STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

APPLICATION OF MERIDIAN OIL, INC.

CASE NO. 11,089

ORIGINAL

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: DAVID R. CATANACH, Hearing Examiner

November 10th, 1994

Santa Fe, New Mexico

This matter came on for hearing before the Oil Conservation Division on Thursday, November 10th, 1994, at Morgan Hall, State Land Office Building, 310 Old Santa Fe Trail, Santa Fe, New Mexico, before Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

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STEVEN T. BRENNER, CCR
(505) 989-9317

I N D E X

November 10th, 1994
Examiner Hearing
CASE NO. 11,089

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A P P E A R A N C E S

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* * *

ALSO PRESENT:

SHERRI THOMPSON
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(Continued...)

A P P E A R A N C E S (Continued)

ALSO PRESENT:

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KEN YOUNG
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* * *

WHEREUPON, the following proceedings were had at 12:37 p.m.:

EXAMINER CATANACH: We'll call the hearing back to order at this time, and at this time we'll call Case 11,089.

MR. CARROLL: Application of Meridian Oil, Inc., to contract the vertical limits of the Barker Creek-Paradox (Pennsylvanian) Pool, the amendment of Division Order Number R-46, and the concomitant creation of three gas pools, each with special rules and regulations therefor, San Juan County, New Mexico.

EXAMINER CATANACH: Are there appearances in this case?

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

EXAMINER CATANACH: Additional appearances?

MR. VAUGHN: Mr. Examiner, let me leave this with you. I don't have a card.

EXAMINER CATANACH: Okay.

MR. VAUGHN: My name is Grant Vaughn. I'm Acting Field Solicitor for the US Department of the Interior here in the Santa Fe field office.

I have with me today Sherri Thompson, Petroleum Engineer, Colorado BLM State Office; Kent Hoffman,

Supervisory Geologist, San Juan Resource Area, BLM, out of Durango, Colorado; and Mr. Ken Young, Petroleum Engineer with the Albuquerque Office, Bureau of Indian Affairs.

Our reason for being here is to make a preliminary statement and then to observe the proceeding today. If you'd like that statement now or --

EXAMINER CATANACH: Yeah, that would be fine.

MR. VAUGHN: Okay, thank you.

I'm here at the request of the Bureau of Land Management and the Regional Solicitor for the Southwest Region.

We make this appearance to assert that the State of New Mexico and this board do not have the authority to render a final decision in this matter here before it today.

Federal law is very clear that operation of oil and gas leases on Indian lands are subject to the ultimate jurisdiction of the Secretary of the Interior.

The Indian Minerals Leasing Act states, All operations under any oil, gas or other mineral lease issued pursuant to the terms of these sections or any other act affecting restricted Indian lands shall be subject to the rules and regulations promulgated by the Secretary of the Interior. In the discretion of the said Secretary, any lease for oil or gas issued under the provisions of these

sections shall be made subject to the terms of any reasonable cooperative unit or other plan approved or prescribed by said Secretary, prior or subsequent to the issuance of any such lease which involves the development or production of oil or gas from land covered by such lease.

That's 25 United States Code, Section 396, small d.

Regulations pursuant to this authority issued by the Secretary state, Oil and gas leases issued under the provisions of the regulations in this part shall be subject to imposition by the Secretary of the Interior of such restrictions as to time or times for the drilling of wells and as to the production from any well or wells as in his judgment may be necessary for or proper. The Secretary may take into consideration, among other things, the federal laws, the state laws, regulations by the competent federal or state authorities, lawful agreements among operators regulating either drilling or production or both, and any regulatory action desired by tribal authorities. All such leases shall be subject to any cooperative or unit development plan affecting the lease plans that may be required by the Secretary, but no lease shall be included in any cooperative or unit plan without prior approval of the Secretary of the Interior and consent of the Indian

tribe affected.

That's 25 CFR Section 211.21.

The federal courts have sustained these principles in *Cheyenne Arapaho tribes of Oklahoma v. United States* -- that's 966 F. 2nd, 583, 10th Circuit case from 1992; *Assiniboin and Sioux Tribes v. Board of Oil and Gas Conservation*, 792 F. 2nd 782, 9th Circuit, 1986; and *Kenai Oil and Gas v. Interior*, 671 F. 2nd 383, 10th Circuit, 1982.

The *Assiniboin and Sioux* case out of Fort Peck is of interest, because it holds that the Department may not delegate its decision-making responsibility with regard to Indian oil and gas to the states. However, the decision recognizes that the Department may properly cooperate with state agencies to create a record through evidentiary hearings or other consultations.

In the language of the court, quote, We do not suggest that cooperation, including possibly limited subdelegation by the Secretary to the state board of nondiscretionary activities, such as compiling, hearing and transmitting technical information, might not be permissible and desirable.

That's 792 F. 2nd at 795.

The reason why the Department may not fully delegate decision-making authority to the state is simply

that the Department acts as trustee for the Indian tribe and must take into consideration factors other than the usual technical information that state oil and gas boards are usually concerned with.

Principally, the Department must give careful consideration to the views of the tribe in reviewing economic factors affecting the tribe and the resource. And I refer you to the Kenai Oil and Cheyenne Arapaho cases for those principles.

We note that the BLM has proposed an arrangement which we understand now has been favorably received by the Commission, that we're willing to cooperate with this board in fact-finding hearings such as this today, and that is why we're here. The BLM is very pleased to have you conduct this technical review today.

But what we request is that after this hearing is over, that the board and the Applicant recognize that a final decision will be made by the Department of the Interior.

And in that regard, we request copies of the exhibits and hearing transcripts that are produced out of this proceeding today. And that information should be forwarded to Mr. Hoffman, and we can provide you with that address and the location of his office as necessary.

Thank you, that's all we have to say at this

time.

MR. CARROLL: So Mr. Vaughn, you have no objection to us going forward with the hearing?

MR. VAUGHN: No, we have no objection. We have our BLM decision-makers here who, as necessary, would like to supplement the record with any questions they may have, but they can direct through me if that's how you prefer to proceed on any of this technical information that's here today. But they're very willing to hear any additional information from Meridian in the next short time that we have to make this final decision.

(Off the record)

MR. CARROLL: Mr. Vaughn, we'd like you to address the possible conflict between OCD's mandate of prevention of waste and protection of correlative rights versus what you may consider the Department of the Interior's interest in protecting, I guess, Indian oil and gas reserves.

MR. VAUGHN: Well, in the first place, I don't -- It's all hypothetical, because we don't know if there would be such a conflict in this case or any other.

All our position is, is that we need to make a final determination based on the findings and recommendations and decisions of this hearing, plus the additional considerations we need to make with the input of

the Ute Mountain Ute Tribe.

All I'm saying is that it's speculative. I don't know how it would be resolved. We may stand on our federal rights, and you can stand on your state rights and see how that works out in the long run.

But I don't think it's necessary to speculate on a conflict when we do not have one as of yet.

MR. CARROLL: So you have no thoughts on what would happen if our decision is based upon prevention of waste, protection of correlative rights, and the Ute Mountain Tribe disagreed with that decision, saying it's in the best interests of the Tribe to find differently?

MR. VAUGHN: Well once again, it's based on pure speculation, but the federal government interest is also to avoid waste. As trustee, we have to avoid waste of the resource of the Indian tribe.

The views of the Tribe are to be considered. They're not the final determination here, just as we believe this board is not the final determination. The Department as trustee has to make that responsibility.

And the reason why, the importance of why we're here and why I cited those cases, because those cases clearly point out that the US Department of the Interior is liable to the tribes in breach of trust if they fail to make an appropriate decision.

An appropriate decision is not necessarily a decision that's right or wrong; it's an appropriate decision that takes into consideration all the appropriate considerations. We're looking at an arbitrary and capricious standard.

So I'm sure there could be a lot of factual disputes and argument as to what constitutes waste and what doesn't, what's the best evidence and what's not, and all those kinds of things. But the important thing for the Department is that we're fully informed to make a reasonable and rational decision.

And we're not anticipating conflicts. We want to get along with both the State and the Tribe, and that's the reason why we're here today, to cooperate in this proceeding.

MR. CARROLL: Okay, Mr. Vaughn, I'll call the office and have somebody run over here with the letter we responded to Mr. Strunk.

MR. VAUGHN: We'd appreciate that, that's great.

MR. CARROLL: I wish I would have remembered it.

MR. KELLAHIN: We have that here.

MR. CARROLL: Oh, you have a copy of it?

MR. KELLAHIN: Sure, you gave me one the other day. Is that the one you're talking about?

MR. CARROLL: Yeah.

MR. KELLAHIN: Yes, sir, we have it.

MR. CARROLL: Do you have an extra copy?

MR. KELLAHIN: Yes, sir, we fully intend to show you all those letters.

MR. CARROLL: Okay.

EXAMINER CATANACH: Mr. Kellahin, do you have any kind of statement you'd like to make?

MR. KELLAHIN: I didn't think you'd ever ask me, Mr. Examiner. I didn't think I'd ever be asked.

I'm certainly not here to debate jurisdiction nor to concede any of the points or concerns that Mr. Vaughn has raised with you. I think we have an incredibly useful, very meaningful process that the Oil Conservation Division has in place by which all these agencies can listen, learn and participate in the technical process by which they can make their own decisions.

Our concern as an operator is that the federal government will stand on its federal jurisdiction, the Native American Indian will stand on its tribal jurisdiction, and the State of New Mexico will be standing on its state jurisdiction, and we're afraid they're all going to be standing on Meridian Oil, and we don't want you standing on our neck.

And we think the way to accommodate that potential concern without resolving all these jurisdiction

issues is to use this very process.

I think it was best stated in the letter that was sent to Director LeMay, dated October 20th, by David Strunk, who I understand is the Deputy State Director, Bureau of Land Management, in the Colorado State Office. We have these letters available. You can read them in detail.

But let me simply paraphrase a couple of the articles out of -- paragraphs out of the letter that conveyed to me my personal sense of how this process certainly can work.

And he begins by saying, For many years there has been a spirit of cooperation, communication and trust between the New Mexico Oil Conservation Division and the Colorado Bureau of Land Management in the management of the Ute Mountain Ute tribal lands and the State of New Mexico in the development of our Nation's oil and gas resources. Each agency's mission and staffing levels have grown during these years to the point where we believe it is important to formalize our excellent working relationships, as well as define each agency's role and responsibilities. It is important to provide the oil and gas lessee and operator with consistent policy and procedures on the Ute Mountain Ute tribal lands.

It goes on to say that the BLM would like to use

the State Commission's hearing process so as not to duplicate the effort and costs of a separate hearing process to accommodate the industry's familiarity with the existing process, and we would appreciate the NMOCD's input to achieve consistency across jurisdictional boundaries.

It says, This course of action is useful to the BLM in its review of oil and gas development decisions on tribal lands, and it provides a more efficient and lower-cost option than formulating and implementing a hearing process of our own, and it is also less confusing to the oil and gas industry.

And that's what we hope to accomplish here, is a forum where there is technical people involved, technical decision-makers that are here to listen to the presentation, to ask questions, and to participate in a process that develops a record that's useful for all of us, and so that we don't have to go from jurisdiction to jurisdiction with individual presentations. The opportunity for consistency and uniformity is important to us.

We are principally here today to persuade this agency that in order to prevent waste and protect correlative rights there are some very fundamental and important changes that must be made in one of the pools that you have managed for some 50 years with the

acquiescence, consent and concurrence of the federal and tribal jurisdictions, and so we're ready to proceed on that point.

