



U.S. Department of the Interior
Bureau of Land Management
Wyoming State Office

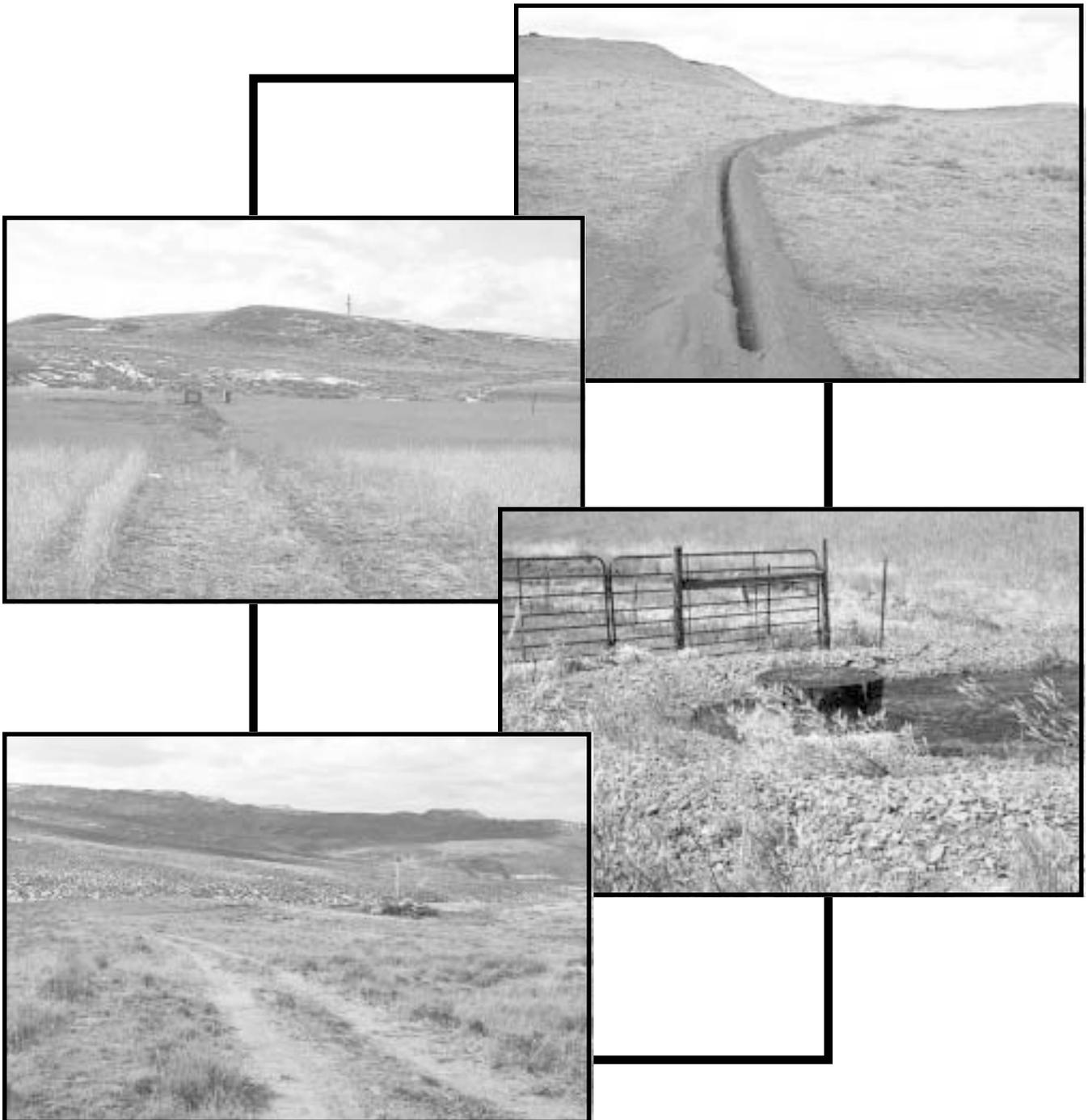
Buffalo Field Office

March 2001



DECISION RECORD

Wyodak Drainage Coal Bed Methane Environmental Assessment (WY-070-01-034)



MISSION STATEMENT

It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

BLM/WY/PL-01/008+1320



UNITED STATES DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Buffalo Field Office
1425 Fort Street
Buffalo, Wyoming 82834-2436

In Reply Refer To:
3160

March 26, 2001

Dear Reader:

Enclosed is the Decision Record for the Environmental Assessment prepared for the Wyodak Drainage Coalbed Methane Project. All comments were considered in reaching my decision. Comments have been summarized and responses have been made to those comments.

We thank you for your participation in the EA effort. If you have any questions concerning this decision, please feel free to call or write us.

Sincerely,

Dennis R. Stenger
Field Manager

Enclosure
Decision Record with Attachments

Decision Record
for
Wyodak Drainage Coal Bed Methane
Environmental Assessment
EA # WY-070-01-034

Introduction

The impact analysis in this environmental assessment (EA) identifies the effects of drilling 2,500 federal coal bed methane (CBM) protective wells in the next 15 months to prevent (CBM) drainage within the Wyodak CBM project area.

Scoping for this action began in April 2000. The Bureau of Land Management (BLM) felt an urgency to conduct this analysis due to the disparity between the number of state and private (CBM) wells being permitted, drilled, and put into production when compared to the number of federal wells. This EA is an interim measure between the 1999 Wyodak Environmental Impact Statement (EIS) and the Powder River Basin EIS (PRBO&G EIS) which is scheduled for completion in April 2002. It became apparent in March 2000, based on information from the BLM's Wyoming State Office, Reservoir Management Group (attachment A), that federal protective wells needed to be drilled in order to prevent loss of federal gas and associated royalties and to protect the public interest. Sufficient NEPA analysis had not been conducted that disclosed the effects of drilling additional federal CBM wells beyond the level analyzed in the Wyodak EIS. The BLM was faced with complying with two conflicting mandates—the requirements of the National Environmental Policy Act (NEPA) for any federal action, and the Mineral Leasing Act as Amended requiring the maximum economic recovery (MER) of the mineral resource.

The EA evaluates one alternative. Several others were considered but eliminated from further detailed analysis. The No Action Alternative was not considered because allowing federal protective wells is not a discretionary decision. An operator's drilling and producing obligations to the BLM on federal leases are described at 43 CFR 3162.2, which states, "Operators must drill diligently and produce continuously to protect the federal government from royalty loss resulting from drainage." Under these regulations, the No Action Alternative would not comply with 43 CFR 3162.2.

This EA is tiered to the 1999 Wyodak EIS. Selecting Alternative 1 in the Wyodak EIS allowed 5,000 new CBM wells to be drilled. The EIS contains analysis of direct, indirect, and cumulative effects. The threshold level to judge significance of impacts for this EA is the cumulative effect levels for surface disturbance, water, and air impacts from Alternative 1.

An analysis of impacts from overall continued CBM development within the Powder River Basin of Wyoming was initiated in May 2000 with scoping for the PRBO&G EIS. A decision for this new EIS is anticipated in about 15 months. The analysis in the EIS will include completed air quality, groundwater, and surface water computer models to analyze impacts. The results of the analyses for this EA will be included in the PRBO&G EIS analysis.

Decision

It is my decision to authorize the actions described in the Proposed Action (PA) of the subject EA (WY 070-01-034). This decision will allow Federal mineral leaseholders to drill up to 2,500 federal protective CBM wells, within the Wyodak area, to help alleviate drainage of methane and on-going loss of royalties to the U.S. and the State of Wyoming. These wells will be drilled in accordance with the maintained Buffalo Resource Management Plan (RMP) and the standard and supplemental conditions of approval in appendices B and C of the EA. In addition, the mitigation measures in attachment B will also be required. Project-specific NEPA analysis will also be required before applications for permit to drill (APD) are approved.

All conditions, mitigating measures, and monitoring from the Record of Decision for the Wyodak EIS are required along with this decision. This decision updates the NEPA compliance for the Buffalo RMP.

In accordance with 43 CFR 3165.3 (b) you have the right to request an administrative review before the Wyoming, State Director, either with or without oral presentation, regarding this decision. Such request, including all supporting documentation, shall be filed in writing with the State Director within 20 business days of receipt of this decision. Upon request and showing of good cause, an extension for submitting supporting data may be granted by the State Director.

Response to Comments

The EA was released for a 30-day public review on January 9, 2001 with a deadline to receive comments of February 7, 2001. A preliminary finding of no significant impacts (FONSI) was included in the release. During the comment period, 34 letters were received. These letters have been reviewed to determine whether information was provided that would warrant a change to the preliminary FONSI. Substantive comments with responses are summarized below.

- 1. The analysis does not provide information that supports the need to reduce the drainage of federal minerals. Where are protective wells needed? Why would they be successful; how many are needed to significantly reduce royalty losses?*

The general area of current CBM production is outlined by the 90% contour line on maps 1 and 2. In these producing areas about 40% of the mineral ownership is federal. However, only 15% of the CBM currently being produced is from U.S. minerals (see figure 1).

South Gillette Area A recently completed study of pressure depletion and CBM drainage covers a 66-township area (1.5 million acres) south of Gillette, Wyoming (USDI, 2001) (map 1). The pressure at the top of the main producing coal was mapped and is displayed as a percent of original pressure (pressure before CBM production began). Each pressure zone shown on map 1 is summarized below:

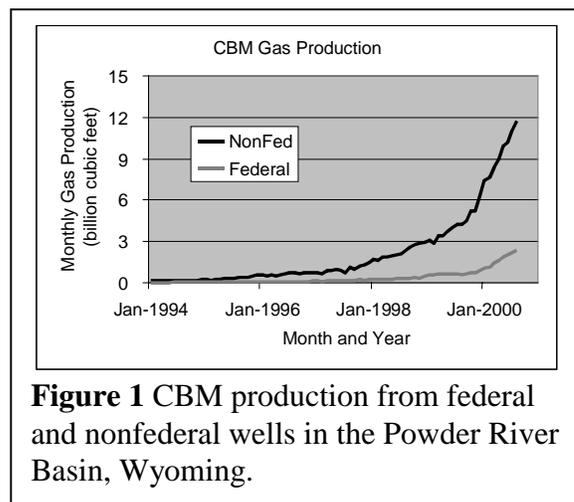


Figure 1 CBM production from federal and nonfederal wells in the Powder River Basin, Wyoming.

Zone one (80-90% of original pressure remaining) probably contains little drainage from undrilled federal acreage.

Zone two (60-80% of original pressure remaining) contains some drainage from federal acreage, but most of the CBM is still present. It is unlikely that more than one-third of the CBM has been drained from undrilled federal acreage. In most areas the amount of drainage is much less than one-third, and some areas have little or no drainage.

Zone three (40-60% of original pressure remaining) has experienced drainage throughout most of the area. In some parts of this zone CBM may be as much as half depleted from undrilled federal acreage.

Zone four (20-40% of original pressure remaining) most of the area probably contains less than half the original CBM content. In a few areas undrilled federal acreage may not support economic wells.

Zone five (less than 20% of original pressure remaining) is badly drained. In much of the area undrilled federal acreage may not support economic wells.

