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 CONOCOPHILLIPS FOR AN EXCEPTION TO THE WELL DENSITY REQUIREMENTS OF THE BASIN-DAKOTA GAS POOL, RIO ARRIBA COUNTY, NEW MEXICO	)	CASE NOS. 14,016
APPLICATION OF CONOCOPHILLIPS FOR AN EXCEPTION TO THE WELL DENSITY REQUIREMENTS OF THE BLANCO-MESAVERDE GAS POOL, RIO ARRIBA COUNTY, NEW MEXICO	)	14,017
APPLICATION OF CONOCOPHILLIPS FOR AN EXCEPTION TO THE WELL DENSITY REQUIREMENTS OF THE BLANCO-MESAVERDE GAS POOL, RIO ARRIBA COUNTY, NEW MEXICO	)	and 14,018
	)	(Consolidated)

REPORTER'S TRANSCRIPT OF PROCEEDINGS
EXAMINER HEARING

ORIGINAL

BEFORE: WILLIAM V. JONES, Jr., Technical Examiner
DAVID K. BROOKS, Jr., Legal Examiner

January 10th, 2008
Santa Fe, New Mexico

These matters came on for hearing before the New Mexico Oil Conservation Division, WILLIAM V. JONES, Jr., Technical Examiner, DAVID K. BROOKS, Jr., Legal Examiner, on Thursday, January 10th, 2008, at the New Mexico Energy, Minerals and Natural Resources Department, 1220 South Saint Francis Drive, Room 102, Santa Fe, New Mexico, Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

* * *

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I N D E X

January 10th, 2008
Examiner Hearing
CASE NOS. 14,016, 14,017 and 14,018 (Consolidated)

* * *

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A P P E A R A N C E S

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* * *

WHEREUPON, the following proceedings were had at 4:15 p.m.:

EXAMINER JONES: Let's go back on the record.

Do you want to combine all three of these?

MR. KELLAHIN: Yes, please.

EXAMINER JONES: Okay, let's call Case 14,016 and Case 14,017 and Case 14,018. They're the Application of ConocoPhillips for an exception to the well density requirements of the Blanco-Mesaverde Gas Pool and also, in Case 14,016, the Blanco- -- the Basin-Dakota Gas Pool, all three in Rio Arriba County, New Mexico.

Call for appearances.

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

EXAMINER JONES: As I see no other appearances -- Any other appearances?

Will the witness please stand to be sworn?

(Thereupon, the witness was sworn.)

MR. KELLAHIN: By way of introduction, Mr. Examiner, Mr. Neale Roberts is a petroleum engineer with ConocoPhillips. He resides in Farmington, and he's the team leader of the group of technical people that are in the hearing room today. And in order to accommodate the

remaining time and try to expedite the process, Mr. Roberts is the presenter.

The geologic components that are in the presentation that you're about to see have been worked on by he and a geologic expert with ConocoPhillips. If we are not successful in that part of the presentation, or if there are questions that Mr. Roberts cannot answer, we do have an expert geologist here to supplement his testimony.

In addition, we have two land people here to talk about land issues if that becomes necessary.

What you're about to see is the result of an extensive research effort by ConocoPhillips to inventory its wells for compliance with the well density requirements of the Blanco-Mesaverde and the Basin-Dakota Pools.

You may recall that back in March of last year you were the Hearing Examiner when Burlington brought to you an example of a noncompliant spacing unit in which, by happenstance, Burlington had put two Mesaverde wells in the same 40. And I have copies of that order to refresh your memory.

As part of that process, when there was the consolidation of the two companies, ConocoPhillips then picked up the same methodology of research and study to see if their inventory of those wells for those pools had any of those kind of problems.

As an end result of that search, Mr. Roberts is here to testify about how all that was done. We come down with a population of six 320-acre spacing units, of which three have a circumstances in which within those 320s there are a 40-acre tract that have two wells. In two of the cases they're Mesaverde wells. In the third case, it's a Dakota that's paired up.

In none of those 320-acre spacing units have we exceeded the density that would otherwise be allowed. The mistake has been, they have drilled two wells in the same 40, as opposed to spreading them out into two different 80-acre tracts.

The dilemma for Mr. Roberts and his team was not only to satisfy that those were the only ones, but then to decide whether one of those wells ought to be plugged and abandoned. Currently three of those wells are shut in so that there is no noncompliance going on.

The question now is whether we restore those to production and will grant them as exceptions. The end result of Mr. Roberts' study with his technical people is that he has found correlative rights would not be violated if you allow them to return those wells to production, and he goes through a complex set of calculations with some reservoir simulation to show you how you reach that conclusion. So that's about where we're headed.

And with your permission, Mr. Examiner, there's a PowerPoint show. In addition, the hard copies of the display are in the exhibit books before you, and Mr. Brooks and the court reporter has a copy. Finally, I will give you the disc of the PowerPoint. If for any reason you need to go through the PowerPoint again, you'll have the disc for your own computer.

NEALE ROBERTS,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. With that introduction, Mr. Roberts, would you please state your name and occupation?

A. Neale Roberts, and I'm a reservoir engineer at ConocoPhillips.

Q. And where do you reside, sir?

A. Farmington, New Mexico.

Q. Give us a general summary of what is that you've done as an engineer concerning the projects involved in the three cases that Examiner Jones is about to hear.

A. I became involved in the project at the conclusion of the research that you described wherein the cases to be considered were identified. And from that point I -- we actually found six violations, and I

recommended other solutions in three of them and then pursued the arguments to request exceptions for the remaining three. So that -- kind of the decision as to what to do with the six violations and then the assessments of the three cases that we decided to proceed to request exceptions for, all of that work was done by me.

