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

20 September 1989

EXAMINER HEARING

IN THE MATTER OF:

Application of Meridian Oil, Inc. for a highly-deviated directional drilling project, unorthodox gas well location and an exception to Rule 2(b) of the Special Rules governing the Blanco-Mesaverde Pool, San Juan County, New Mexico, and	CASE 9764
Application of Meridian Oil, Inc. for a highly-deviated directional drilling project, unorthodox gas well location and an exception to Rule 2(b) of the Special Rules governing the Blanco-Mesaverde Pool, San Juan County, New Mexico.	CASE 9765

BEFORE: David R. Catanach, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

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I N D E X

E X H I B I T S

MR. CATANACH: At this time we'll proceed and call Case 9764.

MR. STOVALL: Application of Meridian Oil, Inc., for a highly deviated directional drilling pilot project, unorthodox gas well location and an exception to Rule 2-B of the special rules governing the Blanco-Mesaverde Pool, San Juan County, New Mexico.

MR. CATANACH: Are there appearances in this case?

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

MR. CATANACH; Any other appearances?

MR. LUND: Kent Lund in association with Charles Sanchez of Belen, New Mexico, appearing on behalf of Amoco Production Company. We're an interested party, not a protestant.

MR. HALL: Scott Hall, Campbell & Black law firm, on behalf of Blackwood & Nichols Company.

MR. KELLAHIN: Mr. Examiner, at this time we would request that for purposes of hearing presentation and taking testimony from the respective wit-

nesses that you also call at this time 9765.

MR. CATANACH: We will do so. Call Case 9765.

MR. STOVALL: Application of Meridian Oil, Inc., for a highly deviated directional drilling pilot project, unorthodox gas well location and exception to Rule 2-B of the special rules governing the Blanco-Mesaverde Pool, San Juan County, New Mexico.

MR. CATANACH: Can I get the witnesses to stand and be sworn in?

(Witnesses sworn.)

MR. KELLAHIN: Mr. Examiner, at this time I'd like to call our first witness, Mr. George Dunn.

GEORGE T. DUNN,

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A My name is George Dunn. I'm a Senior Staff Reservoir Engineer for Meridian Oil Company in Farmington, New Mexico.

Q Mr. Dunn, have you on prior occasions testified as an engineer before the Division?

A No, I have not.

Q Would you take a moment and describe for us when and where you obtained your degree?

A I graduated in 1979, the spring of 1979, from the Colorado School of Mines with a Bachelor's degree in petroleum engineering.

Q Subsequent to graduation would you summarize for us what has been your employment experience as an engineer?

A I've worked for over ten years since that time within two phases of petroleum engineering; five years as a drilling engineer, performing both technical engineering calculations and on site supervision in the Gulf Coast area for Tenneco Oil Company; and over five years as a reservoir engineer for Tenneco and now for Meridian; experience in both high permeability Gulf Coast type sand, Fruitland coal, and tighter permeability reservoirs, such as in the San Juan Basin.

Q Have you published or authored any technical papers within your field of experience, Mr. Dunn?

A Yes, I've co-authored one paper primarily concerned with completion techniques and completion procedures in deep high pressure, the corrosive wellbores.

Q Have you made yourself familiar as a reservoir engineer with the facts and circumstances of this -- of these two applications by your company?

A Yes, I have.

MR. KELLAHIN: At this time, Mr. Examiner, we tender Mr. Dunn as an expert reservoir engineer.

MR. CATANACH: He is so qualified.

Q Mr. Dunn, would you summarize for us what is the purpose of the study that you and the other technical personnel of Meridian undertook with regards to the two applications that are before the Examiner today?

A The purpose of our study was to determine if there was any new techniques that could be utilized to increase ultimate recovery within the Mesaverde gas pool and as such one of the techniques we have now suggested and applied for is the drilling of two highly deviated Mesaverde gas wells with the intentions to increase ultimate recovery within our own proration unit.

Q Why was the Mesaverde formation selected as the study formation for the pilot project for these two

applications?

A Initially, approximately 5 months ago we formed a team and that team's goal was to use the largest asset of Meridian Oil's in the San Juan Basin, and that is the Mesaverde gas field which provides the largest base reserves for the company and the potential for the highest productivity.

And within that team concept, consisting of an integration of all departments, we focused upon the Mesaverde to identify areas where we were less competitive due to old 1950's wellbores and with low production efficiencies to look for redrills, and then on top of that to look for new and refined techniques beyond a typical vertical redrill to enhance ultimate recovery.

Q Did the study group agree upon a criteria by which you would then examine the various Mesaverde spacing units to make a selection of which particular spacing units met the criteria in order to be eligible for the proposed pilot project?

A Essentially that criteria primarily consisted of low competitive areas in combination for the highly deviated case of 100 percent drill blocks just to effectively perform these projects in a timely manner.

There were several areas, several wells that could have been proposed for this technique. For

purposes of a pilot program we deemed it necessary to select two of these several wells, the two which we're going to speak about today, for the purpose of initiating the project, determining the effectiveness of this technique. In addition, we felt just one wellbore was not enough because if we had any mechanical failures and/or productivity failures, it would not necessarily tell us that this technique was not a good one.

Q How long was the study undertaken by this group of technical people for Meridian in order to reach the point where you are at now?

A We've been working on this approximately five months.

Q Would you go to what is marked as Exhibit Number One. We've handed out copies of that exhibit and I've put one on the wall of the hearing room, Mr. Dunn. Would you --

A The exhibit on the wall is a locator map which has within it spotted all the producing wells within the Blanco Mesaverde Pool, and then highlighted a 9-section plat area of the two wells that we're going to speak about today.

The Howell E 2-R has been drawn out in a blown-up portion of the 9-section plat.

The Howell E 2-R is in Section -- the

east half of Section 14 in Township 30 North, Range 8 West, as shown in the upper righthand corner of the map.

Q Where do we find the Riddle?

A The Riddle is in Section 4, the west half of Section 4, Township 30 North, Range 9 West, and located in the middle of the Blanco Mesaverde Pool and it's shown in the lower lefthand corner on the blowup of the 9-section area.

I might also note that I didn't suggest it before, another criteria in the selection of these two wells, they did exist within the middle, the meat of the Blanco Mesaverde Pool and we felt that this was the first area to attack instead of working on the fringe areas where there could be other production problems encountered.

Q Let's look specifically at that portion of Exhibit One that identifies the proposed Howell E 2-R Well, and if you'll look at the offsetting operatorship of the spacing units, can you generally describe for us who the offsetting operators are to that subject spacing unit?

A Yes. The operators to the east of Section 14, three sections, are Blackwood and Nichols is the Northeast Blanco Unit, and that would be Sections 12, 13, and 24. And Sections 10, 11, 15, 22 and 23 are separated between Amoco and Meridian. There's only two operators in this 9-section area. Three operators, excuse me.

Q One of the criteria you gave us awhile ago for establishing a tentative spacing unit for the pilot project was to find an area that had older Meridian wells in it and that you were offset by spacing units that had not only the original Mesaverde well but an infill well?

A That's true.

Q Show us the Howell E 2-R spacing unit and help us identify the offsetting wells that are contiguous to your spacing unit.

A The Howell E 2-R is located -- is proposed to be located, in the northeast quarter of Section 14 and it's shown in the upper righthand corner here. Near it is the original Howell E-2 Well, which is an old open hole completion that we'll show more on later.

The infill well is the Howell E 2-A, located in the southeast quarter of this section.

On either side of us Amoco has the west half of Section 14 with two wells, an infill 38-A and the parent well, the 38, and then Northeast Blanco Unit has two wells in the west half of their Section 13.

In addition, as we move around all the way around this, there are two wells around this.

Q Let's go now to the Riddle E-1 R portion of the display, Mr. Dunn, and for purposes of that display show us the subject spacing unit, identify the original

Mesaverde well in the spacing unit and the infill well.

A Within this we're in the west half of Section 14 with the Riddle 1-R proposed to be in the northwest quarter. It is to the east of the Riddle 1 Well, currently staked approximately 3-to-400 feet.

The Riddle 1 is up in the far northeast quarter -- northwest quarter.

The Riddle 1-A, is the infill well within the southwest quarter.

This does bring in different operators.

Q Would you identify for us the offset operators on the Riddle case?

A This also has Amoco and Meridian operatorship and in addition there's Union Texas to the north in Section 33 and Mesa Petroleum in Section 32.

Q Mr. Dunn, let me show you what I have marked as Meridian Exhibit Number Two and ask you to identify that exhibit.

A Exhibit Number Two is a 9-section plat of the Howell E 2-R, which identifies the offset operators and identifies the location of the Howell E 2-R Well, and including the parent well for that half section and the infill well.

Q And now let me ask you to identify Exhibit Number Three.

A Exhibit Number Three is a similar exhibit pertaining to the Riddle 1-R, a 9-section plat which identifies all the offset operators and also identifies the subject location for the Riddle 1-R Well.

Q Mr. Dunn, we have marked an exhibit as Exhibit Number Four and have circulated copies of that exhibit. Before we describe your opinions and conclusions from that exhibit would you simply take a moment and identify it and help us understand how to -- to read the exhibit?

A This is a cross section across the east half of Section 14 where the two -- the Howell E-2 and the Howell E 2-A wells are located and where the proposed Howell E 2-R well is located. It runs from the left, the north section line of Section 14; all the way to the right would be the south section line. Within it the three wellbores, the two existing and the one proposed wellbore are spotted, and in the center is a dashed line to indicate the middle of that proration unit.

In addition, on the bottom is a summary of advantages and disadvantages as we currently see them for this project.

Q Let me have you describe for us the plan for the directional drilling, why you have selected to start at a particular point and terminate at another point,

and simply outline for us the general mechanics of what you're trying to do.

A The concept of this highly deviated well is to enter the Mesaverde interval within our drilling window for the Mesaverde proration unit, which is -- would be somewhere inside of the 790 feet from the north line, starting -- thereby we would have to start at a surface location which is unorthodox and out of the drilling window to be able to make our build section and then enter into the Mesaverde interval with a ramp section.

