

1 STATE OF NEW MEXICO
2 ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
3 OIL CONSERVATION DIVISION
4 STATE LAND OFFICE BUILDING
5 SANTA FE, NEW MEXICO

6 1 February 1989

7 EXAMINER HEARING

8 IN THE MATTER OF:

9 Application of Meridian Oil, Inc. for compulsory pooling, San Juan County, New Mexico, and

CASES-

9593

9594

9595

9596

9598

10 Application of Meridian Oil, Inc. for compulsory pooling and an unorthodox coal gas well location, San Juan County, New Mexico.

9599

11 BEFORE: David R. Catanach, Examiner

12 TRANSCRIPT OF HEARING

13 A P P E A R A N C E S

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22 Company and for ARCO in
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I N D E X

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STATEMENT BY MR. KELLAHIN

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1 MR. CATANACH: We'll call next
2 Case Number 9593, which is the application of Meridian Oil,
3 Inc. for compulsory pooling, San Juan County, New Mexico.

4 Are there appearances in this
5 case?

6 MR. KELLAHIN: I'm Tom Kella-
7 hin of the law firm of Kellahin, Kellahin & Aubrey, Santa
8 Fe, appearing on behalf of Meridian Oil, Inc.

9 MR. CATANACH: Are there any
10 other appearances in this case?

11 MR. CARR: My name is William
12 F. Carr with the law firm Campbell & Black, P. A., of Santa
13 Fe, appearing in Case 9593 on behalf of ARCO and also Amoco
14 Production Company.

15 MR. KELLAHIN: Mr. Catanach,
16 we would request that you also call Cases 9594, 9595, 9596,
17 9598 and 9599 at this time. The testimony is similar in
18 each of these cases and we would present testimony in all
19 of them at the same time.

20 We will have four witnesses to
21 be sworn.

22 MR. CATANACH: Are there any
23 objections?

24 MR. CARR: No objection.

25 MR. CATANACH: Case 9594,

1 application of Meridian Oil, Inc. for compulsory pooling,
2 San Juan County, New Mexico.

3 Case 9595, application of Mer-
4 idian Oil, Inc., for compulsory pooling, San Juan County,
5 New Mexico.

6 Case 9596, application of Mer-
7 idian Oil, Inc., for compulsory pooling, San Juan County,
8 New Mexico.

9 Case 9598, application of Mer-
10 idian Oil, Inc., for compulsory pooling, San Juan County,
11 New Mexico.

12 Case 9599, application of Mer-
13 idian Oil, Inc., for compulsory pooling and an unorthodox
14 coal gas well location, San Juan County, New Mexico.

15 Are there other appearances in
16 these cases?

17 MR. CARR: Mr. Examiner, my
18 name is William F. Carr, with the law firm Campbell &
19 Black, P. A., of Santa Fe.

20 We appear in each of these
21 cases on behalf of Amoco Production Company.

22 MR. CATANACH: Will the wit-
23 nesses please stand and be sworn?

24
25 (Witnesses sworn.)

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MR. CATANACH: Mr. Kellahin?

MR. KELLAHIN: Thank you, Mr. Examiner.

(REPORTER'S NOTE: Due to a flaw in taping this portion of the hearing some testimony was not clearly recorded.)

-- was made in conjunction with various members of Meridian's engineering group.

Our second witness is one of those engineers, Mr. Pat Bent. Mr. Bent is a drilling and operations engineer and he will provide testimony on his part of that study which includes his opinions and comments with regards to the penalty factors attributable to the mechanical and operations risks of these types of wells.

Finally, we'll call John Caldwell, who is a Senior Reservoir Engineer with Meridian and he will discuss with you the other factors and parameters Meridian considers important in assessing an appropriate penalty factor for what we consider unconventional type drilling in the Fruitland Coal Gas formation.

Mr. Caldwell's testimony will be generally focused on reservoir factors that encompass that risk and inherent in this study is some economic consideration.

1 Normally we put the landman on
2 first to discuss with you the efforts we've made to obtain
3 voluntary joinder.

4 In this particular instance
5 Mr. John Myrick, our landman will testify last and he has
6 organized the exhibit books so that I think while we are
7 presenting some of the exhibits out of numerical sequence,
8 they still can be understood very clearly if you take them
9 out of sequence. There is a separate exhibit book for each
10 of the seven cases. Those are before you.

11 Also before you is a brown
12 folder that contains the geologic exhibits of Meibos.
13 Along the walls of the hearing room today are Mr. Meibos'
14 geologic exhibits so that you can refer to them as he dis-
15 cusses and then you have your own set to refer to later.
16 The exhibit books are marked so that Mr. Meibos' exhibits
17 are identified under Tab Exhibit Seven and then he's num-
18 bered them Seven-A through Seven-E.

19 After his exhibits, following
20 Exhibit Eight tab, within that series of exhibits in that
21 section you'll find a summary of the risk penalty analysis
22 that becomes part of the testimony of all three of the
23 technical experts, and then following that summary are the
24 technical documents for Mr. Bent and Mr. Caldwell to
25 discuss.

1 In each exhibit book, then,
2 you'll find from Exhibit One through Six, all within the
3 same sequence, (not clearly understood) followed by a plat
4 showing you the spacing unit and the well location.

5 Exhibit Three will then be a
6 compilation of his chronology of events in his efforts to
7 obtain voluntary joinder by the various parties to be com-
8 mitted to the well.

9 He further identifies the
10 specific interest owners and what the current status is of
11 their efforts to obtain voluntary joinder. He will give
12 you the authorized expenditure for the well and in each
13 instance the Authorization for Expenditure has been ap-
14 proved and processed by Mr. Pat Bent, who is one of the
15 witnesses today. And then finally, in Exhibit Six is a
16 model form operating agreement for each of the wells.

17 We do not propose to go
18 through each page of each exhibit book but to start off
19 with, Mr. Meibos' geologic presentation and then after he
20 makes his general presentation, we will go to his specific
21 opinions with regard to the inherent geologic risk involved
22 for each of the wells.

23 (Not clearly understood) of
24 the parties to be pooled, let me briefly tell you the cur-
25 rent status of the parties to be pooled, starting off with

1 the first case, of what I understand to be participation at
2 this point.

3 In Case 9593 to be pooled were
4 ARCO, Tenneco, and Conoco. Conoco has subsequently joined.
5 Tenneco interest has now been acquired by Amoco. I'm ad-
6 vised by Mr. Myrick that he confirms Mr. Carr's comments to
7 you awhile ago that ARCO can be dismissed from this case
8 and it's the only case in which they have an interest.

9 In Case 9594 to be pooled were
10 Tenneco and Conoco. Conoco has agreed to participate.
11 Tenneco interest is now under the control of Amoco. In ad-
12 dition, Case 9594 has a typographical error in the docket
13 sheet. That should be Township 30 North instead of Town-
14 ship 31 North. We'd like to present this case today and
15 simply have it readvertised for correction on a subsequent
16 docket.

17 Case 9595 involves the inter-
18 est of Tenneco, Conoco, Texaco and an individual, spelled
19 T-U-R-R-I-E-T-T-A. Again, the Conoco interest has agreed
20 to participate. The Tenneco interest is now controlled by
21 Amoco and so the parties to be pooled are Amoco, Texaco and
22 Turrietta.

23 In Case 9596 originally were
24 Conoco, Tenneco, forced pooling of those interests. Conoco
25 has now agreed to participate. Tenneco interest is now

1 controlled by Amoco and so the parties to be pooled are
2 Amoco, Texaco.

3 In Case 9598, again it was
4 Tenneco and Conoco originally to be pooled at the time of
5 the application.

6 Conoco has agreed to partici-
7 pate. The Tenneco interest is now controlled by Amoco.

8 And then finally in Case 9599
9 the only original two parties were BHP and Mesa Limited
10 Partners. Mesa Limited has agreed to participate and
11 they're to be dismissed, leaving the only party to be
12 pooled in that case to be BHP Petroleum.

13
14 (There followed a discussion off the record.)
15

16 LYNN MEIBOS,
17 being called as a witness and being duly sworn upon his
18 oath, testified as follows, to-wit:

19
20 DIRECT EXAMINATION

21 BY MR. KELLAHIN:

22 Q Mr. Meibos, would you please state your
23 name and occupation?

24 A Lynn C. Meibos. I'm Senior Geologist
25 with Meridian Oil in Farmington, New Mexico.

1 Q Mr. Meibos, on previous occasions have
2 you testified as a petroleum geologist before the Division?

3 A Yes, I have.

4 Q And pursuant to your work with your
5 company have you made a study of the various geologic
6 factors and information available for the seven compulsory
7 pooling cases, applications that are now the subject of the
8 consolidated hearing this afternoon?

9 A Yes, I have.

10 MR. KELLAHIN: We tender Mr.
11 Meibos as an expert petroleum geologist.

12 MR. CATANACH: He is so qual-
13 ified.

14 Q Mr. Meibos, I want to direct your atten-
15 tion specifically to the issue in a compulsory pooling ap-
16 plication which concerns recommendations and opinions as to
17 the risk factor penalty to be assessed by the Oil Conserva-
18 tion Division against any working interest owner who elects
19 after the -- who fails to elect within the election period
20 to participate in the well. Do you understand that risk
21 factor penalty concept?

22 A Yes, I do.

23 Q Do you understand that the maximum
24 available percentage that the Commission can authorize is a
25 200 percent number?

1 A Yes, I do.

2 Q And do you understand that that number
3 is in addition to recovering out of production the first
4 100 percent?

5 A Yes, I do.

6 Q In making a study of the recommendations
7 you have for the Division Examiner on the risk factor pen-
8 alty question, can you describe for us how you and others
9 working with you attempted to analyze that issue with re-
10 gards to these seven wells?

11 A Yes. We formulated a task force that
12 consisted of myself, some of the reservoir engineers and
13 drilling engineers, whereby we sat down and discussed the
14 different risks involved in drilling a Fruitland coal well.
15 Each area of drilling, reservoir parameters and the geo-
16 logic parameters each have a different risk associated with
17 the overall risk penalty and we tried to assess those dif-
18 ferences and weight them with respect especially to the
19 wells before the Division today.

20 Q Describe for us generally in your analy-
21 sis what were the various categories of risk that was exa-
22 mined by the group.

23 A We looked at the geologic risk. the
24 operational and mechanical risk, and the reservoir/economic
25 risk.

1 Q In addressing those issues or that
2 analysis to these particular seven wells, how was that
3 analysis divided among the group?

4 A I was primarily in charge of assessing
5 the geologic risk.

6 Mr. Dana Craney from our office in
7 Farmington was -- sat in on several of the discussions
8 regarding the risk.

9 John Caldwell and some other reservoir
10 engineers discussed the reservoir aspect of the risk and
11 made their opinions known about that.

12 And Mr. Pat Bent made his recommenda-
13 tions with regard to the mechanical and operational risks.

14 Q When we examine that portion of the ana-
15 lysis that involves the geology, your area of expertise,
16 Mr. Meibos, describe for us what issues or factors were
17 included within that issue.

18 A There are three primary factors that we
19 considered.

20 The coal thickness was the first para-
21 meter. Coal character and coal petrology was the second
22 parameter. The third parameter was the fractured nature of
23 the coal reservoir. The production comes mainly from
24 fractures within the coal.

25 Q So that we don't have to write down each

1 of the various parameters in each of the groups, let me
2 direct your attention, sir, to the first page following Tab
3 Eight. I simply picked Case 9593 and I've turned to the
4 tabulation (unclear). When we look at that tabulation
5 following Exhibit Number Eight, does that break you out the
6 three areas of geologic risk that you examined for these
7 wells?

8 A Yes, it does.

9 Q Let's take a moment before we discuss
10 the specifics, and have you describe the concept of analy-
11 sis by which the divisions were made. We've got four areas
12 in which a risk factor was analyzed, the geologic, the
13 reservoir, the economic and the operational aspect.

14 In examining those was there any
15 agreement or decision in what percentage each of those
16 factors made up or encompassed the whole risk?

17 A Could you restate the question?

18 Q Yes, sir. I want to understand if any-
19 one of these had a numerical value applied to it that was
20 uniformly applied to all seven of the wells.

21 A Specifically with regard to the geologic
22 risk the factor that we found was 60 percent for all 7, 7
23 of the wells within the pooling cases today.

24 Q Am I correct in understanding then that
25 you didn't simply say that out of the maximum 200 percent

1 perspective penalty that 25 percent or X percent of that
2 risk in all instances must be attributable to the geologic
3 risk?

4 A No. In fact we -- we broke the risk
5 down depending on the area that the well was in and pro-
6 portioned out, especially for the reservoir, economic and
7 operations risk, different percentages. The geologic risk
8 within this area that we're discussing is -- is such that
9 the geologic risk for these seven wells remains fairly
10 constant because of the changes in coal character, and in-
11 ability to predict where fractures occur; and we broke down
12 some of the other risk into different percentages of that
13 total risk.

14 Q Let's come back to the specific geologic
15 conclusions for each of the seven wells at a later time,
16 Mr. Meibos, and let me have you begin to discuss for us the
17 method by which you analyzed the geology for the Fruitland
18 coal production and how you have determined in your mind,
19 then, what the ultimate recommendation on a geologic risk
20 would be for each of the seven wells.

21 A Okay. I'd like to start first by
22 drawing your attention to the net isopach map, montage,
23 that I have here on the wall.

24 You'll notice that the area included in
25 the isopach map includes the townships in the north half of

1 29 North through 32 North, Ranges 7,8,9, 10 West, in the
2 north central part of the San Juan Basin in New Mexico.

3 For locator purposes, to give you an
4 idea of where you are, the Cedar Hill Fruitland coal is
5 here. The 30 and 6, San Juan 30 and 6 Unit is outlined
6 here. The contour interval for the map is a 10 foot
7 contour interval of net Fruitland coal based on Meridian's
8 mapping parameters. It's a generalized (unclear) computer
9 to help us portray the general thicknesses of the Fruitland
10 coal. It's not in detail.

11 The four logs portrayed on the montage
12 illustrate generally the variability in the Fruitland coal
13 interval from one area to the next; the Cedar Hill area,
14 the 32, 8 area, the 30 and 6 area, and then just six miles
15 east -- or west of the 30 and 6 within the 30 and 8 Town-
16 ship.

17 As you can see, each -- each log shows
18 that the coals are different and it would be very hard to
19 correlate them from one far-reaching part of the area to
20 the other, and that's the reason for sharing those;
21 however, if you --

22 Q Before you leave that display, Mr.
23 Meibos, identify for us how you have located the seven
24 wells that are subject of the pooling cases.

25 A Okay. (Not clearly understood) so there

1 are eight stars. We'll be discussing all but two of them
2 today.

3 The Delhi Com #300, is that correct, and
4 Turner Com #250 have been dismissed, so -- so these two
5 aren't considered in the forced pooling but the rest of
6 them are.

