

STATE OF NEW MEXICO  
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT  
OIL CONSERVATION DIVISION  
STATE LAND OFFICE BUILDING  
SANTA FE, NEW MEXICO

6 July 1988

EXAMINER HEARING

IN THE MATTER OF:

In the matter of the hearing called CASE  
by the Oil Conservation Division on 9420  
its own motion for pool creation and  
Special Pool Rules, San Juan, Rio Ar-  
riba, McKinley and Sandoval Counties,  
New Mexico, and

In the matter of the hearing called 9421  
by the Oil Conservation Division on  
its own motion for an order contract-  
ing the vertical limits of certain  
pools in San Juan and Rio Arriba  
Counties, New Mexico.

BEFORE: David R. Catanach, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

In attendance: William J. Lemay, Director  
Oil Conservation Division  
State of New Mexico

William R. Smith, Director  
Oil and Gas Conservation  
Commission  
State of Colorado

For the Division: Robert G. Stovall  
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## I N D E X

1		
2		
3		
4		
5	STATEMENT BY MR. STOVALL	10
6		
7	ERNEST BUSCH	
8	Direct Examination by Mr. Stovall	12
9	Cross Examination by Mr. Catanach	33
10		
11	DANA CRANEY	
12	Direct Examination by Mr. Kellahin	36
13	Cross Examination by Mr. Lund	58
14	Questions by Mr. Lyon	61
15	Redirect Examination by Mr. Kellahin	62
16		
17	C. ALAN WOOD	
18	Direct Examination by Mr. Lund	64
19	Cross Examination by Mr. Catanach	78
20		
21	ALAN E. ALEXANDER	
22	Direct Examination by Mr. Kellahin	80
23	Cross Examination by Mr. Lund	92
24	Cross Examination by Mr. Stovall	93
25	Cross Examination by Mr. Catanach	96

## I N D E X Cont'd

## FRANK CHAVEZ

Direct Examination by Mr. Stovall	100
Cross Examination by Mr. Kellahin	109
Cross Examination by Mr. Catanach	111
Cross Examination by Mr. Roberts	112

## KURT H. FAGRELIUS

Direct Examination by Mr. Roberts	114
Cross Examination by Mr. Kellahin	126
Cross Examination by Mr. Lund	141
Cross Examination by Mr. Stovall	147
Redirect Examination by Mr. Roberts	148

## KEVIN H. McCORD

Direct Examination by Mr. Roberts	151
Cross Examination By Mr. Kellahin	160
Cross Examination by Mr. Lund	169
Cross Examination by Mr. Carr	172
Cross Examination by Mr. Stovall	177
Redirect Examination by Mr. Roberts	177

## I N D E X Cont'd

## ROB A. WILLIS

Direct Examination by Mr. Roberts	178
Direct Examination by Mr. Kellahin	187
Cross Examination by Mr. Lund	193
Redirect Examination by Mr. Roberts	195
Cross Examination by Mr. Catanach	195

## KEVIN H. McCORD (Recalled)

Redirect Examination by Mr. Roberts	196
Questions by Mr. Lyon	201

## KURT H. FAGRELIUS (Recalled)

Redirect Examination by Mr. Roberts	203
-------------------------------------	-----

## C. ALAN WOOD (Recalled)

Redirect Examination by Mr. Lund	206
Recross Examination by Mr. Stovall	219
Cross Examination by Mr. Roberts	220

## JOHN CALDWELL

Direct Examination by Mr. Kellahin	221
Cross Examination by Mr. Roberts	236

## I N D E X Cont'd

STATEMENT BY MR. DWYER	240
STATEMENT BY MR. STOVALL	244
STATEMENT BY MR. CARR	245

## E X H I B I T S

Committee Exhibit One, Booklet	18
Meridian Exhibit One, Type Log	40
Meridian Exhibit Two, Map	45
Meridian Exhibit Three, Map	45
Meridian Exhibit Four, Map	46
Meridian Exhibit Five, Map	47
Meridian Exhibit Six, Map	51
Meridian Exhibit Seven, Map	53
Meridian Exhibit Eight, Map	53
Meridian Exhibit Nine, Display	92
Meridian Exhibit Ten, List	226
Meridian Exhibit Eleven, Document	227
Meridian Exhibit Twelve, Document	229

## E X H I B I T S Cont'd

1		
2	Amoco Exhibit One, Map	67
3	Amoco Exhibit Two, Graph	68
4	Amoco Exhibit Three, Graph	73
5	Amoco Exhibit Four	212
6	Amoco Exhibit Five	214
7		
8	Dugan Exhibit One, Isopach	118
9	Dugan Exhibit Two, Composite Map	119
10	Dugan Exhibit Three, Map	119
11	Dugan Exhibit Four, Isopach	121
12	Dugan Exhibit Five, Contour Map	121
13	Dugan Exhibit Six, Structure Map	122
14	Dugan Exhibit Seven, Two Maps	123
15	Dugan Exhibit Eight, Map	123
16	Dugan Exhibit Nine, Description	124
17	Dugan Exhibit Ten, Reference List	124
18	Dugan Exhibit Eleven, List	152
19	Dugan Exhibit Twelve, Map	157
20	Dugan Exhibit Thirteen, Plot	158
21	Dugan Exhibit Fourteen, Area Map	181
22	Dugan Exhibit Fifteen, Log and Curve	181
23	Dugan Exhibit Sixteen, Well Information	183
24	Dugan Exhibit Seventeen, Well Information	184
25	Dugan Exhibit Eighteen, Well Information	185

1 MR. CATANACH: Okay, we'll  
2 call Case Number 9420, in the matter of the hearing called  
3 by the Oil Conservation Division on its own motion for pool  
4 creation and special pool rules, San Juan, Rio Arriba,  
5 McKinley, and Sandoval Counties, New Mexico.

6 Are there appearances in this  
7 case?

8 MR. STOVALL: Yes. Mr.  
9 Examiner, before we take appearances in this case, I'd like  
10 to ask that this case be consolidated with the following  
11 Case 9421.

12 MR. CATANACH: At this time  
13 we'll call Case 9421, in the matter of the hearing called  
14 by the Oil Conservation Division on its own motion for an  
15 order contracting the vertical limits of certain pools in  
16 San Juan and Rio Arriba Counties.

17 Are there appearances in  
18 either one of these cases?

19 MR. STOVALL: Robert G.  
20 Stovall, appearing on behalf of the Oil Conservation  
21 Division.

22 MR. LUND: Kent Lund,  
23 appearing on behalf of Amoco Production Company and also  
24 (unclear).

25 MR. ROBERTS: Mr. Examiner, my



1 name is Tommy Roberts. I'm an attorney in Farmington. I'm  
2 appearing on behalf of Dugan Production Corporation, Mer-  
3 rion Oil & Gas Corporation, Hixon Development Company,  
4 Robert L. Bayless, and Jerome P. McHugh and Associates.

5 MR. CARR: May it please the  
6 Examiner, my name is William F. Carr of the law firm  
7 Campbell & Black, P. A., in Santa Fe.

8 We represent ARCO Oil & Gas  
9 Company and Blackwood & Nichols.

10 MR. KELLAHIN: Mr. Examiner,  
11 I'm Tom Kellahin of the Santa Fe law firm of Kellahin,  
12 Kellahin & Aubrey, appearing on behalf of Meridian Oil,  
13 Inc..

14 MR. DWYER: Mr. Examiner, I'm  
15 Dennis Dwyer, appearing on behalf of El Paso Natural Gas  
16 Company, and in association with the firm of Montgomery &  
17 Andrews in Santa Fe.

18 MR. CATANACH: Are there any  
19 individuals who will be presenting statements without an  
20 attorney here today?

21 MR. STOVALL: Mr. Examiner,  
22 I'd like to note for the record entry of appearance by  
23 James Bruce of the Hinkle, Cox law firm in Santa Fe, New  
24 Mexico, on behalf of Pennzoil Company. It's a written  
25 entry of appearance by letter dated June 30th, 1988.

1 MR. CATANACH: Could I get all  
2 the witnesses to stand at this time to be sworn in?

3  
4 (Witnesses sworn.)

5  
6 MR. STOVALL: Mr. Examiner,  
7 I've entered my appearance in this matter on behalf of the  
8 Oil Conservation Division.

9 I'm actually presenting a  
10 witness on behalf of the committee which was set up to  
11 study, evaluate, and propose a set of rules for the produc-  
12 tion of gas from the Fruitland coal formation.

13 This committee is not an offi-  
14 cial, existing entity and therefore had not actually an  
15 appearance but the recommendations in this case are being  
16 presented by the committee.

17 There will be four witnesses  
18 who will testify and present evidence on behalf of the com-  
19 mittee. Mr. Ernie Busch in the Aztec OCD office who ser-  
20 ved as Co-chairman of the committee throughout its working  
21 period, will present the initial opening evidence covering  
22 the broad scope of what the application in this case re-  
23 quests and will propose an order to be entered in this  
24 case.

25 Mr. Dana Craney of Meridian

1 Oil will be presenting the committee's geological evidence  
2 in support of the application.

3 Mr. Alan Wood of Amoco will be  
4 presenting the committee's engineering evidence in support  
5 of the application.

6 Mr. Alan Alexander of Meridian  
7 Oil will be presenting the committee's evidence with res-  
8 pect to the proposed spacing requirements in this -- in  
9 this proposed application and proposed order.

10 Mr. Craney and Mr. Alexander  
11 from Meridian will be examined by Mr. Tom Kellahin. Mr.  
12 Wood will be examined by Mr. Kent Lund. They will all be  
13 presenting, in this capacity initially, evidence in support  
14 of the application as representatives of the committee.  
15 This will not preclude them at a later time from presenting  
16 evidence in support of their own company's position, should  
17 there be any additional evidence they wish to offer in that  
18 respect.

19 Having said that, I would now  
20 call Mr. Ernie Busch to the stand.

21 Before Mr. Busch gets started,  
22 I believe that there are copies of Mr. Busch's exhibit over  
23 in the box in the corner, is that not correct, Ernie?

24 MR. BUSCH: That's correct.

25 MR. STOVALL: If anybody did

1 not receive one, I think there are some --

2 MR. BUSCH: I'm sorry, Mr.  
3 Stovall, they're up on --

4 MR. STOVALL: Oh, on the top,  
5 I'm sorry, on the upper corner up here.

6  
7 ERNIE BUSCH,  
8 being called as a witness and being duly sworn upon his  
9 oath, testified as follows, to-wit:

10  
11 DIRECT EXAMINATION

12 BY MR. STOVALL:

13 Q Mr. Busch, would you please state your  
14 name and place of residence?

15 A Yes. My name is Ernie Busch and I'm  
16 with the New Mexico Oil Conservation Division in District  
17 III, Aztec.

18 Q And in what capacity do you serve in the  
19 Oil Conservation Division?

20 A I am the geologist for that district.

21 Q Have you previously testified before  
22 this Division and had your credentials accepted as a petro-  
23 leum geologist?

24 A Yes, I have.

25 Q Are you familiar with the applications

1 which have been filed in this case?

2 A Yes, I am.

3 Q Would you please briefly for the  
4 Examiner summarize the broad purpose of the application in  
5 the Case 9420

6 A Yes. Case 9420 is to recognize the  
7 Fruitland Coal as a separate reservoir from other forma-  
8 tions in the San Juan Basin by declaring it a separate pool  
9 and to enact special rules that will address the unique  
10 character of this resource.

11 Q And what is the purpose of the applica-  
12 tion in Case 9421?

13 A Case 9421 is an application to contract  
14 the vertical limits of all of the Fruitland pools in this  
15 -- in the San Juan Basin to include only the sandstone  
16 formations.

17 Q To take the coal formations from -- from  
18 those pools in order that they might be in a coal pool  
19 rather than in the -- in the sandstone pool.

20 A That's correct. Today we're going to --  
21 we're going to show to the satisfaction of the Examiner  
22 that the coal is a separate source of supply from -- from  
23 the sand.

24 MR. STOVALL: Mr. Examiner,  
25 I'd like to offer Mr. Busch as an expert witness in this

1 case.

2 MR. CATANACH: He is so qual-  
3 ified.

4 Q Mr. Busch, would you please describe the  
5 history of what has gone on before these applications were  
6 filed and why these applications were filed?

7 A Yes. In the fall of 1986 the Aztec  
8 Office of the NMOCD saw that the Fruitland Coal develop-  
9 ment, gas development, was increasing and that because of  
10 the unique nature of this resource existing rules might not  
11 be adequate.

12 So we contacted Mr. Bill Smith of the  
13 Colorado Oil and Gas Conservation Commission to see if he  
14 would be interested in joining with us in calling together  
15 an industry committee to advise us on what type of regula-  
16 tion would be necessary to allow for the best development  
17 of this resource.

18 Q Mr. Busch, may I interrupt you here for  
19 just a moment, please, and ask you, why -- why did you con-  
20 tact Mr. Smith in Colorado? What was the reason for that?

21 A The resource extends into both states  
22 and --

23 Q So it was an effort to come up with a  
24 common set of rules, or common understanding of the forma-  
25 tion in both states?

1           A           That's correct; to try to establish some  
2 rules that would apply in New Mexico as well as in Colo-  
3 rado.

4           Q           All right, would you continue, please,  
5 then with what happened?

6           A           Yes. We held our first meeting in  
7 November of 1986 and today we are presenting the fruits of  
8 our labors of the 1-1/2 years of work that the Committee  
9 has undertaken.

10                   And we would like to thank the Committee  
11 members for the tremendous input that they have given us  
12 and the cooperation of all the companies, the company re-  
13 presentatives that served on the Committee, and at this  
14 time I'd like to briefly give a list of those -- of those  
15 companies that did serve on the Committee.

16                   Meridian Oil Company, Amoco Production,  
17 Mesa Limited, NCRA, ARCO Oil and Gas, the BLM, Southern Ute  
18 Tribe, Northwest Pipeline, El Paso Natural Gas, Tenneco Oil  
19 Company, Blackwood & Nichols, Resource Enterprises, Union  
20 Texas Petroleum Corporation, Dugan Production Corporation,  
21 Merrion Oil and Gas Corporation, and that -- that would  
22 conclude the list of those participating on the (unclear).

23           Q           Now you've identified the Southern Ute  
24 Tribe as being one of the participants.

25           A           That's correct.

1           Q           In what capacity did the Southern Ute  
2 Tribe appear and participate in the hearings -- or the  
3 meetings?

4           A           They -- they participated as an active  
5 voting member of the -- of the Committee.

6           Q           And to your knowledge, does the Southern  
7 Ute Tribe exercise any jurisdictional authority over and  
8 regulate oil and gas production in the interest of conser-  
9 vation and protection of correlative rights?

10          A           Yes, it's my understanding that they do.

11          Q           So in addition to the State of Colorado  
12 and the State of New Mexico, we also have the Southern Ute  
13 Tribe as a regulatory authority participating in an effort  
14 to come up with a unified plan, is that correct?

15          A           That's correct.

16          Q           Let me ask you, Mr. Busch, you've ident-  
17 ified a broad number of companies. How did you seek or  
18 solicit participation in this Committee effort?

19          A           We issued a memorandum addressed to all  
20 the gas operators in the San Juan Basin to join us in dis-  
21 cussing formation of a committee.

22          Q           And how did you identify those oper-  
23 ators?

24          A           All gas operators in the San Juan Basin.

25          Q           From the records of the New Mexico Oil



1 Conservation Division?

2 A That's correct.

3 Q And did you also go to the Colorado  
4 Commission's to identify additional operators?

5 A Yes, we did.

6 Q You invited participation by each and  
7 every operator that you identified in this committee's  
8 effort, is that correct?

9 A That's correct.

10 Q What was the role of the Aztec office of  
11 the New Mexico Oil Conservation Division in this work?

12 A I was asked to be chairman initially and  
13 later became co-chairman with Katy Templeton Buell of the  
14 Colorado Oil and Gas Conservation Commission, but our role,  
15 Katy and my roles were as non-voting members of the commit-  
16 tee, and although I am District Geologist for the New  
17 Mexico Oil Conservation Division, District III, I am here  
18 today as Co-Chairman of the Fruitland Coalbed Methane Com-  
19 mittee presenting the recommendations that the Committee  
20 came up with.

21 Q Do you know if the State of Colorado has  
22 conducted any hearings with respect to these proposed rules  
23 for production from the Fruitland coal seams?

24 A Yes, they have and I'm in this morning  
25 of an order that they have issued on the recommendations of

1 the committee, although it is not signed yet.

2 Q And are those -- is that proposed order  
3 generally consistent with the application in this case, the  
4 proposed order in this case?

5 A Yes, it is, Mr. Stovall.

6 Q In your capacity, you've indicated that  
7 you are here testifying as the Chairman of the committee  
8 rather than as the District Geologist for the Oil Conser-  
9 vation Division.

10 Are you representing the perspective or  
11 point of view of any individual companies in this case?

12 A No, I am not. I'm representing the  
13 recommendations of the entire committee as to this.

14 Q Mr. Busch, let's now turn to your  
15 exhibit and discuss that.

16 Would you describe for us, please, what  
17 the proposed vertical and horizontal limits of the pool  
18 are?

19 A Yes, Mr. Stovall. I'd like to -- before  
20 we do that, I'd like to indicate that there may be some  
21 exhibits out there that the first two pages are in reverse  
22 order. The map should be first and then the log should be  
23 second.

24 Q Are they both behind Tab A?

25 A They are both with Tab A.

1 Q All right.

2 A That's correct.

3 Q All right.

4 A I'd like to start with part one of Tab  
5 A, which is a map showing the proposed pool boundary.

6 This boundary follows the Fruitland Coal  
7 outcrop around the San Juan Basin.

8 The second page of Tab A is a log re-  
9 ferred to in the proposed order which is under Tab B, of  
10 the Schneider Gas Com B No. 1 Well, which illustrates the  
11 top of the Fruitland formation at 2450 feet to 2880 feet,  
12 which is the vertical interval that we're looking at today.

13 Q And the proposed order proposes that the  
14 vertical limits of the pool be correlated to this low as  
15 well, is that correct?

16 A This is a typical log from the coal  
17 producing wells, not a type log. It's merely to indicate  
18 where the top of the Fruitland formation is and the bottom  
19 but, yes, the purpose of the application is to examine the  
20 entire Fruitland interval.

21 Q Now, I'm looking at the contour map  
22 under Tab A. The boundary of the pool is shown in a dark  
23 outline, is that correct?

24 A That's correct.

25 Q And the boundaries for the pool as it

1 affects this case are, the northern boundary is the Colo-  
2 rado/New Mexico state line, is that correct?

3 A That's correct.

4 Q And then the Colorado case would encom-  
5 pass the remainder of that formation as it appears north of  
6 that boundary in the State of Colorado. Correct? To the  
7 best of your knowledge?

8 A That's correct.

9 Q Turn now to the proposed rules, if you  
10 would, Mr. Busch, and just -- what I would like you to do  
11 is briefly go through them part by part and summarize the  
12 rules and the reasons for those rules.

13 A Before we do that, Mr. Stovall, I would  
14 like to refer you -- refer the Examiner to -- to Tab, the  
15 back of Tab B, where we do have a list of criteria that  
16 will in our opinion classify a well as a Fruitland Coal  
17 Well.

18 Now on to -- on to the recommended rules  
19 for the pool.

20 Rule 1 is the general rule, which states  
21 that any well drilled, operated and produced will be in  
22 accordance with the rules set forth.

23 Rule 2, the pool establishment, indi-  
24 cates that the Director may require the operator to produce  
25 to the satisfaction -- to his satisfaction, that existing

1 wells are producing and the proposed wells will produce  
2 from the appropriate common source of supply.

3 Rule 3 (a) is Well Spacing and Loca-  
4 tion. This matter will be taken up by a later witness.

5 Rule 3 (b), Unorthodox Well Location,  
6 will also be covered by a later witness.

7 Rule 4, Increased Well Density, will be  
8 addressed by a later witness.

9 Rule 5, Horizontally Drilled Wells, will  
10 again be covered by a witness later.

11 Rule 6 (a), Testing, the 24-hour shut-in  
12 period that we recommend is because of a concern that  
13 longer shut-in may cause damage to -- to a Fruitland well,  
14 to the Fruitland coal well.

15 Q And the normal shut-in testing period  
16 for the Oil Conservation Division is greater than 24 hours,  
17 is that correct?

18 A That's correct. It is a 7-day shut in  
19 period.

20 Q So you're proposing to change due to the  
21 unique characteristics of the wells in this pool.

22 A That's correct.

23 Rule 6 (b), the venting and flaring  
24 portion, is an adoption by the Committee of the BLM paying  
25 well determination provision which allows a volume greater

1 -- well, New Mexico Oil Conservation Division rules, the  
2 Rule 404 allows no venting of gas for gas wells, so the  
3 Committee wants to adopt, wants the Commission to adopt  
4 this particular provision of the BLM to give it flexibil-  
5 ity in producing these unique wells.

6 Q If I understand you correctly, what  
7 you're saying is that under existing general OCD rules  
8 venting of the gas well gas is not allowed for any purpose,  
9 is that correct?

10 A That's correct.

11 Q The -- because of the -- again, because  
12 of the nature of these particular wells and the production  
13 therefrom, it may be necessary to vent a well in order to  
14 -- vent it or flare it -- in order to test the well's pro-  
15 ductivity to determine whether in fact it is a productive  
16 well, is that correct?

17 A That's right.

18 Q And the numbers you have chosen, you've  
19 not chosen necessarily because of any standard for testing  
20 purposes, but rather because it is consistent with BLM  
21 rules and regulations regarding the flaring of gas from  
22 Federal leases and really these -- these numbers are for  
23 the purpose just being consistent with those rules, is that  
24 correct?

25 A For a paying well determination, that's

1 -- that's correct.

2 I would like to state that in regard to  
3 venting gas in New Mexico, C-129 Form is an application by  
4 the operator to vent greater amounts of gas subject to  
5 pipeline hookup. So there is a provision that does exist  
6 for the venting of 30 MCF a day prior to pipeline hookup  
7 under hardship conditions.

8 Q Okay. Will you now turn to Rule 7 and  
9 just briefly summarize the purpose of that rule?

10 A Yes. Rule 7 is not a recommendation  
11 made by the Committee, however, the committee that we --  
12 the subcommittee that we set up that was -- that was  
13 chaired by Mr. Paul Burchell, felt that it was necessary to  
14 make a provision to those operators who have existing  
15 Fruitland, Pictured Cliff, or commingled Fruitland-Pictured  
16 Cliff wells which would fall in conformance with Paragraphs  
17 A and B of this recommended order, such that they could  
18 have their well reclassified as a Fruitland Coalbed Methane  
19 Well and have given them a period of 90 days effective at  
20 the date of the order, to submit the C-102's and C-104's  
21 that are appropriate for that reclassification.

22 Q Is that proposal in recognition of the  
23 fact that this is a rather unique case for the creation of  
24 a new pool, given that it is not really based upon the  
25 existence of a discovery well but rather it's actually

1 forming a new pool into which many wells have already been  
2 drilled and are already operating. Is that correct?

3 A Well, that's correct.

4 Q So you're trying to accommodate the  
5 existing wells which may penetrate or be producing from  
6 these -- the coal seams.

7 A That's right.

8 Q Now, Mr. Busch, in order for the  
9 Examiner to understand the necessity for coming up with a  
10 special set of rules for production from the Fruitland Coal  
11 seams, would you please describe the geological history of  
12 the Fruitland Coal?

13 A Yes. The Fruitland Coal formation was  
14 deposited approximately 75-million years ago during the  
15 Cretaceous period.

16 Part C of Exhibit One is a map  
17 illustrating the position of the San Juan Basin on the edge  
18 of a large sea that existed during that time.

19 On the lower two-thirds of Part D  
20 there's a sketch showing how the southwestern shoreline of  
21 this sea transgressed and regressed creating and covering  
22 those coastal swamps.

23 And at the top of this exhibit is a  
24 stratigraphic cross section from southwest to northeast  
25 across the midsection of the San Juan Basin showing the



1 resultant Fruitland Coal Beds and the underlying Pictured  
2 Cliff sandstone.

3                   If we turn to Part E it shows how the  
4 tectonic movement during the Laramide orogeny created the  
5 current San Juan Basin structure. The Fruitland Coal has  
6 been mined along its outcrop for many years and is in fact  
7 fuel for the electric generating plants just west of here.

8           Q           Would you please describe the litho-  
9 logical nature of the Fruitland formation and particularly  
10 the coal seams?

11           A           Yes. The Fruitland formation is a  
12 coastal plain deposit of (unclear) carbonaceous shales,  
13 siltstones, sandstones, and coals. It ranges from a thick-  
14 ness of from 100 to 600 feet.

15                   Part F is a typical lithologic column  
16 combined with an induction electric log showing how the  
17 Fruitland formation is underlain by the Pictured Cliff  
18 formation, a regressive coastal barrier sandstone, and  
19 overlain by the lower member of the Fruitland -- Kirtland  
20 Shale formation.

21                   The depositional and preservational en-  
22 vironments for the individual coalbeds vary and therefore  
23 correlating the individual lenticular beds is difficult  
24 over large distances; however, the major coalbeds have an  
25 areal extent of several miles, square miles, and therefore

1 it's necessary to include all coals as a common source.

2 The coal is generally considered to be  
3 low volatile bituminous to sub-bituminous.

4 Q Why couldn't Fruitland Coal be consid-  
5 ered as a separate source of supply than the gas pool?

6 A It has a unique character, unique signa-  
7 ture in the -- in the gas analysis.

8 Part G is a paper by Mr. J. R. Levine  
9 describing how coal quality influences the generation of  
10 methane gas during coalification. I can't fully explain  
11 the complex chemical nature of the processes described in  
12 this paper but I do want to point out that this paper shows  
13 that methane, carbon dioxide and water are the results of  
14 coalification.

15 This means that the coal itself becomes  
16 a source bed for natural gas.

17 If you'll note, looking through the  
18 paper, there is no reference to heavier hydrocarbons than  
19 methane and we have yet to find heavier hydrocarbons within  
20 the -- within the coal wells.

21 Q Has the OCD ever heard cases before and  
22 are you familiar with any cases in which the distinct  
23 nature of gas produced coal seams has been identified?

24 A Yes.

25 Q (Not understood).

1           A           Yes, Mr. Stovall. Amoco Production  
2 Company presented some evidence for NGPA Section 107  
3 Pricing, to -- and in these cases, there were -- there were  
4 eight of them, and in these cases they showed the unique  
5 character of the -- of the gas composition from the Fruit-  
6 land Coal.

7           Q           Is coal actually source rock for any  
8 other horizons?

9           A           No. At one time it was generally accep-  
10 ted that the coals were the source rock of gas found in the  
11 Pictured Cliff formation, but this idea is being less  
12 accepted for several reasons.

13                   First, in the area of better Pictured  
14 Cliff production, the southwest part of the Basin, the  
15 Fruitland Coals and the Pictured Cliff formation are great-  
16 ly separated.

17                   Second, in the area where they are  
18 closest to the north, there's little PC production.

19                   Finally, and most obvious, given the  
20 geometry of these formations, it's difficult to imagine  
21 (unclear) large amounts of gas.

22           Q           Now would you go into a little more  
23 detail and describe for the Examiner how you differentiate  
24 the coal gas production from sandstone production in the  
25 area?

1           A           Yes.    Yes, we can show that two ways;  
2 one by gas analysis and produced water analysis and pres-  
3 sure.

4                   Part H shows a typical gas analysis for  
5 -- for a coal well, or for some coal wells, and it also  
6 shows some sandstone gas analyses.

7                   The, as you'll note, the coal gas shows  
8 significant carbon dioxide and low BTU as compared to the  
9 Pictured Cliff sands and Pictured Cliff gas, excuse me.

10                  Part I is a Piper diagram of a water  
11 analysis, the produced water analysis from PC and Fruitland  
12 coals, and this shows that the bicarbonate and chloride  
13 levels can be used to differentiate producing intervals.

14                  And finally, it's been long know that  
15 drillers in the San Juan Basin have had to take precau-  
16 tions when drilling through the Fruitland Coal because of  
17 the danger of blowouts from over-pressured coals.

18                  Part J is a paper written by A. D.  
19 Decker describing his analysis of the -- of the over-  
20 pressured situation.

21                  I will quote from the second paragraph  
22 of what is marked at page -- at the bottom of page 55.

23                  "To date, overpressured coal reservoirs  
24 in the San Juan Basin are water saturated and highly perm-  
25 eable. These reservoir conditions may be related to coal

1 water generative cycle under shale bounded conditions."

2 If you will again refer to Part F, this  
3 becomes clear, not all the Fruitland coal is over-pressure,  
4 but this over-pressure is excellent to show separation.

5 Q Would you just please summarize the  
6 geological conclusions?

7 A Yes, the Fruitland Coal extends  
8 throughout the area of this application and although they  
9 are lenticular, the individual coalbeds are large enough to  
10 extend over several miles each.

11 The coalification process has produced  
12 gas which is confined within the coals and can be produced  
13 through coals -- through wells drilled to the coalbeds.

14 Therefore the Fruitland Coal should be  
15 designated as a common source of supply apart from the  
16 sandstone intervals within the Fruitland formation and  
17 apart from the Pictured Cliff formation.

18 Q Why is it important that the coal be a  
19 separate pool?

20 A Well, there are two reasons. First,  
21 production of coal gas requires a different technology and  
22 science than the conventional oil and gas production and  
23 because of that it needs to be regulated differently to  
24 assure the efficient and orderly development of the re-  
25 source to prevent waste and protect correlative rights.

1                   Secondly, we are now beginning to real-  
2     ize the value of this resource.

3                   Part K is a paper written by Mr. Bruce  
4     Kelso. I will quote from the third paragraph of what is  
5     marked as page 119.

6                   "The regional geologic analysis conclud-  
7     ed that the Fruitland formation coals have an estimated in  
8     place methane resource of 56-trillion cubic feet (TCF),  
9     nearly double the previous estimate of 31 TCF."

10                  This is quite significant in that to  
11     date we've only produced approximately 14-trillion cubic  
12     feet from all formations in the San Juan Basin and have  
13     proven reserves left of about that much.

14                  Also it's significant in relationship to  
15     another giant gas pool, the Prudhoe Bay, which has an esti-  
16     mate of only approximately 29 TCF gas in place.

17                  So declaring the coal as a separate pool  
18     is a recognition of these facts.

19                  Q           Do you have anything further you wish to  
20     add with respect to Exhibit One?

21                  A           Not at this time.

22                               MR. STOVALL:   Mr. Examiner,  
23     I'd like to offer Exhibit One into evidence at this time.

24                               MR. CATANACH:   Exhibit One  
25     will be admitted into evidence.

1           Q           One question, when the Committee was  
2 doing its work, in the course of doing its work, were there  
3 any problems that it identified which have not been  
4 included in the proposed order in this application?

5           A           Yes, Mr. Stovall. The Committee made a  
6 recommendation that the -- that serious consideration  
7 should be given to the following issues:

8                       Number one, establish a new priority  
9 under R-8441, which is the -- the gas priority schedule for  
10 the Fruitland Coalbeds Wells while they're in the dewater-  
11 ing phase and additionally recommended that this issue  
12 should be addressed by the Gas Advisory Committee and that  
13 they would be charged with developing guidelines to deter-  
14 mine and define the dewatering phase and where coalbed  
15 wells should be placed in that -- in that schedule.

16                      Secondly, the Water Disposal Subcommit-  
17 tee made the recommendation to the Committee and the Com-  
18 mittee adopted it, that a joint department be set up in New  
19 Mexico and Colorado to take care of the applications coming  
20 in from the operators to take -- to handle the disposal of  
21 these produced waters from the Fruitland Coalbeds.

22           Q           Why is that particularly a concern?  
23 Would you just briefly touch on that?

24           A           These wells make a tremendous amount of  
25 water initially and water disposal is a very vital concern

1 to the operator and has a very economic - big economic  
2 impact on him, on the lifting costs for the operator on  
3 these wells.

4 Q Are there any other concerns that the  
5 Committee addressed that are actually part of this appli-  
6 cation?

7 A Yes. Upon completion of the other  
8 Fruitland Coalbed gas well and having been classified, that  
9 Colorado and New Mexico represented -- approve or recog-  
10 nize a determination for NGPA category 107 be made regard-  
11 less of whether it's an open hole or a cased hole comple-  
12 tion.

13 Q Do you have anything further you'd like  
14 to add with respect to your testimony today?

15 A No, I don't think so.

16 Q To you believe that granting this appli-  
17 cation would be in the interest of conservation, the pre-  
18 vention of waste, and the protection of correlative rights?

