STATE OF NEW MEXICO 1 2 ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT 3 OIL CONSERVATION DIVISION 4 IN THE MATTER OF THE HEARING 5 CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING: CASE NOS. (10843 6 and 10844 APPLICATIONS OF MERIDIAN OIL INC. 8 REPORTER'S TRANSCRIPT OF PROCEEDINGS 9 **EXAMINER HEARING** 10 BEFORE: David R. Catanach, Hearing Examiner 11 October 7, 1993 12 Santa Fe, New Mexico 13 14 This matter came on for hearing before the 15 Oil Conservation Division on October 7, 1993, at 16 Morgan Hall, State Land Office Building, 310 Old Santa 17 18 Fe Trail, Santa Fe, New Mexico, before Deborah O'Bine, RPR, Certified Court Reporter No. 63, for the State of 19 New Mexico. 20 21 22 23 24 25

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1			1	A P	P E A R A N C E S
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EXAMINER CATANACH: At this time we'll call 1 2 Case 10843. MR. STOVALL: Application of Meridian Oil 3 4 Inc. for a high angle/horizontal directional drilling 5 pilot project, an unorthodox oil well location, a nonstandard oil proration unit, a special project 6 allowable, and special operating rules therefor, San 8 Juan County, New Mexico. 9 EXAMINER CATANACH: Appearances in this case? 10 11 MR. KELLAHIN: Mr. Examiner, I'm Tom Kellahin of the Santa Fe law firm of Kellahin and 12 Kellahin appearing on behalf of applicant, and I have 13 three witnesses to be sworn. 14 15 EXAMINER CATANACH: Additional 16 appearances? MR. STOVALL: Consolidate at this time? 17 18 MR. KELLAHIN: Together. 19 MR. STOVALL: Not apart? MR. KELLAHIN: 20 No. MR. STOVALL: Do you want to call the other 21 22 case? EXAMINER CATANACH: We will at this time 23 consolidate this case and call Case 10844. 24 25 MR. STOVALL: Application of Meridian Oil

Inc. for a high angle/horizontal directional drilling pilot project, an unorthodox oil well location, a 2 3 nonstandard oil proration unit, a special project allowable, and special operating rules therefor, San 4 5 Juan County, New Mexico. 6 EXAMINER CATANACH: Appearances in this 7 Additional appearances? case? 8 MR. KELLAHIN: Mr. Examiner, Tom Kellahin. 9 Same appearances. Same witnesses. No opposition. 10 Ready to be approved. 11 MR. STOVALL: According to the special rules which are being drafted but have not yet been 12 13 adopted? 14 MR. KELLAHIN: Yes. 15 EXAMINER CATANACH: Will you please swear in the witnesses, Mr. Stovall. 16 17 (Witnesses sworn.) 18 MR. KELLAHIN: Call at this time Mr. John Zent. 19 20 JOHN ZENT, the witness herein, after having been first duly sworn 21 22 upon his oath, was examined and testified as follows: 23 EXAMINATION BY MR. KELLAHIN: 24 25 Q. Mr. Zent, for the record, would you please

state your name and occupation.

- A. My name is John Zent. I'm a petroleum landman employed by Meridian Oil Inc.
- Q. On prior occasions have you testified before the Division as a petroleum landman?
 - A. Yes.

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- Q. Pursuant to your employment in that capacity, have you made a study of the land title situations concerning these two cases?
 - A. Yes, sir, I have.
- Q. Have you identified, and are you prepared to testify to the examiner as to the offset operators that may have an interest in the spacing unit that you propose to develop with each of these two wells?
 - A. Yes, sir, I will.
- MR. KELLAHIN: We tender Mr. Zent as an expert petroleum landman.
- EXAMINER CATANACH: Mr. Zent is so qualified.
 - Q. (BY MR. KELLAHIN) Let's take the first exhibit book, Mr. Zent. It's the one marked for Case 10843.
 - A. Yes, sir.
 - Q. That's the Black Diamond Com 18 #1 well?
- A. Yes, sir.

