

Coal Bed Methane

Packin' Power From the Paleocene in Powder River Country

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INTRODUCTION

It hasn't been long since I first heard about coal bed methane. During the 1999 Legislative Session I was asked to prepare a single amendment exempting coal "bead" methane from certain provisions of a bill. The 2001 Montana Legislature considered 7 bills related to coal bed methane, and I drafted 15 sets of amendments. Things change. I now know how to spell "coal bed methane", and I've learned a few other things.

WHAT AND WHERE

Coal bed methane is a type of natural gas that is stored in coal beds. The gas was formed during the long process of converting buried plant material into coal and gas.

Twenty-four percent of the energy consumed in the U.S. in 2000 was natural gas.¹ Use of natural gas nationwide increased 22 percent during the last decade,² and this trend is projected to continue. Natural gas is the fastest growing energy source for electricity generation. Of the natural gas produced in the U.S., approximately 7.5 percent is now coal bed methane.³

Natural gas is a "hot"⁴ commodity, partly because of its clean reputation. Emissions of air pollutants and greenhouse gases that contribute to global warming from burning natural gas are lower than for other fossil fuels.

In Montana, the primary area of interest for production of coal bed methane is the Powder River Basin in the southeastern part of the state. Interest has also been expressed in potential coal bed methane

¹*U.S. Natural Gas Markets: Recent Trends and Prospects for the Future*, SR/OIAF/2001-02, Energy Information Administration, U.S. Department of Energy, Washington, D.C., May 2001, p. vii.

²*Ibid*, p. viii. Calculated from change in consumption between 1990 and 2000.

³"Coal-Bed Methane: Potential and Concerns," *USGS Fact Sheet FS-123-00*, U.S. Geological Survey, October 2000.

⁴This stupid pun is intended.

development in Gallatin, Park, and Blaine Counties.

The Powder River Basin is one of the major regions producing coal bed methane in the U.S. The estimated quantity of recoverable coal bed methane reserves in the basin is 25 trillion cubic feet.⁵ This is a little more than the nation's total consumption for 1 year.

Outside of Montana and Wyoming, major areas of coal bed methane production are the Uinta Basin in Utah, the San Juan Basin in New Mexico and Colorado, and the Black Warrior Basin in Alabama.

COAL BED METHANE DEVELOPMENT IN MONTANA

Interest in production of coal bed methane in the Powder River Basin of Montana and Wyoming has increased dramatically as a result of improved technology and the increase in demand for natural gas.

The Montana Board of Oil and Gas Conservation has issued current permits for 314 coal bed methane wells. This figure includes dry holes and plugged test wells. Of these, 239 wells are producing or shut-in (capable of producing).⁶

In June 2000, the Board signed a stipulation and settlement agreement with the Northern Plains Resource Council, Inc. The two parties agreed to a moratorium on the issuance of new permits pending completion of a statewide programmatic supplemental environmental impact statement (EIS). The settlement agreement allows the Board to permit up to 200 new test wells statewide, subject to certain conditions. The Board has authority over drilling for coal bed methane only on private and state lands.

The federal Bureau of Land Management, the Montana Department of Environmental Quality, and the Montana Board of Oil and Gas Conservation are jointly preparing an EIS to analyze the impacts of proposed oil and gas development, including coal bed methane development. The agencies solicited public comment on the scope of the environmental review in January 2001. More than 300 sets of comments were received. A draft EIS is expected to be available in October 2001.

WHAT'S ALL THE FUSS?

Methane is a very simple chemical compound, composed of one carbon atom and four hydrogen atoms. In contrast, the issues surrounding coal bed methane are multifaceted and far more complex than can be covered in a short "Back Page" article. The following tidbits help to illustrate the complexity of the issue:

⁵Rodney H. De Bruin, Robert M. Lyman, Richard W. Jones, and Lance W. Cook, "Coalbed Methane in Wyoming," *Information Pamphlet 7 (revised)*, Wyoming State Geological Survey, Laramie, Wyoming, 2001, Table 2.

⁶Montana Board of Oil and Gas Conservation database, July 31, 2001.

- ? According to the U.S. Environmental Protection Agency, methane is a greenhouse gas that is 21 times as potent as carbon dioxide and avoiding the release of methane to the atmosphere can contribute substantially to protection of the global environment. Consequently, the agency has established the Coalbed Methane Outreach Program to promote profitable recovery and use of coal mine methane.⁷ However, burning methane (rather than releasing it directly to the atmosphere) adds considerably less carbon dioxide to the atmosphere than does the burning of coal, and production of methane from coal prior to mining reduces the amount of methane released to the atmosphere during the mining process.⁸
- ? The owner of the mineral rights for gas may benefit substantially from royalty payments. However, the surface owner may not own the mineral rights. Surface owners are entitled to compensation for damages to their property due to coal bed methane extraction.
- ? Concerns have been raised that severe erosion may result if large amounts of water are discharged from coal bed methane wells. However, industry officials have credited reservoirs used for storage of water from coal bed methane wells with mitigation of flood damage in the Gillette area in May 2001.