Q When you enter the entry point in the top of the Mesaverde formation it will be at a standard location, though, for the Mesaverde Pool, will it not?

A That's correct. And in this case I believe it's about 1150 feet from the north line in the design that we currently have.

What I'm showing here is 885 feet. It's a distance for where the Howell E-2 originally entered the top of the Mesaverde and the entry point for our designed Howell E 2-R Well.

Q Now if you'll look at the ending point of the deviated well, will -- will the terminus or the end point for the deviated wellbore stop at a point so that you will not encroach on the 790 setback from the end of the spacing unit?

A Yes, our design is to stop at the furthest -- the closest to the south line to be within 790 feet and this diagram shows that this is exactly 790 feet from the south line. If there's any change, directional problems, to get us out of the drilling window, we would halt the operations at that point and determine if there's any way to make a correction to stay within the window, and if not, the well would be stopped at that point.

Q What's the significance to you of the different zones that are shaded in the Mesaverde formation?

A The -- we're showing essentially five intervals within the Mesaverde. We have the Cliff House portion colored green; the Menefee colored yellow; and the Lower Point Lookout colored pink. For most purposes we're really just going to talk about these three intervals although there are in the case of the Cliff House consists of Upper and Lower Cliff House and Point Lookout Massive and Lower Point Lookout.

The significance of this is to show the difference between a highly deviated wellbore and a horizontal wellbore and it's significant in terms of this project.

They are twofold, the first being with a horizontal wellbore, one horizontal wellbore, you would only be able to enter one of these distinct intervals to

drain and therefor, to actually drain the extent of the Mesaverde intervals within our proration unit it would require multiple laterals or multiple horizontal wells, four or five or more just for this depiction.

In addition what it shows is by utilizing a high angle ramp that we have, this one's approximately 68 degrees here, we would intersect all three zones, thereby being able to produce from all three zones.

In addition what it does, it moves our Upper Cliff House section, or our Cliff House section to the south of our old Howell E-2 Well, where we're trying to get a certain distance away from the Howell E-2 to pick up new pay, potentially new sand lenses, actually new sand lenses in any of these, undrained gas pods or areas of enhanced permeability. It gives us this movement over to the south and it spreads the intercept points and the contact area with these three formations across the unit.

The result of drilling a highly deviated well is a wellbore, in this case, with the length of 3,140 feet in contact with the Mesaverde interval.

If we were to drill a similar wellbore vertically it would give us a contact area of 1173 feet, which is noted here on the lefthand side.

The advantage of having this 3,140 feet is essentially we have increased our chances threefold of

finding new sand lenses or these undrained gas pockets and therefor increased our chances of increasing the ultimate recovery within the proration unit.

Q Describe for us some of the anticipated disadvantages that you and the other study group members saw with the highly deviated well.

A The two biggest disadvantages at this point are it's a new technology, essentially drilling gas drilled deviated wells and it has a high mechanical risk of failure and/or a high mechanical risk of increasing the cost and the base cost at this point is estimated at somewhere around three times that of drilling a normal vertical well; therefor we would require with a well in this manner to increase ultimate recovery and productivity to actually make it economic in terms of comparing it to a normal vertical well.

And the third point listed on the disadvantage is that if we fail to increase our recovery with this kind of well, then essential it's a failure and would not be done. A vertical well would have to be chosen.

Q Why is this identified as a pilot project, Mr. Dunn?

A Because we do not know at this point if it is advantageous to come in with a highly deviated wellbore versus drilling a vertical wellbore. Our feeling is

that by increasing our chances and our contact area with the formation that it will increase ultimate recovery but we deemed it important, since the high cost and reduced economics, that those costs keep growing, to drill a pilot program, one to two wells, to determine how effective this design is.

Q Is this intended to replace the conventional wells in the spacing unit?

A No, it is not intended to replace them. It is intended to determine if this can enhance productivity and enhance ultimate recovery. It does not necessarily stand up as a replacement for vertical wells being drilled.

Q Let me have you go to Exhibit Number Five now and again before we discuss the details simply identify the exhibit and tell us how to read the display.

A Exhibit Number Five is a plan view, a view from the top of the diagram that we showed in Exhibit Number Four, which was the cross section. It shows all of Section 14 but within the east half of Section 14 we show the drilling window, for any well drilled within this half section and specifically to the Howell E-2, proposed Howell E 2-R. And within that window we show a design plan view of the wellbore going through, the entry being one of the green starts and the -- there's a dot point on that line, that would be the entry point within the Mesaverde. From

that point to where we change colors from green to yellow would be the distance that we're actually within the Cliff House and it would correlate to this area right here on our cross sectional view, and as you can see, it spreads out over a large portion from the middle to the lower half of the northeast quarter. Then we've entered the Menefee and again based on the cross section, we would drill through the Menefee, crossing across to the section line and getting into the southeast quarter of the half section line and then finish within the Point Lookout.

I might also mention that not all the older wells, the Howell E-2 is one of those wells, were drilled into all of these zones, and this cross section, Exhibit Number Four shows that. So there are points where we'll be picking up additional pay that wasn't developed before in some areas.

The significance of this is to show again that this is -- should not be confused with the horizontal wellbore in a continuous formation. If this was one, a horizontal wellbore, and two, a continuous formation and you drilled a similar well, you would be in contact with the same formation the length of this area and increasing your drainage area for the whole area.

This one, we're just in discrete locations within each interval.

Q Do you propose to honor the pool setbacks for the formation -- for the well within the formation itself, so that your 790 from all the side boundaries and end boundaries of the spacing unit?

A Yes, we propose to enter and TD within 790 feet from any line drilling block, and in addition, I might point out that our optimum design is not necessarily this due south design shown here. We would probably -- we would try to lead down the center of the proration unit primarily for the purpose of staying as far away as possible from the Howell 2-A.

Q But you want the flexibility in the order to allow you to stay within that legal drilling window in the formation, if you will.

A That is correct because of the new technologies involved we require that mobility.

Q Would you identify Exhibit Number Six for us, Mr. Dunn?

A Exhibit Number Six is a generic 3-D view of a deviated well going through a formation such as the Mesaverde. This is not specifically to scale to either the Howell E-2 or the Riddle 1 and should not be confused as such. It is primarily to reiterate the same points that we've just discussed, which the cross sectional view and the plan view shows, which is that as you drill a deviated

wellbore, you'll be changing intervals within the Mesa-verde as you drill through and those intervals would only be produced from at those areas. There would only be perforations within the wellbore at those points; again the Cliff House being the top, and we've separated this into the three, Cliff House being the top interval, Menefee and Point Lookout. We show the Cliff House intercept point; drilling down into the Menefee intercept point; and above the 3-D diagram is a view of the plan section of the distance which you would be in that from the plan view; and then drilling on to the Point Lookout and TDing it at the base of the Point Lookout.

Q Why not simply drill a third vertical well within the spacing unit to try to encounter these pods of production that have not been depleted by the existing vertical wells?

A Well, you can and it is commonly done. The advantage of attempting this technique is again we've increased our formation contact area, in the case of the Howell E-2, threefold, which increases our chances of intercepting those same areas and intercepting any enhanced permeability areas.

Q Let me have you return to your seat, Mr. Dunn, so that we can discuss the performance of the existing wells on the spacing unit that has the Howell D-3 and

the 3-B Well in it? Take a moment and make sure I've got the right exhibits.

Mr. Dunn, let me direct your attention to Exhibit Number Seven. Would you identify that for us?

A Exhibit Number Seven is a material balance plot, a P/z plot, of the Howell D-3 and the D-3-B well.

The Howell D-3 is a parent well in Section 31 of Township 31 North, Range 8 West, that was originally drilled in the early fifties as an open hole completion, and the D-3-B was a redrill of that well.

Now the purpose of this plot is to show that when the Howell D-3-B and the initial pressure was taken, and that pressure is noted on the P/z plot, we've gained approximately 60 psi in bottom hole pressure by moving a distance no more than 300 feet away, showing the existence of picking up additional reserves immediately, and then following that the first pressure point after that shows a change in the slope of the P/z curve indicating that we have increased reserves by redrilling with a vertical well, an old open hole completion.

Q The material balance calculation simply confirms the necessity and usefulness of the infill drilling program in the Mesaverde formation, doesn't it?

A That's right.

Q Shows you that the existing original well is not going to be able to fully develop 320 acres of reserves on 320-acre spacing.

A Or -- right.

Q The Howell D-3-B is the infill well in the spacing unit?

A No, the Howell D-3-B would be the re-drill of the Howell D-3. The Howell D-3-A would be the infill well.

Q Do we have for these particular spacing units effective 160-acre spacing at this point?

A Effectively we do have 160-acre spacing with the Howell D-3-A producing from the northern half of the half section and the Howell D-3-B producing from the southern half, 160 acres per well.

Q This is a prorated gas pool in the Mesaverde formation?

A This is a prorated Mesaverde gas pool defined as a 320-acre proration unit but effectively producing as a 160-acre unit with two wells.

Q What are the basic mechanics of the allowables by which production is set for the spacing unit in the Mesaverde?

A In the case of one well within 320 acres that one well is utilized, tested for a state deliver-

ability number, and adjusted by an acreage factor, and your allowable is allocated based on that one well.

If you drill one infill well, you allocate the allowable based on both wells. Essentially you add the two wells, take deliverabilities together, multiply by any acreage factor that's in accordance with that acreage, and utilize both wells, which effectively again gives you the 160-acre spacing.

Q What is the Commission practice with regards to how to handle Mesaverde spacing units in which there is a third wellbore in producing from the Mesaverde?

A The standard that's been set, when there is a redrill performed, is to still take two of the three wells, those two wells being one, the first well being in the quarter section that has only one well, and the second well is a choice of the two wells, either the original or the redrill, still staying on the original standard of two wells per 320 acres.

Q Once the allowable is set taking the two deliverabilities from the spacing unit where -- where you've made the selection of the deliverability for that 160 that had two wells, the allowable then is set for that spacing unit and does the Division then allow the operator to produce the allowable in any combination among those three wells?

