Wyoming CarbonSAFE:

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

DE-FE00311891

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University of Wyoming
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August-17-19 2020

THE WORLD NEEDS MORE COWBOYS.

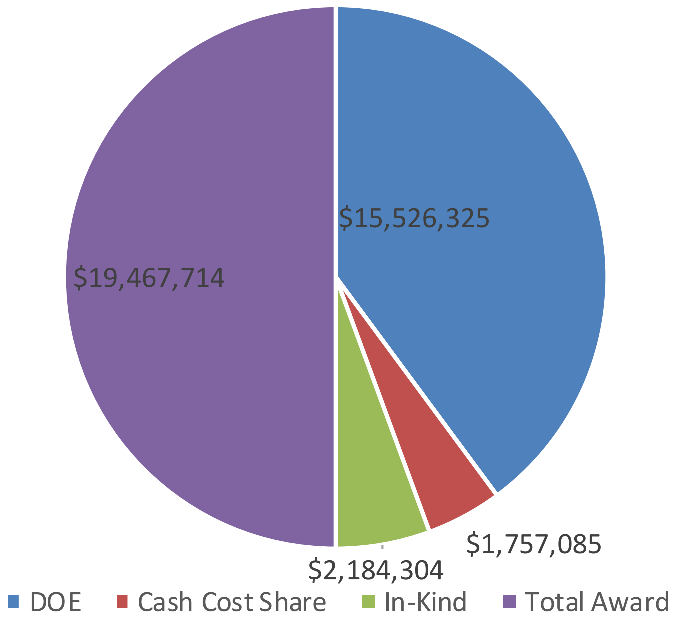
University of Wyoming | School of Energy Resources

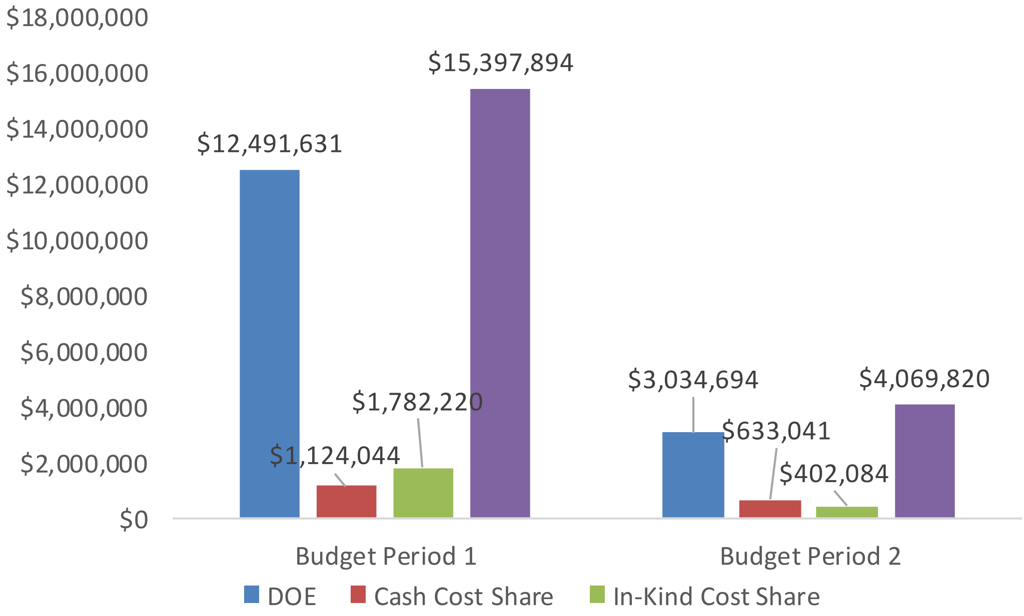
Program Overview

Phase III project period from October 1st, 2020 to September 30th, 2023

Funding

BP1=24 months, BP=12 months





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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:
- Schlumberger Carbon Services
- Denbury Resources
- Oxy Low Carbon Ventures
- Carbon GeoCycle

Permitting, Environmental and Regulatory Experts:
- Long Reimer Winegar, LLP
- Trihydro Corporation

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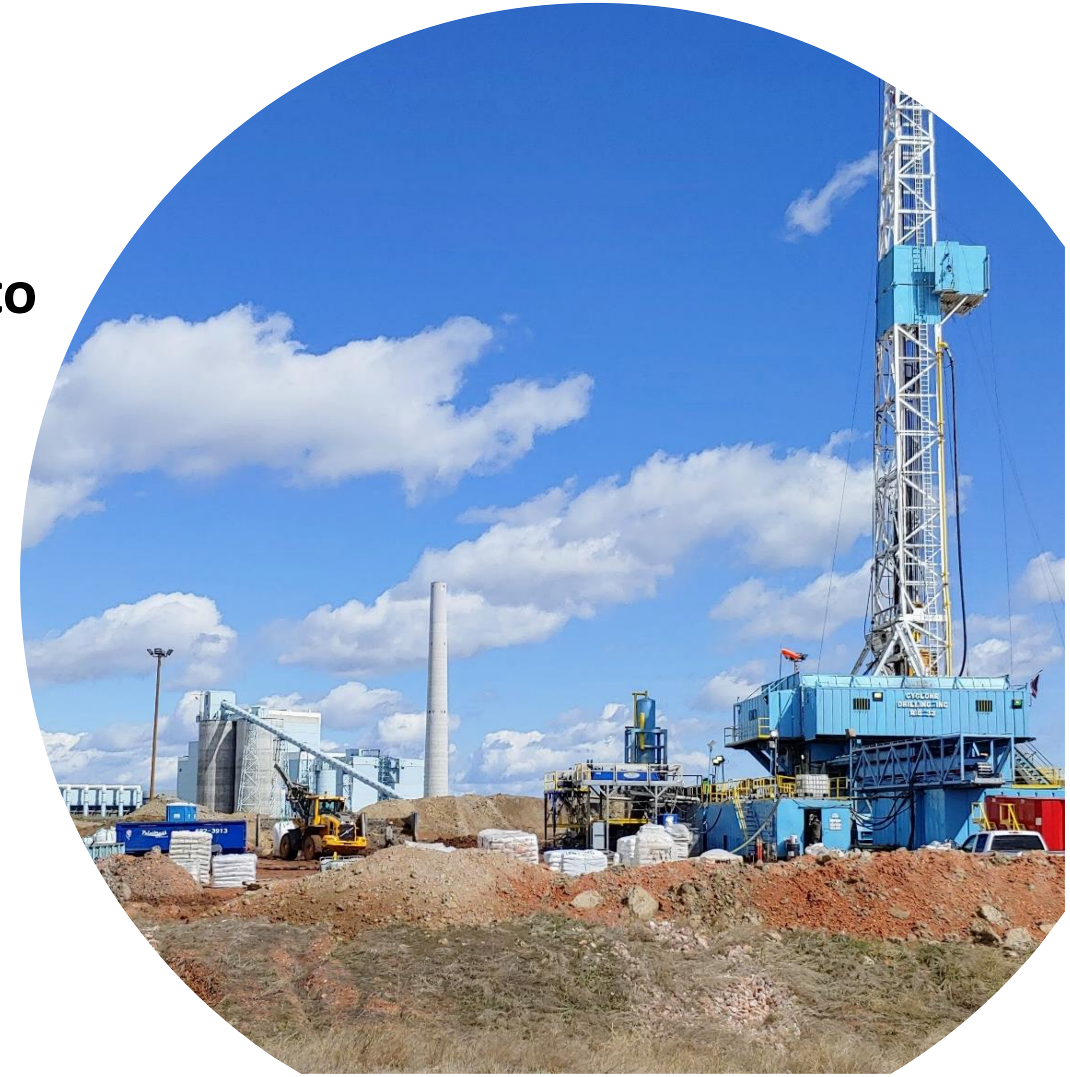
Project Objectives

1. Finalize site characterization

2. Complete Class VI permitting to construct

3. Integrate MTR's CO_2 capture assessment

4. Conduct NEPA analysis



Technology Section

Study site: CO2 Source and Capture

1. **Wyoming:**
- ✓ CCUS legal Framework
- ✓ Statewide CO_2 transportation network
- ✓ Class VI Primacy (pending final approval)

2. Dry Fork Station:
- ✓ Built in 2007, on-line in 2011
- ✓ 385 MW Coal-fired plant
- ✓ 3.3 Million tons of CO_2/year
- ✓ Operating life span through 2070

BASIN ELECTRIC POWER COOPERATIVE
A Touchstone Energy® Cooperative

3. Wyoming Integrated Test Center:
- ✓ Commercial-Scale Front-End Engineering Study for MTR's Membrane CO_2 Capture Process (DE-FE0031846)
- ✓ UKY-CAER Heat-Integrated Transformative CO_2 Capture Process for Pulverized Coal Power Plants (DE-FE0031583)
- ✓ Novel Next Generation Sorbent System for Post-Combustion CO_2 Capture – TDA Research, Inc. (DE-FE0031734)
- ✓ Kawasaki Heavy Industries and JCOAL novel solid technology