North Gillette Area A very generalized drainage study was completed for a 52-township area (1.2 million acres) northwest of Gillette (map 2). This study was based on limited data and geological interpretation compared to the drainage study of the South Gillette area. Preliminary findings indicate undrilled federal acreage just north of Gillette, with less than 60% of original pressure remaining, may have been significantly drained. Other areas that have been potentially drained are outlined by the 80% contour lines on map 2 (Meyer 2001).

In summary, it can be concluded that CBM is being extensively drained from undrilled federal mineral acreage over large areas north and south of Gillette, Wyoming. This drainage from undrilled federal mineral acreage represents a large transfer of wealth from the public estate to the nonfederal estate owners and a potential loss of unrecoverable methane resource.

Based on the above information, it is likely that the majority of the federal protective wells would be drilled in the Belle Fourche watershed area (South Gillette Area, map1). It is likely that the next largest percentage (25-30%) of federal protective wells would be drilled in the Little Powder River watershed area (SE ¼ of map 2). It is estimated that only a small percentage (5%) of the 2,500 federal protective wells would be drilled in the Powder River watershed as proportionately fewer wells have already been drilled in that area compared to areas immediately north and south of Gillette (NW ¼ map2).

In the South Gillette Area, in order for federal CBM production to equal nonfederal

CBM production, nonfederal CBM production should be no more than about 1

½ times federal production. Figure 2 shows the disparity of federal wells to nonfederal wells from 1998 through 2000. In order for federal wells to be equal (eliminate drainage) with nonfederal wells, approximately 3,000 federal wells would have needed to be completed in 2000; however, only about 1,200 were completed. There are currently 1,900 pending APDs that are confirmed drainage cases on file in the Buffalo Field Office.

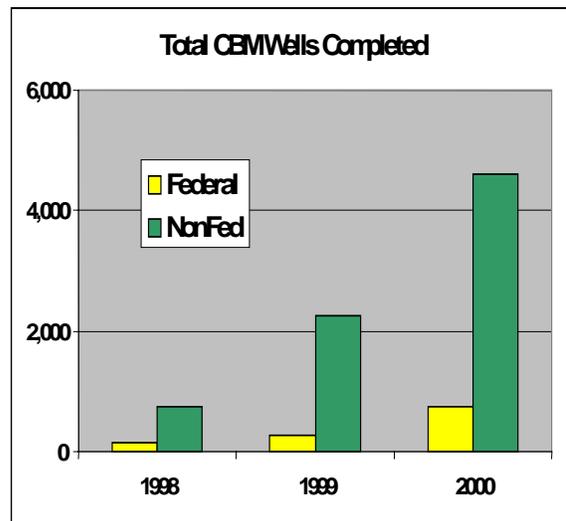


Figure 2

2. *Analysis concerning discharges of produced water (primarily to the Powder River drainage) does not support the FONSI.*

Over the past several months, protests over issuing CBM-related National Pollution Discharge Elimination System (NPDES) permits have been submitted to the Wyoming Department of Environmental Quality (WDEQ) from Montana Department of Environmental Quality (MDEQ), Wyoming Outdoor Council (WOC), Powder River Basin Resource Council (PRBRC), and individuals. These protests stated that discharged CBM- produced water could adversely affect water quality in tributaries to the Powder River and downstream into Montana. This in turn could have an adverse impact on lands irrigated with this water in Montana. These issues were not raised during scoping for this EA nor did MDEQ submit comments during the 30-day EA comment period. Therefore, the EA did not analyze affects of Powder River water on irrigated lands and water quality of the Powder River in Montana.

These protests have caused the WDEQ to either require a demonstration by the operator that their discharge would have no adverse effects or to temporarily suspend issuing NPDES permits for surface discharge of water in the Powder and Little Powder River watersheds. The WDEQ and MDEQ offices are working together to come to resolution regarding the water quality issue between their respective states. Three letters between the agencies explaining their strategies regarding this issue are in attachment D. WDEQ has stated that, “It will administer its permit program on the Powder and Little Powder Rivers to insure no measurable change in water quality occurs at the border.”

If companies cannot obtain NPDES permits to discharge produced water from their federal wells they will need to look at alternative methods for disposing the produced water. This EA did not analyze alternative methods of disposal such as re-injection or channel storage and dilution ponds. Impacts from surface discharge with mitigating measures were not anticipated to be significant; therefore, it was determined that additional mitigation analysis for re-injection or impoundment was not warranted. If companies pursue other alternatives, additional NEPA analysis would be needed as those impacts were not analyzed in the EA.

WDEQ may consider NPDES permit issuance if water is adequately treated to meet applicable effluent standards (see mitigation section) prior to discharge. Additional NEPA analysis may also be needed should this option be pursued by companies.

Based on the possible distribution of wells, as stated in response to comment #1 above, the BLM estimates the largest percentage of water produced from the proposed federal protective wells would be discharged into the Belle Fourche watershed. The Little Powder River would receive somewhat less and the Powder River would receive the smallest percentage. Several factors come into play that could affect the portion of federal wells that could be drilled in the Powder and Little Powder River watersheds.

1. WDEQ would be approving discharge permits incrementally for these wells during the next 15 months. BLM permits to drill these federal wells would be issued with the condition that before water could be discharged all other state and federal permits must be obtained.
2. Many NPDES permit applications are currently pending approval through WDEQ. The majority of these applications apply to state and fee wells. These permits may be issued prior to any new federal well discharge permit approvals.

The majority of data used in this next section is from AHA 2000a.

Powder River

Of the 1,425 federal-producing wells discussed in the Proposed Action, only an estimated 5% (71 wells) will discharge to the Powder River. The average production of water from these wells, 30.9 gallons per minute (gpm), is higher than the overall basin (from Figure 2.2, Main Stem Study, Tier 1 Report). It is important to note this volume is based on initial production reported. Volumes decline continually several months after initial production as other wells come on line. This is evident in the Belle Fourche area where average water discharge rates were predicted in the Wyodak EIS to be 12 gpm. As of August 2000, overall average production rates in the Belle Fourche area were approximately 6 gpm. The average for the entire Wyodak area used in the EA was 11.1 gpm.)

Assuming a worst case scenario of 100% of the discharge water reaching the Powder River would result in 3.2 million gallons per day (gpd) or approximately 5 cubic feet per second (cfs). Table 1 shows this discharge (in cfs) as compared to mean monthly and minimum monthly flows of the Powder River at Moorhead, MT (USGS 1999).

Table 1

FLOW	MAY	JUNE	JULY	AUGUST	SEPTEMBER
Average flow (cfs)	1,083.00	1,416.0	482.0	179.0	147.0
CBM % of average	0.50	0.4	1.0	2.8	3.4
Minimum flow (cfs)	82.6	39.5	33.9	.6	1.28
CBM % of average	6.1	12.7	14.7	833.3	390.60

The average adjusted sodium absorption ratio (SAR) for wells discharging into the Powder River is 17 (ranging from 7 to 26.5), and the specific conductance is 2,253 (ranging from 946 to 3560). The average baseline adjusted SAR in the Powder River is 4 (ranging from 3.5 to 5), and the average specific conductance (salinity) is 1,800 umhos/cm (ranging from 1,500-2,200).

The results of mass balance calculations showing the impacts of the CBM discharge water are displayed in the following table.

Table 2

SAR	MAY	JUNE	JULY	AUGUST	SEPTEMBER
Baseline SAR	5.00	3.50	4.20	4.40	4.20
SAR at average flow with CBM influence	5.06	3.55	4.33	4.74	4.62
SAR at minimum flow with CBM influence	5.68	5.02	5.85	15.65	14.39
SAR at minimum flow with CBM influence and 30% delivery	5.21	3.99	4.74	13.40	11.01
SAR threshold	8.00	6.50	11.50	13.50	13.00

The approximate threshold SAR values for no impact to soil infiltration and crop production for May, June, July, August, and September are 8, 6.5, 11.5, 13.5, and 13, respectively. As can be seen in table 2, at the minimum monthly flows on record, the combined CBM and natural flow SAR values exceed the threshold in August and September while assuming 100% of the CBM produced water makes it to the Powder River. However, assuming a 70% loss due to infiltration/evapotranspiration at the minimum flows shown above in August and September, the SAR threshold will not be exceeded. Infiltration/evapotranspiration loss has been documented by Meyer (2000) and AHA (2000b) specifically: Belle Fourche - <3%; Caballo Creek - 0%; Pumpkin Creek - 2.3% to 3%; Wildcat Creek - 3%; and, Spotted Horse Creek - 25%.

Cumulative Direct Impacts To Powder River Mainstem

The tables below are similar to those above but consider the impacts of 5% of all the wells (7,129 total wells or 357 projected wells discharging to the Powder River).

Using a similar production rate (30.9 gpm) for 357 wells results in a cumulative discharge volume of 25 cfs.

Table 3

FLOW	MAY	JUNE	JULY	AUGUST	SEPTEMBER
Average flow (cfs) CBM % of average	1,083.0 2.3	1,416.0 1.8	482.0 5.2	179.0 14.0	147.00 17.00
Minimum flow (cfs) CBM % of average	82.6 30.0	39.5 63.0	33.9 74.0	0.6 4,000.0	1.28 1,660.00

Table 4

SAR	MAY	JUNE	JULY	AUGUST	SEPTEMBER
Baseline SAR	5.00	3.50	4.20	4.40	4.20
SAR at average flow with CBM influence	5.27	3.73	4.83	5.94	6.06
SAR at minimum flow with CBM influence	7.79	8.73	9.63	16.70	16.40
SAR at minimum flow with CBM influence and 30% delivery	6.00	5.65	6.52	16.10	15.13
SAR threshold	8.00	6.50	11.50	13.50	13.00

As can be seen in Table 4, at the average monthly flows on record the combined CBM and natural flow SAR values do not exceed the threshold while assuming 100% of the CBM produced water makes it to the Powder River. However, the combined CBM and minimum monthly flows exceed the threshold in three of the five irrigation months; and, assuming a 30% delivery, exceed the threshold in two of the five months. Only when the CBM delivery is less than 7% is the threshold not exceeded in all five-irrigation months. This is assuming the worst case discharge volume of 30.9 gpm.

Little Powder River

Of the 1,425 federal wells discussed in the PA, only an estimated 30% (or 428 wells) will discharge to the Little Powder River. The production of water from these wells average higher than the overall basin average at 15.6 gpm (extrapolated from Figure 2.2, Main Stem Study, Tier 1 Report). Assuming a worst case scenario of 100% of this discharge water reaching the Little Powder, this equates to 9.6 million gpd or approximately 15 cfs . Table 5 shows this discharge (in cfs) as compared to mean monthly and minimum monthly flows of the Little Powder River above Dry Creek, near Weston WY (means for years 1973-1999, USGS Water Resources Data, Wyoming 1999).

