



FE0032266: Uinta Basin CarbonSAFE II: Storage Complex Feasibility

Ting Xiao
Research Assistant Professor
Energy & Geoscience Institute, University of Utah
November 28th, 2023
ting.xiao@utah.edu

Acknowledgement

Funding for this project is provided by the U.S. Department of Energy's (DOE) National Energy Technology Laboratory (NETL) through the Uinta Basin CarbonSAFE II: Storage Complex Feasibility under Award No. DE-FE0032266.





Project Goal

Uinta Basin CarbonSAFE II: Storage Complex Feasibility

To establish the technical and economic feasibility of a commercial-scale CO₂ geological storage complex in the eastern Uinta Basin, Utah, to securely and economically sequester at least 50 million metric tons of captured CO₂ over 30 years.

Our Project Team

PI & Co-PIs



Dr. Ting Xiao



Dr. Brian McPherson



Mr. Michael Vanden Berg



Dr. Richard Middleton

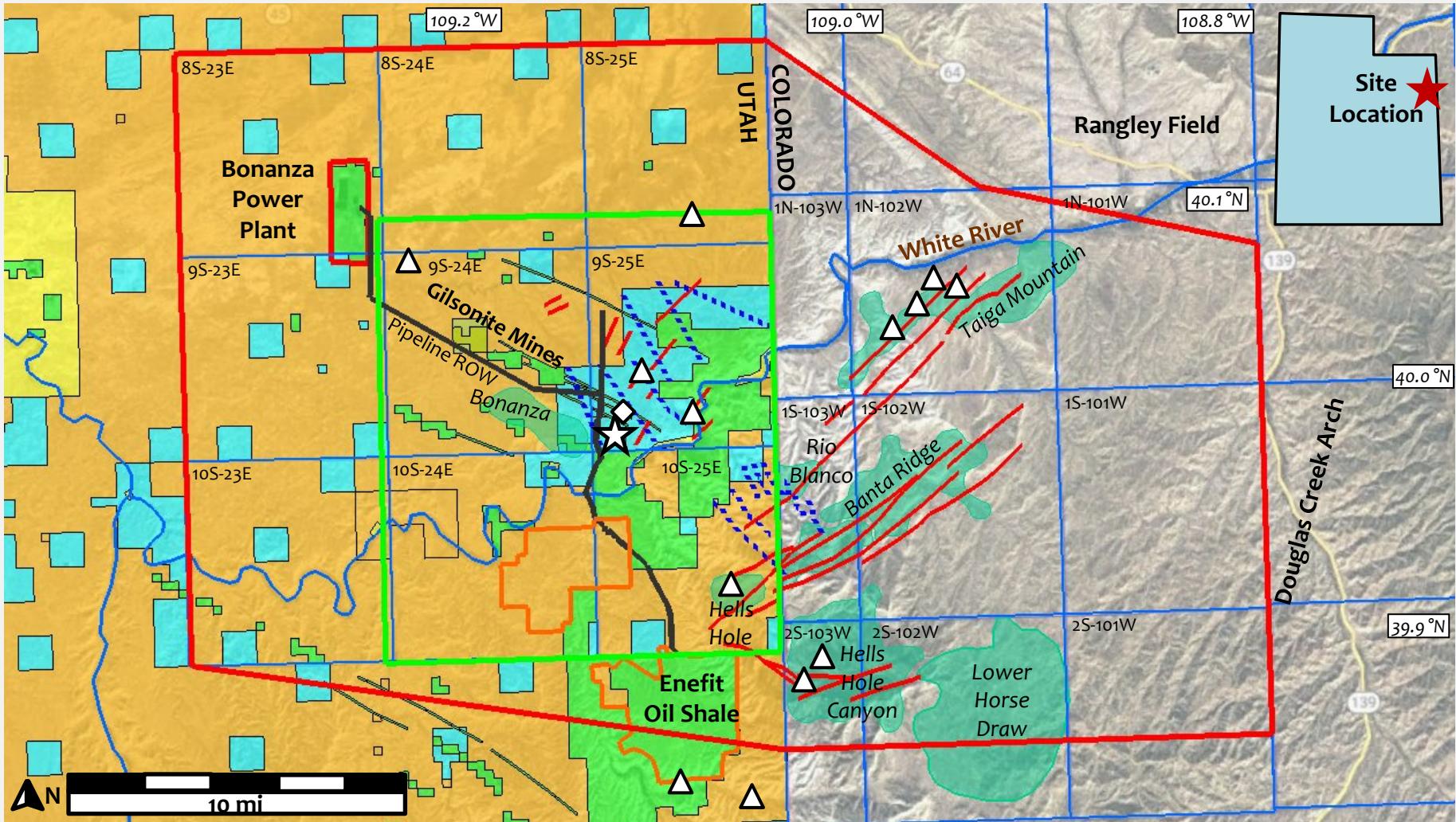


Dr. Maohong Fan

Collaborative Institutes



Research Site Overview



LEGEND

CarbonSAFE PHASE II Study

- Area of Study
- ★ Proposed Injection Site
- CCS Storage Area
- ◊ Proposed Stratigraphic Well