7 From there what I'd like to do is go to
8 a dip (unclear) this map, it goes from the southwest of 31,
9 30 continuing through 31 of -- Section 31 of 31, 9, and as
10 illustrated on -- 32 of 31, 9, is illustrated here. You
11 can see that generally the same coal interval is present on
12 the north end of the -- the northeast end of the cross
13 section or as found in Howell Com "J" 301 Well illustrated
14 on the (unclear) part of the montage; however, as you go
15 from the northeast part of the township southwestward, you
16 can see that there are several splits that develop in the
17 thick coal seams.

18 Generally this cross section shows that
19 there is relative continuity, relative zone continuity of
20 the coals within the Fruitland formation; however, it also
21 shows that there's extreme, or at least well to well,
22 variability within each zone.

23 As you can see, there are several splits
24 that develop within each, each zone from one to five, six
25 splits of separate coal seams within each interval.

1 As you notice, the seams -- the seams
2 are split more to the southwest than they are to the north-
3 east. The increase in split southwestward is more likely a
4 function of the depositional environment that was present
5 during Fruitland coal deposition. The stratigraphic
6 changes that took place influenced the coal capture and the
7 net thickness of the coal. You may have a total net coal
8 thickness of 30 feet in -- from one seam in one well, and a
9 total net coal thickness of 30 feet in another well from 30
10 separate 1-foot seams. So net coal thickness isn't really
11 an indicator of coal quality.

12 In past hearings we gave testimony that
13 coal was relatively present everywhere we turned in the
14 basin and the presence of coal doesn't lower the risk be-
15 cause of the changing nature of coal, its depositional en-
16 vironment and its nature is such that from well to well the
17 coal character will change abruptly.

18 Just to review some of that, the general
19 coal geology is such that the federal government has given
20 us an unconventional reservoir tax credit for the Fruitland
21 coal. It's not like a sandstone reservoir. It's different
22 and it's differences are a function of different hetero-
23 geneity factors, the first one being the heterogeneous
24 nature of the depositional environment. If you can think
25 back or if you've been to the east coast and seen the

1 swamps on the east coast approximate to the Atlantic
2 seaboard, you know that there is a varied environment of
3 coal or of swamp material and during Cretaceous time when
4 the Fruitland coal was developed, we had a mix of environ-
5 ments. We had swamps that were approximate to the ocean
6 front; there were swamps that were far removed from the
7 ocean front, 6, 7, 8, 10, 20 miles away from the ocean, all
8 of which were depositing peat, and we had rivers and lakes
9 and animals that mixed the swamp and organic material to-
10 gether to create a mishmash of different things.

11 Coal itself, the definition of coal is
12 that it's a heterogeneous mix of mineral matter and organic
13 matter, mineral matter being made up of typical minerals.
14 illite, kaolinite, smectite, and quartz is another one, and
15 associate siderite and some other different minerals;
16 whereas, the organic material is made up of coal macerals
17 and macerals are -- is a term that means relatively the
18 same as minerals only it refers to the organic content of
19 the macerals, made up of three main lithotypes, the first
20 being liptinites, which include waxy or oily components of
21 plants; vitrinites, composed of woody components of plants;
22 and inertinite, which is the charred component of a plant.

23 If you take that, if you mix in the
24 modus of deposition, the rivers and the streams and the
25 swamp and then you mix the different organic materials to-

1 gether, you develop a very heterogeneous mix that would
2 change from one location to the next relatively abruptly.
3 Coal's physical properties, because of this, coal's physi-
4 cal properties change from area to area, like I said,
5 relatively quickly, and they also change through time.

6 If a well is drilled and you change the
7 pressures and physical parameters within a wellbore, there
8 are certain things that can change the coal as you change
9 those pressures, and the coal will break and move into the
10 wellbore or you can find little particles that can break
11 into big chunks and close off the wellbore because of its
12 physical character. Its physical character differences
13 also, you know, change the amount of gas that is recover-
14 able from each individual seam. The desorption rates that
15 are recoverable from each seam is different because of this
16 difference, difference in coal character.

17 Q What I'd like to do now is before you
18 leave this let's identify it.

19 A This is the cross section A-A'. The
20 Fruitland, base of the Fruitland formation is -- the top of
21 the Pictured Cliff sandstone is this fine line shown here.

22 Q Do you have a display, Mr. Meibos, now
23 that demonstrates for us not only the lateral but the ver-
24 tical characteristics of the coal?

25 A Yes. I was going to talk a little bit

1 about this one first.

2 Q All right, let's do the D-D' cross
3 section and that's Exhibit Seven-C.

4 A This cross section in Township 30 North,
5 Range 8 West. The furthest well to the right here is the
6 same well as I put here. It goes basically four miles
7 directly to the west. This is a strike cross section.

8 Now I tried to follow the same thickness
9 of coalbeds to illustrate the heterogeneity of the coal as
10 much as I could within similar seams (not clearly under-
11 stood) parameters they seem clearly to me very similar.

12 The cross section does show that the
13 seam thickness and continuity is relatively constant. It
14 does show also that there are still several different
15 splits in the coal that develop at different places, making
16 individual seam thicknesses variable.

17 The other thing that it shows, and you
18 can't see it very well, but it's at the base of each of the
19 cross sections I've indicated the production range that
20 we've been able to determine from each of the wells.

21 The first delivery rate I posted where
22 it's been available and where I have preliminary flow test
23 data I've posted that just to show you the variability in
24 production rates through similar appearing seams.

25 This well has a flow test rate of

1 2.2-million a day. Before it was tied to the line the
2 first delivery, the first 30-day deliverability had been
3 589 MCF a day. It was open hole completed and it's been
4 producing from all three zones.

5 This well and this well were completed
6 by Tenneco.

7 Q You'll have to identify them for the
8 record.

9 A For the record Moore No. 3-A and the
10 Lawson No. 1-A; the Moore 3-A in the southeast of 4, 30 and
11 8; the Lawson 1-A in the northwest of 10, 30 and 8, were
12 completed by Tenneco. Their first delivery (not under-
13 stood). They didn't produce yet they were completed as
14 (unclear). The cross sections shows the
15 301, which is in the northeast of 11, 30 and 8. As we go
16 further to the west the Tenneco Moore No. 6-E was completed
17 in the same three zones and the first delivery rate was 107
18 MCF a day.

19 And finally, to give an attempt to com-
20 pare, these were perforated in the coal so the Meridian
21 well was open hole completed to compare the open hole com-
22 pletion here the two other Meridian open hole completions,
23 a well offset to the Howell A-4 E in the southwest of 30,
24 30 and 8, is the Meridian Howell A No. 301 in the same
25 quarter section was open hole completed and had a flow test

1 of 500 MCF a day, almost a quarter of the rate that the
2 Howell Com 301 rate was.

3 In the northeast of 7, 30 and 8, which
4 is the Meridian Oil Howell (unclear) No. 300 was an open
5 hole completion. The flow test was too small to measure.
6 It didn't produce at all yet the coals are all present.
7 There's continuity in every seam, yet it didn't produce as
8 did the (not clearly understood) No. 301. It's a function
9 of the three parameters that I'll be discussing. The
10 stratigraphy is one. The coal character, especially with
11 regard to the mineral content and the maceral content and
12 the cleating content, or the number of cleats in the hole,
13 which I'll talk about a little bit later.

14 I'll go now with the Howell Com J Number
15 301 in the northeast of 11, 30 and 8. I've enlarged the
16 log to the scale of 5 inches equals 100 feet. You can see
17 the three zones. This log here is a gamma ray log and a
18 high resolution bulk density log here. High resolution
19 let's us pick out individual coals better. We cored this
20 well from intermediate casing depth to -- or intermediate
21 casing of 2886 to a total depth of 3124.

22 The coal description, I described the
23 upper coal as coal, black, dull with bright bands, poorly
24 cleated, concoidal fracture and no kicks.

25 The second, or middle coal, black, dull

1 with bright bands, poorly cleated, concoidal fracture, no
2 kicks.

3 The lower coal I described as coal,
4 black, dull-bright with brighter bands, well cleated,
5 blocky fracture, well started in kick when core barrel was
6 1000 off bottom. They had to -- to control the well they
7 had to mud up to 10.8. They went back to bottom of the
8 core and then came out real slowly in order not to unload
9 the well from the gas that was being generated in the
10 special seam. Now, from my descriptions I assumed that
11 there was some definite differences in the coal character.
12 When we finished logging the well we saw some even more
13 abrupt differences. This is a digital sonic log. It's a
14 computerized log Schlumberger makes. It shows a compres-
15 sion wave and a sheer wave. The compression waves are
16 not -- they're not real good in helping us determine coal
17 character because the compression and the sheer waves are
18 lost in the coals. The stony wave, however, is the wave
19 that follows the wellbore and follows the tool up the
20 wellbore and where it comes, wherever there's permeability,
21 it kind of follows out. It goes out into that permeability
22 and comes back in so that you can see from this log that --
23 that we encountered extreme permeability in the basal seam
24 and through the upper relatively low permeability compared
25 to the basal seam. The seams are still more sandstones and

1 shales but much more permeable than the basal seams and
2 that was evident in the core description as well as the gas
3 that we recovered from the basal seam.

4 Q Mr. Meibos, you've been referring to the
5 Howell Com display and, Mr. Examiner, that's Exhibit Seven
6 D in the exhibit book.

7 Mr. Meibos, are you able now, having
8 found the -- a permeability zone in the lower coal section
9 in the Howell Com, are you able now as a geologist to
10 develop a mapping technique with that information that
11 helps you diminish the risk in picking the locations for
12 subsequent coal wells?

13 A No, we can't because there's nothing
14 that we can take from most of the logs that are -- that are
15 available with regard to permeability in the coal. We've
16 subsequently run a digital sonic log on several wells and
17 found it to be of marginal use in areas where there are
18 thin coal seams. The resolution of the tool is such that
19 where there are several thin beds the sonic data is inef-
20 fectual.

21 So the sonic data was good for the
22 Howell Com J 301, but we found that it's marginal in other
23 areas and some of the -- and some -- we ran it in one of
24 the wells north of the Cedar Hill Unit and it showed some
25 well cleated coals but we expected to find some well

1 culated coals because of the mud log description that we
2 recovered.

3 So mapping, mapping different logging
4 parameters is relatively hard and next to impossible be-
5 cause of the kind of log data available and the amount of
6 information that we can gain from that log data available.

7 Q Would you identify for us what is the
8 last of your displays? It's marked as Exhibit Seven-E? It
9 has a plastic overlay on it.

10 A The plastic overlay is the same sort of
11 isopach data that I've illustrated on the montage, Number
12 Seven-A.

13 The map here shows production rates for
14 the first thirty days deliverability of Meridian wells and
15 wells operated by people other than Meridian within the
16 area I've selected and described previously. The forced
17 pooled wells are starred again, as noted before. Meridian
18 wells are triangles. The wells operated by people other
19 than Meridian are hexagons.

20 The Cedar Hill Pool is here; the 30 and
21 6 unit is here.

22 This map shows the variability of pro-
23 duction rates that occur from well to well within the dif-
24 ferent areas that coal wells have been drilled, and it is
25 evidence, I think, more that the coal permeability varies

1 from well to well and from location to location and since
2 the coal is the -- coal permeability is very, very small,
3 it's less than -- much less than a hundredth of a milli-
4 darcy; in fact, some measurements that we've seen are as
5 low as a thousandth of a millidarcy. Permeability is im-
6 portant in generating gas out of the coal and since there
7 isn't any inherent permeability in coal, permeability must
8 come from -- from the fractures, and as -- as we talked
9 about in the Howell Com J 301 Well, the lower coal was
10 fractured, the upper two coals were not, yet they were in
11 the same wellbore. That means that the coal character must
12 also influence the ability of the coal to fracture. The
13 permeability from fractures is tied directly to the region-
14 al tectonics, local tectonics, coal character, and the
15 hydro-dynamics of the whole system.

16 And this map illustrates best, I think,
17 that closeology doesn't guarantee that fractures will be
18 encountered by a particular wellbore.

19 Q Mr. Meibos, have you also familiarized
20 yourself with all available published literature on the
21 subject of coal in the San Juan Basin, the Fruitland coal
22 production? Are you generally familiar with those publi-
23 cations?

24 A Generally familiar with the publica-
25 tions, yes.

1 Q And are you attempting to keep current
2 on available technical papers that are -- have been pre-
3 sented or about to be presented on this topic?

4 A Yes.

5 Q In analyzing the geologic risk for these
6 particular wells, have you availed yourself of the oppor-
7 tunity to examine some of those reference materials?

8 A I've done my best, yes.

9 Q What do those reference materials tell
10 you in terms of your opinions and analysis about the risk
11 for these particular coal gas wells?

12 A In particular some research that's been
13 done by REI. Particular authors are located in Grand
14 Junction, Colorado. They've come to the conclusion that --
15 that it's almost -- well, they've come to the conclusion
16 that the ability to predict fractures makes the Fruitland
17 coal, coal seam development very high risk.

18 Q The examiners are often asked to apply a
19 risk factor penalty in a conventional sandstone gas reser-
20 voir, either the Mesaverde in the northwestern part of the
21 state or some other formation in southeastern New Mexico,
22 and I'd like to draw some comparisons or some -- I want you
23 to see what comparisons can be drawn between typical sand-
24 stone gas production in anticipating the risk to be en-
25 countered versus trying to locate wells that will produce

1 gas in the Fruitland coal gas seams.

2 One of the things we attempt to discuss
3 with examiners at pooling cases in the sandstone gas re-
4 servoirs are whether or not you are within an established
5 gas pool or not. All right? Does the fact that these
6 wells are located in the Basin Fruitland Coal Gas Pool, for
7 you as a geologist, help you diminish or reduce the geo-
8 logic risk?

9 A No, it doesn't.

10 Q Why not?

11 A Because of the -- the differences that
12 we can see from wellbore to wellbore and from seam to seam
13 in the coal. There's so much variability in heterogeneity
14 that it's impossible for us to reliably predict all the
15 parameters necessary in order to say that it's just like
16 drilling a Mesaverde well. It's not like just drilling a
17 Mesaverde well because of the different changes. I've been
18 working as a geologist with responsibility over the Mesa-
19 verde formation for the last six years at El Paso, and the
20 differences that occur between the sandstone reservoir and
21 the unconventional coal reservoir are -- are so much so
22 that -- that it's almost like drilling a wildcat well every
23 time that we drill a Fruitland coal well. In fact, several
24 of the wells that we've drilled would technically be
25 classed as shallow pool wildcats by the APD form of classi-

1 fication.

2 So in comparing -- the differences in
3 depositional environment, differences in how the homogen-
4 eity of the sandstone develops and how the heterogeneity of
5 a coal seam develops are such that they are two separate
6 things and ought to be considered much differently in their
7 -- their risk penalty assessment than -- from one another.