A That's correct.

Q What do you propose, Mr. Dunn, with regards to how to establish the spacing unit allowable when we introduce the highly deviated wellbore into the calculation?

A Based on the highly deviated wellbore drilling across both 160 acres, we propose that it should receive double the normal allowable because it would be covering the 160-acre drilling windows of the north and south half.

Q To make sure I understand the proposal, what would you do with the deliverability of the two conventional wells in the spacing unit?

A In terms of testing it or --

Q No, sir, in terms of calculating the allowable.

A If we --

Q All right, if we're looking for a spacing unit allowable --

A Right.

Q -- we now have a directional deviated well. We have a deliverability on that well. You still have the deliverability on each of the two conventional wells. Now, you have proposed to us taking twice the deliverability of the deviated well by which to factor the

allowable for the spacing unit?

A Right.

Q What do you do with the deliverability of the two conventional wells?

A I don't think that those, in that case, would need to be considered. If there is any reduction in the double allowable, then that is not necessarily the case. If you reduce to a single allowable for the directional well, then you would require a second well within that proration unit to be allowed in the calculation and the reason why, if we're not given -- there's no incentive to drill this well. In fact, if it's penalized, then we're back to continuing on with the standard practice of drilling a vertical wellbore and this vertical wellbore would give us the right to have two wells within the 320, and calculated into the allowable, and would therefor have an economic incentive impact on the directional well.

Q So you're not proposing any change in the proration system with regards to the spacing.

A No, we are not proposing any.

Q Nor are you proposing any modification to the testing procedures by which the deliverability is taken.

A No, no change in that.

Q The recommendation then is for the oper-

ator to have the option of fixing his allowable for the spacing unit by taking the deliverability on each of the two conventional wells and factoring that into the allowable or taking the highly deviated well, taking that deliverability and multiplying it by two.

A That's correct.

Q And the reason to multiply it by two is what, Mr. Dunn?

A Because it would be covering the effectiveness of two vertical wellbores in terms of drainage within that proration unit; therefor it should receive the same as having two wellbores or double the deliverability for that one wellbore.

Q In your opinion, Mr. Dunn, would that recommended procedure by which the allowable for the spacing unit is set, would that, in your opinion, violate the correlative rights of any of the offsetting operators?

A No, it would not, in my opinion, and in fact, it is an enhancement for all operators within the area. They have the right to drill with the same technology that we do and if this proves to be successful, could increase the ultimate recovery within the whole Blanco-Mesaverde Pool, which is obviously good for not only Meridian but other operators within the area and the State of New Mexico.

Q Without the opportunity to have an allowable set for the spacing unit as you've recommended, in your opinion would waste likely occur with regards to the recovery of hydrocarbons out of the Mesaverde formation?

A That is correct.

Q Why, sir?

A Because we have neglected the chance to drill a highly deviated well which increases our chances of intersecting zones that cannot be drilled by the existing vertical wells and also it increases the chances of intersecting these zones even if you poke several vertical wells within those units.

Q What would be the consequences of the Division deciding to simply set the allowable for the spacing unit by giving the operator the option of taking the deliverability on the deviated well, not multiplying that, taking that as the deliverability for the entire spacing unit and pegging your allowable on that factor?

A If the allowable was based only on the deviated well and not on the -- and with not in combination of either a factor for that well or any of the other two wells in existence, it would reduce the economic incentive to move ahead with this wellbore again because we could drill a vertical well and get twice the deliverability

without spending as much money or introducing ourselves to the risks involved with this highly deviated well.

Q Let's go to the vertical section that shows the Riddle 1-R Well, Mr. Dunn. Mr. Dunn, we have passed out and put on the wall of the hearing room what is marked as Exhibit Number Eight with regards to the real 1-R well. Would you identify and describe that display for us?

A Exhibit Number Eight is a cross section view of Section -- of the drilling window within Section 4 of Township 30 North and Range 9 West. It is identical to the -- in terms of the concept of the drawing, it is identical to the cross section shown for the Howell E-2-R earlier, except this one contains the Riddle 1, the Riddle 1-A and the Riddle 1-R, and again shows a summary of the advantages and the disadvantages on the bottom of the diagram.

Q So there's no confusion on the Exhibit Number Eight, would you identify what you've noted on the far right margin of the display? It says 790 from the --

A Right.

Q What's the purpose of that?

A The purpose of this is to show that we're TD'ing within our drilling window. That is the course of action for this well, and so we will be 790 feet from the south line of Section 4.

Q Describe in what ways the plan of drilling and completion of the Riddle 1-R Well is in any way materially different from that proposed by the Howell E-2-R Well shown in Exhibit Four?

A Essentially in terms of drilling there is no difference for the Riddle 1-R. The only differences within these two wells would be the location of the parent well and the original infill well, as you can see.

The Riddle 1 will be somewhat to the south of the Riddle 1-R location. We'll be under the ground and will actually pass by it and the drilling engineer later can discuss the details about that.

The Riddle 1-A is further within -- from the south line than the Howell E 2-A was; therefor we'll pass by it, hopefully in the range of 4-to-500 feet to the east.

Q Let me have you turn to the plan view, which is Exhibit Number Nine, Mr. Dunn, and would you identify and describe that?

A Again this is a plan view, in this case of Section -- the east half of Section 14, which contains the Riddle 1-R and would be similar to Exhibit Number Five which showed the Howell E 2-R, and again it shows the surface location of the Riddle 1 in the upper lefthand corner, the surface location of the Riddle 1-R, and again unortho-

dox, and then it shows from a plan point of view the wellbore coming in and intersecting within the drilling window, the top of the Mesaverde, continuing through the Mesaverde and as it continues on the angle intersecting each of the separate intervals and TD'ing no closer than 790 feet from the south line, and while making the traverse through the drilling window will pass to the east of the Riddle 1-A, which is noted on the plan view, also.

Q Again, as you've indicated on the Howell E-2-R display, do you propose to have the flexibility in the Riddle 1-R to stay within the drilling window identified by the setbacks of 790 pursuant to the pool rules?

A That is correct. We propose to stay within that 790 window but request the utilization of that whole window.

Q Let me ask you to again look at both the Howell and the Riddle displays, Exhibit Four and Eight, and tell us as a reservoir engineer whether or not by utilizing the directional drilling you're effectively exposing 320 acres to potential drainage by this single wellbore, or whether you're effectively exposing some acreage less than 320.

A Again, we have -- we are drilling through the total of the Mesaverde from north to south

within the drilling window and on both diagrams we traverse an area of three-to-fourfold what a vertical wellbore traverses, and covers the full 320 -- or the drilling window within the 320 proration unit; therefor, having contact area and producing from that whole window.

Q And again because you're exposing the formation in both 160's with the single wellbore, you're proposing to double the deliverability of that wellbore to set the allowable.

A That's correct. And again the center line as shown on the Riddle 1-R, shows that we cross approximately in the Menefee; again on the plan view we'll be in the Menefee and cross across and be within both 160-acre sections.

Q Have you done a material balances study with regards to the performance of the wells in the spacing unit for the Riddle Well, Mr. Dunn?

A Well, near to it, another set of wells would be the Scott 2 and Scott 2-R. That's in Township 32 North, Range 10 West, in Section 31. That's a similar occurrence as to the Howell D-3 and Howell D-3-B. We're showing the P/z line in this exhibit. With the initial pressure in the redrill, the Scott 2-R, actually being almost equivalent to the Scott 2, so initially no definite appearance of additional reserves but as soon as production

is initiated and additional pressure points and cumulative production taken, the slope of the line is shown to be changed and we have increased reserves again performing a redrill.

Our intention is for that -- again these are two vertical wells and increasing our chances of picking up additional reserves beyond a vertical well with the highly deviated concept.

Q As a reservoir engineer, Mr. Dunn, can you equate the highly deviated well with the notion that this equates to a new completion technique that might be utilized by an operator with regards to improving the performance of extraction of hydrocarbons from a gas spacing unit?

A Yes, we feel it's a technique that everybody has the capability to go out and try. It would be very little different from hydraulic fracturing techniques which are used to enhance production and recovery from a wellbore and you do not penalize a new technique or any completion technique which enhances this production, such as hydraulically fracturing, and therefor a directional well, which is a new technique of drilling and completing within this formation, should not be penalized.

Q Were Exhibits One through Ten either prepared by you or compiled under your direction and super-

vision as part of the collective effort of the Meridian study group?

A Yes, sir, they were.

MR. KELLAHIN: We move the introduction of Meridian's Exhibits One through Ten.

MR. CATANACH: Exhibits One through Ten will be admitted as evidence.

MR. KELLAHIN: That concludes my examination of Mr. Dunn.

MR. CATANACH: Mr. Lund?

CROSS EXAMINATION

BY MR. LUND:

Q A few, if I may. Mr. Dunn, forgive me if I missed this, but looking at your Exhibit Eight and Four, how do you propose to case those deviated wellbores?

A Well, you mean what size casing or how do you run --

Q You're going to case them --

A Yes.

Q -- all the way down?

A Yes, they'll be cased. That testimony will be coming. We have a drilling engineer that actually will be discussing any of the actual physical drilling parameters as we go, but they would -- it would be cased.

Q So it will be cased all the way down to total depth?

A Well, I think that depends on the actual success of the well and what you intercept as you drill the well. I could not definitely say it will be cased to TD.

Q But somebody else is going to address that?

A I -- they can. Also, I think that, though, that's a performance related parameter if you drill into an area earlier than TD or even at TD, that's a highly successful area in terms of productivity, you may not. You may end up with some sort of barefoot completion.

Q Again, turning to Exhibits Five and Nine, I think you testified that you were going to produce from these deviated wellbores only in those particular segments of the producing horizon, is that right?

A Only -- those are -- we will only produce within the Mesaverde interval, that's correct.

Now these diagrams that you're looking at combine interval, and you couldn't necessarily say that -- in other words, I wouldn't want to -- we would actually be from both the Upper Cliff House and the Lower Cliff House. I don't want to confuse you that those three name every interval within the Mesaverde.

