



Update on the Texas Class VI UIC Program

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PRESENTATION OUTLINE



- Current status of Texas application for Class VI primacy
- Additional State Requirements
- Class VI Issues
 - Class II Acid Gas Wells vs Class VI Wells
- Stakeholder Concerns about CCS
- Overview of Texas CCS Projects

UPDATE ON TEXAS CLASS VI PRIMACY APPLICATION



- 12/2022 Class VI primacy application to EPA Region 6
- 08/2023 Adopted rule amendments
- 01/2024 Last of revised application elements to EPA Region 6
- Developed technical review templates to make reviews consistent, objective, and auditable
- In process of hiring additional staff
- New Office of Public Engagement



Until primacy:

- Application to both EPA and RRC
- GSDDT
- Reviewing applications in tandem with EPA

ADDITIONAL STATE CLASS VI REQUIREMENTS



- Organizational Report
- Drilling permit
- Fee (Trust Fund)
- Good faith claim
- Alternative PISC period (no 50-year default)
- Cannot impact/interfere with any previous/existing Class I injection well
- Requires coordination between storage facility operator and oil and gas driller

ADDITIONAL STATE CLASS VI REQUIREMENTS (cont'd)



- Requires a safety plan that includes:
 - instructions/procedures for alerting general public/public safety personnel;
 - procedures for requesting assistance and for follow-up action to remove public from area of exposure;
 - provisions for advance briefing of the public within AOR on subjects such as the hazards and characteristics of CO₂;
 - manner in which public will be notified of emergency and steps to be taken in case of emergency
 - if necessary, proposed actions to minimize and respond to risks associated with seismic events

- Requires applicant to hold public meeting

ISSUES



- Amalgamation (“unitization”)
- Transfer of liability/transfer of stewardship
- Federal definition of “CBI” vs state definition of “trade secret”
- Direct vs Indirect monitoring
- State authority to “enforce” Community Benefit Plans/Agreements
- Classification of
 - waste generated during drilling and operation of Class VI wells
 - well for injection of formation fluids produced to control pressure

➤ Acid Gas Injection (AGI) Wells

- On EPA's webpage, the introduction to EPA's 2015 Memorandum related to Key Principles in EPA's Underground Injection Control Program Class VI Rule Related to Transition of Class II Enhanced Oil or Gas Recovery Wells to Class VI, states that EPA "interprets these key principles as applicable to Class II-D acid gas wells."
- Injection of acid gas that contains CO₂ and was generated as part of oil and gas processing may continue to be appropriately permitted under the UIC Class II program.
- The key factor in determining the potential need to transition an acid gas disposal well from Class II to Class VI is the increased risk to USDWs related to significant storage of CO₂ in the reservoir, where the regulatory tools of the Class II program cannot successfully manage the risk.

ISSUES (cont'd)



Acid Gas Injection (AGI) Wells

Disposal Gas Rate (w CO ₂)	CO ₂ Source	UIC Class	Additional Requirements
≤ 10 MMcf/day	One or two upstream O&G sources*	Class II	None
> 10 MMcf/day	One or two upstream O&G sources*	Class II	Reporting to confirm no increased risk to USDW
≤ 10 MMcf/day	One or two upstream O&G sources*	Class II	None
			Modeling to demonstrate no increased risk to USDW and Reporting to confirm no increased risk to USDW (Class II), or
10 - 20 MMcf/day	Many upstream O&G sources*	Class II or Class VI	16 TAC Ch. 5, Subch. B (Class VI)
≥ 20 MMcf/day	Many upstream O&G sources*	Class VI	16 TAC Ch. 5, Subch. B
Any	Downstream O&G or non-O&G sources	Class VI	16 TAC Ch. 5, Subch. B

* "acid gas generated from oil and gas activities from leases, units, fields, or a gas processing facility" per 16 TAC §5.201 (c)



Any **disposal** application with CO₂ as an injection fluid will be reviewed.