8 Q Another approach to applying a risk
9 factor penalty in a conventional sandstone gas reservoir is
10 to have the geologist prepare a net pay isopach map with
11 sufficient well control and thereby looking at his isopach,
12 can find a location that helps him minimize the geologic
13 risk.

14 Are you able to do that kind of analogy
15 of risk for the Fruitland coal gas wells?

16 A No, we can't. We can make a -- we can
17 make an isopach map of the net coal thick, as I've pre-
18 sented, but that net coal thick does not necessarily guar-
19 antee that we can make an economic Fruitland coal well.

20 As you can see from the cross section
21 that I've illustrated, I guess it's Exhibit Seven-C, shows
22 that though the coal is present and would have essentially
23 the same net coal thick, it is obvious from the production
24 rates that there's more risk and more heterogeneity to this
25 reservoir than would be in a typical sandstone reservoir.

1 Q Another approach that's often taken to
2 discuss with the examiner the minimized risk factor pen-
3 alty in the sandstone gas reservoirs is simply the proxi-
4 mity of the location to a commercial producing well in that
5 reservoir.

6 Are you able to find when you examine
7 the Fruitland coal gas wells that you help minimize the
8 risk by locating your wells in proximity to known commer-
9 cial producing gas wells?

10 A Some people have tried that and we've
11 tried that and it doesn't work. Proximity to a known good
12 coal gas well often will lead to a poor well. Sometimes it
13 will lead to a good well but you can't predict it. You'd
14 hope that being close to one well, to a good well would --
15 would mean that you're going to have another good well, but
16 because of the fractured nature of the reservoir, because
17 of the heterogeneic nature of the coals is such that you
18 can't really predict that, yes, I'm going to have a good
19 well, and its risk should be diminished because of being
20 close to a good well.

21 Q Let's take the exhibit books, Mr.
22 Meibos, and let's start with Case 9593.

23 Let me have you turn to the tab follow-
24 ing Exhibit -- the Exhibit A tab in the exhibit book.

25 A Okay.

1 Q Describe for us for the Atlantic B Com
2 220 Well, Mr. Meibos, what did you ultimately conclude with
3 regards to the geologic risk to be applied for this well?

4 A Well, we -- the three different factors
5 within the geologic risk are weighted differently within --
6 within that 60 percent that I've assigned for the total
7 geologic risk for the Atlantic B Com 220.

8 The 60 percent total that is listed is
9 something that was arrived by the consensus opinion of the
10 different, different groups as to what portion of the total
11 risk made up the geologic risk.

12 Because of the general continuity of the
13 coals, because of the general inability to predict cleating
14 of the coals in this area, those factors were relatively
15 equal in my assessment.

16 The coal character is -- changes signi-
17 ficantly enough from well to well, as I've shown with the
18 Howell Com J 301 cross section and from scene to scene,
19 that the coal characteristics are -- it's -- the coal char-
20 acteristics are not predictable from well to well.

21 Q For any of the other wells involved in
22 the pooling cases did you come up with a percentage risk
23 factor penalty in the column on the far right that was dif-
24 ferent than the 60 percent?

25 A No, I didn't because they -- the wells

1 were all within the same general area. I feel like the 60
2 percent risk factor for geological factors is relatively
3 the same.

4 Q And rather than go through all the other
5 six or five pooling cases with you on an individual basis,
6 am I correct in understanding that your testimony is you
7 took each individual well and specifically applied the
8 geology to that given well location to assess a risk factor
9 penalty?

10 A Yes, I did.

11 Q And in each separate instance you came
12 up with a 60 percent as a number to apply in the calcula-
13 tion?

14 A Yes, I did.

15 MR. KELLAHIN: That concludes
16 my examination of Mr. Meibos, Mr. Catanach.

17 We would at this time move the
18 introduction of his Exhibits Seven-A through Seven-E in
19 each of the cases.

20 MR. CATANACH: Exhibits Seven-
21 A through Seven-E in each of the cases are hereby admitted.

22 Mr. Carr, cross?

23
24 CROSS EXAMINATION

25 BY MR. CARR:

1 Q Mr. Meibos, as you constructed your
2 geologic interpretation of this portion of the -- of this
3 pool, did you rely primarily on well control information?

4 A Yes, I did.

5 Q Is there seismic data utilized up here
6 at all?

7 A No, we don't.

8 Q So what you have here is just from in-
9 dividual well data.

10 A That's correct.

11 Q And you have developed sort of an ap-
12 proach to evaluating risk in a number of prospects as you
13 indicated how you have a group that works with that, is
14 that a procedure that's developed for other pooling hear-
15 ings as well as the ones that we're hearing today? Is the
16 same general procedure utilized?

17 A Generally, yes.

18 Q As you've utilized in the prior hear-
19 ings?

20 A Generally.

21 Q Now, when you evaluated the various com-
22 ponents of a risk penalty recommendation as you've set
23 forth in your exhibits for each well, was it a group deci-
24 sion that 60 percent of it would be allocated to the geol-
25 ogy in this area or was the decision made by you?

1 A It was a group decision.

2 Q And when you sat down you said, I think
3 you said, correct me if I'm wrong, you testified that we
4 decided what portion of the total risk was geology. Is
5 that how you went about it?

6 A Yes.

7 Q Had you previously decided what the
8 total risk would be?

9 A The total risk from what Mr. Kellahin
10 has told me is 200 percent by statute.

11 Q And so you were looking at a 200 per-
12 cent figure and saying, well, 60 percent of it is -- or 60
13 percent of the 200 is geology.

14 A Uh-huh.

15 Q And it came out the same in every one of
16 the prospects.

17 A Yes, in this case it did.

18 Q Okay. Has it in other cases come out to
19 be a different figure?

20 A Not in forced pooling hearings that
21 we've been to, but if we were to drill a well, say, in the
22 extreme southwest part of the basin, the geologic risk may
23 be 50 percent of the total risk, or --

24 Q Had you --

25 A -- or 100 percent of the total risk.

1 Q My question really is when your group
2 sat down did they decide how we were going to divide up the
3 200 percent or did you just come up with various factors
4 and then total them?

5 A We decided how we were going to come up
6 with the risk and then came up with the factors.

7 Q And they just happened to add up to 200
8 percent each time.

9 A We predesigned that they would add up to
10 200 percent based -- based on the fact that it's the rules.

11 Q Now, if we looked at the isopach, I
12 think -- I don't know what exhibit this is. Is this One
13 over here?

14 MR. KELLAHIN: It's Seven-A.

15 Q Seven-A, all right. This isopach shows
16 reservoir changes across a fairly large portion of this
17 pool, is that correct?

18 A It shows thickness changes.

19 Q Okay. Do you see similar thickness
20 changes when you get closer to -- wells in closer proximity
21 one to the other? When you start talking about closeology
22 you would see the abrupt changes in thickness?

23 A If you look at the cross section,
24 Exhibit Seven-B --

25 Q The top one?

1 A Yes. You can see here in the northeast
2 of 14, 30 North, 10 West, and the southwest of 14, 30
3 North, 10 West, that there is an abrupt thickness change as
4 to coal split to the southwest.

5 Q And are those offsetting locations?

6 A Yes.

7 Q And is that a common occurrence through-
8 out the pool?

9 A In certain areas.

10 Q And when you say in certain areas, have
11 you defined where those areas are? I'm not going to ask
12 you to, but I mean have you defined areas where you exper-
13 ienced these abrupt changes?

14 A Not in every case; only in a few; in a
15 few cases.

16 Q Would it be fair to say that the changes
17 as you depict in the cross sections, are -- you're more
18 likely to find these changes in the thickness across this
19 area that you've mapped as opposed to looking at just off-
20 setting wells?

21 A Will you rephrase the question?

22 Q Would you expect to see as much a change
23 in thickness if you looked just at individual offsetting
24 wells as what you have depicted with this cross section?

25 A The two offsetting wells that are de-

1 picted on the cross section show a rather drastic change.

2 Q But is that the norm or is that unusual?

3 A In some areas it's the norm and in some
4 areas it's unusual.

5 Q Okay. And have you mapped to find these
6 areas where you would expect that more than others?

7 A No, we haven't.

8 Q As we look at this, we can see that the
9 basal coal is always present, isn't that correct?

10 A On these cross sections, it is, but it's
11 not always present.

12 Q Are there areas where it is not?

13 A That's correct.

14 Q Are they areas that you can define?

15 A Given thirty more geologists, maybe.

16 Q Why don't we look at -- why don't we
17 look at the Pearce No. 250. Are the triangles on -- on
18 whatever this other exhibit is, the --

19 A The production rates?

20 Q Yeah, the production rates, the stars
21 are the wells we're talking about at this hearing?

22 A Yes.

23 Q The triangles are Meridian wells?

24 A Meridian wells are triangles, yes.

25 Q Around the Pearce No. 250 there are a

1 number of triangles. Would you expect in that area that
2 the basal coal wouldn't be present?

3 A The Pearce 250?

4 Q Yes, sir.

5 A The Pearce 250 is in Section 7 and the
6 basal coal is present in the Pearce 250.

7 Q Okay.

8 A If I recall correctly.

9 Q Without going through all of these wells
10 that we're talking about here today, are there any where
11 you would expect as a geologist not to find the basal coal
12 present?

13 A It's at least present but I don't think
14 the presence of the basal coal matters.

15 Q Well, if you don't have it, it matters,
16 doesn't it?

17 A Might, might not.

18 Q And you would think you could make a
19 well in the basal coal if it wasn't there?

20 A In some wells that we've drilled the
21 basal coal isn't as productive as the upper coals.

22 Q But if you're -- I'm just trying to see
23 if generally speaking the basal coal is present in the
24 prospects that you're considering, isn't it?

25 A Generally, yes.

1 Q Okay.

2 A And to what thickness it is, I couldn't
3 say.

4 Q Okay. Now, if I understand it, you
5 don't believe that closeology is probably a very valid tool
6 in this reservoir.

7 A No, I don't.

8 Q You don't think that your -- the quality
9 of your information improves directly with the quantity of
10 it.

11 A No, I don't.

12 Q You don't think that you would have a
13 better read on the acreage around this Pearce No. 250 than
14 you would, say, a well several miles to the north where you
15 don't have that kind of control offsetting it. Is that
16 right?

17 A I don't think that -- that, like I said,
18 that closeology is that helpful.

19 Q Would you think --

20 A Maybe if -- if we had five years of pro-
21 duction data on the wells that we've drilled, then maybe,
22 yes, but at this point I'd have to answer no.

23 Q Okay, well, how do you judge your -- the
24 prospects that you recommend to your management if it isn't
25 off of wells in the area?

1 A We recommend our prospects based on
2 wells drilled through the Fruitland coal that haven't ever
3 tested or completed the Fruitland coal, so we don't know if
4 the Fruitland coal is even productive in many of the areas
5 that we've drilled.

6 Q And you're making your recommendations
7 to your management on wells that have never produced?

8 A That's correct.

9 Q Okay, and so you would feel that you
10 would be justified with the data in the township north and
11 east, or in the township north with the Pearce No. 1 that
12 you can make a recommendation in that section as well as
13 you could for the tract where the Pearce is actually
14 located.

15 A That's correct, and we've done so.

16 Q Okay, then why do you drill them all
17 together like that?

18 A That's where our acreage is.

19 Q That's the only reason? Is that the
20 reason that there are pockets of wells throughout?

21 A That's exactly why.

22 Q And is that the only reason?

23 A That's the only reason. If Amoco would
24 sell us their stuff, we'd drill more wells.

25 Q If you'd sell your wells to Amoco they'd

1 have another data problem, I'm sure, like you do.

2 But that is the only reason?

3 A That's correct.

4 Q Now, when you're looking for a good well
5 fractures are important, is that correct?

6 A Yes, they are.

7 Q What -- other than just finding the
8 fractures are there certain things that tell you where you
9 would probably have a better chance of encountering the
10 better fracturing in the reservoir?

11 A We try to hedge our bets.

12 Q And what would you look to to try and
13 determine where the fracturing might be better in terms of
14 hedging your bets?

15 A We would look at Landsat information and
16 where we have it --

17 Q And what is that?

18 A Landsat is High Altitude Satellite
19 photos.

20 Q All right. Anything else?

21 A And we'd use stereo photographs flown at
22 low altitude.

23 Q Would you be looking at the quality of
24 the coal itself --

25 A No.

1 Q -- to determine --

2 A The coal character or coal quality would
3 have nothing to do with that type of a new analysis.

4 Q Okay. You would presume that better
5 coal quality would have a better fracturing.

6 A Better coal quality -- coal quality is a
7 term that's a little ambiguous. Some coals may appear to
8 be of high quality; in fact, the two upper coals of the
9 Howell Com J 301 appeared in hand -- hand examination to be
10 of high quality. They were dull with bright bands, which
11 isn't too much different than the basal coal. They may
12 have had a little bit duller appearance but from what I can
13 remember looking at them, they weren't that much difference
14 in their quality; however, the lower coal was cleated and
15 the upper coals were not.

16 Q When you talk about, oh, low test varia-
17 bility, things of that nature, do you have an opinion as to
18 whether or not that's a factor of geology or maybe a factor
19 of completion or producing techniques?

20 A Yes.

21 Q And what is that?

22 A I think that it's varied. It can be
23 either. It could be a factor, a function of geology. It
24 could be a function of completion techniques.

25 Q Or all of the above?

1 A Or all of the above, or both, yeah.

2 Q Okay. How many dry holes have you
3 drilled out in that coal?

4 A I couldn't say.

5 Q Okay, and why is that? Because you're
6 not producing?

7 A Because we haven't tied or tried to tie
8 all of the wells to -- to the line yet. We're not sure
9 which wells will produce and which wells won't yet, just as
10 a function of the logistical problems and getting all the
11 wells that were drilled hooked up.

12 So I couldn't -- couldn't answer that
13 question.

14 Q Do you have some?

15 A Yes.

16 Q How many, that you know of?

17 A I couldn't specifically name them.

18 Q Okay. I mean --

19 A And I couldn't specifically name the
20 number. I haven't studied that.

21 Q But you do have them?

22 A Yes, sure.

23 Q Do you think so?

24 A Well, I know the well on the end had a
25 flow -- a flow test of too small to measure.

1 Q Okay.

2 A I know that and I know that there are
3 several other wells that we've completed in a similar
4 manner that have had flow rates of too small to measure, I
5 know that, but I don't know if I can call them dry holes or
6 not and since we're dealing with an unconventional reser-
7 voir, the conventional term of dry hole, I don't think,
8 applies. Until we're able to assess this reservoir more
9 fully, it's hard to answer that question.

10 Q When you do these, do you go back and
11 fracture them, stuff like that? I mean that might change
12 the profile on these wells later on?

13 A Some of the wells have been fractured.

14 Q And does -- am I getting you into an
15 area that is not geology?

16 A Yes, you are.

17 Q Would you like to continue and try to
18 answer them?

19 A I've practiced reservoir -- I've prac-
20 ticed engineering without a license in the past and I usu-
21 ally get myself in trouble, so --

22 Q Mr. Kellahin and I have practiced, too.
23 What I'm trying to do is get a sense of
24 how -- what percent of the wells look like they might fall
25 into a dry hole category. Is 10 percent in that league?

