NEW MEXICO OIL CONSERVATION DIVISION

STATE LAND OFFICE BUILDING

STATE OF NEW MEXICO

CASE NO. 10393

IN THE MATTER OF:

The Application of Meridian Oil, Inc., for Downhole Commingling, San Juan County, New Mexico.

BEFORE:

MICHAEL E. STOGNER

Hearing Examiner

October 3, 1991

REPORTED BY:

CARLA DIANE RODRIGUEZ
Certified Shorthand Reporter
for the State of New Mexico

ORIGINAL

A P P E A R A N C E S

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BY: **W. THOMAS KELLAHIN, ESQ.**

I N D E X

E X H I B I T S

EXAMINER STOGNER: Call next case, No. 10393.

MR. STOVALL: Application of Meridian Oil, Inc., for downhole commingling, San Juan County, New Mexico.

EXAMINER STOGNER: I'll call for appearances.

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

EXAMINER STOGNER: Are any of these witnesses the same ones that appeared in the previous case?

MR. KELLAHIN: Only Mr. Alexander.

EXAMINER STOGNER: Would the other witness, besides Mr. Alexander, stand and be sworn at this time?

(At this time, the witness was sworn.)

EXAMINER STOGNER: Let the record show that Mr. Alan Alexander, the first witness, has been previously sworn in Case No. 10392.

MR. STOVALL: And he's also qualified.

EXAMINER STOGNER: And who has also been qualified.

ALAN ALEXANDER

Having been previously duly sworn upon his oath, was examined and testified further as follows:

EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Alexander, let's turn to the topic of this downhole commingling case. From your perspective as a landman, have you verified the ownership within this Section 22, which is reference to the Gordon #5 well, it's in Section 22, 27 North, 10 West? And we're dealing with the west half of this section for the Fruitland Coal spacing, and we're dealing with the southwest quarter of that section for the Pictured Cliffs spacing for that pool?

A. Yes, sir, that's correct. I had that verified under my supervision.

Q. Based upon your verification of the ownership, do you find a difference in the ownership by which production would be shared dependent upon which pool it would be allocated to?

A. Yes, sir, I have investigated that, and there is a slight difference in the overriding royalty between the two spacing units.

Q. When we look at the west half of the section, describe for us the kinds of leases involved in the west half.

A. They consist of two federal leases, being one in the northwest quarter and then one in the southwest quarter.

Q. Let's turn to the first display behind Exhibit No. 2. My copy of the exhibit book has a plat showing the west half of the section?

A. Yes, sir, that's correct.

Q. The next display after that is a plat showing the southwest quarter of the section?

A. Yes, sir, that's correct. I believe the Examiner's book may start with the offset operator plat.

Q. I believe his is just like yours, Mr. Alexander. His first display is the west half.

A. Yes, sir, that's the offset operator plat for the west half, and then immediately following that would be the offset operator plat for the southwest quarter, which is the Pictured Cliffs formation. And then immediately behind that is a list of the owners in the west half, inside the west half, for the Gordon #5 well.

Q. Let's deal with that ownership first.

A. All right.

Q. There are only two different leases that are consolidated for the coal/gas production in the west half of 22?

A. Yes, sir, that's correct.

Q. They consist of the northwest quarter and then the southwest quarter?

A. Yes, sir, that's correct.

Q. When we look at the southwest quarter and its relationship to the northwest quarter, while they are both federal leases, they are not the same overriding royalty interests?

A. Yes, sir, that's correct.

Q. All right. The offset operators shown on the west half of the offset owner plat, you've identified the offset operators?

A. Yes, sir, we have.

Q. And have you done the same thing with the southwest quarter plat for the Pictured Cliffs?

A. Yes, sir, we have.

Q. Have you caused notification of Meridian's request to commingle production in this wellbore in the Pictured Cliffs and the coal/gas pool, to be sent to not only the

interest owners within the area affected by the commingling, but to the operators adjoining that spacing unit?

