Walter R. Merschat Comments on BLM's Draft EIS

Final Comments on Draft Environmental Impact Statement
Related to Water Quality

April 5, 2002

Mr. Paul Beels
Project Manager
Bureau of Land Management Buffalo Field Office
1425 Fort Street
Buffalo, WY 82834-2436

Dear Mr. Beels:

On September 6, 2001, I had the opportunity to present my oral testimony at a Hearing to the Committee on Resources, U.S. House of Representatives, in Washington D.C. The topic of the Hearing was: "*The Orderly Development of Coalbed Methane Resources from Public Lands*". I summarized my comments by stating, "In my opinion the race for CBM income has not given ample time or consideration to the lessons we have already learned and the penalties we have been and will continue to pay for this uncontrolled development". I was basically referring to the adverse impacts we have already felt by other Coalbed Methane (CBM) operations in other parts of the United States and that we have lost sight of these environmental consequences due to the blinding desire for CBM income.

As stated in the Bureau of Land Management's (BLM) 1998 annual report, "The BLM Vision for the Future is to provide for a wide variety of public land uses without compromising the long term health and diversity of the land and without sacrificing significant natural, cultural, and historical resource values". I suggest you read the December 1999 BLM document "Coalbed Methane Development in the Northern San Juan Basin of Colorado". In that document the BLM discusses the environmental problems associated with CBM production including: increased methane in domestic water wells, gas seeps (manifested by dead vegetation in pastures), plant loss (trees and other vegetation) due to venting methane precluding soil oxygen, venting methane collecting to explosive levels in dwellings, new and/or expanding coal fires, loss of water wells, water quality, and more.

Mr. Beels, it is hard for me to believe the BLM has already recognized so many detrimental impacts to the environment caused by CBM operations and continues on a "break-neck" development mentality.

Attached to this letter is a more detailed outline of my concerns.

Sincerely,

Walter R. Merschat

April 5, 2002

Mr. Paul Beels
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Re*: Draft Environmental Impact Statement (DEIS) and Draft Planning Amendment for the Powder River Basin Oil and Gas Project (WY-070-02-065)*

Dear Mr. Beels:

Thank you for the opportunity to comment on the Powder River Basin DEIS. I obtained my B.S. and M.S. in Geology from Ohio University in 1967 and 1971, respectively and I have over 25 years experience in the field of oil and gas exploration, which includes extensive background, research and analysis in Coal Bed Methane (CBM) extraction.

I am presently President and Owner of Scientific Geochemical Services and have been so employed since 1987. As part of my duties, I routinely consult on oil and gas exploration, associated environmental impacts, and related geology issues.

I am a Certified Petroleum Geologist (CPG 4252) with the American Association of Petroleum Geologists and a Professional Geologist (PG 51) with the Wyoming Geological Association.

Based upon my experience in oil and gas development and particularly in the field of CBM operations and after reviewing the DEIS, I am concerned that the analysis (or lack thereof) presented in the DEIS fall short with respect to numerous critical environmental impacts associated with CBM extraction.

Specific comments/questions follow.

Page 4-29: The comments made under the ***Methane Emission*** section are far too brief for an environmental impact that has the potential of being the most disastrous of all impacts discussed in the DEIS, i.e., the loss of life due to methane explosions. The casual discussion in these two paragraphs outlining the possibility of methane migrating into homes and/or basements to explosive levels via water wells and then mentioning that people should periodically check for methane gas (to avoid explosions) is totally inappropriate for such a serious life threatening issue. On September 5, 2001, methane from a water well collected in the home of Kristine and Scott Wilson's home near Gillette, Wyoming and ignited. The subsequent fire caused an estimated $45,000.00 damage to the dwelling.1[1] Fortunately, the Wilson family was not harmed.

