BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
February 10, 1965

EXAMINER HEARING

IN THE MATTER OF:

Application of Apache Corporation for a pool extension and special pool rules, Lea County, New Mexico.

Case No. 3206

BEFORE: DANIEL S. NUTTER, Examiner
ELVIS A. UTZ, Alternate Examiner

TRANSCRIPT OF HEARING

MR. UTZ: Call Case Number 3206.

MR. DURRETT: Application of Apache Corporation for a pool extension and special pool rules, Lea County, New Mexico.

MR. HINKLE: Clarence Hinkle of Hinkle, Bondurant and Christy, Roswell, representing the applicant.

(Witnesses sworn.)

(Whereupon, Applicant's Exhibits 1 through 17 marked for identification.)

J O H N B L A C K, called as a witness herein, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. HINKLE:

Q Your name is John Black?

A Yes, sir.

Q By whom are you employed, Mr. Black?

A Apache Corporation.

Q In what capacity?

A District Geologist.

Q Where do you reside?

A Midland, Texas.

Q Have you previously testified before the Oil Conservation Commission?

A Yes, sir, I have.

Q Your qualifications are a matter of record, then?

A Yes, sir.

Q You are a geologist?

A Yes, sir.

MR. HINKLE: Are his qualifications acceptable?

MR. UTZ: Yes, sir.

Q (By Mr. Hinkle) Are you familiar with the Application of Apache Corporation in this case, 3206?

A Yes, sir, I am.

Q What is Apache Corporation seeking by this Application?

A We are seeking to expand the High Plains-Pennsylvanian Pool to include the Southwest Quarter of Section 14, the Southeast Quarter of Section 15, the Northeast Quarter of Section 22, and the Northwest Quarter of Section 23.

Q Now, Mr. Black, what are the present pool's limits?

A As I understand it, the present pool limits on the High Plains-Pennsylvanian Field include only the Southwest Quarter of Section 23, the quarter section where the well is located.

Q What else are you seeking by this application?

A We are seeking to establish temporary special pool rules including 160 acre well spacing.

Q Are you requesting an adoption of similar rules to those adopted in the East Saunders Permo-Pennsylvanian Pools?

A Yes, sir, we would like to adopt field rules similar

to the rules adopted by the East Saunders Permo-Pennsylvanian pool located approximately two and one half miles west of the High Plains field.

Q Has Apache recently completed a well within a mile of the Texas Crude, et al. well in the High Plains Pool?

A Yes, sir, the Delaware-Spache Number 1 High Plains unit was completed January 15 in the Northeast Quarter of Section 22 with perforations from 10,438 to 10,515.

Q Have you prepared a plat which shows the location of this well with reference to the High Plains initial well and also those in the East Saunders Pool?

A Yes, sir.

Q Refer to Exhibit Number 1 and explain what that shows.

A Exhibit Number 1 shows the outline of the High Plains working interest unit comprising 1840 acres. It also shows locations of wells in Section 17 and 20, which comprise the East Saunders Permo-Penn Field, and it also shows the location of the Apache Number 1 High Plains unit in Section 22 and the Texas Crude Sinclair Well in the Southwest Quarter of Section 23 which is now the one existing well in the High Plains Field.

Q Does this exhibit show the ownership of all the leases in the area which it covers?

A Yes, sir, the ownership is designated on the plat and I'd like to point out that all of this acreage on the plat is

State acreage with the exception of Section 21 in the Southeast Quarter of Section 11. A portion of Section 21 is government owned and the rest is fee.

Q And this exhibit also shows the outlines of the High Plains Unit, does it not?

A Yes, sir, that's correct.

Q Is this a field wide unit or regular unit or working interest unit, or what sort of unit?

A This is a working interest unit in which some eight or nine companies have dedicated acreage to the working interest unit.

Q Who is the operator of the unit?

A Delaware Apache Corporation.

Q Who are the working interest owners within the unit who participated in the drilling of this initial test well?

