NEW MEXICO OIL CONSERVATION DIVISION

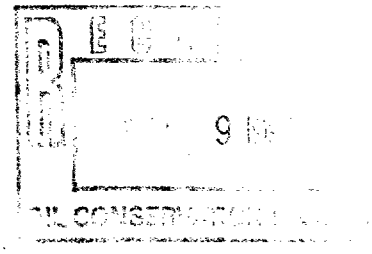
STATE LAND OFFICE BUILDING

STATE OF NEW MEXICO

CASE NOS. 10745 and 10754

IN THE MATTER OF:

The Application of Meridian Oil Inc.
to amend Division Order No. R-9920
and to reopen Cases 10754 and 10745,
San Juan and Rio Arriba Counties, New Mexico



BEFORE:

MICHAEL E. STOGNER
Hearing Examiner
State Land Office Building
August 26, 1993

ORIGINAL

REPORTED BY:

SUSAN B. SPERRY
Certified Court Reporter
for the State of New Mexico

A P P E A R A N C E S

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I N D E X

E X H I B I T S

EXAMINER STOGNER: Call the next cases, 10745 and 10754, to be reopened.

MR. STOVALL: These are the applications of Meridian Oil Inc., to amend Division Order No. R-9920 and to reopen Cases 10754 and 19745, San Juan and Rio Arriba Counties, New Mexico.

EXAMINER STOGNER: Call for appearances.

MR. KELLAHIN: Mr. Examiner, I'm Tom Kellahin of the Santa Fe law firm of Kellahin and Kellahin, appearing on behalf of the Applicant, and I have one witness to be sworn.

EXAMINER STOGNER: Are there any other appearances? Will the witness please step forward, take the bench, raise your right hand.

MR. KELLAHIN: Mr. Examiner, we appreciate the opportunity to reopen these cases and to discuss with you again a certain provision of Order 9920. We have requested the opportunity to supplement the record and to present to you our request for the economic criteria to justify the downhole commingling of those wells.

I have brought with me today certain witnesses that are available for discussion, all the witnesses that participated in the original hearing. Mr. Alexander is here, if there's any questions of him.

Mr. Mike Dawson is the reservoir geologist that

presented the geology, I've asked him to come back. Mr. Jim Craddock is the production engineer supervisor for Meridian. These wells are his responsibility.

Mr. Scott Daves works for Mr. Craddock, under his supervision. Mr. Scott Daves was the original engineering witness that provided the discussion to the division concerning the five cases that were decided by Order R-9920.

In addition, Mr. Daves worked in association with Mr. Shipley, who was the engineer that presented the economics on the other two cases that are reopened, the Valdez well, and then the last well.

I propose to call for direct testimony Mr. Scott Daves to explain to you his economic criteria, and to discuss with you the opportunity to amend the existing order.

In our discussions yesterday with these technical people, we have drafted yesterday proposed language changes where, if you agree with us, we have suggested a solution.

This has been an evolving process. At the original hearing, substantial effort was spent on the allocation formula by which reliable means of allocation between the Pictured Cliffs and the Fruitland could be realized. Meridian believes that the Examiner has

properly and carefully allocated the production.

You may remember that following that initial hearing, you requested Mr. Daves to provide additional support on the economics. We now want to present to you what we think is a viable solution, so that you can use a graph that will give you an economic threshold to justify downhole commingling.

Mr. Daves, in his technical analysis, has used three factors: the cost components, initial rate, and ultimate gas recovery. He's made his analysis on Pictured Cliffs, and he's prepared to discuss with you how he made those conclusions and how the calculations were prepared.

In the prehearing statement, we have suggested one solution to you. Should the Examiner decide to have a specific value as to initial rate and ultimate recovery, we've suggested a number. There is an inherent weakness in that methodology, because it only picks one point in time to set that rate.

In reflecting on the prehearing statement yesterday, we would like to suggest to you that we substitute a different method, which would be the adoption of a curve, which Mr. Daves will explain to you. A point can be found on that curve, below which the combination of rate or EUR will give you the threshold below which then the only way to produce this gas is under a downhole

commingling procedure.

