STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
26 March 1980

EXAMINER HEARING

IN THE MATTER OF:

Application of Tenneco Oil Company for dual completions and downhole commingling, San Juan County, New Mexico.

CASE 6847

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: Ernest L. Padilla, Esq.
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: W. Thomas Kellahin, Esq.
KELLAHIN & KELLAHIN
500 Don Gaspar
Santa Fe, New Mexico 87501

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

I N D E X

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

E X H I B I T S

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

MR. STAMETS: We'll call next Case 6847.

MR. PADILLA: Application of Tenneco Oil Company for dual completions and downhole commingling, San Juan County, New Mexico.

MR. STAMETS: Call for appearances in this case.

MR. KELLAHIN: Tom Kellahin of Santa Fe, New Mexico, appearing on behalf of the applicant, and I have two witnesses.

MR. STAMETS: I'd like to have them stand and be sworn, please.

(Witnesses sworn.)

CAROLYN PEAVEY

being called as a witness and having been duly sworn upon her oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Would you please tell us your name, by whom you're employed, and in what capacity?

A. It's Carolyn Diane Peavey. I'm employed by Tenneco Oil Company and I'm a Senior Geological Engineer.

Q. Ms. Peavey, have you previously testified

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

before the Oil Conservation Division?

A. No, I have not.

Q. Will you describe for the Examiner when and where you obtained your degree?

A. I graduated in 1974 from Stephen F. Austin State University, it's in Nacogdoches, Texas, with a BS in geology.

Q. Subsequent to graduation where have you been employed as a geologist?

A. I spent four and a half years with Sun Oil Company and the first year and a half was as a research geophysicist; the next three years were as a production geologist, and then I joined Tenneco Oil Company a year and a half ago as a geological engineer, and as of December of this year I was a senior geological engineer.

Q. Pursuant to your employment as a geologist with Tenneco, have you made a study of and are you familiar with the geological facts surrounding this particular application?

A. Yes, I am.

MR. KELLAHIN: We tender Ms. Peavey as an expert geologist.

MR. STAMETS: The witness is considered qualified.

Q. Would you please refer to what we've

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

marked as Exhibits One, and I think it might be helpful if we also looked at the same time at Exhibit Number Two.

And, Ms. Peavey, if you'll begin your testimony by looking at Exhibit Number Two and identifying for us, first of all, how the wells you propose to complete as Chacra-Mesaverde downhole commingled wells, how those wells are identified and where they are located.

A. Okay. The Mesaverde-Chacra commingled are the locations that are just a single dot. That would be the northwest quarter of Section 19, Township 29 North, 10 West; the northwest quarter of Section 30, Township 29 North, 10 West; southeast quarter of Section 24, 29 North, 11 West; the northwest quarter of Section 25, 29 North, 11 West; and the southeast quarter of Section 25, 29 North, 11 West.

Q. And each of those five wells for which you propose a program for the downhole commingling of the Mesaverde and Chacra are identified specifically on Exhibit Number One, are they not?

A. Yes, they are, the first five wells, the second five wells.

Q. All right. What is identified by those wells with the well dot and the circle around the well dot?

A. Those are wells that we intend to drill to the Dakota and dual it with the Mesaverde-Chacra com-

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

mingled.

Q. Now let's start off with the spacing in the Chacra for this area. What will be the spacing for the Chacra wells?

A. The spacing on the Chacra is 160's.

Q. Okay. What is the spacing for each well to be completed in the Dakota formation?

A. Okay, they will be on 320's. The wells -- well, the -- it's 320 spacing now. Section 19 will be the west half, and the spacing in the well, the Dakota well in Section 30 will be in the north half. Going to Section 24, 29 North, 11 West, it will be the east half. Going to Section 25, it's split, east half/west half.

Q. All right. Now, the five Dakota wells involved, are these original Dakota wells on a proration unit or are these infill Dakota wells?

A. These will be infill wells.

Q. So on each of the five proration units there already exists an original Dakota producer.

A. This is true.

Q. And where would the Dakota producer be located?

A. They are at the time located where the single dots are, where we propose to have the Mesaverde-Chacra commingled wells. They're in the same quarter section.

