

1 COMMITTEE ON EARTH RESOURCES
2 BOARD ON EARTH SCIENCES AND RESOURCES
3 NATIONAL RESEARCH COUNCIL

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5 MEETING ON THE STATUS OF DATA AND MANAGEMENT REGARDING
6 THE EFFECTS OF COALBED METHANE PRODUCTION ON SURFACE
AND GROUND WATER RESOURCES

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8 LOCATION:

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10 ADAM'S MARK HOTEL
11 1550 COURT PLACE
12 DENVER, COLORADO

13 DATE:

14 APRIL 9, 2008
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1 MR. HITZMAN: Well, welcome everyone. Thank
2 you for supporting the meeting and we really hope that
3 it actually helps them in deciding how to move forward
4 to meet the mandates for them in the Energy Policy Act
5 of 2005 regarding CBM production. I hope we all
6 learned quite a bit from yesterday's discussions. I
7 certain know I did.

8 In reviewing what we heard and what it might
9 imply in terms of scoping or framing a possible NRC
10 study to meet the mandate, some of the salient points I
11 thought we might think about: One, a large amount of
12 data has clearly been collected and is being collected
13 by federal agencies such as BLM, EPA, USGS and DOE
14 regarding CBM production in the west. Likewise, the
15 states are extremely active in collecting data. There
16 certainly appears to be issues with data collection and
17 the one that I found from yesterday was the stream
18 gauge data from the Powder River Basin where some of
19 those stream gauges have been turned off and we're not
20 getting the data we need. So there's certainly issues
21 there of trying to ensure that we have good data
22 collection going forward.

23 Another point, there clearly is real
24 diversity between CBM basins and even within individual
25 CBM basins, as highlighted by the discussions on the

1 Powder River Basin in terms of lateral variation in
2 terms of water quality and quantity.

3 Third, there's a real diversity in how
4 produced water is handled between the basins and it
5 seems to be based largely on water quality. As we
6 heard in the San Juan Basin, water is routinely
7 reinjected, while in the Powder River Basin much of the
8 water is released to the surface in various ways.

9 There does not appear to be insurmountable
10 technology issues with regards to CBM production. We
11 clearly have a multiplicity of means to deal with CBM
12 water from reinjection to treatment. The presentation
13 by Anadarko illustrated the many ways companies are
14 dealing with the issue and costs associated with
15 different options. The DOE presentation showed that
16 the government is still looking at new ways of trying
17 to develop different technologies that will work in the
18 future.

19 However, there may be issues between large
20 and small producers of CBM and making sure that the
21 very best practices are actually disseminated
22 throughout the industry. And there may be issues in
23 looking -- going forward with things like next
24 generation CBM using CO2 injection, et cetera. So
25 that's the good news and I think we heard a lot of

1 comments yesterday.

2 We also heard, I think, that there are
3 differences in perceptions between people who believe
4 they've been impacted and those that think we have most
5 of the answers. And it's this gap that has probably
6 provided the impetus for the mandate that actually is
7 in EPAC. I think the impetus for that mandate came not
8 from the technical community, but actually from the
9 public itself. That's probably important for us to
10 realize.

11 The real issues appear to be actually in data
12 integration and analysis and in dissemination of data
13 that we already have. So some of the other issues
14 despite the large amounts of data collected, there
15 appears to be less in-depth analysis of the data we
16 have. Because of the diversity of basins and the
17 highly interconnected nature of the geology, the
18 hydrology, the chemistry and the biology of these
19 systems and in these basins, we actually really do not
20 understand all the impacts probably as well as we
21 should.

22 In fact, if I had to sum up yesterday's
23 presentations, I would say the production of CBM has
24 outstripped our understanding of CBM systems. It's
25 clear that despite over a decade of production, we do

1 not really understand the hydrology of the basins, the
2 real reasons for variations in water quality and
3 quantity in CBM wells, the complex biological
4 interactions of CBM produced water on aquatic and
5 terrestrial life and on shallow soils and importantly,
6 variations of impacts through time, particularly with
7 regards to what may be happening in terms of climate
8 change and how we have variability in precipitation, et
9 cetera.

