

Geologic Sequestration of Carbon Dioxide

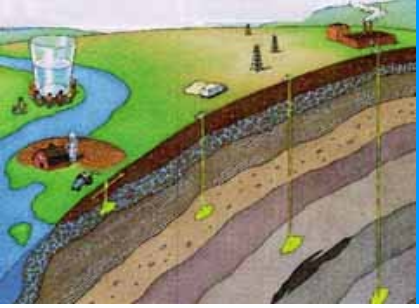
EPA's Notice of Data Availability and Request for Comments

2009 Regional Carbon Sequestration Partnerships Annual Review



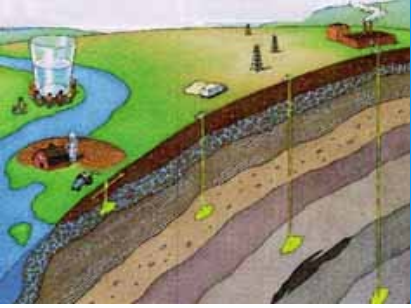
Sean Porse

**U.S. Environmental Protection Agency
Office of Ground Water and Drinking Water
November 17, 2009**



EPA's GS Rulemaking *Outline*

- Underground Injection Control (UIC) Program Background
- Proposal
- The Notice of Data Availability and Request for Comment
 - Overview
 - Brief Comment Summary
- Schedule



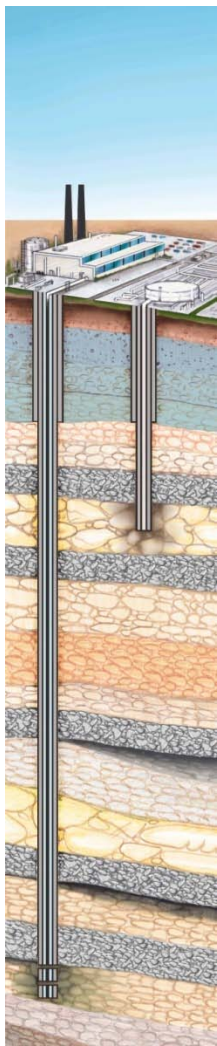
UIC Program Background

- The 1974 Safe Drinking Water Act (SDWA; Reauthorized in 1996)
 - Federal regulations for protection of Underground Sources of Drinking Water (USDWs)
 - USDW defined:
 - Any aquifer or portion of an aquifer that contains water that is less than 10,000 PPM total dissolved solids or contains a volume of water such that it is a present, or viable future source for a Public Water Supply System
- UIC Program regulates underground injection of *all fluids* – liquid, gas, or slurry
 - Designation as a commodity does not change SDWA applicability
 - Some natural gas (hydrocarbon) storage, oil & gas production, and some hydraulic fracturing fluids exempted
- Existing UIC program provides a regulatory framework (baseline) for the Geologic Sequestration of CO₂

