



TESTIMONY OF EDISON ELECTRIC INSTITUTE

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EPA's UIC Proposed Regulations for Geologic Storage of CO₂ – Public Hearing

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Introduction

Good (morning/afternoon). My name is Karl R. Moor, and I am Vice President and Associate General Counsel of Southern Company, one of the largest producers of electricity in the country, serving nearly 4.4 million customers in the southeastern United States. I am pleased to say that Southern Company already has begun to assess geologic storage opportunities in the Southeast and will begin injecting carbon dioxide into a deep saline-filled geologic formation at our Plant Daniel in Mississippi next week. This demonstration project at Plant Daniel is the product of the collaborative efforts of the Department of Energy, Electric Power Research Institute and the Southern States Energy Board, and is under the auspices of the Southeast Carbon Sequestration Regional Partnership. Southern Company supports carbon capture and storage as a critical tool in addressing greenhouse gases and is proud of our efforts to bring this important technology toward commercial viability.

I am here today representing the Edison Electric Institute. EEI is the national trade association of U.S. shareholder-owned electric companies. EEI's members serve 95 percent of the ultimate customers in the shareholder-owned segment of the industry and represent about 70 percent of

the U.S. electric power industry. I am the chairman of EEI's Carbon Capture and Storage Work Group, which is comprised of member companies who are committed to exploring CCS as an option for reducing greenhouse gas emissions.

I would like to thank the Environmental Protection Agency for this opportunity to discuss its proposed Underground Injection Control regulations for geologic storage of carbon dioxide. EEI and its members participated in EPA's public workshops on carbon storage in December 2007 and February 2008. Here, as at the workshops, EEI appreciates the Agency's willingness to consider the expertise and experience our membership can provide with regard to the regulation of carbon dioxide injection and geologic storage. We are committed to continuing dialog with all stakeholders to ensure that the final rule protects underground sources of drinking water while creating a clear and flexible regulatory scheme that encourages further development and deployment of carbon capture and storage.

First, I'd like to put the importance of carbon capture and storage in context. Electricity generation produces 34 percent of greenhouse gas emissions and 40 percent of carbon dioxide emissions in the United States. The Energy Information Administration projects net electric demand will increase 30 percent by 2030, even after taking into account energy-efficiency improvements. New and replacement power plant capacity to meet this increased demand is projected to total 150,000 megaWatts. Coal is one of the primary sources of baseload generation in the United States and will continue to be an important fuel for generating electricity through 2030 because it is comparatively affordable and abundant in this country. Given this backdrop, the potential environmental benefits of carbon capture and storage – in terms of avoided carbon

dioxide emissions – are substantial. Consequently, EEI and its members see carbon capture and storage as a critical element in the full portfolio of options needed not only to reduce carbon dioxide emissions, but also to ensure continued affordable and reliable electric service to customers throughout the United States.

Our assessment of the proposed regulations has been extensive and is ongoing. We are here today to learn as well as to educate. EEI’s members, like Southern Company and American Electric Power and others, are gaining experience with pilot and demonstration projects involving site characterization, permitting, monitoring and verification, and understanding storage capacity and integrity. Our testimony today is informed by what we have already learned from these projects. Our goal at these hearings – and throughout this process – is to use this experience to help EPA ensure that the final rules for geologic storage of carbon dioxide are part of a clear and flexible regulatory regime that will facilitate the development of, and investment in, carbon capture and storage technology and projects.

As EPA noted in the Preamble to the proposed regulations, its goal is to create a regulatory framework that “supports the development of a key climate change mitigation technology.” EPA’s regulations for geologic storage of carbon dioxide are an important first step in moving carbon capture and storage closer to reality. EEI and its members applaud EPA for taking this step, and encourage EPA to keep this important goal in mind as it moves to finalize the regulations.

EEI and its members intend to submit detailed written comments on the proposed regulations, but today I would like to highlight several initial areas for EPA consideration.