10 We also have not pulled the data together to
11 really be able to do proper scientific comparisons and
12 contrasts between different CBM basins. While we're
13 starting to appreciate and understand variations in
14 water quality and water quantity in the Powder River
15 Basin we cannot really do the same for the San Juan
16 Basin because the water is routinely reinjected, and
17 we've not studied it to the same degree that we have in
18 the Powder River.

19 I don't think this bodes well as we move into
20 future CBM basins, such as the Green River Basin. We
21 need to actually understand where we are now.

22 We also appear to have a problem with regards
23 to baselines. As was pointed out yesterday, we really
24 do not understand pre-CBM conditions in, say, the
25 Powder River Basin. While a relatively small number of

1 monitoring wells are in place, it's very difficult to
2 know what the pre-development conditions really were,
3 and that's simply because we started producing early
4 and that's the state we find ourselves in.

5 We actually need more integrated analysis,
6 including subsurface models that include two-phase flow
7 and a real understanding of the geology and hydrology
8 and we need these sort of models going forward as you
9 move into new CBM basins. It's clear that simply
10 satisfying the requirements of the Clean Water Act and
11 the Safe Drinking Act, while critical, may not actually
12 be providing the data needed to ensure both safe and
13 cost-effective production, especially in new basins.

14 Finally, CBM production, while similar in
15 many regards to traditional oil and gas, does have its
16 differences. Seems to me that there will be very
17 valuable lessons to learn from CBM that we may be able
18 to apply to new energy technologies on the horizons,
19 such things as institute coal gasification, oil shale
20 development, and other technologies we see down the
21 road. A better understanding of what we're doing now
22 with CBM may help frame or more efficiently produce
23 these other energy resources, which will be critical to
24 the U.S.'s energy future.

25 I think BLM has done an absolutely huge

1 amount of work and I applaud them, but we really think
2 -- I heard yesterday is we need more integration of
3 that data and then better dissemination of that data to
4 a non-technical audience. There seems to be
5 differences between perception of what exists and what
6 may exist. We need to think about short and long-term
7 beneficial uses and clearly we need to think in terms
8 of time and climate change that may be happening in the
9 west and how that affects some of the things we're
10 doing.

11 I'd like to invite the audience and our
12 Committee, obviously, to discuss what we heard
13 yesterday to provide BLM with valuable input as they
14 move forward in deciding how to scope out the study
15 mandated in the Energy Policy Act and I'd welcome your
16 comments and questions and I open it to the floor. So
17 any of our -- any comments from people in the audience?
18 Comments from our Committee? Yes. And if you could
19 just state your name for us?

20 MR. HOCHHEISER: Bill Hochheiser from the
21 Department of Energy. There is an issue that I keep
22 seeing both in my travels of San Juan, Raton Basins and
23 Powder River Basin and also in oil and gas
24 environmental conferences and while it's not
25 specifically in the questions that were listed, I think

1 it's very important and that's the issue of water
2 rights and water value and I think the issue of water
3 availability and supply in general is rising very fast.
4 What's call the "Energy Water Nexus" is something
5 that's being addressed by our national labs and by
6 Congress, and I think that it hit CBM in both positive
7 and negative ways.

8 I mentioned yesterday the Farmington Project,
9 which got value out of water rights laws there and --
10 but also in the Raton Basin where they're discharging
11 about 40 percent of the CBM water onto the rancher's
12 lands, there is a court case in Colorado, on the
13 Colorado side that is a struggle over who owns that
14 water.

15 And I think in the future, those water rights
16 issues, who owns the water, especially if it's water
17 that hasn't been accessed before, could change the way
18 that that water is used, could change the economics of
19 the Coalbed Methane projects. It's something that
20 needs to be paid attention to, and of course, it varies
21 state by state and I don't pretend in the least to
22 understand the water rights laws of Colorado and New
23 Mexico and Wyoming. I just know they're very
24 complicated and they're different.