Q Is that --

A It would only produce from the Mesaverde interval.

Q Maybe I didn't understand your testimony but I thought when you referred to Exhibits Five and Nine that you stated that at those particular points in the formation that you've identified, the Cliff House, the Menefee, and the Point Lookout, you would only produce from those deviated wellbores in those segments of the reservoir as you've depicted in those exhibits. Did I misunderstand you?

A Well, I think we're kind of saying the same thing. I guess I'm just leary of where you're heading. Because of their -- as we drill in a highly deviated fashion across that block, once we intersect the Mesaverde, whether they're named -- whether the Mesaverde intervals are named those specific names, we would potentially perforate or produce from the top of the Mesaverde interval to the TD, as long as it's within that 790-foot window from any line.

Q I'm sorry, I think I misunderstood you. As you go down the deviated wellbore you're going to perforate the entire interval as you go, right?

A Potentially you can, yes.

Q What are your plans?

A Well, you don't necessarily perforate

every foot of every wellbore, depending on whether they're shale, coal, whatever, within that wellbore, so based on the log analysis that's obtained when you log the well, you would determine what intervals to perforate.

Q I'm sorry, I guess I'm just confused, but on Exhibits Five and Nine I thought you said that you were going to perforate just those intervals that you've designated there, and produce just from those designated --

A What -- what my point is, I guess, a little different from the angle you're taking. My point is that the formation would not be contacted; for example, the Upper Cliff House or Lower Cliff House would not be contacted by that wellbore for the full length of the 320. It would only be contacted within the area either on the plan view or the cross sectional views that you see there.

Q I understand. That's just to designate what points you're going to contact that particular part of the formation.

A Correct.

Q Not designating where you're going to produce from.

A Correct.

Q Okay. But you intend to produce from the whole interval depending on what the logs say.

A Right.

Q I'm sorry. Now you stated a number of times that both wells would be produced only within the producing window, meaning the 790 setbacks, and that applies both to where you first intersect the Mesaverde and also at the bottom hole location, right?

A Correct, for the deviated well, you're talking about?

Q Correct. You're going to take directional surveys?

A Correct, and, again, that will be covered later but there will be multishots and single shots run at different points during the program.

Q Do you intend to file the results of the directional surveys with the OCD?

A Yes, we do.

Q Because you don't give yourself much margin for error when you have total depth right at 790 from the section line.

A That's true, but, again, that's because our plan is to have the whole window available to us, whether we would end up at exactly 790 from the south line is probably not very (unclear).

Q Did you testify that the vertical wells in these spacing units produce only from one interval in the Mesaverde?

A No, I did not. They -- what I -- the only points I remember making are that some of the wells do not drill through all the intervals or produce from all the intervals. An example would be the Howell E-2 on Exhibit Number Four, I believe, where it stops at the Massive Point Lookout and doesn't drill into the Lower Point Lookout, and again, on the Riddle 1 you can see on Exhibit Eight the same type situation, and so in those cases where they didn't drill deeper, they don't produce from that deeper zone.

Q But they're perforated in all of the producing intervals that they do contact?

A Some of the wells are open hole completions; some of them are perforated and cased.

Q Did you do any calculations about what drainage radius a deviated wellbore would affect?

A We don't foresee a difference in drainage radius. We don't foresee an extension of that drainage radius beyond the 320-acre area, as long as we're staying within that window that's already set to protect those correlative rights.

The actual drainage pattern of the deviated well is totally different from a horizontal well and totally different from a vertical well and is a difficult thing to determine until you know what intervals are

actually going to be productive, and what their properties are.

Q You don't know if the drainage radius around the deviated wellbore will be radial or elliptical or --

A It's kind of a combination. What you end up with is essentially a kind of a 3-D radially elliptical drainage pattern, which -- because the reason it's a combination is because you're angling across the formation so you're causing a little different type pattern than the normal vertical or horizontal well.

Q But it's your opinion that that drainage radius of the deviated wellbore will not extend beyond the 320?

A That's our opinion, yes.

Q What if you get a really good well? Will you change your opinion about that?

A I think it depends on why you have a good well, what the drainage pattern is coming from. Good wells throughout this area can be shown that are -- well, there's wells producing tenfold what we produce currently in either one of the -- any of the four wells that are there now, and that is not due to a drainage pattern that they produce at a higher level.

Q If it's determined that the deviated

wellbore is producing well and it's draining more than 320, would Meridian be willing to accept a reduction in the allowables to prevent that drainage beyond the 320?

A We would be willing to consider at that point whether that is necessary.

Q Getting to the calculation in the allowable, I think -- did you testify that when you calculate the allowable now that you can use two wells in the same quarter section for deliverability purposes as opposed to a well in the other quarter section?

A No, when you have two wells in a quarter section in existence, you can use one of those two and then you have to use the one, the quarter section that only has one well in it.

Q And you're suggesting that your deviated wellbore get a double deliverability factor in the calculations.

A Correct.

Q And if you can get the double, you will not consider the deliverability factor of the two original wells.

A Correct.

Q And you think it's fair to get the double deliverability factor even though you're contacting three to four times the formation yardage or footage in the

wellbore?

A Yes, I do.

Q Why is that?

A Because that increase in contact area does not necessarily increase productivity. Within a longer deviated wellbore where you -- within a long wellbore that is a deviated wellbore, you decrease pressure losses by increasing your perforated interval. You, in addition, can reduce pressure losses due to turbulence, but at the same time you introduce pressure losses due to the pipe limitations and in this case you've extended the length of your pipe, and you also introduce a pressure loss due to inclined flow. The primary point of this is that you're going to be mechanically tubing limited on your productivity prior to any advantage that you may gain at the current reservoir pressures in the Mesaverde out of the inclined well.

Q Do you see where I'm coming from, that it's a new animal and --

A Sure.

Q -- we're concerned about correlative rights and problems potentially.

A True, but as stated earlier, it's a drilling and completion technique that you would have the same right to use.

Q Well, it's a new technology and I'm not sure that it's fair to suggest that an offset owner should do the same thing you're doing when it's an unproven and untested technique.

A And that's why it's a pilot program.

Q Right, and that's why it's not fair to say that we can automatically do the same thing you're doing when it is (unclear).

MR. KELLAHIN: Is that a closing argument, Mr. Lund?

MR. LUND: No, that's a --

MR. KELLAHIN: Is that a question?

MR. LUND: A question about fairness.

A It means that if you want to get involved in determining new and innovative ideas to increase recovery from the Mesaverde, you have the total right to go out and drill a similar well.

Q And we're very interested in --

A And develop a pilot program.

Q We're very interested in that.

MR. LUND: I have nothing further. Thank you.

MR. CATANACH: Mr. Hall?

CROSS EXAMINATION

BY MR. HALL:

Q Further clarification on the allowable. As I understand, under either of the two options Meridian is requesting, you will utilize the deliverability of the equivalent of no more than two wellbores.

A That would be correct. It would be -- it would be no change from the current standard.

Q Right. Now, if you utilize the deliverability of the deviated hole, what is the basis of your statement that you consider the deviated wellbore to be the equivalent of no more than two 160-acre proration units, as opposed to three or four (unclear)?

A Because, as pointed out before, we're not intersecting the whole interval as a horizontal wellbore would, nor can we drain within the whole interval or have contact points within the whole interval that would insure drainage throughout, so we're crossing across those intervals. We're covering the drilling window and contacting different portions of those intervals in different areas, and it should not expand it beyond the proration unit that exists currently.

Q So the spatial contact of the wellbore deviated is no more than the equivalent spatial contact

across the formation from two straight holes.

A Well, it depends on what angle you go across. In these exact cases you're probably going to have about a 30 percent increase in formation contact, but that does not necessarily correlate to a 30 percent increase in either ultimate recovery or in deliverability or any of that nature.

What it does is increases your chances of intersecting new lenses that are well known throughout the Mesaverde and hopefully picking up new reserves in that manner.

Q I see. How about your contact, you pressure loss, are there any other factors?

A In terms of increasing your drainage area?

Q Yes.

A Well, the spreading it across, what we'd be doing, and it states this on the advantages, is you'll be spreading your drainage pattern within each interval across the 320 and so therefor you should hopefully be able to more efficiently drain in this sense the longitudinal direction of that east half.

Q But in your view that drainage will not exceed what would otherwise be recoverable through two vertical straight holes, is that correct?

A Would not exceed what you could normally get from two vertical wells. I think you would expect it to be somewhere near the equivalent but no matter where you drill, you cannot correlate any two vertical wells in the Mesaverde, would be the way to put it.

You don't know what any well as it is drilled, what it will actually intersect and produce.

MR. HALL: Nothing further.

CROSS EXAMINATION

BY MR. CATANACH:

Q Mr. Dunn, is this -- is this Meridian's first attempt at this type of a completion, drilling and completion?

A First attempt in the San Juan Basin. I couldn't necessarily speak about other areas, but I'm not aware of anything of this nature; definitely not a gas drilled highly deviated well.

Q Do you know of other instances where it's been used before by other companies or --

A We're aware of the Department of Energy, I believe it is, drilled an air drilled deviated well as a test pilot project in Pennsylvanian or West Virginia or something like that, and then it's been done in Australia with air.

I do not have in intimate knowledge with actual angles or the technology that was used. The drilling engineer later would have any discussion in that.

Q Do you know what the results of those tests were?

A No, I'm not familiar with that. Well, I can say the one in Australia was a successful completion.

Q Within the Mesaverde what are your major producing zones? Do you have a handle on this?

A Well, they vary at times. Primarily it would be the Cliff House and the Massive Point Lookout, being the green and the top of the pink area here, and in this, in the case of the Howell E-2 an example would be it doesn't even drill into the Lower Point Lookout. We have the Massive Point Lookout and the Cliff House intervals open for producing; actually it's producing from the total interval through an open hole completion and we know that it's one of these two and probably both that is the major production in the area, and that's relatively consistent throughout the basin, although you can pick up pay in one area that is not -- or good pay, that is not as good in this area.