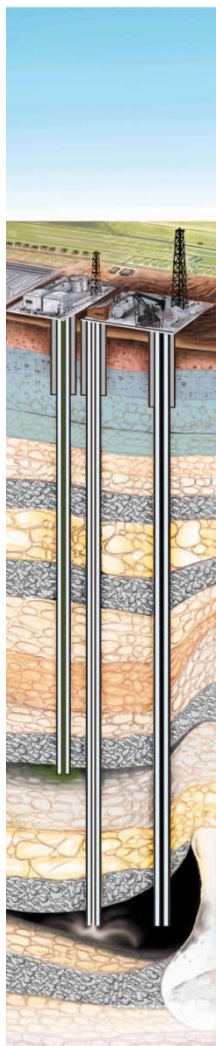
UIC Program Background

UIC Well Classes

Class I



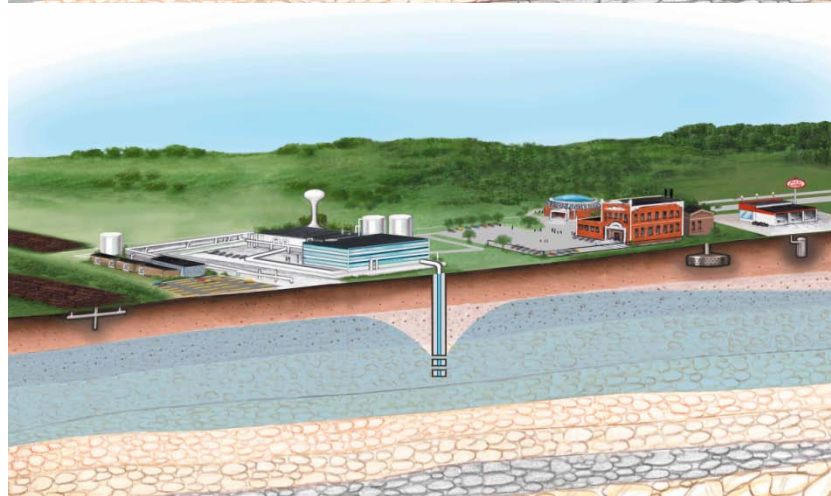
Class II



Class III



Class V

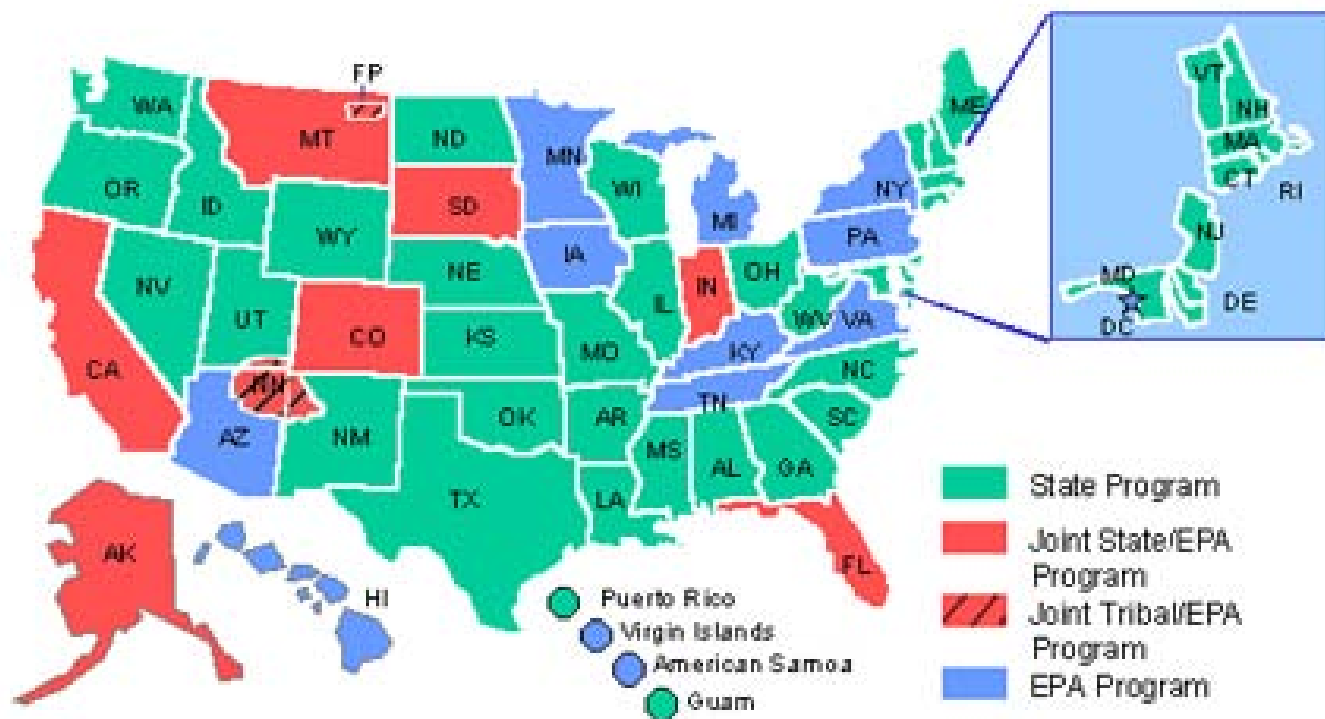


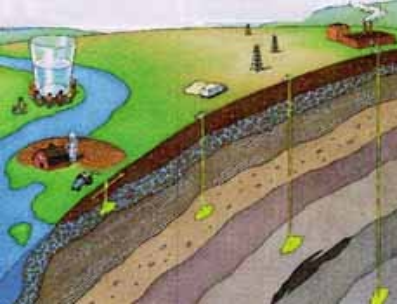
UIC Program Background

Primacy



- 33 States have primary enforcement authority (primacy) for the UIC program; EPA and States share program implementation in 7 States; EPA and 2 tribes share program implementation; EPA directly implements the entire UIC Program in 10 states

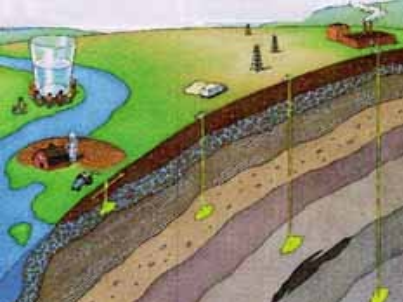




EPA's GS Rulemaking

Goals of the Rulemaking Process

- Develop proposed rules that would protect underground sources of drinking water under SDWA
- Tailor existing UIC program requirements to unique needs of GS of CO₂ for long-term storage
- Ensure adaptive approach to incorporate new data
- Use existing experience with industrial and enhanced oil/gas recovery injection