A If you will refer to Exhibit 2, we have the percentage of working interest in the various companies, which is self-explanatory.

Q And all of these companies have participated in the completion of the initial test well?

A That is correct.

Q Have you made a geological study of the High Plains area and of the well in the East Saunders Permo-Penn Field?

A Yes, sir.

Q Have you prepared a structural map as a result of this study?

A I have prepared the structural contour map shown on Exhibit 3 and this structural map is drawn on top of what is known as the Saunders lime; in the contoured area, it's fifty feet. The area comes from the Saunders Field in Section 17 and 20, down to and including the High Plains Pool.

Q What conclusions, if any, do you draw from this Exhibit?

A It appears at this time, from my work, that there is no vertical separation indicated between the Saunders field and the existing High Plains field. In other words, there's no structure separating the areas of production.

Q Now, as a result of this study, have you also prepared an isopach map?

A Yes, sir, this is our Exhibit 4, which is also in the pocket.

Q Now, refer to Exhibit 4 and explain what this shows.

A Exhibit 4 shows the East Saunders Field and the High Plains Field and the Apache Number 1 High Plains Unit; and the isopach is drawn on the net pay in the Saunders lime as taken from the electric logs run on the wells.

Q What conclusions, if any, did you draw from this Exhibit?

A There is no specific conclusion drawn from this exhibit.

Q Now, have you also prepared a cross section plat or map of the wells involving the East Saunders wells and the unit well and the initial High Plains well?

A Yes, sir.

Q Refer to Exhibit Number 5 and explain what this is.

A Exhibit Number 5 is a cross section of gamma ray sonic logs run on the Texas Crude 1-23 State to the Delaware-Apache Number 1 High Plains unit and to the Kern County Land Number 1 State, which was a discovery well in the East Saunders Field. The cross-section is lined up on a stratigraphic datum which is indicated in the green color marked on each of the logs as a stratigraphic marker which is correlative in each one of the wells. The top of the Saunders lime is indicated in each well and the Saunders lime itself is colored in blue.

The orange color indicates the porosity as taken from the sonic log, the effective porosity taken from the sonic log in each of the existing wells. The red color indicates the perforated zones in each of the three wells.

Q Do these wells, in your opinion, correlate very nicely, or unusually well?

A The only variation in the correlation is between the Texas Crude well and the Apache Number 1 High Plains Unit, in

which the top zone of porosity is not present in the Texas Crude well which is present in the Apache Number 1 High Plains. However, the correlation between the Apache Number 1 High Plains unit and the Kern County Number 1 State, I feel, is very good correlation, yes. The pay zone seems to correlate real well.

Q What distance separates these two units, the Kern County Number 1 and the High Plains Unit?

A Approximately two and one half miles.

Q Do you think that this correlation -- in your opinion, is this correlation unusually good to be at that distance?

A I think it is unusually good correlation and I have a strange feeling that the two areas of production may join into a common field.

Q Have you formed any opinion as to whether or not the East Saunders Pool well and your High Plains unit Number 1 well are producing from the same reservoir?

A I feel sure they are producing from the same pool.

Q At this stage, on account of the correlations, it looks like it might be probable?

A Right.

Q Now, Order No. R-2507 of the Oil Commission dated July 1st establishing a High Plains Pennsylvanian Pool included all the Southwest Quarter of Section 23. Due to the

information which has been obtained by the completion of the High Plains Number 1 well, in your opinion should the Pennsylvanian High Plains Pool be extended?

A Yes, sir.

Q What acreage, in your opinion, should the pool be extended to include?

A The Southwest Quarter of Section 14, Southeast Quarter of Section 15, Northeast Quarter of Section 22, the Northwest Quarter of Section 23, and you may as well put in the Southeast Quarter of Section 22, also.

Q In your opinion, is this acreage reasonably proven by the wells which have been drilled so far?

A Yes, sir.

MR. HINKLE: We would like to offer in evidence Applicant's Exhibits 1 through 5.