ITC WYOMING INTEGRATED TEST CENTER

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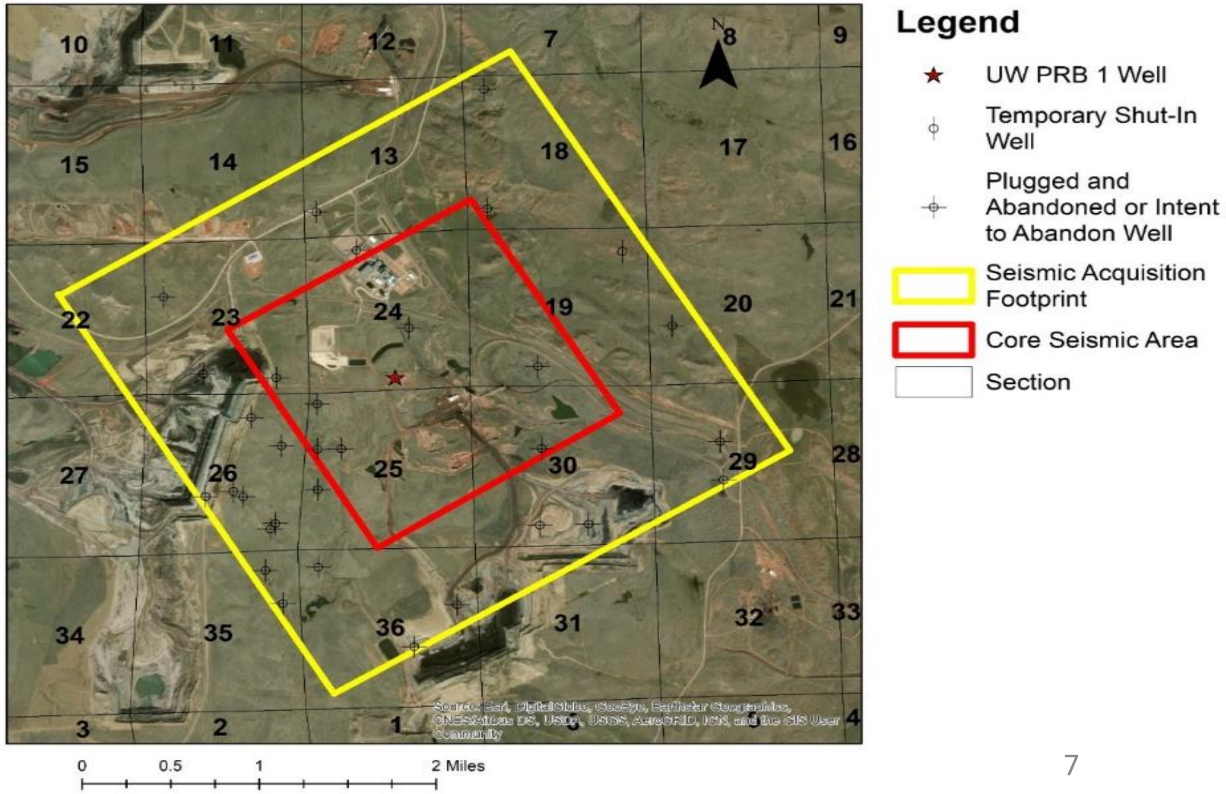
Study site: Site Characterization

- ✓ Phase 1 Integrated CCS Pre-Feasibility - Completed
- ✓ Phase 2 Storage Complex Feasibility – In-progress
  - Field Operations
    - Legacy 2D Seismic evaluation (6 regional lines)
    - 9,875.0’ stratigraphic test well
      - Designed to meet future commercial goals
    - Collected and analyzed 625’ of core from seal/reservoir intervals
    - Collected and analyzed fluid samples from all target injection intervals
    - 3D seismic centered on the well location (see figure)
  - Modeling and Simulations using Field Data
  - Economic, Legal and Regulatory Assessments
  - Permitting Analysis
  - MVA
  - Risk Assessment
  - Public Outreach
  - Commercial Interoperability Assessment
  - Integrated Commercial Strategy



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Study site: Economic benefits

<u>Integration of capture, transport and storage</u>

✓ Wyoming's Carbon Valley:
- Greencore CO2 pipeline
- Existing EOR and undeveloped fields
- Wy-ITC: Carbon capture and utilization research
- Investments in CO_2 to products
- Wyoming innovation center: For coal to products and coal derived rare earth element testing

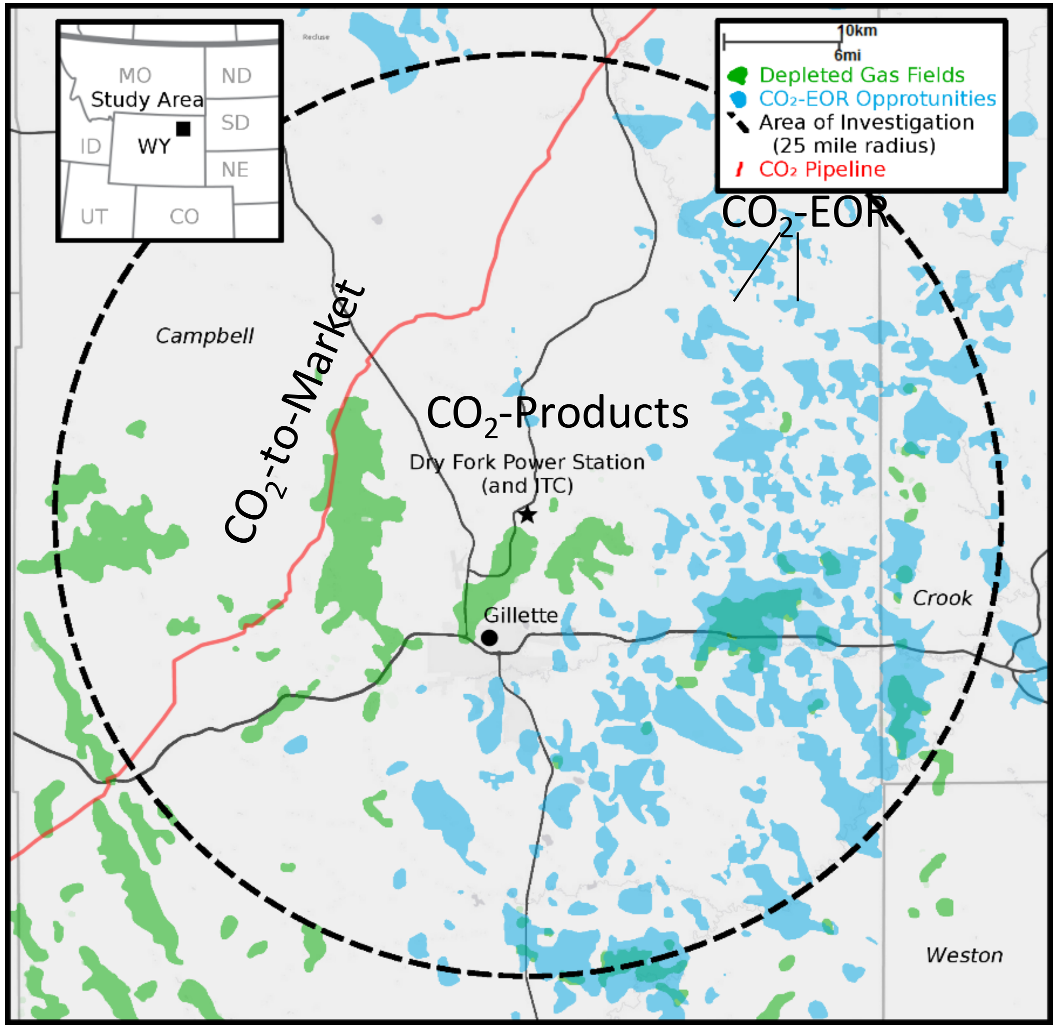
<u>Minimized economic risk</u>

✓ 45Q analysis

✓ Current partners have local interests

✓ Dry Fork Station: economic, technologically advanced, long life span

✓ Wyoming CCUS regulatory framework is in-place, and the State is nearing Class VI primacy



Technical Approach

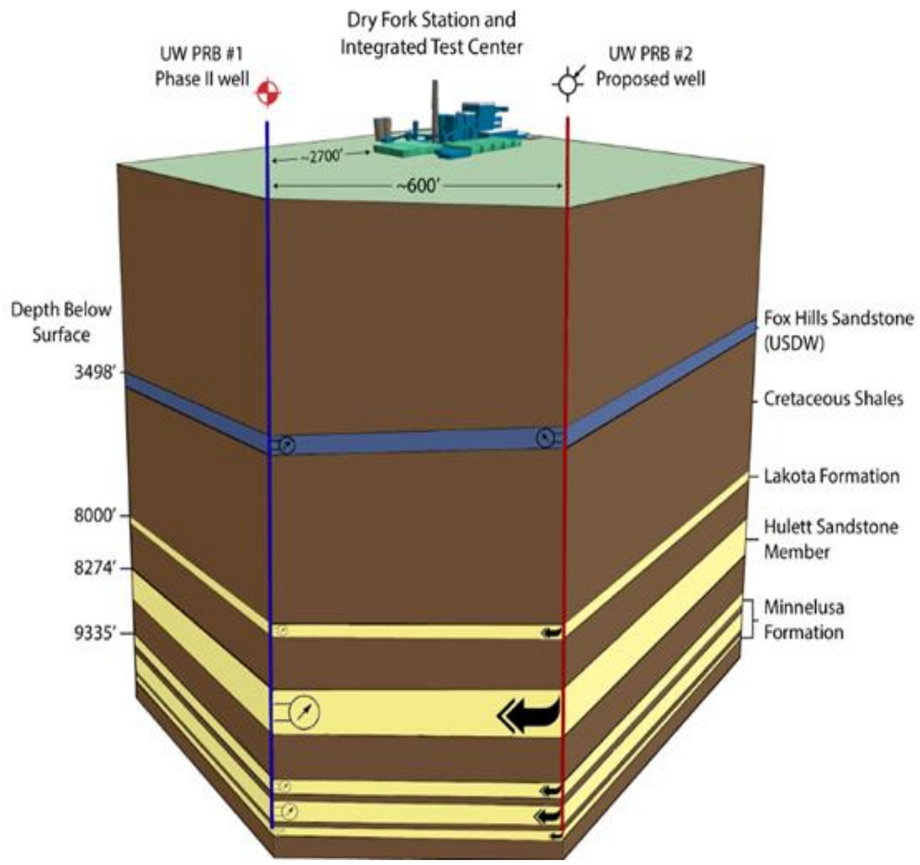
Scope of work

1. Environmental and CO_2 capture assessment

2. Field operations and technical research

3. Class VI permitting, business, economics, and outreach

4. CCUS commercialization plan



Schedule, Success Criteria and Project Risks

Project schedule

- ✓ Budget Period 1 (Months 1-24)
  - Implement public outreach plan
  - Conduct NEPA assessment
  - Integrate CO_2 capture analysis
  - Conduct field activities and data collection
  - File Class VI applications
  - Begin subsurface data analysis
  - Risk assessment and mitigation
- ✓ Budget Period 2 (Months 25-36)
  - Complete subsurface data analysis
  - Complete modeling and simulation
  - Finalize MVA plan
  - Prepare commercialization strategy

Success Criteria

- ✓ Completion of NEPA assessments
- ✓ Submission and approval for all necessary permitting prior to operations
- ✓ Drilling, testing and completion of both wells
- ✓ Submission of all Class VI permits-to-construct (necessitates successful completion of characterization activities)
- ✓ Quantifiable positive response to outreach activities
- ✓ Realized commercialization plans

Project Risks and Mitigation

- ✓ Risks and mitigation strategies provided in Appendix A

Progress and current status of the project

Project Status: Field Operations Data Collection

- UW PRB#1 was permitted as a stratigraphic test well and spud on April 12th, 2019.
- 3D Seismic Acquisition begins August 20th, 2020.

