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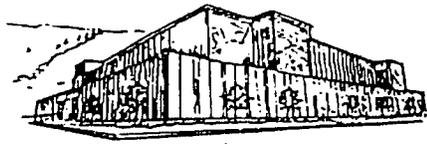
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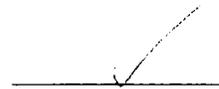
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Powder River Country

by

Marianne Zugel

B.S. Georgetown University 1986

presented in fulfillment of the requirements

for the degree of

Master of Science

The University of Montana

December 2004

Approved By:

Kevin Watson

Chairperson
[Signature]

Dean, Graduate School

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Powder River Country

Chairperson: Dr. Vicki Watson

VW

Powder River Country is a documentary about the coalbed methane energy development currently ongoing in the Powder River Basin of Montana and Wyoming. The story is told from the perspective of local ranchers who are concerned about impacts associated with development. Coalbed methane development requires the withdrawal of large amounts of water from coal seams. Both the potential depletion of aquifers and damage to soil from groundwater discharge are the most serious concerns of local residents. Looking at what is being lost as a result of coalbed methane development inspires the larger question of what we value as a society.

Acknowledgements

First and foremost, I would like to thank the residents of the Powder River Basin who took the time to help me understand the area and the coalbed methane development process. In particular I would like to thank the Northern Plains Resource Council and the Powder River Basin Resource Council for introducing me to their local members and sharing with me their wealth of knowledge of the current development situation.

I would also like to thank my committee chairperson, Dr. Vicki Watson, and committee members Dr. Tom Roy and Dr. Ray Ekness for their ongoing support and insightful critiques. While I am responsible for any errors in this text and film, I want to recognize their role in this project.

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Chapter 1: Introduction

Powder River Country is a documentary about the coalbed methane (CBM) energy development currently taking place in the Powder River Basin of Montana and Wyoming. The treatment highlights ranchers' concerns about the development and focuses on what many state as the most contentious issue: water.

The CBM development plan in the Powder River Basin of Wyoming and Montana is the largest oil and gas development project in the history of the U.S. Bureau of Land Management. In fact, just about everything having to do with coal-bed methane is large...the area worldwide with development potential; the water pumped from aquifers; the collective surface disturbance including gas pipelines, water pipelines, power lines, and roads; the gas to be recovered; the money to be made; and the growing number of players. The scale of this development effort along with the setting – the 'developed' U.S. West at a time of competing visions for the future of the region – makes for a somewhat unique version of a not-so-unique situation, i.e. large-scale natural resource development.

CBM development appealed to me as a thesis topic for several reasons. First, water and energy development, both prime interests of mine, are fundamental elements in the Powder River Basin situation. Because I previously worked in the biological sciences, water, a basic necessity for life, has always been paramount in my mind. And it continued to remain in the forefront of my academic interests as they shifted towards sociological and philosophical analyses of human relationships with their environment. As Tanaka Shozo, described as Japan's conservationist pioneer, so eloquently explains, "The care of the rivers is not a question of rivers, but of the human heart."

As a writer for the Public Interest Research Group in the year prior to my enrollment in graduate school, I had written a series of reports for individual states assessing their energy demands, sources, and potential for renewable energy development. Through my research for these reports, I developed a better appreciation for the profound effects that our choice of energy development has on both our natural environment and human societies. I also learned for the first time about CBM development specifically.

The second reason CBM interested me is because it brought together ranchers and environmentalists, two stakeholder groups that often occupy opposite seats at the table when it comes to energy development. The two groups have collaborated before when the Colstrip, Montana, coalfields were being developed in the 1970s, but for the most part they seldom see eye to eye with regards to conventional oil and gas development. Their collaboration reveals that something is different about this development; a line has been crossed.

Finally, I chose CBM as my thesis topic because the time is ripe to investigate this development. On the one hand, right now the U.S. West is coming under increasing pressure to develop its energy resources, and CBM is a new and desirable natural gas resource. On the other hand, some sociologists argue that, in the case of CBM development and perhaps on a national scale, momentum is building to challenge the status quo regarding our society's perception of property, environment, and natural resource management (Duffy 2004 and Freyfogle 2003).

Coalbed Methane History and Description

Coalbed methane (CBM) is methane gas (that is, natural gas with fewer impurities) that is adsorbed to coal in underground coal seams. In the U.S., the largest potential for CBM lies in the Rocky Mountain areas; however, there is also development occurring in the Mid-West, the Deep South, and the Mid-Atlantic Appalachian Mountains. Internationally, Australia, Bulgaria, Canada, China, the Czech Republic, France, Germany, India, Japan, Kazakhstan, Mexico, Poland, Russia, South Africa, the United Kingdom, and the Ukraine are either currently developing or analyzing their potential to develop CBM (USEPA 2003).

It has long been known that methane was found with coal. Methane gas was the life-threatening risk for which canaries were employed as warning signals in coalmines. Only about twenty years ago in an Appalachian coalfield in Alabama, a method for capturing the gas was inadvertently discovered (Christiansen, personal communication). The recovery of CBM from coalmines is now referred to as coalbed methane mining (CMM) to distinguish it from wells drilled outside of existing coalfields.

