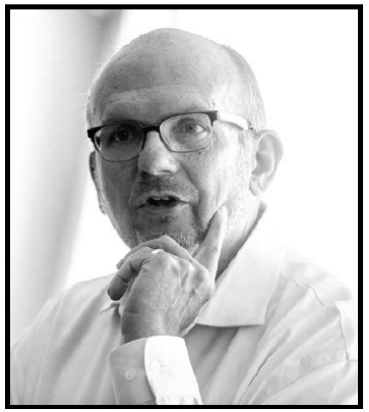
WEBINAR PANEL DISCUSSION



UW School of Energy Resources

CO_2

Carbon Capture, Utilization & Storage Development in Wyoming

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UW SCHOOL OF ENERGY RESOURCES

CCUS in Wyoming

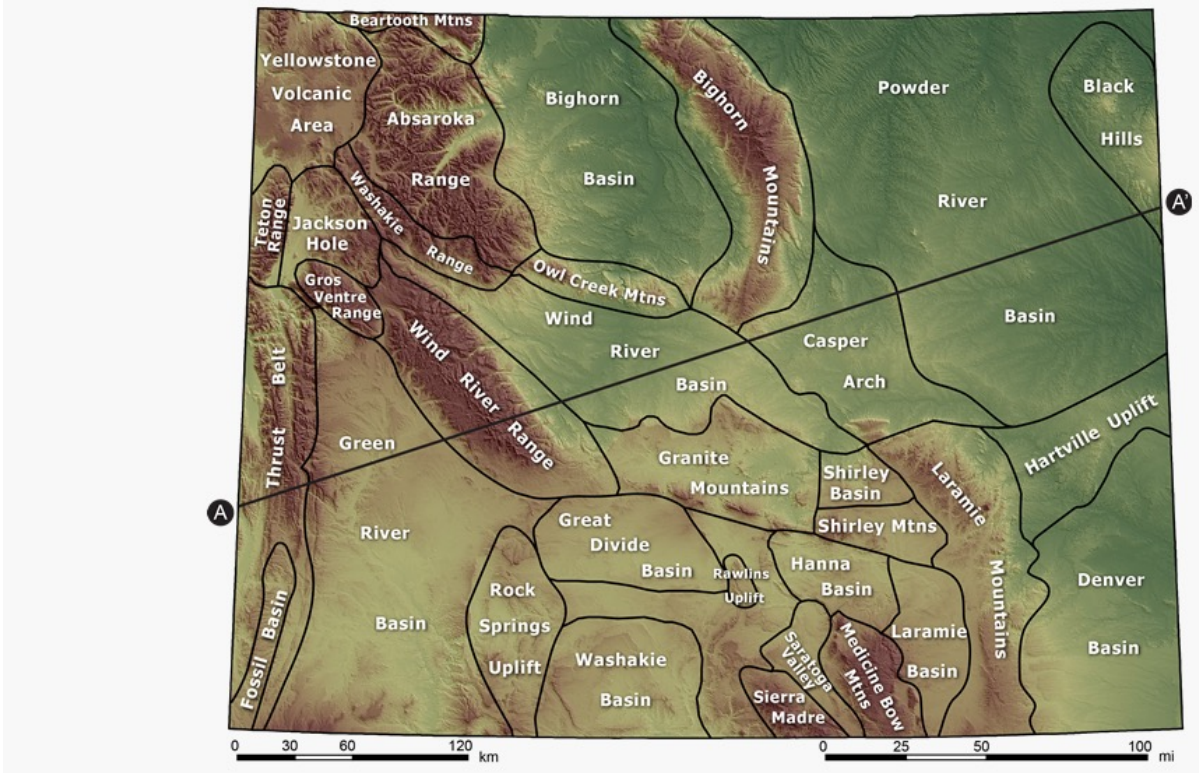
Presented By:
J. Fred McLaughlin, Interim Director of the Center for Economic Geology Research
November 19th, 2021

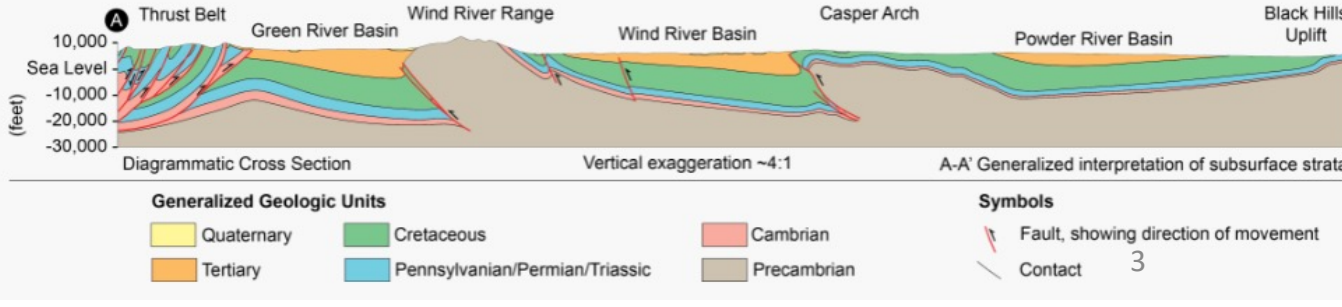
THE WORLD NEEDS MORE COWBOYS.

UNIVERSITY OF WYOMING | School of Energy Resources

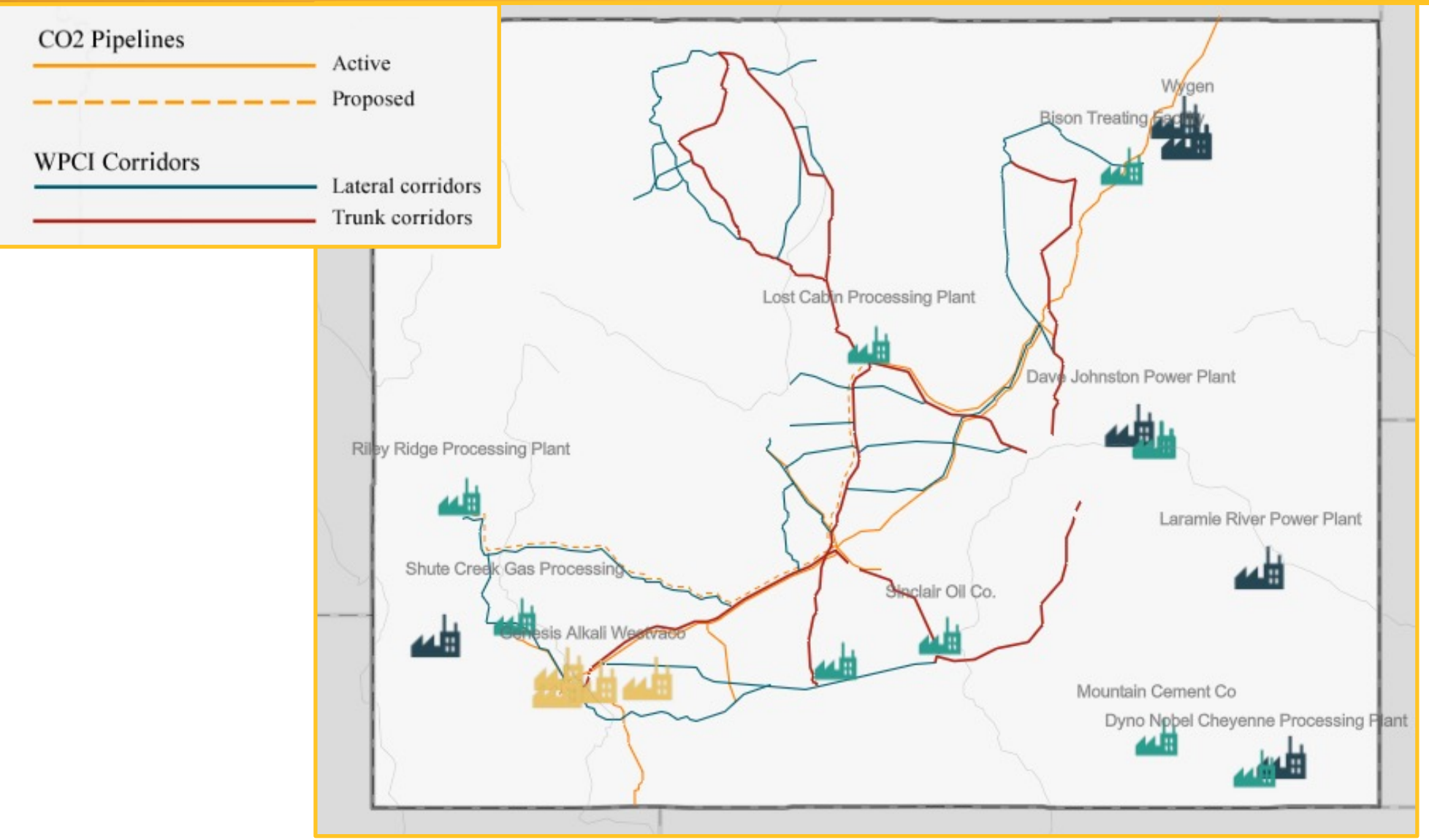
Wyoming's Pore Space Resources

1. Conventional Reservoirs in Every Basin
2. Proven Caprock Holding Capacity
3. Low Impact CCUS Deployment
4. Regulatory Framework
5. Optimize Wyoming's Pore Space





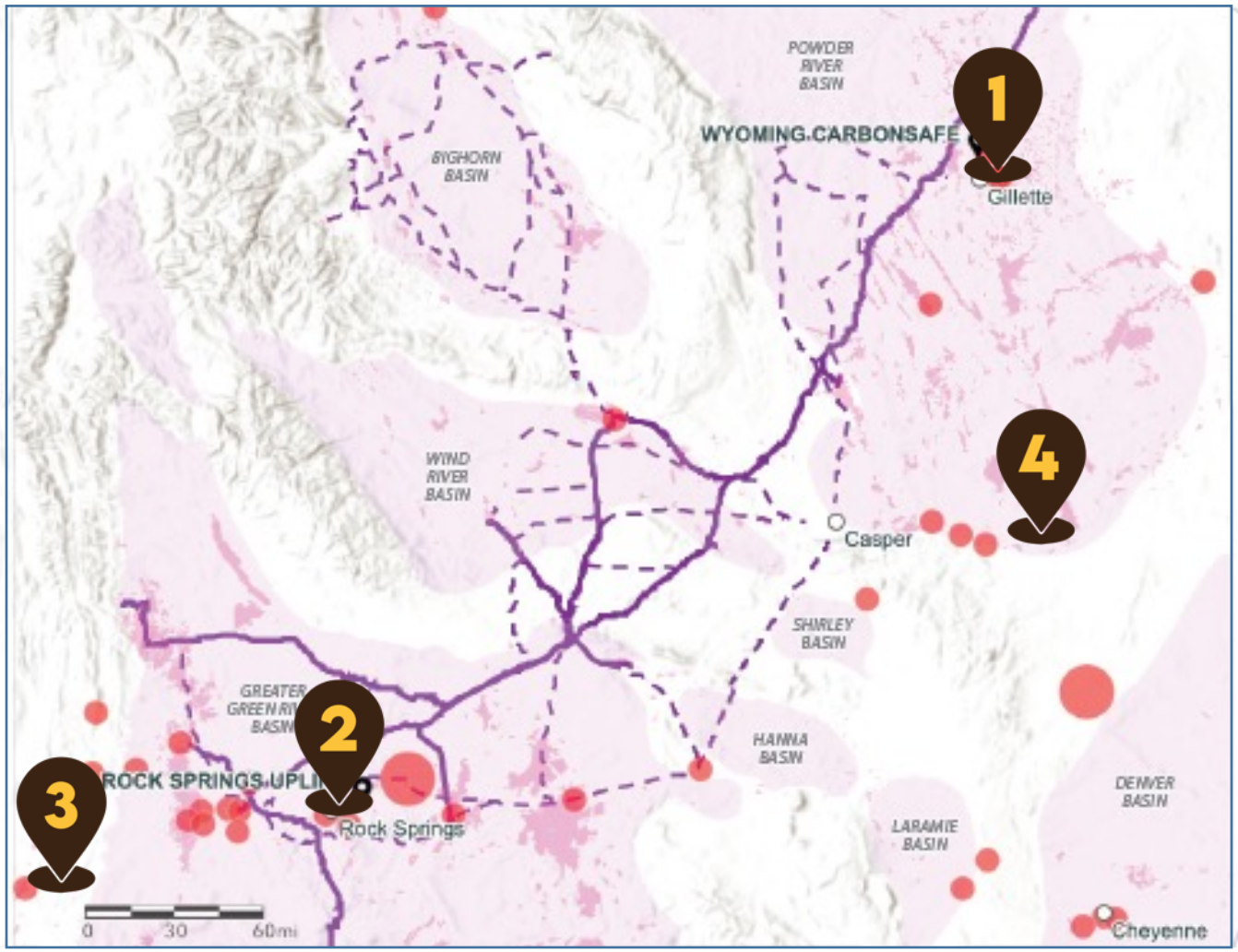
Initial CCUS Targets: CO_2 Sources and Transportation Corridor

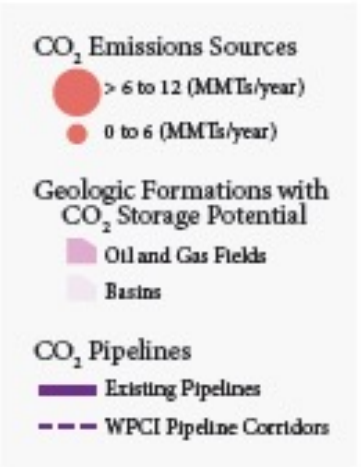


UWyo/SER CCUS Projects

Carbon Capture and Storage (CCS) projects in Wyoming

1. Wyoming CarbonSAFE Project at Dry Fork Station
2. Rock Springs Uplift-Regional CCUS Hub
3. Depleted Gas Fields (Fold and Thrust)
4. Project Blue Bison (Blue Hydrogen)
5. Plains CO_2 Reduction Partnership (PCO_2R)