- CO₂ source
- Information regarding the well construction materials and any other precautions taken for injection of CO₂
- Staff evaluation of proposed injection volumes and pressures to ensure no increased risk to USDWs. Staff may require modeling.
- Permits may include the conditions to enable RRC to monitor thret to USDWs.



- **Induced Seismicity** from Underground Injection of CO₂
- Groundwater Contamination by CO₂
- Release of Concentrated CO₂ (Asphyxiant) Near Human Receptors
- **CO₂ Pipeline Leaks (like Mississippi)**
- **CO₂ Pipeline Encroachments to Property**
- Environmental Justice Impacts
- General “Fear of the Unknown” and NIMBY

Public Awareness of Induced Seismicity in Texas



TexNet Earthquake Catalog

Since 2017-01-01

12/31/2016

12/6/2023

Focal Mechanisms

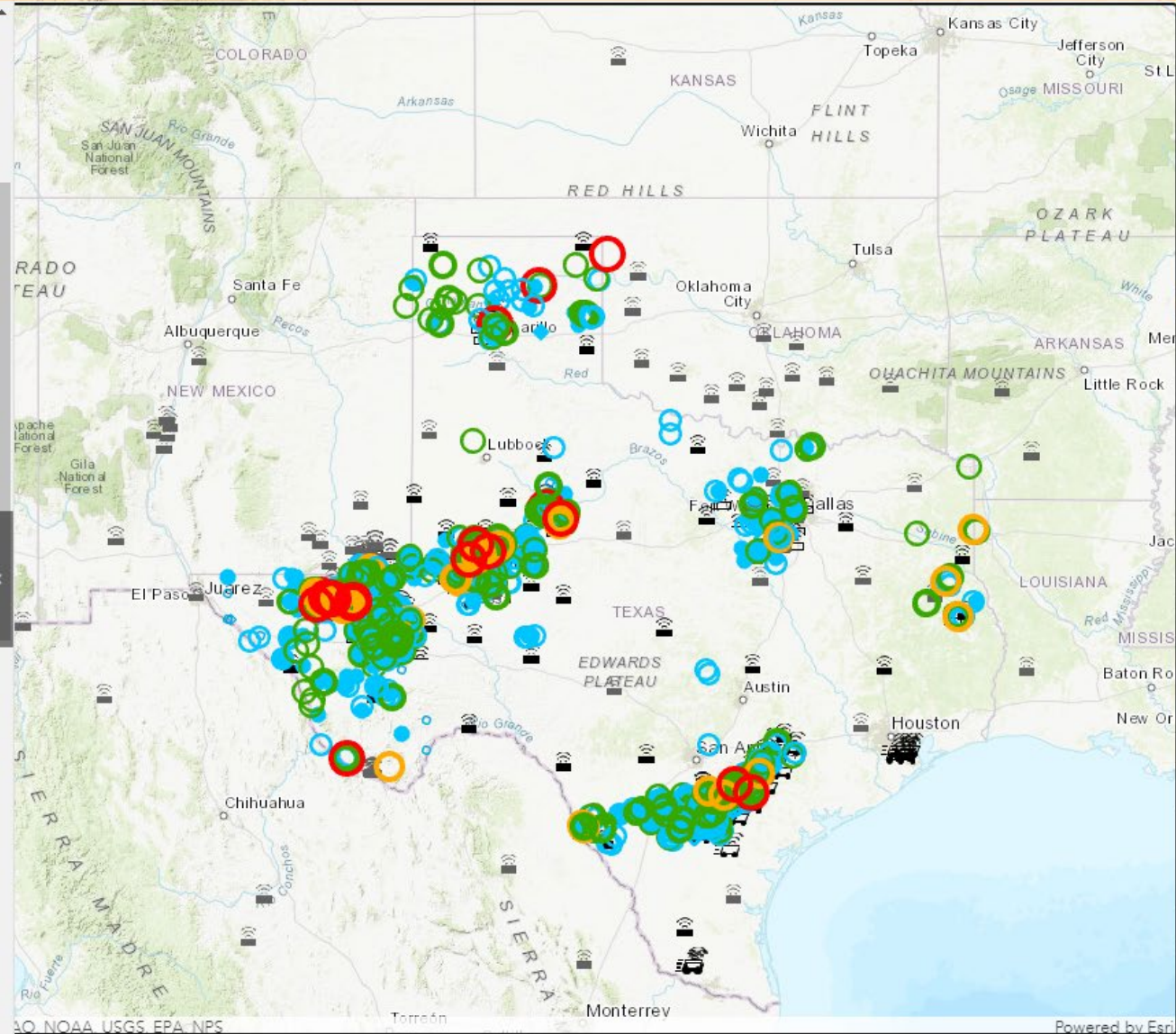
TexNet Catalog

Earthquake

- 0 <= Magnitude <= 1.5