The methane gas is contained in place, adsorbed to the coal due to water pressure. In order to release the gas, the water pressure must be reduced. In practice, this means dewatering the coal seam to a level that allows this release to take place. Once the water pressure is removed, the methane gas is easily harvested through a separate pipeline from the water pipeline, piped to a compressor station where the gas is processed for entry into national gas pipelines.

There are many issues of contention surrounding coalbed methane development including public participation (the citizen's voice), property ownership (more specifically

private property rights), wildlife habitat fragmentation, and the transformation of open space to an industrial zone. But perhaps the most contentious issues involve water (water usage, wastage, and impacts).

These coal seams are aquifers and serve as drinking water reservoirs for the residents in the development area and for their livestock. Coal seams are also the source of many natural springs on which people, livestock and wildlife depend. Huge amounts of groundwater must be pumped out of the coal seam aquifers in the development process. Estimates of groundwater discharge range from 2.5 to more than 11 gallons of water per minute per well (Friends of the Earth 2003, Stanford and Hauer 2003, U.S. Department of Energy and State of Montana 2003). Currently, there are about 30,000 wells in Wyoming and about 325 wells in Montana. Full development could bring a total of about 100,000 wells in the Powder River Basin (PRBRC 2004). The duration of production estimates vary widely from ten years to fifty years or more. This translates to hundreds of millions of gallons of water discharged per day with full development.

No one knows how long it will take for the aquifers to recharge (Bauder 2004, Christiansen, personal communication, McInay, personal communication). At least fifty people on the Wyoming side of the Powder River Basin have lost their water wells and had to replace them with deeper ones (Christiansen, personal communication).

The second issue having to do with water discharge is water quality. CBM water (i.e., the groundwater discharged during CBM production) contains salts and elements that are harmful to aquatic life, crops, and soils found in the region. CBM water is described as salty or sodic. Several water management strategies have been proposed, but

to date the most common management strategies have been direct discharge onto the land, into stream channels, or into one of several types of ponds.

Though my documentary does not address the concept of property explicitly, property issues are an undercurrent that warrants brief discussion. Many residents who own land in the Powder River Basin own only the surface while the underground minerals are held under a different ownership title. This situation is referred to as a 'split estate'. In a split estate, the minerals below the surface exist as a property separate from the surface. Rarely is there only one owner of both surface and all minerals. The common breakdown of ownership is one surface owner and several to many different mineral owners and lessees. Under federal law, mineral ownership takes precedence over surface ownership, and the surface owner is required to provide 'reasonable' access to the mineral owner. In practice, this has caused havoc with CBM development and there have been numerous lawsuits over damages incurred by the surface owners.

The coalbed methane development project did go through the National Environmental Policy Act (NEPA) process with the U.S. Bureau of Land Management (BLM) as the lead agency. Against the advice of the U.S. Environmental Protection Agency (EPA), two separate environmental impact statements (EIS) were developed rather than a single comprehensive one – one for Montana and one for Wyoming. The EPA gave both draft EIS's its worst possible rating, EU-3, environmentally unsatisfactory and recommended a new draft EIS be developed (USEPA 2004). The BLM did not develop another draft EIS and when the final EIS's and records of decision for both states were issued, several lawsuits were filed immediately by citizen groups. Development currently continues while the lawsuits remain pending.

Project Goals

The basic objective of the documentary is to draw more attention to the water-related risks that are being taken with CBM development and to inspire the questioning and consideration of what we value as a society. In the status quo, industry and government stakeholder groups control the discourse surrounding CBM development. This film gives a less powerful stakeholder group, local residents, the opportunity to voice their opinion of the development and redefine the problems they see associated with it. The film is directed towards a general American audience and appeals to the emotions and common sense of people in order to convey the message, “what are we valuing here?”

Chapter 2: Methods

Preparation

To prepare for this project, I completed relevant coursework in media production, documentary production, and sociology. In addition, I produced a short video, *A Glimpse Into the World Social Forum*, conducted an analysis of the CBM development in the Powder River Basin using a regional political ecology approach, and interned with Cold Mountain, Cold Rivers, a local non-profit video production group. This film was produced in fulfillment of a fellowship with High Plains Films.

Documentary Treatment Parameters

There are many stakeholders or communities involved with the CBM development in the Powder River Basin that could be incorporated into a documentary treatment of the situation. Long ago, of course, several Native American tribes occupied the area. Currently, the Crow and Northern Cheyenne reservations fall within the boundaries of the Powder River Basin in Montana, however, ranchers and farmers of European descent occupy the vast majority of the area. It should be noted that mining and energy development are not new to the area. The 1970's – '80's saw the boom of surface-mined coal developments, and conventional oil and gas developments have been ongoing even longer. So natural resource developers have been coming and going in the community for quite awhile. Additional stakeholders are local government and local field offices of federal government, like the Bureau of Land Management.