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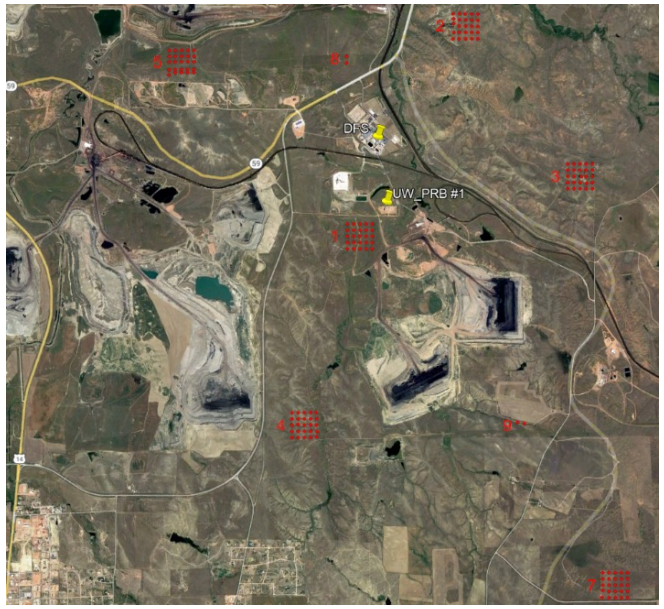
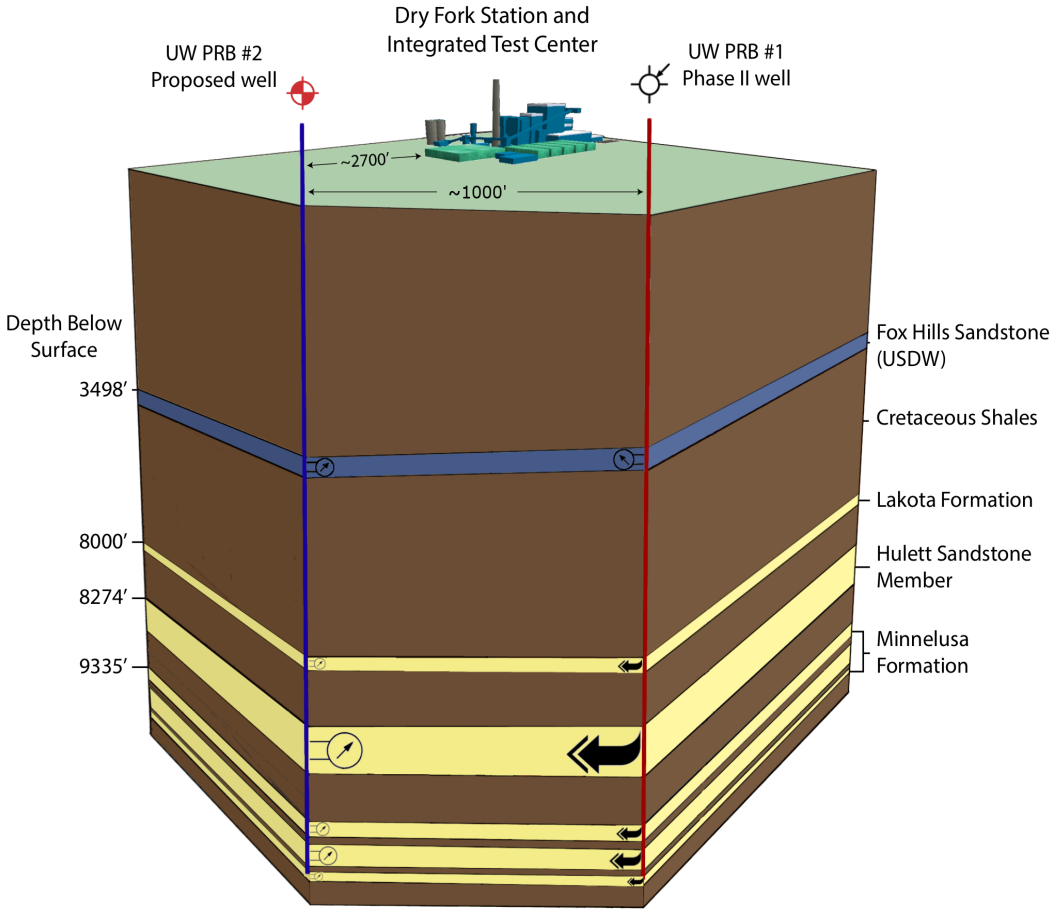
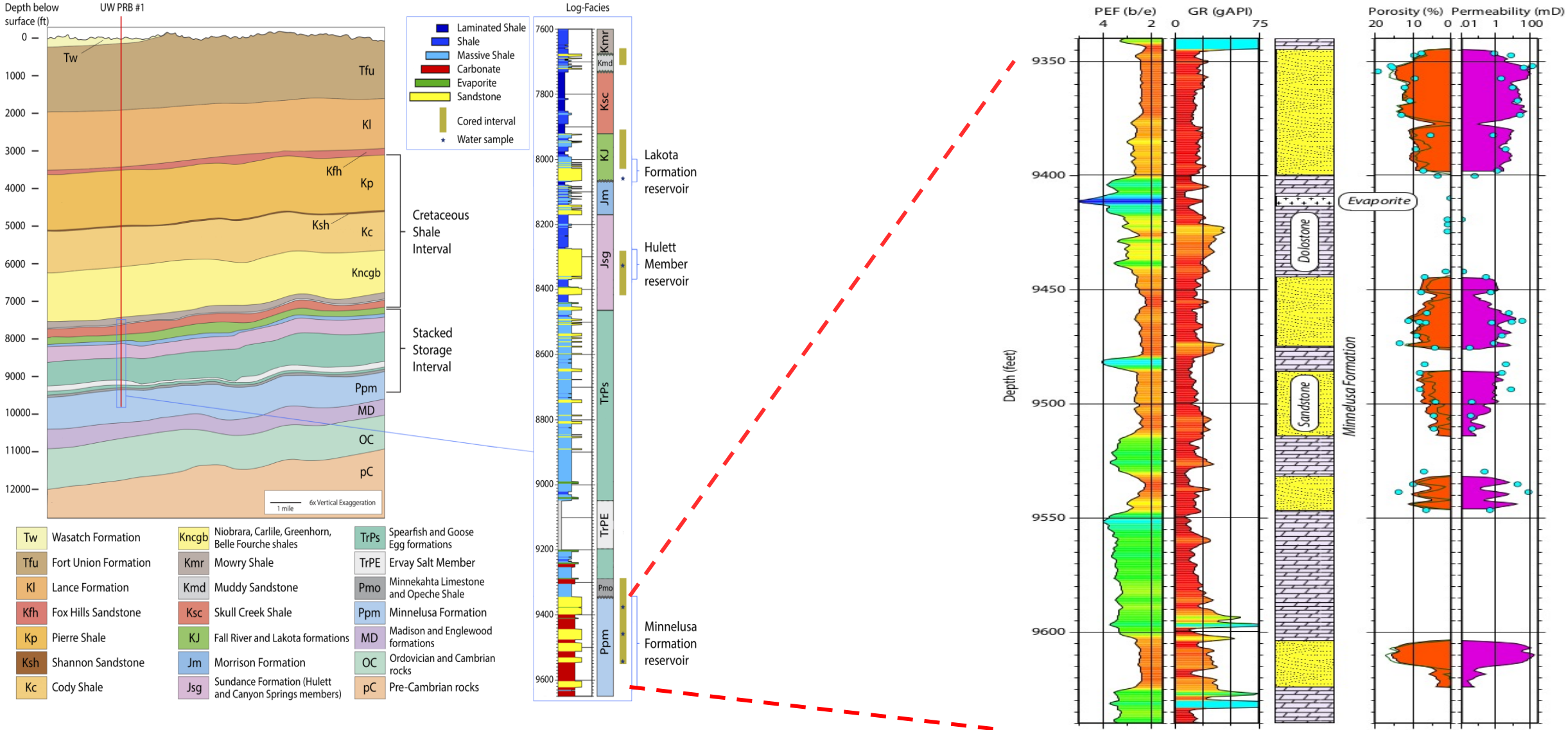
Wyoming CCUS Highlight: Wyoming CarbonSAFE

- Located at BEPC's Dry Fork Station, 385 MW capacity
- Adjacent to the Wyoming Integrated Test Center
- Location of the first 2 wells drilled specifically for CCUS in Wyoming
- Location of the first fully operational CCUS environmental monitoring system (soil, groundwater and seismicity)

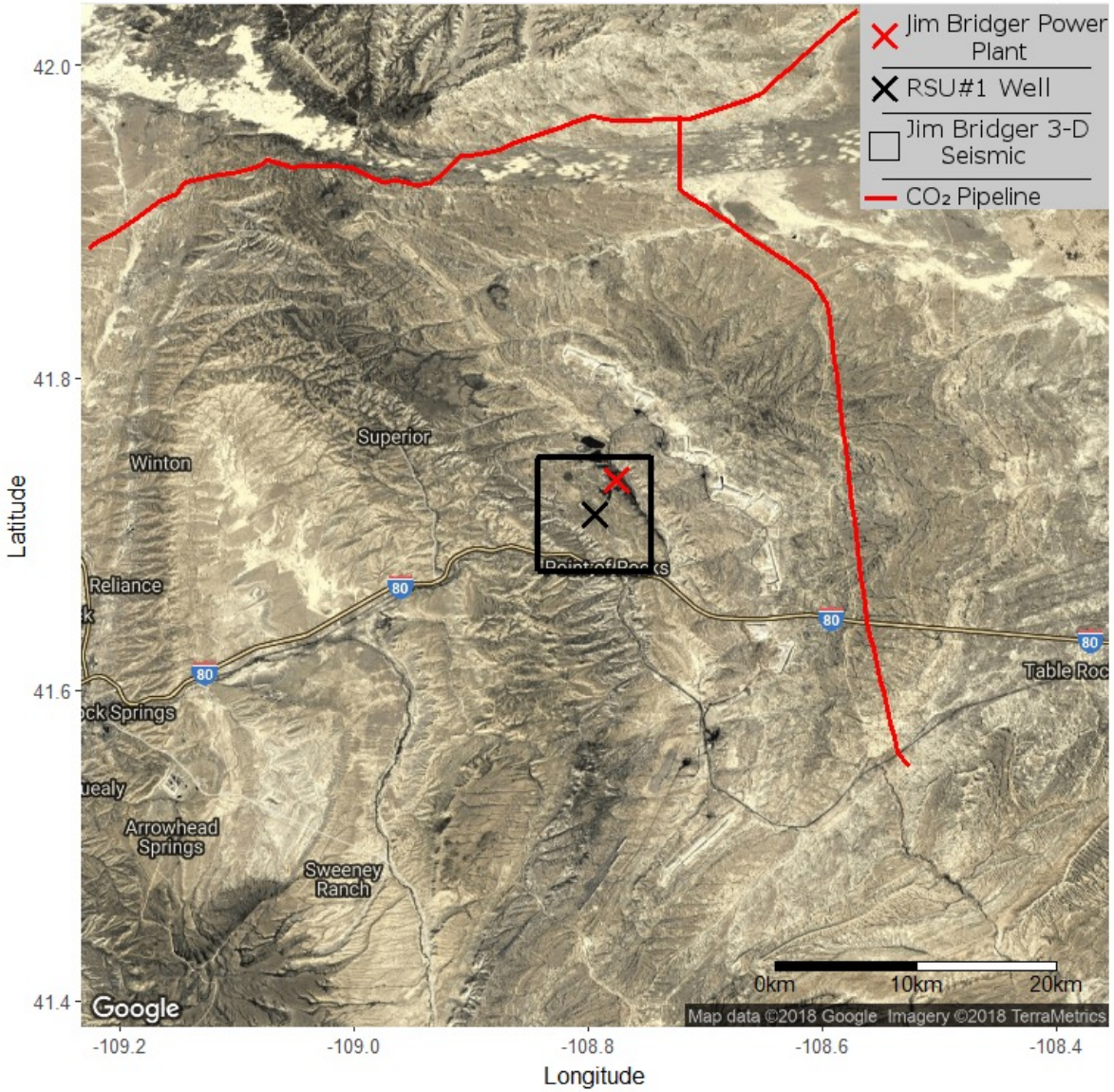




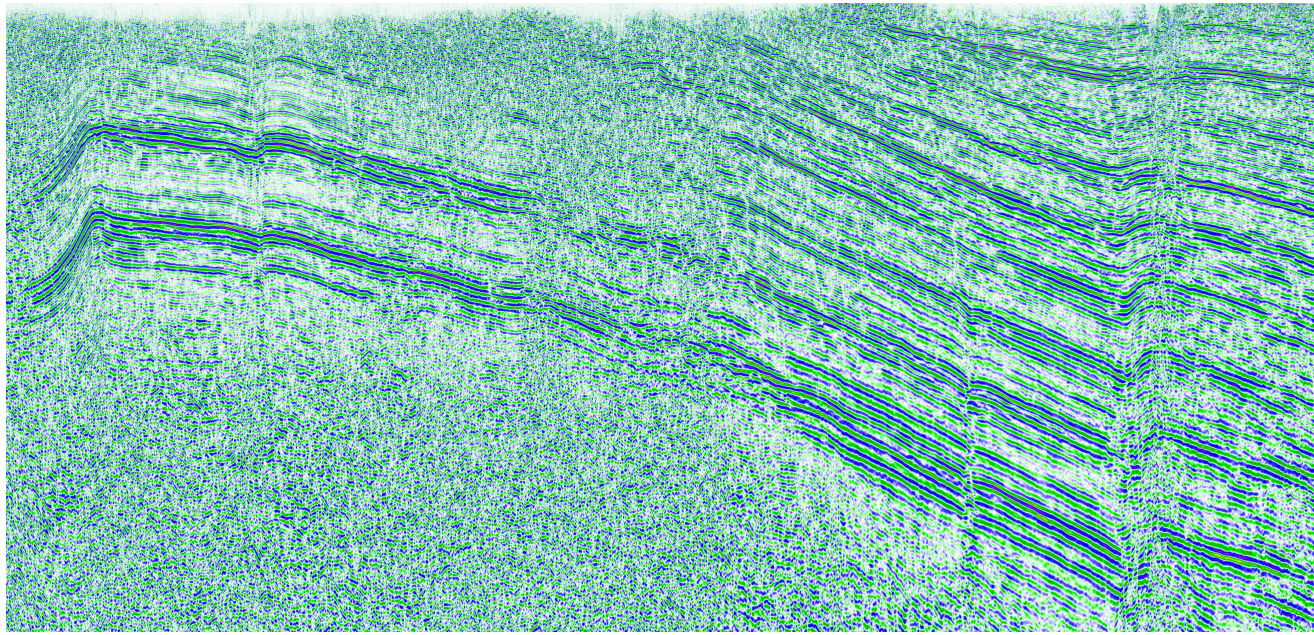
Wyoming CCUS Highlight: Wyoming CarbonSAFE



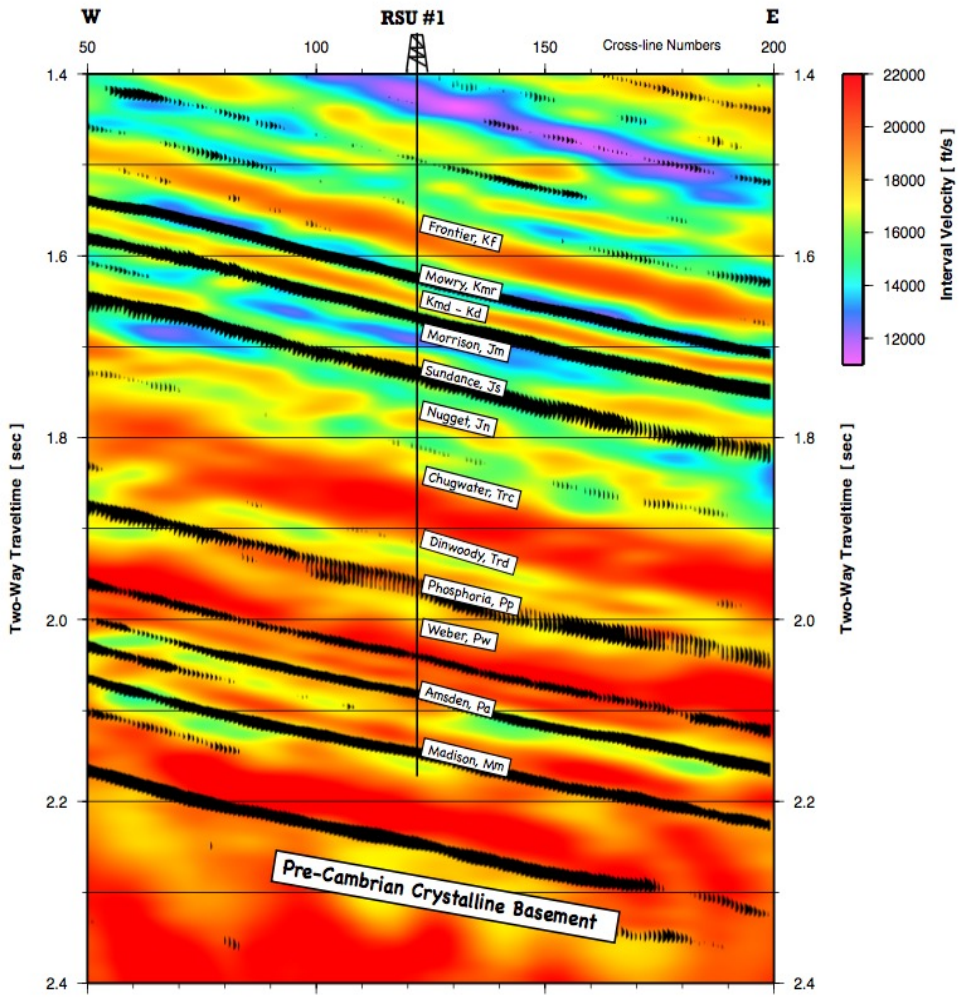
Wyoming CCUS Highlight: Wyoming CarbonSAFE at the Rock Springs Uplift

