

**2004 Annual Report
Powder River Basin Controlled Groundwater Area
Technical Advisory Committee**

Introduction

The Powder River Basin Controlled Groundwater Area (PRBCGA) was established to protect existing water users from impacts resulting from coal bed methane (CBM) development. The Montana Board of Oil and Gas Conservation (MBOGC) implement the PRBCGA through regulations that require characterization, monitoring, and evaluation of ground water conditions, and mitigation of impacts to existing water users.

A technical advisory committee (TAC) was established to oversee the ground-water characterization, monitoring, and evaluation requirements of the PRBCGA. TAC consists of five members selected by DNRC for their expertise in the Powder River Basin coal region, ground-water hydrology, and/or the CBM industry. In addition to overseeing monitoring and reporting requirements for individual fields, TAC is assigned to review ground-water data and scientific evidence related to the PRBCGA and make recommendations to the MBOGC regarding mitigation of impacts.

The purpose of this report is to describe the activities of TAC during 2004 and the impacts of CBM development on ground-water resources during 2003.

Summary of TAC Meetings

The TAC met on May 18, 2004 to discuss the CX Field 2003 Annual Groundwater Monitoring Report, to hear an update on pending CBM projects by Tom Richmond of the Montana Board of Oil and Gas Conservation, and to hear an update on by John Wheaton of the Montana Bureau of Mines and Geology (MBMG) on regional monitoring of CBM effects. In addition, Ray Muggli and Michele Reinhart of the Northern Plains Resource Council presented low-elevation aerial photographs of the Tongue River Reservoir and CBM impoundments for consideration by the TAC. TAC members present included Wayne Van Voast of MBMG, Michael Bergstrom of Fidelity Exploration and Production Company, Peter Bierbach of the U.S. Bureau of Land Management, Angela McDannel of the Montana Department of Environmental Quality, Mike Cannon of the U.S. Geological Survey, and Russell Levens of the Montana Department of Natural Resources and Conservation.

Photographs of the Tongue River Reservoir presented by Ray Muggli show open areas in the reservoir ice and clear water in pictures taken after the ice melted, indicating methane is emanating from the bed of the reservoir. In addition, photographs showed sprinkler systems used to distribute CBM produced water and CBM impoundments with signs of seepage indicating that CBM produced water is leaking to shallow sediments and surface drainages. The primary concern of Ray Muggli is that seepage of water into the reservoir accompanying the methane emanation and leakage from CBM impoundments will increase the salinity and Na concentration in water used for irrigation from the Tongue River.

The TAC discussed the possible origin of gas emanating from the reservoir. Depressurization of coal aquifers by CMB development and coal mining could cause or increase the rate of this

phenomenon. However, it is unclear whether this is a recent phenomenon or whether it has occurred in the past. In addition, there is disagreement whether an increase in water discharge would accompany the gas emanation. Discussion of the photographs showing sprinkler systems and seepage from CBM impoundments focused on the locations of the ponds and the fate of the seepage.

Tom Richmond presented a list of all permitted CBM drilling activity in Montana. Pending projects include expansion of the CX Field by Fidelity Exploration and Production Company, and new projects by Yates Petroleum Corporation and Powder River Gas, LLC. Michael Bergstrom described the proposed expansion of the CX Field including a plan to include treatment of produced water.

John Wheaton presented maps showing current and planned regional monitoring efforts. Approximately, 25 monitoring wells have been installed near coal outcrops as outlined in the regional-scale monitoring plan drafted by the TAC. In addition, MBMG plans to install monitoring wells along the Wyoming border during 2004. The TAC also discussed ongoing efforts by the Interagency Hydrology Task Group to develop an integrated regional monitoring plan for Montana and Wyoming portions of the Powder River Basin.

Michael Bergstrom of Fidelity Exploration and Production Company provided an overview of new development and monitoring conducted in the CX Field during 2003. In addition, the TAC discussed locations of wells to be used to monitor impacts of the proposed expansion of the CX Field. Michael Bergstrom commented on the difficulties caused by shutting in numerous wells to measure pressures, and problems with obtaining accurate head measurements. The TAC agreed the number of wells shut-in within the interior of the field could be reduced in favor of more emphasis on monitoring drawdown near the margins of the field.