19 A Very definitely.

20 MR. STOVALL: Thank you. I  
21 have no other questions, Mr. Examiner.

22 MR. CATANACH: Any cross  
23 examination at this time? I'll start out with Mr. Lund?

24 MR. LUND: No questions, Mr.  
25 Examiner.



1 MR. CATANACH: Mr. Roberts.

2 MR. ROBERTS: No questions.

3 MR. CATANACH; Mr. Carr?

4 MR. CARR: No questions.

5 MR. CATANACH: Mr. Kellahin?

6 MR. KELLAHIN: No questions.

7 MR. CATANACH: Mr. McGuire?

8 MR. DWYER: No questions.

9

10 CROSS EXAMINATION

11 BY MR. CATANACH:

12 Q Mr. Busch, how was the -- actually was  
13 the horizontal boundary of the pool determined?

14 A Mr. Examiner, it was determined by fol-  
15 lowing the Fruitland outcrop around the Basin.

16 Q That goes all the way around the Basin?

17 A Yes. That's illustrated in Exhibit One  
18 under Tab A.

19 Q I have a question on the -- the criteria  
20 for classification.

21 A Yes, sir.

22 Q Would a well have to demonstrate, what,  
23 two of those criteria at least, or --

24 A Well, a preponderance. We thought that  
25 a preponderance would be a good yardstick for that. An

1 operator may not run electric logs, for instance. Some of  
2 the other, he certainly should have a gas analysis. That  
3 would be after the fact. Of course a water analysis would  
4 be after the fact; reservoir performance would be after the  
5 fact; have completion data, mud logs, drill cuttings, log  
6 cores, and that type of thing would probably be sufficient,  
7 and we wanted to leave that, really, to the discretion of  
8 the -- of the regulatory bodies to make a determination as  
9 to what would qualify, but these are some recommendations  
10 from -- as to what could be used.

11 Q In your Rule Number 1 you don't have the  
12 -- the 1-mile limit normally in a pool. Is that on purpose  
13 that you left that out?

14 A Well, yes, because the pool boundary is  
15 the entire -- the entire coal occurrence.

16 Q It takes in everything, though.

17 A Takes in everything.

18 Q So it probably won't be extended any  
19 time.

20 A That's -- that's right.

21 Q I'm a little curious about the recommen-  
22 dation for the joint department with Colorado and you can  
23 go into a little bit more detail on that, as to why?

24 A Yes. The operator has historically en-  
25 countered a lot of problems with clearing various regula-

1 tory agencies and bodies, such as in Colorado, not only  
2 does the operator have to go through the Colorado Oil and  
3 Gas Conservation Commission, but they need to go through  
4 the county health departments and -- and various other --  
5 other departments of that nature.

6 In New Mexico it's -- it's a lot easier  
7 to do. We do have the Environmental Bureau in Santa Fe and  
8 so we recognize that in New Mexico it's a fairly simple  
9 process but -- or easier, I'm not going to say simple, but  
10 you know, a little easier process than it would be in Colo-  
11 rado and so the operators wanted to see if there was any  
12 way that Colorado and New Mexico could get together and  
13 create a department to facilitate speedier application  
14 approval.

15 When an operator drills one of these  
16 coal wells he has an immediate problem with disposal of  
17 these large volumes of water and so an expedient approval  
18 would certainly be in the best interest of economic consid-  
19 erations.

20 MR. CATANACH: Are there any  
21 other questions of this witness?

22 If not, he may be excused.

23 MR. KELLAHIN: Mr. Examiner,  
24 for the record my name is Tom Kellahin. I'm an attorney  
25 appearing on behalf of Meridian Oil, Inc. As part of the

1 work study presentation we'd like to call at this time Mr.  
2 Dana Craney. He spells his last name C-R-A-N-E-Y. Mr.  
3 Craney is a petroleum geologist with Meridian Oil, Inc.  
4 He's already been sworn in.

5 We have, Mr. Examiner, marked as Meri-  
6 dian exhibits, Mr. Craney's presentation, and as we go  
7 through them we will number them as Meridian Exhibits One,  
8 Two, consequently.

9 I have for the Examiner and staff copies  
10 of Mr. Craney's exhibit books. I believe we've distributed  
11 to some counsel who have made entries of appearances,  
12 copies of the exhibit book.

13 Mr. Craney will use an overhead viewer,  
14 Mr. Catanach, which displays all of this exhibits in a  
15 format where I think the audience can see it. I'd like to  
16 spend a few minutes, if that's all right, to qualify Mr.  
17 Craney as an expert geologist.

18  
19 DANA CRANEY,  
20 being called as a witness and being duly sworn upon his  
21 oath, testified as follows, to-wit:

22

23 DIRECT EXAMINATION

24 BY MR. KELLAHIN:

25 Q For the record, sir, would you please

1 state your name and occupation?

2 A My name is Dana Craney. I'm a (unclear)  
3 Staff Geologist with Meridian Oil.

4 Q Mr. Craney, would you describe your edu-  
5 cational background for us?

6 A I received a Bachelor of Science degree  
7 from the University of Southern Colorado, Master of Science  
8 degree from the University of Oklahoma.

9 Q In what years, sir?

10 A '74 and '78.

11 Q Subsequent to graduation and obtaining  
12 your degrees, would you summarize your work experience as a  
13 petroleum geologist?

14 A I worked for El Paso Natural Gas as a  
15 Development Geologist for three years.

16 I worked with El Paso Exploration as a  
17 Development Geologist and Development Coordinator for four  
18 years.

19 And presently work for Meridian Oil,  
20 which Meridian (unclear) El Paso Exploration and they --  
21 sort of a project coordinator for the Fruitland Coal.

22 Q Let's talk specifically about your  
23 personal involvement as a petroleum geologist in the study  
24 of the coal seam gas production out of the Fruitland  
25 formation. What has been your personal experience?

1           A           I've been involved in Fruitland Coalbed  
2 Methane development and exploitation since about 1982 and  
3 have been actively involved in Meridian's drilling and  
4 development program in the San Juan Basin.

5           Q           Have you participated on behalf of your  
6 company as an expert geologist with regards to the work  
7 study program that Mr. Busch described here earlier this  
8 morning?

9           A           Yes, I have.

10          Q           And what has been your particular in-  
11 volvement?

12          A           I was involved in the commingling sub-  
13 committee.

14          Q           Did you participate on that subcommit-  
15 tee in terms of voting and discussing issues before that  
16 committee?

17          A           Yes, sir, I did.

18          Q           And pursuant to the work of that subcom-  
19 mittee have you prepared for us a package of exhibits to  
20 illustrate your conclusions and recommendations on behalf  
21 of that subcommittee?

22          A           Yes, I have.

23                               MR. KELLAHIN:   Mr. Examiner,  
24 at this time we tender Mr. Craney as an expert petroleum  
25 geologist.

1 MR. CATANACH: He is so  
2 qualified.

3 Q Approximately when did your efforts and  
4 the efforts of the subcommittee on commingling begin?

5 A I believe we started the subcommittee  
6 back in February of 1988.

7 Q Would you identify for us, sir, what  
8 were the major issues of concern that directed the atten-  
9 tion of the subcommittee and their work?

10 A Okay. Our subcommittee addressed four  
11 main issues and the results of these were that we adopted  
12 the current definitions of the Pictured Cliff Fruitland  
13 formation that are already established in the San Juan  
14 Basin.

15 The Pictured Cliff sandstone is the  
16 stratigraphically highest sandstone in the San Juan Basin  
17 and on wireline (unclear) contact between Pictured Cliff  
18 and Fruitland formations we picked the top of the massive  
19 marine sandstone.

20 The contact between the Fruitland and  
21 Kirtland formations is placed at the top of the highest  
22 carbonaceous shale or the highest coalbed, and (not clearly  
23 understood) combination of logs. If you could use this log  
24 in conjunction with the induction SP log, you would see a  
25 decrease in resistivity as you got above the carbonaceous

1 bed and got in the lower resistivity for the Lower Kirt-  
2 land Shale.

3 First of all, I'm talking on a type log  
4 here and --

5 Q We'll come back and identify the dis-  
6 play and we'll talk in detail about each of the four  
7 issues.

8 A Okay.

9 Q Give us an outline, though, and tell us  
10 what the four issues were.

11 A Okay, the four issues were that we  
12 defined the Pictured Cliff and the Fruitland formation. We  
13 established the Fruitland Coal as a separate pool. We left  
14 the currently defined Pictured Cliff Sandstone and Fruit-  
15 land Sandstone Pools as they are; that is, commingled in  
16 Colorado and separate in New Mexico, and then we adopted  
17 coalbed methane criteria from the Bureau of Land Management  
18 which Ernie Busch talked to earlier in his exhibit.

19 Q In addressing the first issue, which is  
20 to identify the vertical limits of the proposed pool, you  
21 have noted what is identified as a type log? This is Meri-  
22 dian Exhibit Number One?

23 A Yes, sir.

24 Q What is the source of that type log?  
25 Identify the log for us.



1           A           Okay, this is a type log of the Amoco  
2 Schneider Gas Com "B" No. 1 Well. It's drilled in the  
3 southwest of Section 28, 32, 10, San Juan County, New  
4 Mexico.

5                       This is a gamma ray (unclear) density  
6 log.

7                               MR. KELLAHIN: Mr. Examiner,  
8 this is the type log used by the Division when they adopted  
9 special rules for the creation of the Cedar Hills Basal  
10 Coal Pool. It's Order No. R-7588 and I have a copy of that  
11 order for you, which refers to the type log.

12           Q           Tell us about the selection of a type  
13 log for the Basin coal gas pool that we're discussing  
14 today, Mr. Craney.

15           A           The Rules Committee selected this type  
16 log first of all because it was already used in the Cedar  
17 Hill Pool and what the type log will show is the recogni-  
18 tion of the Fruitland Coal primarily, which is the (not  
19 clearly understood) new coal pool. It would also show the  
20 recognition of the Picture Cliff Sandstone and the top of  
21 the Fruitland formation.

22           Q           When we look at the blue shading on each  
23 side of that log, what is identified by that area?

24           A           Okay, on the right side, the right  
25 column, identifies the three formations defined in -- by

1 the log, and on the left side it identifies the boundary,  
2 vertical limits of the Fruitland Coalbed Methane Pool.

3 Q What's shown with the green lines in the  
4 center portion of the display?

5 A The green in the depth track shows the  
6 coal as identified primarily from the bulk energy volume.

7 Q When we look at that interval that was  
8 identified as the Basin coal for the Cedar Hills Pool, what  
9 are we looking at on the type log?

10 A On the type log the Basal Coal Zone is  
11 this coal zone right here, from about 2832 to 2880.

12 Q Was there a general consensus among the  
13 geologists working on the subcommittee that you participat-  
14 ed in as to whether or not this type log would be  
15 characteristic of a type log to be used throughout the  
16 Basin for identifying the coal gas seam production?

17 A No, sir, it wasn't and the reason is  
18 that the type log was picked after the Committee submitted  
19 their recommendations. It was picked by the rules writing  
20 committee but we have no problem with the type log.

21 Q Describe for us the Committee's conclu-  
22 sions and recommendations with regards to the vertical  
23 definition and limits for the Basin gas coal seam pool.

24 A The vertical limits of the Fruitland  
25 Coalbed Methane Pool established that it encompasses the

1 entire Fruitland formation and on the type log it's posi-  
2 tioned at the top of the Pictured Cliffs formation, which  
3 is picked on the top of the sandstones at 2880, to the top  
4 of the highest carbonaceous shale for a coalbed, which on  
5 the type log is at 2450 (not clearly understood) through  
6 the Kirtland Shale and the type log is used to show that  
7 the Coalbed Methane Pool can be identified anywhere in the  
8 San Juan Basin as encompassing any and all coalbeds within  
9 the entire Fruitland formation.

10 Q Am I correct in understanding that above  
11 the top line there on the display that they are not going  
12 to find in the Basin coal seam gas production in commercial  
13 quantities?

14 A That's correct.

15 Q Anything further about the type log?

16 A No, sir.

17 Q All right, after having gone through the  
18 process of identifying the vertical limits for the pool,  
19 what then did you do as a study group?

20 A Okay. The -- we defined the vertical  
21 limits -- well, to reach the point of defining the vertical  
22 limits, we had to define the Pictured Cliff- Fruitland for-  
23 mation, which I jumped into right off the bat.

24 Q Okay.

25 A And we adopted the current definitions

1 as they already are in the San Juan Basin.

2 To reiterate, (not clearly understood)  
3 encompasses the carbonaceous sediments of the Continental  
4 deposit immediately overlying the Pictured Cliff forma-  
5 tion.

6 The second step the Committee took was  
7 to -- we agreed and therefore recommended that the Fruit-  
8 land coal represents a common source of supply within them-  
9 selves and that the coal also represents a distinct and  
10 separate source of supply from the sandstones.

11 Q What was the basis of information that  
12 led you to that conclusion?

13 A The basis of that information is widely  
14 published data which the operators had access to and this  
15 information, as well as published information from the  
16 hearing information which was talked about earlier in Amoco  
17 establishing the Basal Fruitland Coal as a separate source  
18 of supply from the sandstones in the Cedar Hill area.

19 Q I know Mr. Busch touched on some of that  
20 discussion, but let's have you go through that discussion  
21 and lead us towards, then, your conclusions with regards to  
22 the horizontal boundaries of the Basin pool.

23 A Okay. Just by way of a brief review of  
24 how we -- I'll present this very quickly because Ernie  
25 presented this very well -- just a brief review of the

1 geology and how we made our conclusion --

2 Q You've displayed Exhibit Number Two,  
3 Meridian Exhibit Number 2?

4 A Exhibit Number Two.

5 Q All right, sir.

6 A This shows a rough diagrammatic Paleo-  
7 geographic map of the depositional environment during the  
8 time of (not clearly understood) deposit.

9 The Fruitland formation was deposited in  
10 the coastal plains exhibited, marine swamps, marshes, and  
11 rivers, and it was deposited out westward of the receding  
12 Pictured Cliffs shoreline, where the Pictured Cliffs sands  
13 were deposited and northeast of that was the Pictured  
14 Cliffs Sea, where the marine Lewis Shale was being deposit-  
15 ed.

16 Exhibit Three is an exhibit which Ernie  
17 showed. It shows the southwest to northeast cross section  
18 taken through time of this interval.

19 This cross section show how the pools  
20 were evolved on a coastal plain and it shows that after the  
21 coals were deposited that this relatively small strati-  
22 graphic interval of a few hundred feet would then be sub-  
23 jected to the pressure and increasing temperature due to  
24 (not understood) and tertiary sediments after that.

25 The response of these coals to the in-

1   creasing temperature and pressures is for them to metamor-  
2   phose (sic) from peat to lignite to various ranks of coal,  
3   potentially all the way to anthracite. In the San Juan  
4   Basin they metamorphosed to low volatile bituminous.

5                   The process of this coalification caused  
6   the coal to become its own source and trap. The gas gen-  
7   erated within the coal seams did not migrate out of the  
8   coal but remained trapped in the coal seams.

9                   Conversely, the current sandstone reser-  
10   voirs have gas that was generated from the adjacent shales  
11   of the overlying Kirtland, Fruitland, and underlying Lewis  
12   formations, and gas and water from these shales has migrat-  
13   ed into the sandstone.

14                   So thus today we see the distinct gas  
15   and water differences in analysis between the Fruitland and  
16   the sandstones that Ernie Busch already talked about.

17           Q           Identify for us, Mr. Craney, what is the  
18   source of the information displayed on Exhibit Number  
19   Three.

20           A           The source of information on Exhibits  
21   Two and Three is from articles (unclear) by James E. Fas-  
22   sett, the U.S.G.S. geologist, noted authority on the Cre-  
23   taceous in the San Juan Basin.

24           Q           All right, sir. Exhibit Number Four?

25           A           Exhibit Number Four is a rank map of the

1 Fruitland formation and ranks are determined based on  
2 vitrinite reflectance and volatile property of the coal,  
3 which changes as the coal matures.

4 And this map shows two things. One is  
5 that coal is present almost everywhere within the San Juan  
6 Basin and the net coal isopach map behind Tom Kellahin on  
7 the white board over there also shows the coal present  
8 almost everywhere in the San Juan Basin.

9 Q Let's take a moment and bring this  
10 display over there to you, sir.

11 A Shall I continue?

12 Q Let's -- We've marked the vitrinite  
13 reflectance value map as Exhibit Number Four. Let's do the  
14 thickness map as Exhibit Number Five so that you have them.

15 All right, you were making reference to  
16 Exhibit Number Five. Take a moment and identify it for us.

17 A Exhibit Number Five is a net coal thick-  
18 ness map of the Fruitland formation. This was published in  
19 the Southern (unclear) Association's Symposium by Mr.  
20 Kelso, and what -- what this map primarily shows is that  
21 the coal is present almost everywhere in the San Juan  
22 Basin. It shows the outcrop of the Fruitland formation and  
23 places upon the eastern side of the San Juan Basin where  
24 you can see the only -- where the zero contour line is, it  
25 shows the where the Fruitland Coal was either not deposited

1 or more than likely eroded off.

2 That zero line, this zero contour line  
3 for the Fruitland Coal is not present today.

4 Q When you -- stay a moment at the dis-  
5 play there, Mr. Craney, when you look at that zero contour  
6 line around the outer boundary of the shaded area --

7 A Yes.

8 Q -- how does that conform to the proposed  
9 boundary for the -- horizontal boundary of the pool?

10 A The horizontal boundary was established  
11 outside of the zero line in this side of the San Juan Basin  
12 and then follows the outcrop of the Fruitland formation  
13 around the southern and western sides of the San Juan Basin  
14 and then follows the Colorado border to the eastern side of  
15 the San Juan Basin.

16 Q Within that boundary was the Committee  
17 satisfied that they encompassed and contained all of the  
18 potential coal that would be productive of gas --

19 A Yes.

20 Q -- in the Basin?

21 A Yes.

22 Q In looking at the different shades, is  
23 it reasonable or possible to separate out the different  
24 thicknesses of the coal seams and, say, create multiple  
25 different pools for the coal gas?



1           A           Based upon a thickness map it's not;  
2     that some of the best coal wells that are producing from 18  
3     feet of coal to 19 feet of coal, and this it showed that in  
4     other parts of the Basin we have as much as 80 feet of  
5     coal, so there is not a relationship between thickness and  
6     production.

7           Q           Help us understand, for those of us that  
8     deal more commonly in gas produced out of marine sand as  
9     opposed to gas produced out of coal, what the relationship  
10    is, if any, that you can draw between a typical or charac-  
11    teristic isopach thickness map and the kind of coal thick-  
12    ness map you're seeing before you on Exhibit Five.

13          A           The primary relationship that we could  
14    establish from the -- from the thickness map would be to  
15    calculate a volumetric type gas in place calculation. But  
16    to take a -- to take that and relate it to a rate is more  
17    dependent upon the permeability, the relative permeability,  
18    the pressures, an absorption/desorption isotherm; it's pri-  
19    marily permeability of the reservoir where that well is,  
20    and that primarily has been influenced by fracturing,  
21    natural fracturing.

22          Q           Was the Committee satisfied taking the  
23    area encompassed with the dark outer boundary that you were  
24    containing an area of gas production out of coal that ought  
25    to be treated by the same rules and regulations?

1           A           Yes, sir.

2           Q           Let's go back for a moment to Exhibit  
3 Number Four and look at the coal quality map, the vitrinite  
4 reflectance values?

5           A           Yes, sir.

6           Q           Describe for us again what we're seeing  
7 when we look at that display.

8           A           What we see in this display is that the  
9 coals range from a high volatile C bituminous in the south-  
10 ern part of the Basin to a low volatile bituminous in the  
11 northern part of the Basin.

12                   This is an increase in rank or an in-  
13 crease in coal maturity and this is due to the greater  
14 depth of burial in the northern part of Basin, influence  
15 from a heat source, heat source to the north of the San  
16 Juan volcanic intrusive activity.

17           Q           With regards to this information was  
18 there any consensus by the Committee as to whether or not  
19 using this data you should have any other boundary than the  
20 outer boundary proposed for the pool?

21           A           No, there wasn't.

22           Q           Did you consider whether or not you  
23 ought to shrink the boundary based upon the quality of the  
24 coal encountered in the area?

25           A           In the Commingling Committee we did not.

1           Q           Do you as a geologist consider that  
2 outer boundary as proposed to be a reasonable, logical  
3 geologic boundary for the pool?

4           A           Yes, sir, I do.

5           Q           Based upon that information you've seen  
6 on Exhibit Number Four, do you see any reason to treat any  
7 different area of that pool under rules and regulations  
8 that are any different from any other part of the pool?

9           A           No.

10          Q           All right. Let's go on to your next  
11 exhibit, Mr. Craney.

12          A           The next exhibit is a series of three  
13 slides with data which Meridian recently collected on the  
14 Vanderslice No. 100 Well in the Cedar Hill Pool in -- well,  
15 the well is located in the northeast of 18, 32, 10, San  
16 Juan County, New Mexico.

17          Q           Give us a preface, Mr. Craney, as to  
18 what four issues does this -- these three exhibits address  
19 themselves?

20          A           The primary issue that these will  
21 address themselves to is that the coal, all the coals  
22 within the Fruitland formation represent a common source of  
23 supply and they are indeed separate and distinct from the  
24 Fruitland sandstone, the Pictured Cliffs sandstone, and  
25 when Amoco established the Cedar Hill Pool it was for the

1 Basal Coal only and that the vertical limits encompassed  
2 only the Basal Coal.

3 Q Did you find in your studies that the  
4 upper coal gas production had a similar gas composition  
5 signature as the Basal coal gas analysis?

6 A Yes, sir, we did.

7 Q And you were able to distinguish also  
8 the gas production composition from coal versus the sand-  
9 stone within the Fruitland formation.

10 A Yes, sir.

11 Q Tell us how you did it.

12 A Okay. We -- this is a well which  
13 Meridian cored. We took a sample of the core from approx-  
14 imately 2968 feet in the upper coal.

15 We took a sample of the core from 29 --  
16 3042, 70 feet below that, which is the base of the Fruit-  
17 land Coal.

18 We put these cores into canisters and  
19 had gas analyses run of these canisters.

20 Q Take a moment and using Exhibit Number  
21 Five there, on the bulletin board, show us approximately  
22 where this well is located.

23 A This well is located in about the very  
24 northwest of 32 North, 10 West.

25 Q Please continue.

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A           The solid blue denotes the upper coal and the cross hatched blue shows the gas schematic data on the lower coal.

As you can see, the carbon dioxide -- well, the molecular percent is on the lefthand side of the graph. The breakdown of the gas constituents is on the bottom. As you can see, the carbon dioxide, methane, ethane, and hexane+, that these gases are similar, and the next two slides show a comparison of the gases to the average gas composition of the Fruitland formation -- or the Fruitland coal, Fruitland sand, and Pictured Cliffs sandstone in this area.

Q           This one is -- the current exhibit is Number Six and you're going to Exhibit Number Seven?

A           Yes.

Q           All right, let's look at that exhibit.

A           The exhibit again shows the solid blue is the Upper Fruitland Coal. The cross hachured blue is is the Basal Fruitland Coal. And then the next blue hachured line is the Average Fruitland Coal, (unclear) data Cedar Hill Area. The red line shows the average Fruitland Sandstone gas analysis and the green cross hachured shows the average Pictured Cliffs Sandstone gas in the area.

The key characteristics of coalbed

1 methane gas, or coalbed gas, is high methane content and  
2 high carbon dioxide content.

3 The key factors of the sandstone gas is  
4 high methane content and a high ethane content or other  
5 heavies in the gas.

6 In this slide the two main characteris-  
7 tics which you want to look at would be the carbon dioxide  
8 and the ethane. So we've magnified those two curves.

9 We again show the Upper Fruitland Coal,  
10 Basal Fruitland Coal, Average Fruitland Coal, gas analysis  
11 in the Cedar Hill Area. This contrasts with the carbon  
12 dioxide of the Average Fruitland Sandstone and the Average  
13 Pictured Cliff Sandstone in the area.

14 In addition, the upper, basal, and aver-  
15 age ethane contents of the Fruitland Coal is greatly lower  
16 than the Average Fruitland sandstone and the Average Pic-  
17 tured Cliff Sandstone in the Cedar Hill Area.

18 These slides show that the, based upon  
19 fluid analysis that the coals are a common source of sup-  
20 ply.

21 Q I don't know if you have a copy of it  
22 but it's Mr. Busch's exhibit book and it is the character-  
23 istics or the set of criteria shown on page two just before  
24 you get to the proposed rules, and they show a set of  
25 criteria or data to help establish whether you're dealing

1 with a well that produces gas from the coal seam or pro-  
2 duces gas from the Fruitland Sandstones.

3 You're familiar with the criteria, are  
4 you?

5 A Yes, sir.

6 Q Would you care to comment on the cri-  
7 teria and whether or not it serves as a useful, realistic  
8 basis by which you can, using various combinations of this  
9 data source, distinguish between gas produced from the coal  
10 and gas produced from the sandstone?

11 A The -- start at the top and go through  
12 each criteria to --

13 Q No, sir, just tell me, generally,  
14 though, what the -- what you, as a geologist, feel about  
15 using this data source to help you develop then a basis  
16 upon making comparisons by which you can distinguish, then,  
17 wells that produce coal gas versus sandstone gas.

18 A We would feel comfortable using the  
19 entire group as a data source and that -- we feel that  
20 coalbed methane can be identified, again from the fluid  
21 analysis that we just showed, gas analysis, likewise water  
22 analysis also shows characteristics of the two different  
23 reservoirs after the fact. These are after the wells are  
24 produced.

25 However, the other data sources which

1 are listed on here also provide the operator a preponder-  
2 ance of evidence to justify a coalbed methane well.

3 Q Did you have any comments or responses  
4 or criticisms by any operator or participant in the work  
5 study that this was simply too difficult a way to distin-  
6 guish between the two types of gas?

7 A There was some discussion but it was  
8 generally accepted that these were very acceptable criteria  
9 to identify the coal gas.

10 Q Have you reviewed Amoco's presentation  
11 in the Cedar Hill Pool where they requested the establish-  
12 ment of 320-acre spacing in the Cedar Hill Pool?

13 A Yes, sir, I have.

14 Q And that transcript includes a discus-  
15 sion of gas analysis comparison about certain values in the  
16 gas composition, that would be signatures of gas produced  
17 from the coal seam, does it not?

18 A Yes, sir, it does.

19 Q How does that relate to the type of in-  
20 formation you've seen in your display here?

21 A Well, the data which Amoco presented is  
22 incorporated in the Average Fruitland Sandstone data and  
23 the Average Pictured Cliffs Sandstone data (not clearly  
24 understood) as well as the average Fruitland Coal data.  
25 That data is this data presented in graphic form.



1           Q           Are you satisfied as a geologist that  
2 this is methodology by which we can separate out gas pro-  
3 duced from coal versus gas produced from the Fruitland  
4 Sandstone in an accurate, reliable way?

5           A           Yes, sir, I am.

6           Q           Do you have anything else to add to your  
7 presentation?

8           A           No, sir.

9           Q           Let me ask you, sir, what your opinion  
10 is with regards to the implementation of the proposed rules  
11 as outlined by Mr. Busch, and whether or not in your  
12 opinion those rules will in fact protect correlative  
13 rights?

14          A           I feel that they will.

15          Q           And do you have an opinion, sir, as to  
16 whether or not the adoption of those rules will also pre-  
17 vent waste?

18          A           Yes, sir.

19          Q           Has the Committee completed its work  
20 with regards to this project, Mr. Craney?

21          A           I believe that there is -- as far as the  
22 recommendations, yes, sir.

23          Q           Have we covered all those geologic  
24 points that you desire to discuss with regards to adoption  
25 of these rules?

1           A           Yes, sir, I have.

2                   MR. KELLAHIN: Thank you, Mr.  
3 Examiner. We move the introduction of Meridian Exhibits  
4 One through Eight at this time, Mr. Examiner.

5                   MR. CATANACH: Exhibits One  
6 through Eight will be admitted as evidence.

7                   MR. KELLAHIN: Pass the wit-  
8 ness.

9                   MR. CATANACH; Mr. Lund.

10

11                   CROSS EXAMINATION

12 BY MR. LUND:

13           Q           Mr. Craney, I wanted to ask you a  
14 little bit about the geologic phenomenon of intertonguing  
15 caused by the transgression and regression in the sea.  
16 Would you explain what that is and how it's effective in  
17 the area that we're talking about today?

18           A           Okay. Referring back to this exhibit,  
19 what -- what you're referring to is that during the deposi-  
20 tion of the Fruitland formation there have been regressions  
21 or transgressions of Pictured Cliffs shoreline over parts  
22 of the Fruitland formation due to (not clearly understood\_.

23                   The result of that is that the Pictured  
24 Cliff Sandstone has been deposited on parts of the Fruit-  
25 land Coal and thus you have an intertonguing that you've

1 referred to because where you have Fruitland formation  
2 overlying Pictured Cliff Sandstone underlain by Fruitland  
3 formation, and again underlain by Pictured Cliffs Sand-  
4 stone.

5 Q So simplistically the sea moved in and  
6 out --

7 A Yes, sir.

8 Q -- and then it left kind of fingers of  
9 coal throughout the area, is that correct?

10 A That is correct.

11 Q And the intent of the Committee as far  
12 as the geologic testimony that you've given, is to include  
13 all the coals, you know, not just intertongue the coal  
14 within the Pictured Cliff but also the coal within the  
15 Fruitland Sand as part of the pool we're talking about.

16 A That's correct.

17 Q That is, we're including all the sands.

18 A That's right.

19 Q And the last question I have, looking at  
20 your Exhibit Exhibits Four and Five that show differences  
21 or variances in the coals throughout this area, is it your  
22 opinion that it's proper to uniformly space the entire area  
23 on 320's despite that variance?

24 A Yes, sir.

25 Q Why?

1           A           At this point in time we don't -- we  
2 have not seen data from other parts of the Basin changing  
3 any spacing the Commission recommended.

4           Q           In particular, as a geologist, are you  
5 comfortable to space even (unclear) in the area to 320?

6           A           At this time we are.

7           Q           And again all for the same reason.

8           A           Same reason.

9           Q           Okay, thank you.

10                      MR. LUND: Nothing further.

11                      Oh, I have to have one more.

12           Q           When you're referring to the common  
13 source of supply, you're actually referring to all coals  
14 available for production not necessarily a single coal  
15 seam, is that right?

16           A           That is correct.

17           Q           Okay. Thank you.

18                      MR. CATANACH: Mr. Roberts?

19                      MR. ROBERTS: No questions.

20                      MR. CATANACH: No questions?

21 Any other questions from anybody?

22                      MR. LYON: May I ask one ques-  
23 tion?

24                      MR. CATANACH: Mr. Lyon.

25

1 QUESTIONS BY MR. LYON:

2 Q I'm not sure whether it was Exhibit Four  
3 or Exhibit Five but it was the projection of the volatile  
4 -- the various grades of coal expressed in volatility.

5 A I think that's Exhibit Number Five.

6 Q Right. Since this is quite different  
7 from what we normally encounter in our Division, I'd like  
8 to ask you if there is some relationship between the like-  
9 lihood or quantity of gas that you would encounter in these  
10 various grades, is this a various grade of the coal or are  
11 you more likely to encounter significant gas in the high  
12 volatile coal as opposed to low volatile coal?

13 A You are more likely to encounter -- in  
14 the San Juan Basin you are more likely to encounter high  
15 gas in place in the northern part of the San Juan Basin  
16 due to the more (unclear) gas that is generated in the coal  
17 in the northern part of the San Juan Basin, and (not clear-  
18 ly understood), that build pressure.

19 Q So the light yellow or ecru color in the  
20 south is less likely to have gas, significant gas, than the  
21 -- than the darker green shade to the north, is that  
22 right?

23 A There has been some gas present all the  
24 way to the southern part of the lighter shades of green,  
25

1 and you (not clearly understood) in part of the San Juan  
2 Basin there is less gas in place in the southern part of  
3 the (unclear) and it appears there's gas, there's gas  
4 everywhere in the Fruitland Coal in the San Juan Basin.