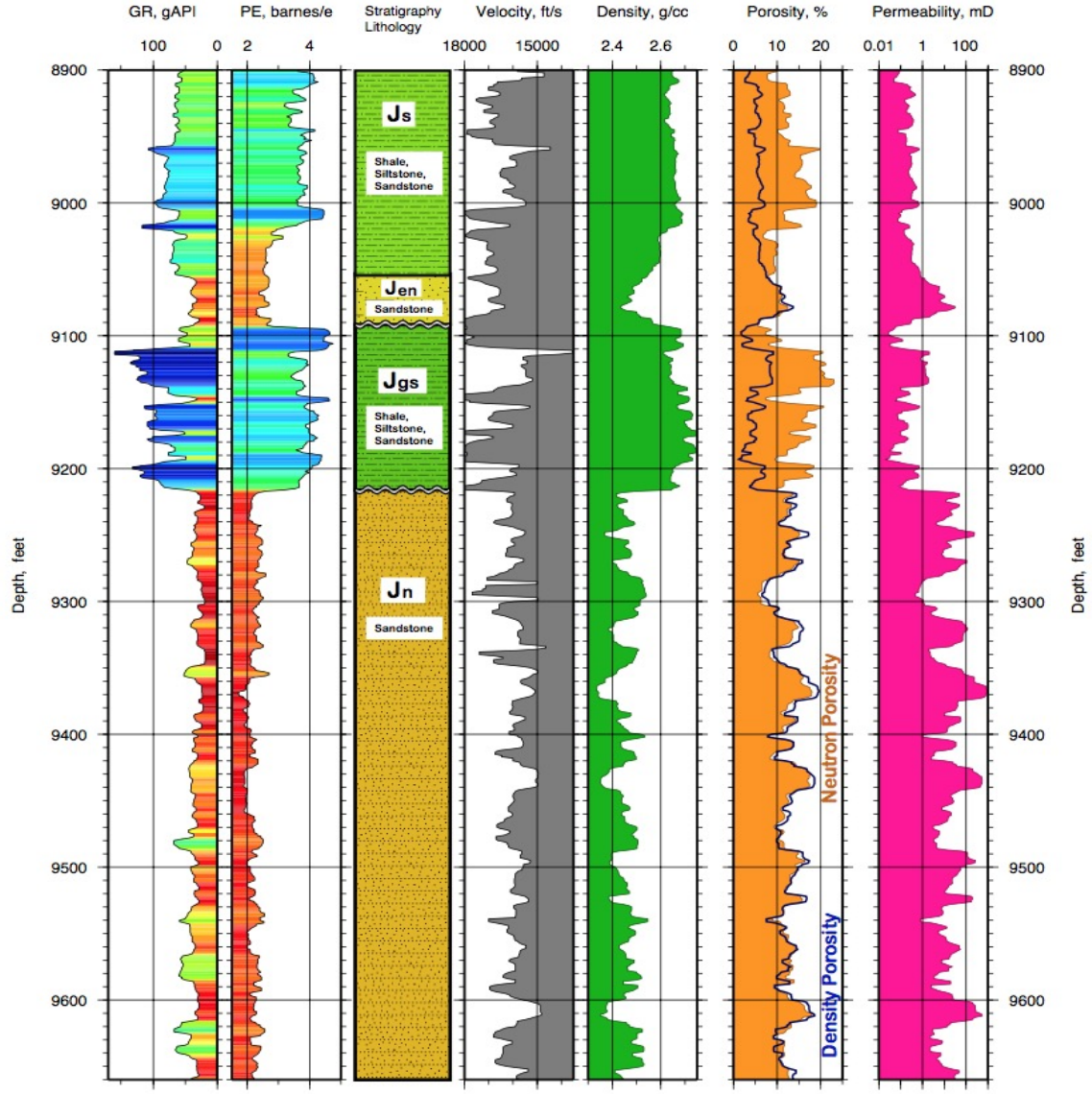


- SW Wyoming Green River Basin
- Capture from the Jim Bridger Power Station (largest CO_2 source in State ~18 Mt/yr)
- Adjacent to CO_2 infrastructure and existing CO_2-EOR fields



Wyoming CCUS Highlight: Wyoming CarbonSAFE at the Rock Springs Uplift





Pore Resource Variance in Wyoming

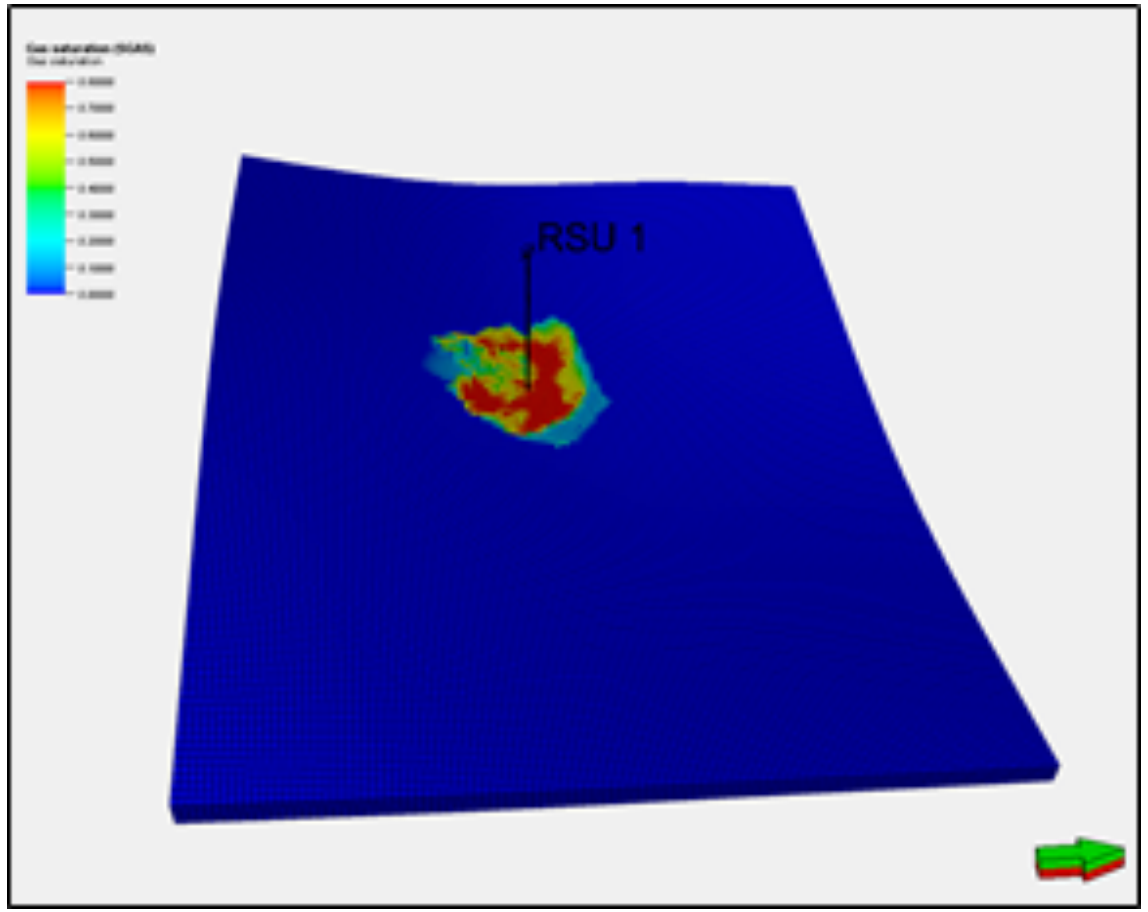
Northern Powder River Basin

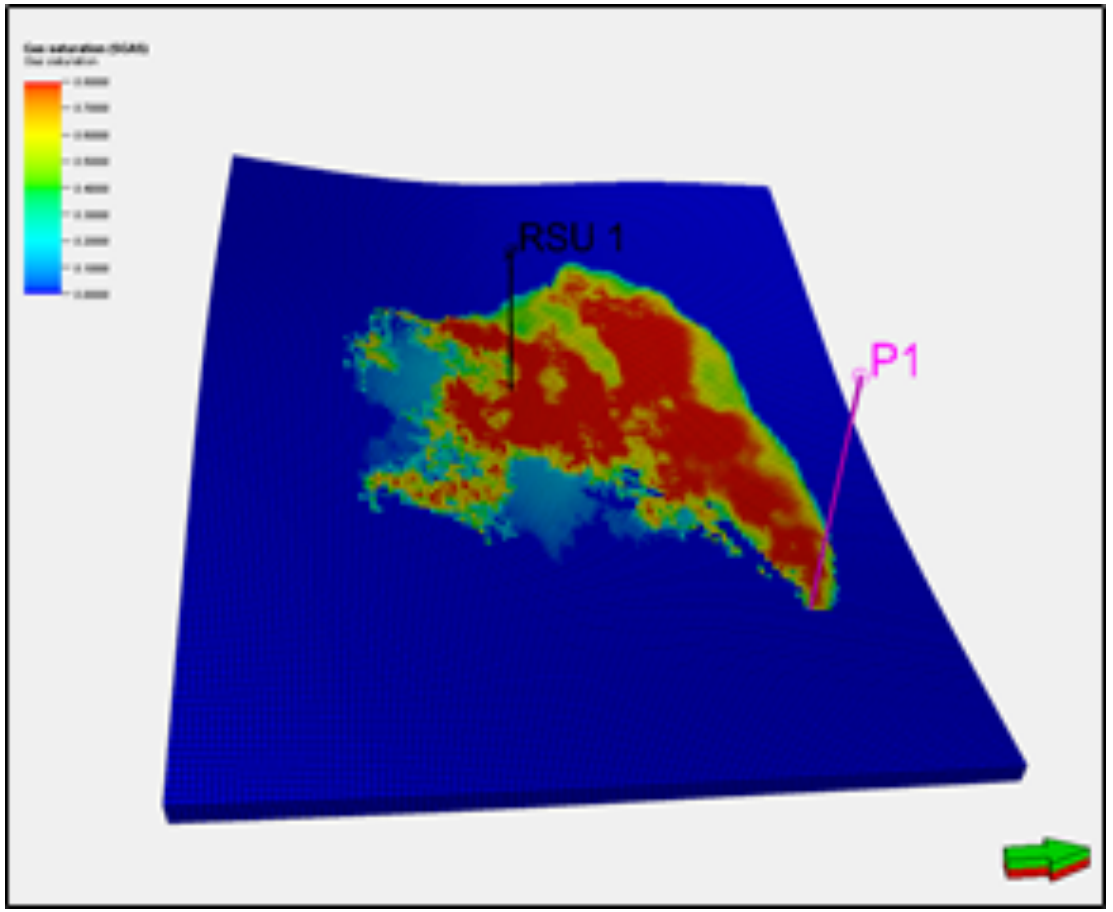
	Target Formation	Φ_{avg} (%)	Average Thickness (ft)	Storage Volume (Mt/mi²)		
				P10	P50	P90
Young to Old	Minnelusa Fm.	13%	150	0.84	1.6	2.7
	Lwr. Sundance Mb.	10%	110	0.47	0.89	1.5
	Lakota/Fall River Fms.	15%	70	0.45	0.85	1.5
	Muddy Ss.	9%	10	0.04	0.07	0.1
Total				**1.8**	**3.4**	**5.8**

Rock Springs Uplift

	Target Formation	Φ_{avg} (%)	Average Thickness (ft)	Storage Volume (Mt/mi²)		
				P10	P50	P90
Young to Old	Madison Lm.	10%	425	3.0	4.0	4.9
	Weber Ss.	12%	900	0.7	1.2	2.1
	Nugget Ss.	8%	400	2.9	5.6	9.6
	Entrada Ss.	16%	40	0.14	0.27	0.47
Total				**8**	**11.1**	**17.1**

Pore Resource Optimization

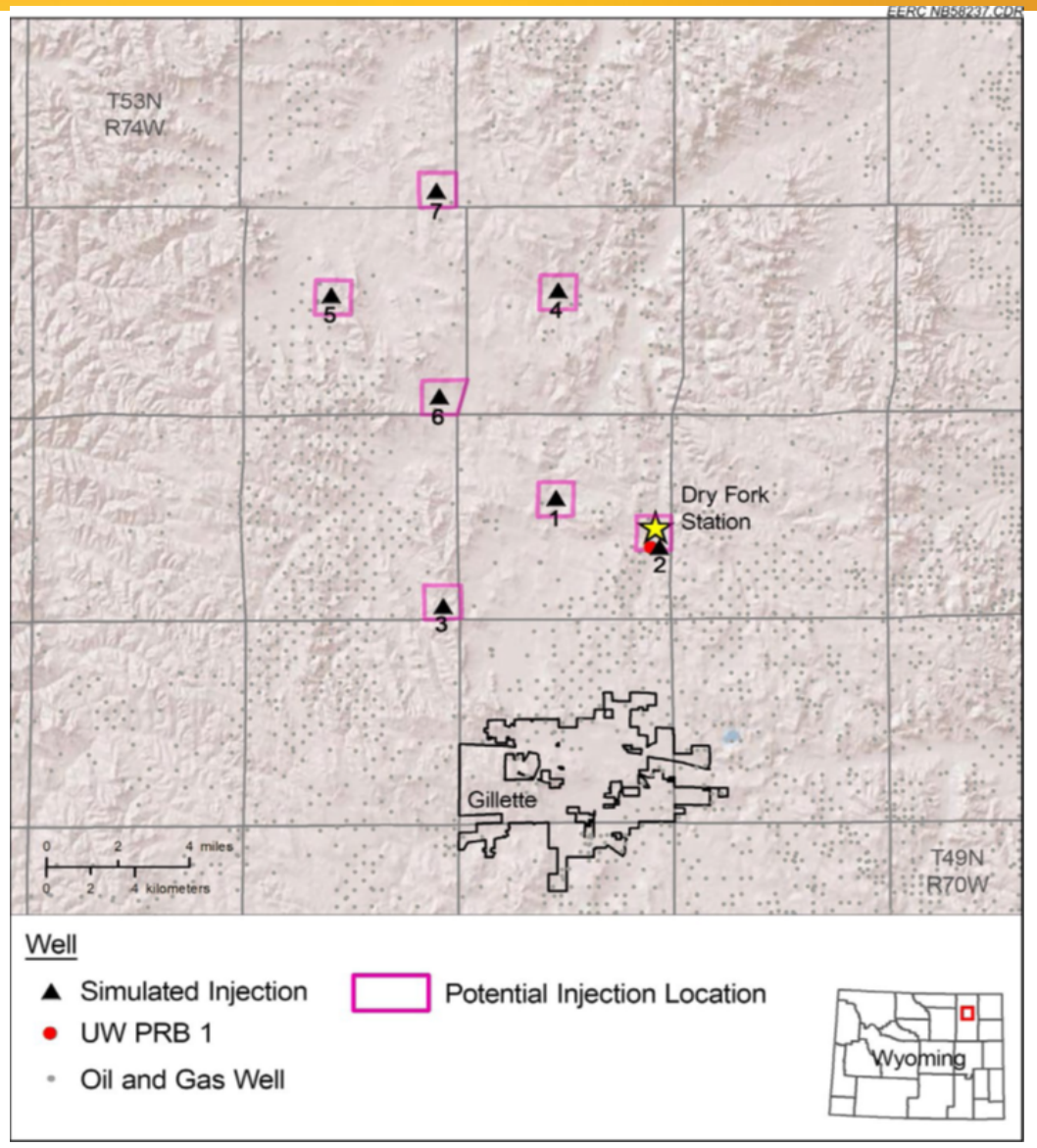




Wyoming CarbonSAFE CCUS Blueprint

Wyoming CarbonSAFE at Dry Fork Station: A Template for Commercial-Scale CCUS Storage and Research Facility

- Carbon Capture/Source Integration
- Carbon storage
  - Pore resource assessments
  - Feasibility
- Carbon Transportation and Utilization
- Monitoring and Environmental Systems



UW School of Energy Resources

Thanks

derf1@uwyo.edu

References

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WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

Class VI Permitting: Resources, Guidance and Approach

Lily R. Barkau, P.G.
Groundwater Section Manager
Water Quality Division
Department of Environmental Quality