1 Is 25 percent?

2 A I couldn't say and if I -- if there was
3 a concrete number I still don't think that it diminishes
4 the risk that's there within producing the Fruitland coal.

5 I still think the risk is -- is high be-
6 cause of -- of all the other parameters, let along the
7 geologic parameters that enter into getting the Fruitland
8 coal to produce.

9 Q You mean a dry hole isn't the factor, is
10 that what you're saying?

11 A If -- a dry hole is generally considered
12 -- I drilled one once.

13 Q Up here?

14 A Up in the San -- not in the Fruitland
15 coal. I drilled a Mesaverde well that was a water, water
16 well, and right now we're trying to farmout the up hole
17 stuff from you guys.

18 Aside from that --

19 Q And the downhole stuff, too?

20 A Well --

21 Q I'm kidding.

22 A But -- but that well, because I had
23 recovered no gas out of the -- of the sand and recovered
24 just water, I could make an assessment of that and knowing
25 the character of the reservoir, knowing that it was just

1 sand and that I wasn't going to have any changes in the
2 reservoir, just say, yes, this is a dry hole and we need to
3 plug this zone and see if we can talk Amoco into giving us
4 the rest of the well; whereas, in the Fruitland coal, and
5 my counterparts will talk about this more in detail, the
6 Fruitland coal character changes when you -- when you open
7 the wellbore. You can have coal fines move in and plug the
8 well off and it might have had a flow test that was high to
9 begin with and you'd think, great, we've got a super well,
10 but because of the changing character of the reservoir,
11 boom, you shut the well in, like Amoco did the Kahn (sic)
12 well, and you destroy the well.

13 Now, would you call the Kahn a dry hole
14 or not? I think the risk is still there though it has pro-
15 duced a bunch of gas, the risk of the coal producing gas is
16 something that is a time intensive process.

17 Q Now, I'll try one more time and then I'm
18 going to leave this.

19 A lot of wells out here, from what I
20 understand, if I understand what you said, you can't even
21 -- I don't mean that to be sarcastic -- you can't tell that
22 -- what it's going to do; whether it's a dry hole or a
23 great producer because it hasn't been produced yet. Is
24 that what you said?

25 A Yes.

1 Q When you do that do you get an initial
2 rate on those wells? Do you test them or anything?

3 A That's the flow test that -- that I was
4 talking about regarding these.

5 Q All right, and does that initial rate
6 give you any indication of what that well actually ul-
7 timately will do?

8 A No. We'd like it to, but it doesn't.

9 MR. CARR: I have no further
10 questions. Thank you.

11 MR. CATANACH: Mr. Kellahin,
12 do you have anything further?

13 MR. KELLAHIN: Thank you, Mr.
14 Examiner.

15

16 REDIRECT EXAMINATION

17 BY MR. KELLAHIN:

18 Q Let's see if I can clarify something,
19 Mr. Meibos, in relation to Mr. Carr's earlier questions.
20 He asked you about a presentation in terms of prior hear-
21 ings on forced pooling cases in Fruitland coal.

22 A Uh-huh.

23 Q You, in fact, before this very Division
24 have made prior geologic presentations requesting a risk
25 factor penalty, have you not?

1 A Yes, I have.

2 Q The geologic presentation the analysis
3 shown on the tab following Exhibit A is significantly dif-
4 ferent than the presentation you made before, is it not?

5 A Somewhat different. I wouldn't say sig-
6 nificantly.

7 Q All right, it is more detailed in its
8 analysis and execution than you have made before.

9 A Yes, it's much more detailed.

10 Q And you made that in response to your
11 dissatisfaction over the risk factor penalty applied by the
12 Division in those prior cases, didn't you?

13 A That's correct.

14 Q Let's discuss some of those prior analy-
15 ses so that I can understand what you have done in this
16 particular group of cases.

17 A Okay.

18 Q The analysis of the risk factor in those
19 prior pooling cases, let's assume that it was divided into
20 three parts. A third was a geologic risk; a third was the
21 mechanical risk; a third was the reservoir characteristics
22 that were at risk.

23 A Uh-huh.

24 Q Within that last third, that third was
25 again divided into thirds, whereby one third was assigned a

1 hydrologic risk; one third reservoir performance; and one
2 third presence of coal in the wellbore.

3 A That was the geologic risk, if I recall
4 correctly.

5 Q All right. In what ways does your
6 analysis today with the collective group differ from an
7 analysis that separates out the risk as I've just de-
8 scribed it?

9 A Our analysis today differs in that the
10 previous analysis assumed that if coal was present, that
11 there was no risk to the coal, to finding coal.

12 Q Did you agree with that assumption in
13 the prior pooling cases?

14 A We agreed that there is no risk to
15 finding the coal where we have a wellbore that has already
16 cut it. We know that -- and as most of these wells are
17 either Pictured Cliff or Mesaverde wells, that I've shown
18 in the my cross section, we know that coal is present in
19 the subsurface.

20 Q Did you agree or disagree in the prior
21 cases that the presence or absence of coal should be a
22 factor by which you diminish the risk?

23 A We disagreed with -- with it, because
24 the presence of coal is not the risk. The risk is the
25 character of the coal, the stratigraphy of the coal, the --

1 and the other factors that I've discussed here today.

2 Q Mr. Carr also asked you a question about
3 the mathematics of making the risk factor calculation. You
4 started with the total risk, the maximum statutory penalty
5 of the 200 percent?

6 A Uh-huh.

7 Q Am I to understand that that was an ob-
8 jective, impartial analysis on your part to determine where
9 within that range of risk from zero to 200 percent, the
10 group collectively decided the risk ought to apply for each
11 of these seven wells?

12 A (Not clearly heard.)

13 Q Am I also correct in understanding that
14 you simply didn't analyze the data by which then to justify
15 or back in to the maximum penalty.

16 A That's correct. Might I add something?

17 Q Yes, sir.

18 A We took, in order to come up with this,
19 we took the information that -- that you provided us with
20 regard to the Commission's assessing us a risk factor or
21 not assessing us, but giving us a risk factor penalty of
22 156 percent in the previous hearing. We took that informa-
23 tion and tried to follow a similar pattern as to be consis-
24 tent with -- with the Commission's thinking on the subject.

25 MR. KELLAHIN: No further

1 questions.

2 MR. CATANACH: Are there any
3 other questions of this witness?

4 MR. CARR: No questions.

5 MR. CATANACH: Mr. Chavez?
6

7 QUESTIONS BY MR. CHAVEZ:

8 Q Yes, sir. How many Fruitland Coal wells
9 have you recommended to be drilled in this area?

10 A More than a hundred but less than a
11 thousand.

12 Q Of the Fruitland coal wells that have
13 been --

14 A And that's not me particularly. I
15 haven't recommended those particularly. It's been the --
16 as a group.

17 Q Of the Fruitland coal wells that have
18 been drilled and are producing, how many of them would you
19 call geologic failures?

20 A That would be -- I would have to answer
21 that the same way I answered Mr. Carr's question with res-
22 pect to how many dry holes we've drilled. I can't answer
23 that yet, because there's too many factors to consider when
24 you consider the geologic factors that enable the Fruitland
25 coal to produce.

1 Q Yes, but the geology has a portion in
2 the assessing risk. Have you looked back at those wells
3 and tried to make any kind of determination as to what
4 geology -- the geology contributed to the productivity or
5 successfulness of the wells?

6 A Yes, we have, and we've been at least
7 marginally successful in re-determining the geologic poten-
8 tial in some areas.

9 MR. CHAVEZ: That's all I
10 have.

11 MR. CATANACH: Any other
12 questions of this witness?

13 If not, he may be excused.

14 MR. MEIBOS: Thank you.

15
16 PATRICK W. BENT,
17 being called as a witness and being duly sworn upon his
18 oath, testified as follows, to-wit:

19
20 DIRECT EXAMINATION

21 BY MR. KELLAHIN:

22 Q Mr. Bent, for the record would you
23 please state your name and occupation?

24 A My name is Patrick Bent. I'm the
25 Regional Drilling Engineer for Meridian Oil in Farmington,

1 New Mexico.

2 Q You've testified on prior occasions be-
3 fore the Division as a drilling engineer, have you not?

4 A Yes, I have.

5 Q And did you participate with Mr. Meibos
6 and Mr. Caldwell, and others, in analyzing the recommenda-
7 tion from Meridian to the Examiner for the risk factor
8 penalty to be assessed in these pooling cases?

9 A Yes, I did.

10 Q Before we discuss your opinions on the
11 risk factor, let me ask you, sir, for each of the exhibit
12 books which I believe contain within them following Tab
13 5 is an AFE for each of the wells.

14 Did you cause those AFE's to be prepared
15 and have you reviewed and approved those AFE's for your
16 company?

17 A Yes, I have.

18 MR. KELLAHIN: We tender Mr.
19 Bent as an expert drilling engineer.

20 MR. CATANACH: He is so qual-
21 ified.

22 Q Mr. Bent, without going through a lot of
23 detail and because it is not an issue of controversy in
24 this case, let me simply ask you to take one of the exhibit
25 books, let's pick at random Case 9593, and if you'll turn

1 to Tab Exhibit Five and find the AFE for that particular
2 well.

3 What have you recommended and found to
4 be your opinion with regards to the total completed well
5 cost for that well?

6 A \$244,400.

7 Q Can you describe for us, sir, what is
8 the general range of AFE's as we go through the various
9 exhibit books, do you recall?

10 A They're all in this general range of
11 approximately \$240,000, drilled and completed.

12 Q Describe for the Examiner how to read
13 the information. The first page behind Exhibit Five re-
14 presents what?

15 A The well cost estimate prepared by en-
16 gineers under my supervision. It details the costs asso-
17 ciated with drilling and completing a Basal Fruitland coal
18 well.

19 Q And then page two following that exhibit
20 number?

21 A Is the tangible facility costs asso-
22 ciated with the equipment placed on the location subsequent
23 to the completion of the well.

24 Q And in order for this well, in order to
25 get the \$419,000 plus, you add together the 244 under the

1 total drilling cost estimate plus the total facilities?

2 A That's correct.

3 Q The 174?

4 A Yes, sir, that's correct.

5 Q Have these AFE's been circulated to all
6 working interest owners that will participate in each of
7 the wells?

8 A To the best of my knowledge, yes.

9 Q And have you received any objection or
10 comments from any of the parties to participate in these
11 wells?

12 A No, we have not, to the best of my know-
13 ledge.

14 Q In your opinion, Mr. Bent, do these
15 AFE's for each of these wells represent reasonable, accu-
16 rate, and current estimates of expenditures for these
17 wells?

18 A Yes, they do.

19 Q And would you recommend to the Examiner
20 that the cost utilized in these AFE's be adopted by the
21 Examiner when he issues the pooling orders?

22 A Yes, I would.

23 Q Let's turn now, sir, to the subject of
24 the risk factor penalty. When we look at the exhibit books
25 there is, as I showed to Mr. Meibos, a tabulation of the

1 risk factor analysis in any one of the books. Describe for
2 us, sir, what role you played in the group's effort to
3 analyze the risk for each of these wells.

4 A I was responsible for the assignment of
5 the operations risk.

6 Q Describe for us what you did as a
7 drilling engineer to determine that you had identified the
8 right factors that make up the operational risk for the
9 Fruitland coal gas wells.

10 A We went through the well histories area
11 by area and determined where the problems were, the fre-
12 quency of problems, the percentage of total well time that
13 was made up by trouble time.

14 Q When we examine the individual exhibit
15 books for each of the pooling cases do we find a range of
16 percentages tabulated in the far right column or are they
17 all 70 percent as it shows on this display I have before
18 me?

19 A No, there is a range. I believe 80 per-
20 cent is the highest. 70 percent is the lowest.

21 Q Describe for us how you determined that
22 there was a range of risk involved in the operational as-
23 pects of the total penalty.

24 A In different areas there are different
25 operational concerns. We looked at those areas where the

1 problems had greater frequency and assigned those areas a
2 greater risk factor.

3 Q When taking all the various components
4 of the risk factor penalty together did you find in your
5 analysis with the group that you ever had any of these
6 wells that in your opinion constituted a total risk factor
7 of less than 200 percent?

8 A No, we did not. In some instances it
9 was more than 200 percent but the maximum allowable is 200
10 percent.

11 Q Let's go through each of the components
12 of the operational risk and have you discuss for us how you
13 attempted to value for each of these specific wells the
14 equipment failure while drilling.

15 A Equipment failure while drilling basic-
16 ally is equipment reliability. You have the normal day to
17 day operational failures associated with rigs; a failure of
18 clutches, pumps, hoses, that type of things. Those things
19 don't particularly pose a threat to the productive capabil-
20 ity of a well.

21 Then we looked at specialized equipment
22 failure. Our completion technique employs some special-
23 ized equipment used in ways that are not the norm for the
24 San Juan Basin and as such, determined those to be special-
25 ized; power swivels, air compressors, things that we found

1 that be more appropriate in the completion of Fruitland
2 coal wells.

3 Q Why does this represent an item or a
4 component of the operational risk for these type of wells?

5 A Because the failure of these type of
6 specialized tools or the failure of these would constitute
7 what we consider catastrophic failure in a well resulting
8 in cessation of operations, fishing jobs, that sort of
9 thing.

10 Q Have those instances of equipment fail-
11 ure occurred to Meridian in the drilling and completion of
12 Fruitland coal gas wells?

13 A On numerous occasions, some which are
14 listed in Eight-A, I believe.

15 Q Before we discuss the specifics of that
16 information, let me make sure that your analysis is clear
17 to everyone about the various components. You've talked
18 about equipment failure.

19 The other -- the other factor under
20 operational risk is a formation problem while drilling?

21 What does that mean?

22 A That's correct. Normally when drilling
23 to an intermediate TD we don't experience any operational
24 problems as such. A few do occur but what I took the for-
25 mation problems while drilling to be, while drilling the

1 Fruitland coal itself and Meridian's, one of Meridian's
2 methods of completing the Fruitland coal involves drilling
3 through the coal with water under balanced allowing the
4 well to influx and we get to enlarge the wellbore creating
5 a greater surface area, a production enhancement technique.

6 Q What other type of formation problems do
7 you encounter in the drilling of your Fruitland coal wells?

8 A The problem basically with -- with this
9 method is formation solids production, water production,
10 and gas production, we have to have a method.

11 By drilling under balance we create a
12 controlled blowout situation where it's necessary to use
13 double BOP stacks, blowout prevention stacks, rotating
14 heads, double flow lines, equipment that we feel is neces-
15 sary to control the situation.

16 By injecting air during the operation we
17 again increase the solids production. We feel that this --
18 this procedure allows us to enlarge the wellbore and it's
19 part of our completion technique that we feel is respon-
20 sible for some of the success that we've experienced.