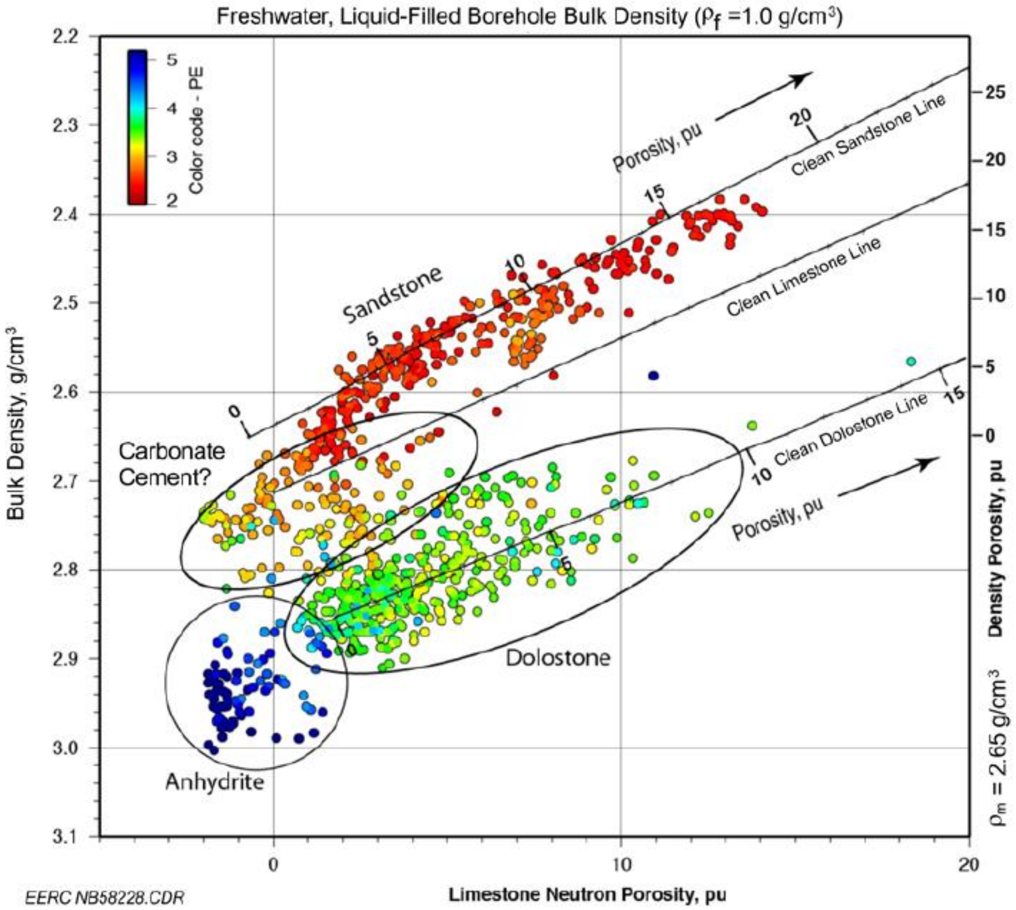
Project Status: Laboratory Analysis

Analytical work (UW)

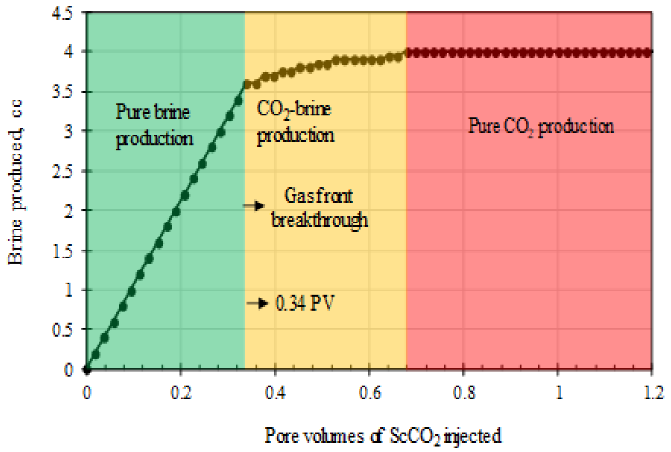
- ✓ Reservoir fluid analysis:
- ✓ Core analysis:
- ✓ Petrophysical and 2D seismic analysis
- ✓ 3D in-acquisition

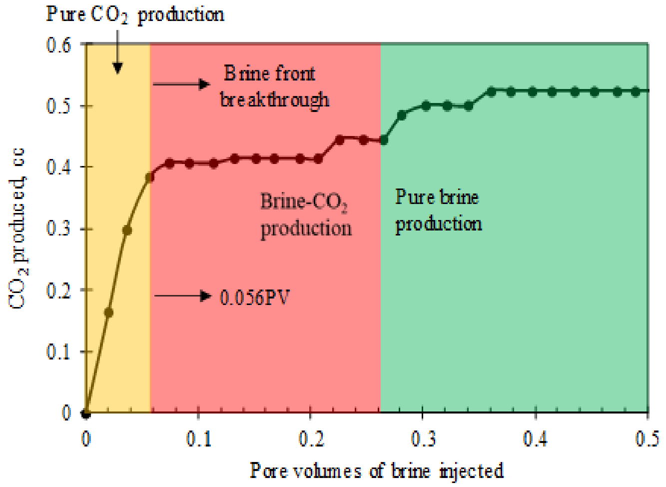
Summary of findings

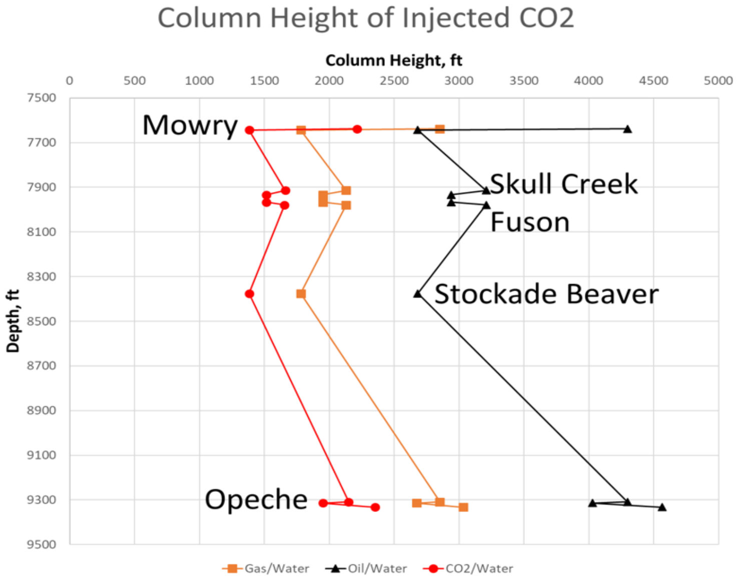
- ✓ Two high priority injection targets
- ✓ All reservoirs exceed 10,000 ppm TDS
- ✓ Seals are continuous, reservoirs are locally confined
- ✓ Stacked storage is achievable



