

APPENDIX E

CBNG WELLS CAPABLE OF PRODUCTION
ON OR IN SECTIONS ADJACENT TO THE
WEST ANTELOPE II LBA TRACT

Coal Bed Natural Gas Wells Capable of Production

Antelope Mine

West Antelope II Coal Lease By Application Area (T.40N. R.71W., T.41N. R.71W.)

API	Company	Well Number	TWP	RNG	Section	Status
536267	LANCE OIL & GAS COMPANY INC	No. 31-7-4171	41N	71W	7	PG
536268	LANCE OIL & GAS COMPANY INC	No. 23-6-4171	41N	71W	6	PG
536269	LANCE OIL & GAS COMPANY INC	No. 21-6-4171	41N	71W	6	PG
536271	LANCE OIL & GAS COMPANY INC	No. 14-6-4171	41N	71W	6	PG
536272	LANCE OIL & GAS COMPANY INC	No. 12-6-4171	41N	71W	6	PG
537933	LANCE OIL & GAS COMPANY INC	No. 23-15-4171	41N	71W	15	PG
541468	BILL BARRETT CORPORATION	No. 43-2-4171	41N	71W	2	PG
541470	BILL BARRETT CORPORATION	No. 32-2-4171	41N	71W	2	PG
541471	BILL BARRETT CORPORATION	No. 34-2-4171	41N	71W	2	PG
541473	BILL BARRETT CORPORATION	No. 41-11-4171	41N	71W	11	PG
541474	BILL BARRETT CORPORATION	No. 32-11-4171	41N	71W	11	PG
541475	BILL BARRETT CORPORATION	No. 12-11-4171	41N	71W	11	PG
542928	COLEMAN OIL & GAS INC	No. 21-19	41N	71W	19	PG
545382	COLEMAN OIL & GAS INC	No. 5-19 LW	41N	71W	19	PG
545385	COLEMAN OIL & GAS INC	No. 23-19	41N	71W	19	PG
545387	COLEMAN OIL & GAS INC	No. 12-30	41N	71W	30	PG
545389	COLEMAN OIL & GAS INC	No. 21-30	41N	71W	30	PS
545391	COLEMAN OIL & GAS INC	No. 32-30	41N	71W	30	PG
549076	COLEMAN OIL & GAS INC	No. 43-19	41N	71W	19	PG
549078	COLEMAN OIL & GAS INC	No. 41-19	41N	71W	19	PG
549080	COLEMAN OIL & GAS INC	No. 34-19	41N	71W	19	PG
549091	COLEMAN OIL & GAS INC	No. 12-7	41N	71W	7	PG

Well Data Obtained from WOGCC, April 2007.

Status Codes: AP = Active Permit; FL = Flowing; PG = Producing Gas; PS = Pumping Submersible; SI = Shut-in; SP = Well Spudded; WP = Waiting on Approval.

Coal Bed Natural Gas Wells (Continued)						
API	Company	Well Name	TWP	RNG	Section	Status
549092	COLEMAN OIL & GAS INC	No. 14-7	41N	71W	7	PG
549094	COLEMAN OIL & GAS INC	No. 23-7	41N	71W	7	PG
549095	COLEMAN OIL & GAS INC	No. 32-18	41N	71W	18	PG
549096	COLEMAN OIL & GAS INC	No. 34-18	41N	71W	18	PG
549097	COLEMAN OIL & GAS INC	No. 41-18	41N	71W	18	PG
549098	COLEMAN OIL & GAS INC	No. 43-18	41N	71W	18	PG
549099	COLEMAN OIL & GAS INC	No. 32-19	41N	71W	19	PG
549250	COLEMAN OIL & GAS INC	No. 21-5	41N	71W	5	PG
549251	COLEMAN OIL & GAS INC	No. 12-5	41N	71W	5	PG
549252	COLEMAN OIL & GAS INC	No. 41-17	41N	71W	17	PG
549253	COLEMAN OIL & GAS INC	No. 32-17	41N	71W	17	PG
549254	COLEMAN OIL & GAS INC	No. 41-8	41N	71W	8	PG
549255	COLEMAN OIL & GAS INC	No. 32-8	41N	71W	8	PS
549256	COLEMAN OIL & GAS INC	No. 23-8	41N	71W	8	PG
549257	COLEMAN OIL & GAS INC	No. 21-8	41N	71W	8	PG
549258	COLEMAN OIL & GAS INC	No. 14-8	41N	71W	8	PS
549259	COLEMAN OIL & GAS INC	No. 12-8	41N	71W	8	PS
549260	COLEMAN OIL & GAS INC	No. 23-5	41N	71W	5	PG
549261	COLEMAN OIL & GAS INC	No. 14-5	41N	71W	5	PG
549275	REDSTONE RESOURCES INC	No. 14LW-511	41N	71W	5	WP
549600	COLEMAN OIL & GAS INC	No. 3-19P	41N	71W	19	SI
549740	LANCE OIL & GAS COMPANY INC	No. 12-15-4171	41N	71W	15	PG
549741	LANCE OIL & GAS COMPANY INC	No. 14-15-4171	41N	71W	15	PG
549742	LANCE OIL & GAS COMPANY INC	No. 34-15-4171	41N	71W	15	PG
549743	LANCE OIL & GAS COMPANY INC	No. 32-22-4171	41N	71W	22	PG
549744	LANCE OIL & GAS COMPANY INC	No. 41-22-4171	41N	71W	22	PG
550552	LANCE OIL & GAS COMPANY INC	No. 12-14-4171	41N	71W	14	PG
550708	LANCE OIL & GAS COMPANY INC	No. 43-16-4171	41N	71W	16	PG
550709	LANCE OIL & GAS COMPANY INC	No. 14-16-4171	41N	71W	16	PG
550710	LANCE OIL & GAS COMPANY INC	No. 12-16-4171	41N	71W	16	PG

