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**Testimony**

**Before the Texas Energy Resources Committee of the  
Texas House of Representatives**

**Hearing on**

**The Texas Railroad Commission and Carbon Capture and Storage**

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## SUMMARY OF TESTIMONY

As the world becomes increasingly concerned about the growing volumes of CO<sub>2</sub> emissions, a new and exciting industry will be forming. The industry will be charged with capturing, compressing, transporting, and permanently storing the CO<sub>2</sub> underground. Most persons refer to this nascent industry as the sequestration or carbon capture and storage (CCS) industry. Although all states have large energy needs, some states will be prosperous in this new era of energy and some states disadvantaged. The future of CCS should be quite bright for the State of Texas. Texas has a multitude of oil and gas reservoirs to host dramatic volumes of CO<sub>2</sub> while also possessing almost limitless deep saline formations. A recent study illustrates that 40% of the CO<sub>2</sub> EOR oil production potential in the U.S. lies within the state borders. Since CO<sub>2</sub> EOR sequesters large volumes of CO<sub>2</sub> while producing oil, the future should be bright as long as regulatory frameworks are workable and commercially friendly. With the increasing need for clean and plentiful energy in America, a careful formulation of the regulatory oversight should enable Texas' hydrocarbon economy to continue its impressive performance.

The Texas Railroad Commission (RRC) is the Texas state agency charged with regulation of most underground activity. Their long and distinguished history of oil and gas activities and injection responsibilities have arguably developed the foundation of the nation's underground regulatory regimes and protected the state's interests while fostering the state's economic engine. Abandonment of their oversight and history of leadership for the coming activities of sequestration is counterproductive since most of the functions of CCS are effectively the same as the CO<sub>2</sub> EOR activities they regulate today. Some expansion of authority will be necessary, as security of storage over long periods of time will be needed.

Some incremental needs will require statutory attention. The RRC will be given a new mission so new staffing requirements, especially at the district offices will be necessary. The new mission will require new types of training. All of this will grow as general revenue grows. It will be important that sources of CO<sub>2</sub> be connected to multiple sinks. Some form of state-assisted pipelines could facilitate this. A federally-based regulatory regime for CCS (at EPA) is currently being considered. The authority cited is groundwater protection which is, admittedly important, but far from the only parameter critical for secure emplacement of large volumes of CO<sub>2</sub>. Most of the parameters are state-by-state ones and should be under the purview of a state agency like the RRC.

Finally, permitting of storage projects will be necessary. Again, this will best be accomplished by a state organization advised by the state geological surveys (in Texas, the organization best qualified is the Bureau of Economic Geology). Protocols and ranking for evaluating sites should be undertaken in order to advise the RRC during the permitting process.

**Testimony of L. Stephen Melzer  
Texas Carbon Capture and Storage Association**

Mr. Chairman and members of the Committee, thank you for the opportunity to testify today on the subject of regulation of carbon capture and storage (CCS). My name is Steve Melzer. I am a registered professional engineer and President of the Texas Carbon Capture and Storage Association, an industry association charged with the growth of the capture, transport and storage of CO<sub>2</sub> for emissions reduction, enhanced oil recovery and energy security. For the past 13 years I have also directed the annual CO<sub>2</sub> Flooding Conference. Our goal has been to encourage more and better CO<sub>2</sub> floods and, with the contributions of the companies with the technology and experience, we have watched CO<sub>2</sub> flooding grow to contribute 73 million barrels last year to the oil production of Texas and the U.S.

Five years ago, we added an event to our CO<sub>2</sub> conference that we entitled the EOR carbon management workshop. We were anticipating the interest that the coming (next) generation of energy would place on reducing CO<sub>2</sub> emissions. We felt that our CO<sub>2</sub> EOR industry, with its use of huge volumes of CO<sub>2</sub>, should play a key part in this coming world. But because CO<sub>2</sub> flooding was such a tightly held technology among a select few of the major oil companies, very little was known about the use of CO<sub>2</sub>. Our conference became the outlet of that knowledge. The state of Texas, the City of Midland and the Permian Basin in general, are clearly in the spotlight and at the forefront of this technology and experience. Our small group of volunteers became not only the purveyors of technology but soon found ourselves become the ambassadors of CO<sub>2</sub> practices to the world. And it was not just the companies; a critical part of this worldwide CO<sub>2</sub> leadership is the regulatory experience. The Texas Railroad Commission is, without challenge, the leading CO<sub>2</sub> regulatory organization in the world today. But, still today and in spite of our efforts, the need to promulgate this extensive experience are fraught with frustrations that so little is known about the magnitude of this industry outside the few companies and its regulators. But we keep trying and gathering help from other states, other companies and some very effective assistance from environmental non-governmental organizations. Our network is growing from its Permian Basin origins to an international presence but, make no mistake about it, Texas is at the core of these initiatives.