Geological Features and Data

- △ Wells with Cores / Cuttings / Logs
- Faults
-
- Legacy 2D Seismic Lines

Oil and Gas Operations

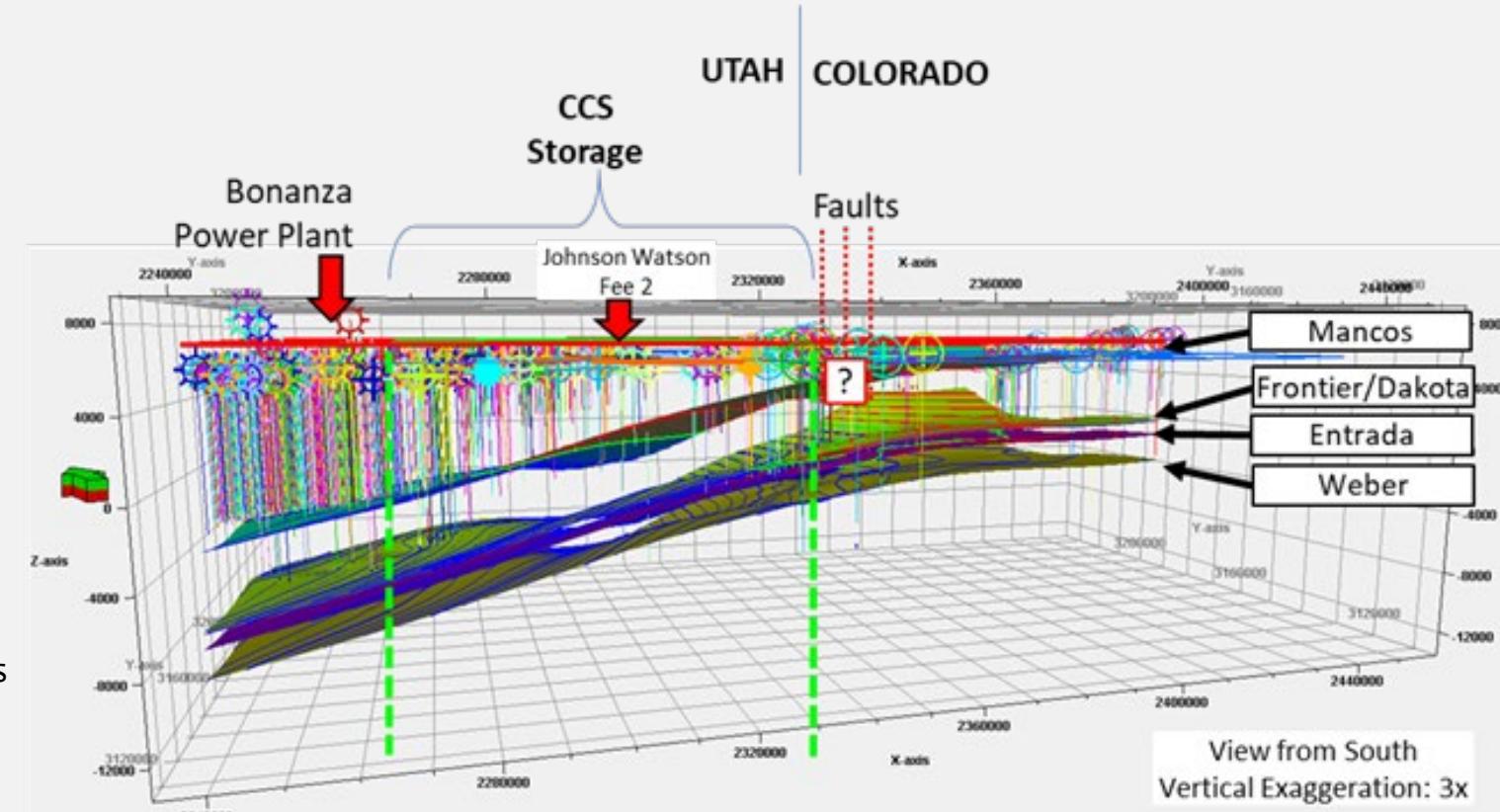
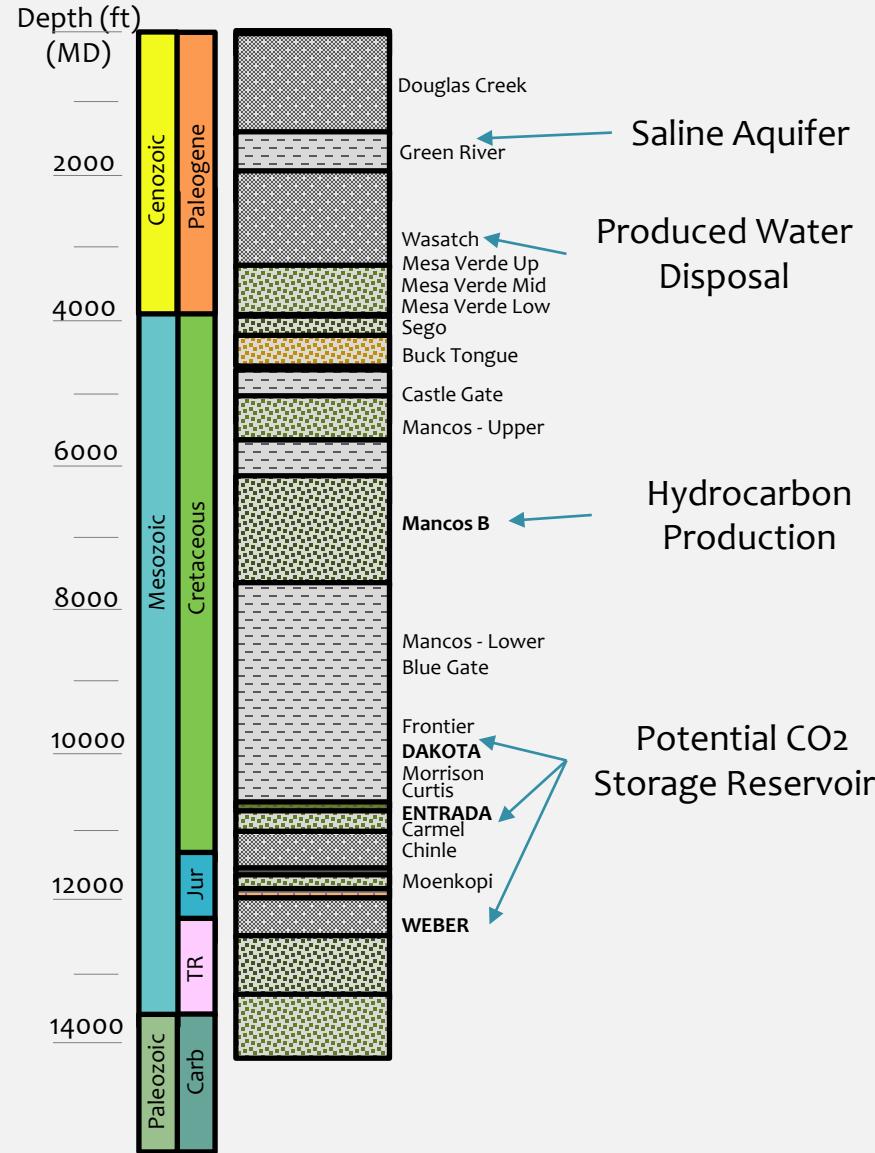
- Oil and Gas Fields
- Enefit Oil Shale Mines
- Enefit Pipeline Right-Of-Way