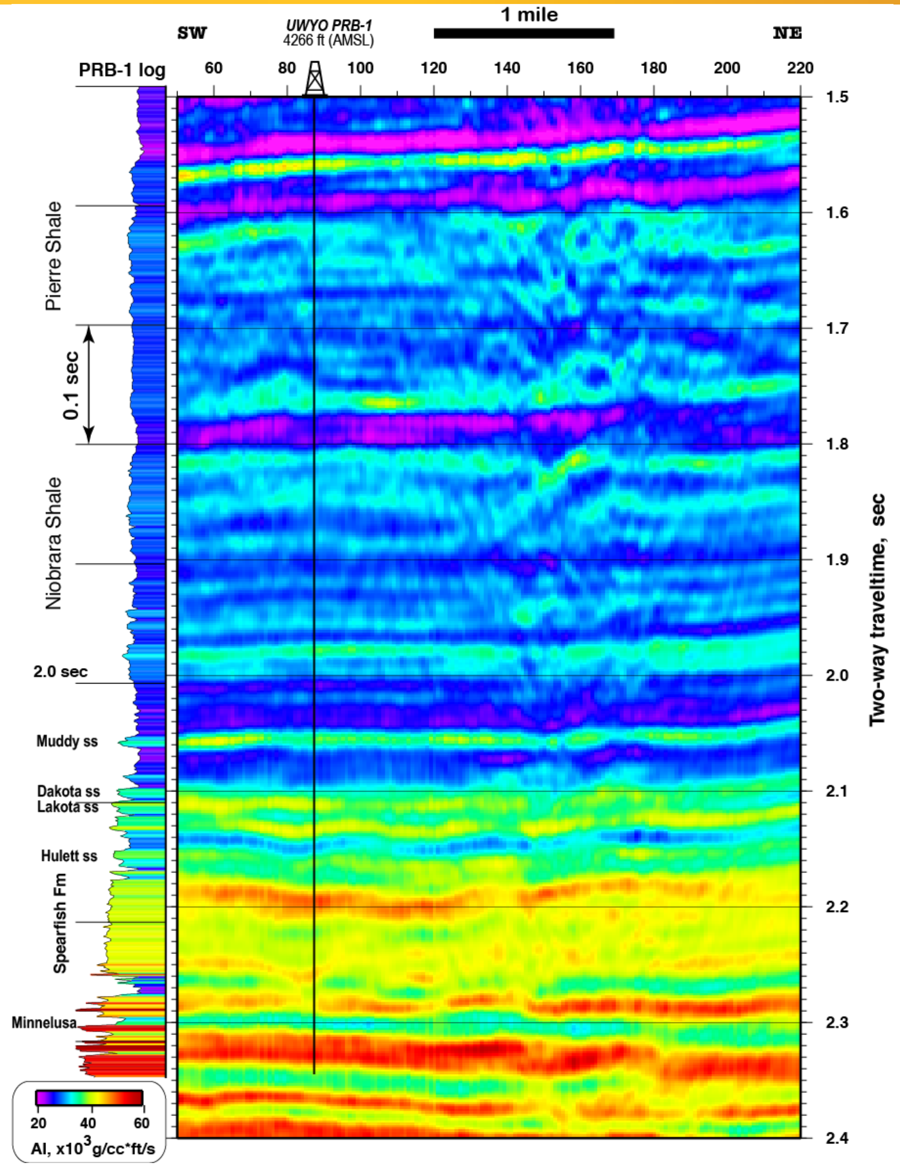
Project Status: Laboratory Analysis



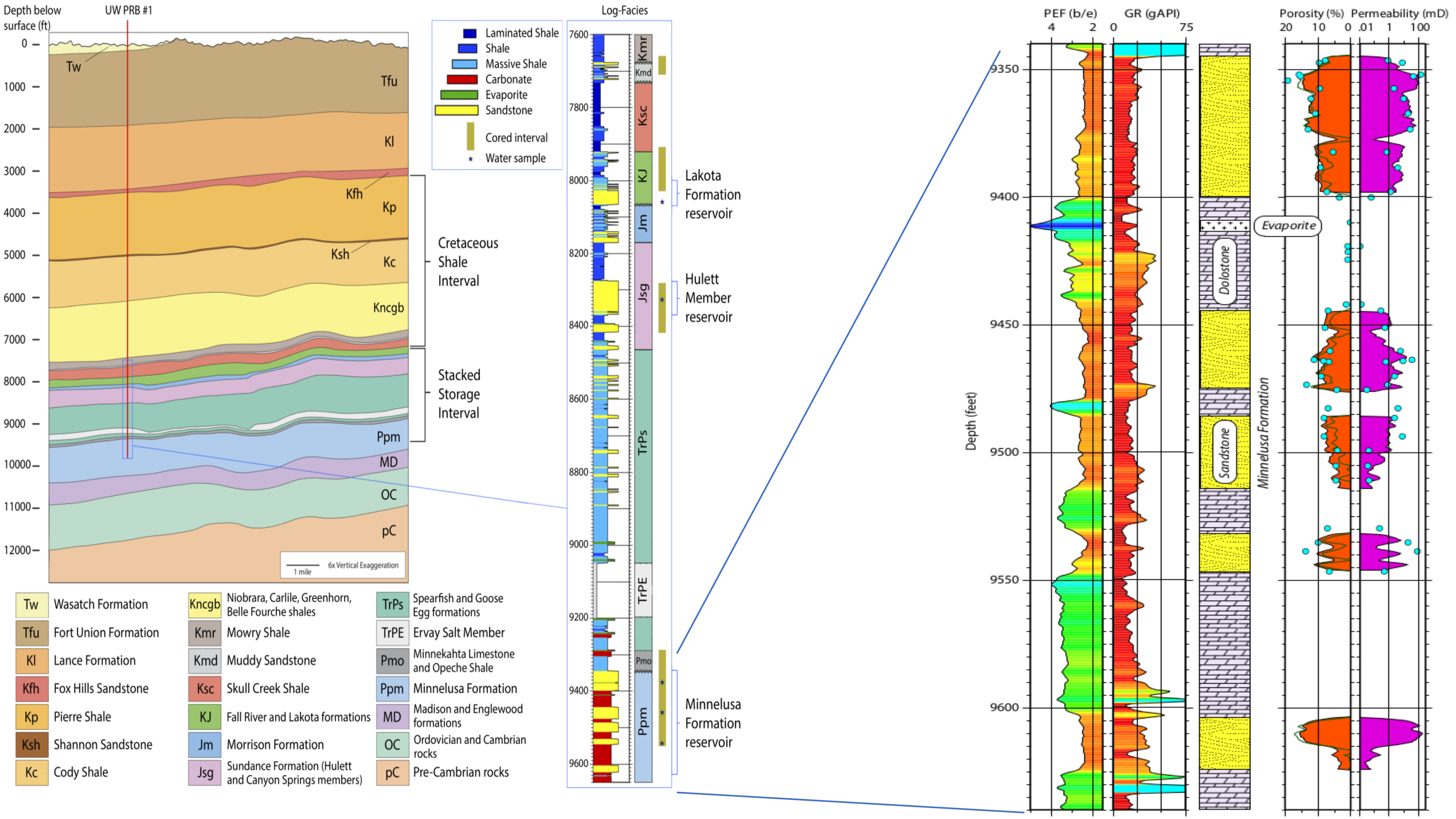




Sample	Depth	TDS (mg/L)	Temperature
Lakota	8060ft	68,658	82.9 C
Hulett	8330ft	113,656	85.8 C
Minnelusa "B"	9380ft	110,203	89.1 C
Minnelusa "C"	9463ft	64,878	91.9 C
Minnelusa "D"	9544ft	111,179	95.1 C
Minnelusa "D"	9544ft	110,575	95.1 C



Project Status: Laboratory Analysis

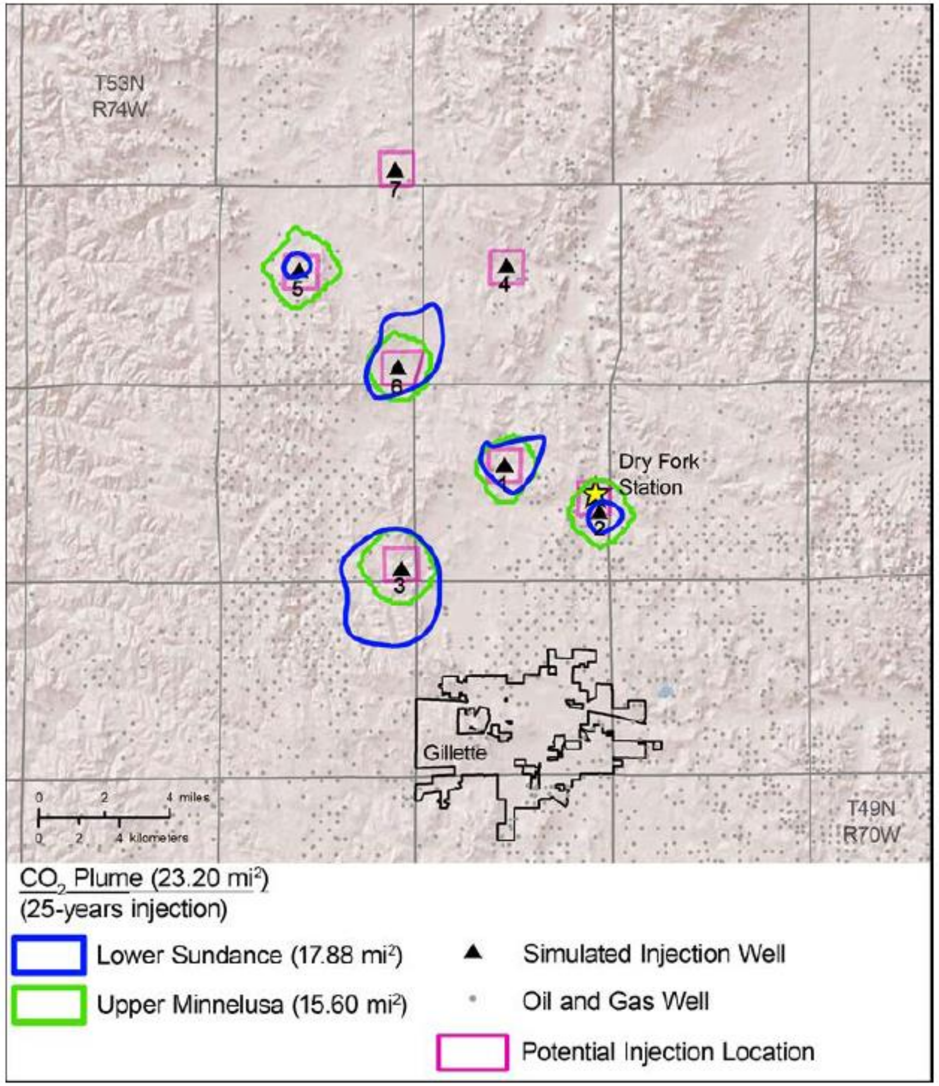


Project Status: Modeling and Simulation

Modeling and simulations (EERC, ARI, UW) :

- ✓ NRAP Models
- ✓ Facies Distributions
- ✓ Petrophysical Property Distributions
- ✓ Numerical Simulation
- ✓ AOR Determination

Location	Sundance Stored CO_2, MT	Minnelusa Stored CO_2, MT	Total Stored CO_2, MT
1	2.9	5.4	8.3
2 (UW PRB 1)	0.9	6.8	7.7
3	8.5	9.1	17.6
4	-	-	-
5	0.6	7.5	8.1
6	5.2	6.8	12.0
7	-	-	-
Total	18.1	35.6	53.7



Project Status: Risk Assessment

Risk Assessment (EERC)

✓ Based on:

- Stacked storage
- Technical risks include injectivity, capacity and containment
- Non-technical risks include economics, social factors, regulatory, acts of god
- Wyoming specific Class VI risk matrix (Ch.24)