Coal Bed Natural Gas Wells (Continued)						
API	Company	Well Name	TWP	RNG	Section	Status
550711	LANCE OIL & GAS COMPANY INC	No. 23-16-4171	41N	71W	16	PG
550712	LANCE OIL & GAS COMPANY INC	No. 32-16-4171	41N	71W	16	PG
550714	LANCE OIL & GAS COMPANY INC	No. 34-16-4171	41N	71W	16	PG
550716	LANCE OIL & GAS COMPANY INC	No. 41-16-4171	41N	71W	16	PG
550781	LANCE OIL & GAS COMPANY INC	No. 21-16-4171	41N	71W	16	PG
550926	LANCE OIL & GAS COMPANY INC	No. 14-4-4171	41N	71W	4	PS
550927	LANCE OIL & GAS COMPANY INC	No. 23-4-4171	41N	71W	4	PS
550928	LANCE OIL & GAS COMPANY INC	No. 34-4-4171	41N	71W	4	PS
550929	LANCE OIL & GAS COMPANY INC	No. 43-4-4171	41N	71W	4	PS
550930	LANCE OIL & GAS COMPANY INC	No. 32-5-4171	41N	71W	5	PG
550931	LANCE OIL & GAS COMPANY INC	No. 34-5-4171	41N	71W	5	PS
550932	LANCE OIL & GAS COMPANY INC	No. 41-5-4171	41N	71W	5	PS
550933	LANCE OIL & GAS COMPANY INC	No. 43-5-4171	41N	71W	5	PS
550934	LANCE OIL & GAS COMPANY INC	No. 12-9-4171	41N	71W	9	PS
550935	LANCE OIL & GAS COMPANY INC	No. 43-9-4171	41N	71W	9	PS
550936	LANCE OIL & GAS COMPANY INC	No. 12-10-4171	41N	71W	10	PS
550943	LANCE OIL & GAS COMPANY INC	No. 21-15-4171	41N	71W	15	PG
550944	LANCE OIL & GAS COMPANY INC	No. 32-15-4171	41N	71W	15	PS
550945	LANCE OIL & GAS COMPANY INC	No. 41-15-4171	41N	71W	15	PG
550946	LANCE OIL & GAS COMPANY INC	No. 12-22-4171	41N	71W	22	PG
550947	LANCE OIL & GAS COMPANY INC	No. 21-22-4171	41N	71W	22	PG
550948	LANCE OIL & GAS COMPANY INC	No. 23-22-4171	41N	71W	22	SI
550949	LANCE OIL & GAS COMPANY INC	No. 43-22-4171	41N	71W	22	SI
550976	BOWERS OIL & GAS INC	No. 3-29	41N	71W	29	FL
550996	LANCE OIL & GAS COMPANY INC	No. 21-9-4171	41N	71W	9	PS
551073	BILL BARRETT CORPORATION	No. 12-4-4171	41N	71W	4	PG
551074	BILL BARRETT CORPORATION	No. 21-4-4171	41N	71W	4	PG
551075	BILL BARRETT CORPORATION	No. 32-4-4171	41N	71W	4	PG
551076	BILL BARRETT CORPORATION	No. 41-4-4171	41N	71W	4	PG
551169	PEABODY NATURAL GAS LLC	No. 41-2-4171	41N	71W	2	PS

Coal Bed Natural Gas Wells (Continued)						
API	Company	Well Name	TWP	RNG	Section	Status
551170	BILL BARRETT CORPORATION	No. 21-11-4171	41N	71W	11	PG
551244	BILL BARRETT CORPORATION	No. 12-2-41-71	41N	71W	2	PS
551245	BILL BARRETT CORPORATION	No. 14-2-41-71	41N	71W	2	PS
551246	PEABODY NATURAL GAS LLC	No. 21-2-41-71	41N	71W	2	PG
551247	BILL BARRETT CORPORATION	No. 23-2-41-71	41N	71W	2	PS
551248	BILL BARRETT CORPORATION	No. 34-11-41-71	41N	71W	11	PG
551249	BILL BARRETT CORPORATION	No. 43-11-41-71	41N	71W	11	PS
551452	BOWERS OIL & GAS INC	No. 4-28	41N	71W	28	FL
551453	BOWERS OIL & GAS INC	No. 3-28	41N	71W	28	FL
551652	LANCE OIL & GAS COMPANY INC	No. 21-21-4171CA	41N	71W	21	PG
551654	LANCE OIL & GAS COMPANY INC	No. 41-30-4171CA	41N	71W	30	SI
552008	BILL BARRETT CORPORATION	No. 12-3-41-71	41N	71W	3	PG
552009	BILL BARRETT CORPORATION	No. 14-3-41-71	41N	71W	3	PG
552010	BILL BARRETT CORPORATION	No. 21-3-41-71	41N	71W	3	PG
552011	BILL BARRETT CORPORATION	No. 23-3-41-71	41N	71W	3	PG
552012	BILL BARRETT CORPORATION	No. 32-3-41-71	41N	71W	3	PG
552013	BILL BARRETT CORPORATION	No. 34-3-41-71	41N	71W	3	PG
552014	BILL BARRETT CORPORATION	No. 41-3-41-71	41N	71W	3	PG
552015	BILL BARRETT CORPORATION	No. 43-3-41-71	41N	71W	3	PG
553254	COLEMAN OIL & GAS INC	No. 21-7	41N	71W	7	PG
553440	COLEMAN OIL & GAS INC	No. 14-19	41N	71W	19	PG
553817	BILL BARRETT CORPORATION	No. 12-12-4171	41N	71W	12	SI
553818	BILL BARRETT CORPORATION	No. 14-12-4171	41N	71W	12	PG
553819	BILL BARRETT CORPORATION	No. 23-12-4171	41N	71W	12	SI
553934	COLEMAN OIL & GAS INC	No. 43-8	41N	71W	8	PG
554210	YATES PETROLEUM CORPORATION	No. 1	41N	71W	13	PG
554211	YATES PETROLEUM CORPORATION	No. 3	41N	71W	11	PG
554212	YATES PETROLEUM CORPORATION	No. 2	41N	71W	11	PG
554213	YATES PETROLEUM CORPORATION	No. 1	41N	71W	10	PG
554214	YATES PETROLEUM CORPORATION	No. 12	41N	71W	17	PG