- 1.5 < Magnitude <= 2.0
- 2.0 < Magnitude <= 2.5
- 2.5 < Magnitude <= 3.0
- 3.0 < Magnitude <= 3.5
- 3.5 < Magnitude <= 4.0
- 4.0 < Magnitude <= 5.5
- Magnitude > 5.5

Earthquakes (Preliminary)

- 0 <= Magnitude <= 1.5
- 1.5 < Magnitude <= 2.0



Satartia, Mississippi CO2 Pipeline Rupture: February 22, 2020



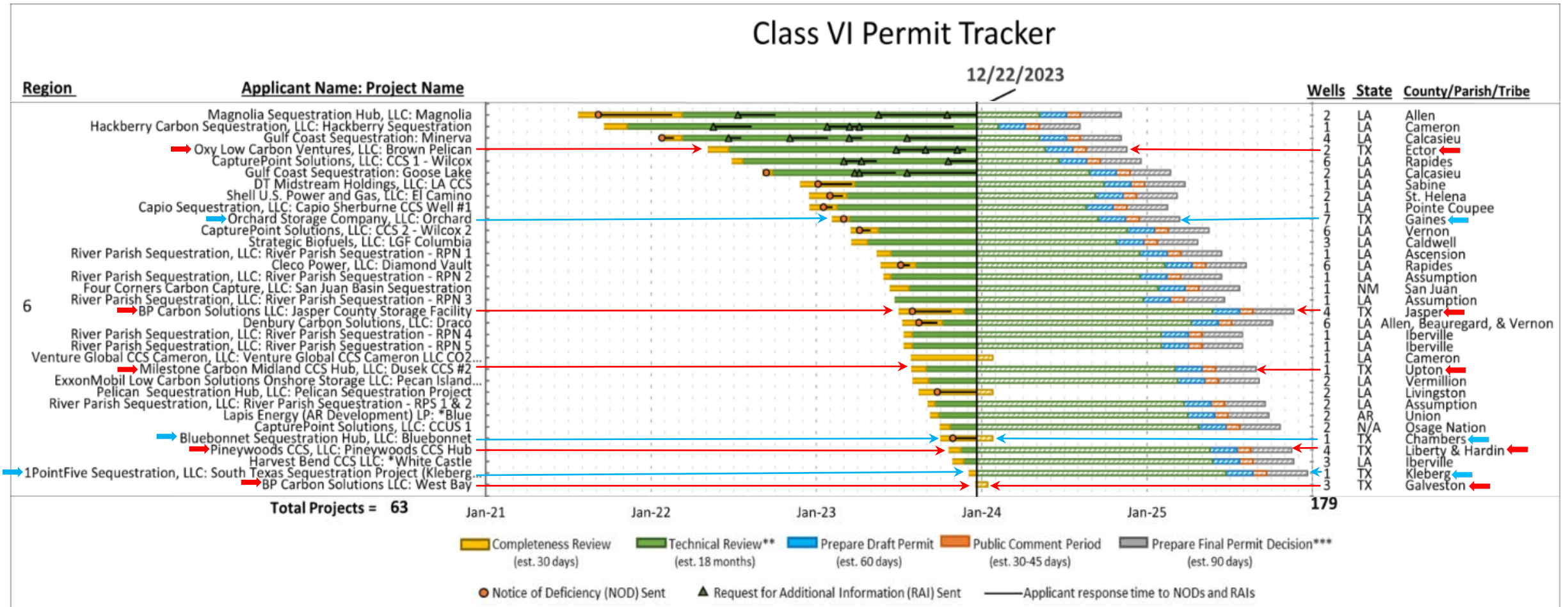
- The 31-mile long Delta Pipeline was built in 2007 by Denbury, to provide CO2 from the Jackson Dome to the Tinsley Field EOR project outside Satartia.
- CO2 from the Jackson Dome also contains H2S, that likely worsened residents' symptoms and accounts for the gas cloud's odor and greenish color (since pure CO2 is odorless and colorless).
- Weather – related soil instability caused the rupture. Regulators found that Denbury failed to recognize the risks that the weather and soil posed to the pipeline.