Risk Register

Risk No.	Principal Risk Category	Risk Descriptions
Subsurface Technical Risks		
01.A	Injectivity	Injectivity into both storage units for the project (Storage Unit 1 [Lower Sundance Formation] and Storage Unit 2 [Upper Minnelusa Formation]) is insufficient to accept a minimum injection rate of 2 million metric tons (MMT) (across the 10 injection locations) of captured CO_2 per year during the 25-year period of operation.
01.B		Injectivity into Storage Unit 1 (Lower Sundance Formation) (across the five injection locations) is insufficient to accept the minimum injection rate in support of the overall goal of 2 MMT per year of CO_2 per year during the 25-year period of operation.
01.C		Injectivity into Storage Unit 2 (Upper Minnelusa Formation) (across the five injection locations) is insufficient to accept the minimum injection rate in support of the overall goal of 2 MMT per year of CO_2 per year during the 25-year period of operation.
02.A	Storage Capacity	Storage capacity of both storage units (Storage Unit 1 [Lower Sundance Formation] and Storage Unit 2 [Upper Minnelusa Formation]) is insufficient to store the target storage volume of at least 50 MMT of CO_2 at the end of the 25-year period of operation.
02.B		Storage capacity of Storage Unit 1 (Lower Sundance Formation) is insufficient to store the target volume for this formation in support of the overall goal of 50 MMT of CO_2 at the end of the 25-year period of operation.
02.C		Storage capacity of Storage Unit 2 (Upper Minnelusa Formation) is insufficient to store the target volume for this formation in support of the overall goal of 50 MMT of CO_2 at the end of the 25-year period of operation.
02.D		Discovery of recoverable minerals after CO_2 injection has commenced reduces the pore space available for the storage of CO_2 within either storage unit such that the storage capacity is insufficient to store the target storage volume of at least 50 MMT of CO_2 at the end of the 25-year period of operation.
02.E		New technology (or economic conditions) after CO_2 injection has commenced enables the recovery of previously unrecoverable minerals, reducing the pore space available for the storage of CO_2 within either storage unit such that the storage capacity is insufficient to store the target storage volume of at least 50 MMT of CO_2 at the end of the 25-year period of operation.
03.A	Containment – Lateral migration of CO_2	CO_2 moves laterally beyond the permitted Area of Review (AoR) for Storage Unit 1 (Lower Sundance Formation).
03.B		CO_2 moves laterally within Storage Unit 1 (Sundance Formation) and negatively influences existing mineral zones, e.g., coal mining.
03.C		CO_2 moves laterally beyond the permitted Area of Review (AoR) for Storage Unit 2 (Upper Minnelusa Formation).
03.D		CO_2 moves laterally within Storage Unit 2 (Upper Minnelusa Formation) and negatively influences existing mineral zones, e.g., coal mining.
03.E		CO_2 moves vertically from Storage Unit 1 (Lower Sundance Formation) and then migrates laterally within the Inyan Kara Group beyond the permitted Area of Review (AoR).
03.F		CO_2 moves vertically from Storage Unit 1 (Lower Sundance Formation) and then migrates laterally within the Inyan Kara Group beyond the permitted Area of Review (AoR) and negatively influences existing mineral zones, e.g., coal mining.
03.G		CO_2 moves vertically from Storage Unit 2 (Upper Minnelusa Formation) and then migrates laterally within the Goose Egg Formation beyond the permitted Area of Review (AoR).
03.H		CO_2 moves vertically from Storage Unit 2 (Upper Minnelusa Formation) and then migrates laterally within the Inyan Kara Group beyond the permitted Area of Review (AoR) and negatively influences existing mineral zones, e.g., coal mining.
04.A	Containment – Pressure Propagation	Subsurface pressure impacts extend beyond the permitted Area of Review (AoR) for Storage Unit 1 (Lower Sundance Formation).
04.B		Subsurface pressure impacts in Storage Unit 1 (Lower Sundance Formation) negatively impact adjacent mineral zones.
04.C		Subsurface pressure impacts extend beyond the permitted Area of Review (AoR) for Storage Unit 2 (Upper Minnelusa Formation).
04.D		Subsurface pressure impacts in Storage Unit 2 (Upper Minnelusa Formation) negatively impact adjacent mineral zones.
05.A	Containment – Vertical migration of CO_2/formation brine via injection wells	CO_2 or formation brine moves vertically up the injection well(s) completed in Storage Unit 1 (Lower Sundance Formation) resulting in vertical migration from the storage unit to the surface.
05.B.i		CO_2 or formation brine moves vertically up the injection well(s) completed in Storage Unit 1 (Lower Sundance Formation) resulting in vertical migration from the storage unit to the lowermost USDW (Fox Hills Sandstone).
05.B.ii		CO_2 or formation brine moves vertically up the injection well(s) completed in Storage Unit 1 (Lower Sundance Formation) resulting in vertical migration from the storage unit to the lowermost USDW (Fox Hills Sandstone) and subsequent impacts to one of the regional municipal water supply wells.
05.C		CO_2 or formation brine moves vertically up the injection well(s) completed in Storage Unit 1 (Lower Sundance Formation) resulting in vertical migration from the storage unit to surface water bodies.
05.D		CO_2 or formation brine moves vertically up the injection well(s) completed in Storage Unit 2 (Upper Minnelusa Formation) resulting in vertical migration from Storage Unit 2 to the surface.
05.E.i		CO_2 or formation brine moves vertically up the injection well(s) completed in Storage Unit 2 (Upper Minnelusa Formation) resulting in vertical migration from Storage Unit 2 to the lowermost USDW (Fox Hills Sandstone).
05.E.ii		CO_2 or formation brine moves vertically up the injection well(s) completed in Storage Unit 2 (Upper Minnelusa Formation) resulting in vertical migration from Storage Unit 2 to the lowermost USDW (Fox Hills Sandstone) and subsequent impacts to one of the regional municipal water supply wells.
05.F		CO_2 or formation brine moves vertically up the injection well(s) completed in Storage Unit 2 (Upper Minnelusa Formation) resulting in vertical migration from Storage Unit 2 to surface water bodies.
05.G		CO_2 or formation brine moves vertically up the injection well(s) completed in Storage Unit 2 (Upper Minnelusa Formation) resulting in vertical migration from Storage Unit 1 to the surface.
05.H.i		CO_2 or formation brine moves vertically up the injection well(s) completed in Storage Unit 2 (Upper Minnelusa Formation) resulting in vertical migration from Storage Unit 1 to the lowermost USDW (Fox Hills Sandstone).

Risk No.	Principal Risk Category	Risk Descriptions
05.H.ii		CO_2 or formation brine moves vertically up the injection well(s) completed in Storage Unit 2 (Upper Minnelusa Formation) resulting in vertical migration from Storage Unit 1 to the lowermost USDW (Fox Hills Sandstone) and subsequent impacts to one of the regional municipal water wells.
05.I		CO_2 or formation brine moves vertically up the injection well(s) completed in Storage Unit 2 (Upper Minnelusa Formation) resulting in vertical migration from Storage Unit 1 to surface water bodies.
06.A	Containment – Vertical migration of CO_2/formation brine via other wells	CO_2 or formation brine moves laterally within Storage Unit 1 (Lower Sundance Formation) and intercepts existing wells resulting in vertical migration from Storage Unit 1 to the surface.
06.B.i		CO_2 or formation brine moves laterally within Storage Unit 1 (Lower Sundance Formation) and intercepts existing wells resulting in vertical migration from Storage Unit 1 to the lowermost USDW (Fox Hills Sandstone).
06.B.ii		CO_2 or formation brine moves laterally within Storage Unit 1 (Lower Sundance Formation) and intercepts existing wells resulting in vertical migration from Storage Unit 1 to the lowermost USDW (Fox Hills Sandstone) and subsequent impacts to one of the regional municipal water supply wells.
06.C		CO_2 or formation brine moves laterally within Storage Unit 1 (Lower Sundance Formation) and intercepts existing wells resulting in vertical migration from Storage Unit 1 to surface water bodies.
06.D		CO_2 or formation brine moves laterally within Storage Unit 2 (Upper Minnelusa Formation) and intercepts existing wells resulting in vertical migration from Storage Unit 2 to the surface.
06.E.i		CO_2 or formation brine moves laterally within Storage Unit 2 (Upper Minnelusa Formation) and intercepts existing wells resulting in vertical migration from Storage Unit 2 to the lowermost USDW (Fox Hills Sandstone).
06.E.ii		CO_2 or formation brine moves laterally within Storage Unit 2 (Upper Minnelusa Formation) and intercepts existing wells resulting in vertical migration from Storage Unit 2 to the lowermost USDW (Fox Hills Sandstone) and subsequent impacts to one of the regional municipal water supply wells.
06.F		CO_2 or formation brine moves laterally within Storage Unit 2 (Upper Minnelusa Formation) and intercepts existing wells resulting in vertical migration from Storage Unit 2 to surface water bodies.
06.G		The primary seal above Storage Unit 1 (Upper Sundance Member and Morrison Formation) fails resulting in the vertical movement of CO_2 or formation brine from Storage Unit 1 into the overlying Inyan Kara Group (Lakota Formation and/or Fall River Formation), after which the CO_2 or formation brine move laterally within the Inyan Kara Group and intercept one or more existing wells resulting in vertical migration from the Inyan Kara Group to the near-surface/surface environment (i.e., lowermost USDWs [Fox Hills Sandstone], surface, and/or surface water bodies).
06.H		The primary seal above Storage Unit 2 (Opeche Shale Formation) fails resulting in the vertical movement of CO_2 or formation brine from Storage Unit 2 into the overlying Goose Egg Formation, after which the CO_2 or formation brine move laterally within the Goose Egg Formation and intercepts one or more existing wells resulting in vertical migration from the Goose Egg Formation to the near-surface/surface environment (i.e., lowermost USDWs [Fox Hills Sandstone], surface, and/or surface water bodies).
06.I		Abandoned orphan wells that penetrate the storage complexes, which are not identified prior to injection, fail and result in vertical migration the near-surface/surface environment (i.e., lowermost USDWs [Fox Hills Sandstone], surface, and/or surface water bodies).
07.A	Containment – Vertical migration of CO_2/formation brine via inadequate seals	The primary seal above Storage Unit 1 (Upper Sundance Member and Morrison Formation) fails resulting in the vertical movement of CO_2 or formation brine beyond the AoR of Storage Unit 1 (Lower Sundance Formation).
07.B		The primary seal above Storage Unit 1 (Upper Sundance Member and Morrison Formation) and additional seals above the Inyan Kara Formation (Skull Creek Shale and Upper Cretaceous Shales) fail resulting in the vertical movement of CO_2 or formation brine from Storage Unit 1 (Lower Sundance Formation) to the near-surface/surface environment (i.e., surface, lowermost USDWs [Fox Hills Sandstone], and/or surface water bodies).
07.C		The primary seal above Storage Unit 2 (Opeche Shale) fails resulting in the vertical movement of CO_2 or formation brine beyond the AoR of Storage Unit 2 (Upper Minnelusa Formation).
08.A	Induced seismicity	CO_2 injection into Storage Unit 1 (Lower Sundance Formation) induces seismicity resulting in a seismic event that is felt by local residents.
08.B		CO_2 injection into Storage Unit 2 (Upper Minnelusa Formation) induces seismicity resulting in a seismic event that is felt by local residents.

