

December 18, 2008

Environmental Protection Agency  
Water Docket  
Mailcode 2822T  
1200 Pennsylvania Avenue  
Washington, DC 20460

**Re: Docket number EPA-HQ-OW-2008-0390**

**Comments by the CCS Reg Project on proposed EPA rule: Federal Requirements Under the Underground Injection Control (UIC) Program for Carbon Dioxide (CO<sub>2</sub>) Geologic Sequestration (GS) Wells (73 FR 43491-43541, July 25 2008)**

**Introduction**

1. These comments are submitted on behalf of the CCS Reg Project, a two-year research effort with the objectives of: designing and facilitating the rapid adoption of a U.S. regulatory environment for the capture, transport and deep geological sequestration (GS) of carbon dioxide (CO<sub>2</sub>); and, ensuring that carbon capture and sequestration (CCS) will be done in a manner that is safe, environmentally sound, affordable, compatible with evolving international carbon-control regimes (including emissions trading) and socially equitable.
2. The CCS Reg Project is anchored in the Department of Engineering and Public Policy at Carnegie Mellon University. Other members of the project team are located at the Hubert H. Humphrey Institute of Public Affairs at the University of Minnesota, the Institute for Energy and the Environment at the Vermont Law School, and the Washington, DC law firm of Van Ness Feldman. Questions regarding these comments should be directed to project manager Dr. Sean McCoy at 412-268-5489.
3. Primary funding for the CCS Reg Project comes from the Doris Duke Charitable Foundation. More information about the CCS Reg Project can be found at <http://www.ccsreg.org/index.html>.
4. The CCS Reg Project has produced an interim report framing the issues we believe must be considered if CCS is to be safely and effectively developed. This report (attached) lays out options for legal and regulatory approaches for CCS. Over the next 12 months, the CCS Reg Project will complete and publish a final report that will include specific recommendations and suggestions for possible new legislative authority.
5. Contributors to the CCS Reg Project, and to these comments, are listed in the attached report. Opinions expressed in the report, and in these comments, are those of the individual contributors and may not represent the views of the institutions with which they are affiliated.

## Overarching issues and concerns

6. We applaud EPA's work toward developing regulations for GS. It is urgent that the U.S. moves forward with deployment of CCS technologies: EPA's effort to write rules for GS wells incorporating sound scientific and technical knowledge contributes to creating a regulatory framework that ensures that GS will be done in a manner that is safe and environmentally sound. The speed with which EPA drafted these rules, and the inclusiveness of the rulewriting process, are well matched to the urgency and broad interest in the problem.
7. EPA's laudable efforts notwithstanding, we believe the Safe Drinking Water Act (SDWA) does not provide adequate authority to comprehensively regulate GS. Because the statutory authority for the UIC Program derives from the SDWA, the proposed rule is unable to address key issues that must be resolved for commercial-scale GS,<sup>1</sup> such as:
  - ownership of pore space (discussed in Chapter 5 of attached report);
  - potential human health or ecological impacts if carbon dioxide leaks to the surface or near-surface (discussed in Chapters 1, 4, and 6 of attached report);
  - long-term liability (discussed in Chapters 7 and 8 of attached report); and,
  - greenhouse gas regulatory accounting, which will be the enabling link to incentive structures that make GS economically viable (discussed in Chapters 8 and 9 of attached report).
8. Failure to resolve the above issues could make the commercial development of CCS impossible.
9. The proposed rules for Class VI GS wells are more stringent than the other UIC well classes (73 FR 43524-43525) yet they do not comprehensively manage issues of concern for GS. With this limitation, the proposed rules run the risk of locking in a regulatory framework that ultimately inhibits widespread commercial deployment of CCS.

## Overarching recommendations

10. The inability of the proposed rule to manage the issues listed above should be remedied by either:
  - a. passage of new federal legislation to supplement the UIC program and amend the SDWA; or
  - b. passage of new freestanding federal legislation to regulate GS comprehensively.These options are detailed in Chapter 6 of the attached report.

