



May 15, 2008

Stephen E. Heare  
Director, Drinking Water Protection Division  
U.S. Environmental Protection Agency  
1200 Pennsylvania Avenue, N.W.  
Room 2160A EPA East: MC-(4606)  
Washington, D.C. 20460

Re: Comments on EPA's Safe Drinking Water Act Underground Injection Control Pre-rulemaking

Dear Mr. Heare:

The Edison Electric Institute (EEI) submits the attached comments, accompanied by executive summary, regarding the U.S. Environmental Protection Agency's (EPA or Agency) plan to issue proposed regulations in July 2008 for the injection and geologic storage of carbon dioxide (CO<sub>2</sub>) under the authority of the Safe Drinking Water Act underground injection control program. Our comments provide additional information and EEI's views on issues raised thus far in EPA's pre-rulemaking process.

EEI is the national association of shareholder-owned electric utilities in the U.S. Our members represent about 70 percent of the U.S. electric power industry and serve 95 percent of the ultimate customers in the industry's investor-owned segment.

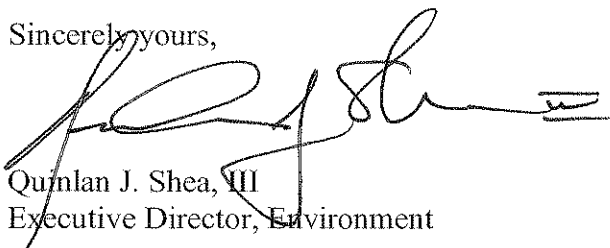
Addressing climate change concerns requires a full commitment to development and commercial deployment of carbon capture and storage (CCS) technologies, and EEI supports the development of clear regulatory regimes that will facilitate development of and investment in CCS technology and projects. EEI urges EPA to consider and incorporate into any proposed regulations the valuable knowledge and experience of key stakeholders, including utilities that are engaged or anticipate involvement in CCS projects. EEI also encourages the Agency to establish a docket for the proposed regulations in advance of publication for comment in the Federal Register, so that various stakeholders may have the benefit of a more thorough understanding of the body of information that is presented to the Agency at this early stage in the process.

EEI appreciates the Agency's willingness to consider the expertise and experience its membership can provide with regard to the regulation of CO<sub>2</sub> injection and geologic

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storage. Should you have any questions about the attached comments, please contact William Fang, EEI Deputy General Counsel and Climate Issue Director (202-508-5617 or [bfang@eei.org](mailto:bfang@eei.org)), or Eric Holdsworth, EEI Director of Climate Programs (202-508-5103 or [eholdsworth@eei.org](mailto:eholdsworth@eei.org)).

Sincerely yours,



Quinlan J. Shea, III  
Executive Director, Environment

Attachments (2)

cc (w/ atts):

Jason Burnett, Associate Deputy Administrator  
Ann Codrington, Chief, Prevention Branch,  
Office of Groundwater and Drinking Water  
Bruce Kobelski, Environmental Geologist,  
Office of Groundwater and Drinking Water  
Robert J. Meyers, Associate Assistant Administrator,  
Office of Air and Radiation

## **Executive Summary**

Addressing climate change concerns requires a full commitment to development and commercial deployment of carbon capture and storage (CCS) technologies.

The potential environmental benefits of deploying CCS technologies, in terms of avoided carbon dioxide (CO<sub>2</sub>) emissions, should be weighed against potential requirements that might delay or compromise the ability to achieve commercial-scale CCS. Key issues include balancing state and federal interests, appropriate characterization of CO<sub>2</sub>, appropriate risk management approaches and maintaining needed flexibility.

It is critical that any regulation under the Safe Drinking Water Act underground injection control (UIC) program does not characterize CO<sub>2</sub> as a waste, pollutant or contaminant or otherwise unduly stigmatize the injection and geologic storage (GS) of CO<sub>2</sub>, such as requiring secondary containment or the use of tracers and surface air/soil gas monitoring.

Grandfathering of Class V experimental wells provides incentives and certainty. Without such provisions, project developers and operators will be unwilling to undertake injection and storage projects, and funding for such projects will be severely hampered.

