Pace Environmental Law Review

Volume 24
Issue 2 *Summer 2007*

Article 4

July 2007

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ARTICLE

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The great eastern expanses of Wyoming and Montana are reminiscent of time that exists almost solely on movie screens—the Western frontier. This fabled area is rich in history. It is where Butch Cassidy, Buffalo Bill, and Crazy Horse added to their legends, Old West battles raged, and homesteaders came to set up new life.[1] It is part of a vast region deep in Native American history and where the Crow Tribe largely dwelt.[2]

In the beautiful area of the Powder River Basin of Wyoming and Montana, coal is plentiful, but water is scarce. This unfortunate balance has put this treasured landscape under a new and potentially devastating threat. Coalbeds contain significant quantities of methane, a form of natural gas that can be used as fuel.

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1. *See* Keith Kloor, *Powder Keg*, AUDUBON MAG., Dec. 2002, *available at* http://audubonmagazine.org/features0212/dispatch.html; TOM DARIN ET AL., WYO. OUTDOOR COUNCIL & POWDER RIVER BASIN COUNCIL, COALBED METHANE DEVELOPMENT IN WYOMING'S POWDER RIVER BASIN: NATURAL GAS DEVELOPMENT AND ITS THREATS TO LANDSCAPE, PEOPLE AND WILDLIFE 3 (2001), *available at* http://www.wyomingoutdoorcouncil.org/programs/cbm/docs/cbm_screen.pdf [hereinafter JOINT REPORT].

2. *See* Wyoming Indian Tribes, http://www.accessgenealogy.com/native/wyoming/index.htm (last visited Apr. 17, 2007); Access Genealogy, Indian Tribes of America, http://www.nativeamericans.com/tribe_map_1.jpg (last visited Apr. 17, 2007).

Historically, efforts have not been made to capture this methane. Recently, however, this has changed. Governmental policies, antiquated laws regarding land ownership, and technological advances have made it both possible and economical to extract the methane fuel trapped in the region's vast coalbeds.

Coalbed methane ("CBM") development brings with it a host of environmental concerns. Not only do methane wells and their accompanying infrastructure cause serious disruption to the land, methane extraction also presents a particular danger to this dry region. In order to capture the gas, vast quantities of water contained in the region's precious aquifers must first be pumped to the surface. Frequently this water, which can be salty or otherwise contaminated, is dumped on the surface or directly into streams and other watercourses. This results in waste and pollution.

This paper will explore the complex issues concerning CBM development, with a focus on how it has impacted the Powder River Basin. First, it will describe the Powder River Basin and examine what CBM is, how it is recovered, and the impacts from CBM development. The paper will then examine some of the laws that regulate CBM production and how litigation concerning CBM development in the Powder River Basin has resulted in some successes in mitigating and accounting for the impacts of such development. The final section will analyze the challenges and hopes faced in addressing the impacts of further CBM development.

I. AN OVERVIEW OF THE POWDER RIVER BASIN AND CBM DEVELOPMENT

A. The Powder River Basin

The Powder River Basin encompasses much of southeastern Montana and northwestern Wyoming,[3] spanning approximately thirteen million acres.[4] The basin stretches from the headwaters of Big Horn Mountain rivers and streams in the west to prairie rivers in the east. Among the basin's fabled waters are the Tongue River, the Big Horn River, the Cheyenne River, the Yellowstone River, and the Powder River, a shallow, wide river with a

3. *See* Biodiversity Conservation Alliance, Coalbed Methane Development in the Powder River Basin, http://www.voiceforthewild.org/general/mapgallery/prb/cbm.html (last visited Apr. 17, 2007).

4. Earthjustice, Background: Coalbed Methane in the Powder River Basin, http://www.earthjustice.org/library/background/coalbed_methane_in_the_powder_river_basin.html (last visited Apr. 17, 2007).

dark, powdery bottom.[5] The Powder River itself is one of the few remaining prairie rivers that resemble the waterways of the old frontier, containing rare pockets of true prairie habitat where antelope, prairie dog, elk, mountain lion, and coyote play nature's harsh games of survival.[6]

Since frontier settlement, this area has successfully accommodated many uses that rely on high quantities of water, such as agriculture (mainly including grazing and ranching) and energy development.[7] Because the region is a semi-arid climate which receives little rainfall,[8] careful use and allocation of the region's water is instrumental in ensuring these uses remain viable.[9]

Traditional coal mining did not upset this important balance, but intense expansion of CBM development places an unprecedented strain on the area's water resources. The result is that these traditional uses and CBM development are beginning to collide.

B. A National Demand for Gas

It has long been known that methane gas is present in coal deposits.[10] CBM gas is generally trapped under groundwater where it attaches to coal.[11] Until recently, methane gas in coal deposits was mainly viewed as a health threat to miners and as an explosion risk.[12] This has changed as a variety of factors—such as increased demands for natural gas, soaring natural gas prices,

5. *See* Biodiversity Conservation Alliance, Watersheds in the Powder River Basin, http://voiceforthewild.org/general/mapgallery/prb/watershed.html (last visited Apr. 17, 2007).

6. Kloor, *supra* note 1 (stating that the Powder River Basin is home to over 157,000 mule deer, 108,000 pronghorn antelope, nearly 12,000 elk, and 25 native species of fish); JOINT REPORT, *supra* note 1, at 4.

7. *See* Kloor, *supra* note 1.

8. *See* JOINT REPORT, *supra* note 1, at 3.

9. *See id.* at 4.

10. JOSHUA SKOV & NANCY MYERS, SCI. & HEALTH NETWORK, EASY MONEY, HIDDEN COSTS: APPLYING PRECAUTIONARY ECONOMIC ANALYSIS TO COALBED METHANE PRODUCTION IN THE POWDER RIVER BASIN § 1.1 (2004), *available at* http://www.powderriverbasin.org/cbm/easymoney.shtml.

11. U.S. GEOLOGICAL SURVEY, U.S. DEP'T OF INTERIOR, USGS FACT SHEET FS-123-00, COAL-BED METHANE: POTENTIAL AND CONCERNS 1 (2000), *available at* http://pubs.usgs.gov/fs/fs123-00/fs123-00.pdf [hereinafter CBM POTENTIAL AND CONCERNS].

12. In fact, it was concern for methane that gave us the phrase "canary in a coal mine," as canaries would detect this gas to their demise, warning coal miners of the danger of respiratory ailments and explosion. SKOV & MYERS, *supra* note 12, at § 1.1.

technological developments, and federal subsidies—have made it possible and desirable for gas companies to extract this gas.[13]

Natural gas is an important and growing source of fossil fuel energy. Combined, oil and natural gas provide 62% of the United States' energy supply.[14] Natural gas alone provides 24% of the nation's total energy consumed and generates 16% of the country's electricity.[15]

Part of natural gas's allure is that, unlike many other fossil fuels, it is largely produced domestically.[16] It is also promoted for environmental reasons. Despite many of the environmental costs of its extraction, natural gas burns cleaner than other fossil fuels.[17]

Thus, demand for gas is high. Further, this demand is growing by one trillion cubic feet a year, an amount that currently represents approximately a seventy-five day supply of U.S. residential gas consumption.[18] It is forecasted that 95% of future power plants in the U.S will be fueled by natural gas.[19] At current consumption growth rates, the Bush Administration's Department of Energy projects the country will need about 50% more natural gas production in the year 2020.[20]

C. A Limited Supply, Made Easy to Exploit

The United States is estimated to have 700 trillion cubic feet of CBM gas.[21] Only about 100 trillion cubic feet of that gas is con-

13. *See generally* GARY BRYNER, NATURAL RES. LAW CTR., UNIV. OF COLO. SCH. OF LAW, COALBED METHANE DEVELOPMENT IN THE INTERMOUNTAIN WEST (2002), *available at* http://www.cbmclearinghouse.info/docs/nrlc/title_contents_pages.pdf.

14. *Id.* at 4.

15. *Id.*

16. *See id.* (85% of natural gas production is domestic; the rest is imported from Canada).

17. U.S. GEOLOGICAL SURVEY, U.S. DEP'T OF INTERIOR, USGS FACT SHEET FS-156-00, WATER PRODUCED WITH COAL-BED METHANE (2000), *available at* http://pubs.usgs.gov/fs/fs-0156-00/fs-0156-00.pdf. ("The need to decrease CO2 emissions favors the increased use of natural gas as an alternative to coal.") [hereinafter PRODUCED WATER].

18. BRYNER, *supra* note 15, at 4.

19. Jason King, *The Dirty Side of Clean Energy: Coalbed Methane Production in Wyoming's Powder River Basin,* VT. J. EVTL. L., Dec. 10, 2001, http://www.vjel.org/editorials/2001F/king.html.

20. *See* BRYNER, *supra* note 15, at 4 (DOE projects that natural gas use increasing from 22.8 to 34.7 Tcf between 2000 and 2020).

21. ENERGY RES. SURVEYS PROGRAM, U.S. GEOLOGICAL SURVEY, U.S. DEP'T OF INTERIOR, USGS FACT SHEET FS-019-97, COALBED METHANE—AN UNTAPPED ENERGY RESOURCE AND AN ENVIRONMENTAL CONCERN (1997), *available at* http://energy.usgs.gov/factsheets/Coalbed/coalmeth.html.

sidered to be economically recoverable.[22] According to the United Stated Geological Survey, this recoverable gas represents about a five year supply of gas for America.[23]

Coal tends to lie at relatively shallow depths so wells are easy to drill and fairly inexpensive to complete.[24] Also, since the location of most of the nation's coal is already known, the probable locations of CBM are also known, making exploration costs low.[25] The low cost, low risk nature of CBM development makes it attractive to developers.

CBM was first commercially developed in 1981[26] due to encouragement by a tax credit passed in 1980—the Crude Oil Windfall Tax Act of 1980—that sought to promote domestic energy production from unconventional sources.[27] CBM development got a further boost in 1999 when the Supreme Court ruled that for federal purposes CBM is not included within the meaning of coal.[28] This ruling meant that patentees with rights in the gas estate (the interest in gas) on federal lands can access the CBM even if another party owns the coal rights.[29] Since the gas estate is generally senior to the coal estate, this ruling also meant that owners of CBM may seek to enjoin coal mining activities from interfering with their ability to produce CBM, further lowering the risks associated with CBM development.[30] Recent government policies reflecting willingness, even encouragement, to develop gas

22. *Id.*; BRYNER, *supra* note 15, at 1.

23. U.S. Geological Survey, Coalbed Methane Activities in the Energy Resources Program, http://energy.cr.usgs.gov/oilgas/cbmethane/ (last visited Apr. 17, 2007).

