

Statement by

**Scott Anderson
Environmental Defense
January 31, 2008**

**regarding
the regulatory aspects of carbon capture, transportation and
sequestration and related issues
specifically S. 2323 and S. 2144**

**submitted to
The U.S. Senate
Committee on Energy and Natural Resources**

We appreciate the opportunity to speak to you today as the Committee considers how to create a regulatory framework that will enable carbon capture and storage (CCS) to play a role in the fight against climate change. Climate change is the most important environmental issue of our generation and successful development and deployment of CCS is a critical path for taking coal, the world's most abundant but carbon-intensive fossil fuel, and accommodating it to a carbon-constrained future.

Environmental Defense is a national non-profit organization representing more than 500,000 members. Since 1967, we have linked science, economics and law to create innovative, equitable and cost-effective solutions to urgent environmental problems. My personal background includes more than 20 years representing independent oil and gas producers in Texas, and so I have some appreciation for many of the issues and concerns related to the underground storage of carbon dioxide.

The Senate is doing important work to address the threat of climate change. The single most important thing the Senate can do to commercialize CCS is to take quick action on cap and trade legislation, since such legislation would create a market value for avoiding carbon dioxide emissions. Given the right incentives, we believe that the market will be far more effective and efficient in discovering necessary technologies of all types, including CCS, than any suite of government mandates or subsidies, however well intentioned.

Consideration of regulatory measures such as those before you today is vital work as well. Without a sound regulatory framework to govern carbon capture, transportation and storage, uncertainty will prevail and the marketplace will not be able to achieve the kind of deep and sustained reductions necessary to avoid the worst consequences of greenhouse

gas build-up. Similarly, public acceptance of CCS will happen only if the public is confident that rigorous and credible regulatory oversight is in place.

The fact that Environmental Defense supports the deployment of CCS does not mean that we are champions of coal. We believe that business as usual for coal is over. Public opinion is shifting and conventional coal plants are being delayed or canceled at a rate unimaginable even a year ago. In states like Texas, Florida, Oklahoma and Kansas, people are beginning to realize that it is environmentally irresponsible and fiscally imprudent to proceed with building new coal plants, absent a concrete plan to reduce and avoid CO₂ emissions. We are also pleased that people are increasingly recognizing that energy efficiency and renewables should play a leading role in energy and climate policy.

Although we are not champions of coal at Environmental Defense, we are realists. Coal will continue to be used for electricity production for the foreseeable future. Therefore the nation and the world need technologies that enable coal to be used in a manner that avoids significant greenhouse gas emissions. According to an IEA study released in 2006, CCS could rank, by 2050, second only to energy efficiency as a greenhouse gas control measure. The Intergovernmental Panel on Climate Change projects that CCS could, by 2100, contribute 15 to 55% of the greenhouse gas reductions needed to avert catastrophic climate change. Just last week in a proposed directive on CCS, the Commission of the European Communities noted that efficiency and renewables are the most sustainable supply options in the long run but that “we cannot reduce EU or world CO₂ emissions by 50% in 2050 if we do not also ... capture CO₂ from industrial installations and store it in geological formations.”

While different analysts come up with somewhat different scenarios, it is clear that coal is not going to disappear anytime soon and therefore effectively capturing and sequestering carbon dioxide emissions from coal can make a real difference in whether mankind will be able to solve climate change problems. We are fortunate that early sequestration projects, together with over 30 years of experience with injecting CO₂ into oilfields, have provided confidence that long-term sequestration in properly selected geologic formations is feasible.

In fact, even today, when large-scale commercialization of CCS is hampered by the absence of price signals that could be provided by a market in trading allowances, it is possible to begin deployment and start making real reductions in CO₂ emissions. McKinsey & Company’s recent study, “Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?,” provides a sense of the costs involved. My fellow panelist Tracy Evans of Denbury Resources can speak from direct experience about the feasibility of deploying CCS in the oilfield context.

Summary of Comments on S. 2144 and S. 2323

I would like to cover several things this morning. I will touch briefly on S. 2144, which would require a study of the feasibility of constructing and operating carbon dioxide pipeline and sequestration facilities. I want to focus most of our remarks, however, on Section 5 of S. 2323, which would establish an interagency task force to develop regulations for CO₂ capture and storage. Our remarks on Section 5 will focus on regulations for geologic sequestration, rather than capture. Finally, we will offer comments on the appropriate design of sequestration regulations. We will mention why it is important for CO₂ storage regulations, especially in the early years, to be relatively performance-based rather than prescriptive and why it is important for the regulatory framework to adapt as knowledge improves.