Table 5

FLOW	MAY	JUNE	JULY	AUGUST	SEPTEMBER
Average flow (cfs)	63.6	31.10	11.300	6.11	4.44
CBM % of average	23.6	48.20	132.700	245.50	337.88
Minimum flow (cfs)	104.0	2.11	.044	0.00	.0028
CBM % of average	1,400.0	711.00	>>1000.000	>>4,000.00	>>1,000.00

The average adjusted SAR for wells discharging into the Little Powder River is 9.25 (ranging from 7.7 to 11 based on discharges from 4 currently permitted wells completed in the Wyodak, Pawnee, and Wall coal seams). The specific conductance is 1,027 (ranging from 800 to 1,260). The average baseline adjusted SAR in the Little Powder River is 5.8 (ranging from 5.5 to 6.5), and the average specific conductance is 1,850 umhos/cm (ranging from 1,750-2,000).

The results of mass balance calculations showing the impacts of the CBM discharge water are displayed in the following table.

Table 6

SAR	MAY	JUNE	JULY	AUGUST	SEPTEMBER
Baseline SAR	6.50	6.00	5.50	5.50	5.50
SAR at average flow with CBM influence	7.02	7.06	7.64	8.16	8.39
SAR at minimum flow with CBM influence	9.07	8.73	9.24	9.25	9.25
SAR at minimum flow with CBM influence and 30% delivery	7.40	8.21	9.21	9.25	9.25
SAR threshold	14.00	12.00	10.00	10.00	10.00

The approximate threshold SAR values for no impact to soil infiltration and crop production for May, June, July, August, and September are 14, 12, 10, 10, and 10, respectively. As can be seen in Table 6, at any of the three scenarios, never do the combined CBM and natural flow SAR values exceed the threshold.

Cumulative Direct Impacts To Little Powder River

The following tables are similar to those above but they consider the impacts of 30% of all the wells (7,129 total wells or 2,139 projected wells discharging to the Little Powder River).

Using a similar production rate (15.6 gpm) for 2,139 wells results in a cumulative discharge volume of 74 cfs.

Table 7

FLOW	MAY	JUNE	JULY	AUGUST	SEPTEMBER
Average flow (cfs) CBM % of average	63.6 116.0	31.1 238.0	11.3 655.0	6.11 1,211.00	4.44 1,667.00
Minimum flow (cfs) CBM % of average	In low flow years, the CBM discharge will be practically all of the flow.				

Table 8

SAR	MAY	JUNE	JULY	AUGUST	SEPTEMBER
Baseline SAR	6.50	6.00	5.50	5.50	5.50
SAR at average flow with CBM influence	7.98	8.29	8.75	8.96	9.04
SAR at minimum flow with CBM influence	9.25	9.25	9.25	9.25	9.25
SAR threshold	14.00	12.00	10.00	10.00	10.00

As can be seen in Table 8, at the average monthly flows on record the combined CBM and natural flow SAR values never exceed the threshold values.

In summary, SAR could be above threshold levels (in the Powder River only) during some months assuming discharge rates stay the same as initial reports and all the wells will have approved discharge permits within the 15-month period. The primary point regarding these affects is that for the next 15 months, WDEQ will not be issuing NPDES permits unless companies can demonstrate that water quality in the Powder and Little Powder rivers will not be elevated beyond current baseline levels at the state line. This may require some companies to provide some level of treatment or storage so that the water can meet permit limits.

Treatment options that could be used and have been explored to reduce SAR levels include:

1. Off channel complete containment in evaporation/infiltration ponds.
2. On channel storage and dilution ponds, where dilution with the natural runoff will meet acceptable SAR values on a discharge.
3. Ion exchange units.
4. Re-injection into potable and non-potable aquifers, if there are receivers that will accept the water.
5. Infiltration leach fields.

Of these options, 1 and 2 are getting extensive use; 3 has been found to be too expensive; 4 is being piloted at a number of locations (city of Gillette's depleted aquifer); and 5, is being tried.

There are a number of conservative assumptions in the above data (AHA 2000) that lead to projections that are extremely unlikely to be realized. First, all of the information on conveyance loss indicates that the 70% loss factor is very conservative; a loss factor of 90% or higher would be more appropriate. Second, the per-well water production estimate is much higher than the expected actual water production. The estimate is based on production values reported in the Wyoming Oil and Gas Conservation Commission's (WOGCC) database. The water production values reported to the WOGCC have historically been instantaneous well production measurements. These values overestimate production because they do not include shut down time, and they usually include some produced gas in the flow measurement.

Barium

As stated in the EA (page 4-5, paragraph 4) in the course of a study of discharge water, 47 samples were taken from CBM wells in the Powder River Basin. Barium concentrations ranged from 0.14 milligrams per liter (mg/l) to 1.6 mg/l (mean of 0.62). None of these samples exceeded the human health standard proposed by the WDEQ of 2.0 mg/l. Based on other available water quality data, less than 10% of all CBM discharges would approach or exceed this limitation and would require preliminary treatment to reduce the barium concentration. "In most natural waters, there is sufficient sulfate or carbonate to precipitate the barium present in the water as a virtually insoluble, non-toxic compound" (EPA 1986). The streams (and soils) in the Powder River Basin are no exception. Natural surface water in the region has sufficient concentrations of sulfates to prevent any toxicity risk from dissolved barium discharged in relation with CBM development.

Allowing the discharge water to come in contact with soils, stream channels, and/or naturally occurring surface water would be the primary treatment method. WDEQ also requires best management practices (BMPs) at the wellhead to remove soluble iron. These aeration devices and small treatment ponds also work well to remove barium. Another option would be to have CBM waters containing elevated barium (800 to 2,000 ug/l range) discharged into stream channels immediately above a storage reservoir (CBM Associates 2001). The short flow stream path should provide sulfate via gypsum dissolution; the reservoir itself should provide some

sulfate via the same process. Wind-driven deposition of local dust and storm event run-in providing sulfate to small reservoirs also would occur. Once in the reservoir, CBM water should mainly infiltrate to shallow groundwater (Wasatch sands preferably) with only a limited volume being transported to the next reservoir downslope during storm events. Barium should end up in the reservoir sediments and in shallow subsurface areas in a form that cannot be absorbed by organisms (nonbioavailable). This layout should more or less preclude long range transport of barium below the reservoirs either in surface or in groundwaters.

In a study conducted by WWC Engineering (WWC 2000) conclusions similar to those above were made.

1. The water quality of the Powder River will be protected. With no or only minimal treatment to lower the concentrations of barium, manganese, and possibly iron, up to 80,000 acre-feet/year (71.4 billion gallons/day) of CBM water can be discharged without exceeding the assimilative capacity of the Powder River therefore complying with WDEQ antidegradation rules.
2. The downstream suitability of Powder River water for irrigation will not be affected. Considering normal flow rates and water quality in the Powder River during the irrigation season (May – September), discharge of up to 80,000 ac-ft/yr (71.4 bgd) of CBM water will not change the river waters suitability for downstream irrigation. Downstream from the discharge point, the Powder River flows are augmented by Crazy Woman Creek and Clear Creek, which help to ensure water quality downstream.

The study further concludes, “The proposed CBM water would likely increase the SAR of the Powder River while reducing its salinity. The effects are minor, however, and the projected overall impact is to leave the irrigation classification of the Powder River unchanged. Based on the limited number of irrigated lands, the adequate drainage characteristics and low clay content of typical irrigated lands, and the limited impacts to SAR and salinity, the suitability of the Powder River for irrigation water will be maintained.”

3. *Unnecessary or undue degradation (FLPMA). BLM ignored other means such as unitization, communitization, and compensatory royalties.*

To assume that existing CBM wells in the Wyodak area will efficiently and economically drain all the CBM resource is incorrect. The private and state wells are and will continue to drain a significant portion of the Federal oil and gas resource; but they will not recover all of the resource. To cease drilling federal wells in the Wyodak area, thus leaving economic recoverable CBM gas in the ground, does not meet BLM responsibility to obtain MER of the resource and protect the public resource.

Compensatory Agreements

The BLM can attempt to enter into a compensatory agreement with the operator or the lessee of adjacent private and state lands (43CFR 3100.2-1). However, compensatory agreements are voluntary and are usually entered into in situations where unleased federal lands are being drained. Unleased lands are those that have been withdrawn from the mineral leasing laws (National Park lands, wildlife refuges, wild and scenic river lands, wilderness areas, certain

rights-of-way, etc). There is little to no incentive for the operator or the lessee of the adjacent nonfederal lands to enter into such an agreement with the BLM. The BLM cannot force a nonfederal operator or lessee to enter into a compensatory agreement. The BLM can attempt to enter into a compensatory agreement if the federal land is already leased, but again, there is little or no incentive for the nonfederal operator or lessee of the adjacent private and state lands to enter into such an agreement.

Compensatory Royalty Assessments

In accordance with the regulations at 43 CFR 3162.2, *Drilling and Producing Obligations*, and section 4 of the oil and gas lease agreement, the record title owner and/or the operating rights owner shall drill diligently and produce continuously all wells necessary to protect the lessor from loss of royalty by reason of drainage. The BLM may assess compensatory royalty to reimburse the United States as a result of drainage if the record title owner/operating rights owner fails to drill a protective well. By regulation, the BLM cannot assess the lessee and/or the operating rights owner compensatory royalty unless the lessee/operating rights owner refuses to drill a protective well. Also, the Interior Board of Land Appeals (IBLA) has ruled in numerous cases--*Gulf Oil Exploration and Production Company* (94 IBLA 364); *CSX Oil and Gas Corporation* (104 IBLA 188); *Atlantic Richfield Company* (105 IBLA 218); and, *Kerr-McGee Corporation* (118 IBLA 119)—that BLM cannot assess compensatory royalty unless actual drainage is occurring, it is economic to drill a protective well, and if the lessee/operating rights owner refuses to drill a protective well. The lessee/operating rights owner has to be given an opportunity to drill a well before the BLM can assess compensatory royalties. Lessees/operating rights owners have not been given this opportunity because BLM CBM well NEPA analysis was reached in August of 2000. No new wells can be approved until additional analysis is completed. Therefore, BLM cannot assess compensatory royalties as the operators have not been given the opportunity to drill protective wells.

Unit Agreements

A unit agreement is a contract between the federal government and the interest owners of federal, private, and state leases in an area with potential oil and gas resources. This includes owners of any right, title, or interest in the oil and gas deposits to be unitized. The actual producers may or may not fit this definition. Unitization is intended to facilitate the orderly and timely development of all the oil and gas resources within the proposed unit area. The BLM encourages federal unit agreements be established whenever and wherever practical. To date, 24 federal units have been approved. However, the BLM cannot force a private or state interest owner to enter into a unit agreement contract. Since the vast majority of the CBM wells have been drilled on, and are producing from, nonfederal lands, there is little to no incentive for the interest owners of the nonfederal leases to enter into a unit agreement.

Communitization Agreements (CA)

Communitization is authorized when a Federal lease cannot be independently developed in conformity with an established spacing pattern (usually 80 acres or larger). The WOGCC establishes well spacing on all lands in Wyoming. The BLM constantly monitors all drilling activity in the state and will always ensure that a CA is established whenever it is appropriate.

Relinquish Affected Acreage

If BLM determined that a federal lease is being drained, it is solely the decision of the lessee to relinquish their entire lease or that portion of the lease that is subject to drainage. The lessee is liable for any drainage that occurred during that time the lessee had an interest in the lease. The BLM will attempt to lease the relinquished lands as soon as possible. It is important to note that an operator has a lease right to drill regardless of how much gas is left in place.

