Committee on Resources,

Subcommittee on Energy & Mineral Resources

energy - - Rep. Barbara Cubin, Chairman
U.S. House of Representatives, Washington, D.C. 20515-6208 - - (202) 225-9297

Witness Statement

TESTIMONY OF
GENE R. GEORGE, WPG#8
PETROLEUM ASSOCIATION OF WYOMING
BEFORE THE
SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES
OF THE
COMMITTEE ON RESOURCES OF THE HOUSE OF REPRESENTATIVES
REGARDING
ORDERLY DEVELOPMENT OF COALBED METHANE RESOURCES
FROM PUBLIC LANDS
THURSDAY, SEPTEMBER 6, 2001
LONGWORTH HOUSE OFFICE BUILDING
WASHINGTON, D.C.

INTRODUCTION

Madam Chairman Cubin and distinguished members of the Subcommittee on Energy and Mineral Resources of the Committee on Resources of the House of Representatives, my name is Gene R. George. I am here on behalf of the Petroleum Association of Wyoming (PAW). I am a Wyoming Professional Geologist, license number Wyoming No. 8. I have a Bachelors Degree in Geology from the University of Kansas and a Masters Degree in Geology from Oregon State University. I have been an independent in the oil and gas industry since 1971. I am a past President of the Wyoming Geological Association and a former two-term Commissioner for the Wyoming Oil and Gas Conservation Commission. I serve as the current Chairman of the Wyoming Department of Environmental Quality Water and Waste Advisory Board. I am a board member of the Petroleum Association of Wyoming and am the Chairman of the PAW Coalbed Methane Committee. PAW represents coalbed methane producers who account for the vast majority of drilling and producing activity now occurring in Wyoming and particularly in the Powder River Basin of Wyoming. These producers range in size from major oil companies to small independent producers.

ORDERLY DEVELOPMENT OF COALBED METHANE RESOURCES FROM PUBLIC LANDS

The subject at hand is the orderly development of coalbed methane (CBM) resources

from public lands. First, nearly 82% of the CBM activity in the Powder River Basin of northeast Wyoming has occurred on private and Wyoming State minerals. This is due in great part to the National Environmental Policy Act (NEPA) and Federal Land Policy and Management Act (FLPMA) constraints on issuing permits on federal minerals. The Buffalo Field Resource Management Plan's Reasonably Foreseeable Development does not account for the extent of the CBM activity and surface disturbances. Although the actual short-term disturbance for CBM will be two (2) percent of the surface area analyzed, it was deemed

necessary to analyze the entire CBM area of Johnson, Sheridan, Campbell and the north half of Converse Counties in a new Powder River Basin Oil and Gas Environmental Impact Statement. The Wyoming Oil and Gas Conservation Commission (WOGCC) has changed well densities from 40-acre spacing (16 per square mile) to 80-acre spacing (8 per square mile) to assure the prevention of waste of natural resources and to protect correlative rights. This density reduction further reduces surface disturbance.

Since 1986, there have been a total of 11,658 CBM wells drilled. Two thousand fifty four (2,054) CBM wells were drilled on federal minerals. Of the 5,890 wells analyzed by the Wyodak EIS only about 1,000 wells were drilled on federal minerals. The rest of the wells were drilled on private and state minerals while waiting on the Wyodak EIS process. The same situation currently exists in that many wells are being drilled (eleven per day) on private and Wyoming State minerals while the Powder River Basin Oil and Gas EIS is being completed. The Record of Decision for that document should be completed by July of 2002. BLM is permitting CBM wells at the rate of 1,250 wells per year while the Wyoming Oil and Gas Conservation Commission is approving permits at the rate of over 700 per month or 9,000 per year. The BLM completed the Wyodak Drainage Coal Bed Methane Environmental Assessment in March of 2001. This allows for 2,500 wells to be drilled in the Wyodak EIS area to protect federal minerals from drainage from wells on private and state minerals. To date, the BLM has approved 900 new federal drainage protection wells. The BLM is staffing up in the Buffalo Field Office and hopes to be able to approve and monitor 3,000 well permits per year.

Between the NEPA and FLPMA requirements and the slow process for approving drilling permits on federal lands, the activity on federal lands is being tightly controlled and is extremely orderly. The problem is that the Federal Government and the people of the United States of America are losing the battle to capture their fair share of the methane. It is suggested that the rapid pace of activity in the CBM play will slow down as the play approaches the central portion of the Powder River Basin where federal minerals dominate. As operators run out of private and state minerals to develop, the federal minerals will become the focus of activity.

