# US Regulatory Framework

**Creating the right conditions for CCUS to grow?**

**6th IEA International**
**CCS Regulatory Network Meeting**

Bob Van Voorhees, Carbon Sequestration Council

**27-28 May 2014 – Paris, France**

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# USEPA CCS Framework 2001-2014

- GS Program & Guidance Development
- Class VI Permit Review
- Class VI State Primacy Progress
- Coordination with Other EPA Offices
  - GHG Reporting framework – W PP RR UU
  - Waste management provisions
- EPA's Lessons learned

Source: EPA

# Climate Change Action Plan June 2013

- Reduce Power Plant Carbon Pollution
- Accelerate Clean Energy Leadership
- Build 21st Century Clean Energy Infrastructure
- Cut Energy Waste in Homes and Businesses
- Reduce Other Greenhouse Gas Emissions
- Provide Federal - International Leadership
  - U.S. National Climate Assessment – May 2014

SOURCE: http://www.whitehouse.gov/climate-change

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# Climate Change Action Plan
# CCS Focus

- US working with China, India, and other countries relying on coal for power to advance the development and deployment of clean coal technologies.
- US leading on development of carbon capture and sequestration technologies.
- Going forward, we will continue to use these bilateral and multilateral efforts to promote clean coal technologies.

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# International Financing for Power Plants

- President Obama calls for an end to U.S. government support for public financing of new coal plants overseas, except for
  - (a) the most efficient coal technology available in the world's poorest countries in cases where no other economically feasible alternative exists, or
  - (b) facilities deploying carbon capture and sequestration technologies.
- US will work actively to secure the agreement of other countries and the multilateral development banks to adopt similar policies as soon as possible.

# US – China Cooperation

- U.S.-China Climate Change Working Group Report - areas of cooperation
- Action initiatives include carbon capture, utilization and storage (CCUS)
  - Emissions from coal combustion in the electric power and industrial sectors can be significantly reduced through CCUS

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# CCUS Action Commitment

- Building on the significant R&D collaborations between the United States and China, and to encourage the transition from research to commercial-scale demonstration, China and the United States will cooperate to overcome previous barriers to CCUS deployment by implementing several integrated CCUS projects in both countries.

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# NSPS for Fossil Fuel-fired Power Plants

- Pre-publication Issued September 20, 2013
- Based on partial implementation of CCS as the best system of emission reduction
- Proposed limit is 1,100 lb $CO_2$/MWh
- Requires $CO_2$ injection wells reporting under subpart RR GHG emissions rule
- Comment period ended May 9, 2014

**Existing source rule due June 2, 2014**

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# Commitment to CCUS Development

- While EPA has confidence that geologic sequestration is technically feasible and available, EPA recognizes the need to continue to advance the understanding of various aspects of the technology, including, but not limited to, site selection and characterization, $CO_2$ plume tracking, and monitoring.
- On-going Federal government efforts such as DOE/NETL's activities to enhance the commercial development of safe, affordable, and broadly deployable CCS technologies in the United States, including: research, development, and demonstration of CCS technologies and the assessment of the country's geologic capacity to store carbon dioxide, are particularly important.

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# Projects Identified

- Southern Company Kemper County, MS IGCC/EOR Energy Facility
- SaskPower Boundary Dam CCS Project
- ***Proposed*** Summit Power Texas Clean Energy Project (TCEP) IGCC/EOR
- ***Proposed*** Hydrogen Energy California Project (HECA) IGCC/EOR
- NRG Energy post-combustion project

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# Where do we stand?

- Class VI rule promulgated Dec 2010
- Guidance development and publication – still a work in progress
- State primacy delegation
  - Manual published April 2014
  - One state application received from North Dakota
- Project deployment
  - Class VI permitting has sometimes been a barrier
  - Class VI permitting has been slow
  - Funding problematical

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# Class VI Guidance

**Final Class VI Rule (DEC 2010) identified technical guidance documents needed to facilitate safe, effective Class VI permitting and GS injection. Guidance documents focus on:**

- Financial Responsibility
- Well Construction
- Project Plan Development
- Site Characterization
- Area of Review Evaluation and Corrective Action
- Testing and Monitoring
- State Primacy Manual
- Implementation Manual
- Reporting and Recordkeeping - Owners
- Reporting and Recordkeeping – Permitting Authorities
- Well Plugging, Post-Injection Site Care (PISC), and Site Closure
- Class II – Class VI Transition
- Injection Depth Waivers
- Guidance 83 ETW Revision??