4. The additional 2,500 CBM wells would require additional compression, which could affect air quality.

The Wyodak EIS air quality model analyzed the amount of compression and associated facilities that would be necessary to move one billion cubic feet (bcf) of gas per day out of the Powder River Basin. In September 2000, approximately 460 million cubic feet of gas per day was being moved. Using the cumulative producing well number of 7,129 for the 15-month period, approximately .98 bcf of gas could be produced per day. The Wyodak EIS modeled compression emission for nitrogen oxides (Nox) at 1.5 grams per horsepower hour (gm/hp-hr) and 2 gm/hp-hr for carbon monoxide (CO). WDEQ has permitted these compression facilities at a maximum emission limit of 0.7 gm/hp-hr for nitrous oxides (Nox) and 1.5 gm/hp-hr for CO. The results of these differences are that Wyodak EIS over modeled the true emissions for these facilities. Because of these factors, the cumulative effects of the Proposed Action fall within the levels analyzed and approved in the Wyodak EIS.

5. Interim actions during the NEPA process.

Federal regulation 40CFR1506.1 states “Until an agency issues a record of decision as provided in 1505.2, no action concerning the proposal shall be taken which would 1) have an adverse environmental impact, or 2) limit the choice of reasonable alternatives in the subsequent EIS.” This analysis and decision has determined that no significant impact will result from this Proposed Action. Secondly, the PRBO&G EIS alternatives have already been developed, and this action has not changed the development of alternatives to be analyzed.

6. FLPMA non-conformity.

The rationale for conformity with the Buffalo Resource Management Plan and other oil and gas and coal decisions is addressed in the EA on pages 1-13 & 1-14.

7. Impacts over the lifetime of the wells.

An EA that analyzes effects over a 15-month interim period between two EISs analyzing similar actions is unusual. The impacts analyzed in this EA fall under the umbrella of the analysis of impacts for the approved action alternative in the Wyodak EIS ROD. The impacts were mainly related to the water and air resources cumulative effects. Impacts from this Proposed Action for water and air resources are below Wyodak EIS levels; thus, cumulative effects beyond the 15-month interim period would be analyzed in the on-going PRB O&G EIS based on new models for those resources.

Findings of No Significant Impact (FONSI)

Based on the analysis of potential environmental impacts, I have determined that the Proposed Action is not a major federal action significantly affecting the human environment. Therefore, preparation of an EIS is not required.

Rationale for the Findings

Surface Disturbance

The analysis in the Wyodak EIS determined the alternative selected in the ROD would disturb a total of 26,551 acres. Of this total, 103 acres were associated with compressor stations and 26,448 acres were for pads, roads, pipelines, and POD facilities. Since the Wyodak EIS ROD was published, the BLM has monitored disturbance associated with the new wells and ancillary facilities. Results of this monitoring suggest the actual areal extent of the 1,063 federal wells and associated facilities is 1,470 acres. This disturbance equates to an actual rate of about 1.38 acres of disturbance per well.

Assuming this actual rate of disturbance remains constant through implementation of the PA, the cumulative drilling of 12,501 wells (includes Wyodak EIS wells, the PA's 2,500 wells, and projected state and fee wells) would affect 17,251 acres. This figure is well below the total areal extent of disturbance projected in the Wyodak EIS (26,448 acres) for these facilities. Thus, disturbance associated with the PA in addition to those associated with the 1999 Wyodak project do not exceed the level of effect disclosed in the Wyodak EIS and ROD.

Information obtained from on-site reviews of plans of development for pending federal drainage wells show that the majority of infrastructure for production is already in place. This means that the estimates of disturbance to drill the 2,500 protective wells made in the EA are probably higher than will actually occur.

Air Quality

No additional compression facilities are anticipated for the Proposed Action. The Wyodak EIS air quality model analyzed the amount of compression and associated facilities that would be necessary to move one billion cubic feet of gas per day out of the Powder River Basin. In September 2000, approximately 460 million cubic feet were being moved per day. Using the cumulative producing well number of 7,129 for the 15-month period, approximately 0.98 bcf could be produced per day. The Wyodak EIS modeled compression emission for nitrogen oxides (Nox) at 1.5 grams per horsepower hour (gm/hp-hr) and 2 gm/hp-hr for carbon monoxide (CO). WDEQ has permitted these compression facilities at a maximum emission limit of 0.7 gm/hp-hr for Nox and 1.5 gm/hp-hr for CO. The results of these differences are that Wyodak EIS over modeled the true emissions for these facilities. Because of these factors, the cumulative effects of the Proposed Action fall within the levels analyzed and approved in the Wyodak EIS.

Water

Based on the BLM's and WOGCC's current projection for increased numbers of wells and their compilation of water production data for existing CBM wells (WOGCC 2002a), total water production for 1,425 new producing protective federal wells is estimated at 98,172 acre feet over

the 15-month period. This is about 82,900 acre- feet for the 12-month period ending February 28, 2002. For the 6-month period (January 2000 through June 2000), the discharge rate from producing wells averaged 11.1 gpm.

As wells come on line over the 15-month period, applying the 11.1 gpm rate, water production would total approximately 127,497 acre feet (as of February 28, 2002) or about 107,660 acre-feet per year based on the previous 12 months of projected production.

The maximum rate of water production under the approved action for the Wyodak EIS was estimated to be 101.8 mgd or 114,030 acre-feet per year (Wyodak FEIS, p. 4-63). The Proposed Action's projected volumes of water to be produced daily and annually, compared to the volumes for the approved action in Wyodak EIS, indicate CBM-generated flows for the Proposed Action would be less than those volumes estimated in the Wyodak EIS.

SAR could be above threshold levels during some months on the Powder River. This assumes discharge rates stay the same as initial reports and all the wells have approved discharge permits within the 15-month period. Mitigation measures could be used to reduce SAR levels during those months when levels exceed threshold.

It is anticipated that less than 10% of all CBM discharges would approach or exceed threshold levels for barium and would require preliminary treatment to reduce concentrations to acceptable levels.

The Water Quality Division (WQD) of the WDEQ regulates increasing sedimentation, erosion, and other issues affecting the quality of water. WQD also is responsible for granting NPDES permit for surface discharge of produced waters from CBM wells. The WDEQ's NPDES permitting process, effluent limitations, and monitoring requirements for CBM produced water currently are being reevaluated. WDEQ will not be issuing NPDES permits unless companies can demonstrate that water quality in the Powder and Little Powder Rivers will not be elevated beyond current baseline levels at the state line. This may require companies to treat the water before it meets permit limits.

The BLM will issue APD's to operators with the condition that "water will not be discharged until all required State and Federal permits have been obtained".

References

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2000a *Current CBM Discharge Contributions to Mainstem Streams, Powder River Basin Wyoming.*

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Meyer, J.

2000 *Coal Bed Methane Produced Water – Infiltration/Evaporation, Belle Fourche River Basin 1993 to 1999.* Abstract. Annual Geologic Society of America Conference, November 2000, Reno Nevada.

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1999 *Water Resources Data, Wyoming.* Means for years 1930-1999.

WWC Engineering.

2000 *Option #3 NPDES Permit Application for Discharge to the Powder River.*

Wyoming Oil and Gas Conservation Commission (WOGCC).

2000 Coal Bed Production. Located on the Internet, <http://wogcc.state.wy.us/coalbedchart.cfm>. Accessed November 1, 2000.

ATTACHMENT A

DATE ¹	NUMBER OF WELLS ²	NUMBER OF OFFENDING WELLS ³	NUMBER OF POTENTIAL DRAINAGE CASES ⁴
08/16/1999	220	81	186
08/30/1999	15	5	18
09/16/1999	84	26	57
10/05/1999	66	18	35
10/19/1999	96	41	128
11/02/1999	25	8	17
11/15/1999	127	52	184
12/01/1999	249	114	231
01/18/2000	464	194	447
02/01/2000	169	83	229
02/14/2000	115	57	181
02/28/2000	16	8	18
03/16/2000	89	34	74
04/03/2000	114	54	125
04/17/2000	344	119	360
05/01/2000	300		343
Total	3,387	894	2,630
NEW PROCEDURE – Producing Wells Only			
07/17/2000	96	20	51
08/07/2000	28	1	1
08/30/2000	48	13	29
09/22/2000	53	12	22
10/04/2000	127	53	97
11/03/2000	38	2	5
12/08/2000	10	0	0
TOTAL	2,893	1,131	2,838
¹ Date RMG checked all new wells that had production since the last down load date. ² Number of new producing wells on this download. ³ Number of offending wells generated from (²). ⁴ Number of potential drainage cases generated from (³). With the new procedure, the offending wells are producing. The offending wells need to pass a screen to validate drainage cases.			

ATTACHMENT B

PROGRAMMATIC MITIGATION PLAN COMMON TO THE PROPOSED ACTION

Project design features that will be required, if applicable site-specifically, at the APD/POD level of analysis under the Proposed Action are compiled below as a programmatic mitigation plan for CBM development. These mitigating measures also are described in various sections of chapter 4 of the EA, where they are incorporated within the resource impact analyses. Requirements that are standard conditions of approval for CBM APDs are described in appendix A of the Wyodak EIS Record of Decision and in **Appendix B** of the EA. Supplemental standard conditions of approval are presented in **Appendix C** of the EA. The Buffalo Field Office's *Coalbed Methane Well Application for Permit to Drill and Project Plan of Development Preparation Guide*, (December 2000), is also used as a guide to avoid or minimize environmental harm.

Geology and Minerals

Inadvertent release to the atmosphere of the methane resource will be controlled through WOGCC requirements and APD conditions of approval that address well control, casing, ventilation, and plugging procedures appropriate to site-specific CBM development plans.

Surface Water

Mitigation measures in the form of water management plans will be developed and applied as a cooperative effort at the APD/POD level of analysis, on a site-specific basis or on a project-level basis (appendices B and C). Participants in this planning effort include jurisdictional agencies (BLM, Forest Service (FS), Corps of Engineers, Wyoming State Engineer's Office, WOGCC and/or WDEQ), involved land managers and conservation districts. Operators, landowners, and nearby downstream interests (including water users and landowners affected by impacts of increased flows on access, ranching, or mining operations) will also be involved. Cooperation between all stakeholders will be necessary in order to develop water management plans that identify mitigating measures for areas or drainages where high CBM-generated flows are or could be impacting existing uses. Some of the measures that could be applied, as appropriate, at each site include:

- Produced water will be dispersed in the upper reaches of drainages by installing stock tanks.
- Produced water will be transported to distant discharge points when required to avoid sensitive soils, agricultural areas that could be harmed, or areas of potential accelerated erosion. This could require pipelines of considerable length.
- Produced water will be discharged into existing stream channels, reservoirs, stock ponds, and stock tanks in a manner that will not cause increased or accelerated erosion. This has been done effectively in past CBM projects by using energy dissipaters at discharge points and by discharging into channels that are well developed and large enough to handle the increased flows. Energy dissipation can be achieved by using rock, concrete

control structures, or hydrophytic (water-loving) vegetation.

