BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
April 28, 1976

EXAMINER HEARING

IN THE MATTER OF:	)	
Case 5443 being reopened pursuant to the provisions of Order No. R-4994, which order established special rules and regulations for the East Lusk-Bone Spring Oil Pool, Lea County, New Mexico.	)	CASE 5443 (Cont'd.)

BEFORE: Richard L. Stamets, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the New Mexico Oil Conservation Commission:	William F. Carr, Esq. Legal Counsel for the Commission State Land Office Building Santa Fe, New Mexico
For the Applicant:	W. Thomas Kellahin, Esq. KELLAHIN & FOX Attorneys at Law 500 Don Gaspar Santa Fe, New Mexico

I N D E X

	Page
HERBERT A. SEIDEL, JR.	
Direct Examination by Mr. Kellahin	3
Cross Examination by Mr. Stamets	14

EXHIBIT INDEX

	Page
Sun's Exhibit No. Six, Log	14
Sun's Exhibit No. Seven, Recovery Calculations	14
Sun's Exhibit No. Eight, Drainage Calculations	14
Sun's Exhibit No. Nine, Economics Calculations	14

MR. STAMETS: We will call the next Case 5443.

MR. CARR: Case 5443 reopened and continued. In the matter of Case 5443 being reopened pursuant to the provisions of Order No. R-4994, which order established special rules and regulations for the East Lusk-Bone Spring Oil Pool, Lea County, New Mexico, including a provision for one hundred and sixty acre spacing and proration units.

MR. KELLAHIN: Tom Kellahin of Kellahin and Fox appearing on behalf of Sun Oil Company and I have one witness to be sworn.

MR. STAMETS: Will you stand and be sworn, please?

(THEREUPON, the witness was duly sworn.)

HERBERT A. SEIDEL, JR.

called as a witness, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A. I'm Herbert A. Seidel, S-e-i-d-e-l, Jr. I work for Sun Oil Company as a Senior Professional Engineer in their Dallas Production Region, Dallas, Texas.

Q. 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. Have you made a study of and are you familiar with the regulations concerning the Casey-Strawn Pool, Lea County, New Mexico?

A. Yes, I am.

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

MR. STAMETS: They are.

Q. (Mr. Kellahin continuing.) Mr. Seidel, would you refer to what has been marked as Sun Oil Company Exhibit Number One and identify it?

A. Excuse me, would this be Exhibit One or Six?

MR. KELLAHIN: This is a continuation. Let me renumber those if you don't mind, Mr. Stamets.

MR. STAMETS: Start with Six.

MR. KELLAHIN: We'll start with Six. The previous five exhibits were presented by Mr. Larson in the hearing of this case a couple of weeks ago.

Q. (Mr. Kellahin continuing.) Beginning then with Exhibit Number Six, Mr. Seidel, would you identify it?

A. Yes, sir, this is a semi-log plot of the daily oil production for this one well in this field, Sun Oil Company's Jennings Federal No. 1. Production began in February, 1975.

I might point out the scale on the left there has a line drawn through it and it is supposed to represent a decimal point. In February of '75, for example, is three hundred barrels a day production and averaged about that for about eight or nine months and has begun to decline.

We have installed a pump just a few days ago and on pump the well produced three hundred barrels a day. That's not shown on this exhibit.

What we have done here is tried to show in our opinion what the minimal reserves would be for this well and to date they have produced a hundred and four point eight thousand barrels and have a remaining reserve of about ninety-seven thousand barrels for a total ultimate recovery of about two hundred and two thousand barrels of oil.

Q. Would you please refer to Exhibit Number Seven and identify it?

A. This is an exhibit showing recovery calculations assuming three different drainage areas as well as the original stock tank oil in place based on the porosity and water saturations calculated from log analysis in the Jennings Federal No. 1.

The original stock tank oil in place, the equation at the top there is seventy-seven, fifty-eight times the porosity of point oh six five times the difference in one minus the water saturation, point three, divided by the formation

volume factor at bubble point conditions of one point three seven. This gives you two hundred and fifty-seven point seven stock tank barrels per acre foot in place.