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

Q. All right. What is the spacing for the Mesaverde formation?

A. Right now the Mesaverde is in the undesignated Mesaverde and it will be on 160's.

Q. To orient the Examiner, where does this area lie in reference to the Blanco Mesaverde Pool?

A. It lies about two and a half miles southeast of the existing Blanco Mesaverde Pool.

Q. Are there any other wells in the immediate area located on Exhibit Number Two, which are operated by another operator and which produce either from the Chacra or Mesaverde formations?

A. No, all the wells that produce are on this map.

Q. All right, what about the Getty wells located to the north? What kind of wells are those?

A. Okay. Map 3, or your Exhibit Three, shows the existing Mesaverde completions. There are four of them at this time that I've included in the undesignated Mesaverde.

Q. Would you identify the four wells that are completed in the undesignated Mesaverde?

A. Okay. The one in the northeast quarter of Section 13, 29 North, 11 West, is the Hauk B No. 1.

The one in the northwest quarter of Sec-

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

tion 18, 29 North, 10 West, is the Hanley A No. 1.

The southwest quarter of Section 18, 29 North, 10 West, is the Hanley B No. 1.

And the Buntz A No. 1 is the one in the northeast quarter of Section 19, 29 North, 10 West.

Q. Do any of those wells produce from any other formation other than the Mesaverde?

A. They are at this time dualed with the Chacra.

Q. Am I correct, I believe you've already said it, but am I correct in understanding that each of the Getty Wells are dedicated to 160-acre spacing and proration unit, dedicated to an undesignated Mesaverde formation?

A. Yes, sir.

Q. Would you now turn to what we've marked as EXhibit Number Four and have you identify that?

A. Okay. Exhibit Number Four is the Hanley B No. 1. It is the well, Getty's well that is closest to our acreage in question. That is dualed in the Mesaverde and the Chacra. This is a type log of the Chacra. They encountered about 8 to 10 feet of pay with average porosity of 12 percent, and their IP was 791 Mcf a day. Their shut-in casing pressure was 1012.

Q. Why have you chosen this particular log as a type log for the Chacra completion in each of the sub-

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

ject wells?

A. This well is the closest to Tenneco's acreage and I think -- I believe typifies what we will be encountering if we drill the well. We have a cross section, the next exhibit is the cross section of the Chacra.

Q. That's Exhibit Number Five?

A. Right.

Q. Let's look at that.

A. This is a southeast/northwest trending cross section. The type log is the well that is situated at A'. It extends southwest of Tenneco's acreage. As you can see, the Chacra is developed. We anticipate about 8 to 10 feet of pay in Tenneco's wells that we drill.

Q. Will you start with A and continue through A' and describe briefly each of the wells you've placed on your cross section?

A. Okay. Starting in the southwest quarter, we have the Delo No. 2 and it has two stringers that are developed in the Chacra. Estimated pay again is about 8 feet.

Moving towards the northeast we have the two stringers that are developed more as one sand with a slight shale indication. Probably pay would be about 10 to 12 feet.

Moving farther northeast to the Valdez

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

A No. 1 we lose -- it appears we lose the resistivity in the first stringer, so production is probably only from the second stringer, and I anticipate a pay of about 6 to 8 feet.

Moving farther northeast, we do lose the first stringer and the second stringer is the production zone. Pay is about 6 feet.

And moving up to the Hanley B. No. 1 we have the first stringer again -- or second stringer again as production, and pay is about 8 feet.

Q. Okay. Would you turn to what we've marked as Exhibit Number Six and discuss the characteristics of the Mesaverde formation encountered in this area?

A. Okay, this is the Mesaverde formation. In this particular well, this is the Hanley B No. 1. The Point Lookout and the Menafee are the only two producing members of the Mesaverde.

Point Lookout had 18 feet of net pay and the Menafee had 32 feet of net pay, and the isolated stringers.

This well was perforated;initial potential was 2 barrels of condensate and 2.1 million cubic feet of gas a day. Shut-in tubing pressure was 1290.

Q. And why have you chosen this particular well as a type log for the Mesaverde?

A. Again, this is the well that is closest

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

to Tenneco's acreage and gives us a feel for what we may anticipate as far as what is the most production.

Q. Go to the cross section marked Exhibit Number Seven and describe for us generally the -- how the Mesaverde formation appears through the cross section?

A. Starting from the northeast, we have the Hanley B No. 1. As we progress southwest we encounter -- we get up-dip of structure.