Some Examples of Proposed Carbon Capture & Sequestration (CCS) Projects in Texas

EPA Website Showing Current Status of All Class VI UIC Permit Applications in Region 6



→ 5 Class VI UIC Permit Application received by **both** Texas and EPA Region 6

→ 3 Class VI UIC Permit Application received by EPA Region 6 only.

* As of December 22, 2023

Oxy Low Carbon Ventures Brown Pelican CCS Project in Ector County, Texas

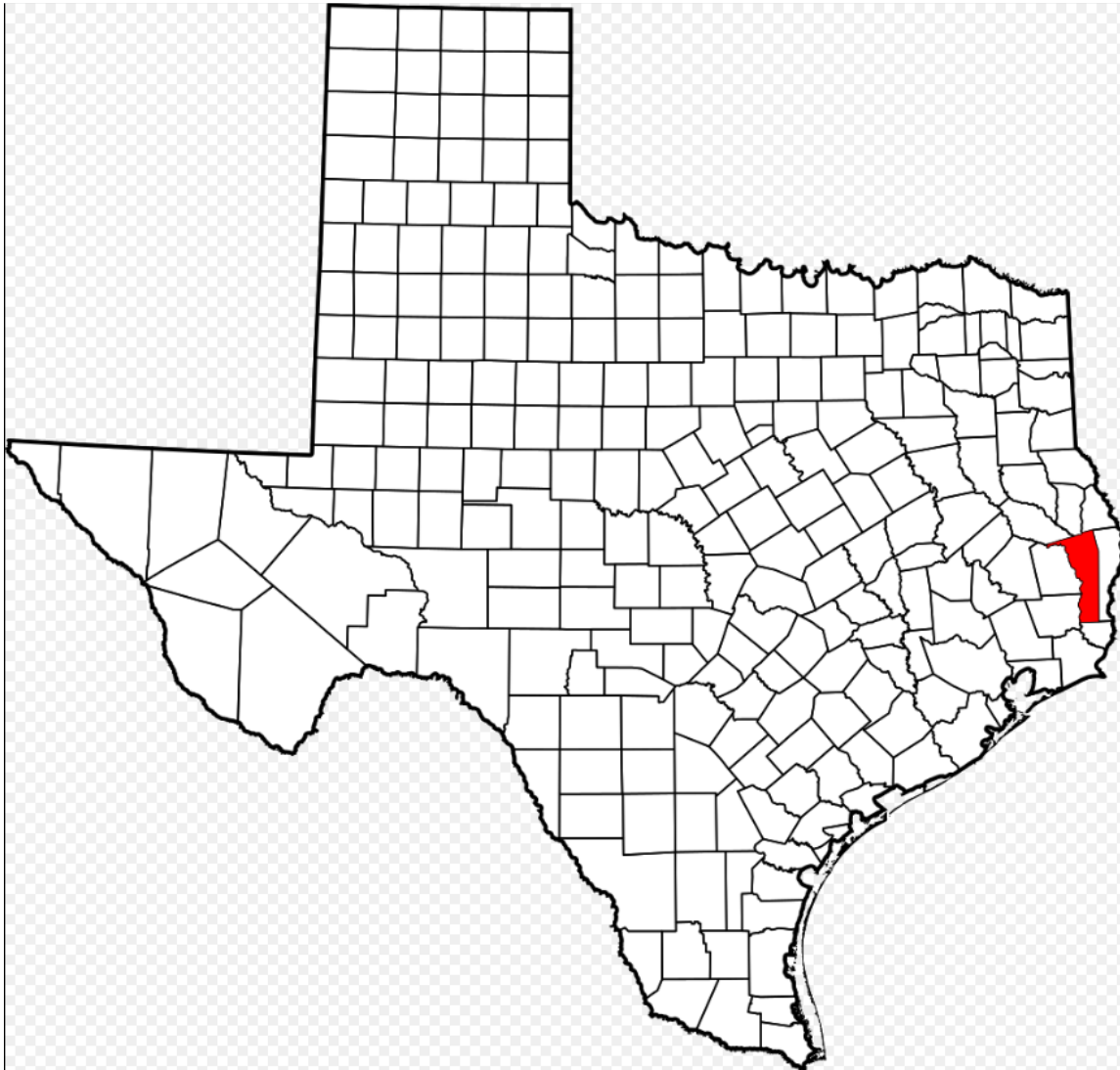


Ector County, Texas

- Class VI UIC application submitted to EPA and Texas.