The first assumption of a hundred and sixty acre drainage, we have original oil in place of two hundred and fifty-seven point seven barrels per acre foot times sixteen feet times a hundred and sixty acres or six hundred and fifty-nine thousand, seven hundred stock tank barrels.

Our ultimate recovery projected at two hundred thousand barrels indicates a recovery efficiency of thirty point three percent of the original stock tank oil in place. Our current recovery of a hundred and five thousand barrels indicates a recovery efficiency of fifteen point nine percent.

On eighty acre spacing, using the same equation, we have a recovery efficiency of sixteen point six for two hundred thousand barrels ultimate recovery and thirty-one point eight percent for a hundred and five thousand current.

On forty acre spacing we are expected to produce more than the original oil in place or a hundred and twenty-one percent. Current recovery would be sixty-three point seven percent of the original oil in place.

Q. What was the reference you used to make the calculations for the recovery of the above bubble point calculations?

A. We used Stannings Correlations and a six hundred and seventy-four cubic feet per barrel, initial gas-oil ratio from

our potential test.

Q. And for using the calculations under B, the recovery below bubble point, what was your source of authority?

A. Now, you are moving on to Exhibit Number Eight, am I right, Tom?

Q. No, I'm talking about notations down here at the bottom.

A. I'm sorry, I've been reading off of this exhibit. This was my Exhibit Seven.

MR. KELLAHIN: Did we get it renumbered here?

MR. STAMETS: I've got the same Exhibit Seven as the witness has.

MR. KELLAHIN: I'm sorry I've got mine -- go ahead.

A. I think that's about all I had to say about this exhibit. We may refer back to it after we get through with this Exhibit Number Eight.

Q. (Mr. Kellahin continuing.) Fine. Let's go now to Exhibit Number Eight.

A. This is an exhibit showing the drainage calculations from the material balance calculations and some statistical equations developed by John Arps, et al, and published in an API Bulletin D14 in October, 1967.

Starting up at the top we have some recovery above the bubble point and note we referenced Craft & Hawkins,

Applied Petroleum Reservoir Engineering, (Prentice-Hall, Inc., 1959) and we have barrels per acre foot of two hundred and fifty-seven point seven, which we had calculations shown on Exhibit Seven, times the initial pressure, minus the bubble point pressure of thirty-nine, twenty-seven minus two thousand, times the oil saturation, which is point seven, times the compressibility of the oil which is eight times ten to the minus six, the water saturation at point three times the compressibility of water at two point eight, times ten to the minus six, the raw compressibility of formation compressibility is six times ten to the minus six. All of this divided by one minus water saturation point three, all of this times the initial formation volume factor, which is determined from an equation, it is equal to the compressibility of the oil times the bubble point formation volume factor times the difference in the initial pressure minus the bubble point pressure. All of this plus the formation volume factor at the bubble point, divided by this one point three seven bubble point formation volume factor which as we earlier said was developed from Stannings Correlations, using a gas-oil ratio of six hundred and seventy-four cubic feet per barrel which was observed on a potential test. This gives us an eight point seven barrels per acre foot of three point four percent recovery of the original stock tank oil in place.

For recovery below the bubble point we have used this

John Arps correlation that I mentioned earlier which is published in the API Bulletin D14 and this is a rather complex equation. It's a regression analysis using the groupings of variables as shown on the exhibit in B.

I might point out that we used the six point five percent porosity water saturation point three, the formation volume factor of bubble point of one point three seven, a perm in darcies of point one seven eight or one hundred and seventy-eight millidarcies of viscosity of oil at bubble point conditions of point five, five centipoise, again water saturation of point three, bubble point pressure of two thousand and we assumed an abandonment pressure of two hundred pounds.

This equation gives us a recovery of fifty-three point two barrels per acre foot or twenty point six percent of original stock tank oil in place.

The total recovery under Item C is sixty-one point nine barrels per acre foot or twenty-four percent of the original oil in place.

I might mention that in the original hearing that we had assumed a twenty percent recovery but we had used a four hundred pound abandonment pressure in that case. We are just trying to show that even if we do have as high a recovery as twenty-four percent we are draining a relatively large area.