24. CBM POTENTIAL AND CONCERNS, *supra* note 13, at 1. CBM producing wells are usually between 200 and 2,200 feet deep. ROMEO M. FLORES, ET AL., CENT. REGION ENERGY RES. TEAM, U.S. GEOLOGICAL SURVEY, U.S. DEP'T OF THE INTERIOR, OPEN-FILE REP. 01-126, A FIELD CONFERENCE ON IMPACTS OF COALBED METHANE DEVELOPMENT IN THE POWDER RIVER BASIN, WYOMING (2001), *available at* http://pubs.usgs.gov/of/2001/ofr-01-126/stops.html. Generally, gas wells less than 4,000 feet deep are considered "shallow," meaning that CBM wells are often rather inexpensive to drill (about $35,000 per well) compared to other gas wells. BRYNER, *supra* note 15, at 6, 11.

25. *See* BRYNER, *supra* note 15, at 6-7, 11.

26. *Id.* at 1.

27. *Id.* at 6; Friends of the Earth, *The Coalbed Methane "Play,"* POWER POLITICS, Aug. 12, 2003, http://www.foe.org/powerpolitics/8.12.pdf.

28. *See* Amoco Prod. Co. v. S. Ute Indian Tribe, 526 U.S. 865, 865 (1999).

29. *See* King, *supra* note 21; BRYNER, *supra* note 15, at 6.

30. *See* BRYNER, *supra* note 15, at 6.

sources on public lands have added further fuel to the growth of CBM production.[31]

As a result, though still dwarfed by conventional gas development, CBM production has grown to represent a sizable amount of total gas development in the U.S.[32] It has expanded from just a few dozen wells in the early 1980s to nearly 6000 wells by 1992 and 14,000 wells by 2000.[33] Today, CBM gas production accounts for about 7.5% of the nation's gas production and is the fastest growing domestic source of natural gas.[34]

D. The Powder River Basin, in the Eye of the Storm

The Powder River Basin is at the center of much of the current growth in CBM development. In the Wyoming portion of the basin, where most activity has occurred and is planned to occur, the Powder River Basin has an estimated thirty-nine trillion cubic feet of CBM, about twenty-five trillion of which are recoverable.[35] This amount of recoverable CBM could meet the nation's gas needs for approximately one year.[36] It is expected to be extracted over about a twenty-year period.[37]

The Powder River basin has experienced rapidly rising CBM development since 1993.[38] Since then, production has exploded. Production in the basin rose from 360 wells producing fifty-four million cubic feet of gas in 1997 to almost 6000 wells producing 656 million cubic feet of gas in 2001.[39] The Bureau of Land Management ("BLM") predicts that more than 50,000 wells will be de-

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31. *Id.* at 5, 20 (discussing Bush Administration energy policy to increase energy production on public lands and citing figures that show increased energy production on public lands in the 1990s).

32. *See id.* at 6 (CMB produced gas represented 7% of U.S. gas production in 2000).

33. *Id.*

34. SKOV & MYERS, *supra* note 12, at § 1.1. This growth is quite substantial. In 1989, ninety-one billion cubic feet of CBM was produced. BRYNER, *supra* note 15, at 6. That number soared to 1.3 trillion cubic feet in 2000. *Id.*

35. BUFFALO FIELD OFFICE, WYO. STATE OFFICE, BUREAU OF LAND MGMT., U.S. DEP'T OF THE INTERIOR, NO. WY-070-02-065, RECORD OF DECISION AND RESOURCE MANAGEMENT PLAN AMENDMENTS FOR THE POWDER RIVER OIL AND GAS PROJECT 2 (2003) [hereinafter RECORD OF DECISION AND AMENDMENTS]; JOINT REPORT, *supra* note 1, at 4.

36. King, *supra* note 21.

37. SKOV & MYERS, *supra* note 12, at § 1.1

38. FLORES, *supra* note 26.

39. BRYNER, *supra* note 15, at 1

veloped in the Powder River Basin over approximately the next ten years.[40]

This level of production represents enormous development pressure in the rural Powder River Basin, which currently has 1205 grazing allotments covering 1.6 million acres of federal land in Montana alone.[41] CBM development will bring more than five wells per square mile, 25,000 miles of unpaved roads, and 47,000 miles of pipelines and power lines to this land.[42] It will also pump trillions of gallons of water out of the ground in a dry region where water is precious.[43]

Obviously, development of this magnitude in a relatively pristine region carries with it a host of environmental concerns. CBM development presents environmental issues substantially different from conventional gas development. Unlike natural gas, which is usually extracted by drilling into pockets of gas and allowing the gas to escape upwards through a well, coal bed methane is extracted by pumping sub-surface water to the surface in order to reduce water pressure trapping the methane below ground.[44] As such, CBM extraction produces enormous amounts of water generally not seen in conventional gas development.[45] Consequently, CBM extraction poses new threats to water resources, soil, and habitat, as well as presenting problems of noise and air quality.

E. The Environmental Impacts of Coalbed Methane Extraction

Primarily, the deleterious environmental impacts of CBM development concern the enormous amount of wastewater produced. CBM wells can produce up to 17,280 gallons of wastewater per

40. RECORD OF DECISION AND AMENDMENTS, *supra* note 37, at 2; *see also* JOINT REPORT, *supra* note 1, at 4. Companies wishing to develop CBM wells in the Powder River Basin include: Barrett Resources Corporation (Williams), CMS Oil and Gas (Perenco S.A.), Devon Energy Corporation, Lance Oil and Gas (Western Gas Company), Pennaco Energy (Marathon Oil Corporation), and Yates Petroleum Corporation. RECORD OF DECISION AND AMENDMENTS, *supra* note 37, at 1.

41. SKOV & MYERS, *supra* note 12.

42. *Id.*

43. *Id.*

44. *See, e.g.*, Pennaco Energy, Inc. v. U.S. Dep't of the Interior, 377 F.3d 1147, 1158 (10th Cir. 2004) (describing CBM extraction process).

45. *See id.* (noting findings that CBM extraction results in far more water production than conventional gas and oil drilling); PRODUCED WATER, *supra* note 19, at 1 (stating that "[t]he amount of water produced from most CBM wells is relatively high compared to conventional natural gas wells").

day.[46] Though some of this water can be of high quality, much of it is highly saline and unsuitable for many uses.[47] Pumping large quantities of water to the surface to aid in CBM production drastically reduces underlying aquifers.[48] Because this water contains high concentrations of sodium, calcium, and magnesium, it also seriously degrades the quality of nearby rivers and streams when it runs into surrounding waterways.[49] Furthermore, CBM production involves a process called hydraulic fracturing, whereby fluids which are often toxic and carcinogenic are injected into the well to break up coal seams and allow gas to more easily escape.[50] The presence of such fluids in groundwater is a cause for concern.[51] Additionally, the extensive roads, pipelines and power lines, well pads, compressor stations, and reservoirs that accompany wells may disturb habitat.[52] The density of CBM development, projected to be one well per every eighty acres, furthers this disturbance.[53]

The length of return for each well is also fairly short. The production life of each well is often only about seven years.[54] This short period of economic return should be compared to the environmental consequences—described in more detail below— which are frequently permanent and irreversible.

Thus far, however, policies have been slanted to favor realizing these short-term returns despite the environmental costs. For instance, a report recently prepared for the Department of Energy seemed to advocate for allowing surface discharges of produced water because it is cheap for the producer and therefore "economically recoverable."[55] The report was purportedly prepared to address recent concerns that higher gas prices have changed the gas

46. *See Pennaco*, 377 F.3d at 1158.

47. *See, e.g,* PRODUCED WATER, *supra* note 19, at 1 (describing beneficial uses of some CBM produced water and the varying quality of CBM produced water).

48. *See* King, *supra* note 21.

49. *Id.*

50. *See* NATURAL RES. DEF. COUNCIL, HYDRAULIC FRACTURING OF COALBED METHANE WELLS: A THREAT TO DRINKING WATER 2 (2002), *available at* http://www.earthworksaction.org/pubs/200201_NRDC_HydrFrac_CBM.pdf.

51. *Id.* at 3.

52. *See* JOINT REPORT, *supra* note 1, at 4.

53. *See* RECORD OF DECISION AND AMENDMENTS, *supra* note 37, at 2. This equates to eight pads per square mile. *Id.*

54. *Id.*

55. *See* GREGORY C. BANK & VELLO A. KUUSKRAA, U.S. DEP'T OF ENERGY, THE ECONOMICS OF POWDER RIVER BASIN COALBED METHANE DEVELOPMENT 2-1 (2006), *available at* http://www.netl.doe.gov/technologies/coalpower/ewr/pubs/netl%20Cost%20of%20Produced%20Water%20Treatment%200106.pdf.

market and "concerns over the environmental impact of natural gas operations have increased lag time experienced between initial well drilling and the start of natural gas production."[56] The report concludes that "[t]he more stringent and costly the water management option, the less of the CBM resource in the [Powder River] basin that will be economic, generating lower domestic gas production and lower public revenues."[57] The report dwells on the burdens that may be placed on CBM producers by stringent water disposal controls.[58] It also laments tax and royalty revenue, as well as energy production, that may be lost should stringent controls be applied to CBM wastewater disposal.[59] Yet, the report takes little account of the economic value of the produced water discharged or the environmental impacts of surface discharge.

1. Quantity of Produced Water

According to the U.S. Geological Survey, the average water production from CBM wells in the Powder River is 400 barrels per day per well.[60] Disposing of this amount of water presents problems, especially in a semi-arid region. Some water is reinjected back into wells, but a great amount is not. In the Powder River Basin, 99.9% of the water is discharged onto the surface.[61] It is estimated that in the Powder River Basin as many as sixty million gallons of water each day are being dumped on the surface in northern Wyoming as a result of CBM production.[62] Many of the receiving waters are washes, gullies and rills that are generally accustomed to running dry.[63] The quality of this water aside—which will be discussed below—this amount of discharged water often results in an enormous increase in flow rates in receiving waters.[64] For instance, the discharge of produced water

56. *Id.* at i, 2-1.
57. *Id.*
58. *Id.* at 2-1.
59. *Id.* at 2-18 to -19.
60. PRODUCED WATER, *supra* note 19, at tbl.1; *see also* Pennaco Energy, Inc. v. U.S. Dep't of the Interior, 377 F.3d 1147, 1158 (10th Cir. 2004) (noting separate studies that have found that CBM water production could be up to 2,000 barrels—or 17,280 gallons—per day per well).
61. BRYNER, *supra* note 15, at 14. However, in other basins, like the San Juan in Colorado and New Mexico, where development is occurring, most CBM produced water is reinjected. *Id.*
62. *Stripping the West* (PBS television broadcast Mar. 8, 2002) (a transcript is available at http://www.pbs.org/now/transcript/transcript_powderr.html).
63. JOINT REPORT, *supra* note 1, at 3.
64. *See id.*

from approximately 9,000 wells into the Tongue River basin area—which is quite possible given current proposals—would nearly double the river's flow.[65] Such increased flow can alter ecological structure, damage vegetation, lead to sediment loads in downstream waters, and cause erosion.[66]

2. Aquifer Drawdown

Given the immense quantities of water pumped from aquifers, many of which have accumulated their water supply over hundreds of years or more, depletion of groundwater aquifers is another negative impact associated with CBM development.[67] Aquifer drawdown is an issue of particular concern in the West because of the scarcity of water and the slow recharge rates for aquifers. It may take two hundred years to recharge many aquifers depleted by CBM production.[68]

Many people in the region depend on aquifers for a variety of water needs, such as drinking water, irrigation, and other agricultural uses, and do not have alternative water sources.[69] Additionally, in states where water rights are rigidly allocated, there are concerns as to how these rights will be affected when aquifers are depleted.[70] These concerns may gain urgency, as scientific data indicates that the West is on the verge of significant long-term drought.[71]

Aquifer depletion highlights another concern—the untapped potential of high quality water. Much of CBM produced water is

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65. STEVE REGELE & JUDD STARK, INDUS. & ENERGY MINERALS BUREAU, MONT. DEP'T OF ENVTL. QUALITY, COAL-BED METHANE GAS DEVELOPMENT IN MONTANA, SOME BIOLOGICAL ISSUES 4-5 (2000), *available at* http://deq.mt.gov/coalbedmethane/pdf/fnl_cbm_txt3.PDF.

