

EPA Geologic Sequestration Initiative and Upcoming  
Plans for Developing a Management Framework

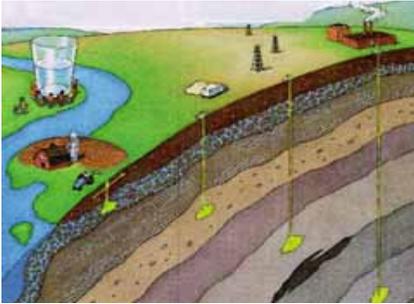
# Sixth Annual Conference on Carbon Capture & Sequestration Pittsburgh, PA.

May 7-10, 2007



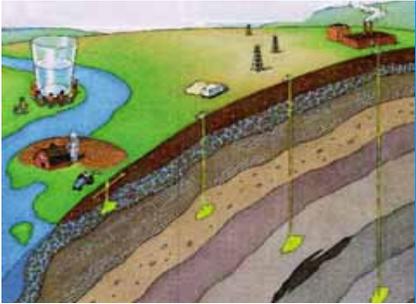
Office of Ground Water and Drinking Water  
USEPA Office of Water

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# Current and Future Steps

- General Background
- Class V Experimental Well Guidance
- EPA Workshops Focused on Specific Technical Issues
- New Research Opportunities
- How to keep everyone involved and able to provide input to a Management Framework



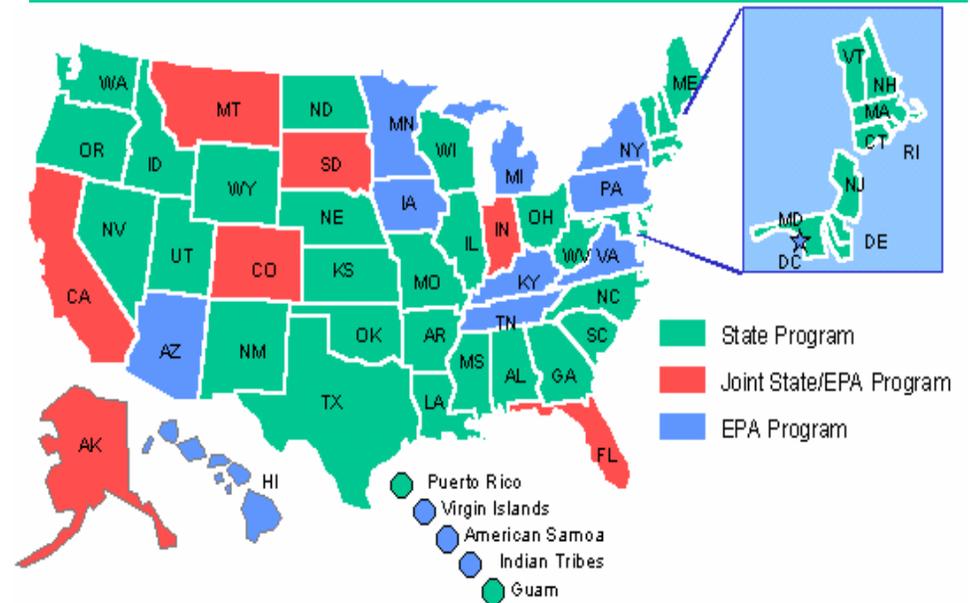
# Regulatory Framework

*“With appropriate site selection..., a monitoring program..., a regulatory system, and the appropriate use of remediation methods..., the local health, safety and environmental risks of geological storage would be comparable to risks of current activities...”*

*-Summary for Policymakers, IPCC Special Report on CCS*



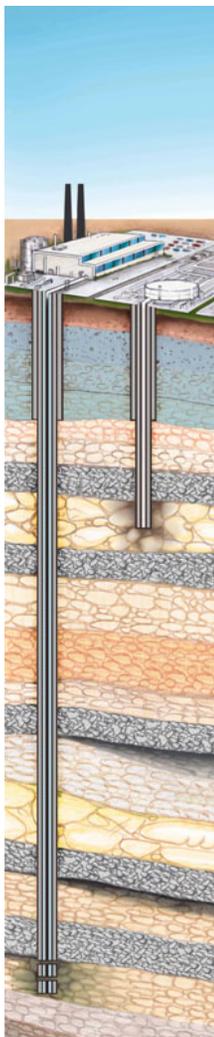
## Underground Injection Control (UIC) Program