Carbon Capture, Utilization & Storage Development in Wyoming

Thursday, December 16, 2021

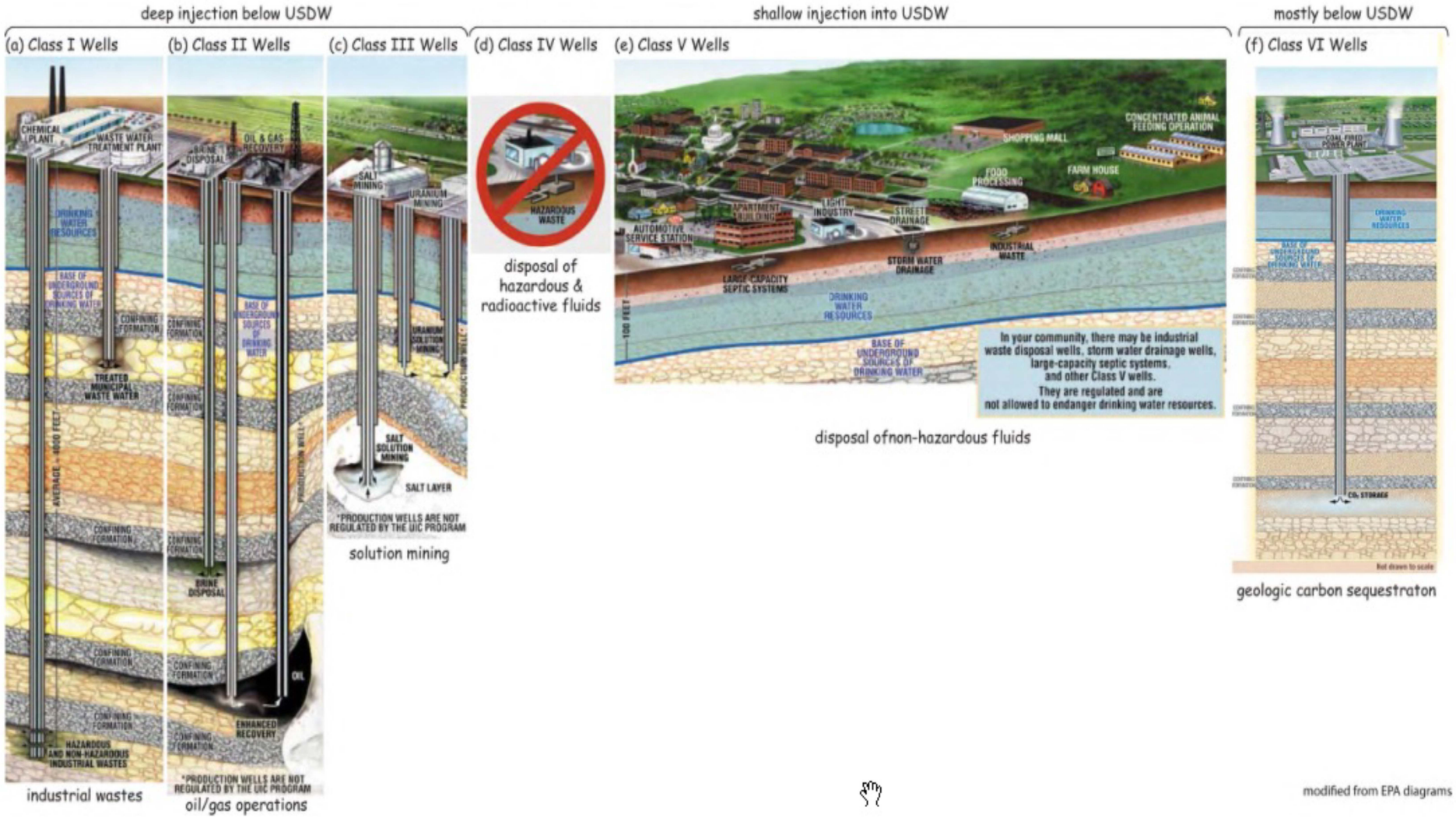
Overview

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

- Underground Injection Control Program
- Primacy
- Carbon Sequestration Project Process
  - Application
  - Well Construction
  - Operation and Injection
  - Post-Injection Site Care and Closure

Underground Injection Control Program

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY



Primacy

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

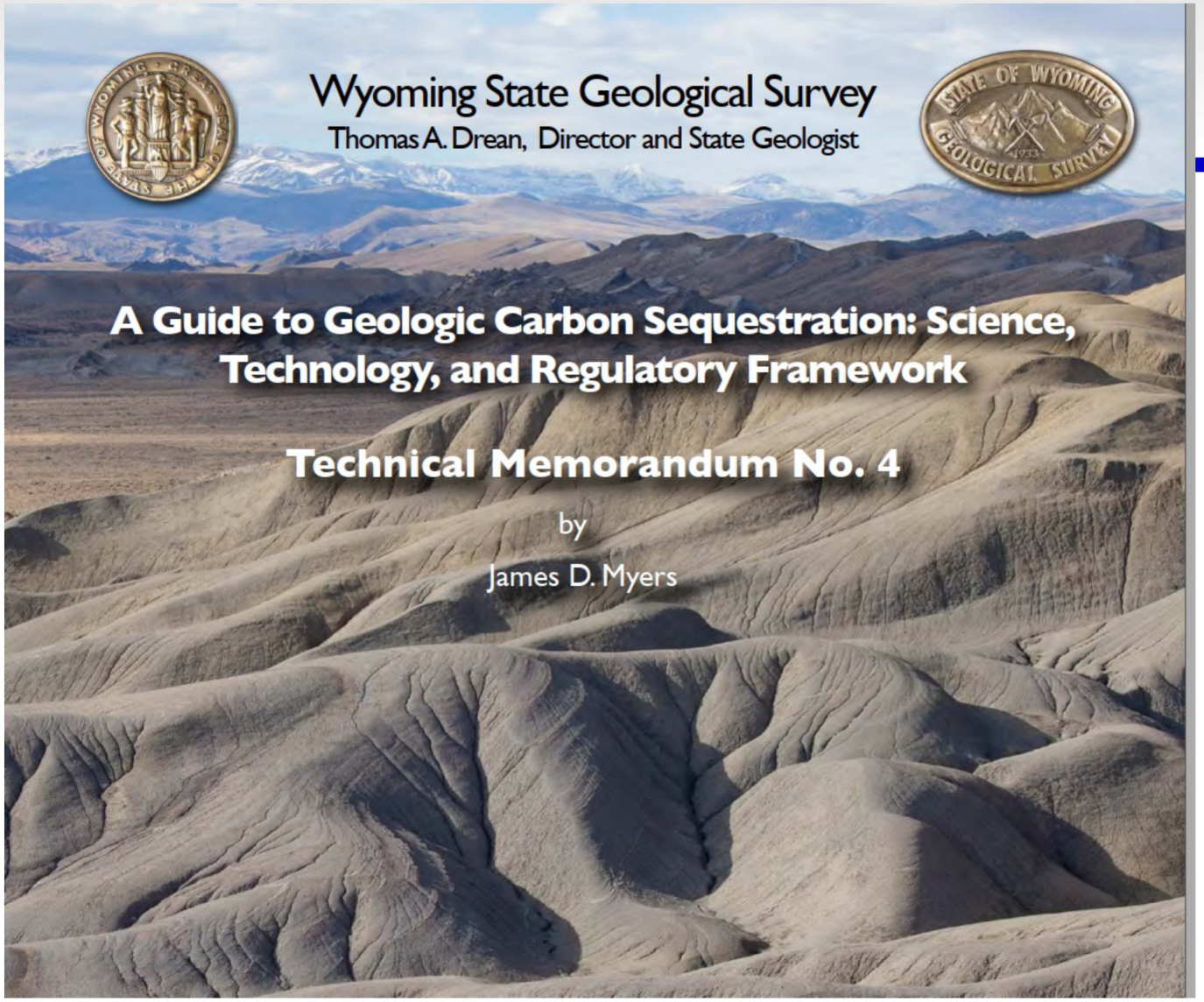
- Wyoming received primacy of UIC Class I through V wells in 1983.
- Class II wells are under Section 1425 of the Safe Drinking Water Act and are under the regulatory authority of the Wyoming Oil and Gas Conservation Commission
- Class I, III, IV, and V are under 1422 of the Safe Drinking Water Act and are under the regulatory authority of the Wyoming Department of Environmental Quality

Road to Primacy – Class VI

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

- Statute (2008)
- Statute Amendments (2009 and 2010)
- Rule Making (2010, 2013, 2019)
- Primacy Application (2017-2018)
- Primacy (2020)
- Rule Revision (2021)
- Second State to Receive Primacy of Class VI wells

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY



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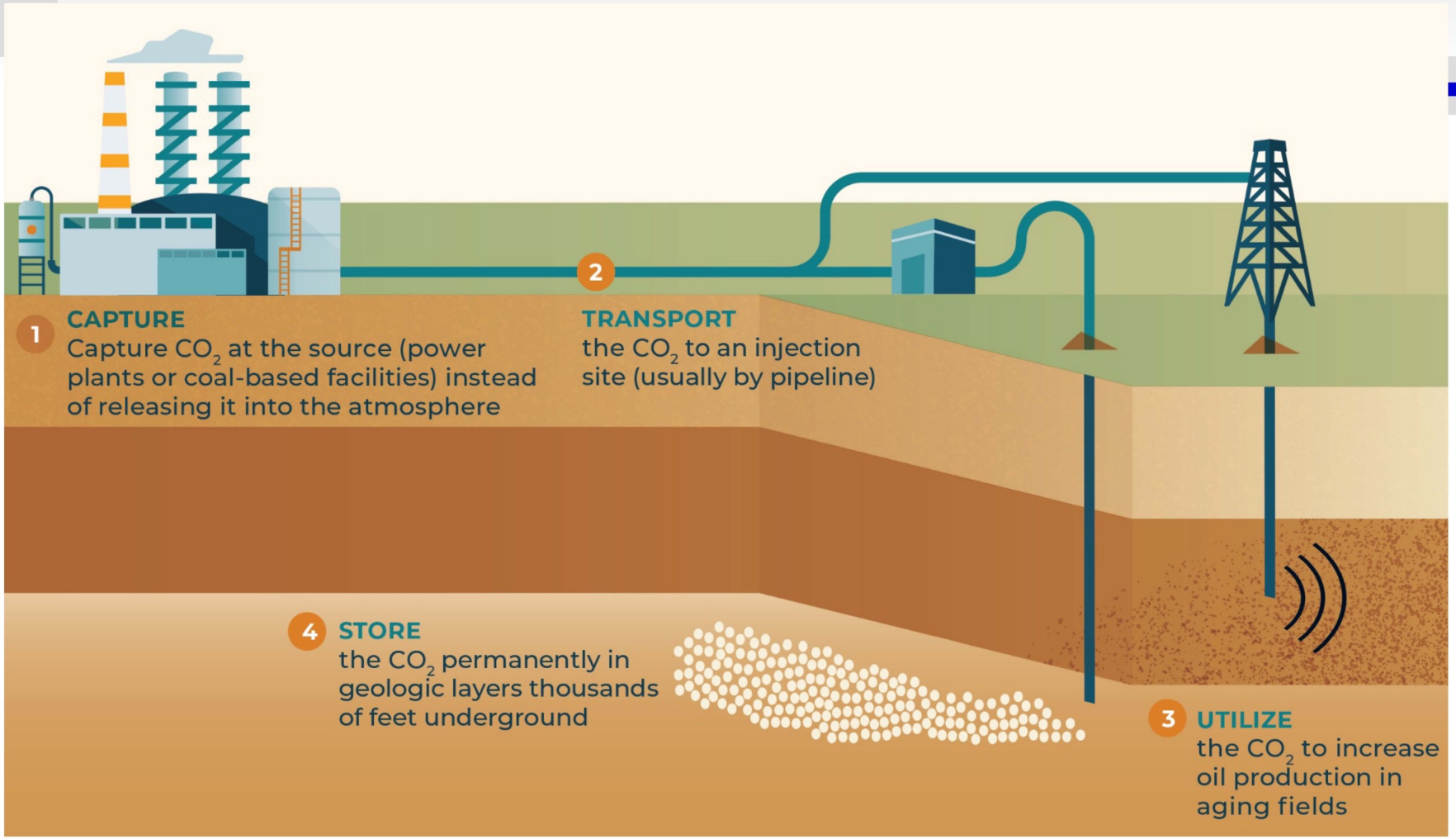
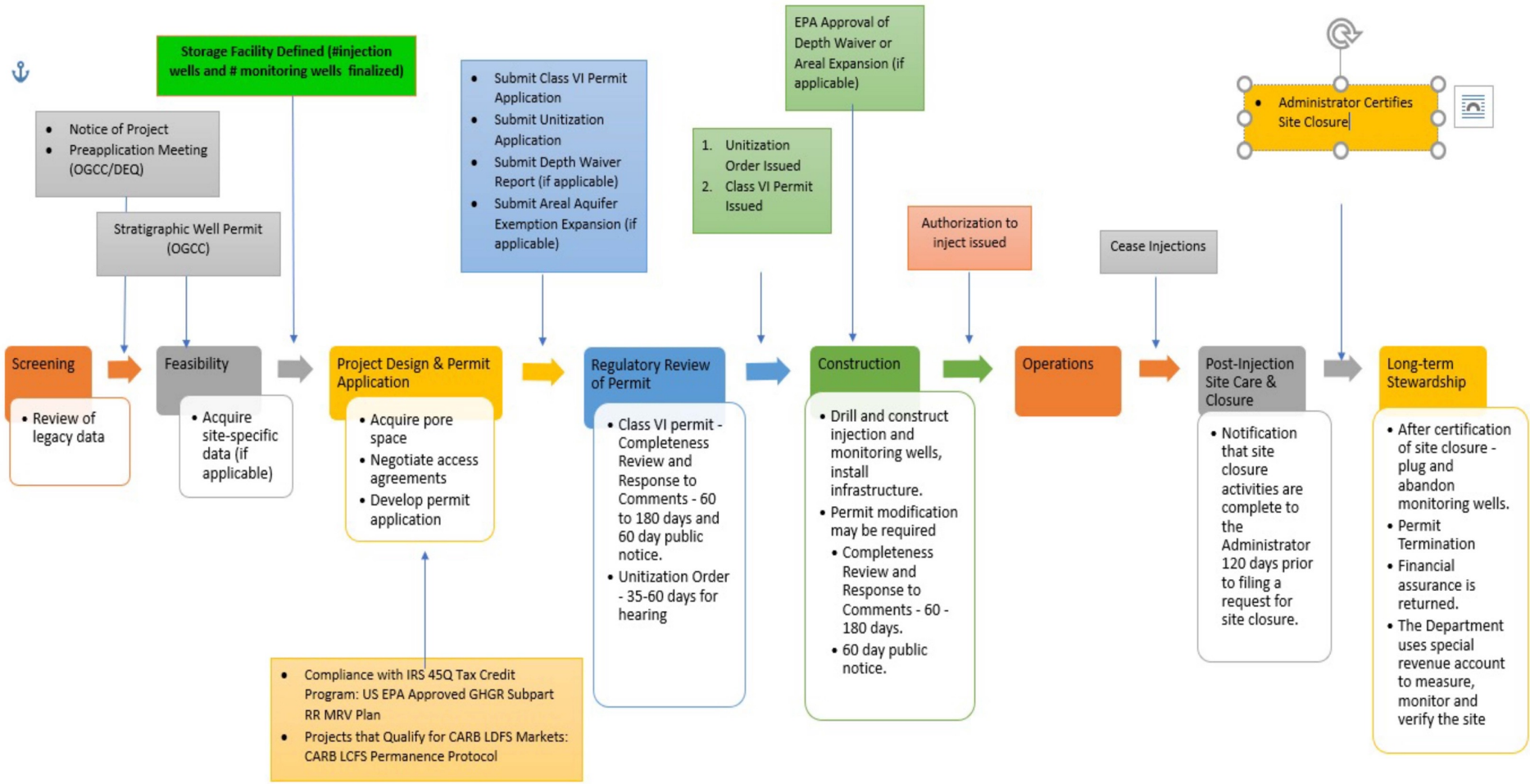
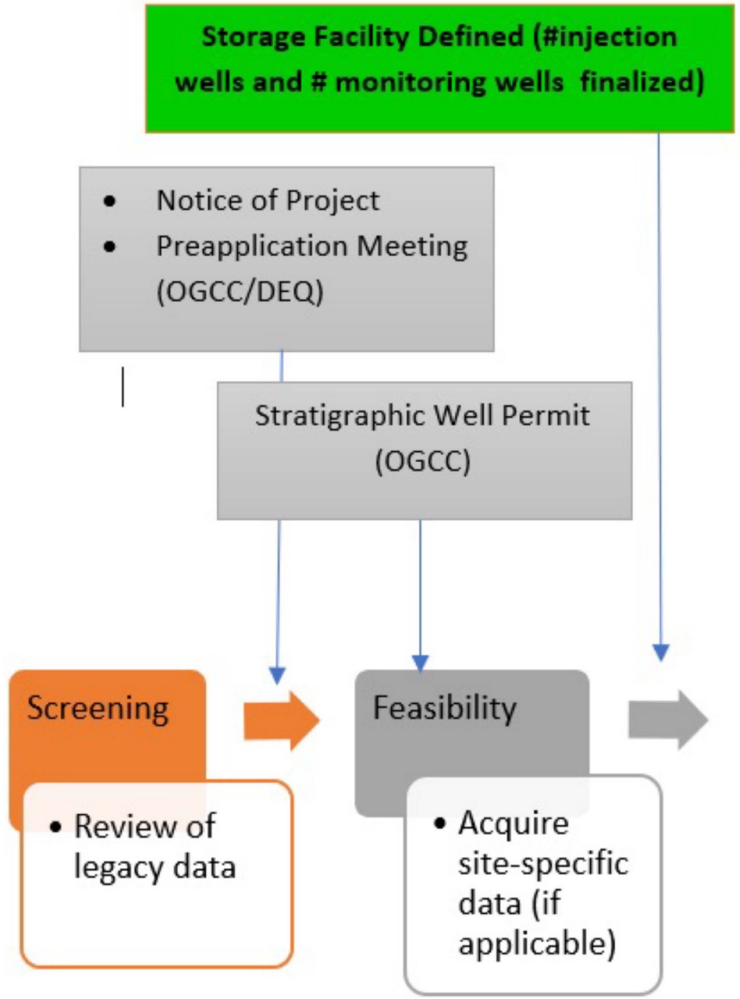