- Discharge points will be located to minimize spring flooding in fields and in accordance with surface owner agreements.
- Discharge outfalls will use alternative outfalls for use with irrigation, as agreed by the operator and landowner or lessee. If discharge water SAR values are not in compliance with WDEQ irrigation suitability evaluation criteria, water discharge on irrigated lands will be prohibited unless the operator treats the water to meet the criteria before discharging it, or confines the untreated water in compliant nondischarge impoundment(s).

Treatment options that could be used and have been explored to reduce SAR levels include:

1. Off channel complete containment in evaporation/infiltration ponds.
2. On channel storage and dilution ponds, where dilution with the natural runoff will meet acceptable SAR values upon a discharge.
3. Ion exchange units.
4. Re-injection into potable and nonpotable aquifers if receivers are available to accept the water.
5. Infiltration leach fields.

Effectiveness of these treatment methods have not been analyzed in the EA.

- In those situations where treatment for barium would be necessary before WDEQ would issue a NPDES permit, the following treatment methods could be used:
 1. Allow the water to come in contact with soils, stream channels, and/or naturally occurring surface water.
 2. WDEQ requires BMPs at the wellhead to remove soluble iron. These aeration devices and small treatment ponds also work well to remove barium.
 3. CBM waters containing elevated barium (800 to 2,000 ug/l range) may be discharged into stream channels immediately above a storage reservoir (CBM Associates 2001).
- To handle total flows with the addition of CBM produced waters, existing downstream culverts on lease will be replaced should flows exceed culvert capacity. New culverts and/or low water crossings will need to be sized to BLM standards for anticipated total flows. Off lease, it is recommended that the operator work with other operators and with

- surface owners in the same drainage to replace downstream undersized culverts that will be affected by their discharge.
- Discharges will be limited to a volume less than or equal to the naturally occurring mean annual peak flow (which is roughly equivalent to a peak generated by a 2-year, 24-hour storm) and that can be handled by the natural channel under anticipated conditions.
 - Local springs will be identified, and construction will be avoided in these areas.
 - Discharge into playas will be avoided unless issues related to potential wetland creation, maintenance of discharge facilities, reclamation, and accountability are agreed to by the operator and landowner or lessee.
 - Discharge points will be selected in stable channels or reservoirs away from any significant downstream headcuts or other major erosional features. Outfall design may include discharge aprons and downstream stabilization of channel side slopes to prevent erosion and provide energy dissipation.
 - Discharge facilities will be site-specifically designed using best management practices, to accommodate livestock's access to water, to control erosion, and to limit sedimentation.
 - Irrigation diversions to increase channel length and in-stream impoundments will be established, as appropriate, and as agreed to by the operator and landowner or lessee.
 - Downstream impoundments may need new or redesigned outlet works in order to handle the steady inflow provided by CBM discharge water.
 - As per State of Wyoming effluent limitations and monitoring requirements contained in approved permits, and BLM or FS monitoring requirements contained in approved monitoring plans, CBM producers will monitor volume and water quality parameters at discharge sites. Monitoring also will occur at selected stations or downstream points of compliance on the Little Powder, Powder, Belle Fourche, and Cheyenne rivers and/or their tributaries.
 - The areal extent of surface disturbance and the length of time that the area will remain disturbed before interim or final reclamation activities commence will be minimized.
 - Interim and final reclamation of all disturbed areas will proceed in a timely manner. Reclamation activities will be conducted during timeframes established by federal land management agencies, landowners, and affected interests.
 - Reclamation must produce a natural appearance and must be consistent with site conditions, area management standards, and projected uses, as agreed to by the operator, landowner or lessee, and appropriate state and federal agencies.
 - Reclamation will include, as appropriate, recontouring, establishing desirable, perennial vegetation, and stabilizing and controlling erosion of all disturbed areas. Additional

measures, such as topsoil conservation, temporary fencing, mulching, or weed control will be used as necessary to ensure long-term vegetative stabilization of all disturbed areas. Reclamation standards will be agreed to between the operator, landowner or lessee, and appropriate state and federal agencies.

- A water management plan must accompany each federal APD/POD and must address all potential CBM development in a watershed area, regardless of surface and mineral ownership (appendices B and C and BLM Plan of Development Preparation Guide).
- At the discretion of the surface owner, dams can be removed and the impoundment area reclaimed after the produced water is no longer available.
- Design and siting of discharge facilities must be carefully controlled or limited where channels are not stable, armored, or large enough to accommodate the flows that will be anticipated.
- Design and location of discharge points must be carefully controlled or limited to ensure that localized flooding does not occur where channel or basin capacity is insufficient to handle increased flows.
- Potential impacts to spring flow, specifically those related to scoria aquifers like the one feeding Moyer Springs, can be analyzed site-specifically, as needed, during review of APDs/PODs or sundry notices. Impacts will be mitigated by applying special conditions of approval for drilling or production operations.
- The feasibility of designing surface water discharge facilities that could prevent increased sediment loads from reaching the affected segments of the Belle Fourche drainage having water quality limited beneficial uses will be analyzed site-specifically.
- Timely recontouring and revegetation of disturbed areas will be required to limit runoff from disturbed areas that could cause sediment concentrations in surface waters to rise over present levels.

Groundwater

- A standard agreement has been developed by CBM operators and landowners to monitor and mitigate water well impacts caused by CBM operations.
- The BLM requires compliance with the Hydrologic Monitoring and Mitigation program outlined in the Wyodak EIS ROD.
- The objective of the monitor well program is to collect data and monitor the effects of coal bed methane development on the groundwater system including the target aquifer(s), adjacent sand zones, and other zones of local importance. Data will be used to characterize and monitor aquifer properties, drawdown, interaquifer communication, leakage, recharge, water quality, and water production / methane production interaction.

As required by the Wyodak EIS/ROD (11/17/99) and in consultation with BLM, the operator will be responsible for drilling, completing, and equipping a set of monitoring wells, as described below, in or near their project area. The specific location will be determined in consultation with the BLM. A well set will include wells completed in the production zone(s) and a sand aquifer, above or below the production zone(s). A typical well set would consist of two or more monitor wells depending on the number of production zones. The two or more monitor wells are to be on the same location, situated 20 to 60 feet apart (depending on topography and site specific constraints). In addition to drilling and completing the wells, the CBM operator is responsible for geophysical logging of the wells, obtaining surface access for the drilling and operation of the monitor wells, and all permitting (Wyoming State Engineer's Office, etc.). The operator is also responsible for a portion of the cost of the monitoring equipment and set-up (the BLM will do the actual equipment setup). This cost share has been established for this year (2001) at \$10,000 per monitor well set. The operator must provide cost share dollars before BLM can equip the wells. These monitor wells must be drilled, completed, equipped and operating at least 30 days prior to any water or gas production from the well(s) authorized under this approval.

WELL COMPLETIONS

COAL WELL (S)

The coal well(s) of the well sets will be completed in a manner similar to a CBM production well. The well(s) will be drilled to the top of the production zone(s) and 5 1/2" (minimum OD) steel casing will be set and cemented from the top of coal to the surface. The coal will then be drilled out, leaving an open whole completion. The well will then be circulated with fresh water to remove any remaining drilling fluids. If the coal doesn't appear to be making water during the clean up of the well bore, water frac may be required. The well must be completed on top with a standard well head, (i.e. KVF 'Gillette Special' well head (2x2 or 2x4 with a 2", centered tubing port and threaded auxiliary access port in the mandrel).

SAND WELL

The depth of the sand well will be determined in the field utilizing the geophysical logs from the coal well. The objective is to complete the sand well in the best sand aquifer immediately above, or below, the production zone(s).

On wells less than 500 feet, the hole must be drilled with a minimum of a 8 3/4" bit to accommodate SDR17, 5 inch ID (minimum) PVC casing and allowing for proper placement of gravel pack and bentonite grout. If larger casing is used, a larger hole will have to be drilled. Upon completion of drilling, geophysical logs will be run to determine the exact placement of the well screen. The well casing will include 10 to 20 feet of blank pipe on the bottom (capped), .020 slot well screen open to the selected sand zone, and blank pipe to the surface. The well will then be gravel packed with 10-20 silica sand to cover the well screen (and associated sand zone) and backfilled with bentonite gravel (or pellets) to the surface. The top of the well casing must have threads (slip to thread adapter) and a vented cap.

On wells greater than 500 feet, 5 1/2" (minimum) steel casing will be set through the sand zone, cemented to surface, and perforated, 4 shots per foot, through the sand zone.

The monitor wells are subject to the same spud notification requirements and completion report requirements as regular federal wells (see General Conditions of Approval). If you have any questions concerning this stipulation and for information on locating and equipping of the wells, please contact Mike Brogan, BLM Hydrologist, at (307) 261-7600.

Air Quality

- Air quality issues related to stationary sources of air pollution will be addressed in accordance with the authorities of the WDEQ. Air quality issues related to mobile sources of air pollution will be addressed in accordance with the authorities of the EPA. Visibility impairment within federally mandated Class I areas will be addressed in accordance with federal regulations on regional haze. Visibility impairment at other Class I and sensitive Class II areas will be addressed in accordance with the recommendations from interagency and stakeholder coordinating groups.
- At the discretion of the surface owner, and in accordance with permitting decisions made by the WDEQ, compressors and compressor stations should be sited to avoid sensitive surface resources and potential conflicts with other uses.
- Under the regulatory authority of the WDEQ and at the discretion of the landowner and the CBM operator, the implementation cost and effectiveness of electrification of compressors and other BACT will be considered.
- Dust control by watering or other appropriate means may be required on access roads.

Soils

- Accelerated soil loss will be minimized by limiting vegetation removal; leveling work areas; and locating wells on slopes that require cuts-and-fills for well pad construction.
- Timely initiation of reclamation and revegetation efforts will be required to effectively and immediately control accelerated soil loss due to either wind or water erosion.
- Road construction that requires cuts-and-fills will be minimized. Pipeline construction also will avoid steeper slopes where possible. Where necessary, erosion control features, such as water bars or other means of diverting flows off sloping pipeline rights-of-way, will be constructed.
- Areas of highly erosive soils will be avoided when drill sites, two-track access routes, and pipeline routes are surveyed and staked in order to substantially reduce the amount of soil loss.

- Soil fertility testing and the addition of soil amendments may be required to stabilize some disturbed lands.
- Surface disturbance will be minimized using construction equipment that is appropriate to the scope of work.
- Roads will be constructed to the minimum standard needed, so that disturbance to soil and vegetation on each road will be minimized.

Vegetation Resources

- Reclamation in the disturbance areas and final closure of the proposed operations will re-establish vegetation suitable for forage and wildlife habitat.
- Actions to enhance restoration of vegetation productivity from desirable species include the following site preparation and reclamation techniques: mechanical loosening or roughening the soil where compacted (discing or ripping); fertilizing or amending soil; seeding to proper depth with desirable species; mulching to retain soil moisture; transplanting containerized plants to speed up the slow-growing species; controlling noxious weeds; or temporary fencing to exclude livestock until vegetation is reestablished successfully. These actions will be required as appropriate.
- Mitigating measures most effective in reducing the potential for decreased vegetation production include timely and well-planned reclamation and effective noxious weed management, avoiding disturbance within playas (old lake beds), and avoiding discharge within closed basins, playas, and areas with soils that will be difficult to revegetate. These mitigation activities will be required as appropriate.