As a matter of information, we have not forecasted the participation of all these people. We have brought 12 sets of our exhibits, and we will hand them out till we don't have any more, and if there's someone that wants some more, if they'll just give me the name and mailing address, we'll assure you that you can all have copies of whatever we present.

MR. CARROLL: One preliminary matter here. In the letter from Mr. Strunk it said the BLM would issue an order within 30 days after this hearing, after receiving the Examiner's recommendation.

That might be cutting the time pretty short for getting our Examiner's recommendation. Sometimes -- We try to get it out 30 days after the transcript is received.

MR. VAUGHN: Well, that 30 days is after your final action is completed; am I right?

MR. CARROLL: The letter said after the hearing.

MR. VAUGHN: Well, the intent, I believe, was to --

MR. CARROLL: Thirty days after this decision.

MR. VAUGHN: -- thirty days after your determination is made.

MR. CARROLL: Okay. Well, that clears that up.

MR. VAUGHN: And so we'll state that on the record.

EXAMINER CATANACH: Well, there's a question in my mind about -- we usually -- In a situation like this, we will usually issue an order that has our decision in it.

I don't know if we're going to stay with that process and issue a formal decision or we're just going to make recommendations. I don't know what we're going to do about that yet, but that has to be addressed sometime --

MR. VAUGHN: It does, and I'm glad that we've got a dialogue going. I'm glad that you responded favorably to that letter. It would be best, of course, if we had everything formally put in place already, but I think we're all in agreement that we can make this work. And whatever you do in your final action is -- will be respected by the Department and will form the principal basis of our decision, because it will have the technical findings and review.

EXAMINER CATANACH: Okay, that's something that's going to have to be addressed internally within our Division to see how we're going to handle it.

MR. VAUGHN: Okay.

EXAMINER CATANACH: Are we ready to proceed at that? Mr. Kellahin?

MR. KELLAHIN: We are, Mr. Examiner. I have three witnesses to be sworn.

EXAMINER CATANACH: Will the witnesses please stand and be sworn in?

(Thereupon, the witnesses were sworn.)

MR. KELLAHIN: Mr. Examiner, by way of introduction, we have a series of exhibits that are organized in a smaller handout exhibit book. We've also chosen to take key exhibits and to make larger copies of those.

In addition, there are large copy displayed exhibits that, if reduced to put in a little book, are no longer legible or meaningful.

So as we go through the presentation exhibits, I want you to know that we have pre-numbered the ones in the book.

The larger ones have the identification for the exhibits but are unnumbered, and we may have to present them to you out of sequence in order that you see all the parts. But that's how we have organized the exhibits.

We have distributed to you copies of some of the larger ones already. I have extra copies on the table, and as we discuss those exhibits I will hand them out. That may be the most expedient way to go about that.

First of all, let me circulate the smaller

booklets so that at least we have distributed those.

Again, I apologize for not quite having enough. If we're short --

MR. VAUGHN: We're fine.

MR. KELLAHIN: -- and you need extras, call me and we'll get you some.

Mr. Examiner, my first witness to present to you is Mr. Jim Hornbeck. He spells his last name H-o-r-n-b-e-c-k. Mr. Hornbeck is a petroleum geologist residing in Farmington, New Mexico.

JAMES M. HORNBECK,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. For the record, sir, would you please state your name and occupation?

A. My name is Jim Hornbeck, and I'm a petroleum geologist with Meridian Oil in Farmington, New Mexico.

Q. On prior occasions, sir, have you testified before this regulatory body as a qualified expert witness in the field of petroleum geology?

A. Yes, I have.

Q. Summarize for us, if you will, what has been your particular involvement on behalf of your company within

your profession for this particular case.

A. I am the project geologist for the Barker Dome field project.

Q. Are there other members of your project team besides yourself that worked on this project?

A. Yes, there are.

Q. Identify them for me, please.

A. I have two in the audience: Mr. Chip Lane, the reservoir engineer; and Mr. Dean Price, the project landman.

Q. As a result of that combined effort by you technical individuals, have you come up to some recommendations with regards to how to future manage the regulatory rules with regards to production out of what is now known as the Barker Creek-Paradox (Pennsylvanian) Gas Pool?

A. Yes, we have.

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

EXAMINER CATANACH: Mr. Hornbeck, for the benefit of the parties here, could you briefly go over your educational background?

THE WITNESS: I have a bachelor of science degree in geology from Long Island University. I have a master of science --

Q. (By Mr. Kellahin) In what year did you obtain it? These are tough, Jim, I know. I'm sorry.

A. Going back a ways here. I believe it was 1973. And I have a master's of science from the University of New York, State University of New York, in geology in 1976, and I have been working in the petroleum industry for a variety of companies since that time, predominantly in the San Juan Basin and Paradox Basin of southeastern Utah and northwestern New Mexico.

EXAMINER CATANACH: Thank you, Mr. Hornbeck.

The witness is considered qualified.

Q. (By Mr. Kellahin) I think it may be useful, Mr. Hornbeck, if we'll go to the small exhibit book. Help me find the locator map that shows us what part of the San Juan Basin that you're focusing our attention to. Is there such a display?

A. Yes, there is. Exhibit 2 is --

Q. All right, let's turn to Exhibit Tab 2 and turn behind that tab, and there's a display. Is that what you're talking about?

A. Yes, I am.

Q. All right. What's the source of this document?

A. This is a structural map of the northwestern New Mexico San Juan Basin and southern Colorado. It is a professionally prepared structure map from a technical

journal, and it is a structure map on the base of the Greenhorn, which is a very good structural datum for mapping in the northwestern New Mexico area.

And from that map it's possible to note -- to see that the Barker Creek Dome field is located along the Colorado-New Mexico border. It is about 30 miles northwest of Farmington, New Mexico and is located outside the proper San Juan -- structural San Juan Basin, and is located in an area referred to as the Four Corners Platform.

Q. Is this a geologic map that's generally utilized and relied upon by geologic experts within this particular area and portion of Colorado and New Mexico?

A. Yes, it is.

Q. Okay. What's the point?

A. The point is to locate for the audience and the Examiner where Barker Creek Dome field is and its position with relationship to the State of -- the northwestern area of New Mexico.

Q. All right, sir. Do you have another locator map that will give us the current horizontal boundaries of the existing pool and show the location of wells that currently produce out of that pool?

A. We do, it's a larger wall exhibit.

Q. All right, and you characterized it with the type log?

A. That's correct.

Q. Hang on, don't talk.

What's our last exhibit number?

A. Eight.

MR. KELLAHIN: All right, this will be Number 9.

Did you get one of these already?

EXAMINER CATANACH: I believe they already have been distributed up there.

Q. (By Mr. Kellahin) All right. For purposes of the record, Mr. Hornbeck, I'm taking what you've identified as a structure map on top of the Barker Creek.

A. Yes.

Q. It's a large-scale display, and I'm going to mark that as Meridian Exhibit 9.

All right. Before we discuss the technical details, help us understand how you've color-coded the display.

A. This display is an intent to visualize our proposed pool area within the State of New Mexico for the Barker Creek pools.

There is a structure map drawn on the top of the Barker Creek, which is a -- one of the pay intervals within the Barker Creek producing field, and on it are located all existing Pennsylvanian tests that have been drilled from the discovery of the pool back in 1945 to the present time.

Q. All right, let me stop you there. The green line represents your proposed boundary for all the pools?

A. That is correct.

Q. This proposed boundary is not consistent with the current pool boundary for the Barker Creek-Paradox (Pennsylvanian) Pool?

A. That is correct.

Q. All right. Let's look to see what the current boundary is for the pool. If you'll look behind Exhibit Tab Number 3 in the little book, that display has got some information on it other than what I'm describing for you, but is there a color code on Exhibit 3 that will show the Examiner what the current boundary is for the existing pool?

A. Yes, if you look down in the lower left-hand corner of the exhibit, there is a legend which shows the current pool boundary as a dotted and dashed outline, and then the proposed pool boundary directly underneath it in the legend is a solid red line, and the two are compared on that map.

Q. All right, let's stay on this topic.

Are you recommending to the Examiner that if he agrees to subdivide the existing pool, that the original pool, as contracted, plus the new pools created out of the subdivision, should have a boundary for pool purposes that

is concomitant with the green line shown on Exhibit 9?

A. That is correct. The green line on that larger scale map and the proposed pool boundary in the smaller exhibit are the same.

Q. Okay, let's talk about why. Geologically, is there anything on Exhibit 9 that causes you to reach a geologic conclusion about the appropriate horizontal boundaries, if you will, by which to establish rules for all these pools?

A. Yes, we believe there are.

The structural interpretation of that map leads to a double -- an anticlinal closure that was originally developed in the early 1940s and 1950s, testing the structural area under closure on approximately eight or ten miles, square miles, of closure, and the productive zones are developed in a relationship structurally with the area under closure.

And we feel that that area that is being proposed for the pool area right now will allow us to effectively delineate and explore along the closure for additional oil and gas reserves.

Q. Is there a label that you geologists put on this kind of creature? What do you call this thing?

A. It would be a doubly plunging anticline or a structural dome.

Q. Easy for you to say.

A. Dome.

Q. Dome. All right. So on the New Mexico side of this feature, you're proposing that all these pool rules cover the surface acreage that you've identified on this display?

A. That is our recommendation, yes, sir.

Q. All right. On the Colorado side of this, just for point of information, are there rules that deal with any of these various intervals in the Pennsylvanian?

A. Yes, there are.

Q. Do you know from memory what they were doing in Colorado about spacing?

A. It is 640-acre spacing --

Q. All right.

A. -- for all those zones.

Q. Okay. Is it appropriate, do you think as a geologist, that the boundaries should be the same for all these pools if the Division agrees to subdivide the original pool?

A. Based on their relationship to the structural closure on the dome, I think it's a reasonable interpretation.

Q. Will that provide uniformity and consistency to these various intervals so that they'll have the same set

of rules, regardless of where the well may be within the structural feature?

A. Yes.

Q. We're going to come back to this display in a minute, but let's now look at the vertical picture.

Do you have a display that we can go to and help the Examiner and the audience see what the opportunities are for subdividing the Pennsylvanian and then looking at what your recommendations are?

A. I would like to have everyone turn to the exhibit behind Tab Exhibit 6.

Q. Okay.

A. This is a stratigraphic cross-section relating the older existing 1950s vintage electrical wireline log control, which is the majority of the well log information in the New Mexico portion of the field.

Q. All right, let's take a little detour, Mr. Hornbeck.

A. Okay.

Q. When you look at the vintage of the log data in the existing pool, what kind of vintage are we talking about?

A. Well, for the most part, the majority of the data is early 19- -- well, middle to late 1940s and early 1950s. You have old SP and resistivity logs, and if we're lucky a

gamma-ray.

Q. So what's the problem?

A. We don't really have a good understanding of the thickness and development of porosity within the particular zones, unless we have a new, modern set of wireline logs.

Q. Log quality, then, is not as sophisticated as it is now, and therefore you can't use those old logs to the degree that you can use new logs for analytical purposes?

A. That is correct.

Q. What did you do?

A. We utilized the available data from the original drilling files to try and understand the nature and thickness of pays within the field, looking at cuttings descriptions, any available core descriptions, which were very limited. There's one core -- or maybe perhaps two cores in New Mexico when the field was developed.