A secondary containment/confining zone requirement is unwarranted, as the adequacy of a primary confining system is much more important when siting a geological storage site than the presence of a secondary confining system. Moreover, a secondary containment requirement could eliminate many storage sites that would otherwise be available. Such systems are currently not required for any other types of injection wells under the UIC program, nor on CO<sub>2</sub> storage projects operating outside the U.S. In addition, there are no other comparable requirements to ascertain secondary containment features in geologic formations in any other environmental regulatory regime.

A broad, unconstrained requirement for periodic reevaluation of the area of review (AOR) that would apply in the same manner to all potential project sites is unwarranted. The schedule for AOR review should be a matter addressed through permitting and a plan for development and operation.

Tracers and surface air/soil gas monitoring should not be required, and may create an overly negative and unwarranted public perception regarding the safety of GS projects or tracers.

The potential imposition of financial assurance requirements for post-injection activities raises a number of critical issues, and it is crucial that the Agency further explain the nature of the “corrective action, remediation, and post-closure monitoring” it may be contemplating as part of a potential financial assurance requirement. Additional key considerations regarding financial assurance obligations include:

- Should not exceed in scope any other such obligations under the UIC program; the properties of CO<sub>2</sub> simply do not warrant treatment akin to that given to hazardous waste.

- Must be based on reasonable and reliable cost estimates for the work being assured and should be subject to reasonable caps.
- Must be flexible enough to take into account the risks associated with any particular project.
- Should take into account the nature of the risk curve associated with GS projects, which declines over time after injection is complete.
- May differ where a state or the federal government, for example, has assumed long-term risk or liability for or ownership of stored CO<sub>2</sub>.



**COMMENTS OF EDISON ELECTRIC INSTITUTE  
ON THE ENVIRONMENTAL PROTECTION AGENCY'S  
SAFE DRINKING WATER ACT UNDERGROUND  
INJECTION CONTROL PRE-RULEMAKING**

May 15, 2008

The Edison Electric Institute (EEI)<sup>1</sup> submits these comments regarding the plan of the Environmental Protection Agency (EPA or Agency) to issue proposed regulations for the injection and geologic storage (GS) of carbon dioxide (CO<sub>2</sub>) under the authority of the Safe Drinking Water Act (SDWA) underground injection control (UIC) program in July 2008. These comments provide additional information and EEI's views on issues raised thus far in EPA's pre-rulemaking process.

Addressing climate change concerns requires a full commitment to development and commercial deployment of carbon capture and storage (CCS) technologies, and EEI supports the development of clear regulatory regimes that will facilitate development of and investment in CCS technology and projects. EEI urges EPA to consider and incorporate into any proposed regulations the valuable knowledge and experience of key stakeholders, including utilities, who are engaged or anticipate involvement in CCS projects going forward. EEI also encourages the Agency to establish a docket for the proposed regulations in advance of their publication for comment in the Federal Register

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<sup>1</sup> EEI is the national association of shareholder-owned electric utilities in the U.S. Our members represent about 70 percent of the U.S. electric power industry and serve 95 percent of the ultimate customers in the industry's investor-owned segment.

so that various stakeholders may have the benefit of a more thorough understanding of the body of information that is presented to the Agency at this early stage in the process.

## **I. General Principles Applicable To EPA's GS Regulatory Effort**

EEI's views are guided by general principles applicable to any federal legislative or regulatory effort on CCS:

1. Promotion of CCS. Any EPA regulatory regime developed under the SDWA should be designed to facilitate, and not unduly hinder, the successful commercial-scale deployment of CCS. The potential environmental benefits of such deployment in terms of avoided CO<sub>2</sub> emissions should be weighed against potential requirements that might delay or compromise the ability to achieve commercial-scale CCS. Issues the Agency should consider in connection with this principle include without limitation:
  - a. Balancing state and federal interests. The Agency's UIC rulemaking is occurring in the context of the development of an overall framework for CCS projects, one that must properly balance federal and state roles. As to the UIC rules, EPA should ensure it considers the significant interests and experience of the states in developing regulations.
  - b. Appropriate characterization of CO<sub>2</sub>. It is critical that any regulation under the UIC program does not characterize CO<sub>2</sub> as a waste, pollutant

or contaminant or otherwise unduly stigmatize the injection and geologic storage of CO<sub>2</sub>.

