BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
February 4, 1976

EXAMINER HEARING

IN THE MATTER OF: Case 5397 reopened pursuant to the provisions of Order No. R-4949, which order established the North Burton Flats-Wolfcamp Gas Pool, Eddy County, New Mexico and promulgated special pool rules therefor, including a provision for 320-acre spacing and proration units	CASE 5397 (Reopened)

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

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EXHIBIT INDEX

MR. STAMETS: We will call next Case 5397.

MR. CARR: Case 5397, in the matter of Case 5397 being reopened pursuant to the provisions of Order No. R-4949, which order established the North Burton Flats-Wolfcamp Gas Pool, Eddy County, New Mexico, and promulgated special pool rules therefor, including a provision for three hundred and twenty acre spacing and proration units.

MR. STAMETS: Call for appearances in this case.

MR. KELLAHIN: Tom Kellahin, Kellahin and Fox, Santa Fe, New Mexico, appearing on behalf of Cities Service Oil Company and I have two witnesses to be sworn.

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

(THEREUPON, the witnesses were duly sworn.)

ROD ANDERSEN

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. My name is Rod Andersen, I'm a development geologist for Cities Service Oil Company.

Q. Mr. Andersen, have you previously testified before this Commission?

A. No, I have not.

Q. For the benefit of the Examiner will you describe for him when and where you obtained your degeee?

A. I have a Bachelor of Science and Master of Science from Wichita State University.

Q. What years were those obtained?

A. The Bachelors in 1972 and the Masters in '74.

Q. And subsequent to your graduation where have you been employed?

A. Excuse me.

Q. Where have you been employed subsequent to graduation?

A. For Cities Service for a year and a half.

Q. Are you familiar with the facts surrounding this particular application and the cause in question?

A. Yes.

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

MR. STAMETS: They are.

Q. (Mr. Kellahin continuing.) Mr. Andersen, would you refer to what has been marked as Exhibit Number One and identify that for us, please?

A. Yes, this is a plat from portions of Township 20 South, Range 28 East and 19 South, 28 East. Cities Service

acreage in the area is indicated in yellow and the wells which have been perforated in the Wolfcamp are indicated as starred gas wells, also two lines of cross sections which are the next two exhibits.

Q. Which sections compose the horizontal limits for the north Burton Flats-Wolfcamp gas pool?

A. Fourteen and twenty-three.

Q. Is it Cities Service Oil Company's desire to continue the pool rules as they are currently in effect and established by this Commission pursuant to Order Number R-4949?

A. Yes, it is.

Q. Please refer to Exhibit Number Two and identify that?

A. Exhibit Two is a cross section seen from Exhibit One along the east side of the field and covers six wells, it extends from the Monsanto-Burton Flat 12 to the CSO Government AB Number 2. For purposes of correlation, these have been set to a common datum on a Canyon shale marker. You can see along the east side of the field we have the Wolfcamp marked as the lower line and the upper line. The lower line is the most continuous in the cross section and the perforated intervals are indicated on the cross section.

Q. You show that the upper Wolfcamp zone begins to pinch out as it approaches this Government R Number 1 Well, is that right?

A. Yes, that's true. It's present in the AB Number 2,

the T Number 1 and pinches out to the R Number 1. It is not present in the AA, the Z or the Burton Flats 12.

Q. Identify for the Examiner the three wells that originally composed the pool in Sections 14 and 23?

A. This is The Government Z, the Government AA and the Government T.

Q. Are all of those wells completed in the lower Wolf-Camp?

A. Yes, they are.

Q. Are they completed and producing from the upper Wolfcamp?

A. No.

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

Q. Exhibit Number Three is indicated on Exhibit One, it is a cross section across the western portion of the pool and it indicates the presence of the upper line in all of these wells. The upper line is only perforated in the AB Number 2.

Q. The Ab Number 2 is located in Section 10?

A. Yes.

Q. Okay. What conclusion do you draw from these two exhibits, Mr. Andersen?

A. By setting all of the wells here, the electric logs, to a common horizon we have found that over the area there are

a series of Wolfcamp limestone mounds which occur at varying stratigraphic positions. However, here in Sections 10, 11, 14, 15 and 22 and 23, they all fall on a common horizon and we feel are all of one large limestone mound complex. These are separated, both from the wells which are started in the north and south, away from this acreage.

Q. Please continue by referring to what has been marked as Exhibit Number Four?

A. This is a gross thickness isopach of the lower zone. You will note the zero contour by setting these wells to the Canyon datum we feel that the mound to the north, which is the Winchester field, indicated by the starred wells to the north, is a separate mound from the one which we are discussing here. Also it is a separate mound from the Great Western Well in Section 28. These are different stratigraphic positions and we feel that we have one isolated mound as seen here on this gross thickness.

