STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO

27 April 1988

EXAMINER HEARING

IN THE MATTER OF:

Application of Anadarko Petroleum Corporation for the amendment of the special rules and regulations for the Foster-San Andres Pool, Lea County, New Mexico. CASE 9363

BEFORE: Michael E. Stogner, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

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I N D E X

E X H I B I T S

MR. STOGNER: Call next Case Number 9363.

MR. ROYBAL: Case 9363. Application of Anadarko Petroleum Corporation for the amendment of special rules and regulations for the Foster San Andres Pool, Lea County, New Mexico.

MR. STOGNER: Call for appearances.

MR. KELLAHIN: If the Examiner please, I'm Tom Kellahin of Santa Fe, New Mexico, appearing on behalf of the applicant, and I have one witness to be sworn.

MR. STOGNER: Are there any other appearances in this matter?

Will the witness please stand and be sworn at this time?

(Witness sworn.)

TOMMY W. THOMPSON,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A My name is Tommy Thompson. I'm a Senior Production Engineer for Anadarko Petroleum Corporation in Midland, Texas.

Q Have you previously testified before this Division as a petroleum engineer?

A Yes, I have.

Q Pursuant to your employment, Mr Thompson, have you made a study of the facts surrounding the Foster San Andres Pool in Lea County, New Mexico?

A Yes, I have.

Q And pursuant to that study do you have an opinion with regards to the increasing gas/oil ratio limitation that's applied under the special rules for that pool?

A Yes, sir, Anadarko has formulated an opinion.

Q And what is your opinion as to what the gas/oil ratio limitation can be increased to for this pool?

A It is Anadarko's opinion that the current limitation of 10,000 standard cubic feet per barrel should be increased to 20,000 standard cubic feet per barrel.

Q In order to reach that opinion, Mr. Thomp-

son, have you made a study of and prepared certain exhibits for presentation to the Examiner?

A Yes, I have.

MR. KELLAHIN: At this time, Mr. Examiner, we tender Mr. Thompson as an expert petroleum engineer.

MR. STOGNER: Mr. Thompson is so qualified.

Q Mr. Thompson, let's take the first display, which is marked as Anadarko Exhibit Number One, and take a moment and orient the Examiner as to where the three wells that are defined in this pool, where they are located?

A Exhibit Number One is a structure map on the top of the San Andres. Its scale is one inch to 2000 feet. The contour intervals are on 25-foot intervals.

Highlighted in yellow is the current existing Foster San Andres Pool as it was established in 1957.

In red is Anadarko's acreage. Cross hatched is the 40-acre proration unit of the Anadarko Harvard No. 1 wellbore and marked with red dots are each of the three producing wellbores in the Foster San Andres Pool.

Q Which is the first of the three wells to produce from this pool?

A The first well to establish the pool is located in the northwest quarter of Section 5. It is currently operated by Martindale Petroleum. It's the Foster No. 1. It was originally drilled in 1957.

Q And what was the second well?

A The second well was the next location located to the west. It's operated by Texas American. It is their Foster No. 1. It was drilled and completed in June of '81.

Q All right, then the third and final well is the Anadarko well?

A Yes, it is. Anadarko completed the Harvard No. 1 in June of 1984.

Q The Examiner has just heard an application by Primary Fuels in Case 9361 for the forced pooling of a 40-acre tract in Section 31?

A Yes, they have.

Q Would you identify on this display where that acreage is located?

A Primary Fuels' location, as they stated in the previous case, would be one location, orthodox location, due west of Anadarko's Harvard Well.

Q It would be the southeast quarter of the southwest quarter.

A Yes, it would.

Q Let's talk for a moment about the history of the Foster San Andres Pool, Mr. Thompson, first of all describing for us whether or not you have an opinion concerning the Foster Pool and its separation from the Hobbs Pool to the north?

A On original completion of the Foster San Andres Pool with Martindale Petroleum's Foster No. 1 there was no measurement of bottom hole pressure. It is my opinion that bottom hole pressure was on the order of 2000 pounds for this depth.

At the time Anadarko drilled and completed its well in June of 1984, on a drill stem test the bottom hole pressure was measured around 420 pounds, clearly establishing a depleted state for this reservoir.