2003 CBM Development

The CX Field operated by Fidelity Exploration & Production Company near Decker Montana was the only CBM field producing in Montana during 2003. The 2003 Annual Groundwater Monitoring report for the CX Field was submitted to the MBOGC March 31, 2004. Fidelity's report contains information on development and monitoring activities, coal bed hydrogeology, ground-water conditions, and proposed changes to their monitoring plan. The report includes a list of wells and springs included in Fidelity's inventory at the end of 2003, structural contour maps for the Dietz, Carney, and Monarch coals based on the latest drilling information, potentiometric surface and drawdown maps, and lists of cumulative water production by well. Table 1 is a summary of volumes of produced water reported for the three coal beds developed at the CX Field and Figure 1 shows the limit of drawdowns observed in the Dietz and Monarch coals. Monitoring data are insufficient to estimate the extent of drawdown in the Carney coal.

MBMG monitors ground-water levels and chemistry in dedicated monitoring wells installed beginning in the 1970s to investigate potential impacts of proposed coal mines (see Figure 2 for distribution of monitoring wells installed through 2003). Monitoring wells installed during 2003 and those planned for 2004 are located according to the regional monitoring plan developed by the TAC. These wells are located in coal zones near their outcrops, in areas where water from coal beds is heavily used, and along the Wyoming border.

Table 1. Summary of water produced from CBM production wells.

Field	Coal Seam	# Wells	Total Water Production	
			Barrels	Gallons
CX	Dietz 2000	62	9,334,416	392,045,472
	Dietz 2001	85	18,089,198	759,746,316
	Dietz 2002	91	7,314,850	307,223,688
	Dietz 2003	133	4,496,207	188,840,693
	Monarch 2000	53	5,235,357	219,884,994
	Monarch 2001	75	10,237,672	429,982,224
	Monarch 2002	77	4,152,860	174,420,133
	Monarch 2003	89	2,998,966	125,956,551
	Carney 2000	48	5,599,865	235,194,330
	Carney 2001	74	10,371,528	435,604,176
	Carney 2002	75	4,831,076	202,905,178
	Carney 2003	86	3,920,378	164,655,878
Totals	2000	165	20,169,638	847,124,796
	2001	236	38,756,615	1,627,777,830
	2002	244	16,299,771	684,590,369
	2003	308	11,415,551	479,453,122