Coal Bed Natural Gas Wells (Continued)						
API	Company	Well Name	TWP	RNG	Section	Status
554215	YATES PETROLEUM CORPORATION	No. 11	41N	71W	17	PG
554216	YATES PETROLEUM CORPORATION	No. 7	41N	71W	17	PG
554217	YATES PETROLEUM CORPORATION	No. 5	41N	71W	7	PG
554218	YATES PETROLEUM CORPORATION	No. 4	41N	71W	6	PG
554219	YATES PETROLEUM CORPORATION	No. 3	41N	71W	6	PG
554220	YATES PETROLEUM CORPORATION	No. 2	41N	71W	6	PG
554221	YATES PETROLEUM CORPORATION	No. 1	41N	71W	6	PG
554222	YATES PETROLEUM CORPORATION	No. 1	41N	71W	21	PG
554223	YATES PETROLEUM CORPORATION	No. 3	41N	71W	10	PG
554224	YATES PETROLEUM CORPORATION	No. 2	41N	71W	10	PG
554225	YATES PETROLEUM CORPORATION	No. 9	41N	71W	15	PG
554226	YATES PETROLEUM CORPORATION	No. 8	41N	71W	10	PG
554227	YATES PETROLEUM CORPORATION	No. 7	41N	71W	10	PG
554228	YATES PETROLEUM CORPORATION	No. 6	41N	71W	10	PG
554229	YATES PETROLEUM CORPORATION	No. 5	41N	71W	9	PG
554230	YATES PETROLEUM CORPORATION	No. 4	41N	71W	9	PG
554231	YATES PETROLEUM CORPORATION	No. 3	41N	71W	9	PG
554232	YATES PETROLEUM CORPORATION	No. 2	41N	71W	9	PG
554233	YATES PETROLEUM CORPORATION	No. 1	41N	71W	9	PG
554237	YATES PETROLEUM CORPORATION	No. 4	41N	71W	23	AP
554238	YATES PETROLEUM CORPORATION	No. 3	41N	71W	14	PG
554239	YATES PETROLEUM CORPORATION	No. 2	41N	71W	14	PG
554285	YATES PETROLEUM CORPORATION	No. 6	41N	71W	8	PG
554286	YATES PETROLEUM CORPORATION	No. 8	41N	71W	17	PG
554287	YATES PETROLEUM CORPORATION	No. 9	41N	71W	17	PG
554303	PEABODY NATURAL GAS LLC	No. 23-1-41-71	41N	71W	1	SP
554305	PEABODY NATURAL GAS LLC	No. 14-1-41-71	41N	71W	1	SP
554306	PEABODY NATURAL GAS LLC	No. 12-1-41-71	41N	71W	1	SP
554552	LANCE OIL & GAS COMPANY INC	No. 12-20-4171CA	41N	71W	20	PG
554553	LANCE OIL & GAS COMPANY INC	No. 34-14-4171CA	41N	71W	14	PG

Coal Bed Natural Gas Wells (Continued)						
API	Company	Well Name	TWP	RNG	Section	Status
554554	LANCE OIL & GAS COMPANY INC	No. 43-7-4171WY	41N	71W	7	PG
554555	LANCE OIL & GAS COMPANY INC	No. 34-7-4171CA	41N	71W	7	SI
554566	LANCE OIL & GAS COMPANY INC	No. 14-20-4171CA	41N	71W	20	PG
554567	LANCE OIL & GAS COMPANY INC	No. 21-20-4171CA	41N	71W	20	SI
554568	LANCE OIL & GAS COMPANY INC	No. 23-20-4171CA	41N	71W	20	SI
554569	LANCE OIL & GAS COMPANY INC	No. 32-20-4171CA	41N	71W	20	SI
554570	LANCE OIL & GAS COMPANY INC	No. 34-20-4171CA	41N	71W	20	PG
554571	LANCE OIL & GAS COMPANY INC	No. 41-20-4171CA	41N	71W	20	SI
554572	LANCE OIL & GAS COMPANY INC	No. 43-20-4171CA	41N	71W	20	SI
554574	LANCE OIL & GAS COMPANY INC	No. 14-21-4171CA	41N	71W	21	SI
554575	LANCE OIL & GAS COMPANY INC	No. 23-21-4171CA	41N	71W	21	SI
554576	LANCE OIL & GAS COMPANY INC	No. 34-22-4171CA	41N	71W	22	PG
554577	LANCE OIL & GAS COMPANY INC	No. 14-22-4171CA	41N	71W	22	SI
554578	LANCE OIL & GAS COMPANY INC	No. 21-29-4171CA	41N	71W	29	SI
554579	LANCE OIL & GAS COMPANY INC	No. 32-29-4171CA	41N	71W	29	PG
554580	LANCE OIL & GAS COMPANY INC	No. 41-29-4171CA	41N	71W	29	SI
554755	LANCE OIL & GAS COMPANY INC	No. 12-18-4171	41N	71W	18	PG
555297	YATES PETROLEUM CORPORATION	No. 10NEW	41N	71W	17	PG
556665	LANCE OIL & GAS COMPANY INC	No. 14-18-4171	41N	71W	18	PG
556666	LANCE OIL & GAS COMPANY INC	No. 21-18-4171	41N	71W	18	SI
556667	LANCE OIL & GAS COMPANY INC	No. 23-18-4171	41N	71W	18	PG
927865	BOWERS OIL & GAS INC	No. 1-33	41N	71W	33	PG
927888	COLEMAN OIL & GAS INC	No. 43-30	41N	71W	30	PG
927889	COLEMAN OIL & GAS INC	No. 23-31	41N	71W	31	PG
927891	COLEMAN OIL & GAS INC	No. 14-31	41N	71W	31	PG
927894	COLEMAN OIL & GAS INC	No. 12-31	41N	71W	31	PG
927912	BOWERS OIL & GAS INC	No. 2-29	41N	71W	29	FL
927913	BOWERS OIL & GAS INC	No. 1-29	41N	71W	29	FL
927944	BOWERS OIL & GAS INC	No. 2-28	41N	71W	28	FL
927945	BOWERS OIL & GAS INC	No. 1-28	41N	71W	28	FL