As you know, the Menafee is -- was a plutal (sic) depositional environment. Most of the sand developments are not continuous throughout the area. There are isolated sand stringers.

The Cliff House in the Hanley B No. 1 encountered about 18 feet of pay again, and most of the production, I believe, is coming from the Menafee where you have 32 feet of pay.

As you move -- well, what is colored in this map in yellow is what I anticipate as being productive stringers, and what is in blue is what I calculated to be water productive.

As you move to the southwest, you're going up structure. You're encountering more of the stringers in the Menafee, becoming water productive, due to hydrodynamics, and also probably due to the fact that the stringers are not continuous from one well to another.

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

Q. As a generalization, Ms. Peavey, which of the two zones is generally going to be the better producing formation in each of the subject wells?

A. Typically in the San Juan Basin the Point Lookout is; however, taking the Hanley B No. 1, the Menafee, I believe, is the main producing horizon from this, and I -- as you move farther southwest you do not see the Menafee as productive across Tenneco's acreage.

The interval of the Menafee is from about 3550 down to about 4100.

Q. As a geologist would you recommend to your management the drilling and testing of the Mesaverde formation alone in this area?

A. Not for the reserves that we see here, no.

Q. Would you turn to Exhibit Number Eight and identify that?

A. Okay. This is a graph showing the -- each of the four wells that are presently completed, Getty's wells completed in the Mesaverde on Mcf per day basis.

As you can see, they start out at a fairly decent rate per Mcf a day, but within nine months they've dropped of 60 percent. Production in this area, I do not believe, is very significant in the Mesaverde, as you can see by the rapid decline.

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

Q. Based upon your study of the geology, Ms. Peavey, in your opinion would a prudent operator complete these wells as a downhole commingled well or as a dual completion?

A. Based on the reserves in the Mesaverde and the Chacra, I believe the only way to do it would be to commingle the two zones.

Q. Do you have any opinion with regards to the spacing of the Mesaverde formation? I realize that some of the -- or all of the Getty wells to the north are spaced on 160 acres for Mesaverde. Is that a reasonable and logical spacing for the Mesaverde in this area?

A. I believe it is. First, the reserves that we're looking at are not significant with the rapid decline. 160 acres is sufficient to -- for drainage, and again, it lies about two and a half miles southeast of the existing Blanco Mesaverde where they found that the infills should be on 160's.

Q. From the information contained on Exhibit Number Eight, do you have any opinion as to any potential risk of cross flows because of the pressure differential between the Mesaverde and the Chacra formations?

A. I believe that the pressures are in agreement with each other. I don't think you will have cross flow. We do have about 200, 250 pounds pressure

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

higher in the Mesaverde; however, we don't anticipate encountering the same quality of rock in the Mesaverde, and I anticipate the pressures to be more like the Chacra is.

Q. If this area is developed as Tenneco proposes, with the Chacra and the Mesaverde on 160-acre dedication, will the ownership be common between the Mesaverde and the Chacra formations?

A. Yes, they will.

Q. If the Mesaverde is developed on 320's, would the ownership be in common?

A. No, they would not.

Q. Would you turn to Exhibit Number Nine and Exhibit Number Ten and discuss those two exhibits?

A. Okay. This is the gas analysis on the Hanley B No. 1. For the first Exhibit Number Nine is for the Chacra. Exhibit Number Ten is for the Mesaverde. And as you can see, the BTU's are not that different. The Chacra is 1173 and the Mesaverde is 1274.

Q. Based upon your study of the gas analysis of the Getty Well, do you have an opinion as to whether the gas composition of the two formations are compatible with each other?

A. I believe they're compatible.

Q. Were Exhibits One through Ten prepared by you directly, except for the information from the Getty

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

wells, compiled under your direction and supervision?

A. Yes, they were.

Q. And where did you obtain the gas analysis on the Getty wells?

A. From El Paso, who had approval to release them from Getty.

Q. In your opinion, Ms. Peavey, will approval of this application be in the best interests of conservation, the prevention of waste, and the protection of correlative rights?

A. I believe it will.

MR. KELLAHIN: That concludes our examination of this witness.

CROSS EXAMINATION

BY MR. STAMETS:

Q. Ms. Peavey, let's just take, for example, Section 19. You show two wells there on your Exhibit Number Two, one is just simply a dot and the other is a dot with a circle around it. I believe that you indicated that ones with the circles are infill wells in the Dakota?