Q. Any modern geologic data that you could utilize?

A. We utilized some cased-hole modern gamma-rays when we re-entered inactive wells, and that is about the sum of the data we had to call on for interpretation purposes.

Q. So then what did you do?

A. Well, we correlated the intervals as best we could with the data we have, and we're integrating the modern well control as we acquire it.

Q. Do you have a point of modern well control that exists by which to aid you in making this correlation?

A. Yes, we do, and --

Q. And where is that well?

A. The well we have used for the correlation purposes is a well just north of the New Mexico border, and I believe it's in Section 22 of La Plata County, in 32 North, 13 1/2 West.

Q. All right. And if we're looking at Exhibit 6, if we look at the log on the right-hand side of Exhibit 6, that's it?

A. That's correct.

Q. Okay. Let's use that log for a moment.

A. Okay.

Q. Take that log for me and geologically subdivide the Pennsylvanian into the separate sources of common supply within the Pennsylvanian.

A. What we found with modern wireline logs -- in particular, porosity, neutron porosity and density wireline log control -- is that there are a series of intervals with varying limestone/dolomite make-ups in which some of the zones are more porous and permeable and are interpreted as gas-productive, separated vertically by very thick intervals of impermeable shales, anhydrites and, in some cases, tight limestones.

Q. Before we go through that detailed discussion, tell us where the primarily producing interval has been among the Pennsylvanian intervals for all the historic production out of the pool.

A. Originally when the structure was tested and gas was found productive within the Pennsylvanian Paradox formation, all wells on the structure were drilled to test and were completed in what is called the Lower Barker Creek.

Q. How is that color-coded on your Exhibit 6?

A. It is a salmon-pink color, and it's also noted on the side by the stratigraphic nomenclature. And that is the zone in the field that has to date produced the majority of gas, and it's right now at about 230 billion cubic feet of gas, since production was initiated back in 1945.

Q. This regulatory body, under an order from the Oil Conservation Commission dated November 21st, 1950, Order Number R-46, established some pool rules for this entire Pennsylvanian series of reservoirs, did it not?

A. That is correct.

Q. What were the rules?

A. The rules were, a well could be drilled on 640-acre spacing, one well on 640-acre spacing, completed in a Paradox-defined pool, which included everything from -- on

this cross-section, from the top of the Ismay to the bottom of the Alkali Gulch.

Q. Did it provide for well locations within a section or spacing unit?

A. Yes, it did.

Q. And what were those locations?

A. There's an exhibit I'll need to refer to, to make sure I get this correct, and I hope it's in here.

Q. If it's not, I'm holding it.

A. Would you help me out, please --

Q. Sure.

A. -- and tell me what that spacing is?

Q. May I approach the witness, Mr. Examiner?

A. Thank you. I'm going to read from the original gas pool determination: For those pools appearing to require 640-acre spacing in the Pennsylvanian formation, orthodox locations should be required to be no closer than 330 feet to the center and 1650 feet from the boundary of each section in the Barker Creek Paradox (Pennsylvanian) Pool.

Q. All right. Let's look at your Exhibit 4 now.

A. Okay.

Q. What does that show you?

A. There are a series of -- There are four exhibits included in there.

Q. Find me the one that shows me the well spacing pattern under the current rules if I'm stuck with 640 gas spacing and these footage setbacks.

A. It is -- I believe it's the first of the four behind Tab Number 4, Exhibit Number 4.

Q. All right, that's what we have for the current rules. That's well locations plus the proration spacing unit dedication of 640?

A. Right.

Q. All right?

A. Yes, sir.

Q. How long did those rules stay in place?

A. They are still in place, to this day.

Q. So what's wrong with them?

A. They are an encumbrance, based on some certain physical aspects of the topography of the area where the field is located and the very special considerations for archeological sites within the area. It has become very difficult for Meridian Oil to space wells within this existing spacing resolution that we have right now.

Q. The well-location problems are significant because the restrictions on locations are too severe for the topography and the archeological limitations?

A. Well, we feel it would benefit all parties if we would have a little bit more flexibility in trying to stake

new well locations.

Q. All right, we're going to come back to that later.

When you look at 640 gas spacing, what's wrong with that?

A. Nothing, if -- depending on what reservoir you're talking about.

Q. Well, shouldn't we keep the entire Pennsylvanian as one pool?

A. No, based on the work that we have done, looking at the producing horizons in the Barker Dome field, we've found that there are variations in reservoir quality, depending on which zone we are looking at evaluating, which would not be effectively -- the gas would not be effectively drained, based on a blanket 640-acre spacing regulation.

Q. Well, I don't understand. Why can't you take these wellbores depleted out of a lower zone and, once depleted, move up to another portion of these intervals in the same gross pool?

A. Well, based on the comment I made before about the modern wireline log on the Ute 16, we've found that there are vertical permeability barriers to the other distinct zones and the porosity developed within them, in that they are still at higher normal pressures, virgin

pressures, which are undepleted, and the existing pressure in the main producing horizon, the Lower Barker Creek, has been depleted down to approximately half of its original pressure.

So we're looking at trying to commingle new zones at about 3400 pounds pressure with old zones that have been completed down to approximately 1500 pounds of pressure.

Q. What's the approximate date of the last vertical well to be drilled in this pool?

A. In the pool itself we have been actively developing in the past year, and we have just completed a program in which we probably -- I'd say the middle of September was our last drilled well in the pool.

Q. All right. Before you started that program, how long a period had elapsed between starting that program and the last vertical well drilled?

A. If what you're asking me is how long before we started our delineation and additional drilling to try and identify additional remaining reserves, it was probably on the course of between 35 and 40 years.

Q. Was there anything about these existing rules that was an impediment to further exploration and development of this resource?

A. It was an impediment to some of our additional evaluation of these shallower zones.

Q. Let's go back to the subdivisions. When we look at Exhibit 6, staying with the Ute 16 log -- and you can either start at the bottom or start at the top, but let's start and have you geologically show me your conclusion and the reasons for identifying however many separate sources of supply as you've concluded are contained within the current pool limits.

A. We believe, based on the work with the older geologic information we had to work with originally and the modern wireline logs to help us support that interpretation with stratigraphic correlations, that we have found an Ismay zone which is separate from the Lower Barker Creek productive interval, a Desert Creek interval which holds promise with the porosity developed in it, an Upper Barker Creek, and an Alkali Gulch interval that all have separate different sources of supply of gas across the structure as mapped on the wall exhibit, which is Exhibit Number 9.

Q. All right. Did you get me to the bottom?

A. Yes, I did.

Q. All right. Let's start with the top pool.

A. All right.

Q. When you look at the data available -- We've got the X-X' cross-section; I think that's a useful display to go to. How is that identified for us in the book?

A. There is a locator map for stratigraphic cross-

section X-X', which is Exhibit 5.

Q. Did you reduce the cross-section to a small display in the book?

A. No, I did not.

Q. All right. Let me hand out the cross-sections, then.

A. That will be Exhibit 10.

Q. Ten, cross-section, 10. We're going to work our way to Exhibit 10?

A. Yes, we are.

Q. But let's finish with Exhibit 6 so we don't lose anybody.

A. Okay.

Q. Back to Exhibit 6, you've taken the Ute 16 log, which is a modern, high-quality log --

A. That's right.

Q. -- you've analyzed it, and you have found your separate reservoirs, if you will.

A. Yes, sir.

Q. What then did you do to integrate it back into the existing pool in New Mexico?

A. What I attempted to do, based on the existing older wireline logs and cutting descriptions and core data and whatever we could find to utilize, was, we tried to correlate the modern wireline log zones back into the older

electrical log responses, as shown in the Ute 6, and that relationship between the Ute 16 and the Ute 6 is indicated or pointed out on Exhibit 9 on the wall, the structure map.

This shows the spatial relationship between the type log, the Ute 6 log, which we're going to propose our pools on, and then the red line tying it to the Ute 6, along the northwest flank of the structure, down in the proposed pool area in New Mexico.

And what it does is, it allows us, along with the other wall exhibit, cross-section -- stratigraphic cross-section X-X', is to tie all the wireline log control or most of the wireline log control within the proposed pool area and delineate the zones across the feature in New Mexico and show the lateral continuity of those zones.

And all I wanted to also point out on Exhibit 6 before we leave it is that based on the neutron density responses on the Ute 16 log, it is possible to delineate the tighter permeability barriers to vertical migration of gas between the zones.

Q. Well, let's do that.

A. All right, that's fine.

Q. Start at the top and show me these barriers to vertical flow that separate these out into separate reservoirs.

A. Okay, starting at the top of the Ute 16 in the

Ismay, there's a tight and impermeable shale section of approximately 50 feet, at which -- the base of it is the base of the interpreted Ismay stratigraphic interval.

In the Desert Creek we have an interval that is for the most part tight and impermeable, and it has a thickness of over -- right at 100 feet, and that is mostly tight dolomites and some shales.

The Akah interval, which is not colored here, is a series of evaporites, including anhydrite, nonporous dolomite and shales, and it separates the Desert Creek from the Barker Creek, which we have broken out from correlations across the field between upper and lower.

Within the Upper Barker Creek, there are various tight limestones and dolomites with very few stringers of porosity interspersed within it.

The high-porosity main producer in the field, the Lower Barker Creek, is in pink on the Ute 16 wireline log, and you can see there are some porosity responses with deflections to the left, indicating porosity in about 40 foot of interval. But then there's about 30 or 40 feet of tight limestone and dolomite underlying it from the Alkali Gulch.

And then finally in the Alkali Gulch, there's a series of tight and impermeable limestones and dolomite separating out the one particular zone that has been

perforated and is productive, and it is down at about 8360 feet.

And then we're back into tight, nonporous impermeable shales and dolomites.

Q. Okay.

A. And we have a larger scale log which might also lend itself to --

Q. Yeah, we can come to that in a second.

All right, now make the correlation from the Ute 16 log to the Ute 6.

A. Okay, in trying to correlate and tie in the modern wireline log control to the older existing electrical logs, you can correlate in as we have done, or I have done on this type -- on this cross-section.

And that gives you a tie to all the old, existing electrical wireline control in the New Mexico proposed pool. And that locator -- Or that allows you to correlate across the entire proposed pool area with the existing well control, as is shown in Exhibit 5, in which we have shown the outline of the proposed pool area, and then the cross-section as it is -- cross-section X-X' on the wall here, Exhibit 10, which links all the stratigraphic intervals across the proposed pool area.

And those are the wireline logs and the zones as mapped based on the existing control that we have.

Q. Are you satisfied that you have successfully and accurately used this method and properly correlated all the logs within the existing pool?

A. I feel we have done the best job we can, yes, sir.

Q. All right. Do you believe that there is sufficient quality of correlation that you can reach geologic conclusions about the continuity or lack of continuity of those individual reservoirs, as they are identified throughout the pool?

A. Based on the wireline control, one well per mile, we feel confident that that is the stratigraphic relationship across that portion of the structure.

Q. Let's go now to Exhibit 10, which is the X-X' cross-section. You said Exhibit 5 is the locator index to show the Examiner that you've attempted to connect virtually all of the wells in some fashion so that he would have them displayed before him.

A. Yeah, stratigraphic cross-section X-X' is merely an attempt to show the correlations from well to well in a southwest-northeasterly direction along the axis of the structure and ties the majority of the wells across the New Mexico portion of the field.

