

**Testimony of Thomas E. Lubnau II**  
**Department of Energy Carbon Capture and Sequestration**  
**Program Amendments Act**

Mr. Chairman, Members of the Committee:

Thank you for the opportunity to share my thoughts on Carbon Capture and Sequestration (CCS). Creation of a legal infrastructure to make carbon capture and sequestration possible is a key component in domestic security, economic recovery and environmental protection.

I come to you, today, from Campbell County, Wyoming, where we supply the raw materials to generate 30% of the nations electricity, and 10% of the nations total energy. Annually, Wyoming generates 10.01 Quadrillion BTU's of energy. That is more energy than Saudi Arabia, Venezuela, Nigeria and Iraq, combined.<sup>1</sup> The bulk of that energy is produced in the form of coal, but Wyoming also contributes significant oil, natural gas and uranium to the national energy picture.

As you know, a secure energy source is one of the keys to domestic security. The security of the Wyoming resources are best illustrated by the fact few people know that less than 50,000 people, working quietly and efficiently, produce ten percent of the nation's energy supply, every hour of every day of every year.

The energy is produced in the U.S. for consumption in the U.S. Dollars are not being spent overseas to support entities and governments who's motivations are not necessarily aligned with the interests of the United States.

About two years ago, the Wyoming legislature sensed a change in the political tide in the country. We anticipated that no matter which party won the presidential election, the policies of the United States Government were going to be "greener" than the policies of the past three decades. Working together in a bipartisan manner, the Governor's Office worked with legislative leadership to craft the legal infrastructure necessary to operate geologic carbon capture and sequestration sites inside the State of Wyoming. As a result, the State of Wyoming has put in place the most comprehensive package of legislation in the country to establish the legal framework for geologic sequestration activities.

We felt carbon caps or other regulation of carbon dioxide emissions are adopted by this country, the tools should already be in place to meet the requirements of such legislation. Without both the legal and technical infrastructure in place to take the steps to reduce carbon dioxide emissions, such legislation is doomed to failure. While the State of Wyoming would never mandate carbon dioxide caps, we felt we should take the lead in establishing a paradigm for the geologic sequestration of carbon dioxide.

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<sup>1</sup> Source: Ron Surdam, State Geologist, State of Wyoming Geological Survey, *A Prospective on the Geologic Sequestration of Carbon Dioxide in Wyoming*.

Wyoming's approach has been to anticipate what questions the large finance houses might ask prior to financing a large-scale carbon sequestration project, and to answer those questions. As a result, we have passed 5 pieces of legislation establishing the legal framework for CCS development in Wyoming. At this point, there are a few pieces of legislation at the state level needed to round out the package (finalizing the form of financial assurances and risk assessment), and, as I see it, two things that need to happen at the federal level to make geologic sequestration activities possible (addressing the issue of long term liability and determining the ownership of pore space on federal properties).

Creating the legal infrastructure necessary for the geologic sequestration of carbon dioxide in Wyoming took more than two years to and thousands of hours of work to establish. The five bills the Wyoming legislature passed to create the legal framework were pore space, permitting and regulation, we really mean it, you inject it, you own it, and pore space unitization.

### **Pore Space**

The first bill Wyoming passed was entitled "Pore Space." With that bill, we tried to answer the question, who owns the rights to authorize geologic sequestration activities under the surface of the land. Our underlying philosophy was that everyone who came into the legislative session with property rights, left the legislative session with the same property rights with which they arrived. In other words, as any first year law student knows, property rights are a bundle of sticks. Our goal was that everyone who showed up with a bundle of sticks, left the legislative session with the same sticks in their bundle.

We determined that the majority rule in the United States was the American Rule, which said that the surface owner owns the voids – or as we later came to know – pore space under the surface. That determination makes sense, when you think the process all the way through. One of the first cases dealing with subsurface rights was a case about a salt mine. Salt had been mined out of the subsurface, except for a few salt pillars that were necessary to keep the roofs of the caverns from collapsing. After all the salt that could be mined, was mined, the empty salt mine was going to be converted to deep storage.

The question was who owns the rights to the deep storage?

The law in the United States, which we adopted from old England, says that the mineral owner has the right to use so much of the surface and subsurface as is necessary to extract the minerals. Since the salt miners were no longer extracting minerals, the court reasoned the salt miners did not have the right to use the voids for storage.