A. Right.

Q. And would that mean that the other well that is just a single dot is the original Dakota well?

A. No. The single dot is where we propose

the Mesaverde-Chacra commingling; however, it is also the same core section where we have an existing Dakota well.

Q. I see, so the original Dakota well is not shown on this particular map?

A. Right, yes, sir.

Q. And each one of these wells that we've discussed here will be a new well drilled?

A. Uh-huh.

Q. Okay. So the single dots will only be Mesaverde-Chacra downhole commingles.

A. Right.

Q. And then the other five wells will be dualed and commingled.

A. Uh-huh.

MR. STAMETS: Will your next witness talk about an allocation?

MR. KELLAHIN: Yes.

MR. STAMETS: Okay.

Q. You've indicated in a couple of cases that we're talking about pressures, say, 1000 pounds, 1100 pounds, in the Chacra, and maybe 1200 pounds in the Mesaverde. Do you anticipate that that will be true over this entire area?

A. I believe for the most part our Mesaverde that we will encounter will not be -- the development of

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

the Mesaverde is not as well developed as it is in Getty's wells, so our pressures, I believe, will probably be somewhat lower and more in agreement with the Chacra.

Q. Do you anticipate any liquid production from either of the two zones, the Chacra or the Mesaverde?

A. At the time the four Getty wells, they are making some condensate. On the average it's 3 to 4 barrels of condensate a day.

Q. Do you feel that would be any problem in producing these wells?

MR. STAMETS: Will the next witness address that?

MR. KELLAHIN: Our next witness will talk of that.

MR. STAMETS: Any other questions of this witness? She may be excused.

PAUL A. DOYLE

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Would you please state your name, by whom you're employed, and in what capacity?

A. My name is Paul Anthony Doyle. I'm employed by Tenneco Oil Company, and I'm a Senior Production Engineer.

Q. Mr. Doyle, have you previously testified before the Oil Conservation Division?

A. No, I have not.

Q. Will you describe for the Examiner when and where you obtained your degree?

A. I graduated from Georgia Tech with a Bachelor in Science in civil engineering in 1975.

Q. Subsequent to graduation where have you been employed in the oil and gas industry?

A. I worked for Texaco for two years in Craig, Colorado, as a production engineer. After that I have worked for Tenneco for three years out of their Denver office, as a production engineer.

Q. Pursuant to your duties as a production engineer, have you made a study of the facts surrounding this particular application?

A. Yes, I have.

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

MR. STAMETS: He is considered qualified.

MR. KELLAHIN: Production engineer.

Q. Would you refer to what we've marked as

Exhibit Number Eleven and describe for us how the proposed Mesaverde-Chacra commingled wells are going to be drilled and completed?

A. See, on these type wells we plan to drill a 250-foot hole with 12-1/4 inch bit and set surface pipe cementing over this area. Then we plan to drill through the Chacra formation at about approximately to a depth of approximately 3100 feet with mud and set 7-inch casing through this zone. We then plan to drill out below the 7-inch, through the Mesaverde formation to a depth of approximately 4500 feet, with gas, log the well, and set a 4-1/2 inch liner and cement it in place over the Chacra formation.

Inasfar as our completion is concerned, we plan to drill the well out to the total depth, perforate, acidize, and frac the Mesaverde formation, and we plan to do this in only one stage because we do not feel that it would be sufficient development to frac in two stages, which we have done in the past, because of such thick net pays.

We then plan to run our tubing back in the hole, clean the well out, let the -- return the frac fluid, and shut the well in for eight days and run an AOF test on the Mesaverde formation.

We then plan to pull -- clear the well, pull the tubing, set our retrievable bridge plug between the Chacra and the Mesaverde, complete the Chacra formation

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

by perforating, acidizing, and fracing this zone. Then plan to clean -- then we plan to retrieve our retrievable bridge plug, clean up both zones, and run an AOF test on the combined Mesaverde-Chacra well.

Q. While we're talking about how you're going to complete these zones, describe for us how you would propose to come up with a method of allocating the production between the Chacra and the Mesaverde formations?