And it shows that there are some mappable units that can be correlated and interpreted to show the zones

across the New Mexico portion of the field.

Q. One of the concerns the Examiner is going to have is that in exercising his conservation obligations, he wants to deal with pools that can be identified horizontally to be continuous over a certain defined area.

When we look at your proposed pool area, can you reach any geologic conclusions about the continuity of each and every one of these zones?

A. Yes, they are definitely definable across the proposed pool area. As we get more modern wireline control in the area, it will become easier to identify them and make sure they are truly laterally continuous as we have interpreted from the existing well control.

And I think that we are close to as accurate as we can be with the correlation using the sample descriptions, existing core data and existing wireline logs.

Q. Let me put it to you this way: Are you aware of any geologic data that is contrary to and inconsistent with the conclusions you've reached?

A. I am not.

Q. All right. You've identified geologically six separate identifiable intervals, each separated one from another.

A. (Nods)

Q. All right?

A. Yes, sir.

Q. Show us what you have concluded to be an appropriate organization of those intervals into separate pools.

A. All right.

Q. You've got more intervals than you have pools?

A. That is correct.

Q. Show us what you did and how you got that conclusion.

A. In order to do that, it would be necessary to go to the proposed pool revision rules and the type log that is hanging on the wall here, which I believe we'll call Exhibit 11.

Q. Let's do that.

A. Okay.

Q. All right, we've got the little Exhibit 6 as a reference. We're now looking at the big display, Exhibit 11, which is your type log.

Take us through your analysis of how you're proposing to subdivide the existing pool into what will now be four pools, the contraction of the original one and the creation of three more, for a total of four.

A. What we have attempted to do -- and I'll be speaking from the Exhibits 11, which is a larger-scale type

log of the Ute 16 with modern wireline control -- What we have tried to do is make the most logical division of productive intervals within the field to help us delineate additional opportunities and produce existing gas that is now not developed.

And what we propose to do in this field at the present time is to vertically contract the vertical limit of the existing pool, which at the present time includes all zones within the Paradox formation, to vertically contract that down, 640-acre spacing, to include both the Lower Barker Creek, which is already developed within the structural -- along the structure of the field, and include it with the Alkali Gulch pay zone and call that, now, the revised vertical limit of the Barker Creek Paradox Pool, and we'd like to maintain that on 640-acre spacing.

Q. All right. Let me stop you at that point and ask you for the rationale to do that.

A. Well, it's become apparent to us in operating the field that wells under existing 640-acre spacing completed in the Lower Barker Creek and the Alkali Gulch have been effectively drained on 640-acre spacing.

Current pressures are in the range of half the original pressure in that existing productive pool -- or interval. And we see no reason to try and infill for additional reserves since it looks like it has been

effectively drained on its present spacing.

Q. Do you have any geologic data or information to cause you to believe you should downspace that proposed lower pool?

A. Well, we have what we think is geologic information to the opposite. We think we should leave it alone.

We have some production information and some pressure information, like I said, that shows the depletion on existing spacing. And --

Q. All right. What's the argument to include the Lower Barker Creek and the Alkali -- is it? -- Gulch?

A. Alkali.

Q. -- and the Alkali Gulch portion? You've identified them as having slightly different geologic characteristics, if I believe -- I remember.

A. They are separated by some tight impermeable section. And the reason we'd like to keep them included in the same pool right now is, based on the development originally in the 1940s and 1950s of the Lower Barker Creek -- or the field on this structural -- the structure of the -- Based on the development of the structure of the field, they were at times along the development plan commingled and produced together.

And when they are produced like that, it's become

apparent that depletion has occurred in both zones. They're about at the same pressure and can be produced at the same -- in the same wellbore commingled, based on the 640-acre spacing.

Q. Is there any practical reason, then, to separate them into two different reservoirs?

A. No, we see none.

Q. All right. Let's go up and look at the next pool.

A. The next pool that we propose is the Upper Barker Creek-Akah Pool, and we would propose that that be allowed to be developed on 320-acre spacing.

Q. All right, sir. What's the reason to combine that interval into one pool?

A. Originally we had proposed to create a separate, single pool in the Upper Barker Creek, which is a porous dolomite, developed on the structure at Barker Dome.

We thought that, based on modern wireline logs we have looked at through the interval and some cuttings descriptions that we have, that it was not as good a quality reservoir as the Lower Barker Creek was in terms of permeability and porosity.

And the little bit of test data that we have on the zone showed us rates that were lower than the more prolific and better quality reservoir in the Lower Barker

Creek.

And so we proposed to develop it on 320-acre spacing to understand it better and optimize recoveries out of it.

In talking with our Aztec -- the Aztec office, Frank Chavez, the superintendent of the Aztec office, suggested to us that we include the Akah within this Upper Barker Creek-Akah Pool and allow that to be commingled as one separate pool.

Q. For the record, he's referring to Mr. Chavez, the supervisor at the OCD Office in Aztec.

Go ahead.

A. And it was his recommendation that we include the Akah with this pool so there would be no gap vertically within the definition of the pools on the structure.

Q. In terms of reservoir management and practice, do you see any reason not to do a combination?

A. No, it does not present a problem to us, and we feel that if any productive opportunities arise in the Akah zone, it would be of a poorer quality reservoir characteristic, and 320-acre spacing would probably be effective as a starting point for developing it.

Q. Is there currently any Akah production in the pool?

A. No, there is not. It's a series of evaporites,

shales and tight dolomites.

Q. So we don't have any technical data that would cause us to support creating that as its own separate pool at this point?

A. That's correct. That's originally why we left it out.

Q. All right. Okay, take us up to the Desert Creek.

A. In the Desert Creek we would like to recommend a development of a separate pool prorated on 320-acre spacing.

We have modern wireline log data, we have cored the interval in some recently drilled wells, and as our reservoir engineer, Mr. Lane, will point out and show in his testimony, based on some production information and volumetrics, that 320-acre spacing looks like a good, sound basis for developing the pool to identify its limits and productive potential. It's a finely intercrystalline dolomite.

Q. Okay. When you move out of the Desert Creek and look at the Ismay, characterize that as a reservoir for us.

A. The Ismay is the highest stratigraphic interval that we propose to create a pool in. We would like to see the ability to develop the Ismay on 160-acre spacing, because based on core that we have studied and wireline logs throughout the new drills that we've drilled, we find

that the Ismay is a limestone with predominantly vuggy porosity, which means it is a solution-enhanced porosity that is not very well interconnected in the reservoir and has lower permeability overall than any of the other reservoirs in the field.

And so it has a lot less effective drainage area, and that's our basis for asking for a 160-acre spacing in the Ismay.

Q. Okay. Let's go back to Exhibit 9, which we've been utilizing as a locator map. I'll give you another one if you don't have one.

Let's again use it as a locator map, and in the small book help me find the index for the wells. I believe it's behind Exhibit Tab Number 7.

A. It is.

Q. Let's go through that data.

A. Okay.

Q. Before we describe the data, show the Examiner how you've organized the well information behind Exhibit Tab Number 7.

A. Exhibit 7 is a table listing the existing tests drilled in the New Mexico portion of the Barker Creek Dome field. It's listed in chronological order, starting with the first drilled up to the last drilled. There are 11 wells that have been drilled in that -- for those pool area

to date.

And what it shows is the zone currently producing out of, where productive. If it was a dry hole, it's noted.

And we have one water disposal well located within this area of the pool, and it has been plugged back to the shallower Morrison formation.

In addition, there are acreage dedications, location where it is with respect to what section, and any comments that we thought would be relevant to the discussion.

Q. All right. Those are all the wells?

A. That's right.

Q. Let's go back and compare that information with the color code on Exhibit 9, starting off with the proposed uppermost pool, the Ismay pool.

A. All right.

Q. Identify for the Examiner which, if any, of these existing wells either are now or can be Ismay producers under this plan.

A. Currently in the field, in the New Mexico portion of the pool, there are two existing wells completed in the Ismay zone, and they are located here on the very eastern and central structural portion of the pool with regard to structural setting.

And the color code on the map is, purple circles are Ismay completions, blue are Desert Creek completions, and then the pink is Lower Barker Creek and Alkali Gulch commingled completions, or just Lower Barker Creek completions.

And what we see is, we have two Ismay completions at the current time producing. We have two blue Desert Creek completions off on the west flank of this structure. And then the remaining four that are pink are completed in the Lower Barker Creek and possibly commingled also with the Alkali Gulch.

I will point out that the two wells in Section 19 that are completed in the Lower Barker Creek, only one is actively producing at this time. It's the Ute 14 in the northeast of that section. And we are currently evaluating additional opportunities within the Ute 11 wellbore in order to see if we can recomplete it to another zone before plugging it completely as a dry hole.

Q. If you obtain the approvals to subdivide the Pennsylvanian and establish these multiple new pools, what kind of opportunity for additional wells is there created by that process?

A. There is significant opportunity created, which currently we cannot take advantage of as an operator.

Q. Let's talk about the immediate, foreseeable plans

that you're already scheduling in the hope that you obtain your approvals to reformulate the rules.

Can you give us a time reference and tell us within that time reference what your expectations are for new wells?

A. Well, we have gone out and currently staked five additional locations within the New Mexico portion of the field with the intent of being able to drill and develop additional drill blocks within that portion of the pool, if we get the spacing requests that we are asking for.

Q. Can you estimate for us the cost of each of those wells?

A. We have found wells drilled and completed in the Barker Creek Dome field have run us about $1.3 million apiece.

And these wells that we have -- The current staked locations are planned to be developed at any time the weather allows, although at this point it looks like we wouldn't start up until spring again at this time.

But we are at this time planning on developing those five additional staked locations in the early spring.

Q. Is Meridian the operator and/or the lessee of all the oil and gas rights to drill within the pool boundary that you propose?

A. Yes.

Q. We don't have any other operators within this pool as you propose to have it configured?

A. No.

Q. Let's go to the unique circumstances with regards to well spacing.

A. Okay.

Q. Do you have a display that will illustrate for us the various surfaces either topographical or archeological limitations that you're faced with as an operator in locating wells?

A. Yes, we do.

Q. All right, how is that shown?

A. Well, we have it here as an aerial photo, low-altitude aerial photo with an overlay showing the proposed pool outline.

Q. Do we have some extras of those?

A. We have one extra --

Q. One extra?

A. -- picture, so we'll have to orient this, perhaps, to the audience, if you --

Q. Yeah. Why don't you -- You've memorized this stuff, Jim, right?

A. Yeah.

Q. You don't need to look at it.

A. Well, I won't go that far.

Q. How good are your eyes?

A. That's good.

Q. First of all, before we describe the details, what's the base map? What's the source?

A. The base map is a Department of Transportation low-altitude aerial photo of the proposed pool area in New Mexico, in which -- I believe it was run by the El Paso Natural Gas Company several years back to locate pipelines and other production facilities in that area.

Q. Have you and other members of Meridian staff utilized this map?

A. Yes.

Q. Have you found it to be accurate and reliable?

A. Yes, I have.

Q. Do you find any distortion on the map that you need to explain to us?

A. No, I don't.

Q. Okay. What's the base map show? You know, is there a particular point in time that we're looking at the surface here?

A. It's probably about ten years old, I'm not sure. There might be a date printed on the bottom. I can't see it from here.

Q. All right.

A. I'll guess it's 1975 vintage, something like

that.