21 With this solids production there is
22 again the risk of -- the operational risks associated with
23 it, the bridging, shell bridging, coal bridging, lost
24 circulation, several different factors, which make it a
25 operational problem if it's not controlled.

1 Q Let's turn now, sir, to the exhibit book
2 9593 and look behind Tab 8. The first page is the analysis
3 for the Atlantic B Com 220 Well. Based upon your analysis
4 of the operational risk, what percentage of the risk factor
5 penalty have you recommended for operational risk for this
6 well?

7 A 70 percent.

8 Q Have you gone through a similar analysis
9 for each of the other wells involved in the pooling case
10 today?

11 A Yes, we have.

12 Q And you specifically looked at those
13 operational risks as you might determine them to occur in
14 each of those other wells?

15 A That is correct.

16 Q And then placed on that particular point
17 in the exhibit book your assessment of percentage factor.

18 A That is correct.

19 Q Let's look now to some of the documenta-
20 tion that you have provided that further illustrates your
21 point about the operational risk involved in this type of
22 well.

23 There are three more areas. One is the
24 production history on the 401 Well. Let's skip past that
25 one for a moment.

1 There's the production history on the
2 413 Well; skip that for a moment, and go to the tabulation
3 then which is captioned Mechanical Failure. What have you
4 done here, Mr. Bent?

5 A We've reviewed the well histories basic-
6 ally east to west across the map that Mr. Meibos supplied
7 and documented some specific instances of formation prob-
8 lems, mechanical failures, failures associated with dif-
9 ferent completion techniques.

10 Q And then provided a tabulation of that
11 information.

12 A Yes, that's correct.

13 Q If Amoco elects not to participate under
14 the pooling order and does not pay its share of the costs
15 of the well, then that cost must be borne initially by
16 Meridian as part of the cost of the well, to then be recov-
17 ered out of Amoco's share of production plus the penalty
18 factor that's approved by the Examiner.

19 Do you have an opinion as to whether or
20 not the operational or mechanical risk applied to each of
21 these wells is a significant element of that risk?

22 A Yes, it is a significant element. Even
23 though, as Mr. Meibos testified, coal changes from area to
24 area, so do the operational concerns and so for instance,
25 on the first page we see some problems in the 30 and 6

1 area, yet these wells are further to the west. Again, with
2 the different coal types that we encounter, we encounter
3 different operational concerns and so everywhere we go
4 there are substantial operational risks involved.

5 Q If Meridian undertakes to assume that
6 risk for Amoco's share of the interest in these wells, is
7 that a risk that ought to be compensated for in a risk
8 factor penalty?

9 A Yes, it is.

10 Q Let's turn now, sir, to the production
11 history on the 413 Well, if you will. Describe for us
12 what's shown on this exhibit.

13 A This is a gas/water production form
14 approximately mid-year 1986 through the present -- excuse
15 me, '87 through present, and what it shows is a marked de-
16 crease in the production of the well.

17 Let me give you a little background.
18 Once a well in this area, or this type of well, has been
19 completed, we run a liner. The procedure we use to run
20 these liners is determined on a well by well basis; that
21 the volume is low enough of gas produced and the water
22 production and solids production is stable enough we're
23 able to strip the liner in the well.

24 If the gas volume and solids production,
25 water production, is substantial, we have to snug the liner

1 in the well and in certain instances where it is unable to
2 do either, we have to mud the well up and kill it. We feel
3 at this time that any weighted drilling fluid across the
4 formation is extremely damaging to the fracture system as-
5 sociated with the coal production, gas and water produc-
6 tion.

7 What happened on this well was that it
8 was drilled and completed with a minimum amount of problem
9 but in the producing life of the well the casing suffered a
10 catastrophic failure. We were -- had to work over the well
11 to repair the casing, and in doing so we had to mud the
12 well up and kill it, using a low solids, nondispersed mud
13 system, approximately 11 pound per gallon mud. In order
14 for us to be able to do this we lost approximately 2000
15 barrels of whole mud to the well. Once we did kill the
16 well we were able to repair the casing, brought the well
17 back on line and it never has produced -- the initial pro-
18 duction rate or the producing rate at the time of (unclear)
19 was in excess of 10-million a day. Now, due to the loss of
20 mud and what we feel is the damage associated with that
21 loss, the well produces somewhere in the vicinity of 500
22 MCF a day.

23 Q Let's turn to the example shown on the
24 production history tabulation just before the 413. Let's
25 turn to the 401 Well. Describe for us the well history on

1 that well, Mr. Bent.

2 A This is one of the initial wells in our
3 pilot program drilled in 1986. This well was drilled to TD
4 and casing run through the Fruitland coal. The well was
5 cemented, selectively perforated, fractured, sand/water
6 hydraulically fractured. It is one of the lesser or least
7 productive wells in the 30 and 6 Unit. What it's showing
8 is that -- that we tried several different techniques in
9 order to bring the well around to enable it to produce like
10 the offsets, some of the other wells in the 30 and 6 Unit
11 we had sand/water fractured, as I've stated; nitrogen in-
12 jection, we blew the well with air, gas, tried several
13 different things with really no success at all. Once we
14 did leave it alone the production rate did rise slightly up
15 to approximately 500 MCF a day. Currently it's producing
16 just about 300 MCF a day. It's an example of a well that
17 completion technique used didn't fit the well. We have to
18 look at each well on an individual basis in order to com-
19 plete the well, I think, as successfully as we possibly
20 can, and this is an example of not doing very well at that.

21 Q The general period of time involved in
22 the treating and work on this well is from '87 through '88?

23 A From mid-year '86 to the present.

24 Q And what is the current rates on that
25 well?

1 A It appears to be somewhere around
2 2-to-300 MCF a day.

3 Q And what was the highest rate on that
4 well during the life of the production?

5 A Standard production appears to be some-
6 where around 500 but only for a short period of time. I
7 think the average would run about 350.

8 Q This well was being operated by Meridian
9 during the period of time that you had a basis of informa-
10 tion from prior Fruitland coal gas wells that you were
11 drilling and producing?

12 A Very little information at the initial
13 stages of the well. Again, in 1986 we drilled 4 Fruitland
14 coal wells; '87, we drilled 16, and as you can see, most of
15 the work was done in late '86 or '87. Our data base at
16 that time was not as substantial as it is now. Again I
17 think one of the points here is that -- that depending on
18 the area we have to look at each well individually to de-
19 termine the completion technique and again there's a risk
20 involved with inappropriately completing a well using a
21 method that's not suited to that area.

22 Q Even with Meridian's basis of expertise
23 and knowledge about the drilling the Fruitland coal gas
24 wells, is there still the element of risk associated with
25 operational risk that you've assigned for each of these

1 wells?

2 A Yes, there is. One of the things that
3 we do to give the well a chance, again, to perform, is in
4 some of the outlying areas we've drilled through the Fruit-
5 land coal with water and allow that well to be given a
6 chance to show any signs of gas production prior to, say,
7 running casing across the Fruitland coal and maybe hydraul-
8 ically stimulating the well. That's all.

9 Q In conclusion, then, the element of op-
10 erational risk you've assigned for each of these wells is
11 shown the summary of information behind Tab 8 in the exhi-
12 bit book?

13 A That's correct.

14 MR. KELLAHIN: That concludes
15 my examination of Mr. Bent, Mr. Catanach. We would move
16 the introduction of information shown in the exhibit book
17 behind Tab Exhibit Eight in each instance.

18 MR. CATANACH: Okay. Did you
19 already offer a portion of your exhibits --

20 MR. KELLAHIN: We already did,
21 yes, with Mr. Meibos.

22 MR. CATANACH: Okay, that por-
23 tion of Exhibit Eight in all of these cases will be
24 admitted as evidence.

25 Mr. Carr, do you have

1 anything?

2
3 CROSS EXAMINATION

4 BY MR. CARR:

5 Q Mr. Bird, if I understand your --

6 A Bent.

7 Q Mr. Bent, I'm sorry. We always screw up
8 the hard names.

9 Your responsibility is assigning a per-
10 centage risk for operation risk, is that correct, in these
11 -- in the cases we're looking at here today.

12 A That's correct.

13 Q And those figures, based on your recom-
14 medation, have varied from 70 to 80 percent, is that cor-
15 rect?

16 A That's correct.

17 Q Could you tell me what kind of a problem
18 would have caused one well to have an 80 percent factor as
19 opposed to a 70 percent given to others?

20 A Right.

21 Q I don't understand what you base that 10
22 percent differentiation on.

23 A I think -- well, what we based it on was
24 the completion technique that we felt would be most appli-
25 cable for the certain well and in that completion technique

1 there are higher operational risks involved in certain
2 wells than in others.

3 Q So some completion techniques have a
4 higher risk than others.

5 A That's correct.

6 Q And when you use those you would kick up
7 the operational risk category.

8 A That's correct.

9 Q These completion techniques that you
10 use, are they commonly used by operators in this pool or
11 are they unique to Meridian?

12 A The higher risk completion procedures is
13 a Meridian developed technique, although other operators
14 are moving towards that.

15 Q How many wells has Meridian drilled to
16 this -- at this point in time in the -- in this pool?

17 A Total wells in a 3-year period are 201.

18 Q Have you been involved on a number of
19 those?

20 A 201.

21 Q Are you getting better at controlling
22 the problems relating to the completion techniques?

23 A We're learning more. We're having to
24 develop new tools, modified tools, that sort of thing.
25 Each different area we move into we encounter different

1 types of problems, but on an area to area basis we're
2 learning.

3 MR. CARR: That's all I have.

4 Thank you.

5 MR. CATANACH: Other questions
6 of this witness?

7 If not, he may be excused.

8 Let's take a break here.

9

10 (Thereupon a recess was taken.)

11

12 MR. CATANACH: Okay, we'll
13 call the hearing back to order and I will turn it over to
14 Mr. Kellahin.

15 MR. KELLAHIN: Mr. Examiner,
16 I'd like to call Mr. John Caldwell

17

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

21

22 DIRECT EXAMINATION

23 BY MR. KELLAHIN:

24 Q Mr. Caldwell, for the record would you
25 please state your name and occupation?

1 A My name is John Caldwell,
2 C-A-L-D-W-E-L-L. I'm employed by Meridian Oil in Farming-
3 ton, New Mexico, and my title is Regional Reservoir En-
4 gineer.

5 Q Mr. Caldwell, on previous occasions have
6 you testified as a reservoir engineer before the Division?

7 A Yes, sir, I have.

8 Q Describe for us generally what it is
9 that you are addressing with regards to the risk factor
10 penalty portion of the compulsory pooling applications that
11 are before Examiner Catanach this afternoon.

12 A Specifically the portions that I plan on
13 addressing today are reservoir risk associated with the
14 risk factor penalty and economic risk.

15 Q Have you and the staff engineers that
16 work for you with Meridian Oil, Inc., performed the neces-
17 sary engineering analysis to allow you to reach an opinion
18 about the risk factor penalties to be applied to each of
19 these wells?

20 A Yes, sir, we have.

21 MR. KELLAHIN: I tender Mr.
22 Caldwell as an expert reservoir engineer.

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

25 Q Before we discuss the individual wells,

1 Mr. Caldwell, let me for reference show you a copy taken
2 from any of the exhibit books of the first page following
3 Exhibit 8, and as we've discussed with the prior witnesses,
4 let me direct your attention, sir, to having you identify
5 and describe for us the method by which the study group
6 attempted to define issues that encompass the risk factor
7 penalty and then subsequently what role you played in that
8 study group.

9 A Okay. In essence the reservoir en-
10 gineering staff, Pat Bent of the drilling engineering
11 group, and Lynn Meibos of the geologic group upstairs in
12 our office, decided that we needed to address the appro-
13 priate parameters that went into calculating the necessary
14 risk factors for the Fruitland coal forced pooling cases
15 that we have in front of us today.

16 Some of the things that we wanted to
17 address were more detail associated with each of the three
18 or four parameters that we talked about previously, and my
19 charge, really, as a president pro tem, whatever, of the
20 group, was to try to come up with the appropriate risk
21 factors, geologic, reservoir, economic and operation.

22 Specifically the way Meridian's office
23 is styled, they have a separate engineer in the reservoir
24 group that each works a particular area. Of the eight
25 wells that we're originally planning on pooling today,

1 Three separate reservoir engineers that
2 work for me covered those particular wells. I asked them
3 to sit down and get their heads together on the differ-
4 ences and the similarities in assigning risk between each
5 of their particular areas in each of their coal wells as
6 pertaining to reservoir risk and economic risk.

7 And some of the things that they came up
8 with and I came up with are listed on each of these
9 exhibits under risk penalty analysis.

10 Q For definition purposes, then, Mr. Cald-
11 well, will you identify for us under reservoir risk what is
12 intended to be meant by sustained deliverability and how
13 that parameter applied to the risk factor calculation?

14 A One of the things that we looked at was
15 sustained deliverability. That, in essence, can be defined
16 as what type of rate are we getting from the wells that
17 have been drilled, completed, and tied into the line.
18 Along that line we've drilled a number of wells that have
19 not been tied in. The Exhibit Seven-E that Lynn and I
20 prepared reduces that data to a visual exhibit where you
21 can graphically see juxtaposition, I guess. if you will, of
22 the rates as opposed to the wells that we're planning on
23 force pooling.

24 One of the things that's very important
25 to us is economics, naturally, to program it we're drilling

1 the Fruitland coal, and we're very interested in finding
2 out what rates are, what rates are we getting from the
3 wells that we're drilling.

4 Exhibit Seven-E addresses the rate
5 variability that Lynn has mentioned that can be directly
6 correlated in essence with permeability.

7 We feel that well rate performance ex-
8 hibited on that exhibit, which is a 30-day sustained de-
9 liverability number in MCF per day for each of the parti-
10 cular entities up there, is not sensitive particularly to
11 thickness of the coalbed. It is sensitive to permeability.

12 As permeability is not an easily map-
13 pable parameter, we'd like to look at the distribution of
14 rates associated with the wells that we have drilled and
15 tied in to see if we can make some correlations. I'm not
16 sure that there is a correlation. We haven't been able to
17 detect a particular parameter that we can put our finger on
18 to get to that point.

19 Q Because of your inability to do that,
20 did you assess a higher portion of the reservoir risk then
21 to the fact that you could not predict the performance or
22 deliverability of particular areas, if any, to be drilled?

23 A Yes, sir, that's correct. If we had
24 offset production data that indicated a relatively high
25 degree of confidence we'd get an economic well based on in-

1 initial potential or based not on initial potential but on a
2 30-day deliverability averages. We felt more comfortable
3 about drilling a well in that proximity, as I think pro-
4 bably most people would. Unfortunately, of the eight wells
5 that we're talking about only one well can be used as rela-
6 tively low risk based on rate.