- c. Appropriate risk management approaches. The Agency should avoid development of risk management approaches that discourage CCS deployment or create additional uncertainty, and should seek where possible to bring greater certainty to the long-term obligations and risks associated with a GS project.
  - d. Maintaining needed flexibility. Any regulatory regime must be sufficiently flexible to adapt to new information. Indeed, regulation of GS projects to date as Class V “pilot projects” under the existing UIC regulations has been positive. It may be premature to move to a new or different regulatory framework while projects designed to gain more technological certainty, as well as the increased certainty about appropriate risk management solutions for CCS projects that would likely follow, are ongoing. Given that EPA has decided to move forward with proposed GS-specific regulations, EEI urges the Agency to develop a framework that can consider and, as appropriate, incorporate data developed through CCS demonstration projects and the activities of the Department of Energy Regional Carbon Sequestration Partnerships.
2. Limitations on existing authority. The Agency should adhere to its limited authority at this juncture under the SDWA and should avoid exceeding

that authority. The value of developing a clear regulatory regime will be undermined if that regime is potentially unstable or subject to lengthy delays because of potential susceptibility to attack for failure to adhere to the Agency's authority.

3. Anticipation of related developments. On the other hand, the Agency should strive to anticipate future statutory and regulatory developments in the area of greenhouse gases (GHGs) and climate change so that any rulemaking has a reasonable chance of melding with such developments. For instance, while it is clear that the SDWA does not authorize the Agency to develop rules that specify any kind of "credit" system for capture and storage of CO<sub>2</sub>, the Agency can and should consider how its UIC rulemaking will fit with foreseeable features of potential future regimes.
4. Avoidance of one-size-fits-all approaches. Those portions of the rulemaking that address inherently site-specific issues should allow for site-specific determinations. The geologic variability involved in different conceivable GS projects needs to be taken into account in issues ranging from site characterization, to area of review (AOR), to containment requirements. EEI recognizes that in order to allow for effective site-specific determinations, and in order to maintain needed regulatory flexibility, some amount of discretion must be vested in the Agency. At the same time, such discretion should be bounded by the inclusion of

relevant and appropriate considerations for making necessary determinations. In general, the rules should establish with sufficient clarity the factors to be taken into account on these issues and leave the precise determinations to the permit process.

## **II. Specific Comments On Issues Raised At EPA's Second Workshop**

At EPA's February 26-27, 2008, public workshop, the Agency raised several questions about potential regulatory treatment of certain aspects of the injection and geologic storage of CO<sub>2</sub> under the UIC program, and invited stakeholders to share information with it that may prove useful to answering such questions (as well as to the Agency's rulemaking effort more generally).

### **A. Should Well Construction of Existing Class V Experimental Wells Be "Grandfathered"?**

The proposed rule should ensure that wells for injection and geologic storage previously permitted as "experimental technology" wells pursuant to the Agency's March 1, 2007, UIC Program Guidance (UICPG # 83), or within other UIC well classifications, are "grandfathered" so that GS projects may continue operation and closure as so initially permitted. Grandfathering is both important to provide needed incentives and to relieve uncertainty, and is highly rational given the context within which such projects have been or would be permitted in the first instance, as explained further below.

1. Grandfathering provides incentives and certainty. In order to incentivize injection and storage projects, owners and operators must be given assurance that existing Class V wells, or wells that may be permitted

before the proposed rule takes effect, will remain viable wells from a regulatory perspective going forward. If not grandfathered, project developers and operators will be unwilling to undertake injection and storage projects, and funding for such projects will be severely hampered, in the face of the possibility that a nascent project may soon lose viability due to regulatory changes.

2. Grandfathering is rational in the GS context. Absent a specific showing that such Class V wells, which are constructed specifically for injection and storage of CO<sub>2</sub>, are unsuitable for the purpose for which they were designed, there is no justification not to grandfather such wells. In permitting these wells in the first instance, the Agency has already determined their use to be protective of underground sources of drinking water (USDW), and there is no justification for undermining that finding.

**B. How Should Class II Wells Injecting CO<sub>2</sub> Be Distinguished from GS Wells?**

At this time, EEI has no comment on this issue.

**C. Should a Secondary Containment/Confining System Be Required? Or Should the Rule Require Identification of Additional Zones that Can Provide Containment and Monitoring Opportunities?**

A secondary containment/confining zone requirement is unwarranted in general and particularly unwarranted as a matter of presumption, for the reasons set forth below.

