The Gulf Coast Carbon Center: Exploring Carbon Public Policy Initiatives for Texas

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Gulf Coast Carbon Center

GCCC Vision Statement

The GCCC seeks to impact global levels of GHG in the atmosphere by doing science and engineering studies that will support reduction of CO2 and methane emissions and enable the development of an economically viable, multifaceted, CO2 sequestration industry in the Gulf Coast

GCCC Industry Partners

Gulf Coast Carbon Center

bp

KINDER MORGAN

PRAXAIR

NRG

Entergy
THE POWER OF PEOPLE™

MARATHON

Chevron

The University of Texas at Austin
John A. & Katherine G.
JACKSON
SCHOOL OF GEOSCIENCES

Schlumberger

KEY PUBLIC POLICY STAKEHOLDERS

- Texas Legislature
- State Agencies
- NGO's
- General Public
- Power Generating Companies
- Coal/Lignite Mining industry
- Refineries
- Chemical Industry
- Cement Industry
- CO2 EOR Industry
- Pipeline operators

PUBLIC POLICY PROJECT CLASS UT's LBJ SCHOOL

Course Goal:

To explore the notion ……."CO2 EOR can drive the development of infrastructure that will enable a cost effective CO2 sequestration industry in the Texas"

Methodology:

Case Study…. Cash flow modeling of CO2 EOR projects suggest they would give a good return on investment…. Then why isn't it happening?

PUBLIC POLICY PROJECT CLASS UT's LBJ SCHOOL

Stakeholder Involvement in Class:

Presentations to the Class by: State agency staff; NGO Executives; Industry experts; Faculty experts

Outreach:

Presentations of Case Study by the class: To Elected Officials; Industry; NGO's

CLASS IDEAS FOR CO2 INCENTIVES

Federal income tax:

Waive income tax until investment reimbursed by oil income; or accelerated investment depreciation

Federal CO2 credits:

A federal “credit” for every ton of CO2 sequestered

Federal demonstration grants:

To support development of advanced carbon capture and storage technology

CLASS IDEAS FOR CO2 INCENTIVES

Texas Carbon Capture Board:

Establish an agency to raise bond funds to invest in private carbon capture and storage (converting up-front capital expense to annual operating expense)

Legislation:

Resulting in State of Texas taking on liability related to long-term storage of CO2

INCENTIVES FOR CAPTURE

- With current oil prices Texas could offer a $5 a ton cash incentive for CO2 capture and still make money on taxes through CO2 EOR

- Texas could offer State backed bond financing for capture plants (our classes economic analysis shows that this has a major impact on projects return on investment)

INCENTIVES FOR PIPELINE CONSTRUCTION

- Pipeline could be constructed by public-private partnerships with State backed bond financing
- Texas could offer incentives to oversize source/sink linking pipelines that eventually could be part of a pipeline backbone system

A PROJECT FOR THE NEXT CLASS

Developing a Standard and Poor Type Rating System for Sequestration Projects

A PROJECT FOR THE NEXT CLASS

Well chosen, well executed long term storage projects will either not leak.

Poorly chosen, projects are likely to leak.

How do we create incentives for good projects and discourage poor projects?

How do we draw the boundary line between the two?

Developing a Standard and Poor Type Rating System for Sequestration Projects

SEQ Ratings: AAA= negligible risk of leakage

AA= very low risk

D= high risk of leakage

- **Private-Public Partnership Non-Profit Corporation to rate projects**
- **Ratings based on best available science on risk of leakage**

Developing a Standard and Poor Type Rating System for Sequestration Projects

SEQ Ratings: A= low risk of leakage
B= moderate risk
D= high risk of leakage

- **Ratings can go up or down during life of project with experience and as new science comes out on leakage risk**
- **Carbon credits directly linked to SEQ Ratings.**

Establishing Discount rates for Credits

Lower Risk Project = Higher SEQ Rating

- Projects with lower than AAA SEQ rating get discounted carbon credits
- Balance of discounted credit goes into a pooled fund for remediation and/or replacement injection

