BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
19 March 1975

EXAMINER HEARING

IN THE MATTER OF:

Case 5443. Application of Sun Oil Company for pool creation and special pool rules, Lea County, New Mexico. Applicant in the above styled cause seeks the creation of a new oil pool for Bone Spring production for its Jennings-Federal Well No. 1, located in Unit F of Section 15, Township 19 South, Range 32 East, Lea County, New Mexico, and the promulgation of special pool rules therefor, including a provision for 160-acre proration units.

CASE # 5443

BEFORE: Daniel S. Nutter, Examiner.

For the New Mexico Oil Conservation Commission: William H. Carr, Esq.
Legal Counsel for the Commission
State Lans Office Building
Santa Fe, New Mexico 87501

For the Applicant, Sun Oil Company: Thomas Kellahin, Esq.
KELLAHIN AND FOX
500 Don Gaspar
Santa Fe, New Mexico 87501

I N D E X

E X H I B I T S

MR. NUTTER: Case 5443.

MR. CARR: Case 5443. Application of Sun Oil Company for pool creation and special pool rules, Lea County, New Mexico.

MR. KELLAHIN: I'm Tom Kellahin, Kellahin and Fox, Santa Fe, New Mexico, appearing on behalf of the applicant, Sun Oil Company, and I have two witnesses to be sworn.

(Witnesses sworn.)

KENNETH W. LARSON

being called as a witness and being 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 are employed and in what capacity?

A Kenneth W. Larson. I'm employed as a staff professional geologist, Sun Oil Company, Production Department, Dallas Region, Dallas, Texas.

Q Mr. Larson, have you previously testified before this Commission and had your qualifications as an expert witness accepted and made a matter of record?

A Yes, I have.

Q And are you familiar with the facts surrounding this particular application by Sun Oil Company?

A Yes, I am.

MR. KELLAHIN: If the Examiner please, are the witness' qualifications acceptable?

MR. NUTTER: Yes, they are.

Q (By Mr. Kellahin) Mr. Larson, would you please refer to what has been marked as Applicant's Exhibit Number 1, and identify it and state briefly what Sun Oil Company is seeking?

A The Sun Oil Company is seeking to create a new oil pool for Bone Spring oil production for its Jennings-Federal Well located in the northwest quarter of Section 15, Township 19 South, Range 32 East, Lea County, New Mexico, and the promulgation of special pool rules, including a provision for 160-acre proration units.

Q Would you please refer to Exhibit Number 1 and describe the information contained on that Exhibit?

A Exhibit G-1 is a structure map of the East Lusk Field and adjacent areas at a scale of 1 inch equals 1000 feet. The datum is the top of the second Bone Spring formation and the contour interval is 50 feet. The control points are color coded in red and blue. The red de-

note wells which are currently producing from the second Bone Spring while the blue dots denote second Bone Spring penetrations. In areas of little or no well control, seismic data was utilized. On the right side of the map is a portion of the borehole compensated sonic gamma ray of the Sun Oil Company Shearn-Federal Number 1, with various formations of interest marked on the log. This well is marked by a red arrow on the map. Line of cross-section A-A prime and a proposed 160-acre unit consisting of the northwest quarter of Section 15 are also posted on the map. The entire area falls within Township 19 South, Range 32 East.

Q Please refer to Exhibit Number 2, identify it and explain what information it contains.

A Exhibit G-2 is a stratographic cross-section A-A prime, the datum of which is the top of the second Bone Spring pay. The vertical scale is 1 inch equals 20 feet. There is no horizontal scale. The perforations are marked on the logs and the zones of porosity using an approximate 4% cutoff are quoted in red. As shown on the structure map, it extends from west to east. The Cleverock Energy Corporation Pedco State Number 1 in the southeast quarter of Section 16 is the well to the left, or

west of the cross-section. This well was completed in the Wolfcamp limestone with a flowing potential of 42 barrels of oil plus 7 barrels of water per 24 hours on September 28, 1974. It was recompleted in the second Bone Spring as a gas well on October 17th, 1974, after producing about 341 barrels of oil from the Wolfcamp. The calculated open flow for the second Bone Spring was 9683 MCF gas per day. Gas-oil ratio, 9263; condensate gravity of 59.9. I assign this well 18 feet of porosity.