A. Yes, sir, that is correct.

Q. Have you received any objection from any of those potential parties?

A. No, sir, we have not.

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

EXAMINATION

BY MR. STOGNER:

Q. Mr. Alexander, I'm going to refer back to the list. I'm still a little bit confused. Which overriding royalty is different?

A. The basic difference occurs in the overriding royalty that was owned by Amoco Production Company.

Q. Can you go into a little more detail about that overriding?

A. Yes, sir. Let me refer to some other information here.

Q. The way I understand that, this list is the Gordon Well #5, is the interest as a whole, whether it be working interest, overriding or royalty inside the west half? Is it all mineral

interests?

A. It's all leased mineral interests, yes, sir. Mr. Examiner, for a little bit more detail about the ownership, in the southwest quarter we, of course, have the 12-1/2 percent royalty to the United States of America, the government, since they're both federal leases. We have a one-percent override to the Gordon family, and a one-eighth of one-percent override to Mr. A. L. Duff and his successors, and then Amoco Production Company has a 12-1/2 percent override.

Q. What was that override?

A. 12-1/2 percent. In the northwest quarter we have the same royalty to the federal government, 12-1/2 percent. The overrides for the Gordon group and the successor to Mr. A. L. Duff would be the same, one percent and one-eighth of one percent respectively, and then Amoco Production Company, through a farmout arrangement with Meridian, is going to have a 16.375 percent override.

Q. Okay. That's 12-1/2 percent override in the west half, 16.375 in the southwest, or do I have that reversed?

A. Let me clarify that. In the southwest

quarter, Amoco has a 12-1/2 percent override, and in the northwest quarter they will have a 16.375 percent override.

Q. Is this also the address list of which people were notified for their interest?

A. Yes, sir. We have three separate lists. One list--or two lists, I beg your pardon, for the offset operators, being the offset to the Fruitland Coal and the offset to the Pictured Cliffs, as shown on the two exhibits that are behind Exhibit No. 2, and then the list that is entitled Gordon #5 well, owner address list, would be those owners of the royalties and the overrides within the entire west half.

Q. I'm particularly kind of interested in Amoco at this time. Do you have that, Mr. Kellahin?

MR. KELLAHIN: Certificate of notice is marked as Exhibit No. 6, Mr. Examiner, and we sent our application and cover letter to Mr. Eric Nitcher of Amoco in Denver, who is the attorney that customarily appears at the Division hearings for Amoco. I believe Meridian personnel have also talk to Amoco, and it's our understanding they have no objection to the application today.

EXAMINER STOGNER: You show a different address, a Dallas address, on the owner address list for Amoco.

MR. KELLAHIN: I understand, but we used the Denver address, and Mr. Nitcher, specifically, because I knew he was the attorney that often handled their projects here in Santa Fe.

EXAMINER STOGNER: So as I understand it, the Denver address is also adequate for both concerns, overrides and offsetting, is that correct?

MR. KELLAHIN: That was our information.

MR. STOVALL: As a business decision, both Mr. Kellahin and Mr. Alexander, are you comfortable with the notice given to Amoco? Do you feel that you're adequately protected, recognizing that if the notice is inadequate, they can come back and challenge any order issued here?

A. Yes, sir, we're very satisfied.

EXAMINER STOGNER: Are there any other questions of Mr. Alexander?

MR. KELLAHIN: Not for me.

EXAMINER STOGNER: Do you wish to go ahead and offer Exhibit 6?

MR. KELLAHIN: Yes, let's please do that, as well as Exhibit 1 and the displays following Exhibit 2.

EXAMINER STOGNER: Did we go over Exhibit 1?

MR. KELLAHIN: I'll have him do it for the record.

FURTHER EXAMINATION

BY MR. KELLAHIN:

Q. Identify what's contained behind Tab Exhibit No. 1, Mr. Alexander.

A. We have included for the Division a copy of our application to the Commission, as the first item appearing behind Exhibit No. 1. We've also included a copy of the application itself, and behind the application we have exhibits that were attached to the application being Exhibit A, which is a well schematic of the present condition of the Gordon #5 well, Exhibit B is a well schematic showing the effect of commingling, and Exhibit C is a generic formula to be used in allocating the production between the two formations for the Gordon #5 well. Exhibit D is

the offset operator plat for the southwest quarter Pictured Cliffs formation, Exhibit E is the offset operator plat for the west half of the Fruitland Coal formation, and Exhibit F are the owners within the west half of the section for the Gordon #5 well.

