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 BURLINGTON RESOURCES OIL AND GAS COMPANY FOR APPROVAL OF A PILOT PROJECT INCLUDING AN EXCEPTION FROM RULE 2(b) OF THE SPECIAL RULES AND REGULATIONS FOR THE BLANCO-MESAVERDE GAS POOL FOR PURPOSES OF ESTABLISHING A PILOT INFILL DRILLING PROGRAM WITHIN ITS SAN JUAN 27-5 UNIT WHEREBY UP TO FOUR WELLS MAY BE DRILLED ON A STANDARD GAS PRORATION UNIT TO DETERMINE PROPER WELL DENSITY AND WELL LOCATION REQUIREMENTS FOR MESAVERDE WELLS, RIO ARRIBA COUNTY, NEW MEXICO

CASE NOS. 11,879

APPLICATION OF BURLINGTON RESOURCES OIL AND GAS COMPANY FOR APPROVAL OF A PILOT PROJECT INCLUDING AN EXCEPTION FROM RULE 2(b) OF THE SPECIAL RULES AND REGULATIONS FOR THE BLANCO-MESAVERDE GAS POOL TO INSTITUTE A PILOT INFILL DRILLING PROGRAM WITHIN A FOUR-SECTION AREA INCLUDING SIX UNORTHODOX GAS WELL LOCATIONS FOR PURPOSES OF ESTABLISHING A PROGRAM TO DETERMINE PROPER WELL DENSITY AND WELL LOCATION REQUIREMENTS FOR MESAVERDE WELLS, SAN JUAN COUNTY, NEW MEXICO

and 11,880

(Consolidated)

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: DAVID R. CATANACH, Hearing Examiner

November 6th, 1997

Santa Fe, New Mexico

This matter came on for hearing before the New Mexico Oil Conservation Division, DAVID R. CATANACH, Hearing Examiner, on Thursday, November 6th, 1997, at the New Mexico Energy, Minerals and Natural Resources Department, Porter Hall, 2040 South Pacheco, 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

November 6th, 1997
Examiner Hearing
CASE NOS. 11,879 and 11,880 (Consolidated)

* * *

EXHIBITS

Applicant's	Identified	Admitted
Case 11,879		
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* * *

Applicant's	Identified	Admitted
Case 11,880		
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APPEARANCES

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* * *

WHEREUPON, the following proceedings were had at 10:26 a.m.:

EXAMINER CATANACH: Okay, at this time I will call Case 11,879, Application of Burlington Resources Oil and Gas Company for approval of a pilot project including an exception from Rule 2(b) of the special rules and regulations for the Blanco-Mesaverde Gas Pool for purposes of establishing a pilot infill drilling program within its San Juan 27-5 Unit whereby up to four wells may be drilled on a standard gas proration unit to determine proper well density and well-location requirements for Mesaverde wells, Rio Arriba County, New Mexico.

Call for appearances in this case.

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

At this time, Mr. Examiner, we would request your permission, for presentation of the evidence, to have you call Case 11,880.

EXAMINER CATANACH: At this time I'll call Case 11,880, which is the Application of Burlington Resources Oil and Gas Company for approval of a pilot project, including an exception from Rule 2(b) of the special rules and regulations for the Blanco-Mesaverde Gas Pool to institute a pilot infill drilling program within a four-section are including six unorthodox gas well locations for purposes of establishing a program to determine proper well density and well location requirements for Mesaverde wells, San Juan County, New Mexico.

At this time I will call for additional appearances in these cases.

No additional appearances.

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

EXAMINER CATANACH: Will the witnesses please stand to be sworn in at this time?

(Thereupon, the witnesses were sworn.)

MR. KELLAHIN: Mr. Examiner, Burlington Resources is examining the feasibility of the well density in the Blanco-Mesaverde Pool. As you know, we currently have 320-acre gas spacing in that pool with an optional second well.

Burlington is continuing to engage in pilot projects in various portions of the pool to develop geologic and reservoir engineering data to determine whether or not there are remaining gas reserves to be recovered in each of those spacing units which are not currently being recoverable by that spacing pattern we now have.

Back in October of 1996 you heard the first of three pilot project areas. You heard at that time the presentation for the San Juan 29-and-7 unit. That was Case 11,625.

It was Division Order R-10,720. I have a copy of that order here for you, because it forms an outline by which we'll ask you to examine the second two projects we have.

The second project that is on the docket today is the project that deals with the 27-and-5 unit. The 27-and-5 unit is in the southern portion of the pool.

The third and final pilot project area is what we call the drillblock project. It is called that because it's not contained within a unit. It is in the northwestern portion of the pool.

The reason it's not in a unit is, there are no units in that area in which to test the pilot project. We had to find a four-section area in which we substantially controlled the working interest where there were few other interest owners, where there were few correlative-rights issues, and Mr. Alexander and the other employees of Burlington have found such an area, and they have chosen that as a suitable one to provide the third test area for the pilot project.

If you'll approve these other two for us, at the -- other two projects for us, at the conclusion of the test of all three we believe we'll have sufficient information to come back to the Division and propose to you increasing the density for the entire pool.

My proposal, Mr. Examiner, is that we would start with the 27-and-5 case, which is the Exhibit Book 11,879, and then after we go through parts of that we will pick up Case 11,880, which is the drillblock exhibit book. Mr. Alexander and I will go through each of those two books separately to satisfy you about the ownership and the correlative rights issues.

Thereafter, the geologic witness and I will go through each exhibit book concurrently so that we can make a direct comparison of each geologic component between the two areas.

We will set the stage geologically for you by having Mr. Babcock, who is the geologic expert that testified before you back in October of 1996, give you a summary of the results of the effort in 29 and 7, which was the unit you approved this project for back in October of 1996.

Finally, we will present an engineering witness who will go through with you, Mr. McNeil, and compare, then, what he has done from the engineering discipline.

And at the conclusion we'll ask you to approve both of these projects.

My first witness is Mr. Alexander.

ALAN ALEXANDER,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A. Yes, my name is Alan Alexander.

Q. On prior occasions have you testified before the Division as a petroleum landman?

A. Yes, sir, I have.

Q. As part of your duties and responsibilities, have you made yourself informed about the ownership of both the 27-5 unit and what we've called the drillblock project?

A. Yes, sir, I have.

Q. In addition, have you been responsible for providing notification of this hearing to all the interest owners involved in each project?

A. I did.

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

EXAMINER CATANACH: He is so qualified.

Q. (By Mr. Kellahin) Mr. Alexander, let's take a moment, sir, and I'm going to ask you to look at Exhibit Book 11,879. Turn behind Exhibit 1, and let's start with

Exhibit 2. Identify and describe for us what we're seeing on this display.

A. Behind Exhibit Number 2 we have an area plat that shows the original project 29 and 7. It's approximately in the center of the Basin.

Q. How is that identified?

A. It's identified in red. It's a red solid field, and it says 29-and-7 unit.

We also have -- are showing on there the two additional pilot projects. The one to the southeast would be the 27-and-5 unit, again, filled in red. And to the northwest we have the drill- -- what we call the drillblock area pilot project.

You can see those projects in relationship to the other federal units which are in green, and also in relationship to the Pictured Cliffs outcrop for the San Juan Basin definition.

Q. Let's turn behind that display and look at the next display. What are you illustrating here?

A. This display is a plat showing the San Juan 27-5 federal unit, and it shows all of the existing production in that unit, and the production code is displayed at the bottom of the plat.

Q. Describe for us how production from the Mesaverde formation is allocated back to the interest owners under this unit concept.

A. Well, if we would flip to the next exhibit, I'm showing there a plat again of the 27-and-5 unit, but this time I'm only showing the wells -- the Mesaverde wells in that unit.

And all of the unit area is currently participating in the Mesaverde participating area, and that participating area was last expanded, fully expanded, back in 1981.

Q. Let me see if I understand how that works. If I am an owner entitled to receive Mesaverde production, and my ownership is confined to Section 28, will I participate in Mesaverde production if the well is located in Section 9?

A. Yes, sir, you would.

Q. On what basis will I do that?

A. You would participate on an acreage basis, the total amount of acreage that you have in the unit, as compared to the total amount of acreage in the participating area.

Q. So regardless of where the Mesaverde well is drilled in the unit, I will share in that production based upon my percentage in the unit?

A. That's correct.

Q. Identify on this display what the significance is of the green dots.

A. The green dots, I've indicated where we intend to drill the first pilot wells within the 27 and 7 unit.

Q. There are seven initial infill -- increased density wells in the unit that are proposed?

A. There are eight of them.

Q. Eight of them.

A. Yes, sir.

Q. What's the significance of the boundary just inside the outer dimensions of the unit that's in the blue-hached mark?

A. That is a boundary that we are proposing as a buffer zone because we are asking the Division to give us approval for a pilot project, including all of the unit area, not just limited to these eight initial increased density wells. And that buffer is a half-mile buffer, and that would protect the correlative rights of any of the offsetting owners outside of the San Juan 27-and-5 unit, in our opinion.

Q. Let's go back to Exhibit Tab 1 and talk about notification. Have you had notification made?

A. Yes, sir. Immediately behind Exhibit Tab Number 1 you'll see our certificate of mailing whereby we furnished all of the parties, including royalties and overriding royalty owners, with a certified copy of the

Application and a subsequent letter that I will also talk about.

Behind that certified mailing is a copy of the Application.

Q. They received the actual Application itself?

A. Yes, sir.

Q. And the Application itself details specifically what Burlington is proposing to do?

A. It does.

Q. Okay, it goes so far as to describe the footage setbacks and the various components of your Application?

A. It does.

Q. After the Application itself, you have provided the affected parties with a plat of the unit, have you not?

A. Correct.

Q. And then beyond that are the actual wells in the unit?

A. The actual Mesaverde wells --

Q. Yes, sir.

A. -- that's correct.

Q. And beyond that, what then do we find?

A. Beyond that we find the list, copies of -- Well, we find a list of the royalties and overriding royalties and working interest owners that are in the 27-5 unit.

And then immediately behind that you will see copies of the certified mailings that we have provided.