Q. Exhibit Number Five, please refer to that?

A. Exhibit Number Five indicates the porosities. The porosity isopach on the lower mound as well and we feel that there is a very strong correlation between the porosity and the gross thickness. Even though the porosity does not extend to the total limits of the lower mound, there is porosity continuous through the inner portion of it. You will note the zero contour line on the outside, indicating zero porosity

at that point and outside.

Q. Okay, Exhibit Number Six?

A. Exhibit Number Six indicates the structure, again using the Canyon as a datum and this indicates a general southeast dip to the regional dip to the field, with the reservoir being just tilted down dip to the southeast.

Q. How would you compare this Wolfcamp pool with other Wolfcamp pools in the area?

A. The Wolfcamp in Eddy County is typically of low porosity, low permeability and small isolated mounds. This particular mound has a larger areal extent than most and also has more continuous porosity throughout than any other Wolfcamp mound I have studied there.

Q. Do you have a geological opinion as to whether from a geological standpoint you would anticipate that one well could potentially drain an area of three hundred and twenty acres?

A. Yes, I think it would because of the porosity continuity throughout the reservoir.

Q. Were Exhibits One through Six either prepared by you directly or under your supervision and direction?

A. Yes, they were.

MR. KELLAHIN: If the Examiner please, we move the introduction of Exhibits One through Six.

MR. STAMETS: These exhibits will be admitted.

(THEREUPON, Applicant's Exhibits One through Six were admitted into evidence.)

MR. KELLAHIN: That concludes our geological presentation for this case.

MR. STAMETS: I presume you have an engineering witness?

MR. KELLAHIN: Yes, we do.

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

(THEREUPON, the witness was excused.)

MR. KELLAHIN: We would call Mr. Catron.

DON CATRON

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. My name is Don Catron, I'm a reservoir engineer, I work in Midland, Texas for Cities Service.

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

A. Yes.

Q. And did you testify on behalf of Cities Service Oil Company in the previous hearing of this case upon which Order Number R-4949 was entered?

A. Yes.

Q. Have you made a continued study of the area and are you familiar with the facts surrounding this particular application?

A. Yes.

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

MR. STAMETS: They are.

Q. (Mr. Kellahin continuing.) Mr. Catron, would you refer to Exhibit Number Seven, which is the first of your exhibits, and identify it?

A. This is another map of the North Burton Flats-Wolfcamp area. Again it shows the Wolfcamp wells and we contoured on this map the porosity thickness using a permeability index cut off, which is all of the pay that is shown as having permeability on Coriband logs and this includes both pay in the upper and lower mounds that Mr. Andersen talked about.

Q. Would you refer to Exhibit Number Eight now and identify it?

A. Number Eight is a cross section through Sections 11,

14 and 23, starting with Government AB 1 and going through Government Z-1 and the traces on this cross section are from Coriband logs and on the right side on each well is a permeability index trace and on the left side is a porosity index trace and as a cut off we used for this isopach in Exhibit One, we used what showed to have a permeability greater than zero on the permeability index and in addition, this cross section shows that the pay zones in these wells fall in about the same stratigraphic position.

Q. All right, would you refer to Exhibit Number Nine and identify it?

A. This is another cross section and it is through Section 10, 15 and 22 from Government AB-2 to Government W and this one shows the presence of an upper mound above the lower mound, which is present in the eastern part of the field.

Q. Okay, Exhibit Number Ten, now, Mr. Catron?

A. Exhibit Number Ten is the production record of the four wells that we have producing from this field at the present time and one of the important points shown by this is the stable GOR's they produced at. Most of the wells had fairly constant GOR's, GLR.

Q. Okay, Exhibit Number Eleven.

A. Exhibit Number Eleven is a fluid analysis and recombined samples from the Government Z-1 and shows the

recombined reservoir fluid that have a gravity of about point eight, oh, five. No, it's point six, nine, excuse me. And we also have the same type of analysis for the 1 and the Double A-1, which shows a recombined gravity to be about the same for all four wells.

Q. That is Exhibits Twelve and Thirteen?

A. Right, and these analysis were made on fluids that were recombined from separator samples, at the average GOR's for those wells.

Q. Okay, Exhibit Number Fourteen?

A. Exhibit Number Fourteen is a windowed cell analysis of recombined samples from the Government T-1 which we recombined as gas and liquid production and an average GOR and at reservoir temperatures and pressures and we found that by expanding the cell and lowering the pressure a liquid began to form at forty-six hundred and seventy pounds and as the pressure was lowered further the liquid volume increased until about thirty-three hundred and seventy pounds. At that time the liquid began to vaporize again.

Q. In your opinion, Mr. Catron, what type of reservoir are you dealing with?

A. This data shows it is retrograde condensate reservoir initially in a gas phase and it develops a liquid saturation as you lower the pressure.

Q. Exhibit Number Fifteen?

A. Exhibit Number Fifteen is a plot of the same data that we have tabulated in Exhibit Fourteen. It shows the liquid saturation building up and re-vaporizing as the pressure is lowered.