Key Messages

We have two key messages for EPA today:

- First, the regulations can and should promote the development and deployment of carbon capture and storage while protecting underground sources of drinking water without unduly stigmatizing carbon dioxide injection and storage. Carbon dioxide has been injected for years for enhanced oil recovery and enhanced gas recovery without incident.
- Second, the regulations should be sufficiently flexible to take into consideration site-specific characteristics and performance-based measures, and should be sufficiently adaptable to incorporate lessons learned from ongoing pilot and demonstration projects.

Let me elaborate on each of these points:

- **EEI urges EPA to work to ensure the regulations do not stigmatize carbon geologic storage, which would create public confusion and hamper development of a critical carbon reduction technology.**

As I noted, EPA has recognized that it has two goals for the proposed rules for geologic storage of carbon dioxide: the protection of underground sources of drinking water *and* the promotion of carbon capture and storage. EEI urges EPA to keep both of these goals in mind and to work to ensure that the regulatory regime that is ultimately adopted is designed to facilitate – not delay or discourage – the successful commercial-scale development of carbon capture and storage. The

potential emissions benefits of commercial-scale carbon storage are too large and too important to ignore in the context of these regulations.

While our written comments will discuss some of the specific ways that the proposed regulations can support the development of appropriately sited storage projects, I would also like to bring to your attention today the importance of creating an accurate public perception of the risks and rewards of carbon geologic storage.

In its laudable efforts to protect sources of drinking water – an important goal, as we all agree – EPA has inadvertently stigmatized carbon dioxide injection and storage. In reviewing the proposal, EEI and its members became very concerned that the proposed regulations repeatedly mischaracterized the possible risks posed by carbon dioxide injection and storage.

Indeed, while carbon dioxide is not a hazardous waste and is, in fact, found in the ambient air in abundance, the proposed rules for CO₂ storage are, in many ways, stricter than those for underground injection of hazardous wastes under Class I of the UIC program. Many of the construction, mechanical integrity, monitoring and financial assurance provisions for Class VI wells are more comprehensive and more strict than those for Class I wells.

However, carbon dioxide is not a hazardous waste and does not warrant treatment akin to or more stringent than given to hazardous wastes. The increased regulatory burden placed on Class VI wells by the proposed regulation is of concern to EEI and its members, who are potential

owners and operators of CCS projects. We are also concerned that by imposing such stringent measures EPA would be unduly stigmatizing carbon geologic storage.

Our industry knows first-hand the importance of accurate public perceptions when it comes to the siting and permitting of needed infrastructure expansions or improvements. In the preamble to its proposal, EPA finds that the public should participate in the permitting process for carbon dioxide storage projects. Today we ask EPA to ensure that the public fully understands that it is *very unlikely* carbon geologic storage projects will harm underground sources of drinking water or human health, so that its participation in the permitting process is appropriately informed. EPA can help create accurate public perceptions about carbon capture and storage by retooling the proposed regulations to tie requirements to actual risks more closely. In addition, EPA should remove elements that serve only to fan the flames of fear without offering increased protection to underground sources of drinking water.

For example, requiring a secondary containment field would create the wrong impression about the safety of carbon capture and storage, and should not be part of the final rule. Such a requirement is unprecedented in the UIC program, even for storage of hazardous wastes in Class I wells. Secondary containment fields are also unprecedented internationally: Countries where carbon capture and storage projects are currently underway — including Norway, Canada, Australia and Algeria — do not require additional containment zones, and in fact, those countries regulate CCS using existing petroleum laws. Singling out carbon capture and storage for this heightened and substantially more rigorous requirement would suggest to the public that EPA thinks geologic storage of carbon dioxide is more dangerous than the underground injection of

other substances. Since EPA is the agency charged with protecting the environment, the public could be easily swayed by EPA's apparent apprehension of carbon capture and storage as currently embodied in the proposed regulations. In order to create a regulatory scheme that fosters carbon capture and storage development and deployment, EPA should reconsider how it has characterized carbon dioxide injection – both explicitly and implicitly – in its final regulations.