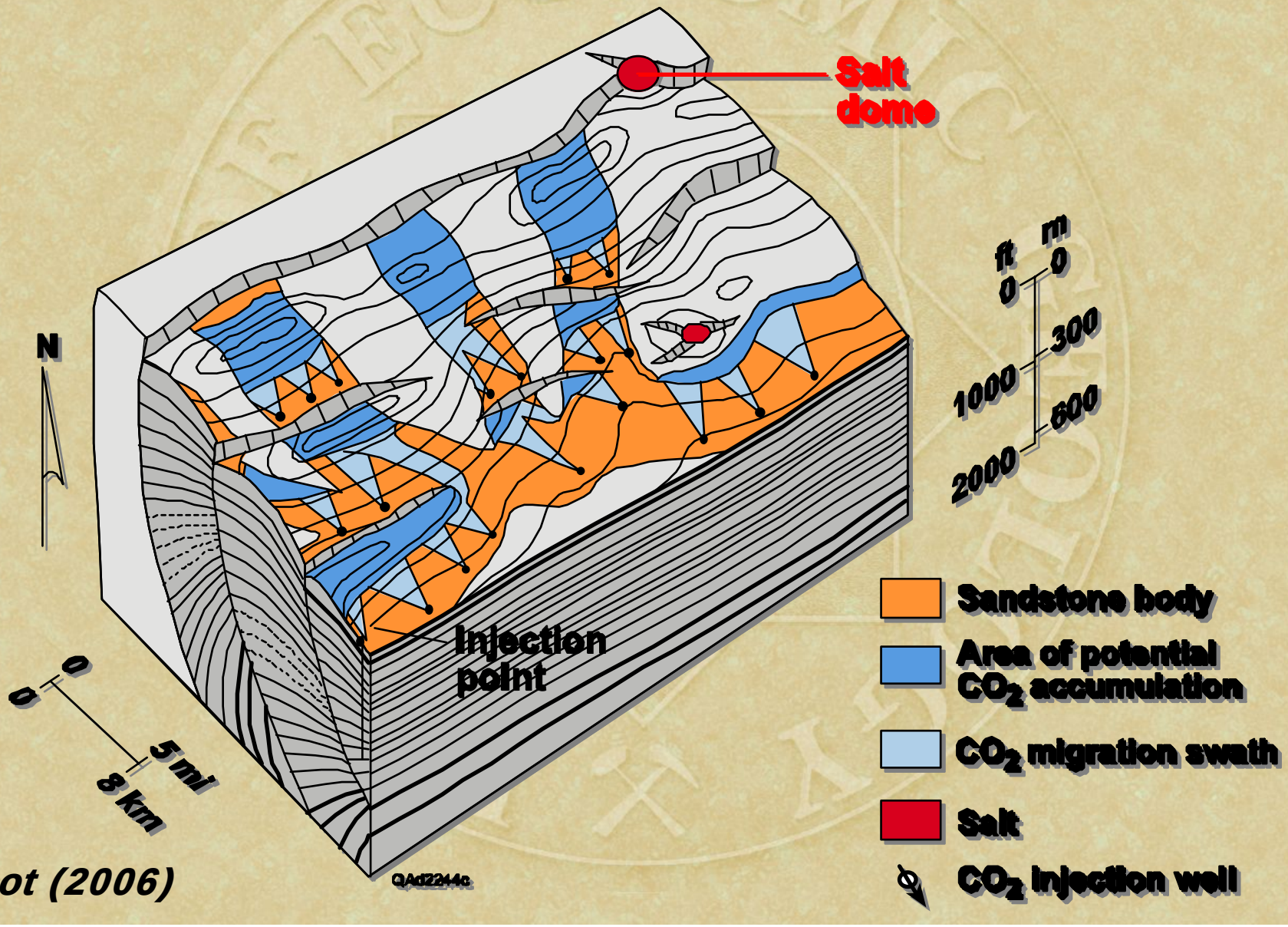
Establishing Discount rates for Credits

Higher Risk Project = Lower SEQ Rating

- Discount rate for credits based on cost differential for lower rated projects plus discount based on estimated leakage risk

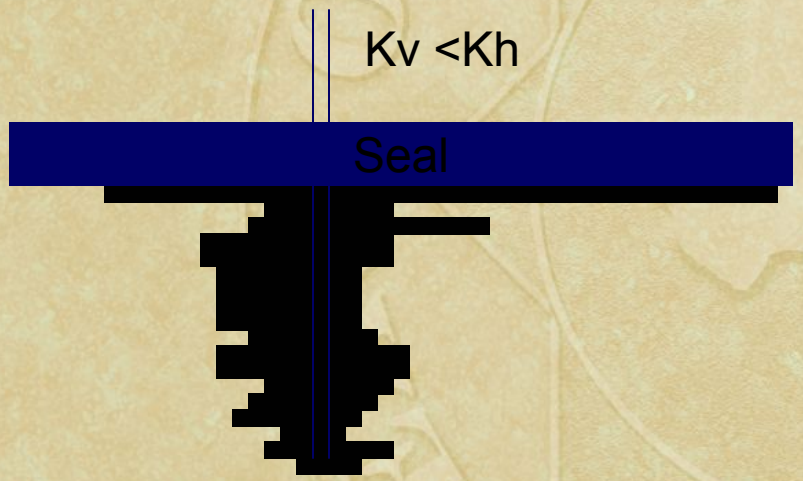
- SEQ ratings of D would be analogous to Junk Bonds with the credit discount approaching 100%

Gulf Coast Model for CO_2 Migration



Nicot (2006)

