

**2007 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) implements 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 hydrogeology, water quality, and CBM extraction systems and operations. 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 2007 and the impacts of CBM development on ground-water resources during 2006.

**Summary of TAC Annual Meeting**

The TAC met on April 10, 2007 to discuss progress of regional monitoring by the Montana Bureau of Mines and Geology, current and prospective CBM activity, and discuss 2006 Ground-Water Monitoring reports by Fidelity Exploration and Production Company and, Pinnacle Gas Resources, Inc. Attending the meeting were TAC members Peter Bierbach, John Wheaton, John Kilpatrick, Angela McDannel and Russell Levens. Also attending were, Andy Bobst of the U.S. Bureau of Land Management, Tom Richmond of the Montana Board of Oil and Gas Conservation, Keith Kerbel, Tim Lewis, and Christine Smith of the DNRC regional office, Terry Webster and Mike Trout of Pinnacle Gas Resources, Inc., Boe Gregson and David Demmer of Western Land Services, representing Pinnacle Gas Resources, Inc., Al Hilty, Lana Wilson, and Heidi Kaiser of Hydrometrics, representing Fidelity Exploration and Production Company, and Marian Lyman of the Northern Plains Resource Council.

Tom Richmond described the current and prospective CBM activity by Pinnacle and Fidelity in the Montana portion of the Powder River Basin. The Decker Mine East POD submitted by Fidelity was approved by MBOGC during 2006. He discussed injection plans by Pinnacle and the Tongue River Infiltration Project by Fidelity. John Wheaton described progress of the regional monitoring well network and discussed regional monitoring data. Data and interpretations through 2006 are presented in MBMG Open-File Report 556 (Wheaton et al, 2007). John discussed monitoring locations and frequency and coordination of the annual report with Wyoming. In addition, John discussed sandstone isopach maps prepared by David Lopez.

Al Hilty and Lana Wilson described activities on Fidelity leases near Decker during 2006. Fidelity increased the density of producing wells in the Coal Creek and Deer Creek North PODs and brought four new batteries into production during 2006. In addition to

discussion of the Fidelity monitoring data, TAC members had questions regarding monitoring data collected from private wells covered under well mitigation agreements. Questions were related to what data are collected, whether data are provided to land owners, and whether data can be provided to the TAC in the future. These questions were not resolved.

Terry Webster and Mike Trout of Pinnacle Gas Resources, Inc. and Boe Gregson and David Demmer of Western Land Services discussed groundwater monitoring and evaluation plans for Pinnacle’s Coal Creek and Dietz fields.

**Additional TAC Meetings**

In addition to the annual meeting, the TAC met on October 16, 2007 and November 28, 2007 to consider whether to recommend the Montana Board of Oil and Gas revise monitoring requirements for coalbed methane projects.

**CBM Water Production**

The CX Field operated by Fidelity Exploration & Production Company near Decker Montana and the Coal Creek and Dietz fields operated by Pinnacle Oil and Gas Inc. were in production in Montana during 2006. The 2006 Annual Groundwater Monitoring report for the CX Field was submitted to the MBOGC in February 2007. 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 2007, structural contour maps for the Dietz, Carney, and Monarch coals based on the latest drilling information, potentiometric surface and drawdown maps, hydrographs and lists of cumulative water production by well. Total water production from all CBM wells through September 2006 is listed in Table 1. Volumes of produced water reported for the CX Field by Fidelity is summarized in Table 2 and for Coal Creek and Dietz fields by Pinnacle is summarized in Table 3.

MBMG monitors ground-water levels and chemistry in dedicated monitoring wells installed beginning in the 1970s to investigate potential impacts of proposed coal mines. Monitoring wells installed during 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. Locations of regional monitoring wells, and data and interpretations from monitoring conducted through 2006 can be found in Wheaton et al (2007).

Table 1. Total water produced from CBM production wells through September 2006.

Field	Coal Seam	# Wells	Total Water Production	
			Barrels	Gallons
All	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	327	11,415,551	479,453,122
	2004	423	15,426,082	647,895,458
	2005	529	19,426,428	815,909,976
	2006	808	21,317,810	895,348,020

Table 2. Summary of water produced from CBM production wells by Fidelity through September 2006.

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	
	Dietz 2004	159	7,038,114	295,600,799	
	Dietz 2005	249	7,261,177	304,969,428	
	Dietz 2006	359	8,260,961	346,960,362	
	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	
	Monarch 2004	90	3,943,355	165,620,897	
	Monarch 2005	123	4,287,534	180,076,414	
	Monarch 2006	217	4,662,714	195,833,988	
	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	
	Carney 2004	107	4,408,829	185,170,811	
	Carney 2005	132	5,822,537	244,546,545	
	Carney 2006	159	5,495,980	230,831,160	
	Roberts 2004	2	6,844	287,448	
	Roberts 2005	2	94,229	3,957,597	
	King 2004	2	28,938	1,215,396	
	King 2005	2	260,164	10,926,896	
	Wall 2005	4	22,526	946,094	
	Wall 2006	14	65,894	2,767,548	
Monarch, Carney 2004	1	13,660	573,720		
Monarch, Carney 2005	1	12,323	517,566		
Monarch, Carney 2006	1	8,425	353,850		
Dietz, Carney, Wall 2006	1	11,088	465,696		
Carney, Wall, Carlson 2006	1	31,149	1,308,258		
<b>Totals</b>	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	327	11,415,551	479,453,122	
	2004	423	15,426,082	647,895,458	
	2005	516	17,760,489	745,940,538	
	2006	752	18,536,211	778,520,862	

Table 3. Summary of water produced from CBM production wells by Pinnacle through September 2006.

<b>Coal Creek</b>	Wall 2005	9	1,418,193	59,564,106
	Flowers-Goodale 2005	2	247,185	10,381,770
	Wall 2006	23	2,327,275	97,745,550
	Flowers-Goodale 2006	7	325,740	13,681,080
<b>Dietz</b>	Wall 2005	1	426	17,892
	Cook 2005	1	135	5,670
	Wall 2006	6	19,072	801,024
	Cook 2006	4	25,516	1,071,672
	Canyon 2006	2	29,792	1,251,264
	Canyon, Cook 2006	8	23,935	1,005,270
	Cook, Wall 2006	5	12,939	543,438
	Monarch 2006	1	17,330	727,860
<b>Totals</b>	2005	13	1,665,939	69,969,438
	2006	56	2,781,599	116,827,158

**References**

Wheaton, J, S. Reddish-Kuzara, T. Donato, and L. Hammer, 2007. 2006 Annual coalbed methane regional ground-water monitoring report: Northern portion of the Powder River Basin, Montana Bureau of Mines and Geology, Open-File Report 556, 65 pp.