25 So that's something that people need to pay

1 attention to. On the one hand it can -- you know, it
2 can be a barrier to both the use of the water and the
3 economics of the project; on the other hand, if the
4 producers can monetize the value of those -- of that
5 water, and in one conference I was in, they were
6 quoting the value of an acre foot water right in the
7 Colorado River Basin as anywhere between 20,000 and
8 \$50,000 per acre foot. If that can be monetized as
9 part of the project, that could be of real value to
10 Coalbed Methane production. I know everybody is going
11 to want that value, so it's something to, I think,
12 really pay attention to. Soon that's going to be
13 increasingly a part of the calculations of these
14 projects.

15 MR. HITZMAN: Comments and questions? Yes?

16 MR. GOODWIN: Good morning. I'm Richard
17 Goodwin, representing myself. I may be able to provide
18 you with a unique perspective regarding this meeting,
19 that of a lay person. You are all obviously been in
20 this field for many years and have achieved a certain
21 level of notoriety related to your individual efforts;
22 otherwise, you wouldn't be at this meeting in my
23 opinion. I, on the other hand, am a complete novice in
24 this arena.

25 I have learned a great deal of data and

1 commentary regarding CBM yesterday. I entered into the
2 room knowing a little. I leave the room knowing just a
3 little bit more, not to your level, of course. What I
4 leave with is, among other things, is an increased
5 awareness that every basin is different from its
6 neighbor and in fact is different within the same basin
7 and that will help me explain to some of my people,
8 since I'm president of the landowner's association, as
9 to why six lots on the west side of our development are
10 spewing forth methane and/or gone dry and are having
11 explosions and those of us who happen to be on the east
12 side of the development have very little problems.

13 I also leave with an increased appreciation
14 for all the countless hours of dedicated individuals
15 such as yourselves to solve these puzzles. If there is
16 one thing that I could leave you with is to stop every
17 so often and focus on the individual landowner who is
18 only trying to make a life for his family. That is
19 your ultimate customer and that is the person who, even
20 though he may never know or realize what you have done,
21 will most greatly appreciate your efforts.

22 Thank you very much.

23 MR. HITZMAN: Thank you. Other comments from
24 the audience? Yes?

25 MR. BARKMAN: I'm Peter Barkman of the

1 Colorado Geological Survey and I'd like to just make a
2 few comments about the state's perspective. I wasn't
3 brought in to do this as a technical liaison, but I've
4 been sitting through and enjoying hearing all the
5 presentations and it's been very valuable for me to get
6 a perspective of what's going on with CBM development
7 in other regions.

8 We at the Colorado Geological Survey, along
9 with Division Water Resources and Colorado Oil and Gas
10 Conservation Commission, have just completed three
11 studies on the depletive effects of CBM development on
12 surface water and we were really challenged with this
13 because we found we had some understanding of the
14 basins, but not a full enough understanding and I think
15 it's really important as CBM development progresses to
16 have a really good holistic view of the hydrologic
17 systems of these regions. Beforehand would be great
18 and we didn't have that with the San Juan, Peance and
19 Raton and it's really unfortunate with the Raton
20 because there's a lot going on.

21 At the same time that we have this great
22 demand for CBM, we have this regional growth of people
23 wanting to come here and live and you know, they find
24 these beautiful pieces of property, put in their homes,
25 you know, everybody wants to do it, so you've got at

1 the same time a tremendous growth and demand on the
2 ground water resources. Most of these people are
3 putting in little individual wells, exempt wells, and
4 as an aside, we did a little comparison of the impacts
5 of CBM production in the San Juan Basin against all the
6 exempt wells and the potential impacts from the exempt
7 wells, I believe -- the numbers are in our report, but
8 it was like an order of magnitude greater than the CBM.
9 So you know, we've got all this happening at the same
10 time and it would be good to have that holistic three
11 dimensional view of the system.