7 Q You also identified as a topic under
8 reservoir risk the subject of dewatering. Would you de-
9 scribe for us how that plays a part in the analysis?

10 A Yes, sir. Dewatering as it relates to
11 risk is -- is -- can be explained, I guess, again as a
12 function of cleating. Dewatering a highly cleated reser-
13 voir will give you high rates of water but low or TSTM
14 rates of gas per some period of time.

15 In other cases in some of our wells
16 we've got water cuts up in excess of 1000 barrels of water
17 per million. In dealing with disposal water costs, that's
18 not economic to us if we were making 5, 10, 15 MCF a day.

19 In other cases the water cut is much
20 lower than that and we can tell a lot quicker in the well's
21 life whether or not we have an economic venture.

22 We have some wells that we're convinced
23 are going to be economic but we don't know when or how and
24 we have some that we think we can tell in six months pro-
25 duction time that they might be economic and we have some

1 wells that we don't know, and the dewatering risk is
2 drilling a well in an area that we know has permeability
3 and cleating and maybe not getting a successful economic
4 venture.

5 So all of that is rolled up, I guess, in
6 the dewatering aspect of reservoir risk. How long will it
7 take us to get economic rate, a month, a year, five years,
8 maybe never, and even though we've got demonstration of
9 high permeability in the coal, do we have any -- any gas
10 production?

11 Q And those are all elements of the risks
12 that do not in your opinion have a comfortable handle on
13 that you can make accurate projections and thereby minimize
14 your risk.

15 A Yes, sir. We drilled wells that have
16 tested at high water rates and high gas rates and tied them
17 into the line and have not seen those types of water rates
18 or gas rates.

19 Q Let's turn now to the reservoir recovery
20 aspect of the reservoir risk and have you explain and de-
21 scribe what that is.

22 A One of the things I think most companies
23 do when they decide whether or not a particular well is
24 economic or not is take initial potential or take the first
25 30 days deliverability and do some kind of extrapolation to

1 come up with reserves. They run some type of internal
2 in-house economics to see whether or not the venture that
3 they've been sold by their staff is really such a good deal
4 after all and they come up with a projection as to whether
5 or not they want to drill some more of these wells.

6 One of the problems that arises when
7 you're drilling an unconventional reservoir, like the
8 Fruitland coal is, you can't tell from the initial rate
9 what the well performance is going to be. You can't tell
10 in our experience from a flow test before you tie the well
11 and what the well is going to perform as. Based on the
12 behavior of inclining rate with time and the dewatering
13 mechanism and a non-linear pressure versus cum performance,
14 we can't tell if the 25 MCF a day is eventually going to
15 end up to be 2-million a day or if it's going to be flat at
16 25 MCF a day, or in fact it's going to decline at some
17 number. We have some pretty good ideas but there's defin-
18 ite reserve recovery and undefined producing coal charac-
19 teristics that play a big part in assessing reservoir risk.
20 This isn't a traditional reservoir by any means and to
21 assign -- to assign a risk knowing that we know how the re-
22 servoir behaves is not appropriate here.

23 Q Discuss for us now the issue of economic
24 risk and how is that integrated into the other risks.

25 A Well, as I mentioned, I guess, briefly

1 earlier, everything boils down to the bottom line in our
2 company and I'm sure it probably does in others, too, and
3 what we need to be thinking about are the economics asso-
4 ciated with the project that we're drilling and some of the
5 economic risks that go in to our evaluation are not typical
6 in the Fruitland coal as they are in some of the other
7 formations in other parts of New Mexico and other parts of
8 the San Juan Basin, and we've tried to lay out for you some
9 of the items that we feel we need to spend money on and
10 we're taking a risk on to make the whole thing profitable,
11 and those are laying a completely separate CO₂ gathering
12 gas pipeline system and treating plant; drilling SWD wells
13 at some risk to take care of the high volumes of water; all
14 of those associated expenditures with treating the produced
15 fluids and marketing that gas. There are a lot of risks
16 associated with the Fruitland coal and in essence, in my
17 mind, indicated it's a wildcat play. I think Lynn alluded
18 to that a little bit earlier when he said that it's an AAPG
19 shallow pool test in most areas, and we really feel that
20 way even though we've got 10,000 control points, what we're
21 drilling here is a wildcat play, and I think the risk needs
22 to be appropriate to that.

23 Q Let's talk about where Meridian is in
24 the current state of drilling activity, your plans for
25 drilling. Up to this point you have been drilling what

1 type of prospects, geologically? Is there a particular
2 pattern? Have you taken the lowest risk areas first to
3 drill or have you taken those areas and where you have the
4 greatest percentage interest ownership of that well, or how
5 have you organized your scheme or plan of development for
6 all these wells?

7 A We've tried to be reasonably even-handed
8 for a variety of reasons. Initially the way that our pro-
9 gram started we wanted to drill on 100 percent acreage be-
10 cause we couldn't get, we felt, any partners to approve the
11 research effort that we were doing on the 4-well pilot pro-
12 gram.

13 We spent over a million dollars per well
14 on those 4 wells and some of those wells are not economic
15 ventures. Based on the results of playing around with
16 those 4 wells, we proposed 16 wells to be drilled in 1987
17 in areas that we'd identified as being high potential, 100
18 percent drill blocks in most cases; I think in all cases.

19 Based on those results, which we do have
20 some production data now that's a year to 18 months, we
21 proposed a third phase, if you will, for 1988 that involved
22 the acreage that we felt was high potential both operated
23 100 percent drill blocks, 100 percent working interest, and
24 partner wells. Those wells were proposed primarily I think
25 in April of 1988 and by virtue of -- of being able to get

1 consent on 100 percent wells, we drilled those preferen-
2 tially.

3 The rest of the wells in what we consi-
4 der the high potential areas, we've had a difficult time
5 gaining consent or some type of election from our partners
6 on. Feeling a little bit frustrated by that and also
7 wanting to maximize our acreage position and find out
8 really what the Fruitland coal resource was out there, we
9 stepped out and optimized on 100 percent drill blocks that
10 we could drill early to see what in essence our -- the
11 value of our acreage was in outlying areas.

12 So now what we have is we have lower,
13 less than 100 percent working interest prospects, if you
14 will, being drilled at the same time as we're drilling
15 higher risk outpost type prospects in the outlying regions
16 of the basin. We're drilling both plays right now.

17 Q Within what group of activity do the
18 current group of six pooling cases find themselves, Mr.
19 Caldwell?

20 A These six cases we're talking about
21 today lie in our originally identified high potential area
22 and they've been on our books since April and they've been
23 a project we've wanted to drill since early last year.

24 Q In studying of assessing the risk factor
25 penalty describe for us your opinions with regards to the

1 risk of these wells as they relate to the maximum 200
2 percent risk factor penalty.

3 A I'm sorry, could you rephrase that?

4 Q All right. I want to focus in on the
5 maximum 200 percent risk factor penalty with regards to
6 these particular eight wells, all right?

7 In the group's analysis of that risk
8 factor, what has -- what is the conclusion as you can ex-
9 press it for the group concerning that penalty for these
10 wells?

11 A The penalty was derived independently of
12 the 200 percent maximum and we felt constrained, naturally,
13 by the 200 percent maximum. We came up with some numbers
14 in some of the high potential areas of a lot of operational
15 risk, a lot of watering risk, with numbers that were way in
16 excess of 200 percent. I don't have those numbers handy.
17 We felt he had to proportionately reduce them to -- to tie
18 the 200 percent maximum, when the issues that we looked at
19 drove us up to 300, 300+ percent penalty on top of that. I
20 don't know if that's inappropriate.

21 Q The Division is allowed to assess a
22 penalty for the drilling and completion of the well that
23 you undertake on behalf of Amoco for their share of the
24 cost of that well and says, which charge for risk shall not
25 exceed 200 percent of the nonconsenting working interest

1 owner, or owners, prorated share of the cost of drilling
2 and completing the well. All right?

3 A Okay.

4 Q Does the geologic risk that your group
5 discussed fall within the concept of the risk involved in
6 the drilling and completion of the well?

7 A You mean does the geologic risk that
8 Lynn has assigned double dip, if you will, operation risk
9 on completion?

10 Q Yes.

11 A No, it does not.

12 Q Okay. When we look at the reservoir
13 risk assigned and the penalty then to be recovered for the
14 risk undertaken for drilling and completing the well, is
15 this a reservoir risk that applies to that activity?

16 A Yes, sir, that's correct.

17 Q And with regards to the complete -- the
18 economic risk involved, are those items that specifically
19 involve the risk in drilling and completion of the wells?

20 A Yes, sir, that's correct.

21 Q When we look now to -- when we look to
22 the operational risk, those are operational risks involved
23 in the drilling and completion and stimulation of the well?

24 A Yes, sir.

25 Q When we get down to a study of the indi-

1 individual wells can you summarize for us, if we go through the
2 individual wells, and tell us what were some of the major
3 parameters that influenced the group's decision to recom-
4 mend the maximum for that particular well?

5 A Certainly.

6 Q For example, if you'd start with the
7 9593 case, that's the Atlantic B Com 220 Well?

8 A Yes, sir.

9 Q Summarize for us what is your opinion
10 and conclusion about the risk factor penalty for that well.

11 A I don't want to drag this out any longer
12 than I have to but I'm going to step up to Exhibit Seven-E
13 if I could.

14 Q Okay.

15 A Case 9593 deals with the Atlantic B Com
16 220 Well, which is located in Section 34, 31, 10. The risk
17 that we associated with the first part of that, rate risk,
18 reservoir risk, we gave it a high risk to rate because the
19 closest offset well that we have any data on is in Section
20 1 of 30 and 10, and that number is 81 MCF a day and that's
21 after stimulation. That's a 30-day number and we feel --
22 we've drilled all of these wells in this area that are
23 TSTM, and this one is going to do better than that one but
24 we don't know. Our rate risk in this particular area is a
25 wildcat and it's a low, uneconomic well that we're compar-

1 ing it to. We've got some coal thickness but for purpose
2 of our risk analysis, it's a very risky venture.

3 We gave it a low risk for project be-
4 cause this is going to be lying right along the trend of
5 some of our pipeline work that we're already doing through-
6 out the lease to take care of some of these associated
7 problems with water production and maybe not going to have
8 a lot of water, 5 barrels per day. That piece of a risk
9 package we gave a low number. I can't really speak for the
10 operational risk for that. we gave (unclear). I can't
11 really speak for the operational risk for that.

12 Q In conclusion, then, do you recommend
13 the maximum 200 percent penalty for that particular well?

14 A Actually, I'd recommend higher than this
15 if we could go higher because that's a pretty risky well.
16 We felt constrained at the 200.

17 Q Let's look at Case 9594. That's the
18 Florence 260 Well?

19 A Yes, sir. The Florence 260 is located
20 in Section 21 of 30 and 9. This happens to be an area
21 where the plot of the operated production data came from
22 the Florence leases which have been recompleted over time.
23 Our closest offsets are several Tenneco wells operated, I
24 think, by Amoco now that are 30-day (unclear) drilling in
25 the order of 100-to-150 MCF a day. To us that indicates

1 the possibility of hydrocarbons. It doesn't necessarily
2 indicate the possibility of drilling an economic well.

3 What we gave that was a high risk for
4 rate. I think it's probably a little bit lower than this
5 but we gave it the same number as the Atlantic B 220 be-
6 cause we couldn't go any higher in the Atlantic Well, and
7 we gave it a low, relatively low risk project because in
8 this area there's a lower CO₂ concentration and we feel
9 it's going to be lower in water production and those asso-
10 ciated risks are going to be relatively smaller because of
11 that.

12 Q In conclusion, then, with regards to the
13 Florence 260 Well, what is the collective opinion on the
14 risk factor penalty for that well?

15 A We wanted the maximum on this and I
16 think that's probably appropriate, whereas the other one
17 was maybe higher than 200 percent, this one would probably
18 be closer.

19 Q Let's go to Case 9595, which is the
20 Caperton 310 Well?

21 A Yes, Caperton 310. That well is located
22 in Section 32 of Township 30 and 8, 30 North, 8 West. As
23 you can see, we're closer to the 30 and 6 unit; (unclear)
24 this (unclear) Township 30 and 7 and Lynn's Howell J Com
25 301 Well is represented on the exhibit. I believe it's in

1 Section 14 --

2 MR. MEIBOS: 11

3 A Section 11, I'm sorry. Our closest
4 production data is the well that we've had on line for
5 several months; the first 30 days averaged 340 MCF per day
6 with relatively small amounts of water, 5 or 10 barrels
7 per day. That well is currently making 200 MCF a day and
8 about a 20 percent decline. We're not convinced that's an
9 economic venture, although (not clearly understood.)

10 The other closest well offsetting it
11 now is an operated well, averaged 15 MCF a day. Even for
12 a traditional well that's uneconomic.

13 The other two key wells, we have one, a
14 well in Section 34 that's 57 MCF a day and that well, I
15 believe, (unclear) over a million a day and tied into the
16 line at 500 a day, and the first (unclear) average was 57
17 MCF.

18 The key point here is that the
19 Caperton, we associated a high risk for rate because we
20 have no analogs that say that any of the wells that we
21 drill in this area are going to be economic and we associ-
22 ated the low risk for project because we felt that the
23 water was going to be higher than some of these other
24 wells, was still going to be relatively small economic
25 risk associated with taking care of all the project's

1 (unclear).

2 This well in Section 35 is another one
3 of our wells that IP'd at 7-million a day, I believe, and
4 it's producing about a million and a half a day from the
5 Fruitland.

6 Q What's your conclusion, then, about
7 your recommendation for a risk factor penalty for the
8 Caperton 310 Well?

9 A Our conclusion was that this was --
10 this well should be higher than 200 percent nonconsent
11 again because we have no -- no basis for judging other-
12 wise.

13 Q Let's go to the 9596 well, the Pearce
14 250.

15 A The Pearce 250 is located in Section 7
16 of Township 30 North, 9 West. Again the analog that we're
17 using based on actual performance is the same one we've
18 talked about, the Atlantic B Com 220, with 81 MCF per day.
19 Therefore we gave it the high risk for rate and low risk
20 for project for the same reasons.

21 Q And your ultimate recommendation, then,
22 is what percentage with respect for that well?

23 A This -- this well we feel a little bit
24 better about because it is only a mile and a half away
25 from -- from an uneconomic well that's making some gas,

1 but it's still a risky venture.

2 Q Representing in your opinion what per-
3 centage risk factor penalty?

4 A 200 percent.

5 Q Let's go to the Delhi 300. It's Case
6 9597? Find that well for us.

7 A Yes, sir, the Delhi Com 300 is located
8 in Section 16 of Township 30 North, 8 West, and again in
9 looking at the actual production data of the wells around
10 it, we have the same well that we talked about in the Cap-
11 erton case in Section 27, 30 and 8, which has averaged 15
12 MCF a day and in our mind is uneconomic.