Utah Land Ownership

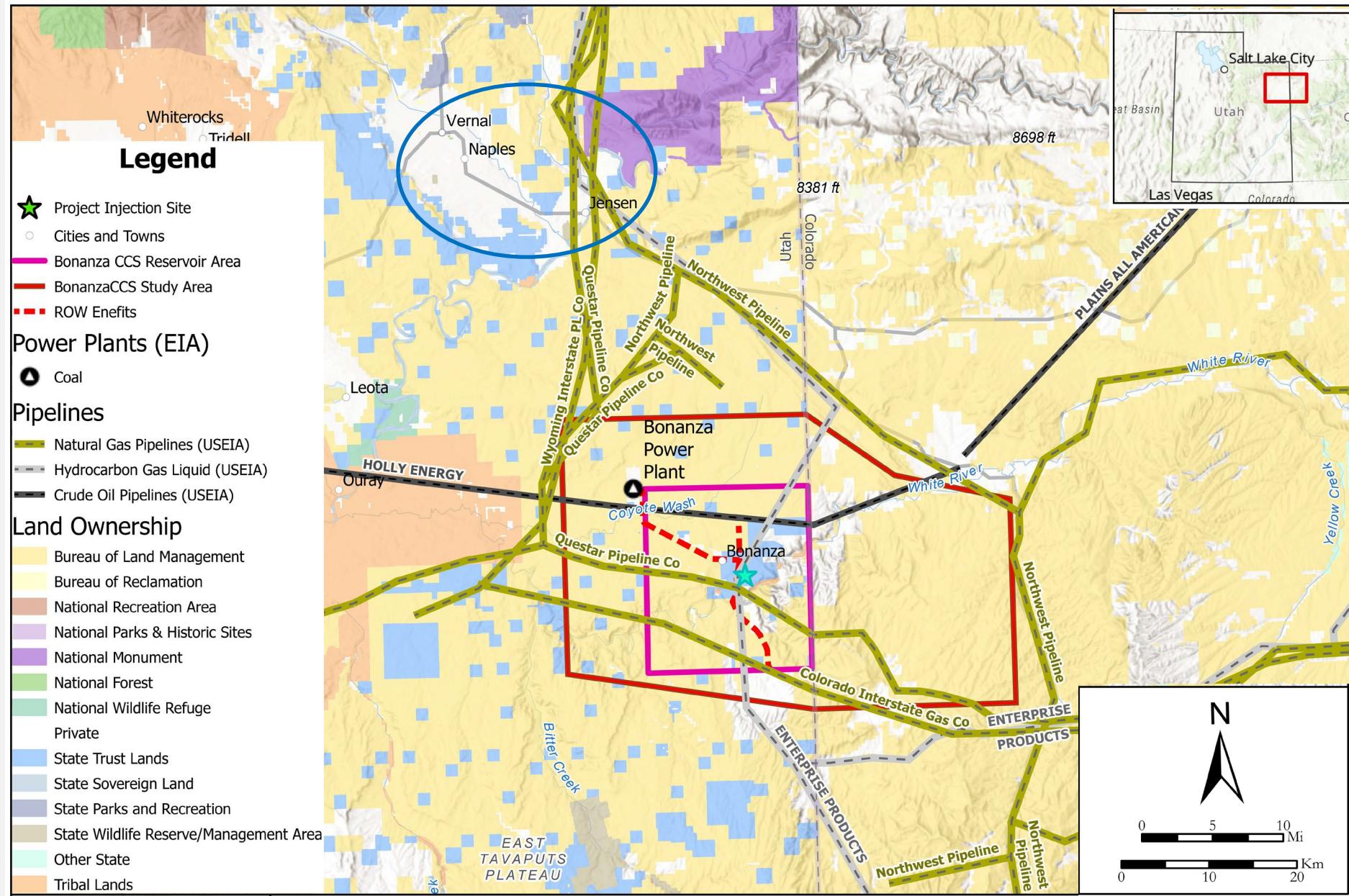
- Tribal
- Private
- State (SITLA)
- Federal

Regional Geology

Stratigraphic Column



Regional Overview



Tasks and Leadership

Task 1 Project Management



- Management
- Reporting
- Project Coordination



Ting Xiao Brian McPherson

Task 2 Community Benefits Plan



- DEIA
- Justice40
- Public Engagement
- Workforce Engagement



Erin Middleton Rob Simmons

Task 3 Site Characterization



- Data Evaluation
- Strat Well Drilling



Michael Vanden Berg Carlos Vega

Task 4 Modeling & Simulation



- Model Development
- Storage Capacity
- Storage Scenarios
- AoR



Nathan Moodie Rouzbeh Moghanloo

Task 5 Risks & Mitigation Plans



- Non-Technical Risks
- Leakage
- Induced Seismicity
- Transportation Risks
- Risk Mitigation Plans