66. *See id.* at 5; JOINT REPORT, *supra* note 1, at 3.

67. *See* PRODUCED WATER, *supra* note 19, at 1 ("In some areas, coal beds may function as regional or local aquifers and important sources for ground water.").

68. Walter R. Merschat, *Coalbed Methane: Gas Boom, Environmental Bust*, CASPER STAR-TRIB., Aug. 29, 1999, at E1, *available at* http://www.powderriverbasin.org/press_releases/walt_merchat.shtml.

69. REGELE & STARK, *supra* note 68, at 3.

70. BRYNER, *supra* note 15, at 13-14.

71. *See* Faye Flam, *Dry, Dry West: Stubborn Drought is Choking the Western U.S., Stressing Plants and Humans Alike. Ironically, the Same Weather Systems are Soaking the East*, PHILA. INQUIRER, Mar. 8, 2004, at E1, *available at* http://www.mindfully.org/Water/2004/Drought-Western-States8mar04.htm ("[S]cientists warn that long-term shifts in faraway ocean temperatures foreshadow a dry spell in the West that could persist for many years or even decades.").

actually of high quality.[72] Disposing of this water instead of using it is wasteful. Thus, instead of simply sending high quality water downstream, contaminating it by mixing it with lower quality water in a retention pond, or just dumping it on the ground, efforts need to be made to ensure that higher quality water goes towards a beneficial use.

Yet, even using higher quality CBM produced water presents challenges. Given the short life span of most CBM wells, any use that becomes dependent on CBM produced water will likely see that source dry up.[73] For instance, livestock or wildlife that come to rely on retention ponds replenished by CBM produced water may quickly see the water supply to those ponds disappear when production stops and be left with dry ponds with high levels of salt due to evaporation and resulting poor soils and noxious weeds.[74]

3. Produced Water Quality and Its Impacts

While some produced water is high quality, water produced by CBM development tends to be high in salinity (dissolved salts), and have high sodium absorption ratios (described in more detail below).[75] Water with high salinity and sodium absorption ratios presents several potential problems. When such water is discharged into surface waters, it can harm croplands that are intolerant of higher salt levels.[76] It can also change vegetation, harming species dependent on the existing vegetation. For instance, where CBM discharges into streams have occurred, riparian vegetation has shifted from cottonwood trees to salt-tolerant salt cedars.[77] The roosting spots, shade, and woody debris that cottonwood trees provide are relied on by trout, eagles, herons,

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72. ENVTL. PROT. AGENCY, EVALUATION OF IMPACTS TO UNDERGROUND SOURCES OF DRINKING WATER BY HYDRAULIC FRACTURING OF COALBED METHANE RESERVOIRS, EPA REP. NO. 816-R-04-003, ES-14 tbl.ES-2 (2004) (stating that "water produced by CBM wells in the Powder River Coal Field commonly meets drinking water standards").

73. REGELE & STARK, *supra* note 68, at 9-10.

74. *Id.*

75. *See* PRODUCED WATER, *supra* note 19, at 1 (showing that while some CBM water can be fresh, CBM water can also be extremely saline, up to 170,000 milligrams/liter of total dissolved solids—average seawater has a total dissolved solids of about 35,000 milligrams/liter).

76. REGELE & STARK, *supra* note 68, at 6.

77. Gillian Malone, *Biological Survey of Powder River and Tributaries Recommends Adaptive Management of CBM: Stresses Protection of Powder River Ecosystem*, POWDER RIVER BREAKS (Powder River Basin Res. Council, Sheridan, Wyo.), Mar.-Apr. 2004, at 3, *available at* http://www.powderriverbasin.org/Breaks/March%20April%20Breaks%2004%20Binder2.pdf.

and other species.[78] These species will suffer if cottonwood trees are diminished in number along stream corridors.[79]

Produced water also impacts soils. Sodium absorption ratios measure the imbalance between sodium ions and the sum of magnesium and calcium ions in discharged water.[80] Excessive sodium ion concentrations are present in water damaged soils that are high in clay content—like many soils in the Powder River Basin—causing these soils to compact and become hard and impervious to water.[81] The result is that such water is not suitable for irrigation.[82]

4. Impacts to Wildlife

The loss and fragmentation of habitat, water quantity and quality impacts, and change in vegetation has impacts on wildlife as well. These impacts can be substantial. In BLM's first Environmental Assessment of the impacts of CBM in the Powder River Basin, it stated that CBM development "'may result in trends toward federal listing' under the Endangered Species Act for 16 species, including the white-tailed prairie dog, the burrowing owl, and the Brewer's sparrow."[83] These findings are consistent with a recent study of wildlife risks to the region. The study forecasted that twenty to thirty species may be lost in the Powder River Basin as a result of CBM development.[84] The study found that water added to streams would lead to changes in flow, soil degradation, land erosion, and other impacts.[85] While these impacts would primarily affect insect and other invertebrate species, species up the food chain would suffer as well.[86]

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78. *Id.*

79. *Id.*

80. N. Plains Res. Council v. Fidelity Exploration and Dev. Co., 325 F.3d 1155, 1158 (9th Cir. 2003).

81. *Id.*

82. *Id.*

83. *Kloor*, *supra* note 1 (discussing the results of the environmental assessment).

84. Charlie Homans, *Scientist Predicts 20-30 Species Lost Due to Coal-Bed Methane*, GILLETTE NEWS-REC. (Gillete, Wyo.), Nov. 11, 2003, *available at* http://www.helenair.com/articles/2003/11/06/montana/a05110603_02.txt.

85. Clair Johnson, *Scientist Warns of Adverse Effects of Excess CBM Water*, BILLINGS GAZ., Oct. 31, 2003, *available at* http://www.billingsgazette.net/articles/2003/10/31/rapid/export129173.txt.

86. *Id.*

5. Hydraulic Fracturing and Groundwater Contamination

Hydraulic fracturing is a process whereby fluids and a propping agent (usually sand) are injected into pre-existing wells.[87] Pressure is then applied, which causes the fluid to fracture the coal bed thus making it easier for gas to escape.[88] Diesel oil, fumeric acid, gelled oil, guar gel, hydrochloric acid, nitrogen or carbon dioxide gases, sodium hydroxide, sulfuric acid, and other additives are contained in fluids used in hydraulic fracturing.[89] After fracturing, both the injected fluids and the groundwater are pumped out to allow for gas to be released.[90]

The risks to groundwater associated with hydraulic fracturing may be substantial. It is estimated that 20-30% of the fracturing fluids injected into wells may remain in the ground after fluids are pumped out.[91] Very small quantities of the materials used as fracturing fluids, like benzene and methyl tert-butyl ether ("MTBE"), can contaminate enormous quantities of drinking water.[92] For example, several tablespoons of MTBE could render millions of liters of drinking water unusable.[93]

Hydraulic fracturing is not used as frequently in the Powder River Basin as it is in other coal basins, such as the Black Warrior basin in Alabama, where CBM development also occurs.[94] While not of terrible concern in the Powder River Basin, this paper includes this discussion for two reasons. First, as will be discussed later, it is included as an example of how litigation victories can be undone by a Congress too willing to help the oil and gas industry without proper regard for the environmental costs. It is also included because this is an issue practitioners in other regions of the country should be aware of when confronting CBM impacts.

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87. Legal Envtl. Assistance Found. v. U.S. Envtl. Prot. Agency (*LEAF I*), 118 F.3d 1467, 1470 (11th Cir. 1997).

88. *Id.*

89. *Id.* at 1471. While not a focus of this paper, practitioners confronting the impacts of hydraulic fracturing may want to investigate possible actions under the Resource Conservation Recovery Act, 42 U.S.C. §§ 6901-6992 (2000).

90. *LEAF I*, 118 F.3d at 1471.

91. NATURAL RES. DEF. COUNCIL, *supra* note 52, at 2.

92. *Id.*

93. *Id.*

94. ENVTL. PROT. AGENCY, *supra* note 75, at ES-3, tbl.ES-1 & fig.ES-1.

6. Noise and Air Pollution

CBM production requires gas-powered compressors at each well throughout the productive life of the well.[95] It also requires fleets of motor vehicles to maintain widely dispersed extraction and distribution systems.[96] Both of these activities emit carbon dioxide, and compressors emit other air pollutants including formaldehyde.[97] Venting gas is also common with CBM production.[98] Gas companies argue that methane is a cleaner burning fuel than others, and therefore helpful for preventing global warming.[99] However, venting involved with CBM production releases large amounts of the global warming gas carbon dioxide into the air, thus countering these positive effects.[100]

Compressors also create noise, which is an issue for nearby residents and users. This noise has been likened by nearby ranchers to the sound of 747 airplanes continuously taking off.[101]

F. Ownership of Land in the Powder River Basin Where Coalbed Methane is Found

The way much of the land in the Powder River Basin is owned compounds the impacts of CBM production for affected residents. As is typical in the West, the Powder River Basin has a considerable—though not tremendous (slightly over 10%)—amount of publicly owned surface land.[102] This alone presents concerns for the region given that recent administration policies favor energy production on public lands.[103]

Surface ownership alone, however, does not tell the whole story. When much of the West was settled pursuant to laws pro-

95. *See* W. ORG. OF RES. COUNCILS, COALBED METHANE DEVELOPMENT: BOON OR BANE FOR RURAL RESIDENTS? 4 (2003), *available at* http://www.worc.org/pdfs/ cbm.pdf.

96. *Id.*

97. *See id.*

98. *Id.*

99. *Id.*

100. *Id.*

101. Kloor, *supra* note 1.

102. JOINT REPORT, *supra* note 1, at 5. According to the BLM, in the Wyoming planning area, which encompasses about eight million acres, the BLM administers 11% of the total surface and the U.S. Department of Agriculture Forest Service administers three percent of the area. RECORD OF DECISION AND AMENDMENTS, *supra* note 37, at 1.