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<sup>1</sup> These limitations are acknowledged by the agency in the preamble to the rule. (73 FR 43,495)

11. To prevent creation of an overly inhibitive regulatory framework, the UIC program should continue to permit wells injecting CO<sub>2</sub> under existing well classes and/or the proposed Class VI rules, for a limited and defined period. Concurrently, a Commission or an Interagency Task Force (established either through legislation or executive order of the President) should gather and synthesize results from pilot and early commercial-scale projects, providing recommendations to Congress on the proper format to regulate widespread commercial CCS. Chapter 11 of the attached report details this two-stage approach.
12. Adoption of the Class VI rules should be accompanied by funding adequate to implement them. Regulation of GS through the UIC program cannot be effective unless funding is provided commensurate to the goals of the Class VI program. The EPA UIC budget, including grants to state programs, is chronically underfunded. Annual federal appropriations to the UIC program have been approximately \$11 million: less than half the funding level (\$25 million per year) authorized in the SDWA. Studies by the Ground Water Protection Council show that the Class V program would need an additional \$50 million annually to meet its objectives and that the Class II program is under-funded by approximately \$25 million annually. An under-resourced regulatory agency cannot ensure the safe and effective operation of GS projects.

#### **Issues that would require amendment of the SDWA or passage of new legislation**

13. *Need to balance multiple environmental interests:* Protection of drinking water is an essential environmental goal, but must be balanced with avoidance of the dangerous impacts of climate change. As mandated by the SDWA, the UIC Program rules have been developed with the objective of preventing any migration of injected fluid or other contaminants into USDWs. In practice, however, regulatory treatment of injectate migration has been less clear-cut. For example the experience in Florida, discussed in Chapter 6 of the attached report, suggests that it would be highly desirable to have arrangements in place ahead of time to allow balancing of potentially conflicting national environmental interests. We recommend that the SDWA be amended to allow balancing multiple environmental interests.
14. *Ownership of Pore Space:* Considerable ambiguity exists today in the U.S. as to the current ownership of the deep pore space that would hold injected CO<sub>2</sub>, and how the right to use deep pore space would be obtained for GS purposes. It appears that most injectors of waste fluids into other well classes regulated by the UIC have not secured rights or permission to use the pore space from any surface or sub-surface property owners. At least a few of those injection projects likely involve volumes of fluid as large or larger than the volumes of CO<sub>2</sub> that will be involved in commercial-scale CCS projects. In order for CCS to remain an economic possibility, new legislation must allow the federal or state governments to intervene to manage or limit private property rights for the use of pore space for GS. Otherwise, states or private property owners could demand high rental rates that could block development of CCS.

15. *Potential Health or Environmental Impacts other than to Groundwater:* While we believe that the risk of health or environmental impacts other than to groundwater is very slight for sites that are well-characterized and well-operated, we understand that this is a topic of concern to the public. The inability of the proposed UIC Class VI rules to address these concerns carries the potential to undermine public acceptance of CCS. Should such impacts occur under the proposed UIC Class VI rules, some other regulator would need to intervene. It would be preferable, and more efficient, to have site permitting conducted by a program with the authority to manage all potential risks from CO<sub>2</sub> injection comprehensively.
16. *Long-term Liability:* Widespread commercial deployment of CCS requires a clear prior understanding of what entity will be responsible and financially liable for assuring that injected CO<sub>2</sub> remains safely underground after operations at the site cease. Private sector entities often have relatively short time-horizons and lifetimes in comparison with the period over which injected CO<sub>2</sub> must remain sequestered. Thus, we have serious doubts about the efficacy of holding operators responsible in perpetuity, as under the proposed UIC class VI rules. A number of alternative strategies could be used to finance and manage long-term liability, as detailed in Chapters 7 and 8 of the attached report. We believe that settling the question of long-term liability, in a manner that gives confidence to both the public and project financial backers, will require either amendment of the SDWA, or passage of new legislation, to allow legal responsibility for closed GS sites to be transferred to a third party or government entity.

### **Specific comments on the proposed rule**

17. *Iterative Area of Review:* We support the proposal to reevaluate iteratively the area of review over the project life cycle and to allow phased corrective action (sec. 146.84).
18. *Relationship between Class VI Wells and Class II Wells:* Regulations for GS site permitting should create a clear path by which CO<sub>2</sub>-flood enhanced oil recovery (EOR) projects permitted as UIC Class II wells, can become commercial sequestration projects under new regulations. The risk profile at a site operated for EOR will change when the site transitions to GS as different stresses are placed on wells and geologic formations. The Class VI rules should provide more specific and comprehensive guidance on how an operator must demonstrate that a Class II site can safely contain injected CO<sub>2</sub> as a commercial sequestration project. The proposed Class VI rules lay the groundwork, by providing the Director with discretion to “grandfather” only the construction requirements for existing Class I and Class II wells seeking a permit for GS (provided he/she is able to make a determination that these wells would not endanger USDWs) and requiring operators to meet all other requirements of the proposed rule. However, additional conditions are needed, such as:
- Establishment of monitoring and reporting requirements for EOR sites that wish to be eligible for crossover;

- Specification of the technical requirements for an operator to demonstrate that a Class II well could be reclassified as a Class VI well; and
- Much of the data for EOR projects is currently proprietary. The rule should address what types of data must be made public for EOR sites that wish to be eligible for crossover.