5 Q I guess I'm just having problems  
6 evaluating what that tells me about gas in the Basin.

7 What I'm wondering is the different  
8 colors, you'd think --

9 A You could -- you can say that the darker  
10 the color the more gas in place (not clearly understood).

11 Q So a low volatile bituminous would be  
12 likely to produce more gas than a high volatile C bitumin-  
13 ous --

14 A Yes. The conclusion was that a foot of  
15 low volatile bituminous coal would produce more gas than a  
16 foot of high volatile C bituminous and the answer is yes.

17 MR. CATANACH: Are there any  
18 other questions of this witness?

19 MR. KELLAHIN: Let me pursue  
20 that a little bit.

21

22 REDIRECT EXAMINATION

23 BY MR. KELLAHIN:

24 Q I want to pursue with you, Mr. Craney,  
25 Mr. Lyon's line of questioning with regards to an attempt

1 to quantify the volume of gas in place within the Basin by  
2 looking at the different shades of green on the display  
3 when you look at Exhibit Number Four.

4 Other than saying in a general way as we  
5 move north we find more gas in place in a given acre as the  
6 color gets darker. Can we quantify it any more specifi-  
7 cally?

8 A Not off the display. You have to take  
9 that in conjunction with other types of data.

10 Q That display alone, then, cannot tell us  
11 how to establish whether or not we should treat the darker  
12 green areas with different rules, including different  
13 spacing patterns for wells, than the southern portion.

14 A That's correct.

15 Q In addition, in the southern portion  
16 while the quality of the coal is less than the northern  
17 portion, you also have certain areas in the southern por-  
18 tion that have thicker coal seams.

19 A That's correct.

20 Q Then you would have to integrate that to  
21 determine how much gas in place you have in the coal seams.  
22 And having integrated the thickness map, Exhibit Number  
23 Five, with the value map on the quality, Exhibit Number  
24 Four, those two pieces of the puzzle still are not going to  
25 tell you anything about drainage, are they?

1                   A           That's correct.

2                                   MR. KELLAHIN:   Nothing fur-  
3 ther.

4                                   MR. CATANACH:   Any other  
5 questions of this witness?

6                                   If not, you may be excused.

7                                   And let's go ahead and take  
8 about a 20 - 25 minute break at this time.

9  
10                                   (Thereupon a recess was taken.)

11  
12                                   MR. CATANACH:   The hearing  
13 will come to order at this time.

14  
15                                   C. ALAN WOOD,  
16 being called as a witness and being duly sworn upon his  
17 oath, testified as follows, to-wit:

18  
19                                   DIRECT EXAMINATION

20 BY MR. LUND:

21                   Q           Would you please state your name, your  
22 business address, and by whom you are employed and in what  
23 capacity?

24                   A           C. Alan Wood, with Amoco Production  
25 Company. I have worked in regulatory practices for appro-



1 ximately seven years. I've participated in excess of 150  
2 different hearings involving the establishment of field  
3 rules as well as general rules and have also participated  
4 in legislative matters.

5 Q Your expertise is in the field of  
6 petroleum engineering?

7 A My degree is in mechanical engineering.  
8 I went to work for Amoco in 1977 and have been with them  
9 since that time.

10 Q You have testified before this  
11 Commission before, isn't that right?

12 A Yes, I have.

13 Q And your qualifications have been ac-  
14 cepted?

15 A Yes, they have.

16 Q And you're testifying in this part of  
17 the hearing on the spacing issues that may have recommend-  
18 ations presented today?

19 A That's correct.

20 MR. LUND: I would offer Mr.  
21 Wood as an expert in petroleum engineering and unitization.

22 MR. CATANACH: He is so qual-  
23 ified.

24 Q Mr. Wood would you tell the Examiner  
25 what committees and subcommittees you served on and what

1 you did?

2 A Okay, I was one of two Amoco employees  
3 to serve on the committee.

4 I participated on the Spacing Subcom-  
5 mitee as well as the Drafting Committee.

6 Q Please tell us the methods the Spacing  
7 Subcommittee went through to formulate its recommendations  
8 that it's presenting today.

9 A The Spacing Committee had a live con-  
10 servation approach to handle this properly and to prevent  
11 waste of this natural resource. There was a live discus-  
12 sion concerning the data available from the Cedar Hill  
13 Field, since that was the only data that was at that time  
14 public record with regard to coal wells' ability to drain.

15 Q And was the concern of the Spacing  
16 Subcommittee the possibility of drilling unnecessary wells?

17 A Yes, it was one of the concerns.

18 Q And what generally was that discussion  
19 about?

20 A I think part of the discussion dealt  
21 with the fact that we had recognized that the coals under-  
22 lying (unclear) and we had relatively little data in order  
23 to determine appropriate spacing, and certainly it con-  
24 cerned prevention of waste. We Could have seen the drill-  
25 ing of unnecessary wells, which would have been waste.

1           Q           And ultimately the Committee decided to  
2 recommend 320-acre spacing?

3           A           That's the recommendation the Subcommit-  
4 tee made to the General Committee and subsequently approved  
5 by the General Committee. It has to be recognized that  
6 that was one of a couple very significant recommendations  
7 with regard to spacing.

8                       Another recommendation developed by the  
9 Spacing Subcommittee was administrative approval for an  
10 increased density well, which I believe recognized some  
11 concern that we only had, or have, limited data in order to  
12 make the spacing determination.

13          Q           And so for purposes of this part of your  
14 testimony, Mr. Busch asked you to (unclear) and you are  
15 advocating the 320-acre spacing as was discussed by the  
16 Methane Committee?

17          A           Yes.

18          Q           And now you've prepared three exhibits  
19 for this committee?

20          A           Yes, I have.

21          Q           Let's turn, then, to Exhibit Number One.  
22 Will you identify it and explain its significance?

23          A           Exhibit Number One is a 12-section plat  
24 showing the relative location of coal gas wells and also  
25 pressure observation wells in the Cedar Hill Field.

1                   That field is located in portions of  
2 Townships 31 North and 32 North of Range 10 West.

3                   Q           And this shows the wells as of approxi-  
4 mately what date?

5                   A           Late 1983, I believe, and it has been  
6 updated. It has been updated to show some --

7                   Q           Additional wells?

8                   A           Yes.

9                   Q           It shows both pressure observation  
10 wells and producers and how are those designated on the  
11 exhibit?

12                  A           The producing coal wells are designated  
13 with a gas well symbol. The pressure observation wells,  
14 there are three of them in the area, or were three of them  
15 in the area, are indicated by a gas well symbol highlighted  
16 by a small, black arrow.

17                  Q           And the distances among those wells?

18                  A           Yes, sir, that's correct.

19                  Q           Anything else about Exhibit Number One?

20                  A           We'll refer to it a little bit later  
21 when we start talking about Exhibit Number Three.

22                  Q           Will you go to Exhibit Number Two and  
23 explain the significance of this exhibit?

24                  A           Amoco's Cahn No. 1 Well, located in Sec-  
25 tion 33, of Township 32 North, Range 10 West, was the dis-

1       covery well for the Cedar Hill Pool.

2                   The production plot, as indicated on  
3       Exhibit Number Two, shows in a solid black line the aver-  
4       age in a daily rate. It shows in a dashed line the barrels  
5       of water per day, and in the lower portion of the exhibit  
6       shows the days produced.

7                   Q           What is -- excuse me. Why is this  
8       unique or significant?

9                   A           Why this is significant is that the Cahn  
10       No. 1 exhibited a production trend which is unique to coal  
11       well gas production, and that being our initial production  
12       period, which was the first part of 1979, late 1978, was  
13       basically 100 percent water with no gas production.

14                   In 1979 we actually started seeing some  
15       commercial quantities of gas and through a period of '79  
16       through 1984 this gas actually exhibited an incline in its  
17       production rate, which is certainly different from what you  
18       would anticipate with a traditional sand reservoir.

19                   Q           Now what does this information show you  
20       about whether you can apply traditional reservoir  
21       engineering calculations in matters such as spacing and  
22       drainage?

23                   A           This particular producing characteristic  
24       is relied upon to determine appropriate spacing and you  
25       have to appreciate what is typically done when an engineer

1 develops spacing recommendations.

2                   You basically perform two calculations.  
3 What gas is available in the reservoir to produced and what  
4 an individual well is capable of producing, and from those  
5 two calculations you can determine appropriate spacing.

6                   The problem exhibited on the Cahn No. 1  
7 Well is that we had no method. If we apply traditional  
8 decline curve analysis to the Cahn No. 1, we would actually  
9 calculate infinite reserves; therefore, infinite drainage,  
10 which I think is inappropriate.

11               Q           Will you go now to the last exhibit,  
12 identify it and explain it?

13               A           Exhibit Three is a graph showing the  
14 pressure measurements taken in the three pressure observa-  
15 tion wells located on Exhibit Number One versus time. This  
16 is the data that was available in 1984 that we presented to  
17 the New Mexico Oil Conservation Division in support of our  
18 application to adopt 320-acre spacing for the Basal Coal  
19 Seam in Cedar Hill.

20                   Now we have to at this point go back to  
21 Exhibit Number One and start taking a look at some of the  
22 inter-well distances and equate those to what might be an  
23 effective drainage radius.

24                   On Exhibit Number One I've indicated the  
25 Cahn Well and that's the well located, a producing coal

1 well located in the northwest quarter of Section 33. It  
2 was the discovery well. That well actually produced by  
3 itself until mid-1981.

4 The distances from the Cahn Well are  
5 very important to know.

6 The three observation wells are the Cahn  
7 No. 2, located to the southwest of the Cahn No. 1, which is  
8 our gas producing well. That inter-well distance was 933  
9 feet. That equates to a little bit less than an 80-acre  
10 drainage radius.

11 The well to the north of the Cahn No. 1,  
12 which is our pressure observation well, was the the  
13 Schneider B No. 1. That's located in the southwest quarter  
14 of Section 28. The inter-well distance was 2,180 feet.  
15 That equates to approximately a 320-acre drainage radius.

16 The third pressure observation well is  
17 located to the east of the Cahn No. 1 and it's located in  
18 the northwest quarter of Section 34. That well was the  
19 Leeper B No. 1. The inter-well distance between the Cahn  
20 and the Leeper was 5,131 feet, which is in excess of a 640-  
21 acre drainage radius.

22 Q Again, those three pressure observation  
23 wells are designated on Exhibit One with an arrow.

24 A They are highlighted with the black  
25 arrow, that's correct.

1                   Returning to Exhibit Number Three, we  
2 can actually see the pressure history of these pressure  
3 observation wells over a period of time. The initial  
4 reservoir pressure that's been estimated from data from the  
5 Cahn No. 1, is 1562, 1,562 psi.

6                   The first thing I would like to point  
7 out is the pressure history of the Cahn No. 2. That is the  
8 well that's located some 933 feet away from the Cahn No. 1  
9 and would amount to an 80-acre drainage radius.

10                  We see the first pressure test run in  
11 the Cahn No. 2 was taken in mid-1979 and that's indicated  
12 by the solid black line. That particular pressure point  
13 was already below the original reservoir pressure as deter-  
14 mined by the Cahn No. 1. Over the next twelve months that  
15 pressure continued to decline until mid-1980 it reached a  
16 point of some 1350 psi. That would indicate, given the  
17 understanding that during this time the only well producing  
18 in the reservoir was the Cahn No. 1, that we were seeing  
19 pressure response from the Cahn No. 2; better said, we were  
20 seeing pressure response at an 80-acre drainage radius.

21                  The second curve that I would like to  
22 discuss, is for the Schneider pressure observation well.  
23 That's indicated by the solid or, excuse me, the dashed  
24 line.

25                  The initial pressure observed in the



1 Schneider Well was very close to the estimated initial  
2 reservoir pressures but over a period of some two years,  
3 from mid-1979 through mid-1981, the pressure declined to  
4 approximately 1485 psi.

5 Now this particular well was located  
6 2180 away from the Cahn No. 1, which would be the 80-acre  
7 drainage radius, and during this period of time, once again  
8 the Cahn No. 1 was the only well producing from Cedar Hill.

9 Beginning in mid-1981 we brought some  
10 additional wells on line. Those are indicated on Exhibit  
11 Number Three. The wells that were brought on line are the  
12 Schneider B-1S and the State BW No. 1. Those are also  
13 indicated on Amoco's Exhibit Number One.

14 The Schneider B-1S is located some 327  
15 feet from the Schneider B No. 1, which is the pressure  
16 observation well, and if you look at the pressure response  
17 of the Schneider Well during that period of time you see a  
18 very rapid decline in measured pressure. I believe that  
19 indicates the response of that well to the Schneider B-1S  
20 coming on production.

21 The third pressure observation well was  
22 the Leeper, which is, as I indicated earlier, located in  
23 the northwest quarter of Section 34.

24 The first measured pressure data is in  
25 1983. At that point in time we had three wells on produc-

1 tion, those being the Cahn No. 1, the Schneider B-1S, and  
2 the State BW No. 1. The closest well to the Leeper Well  
3 was in fact the Cahn No. 1, some 5100 feet away. The  
4 initial pressure indicated in the Leeper Well was 15 -- ap-  
5 proximately 1525 psi, which was a relatively small differ-  
6 ence from the initial reservoir pressure as determined in  
7 the Cahn No. 1.

8 It was that data point that indicated to  
9 us that 320-acre spacing appeared to be appropriate for the  
10 Cedar Hill Pool.

11 Q Let's try to sum up what you've set  
12 forth on those exhibits.

13 What are your conclusions about pressure  
14 response on a 40-acre offset here.

15 A The well that we equate to a 40-to-80  
16 acre offset shows very rapid pressure response to offset  
17 productions.

18 Q What about on an 80-acre offset?

19 A It would be basically the same well and  
20 it would show -- and it did show a fairly rapid pressure  
21 response.

22 Q How about on 320 acres?

23 A 320 acres we did see a somewhat less  
24 pressure response although we did define that there was a  
25 significant pressure response in that 320-acre well.

1           Q           And then finally, from the Cahn to the  
2 Leeper Well is just about 5131. What about that?

3           A           Basically insignificant pressure differ-  
4 ence between the two points.

5           Q           All right. When you -- when you receiv-  
6 ed this data, what actions did Amoco take then with respect  
7 to the Cedar Hill Area?

8           A           Amoco filed an application with the New  
9 Mexico Oil Conservation Division requesting a hearing to  
10 adopt 320-acre spacing for the Basal Coal Seam in the Cedar  
11 Hill Pool.

12          Q           What then did the Division do?

13          A           The Division issued an order adopting  
14 320-acre spacing. That was adopted as a temporary order.  
15 It was subsequently heard again, I believe, in March of  
16 1986 and was adopted as a permanent order. Both orders  
17 reflect the 320-acre spacing.

18          Q           Were Exhibits One through Three prepared  
19 by you or under your supervision and control?

20          A           Yes, they were.

21                       MR. LUND: I would offer  
22 Exhibits One through -- Amoco Exhibits One through Three  
23 in evidence.

24                       MR. CATANACH: Exhibits One  
25 through Three will be admitted into evidence.

1                   Q           Just a couple final questions, Mr. Wood.  
2                               Number one, do you think that the Cedar  
3 Hill information can be properly applied for purposes of  
4 this hearing in a little broader fashion with respect to  
5 spacing?

6                   A           I think it must be applied in a broader  
7 fashion. I've tried to indicate the unique producing  
8 characteristics of coal wells preclude the application of  
9 traditional engineering calculations to determine spacing.

10                               One of the concerns that must be recog-  
11 nized is the potential for drilling what can be proved to  
12 be unnecessary wells, which would be waste.

13                               I think the adoption of a 320-acre  
14 spacing order based upon the only technical data that I'm  
15 familiar with is appropriate. I think that if one looks  
16 through the recommendations made by the Methane Committee,  
17 there is ample flexibility given, not only to the operators  
18 but also to the State to hear on an individual merit basis  
19 future requests from either 160-acre spacing or even  
20 something greater than 320.

21                   Q           And do you have an opinion about whether  
22 it would be more prudent to start on a 320-acre basis as  
23 opposed to a smaller spacing basis?

24                   A           Yes, I do. It's my opinion that it's  
25 always better to start wide because you can never undrill a

1 well and if you start wide and you're proven to be wrong,  
2 you would still have the option to go back in and allow  
3 additional wells to be drilled within the reservoir.

4 Q Do you want to talk about the increased  
5 density situation as part of this testimony or would that  
6 be later?

7 A That would be fine.

8 Q Why don't we talk about Rule Number  
9 4 that they proposed?

10 A Rule Number 4 in my opinion reflects  
11 the concern that the Spacing Subcommittee had with the  
12 limited data that was available to justify trends when  
13 you're spacing. I believe that the parties recognize that  
14 there may very well be areas within the Basin that would  
15 justify 160-acre drilling.

16 What we came up with is an administra-  
17 tive procedure by which the New Mexico Oil Conservation  
18 Division, and also the Colorado Oil and Gas Conservation  
19 Commission, could allow an operator to drill that addition-  
20 al well.

21 The operator of the well was obligated  
22 to provide notice to the offset owners and those offset  
23 owners had a 20 working day period in order to enter an  
24 objection.

25 We thought that this complimented the

1 320-acre spacing recommendation and we believed it gave  
2 ample latitude for an operator to address specific needs  
3 within specific portions of the Basin and gave the offset  
4 operators who could have been affected by that act ample  
5 opportunity to protect their interest.

6 Q And you think Rule 4 as composed is  
7 fair in large part because of the notice requirements?

8 A Yes, I do.

9 Q Let's just summarize. Is the bottom  
10 line there your conclusion that the best data available  
11 indicates that 320 is an appropriate spacing pattern in the  
12 (unclear)?

13 A Yes, sir, that's correct.

14 Q Do you have anything further?

15 A No, sir.

16 MR. LUND: I have nothing  
17 further and would tender the witness for cross examination.

18 MR. CATANACH: Any questions  
19 of this witness?

20  
21 CROSS EXAMINATION

22 BY MR. CATANACH:

23 Q Mr. Wood, are there any other wells  
24 outside the Basal Coal Area that are producing from the  
25 coal formations?

1           A           One of the first actions that the  
2 Methane Committee took was an attempt to identify where the  
3 producing coal wells were. Amoco certainly supplied the  
4 requested information to the Committee. I think it might  
5 be more appropriate to address that particular question to  
6 one of our Co-Chairs and they might have the map that  
7 actually showed that.

8                   It's my understanding that there is  
9 some other established coal production and certainly Amoco  
10 operates some coal wells in the Colorado portion of the  
11 Basin.

12           Q           Okay, but you're not aware of any other  
13 test data that exists at this time?

14           A           Not -- no, sir, I'm not.

15           Q           You talked about Rule 4 there, would an  
16 operator have to demonstrate the need for a second well or  
17 not?

18           A           The operator really has two options.

19                   One, he could request the administra-  
20 tive approval route if in fact the offset operators did not  
21 have an objection to the request; and he also has the  
22 option to pursue notice -- or pursue relief through notice  
23 and hearing, and at that time I think we'd be obligated to  
24 demonstrate to the satisfaction of this agency that they  
25 were entitled to relief that they were seeking.

1 MR. CATANACH: Any other  
2 questions?

3 If not, this witness may be  
4 excused.

5 MR. KELLAHIN: Mr. Examiner,  
6 we'd like to proceed with the testimony of Alan Alexander.  
7 He's a landman with Meridian Oil Company, Inc..

8  
9 ALAN E. ALEXANDER,  
10 being called as a witness and being duly sworn upon his  
11 oath, testified as follows, to-wit:

12  
13 DIRECT EXAMINATION

14 BY MR. KELLAHIN:

15 Q Mr. Alexander, for the record would you  
16 please state your name and occupation.

17 A My name is Alan Alexander. I'm cur-  
18 rently employed as the Area Land Manager for Meridian Oil  
19 here in the Farmington Office.

20 Q Have you previously testified before  
21 the Oil Conservation Division of New Mexico as a petroleum  
22 landman?

23 A No, I have not.

24 Q Would you take a moment and describe  
25 what has been your educational and employment experience as



1 a petroleum landman?

2 A I received a Bachelor of Business  
3 Administration degree from West Texas State University in  
4 1970.

5 I received a Master's of Business  
6 Administration from the same institution in 1971.

7 I started work for El Paso Natural Gas  
8 Company in their Land Department in 1972. I was in El  
9 Paso, Texas, from 1972 through 1974.

10 I was transferred to the Field Office  
11 in Amarillo, Texas, for El Paso; worked the Anadarko Basin  
12 from 1974 through 1984.

13 I was then transferred under Meridian  
14 Oil, Inc. to the Farmington Office in 1984 up to the  
15 present time and I have -- in the present capacity of Area  
16 Land Manager.

17 Q As Area Land Manager for Meridian Oil,  
18 Inc., did you participate in any of the committees that  
19 were involved in the study of the Fruitland Coal Methane?

20 A Yes, I did. I was the Chairman of the  
21 Spacing Committee and participated in the Committee in that  
22 capacity.

23 A In that capacity do you have recommen-  
24 dations and opinions to express with regards to the spacing  
25 matters that were addressed by that Committee?

1                   A           Yes, I do.

2                               MR. KELLAHIN: At this time,  
3 Mr. Examiner, we tender Mr. Alexander as an expert petro-  
4 leum landman.

5                               MR. CATANACH: He is so  
6 qualified.

7                   Q           Mr. Alexander, would you identify for  
8 us those particular issues that the subcommittee on spacing  
9 dealt with that you would like to report to the Examiner?

10                   A           Yes, I would.

11                               The Spacing Committee was charged with  
12 the responsibility of developing a spacing pattern for this  
13 new resource, the Fruitland Coalbed Methane Pool.

14                               We considered the area to be spaced,  
15 the footage requirements and setback requirements of that  
16 spaced area. We also considered unorthodox well locations.  
17 We considered increased density wells that Mr. Wood has  
18 spoken to. We have also considered the application of a  
19 horizontal well for this unique pool.

20                   Q           Let's start with the well spacing in  
21 terms of the acreage to be dedicated to a given well. The  
22 recommendation of the Subcommittee was 320 acres?

23                   A           That's correct.

24                   Q           Was -- how was the ballot and vote  
25 taken on that particular item?

1           A           The vote was initially taken, of  
2 course, by the Subcommittee. It was a majority consensus  
3 that we do -- that we did recommend to the full committee  
4 the 320-acres with the increased density provisions be  
5 adopted and be recommended to the full committee.

6                   The full committee then voted upon the  
7 very same recommendation and it again was approved by a  
8 majority of the Committee votes.

9           Q           Do you recall, Mr. Alexander, the  
10 particular vote count by the Committee as a whole on the  
11 spacing unit?

12           A           I believe I have some information here  
13 that would indicate that.

14                   The initial vote in the -- once the  
15 Subcommittee recommended to the full Committee, that was  
16 the first time that we tabulated the actual votes, the vote  
17 at that time, and the record was left open by the  
18 Co-Chairmen for some people that were not present or that  
19 needed additional time to consider the votes, it looks like  
20 that we had at the initial voting stage 12 affirmative  
21 votes adopting the Committee's recommendation, 1 no vote,  
22 and 1 abstaining vote.

23                   Mr. Busch took some votes later on,  
24 tabulated those votes. I do not have my copy of that  
25 voting available, however, I believe that there was one

1 additional no vote and one additional abstaining vote.

2 Q Approximately what length of time or  
3 period of time was involved by the Subcommittee in dis-  
4 cussing and addressing the spacing issue?

5 A I believe that the Subcommittee per-  
6 formed in January.

7 Q Of this year?

8 A Of 1988.

9 Q And when were the final votes taken on  
10 that topic?

11 A I believe the final votes were taken  
12 approximately on the 27th of April, 1988, and the remaining  
13 votes to be called in to Ernie were shortly thereafter.

14 Q Let's go now, sir, to the question of  
15 unorthodox well locations. It's in Mr. Busch's exhibit  
16 package where he sets forth the proposed rules. It's under  
17 Rule 3(b).

18 What was the Committee's action and re-  
19 commendation with regards to unorthodox well locations?

20 A The Subcommittee recommended and the  
21 full Committee approved again by a majority vote that the  
22 Director should have the authority to grant an exception to  
23 well locations stated in Rule 3(a) any time without notice  
24 and approve those administratively any time that the  
25 location was based upon topographic conditions; for the

1 proposed well or if the operator desired to plug back an  
2 existing well, that approval could also be made adminis-  
3 tratively if that well was drilled at an orthodox or if  
4 that well was drilled at an unorthodox -- previously ap-  
5 proved unorthodox location.

6 Q Was there a consensus among the  
7 committee members voting -- in principle on this topic was  
8 there any dissenting votes among the committee members on  
9 questions of unorthodox well location?

10 A I do not believe that there was any  
11 dissenting votes on unorthodox well location.

12 Q Let's turn now to the increased well  
13 density. That's set forth in Rule 4. Was that part of the  
14 Spacing Committee action?

15 A Yes, it was.

16 Q And what action did you recommend?

17 A We recommended that the Commission have  
18 the right to approve administratively, again, an increased  
19 density well on the 320-acre drilling block upon proper  
20 notice by the operator that was proposing the well, and if  
21 there were no objections received, it could be approved ad-  
22 ministratively. If there were objections received, the  
23 hearing could be -- it could be set for hearing, or that  
24 the Commission would have the right to set the cause for  
25 hearing if it deemed that that was proper to do that.

1           Q           We're characterized this rule as an  
2 infill well provision?

3           A           Yes.

4           Q           In taking the committee action, did you  
5 ultimately after discussion have any dissenting votes as of  
6 now?

7           A           Not during the phase of the Subcommit-  
8 tee, we did not have a dissenting vote. There was a great  
9 deal of discussion about the rule, the procedures to be  
10 employed. There were a great many variations discussed,  
11 possibilities discussed. There were, of course, some dis-  
12 senting votes on spacing in general at the time that they  
13 were voted before the full Commission.

14          Q           Turn now, sir, to the question of the  
15 horizontally drilled wells under Rule 5. Summarize for us  
16 what the Committee action was with regards to this proposed  
17 rule.

18          A           The Committee discussed the possibility  
19 and the probability that an operator would in fact like to  
20 drill a horizontal well in the Fruitland Coalbed Methane  
21 Pool. This is a fairly new technology. We have seen it  
22 employed in the coal and we expect that it probably will be  
23 employed in the future.

24                   The Committee did not feel that the  
25 current Rule 111, which basically addresses deviated holes,

1 was sufficient and did not give the flexibility to address  
2 the horizontal well in this particular reservoir.

3 Q Summarize specifically for us, Mr.  
4 Alexander, why the Committee felt that the current Rule 111  
5 for directionally drilled wells was not inclusive enough to  
6 include what the operators proposed for these horizontally  
7 drilled wells in the coal seams.

8 A A deviated well generally means a well  
9 that is deviated from a surface location in order to en-  
10 counter at the bottom hole the formation that they are  
11 exploring for.

12 Of course, a horizontal well, of  
13 course, is deviated, but the intent there is to have the  
14 lateral borehole transverse the formation or be drilled  
15 through the formation and not just cut it or just inter-  
16 sect it at the bottom of the hole. There is enough differ-  
17 ence there that we felt that it would be prudent to recom-  
18 mend that the Commission adopt specific rules for horizon-  
19 tal wells that would allow them to address this specific  
20 problem.

21 Q And was there a consensus reached by  
22 the Subcommittee on this topic?

23 A Yes, there was.

24 Q And how did -- what action did the full  
25 committee take on this issue?

1           A           The full committee also voted by the  
2 majority to adopt the position and to have incorporated in  
3 the rule making -- by the rule making body into these final  
4 rules that are being proposed.

5           Q           Did the Subcommittee discuss and debate  
6 the issue of well locations internally within the spacing  
7 unit (not understood)?

8           A           Would you restate that, please?

9           Q           Yes, sir. When you look at a 320-acre  
10 spacing pattern, did you come to any consensus with regards  
11 to where a well could be drilled within the drilling window  
12 for that 320-acre pattern?

13          A           Yes, we did.

14          Q           And have you set forth that as a  
15 diagram in the last page of the Meridian exhibit book?

16          A           Yes, I did. I have a visual repre-  
17 sentation of that, also, that I could --

18          Q           Well, that might be helpful. Let's get  
19 it and put it on the overhead and have you show us what  
20 you've got there.

21          A           As I stated, this is a visual repre-  
22 sentation of the --

23          Q           Excuse me, Alan, turn this way so that  
24 you're talking this way.

25          A           It is a visual representation of the



1 spacing rule that is being recommended to the Commission.

2 This particular view graph is set up to  
3 describe what would happen if a person drilled a well on a  
4 320-acre drill block with standup drill blocks.

5 Q The total display shows us a single  
6 section.

7 A Yes, it does.

8 Q And what is the orientation of the 320  
9 spacing unit? Is it a standup or a laydown?

10 A Yes, they would be standup 320-acre  
11 units.

12 Q Let's look at the west half standup 320  
13 and and show us what the drilling window is that is pro-  
14 posed.

15 A The drilling window as described by the  
16 proposed rule would include all the area within this black  
17 outline here.

18 Q Within that drilling window is there an  
19 internal setback from the quarter quarter lines proposed?

20 A There is no interval from the quarter  
21 quarter. The setback distance of 790 feet from a quarter  
22 -- from the outer boundary of a quarter section. The only  
23 internal setback requirement that we have proposed to the  
24 Commission is 130 feet, and that would be the internal  
25 quarter section setback.

1           Q           Within that drilling window why have  
2 you proposed a no setback requirements from the internal  
3 quarter quarter lines?

4           A           Since we do not have all the informa-  
5 tion that we need at this point in time to fully address  
6 this unique reservoir, we did want the Commission to give  
7 us the flexibility to move within this drilling window.  
8 There are many concerns, such as topographic conditions and  
9 conditions well previously drilled in the areas, pipelines,  
10 and other facilities that are already there, since we are  
11 dealing basically with areas that are currently held by  
12 production from existing wells.

13                   This approach was also developed to  
14 give consideration to the horizontally drilled wells. The  
15 horizontally drilled well, as we have proposed it, could be  
16 located anywhere within -- in this instance, and keep in  
17 mind we're talking about a 320-acre drilling unit, but the  
18 first well as the rule reads, would, of course, be located  
19 in a particular quarter section, and for a horizontal well  
20 that's basically true, also. Now a horizontal well, the  
21 surface location of that well could be located anywhere  
22 within the quarter section. We do not have the requirement  
23 as proposed to the Commission that would establish that as  
24 being inside the drilling window; however, the borehole  
25 cannot cut the Fruitland Coal formation; cannot enter it

1 nor exit it outside of the drilling window that we've de-  
2 scribed here.

3 And this also again gives us the  
4 flexibility to try to develop this particular resource.

5 Q Do the proposed rules require a parti-  
6 cular orientation in a given section as to whether it's a  
7 standup or a laydown 320?

8 A No, they do not. The Committee felt --  
9 it was discussed whether to possibly dedicate a location  
10 such as we had in the Cedar Hill Pool or just to leave that  
11 dedication open and to leave the laydown and standup aspect  
12 of the decision open to the operator also.

13 When the first well is drilled in there  
14 the operator would determine whether it would be a standup  
15 or a laydown 320-acre configuration. He could also deter-  
16 mine which quarter section that he would want to drill in.

17 Again this was done for reasons of  
18 flexibility, topographic, plugback of existing wells that  
19 may not conform to dedicated spacing or to the drilling  
20 windows as they are proposed in other gas pools.

21 Q Is there a requirement in the proposed  
22 rule with regards to the location of the infill well in  
23 relation to the original wellbore?

24 A Yes. We have recommended to the Com-  
25 mission that the infill well would of course be located in

1 a quarter section that does not already have a well drilled  
2 to this formation or to this pool.

3 Q And it would be confined to a similar  
4 drilling window as you see displayed in the northwest  
5 quarter of that section?

6 A That's correct, for an increased den-  
7 sity well.

8 Q Does that conclude the recommendations  
9 and the issues addressed by your subcommittee, Mr. Alex-  
10 ander?

11 A I believe it does.

12 MR. KELLAHIN: Mr. Examiner,  
13 we've marked this display that Mr. Alexander has just re-  
14 ferred to as Meridian Exhibit Number Nine. We would at  
15 this time move its introduction.

16 MR. CATANACH; Exhibit Number  
17 Nine will be admitted into evidence.

18 MR. KELLAHIN: Pass the  
19 witness.

20 MR. CATANACH: Any questions  
21 of this witness?

22 Mr. Lund?

23

24

#### CROSS EXAMINATION

25

BY MR. LUND:

1           Q           Just one question, Mr. Alexander. I  
2 believe you indicated that no orientation was recommended  
3 by the Committee, is that correct?