The second major pace-controlling factor is in securing NPDES permits from the Wyoming Department of Environmental Quality (WDEQ). Although the water is of very high quality, the antidegradation requirements and the sodium issues to protect agricultural uses dominate. The severe restrictions being faced for discharge permits particularly on the Powder, Little Powder and Tongue Rivers and their tributaries have caused operators to reduce the drilling pace and cut back on expenditures. Most of the water produced from the coal in the aforementioned drainages will be held onlease in total containment ponds. The recent agreement between Montana and Wyoming for the Powder and Little Powder Rivers will ease some of the restrictions. The WDEQ is attempting to expedite the process by the use of General Permits for these structures. It has been taking 4 to 6 months or more to obtain permits in these areas. It is estimated that over 1,000 currently drilled wells are waiting on NPDES permits. These wells could represent over 250 million cubic feet of gas per day in production.

Coalbed methane activity in the rest of Wyoming is limited currently to a few pilot projects and is occurring primarily on private and Wyoming State minerals. There are two Environmental Assessments and one Environmental Impact Statement involving federal lands for CBM pilot projects in south central Wyoming that are being conducted by the BLM. CBM success is still a question and the water quality issues are even greater outside of the Powder River Basin of Wyoming.

The members of the Petroleum Association of Wyoming believe that development is orderly and even overly restricted by regulation and the slow pace of the NEPA requirements. In order to drill a coalbed

methane well, the following items are required:

- Wyoming Oil and Gas Conservation Commission Application for Permit to Drill
- Wyoming State Engineer's Office Water Well Appropriation Permit
- Wyoming Department of Environmental Quality NPDES Discharge Permit
- Wyoming State Engineer's Office Reservoir Appropriation Permit
- On federal Lands a BLM Application for Permit to Drill
- On federal Lands a Water Management Plan
- Wells on state minerals must meet an eight-point water management plan
- On federal lands a water well agreement with every water well owner within one-half mile
- Notification for some pipelines to the U.S Corps of Engineer's 98-08 General Permit
- All wells require bonds for surface restoration either by the BLM, the WOGCC or State Land Board
- Wyoming Department of Environmental Quality Air Quality Permit for compressor engines

To further show that the development is orderly, a number of false perceptions concerning the CBM play of Wyoming need to be exposed to the bright light of scientific analysis. The following discussion concerns these perceptions.

COALBED METHANE PERCEPTIONS

Activity "out of control"

The current coalbed methane activity particularly in the Powder River Basin of northeast Wyoming is often portrayed as "out of control". The primary reason for this perception is that the wells are shallow (500 to 2,000 feet) and are drilled by small truck-mounted rigs and are drilled in 2 to 5 days. Conventional drilling for a single well usually occurs from weeks to months. Therefore, the number of coalbed methane wells drilled and hooked up for production and the surface owners affected by those wells appears to occur at random and covers a lot of area quickly. It is true that a lot of wells can be quickly drilled, but it is not random, and it is not "out of control".

Orderly development is exactly what is happening today. All wells are drilled on lands for which an oil and gas lease has been secured from the holder of the mineral estate. The operator must negotiate or competitively bid for the right to drill for coalbed methane. Then the operator must negotiate with the surface owner (if different from the mineral owner) on paying for surface disturbances and for gaining access. Wyoming case law has long established that the surface owner is entitled to actual surface damage payment. Because the mineral estate dominates over the surface estate, if an agreement cannot be reached, the mineral lease owner can gain access by putting up a bond in the amount of the estimated surface damage costs and proceed. The final agreement will be set by court action. No one can go on someone's surface without permission or an agreement unless court action has taken place. To date, court action has never had to be taken by an operator.

Next, the operator must get a permit for all wells from the Wyoming Oil and Gas Conservation Commission. If the lease is on federal minerals, the operator must also get a permit from the Bureau of Land Management. The BLM permit also requires a water management plan and an agreement with any water well owner within one-half mile of the well even if they are off the operator's lease. The BLM also does a site specific Environmental Assessment for each group of 32 wells. A permit from the Wyoming State Engineer's Office is also necessary before drilling starts. Wells drilled on Wyoming State Minerals must meet an eight-point water management plan. The State Engineer also approves all reservoirs or other

appropriations of the water. Then a permit to discharge any water must be obtained from the Wyoming Department of Environmental Quality/Water Quality Division through the National Pollutant Discharge Elimination System (NPDES) process.