EXAMINATION

BY MR. STOVALL:

Q. Exhibits D, E and F are the same as Exhibit 2 essentially, is that correct?

A. Yes, sir, that's correct.

Q. As far as your testimony is concerned and the purpose of the exhibits, the items identified as Exhibit A, B and C are merely offered here by you as being evidence of the application that was sent, and not for the actual content, the technical information with respect to the well or the allocation, is that correct?

A. That is correct.

Q. I assume we'll see these again in some sort of testimony, to make them useful?

A. Yes, sir.

MR. KELLAHIN: Yes, sir. We wanted you to know that all these interest owners had been provided a sample calculation for the allocation

formula.

EXAMINER STOGNER: Thank you. At this time I'll admit Exhibits 2 and 6 and come back to Exhibit 1 after your next witness describes it in more detail.

JAMES E. (JIM) CRADDOCK

Having been first duly sworn upon his oath, was examined and testified as follows:

EXAMINATION

BY MR. KELLAHIN:

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

A. My names is James Craddock, and I'm the regional reservoir engineer for Meridian's Farmington's region.

Q. On prior occasions, Mr. Craddock, have you testified as a petroleum engineer before the Division?

A. No, I have not.

Q. Summarize for us your education.

A. I received a bachelor of science degree in mechanical engineering from Texas A & M University in 1981.

Q. Subsequent to graduation, summarize for us your employment experience.

A. Following that I worked for Superior Oil Company for four years in the Gulf Coast area, and then the following six years for Meridian Oil in the Permian basin and San Juan basin areas.

Q. You currently reside in Farmington, New Mexico?

A. That is correct.

Q. Describe for us specifically what it is that you do currently for your company.

A. I currently supervise the reservoir engineering group.

Q. How many engineers are working for you?

A. Eight at this time.

Q. As one of your projects, have you studied the problems that have occurred with the Gordon #5 well, made a study of that with the assistance of your engineers, to come up with a suitable solution for the fact that that production, as a result of mechanical failure, is now commingled between the Pictured Cliffs and the Fruitland Coal?

A. Yes, I have, sir.

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

EXAMINER STOGNER: Mr. Craddock is so qualified.

Q. Let's turn to Exhibit No. 3 and, for illustrative purposes, let's use the first display here. And in my book it shows a well schematic for the well and it says "present." Is that the one you have?

A. That is correct.

Q. Describe for the Examiner what was the history of the well, taking us up to the time that Meridian attempted to recomplete this as a dual well, adding in the coal production in this wellbore.

A. All right. Well first off, the completion date for this well, the original completion date, was March of 1955. The well was completed originally in the Pictured Cliffs formation, open hole and was nitroglycerine shot for the completion stimulation.

It produced accordingly until Meridian sought to recomplete the well as a dual producer in both the Pictured Cliffs and Fruitland Coal. As you see the existing schematic labeled "present," that shows the current condition of the well. That recompletion attempt to dual the

two zones occurred in October of 1990.

Q. Prior to October of 1990, the well was being produced only out of the Pictured Cliffs formation as an open hole completion in that interval?

A. That is correct.

Q. Nothing was added or subtracted from the way in which that well was being operated?

A. Yes, sir.

Q. In October of 1990, what, then, did you attempt to do?

A. The Pictured Cliffs zone was isolated while the uphole Fruitland Coal zone was perforated and stimulated. The stimulation was simply a perforation breakdown and acid job.

And then, following that and a float test, a production packer, a Baker model-81 packer, was run in the hole and two strings of tubing were run in as you see on this schematic, to dual complete the well.