There are several wells located on an east/west trend north of Anadarko's location that are dry holes that in Anadarko's opinion clearly delineates the East Hobbs Field from the Foster San Andres Pool.

Q Do you have an opinion as to whether the depletion experienced upon completion in the Anadarko well is attributable to the past production over some 20 years in the Martindale well or can it be attributed to produc tion out of the pool to the north?

A I would draw the conclusion that the depleted state in the Foster San Andres Pool is due to Martin

dale Petroleum's Foster No. 1.

Q You're seeking to have the gas/oil ratio for the Foster San Andres Pool increased from 10,000-to-1 to 20,000-to-1?

A Yes, sir, that's correct?

Q Exhibit Number Two represents the current status of the special pool rules?

A That is correct, yes, sir.

Q All right. Let's go to Exhibit Three and have you summarize for Mr. Stogner what is the current information available on the three wells in the Foster San Andres Pool.

A Exhibit Number Three is a monthly report by the State of New Mexico for the month of December of the year 1987.

Highlighted in yellow is the Foster San Andres Pool. Each of the three operators are listed below. Monthly oil production is indicated, monthly oil allowable, gas allowable, and monthly gas production. Water production is also indicated as well as productive days.

Q At what point did the Commission increase the gas/oil ratio up to 10,000 cubic feet of gas per barrel of oil?

A The current existing rules for the Foster San Andres Pool were established at a hearing held on

June 1st, 1987, and were made retroactive to September 1st, 1986.

MR. KELLAHIN: Mr. Stogner, the actual hearing date was May 20th of '87. Mr. Thompson has, I think, referred to the order date. The case number was 9137 and the order is R-8113-A.

I have a copy, if you like, of the transcript of that hearing. It's a case that you did hear last year.

MR. STOGNER: At this time I'll take administrative notice of all cases involving this pool. I have a record here.

Continue, Mr. Kellahin.

Q Let's turn to Exhibit Number Four now, Mr. Thompson, and have you identify that exhibit.

A Exhibit Number Four is a production plot prepared on the field summary, which would include each of the three, the sum of the three producing wells in the Foster San Andres Pool. It is a plot of monthly production versus time with monthly production on a semilog plot.

Oil production is indicated by your green line or your green dots on that line, starting in 1957 would be on the order of 420 barrels a month.

Gas production is indicated as a ratio to the primary phase. It's scale is on the righthand side of

the curve, and initial gas/oil ratio was on the order of 1700 cubic feet per barrel in 1959.

At this time the last 6-month average for 1987, oil production was in the order of 1300 barrels per month and the gas/oil ratio was around 18,000-to-1.

Q Prior to the completion of the Texas American well in 1981, what has been the historical relationship between the gas/oil ratio and the oil rate for the pool?

A Initially completed, the well reported no gas production.

In 1959 the gas/oil ratio reported was 1700-to-1.

By 1962 that gas/oil ratio had increased over 12,000 cubic feet per barrel. At that point in time oil production had stabilized at about a 4-to-5 percent decline rate per year.

Q In 1973 that gas/oil ratio trend extended upward towards 20,000 cubic feet per barrel and continued as such for almost seven years.

At that point in time there was no noticeable change in your oil decline on a yearly basis.

Q What is your opinion of the drive mechanism in the reservoir?

A It's clearly a solution gas drive reservoir.

Q Do you see any adverse consequences that can occur from the Examiner granting this application to increase the gas/oil ratio?

A No, sir, Anadarko does not..

Q Do you have an opinion as to whether the increase in the gas/oil ratio will result in the recovery of additional oil that will not otherwise be recovered?

A Yes, sir, it will.

Q Do you have an estimate as to the additional volume of oil that might be recovered?

A On Adadarko's wellbore a limitation increase to 20,000 standard cubic feet per barrel would result in about a 20 percent reduction in operating expenses. That reduction would increase recoverable reserves some 3500 barrels; almost 12,000 equivalent barrels if you include the gas phase.

Q If the application is granted, do you see any disadvantage to Martindale or Texas American?

A No, sir, I do not.

Q Have you obtained waivers from both of those companies with regards to this application?

A Yes, sir, as well as other interest owners in the area.

