NEW MEXICO OIL CONSERVATION COMMISSION

EXAMINER HEARING

SANTA FE, NEW MEXICO

REGISTER

HEARING DATE NOVEMBER 8, 1962 TIME: 9 A.M.

NAME:	REPRESENTING:	LOCATION:
Carl W. Jones	Phillips Pet. Co.	Midland, Tex.
Don Cyrs	Phillips Pet	Midland, Tex
John Springer	Tidewater Oil Co.	Midland, Tex
George Eaton	Pan American	Farmington
Guy Bull	" "	Fort Worth
Phil Tourtelot	Atlantic	Roswell
R M Anderson	Sinclair	Midland
H. N. Sweeney	S.P. + Martin Yates III	Roswell
Richard S. Morris	Seth, Montgomery Federici & Andrews	Santa Fe
John H. Hoover	Gulf	Roswell
Bill Kastler	"	"
Joe Gordon	Mobil	Hobbs
JACK HILL	MOBIL	HOBBS
Earl Schmidt	Mobil	Roswell
Marion Conway	MOBIL	ROSWELL

NEW MEXICO OIL CONSERVATION COMMISSION

Examiner Hearing

Santa Fe , NEW MEXICO

REGISTER

HEARING DATE November 8, 1962 TIME: 9 A.M.

NAME:	REPRESENTING:	LOCATION:
Jim Sperling	Mobil	Albuquerque
Jerry Hickson	El Paso Natural Gas	El Paso
B. H. Keyes	A. K. Barbour J. R. Abraham	
R. Ken Williams	MWJ	Midland
Robert W. Arrendiell	Sunset International Petr Corp	Midland.
R. M. Richardson	Atty	Roswell, N. Mex
Booker Kelly	Texaco —	Santa Fe
[illegible]	El Paso Natural Gas	Farmington
Garrett Whitworth	" " "	El Paso, Tex.
A. L. Porter, Jr	OCC	Santa Fe
F. Norman Woodruff	El Paso Natural Gas	El Paso
[illegible]	Southern Union Prod	Farmington
[illegible]	" " "	"

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
November 8, 1962

IN THE MATTER OF: Application of Pan American Petroleum Corporation for the creation of a new pool and the establishment of special rules and regulations, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new oil pool to be designated the Simpson-Gallup Oil Pool comprising the S/2 of Section 23, SW/4 of Section 24, N/2 of Section 25, and the NE/4 of Section 26, Township 28 North, Range 12 West, San Juan County, New Mexico. Applicant further seeks the establishment of special pool rules including the provisions for 80-acre proration units.	CASE NO. 2682

BEFORE:

Daniel S. Nutter, Examiner.

TRANSCRIPT OF PROCEEDINGS

MR. NUTTER: The hearing will come to order, please. The first case this morning will be Case 2682.

MR. DURETTE: Case 2682. Application of Pan American Petroleum Corporation for the creation of a new pool and the establishment of special rules and regulations, San Juan County, New Mexico.

MR. BUELL: For Pan American Petroleum Corporation, Guy Buell, and we have one witness, Mr. Eaton.

G E O R G E W. E A T O N, a Witness, called by the Applicant, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. BUELL:

Q Mr. Eaton, would you state your full name, by whom you are employed, and what capacity, and what location?

A George W. Eaton, Junior, Senior Petroleum Engineer for Pan American Petroleum Corporation, Farmington, New Mexico.

Q Mr. Eaton, you've testified at prior Commission hearings, have you not?

A Yes, sir.

Q And your qualifications as a Petroleum Engineer are a part of public record?

A They are.

MR. BUELL: Any questions as to his qualifications, Mr. Examiner?

MR. NUTTER: No, sir; please proceed, Mr. Buell.

Q (By Mr. Buell) Mr. Eaton, the purpose of this hearing is to designate a new pool and to adopt rules for that pool. In order that the Examiner can analyze and evaluate your testimony, I wish you would state at the outset the rule that you are going to recommend for this pool.

A We will recommend rules for this proposed new pool substantially identical to the pool rules contained in New Mexico Oil Conservation Commission Order R-1800 and R-1800-A, which adopt

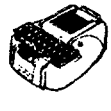
special pool rules for Chacha Gallup Pool, also in San Juan County, New Mexico.

Q Mr. Eaton, what has been identified as Pan American's Exhibit 1 is a photostatic copy of the Chacha Gallup Pool. Would you briefly, for the record, summarize the pertinent rules that are included in this Order?

