UIC Class VI GS Technical Guidance Update

DOE Carbon Storage R&D Project Review Meeting – Pittsburgh, PA

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U.S. Environmental Protection Agency

UIC Well Classification

Well Class	Function	Inventory
Class I	Hazardous industrial and municipal wastes	650
Class II	Fluids related to oil and gas production	151,000
Class III	Solution mining (e.g. salt, uranium)	21,400
Class IV	Shallow hazardous waste – only used for remediation activities	24 sites
Class V	Shallow injection of nonhazardous fluids	500,000 – 650,000 (Estimate – precise inventory is unknown)
Class VI	**Geologic sequestration of carbon dioxide**	**N/A**

UIC WELL CLASSES

Class VI Rule Background

Considerations for GS

- Large Volumes
- Buoyancy
- Viscosity (Mobility)
- Corrosivity

New well class established:
Class VI (December 2010)

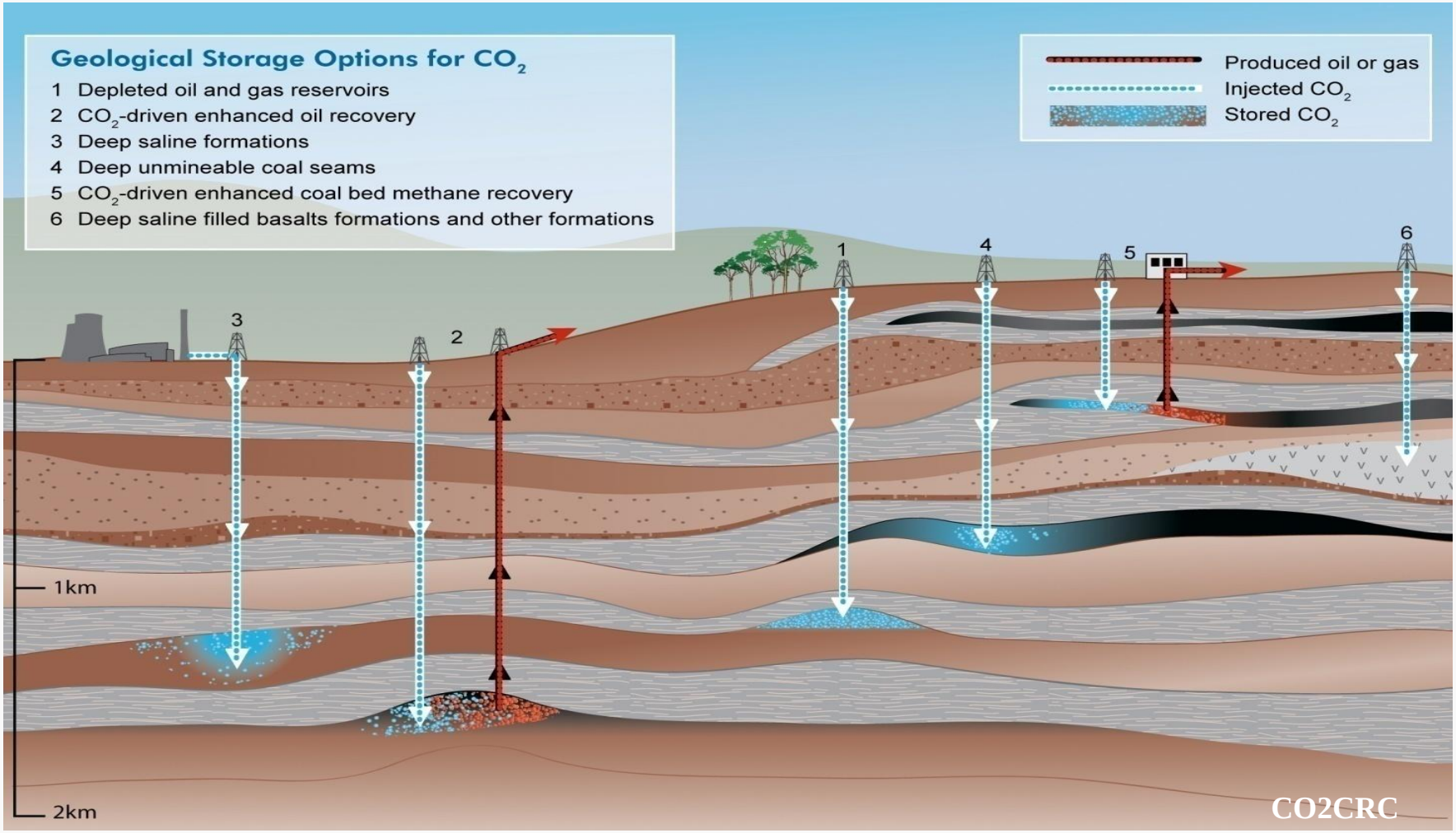
UIC Program Elements

- Site Characterization
- Area of Review (AoR)
- Well Construction
- Well Operation
- Site Monitoring
- Post-Injection Site Care
- Public Participation
- Financial Responsibility
- Site Closure