Coal Bed Natural Gas Wells (Continued)						
API	Company	Well Name	TWP	RNG	Section	Status
927947	BOWERS OIL & GAS INC	No. 5-29	41N	71W	29	FL
928002	COLEMAN OIL & GAS INC	No. 21-31	41N	71W	31	PG
928049	YATES PETROLEUM CORPORATION	No. 3	41N	71W	31	PG
928050	YATES PETROLEUM CORPORATION	No. 2	41N	71W	31	PG
928051	YATES PETROLEUM CORPORATION	No. 1	41N	71W	31	PG
928063	YATES PETROLEUM CORPORATION	No. 4	41N	71W	31	PG
928083	COLEMAN OIL & GAS INC	No. 23-30	41N	71W	30	PG
928084	COLEMAN OIL & GAS INC	No. 14-30	41N	71W	30	PG

APPENDIX F

SUPPLEMENTAL AIR QUALITY INFORMATION

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F-1.0 INTRODUCTION

The information in this air quality appendix is taken from the Air Quality Technical Support Document prepared by McVehil-Monnett Associates, Inc. for ACC for use in the West Antelope II Coal Lease Application EIS¹. The Air Quality Technical Support Document (MMA 2007) is a stand-alone document which is available for review. The purpose of this appendix is to provide background information on air quality issues, including the regulatory framework, regional air quality conditions, dispersion model methodologies, and the BACT process.

The air quality discussion in Chapter 3 of this EIS focuses on potential air quality impacts specific to the Antelope Mine and the West Antelope II LBA tract. Cumulative air quality-related impacts associated with coal leasing in the PRB of Wyoming are addressed in Section 4.2.3 of this EIS, which summarizes the results the Task 1A (Current Air Quality Conditions) and Task 3-A (Cumulative Air Quality Effects) Reports of the Powder River Basin Coal Review, prepared by the ENSR Corporation for the BLM Wyoming State Office, BLM Wyoming Casper Field Office, and BLM Montana Miles City Field Office, September 2005.

Analysis methods utilized in preparing the Air Quality Technical Support Document meet or exceed the BLM's "Data Adequacy Standards for the Powder River Coal Region" (1987) and include use of recent and extensive air quality modeling analyses conducted at the Antelope Mine by McVehil-Monnett Associates, Inc. for recent permitting actions.

F-2.0 REGULATORY BACKGROUND

Ambient air quality and air pollution emissions are regulated under federal and state laws and regulations. In Wyoming, the WDEQ/AQD is responsible for managing air quality through state regulations promulgated in the WAQSR and through the Wyoming SIP. WDEQ/AQD has also been delegated authority by the EPA to implement federal programs of the CAAA of 1990.

The WDEQ/AQD implements WAQSR and CAAA requirements through various air permitting programs. A proponent initiating a project must undergo new source review and obtain a pre-construction permit or a permit waiver authorizing construction of the project. This process ensures that the project will comply with the air quality requirements at the time of construction. To ensure on-going compliance, WDEQ/AQD also implements an operating permit program that can require on-going monitoring of emissions sources and/or source control systems.

¹ Refer to page xv of the EIS for a list of abbreviations and acronyms used in this document.

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PM₁₀ due to localized sources and activity within the town. There are no other non-attainment areas within 150 miles of the project area.

F-2.3 Prevention of Significant Deterioration (PSD)

Under requirements of the CAA, the EPA has established PSD rules, intended to prevent deterioration of air quality in attainment (and unclassifiable) areas. Increases in ambient concentrations of NO₂, SO₂, and PM₁₀ are limited to modest increments above the existing or “baseline” air quality in most attainment areas of the country (Class II areas discussed below), and to very small incremental increases in pristine attainment areas (Class I areas discussed below).

For the purposes of PSD, the EPA has categorized each attainment area within the United States into one of three PSD area classifications. PSD Class I is the most restrictive air quality category, and was created by Congress to prevent further deterioration of air quality in national and international parks, national memorial parks and national wilderness areas of a given size threshold which were in existence prior to 1977, or those additional areas which have since been designated Class I under federal regulations (40 CFR 52.21). All remaining areas outside of the designated Class I boundaries were designated Class II areas, which allow a relatively greater deterioration of air quality over that in existence in 1977, although still within the NAAQS. No Class III areas, which would allow further degradation, have been designated.

The federal land managers have also identified certain federal assets with Class II status as “sensitive” Class II areas for which air quality and/or visibility are valued resources.

The closest Class I area to the West Antelope II LBA tract is Wind Cave National Park in South Dakota, located about 94 miles east of the site. The next closest Class I area is the North Absaroka Wilderness, located about 256 miles to the west-northwest. The closest sensitive Class II areas are the Devils Tower National Monument, the Cloud Peak Wilderness Area and the Northern Cheyenne Indian Reservation (in Montana), which are approximately 86, 108 and 155 miles from the Antelope Mine, respectively. See EIS Table 3-8 for a list of Class I and sensitive Class II areas in the vicinity of the PRB and their distance from the Antelope Mine.