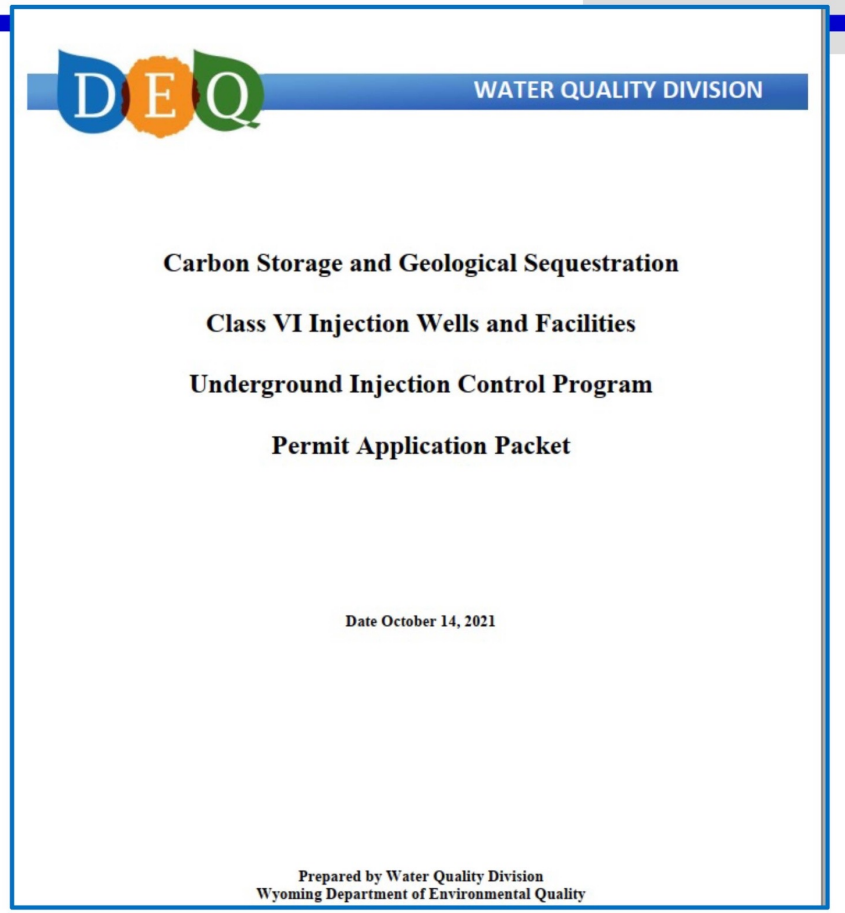
WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

Carbon Sequestration Utilization and Storage Sequence



WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY




WATER QUALITY DIVISION

Carbon Storage and Geological Sequestration

Class VI Injection Wells and Facilities

Underground Injection Control Program

Permit Application Packet

Date October 14, 2021

Prepared by Water Quality Division
Wyoming Department of Environmental Quality

Pre-Application Meeting

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

WATER QUALITY DIVISION

GEOLOGIC SEQUESTRATION

CLASS VI INJECTION WELL PRE-APPLICATION MEETING

Prospective owners or operators of a Geologic Sequestration Site are recommended to meet with the Water Quality Division of the Wyoming Department of Environmental Quality (Department) early in the project to ensure that the appropriate information is identified to complete the Class VI Injection Well and Facility Permit Application. The department has sixty (60) days to determine application completeness. Permit applicants have a mandatory sixty (60) day public notice period. Severely lacking applications, applications without original and required signatures, in a format that is not approved by the Administrator, applications with illegible information, or applications with information not submitted in a timely manner shall be returned to the applicant.

Contact Lily R. Barkau, Groundwater Section Manager at 307-777-7072 to request a pre-application meeting.

To request a trade secret/confidential commercial or financial information claim, please complete the CBI-TS External Claim Form and submit it with any documents via mail carrier or hand delivery to

Wyoming Department of Environmental Quality
Attn: Lily R. Barkau, Groundwater Section Manager, Water Quality Division.
200 West 17th Street, 2nd Floor
Cheyenne, WY 82002

During the pre-application meeting, the prospective owner or operator may provide discussion on:

1. Scope of the project.
2. Location, property ownership, Federal mineral estate.
3. Site Characterization data identified to date.
4. Anticipated timeframe to submit Class VI permit application.

During the pre-application meeting, the prospective owner or operator may meet with other Department coordinators from the Industrial Siting, Air Quality Division, and Water Quality Division, if requested. A representative from the Bonding Group may also be present to address questions regarding financial assurance. These groups may have requirements in addition to the Class VI permit:

Site Characterization – Stratigraphic Well

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

WATER QUALITY DIVISION

GEOLOGIC SEQUESTRATION

SITE CHARACTERIZATION

The geologic setting for the proposed geologic sequestration site must be sufficiently characterized. In accordance with Wyoming Water Quality Rules, Chapter 24, Section 12, (a) The geologic system shall be comprised of:

(i) An injection zone of sufficient areal extent, thickness, porosity, and permeability to receive the total anticipated volume of the carbon dioxide stream; and

(ii) Confining zones that are free of transmissive faults or fractures and of sufficient areal extent and integrity to contain the injected carbon dioxide stream and displaced formation fluids and allow injection at proposed maximum pressures and volumes without initiating or propagating fractures in the confining zones or causing non-transmissive faults to become transmissive.

(b) Owners or operators of Class VI wells shall identify and characterize additional zones, if they exist, that will impede vertical fluid movement, allow for pressure dissipation, and provide additional opportunities for monitoring, mitigation, and remediation. Faults and fractures that transect these zones shall be identified.

The following checklist should be evaluated to determine whether sufficient information has been collected to characterize the site in accordance with Wyoming Water Quality Rules, Chapter 24, Section 12:

Regional geology and geologic structure	Information on lithology, the sequence of geologic units (i.e., the injection and confining zones and USDWs), the thicknesses and lateral extent of formations, and correlation of units near the project site to place the GS project in a regional context. Description of the regional stratigraphy, including stratigraphic depictions. Geology should be described from the surface to the confining strata below the injection interval. Stratigraphic units, aquifer, confining zones, and the injection interval shall be indicated on any cross-sections. Local geology	☐

FORM 1
MAY, 2009

Wyoming Oil & Gas Conservation Commission
Office of State Oil and Gas Supervisor
P. O. Box 2640
Casper Wyoming 82602

12. County: | 9. API Number:

5. Split Estate Yes ☐ No ☐ | If Split Estate, provide the Form 1A.
Answer Yes, if Surface owner differs at all from Mineral owner.

APPLICATION FOR PERMIT TO: (Submit 1 copy on Fed., 2 on Fee & 3 copies on State Lands)
DRILL ☐ RE-ENTER/ DEEPEN ☐ RENEW OR EXTEND ☐

16. Mineral Ownership: Fee ☐ State ☐ Fed ☐
Mineral Lease #:
17. Surface Ownership: Fee ☐ State ☐ Fed ☐

1.
Oil Well ☐ Gas Well ☐ CBM Well ☐
Single Zone ☐ Multiple Zone ☐ Other
Directional ☐ Horizontal ☐ Natural Drift ☐
These in gray require a separate admin.or Comm. approval.

Yes No 6. **Well Spacing:**
☐ ☐ Does this well conform to Chapter. 3, Sec.2?
☐ ☐ Is this well an exception location?
If yes, attach the approval letter.
☐ ☐ Is this well in a spaced or exempted area?
If yes, Docket No.or Rule

INFORMATION ON THIS PAGE WILL BE RELEASED TO THE PUBLIC.

2. Operator:
3. Address:
Contact Person: | 3a. Phone Number: | 3b.Email:
7. Unit Name: (for committed lands only)
4. Location, (**quarter-quarter** and footages):
Surface (SHL): | 11. Section, Township & Range, Lot, TR (SHL): L / TR S T , R
14. DISTANCE from this well BHL to the nearest unit boundary or uncommitted lands, if less than 1120':
Bottom (BHL): | 11a. Section, Township & Range, Lot, TR (BHL): S T , R
15. DISTANCE from this well BHL to the nearest drilling, completed or applied-for well in the same reservoir, if less than 1120':
Latitude (SHL): | Longitude (SHL):
10. Reservoir:
18. DISTANCE: Is this location less than 350 feet from water supplies, residences, schools, parks, hospitals, churches, businesses or other places where people are known to congregate? No ☐ Yes ☐
13. Field Name:
19. Proposed depth: | 21. Ungraded Elevation: | 21a. Graded Elevation:
8. Well Number and Name:

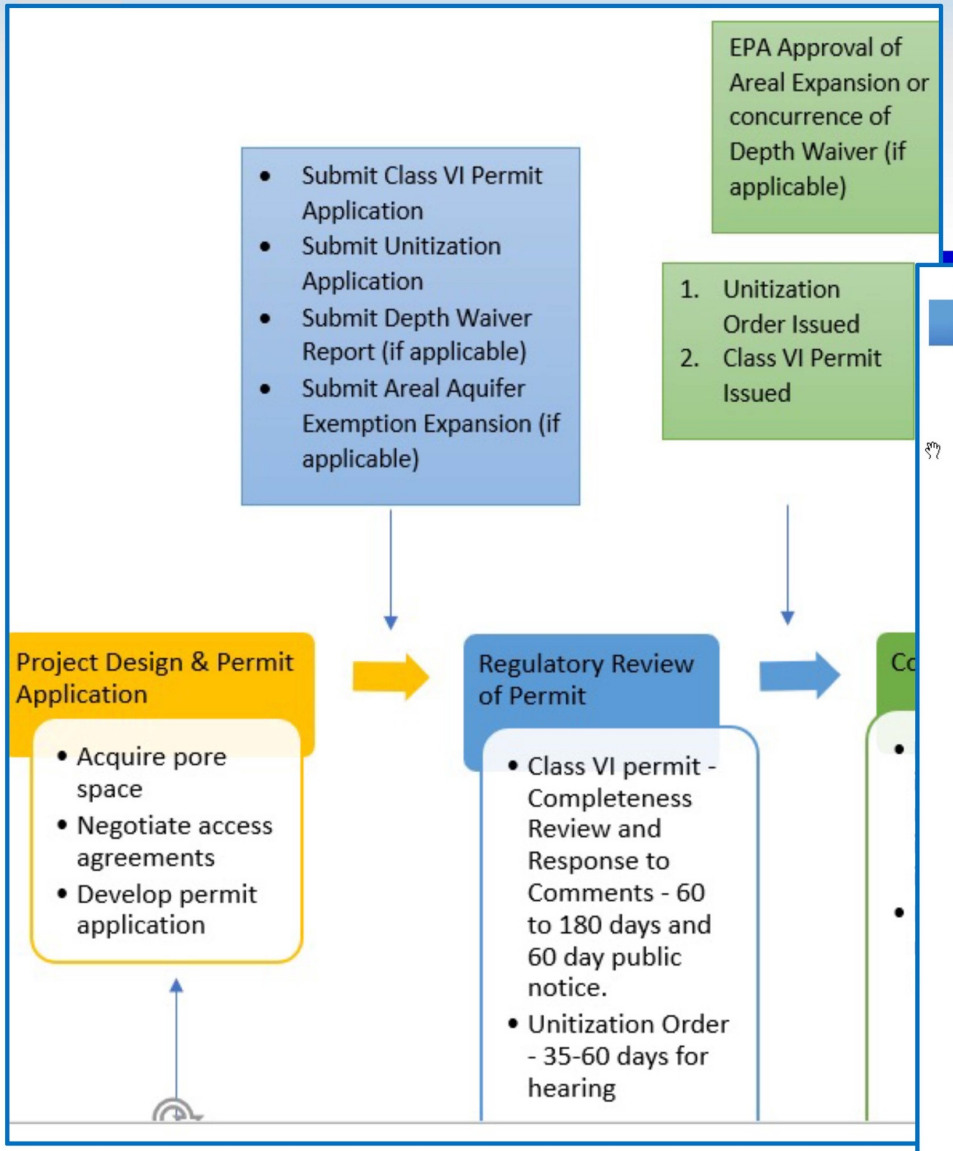
22. PROPOSED SURFACE & PRODUCTION CASING & CEMENTING PROGRAM

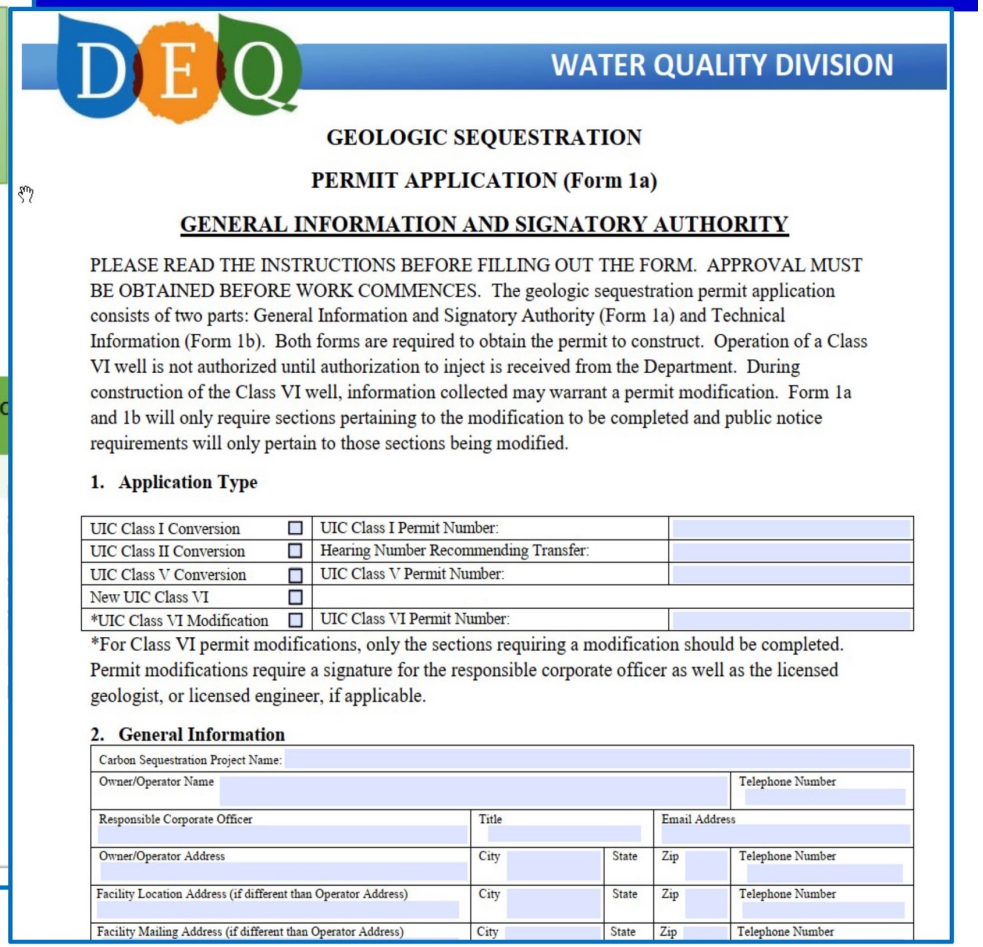
SIZE OF HOLE	SIZE OF CASING	Lb/ Foot	API Grade	NEW OR USED	DEPTH (MD)	SACKS OF CEMENT

23. DESCRIPTION OF PROPOSED OPERATIONS: If proposal is to directionally drill or deepen, give pertinent data on subsurface locations, measured and true vertical depth. If proposal is to deepen or plugback, give data on present productive zone and proposed new productive zone. Give blowout preventer program.
WOGCC DATE STAMP

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

Application – Form 1a





DEQ WATER QUALITY DIVISION

GEOLOGIC SEQUESTRATION

PERMIT APPLICATION (Form 1a)

GENERAL INFORMATION AND SIGNATORY AUTHORITY

PLEASE READ THE INSTRUCTIONS BEFORE FILLING OUT THE FORM. APPROVAL MUST BE OBTAINED BEFORE WORK COMMENCES. The geologic sequestration permit application consists of two parts: General Information and Signatory Authority (Form 1a) and Technical Information (Form 1b). Both forms are required to obtain the permit to construct. Operation of a Class VI well is not authorized until authorization to inject is received from the Department. During construction of the Class VI well, information collected may warrant a permit modification. Form 1a and 1b will only require sections pertaining to the modification to be completed and public notice requirements will only pertain to those sections being modified.