103. BRYNER, *supra* note 15, at 5, 20. From 1988-1998 production of natural gas grew by 26% on public lands, and this was before the Bush Administration began an aggressive campaign to even further increase energy production on public lands. *See id.* at 20.

moting settlement—like the Stock Raising Homestead Act of 1916—mineral rights to the land were reserved to the federal government and surface ownership was granted to settlers, creating what are known as "split estates."[104]

As a result of split estates, over 56% of the natural gas reserves in the Wyoming portion of the Powder River Basin are federally controlled.[105] Moreover, where split estates are concerned, the mineral estate is dominant, meaning that the surface estate must accommodate the mineral estate.[106] For surface owners, this has meant that CBM development has come directly onto the lands they own and use for ranching, agriculture, and other uses.[107] In exchange for this access, CBM producers holding rights to the gas only need post a paltry bond—$25,000 per company in Wyoming, regardless of how many wells the company possesses.[108]

II. A SNAPSHOT OF COALBED METHANE LITIGATION IN THE POWDER RIVER BASIN

The many impacts of CBM development have been the focus of intense litigation in the Powder River Basin. Many of the litigants challenging CBM development are non-traditional environmental plaintiffs. For instance, plaintiffs so far have included both individual ranchers and organizations like the Powder River Basin Resource Council, which is largely made up of ranchers and other traditional users of the land.[109] These litigants are often

104. JOINT REPORT, *supra* note 1, at 5. The BLM states that about 40% of the planning area is split estates. RECORD OF DECISION AND AMENDMENTS, *supra* note 37, at 1. It also states that it administers the mineral rights for 68% of the area. *Id.*

105. JOINT REPORT, *supra* note 1, at 5; *see* FLORES, *supra* note 26 (more than 50% of the land in the Powder River Basin contains lands with mineral rights owned by the federal government).

106. JOINT REPORT, *supra* note 1, at 5.

107. *Id.*

108. W. ORG. OF RES. COUNCILS, *supra* note 98, at 6.

109. *See generally* Kloor, *supra* note 1. The Powder River Basin Resource Council's mission is the "preservation and enrichment of [Wyoming's] agricultural heritage and rural lifestyle" and it advocates that "greater authority be given to surface owners over what happens on their property." Powder River Basin Resource Council, Our Mission, http://www.powderriverbasin.org/mission.shtml (last visited Apr. 17, 2007). The Northern Plains Resource Council is another organization that is involved in protecting landowners from the harms of CBM production. *See* Northern Plains Resource Council, Our Work, http://www.northernplains.org/ourwork (last visited Apr. 17, 2007). The Council "believes that family-scale farms and ranches are better for our environment, our economy, and our communities than corporate agriculture" and that "[p]rosperity for Montana's farms and ranches, and the communities that rely on them, depends on building and maintaining healthy markets and defending the pri-

surface owners of split estates who feel their way of life and livelihoods are directly threatened by CBM development.[110]

Litigation concerning CBM development in the Powder River Basin has brought some success, particularly in ensuring that some discharges are permitted and in forcing a closer look at the environmental impacts of CBM development. Litigation has also, as a recent Department of Energy sponsored report implicitly acknowledged, had the effect of slowing CBM development down.[111] As will be explained in the last section, these litigation efforts may also have the effect of forcing a closer look at the true costs and impacts of the CBM development, perhaps even leading to resulting policy changes.

A. The Regulatory Structure for Coalbed Methane Development on Federal Lands

The Department of Interior ("DOI"), through its delegation to the BLM, manages the use of oil and gas resources on public lands.[112] Pursuant to Section 202 of the Federal Land Policy and Management Act ("FLPMA") and applicable regulations, DOI manages oil and gas resources by first creating a broad land use plan for resource management, often called a resource management plan.[113] Among other requirements, these land use plans must "give priority to the designation and protection of areas of critical environmental concern," "weigh long-term benefits to the public against short-term benefits," and "provide for compliance with applicable pollution control laws."[114] FLPMA also requires that the Secretary of the DOI "shall manage the public lands under principles of multiple use and sustained yield" in accordance with the resource management plans when they are available.[115] While sustained yield is not defined in the regulations, "multiple use" is broadly defined to mean:

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vate property rights of landowners." Northern Plains Resource Council, About Us, http://www.northernplains. org/about (last visited Apr. 17, 2007).

110. *See generally* Kloor, *supra* note 1; *see also* PBS, *supra* note 65.

111. *See* BANK & KUUSKRAA, *supra* note 57, at i ("concerns over the environmental impact of natural gas operations have increased the lag time experienced between initial well drilling and the start of natural gas production").

112. *See* Pennaco Energy, Inc. v. U.S. Dep't of the Interior, 377 F.3d 1147, 1151 (10th Cir. 2004); BRYNER, *supra* note 15, at 24.

113. *See* 43 U.S.C. § 1712 (2000) (the Secretary of the DOI is responsible for creating a land use management plan); *Pennaco*, 377 F.3d at 1151.

114. 43 U.S.C. § 1712(c)(3), (7)-(8).

115. 43 U.S.C. § 1732(a) (2000). Applicable regulations similarly provide that "[a]ll future resource management authorizations and actions . . . and subsequent more

> management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people . . . and harmonious and coordinated management of the various resources *without permanent impairment of the productivity of the lands and the quality of the environment* with consideration being given to the relative values of the resource and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output.[116]

When a resource management plan is in place, the BLM must make an initial determination as to whether the issuance of a particular oil and gas lease is consistent with the plan.[117] Any lessee must also obtain BLM approval of an application for a permit to drill prior to commencing any drilling operations or surface disturbances related to drilling.[118] This application should include a surface use plan that details (among other information) methods for containment and disposal of waste and plans for surface reclamation.[119]

As with any major federal action, resource management plans and approved drilling applications must be issued in accordance with the National Environmental Policy Act ("NEPA").[120] NEPA ensures that a thorough review of the environmental impacts of major federal actions takes place.[121] NEPA directs federal agencies to:

> [I]nclude in every recommendation or report proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on – (i) the environmental impact of the proposed action, (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented, (iii) alternatives to the proposed action, (iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and (v) any irreversible and irretrievable commitments of resources which

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detailed or specific planning, shall conform to the approved plan." 40 C.F.R. § 1610.5-3(a) (2006).

116. 43 C.F.R. § 1601.0-5(i) (2006) (emphasis added).

117. *Pennaco*, 377 F.3d at 1151-52 (citing 43 C.F.R. § 3162.3-1(c) (2006)).

118. *Id.*

119. 43 C.F.R. §§ 3162.3-1(d), (f) (2006).

120. National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321-4347 (2000).

121. *See* 42 U.S.C. § 4332(c).

> would be involved in the proposed action should it be implemented.[122]

Thus, NEPA sets up a process requiring environmental assessment and study of an agency's actions, but it does not dictate a particular outcome.[123] Agencies must therefore give the environmental impacts of a federal action a "hard look."[124]

If an assessment performed by a federal agency shows that a project will have significant environmental impacts,[125] the Council of Environmental Quality (which oversees NEPA regulatory requirements) has regulations which direct agencies to prepare a draft Environmental Impact Statement ("EIS") to be circulated for review and public comment and a final EIS that responds to those comments.[126]

B. NEPA Litigation for Coalbed Methane Development in the Powder River Basin on Public Lands: *Pennaco Energy, Inc. v. United States Department of the Interior*

In 2000, the BLM auctioned off several leases for CBM development.[127] Instead of performing EISs for these leases, the BLM relied on two existing EISs.[128] One of the EIS documents relied on by the BLM was the 1985 Buffalo Resource Management Plan EIS; the other document was the Wyodak Draft EIS, published in 1999.[129] While these EISs discussed leasing of conventional gas wells, neither addressed the issuance of CBM leases.[130]

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122. *Id.*

123. *See id.*

124. Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 350 (1989). It is worth noting that NEPA "merely prohibits uninformed—rather than unwise—agency action." *Id.* at 351. The Court stated in *Robertson* that "[a]lthough [NEPA's required] procedures are almost certain to affect the agency's substantive decision, it is now well settled that NEPA itself does not mandate particular results, but simply prescribes the necessary process." *Id.* at 350.

125. If a project does not have significant impacts, agencies are still required to document this in a short document known as a Finding of No Significant Impacts ("FONSI"). 40 C.F.R. § 1508.13 (2006); 23 C.F.R. § 771.121 (2006).

126. 40 C.F.R. § 1502.9(a) and (b) (2006).

127. *See* Pennaco Energy, Inc. v. U.S. Dep't of the Interior, 377 F.3d 1147, 1152 (10th Cir. 2004).

128. *Id.*

129. *Id.*

130. *Id.* (The Buffalo Resource Management Plan EIS did not contemplate CBM development impacts at all. It only considered conventional oil and gas development. While the Wyodak DEIS did address the potential impacts of CBM extraction, the

On January 27, 2000, two local conservation groups representing mainly ranchers filed a formal protest of the BLM's reliance on the two EISs, alleging in pertinent part that the "environmental impacts of CBM development and extraction are not comparable to the impacts of other oil and gas development."[131] The groups contended that the BLM was required by NEPA to prepare a new EIS before issuing CBM leases and that it failed to take a "hard look" at the potential environmental impacts of issuing the leases.[132] The BLM disagreed with the group's claims, and the groups appealed to the Interior Board of Land Appeals ("IBLA"), an administrative oversight body.[133]

The IBLA dismissed forty-six of forty-nine claims for lack of standing.[134] For the three leases where it did find standing, the IBLA reversed the BLM's decision that it had complied with NEPA.[135] The IBLA rejected the BLM's assertion that CBM impacts and conventional gas development impacts were similar enough that the BLM could rely on previous EISs.[136] It ruled that the BLM could not use these previous studies to approve the leases.[137]

The IBLA also found that "the record amply demonstrate [sic] that the magnitude of water production from CBM extraction in the Powder River Basin creates unique problems and that CBM development and transportation present critical air quality issues not addressed in the [Buffalo] RMP/EIS."[138] It went on to state that:

> Given that the leasing decisions had already been made and the leases issued, the [Wyodak] EIS did not consider reasonable alternatives available in the leasing decision . . . . Thus, despite the Wyodak EIS' detailed analysis of the impacts of CBM development, which we note parenthetically undercuts BLM's claim that the impacts of CBM extraction are the same as those of other methane production, that document's failure to consider reasonable alternatives relevant to pre-leasing environmental

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DEIS was a post-leasing study and did not consider the issuance of CBM leases in the first place).