With that introduction, then, I'd like to present Mr. Daves to explain to you this aspect of the case.

We have not marked this for introduction. It is an orientation map, which perhaps we can unroll it somewhere convenient for you, just to give you a sense of where these wells are.

SCOTT DAVES

After having been first duly sworn under oath, was questioned and testified as follows:

EXAMINATION

BY MR. KELLAHIN:

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

A. My name is Scott Daves. I'm a reservoir engineer with Meridian Oil.

Q. Mr. Daves, were you the technical witness that provided the reservoir engineering and the economic presentation at the original hearing that resulted in Order R-9920?

A. Yes.

Q. In addition, have you reviewed the transcript and record not only of that case, but of the consolidated cases for 10754 and 10745?

A. Yes.

Q. Do you now have additional recommendations to the Examiner with regards to the adoption of an economic criteria by which downhole commingling, in your opinion, would be justified for these seven cases?

A. Yes, I do.

MR. KELLAHIN: We tender Mr. Daves as an expert reservoir engineer.

Examiner STOGNER: Mr. Daves is so qualified.

Q. (By Mr. Kellahin) Let me have you take a moment, Mr. Daves, and use the orientation map to identify for the Examiner the seven wells or the seven cases that are the subject of this hearing.

A. Okay. The two road wells that are listed are right here. The Rhodes C-101, the Rhodes C-102, the Whitley A 100, the Rally Call No. 500, Adams 500, the San Juan Unit 20 or San Juan 28-4 Unit No. 225, and the Valdez No. 5.

Examiner STOGNER: So the record is clear, the first four wells that you talk about were in the lower right-hand corner of the large map that is on the table, not offered as an exhibit today.

THE WITNESS: Lower left-hand.

Examiner STOGNER: I'm sorry, lower left-

hand corner.

THE WITNESS: The first five are.

Examiner STOGNER: Marked with pink arrows?

THE WITNESS: Right.

Examiner STOGNER: And then subsequent to, or the last two wells, are on the far right-hand side?

THE WITNESS: Correct.

Examiner STOGNER: And they're in which unit?

THE WITNESS: It's the San Juan 28-4 unit, Unit No. 225. And the other one is Valdez Unit No. 5 -- excuse me. It's Valdez No. 5; it's not a unit well.

Examiner STOGNER: It's the far-right well?

THE WITNESS: Right.

Examiner STOGNER: Okay. Thank you.

Q. (By Mr. Kellahin) Give us a generalized summary, if you will, Mr. Daves, of the relationship that caused you to package onto your analysis the five cases that were described as being on the lower-left area? Those are the ones dealt with by Order R-9920?

A. Correct.

Q. And, how they relate, then, to the other two wells, which are 10745 and 10754?

A. How they relate is, they were all proposed as new drill wells. They are all proposed as Fruitland

Coal/Pictured Cliffs commingles. And, although they do produce out of various pools, as designated by various orders, they are Pictured Cliffs/Fruitland Coal commingles as proposed.

Q. Let's focus on the five for a moment.

A. Okay.

Q. Are you the engineer primarily responsible for analyzing the economics to determine whether or not it was suitable to drill for those two pools in this area, using either downhole commingling, dual completion, or single-well technology?

A. Yes.

Q. What was the analysis or the criteria that you and your company apply in order to answer that question?

A. The three primary criteria that we look at, first off, we look at reserves. Are there enough reserves in there to pay out the investment of drilling and completing, facilitating these wells?

Second thing that we look at is cost. We look for the optimal cost scenario.

And the third thing that we look at is initial rates.

Q. Let's turn to the exhibit that shows the summary of the economic criteria. Where is that found in the exhibit book?

A. It's Exhibit 2.

Q. Describe for me, as a layman, what do you do as a reservoir engineer when you look at reserves, costs, and flow rate in order to compare those factors, or components, to arrive at a decision on what to do, in terms of the type of well you drill?

A. First off, as far as reserves are concerned, we look for a method, an amount of reserves that will provide us with a way to pay out our investment. And that would lead you into the costs, and we evaluate the various alternatives as to how to produce those reserves.