4           A           That's correct.

5           Q           Although your exhibit indicates a north-  
6 west/southeast orientation.

7           A           That is purely for purposes of this  
8 exhibit and I did not attempt to show any particular trend  
9 or 320-acre spacing unit. It just so happened that I chose  
10 that spacing pattern for this exhibit.

11          Q           In fact Amoco is of the opinion that it  
12 ought to be northeast/southwest orientation like the Cedar  
13 Hill, is that right?

14          A           I understand that to be correct.

15          Q           Thank you.

16                       MR. CATANACH:   Any other  
17 questions?

18                       MR. STOVALL:   Mr. Examiner, I  
19 have a couple of questions with respect to Rule 3(B), if we  
20 could take a look at that for a moment.

21

22                               CROSS EXAMINATION

23 BY MR. STOVALL:

24          Q           In the first sentence, second line of  
25 Rule 3(B), you're proposing to have -- to give the Director

1 authority to grant an exception to the well location  
2 requirements without notice and hearing.

3                   Would it not be more accurate to say  
4 what you're proposing is without hearing but that notice  
5 would be required to the offset operators or owners of  
6 interest, in the -- particularly in the circumstances  
7 described in the third paragraph of that rule, where you're  
8 talking about notice if it's closer to the outer boundary  
9 of the drilling unit?

10               A           Yes. That's correct. That would pro-  
11 vide notice to the offset operator under that circumstance.

12               Q           Would you object or do you think that  
13 the Committee would object, I realize you're not taking a  
14 formal vote, but just speaking for yourself, would you ob-  
15 ject to deleting the words -- the word "notice" out of that  
16 second line, just "without hearing", providing for notice  
17 to the offset operators?

18               A           Well, we do have a differentiation here,  
19 I believe, that we -- we were specific that if the unor -  
20 thodox location was closer to the outer boundary. Now we  
21 do have some -- we do have an internal boundary that is  
22 the 130 foot from the quarter section line. I think it  
23 probably would be changing the rules as proposed somewhat.  
24 It was contemplated that probably -- or that we would not  
25 request notice to the offset operators unless we were en-

1 croaching upon the outer boundaries. There is a little bit  
2 of a difference there.

3 Q So in other words, what you're saying is  
4 if within the proration unit that well was less than 130  
5 feet from the quarter section line, you would think that  
6 notice would not be -- be necessary?

7 A That's correct. We are internal to the  
8 drilling unit and we do not see a breach of correlative  
9 rights in that instance, and that was the reason the rule  
10 was written as it was written.

11 Q One other question with respect to that  
12 rule. In the third paragraph, moving over Mr Busch's  
13 exhibit to page three, second line, you're providing for  
14 notice to the operator of any spacing unit, and I assume  
15 that you use the term "spacing unit" you're talking about a  
16 developed spacing unit, is that correct?

17 A Where are we located exactly here?

18 Q Page three, first line, let's look at  
19 the first line of page three.

20 A All right.

21 Q It's talking about notice if a -- when  
22 the proposed unorthodox location is closer to the outer  
23 boundary of the spacing unit, you're talking about notice  
24 to the operator of a spacing unit, and then you go on to  
25 say the "owner of an undrilled lease".

1           A           Yes.

2           Q           A spacing unit, does that mean a spacing  
3 unit on which there is an existing well, a producing  
4 spacing unit?

5           A           To this pool, that's correct, it would  
6 be a developed spacing unit.

7           Q           And going on in that sentence you go to  
8 "or owner of an undrilled lease". Would you object to  
9 changing that language to the -- to read "owner of any  
10 undrilled acreage", recognizing that there may be unleased,  
11 undrilled acreage there?

12                       Do you understand what I'm saying?

13          A           Yes, I do. I do understand what you're  
14 saying, and I do not believe that I would object to include  
15 the unleased mineral owner in that language.

16          Q           I think -- it's my opinion that the  
17 language "owner of an undrilled acreage" could refer to  
18 either a lessor -- a mineral owner or a lessee.

19          A           That's correct.

20                       MR. STOVALL: I have no fur-  
21 ther questions.

22

23                       CROSS EXAMINATION

24 BY MR. CATANACH:

25          Q           Mr. Alexander, did the Committee ever



1 consider a minimum distance between two producing wells in  
2 the same spacing unit?

3 A Yes, we did, and we addressed such is-  
4 sues as a clustering of wells that an operator may want to  
5 adopt at a later date upon the proper hearing and notice,  
6 and so we felt it probably wasn't appropriate for us at  
7 this time to try and just strictly define distances between  
8 wells, because there may very well be some need to drill  
9 additional wells or drill additional wells that may not be  
10 producing gas, that may be dewatering the formation  
11 involved here.

12 Since we are dealing with a unique re-  
13 servoir that does in most instances require a dewatering  
14 process. So we did recognize that problem; however, we  
15 decided that we did not want to address a specific footage  
16 requirement between wells, to leave open the flexibility of  
17 an operator to handle these situations.

18 Q Okay, so it's possible that we could  
19 have two producing wells 260 feet away from each other, the  
20 way the rules are written.

21 A Not --

22 Q The proposed rules.

23 A Not under the proposed rules because  
24 that would be in effect an increased density well if it was  
25 used for production and the increased density well, the

1     only time you could have that, you're talking about the  
2     distance between the two quarter sections on 130-foot  
3     setback requirements, that would apply and that would be  
4     the only instance that I know of where we could have that  
5     situation because we have provided that each well should be  
6     located in a separate quarter section.

7             Q             Right, but your -- your second well  
8     could be located 260 feet away from your first well.

9             A             In the other quarter section, that's  
10    correct.

11            Q            Right. But you -- the Committee felt  
12    that they needed that flexibility to have that in there?

13            A            Yes, that's correct. We saw the need,  
14    possibly, that we would want the increased -- or the more  
15    dense drilling pattern in the case of dewatering, first,  
16    and that that would give some flexibility in that regard  
17    without having to go to a hearing before the Commission to  
18    accomplish that.

19                           MR. CATANACH: Any other  
20    questions of this witness?

21                           If not, he may be excused.

22                           Can we get a count of who else  
23    is going to put on individual testimony or evidence?

24                           MR. ROBERTS: Mr. Examiner,  
25    the Dugan Group will put on three witnesses and that direct

1 testimony will last about forty-five minutes.

2 MR. CATANACH: For all three.

3 MR. ROBERTS: Yes.

4 MR. STOVALL: Mr. Examiner,  
5 the Aztec Office of the OCD wishes to put on some separate  
6 testimony as the Aztec Office of the OCD. Mr. Chavez will  
7 testify for you. I don't imagine that would take fifteen,  
8 twenty minutes.

9 MR. LUND: Amoco has (unclear)  
10 just a few minutes, one witness.

11 MR. KELLAHIN: I'll have a  
12 witness this afternoon.

13 MR. STOVALL: For the record,  
14 Sally, I'd like to point out that this does end the Commit-  
15 tee presentation and all further testimony will be by indi-  
16 vidual parties to this hearing, companies or individuals  
17 wishing to present evidence.

18 There will be no further, to  
19 my knowledge, no further Committee evidence presented in  
20 support of the application.

21 MR. CATANACH: Okay, is there  
22 going to be anybody else presenting any witnesses?

23 I'm going to go ahead and let  
24 Bob put on Mr. Frank Chavez at this time.

25 Do you want to go on at this

1 time?

2 MR. STOVALL: For the record  
3 let me indicate at this time that this morning when I  
4 examined Mr. Busch I did so as OCD attorney, but Mr. Busch  
5 was not appearing truly as an OCD witness but rather a  
6 committee chairman.

7 While I may not be exactly  
8 switching hats right now, I'm at least turning my hat  
9 around now and acting as OCD attorney examining Mr. Frank  
10 Chavez as an OCD witness. He is not representing a com-  
11 mittee. He is representing the Aztec Office of the Oil  
12 Conservation Division.

13  
14 FRANK CHAVEZ,  
15 being called as a witness and being duly sworn upon his  
16 oath, testified as follows, to-wit:

17  
18 DIRECT EXAMINATION

19 BY MR. STOVALL:

20 Q Mr. Chavez, would you please state your  
21 name and place of employment?

22 A My name is Frank Chavez. I'm District  
23 Supervisor of the Aztec Office of the Oil Conservation  
24 Division.

25 Q Have you previously testified before the

1 Division and had your credentials accepted?

2 A Yes, I have.

3 Q Have you reviewed the application in  
4 this case and the proposed order?

5 A Yes, I have.

6 Q Are you familiar with the background and  
7 the work of the Methane Committee in preparing the appli-  
8 cation and the proposed order?

9 A Yes, I am.

10 Q In general, do you support the concept  
11 and the provisions of the order?

12 A Yes, I do.

13 Q Do you have any specific provisions of  
14 the order to which you would like to address some comments  
15 or make alternative suggestions?

16 A Yes, I would in the sense that in my  
17 duty to enforce the regulations of the Oil Conservation  
18 Division sometimes the wording or the application of the  
19 rules can be awkward.

20 First of all, the horizontal limits as  
21 described in the application are very specific, and I'll be  
22 addressing the application under Part B of Mr. Busch's  
23 Exhibit One.

24 The horizontal limits are large enough  
25 to take in several townships that include some areas where

1 there is no Fruitland present, or Fruitland Coal present.

2 For administrative purposes it could be  
3 easier, for the purposes of warning and administering this  
4 -- this rule, to define the horizontal limits of the pro-  
5 posed pool as the Fruitland Coal Producing Interval in the  
6 San Juan Basin in part of San Juan, Rio Arriba, Sandoval  
7 and McKinley Counties.

8 We already have a precedent like this  
9 set in defining the horizontal limits to the Basin Dakota  
10 Pool, which includes the Dakota producing interval of the  
11 -- within San Juan and Rio Arriba Counties.

12 Some of the specific rules I'd like to  
13 talk about, first are Rule 3(A).

14 Rule 3(A) does not specify any particu-  
15 lar quarter section within the 320-acre drill tract in  
16 which the well should be drilled. I think there will pro-  
17 bably be later testimony indicating that there is a prefer-  
18 ence for this and I would recommend that the Examiner look  
19 closely at that because of the possibility of clustering  
20 four wells at a section corner that could occur should  
21 there be no preferential quarter section for drilling the  
22 first well in a drill tract.

23 Q Excuse me, Mr. Chavez, you're talking  
24 about quarter section? Perhaps we should look back up the  
25 last Meridian exhibit. Would that be --

1           A           Well, not necessarily. I'll just  
2 specify that we should prefer the diagonal quarter  
3 sections, either the northeast and southwest or southwest  
4 and -- I'm sorry, either the northeast and southwest or the  
5 northwest and southeast quarter as preferential for the  
6 first well in the half section.

7                       That would, I think, lead to more order-  
8 ly development of the pool and of the sections that will be  
9 drilled.

10           Q           And it wouldn't matter whether we're  
11 talking a laydown or a standup orientation as far as you're  
12 concerned.

13           A           No, it would not.

14                       The second matter I'd like to speak  
15 about is Rule 4, which allows for increased well density.

16                       The application as proposed by the  
17 Committee does not require that an operator make any kind  
18 of engineering data presentation to show that a second well  
19 is necessary to effectively and efficiently drain the drill  
20 tract or that there are any reserves that would otherwise  
21 be lost. So there is no conservation proof required of the  
22 operator wanting a second well.

23                       Also, at this time the Colorado Commis-  
24 sion has not adopted a provision for increased well den-  
25 sity, although they will, my understanding is they will

1 reopen the case to hear that one provision.

2 And along the state line we'd want to be  
3 sure that the spacing was at least complimentary. I think  
4 that's one of the reasons that we originally set up this  
5 committee, so that we would have uniformity throughout the  
6 development of this resource.

7 The next one I'd like to speak on is  
8 Rule 6(A).

9 There are some problems with a 24-hour  
10 shut-in period in that we don't know that the information  
11 is necessarily that usable or actually that necessary.

12 We do need some testing provisions and  
13 since we're at the very, I would say the beginning of the  
14 development of this resource, it would be important to the  
15 State and to the operators, to the industry in general, to  
16 develop the data base of pressures and testing that would  
17 help us evaluate this resource as we develop it through the  
18 next few years.

19 Under Rule 6(B) the existing rules and  
20 the way they're applied in the field allow for the venting  
21 of such gas as is necessary to clean up a well after frac-  
22 ture or if it was necessary to blow down a well should it  
23 become waterlogged.

24 The operators have expressed a concern  
25 about needing to qualify wells drilled on Federal lands as



1 paying wells under a paying well determination procedure  
2 set up by the Bureau of Land Management.

3 This rule as written applied to all  
4 wells, including wells on State and fee lands, which do not  
5 necessarily require this type of testing.

6 The Committee should stay in session and  
7 -- or should at least not disband and continue to study  
8 this problem and work with the Bureau of Land Management to  
9 develop criteria which could help make a determination  
10 necessary to satisfy Federal laws and yet prevent the  
11 venting of unnecessary gas.

12 I recommend that if there is any gas to  
13 be vented, it should be done only after obtaining written  
14 permission from the District Office and after a showing  
15 that such venting is necessary to maintain the producibil-  
16 ity of the well or obtain necessary test information.

17 Basically this is our current policy and  
18 therefore, no special rules would be necessary; the exist-  
19 ing rules and policies would cover it.

20 A problem that's developed in developing  
21 the coal resource is that due to the nature of the shales  
22 that separate the coals and the sandstone, it is not uncom-  
23 mon for a hydraulic fracture initiated in the Fruitland  
24 Sand or the Pictured Cliff Sandstone, to break through the  
25 shale into a coal. When a well which has been previously

1 identified as a sand well is found to be producing from the  
2 coal, the operator should be allowed sufficient time to  
3 come into compliance with these rules.

4           The last thing I want to talk about is  
5 the name of this pool. The Committee report or proposed  
6 rules include a name or designation as San Juan Basin  
7 Fruitland Coalbed Methane Gas Pool.

8           Administratively this is rather awkward  
9 to handle, although it could be abbreviated. I would  
10 recommend that we consider a shorter name and just one  
11 recommendation could be Basin Fruitland Coal Gas Pool.  
12 This designates the Fruitland formation, that the gas is  
13 produced from the coal, and it is in accordance with the  
14 way we've named the Basin Dakota Pool.

15           Also, I don't think at this time it  
16 would be appropriate to say "methane" to designate or  
17 separate the methane from the gases produced from these  
18 wells. As of now we're producing 5 to 10 percent carbon  
19 dioxide from these wells and there's a possibility that in  
20 the future that may be commercial given the nature that Mr.  
21 Busch testified that -- or the information he testified to  
22 that an estimated 56-trillion cubic feet -- I'm sorry --  
23 yes, 56-trillion cubic feet of gas is available in the  
24 pool, if you consider 5 to 10 percent of that is carbon  
25 dioxide, we have a very large resource in there that may be

1 available in the future.

2 And that is all I have to comment on the  
3 proposed rules.

4 Q Let me take you back a moment as to Rule  
5 6(A), the testing rule.

6 Are you stating -- I think Mr. Busch  
7 testified that the 24-hour minimum shut-in period was much  
8 shorter than is normally required by OCD prior to well  
9 testing, is that correct?

10 A That's correct.

11 Q Are you suggesting that that 24-hour  
12 period may be too short?

13 A No. What I'm suggesting is that the  
14 information that's gained from this may not actually be  
15 usable in some cases. The 24-hour shut-in period, as I  
16 understand it from the committee -- other committee  
17 reports, is a minimum amount of time at which many wells  
18 can reach a point of build-up that they've successfully  
19 accomplished a build-up test; also, there is a concern  
20 about the possibility of formation damage to a coal well  
21 after extended shut-in.

22 All I was commenting on was that the  
23 information may not be that valuable or that usable, and  
24 that the Committee, I think, should still address testing  
25 for the purposes of future development and study of the

1 pool.

2 Q Do you have any specific recommendations  
3 with respect to testing which could be placed in this rule  
4 if the rule were to be adopted pending further study?

5 A Not at this time.

6 Q Can we go back to Rule 4 for just a  
7 moment. You've indicated you have some concern there  
8 because there's no requirement that there be any engineer-  
9 ing evidence to support the need for a greater well density  
10 to drain a particular spacing unit.

11 A That's Correct.

12 Q I believe Mr. Alexander testified that  
13 one of the concerns they have is that you may have dewater-  
14 ing wells within the spacing unit which, while not able to  
15 be productive of gas, if I understood him correctly, it  
16 would assist in the production of gas by taking the water  
17 out and allowing the gas to be produced from the other  
18 wells.

19 A If that is necessary it should be listed  
20 as one of the requirements for approval to drill a second  
21 well within a tract, and the way the rule is stated, a per-  
22 mit could be filed and there the operator does not neces-  
23 sarily have to state that he's drilling a dewatering well.

24 Q Okay, thank you.

25 MR. STOVALL: I have no fur-

1 ther questions.

2 MR. CATANACH: Any other  
3 questions of this witness?

4 Mr. Kellahin?

5  
6 CROSS EXAMINATION

7 BY MR. KELLAHIN:

8 Q Let me direct your attention, Mr.  
9 Chavez, to proposed Rule 3(A). The proposed rule is to  
10 create 320-acre spacing for the entire Basin Fruitland Coal  
11 Gas Pool within the outer boundary, as shown on the various  
12 exhibits.

13 Do you have a position or a recommenda-  
14 tion as to whether or not 320-acre spacing ought to ini-  
15 tially be applied to the entire Basin Fruitland Gas Coal  
16 Pool?

17 A Yes. I recommend that the Division  
18 adopt the recommendation of the Committee for 320-acre  
19 spacing throughout the pool.

20 Q What's the basis for that recommenda-  
21 tion, Mr. Chavez?

22 A The information that the Committee dis-  
23 cussed indicated that 320 acres was adequate. We have also  
24 seen other information and -- or have been informed of it  
25 by other operators, though we haven't absolutely studied

1 it nor has it been made a matter of record here, that would  
2 indicate that that would be appropriate.

3 But one of the more important reasons on  
4 a conservation standpoint, would be that the information we  
5 have is 320 and to start out with a new pool it is much  
6 easier to space on a larger spacing and allow for the pool  
7 to start to be developed, information gathered, and then we  
8 could down space. The possibility of the violation of  
9 correlative rights is greater when you start with smaller  
10 spacing and it -- that's basically my opinion on the 320  
11 spacing.

12 Q If we're dealing with 320-acre spacing  
13 within a given township of the pool and we have a certain  
14 portion of that reservoir being developed on 160 acres, how  
15 many additional wells in a township does that entail?

16 A Well, in one township that would be 72  
17 other wells.

18 Q Potentially unnecessary wells, true?

19 A Yes.

20 MR. KELLAHIN: No further  
21 questions.

22 MR. CATANACH: Any other  
23 questions of this witness?

24

25

CROSS EXAMINATION

1 BY MR. CATANACH:

2 Q Mr. Chavez, you recommended that we not  
3 adopt a -- the horizontal boundaries of the pool as  
4 proposed?

5 A No. What I recommended was that we  
6 could alternatively describe the horizontal limits as the  
7 Fruitland Coal productive interval within the four counties  
8 rather than looking at the -- each township individually,  
9 because some of the acreage included within the township  
10 specified in the application do not contain any Fruitland.

11 Q How do you know that?

12 A If you'll look at Mr. Busch's Exhibit  
13 Part A, you'll notice that the proposed boundary follows  
14 the Fruitland formation outcrop. Outside of that outcrop  
15 there is no -- neither Fruitland -- well, the Fruitland is  
16 present only at the surface, I should say there, and it  
17 would not be a reservoir quality.

18 So the outline following the formation  
19 outcrop would otherwise -- otherwise be adequate but for  
20 the purpose of administrative ease, to define it like I had  
21 recommended might be less complex and would be more defini-  
22 tive.

23 MR. CATANACH: No further  
24 questions. You may be excused.

25 MR. ROBERTS: Mr. Examiner, I

1 have some questions for Mr. Chavez.

2 MR. CATANACH: Oh, Mr.  
3 Roberts.

4  
5 CROSS EXAMINATION

6 BY MR. ROBERTS:

7 Q Mr. Chavez, you have indicated in  
8 response to a question by Mr. Kellahin that you felt a  
9 320-acre poolwide spacing was appropriate for the Fruit-  
10 land Coal -- Coalbed Pool because basically the Committee  
11 had reviewed data available to it and you'd come to that  
12 conclusion yourself.

13 Now have you been presented with any  
14 data which would indicate the 320-acre poolwide spacing  
15 might not be appropriate for the entire pool?

16 A Not -- not any drainage data.

17 Q If you were presented with that data  
18 would your opinion change based on that data?

19 A Well, of course.

20 Q That's all.

21 MR. CATANACH: We'll go ahead  
22 and break for lunch at this time and reconvene at about  
23 1:20, 1:25, something like that.

24  
25 (Thereupon the noon recess was taken.)



1 MR. CATANACH: At this time  
2 we're going to turn it over to Tommy Roberts.

3 MR. ROBERTS: Mr. Examiner, my  
4 name is Tommy Roberts and I'm representing today five  
5 independent oil and gas producers whose operations are  
6 primarily limited to the San Juan Basin.

7 Those independent producers  
8 are Dugan Production Corporation, Merrion Oil & Gas Corpor-  
9 ation, Hixon Development Company, Robert L. Bayless, and  
10 Jerome P. McHugh and Associates.

11 We will have three witnesses  
12 today.

13 The first witness will be Kurt  
14 Fagrelius and at this time I'll go ahead and have him --  
15 he's already sworn in, okay.

16  
17 KURT H. FAGRELIUS,  
18 being called as witness and being duly sworn upon his oath,  
19 testified as follows, to-wit:

20  
21 DIRECT EXAMINATION

22 BY MR. ROBERTS:

23 Q Mr. Fagrelius, for the record, please,  
24 will you state your name and residence?

25 A My name is Kurt Fagrelius. I live in

1 Farmington, New Mexico.

2 Q What is your occupation?

3 A I'm a petroleum geologist for Dugan  
4 Production.

5 Q How long have you been employed by  
6 Dugan Production?

7 A For nine years.

8 Q Have you testified before the Oil Con-  
9 servation Division on any prior occasions?

10 A Yes, I have.

11 Q In what capacity did you testify?

12 A As a geological witness.

13 Q Were you qualified as an expert in that  
14 case?

15 A Yes, I was.

16 Q Are you familiar with the application in  
17 this case today?

18 A Yes, I am.

19 Q Have you conducted a study of relevant  
20 geologic data and information for purposes of testimony  
21 here today?

22 A Yes, I have.

23 Q Would you briefly describe that, please?

24 A I have researched published reports pre-  
25 pared by others that deal with the regional geologic

1 aspects of producing coalbed methane from the Fruitland  
2 formation in the San Juan Basin.

3 MR. ROBERTS: Mr. Examiner, I  
4 would tender Mr. Fagrelus as an expert in the field of  
5 petroleum geology.

6 MR. CATANACH: He is so qual-  
7 ified.

8 Q Mr. Fagrelus, would you describe the  
9 purpose of your testimony in this case today?

10 A Dugan Production Corporation, Merrion  
11 Oil & Gas Corporation, Robert L. Bayless, Hixon Development  
12 Company and Jerome P. McHugh and Associates are each inde-  
13 pendent oil and gas producers owning substantial oil and  
14 gas leasehold interest in the San Juan Basin.

15 Each of these independent producers owns  
16 oil and gas leasehold operating rights in the Fruitland  
17 formation in various areas of the San Juan Basin, and each  
18 of them is interested in the establishment of pool rules  
19 which will facilitate the orderly and equitable development  
20 and production of coal based gas from the Fruitland forma-  
21 tion.

22 This group of independent producers  
23 believes that the creation of the San Juan Basin Fruitland  
24 Coalbed Methane Gas Pool and development of rules appli-  
25 cable to development, operation, and production in the pool

1 is timely.

2 We want to express our appre-  
3 ciation to the members of the Fruitland Coalbed Methane  
4 Committee and their significant efforts in generating pro-  
5 posed rules and regulations for the pool.

6 This group of independent pro-  
7 ducers is not here today to oppose the creation of the  
8 pool. The creation of a pool and the adoption of pool  
9 rules is timely and necessary. We have reviewed the pro-  
10 posed special rules and regulations for the pool and our  
11 reaction to those special rules and regulations is favor-  
12 able. Our major concern is the requirement for poolwide  
13 320-acre spacing and proration units. The purpose of our  
14 testimony today is to suggest for consideration and review  
15 a rule with respect to spacing that would reflect the  
16 existence of different geologic and engineering data be-  
17 tween areas within the horizontal boundaries of the pool.

18 Toward that end I will present  
19 testimony regarding applicable geologic data and  
20 information.

21 Kevin McCord, representing  
22 Robert L. Bayless, will present testimony regarding gas  
23 analysis data and information.

24 Rob Willis, representing Hixon  
25 Development Company, will present testimony regarding

1 drainage data and information.

2 Finally, Mr. McCord will  
3 identify problems which may arise if 320-acre poolwide  
4 spacing is adopted for the pool.

5 Based on this testimony, this  
6 group of independent producers will suggest a temporary  
7 spacing rule for the pool that will differ from the spacing  
8 proposal recommended by the Fruitland Coalbed Methane  
9 Committee.

10 The proposal which will be  
11 submitted by this group of independent producers will be to  
12 divide the pool into two areas. The line dividing the two  
13 areas will be established on the basis of available geo-  
14 logic and engineering data and information. Those lands  
15 generally located to the north of the dividing line would  
16 be developed on 320 acres. Those lands generally located  
17 to the south of the dividing line would continue to be  
18 developed on 160 acres for a period of three years, at  
19 which time the temporary spacing rules would be re-examined  
20 by the New Mexico Oil Conservation Division.

21 We will also propose that a  
22 buffer zone one section deep on each side of the dividing  
23 line be established in an effort to lessen the likelihood  
24 that 160-acre development south of the dividing line would  
25 encroach on 320-acre development north of the dividing

1 line.

2                               Within the area of the buffer  
3 zone an operator would have the option to develop on either  
4 320 or 160-acre spacing.

5               Q               Mr. Fagrelus, do you have a copy of the  
6 exhibits to be presented by the Dugan Group and can you get  
7 that in front of you?

8               A               Yes, I do.

9               Q               I'd like for you to refer to what's been  
10 marked as Exhibit Number One, please, and identify that  
11 exhibit and describe its contents.

12              A               Exhibit Number One is an isopach map of  
13 the interval between the Huerfanito Bentonite bed of the  
14 Lewis Shale and the top of the Pictured Cliff Sandstone  
15 showing lines of cross section A-A', B-B' and C-C', and a  
16 line of demarcation highlighted in yellow and proposed by  
17 Dugan, et al.

18                               This exhibit shows the time trans-  
19 gressive nature of the Pictured Cliff - Fruitland interval,  
20 which becomes younger and rises stratigraphically to the  
21 northeast.

22                               It also demonstrates that the Pictured  
23 Cliff seas did not regress to the northeast at a constant  
24 rate. As the rate of regression slowed or came to a stop,  
25 a thickening and stratigraphic rise in the Pictured Cliff

1 occurred and thicker Fruitland coals were deposited land-  
2 ward of the up-building Pictured Cliff shoreline.

3 Q Will you refer to what's been marked as  
4 Exhibit Number Two and please identify that exhibit and  
5 explain its significance to your position?

6 A Exhibit Number Two is a composite map  
7 showing the total thickness isopachs for Fruitland forma-  
8 tion coal and the location of the large stratigraphic rise  
9 of the Pictured Cliff Sandstone, which trends northwest to  
10 southeast across the north central San Juan Basin.

11 This exhibit shows that the thickest  
12 accumulations of coal occur in a northwest/southeast trend  
13 which is southwest of the stratigraphic rise of the Pic-  
14 tured Cliff and north of the proposed line of demarcation.

15 Q Please turn to what's been marked as  
16 Exhibit Number Three and identify that exhibit.

17 A This exhibit includes three coal rank  
18 maps contoured on fixed carbon and isoreflectance values  
19 obtained from Fruitland coal samples.

20 All three maps are indicators of coal  
21 rank and correlate well with each other. They depict an  
22 increase in coal rank from the southwest to the northeast  
23 part of the Basin. This increase in rank can be attributed  
24 to deeper burial and a closer proximity to the San Juan  
25 Mountain intrusive complex.

1                   The original demarcation line, proposed  
2 by Dugan, was along the 55 percent fixed carbon contour of  
3 Fassett's in the north central part of the map.

4                   The other two maps were published after  
5 our initial proposal; however, they correlate well with  
6 Fassett's map and provide us with additional data to sup-  
7 port the location of the demarcation line.

8                   Rice's data indicates areas C through F  
9 in the north produce a distinct coal gas.

10                  Area B produces a mixed Pictured Cliff  
11 and Fruitland Coal gas.

12                  And coalbed gas produced in Area A is  
13 distinctly different from the underlying Pictured Cliff or  
14 that of coalbeds in Area C through F.

15                  Also, Rice concludes that significant  
16 thermal methane generation for Fruitland coals begins at a  
17 reflectance of 0.7 percent or a rank of high volatile A  
18 bituminous, which occurs one to two townships north of the  
19 proposed demarcation line.

20                  Q           You've referred to a line of demarcation  
21 originally proposed by Dugan. Can you elaborate and ex-  
22 plain to whom that proposal was made or when it was origin-  
23 ally proposed?

24                  A           That line of demarcation was proposed to  
25 the rules writing committee, Coalbed Methane.



1           Q           And when did that happen?

2           A           I don't have an exact date. It was very  
3 close to the time of them writing the rules.

4           Q           Mr. Fagrelius, turn now to what's been  
5 marked as Exhibit Number Four and identify that exhibit.

6           Q           This was an isopach map showing the  
7 thickness of the overburden on Fruitland coal deposits.

8                       This exhibit shows the thickness of  
9 overburden on Fruitland coal and drilling depths to the  
10 coal increases from 500 feet on the southwest rim of the  
11 Basin to about 3500 feet northeast of the demarcation line.

12                      The region of thickest overburden trends  
13 northwest to southeast, lies northeast of the demarcation  
14 line and is located above the regions of thicker coal  
15 accumulations, higher rank, over-pressuring and gas in  
16 place for the Fruitland coal.

17           Q           Turn to Exhibit Number Five, identify  
18 that exhibit and identify the contents relevant to your  
19 position in this case.

20           A           Exhibit Number Five is a gas in place  
21 contour map for Fruitland coal in the San Juan Basin. The  
22 map depicts an area of highest coalbed methane potential  
23 and also shows a rapid and large increase in gas in place  
24 north of the proposed demarcation line.

25                      South of the line Fruitland coals

1 contain zero to 5 BCF of gas per square mile, whereas,  
2 north of the line coals contain 5 to 35 BCF of gas per  
3 square mile.

4 Q Mr. Fagrelus, for the purpose of clar-  
5 ity, would you describe how the proposed line of demarca-  
6 tion is depicted on each of these exhibits?

7 A The proposed line of demarcation is the  
8 black dashed line which has been highlighted with a yellow  
9 marker.

10 Q Now refer to what has been marked as  
11 Exhibit Number Six and identify that and what it shows.

12 A Exhibit Number Six is a structure con-  
13 tour map drawn on the Huerfanito Bentonite bed and includes  
14 major tectonic elements of the San Juan Basin. This compo-  
15 site map shows that the northwest, north, and northeast  
16 edges of the San Juan Basin are bound by a steeply dipping  
17 monocline with flexures radiating into the Basin.

18 Also it shows the southern Basin is a  
19 relatively undeformed, gentle northeast dipping slope that  
20 grades into a deeper flat lying region with several anti-  
21 cline and synclinal fractures in the north central part of  
22 the Basin.

23 The lack of structural deformation south  
24 of the demarcation line suggests that the permeability in  
25 this area has not been greatly enhanced by fracturing,

1       whereas, north of the line the increased density of  
2       existing structural elements enhances the potential for  
3       natural fractured permeability in the north central part of  
4       the Basin.

5               Q           Please refer to Exhibit Number Seven,  
6       identify that exhibit, please.

7               A           This exhibit has two maps of the  
8       Fruitland overpressured area. Kelso's map on the left is  
9       based on drilling mud weights and Kaiser's map is based on  
10      DST data and calculated shut-in pressures.

11               Both maps correlate well with each other  
12      and depict an area of over-pressuring exists in the north  
13      central basin, northeast of the demarcation line, and  
14      Kaiser's map also shows that the region adjacent to and  
15      southwest of the demarcation line is underpressured.