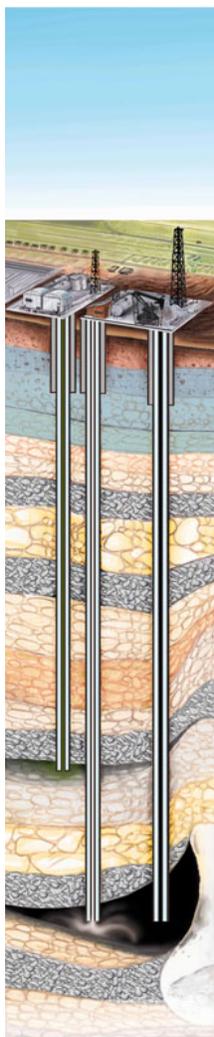
# UIC WELL CLASSES



**Class I**



**Class II**

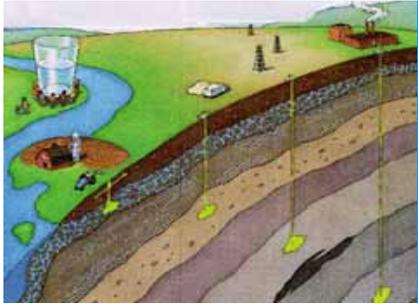


**Class III**



**Class V**

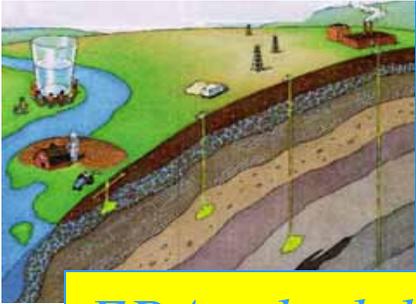




# CCS under the SDWA: Which Well Class?

- **Class I** – technically sophisticated, stringently regulated injection wells with detailed siting, monitoring, and closure requirements. Examples:
  - Florida municipal wastewater injection (high volumes)
  - Industrial fluids injected beneath USDWs (more typical)
  - Hazardous waste wells (long storage times)
- **Class II** – wells used by oil and gas operators for waste fluid disposal, enhanced recovery (ER), and hydrocarbon storage (*may* be appropriate for CO<sub>2</sub> storage in depleted reservoirs)
- **Class III and IV** – very unlikely options (mining & banned)
- **Class V** – initial GS pilot projects permitted as Class V experimental wells
- **Potential Class VI** – new class of injection wells with guidance/regulations tailored to match technical specifics and degree of risks associated with geologic sequestration of CO<sub>2</sub>





# EPA's Potential Role

*EPA schedule coincides with DOE's Sequestration Program Goals\**

## DOE Goals

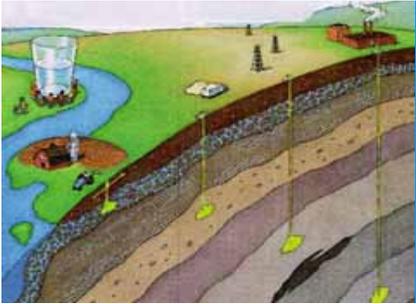
- 2006: Begin field demonstrations
- 2007-2008: **Demonstrate sequestration of more than 1 MMT CO<sub>2</sub>/yr**
- 2010: Fully develop MMV for accounting
- 2012: Commercialization

## EPA HQ Efforts

- 2006-2007: Issue experimental well guidance
- 2007-2008: Collect data, conduct outreach, create Advisory Panel (?)
- 2009: Publish options for permitting commercial scale projects (?)
- 2010: Draft proposal(?)
- 2012: Finalize decisions (?)

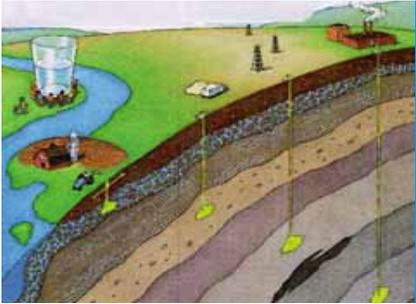
\*EPA will also have an important role in reviewing EISs for DOE funded pilot projects including FutureGen