(Whereupon, Applicant's Exhibits 1 through 5 offered into evidence.)

MR. UTZ: Applicant's Exhibits 1 through 5 will be admitted into evidence.

(Whereupon, Applicant's Exhibits 1 through five admitted into evidence.)

CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Black, over in the East Saunders Pool, Skelly drilled a dry hole in the south end of that Pool. Which well

would that be on your exhibit?

A They actually completed the well; it's in the Southwest Quarter of Section 20.

Q That would be the 1-P?

A Right, as a pumping well, pumping 66 barrels a day, and the well has subsequently been plugged.

Q It did produce for a short time?

A Right.

Q The Texas Crude well was potentialed for 864 barrels; what's that well capable of making now?

A I think it makes about 50 barrels a day. I think primarily due to the thin nature of the pay, there's only about five feet or so.

Q Now, how much cumulative production have you obtained from your High Plains Number 1?

A We haven't got our first month's production in yet, but our allowable is set at 187 barrels a day.

Q It can still make that 187 barrels without any problem?

A Right.

MR. UTZ: Are there any further questions of Mr. Black?

You may be excused.

(Witness Excused.)

L A R R Y S H A N N O N, called as a witness herein, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. HINKLE:

Q What is your full name, please?

A Larry Shannon.

Q By whom are you employed?

A By Apache Corporation.

Q In what capacity?

A As Area Engineer.

Q You are a petroleum engineer?

A Yes, sir, I am.

Q Have you previously testified before the Commission?

A Yes, sir, I have.

Q And your qualifications are a matter of record?

A Yes, sir.

MR. HINKLE: Are the qualifications acceptable?

MR. UTZ: Yes, sir, they are.

Q (By Mr. Hinkle) Have you made a study of the wells which have been drilled in the High Plains-Pennsylvanian Pool including the Delaware Apache Number 1 and the wells which have been drilled in the East Saunders Permo-Pennsylvanian Pool in Lea County?

A Yes, sir, I have.

Q Are you familiar with the completion of the Delaware-Apache Number 1 or the High Plains unit well and the drill stem tests which were made in connection with them?

A Yes, sir.

Q Have you prepared an Exhibit which shows the well history and the drill stem test which was made in connection with this well?

A Yes, on Exhibit 6 we show the completion data, the way that the well was completed and the dates of the potential. I think it's fairly self-explanatory. The drill stem tests.

Q You might point out the drill stem tests and the results of them.

A The drill stem tests, there were two; the first test took the Plains zone on the Saunders Field and if you refer to Exhibit Number 5, the top zone and the well flowed for two and one half hours. We had 148 barrels of oil and a surface pressure of 410 to 480 psi. After it was shut-in, the gas and solution unloaded an additional 61 barrels of oil after tool was closed, and then we reversed out 20 more barrels of oil. The shut-in pressures are shown.

Q What is the flowing pressure?

A The flowing pressures, the initial flowing pressure was 120 and the final pressure was 3414.

Q What is the shut-in pressure?

A And the shut-in pressure of 35 and the initial shut-in was 3942 and the final shut-in was 120, final shut-in was 3923; and then drill stem test number 2 was 10,475-10,525, this comprised the two lower zones shown on Exhibit 5. This was open for one and one third hours, flowed 71 barrels of oil in one hour, surface pressure was 480 pounds, it unloaded an additional 35 barrels after the tool was closed, and reversed out 10 barrels of oil. The initial flowing was 2852 and the final flowing was 3159. The initial shut-in of 30 minutes was 3869 and the final shut-in pressure of 90 minutes was 3687.

Q This also shows the perforation intervals?

A Yes, sir, the next part shows the intervals on a selective perforation technique and we have a total of 12 holes comprising the three main zones of the reservoir.

Q They are shown on Exhibit Number 5?

A Yes, sir. The stimulation treatment is shown next of 250 gallons of mud clean up acid.