Bailian Chen Ting Xiao

Task 6 CO₂ Management & Monitoring Plan



- CO₂ Management Plan
- CO₂ Monitoring Plan



Sai Wang Maohong Fan

Task 7 Subsequent Characterization & UIC Class VI Permitting Plans



- Site Characterization Plan
- UIC Class VI Permitting Plan



Michael Vanden Berg Sai Wang

Task 8 Technical & Economic Feasibility Evaluation



- CO₂ Source Viability
- CO₂ Transportation Options
- Economic Feasibility



Richard Middleton Maohong Fan

Project Timeline

Tasks	Year 1 (2024)				Year 2 (2025)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1.0 Project Management & Planning								
<i>Milestone – Kickoff Meeting & Annual Meetings</i>	◆			◆				◆
1.1 Project Management								◆
1.2 Project Reporting								◆
<i>Milestone – PMP and DMP Updated</i>	◆							
1.3 Data Submitted to EDX								◆
<i>Milestone – Reports & EDX archives</i>	◆	◆	◆	◆	◆	◆	◆	◆
1.4 Advisory Board								◆
1.5 Coordination with other DOE Projects								◆
2.0 Community Benefits Plan								
2.1 – Diversity, Equity, Inclusion, and Accessibility								◆
<i>Milestone – Project Team DEIA Training</i>					◆			
2.2 – Justice40 Initiative								◆
2.3 – Community and Labor Engagement								◆
2.4 – Investing in Job Quality and Skilled Workforce								◆
2.5 – Public Outreach and Engagement								◆
<i>Milestone – Community Benefits Plan Updated</i>	◆	◆	◆	◆	◆	◆	◆	◆
3.0 Geological Characterization								
3.1 Evaluate Existing Data								◆
3.2 Stratigraphic Well Drilling and Data								◆
<i>Milestone – Stratigraphic Well Drilled</i>					◆			
<i>Milestone – Database of New Core and Log Data</i>							◆	
4.0 Modeling & Simulations								
4.1 Geologic Model								◆
4.2 Storage Complex Modeling								◆
4.3 CO ₂ Storage Capacity Estimation								◆
4.4 Storage Scenarios and Optimization								◆
4.5 Areas of Review								◆
<i>Milestone – Area of Review Refinement</i>								◆
5.0 Risk Assessment & Mitigation Plan								
5.1 Non-Technical Risks								◆
5.2 Leakage Risks with NRAP								◆
5.3 Induced Seismicity								◆
5.4 Transportation Risks								◆
5.5 Risk Mitigation Plans								◆
<i>Milestone – Risk Registry and Identification</i>						◆		
<i>Milestone – Risk Mitigation Plan</i>								◆
6.0 CO₂ Management & Monitoring Plan								
6.1 CO ₂ Management Plan								◆
6.2 CO ₂ Monitoring Plan								◆
<i>Milestone – Plans Completed</i>								◆
7.0 Site Characterization and UIC Permitting Plan								
7.1 Subsequent Site Characterization Plan								◆
7.2 UIC Class VI Permitting Plan								◆
<i>Milestone – Plans Completed</i>								◆
8.0 Technical & Economic Feasibility								
8.1 CO ₂ Source Viability								◆
8.2 CO ₂ Transportation Options								◆
8.3 Economic Feasibility								◆
<i>Milestone – Final Scenario Analysis</i>								◆



Project Task Update

Task 1 Project Management



- **Contracts**
 - Primary Contract with DOE – 9/29/2023
 - Subcontracts sent out on 11/14/2023
- **Reporting**
 - Project Management Plan (PMP) submitted to Project Manager on 11/16/2023
- **Advisory Board**
 - Confirming and Recruiting advisory board members