Q I see, so it's -- so it's mostly Massive Point Lookout and Cliff House, is that right?

A Correct.

Q Upper Cliff House, I think you said.

A It's typically more the Massive Cliff House, although some of the upper is real good. Here we would expect the Massive Cliff House and Massive Point Lookout to be the major areas.

Q Have you guys calculated what the remaining reserves under these two proration units are?

A The only form of really calculating remaining reserves currently would be through material balance techniques and, yes, they have been calculated. The weakness in that again is the same reason that we're drilling the highly deviated well, is to determine if we can find new pockets and areas and the Howell D-3-B was an excellent example of that. We're drilling within 300 feet away, we picked up reservoir pressure, changed the slope of the P/z plot, and increased reserves. Therefor, my answer would be that I don't think we really know what exactly underlies -- probably underlies any of the 320-acre proration units throughout the basin, and it's been difficult for years for anybody to perform either volumetric or material balance calculations in the field with any term of accuracy, form of accuracy.

Q So at this point your -- it's your assumption that the 320 acres can't be drained by the two existing wells, totally drained.

A That's correct, and we can calculate reserves based on those two wells that whether or not they'll -- an example of the Howell E-2 through production efficiency and mechanical constraints of being an old wellbore, whether or not it would even produce its portion of the reserves is questionable.

Q Okay. You made the statement that the deviated wellbore would not -- the drainage radius would not exceed the outer boundary of the proration unit. What's that based on?

A I hopefully said we do not expect it to and, again, that would be something that would have to be determined after we see the results of this pilot project.

Q So you can't say at this point whether or not you'd be encroaching on any offset operators or draining a portion of their acreage that normally wouldn't be drained by two vertical wells.

A I don't expect any advantage in just the synopsis that it is a deviated wellbore. I do not expect any advantage over the vertical wellbore in terms of drainage of offset units just because it's a deviated wellbore.

Q What's -- do you know what the current production is on the existing four wells in the proration unit?

A No. I know what the last State deliverability tests were and are we speaking -- which proration unit would you like to talk about?

Q Both.

A Okay. Section 14, which would concern the Howell E-2, the State deliverability numbers for the west half, which would be Amoco now, totaled to be 1,404,000 -- 1,404 MCF a day as compared to the east half, which is Meridian's operated half, which would be 773 MCF a day, and those are 1986 State deliverability numbers. We do not have this year's latest update yet.

In terms of the Riddle, which is in Section 4, 30 and 9, that is totally a Meridian-operated section and I can give those numbers. I can also give the east half of Section 5, which would be the nearest offset operator, which again would be Amoco.

The Meridian west half of Section 4 State deliverability numbers are 741 MCF a day, that's a total of the two wells, and Amoco's in the east half of 5, would be 1,269 MCF a day.

Q Just to make sure I understand the proposal for the calculation of allowables, you would take the deliverability of the deviated well and double that.

A That's correct.

Q To use in the formula. Is that an or

situation? If you did not get a good well, if the deviated hole was not good, you would then revert to using the two vertical wells, whichever was higher?

A I think it would be a situation we either take double the directional well or we take the directional well in combination with one of the vertical wells.

Q Whichever was higher.

A Well, of course, that would be the preference, but we feel both of those are within the fair region for us and for other owners and therefor, those are acceptable, where, if we start reducing below that level, then we start reducing the incentives to move ahead with even attempting this type of project.

MR. CATANACH: I believe that's all I have of the witness.

Anything further of this witness? He may be excused.

We'll take a little break.

(Thereupon a recess was taken.)

MR. CATANACH: The hearing will come to order and turn it over to Mr. Kellahin.

MR. KELLAHIN: Thank you, Mr.

Examiner.

We'd call at this time Mr. Greg Jennings. Mr. Jennings is a geologist with Meridian Oil, Inc.

GREGORY L. JENNINGS,

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Mr. Jennings, would you please state your name and occupation?

A I'm Gregory L. Jennings, petroleum geologist with Meridian Oil, based in Farmington, New Mexico.

Q Mr. Jennings, would you summarize for us your educational background as a geologist?

A I received a Bachelor of Science in geology from Clemson University in South Carolina in 1980.

Q Subsequent to graduation would you summarize for us your employment experience as a petroleum geologist?

A I've been with Meridian and its predecessor company since February of 1981 as both a development and exploration geologist. Worked about a year and a half

in the Powder River Basin; 6-1/2 years in the Williston Basin; the last two years I was one of two geologists responsible for implementing and handling the horizontal drilling program in the Bakken formation in the Williston Basin.

The early part of this year I was transferred to the Farmington office where I'm -- where I've been working with the Fruitland Coal project and in addition, I've been assigned to Mesaverde Group as an additional responsibility.

Q Have you participated on -- as a geologist with the study group that examined the feasibility of utilizing certain Mesaverde spacing units for the highly directional deviated wellbore that's the subject of the two applications before the Division today?

A Yes, I have.

MR. KELLAHIN: We tender Mr. Jennings as an expert petroleum geologist.

MR. CATANACH: He is so qualified.

Q Mr. Jennings, let me ask you to go to the two displays that we have put on the wall of the hearing room, sir, and first of all identify what we have marked as Exhibit Number I think we're Eleven and Twelve and let me change these. Let's start with Exhibit Number

Eleven, Mr. Jennings, and have you identify that exhibit.

A Exhibit Number Eleven shows the two logs from the Howell E-2 and Howell E-2-A which are the two Mesaverde producing wells in the spacing unit that we are proposing our directional well in.

The Howell E-2 is located in the north part of the section and was drilled in the 1950's and the E-2-A in the south part of the section, the infill well, drilled in the seventies.

The -- one of the purposes of this exhibit is to show the differences in the intervals producing from the old wells and the new infill wells. The general procedure employed when drilling and completing these old wells in the fifties was to only drill into the Massive Point Lookout, set casing above the Massive Cliff House and generally do an open hole nitro completion in that interval.

The new wells drilled in the 1970's drilled deeper into the Lower Point Lookout and ran casing throughout the entire interval and perforated and fraced not only additional pay in the Lower Point Lookout but additional pay in the Upper Cliff House as well.

And it's quite obvious that there is additional pay that has not been penetrated or completed in the old wellbore and therefor in the north half of this

320-acre spacing unit.

Q When we introduce in the Howell spacing unit the potential of a third wellbore somewhere in between these two and drill it directionally or as a highly deviated wellbore, can you as a geologist conclude that in all reasonable probability we're going to encounter portions of the gross Mesaverde formation that are not currently being produced by either of the two existing wells?

A Certainly we will encounter pay and intervals that are not producing in the -- in the old wellbore and to a certain extent additional pay that is not producing in the 1977 wellbore.

Q Describe to us on the display or from your own knowledge how you reach that conclusion, Mr. Jennings.

A Well, simply, you can look at the perforations which are highlighted in red and just visually see the intervals which are completed in the new wellbore which were not completed in the old wellbore. But I'd also like to at this time introduce this second exhibit.

Q All right, that's marked for the record purposes as Exhibit Number Twelve and what does it show us, Mr. Jennings?

A In many respects it shows the exact same thing for the Riddle area.

The Riddle No. 1, an old well drilled in the fifties, shown on the lefthand side of the exhibit, and 7-inch casing set up in the Upper Cliff House and they did not drill into the Lower Point Lookout. In this case they did a sand/oil frac just in the lower -- or, excuse me, in the Massive Point Lookout interval, and in this well there's probably a fair amount of interval up in here that is not -- was not completed efficiently.

Q Showing "here" meaning the green shaded area on the logs for the Riddle No. 1?

A Yes. Now the Riddle No. 1-A, drilled in the mid-seventies, once again you have a large interval, a few hundred feet in the Lower Point Lookout that was tapped into that the old well didn't and also intervals up here in the Upper Cliff House, as well, that were new additional pay.

Now, I've constructed regional cross sections and net pay maps. What you -- over the whole area, and what you see are variations from well to well in the reservoir quality, sand lenses pinching out, blossoming and pinching out, but those subtle changes don't account for all of the production variances we see from wellbore to wellbore. The real changes that are occurring are lateral changes in permeability that you can't identify from logs and two examples of this type of situation have already

been presented earlier. I'd just like to elaborate on those a little bit.

The Howell E-3-B, located in Section 31 of 31 North, 8 West, we had an old 1950 vintage well, the Howell No. 3, and that well had cumed 12 BCF and about 10,000 barrels of condensate and El Paso in the mid-eighties went to actually drill a Dakota well within 2-or-300 feet of the old wellbore and took a kick in the Lower Point Lookout and TD'd the well there and completed that well in the Mesaverde, absolute open flow of 10-million a day and the interesting thing is that they now had a rate of 100 barrels a day of 30 gravity crude, whereas the old wellbore produced 10,000 barrels of condensate. So we've got a different fluid that the new wellbore is producing only a few hundred feet away from the old wellbore, not to mention a significantly higher rate.

Now, this, combined with the pressure, a P/z plot which George Dunn presented, is -- it's obvious that this new well just a few hundred feet away from the old wellbore, tapped into pay that was not in direct communication with that old wellbore and probably never would have been drained without that new penetration.

Another example a little closer to the Riddle is the Scott No. 2-R. Scott No. 2 was an old well drilled in the fifties, similar completion, an open hole

completion in the -- just the heart of the Mesaverde interval, the Massive Cliff House and the Massive Point Lookout, and that well had only cumed 3 BCF in thirty years, and we -- El Paso redrilled the well 2-to-300 feet away from the old wellbore and took a kick this time in the Upper Cliff House and this well came on for an initial rate absolute open flow of 10-million a day and in five years that well has cumed 6 BCF, so it's cumed twice as much in five years as the old wellbore had cumed in thirty years. And I think it's inherently obvious that there are reserves being drained from that wellbore that would not have been drained from the old wellbore.

The problem is I can't identify these greater areas of permeability from logs and therefor I can't map the same, so although we know they're out there, we can't necessarily predict where to drill the wells. We could drill 3 or 4 vertical wells and potentially never tap into those areas of higher permeability.

