TETRA TECH

Early Phase Execution for Carbon Sequestration Projects Today

IOGCC Annual Meeting Presentation - November 8, 2021

by Ed Steele and Lloyd Hetrick

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Introduction

Early Phase Execution for Carbon Sequestration Projects Today

21,000 STAFF

$3B ANNUAL REVENUE

16,500 CLIENTS

WORKS ON **65,000+** PROJECTS ANNUALLY

WORKS IN **100+** COUNTRIES | **7** CONTINENTS

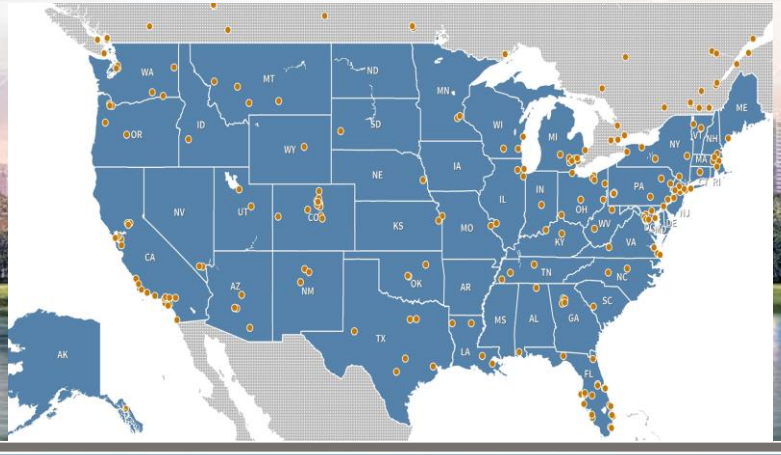
450 OFFICES WORLDWIDE

PUBLICLY TRADED ON NASDAQ — TTEK NASDAQ GLOBAL SELECT

$7B USD VALUE

ENR RANKINGS

- #1 Environmental Management
- #1 Hydro Plants
- #1 Water
- #1 Water Treatment/Supply
- #1 Wind Power



TETRA TECH

I. Introduction

II. What it takes to “make a Carbon Sequestration project work”
   A. People
   B. Funding
   C. CO_2 Source
   D. Geologic Storage Site
   E. CO_2 Capture, Processing, and Transportation
   F. UIC Permit
   G. 45Q Credit and Greenhouse Gas Reporting

III. Summary and Conclusions

IV. Discussion, Q&A

People

What it takes to "make a carbon sequestration project work"

Scientists
- Geophysicists
- Geologists
- Geochemists
- Seismologists
- Petrophysicists
- Hydrogeologists
- GIS Specialists

Engineers
- Reservoir
- Chem/Mech
- Process Safety
- Project
- Drilling
- Operations

Legal
- Regulatory
- Property
- Tax
- Contract
- Partnership
- Tort

Commercial
- Accounting
- Tax
- Finance
- Insurance
- Audit
- Public Relations

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Funding

What it takes to "make a carbon sequestration project work"

Private Funding expects commercial success that includes a firm schedule and Rate of Return

Federal Funding expects shared learnings, typically less concerned with schedule and Rate of Return

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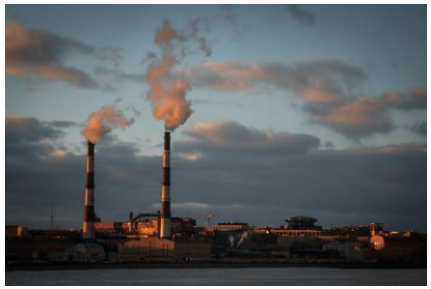
CO_2 Source

What it takes to "make a carbon sequestration project work"

- Sufficient Size and Predictable Quality of CO_2
- Contractually Secure
- Priced Right
- Relatively Near the Geologic Storage Site
- Willing to Change and to Accept More
  - Operational Risk
  - CAPEX Cost
  - OPEX Costs

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Geologic Storage Site

What it takes to “make a carbon sequestration project work”

