



Coalbed Methane

The Role of the Montana Bureau of Mines and Geology

LANDOWNERS
AND THE MBMG
HAVE A LONG HISTORY
OF WORKING TOGETHER
IN SOUTHEASTERN
MONTANA

Information Pamphlet 7

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SPECIAL POINTS OF INTEREST:

- Introduction to coalbed methane
- The role of the Montana Bureau of Mines and Geology
- Current CBM production in Montana
- Coproduced water management
- Resources available to the public

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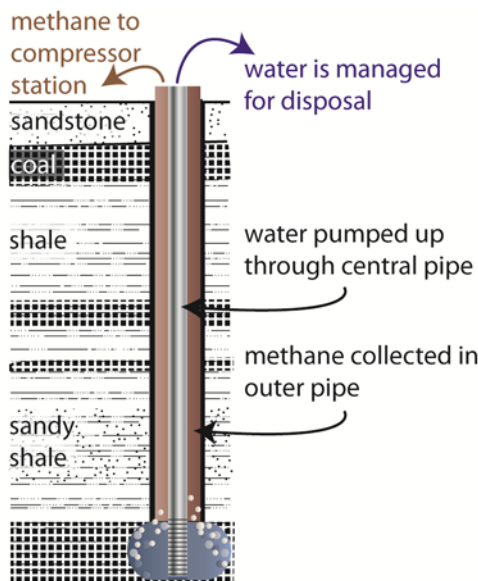
Coalbed methane [CBM; also known as coalbed natural gas (CBNG)] is naturally occurring methane gas that is found in many coalbeds in Montana. Methane is a byproduct of bacteria consuming organic matter in the coal.

The majority of Montana's CBM development is occurring in the Powder River Basin of southeastern Montana. Much more intensive development is occurring across the state line in Wyoming.

Methane in the coal is held in place on the coal fractures by the hydrostatic pressure of water in the coal.



Water-quality sampling in the Big Sky.



Schematic of a coalbed methane well

Extracting methane from the coal requires the installation of wells that withdraw the coal aquifer groundwater through a central pipe. Lowering the hydrostatic pressure releases the methane, which can then be collected in an outer pipe and brought to the ground surface.

Within the first year of production, some wells can produce water in excess of 20 gallons per minute, but after approximately 5 years average CBM wells pump water at 4 gallons per minute. The current lifetime of a CBM well is around 10 years.

Groundwater is a valued resource in semi-arid southeastern Montana, and coal aquifers are often the primary source of groundwater for domestic and stock uses.

The Role of the Montana Bureau of Mines and Geology

In order to support scientifically sound resource management decisions, the Montana Bureau of Mines and Geology (MBMG) collects, analyzes, and publishes groundwater monitoring information and observations in areas of CBM development.

To monitor for changes in groundwater availability and quality, the MBMG has a network of monitoring wells, springs, and streams that are evaluated monthly or quarterly. There are over 200 monitoring wells in the network that are completed in shallow and deep aquifers, including coal aquifers that are being developed for CBM.

New wells are added as needed to monitor groundwater impacted by CBM development in Montana and Wyoming.

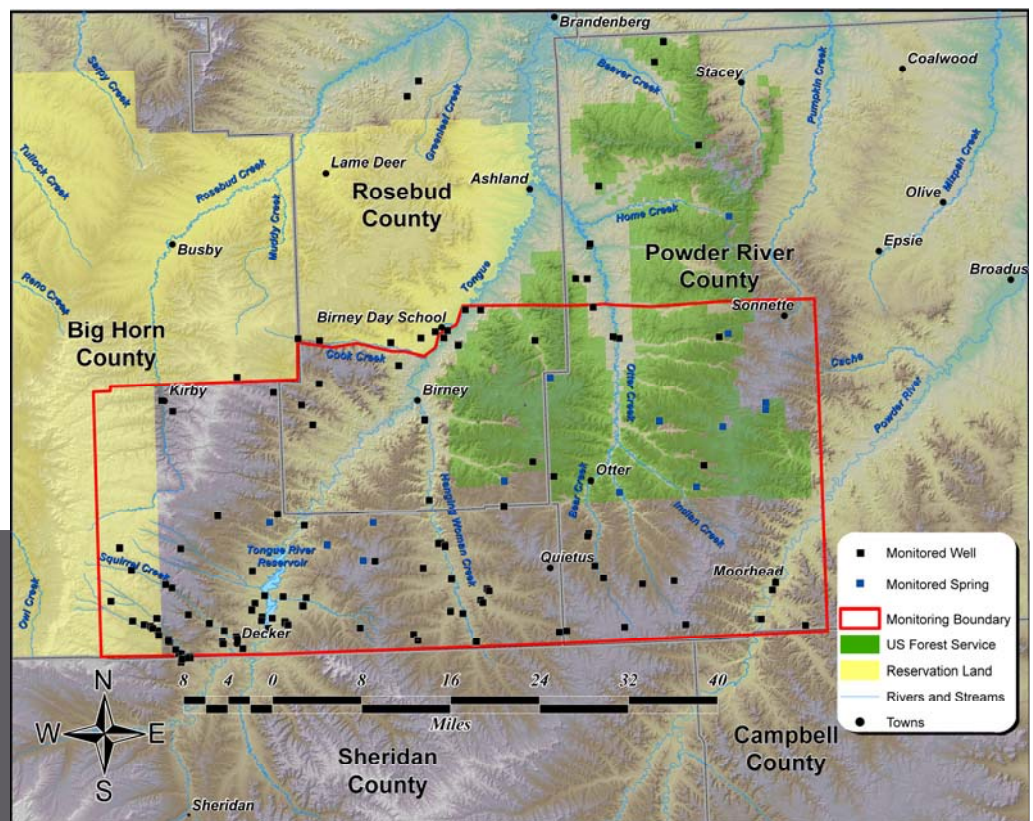
The annual report of CBM monitoring is available free of charge on the MBMG Publications website (www.mbmgs.mtech.edu/). This report provides data and interpretations for use in environmental and permitting decisions.