Q Is that part of the problem why the engineer then can't take your geologic interpretation and come up with a volumetric analysis of the gas in place in the reservoir because of the uncertainties as to how to map those individual lenses in the Mesaverde?

A Definitely. Now, the fact that there are unique reserves within our spacing unit to be drained

but they are not being tapped into by those old wellbores, and probably our ability to predict where those areas are, lends itself perfectly to this directional -- high angle directional approach.

By drilling at a high angle all the way across the spacing unit we'll expose more surface area of the formation and significantly increase our chances of intersecting those areas that contain those unique reserves and are within our spacing unit.

This is really the crux of the whole deviated well concept.

Q To make sure I understand, that the geologic conclusions you have reached have led you to the ultimate opinion that the highly deviated wellbores are a reasonable and prudent undertaking by your company in order to potentially tap those portions of the spacing unit in the Mesaverde that are not currently being tapped by the existing wellbores.

A Yes. Not only reasonable but probably necessary to tap those reserves.

Q And that because of the unique nature of the Mesaverde we cannot analyze this particular spacing unit or any other spacing unit like this in any conventional way of having you prepare a net pay isopach for that particular sand and then have the engineer volumetrically

determine the gas in place and therefor the existing drainage areas of the two current conventional vertical wells in the spacing units.

A Yes, that's correct.

Q The fact that you cannot in a conventional way determine the area of drainage or the gas remaining in the spacing unit does not undercut your conclusion, however, that this wellbore is necessary in a directional manner in order to intersect additional reserves that are not currently being developed.

A No. It is, in fact, the best -- the best way to increase our probabilities of encountering those reserves.

MR. KELLAHIN: That concludes my examination of Mr. Jennings.

We move the introduction of his Exhibits Eleven and Twelve.

MR. CATANACH: Exhibits Eleven and Twelve will be admitted as evidence.

Mr. Lund?

CROSS EXAMINATION

BY MR. LUND:

Q Mr. Jennings, it looks like from your exhibits that the Mesaverde formation is continuous in the

two 320-acre drilling units we've been discussing today.

A Well, the Mesaverde interval, the gross interval is continuous. There are extreme variations in reservoir and permeability within that spacing unit, some of which we can identify and map, some of which we can't.

Q From a geologic standpoint, though, you see good stratigraphic continuity of the reservoir in those two units, correct?

A There are changes but overall there's a relatively uniform gross interval.

Q And the difference you're talking about is the lateral changes in permeability that you said you cannot identify as a geologist.

A I cannot map those using logs; basically cannot map those areas using any of the tools available to us, yes.

Q How often in the formation does the permeability change in a dramatic fashion?

A Well, quite frequently. The two examples that I mentioned are only two of many cases where newer wells drilling near older wells have tapped into something that was not in communication with the old wellbore.

Q And the permeability has changed so much that it constitutes a permeability barrier for producing

purposes?

A For the most part, yes. I mean that's going to vary a lot, but the fact that we have different fluids and higher reservoir pressure, not to mention the significantly higher rate, is strong evidence that those areas are not in complete communication with the old well-bore.

Q Mr. Catanach asked about some other experiences of Mr. Dunn and I was curious about your experience in the Bakken formation in North Dakota. How analogous is the Bakken formation in North Dakota to this geologic formation here in New Mexico?

A Really not very analogous at all. The pay, the shale that we drilled horizontally in there ranges from 2 to 10 feet thick, and therefor lends itself to a horizontal approach.

This formation is -- the pay interval is on an average of 1200 feet thick and does not lend itself to a horizontal approach. If you did drill horizontally in one particular interval you would sacrifice all of the other intervals.

Q Because the pay is so much thicker here in New Mexico you don't need to do it purely horizontal? Right?

A Well, you would -- it wouldn't be wise.

You would sacrifice a lot.

Q How about the completion practices in North Dakota as opposed to what you want to do here in New Mexico, are they similar?

A No, they're generally different, as well. First of all, it's an oil producing zone. When fractures are encountered it has very high permeability and we do not stimulate those wells, whereas down here with the tight nature of the reservoir, they generally require fracture stimulation.

Q Did you learn anything in North Dakota that you'll be able to apply here?

A Well, that's -- yes and that's one of the exciting things for me is to be involved with this project and we -- in North Dakota we have -- we are recovering reserves that would never be recovered by vertical wells and we hope to apply the same philosophy here.

Q Thank you. Nothing further.

CROSS EXAMINATION

BY MR. CATANACH:

Q Mr. Jennings, you gave an example or two examples of new wells that were drilled on the Howell B and Scott -- two Scott leases that encountered new production. Is it your opinion that that production could not have been

produced from the existing vertical wells?

A Some of the reserves that are being produced in the new wellbore certainly would have been produced in the old wellbore, but I'm confident that there are definitely unique reserves in the new wellbore that would not have been produced in the old one.

MR. CATANACH: That's all I have of the witness.

Anything else?

MR. KELLAHIN: No, sir.

MR. CATANACH: He may be excused.

MR. KELLAHIN: Call Mr. Jim Falconi at this time, Mr. Examiner.

JAMES D. FALCONI,

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Mr. Falconi, would you please state your name and occupation?

A My name is Jim Falconi. I'm the Regional Drilling Engineer for Meridian Oil in the Farm-

ington region.

Q Mr. Falconi, have you on prior occassions testified as a drilling engineer before the Division?

A No, sir, I have not.

Q Would you summarize for us your educational and employment experience?

A In 1982 I graduated from the Pennsylvania State University with a BS in petroleum engineering and shortly thereafter went to work for El Paso Exploration Company as a drilling engineer and have been in the Drilling Department since 1982.

Q Have you been involved as a drilling engineer with regards to planning the program for the drilling of the Howell E-2-R Well and the Riddle 1-R Well?

A Yes, sir, I have. I've been a member of our Asset Management Team.

Q Did you cause to be prepared what has been marked for identification as Meridian Exhibits Thirteen and Fourteen for the hearing?

A Yes, sir.

MR. KELLAHIN: We tender Mr. Falconi as an expert drilling engineer.

MR. CATANACH: He is so qualified.

Q Mr. Falconi, we have large copies of Exhibits Thirteen and Fourteen which we have put on the wall of the hearing room and let me ask you to go to first Exhibit Number Thirteen, identify the exhibit for us.

A Exhibit Number Thirteen is a profile view of the Howell E-2 wellbore which we intend to drill within the east half of Section 14, Township 30 North, Range 8 West.

On this exhibit on the lefthand side is shown the north line of Section 14 and on the righthand side of the exhibit is shown the south line of Section 14. In the upper righthand portion of the exhibit we have an inset which shows the plan view of the proposed high -- high angle wellbore.

Q Would you identify for us Exhibit Number Fourteen?

A Exhibit Fourteen is similar to Exhibit Thirteen in that it is also a plan view and profile view of the Riddle 1-R wellbore, which will be drilled in the west half of Section 4, Township 30 North, Range 9 West, and again the lefthand side of the exhibit is shown the north line of Section 4. On the righthand side of the exhibit is shown the south line of Section 4 and again there is the plan view insert shown in the upper righthand corner of the exhibit.

Q Is the proposed drilling and completion program for the Riddle well to be similar to that of the Howell well?

A There -- the two wellbores will be drilled and programmed in the same manner. The only differences are lengths of wellbore and depths to which casing will be set.

Q Take us through Exhibit Number Thirteen and give us the -- a summary of the drilling and completion program for the well.

A Okay. Exhibit Thirteen again shows the Howell E-2 wellbore in both plan view and profile view and what we intend to do is set 500 feet of 13-3/8ths surface casing. At that point in time we'll drill the mud out with a 12-1/4 bit to a kickoff point indicated on the diagram at a depth, true vertical depth, of 3421 feet.

From that point we will drill with an 8-3/4 inch bit and angle build assembly and build an arc which will be built at a rate of 8 degrees per 100 foot, to approximately 68 degrees.

At that point we will pick up a different assembly and drill 150 foot tangent section and this will be our casing point, which is 100 feet above the Mesaverde interval. This is a competent casing point that we picked above the Mesaverde interval.

Q At that point in the top of the Mesaverde, how are you going to determine where you are both vertically and horizontally?

A We will run a -- prior to setting casing to this point, we will run a multishot survey to confirm our wellbore location and submit the results of that multishot survey to the Commission.

Q Once you have identified where you are both vertically and horizontally as you enter the Mesaverde formation, what then will you propose to do?

A We intend to gas drill below the 9-5/8ths casing point with an 8-3/4 inch assembly and penetrate the Mesaverde interval in a southerly direction, as indicated on the diagram, from our casing point, to a total depth of 5415 feet true vertical depth, at a measured depth of 7561 feet. This interval here will be within the window requested in the east half of Section 14 proration unit.

These wellbore -- during the drilling of the wellbore we will run single shot surveys at approximately 100 foot intervals to insure that we're staying within the window. When we get the well drilled to total depth we will run a multishot survey to tie it back into this casing hole, and again, the results of that survey will be submitted to the Commission.

Q Describe for us the program for the completion of the well.

A Depending on wellbore conditions, we will either case this interval or leave it as an open hole interval and that's going to be dictated to us by the wellbore conditions, producing rates, and -- or lack of producing rates.

Q What type of treatment or stimulation program is anticipated for the well, if any?

A If wellbore conditions dictate so, we will case this interval back to surface, cement it back into the 9-5/8ths inch casing string, and selectively perforate and fracture stimulate this interval.

Q Why is this identified as a pilot project, Mr. Falconi?

A This project is unique in that this high angle wellbore has never been drilled with gas before, to my knowledge, in the San Juan Basin or in the western United States.

Q Mr. Dunn awhile ago talked about the risk involved in drilling such high deviated wells as part of a pilot project and indicated that he needed an incentive in terms of calculating his allowable for the spacing unit because of one of the parameters being the inherent risk involved in drilling.

Do you concur in his assessment of the risk involved in drilling this type of well?