16               Q           Now turn to Exhibit Number Eight,  
17      identify that exhibit and explain its contents.

18               A           Exhibit Number Eight is a potentiometric  
19      surface map drawn for the Fruitland formation.

20               It shows that the Fruitland has two  
21      distinct hydrologic basins; a northern and southern basin,  
22      which are separated by a pronounced deepening of the poten-  
23      tiometric surface that trends northwest and southeast  
24      across the Basin and is located approximately two town-  
25      ships north of the demarcation line. Both hydrologic

1 basins are different. The northern basin has a very strong  
2 active recharge area along the north and northwest rim of  
3 the Basin, which results in a strong influx of meteoric  
4 waters flowing basinwards.

5 The southern basin has a weak, limited  
6 recharge area along the southern Chaco slope and southeast  
7 rim of the basin.

8 Q Turn to Exhibit Nine and identify that  
9 exhibit.

10 A Exhibit Nine is a legal description of  
11 the proposed dividing line that we're proposing. This line  
12 is illustrated on all previous exhibits as a dotted line  
13 highlighted in yellow.

14 Q Turn to Exhibit Number Ten, please, and  
15 briefly summarize the contents of that exhibit.

16 A Exhibit Number Ten is a list of refer-  
17 ences I used to prepare my exhibits from .

18 Q Mr. Fagrelus, would you summarize the  
19 conclusions that you have drawn from the data illustrated  
20 in these exhibits with respect to the geologic differences  
21 between the area south of the proposed line of demarcation  
22 and the area north of the proposed line of demarcation?

23 A In summary, the geologic setting which  
24 favors the extraction of coalbed methane the most lies  
25 north of the proposed demarcation line. This area is over-

1    pressured and contains deeper, thicker, higher rank coals  
2    that have a large amount of gas in place and enhanced  
3    permeability due to fracturing; whereas, the geologic  
4    setting which favors extraction of coalbed methane the  
5    least lies south of the demarcation line. In this area the  
6    coals are underpressured, shallow, thinner, lower rank,  
7    contain less gas in place, and lack structure related  
8    permeability.

9           Q           In your comments before you began any  
10   discussion of the exhibits you had prepared, you indicated  
11   that this group of independent producers would be proposing  
12   the establishment of a buffer zone one section being on  
13   either side of the proposed line. Can you elaborate on the  
14   purpose for that proposal?

15          A           The purpose for the buffer zone is to  
16   make it less likely that 160-acre spacing would encroach  
17   upon the 320-acre spacing area.

18          Q           In your opinion is the location of the  
19   proposed line of demarcation justified geologically?

20          A           In my opinion, yes.

21          Q           Mr. Fagrelus, were Exhibits One through  
22   Ten prepared by you or at your direction and under your  
23   supervision?

24          A           Yes, they were.

25                       MR.    ROBERTS:  Mr.  Examiner,

1 we'd move the admission of Exhibits numbered One through  
2 Ten.

3 MR. CATANACH: Exhibits One  
4 through Ten will be admitted into evidence.

5 MR. ROBERTS: We have no other  
6 questions of this witness on direct.

7 MR. CATANACH: Questions of  
8 this witness?  
9

10 CROSS EXAMINATION

11 BY MR. KELLAHIN:

12 Q Mr. Fagrelus, you prefaced your  
13 comments awhile ago when you mentioned your direct testi-  
14 mony with the fact that you'd researched published reports  
15 done by others.

16 Did you independently perform any geolo-  
17 gic assimilation of data to reach your conclusions?

18 A We've been assimilating gas analysis  
19 data and water analysis data.

20 Q Apart from the assimilation of the gas  
21 analysis and water analysis, then, the conclusions and  
22 opinions you've expressed have been based upon the  
23 published reports of others.

24 A That is correct.

25 Q Specifically you have relied on some of

1 the mapping done by Mr. Fassett and I think originally  
2 published in his paper of 1971?

3 A That's correct.

4 Q And that paper has been updated, has it  
5 not, sir?

6 A Yes. He comes out with an updated  
7 version in 1988.

8 Q When we look at the demarcation line  
9 that you have proposed to separate the pool between 320's  
10 and 160's, the demarcation line you propose today is dif-  
11 ferent than the one that you circulated to the working  
12 study committee back on April 28th of this year, is it not?

13 A It is.

14 Q In that first draft of the demarcation  
15 line, sir, you in effect took similar exhibits as we've  
16 seen today and you've drawn a line generally from the  
17 northwestern portion of the basin to the southeastern cor-  
18 ner somewhat different than the one we saw today.

19 A That's correct.

20 Q When we look at the line that you've  
21 presented us today do we find any coal wells being produced  
22 or operated by any of the group you represent above that  
23 line?

24 A We have acreage above that line and we  
25 are contemplating developing that. But currently we do not

1 have any producing wells, Dugan Production. I cannot speak  
2 for the companies all over.

3 Q So there are no producing coal wells  
4 operated by Dugan north of the current proposed line.

5 A No wells operated by Dugan Production;  
6 however --

7 Q (Not clearly understood.)

8 A Yes, we do.

9 Q When we look below the line, Mr.  
10 Fagrelus, how many coal wells does Mr. Dugan operate?

11 A There are quite a few and it depends --

12 Q Do you have an approximation?

13 A Well, I've completed two here in the  
14 last month and a third one two months ago.

15 We've got a program that we're working  
16 on where we plan to drill additional wells, and we feel  
17 that we have a large holding in the WAW Fruitland-Pictured  
18 Cliff Pool, and we believe we're producing Fruitland Coal-  
19 bed Methane from that pool.

20 Q Are the coal analyses and water analyses  
21 that you've alluded to generated out of your production in  
22 the WAW Field?

23 A A good part of them are, yes.

24 Q Do you have any core analysis from any  
25 of those wells that demonstrate core information from



1 penetrations through the coal seams?

2 A Could you reword that for me, please?

3 Q My question is do you have any core  
4 information from any of your wells?

5 A We do not have core information from our  
6 wells. We are not sure that the information gained from  
7 the core is indicative of what to expect.

8 Q The answer to my question is you do not  
9 have core information.

10 A No, sir, we do not.

11 Q When we look at Mr. Craney's exhibit  
12 behind you, sir, I believe that's Exhibit Number Four from  
13 the Meridian book, you're familiar with that display, are  
14 you not?

15 A Yes, I am.

16 Q That's a display that shows the net  
17 thickness of the coal seams in the basin, is it not?

18 A That's correct.

19 Q And it values those on a contour map.

20 A That's correct.

21 Q And if we were to place your demarcation  
22 line across that basin, we're going to find coal thick-  
23 nesses south of the line that represent some 40 to 60 feet  
24 of thickness.

25 A That's possible, yes.

1           Q           And north of that line we'll find thick-  
2 nesses of 40 to 20 feet in some instances.

3           A           That's correct.

4           Q           We cannot use the demarcation line you  
5 propose today and honor the data on the thickness map,  
6 Exhibit Number Four, can we?

7           A           There is not any one map that will  
8 support the demarcation line. It is a preponderance of  
9 data upon which the line has been located.

10          Q           Let's turn to the first exhibit you  
11 presented, Mr. Fagrelus.

12                   I believe I understood this to be an  
13 isopach map?

14          A           That's correct.

15          Q           This does not isopach a coal seam, does  
16 it?

17          A           This isopachs the interval between the  
18 Huerfanito Bentonite bed of the Lewis Shale and the top of  
19 the Pictured Cliff.

20          Q           For illustration, when we look at the  
21 current demarcation line, if you'll look at the southern  
22 end of that line where it runs horizontal for about four  
23 townships and then suddenly goes north?

24          A           Uh-huh.

25          Q           Do you see that?

1           A           Yes, sir, I do.

2           Q           Your first proposal was not to take that  
3 line north, was it? It would have gone straight across to  
4 the east.

5           A           We've gathered additional data from the  
6 time of our first proposal which supported that area did  
7 not drain 320-acres either.

8           Q           My question, sir, was that the original  
9 proposal went straight to the east, did it not?

10          A           That's correct.

11          Q           This does not purport to map on an iso-  
12 pach a coal seam, does it?

13          A           Could you reword that for me, please?

14          Q           This is not an isopach of a coal seam.

15          A           No, sir, it is not. The Exhibit Number  
16 Two is.

17          Q           And the line that you've drawn verti-  
18 cally at the point of departure from the earlier draft is a  
19 line that does not honor the data on this display, does it?

20          A           I will not make that conclusion. That  
21 line honors a propensity or a preponderance of geologic  
22 anomalies that occur northeast of it.

23          Q           You're using other information apart  
24 than what's depicted on this display to cause that line to  
25 go vertically to the --

1           A           I'm using all of the exhibits that I've  
2 presented today.

3           Q           In using this display, you have to go  
4 inconsistent with the contour lines on the Isopach to draw  
5 that line vertically.

6           A           There are other maps which support it  
7 going north.

8           Q           This map does not do that.

9           A           No, but the gas in place map does.

10          Q           Can you determine recommendations on  
11 spacing based upon a gas in place map?

12          A           No, you cannot.

13          Q           Can you determine spacing from the gross  
14 structure map that you presented?

15          A           You can make inferences.

16          Q           But you can't make any direct determin-  
17 ation or calculations of spacing based upon that gross  
18 structure map.

19          A           No, sir, we have engineering data,  
20 testimony that will follow mine to support our position.

21          Q           When we focus on the geologic presenta-  
22 tion you've made, however, you cannot take that flexure map  
23 that you presented in here and use that to determine what  
24 spacing ought to be, can you?

25          A           Again, I've used numerous maps to pick a

1 location for a line as a starting point. The spacing will  
2 be dealt with by our engineer.

3 Q Do you see anything on your structure  
4 map that you've presented to us that would isolate the  
5 reservoir structurally into two separate sources of supply?

6 A No. We feel that there is one common  
7 source of supply.

8 Q Within the Basin area you don't have any  
9 disagreement, then, with the vertical and the horizontal  
10 boundaries for the Basin Coal?

11 A We agree with the vertical limits and  
12 the horizontal limits are what we're addressing right now.

13 Q The issue, then, is the question of what  
14 portion, if any, of the basin would be spaced upon 160-acre  
15 spacing.

16 A That's correct.

17 Q Exhibit Number Two, sir, I think I  
18 understood this to be a gross coal thickness map?

19 A That's correct.

20 Q And this is the Fassett map from 1971  
21 updated to '88?

22 A That's correct.

23 Q Is this different from the one that Mr.  
24 Craney presented in Meridian Exhibit No. 4 behind you or is  
25 this the same display?

1           A           This map is from Fassett, 1988, and the  
2 map behind you is from Kelso, 1988.

3           Q           Is there any material difference between  
4 the two interpretations on each of those displays?

5           A           The map behind you done by Kelso is --  
6 shows quite a bit more detail, whereas, the Fassett map is  
7 based more on a regional contour.

8           Q           For specificity on developing rules for  
9 this pool, which of these exhibits as a geologist would you  
10 use?

11          A           Well, it's obvious I preferred to use  
12 the Fassett paper.

13          Q           And why, sir?

14          A           It has withstood time and he is a highly  
15 accredited authority on the Fruitland Coal, and Picture  
16 Cliff.

17          Q           Well, let's look at the Fassett No. 2  
18 display then, if you will.

19                      I find values when we contour that gross  
20 coal thickness that are inconsistent and do not -- are in-  
21 consistent to the demarcation line you've put on that  
22 display, isn't it?

23          A           I'm sorry, I didn't follow that.

24          Q           Well, look at the yellow line.

25          A           Sure.

1           Q           See the yellow line? It crosses through  
2 and over an area that's shaded as having a contour thick-  
3 ness of -- what's that general contour thickness shaded? I  
4 can't make it out.

5           A           Everything shaded is greater than 40  
6 feet thick.

7           Q           40 feet? It doesn't follow the -- the  
8 demarcation line does not honor, does it, sir?

9           A           No, it doesn't.

10          Q           Okay. When we look at the coal ranking  
11 maps, those were on display number three, Dugan Exhibit  
12 Number Three?

13          A           That's correct.

14          Q           The -- the Kelso display on that  
15 exhibit, the one to the far right, that was one of the  
16 attachments to Mr. Busch's exhibit book this morning,  
17 wasn't it?

18          A           That's correct.

19          Q           It's contained in that information. In  
20 fact, all this information is generally published, known  
21 information among you geologists that are working this  
22 particular area.

23          A           That's correct.

24          Q           And it was know to the other geologists  
25 working on the work study group?

1           A           I don't believe that the Kelso, Wicks  
2 and Kuuskraa map was in publication at the time the com-  
3 mittee was meeting; however, the Fassett paper was.

4                   Rice had a paper in '83 which is very  
5 similar to the one he's presenting here in '88.

6           Q           When we look at the three displays on  
7 coal ranking that are shown on Exhibit Number Three, none  
8 of those are consistent with the demarcation line that you  
9 have put on each of those displays, is it?

10          A           Initially the demarcation line ran right  
11 along the 55 percent fixed carbon contour in the northern  
12 part of the basin on the Fassett map.

13          Q           Okay, on the Fassett map the contour  
14 line that you were mapping is the 55 percent number?

15          A           That's correct, in the north --

16          Q           And then you gave -- I'm sorry.

17          A           -- in the north central part of the  
18 basin.

19          Q           You used a value awhile ago on the re-  
20 flectance map. I think a .7?

21          A           0.7 percent.

22          Q           0.7 percent was the value used on the  
23 reflectance map? And that was a display that Mr. Craney  
24 had earlier today, was it not?

25          A           I don't believe so. Craney's map was a



1 Kelso, Wicks and Kuuskraa map.

2 MR. KELLAHIN: If I might  
3 approach the witness, Mr. Examiner.

4 A Okay, I thought you were talking to the  
5 Rice map. I'm sorry; I missed the cue. That was one of  
6 Craney's exhibits.

7 Q I didn't make myself clear. Exhibit  
8 Number Four that Mr. Craney was using is this Lewin Energy  
9 1988 depiction of the vitrinite reflectance values.

10 A That's correct.

11 Q All right. When we look at that dis-  
12 play what point or what value on that display is one that  
13 is utilized by you in picking the demarcation line?

14 A In Rise's paper he states that signifi-  
15 cant thermal methane generation does not occur or begins to  
16 occur at a reflectance of 0.7 percent and -- or a rank of  
17 high volatile A-bituminous. And the Kelso, Wicks, Kuuskraa  
18 map shows the area that is shaded in white as being high  
19 volatile A-bituminous.

20 And the southwest line of that coal rank  
21 coincides very closely with Rice's 0.7 percent reflectance  
22 line.

23 Q When we look at Mr. Craney's display  
24 number four, do you have a copy of that?

25 A Not in my hands, no.

1           Q           Let me show you. What value would you  
2 peg as the point to place that demarcation line on that  
3 display? Is it the area between the yellow area and the  
4 next shaded green area?

5           A           Well, these lines are not drawn on  
6 reflectance value. They're drawn on coal (unclear).

7           Q           If we use that display and superimpose  
8 your demarcation line, the demarcation line again would not  
9 honor the data on that display, would it?

10          A           The demarcation line would be south of  
11 the area of high volatile A-bituminous coal and this is an  
12 area where we decided to move our demarcation line south in  
13 order to allow, if you will, a buffer zone between the  
14 better areas of coal gas production and the poorer area.

15          Q           The over-pressuring map, I think it's  
16 Exhibit Number Seven, the area of over-pressurization on  
17 the display, is that area shown with the dark, black  
18 shading?

19          A           On Kelso and Wicks map, yes.

20          Q           Yes, sir, the one on the left of the  
21 two.

22          A           That's correct.

23          Q           When we look at the area of over-pres-  
24 surization, the only thing we can conclude from this dis-  
25 play is those areas of over-pressurization are north of the

1 demarcation line.

2 A That's correct.

3 Q Again, the occurrence of an area of  
4 over-pressurization is not going to tell you what the  
5 spacing ought to be for the area, does it?

6 A No, it does not.

7 Q The presentation including the legal  
8 description in Exhibit Number Nine, is this information  
9 that you circulated among the operators and the owners and  
10 participants of the work study before today?

11 A The legal description as it is in  
12 Exhibit Nine, no; however, I did contact them all on the  
13 phone and we went over the line.

14 I contacted all voting members of the  
15 Coalbed Methane Committee.

16 Q And did you participate on behalf of  
17 Dugan as a voting member on the issue of spacing?

18 A I was delegated to the Water Disposal  
19 Committee.

20 Q Was there a representative of Dugan that  
21 voted on the spacing issue?

22 A No, there was not; however, we made our  
23 position clear for the subcommittees. The committee was  
24 broken up into small subcommittees..

25 Q Was -- was Dugan's vote the dissenting

1 vote on that issue before the work study committee?

2 A Yes, we were and I believe there was --  
3 yes, sir, we're the only one.

4 Q Do you have anything where you've  
5 attempted to map the permeability of the reservoir?

6 A I made inferences from my structure map  
7 with the structural elements on it.

8 Q Did you participate with the work study  
9 when they made a tabulation of all the wells by operator  
10 that would produce (not clearly understood)?

11 A Yes, I did.

12 Q And there is such a tabulation avail-  
13 able, is there not?

14 A I'm not sure of its availability.

15 Q There was one discussed and used by the  
16 work study?

17 A That's correct.

18 Q And would reference to that tabulation  
19 show us where to find the Dugan, the Merrion, the Bayless,  
20 and the McHugh wells?

21 A The Dugan wells are on that map and as  
22 far as I know the Merrion wells are also. The McHugh and  
23 Bayless wells were not because they were not participating  
24 in the committee.

25 Q If the Division were to adopt 320-acre

1 spacing for the entire basin area, would an alternate  
2 avenue of procedure that would be available to you be one  
3 where you could come in and file an application and set  
4 aside a certain portion of this southern acreage on  
5 160-acre spacing?

6 A We felt that our needs were best served  
7 by approaching it in this form here.

8 Q The approach I suggested would be an  
9 alternative.

10 A I cannot speak for the companies I'm  
11 representing on that issue.

12 MR. KELLAHIN: Thank you.

13 MR. CATANACH: Other questions  
14 of the witness?

15 MR. KELLAHIN: Mr. Fagrelus,  
16 I misspoke. I'm reminded that that exhibit behind you is  
17 not Exhibit Four, it's Exhibit Number Five.

18 Make note of that in the re-  
19 cord. I apologize.

20  
21 CROSS EXAMINATION

22 BY MR. LUND:

23 Q I'm sorry, your answer to Mr. Kellahin  
24 on whether you furnished your testimony and your exhibits  
25 to the committee members prior to this date, what was your

1 answer on that?

2 A The answer was yes.

3 Q And that was orally?

4 A Over the telephone.

5 Q When was that?

6 A It spanned the period of a couple of  
7 weeks. The exact date I don't have in my head.

8 Q The last couple of weeks before the  
9 hearing?

10 A No, sir, it was probably five or six  
11 weeks ago.

12 Q Are you going to have a landman testify  
13 by Dugan today?

14 A No, we're not.

15 Q Are you familiar generally with the  
16 Dugan lease situation?

17 A Yes, I am.

18 Q South of the demarcation line is it  
19 fair to say that Dugan's leases are primarily on a 160-acre  
20 basis?

21 A Yes, that would be a fair assumption.

22 Q Don't have any 320-acre leases south of  
23 your demarcation line?

24 A Not that I can recall.

25 Q Exhibit Seven and Eight of yours are

1 stamped "Draft". Why is that? Does that mean that they  
2 haven't been published previously?

3 A They are works that are currently being  
4 undertaken by the University of Texas at Austin by the  
5 Bureau of Economic Geology. They are, as I say, being  
6 studied for GRI. Currently they have not been published.

7 Q Does that mean that they're subject to  
8 change?

9 A In my personal communication with the  
10 authors it did not appear there will be any drastic changes  
11 in this report, no.

12 Q Primarily what your testimony boils  
13 down to is differences in gas in place, isn't it?

14 A Differences in geology of the coal.

15 Q And differences in the geology of the  
16 coal results in differences in gas in place, right?

17 A That, you may assume that.

18 Q I'm sorry?

19 A I believe so.

20 Q Isn't that primarily what you're focus-  
21 ing on? You're saying that there's more gas in place to the  
22 north of your demarcation line and less to the south?

23 A There's more gas in place north of the  
24 line. There's thicker coals north of the line. There's  
25 higher rank coals north of the line. There's an increase

1 fracture permeability associated with structural elements  
2 which also increase north of the line.

3 The bulk of my testimony is to show that  
4 all these geologic factors favor coalbed methane production  
5 increased or -- or better north of this line.

6 Q And so I think what you said to Mr.  
7 Kellahin was your testimony can't really give us any indi-  
8 cation about the drainage, can it? That's more of an en-  
9 gineering function?

10 A That's correct.

11 Q And drainage is -- your testimony says  
12 nothing about a well's ability to produce, is that correct?

13 A It says something about the ability of  
14 the coal, whether it's a good coal or a bad coal, or --

15 Q And geologically that depends a lot on  
16 deep formation, isn't that right?

17 A That's right.

18 Q And basically the permeability, right?  
19 Yes?

20 A Yes, sir.

21 Q And you're familiar that under the  
22 proposed rules it's already possible to develop this  
23 particular area on 160's, aren't you familiar with that?

24 A Could you reword that for me, please?

25 Q Sure. Are you aware that under the



1 proposed rules by the Committee it's possible to go in and  
2 seek development on 160's based on a showing of a particu-  
3 lar (unclear).

4 A Okay, Colorado did not adopt that  
5 option, and --

6 Q Well, it hasn't acted finally yet.

7 A Okay, and in New Mexico the nature of  
8 your competitor is such that you will have a hard time  
9 getting administrative approval for 160-acre spacing.

10 They will oppose you. They do not want  
11 to be offset by a 160.

12 Q So what you're saying is if you don't --  
13 if you show a technical basis to justify 160 you're not  
14 going to get an order from the Division?

15 A No, you'll have to go to hearing and I  
16 work for a small, understaffed company, and people and time  
17 are very important to us.

18 Q So you're concerned about the adminis-  
19 trative burden on the company.

20 A That is part of it, yes.

21 Q Is it a large part of your concern?

22 A No, it is not. The major part of our  
23 concern is we do not feel the coal wells in the southern  
24 part of the basin are capable of draining 320 acres.

25 Q Well, let's talk about the southern part

1 of the basin. There's not many wells drilled there, is  
2 there?

3 A Dugan Production has 18 wells in the WAW  
4 Fruitland Pictured Cliff Pool that are open hole comple-  
5 tions in the Fruitland Basal Coal and the upper Pictured  
6 Cliff Sands.

7 In the WAW Fruitland Pool we have gas  
8 analysis data that will support we are producing Fruitland  
9 coal gas. We are recompleting many old abandoned wells in  
10 the Fruitland coal zone development.

11 Q So what you're talking about is comming-  
12 led production?

13 A In some cases our gas analysis data in-  
14 dicates that it is commingled. In other cases it indicates  
15 we're producing strictly the Fruitland coal gas.

16 Q You've got data that shows separation  
17 of production from coal as opposed to from sand?

18 A We have data that will support a dis-  
19 tinct coal gas and also a distinct Pictured Cliff gas and  
20 also a mixed Fruitland coal and Pictured Cliff sandstone  
21 gas for the southern part of the basin.

22 Q Is that an engineer's (unclear)?

23 A That's correct.

24 Q Well, let's get to the bottom line. If  
25 you're wrong about the 160's, we're going to drill about

1 7000 too many wells in this area, are we not?

2 A Currently the coal play in the southern  
3 part of the basin, if you will, is very inaccurate and that  
4 is also why we decided to incorporate a 3-year temporary  
5 ruling on this because we feel with additional data there  
6 will be -- the data will either support or negate the con-  
7 clusions that we're drawing from our area today.

8 Q Yeah, but to answer my question, then,  
9 if you're wrong about spacing we're going to drill way too  
10 many wells?

11 A I don't believe that those wells would  
12 get drilled in the southern part of the basin.

13 Q The answer is yes?

14 A The answer is no.

15 Q Thank you.

16 MR. CATANACH: Any other  
17 questions?

18 MR. STOVALL: Tommy, before  
19 you go to redirect I'd like to ask a question.

20

21 CROSS EXAMINATION

22 BY MR. STOVALL:

23 Q With respect to the -- if you go to  
24 160-acre spacing, Mr. Fagrelus, what would you recommend  
25 in terms of well location criteria? Would you recommend a

1 different rule than is proposed with the 320-acre spacing?

2 A We would go with the statewide rules,  
3 the 160-acre spacing.

4 Q The statewide rules being --

5 A I don't have those numbers in front of  
6 me but I believe it's 790 from the section line.

7 Q Basically what you'd say is to change  
8 the proposed spacing in this proposed order to -- the real  
9 change would be on that quarter section line, you'd have to  
10 go to 790 all the way around rather than have that 130?

11 A That's correct.

12 Q What about -- would your proposal affect  
13 the rule with respect to horizontal completions, horizontal  
14 drilling?

15 A I'm not sure. I haven't studied that  
16 angle.

17 Q That's it.

18

19 REDIRECT EXAMINATION

20 BY MR. ROBERTS:

21 Q Mr. Fagrelus, I'd like for you to once  
22 again address the reason for the change in the location of  
23 your proposed line of demarcation which you had originally  
24 from, oh, from that as it is now proposed.

25 A We moved our demarcation line south one

1 to two townships from the Fassett 55 percent fixed carbon  
2 contour in hopes of creating a buffer zone which would make  
3 it less likely 160-acre spacing could encroach upon 320-  
4 acre spacing.

5 Q Thank you. Is it accurate to say that  
6 your group does not object to 320-acre spacing north of the  
7 proposed line of demarcation?

8 A No, we don't. We feel that the data  
9 that has been presented supports 320 acres and we are in  
10 agreement with that.

11 Q Do you know how many defined Fruitland  
12 Pictured Cliff pools there are below this proposed line of  
13 demarcation?

14 A The exact number I'm not sure of. I can  
15 just (unclear). The Ojo Fruitland Pictured Cliff Pool, the  
16 WAW Fruitland Pictured Cliff Pool, the South Gallegos  
17 Fruitland Pictured Cliff Pool, the Harper Hills Fruitland  
18 Pictured Cliff Pool and I know there are several more and  
19 they'd be listed on the docket for this hearing.

20 Q Do you have any ballpark figure estimate  
21 of the number of wells completed and producing in those  
22 combined Fruitland Pictured Cliff Pools? Is it over 100?

23 A Way over 100.

24 Q Over 200?

25 A I would say 200, 250, something in that

1 range.

2 Q Mr. Lund posed a question to you and  
3 paraphrasing it I think that he was asking you whether you  
4 would feel there was any relief from the proposed rule re-  
5 garding increased well -- any -- any relief (not clearly  
6 understood) that you may perceive as existing in the -- if  
7 spacing is made on 320-acres.

8 A I'm --

9 Q Do you -- go ahead.

10 A I'm sorry, Tommy, I didn't follow your  
11 question.

12 Q Well, you're one of three witnesses. Is  
13 there someone here today who will testify on behalf of this  
14 group of independent producers who can address the relief  
15 that may be provided by an increased well density provision  
16 in the proposed rules?

17 A Yes.

18 Q Okay. Then I'll withdraw that. I have  
19 no other questions of the witness.

20 MR. CATANACH: Any other  
21 questions?

22 If not, the witness may be  
23 excused.

24 MR. ROBERTS: Mr. Kevin  
25 McCord.

1 KEVIN H. McCORD,  
2 being called as a witness and being duly sworn upon his  
3 oath, testified as follows, to-wit:  
4

5 DIRECT EXAMINATION

6 BY MR. ROBERTS:

7 Q Would you state your name and your place  
8 of residence?

9 A My name is Kevin McCord and I live in  
10 Farmington, New Mexico.

11 Q And what is your occupation?

12 A I'm a petroleum engineer.

13 Q How long have you been employed as a  
14 petroleum engineer?

15 A Approximately ten years.

16 Q Have you testified before the New Mexico  
17 Oil Conservation Division on any prior occasions?

18 A Yes, I have.

19 Q And in what capacity?

20 A As petroleum engineer and a Registered  
21 Professional Engineer in the States of New Mexico and  
22 Colorado.

23 Q Are you familiar with the application in  
24 this case?

25 A Yes, I am.

1           Q           Have you conducted a study of relevant  
2 engineering data and information for purposes of providing  
3 testimony in this case?

4           A           Yes, I have. I've examined many gas  
5 analyses in the south of our area line of demarcation and  
6 also looked at some decline curve production on some wells  
7 south of the line of demarcation.

8                           MR. ROBERTS: Mr. Examiner, I  
9 would introduce Mr. McCord as an expert in the field of  
10 petroleum engineering.

11                          MR. CATANACH: He is so  
12 qualified.

13           Q           Mr. McCord, refer to what's been marked  
14 as Exhibit Number Eleven and identify that exhibit.

15           A           Exhibit Number Eleven is a list of gas  
16 analyses taken from wells in the San Juan Basin.

17                          The purpose of this exhibit is to demon-  
18 strate that Fruitland Coal Gas south of the proposed demar-  
19 cation line can be distinguished from Pictured Cliff gas  
20 and Fruitland coal gas south of this line is not similar in  
21 composition to Fruitland coal gas north of the demarcation  
22 line.

23                          Exhibit Number Eleven consists of four  
24 pages of gas analyses the majority of which are from wells  
25 south of the proposed line of demarcation.



1           The first page of Exhibit Number Eleven  
2 is a summary table showing the average normal molecular  
3 percentage components for 79 gas analyses taken from wells  
4 south of the demarcation line which were either perforated  
5 in the Fruitland coal or possibly producing Fruitland coal  
6 gas from Pictured Cliff perforations.

7           Also, there are wells that are  
8 perforated in Fruitland sands in this, also.

9           Also presented in page one of Exhibit  
10 Number Eleven is average gas analysis data from the Cedar  
11 Hill Fruitland Basal Coal Field, which was taken from  
12 Decker, et al's paper entitled Geology, Geochemistry,  
13 Reservoir Engineering and Completion Methods at the Cedar  
14 Hill Field, San Juan County, New Mexico, A Field Study of  
15 Classic Coal Degasification Behavior", which was printed in  
16 the Guidebook for Geology and Coalbed Methane Resources in  
17 Northern San Juan Basin, Colorado and New Mexico, and this  
18 was a symposium which was given -- held in June of 1988.

19           The remaining pages of Exhibit Number  
20 Eleven are the individual gas analyses used to come up with  
21 the averages presented on page 1 of the exhibit.

22           A total of 79 gas analyses were examined  
23 mainly from WAW and South Gallegos Fruitland PC wells.

24           These wells are commonly perforated in  
25 Fruitland coal, Fruitland sands, Picture Cliff sand, and

1 any combination of these, and these zones are generally  
2 commingled.

3 To determine the average gas analysis  
4 for the area I grouped these gas analyses together, first  
5 of all, by BTU values and by grouping them as such it was  
6 then obvious how Fruitland gas and Pictured Cliff gas were  
7 separated apart from each other.

8 The summary results shown on the first  
9 page of Exhibit Number Eleven give the results of the  
10 groupings.

11 I've listed these averages as average  
12 Fruitland dominated gas and average PC dominated gas be-  
13 cause I'm not sure if these analyses are 100 percent Fruit-  
14 land or 100 percent PC gas, but the mixture is dominated by  
15 one or the other zones.

16 On page one of Exhibit Number Eleven  
17 note the average BTU content for a Fruitland dominated gas  
18 versus a Picture Cliff dominated gas and you'll see that  
19 the Fruitland is much lower in BTU, being 1023 while the  
20 Picture Cliff is much higher, 1139.

21 The average methane is 95 percent in the  
22 Fruitland zone and only 88 percent in the Pictured Cliff.

23 Average ethane, 2 percent in Fruitland  
24 and 6 percent in the Pictured Cliff.

25 Average specific gravity, .59 in the

1 Fruitland and .66 in the PC.

2 I've also listed a column called average  
3 C1/C1-5, which is a factor used in Dudley Rice's paper, and  
4 this is called the ratio of methane gas to total hydrocar-  
5 bon gas, and in the Fruitland zone this value is .97 while  
6 the Pictured Cliff value is .89.

7 Also note that the CO<sub>2</sub> value in the  
8 Fruitland in this area is quite low, 1.3 percent and 0.9  
9 percent in the PC.

10 The combination gas analysis values  
11 shown fall between the Fruitland dominated gas averages  
12 and the PC dominated gas averages and probably represent a  
13 split mixture of the two formation gases in those wells.