Wetlands

- For any jurisdictional wetlands identified that may be impacted, a detailed mitigation plan will be developed during the APD/POD or sundry notice approval process. Federal requirements to replace all impacted wetlands will mitigate this loss, so environmental impacts will occur only during the life of the project (including reclamation).
- The WDEQ's Water Quality Division administers a state wetland bank. Landowners have the opportunity to bank newly created or expanded wetland areas. While banking provisional wetlands from CBM discharges serves to record the existence or nonexistence of prior nonwetland status, there is no temporary mitigation. Wetlands used for mitigation purposes become jurisdictional and must be maintained in perpetuity. If wetland characteristics are lost due to inadequate hydrology, or other factors, then the banked credit is lost. Banking of wetlands will be considered as appropriate.
- To reduce adverse effects on existing wetlands, water discharge should not be allowed within playas and closed basins, near existing wetlands (if increased discharge volumes or subsequent recharge of shallow aquifers will inundate and kill woody species, especially willows or cottonwoods), and within all delineated or recognized wetlands.

- At the discretion of the surface owner, fencing wetlands and providing off-site watering for livestock will be used to allow vegetation to develop and to maintain water quality in key wetlands. Any fences used should be placed well back from the wetlands to prevent waterfowl mortalities and should be constructed to standards that allow big game movement.
- Consideration will be given to having wetlands and ponds built on accessible public lands where recreational users can benefit from the development.

Wildlife

- All power lines will be built to protect raptors from accidental electrocution.
- Power line corridors will avoid wetlands, to the extent possible, in order to reduce the chance of waterfowl hitting the lines.
- At the discretion of the surface owner, several small ponds will be consolidated into one larger pond in order to provide more open water and a longer shoreline at one site, which may be more beneficial to wildlife.
- The appropriate standard seasonal or year-long stipulations for raptors, sage grouse, and big game, as identified by the BLM's RMP, will be applied.
- Fences along service roads will be avoided unless absolutely necessary in order to prevent a maze of barriers to big game movements. Fences will be constructed to standards that allow for easy big game passage.

Fisheries

- At the discretion of the surface owner, several small ponds will be consolidated into one larger pond that may have the characteristics needed to support a fishery.
- At the discretion of the surface owner, reservoirs developed as part of CBM activities will be sited within natural stream courses to provide benefits to fish and wildlife resources.
- Under the authority of the WDEQ, CBM-produced water and receiving waters will be analyzed before wetlands, ponds, or lakes are formed or expanded. Selenium levels that would cause adverse effects in fish or waterfowl should not be present.

Special Status Species

The following terms and conditions, implement the reasonable and prudent measures described in the U.S. Fish and Wildlife Service (FWS) Biological Opinion, March 2001, for this action. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the Proposed Action. If, during the course of the action, this level of incidental take is exceeded, such incidental take

represents new information requiring re-initiation of consultation and review of the reasonable and prudent measures provided. The Bureau must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures. The terms and conditions are non-discretionary.

The following terms and conditions will be addressed through educational efforts with drilling permit holders. These conditions apply to areas of identified habitat and nesting locations. The Bureau can only apply and enforce these conditions where we have authority.

Bald Eagle

- Speed limits on all project access roads will not exceed 35 mph.
- In the event that a (dead or injured) bird is located during construction and operation, the Services' Wyoming Field Office (307-772-2374) and the Services' Law Enforcement Office (307-261-6365) will be notified within 24 hours.

Mountain Plover

- In the event that a (dead or injured) bird is located during construction and operation, the Services' Wyoming Field Office (307-772-2374) and the Services' Law Enforcement Office (307-261-6365) will be notified within 24 hours. Because of difficulty in identification, all small birds found dead should be stored in a freezer for the Service to identify.
- Speed limits will be 35 mph on local roads and 25 mph within 1/2 mile of identified nesting areas.
- Construction of ancillary facilities (e.g. compressor stations, processing plants) shall not be located within 1/2 mile of known nesting areas.
- Road-killed animals (excluding migratory birds) shall be promptly removed from areas within 1/2-mile of identified nesting areas to avoid attracting avian and mammalian predators. If possible, work schedules and shift changes should be set to avoid the periods from 1/2-hour before to 1/2-hour after sunrise and sunset during June and July, when mountain plovers and other wildlife are most active.
- No dogs will be permitted at work sites to reduce the potential for harassment of plovers.
- The Bureau shall provide operators with educational material illustrating and describing the mountain plover, its habitat needs, life history, threats, and gas development activities that may lead to incidental take of eggs, chicks, or adults. Operators will be responsible for circulating this information among all employees and service providers.

All conservation measures/mitigation measures identified in the Biological Assessment prepared for the project and dated November 2000 will be implemented. The Bureau shall monitor for compliance with the measures. These measures are as follows:

Bald Eagle

- Power lines will be built to standards identified by the Avian Power Line Interaction Committee (1996) to minimize electrocution potential
- The appropriate standard seasonal or year-long stipulations for raptors as identified in the Buffalo Resource Management Plan (U.S. Bureau of Land Management 1985) will be applied
- Surveys for active raptor nests will be conducted prior to construction.
- A minimum disturbance-free buffer zone of 1/2 mile radius will be established for all bald eagle nests and roost sites.
- A seasonal disturbance-free zone of 1 mile radius will be established for all bald eagle nests (February 15 - August 15). This buffer zone and timing may be adjusted based on site specific information through coordination with and with written concurrence of the Service.

Mountain Plover

- Roads will be located outside of nesting plover habitat wherever possible.
- Creation of hunting perches (any object taller than 5 feet high) will be minimized within 1/2 mile of identified nesting areas.
- Disturbance to prairie dog towns will be avoided where possible.
- Native seed mixes will be used during reclamation to re-establish areas where short grass prairie vegetation was disturbed due to Proposed Action activities.
- In areas identified as potential habitat, surveys for nesting mountain plovers will be conducted if ground-disturbing activities are anticipated to occur between April 15 and June 30. Surveys will be conducted in compliance with the FWS *Mountain Plover Survey Guidelines*. A disturbance-free buffer zone of 1/4 mile will be established around all mountain plover nesting locations between April 1 and July 31.

Once occupied mountain plover nesting habitat is located, the Bureau shall reinstate section 7 conferencing with the Service on any project-related activities proposed for such habitat or within 1/4 mile of such habitat. The amount and nature of ground-disturbing activities shall be limited within and adjacent to identified nesting areas in a manner to avoid the abandonment of these areas.

The Bureau shall monitor all take of bald eagle and mountain plover habitat associated with the proposed project. The actual measurement of disturbed habitat can be the responsibility of the Bureaus' agent (consultant, contractor, etc.) with a written summary provided to the Services' Wyoming Field Office upon project completion, or immediately if the anticipated impact area is exceeded.

In addition to the above FWS terms and conditions, the following mitigation measures will also be applied for special status species.

- Special habitats for raptors will be analyzed site-specifically during review of the APD/POD or sundry notices. A minimum disturbance-free buffer zone of 1/2-mile will be established for all raptors during the nesting season (February 1 through July 31), in accordance with the BLM's RMP. Enlarged disturbance-free buffer zones will be established for specific species, as appropriate, at the APD/POD level of analysis.
- Prairie dog towns will be surveyed for the presence of black-footed ferrets if the towns meet U.S. Fish and Wildlife Service (FWS) guidelines. Disturbance in prairie dog towns will be avoided or minimized to protect sensitive species such as the burrowing owl and mountain plover.
- A disturbance-free buffer zone of 1/4 mile will be established around a sage grouse lek to reduce disruption of breeding and nesting activities. A seasonal timing restriction will extend outward for another 1 mile from the 1/4-mile buffer-free zones between March 1 and June 15.
- At the discretion of the surface owner, native species will be planted to reestablish special habitats.

Cultural Resources

- A cultural inventory will be conducted on all areas of proposed surface disturbance at the APD/POD or sundry notice phase of each action.
- Specific plans for avoidance or data recovery will be recommended for any significant sites within the area of potential effect of the proposed activities.

Land Use and Transportation

- If CBM development activities are proposed in the vicinity of scattered subdivisions near Gillette, site-specific mitigating measures will be developed to minimize the impacts and to resolve conflicts.
- Over the project life, uneconomic and depleted wells will be plugged and abandoned, and the disturbance reclaimed and revegetated to approximate pre-project conditions.

- Reclamation and final closure of the proposed operations will be reestablished to grazing and wildlife habitat.
- CBM facilities such as central gathering and metering facilities or compression facilities will be fenced as specified by the BLM.
- Roads and facilities no longer needed will be removed and the affected area will be rehabilitated.
- Where feasible, each access road will be constructed in a transportation corridor that will also include gas and water pipelines and electrical cables.

Visual Resources

- Gathering lines, water lines, high pressure gas lines and underground electrical cables will be located along road rights-of-way whenever feasible.
- Long-term visual impacts will be minimized by designing permanent structures so that they blend with the surrounding landscape to the extent feasible. Disturbed areas no longer needed for operations will be recontoured and revegetated as soon as practicable, and straight edges made by roads, pipelines, well pads, and compression facilities will be reshaped to create irregular or indistinct edges.
- Proposed facility developments on BLM-administered federal surface will be consistent with BLM management objectives for mapped VRM classes.
- All proposed wells and facilities on FS-administered federal surface will be consistent with visual quality objectives for the Thunder Basin National Grassland. Adverse impacts will be minimized by locating facilities, minimizing disturbance of affected sites, and by designing facilities so that they blend in with the surrounding landscape.
- Using two-track and existing roads and centralizing gas compression facilities along existing roads will minimize the visual impact of the road network.
- Use buried power lines to each well, where feasible, will reduce the linear element in the landscape.
- Construction debris will be removed immediately.
- Resource protection measures proposed for erosion control, road construction, rehabilitation and revegetation, and wildlife protection will be implemented during approval of APDs and sundry notices. These measures also will mitigate impacts to visual quality.

Noise

- Compressors should be located at least 600 feet from sensitive receptors (residences, schools, medical facilities, and recreation areas). Under current Wyoming law, the WDEQ can only require this mitigation to occur if municipal or county land use plans address siting of noise emitters.