And then, the final thing that we look at is flow rate.

Q. Define for me what you have meant by "flow rate." What kind of rate of flow are you looking for in the well?

A. Initialized, initial stabilized production, and then production through the life of the well.

Q. Why is that important to you as a rate, as opposed to any other way to measure rate?

A. That's where your sales come from. That's where your revenue is generated.

Q. When you look at the five wells in this area that were authorized under Order R-9920, what was the range of maximum flow rate that you analyzed? You started

from zero, and projected on up to what maximum rate?

A. 750 a day. We didn't expect those kinds of rates, but we ran sensitivities to evaluate that scenario.

Q. The purpose of running it to that extreme is to cover any potential rate that might have been expected in either pool within this area?

A. Right, correct.

Q. What do you do about the reserve volume or number that you used in the analysis?

A. When you look at reserves, there again, we sensitized between zero and some number that we know would be slightly above a theoretical EUR in a specific area.

Q. The purpose, then, would be to investigate the full range of potential reserve that might be realized in either pool?

A. Correct.

Q. All right. Having investigated the greatest range of flow rate and the greatest expansion of EUR, what did you do about the cost?

A. I explored the options of a single completion per zone, a dual completion per zone, and a commingle completion per zone.

Q. One of the provisions of the order we're seeking to modify is that provision which dealt with the downhole commingling for both pools. The order provides that the

economic criteria is based upon a combination rate for both pools?

A. Right. I believe that's what the order states.

Q. And you're proposing to change that?

A. Correct.

Q. Why?

A. The problem with just using a rate is it doesn't take into consideration a reserve amount. And economics are as sensitive, or more sensitive, to a reserve amount as they are an initial rate.

Q. Why would you not want to determine EUR and rate on a consolidated basis for both pools? Why would you separate it out and focus only on one pool first, and then the other?

A. In a true economic analysis, I don't think you can. It's as sensitive to each of those two factors, an economic solution.

Q. My question is, when you look at the economic solution, Meridian proposes to apply that to an individual pool?

A. Right.

Q. The order lumps it together for both pools?

A. Right.

Q. Why are you proposing to single out the economic criteria for either the PC or the Fruitland separately?

A. One of the things that we looked at when we looked through, evaluated the orders was, is a zone in and of itself economic?

So, we're looking at that point using reserves and rates and costs, and evaluating each zone specifically for an economic determination, if that zone is itself economic.

Q. Your basis for doing that is the application of the downhole commingling rule in the rule book?

A. That's correct.

Q. Is there an economic criteria within the downhole commingling rules that discusses this issue?

A. I believe the wording is it is economic -- I can quote that; might be best if I do that. Says that, "The commingling is necessary to permit a zone or zones to be produced which would not otherwise be economically produceable."

Q. There may be instances, then, where one pool would be economic, but the other one is not?

A. That's correct.

Q. And, therefore, in order to produce the uneconomic pool, you've got to have downhole commingling, or you have to abandon those reserves?

A. Exactly.

Q. Having followed that methodology, were you able

to come to an engineering conclusion about various threshold rates, below which only downhole commingling was the method by which these reserves could be produced?

A. That's correct. We documented that with Exhibit No. 3. It's a graph.

Q. Let's look at Exhibit No. 3, and show us how to read it, and then we'll go through specific examples.

A. Okay. On the X axis, you have initial rate, and that's sales rate on a daily basis. On the Y axis, you have EUR, states here Pictured Cliffs, EUR.

And then, the three curved lines that go through the dark line, that is representative of a 15 percent, a 15 percent rate of return for a single-well completion. This dotted line that's in the middle would be a dual completion, based on those costs.

And the dotted-dashed line, which is the lowest left-hand corner, would be a commingle. And each of these represents the point at which you would have a given EUR and a given initial rate that would give you a 15 percent rate of return for each of the various scenarios.