Class VI Unique Requirements

- **146.82: Required Class VI permit information**
- **146.83: Minimum criteria for siting**
- **146.84: Area of Review and corrective action**
- **146.85: Financial Responsibility**
- **146.86: Injection Well Construction**
- **146.87: Logging, Sampling, and Testing (prior to operation)**
- **146.88: Injection Well Operation**
- **146.89: Mechanical Integrity**
- **146.90: Testing and Monitoring**
- **146.91: Reporting and Recordkeeping**
- **146.92: Injection Well Plugging**
- **146.93: Post-Injection Site Care and Site closure**
- **146.94: Emergency and Remedial Response**
- **146.95: Injection Depth Waiver requirements**

Geologic Sequestration Scenarios



Class VI Implementation

- Currently, EPA HQ is providing extensive one-on-one assistance to Regions, permit applicants, and states on:
  - AoR delineation and modeling
  - Model-based post-injection site care timeframe determinations
  - Financial responsibility demonstrations
  - Injection well design and construction
  - Project plan development
  - Permit application information submittals and reviews
  - Permit condition development assistance

Class VI Implementation

- Permit applicants, Regions, and states continue to request finalization of the technical guidance documents to help them move forward with Class VI permitting
- Guidance documents should reduce the amount of one-on-one assistance requested by permit applicants as guidance documents address questions that permit applicants are raising (e.g., PISC, permitting and site characterization)

Class VI Implementation

The final Class VI Rule 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
- Reporting and Recordkeeping
- Primacy
- Implementation
- Well Plugging, Post-Injection Site Care (PISC), and Site Closure
- Class II – Class VI Transition
- Injection Depth Waivers

Class VI Guidance Development Process

- EPA UIC staff develop drafts
- Regional and Program Offices review and comment
- External experts (e.g., industry, academic, and state representatives) review and provide comments
- UIC staff incorporate expert and other comments
- Public comments on management-approved draft documents (45-60 days)
- UIC staff revise documents based on public comments
- OGC reviews and comments
- UIC staff finalize management-approved documents

Outreach Materials in Support of Guidances

- Developed communication materials:
  - Communication strategy
  - Desk statement
  - Question and answer document
  - Fact sheet
  - Website updates
- EPA is holding public webinars after each technical guidance document is final (usually about 2 weeks after web-posting)

Status of Guidance Documents

- Released:
  - **Financial Responsibility *Final(July 2011)***
  - **Well Construction *Final* (*August 2012*)**

- Ready for release: *(Late August/September 2012)*
  - *Class II – Class VI Transition DRAFT for public comment*
  - Well Plugging, Post-Injection Site Care (PISC), and Site Closure *DRAFT for public comment*
    - Project Plan Development *FINAL*

Status of Guidance Documents (cont.)

- Future release of final documents:
  - Site Characterization *(Summer/Fall 2012)*
  - Area of Review Evaluation and Corrective Action *(Summer/Fall 2012)*
  - Testing and Monitoring *(Fall 2012)*
  - Primacy Manual *(Winter 2012)*
  - Implementation Manual *(Winter 2012)*

- Future release of draft documents for public comment:
  - Reporting and Recordkeeping *(Summer/Fall 2012)*
    - Owner/Operator guidance
    - UIC Program Director guidance
  - Injection Depth Waivers *(Summer 2012)*

Class VI Well Construction Guidance

- Contains information on requirements for:
  - Injection well construction (40 CFR 146.86)
  - Logging, sampling, and testing of injection wells (40 CFR 146.87)
  - Injection well operation (40 CFR 146.88)
  - Mechanical Integrity testing (40 CFR 146.89)
- Affords flexibility in:
  - Selection of well construction materials
  - Well design (e.g., staging cement; use of multiple surface casing strings)
  - Logging and mechanical integrity testing techniques