Q. On prior occasions have you testified and qualified as a petroleum engineer before the Division?

A. Yes.

Q. Have you satisfied yourself that you have had sufficient database on which to perform the work that you did?

A. Yes.

Q. And with the assistance of the geologist, did you have a sufficient geologic basis in which to select geologic parameters for your reservoir simulations?

A. Yes, we -- the work that we did integrates pressure and production and geologic data into a fairly coherent analysis that all serves to support and validate the conclusions.

Q. As part of your study, did you have available to you the appropriate production and pressure data from the area?

A. Yes.

MR. KELLAHIN: We tender Mr. Roberts as an expert

petroleum engineer.

EXAMINER JONES: Mr. Roberts is expert in petroleum --

Q. (By Mr. Kellahin) If you'll take the exhibit book for a moment, Mr. Roberts, and let's go past Exhibit 1, which is simply a reproduction of the three hearing Applications and the associated plats, and let's turn to what would be marked as Exhibit Tab Number 2. If you look behind that tab, you're going to find an area locator map.

Correspondingly, if you'll take the PowerPoint at this point, Mr. Roberts, let's start with the display which first appears behind Tab Number 2 and let you set the stage for what Mr. Brooks and Mr. Jones are about to see.

A. Yes, this is a plat of the San Juan Basin showing the township boundaries as well as the unit boundaries. And highlighted on this plat in pink are the 28-and-7 Unit in a southwesterly position, with the 29-and-5 Unit to the northeast.

Two of the exceptions that we're requesting occur in 28-and-7, including one Mesaverde, as well as one Dakota case --

(PowerPoint display went blank.)

THE WITNESS: That's not good. Did we pull a plug here?

FROM THE FLOOR: I think that was probably the bulb.

THE WITNESS: The bulb burned out?

FROM THE FLOOR: Yeah.

THE WITNESS: Okay, carry on from the book?

Q. (By Mr. Kellahin) Let's go to the book.

A. Okay, go from the book.

The remaining third case is a Mesaverde case, and it occurs in the southern part of the 29-and-5 Unit.

MR. KELLAHIN: If you flip to the second page of Exhibit 2, let's focus in on the plat. And for the record, Mr. Jones, you're looking at the Dakota issue, and you're looking at Case 14,016, is the first plat.

EXAMINER JONES: Okay.

Q. (By Mr. Kellahin) Identify for us the spacing unit involved, Mr. Roberts.

A. Yeah, this would be the west half of Section 24. In the northwest quarter of the southwest quarter we find two Dakota wells indicated by the blue boxes. That would be the 259 and the 259G.

Q. And sometimes the computer overlays may cause you some concern about the compliance, so when we're looking at this display we're focusing on the southwest quarter of Section 24?

A. That's correct.

Q. And it's clear from your understanding of this color code that the two Dakota wells are located in the

same 40-acre tract?

A. That's correct.

Q. Let's turn past that one and also orient the Examiner and look at the next colored display. What are we seeing here?

A. Here we're looking at the northeast quarter of Section 34 in 28-and-7, where the blue wagon-wheel-type symbols indicate Well 225F and Well 91 are both Mesaverde completions in the northwest quarter of the northeast quarter of Section 34.

MR. KELLAHIN: Mr. Examiner, this locator map is associated with Case 14,018, and it involves the Mesaverde.

Q. (By Mr. Kellahin) And then the next locator, Mr. Roberts?

A. Again, it's a Mesaverde case, so we're looking at the blue wagon wheels, and we see in this case, in Section 34, northeast -- no, excuse me, southwest quarter of the northeast quarter we see two Mesaverde wells in that quarter section -- quarter quarter.

MR. KELLAHIN: And for the record, then, Mr. Jones, this is Case 14,017.

Q. (By Mr. Kellahin) At this point, Mr. Roberts, would you turn to Tab 3 and look at the first display, and let's start with the overview. Would you summarize for the Examiner what it is that you and ConocoPhillips have done

concerning this project?

A. Yeah, this outlines the process that we followed in this project, as well as the testimony that we've prepared for today. We began with a research project where we -- Following the procedure similar to the Burlington case that was presented in 2006, we went back over the Heritage ConocoPhillips well database to identify similar density violations.

And concurrent with that, at the same time, we -- having just gone through the acquisition and merging the two business units, it was necessary to review the compliance assurance process and basically re-establish that process following very closely the processes established with Burlington Resources and included in the testimony of that Case 13,667.

Q. We'll talk more about the compliance assurance process, but am I clear in understanding that there are now in place for ConocoPhillips the same type of internal protections to preclude the occurrence of multiple wells in the wrong quarter quarter section?

A. Right.

Q. And in addition, that program would allow the company to stay in compliance with the well density for those pools involved?

A. Correct.

Q. Following the outline, then, after you've satisfied yourself you have a quality-assurance system in place, did you further make an individual-case assessment for the noncompliant spacing units?

A. Yes, following all of those processes we looked at each of the three cases that we wanted to bring before you today from a general point of view, and then to examine the issues with respect to correlative rights as well as incremental recoveries.

Q. Let's go now to Tab 3 [*sic*] and talk about the summary of the research efforts, Mr. Roberts.

A. Yeah, for the research we began by building our database, and in that process we -- it was necessary to identify all the directional wells in order to correct our locations to the bottomhole locations of the directional wells.

Having done that, then, we proceeded to identify all quarter sections that contain more than two wells, as well as all quarter quarter sections that contain more than one well.

With those wells, then, we reviewed previous pilot approvals to see if any of them had already been granted exceptions, and verified the company ownership, and then finally researched the well files to confirm, in fact, that each of the wells that we had identified were, in

fact, noncompliant, in order to finalize our list.

Q. Do you have finalized lists to share with the Examiner this afternoon?

A. Yes, we found six instances where we were, in fact, in violation.

Q. So if you'll turn to the next page following Exhibit Tab 4, you'll see the summary of those six noncompliant spacing units?

