



## Public Lands Foundation

### Coalbed Methane - A Major New Energy Source and an Environmental Concern

#### EXECUTIVE SUMMARY

Coalbed methane (CBM) is methane gas that can be extracted from coal beds. Large quantities of CBM are available from coal beds beneath public lands in the western states, with most of the current development in the Powder River Basin of eastern Wyoming and Montana. CBM production is a new and major onshore source of natural gas for the Nation, but with it comes a new set of major environmental problems.

The principle environmental issue associated with the development of the Powder River Basin CBM is how to dispose of the huge quantities of low quality groundwater that are produced along with the CBM. The water has limited suitability for domestic and animal consumption; its high saline and sodium content make it unsuitable for agriculture; and it has the potential to damage wildlife habitat and surface water supplies. Alternative solutions involve releasing the water into natural stream beds, and reinjecting it back into the coal beds.

PLF strongly recommends that the CBM water be reinjected back into the coal beds. Reinjection is not only viable, but it will also mitigate or solve most of the difficult water quality and ecosystem problems that will be caused if this water remains on the surface. The quality of the existing rivers and streams in the Powder River Basin must be maintained at their pre-CBM development conditions, and not allowed to deteriorate.

#### ISSUE

The issue is how to deal with the environmental impacts of the development of a major new source of natural gas from the coal fields in the Powder River Basin of Wyoming and Montana. Coalbed methane (CBM) is methane gas extracted from coal beds. The greatest environmental concern and controversy involves the huge quantities of low grade groundwater are produced along with the coalbed methane gas. The water has limited suitability for domestic and animal consumption; its high saline and sodium content make it unsuitable for agriculture, and it has the potential to damage wildlife habitat and surface water supplies. Alternative solutions involve releasing the CBM water into natural stream beds, and reinjecting it back into the coal beds.

#### BACKGROUND

Coalbed methane is methane gas that is extracted from coal beds. In a conventional oil and gas reservoir, production is from oil and gas located above a water contact. CBM production is different. Water completely permeates the coal beds and its pressure causes the methane to be absorbed onto the grain surfaces of the coal. To produce CBM, the water must be drawn off first, lowering the pressure so that the

methane will desorb from the coal and then flow to a well bore. The same principal is involved in opening a can of soda pop.

CBM production is attractive due to several geologic and economic factors, and, of course, because of the need for energy in the United States. Coal stores six or seven times as much gas as a conventional natural gas reservoir of equal rock volume due to the large internal surface area of the coal. Much of the coal is accessible at shallow depths, making well drilling and completion relatively inexpensive. Discovery costs are also low, since CBM occurs in coal deposits, and the locations of the Nation's coal resources are well known.

During the 1995 to 2000 period, CBM production increased dramatically nationwide, spurred by a tax incentive and the shortage of U.S. produced energy, to represent a significant source of natural gas. In 2002, coal beds were providing at least 6% of the Nation's natural gas. There is so much methane in coal beds that recovering just 15% would yield enough gas to meet the entire country's natural gas needs for more than a decade.

CBM is found wherever coal is found, but this paper addresses the concerns of the Public Lands Foundation in those states where the Bureau of Land Management has public land and CBM management programs. These states are Colorado, Montana, New Mexico, Utah and Wyoming. The development of CBM in the Powder River Basin of Montana and Wyoming has become one of the most important natural gas plays in the western states, and thus will be the main focus of this paper.

In 2002, there are about 12,000 CBM wells on federal, state and private lands in Wyoming and nearly 300 CBM wells in Montana. A draft Environmental Impact Statement (EIS) issued by the BLM estimates that 39,000 new CBM wells could be drilled in Wyoming over the next 10 years. A draft EIS for the Montana portion of the PRB estimates that over the next 20 years, approximately 18,000 new CBM wells could be drilled on state and federal lands in that state.

The development of CBM in the Powder River Basin is complicated by intermingled Federal, State and private land ownerships, and by separated surface and subsurface ownerships in much of the Basin. There are over six million acres within the Powder River Basin, and the federal government owns 1.15 million surface acres and 4.3 million acres of subsurface oil and gas rights which are administered by the BLM. The various federal homestead acts and the federal Mineral Leasing Act do not give the surface owner the right to prevent development of the subsurface mineral resources, but do require the CBM developer to either obtain the surface owner's consent or post a bond to cover damages to the surface.

The intermingled land ownerships and separated surface and subsurface estates are creating an additional administrative problem for the BLM. CBM wells on private and State lands are draining CBM gas from federally-owned coalbeds on adjacent lands. This drainage is a serious problem in the Powder River Basin in Wyoming, and there is an urgent need for action by the BLM to deal with the issue of the loss of this federal resource.

## ENVIRONMENTAL CONCERNS

Environmental concerns and issues associated with the production of CBM can vary significantly from basin to basin depending on water quality, gas reserve and the topography.

Water quality and quantity: Perhaps the greatest concern and controversy associated with the CBM development of the Powder River Basin involves the large quantity of groundwater that is produced along with the CBM. For example, in December 1997, the PRB-wide average amount of water produced per CBM well was 13 gallons per minute. This amount, multiplied by the potential number of wells involved, will yield very large quantities of water.

The disposal of this large amount of water is complicated by the fact that much of the water is of low quality. The majority of the water contains high levels of dissolved sediments and a high sodium absorption ratio. Such water has limited suitability for domestic or animal consumption, and its high saline and sodium content makes it unsuitable for agriculture irrigation.