Similar clarifications are needed for pilot and early-mover projects permitted as UIC Class V wells which later might be converted to commercial sequestration projects.

19. *Post-injection site care:* We support the site-specific approach to post-injection site care that EPA proposes in section 146.93.
20. *Site closure:* We support the general approach that EPA proposes to determine the length of the post-injection site care period (a performance standard, anchored by a suggested duration of several decades). However, we suggest three modifications: 1) The rule should require that the post-injection site care and site-closure plan specify thresholds for demonstrating that the GS project no longer poses an endangerment to USDWs; 2) The rule should provide mechanisms to coordinate information and allocate responsibility if site conditions during the post-injection site care period are altered by operations of another GS project in the basin; and, 3) The 50-year time period should not become a prescriptive default. There is not yet enough experience to set this as the suggested duration of the post-injection site care period. For now, a performance standard alone is preferable and creates the right incentives to protect USDWs. After experience has been gained from early projects, the rule could be amended to include a suggested duration.
21. *Performance standards:* We support EPA's general approach of establishing performance standards for acceptable operation, but strongly caution that action thresholds or performance standards established for the Class VI rule *should not* be expressed as quantitative requirements for maximum leakage (or minimum retention) from the injection zone. Current monitoring methods cannot quantify low-level leakage rates or volume retained at reasonable cost or with needed precision, as detailed in Chapter 4 of the attached report. Thus, other performance measures are needed.
22. *Primacy issues:* Many geological formations suitable for GS span state boundaries, making consistent regulation important. The proposed rule calls for "Director discretion" over a number of important issues. This flexibility is necessary because of geologic variability across the U.S., but should be balanced by inclusion of specific thresholds for action, to provide consistency. In other words, because of the potential for basin-scale, interstate interactions with GS, the primacy for Class VI wells should be more constrained than for other well classes.

23. *Appropriate outreach techniques:* The proposed rule's 30-day public comment period for GS wells should be extended to at least 60 days because of the complexity of the issues. EPA should utilize modern media (electronic and digital communications, including, but not limited to web-pages and e-mails) to inform local citizens about GS site permitting.
24. *Use of proprietary models:* Use of proprietary models has the potential to exaggerate information asymmetry among project operators, regulators and the public. If the project operator uses proprietary software for modeling, then they should be required to provide all key modeling assumptions, run sensitivity analyses on important inputs, or provide additional model runs of the data in a publicly available model acceptable to EPA.
25. *Perverse incentives:* The stringency of the Class VI rules (relative to the other UIC well classes) may create perverse incentives. For example, an operator could add hydrogen sulfide to the carbon dioxide stream and then seek a Class I permit with less stringent area of review, monitoring, post-injection and closure requirements than a Class VI permit. Thus, EPA should review the requirements and applicability of Class I wells in conjunction with the proposed rulemaking for Class VI wells.

## **Conclusion**

26. The CCS Regulatory Project shares EPA's commitment, and that of other participants in the national discussion, to advancing the potential for safe and effective geological sequestration of carbon dioxide. To that end, the agency's draft rules are, subject to the specific concerns raised in our comments, a laudable effort to define a regulatory framework for assuring that carbon capture and sequestration proceed in a manner that is calculated to protect the nation's water supply. But, in our judgment, the objectives we share with EPA are best served by a regulatory scheme that takes into account, and ultimately advances, the full range of environmental imperatives that drive the development of CCS in the first place. With the impending advent of a new administration and a new Congress, both of which are expected to be attentive to issues related to climate change, the potential for near-term legislative action is relatively high. In these circumstances, EPA should consider using existing regulatory authority under the UIC program to license the first few CCS projects, but wait to finalize rules for GS wells until they can be drafted under the authority of new or amended legislation that enables more comprehensive regulation.