Q. That notification went to the working interest owners, the royalty interest owners and the overriding royalty interest owners within the entire unit that were entitled to share in Mesaverde production?

A. Yes, sir, that's correct.

Q. Just after this mailing -- and I apologize for not tabbing it for you, Mr. Examiner, but about halfway through the Exhibit Tab 1, there's a letter dated October 1st, 1997.

Let me direct your attention to that letter, Mr. Alexander, and ask you what was the purpose of that letter?

A. Mr. Catanach, I don't know if you found it, but it's right behind the first set of certified mailings. You have to go to the end of those.

It is a letter dated October the 1st of 1997. We wanted to additionally advise all of the royalty and overriding royalty owners of our proposed pilot project, so we sent them an additional notification prior to sending them the Application, and to date we have not heard back with any concerns from the royalties or the overriding royalty interest owners in the 27-and-5 unit.

Q. As to either mailing?

A. That's correct.

Q. Okay. Let me ask you to direct your attention to a copy of the order I was describing to Mr. Catanach. It's the Order R-10,720. And let me ask you to look at the first finding there. When Mr. Catanach prepared and had this order issued, he summarized what Burlington was seeking to do with regards to the pool rules.

He first identifies what the current rules are for the pool. Is your understanding of these rules consistent with his finding?

A. It is.

Q. All right. Let's turn and find the next finding. Finding 3, he summarized what you propose to do with this pilot infill drilling program for the 29-and-7 unit. Did he correctly summarize for you what you were proposing in that pilot project area?

A. He did.

Q. Did he, in fact, approve your request for the 29-and-7 unit as you had requested it?

A. Yes, he did.

Q. And he authorized you to drill up to an additional four wells per section for the pilot project area; is that not true?

A. That is correct.

Q. In addition, he provided you some details about well locations and then specifically approved the eight project wells?

A. That's correct.
Q. As part of that request, did you request any change, modification or other items concerning gas prorationing in this pool?
A. No, we did not.
Q. And are you maintaining that same request with regards to these other two project areas?
A. That's correct. We do not desire any change to the current proration schedules.
Q. In terms of well locations within the drill block project and the 27-and-5 project area, what are you proposing for well locations?
A. We're proposing -- we haven't identified -- In the prior order for the 29-and-7 unit we had identified some particular seven or eight wells -- eight wells.
However, in this request we are asking permission from the Division to simply locate any of the wells in accordance with the setbacks that we're proposing. And that setback would, again, be ten feet from any section, quarter section or quarter-quarter section line, with the understanding that we would not drill any increased density wells within the half-mile buffer surrounding the unit.
Q. Now, that concept works for the unit projects, does it not, where you can be that close to a boundary?
A. Yes, sir.

Q. Have you -- Do you desire to have that flexibility established for the drillblock area?
A. No, sir, we do not.
Q. Okay. Let's turn to the drillblock case, if you'll find that exhibit book. Again, let's skip past Exhibit 1 and look at the information behind Exhibit Tab Number 2.
A. Yes, the information that we have provided behind Exhibit Number 2 contains a letter --
Q. I'm sorry, Mr. Alexander, I have not taken you far enough back --
A. All right.
Q. -- in the exhibit book. Let's -- I've got a better idea. Let's look at Exhibit Tab 2 and look at the last page under that tab. There's a plat. It says, "increase density study area Mesaverde formation" Do you find that?
A. Yes, sir.
Q. All right. You have scribed an area that contains four sections, correct?
A. Correct.
Q. Within that area, there's 160 acres out of the corner of each of those sections that consolidated in the center of that project area. Do you see that?
A. Yes, sir.

Q. Outside of that area, there are some diagonal hached lines. What does that represent?

A. Again, this is the same buffer concept that we were using in the federal units. This is the half-mile setback buffer zone where we're proposing not to drill any increased density wells in order to not impact any of the surrounding sections.

Q. The increased density wells, for purposes of the pilot project, are identified how on this display?

A. They're identified by solid black dots.

Q. Okay. Let's turn now to Exhibit 3 and look at the plat that describes the ownership of the various spacing units within the project, the four sections that are involved in the project.

A. Yes, this plat is our offset operator plat, which we did make notification in this instance to offset operators.

Q. Let's use this for a different purpose. Let's take a moment --

EXAMINER CATANACH: Where are we at?

MR. KELLAHIN: We are behind Exhibit Tab 3. It's that first illustration. It says "increase density study area".

Q. (By Mr. Kellahin) I realize this was to illustrate notice --

A. Yes.

Q. -- but let's use it for a different purpose. If you'll start in Section 31, describe for us the orientation of the Mesaverde spacing units in that section.

A. The orientation of the Mesaverde spacing units in that section are east half and west half, and I have shown those by a hached pattern.

Q. Who operates that section in the Mesaverde?

A. Burlington operates Section 31.

Q. Within Section 31 there is a black dot. Does that represent one of the increased density pilot project wells?

A. Yes, sir, it does.

Q. Move down into the southwest corner; we're now in Section 6 of a different township, are we not?

A. Correct.

Q. Describe for us the orientation of the Mesaverde spacing units in that section.

A. That orientation is shown to be a west-half orientation, and with the two black dots showing the increased density wells for that particular proration unit.

Q. Who operates the two Mesaverde spacing units in that section?

A. Burlington operates that spacing unit also.

Q. Okay. When we go over to Section 1 in the southeast quarter of the project area, identify and describe for us the orientation of the Mesaverde spacing units.

A. Section 1 shows the orientation of that spacing unit, proration unit, to be north half, and it also shows two increased density wells in that spacing unit also.

Q. And who operates that section in the Mesaverde?

A. Burlington, again, operates that spacing unit.

Q. And the finally Section 36 in the northwest corner of the project, identify and describe how that's configured and who operates what.

A. The spacing unit for the Blanco-Mesaverde Pool in Section 36 is a laydown south-half spacing unit, and there is one increased density well to be located in that spacing unit.

Q. Okay. Have you -- Who are the operators in 36?

A. Great Western Drilling Company is the historical operator of that spacing unit.

Q. Have you obtained the agreement of Great Western to utilize the spacing unit in the south half of Section 36 for purposes of drilling and operating the infill well within that spacing unit?

A. Yes, sir, we met with Great Western and Conoco, Taurus and Davoil, who own interest in that spacing unit, down in Midland, Texas, back on October the 9th or the

10th.

We reviewed this project with them, they were in agreement that it is a project that we do need to do, and I have currently been circulating the AFE for that well, because we have proposed to them that we drill that well along with the other five wells in the study area so that we can accumulate the data.

We have proposed to Great Western that we drill the well and that we operate it for six months in order to gather that data, and they were agreeable with that approach.

Q. Now, let's use this display for the purpose you intended. How do you identify the offsetting operators to whom notice was entitled?

A. We have shown with squares and numbers who the offset operators are in the offsetting drillblocks, and you will note that there are only two. One of them is Burlington and the other one is Amoco Production Company.

Q. Have you received any objection from Amoco for approval of this project?

A. No, sir, I have not.

Q. Concerning the consolidation of the working interest owners for the drilling of these increased density pilot wells within the project area, what's the status of that voluntary agreement?

A. We have decided that we will not form or manipulate any of the units, that all of the units will continue to stand on their own. All production from the increased density will be allocated back to the unit that it's drilled upon.

Q. And do you have the agreement of the interest owners to do that?

A. Yes, sir, we do.

Q. And how will the cost of these wells be apportioned among the interest owners?

A. They will -- Again, all of the cost will be borne by the party upon whose drillblock the well is drilled. We will pay for and bear all of the costs except for the one well which is located in Section 36, the Great Western-operated unit. And Great Western and its partners will -- and I have sent them the AFEs and have several of them back. We're asking them to bear their share of those well costs.

Q. Let's turn to the topic of notification of the interest owners within the project area. Have you tabulated what you believe to be an accurate list of the working interest, royalty and overriding royalty interest owners within the project area?

A. Yes, sir, I have.

Q. And have you caused notification of this hearing to be sent to those parties?

A. Yes, sir. Behind Exhibit Tab Number 1 I have shown our certificate of mailing. And behind that, of course, the mailing consisted of the Application in today's hearing.

And again, in another section of the book, we also notified by separate mailing the royalties and the overriding royalty owners in advance of the mailing of the Application.

Q. Have you received any objection from any of those parties concerning the approval of this Application?

A. No, sir, I have received no objections.

Q. Okay. Let's turn to Exhibit Tab 2 and have you identify and explain the first letter contained here, dated October 24th.

A. There's a sequence of letters behind this exhibit, the first one being October the 24th, the most recent letter, and it is the letter that we sent to the parties owning the interest in the south half of Section 36, which Great Western normally operates.

You'll see those parties listed at the top. You'll also see their interest in this particular increased density well in the middle of the letter. And we have enclosed with that our cost estimate and authority for drilling, for them to execute and return to us.

Q. Behind that, then, is a summary of -- It says "Completion Procedures" for the well?

A. Yes, sir.

Q. If you'll turn past that -- there are four pages of completion procedures -- you get to a letter dated September 29th. What's the purpose of this letter?

A. This is the letter that we wanted to give advance notice to the royalty and overriding royalty owners in this pilot project. Since we are in a drillblock area, this is different from being in the federal unit where we have other mechanisms to help share the revenue to prevent any correlative-rights violations.

And so we wanted them to be aware of the project, and if they had any questions or problems with it at all we wanted to hear from them about it.

Q. Did the notification to the royalty and overriding royalty interest owners include the Application, and specifically directing their attention to the unorthodox location of the pilot infill wells?

A. It did.

Q. Let's go back to Exhibit 3 now, which is our little locator map, and let's talk about your opinions concerning those unorthodox location wells, and whether or not you think there's an opportunity for the violation of correlative rights.

A. We looked all over this portion of the Basin where we needed to do a pilot project and it is very difficult to find an area that we -- in fact, it was impossible to find and area that we completely controlled and that had identical ownership in it. So this was our best choice to minimize the impact of any correlative-rights violations.