A. We plan to do this in a similar method as we've done with Farmington -- with Fruitland-Pictured Cliffs, where we will AOF the first well -- the first zone in the well, which is the Mesaverde formation, get that AOF, then complete the well in the Chacra, and then AOF the well in both -- with both the Chacra and Mesaverde zones producing, giving us an AOF of the cumulative zones between them.

With the information from both zones and the information from one zone, by subtracting the first AOF from the second, we'll get an implied AOF in the Chacra formation, and we plan to use this AOF to allocate production between zones.

Q. Tenneco has used that method for determining allocation between commingled zones in other wells?

A. Yes, sir. The example of this is our recent method that we used between the Fruitland and the

Pictured Cliffs formations, which is a similar circumstance, where the Fruitland in that case, as the Mesaverde in this case, was a relatively weak producer, and we felt that it would be necessary just for prudent operating to have the wells commingled to make sure that that would keep -- keep the Fruitland producing, and this is the method we used on these wells, and this is what we propose to do here.

Q. Was the method of completion on the Fruitland-Pictured Cliffs commingled production one approved by the Oil Conservation Division?

A. Yes, sir, it was.

Q. Would you turn to Exhibit Number Twelve and identify that schematic for us?

A. This is a downhole schematic of our proposed Mesaverde-Chacra commingled wells, showing a 9-5/8ths casing set through 200 to 250 feet; 7-inch casing set through 3100 feet, and a 4-1/2 inch liner set from 2900 feet to 4500 feet, and both zones will be produced up 2-3/8ths tubing, set approximately the top of the Mesaverde formation.

Q. Let me address a question to you that was asked of the last witness. What, if any, liquids are produced from either of these zones?

A. We do not anticipate significant liquid production as far as condensate is concerned. There is a

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

possibility, if the Mesaverde is a weaker producer, as was mentioned, that there may be some water production from the Mesaverde. We don't anticipate it being significant, but if it should become a problem in either zone, we feel the commingling of zones having a higher gas volume, because both zones will be coming up the same string of tubing, we feel that we'll get better removal of our liquids from the wellbore by commingling the wells.

Q. All right, let's turn to Exhibit Number Thirteen and have you talk about that exhibit, and in addition, at the same time, if you'll look at Exhibit Number Fourteen, which is the schematic. Go through your completion procedure for those wells that will also include dualing the Dakota.

A. Okay. These wells, again, we'll set 250 feet of surface pipe. Then we'll drill out with an 8-3/4 inch hole, using mud, drill through the Mesaverde to approximately 4500 feet. We'll then set 7-inch casing and cement the 7-inch casing in place with a two-stage cement job with a DV tool being placed just below the Chacra formation in order to cover that interval with cement.

After this is done we'll drill out below the 7-inch, through the Dakota formation to approximately 6400 feet, we'll run our logs, and we'll set 4-1/2 inch liner across the Dakota formation and cement it in place.

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

For our completion we will drill out to plug back total depth and then perforate and acidize and frac the Dakota formation in a manner similar to the method in which we complete all our Dakota wells in the San Juan Basin. We will flow this zone to clean up for a couple days. We will not run an AOF test at that time until the well has been completed and the tubing has been -- final tubing string has been landed in the Dakota.

But after we flow some of the water off the formation we'll set a Model F packer with an expendable plug above the Dakota formation, which will then isolate the Dakota formation.

We'll then perforate the Mesaverde formation, perforate, acidize, and frac the Mesaverde formation, clean it up, and flow the well until it is cleaned up. We will then shut it in for eight days, perform an AOF test on that zone.

After that is completed we'll set a retrievable bridge plug between the Chacra and Mesaverde, and we'll complete the Chacra by perforating, acidizing, and fracing the Chacra.

We'll then remove the retrievable bridge plug, flow both zones to clean up, and run an AOF test -- excuse me, at that time we'll run in the hole and land our long string in the MOdel F packer to produce the Dakota

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

formation and we'll run in the hole and land our short string to produce the Mesaverde-Chacra up the short string.

Then flow the well to clean up in both zones; we'll then shut the well in and run an AOF test in the Dakota formation and in the commingled Chacra-Mesaverde formations.

Then next --

Q. If I understood you correctly, then the method for determining the allocation between the Chacra and the Mesaverde in those wells that also contain a dual with the Dakota will be the same way as you've done with the other five wells that do not contain Dakota production?