**BACKGROUND**

Many persons would attribute the origins of the CO<sub>2</sub> injection industry to an incentive devised by the Texas Railroad Commission. Observers at TRRC noted that the huge Kelly Snyder Field near Synder, Texas was at risk of poor reservoir management, falling below its bubble point, and leaving huge unproduced reserves in the ground. The multitude of producers of the almost countless mineral leases were faced with this pending doom and the TRRC came up with a proposal to encourage conservation of the oil resource by incentivizing unitization of the field. Additionally, and after unitization, they would offer relief from the daily allowable limitations of production if the group of producers would implement a novel flood. Thus, the producers were faced with devising a new flooding concept called CO<sub>2</sub> enhanced oil recovery that was essentially unproven at commercial scale. With the incentive in place, a massive investment would be made to capture and compress CO<sub>2</sub> from natural gas separation plants in Pecos and Terrell counties and transport via newly constructed CO<sub>2</sub> pipeline to the field located 350 miles away. This, according to the TRRC guideline, would qualify the unitized field for the incentive and the first large scale CO<sub>2</sub> flood in the world was begun. What happened after that was, as they say, "history." Today, we have 54 CO<sub>2</sub> floods in the Permian Basin that are producing

200,000 barrels of oil per day or about 18% of today's Texas oil production. This is accomplished by injecting 30 million tons per year of new CO<sub>2</sub> or about the equivalent of 12 FutureGen-sized (275 MW) projects. To further emphasize the magnitude of the relatively unknown CO<sub>2</sub> EOR industry, in late 2005, the Permian Basin produced its billionth barrel of oil from CO<sub>2</sub> injection.

The regulatory framework for worldwide CO<sub>2</sub> flooding evolved from a combination of TRRC rules for both waterflooding and the new requirements of CO<sub>2</sub> handling. The thirty-five years of CO<sub>2</sub> experience has been exemplary without a single lost-life accident while handling aggregate volumes of CO<sub>2</sub> that total over 570 million tons (~10 tcf), counting both purchased and reinjected volumes.

The foundation of the regulatory framework is shown in the Texas Administrative Code, Title 16 - Economic Regulation, Part 1 - Railroad Commission of Texas, Chapter 3 - Oil and Gas Division. These rules have carefully evolved over the history of drilling in the state and seek a balance between commercial activity and preserving public health and safety while protecting our Texas environment. A built-in interaction for groundwater protection lies with the Texas Commission on Environmental Quality that applies not just to the CO<sub>2</sub> industry but for all wells drilled for oil and gas purposes. It is interesting to note that the rules for groundwater protection through the Underground Injection Control (UIC) program owe their origins to procedures originally developed from rules established at the Texas Railroad Commission.

Groundwater protection is a key issue of all underground activity but it is one of many key issues that are required for effective injection projects. Just to name a few of these other activities that have regulatory oversight are organizational qualification and reporting, retention of records, notice requirements (§3.1), access to properties (§3.2), identification of properties, wells, and tanks (§3.3), lease numbers (§3.4), applications to drill, deepen, reenter, or plug back (§3.5), application for multiple completion (§3.6), and strata to be sealed off (§3.7). These functions and others are all critically important to carbon capture and storage (sequestration).

## **THE CASE FOR THE TRRC TO REGULATE CCS**

Oil and gas activities in the state of Texas are continuing at an impressive pace. The probability of this ceasing in the next 50 years is zero. The RRC regulatory responsibilities and the staff to provide the oversight of this activity will also continue. Their toolbox can easily be expanded to include the necessary overlay of functions required for CCS. Since injection projects for gas storage (RRC), oil recovery (RRC) and CO<sub>2</sub> storage all have common regulatory requirements, the assignment of CCS functions to another organization, Federal or State, would be counterproductive. As with any new activity, some functions will need refinement or additions, but the expertise present at the RRC will be able to make those refinements properly and efficiently.

A second consideration has to do with whether CO<sub>2</sub> EOR injection will be the leading injection method for CCS. Many individuals and organizations believe the near-term projects for CCS will be EOR projects. As new EOR opportunities begin to fade, deep saline formations will come to the forefront. To have deep saline formation injection oversight in a separate regulatory organization is not only arbitrary in our opinion but lacks efficiency and can present unique bureaucratic challenges as wells simultaneously inject into EOR and saline formation zones.

A third consideration has to do with injection rights and aggregation of those rights. The state principles for unitization and gas storage rights aggregation are the same considerations for CCS. State-by-state rules apply to these rights and a federal agency oversight of those rules is not practical.

A fourth consideration has to do with qualified personnel in field offices charged with on-site regulatory responsibilities. The RRC districts are an excellent fit to those requirements.

Appropriate sites for CCS will need to have validation with the subsurface stratigraphy and formation properties. Thus, another important consideration has to do with the value of the subsurface database for which the RRC has the current responsibility.

Lastly, most would believe and hope that the new CCS companies will grow from the realm of the oil and gas producing companies. That is a culture and a collection of companies with which the RRC has exhaustive experience and should facilitate proper and effective storage projects.

## **NEEDS**

With an expanded and new mission for CCS, new staffing requirements will be levied on the district offices of the RRC. However, economic development from CCS activity will expand state revenue providing additional agency funding for new staffing requirements. Incremental district staffing and training needs are expected to be greatest in districts 3, 8A, 8, 7C, 4, 7B, 6, 10, 2.

Moving CO<sub>2</sub> from multiple industrial sources to sinks will be key. Some state assistance on pipelines may be necessary.

A concerted movement is underway to develop a national (EPA) regulatory framework for sequestration. Most of the issues of CCS do not pertain to the current regulatory purview of EPA nor can a national system adapt to state-by-state constitutional matters related to legal frameworks to conduct CCS activities. For example, state primacy is imperative to address such issues as storage rights aggregation.