Storage of Carbon Dioxide in Geologic Structures

A Legal and Regulatory Guide for States and Provinces

The Interstate Oil and Gas Compact Commission

Task Force on Carbon Capture and Geologic Storage

September 25, 2007

Executive Summary

This report is the product of the Interstate Oil and Gas Compact Commission (IOGCC) Task Force on Carbon Capture and Geologic Storage. It is the culmination of a two-phase, five-year effort.[1] This Phase II report takes the form of a Guidance Document for U.S. states and Canadian provinces. Its purpose is to provide to a state or province contemplating adoption of a legal and regulatory framework for the storage of carbon dioxide (CO_2) in geologic media the resources needed to draft a framework that meets the unique requirements of that particular state or province. It is anticipated that a state[2] adopting a regulatory framework for CO_2 storage will make changes to the model framework as necessary to conform to state law. The Task Force therefore envisions that what will result will be a substantially consistent system for the geologic storage of CO_2 regulated at the state and provincial level in conformance with national and international law and protocol.

The Task Force was composed of representatives from IOGCC member states and international affiliate provinces, state and provincial oil and gas agencies, U.S. Department of Energy (DOE)-sponsored Regional Carbon Sequestration Partnerships, the Association of American State Geologists (AASG), and independent experts. Representatives from DOE, the U.S. Environmental Protection Agency (EPA), the U.S. Department of the Interior's Bureau of Land Management (BLM), and the environmental group, Environmental Defense, also participated as observers.

The interest of states in the geologic storage of CO_2 arises because, in addition to conservation, it is among the most immediate and viable strategies available for mitigating the release of CO_2 into the atmosphere. The thirty member states and four Canadian affiliate member provinces of the IOGCC are well suited for regulation of CO_2 storage because of their jurisdiction, experience, and expertise in the regulation of oil and natural gas production. For half a century, most of these states have been the principal regulators of enhanced oil recovery (EOR), as well as natural gas storage and acid gas disposal. They also are strategically well situated for the storage of CO_2. Regulations already exist in these petroleum-producing states covering many of the same issues that need to be addressed in the regulation of CO_2 storage, and consequently serve as adaptable frameworks for CO_2 storage.[3] Several associate member and non-member states of the IOGCC also might be geologically suitable for CO_2 storage and might find the IOGCC Guidance Document valuable in developing a regulatory framework for CO_2 geological storage.

The IOGCC Task Force, funded by the U.S. Department of Energy and its National Energy Technology Laboratory, through a cooperative agreement with the New Mexico Institute of Mining and Technology, has produced for the first time a clear and comprehensive model legal

[1] The first phase concluded with the publication of a Final Report publicly released in early 2005. This phase of the Task Force is henceforth referred to as Phase I.

[2] Although references throughout this Executive Summary are, for the most part, to "state" or "states", it is the intent of the Task Force that the comments and provisions are equally applicable to Canadian provinces. Of course, this would not apply to discussions concerning underground storage rights and the Underground Injection Control Program of the U.S. Safe Drinking Water Act.

[3] States that do not have oil and natural gas production may have experience regulating natural gas storage that will give them an important analogous regulatory experience for purposes of CO_2 geologic storage.

and regulatory regime for the geologic storage of CO_2. As a result of this effort, states and provinces, and indeed other nations using our model, can begin immediately the process of enacting legislation and promulgating regulations enabling CO_2 geologic storage projects. California, New Mexico, North Dakota, Texas, and Wyoming are already in various stages of developing a legal and regulatory framework for geological storage as a result of the work of the Task Force.

The Guidance Document prepared for the states contains, in addition to background information, a paper analyzing property rights issues related to underground space used for geologic storage of carbon dioxide; an overview and explanation of the Model General Rules and Regulations, a Model Statute for Geologic Storage of Carbon Dioxide, and Model General Rules and Regulations.

Development of these model laws and regulations for geologic storage facilitates more states beginning to put in place this critical legal and regulatory infrastructure for CO_2 storage. This should enable timely and responsible development of CO_2 geologic storage projects and, concomitantly, the continued development of CO_2 geologic storage technology.

The Guidance Document does not address the regulatory issues involving CO_2 emissions trading and accreditation for the purpose of securing carbon credits. However, the Task Force strongly believes that development of any future CO_2 emissions trading and accreditation regulatory frameworks should utilize the experiences of the states. The Task Force-proposed Model General Rules and Regulations developed in this report primarily address the regulatory issues related to public health and safety and environmental protections associated with the geologic storage of CO_2. The Task Force concluded that the issue of CO_2 emission trading and accreditation might best be addressed in the marketplace and/or at the federal government level and was beyond the scope of this report.

The Task Force addressed the issue of the content of the CO_2 emission stream proposed to be stored. Given the many technical and regulatory complexities involved in the transportation and geologic storage of varying qualities of CO_2, the Task Force defined CO_2 for purposes of this report as "anthropogenically sourced CO_2 of sufficient purity and quality as to not compromise the safety and efficiency of the reservoir to effectively contain the CO_2." In its Phase I Report, the Task Force defined CO_2 as a direct emissions stream with purity in excess of 95 percent or a processed emission stream with commercial value. However, after much discussion, this definition was modified to accommodate the evolving capture technologies and new research regarding reservoir storage capabilities. The Task Force discussed and is cognizant of the many complexities involving the transportation and injection of CO_2 of varying quality. In addition to quality requirements for transportation of CO2, ultimately it will be up to the State Regulatory Agency to decide what is and what is not suitable to long-term geologic storage.