14 Note at the bottom of the page the  
15 Fruitland coal gas analysis averages from the Cedar Hill  
16 Field, which is north of the demarcation line. These num-  
17 bers are drastically different from those south of the  
18 demarcation line for the Fruitland coal gas.

19 Q Looking at CO<sub>2</sub> to the south, the average  
20 is 1.3 percent, and north of the line in the Cedar Hill  
21 Field the average is 6 percent.

22 Average BTU, 1023 in the south; to  
23 the north in Cedar Hill, 951.

24 The average methane percentage is about  
25 the same, 95 percent in the south, 94 percent in Cedar

1 Hill.

2 Average ethane, 2.2 percent in the  
3 south; 0.2 percent at Cedar Hill.

4 Average specific gravity, .59 in the  
5 south; .61 at Cedar Hill.

6 And the average ratio of methane gas to  
7 total hydrocarbon gas in the south, .97; Cedar Hill, 1.0.

8 It is also interesting to recognize that  
9 the Fruitland coal south of the demarcation line tends to  
10 produce gas with very little or no water production at  
11 all. There are drastically different production character-  
12 istics in the Cedar Hill Field.

13 Note that Rice, et al, printed a paper  
14 on Fruitland coal analysis in the same guidebook I  
15 mentioned earlier, which states that Fruitland coal gas in  
16 the southern part of the basin exhibits different gas  
17 characteristics than gas analysis in the northern part of  
18 the basin.

19 My study represents quite a few more  
20 southern wells than Rice examined and his findings seem to  
21 hold true. Rice's paper is entitled "Identification and  
22 Significance of Coalbed Methane Gas" -- excuse me, "Coalbed  
23 Gas, San Juan Basin, Northwestern New Mexico and Southwest-  
24 ern Colorado."

25 I'd like to also add here that the gas

1 analysis presented today by Mr. Busch, and a gas composi-  
2 tion study presented today by Mr. Craney for Fruitland coal  
3 fit very well with the averages just presented for the  
4 Cedar Hill Field and the area north of the line of demar-  
5 cation, not with the averages for the area south of the  
6 line of demarcation.

7 Q Mr. McCord, would you now direct your  
8 attention to your Exhibit Number Twelve, identify that  
9 exhibit and its contents?

10 A Exhibit Number Twelve is a map of the  
11 Fruitland formation outcrop in the San Juan Basin, showing  
12 contours of coal isorefectance throughout the San Juan  
13 Basin.

14 The map was reproduced from Rice's paper  
15 I just mentioned. This map is presented to indicate the  
16 gas analysis samples used to calculate the average gas  
17 characteristics in Exhibit Number Eleven with relation to  
18 the line of demarcation.

19 I have labeled the number of Fruitland  
20 coal dominated gas wells, PC dominated gas wells, and com-  
21 bination gas wells per section on this map. Note also the  
22 location of the Cedar Hill Basal Coal Field, which is  
23 marked as Area E on Rice's map and marked as a solid area  
24 in this exhibit.

25 Q Now turn to what is marked as Exhibit

1 Number Thirteen and identify that exhibit.

2           A           Exhibit Number Thirteen is a decline  
3 plot to support that there is no drainage interference on  
4 160-acre spacing in the Fruitland - PC formation in South  
5 Gallegos Field.

6                   This exhibit shows the decline trends  
7 for four combined Fruitland - PC producers in the South  
8 Gallegos Field. These wells are the Nassau No. 5, No. 6,  
9 No. 7 and No. 8 Wells located in Section 36 of Township 27  
10 North, Range 12 West, and operated by Jerome P. McHugh.

11                   The bottom curve is a running average  
12 production plot of the Nassau No. 5 Well, which started  
13 producing in late 1973.

14                   The upper curve is a combined running  
15 average production plot of the Nassau No. 6, No. 7, and No.  
16 8 Wells, which began producing in 1977.

17                   Three months running average production  
18 was used to generate both curves to smooth out production  
19 data on the curves due to production rate variation  
20 throughout the years.

21                   The Nassau No. 5 has an established  
22 decline trend which did not vary throughout its production  
23 life, even with the large production volumes taken from the  
24 320-acre offset wells.

25                   The total production from all wells is

1 now over 2 BCF of gas. All of these wells were perforated  
2 in the Fruitland coal. The gas analysis for these wells  
3 were either Fruitland dominated gas or combined gas from  
4 the gas analysis study presented in Exhibit Number Eleven.

5 It is interesting to note that these  
6 wells all have production declines and make small amounts  
7 or no water at all. There is not classic coal gas -- this  
8 is not classic coal gas reservoir behavior, but this is a  
9 good example of how no interference taking place on 160-  
10 acre spaced wells producing all or a large part of their  
11 gas from the Fruitland coal.

12 320-acre spacing would definitely not be  
13 appropriate in this area.

14 Q Does this (unclear) to you or would you  
15 expect to be able to do similar conclusion (unclear) on an  
16 analysis of other wells in the area south of the proposed  
17 line of demarcation?

18 A It would be my guess if enough data was  
19 available we'd find the same situation time and time again.  
20 Definitely not coal gas behavior as exhibited north of the  
21 line. We do not, in bringing on a Fruitland well south of  
22 the line, it exhibits normal decline curve tendencies; it  
23 does not incline; you do not see large amounts of water.  
24 It's a whole different formation.

25 Q Do you know of any evidence that will

1 contradict that conclusion?

2 A Not to my knowledge, no.

3 Q Were Exhibits Eleven through Thirteen  
4 prepared by you or at your direction and under your  
5 supervision?

6 A Yes, they were.

7 MR. ROBERTS: Mr. Examiner,  
8 I'd move the admission of Exhibits Numbered Eleven through  
9 Thirteen.

10 MR. CATANACH: Exhibits Eleven  
11 through Thirteen will be admitted into evidence.

12 MR. ROBERTS: I have no other  
13 questions of Mr. McCord on direct.

14 MR. CATANACH: Are there  
15 questions of this witness?

16 Mr. Kellahin.

17

18 CROSS EXAMINATION

19 BY MR. KELLAHIN:

20 Q Mr. McCord, you're an engineer for Mr.  
21 Bayless?

22 A I own my own company called KM Produc-  
23 tion Company and he's my major client, yes.

24 Q Do you have any information south of the  
25 demarcation line on wells that are not otherwise



1 communicated the PC sand or the Fruitland sand where we can  
2 isolate out the production attributable solely to the coal  
3 seam?

4           A           I think with enough study and analysis  
5 you could come up with a candidate or two, but for the most  
6 part it's going to be very difficult to find that situation  
7 when wells south of the line, mainly, this is an area  
8 dominated by independent by independent producers, when  
9 they drill and complete their wells they're -- initially  
10 they were looking for Pictured Cliff sand production, they  
11 perforate the Pictured Cliff, stimulate the Pictured Cliff,  
12 and I believe for the most part they are fracing up into  
13 the coals.

14                   There have also been instances of per-  
15 forating the coal, Fruitland coal, from the Fruitland sand,  
16 and accomplishing roughly the same result. Whether you can  
17 -- this is why I classified my average Fruitland dominated  
18 gas as Fruitland dominated gas, because I don't know that  
19 you can specifically say this is 100 percent Fruitland gas.

20                   So I guess the answer to your question  
21 is at this point in time, no, but I think that work could  
22 be done. It would be a massive job but I think an example  
23 or two could be found.

24           Q           When we look at Exhibit Number Eleven  
25 and we look at the last page, we're looking at the analy-

1       sis of gas from wells that there is absolutely no disagree-  
2       ment   are producing solely and singly out of the coal seams  
3       in those wells.   Yes or no?

4               A               If that's in the form of a question,  
5       yes.

6               Q               There are one, two, three, four, five,  
7       six wells shown on that tabulation.

8               A               Uh-huh.

9               Q               And it's your understanding that each of  
10      those represents the values for the gas composition from  
11      which there is no dispute that gas is produced out of  
12      those.

13              A              That's correct.

14              Q              When we turn to page one of Exhibit  
15      Number Eleven, and we look at the top portion of that  
16      display and look at the average Fruitland values, is this a  
17      summary of the information that's on the next page?

18                              Help me understand how to --

19              A              There again, page two, it's solely the  
20      first line, average Fruitland dominated gas.

21                              Page three is average Pictured Cliff  
22      dominated gas and also average combination gas.

23              Q              Do you have the data available from  
24      which we can see the spread of the values which you have  
25      averaged?

1           A           It's on page two and on page three.

2           Q           All right. When we look at page two,  
3 then, you say these are Fruitland dominated gas. Are all  
4 of these wells producing out of simply the Fruitland  
5 formation? We don't have PC wells in this tabulation at  
6 this point.

7           A           The way I define PC wells, no, we do  
8 not. We have Pictured Cliff perforated wells in this  
9 analysis. We also have Fruitland coal perforated wells in  
10 this analysis. We also have Fruitland sand perforated  
11 wells in this analysis.

12                   This analysis shows that this combina-  
13 tion of wells, no matter where they're perforated, are  
14 producing Fruitland coal gas.

15           Q           Can you pick out any of the wells on the  
16 page two of the display and tell me that that well is per-  
17 forated and producing only out of the coal seam?

18           A           I answered that question before. That  
19 is a very tough analysis to do. It would be a very large  
20 task, as I said with your first question.

21           Q           How have you determined that it is  
22 Fruitland dominated production?

23           A           As I stated in my testimony, if you'll  
24 look on page one, the average on page two, look at the BTU  
25 content and look at the large spread between the BTU con-

1 tent and the Pictured Cliff dominated gas. Compare that to  
2 the CO<sub>2</sub> values, which are different; the methane values,  
3 which are different; the ethane values, which are differ-  
4 ent; the propane values, which are different; and specific  
5 gravity values, which are different; along with the C1/C1-5  
6 ratio values, which are different.

7 Q Do we know whether or not any of the  
8 wells shown on the tabulation as Fruitland dominated gas  
9 are specifically isolated to the coal gas?

10 A No, I think that also answers -- is  
11 answered in question one.

12 Q When you indicate that production is PC  
13 -- Pictured Cliff dominated gas production, how have you  
14 made that determination.

15 A Once again by the comparisons I just  
16 gave you, BTU, specific gravity, nitrogen, methane, ethane,  
17 propane. They're all considerably different.

18 Q But in each of those wellbores for a  
19 Pictured Cliff well, we have that wellbore open to some-  
20 thing other than Pictured Cliff production.

21 A That's correct.

22 Q When we look at Exhibit Number Thirteen,  
23 Mr. McCord, does the information tabulated on this display  
24 from these four wells, are any of those wells specifically  
25 isolated to the coal seam?

1           A           They are all perforated in the Fruitland  
2 coal. Their data, gas analysis data, is presented in Exhi-  
3 bit Number Eleven about -- almost toward the bottom, six,  
4 seven and eight.

5                   And the BTU's, for example, range from  
6 1023 to 1049 and they fit very well with the averages;  
7 therefore, I'd consider these to be dominated Fruitland  
8 coal producers.

9           Q           While these are perforated in the coal,  
10 they are not exclusively perforated in the coal seam, is  
11 that correct?

12          A           They are exclusively perforated in the  
13 coal seam, yes.

14          Q           Do you have any core information from  
15 any of those four wells?

16          A           No, sir, I don't.

17          Q           In making your analysis of the fact that  
18 there's no drainage interference on 100-acre spacing --  
19 160-acre spacing on Exhibit Number Thirteen, the basis for  
20 the fact that you see no drainage interference is based  
21 upon these production decline trends that you've shown on  
22 the display?

23          A           Yes.

24          Q           What would happen, in your opinion, if  
25 these were in fact communicating with each other on 160

1 acres?

2           A           What you would see is a well like the  
3 Nassau No. 5 showing a drastically different change in de-  
4 cline trend when the other wells came on line, especially  
5 large wells like they are. You'll see the drainage domi-  
6 nated by one of the other wells and an established decline  
7 from the existing well will change drastically.

8           Q           Was your engineering method of analysis  
9 the additional analysis that Mr. Wood testified about over  
10 here today?

11          A           Not at all.

12          Q           What did you estimate to be the perme-  
13 ability of these wells?

14          A           No estimation given. It must be fairly  
15 high.

16          Q           Have you run any similar interference  
17 tests on any of the coal producing wells south of the  
18 demarcation line that is similar to the information  
19 developed by Amoco in the Cedar Hill?

20          A           No, we have not.

21          Q           On Exhibit Number Thirteen I notice that  
22 you've got gas volumes displayed in here. Have you tabu-  
23 lated and reported any water production?

24          A           To my knowledge there is -- this is once  
25 again another operator's well -- to my knowledge no water

1 production is being tabulated and being reported.

2 Q Do the coal wells that you see below the  
3 line, I think you've indicated to us that you see a per-  
4 formance that's different from the coal wells above the  
5 demarcation line?

6 A Yes. I've indicated that you can, in  
7 this specific instance, Exhibit Number Thirteen, you'll  
8 notice from the Nassau No. 5 you have an established de-  
9 cline, not an incline, in gas production, and making little  
10 or not reported water is definitely not classic Fruitland  
11 coal production trend as, for example, is seen up in the  
12 Cedar Hill field.

13 Q Does that cause you to be suspicious  
14 that the information reported on this analysis might be  
15 influenced by the fact that you have Fruitland sand pro-  
16 duction?

17 A No, considering the PC sand in these  
18 wells had absolutely, or very little, reservoir quality  
19 compared to other Pictured Cliff sands throughout the Basin  
20 and that its gas analysis falls within the Fruitland coal  
21 trend that I've described in Exhibit Number Eleven.

22 It all points to the fact these wells  
23 are producing from Fruitland. They've produced over 2 BCF  
24 of gas.

25 Q When you look at Exhibit Number Twelve,

1 the demarcation line on the southern end goes horizontally  
2 and then moves vertically and then horizontally again. The  
3 information you've provided for us on the display predomi-  
4 nantly comes from the WAW area shown in the left side of  
5 that display?

6 A That's correct.

7 Q And it's that are below where the City  
8 of Farmington is shown on the exhibit?

9 A That's correct.

10 Q What is the area indicated on the con-  
11 tour line at value 0.7 percent? Do you see that one?  
12 There is another circle and it's got a hatched mark through  
13 it? It says C.

14 A Yes.

15 Q What is that?

16 A That is the original area of data that  
17 Dudley Rice put together in trying to come up with average  
18 -- I hope I'm stating this correctly -- he was looking for  
19 an average for gas analysis for the Fruitland coal and com-  
20 paring that to the Pictured Cliff sand and also the Fruit-  
21 land sand and I believe these areas are the different  
22 groupings that he presented in his paper.

23 Q Do we find any groupings on the display  
24 that are inconsistent with the demarcation line?

25 A I'm not sure I fully understand the data



1 presented by Dudley Rice generally agree with the averages  
2 I came up with. The problem with his data was that they  
3 were not full gas analyses presented. There was only, I  
4 believe, the methane percentage presented and also the  
5 C1/C1-5 ratio was presented, but generally it was not a  
6 full gas analysis.

7 MR. KELLAHIN: Thank you, Mr.  
8 Examiner.

9  
10 CROSS EXAMINATION

11 BY MR. LUND:

12 Q Mr. McCord, I'll try not to duplicate  
13 what Tom is asking, but let me just see if I understand  
14 what you're testifying about.

15 Is it fair to say that most of your  
16 analyses, these 79 analyses you got (not clearly under-  
17 stood)

18 A I don't think it's fair to say that I  
19 tend to like the Fruitland dominated, PC dominated, and  
20 combination affect, because it's not really commingled pro-  
21 duction if it's dominated solely by one zone and I think by  
22 looking at enough of these analyses you can pick out which  
23 zones are the dominant producer in the well.

24 The only problem with doing it that way  
25 is you do not know the 100 percent number, if I can say it

1 that way; otherwise, I don't know exactly what the 100  
2 percent Fruitland Coal number is. I feel by looking at  
3 enough of these analyses it's going to be the same or very  
4 close to my Fruitland dominated gas analysis average.

5 Q But isn't it cleaner and more accurate  
6 to look at just the coal production, for example, and then  
7 comparing these to just the sand production?

8 A I would absolutely love to have that  
9 data if it was around. It is not around in the southern  
10 part of the basin.

11 Q In Cedar Hill data is just coal produc-  
12 tion, is that true?

13 A That is correct, yes.

14 Q Now, the desorbed gas from coal is near-  
15 ly all methane, isn't it?

16 A Coal in the published, classical, Fruit-  
17 land coal gas, yes, it is almost entirely methane. That's  
18 what the C1/C1-5 value shows.

19 If you'll look at the average for the  
20 Cedar Hill Field, you'll see that .997.

21 What I'm saying here today is that is  
22 different gas than you're seeing in the southern part of  
23 the basin, also being Fruitland gas, and I think Mr. Rice  
24 alluded to that, also. It is not a consistent form.

25 Q But again in the southern data that

1 you're talking about, it's not just a coal production,  
2 isn't that right?

3 A I think generally speaking, once again  
4 I'm going to lean very heavily to my Fruitland dominated  
5 gas, if it's not 100 percent Fruitland coal gas, it's going  
6 to be very close to that.

7 Q So you don't agree that your samples for  
8 the south are contaminated or not representative of what  
9 the sands would do as opposed to what the coal would do?

10 A They are contaminated to the extent that  
11 I can't be 100 percent definitely sure, if you want to put  
12 it that way, that it's all coal as in the Cedar Hill Area,  
13 but I think if you look at enough of these analyses, you  
14 can come up with a very -- let's call it a low contamina-  
15 tion factor.

16 Q Only methane absorbs from the coal,  
17 isn't that right?

18 A I think that's published, yes.

19 Q The ethane and the heavier matter does  
20 not, right?

21 A I -- I have to say I question a lot of  
22 that data when I look at things like this. As published,  
23 and as well known as it is, I'd have to question it.

24 Q Now, when you've got commingled produc-  
25 tion, you agree, don't you, that it's necessary to drop the

1 production in the reservoir to absorb the methane from the  
2 coal? Do you agree with that?

3 A From a classic coal reservoir, yes.

4 Q Okay, and in some of the commingled  
5 areas that you've been discussing the reservoir has to --  
6 the reservoir pressure has to drop and absorb a lot of  
7 methane from the coal.

8 A That might -- I don't know that exact  
9 answer to that question, but that might be a correct state-  
10 ment, and once again I feel that this whole analysis leads  
11 to this is not a classic coal gas area to the south of the  
12 line.

13 Q Well, do you have any indication of how  
14 the Cedar Hill Area would perform with the PC open and  
15 commingled?

16 A Probably very differently. It's a dif-  
17 ferent area. It's a different coal; the same common source.

18 MR. LUND: Nothing further.

19 MR. CATANACH: Mr. Carr.  
20

21 CROSS EXAMINATION

22 BY MR. CARR:

23 Q Mr. McCord, you would agree with me,  
24 would you not, that when we're talking about spacing rules  
25 what we're really talking about is the area that an indi-

1 individual well can be expected to drain?

2 A Correct.

3 Q And what you're proposing is temporary  
4 spacing rules for a 3-year period of time at which time  
5 this body would again examine the rules.

6 A I do propose that and I would sure hope  
7 that we can iron out some of the problems just presented,  
8 trying, especially in our area, to come up with 100 per-  
9 cent Fruitland coal gas analysis to prove if all this is  
10 correct or not.

11 I believe it is but I would sure like to  
12 see more data, also. I think that's a very good reason to  
13 have a temporary 3-year period.

14 Q And the real reason for the 3-year  
15 period is the limited data that you have on the character-  
16 istics of the -- producing characteristics of these coal-  
17 beds south of your line of demarcation.

18 A That's one of the reasons, yes.

19 Q And you would hope three years from now  
20 to have better information so a final call could be made.

21 A I would hope that to be the -- true,  
22 yes.

23 Q And you're hoping that at that time  
24 to have definitive information and show 160-acre spacing to  
25 be appropriate.

1           A           I'd also like to have some pressure  
2 interference data, too.

3           Q           And then it's also possible, is it not,  
4 that when you get that information it might show that  
5 320-acre spacing is appropriate.

6           A           That certainly is possible.

7           Q           Now, if your recommendation is granted,  
8 during the next three years individuals could south of the  
9 line of demarcation develop this acreage on 160-acre  
10 spacing units.

11          A           Yes.

12          Q           And if it was determined that 320-acre  
13 drainage is in fact appropriate, we could have more wells  
14 than are necessary to produce the reserves south of that  
15 line, isn't that true?

16          A           That's correct.

17          Q           So we could have some unnecessary wells.

18          A           You could.

19          Q           In the meantime before the rules could  
20 be changed, we might also have situations occur where you'd  
21 have 160 acres dedicated to a well when the well in fact  
22 could drain more than 160 acres, isn't that also possible?

23          A           Yes, sir.

24          Q           If you go ahead and develop on 160 acres  
25 during the next three years, just assuming that 320 is the

1 appropriate spacing, you wouldn't really expect to have any  
2 additional recovery by virtue of the fact that you for a  
3 time drilled on 160-acre spacing, would you?

4 A Let's call it economic production --  
5 economic recovery, then.

6 Q You would increase your cost of develop-  
7 ing the reserve, would you not?

8 A Yes, you would.

9 Q And then when we get three years down  
10 the road and we'd have to change to 320-acre spacing, you  
11 would be confronted with having to find additional acreage  
12 to dedicate to those wells that are now on 160-acre spac-  
13 ing, wouldn't you?

14 A And I'll -- yes, that's correct, and  
15 I'll bring out that same type of scenario that this propo-  
16 sal right now will cause us to look at hundreds of wells  
17 already dedicated to the combination Fruitland-PC zone as  
18 a 160-acre common reservoir. That same type of scenario  
19 would happen in what you just described. It's already a  
20 problem.

21 Q But it would be a greater problem if in  
22 fact you develop on 160 and three years from now had to go  
23 to 320.

24 A Yes.

25 Q Now if we go with the Committee report

1 and we adopt rules to provide the 320-acre spacing, and in  
2 fact the interference information that you have was just an  
3 isolated set of circumstances, there are provisions in  
4 these proposed rules where you could infill a 320 in that  
5 area, isn't that correct?

6 A Yes, but it doesn't adequately address  
7 the problem right now of operators drilling Pictured Cliff  
8 wells on 160-acre spacing and having a problem of all of a  
9 sudden finding out that they are producing Fruitland gas  
10 and having to go back and redetermine their ownership in  
11 the well. Yes.

12 Q You also, if in fact it is determined  
13 320-acre spacing is appropriate across the southern por-  
14 tion of these coalbeds, and you had any isolated area or  
15 any portion of that area where 160-acre spacing was appro-  
16 priate, you would be able to drill an infill well, would  
17 you not?

18 A Yes. I think infill drilling is the  
19 wrong term, though, because you'd obviously --

20 Q You could put a second well on the other  
21 --

22 A You would put a second well on the other  
23 160, yes.

24 Q That's all I have.

25 MR. CATANACH: Any other



1 questions?

2  
3 CROSS EXAMINATION

4 BY MR. STOVALL:

5 Q I do have one question, Mr. McCord.  
6 In talking about your Exhibit Eleven, yeah, Exhibit Eleven,  
7 what bearing does the differing gas analyses depicted on  
8 here have with respect to drainage? What's the correla-  
9 tion you made between the evidence on composition of the  
10 gas and the appropriate drainage area?

11 A The correlation I've made is that the  
12 commingled wells are truly producing Fruitland gas, not  
13 Pictured Cliff- Fruitland combination. That's what I've  
14 done and tried to analyze and group these analyses, is try  
15 to prove from the wells that we're looking at that will  
16 infer (sic) drainage, are they producing predominantly Pic-  
17 tured Cliff gas or are they producing predominantly Fruit-  
18 land gas, and therefore through that analysis I've come up  
19 with the conclusion that they are producing predominantly  
20 Fruitland dominated gas and therefore the spacing.

21  
22 REDIRECT EXAMINATION

23 BY MR. ROBERTS:

24 Q I have one question on redirect.  
25 Mr. McCord, do you now have any data or

1 information available or are you aware of any data or  
2 information which would indicate that 160-acre spacing is  
3 not now the appropriate spacing for the area south of the  
4 line of demarcation?

5 A I don't have any data that suggests  
6 that. The only thing we've seen so far is the interfer-  
7 ence data presented by Amoco in the Cedar Hill Area and I  
8 think we're not talking in the same reservoir.

9 MR. ROBERTS: I have no other  
10 questions of this witness.

11 MR. CATANACH: Any other  
12 questions of this witness?

13 If not, he may be excused.

14 MR. ROBERTS: Mr. Examiner,  
15 I'd call Rob Willis.

16  
17 ROB A. WILLIS,  
18 being called as a witness and being duly sworn upon his  
19 oath, testified as follows, to-wit:

20  
21 DIRECT EXAMINATION

22 BY MR. ROBERTS:

23 Q Would you state your name and your place  
24 of residence for the record?

25 A Yes. My name is Rob Willis. I live in

1 Farmington, New Mexico.

2 Q What is your occupation?

3 A I'm a petroleum engineer.

4 Q Who are you employed by?

5 A Hixon Development Company.

6 Q How long have you been employed in that  
7 capacity?

8 A Approximately three years.

9 Q What are your employment responsibili-  
10 ties for Hixon Development Company?

11 A I'm responsible for drilling and  
12 completion, production, and reservoir work on Hixon  
13 operated leases in Farmington -- or in New Mexico, Okla-  
14 homa and Kansas.

15 Q Have you testified before the New Mexico  
16 Oil Conservation Division or Commission on any prior occa-  
17 sions?

18 A No.

19 Q Would you briefly describe your post-  
20 high school educational background?

21 A Yes. I have a Bachelor of Science de-  
22 gree in petroleum engineering from the University of Wyo-  
23 ming in 1984.

24 Q And have you practiced your profession  
25 for any other employer other than Hixon Development

1 Company?

2 A No, I haven't.

3 Q Are you familiar with the application in  
4 this case?

5 A Yes, sir.

6 Q Have you conducted a study of relative  
7 engineering data and information for purposes of providing  
8 testimony in this case?

9 A Yes.

10 Q Will you briefly describe that data and  
11 information?

12 A I've run through some drainage types of  
13 calculations incorporating volumetric gas calculations and  
14 P/z curves to try to formulate the drainage of some Fruit-  
15 land - PC wells Hixon operates

16 Q And those are -- those are applicable --  
17 that information is applicable to wells Hixon Development  
18 Company operates in the area south of the line of demarca-  
19 tion?

20 A Yes, that's -- that's correct.

21 MR. ROBERTS: Mr. Examiner, I  
22 would tender Mr. Willis as an expert in the field of pet-  
23 roleum engineering.

24 MR. CATANACH: He is so qual-  
25 ified.

1           Q           Mr. Willis, let's turn to what we've  
2 marked as Exhibit Number Fourteen and identify the exhibit  
3 and point out the pertinent data on that.

4           A           Exhibit Fourteen is an area map which  
5 indicates the location of the study wells, Mandana State  
6 No. 1, Mandana State No. 2, N.T.B. No. 1 and the Sam  
7 Jackson State No. 1.

8                       They were used to sample wellbores  
9 drilled on 160-acre spacing penetrating the Pictured Cliffs  
10 formation, and all these wells are operated by Hixon Deve-  
11 lopment Company.

12          Q           Now the dark line that appears to be  
13 drawn in on this map, that is the boundary of the WAW  
14 Fruitland - Pictured Cliff Pool?

15          A           Yes, sir.

16          Q           Go to Exhibit No. 2, please, and ident-  
17 ify that exhibit.

18          A           Exhibit Fifteen contains information  
19 provided from the Mandana State No. 1 Well.

20                       The first section depicts open hole  
21 logs, this is an induction log, of that Mandana State No.  
22 1.

23                       Of note are the indicated Pictured Cliff  
24 perforations. The Fruitland coal section in this wellbore  
25 is encountered directly above the Pictured Cliff sand. The

1 perforations were fracture stimulated upon completion.

2 With the small amount of separation  
3 between the PC and the Fruitland coal it is possible that  
4 the treatments through these Pictured Cliff perforations  
5 enhance communication with the Fruitland coal seam.

6 This type of completion procedure is  
7 consistent with all four sample wells.

8 Section Two is a gas producer's P/z  
9 curve from the Mandana State No. 1. The best fit curve  
10 yields a value of original gas in place at approximately  
11 720,000 MCF with an abandonment pressure of 25 psia.

12 In referring to Section 3, which are  
13 calculations regarding original gas in place and coal  
14 contribution, with the assumptions as stated on this paper,  
15 volumetric calculations from the Pictured Cliff sands with  
16 160-acre well spacing yielded original oil -- an original  
17 gas in place value of approximately 85,000 MCF.

18 In referring to the aforementioned P/z  
19 curve, the recoverable reserves from the wellbore are ap-  
20 proximately 720,000 MCF.

21 The difference between the two calcul-  
22 ated gas in place values is approximately 634,000 MCF.  
23 With the amount of Fruitland coal present in this wellbore  
24 one can suggest that the discrepancy in gas in place calcu-  
25 lations is due to methane generation or liberation from the

1 coal seam, and that is on the magnitude of 5.1 MCF per  
2 cubic foot of coal section.

3 The last part of the exhibit is a  
4 production history on a monthly basis from the Mandana  
5 State No. 1.

6 This wellbore was offset nine months  
7 post initial production and no drastic change in the P/z  
8 curve was noted and therefore leading me to believe that  
9 we're not seeing much interference, if any.

10 Q Mr. Willis, I'd like to direct your  
11 attention to the third page of Exhibit Number Fifteen, your  
12 gas in place and coal contribution calculations.

13 A Yes.

14 Q Could you very, very quickly describe  
15 how you selected the parameters for that calculation?

16 A Yes. As far as the initial gas in place  
17 it was a volumetric method. These parameters were used --  
18 the parameters that were used were mostly averages taken  
19 from either log calculations or samples taken at the well-  
20 site.

21 Q Now turn to your Exhibit Number Sixteen  
22 and just kind of describe that -- that exhibit.

23 A This is information pertaining to the  
24 Mandana State No. 2, which is 160-acre offset to the Man-  
25 dana State No. 1. The first section of this exhibit shows

1 that it has been just perforated in the Pictured Cliffs  
2 formation with the same type of treatments, fracture  
3 treatment as the Mandana State No. 1.

4 The next page is the gas produced versus  
5 P/z curve and it indicates a value of 950,000 MCF.

6 Referring to the third section, the  
7 volumetric calculations suggest that the initial gas in  
8 place is 117,000 MCF, whereas, if we laid the two of those  
9 together we'd find a discrepancy of 830,000 MCF, which  
10 suggests that with this Fruitland coal seam of 21 foot in  
11 this well, that would give you a coal contribution of ap-  
12 proximately 5.7 MCF per cubic foot of coal section.

13 Q Now, Mr. Willis, refer to your Exhibit  
14 Number Seventeen and identify and describe that (unclear).

15 A Exhibit Seventeen is similar to the  
16 aforementioned exhibits.

17 This was another area offsetting appro-  
18 ximately three miles to the west of the Mandana State  
19 Wells.

20 This well was also perforated in the  
21 Pictured Cliff formation and fractured.

22 Referring to the P/z curve we find a  
23 value of approximately 2950 MMCF original gas in place.

24 Calculations volumetrically suggest that  
25 this wellbore should be draining -- or should be -- have an



1 original gas in place value of approximately 215,000 MCF.

2           The discrepancy between these two values  
3 for original gas in place is approximately 2,735,000 MCF,  
4 which would suggest the coal contribution of approximately  
5 18.7 MCF per cubic foot of coal section in this wellbore.

6           Q           Now turn to your Exhibit Number Eighteen  
7 and identify that for the Examiner.

8           A           Exhibit Number Eighteen pertains to  
9 information from the Sam Jackson State No. 1, which is a  
10 160-acre offset to the N.T.B. No. 1.

11                   This well was also perforated in the PC  
12 and fracture stimulated.

13                   A P/z curve gives us a value of approxi-  
14 mately 1.020 MMCF original gas in place.

15                   Volumetric calculations suggest that the  
16 initial gas in place for this Pictured Cliff sand is approx-  
17 imately 173,000 MM -- or MCF and the discrepancy in these  
18 two calculated values is approximately 846,000 MCF and with  
19 this 22 foot section of Fruitland coal present in this  
20 wellbore, it suggests a coal contribution of approximately  
21 5.5 MCF per cubic foot of coal.