Wyoming codified that rule. We adopted a bill, known as HB89, which codified ownership

of pore space on fee lands in Wyoming.<sup>2</sup> In that bill, we confirmed that the surface owns the pore space. We declared that unless specifically severed, transfers of the surface included transfers of the pore space. We confirmed the mineral estate was dominant over the servient surface estate, we required a specific description of the pore space to be included in the instrument of grant, or the instrument was void, and we required, in the instrument of transfer, that the instrument specifically describe the rights of use of the surface by the pore space owner in the instrument, or no rights to utilization of the surface were transferred.<sup>3</sup>

In so doing, we created some interesting political coalitions. The Agriculture industry was generally happy because they were the owners of the pore space. Their ownership of an asset was confirmed. They had control over what happened on the surface of their ranches. The mineral industry was sort of happy, or maybe agnostic, because their rights to extract the minerals were confirmed. The environmental movement in Wyoming found itself in an interesting dichotomy. Wyoming was taking the lead in establishing a framework for the carbon-friendly utilization of coal. On one hand, they found themselves applauding the infrastructure we were creating. On the other hand, they were sad that we were making the continued utilization of coal possible.

### **Permitting and Regulation**

In the early 1970's, Wyoming passed the strictest mining reclamation law in the country. We tried to learn from the experience of our sister states, who had been overcome with mining related environmental problems. As a result, we passed the Wyoming Mine Reclamation Act. That law formed the pattern for the United State Surface Mine Reclamation Act.

We are proud of our tradition of environmental protection in Wyoming. We love our state, our unique wide open spaces and beautiful environment. And as much as we love our friends from the Federal Government, we think we do a pretty good job of taking care of our environment.

Carbon sequestration activities are regulated under the Clean Water Act. Presently, the carbon sequestration wells are regulated as Class V experimental wells, or in the case of enhanced oil recovery, Class II wells. The EPA has proposed regulations which will create a new class of wells, Class IV carbon sequestration wells. Those regulations are slated to be finalized somewhere in the summer of 2011.

The State of Wyoming found that the Underground Injection Control (UIC) program was inadequate, in many respects, in protecting the environment, and in assuring that carbon sequestration activities were conducted in a responsible, ethical and safe manner. As a result, the

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<sup>2</sup>HB 89 is now codified as W.S. §34-1-152.

<sup>3</sup>We confirmed the mineral estate was dominant over the severed pore space estate in a HB 58, the “we really mean it bill.”

Wyoming State Legislature passed HB 90, now codified as W.S. §35-11-313. That statute creates a comprehensive permitting and regulatory scheme which regulates, from cradle to grave, carbon sequestration activities. The legislation, and the concomitant regulations which are forthcoming, create a paradigm in which the carbon sequestration operator must operate safely and according to law.

The essential provisions of the regulation include a general prohibition against carbon sequestration activities in the State of Wyoming unless permitted in accordance with this chapter.

Enhanced oil recovery activities (“EOR”) are exempted from the Act, because they are governed, and have been governed for the past 40 years by the Wyoming Oil and Gas Conservation Commission. During the last 40 years, enhanced oil recovery activities have been conducted in the State of Wyoming without incident. One of the weaknesses of the legislation pending in front of this committee is there is no a distinction between EOR activities and geologic sequestration of carbon dioxide for pure geologic sequestration purposes. Currently in Wyoming, there is an Enhanced Oil Recovery project in which, ultimately, 40 million tons of CO<sub>2</sub> will be injected and sequestered underground. If the intent of this committee is to finance those types of projects, then the legislation is fine. If not, then the legislation may need modification.

In order to obtain a Wyoming permit for geologic sequestration of carbon dioxide, one must describe the geology, including i) geochemistry, structure and faulting, fracturing and seals, stratigraphy and lithology including petrophysical attributes; ii) a characterization of the injection zone and aquifers above and below the injection zone which may be affected, including the applicable pressure and fluid chemistry data to describe the projected effects of injection activities; iii) the identification of other drill holes and operating wells that exist within and adjacent to the proposed sequestration site; iv) an assessment of the impact to fluid resources, the subsurface structures and the surface of land that might reasonably be expected to be impacted and the measures required to mitigate such impacts; v) plans for environmental surveillance and excursion detection, prevention and control programs; vi) site and facilities descriptions, including documentation sufficient to demonstrate the applicant has all legal rights to sequester carbon dioxide and associated constituents into the proposed geologic sequestration site; vii) proof the wells are deigned to the minimum standards set forth by the Wyoming Oil and Gas Conservation Commission; viii) a plan for periodic integrity testing of all wells; ix) a monitoring plan to assess the migration of injected carbon dioxide; x) proof of financial assurances; xi) a detailed plan for post-closure monitoring; xii) proof of notice to surface owners, mineral claimants, mineral owners, lessees and others of record of the subsurface interest; xiii) a requirement that any excursions are immediately reported; xiv) a procedure for terminating the permit if excursions cannot be controlled; and, xv) such other conditions or requirements as the department of environmental quality deems necessary to carry out the purposes of this section.