In a nutshell, there are benefits and costs and different ways of doing things. Although it is dangerous and difficult to simplify, some of the potential effects are highlighted below.

A study of the economic and social impacts of proposed development in the Powder River Basin of Montana was recently conducted by Anderson ZurMuehlen & Co. for the Montana Coalbed Natural Gas Alliance. Estimated economic benefits over the anticipated life of the project (22 years) totaled \$4.1 billion. The benefits estimated include wages, employee benefit payments, purchases of goods and services, royalties, and taxes.⁹

When the conversation turns to coal bed methane, water is a major theme. Forty percent of the comments received during the initial public involvement process for the EIS addressed water-related topics including ground water quality and quantity, surface water quality and availability, waste water disposal and discharge, water conservation, and water rights.

Coal bed methane production requires withdrawal of ground water in order to lower the pressure in the coal bed so methane can flow out of the coal. The water produced is usually saline. Once the water is withdrawn, it must be disposed of in some way. Potential discharge methods include discharging the

⁷*Coalbed Methane Outreach Program*, EPA-430-F-99-008, U.S. Environmental Protection Agency, July 1999.

⁸U.S. Geological Survey.

⁹*Coalbed Methane Development, Powder River Basin of Montana: Economic and Social Impacts of Proposed Development*, Anderson ZurMuehlen & Co., P.C., June 1, 2001, p. 20.

water onto the land surface or into surface water, storage in evaporation ponds, use for stock or wildlife ponds, infiltration, treatment for various uses, and reinjection back into the aquifer.

Some Montanans have expressed concerns about possible impacts on water quality when water from coal bed methane wells is discharged into rivers or streams. The quality of water produced in association with coal bed methane wells, as well as the impact of any water discharged, will vary from location to location. In general, water produced directly from coal bed methane wells in Montana may be suitable for consumption by humans or livestock, but unusable for irrigation due to the elevated salinity and sodium adsorption ratio or SAR. Clay soils are more susceptible to adverse effects from water with a high sodium adsorption ratio. It should be noted that when water from coal bed methane wells is discharged into streams or rivers, it is mixed with the receiving waters.

The bulk of the coal bed methane production occurs in Wyoming, while Montana is positioned downstream. Officials from each state's environmental quality department have been working on an agreement for monitoring water quality to identify impacts from coal bed methane development in Montana. A tentative agreement has been reached for the Powder and Little Powder Rivers. The group also intends to address the Tongue River.

Water is scarce in southeastern Montana, and there are also concerns about water quantity and availability. The Montana Department of Natural Resources and Conservation noted that coal aquifers are often the only practical source of fresh water for domestic, stock, and agricultural uses in the Powder River Basin.¹⁰ Coal bed methane development can provide benefits by making water available for stock ponds, wildlife ponds, and other uses.

Legislation approved by the 2001 Montana Legislature and signed by the Governor requires developers of coal bed methane wells to offer mitigation agreements to water right holders for ground water within 1 mile of coal bed methane wells or within one-half mile of wells that are adversely affected by coal bed methane wells. The agreement must provide for prompt supplementation or replacement of affected water resources.

A few of the other topics that Montanans have raised questions and concerns about include air quality, cultural resources, and property.

THE MONTANA LEGISLATURE

The 2001 Montana Legislature considered seven pieces of legislation related to coal bed methane production. Four bills and a joint resolution were approved by the Legislature and signed by Governor

¹⁰"In the Matter of the Designation of the Powder River Basin Controlled Groundwater Area," *Final Order*, Montana Department of Natural Resources and Conservation, December 15, 1999.

Martz.¹¹

Wyoming legislative leaders invited their Montana counterparts to join them for a tour of coal bed methane facilities in May 2001. Representatives Bales, Branae, and Olson; Senators Beck, Cole, Pease, and Roush; and Lieutenant Governor Ohs traveled to Sheridan, Wyoming, to visit a variety of facilities and witness the various stages of coal bed methane production firsthand.

The Environmental Quality Council (EQC) has appointed a Subcommittee to address water policy and coal bed methane issues. EQC members are promptly diving into the topic; following the September 10, 2001, EQC meeting in Colstrip, members will tour energy and coal bed methane facilities.

House Joint Resolution No. 27 requested that the EQC provide oversight of the state's involvement in the preparation of the EIS. The Subcommittee will take on this responsibility and will adopt a work plan that details other activities in September 2001.

FOR MORE INFORMATION

The information in this article represents only the tip of the coal seam. There are plenty of opportunities to learn more about coal bed methane development.

General Information and Links

Montana Department of Environmental Quality website :
< <http://www.deq.mt.gov/coalbedmethane/index.asp>>

This website includes a wide variety of information about topics, including the status of coal bed methane in Montana, the EIS, environmental and economic issues, laws, regulations, permits, coal bed methane in Wyoming, press releases, public notices, news clippings, contact information, and links.

EQC Interim Activities and Legislation

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¹¹A summary is available on the EQC's Coal Bed Methane & Water Policy Subcommittee website: <<http://leg.mt.gov/services/lepo/subcommittees/wpsub.htm>>. Look under "Staff Reports".

Environmental Impact Statement

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