A. Right. And in the first case, in Section 18 of 28-and-7, we found three completions in a quarter section, which upon further research we discovered that one of those completions had been recorded with the State as a temporary abandonment following a sidetrack to a Dakota well. And in this case we simply filed paperwork to indicate that that zone had been plugged and abandoned, and that was resolved.

In 30-and-6, Section 2, we found three Mesaverde completions in a quarter section, and that one we found we had simply failed to abandon, Well Number 15 of San Juan Unit 31-and-6, which was our original plan, and we are now preparing that abandonment.

Q. That well currently is shut in?

A. Yes.

Q. Okay. And the third one, now?

A. 31-and-8, Section 32, same thing, three Mesaverde completions in a quarter sections. This particular case,

it's a very high deliverability area with checkerboard leasing, and in fact, ConocoPhillips as well as Burlington both operate in that area, and being more or less in a situation of conflicting interests, we didn't see any alternative except to plug that -- or abandon that zone in Well 36.

Q. The fourth one on the list refers to Case 14,018, and what's the status of that?

A. And that is Section 34 of 28-and-7. We have two Mesaverde wells in a quarter-quarter section, and we have shut in Well Number 91 of 28-and-7 Unit, and are here requesting an exception to pool rules today.

Q. The third one down [*sic*] is associated with Case 14,017?

A. And that is 29-and-5, Section 34, where we have two Mesaverde completions in a quarter quarter section. We've shut in Well Number 34, and we're requesting an exception to pool rules.

Q. And the last one, or the sixth on the list, is associated with Case 14,016?

A. Right, that's in 28-and-7, Section 24. We have two Dakota completions in a quarter quarter section. We've shut in Well Number 259, and we're requesting exception to pool rules.

Q. As we continue through the exhibit book, Mr.

Roberts, you have then divided the book so that each of the next three sections is unique as to the individual case and the problems associated with that case?

A. Except there's four sections remaining.

Q. Four sections.

A. Compliance assurance.

Q. Okay, so if we turn to Tab 5, then, what are we seeing here?

A. Under Tab 5, this is the work that kind of was performed in parallel with the research effort to bring our compliance assurance process up to speed, in order to avoid situations going forward.

Q. Let's do that now. If you'll turn to Tab 5, and let's look at the summary of the compliance assurance process.

A. Yes, this has been in place now since early 2007 and is based largely on the Burlington process that was presented in testimony for Case 13,667.

And all of our capital projects are initiated by a project development team, which carries projects from the planning and budgeting stage to the implementation stage, and includes process steps in our land group, surveying group, regulatory, construction and engineering. And each step along the way includes verification of location compliance, and this verification is included as checkoffs

on a checklist in a commonly held database using proprietary software.

And then ongoing improvement to this process is being taken up in order to account for increasing numbers of directional wells, which are a bit of a loop at the moment, yes.

And finally, any recompletion projects are checked against our drilling inventory in order to avoid duplicating completions.

Q. So as each part of the company, whether it's the land, the geology or the engineering, is utilizing the same master manager, if you will? --

A. Yes.

Q. -- to make sure that as you go through this process it will recognize and alert you to what your density is for a well, to make sure that you're staying within compliance --

A. Correct.

Q. -- to the location and density for wells in these two pools?

A. Uh-huh.

Q. If you'll turn now, sir, to Tab Number 6, let me direct your attention to Case 14,018, and start off with what you did in this particular case to come to the conclusions that you have.

A. Yes, for each of the cases we had a general review of the case that included the well locations and the general land situation, as well as the geologic setting and the specific well completions and production histories.

Following that, we looked at correlative rights issues by mapping the drainage areas using no-flow boundaries from relative rate calculations as described by Golan and Whitson in their book titled *Well Performance*. These maps then were validated using flowing material balance, which would take pressure and rate data into account, as well as volumetric data, to back into an area that would be used, then, to confirm or not the drainage area map.

Finally, we looked at incremental recoveries to determine whether or not the loss of the noncompliant well would result in a loss of recovery.

Q. Let me ask you generally as to each of the three cases, what did you conclude about any potential correlative-rights violation?

A. In each case we concluded that there would be no correlative-rights violations.

Q. And how do you define that question?

A. We did our best to describe the drainage area of the noncompliant wells, and provided that that drainage area was contained entirely within an area of common

interest, we decided that that therefore posed no threat to correlative rights.

Q. As we look at each of the three cases, are you dealing with production that's associated with a participating area that's common in that general area?

A. That's correct. And in fact, in one case, the one in Section 34 of 28-and-7 is very much interior to the unit, and we did not do that particular part of the analysis for that case because it was clear that there were no correlative-rights issues.

Q. In a situation where there was a potential for correlative-rights violation, did you then do the drainage assessment for those other two cases?

A. Yes, we did that for the Case in Section 34 of 29-and-5, because that proration unit is adjacent to the 28-and-5 Unit, which has different ownership.

And we also did it for the Dakota case in this west half of Section 24 of 28-and-7, which has, in fact, a buffer proration unit to the east before you go into the adjacent unit. But since it was as close as that, we still had a look at that one as well.

Q. When you get to the final point, having addressed correlative rights, you then examined whether the noncompliant 40-acre tract ought to have one of those wells plugged. And the analysis then was to see if in

combination the two wells were producing more gas than a single well might otherwise recover?

A. That's correct.

Q. Is that how you would identify incremental reserves?

A. Yes, we built a model from our analysis of that area to simulate the production from the two wells and the drainage area in question, and we ran cases with both wells producing and a case with one of the wells shut in, in order to see whether there was any difference in recovery. And in each case, again, we found that there was incremental reserves produced by leaving both wells on production.

Q. I'll have some more questions for you as we look at that process, but that's the end result of your work?

A. That's correct.

Q. Let's turn, now, to the next display behind Exhibit Tab Number 6 and look more specifically again at the details for Case 14,018. Starting again, then, with the locator map.