Given that the United States Government is accepting long term liability for carbon sequestration activities under this legislation, my suggestion is at a minimum, insure that such a

permitting process is in place in each of the states where geologic sequestration activities are to occur. I would not recommend federal preemption of state's rights in this area. If the voters of a state do not want geologic sequestration activities conducted within the borders of their state, and the elected representatives of that state are unwilling to establish a permitting process, and if the consumers of power are willing to pay the increased costs of industrial applications which do not utilize geologic sequestration, then I believe it is not the obligation of the United States Government to force such activities to occur within the borders of those states.

The legislation pending in front of this committee does not take into account the existence of comprehensive, and in many cases, stricter state requirements for Carbon Sequestration activities. I would suggest the legislation be amended to include the possibility that the several states can regulate geologic sequestration activities. I would also suggest, as is contained in the UIC program, that the states take a primacy role in regulating these pilot CCS programs so long as they meet the minimum standards set forth by the United States government.

Whether by regulations, or by legislation, I would urge this body to include the minimum standards for permitting set forth in the Wyoming legislation. Frankly, at this stage, no one knows, in great detail, how to sequester carbon dioxide in large quantities. We only have one chance to do this right. We must proceed cautiously and with measured steps, rather than rushing headlong into carbon sequestration activities.

For example, there is much discussion in the scientific community regarding pressurization of formations. When one injects supercritical carbon dioxide into a formation that is already full of a brine solution, pressures in that formation build. The fluid dynamics mean that something is going to change. When CCS was initially contemplated, those fluid dynamics had not been fully explored. The Wyoming State Geologist has not modeled those fluid dynamics. His suggestion, to preserve homeostasis in the formation is, for every gallon of carbon dioxide that is injected into the formation, a gallon of brine is drawn out and purified. The waste is reinjected back into the formation it came from with the carbon dioxide, trace minerals are stripped out and marketed, and the water from the saline formation is purified and used for domestic or agricultural water supply purposes. Now, that is a proposal on the table. We have not thought all of the ramifications completely through. But, you can see the science is dynamic. With dynamic science, we must proceed prudently and cautiously.

**You inject it, you own it.**

Wyoming has taken the policy position that it does not make sense for the 550,000 citizens of the State of Wyoming to take liability for injected carbon dioxide, when, by and large, the ultimate consumers of the power generated from Wyoming resources are from out of state. Given that position, the Wyoming State Legislature passed HB 58, which will become law on July 1, 2009. That bill creates a rebuttal presumption that if a person injects carbon dioxide, that person owns it for all purposes, including liabilities of such ownership. This position is one from which Wyoming

can retreat, but it can never return to this position, once the position has been abandoned. Our belief is the risks of the project are allocated, through the rate base, back to the user of the power. If the federal government provides indemnification, then all the better. In that way, a paradigm is created in which the injector owns the liabilities, but if certain conditions are met, the federal government will assume those liabilities, and the rebuttal presumption included in the statute will be overcome, and the liability will be assumed by the United States of America.

One consideration might be that carbon dioxide, in and of itself, is a valuable commodity. If the United States government is taking the liability for the asset, consideration should be given for taking the value of the asset as well – either in the legislation, or in the agreements authorized by the legislation.

### **Unitization**

Wyoming passed HB 80, which will become law on July 1, 2009, provides for the exercise of Wyoming's police power to protect "corresponding rights." The statute is based upon oil and gas unitization principles. In much the same way there are oil and gas units formed under state law as well as federal law, I anticipate both federal and state carbon sequestration units. The exercise of the police power is justified to protect the rights of all pore space owners in the unit, and to not waste valuable pore space.

Under Wyoming's unitization concept, 80% of the owners of the pore space consent to the unitization, 20% of nonconsenting landowners can be brought into the unit.