PSD regulations limit the maximum allowable increase (increment) in ambient PM₁₀ in a Class I airshed resulting from major stationary sources or major modifications to 4 µg/m³ (annual geometric mean) and 8 µg/m³ (24-hour average). Increases in other criteria pollutants are similarly limited. Specific types of facilities listed in the PSD rules which emit, or have the PTE, 100 tons per year or more of PM₁₀ or other criteria air pollutants, or any other facility which emits, or has the PTE, 250 tons per year or more of PM₁₀ or other

criteria air pollutants, are considered major stationary sources and must therefore demonstrate compliance with those incremental standards during the new source permitting process. However, fugitive emissions are not counted against the PSD major source applicability threshold unless the source is so designated by federal rule (40 CFR 52.21). As a result, the surface coal mines in the PRB have not been subject to permitting under the PSD regulations because the mine emissions that are subject to PSD applicability levels fall below these thresholds.

F-2.4 Best Available Control Technology (BACT)

All sources being permitted within Wyoming must meet state-specific BACT requirements, regardless of whether the source is subject to state/federal PSD review. During new source review, a BACT analysis is developed for the proposed project. The BACT analysis must evaluate all control options on the basis of technical, economic and environmental feasibility. BACT for mining operations in the PRB is largely dictated by categorical control requirements defined in the WAQSR. BACT decisions are mandated through the new source review pre-construction permit.

F-2.5 New Source Performance Standards (NSPS)

The NSPS are a program of “end-of-stack” technology-based controls/approaches required by the CAA and adopted by reference into the WAQSR. These standards, which apply to specific types of new, modified or re-constructed stationary sources, require the sources to achieve some base level of emissions control. For surface coal mining in the PRB, this includes certain activities at coal preparation plants. Specifically, the applicable requirements can be found at 40 CFR Part 60, Subpart Y (Standards of Performance for Coal Preparation Plants), and in the WAQSR. However, in Wyoming these standards are typically less stringent than state-level BACT limits.

F-2.6 Federal Operating Permit Program

The CAAA of 1990 required the establishment of a facility-wide permitting program for larger sources of pollution. This program, known as the Federal Operating Permit Program, or “Title V” (codified at Title V of the 1990 CAAA), requires that “major sources” of air pollutants obtain a federal operating permit. Under this program, a “major source” is a facility that has the PTE more than 100 tpy of any regulated pollutant, 10 tpy of any single HAP, or 25 tpy or more of any combination of HAPs, from applicable sources. The operating permit is a compilation of all applicable air quality requirements for a facility and requires an ongoing demonstration of compliance through testing, monitoring, reporting and recordkeeping requirements. Under its proposed permit application, the Antelope Mine’s PTE for PM₁₀ would be 12.1 tons per year, well below the 100 tpy applicability threshold.

F-2.7 Summary of Pre-Construction Permitting Procedures

The WDEQ/AQD administers a permitting program to assist the agency in managing the state's air resources. Under this program, anyone planning to construct, modify, or use a facility capable of emitting designated pollutants into the atmosphere must obtain an air quality permit to construct. Coal mines fall into this category. A new coal mine, or a modification to an existing mine, must be permitted by WDEQ/AQD, pursuant to the provisions of WAQSR Chapter 6, Section 2. Under these provisions, a successful permittee must demonstrate that it will comply with all applicable aspects of the WAQSR including state and federal ambient air standards.

When a permittee decides to construct a new surface coal mine or modify operations at an existing surface coal mine that will cause an increase in pollutant emissions, they must submit an application, which is reviewed by WDEQ/AQD new source review staff and the applicable WDEQ/AQD field office. Typically, a company will meet with the WDEQ/AQD prior to submitting an application to determine issues and details that need to be included in the application. A surface coal mining application will include the standard application, BACT measures that will be implemented, an inventory of point and fugitive sources for the mine in question as well as neighboring mines and other sources, and air quality modeling analyses addressing cumulative impacts in the mining region.

BACT must be employed at all sources permitted/exempted in Wyoming. Per WAQSR Chapter 6, Section 2, BACT at large mining operations typically include but may not be limited to: paving of access roads, treating of haul routes with chemical dust suppressant (and water) and storage of large amounts of materials/coal awaiting shipment in enclosures such as silos, troughs or barns. These (and other) mitigation measures are considered in the development of emission inventories used for modeling/permitting.

For the modeling analyses, an applicant must compile an emission inventory of PM₁₀ from their mining operation, neighboring mines and other surrounding sources. For PM₁₀ from the applicant mine, both point source and fugitive dust emissions are quantified. The emissions are based on the facility's potential to emit in each year of the LOM. The applicant also examines the surrounding coal mining operations and their previous air quality permits to determine their emissions throughout the LOM. Two or more worst-case years (generally with the highest potential emissions) are then modeled in detail. Other surrounding emission sources, such as power plants, compressor stations, paved highways, long-haul railroad lines and municipalities are also considered in the modeling analysis.

Coal mines in the PRB are also required to quantify NO_x emissions from their operations. Dispersion modeling is required to demonstrate compliance with

the ambient NO₂ standard. Potential emissions from diesel powered mining equipment, blasting and locomotive emissions (on mine property) are considered in the modeling analyses. In a fashion similar to the PM₁₀ analysis, neighboring mining operations and other surrounding sources are also included in the NO_x /NO₂ analysis.

Long-term PM₁₀ modeling is conducted for the permit application to demonstrate compliance with the annual PM₁₀ standard. For both point and area sources, the Industrial Source Complex Long Term model, version 3 (ISCLT3) is typically used.

The AQD has recently required all mines in the PRB to “submit and justify a background PM₁₀ concentration with each permit application” (WDEQ-AQD, 2006b). A site specific PM₁₀ background concentration of 12 µg/m³ was developed in the modeling analysis and submitted to the AQD in May, 2006, in the Application to Modify the Antelope Mine. The WDEQ approved the permit on April 23, 2007. The modeling results are added to the background and compared to the annual standard. Likewise, compliance with the annual NO₂ standard is verified using ISCLT3 and an NO₂ background concentration of 20 µg/m³.