Q Which, excuse me, which well was that?

A The Cleverock Well.

Q All right, go ahead.

A The next well to the east is the Sun Oil Company Shearn-Federal, which is a Wolfcamp oil completion. There were no tests taken in the second Bone Spring pay. This well has 8 feet of porosity. The cross-section then extends northeast to the Sun Oil Company's Number 1, Jennings-Federal, which was completed as an oil well in the second Bone Spring on January 30th, 1975, with a flowing potential of 669 barrels of oil plus 1 barrel of water in 24 hours. It was on a 16/64 score inch; GOR, 674/1; flowing tubing pressure, 950-850; gravity of oil, 41.4 API. This well has 16 feet of porosity.

Q With regard, excuse me, for the porosity on this Jennings-Federal Number 1 well used the cutoff, same cutoff of 4%?

A 4% was utilized on all three wells on the cross-section.

Q Please continue.

A It's apparent from Exhibits 1 and 2 that the second Bone Spring is of considerable areal extent and underlies the area of interest.

The producing zones in the Cleverock Pedco State and the Sun Oil Company Jennings-Federal are obviously not in a common reservoir. The completion in the Pedco State is in a lower portion of the second Bone Spring pay while the Jennings-Federal is producing from the upper portion. In addition, the base of the perforations in the Jennings-Federal oil zone is 13 feet structurally higher than the top of the perforations in the Pedco State gas zone.

Q Mr. Larson, were Exhibits 1 and 2 prepared by you directly or under your direction and supervision?

A They were directly prepared by me.

MR. KELLAHIN: If the Examiner please, that concludes our geologic testimony.

EXAMINATION BY MR. NUTTER:

Q Mr. Larson, now I understood you to say that the Pedco Well originally was completed in the Wolfcamp.

A Yes, sir.

Q And after only 342 barrels cumulative production was recompleted in the Bone Spring?

A That is correct.

Q And it is a gas well. What is the potential on that well?

A Just a moment, I have it here in my notes. Oh, the calculated open flow was 9683 MCF of gas per day with a GOR of 9263. The condensate gravity was 59.9.

Q 59.9?

A Yes, sir.

Q And I believe you mentioned that the oil gravity in your well, your Jennings-Federal, is 41.4?

A That is correct.

Q Okay. Now I see the perforated interval on the Pedco Well. Now, on your Jennings-Federal these little arrows up there at the top, are those perforations?

A They are single entry perforations, Mr. Nutter.

Q So the perforated interval in your well is the equivalent of what, actually, on the log over there on the

on the Pedco Well?

A It would be approximately 97, oh, 70 to 80.

Q Is it that little red tic that's been colored up at the top there?

A That is correct.

Q Those are the equivalent zones, then?

A Yes.

Q I see. And no tests were made in the Bone Spring and the Shearn Wells?

A That is correct.

MR. NUTTER: Are there any further questions of Mr. Larson?

(No response.)

MR. NUTTER: He may be excused. Oh, wait, Mr. Larson, I didn't write down the feet of porosity you attribute to each of these three wells in the second Bone Spring. 4% was your cutoff.

A That is correct. To the left, Mr. Nutter, in the Pedco State I assigned that 18 feet of porosity; the Shearn-Federal, 8 feet of porosity; and in the Jennings-Federal, 16 feet of porosity.

MR. NUTTER: Thank you. You may be excused.

MR. KELLAHIN: Mr. Price.

CHARLES R. PRICE

being called as a witness and being 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 are employed and in what capacity?

A My name is Charles R. Price. I'm employed by Sun Oil Company in Midland, Texas, as a production engineer.

Q Mr. Price, have you previously testified before the Commission?

A No, I have not.

Q Would you state briefly when and where you obtained your degree in engineering?