Geologic Characterization to Limit Plume Size – Role of Kv/Kh

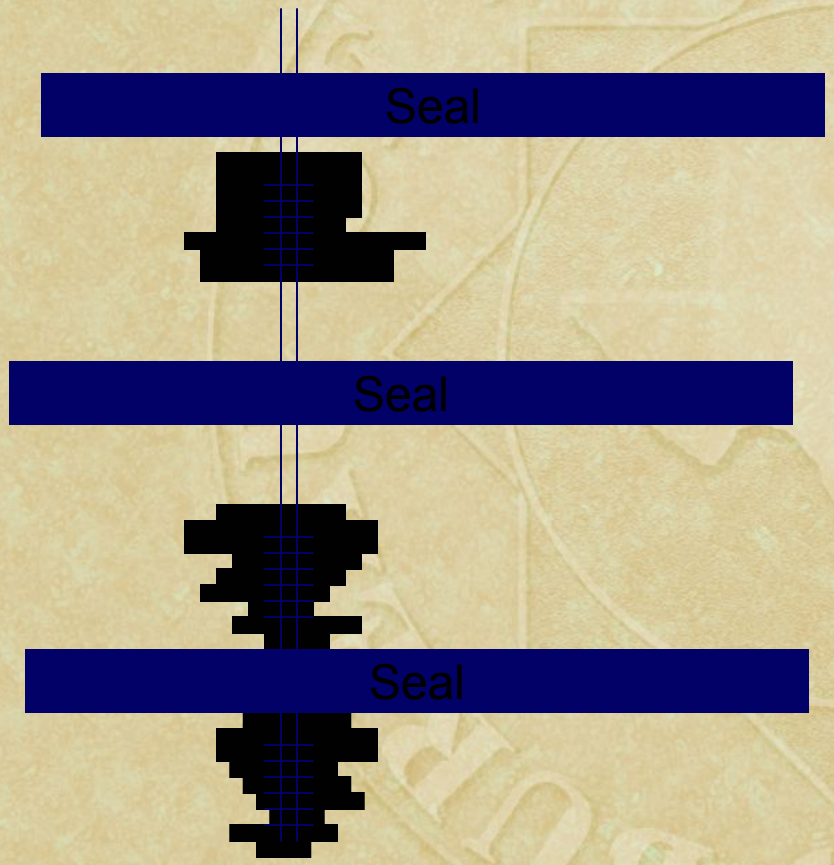


Weak layering allows rapid vertical migration= Large spread beneath seal

Effective horizontal baffling layers limit vertical rise – avoid spread below seal

Kh= Horizontal permeability Kh = vertical permeability. Related to rock fabric, Interpreted from sedimentary depositional environment

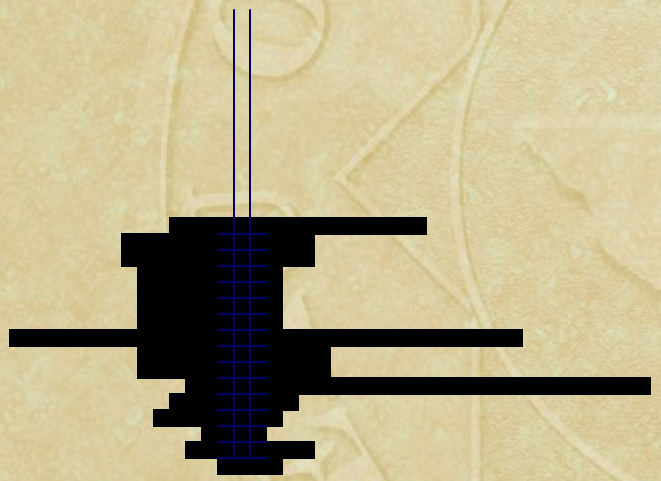
Geologic Characterization to Limit Plume Size – Stacked Reservoirs



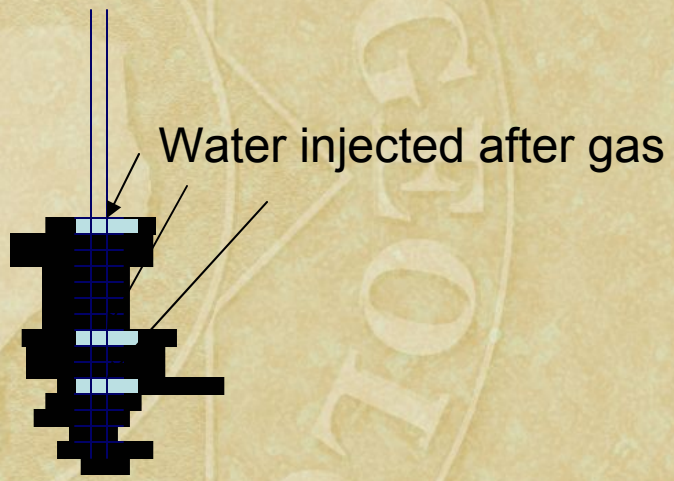
Multiple injection zones beneath one land tract

CO2 is emplaced in zones though well perforations designed after geologic characterization and modeling

Injection Design to Limit plume Area



Plume size is large because of rapid migration along high permeability beds



Water after gas preferentially enters high permeability zones to control gas migration, straighten plume front

PUBLIC POLICY IN CARBON MANAGEMENT

CONCLUSIONS

Things we have learnt:

- NGO's, power companies, and CO2 EOR companies all stand to gain from collaboration
- Using students to mediate can help overcome some issues of trust

PUBLIC POLICY IN CARBON MANAGEMENT

CONCLUSIONS

Things we have learnt:

- **Teaching project classes is useful way to explore innovative ideas in Carbon management**
- **Students can communicate effectively with Stakeholders**