Q. With what result?

A. Upon a packer leakage test, we determined that the two zones were in communication. Further, during that workover, we separately tested the tubing string and we ran a

new Baker packer. The original one was also new. Based on that, plus the fact that the two zones appear to be relatively slow to equalize, we believe that communication is occurring behind the casing.

Q. Let's go through the sequence again. Start operations on the well, set the packer, attempt to establish production separately within the same wellbore from the coal gas, which is slightly above the Pictured Cliffs. What test data did Meridian receive to tell you that you were not maintaining isolation of production within the wellbore?

A. Essentially, during the packer leakage test, pressures are measured for the casing and the two tubing strings. As you see, essentially the Fruitland Coal was open to the casing string while the Pictured Cliffs was only open to the lower tubing string.

By measuring those pressures, we found that those two zones would equalize over time.

Q. To satisfy yourself that it wasn't a failure of the packer itself, the procedure was conducted again shortly thereafter?

A. With a new packer, yes, sir.

Q. With the same result?
A. Yes, sir.
Q. That you could not attain separation within this wellbore between the two formations?
A. That's correct.
Q. And the conclusion is what?
A. Our conclusion is that we believe the two zones are in communication, and the most likely situation is that they are communicated behind the casing string.
Q. That communication can be attributed to what specifically, Mr. Craddock, in your opinion as an engineer?
A. It's difficult to tell, but the most likely scenario is probably due to poor primary cement job.

As you can see, the open hole Pictured Cliffs zone begins at a measured depth of 1,914 feet. The bottom perforation for the Fruitland Coal zone begins at 1,904, so that's 10 feet of separation.

As I mentioned earlier, stimulation on the Fruitland Coal was conducted with a breakdown using a perforation isolation tool. Stimulation of the Pictured Cliffs was due to nitro

stimulation, and so it's our belief that there's a very high likelihood that that primary cement job is probably not competent.

Q. Tell me the details of the producing rates that were being achieved on the Pictured Cliffs production just prior to the attempts to add the coal gas to the well.

A. Approximately 40 Mcf per day for the PC.

Q. Have you made an investigation to determine whether it is economic to attempt to conduct procedures in the well to cement the zones, reperforate, recomplete in some fashion, that you can then establish separation in the production?

A. Our feeling is that the probability of that being successful is pretty low, and that the main reason is there's relatively low bottom hole pressure in both zones and, as such, there's a good likelihood that trying to do a remedial cement job, squeeze job, if you will, could damage the formations irreparably, and we would lose the possibility of producing those reserves.

Q. What, in your judgment as an engineer, is the best way to produce the remaining gas that

can be recovered not only out of the Pictured Cliffs but out of the Fruitland Coal?

A. We would recommend commingling both zones, removing the packer that's currently between them, and commingling the two zones and producing them together.

Q. As an engineer, have you examined to determine whether or not you're going to have any difficulties with downhole commingling? For example, do you have any substantial pressure differences between the zones that's going to cause you any migration problems?

A. No, we don't believe there will be a problem.

Q. Have you looked at the types of fluids that are being produced from the commingled streams to satisfy yourself that you don't have a water problem, of having water migrate from one zone into a dry gas zone?

A. Yes, sir, we have investigated that, and essentially both zones are dry, very little water production if any, and that's also characteristic of other Fruitland Coal wells in the area.

Q. From an operational, as well as a

recovery point of view, do you see any adverse consequences to the owners in either production, from having the production commingled and produced in that fashion?

A. No, sir, I do not.

Q. In the absence of approving the downhole commingling, would there be reserves that are left in the reservoir that might not otherwise be recovered?

A. Yes, sir, we believe there would be.

Q. Having satisfied yourself about the ability to recover the remaining reserves attributable to each zone, did you determine how to fairly allocate those reserves to the various owners that are entitled to receive that production?

A. Yes, sir, we believe we have a method determined.

Q. What is your method?

A. Should I go ahead and reference that in the exhibit?

Q. Well, describe the concept. What are you trying to achieve?

A. Essentially, we feel the fairest method and the one most likely to attribute the proper

reserves to each formation, would be one in which we attribute the reserves that we estimate for the PC, based on material balance, over the producing life or the remaining producing life of the well, and then attribute the remainder of production at each month to the Fruitland Coal.