Risks of Wyoming Risk Activity Table Not Addressed in Risk Register		
1.4, 2.4, 3.7, 4.8	Act of God (seismic event)	Difficult to score and beyond the scope of our risk assessment.
3.3	Well blowout, including monitoring wells	We are looking at storage risks not drilling risks.
5.2	Post injection decision (e.g., due to new technology or changed economic conditions) to store gas in adjacent pore space	??
5.3	Acts of God affecting storage capacity of pore space	Difficult to score and beyond the scope of our risk assessment.
3.6	Sabotage/Terrorist Attack (e.g., on surface infrastructure)	Difficult to score and beyond the scope of our risk assessment.
8.1	Surface infrastructure damage	New risks added to focus only on CO_2 storage and pipelines for the transfer from the capture facility to the storage complex.
8.2	Saline water releases from surface storage impoundment	There is current no surface impoundment planned for this particular CCS project.

End of document

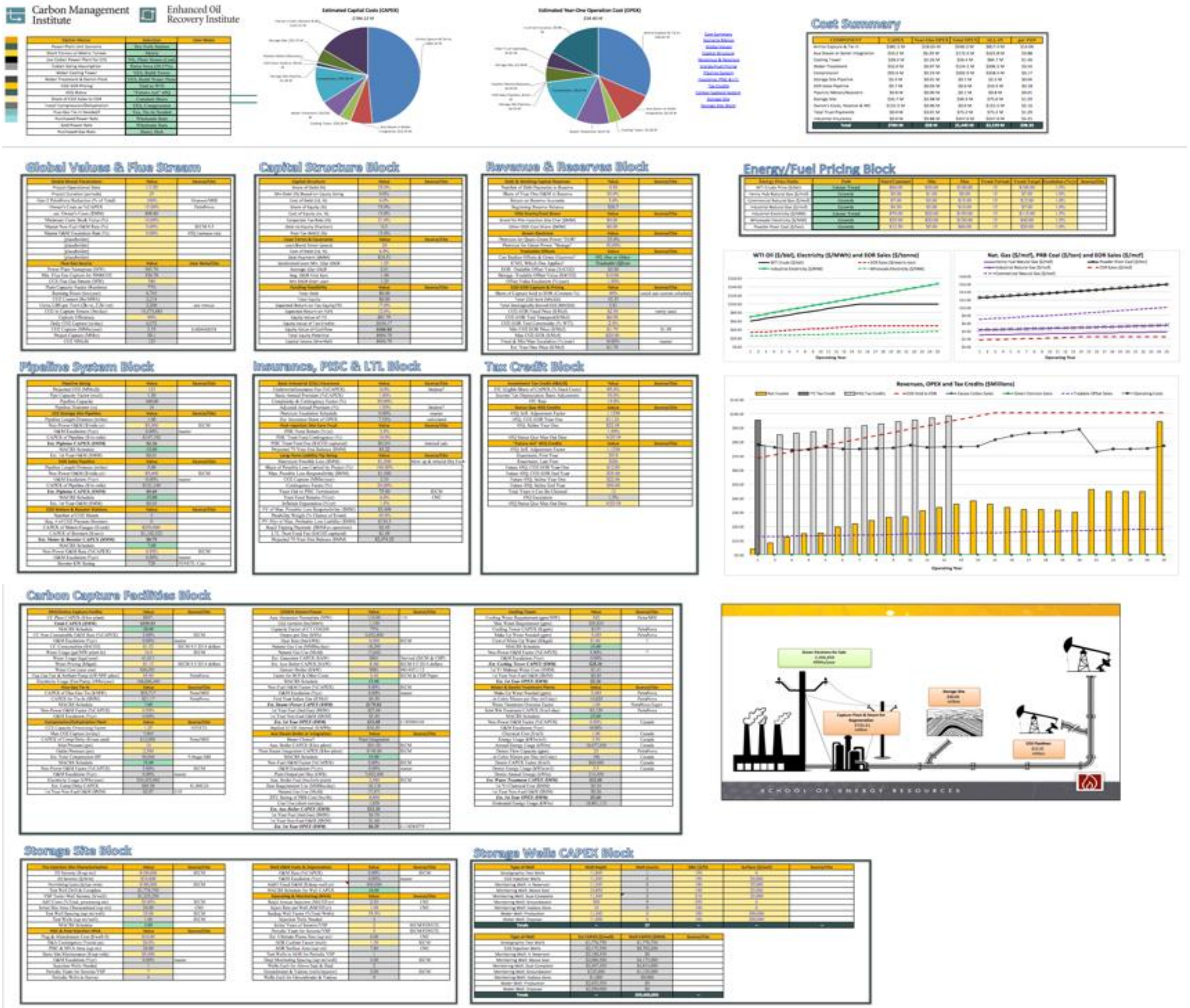
Project Status: Economic Model

Economic Modeling (UW COB)

Based on:

- Integrated Environmental Control Model (IECM 9.5, 2017, Carnegie Mellon/NETL)
- FE/NETL CO2 Saline Storage Cost Model (NETL 2017),
- Publicly available details on amine capture

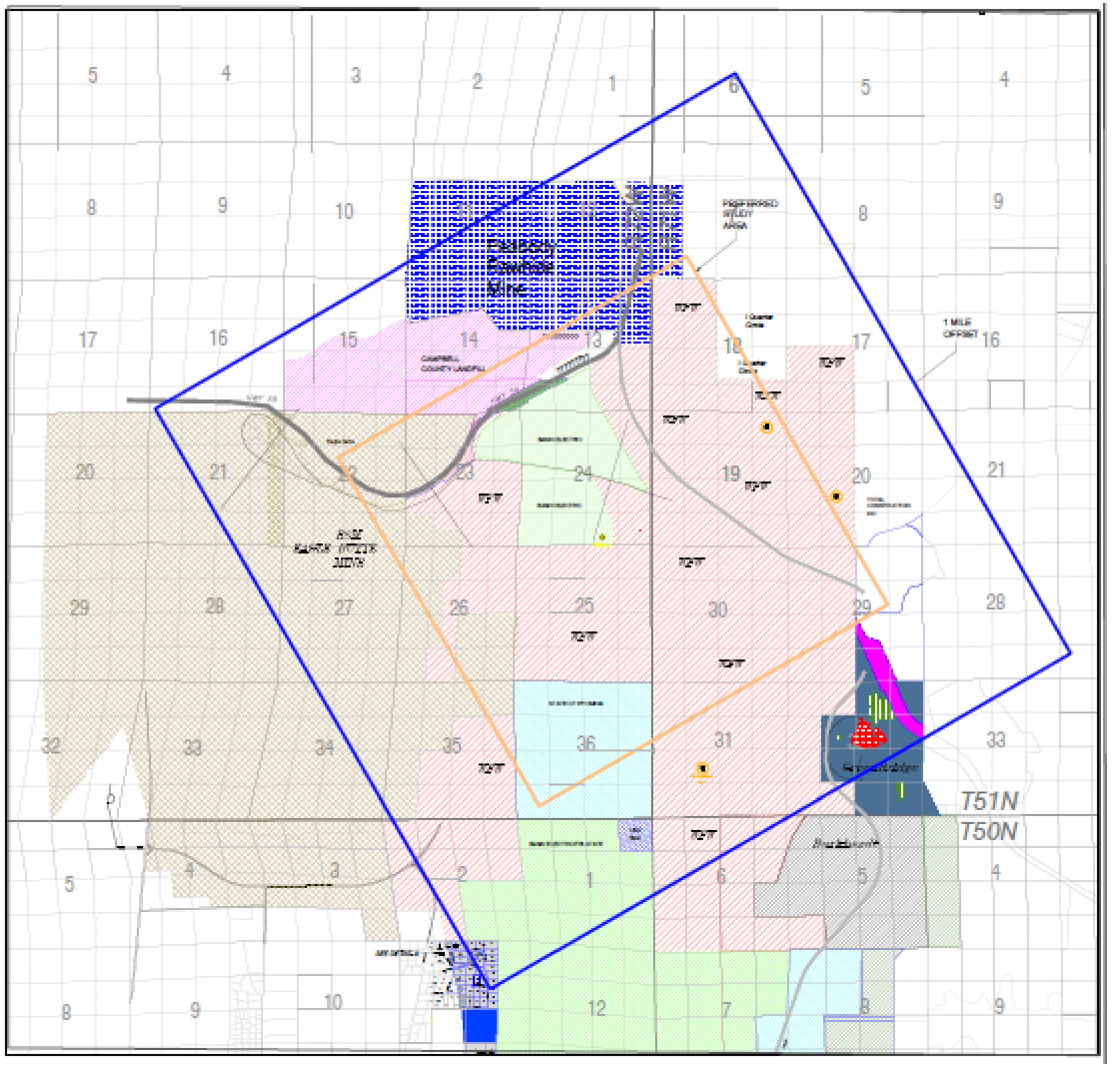
- Economic impact analysis
- Need update MTR technology



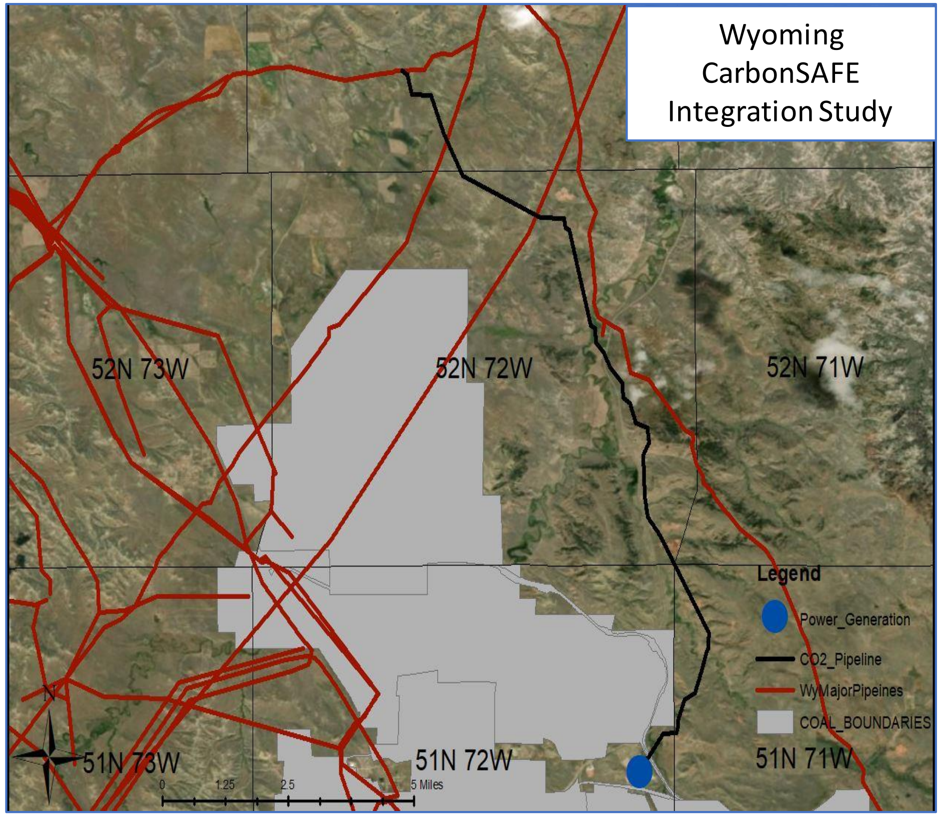
Project Status: Legal and Regulatory Analysis