A. That is correct.

The next exhibit is just a schematic of the bottom hole assembly that we've just described with 9-5/8ths casing set to 250 feet, 7-inch casing set to 4500 feet, and a 4-1/2 inch liner set from 4300 feet to 6400 feet. In the 7-inch casing a DV tool will be placed at 2950 just below the Chacra formation to insure that we get cement both across the Mesaverde and the Chacra formations.

The well -- the Dakota formation will be produced through the Model F packer that will be set just above the Dakota formation and up the 2-3/8ths tubing. The Chacra and Mesaverde formation will be produced commingled through the 2-3/8ths tubing, that second string of 2-3/8ths

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

tubing that we will set just above the Mesaverde formation.

MR. STAMETS: While we're on the subject of that string of tubing, your exhibit shows the Mesaverde tubing to be set above the DV tool at 2950 feet.

A. Yes, sir, that is incorrect.

MR. STAMETS: Okay.

A. Diagrammatically incorrect.

MR. STAMETS: Well, I'll fix my copy.

A. Thank you.

Q. Mr. Doyle, do you have an opinion as to whether or not the optimum spacing for the development of these ten wells in the Mesaverde is 160 acres?

A. Just from the fact that the ownership would be different between the wells, it would cause a problem if we were not spaced on 160, but as far as --

Q. Have you made any reserve calculations for each of the three zones which would demonstrate the profitability of any of those zones?

A. Yes, I have.

Q. All right. Let's look at Exhibit Number Fifteen, then, and have you explain how you reached those numbers.

A. Okay, the Exhibit Fifteen gives what we estimate to be the reserves to be produced from the three formations in this particular area.

For the Chacra formation we anticipate 170-million cubic feet. IN the Mesaverde formation we anticipate 160-million cubic feet, and for the Dakota formation we anticipate 1,350-million cubic feet.

Q. Would you summarize for us briefly what kind of data you used in order to get to those numbers?

A. Well, the way we achieved these numbers is we looked at the wells in the surrounding area, both the Chacra and the Mesaverde wells. We looked at the initial rates from these wells, how -- what the initial turn-on rates were for the wells, how much they produced. We looked at the decline curves for these wells to see just what kind of a decline percentage -- percentage decline they experienced every year, and what maybe their stabilized decline rate was at some point in time.

By then, having these initial productions and the decline rates for the Chacra and Mesaverde wells, we ran it through a computer simulator that gives you an estimated lifetime production history of the well, and cums up your ultimate recovery from the wells.

As far as the Dakota formation is concerned, the way we achieved these reserve numbers is there are other Dakota wells in the area that have extensive production histories, cumulative data, and anticipated ultimate cumulative data. The figure that we're using to achieve

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

reserves, to estimate reserves in our Dakota infills right now, is by taking the performance of these original wells and multiplying their production, and therefore, obviously, their cumulative production, by a factor of 60 percent, assuming that our infill wells will produce 60 percent of what the original wells have produced.

Q. Would you turn to Exhibit Number Sixteen and explain that exhibit for us?

A. Okay. In order to analyze the different options we had for recovering reserves from all three of what we felt were the potentially productive zones in this area, the Chacra, Mesaverde, and Dakota, we put together cost estimates for individual wells and even several different types of wells to see just how much these different types of wells would cost.

The first option that we have is a single completion in any one of the three zones and the costs on here are all given in thousands of dollars.

The Mesaverde, single Mesaverde completion in the area we estimated would cost $263,000.

A single Dakota completion would be $347,000.

And a single Chacra completion would be $140,000.

Q. Am I correct in assuming from the exhibit

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

that it is uneconomic to drill a single completion to test either the Mesaverde or the Chacra formation, based upon the reserve information you compiled?

A. Based upon the reserves,the costs of the wells, and the operating costs of the wells, these wells are uneconomic by Tenneco's standards, yes.

Q. Now, let's compare the costs of a dually completed Mesaverde and Chacra to a situation, as you propose, where those two zones are commingled.

A. Okay, well, going further on Exhibit Sixteen here, we estimated the costs of dualing the wells -- in making a dual completion without commingling; otherwise, with two strings of tubing and with a packer isolating the zones.

The dual Mesaverde-Dakota well we estimated would run $449,000.

The Mesaverde-Chacra dual well would run $349,000, and the Dakota-Chacra dual well would run $401,000.