22           Q           Mr. Willis, based on your analysis and  
23 review of the data illustrated in Exhibits Fifteen through  
24 Eighteen, do you have an opinion as to what kind of gas of  
25 being produced from each of these four wells?

1           A           Yes.    In referring to Exhibit Eleven,  
2 handled by Mr. McCord, these wells all fall in the com-  
3 bination Fruitland coal - Pictured Cliff gas scenario.

4           Q           Are you able to, or have you drawn any  
5 conclusions from the data you've mentioned illustrated on  
6 these exhibits with respect to 320-acre poolwide spacing?

7           A           It is my opinion that these calcula-  
8 tions support 160-acre spacing for the Fruitland coal in  
9 this area south of the demarcation line.

10                   One could pose the question with the  
11 high recoveries from these wells it is possible that -- is  
12 it possible that this wellbore is draining more than the  
13 calculated 160 acres.

14                   And my feeling is no, based on the in-  
15 formation provided by the 160-acre offsets, the initial  
16 reservoir pressures provided show pressures of the same  
17 magnitude and the older well showed no appreciable pressure  
18 depletion indicating possible interference.

19           Q           Mr. Willis, based on your study of rele-  
20 vant engineering data which you have now testified to, do  
21 you have any -- any knowledge of the availability of any  
22 other data or information that would indicate that 160  
23 acres is not now an appropriate basis for the area south of  
24 the proposed line of demarcation?

25           A           I've seen no data to suggest that these

1 conclusions can't be extended throughout the area south of  
2 the line.

3 Q Were Exhibits Numbers Fourteen through  
4 Eighteen prepared by you or at your direction and under  
5 your supervision?

6 A Yes, sir.

7 MR. ROBERTS: Mr. Examiner, I  
8 move the admission of Exhibits Numbers Fourteen through  
9 Eighteen.

10 MR. CATANACH: Exhibits  
11 Fourteen through Eighteen will be admitted into evidence.

12 MR. ROBERTS: And I have no  
13 other questions on direct of this witness.

14 MR. CATANACH: Are there  
15 questions of this witness?

16 Mr. Kellahin.

17  
18 CROSS EXAMINATION

19 BY MR. KELLAHIN:

20 Q Mr. Willis, other than the analysis that  
21 you've presented on these four wells operated by Hixon  
22 south of the demarcation line, did you do any other volu-  
23 metric calculations?

24 A Other than these presented, no.

25 Q What made you select these four?

1           A           These four were -- had probably the  
2 greatest amount of P/z data that we have, and so I just  
3 grabbed these.

4           Q           Let's start with Exhibit Number Sixteen,  
5 I believe. Based upon your analysis, how do we quantify  
6 the amount of gas that is attributable to the Fruitland  
7 coal?

8           A           As I stated, there's a volumetric value  
9 calculated that was attributed to the Picture Cliff forma-  
10 tion. This value was then subtracted from the P/z curve --  
11 or the amount of oil -- or original gas in place indicated  
12 from the P/z curve and this discrepancy was the value that  
13 I felt was attributable to the Fruitland coal seam.

14          Q           What made you select a volumetric P/z  
15 methodology for analyzing the performance of these wells?

16          A           Mostly that's the only data that I had  
17 available to me.

18          Q           You heard earlier today, did you not,  
19 Mr. Woods concern using volumetric and P/z methodology in a  
20 diffusion reservoir such as this?

21          A           Yes, I did hear it.

22          Q           Do you disagree with Mr. Wood on that?

23          A           No, I don't disagree. I think this is a  
24 different type of area whereas I think this is applicable.  
25 The curve suggests -- the P/z curves that I came up with

1 flow fairly well, I think.

2 Q Well, when we look at Exhibit Number  
3 Sixteen, you have given us the volume of gas that you  
4 attribute to the coal. Have you calculated the drainage  
5 area attributed to the coal production?

6 A Well, once again, no, I -- I just used  
7 the 160-acre spacing as my area interpretation.

8 Q Did you go and make an interpretation of  
9 what would occur with a 320-acre assumption?

10 A No, I didn't.

11 Q You plugged in an assumption of 160  
12 acres.

13 A Yes, that's what those wellbores were  
14 drilled on, yes.

15 Q Yeah, but you didn't go through and make  
16 an analysis to see what it would be if you made an assump-  
17 tion of 320.

18 A No, I felt that that wasn't pertinent.

19 Q Well, the subject matter for the hearing  
20 --

21 A Well, it's pertinent, I agree, but to  
22 these wellbores, no.

23 Q Oh. You didn't give us a drainage  
24 radius area for the Exhibit Sixteen. Did you do the same  
25 thing with the other four, Fifteen, Seventeen and Eighteen?

1           A           Yes, sir.

2           Q           You'd made the assumption that you had  
3 160 acres and used that assumption in your calculation.

4           A           Yes, sir.

5           Q           And you've made no comparison as to what  
6 would happen if you made an assumption on 320 acres.

7           A           Since these wellbores were drilled on  
8 160 acres and I believed there wasn't any interference, I  
9 did not do that.

10          Q           Now, which one of these analyses is the  
11 one you discussed where you said you had small separation  
12 between the PC and the Fruitland and because of the frac-  
13 ture stimulation of these wellbores on completion you might  
14 have communicated the PC and the Fruitland?

15          A           That would be Exhibit Fifteen.

16          Q           Fifteen. Again what is the method by  
17 which you have analyzed that production to separate out,  
18 then, Pictured Cliff sand and Fruitland sand from the  
19 Fruitland coal gas production?

20          A           What is the method is attribute to that?

21          Q           Yes, sir.

22          A           Exhibit Eleven.

23          Q           You as an engineer, then, how do you  
24 separate that out for yourself?

25          A           The composition of the gas from analy-

1       sis.

2                   Q               When we look at Exhibit Number Seven-  
3       teen, Mr. Willis, if I remember correctly you've got a 2.7  
4       BCF difference?

5                   A               Yes.

6                   Q               And that's a difference between what?

7                   A               That's a difference between the calcu-  
8       lated P/z value and volumetric gas in place.

9                   Q               And that difference, the 2.7 BCF, you  
10       attribute to the Fruitland coal production?

11                  A               It would be suggested, yes.

12                  Q               That's suggested, and have you calcu-  
13       lated the drainage area for that, other than what you've  
14       told us?

15                  A               I used the same 160, since the offset  
16       was 160.

17                  Q               In the calculation what was the assump-  
18       tion of the thickness of the coal?

19                  A               21 feet, and that's from the log sec-  
20       tion.

21                  Q               Do you have a gas analysis for that  
22       well?

23                  A               Yes, sir.

24                  Q               And is that one of the exhibits that Mr.  
25       McCord gave us? Is it on that display?

1           A           Yes.

2           Q           When we're talking about the volume of  
3 gas in a cubic feet -- foot hole, can you translate that  
4 into what it represents in terms of cubic feet of gas in  
5 relation to a ton a coal?

6           A           It can be done. I haven't done it.

7           Q           You have not done it?

8           A           No.

9           Q           In plotting your analysis did you see  
10 any of the typical signature of a gas produced from a coal  
11 seam whereby we have inclining gas allowables?

12          A           No, sir, not in these samples.

13          Q           You talked in relation to Exhibit Number  
14 Eleven about an inference of interference data? Did I mis-  
15 understand when you were addressing Exhibit Number Eleven  
16 you talked about the interference between wells?

17          A           Not referring to Exhibit Eleven but the  
18 only inference I made to interference dealt with the fact  
19 that I saw no drastic pressure depletion in the P/z curve  
20 at the time the offset well was drilled and completed.

21          Q           And what wells were you specifically  
22 referring to when you saw no interference?

23          A           Both Mandana Well No. 1 and the Sam  
24 Jackson State No. 1. I'm sorry, Mandana Well No. 2 and the  
25 Sam Jackson State No. 1.



1           Q           In providing the data for each of these  
2 four wells, Mr. Willis, did you actually plot a production  
3 decline curve?

4           A           No, no, I didn't. No, sir.

5           Q           You've got the tabulated data here but  
6 you didn't plot --

7           A           No.

8           Q           -- a decline curve.

9           A           No. No. The curve would certainly have  
10 some fluctuations in it due to market conditions and being  
11 dropped down. I did not plot the actual curve, no.

12                       MR. KELLAHIN: Thank you.

13  
14                       CROSS EXAMINATION

15 BY MR LUND:

16           Q           Mr. Willis, I'm afraid I'm way over my  
17 head. I've already confused absorption and desorption, so  
18 I'll -- I've got to just ask you a couple of questions --

19           A           Okay.

20           Q           -- and then let the engineers talk about  
21 this.

22                       Let me see if I can -- see if I under-  
23 stand your testimony.

24                       In calculating your recoverable reserves  
25 you did the P/z calculation and then the difference -- the

1 difference between what's actually produced and what your  
2 calculations were you attributed to the coal, is that  
3 right?

4 A Yes.

5 Q On your Exhibit Number Fifteen, would  
6 you turn to that, please?

7 A Yes.

8 Q On your second page, am I incorrect? It  
9 looks like your last two data points are not on that curve,  
10 is that right?

11 A Certainly this is approximation or a  
12 best fit according to my eye. They are not certainly in  
13 contact with that line, no.

14 Q So the 146 and 137 would be over above  
15 that decline line, right?

16 A Yes. I believe that the 110 number is  
17 probably a little bit low.

18 Q All right, that's my second question.  
19 You've got over on your far righthand column, you go 144,  
20 then it goes up, 148, then it goes down to 110. Then it  
21 goes up to 146 and and down to 137. Is that typical?

22 A That's possible with mechanical opera-  
23 tions, yes; possibly just some bad data, bad gauge or some-  
24 thing.

25 Q Our engineer will talk about it later.

1 Okay.

2 MR. CATANACH: Any other  
3 questions of this witness?

4 MR. ROBERTS: Mr. Examiner, I  
5 have one question on redirect.

6  
7 REDIRECT EXAMINATION

8 BY MR. ROBERTS:

9 Q Mr. Willis, you would expect, would you  
10 not, that the use of a 320-acre drainage parameter for your  
11 gas in place calculations would -- would affect the bottom  
12 line calculation, would it not?

13 A Yes, it would.

14 Q But would it change your conclusions  
15 with respect to the absence of interference?

16 A No.

17 MR. ROBERTS: I have no other  
18 questions.

19  
20 CROSS EXAMINATION

21 BY MR. CATANACH:

22 Q Mr. Willis, in your four exhibits you've  
23 got a number for the coal's contribution. Three of them  
24 are basically the same and one of them is significantly  
25 higher.

1           A           Yes, that's correct.

2           Q           Can you explain that?

3           A           No, I cannot explain that. It's  
4 certainly a better well.

5                       MR. CATANACH: That's all I  
6 have. You may be excused.

7                       MR. ROBERTS: Mr. Examiner, I  
8 would like to recall Mr. McCord to address some of the  
9 potential problems these operators have identified with  
10 320-acre poolwide spacing.

11  
12                      KEVIN H. McCORD,  
13 being recalled as a witness and remaining under oath,  
14 testified as follows, to-wit:

15  
16                      DIRECT EXAMINATION

17 BY MR. ROBERTS:

18           Q           Mr. McCord, have you identified some  
19 potential problems associated with 320-acre poolwide  
20 spacing?

21           A           Yes, I have.

22           Q           Would you discuss those -- these  
23 problems?

24           A           The Fruitland formation in the area  
25 south of the proposed dividing line is currently primarily

1 developed on 160-acre spacing.

2           The primary objective of much of the  
3 shallow depth drilling in this area is the Pictured Cliff  
4 formation, which is currently also developed on 160- acre  
5 spacing.

6           With spacing for the two formations uni-  
7 form, downhole commingling has proven to be relatively sim-  
8 ple from an administrative perspective because -- primarily  
9 because it is extremely unusual for ownership to be segre-  
10 gated vertically. With ownership of the two formations  
11 common, administrative approval of request for downhole  
12 commingling is commonplace. This has relieved operators  
13 of the time and expense of a hearing before the NMOCD to  
14 obtain approval for downhole commingling.

15           The practice of completing and producing  
16 wells in this manner has not created allocation of produc-  
17 tion problems or correlative rights problems because spac-  
18 ing and consequently ownership of the two formations has  
19 been uniform.

20           If spacing for the Fruitland formation  
21 south of the proposed demarcation line is changed from 160  
22 acres to 320 acres, then administrative problems, alloca-  
23 tion problems, and correlative rights problems will begin  
24 to surface.

25           The ownership of the two formations may

1 no longer be uniform; in fact, this would be a common sit-  
2 uation.

3                   It not uniform, then request for down-  
4 hole commingling will be gathered -- will be granted only  
5 after incurring the time and expense of notice and hearing.  
6 This is an administrative burden both for the NMOCD and the  
7 the operator.

8                   In addition, accurate and equitable  
9 allocation of production between the formations becomes a  
10 critical process under circumstances in which ownership is  
11 not common. Allocation is not an exact process and the  
12 potential for abuse exists.

13                   Non-uniform ownership of the two forma-  
14 tions may also provide a setting in which violation of cor-  
15 relative rights is more likely to occur.

16                   For example, in the Chaco area where the  
17 main Fruitland coal is located just on top of the Pictured  
18 Cliffs formation, the common practice of fracture stimula-  
19 tion -- stimulating the Pictured Cliff formation commonly  
20 results in drainage of gas from the Fruitland coal thereby  
21 damaging the correlative rights of the owners of the Fruit-  
22 land formation.

23                   This is a potential problem regardless  
24 of whether the two formations are commingled downhole or  
25 completed and produce separately.

1                   Another possible problem that could  
2 arise if the vertical limits are contracted to exclude the  
3 Fruitland coal zone and 320-acre spacing is given to the  
4 Fruitland coal zone in the WAW Fruitland - PC Pool, for  
5 example, would be the case where in a given well you could  
6 have a Fruitland sand with 160-acre spacing overlying a  
7 Fruitland coal overlying the Pictured Cliff sand with  
8 160-acre spacing. This would generally be a case of a pool  
9 within a pool having different spacing and very little  
10 control completionwise to produce these zones separately.

11                   If the Fruitland coal was spaced 160  
12 acres in this situation, at least a correlative rights  
13 question in this situation would not be such a problem.

14                   It was suggested by Mr. Chavez that if  
15 an operator is found to have fracture stimulated into the  
16 Fruitland coal while completing the Pictured Cliffs forma-  
17 tion and thus produce gas from both formations, then the  
18 operator should have the opportunity to come into  
19 compliance with the regulations.

20                   This would be a near impossible task to  
21 do physically other than simply plugging the well.

22                   The other possibility would be to read-  
23 just ownership, costs, and revenue distribution for the  
24 well, which would be very difficult to do.

25                   The potential problems I've identified

1 illustrate the kinds of problem that may surface if spacing  
2 for the Fruitland formation in the area south of the pro-  
3 posed dividing line is changed from 160-acres to 320-acres.  
4 I've not attempted to describe all potential problems.

5 Other problems such as the allocation of  
6 cost of operation between the owners of the two formations  
7 under circumstances in which ownership is not common, are  
8 foreseeable and I've just pointed one case out; however;  
9 most of these kinds of problems can be avoided simply by  
10 maintaining 160-acre spacing for the Fruitland formation in  
11 the area south of the proposed dividing line.

12 Q Mr. McCord, in earlier testimony it was  
13 inferred that the increased well density provision that  
14 Rule 4 of the proposed special rules would give the opera-  
15 tor the flexibility to drill on 160 acres.

16 In your opinion does the increased well  
17 density provision in Rule 4 serve to alleviate all or any  
18 of the problems that you have identified?

19 A It does not and the most glaring example  
20 is common ownership of the 160's. If the two 160's side-  
21 by-side are not common ownership, then you have a situation  
22 of trying to allocate production between the two zones,  
23 which could be a terrible problem.

24 MR. ROBERTS: I have no other  
25 questions.



1 MR. CATANACH: Any other  
2 questions of this witness?

3 Mr. Lyon.  
4

5 QUESTIONS BY MR. LYON:

6 Q Mr. McCord, is there not a subsidy that  
7 has (not clearly understood)?

8 A Yes, that's correct.

9 Q If you have a combined stream there can  
10 you allocate that production?

11 A I don't see any other way to do it. I  
12 mean you, first of all, you're going to have to identify  
13 gas being produced from the Fruitland zone, Fruitland coal  
14 zone and as has been pointed out through my gas analysis,  
15 that's not easily done. You have to make some assumptions  
16 so it does become a real problem, yes.

17 Q Are you collecting a subsidy on your  
18 wells now?

19 A No, sir.

20 Q Did you think that you might be able to  
21 as a result of this hearing or other hearings before the  
22 Division?

23 A I don't believe any more so than we  
24 would be able to at this point in time. That situation  
25 exists to an individual operator depending on his tax sit-

1 uation. It is not open and free to everyone. Tax conse-  
2 quences certainly come into effect with the use of that tax  
3 (unclear)

4 Q Well, if you -- if you have to allocate  
5 to collect the subsidy then there wouldn't -- there -- you  
6 wouldn't have the problem of allocating specifically to --  
7 to meet our requirements, is that right?

8 A I'm not sure I can answer that exactly.  
9 Why don't you state it again?

10 Q Well, if you have to allocate the gas in  
11 order to collect the subsidy, then you have to allocate by  
12 a well basis, would you not?

13 A Yes.

14 Q And whatever the spacing that we set up  
15 for the Fruitland, you would have made that allocation  
16 anyway, would you not?

17 A That's correct.

18 MR. LYON: That's all I have.

19 MR. CATANACH: Any other  
20 questions?

21 The witness may be excused.

22 MR. ROBERTS: Mr. Examiner,  
23 I'd like to ask Mr. Fagrelus to come to the witness stand  
24 for a brief (not understood ).  
25

1 KURT H. FAGRELIUS,  
2 being recalled as a witness and remaining under oath,  
3 testified as follows, to-wit:  
4

5 REDIRECT EXAMINATION

6 BY MR. ROBERTS:

7 Q Mr. Fagrelus, would you briefly  
8 summarize the recommendations you would submit today with  
9 respect to the adoption of the special pool rules appli-  
10 cable to this proposed Fruitland coal pool?

11 A We propose that the following recommend-  
12 ations be incorporated into the special pool rules adopted  
13 for the San Juan Basin Fruitland Coalbed Methane Pool:

14 First, that a line be established  
15 dividing the proposed San Juan Basin Fruitland Coalbed  
16 Methane Gas Pool into two areas. The area generally  
17 located to the north of the dividing line would be devel-  
18 oped on 320-acre spacing and proration unit.

19 The area generally located to the south  
20 of the dividing line would be developed on 160-acre spacing  
21 and proration units.

22 The legal description of the proposed  
23 dividing line is set forth in Exhibit Number Nine.

24 We also propose that a buffer zone one  
25 section deep on each side of the dividing line be esta-

1 lished. An operator would have an option to develop lands  
2 within the buffer zone on either 320-acre or 160-acre  
3 spacing.

4 We also propose that the development of  
5 the San Juan Basin Fruitland Coalbed Methane Gas Pool south  
6 of the dividing line continue on 160-acre spacing and pro-  
7 ration units for a period of three years from the date of  
8 the issuance of an order in this case, at which time the  
9 New Mexico Oil Conservation Division would re-examine the  
10 spacing rules.

11 Q Mr. Fagrelus, in your opinion would the  
12 adoption of these recommendations be in the best interest  
13 of conservation, protect correlative rights, and result in  
14 the prevention of waste?

15 A I believe it would.

16 Q Have you contacted the members of the  
17 Fruitland Coalbed Methane Committee regarding these recom-  
18 mendations?

19 A Yes, I have.

20 Q Would you describe the reaction of those  
21 members whom you contacted?

22 A Of the twelve voting members of the com-  
23 mittee contacted, seven approved or did not oppose our  
24 proposal; four chose to go with the committee recommenda-  
25 tion and one was undecided until they could view our data.

1 MR. ROBERTS: I have no other  
2 questions. That concludes our case, Mr. Examiner.

3 MR. CATANACH: Thank you, Mr.  
4 Roberts.

5 Mr. Kellahin? Mr. Lund, do  
6 you have something else?

7 MR. LUND: Could we have five  
8 minutes to see if we could consolidate it and it could go  
9 quicker?

10 MR. CATANACH: That would be  
11 great. Let's take five minutes.

12  
13 (Thereupon a recess was taken.)

14  
15 MR. CATANACH: We'll turn it  
16 over to Mr. Lund at this time.

17 MR. LUND: Thank you, Mr.  
18 Examiner. What we'll do is Mr. Wood will first respond to  
19 the last three witnesses' testimony and real quickly set  
20 forth Amoco's additional testimony.

21 So, Mr. Wood has already been  
22 qualified and sworn. Are his qualifications acceptable?

23 MR. CATANACH: Certainly.  
24  
25

1 C. ALAN WOOD,  
2 being called as a witness and being previously sworn upon  
3 his oath, testified as follows, to-wit:  
4

5 REDIRECT EXAMINATION

6 BY MR. LUND:

7 Q Mr. Wood, would you please just comment  
8 on the last three, or whatever portion of the last three  
9 witnesses' testimony as it was and give our side of it?

10 A Yes, I would.

11 In particular I'd like to address the  
12 information and data shown on Exhibits Fifteen through  
13 Eighteen.

14 If you take a look at Exhibit Number  
15 Fifteen, and in particular the third page of the exhibit,  
16 excuse me, the second page, which is the P/z plot, it's my  
17 understanding based upon what Mr. Willis said, that that  
18 this was a "best fit" as to visual fit of the data that's  
19 available.

20 It's also my understanding that the data  
21 that was used to construct this particular plot is listed  
22 in the table in the upper righthand portion of the exhibit.  
23 There are dates. There are gas cum volumes, and also a P/z  
24 calculated number, or a P/z number.

25 The last two numbers, one corresponding

1 to the June '85 date, as well as the April, '86 date, do  
2 not appear to be plotted on the -- on the graph. I've  
3 taken the liberty to plot those and they fall substantially  
4 above the extrapolated line Mr. Willis had put on this  
5 plat.

6 We have heard that their conclusion is  
7 that these four wells may be producing volumes of coal gas  
8 in conjunction with a Pictured Cliff gas volume. Right now  
9 I do not have sufficient data before me to support that  
10 conclusion nor to completely deny that conclusion.

11 In looking at the data that has been  
12 presented, in particular these four exhibits, there are  
13 some funny things happening we need to talk about.

14 The first thing we need to discuss is  
15 the technical background for using the P/z extrapolation to  
16 determine recoverable reserves or even original gas in  
17 place numbers for a given well.

18 Traditional gas well engineering tells  
19 us that within a volumetric reservoir whenever we have  
20 withdrawal of a gas volume, you see a corresponding de-  
21 crease in the reservoir pressure. It's that theory that  
22 allows us to construct a P/z plot and to utilize it for  
23 reserve extrapolations or extrapolations of original gas in  
24 place.

25 The things that can affect us in a trad-

1     ditional gas reservoir is we have an external pressure  
2     source, such as do we have some type of water influx or if  
3     we're in an extremely tight reservoir we always question  
4     the validity of our pressure data, our measurements of the  
5     pressure.

6                     What happens within a coal reservoir is  
7     that we're producing from a different mechanism. We're  
8     producing from a desorption mechanism, and as opposed to a  
9     volumetric reservoir, traditional sand type reservoir, we  
10    do not see a linear relationship with gas volumes and pres-  
11    sure drops.

12                    In coal wells as we increase -- as we  
13    further decrease the reservoir pressure we see increasingly  
14    large volumes of gas being produced for that same delta P.

15                    I've stated earlier in my testimony with  
16    regard to Cedar Hill that one of the problems we recognized  
17    was the inability to apply traditional engineering calcula-  
18    tions to coal wells. These exhibits, in my opinion, repre-  
19    sent their problem in demonstrating that problem.

20                    The difference that we actually see here  
21    is that you cannot utilize a P/z extrapolation to determine  
22    recoverable reserves from a well that's producing coal gas.

23                    That's what they've attempted to do  
24    here. They have said, I've got well performance that says  
25    I'm going to recover X volume of gas. Based on volumetric



1 calculations I can only contribute a certain portion of  
2 that to the sand production; therefore, the remaining  
3 volumes must be produced from coal.

4 My contention is, given the different  
5 producing characteristics of coal as compared to tradi-  
6 tional gas sand reservoirs, you cannot utilize this P/z  
7 plot to make that type of reserve determination or an  
8 original gas in place determination.

9 There are some things, strange things,  
10 happening on these four plots.

11 If you'd take a look at Exhibit Number  
12 Fifteen and the tabulation of the data in the upper right-  
13 hand portion of the exhibit, you do see that there is a  
14 significant fluctuation in the calculated and presented P/z  
15 data points.

16 In January, 1984, we have 144 psia. Six  
17 months later in June of 1984 they report 148. Five months  
18 later they go down to 110 and then they go back up seven  
19 months later in June of 1985 to 146.

20 In a volumetric reservoir you cannot  
21 have increasing reservoir pressure unless you have some  
22 type of external pressure source or possibly in this case  
23 you're producing something other than sand gas.

24 Another thing you can look at is  
25 Exhibits Sixteen and Seventeen. You also see that the his-

1 torical P/z numbers do not show a consistent decline. You  
2 see numbers that are higher than numbers that were measured  
3 in the previous test or even the test before that.

4 One of the other things we can also do  
5 on a volumetric reservoir is we can make a calculation on  
6 the volume of gas that will be produced that corresponds to  
7 a drop in the reservoir pressure, an MCF per delta P calcu-  
8 lation, if you wish.

9 Utilizing that approach on Exhibit  
10 Fifteen, in April of 1979, which is the first reported  
11 data, you have produced approximately 1100 cubic -- 11,000  
12 cubic feet of gas per 1 psi pressure drop.

13 That same performance in March of 1983  
14 has gone up to 5900 MCF per delta P.

15 If you look at Exhibit Number Seventeen,  
16 based on the July, 1980, test we can make that calculation  
17 5600 MCF per delta P and in November of 1982 that increases  
18 to 12,000 MCF per delta P.

19 On Exhibit Number Eighteen on the June,  
20 1984, test data we can calculate 3700 MCF per delta P.

21 In October of 1985 that number increases  
22 to 9,900 MCF per delta P.

23 That may indicate that we are seeing  
24 contribution from coals on these wells. As I've indicated,  
25 we don't have enough data, I do not have enough data before

1 me to draw that conclusion.

2 If in fact we are seeing a contribution  
3 from coals in these wells, then the engineering approach is  
4 in utilizing the P/z plot to make a determination of re-  
5 coverable reserves or original gas in place is technically  
6 incorrect.

7 Q Do you think that the -- that informa-  
8 tion about the Cedar Hill Area has been altered or changed  
9 by anything you've heard from the last two witnesses?

10 A No, sir, I do not. As I indicated in my  
11 previous testimony, Cedar Hill gave us some very useful  
12 data. We had a single producing well and we had three  
13 pressure observation wells surrounding that well that we  
14 could physically take pressure data (unclear).

15 We had, I guess you could say, as close  
16 to laboratory conditions as you could possibly hope to  
17 find.

18 Q Before we turn to our two individual  
19 concerns, do you have anything else to add about the  
20 (unclear)?

21 A Not on this.

22 Q Real quickly, we're going to make two  
23 more points that show how Amoco deviates a little bit from  
24 the proposed rules. We have two short exhibits.

25 Mr. Wood, while I'm passing these out,

1 would you please first identify Exhibit Number Four and ex-  
2 plain this exhibit, please?

3           A           Exhibit Number Four would represent four  
4 sections and they could be any four sections within a  
5 township.

6                       On each one of the sections by virtue of  
7 a dashed line I have indicated the half section line, which  
8 would be the division between what I've assumed to be two  
9 stand-up 320-acre drilling and spacing units. Within each  
10 of those 320-acre stand-up units I've indicated by another  
11 box what would be the permitted well location under the  
12 recommended rules from the Methane Committee.

13                      On the righthand side of the exhibit I  
14 have presented the calculations of the drainage radius that  
15 would correspond to different spacing sizes, on a 40-acre  
16 spacing size up to a 640-acre spacing size.

17                      Below that we present some information  
18 as to what the effective drainage radius would be if in  
19 fact an operator or any number of operators elected to  
20 develop the reservoir at locations which would be legal  
21 under the recommended well location requirements from the  
22 Methane Committee.

23                      In the interior portion of my 4-section  
24 plot, I've got four gas well symbols. Those would indicate  
25 4 legally drilled, legally located wells.

1           Q           Now, both Mr. Catanach and Mr. Chavez  
2 expressed some concern about the possibility of well  
3 clustering.

4                       What is your recommendation on behalf of  
5 Amoco to alleviate that problem?

6           A           Well, we certainly agree with the  
7 previous comments that the proposed well locations could  
8 result in well clustering. It's my opinion that could be a  
9 wasteful action in that you would have de facto spacing  
10 much less than your 320-acre spacing and it could result in  
11 ineffecient production and recoveries from the reservoir.

12                      Amoco's recommendation is to adopt a  
13 staggered well location that actually honors the fact that  
14 we're looking at 320-acre spacing and we are advocating  
15 that this Commission adopt in a requirement that wells, the  
16 initial well within each 320 be located in either the  
17 southwest quarter or the northeast quarter of the section  
18 with the footage requirements as specified by the Methane  
19 Committee.

20           Q           Now your Exhibit Four indicates that  
21 you've got in fact both 40-acre offsets and 80-acre off-  
22 sets. If your recommendation is granted isn't it true that  
23 there would still be what would be in fact an 80-acre  
24 offset?

25           A           That's true but you have to take a look

1 at what happens to the section to the north of my four  
2 sections and also to the sections to the south.

3 If you had similar development down here  
4 you can in excess of 8000 feet between producing wells  
5 because of operators' decisions to cluster wells in the  
6 unit.

7 Q Is your suggestion unique in your exper-  
8 ience as a proration and unitization expert?

9 A No, it is not. It's been my experience  
10 that states on numerous occasions will adopt staggered well  
11 locations whenever they adopt rectangular spacing units.

12 Q So the staggered locations go with the  
13 rectangular spacing units, is that --

14 A Yes, sir, they do.

15 Q Was Exhibit Number Four of Amoco's pre-  
16 pared by you or under your supervision and control?

17 A Yes, it was.

18 MR. LUND: I offer Exhibit  
19 Four in evidence.

20 MR. CATANACH: Exhibit Number  
21 Four will be admitted as evidence.

22 Q Let's turn to Exhibit Number Five, now,  
23 Mr. Wood, please. Would you identify it, please?

24 A Exhibit Number Five is a 16-section plat  
25 of the Cedar Hill spaced area, currently spaced on Divi-

1 sion orders. As I indicated in my previous testimony,  
2 Cedar Hill was spaced in 1984 and that was under Order No.  
3 R-7588, dated July 9th, 1984. That was granted for a  
4 temporary period of two years and subsequently reviewed on  
5 March 7th, 1986, resulting in Order No. R-7588-A, which  
6 made the spacing permanent.

7 If you notice in the hearing the OCD  
8 staff identified a number of existing Fruitland spaced  
9 area, Fruitland fields, for address -- to be addressed by  
10 this Division to delete from the nomenclature in those  
11 fields the coal seams. One of the fields which was absent  
12 from that list was in fact Cedar Hill.

13 Cedar Hill was spaced only for the Basal  
14 Coal. If you could remember Busch's type log, you would  
15 then find that there's a number of up-hole coal stringers  
16 that by virtue of today's cost may be spaced 320 acres.

17 We have a concern within Cedar Hills  
18 that our production to date has been predominantly from the  
19 Basal coal seam. We have dewatered that coal seam; our  
20 concern is that if we're obligated to utilize that same  
21 wellbore for an up-hole coal seam completion, we may be  
22 seeing water that would be found in that up-hole coal seam  
23 being dumped upon the Basal coal member which in Cedar Hill  
24 has been effectively dewatered already.

25 And we are concerned that there is a

1 potential for subsurface waste if that was allowed to hap-  
2 pen.

3 Q And what is Amoco's proposal to prevent  
4 that potential waste?

5 A Our proposal is for the lands currently  
6 included within the Commission's order for Cedar Hill, but  
7 in particular for the 320-acre tracts that have been deve-  
8 loped with a wellbore, that they be allowed to produce the  
9 up-hole coal stringers from a separate wellbore than the  
10 the current wellbore that's producing only from the Basal  
11 Coal stringer -- seam.