Q. Is this an exhibit that currently is in the case file for any of these cases?

A. No, sir, it's not.

Q. It's a new exhibit?

A. Right.

Q. Why have you utilized the 15 percent rate of return?

A. That's a typical economic threshold.

Q. Was that the rate of return that Mr. Shipley used when he presented the economics on the other two cases?

A. That's correct.

Q. When you look at the curve, what determines the position of those curves for each case on this display?

A. The investment and the specific operating costs for each scenario shape that curve.

Q. Talking about the costs of the well and operating expenses associated with that type of well?

A. Correct.

Q. The darkest curve, the one in the upper right-hand corner of the illustration, is for the single-well cost and operating expenses for a well to be drilled only to the Pictured Cliffs or Fruitland Coal?

A. That's correct.

Q. Would the economics change for either one of those pools for this example?

A. Slightly, if at all.

Q. Would that slight change make any material difference in the decision to be made by the Examiner here?

A. No.

Q. When you look at the next curve down, what does that represent?

A. That represents a dual completion, and the associated costs and operating costs that would be associated with that.

Q. And, then, the lowest curve represents what?

A. A commingle.

Q. Describe for us how you would apply this curve as a basis upon which to determine, prior to drilling, whether or not, in a certain area, we can have downhole commingling approved as the method for producing reserves from these two pools.

A. Using the allocation formula that was presented in previous testimony, you could determine an EUR and estimated initial rate using those two pieces of data. You could move along the Y axis, determine an EUR, find that point on the Y axis. You could move along the X axis, determine an initial rate, connect the two somewhere within the graph.

And, at that point, that would give you an evaluation of whether the well is economic or not, given the various scenarios.

Q. In any individual example, the initial rate may vary considerably in relation to the EUR?

A. Correct. Correct. And that's why it's important that you have both of these on a separate axis.

Q. Have you provided a tabulation for the Examiner? I believe it's shown behind Exhibit Tab No. 4?

A. That's correct.

Q. What is the purpose of the information on Exhibit No. 4?

A. Two things, essentially. One, to give a summary of where we are with our program with these specific cases, and the results that we have at this point.

And, then, at the same time, you can use that data and those results, and go back into this curve and determine which is the economic completion technique to use.

Q. Let's deal with one question first.

A. Okay.

Q. When we look at Exhibit 4, let's second-guess ourselves. We asked for approval to downhole commingle initially drilled wells in certain areas.

In examining this data, did we make the right choice for those wells?

A. To commingle?

Q. Yes, sir.

A. That's correct.

Q. Was there any other result realized from

drilling these wells?

A. No, sir.

Q. None of the drilling information would have, now, in hindsight, allowed you to either dual or separately produce either reservoir?

A. That's correct.

Q. Give us an example of that. Let's look at Exhibit 4 and start off with the Aztec 700.

A. All right. This was a well that was completed, drilling completed last year. The initial flow test for the Pictured Cliffs was determined to be 266 MCF per day. The original flow test for the Fruitland Coal was 539 MCF per day.

If you use that ratio, those two times, the initial monthly production of 275 MCF per day, you calculate out a Pictured Cliffs initial rate of 91 MCF a day. We determined the shut-in bottomhole pressure of 130 PSI.

You can calculate out, using the next two columns there, the hydrocarbon pore volume and recovery factor, and you get a Pictured Cliffs EUR of 175.7 million cubic feet.

Now, having that 175.7 number and the 91 MCF per day, you can go to this graph. You can pick off the 91 MCF per day point, and the 175.7 million cubic feet, and

find that point, and you see that it falls well below even the commingle threshold economics.

Q. You can follow a similar analysis on all the other well information tabulated?

A. That's correct. Several of the wells have not yet been completed, so there is no data. But the estimations of pressure are there for those wells, and they show what the EURs are estimated to be at this point.

We don't expect any surprises; that the pressure should be in that range right there.

Q. Do you have an opinion as to whether this information validates the reliability of the type of economic curve you're proposing to utilize in these amended cases?

A. It gives a clear representation of whether a well is economic or not, given the various scenarios.

Q. Does the economic picture change when we move from the Pictured Cliffs analysis to the Fruitland Coal Gas Pool analysis?