# Guidance on Geologic Sequestration (GS) of CO<sub>2</sub>

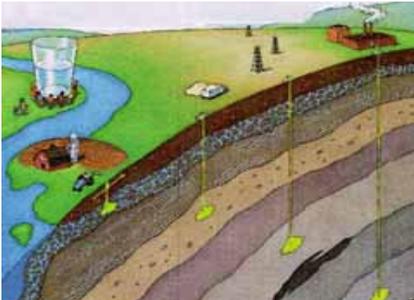
- EPA anticipates 25 UIC permit applications:
  - 10 deep saline projects
  - Remainder are either EOR, EGR or Coal Seam (Methane)
- Supplementary guidance will help State and Regional Directors achieve three important goals:
  - Protection of USDWs and human health
  - Assist with Demonstration-scale projects
  - Inform a future management framework for Commercial-scale implementation of GS



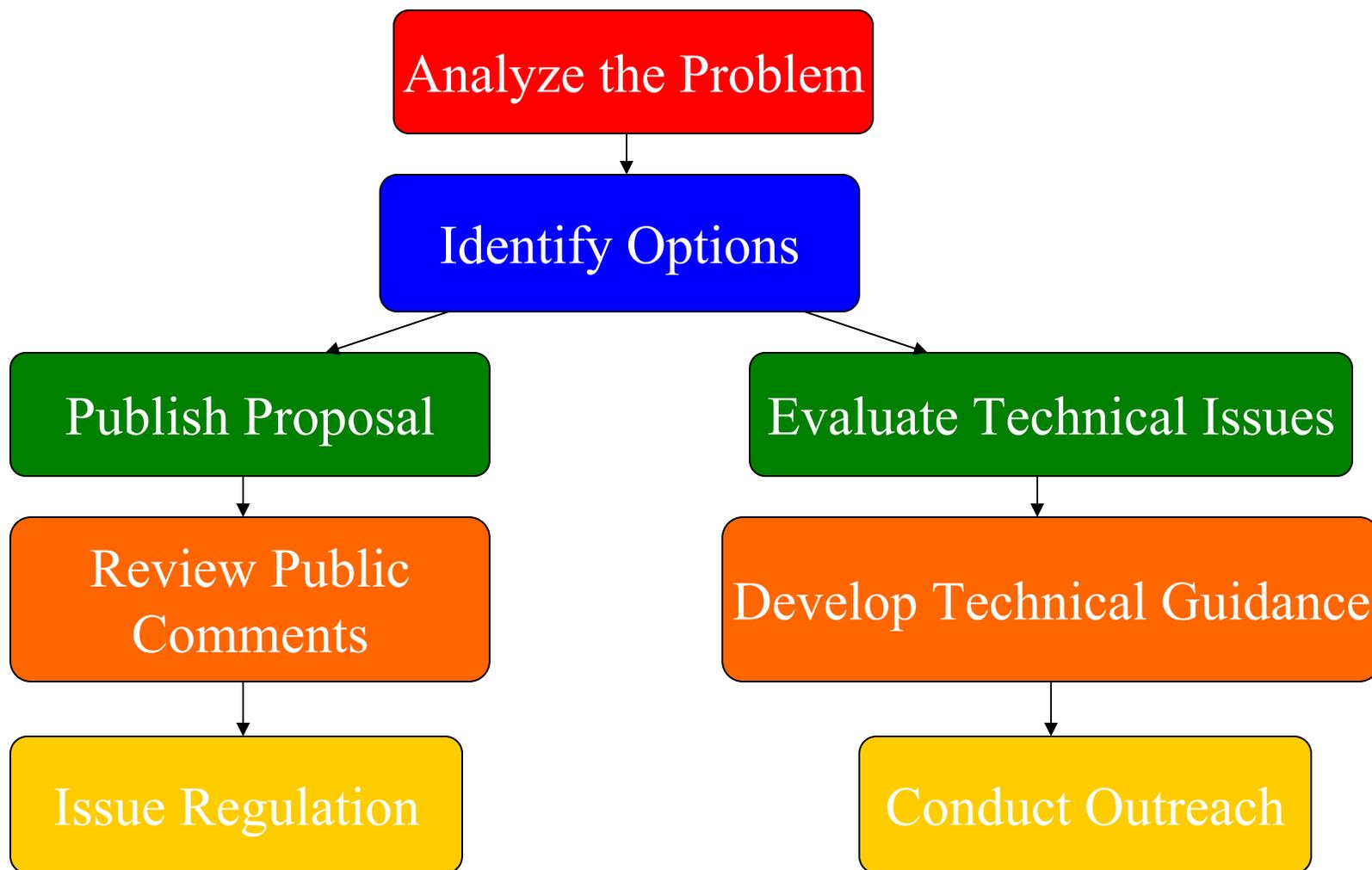
# How the Draft UIC Program Guidance #83 Was Developed