Until all of these permits are approved and are in hand and until the lease is secured and the surface access is obtained, the operator cannot move a single spade of dirt nor discharge a single drop of water. This process may take a few months, or even in some cases, a year. This is hardly a case of uncontrolled activity!

The Powder River Basin is being flooded with water

There are no creeks, rivers, or streams that are or ever have been in flood stage due to CBM discharges. Four instances of minor short-term, site-specific flooding occurred when the surface owner and operators of upstream discharges failed to clean out the tree debris dams or to bypass the man-made silted-in hay meadows or spreader dikes. Two cases have been resolved and the other two are being negotiated. In these negotiated cases, the wells have remained shut in. In most places, the water is kept on location by reservoirs and dams. What water is directly discharged to the Belle Fourche and Cheyenne Rivers adds little to the natural flows due to percolation and transpiration of plants. Some ice damming in the winter has occurred where shallow gradients in the creek are insufficient to allow the water to move through the area. These areas have been put in pipe or channelized. The water management plans by the BLM and the Watershed Plans for Dead Horse, Spotted Horse and Wild Horse Creeks all show that the creek channels have the capacity to handle all CBM discharges without flooding. Virtually all of the receiving creeks are normally dry most of the year. The only streams that flow most of the year under normal conditions are the five major rivers and four small creek tributaries. Currently, the second year of drought conditions exist in northeast Wyoming. Ranchers are asking the WDEQ to issue permits to the operators to gain water for livestock. The gauging station on the Belle Fourche River shows no increase over the last several years where CBM development has been intense. The area is certainly not awash with water!

Water production from CBM wells occurs at predictable rates. The initial rate for an average well is very high and may range between 5 and 100 gallons per minute. The average well also declines by at least 50% in the first year and will decline by another 50% in the second year. The rates continue to decline until they stabilize at a very low rate as gas depletion is achieved. Estimates in the Wyodak EIS were that an average well would produce 12 gallons per minute. The statistical average as of May, 2001 with 5,771 wells producing is 7.3 gallons per minute. It is not reasonable to apply a flat rate of water production to the total number of wells to be drilled. All estimates of water production must take into account the rapid decline in water production rates as a well ages through its short five to ten-year average life. The BLM EIS models will predict the total discharges from wells relative to the sequence of drilling, production and abandonment and for specific drainages. Flooding of drainages will not occur. The current practice of retaining the water on lease by total containment will further ease any concerns about excess water. In fact, the City of Gillette, Wyoming recently announced that flooding was greatly reduced in the City by CBM reservoirs during a major thunderstorm event.

As of May 2001, 5,771 wells were producing over 50 million gallons of water per day. Even with this large number, the individual wells are so spread over the area that no flooding is occurring. In fact, the water is not leaving the State of Wyoming and in many cases up to 90% of the water is lost through percolation, evaporation and transpiration by plants.

Need for more study

Since 1990, the Bureau of Land Management has written seven environmental assessments (EAs), two environmental impact statements (Gillette South and Wyodak) and is in the process of completing a new Powder River Basin Oil and Gas Environmental Impact Statement due out in July of 2002 that covers the entire CBM play in the Wyoming portion of the Powder River Basin. Montana is also conducting an EIS for the entire Powder River Basin in Montana. The BLM requires a site specific Water Management Plan for each 32-well Plan of Development (POD) that it approves on federal minerals. Watershed studies have been completed by the CBM operators for Dead Horse Creek, Spotted Horse Creek and Wild Horse Creek. The operators and the Wyoming Department of Environmental Quality (WDEQ) have prepared studies on Barium, Conveyance Losses, Main Stem Flow Quality. The University of Wyoming is completing studies on CBM water toxicity on plants, Plant/Soil/Water interactions and erosion in Burger Draw. The Wyoming Water Development Commission (WWDC) is planning Powder-Tongue Rivers Basin Watersheds, Northeast Wyoming Basin Watershed, and Tongue River Watershed Management plans. The WWDC is also funding a Digital Elevations Model study, a Channel Fluvial Morphology Study and a GIS erosion model. The Wyoming Geological Survey is conducting a State/Federal water quality project involving numerous State agencies, the BLM and the U.S. Geological Survey to be funded by the WWDC. The WDEQ requires analysis of all downstream irrigation areas for each NPDES permit. Montana and Wyoming have reached an agreement requiring monitoring for the Powder and Little Powder Rivers based on a baseline analysis. The Conservation Districts are doing Watershed studies on Dead Horse, Wild Horse and Spotted Horse Creeks. The Wyoming Geological Survey has published articles on underground fire potential, subsidence and has a great information pamphlet for public use. Many studies and plans are on-going. It is currently impossible to know all of the studies that are being conducted at any one time. Even the EPA is conducting a CBM Best Management Practice study.