<u>Legal and regulatory analysis (UW)</u>

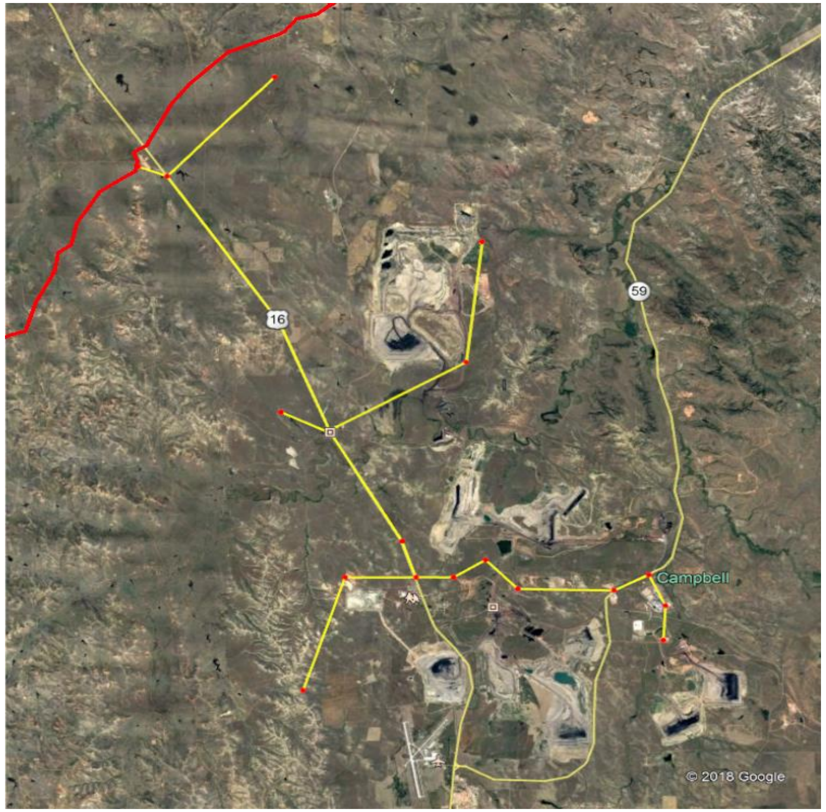
- ✓ Class VI Permitting Analysis
- ✓ Preliminary title abstract for pore space ownership
- ✓ Impacts of anticipated Federal and State regulations
- ✓ Developing model project agreements.
- ✓ Developing potential business agreements
- ✓ Developed integrated pipeline networks



Project Status: CO_2 Storage Hub Build-Out



DFS Direct Integrated Route: 10 landowners and 12 parcels of land. Pipeline length of 13.2 miles.

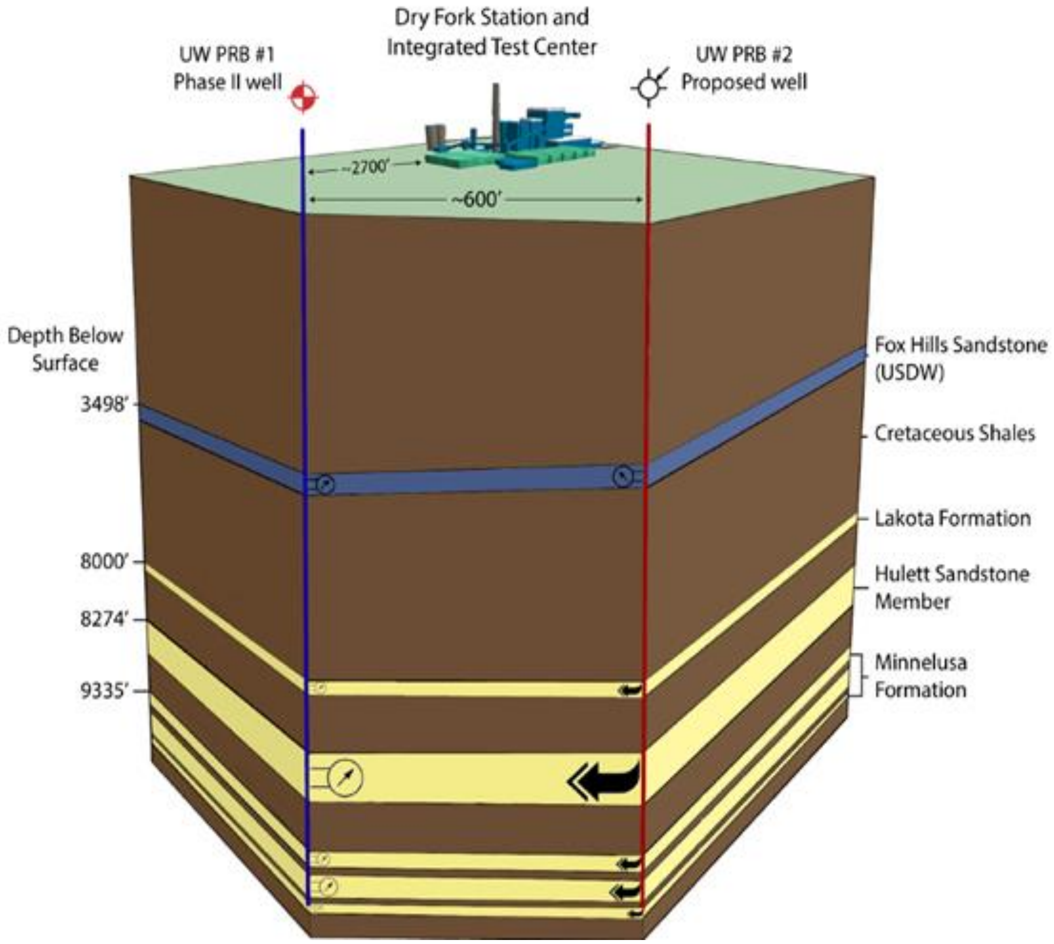


Wyoming CarbonSAFE Storage Complex Integrated Route: Spurs to all sites, longest pipeline span of 17 miles.

Project Status: Status of Host Site

Status of host site

- ✓ UW PRB#1 Closed and TA
- ✓ MTR developing FEED study
- ✓ UK, TDA, JCOAL Large-Scale Capture Pilot
- ✓ Dry Fork Station good economic standing and planned to continue operations through 2070



Project Status: Remaining Research Gaps

Gaps/Challenges/Hurdles:

- ✓ First Class VI application for the Wyoming Department of Environmental Quality
- ✓ Understand injectivity, pressure response to injection, geologic heterogeneity
- ✓ NEPA analysis
- ✓ Site specific cost of capture