A. Yes, again, the wells in question are here in San Juan 28-and-7 Unit, and they're found in Section 34 of 28-and-7 and are specifically the wells 225F and Well 91. And those are both Mesaverde wells, they're in a standup unit in the east half of Section 34, interior to the unit.

There are therefore no correlative-rights issues in this case, so we went directly to the question in this case of whether the wells were going to produce incremental reserves if they were left on production, as compared to if one was shut in.

You might notice on this display some apparent other offenses or noncompliances with the spacing rule. For example, in the southwest of Section 26 you notice two wells in the southeast quarter of the southwest quarter. In fact, Well 27 has been plugged and abandoned, and so that one is not out of compliance.

Similarly in the northeast quarter of Section 34, Well Number 1 has been temporarily abandoned.

In the northeast of Section 4 in 27-and-7, Well 82 has been temporarily abandoned.

Q. I think you misspoke, it's Section 33, the northeast --

A. You're right.

Q. -- of 33?

A. Yes, northeast of 33, Well Number 1 is TA'd.

Q. So now when we come back and focus on Well 50, 91 and 225F, do you have a side-by-side comparison of a two-well cross-section so we can look at the geology and how those wells were completed?

A. Yes, on the next display you see a cross-section

showing the main intervals of the Mesaverde with the Cliff House, the Menefee and the Point Lookout, and you can see in this display, the 225F has completed all three layers, while the Well Number 91 has completed only the Cliff House and the Point Lookout.

Q. When we get to the question of the reservoir simulation, am I correct in understanding that the reservoir simulator is going to make some assumptions or generalizations about the geologic characteristics of each of these two wellbores as it runs its calculation?

A. That's correct. The basic geologic model will have come from a study that is illustrated essentially by the maps that follow this display.

Q. Now, the model will make an assumption that there's a certain range of uniformity in reservoir characteristics?

A. Yes, essentially what we did is, we took the properties from this geologic study at the center of the section and assumed that they were constant throughout the study area, which was a piece of that section.

Q. Have you and the geologist come to the technical conclusion that it's reasonable and appropriate to make those assumptions?

A. Yes. Yes, and that's shown, in fact, I think, on the displays. The first map --

Q. Let's look at the first display, and we're looking at the Cliff House?

A. Right, the Cliff House formation, and we see we're in a relative thick of the Cliff House that would be associated with an upper marine --

Q. And that's the first --

A. -- environment --

Q. -- display on the cross-section, right?

A. That's correct.

Q. All right.

A. And highlighted -- the section in question is highlighted in red here in 28-and-7, and you see that we're at a relative thick associated with an upper marine facies, and that although there is some gradient or thinning to the south in that section, the northeast part of the section is relatively uniform in the Cliff House.

Q. Mr. Roberts, have you and the geologist come to the conclusion, then, that both of these wellbores are in a homogeneous area of the Cliff House?

A. Yeah, relative to each other they're very similar.

Q. Let's look at the relationship in the Menefee. If you'll turn to the next area map behind that.

A. In the Menefee again, you see relatively little variation in the area of interest, which could be

characterized as -- the Menefee in general is a nonmarine unit which has much discontinuity, and in this particular position away from the depicenter, so to speak, you would expect that it would have very large issues with discontinuities and tend not to contribute much to the production in this area.

Q. Let's turn to what you and the geologist have concluded about the Point Lookout, which is the next area geologic map.

A. The Point Lookout, we see a much thinner area with respect to the area of interest, but at the same time very little variation within the area of interest.

Q. So I don't have to keep asking you the same question, are you and the geologist in agreement that there's a sufficient similarity in the reservoir here that your no-flow boundary is reasonable, making those assumptions?

A. That's correct.

Q. Let's turn now to the specifics of the production for these two wells.

A. What we see on the next slide is a graph of the production from the two wells over time, with Well Number 91 being completed in the Mesaverde since September, 1958.

Q. And this is a well that's now shut in?

A. That's correct. The 225F was completed in the

Dakota in August, 2001, with the Mesaverde being added, then, in January of 2002.

Q. The point of this display would be what?

A. Simply to illustrate the history of the completions and the production. There's nothing terribly profound coming from this in terms of analysis.

Q. Okay, let's turn to your next display and look at your material balance.

A. Okay, this is a plot of flowing material balance, which is indicating from Well 91 an original gas in place within the well drainage area of about 4.8 BCF.

Using our volumetric model that comes from the geologic model that we have just displayed, we arrive at a drainage area equivalent of about 230 acres around this well.

Q. As a comparison, then, can you run a reservoir simulation to see how this lines up with what you've calculated volumetrically and from material balance?

A. Well, in fact, we take the conclusion from this that 230 acres is what is being drained by Well 91 in order to construct a 230-acre simulation model, using the same input as the flowing material balance.

Q. Lead us through the analysis of how you do this.

A. Okay, it's a two-layer model, including Cliff House and Point Lookout, which are the assumptions that we

use to arrive at the 230 acres, and if we look at the graphs on the following page what we see is --

MR. KELLAHIN: Let me make sure everybody stays with you. I'm sorry I didn't number these pages, I should have. What we're leaving now is the page that's captioned Numerical Simulation, and that would be this one, and this is the one that's showing the layer of the computer which Mr. Neale Roberts has got layered.

The next one says Numerical Simulation, and it's the quadrant display.

EXAMINER JONES: Okay.

MR. KELLAHIN: Okay.

THE WITNESS: Okay, in the upper two displays we're looking at the history match, and the red circles are indicating the actual production history while the red line is indicating the simulated production history, and the black line is indicating the backpressure control on the well.

And so we input the same backpressure history that the actual well has, and we find that the model produces a rate very much like the actual rate, and so we say from that that the model is reasonably matched to the actual data.