After we chose this area, knowing that we have slightly different royalties and overrides -- For instance, Section 31, Section 6 and Section 1 are federal leaseholds; Section 36 is state leases; and the overrides do vary slightly among all of those drillblocks. This is the best example that we could come up with.

So after knowing that we had some differences in ownership, the next thing was to place the well so that we felt that we had some compensating drainage patterns so that nobody would be adversely affected, or that we would minimize the effect of any drainage that would occur between the various spacing units. And that was one of the reasons on why these wells are located where they are.

The geologist will go into more detail about the extent of those drainage patterns, and I think it will become even more clear on how this setup, we feel, is a good pilot project area and will minimize any correlative-rights issues.

Q. For each of these increased density wells that are drilled at unorthodox locations, how far set back from the side boundary of a spacing unit are they?

A. We tried to keep them all approximately about 330 feet. The Application does list exactly where they're located, but that was our goal, was to try to keep them approximately 330 feet off of the drillblock boundaries.

Q. In each instance, then, you have told all interest owners, including the overriding interest owners, of these well locations and of this project?

A. Yes, sir, we have.

Q. And have you received any objection to the Division approving these unorthodox well locations?

A. We have not.

Q. Let's go back to Order R-10,720, which is the order that approved the 29-and-7 unit. When we deal with the drillblock area, are you seeking approval to do the same kind of operation in the drillblock?

A. Insofar as it's a pilot project, that's true. But insofar as the setbacks are concerned, it is not true. We're asking specifically for nonstandard locations for each of these increased density wells in the drillblock area, and that would be the difference between the two Applications.

Q. If there is a desire to expand or increase the density in the drillblock area, then we're going to have to come back and get further approvals?

A. That is correct.

Q. When we get to the 27-and-5 unit the idea is, as more wells are drilled in the Mesaverde in that unit to test this pilot, we would not need additional approvals?

A. That's correct.

Q. All right, sir. Anything else, Mr. Alexander?

A. No, sir, I believe not.

MR. KELLAHIN: That concludes my examination of Mr. Alexander, Mr. Catanach. We move the introduction in Exhibit Book 11,880 of Exhibits 1 through 3 and, in Exhibit Book 11,879, Exhibits 1 and 2.

EXAMINER CATANACH: Exhibits 1 and 2 in Case 11,879 and Exhibits 1, 2 and 3 in Case 11,880 will be admitted as evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Alexander, dealing with the unit case first, the entire unit, again, is in the Mesaverde PA?

A. Yes, sir, that's correct.

Q. And that's been established since 1981?

A. Yes, sir.

Q. Okay. Are there going to be more than eight wells drilled in that pilot project?

A. Yes, we anticipate that there will be. However, what I have shown here are just the 1998 project wells.

Q. Those are for 1998?

A. Yes, sir.

Q. Okay. You don't have an idea how many wells will ultimately be drilled in that?

A. No, sir, that will be a factor of the results that we find, and I believe the geologists will give you better information concerning why that is later when he testifies.

EXAMINER CATANACH: Okay. For the record, I would just like to state that we have received an entry of appearance in this case, Case 11,879, from Scott Hall on behalf of the Ruth Zimmerman Trust, just for the record.

MR. KELLAHIN: Mr. Catanach, I don't believe I received that. We may ask Mr. Alexander about her interest, his knowledge of that interest and where it is.

Q. (By Examiner Catanach) Do you have knowledge of that?

A. Yes, the Zimmerman Trust is a working interest owner in the San Juan 27-and-5 Mesaverde participating area. It has about an 8-percent interest.

EXAMINER CATANACH: Okay. Mr. Hall or the Zimmerman interest is not represented here, I gather?

MR. KELLAHIN: I believe not.

Q. (By Examiner Catanach) Okay. So in the unit case we're basically doing the same thing as we did in the 29-7?

A. Yes, sir, except this time we're asking for a little increased flexibility to locate the wells, and we're not asking for specific NSL locations for the initial wells at this point.

Q. Okay, you're just asking for the flexibility in the setbacks?

A. Yes, sir.

Q. We did that in that other case, though?

A. We did, but also at that time we asked you for some specific NSLs that we don't believe -- that we have to go through that step in this case. We'd be better to be able to locate the wells in accordance with the requested setback.

Q. Okay. With regards to the drillblock area, it's my understanding that in Section 31 and Sections 1 and 6 Burlington is the operator of those spacing units?

A. That is correct.

Q. And in Section 36 Great Western is the operator?

A. They're the historical operator, although we have asked them for permission to drill and operate this increased density well.

Q. Okay, but they currently operate two Mesaverde wells in that spacing unit?

A. Yes, sir, that's correct.

Q. Burlington proposes to drill and operate the well for six months?

A. Correct. We did check with the Aztec Office, with Tax and Revenue --

Q. Uh-huh.

A. -- and with the Commissioners of the Public Land Office, and they said that that's agreeable with them.

Q. Our Aztec Office told you that it was agreeable to have two operators on a spacing unit?

A. Well, they're able to accommodate that in ONGARD by a different PIN number. That's what we wanted to validate, to make sure that there wouldn't be any problems. And when we turn this well back, they will assign a PIN number to it for Great Western. And they thought that we would not have any trouble tracking production and the payment of royalties and the overrides during that time period.

Q. Can you provide verification of that from the people that you talked to?

A. I can ask them for a letter or --

Q. Yeah.

A. -- what would you -- What you like?

Q. If you can get a letter from them, that would help us to determine if that's possible. I was under the impression that that was not permitted or permissible up to this point.

A. We were under that same impression. That's why we wanted to call them. We talked with Velvet Money in the Taxation and Revenue and Mr. Albers in the Commissioner of the Public Land Office, and then with both Frank and Ernie in the Aztec Office.

Q. Okay. If you can provide me with something that would support your request, that would be helpful.

A. All right.

Q. Okay, as far as the interest owners -- I mean, the proration units that Burlington does operate, you said that Burlington was going to bear the entire cost of drilling the well?

A. In those spacing units, yes, sir, that is correct.

Q. Is Burlington the only working interest owner in those spacing units?

A. Yes, sir, we own those 100 percent.

Q. Okay.

A. That is part of the reason why we chose this area. We were trying to minimize the impacts to everybody.

Q. Okay. Are there some very -- There are some other royalty interest owners and overrides in those sections?

A. Just -- The royalty, as I explained, the Section 31, Section 6 and Section 1 are -- those are federal leaseholds --

Q. Okay.

A. -- and 36 is state.

There are various override owners in each of the drillblocks that are ranging from about 2-percent to about 5-percent total overrides.

Q. Okay. Are those subject to -- what? A joint operating agreement or --

A. Only the well in Section 36. The others are 100-percent ownership, so there's no operating agreement on the ones that we own.

There is a communitization agreement in Section 1 between the two federal leases, there's a communitization agreement and an operating agreement in Section 36 because of the diverse ownership in that drillblock.

Q. So there's nothing to preclude you from drilling a third well, as far as any kind of operating agreements or anything, any other agreements?

A. Only the operating agreement in Section 36, and we are getting the approvals to increase that density from the owners in that drillblock.

Q. Does that -- There is a JOA in that section?

A. Yes, sir, there is.

Q. Does that have to be amended, or how do you proceed with it?

A. No, it's a joint operating agreement that covers the south half for the Mesaverde. So it would cover the increased density well, providing the Division authorizes the increase in the density.

Q. So if we authorize it, the JOA allows it?

A. Yes, sir.

Q. Okay. And so far you've got -- Let's see, in Section 36 have all those interest owners agreed to that?

A. Yes. I've currently got back the -- They agreed at the meeting in Midland, in principal, and then I told them that we would furnish them the cost estimates, and currently, as of today, I've received Conoco's and Taurus's. I talked with Great Western, Mr. Simpson, here this morning, and his is up for signature in Dallas or Forth Worth, in their main office.

So we're not anticipating any problems in that area.

Q. Okay. These are the only six wells that are going to be drilled in this drillblock?

A. That's all we're asking authorization to drill at this time, that's correct.

Q. Have you talked to any interest owners that have expressed any concern about this, Mr. Alexander?

A. No, sir. Everybody, I think, is fairly excited about the prospects and testing for increased density in this formation.

EXAMINER CATANACH: Okay, I have nothing further, Mr. Kellahin.

MR. KELLAHIN: Thank you, sir.

I'd like to call Mr. Babcock.

WILLIAM BABCOCK,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Babcock, will you please state your name and occupation?

A. My name is William Babcock. I work as a geologist for Burlington Resources in Farmington, New Mexico.

Q. Mr. Babcock, did you testify before Examiner Catanach back on October 17th, 1996, in Case 11,625, concerning the geologic opinions and conclusions for the San Juan 29-and-7 unit?

A. Yes, I did.

Q. As part of your efforts for examining increased density wells for the Blanco-Mesaverde Pool have you now established recommendations for the Division to add two more pilot project areas for this study?

A. Yes, I have.

Q. And based upon that recommendation, do you now have opinions for Mr. Catanach concerning the feasibility of each of those projects?

A. Yes, I do.

Q. Is the geologic work your work?

A. Yes.

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

EXAMINER CATANACH: He is so qualified.

Q. (By Mr. Kellahin) Let's turn to the unit case, Mr. Babcock, and look at case book 11,879. If you'll turn with me behind Exhibit Tab Number 3, there's a fold-out map. Describe for Mr. -- Examiner Catanach what he's seeing.

A. This is a map of the drainage areas in the Mesaverde formation. This map was made by using wireline logs and calculating the volumetric original gas in place across the Basin.

Q. Were there petroleum engineering experts that helped you in this calculation and the preparation of this display?

A. Yes.

Q. And the volumetrics and some of the rest of this?

A. Most of the volumetrics were done by myself, with some help from outside consultants to determine the proper methodology to use. The reserves -- In order to determine the actual area that was drained, that was done by reservoir engineers and rate-time analysis.

Q. Tell me what the color code means.

A. The color code, it's -- The black are areas where we feel that the existing wells are draining greater than 160 acres.

Q. When you talk about existing wells, what are you meaning?

A. The wells that are currently spaced on one well per 160 acres.

Q. Okay. What's the significance of the pink area?

A. The pink areas are where we feel that the drainage recovery of existing wells ranges from 80 to 160 acres. And then the blue areas are where we feel the drainage is currently less than 80 acres per existing well.