At this time, calculating reserves for the Fruitland Coal would be rather difficult.

Q. We have no way to separately test the Fruitland Coal at this point in this wellbore, do we?

A. That's correct.

Q. The historical past production in the Pictured Cliffs is the only reliable data we have achieved in this wellbore upon which you can base any calculation?

A. Yes, sir.

Q. All right. Taking the past data in the Pictured Cliffs, you've utilized material balance to forecast future reserves that will be recovered that can be attributable to the Pictured Cliffs?

A. Yes, sir, we have.

Q. Describe for us the methodology that you'll take that Pictured Cliffs reserve

calculation and allocate the share to the Pictured Cliffs versus the coal gas.

A. Okay. First, utilizing material balance, we would estimate the gross or eight-eighths remaining reserves from the PC, and then apply that to the remaining production life of the well, starting with the current producing rate and declining out at approximately eight percent decline.

And so, for each month of production, we would use that formula to determine the amount of production from the PC, and then subtract that amount that we attribute to the PC from the total production of the well, the remainder being Fruitland Coal production.

Q. Have you shared this proposed allocation procedure and formula with the district office in Aztec, and discussed it with the personnel in Aztec?

A. Yes, I have.

Q. Have you been able to determine a more reliable method for allocation other than the one you're proposing?

A. No, sir. We feel this is probably the most reliable method.

Q. Do you have any objection from the district office of the OCD with regards to the application of this allocation formula to the Gordon #5 well?

A. No, sir, not that I'm aware of.

Q. Let's talk specifically about how the formula works. If you'll turn--let's go through the background details again. If you'll turn to the exhibits behind Exhibit 4, let's start there. The first plat shows what, Mr. Craddock?

A. The first plat shows an area map with offsetting wells shown with various symbols. The triangle symbol in this case represents the Gordon #5 well. Circles represent wells that have been completed in the Fruitland Coal in this case and are currently tied in and producing. Hexagon shaped wells represent wells that have been completed in the Fruitland Coal but are currently awaiting tie-in. Then there are additionally some squares that show PC wells in the area.

Q. The next display is what?

A. The next display is a production curve of rate versus time for the Gordon #5 well.

Q. When we look to the left of the display

at years prior to 91, what are we looking at?

A. Those are monthly production figures, the total amount of gas produced in a given month.

Q. Okay. And at mid-point 91, when we look to the right, what have you projected with the declining line?

A. That would be the projected production rate decline curve for the well, based on material balance reserve estimate.

Q. The next display following the production decline curve is what?

A. The next display is a pressure versus cumulative production curve, showing shut-in wellhead pressure versus cumulative production for this well, the Gordon #5.

Q. What's the purpose of the P/Z plot?

A. This is a way for us to determine, for the gas reservoir in the PC, what we believe the remaining reserves would be. In this case, in the upper right-hand side you can see that the EUR, or estimated ultimate recovery for this well, is estimated at 592,428 Mcf.

Q. You're utilizing what abandonment pressure in the P/Z plot?

A. 50 psi, which would be standard for a well producing in the low-pressure gathering system for a PC well.

Q. When we look at the decline curve on the P/Z plot, you get a reference point after the initial surface pressure, and you follow that down, and you have plotted some pressure data points that are slightly below the line. What's represented there?

A. Let's first back up. The initial pressure point at cumulative production of zero, was taken in March of 1965 and was 560 psi. The subsequent points were taken during the life of the well, and the most recent point, the one that the line goes through, is the one in 1985, June of 85.

The previous two points that are below the line represent prior cumulative production and pressure points that were produced earlier in the life of the well, and in general were produced during a time when the well was less constrained production-wise than it is now.

Q. Is that a typical signature of pressure in a Pictured Cliffs well when you're trying to plot pressure, to see a pressure that

subsequently is slightly higher than Pictured Cliffs reservoir wells?