Well Construction Guidance Webinar

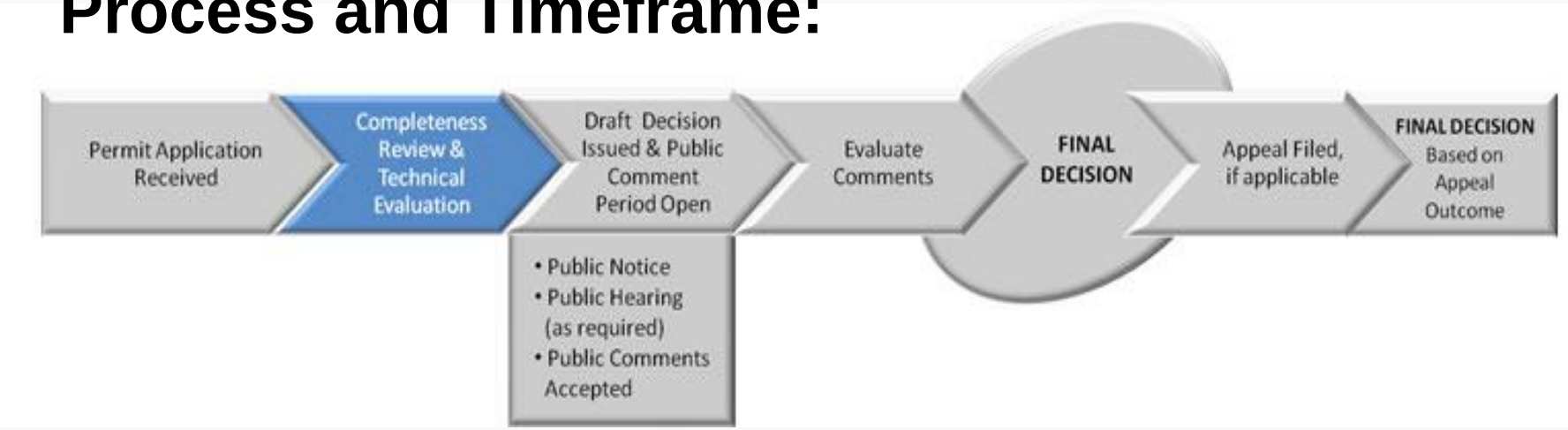
- EPA Conducted the Well Construction guidance webinar on August 16, 2012
- Over 70 individuals registered and took part in the webinar
- Information was exchanged and discussions took place regarding aspects of Class VI well construction and operation

Flexibilities Addressed in Upcoming Class VI Guidance Documents

- Selection of injection site, formation type, and injection depth
- Use of *any* of a suite of computational, multi-phase fluid flow and transport modeling tools for AoR delineation
- Use of phased corrective action
- Selection of financial instruments for various phases of GS projects (e.g., operation, PISC)
- Demonstration and duration of the PISC timeframe
- Selection of monitoring technologies for plume and pressure front tracking and USDW protection

Class VI Permitting

Process and Timeframe:



- 40 CFR 146.82
- Iterative and flexible
- Accommodates new information
- *Remember: This is a new process for everyone*

Class VI Permitting: Permit Applications

- Region 5:
  - Archer Daniels Midland: Decatur, Illinois
    - Two Class VI permit applications (CCS #1 and #2) received in December and July 2011, respectively
    - Injection formation: Mount Simon sandstone
    - Proposed injection volume and duration: approximately 4.75 million tons of CO_2 over 5 years
  - Tenaska: Taylorville, Illinois
    - Two Class VI permit applications received in September 2011
    - Proposed injection volume and duration: 63 million tons of CO_2 over 30 years

Class VI Permitting: Project Discussions

- Region 5:
  - FutureGen 2.0: Illinois
    - Proposed injection formation: Mount Simon sandstone
    - Proposed injection volume: ~1.3 million tons/year
    - Proposed injection duration: ~30 years

Class VI Permitting: Project Discussions

- Region 7:
  - Wellington, Kansas
    - Proposed formation: Arbuckle
    - Proposed injection volume: 40,000 tons saline + 30,000 for EOR
    - Proposed project duration: TBD
- Region 8:
  - Big Sky: Kevin Dome, Montana
    - Proposed injection formation: Kevin Dome
    - Proposed injection volume: 1 million tons
    - Proposed project duration: 8 year project

More on Class VI Implementation

- GS Data System development
  - Alternatives Analysis Completed in January 2012
  - Management decisions and ongoing discussions with Key Participants will influence next steps

- Working with 6 States on Class VI Primacy – EPA is Implementing Authority for Class VI as of 9/2011

- Continue Coordination with
  - EPA Program Offices (OAR) and Regions
  - State and Federal partners, Non-governmental organizations, Industry and other stakeholders
  - CCS Presidential Task Force Offices

Contact Information

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  References
  - http://water.epa.gov/type/groundwater/uic/wells_sequestration.cfm
  - http://www.gpo.gov/fdsys/pkg/FR-2010-12-10/pdf/2010-29954.pdf
  - http://www.gpo.gov/fdsys/pkg/FR-2011-09-15/pdf/2011-23662.pdf