A These rules contain provisions for 80-acre proration units, such proration units to consist of any two contiguous quarter quarter sections of a standard governmental quarter section. They further provide that well locations may be any place within 150 feet of the center of either of the quarter quarter sections in the proration unit. It is further provided that allowables will be assigned on the basis of Statewide Rule 505.

Q Mr. Eaton, in Chacha initially temporary rules were adopted and then made permanent by a later order, so Exhibit 1 has words in there like "temporary", are you recommending temporary rules for this new pool, or are you recommending so-called permanent rules?

A I'm recommending the adoption of permanent rules for the Simpson-Gallup Pool, for the reason that should later data suggest to Pan American that proration units should be something other, either smaller or greater, than 80-acres, another hearing would be called and those proper sized proration units recommended. Furthermore, the Commission normally retains continuing jurisdiction of this type order, and the Commission might then on its own



motion call a hearing to consider the adoption of the different size proration unit.

Q Mr. Eaton, would you look now at what has been marked Pan American's Exhibit Number 2, and briefly state for the record what that exhibit reflects?

A Exhibit Number 2 is a map of a portion of the San Juan Basin in San Juan County, New Mexico. It shows the location of a portion of three Gallup oil pools in the area of Township 28 North, Range 12 West. A portion of the Chacha-Gallup Pool, and a portion of the Totah-Gallup Pool, and a portion of the Simpson-Gallup Pool are shown on Exhibit Number 2; the contour lines which are shown on Exhibit Number 2 are lines drawn on the gross sand thickness of the Gallup sand which is productive in each of the three pools. Gross sand was selected as a contour medium for it better depicts the configuration of the sandbars that produce and the strand lines that exist during the retreating of the Gallup Sea which formed these sand pays better than a net pay map would.

Q Mr. Eaton, with respect to what we're asking to be designated as the Simpson-Gallup Oil Pool, what is the significance of the red lines in that area?

A In the eastern part of the map shown in Exhibit 2, the red line denotes the recommended initial horizontal limits of the Simpson-Gallup Oil Pool.

Q Mr. Eaton, at this point it might be well to briefly discuss the geology of these three Gallup pools that we see on

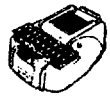


Exhibit Number 2.

A All right, sir. The geology of this general region is in that area of the San Juan Basin where the center of the Basin is in a generally Northeast direction. In other words, these sands lie on a monocline which dip upward to the generally Southwesterly direction. During the transgression and regression of the Gallup Seas, the shoreline continually moved up and down this monocline, so that we find a series of parallel sandbars formed during that time, which now have become in this particular area the Chacha-Gallup Pool, the Totah-Gallup Pool, and now the Simpson-Gallup Pool. As you can see from this map, it appears that the Simpson-Gallup Pool, and the Totah-Gallup Pool are on essentially the same ascent strand line, and the Chacha-Gallup Pool appears to be on a different one.

Q At this time, how many wells are in the Simpson-Gallup Oil Pool?

A There are presently five wells in the Simpson-Gallup Oil Pool.

Q What is the significance of the orange line that connects all these wells, as shown on your Exhibit Number 2?

A The orange line on Exhibit Number 2, which has been labeled A-A, prime, is the trace of a correlative cross-section which has been drawn through the area, utilizing each of the five wells that have now been completed.

Q Mr. Eaton, that cross-section has been marked as Pan

American's Exhibit Number 3; would you briefly, for the record, discuss what that exhibit reflects?

A Yes, sir. Exhibit Number 3 is the cross-section, the trace of which is shown on Exhibit Number 2. The purpose of this cross-section is to show the continuity and the correlative nature of the productive Gallup sand throughout the Simpson-Gallup area. Although it is shown on Exhibit Number 3 that the center well, which is Gallegos Canyon Unit Number 125, is apparently low to the other wells, that's only because the general regional dip in this area is to the Northeast.

You will notice from Exhibit Number 2, that in order to put Well Number 125 in this cross-section, it had to be moved perpendicularly to the trace A-A prime in a Southwesterly direction. So it is apparently low, but only apparently low.

Q Mr. Eaton, from a geologic standpoint, is there any geologic impediment to the free flow of communication in this reservoir?

A No, sir; that's the purpose, really, of presenting Exhibit Number 3. The Gallup sand in this are is a continuous and correlative member that can be correlated through all five of the existing wells, so there's no stratographic impediment to drainage throughout the pool; there's, furthermore, no obvious structural impediment to drainage throughout the pool.