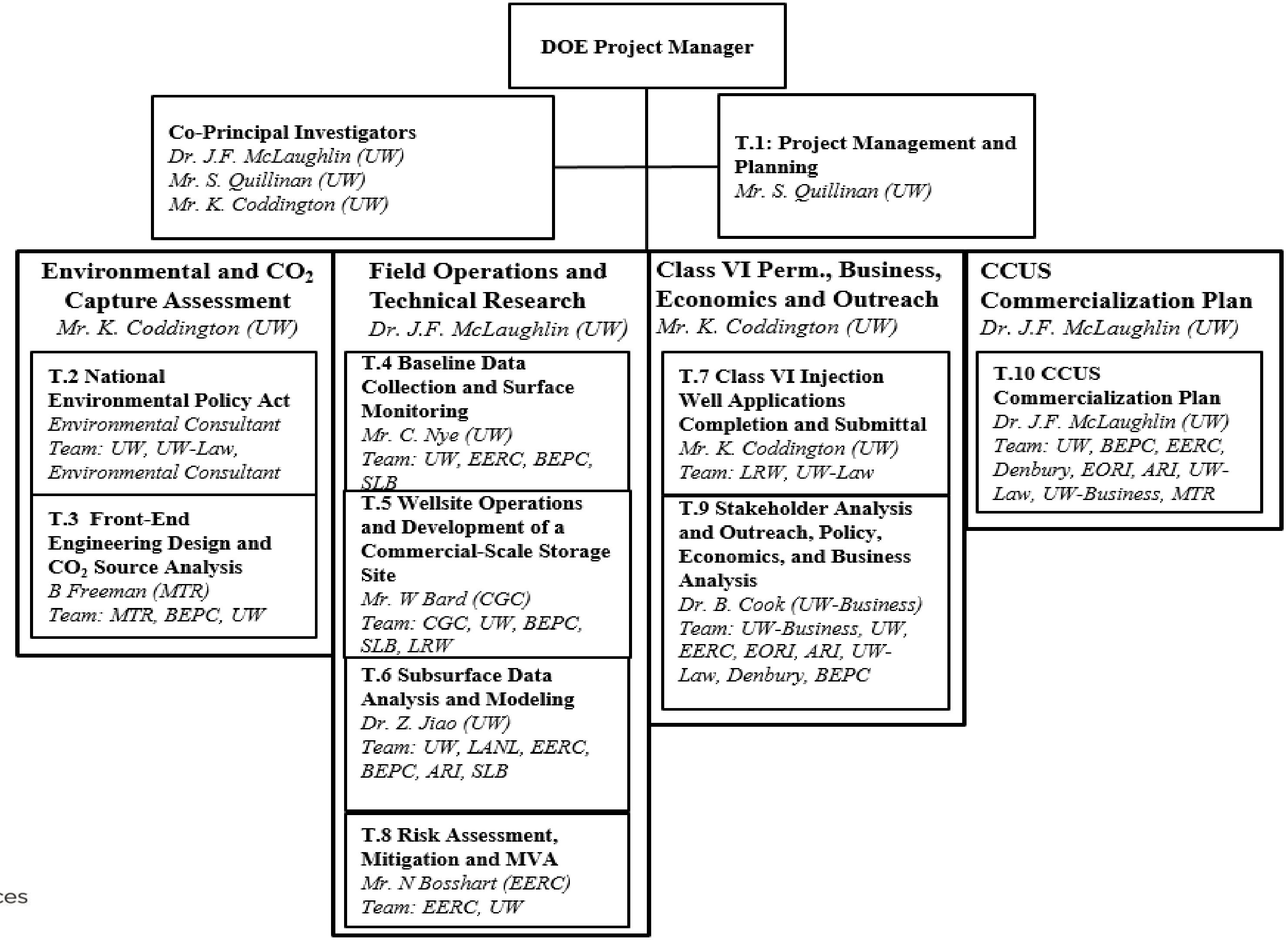
Summary

Project Summary

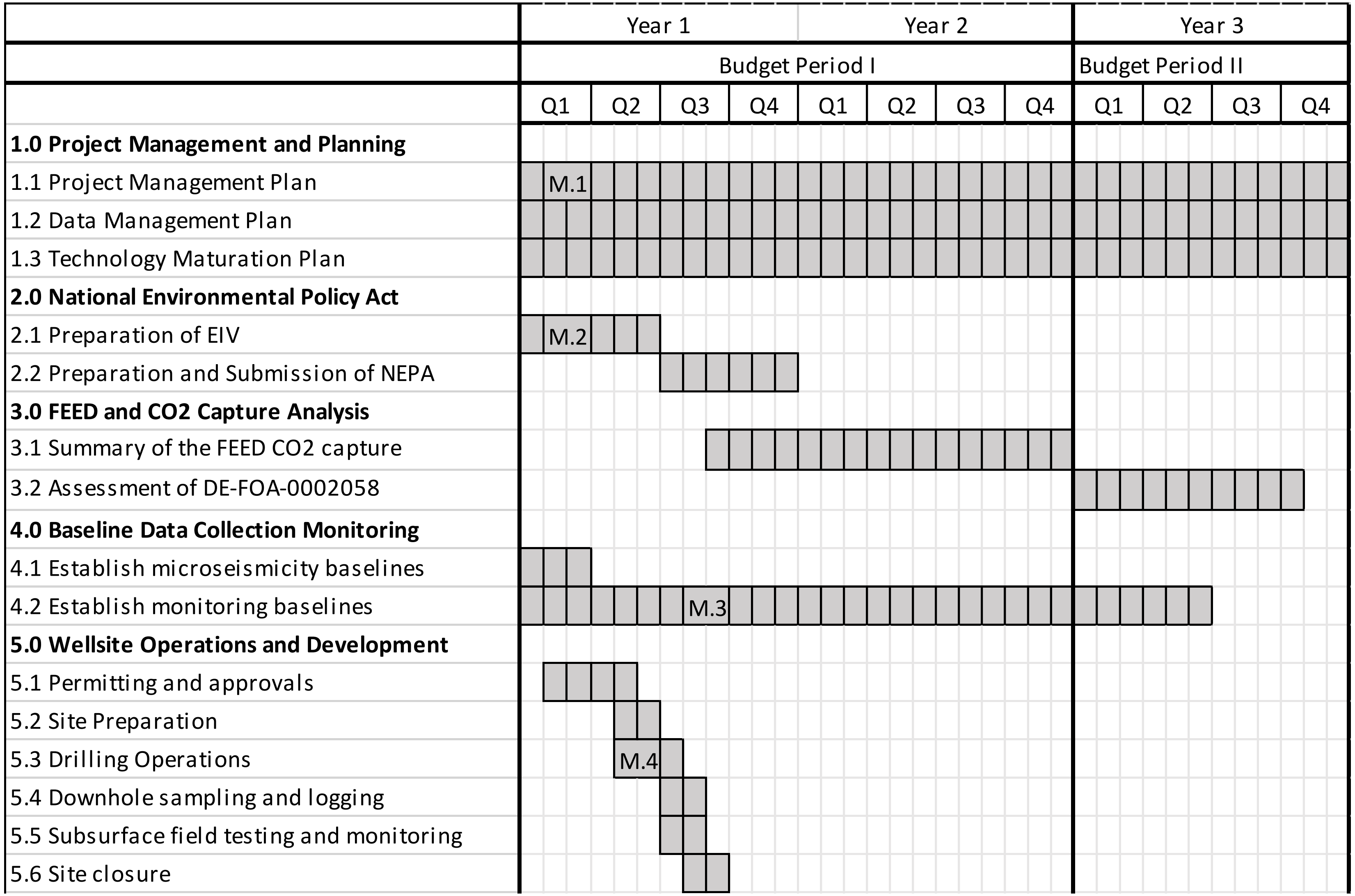
Phase III will finalize characterization of the Wyoming CarbonSAFE storage complex, integrate MTR's capture technology with CarbonSAFE objectives, address all Class VI permitting needs, and finalize commercial operational strategies. Wyoming CarbonSAFE Phase III will advance the commercialization of CCUS in Wyoming.

Appendix

Organization Chart



Gantt Chart



Year 1
Year 2
Year 3
Budget Period I
Budget Period II
Q1
Q2
Q3
Q4
Q1
Q2
Q3
Q4
Q1
Q2
Q3
Q4
1.0 Project Management and Planning
1.1 Project Management Plan
M.1
1.2 Data Management Plan
1.3 Technology Maturation Plan
2.0 National Environmental Policy Act
2.1 Preparation of EIV
M.2
2.2 Preparation and Submission of NEPA
3.0 FEED and CO2 Capture Analysis
3.1 Summary of the FEED CO2 capture
3.2 Assessment of DE-FOA-0002058
4.0 Baseline Data Collection Monitoring
4.1 Establish microseismicity baselines
4.2 Establish monitoring baselines
M.3
5.0 Wellsite Operations and Development
5.1 Permitting and approvals
5.2 Site Preparation
5.3 Drilling Operations
M.4
5.4 Downhole sampling and logging
5.5 Subsurface field testing and monitoring
5.6 Site closure

Gantt Chart cont.

	Year 1				Year 2				Year 3			
	Budget Period I								Budget Period II			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
6.0 Subsurface Data Analysis and Modeling												
6.1 Subsurface data analysis												
6.2 Process and interpret seismic 3D survey												
6.3 Complete models of geological structure and properties							M.5					
6.4 Update numerical injection simulations												
6.5 Geomechanical modeling												
6.6 Machine Learning												
6.7 NRAP risk assessment of legacy wellbores												
7.0 Class VI Injection Well Applications												
7.1 Permitting technical data and plans	M.6											
7.2 Other permit data and filing of applications			M.7									
7.3 Technical review of engineering standards												
8.0 Risk Assessment, Mitigation and MVA												
8.1 Risk Assessment and Mitigation										M.8		
8.2 Finalize an MVA Plan												
9.0 Stakeholder Analysis and Outreach, Policy, Economics, and Business Analysis												
9.1 Stakeholder Analysis and Public Outreach			M.9									
9.2 Regulatory and policy assessment												
9.3 Finalize commercial business plan												
9.4 Implementation of the business plan										M.10		
9.5 Preparation of a staged build-out plan												
10 CCUS Commercialization Plan												

Project Risks and Mitigation

Perceived Risk	Risk Rating			Mitigation/Response Strategy
	Probability	Impact	Overall	
	(Low, Med, High)			
Financial Risks:				
Drilling expenses	Med	Med	Med	Inherent to all drilling operations, rig rental rates are subject to the market price of oil. If rates increase, the co-PIs will look for ways to absorb costs in other areas of the project.
Cost/Schedule Risks:				
Project timeline	Low	Low	Low	The Project timeline was developed based on the experienced gained form previous projects of this scale. Though risk low, the Project team will communicate with the DOE project manager if modifications are required.
Technical/Scope Risks:				
NEPA assessments	Low	High	Low	Preparation of Environmental Information Volumes (EIV) and related NEPA documents are standard practice. UW will select an environmental consultant with a proven record of accomplishment of EIVs.
Drilling and field operations	Low	High	Low	Drilling challenges will be addressed through the team's prior experience with drilling operations and the selection of experienced contractors.
Data collection	Low	High	Low	The team has extensive experience performing fieldwork in the PRB and has successfully collected the types of data necessitated for this project.
Subsurface modeling	Low	Low	Low	CEGR, EERC and ARI have extensive experience with the industry-standard software packages that will be used during this Project.
Class VI well permitting	Low	High	Med	WYDEQ is anticipated to receive Class VI primacy in 2020. The Project team has collaborated closely with WYDEQ on permitting strategies under all foreseeable scenarios.
CO_2 source commitment	Low	High	Low	As demonstrated by the CO_2 source commitment letters, BEPC (source) and MTR (capture) can provide the CO_2 for successful implementation of future phases.
Management, Planning and Oversight Risks:				
Project Management	Low	High	Low	Risks are negligible due to the team's collective experience in projects of this type.
ES&H Risks:				
Operation of the drilling rig	Low	High	Low	All physical activities, including drilling, will be overseen in compliance with applicable federal and State laws. Individuals engaged in activities will receive training.
External Factor Risks:				
Site access	Low	High	Low	The drilling site is on land owned by partner BEPC, which mitigates these concerns.
Pore space ownership	Low	High	Med	Risk will be addressed by: (1) WY law, which defines pore space ownership; (2) minimization of project impacts (i.e. AoR, etc.); and (3) project siting to focus impacts on land owned by team members. Risks are at medium due to the first-of-its-kind program.
Public acceptance	Low	High	Low	The Project team will continue to implement the successful outreach strategy designed and deployed during Phases I & II of the project.
Resource availability	Low	High	Low	Resource availability risks include access to a drilling site, equipment and skilled labor. These are negligible as due to non-site skilled workforce.

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