- Q. Turn to Exhibit Tab No. 1 and identify that for us.
- A. Tab No. 1 is the application filed by your firm on behalf of Meridian Oil Inc. in this application.
- Q. The other exhibit book is organized in the same chronology of exhibits?
 - A. Yes, sir, it is.

- Q. Turn to Exhibit No. 2 in the first case book. What does that plat describe?
- A. This is a nine-section plat of the section surrounding Meridian's proposed drill site of the east half Section 18, Township 30 North, Range 15 West, San Juan County, New Mexico. The center of the plat is the east half of Section 18, and it is shaded in a dark color, which will be the proposed proration unit. Meridian has shaded, had the drafting department shade in a lighter fashion the offsetting operators surrounding the east half of Section 18.
- Q. How have you determined the status of the offsetting operators to the spacing unit?
- A. Meridian researched federal, state, and county records to determine the leasehold ownership in the offsetting drill blocks and the drill block for the proposed proration unit.

- Q. All right. Let's turn now to the Exhibit book for the Black Diamond Com 8-1.
 - A. Yes, sir.

- Q. In the same fashion, let's turn to Exhibit 2 of that exhibit book and have you identify and describe what is contained on that display.
- A. Exhibit 2 is, again, a nine-section schematic of the area around Meridian's proposed drill block for the Black Diamond Com 8 #1 well, being the west half of Section 8, Township 30 North, Range 15 West, San Juan County, New Mexico.

The proposed proration unit is shaded in dark color, and the offsetting proration units are shaded in the lighter color. Again, Meridian has researched the federal, state, and county records for leasehold and mineral ownership in the offsetting ownership areas, and we've indicated that ownership below the schematic.

MR. KELLAHIN: Mr. Examiner, I have submitted to you separate certificates in each case, and my firm has used the notification list prepared by Mr. Zent. And as of the indicated date, September 15, in both cases, we sent certified mail letters to each of the individuals or companies shown on both lists.

Q. To the best of your knowledge, Mr. Zent,

has any company or individual that was notified raised any objection to you about Meridian's application in these two cases?

A. To my knowledge, no parties have raised objection to this application.

MR. KELLAHIN: In addition, Mr. Examiner, I am aware of no opposition to these two cases. That concludes my examination of Mr. Zent.

EXAMINATION

BY EXAMINER CATANACH:

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- Q. Mr. Zent, within the east half of Section 18, is that one or more leases?
- A. It is two leases. If you look at the plat, the east half of Section 18, there is a large numeral 2 indicated on five of the 40-acre proration units.

 That happens to be a single federal oil and gas lease held by Yates Petroleum Corporation.

In the south half of Section 18 as to the southeast quarter, there are also three 40-acre proration units that have the number 1 designation. That is also a federal oil and gas lease that is held jointly by Meridian Oil Inc. and Morgan Energy Corporation from Denver, Colorado.

Meridian has a drilling option on the Yates leasehold and are partners again with Morgan Energy on

the tract indicated with the number 1.

- Q. In putting a project of this nature together, do you have knowledge of what the BLM, whether or not they would have to approve something like this in terms of putting the two leases together?
- A. As in all cases where federal acreage is involved in a single proration unit, the Bureau of Land Management must approve a communitization agreement prior to production. In the event of a successful well in production, Meridian will prepare and circulate a communitization agreement for approval by all working interest owners, all lessees of record, and the Bureau of Land Management.
- Q. You have not done any preliminary BLM discussion?
- A. No, sir. That is not normal until after production is secured.
- Q. Have you had a similar type of project in the past?
- A. Yes, sir, we have in this immediate area. In fact, if we look at the exhibit book for Case 10843, being the Black Diamond Com 18 No. 1, on that case you'll notice the west half of Section 20 is shaded. Meridian currently has just completed drilling a well and is currently completing a well