1. Importance of primary containment system. Regional differences in confining systems need to be accommodated through flexible regulations that recognize that not all sequestration sites need a secondary

containment system. Indeed, the adequacy of a primary confining system is much more important when siting a geologic storage site than the presence of a secondary confining system

2. Potential elimination of sites. Requiring secondary containment as a permitting condition could eliminate many storage sites that would otherwise be available, reducing overall storage capacity to an unknown extent and potentially limiting storage options in particular locations that may be critical in allowing cost-effective proximity to key energy generation locations. Regional differences in confining systems need to be accommodated through flexible regulations that recognize that not all storage sites will have or need a secondary containment system. Indeed, the adequacy of a primary confining system is much more important when siting a geologic sequestration site than the presence of a secondary confining system
3. Better alternatives to protect USDW. The presumed purpose of secondary containment is better addressed with well-designed plans to detect and contain leakage from the primary containment system. EEI also notes a discussion led by panelist Susan Hovorka of the University of Texas at the Agency's December 2007 public workshop, as characterized in the Agency's meeting summary (p. 8):

CO<sub>2</sub> is very responsive to pressure as a mitigation technique in the event of movement to an undesired location. Injecting fluids in an adjacent well at a regulated pressure can guide CO<sub>2</sub> back to the containment area. Another mitigation option is changing injection

patterns once a problem is detected. Site-specific contingencies could be built into plans to provide guidance in the event of an unexpected event.

4. Unprecedented under UIC program. Secondary containment/confining systems are currently not required for any other types of injection wells under the UIC program. The physical and chemical properties of CO<sub>2</sub> injected for purposes of storage are not sufficiently unique—nor do they pose a sufficiently unique potential threat to USDW—to warrant such unprecedented treatment under the UIC program.
5. No international precedent. To our knowledge, none of the CO<sub>2</sub> storage projects currently operating outside the U.S. has been required to have or demonstrate existence of a secondary containment zone/confining system. The proposed CO<sub>2</sub> storage Directive of the European Union does not require secondary containment, but rather an assessment of possible secondary containment within the storage complex. This may only be an acceptable requirement provided that standard methods for examining geological structures are deemed insufficient. Final approval is left to the discretion of the relevant authority in each member state. Further, Norway, Canada and Algeria, countries where CCS projects are currently underway, have regulated the activity under existing petroleum law. Australia is also developing its regulatory regime for CO<sub>2</sub> storage, which primarily is likely to apply existing petroleum law to such activities.

These frameworks do not require secondary containment zones or secondary confining systems.

6. Unprecedented in U.S. environmental law generally. EEI is unaware of any comparable requirement to ascertain secondary containment features in geologic formations in any other environmental regulatory regime. Those regimes that impose secondary containment requirements—for example, secondary containment requirements for oil spill prevention control and countermeasure plans under the Oil Pollution Act, and for land disposal and underground storage tanks under the Resource Conservation and Recovery Act—relate to **man-made** containment structures, as opposed to geologic containment structures.
7. Concerns regarding inaccurate public perception. EEI is also concerned that requirements such as geologic secondary containment that are substantially more rigorous than current UIC requirements for even the most hazardous of wastes would create what amounts to a “Class 1 plus” UIC system, which in turn suggests that subsurface geologic storage of CO<sub>2</sub> is more dangerous than underground injection of a host of other materials. **EEI rejects that implication, and urges the Agency to avoid creating a public stigma around the technology that appears to be the most critical of all GHG-management strategies.**

#### **D. Should Periodic Reevaluation of AOR Be Required?**

A broad, unconstrained requirement for periodic reevaluation of the AOR that would apply in the same manner to all potential project sites is unwarranted as a matter of presumption. EEI presents the following points in this regard:

1. Unknown trade-offs warrant against universal requirement. It is impossible in general terms to know what the relevant trade-offs are as to the initial AOR versus potential later assessments of the AOR. For example, in certain instances it is foreseeable that a project owner may seek a relatively more constrained AOR for an initial portion of the project life, and propose periodic AOR reevaluations as a function of project experience. In other instances, a broader initial AOR may be appropriate, with a correspondingly reduced need for periodic reevaluations.
2. Consideration of specific circumstances should be required. While provisions related to periodic reevaluation of the AOR under certain circumstances may be desirable, any requirement for such review should be triggered by reasonable parameters, taking into consideration site-specific issues, as discussed in the general principles set forth above.
3. Permitting process a better fit. Accordingly, EEI suggests that the schedule for AOR review should be a matter addressed through permitting and a plan for development and operation, and the permit application should include the permittee's proposal for any AOR schedule that may apply, with the ultimate determination to be made pursuant to the

permitting process. The rules may address the considerations that apply to this issue in the permitting process but should avoid setting specific AOR reevaluation requirements.