If the concept of community is expanded to include the 'community of interest', non-resident outdoor enthusiasts, mainly fishers and hunters, must be included. Indeed,

they are very much accepted as part of the community by local residents. The Wyoming Outdoor Council is one such group that is prominent in the area. Non-resident environmentalists would also fall into this category of 'community of interest', however, they often join forces with either the outdoor enthusiasts or the local residents to gain legitimacy among local residents. The Powder River Basin Resource Council in Sheraton, Wyoming and the Northern Plains Resource Council in Billings, Montana are both prominent citizens groups in the region whose members are primarily ranchers and environmentalists. All U.S. citizens could be argued to be a part of the 'community of interest' due to the vast amounts of public land with CBM development potential. This group of community members – U.S. citizens - however, is represented in legal arguments posed by the other members rather than occupying a separate seat at the table.

In order to carve out a manageable story from the multitudes of stories that could be told about the CBM development, I had to either eliminate or severely restrict the treatment of some of the issues involved with the development. I decided to focus on water. Water quantity and quality are considered by many people to be the most substantial issues at hand. Wasting water in the arid west is what immediately caught my attention back in 2001 when I first learned of CBM development in Colorado. I feel it is the most compelling of the CBM-related issues. Although I briefly touch on the issues of threatened wildlife habitat and property conflicts, and try to convey a sense of threat to intrinsic beauty and open space, water is the central issue of the documentary. I wanted to develop one issue more completely rather than treat many issues in a shallow fashion.

The treatment of perspectives had to be narrowed down as well. I purposely wanted to highlight the perspectives that are not being heard in the mainstream media or

in most public discourse. These voices are those of the concerned residents of the area – ranchers and farmers. Also included, but to a much lesser degree, were regulatory personnel, scientists, local government representatives, and industry representatives. The latter were interviewed primarily to provide some information on what is known and not known about CBM development impacts.

I chose not to include the Native American perspective, even though their voice is also not being heard, because their perspective is so unique that it would require a separate discussion prior to incorporating them into the main thesis of the documentary. I also chose not to include wildlife issues or the wildlife protection advocates' point of view.

The final factor that affected my treatment of the subject is the target audience. This documentary is directed towards a general audience that knows nothing of coalbed methane. For this reason, the technical aspects of the CBM development process are kept to a minimum. The process is explained to the extent that one can understand the basic steps involved and why the management of water is an issue of contention, but what it really means to have your water source impaired or lost in arid country is conveyed by having the locals tell the story from their perspective in a way that invites the viewer to develop an understanding of the situation through empathizing with the locals.

Information Collection Methods

I would describe my overall approach as a combination of observation and investigation. I used a variety of methods to gather background information about CBM development and the political situation in the Powder River Basin. First, I conducted a

literature review to understand the technology and to determine whether CBM was an appropriate subject for a documentary film. Through networking and purposive sampling, I identified and attempted to interview representatives of the selected stakeholder groups and the technical experts they cited. With the intention of highlighting the voices of the local farmers and ranchers, I made special efforts to find and develop a rapport with two or three area residents to serve as representatives of that group. Over the course of four trips to Southeastern Montana and Northeastern Wyoming, I observed industry workers in the field, ranchers tending to daily duties, and participants in CBM-related meetings.

Literature Review

Many sources of information contributed to my understanding of the CBM technology, the current status of development, the geology of the Powder River Basin, and the different stakeholders' perspectives of the development. The following table lists sources of information, most of which are not cited elsewhere in this paper, and the type of information each source provided.

Table 1: Literature Sources

Source	Type of Information Provided by Source
Anderson ZurMuehlen and Company, P.C., <i>Coalbed Methane Development: Economic and Social Impacts of Proposed Development</i> (Anderson ZurMuehlen 2001)	Industry Perspective
Berg, Bruce L. <i>Qualitative Research Methods for the Social Sciences, Fourth Edition</i> (Berg 2001)	Sociological Research Methods and Interview Guidelines
Charter, Anne G., <i>Cowboys Don't Walk: a tale of two</i> (Charter 1999)	Rancher Perspective
Coalbed Methane Coordination Coalition Website (CBMCC 2004)	Status of Current Development

Source	Type of Information Provided by Source
Colorado Petroleum Association Website (CPA 2004)	Industry Perspective; Status of Current Development
Federal Government Websites <ul style="list-style-type: none"> • Environmental Protection Agency (USEPA 2003) • Bureau of Land Management (USBLM 2004 and U.S. Department of the Interior and State of Montana 2003) • U.S. Geological Service (USGS 2004) 	Government Perspective; Status of Current Development; Geology of Powder River Basin; CBM Technology
Freyfogle, <i>The Land We Share</i> (Freyfogle 2003)	Historical Perspective of Property in U.S.
Greider, Thomas and Lorraine Garkovich, <i>Landscapes: The Social Construction of Nature and the Environment</i> (Greider and Garkovich 1994)	Sociological Perspective of Society-Environment Interaction
Hajer, M.A., <i>The Politics of Environmental Discourse</i> (Hajer 1995)	Sociological Perspective of Discourse
High Plains News Website (High Plains News 2004)	Environmental Perspective
Jorgensen, Joseph, G., <i>Native Americans and Rural Anglos: Conflicts and Cultural Responses to Energy Development</i> (Jorgensen 1984)	Resident Perspective
Oil and Gas Accountability Project, <i>Oil and Gas at your Door?: A Landowner's Guide to Oil and Gas Development</i> (Oil and Gas Accountability Project 2004)	Citizen Organization Perspective; Status of Development
Rabiger, M., <i>Directing the Documentary</i> (Rabiger 1998)	Documentary Production Guidelines