Q. Refresh our recollection about why Burlington chose the 29 and 7 as one of the three pilot project areas.

A. As you can see by its location, it's in the heart of the main producing portion of the Basin where on all sides of it the wells are recovering significantly more as a function of the gas in place.

We wanted to go into an area like that, which we felt was low risk, but as you can see there's also a significant amount of blue and pink within that pilot area, so we knew that there were additional reserves to be gathered. The pressure drop in that area was low, but we felt that the reserves recovered would be relatively high.

So we looked at that as a low-risk area to test the concept of our -- do we need more wells to drill -- to recover the gas in place?

Q. If you'll turn with me to Order R-10,720 -- I think you have a copy of it there -- if you'll turn to page 3, at the last hearing you discussed Findings 8, 9 and 10, and they had to do with the analysis of the pressure drop in the Mesaverde reservoir.

In the 29-and-7 unit, refresh our recollection about the pressure drop and what significance that had.

A. In the 29-7 unit, the pressure drop per year was -- ranged from 5 to 15 p.s.i. per year. Now, this -- Should I explain how it was calculated, or is that not necessary?

Q. I think that's obvious, how it was calculated --

A. Okay.

Q. -- but you can summarize again, if you like --

A. Okay.

Q. -- what you were doing.

A. Well, it was the shut-in wellhead pressures and the difference between the shut-in wellhead pressures of the wells that were drilled in 1950 and those wells drilled in 1970. So it's effectively looking at the efficiency of the drainage of the original wells.

Q. When you mapped out the pressure-drop map, if you had an area that was greater than 30 p.s.i. per year, that was an indication that existing wells were reasonably efficient under that pattern for depletion of Mesaverde gas?

A. That is correct.

Q. And as you moved down on that p.s.i.-per-year drop, you found areas that were less efficient?

A. Correct.

Q. And you took it all the way down to 5 p.s.i. per year?

A. Yes.

Q. Within the 29-and-7 pilot area, what was the range of pressure drop?

A. In the pilot area it was 5 to 10 p.s.i. per year.

Q. As we move into the San Juan 27 and 5, what kind of pressure-drop area are we in here?

A. We're also -- The 27-5 unit is in the 5 to 15 p.s.i.-per-year drop.

Q. And then finally in the drillblock area, what's the range of pressure drop there?

A. Once again, it's 5 to 15 p.s.i. per year.

Q. Okay. Let's go back to the 29-and-7 pilot area. Why is it necessary to have two more pilot project areas in addition to the 29 and 7?

A. The 29-7 pilot, as you can see by its location, is in the heart of the field, very thick sands, excellent recovery from most of the wells in there.

The two pilot areas we're looking at today, the San Juan 27-5 and the drillblock pilot, are out on the edges of the field. The recovery -- The drainage areas generally decrease as you move outwards within the field, and we're getting out to the edges between where there's very little pink and it's mostly just blue.

So we felt it necessary to go out into those areas and evaluate both from an economic and from a reservoir-evaluation standpoint.

Also, the two pilots that are in -- They're quite a ways away, as you can see, about 25 miles apart, and there are some significant differences in the sand geometries from one area to the other. Based on core, the matrix properties remain similar, but the sand geometries are significantly different, and so we felt it necessary to evaluate both areas.

Q. Let's go back and look at Order 10,720, and look at Finding 11. Now that you've got your eight increased density pilot wells in 29 and 7 -- I assume you've examined all that geologic data?

A. Yes.

Q. -- is there any of that new data that causes you to change any of the conclusions that were reached by the Examiner in Finding 11?

A. No, there is not. Everything we're finding confirms what we believe going into the drilling of those wells.

Q. As we look at the Findings 11 that were applied to 29 and 7, do you see any geologic reason to change those findings with regards to the approval of a pilot project for the 27-and-5 area?

A. No, I don't.

Q. When we look at the opportunity for gas in place, thickness in the Mesaverde, is there a difference that we should be aware of when we move from the 29-and-7 to the 27-and-5 units?

A. The difference -- There is a little bit less gas in place in the 27-5 unit, the permeability is a little bit less, and consequently the well recoveries are a little bit less. We still see very similar pressure drops, so that the overall parameters remain essentially the same, but the wells are not quite as good down in that area as they are in the 29-7 area.

Q. Geologically, give us the summary, then, when you compare 29 and 7 to the drillblock.

A. The drillblock is somewhat between those two areas, between the 27-5 and the 29-7 unit, as far as the productivity of the wells in that area. The sands are a little bit thicker in the drillblock area. It has approximately as much gas in place as the 29-7 area. Permeability is a little bit less. The sands are not quite as thick; therefore they probably are not quite as continuous, based on our analysis.

Q. If you'll turn with me to the next display behind Exhibit Tab Number 3, let's refresh Mr. Catanach's recollection about this drainage pattern orientation concept. Explain to us the concept, and then I'll ask you about the three projects.

A. Okay. What this is, it's purely a conceptual diagram which shows our interpretation of the drainage areas of a hypothetical well. Since these -- The drainage areas are controlled by natural fracture systems which tend to be linearly oriented in a north-south direction, according to nearly all of our data.

We see a strong permeability anisotropy in that north-south direction. That permeability anisotropy will set up an preferential drainage orientation so that instead of a drainage circle, a circular drainage area, we would have an elliptically shaped drainage area.

Now, these ellipses shown here are approximately three to one -- a little less than three to one, actually, and that may very well be representative of certain areas of the Mesaverde.

Q. When we look at the display we're seeing in each square, that represents a section?

A. Yes, it does.

Q. In each section, each red dot represents the existing well pattern drilled to that density?

A. That's correct.

Q. And as the wells compete for gas in the Mesaverde, the concept is, there is a north-south orientation to the elliptical drainage shapes?

A. Yes, sir.

Q. If that is the nature and extent of the gas depletion in the Mesaverde, what, then, is the opportunity that you're testing with the increased density plan?

A. The opportunity is to get between those ellipses and put another row of ellipses, of elliptical drainage areas. Because of the orientation of the wells, we haven't been draining the gas efficiently between those wells.

Q. Okay. Let's turn to Exhibit Tab 4 and go back to the 29-and-7 unit and look at the project there and the eight additional density wells, have you show us where they are, and then we'll talk about what's happened as a result of those wells.

A. Okay. The eight wells are located in Sections 1, 2, 11 and 12. They should be highlighted in orange on the map. Four of those wells were drilled directionally because of topographic problems, to get to what we felt to be appropriate bottomhole locations to get between the drainage ellipses, so to speak.

Q. When you turn past the locator, there is a summary sheet that says "29-7 Infill Results". What are we seeing here?

A. This is a table with the first column being the well names. There are eight wells, all of the eight wells that we've drilled in that unit.

These wells have been on a time period ranging -- have been producing gas and -- have been selling gas between two to four months on these wells. What this represents is the initial 30 days averages that we saw on those wells.

The first column -- or the second column after the well name is the actual bottomhole pressure, as measured by a pressure bomb which was lowered into the well.

The second column is our simulation model predicted bottomhole pressures.

Q. Now, that model presentation and simulation was part of the evidence submitted in the case that approved the 29-and-7 unit project?

A. Yes, it was.

Q. All right. So you have the model pressure, bottomhole pressure for the model. What's the next row?

A. The next row is the actual initial -- the actual 30-day average rates for the first month's production, and then that's followed by the model projected 30-day average rates for the first month of production.

Q. There are differences here. Summarize for us what the differences mean, and what can we conclude from the results?

A. What we see is that in the bottomhole pressures where we've essentially matched the model to the actual pressures, if you look at the average, we're only about 25 p.s.i. off.

Q. So what does that mean?

A. That means that we've modeled it accurately --

Q. Okay.

A. -- at least as regards the pressure.

But the rates, we've underestimated the rates by about 200 MCF per day.

Q. The model projected 691 MCF?

A. Yes.

Q. And the actual for the eight wells was 991 MCF a day?

A. 911.

Q. I'm sorry, 911 MCF a day. What does that difference mean?

A. Several possible explanations for that. One is that potentially we haven't modeled the skin of the new wells, or the efficiency of our completion methods in those new wells. I think that's one of the most likely possibilities of that. That's what I see as probably the reason that our rates are so much higher than what we expected.

Q. Once you compare what the model predicted at the last hearing with the actual results, what are the ultimate conclusions that you want to tell Mr. Catanach?

A. That we did the right thing in drilling the wells. We're finding the high pressures that we had anticipated between these wells, so that we were correct in assuming that we weren't efficiently draining the wells with the original four wells per section.

We may have been a little conservative on our rates, and therefore we only drilled two additional wells per section, and potentially it may be economic for us to drill more than two wells per section, based on these rates.

Q. Okay. The pilot at this point has increased the density per section from four wells to six?

A. That is correct?

Q. And there may still be an opportunity for more wells in a section, based upon economics?

A. That's correct.

Q. At this point, though, you're satisfied that increasing the density in this project from four to six wells a section had been a good idea and, in fact, is a good idea?

A. Absolutely.

Q. Okay. Let's turn to the next display. We have a table here. Identify and describe what we're seeing.

A. This is just a bar chart summarizing the average values shown in the table from the previous page, and the first bar chart shows the average 30-day gas rates. As you can see, the actual is in blue and the model is in red.

And then the next chart is the same type of display, except with the bottomhole pressures shown on the Y axis, with, once again, the actual in blue and the model in red. And you can see our actual pressure is about 25 p.s.i. higher than our model-predicted pressure.

Q. When we look at the drillblock exhibit book, all the exhibits that were applicable to the Unit case are identical in the drillblock exhibit book?

A. That is correct.

Q. All right. Let's open both books at this point and start with Exhibit Number 6 in the drillblock case and Exhibit Number 5 in the 27-and-5 unit case. We are looking at two bubble maps, are we not?