A I got my Bachelor of Science in Petroleum Engineering from the University of Texas in 1972.

Q Subsequent to that time where have you been employed and in what capacity?

A Since June of 1973 I've been employed by Sun Oil Company as a production engineer in Midland, Texas.

Q Mr. Price, have you made a study of the facts surrounding this particular application by Sun Oil Company?

A Yes, I have.

Q If the Examiner please, are the witness' qualifications acceptable?

MR. NUTTER: Yes, they are.

Q (By Mr. Kellahin) Mr. Price, would you please refer to what's been marked as Applicant Exhibit 2 -- I'm sorry, 3. Identify it and explain what information it contains.

A Exhibit Number 3 shows the production history of the Jennings-Federal Number 1 since it was completed in the Bone Spring interval. Shown here are plots for the recording of tubing pressure, the production rate, and the barrels of oil per day, and the GOR cubic feet per barrel.

Q What was the date of completion?

A The date of potential was January 30th, 1974. Initial completion was on December -- excuse me, January 28th.

Q Would you please refer to Exhibit 4 and identify it and explain what information it contains?

A Exhibit 4 is an economic comparison of 80-acre spacing versus 160-acre spacing for the proposed East Lusk Bone Spring oil pool. The cost to successfully drill,

complete and equip a well in this pool would be $537,000 in the above cases. Unsuccessful completion would cost $310,000 for above 80-acre and 160-acre spacing. For 100% probability of successful completion a 16-foot net pay interval was used and reserves calculated at 65,540 barrels for 80-acre spacing and 131,080 barrels for 160-acre spacing.

Q Is that the calculated recoverable reserves?

A That's the recoverable reserves using a porosity of 6.6% and a water saturation of 30% based on log analysis, and that also includes a 20% recovery factor, which I believe is reasonable for this type of reservoir.

Q Let me ask you about your 20% recoverability factor. How is that determined?

A Well, that's mainly an experience factor based on performance of similar reservoirs.

Q Have you calculated the permeability of this reservoir?

A The permeability has been calculated from build-up analysis, which was done -- which was done during the period shown shut in on Exhibit 3. Permeability was calculated to be 178 millitarses (sic).

Q Please continue with your explanation of Exhibit 4.

A Okay. For probabilities of success less than 100% decrease in pay thickness was assigned and the reserves calculated are shown on Exhibit 4. The last table on Exhibit 4 is a profitability table using 40% and 60% success rations; net cash flow for 40% success ratio under 80-acre spacing is a negative $49,907. 10% net present value is a negative $59,329. Cost per barrel of oil is calculated to be $14.6 dollars and there is a loss on drilling the well. With a 60% probability of successful completion, net cash flow is $13,264; rate of return 10%; 10% net present value, a negative $869; cost per barrel of oil, $10.47 dollars; profit dollar for dollar invested was .03 cents.

Q That's on 80-acre spacing?

A That's on 80-acre spacing. Pay out was approximately one year.

For a 40% probability of successful completion under 160-acre spacing, net cash flow is $138,274; rate of return is greater than 50%; 10% net present value is $112,973; cost per barrel of oil is $7.23; profit is .37 cents per dollar invested; pay out is .78 years. For a 60% probability of successful completion, net cash flow is $295,536; rate of return greater than 50%; 10% net present value, $251,585; cost per barrel of oil, $5.24;

profit .73 cents per dollar invested and pay out is .61 years.

Q In your opinion, Mr. Price, would it be economical to drill a well in this pool on less than 160-acre spacing?

A No, sir, not in my opinion.

Q With regards to your reservoir calculations and your reservoir performance, do you have any opinion with regards to the ability of one well to drain a 160-acre unit?

A Well, based on the high permeability calculated 178 millitarses (sic), I feel that this well should drain 160 acres.

Q Do you have a proposed name for this new pool?

A Yes. The East Lusk Bone Spring is the name we propose for this pool.

Q Were Exhibits 3 and 4 prepared by you or prepared under your supervision and direction?

A Yes, they were.