Source	Type of Information Provided by Source
State Government Websites <ul style="list-style-type: none"> • Montana Board of Environmental Review (MTBER 2004) • Montana Board of Oil and Gas Conservation (MBOGC 2004) • Montana Department of Environmental Quality (MTDEQ 2004) • Wyoming Oil and Gas Conservation Commission (WOGC 2004) 	Government Perspective; Status of Development
Steiner, Stan, <i>The Ranchers: a book of generations</i> (Steiner 1980)	Rancher Perspective
Walker, Peter A., <i>Reconsidering 'regional' political ecologies: toward a political ecology of the rural American West</i> (Walker 2003)	Sociological Perspective of Natural Resource Development in the U.S. West
Wyoming Outdoor Council (WOC 2004)	Environmental Perspective

In addition to the above list, I kept abreast of events by routinely reading the local newspapers, receiving daily email alerts provided by the internet search engine, Google, and maintaining contact with local organizations involved with CBM development like the Northern Plains Resource Council, the Powder River Basin Resource Council, and the Oil and Gas Accountability Project.

Interviews

The following people were interviewed at least once for this project:

- Gail Abercrombie, Montana Petroleum Association
- Irv and Jeannie Alderson, Ranchers, Birney, Montana
- Jim Bauder, Soil Scientist, Montana State University
- Jeff Blend, Montana Department of Environmental Quality
- BJ Christiansen, Geologist, CBM Coordination Coalition, Buffalo, Wyoming
- Marilyn Connelly, Johnson County Commissioner
- John Dewey, Rancher, Sheridan, Wyoming

- Mark Fix, Rancher, Miles City, Montana
- Art Hayes, Rancher, Birney, Montana
- Joe Icenogle, Fidelity Exploration and Production Co., Sheridan, Wyoming
- Bev and Roland Landrey, Ranchers, Arvada, Wyoming
- Dave McNay, US Bureau of Land Management, Miles City, Montana
- Clint McRae, Rancher, Colstrip, Montana
- Roger and Ray Muggli, Farmers, Miles City, Montana
- Bill and Judy Musgrave, Ranchers, Decker, Montana
- Tom Reid, Montana Department of Environmental Quality
- Tom Richmond, Montana Board of Oil and Gas
- Nancy Sorensen, Rancher, Buffalo, Wyoming
- Mickey Steward, Environmental Scientist, CBM Coordination Coalition, Buffalo, Wyoming
- Bill and Marj West, Ranchers, Arvada, Montana

Interviews were semi-structured and varied according to the interviewee's area of expertise. See Appendix I for examples of interview guides. A former Environmental Studies student, Amy Frickman who now works for the Northern Plains Resource Council (NPRC), a citizen's organization based in the Powder River Basin, arranged for my initial meeting with local ranchers and farmers who are members of NPRC and its Wyoming counterpart, the Powder River Basin Resource Council. Regulatory and industry representatives were identified through Internet searches and networking.

Observation

I attended the following meetings:

- Northern Plains Resource Council Annual Members Meeting (by invitation)
- March 2003 Johnson County Commissioners Meeting (by invitation)
- March 2003 Soil and Water Conservation Society Conference on CBM (public)
- Rosebud County Conservation District Meeting (public)

In addition, I spent considerable time observing and filming local ranchers at home and at work, and industry workers in the field.

Video and Audio Equipment

The following equipment was used in the production of the documentary:

- Cameras: Sony TRV 900, Sony PD150
- Microphones: Sony TRV 900 attachable microphone, Sennheiser ME66
- Digital Recording Tapes: Sony Mini DV (60 & 80 min)
- Software Editing Program: Media 100i
- Distribution formats: DVD, VHS

Chapter 3: Results

Powder River Country is a 34-minute documentary production about the coalbed methane development in the Powder River Basin. The film highlights the local ranchers' and farmers' perspective of CBM development by allowing them to speak for themselves. Through character development scenes of locals going about their daily routines, the viewer acquires some understanding of their attachment and dependence on the land and water. Technical details of the process of CBM development are kept to a minimum to maintain the interest of the general audience viewer and to enhance the focal message of the piece: the current CBM development involves potentially serious risks to water resources and the landscapes that interact with the water. Through this example of CBM development and its impacts, the viewer is inspired to consider the question of what we value as a society.

The film will be available in DVD and VHS formats. Distribution of the film is currently under discussion.

Script Outline

- 00:00-00:27 Opens with an aerial view of coalbed methane (CBM) product water holding ponds. Music begins and faceless voices speak of the lack of knowledge surrounding development and aquifers.
- 00:27-01:59 Off-screen voice asks, "Do you think the state's protecting your interest?" and the man on screen replies with laughter. Music starts up again as laughter trails off. "Music video" includes video clips of the Powder River Basin, the CBM development currently ongoing in the area, and voice-

overs give teaser statements about the development that evoke questions in the viewers' mind.