Q Let's turn now to the individual gas/oil ratio oil production; plots for each of the wells, and if

you'll turn to Exhibit Number Four, that is the plot for the Martindale well?

A Exhibit Number Five is a production --

Q I'm sorry, it's Number Five.

A -- plot on Martindale Petroleum Foster No. 1, yes, sir.

This is the same presentation as the field summary. It indicates monthly production on a yearly basis from 1957 to date. Beginning in 1980 it shows bi-yearly production.

You'll see the same trend established as you saw in the field summary presentation from 1957 to 1981, at which point in time Texas American drilled an offset for the second producer in the field.

I'd like to establish the fact that for the seven years between 1973 to 1979, that this wellbore did produce on the order of 20,000 standard cubic feet per barrel without a hazardous change in the decline trend of the oil production.

Q To what, in your opinion, Mr. Thompson, do you attribute the recent decline in 1987 on the Martindale well?

A This trend could be one of several indicators. I've talked to a Mr. Veteto and Martindale, which is the head of operations in Hobbs, New Mexico. It is his

opinion that this trend is not indicated by the high producing gas/oil ratio in the field at this time.

Q Did he express an opinion to you as to what he attributes that decline to?

A He attributes this decline to the length in time which this well has produced since 1957; the fact that it's made nearly 83,000 barrels of oil; and that Martndale is not at the point in time they'll spend additional money to increase fluid lift in this area.

Q They have their well completed and operating in a different manner than you have your well?

A Yes, sir, it is.

Q We'll discuss that in a minute.

Let's go now to the Texas American well. That's Exhibit Number Six.

A Exhibit Number Six is a production plot of Texas American's Foster No. 1. The first production began in June of1981 and I have plotted through the last half of 1987.

It also is monthly production and the gas phase is plotted as a ratio to primary phase.

Q Have you contacted Texas American about their well to determine if they have any objection to the increased gas/oil ratio for the pool?

A I have, in fact, had conversations with

Texas American, a Mr. David Miller, head of operations.

Texas American at this time does not have an objection to Anadarko's request for an increase in gas-oil ratio limitation.

Q And, finally, do you have an individual plot on the Anadarko well?

A Yes, sir, Exhibit Number Seven is a monthly production plot of Anadarko's Harvard No. 1.

It was completed in -- actually completed in May of 19484; first reported production in June of '84.

It shows a current rate during the last six months of 1987, about 1100 barrels a month.

Q Let's go now to Exhibit Eight and Nine and look at those two pages together.

A Exhibits Numbers Eight and Nine, Exhibit Number Eight is the same production plot for the Harvard No. 1. It is plotted in barrels of oil per on your lowest trend line and gas/oil ration on your highest. The scale for gas-oil ratio is on the righthand column of -- of the plot.

Below the curve there are indicated six, six numerals, which are to reflect changes in operating conditions that Anadarko has made to increase fluid production.

And Exhibit Number Nine are those changes at which point in time they occurred.

On Exhibit Nine you'll notice that Ana-

darko's pump capacity, beginning in 1984, was on the order of 180 barrels of fluid a day, and our current pump capacity with these changes is on the order of 535 barrels per day.

These increases in pump capacity are Anadarko's belief of the increase in production from the Harvard No. 1.

Q To what extent have the other two operators for their respective wells taken similar measures to Anadarko to obtain more efficient fluid production in that well?

A Neither operator in the Foster San Andres Pool has spent money to accomplish this kind of procedure.

Q I direct your attention now, Mr. Thompson, to Exhibit Ten and Eleven.

A Exhibit Numbers Ten and Eleven are letters from each of the operators in the Foster San Andres Pool that indicates support of Anadarko's proposal to increase the gas/oil ratio limitation from 10,000 cubic feet per barrel to 20,000.

Q Have you determined whether or not you have a market for the additional gas to be produced if the gas/oil ratio is increased?

A Yes, sir, I have.

Q Do you have an exhibit that demonstrates your ability to market that additional gas?

A Exhibit Number Twelve is correspondence I have -- received from a Mr. Christopher Wren, which is the manager of Gas Contracts and Purchasing for Phillips 66 Natural Gas Company. They are the current purchaser at this time of Anadarko's casinghead gas.

And in this correspondence Mr. Wren indicates that Phillips will have no problem in marketing the additional gas production or causing any potential problems on other operators in the area.