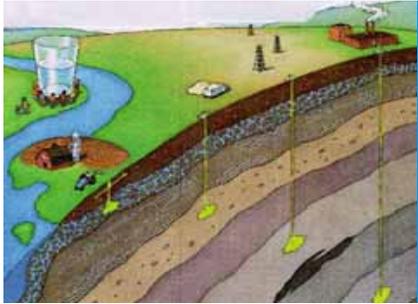
- Initial draft developed by the Agency's Official CO<sub>2</sub> GS Workgroup
  - Co-chaired by Office of Air & Radiation and the Office of Ground Water and Drinking Water since 2004
  - Comprised of members from EPA Regional Offices, EPA HQ offices and ORD Lab in Ada, OK
  - First draft discussed at San Francisco meeting (March 2006)
- Shared drafts with DOE/NETL (Summer 2006)
- Approval to distribute the draft to GWPC and IOGCC States for review and comment (October 2006)





# Role of an EPA Workgroup

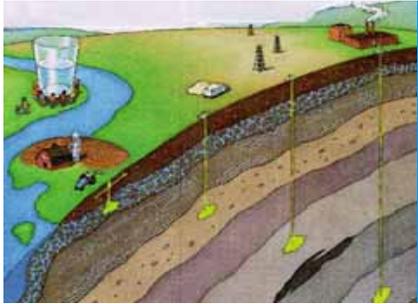




# Key Features of UIC Program Guidance #83

## Provides Maximum Flexibility

- Encourages GS project *permits* to be tailored to the data collection goals of the project
- Topics that merit further evaluation include:
  - Potential impacts on ground water
  - Possibility of large releases
  - Casing, tubular, and cement integrity
  - Measurement, monitoring and verification tool applicability
  - Fluid displacement and associated pressure impacts

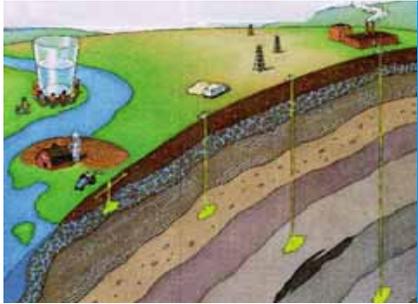


# Key Features of UIC Program Guidance #83

## **Provides Maximum Flexibility (cont'd.)**

- Does not include specific criteria, standards, volumes
- Describes technical considerations that should be taken into account when issuing a project permit such as:
  - Siting
  - AOR
  - Well construction
  - Operation and Monitoring
  - Closure



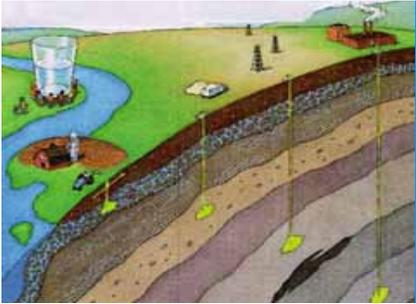


# Key Features of UIC Program Guidance #83

## Encourages Communication

- Recommends permitting instead of rule authorization
  - Public participation is essential for transparency
  - Clear expectation of procedures, outcomes, and compliance
- Suggests that UIC Program Directors seek help if access to a particular expertise is not readily available
  - Permitting and monitoring of pilot GS projects will require a multidisciplinary effort and could be resource intensive
  - EPA is looking for ways to address the financial burden
  - Need to facilitate sharing of information and expertise





# UIC Program Guidance #83

- EPA tried to address all comments received
- Final guidance was signed 3/1/07 and was posted to website on 3/8/07
- Guidance mentioned by EPA at House Energy and Commerce hearing 3/6/07
- The final guidance is posted to:  
[www.epa.gov/safewater/uic.html](http://www.epa.gov/safewater/uic.html)

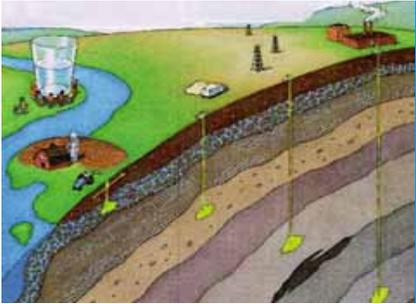




# UIC Program State Regulator's Workshop

- GWPC UIC Meeting – San Antonio, Texas
- Full Day Workshop on January 24, 2007
- Over 125 Attendees
- AM Technical Presentations by DOE/NETL and PM Discussion Sessions on Research/Data Gaps by USEPA
- Some Key Findings...