A. Yes, this seems pretty representative and very similar to similar wells in the area. Oftentimes, the production points in between the initial point and current data are lower than the line, and that's primarily due to the nature of the reservoir being a very low permeability, tight formation.

Q. Is this a conventional methodology applied by you and your company to other Pictured Cliffs wells to determine estimated ultimate recovery from other Pictured Cliffs?

A. Yes, it is.

Q. All right. Having calculated estimated reserves for the Pictured Cliffs, show us how you have derived an equation for which you can allocate production, then, between Pictured Cliffs and the coal gas?

A. The following page, the page following the P/Z plot, details that. The first paragraph there, under "equation derivation," simply shows, taking the standard decline formula and--be a replacement solving for a future production rate based on an initial one. And then, following

that, we make it specific for the Gordon #5 by applying the 9.18 percent decline--I'm sorry, the 8.19 percent decline--such that it's specific for this well.

Following that is a paragraph that demonstrates how months of curtailment could be taken into account. Essentially, what we're recommending is that if the well is shut in for a month, or even a few days, we would have, via this formula, the ability to not lose that production for the future but rather bring the well or attribute the correct amount of production to the PC following those production periods.

Q. How often will you calculate the allocation between the two reservoirs for production from the well?

A. It would be on a monthly basis.

Q. When we turn to the last page behind Exhibit No. 4, what have you shown here?

A. This is an example that walks through how this evaluation will be done on a given month. The example starts with January 1, 1991 as an example. It also demonstrates how, with a months of curtailment, how the formula would work

as well.

Q. Identify for us the data shown behind Exhibit 5.

A. All right. I believe the first page is a Tefteller, Inc. pressure measurement that occurred on the Rowley #501 well located approximately two miles east of the Gordon #5. It is a Fruitland Coal producing well. This is intended to demonstrate that the bottom hole pressure measured in that well is approximately 289 psi.

Q. How does that help you do anything with the Gordon #5 well?

A. We're simply showing that the pressure is relatively similar to what the PC currently is measured in the Gordon #5.

Q. You, as an engineer, can conclude that you won't have the likelihood of one's own thieving from the other because of a substantial pressure differential?

A. It appears the pressure differential is not significant and also the PC is a rather low permeability zone.

Q. The last data behind Tab Exhibit 5 is what?

A. This shows two tests that were run on the Gordon #5. The first shows on November 13, 1990, the well flowing on the PC side, and this is as the well is currently configured with the packer in the hole but with, we believe, some communication behind pipe.

As you can see, the well begins at a shut-in condition where the Fruitland Coal and the PC are essentially equalized at the same shut-in pressure of 215 psi. And then as we flow, only the PC side, with the Fruitland shut in, you can see that the Fruitland tubing and casing pressures both decline and equalize at something very near what the PC tubing pressure is flowing at, over a period of approximately three hours.

The second set of data is on November 20th, and it's the reverse test, essentially, where the PC and Fruitland begin at a shut-in condition. The Fruitland is opened up while the PC is left shut in, and again you can see that over a period of time the pressures begin to equalize.

Q. You characterized these earlier as being part of the packer leakage test procedures?

A. Correct.

Q. The conclusion is what?

A. Again, that the two zones will equalize currently with the current wellbore configuration.

Q. In your opinion, Mr. Craddock, will the approval of this allocation formula and the opportunity to continue or to establish downhole commingled production and to continue that production, be in the best interest of the correlative rights of all the interest owners in the area subject to receive production from the well?

A. Yes, sir, we believe they will protect correlative rights, and in addition they'll prevent waste because it's very likely that a remedial job could damage the formations and we could lose the reserve.

MR. KELLAHIN: That concludes my examination of Mr. Craddock. We'll move the introduction of Exhibits 3, 4 and 5. In addition, we will again tender the technical exhibits attached to Exhibit 1.

EXAMINER STOGNER: Exhibits 1, 3, 4 and 5 will be admitted into evidence at this point.