More monitoring is needed

Currently, the operators are required to monitor each NPDES discharge point and submit complete water analyses monthly to quarterly. WDEQ also requires point of compliance monitoring which sometimes is daily. The BLM is requiring operators to drill and equip monitoring wells with federal mineral development. The BLM has more than 40 monitor wells in operation. The Wyodak EIS mandates up to 280 monitor wells be drilled at operator cost and equipped by operators for BLM use. The Wyoming State Engineer's office has monitoring wells spaced throughout the CBM area. The Wyoming State Engineer's office also requires separate water volume reports. The Wyoming Oil and Gas Conservation Commission (WOGCC) requires that total gas and water production be reported on a monthly basis. The WOGCC has monthly hearings on spacing and compliance issues. What else is there to monitor? The water quality does not change with time or volume.

Withdrawing water from the coals will cause subsidence

First, the BLM EIS states that only about three to five percent of the total groundwater resource will actually be withdrawn. The coals are not totally dewatered. The Wyoming Geological Survey published a document on their web site (wsgweb.uwyo.edu/oilandgas/subsidence.html) entitled *Subsidence potential related to water withdrawal in the Powder River Basin*. This article concludes that up to ½ inch of subsidence may occur but it may not be transmitted to the surface. To date, no surface subsidence has been associated with other equally significant water withdrawals in the Gillette area. This means that even at the coal mines, where the coal is nearly dewatered before mining, there has been no subsidence recognized at the surface.

Withdrawing water from the coals will cause underground fires

The coal mines near Gillette have been active for over twenty years and even though they nearly dewater the coals, there have been no underground fires. The Wyoming Geological Survey has published Coal Report CR 01-1 March 2001. The title is *Pryophoricity (spontaneous combustion) of Powder River Basin coals - considerations for coalbed methane development*. This paper concludes that "During the production phase of CBM activity, conditions necessary to foster spontaneous combustion of coal are not present. After the coal seam is depleted of economic methane resources, wells must be plugged and sealed. Unlike abandoned mines, CBM wells leave no underground voids susceptible to further subsidence and associated spontaneous coal ignition." Finally, oxygen is required for combustion. All pipelines have oxygen sensors that will shut in wells if any oxygen is recorded. Without oxygen fire cannot exist.

As pressure in the coals is drawn down, methane leaks will occur at the surface

As nature erodes the surface and brings the coals near the surface, methane has been known to escape. Rawhide village was just such a case. The erosion breached the overlying confining shale layer and allowed the gas to escape. When homes were placed in the ground where the overlying shale had been breached, gas did escape into those homes. The gas seeps in this area were historic and known to predate the homes. Currently, the coal mines, which nearly dewater the coal in front of the highwall, have some methane pass out of the coal mine face to the atmosphere but until the overburden is stripped, no methane escapes out in the area in front of the mining pit. When coalbed methane wells are drilled and completed (cased), they maintain the overlying sealing layers which confine the water, the formation pressure and the methane in the coal. As water is pumped from the coal bed, a cone of depression is created around the well. All water and gas flows from high pressure to low pressure. Therefore, because the confining layer is maintained, and because the gas flows to the lower pressure wellbore, methane does not escape to the outcrop and does not migrate to the surface.

The City of Gillette, Wyoming contracted a subsurface investigation by CE&MT, Inc. This study found no actual faulted well in the area of study but concluded that because of changes in dip that faulting was inferred. It states that "These 'faults' are interpretive only". The study then suggests that these inferred faults may be paths of water and gas migration as CBM wells are drilled and produced in the vicinity of Gillette. The Ayers article cited in the American Association of Petroleum Geologists Bulletin, Volume 70 deals with wells in which coals are not present by faulting in well logs and where faulting is seen on the surface many miles north of Gillette. No such evidence of faults exists in the Gillette area.