- 1st Class VI UIC Application in Texas
- Direct Air Capture
- Injection into Permian-age carbonate rocks (saline aquifer)



Artists Rendering of Oxy DAC Unit
Under Construction in Ector County, Texas



Jasper County, Texas

- Class VI permit application submitted to EPA and Texas.
- 2nd Class VI application in Texas. First in East Texas.
- Four wells proposed.
- Injection into Tertiary clastic rocks with shale top-seal (saline aquifer)

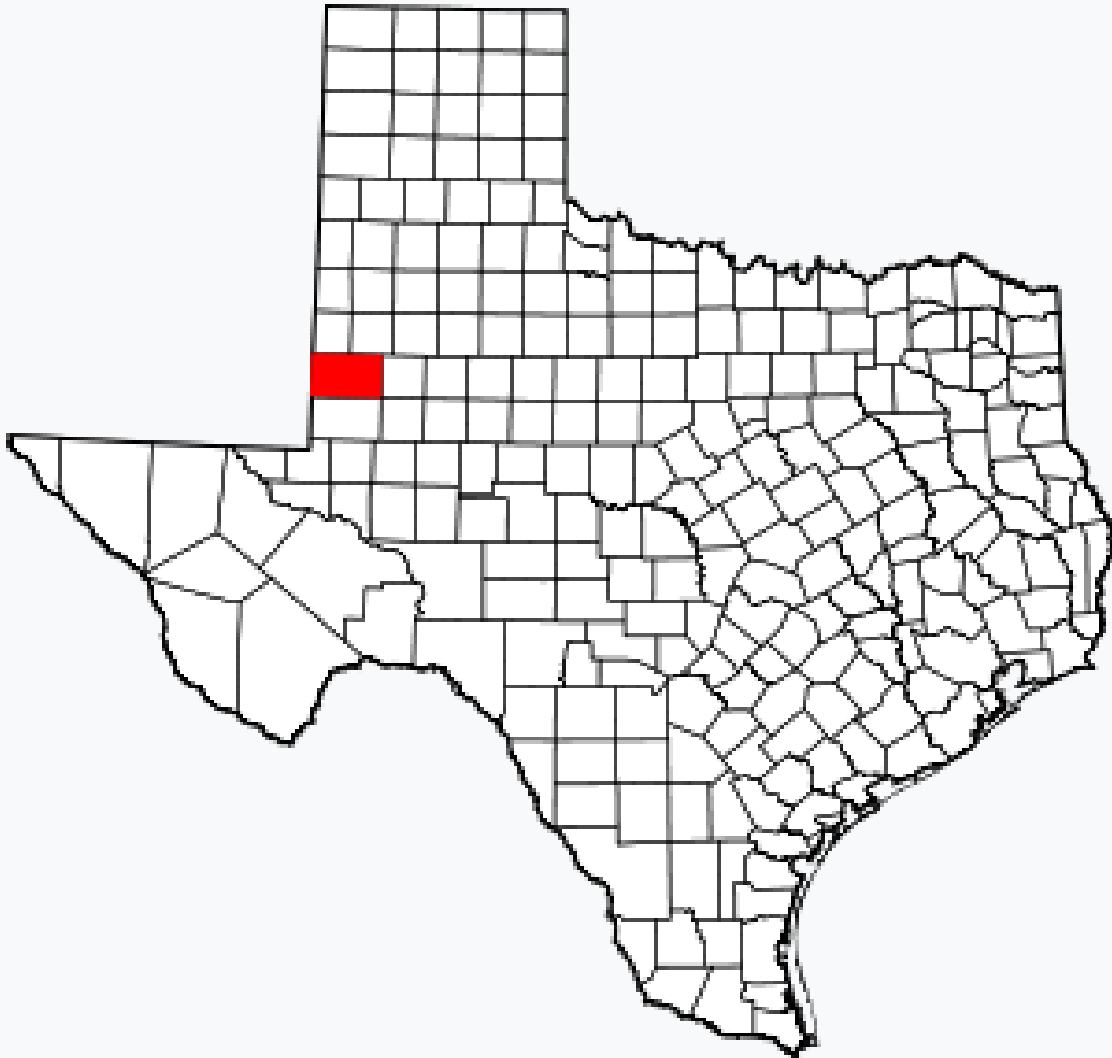
Tenaska – Pineywoods CCS HUB Proposed in Liberty & Hardin Counties, Texas