EXAMINATION

BY MR. STOGNER:

Q. Mr. Craddock, so that I understand, in looking at the allocation formula and the first portion of it, the Q-1 figure, that is the current rate, and that would remain constant at 40 Mcf?

A. Yes, sir, that's correct.

Q. Okay. You make a reference to something down at the bottom of this page. Is that how this formula was derived was through this research?

A. Yes, sir. This is a reference of the Oil and Gas Evaluation Book. Also Craft and Hawkins and several other reference materials would also contain the same formula, though we reference one instance here.

Q. As far as the actual mechanism, who would do the calculation?

A. We would do that internal to Meridian and then submit that--and I'm sorry, I'm not going to be able to state the right NMOCD document that we submit each month to show production from the various wells, but it would be submitted as part of that effort each month.

Q. We'll call it the monthly production form.

A. There we go.

Q. Have you had discussions with the MMS or BLM concerning this proposal?

A. No, sir.

Q. Other than notification?

A. Other than notification, no, sir.

Q. Would Meridian have an objection, say, on an annual basis, providing a check, if you will, showing the formulas, since I'm sure that would be done out of your office, I would assume or the reporting office, that those records be kept and at the end of the month perhaps a copy be provided for the record backing up the accuracy of these figures, so that they can be double-checked over the year on a monthly basis?

A. No, sir, we have no problems with that.

EXAMINER STOGNER: Mr. Ernie Busch, out of the Aztec District office, do you have any questions of this witness?

MR. BUSCH: Yes, I do, Mr. Examiner.

EXAMINATION

BY MR. BUSCH:

Q. Mr. Craddock, would you refer to the

first page behind Exhibit 4.

A. Yes, sir.

Q. Those are the wells that are distributed throughout the area there. You noted that the completed and tied-in wells were Fruitland Coal producers?

A. Yes, sir, that's correct.

Q. Any of these recompletions?

A. Yes, sir, I would say a fairly substantial number would be recompletions.

Q. Of those that were recompleted, did you have any suspicion or concern that there might be some Fruitland Coal production already being produced through the PC by the character of the production curves?

A. Yes, sir. I think you phrased it right. There is suspicion, and it's very difficult to go much beyond that.

As I mentioned earlier, the vertical separation between PC and Fruitland Coal in this area is very small. In some cases there may only be one or two feet of shale as a barrier between what's called the basal coal seam, which would be the lowermost seam of coal in the Fruitland Coal and the upper part of the Pictured Cliffs.

Also, as I mentioned, some of the wells are wells that were drilled in the 1950s, and many of them were stimulated in the same manner as the Gordon #5, with a nitro shot. There is some circumstantial evidence and certainly some interesting production curves from some of these wells in the PC that lead us to believe it's possible that some could be in communication geologically with the Fruitland Coal.

Q. So it's fair to say that there may be a number of wells, if not now but within the area in the future, that may have the same type of problem that the Gordon #5 does?

A. It's possible. Again, we do believe there's some mechanical situation involved with the Gordon #5 in terms of a primary cement job separating these two zones that's not entirely competent. I couldn't comment on whether that will be the case in other wells or not, but it is possible.

Q. Okay. Let me ask you, then, can we refer to the formula that's the fourth page behind Exhibit No. 4? How would this formula apply, or how could it be used, would it have to be changed, or in your opinion what would be the

best application of this formula, to wells that have already been producing Fruitland through the PC?

A. That would be rather difficult. I guess first of all, I would like to state that our intention in this hearing is to present this formula as an allocation method for the Gordon #5 in and of itself.

It would be very difficult to try, if I understand your question correctly, to go back in time, perhaps, and try to determine how to allocate something that may have been Fruitland Coal production. I have no ready answer for you there, and I'm not sure that technically we have the data to tell us definitively that we have that situation occurring and, if so, in what proportions.

Did I understand your question correctly?

Q. You bet. Yes, you answered my question.

Then it would be fair to say that if we do have a situation that exists with the Gordon #5 in a number of the other wells, that we may not have a ready answer with this particular

formula?