12 Next week, I'm going up to Rangely to
13 Yampa/White Round Table. You know, this is part of
14 Colorado's system to get a handle on our water demands
15 and supplies to try to get funding to go into the Sand
16 Wash Basin, which when you looked at the maps of all
17 the CBM potential and where it's being produced, Sand
18 Wash Basin is one of those. It's an extension of the
19 Green River Basin in the Colorado. A lot of gray
20 indicating potential, but not many dots. When we did
21 the work in the Peance Basin, we kept finding
22 information that said that there may be greater
23 potential in the Sand Wash for CBM than in the Peance,
24 and we went, "Why are you even looking at the Peance
25 when it looks like it's not a happening CBM basin?"

1 The Sand Wash may be happening.

2 You know, here's an opportunity where we may
3 be able to get in there early on in the development of
4 the resource and try to understand that system, but I
5 have to go try to get the funding to do this and you
6 know, in a year or so, maybe we'll have a better
7 picture, but what we'd like to look at are the
8 relationship of the coal bearing sequences and the
9 potential CBM resource to surface water and the
10 aquifers that people in that region are using for these
11 domestic -- their domestic water supplies.

12 So yeah, hopefully, we'll be able to get a
13 better handle on this early on. It may be that that
14 area does not take off for CBM, but if it does, we'd
15 like to say we're a little better off on that.

16 So that's just a little perspective of what
17 the State of Colorado is trying to do. It might help
18 you in the BLM to understand. You know, and maybe help
19 us out in our pursuit of this.

20 Thank you. It's been a good presentation.

21 MR. JOHNSON: My name is Pete Johnson and I
22 just wanted to address things from the environmental
23 perspective a little bit to let you know what those
24 types of groups would like to see addressed in the
25 study and why we think that further study is needed and

1 I think everyone in this room knows that in the west,
2 whiskey is for drinking and water is for fighting so
3 obviously produced water has been a big focus of CBM
4 and development and issues that surround CBM
5 development and so that the focus of this presentation
6 has been a fairly heavy emphasis on produced water, as
7 well.

8 But we would like to implore the NAS and the
9 BLM to look at some of the other effects of CBM
10 development, such as the effects of hydraulic
11 fracturing practices and open pit contamination and pit
12 system contamination, and these are the types of
13 impacts of CBM development that are going to be very
14 difficult to study and very difficult to detect and are
15 going to have contamination effects on the environment
16 in the long term. So again, it's going to take a very
17 comprehensive approach to adequately understand the
18 impacts of these types of practices on our environment
19 and on drinking water quality.

20 So we believe that there's still a lot of
21 unknowns in those areas, especially concerning
22 hydraulic fracturing and the initial EPA study that was
23 done, as well as some of the state's studies that have
24 been done by the Oil and Gas Commission and some of the
25 other organizations, have sort of reached preliminary

1 conclusions about some of these practices that they're
2 not a danger to drinking water quality, but again, we
3 would like to stress that many of the far reaching
4 implications of these applications of these practices
5 are very difficult to detect and very scientifically
6 complex, so further study is definitely required to
7 adequately satisfy what the National Energy Policy Act
8 calls for in that it asks for a comprehensive study of
9 these effects.

10 Thank you.

11 MR. HITZMAN: Thank you. Further comments?

12 From our Committee?

13 MR. SPILLER: Reggie Spiller with the
14 Committee. I wanted to follow up on something I heard
15 from Peter, from the Colorado --

16 MR. JOHNSON: Geological Survey.

17 MR. SPILLER: I heard something that said --
18 Peter said, "Let's get ahead of the curve on new
19 basins." I mean, I really like that. I think a lot of
20 what we've been talking about is information with
21 existing basins, but you know, here's an individual
22 saying, "I'm looking for funding to get ahead of the
23 curve on new basins."

24 Kathy showed us an interesting map yesterday.
25 Several other people showed us maps of where some of

1 the new, potential Coalbed Methane could be produced
2 and getting some of the baseline work, I think Kathy
3 talked about, getting some of this work early, early
4 on, getting ahead of the curve, I think would be very
5 important.