Now, then we also analyzed the estimated cost of a well that was commingled, a commingled Chacra-Mesaverde well, and the costs we estimated for this was $327,000.

And then we also have the cost on here for the proposed -- the wells that we are proposing of the type where the Dakota is produced up one string of tubing

and then the Chacra and Mesaverde are commingled and the estimated cost for this type of well is $461,000.

Q. Let's focus for a moment on those five wells in which you do intend to test the Dakota.

Is there an acceptable way of completing a Dakota producer in such a fashion that you could -- I guess what I'm asking is, is it feasible to triple complete the well?

A. Well, I --

Q. To have a triple completion with the Dakota, Chacra, and Mesaverde?

A. In our opinion it's unfeasible to have a triple completion because of the requirement of having three strings of tubing in the hole and the size of the hole that you would have to drill for this makes the costs excessive to where we would not want -- we would not feasibly do anything like that.

We have approximately 500 wells in the San Juan Basin, Tenneco does, and close to ten percent of those wells are dually completed wells, and of those 500 wells we do not have any triple completions. We just consider it an unfeasible, unacceptable method of completing the wells, because it just creates operating problems and bottom hole difficulties become such plumbers headaches that they are just -- we consider them unfeasible.

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

Q. All right. If the Division should deny your application to commingle the Mesaverde and Chacra formations, what would your alternative be?

A. Okay, if you'll look at the Exhibit Number Seventeen, the proposed completion costs for a well that is commingled in the Mesaverde and Chacra, is $327,000. The only -- the alternative to this method of completion is to dually complete the Chacra and Mesaverde. As we said, this has a cost of $349,000, or an additional cost of $22,000, and these additional costs stem from the necessity of installing a bottom hole packer to isolate the zones, an additional string of tubing, a dual wellhead, which is more expensive than a single wellhead, and having two separators on the surface, which is obviously more expensive than one separator.

And we've also -- we've run some economics on these two alternative cases, and that is shown in Exhibit Eighteen.

Q. All right, let's look at that.

A. Okay, the two types of wells are shown here, the commingled Mesaverde-Chacra and the dual Mesaverde-Chacra.

The after tax rate of return, the discounted profit, reserves that we expect, and the payout in years for each of these wells is presented.

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
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The -- I'd like to point out on here this discounted profit number is for the 100 percent working interest, so for instance, if the well was only 50 percent ownership by Tenneco or another company, that you'd have to divide these numbers in half, but these economics are run with a working interest owner of 100 percent.

Okay, using your different intial expenses to complete the wells, as I said, it's $22,000 more expensive to complete the dual, and then using also, you have a more expensive operating cost, because,if you have a dual well, because of the fact that you have two separators on surface.

We again ran through a simulated history of these wells, looking at production expenses, and calculated what our rates of return would be on these wells.

The commingled Mesaverde-Chacra well had a rate of return,after tax rate of return of 22.6 percent, which is a number that Tenneco feels is acceptable for an investment at this time.

The dual completion had an after tax rate of return of 14 percent, which is a number that Tenneco feels is an unacceptable rate of return on any project with borrowing money for a capital investment at interest rates of -- in excess of 18 percent. We do not feel that 14 percent rate of return is an acceptable return on our money,

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

and we would not drill a well of this type.

Another thing that I think is significant on this exhibit is the fact that we feel the commingled well will produce an additional 30-million cubic feet of reserves because of the fact that when one zone gets weak and possibly starts producing liquids, it will -- between both zones coming up the tubing, the life of the well will just be longer. With the more efficient flow regime, we'll just be able to keep it on longer.

Q. All right, would you describe for us Exhibit Number Nineteen?

A. Okay. Exhibit Number Nineteen is our options, this time looking at the comparison of drilling -- well, our objective is to recover gas from all three zones.

One way in which we can do this is the way we have proposed, the first proposal here, which is dualing the Dakota with commingled Mesaverde-Chacra, for a cost of $461,000.

Should we want to recover the reserves from all the wells without -- without commingling those two zones, we would have several other alternatives that we could follow, and these are listed in Group Two there.

The first alternative, of course, would be to drill three single completions. Now this would cost $750,000. Both the Mesaverde and the Chacra under our econ-

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

omic standards are uneconomic, so this is not what we -- this is not really a consideration for us.