Moreover, EPA should consider the effect of these regulations on securing critical financial backing for CCS projects. Misperceptions about risk will also influence financial institutions. The recent turmoil in the financial markets highlights how challenging financing of new technologies may become. In a credit-constrained world, investors will be wary of putting their limited funds behind carbon capture and storage projects if they believe they are likely to endanger sources of drinking water or human health. As with public acceptance, EPA can shape carbon capture and storage as a tool for reducing carbon emissions by the messages that it sends the financial world with its regulations.

Similarly, EPA should not require the use of tracers or soil flux to monitor for possible carbon dioxide leaks. Not only are tracers relatively untested when it comes to their ability to monitor such leaks – and, in fact, the best tracer for monitoring carbon dioxide leaks would be CO₂ itself – but they also will not transmit information sufficiently early to provide any sort of real protection to underground sources of drinking water. Soil flux monitoring is problematic because it can result in false positives based on natural variability in the earth flux rate. What these requirements would do, however, is signal to the public that carbon capture and storage is

unsafe because it might be leaking CO₂, despite the fact that this is very unlikely to happen. The United Nations' Intergovernmental Panel on Climate Change has found that the amount of carbon dioxide retained in appropriately sited storage sites is very likely to exceed 99 percent over 100 years.

EEI and its members urge EPA encouragement of carbon capture and storage to be reflected in the final regulations, and recommend that the final regulations serve this purpose by appropriately characterizing carbon dioxide and its risks. The final regulations should be carefully crafted, therefore, to avoid creating a public stigma around this critical GHG emissions control technology.

Our second message for EPA today addresses the importance of regulatory flexibility.

- **Regulatory flexibility is essential for carbon capture and storage projects. EEI cautions against overly prescriptive, one-size fits all regulations because they add costs without ensuring greater protection to underground sources of drinking water.**

Because no two geologic formations are the same, no two CCS projects will be the same. The geologic framework in the selected injection formation — including, but not limited to, geometry, depth, composition, confining strata, and the number and location of existing wells in the Area of Review — will all affect how and whether a project moves forward. EPA already recognizes that each storage project will be unique: Under the proposed regulations, a potential owner or operator of a project will be required to present detailed information in its permit application that is specific to the geologic formation chosen for storage and the surrounding area,

both above and below the surface. Based on the site-specific information presented, the UIC program director will decide whether to issue a permit.

Consistent with EPA's approach to permitting, the portions of the proposed regulations that address inherently site-specific issues should allow for site-specific determinations. Tying regulatory requirements to site-specific characteristics not only will ensure that properly sited projects are able to secure the approvals and financing needed to move forward, but also will prevent the imposition of unnecessary and expensive requirements that could render some proposed projects uneconomic and hinder the commercial deployment of this critical technology.

EEI urges EPA to defer to site-specific characteristic wherever possible in the regulations.

For example, the proposed regulations contemplate a 50-year post-injection site care period, but the UIC program director can require continued monitoring if he or she deems it necessary to protect underground sources of drinking water. In the notice of proposed rulemaking, EPA states that it is willing to consider other time frames for the post-injection site care period, but instead of a default, the Agency should let the characteristics of each site determine the appropriate length of time for post-injection site care. If the director has the discretion to vary the length of the monitoring period based on site-specific characteristics, establishing a lengthy default period would place an unnecessary burden on those owners and operators who can show that their projects pose no threat to underground sources of drinking water in less than 50 years. In fact, EEI and its members believe that appropriately sited CCS projects will be able to make such a demonstration in substantially less than 50 years, perhaps only 10 years since data suggest that

the risk profile of carbon dioxide injection tails off markedly after a decade. Consequently, a lengthy default period would penalize those owners and operators who have taken steps to ensure proper site characterization. Surely, EPA would rather reward – and, therefore, encourage – appropriate siting: Properly managed site characterization and operations are the best way to ensure the highest level of protection for underground sources of drinking water.