Q When Mr. Beaird testified on behalf of Anadarko in 1987 to get the gas/oil ratio increased to 10,000-to-1 it was his testimony at that time that it will result in the additional recovery of some 6000 barrels of oil on a certain basis and I have forgotten what that ratio was.

A Yes, sir, that basis was, to my recollection, was prepared on a different consideration of operating costs and product prices.

Q You have made an analysis of the economics pursuant to the additional incremental increase in the gas/oil ratio and have determined a number of what in terms of production of additional volumes of oil?

What -- what is your oil rate?

A At this time?

Q Yes, sir.

A At this time Anadarko is being restricted for allowable restriction some 8 days a month of production with a 20,000-to-1 increase, or an increase to 20,000 cubic feet per barrel, we should be able to operate on the order of 80 barrels of oil per day. Our current rate is 65 barrels of oil a day until we reach our limitation set by the (unclear).

Q Have you made a projection for your well of the additional oil recovery to be produced with the increase in gas/oil ratio?

A That estimate, as I stated before, is about 3500 barrels of oil, around 10,000-to-11,000 equivalent barrels if you consider the gas phase.

Q Do you have a recommendation to the Examiner as an effective date at which to implement the increase in the gas/oil ratio rate?

A Yes. In our notification we requested a March 1st, 1988, retroactive date.

Q If the Examiner agrees to use that as the effective date for implementation of the increase, will that result in the cancellation of any overproduction?

A Not at this time, no, it will not.

Q I show you what is marked as Exhibit Number Thirteen, Mr. Thompson, and ask you to review that list for me. To the best of your knowledge, information, and be-

lief does that list include all of the interest owners that potentailly are affected by this application?

A Exhibit Number Thirteen is a notification of Anadarko's application for a change in pool rules. It indicates each of the interest owners or operators in the Foster San Andres Pool that Anadarko operates.

Q And includes a notification to Primary Fuels?

A Yes, sir, it does, which has applied for a forced pooling order in this field.

Q Except for the notice of hearing, Mr. Thompson, and the Exhibit Number Two that represents the pool rules, were the other exhibits prepared by you or compiled under your direction and supervision?

A Yes, sir, with the exception of the correspondence from each offset operator and the purchaser, they were.

q And that correspondence was generated in response to inquiries by you to those individuals?

A Yes, they were.

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

We move the introduction of Exhibits One through Thirteen.

MR. STOGNER: Exhibits One

through Thirteen will be admitted into evidence.

CROSS EXAMINATION

BY MR. STOGNER:

Q When I'm looking at your field total and compare that to the Martindale Petroleum Company's well, it appears that when your well went on line Mr. Martindale's well experienced a very severe decrease in the gas production. Am I to assume that this formation out there is that porous, that that well affected this one, although it's, what, a little over a half a mile away?

A No, sir, as I read that change in trend on the gas/oil ratio, it began to occur some years prior, beginning about 1979 you started to decrease your trend in gas/oil ratio.

Q And then it went back up for him. Now WAS that due to the order that raised it to 10,000-to-1?

A Yes, sir, that's my understanding.

Q What would have happened to this well if we would have kept -- if we would have kept the gas/oil ratio 5000-to-1? Would that gas have kept going down on the Martindale well, or how would that have affected it?

A Not knowing their exact operations, I don't know that I could answer that.

Q Do you know if that was an open hole com-

pletion or a perforated completion?

A By my records, I believe it's a perforated completion.

Q What stimulation procedures do you -- did Anadarko use on your well?

A On the Harvard No. 1 the porosity is fairly tight and it's a fairly high permeable reservoir. It required a hydraulic fracture treatment in order to produce economically.

Q And how about the other two wells, do you know?

A I couldn't testify to that, no, sir.

Q On Exhibit Number Nine you presently have a pump on there that has a capacity of 535 barrels a day. With this increase, would this pump be sufficient or would you have to put another one on it?

A Yes, sir, with this increase, this pump should be sufficient.

If you'll look under numeral IV, Anadarko installed some back pressure valves on the wellbore which would -- which, it was Anadarko's intention at that time to try to increase pump capacity or pump efficiency by keeping as little gas out of the tubing as possible.