1. Application Type

UIC Class I Conversion	☐	UIC Class I Permit Number:	
UIC Class II Conversion	☐	Hearing Number Recommending Transfer:	
UIC Class V Conversion	☐	UIC Class V Permit Number:	
New UIC Class VI	☐		
*UIC Class VI Modification	☐	UIC Class VI Permit Number:	

*For Class VI permit modifications, only the sections requiring a modification should be completed. Permit modifications require a signature for the responsible corporate officer as well as the licensed geologist, or licensed engineer, if applicable.

2. General Information

Carbon Sequestration Project Name:					
Owner/Operator Name					Telephone Number
Responsible Corporate Officer		Title		Email Address	
Owner/Operator Address		City	State	Zip	Telephone Number
Facility Location Address (if different than Operator Address)		City	State	Zip	Telephone Number
Facility Mailing Address (if different than Operator Address)		City	State	Zip	Telephone Number

Potential Damage to Mineral Estates

Wyoming Water Quality Rules Chapter 8, Section 6(c)(ii) "The discharge of waste will not degrade or decrease the availability of mineral resources, including oil and gas."

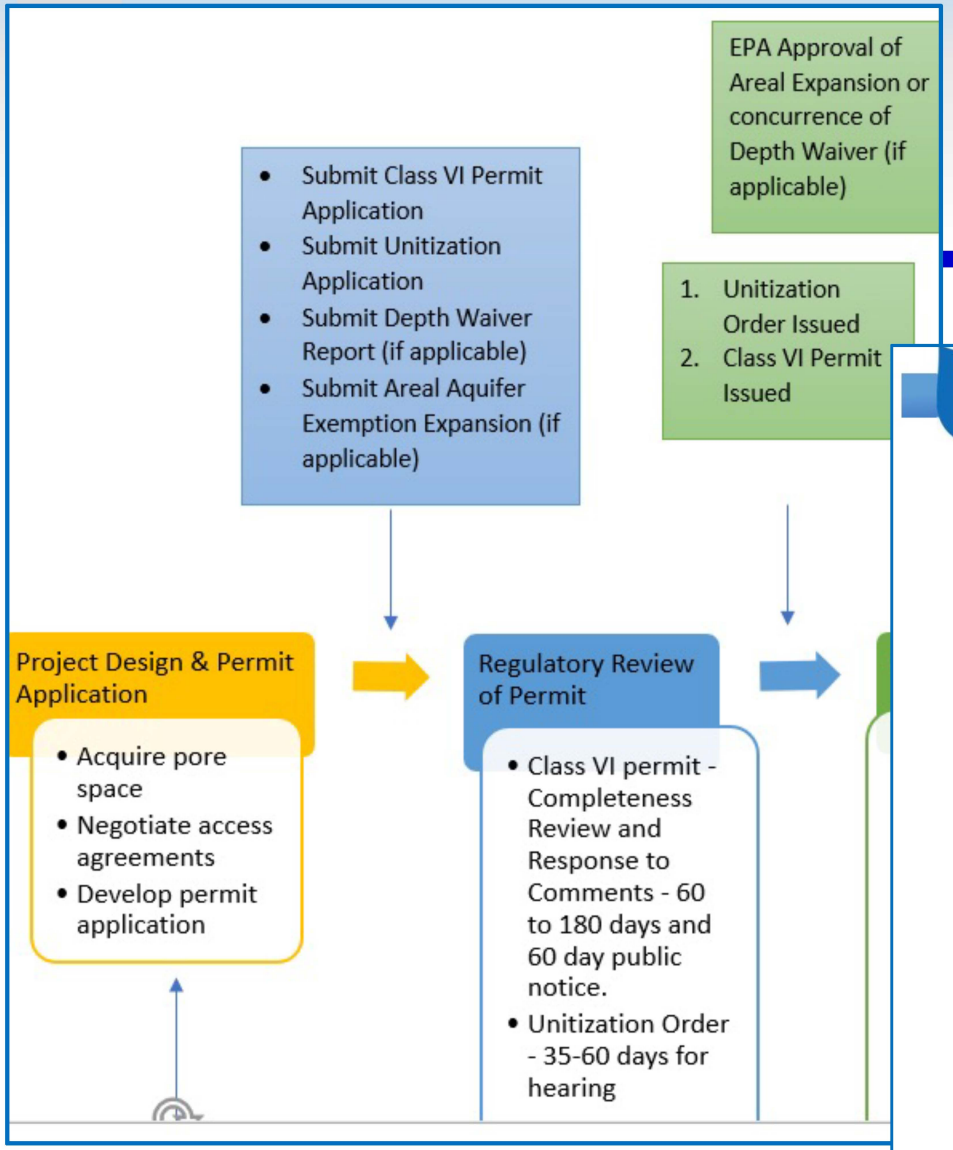
Therefore, WDEQ strongly encourages applicants to collaborate with nearby leases and mineral ownership owners (private, state or federal leases) to demonstrate that the proposed injection activities will present no damage to existing or future recovery of sub-surface minerals.

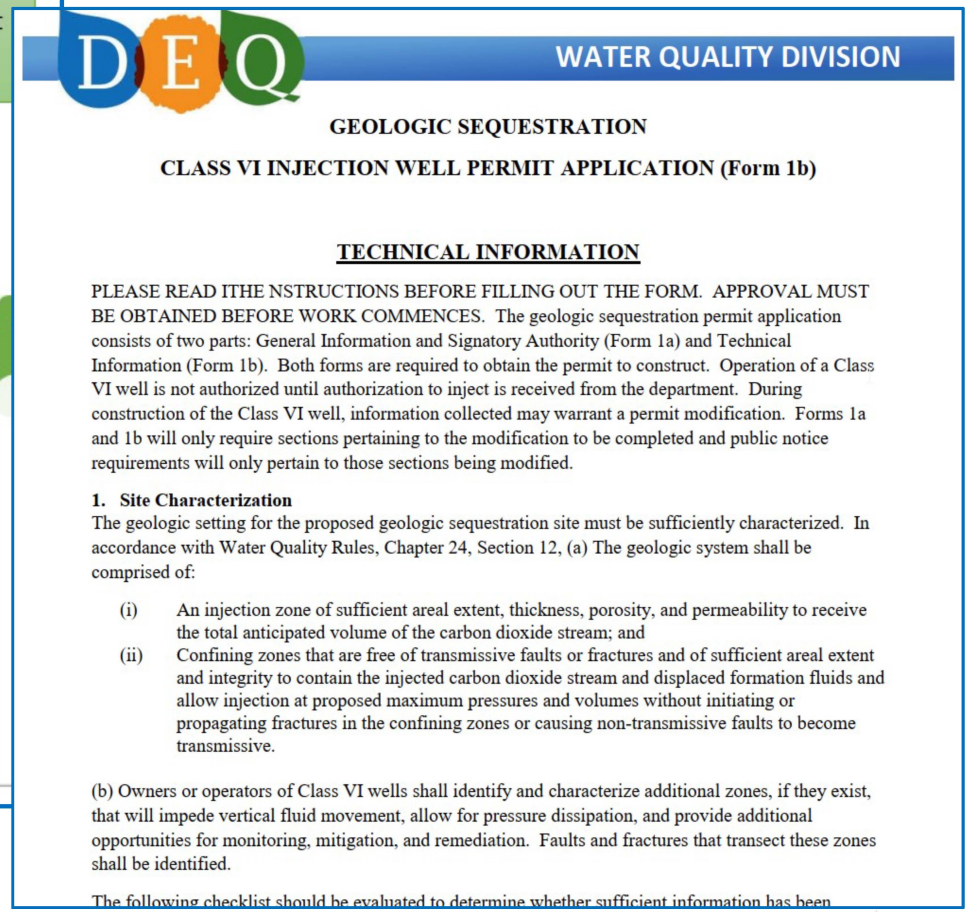
Unitization

- An order is issued through OGCC.
- Requirements for Unitization are outlined in 35-11-314 through 317.
- Begin the process of pore space access/ownership – leasing
- Unitization application requirements 35-11-315
- **Unitization Order is required prior to Class VI permit being issued.**

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

Application – Form 1b





WATER QUALITY DIVISION

GEOLOGIC SEQUESTRATION

CLASS VI INJECTION WELL PERMIT APPLICATION (Form 1b)

TECHNICAL INFORMATION

PLEASE READ ITHE NSTRUCTIONS BEFORE FILLING OUT THE FORM. APPROVAL MUST BE OBTAINED BEFORE WORK COMMENCES. The geologic sequestration permit application consists of two parts: General Information and Signatory Authority (Form 1a) and Technical Information (Form 1b). Both forms are required to obtain the permit to construct. Operation of a Class VI well is not authorized until authorization to inject is received from the department. During construction of the Class VI well, information collected may warrant a permit modification. Forms 1a and 1b will only require sections pertaining to the modification to be completed and public notice requirements will only pertain to those sections being modified.

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(i) An injection zone of sufficient areal extent, thickness, porosity, and permeability to receive the total anticipated volume of the carbon dioxide stream; and

(ii) Confining zones that are free of transmissive faults or fractures and of sufficient areal extent and integrity to contain the injected carbon dioxide stream and displaced formation fluids and allow injection at proposed maximum pressures and volumes without initiating or propagating fractures in the confining zones or causing non-transmissive faults to become transmissive.

(b) Owners or operators of Class VI wells shall identify and characterize additional zones, if they exist, that will impede vertical fluid movement, allow for pressure dissipation, and provide additional opportunities for monitoring, mitigation, and remediation. Faults and fractures that transect these zones shall be identified.

The following checklist should be evaluated to determine whether sufficient information has been

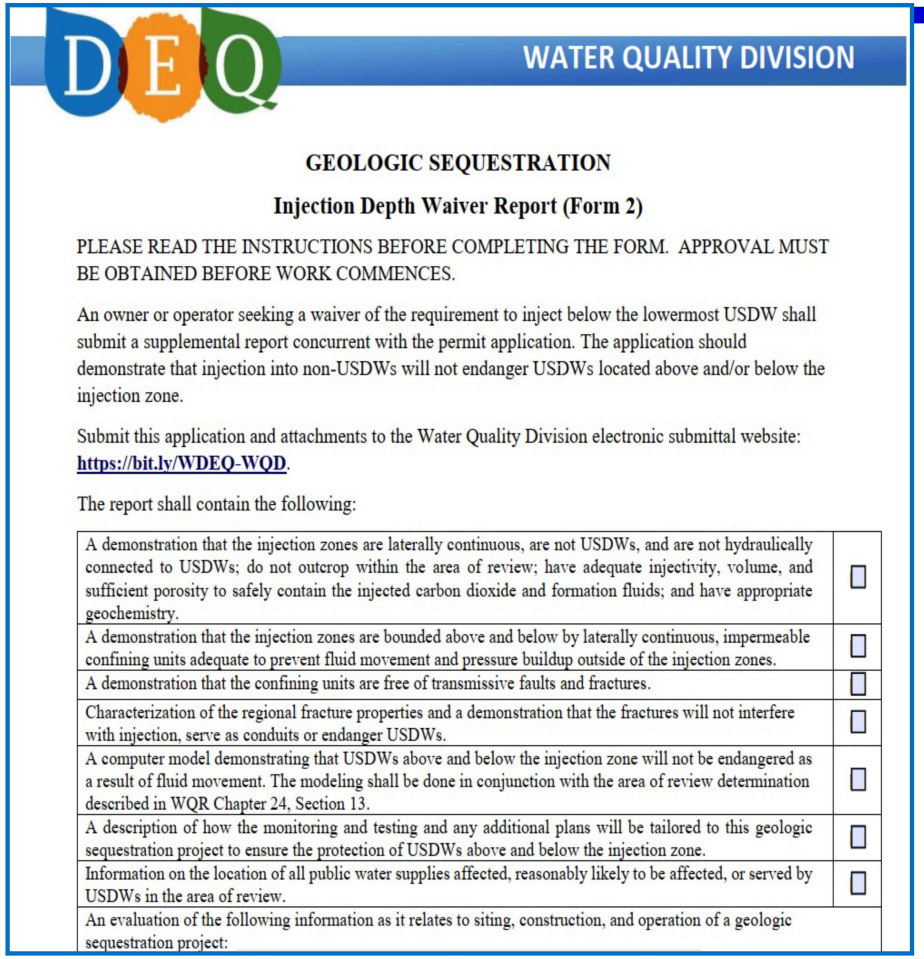
Required Plans

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

1. Area of Review and Corrective Action Plan (WQR Chapter 24, Section 13)
2. Testing and Monitoring Plan (WQR Chapter 24, Section 20)
3. Injection and Monitoring Wells Plugging Plan (WQR Chapter 24, Section 23)
4. Post-Injection Site Care and Site Closure Plan (WQR Chapter 24, Section 24)
5. Emergency and Remedial Response Plan (WQR Chapter 24, Section 25)

Aquifer Exemptions

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY



WATER QUALITY DIVISION

GEOLOGIC SEQUESTRATION

Injection Depth Waiver Report (Form 2)

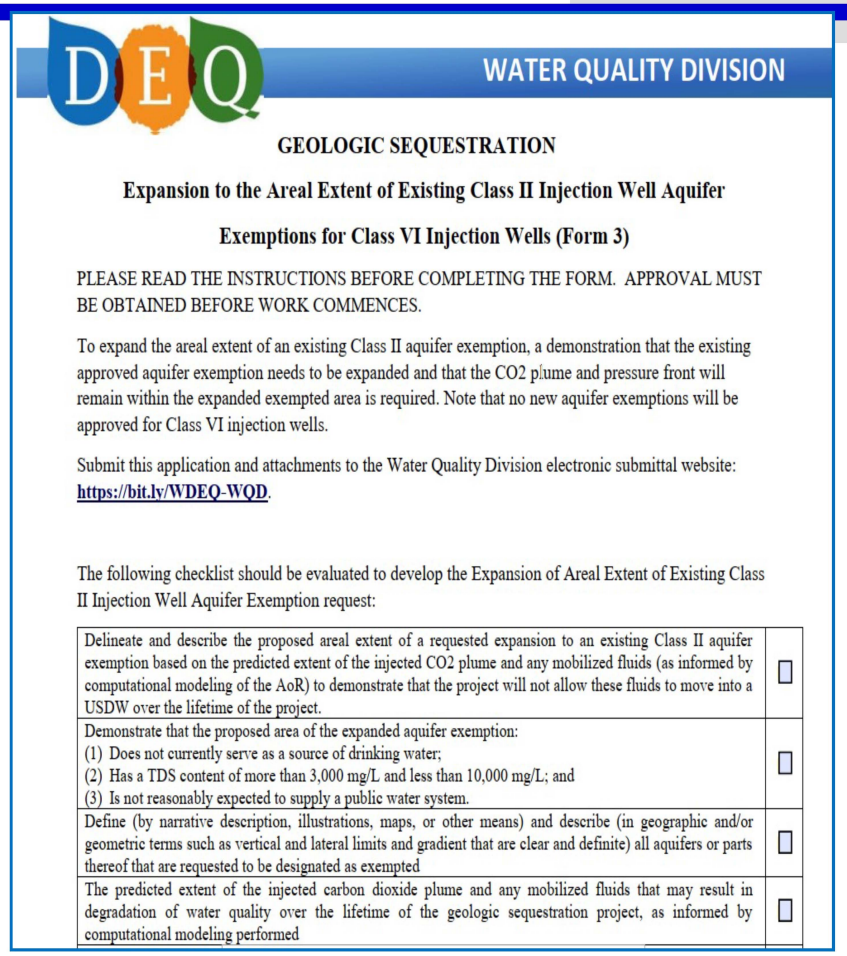
PLEASE READ THE INSTRUCTIONS BEFORE COMPLETING THE FORM. APPROVAL MUST BE OBTAINED BEFORE WORK COMMENCES.

An owner or operator seeking a waiver of the requirement to inject below the lowermost USDW shall submit a supplemental report concurrent with the permit application. The application should demonstrate that injection into non-USDWs will not endanger USDWs located above and/or below the injection zone.

Submit this application and attachments to the Water Quality Division electronic submittal website: https://bit.ly/WDEQ-WQD.