Q. All right. What is the significance of the orange boundary?

A. Well, the orange boundary is the same proposed pool outline as in all the other exhibits, and in addition the hot orange tape or fluorescent orange tape is the section lines, and so you can see it's quite a larger scale than any of the other presentations. It looks like it's about -- Several inches equals a mile.

Q. Have you identified the existing pool wells with a color code?

A. Yeah, there are some orange well, gas-well symbols, posting the existing well control at the current time on that aerial photo.

Q. And what are the significance of the red open circles?

A. The red open circles are proposed locations that we have staked and initiated approval through the regulatory agencies.

Q. Are these wells planned in the expectation in hope that there would be pool rule changes?

A. Yes, they are.

Q. All right. Would these wells be drilled without the pool rule changes?

A. We'd have to look and see if they would fit the

existing spacing and setback limitations. Some -- if -- Bear with me here for a second.

Q. Well, let me put it to you this way: Were these planned and approved by your company with the expectation of the pool rule changes?

A. We were hoping for it, yes, sir.

Q. All right, sir. And if they're not changed, you're going to have to rethink these?

A. Well, we would certainly still like to develop the area, but it would incorporate an additional untimely delay, which we would very much like to avoid.

Q. What is the meaning or significance of the areas contained in the oddly shaped green outline?

A. The green-taped outlines are archeological sites that have been identified through the staking process of those five newly staked wells as we went out with our surveyors and the other regulatory people to try and stake wells in acceptable setbacks as they presently are on the books for the pool.

Q. If I'm within the pool boundary and within a green outline, I'm precluded by whatever limitation from using that surface?

A. Absolutely.

Q. Does that mean you've examined the entire surface area of the pool?

A. No, this is merely the density we've found in attempting to stake the five new locations.

There are certainly -- most likely the same density in all the other drill blocks, but we haven't gone out there and looked at them in the modern staking process.

So I would say in those sections that have been looked at where there are two drill blocks or two new-stake locations, that's probably fairly representative of the density of archeological sites throughout the area.

Q. Describe for us the kind of limitations on the surface that you have to solve in order to use the surface for well locations.

A. Well, it is a very rugged area. In addition to the archeological sites, the other half of our dilemma is that there are very steep canyons, highly wooded areas, relief on the order of, in some places, 800 feet between the canyon bottom and the mesa top, which render lots of slopes within those drill blocks inaccessible or unviable to development of -- creation of a drill site to drill a well.

Q. Have you integrated this information about surface use into your proposed plan for well spacing for each of these individual pools?

A. We have tried to accommodate the topographic problems and the archaeologic problems with what we're

requesting for setbacks.

Q. If you'll turn to Exhibit Tab 4 of the little book, we've already described the first display, which is the current conditions --

A. Right.

Q. -- for which you have concluded what, sir?

A. They're very restrictive.

Q. Let's look at the next display after that. What does that demonstrate?

A. This is an illustration of our proposed spacing for 160-acre drill blocks, which is 330 back from the section line and 20 from the quarter section lines -- or, excuse me, quarter-quarter section boundaries.

Q. And you would propose this well spacing setback rule for the Ismay Pool?

A. That is correct.

Q. All right. What does this afford you in terms of a unique solution to your particular area?

A. Well, it may help us in locating wells without disturbing archeological sites, and also preclude additional burdensome expenses to locating drill sites, and perhaps precluding us drilling marginal drill blocks, which otherwise wouldn't be developed.

Q. Let's turn to what you are recommending for the well footage locations for the 320-spaced pools. If you'll

turn to the next sheet.

A. Well, this is what we would recommend for setbacks under the 320-acre spacing allocation. We would be 790 from the section lines and 1190 from a quarter-quarter section line, and no closer than 130 feet to any quarter section line or subdivision.

And this again would grant us a very greatly increased flexibility in trying to locate wells in a difficult area.

Q. How does this 790 setback on 320 spacing for these pools compare, if at all, to any other 320 gas spacing rules in the San Juan Basin?

A. I believe that this is the same setback as is invoked right now on the Dakota in the San Juan Basin, the Mesaverde Gas Pool, which are both on 320-acre spacing at the present time.

Q. All right, and I think also the coal gas?

A. Okay, Fruitland Coal.

Q. All right. Let's look now at the 640 spacing.

If the Examiner approves the creation of these pools and the contraction of the existing pool which stays on 640 spacing, do you have a recommendation of what to do with the footage locations for that 640 pool?

A. Well, we would like to also be able to, in the event of new technology or additional data indicating that

we have left reserves in the ground in the Lower Barker Creek, we would like the flexibility to also locate wells, even on the 640-acre spacing, with a little more flexibility than we have at the present time, and this is the setbacks and the flexibility that we would prefer.

There is at this time work and study being done by myself to look at the existing remaining potential in the Alkali Gulch portion of the Lower Barker Creek-Alkali Gulch Pool. We have found that there could be economic reserves still there in the ground. And so there is the chance, when the work is finished, that we would propose new drills to test potential in the Alkali Gulch. So we would like this flexibility, too, for the Alkali Gulch-Barker Creek Pool.

Q. Do you have a recommendation to the Examiner as to what is an appropriate period of time by which to establish these rules on a temporary basis after which, then, you would be required to come back to the regulatory agency, submit additional data, and determine if any adjustments should be made in your pools?

A. Absolutely.

Q. What is your recommendation?

A. Mr. Examiner, we would like a temporary basis of a decision for two years, to go out and drill these wells and gather more information so that we can more clearly

understand the productive potential and nature of these reservoirs and then be willing to come back at that time and formulate more detailed plans as the data allows us to determine.

MR. KELLAHIN: Mr. Examiner, that concludes my direct examination of Mr. Hornbeck.

We would at this time move the introduction of the Exhibits that he's authenticated, which are Exhibits 2 through 7, and then 9, 10 and 11.

EXAMINER CATANACH: Exhibits 2 through 7 and 9, 10 and 11 will be admitted as evidence in this case.

I think what we'll do at this point is maybe take a short break and let Mr. Vaughn get his questions together, and then we'll proceed with him after we come back from that. So let's take about ten minutes.

(Thereupon, a recess was taken at 1:58 p.m.)

(The following proceedings had at 2:10 p.m.)

EXAMINER CATANACH: Okay, let's call the hearing back to order and turn it over to Mr. Vaughn.

EXAMINATION

BY MR. VAUGHN:

Q. I have just a few questions for you, Mr. Hornbeck.

With reference to Exhibit 9, which is this contour map here, what is the lowest structural elevation

believed to be productive? Can you tell us from that map?

A. In which horizon?

Q. In the whole anticline.

A. There's been a gas/water contact established in the Lower Barker Creek, and in all the other pools there has not been a downdip water leg or downdip productive limit established at this time.

And if you'd notice, some of the wells that we have staked for this coming drilling season, we are drilling down the flank, trying to establish that productive limit.

Q. Okay. And are you aware which Meridian has filed with the State of Colorado to change any spacing in the northern portion of this anticline that crosses the boundary?

A. We have not filed, but our plans are to do that shortly.

Q. Could you explain a little the purpose of the well that's marked Ute Number 1? I believe that's an old El Paso Natural Gas well. Why was that completed for disposal?

A. Well, that was an original test into the Lower Barker Creek, completed and produced in that zone up until it had cum'd many billion cubic feet of gas.

It watered out and -- as did all the other, older

original tests completed in the Lower Barker Creek, and to dispose of produced water in the field, it was converted to a shallower horizon to take the produced water out of the Lower Barker Creek.

Q. With reference to your proposed pools, which produce or are believed to contain sour hydrogen sulfide?

A. We are prepared and anticipate that all of them will.

Q. They'll all be sour?

A. Yes, sir.

Q. We understand that one reason for the spacing request is because of archeological and topographic constraints.

How are you proposing that Meridian diligently develop all new spacing units if this proposal is granted?

A. I think we'll assume we will drill out to the economic limit of each pool and try to develop it in the best fashion we can.

MR. VAUGHN: I have no further questions of Mr. Hornbeck.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Hornbeck, your proposed pool boundary is an expansion of the existing pool. What geologic information did you utilize to construct the proposed pool boundary?

A. That was a decision based on the -- Well, let me just say that we are proposing to expand the pool on the west and southern parts of the existing pool.

There's -- And what has been done in that is, we recompleted the Ute 6 in Section 7 to the Desert Creek, and it is a producer at the current time. It's in the southwest of Section 7, outside the proposed pool boundary.

So we would like to include that -- I'm sorry, I'm on Exhibit 3.

Q. I'm lost.

A. I'm sorry, I should have said that.

Q. Okay.

A. Exhibit 3.

MR. KELLAHIN: Start over, Jim.

THE WITNESS: On Exhibit 3, the plat showing the proposed and the current pool boundaries --

Q. (By Examiner Catanach) Right.

A. -- in the southwest of Section 17, the Ute 6, which was an original deeper Lower Barker Creek completion, watered out and was in the last several years recompleted to the shallower Desert Creek and is productive from that zone at the current time.

So we propose to expand the pool boundary to include the known productive well outside the pool at the current time.

In addition, we have re-studied the old wireline logs on the Ute 7 in Section 19, southwest of Section 19, and based on the data from the 6 recompletion and the correlations with the Ute 7 old wireline logs, I've determined that both Section 18 and 30 are productive to some degree in several of those horizons, and we'd like to go in and test them.

So based on that information geologically, we decided it would be prudent at this time to attempt to expand the pool boundary to include both Sections 18 and 30.

Q. But in Sections 18 and 30 you've got no established production at this point?

A. We don't, but we are proposing in the current wells staked to gain some additional offset information that would allow us to drill out to those locations. They are the furthest down the flank of the structure, and we're drilling out to the downdip limit, as we had mentioned before.

Q. Any well that is drilled in Sections 18 and 30 will be within a mile of the outer boundary of the current pool boundaries and will be subject to those pool rules, so I'm not sure it's an advantage at this point to include that acreage, or even a necessity to include that acreage if it's not been proven productive. That's something we'll

have to take into consideration.

A. Okay.

Q. It's my understanding that at the present time you've got established production in three of the formations, the Ismay, the Desert Creek and the Lower Barker Creek?

A. That's correct.

Q. Have any of the other zones been tested?

A. Yes, they have.

Q. Which zones have been tested?

A. Well, I guess if you're asking me -- I mean, we have production in the Lower Barker Creek, the Desert Creek and the Ismay, within the proposed pool outline, so I guess we're focused on the Upper Barker Creek, some information on that.

Q. Yeah.

A. I'm assuming that's what you're asking me.

Q. Well, that's one of them, yeah.

A. Okay. We have a producing well in the Upper Barker Creek at the current time -- in Colorado -- and if you can refer to your structure map, Exhibit Number 9, we have a Ute Com Number 1 well which is completed in the Upper Barker Creek right here and commingled with the lower Barker Creek at the present time, but certainly is contributing to the production in that well.

In addition, we have tested the Upper Barker Creek in the Ute 24 well in the northwest of Section 20 and had a small rate of gas out of it on this side of the structure.

So what we see is production associated overall with the structural setting along the entire trend of the structure, and we feel that there's prospective section, based on the old original e-logs throughout this entire area, and that is one of the zones we will be evaluating as we drill additional wells in the area.

The Alkali Gulch has been commingled in several of the original tests drilled in the New Mexico portion of the field and has contributed to the overall production in the field to date, and we believe there is additional potential to be developed that we are looking at at the current time.