A more feasible consideration, as far as costs are concerned, would be the next three options, and this is essentially, drill one dual well and one single completion, and I should also mention that these options would be considered far superior and of less cost than drilling a triple completion.

Q. But am I correct in understanding, under all the other alternatives, the total ultimate recovery from both the formations is going to be less than if they were commingled?

A. We believe that to be the case, yes.

The second alternative on here is to drill a dual Mesaverde-Dakota well, for a cost of $449,000, and drill a single Chacra well for $140,000, for a total cost of $589,000. This would be $128,000 more expensive than our initial alternative, but because of the fact that the Chacra well is economically unfeasible, we would not drill that well, and therefor, we would not recover the reserves in that zone.

The third alternative is to drill a dual Mesaverde-Chacra well and a single Dakota well, with the dual Mesaverde-Chacra well costing $349,000 and the single Dakota, $347,000, total cost would be $696,000, which again

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

is -- which is $235,000 more expensive than our initial alternative.

But again in case three, we have a dual Mesaverde-Chacra well, which I have just showed on the previous page, only has a rate of return of 14 percent, which we consider unacceptable, so we would not drill a well of that type.

The fourth alternative is to drill one -- to drill a dual Dakota-Chacra well for $401,000, and then a single Mesaverde well for $263,000. That would give you a total cost of $664,000, which is $203,000 more than our initial -- than our proposed alternative, but again here we would have a single Mesaverde well, which is far from being anywhere near economically acceptable with what we believe the reserves to be, and we would not drill a well of that type, and therefor, we would not recover any reserve from the Mesaverde in that alternative.

Q. Were Exhibits One -- I'm sorry, Exhibits Eleven through Nineteen prepared by you or compiled under your direction?

A. Yes.

Q. And in your opinion, Mr. Doyle, will approval of this application be in the best interests of conservation, the prevention of waste, and the protection of correlative rights?

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

A. Yes.

MR. KELLAHIN: We move the introduction of Exhibits One through Nineteen.

MR. STAMETS: These exhibits will be admitted.

Any questions of this witness?

MR. PADILLA: I have.

CROSS EXAMINATION

BY MR. PADILLA:

Q. Mr. Doyle, on Exhibit Eighteen you were comparing the after tax rate of return. I believe you testified that the 14 percent rate of return would be unacceptable because of your interest costs.

If that is an after tax rate of return would you have already taken into account your interest costs?

A. I don't really understand the question. Now, if the -- the after tax -- I believe the answer to the question is no. We do not consider, you know, in our economic evaluations we do not consider the, you know, the 18 percent cost of that money. We do discount the money that we have to -- that we spend. All our economics are discounted to present value of 10 percent, but as far as the cost of borrowing the money, we -- we have a present value,

I would say, of the money, but there is no value pre-tax, you know, there is no cost figured in for the -- for the cost of capital, no, that is not in the economic analysis as we run them.

I don't know if that really answered your question.

Q. Well, I don't know, it just seems to me thatin computing your tax you would be deducting the interest cost.

A. No, we are not.

Q. In arriving at a net --

A. No, in this particular computer simulation we do not.

Q. Then this really isn't an after tax rate of return, is it?

A. Okay, well, we -- when we go through this computer program, it takes a net lease operating income, or profit, from each year, and then it takes Federal income tax from that, and that is subtracted from our cash flow. That is how that after tax comes out. It's a reduction in our profitability because of Federal taxes. That's where our tax consideration comes in.

MR. PADILLA: Okay. Mr. Kellahin, did anyone testify as to whether the nature of the ownership in each of the commingled -- or proposed commingled zones?

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
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MR. KELLAHIN: Yes, Ms. Peavey did. She indicated that if the Mesaverde is continued to be developed on 160 acres, and a Chacra 160-acre unit is dedicated, that the interest between the two zones is common.

The only time the interest is different is if the Mesaverde is developed on 320, and then we have a problem. We couldn't downhole commingle because of the difference in ownership.

MR. PADILLA: No further questions.

MR. STAMETS: The witness may be excused. Anything further in this case?

The case will be taken under advisement.

(Hearing concluded.)

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

REPORTER'S CERTIFICATE

I, SALLY W. BOYD, C. S. R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd C.S.R.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 6847 heard by me on 3-26 1980

Richard L. Stamets, Examiner
Oil Conservation Division

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409