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# CO2 Injection Permitting

- Class V Experimental well (basically the same as a Class I non-hazardous)
- Class I Non Hazardous
- Class II for all projects using EOR
- EPA initially signaled RCSP Phase II, Phase III and similar projects to continue under Class V permits
- Now all GS projects must permit as Class VI

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# Class VI Permit Applications

All current applications in EPA Region 5 (Chicago):

- Archer Daniels Midland: Decatur, Illinois
  - Two Class VI permit applications (CCS #1 and #2) received in December and July 2011, respectively
  - Proposed injection volume and duration: approximately 4.75 million tons of CO2 over 5 years
  - Draft permit published for comment on April 15, 2014
  - Comment period will close May 30, 2014
- FutureGen 2.0: Illinois
  - Four Class VI permit applications received in March 2013
  - Proposed injection volume and duration: ~1.3 million tons/year for 30 years
  - Draft permits published for comment on March 31, 2014
  - Comment period closed May 15, 2014

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# CCS Deployment Has Become Complicated

- No completed US commercial projects
- Pilot-demonstration scale projects moving
- Developed with Class V and Guidance 83
- Many concerns expressed over Class VI rule hurdles for all types of projects
- Specific issues have surfaced for both pilot and demonstration scale projects
- Disincentives for EOR with captured CO2

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# Project Developer Concerns

- Scaling rule provisions to pilots and demonstrations
- Long time to obtain Class VI permits
  - Early estimates indicated 18 months
  - Experience to date = 12 & 30 months
  - Need more streamlined process
- Post injection site care (PISC) timeframe
  - Default period of 50 years inappropriate
  - Using alternative timeframe demonstrations is expensive
- Potential burdens for project host sites
  - Financial assurance demonstration
  - Long term liability presumptions for short term projects inherent in Class VI rule

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# Class VI Primacy

- As of September 7, 2011:
  - EPA directly implements the Class VI Program in all States, Tribes, and Territories
- States may apply for Class VI primacy at any time:
  - States without §1422 primacy must apply to implement a new §1422 Program
  - States with §1422 primacy for Classes I, II, III and V, must submit a program revision to add Class VI
- State primacy applications
  - North Dakota application submitted in June 2013
  - Noticed in FR August 2013 and provided for 30-day comment
  - Currently initiating rulemaking package

SOURCE: EPA

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# GHG Reporting Process

- Subpart UU of the greenhouse gas reporting rule: Facilities that receive CO2 for injection underground
  - EPA has two years of data from facilities subject to Subpart UU
  - RY2011 data was published on-line in January 2013
  - RY2012 data was published on-line in January 2014 (86 reports)
- Subpart RR of the greenhouse gas reporting rule: Facilities conducting GS of CO2
  - Class II ("opt-ins") or Class VI wells
  - No facilities are currently reporting (i.e., no MRV plans)
  - R&D exemptions for 4 projects submitted and approved

SOURCE: EPA

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# Waste Disposal Rule

- Proposed Rule: August 2011
- Final Rule: Published January 2014
- Classified CO2 streams as "solid waste"
- Conditional exclusion from hazardous waste classification for "hazardous" CO2 streams
  - Captured from emission sources
  - Transported via qualified and regulated means
  - Injected via Class VI permitted wells
  - No added hazardous wastes
  - Covered by certifications from waste "generator" (capturer) and "disposer" (injector)

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# Waste Rule Concerns

- EPA has not considered captured gaseous air emissions (even pollutants) to be solid waste
- Makes $CO_2$ a waste rather than gas and commodity
- Hazardous waste rules directed at "solid wastes" have no standards for gaseous or supercritical $CO_2$
- No evidence that captured $CO_2$ is ever hazardous
- Certification difficulties if $CO_2$ streams are commingled for transportation
- Potential complications for post-EOR storage
- CSC challenging solid waste classification in court

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# EPA's Lessons Learned

- Research and knowledge building are ongoing to inform science-based decision-making
- Communication is extremely critical
  - Between EPA and owners or operators
  - Among Federal partners and with co-regulators
  - To the public, NGOs, and interested stakeholders
- Flexibility is needed
  - To accommodate project-specific differences
  - To adapt to evolving technologies
  - To process permit/primacy applications as expeditiously as possible

Source: EPA

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# Operator Concerns

- Viability of UIC Class VI regulations
  - Potential additions through guidance
  - Practicality of permitting process
  - Primacy opportunities for States
- Potential additional burdens for EOR
  - Monitoring, testing and reporting
  - Conversion requirements Class II to VI
    - Controlled by Class II Director or Class VI?
    - Prescriptive or performance standards?

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# Path Forward

- Foster additional development projects
- Maximize flexibility and adaptability
- Permit projects at scale
- Continue guidance development
- Facilitate state primacy contributions
- Begin developing rule adaptations
- Work together to advance CCUS

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# For More Information


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