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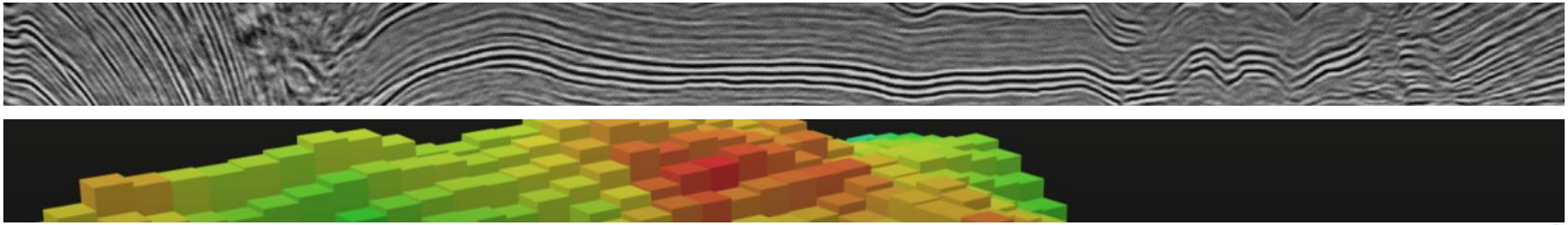
Geologic Storage Site

What it takes to "make a carbon sequestration project work"

- Sufficient storage capacity, without leakage
- Described by high quality data, typical of oil and gas operations



- Not near oil and gas wells or anything else that may compromise geologic barriers
- Not near seismically active areas

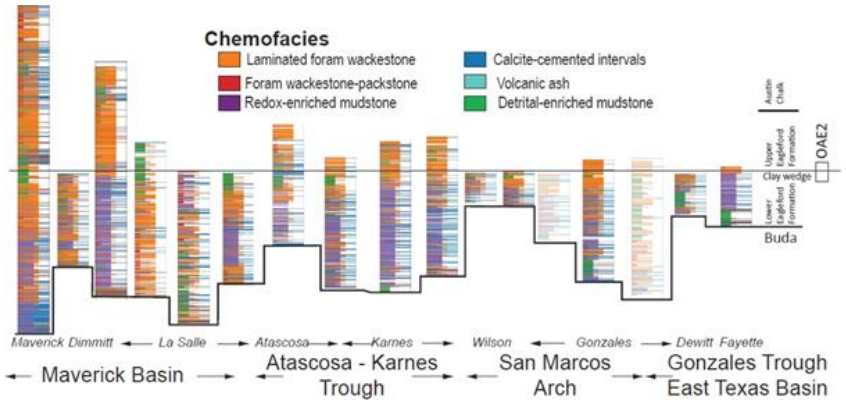
Seismic and Petrophysical Visualizations, silverthorneseismic.com

Geologic Storage Site

What it takes to "make a carbon sequestration project work"

Therefore

- It takes high quality data to select a candidate reservoir with good geologic barriers and few hazards,
- While an abundance of data is usually accompanied by an abundance of oil and gas wells, and
- You'll likely acquire the pore space BEFORE it has been fully described, by drilling into it.



CorePy, Core and Log Data Synthesis, Texas Bureau of Economic Geology

Geologic Storage Site

What it takes to "make a carbon sequestration project work"

Potential Legal Questions

- State Law and Judicial Interpretation for
  - Surface rights and pore space ownership
  - Mineral rights and trespass
- Pipeline Right of Way

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CO_2 Capture, Processing and Transportation