These calculations are shown in D using the two hundred thousand barrels expected recovery, the sixty-one

point nine barrels per acre foot and sixteen feet of pay, we have an indicated minimum drainage area from this well of two hundred and two acres.

Now, referring back to Exhibit Seven, you can see for a hundred and sixty acre drainage we are talking about an ultimate of thirty point three percent recovery, which is significantly greater than the twenty-four percent we would expect.

Q. What conclusion then do you draw from that comparison?

A. That we are draining in excess of one hundred and sixty acre spacing.

Q. Please refer to Exhibit Number Nine and identify it?

A. All right, sir, these are before tax, economics calculations for the three different cases of development density on a hundred and sixty acre spacing, eighty acre spacing and forty acre spacing.

We have assumed the same areal extent for each one of these cases, a hundred and sixty acres, so for the eighty acre spacing we are talking about two wells, for the forty acre spacing we are talking about four wells to develop the area.

We have an expense interest of a hundred percent, revenue interest of eighty-seven point five or royalty of one eight, oil price of twelve dollars and eight cents a barrel, gas price of fifty-one point nine cents per barrel,

production tax of seven-and-a-half percent, operating expense based on our 1975 experiences of a thousand and fifty dollars per well a month. The cost per completed well is three hundred and forty-nine thousand dollars, which was provided us by Sun Oil Company's Regional Drilling Engineer.

I might point out that these costs do not include artificial lift equipment which we anticipate to be about eighty-four thousand dollars or any surface facilities indicated would be around thirty-two thousand dollars.

At the original hearing we testified that the cost of a well would be five hundred and thirty-seven thousand dollars and this is the cost that we had estimated for the well at the time of the hearing and which included the cost of some testing in the Wolfcamp, unsuccessful testing in the Wolfcamp zone.

Q. That was the cost of the Jennings Federal No. 1 Well?

A. The cost of the Jennings Federal No. 1 Well was five hundred and eighty-three thousand dollars but we estimated at the time of our first hearing that the cost would be five hundred and thirty-seven thousand dollars. We were not clear in our testimony as to whether the new well would cost as much as five hundred and eighty-two. Actually when you add the cost of surface equipment in here you are talking about four hundred and sixty-five thousand dollars, but again in

the interest of showing a very conservative situation on drainage area and profitability, we have assumed just the cost of drilling and completing the well.

The ultimate recovery, using twenty-four percent of the original oil in place is sixty-one point nine barrels per acre foot, sixteen feet of pay and a hundred and sixty acres, we have a hundred and fifty-eight thousand, four hundred and sixty-four stock tank barrels. This plus the three hundred million cubic feet of casinghead gas.

Our gross revenue, using the twelve oh eight dollars per barrel and the fifty-one point nine cents per MCF is two million, sixty-nine thousand, nine hundred and forty-five dollars. Taking out the royalty burdens, it leaves us with one million, eight hundred and eleven thousand and taking out the production tax it leaves us with one million, six hundred and seventy-five thousand dollars for all three cases.

A total investment for the hundred and sixty acre case, three hundred and forty-nine thousand dollars; the eighty acre case, six hundred and ninety-eight thousand for two wells, the forty acre case would be one million, three hundred and ninety-six thousand dollars for four wells.

The total operating cost is a hundred thousand, eight hundred dollars for an eight-year life on a hundred and sixty acres, for four-year life on the eighty acre and a two-

year life on the forty acre spacing. This leaves us with a profit on the hundred and sixty acre case of one million, two hundred and twenty-six thousand dollars and a profit ratio of three point five one to one. On eighty acre spacing we have eight hundred and seventy-seven thousand dollars profit or one point two six to one. On forty acre spacing we have a profit of a hundred and seventy-nine thousand dollars or a profit ratio of thirteen cents to one.

Again I will point out that these are real conservative numbers as far as the profitability is concerned and that the total cost involved is not that that was used. We also have applied no risk factor at all in the area and our indications are from historical evidence that the success ratio will be something on the order of one and three.

Q. Your calculations here don't take into account any risk factor at all?

A. That is correct.

Q. They assume a one hundred percent success?

A. That's right.

Q. In your opinion then, Mr. Seidel, can you economically drill a well based on less than a hundred and sixty acre spacing?