The report shall contain the following:

A demonstration that the injection zones are laterally continuous, are not USDWs, and are not hydraulically connected to USDWs; do not outcrop within the area of review; have adequate injectivity, volume, and sufficient porosity to safely contain the injected carbon dioxide and formation fluids; and have appropriate geochemistry.	☐
A demonstration that the injection zones are bounded above and below by laterally continuous, impermeable confining units adequate to prevent fluid movement and pressure buildup outside of the injection zones.	☐
A demonstration that the confining units are free of transmissive faults and fractures.	☐
Characterization of the regional fracture properties and a demonstration that the fractures will not interfere with injection, serve as conduits or endanger USDWs.	☐
A computer model demonstrating that USDWs above and below the injection zone will not be endangered as a result of fluid movement. The modeling shall be done in conjunction with the area of review determination described in WQR Chapter 24, Section 13.	☐
A description of how the monitoring and testing and any additional plans will be tailored to this geologic sequestration project to ensure the protection of USDWs above and below the injection zone.	☐
Information on the location of all public water supplies affected, reasonably likely to be affected, or served by USDWs in the area of review.	☐
An evaluation of the following information as it relates to siting, construction, and operation of a geologic sequestration project:	



WATER QUALITY DIVISION

GEOLOGIC SEQUESTRATION

Expansion to the Areal Extent of Existing Class II Injection Well Aquifer

Exemptions for Class VI Injection Wells (Form 3)

PLEASE READ THE INSTRUCTIONS BEFORE COMPLETING THE FORM. APPROVAL MUST BE OBTAINED BEFORE WORK COMMENCES.

To expand the areal extent of an existing Class II aquifer exemption, a demonstration that the existing approved aquifer exemption needs to be expanded and that the CO2 plume and pressure front will remain within the expanded exempted area is required. Note that no new aquifer exemptions will be approved for Class VI injection wells.

Submit this application and attachments to the Water Quality Division electronic submittal website: https://bit.ly/WDEQ-WQD.

The following checklist should be evaluated to develop the Expansion of Areal Extent of Existing Class II Injection Well Aquifer Exemption request:

Delineate and describe the proposed areal extent of a requested expansion to an existing Class II aquifer exemption based on the predicted extent of the injected CO2 plume and any mobilized fluids (as informed by computational modeling of the AoR) to demonstrate that the project will not allow these fluids to move into a USDW over the lifetime of the project.	☐
Demonstrate that the proposed area of the expanded aquifer exemption: (1) Does not currently serve as a source of drinking water; (2) Has a TDS content of more than 3,000 mg/L and less than 10,000 mg/L; and (3) Is not reasonably expected to supply a public water system.	☐
Define (by narrative description, illustrations, maps, or other means) and describe (in geographic and/or geometric terms such as vertical and lateral limits and gradient that are clear and definite) all aquifers or parts thereof that are requested to be designated as exempted	☐
The predicted extent of the injected carbon dioxide plume and any mobilized fluids that may result in degradation of water quality over the lifetime of the geologic sequestration project, as informed by computational modeling performed	☐

Completeness Review

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

- 60 days to conduct a completeness review
- Comments submitted to the operator on application deficiencies
- Resubmittal of information restarts the 60-day completeness review timeframe over
- Non-response after 180 days of WDEQ response will require the permit to be denied based on an incomplete application.

Permit Issuance (Permit to Construct)

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

- 60-day public comment/notice period.
- If Unitization is applicable, the OGCC Unitization Order will need to be issued and provided to DEQ prior to the issuance of the permit.
- Financial Assurance for the applicable phase is submitted and approved.
- Liability Insurance is submitted and approved.
- The permit issued allows for well construction. A permit modification may be necessary to receive authorization to inject.

Well Construction

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

Construction

- Drill and construct injection and monitoring wells, install infrastructure.
- Permit modification may be required
  - Completeness Review and Response to Comments - 60 - 180 days.
  - 60 day public notice.

- Construct the well
- Collect additional information from well drilling
- Conduct pre-operational testing
- New information – Will this require a permit modification?

Permit Modification

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

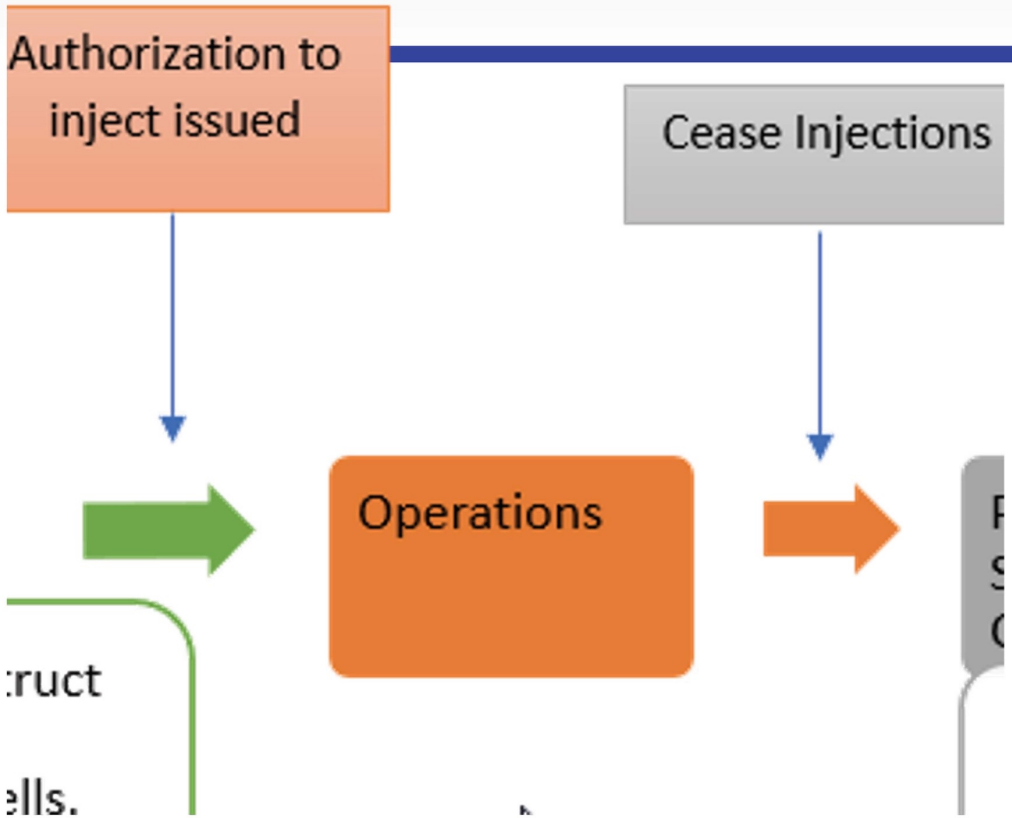
- Modifications to well construction are considered minor modifications and are not subject to public notice requirements.
- Revisions to any of the five required plans based on data collected requires a permit modification application
- Complete the portions of Form 1a and 1b that require modifications.
- Only those portions of the permit being modified are open to public notice requirements.

Permit Issuance (Authorization to Inject)

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

- 60-day public comment/notice period for those portions being modified.
- Financial Assurance for all phases is submitted and approved.
- Liability Insurance is submitted and approved.
- The permit issued allows for operation and injection.

Operation and Injections



Special Revenue Account

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

§ 35-11-313(f)(vii) – Fees to be paid by all permittees of geologic sequestration sites and facilities, which may include a per ton injection fee or a closure fee, during the period of injection of carbon dioxide and associated constituents into subsurface geologic formations.

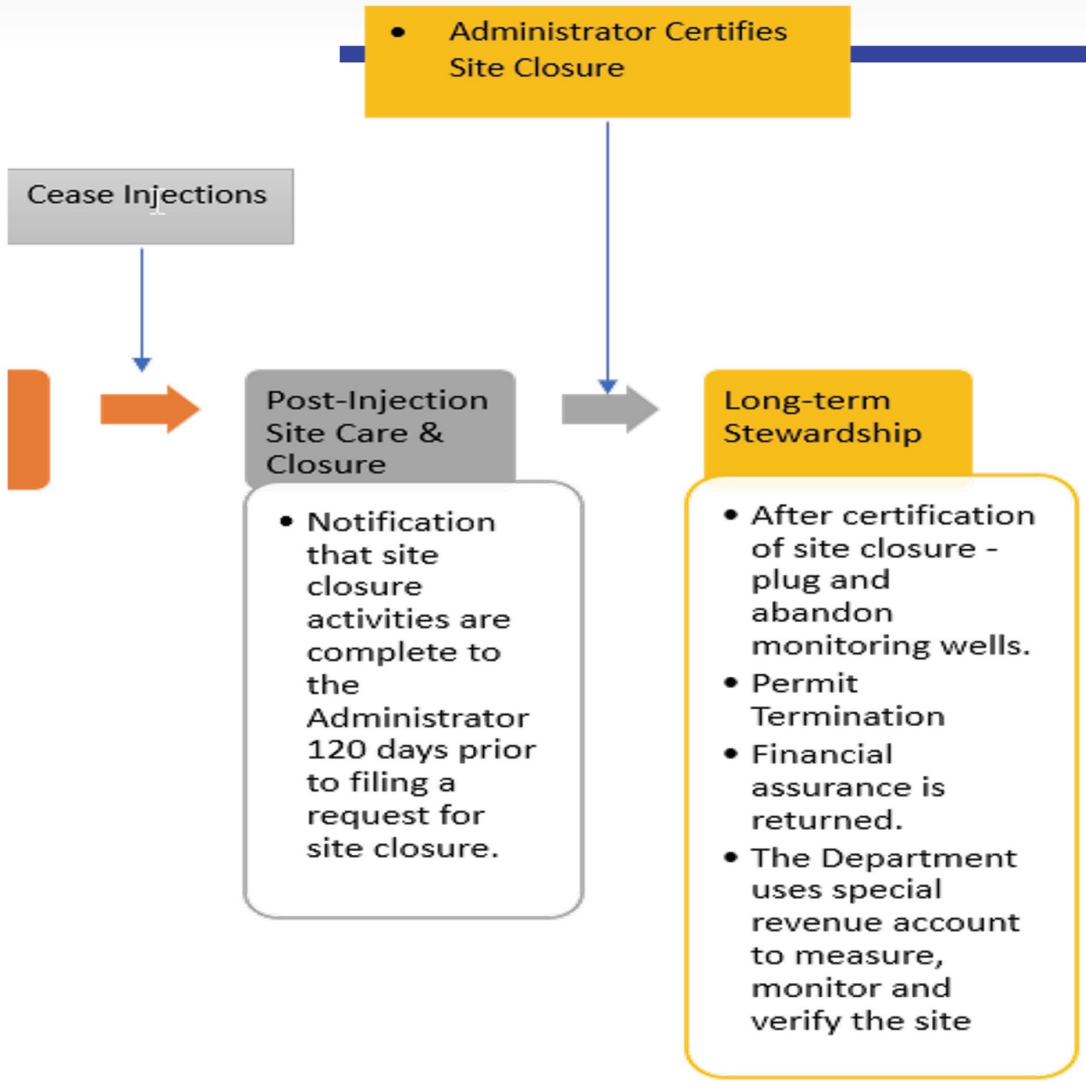
§35-11-318 – Geologic sequestration special revenue account

- Outlines the creation and use of monies collected during sequestration operations to be used for long-term stewardship – measurement, monitoring and verification of the geologic sequestration sites following site closure certification, release of all financial assurance instruments and termination of the permit.

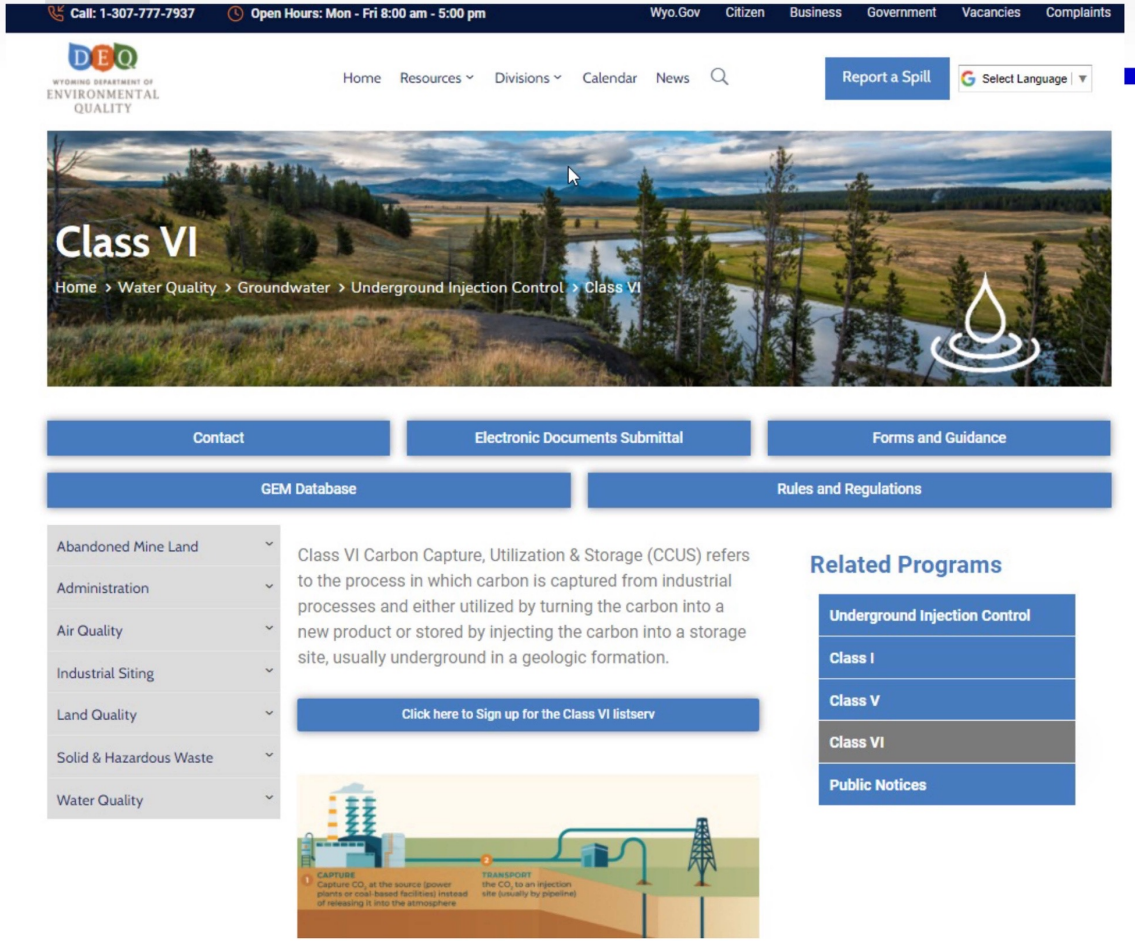
Water Quality Rules, Chapter 29 is being drafted to establish fees and other requirements.

Post-Injection Site Care & Closure, Long-term Stewardship

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY



Thank you



Contact:

Lily R. Barkau, P.G.
Groundwater Section Manager
(307) 777-7072
Lily.Barkau@wyo.gov

https://deq.wyoming.gov/water-quality/groundwater/uic/class-vi/

Class VI Permitting

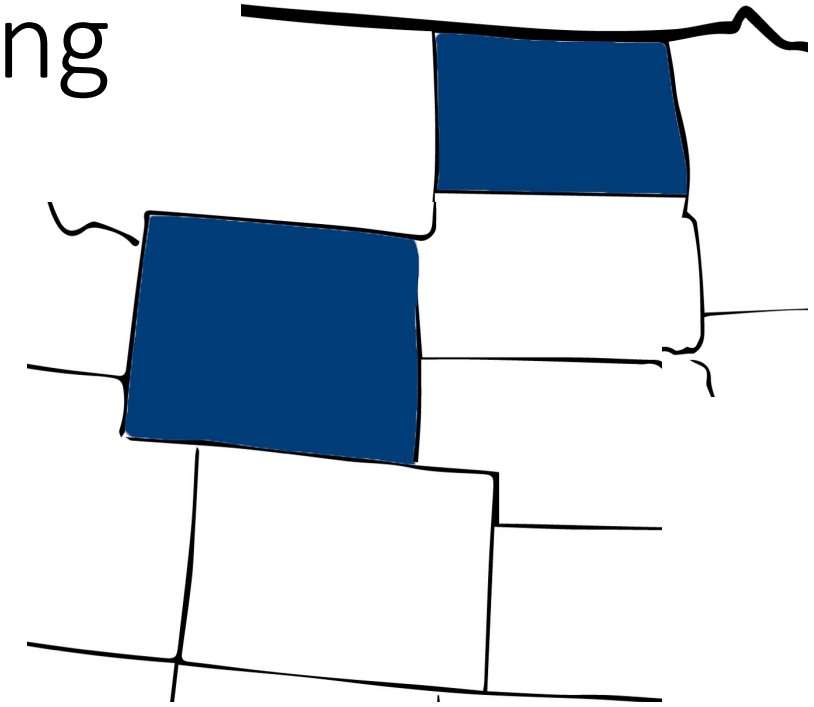
Carbon Capture, Utilization & Storage Development in Wyoming

Kris Koski, Esq.
December 16, 2021
10-11:30 am MT

UNIVERSITY OF WYOMING | School of Energy Resources

THE WORLD NEEDS MORE COWBOYS.