ATTACHMENT C EA ERRATA

Page Number	Paragraph Number	Line Number	Errata
1-20	<u>Air Quality</u> heading	3 rd bullet	After the third bullet, add heading <u>Coal Mining Conflicts</u>
2-7	1 st row of table	8 th column, "Cum. No. Producing Wells	Replace the number "1857" with 1867
3-12	1	2	The text should read evapotranspiration and infiltration losses may be greater than 90 percent over a distance of 17 miles (Meyer 2000).
4-18	4	2	Replace sentence starting with "Each well is..." with "Each well is expected to produce an average of 138 mcf per day over the projected 15-month period, for an average of 62,928 mcf over the entire 15-month period for each well."
4-18	4	3	Replace "155 bcf" with 90 bcf
4-18	4	4	Replace A\$309,305" with A\$179,345" .
4-18	4	5	Replace A\$441 million with A\$256 million .
4-19	2	1	Replace A\$38,663" with A\$22,418" .
4-19	2	2	Replace A\$309,305" with A\$179,345" .
4-19	2	3	Replace A\$55,095,000" with A\$31,945,650" .
4-19	2	4	Replace sentence starting with "Natural gas produced ..." with The remaining \$156,927 per federal well (87.5 percent of the estimated sales value of \$179,345 per well) is subject to state severance (6 percent) and ad valorem (6 percent) taxes that total \$18,832 per federal well. The proposed 1,425 producing federal wells would contribute \$26,835,600 in severance and ad valorem taxes.
4-19	2	5	Replace "However" at the beginning of the sentence with In addition
4-19	2	6	Replace A\$27,547,000 with A\$15,972,825 .
4-20	4	2	Insert the following at the end of the sentence that begins with "A1) \$14.0 million....": and 4) \$13.8 million (ad valorem taxes) .
4-20	4	3	Replace "\$39.4 million" with \$53.2 million .
4-20	4	4	Replace the fourth sentence starting with "However, the estimated..." with the following sentence: However, the estimated \$16.0 million is about 19 percent of the contribution of \$82 million in federal royalties that was projected in the Wyodak EIS, because existing wells have produced larger quantities of natural gas (average of 138mcf/day) than projected in the Wyodak EIS (average of 125 mcf/day) .
4-20	4	4	Replace "seven percent" with nine percent in the last sentence of the paragraph
4-27	4	2	Replace the sum "\$2,204.8 million" with \$1,278.7 million .
4-27	4	5	Replace the sum of "\$551.2 million" with A\$379.2 million
4-28	Table 4-2		See Revised table 4-2 below.
6-4	1 st citation on page		Replace the citation for "Meyer, J. 2000...." With Meyer, J. 2000. Testimony before Wyoming Select Water Committee. Gillette, Wyoming. November, 2000.

**Revised Table 4-2
Cumulative Economic Impact for Proposed CBM Production**

	Proposed Action	Existing Federal Wells	Existing State & Fee Wells	Projected State & Fee Wells	TOTAL
Number of Producing Wells	1,425	573	3,521	1,610	7,129
Sales Value	\$255.6 million	\$102.8 million	\$631.5 million	\$288.8 million	\$1,278.7 million
Direct/Indirect Employment	\$37.2 million	7.8 million	48.4 million	22.1 million	\$115.5 million
Federal Royalty	\$31.9 million	\$12.6 million	0	0	\$44.5 million
Federal Royalty Returned to State	\$15.9 million	\$6.3 million	0	0	\$22.2 million
State Royalty	0	0	\$105.3 million	\$48.1 million	\$153.4 million
Severance & Ad Valorem Taxes	\$26.8 million	\$10.8 million	\$75.8 million	\$34.6 million	\$148.0 million
Sales and Use Taxes	\$2.2 million	\$0.9 million	\$5.5 million	\$2.5 million	\$11.1 million
TOTAL	\$369.6 million	\$141.2 million	\$866.5 million	\$396.1 million	\$1,773.4 million

Notes: Calculated using 2000 dollars and spot gas price of \$2.85 per mcf.
 Federal royalties are an estimated \$22,418 per federal well
 State royalties are an estimated \$29,897 per state well (State royalty - 16.67 percent)
 Sales and Use taxes are \$1,575 per well

**ATTACHMENT D
DEQ LETTERS**



Montana Department of
ENVIRONMENTAL QUALITY

Marc Racicot, Governor

P.O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • Website: www.deq.state.mt.us

23 January, 2001

Bill DiRienzo
Water Quality Division
Department of Environmental Quality
Herschler Bldg. 4W
Cheyenne, WY 82002

RE: Comments on the Antidegradation Findings for Barium by the State of Wyoming

Dear Mr. DiRienzo:

The Montana Department of Environmental Quality (MDEQ) is taking this opportunity to comment on Wyoming's Antidegradation Review, Analysis and Findings of Concentrations of Barium in the Surface Waters in Northeastern Wyoming Related to Discharges of Coal Bed Methane Produced Water. MDEQ will also describe our understanding of the initial approach, upon which our states have tentatively agreed, to address border water quality issues related to CBM production.

MDEQ's primary responsibility is protection of water quality that supports the current and future uses of state waters. Foremost among these is the seasonal irrigation which occurs on approximately 16,000 acres of the Powder River basin in Montana, and the ranching operations that depend upon the alfalfa produced. One point upon which there is apparent consensus is that the salinity of the Powder is already adversely affecting hay production in Montana. We must also attempt to insure that future CBM development in Montana is not faced with insurmountable obstacles brought about by further impairment of the Powder caused by discharges permitted in Wyoming.

The reports prepared for the Wyoming DEQ may meet specific permitting needs in Wyoming but they may not adequately address the cumulative impacts that will be felt in Montana. The reviewers of these reports in Montana have not had the opportunity to review the water quality data used or any of the specifics that may support the conclusions in the Barium antidegradation reports. Therefore MDEQ must proceed cautiously until the necessary water quality and flow information (surface water and CBM production water) is available for review. Joint review of available data is a key element of the preliminary agreement the states have forged. Our staffs will meet in Sheridan on February 6 to review available data on the quality of the flow in the Powder, the quality of CBM production water measured so far, and to address the difficulty in estimating the amount and quality of production water that will eventually reach surface waters.

Our states have tentatively agreed that Wyoming will administer its permit program on the Powder and Little Powder to insure that there is no measurable change in water quality at the border. This approach is designed to provide the opportunity for the launch of a monitoring program, identification of baseline conditions, and compilation of sufficient and credible data. These efforts will enable us to identify any future measurable change and aid in the establishment of permanent water quality targets at the Montana/Wyoming border. An issue that we have yet to discuss is the nature of any adjusted or corrective action available to the states to address any measurable changes that do occur.

Bill DiRienzo, page 2

Thank you the opportunity to comment and for considering Montana's request for further dialogue on the proposed permits. We look forward to working with the Wyoming DEQ to insure that CBM development can be conducted on both sides of the border without additional adverse effect on the agriculture that constitutes the economic heart of the Powder River Basin in Montana.

Sincerely,


Jan Sensibaugh
Director MT DEQ

C: Art Compton



The State
of Wyoming



Department of Environmental Quality

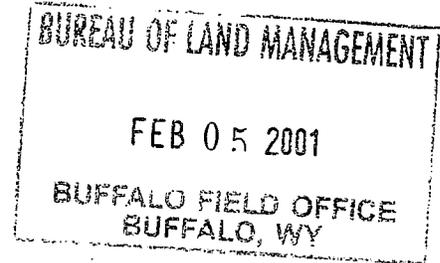
Jim Geringer, Governor

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ADMIN/OUTREACH (307) 777-7758 FAX 777-3610	ABANDONED MINES (307) 777-6145 FAX 777-6462	AIR QUALITY (307) 777-7391 FAX 777-5616	INDUSTRIAL SITING (307) 777-7369 FAX 777-6937	LAND QUALITY (307) 777-7756 FAX 777-5864	SOLID & HAZ. WASTE (307) 777-7752 FAX 777-5973	WATER QUALITY (307) 777-7781 FAX 777-5973
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January 26, 2001

Ms. Jan Sensibaugh, Director
Montana Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901



Dear Jan:

Recently you provided this agency with comments and concerns about the potential impacts of CBM development in Wyoming to waters that flow into Montana. Your most recent letter of January 2, 2001 outlines more specific concerns and seems to offer the foundation upon which we can begin to address mutual concerns and interests as we cautiously proceed with the permitting of CBM discharges in Wyoming.

We understand your concern that downstream designed uses in your state should be protected, that we recognize Montana's water quality standards where they differ from ours and realize your efforts to develop a TMDL for the Powder and Tongue River. As we proceed with our permitting decisions and work toward a mutually acceptable agreement, we intend to address the specific concerns you have raised. We understand that you want the same opportunities to develop your reserves and that downstream irrigators must continue to receive suitable irrigation water.

We agree with your proposal to work toward a long term solution that could result in an allocation of the waste load between the respective states. We anticipate this effort will take several years to complete and require the development of additional site specific and credible data to function as a foundation for the agreement. In the interim, I will propose the following approach:

Powder River and Little Powder River drainage:

1. Permits we continue to issue after the January 3rd hearing should not result in a measurable increase in concentration, for parameters of concern, at the state boundary. We will mutually work together to define what are current baseline conditions for the parameters of concern, looking at existing data variability, availability, and seasonal variation to decide what would constitute a measurable increase. We will build safeguards into new permits so that if we start seeing unacceptable trends we can reopen permits and make appropriate adjustments.

Ms. Sensibaugh
January 26, 2001
Page 2

2. We will develop and implement a monitoring program to measure water quality conditions, trends, and to document whether there are measurable changes in concentrations at the state boundary. We will share with you our monitoring program, and would be interested in the monitoring plans you have for Montana so as to be complementary and avoid unnecessary duplication.
3. We are currently completing an assessment of the potential impacts of the point source contributions to Salt Creek, a concern you continually raise in your letter. In the near future, we can hopefully quantify the impacts of these sources on the Powder River system. We are also reissuing these point source permits with additional monitoring requirements and they are time limited to 2 years.
4. During this interim period, we intend to strategically issue CBM permits in a manner that will give us the water quality data necessary to better judge and predict the impacts of full development on these drainages. Our future negotiation of an appropriate waste load between our states would certainly benefit from these site specific water quality data.

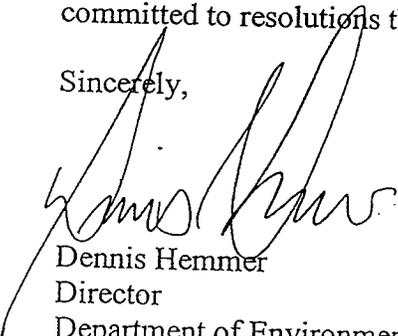
Tongue River drainage:

5. We recognize the higher quality of the Tongue river and the unique uses that exist on this drainage. Until we can come to some long term agreement on a waste load, we would likewise only issue permits on this drainage that assured no measurable increase in the water quality concentration at the state boundary.

Finally, to make this coordination work, I suggest we formalize a process whereby our respective staffs periodically meet and share information and discuss concerns. I feel that the meeting on February 6, 2001 will function as the beginning of this effort.

I hope you find this to be an appropriate response to your letters of concern. I, like you, am committed to resolutions that meet both of our needs.

Sincerely,



Dennis Hemmer
Director
Department of Environmental Quality

DH/bb/10184.ltr
xc: Gary Beach
Art Compton

Post-it® Fax Note	7671	Date	# of pages ▶
To	<i>Paul Beels</i>	From	
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February 28, 2001

Dennis Hemmer
Director, Department of Environmental Quality
Herschler Bldg. 122 West 25th Street
Cheyenne, WY 82002

RE: Coal Bed Methane—Letter of January 26th

Dear Dennis,

Montana supports the general framework that you laid out in your January 26th letter as a reasonable approach to addressing interstate water quality concerns about coal bed methane (CBM) development. We appreciate the cautious approach that Wyoming is taking in regard to permitting CBM discharges and are particularly pleased with your commitment to assess the contributions from Salt Creek. Furthermore, we wish to thank Wyoming for hosting the first meeting of the Montana/Wyoming CBM Technical Workgroup. The meeting was a good first step in resolving our concerns.