131. *Id.* at 1153 (internal quotation marks omitted).
132. *Id.*
133. *Id.*
134. *Id.*
135. *Id.*
136. *Id.*
137. *Id.*
138. *Id.*

> analysis fatally impairs its ability to serve as the requisite pre-leasing NEPA documents for these parcels.[139]

Pennaco Energy, a successful lease bidder, appealed the IBLA's decision.[140] The United States Court of Appeals for the Tenth Circuit upheld the IBLA's decision largely because the BLM failed to recognize the unique impacts of CBM development.[141] The court found that the IBLA's conclusion that "CBM development poses unique environmental concerns related to water discharge that were not addressed in the Buffalo RMP EIS," was reasonable and that "the record contains substantial evidence to support the IBLA's conclusion that CBM development poses unique environmental concerns related to air quantity that were not addressed in the Buffalo RMP EIS."[142]

This decision is very favorable in that it prevents the BLM from relying on old studies that do not adequately consider CBM impacts. It also represents how opposition to CBM development, in court and elsewhere, has curbed the BLM's initial inclination to permit CBM development without much of a hard look at its impacts. For instance, in 2001, even before the *Pennaco* decision was issued, BLM Assistant Secretary Tom Fulton acknowledged that:

> At the time of the original EIS [concerning the resource management plans for the Powder River Basin], no one anticipated or planned for the rapid development of this resource. Consequently, there is a need for a new EIS . . . [which] will analyze the effects of the drilling of 50,000 CBM wells, and 3,000 conventional oil and gas wells, expected to be drilled in the next 10 years.[143]

Subsequently, EISs were performed for both the Wyoming and the Montana portions of the Powder River Basin.[144]

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139. *Id.* at 1154.

140. *Id.*

141. *See id.* at 1156-62.

142. *Id.* at 1159. The court also rejected an argument that the Wyodak EIS corrected any deficiencies in the Buffalo RMP EIS because of its "failure to consider the pre-leasing options." *Id.* at 1160. While not discussed in this paper, the Clean Air Act may also provide tools to address the negative impacts of CBM development.

143. *Id.* at 1158.

144. *See* U.S. DEP'T OF INTERIOR, BUREAU OF LAND MGMT., & STATE OF MONT., FINAL STATEWIDE OIL AND GAS ENVIRONMENTAL IMPACT STATEMENT AND PROPOSED AMENDMENT OF THE POWDER RIVER AND BILLINGS RESOURCE MANAGEMENT PLANS (2003), *available at* http://www.mt.blm.gov/mcfo/cbm/eis/; BUFFALO FIELD OFFICE, WYO. STATE OFFICE, BUREAU OF LAND MGMT., U.S. DEP'T OF INTERIOR, FINAL ENVIRONMENTAL IMPACT STATEMENT AND PROPOSED PLAN AMENDMENT FOR THE POWDER RIVER

C. Private Lands and NEPA

Unlike CBM development on public lands, CBM extraction on private lands does not occur pursuant to resource management plans or applications for permits to drill. The absence of these triggers does not mandate NEPA review. This presents a concern for those affected by CBM development on private land. Obviously, the impacts of CBM development on private land similarly affect common resources—such as rivers, wildlife habitat, soils, and aquifers—and another trigger must be found to force NEPA review of CBM drilling on private lands.

The Clean Water Act ("CWA")[145] includes such a trigger, as shown in *Wyoming Outdoor Council v. U.S. Army Corps of Engineers*.[146] The issue in this 2005 case was whether the Army Corps of Engineers violated NEPA by issuing a CWA permit for CBM development in the Powder River Basin without full NEPA review.[147] In addition to the National Pollutant Discharge Elimination System ("NPDES") permitting program—which is discussed below—the Clean Water Act regulates the discharge of dredged and fill material into wetlands, streams, and other water bodies.[148] The Corps can issue either individual permits for specific projects or general permits for activities that are similar in nature but that will have minimal impacts on the environment.[149] As a major federal action, the approval of either an individual permit or a general permit requires review under NEPA.

In response to the intense growth of CBM development, in June of 2000 the Corps issued General Permit 98-08 along with a Combined Decision Document that the Corps contended met NEPA requirements for General Permit 98-08.[150] General Permit 98-08 authorized the discharge of dredged and fill material associated with several gas and oil development activities such as surveys, roads, well pads, utilities, reservoirs, erosion control, hazardous waste clean up, and mitigation.[151]

BASIN OIL AND GAS PROJECT (2003), *available at* http://www.wy.blm.gov/nepa/prb-feis/Vol_1/front1.pdf.

145. Federal Water Pollution Control Act, 33 U.S.C. §§ 1251-1387 (2000).

146. Wyo. Outdoor Council v. U.S. Army Corps of Eng'rs, 351 F. Supp. 2d 1232 (D. Wyo. 2005).

147. *Id.* at 1238.

148. 33 U.S.C. §§ 1311(a), 1344.

149. *Id.* § 1344(e).

150. *Wyo. Outdoor Council*, 351 F. Supp. 2d at 1237.

151. *Id.*

The Wyoming Outdoor Council, the Powder River Basin Resource Council, and other plaintiffs raised several claims in objection to the issuance of General Permit 98-08 under NEPA and the Clean Water Act. The plaintiffs argued that the Corps violated NEPA by failing to consider cumulative impacts on non-wetland resources, water quality, private ranchlands, threatened and endangered species, and wetlands themselves.[152]

The court found for the plaintiffs on several of their claims. It ruled that the Corps' cumulative impacts analysis needed to account for impacts other than those to wetlands, that the Corps failed to adequately consider impacts to private ranchlands, and that the Corp's wetlands mitigation analysis was unsubstantiated.[153]

The court rejected the Corps' claims that, in approving General Permit 98-08, it did not need to consider environmental impacts other than those to wetlands.[154] Instead, the court found that Corps' jurisdiction over CBM dredged and fill activity put the Corps in an oversight role for other environmental impacts caused by CBM activities on private lands:

> Undoubtedly, CBM development would continue even without G[eneral] P[ermit] 98-08. When a particular oil and gas developer, however, proposes to discharge dredge and fill material into the waters of the United States in conjunction with a project, the Corps, or the relevant surface management agency, becomes the gatekeeper for approval of the project.[155]

The court ruled that this gatekeeper role means that in order for the Corps to forego an EIS, it "must make a finding that there will be no significant impact on the human environment from the proposed agency action . . . [and] its NEPA analysis in issuing a § 404 permit must include consideration of cumulative impacts to the 'the natural and physical environment,' not just impacts to wetlands."[156]

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152. *Id.* at 1238. Cumulative impacts must be considered under 40 C.F.R. § 1508.25(c). Cumulative impacts are those that result from the "incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period time." 40 C.F.R. § 1508.7 (2006).

153. *Wyo. Outdoor Council*, 351 F. Supp. 2d at 1238.

154. *Id.* at 1242.

155. *Id.*

156. *Id.* (citations omitted).

The court also rejected the Corps' assertion that private landowners would protect prime farmlands because they have full control over surface disturbance on their private lands, an argument which the Corps claimed justified a determination of no significant impact.[157] Instead, the court found that, "[n]owhere does the C[ombined] D[ecision] D[ocument] express or demonstrate a consideration for those individuals whose livelihood depends on the vitality and sustainability of the land. The Court cannot accept the Corps' summary dismissal of the reasonably foreseeable impacts to private ranchlands."[158] The court also ruled that more evidence was required to demonstrate that mitigation would offset wetlands impacts.[159]

Not all of the court's findings, however, were favorable to the plaintiffs. For instance, the court ruled that the Corps properly accounted for water quality impacts because the Corps had acknowledged the potentially polluting effects of CBM produced water.[160] The court based this holding, in part, on the facts that the Wyoming Department of Environmental Quality has primarily responsibly for dealing with these impacts under its Clean Water Act Section 402 permitting program and had already issued a water quality certification for a general permit.[161] The court further found the fact that the permit covered several types of fill projects did not mean that it violated the Clean Water Act's requirement that a general permit cover projects that are similar in nature.[162] The court reasoned that "requiring the Corps to permit the various activities associated with oil and gas development with separate general permits would defeat one of the purposes of the general permitting process, to reduce duplication."[163] Similarly, the court found that conditions placed on the permit, such as limiting the size of the acreage that can be affected, are reasonable grounds to conclude that impacts will be similar in nature.[164]

157. *See id.* at 1245-46.

158. *Id.* at 1246.

159. *Id.* at 1251 ("Rather than being detailed and justified by some evidence in the record that would support their efficacy, the mitigation measures mandated by G[eneral] P[ermit] 98-08 are vague and speculative. The Corps fails to point to a shred of scientific evidence in the record to demonstrate that wetland replacement is a successful mitigation measure. Nor could this Court, after a review of the record, find any such statement."). *Id.* at 1251.

160. *Id.* at 1243-44.

161. *Id.* at 1244.

162. *Id.* at 1259.

163. *Id.*

164. *Id.* at 1259-60.

The gatekeeper duties outlined by the court certainly have value to those concerned with CBM production. They require a federal agency with authority over an aspect of CBM development on private lands to go beyond just a look at the impacts related to its jurisdiction (such as requiring the Corps to also consider non-wetland impacts). Instead, the agency must take a comprehensive look at all relevant environmental impacts.

D. The CBM and the CWA

As previously stated, CBM production discharges a substantial amount of CBM produced water into surface waters. This frequently wasteful practice may make CBM extraction cheaper for the producer but—as detailed above—it also has many harmful consequences for water resources and those dependent on affected waters. Many of these discharges were originally not regulated at all. This resulted in challenges being brought under the Clean Water Act. The Clean Water Act prohibits discharges of pollutants into surface waters unless authorized under a NPDES permit, or a Section 404 permit as described above.[165] NPDES permits must ensure that state water quality standards are not violated for the waters receiving the discharge.[166] As a result of litigation, it has been made clear that CBM produced water discharges to surface waters require permitting under the Clean Water Act.

1. *Northern Plains Resource Council v. Fidelity*: Unaltered Groundwater is a "Pollutant"

In 1997, Fidelity Exploration and Development Company began exploring and developing CBM in the Powder River Basin in Montana.[167] Fidelity wanted to discharge its produced water—which was unaltered groundwater—into the Tongue River and Squirrel Creek, both of which are waters in the Powder River Basin.[168] Both Fidelity and the Montana Department of Environmental Quality ("MDEQ") were on record at the time acknowledging the potentially negative impacts that discharging CBM produced water could have on surface water quality and

165. 33 U.S.C. §§ 1311(a), 1342, 1344.
166. *Id.* § 1311(a).
167. N. Plains Res. Council v. Fid. Exploration & Dev. Co., 325 F.3d 1155, 1158 (9th Cir. 2003).
168. *Id.* at 1157-59.

soils.[169] When Fidelity contacted the MDEQ about the need to permit its discharges into the Tongue River and Squirrel Creek, however, the MDEQ told Fidelity no permit was needed because the state had exempted unaltered groundwater from its assumed NPDES permitting program.[170]

With uncontested evidence of discharges of CBM produced water into the Tongue River and Squirrel Creek, the Northern Plains Resource Council ("NPRC") filed a citizen suit enforcement action under the Clean Water Act.[171] In order to satisfy its claim of a Clean Water Act violation, NPRC needed to prove that there was (1) a discharge of (2) a pollutant (3) from a point source (4) into a navigable water (5) without a permit.[172] Fidelity stipulated to the presence of all of these elements except that unaltered groundwater from CBM production was a "pollutant."[173] It was this issue that the court decided.