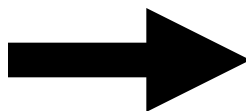


EPA's GS Rulemaking

Approach to Rulemaking

Special Considerations for GS

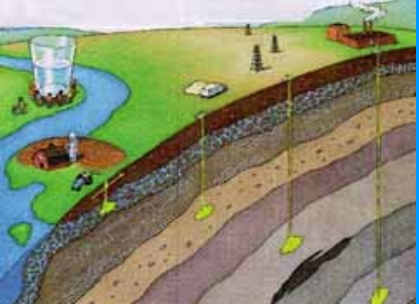
- Large Volumes
- Buoyancy
- Viscosity (Mobility)
- Corrosivity



UIC Program Elements

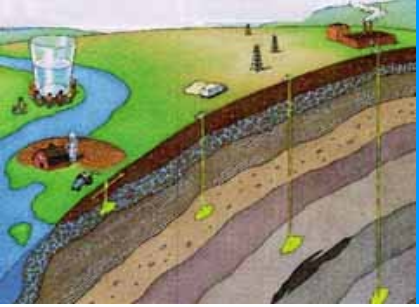
- Site Characterization
- Area Of Review
- Well Construction
- Well Operation
- Site Monitoring
- Post-Injection Site Care
- Public Participation
- Financial Responsibility
- Site Closure

Develop new well class
for GS – Class VI



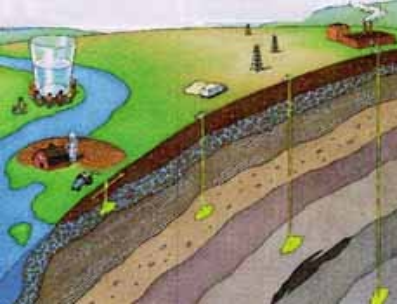
EPA's GS Rulemaking *Rule Development Process*

- EPA developed a **Proposed Rule** for Geologic Sequestration (GS) of CO₂
 - Announced October 2007
 - Signed & published July 2008
- Proposed rule uses Safe Drinking Water Act authorities and revises Underground Injection Control Program requirements for GS
- Priority placed on avoiding endangerment of underground sources of drinking water