The report includes:

- a description of current groundwater conditions associated with CBM development in the Powder River Basin
- a discussion of groundwater quality in alluvial systems near CBM development

- current public information related to CBM development in Montana, including total number of wells, amount of water produced, and amount of gas produced
- incorporated CBM industry monitoring results
- a description of baseline hydrogeologic conditions in areas of potential CBM development

All water-level and water-quality data are publicly available on the MBMG Ground Water Information Center (<http://mbmgs.mtech.edu/>).



2010 coalbed methane monitoring area in the Powder River Basin of southeastern Montana

CBM Production in Montana

- 824 CBM wells in southeastern Montana produced gas, water, or both during 2010.
- The majority of Montana's CBM wells are located in the area around the Tongue River Reservoir.
- In 2010, Montana CBM wells produced 10 million Mcf of gas and 4,000 acre-feet of water.
- Yearly records are available in the MBMG's annual report of CBM monitoring available online: <http://www.mbm.mtech.edu>

Coproduced Water Management

Coproduced water can have high salinity and high sodium concentrations, which make it undesirable for some uses without treatment. The potential for adversely affecting soil and water chemistry means water brought to the surface during CBM production warrants careful management.

Water management methods include:

- Direct discharge to existing drainages (with¹ and without² treatment)
- Impoundment in man-made ponds
 - Lined for evaporation¹
 - Unlined for evaporation, infiltration, and stock water³
 - Addition of sprayers (atomizers) to speed evaporation²
- Applied to the soil surface for irrigation³
- Discharged through subsurface drip lines for irrigation³
- Sprayed for dust control at local coal mines¹

¹Methods used in Montana

²Methods no longer in use in Montana as of 2010

³Methods used in Wyoming and elsewhere, but not currently in Montana



Top to bottom: lined impoundment, atomizers, Tongue River

Available Resources

CBM Protection Act

The Coalbed Methane Protection Act was established by the 2001 Legislature for the purpose of “compensating private landowners and water right holders for damage to land and to water quality and availability that is attributable to the development of coalbed methane wells.”

Conservation Districts whose water sources could be affected by CBM extraction and/or whose boundaries contain coalbeds are given administrative authority over the awarding and amount of funds used for landowner compensation.

For more information, contact your local Conservation District or <http://dnrc.mt.gov/cardd/CBM/default.asp>

MBMG Website

Provides contact information for MBMG employees, details for current and past research projects, and links to the GWIC (Ground Water Information Center) database and the MBMG publication catalog.

<http://www.mbmgt.mtech.edu>

MBMG CBM Annual Report

Available from the MBMG Publication website:

www.mbmgt.mtech.edu/mbmgcat/catMain.asp

- Search for “CoalBed Methane” under the keyword field.
- PDF version is free for download. Must have Adobe Reader installed to view.

GWIC

The GWIC (Ground Water Information Center) database gives the public the resources to research well and spring ownership, well productivity, and groundwater chemistry.

- To start your research, register a user name by clicking on “create one here” just above the sign in area.

<http://mbmggwic.mtech.edu>

Wyoming Oil and Gas Conservation Commission

For information regarding coalbed methane production and coproduced water in Wyoming’s Powder River Basin.

<http://wogcc.state.wy.us>

Additional Information

Meredith, E., Kuzara, S., Wheaton, J., Bierbach, S., Chandler, K., Donato, T., Gunderson, J., and Schwartz, C., 2010, Annual coalbed methane regional groundwater monitoring report: Powder River Basin, Montana: Montana Bureau of Mines and Geology Open-File Report 600.

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Drilling monitoring wells in southeastern Montana.

Acknowledgments

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