Short-term PM₁₀ modeling is not required by WDEQ-AQD, nor does WDEQ-AQD consider it to be an accurate representation of short-term impacts. Section 234 of the 1990 CAAA mandates the administrator of the EPA to analyze the accuracy of short-term modeling of fugitive particulate emissions from surface coal mines. A June 26, 1996 letter from EPA Region VIII to Wyoming state representative, Ms. Barbara Cubin, details the results of an EPA study wherein the short-term model failed to meet evaluation criteria and tended to significantly overpredict 24-hour impacts of surface coal mines. The memorandum of agreement of January 24, 1994 between EPA Region VIII and the state of Wyoming allows WDEQ-AQD to conduct monitoring in lieu of short-term modeling for assessing coal mining-related impacts in the PRB. This agreement remains in effect and ambient particulate monitoring is required of each coal mine through conditions of their respective permits. The 1994 Memorandum of Agreement also requires WDEQ/AQD to implement “Best Available Work Practice” mitigation measures at any mine where an exceedance of the PM₁₀ air quality standard has occurred.

The permit application is reviewed by WDEQ/AQD to determine compliance with all applicable air quality standards and regulations. This includes review of compliance with emission limitations established by NSPS, review of compliance with ambient standards through modeling analyses, and establishment of control measures to meet BACT requirements. The WDEQ/AQD proposed permit conditions are sent to public notice for a 30-day review period after which a final decision on the permit is made (or a public hearing is held prior to a final permit decision).

The Antelope Mine has prepared permit applications and conducted air quality modeling analyses when mine plan changes have dictated and as required by WDEQ/AQD. These applications and analyses demonstrate that mining operations have complied, and will continue to comply, with all applicable aspects of the WAQSR and the federal CAAA.

In conducting an analysis of air quality impacts in the PRB for the Wyoming and Montana BLM, the Task 1a Report for the Powder River Basin Coal Review reports a background concentration of 5 $\mu\text{g}/\text{m}^3$ for NO_x for the entire PRB. The air permit action for the Antelope Mine used a background concentration of 12 $\mu\text{g}/\text{m}^3$ for PM_{10} (See EIS Table 3-3). These concentrations are based on recently monitored values in Gillette, Wyoming and at the Antelope Mine respectively, and include all sources operating at the time the value was measured, including existing coal mine operations located around Gillette.

In 2006, the Antelope Mine submitted detailed modeling analyses to the WDEQ-AQD in support of a request for a permit modification, which addressed the impacts associated with a proposed production increase. These analyses considered all emissions sources and included the neighboring Jacobs Ranch, Black Thunder, and North Antelope Rochelle mines, as well as the former North Rochelle Mine. The WDEQ approved the mine modification in Permit MD-1543 on April 23, 2007.

F-3.0 EXISTING AIR QUALITY

WDEQ monitors air quality through an extensive network of air quality monitors throughout the state. Particulate matter is generally measured as particulate matter with mean aerodynamic diameters smaller than 10 microns (PM_{10}). The eastern portion of the PRB has an extensive network of PM_{10} monitors operated by the mining industry due to the density of coal mines in the region (Figure F-1). There are also monitors in Sheridan, Gillette, Arvada and Wright, Wyoming.

This network is sited to measure ambient air quality and to infer impacts from specific sources. Source-specific monitors may also be used for developing trends in PM_{10} concentrations. WDEQ uses data from this monitoring network to identify potential air quality problems and to anticipate issues related to air quality. With this information, the WDEQ can stop or reverse trends that negatively affect the ambient air. Part of that effort has resulted in the formation of a coalition involving the counties, coal companies and coal bed methane operators to focus on minimizing dust from roads.

The WDEQ may also take enforcement action to remedy a situation where monitoring shows a violation of any standard. If a monitored standard is