We believe that it would be useful to adopt S. 2144, and Section 5 of S. 2323 if modified in several respects, as stand-alone measures. These measures would be most useful, however, if enacted as part of or in concert with comprehensive cap and trade legislation that would create a market value for avoiding CO₂ emissions and thereby encourage market participants to engage in the activities that these measures are intended to address.

S. 2144

Senator Coleman's S. 2144 would require the Secretary of Energy, in coordination with certain other agencies, to study the feasibility of constructing and operating carbon dioxide pipelines and sequestration facilities. We believe that the scope of the contemplated study is sound and that the study is likely to yield important information. Without prejudice to the possibility that others may have valuable suggestions on improving the scope of the study, we generally endorse this bill as proposed.

Section 5 of S. 2323

Section 5 of Senator Kerry's S. 2323 would establish an Interagency Task Force "to develop regulations providing guidelines and practices for the capture and storage of carbon dioxide."

Section 5 has several notable strengths:

1. The most fundamental benefit of Section 5 lies in assuring that the development of a regulatory framework for CCS will move forward expeditiously. The intent is clearly that issuance of regulations should be accelerated, not delayed.
2. Including the Departments of Energy and Interior in the regulatory development process is worthwhile. DOE has significant expertise in carbon capture and sequestration that can benefit the rulemaking process. The Department of

Interior's Geologic Survey also has significant expertise and is in a position to offer useful input.

3. The bill appropriately names the Administrator of the Environmental Protection Agency as the chair-person of the task force. This is appropriate given that EPA, in addition to having its own significant expertise in CCS, has responsibility under the Safe Drinking Water Act's Underground Injection Control Program to protect underground sources of drinking water from contaminants that might cause a violation of a national primary drinking water regulation or otherwise adversely affect the health of persons.
4. The legislation builds on existing regulatory authority on an incremental, as-needed basis, i.e. subsection (a)(5)(A) requires that the regulations "take into account existing underground injection control program requirements" and then provides additional requirements that regulations must satisfy in subsections (a)(5)(B)-(F). We believe it is prudent to take such a step-by-step approach to authorizing and overseeing the development of "first generation" rules for CCS. Both industry and regulators will "learn while doing" in the early years of this technology. For now, most observers (ourselves included) appear to find the Safe Drinking Water Act's Underground Injection Control Program to be generally adequate as a basis for initial federal regulations. As the need for additional grants of jurisdiction and/or Congressional guidance becomes apparent, additional provisions can be enacted through supplemental legislation.

There are also several aspects of Section 5 where the Committee has an opportunity to make improvements:

1. As noted above, subsection (a)(5)(B)-(F) builds on the Safe Drinking Water Act by requiring that carbon dioxide capture and storage regulations satisfy several objectives that are not part of the existing underground injection control program. However, in our judgment, two more requirements ought to be added. These are (to borrow language from the proposed Lieberman-Warner Climate Security Act): (a) a requirement to regulate the "long-term storage of carbon dioxide and avoiding, to the maximum extent practicable, any release of carbon dioxide into the atmosphere;" and (b) a requirement that the carbon dioxide storage regulations protect not just underground sources of drinking water and human health, but "the environment" as well. In order to fill these two gaps, we recommend borrowing the language just quoted from section 8001 of S. 2191.
2. We are confident that S. 2323 is intended to accelerate the adoption of carbon sequestration regulations (while at the same time broadening the regulatory development process beyond EPA). There is a risk, however, that the bill could actually slow down adoption of EPA's first set of regulations, which the agency currently plans to propose in the Federal Register by this fall. Publication and

adoption of rules in the near term would be likely to have a positive effect on the development of early CCS projects. It would be extremely unfortunate if passage of S. 2323 served to convince EPA to wait for the conclusion of the S. 2323 process before adopting the first set of regulations. Accordingly, we recommend that a provision be added to the bill indicating that Congress does not intend to discourage earlier CCS rulemaking but rather desires to make sure that regulations growing out of an interagency process are adopted in the near-term. If EPA adopts rules based on existing procedures in the meantime, the regulations developed pursuant to S. 2323 would become the second generation rules.