Q But you didn't frack this well?

A No, sir.

Q Go ahead.

A The potential test was taken on January 14th, 1965. The well flowed 631 barels of oil, no water, in 12 hours on one half inch choke, with a tubing pressure of 640. The GOR was 1188 to 1, the oil gravity was 44.1 degrees Fahrenheit,

the gas gravity was 0.87; this gravity was calculated at a rate of 162 barrels per 24 hour day.

Q Have you prepared an exhibit which shows the reservoir rock and fluid properties as indicated in this Number 1 well?

A Well, we'll refer to Exhibit Number 7. The depth of the top of the formation is shown from our open hole logs at 10,437. The gross pay is computed from our log data. The net effective pay we determined also from the logs, from both the micro log and the sonic log. The porosity was computed from the sonic log to be 10 per cent. The water saturation we calculated through our logs to be 32 per cent. The original reservoir pressure was 3942 taken from our drill stem test number 1. The saturation was from a bottom hole fluid sample which was taken by Core Laboratories and was an actual measurement of 2625. The reservoir temperature was also computed from this bottom hole fluid sample to be 124 degrees Fahrenheit. The original solution gas-oil ratio and the cubic feet per barrel was measured through our fluid samples to be 1125, and that is with 40 pounds separator pressure. The formation volume factor was also computed from this to be 1653. The oil gravity was found to be 44.1, specific gravity of gas was measured by three different gas companies and it came out 0.87.

Q Have you made a comparison of the reservoir rock and fluid properties of the High Plains Unit Number 1 Well with the

East Saunders Permo-Penn Pool?

A Yes, sir, I have, and this is Exhibit Number 8, and we took the evidence that Kern County Land Company presented at their various hearings on the East Saunders Permo-Penn pool and compared their data with our data that we have established from our High Plains Unit Well Number 1, and I think it's rather self-explanatory and the similarity of the data is to me, very indicative that we could be in definitely the same reservoir and like Mr. Black says, possibly the same pool.

The various other data was all from the same method. Now, Kern County Land Company ran a permeability test from core and we had to assume this from our pressure measurement on our drill stem tests, which was calculated to be 103 millidarcies versus core data of Kern County Land wells to average 46.2 millidarcies.

The original reservoir pressures, in all, were also measured through a bottom hole fluid sample, so we attempted to compare it as near as we could to their actual measurements.

Q Did you draw any conclusions from this comparison?

A It's very similar, sir.

Q Does that indicate it might be the same reservoir?

A I think with the limited information we have at this time, it very definitely could be.

Q Now, have you prepared any information with regard

to comparison of the drill stem test data of the East Saunders Pool against the High Plains Unit Well Number 1?

A Well, let's refer to Exhibit Number 9, this is a graphic comparison of the drill stem tests taken on the Kern County Land Company's Well Number 1; this wasn't stated on our exhibit, but it's Number 1 well.

Q That's your continuous line?

A The dashed line. And the solid line is our High Plains Unit Well Number 1. The time is relative because the pools are not open for the same intervals but what we wanted to graphically discover were the curves and the angles of the curves and how they compared in the two wells and of course, the pressures at each individual point; and although they flowed their well on different conditions than we did, varying their surface choke from 1/8 to 1/2, we maintained ours at 3/4 and 1/2 each, the curves are very similar.

What I would like to refer to now is in the form of a calculation, but is a graphic display. At the point of the final flow where the well was shut-in for the final flow, the curves are very rapid in their build ups and in a straight line, almost no bends, up to within just a few minutes on both wells.

Q Have you made a reservoir study from the information available to determine the expected oil recovery from the High Plains Unit Number 1 Well?

A Well, if we'll refer to Exhibit 10, I have attempted a preliminary reservoir calculation. The porosity as shown is taken from the sonic log and is shown to be 10 per cent, the water saturation is calculated from the sonic log and shown to be 32 per cent. The net effective pay was also computed from the logs to be 25 feet, the recovery factor is assumed and this is from experience in that area, particularly the Saunders and the East Saunders Pool, both to the west of our present pools, and I might add is a conservative estimate of the recovery found in this reservoir.