Methane seeps in the Belle Fourche River have been cited as evidence that CBM causes gas to escape to the surface. The Wyoming Oil and Gas Conservation Commission investigated one report of seepage in the Belle Fourche River which is about 3 miles from the Cordeo Rojo coal mine. The WOGCC field inspector reports that gas has been seen seeping from this area for many years according to oil field pumpers in the area with RIM. There are no coalbed methane wells anywhere close to the seep. The seep is very low volume and the surface disturbance of the water is easily masked by a slight wind or breeze.

Domestic water wells are being ruined by CBM production.

The BLM monitoring wells show that there is little connection between sands above and below the coal beds. The BLM and the Wyoming State Engineer's Office monitor wells suggest that water wells in zones other than the coal will show little affect from CBM production. The BLM requires that an agreement be made with owners of all water wells permitted with the Wyoming State Engineer's Office within one-half mile of the CBM well. Operators generally provide the same agreement when drilling on fee and State lands. These agreements are voluntary. To date, the Wyoming State Engineer's office has no reports of wells

being damaged by CBM production that have not been taken care of by responsible operators.

A photograph has been shown of a water well in front of a house on an old farm on land owned by P&M Coal Company near Sheridan, Wyoming with gas and water blowing out of the well. This is an old livestock water well drilled in 1982. The water in the coal from which the well was producing had been drawn down by both the nearby coal mining just across the border in Montana and by CBM wells operated by Redstone Gas Partners. Redstone voluntarily plugged the well and checked the house for safety. Once the well was plugged, the house was declared safe. The person to whom P&M rented was not evicted.

COALBED METHANE FACTS

The members of the Petroleum Association of Wyoming would prefer that the title of this play be: "GREAT WATER, CLEAN NATURAL GAS AND A SAFE ENVIRONMENT".

Great Water

The water produced by CBM is near drinking water quality, is generally higher in quality than the shallow groundwater and even the surface water and is beneficial to livestock, wildlife and to most agricultural operations. Attached are photographs of water discharged to the Belle Fourche River and to reservoirs for livestock and wildlife use. The primary water quality issue is Sodium. While the Sodium content meets drinking water standards, the lack of Magnesium and Calcium in the CBM water to offset the Sodium may negatively affect the irrigation of crops. There is no harm to creek bottoms, to livestock or the wildlife. Most of the water is being retained on the surface for agricultural use. Some CBM water has already been injected into the City of Gillette's sandstone aquifers to recharge those zones. Gillette is considering a large-scale CBM water injection project.

Clean Natural Gas (Methane)

In May, 2001, 5,771 wells produced over 653 million cubic feet per day of coalbed methane (natural gas). It is projected that the maximum production will reach 2 billion cubic feet of natural gas per day. The ultimate reserves are expected to be 25 trillion cubic feet of natural gas. The revenues to the Federal and State Governments will be in the billions of dollars for twenty or more years. The demand for natural gas is driven by the Clean Air Act requirements. Wyoming will greatly aid in increasing the supply of natural gas to help maintain a reasonable price for home heating and electrical supply to the consumer.

Safe Environment

There are no oil liquids with this gas and no natural H_2S with the methane. The wells do not emit any volatile organic compounds to the atmosphere and the compressor engines are lean-burn natural gas fired. This is the cleanest project that the oil and gas industry has. The disturbance of the entire three and one-half county area will only be 2% of the total area on a short-term basis and about 1% on a long-term basis. An average well only disturbs about one-half an acre. The water is of high quality and discharges must meet protection for wildlife, agriculture, drinking water and groundwater uses.

CONCLUSION

The members of the Petroleum Association of Wyoming represent the majority of the CBM activity in Wyoming. The development of CBM on federal lands is controlled, regulated and orderly. The water is of

good quality and is beneficial to the surface user and to wildlife. The product is clean-burning natural gas which is beneficial to America's air quality and our citizens' health. The methane supply is immediately needed to supply electrical generation demand and to lower home heating costs. Our environment is fully protected by operator best management practice and by strict regulation. Thank you for this opportunity to make the truths of Coalbed Methane known.

ATTACHMENTS

Photographs of:

- Irrigated meadow using CBM water
- Typical CBM wellhead and Pod house
- Typical Pod house where gas is metered for each well
- A surface discharge of CBM water filling a new reservoir for livestock and wildlife
- A discharge into the Belle Fourche River showing erosion protection measures
- The Belle Fourche River below the discharge showing no surface flow in the river
- A tire-tank water trough CBM discharge used for livestock and wildlife

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