The unitization concept is much more palatable than eminent domain to pore space owners who's pore space is involuntarily included in the unit, because the pore space owner has the right under the unitization concept to participate in the income stream from the unit for the life of the unit, rather than being compensated for the value of the pore space taken at the outset of the carbon sequestration project. Additionally, the pore space owner, through the administration of the Wyoming Oil and Gas Conservation Commission has the right to object or otherwise have input into the operation of the unit.

The unitization concept allocates "economic benefits" throughout the life of the unit, to all parcels of the unit in and equitable fashion.

### **The Last Two Steps at the Federal Level**

Wyoming has created as much legal infrastructure for carbon sequestration as it can, alone. There will be fine tuning of this state legislation for years, but the basic legal infrastructure is there. Two things need to happen to make carbon sequestration possible on a large scale. The first issue is addressed by S. 1013. Since this process is unknown, and the liabilities are unknown, and since the carbon dioxide will be under the surface of the earth for geologic time, long term liability needs

to be allocated. This bill does exactly that. Insurance vendors have created a product for the short term liability, but no project will proceed until the long term liabilities have been addressed.

The second decision that needs to happen is for the federal government to determine the ownership of pore space under federal surface and federal minerals. While the several states can determine fee property ownership, unless the federal government makes its determination regarding federal lands, no project will proceed. States cannot preempt the federal government's ownership of its property, and so that determination will be key to the development of carbon sequestration projects, particularly in the west.

### **Comments Regarding This Bill**

I commend the sponsors of this bill for bringing forward thinking legislation which takes a significant step toward proving carbon sequestration technologies. At the root of every successful economy is cheap and available energy. In order to spur economic recovery and to capitalize on the strengths of this country, we need to focus on the assets we have, instead of becoming dependent upon the assets of other countries. This technology will allow the country to develop its assets in a way that is both economically sound and environmentally friendly.

This bill is a great step in the right direction. Frankly, I had to think long and hard about things that I might do differently were I in this committee's position.

Some considerations on the language of this bill are as follows:

1. This body should make a determination as to whether or not enhanced oil recovery activities will be included as projects which qualify for this legislation.
2. Either by regulation, or by the language of the bill, consideration should be given to many of the factors included in the Wyoming model permitting scheme. I would suggest minimum permitting requirements. Factors which might be included in section 963(e) are:
  - i) a characterization of the injection zone and aquifers above and below the injection zone which may be affected, including the applicable pressure and fluid chemistry data to describe the projected effects of injection activities;
  - ii) an assessment of the impact to fluid resources, the subsurface structures and the surface of land that might reasonably be expected to be impacted and the measures required to mitigate such impacts,
  - iii) plans for environmental surveillance and excursion detection, prevention and control programs

iv) a requirement that any excursions are immediately reported,

v) a procedure for terminating the or substituting the operator of the geologic sequestration facility if certain operating parameters are not met. I do not believe that termination of indemnification obligations will encourage financing, but there should be some sort of process by which incompetent or unscrupulous operators can be removed, and others substituted in their stead if operations are not being conducted as required.

3. The following concept was first put forth by David Victor from Stanford University. He urges that we do not proceed with too much haste in development of these projects. We need to insure development is done in a logical fashion, and that we do not force all of the projects to be built at the same time. Instead, we allow the projects to proceed successively, and that we are allowed to learn from the mistakes from others, rather than charging headlong into the process all at once. While the situation may be perceived as critical, we need to proceed carefully and prudently. We need to account for unexpected consequences of large scale geologic sequestration, which has never been accomplished before at scale, and to work through the process logically and safely.
4. I urge you to not force a cookie cutter approach on the entire country. Instead, I would defer to the collective wisdom of each of the states. Let each of the states serve as a laboratory for the United States as a whole. The good ideas will rise to the surface.
5. I have heard proposals, primarily in the halls of academia, to nationalize aquifers and pores space, and to impose a common scheme for carbon sequestration on the entire country. I would urge you not to take this approach. Our strength is in our diversity. Rather than an inbred single thought system, I would urge this technology be allowed to develop in broad and varied ways. The strength in the competition and diversity of ideas will allow us all to benefit by the best process and product available. If we do it the cookie cutter way, there is no motivation to cut costs, compete and provide the highest quality, lowest cost product.

## **Conclusion**

Should carbon caps become a reality, the technology for carbon sequestration needs to be in place. The United States has vast coal resources, and to write them off without developing clean coal technologies is, to my way of thinking, short sighted and will have serious economic consequences to the country. This legislation is a giant step forward, and I wholly support it.

Thank you for the honor and opportunity to share my thoughts with this committee.