Q. It has actually been perforated in some of these wells?

A. Yes, it has. In fact, on cross-section X-X', I'll try and find one for you.

There are perforations noted on the old original wells on this cross-section, and if you look along in the Alkali Gulch interval, the Ute 11 well -- and it's in Section 21, in the northwest of Section 21 -- it was perforated and produced in a commingled fashion with the

Lower Barker Creek.

The Ute 12 well was tested in the Alkali Gulch and after some production was separated from the Upper Barker Creek and then just solely produced with the Upper Barker Creek and tested in the Ute 8 well also.

And at the current time we have a zone in the Ute 16, which is our type log, immediately adjacent to the northern boundary of the proposed pool outline, which is in La Plata County right there. And that well is currently completed in a zone in the Alkali Gulch and tested over 5-million-a-day rate of gas, but, as we've said earlier, at a lower pressure than the shallower Ismay and Desert Creek horizons.

So we're waiting for the pressures to equalize so we can commingle all those zones together.

Q. Okay, that leaves the -- Does that leave just the Akah?

A. Yes, it does, and there has not been any testing or completions to date in the Akah, but I'm working on it.

Q. I believe you testified that you have some engineering evidence in the Lower Barker Creek that would establish that 640 acres is appropriate; is that correct?

A. Yes, we do, and our reservoir engineer will be presenting that here.

Q. What other evidence do you have for each of these

zones to establish even on a temporary basis what the spacing should be? Do you have any geologic information?

A. Well, we've developed a model for each horizon, based on the core data that we have acquired and the new drills, along with modern wireline logs, to support the porosities and allow us to build volumetric cases for each zone, and interpreted areas of drainage, and those models will also be presented by our reservoir engineer, Mr. Lane.

I'm sorry, you asked about the geologic information, didn't you?

Q. Well --

A. We have hole-core analysis porosities, which have allowed us to accurately interpret the modern wireline logs and build volumetric cases for all zones.

Q. What well do you have core data from?

A. We have a few core data points.

For the Ismay zone we have hole-core information and analysis from the Ute 16, the type log, in which we cored the majority of the Ismay interval and the productive horizons.

For the Desert Creek we have hole-core analysis from the Ute 24, which is in the northwest of Section 20, in the proposed pool outline, in New Mexico.

And in addition to that, we have hole-core analysis for the Upper Barker Creek also in the Ute 16,

which is our type log exhibit, on several exhibits, and we have hole-core analysis from the Colorado portion of the field in the Lower Barker Creek.

And we only have modern wireline log data for the Alkali Gulch.

Q. Is the Lower Barker Creek the only formation that you have existing production information from which to make a determination of spacing?

A. No, I believe we have -- We'll present cases for the Ismay, Desert Creek and Lower Barker Creek.

Q. Okay. Is part of the rationale for -- The way that you split up these zones, is part of that rationale based on the drainage areas? Do they have similar drainage areas?

A. That is correct, yes, they do.

We also know that there's been depletion in the lower main producing, Lower Barker Creek and Alkali Gulch, and we cannot commingle the upper, higher-pressure, undepleted Ismay Desert Creek along with the lower, depleted-pressure Lower Barker Creek in existing wellbores.

Q. I believe Mr. Kellahin asked you a question, and I'm not sure that it was -- that I got the answer to it, about depleting some of these zones and then coming back uphole and recompleting in some of the additional productive intervals. Is that not an option with Meridian?

A. It is definitely an option, and we have utilized it where we can.

For example, all of the colored, non-pink-colored circles on our structure map, Exhibit 9, are recompletion -- I'm sorry, that's not correct.

Three of the four colored circles with Desert Creek and Ismay completions are recompletions in existing older wellbores.

The Ute 24, in the northwest of Section 20, is a new drill and completed in the Desert Creek.

But the Ute 6 in the southwest of 7, the Ute 4 in Section -- I believe it's 10, and the Ute 8 in Section 15, have all been shallower recompletions from existing deeper tests which have -- were completed and watered out in the Lower Barker Creek, and we came up and tested shallower horizons and recompleted as productive.

I'm sorry, that's -- We have tried to utilize that where we can.

Q. In trying to understand Meridian's plan of development for the field, within any given section, would you attempt some dual completions or some downhole comminglings, or how would you propose to develop all of these separate zones with the fewest number of wells you have to drill?

A. What we've found has been a fairly successful

scenario has been to drill and test and evaluate with wireline logs all horizons, and then where we can commingle higher pressure, uncompleted intervals, we will commingle.

There are two or three new drills in Colorado in which we have commingled the Desert Creek and the Ismay in new wellbores, because they are similar initial bottomhole pressures.

So in answer to your question, we would commingle wherever possible.

Dual completions under a sour gas environment are not very appealing to Meridian Oil because of the complications with -- potential for risk. And so we will try and commingle as many zones as possible or practical.

Q. I'm not sure this is -- that you may be the appropriate one to answer a question like this, but this spacing -- I mean, this pool has been spaced on 640 acres for a long period of time.

A. Uh-huh.

Q. Would it be more reasonable, maybe, to request an infill drilling provision within this pool where you could drill on shallow -- on lesser -- denser spacing?

A. You're probably in that I'm not the right person to answer this question, but I would offer a geologic insight if you'd care to hear it.

Q. Sure.

A. Part of the problem that we've had in developing this field has been the fact that in some of the Desert Creek completions we've had enough success that we're looking at wells that will have a 20- to 30- or 40-year life of their own in recompletions or new drills.

And when you recomplete a well in, say, an existing deeper test, based on the 640-acre spacing, we would not get the chance to infill the offset acreage because of length of production out of that newer horizon, shallower horizon.

I guess that doesn't lend itself to infill drilling, but that is a problem that we have come across several times in this portion of the field, and we'd like to address with additional spacing to allow us the flexibility to go in and infill efficiently in the horizons and develop them.

Q. Within each given section within this pool, how many wellbores do you think it would take to efficiently develop all these zones? Or how many wellbores does Meridian propose to drill within each given section?

A. Well, we have a basic framework of one well per 640, for the most part. And in that we've had the chance to deplete the existing main productive horizon, the Lower Barker Creek and the Alkali Gulch, as we know from pressure information taken through the field.

That allows -- So therefore, based on that, we would probably not infill the Lower Barker Creek-Alkali Gulch.

So what you're left with is a situation where you would like to develop and evaluate the potential in the Upper Barker Creek, Ismay and Desert Creek. And if they're all at the same pressures and they were productive, we would just go ahead and commingle all three of those in a single wellbore.

So one additional well, potentially, or two where we could maintain the existing produc- -- Actually, let me back up, because in most instances the production from the Lower Barker Creek has been depleted, and the wells have watered out.

So you would have the opportunity to recomplete the shallower horizons in that wellbore and then drill an additional well on an offset 320 and commingle those additional horizons.

For the most part, that would be our plan of development at the current time, to try and understand, especially, the Ismay and the Upper Barker Creek. I think our model on the Desert Creek is fairly accurate and is a good plan of development on 320 acres.

Q. So you're talking about probably two wells per section, maximum?

A. That's really, I think, what we're looking at trying to do right now, yeah.

Of course, the Ismay, as I've said, is a poorer-quality reservoir, and where it is well developed based on geologic analysis, we may need an additional wellbore to effectively drain reserves out of it on 160-acre spacing.

Q. Just one question. Are you confident that you've got geologic separation between all of your proposed pools and they're not in vertical communication?

A. We are -- We see no depletion in any of the shallower pools. They're all at virgin bottomhole pressure, normally pressured pressures, after 35 years of production out of the Lower Barker Creek and Alkali Gulch.

Yes, we are certain there's vertical separation.

EXAMINER CATANACH: I have nothing further at the present time, Mr. Kellahin.

MR. KELLAHIN: I'd like to excuse Mr. Hornbeck and call at this time Mr. Lane.

CHIP LANE,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A. Yes, my name is Chip Lane. I'm a petroleum engineer with Meridian Oil, Inc., located in Farmington, New Mexico.

Q. When and where did you obtain your professional degree?

A. I graduated from Colorado School of Mines in 1984, December, with a bachelor of science in petroleum engineering.

Q. Summarize for us your employment experience as a petroleum engineer since obtaining your degree.

A. I went to work in 1985 for Meridian Oil in Elk City, Oklahoma as a drilling engineer. I subsequently worked two years there, moved to Amarillo, Texas, again with Meridian, worked as a drilling and production engineer, and two years later moved to Houston, Texas, worked as a reservoir engineer, and last year I moved to Farmington, New Mexico.

I've worked in reservoir engineering, production engineering and drilling engineering through New Mexico, Colorado, Oklahoma, Kansas, Texas, Louisiana, Mississippi, Alabama, and offshore in oil and gas reservoirs from 2000 feet deep through 20,000 feet, with oil and gas, sandstones and carbonates.

Q. What has been your involvement concerning this project that Meridian has presented to the Examiner?

A. I've been assigned to examine on an engineering basis the producing wells in the proposed pools and determine the drainage area and proposed spacing of those wells.

Q. Have you used commonly utilized engineering protocol, techniques and procedures to make those type of calculations and to analyze the reservoirs to reach conclusions about spacing patterns?

A. Yes, sir, I have.

Q. What other employees of Meridian have participated with you in this project?

A. I've worked with Mr. Hornbeck to utilize his geologic experience and knowledge of the area to characterize the reservoirs, to help determine what the drainage areas are.

Q. As a result of your study, do you have any engineering conclusions that are contrary to or inconsistent with Mr. Hornbeck's geologic conclusions concerning these topics?

A. No, sir, I do not.

MR. KELLAHIN: We tender Mr. Lane as an expert petroleum engineer.

EXAMINER CATANACH: Mr. Lane is so qualified.

Q. (By Mr. Kellahin) Let's turn to the exhibit book, Mr. Lane, and let's find your work product.

A. Yes, sir.

Q. I have found it useful to take a copy of Exhibit 9, simply as a locator. We have one on the display board, but it has helped me find these wells as you and Mr. Hornbeck have described them.

Let's start with the locator map, and behind Exhibit Tab Number 8, then, there's a production plot for the first well. What is that well?

A. Yes, sir, this is the Ute 2R. It's located in Section 15 of 32 North, 13 1/2 West, of La Plata County, Colorado.

It's about a mile to the north of the Ute 4, which you'll see on Exhibit 9 is the northernmost purple dot adjacent to the cross-section line.

Q. What's the significance of this information to you?

A. The first plot in Exhibit Number 8 is a production plot of the production from the Ute 2R well, which is a Desert Creek-producing well.

The significance is, this is a commonly accepted manner in which to determine the estimated ultimate recovery of the well.

Plotted along the Y axis is the daily production rate in MCF per day, with a bottom value of 10 and an uppermost value of 100 million a day.

Along the Y -- or the X axis, across the bottom, is the calendar year.

What this plot shows is the production from the well for that particular month.

Q. All right. What you're looking for is a signature well, a typical well in the Desert Creek, by which you can analyze that production for purposes of making engineering forecasts about spacing and recoveries?

A. Yes, sir.

Q. Why have you chosen this well as a typical Desert Creek well by which, then, to forecast its ultimate recovery?

A. From a discussion with Mr. Hornbeck, and from analysis of the other wells in the Desert Creek, this is pretty much a typical well in the Desert Creek. It's not an anomaly productionwise or reservoir-qualitywise or anything. We felt it was pretty typical.