with a proration unit, being the west half of Section That case was heard by the Commission I believe 2 in July of 1992. The case number and order escape me 3 at this point in time, sir. MR. KELLAHIN: Are you talking about the 5 Com 20? 6 7 THE WITNESS: Yes, sir. MR. KELLAHIN: Mr. Examiner, it's Case 8 It's order No. R-9702, and it was heard by you back in July of 1992. Here's a copy of that. 10 11 EXAMINER CATANACH: Okay. (BY EXAMINER CATANACH) Did you say you 12 have approached BLM on that project? 13 Yes. We have a communitization agreement Α. 14 that has gone to the Bureau of Land Management for 15 approval within the last two weeks. 16 Has that been approved? 17 Q. 18 Α. No, it has not. Do you foresee any kind of problem with 19 Q. that? 20 21 Α. No, sir. Now, do we have a similar type situation in 22 Q. the west half of Section 8? 23

numbers indicated No. 3, that is a federal oil and gas

In the west half of Section 8, the

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lease held by EP Operating Company out of Dallas,
Texas. Meridian has a drilling option on that lease.

The acreage indicated with a number 2 is also held by Yates Petroleum Corporation. That is also a federal oil and gas lease with a November 30, 1993, lease expiration date. Those two leases would be combined to form one proration unit via federal communitization agreement.

- Q. You've got from EP a farmout agreement?
- A. It's a farmout, yes, sir. They were involved in our well in Section 20, and we had a farmout on that well. We have a continuing drilling option from EP on their acreage in 8.

EXAMINER CATANACH: I have nothing further at this time. The witness may be excused.

MR. KELLAHIN: Mr. Examiner, at this time we'll call Meridian's geologist in these two cases, Mr. Paul Basinski.

PAUL BASINSKI,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

EXAMINATION

23 BY MR. KELLAHIN:

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Q. Would you please state your name and occupation.

- A. Paul M. Basinski, senior staff geologist, Meridian Oil.
- Q. Mr. Basinski, on prior occasions have you testified before the Division as a petroleum geologist?
 - A. No, I have not.

- Q. Summarize for us your education.
- A. I received a bachelor's in geology from the State University of New York at Buffalo in 1975. I received my master's in geology from the University of Nevada Reno, Mackey School of Mines in 1978. I went to work for Chevron immediately following graduation for a number -- for several years. Then I worked for Tesoro Petroleum, then under Grace Petroleum where I was the last nine years, and I started with Meridian Oil about six months ago.
- Q. Describe for us your specific area of responsibility for Meridian.
- A. I'm responsible for area 4, which is inclusive of the wells that we're going to talk about today.
- Q. Are both these wells within the area designated or affected by what is described as the Horseshoe Gallup Oil Pool?
 - A. That is correct.

- Q. Are you in that general vicinity?
- A. That is correct.

- Q. Can you tell us where that is? Where do we go to find it on the ground?
- A. We're approximately 4-1/2 to 5-1/2 miles northeast of the Town of Waterflow.
- Q. Where are you in relation to the power generation plant up there in the Four Corners area?
- A. We're immediately to the west of the power plant.
- Q. Within this geologic setting of the Gallup in this formation, can you give us a visual picture, a word description of the environment that this production is contained in?
- A. We're proximal to Horseshoe Gallup field where production has been established from the Tocito Sands. Those sands exhibit good matrix porosity and permeability. They're up on the Four Corners platform area.

Our proposed wells are immediately

Basinward of that production. In this position those

porous and permeable sands have become tighter and

more shaley; hence, matrix porosity and permeability

is quite low.

The Waterflow zone, which is the objective

in the two horizontal wells, is a widespread contiguous unit throughout the area.

- Q. Let's turn to the structure map that's located behind exhibit tab No. 5 in the exhibit book for the Com 18-1 well. Let's use that illustration and have you describe the structural setting for the two wells.
- A. We're situated on the northwest corner of the San Juan Basin immediately Basinward of the Hog Back monocline. The two wells exhibit dip to the southeast of approximately 8 degrees in the case of the 8-1 well and approximately 3 degrees for the 18-1 well.