There are other problems involved with the extraction of this much groundwater, such as the impacts on domestic water wells and natural springs, and water rights and groundwater recharge issues are also involved. The main problem, however, is what to do with this surplus water. Alternatives include releasing the water into the natural streams, and reinjecting it back into the land.

The States of Wyoming and Montana, which have primacy in regulating discharge of produced water, have reached an agreement to monitor water quality in major rivers and streams, and allow no change in water quality that will impact irrigated agriculture.

Other Resource Issues: The facilities and infrastructure needed for the production and distribution of CBM will dominate the landscape and will have substantial impacts on existing surface resources and resource uses on about 1.5 million acres in the Powder River Basin. There could be a CBM well on every 20 acres, or closer, along with connecting pipelines and from 9,000 to 27,000 miles of access roads. The principal concerns are about the impacts on:

- air quality, caused by the dust from the extensive network of unpaved access roads,
- wildlife, from noise disturbances; the direct loss of critical winter range habitat; habitat fragmentation resulting from the construction of an estimated 30,000 to 85,000 miles roads, fences and pipelines and 50,000 well pads; habitat alteration such as water temperature, quality and quantity changes in stream conditions; increases in hunting pressure; and impacts on T & E species that are proposed for, or identified as candidates for, threatened and endangered designations, or species listed as sensitive by the BLM,
- livestock grazing, which would be almost totally excluded from the land,
- cultural resources; and
- agricultural land which may be lost or damaged by low quality water coming from CBM production.

Environmental Impact Analysis: The BLM's management of CBM mineral leasing activity has been based on an Environmental Impact Statement (EIS) prepared in 1986. In April, 2002, the Interior Board of Appeals (IBLA) held that this 1986 EIS did not provide an adequate assessment of the large quantities of poor quality water from CBM development. This decision is being contested in court by the CBM industry.

In 2002, the BLM Offices in both Wyoming and Montana issued separate draft EIS's on CBM activities in the Wyoming and Montana portions of the Powder River Basin. These EISs have generated controversy and litigation. The Environmental Protection Agency (EPA) found that the two draft EISs lack an adequate analysis of the water and air quality issues, and concluded that the draft EISs were inadequate and should be redone. Many local ranchers have joined forces with environmental groups to expand litigation against the CBM leasing and production activities.

The Powder River Basin is huge and badly needed onshore source of natural gas, and the BLM plans to continue to seek environmentally acceptable ways to develop this resource.

## PUBLIC LANDS FOUNDATION POSITION AND RECOMMENDATIONS

With rising natural gas prices and advances in technology, the coalbed methane in the Powder River Basin has become a valuable natural resource that should be developed to help meet the Nation's energy needs. As its value increases, so do the conflicts between those who are committed to caring for the surface of the land and those whose primary concern is to retrieve the valuable methane as quickly and cheaply as possible.

Members of the Billings Chapter of the PLF and Wyoming members have attended the field public hearings, studied issues and provided written comments to the BLM State offices on their draft EISs, and have first hand knowledge of the Powder River Basin.

The handling of groundwater water produced from CBM development is perhaps the controversial issue. Because of the risks and possible negative impacts of handling the surplus water, the PLF believes that reinjecting CBM water into the coalbeds is not only viable, but it could also mitigate or solve most of the difficult surface water problems, including degradation of water quality, possible surface ecosystem damages, and impacts on irrigation water, water rights, erosion and aquifer depletion. It is expected that a minor amount of the water produced will be potable and could be put to safe and beneficial use, but reinjection is the most direct approach to deal with the impacts of producing huge amounts of poor quality water.

Reinjection or recycling is, and has been, a recognized method for disposing of CBM-produced water. While reinjecting will add costs to the CBM industry, it must be done; and, with whatever water disposal method is ultimately followed, there must be provisions for a continuous monitoring of the impacts of the process.

The PLF believes that the quality of the existing rivers and streams in the Powder River Basin must be maintained at their pre-CBM development condition, and not allowed to deteriorate, and that drinking water sources and supplies must be

protected.

The PLF also recommends the following actions:

- Thorough biological inventories are needed for each proposed CBM field before production begins.
- Since the States of Montana and Wyoming have the authority for handling water rights issues, their schedules for General Water Discharge Permitting should not get ahead of the BLM EIS and Resource Management Plan modification schedules. BLM's oil and gas leasing program and the States' water permitting will only work if there is a high level of cooperation on a continuing basis.
- BLM and the States involved should establish permitting schedules that phase in development over time to allow the economic benefits to last longer while reducing the concentration of impacts.
- All areas disturbed during CBM production must be cleaned up and reclaimed with vegetation immediately following cessation of methane production. Bonds that cover the full cost of reclamation must be required.
- Drainage of coalbed methane gas from federal coal reserves is a serious problem in the Powder River Basin area of Wyoming, and the BLM's EIS should address the issue of this ongoing loss of a valuable federal resource.
- The protection of cultural and historic sites in the Powder River Basin that are impacted by CBM production must be considered through consultation with Indian Tribes, State historic preservation offices and the Advisory Council on Historic Preservation.
- The development of the CBM resources on the massive scale contemplated for the Powder River Basin should be monitored through regular inspections to ensure that all terms and conditions of the leases are adhered to and that the public land and resources are afforded the maximum protection possible.

Position Statement: PS 21-02