The other thing, too, was that it does have modern logs on the well that we can do some volumetric analysis with, and it does have a production history that we can forecast the estimated ultimate recovery from.

The other wells in New Mexico and Colorado, the Ute 24, the new well we drilled, doesn't have sufficient production history to make any sort of estimate of the estimated ultimate recovery, and the Ute 6 has old logs

which wouldn't allow us to do any sort of volumetric analysis to determine the drainage area.

Q. Having satisfied yourself that the Ute 2R well is a type well for the Desert Creek, have you satisfied yourself that there is enough production from which you can then forecast a decline?

A. Yes, sir, there's enough production to forecast a decline.

Q. Describe for us the shape of the decline curve that you've utilized by which to forecast ultimate gas reserves to be produced by this well.

Q. This shape is typical of a carbonate-limestone-dolomite sequence.

The first month you see the low value in 1993. That is probably just a half a month of production where we didn't have the well on for the full month.

But you can see a typical hyperbolic decline through the remaining -- for the producing period of the well. What you see typically in a carbonate -- especially in a carbonate zone, where you have flush production initially and then the flow regime settles down into being more representative of what the quality of the reservoir would indicate to you.

Q. What have you forecasted to be the estimated ultimate recovery of gas from this type well for the Desert

Creek.

A. On the right-hand side of the graph, signified by EUR, we've forecasted the reserves to be around about 3.95 BCF.

Q. Let's turn to the next display, and describe for us how you've utilized that number to calculate the reservoir area to be depleted by that well.

A. Yes, sir. On the next page we use the EUR that we gained from the decline-curve analysis, and the equation for the EUR, which is 43,560 times the area, times the height, times the porosity, times the quantity 1 minus water saturation, times the initial minus the abandonment gas formation volume factor, to back into or solve for A, the area that we expect to be drained by this well.

From log analysis, we determined the height, 21 feet, porosity of 13 percent, water saturation of 28 percent.

The remaining elements of the equation are B_{gi}, B_{ga}, which are the initial gas formation volume factor and the abandonment gas formation volume factor, and those are purely calculations off of additional pressure and abandonment pressure.

And the initial pressure of 3640 pounds we acquired through pressure testing in wells in the Desert Creek.

The abandonment pressure of 750 pounds is an assumption based off of the current line pressures and the rates necessary to maintain an economic well and the drawdown required.

What we did was, we used those -- the initial pressure, the abandonment pressure, came up with B_{gi} of 206 standard cubic feet per reservoir cubic feet -- in other words, if you had one cubic foot of gas down in the reservoir, it would be 206 cubic feet at the surface -- a value of 40 for the abandonment factor, plugged those values into the EUR equation, solved for area and came up with a drainage area of 288 acres.

Q. Based upon this calculation, then, what is your recommendation to the Examiner as the initial spacing to apply to the Desert Creek if he chooses to establish that as a separate pool?

A. We recommend to apply a spacing of 320 acres in the Desert Creek.

Q. Let's turn now to the next display. You've got a production plot shown for the Ute 16 well?

A. Yes, we did the -- The next plot is for the Ute 16. Again, it's a similar analysis, this time in the Ismay.

The graph shows the production history of the well. And again, typical of a tight carbonate, you'll see

the hyperbolic performance early on in the life.

And we've forecasted an EUR of 563 million cubic feet of gas.

Q. Again, did you apply the same method and find an Ismay well that you had confidence in, represented a well characteristic of the performance to be expected from an Ismay-producing well?

A. Yes, sir, I did. I worked with Mr. Hornbeck, and we examined the quality of the reservoir across the field, determined that this did not have any -- wasn't any different from the other wells. And again, this well had modern logs on it in the Ismay.

From Exhibit 9, you'll notice that the Ute 4 is in the Ismay. That's an old well, it doesn't have modern logs.

And the Ute 8 is in the Ismay too. The Ute 8 is a recompletion to the Ismay, but it's a horizontal well and volumetric analysis would be pretty difficult and overly complex when there's a better example in the Ute 16.

Q. Again, you've applied your engineering judgment and forecasted an ultimate recovery for the well?

A. Yes, sir, we have.

Q. And that number is just over half a BCF?

A. Yes, sir, it is.

Q. All right. Then you went to the next page.

Again, that's the same formula you used to solve for area?

A. Yes, sir, it is.

Q. And you have plugged in your EUR estimate for the type well, put in the appropriate values and solved the equation?

A. Yes, sir, I have.

Q. And what was your end result of that calculation?

A. We found a drainage area of 39 acres.

Q. All right. Based upon that engineering study, what is your recommendation to the Examiner for the initial spacing to be established for the Ismay pool?

A. We recommend an initial spacing in the Ismay pool of 160 acres.

Q. Okay. All right, let's go to the next display, looking at the Ute 18 well.

A. The next display, the Ute 14 well --

Q. I'm sorry, the Ute the 14.

A. -- this is a Lower Barker Creek test, and what we want to show is that the current 640-acre spacing in the Lower Barker Creek was adequate.

And what we want to show through the next few pages is that the Ute 14 was originally producing in the Lower Barker Creek.

In 1990, we recompleted the Ute 12, which is on Exhibit 9 also, to the Lower Barer Creek. We saw

interference between the wells. It made us feel comfortable that the current spacing will efficiently recover the reserves in the Lower Barker Creek.

Q. You as an engineer have some choices of methods by which to come to conclusions about well spacing?

A. Yes, sir.

Q. You've shown us a volumetric solution. Here in the Lower Barker Creek you have some actual field studies of the interference of one well's performance on the performance of a second well?

A. Yes, sir.

Q. When we look at the 14 well and compare it to the performance of the 12 --

A. Yes, sir.

Q. -- take us along the plot of the 14 well's production --

A. Okay.

Q. -- and show us what's happened to the forecasted ultimate recovery of the 14 well at the point in time when it has to compete in this reservoir with the Ute 12.

A. Okay.

Q. All right?

A. If you look at the Ute 14 well, the time period especially from 1976 until 1990, you'll see that the well's established a pretty consistent decline. If you forecast

that decline out, you come up with an EUR of approximately 42 BCF of gas.

Q. All right, and that's the number over in the far right column that was originally forecast as the EUR for this well without interference?

A. Yes, sir.

Q. All right. In about 1990 something's happened to the performance of this well where the actual production is less than the forecasted level of performance?

A. Yes, sir.

Q. What happened?

A. In 1990, on the next page, we've recompleted the Ute 12 into the Lower Barker Creek.

And you can see from that plot that it has established a pretty good decline and has forecasted reserves of approximately 24 BCF of gas.

Q. Okay. So when we look at the far right columns for the performance plot on the Ute 12, the EUR represents the recovery for the Number 12 as it competes against the Number 14?

A. Yes, sir.

Q. Okay. When we go beyond that and look at the next plot, what are we looking at?

A. When we look at the next plot, it's the plot of the Ute 14 as the reserves would be forecasted out today or

any time since 1990, and it shows that the original EUR of 42 BCF has been reduced approximately to 29 BCF, showing that the well is in competition with the Ute 12 and that they're competing for the same reserves.

Q. Okay. How do you analyze that as a reservoir engineer? What does that tell you?

A. It tells us really two things.

First of all, that the Ute 12 and Ute 14 are in communication on 640 acres.

The second thing it tells us, too, is that from the first plot of the Ute 14 we looked at, we had an EUR of 42 BCF. If you add up the EUR of the Ute 12 at 24 and the new EUR of the Ute 14 at 29, you come up with 53 BCF.

So even though they are competing for the same reserves, they've increased the recovery from 42 to 53 BCF. So the Ute 12 will recover an additional 11 BCF that wouldn't have been recovered solely by the Ute 14.

Q. All right. Pretty good evidence to you, then, as a reservoir engineer that we ought to leave the spacing alone for those wells that are still producing out of this Lower Barker Creek?

A. Yes, sir, it is.

One last thing to point out, too. On the Lower Barker Creek wells, you'll see that they have a pretty low decline rate, and they have a long life in the wells too.

And essentially in the Ute 12 Section and the Ute 14 section, just looking at how long they're going to be productive, it would take a long time under the current rules before we could go in and complete in a different zone or drill a new well to produce from a different zone.

Q. Let me explore that topic with you in terms of your expertise as a reservoir engineer.

You're dealing with a long-lived well that's producing out of the Lower Barker Creek. What kind of current pressures are you dealing with?

A. It's currently 1500 pounds, 1700 pounds, in that range.

Q. All right. And how long a life do we still have remaining for the production out of that interval?

A. We have at least a 20-year life, if not longer.

Q. Do you have a realistic option as a reservoir engineer to take any of those kinds of wells and commingle it with production out of the Desert Creek or the Ismay?

A. Not right now. They're at -- In the Lower Barker Creek we're at 1500 to 1700 pounds of pressure. From our tests we are approximately 3600 pounds in the Desert Creek and the Ismay. So it wouldn't be prudent to combine the two together.

Q. All right. So you either have to postpone the drilling of a well for Ismay or Desert Creek production on

current 640 spacing until you're ready to abandon that wellbore's performance out of the Desert Creek, the Lower Desert Creek?

A. Yes, sir, that's correct.

Q. And under current rules, you can't have any more wells than one per section?

A. That's correct.

Q. If the rules are changed as Meridian proposes to do it, what does that afford you as a reservoir engineer?

A. It affords us really the opportunity to develop the Desert Creek and the Ismay in a timely fashion and also to develop them in a method that's going to be compensatory with the reservoir qualities.

In other words, we don't expect those zones to drain 640 acres, and we don't expect them to be fully drained by a 640-acre spacing.

So if we go with the current rules and just wait, we will still never fully develop those two zones.

Q. In addition, you're dealing with the complexities of having a political pool -- that is, the gross Pennsylvanian interval -- that really consists of at least four or more separate sources of supply?

A. Yes, sir, that's correct.

Q. And you know that as a reservoir engineer, don't you --

A. Yes, sir.

Q. -- that they are pressure-separated?

A. Yes, sir.

Q. And in terms of reservoir management of this production, you need some more pools --

A. Yes, we do.

Q. -- with their own special rules?

A. Yes, sir.

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

We move the introduction of his exhibits behind Exhibit Tab Number 8.

EXAMINER CATANACH: Exhibit Number 8 will be admitted as evidence.

Mr. Vaughn, do you need some time, a couple minutes?

MR. VAUGHN: I just have one basic question, I think.

EXAMINATION

BY MR. VAUGHN:

Q. Mr. Lane, I just wanted to ask, was interference from the 1990 recompletion in Ute Number 12 seen in the Ute Number 11 well? Did anything show up there?

A. I don't know; the Ute Number 11 is TA'd.

Q. I believe it -- Isn't that in the same proposed

pool?

A. (No response)

Q. I guess the question arose because it seems close to the other well where there was something noticed.

A. I'm not sure on the history of the 11, but I know it's been TA'd for a while.

Q. Okay.

A. If it is producing, or if it was producing at the time, it would have been effective, but --

Q. In both cases, there's nothing there to see.

Did you notice any other interference in any other well in the whole area?

A. No. There's one other Lower Barker Creek completion. It's in the Ute 9, it's in Colorado. And that one is questionable whether it's interference or whether it's just close to the end of the life on the well.