Liberty & Hardin Counties, Texas



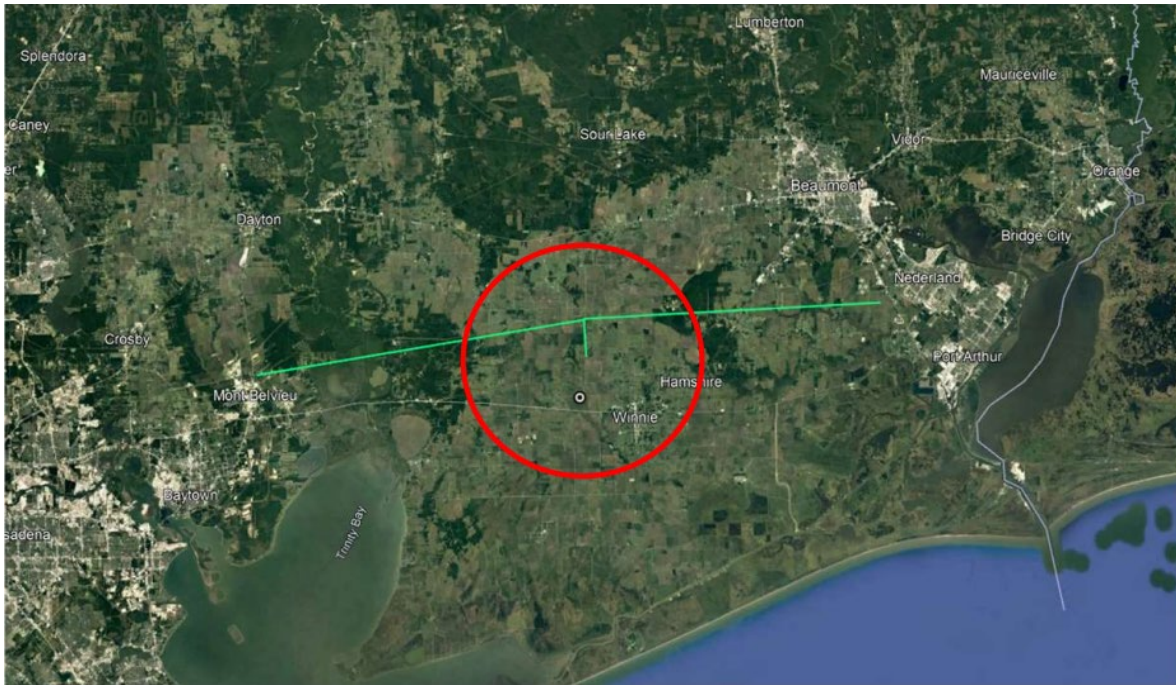
- Class VI application submitted to EPA and Texas.
- Four wells proposed.
- Injection into Tertiary clastic rocks with shale top-seal (saline aquifer)