Q. Exhibit Number Sixteen?

A. This is a similar type of analysis, except that the pressure was lowered by withdrawing from the gas phase instead of expanding the cells. We have referred to it as a constant volume depletion test and this is more comparable to what happens in a reservoir than the expansion test in the preceding exhibits showed and the test was started at the dew point of forty-six hundred and seventy pounds and lowered in three hundred pound increments by withdrawing from the gas phase only, then the gas that was produced from the cells from these increments was analyzed and the gravity of the liquids that could be separated from this produced gas and were determined and a GOR was calculated by flash calculations and it shows how the GOR would typically increase with lowering the pressure below the dew point, the bottom line there, with it going to as high as forty-eight thousand to one by the time the pressure was lowered to a thousand pounds.

Q. Okay, Exhibit Number Seventeen?

A. Exhibit Number Seventeen shows the performance of the well that you could expect as the pressure is lowered from the dew point at forty-six hundred pounds, with the GOR

rising to -- I left a zero off the GLR scale. That should be twenty thousand, forty thousand and sixty thousand but the GOR goes to greater than forty thousand, at the point where liquid saturation has developed a peak in the reservoir and then as the liquid starts re-vaporizing, we get a decrease in GLR and finally that the pressure is lowered toward abandonment it starts to rise again and the lower curve shows the percentage of condensate in place that you could expect to recover by volumetric depletion of the reservoir with a peak of about fourteen percent of condensate originally in place.

Q. In your opinion, Mr. Catron, would this particular reservoir be classified as a gas reservoir under the current New Mexico Rules and Regulations?

A. Yes.

Q. In your opinion, Mr. Catron, will one well efficiently and economically drain three hundred and twenty acres?

A. Yes.

Q. Were Exhibits Seven through Seventeen prepared by you directly or under your direction and supervision?

A. Yes.

Q. Do you have a recommendation as to whether or not the existing field rules for this particular pool be made permanent or not?

A. Yes, I think they should be.

Q. That they should be made permanent?

A. Yes.

MR. KELLAHIN: That concludes our direct examination, and we move the introduction of Exhibits Seven through Seventeen.

MR. STAMETS: These exhibits will be admitted.

(THEREUPON, Applicant's Exhibits Seven through Seventeen were admitted into evidence.)

CROSS EXAMINATION

BY MR. STAMETS:

Q. Mr. Catron, looking at Exhibits Number Fourteen and Seventeen, if I understand these correctly, you could not physically produce this reservoir without liquids dropping out and reducing the final recovery of liquids to this fourteen percent figure unless there was some way of keeping the reservoir pressure above the dew point, is that correct?

A. That is correct.

Q. That would entail the injection of water or inert gases or some such thing as that?

A. That's right.

Q. Would that be a practical way of producing the reservoir?

A. We are studying that very closely right now, as far as to injecting gas, re-injecting crude gas and some

maintenance gas?

Q. What is the current producing pressure?

A. Reservoir pressure?

Q. Yes.

A. The last pressure we had ranged from, the best I remember, forty-three hundred pounds, forty-five hundred pounds.

Q. So you have already dropped below the dew point?

A. Well, it would depend. We could be right at it in some wells and we could be slightly below it in some. The dew point we show in one dew point determination for one well, we re-combined fluid from two other wells and they showed a dew point slightly less than -- about three hundred pounds lower than what we show on this exhibit. The dew point we determined has varied from well to well.

Q. If the current Rules and Regulations are continued in this pool, will any waste occur?

A. Well, if re-pressuring and pressure maintenance turned out to be uneconomic there will be liquid left in the reservoir.

Q. I should have said economic, within economic limits.

A. It would be an efficient way to deplete the reservoir, that is correct.

Q. Okay, so your answer then to my question is, no, there would not be waste if these Rules were continued?

A. That's right.

Q. Within the economic limits?

A. That's right.

MR. STAMETS: Any other questions of this witness?

REDIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Catron, how many wells are currently producing?

A. We have four wells producing now, making something over five hundred barrels per day of condensate.

Q. Do you have any other wells that you anticipate putting on the line shortly?

A. We have recommendations in for recompleting two additional wells in the Wolfcamp, these are depleted Morrow wells.

MR. KELLAHIN: That's all the questions I have.

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. CARR: Mr. Examiner, we have received a letter from Eddie Mahfood, petroleum engineer for the Yates Petroleum Corporation. (Reading.) Yates Petroleum Corporation supports the three-hundred-and-twenty-acre spacing, spacing and special field rules on the North Burton Flats-Wolfcamp Gas

Pool. If the Commission decides not to continue these rules, Yates requests that the rules not be rescinded prior to April 1, 1976. (End of reading.)

MR. STAMETS: Anything further in this case? We will take the case under advisement.

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

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. 5397, heard by me on 3-4, 1976.

Richard L. Stamets, Examiner
New Mexico Oil Conservation Commission