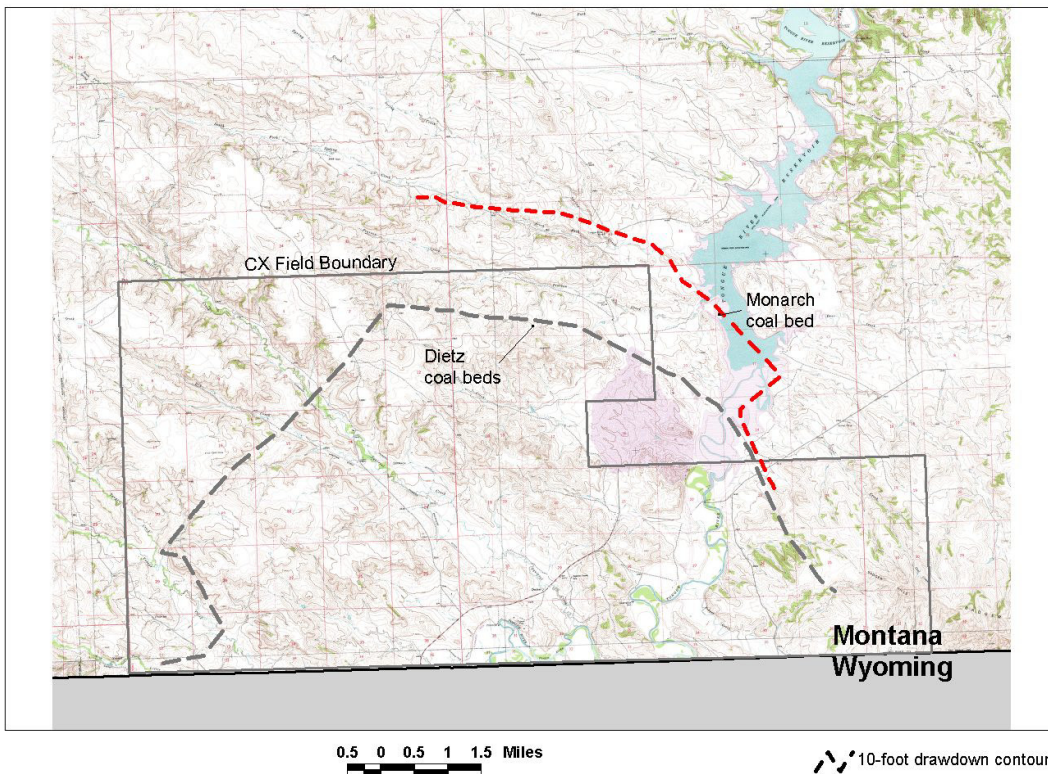


Figure 1. Map of 10-foot water level drawdown contours for Dietz and Monarch coal beds.

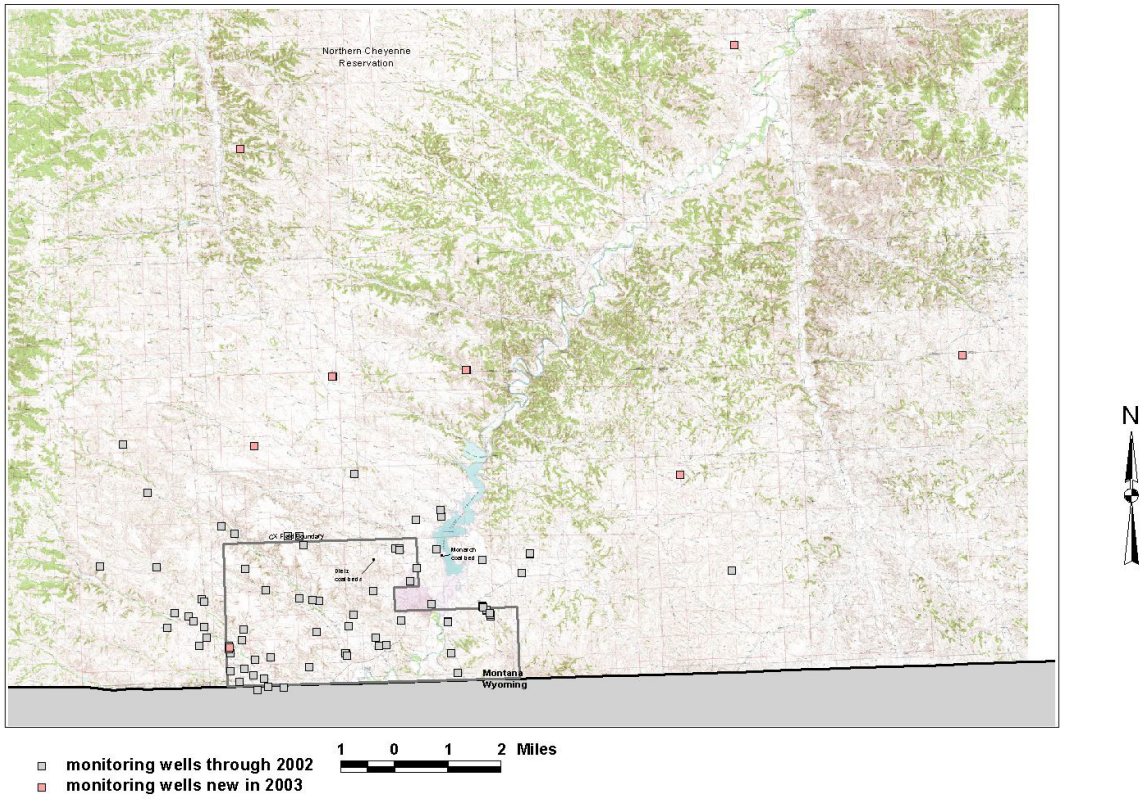


Figure 2. Locations of wells monitored by MBMG in the PRBCGA.