Then if we take that model and put it in prediction mode and forecast going forward, we have one

case shown on the lower left where we close the 91 as of today and leave it closed, and then another case in the lower right where we leave the 91 open. And the rates for the model, both wells total, are shown in red, and the cumulative production for both wells total is shown in black.

And we see in the case where the 91 is allowed to continue to flow that there is a slightly better recovery in the following -- in the next 50 years.

Q. (By Mr. Kellahin) Can you estimate the additional incremental recovery associated with the modeling of these two wells?

A. Yes, it appears to be in excess of 200 million cubic feet.

Q. Let's turn now to the next part of the analysis. Here it's captioned Cliff House Layer Pressure. What are we doing here?

A. Right, this is a picture of the Cliff House layer pressure as of 2058, and in the upper left it's a map view of the Cliff House layer pressure in 2058 for the case where the 91 well is shut in. You see both wells there, indicated in black.

And then in the map on the right you see the same display for the case where the 91 is allowed to continue to flow, and from the colors you can ascertain that the

pressure in the Cliff House layer as of 2058 is lower in the case where the -- significantly lower, I should say, in the case where the 91 well is allowed to continue to flow.

You can also see on each of those maps a red line traversing the map. And if you walk along that line, you would observe the pressures that are indicated in the chart at the bottom, with the dashed line coming from the model where the 91 is shut in and the solid line coming from the model where the 91 is flowing.

And so it's showing the same information, just a different display. It's essentially a cross-sectional view of the pressure in this layer in 2058 for the two different cases.

And what you see is again the pressure of the Cliff House layer in 2058, if the 91 is allowed to continue to flow, will be, or should be, in the range of 200 p.s.i., whereas if it is shut in, it would be greater than 250 p.s.i.

Q. With the Well 91 flowing and achieving a lower pressure, what is -- what happens, or what's the result of having a lower flowing pressure?

A. Right, the lower reservoir pressure would be an indication of a greater volume of production. There's been more gas removed from this layer, and that would be why the pressure is lower.

Q. Let's turn now to an analysis of the Point Lookout.

A. Similarly, for the Point Lookout layer you see two maps for the two cases, one where the 91 is shut in and one where the 91 is flowing, and you see again for the case where the 91 is flowing, a lower pressure as of 2058 illustrated in the map, as well as the layer pressure traverses.

Q. Let me have you summarize, then, your conclusions and recommendations concerning the wells associated with this case.

A. The conclusions of this analysis are that there are no correlative-rights issues, given the location of the infraction, that the abandonment of Well 91 would result in a loss of reserves which I would estimate to be on the order of 240 million cubic feet, and therefore we are here today to request a waiver to produce this well.

Q. Let's turn to the next case, which is the second pair of Mesaverde wells. Now we're dealing with Tab Number 7, and we're looking at the exhibits associated with Case Number 14,017.

Start again with the locator map.

A. Right, we're looking in this case at the 34 and 34R in the east half of Section 34, which is adjacent to the 28-and-5 Unit to the south, Burlington-operated 28-and-

5 Unit to the south. And we have those two wells occurring both in the southwest quarter of the northeast quarter, in other words, two wells in a 40-acre block.

Q. As part of your research and study, Mr. Roberts, have you made any attempt to come to any conclusions concerning how these violations occurred?

A. No. No, we accepted the research that basically the violations existed, and our focus has been on where to go forward.

Q. Whether to plug and abandon or whether you could produce --

A. Yeah.

Q. -- them and what would happen?

A. You know, is to devise a compliance-assurance process that would prevent future occurrences, and then decide what to do with these wells.

Q. Let's then look at the first display behind the locator map, and again let's look at the geologic comparison on the cross-section of Well 34 and 34R.

A. In this case we see Well Number 34 has perforations in all layers of the Lewis, as well as Mesaverde, while the 34R has omitted the second Otero layer of the Lewis.

Q. Now let's go through the series of geologic displays and have you tell me about your conclusions

concerning the uniformity or the nonuniformity of the geology when you're looking at these two wellbores. Starting off, then, with the -- what we call the Navajo City.

A. What you'll see in each of these maps is a well that is fairly marginally located with respect to the Mesaverde fairway, but in each case relatively uniform within the area of interest.

And again, the section of interest is highlighted with a red square in the south part of 29-and-5. So with the Navajo City you see some very minor gradient across the section, but not much.

Q. You're starting at the top, going down?

A. Yes.

Q. So after the Navajo City what happens?

A. In the Otero 1 you see a relative absence of sandstone, as well in the Otero 2.

And then again in the Cliff House you're very much in a distal position, very marginal in terms of sand content.

And the Menefee, same story, as well in the Point Lookout.

Q. Then after you get beyond the geologic displays you're going to come to the production tabulation?

A. Right, we see Well 34 coming on production in the

Mesaverde since February of 1957, and the 34R finally being added in February of '96.

There's a large jump in the 34's production after February of '98 that was caused by a Lewis payout.

Q. As a point on the production display, you have -- ConocoPhillips has shut in the Number 34 well?

A. That's correct.

Q. That's the shut-in well?

A. Yes.

Q. Moving past the production, then, we come to a drainage area map?

A. Yes. And this map was built using the relative rates. The well names are indicated in black, the rates are shown in red, and the no-flow boundaries are calculated between each well based on their rates.

And so we posted the no-flow boundaries and drew the outline of the drainage area and then digitized and planimetered that outline in order to arrive at an area for the two wells.

Q. Let me know, on this display there's an area identified in a box, and the caption in the box says unit boundary?

A. Right, that's an important point. That is the boundary between the 29-and-5 and the 28-and-5 Units, and we see that our drainage area for the two wells in question

does not go over that boundary.