Q In your opinion, Mr. Price, will approval of this application be in the best interests of conservation, the prevention of waste, and the protection of public rights?

A Yes, in my opinion it will be.

Q In addition Sun Oil Company is asking that the special pool rules be made on a temporary basis for a period of one year, is that correct?

A That is correct.

MR. KELLAHIN: That concludes our direct examination of this witness, Mr. Examiner, and we move the introduction of Exhibits 1, 2, 3, and 4.

MR. NUTTER: This is identified as 5; it's supposed to be 3.

MR. KELLAHIN: Yes, that's a mistake.

MR. NUTTER: That is Exhibit 3?

MR. KELLAHIN: Yes, sir.

MR. NUTTER: Exhibits 1 through 4 will be admitted in evidence.

QUESTIONS BY MR. NUTTER:

Q Mr. Price, what was the depth that this Jennings-Federal Number 1 was drilled to?

A It was drilled to the total depth of approximately 10,800 feet.

Q And the perforated interval in that well is approximately a little less than 9900, is that correct?

A Yes, sir, that's correct.

Q Now, what's this $537,000? That's the cost of

Q In addition Sun Oil Company is asking that the special pool rules be made on a temporary basis for a period of one year, is that correct?

A That is correct.

MR. KELLAHIN: That concludes our direct examination of this witness, Mr. Examiner, and we move the introduction of Exhibits 1, 2, 3, and 4.

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MR. KELLAHIN: Yes, sir.

MR. NUTTER: Exhibits 1 through 4 will be admitted in evidence.

QUESTIONS BY MR. NUTTER:

Q Mr. Price, what was the depth that this Jennings-Federal Number 1 was drilled to?

A It was drilled to the total depth of approximately 10,800 feet.

Q And the perforated interval in that well is approximately a little less than 9900, is that correct?

A Yes, sir, that's correct.

Q Now, what's this $537,000? That's the cost of

a completed successful well. Is that the actual cost on this well?

A Well, it's based on the cost of this well, yes, sir.

Q How much did this well actually cost to drill?

A I don't have the exact figure but it would be in this range, $537,000. It would cost approximately $537,000 to drill another well in this field.

Q But this well was actually drilled almost a thousand feet deeper than the productive interval, wasn't it?

A Yes, sir.

Q So an extra 1000 feet of drilling is included in this well cost here?

A I'm not sure of that.

MR. NUTTER: Mr. Larson?

MR. LARSON: The primary target for the Jennings-Federal was the Wolfcamp. We hoped to encounter the same productive zone that we enjoyed in the Shearn-Federal and the Wolfcamp was perforated and it produced between, oh, 30 and 35 barrels of oil a day, and our log analysis indicated that it was a much better zone of porosity in the Bone Spring, so a retrievable bridge plug was placed between

the Wolfcamp and the Bone Spring and it was completed in the Bone Spring.

MR. NUTTER: But $537,000 that we've got quoted here as the cost of the well, is the cost of a well drilled to the Wolfcamp and then completed in the Bone Spring, is that it?

MR. LARSON: To the Bone Spring. These figures were given from the logs in our Dallas office.

MR. NUTTER: But what would it cost to drill a well to the second Bone Spring pay?

A According to the figures used by our resident reservoir engineer, it would cost $537,000 to drill a well to Bone Spring.

Q (By Mr. Nutter) Yeah, I see, but we don't have the actual cost of this well to the Bone Spring. Okay, now you've calculated expected reserves for 16 feet, 10 feet and 6 feet of net pay.

A Yes, sir.

Q Now, I think you've mentioned that you calculated 6.6 porosity.

A Yes, sir.

Q Is this the actual porosity that you mention in this Jennings-Federal?

A That is based on the logs from there, that's correct.

Q Where did you get your 30% water saturation?

A That's also based on logs from the Jennings-Federal.

Q I see, and you took a 20% recovery factor as being a reasonable factor for similar wells?

A Yes, sir.

Q Now, what's the gas/oil ratio in here, in the Jennings Federal Well?