Fidelity argued and the district court accepted two rationales for why CBM produced water was not a pollutant. First, the district court ruled that unaltered groundwater did not fall under the Clean Water Act's definition of a pollutant.[174] Second, the district court found that Montana state law exempted the discharge of unaltered groundwater from permitting requirements.[175]

The United States Court of Appeals for the Ninth Circuit reversed the lower court's decision, rejecting Fidelity's argument that because the CWA does not specifically mention "unaltered groundwater" as a "pollutant," it was therefore not a "pollu-

169. For instance, an expert retained by Fidelity concluded, "the [sodium absorption ratio] of CBM water creates a permeability hazard and precludes its use for irrigation without mixing, treatment or addition of soil amendments," and MDEQ stated that unregulated discharge of CBM produced waters into surface waters would cause "[s]urface water quality in some watersheds [to] be slightly to severely degraded, resulting in restricted downstream use of some waters." *Id.* at 1158 (internal quotation marks omitted).

170. *Id.* at 1158-59. Under the Clean Water Act, states may assume permitting responsibilities from the federal government. 33 U.S.C. § 1342(b).

171. *Fidelity*, 325 F.3d at 1159.

172. *Id.* at 1159-60 (under the Clean Water Act, 33 U.S.C. § 1311(a), these elements must be proven to show a violation of the Act).

173. *Fidelity*, 325 F.3d at 1160.

174. *Id.* The Clean Water Act defines "pollutant" broadly to mean "dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water." 33 U.S.C. § 1362(6).

175. *Fidelity*, 325 F.3d at 1160.

tant."[176] Instead, looking at the plain meaning of the term, the court found that produced water from CBM extraction was clearly an "industrial waste," which is listed as a "pollutant" under the Act.[177] Fidelity also argued that its discharges did not meet the Environmental Protection Agency's ("EPA") regulatory definition of "produced water" from oil and gas development, which previous case law has ruled to be industrial waste and therefore a pollutant.[178] The court likewise dismissed this argument as unsupported by the regulatory definition of produced water.[179] The court further ruled that because the discharges were made directly into surface waters, an exemption for gas wastewater disposal into wells did not apply.[180] The court additionally ruled that neither the EPA nor the state had the authority to exempt discharges not otherwise exempt from Clean Water Act requirements and that a Montana law granting CBM produced water an exemption was improper despite EPA approval.[181]

The Ninth Circuit also rested its decision on somewhat more controversial grounds. The court first looked for support that the unaltered water being discharged constituted a "pollutant" by examining the meaning of "pollution" as defined by the Clean Water Act.[182] The court found that the discharge of CBM produced water caused pollution in the Tongue River because it "alters the

176. *Id.*

177. *Id.* at 1160-61.

178. *Id.* at 1161.

179. *Id.*

180. *Id.* The Clean Water Act exempts:

> water, gas, or other material which is injected into a well to facilitate production of oil and gas, or water derived in the association or with oil or gas production and disposed of in a well, if the well used either to facilitate production or for disposal purposes is approved by authority of the State in which the well is located, and if such State determines that such injection or disposal will not result in the degradation of ground or surface water resources

from the definition of the a "pollutant." 33 U.S.C. § 1362(6).

181. *Fidelity*, 325 F.3d at 1164-65. The court stated, "[o]nly Congress may amend the C[lean] W[ater] A[ct] to create exemptions from regulation." *Id.* at 1164. The court also addressed the issue of deference to the EPA's approval of the Montana law, ruling that "[j]udicial deference to agency action is not warranted where the agency had no authority to act." *Id.* at 1164 n.4 (citing United States v. Mead, 533 U.S. 218 (2001)). The Ninth Circuit concluded Congress did not give the EPA the authority to create exemptions for unaltered groundwater discharges. *Id.* at 1164.

182. *Id.* at 1161-62. The Clean Water Act defines "pollution" as the "man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water." 33 U.S.C. § 1362(19).

water quality of the Tongue River" and "threatens to make the water unfit for irrigation."[183]

The court then found that in determining whether a discharge of water caused "pollution," the relevant analysis should focus on the effects on receiving water and not on whether alterations have been made to the discharged water.[184] This logic rests on a line of cases that had ruled that the discharge of water from one water body to another requires a CWA permit even when nothing is added to the water being discharged because such discharge can pollute the receiving water body. [185] The Bush Administration has taken exception with this reasoning and, although it has not reached a decision on the merits for this issue, this question has also come before the Supreme Court.[186]

The result of the *Fidelity* decision has given those concerned with pollution of surface waters assurance that surface discharges of unaltered CBM produced water require permits. The next case deals with a citizen's ability to enforce meaningful conditions that protect instream uses and water quality for permitted discharges.

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183. *Fidelity*, 325 F.3d at 1162.

184. *Id.*

185. The court's reasoning derives from three other Circuit Court decisions. Miccosukee Tribe of Indians v. S. Fla. Water Mgmt. Dist., 280 F.3d 1364 (11th Cir. 2002), Catskill Mountains Chapter of Trout Unlimited, Inc. v. City of New York, 273 F.3d 481 (2d Cir. 2001), and Dubois v. U.S. Dep't of Agric., 102 F.3d 1273 (1st Cir. 1996). These decisions all held that discharges of unaltered water constituted a discharge of a pollutant because of the polluting effect the discharges had on the receiving water. *Miccosukee Tribe of Indians*, 280 F.3d at 1368; *Catskill Mountain Chapter of Trout Unlimited, Inc.*, 273 F.3d at 485, 491-93; *Dubois*, 102 F.3d at 1298. This interpretation of the Act has obvious logic because, as the court pointed out, a contrary interpretation of the Clean Water Act "would allow someone to pipe the Atlantic Ocean into the Great Lakes [without Clean Water Act liability]. . . because the salt water from the Atlantic Ocean was not altered before being discharged into the fresh water of the Great Lakes." *Fidelity*, 325 F.3d at 1163.

186. *See S. Fla. Water Mgmt. Dist. v. Miccosukee Tribe of Indians*, 541 U.S. 95 (2004). In this case, the U.S. government took the position that all waters should be considered as one "unitary" water and that a transfer of water from any water body to any other water body is not prohibited by the Clean Water Act. *See id.* at 111-12. This position would allow for the Ninth Circuit's troubling, and seemingly ridiculous, example of having the Clean Water Act not regulate the transfer of salt water into the Great Lakes. *See* note 188. The Supreme Court remanded *Miccosukee* back to the district court for a finding on whether the receiving water body and the discharging water body were indeed separate water bodies. *Miccosukee Tribe of Indians*, 541 U.S at 109-12.

2. *Swartz v. Beach*: Enforceability of Anti-Degradation Standards

Ed Swartz, a Wyoming rancher, owned an approximately 280-acre hay meadow which he irrigated pursuant to an adjudicated water right he possessed on Wildcat Creek, an ephemeral stream tributary to Horse Creek, which flows into the Powder River.[187] Redstone Resources, Inc. ("Redstone"), a gas company, operated CBM sites within the Wildcat Creek Basin.[188] Starting in 1999, Redstone began discharging CBM produced water into Wildcat Creek pursuant to a permit.[189]

Despite the permit, Mr. Schwartz alleged that Redstone's discharges were ruining his ability to irrigate his ranch.[190] Mr. Swartz contended that Redstone's activities changed flow patterns because winter CBM related pumping caused flow to occur when water was dumped in winter, rather than summer, months.[191] Mr. Swartz also claimed that the discharged water flowing in the creek was too high in salinity and sodium absorption ratios to be suitable for irrigation use because it caused permanent soil damage.[192]

Among other claims, Mr. Swartz sued Redstone for violating state promulgated anti-degradation standards, a component of water quality standards which protects existing uses in waters.[193] Mr. Swartz argued that: (1) the permit required compliance with water quality standards; (2) Mr. Swartz's use of the water for irrigation was an existing use protected under water quality standards; (3) Redstone's discharge did not protect Mr. Swartz's use; and (4) Redstone's discharge was therefore violating water quality standards and, thus, the conditions of its permit.[194]

Defendants (which included the State of Wyoming Department of Environmental Quality) filed motions to dismiss, arguing that regarding the NPDES claim, the state of Wyoming's anti-degradation policy was not enforceable under the citizen suit provision of the CWA.[195] The court denied Redstone's motion to dismiss on its Clean Water Act claim, finding that Wyoming was under an

187. Swartz v. Beach, 229 F. Supp. 2d 1239, 1247 (D. Wyo. 2002).
188. *Id.*
189. *Id.* at 1247-48.
190. *Id.* at 1248.
191. *Id.*
192. *Id.*
193. *Id.* at 1249, 33 U.S.C. § 1313(d)(4)(B).
194. *Swartz,* 229 F. Supp. 2d at 1248.
195. *Id.* at 1270-71.

obligation to adopt a state regulatory program consistent with the EPA's model, which requires promulgation of an anti-degradation policy that maintains and protects "[e]xisting instream water uses and the level of water quality necessary to protect *existing uses* . . . ."[196] The court went on to conclude that "to be consistent with the CWA, [Wyoming's anti-degradation policy] must protect and maintain the existing uses of instream water, which in the case of Wildcat Creek is for agricultural purposes."[197]

This is an important victory for those affected by CBM discharges. The ruling gives recourse to bring actions against permit holders if CBM related discharges fail to protect existing uses of water, such as irrigation.

E. State Water Law

As is true of most arid and semi-arid western states, Montana and Wyoming are particularly concerned with the appropriation and use of water. Montana is the only western state that directly addresses the use of CBM produced water by statute.[198] Under Montana law, CBM operators may (1) use the water for irrigation, stock water or other beneficial use, (2) reinject the water into an acceptable subsurface strata or aquifer in accordance with applicable laws, (3) discharge the water to surface waters or surface land pursuant to a permit, or (4) manage the water through other methods allowed by law.[199] CBM operators are also required to notify any other appropriators whose rights may be harmed by CBM water withdrawal, and to offer mitigation agreements to appropriators with wells within one mile of a CBM well or within one-half mile of any well adversely affected by a CBM well.[200]

Furthermore, Montana law mandates that ground water not be wasted.[201] One way of not wasting water is to put it to beneficial uses such as irrigation. However, although the quality of much CBM produced water in Montana can be quite good, the sodium absorption ratios of even the higher quality CBM produced

196. *Id.* at 1272 (quoting 40 C.F.R. § 131.12(a)(1)) (internal quotation marks omitted).

197. *Id.*

198. BRYNER, *supra* note 15, at 32; *see* MONT. CODE ANN. §§ 82-11-175, 85-2-505(e) (2006).

199. MONT. CODE ANN. § 82-11-175. For further discussion on the statute, see BRYNER, *supra* note 15, at 32.

200. MONT. CODE ANN. § 82-11-175(3)(a); *see also* BRYNER, *supra* note 15, at 33.

201. MONT. CODE ANN. § 82-11-175.

water is often above levels acceptable for irrigation use.[202] The result is a high likelihood that CBM produced water is often wasted, in contravention of the statute. Other acceptable means for disposal of CBM wastewater under Montana law, such as reinjection into a well or discharging the water downstream, can also lead to waste as higher quality water can be contaminated if injected into a well containing lower quality water or lost downstream if discharged into surface waters.[203]

Some advocacy against such waste has produced positive results when brought before state venues. In 2006, for instance, pursuant to a suit brought by a rancher, a state court forced a CBM producer to condemn land where it was discharging into dry washes that flowed on the rancher's land, causing harm to his ranching operations.[204] Also, in a state administrative forum, the Powder River Basin Resource Council and local ranchers recently convinced the Wyoming Environmental Quality Council to begin rulemaking that would require beneficial use of CBM produced water.[205] However, with so much water being pumped and discharged, the amount of water wasted may be large before state appropriation law catches up with CBM development.