The map that we see in Exhibit No. 5 is contoured on the top of the Gallup, and the contour interval is 100 feet.

- Q. My copy of that display is color-coded in that the spacing units are outlined in green and in pink. Is yours marked that way?
 - A. Yes.

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- Q. What's the significance of that color code?
- A. The two pink boxes represent the orders that we received for exception locations previously. In the west half of Section 20, that was the unit for the Meridian 20-1 Black Diamond well, and immediately

to the north of that is the spacing unit for the Black Diamond 17-1 well.

The two green boxes represent the exceptions that we're seeking today.

- Q. Of the two cases already approved as horizontal wells, you have drilled the No. 20 well?
 - A. That's correct.

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MR. KELLAHIN: Mr. Examiner, the order number for the 17-1 is going to be R-9691, and it was also entered by you based upon a hearing held in June of 1992.

- Q. What's the plan, the concept, the objective in a horizontal well or wells in these spacing units?
- A. The concept is that in this more Basinward position in the Waterflow and Tocito sand pay, where you have less matrix porosity and permeability, the vertical wells to date have not proven to be commercially viable. The concept is through horizontal drilling technology to traverse the formation over the lateral distance of several thousand feet, 3,000 to 4,000 feet, thereby encountering natural fracturing which has been responsible for the marginal vertical production in the immediate vicinity to date.

By drilling the horizontal well, a greater

number of fractures will be intersected in the wellbore, thereby allowing the wellbore to efficiently drain the 320 acres.

Several cores from vertical wells in the immediate vicinity have indicated that fracturing is quite pervasive in the Waterflow zone, which is the objective for both wells.

- Q. If you'll turn with me to the Exhibits behind Exhibit Tab No. 4, and let's talk about the illustration first. Describe for us what you're attempting to illustrate here.
- A. This is a cartoon of the geological situation that we're attempting to display. On the bottom of each cartoon, there are some vertical fractures represented. And the concept is on the left-hand side, a vertical well has been drilled and not intersected a significant number of these fractures, whereas the high-angle well on the right is directed so that its azimuth will be perpendicular to the azimuth of the trending fractures, thereby encountering the maximum number in the Waterflow zone.

These fractures would not have been encountered in a vertical well, and thereby a commercial well is potentially possible in this

situation.

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- Q. With regards to a spacing unit, what do you propose to form for a project spacing unit?
 - Α. We propose 320-acre stand-up units.
- And that would consist then of eight, Q. 40-acre tracts or spacing units within this pool or subject to this pool?
 - That is correct.
- Q. How would you propose to calculate the oil-producing allowable for the project area?
- It is a simple function of the state allowable times the number of 40's that will be cut by the wellbore, which is five, thereby yielding a 400 barrel a day allowable.
- Is that an allowable request that's consistent with the prior two orders entered by Division in this area for these types of wells?
 - Α. Yes.
- Lets go now to the schematic that's shown as Exhibit No. 3. It shows a producing drilling 20 21 window with a 330 setback from the side boundaries of the 320-spacing unit? 22
 - That's correct. Α.
 - What is the plan for the well? Are you to Q. be located at a standard location then within that

setback?

- A. Yes, we will.
- Q. What has caused you to determine where to start within the spacing unit and what direction to proceed?
- A. Surface outcrop work from the nearby producing or mining coal operations from the Fruitland indicate butt cleat orientation to the northeast-southwest, and this orientation has frequently been found to indicate open fracture azimuth in deeper horizons.

Furthermore, the 20-1 Black Diamond well vertical pilot exhibited a fracture azimuth in an analogous northeast-southwest direction. Hence, the proposed trajectory of the well to the southeast will encounter the maximum number of these fractures.