Q. Give us a general understanding of, when you run this calculation, why -- Mr. Roberts, as an end result of the reservoir simulation, you're able to draw this map. Is this a product of the simulation?

A. No, this actually was a very simple calculation derived purely from the rates of the wells in the area. And it is then validated using flowing material balance and, upon validation, used as input to the simulation model.

Q. Give us a general understanding, and perhaps use an example within the context of this map, of how this works?

A. Okay, for example, if we look at -- a very simple example, if we look at Well 34 and Well 89, we see that both of those wells are producing 110 MCF a day. And given that they're producing the same rate, we should expect to find the no-flow boundary halfway between the two wells, which is where it's drawn.

At the same time you see maybe Well Number 9 to the northeast is only producing 25 MCF a day, and you see the boundary there is drawn perhaps four-fifths of the way from the well that's making 110 MCF a day to the well that's making 25. So the no-flow boundary is proportionate to the relative rates.

Q. And north of the common boundary line with the unit to the south, when we're in the unit that contains 34 and 34R, that is within a participating area within that unit that has had its interests consolidated by participation?

A. Yes, and that is shown in a previous display, that all of -- all of this 29-and-5 area is fully expanded and participating in the unit.

Q. Let's turn to the next display, it's captioned Material Flow Balance -- Flowing Material Balance.

A. Right. Now this step was made as another approach to arrive at a drainage area, and what we do here is, we go first to the original gas in place being drained by the wells, and then we use our volumetric data to translate that volume into an area.

So in other words, if we find 5.8 billion cubic feet, and we know that our hydrocarbon height in that area is a given amount, we can use those two numbers to back into a drainage area. And in this case we find 500 acres being affected by the Well 34.

Q. Did you do a similar analysis for Well 34R?

A. Yes, and that analysis indicates about 50 acres being affected by Well 34R, with the total being about 550 acres, which serves to validate the drainage area map that we were first discussing.

Q. And following the Flowing Material Balance, you have a display that shows the reservoir simulation model, and it says Numerical Simulation?

A. Right, now that -- having arrived at an area and validated the volumetric model, we can use that information to build a numerical model containing the two wells, and all of the same input data as we used for the previous analysis, in order to look at the impact of abandoning one of the wells in the quarter section.

Q. If you'll turn to the next display after that, you come again to the similar presentation as we just made for the prior case, the top part of which you're looking for a reservoir -- you're looking for a simulation match?

A. That's correct, the top two displays show our history match on the two wells in question, which we deem to be acceptable, and given that reasonable history match, we then have some confidence that we can forecast going forward. And we've done two forecasts, one with Well 34 continuing to be shut in, and the other with Well 34 open to flow for the next 50 years.

Q. And what's your conclusion?

A. In this case we see again a significant incremental recovery allowed by leaving both wells flowing.

Q. Let's look at this case in terms of the layered pressure. If you'll turn to the next display.

A. The first display showing the Lewis layer pressures as of 2058, and the map displays show a significantly lower pressure for the case where the 34 is allowed to continue to flow along with the 34R.

And then in the layer pressure traverse we see that the Lewis pressure in 2058 could be as low as 300 pounds if the 34 is allowed to continue to flow, whereas if it is shut in it will probably be closer to 450 pounds, indicating a much lower recovery in that case.

Q. Okay, let's look at the Cliff House.

A. In the Cliff House we see the same effect. If we just go directly to the layer pressure traverses, we see that the difference between the two cases is on the order of 320 pounds, if the 34 is flowed for the next 50 years, versus maybe 450, 500 pounds if the 34 is shut in.

Q. And your summary?

A. The summary is that we believe that there's about a 550-acre area being drained by the two wells, but there are no correlative-rights issues within the map drainage area, and that abandonment of one of the wells would result in a loss of reserves on the order of a half a BCF or more, and therefore we would request a waiver to produce both wells going forward.

MR. KELLAHIN: Mr. Examiner, because this spacing unit's southern boundary is the unit boundary line, the

unit to the south is the San Juan 28-and-5, which is operated by Burlington.

When you review the exhibits associated with Tab Number 1, you'll find out that there's a certificate of notification where we caused all the working interest owners in the San Juan 28-and-5 Unit to be notified. And to the best of my knowledge and Mr. Alexander's there have been no objections.

The other two were internal to their units, and we chose not to send notice to any of the offsets, because all the offsets were common.

Q. (By Mr. Kellahin) Now, Mr. Roberts, let's turn to the final case behind Tab Number 8. Let's look at the Dakota issue, and the case number is 14,016. Again, start with the locator map.

A. The two wells in question in this case are the 259 and the 259G. They are located in the northwest quarter of the southwest quarter of Section 24 in the 28-and-7 Unit.

Q. Again, this spacing unit is the west half of Section 24?

A. That's correct. And the unit boundary would be on the eastern side of the eastern half of Section 24.

Q. Now let's go to the two-well cross-section, look at the two-well comparisons, and let's talk about the

geologic components associated with this production.

A. Each of the wells is completed in four layers of the Dakota, the top layer being the Twowells.

The second layer, although we see perforations in the Paguate member, we did not include that in our modeling, simply because our geologic -- current geologic model basically has a negligible volume in this layer, in this area.

The next layer down is called the Cubero member. Both wells are completed.

And below that we have something that on this display is called lower Cubero member, following an older nomenclature, and we'll find that member actually illustrated or labeled the Dakota White Rock Mesa in a later map, but they're the same layer. It's a nomenclature issue.

Q. As part of your study, have you and the geologists working with you come to conclusions about assumptions to be made about the uniformity of the geology associated with each of these two wellbores?

A. Yes, all of our analyses assume a constant petrophysical parameters, and we'll show in the maps that this is a reasonable assumption.

Q. Let's do that. Go through the maps as we look at the Dakota and have you make those comments for us.

A. The first map is of the Twowells, and we see we're in a relatively sand-rich area, fairly uniform. The unit or the section in question is highlighted in red.