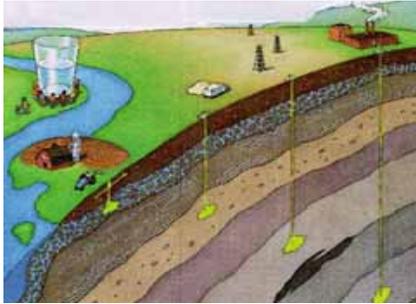




# EPA Well Construction and MIT Technical Workshop

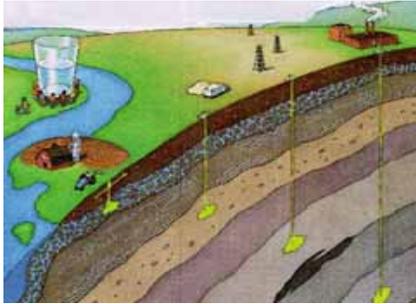
- Albuquerque, NM - March 14, 2007
- In Conjunction with 3<sup>rd</sup> IEA Well Bore Conference in Santa Fe, NM
- 51 Attendees
- AM Technical Presentations followed by PM Facilitated Breakout Groups
- Some Key Findings...





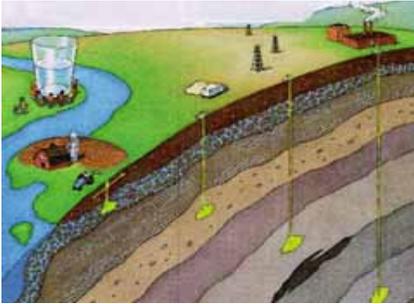
# Future Workshops

- Workshop #3: Geologic Setting, AOR, and Abandoned Well Technical Workshop
- Planned for Washington, DC for July 10-11, 2007 at EPA HQ
- Workshop #4: Financial Responsibility and Risk Analysis Workshop
- Location TBD for a Sept./Oct. Meeting



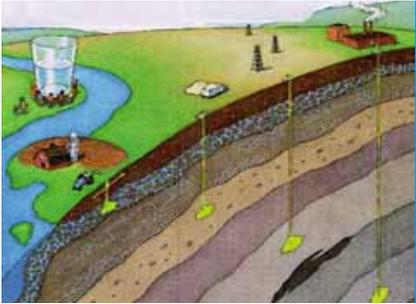
# EPA GS Research

- EPA has funded research via Lawrence Berkeley Lab on critical GS issues
- We are now partnering with DOE/NETL to fund projects on health and safety:
  - Coupled hydrochemical analysis and modeling for CO<sub>2</sub> impacts to USDWs
  - Large scale hydrological impacts on ground water systems



# New EPA GS Website

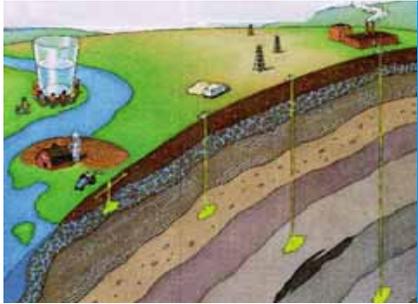
- EPA has two existing websites on GS within Water and Air Program Office sites
- Started development of a distinct, stand-alone GS website that will better inform stakeholders and the public on EPA activity and provide background and links
- Anticipate that it will go up in FY 2007



# Future Involvement

## Input for EPA's Management Framework:

- GS Meetings and Conferences held by DOE, API, GWPC, IOGCC, EPRI, SPE
- State and Regional UIC Meetings
- EPA GS Workshops
- Advisory Group(?)
- EPA WANTS YOUR SUGGESTIONS



# EPA Regulatory Development Goals

- Protect human health and the environment
- Ensure that decisions are cost-effective and fully protective
- Conduct high quality scientific, economic, and policy analyses at early stages to keep decision makers informed
- Apply new/improved methods to protect the environment
  - build flexibility into regulations from the start
  - create strong partnerships with the regulated community vigorously engaging in public outreach and involvement
  - *use alternate but effective non-regulatory approaches*