MR. VAUGHN: Okay, that's all the questions I have.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Lane, what information do you have on the drainage characteristics of the Upper Barker Creek?

A. We have the -- as Mr. Hornbeck testified to, we have one well that produces out of the Upper Barker Creek, the Ute Com 1, which is commingled with the Lower Barker

Creek.

The reasoning behind requesting 320-acre spacing versus the current 640 is that the production rates we've seen out of the Upper Barker Creek in the Ute Com 1 and the rate we tested out of the Ute 24, which is the current Desert Creek completion, indicate that the Upper Barker Creek is more similar to the Desert Creek than it is to the Lower Barker Creek.

Q. In terms of producing capability?

A. In terms of producing capability.

Q. The differences in the drainage areas is, in your opinion, attributable to different lithologies and different permeability and porosity within the reservoirs?

A. Yes, sir.

Q. Is there any other factors that contribute to them?

A. No.

Q. Within any given section there's probably going to be some Ismay gas reserves that are left because of the small drainage areas; is that correct?

A. Yes, sir.

Q. You don't intend on fully developing with four wells each section in this pool?

A. I think that -- If I understand where you're headed, I think it's similar to the BLM representative's

question about how we would develop the different pools. And what we would do is look at it on an economic basis and develop it that way.

In other words, we want to have the ability to recomplete and commingle in the same wellbores. And if we would drill an additional well in a section, we would examine the possibility of drilling from the same drill pad.

And if there was a case where the reservoirs weren't in close enough pressure -- current pressure conditions, then we could have commingled them.

Q. Chances are, you're only going to drill two wells per section, probably, maximum; is that right? Or is that yet to be determined?

A. That's yet to be determined.

Q. It could be more than two?

A. Yes, sir.

Q. If the spacing is determined to be correct in the 320-acre pools, the only -- Well, never mind.

The five staked locations that you currently have proposed --

A. Yes, sir.

Q. -- what completions are those proposed to be in? What intervals are those proposed to be completed in?

A. They'll originally be for the Desert Creek.

But as Mr. Hornbeck said, we're in a learning stage and we'll probably test the other zones also.

Q. With the possibility of commingling one or more zones?

A. Yes, sir.

EXAMINER CATANACH: Okay, I have no further questions of Mr. Lane.

MR. KELLAHIN: I have no further questions for this witness.

EXAMINER CATANACH: The witness may be excused.

MR. KELLAHIN: We have a very short presentation by Dean Price.

Mr. Price is a petroleum landman with Meridian. He resides in Farmington.

DAVID DEAN PRICE,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A. David Dean Price. I'm a senior landman with Meridian Oil, Inc., in Farmington, New Mexico.

Q. Have you testified before the Oil Conservation Division of New Mexico on prior occasions, qualifying as an

expert witness in the field of petroleum land matters?

A. Yes.

Q. You're part of this same area team with Mr. Hornbeck and Mr. Lane, and you provide the land expertise for this team?

A. Yes.

Q. As part of your duties, have you made a study of the ownership information with regards to the ownership of hydrocarbons within the proposed pool area?

A. Yes.

Q. In addition, have you made yourself knowledgeable about the offsetting interest owners, if there are any, by which they are entitled to notice of this hearing?

A. Yes.

MR. KELLAHIN: We tender Mr. Price as an expert witness.

EXAMINER CATANACH: Mr. Price is so qualified.

Q. (By Mr. Kellahin) Let's go back to our display which is behind Exhibit Tab Number 3. It's the index map. It's got various color codes on the index. It's in the small book.

Are you with me?

A. Yes.

Q. Have you sufficient knowledge about the ownership that you can identify and describe the information on this

display?

A. Yes.

Q. Let's have you do that.

A. Okay, we're looking in Township 32 North, Range 14 West, in San Juan County, Colorado. We're looking at the acreage which was the current -- The dashed line, broken dashed red line, indicates the current pool boundary for the Barker Creek Paradox Gas Pool.

The solid red line, which you see outlining acreage on the lease, or the land plat, is a proposed pool boundary.

We've got indicated on the map and highlighted with a green slashed hatch mark leasehold currently held by Meridian Oil, Inc., which in essence covers the gas rights under the Paradox Gas Pool.

We also indicate with a blue hatchmark the Ute Mountain Ute Tribe leased lands -- or unleased lands, indicated in the blue hatched.

In the red hachured slash marks we have acreage which is outside the pool, which is under lease to Amoco Production Company.

I also note one error on the map. In Section 30, the south half, we have a green-hatched line which shows leasehold in Meridian Oil, Inc., and that is currently Ute Mountain Ute Tribe unleased land.

Q. All right. We've got the diagonal running the wrong direction?

A. On that, yes.

Q. And it should be blue?

A. It should be -- That land is currently under negotiation with the --

Q. All right.

A. -- Tribe.

Q. And so that's what? Section 30?

A. Yes.

Q. All of Section 30?

A. No, just the south half.

Q. South half is color-coded wrong. All right.

With the exception of that tract, then, should the Examiner choose to do so and extend the current boundaries as you've requested --

A. Yes.

Q. -- the ownership within the entire boundary is consistent and uniform?

A. Yes.

Q. When we look at any existing producing spacing unit within the current pool, the ownership of that production with that -- in that spacing unit is common to the ownership that offsets that spacing unit within the pool?

A. Yes.

Q. Okay. And the only point of potential difference where we might have another operator other than Meridian would be in the event that production in the pool is such that Section 27 is included beyond its current north-half quarter section?

A. Yes.

Q. Northwest quarter section?

A. Northwest quarter section, that's correct.

Q. All right. As part of your duties, did you cause notification of this hearing --

A. Yes.

Q. -- to be sent to parties that would share in production within the pool?

A. Yes.

Q. And how do we find that information?

A. Through a record check and through a leasehold record check of our company records, and determined the ownerships and found their names and addresses and mailed them copies of the hearing notice and Application, and also the offset owners.

Q. In addition, did you provide the Examiner with copies of some of the correspondence between and among the other regulatory agencies, and that's contained behind Exhibit Tab Number 1?

A. Yes, that was subsequent to the first notice of the hearing, and just exchanges between the Department of the Interior and the NMOCD and your office, at our request.

MR. KELLAHIN: All right, sir. That concludes my examination of Mr. Price.

We would move the introduction of the exhibits contained behind Exhibit Tab Number 1.

EXAMINER CATANACH: Exhibit Number 1 will be admitted as evidence.

MR. VAUGHN: No questions.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Price, is -- The entire leasehold interest held by Meridian, is that one -- Is that a single lease from the Indians?

A. No, it's -- There are a number of leases within the Paradox Gas Pool.

Originally there were a number of leases, and they were put together in a consolidation plan. And under that consolidation plan it was determined it would be treated more or less like one big lease.

Meridian owns all the gas rights under that. Amoco and Conoco and Meridian split the oil rights under that consolidation agreement.

The Ute Mountain Ute Tribe is the single royalty

owner under the entire pool.

Q. I don't know how -- I'm not familiar with how Indian leases are set up, but do you know if in fact the ownership is common underlying this whole area?

What I'm saying is, I've seen certain times where you might have different beneficiaries under the Indian -- under Indian leases.

A. All checks are made payable to the Bureau of Indian Affairs for the benefit of the Ute Mountain Ute Tribe, and --

A. As far as you know, it's all commonly owned?

A. They are all -- Yes. And this is -- I understand what you're saying, that there were -- you know, there are other tribes with other situations where allottees are given separate royalties, and that isn't the case in this instance.

EXAMINER CATANACH: Okay, that's all I have, Mr. Kellahin.

MR. KELLAHIN: Mr. Examiner, because of the complexity, I think, of the issue, taking an existing pool and subdividing it and then developing rules for what is truly a unique circumstance of dealing with exploration opportunities within a very difficult terrain management problem, and the concerns of the Native Americans that own those properties, Mr. Alexander and I, with the aid of the

team that has this responsibility, have drafted a proposed order for discussion purposes.

We'd like to share that with you and the other participants today to give you at least a starting point on how you might organize the approval of this Application, if you chose to do so.

We've taken the liberty of suggesting some unique solutions for consideration, including the flexibility of downhole commingling applied to this particular resource, procedures for nonstandard locations.

The testimony was that we are particularly sensitive to the duplicity of wellbores, and we're going to try to manage the surface disturbance to minimize that adverse impact, but we need to more appropriately access these multiple reservoirs.

And so we've suggested some things in this order that are bits and pieces out of the coal gas pool rules and other rules that we commonly utilize, trying to craft a flexible set of procedures that made common-sense solutions available to the operator and to the interest owners. And so I have that to share with you.

This is an unusual circumstance where you have such a tremendous vertical distance, and for whatever reason it was put into a pool. It's largely unique.

It is the custom, practice and historical

decision of this agency that you deal with resources by defining separate common sources of supply. That is the fundamental conservation building block for the State of New Mexico.

Here, we've taken four or five or six separate sources of supply and put them under one pool.

It doesn't work anymore. We need a better, more appropriate solution that is certainly consistent with what you do.

The reason we didn't suggest infill drilling is that it is contrary to the established practice. Infill drilling applies to a single common source of supply.

For example, you've got infill drilling in the Blanco -- the Basin Dakota and Blanco Mesaverde. Each of those pools are a separate source of supply, so that you know the infill well is competing for gas reserves in the same reservoir as the parent well.

Infill wells in this pool would be competing in separate sources of supply. If it's a mistake in logic, it's my mistake, because I suggested that that was not a feasible option because it didn't make any sense. It was my choice to say the sense of this is to go back to the experts and have them define separate reservoirs.

And once we have good technical data from the geologists and the engineers, saying these are separate

sources of supply, then we craft individual rules for that separate source, and that's how we built this case.

We went back to the scientists, re-examined what we were doing, found the existing rules are inconsistent with practice and technically flawed.

We've got four, at least, reservoirs that demand their own solutions, and it's been an impediment to future production. There is substantial remaining recoverable gas that this company and its interest owners, as well as other participants, ought to enjoy and share.

And so that's why we've presented the case as we've done.

EXAMINER CATANACH: Thank you, Mr. Kellahin. And we would appreciate the draft orders.

Mr. Vaughn, do you have anything that you'd like to say before we -- ?

MR. VAUGHN: Thank you, Mr. Examiner, but we have no further comments.

EXAMINER CATANACH: Okay. I expect that we will not issue an order, probably, until the transcript is received, which is generally about 30 days from the hearing. And I would venture to say that it would be about 30 days from the date of the transcript that an order is issued by the Division.

So about 60 days from now we can expect something

to come out.

And there being nothing further in this case, Case 11,089 will be taken under advisement.

And this hearing is adjourned.

(Thereupon, these proceedings were concluded at 3:18 p.m.)

* * *

CERTIFICATE OF REPORTER

STATE OF NEW MEXICO)
) ss.
COUNTY OF SANTA FE)

I, Steven T. Brenner, Certified Court Reporter and Notary Public, HEREBY CERTIFY that the foregoing transcript of proceedings before the Oil Conservation Division was reported by me; that I transcribed my notes; and that the foregoing is a true and accurate record of the proceedings.

I FURTHER CERTIFY that I am not a relative or employee of any of the parties or attorneys involved in this matter and that I have no personal interest in the final disposition of this matter.

WITNESS MY HAND AND SEAL November 16th, 1994.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 1998

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 11089, heard by me on November 10 1994.

David R. Catanach, Examiner
Oil Conservation Division