6 I think the other thing I heard from Peter,
7 which I also applaud is not looking at CBM simply in a
8 one-dimensional vacuum, but I think I heard a multi-
9 variate story from there that there are a lot of things
10 going on in these basins and our colleague here, a
11 rancher, I think, touched on this as well. There's a
12 lot of things happening in the basin. If we look at
13 Coalbed Methane in the context of a much larger system,
14 it does go right to the heard of our comments, Murray,
15 this perception issue. You know, what's really
16 happening here and what's the relationship of climate
17 change, the development of all of the new homes that
18 are going up, relative to things like CBM.

19 So we should try to help this gentleman find
20 some cash. Was it the Sand Wash Basin?

21 MR. JOHNSON: Sand Wash Basin.

22 MR. SPILLER: Not a bad idea to get ahead of
23 the curve.

24 MR. HITZMAN: Is there comments from the
25 Committee members? It's fair.

1 MS. CRAMER: My name is Nicole Cramer and I'm
2 with Williams, Porter, Day and Deville in Casper,
3 Wyoming. I just wanted to make some overall comments
4 of -- I guess, sort of caution. And I agree that it's
5 a good idea to start getting ahead of the curve on new
6 developments, but following up on Mr. Hochheiser's
7 comments, there are significant water rights issues and
8 in Wyoming definitely in the Powder River Basin and as
9 I referred to yesterday, in the Bighorn Basin with
10 conventional oil and gas production, the water is
11 definitely put to use by a whole lot of family ranches,
12 agricultural producers and in the Powder River Basin
13 those ground water wells that are producing Coalbed
14 Methane actually a whole lot of them, at least a
15 majority and the estimates vary, have water rights held
16 in them by the landowners where the wells are located.

17 And I want to encourage you to look at the
18 net environmental benefits and the value that these
19 wells have to other industries in the community where
20 oil and gas is produced. And as I said before, I
21 represent Devon Energy and so I am an industry
22 attorney, but I am -- I was born in Wyoming. I have
23 lived there most of my life and these are neighbors
24 that we work with and we want to make sure that they're
25 able to take advantage of the water because definitely

1 in the Powder River Basin the ranchers up there have
2 been producing water from these coal seams for years
3 and discharging them into the streams.

4 And granted, that's not near as much as what
5 has been produced by industry, but the talks yesterday
6 were mind numbing towards the end and get to be
7 somewhat overwhelming, but I just would encourage you
8 throughout this process to just every once in a while
9 step back and look at what the overall effects are, not
10 just on the industry, and look at the net environmental
11 benefits that can be gained from the use of the water.

12 MR. HITZMAN: Can I ask a question?

13 MS. CRAMER: Uh huh [affirmative].

14 MR. HITZMAN: This is just from my point of
15 view. I'm not as familiar with the Bighorn Basin, but
16 what will happen when oil and gas production is shut in
17 and it finally stops because then we won't be producing
18 the water. Any idea?

19 MS. CRAMER: Well, in the Bighorn Basin, I'm
20 not sure. Those wells are oil wells that can't be
21 converted to a water.

22 MR. HITZMAN: Right.

23 MS. CRAMER: So family ranches will probably
24 go out of business, some of them for sure because there
25 is not a whole lot of water. Now maybe they would be

1 able to drill for water, but I don't know the hydrology
2 of that basin very well.

3 In the Powder River Basin certainly the wells
4 that have been drilled there and the infrastructure
5 that's been put in place for ranchers up there has been
6 a huge benefit and can stay there. Now there might be
7 -- of course, the coalbed wells need to be converted to
8 strict water wells so that their actual purpose is to
9 produce water and not to produce gas, but that's not a
10 huge conversion certainly and the infrastructure will
11 still be in place. And I think there are very long-
12 term benefits, including taking livestock and wildlife
13 off the Riparian areas exclusively because in the
14 Powder River Basin there's lots of areas that don't get
15 any water in normal circumstances.