One of the issues addressed by the Task Force was the most appropriate state regulatory entity to implement the rules and regulations. Because most of the proposed CO_2 geologic storage regulations are based on natural gas storage and oil and gas injection well rules, the Task Force reasoned that states might well conclude that the most logical and best equipped lead agency for implementing and administering regulations effectively and efficiently would be the state oil and gas regulatory agency. However, the Task Force recognizes that other states, especially those without an existing oil and gas regulatory framework, might choose to designate another regulatory agency, such as an environmental agency or public utility commission, as the lead agency for the state.

Most importantly, many states are likely to regard CO_2 as a resource for purposes of enhanced oil recovery projects and consequently will regulate CO_2 utilizing resource management frameworks and will avoid treatment of CO_2 as a waste. The Task Force reiterates a key conclusion reached in its Phase I Final Report -- although contaminants and pollutants such as H_2S, NO_x, SO_2 and other emission stream constituents should remain regulated for public health and safety and other environmental considerations, CO_2, which is generally considered safe and non-toxic and is not now classified at the federal level as a pollutant/waste/contaminant, should continue to be viewed in a manner that allows beneficial uses of CO_2 following removal from regulated emission streams. The Task Force strongly believes that treatment of geologically stored CO_2 as waste using waste disposal frameworks rather than resource management frameworks will diminish significantly the potential to meaningfully mitigate the impact of CO_2 emissions on the global climate through geologic storage.

The Task Force concluded that control of the reservoir and associated pore space used for CO_2 storage is necessary to allow for the orderly development of a storage project. The right to use reservoirs and associated pore space is considered a private property right in the United States, and must be acquired from the owner. Therefore, the Task Force concluded that control of the necessary storage rights should be required as part of the initial storage site licensing to promote orderly development and maximize utilization of the storage reservoir. In the U.S., with the exception of federal lands, the acquisition of these storage rights, which are considered property rights, generally are functions of state law. The Model General Rules and Regulations propose the required acquisition of these storage rights and contemplates use of state natural gas storage eminent domain powers or oil and gas unitization processes to gain control of the entire storage reservoir.

A major issue was how to deal with long-term monitoring and liability issues. The Task Force has proposed a two-stage Closure Period and Post-Closure Period. The Closure Period is defined as that period of time when the plugging of the injection well has been completed and continuing for a defined period of time (10 years unless otherwise designated by the State Regulatory Agency) after injection activities cease and the injection well is plugged. During this Closure Period, the operator of the storage site would be responsible to maintain an operational bond and individual well bonds. The individual well bonds would be released as the wells are plugged. At the conclusion of the Closure Period, the operational bond would be released and the liability for ensuring that the site remains a secure storage site during the Post-Closure Period would transfer to the state.

During the Post-Closure Period, the financial resources necessary for the state or a state-contracted entity to engage in future monitoring, verification, and remediation activities would be provided by a state-administered trust fund. Although other methodologies were reviewed, the Task Force concluded that the most efficient methodology to accomplish these tasks --- and which can be readily fielded --- is to utilize existing frameworks developed by the states for addressing abandoned and orphaned oil and gas wells. Consequently, the Task Force is proposing the creation of an industry-funded and state-administered trust fund as the most effective and responsive “care-taker” program to provide the necessary oversight during the Post-Closure Period. The trust fund would be funded by an injection fee assessed to the site operator and calculated on a per-ton basis, at the point of custody transfer of the CO_2 from the generator to the site operator.

Given that the state is the proposed “care taker” and responsible party during the Post-Closure Period, the Task Force did not address monitoring and related issues in the Model General Rules and Regulations because the state regulatory entity would have the authority to implement any

monitoring, verification, and remediation methods necessary to ensure the security of the storage site. In addition, there are numerous innovative methodologies that could be employed, and many future methodologies might be developed that will be available to ensure the security of the storage site. A full investigation into existing and future methods will require more detailed regulatory research into the implementation of these approaches, which was beyond the scope of this Guidance Document. However, given the availability of the state-administered trust fund model and assuming the reservoir has been adjudged by the State Regulatory Agency (SRA) to be appropriate for long-term storage, adequate resources should be available for the state entity, as care taker, to field these monitoring, verification, and remediation methods.

Finally, there has been considerable discussion at the national level regarding the proper venue for CO_2 geological storage regulation, in particular whether the U.S. EPA might be the best regulatory authority for oversight of storage. Although the UIC Program may be applicable at the discretion of a state program, the current limitations of the UIC program make it applicable only to the operational phase of the storage project. It would therefore appear that given the ownership issue and the proposed long-term "care-taker" role of the states, the states are likely to be best positioned to provide the necessary "cradle to grave" regulatory oversight of geologic storage of CO_2.