4. A public process for any reevaluation. If any reevaluation is required, a public process should be made available regarding any reopening or modification of permits.

#### **E. Should Tracers or Surface Air/Soil Gas Monitoring Be Required?**

Tracers and surface air/soil gas monitoring should not be required. EEI presents the following points for consideration in this regard:

1. Functionality/usefulness and cost. Tracers are relatively untested in terms of workability as a leak-detecting mechanism. As a monitoring tool, tracers would perhaps be best suited for testing reservoir properties in increments over time, rather than for long-term leak detection/ monitoring purposes. Moreover, for the purpose of detecting potential impacts to USDW, CO<sub>2</sub> itself would function as effectively as a tracer, since decreases in pH may be associated with CO<sub>2</sub> impacts. To the extent the use of tracers could be deemed beneficial, pH sampling would likely offer many of the same benefits. Nevertheless, the use of tracers or surface air or soil gas monitoring would likely provide too little information, too late, in terms of providing protection for USDW, in the sense that they would likely be affected by the time the results of such methods revealed any concerns. An additional and very important consideration is that the

occurrence of local ambient CO<sub>2</sub> fluctuations is very dependent on the time of day since more sunlight naturally increases the amount of photosynthesis. The amount of vehicle exhaust from nearby roadways can also have a huge impact on CO<sub>2</sub> fluctuations. Finally, if employed for purposes of long-term monitoring of underground waters, tracers would prove extremely expensive and would not yield any useful data.

2. Safety. Tracers may present their own safety concerns depending on the precise nature of the tracer at issue.
3. Additional risks for operators. The use of tracers may pose independent risks for project operators. There may be potential health effects from some tracers if workers applying them are accidentally exposed
4. Concerns regarding inaccurate public perception. **As with a secondary containment requirement, a requirement to use tracers may create or encourage an overly negative and unwarranted public perception regarding the safety of GS projects or tracers.**
4. Potential issues of authority. As discussed in the general principles above, project operators and investors share the desire for a clear, defensible regulatory framework for GS projects. Recognizing that the Agency's regulatory authority under the SDWA is tied to protection of USDW, EEI believes that the nexus between surface air/soil gas monitoring and protection of USDW may be subject to challenge. Further, because USDW would likely be affected by the time the use of tracers, surface air,

or soil gas monitoring methods revealed any concerns, EEI believes the nexus between those methods and protection of USDW may be subject to challenge as well.

**F. Should the Owner or Operator Be Required to Maintain Financial Assurance for Corrective Action, Remediation and Post-closure Monitoring in Addition to Well Closure? If so, for What Timeframe?**

The potential imposition of financial assurance requirements for post-injection activities raises issues that are critical to the successful commercial deployment of CCS. As a preliminary matter, it is critical for the Agency to further explain, in advance of publication of the proposed rulemaking if possible, precisely the nature of the “corrective action, remediation, and post-closure monitoring” the Agency may be contemplating as part of a potential financial assurance requirement. This specific topic was addressed only briefly in the breakout session at the Agency’s February 2008 public workshop. For example, it is currently unclear whether the Agency intends to impose financial assurance requirements that exceed those currently in place for Class I hazardous waste injection wells, and if so, what the scope of the Agency’s requirements would be.

In addition, EEI presents the following considerations regarding potential imposition of financial assurance requirements on GS projects:

1. Heightened treatment unwarranted. To the extent EPA is considering financial assurance obligations that exceed in scope any other such obligations under the UIC program, EEI opposes such additional requirements. No showing has been made that the physical and chemical

properties of CO<sub>2</sub> injected for purposes of storage are sufficiently unique—or that they pose a sufficiently unique potential threat to USDW—to warrant such unprecedented treatment under the UIC program. Any financial assurance for “corrective action” or “remediation” that might be required, for example, should in any event not go beyond that currently required for Class I hazardous waste injection wells. Thus, such assurance should be tied, at most, only to the correction of leaks of stored CO<sub>2</sub> from the receiving reservoir (such as through plugging other wells in the AOR or relieving pressure in the reservoir to halt leakage). It would be inappropriate to apply a financial assurance requirement tied to a broad, undefined concept of addressing potentially affected aquifers.