A. Yes, we are.

Q. All right. Let's start with the unit map, and then we'll contrast it to the drillblock map.

A. Okay.

Q. Identify and describe what we're seeing and what it means.

A. This is another display showing the drainage area of each well. As we showed you the regional map of the whole basin, was this same data essentially, but it was contoured. This is just showing exactly the data point at the individual well location.

Each bubble represents the actual drained area -- or the actual drainage area of a particular well. Now, as I indicated, we feel that these drainage areas are actually ellipses rather than circles, but they're shown as circles on this purely as a graphical display, showing how much space there is between the drainage areas of these individual wells.

And you can look at the northern portion of the

27-5 unit. Although there's still a lot of white area between the circles, the circles themselves are larger. Then when we get into the middle of the unit the circles get smaller and significantly lower drainage areas. And then down in the southeastern -- southwestern portion of the unit, excuse me, the bubbles once again get larger, indicating that we're more efficiently draining the reservoir. But there's still lots of white space between these bubbles.

And also, we should note that this is calculated assuming 80 percent of the gas in place, so that the assumption is made that there's no way we could get beyond that recovery factor, so that therefore this is -- what's left is above and beyond that 20 percent.

Q. How is this information useful in terms of your project or your projections about increased density for the pool?

A. Well, this clearly shows where we have opportunities for infill drilling. It shows that we are not efficiently draining these areas.

Q. Okay. When we turn to the drillblock area, identify and describe what we're seeing on this bubble map.

A. The drillblock area, we're looking at the intersection of four townships. The heavy black line represents the township boundaries, with the northeast corner being Township 31 North, 10 West, the northwest corner being 31 North, 11 West, and then the southern corners being 30 North, 10 and 11 West, respectively.

I forgot to mention also that there is a cross-section line shown on each of these maps, which is the cross-section we'll be looking at, a later display.

Back to the bubbles. On the drillblock area you can see that the bubbles are, in general, a little bit bigger than what they are in the 27-5 unit, although there are some very small bubbles in that area, particularly in 36 and over in Section 5 of 30 North, 10 West. And also that the bubbles, in general, increase in size to the northeast portion of the map, which is in agreement with the basinwide map that we saw of the contoured Mesaverde recovery drainage areas, which shows it increasing towards the center of the Basin.

Q. Okay. What's the point, then, of the drillblock bubble map?

A. Once again, the point is to show that there are areas of undrained acreage with the existing well locations.

Q. Let's turn to the next page of each exhibit book, and for each area we are looking at what?

A. This is the localized p.s.i.-per-year map. This is the pressure drop over those areas, based on the parent and infill well initial shut-in pressures.

Q. Help us read the pressure drop per year, based upon the color code.

A. The color code in both maps is the same. And if we would look at the 27-5 map and start in the red, up in the northeast portion of the map, the boundary between that red and the orange is the 5-p.s.i.-per-year contour. The boundary between that orange and the more yellowish orange in the southwestern portion of the map is the 10-p.s.i.-per-year contour.

Then you can also see there's a 15-p.s.i.-per-year contour when the colors turn to yellow, and those contours are a function -- There is one well in Section 5 that has a higher pressure drop in that area.

Q. How was this map used to help you find the location of the eight increased density wells for this project within the unit?

A. Well, we felt it important to come into an area with from 5- to 15-p.s.i.-per-year pressure drop, because that's sort of an arbitrary cutoff we took as being -- below that we would feel comfortable that we are inefficiently draining the reservoir with the existing wells.

Q. Come over and help us understand your conclusions about the p.s.i.-per-year drop in the drillblock area.

A. Similar conclusions. In the drillblock area, the vast majority of the area is from 10 to 15 p.s.i., except there is one well in Section 35 with a little higher pressure drop, and then there's one well in Section 32 with a little bit higher pressure drop.

Other than that, the trends are pretty consistent, so we feel pretty comfortable that both of these areas are reasonable to go in and increase the density on the Mesaverde formation because of that.

Q. Let's look at the cross-sections, if you'll unfold those for us.

A. The cross-sections, as we just saw, they are -- You saw the locations on the previous maps.

The 27-5 cross-section, which you can see it on the well headers -- 26 San Juan 27-5 is the first well -- it's significantly thinner-bedded than what we see in the drillblock area in both the Cliff House and the Point Lookout formations. In both locations the Menefee is thin-bedded.

But the thin-beddedness of it helps explain why the 27-5 unit has lower drainage areas. It's more difficult to get continuous drainage when you don't have continuous sand layers.

But both of them do have a significant amount of gas in place. I've highlighted in yellow what we consider to be net sand. Now, there is some variation in log quality across this cross-section, but you can see that there is a significant amount of sand in both of these cross-sections.

In the drillblock area -- The gross thickness of the interval is the same in both the drillblock and the San Juan 27-5, but in the drillblock area you can see that obviously, especially in the Cliff House, we have significantly more gas in place than we do in the San Juan 27-5 Unit.

Q. When you're trying to develop a base of data to determine how many additional wells ought to be authorized in this huge pool, you need to think about how many more in addition to four a section.

Is there any of this information that gives you a point of reference as to how many more wells might be appropriate for the entire pool? Can you tell yet?

A. It's going to be highly variable across the pool. In some areas, we clearly need additional -- up to four additional wells, and potentially more, particularly in places like the 27-5 where we're -- as you can see, four additional bubbles in there of the same size probably won't --

Q. In the drillblock and in the 27 and 5, based upon geologic differences of thickness, you need to have pilot projects in those areas to see what those drainage patterns are going to be?

A. Yes. Yes, we need to gather some more data to really see how efficiently we're going to be draining it and how much we're drawing the pressures down by these additional wells. That would be correct, that -- This data doesn't give us the absolute answer for how many more wells we need to drill, no. It tells us that we need to drill more wells than what we have now.

Q. All right. Let's fold up the cross-sections and then have you direct your attention to the information behind the next exhibit tab. It's going to be 6 in the unit case and it's going to be 7 -- Well, it's organized a little differently, I'm sorry --

A. Yes.

Q. -- Mr. Babcock. In the unit case you have an Exhibit 6 tab which separates the cross-section, and they're not organized quite the same way in the next book.

A. Yes.

Q. All right. Let's stay with the unit case, then, and go through those displays.

A. Okay.

Q. Exhibit 6, what do we see, and what does it mean?

A. Exhibit 6 is cross-section of our geostatistical model that was used to input into the reservoir simulation.

This is of the whole Mesaverde interval, with blue being shale intervals -- And this is a porosity map, and I apologize, the scale isn't shown on there. But the blue is essentially shale, not reservoir intervals, whereas the greenish-yellow, yellow, red and orange colors are sand layers. You can see the discontinuous nature of those sands across the area.

Q. For the unit case and the drillblock case, there is a geostatistical modeling that's occurring. Is it the same methodology that you apply to the 29 and 7, that you discussed in great detail with Examiner Catanach last year?

A. Yes, it is. There's one slight difference in that, in the drillblock model, which is the last one we did, we did some simulation comparing the detail that we needed to go to, and we ended up going to a little bit less detail in the drillblock area than we did in the 27-5 and the 29-7 simulations, just because we found that that additional level -- There was a point at which the additional level of detail didn't buy us any more accuracy.

Q. All right. Go back and give us the summary in 29 and 7 of what we were doing with the computerized model, the geologic model.

A. A summary of the geostatistics or --

Q. Well, the method. What are you doing?

A. Well, you're taking all the existing well data --

that would be the wireline logs in the area and any core data that's available -- and looking at that on a layer-by-layer basis, along with intervals that the geologist has determined to be continuous, correlatable markers in there.

And then you distribute those reservoir properties between the wells and between those correlated markers in the space between the wells, and those properties are distributed in a non-averaging method. Instead of the typical contours which average those properties across an area, these are not averaged.

Q. Let's turn back to the order, Order 10,720, and look at Findings 12 and 13. The order provides a concise summary of what you're doing with the reservoir modeling?

A. Yes, it does.

Q. All right. You're trying to validate this hypothesis about the elliptical shape of the drainage patterns and the orientation, and that's what you were doing in 29 and 7?

A. Yes.

Q. Is that the same thing that you're doing in 27 and 5?

A. Yes, it is.

Q. And with a small change in the level of detail, you repeated that for the drillblock?

A. Yes.

Q. Okay. Is that information also utilized by the reservoir engineer in determining the volume of gas to be produced -- or forecasted to be produced by these project areas?

A. The geostatistical model is the input into the reservoir simulator. It is the geologic model which is input into the reservoir simulator to forecast production.

Q. Without going through each of the last displays here, let's have you summarize for us at this point, at the end of your testimony, your geologic conclusions about the necessity for the two additional pilot project areas.

A. All the data I've looked at indicate that we're not -- currently we are not efficiently draining the gas in place in those areas, and the only geologic reason I can see for that is that there is not sufficient permeability in the areas to drain a full 160 acres with -- to drain a full 160 acres.

And so we need to drill more wells in order to get the gas in place out, and that there -- it will -- That's it, in a nutshell. We need to drill more wells.

Q. Okay. And nothing you have found in the current project with these eight wells that have been drilled changes any of your conclusions or opinions?

A. No, it doesn't; it reinforces them.

MR. KELLAHIN: That concludes my examination of

Mr. Babcock, Mr. Examiner.

We move the introduction of his geologic displays. They're going to be those information behind -- In Exhibit Book 11,879 it's Exhibits 3 through 6, and in the drillblock case it's going to be Exhibits 4 through 6.

EXAMINER CATANACH: Okay, in the -- Exhibits 3 through 6 in Case 11,879 and Exhibits 4 through 6 in Case 11,880 will be admitted as evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Babcock, in terms of the geologic data that was put into the reservoir model, do you feel that was pretty accurate?

A. I do. You know, there are inherent uncertainties associated with wireline logs and interpolation of data between wells, but I feel it's as accurate as is possible. Yeah, I feel very comfortable that it reasonably captures the reservoir.

Q. Are these -- These are basically the only three pilot projects that Burlington proposes to conduct before coming in with maybe some amended pool rules; is that your understanding?