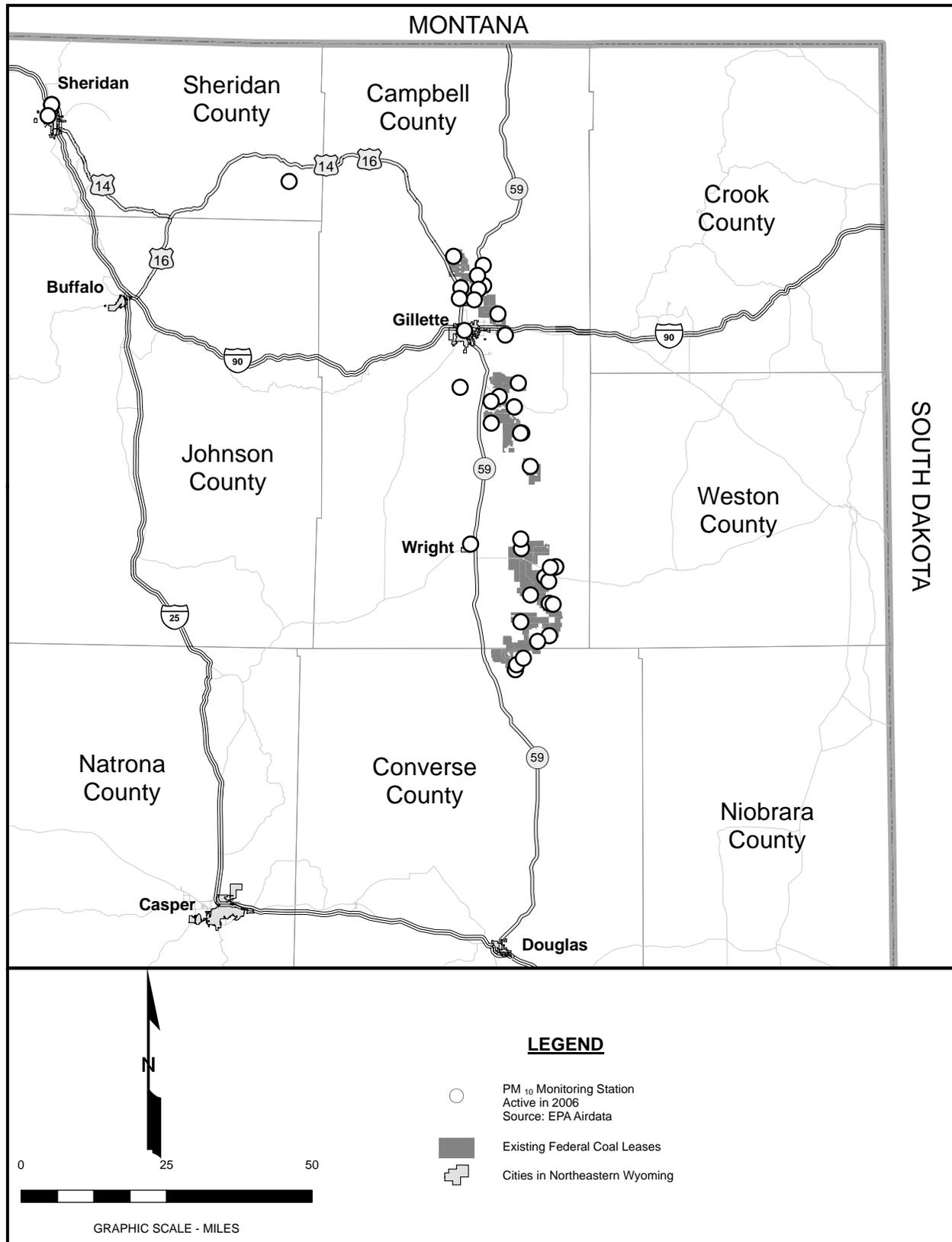


Figure F-1. Active PM₁₀ Monitoring Stations in Northeastern Wyoming.

exceeded at a specific source, the state agency may initiate enforcement against that source. In those instances, the state agency may use a negotiated settlement agreement to seek corrective action.

WDEQ operates two visibility monitoring stations in the PRB, both of which are IMPROVE sites. One of these sites is located north of Gillette. This site includes a nephelometer, a transmissometer, an aerosol monitor (IMPROVE protocol), and meteorological instruments to measure wind speed, direction, temperature, and relative humidity. The site is also equipped with a digital camera and analyzers for ozone and nitrogen oxides (NO, NO₂, NO_x). The second visibility monitoring station is located west of Buffalo and includes a nephelometer, a transmissometer, an aerosol monitor (IMPROVE), meteorological instruments to measure wind speed, direction, temperature, and relative humidity, plus a digital camera.

Air quality monitoring equipment for NO₂ within the PRB includes a WARMS operated by the BLM to detect sulfur and nitrogen concentrations near Buffalo, Sheridan, and Newcastle and a NADP monitoring system for precipitation chemistry in Newcastle.

F-3.1 Particulates

The federal and state standards for particulate matter pollutant are discussed in Chapter 3, Section 3.4.2.1 of the EIS.

F-3.1.1 Regional Particulate Emissions

WDEQ/AQD requires monitoring data to document the air quality at all of the PRB mines. Each mine monitored PM₁₀ for a 24-hour period every six days at multiple monitoring sites through the end of 2001. This frequency was increased by the WDEQ/AQD to one in every three days beginning in 2002. Available monitoring data for TSP began in 1980 and data for PM₁₀ began in 1989. As a result, over 57,000 TSP and 27,000 PM₁₀ samples have been collected through 2004 making the eastern PRB one of the most densely monitored areas in the country (See Figure F-1). Table F-1 uses the annual arithmetic average of all sites to summarize these data.

As indicated in Table F-1, the long-term trend in particulate emissions was relatively flat through 1998. TSP concentration from 1980 through 2003 averaged 37.7 µg/m³, ranging between 27.8 µg/m³ and 57.5 µg/m³. There were increases in 1988 and 1996, which may have been the result of fires in the region during those years. Increases from 1999 to 2003 may be related to drought conditions as well as increases in coal and overburden production and increases in other natural resource development activities, including CBNG, during that period. PM₁₀ concentrations from 1989 through 2004 averaged 20.0 µg/m³, ranging between 12.9 and 27.2 µg/m³.

Table F-1. Summary of Air Quality Monitoring in Wyoming's Powder River Basin, 1980-2004

Year	Coal Produced (mmtpy)	Yards Moved (mmbcy)	Number of Mines Operating/Monitoring TSP/Monitoring PM ₁₀	Number of Sites TSP/PM ₁₀	TSP Average (µg/m ³)	PM ₁₀ Average (µg/m ³)
1980	58.7	105.3	10/14/0	34/0	35.3	
1981	71.0	133.4	11/13/0	35/0	39.4	
1982	76.1	141.1	11/14/0	40/0	31.2	
1983	84.9	150.9	13/14/1	41/1	32.6	11.2
1984	105.3	169.5	14/16/1	42/1	33.9	11.1
1985	113.0	203.4	16/17/0	49/0	32.3	
1986	111.2	165.7	16/17/0	45/0	29.3	
1987	120.7	174.6	16/17/0	43/0	31.7	
1988	138.8	209.7	16/17/0	43/0	37.7	
1989	147.5	215.6	15/17/3	40/3	32.1	15.9
1990	160.7	223.5	17/17/5	47/5	34.3	14.8
1991	171.4	245.9	17/17/5	46/6	32.7	16.5
1992	166.1	296.0	17/17/7	41/7	31.7	15.9
1993	188.8	389.5	17/17/8	40/11	27.8	14.5
1994	213.6	483.9	17/18/8	44/11	31.7	15.5
1995	242.6	512.7	16/18/8	41/12	29.6	12.9
1996	257.0	605.4	17/18/8	41/12	35.4	16.0
1997	259.7	622.0	16/17/10	39/15	33.3	15.9
1998	308.6	710.7	16/17/12	36/17	33.9	15.9
1999	317.1	758.0	15/17/12	36/18	55.3	21.6
2000	322.5	845.3	15/15/12	31/17	56.1	23.4
2001	354.1	927.1	12/11/12	29/29	57.5	27.2
2002	359.7	1032.1	13/11/13	23/38	56.0	23.3
2003	363.7	1043.6	13/10/11	15/30	53.0	22.7
2004	381.6	1184.4	13/5/13	6/36	--*	20.0

Sources:

1980-1996 emissions and production data: April 1997 WMA report for WDEQ/AQD.