The formation and volume factor isn't actually measured. The oil in place was computed to be 319 barrels per acre foot or 7950 barrels per acre. At the bottom of this Exhibit, I show, at the present time, since we assumed that we can effectively drain 160 acres, we have shown the various recoverable oil that we anticipate from the 40 acre spacing, the 80 acre spacing and the 160 acre spacing. The 40 acre spacing, we anticipate 85000 barrels per well; on the 80 acre spacing, we anticipate 170,000 barrels per well, and on 160 acre spacing, we anticipate 340,000 barrels per well. The recoverable gas is shown on the bottom.

Q Have you made an economic evaluation with respect to the High Plains Pool?

A Yes, sir, this is Exhibit Number 11. The oil value that we presently have is $3.01 per barrel, less 14¢ per barrel

for trucking. We anticipate a pipe line in the near future, but there is no contact as yet.

MR. UTZ: Is there a pipe line in the East Saunders?

MR. SHANNON: Yes, sir, there is. The gas value, we have signed a contract with Atlantic Refining Company and this is an average, because of all the factors, at 12¢ per MCF of gas. The net interest leases are 87.5 per cent. The production taxes are 6.1 per cent. The lifting cost is 20¢ per barrel, which is throughout the field once gas lift is installed. Our per well investment costs are shown for a flowing well of $145,000.00 and an additional $15,000.00 per well for artificial lift. This gives a total cost per well of $160,000.00.

The next part is the economics for one well, this is considering one well on the various spacings. The recoverable oil that we have shown in previous exhibits and the recoverable gas from the previous exhibits and the computations that we figure on a 40 acre spacing, we have a profit of $33,000.00 or a profit to investment ration of 0.206 to 1. On 80 acre spacing we would have a profit of $229,000.00 or a ratio of 1.49 to 1; and on 160 acre spacing we will have a profit of $637,000.00, or a ratio of 3.99 to 1.

Q Now, on the application of Apache Corporation, it is proposed that temporary special field rules be adopted for the

High Plains-Pennsylvanian Pool as extended, which are similar to those adopted in the East Saunders Pennsylvanian Pool, which includes 160 acre spacing. Do you have any comments to make with respect to these proposed rules?

A Yes, sir, Rules 1, we would like to state that each well completed or drilled be located on a standard proration unit containing 158 to 162 acres substantially in the form of a square constituting a governmental quarter section.

Rules 2, each well on each 160 acre unit be located within 150 feet of the center of either the Northeast Quarter or the Southwest Quarter of the government quarter section in which the well is located.

Rule 3, that a standard proration unit be assigned a 160 acre proportional factor of 7.67 for allowable purposes and in the event there is more than one well on a 160 acre proration unit, the operator may produce the allowable assigned to the unit in any proportion.

Rule 4, that the Rules be adopted --

Q Well, you recommend --

A Yes, we recommend that the rules be adopted for a period of one year to permit additional production history and experience to be gained by the drilling of other wells in the area.

Q In your opinion, based upon the information which is presently available, and including the information obtained from

the drill stem test in the East Saunders Permo-Penn Pool, would this effectively and efficiently drain 160 acres?

A Yes, sir, with the limited data we have, I feel very frankly that it will, and I might add that we anticipate two additional wells as soon as the Commission has ruled upon our case.

Q You have specific locations for those wells at this time?

A I have one in the Southwest Quarter of Section 15, and one in the Northwest Quarter of Section 22.

Q Are both these wells going to be drilled at the same time, or are you going to drill them one at a time?

A Yes, sir, we propose to drill, have approval for both wells, and we'll drill one well and if it's a producing well, we will move into the second one.

Q Are you going to start immediate operations on these wells?

A This month, we hope.