III. DESPITE LEGAL VICTORIES, A POLICY SOLUTION IS NEEDED

As the above cases illustrate, there has been some success in using litigation to make responsible agencies take a closer look at CBM impacts and to impose permit requirements on some of those impacts, particularly the discharge of produced water into surface streams. These victories have helped to slow the rapid pace of CBM development and to put some important safeguards in place.

Slowing down CBM development has some distinct advantages. Under NEPA and other permit processes, the environmental impacts of CBM development must be evaluated and sometimes accounted for in a permit. Notice and comment also becomes available so that concerned citizens can participate in the

202. BRYNER, *supra* note 15, at 32-33.

203. *Id.* at 33.

204. Associated Press, *Judge Rules for Rancher in Coalbed Case*, BILLINGS GAZ., Mar. 21, 2006, *available at* http://www.billingsgazette.net/articles/2006/03/21/news/wyoming/30-coalbed.txt.

205. Greenwire, *Coalbed Methane: Wyoming Judge Bars Producer from Discharging on Rancher's Lands*, Mar. 21, 2006, http://www.eenews.net/Greenwire/print/2006/03/21/9 (subscription required).

process. NEPA and other permit review processes, therefore, serve to inform the public about the environmental costs of CBM development. Such chances for increased public awareness and involvement not only provide citizens opportunities to advocate for mitigating measures and alternatives to proposals with damaging effects but can also result in an educated public perhaps more inclined to hold elected officials accountable for their policy choices.

Growing awareness (and a consequential desire for action to correct shortsighted policies) is already evidenced by *who* is bringing CBM-related litigation. Defying predictably, it is not just the green left that is rushing to the courthouse to stop CBM development. Instead, it is largely people like Ed Swartz—generally conservative, second or third generation ranchers who have toiled on the land since birth and do not typically sue federal agencies for failing to implement environmental laws—who are bringing these suits.[206]

On a certain level, the reaction of people like Mr. Swartz to the threat of CBM development should be no surprise. After all, Mr. Swartz and others like him face the greatest risk from CBM development's impacts and have the most to lose. Yet, the fury of Mr. Swartz and others (who are often accustomed to supporting many of the politicians advocating for aggressive gas and oil development) may be a signal of a political change that will force a more honest debate about our nation's energy future. These litigants and their dismay with current policies are an indication that promoting shortsighted policies that destroy water and land resources in return for a year's worth of energy is an error that policymakers can no longer make if they want traditional political loyalties to hold firm. While—as is illustrated below—the powerful forces of oil and gas have been able to largely have their way with legislatures and agencies so far, the folly and negative impacts of these policies can only be swept aside for so long without backlash.

This section will look at an example of how the gas industry has used Congress to overturn an otherwise important legal victory that would have required environmental safeguards for CBM development. The example illustrates the difficulty in overcoming the industry's will. The section will then turn towards hope for the future, offering ideas for better policies that could positively

206. *See* Kloor, *supra* note 1; PBS, *supra* note 65.

direct CBM development in the Powder River Basin and other regions.

A. Hydraulic Fracturing: The *LEAF* Cases and a Congressional Exemption

As described above, the Bush Administration made clear early on that domestic energy development, such as gas development, is one of its highest priorities. Congress has also largely favored energy development interests. The influence of the oil and gas industry in Congress is evidenced by the contributions of this industry to key members of Congress. In the 2002 election cycle, for instance, members of Congress received $4.1 million from companies involved in CBM development.[207] Important members of influential committees dealing with environmental regulations—such as Rep. Don Young, R-AK, former Chair of the House Resources Committee; Sen. James Inhofe, R-OK, who chaired the Senate Environment and Public Works Committee; and Sen. Pete Domenici, R-NM, who co-chaired the Senate Energy and Natural Resources Committee—were some of the top recipients of CBM money.[208] Local politicians in areas where CBM development is occurring similarly receive enormous support from gas and oil interests. For instance, nearly 70% of all campaign contributions to Wyoming's state legislators come from the oil and gas industry.[209]

A telling example of how the oil and gas industry can use its influence to undo court rulings it does not like is illustrated in two cases from Alabama. Alabama's Black Warrior coal basin began seeing CBM development in 1980 and now hosts several thousand wells.[210] Concerned about the effects of hydraulic fracturing on drinking water, a local environmental group, Legal Environmental Assistance Foundation, Inc. ("LEAF"), brought a suit challenging the State of Alabama's failure to regulate hydraulic fracturing under an EPA-approved program to administer underground injection control programs.[211]

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207. Friends of the Earth, *supra* note 29.

208. *Id.* In the 2002 election cycle, Rep. Young received $53,500 from companies involved in CBM development, Sen. Inhofe received $73,000, and Sen. Domenici received $62,000. *Id.*

209. *Kloor*, *supra* note 1.

210. *See* Legal Envtl. Assistance Found. v. U.S. Envtl. Prot. Agency (*LEAF I*), 118 F.3d 1467, 1470, 1471 n.5 (11th Cir. 1997).

211. *Id.* at 1469-70. Underground injection control programs are regulated under Part C of the Safe Drinking Water Act, 42 U.S.C. §§ 300h to 300h-8, which establishes a program to protect underground sources of drinking water. The program requires

LEAF had petitioned the EPA to withdraw Alabama's underground injection control program because it did not regulate hydraulic fracturing.[212] The EPA denied this petition on the grounds that Alabama's underground injection control program conformed to EPA regulations.[213] The EPA argued that Alabama did not need to regulate hydraulic fracturing because regulations concerning underground injection control only apply to those injections whose principle function is the injection of fluids into the ground, which the EPA contended was not the case with hydraulic fracturing for gas extraction.[214]

LEAF won its suit challenging the EPA's decision.[215] In its holding, the United States Court of Appeals for the Eleventh Circuit determined "it is clear that Congress dictated that *all* underground injection be regulated under the [underground injection control] programs."[216] Consequently, the court concluded, "hydraulic fracturing activities constitute 'underground injection' under Part C of the S[afe] D[rinking] W[ater] A[ct]. The EPA's contrary interpretation cannot be squared with the plain language of the statute and thus must fall."[217] The court remanded the matter to the EPA to review LEAF's petition in a manner consistent with the court's ruling.[218]

Instead of imposing stringent controls, Alabama simply resubmitted its underground injection control program for approval under § 1425 of the Safe Drinking Water Act, a more flexible provision that applies to certain underground injection control programs including any underground injection which relates to the secondary or tertiary recovery of oil or natural gas.[219] Despite acknowledging that the process of hydraulic fracturing was not technically identical to secondary or tertiary recovery of natural gas,

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the EPA to promulgate regulations that set forth minimum requirements for state underground injection control programs. 42 U.S.C. § 300h(a)-(b). A state must submit a proposed underground injection control program to the EPA that meets these minimum requirements and receive EPA approval in order to obtain primary responsibility for regulating underground injection activities within that state. *Id.* § 300h-1; *LEAF I*, 118 F.3d at 1469-70.

212. *LEAF I*, 118 F.3d at 1471.

213. *Id.*

214. *Id.* at 1471.

215. *Id.* at 1469.

216. *Id.* at 1474.

217. *Id.* at 1478.

218. *Id.* at 1469.

219. Legal Envtl. Assistance Found., Inc. v. U.S. Envtl. Prot. Agency (*LEAF II*), 276 F.3d 1253, 1256-57 (11th Cir. 2001); 42 U.S.C. § 300h-4(a).

the EPA found that it is an "analogous" process and therefore can be approved under § 1425.[220] The EPA did not hide its desire to avoid burdening oil and gas development, arguing that it "would be both inefficient and inconsistent with Congress' expressed admonition that the EPA not prescribe unnecessary requirements related to oil- and gas-related injection[.]"[221]

The court accepted the EPA's position, finding that "[w]e have little trouble concluding that [the] EPA's decision to subject hydraulic fracturing to approval under § 1425 rests upon a permissible construction of the statute."[222] The court, however, ruled that the EPA must regulate the category of wells connected to recovery of gas and oil as so-called "Class II" wells, rather than under the less-stringent standard of "Class-II like underground injection activity" as the EPA argued it could do.[223] Still, this ruling allowed for ample state regulatory flexibility. Its practical effect was that Alabama and other states in the Eleventh Circuit may establish their own oil and gas injection programs which need not follow stricter EPA rules so long as they meet the flexible test of being "an effective program to prevent underground injection which endangers drinking water sources."[224]

Yet, the gas industry desired to shake even this burden. In a brazen effort to both appear environmentally responsible and escape regulation, the industry pushed for a congressional exemption to Safe Drinking Water Act regulation as well as an EPA

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220. *LEAF II*, 276 F.3d at 1257.

221. *Id.* at 1260.

222. *Id.*

223. *See id.* at 1264. To qualify for approval under a Class II program, states must show that five conditions are met:

> (1) the program prohibits any underground injection in such State which is not authorized by permit or rule; (2) the program requires that (i) the applicant for a permit "must satisfy the State that the underground injection will not endanger drinking water sources," and (ii) "no rule may be promulgated which authorizes any underground injection which endangers drinking water sources[,]"; (3) the program "includes inspection, monitoring, recordkeeping, and reporting requirements[,]"; (4) the program applies to (i) "underground injections by Federal agencies, and (ii) to underground injections by any other person whether or not occurring on property owned or leased by the United States[,]"; and (5) the program represents an "effective program . . . to prevent underground injection which endangers drinking water sources[.]"

Id. at 1264-65 (citations omitted). The court ruled that the EPA did not err in determining that Alabama's underground injection control program complied with these requirements. *Id.* at 1265.

224. *See* NATURAL RES. DEF. COUNCIL, *supra* note 52, at 5 (citing 42 U.S.C. § 300h-4).

blessing so that it could praise itself for being environmentally friendly.

This effort took shape as the EPA launched a study of the hydraulic fracturing problem following the original *LEAF* decision. While the study was underway, several CBM-producing companies entered into an agreement with the EPA in which the EPA would "consider providing" these companies with recognition "for their public service in protecting the environment" if they stopped pumping diesel fuel into underground wells.[225] The deal also allows these companies to highlight their agreement not to use diesel fuel in their promotional materials.[226] The agreement, however, created no requirements as to what the industries could use to replace diesel fuel.[227]

Just over half a year later, the EPA came out with a report determining that hydraulic fracturing poses "little or no threat" to drinking water and that no further study of the effects of hydraulic fracturing was needed.[228] The only injection fluid with which the EPA found fault was diesel fuel.[229] This report was called "scientifically unsound" by an EPA whistleblower.[230] Some members of Congress also questioned the report as being politically motivated, especially since Halliburton Co. (formerly headed by Vice

225. U.S. ENVTL. PROT. AGENCY, A MEMORANDUM OF AGREEMENT BETWEEN THE U.S. ENVTL. PROT. AGENCY AND BJ SVS. CO., HALLIBURTON ENERGY SVS., INC., AND SCHLUMBERGER TECH. CO., ELIMINATION OF DIESEL FUEL IN HYDRAULIC FRACTURING FLUIDS INJECTED INTO UNDERGROUND SOURCES OF DRINKING WATER DURING HYDRAULIC FRACTURING OF COALBED METHANE WELLS 2, 4 (Dec. 12, 2003), *available at* http://www.epa.gov/ogwdw/uic/pdfs/moa_uic_hyd-fract.pdf.