13 Meridian has a well in Section 15, the
14 Howell K 300, which the first 30 days have averaged 111
15 MCF a day. This well flow tested over a million a day and
16 the initial after frac, after drill rate was 400 MCF a day
17 and it came on line at 170, a 30-day average.

18 We have some offset wells in Section 10
19 that are zero; in Section 4 that are zero; in Section 3
20 that are 75 MCF a day, all of which are uneconomic.

21 On the up side of this is where there's
22 an area of thinner coal we have higher rates. We do have
23 some 100 to 200 MCF a day analogs.

24 The bottom line of all of that for the
25 Delhi was we gave it a medium risk, if you will, for rate

1 and a low risk for project. This is in an area that we're
2 trying to develop and drilling reasonably elaborate
3 gathering facilities and we've got an SWD well that's
4 located not too far, I'm not sure what section it is, but
5 it is in Township 30, 8.

6 The bottom line of all of that is that
7 although it's not as risky for the project basis, it is
8 risky from a rate basis. There's only one -- one well
9 that's economic in our mind out here; possibly two, and we
10 gave it the maximum.

11 Q 200 percent penalty.

12 A 200 percent penalty.

13 Q I direct your attention to the well for
14 Case 9598. It's the EPNG Com A 300 Well.

15 A Yes, sir.

16 Q Describe for us your analysis of that
17 well and your ultimate conclusion about the risk factor
18 penalty percent.

19 A The EPNG Com 3-A 300 Well is located
20 in Section 32 of Township 31 North, 8 West, and we like
21 this well. This well has got an analog production history
22 around it on three sides that show 780 MCF a day in Sec-
23 tion 33; 900 MCF a day in Section 29; 840 MCF a day in
24 Section 5 of Township 30 and 8. Those are the good wells.

25 The bad wells are two wells we drilled

1 that are TSTM in Section 31 and Section 28; an offset
2 operated well that's averaged one MCF a day; another one
3 that's averaged 89 MCF a day; and several down in Section
4 5 and 6 of 30 North, 8 West that have averaged 100 and 200
5 MCF a day.

6 The bottom line of all of that is we
7 gave it low risk for rate. We felt we could drill a well
8 that would probably be economic ratewise.

9 We gave it a high risk for project be-
10 cause this is an area that typically exhibits high water
11 production and causes a lot of problems in handling that
12 water. We try to -- we feel that there's a very good pos-
13 sibility we'd get some cleatings and permeability but also
14 high water rates. It may take awhile to find out whether
15 this well's going to be an economic venture.

16 Q Do you have difficulty with your wells
17 if they're shut in and they're subject or vulnerable to
18 having that gas production cease as a result of the water
19 influx into the wellbore?

20 A Well, I think Pat testified about the
21 413 Well, what happens if you have to mud up a well, you
22 lose it, We lost a 10-million cubic feet of well -- MCF
23 per day well by having to kill it. We feel that some of
24 the same problems could happen if we have to start de-
25 watering the Fruitland coal and we have to shut it in at

1 some point in time. We feel there's a very definite risk
2 there. It varies by area. One of the things that we men-
3 tioned is a dewatering risk. How do you address the eco-
4 nomic consequences of getting a well on, getting it tied
5 in, and then having to curtail or shut it in? We feel in
6 some areas, and this is one of them, we may lose a well
7 like that.

8 Q And you might lose that well at a time
9 prior to it recovering its cost one time?

10 A Most definitely.

11 Q What then is your ultimate conclusion
12 about the risk factor penalty for the well for Case 9598?

13 A 9598, there's a lot of risk associated
14 with -- with the project, as I mentioned, and we ended up
15 giving it the maximum. This was one of the wells, I be-
16 lieve, that also bumped over that 200 percent.

17 Q All right, finally, let's go to Case
18 9599. It's the Stanoline 300 Well.

19 A Okay, the Stanoline 300 is located in
20 Section 16 of 30 North, 8 West, and in analyzing this par-
21 ticular proposed well it's very similar to what we've al-
22 ready talked about the Delhi Com 300. The offset perfor-
23 mance, the closest well is an outside operated well in
24 Section 10 that averaged zero for the first thirty days,
25 and we have another well that Meridian's drilled, the

1 Howell K 300 in Section 15, that averaged 111 a day. Both
2 of those are uneconomic wells.

3 We have a well down in Section 27;
4 again it's 50 MCF a day. The up side to it, to this par-
5 ticular well is we're not too far from Section 5 and 6
6 where we're getting 100 and 200 MCF a day and one well
7 that's 840 MCF a day.

8 The bottom line of that is we gave it
9 the same risk assessment as the Delhi 300, a medium risk
10 for rate, although that's probably -- probably stretching
11 a little bit in that particular well, and a low risk for
12 project because we felt the cleating and the water asso-
13 ciated with all that would not be quite so high.

14 Q What percentage penalty did you assess
15 for that well?

16 A This well we gave 200 percent.

17 Q Thank you.

18 MR. KELLAHIN: That concludes
19 my examination of Mr. Caldwell, Mr. Catanach.

20 MR. CATANACH: Mr. Carr?

21
22 CROSS EXAMINATION

23 BY MR. CARR:

24 Q Mr. Caldwell, I believe it's within
25 your area to look at, as I think you indicated, sustained

1 deliverability.

2 A Yes, sir, that's correct.

3 Q In doing this are you called upon to
4 look at initial rates and see how long it takes for them
5 to reach a peak rate, a well to reach a peak rate?

6 A We've done a lot of work in that.

7 Q Has that fallen within your area?

8 A Well, it's kind of an inter-disciplin-
9 ary effort between my group and the reservoir department
10 and the production group.

11 Q Is it possible to relate with any accu-
12 racy initial rates and what the well's peak rate will ul-
13 timately be?

14 A We haven't been able to.

15 Q Have you been able to make any estimate
16 as to the times that are required for a well that actually
17 reaches a peak producing rate?

18 A We've been asked that question repeat-
19 edly by our management. One of the answers that we try to
20 look at is what's happened in the basin with some wells
21 that have some history and Amoco's Cedar Hill is one of
22 the things that we fall back on.

23 One of the problems with that is the
24 coal, as Lynn mentions, varies tremendously across the
25 basin. I don't think you can use the Cedar Hill as an

1 analog for Township 30 North, 10 West, because the coal
2 behaves completely differently, we feel.

3 So what that affects is the distribu-
4 tion of permeability affects your initial rate, which af-
5 fects your water production, which affects your timing, if
6 you will to reach a peak rate, and probably your ultimate
7 recovery and your ultimate decline rate, and your decline
8 rate may be 50 percent, it may be 10 percent, we really
9 don't know and some of the stuff that we've looked that
10 Amoco has drilled and operated, shows inclining perfor-
11 mance over 7 years, so maybe that's reasonable, but maybe
12 it's not. We've got a well, like I mentioned, that's
13 declined from day one at about a 25 percent decline rate.

14 Q And do you have an opinion as to what
15 has caused that in that well?

16 A In that particular well?

17 Q Uh-huh.

18 A We've got several opinions and I've got
19 several opinions and I'm not sure what the right answer
20 is.

21 Q Are they related to just the reservoir
22 itself or --

23 A Yeah.

24 Q -- are some related to completion --

25 A Yes, sir.

1 Q -- or producing techniques?

2 A That particular --

3 Q Or both?

4 A That particular well we completed open
5 hole. It's the Day Com 200. We completed that well open
6 hole and tested it as too small to measure.

7 We ran a liner and cemented it and
8 treated it with one of our first fracture stimulations and
9 we got what we felt was very encouraging results of 450
10 MCF a day on an after frac date. We tied the well into
11 the line. We got 300 -- I'm sorry, I'm kind of speaking
12 from memory now, about 400 MCF a day; initial deliverabi-
13 lity into the line at 350 pounds back pressure. From that
14 point the 30 day average was 348 MCF a day and currently
15 it's making about 200 MCF a day, and the only explanation
16 I can have is maybe we didn't stimulate it correctly and
17 maybe the coal was behaving differently, and maybe we
18 haven't opened up maybe all the reservoir; maybe it's not
19 there, and there's a lot of risk associated until we --
20 one -- one of the things that I know has been testified to
21 in the literature is some wells maybe decline for awhile
22 and increase to a peak and then decline from that point
23 on. We've seen, maybe, some of that behavior in some of
24 Amoco's production. We have not seen it ourselves.

25 The well could decline to depletion or

1 -- we don't know.

2 Q When you say -- when you go out and run
3 an initial test on a well, is it -- and it sound to me
4 from your testimony that you have on fairly frequent occa-
5 sions had volumes too small to measure, when you get that,
6 what techniques are available to you to -- to enhance that
7 well's ability to produce?

8 A We've probably tried with maybe several
9 exceptions everything that we can think of, and I think
10 when Pat talked about the 401 Well, and we can talk about
11 that, if you like, that well has had over 20 different
12 stimulation jobs done on it and we've acidized it with
13 hydrochloric acid, 50,000 gallons. We've fracture stimu-
14 lated with sand/water frac of 150,000 pounds of sand.
15 We've nitrogen foam fraced it twice. We've acidized it,
16 acid washed it four or five times. We've gone in and jet-
17 ted it. We've tried lots of different tools, lots of dif-
18 ferent techniques, and we've been pretty disappointed; the
19 well just got worse, kind of like the sick patient that
20 almost died.

21 Q And is languishing?

22 A It's languishing now.

23 Q When you used these various techniques
24 on other wells, have you been able to improve their pro-
25 ducing capabilities?

1 A The Day Com Well that I mentioned we
2 improved from too small to measure to 450 MCF a day.

3 Q Throughout the testimony today was --
4 we keep hearing about a number of wells that are not tied
5 in.

6 A Right.

7 Q Why is that?

8 A Our sister company, El Paso Natural
9 Gas, has chosen to take its time in tying in our wells.
10 Contractually we're limited to a certain percentage of CO₂
11 that we can dump into the system, as I'm sure Amoco is
12 probably aware of. Due to the fact that we have to have
13 arms length negotiations even with our sister company,
14 they put us at arm's length plus across the room, and
15 that's caused some problems.

16 We have permitting problems in laying
17 our own gathering system. We're trying to build a 170-
18 million a day CO₂ treating plant in the basin and we're
19 trying to sign up outside parties to see if we can handle
20 their CO₂ treating problems in their gas stream.

21 Logistically it's just a tremendous
22 project in trying to lay a duplicate gathering system for
23 the Fruitland coal.

24 Q How -- one of the earlier witnesses
25 told me how many wells you had at this time drilled into

1 this pool in the basin, in excess of 200?

2 A 201.

3 Q And of those, how many are not tied in
4 or how many are at this time?

5 A We've tied in our original 20 wells,
6 which is 4 wells '86 and 16 wells in '87. From that point
7 I believe we've probably tied in another 25 wells.

8 Q So less than 50?

9 A The number at my best recollection was
10 44, so --

11 Q Of 200 and --

12 A 201.

13 Q Of the 44 that are tied in, in your
14 opinion have any or many of those wells reached their peak
15 producing rates?

16 A I think a handful may have. Six, in
17 that range but less than half of them are. It's a little
18 bit anomalous because the 20 wells that we drilled in the
19 pilot program and the other 16 are in a very prolific
20 area. Of those 20, 8 are declined, so 12 are still flat
21 or inclined.

22 Q In terms of their reaching their peak
23 rate, did they do it in a similar time frame or did they
24 -- were there variations in that aspect of the well's pro-
25 ducing characteristics?

1 A I don't think any of them were the
2 same. Some of them are flat. Some of them declined and
3 then inclined based on some of the work we were doing.
4 Some of them we stimulated too much that they declined
5 from day one.

6 Q Now when you're looking at wells, from
7 your testimony I gathered that you made judgment calls as
8 to whether a well was high risk or less risk looking at
9 off-setting properties and offsetting wells, is that
10 correct?

11 A That's one of the parameters that we
12 used.

13 Q And that's something that you would use
14 even though your geologist would discount that.

15 A One of the dichotomies, I guess, be-
16 tween geologists and engineers is engineers like to use
17 closeology regardless of what the geologists tell us.
18 That causes some problems, obviously, inter-disciplinar-
19 ily, but on Lynn's Exhibit Seven-C you can readily see
20 that even the same coal thickness gets widely varying re-
21 sults.

22 What we're trying to do is determine in
23 our own minds what's the behavior going to be of that par-
24 ticular well based on what we've seen in the first 30
25 days, and we've got our own ideas that we sell management

1 on, on how those wells are going to perform, but we've got
2 to tie it back to reality and it's some discrepancy there.

3 Q And when you're involved in making re-
4 commendations to your management you look at data on the
5 offsetting properties in making your decisions as to what
6 you're going to recommend?

7 A Yes, sir, we do.

8 Q Is it fair to say that where you have
9 more data you can make more accurate prediction as to the
10 caliber of the chances of success for the prospect?

11 A We've indicated that slightly in our
12 risk analysis but I could give you an example just north
13 of Cedar Hill where we had two wells side by side and one
14 well with 3-million a day and one well was TSTM, and that
15 --

16 Q Because of the reservoir or other
17 factors?

18 A Because of the reservoir.

19 Q Okay, by the same operator?

20 A Meridian drilled.

21 Q When you talk about the water cut
22 effects on the economic life, there are wells that you
23 operate that you've concluded are simply non-economical
24 because of water production, is that right?

25 A I think that Lynn expressed it as well

1 as could, really, we don't know, and there's a lot of risk
2 associated with how many of the 201 wells that we've
3 drilled to this point are going to be economic successes.

4 Q And that's going to require production
5 first, is it not?

6 A Yes. We have several wells that are
7 making in excess of 5000 barrels per million.

8 Q Now, in terms of the portion of the risk
9 factor that was your responsibility, if I understood you,
10 you also looked at economic risks, and when you look at
11 economic risk you include the treating facility, the
12 separate line, the disposal wells, all of that, is that
13 correct?

14 A One of the things that we have to just-
15 ify to ourselves is a certain economic parameter be met and
16 for us to be able to meet that, whether it's net present
17 value, rate of return, whatever it is, you've got to be
18 able to sell the gas. We can't sell the gas because we
19 can't handle the water or we can't sell the gas because we
20 can't handle the CO₂, that has a direct impact on that
21 present value. If it's two years before we can get a CO₂
22 plant up and running, it may be an economic well if you
23 were to tie it in tomorrow, but it would be uneconomic if
24 we had to wait two years, and so projects risk doesn't in-
25 clude on a discrete basis including all the capital costs

1 associated with drilling an SWD and laying all the lines
2 but it does associate with the timing of when you're going
3 to actually produce the well.

4 Q And those matters, though, are factors
5 that you include, is that what your testimony was?

6 Now, during your direct testimony you
7 talked about all of these wells being in what you called
8 your high potential area. Would you -- what is your high
9 potential area?