2. “Hazardous” treatment unwarranted. Even if EPA intends to propose financial assurance requirements for GS wells substantially identical to those currently imposed on hazardous waste injection wells, the fact remains that the properties of CO<sub>2</sub> simply do not warrant treatment akin to that given to hazardous waste. From the standpoint of its physical and chemical properties, CO<sub>2</sub> does not pose any threat to groundwater resources that are as serious as those posed by the various hazardous wastes currently being injected under the UIC regulations. The Agency should exercise care not to stigmatize geological CO<sub>2</sub> storage by equating it in any way with hazardous waste disposal, as doing so could affect

public perception (thereby hindering the permitting process) as well as perceptions by financial institutions (thereby hindering project financing).

3. Need for cost certainty. Any financial assurance obligations must be susceptible to reasonable and reliable cost estimates for the work being assured. Otherwise, these obligations would introduce significant uncertainties into project economics and project finance, which in turn could cripple a project because of either the economics introduced by the financial assurance requirement or the potential lack of a market providing the relevant assurance instruments. In addition, any financial assurance requirements should be subject to reasonable caps in order to facilitate ability to secure the relevant financial instruments.
4. Need for site-specific flexibility. To the extent financial assurance requirements of whatever nature may be imposed upon GS projects, it is crucial that any financial assurance requirements be flexible enough to take into account the particular risks associated with any given project. All projects are not created equal, and thus not all risks are the same.
5. Need to consider general risk curve. In addition, any financial assurance requirement should take into account the nature of the risk curve associated with GS projects, which declines over time after injection is complete. Any financial assurance obligations should be reduced accordingly on a temporal basis.

6. Potential third-party assumptions of risk or liability. Any financial assurance requirements may also appropriately differ where a state, for example, has assumed long-term risk or liability for or ownership of stored CO<sub>2</sub> (as is contemplated in the Interstate Oil and Gas Compact Commission (IOGCC) model statute and regulations issued in September 2007). The current UIC regulations contemplate such a difference; *see, e.g.,* 40 C.F.R. § 144.66, which provides that where a state assumes legal responsibility for compliance with plugging and abandonment requirements or assures state funding for such requirements, the operator is deemed to have satisfied applicable financial assurance requirements where the Administrator determines that the state's assumption is at least equivalent to available financial assurance mechanisms. Because several statutory and regulatory models for GS projects, including the IOGCC model statute and regulations, provide for state assumptions of continued responsibility vis-à-vis the appropriate regulatory agency, there is a need for EPA's proposed rulemaking to take such models into consideration as the Agency drafts any financial responsibility provisions. State involvement in dealing with risk or liability will be critical for "early movers" to proceed with large-scale demonstration projects. These first projects will provide the necessary data, technical expertise and basis for commercially deployed CCS projects. In addition, any financial assurance requirements should be adjusted to take into account federal legislation,

for example, that provides indemnification or otherwise shifts financial responsibilities to the federal government or other entities.

**G. Should the Notification Process Be Adaptive to Incorporate New Technologies?**

EEI supports the use of new technologies in the public participation/notification process.

**H. Should Stakeholders Be Engaged Earlier in the Permitting Process?**

Because it is ultimately in an operator's own best interest to seek early public participation, GS projects already are properly incentivized to engage stakeholders at the most optimal point in time. Imposing specific requirements for early public participation is thus unnecessary and may have unintended consequences where the Agency's generic judgment for the best time to engage stakeholders is substituted for the judgment of those most familiar with a particular project and the relevant stakeholders associated with it.

**III. Additional Comment On Issue Raised At EPA's First Workshop**

In addition, EPA should engage in much more testing, analysis and evaluation before considering mandating special cement for CO<sub>2</sub> injection wells. There is still much debate on whether the substantial cost of the cement is worth its currently unknown benefit.

There is also a lack of experience within the industry on the actual field application of such cement.