1997-2004 emissions: EPA AirData/ WDEQ/AQD databases (EPA 2005a, WDEQ/AQD 2005b).

1997-2004 data: WDEQ/AQD and Wyoming State Inspector of Mines (WDEQ/AQD 2005c and Wyoming Department of Employment 1997-2004).

*Data no longer pertinent due to paucity of monitoring sites

Significant surface coal mining growth occurred in the PRB during the period 1980-2004. Coal production increased from about 59 mmtpy to over 380 mmtpy (an increase of over 331 mmtpy), and associated overburden production increased from 105 mmby to over 1184 mmby. From 1980 through 2005, the annual coal production increased six-fold, while annual overburden production increased ten-fold over the same period. The proportionately larger annual increase in overburden production is probably because mines are gradually moving into areas of higher stripping ratios.

The relatively flat trend in particulate emissions from 1980 through 1998 is due in large part to the BACT requirements of the Wyoming air quality program. These control measures include watering and chemical treatment of roads, limiting the amount of area disturbed, temporary revegetation of disturbed areas to reduce wind erosion, and expedited final reclamation.

The average annual TSP concentration increased from 33.9 g/m³ in 1998 to 55.3 g/m³ in 1999 and 57.5 µg/m³ in 2001. The 2003 average annual TSP concentration was 53.0 µg/m³.

The average annual PM₁₀ concentration increased from 15.9 µg/m³ in 1998 to 21.6 µg/m³ in 1999 and reached 27.2 µg/m³ in 2001; one of the largest increases in PM₁₀ since it has been monitored in the PRB. The monitored concentrations have decreased since 2001. In 2004, the average annual concentration dropped to 20.0 µg/m³.

Emissions control measures that are used to control particulate emissions at the PRB mines, including the Antelope Mine, are discussed in Chapter 3, Section 3.4.2.3 of the EIS.

County roads are also responsible for some portion of the fugitive dust related to transportation. To help address this problem, the Campbell County Commissioners, coal bed methane and oil production companies and coal mine operators have formed a coalition to implement the most effective dust control measures on a number of county roads. Measures taken have ranged from the implementation of speed limits to paving of heavily traveled roads. The coalition has utilized chemical treatments to control dust as well as closing roads where appropriate or necessary and rebuilding existing roads to higher specifications. The coalition requested money from the Wyoming State Legislature to fund acquisition of Rotomill (ground up asphalt) to be mixed with gravel for use in treating some of the roads in the PRB. The Rotomill/gravel mixture has been demonstrated to be effective in reducing dust; the life of the mixture on treated roads is estimated to be from five to six years (Bott, 2006).

F-3.2 Nitrogen Dioxide (NO₂)

The federal and state standards for NO₂ are discussed in Chapter 3, Section 3.4.3.1 of the EIS.

F-3.2.1 Regional NO₂ Concentrations

As discussed in Section 3.4.3.3 of the EIS, annual mean NO₂ concentrations have been periodically measured in the PRB since 1975. The annual mean NO₂ concentrations recorded by those monitoring efforts have all been well below the 100 µg/m³ standard. The highest annual mean concentration recorded to date was 22 µg/m³ at two separate sites between March 1996 and April 1997.

NO₂ is a product of incomplete combustion at sources such as gasoline- and diesel-burning engines or from mine blasting activities. Incomplete combustion during blasting may be caused by wet conditions, incompetent or fractured geological formations, deformation of bore holes, and other factors. Generally, blasting-related NO_x emissions are more prevalent at operations that use the blasting technique referred to as cast blasting (Chancellor 2003). Cast blasting refers to a type of direct blasting in which the blast is designed to cast the overburden from on top of the coal into the previously mined area.

In the mid-to late-1990s, OSM received complaints from several citizens about blasting clouds from several mines in the PRB. EPA expressed concerns that NO₂ levels in some of those blasting clouds may have been sufficiently high at times to cause human health effects. In response to those concerns, several studies have been conducted, the mines have modified their blasting techniques, and the WDEQ has imposed additional blasting restrictions at a limited number of mines. More information about these studies and restrictions is presented in the following discussion.

On the order of the Director of the WDEQ, members of the mining industry in the PRB conducted a comprehensive, multi-year monitoring and modeling study of NO₂ exposures from blast clouds. Results of the study (TBCC 2002), conducted pursuant to protocols reviewed and approved by the WDEQ, were provided to the WDEQ and the public in July 2002.

Using a combination of NO₂ measurements collected near 91 blast sites (78 valid runs) and a conservative modeling/extrapolation approach, the authors developed a series of “safe” setback curves for coal, overburden and cast shots for various wind speed classes. The curves were derived from the sampled data, conservative projections of concentrations at greater/lesser distances than measured and an assumed safe level (based on a comprehensive review of available health effects data) of 5.0 ppm for 10 minutes.

Subsequently, the data in the 2002 report (collected at the Black Thunder Mine) were augmented with monitored data/analyses from an additional 45 validated blast events at the Eagle Butte, North Antelope Rochelle, Buckskin and Cordero-Rojo mines. New curves, based on the entire basin-wide data set encompassing 123 valid tests, were developed but differed only slightly from the original Black Thunder curves.

Measures that are used by the mines to control NO₂ emissions related to blasting by the PRB mines are discussed in Chapter 3, Section 3.4.3.3 of the EIS.