MR. KELLAHIN: Mr. Examiner, we propose to honor a site boundary setback of 330, which would be consistent for a vertical well on a 40-acre tract. We're seeking approval for unorthodox locations insofar as the lateral or the producing interval of the well would cut internal setoffs for the 40-acre tracts.

Q. Describe for us the status of the well that was drilled, the 20-1 well. Where do we stand on that

well?

- A. The well is currently under completion. We are running an emulsion breaker at this point. We believe we damaged the formation well drilling, and we're in the process of cleaning up the well.
- Q. In your opinion as a geologist, is it necessary to have these two additional project areas in which to test the feasibility of high angle/horizontal wells in this particular formation?
- A. Our experience has been that one project will not condemn the concepts. The geology is fairly complex. The drilling situation and completion technology is still being developed, and one wellbore is not sufficient to be able to adequately evaluate the geology. Hence, we are seeking additional wells so that we can continue on our learning curve.

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

EXAMINATION

20 BY EXAMINER CATANACH:

- Q. Are there several producing zones within the formation?
- A. Within the Niobrara, in the immediate vicinity, specifically Horseshoe Gallup field, there are two sand members that are productive. There's an

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upper Tocito sand and a basal Tocito sand in the location of these two proposed two wells. That basal sand is not developed. It's totally shaled out.

The upper sand with matrix porosity and permeability that's productive in Horseshoe Gallup is quite a bit siltier and tighter. And that's our objective for these two wells.

- Q. That's what you're referring to as the Waterflow?
 - A. That is the Waterflow zone.
- Q. Have these areas been developed by vertical wells?
- A. There have been several vertical wells.

 The most proximal to the two proposed horizontal wells is in the northwest of Section 17. It's the BMG Harrington No. 1. In that well, four hole cores were cut through the Waterflow in basal Tocito section.

It demonstrated the tight, fine-grained, sandy nature of the upper zone in the absence of the lower sand zone. Fractures were identified from those cores, and the cores were bleeding oil. The well was subsequently completed and produced 24,000 barrels of oil before its abandonment in April of 1985.

EXAMINER CATANACH: I don't have anything else of the witness. He may be excused.

Mr. Examiner, we'd call at MR. KELLAHIN: this time Mr. Eric Bauer. Mr. Bauer is the drilling engineer for Meridian that's responsible for these two wells. ERIC BAUER, the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

EXAMINATION

BY MR. KELLAHIN:

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- Mr. Bauer, for the record, would you please Q. state your name and occupation.
- My name is Eric R. Bauer. I'm a drilling 12 engineer for Meridian Oil. 13
 - On prior occasions, Mr. Bauer, have you testified as a drilling engineer with regards to this type of well?
 - Yes, I have. Α.
- Q. Are the drilling programs for drilling and completing these two wells designed in a similar fashion? 20
 - Α. Yes, they are.
 - Are there any material differences between Q. the two programs for these wells?
 - No material differences. Α.

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

EXAMINER CATANACH: Mr. Bauer is so qualified.

- Q. (BY MR. KELLAHIN) Let me have you turn to the last display in the exhibit book, Mr. Bauer. We've been working with the one for the Black Diamond Com 18-1. If you go to the Exhibit 6 of that book, it's an illustration of the design program for the well. Why don't you start at the surface for us and take us through the illustration and explain how you propose to have this well drilled?
- A. Okay. My well plan is to drill 12-1/4 inch hole to 300 feet, then set 9-5/8 casing, drill out with mud 8-3/4 inch hole to a kick-off point noted down on the illustration of 3472 -- or excuse me -- to a point of 4120 which is our pilot hole TD; forgive me. And at that point we will analyze the basal Tocito, run some logs, and try to fine-tune our azimuth.

At that point, we will plug back to our kick-off point with a cement plug to 3472, build angle at 12 degrees per 100 foot to 87 degrees. One again, this is with mud. And we will set our 7-inch casing at 4197 measured depth, which is 3949 foot TVD.