A. Not really.

Q. The caption on the graph says, Fruitland Coal gas or Pictured Cliffs economic evaluation?

A. Right.

Q. How would you utilize the graph, then, in making

the decision on downhole commingling for either pool?

A. You would use the graph essentially the same way. You would determine an EUR for the Fruitland Coal, and an initial rate, and it would fall under the same curves, so you could use this curve for that.

Q. Is this standard industry reservoir economic analysis that is applied by Meridian and others to analyze EURs for different pools?

A. Yes.

Q. There's nothing special or unusual about the methodology or the calculations used?

A. No.

Q. Do you have an opinion as to whether or not this serves as a reliable basis for providing an economic limitation in the commingling orders for these cases?

A. Yes, it's a reliable basis.

Q. Let me ask you to turn to Exhibit Tab 1. Look beyond the application, and find the last page in there, which says "Meridian's Proposed Amendments to Order."

Are you with me?

A. I'm with you.

Q. I'm interested in the last paragraph of that proposed change, where it talks about how to utilize this curve in the order. Are you with me?

A. Yes.

Q. Read the paragraph for us and then tell us, in your opinion as an expert, if that can be utilized by another engineer, clerical individuals at the Division's district office, in order to validate or verify whether or not a particular well is going to be eligible for downhole commingling.

A. Okay. "In the event total gas production from either pool in a well exceeds the curve for the dual completion case, as plotted on Exhibit A, attached"...

Q. That would be this curve we've been describing?

A. That's correct.

Q. All right.

A. "Being a plot of costs, compared with, compared to both maximum average daily producing rate, and estimated ultimate gas recovery, EUR, then, and in that event, downhole commingling shall not be allowed in the affected well until such time as total gas production from either pool in that well drops below the described limit on the curve."

Q. Describe for us how you would put that into operation, then, if the Examiner agrees to make this modification in the order.

A. A good example here might be a EUR of 600 million. This is for one that would exceed that economic --

Q. Let's look at the graph, and if we're using the graph as the benchmark, you would look at an EUR you'd find on the Y axis, 600?

A. Correct, 600. And on the X axis, an initial rate of 500 a day. You would go up, find the point where those two lines intersect, you see that it is above the economic threshold for a dual.

Q. So, downhole commingling does not get approved at that time for that well?

A. Correct. Now, if, say, the rate, the EUR was the same and the rate was only 300 a day, you'd scoot over two segments there, and you would see that it does not exceed that economic threshold. And, therefore, commingling could be allowed.

Q. Why is this method preferable to the one contained in the order, where it has a combined total gas production, it says, in excess of 300 MCF per day?

A. One, if you look at the single rate out of a single zone here at 300 a day, if that zone was the only one producing, according to this curve, you would have to dual it at 710 million cubic feet. Okay?

If you look back at Exhibit 4, the various cases that we've presented, the EURs in all of these do not exceed that number. So, therefore, you're limiting yourself to an initial rate of 300, but yet, there's no

discussion of how EUR affects that, that economic limit or economic threshold.

Q. By combining those two factors and comparing them to cost, in your opinion, would that be an accurate way in which the Division can determine at what threshold point they will allow Meridian, as operator, to pursue downhole commingling for initially drilled wells?

A. It defines that threshold limit; that limit is a function of several things. So, what these curves do is define that limit very clearly.

Q. Let's talk about "what if."

A. Okay.

Q. If the Division approves this for these wells, and you have a different area of the basin that has PC and Fruitland potential?

A. Right.

Q. You believe them to be marginal areas?

A. Yes.

Q. Would you then have to develop a new curve to apply to another area, or is this curve here generic, so that it could be applied to all similar cases in the basin?

A. You would probably be able to use this curve for a lot of areas. But, in my opinion, I would want a curve that's specific to those investment costs, those operating

costs, those EURs, and those initial rates.

Granted, for the cases that we're talking about, it does work. But, if you move to a different area, they may not.

Q. And, that would be part of your obligation, if you were the applicant, then, to provide the necessary reservoir and geologic information to meet some threshold area and to define the area in which these components were common?