Class VI Permitting



- Wyoming and North Dakota are only states to obtain primacy from EPA to regulate CO2 injection wells for underground carbon storage (Underground Injection Control Class VI Wells).

- EPA regulates Class VI well permitting in every other state. Process likely to be lengthier than states with primacy.

- Jurisdiction for transboundary projects??
  - 40 CFR 145.1(e) “Upon approval of a State program, the administrator shall suspend the issuance of federal permits for those activities subject to the approved State program.”

Roles of DEQ and WOGCC

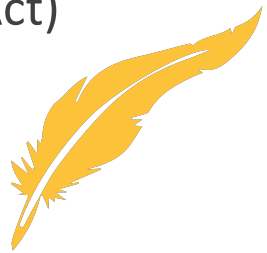
- DEQ, through its water quality division, issues Class VI permits and monitors CO2 storage injection wells. (Wyo. Stat. 35-11-313)
  - Various Permit Requirements: site and facilities description, plume modeling, plan for testing well integrity, monitoring wells to assess migrated CO2, bonding
- WOGCC has authority over injection wells for CO2-EOR and oil and gas exploration produced water disposal (Class II wells).
- Unitization of pore space for CO2 storage regulated by WOGCC (Wyo. Stat. 35-11-314 through 35-11-317)
  - Current rules mirror statutes and likely need updating.
  - "Any interested person" may file pore space unitization application.
  - Requires consent of 80%/75% of pore space owners for unitization order to be effective.
  - Requires WOGCC to evaluate and approve "allocation of economic benefits generated from use of pore space within the unit area…"
- Liability currently in the injector for an unlimited duration pursuant to Wyoming law.
  - Draft bill currently in the Joint Minerals Committee to transfer liability to State after site closure certificate issued (10 years following completion of activities).

Little Federal Guidance

- “Pore Space” storage requires significantly sized parcels of land and proper geology. In Wyoming, the vast majority of applicable locations are going to involve federal interests.
- Who owns the pore space? State Law = surface owner, SRHA patents??
- ROW acquisition under Title V of FLPMA?
  - No provision expressly authorizes
  - Interim Memorandum, dated December 2011 and now expired, instructed that site characterization applications to be filed under Section 302(b) of FLPMA (Form 2920-1) and took the position that Section 501 provided authority.
- No unitization statutes (combining multiple parcels and/or multiple owners’ tracts)
- Long term liability??
- NEPA review (average EIS = 4.5 years)…upcoming construction deadlines for 45Q
- Seismic authority?? BLM Form 3150-4 presumably for oil and gas exploration pursuant to regulations

Legislative and Regulatory Opportunities and Suggestions

- Interim Guidance issued by BLM/Interior for processing CCUS applications on federal lands and minerals.
- Legislation that directly addresses CCUS on federal lands rather than reliance on broad interpretation of Section 501 of FLPMA. (i.e. a Pore Space Leasing Act)
  - Designate agency (BLM natural fit)
  - Address long term liability and abandonment
  - Provide process for unitization of interests



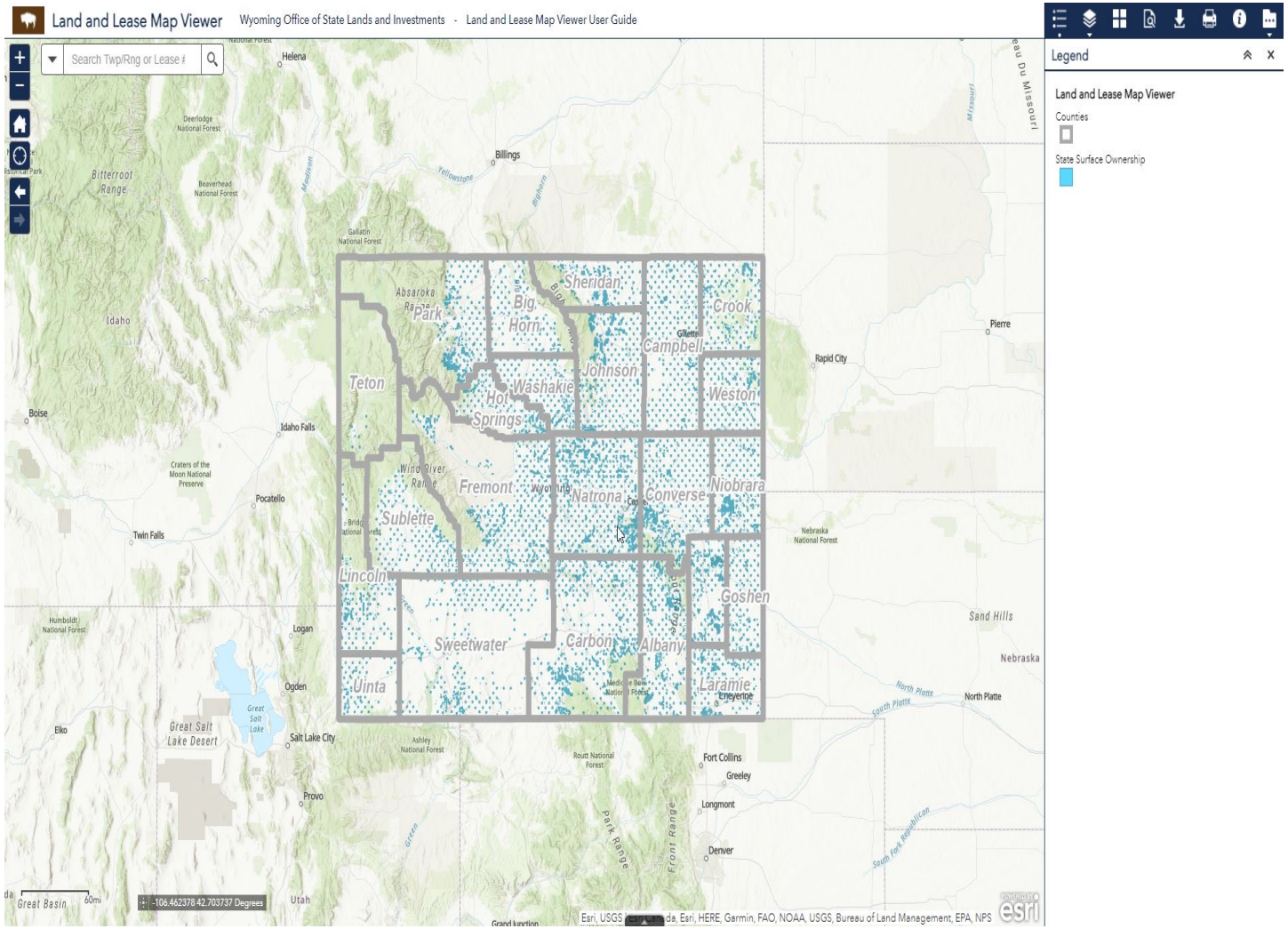
- Clarification of pore space ownership a matter of state law (court precedent, statutory)
- Adopt categorical exclusions to NEPA to cover certain aspects of geologic storage permits. (i.e. projects with no surface disturbing activities on federal lands)
- *Note: Senate Energy Committee currently involved in legislative process on similar topics.*

CCUS Leasing on State Trust Land

Wyoming Office of State Lands and Investments

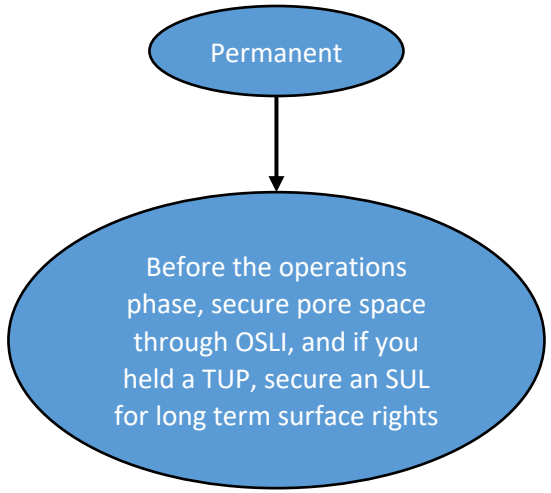
STEP ONE

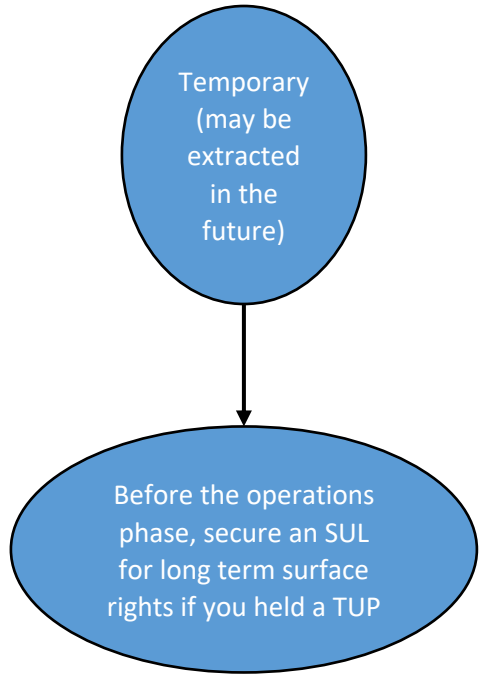
- Identify state owned parcels that work for your project
  - Land and Lease Map Viewer
- If the State owns the surface, the pore space is also owned
- Temporary Use Permits for monitoring wells can be obtained to determine project feasibility
  - Once the land has been identified, it is recommended to contact OSLI to coordinate project timelines and discuss the application process



STEP TWO

- Identify permanence of injected CO2
  - A surface lease needs to be secured for both temporary and permanent storage projects
  - Pore space needs to be secured only if storage is permanent
    - Purchase
    - Lease
    - Easement
- Submit application(s)
  - Negotiate and secure appropriate lease(s) with OSLI
  - Maximum surface lease term is 75 years
  - Timeline for approval could be 6+ months from submission of application depending on project details and application completeness





Office of State Lands and Investments
2022 Board Meetings

Contact: Barbara Pace 307-777-6629

February 3, 2022- 8:00 a.m. -12:00 p.m.
State Loan and Investments Board/ State Board of Land Commissioners - WBC

March TBD, 2022 - 8:00 a.m. - 12:00 p.m.
*Treasurer's Special Session

April 7, 2022- 8:00 a.m. - 12:00 p.m.
State Loan and Investments Board/ State Board of Land Commissioners- WBC

June 2, 2022- 8:00 a.m. - 12:00 p.m.
State Loan and Investments Board/ State Board of Land Commissioners - WBC

August 4, 2022- 8:00 a.m. - 12:00 p.m.
State Loan and Investments Board/ State Board of Land Commissioners

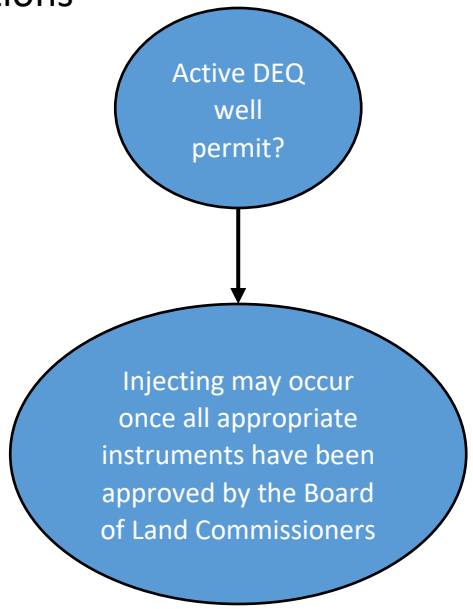
October 6, 2022- 8:00 a.m. - 12:00 p.m.
State Loan and Investments Board/ State Board of Land Commissioners- WBC

November 3, 2022- 8:00 a.m. - 12:00 p.m.
State Loan and Investments Board *Transportation Enterprise Account Grant Meeting

December 1, 2022- 8:00 a.m. - 12:00 p.m.
State Loan and Investments Board/ State Board of Land Commissioners

STEP THREE

- Once the appropriate lease instruments have been approved by the State Board of Land Commissioners and a well permit has been approved through DEQ, the operations/injection phase may begin
- At the end of the life of the project, the surface must be reclaimed to near original conditions



“CCUS Financing”

Carbon Capture, Utilization & Storage Development in Wyoming

December 16, 2021
10-11:30 am MT

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THE WORLD NEEDS MORE COWBOYS.

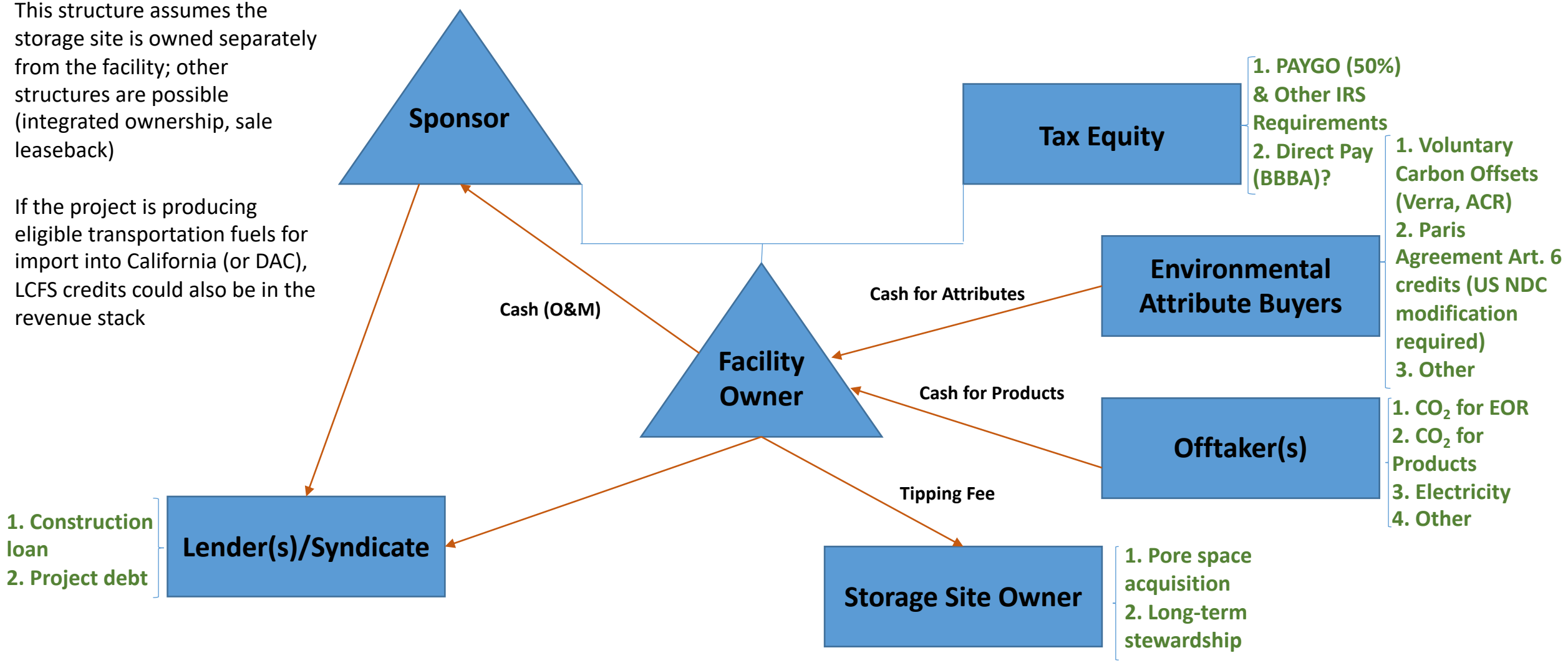
Financing CCS/CCUS Revolves Around §45Q

- ✓§45Q Overview
- ✓Pending amendments to section §45Q in the Build Back Better Act
- ✓A brief note about H.R. 3684 – The Infrastructure Investment & Jobs Act
- ✓Project Finance #101

One Potential Project Finance/45Q Deal Structure

This structure assumes the storage site is owned separately from the facility; other structures are possible (integrated ownership, sale leaseback)

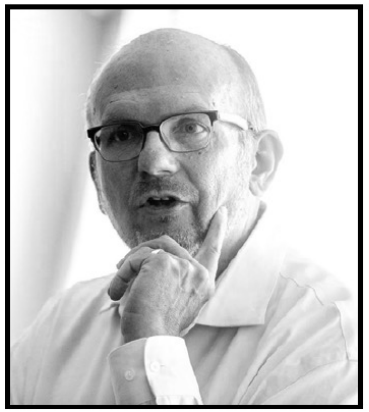
If the project is producing eligible transportation fuels for import into California (or DAC), LCFS credits could also be in the revenue stack



Note: Nothing presented here constitutes legal advice

WEBINAR PANEL DISCUSSION



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