Gaines County, Texas

- Class VI application submitted to EPA
- Class VI application not yet submitted to Texas
- Seven (7) wells proposed
- Injection into Permian-age carbonate rocks (saline aquifer)

Bluebonnet Sequestration Hub Proposed in Chambers County, Texas



Chambers, Liberty, and Jefferson Counties, Texas

- Class VI application submitted to EPA
- Class VI application not yet submitted to Texas
- 1PointFive CCS hub near refineries, chemical plants and manufacturing facilities along the Texas Gulf Coast from Beaumont to Houston
- Injection into stacked Lower Miocene and Frio clastic rocks (saline aquifer)

Oxy Subsidiary 1PointFive Proposed CCS Project in Kleberg County, Texas

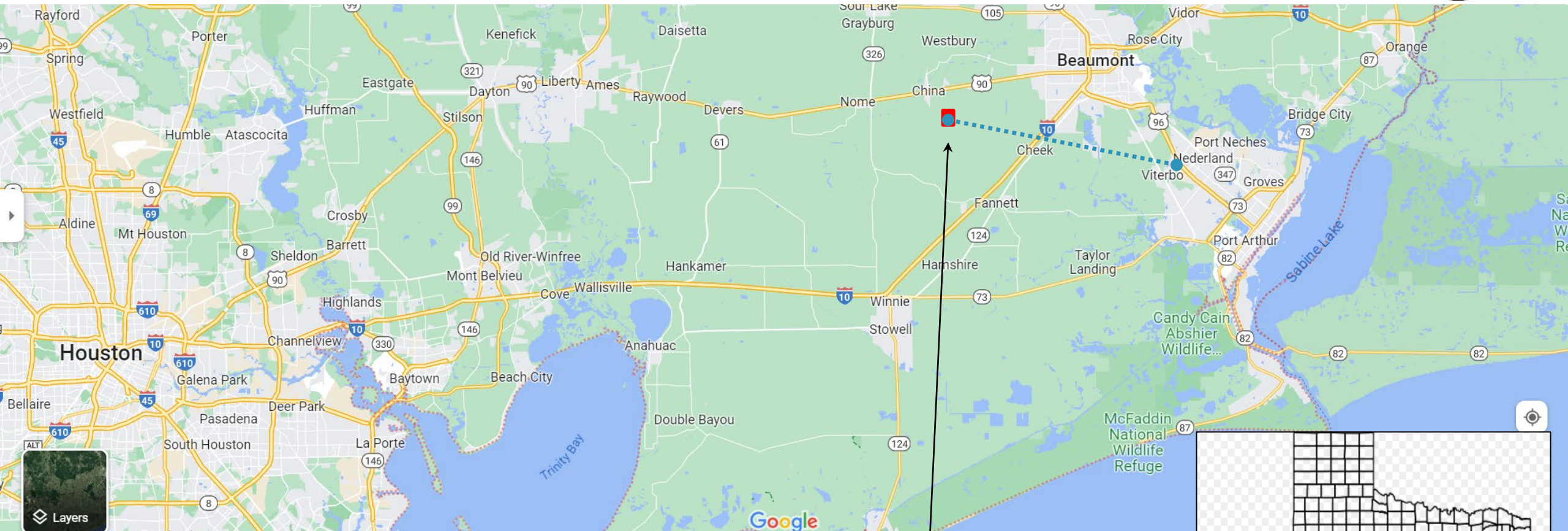


Kleburg County, Texas

- Direct Air Capture
- King Ranch in Kleberg County, Texas
- Class VI application not yet submitted to Texas