A. Yes, sir. In terms of, again, referencing back to your previous question, if the question were seeking an answer for us to determine over the period from 1950-whatever to the current date, did we have Fruitland Coal production? if so, how much? no, sir, I don't think this formula would be this way to get there.

Q. Would it be in the interest of the OCD to apply the formula as it is, even when we discover those types of situations and start from there, being able to commingle the production since we don't have anything better to work with at this point, or do we just continue to leave things as they are and--

A. In my opinion, Mr. Busch, I think the appropriate approach, at least from Meridian's perspective, would be in situations such as the Gordon #5 where we have definitive proof of commingling. Yes, I believe that's the correct approach.

To extend that to wells where we have, perhaps, circumstantial evidence, I don't believe that would be the correct approach because it

would be very difficult and costly to try and prove that up and determine that, in fact, it is occurring. Many of these wells are similar to Gordon #5 in that production rates are in this range, and so that could be economically very detrimental to those wells.

MR. BUSCH: Thank you.

FURTHER EXAMINATION

BY MR. STOGNER:

Q. Mr. Craddock, in your study, to come up with the allocation formula just for the Gordon #5, did you look at any other methods, rather simplified or complicated?

A. Yes, sir. One of the methods we considered, I think, would be one that would be used in many commingling approaches in conventional reservoirs, and that would be simply to estimate the reserves of each formation separately and come up with a percentage, and then simply apply that percentage throughout the life of the well every month to the production rate and thereby allocate it.

Our problem with that and our concern was that we felt that our reserve estimation abilities in the Fruitland Coal are rather

limited at this time. To elaborate on that more, at this point in time, without a lot of production history in this area, it's difficult for us to estimate drainage radius or recovery factor, and we need more time before we're able, as an industry, to do that for this area.

Q. Do you feel at a later date that might be a method utilized for the Gordon #5 as it nears depletion, perhaps?

A. Yes, sir, I think that's possible.

Q. Has the Gordon #5 had any history of condensate production?

A. No, sir.

Q. None at all?

A. I believe it's a dry well.

Q. Are there any other Pictured Cliff wells within the area that have a history of condensate production?

A. I don't know the answer to that question. If you would like, we can research that and get back with you. I don't know for sure

Q. If any condensate production in the San Juan basin was to occur, would it more likely occur out of the Pictured Cliffs formation or the

Fruitland Coal?

A. The Pictured Cliffs. And I guess following that line of logic, if we have condensate production, we can allocate it all to the PC, I think, very safely.

Q. There has been a record keeping of water production per formation out there, and you said that both were dry at this point. Is there any water associated?

A. Yeah, there probably will be some very small amounts of water. By "dry," I mean that essentially we're not having to trek water off location or worry about a substantial amount of water. The coal here doesn't behave as the coal does, say, in the northeast Blanco unit or the 30 and 6 unit, where there's a great deal of water produced.

Q. Is the cost of hauling off the water, do they affect the interest owners in which are listed in today's, oh, where's that list, Exhibit 2?

A. Right. The cost to haul water would effect only the interest owners or cost-bearing owners.

Q. For record keeping purposes, would,

say, a 50/50 split be adequate?

A. That would be, yes.

Q. As opposed to any other kind of elaborate system or complicated system that would confuse any record keeping agency such as us or the MMS, or God knows who in the future?

A. Yes, sir, that sounds correct.

EXAMINER STOGNER: Are there any other questions of this witness? If not, Mr. Craddock may be excused.

Is there anything further, Mr. Kellahin?

MR. KELLAHIN: No, sir.

EXAMINER STOGNER: If nobody else has anything further in Case 10393, this case will be taken under advisement.

(And the proceedings concluded.)

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 10393 heard by me on 3 October 1991.

Oil Conservation Division, Examiner

CERTIFICATE OF REPORTER

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

I, Carla Diane Rodriguez, Certified Shorthand 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 October 10, 1991.

CARLA DIANE RODRIGUEZ, RPR
Certified Shorthand Reporter No. 91