Should we fail to increase our limitation and produce the gas as it comes to the wellbore, we should

increase our pump efficiency and our pump capacity should increase as such.

Q Are you seeking a permanent change or should this be temporary?

A Anadarko is seeking a permanent change in the field rules.

Q With this increase, is it your opinion that the other wells, will they benefit by this with higher production, or is their -- is the present GOR able to meet their allowable?

A At the present time they're not producing the volumes of oil that the gas/oil ratio limitation is a hindrance to their production or financial recourse.

The opinion of each of the other operators is that this increase would -- would benefit each operator.

Q Do you know if they had to shut their production down to meet the allowables?

A No, sir, I don't believe that they have.

Q Are there any other wells besides the Primary Fuels well that you know that are being planned at this time in this pool?

A No, sir, not that I know of.

Q And what is the reason that you wanted it retroactive to March 1st?

A That was basically the date that we applied for in the hearing, on the assumption that the month of March and the month of April would be overproduced as has been our history in this wellbore.

They are in fact not, by voluntary shut-ins by Anadarko.

Q Are you presently shut-in?

A No, sir, we are producing at this time.

Q Do you know if you're over your allowable for April?

A We are not as of day before yesterday.

Q Back in March, did you have to shut down in March?

A As of -- as of last month?

Q Yeah.

A I don't recall the need to shut down in March other than to make up for overproduction in prior months.

Q Do you know if there's any -- any production that you've got to make up now still on this well?

A No, sir, all overproduction is made up as of this time.

MR. STOGNER: I have no further questions for this witness.

Are there any other questions

of Mr. Thompson?

MR. LYON: May I ask some questions?

MR. STOGNER: Mr. Vic Lyon.

QUESTIONS BY MR. LYON:

Q I'm Vic Lyon, Chief Engineer for the Division.

Mr. Thompson, as I understand your -- your testimony, your well is producing at the gas limit, daily gas limit.

A Yes, sir, it is.

Q Of 800 MCF a day.

A Yes, sir.

Q You made the statement that the granting of the application would increase the oil recovery. Now, I can understand that, you know, it will reduce your operating costs, it would permit faster depletion of the reservoir. I have a little trouble understanding why it would increase the oil recovery.

A Cumulative rate or by daily, are you asking?

Q Total recovery.

A That change in total recovery will be a reflection of an economic limit that Anadarko operates un-

der. It's that change in that economic limit that will increase recoverable reserves on an economic standpoint.

Q Do you expect the well to produce 800 MCF a day or 1600 MCF a day until the day you plug it?

A It is -- it is -- I think at some point in time our GOR will collapse and fall, so on that (unclear), no sir.

Q And recovery isn't affected by the GOR limit unless you're producing at the gas limit.

A Would you say that again, please, sir?

Q Well, let me say it another way.

Your -- your economic limit for the well is -- is such that the well would not be producing its gas limit of 1600 MCF a day at the time elect to plug the well.

A No, sir, there -- there are several changes that will be -- that I'm sure will occur between now and Anadarko's economic limit. All that I can work off of is current operating conditions with a forecast on that basis.

In other words, our economic limit changes yearly as we review our operation cost and the product price.

Q Would you agree with me that the economic limit would be the same whether the limiting ratio is 10,000 or 20,000?

A At the current time our economic limit

would be reduced because our product, the volumes of product we could produce and sell would increase, and on that basis of revenue our economic limit should drop.

We're currently -- we're currently spending some money to maintain our pump efficiency as it is now, trying to keep from producing this gas overproduced as an allowable, and it is Anadarko's belief that if we do not have to spend those monies, that we will reduce our operating cost.

Q But those expenditures are based on today's conditions and not -- not at -- at the time that you're looking at the economic limit.

A Yes, sir.

MR. LYON: That's all I have.

MR. STOGNER: Are there any other questions of this witness?

If not, he may be excused.

Is there anything further in this case, Mr. Kellahin?

MR. KELLAHIN: No, sir.

MR. STOGNER: Case Number 9363 will be taken under advisement.

(Hearing concluded.)

C E R T I F I C A T E

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

Sally W. Boyd CSR

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 9363, heard by me on 27 April 1988.

, Examiner
Oil Conservation Division