EPA's GS Rulemaking *Collaboration*

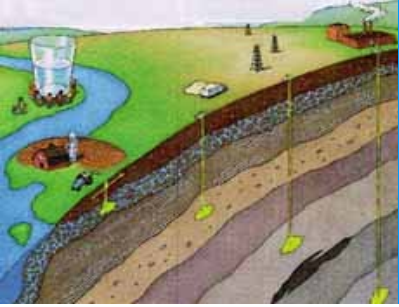
- Inter- and Intra- Agency Coordination
 - Workgroup of ~48 members
 - State co-regulators
 - Department of Energy and other Federal Agencies
- Stakeholder Outreach
 - Federal Advisory Committees
 - Non-governmental Organizations
 - Industry Groups
 - States and Tribes



EPA's GS Rulemaking

Proposed Rule

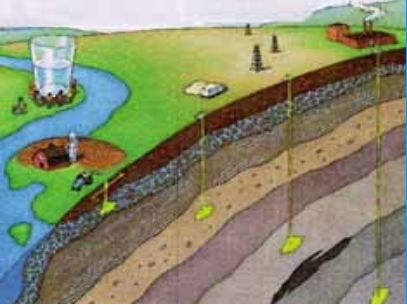
- Two public hearings
 - September, 30, 2008: Chicago, IL
 - October 2, 2008: Denver, CO
- 150 day comment period
 - Ended December 24, 2008
- Proposed Rule Comments Received:
 - 385 public submissions
 - 151 unique comments



Notice of Data Availability *Background*

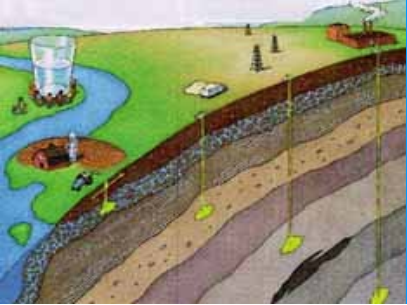
- The Notice of Data Availability (NODA)
 - Developed in early 2009
 - Published August 31, 2009
 - 45 day comment period: August 31st – October 15th, 2009
 - Public Hearing: Chicago, IL on September 17, 2009

- Developed to seek comment on
 - Research findings and project data
 - A new approach to address public comments on the proposed injection depth requirements



Notice of Data Availability *Research*

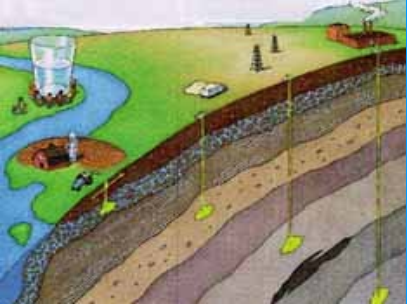
- Provides interim information on projects since the July proposal
- Department of Energy (DOE) GS Project Data
 - Aneth Field, Paradox Basin (Utah; SWP)
 - Escatawpa (Mississippi; SECARB)
 - Pump Canyon Site (New Mexico; SWP)
- Preliminary results support proposed requirements for site characterization, well construction, operation and monitoring and will help inform the final rule



Notice of Data Availability *Research*

Lawrence Berkeley National Laboratory Research

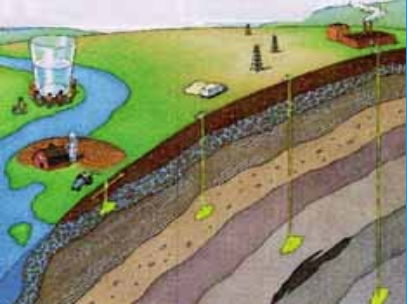
- Modeled Ground Water Quality Changes Related to the Mobilization of Trace Elements
- Modeled Basin-Scale Hydrologic Impacts of CO₂ Storage
- Preliminary results validate the importance of the proposed GS requirements to ensure protection of USDWs



Notice of Data Availability

Injection Depth

- Proposal would require that all Class VI wells inject below the lowermost USDW
- There are some areas of the country where CO₂ storage capacity would be limited by injection as proposed
- Stakeholders:
 - Supported requirements as proposed (e.g., Water organizations, some States)
 - Supported more flexibility in this requirement (e.g. some States and industry)