Similarly for the Cubero sandstone, we see that in the next display, fairly uniform sand distribution.

And then in the third map we're looking at something that is called the Dakota White Rock Mesa, and again we're in a fairly uniform area of this member, which is referred to in the cross-section as the lower Cubero.

Q. Let's turn your attention now, Mr. Roberts, to the production information associated with this case.

A. We see the Dakota production starting in Well 259 in September of 1978. This well -- we realized during the drilling of the 259G that we had made this mistake, and so we actually shut the well in prior to the completion of the 259G, which happened in April of 2006, and we have been producing the 259G as a Mesaverde-Dakota commingle since April, 2006.

Q. Turn to the drainage map for us and identify and describe this display.

A. This drainage area map is again -- it's calculated from relative rates, and what we see here is a drainage area around Well 259 of about 116 acres that does not impinge on the unit boundary to the east.

The 259G is located to the northwest of the 259.

It's not shown on this display, but it was not included in this analysis because it had not yet stabilized, and so it was not possible to analyze that well. But the impact of the 259G would be to reduce slightly the drainage area of the 259 and to extend the combined drainage area to the northwest, which would be away from any correlative-rights issues.

Q. Well 259G is the Dakota-Mesaverde dual?

A. Yes.

Q. Downhole commingle?

A. Yes.

Q. I said dual, it's downhole commingle?

A. Yeah, it's a commingled well.

Q. Let's turn to the material balance.

A. The material balance on the 259 indicates 2 BCF in the drainage area, which equates to 112 acres, which agrees very closely with the 116 acres from the drainage area mapping. So we feel confident in those numbers and have used them as input, then, to our numerical simulation model.

Q. Let's turn to the next display.

A. Here we see that we've modeled the Dakota as a single layer, and that's just been our experience, that while the Mesaverde exhibits very strong layered reservoir properties with no crossflow, the Dakota is -- the layered

behavior is less apparent and can be neglected without any significant errors, so we have simplified this one by looking at it as a single layer, and again using all of the data that was input or determined from the previous analysis.

Q. Let's look at your simulation results. First your history match and then your simulations.

A. So again, the top two displays are showing a nice history match on the existing wells, followed by two forecasts, one with the 259 shut in, and the second with the 259 restored to production for the next 50 years. And we see in this case incremental recovery from the model.

Q. Let's relate that to your study of the pressure. You have some flowing pressure here?

A. Yes, here we have -- we see the layered pressures in map view, indicating significantly greater depletion in the case where the 259 flows.

And on the pressure traverses we see the case where the 259 is flowing, having a pressure in 50 years that ranges between 300 and 550 pounds, while the case with the 259 shut in has a lowest pressure of around 420 and pressure near the perimeter in excess of 700 pounds. So significantly better recovery for the case where the 259 is allowed to continue to flow.

Q. Summarize for us your conclusions and

recommendations for this case.

A. In this case, the 259G is still in transient flow, so we were unable to do a drainage area calculation, but we were able to confirm a plus or minus 150-acre drainage area for the 259 through flowing material balance and drainage area mapping.

The 259G would further reduce the 259 drainage area and extend the collective area into the northwest away from correlative rights problems, and so we have determined that there are no correlative-rights issues with this case and furthermore determined that the abandonment of Well 259 would result in a loss of reserves on the order of 120 million cubic feet. And therefore we would request a waiver to continue to produce both of these wells.

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

We move the introduction of his exhibits associated with the exhibit book, marked Exhibits 1 through 8.

EXAMINER JONES: Exhibits 1 through 8 associated with this exhibit book will be admitted.

EXAMINATION

BY EXAMINER JONES:

Q. Probably another most impressive showing we'll have all year here with you guys, like it was last year.

I'm continuously impressed by the way you have all these logs in your computer and you're able to generate these maps based on the little members in these formations. It's amazing. It's a real powerful tool to come up with ways of managing your reservoir, obviously.

A. Yeah, it is.

Q. It's something that the smaller operators will not have, and even a lot of the bigger operators, you know, so...

So basically, it sounds like you've come up with a pressure differential and a MCF differential, so can you use that to make other conclusions? In other words, like -- Obviously, the biggest issue internally to you guys is whether you should drill another well in those quarter quarters that you haven't drilled wells at yet, so did you guys look at that? And you have to make your own decision, obviously, whether you're going to do that or not. But based on economics --

A. Yeah, in fact, I mean, we expect that those would also be economic, and that's kind of -- the way we're looking at it is that they will get drilled eventually as we downspace the Basin to 40 acres.

Q. That way you won't have to shut in these other wells?

A. Right.

Q. Okay.

A. Yeah, our expectation is that some day they will be drilled --

Q. Okay.

A. -- but we would wait for the -- you know, the infill order.

Q. Yeah. The -- I guess -- I've got several questions related to -- Oh, I guess I should concentrate on this flowing material balance thing, just real quickly --

A. Okay.

Q. -- for me and Mr. Brooks here, probably especially me.

You -- I see where you've got a P/Z and a producing, and you extrapolate those out to an original gas in place; is that right? Grab one here to look at. I guess on the Dakota one -- yeah, here we go, that Dakota one you came up with 112 acres. That was based on your drainage -- your no-flow boundary, drainage area, and the original gas in place of 2 BCF; is that right?

A. Well, no --

Q. You know, they were two different wells?

A. Yeah, I arrived at the 110 acres independently, and --

Q. Okay.

A. -- and that serves as my validation.

Q. Okay.

A. What I've done -- the flowing material balance, essentially, it -- you -- if you look at the left axis here, that's the data that I'm actually curve-fitting --

Q. Uh-huh.

A. -- and that is a normalized rate. In other words, I take the rate, and I normalize it for the flowing pressure and the flowing viscosity --

Q. Okay.

A. -- and by taking those variables out of the equation, I'm left with nothing but the reservoir pressure to drive the decline.