A It's plotted on Exhibit 3 by day. The average is approximately 650 cubic feet per barrel.

Q All right. Do you have a formation volume factor that's used in determining your produceable reserves?

A Yes, sir, we used a formation volume factor of 1.4 for these calculations.

Q And how as it arrived at?

A It was arrived at based on the gravity of the oil and published data.

Q Do you think this 650 barrels per -- 650 to 1 GOR is the solution ratio in here?

A Yes, sir.

Q And with that solution ratio you come up with a

formation volume factor of 1.4?

A That's correct.

Q Okay. Then we come to a figure that you described as being the net cash flow. What does that include, Mr. Price?

A Well, the net cash flow includes -- that's the net present value; that includes the net present value drilling the well plus the salvage value of the well.

Q Okay. Now, you're assuming that the well will produce at what rate? It appears that a decline has been set. Is the net cash flow based on the total recoverable reserves from the well?

A Yes, sir.

Q And what price do you calculate the value of the oil?

A At $12.00 per barrel.

Q And have you calculated the value of the gas that would be produced from that and included it in your net cash flow?

A Yes, sir, it has been included and we calculated the value at .51 cents per thousand cubic feet.

Q And we've got an estimate of the reserves of oil. Do you have a calculation as to how much gas will be

produced from the well?

A I have not included it on Exhibit Number 4, and I cannot give you the exact figure; however, it was included in the calculation. The reserves for 80-acre spacing and 16 feet of net pay would be 128 million cubic feet.

Q Or 128,000 MCF, then?

A Yes, sir, that's correct.

Q And what would you do, just double that for 160-acre spacing?

A That's correct.

Q And so taking into consideration all the value of all the oil that you can produce, you come up with this net cash flow that you calculate?

A Yes, sir.

Q Now, what's this 10% net present value?

A That is the net present value of drilling a well using a 10% discount factor.

Q Is that the value of the net cash flow discounted at 10%?

A No, sir, that's the expected worth of drilling the well to Sun Oil Company today, discounting our money

at 10%.

Q Well, I mean is it -- it's not the present value of drilling the well, it's the present value of the return that you'll get on the well, isn't it?

A Yes, sir.

Q So it is a 138, and take the case of the 4/10ths case, on 160 you've got a net cash flow expected of $138,000.

A That's correct.

Q Then if you discount that at 10% you get a $112,000 and that's for two year life, is that it?

A That's basically correct, yes, sir.

Q And that's all you expect this well to produce in about two years?

A Yes, sir, I think we can recover our reserves in two years, in two year life.

MR. NUTTER: Are there any further questions of Mr. Price?

MR. RAMEY: Mr. Price, do you have a recommendation for well locations?

A No, sir, not at this time.

MR. RAMEY: You don't propose original location of the northwest quarter of the southwest or southeast or --

A No, sir, not at this time. Don't propose any additional locations.

MR. NUTTER: Any further questions?

MR. RAMEY: No, that's all.

MR. NUTTER: Does anybody have any questions of Mr. Price?

(No response.)

MR. NUTTER: You may be excused. Does anyone have anything they wish to offer in case 5443?

(No response.)

MR. NUTTER: We'll take the case under advisement.

(Hearing concluded.)

STATE OF NEW MEXICO)
)
COUNTY OF SANTA FE)

REPORTER'S CERTIFICATE

I, SALLY WALTON BOYD, Notary Public and General Court Reporter, Santa Fe, New Mexico, DO HEREBY CERTIFY that the facts stated in the caption hereto are true and correct; that I reported the captioned proceedings; that the foregoing 22 pages, numbered 1 through 22 inclusive, is a full, true and correct transcript of my notes taken during the hearing.

WITNESS my hand and seal, this 14th day of April, 1975, at Santa Fe, New Mexico.

Sally Walton Boyd

Sally Walton Boyd
Notary Public and General Court
Reporter

My Commission expires:
10 September 1975

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 5443, heard by me on 3/19, 1975.

, Examiner
New Mexico Oil Conservation Commission

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