Similarly, financial assurance requirements should not be set as defaults, but instead should be flexible enough to take into account the particular risks associated with a given project. All projects are not created equal, and therefore, not all risks are the same. Projects with decreased risks should be able to take advantage of proper siting to reduce not only their regulatory burdens, but also their costs of capital and financial assurance.

EEI and its members also encourage EPA to consider performance-based requirements over prescriptive rules. Again, these are better regulatory options for CCS projects because they ensure that a project is subject to only those requirements that have been shown to be necessary. Moreover, in many cases they will better protect underground sources of drinking water than default prescriptions.

For example, the Agency has proposed a 10-year default period for operators to reevaluate periodically the proper scope of the Area of Review. If such a review were required when triggered by appropriate circumstances, the Area of Review would be reviewed only when necessary, but as often as necessary. In this way, allowing site-specific performance characteristics to guide regulatory requirements means that those projects that pose the greater

risk for potential harm to sources of drinking water reevaluate their Areas of Review as often as needed, and those projects that do not pose such risks are not burdened by unnecessary reevaluations. At a minimum, a default period for reevaluations of the proper scope of the Area of Review should be determined by site-specific characteristics at the time of permitting.

Prescriptive regulations and defaults often have unintended negative consequences. For example, consider EPA's proposal to grandfather only construction requirements for wells that currently are permitted as Class V experimental storage wells. This limited grandfathering, if part of the final rule, would render many experimental storage projects as stranded investments and would limit the number of formations available for future storage. A better approach would be to allow Class V permit holders to make their case to EPA, based on the specific characteristics of their site, that the formation can provide long-term storage for carbon dioxide without endangering underground sources of drinking water. In this way, regulatory flexibility can serve to protect water sources without unduly limiting the number and type of formations available for carbon dioxide storage.

Similarly, the regulations should be sufficiently flexible to allow operators of geologic storage facilities, as well as operators of enhanced oil recovery or enhanced gas recovery projects converting their operations to geologic carbon storage facilities, to site these projects above underground sources of drinking water, if they can show there is unlikely to be harm to USDW. The proposed regulations make this nearly impossible since they would restrict injection for long-term storage to formations that are below the lowermost underground source of drinking water. Enhanced oil recovery and enhanced gas recovery facilities have been injecting carbon

dioxide into formations above underground sources of drinking water for more than 30 years without migration or leakage incidents. Rather than reject these types of projects as potential geologic carbon storage sites by rule, EPA should permit the owners and operators of these kinds of projects to make their case based on the specific characteristics of each site.

Flexible, site-specific regulations ask a great deal of the regulator, in this case the UIC program director. Despite these challenges, EEI urges EPA to consider these types of regulations because they present a win-win situation: a higher level of environmental protection while fostering a regulatory regime that encourages investment in CCS projects. We also acknowledge that these benefits cannot be realized unless the UIC program director is given good guidance on how best to exercise his or her discretion. EPA should provide that guidance in either the final regulations or supplemental guidance, in order to ensure that the director's decisions have a sound regulatory basis.

As I noted, Southern has begun evaluating geologic storage sites including our demonstration injection project in Mississippi. The purpose of this project, which is part of the Southeast Carbon Sequestration Regional Partnership, is to learn more about the siting of geologic storage. Carbon capture and storage is not yet a commercial-scale technology, and projects like ours are crucial for expanding our technical expertise. To this end, EEI asks EPA to ensure that the final regulations can consider and, as appropriate, incorporate data developed through this and other carbon capture and storage demonstration projects.

EEI and I appreciate the opportunity to provide additional input to this rulemaking process. EEI and its members are confident that we can work with EPA and other stakeholders to create a clear and flexible regulatory scheme that achieves two important goals: the protection of underground sources of drinking water and the promotion of carbon capture and storage technology and projects.