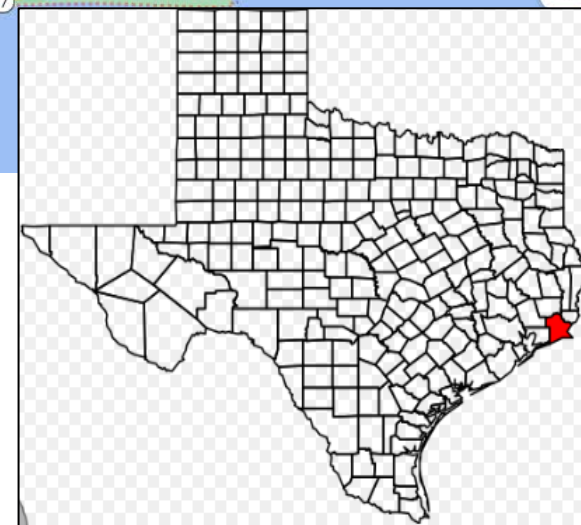


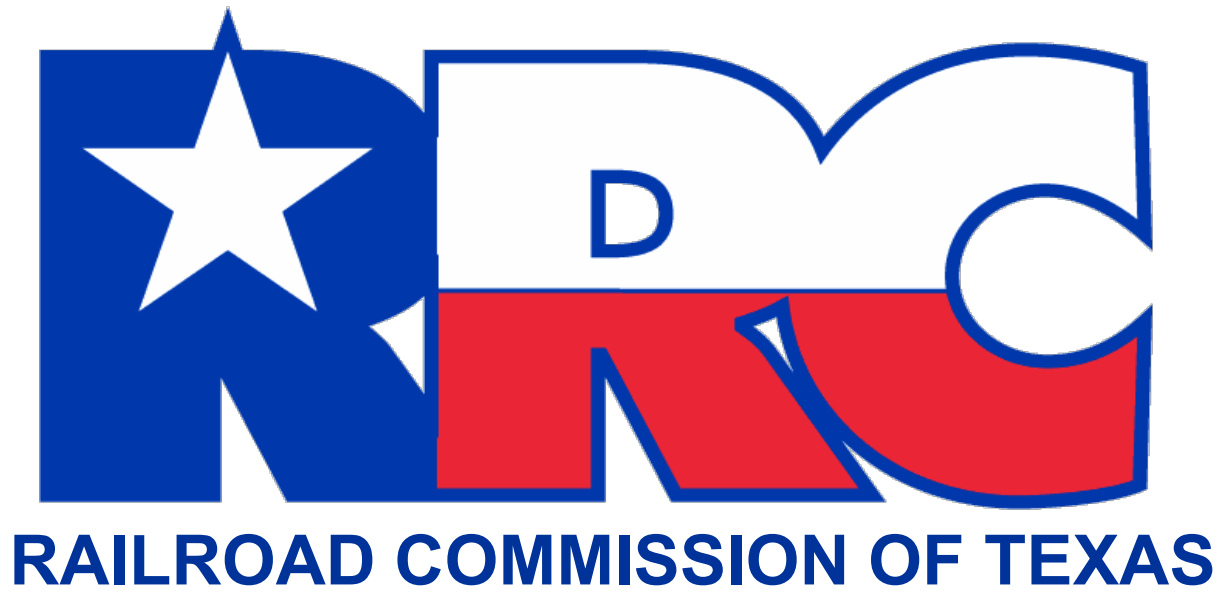
Exxon/Mobil CCS Project – Jefferson County, Texas



CO2 from Linde's hydrogen production facility in Beaumont, Texas.

Approximate Location of Proposed ExxonMobil CO2 Sequestration Project (Jefferson County, TX)





Class VI UIC
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