- 01:59-04:42 Part I of Bev and Roland Landrey's story. An elderly Wyoming rancher couple has lost their water well due to CBM development. We watch the couple make their periodic visit to their neighbors to fill jugs with water as Bev tells their story. Scene closes with Bev stating she hasn't had any success yet in getting any methane company to replace her well and she and Roland walk out the door with jugs in hand and the screen door slams shut behind them. As door slams shut, black screen follows.
- 04:42-06:30 BJ Christiansen, a geologist, describes the history and basics of CBM technology.
- 06:30-07:19 Jim Bauder, soil scientist at Montana State University, describes the physical process of developing CBM.
- 07:19-08:23 Joe Icenogle, a representative of Fidelity Exploration and Production Company, gives a field tour of a wellhead and compressor station.
- 08:23-08:57 Mickey Steward is a representative of the CBM Coordination Coalition, which is an organization formed by the state of Wyoming and several counties and conservation districts to compile and disseminate information pertinent to CBM development. She states her opinion that the most noticeable effect of CBM development is the fact that there is no place that is "away" anymore in the entire Powder River Basin, which used to be one of the most isolated areas in the Western U.S.

- 08:57-09:37 Marilyn Connelly, County Commissioner in Johnson County, Wyoming, expresses the intangible beauty and energy of the area that is threatened by CBM development. Her last statement, “We have to stay on top of it. Otherwise, it could get destroyed.”, immediately cuts to the sights and sounds of a compressor station.
- 09:37-10:06 Compressor station images are shown as John Dewey, a Wyoming rancher, describes them and their noise.
- 10:06-10:49 Marj West, a Wyoming rancher, tells how the number of sharp-tailed grouse she sees has decreased with the methane development.
- 10:49-11:29 Mickey Steward talks about how solitude and open space is a form of wealth. Talking is followed by an image of a subtly beautify Powder River Basin scene with the sound of distant birds.
- 11:29-12:11 Marj and Bill West describe their first interaction with a methane company that operates on their ranch, how they were misled, and how out of the many problems with CBM development, the worst is the problem of the water because so much water is wasted.
- 12:11-12:30 Jim Bauder states how much water is anticipated to be removed from the coal seams/aquifers.
- 12:30-12:58 Marj West speaks of her concern about what they will do when the aquifers are dewatered and the methane companies leave because they have already lost four wells.

- 12:58-13:19 Tom Richmond, a representative of the Montana Board of Oil and Gas, says that there is no doubt that water wells that are located in coal seams which are being developed for CBM will be impaired and may be lost.
- 13:19-14:35 Cut from Tom Richmond to a straight-on shot of Bev and Roland Landry sitting on their coach looking into the camera as music begins. Close-up and slow motion image of water dripping into a pond is shown while music plays and faceless voices talk about how precious water is.
- 14:35-15:13 At a CBM conference, an off-screen voice asks about the discrepancy between the amount of time it's estimated that the water has been in the aquifers (hundreds of years) versus the amount of time it's estimated that it will take to recharge them (fifteen years). John Wheaton, a geologist explains how the estimations are made using a standard scientific approach.
- 15:13-15:27 BJ Christiansen: The unknowns are huge regarding the aquifers.
- 15:27-15:36 Jim Bauder: Regarding estimations of how long it might take to recharge the aquifers, he's heard everything from 6 years to 100 years or more.
- 15:36-16:26 Clint McRae, a Montana rancher, speaks about how water is the state's most valuable resource but the state and federal agencies, whose responsibility it is to manage the state's resources, are not doing their job.
- 16:26-16:33 Tom Richmond says it is the responsibility of the methane companies to provide the regulatory agencies with a water management plan.
- 16:33-17:20 Jim Bauder goes through the list of current water management practices.

- 17:20-17:43 John Dewey: CBM produced water has constituents in it that make it toxic to the land.
- 17:43-17:52 BJ Christiansen: People and stock can drink the water, but you don't want to irrigate with it because the plants can't handle it.
- 17:52-19:07 Rosebud County Conservation District Meeting. Meeting coordinator explains that in order to use CBM water to irrigate, the methane companies put amendments on the fields, but in the future when regular water will be applied to irrigate the land, the land is likely to experience "hardpan". An audience member reminds the group that the area has excellent irrigated land right now that needs no amendments. Rather it just needs its water sources left unimpaired. A second audience member states that what it boils down to is money and the companies will do what they are required to do and no more.
- 19:07-21:18 Marj West reads excerpts from her surface damage agreement with Yates Energy and a letter she received from Yates. She demonstrates that the company is attempting to nullify part of their agreement. The company agreed to totally contain the water, but claims that when the reservoirs are built to contain the water, the reservoirs do not need any lining.
- 21:18-22:04 Jim Bauder describes how infiltration ponds, i.e. ponds without lining, do not work with the landscape in the Powder River Basin because the landscape is a run-off driven system not an infiltration-driven system.
- 22:04-23:35 Roger Muggli, a Montana farmer and irrigation district manager, tells how he has inherited the job of managing the Tongue and Yellowstone

Irrigation district, how he continues to work hard to complete a fish bypass around the irrigation dam, and how he strongly opposes allowing CBM water to be discharged into the Tongue River. He says that no studies have been conducted on the effects of CBM water on the reproduction of the aquatic life in the river. For this reason, no one knows what will happen to the aquatic life, but he's gambling, "it ain't gonna be good".

23:35-23:59 BJ Christiansen: The reason there are so many questions is because CBM development is so new, but the problem is that to get the answers, you need to produce the gas.