16 Well, a lot of the landowners that I know my
17 company works on, they have put in place
18 infrastructures with these wells where they pipe water
19 to salt tanks in various areas of their ranches and
20 they take advantage of the forage that's been growing
21 that their cows will never go to because there's not
22 water available.

23 And that doesn't necessarily mean that these
24 cows will drink all the water, but you have to have a
25 bunch of water there in order for them to go to those

1 areas. So overall, there's a -- I feel there's a net
2 environmental and a net ecological benefit from doing
3 that. So I know that -- this sounds like a great
4 science project. I didn't understand most of the USGS
5 presentation yesterday and I got lost with the
6 chemistry, but the water has been used. It's been put
7 to benefit in a lot of ways and there's always a
8 balancing act, but in order to take advantage of our
9 resources, there's always going to be some changes that
10 happen and a lot of times those changes are difficult
11 to accept. No one likes change, but it can create some
12 real benefits for our communities and I think we've
13 certainly seen that in Wyoming.

14 I am not saying that the Powder River Basin
15 is perfect or that everyone is happy, but I have done a
16 lot of work with landowners, both in the Powder River
17 Basin and the Bighorn Basin and they absolutely want
18 that water and definitely in the Bighorn Basin, some of
19 the ranches completely rely on it. And in the Powder
20 River Basin, the drought has been really hard and
21 coalbed water has not completely alleviated that
22 problem for those Ag producers up there, but it has
23 prevented some of them from going out of business, or
24 from having to reduce their herd sizes even more.

25 MR. HITZMAN: Thanks.

1 MR. CONDIT: Could I ask just a -- is Devon -
2 - where they are taking the -- piping water to stock
3 tanks and get it away from the Riparian zone and such,
4 are they using any cleanup techniques or is that water
5 already?

6 MS. CRAMER: That water is already suitable
7 for livestock.

8 MR. CONDIT: But as they move over westward
9 into the Big George Clay and I don't know whether Devon
10 intends to do that, but would they anticipate that they
11 would even pay for some -- either electro dialysis or
12 the other -- the resin ion exchange stuff to get the
13 water to a point where the cattle can safely drink it?

14 MS. CRAMER: Uh huh [affirmative]. I
15 definitely wouldn't want to speak for the operations
16 engineers in those lease areas, but I know that they
17 are always -- they always evaluate the best -- to
18 determine what the best water management techniques
19 are, and I know that they are considering or maybe even
20 have already some treatment from -- for water that's
21 out of Big George Coals, but understand, too, that that
22 treatment isn't treating it to the point where it's
23 distilled water or --

24 MR. CONDIT: I understand, sure.

25 MS. CRAMER: -- it's treating it more to the

1 level of what some of the cleaner water that's being
2 produced out of these coals is. So it's treating it to
3 livestock quality again. And it would -- it's very
4 difficult, as far as I know, and I don't know if Jon
5 Jaffe is still here -- doesn't look like it, but I
6 think it's difficult to treat it to the point where
7 it's usable for alfalfa irrigation, but there again,
8 there's a lot of controversy in the science.

9 And I don't know if Bill DiRienzo is here.
10 He's definitely heard us make these arguments before,
11 but in Wyoming the DEQ has developed a policy to
12 determine effluent limits for EC and SAR, electrical
13 conductivity and sodium absorption ratio, and that is
14 based on data -- there's default limits incorporated in
15 there that are based on USDA Salinity Labs data and
16 that's out of California. And in Wyoming, we are so
17 dry that in most cases any water is going to be
18 beneficial. I'm not saying water that's got an SAR of
19 30 or 50 is going to be beneficial, but in most cases
20 this water will be helpful and definitely to the cows
21 it will, or the sheep or even the large wildlife.

22 But if you back up just a little bit in
23 history and think about why we're here, the reason that
24 we have oil and gas water discharges in the first place
25 is because there's not very much water in the west.