A. That's probably correct, yes.

Q. Do you think that's going to be sufficient data with which to do that?

A. I think it will give us a wide range of data points. We've specifically chosen these three pilots to get a look at the lower end in terms of economics, which would be the 27-5 unit, what we originally had thought may be the upper end, which would be the 27-7 unit, and then one data point in the middle, which would be the drillblock point. So that would give us a reasonable look at the range.

And tying these back to recovery factors, I think that yes, it probably will be sufficient to determine -- to have a reasonable cross-sectional view of the variations we would expect to see in the Basin.

What we still wouldn't have, that would be something in the -- what we consider to be the highly drained portions of the Basin. But based on our analysis right now, we don't feel that we would want to go and drill additional wells in those areas.

Q. Can you explain to me how the initial infill wells, or those locations within the unit, were determined?

A. In the 27-5?

Q. Yeah.

A. They were determined by looking at the proposed drainage orientations. We feel very strongly that the drainage ellipses are in a north-south orientation, so we want to get out of those existing drainage areas.

But also in an area like that where the recovery is relatively small, we felt that we could fit an additional four wells or equivalent four wells per section in there without overlapping, as long as we in general stayed out of that north-south orientation.

Q. Now, the 27-5 is not fully developed in the Mesaverde; is that correct?

A. That is correct.

Q. There's substantial proration units that only have two wells on them, and the reason for that is what?

A. The -- If you can look at the bubble map, that's an excellent example to look at. You can see in the central portion of the unit, the bubbles are significantly smaller. Across that area the gas in place is essentially unchanged, so -- There are some changes, but essentially the size of that bubble is a function of the EUR of the well. So the wells in the center part of the unit are not as economic as those wells to the north and to the southern part of the unit.

So the majority of the undrilled wells under the existing rules are in that central portion of the unit, and it's purely an economic question, there were better opportunities, better places to spend capital in that area.

We are --

Q. So --

A. Oh, sorry, sir.

Q. No, go ahead.

A. I was going to say, we are drilling some more wells out there this coming year, on the 160-acre spacing also, sort of pushing the edges of that to determine where the economics are, because we realize we're starting to -- We're completing the wells a little bit more efficiently.

Q. So the proposed increased density wells will be in the northern part of that unit?

A. Yes. In fact, the area that they're going to be drilled in is fully developed.

Q. So that's part of the factor in determining where those wells will be located, is, did the existing four wells recover some good EURs?

A. That's correct.

Q. Is the production basically, or predominantly -- In these areas is it Cliff House predominantly, or...

A. In the San Juan 27-5 area, we don't have specific production logs in that area to define that. But based on the well logs, I feel that in the 27-5 unit, it's probably fairly similar to the 29-7 unit where we're getting approximately 20 to 30 percent of our production from the Menefee, and the rest of it would be evenly split between the Cliff House and Point Lookout.

Now, in the drillblock area it's historically been a little bit different. We're on the edges of the field there, and the Cliff House wasn't even completed on the initial wells, and the Cliff House wasn't even completed until the wells were drilled in the 1970s and they began completing the Cliff House when they realized that where the Cliff House becomes water-bearing is further south.

So in those wells the historical production has probably been dominated by the Point Lookout. But current production, we feel, should be relatively consistent, although in the southern part of the area we don't feel that the Cliff House will be a significant producer, the southern -- southwesternmost two wells.

EXAMINER CATANACH: That's all I have of this witness.

MR. KELLAHIN: Would you like him to explain his well locations in the drillblock, his unorthodox locations?

EXAMINER CATANACH: Yeah, why don't we talk about that?

FURTHER EXAMINATION

BY MR. KELLAHIN:

Q. Let's go back, Mr. Babcock, and if you'll look in the drillblock case, let's find Exhibit 3. Do you still have that? That was Mr. -- Alan's map.

A. Okay.

Q. Have you got one?

A. Yes.

Q. And let's look at the drainage bubble map -- it's behind Exhibit Tab 6 for the drillblock -- and let's set these side by side and have you explain to us why you have chosen these unorthodox locations in the drillblock project area.

A. Well, as we talked about, the drainage orientations, instead of the circles that we see in the bubble map, are actually elliptical in nature, so that if you can envision those circles stretching out by about three times in the north-south direction and thinning by a couple times in the east-west direction, that leaves -- that fills in the area in the north-south direction, especially in the eastern portion of the four section, the pilot project we're looking at.

But it leaves big gaps in the middle of each section and along that township boundary line, or the section -- the north-south-running boundary lines, and also in the middle of the western sections.

Q. All right, let's go back and look at the concept, the drainage concept pattern map, which is behind Exhibit Tab 3 and is the one that's got the green ellipses. Let's use that, then, and show the concept for well locations in the drillblock.

A. Okay.

Q. Have you got that?

A. Yeah. This pretty much explains what it looks like in that -- the only difference being that in the line of wells, the easternmost wells in Section 31 of 31 North, 10 West, and in Section 6 of 30 North, 10 West, those wells probably have overlapping ellipses in a north-south direction, and see that they're draining -- they look to be draining about 100 acres or so, for those wells.

And so those wells are going to overlap in a north-south direction, but in an east-west direction they aren't going to be touching at all. So we've located the wells to get in those areas in between the drainage ellipses where our existing well locations have not efficiently drained at all. We should find the highest pressures, and therefore the most gas, in those inter-ellipse areas.

Q. When we look at how this was set up in the drillblock to take advantage of this elliptical drainage concept, it appears as if each unorthodox location is designed where it will help that spacing unit produce gas that might not otherwise be produced --

A. Absolutely.

Q. -- and in a part of the spacing unit where it may be exposed to counterdrainage by an offsetting spacing unit, it also has its own well competing for offset gas. Do you see what I'm saying?

A. Would you please restate that?

Q. Yeah, let me do it again.

In the spacing units, you have four of them that are affected. The well locations are located to give you gas you might not otherwise produce. Certain of these locations encroach upon the offset spacing unit at some point. But each of those spacing units, in turn, has its own unorthodox well location which encroaches on the offset.

A. Yes.

Q. When you package it all together, can you see any equity among all the interest owners with this opportunity to produce gas that might not otherwise be produced?

A. Yeah, I think that there is -- As Alan said, we tried to balance the inequities so that each location, as you mentioned, is able to drain the additional -- the neighboring location, so that everybody will get a piece of something else in these.

And in order to get the gas -- to recover the gas in place, there's going to have to be some trading across these lines.

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

FURTHER EXAMINATION

BY EXAMINER CATANACH:

Q. I guess I'd have a question, Mr. Babcock, about the well in Section -- Well, you're going to drill a well on the southern boundary of that Section 36, pretty close to that southern line there?

A. Yes.

Q. Why wouldn't you move the well in Section 1 further north?

A. In order to --

Q. To maybe compensate for --

A. -- compensate that a little bit?

Q. -- drainage that may be occurring from the well in Section 36 --

A. Yeah --

Q. -- or may occur.

A. -- we probably -- You're talking about the easternmost well in Section 1. We could have moved that up to the border to get in --

Q. I'm actually talking about the well in the middle.

A. Ah, okay. Well, I wanted to stay away from overlapping these ellipses too much in a north-south sense. We could have moved it up, but then the two wells would have been in direct competition with each other, in a north-south sense.

If we -- To explain what I mean, if we would look at the drainage-ellipse concept display, which is behind Tab Number 4, you can see -- In the northwesternmost portion of that, you can see the two ellipses are competing --

Q. Uh-huh.

A. -- there, and we're trying to avoid that kind of a situation where the new wells, sort of the test wells, are competing against each other. The concept we're trying to evaluate, do these wells compete significantly with the wells that are already in place?

I feel very strongly that if we were to put those wells right up next to each other across opposing sides of that border, that they would directly compete against each other and would be -- both of the wells would produce less gas because of that.

Q. Well, do you feel like the north half of Section 1 is adequately protected from drainage which may occur from that well in Section 36?

A. There will clearly be some drainage from Section 1 by Section 36. I think if -- That is probably the closest thing to an inequity in this location.

At least from an operator and working-interest owner standpoint, Burlington is the hundred-percent owner of Section 1. So we felt from that perspective we were addressing that on a larger scale.

Q. Let me ask you about the well location in Section 36. Why is it not possible to move that further north and get the same kind of results?

A. It probably would have been possible to do that, but we felt that the well in Section 31, even though the ellipse is oriented north-south, we had to move as far to the west as possible because of the 4A well in the north of that section. We wanted to get away from its drainage ellipse.

So we moved that well as far west as we could, so there will be some drainage of that drillblock in Section 36 from that well, you know, even though it's a lateral. But it is close enough that we would expect that there will be some drainage because of that.

The well in Section 36 could have been moved more to the north. There's no question about that. We wanted to avoid draining the drillblock in the north half of Section 36, wanted to avoid any objections from the owners in that half section too, and that's another reason why we wanted to stay as far south as we could, so that we could try and keep this constrained within a relatively few owners.

EXAMINER CATANACH: I have nothing further.

JAMIN McNEIL,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A. My name is Jamin McNeil. I'm a petroleum engineer for Burlington Resources in Farmington, New Mexico.

Q. Have you testified before the Division on prior occasions?

A. No, I have not.

Q. Summarize for us your education.

A. I graduated from the Colorado School of Mines in 1988 with a bachelor's in petroleum engineering, and I've worked in the oil and gas industry every since.

Q. Summarize for us your employment experience with Burlington.

A. I've been employed with Burlington for the last year, the last six months of which I've specifically worked on this Mesaverde infill project and in reference to the 27-and-5 unit and the drillblock-area unit.

Q. As part of your preparation, did you read the transcript and look at the exhibits from the 29-and-7 case?

A. Yes, I did.

Q. In addition, you have looked at all that work product generated by the former reservoir engineer, doing the task that you now perform?

A. That's correct.

Q. As part of your duties, did you also look at the reservoir data that went into the modeling that was done in the 29 and 7?

A. Yes, I did.

Q. And what you, in fact, have performed is the reservoir simulation for the 27-and-5 unit and the drillblock area?

A. That's correct.

Q. And based upon that simulation you have recommendations concerning the approval of increased density on a pilot basis for these two projects; is that not true?

A. That's true.

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

EXAMINER CATANACH: He is so qualified.