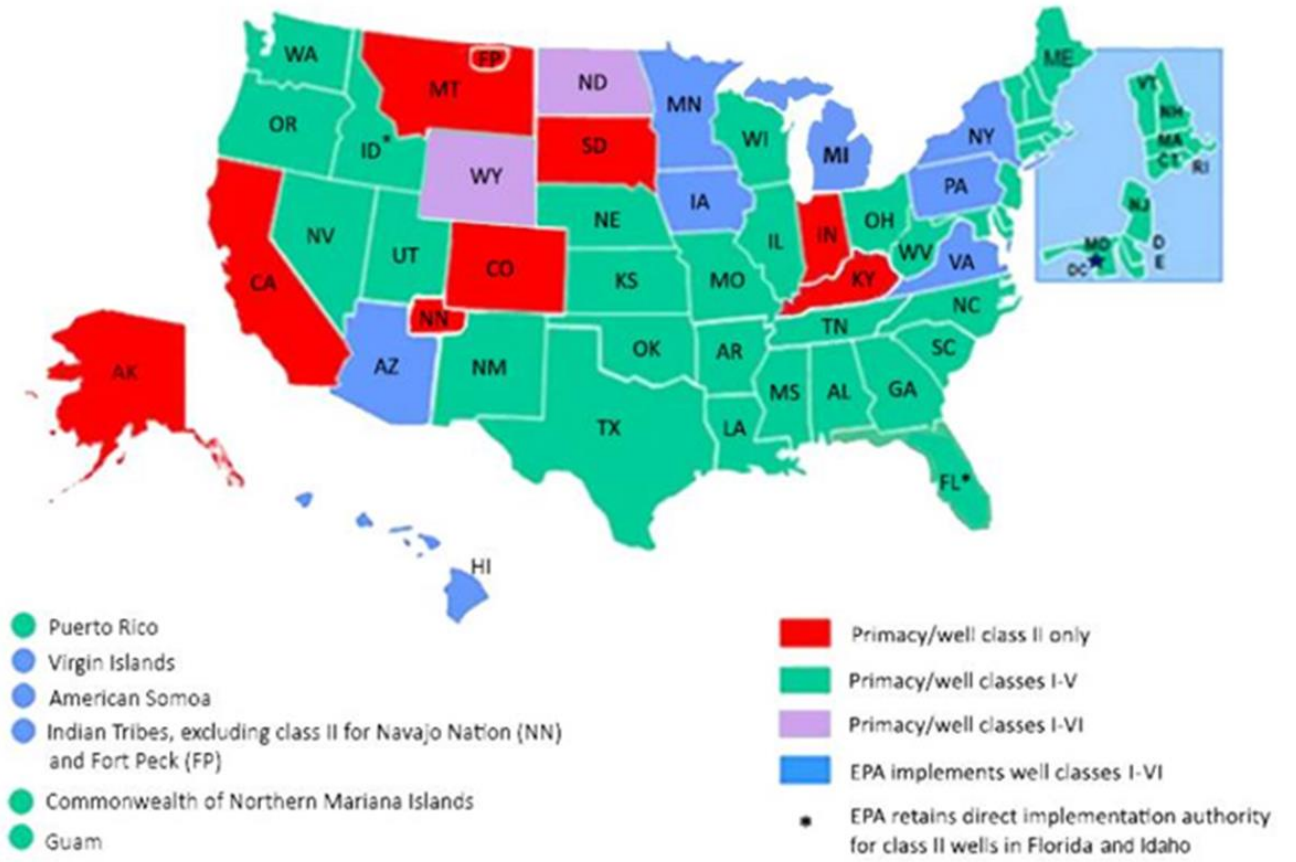
What it takes to "make a carbon sequestration project work"

Equipment

- Capture the CO_2 that was previously vented
- Remove contaminants
- Transform CO_2 from gas, to liquid, or supercritical fluid
- Transport via pipeline to the Geologic Storage Site
- Procurement times and costs are increasing

UIC Permit

What it takes to "make a carbon sequestration project work"