A I concur with Mr. Dunn's conclusions that it is a risky venture that we're undertaking. There are mechanical risks involved drilling to this casing point, one being the Fruitland coal is an overpressured interval at approximately 3000 foot depth. We had penetrated the Fruitland coal interval approximately 500 feet away from where this wellbore will be in our Howell E-300 Fruitland Coal Well.

In addition to that there are mechanical risks associated with drilling to this point, mechanical failures associated with drilling a high angle well.

Below that point there are mechanical risks associated with drilling a gas drilled hole, risk of a downhole fire, risk of drill string failures, and other risks such as drilling (unclear) in the wellbore. It's a unique project to Meridian in that we have never undertaken drilling a high angle wellbore with gas.

Q Can you determine for us the approximate range of expenditures for drilling and completing a well of this type?

A We -- we anticipate drilling a vertical well would cost in the range of $200,000; a horizontal wellbore, because of the additional time involved and the

additional casing string involved from this point to surface, would cost in the range of $600-to-700,000.

Q In a general way, then, the directional drilled well is three to four times as expensive as a conventional, vertical wellbore in the Mesaverde formation?

A That's correct.

Q Were Exhibits Thirteen and Fourteen prepared by you or compiled under your direction and supervision?

A Yes, sir.

Q All right.

MR. KELLAHIN: That concludes my examination of Mr. Falconi.

We would move the introduction of Exhibits Thirteen and Fourteen.

MR. CATANACH: Exhibits Thirteen and Fourteen will be admitted as evidence.

Mr. Lund.

CROSS EXAMINATION

BY MR. LUND:

Q Mr. Falconi, as you drill this deviated wellbore, how can you be sure it's going where you want it to go?

A We will use measurement while drilling

equipment to insure the direction and true vertical depth of the wellbore down to the 9-5/8ths inch surface -- or intermediate casing point, and below that point, at approximately 100 foot intervals, we will run single shot surveys and tie them back into the multishot surveys, to confirm our wellbore position at any point in time.

Q I believe you indicated you would file those surveys with the Oil Conservation Division?

A Yes, we will file those surveys with the Oil Conservation Division.

Q Will you also do a bottom hole location survey?

A Yes, sir, we will run a multishot survey when we get the well to total depth to confirm the bottom hole location of the wellbore.

Q What degree of error is there as you plot the location of this deviated wellbore, and I mean your planning as opposed to where it actual goes, what you anticipate?

A We don't anticipate in a plan view a margin of error of more than 5 degrees, plus or minus 5 degrees from the intended direction.

In a profile view we anticipate we can maintain within 3 degrees.

Q Even though you've never done one of

these yet.

A That's correct.

Q You're going to set casing down to the top of the Mesaverde for sure.

A That's correct.

Q And then you'll decide later whether you case the Mesaverde for a Basin producing interval?

A That is correct.

Q Again what will be the basis for whether you'd set casing in a producing interval?

A There will be a number of factors that will determine whether or not we will case that interval, one of the factors being the production potential of the interval. Obviously, if there is no production potential, we will not case the well.

Q What are the other factors?

A Other factors may be flow rate or a moderate flow rate from the well.

Q So the bottom line is if you don't get very good production from that producing interval you won't set casing.

A I wouldn't say that at this time, no.

Q What would you say?

A That -- that will be evaluated at that time, the production potential of the wellbore.

Q If you set casing, then you'll selectively perforate the producing interval, I think you said?

A That's correct.

Q Is that a difficult thing to do, to perforate a deviated wellbore like that?

A We have perforated in a wellbore which was drilled to 90 degrees, 90+ degrees. No, we don't anticipate problems perforating in this wellbore.

Q When you talk about mechanical risks at various points in the wellbore, are you talking about a casing collapse or a collapse of the hole if there's no casing in there? What are you talking about?

A We're talking about similar situations. You can have a loss of the wellbore due to a collapse of the formation. You can have a loss of the wellbore due to mechanical failures and leaving part of your drill string in the wellbore.

Q Thank you.

MR. LUND: I have nothing further.

CROSS EXAMINATION

BY MR. CATANACH:

Q Mr. Falconi, has Meridian drilled a well similar to this somewhere else?

A We have drilled wells in the Fruitland Coal formation, high angle wellbores. I was the project engineer on both -- both of those projects, which were undertaken in 1988.

Q How did those turn out as far as the drilling?

A Those projects were successful.

Q But you, you did not drill, or you did drill those other ones with (unclear) in the hole.

A Those wells were both drilled with mud in the hole from surface to total depth.

Q Uh-huh. Does Meridian plan to drill both of these wells simultaneous or one after the other?

A We would drill the -- we anticipate to drill the Howell E-2 first and evaluate its potential and drill the Riddle No. 1-R as a second high angle.

Q So in your experience with this type of drilling you've had no significant problems to speak of.

A Drilling our two Fruitland Coal wells, we did experience some mechanical failure while drilling those wells and were able to overcome those mechanical failures and continue the well to total depth.

Q What were those failures?

A In our first well, it was the San Juan 32-5 Unit Number 100, we had a drill string failure, as we

did in the second wellbore, the Sunray H No. 201.

Q Is that something that you -- do you anticipate that happening again?

A No, we don't anticipate those problems happening. We would hope to avoid them.

Q Well, is it likely to happen?

A There's a likelihood that they will happen.

MR. CATANACH: That's all the questions I have of the witness.

He may be excused.

MR. KELLAHIN: Call Mr. Louis Jones at this time, Mr. Examiner.

If I might take a moment, Mr. Examiner I would like to move the introduction of Exhibits Fifteen and Sixteen, which are the certificates of mailing of the notice to the various parties involved in the hearing. Mr. Dunn has identified those parties in this testimony and the certificates simply indicate confirmation of the fact that that notice has taken place.

MR. CATANACH: Okay, Exhibits Fifteen and Sixteen will be admitted as evidence.

LOUIS D. JONES,

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Mr. Jones, would you please state your name and occupation?

A Louis D. Jones. I'm Production Manager with Meridian Oil Company in Farmington, New Mexico.

Q Mr. Jones, have you on prior occasions testified before the Oil Conservation Commission?

A Yes, I have.

Q In particular you have testified as an expert petroleum engineer with regards to issues involving prorationing of spacing units and wells for the two pro-rated gas pools in the San Juan Basin, have you not?

A That is correct.

Q And you have provided technical testimony on behalf of Tenneco and now Meridian with regards to prorated pools in the San Juan Basin?

A Yes, I have.

Q And you have personally participated as a member of various study groups organized by the Oil Conservation Division to study technical questions concerning

prorationing, have you not?

A Yes, I have.

Q Have you studied the issue of prorationing with regards to the two proposed highly deviated wellbores that are the subject of this hearing?

A I am familiar with it, yes.

MR. KELLAHIN: We tender Mr. Jones as an expert proration engineer.

MR. CATANACH: He is so qualified.

Q Mr. Jones, let me have you give us some background from your perspective as to why a project such as the two pilot projects proposed by Meridian are so important to your company and so personally important to you as an engineer.

A Well, Meridian and the State of New Mexico is attempting to convince the California Public Utilities Commission that we have a long term, reliable, reasonable price, source of gas, and we need to create an incentive to drill these highly deviated wells to recover the reserves that would not be recovered by our vertical wells, and without that incentive we think we're going to create waste and not recover those resources for the State of New Mexico.

Q It's of concern to Amoco and certainly

the Division that the incentive provided to Meridian so that you can undertake the proposed operation of these two wells is done so without violating the correlative rights of the parties that might be affected by your spacing unit.

Do you have an opinion as to whether or not if approval of this application is granted by the Examiner, whether or not correlative rights can be protected?

A I feel they can be protected. You're still in a prorated pool. You have a 320-acre spacing unit and if you go to the two times the D proposal that we've made, essentially what you've done is given one well that two allowables.

The precedence has already been made by the State of New Mexico. I believe it was in the Lindrith Field, where you had 160 acre spacing yet the well covered the 320-acre unit and that well received two allowables, and that's essentially what we're asking for here, is two D's.

Now you either/or, the combination of the two D's for the highly deviated well or go back -- fall back to our three well rule as it currently exists, two out of the best three with, of course, the one -- one only on each 160 per quarter section.

Q Have you been able to forecast or anti-

cipate what would be the consequences if the Division should require that the spacing allowable be fixed by either the deliverability of the highly deviated well, not multiplied by two, simply the deliverability, or the -- the combination of the deliverabilities of the two vertical wells? What's the consequence?

A Well, as an example, let's say that our highly deviated well has a deliverability of, let's use 1.5-million a day or 1500 MCF per day. Currently, with our allocations as they stand, we could produce that well approximately 5-1/2 months before we have to shut it in being 12 times overproduced. That's how low allocations are now. And after that period then we can produce it 30 percent of the time without then breaching that 12 times overproduced limitation, which is unacceptable to us to make that type of capital expenditure knowing that we can only produce a limited amount of time and gas.

Now, obviously, if allocations were much higher, and that's part of the subcommittee's efforts, then the D is not as critical an issue, but currently it's very critical. Only being able to produce 30 percent of the time is -- is unacceptable.

Q Do you believe it's necessary to restrict the allowable based upon the D for the highly deviated well is the only factor then to set the allowable?

A I think it would be unacceptable to able the D off of one well when essentially you have 160-acre spacing, and this covers the 320.

Q Is it going to be necessary to set up the allowable in that manner in order to protect the correlative rights of the offsetting operators?

A I still feel that since you have one well in the 320, that two times that D for the highly deviated well is acceptable and still can protect correlative rights and prevent waste.

Q Describe for us your opinion that approval of this application would afford the opportunity to prevent waste. What's the basis for reaching that conclusion?

A I think all the testimony given to this time has shown that additional -- more than likely additional reserves will be recovered with this highly deviated well.

MR. KELLAHIN: I have no further questions of Mr. Jones.

We tender him for cross examination.

MR. CATANACH: Mr. Lund?

CROSS EXAMINATION

BY MR. LUND:

Q Mr. Jones, you understand the prorated pools a lot better than I do. It's a complex subject and I always have trouble reading the rules and trying to figure out how things are going to work and how the allowables are going to be assigned, and I think you and I have talked about whether that's even a viable system to begin with, but --

A That's correct.