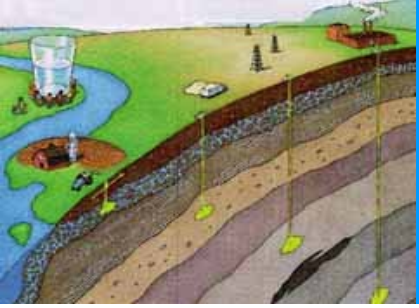


Notice of Data Availability

Injection Depth

The waiver process goals are to:

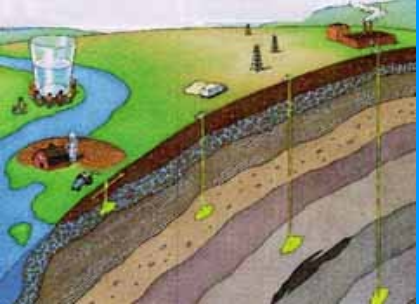
- Accommodate injection into different formations at varied depths
- Consider the concept that injection above and/or between the lowermost USDW, under specific circumstances, can be equally protective of USDWs
- Provide flexibility and respond to storage capacity concerns resulting from limiting injection below the lowermost USDW
- Ensure consideration of community drinking water resources by requiring coordination between the UIC Director and the PWSS Director



NODA Comments

Brief Summary

- EPA received 66 unique comments
- Commenters represented industry (including the oil and gas industry, electric utilities, and energy companies); states and tribes; associations (including water associations and CCS associations); environmental groups; and others



NODA Comments

Brief Summary

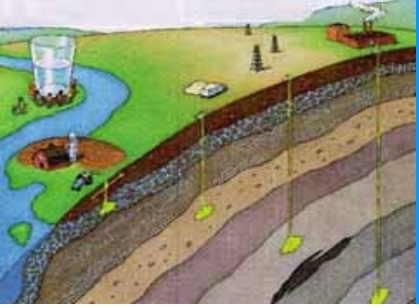
- NODA Research Information
 - Commenters submitted additional GS-related research (e.g., data on the SACROC oilfield project, university-led research, and industry-led efforts)
- Comprehensive Approach
 - Many commenters supported a comprehensive framework for GS that addresses issues beyond SDWA authority



NODA Comments

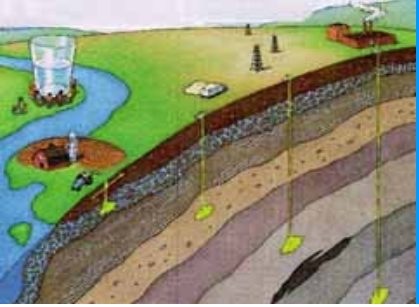
Brief Summary

- Injection Depth Waiver discussion
 - Most commenters supported EPA's suggested approach
 - They welcomed the site-specific aspect and believed that CO₂ injection between USDWs can be conducted in a manner that protects USDWs
 - Some of these commenters believed the waiver application required too much information or that the information was duplicative of permit submittals
 - Others thought the process was too onerous (i.e., that it was duplicative of permit application or that separate approval of the PWSS Director was not appropriate or necessary).
 - Some commenters opposed the use of waivers, saying that protection of USDWs should be paramount



EPA's GS Rulemaking *Schedule*

- Response to Comments:
 - Proposed Rule comments
 - NODA comments
- Development of Final Rule
 - Preamble and regulatory text
- Rule Finalization: Late 2010/Early 2011
- Rule Implementation



Thank you!

More information about the UIC Program

- EPA Geologic Sequestration of Carbon Dioxide Website – http://www.epa.gov/safewater/uic/wells_sequestration.html
- Code of Federal Regulations: Underground Injection Control Regulations 40 CFR 144-148 – http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?sid=d6ee71a544eca89c533c825135913f13&c=ecfr&tpl=/ecfrbrowse/Title40/40cfrv22_02.tpl
- Regulations.gov Online Public Docket- <http://www.regulations.gov/search/Regs/home.html#docketDetail?R=EPA-HQ-OW-2008-0390>