1 And it was recognized that people in Wyoming and
2 Colorado in the aired west used this water and need it
3 for their livestock operations and so we need to
4 recognize those benefits and recognize that while we
5 may not have pristine water, it still is a benefit and
6 there's a lot of other harsh conditions that I guess
7 with the alfalfa example, that you cannot grow alfalfa
8 to the conditions that you would be able to in
9 California, definitely not in an ephemeral drainage in
10 the Powder River Basin.

11 And there's data to show that the rainfall is
12 actually what's causing the increase in vegetation in
13 these bottomlands, rather than the once or twice or
14 three or four times a year that that drainage gets a
15 flashy stormwater event. So it's our position that in
16 most cases making this water available for livestock
17 production is going to be more of a benefit to
18 agricultural producers than preserving the water
19 quality for the two or three times a year that alfalfa
20 sees water because -- and this gets into a whole huge
21 discussion.

22 I don't want to take up all the time, but in
23 most cases the intent of the Coalbed Methane producer
24 is going to be to only discharge enough water that it
25 doesn't spill over the banks and flood a landowner. So

1 that water is not getting to the alfalfa most of the
2 time. Now sometimes it'll mix with natural runoff and
3 for example at the beginning of May last year, we had a
4 -- I think they characterized it as 200-year storm
5 event, but had so much water that it flooded everything
6 in all of the drainages in all of the Powder River
7 Basin and more.

8 But in general, those alfalfa crops are not
9 seeing a whole lot of water. So I encourage you to
10 think about the other factors that are affecting the --
11 guess the environmental impacts that you see and I
12 guess one of the examples of that is the kidney disease
13 statistics, I guess, that there's a whole lot of things
14 in Wyoming that make living hard and contribute to
15 those trends that we see.

16 MR. HITZMAN: Thank you very much.

17 MS. CRAMER: Thank you.

18 MR. HITZMAN: Yes?

19 MR. COURTNEY: Good morning. My name is Bill
20 Courtney. I'm with Amdec Technology. I don't want to
21 talk about our treatment process other than to answer
22 some questions this young lady couldn't answer.

23 I think our process and other processes are
24 able to take enough sodium -- I know that ours is -- to
25 take enough sodium out of the water till alfalfa can be

1 grown, even out of the Big George water, we're doing
2 that right now.

3 What I wanted to talk about was just kind of
4 reinforce what she said. When I got out of college in
5 Wyoming, I was a game warden and down in Baggs,
6 Wyoming, pretty dry area in the state and any water you
7 could get was very helpful for wildlife and for
8 livestock. And through the years, you know, I've seen
9 different things happen in Wyoming and Kathy and I
10 visited this morning. I think it's sad that there's
11 become such polarization between different groups
12 working together to not be able to come up with a
13 solution that helps everybody. I mean, there's some
14 lack of trust and I think it's because of some of the
15 worst-case scenarios get presented in the public forum
16 and the press, wherever.

17 And there's a lot of good things that have
18 been able to happen because of CBM production in the
19 State of Wyoming and I think you just need to make sure
20 you look at that. The one thing I really like what
21 Bill DiRienzo said yesterday was the flexibility to
22 have policy, rather than a rule, to not push toward
23 more rules that prevent the ability to find beneficial
24 uses for this water in all the states.

25 Thank you.

1 MR. HITZMAN: Thank you.

2 MR. LANGHUS: My name is Bruce Langhus with A-
3 L-L. I just want to advocate this morning for the
4 issue of transparency. That's something that we saw a
5 lot of yesterday, and I'm talking about data
6 transparency. The BLM, the both states, and the USGS
7 are awfully good at making this data available to the
8 industry, as well as to the general public on an almost
9 day-to-day basis, and that's something that's extremely
10 powerful and I think we saw some of the evidence of it
11 yesterday where we had excellent analyses being done by
12 the USGS, by the BLM, by the states, by totally
13 independent hydrology academic types because the data
14 is available so easily.

15 I want to contrast to that. That to
16 someplace like Texas, Oklahoma, Kansas, coming up with
17 that kind of data is impossible. You can't do it. You
18 have to go to the operators and to the water boards of
19 the individual counties. So it's something that can't
20 be done in those traditional oil and gas states.