Advisory Board Members



Confirmed

Richard Powell
UIC Program Manager,
Utah Division of OGM



Confirmed

Tyler Esplin
Sr. Engineer,
Deseret Power



Confirmed

Steve Handy
Former State Legislator,
State of Utah



Confirmed

Stephanie Barber-Renteria
Managing Director,
SITLA



Confirmed

Ryan Clerico
Chief Executive Officer,
Enefit American Oil



Confirmed

Seth Lyman
Director,
Bingham Research Center



Invited

Travis Campbell
Director,
Uintah County
Economic Development



Invited

Craig Brown
General Manager,
American Gilsonite



Project Task Update

Task 1 Project Management



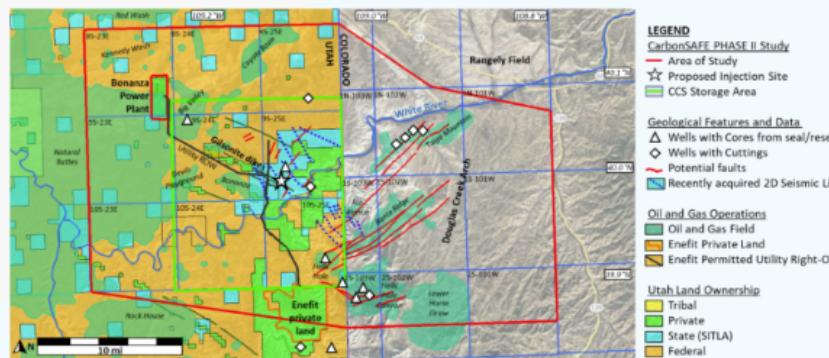
- **Project Website**
 - Project website was created on 11/1/2023
 - <https://egi.utah.edu/uinta-basin-carbonsafe/>
- **Upcoming Conference Presentations**
 - Uinta Basin CarbonSAFE Phase II: An Overview. 12/14/2023, AGU, San Francisco
 - Geologic Carbon Storage Research in Utah: Lessons Learned from Decades of Case Studies and a Preview of New Directions. 12/14/2023, AGU, San Francisco
- **Upcoming Project Kick-off Meeting**
 - Scheduled in late January 2024, Vernal.

Uinta Basin CarbonSAFE

What is the Uinta Basin CarbonSAFE phase II project?

The primary objective of the Uinta Basin CarbonSAFE phase II project is to establish the technical and economic feasibility of a commercial-scale CO₂ geological storage complex in the northeast Uinta Basin, Utah, to sequester at least 50 million metric tons of captured CO₂ securely and economically from the Deseret Power Electric Cooperative Bonanza Power Plant and other sources in 30 years.

This project seeks to establish feasibility of commercial storage with high-resolution societal analysis, geological characterization, technical analysis, economic evaluation, and environmental analysis. This project will accelerate the Deseret Power's assessment of commercial-scale CO₂ capture, combine additional CO₂ sources in the area for a storage hub development, and accelerate economic transition and growth in the communities that have historically been impacted by fossil fuel production.



Project Sponsor: DOE and NETL



Learn more about the Carbon Utilization and Storage Partnership (CUSP) West!

Receive news on the Uinta Basin CarbonSAFE project.

By signing up you are agreeing to receive email updates on the Uinta Basin CarbonSAFE project from EGI.

First Name

Last Name

Email

Subscribe

Project Task Update

Task 2 Community Benefits Plan



- **CBP**
 - CBP was updated in August and submitted to Project Manager
- **CBP Working Group**
 - CBP working group is scheduling a DEIA training for key personnel in December
- **Public/Labor Engagement**
 - A presentation on the Uinta Basin Oil & Gas Collaborative, 11/8/2023