At that point I will run in the hole a

steerable motor assembly and drill to about 88 degrees, using an air mist system and 4-3/4 inch tools. I will then at the TD of the well, which is estimated at 7747-foot measured depth or 4,000 foot total vertical section, run a 4-1/2 plugged and perf'd liner.

- Q. Once you've drilled the well, describe for us your completion plan. What do you propose to do?
- A. Once we drill the well, we'll move that rig off and move on a smaller rig, and it will be in charge of the operations to mill the plugs out of the liner and put a chemical wash on the formation and swab it.
- Q. Give us a summary, Mr. Bauer, of the procedures used for the Black Diamond Com 20 well that is currently under completion process. What did you do when you drilled that well? What kind of design program did you use?
- A. The design program is very similar to these 18 and 8-1 wells. The only difference is the size of pipe that I ran. In the 20-1, I drilled a little larger hole and set 7-5/8 inch casing around the build. In these two wells I'm proposing 7 inch. Those were the only differences.
 - Q. Did you encounter any kind of mechanical

difficulty or drilling problems with that well that would be of concern to the Division Examiner as he 2 3 approaches the next two wells and the subject of these two hearings? 4 Α. No, I did not. There were no problems. 5 MR. KELLAHIN: That concludes my 6 7 examination of Mr. Bauer, Mr. Catanach. We move the introduction of all of 8 Meridian's exhibits in each of these two cases. 9 10 EXAMINER CATANACH: These exhibits -- is it 1 through 6, Mr. Kellahin? 11 12 MR. KELLAHIN: 1 through 6 in Exhibit Book 10843, and the same number in the other case. 13 14 EXAMINER CATANACH: Okay. MR. KELLAHIN: And then the certificates 15 16 would be added as Exhibit 7, and I'll have them marked 17 accordingly. 18 EXAMINER CATANACH: Exhibits 1 through 6 and 7 in each of these cases will be admitted as 19 evidence. 20 EXAMINATION 21 BY EXAMINER CATANACH: 22 23 Mr. Bauer, on the No. 20 well, how far did 24 you drill that well? To a total vertical section of 3623. 25 Α.

Measured depth was approximately 7000 to 8000 feet, 2 7798, in fact. Q. Was that about what you had proposed to do 3 on that well? 4 5 Α. Yes, it was. And you propose to take these wells about 6 7 the same distance? That's correct. 8 Α. 9 Q. I believe the previous testimony was that the wellbore should traverse five, 40-acre units; is 10 that correct? 11 Α. That's correct. 12 Each well? 13 0. Each well. 14 Α. EXAMINER CATANACH: I have nothing further, 15 16 Mr. Kellahin. MR. KELLAHIN: That concludes our 17 presentation in these cases, Mr. Examiner. 18 EXAMINER CATANACH: Okay. There being 19 nothing further, Cases 10843 and 844 will be taken 20 under advisement. 21 22 23 24 25

CERTIFICATE OF REPORTER 1 2 STATE OF NEW MEXICO 3) ss. 4 COUNTY OF SANTA FE 5 I, Deborah O'Bine, Certified Shorthand 6 7 Reporter and Notary Public, HEREBY CERTIFY that I 8 caused my notes to be transcribed under my personal supervision, and that the foregoing transcript is a 9 true and accurate record of the proceedings of said 10 11 hearing. I FURTHER CERTIFY that I am not a relative 12 or employee of any of the parties or attorneys 13 involved in this matter and that I have no personal 14 interest in the final disposition of this matter. 15 WITNESS MY HAND AND SEAL, October 16, 1993. 16 17 18 DEBORAH O'BINE 19 CCR No. 63 20 OFFICIAL SEAL I do hereby certify that the foregoing is **Deborah** O'Bine a complete record of the proceedings (1) the Lucinium hearing of Case No/OP43,10000 21 heard by me on Of 22 23 Off Conservation Division 24