Q -- anyway, you don't know how the deviated wellbore in that well is going to be perform in the future, do you?

A No, not right now, we do not. It's a pilot program.

Q So do you think it will be fair to keep the issue open in the future to potentially adjusting the allowable assigned that deviated wellbore as soon as you get some performance information?

A Well, I would always say we would consi- consider but would never want to leave that open because you've made the capital expenditure, when you spend three, to four, if not more, times the amount of money you would for a vertical well.

Q So you want the two times allowable

factor for the deviated wellbore no matter how it performs?

A Well, obviously, if it doesn't perform well, then we would like to fall back on the two of the best three, at least one out of the 160, so fall back on the current rules and regulations.

Q Now I think I was confused by one of the earlier witnesses, maybe Mr. Dunn. I thought at first the proposal was you take two times the deliverability of the deviated wellbore, that's your first choice.

A That's right, and that would be for the 320, your acre tract of 1.0.

Q And then I thought the other alternative was to use just the deliverabilities of the two existing vertical wells.

A No, it would be -- essentially, you would have three wells and we would go back to the existing rules where you would take the best well out of the two that are on the 160 and then the deliverability of the other well that's on the other 160.

Q You know, under the current system, as I understand it, you have to look at deliverabilities from the opposite quarter section.

A That's correct.

Q In other words, you can't look at the

two wells that are in the same quarter section.

A Right. Let's say that the deviated well and the well that's in the exact same quarter section are the two best. You cannot take those two best. You have to take the best out of those two and then take the other one that's in the other 160.

Q And I guess what kind of concerns me a little bit is that you're changing the system a little bit if you look at the deviated wellbore plus the best of the two remaining vertical wellbores.

A Well, if you look at the second alternative, that's not a change. That's what exists now, exactly as it states in the rules.

Now the first part is a slight change but again what you're doing is you have one well that's covering the 320 and we're asking essentially for two D's for that one highly deviated well, and that is a slight change, but sure can be, I'm sure, administered under the current rules and regulations.

Q And I think that the change is, though, that right now you're looking at two wellbores in opposite quarter sections.

A That's --

Q And if you calculate the deliverability of the deviated wellbore, that deviated wellbore will go

into both quarter sections.

A That's correct, it will make two times that and no other deliverability that's (not clearly understood.)

Q Is it fair to say that you need a two times deliverability for the deviated wellbore so you can pay out that additional cost?

A That's correct, particularly as low as allocations have been and as low as they may seem to be in the future. The example I threw out, it also carries for a million a day well, a two million a day well, five million a day well, that if you produce what your D is you can only produce, I think, 5.4 months before you're 12 times overproduced, not just overproduced but 12 times overproduced. That's unacceptable.

Q Yeah, the whole proration system is some thing that we won't inject here.

A Yes.

Q Thank you very much.

CROSS EXAMINATION

BY MR. CATANACH:

Q Mr. Jones, if we -- if we did not go with the two times the deliverability of the -- of the deviated well --

A Uh-huh.

Q -- if we went with the standard method of doing that, you don't really have two wells -- well, your deviated well spans both quarter sections.

A Yes.

Q And so would you use the surface location of your deviated well as it being that quarter section with two wells?

A We could accept either one, whichever the Commission deemed appropriate.

Q If after you completed the well, the deviated well, it was found to be draining a larger area, a larger offset acreage, would -- would you consider that grounds to maybe reopen the case and readjust the allowable for that proration unit?

A My personal opinion is no; however, --

Q Why not?

A Well, simply because it exists throughout the Basin as we speak. There are several wells that have produced much greater as far as the number of reserves that would be under their 320, and it's not Meridian. It's Amoco, Union Texas, all the other operators that end up having wells that are going to make much more than the offset wells are going to make. That's the nature of the Mesaverde formation.

Now, obviously, would -- would they be brought into this hearing? Probably not.

Q Well, that's not the subject of this hearing.

A No, I was just using that as an analogy, though.

Q But you don't have any idea at this point what the well is going to do.

A No, sir, we do not.

Q If you, you know, if you end up draining or you get a really good well and it's -- it's potentially harming your offset operators, draining more of those reserves than you normally would with two vertical wells, wouldn't -- don't you think that would be grounds for reopening the case?

A Well, I -- my personal opinion is no.

Q Okay. That's all I have.

MR. KELLAHIN: That concludes our presentation, Mr. Examiner.

MR. CATANACH: Would you like to make any closing statements, Mr. Lund, Mr. Kellahin?

MR. LUND: I'd like to very briefly.

MR. CATANACH: Okay, Mr. Lund?

MR. LUND: Mr. Examiner, we

are an offset operator and we are affected and I think that some of the things are in dispute and the order should include provisions that Meridian would be required to file logs and directional surveys with the OCD so that we can actually make sure that penetration in the Mesaverde is not closer than 790 and know where the wellbore is going. I don't think there's any dispute about that.

The allowable calculation does bother me a little bit because we want to make sure that our correlative rights are protected, and as we just asked of Mr. Jones, we don't know how the well is going to do and I think that the order should state that it could be -- that this case could be reopened and evaluated depending on the performance of the well. I think that's only fair.

The calculation of the allowable, I think is a difficult question, and I'm not sure how that -- how to resolve that, but clearly you can't use all three wells and I think that if you look at the deviated wellbore in whole or in part in the calculation, it does change the current system because the current system has a safety mechanism built in because you do not look at the deliverability of two wells in the same quarter section.

The conservation side of this case is interesting. It's a new case. It's never been addressed before. It's not addressed by the field rules,

and I thought the presentation by Meridian was excellent and I think it's a great thing to look at and the only thing, we want to make sure that we protect ourselves on is the correlative rights, because if this well is successful and if it's a very good producer, it changes the opportunity to recover our just and equitable share of reserves.

So, we would request that the order that you issue contain a provision that we can come back and look at the allowables in the future depending on what -- what results from these two drilling efforts.

Thank you.

MR. CATANACH: Mr. Kellahin.

MR. KELLAHIN: Thank you, Mr. Examiner. I appreciate the opportunity to present this case to you and thank you for the considerable time you've provided for us today.

This is a unique opportunity, I think, to further test and explore the chance to produce hydrocarbons out of the Mesaverde that might not otherwise be recovered and I think we need to be very conservative in the type of administrative restraints we want to place upon the applicant for a pilot project so that we give them the greatest flexibility to see if we can make this not only a technological success but a practical, real success for the industry.

As you can see, not only will Meridian have the opportunity to do this all throughout the Mesaverde formation, others will learn from our experience.

I think the issue of the allowable needs to be done very carefully. Mr. Jones and Mr. Dunn, I think, have provided you with abundant reasons why these particular spacing units might be established with an allowable formula that might be unique unto themselves and that should operators desire in other instances to duplicate the effort of the pilot project, then we would have an opportunity to determine whether or not we should set a special hearing to determine the adoption of a procedure in this prorated pool to take care of what is going to be a multiple spacing issue.

Meridian needs some comfort and confidence that if they apply this technology to the spacing unit and incur the expense, that they will not be judged after the fact and be subject to a reduced penalty. I think we've given you at least two very viable suggestions on how to handle that allowable. Your last question to Mr. Jones presumed the answer and with all due respect, perhaps was not fair to his position. I think if the question is you get a big well and it harms your offsets, the only answer is that you set a hearing.

You used the word "harm" and

that's a fundamental right that you as an examiner, and the Division, must protect, and that's true with all our cases. If after the fact there is new information developed and presented that shows harm, shows waste, or the violation of correlative rights, we not only come in and change orders, we change pool rules, we redo rules and regulations. It's not a stagnant process.

To presume that harm will occur to offsets now, prejudges, and I think unduly restricts your flexibility as an administrator. The pilot project is that. It's a pilot project and I think you with confidence could adopt Mr. Jones' proposal that for these two spacing units as a unique incentive for the pilot project, that they be granted an allowable based upon twice the D of the deviated well.

If you find that that is unacceptable to you, I think an alternative approach is to do now for these wells what is consistently done for those spacing units in which you have a third vertical well and that is, as we have already discussed, you take the D of the two best wells in the 160, combine it with the D of the well in the opposite 160, and therefor calculate the allowable. I find less comfort in that mechanical approach because which wellbore do you reject in taking the D? Obviously the surface location of the deviated wellbore in

relation to that well doesn't make a lot of engineering logic to why you would reject the well in the spacing unit where the well is located, the deviated well is located on. I don't know how you select it in a rational way. It seems to me to be more logical from an engineering point of view to say you take the D of the directional well as one of the choices because it in fact exposes the 320. We're dealing with a spacing unit in a pool that is effectively 160 and that's how you resolve it. I think that's a nice, clean, logical, consistent solution that provides the necessary economic incentive to Meridian and to other operators that want to take advantage of this, and remember that the premise upon which the whole case is predicated is that Meridian has found spacing units in which they have very old wellbores and that in each instance they are being exposed to drainage, if you will, or to a lack of competitive advantage or equality with the offsetting operators. You can take the deliverability schedule from -- from your own records and can plot the combined deliverabilities of all the offsetting Mesaverde spacing units to each of these two spacing units, and you'll find in each instance that the offset operators have a tremendous competitive advantage in current deliverabilities to each of the Meridian cases, and we need the incentive, then, to make our spacing units competitive and we think the way to do it is with a

highly deviated wellbore and the appropriate deliverability and allowable assigned to those spacing units, and with that as the incentive, we want the opportunity to see if we can't apply this to the entire Basin and to recover hydrocarbons that might not otherwise be recovered, thereby preventing waste and generating income and revenue for the State of New Mexico and all interest owners.

MR. CATANACH; Thank you, Mr. Kellahin.

Anything further? If not, Case 9764 and 65 will be taken under advisement.

(Hearing concluded.)

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. 9765, 9765 heard by me on September 28 1977.

David R. Catanach, Examiner
Oil Conservation Division