12 Q What about -- would the spacing and the  
13 orientation be the same --

14 A We are recommending --

15 Q -- for this new wellbore?

16 A -- that the spacing and the orientation  
17 for the 320-acre spacings would be the same.

18 Q And is it possible for Amoco to do that  
19 because they have (not clearly understood) in the proposed  
20 open hole completion?

21 A Yes.

22 Q Did you want to comment on Rule 3(B)  
23 about the (unclear)? That's the last thing I have on my  
24 list.

25 A Very briefly.



1                   Q           That's about the unorthodox well loca-  
2 tions?

3                   A           I believe the Examiner had a comment as  
4 to deleting -- or I guess it was Mr. Stovall.

5                               That's right, in Rule 3(B) Mr. Stovall  
6 asked Mr. Alexander whether or not he would have any ob-  
7 jection to delete the notice and, or to specify that the  
8 administrative approval would be granted after hearing,  
9 since the applicant had already given notice by virtue of  
10 this mailing to the affected owners.

11                               I think Mr. Alexander's reply was that  
12 it probably should be left as recommended by the Methane  
13 Committee.

14                               We would support that position because  
15 what we are talking about here are two different animals.

16                               The first portion of proposed Rule 3(B)  
17 allows the Director to grant without any notice or any  
18 hearing when an exception was necessitated by topography.  
19 That means that the applicant or the operator doesn't have  
20 to go to the offset owner. The rest of the proposed rule  
21 deals with a procedure to allow administrative approval of  
22 location exceptions which may be necessitated by something  
23 other than topography, and sets forth a mechanism by which  
24 they can give constructive notice to the offset owners.  
25 The offset owners would have a finite period of time, i.e.

1 twenty days, in order to file an objection.

2 Failing to receive an objection, the  
3 Director can certainly grant the exception.

4 The other comment I would make is that  
5 the notice requirements specified under this rule, that  
6 meaning certified letter, are different from the notice  
7 requirements to call a hearing. We don't have the  
8 published notice requirements and so it's my opinion that  
9 the language should be retained as recommended by the  
10 Methane Committee.

11 Q I don't think -- I'm sorry, housekeep-  
12 ing -- on Exhibit Number Five I forgot to get that into  
13 evidence.

14 Did you prepare Exhibit Five or was it  
15 prepared under your supervision and control?

16 A Yes, I did.

17 MR. LUND: I offer Exhibit  
18 Five into evidence, Mr. Examiner.

19 MR. CATANACH: Exhibit Five  
20 will be admitted into evidence.

21 MR. LUND: Nothing further,  
22 thank you.

23 MR. CATANACH: Any questions?

24 MR. STOVALL: I've got a --  
25 I've got a couple of quick ones, just a couple of point of

1 clarification.

2  
3 RECROSS EXAMINATION

4 BY MR. STOVALL:

5 Q With respect to your Exhibit Four, I'll  
6 call it the designated drilling order proposal, do you know  
7 how that would affect existing wells in the proposed pool  
8 that might already be drilled into the formation. would it  
9 become part of the pool?

10 A Unfortunately I did not make the attempt  
11 to review all of the current Fruitland pools to determine  
12 what the orientation may have been.

13 The orientation presented on this exhi-  
14 bit is the orientation that was adopted from Cedar's.

15 Q And so it might be difficult to put this  
16 in place in light of existing wells and there might have to  
17 be some exception made for existing wells based on location  
18 rather, not necessarily the orientation we have, is that  
19 correct?

20 A Possibly.

21 Q Now, let me -- let me go back and raise  
22 a point on the Exhibit Three and make sure that I under-  
23 stand your response compared to Mr. Alexander's.

24 I understood Mr. Alexander that he is  
25 distinguishing the requirements for notice prior to admin-

1 istrative approval of the unorthodox location based upon  
2 whether or not the unorthodox location is closer to another  
3 proration unit rather than unorthodox within the existing  
4 proration unit; that is, between the two quarter sections  
5 of the proration unit.

6                   You're suggesting that the distinction  
7 as to whether notice to offset operators would be required  
8 would be based not on the nature of the unorthodox location  
9 but rather the cause for the request. Is that correct?

10               A           I would agree with Mr. Alexander that  
11 the proposed language from the Methane Committee does read  
12 by virtue of being closer to the outer boundary of the  
13 spacing unit.

14               Q           Okay.

15               A           So an internal exception, I don't think,  
16 would be addressed under this proposed rule.

17               Q           Okay.

18                               MR. CATANACH: You may be  
19 excused.

20                               MR. ROBERTS: I would --

21                               MR. CATANACH: Oh.

22  
23                               REDIRECT EXAMINATION

24 BY MR. ROBERTS:

25               Q           Mr. Wood, Mr. McCord and again Mr.

1 Willis testified that the coal reservoir in the South  
2 Gallegos Fruitland - Pictured Cliff Pool and the WAW  
3 Fruitland - Pictured Cliff Pool did not exhibit classical  
4 reservoir characteristics. Do you agree with that testi-  
5 mony?

6 A I haven't seen the data to -- that would  
7 lend itself to that conclusion one way or the other.

8 Q Do you know of any data which would  
9 contradict that testimony?

10 A No, I don't, none I've seen with the  
11 production performance curves.

12 Q Was it your testimony that the Cedar  
13 Hill Fruitland Pool is a classic coal reservoir?

14 A I think as we get into additional wells  
15 within the basin, as we develop additional data bases,  
16 we're going to learn more as time goes on. My testimony  
17 before that coal, as exhibited by the well performance in  
18 the Cedar Hill certainly has presented some unique produc-  
19 ing characteristics and that those characteristics have  
20 carried forth and are giving us some problems in applying  
21 traditional conservation calculations.

22 Q Mr. McCord and Mr. Willis, I think, were  
23 implying through their testimony that it's their opinion  
24 that the South Gallegos Fruitland - Pictured Cliff Pool and  
25 the WAW Pictured Cliff Pool represent more of a convention-

1 al coal reservoir. If this is a conventional type reser-  
2 voir in that area would you expect that a P/z versus cumu-  
3 lative analysis would be appropriate?

4 A I don't think it would be, no.

5 Q Why not?

6 A Because coals are producing from a dif-  
7 ferent depletion mechanism than what you see with a volu-  
8 metric gas sand reservoir, and that's the desorption of the  
9 gas from the face of the coal.

10 Q But in your opinion would it be possible  
11 -- I think on one exhibit you were pointing out some data  
12 points that seemed to give some (unclear), to represent  
13 something that -- is it possible to have (unclear) that  
14 data point when doing a P/z type analysis?

15 A As I indicated, hopefully, I indicated  
16 in my opening comments, that I really haven't seen enough  
17 information to fully substantiate or deny the allegation  
18 made by your client that this well is producing coal, or  
19 these four wells are producing coal. In looking at the  
20 data that has been presented, certainly the pressure data  
21 presented raises some questions, and before you'd actually  
22 want to render a professional opinion as to exactly what  
23 that means, you would like the opportunity to review the  
24 data that went into it.

25 Q Now, if -- if we could just for the

1 within the basin. And it's relatively conclusive data for  
2 that specific area, that 320 acres is appropriate.

3           You've got to couple that knowledge with  
4 an understanding of the complexities that you have in  
5 determining appropriate spacing for coal wells. I've  
6 addressed this in previous testimony; I'll try it one more  
7 time.

8           If you have inclining production or even  
9 if you have flat production, you are hard pressed as an  
10 engineer to make a calculation of what that well is going  
11 to recover. That's an integral calculation and it's needed  
12 prior to making a determination of what appropriate spacing  
13 may be.

14           The Methane Committee's recommendations  
15 honor the only physical evidence that I'm aware of and  
16 that's Cedar Hill. That data was applied in an extremely  
17 large area but there are provisions carried forth in the  
18 recommendation that allows the industry, as well as the  
19 State, to react to future information. If we're wrong we  
20 want to make sure we're wrong on the big side. We don't  
21 want to be wrong on the small side.

22           That's what the information from Cedar  
23 Hill was used for. Does the data apply directly to your  
24 client's property? Without seeing some additional informa-  
25 tion I don't know.

1 purpose of this question assume that the WAR Fruitland -  
2 Pictured Cliff Pool and the South Gallegos Fruitland -  
3 Pictured Cliff Pool were conventional type reservoirs, coal  
4 reservoirs, would your Cedar Hill interference data be  
5 relevant to those particular pools?

6 A I don't understand the question.

7 Q Okay, do you extrapolate the interfer-  
8 ence data you have on your Cedar Hill Pool to other areas  
9 in the basin?

10 A Could you try one more time? I apolo-  
11 gize.

12 Q That's about the best I could do.

13 A Well, just restate it, then; I'll try.

14 MR. LUND: I think what he was  
15 asking is can you use the Cedar Hill data in other part of  
16 the pool.

17 MR. ROBERTS: Yeah, that's  
18 essentially it, what he stated.

19 A Okay.

20 Q I thought that's what I asked.

21 A Okay. It may have been. It's probably  
22 not what I heard.

23 I think you have to recognize the Cedar  
24 Hill data for what it is. It's reliable data. I think  
25 it's probably the most reliable data that I'm aware of



1                   Q           Thank you.

2                               MR. CATANACH: Any questions?

3       The witness may be excused.

4                               MR. KELLAHIN: Mr. Examiner,  
5       we'd like to address some comments with regards to the  
6       Dugan, et al, presentation with regards to 160-acre (inaud-  
7       ible) -- Meridian Oil, Inc.'s proposal with regard to the  
8       rule changes.

9                               We swore this witness earlier  
10      but we thought he was not going to testify.

11  
12                               JOHN CALDWELL,  
13      being called as a witness and being previously sworn,  
14      testified as follows, to-wit:

15  
16                               DIRECT EXAMINATION

17      BY MR. KELLAHIN:

18                   Q           Will you state your name and occupation?

19                   A           Yes, sir, John Caldwell. I'm a petro-  
20      leum engineer with Meridian Oil, Inc.

21                   Q           Have you previously testified as a pet-  
22      roleum engineer before the Division?

23                   A           No, sir, I have not.

24                               Will you relate briefly your educational  
25      background and work experience as a petroleum engineer?

1           A           Yes, sir. I received a Bachelor of  
2 Science in civil engineering from the University of Idaho  
3 in December, 1977.

4                       Subsequent to that I worked for Texaco,  
5 Inc., in Hobbs, New Mexico, for two and a half years for  
6 production engineer.

7                       I worked in Farmington for two years for  
8 Southland Royalty Company, in drilling and production  
9 engineering.

10                      I worked for about two and a half years  
11 with Southland Royalty also, in Oklahoma City in reservoir  
12 engineering.

13                      Worked in Houston for about a year,  
14 also, with Southland Royalty Company in reservoir engine-  
15 ering.

16                      Spent two years in Billings, Montana  
17 as a reservoir and drilling engineer (unclear) when they  
18 purchased Southland Royalty Company.

19                      And the last three months I've been  
20 employed by Meridian Oil here as Regional Reservoir Engine-  
21 er for Meridian in the Farmington Region.

22                               MR. KELLAHIN: We tender at  
23 this time Mr. Caldwell as an expert reservoir engineer.

24                               MR. CATANACH: He is so qual-  
25 ified.

1           Q           Mr. Caldwell, let me direct your atten-  
2           tion to the packet of additional exhibits. Have you made  
3           made an investigation to find a well south of the demarca-  
4           tion line that Dugan, et al, proposed to establish in the  
5           Basin, to find a producing well that produces from the coal  
6           gas seam?

7           A           Yes, sir, we have. We did a (unclear)  
8           conversely available Dwight's data status sort on all prov-  
9           en coal gas in the basin and excluding the wells that we  
10          knew about, we found several wells in the southern part of  
11          the basin, south of the demarcation line and the Dugan  
12          Production (unclear) for Fruitland coal recompletion per-  
13          formance curve, and that's what I've tabulated here.

14                    The Dugan Knauff Well, the Dugan Knauff  
15          Well, actually the location, I don't believe, is on Exhibit  
16          Ten. It is on the top of Exhibit Eleven. It's in Section  
17          31, Township 28 North, Range 10 West. I thought I had the  
18          unit letter on here but I do not.

19           Q           Describe for us how you as an engineer  
20           are satisfied that you're dealing with a well that is  
21           producing from the Fruitland coal seam

22           A           We've investigated the logs on this  
23           particular well and are satisfied it's perforated in what  
24           we think is the coal. And looking at Exhibit Number Eleven  
25           we have a production performance curve with time. We've

1 got a history of when the well was originally completed or  
2 recompleted, rather, in 1976. We have approximately four  
3 years of inclining production and an additional (unclear)  
4 of flat production, which to us suggests a typical Fruit-  
5 land coal production fingerprint, if you will.

6 Q Have you satisfied yourself that this  
7 well is -- the data is not otherwise than for Fruitland  
8 sand gas production or PC?

9 A Yes, sir, we have.

10 Q In plotting that data what have you  
11 found?

12 A What we determined, in essence, from  
13 both Exhibit Ten and Exhibit Eleven is we've seen some  
14 characteristics typical of Fruitland coal performance and  
15 we've extrapolated, based on our best knowledge at this  
16 point, a decline projection, which is labeled on Exhibit  
17 Eleven, of what we feel that well would ultimately recover  
18 using existing history. There's been some severe curtail-  
19 ment and I think starting in 1982 but for sure in 1984, '85  
20 and '86, and even, perhaps, '87, and we, through Exhibit  
21 Ten, have attempted to accommodate those curtailments with  
22 production volumes to arrive at an estimated ultimate re-  
23 covery for this well of 668-million cubic feet on Exhibit  
24 Ten. That is the first double underlined value.

25 From decline curve extrapolation then,

1 based on approximately ten years of production, 686-million  
2 cubic feet of recoverable gas, we calculated using a volu-  
3 metric calculation -- I'm sorry, the next line there is gas  
4 in place determined using a recovery factor, we really  
5 don't know what a typical recovery factor is for a coal  
6 well but we think 6.5, 6.7 represents our best estimates  
7 for the model that we've done and we've got an estimated  
8 ultimate recovery of this 980 MMCF.

9 1800 tons per acre foot, which is a  
10 reasonably common parameter throughout the basin, 250 SCF,  
11 standard cubic feet per ton desorption factor, a little bit  
12 less or a little bit more, I'm sorry, of half what is pre-  
13 sent in Cedar Hill, and then the 6 feet of thickness, bed  
14 thickness, net coal thickness, we calculated a drainage  
15 area for this well of 262 acres, and that's the third  
16 double underlined value there on Exhibit Ten.

17 Q Will you turn now, sir, to Exhibit  
18 Twelve and identify and describe that exhibit?

19 A Yes. Exhibit Number Twelve is some re-  
20 cent work that Meridian Oil is -- is attempting to do in  
21 sections south of the demarcation line. It represents our  
22 first three recompletions in the Fruitland coal section,  
23 all in Section 20 -- I'm sorry, in Township 27 North, Range  
24 10 West.

25 What I have tabulated on -- on Exhibit

1 Twelve is the well name, the legal description, the date  
2 that Meridian performed the recompletion, the net coalbed  
3 thickness in feet, our initial rate, and our initial back  
4 pressure, our initial line pressure that we're tested these  
5 wells at.

6                   What this exhibit shows is just the tip  
7 of the iceberg of what Meridian Oil plans to do. We have  
8 at least 25 proposed recompletion candidates we're looking  
9 at across the area that's south of the demarcation line,  
10 and what we're finding in our recompletion at this point is  
11 significant gas rates, initial rates on the order of what  
12 has been achieved at Amoco's original rates in Cedar Hill.

13                   I believe their average rate was about  
14 220 MCF per day per well, and what we're extrapolating from  
15 the initial rate performance and from the calculations on  
16 an off well is that indeed these recompletions will drain  
17 320 acres. So a significant gas production initially; we  
18 feel that the gas production is going to incline with time;  
19 at this point we don't have significant water production.  
20 I have tabulated it here but it's -- it's on the order of 5  
21 to 20 barrels a day.

22                   We have significant pressures. We feel  
23 there's going to be significant coal gas production that  
24 effectively and efficiently drain a 320-acre spacing unit.

25                   Q           Do you mean to infer that the Dugan

1 Knauff Well and the three Meridian wells shown on Exhibit  
2 Number Twelve are the only wells that you're going to find  
3 south of the demarcation line that represent or exhibit the  
4 ability to drain 320 acres of gas coal seams?

5 A No, sir. We're very confident that a  
6 lot of our recompletions will efficiently drain a 320-acre  
7 section based on initial rates.

8 We've got some -- at least 25 identified  
9 candidates at this point. We have a significant number of  
10 abandoned or currently marginal wells in the Mesaverde or  
11 the Pictured Cliff that could easily be recompleted up the  
12 hole to the Fruitland coal formation. Meridian is not  
13 stimulating these wells. These are natural completions,  
14 and these are the kinds of rates that we're getting. We  
15 feel there's maybe on the order of hundreds of candidates  
16 out there that are going to cause us, perhaps, some prob-  
17 lems in spacing to go from 160's in the PC to 320's, but we  
18 feel like there's lots of candidates out there that we can  
19 do this work on.

20 Q Apart from the difficulty of accomplish-  
21 ing the conversion from 160 to 320-acres, do you have an  
22 opinion as a reservoir engineer as to whether that is a  
23 reasonable problem to work through in order not to drill  
24 unnecessary wells south of the demarcation line?

25 A Yes, sir, I have a very definite opinion

1 that I think the up front hardship, if you will, of trying  
2 to develop 320-acre spacing is much more preferable than  
3 drilling 72 -- 72 unnecessary wells per township and we've  
4 got tens of townships that might be potential candidates  
5 for recompletion.

6 Q Mr. Caldwell, you had the opportunity to  
7 hear the three witnesses present their position on behalf  
8 of the Dugan group with regards to 160-acre spacing below a  
9 certain demarcation line. Are you in favor of or opposed  
10 to their position?

11 A I'm opposed to that position for several  
12 reasons.

13 I think Alan Wood has brought out a lot  
14 of those reasons, but the main point's really that I would  
15 find fault with, I guess, is number one, there's not really  
16 a permeability map or a drainage map that is site specific  
17 in the basin. I think there's enough different parameters  
18 that go into the coal gas production within the San Juan  
19 Basin.

20 But we really have to have some good  
21 interference data and we really have to have some good  
22 pressure work and some good production data to determine  
23 that 320's or 160's are the most appropriate method of  
24 producing the coal, and I would agree with Alan completely  
25 that we need to err on the large side because all the cal-



1       culations that we've done internally and that have also  
2       been presented today show that 320 acres would be the most  
3       efficient way of developing this resource.

4               Q           Let me direct your attention now, sir,  
5       to the specific position Meridian has with regards to any  
6       of the rule changes, and let me take a moment and direct  
7       you to Rule 7 which speaks as to existing wells. Did you  
8       have an opportunity to hear Mr. Wood's discussion of  
9       designated well locations in the northeast and the south-  
10      west quarter of the section?

11             A           Yes, sir, I did.

12             Q           Do you have any concerns or comments  
13      with regards to what is the impact of having dedicated  
14      locations in the sections in terms of Meridian's opera-  
15      tions?

16             A           Yes, sir, I do. I have -- Meridian at  
17      this point has staked and invested approximately \$1000 per  
18      location on in excess of 200 locations, the majority of  
19      which are on BLM acreage and the majority of which are on  
20      northeast/southwest staggered locations, if you will, based  
21      on 320-acre sections.

22                        But there are some that we -- that we  
23      have, and I think the estimate is around 50, that do not  
24      fall within that category, and what we'd like to request  
25      would be to avoid in essence a minimum of six weeks delay

1 time in processing the APD's through the BLM and also \$1000  
2 per location capital expense, we would like to insert into  
3 the language of Rule Number Seven of that order a stipula-  
4 tion that we could grandfather in all staked locations as  
5 well as APD approved locations and the other languages in  
6 there.

7 Q Let's go specifically to Rule Seven,  
8 sir, and have you find first of all the line and then the  
9 words at which you would make the additional language  
10 change.

11 A I believe I left my copy over at my  
12 desk. May I get that?

13 Q We'll get it for you.

14 A Thank you.

15 Q Do you have page six that shows out of  
16 Mr. Busch's exhibit book, Rule Seven?

17 A Yes, sir, I do.

18 Q And we go to what line?

19 A Line number three.

20 Q And within line three where do we start?

21 A Let's start at the lefthand side and read  
22 "And (B) of this order and is drilling to, completed, or"  
23 strike the or and insert "or has a location staked as of  
24 the effective date of this order."

25 Q All right, do it again slower.

1           A           I'm sorry, after the comma following the  
2 word "completed", insert the verbiage "or has a location  
3 staked as of the effective data of this order."

4           Q           And what is accomplished with that  
5 proposed rule change to Rule Seven?

6           A           What this change does for Rule Seven is  
7 cover all the wells that are currently drilling, currently  
8 completing, currently have an approved APD through the New  
9 Mexico Oil Conservation Division, or have been currently  
10 staked as a Fruitland Coalbed Methane Gas Pool Well as of  
11 the effective data of the order.

12          Q           Do you have on behalf of Meridian Oil,  
13 Inc. any other proposed language changes to the rules that  
14 are shown in Mr. Busch's exhibit book?

15          A           No, sir, I do not.

16          Q           With that addition, then, what is Meri-  
17 dian's position with regards to the adoption by the  
18 Examiner and the Division of the proposed rules for the  
19 Basin Fruitland coal gas production?

20          A           Meridian's position at this point is we  
21 wholeheartedly endorse all the work that's gone into this  
22 full committee Rules One through Seven as you see them  
23 here.

24          Q           And is that recommendation based upon  
25 the fundamental understanding that adoption of those rules

1 will be in the best interest of conservation, prevention of  
2 waste, and the protection of correlative rights?

3 A Yes, sir, most definitely.

4 MR. KELLAHIN: Move the intro-  
5 duction of Meridian Exhibits Ten, Eleven, and Twelve.

6 MR. CATANACH: Meridian  
7 Exhibits Ten, Eleven, and Twelve will be admitted into  
8 evidence.

9 MR. KELLAHIN: That concludes  
10 our examination of Mr. Caldwell.

11 MR. CATANACH: Mr. Roberts?

12  
13 CROSS EXAMINATION

14 BY MR. ROBERTS:

15 Q Mr. Caldwell, can you tell me in what  
16 formation this Knauff No. 1 Well was completed and is pro-  
17 ducing?

18 A I'm sorry, I don't have that log in  
19 front of me, but I believe it's recompleted, I'm sorry, in  
20 the Fruitland coal formation.

21 Q Okay, but wasn't that originally com-  
22 pleted in the Pictured Cliff formation?

23 A I believe that's right. I apologize I  
24 don't have my notes in front of me on that scout ticket.

25 Q To your knowledge is the Pictured Cliff

1 formation still open?

2 A To my knowledge it was -- they had  
3 bridge plug set over the top of the formation.

4 Q Do you have any gas analysis from the  
5 top of the (unclear)?

6 A No, sir, we do not.

7 Q Is there any water production from the  
8 well?

9 A That's a very good question. We've  
10 tried to track that down. To the best of our knowledge, we  
11 don't believe there is any significant water production;  
12 very typical to our three recompletions in that area.

13 Q Now, how do you -- how do you conclude  
14 that this is Fruitland gas being produced from the wells?

15 A We conclude it's Fruitland gas in  
16 essence from the performance curve, which is very unchar-  
17 acteristic of any kind of a tight sand reservoir, which  
18 would be hyperbolic concave (unclear) as well as the corre-  
19 lation of logs.

20 Q Do you have any opinion as to why this  
21 well does not produce water?

22 A Yeah, I do.

23 Q What is that?

24 A My best description, if you will, of  
25 coalbed methane gas behavior is that the matrix porosity of

1 the coal contributes nothing, or very little, typically to  
2 the gas production. The matrix porosity of the coal  
3 contributes to the water production. The relative perme-  
4 ability curve defines the ratio of gas production and water  
5 production and the matrix through diffusion actually pro-  
6 vides the gas production through absorption.

7               So my interpretation of what's going on  
8 in the southern half of the basin is we don't have a high  
9 matrix porosity; therefore we don't have a high initial or  
10 even over the life of the well high water concentration or  
11 high water production.

12               What we have is diffusion through the  
13 coal matrix to the porosity channels, if you will, the  
14 complete system to the wellbore of primarily gas, a small  
15 amount of water. You have a high relative contribution  
16 occur, therefore we're getting high gas with little water  
17 and we have primarily diffusion mechanism going on.

18               In other parts of the basin we have  
19 regional tectonic events, if you will, that have -- that  
20 have fractured the coal and created a pretty significant  
21 free gas component that provides a high early gas rate,  
22 perhaps declining with time at some point and then  
23 inclining at the gas desorption process; the other half of  
24 the gas is coming out of that well from the Fruitland coal  
25 takeover.

1           Q           Is low water production or the total  
2 absence of water production characteristic of a classic  
3 coal reservoir?

4           A           No it's not characteristic the coal  
5 reservoirs that I'm aware of to the north but low water  
6 production is characteristic of the three recent recomple-  
7 tions we've done.

8           Q           Now, in the absence of a gas analysis  
9 for the gas production from Knauff No. 1 Well, would you  
10 concur with the decision that the data submitted by Mr.  
11 McCord with respect to a gas analysis from numerous wells  
12 within the area is the best data available for that area?

13          A           I'm not exactly sure just where he  
14 gathered the data on the 79 wells that he investigated. I  
15 believe it's in the same area. If he had this particular  
16 well I would accept that appraisal.

17          Q           If he didn't have this particular well,  
18 do you know of any other available that would be better,  
19 better data?

20          A           I would collect a gas sample from the  
21 well probably through El Paso Pipeline's records.

22                               MR.     ROBERTS:     No     other  
23 questions.

24                               MR. CATANACH: Any other ques-  
25 tions? This witness will be excused.

1 MR. KELLAHIN: Mr. Examiner,  
2 that concludes our presentation on behalf of Meridian.

3 MR. CATANACH: Is that it for  
4 Amoco, Mr. Lund?

5 MR. LUND: Amoco will (un-  
6 clear).

7 MR. CATANACH: Okay. I guess  
8 we'll take the -- okay, we'll take any kind of statements  
9 now at this time from anyone, whoever wants to start.

10 Mr. Dwyer.

11 MR. DWYER: Mr. Hearing Exa-  
12 miner, may I make the statement from here, please?

13 MR. CATANACH: Yes, sir.

14 MR. DWYER: I'm Dennis Dwyer  
15 appearing on behalf of El Paso Natural Gas Company.

16 El Paso as an interstate pipe-  
17 line would like to support the designation of the Basin  
18 Fruitland coal gas formation as a separate source of sup-  
19 ply. We believe the evidence that was presented shows  
20 that it has a markedly different production characteristic  
21 and after production that gas has (unclear) different  
22 physical characteristics. I'm referring specifically to  
23 the high CO<sub>2</sub> content, the lack of heavier hydrocarbons,  
24 such as natural gas, that affects my client which very  
25 frequently provides the getaway facility.



1                   In order for us to plan for  
2 the orderly development of gathering facilities whether we  
3 are the purchaser or the transporter, El Paso feels it's  
4 extremely important that this separate and very significant  
5 source of supply be separately designated as such.

6                   El Paso as a pipeline also  
7 supports the adoption of (unclear) rules, specifically  
8 those rules that were recommended by the Fruitland Coalbed  
9 Methane Gas Committee.

10                  We recognize that there is not  
11 unanimity of opinion. We think that that difference of  
12 opinion in fact shows that these rules are balanced.

13                  El Paso does have a few very  
14 minor exceptions that we'd like to offer for consideration.

15                  El Paso is in agreement with  
16 Mr. Chavez that the Director should consider changing Rule  
17 Number Six, which would allow the (not clearly understood)  
18 to dedicate for the flaring of gas right at 30 days or  
19 50-million cubic feet without approval in advance. El Paso  
20 takes this position for two reasons.

21                  First and foremost it's simply  
22 blatant self-interest. Any gas that goes up the stack is  
23 neither transported through our pipe or sold by us and we  
24 earn absolutely no revenues.

25                  But I think there is a greater

1 public interest involved, too.

2                   As you know, El Paso got its  
3 start by taking gas from the (unclear) going to market with  
4 it, clearing it up and then finding a more beneficial and  
5 economical use for it.

6                   Also in the forties when Texas  
7 first engaged in its no flare order, in 1944 El Paso agreed  
8 to take all the casinghead gas and find a way to move it to  
9 market rather than shutting in wells. It was a war effort.

10                  So El Paso has a long history  
11 of trying to insure that natural gas, a valuable wasting  
12 asset, is not depleted without using its very valuable  
13 whole content.

14                  Lastly, El Paso would like to  
15 support the proposal based on 320-acre spacing with the  
16 flexibility of administrative approval for either  
17 unorthodox locations or for increased density without the  
18 formality of a formal hearing. We think that is a  
19 reasonable (un- clear.)

20                  We have a genuine concern as  
21 has been expressed here that too many uneconomic wells are  
22 not being drilled. El Paso at the present time and based  
23 on the evidence, has no desire to lay out a number of un-  
24 necessary and uneconomical connections to those wells. We  
25 feel that doing so could possibly change the economics and

1 make it difficult to market that gas.

2 And lastly, with respect to  
3 Rule 3(B) and Rule 4(B), we note that under this expedited  
4 procedure where administrative approvals could be  
5 given without the requirement for formal hearing, there is  
6 in fact no notice at all to people who may be interested  
7 parties; people who may be affected parties, and it raises  
8 a concern to us both as a person who in great likelihood  
9 would be expected to help and assist in providing getaway  
10 facilities, that if we don't have notice of these things  
11 until after a decision is made, it's probably not possible  
12 to plan on the orderly getaway of that gas.

13 Secondly, there's potentially  
14 a due process problem. People who are genuinely affected  
15 have absolutely no notice of these administrative actions  
16 and without having a positive suggestion, the possibility  
17 exists that even though a hearing would not be held, there  
18 could be some notification by publication in the newspaper  
19 or perhaps the fact that an administrative action was supposed  
20 to be taken could be placed on the Director's docket.

21 That completes my statement,  
22 sir.

23 MR. CATANACH: Thank you, Mr.  
24 Dwyer.

25 Are there any other statements

1 at this time?

2 MR. STOVALL: Mr. Examiner,  
3 I'd like to make just a brief closing statement and the  
4 only purpose for this statement is to make the connection  
5 between Case 9420 and 9421.

6 The evidence which has been  
7 presented today is basically supporting the creation and  
8 formation of the Fruitland Coalbed Methane Pool, whatever  
9 the pool name may be ultimately adopted.

10 I think it should be pointed  
11 out that the evidence also supports the application in Case  
12 9421, which is a corollary application which simply re-  
13 quests that the lands, formations, producing horizons,  
14 whatever, included within the order, whatever they may be,  
15 should be deleted from existing pools of which they are now  
16 a part.

17 I think it is -- the evidence  
18 which was presented in this consolidated hearing should be  
19 applied to both, both cases.

20 I have nothing further in the  
21 way of a closing statement; however, I am going to request  
22 that Case 9420 be continued to the next Examiner docket of  
23 July 20th in order to enable us to advertise it properly in  
24 The Gallup Independent. Apparently we missed that adver-  
25 tisement in the original advertising of this case.

1 MR. CATANACH: Okay, Case 9420  
2 will be continued to the July 20th. I assume there won't  
3 be any more evidence or testimony presented at that time.

4 And with that, we'll --

5 MR. CARR: Mr. Examiner. I  
6 have a written statement from Blackwood & Nichols but I  
7 wanted to make it clear that (not clearly understood) and  
8 also supports the Committee recommendation, but instead of  
9 reading it I will simply provide you with a copy of it  
10 after the hearing is concluded.

11 MR. CATANACH: Okay. That  
12 would be fine.

13 Is there anything further in  
14 either one of these cases?

15 If not, they will be taken  
16 under advisement.

17  
18 (Hearing concluded.)  
19  
20  
21  
22  
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25

## C E R T I F I C A T E

I, SALLY W. BOYD, C. S. R. DO HEREBY  
CERTIFY that the foregoing Transcript of Hearing before the  
Oil Conservation Division (Commission) was reported by me;  
that the said transcript is a full, true and correct record  
of the hearing, prepared by me to the best of my ability.

I do hereby certify that the foregoing is  
a complete record of the proceedings in  
the Examiner hearing of Case No. \_\_\_\_\_  
heard by me on \_\_\_\_\_ 19\_\_\_\_.

\_\_\_\_\_, Examiner  
Oil Conservation Division