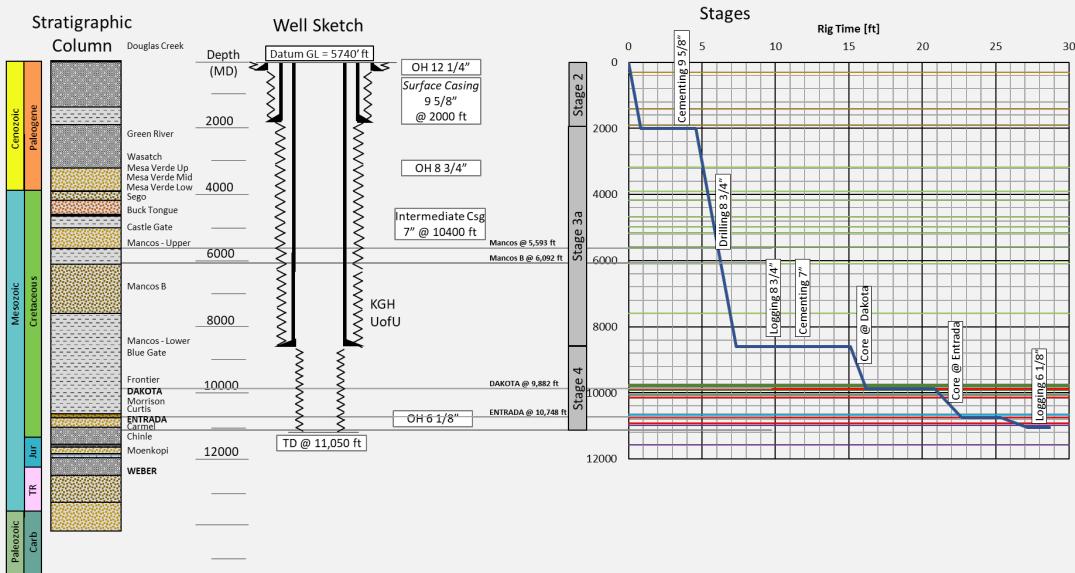


Project Task Update

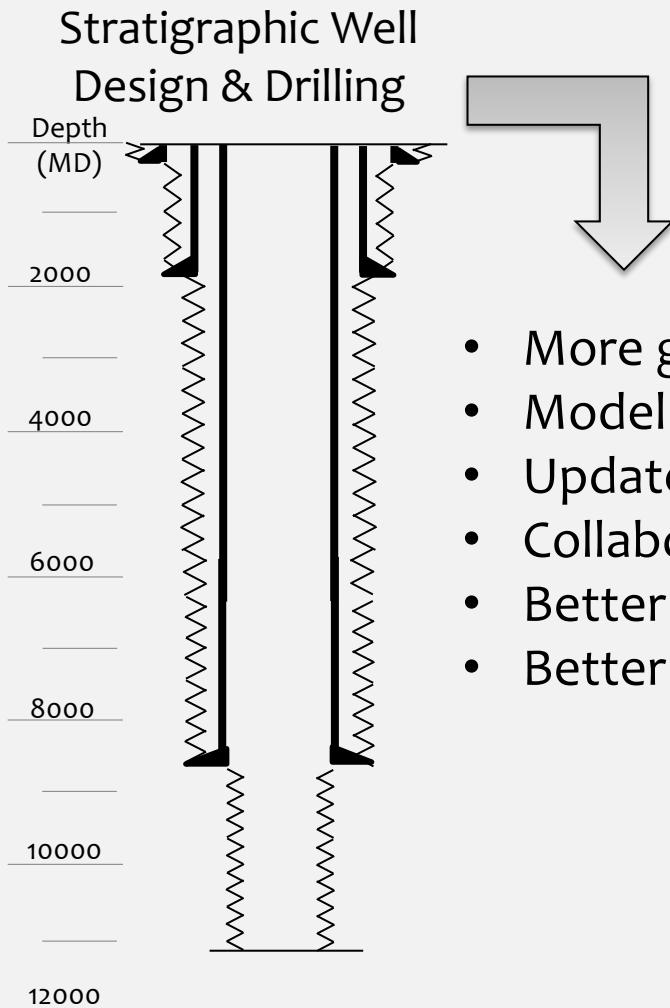
Task 3 Site Characterization



- **Evaluating Existing Data**
 - The team is working on collecting data for geo model update and summarizing the available data for simulations.
- **Drilling a Stratigraphic Well**
 - The team is evaluating the drilling experiences in the basin and contacting potential vendors for drilling cost in detail.



Next Step



- More geology data
- Model refinement
- Updated simulation results
- Collaborations and engagements with stakeholders
- Better evaluation of feasibility
- Better planning



Contact Information



- Ting Xiao: ting.xiao@utah.edu
- Brian McPherson: b.j.mcpherson@utah.edu
- Rob Simmons: rsimmons@egi.utah.edu
- Nathan Moodie: nathan.moodie@m.cc.utah.edu
- Carlos Vega: carlos.vega@utah.edu



- Michael Vanden Berg: michaelvandenberg@utah.gov



- Erin Middleton: erin.middleton@carbonsolutionsllc.com
- Richard Middleton: richard.middleton@carbonsolutionsllc.com



- Rouzbeh Moghanloo: rouzbeh.gm@ou.edu



- Maohong Fan: mfan@uwyo.edu



- Sai Wang: sai.wang@nmt.edu



- Bailian Chen: bailianchen@lanl.gov



- <https://egi.utah.edu/uinta-basin-carbonsafe/>

Receive news on the Uinta Basin CarbonSAFE project.

By signing up you are agreeing to receive email updates on the Uinta Basin CarbonSAFE project from EGI.



txiao@egi.utah.edu | egi.utah.edu