23:59-25:38 Clint McRae tells how Montana has a history of out-of-state and out-of-country companies taking the state's natural resources and leaving the state with the problems and he gives examples. He thinks a slower approach would be wiser, but he thinks it's not happening because people are afraid that the gas will migrate and so they have to get it now. He has no problem with industries making money except when they do it at his expense and this is the issue with CBM development and agriculture.

25:38-26:28 Jim Bauder explains that the holding ponds will not heal by themselves, that reclamation efforts will be limited due to the lack of water that will result from development and he describes how to shut down a containment pond.

26:28-27:17 BJ Christiansen gives an explanation as to why the development is occurring at the pace that it is. The mood of the country, which is dictated

by the policies of political administrations, influences the rate of development.

27:17-28:08 Joe Icenogle explains the company's commitment to the shareholder.

28:08-28:20 Jim Bauder: We all have a vested interest in this issue because we are all energy consumers and the U.S. uses a lot of energy.

28:20-28:46 Bill Musgrave, a Montana rancher, says that we are our own worst enemy and gives an example about how wasteful we are with our energy resources. "We're stupid...we're very spoiled."

28:46-29:08 Shot of a gas stove lighting. Marj's voice states that there is enough gas in the Powder River Basin to power the country for one year.

29:08-29:43 Mickey Steward describes her sense of transition and passing and her drive to document what is passing because she believes if it could be documented then people would value the Powder River Basin more than they do right now.

29:43-31:52 Part II of the Bev and Roland Landrey story. Bev tells the story of how one man organized a group to drill the Landry's a new well since no methane company would step up to the plate. But the new well is problematic. It's much deeper than their original artesian well. The scene ends with Bev's statement, "There just isn't any artesian wells anymore. They're gone."

31:52-32:47 Marj talks about how land is passed on to future generations and how ultimately, shouldn't the land remain good?

32:47-32:58 Image of a bird coasting on a thermal over the wide-open landscape.

32:58-end Images correspond with Mickey Steward as she speaks of things passing and disappearing. We have to value a thing before we will protect it.

Chapter 4: Discussion and Recommendations

This project was an educational experience both in filmmaking and in appreciating the multiple perspectives that exist with natural resource development issues. With regards to multiple perspectives, I found my sociology coursework to be invaluable. It helped define the different viewpoints, their respective visibility and which perspectives dominated the overall discourse. I chose to highlight the concerned rancher's perspective because it was hardly being heard at all compared to the dominant industry/government's view. Simply because a viewpoint is not getting equal visibility is not, in and of itself, a valid reason for bringing it to the forefront. In the case of the ranchers, they have some very valid concerns that are not being comprehensively addressed and for this reason, their voice needed amplification.

Regarding filmmaking, the lessons learned from this exercise fall into two main categories: (1) technical skills, and (2) methodological approach. There is probably no better way to learn how to produce a documentary other than by doing it. Many people graciously gave me advice, but in many cases, it seemed I needed to learn for myself.

The first step in the production of a documentary is to determine if a documentary is an appropriate treatment of the subject. Why are you choosing a visual medium to tell your story? Is it logistically feasible?

Once it is determined that the subject or story is suitable for film, it is important to clearly define the methodological approach up front. When I began this project, I attempted to tell the coalbed methane story, focusing on the issues and perspectives outlined in the methods section above, through a couple ranchers' experiences using a heavily observational style. I also wanted to include the relevant industry and government

representatives so they could respond to the ranchers' statements. This proved to be quite challenging. An observational approach is very time consuming. It requires developing a rapport with the film subjects and then spending time with them. My biggest obstacle was the fact that I live about 400 miles from the action. This placed great limitations on my ability to film the ranchers in different settings to better develop their characters and seize opportunities to cover the topic comprehensively through them. My response to this dilemma was to attempt to cover two angles at once – an objective description of CBM and the concerned ranchers' depiction of CBM. In hindsight, this resulted in the incomplete development of both angles.

Since the nature of a documentary is going out into the real world and reporting a real story, the expectation and hope is to learn, and perhaps even be surprised by, some new information that you did not know in the earlier planning stages. For this reason, it is imperative to be flexible and adaptive. The evolution of the story is an important aspect of the process.

All of the skills involved directly affect the quality of the production like the physical maneuvering of the camera, the cameraperson's eye, sound equipment operation, and communication with the film subjects. But perhaps one of the most important skills to develop is the ability to be still and be very aware so as to absorb what is around you and recognize opportunities. This is a difficult life skill and it is even more challenging to achieve while operating a camera and/or microphone at the same time.

Distribution of the film is currently being discussed. Objectives include a local showing, a public television showing, participation in film festivals, and educational use by citizen's organizations.

References

Anderson ZurMuehlen and Company, P.C. 2001. *Coalbed Methane Development: Economic and Social Impacts of Proposed Development*. By Anderson ZurMuehlen and Company, P.C.

Bauder, James, Soil Scientist, Montana State University. Personal communication 2 April 2004.

Berg, Bruce L. 2001. *Qualitative Research Methods for the Social Sciences, Fourth Edition*. Needham Heights, MA: A Pearson Education Company.

