Recent CCS Regulatory Developments in the United States of America

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International Energy Agency
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Outline

- Permitting geologic sequestration (GS) sites
- Reporting and accounting for emissions from GS sites
- RCRA exemption
- Incentives to promote GS deployment
Overview

Permitting

- UIC Class VI rules finalized
- First UIC Class VI permit app. ADM, IL
- State primacy applications

- Guidance documents and webinars, ongoing
- Reporting rules for GS & EOR finalized
- July 2011 GHG emissions reports published

Emissions Reporting and Accounting
Permitting Geologic Sequestration Sites

Jurisdiction

- Administered by Regional EPA office (federal) unless state applies for primacy

Types of permits for CO₂ injection wells

- Class VI: geologic sequestration
- Class II: enhanced oil recovery (EOR)
- Class V: experimental
EPA Region 5
Class VI well applications: 4 (2 more expected soon)
Primacy applications: None

EPA Region 8
Class VI well applications: 0 (1 possible soon)
Primacy applications: ND in process; MT, WY likely

EPA Region 6
Class VI well applications: 0
Primacy applications: LA in process; TX likely

EPA Region 7
Class VI well applications: 0 (1 possible soon)
Primacy applications: KS likely

Status of Class VI Well Applications & State Primacy Applications
EPA Guidance Documents for UIC Class VI Wells

- 13 guidance documents will be developed.
- 7 are now available
- A training webinar will be created for each guidance document
  - Financial Assurance webinar held September 28, 2011
  - Well Construction and Project Plans webinars planned for this month
EPA Guidance Documents for UIC Class VI Wells

- Well Testing and Monitoring Guidance
- Primacy Application and Implementation Manual
- Site Characterization Guidance
- Area of Review Evaluation & Corrective Action Guidance
- Well Construction Guidance
- Financial Responsibility Guidance
- Public Participation Considerations for Geologic Sequestration Wells Facts
“Hot Topics” in Permitting

- Eligibility for shortened Post Injection Site Care (PISC) period (<50yrs)
- Requirements to transition from Class II to Class VI permit
- Requests for exemptions to permit pilot study GS wells as Class V rather than Class VI
- Strong industry preference for Class II permits

- **Geologic Sequestration (Subpart RR)**
  - Report the source of CO\(_2\), the mass of CO\(_2\) transferred onsite, and the mass of CO\(_2\) injected.
  - Monitor and report fugitive, vented and leakage emissions, as well as the annual and cumulative CO\(_2\) mass stored in the subsurface.

- **CO\(_2\) EOR (Subpart UU)**
  - Report the source of CO\(_2\), the mass of CO\(_2\) transferred onsite, and the mass of CO\(_2\) injected.

- **CO\(_2\) suppliers (Subpart PP)**
  - Report the mass of CO\(_2\) captured or extracted, as well as the mass imported or exported.
Monitoring for GHG Reporting

Each GS site must develop a site-specific MRV plan, and revise that plan based on site performance as necessary. The plan must include:

- **Leakage risk assessment** – identification and characterization of all potential leakage pathways;

- **Monitoring strategy** – a site-specific plan that may include a combination of subsurface, vadose zone, surface water, and/or atmospheric monitoring and modeling. Continuous atmospheric monitoring is not required. Leakage must be quantified if CO$_2$ is detected at the surface;

- **Pre-injection environmental baselines** – a site-specific strategy to determine establish pre-injection CO$_2$ levels; and

- **Tailor mass balance equation** for sequestration EPA acknowledges that establishing a baseline is impossible at EOR sites, and proposes alternatives.
RCRA Exemption

EPA has proposed that CO2 captured from emission sources and injected for geologic sequestration would be exempt from hazardous waste regulations.

- If finalized would avoid complications with permitting, liability management
Incentives to Promote CCS Deployment

- Federal GHG permits required for large power plants
- Federal GHG limits proposed for new power plants
- State GHG limits and CCS requirements
GHG Permits Required for Large Power Plants

- EPA “tailoring rule”
- Beginning in July 2011, CAA Title V operating permits are needed by all sources that emit >100,000 tons CO2e/yr
- CCS is listed as one of the control technologies that must be considered,
- Best Available Control Technology (BACT) determination includes economic considerations, so CCS is unlikely to be selected.
Federal GHG Limits for New Power Plants

"Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources”
(Fed. Reg. Vol. 77, No. 72 Friday, April 13, 2012)

- Clean Air Act Sec. 111
- Limit emissions from new fossil fueled power plants to 1,000 pounds of carbon dioxide per megawatt hour,
- New power plants that use CCS would have the option to use a 30-year average of CO2 emissions to meet the proposed standard, rather than meeting the annual standard each year.
State GHG limits and CCS Requirements

- Washington Oregon and California, currently limit GHG emissions to ~1,000 tons/kWh
- Montana and Illinois currently require CCS for new coal generation.
Thank You

Useful links:

EPA guidance documents:  
http://water.epa.gov/type/groundwater/uic/class6/gsguidedoc.cfm

EPA Region 5 permit applications:  
http://www.epa.gov/r5water/uic/adm/index.htm

RCRA exemption:  
http://www.epa.gov/osw/nonhaz/industrial/geo-sequester/faqs.htm

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CO₂ EOR prevalence in the U.S.

Figure courtesy of Bruce Kobelski, U.S. EPA
Regulatory Pathways for CO$_2$EOR

- Remain Class II; GHG Reporting under Subpart UU (Underground Injection of CO2)
- Remain Class II; Opt-In to GHG Reporting under Subpart RR (Geologic Sequestration)
- Transition from Class II to Class VI; GHG Reporting under Subpart RR
Class II-VI Transition: Risk Profile

Figure courtesy of Bruce Kobelski, U.S. EPA
Requirements for Wells that transition from Class II to VI

- Injection Well Construction: Adequacy of Well Components for Grandfathering
- AoR and Corrective Action: Size and shape of Area of Review
- Injection Well Mechanical Integrity Testing: Continuous Pressure Monitoring; Frequent Testing
- Testing and Monitoring: Tracking CO2 Plume and Pressure Front
- Recordkeeping and Reporting: More Information and More Detail
- Post Injection Site Care and Site Closure requirements
- Emergency & Remedial Response plan
- Financial Responsibility Considerations: Prescriptive and More Detailed
- No Area Permits

Courtesy of Bruce Kobelski, U.S. EPA