Q. (By Mr. Kellahin) Let's take the exhibit book for the 27-and-5 unit. Starting with Exhibit 7, let's look how you adjusted the model that was used for the 29 and 7 and made it applicable to the 27-and-5 project. Starting with the first locator map, what does this mean?

A. This first locator map identifies the four-section pilot area for the 27-and-5 unit. In a similar fashion, the 29-7 unit simulation represented four sections as well, so the areal extent is similar.

Q. All right, we flip past that display and we have another one. This represents what, sir?

A. This particular slide represents the grid of the simulation for the 27-and-5 unit with the -- This is a map view of the top layer. And again, this reservoir simulation included 65 layers. Each of the individual well markings is located on the grid, as well as the appropriate well number.

Q. Mr. Babcock has given you the appropriate geologic parameters to adjust, to make the model specific for the 27-and-5 unit?

A. That's correct.

Q. And now you're inputting the well data by putting the wells at the proper place in the model?

A. Right, the wells are located, due to their proper locations, and the actual production historically for the past 40 years for some of the wells is input into the simulation. And we go from there trying to match pressures.

Q. Okay. The last display behind Exhibit Tab 7 represents what? It says "Porosity".

A. This particular slide represents a single layer in the Menefee. In this particular case it's layer 35. And it's input in here to show the high degree of variability in the porosity within the Menefee.

The scale on the bottom indicates that black is from zero to .03 porosity units, the gray is .03 to .06, and the red is .06 to .10. So the majority of the porosity values fall between 3 and 10 percent, yet within a one-grid-block separation you can range from 3 to 10 percent. So it shows the highly discontinuous and highly variable nature of the Menefee.

Q. But you're helping the model recognize this variability by putting this data into the model?

A. That's correct.

Q. All right. The next thing you're going to do is, you're going to take your model and you're going to try to match it to some known values. Let's turn to Exhibit Tab 8 and have you tell us which parameters or values you've tried to match.

A. Right, in this given model we have input the historical production for all the wells in the four-section simulation area.

Q. Again, the history matching is the same methodology used in this 27 and 5 that was done for the 29 and 7?

A. That's correct.

Q. All right. And here you're matching initial shut-in pressures, aren't you?

A. In this slide, this depicts the model-predicted versus actual shut-in tubing pressure for each well in the four-section pilot area. Again, this scale is shut-in tubing pressure in p.s.i. versus time in days. So that bottom scale represents about a 40-year time frame.

Each of the corresponding pair of red and blue dots represents the original shut-in tubing pressure of each well in the simulation area. And as you can see, we've matched those pressures of model-predicted and actual throughout time very well.

Q. Are you satisfied with the match?

A. Yes, we are.

Q. Let's turn to see if you matched any other parameters. If you'll look at the next display behind Exhibit 8, what are you matching here?

A. In addition to the original shut-in tubing pressures, we also matched pressures on an individual-well basis. This particular well is Well Number 25, and this particular plot displays wellhead pressure versus time, again in days.

Q. Why would you want a match as to this parameter?

A. Again, in the model we're inputting this well's historical gas production rate and trying to match the model-predicted pressure, which is in green, with the observed seven-day shut-in pressures, which are the red hach marks on the upper portion of the trend, as well as the wellhead flowing pressures measured, which are the blue marks.

So again, we're trying to get the model-predicted pressures to, number one, follow the trend, but, number two, match the values of the actual observed data.

Q. And you did this for all the wells in the unit that were part of the computerized study?

A. That's correct, this is just one representative well.

Q. And what degree of confidence do you have in this match?

A. We have high confidence in this match.

Q. You're satisfied that it's matched accurately?

A. Yes.

Q. Is there any reason to match any other parameter? You've matched flowing tubing pressure historically for each of these wells, you've matched your shut-in tubing pressures. Any reason to match anything else?

A. No, I mean, typically with the input of gas production, you're trying to predict pressures. So given one value, you try to match another, and that gives a realistic representation of what the model looks like.

Q. Once you can do that and satisfy yourself the model is being able to match known values, then it can forecast future performance of the wells in the unit?

A. That's correct, once we get a model that's representative of the 40-plus years of production history, then we'd like to, number one, forecast the performance of the existing wells and also what impact additional increased density drilling will have.

Q. Did you follow the same methodology in the drillblock case?

A. Yes. Yes, I did.

Q. Let's turn to the drillblock case. We're going to turn past all the data and the matching information. Can you conclude for the drillblock that you had had an adequate match on those flowing tubing pressure data points, as well as the shut-in tubing pressure database?

A. Again, in a similar fashion for the drillblock four-section simulation area, we were able to match the individual well's original shut-in tubing pressure and the model-predicted shut-in tubing pressure, from the first well back in 1951 through the most recent well in 1990. Again, we're satisfied with the match of those corresponding pressures with time.

So that's each well, individual shut-in tubing pressures.

Q. All right. Now, let's go back and look at what the model predicted for the unit that was approved last year. For the 29 and 7 it forecasted a certain conclusion. You drilled your eight infill wells, increased density wells. How did you fit that together, and what conclusion did you reach?

A. The conclusion from the 29-7 history match and infill performance projection was that our maximum net present value generated was with two additional infills per section.

Now, in the two cases where -- the 27 and 5 and the drillblock, this clearly indicates that we need four additional wells per section. So that really magnifies the difference between the two, at least from a performance standpoint.

Q. When we go back to the 29 and 7, the original one, you're satisfied that the data from the eight new wells didn't cause you to change any of the values in the model that had been run for that unit? You're satisfied?

A. I think the results may have shown, as Bill previously mentioned, that the model may have been somewhat conservative, and specifically with performance of initial skin.

But yeah, the actual data suggests that we're happy with two additional infills per section, and the actual data is positive enough that we may actually indeed have potential for additional wells, infill wells.

Q. The modeling of 29 and 7 was slightly conservative, because the actual increased density from four per section to six per section showed better results in terms of rate and pressure --

A. -- and overall economics, right.

Q. -- and overall economics, than the model had forecast?

A. Right.

Q. When you look at the results to the 27 and 5, what does the model forecast for you?

A. For the 27 and 5, the model predicts that we would indeed need four additional wells, infill wells, per section.

Q. All right. And so in the drillblock area, what does the model forecast for you?

A. And also, similarly, in the drillblock area, we forecast four additional infill wells per section.

Q. All right. So our density per section is eight in each of those areas --

A. That's correct.

Q. And the density in the 29 and 7 is at least six, if not better?

A. That's correct.

Q. Okay, let's look specifically at 27 and 5, at the conclusions. Starting behind Exhibit Tab 9, you've given us a way to understand the coding for the rest of the displays. When we look at a base case on the rest of these displays, that means a current density of one well per 160, right?

A. That's correct.

Q. And one section means one additional well per section?

A. That's correct.

Q. And as you read on down, ultimately you're going to have a total of eight additional wells per section, on top of the original four that are already allowed in the rules?

A. Actually, the bottom one is four additional wells per section --

Q. Yes.

A. -- for a maximum of eight per section --

Q. All right.

A. -- so that simulates 80-acre density.

Q. Okay. Let's turn to the production forecast, which is the color display that follows this, and let's do both books together, because I think you can make a good comparison here. If you'll look in the drillblock and find the same production forecast for the drillblock, starting with the unit case, what does the production forecast tell you?

A. Again, the production forecast is depicted with the rate in MCF per day versus time, and the blue curve on the bottom represents the base case of the existing wells, and each subsequent curve includes the base case plus one additional well per section and subsequently two, three and four additional wells per section.

Q. So as we start with the base case and read up the curves, every time there's a change in color we've added four more wells?

A. To the four-section pilot area, that's correct.

Q. Okay. What's the conclusion?

A. The conclusion, from this slide you can see all the wells come on line in 1998. And on average, each additional infill well in the 27-and-5 unit has an initial production of 500 MCF per day per well, and you can see that that increases subsequently between the cases, and -- from a base case of about 2300 MCF per day to a four additional wells per section of about 11 million cubic feet per day.

Q. By adding multiples of four, we can improve our rate of withdrawal of gas from the pool?

A. That's correct.
Q. And we know we can do it as many as four additional wells per section and still be successful at doing that?
A. That's right.
Q. Let's look at the drillblock example. What do you see here?
A. The production forecast on the drillblock example, again, is rate in MCF per day versus time. Again, the bottom curve represents the base case of the existing wells, which are currently at about 3300 MCF per day. The subsequent curves indicate the base plus one, two, three and four additional wells per section in a similar fashion to the 27-and-5 presentation. In the drillblock area, the average infill initial rate is 650 MCF per day per well.
Q. You've got a little higher rate --
A. Yeah.
Q. -- You've got a little higher rate in the drillblock than in the unit case, but in the drillblock as well adding density up to four more per section improves the rate for the section?
A. That's correct.
Q. Let's flip behind that one and let's see what, in addition to rate, what you do with your cumulative forecast. Starting with the unit case, what do you

forecast to be the results of the cumulative gas production?

A. This chart represents the cumulative forecast in MMCF versus time.

And again, the bottom blue case is the base case performance of the existing wells. And if you pick a time frame out at, say, year 2040, the base case projected recovery is about 37 BCF.

By subsequently increasing with one, two, three and four additional wells per section, you increase the recovery to about 60 BCF. So we get a substantial increase of incremental reserve recovery by adding infill candidates.

Q. And as we add multiples of four we can, in each instance, improve our ultimate gas recovery from the section?

A. That's right. And in the 27-and-5 unit, the average infill well will recover 1.6 BCF per well.

Q. At what density?

A. And it -- The average is pretty close to 1.6, as you subsequently add one, two, three and four. So that's at four additional wells per section.

Q. I didn't follow that. 1.6 BCF?

A. BCF.

Q. Of gas per well?

A. That's right.

Q. And so if I start with four and add a fifth to my section I can get 1.6 BCF?

A. On average it works out fairly similar, yes.

Q. And if I add a seventh I still get 1.6?

A. You still get, on average, 1.6.

Q. So incrementally I still get more with each well?

A. With each well.

Q. All right, let's see what happens in the drillblock.

A. The drillblock cumulative production forecast, again, is versus time, and this reads -- It should be MCF. And the base case is in blue, and if you pick a time frame out at 2040, we've recovered -- or we're projecting the base case of existing wells to recover 47 BCF.