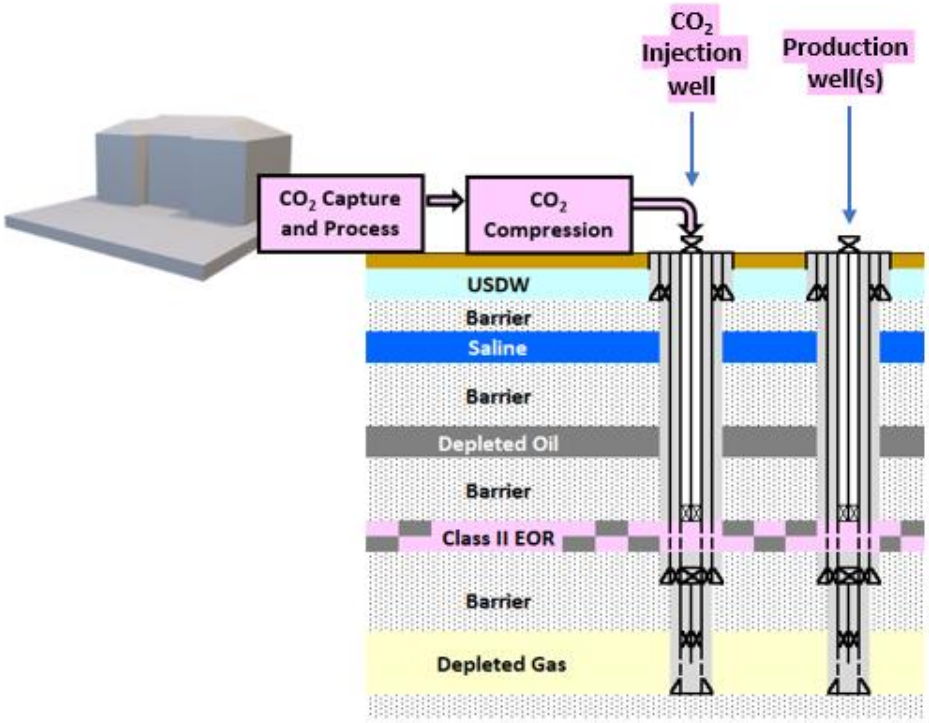


https://www.epa.gov/uic/primary-enforcement-authority-underground-injection-control-program#what_states

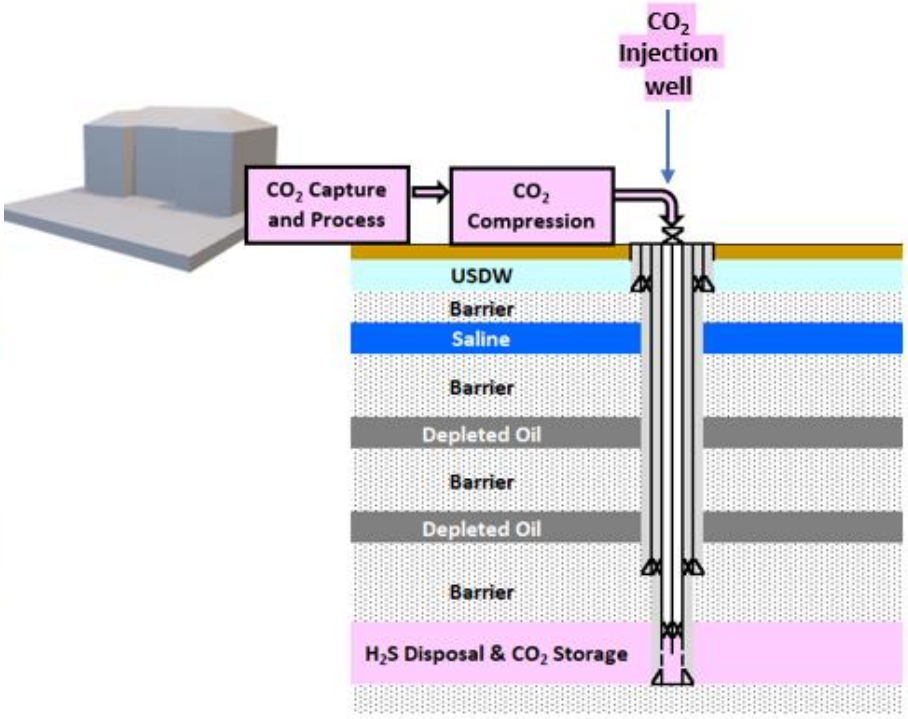
UIC Class II Permit

What it takes to "make a carbon sequestration project work"

Enhanced Recovery "ER"



Acid Gas Disposal "AGD"