a. The BLM states that the withdrawal of water from the coal aquifer during CBM operations depressurizes the coal aquifer and induces methane

release into nearby water wells completed in the coal aquifer. The withdrawal of water (and subsequent depressurizing) from the coal aquifer covers a huge portion of the Powder River Basin (DEIS 4-13), which in turn creates an equally large area for methane migration into wells. By suggesting that people within two miles of operational CBM well fields should periodically check their homes and basements for methane gas the BLM is implying that areas beyond the two-mile limit are safe from methane problems in water wells. This is presenting a false feeling of safety for people since CBM dewatering (and subsequent methane problems) can be felt many miles distant from the dewatering area 2[2] and that methane seepage can occur without a well possibly serving as a conduit. In fact, the BLM states, "Methane migration potentially could occur at widespread locations within the PRB, as methane can migrate long distances along naturally occurring joints and fractures in rocks" (BLM, 1999a). The BLM (DEIS 3-44) again states that the potential for methane migration within the Powder River Basin is not limited to areas containing near surface coal seems and that methane migration could occur at widespread locations over the basin. The BLM has identified the entire CBM operation area of the Powder River Basin as an area of potential methane seepage and nonchalantly suggests people periodically check for explosive levels of methane in their homes. This "one liner" tucked into the massive DEIS is not acceptable for the thousands of people possibly harmed by methane seepage.

b. The BLM (DEIS) fails to adequately cover methane seepage/venting along geologic pathways (faults, joints, etc.) as a result of depressurizing (dewatering) the coal and shallow sands. This seepage/venting has the potential of being many times more severe than problems related to methane finding its way into homes via water wells. During the past two years I have photographed a seep erupting through the Belle Fourche River southeast of Gillette, Wyoming. A long-time rancher who owns property adjacent to the river identified this seep, and does not remember the seep being there in the past. By all comparisons, this seep is enormous and could fill a building with explosive levels of methane in minutes. This is not one of the many tiny "now-and-then" bubble seeps as documented by individuals in the area and occurring over most of the world, but a huge eruption. The seep is in a CBM dewatering area where nearby ranch water wells that once produced water from the coal have now gone dry and hiss with venting methane gas. The seep is visible due to the presence of the river water that is disturbed by the venting gas. Venting also occurs through the soil and into the atmosphere but is left unnoticed due to the lack of a water interface. Dewatering will lower the groundwater levels in/under Gillette as much as 300 to 400 feet (BLM 1999a). Gillette is near the outcrop of the coal it is in a precarious position to be inundated by seeping methane (BLM 1999a). In a June 2001 report by Consolidated Engineers and Materials Testing, Inc. (CE&MT) titled "Subsurface

Investigation of the City of Gillette, Wyoming," CE&MT reported that the combination of dewatering coupled with structural and stratigraphic geologic conditions have created methane migration pathways within Gillette. The BLM, Wyoming Department of Environmental Quality (WDEQ), City Officials and Industry owe it to the people of Gillette as well as other cities, towns, and residents living within the bounds of the CBM development area of the dangers of methane venting.

c. In 1987, AMAX Coal Company was dewatering coal in preparation for expanding their strip mine near the Rawhide Subdivision, just north of Gillette, Wyoming. As the coal was dewatered, voluminous amounts of methane seeped to the surface and collected to explosive levels under people's homes and buildings. The entire Rawhide Subdivision was evacuated (WDEQ). AMAX Coal Company spent millions of dollars to "buy out" the subdivision. Gillette, Wyoming is in a similar geologic position as Rawhide Village, i.e., shallow coal seams beneath the city that are being dewatered. The BLM even states, "Gas migration, seepage, and venting are naturally occurring processes where coal beds are extremely close to the surface, and can be enhanced during CBM development activities" (DEIS 4-85). Sheridan, Buffalo and numerous other small towns and/or ranches, homes, buildings in both Wyoming and Montana are potential targets for CBM related methane seepage. The BLM (DEIS) has failed to adequately address the cumulative impacts caused by the combination of coalmines and CBM wells dewatering the coal and resultant methane seepage.