226. *Id.* at 3.

227. *Id.*

228. ENVTL. PROT. AGENCY, *supra* note 75, at ES-1. In its report, the EPA stated that it "reviewed incidents of drinking water well contamination believed to be associated with hydraulic fracturing and found no confirmed cases that are linked to fracturing fluid injection into CBM wells or subsequent underground movement of fracturing fluids." *Id.* While it is unclear whether any of these incidents were the focus of the EPA report, in 2002, the Natural Resources Defense Council issued a paper explaining that the testing of wells allegedly contaminated by hydraulic fracturing was often done months after the alleged contamination occurred and often times did not target for pollutants known to exist in hydraulic fracturing fluids. NATURAL RES. DEF. COUNCIL, *supra* note 52, at 4.

229. *See* ENVTL. PROT. AGENCY, *supra* note 75, at ES-17 (acknowledging the "potential for diesel fuel to be introduced into [underground sources of drinking water]").

230. Earthworks, Hydraulic Fracturing of Oil and Gas Wells, http://www.earthworksaction.org/hydfracking.cfm (last visited Apr. 17, 2007).

President Richard Cheney) is a pioneer and primary user of hydraulic fracturing for CBM extraction.[231]

Industry's effort to rid itself of the *LEAF* decision cumulated a year later. In 2005, Congress passed an energy bill exempting injection of all fluids, other than diesel fuel, for hydraulic fracturing from regulation under the Safe Drinking Water Act.[232] Thus, the gas industry currently stands alone as the only industry that can inject hazardous and carcinogenic materials into underground water often used as a drinking water source with no Safe Drinking Water Act regulation.

This unfortunate story details how a legal decision that by most measures is a reasonable application of a law designed to protect public safety was swept aside by an industry with strong influence over Congress and an agency that appeared all too eager to appease rather than regulate. It also shows the limits of legal victories in a political climate where policymakers may not be willing to impose rational restrictions on a powerful industry.[233]

B. Approaches for Dealing with the Impacts of Future CBM Development

At first glance, the current landscape looks decidedly grim for those facing the impacts of CBM development in the Powder River Basin. Congress and the Bush Administration appear set on policies that seek to extract domestic fossil fuel sources with little regard for the longer term impacts of such development. Natural gas remains coveted. Its further development also has some local support because it is viewed as a source of local income, tax revenues, and jobs.[234] It would therefore be easy to conclude that

231. Tom Hamburger & Alan C. Miller, *Investigation of Drilling Regulations is Urged: Lawmakers Want an Explanation for EPA's Stance on Hydraulic Fracturing, Used Widely by Former Cheney Employer Halliburton*, L.A. TIMES, Oct. 15, 2004, at A15, *available at* http://www.latimes.com/news/nationworld/politics/scotus/la-na-frac15oct15,1,6258471.story?coll=la-news-politicssupreme_court.

232. Energy Policy Act of 2005, Pub. L. No. 109-58, § 322, 119 Stat. 594, 694 (to be codified at 42 U.S.C. § 300(h)).

233. *See, e.g.*, W. ORG. OF RES. COUNCILS, WORC'S COMPARISON OF HOUSE AND SENATE ENERGY BILLS (Jul. 27, 2005), *available at* http://www.worc.org/pdfs/COMPARISON%20OF%20ENERGY%20BILLS%20-%207-28.pdf (describing provisions of the most recent energy bill passed and signed into law as reading like a Christmas list for the oil and gas industry, including exemptions from Clean Water Act storm water permitting for oil and gas construction related activities, tightening the time BLM must approve permit to drill applications, and giving agencies more latitude to exempt certain gas and oil exploration and drilling activities from NEPA review).

234. BRYNER, *supra* note 15, at 35.

CBM development will continue to roll over this beautiful landscape onto other areas rich in coal.

Yet, there are signs of hope. As discussed above, when looking at who is suing agencies and gas companies for their practices, one sees the stereotypes regarding who typically stands firm for environmental protections over development interests being shattered. One also sees that people of all political persuasions understand the need for sound environmental standards when the alternative is seeing their land and water being needlessly trashed for a paltry amount of fuel.[235] As the chorus of protests to current energy policies grows, it could push our public officials to reevaluate these policies in a manner that will start to emphasize more sustainable forms of energy development that are compatible with long-term uses of other resources.

As discussed above, the success of efforts to push state agencies to promulgate rules ensuring beneficial use of CBM produced water are signs that the outcry against poorly managed CBM development is being heard. Also, the Record of Decision for the Wyoming portion of the Powder River Basin points to some small mitigating measures, such as laying out objectives relating to companies monitoring air quality compliance and taking steps to protect affected water wells, which begin to recognize environmental concerns.[236] While many of these provisions may not be terribly meaningful, unlike even five years ago, some these impacts are at least being acknowledged by responsible agencies.

Encouraging signs also include ranchers and others concerned with the impacts of CBM development taking the lead in proposing workable solutions. For instance, the Northern Plains Resource Council has put forth six suggestions for better management:

- Effective coalbed methane monitoring and enforcement of existing laws;

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235. *See, e.g.*, *Kloor*, *supra* note 1 (describing Swartz as "an active, bedrock Republican" who has "spent almost all of his 62 years . . . herding cattle, baling hay, and building waterlines to keep his ranch from going dry" and describing other ranchers who are now being activists fighting the impacts of the CBM development); PBS, *supra* note 63 (quoting Jill Morrison of the Powder River Basin Council as stating, "People that live on the land, particularly here in Wyoming, [sic] very conservative, mostly Republican. But they care about the land. They care about the water. They care about the air. Those are the folks who stepped forward [to challenge CBM development in the Powder River Basin].").

236. RECORD OF DECISION AND AMENDMENTS, *supra* note 37, at 7.

- Surface owner consent, surface use agreements, and attorney reimbursements (none of these are available, except under some federal statutes);
- Use of aquifer recharge, clustered development, mufflers for compressors, use of other low-impact and best available technology to reduce impacts;
- Collection of fish, wildlife, and plant inventories before development, and phased-in development to lessen impacts over time;
- Meaningful public involvement in decision making; and
- Complete reclamation of disturbed areas and bonding to relieve taxpayers of cleanup costs.[237]

These measures focus on sustainability and a collaborative approach to decision-making that would allow affected landowners to have more say in where CBM development occurs and what type of mitigation takes place. Sustainability principles, if followed, can ideally promote better development of resources by ensuring that CBM development does not deplete or degrade valuable water resources. They would also protect traditional land uses like ranching, account for the interests of future generations, and internalize costs to the producer.[238]

Policy choices to empower surface land users will also likely further sustainable development. Federal agencies that often control leasing for mineral rights on split estates have the capability to and—according to the language of FLPMA discussed in Part II above—arguably are required to adjust their policies to better balance the interests of CBM development and those of surface land and water users. It is therefore necessary that responsible agencies shift their policies in such a manner. Ranchers and groups like the Northern Plains Resource Council are showing how such a policy shift can occur. It is the policy decision-maker's turn to follow.

IV. CONCLUSION

The immense plans to build literally thousands of wells pumping billions of gallons of water—much of it contaminated—to be dumped onto the land without any meaningful environmental review or safeguards have been slowed by litigation efforts. These often successful suits have been brought largely by traditional

237. BRYNER, *supra* note 15, at 19.
238. *Id.* at 36-37.

western land users who are fed up with seeing their way of life ravaged for short-term energy gain.

It is important to realize that these litigation efforts can only be so successful, though. They are waged against a powerful and influential gas and oil industry generally bent on the cheapest short-term return for their CBM extraction. Also, many current policy-makers easily bend to this industry's will.

Yet, the devastating effects of CBM development and the policies allowing for these effects to occur are being objected to by people across the political spectrum. The outcry against the consequences of our current energy policies is likely going to become harder to ignore.

Looking forward, the only realistically effective way to protect lands, soils, water and a way of life from CBM development is to shift our energy policy away from an emphasis on the development of fossil fuels at any cost and towards renewable energy and conservation. Such a shift will hopefully encourage development of fuel sources with lesser impacts and longer returns that allow for other resources, such as water, to be sustained.

The good news is that these alternatives to CBM development exist. While renewable energy sources have their own impacts that must also be accounted for, sources like wind and solar energy do not have many of the polluting effects of CBM development and, unlike CBM, are not exhaustible.[239] Additionally, energy conservation could offset the need for a great deal of energy.[240] Leaders who are less eager to give handouts and exemptions to an industry that poses significant long term environmental threats in return for a year's supply of natural gas energy could help develop these alternatives. People like Ed Swartz could ultimately be instrumental in getting such leaders in decision-making roles.

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239. *See, e.g.*, NAT'L WIND COORDINATING COLLABORATIVE, WIND ENERGY RESOURCES, BRIEF No. 4. (1997), *available at* http://www.nationalwind.org/publications/wes/ibrief04.htm (stating that wind could provide 10-40% of the U.S. electricity demand). The energy production of wind rivals and potentially exceeds the current amount of electricity production from gas. *See supra* text accompanying note 17. *See also* AM. WIND ENERGY ASS'N, WIND ENERGY FACT SHEET: COMPARATIVE COST OF WIND AND OTHER ENERGY SOURCES, *available at* http://www.awea.org/pubs/factsheets/Cost2001.PDF (last visited Apr. 17, 2007) (detailing the relatively low environmental impacts and favorable cost competitiveness of wind power).

240. *See, e.g.*, Valerie Jamieson, *Energy Savings Go Through the Roof*, PHYSICS WORLD, July 2002, at 32-33, *available at* http://physicsweb.org/articles/world/ 15/7/11 (detailing rapid improvements in technology and building design that allow for drastic reductions in energy consumption and increases in conservation).

The fate of much of the Powder River Basin is still not set in stone. Extensive coalfields, potentially ripe for CBM development, exist throughout the coterminous United States, including Colorado, New Mexico, the Gulf Coast states, Appalachia, Illinois, the Great Plains, and Michigan.[241] Litigation and other grassroots efforts in the Powder River Basin have partially slowed down the train of momentum rushing towards the exploitation of our nation's fossil fuel resources. It has given us the time and awareness we need to really look and see what we are doing, and it has begun to build the type of broader political support necessary to change course.

241. CBM POTENTIAL AND CONCERNS, *supra* note 13, fig.1.