Charter, Anne G. 1999. *Cowboys Don't Walk: a tale of two*. Billings, MT: Western Organization of Resource Councils.

Christiansen, B.J., Geologist, Coalbed Methane Coordination Coalition, Buffalo, WY. Personal communication 3 March 2004.

Coalbed Methane Coordination Coalition Website. 2004. Internet. Available from <http://www.cbmcc.vcn.com>; accessed 30 October 2004.

Colorado Petroleum Association Website. 2004. Internet. Available from <http://www.coloradopetroleumassociation.org/info.htm>; accessed 14 June 2004.

Duffy, Robert J. 2004. *Political Mobilization, Venue Change, and the Coal Bed Methane Conflict in Montana and Wyoming*. Colorado State University. Presented at the Annual Meeting of the Western Political Science Association, Portland, OR, March 11-13, 2004.

Freyfogle, Eric T. 2003. *The Land We Share*. Washington, D.C: Island Press.

Friends of the Earth. 2003. *Drilling Holes in the Tax Code: The Impacts of Coalbed Methane Development*. Internet. Available from <http://www.foe.org>; accessed 14 December 2003.

Greider, Thomas and Lorraine Garkovich. 1994. Landscapes: The Social Construction of Nature and the Environment, *Rural Sociology*, 59 (1): 1-24.

Hajer, M.A. 1995. *The Politics of Environmental Discourse*. Clarendon Press.

High Plains News Website. 2004. Internet. Available from <http://www.worc.org/hpns/index.html>; accessed 20 November 2004.

Jorgensen, Joseph. G. 1984. Native Americans and Rural Anglos: Conflicts and Cultural Responses to Energy Development, *Human Organization*, 43 (2): 178-185.

McInay, David, Miles City Field Office Director, Bureau of Land Management. Personal communication 2 March 2004.

Montana Board of Environmental Review Website. 2004. Internet. Available from <http://www.deq.state.mt.us/ber/index.asp>; accessed 29 September 2004.

Montana Board of Oil and Gas Conservation Website. 2004. Internet. Available from <http://bogc.dnrc.state.mt.us/>; accessed 15 August 2004.

Montana Department of Environmental Quality Website. 2004. Internet. Available from <http://www.deq.state.mt.us/index.asp>; accessed 17 October 2004.

Oil and Gas Accountability Project. 2004 *Oil and Gas at your Door?: A Landowner's Guide to Oil and Gas Development*. By Oil and Gas Accountability Project.

Powder River Basin Resource Council. 2004. *Additional Information and Concerns over Coalbed Methane Development in the Powder River Basin*. Internet. Available from http://www.powderriverbasin.org/cbm/info_cbm_prb_concerns.shtml; accessed 13 April 2004.

Rabiger, Michael. 1998. *Directing the Documentary*. Focal Press.

Stanford, Jack A. and F. Richard Hauer. 2003. *A White Paper*. Flathead Lake Biological Station, Division of Biological Sciences. Polson, Montana: University of Montana.

Steiner, Stan. 1980. *The Ranchers: a book of generations*. NY: Knopf.

U.S. Bureau of Land Management Website. 2004. Internet. Available from <http://www.blm.gov/nhp/index.htm>; accessed 22 November 2004.

U.S. Department of the Interior and State of Montana. 2003. *Final Statewide Oil and Gas Environmental Impact Statement and Proposed Amendment of the Powder River and Billings Resource Management Plans*. BLM/MT/PL-03/005.

U.S. Environmental Protection Agency. 2003. *Coalbed Methane Outreach Program*. Internet. Available from <http://www.epa.gov/coalbed/intl/index.htm>; accessed 5 May 2003.

U.S. Environmental Protection Agency. 2004. *Environmental Impact Statement (EIS) Rating System Criteria*. Internet. Available from <http://www.epa.gov/compliance/nepa/comments/ratings.html>; accessed 22 February 2004.

U.S. Geological Survey Website. 2004. Internet. Available from <http://www.usgs.gov/>; accessed 4 October 2004.

Walker, Peter A. 2003. Reconsidering 'regional' political ecologies: toward a political ecology of the rural American West, *Progress in Human Geography*, 27 (1): 7-24.

Wyoming Oil and Gas Conservation Commission Website. 2004. Internet. Available from <http://wogcc.state.wy.us/>; accessed 25 June 2004.

Wyoming Outdoor Council Website. 2004. Internet. Available from <http://www.wyomingoutdoorcouncil.org/>; accessed 1 October 2004.

Appendix 1: Interview Guide Examples

Example #1: Interview Guide for Gail Abercrombie, Executive Director, Montana Petroleum Association

- Can you tell me what MPA is, What's it's mission statement?
- How would you introduce subject of CBM to someone who's never heard of it?
- How long have you worked with MPA? Were you working in the industry during oil/gas/coal development in MT? Any comparisons?
- What does the future of CBM look like – for MT, for US West, for world? Can you compare it to oil or conventional natural gas as far as importance as energy source?
- What does MT look like in the future as a CBM developer?
- What benefits will CBM development bring to Montanans and MT? How long will production continue and how long will MT continue to reap benefits after production ceases? (Jobs – how many for Montanan's, white/blue collar, length of employment expected, etc; royalties to state & local government; taxes to government, temporary source of water to ranchers & animals)
- What are the costs to Montanans and MT to develop CBM?
- Why is CBM development such a contentious issue?
- Are there legitimate concerns among the environmental groups & local residents?
- Could you respond to some comments I have heard from people:
 1. They say...history shows CBM companies have to be sued before they follow existing laws (e.g. Clean Water Act, National Environmental Policy Act).