A. No, we cannot based on Sun's investment decisions. Now we would not develop the reservoir on eighty acre spacing.

Q. In your opinion is the area being drained in excess

of a hundred and sixty acres?

A. Yes, sir, it is.

Q. In your opinion will the continuation of the existing pool rules for the Casey-Strawn Pool be in the best interests of conservation, prevention of waste and the protection of correlative rights?

A. Yes, sir, it will.

Q. Do you have a recommendation to the Commission as to whether these pools should continue on a temporary basis or whether they should be made permanent at this time?

A. I would recommend that the Commission approve our application for hundred and sixty acre spacing in this field.

Q. And that the rules be made permanent or temporary?

A. That they be made permanent.

Q. Were Exhibits Six, Seven, Eight and Nine prepared by you or under your direction and supervision?

A. Yes, sir, they were.

MR. KELLAHIN: If the Examiner please, we move the introduction of those exhibits.

MR. STAMETS: These exhibits will be admitted.

(THEREUPON, Sun's Exhibits Six through Nine were admitted into evidence.)

MR. KELLAHIN: That concludes our direct examination.

CROSS EXAMINATION

BY MR. STAMETS:

Q. Mr. Seidel, referring to Exhibit Nine, the reason you have shown ultimate recovery on that exhibit as a hundred and fifty-eight thousand barrels instead of two hundred and two thousand is that you converted that two hundred and two acre recovery back to a hundred and sixty acre recovery, is that right?

A. That is the best in effect pretty much what I'm saying. I've just said that this well now is draining more than a hundred and sixty acres. It is really recovering more than the twenty-four percent of the original oil in place on the hundred and sixty acres. Additional development in the area if it weren't done on a hundred and sixty acre spacing, each well would be expected on an average to recover this hundred and fifty-eight thousand barrels.

Q. In this case is it probable that this one well is draining the entire reservoir and there is no additional reservoir being developed?

A. We have a relatively high permeability in the area, in this well, we've got about a hundred and seventy-eight millidarcies and with that kind of perm and assuming the reservoir covers a relatively large area, the well could feasibly drain fairly efficiently the entire reservoir. Our calculations to date indicate that we have energy present in the reservoir that would suggest that we have something on the order of three million barrels of oil in place and with

this I think an area something on the order of eight hundred acres and this would require for efficient drainage of the reservoir recovery additional development. At this time, however, Sun Oil Company is not prepared to develop the reservoir any further than where we are right now. I think this could change, of course, with development, future development. As a matter of fact, there is one well currently being completed. We are trying to get a log on the well, it hasn't been released yet but it is in Section 9 and it would be the northwest offset to Jennings Federal No. 1 in Section 15.

This reservoir obviously, I think from previous testimony, is very thin in one direction away from this well and we suspect that it is probably down to the southwest and then the reservoir would probably have to move in another direction. We feel that direction is probably subtended by an arc of something like twenty degrees, so it is going to be hard to find where it is going.

MR. STAMETS: Any other questions of the witness? He may be excused.

(THEREUPON, the witness was excused.)

MR. STAMETS: Anything further in this case?

MR. KELLAHIN: Mr. Stamets, I would like to correct my statement awhile ago. I had intended to ask the witness questions with reference to the East Lusk-Bone Spring Oil

Pool and I think I said Casey-Strawn. I would like to correct the record to that extent.

MR. STAMETS: The record should show that correction.

If there is nothing further we will take the case under advisement and that concludes the hearing.

sid morrish reporting service
General Court Reporting Service
825 Calle Mejia, No. 122, Santa Fe, New Mexico 87501
Phone (505) 982-9212

REPORTER'S CERTIFICATE

I, SIDNEY F. MORRISH, a Certified Shorthand Reporter, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me, and the same is a true and correct record of the said proceedings to the best of my knowledge, skill and ability.

Sidney F. Morrish, C.S.R.

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 4-28, 19 76.

Richard L. Stamets, Examiner
New Mexico Oil Conservation Commission

sid morrish reporting service
General Court Reporting Service
825 Calle Mejia, No. 122, Santa Fe, New Mexico 87501
Phone (505) 982-9212