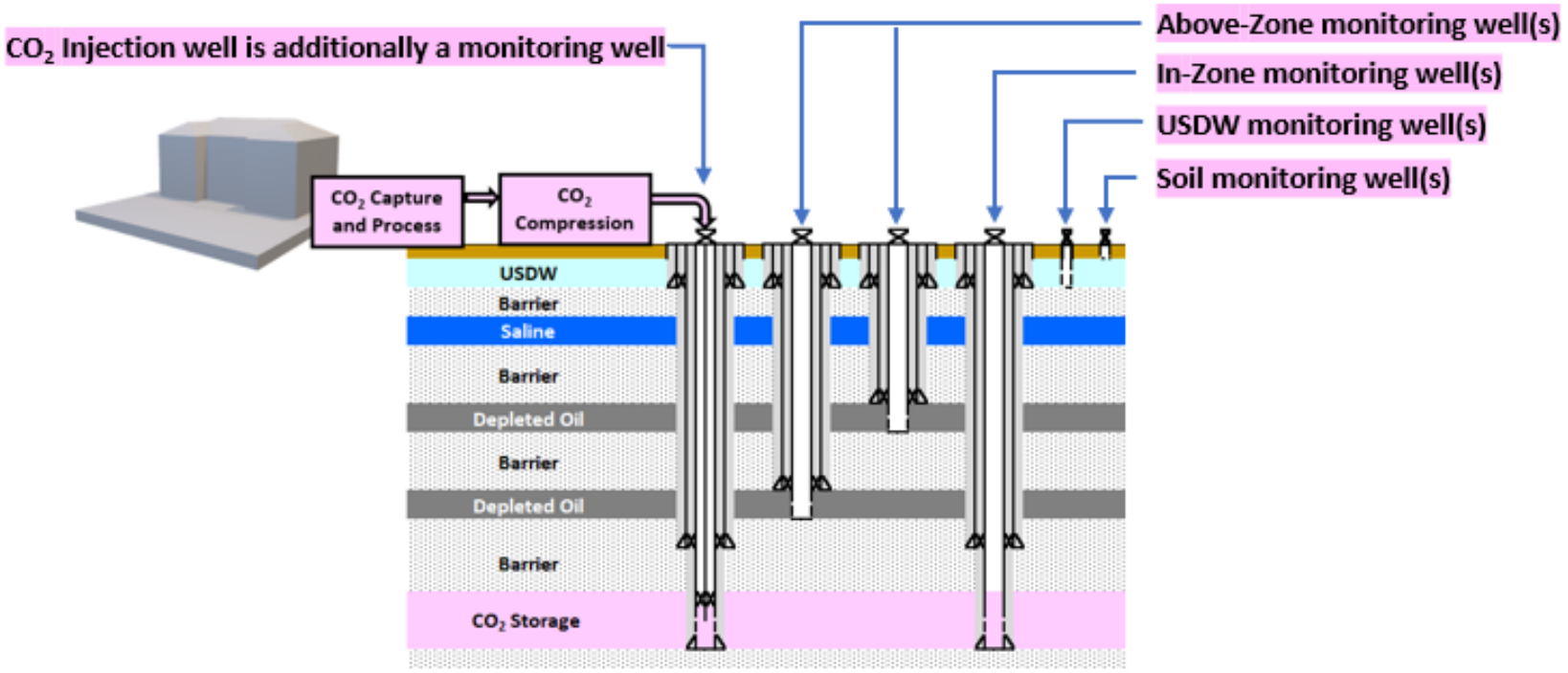


UIC Class VI Permit

What it takes to "make a carbon sequestration project work"

Geologic Storage

Aerial geophysical surveys



45Q Tax Credit

What it takes to "make a carbon sequestration project work"

26 CFR 1 Section 45Q - Internal Revenue Service

As of Today:

- Sequestration credits increase from ≈$35 to $50 per tonne by 2026
- ER credits increase from ≈$23 to $35 per tonne by 2026
- Thereafter, an inflation increase is provided
- Construction must start by January 1, 2026
- Available for 12 years after facility is placed in service

Greenhouse Gas Reporting

What it takes to "make a carbon sequestration project work"

40 CFR 98 Subparts RR and UU – EPA

To get 45Q credit, UIC permit holders, are required to:

- Develop a Monitoring Reporting & Verification "MRV" plan
- Report monitoring results
- Navigate a process of Verification, Life Cycle Analysis and Auditing by EPA, DOE-NETL and the IRS
- Credits are subject to three-year Recapture Period

Summary and Conclusions

The private sector is figuring things out and will be successful

- Legal, Regulatory, Technical, Commercial Challenges Remain
- NASA's transition to the private sector is our example

Official SpaceX Photos flickr.com