By adding, again, one, two, three and four additional wells, we increase the recovery to about 73 BCF.

So to summarize the cumulative forecast for the drillblock simulation, on average an infill well will recover 2.1 BCF per well.

Q. Why is the recovery per well better in the drill block than in the 27-and-5 unit, as forecasted?

A. I think as Bill alluded to earlier, somewhat due to original gas in place, we have a little bit thicker sands, and additionally permeability is slightly higher in the drillblock as compared to 27-and-5 unit.

Q. Okay. We've looked at rate, we've looked at cum gas. Let's see what happens to pressure. If you'll turn to the next display, let's see what happens to the average field pressure, starting with the 27-and-5 unit.

A. Again, this depicts the average reservoir pressure versus time.

So again, if you pick the corresponding year, 2040, the average reservoir pressure in the 27-and-5 unit is projected to be, on the base case, about 900 p.s.i.

And as you add additionally one, two, three and four additional wells per section, you can decrease the average reservoir pressure to about 650 p.s.i.

So as we increase our recovery of gas, we decrease our average field pressure.

Q. So what conclusion should you reach, or what information should -- What's the point of what you're showing?

A. Again, the point is, number one, we're drilling wells to increase recovery, we're having a significant decrease in average field pressure.

But I think additionally it shows you out at year 2040, your average pressure is still above 600 p.s.i., which I think at some point in the future suggests the investigation of additional infill drilling beyond 80 acres.

Q. Would this be a suggestion to you that you're recovering additional gas that might not otherwise be recovered, even though you're increasing the number of wells?

A. Yes. For example, in the 27-and-5 unit the average recovery is 1.6 BCF per well. Only 15 percent of that is what we would call accelerated reserves, and the remaining 85 percent is truly incremental reserves.

Q. All right. Let's look at that display. In both cases that's -- It's the display that's got a table. The bottom half of the table is in green, the top part is in blue, it says "Year 2040 Cumulative Production"?

A. That's right.

In the 27-and-5 unit, we have a cumulative production in MMCF for the base case, and then each subsequent infill case.

The green curve depicts the performance of the existing wells. So in the base case again, we're projected to recover 37 BCF.

The blue portion represents the additional increase in production you'll gain with the infill wells.

So again, our cumulative production increases to 60 BCF in the base case, plus four additional wells per section.

And the amount that the existing well, or the green bar, drops, that reflects the acceleration portion of the infill recovery.

Q. All right, let me see if I can illustrate this. On the drillblock case, if I take a horizontal line on top of the base case and draw it horizontally across the display, everything below the red line, till I get to the top of the green line, represents rate acceleration?

A. That's correct.

Q. Everything above the red line is incremental reserves that I would not have otherwise produced?

A. That's right. And the drillblock area, the acceleration piece represents 25 percent and the incremental piece represents 75 percent.

And conversely at 27 and 5, the acceleration piece represents 15 percent, and the incremental piece represents the remaining 85 percent.

Q. In each of those examples, then, for those two project areas, you've demonstrated that we can increase the density -- we can double the density from four to eight and still get gas that we would not otherwise produce?

A. That's right.

Q. Let's turn and see if we can afford to pay for this. Move past the -- Well, let's talk about recovery factor; it won't take but a minute. Let's see how much of this gas we're getting.

Looking at the unit in the year 2040, what percentage of the gas are we going to get?

A. Again, this is recovery factor in year 2040. On the left is the performance projection for the existing wells. In the 27-and-5 unit the projected EUR is 31 percent, or a 31-percent recovery factor.

With the existing wells plus 16 total infills in the four sections, or four additional infills per section, we can increase our recovery factor to 50 percent.

So again, we saw decreasing reservoir pressures, increasing recoveries, and it's represented here as increase in recovery factory.

And again, this applies, really, to just the four-section pilot area in 27 and 5.

Q. And there still may be a future opportunity to improve that recovery; I thought I heard maybe up to 80 percent was what might ultimately be produced?

A. Typically, in the more efficient parts of the Basin, our recovery factors have ranged in the 70 to 80 percent.

So yes, this would indicate that there may be future potential, that's correct.

Q. Have you done present-value calculations in each of the two project areas?

A. Yes, we have.

Q. Let's turn to those displays and look at them together. Let's start with the unit case that says net present value. On the vertical scale we're reading what?

A. This is after tax, net present value in thousands of dollars.

Q. Okay.

A. And again we have economic cases for one, two, three and four additional wells per section.

Q. All right, let's start with the bottom plot. It starts off with the blue squares and the solid blue line. This one per section means we've added one well to the section?

A. One well to the section.

Q. And the assumption is that it's a dollar fifty?

A. On the bottom curve that is a dollar fifty per MCF, flat. And then we also risked the incremental reserves --

Q. What was the risk component?

A. Seventy five percent.

Q. Seventy-five percent risk?

A. Right.

Q. Okay. If that is the scenario, can you drill one more well in a section?

A. Yeah, based on our most conservative and most pessimistic look, which was represented in the bottom curve of the dollar fifty with risked reserves, again we generate our maximum net present value at four additional wells per section, and in a most conservative look or snapshot this is the type of project that generates a positive net present value, and it's a project that's worth pursuing.

Q. All right. If you go to the four-section study area and add the maximum density, which would be 16 wells -- you've added four more per section -- what does it show you under the dollar-fifty risk analysis?

A. Again, in the most conservative case, on the bottom curve with four additional infills per section, we generate roughly $1.3 million of after-tax net present value.

And again, our maximum net present value on this chart occurs with four additional infills per section.

Q. And you've tried this under three other scenarios. There's the unrisked at a dollar and a half, there's the two-dollar risked and unrisked. And in each example you can demonstrate in the unit that it's profitable to increase the density up to a maximum of four additional wells per section?

A. That's correct.

Q. When we look at the drillblock area we come to the same conclusion, don't we?

A. Right, that's correct.

Q. All right. Let's turn past that and look at the profit-to-investment ratio. Now, these will be specific per company, would they not?

A. Sure, they would. Each company would have their own directives as far as the targets they would like to meet.

Q. All right. Let's look in the vertical scale, and you have a profit-to-investment ratio, and a company could decide what profit-to-investment ratio that they want to have?

A. That's correct.

Q. And if they choose .5, what are they choosing?

A. The profit-to-investment ratio represents the after-tax net present value divided by the discounted net investment.

So again, even in our most conservative case we're between a .1 and a .2. And considering a two-dollar risked gas price and risked reserves or a dollar fifty with unrisked reserves we get to that .4-type project.

So either -- Both of those cases are projects that we would pursue, and to some extent even on the lower and the most conservative case between a .1 and a .2 would still come close to competing under this most conservative case.

Q. Okay. Give us the conclusions for the drillblock area.

A. Again, we've got after-tax net present value divided by the net investment, and that is representative of the after-tax profit-to-investment ratio. And again, here at the most conservative case of a dollar fifty flat with a 75-percent reserve risk, we generate a profit-to-investment ratio of .2 to .3, which is slightly better than the 27-and-5 unit.

Q. For both the drillblock and the 27-and-5 unit, the model forecasts that we can drill up to an additional four per section, the maximum requested, and in doing so we can improve daily rate, we can increase ultimate recovery, we can produce gas that we might not otherwise produce, and we can do so profitably?

A. That's correct.

Q. Any other conclusions?

A. That in a nutshell wraps up the summary of both pilots.

MR. KELLAHIN: Thank you, sir.

We move the introduction of the engineering exhibits. They're the exhibits behind Exhibit Tab 7 and they are 7 and 8 in both books.

EXAMINER CATANACH: Okay. Exhibits 7 and 8 in Case 11,879 and 7 and 8 in Case 11,880 will be admitted as evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. I just want to verify some numbers that you gave us, Mr. McNeil. Within the 27-5 units, additional recovery per well, per infill well, is estimated to be 1.6 BCF?

A. 1.6 BCF per well, that's correct.

Q. Of that 1.6 BCF, 85 percent are incremental reserves, 15 percent are just accelerated?

A. That's correct.

Q. Okay. In the drillblock, can you give me the numbers on that?

A. In the drillblock area the average recovery is 2.1 BCF per well, of which 25 percent is accelerated reserves and 75 percent is incremental reserves.

Q. Okay. Now, within the 27-5 unit, you just looked at the four-section project area; is that right?

A. That's right, and the four-section pilot.

Q. So these numbers could all change depending on drilling in a different area within that unit; is that right?

A. I think this particular pilot would be more representative of -- along the north half of the unit and the south half, but could vary somewhat according to the middle of the section and the production performance we see.

Q. Okay.

A. I think the overall recoveries would probably decrease as you went towards the middle of the section, but from a relative standpoint of, you know, roughly 85 percent being incremental reserves, I think that would stay fairly constant.

Q. Within the 29-7 unit, are you -- You said that you determined that two additional infill wells is sufficient?

A. The simulation and the projection at that time indicated that two additional wells per section was optimum.

However, with some of the positive results we've seen, I think it suggests that we may be able to go above that two additional per section.

Q. Okay. So your model for these two addition pilot areas suggests that four wells per section would be appropriate?

A. That's right.

Q. Do you think the model that you've done for these two new areas is -- will be conservative, as were the last one?

A. The methodology was similar, so it could be slightly conservative.

And as to a specific parameter, it may be that the skin projected in these initial wells may be somewhat conservative.

I think we've probably done a better job of completing wells recently, and that would show up with increased or improved performance, versus the model-predicted.

EXAMINER CATANACH: Okay, I have nothing further.

MR. KELLAHIN: That concludes our presentation.

EXAMINER CATANACH: Okay. There being nothing further, Case 11,879 and 11,880 will be taken under advisement.

(Thereupon, these proceedings were concluded at 12:23 p.m.)

* * *

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case 11879/11880 heard by me on November 6 1997.

David R. Catanach, 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 November 18th, 1997.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 1998