A. Absolutely.

MR. KELLAHIN: That concludes my examination of Mr. Daves, Mr. Examiner. We move the introduction of his Exhibits 1 through 4.

EXAMINER STOGNER: Exhibits 1 through 4 will be admitted at this time.

EXAMINATION

BY EXAMINER STOGNER:

Q. Mr. Daves, looking at Exhibit No. 3 of Order No. R-9920, of all the wells that were included in that particular order, would this particular curve be adequate for those wells?

A. Absolutely.

Q. And, of course, for the two reopened cases today?

A. Right.

Q. What part of the basin are -- pardon me. When I said "the basin," the Basin Fruitland Coal pool, would this not be adequate or cover sufficiently what type of production, what type of associated water production, or whatever? What kind of factors would be involved that this curve would change?

A. Essentially, we're talking Fruitland Coal; correct?

Q. Throughout the basin. You mentioned that this was adequate for this, in most cases.

A. Correct.

Q. When would it not be adequate?

A. Where you would have excessive line pressures, low reservoir pressures, high water rates, deep wells; different variables that would affect your costs, primarily.

Q. In your opinion or your knowledge out there, do you have none of those factors in this area at this time?

A. No, sir.

Q. Is the line out there that these wells will be feeding into, are they subject to pressure change?

A. Somewhat.

Q. But not in a realm that would make this curve unusable?

A. That's correct.

Q. Have you done an EUR on these wells involved in this case today, on this matter today?

A. For the Pictured Cliffs. We've tested -- if you'll refer to Exhibit 4, the results that we have so far of the wells that are in these cases, the Rhodes C 101, the Rhodes C 102, and the Whitley A 100, what we have done to date is, we have drilled the well, we have completed the Pictured Cliffs, we have concluded our flow tests for the Pictured Cliffs, and we have established shut-in bottomhole pressures.

With that data, we have been able to calculate EURs for the Pictured Cliffs.

Q. And that's shown on the last column to the right?

A. Yes, sir.

Q. And, then, in looking at -- all these wells, then, produce a combined, over, a combined rate of over 300 MCF; is that correct?

A. There's a possibility that they will, a real strong possibility, once you combine them with the Fruitland Coal.

Q. The ones that you have tests, I'm looking at the Aztec 700, you show a Pictured Cliffs flow rate of 266; is that correct?

A. Right, that's a test rate. The actual sales

rate was 275, and then the actual allocated to the Pictured Cliffs was 91.

EXAMINER STOGNER: Mr. Stovall, do you have any questions?

MR. STOVALL: This engineering stuff, I don't understand it. No, I don't.

EXAMINER STOGNER: I have no other questions at this time.

Mr. Kellahin, do you have anything further?

MR. KELLAHIN: No, sir.

EXAMINER STOGNER: Would you provide me a rough draft?

MR. KELLAHIN: Yes, sir, I'd be happy to.

EXAMINER STOGNER: And how to incorporate this curve, perhaps, as an exhibit.

MR. KELLAHIN: Yes, sir.

MR. STOVALL: Mr. Kellahin, is your language in your prehearing statement, is that intended to be the language that you would copy?

MR. KELLAHIN: No, sir.

MR. STOVALL: Oh, okay.

MR. KELLAHIN: We provided that initially, and then on reflection, found that this curve was a better way to approach the economic issue. And, so, I'll provide the Examiner with language that we think works.

We have suggested as a draft an appendix behind Exhibit 1, but I'd like to fine-tune that, and we'll just put it within the context of an entire order for your consideration.

EXAMINER STOGNER: If there's nothing further, Mr. Kellahin, then I'll take this matter under advisement and await your rough draft.

MR. KELLAHIN: Thank you.

(And the proceedings concluded.)

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case Nos. 10745 - 10754 heard by me on August 19 92.

Examiner
Oil Conservation Division

CERTIFICATE OF REPORTER

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

I, Susan B. Sperry, 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 caused my notes to be transcribed under my personal supervision; 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 September 3, 1993.

Susan B. Sperry

SUSAN B. SPERRY, RPR, CM
CCR No. 156