3. Subsection (a)(5)(C) requires carbon dioxide storage regulations to “address the potential appropriate transfer of liability to governmental entities.” We would prefer that any regulations transferring liability to governmental entities be postponed until after the task force report called for in Section 8004 of S. 2191. If such regulations are authorized sooner, however, we think additional guidance is desirable in order to assure that those who develop the regulations recognize that shifting liability to the taxpayers affects the taxpayers differently depending on whether or not monitoring has demonstrated that the storage project in question is performing as expected. The current proposal in Europe regarding the transfer of liability, released January 23 by the Commission of the European Communities, would transfer liability to the government only “if and when all available evidence indicates that the stored CO₂ will be completely contained for the indefinite future.” (Proposed Article 18, Proposal for a Directive of the European Parliament and of the Council on the Geological Storage of Carbon Dioxide). Perhaps that would be a good policy for the United States as well. It would protect the taxpayer and assure that project developers maintain an incentive to operate projects safely and effectively. At a minimum, however, we recommend that subsection (a)(5)(C) of Section 5 be amended so that those who draft regulations addressing liability will do so “taking into account whether or not particular projects have demonstrated a reasonable likelihood that virtually all the CO₂ stored will remain sequestered permanently.”
4. Subsection (a)(4) of Section 5 calls on the Interagency Task Force to consult with industry, legal and technical experts. We suggest that consultation be expanded to include experts from non-governmental public interest organizations.

Appropriate Design of Geologic Sequestration Regulations

Geologic sequestration of carbon dioxide is feasible under the right conditions. It has been successfully demonstrated in a number of field projects, including several large projects. The Intergovernmental Panel on Climate Change (IPCC) Special Report on Carbon Capture and Storage concluded in 2005 that the fraction of CO₂ retained in “appropriately selected and managed geological reservoirs” is likely to exceed 99% over

1000 years. The IPCC also concluded that the local health, safety and environmental risks of CCS are comparable to the risk of current activities such as natural gas storage, enhanced oil recovery and deep underground storage of acid gas *if* there is “appropriate site selection based on available subsurface information, a monitoring programme to detect problems, a regulatory system and the appropriate use of remediation methods to stop or control CO₂ releases if they arise.”

While there is little doubt that geologic sequestration is feasible, and little doubt that successful projects are technically achievable today, knowledge and understanding are expected to increase dramatically as the technology begins to be deployed on a large scale. Current projects are highly customized. There are gaps in our knowledge and neither government nor industry have yet developed standard protocols for fundamental aspects of the process such as site characterization and monitoring. The IPCC Special Report projects that increasing knowledge and experience will “reduce uncertainties” and “facilitate decision-making.”

In other words, we know enough to get started but we can expect to experience a lot of “learning by doing.”

What are the implications of this for the regulatory system? We believe at least four recommendations are in order to account for the fact that increasing knowledge and experience will facilitate rational decision-making in different ways over time:

1. Lean toward a performance-based system. “Performance-based” regulations and “command-and-control” regulations *do* co-exist -- they are two poles on a continuum;
2. Be reasonably flexible. Different projects will present different risks and uncertainties, and the uncertainty presented by a single project will tend to decline over time;
3. Require projects to employ an iterative process, informed by monitoring results and perhaps even by experience gained from other projects, in order to reduce uncertainty and drive improvements in site characterization, site suitability assessment, models, model inputs, field operations, the monitoring plan itself, and the remediation plan;
4. Write “adaptive” rules. Look for language that automatically accommodates evolving best practices. Also structure rules to make use of evolving knowledge at each particular site. Be willing to amend rules when needed to protect the environment, giving due regard to the fact that it generally is in the public interest for the regulatory framework to give the regulated community the certainty needed to make investment decisions.

At the same time, it is not enough for rules to be flexible, adaptive and performance-based. It is essential that rules be grounded in a thorough, scientific understanding of the risks involved and that rules assure that the risks will be managed properly. In order to

accomplish this, some aspects of the rules (e.g. site characterization and site selection requirements) will need to be more prescriptive than others.

Conclusion

In a carbon-constrained world where market forces are harnessed to make sure that society's carbon footprint is reduced in an economically rational fashion, Environmental Defense foresees a dramatically increased role for renewable energy and for energy efficiency. At the same time, since any complete transition away from fossil fuels is likely to take a very long time, we foresee a long-term need to deal with CO₂ emissions from coal-based facilities. The sooner we begin to deploy CCS technology on a large scale the better. We applaud you for working on measures to make this a reality.