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# Carbon Capture & Sequestration

## Joint Judiciary Committee

### 2007

# Whatever you believe about global warming . . .

- The political tide has changed
- Governor's letter



# Potential CO<sub>2</sub> Responses

- Conservation
- Switching to low/zero CO<sub>2</sub> energy sources
  - Nuclear
  - Solar
  - Wind
- Capture and Sequestration

# DOE Goals

- Fossil Fuel Conversion System by 2012
- 90% CO<sub>2</sub> Capture
- 99% Storage Permanence
- 10% >10% increase in cost of energy



# Legal barriers to CO<sub>2</sub> deployment

- Who owns the right to store CO<sub>2</sub>?
- How can the CO<sub>2</sub> storage liabilities be controlled?
- What type of regulatory and taxation framework will be created for CO<sub>2</sub> capture and sequestration?

# Technology

- Injection and storage technology available
- Capture Technology Emerging



# Ownership of Gas

- Natural gas, once reduced to possession, is property of person who extracts it.
- Split of authority
  - Wild Animal – *Hammonds v. Central Kentucky*
  - Property of injector – *White v. New York*
  - Hybrid – Injected vs. In situ
- Consequences of Ownership
  - Whoever owns the gas, owns the liability

# Ownership of the Stratum

- Voids are owned by the surface owner –  
American Rule
  - LSO Memo
- Natural gas storage rights are owned by mineral owner
  - Currently in litigation
- What if CO<sub>2</sub> migrates off premises
  - Not analogous to natural gas
- Who is entitled to compensation for storage?



# Ownership of Stratum Issues

- What if CO<sub>2</sub> migrates across interstate boundaries?
- What if interests of different mineral right owners conflict? Which right takes precedence?

# Liability Issues

- Leakage
  - Lake Nyos
- Effect on subsoil ecosystems
- Seismicity increases
- CO<sub>2</sub> pollution of formation water
- Degraded storage reservoir
- Hazards can be minimized if site is well chosen and carefully monitored



# Terrestrial Sequestration

- Displacement of in situ fluids
- Dissolution of CO<sub>2</sub> in fluids
- Chemical reaction with CO<sub>2</sub> with minerals to form stable salt compounds

# Interesting Facts

- Planting trees is a partial temporary solution.
- 750 GtC in atmosphere
- 2200 GtC storage in terrestrial biosphere
- Potential storage
  - Ocean 1000s GtC
  - Deep saline – 100s to 1000s GtC
  - Oil & Gas Reservoirs – 100s GtC
  - Coal seams 10s to 100s GtC



# Policy Considerations

- Taking a leadership position in environmental protection.
- Symbiotic relationship with our current industry
- Facilitation of our carbon based minerals industry

# Legislative Reactions

- California Plan
  - Broad discretion with California Oil, Gas & Geothermal Division to promulgate health, safety, best practices, construction, operation, decommissioning and regulation of facilities
- Texas Plan
  - State own CO<sub>2</sub>
  - Title transfers to state without cost
  - State may sell CO<sub>2</sub> for beneficial use
  - College plan may enter leases to store CO<sub>2</sub>, but must be indemnified against all losses



# IOGCC

## Cradle to Grave

### Regulatory Framework



# IOGCC Guiding Principles

- Make it seamless.
- Keep it simple
- Be flexible and responsive
- Make it Doable
- Maintain a positive public presentation



# The Bills

- Placeholder Bills
- For Discussion Purposes
- Believe this topic is important to the future of the State of Wyoming
  - We have a carbon fuels dependent economy
  - Our prosperity, jobs and future lie in the balance
- We can't afford to wait.



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## Ownership of Subsurface Voids

- American Rule
  - Goal was not to transfer ownership of sticks, but to keep the ownership the same
- Who owns the surface owns the voids
- Conveyance of the surface is a conveyance of the voids
- Notice to owners of voids must be specific
- May need to amend
  - Mineral owner owns created voids so long as they have not been exhausted or abandoned



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## Carbon Capture and Sequestration

- Definitions
  - Carbon Dioxide – anthropogenic sources
  - Sequestration – Retention in place
- Regulation – OGCC
  - DEQ, OGCC
  - Creation of Rules
  - Exempts EOR

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- Regulation of Sequestration
  - Suitable
  - Does not create waste
  - Does not pollute
  - Will not impair production of other minerals
  - Is safe
  - Notice to interested parties
  - Bonding
  - Closure



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- Ownership of CO<sub>2</sub>
- Compensation for migration
- Ways of necessity condemnation
- Left out condemnation of facility or underground

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- Other affected sections – if policy changes
- Eminent Domain
  - CO2 companies
  - Railroads
  - Underground ROW
  - Indemnity
  - Waste
  - Investigative Authority
  - Protection of Surface