Q. Okay.

A. And so that will point me to the original gas in place, similar to the way of P/Z, which is the red line, which is purely hypothetical --

Q. Right, because you don't have the data?

A. -- I don't have the data, right, but hypothetically that is the way the reservoir pressure is actually declining, while the green is the way the normalized rate is declining. And they point to the same original gas in place.

Now that's a volume, and I use my log model to say, okay, the height in this area is this, therefore what is the area --

Q. Oh --

A. -- of that volume? --

Q. -- okay, based on the --

A. -- and when I do that --

Q. Porosity for that height?

A. Correct. So I take the hydrocarbon height and divide it into this volume to calculate my area, and then --

Q. Okay.

A. -- I arrive at 110 acres, which is very close to what I arrived at using the other methodology, which gives me confidence that that's a good input for my numerical simulation.

Q. Is there a paper that tells about using that normalized rate projection to --

A. There is --

Q. -- point to your --

A. -- there's been a lot published in the last 10 years about this method. I can't quote to you the name of the --

Q. It's not -- it's not anything to do with Crafton's method that he -- Colorado School of Mines professor that -- he sells these pressure transient -- flowing pressure transient analysis software --

A. It's being included in most of the --

Q. -- reverse -- or reverse --

A. -- reverse productivity index.

Q. Yeah.

A. I'm not sure if it's on that --

Q. This is a different deal, then, than that?

A. Yeah, but it -- this is being included in a lot of the -- like the RTA is another similar production data analysis software --

Q. Yes.

A. -- and it has included this --

Q. Okay.

A. -- this type of approach as well as, I think, some other software packages are including this now.

Q. So you're relatively confident in using this versus the P/Z?

What I mean is -- I hate to put you on the spot but, you know, we got rid of pressure testing requirements several years ago with OCD, and we said we'd revisit them after five years and see if anybody's -- I'm not sure you guys have a problem in the northwest, but the southeast, you know, we have cases all the time where people are relying solely on geology, instead of any pressure data that they don't have anymore, based -- plot these Morrow sands, meandering sands, and I have a problem with it as a -- you know, an ex-person in the industry, I can

understand.

So you as a -- you're one of the most accomplished reservoir engineers we see around here. Do you agree that no pressure data should be gathered by the State?

A. The pressure data is very valuable.

Q. Okay. Well, I won't push it any further than that.

A. Yeah, when we have it we --

Q. -- use it.

A. -- make great use of it, and when we don't have it it's a lot tougher.

Q. Okay. And that used Eclipse again for this?

A. Yeah, the numerical simulation was done using Eclipse.

Q. You guys have it internally, or you like it and --

A. Yeah.

Q. -- you can use it real well?

A. Uh-huh.

Q. Yeah, the other cases that we had a year or two ago, I think Alan was here for those, and we had a lot of testimony about no-flow boundaries on those. I think that was it. They used a lot of that. And they didn't use this other to -- and so I'm glad you did add this other check to

it, you know --

A. Uh-huh.

Q. -- that makes a lot of sense. Kind of put your geologist on the spot by assuming everything's, you know --

A. Constant?

Q. I'm sure there was a little bit of grinding of teeth there, you know, but -- oh, well, you have to do it, I guess. But the wells are close together anyway.

A. Yeah.

Q. The Cliff House directional permeability, do you have any idea about that? Does it depend on where you're at in the San Juan Basin?

A. The only idea we have about it is that it probably exists, and that's about it. We would expect that it would vary across the Basin. We expect that it becomes more important as we go to higher densities, and it's really the -- one of our primary reservoir characterization objectives going forward, as far as we're doing some horizontal -- we're planning some horizontal tests, and then we've got also the infill pilot plan, and one of the main data-gathering and reservoir-characterization objectives of both of those projects is to better understand the horizontal isotropy which, you know, we only theorize about now --

Q. Yeah.

A. -- we have not quantified at all.

Q. The Cliff House has this La Ventana sand -- not in this area, but -- you know, I think south -- probably southwest, that's real -- the resistivity logs are -- really separate there, and you've got a lot of invasion apparently, and it's a target people like to use for injection, but then we found out that maybe -- maybe it's a little too shallow and a little too fresh to be used for that, and the EPA got ahold of it, and -- We have to watch that real close.

A. Uh-huh.

Q. But we don't have the time or the personnel to do -- or the expertise to do a study on how that varies, you know, so we're kind of in a quandary there --

A. Yeah.

Q. -- and I wanted to ask you about anyway.

So I guess that's about it. I appreciate -- appreciate all this effort you guys did for this.

A. Thanks.

EXAMINER JONES: Mr. Brooks might have some questions too.

EXAMINER BROOKS: well, if it were earlier in the day --

EXAMINER JONES: Yeah.

(Laughter)

EXAMINER BROOKS: -- but Mr. Jones can draft the order, so I think I'll leave it with his -- what he's doing.

EXAMINER JONES: And I promise it won't be a big delay. I know you've got wells shut in, so...

MR. KELLAHIN: Mr. Examiner, may I approach you? Here's a copy of the Burlington order to --

EXAMINER JONES: Okay.

MR. KELLAHIN: -- refresh your memory on how that was done. And if you really want to see the slide show --

EXAMINER JONES: I do.

Okay, thank you very much --

THE WITNESS: Thank you.

EXAMINER JONES: -- Mr. Roberts and Mr. Kellahin.

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

EXAMINER JONES: Okay, with that we'll take Cases 14,016, 14,017 and 14,018 under advisement.

(Thereupon, these proceedings were concluded at 5:29 p.m.)

* * *

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

_____, Examiner
Oil Conservation Division

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 April 7th, 2008.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 16th, 2010