I understand that the issue of which water quality parameters are going to affect, or are likely to affect, uses was discussed at length during the meeting. Although no final list of "parameters of concern" for Coal Bed Methane development was prepared, Montana proposes that the list should include those parameters that:

1. Currently exceed water quality standards in the Powder River watershed at the Montana/Wyoming border,
2. may increase in the Powder River and its tributaries at the Montana/Wyoming border to levels above water quality standards, and
3. may increase so as to use up a significant portion of the assimilative capacity of the Powder River or its tributaries at the Montana/Wyoming border.

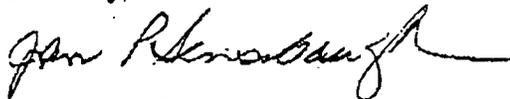
It seems to me that the first two items are of a technical nature and are thus within the purview of the technical workgroup. This does not mean that it will be easy to determine if, how or when the narrative standards for parameters such as salinity or sodium adsorption ratio (SAR) are exceeded. Nevertheless these are technical issues and the technical workgroup can resolve them.

On the other hand, the third item includes the concept of significance. I believe that while the technical workgroup can and should determine which parameters will be increased by CBS discharges, they are not in a position to determine the levels at which such increases become "significant." Both of our states have addressed this issue by adopting policy and/or rules for anti-degradation (or nondegradation) and significance determinations.

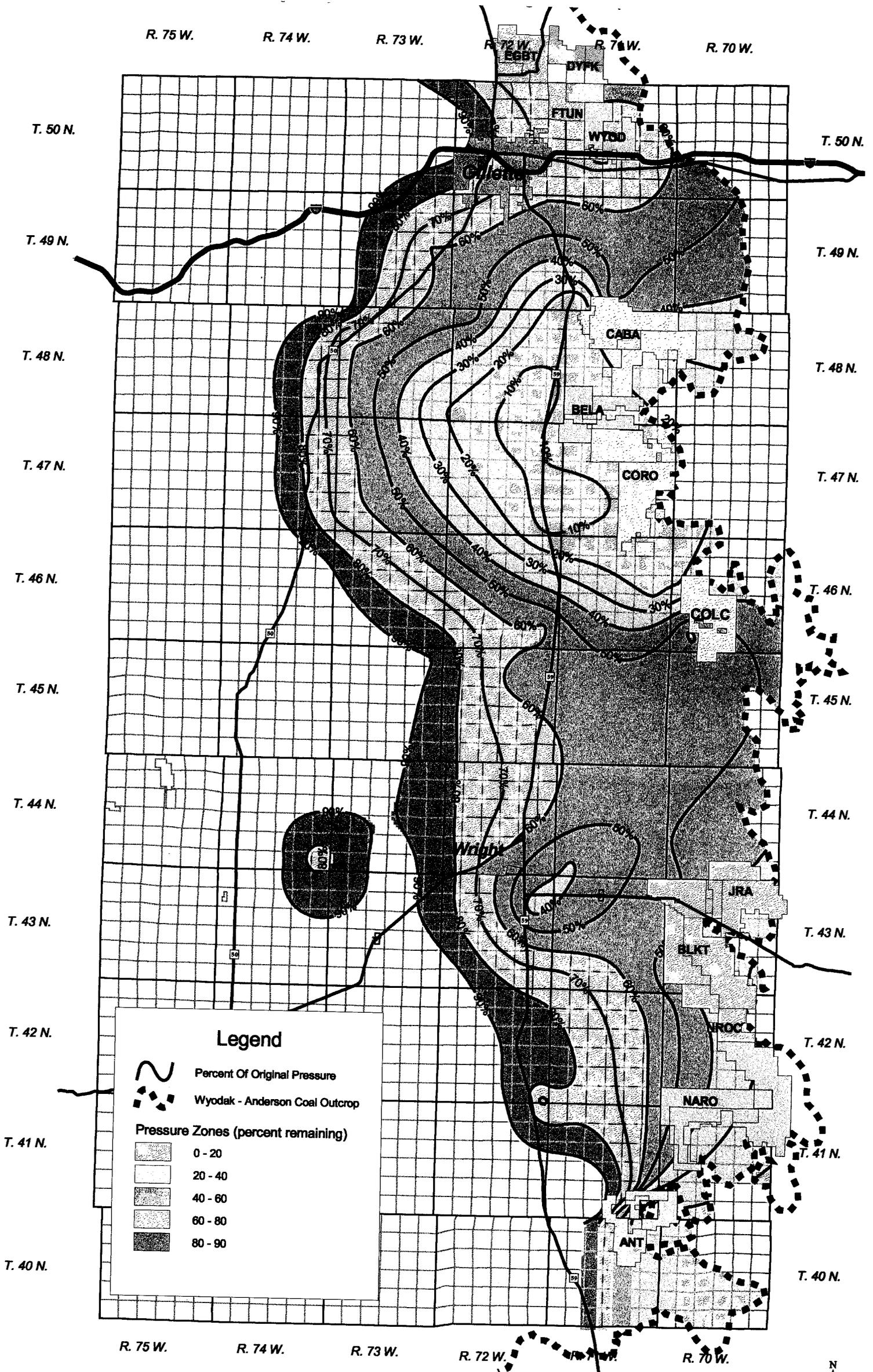
My staff agrees that Wyoming's nondegradation policy and its method of determining significance will be protective of Montana's water quality standards and beneficial uses for those parameters whose current levels are less than applicable standards. Montana does not object to permits issued by Wyoming that contain limits for parameters that are less than the Wyoming significance thresholds. However, in situations where interstate water may receive discharges of carcinogenic or bio-accumulating parameters or where an authorization to degrade is being considered, Montana will actively participate in the nondegradation review and authorization process. We believe that our participation is important to ensure protection of water quality standards and beneficial uses in Montana as well as the equitable sharing of the assimilative capacity of these streams.

I am convinced that our first meeting laid the groundwork for a cooperative consensus based approach to solving the technical and policy issues surrounding Coal Bed Methane development in Wyoming and Montana. My staff indicated that the participation by EPA, industry and the environmental community was beneficial to the process and should continue. I also agree with you that a series of meetings will be necessary to complete the process and that the March 8th meeting in Sheridan is the next step. I am confident that over the course of these meetings our concerns will be resolved and water quality standards and associated beneficial uses will be protected for present and future generations.

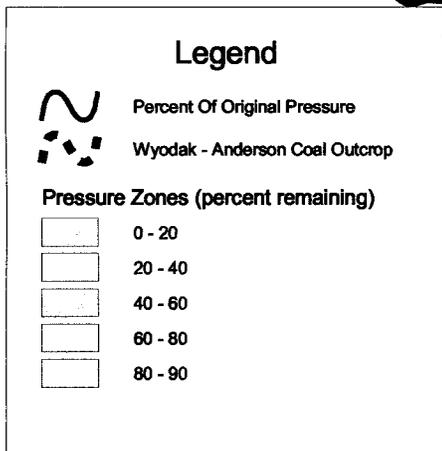
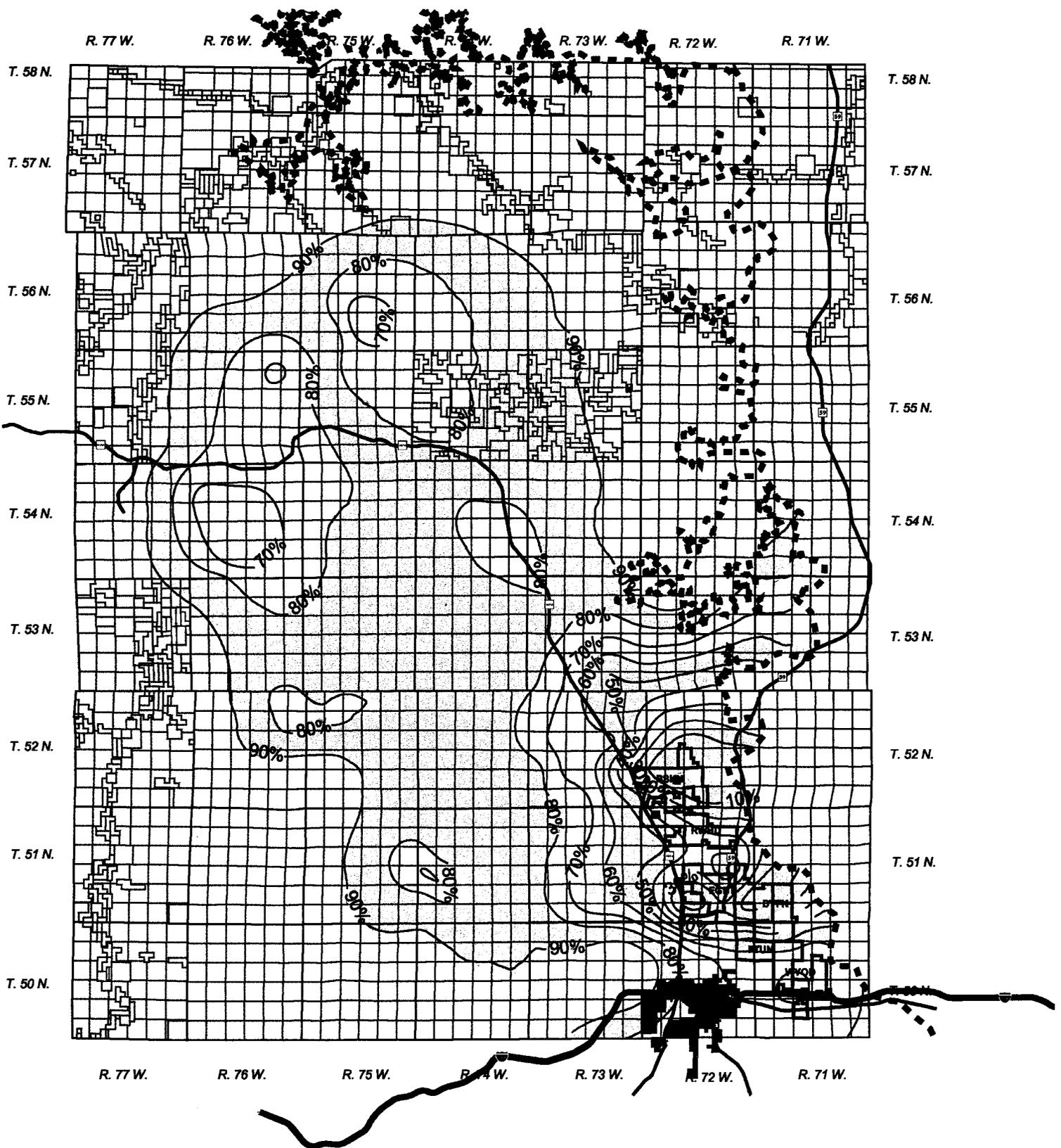
Sincerely,



Jan P. Sensibaugh
Director



Map 1



Map 2