d. Also, the BLM (DEIS 4-21, and BLM 1999a) states that sands (stratigraphy) above the dewatered coals will also be dewatered through vertical continuity between the deeper coal and shallower sands (DEIS 4-1) thus affording a multitude of additional pathways for methane to migrate upward and laterally into shallow sands and not just confined to areas within two miles of a CBM operation. Again, the BLM fails to discuss the widespread nature of the methane seepage potential.

e. The area of the Powder River Basin affected by CBM development and the subject of the DEIS contains thousands of conventional oil and gas wells, many dating back to the early part of the 1900's. Virtually all of these wells penetrate (are deeper than) the Fort Union coals. It is without question that a combination of time and the subsurface conditions (corrosion, rust, pipe fatigue, etc.,) have caused many of these wells (abandoned or working) to have casing problems. Cross contamination of reservoir fluids along these vertical conduits has become a significant problem not only in Wyoming but also other oil and gas producing areas 3[3]. In the Los Angeles Basin, where numerous earthquakes help degrade the well casings, the newly constructed Belmont High School (cost of $185,000,000) will not open due to methane gases migrating from

old underlying wells into the structure 4[4]. The point is rather simple, with thousands of pre existing wells penetrating the coal, literally thousands of possibilities exist for methane seepage to occur transcending the entire geologic column from the coal to the surface. I feel the BLM (DEIS) has grossly underestimated the potential problems associated with this issue.

f. Again, as stated by the BLM, "Gas migration, seepage, and venting are naturally occurring processes where coal beds are extremely close to the surface, and can be enhanced during CBM development activities" (DEIS 4-85). In the San Juan Basin of Colorado, Amoco Oil Company's CBM operations enhanced methane venting to levels sever enough to cause the evacuation of homes/ranches (BLM 1999b), kill 100 year old trees and other vegetation (Stonebrooke, 1996), kill burrowing rodents5[5], and otherwise create an area several miles long and thousands of feet wide unsafe for habitation (Stonebrooke and BLM1999b). The BLM (DEIS) again fails to recognize and the address adverse impacts that are being felt by ongoing CBM development in other areas (as reported by BLM offices).

g. Additionally, the outlook for methane seepage impacts will only get worse. Recently, the Colorado Oil and Gas Conservation Commission (COGCC) stated that recent work has shown that methane seepage at the outcrop in the San Juan Basin will significantly increase (4 to 20 fold increase) 6[6]. The BLM (DEIS) needs to adequately investigate methane seepage issues.

h. Global warming is an intriguing topic that has been debated throughout the scientific community. The possibility of the temperature changes being a totally natural event has merit, however; a preponderance of scientific information suggests human activity (industrial pollution, auto emissions, etc.) has caused or accelerated the climate changes by adding greenhouse gases to the atmosphere. Most debate centers on carbon dioxide (C02) as the major greenhouse gas. Methane is 20 times a more effective greenhouse than C02.7[7] The venting of methane during CBM well completion procedures is one source of additional methane to the atmosphere. Given the amount of potential methane seepage/venting to the atmosphere (other than well testing) caused by CBM development, I feel it imperative the BLM investigate the issue more thoroughly.

Page 4-86: Again, the BLM (DEIS) grossly inadequately confronts one of the most potentially disastrous issues related to CBM development, i.e., *coal fires*. The BLM (DEIS) states, "CBM development is not likely to increase the occurrence of

underground coal fires in the Project Area". The BLM (DEIS) discusses the unlikely nature of coal fires increasing (or starting) by implying the completion of CBM wells create unfavorable conditions for the spontaneous combustion of coal. This may be true for the coal in the deeper portions of the basin (Lyman, and Volkmer, 2001), but the BLM (DEIS) neglects to address the most significant and obvious areas of potential coal fires; the edges of the basin where the coal is shallowest and dewatering of the coal is quite acute (BLM 1999a). The BLM (DEIS) skirts the issue of expanding old or starting new coal fires along the edges of the basin (where dewatering exposes coal to air entry) by directing the reader to the deeper portion of the basin and the unlikely event of coal fires related to well completion techniques.