2. They say...CBM companies are not developing CBM responsibly.
3. They say...why the rush?
4. They say...CBM companies are paying less taxes by selling gas to a subsidiary at one price that they are taxed on, and then having their subsidiary sell it to its customer at a higher price.
5. They say...that the current self-monitoring system does not instill confidence that adequate monitoring is taking place, so why not have an independent party handle those responsibilities?

Example #2: Interview Guide for Tom Reid, Montana Department of Environmental Quality, Water Discharge Permitting

- Name, position and responsibilities with DEQ; how long have you held this position/worked at the DEQ?
- What is the DEQ and what is its purpose?
- Tell me about CBM (what is it/why is it important?).
- Who benefits from CBM development?
- Who bears the costs of CBM development?
- Why is CBM development such a contentious issue?
- Are there legitimate concerns among environmental and other citizens groups?
- What are the roles for the DEQ in CBM development/describe the process/the steps an energy company must go through to develop CBM in MT?
- Tell me about the enforcement and monitoring of CBM discharge water. (How many wells combine into a given discharge point/ how many discharge points per

DEQ monitoring staff/ or frequency of monitoring per discharge point/people not confident with the industry self-monitoring system?)

- Same question for permitting. Basically, is there sufficient staff for projected development?
- Why did we allow discharge before any baseline aquatic studies could be done?
- How much water is estimated to be discharged from aquifers over the course of CBM development?
- What do we know and what are the unknowns regarding aquifer depletion and recharge? What is the mitigation plan? What about the statement that the aquifers will not fully recharge within the lifetime of any of today's Montana residents
- "...although MT does have a NEPA law that requires agencies to perform environmental impact statements, agencies are not required to perform 'cumulative impact' analyses for projects on state or private lands. As a result, state agencies review CBM projects on a well-by-well basis, which minimizes their projected impacts on the environment and public health." (Northern Plains Resource Council, *Doing It Right*, p. 3) Your comment?
- Please explain the logic behind the CBM water exemption from prior appropriations.
- Is there a conflict between the goals of Water 2025: Preventing Crises and Conflict in the West, which is encouraging water conservation, and the lowering of aquifers that occurs with CBM development?
- How were the numeric standards for discharge of CBM water determined? Are they protective of aquatic life?

- Compare CBM to conventional oil and gas with respect to importance as energy source, longevity, environmental and social impacts.

Appendix 2: Tips for Novice Filmmakers

Filming

Get to know your camera. The more familiar you are with your equipment, the better your shooting will be. Very much like any other physical skill, good filming requires lots of practice.

Handholding the camera is preferable for many situations in documentary work, but when a steady shot is desired, there is no substitute for a tripod. When taking tripod still shots, a good rule of thumb is to record the still shot for at least 30 seconds.

It may sound elementary, but clean the camera lens frequently. You will find that what you see through the viewfinder is often quite different from the image you are actually recording. Especially when filming outdoors, it is often hard to tell when your lens is dirty, so it is well worth it to periodically clean the lens to avoid collecting useless footage.

It is advisable to capture your footage into your software program as you go so that you know for sure which shot worked and which you will need to redo. It also helps immensely, with regards to improving and evolving your interview questions, to review what you have done before you set out to do the next interview.

Even though we casually refer to film as a visual medium, sound is a crucial component in the production. Use of headphones will alert you to problems that you might miss if you operate without them. Always use a windsock when recording outdoors. Also, remember to always get at least a full minute or two of the ambient background noise for every interview and every setting. These will be invaluable when

you are editing the audio tracks. Finally, music will be very important in your production and it is wise to start thinking about what you want and how you will get it early on.

If you will be operating as a one-person production crew, be realistic about what you can do to get the best footage possible. Operating solely can be problematic, but it also has benefits. One of the main benefits is that it allows you to be a little less intrusive and intimidating to the film subject when you want to follow them around during a routine day.

Educating yourself about the history of fiction and non-fiction film is very helpful. There are many books on the subject, but also simply watching other documentaries is very instructive.

Filming in an observational setting (versus filming a formal interview) requires that you be calm and acutely aware. One of the critical necessities of non-fiction filming is to recognize and seize opportunities. Opportunities appear as quickly as they disappear, and when they pass, that particular opportunity is gone forever.

Editing

The most important advice to give about editing is probably to stress the fact that it takes a lot of time, probably more than you anticipate if it is your first time. After a basic storyline is assembled, it is a process of multiple revisions. It is actually a highly collaborative process even though you will spend most of the time alone in front of the computer. It is a good idea *not* to have everyone you know view your early versions, so that as you progress, you still have someone at each revision step who has never seen the piece and, therefore, who can give you a fresh perspective.

Equally importantly as any specific technical tip, remember to relax and have fun. Your demeanor will influence your film subjects; they will sense and share either your anxiety or your calmness.