Q In your opinion, will it be in the interest of conservation and the prevention of waste to grant temporary 160 acre spacing and proration units for the High Plains Pennsylvanian Pool as extended?

A Yes, sir, very much so and we feel that possibly in time, if this field develops to the extent that we hope

optimistically there may even be in the future, pressure maintenance, and we would like to have this field developed on the 160 acre spacing at this time for that reason.

Q In your opinion, will the establishment of such field rules prevent economic loss caused by the drilling of unnecessary wells, and will it otherwise prevent waste and protect correlative rights?

A Yes, in fact, I'd like to state at this time the production history of the East Saunders Field. The field was discovered in March of 1962 and as of January 1st, of this year, it produced over 670,000 barrels, mainly from the three wells and the original well to date has produced over 280,000 barrels.

Q Is that indicative of anything in your opinion?

A From the evidence I saw or submitted to the Commission it appears that it is draining even more than 160 acres. It's reasonable to assume that the reservoir is draining more than 160 acres.

Q I believe that Mr. Black testified that all of the lands in the High Plains Unit are state lands; and all of the lands which would be in the pool, if the High Plains pool is extended, are state lands. Have you made an investigation to determine whether or not the lands which you propose to include in the High Plains Pool are all owned by the same beneficiary?

A Yes, sir, I have, Exhibit Number 12. We contacted

the Commissioner of Public Lands and he was kind enough to send us a letter showing that all of the land within our High Plains Unit is one common beneficiary for the total 160 acres.

Q That is Common Schools?

A Common School System.

Q Now, were all of the operators in the High Plains unit sent copies of the application in this case?

A Yes, sir, they were.

Q Have you had any protests from any of them?

A No, sir, none at all.

Q Have you had any indications that some or all of them approved this application?

A Yes, sir, Exhibits 13 through 17 are recommendations. From Pure Oil Company on Exhibit 13, they concurred with the 160 acre spacing drilling unit as proposed. Sun Oil Company on Exhibit 14, Texas Pacific Oil Company on Exhibit 15, Tenneco Oil Company on Exhibit 16, and the Atlantic Refining Company on Exhibit 17. I'd like to state at this time that Atlantic Refining Company has purchased Honda Oil Company's interest and have not changed their lease, and although our lease shows Honda Oil Company on it, Atlantic Refining Company is managing their interests at this time.

Q Do you have any further testimony to add?

A No, sir.

MR. HINKLE: We would like to offer Exhibits 6 through 17, inclusive into evidence.

(Whereupon, Applicant's Exhibits 6 through 17 offered into evidence.)

MR. UTZ: Applicant's Exhibits 6 through 17 will be admitted into evidence.

(Whereupon, Applicant's Exhibits 6 through 17 admitted into evidence.)

MR. HINKLE: I believe that's all we have.

MR. UTZ: Does anyone have any questions of Mr. Shannon? You may be excused.

(Witness excused.)

MR. UTZ: Do you have anything further, Mr. Hinkle?

MR. HINKLE: No.

MR. UTZ: Does anyone have anything they wish to offer in this case?

MR. DURRETT: I might state that we have a letter from the Ruidoso Petroleum Company concurring in your proposal.

MR. UTZ: If there is nothing further, we will take the case under advisement and the Hearing is adjourned.

(Whereupon, the Hearing was adjourned at 11:45 o'clock A.M.)

I N D E X

E X H I B I T S

EXHIBIT	MARKED	OFFERED	ADMITTED
App. Exs. 1-17	2		
App. Exs. 1-5		9	9
App. Ex. 6-17		23	23

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, ADA DEARNLEY, a Notary Public, do hereby certify and swear that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by JOHN ORFANIDES, Court Reporter, and that the same is a true and correct record of the said proceedings.

John A. Orfanides

Ada Dearnley

NOTARY PUBLIC

My Commission Expires:

June 19, 1967.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 3206, heard by me on May 10, 1965.

Examiner
New Mexico Oil Conservation Commission