21 So I want to make sure that you know how
22 important that is. And the one fly in the Powder
23 River, anyway, ointment are the tribal lands and I'm
24 sorry we don't have anybody here from either of the --
25 any of the tribes or the BIA, but there have been a

1 number of CBM wells drilled on the two reservations in
Montana, the Crow and the Northern Cheyenne. And that
2 data is essentially gone. It's essentially not
3 possible to get.

4 And that, if there ever is CBM development
5 on, say, the Crow Reservation where the non-Indian land
6 development goes right up to the barbed wire and there
7 could certainly be development on the other side
8 tomorrow, that that data needs to be available to
9 everybody, not just the gas being produced, but the
10 kind of water that's being produced. What are the --
11 what are the monitoring wells showing there for the
12 alluvial and coal water -- or coal aquifers. No, so
13 data transparency, that's my big thing.

14 MR. BARKMAN: Peter Barkman again. A couple
15 of things that Reginald and Nicole said that just rang
16 a little bell that I wanted to add to this is that
17 thinking of the big picture of what's happening in some
18 of our basins. Northwest Colorado where the Sand Wash
19 and Peance Basins are in southwestern Wyoming have a
20 1600-pound gorilla. We talk about the 800-pound
21 gorilla, but the 1600-pound gorilla is oil shale. This
22 may happen and it may happen in the next 10, 20 years.

23 There are potentially great water demands for
24 oil shale development and what this makes me think is

1 we need to think not only of, you know, the development
2 of homes and the climate change, but other things that
3 may be happening in these basins that may take a lot of
4 water and are there ways that we can look at the water
5 that's coming out of CBM development and how could that
6 be applied to the water needs of another energy
7 development that may be emerging and then it brings to
8 mind that what Anadarko is doing was storing the water
9 in the Madison and Ten Sleep and I think Bruce was
10 talking about putting water in the dry coal seams.

11 I mean, there are a lot of things that could
12 be done to take this water. We have a real discrepancy
13 between supply and demand curves, you know? The timing
14 of CBM development might not meet the demands for oil
15 shale, but other ways to bank that water to be able to
16 use for this next 1600-pound gorilla. And I think the
17 thing that we need to keep as the underlying theme is
18 just a concept of sustainability. What of these
19 regions do we want to sustain -- I mean, what would we
20 -- you know, we've got our agricultural economy, which
21 we would like to see sustained indefinitely; our homes,
22 we'd like to see sustained indefinitely. But these
23 energy resources are finite resources. CBM will come
24 and it will go. It will be a boom and then it'll be
25 gone. And that water will be extracted and then it

1 will end. Oil shale, it'll come; it'll go.

2 So what can we do with these finite limited
3 resources and all that we do to make it happen and all
4 the water we produce and the demands we have for it,
5 how can we manage that to keep what we see as
6 sustainable going? So we're not pulling the water away
7 from our objective of a sustainable system, just to
8 prop up this thing that's going to last for 20 years.

9 So if that can be put into this big picture
10 of how to manage these resources, I think that would be
11 admirable.

12 Thank you.

13 MR. HITZMAN: Well, seeing no more comments,
14 I guess I'd like to bring the meeting to a close. I'd
15 like to thank everyone for coming. As I say, I've
16 learned a lot and I've heard a lot of good things. I
17 know it's helped the Committee that if we do go forward
18 to have a study and try and get it scoped out, it will
19 help immensely. I hope it's helped BLM going forward
20 with their decision-making here in the next weeks to
21 months.

22 And thank you very much.

23

24

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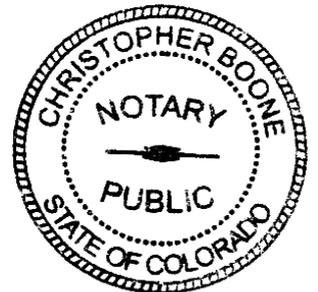
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17 In witness whereof, I have affixed my
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21 My commission expires August 16, 2010.



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