U.S. EPA Draft Rules on Geological Storage: Selected Stakeholder Feedback

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EPA draft rules

• Published Summer ’08
• Focused on protection of ground water under the Safe Drinking Water Act
• 2 groups of stakeholders:
  - Oil and gas industry – CO₂-EOR / GS in depleted oil and gas fields
  - Water industry: municipalities, private companies, well drillers
Some issues covered by the EPA draft rules

• Siting criteria
• Area of review / corrective action
• Well construction requirements
• Operating/monitoring requirements
• Post-injection care

• Two main differences between CO$_2$-EOR and CO$_2$ Storage:
  - pressure field: in EOR, CO$_2$ is injected but both oil and CO$_2$ are produced with no or little pressure increase
  - time frame: safety concerns only during operations / no excess pressure after end of operations
Gulf Coast geologic features

Source: Galloway (1982) and Galloway et al. (1982)
Two Areas of Concern in Area of Review

- Footprint of area of elevated pressure
- Injection well
- Plume of injected CO₂
- Footprint of area over CO₂

Concept of pressure trespass
Well Density

Texas: 1.6 well/km²
Texas Gulf Coast: 2.4 well/km²
Alberta Basin: 0.5 well/km²
Most O&G provinces: <<1 well/km²
Well Depth Varies with Completion Year

Texas Gulf Coast data only
Water displacement

Map view of Open Hydrologic Systems
Impact assessment

MODFLOW / 1Mt/yr/well – 50 wells – 50 years

- Head distribution at the outcrop
- ET and baseflow fluxes at the outcrop
- Displacement of salinity boundaries

Water Table Rise (m)

- Average
- Median
- Maximum
- 90% percentile
Impact assessment (higher mudstone compressibility)

MODFLOW – STO \times 10

- Average
- median
- maximum
- 90\% percentile

Water Table Rise (m)

Time (years)

Injection stops

0 100 200 300 400 500
Stakeholder concerns

• Water industry:
  – Need reassurance that no brine contamination, no metal mobilization will occur
  – Any contamination can technically be fixed (treatment….). However, water is a under-valued low-priced commodity.

• Oil and Gas industry:
  – Need reassurance that CO₂-EOR won’t be impacted in general by GS
  – Would like to combine EOR and GS operations (credits) and to transition smoothly from EOR to GS