10 A I think the high potential area has pro-
11 bably been defined in the literature as eloquently and
12 probably a lot more eloquently than I am today. In essence
13 what that is is a trend line between Cedar Hill with estab-
14 lished production and established fracturing trend from 30
15 and 6, which has established production and established
16 fracturing trend.

17 Early on in our program what we wanted
18 to do was connect it on and optimize our acreage within
19 that corridor, that fairway, or whatever you'd like to call
20 it. Unfortunately, a lot of our acreage doesn't lie in
21 that fairway and what we chose to do was drill some select-
22 ed wells to see what our results would be. Our results have
23 been all over the map. We've got great wells. We've got a
24 lot of TSTM wells.

25 Q Okay, that's all, thank you.

1 MR. CATANACH: Anything fur-
2 ther?

3 MR. KELLAHIN: No, sir.

4 MR. CATANACH: The witness may
5 be excused.

6 MR. KELLAHIN: Mr. Examiner,
7 we'd call Mr. John Myrick.

8
9 JOHN MYRICK,
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. Myrick, would you please state your
16 name and occupation?

17 A John Myrick. I'm a landman for Meridian
18 Oil in Farmington.

19 Q Mr. Myrick, have you testified before
20 the Oil Conservation Division on a prior occasion?

21 A No, sir, I haven't.

22 Q Would you summarize for the Examiner
23 what has been your educational and employment experience as
24 a petroleum landman?

25 A I have a Bachelor's degree from the Uni-

1 versity of Texas at El Paso, 1974; JD degree from Texas
2 Tech University in 1977. I've been employed with Meridian
3 Oil and its predecessor, El Paso Natural Gas, El Paso Ex-
4 ploration Company, since 1978 as a landman; first in the El
5 Paso office as a contracts and titles landman and from '85
6 on as a field landman.

7 Q Have you familiarized yourself with the
8 process by which you negotiate with other working interest
9 owners and attempt to form voluntary spacing units for the
10 drilling of the Fruitland coal wells?

11 A Yes, sir, I have.

12 Q In each of the cases that's before the
13 Examiner this afternoon, have you participated in and com-
14 piled the necessary land information for those wells?

15 A Yes, sir, I have.

16 MR. KELLAHIN: We tender Mr.
17 Myrick as an expert petroleum landman.

18 MR. CATANACH: He is so quali-
19 fied.

20 Q Mr. Myrick, let me take the case book
21 for Exhibit 9593 and let's go through the exhibits.

22 First of all, behind Exhibit One what do
23 you have?

24 A We have the application for compulsory
25 pooling.

1 Q Okay, attached to that application,
2 then, is a plat showing the well location and the spacing
3 unit for the well?

4 A Yes, sir, and behind that is the parties
5 that -- a list of the parties (unclear).

6 Q Let's turn to Exhibit Two now. What's
7 shown here in the exhibit book?

8 A This is a general plat of the area show-
9 ing the proration unit for the well under consideration and
10 the location of the well, the offsetting acreage, offset-
11 ting sections, offsetting owners.

12 Q And behind that landman's plat of the
13 general area --

14 A Is a more specific plat of the unit
15 itself, where we plan to drill the well, showing the loca-
16 tion of the well; leases are described; owners of the
17 leases; acreage attributable to each lease.

18 Q All right, sir, and when we turn to
19 Exhibit Three, identify and describe the information con-
20 tained behind that tab.

21 A This is -- these are copies of letters
22 that we've sent out to the other owners in the well in an
23 attempt to get them to join in the well, make a commitment
24 one way or the other in the well.

25 Q Okay, then when we turn to Exhibit Four,

1 what's behind that tab, Mr. Myrick?

2 A On the first page is a list of owners
3 showing their percentage interest in the well and showing
4 what they have done so far in regard to joining the well,
5 showing whether they've signed the AFE or whether they've
6 signed the operating agreement, or both.

7 Q For this particular case we have 12+
8 percent working interest for this spacing unit that at the
9 time this was prepared was controlled by Tenneco Oil Com-
10 pany?

11 A Yes, sir.

12 Q And as of the date of this hearing we
13 have neither an AFE nor a joint operating agreement signed.

14 A That's correct.

15 Q Now, the Tenneco interest to the best of
16 your knowledge is under the control and operation of what
17 company?

18 A Amoco.

19 Q And have you and others on behalf of
20 Meridian dealt with representatives of Amoco concerning
21 each of the interests that were formerly held by Tenneco in
22 each of the forced pooling cases involved here?

23 A Yes, sir.

24 Q All right, sir, and then after Exhibit
25 Five we have the AFE that was discussed by Mr. Bent?

1 A Yes, sir.

2 Q And did you cause that AFE to be circu-
3 lated to all the working interest owners?

4 A Yes, sir, I did.

5 Q Have you received any objection from any
6 working interest owners for the AFE?

7 A No, sir, not at all.

8 Q And finally, when we turn to Exhibit
9 Six, what are we looking at in the exhibit book?

10 A This is a copy of the operating agree-
11 ment, proposed operating agreement, sent to all the parties
12 in the well.

13 Q And when we turn to the COPAS attach-
14 ments to the operating agreement and look under the over-
15 head fixed rates, what do you recommend for this well?

16 A For this well it's \$3500 drilling rate;
17 \$350 dollars producing rate.

18 Q And that is a rate that except for Ten-
19 neco's interest has been agreed to by others, other than
20 Meridian?

21 A Yes, sir, it has.

22 Q And have you gone through a similar ex-
23 ercise with each of the other compulsory pooling cases be-
24 fore the Examiner today?

25 A Yes, sir, I have.

1 Q Let's go through and summarize, then, as
2 of this point, today's hearing, Mr. Myrick, for Case 9593
3 what interest is outstanding and in what percentage?

4 A The Tenneco interest is still outstand-
5 ing in the amount of 12.321712 percent.

6 Q And when we go to Case 9594, that's the
7 Florence 260 Well, what party and what percentage interest
8 is still outstanding?

9 A Again the Tenneco interest is 12.5 per-
10 cent.

11 Q Case 9595, what parties are outstanding
12 and in what percentages?

13 A Again the Tenneco interest, 6.25 per-
14 cent; Texaco interest in the amount of 25 percent; and Don
15 Turrieta interest, 12.5 percent.

16 Q In case 9596, what interest is outstand-
17 ing and in what percent?

18 A Again the Tenneco interest, 12.5 per-
19 cent.

20 Q Turning to Case 9598, what party and
21 what percentage is outstanding?

22 A Tenneco, 25 percent.

23 Q And in Case 9599, what parties and what
24 percentage are still outstanding?

25 A BHP Petroleum, 37.5 percent.

1 Q Other than Amoco's expressed objection
2 to the risk factor penalty in the pooling cases, Mr.
3 Myrick, are you aware of any other party having any other
4 type of objection --

5 A No, sir.

6 Q -- to the forced pooling?

7 A No, sir, not at this point, no, sir.

8 MR. KELLAHIN: That concludes
9 my examination of Mr. Myrick.

10 We'd move the introduction of
11 his Exhibits One through Six in each of the pooling cases.

12 MR. CATANACH: Exhibits One
13 through Six in each of the pooling cases will be admitted
14 into evidence.

15 Mr. Carr?

16
17 CROSS EXAMINATION

18 BY MR. CARR:

19 Q Mr. Myrick, since Amoco acquired the
20 Tenneco properties have you had any personal association
21 with Amoco?

22 A We've -- yes, sir, we have. We've
23 talked over the phone on several occasions.

24 Q And when you approach a company like
25 Amoco to seek to obtain voluntary joinder in a prospect, is

1 the risk penalty a matter which is open for negotiation or
2 is that something that is predetermined?

3 A I don't follow your question, I'm sorry.

4 Q I mean when you ask someone to, say,
5 sign an operating agreement or join with you in development
6 of a property that you operate, are you an individual who
7 would have authority to, say, negotiate whether the penalty
8 is 250 or 100 or --

9 A No, sir, I'm not.

10 MR. CARR: That's all I have.

11 MR. KELLAHIN: No further
12 questions. That concludes -- Mr. Examiner, I have not
13 marked these with an exhibit number but they represent cer-
14 tificates of mailing and copies of return receipts that I
15 have had sent to parties in each of the pooling cases. I
16 marked these at this time as Exhibit Number Nine in the
17 first case, which is 9593, but they do apply to each of the
18 cases as shown in the certificate.

19 MR. CATANACH: Okay. Exhibit
20 Number Nine will be admitted as evidence.

21 MR. KELLAHIN: And that con-
22 cludes our direct presentation, Mr. Examiner.

23 MR. CARR: Mr, Examiner, I
24 apologize for doing this to you but I've decided not to
25 call a witness.

1 MR. CATANACH: Oh.

2 MR. CARR: I do have a brief
3 closing statement whenever that is appropriate.

4 MR. CATANACH: Mr. Kellahin,
5 we're not quite finished with some of these cases. How do
6 you want to proceed with that?

7 MR. KELLAHIN: May we go off
8 the record for a moment?

9
10 (There followed a discussion off the record.)

11
12 MR. CATANACH: Okay, at this
13 time we'll let Mr. Carr make his closing statement.

14 MR. CARR: May it please the
15 Examiner, Amoco is before you today not opposing the entry
16 of compulsory pooling orders but requesting that a risk
17 penalty of less than 200 percent be imposed by the Divi-
18 sion.

19 We would call your attention
20 to prior compulsory pooling orders in this pool entered on
21 applications filed on behalf of Meridian where the penalty
22 was 156 percent. We believe that some thing between 100
23 and 150 percent would be appropriate.

24 Meridian wants to pool and
25 they're asking for the 200 percent penalty but it seems to

1 us something doesn't add up. They come before you and they
2 scream that everything out here is just like a wildcat but
3 they can't point to any true dry holes. They can't tell
4 you how many geologic failures they have; and we submit to
5 you that this mad drilling campaign that's going on out
6 there to drill up the acreage, that if any of those factors
7 were present you would know about it and we would know
8 about it.

9 But Mr. Meibos will sit here
10 before you and tell you we're just drilling in these areas
11 because that's where our acreage is. We submit to you that
12 a company that is out there going to drill more than 100
13 but less than 1000 wells, when they've only got 44 of their
14 210 wells currently connected, they can't give you an awful
15 lot of information, are either going forward with surpris-
16 ingly little information or they actually have more infor-
17 mation than they're leading the rest of us to believe.

18 Mr. Bent takes the stand and
19 Mr. Bent talks to you about the fact that there are higher
20 risks on -- his factors are higher for some wells because
21 there are higher risks associated with some of the comple-
22 tion techniques that are employed by Meridian. I submit to
23 you that it isn't appropriate to impose the full penalty on
24 us because they have elected to use some riskier completion
25 techniques.

1 range of 100 to 150 percent.

2 MR. CATANACH: Thank you, Mr.
3 Carr.

4 Mr. Kellahin?

5 MR. KELLAHIN: Thank you, Mr.
6 Examiner.

7 Let me explain to you why Mr.
8 Carr's analysis of the economic risk portion of the penalty
9 is not an accurate summation of what is intended by that
10 portion of the exhibit.

11 Very simply, if you were deal-
12 ing in a sandstone gas reservoir with gas production and
13 you had a water problem that you needed to dispose of
14 water, the cost of disposal of that water and producing
15 that water has got to be integrated into the cost of drill-
16 ing, completing, and producing that well at that location.
17 You may determine that you do not have a well of sufficient
18 economic viability, sufficient reserves, that you can pro-
19 ject for that well to support the structure that's neces-
20 sary in order to produce that well.

21 We are by no means saying that
22 the economic risk is for anything other than a portion of
23 the risk assigned the drilling and completing of the well.

24 That was Mr. Caldwell's testi-
25 mony. I specifically asked him about that testimony, and

1 if Mr. Carr wants to put a different slant on that testi-
2 mony, I think it's the wrong slant.

3 The only credible testimony
4 under oath was Mr. Caldwell's and his testimony was that he
5 in preparing the economic risk understood and meant this
6 analysis to be part of the general reservoir risk involved
7 in the drilling and the completion of the wells. I speci-
8 fically read in that portion of the pooling statute. I
9 think there's no question that that 20 percent he's assign-
10 ed in the Atlantic B Com 220 Well is an appropriate part of
11 the risk. We have always utilized in analyzing the risk
12 the question of whether or not you obtain production,
13 whether that production was going to be commercial produc-
14 tion for the life of the well. We continually present to
15 you cases where we show you that you can encounter the re-
16 servoir and are expected to produce some hydrocarbons but
17 historically the Commission has, rightfully so, granted as
18 an element of that risk whether or not that well is ulti-
19 mately going to be economic, and part of his economic ana-
20 lysis includes the necessary facilities to treat, dispose
21 of, and handle produced water.

22 Mr. Caldwell told you that
23 they certainly did not intend to, nor did they have any
24 preconceived design on backing into or justifying the
25 maximum penalty. His testimony, while he stood before you

1 on the Exhibit Seven-E showed you that in many specific
2 instances for these six wells they collectively reached a
3 risk factor penalty in excess of the statutory maximum and
4 they utilized that.

5 With regards to the prior
6 pooling orders, Mr. Meibos explained to you that the
7 presence of coal should diminish the risk. Mr. Meibos has
8 addressed that in half a dozen different ways with all his
9 displays and he has shown you and has repeatedly answered
10 the question that the presence of coal is not the question.
11 He had mapped that coal seam and he has shown you from
12 comparing well to well how erratic and unpredictable that
13 risk can be.

14 We think we are entitled to a
15 200 percent risk factor in an unconventional reservoir
16 where that risk, despite the experience of Meridian Oil
17 Company and its experts is still significant.

18 To try to put this in some
19 perspective for you, let's look at the Amoco interest in
20 case 9593. That's the Atlantic B Com 220 Well.

21 Total well cost is slightly
22 over \$419,000. We are asking Amoco, based upon their ex-
23 pertise in this area, to participate with us. They've got
24 coal gas production in this area. They developed the Cedar
25 Hills Pool. We're not asking them to pay us a great deal

1 of money to help us share that risk. Simply 12.32 percent
2 of \$419,000. All we want Amoco to do is to pay its share
3 of \$51,000.

4 That's all we want. We want
5 them to participate and if they choose not to, then let
6 them recoup to us out of their share of production the
7 inherent risks that are involved for us carrying their
8 share. But if \$51,000 is too much for them to pay, then we
9 think a 200 percent penalty is only appropriate.

10 Thank you.

11 MR. CATANACH: Is there any-
12 thing further in Case 9593?

13 9594 will be readvertised for
14 February 15th, I understand?

15 MR. KELLAHIN: Yes, sir.

16 MR. CATANACH: And we'll leave
17 the record in that case until then.

18 We'll at this time take Case
19 9593, 9595, 9596, 9598 and 9599 under advisement.

20
21 (Hearing concluded.)
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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.

Sally W. Boyd CSR

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 9593, 94, 95, 96, 98, 99 heard by me on February 1 19 89.

David L. Cabant, Examiner
Oil Conservation Division