a. Lyman and Volkmer (2001) conclude by stating, "Nearly all the conditions for the self-ignition of coal are absent in the immediate vicinity of coalbed methane wells". This may be true, but Lyman (2001) like the BLM (DEIS) focus more on CBM well related fires and fail to adequately address the most obvious areas for fires (due to dewatering), the basin edge (BLM 1999b)

b. Coal fires have burned in the recent geologic past and have significantly contributed to the landscape of the Powder River Basin in the form of "clinker" deposits (Coates and Heffern 1999). In more recent time, a coal fire (or fires) has been burning north of Sheridan, Wyoming near/at the old Acme mine. Most recently (last three years), the fire appears to be "rapidly expanding" as evidenced in venting smoke, surface collapse, and vegetation loss 8[8]. This expansion is coincident with CBM development operations and dewatering in the area. The BLM (DEIS) has failed to address this impact and furthermore, appears to want to avoid a thorough discussion of the relationship between dewatering and creating or expanding existing coal fires. However, the BLM (1999b) does give some rather extensive insight into the dewatering-coal fire relationship due to the identification of four new coal fires in the San Juan Basin post CBM dewatering and groundwater lowering. It is a moot point if these San Juan Basin fires are new or just expanding older fires. The point is that the recent fire activity is related to CBM dewatering (BLM 1999b).

c. A recent article entitled "China's on Fire"9[9] states that "China's underground fires are quietly consuming up to 200 million tons of coal each year. The fires spew nearly as much carbon dioxide into the atmosphere as do all the cars in the United States". The coal fire(s) near Sheridan Wyoming are also noticeable by the smoke and sulfur-like odors in the area. Not only does the BLM (DEIS) fail to adequately address the potential for more or new coal fires, there is totally inadequate coverage or concern of air quality/coal fire issues.

d. Coal fires that are presently burning appear to be expanding. As dewatering continues, more fuel (coal) will become available and the fires will continue

to spread. New fires can start. Has the BLM given any thought to the impact spreading or new fires would have on vegetation or wildlife (endangered species)?

e. Dewatering of the coal by CBM operations lowers the groundwater level and liberates methane (BLM 1999a, 1999b). The coal fire near the Acme mine is expanding. Methane liberated by the dewatering and exposing more coal as fuel is contributing to the escalating burn. As dewatering continues, more fuel (coal and methane) will be available. The BLM (DEIS 3-44) states that "If near surface coals were to burn, the introduction of methane to the outcrop area, through seepage, could intensify the natural process of combustion if the methane were to burn along with the coal." There are fires presently burning. They are expanding. What process does the BLM recognize that would prohibit the methane from burning along with the coal?

f. The BLM (DEIS 3-44) discusses coal fires in the section entitled ***Spontaneous Combustion of Coals*** and does a nice job of skirting the issue. Again, the likelihood of coal fires starting in or around a CBM well bore are probably slight. It's the dewatering of the coal along the edges of the basin where the coal is shallow (and the fires presently are) that is of concern.

Mr. Beels, I want to thank you for the opportunity to present my concerns to certain issues within the DEIS.

Sincerely,

Walter R. Merschat

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10[1] Casper Star Tribune, September 6, 2001

11[2] Lance Cook, Wyoming Geological Survey, State Geologist, personal communication.

12[3] New York Times, May 29, 2000, by Jim Yardley

13[4] Los Angeles Times, January 25, 2000, API Article

14[5] Dick Baughman, Geologist for the Ute Indian Tribe, Bayfield, Colorado, personal communication.

15[6] COGCC, 3M Project, web site information

16[7] Various Magazines (Scientific American, Geotimes, Time, Newsweek, News Papers, etc.)

17[8] Leo Ankley, Decker Montana resident, personal Communication, March, 2002.

18[9] Discover Magazine, October, 1999, R&D Section, “China’s on Fire”.