Q Mr. Eaton, since the Totah, Chacha, and Simpson-Gallup are all about the same geologic age, would you expect that they

would have similar reservoir characteristics?

A Yes, sir, I would.

Q Have you made a comparison of the reservoir characteristics of all three of these pools?

A Yes, I have.

Q I believe that comparison, Mr. Eaton, has been identified as your Exhibit Number 4. Would you briefly comment on this comparison, pertinent reservoir data, of these three pools?

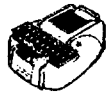
A Yes, sir.

Q Although a number of different properties for the three pools are shown on the Exhibit Number 4, possibly the most important from the standpoint of this case, is the comparison between the average porosity and the average permeability of the Gallup sand in the three areas.

A You will notice that all the Simpson-Gallup Pool has a lower average porosity than either the Totah-Gallup or the Chacha-Gallup Pool. The average permeability in the Simpson-Gallup Pool is slightly greater than the average permeability in the Chacha-Gallup Pool, but somewhat less than the average permeability in the Totah-Gallup Pool.

Q Mr. Eaton, with respect to the crude characteristics, would you expect them to be extremely similar?

A It would be my expectation that the crude oil that has accumulated in the three pools would be quite similar in nature since it very likely has a common origin.



Q Does Exhibit Number 4 show them to be extremely similar?

A Yes, sir, it does.

Q It might be well at this point, Mr. Eaton, to briefly discuss the development history in the Simpson-Gallup Oil Pool.

A The initial well in the Simpson-Gallup Pool was Gallegos-Canyon Unit Number 83. That's the well that's in the NE/¼ of Section 26, 28, 12. That well was completed in February 1959, and although it had an initial potential of more than the current top allowable rate, the well had only 3.7 feet of net pay, using the same criteria for selecting net pay as was previously used by the Totah-Gallup Engineering Committee and the Chacha-Gallup Engineering Committee. That is, net pay was selected as that sand which contained a permeability greater than one millidarcy. Well Number 83 had only two samples that showed permeability greater than one millidarcy. The total for the age shown by those two samples was 3.7 feet.

Likewise, the average porosity of the core on Well Number 83 was only a little over 7 percent, so although the average porosity as shown by Exhibit 4 for the Simpson-Gallup Pool is a little over 12 percent, the average porosity in Well Number 83 was just less than that. Accordingly, it was found that the oil in place under Well Number 83 was of an extremely low order of magnitude, consequently there was no encouragement to continue development in the area based on what we had found out from our core data and what we also see on the electric log.

You'll notice the log on Well Number 83, which is the second well on Exhibit Number 3, the log shows very poor development in this Simpson-Gallup sand. As a matter of fact, the S.P. curve shows absolutely no development whatsoever. So there was nothing encouraging at all about continuing an aggressive development program in the vicinity of Well Number 83.

Now, then, early in the year 1962, the well had continued over the years and by that time it had accumulated a three-year production history, at which time it was still substantially capable of producing at top allowable rate, and had accumulated a production of in excess of 75,000 barrels. This suggested to us that although the sand characteristics in Well Number 83, as well as the interpretation of the electric log, showed that the reservoirs in that immediate vicinity were very poor, the well evidently was dedicated in a reservoir of a substantial area possibly containing much better quality sand. Accordingly, we embarked upon a study to try to determine if additional development was feasible in the immediate area, and if so, in what direction should we move to make that additional development.

Correlating the logs between the Totah-Gallup Pool and the Well Number 83, suggested that the stratographic correlation showed that the same sandbar stratographically was productive in 83, and was productive in the Totah-Gallup Pool. Projection of the strand line from the Totah-Gallup Pool in a Southeasterly direction further suggested to us that if a reservoir existed in

the area of Number 83, it must lie to the North and East of 83, rather than to the South and West of 83. Accordingly, as can be seen by the additional wells that have been drilled subsequently, that projection and the correlation has proved accurate and the development has occurred in the generally North and East direction from the original discovery well.

Q Mr. Eaton, since from the data available from Well Number 83 was discovered in the pool, it was observed that the oil in place under that well was of an extremely low nature, what did the continuous production from that well indicate to you, as an engineer?

A The continuous production from the well, together with the rather large accumulated production, suggested that the well was draining a larger area.

Q Have you made a study, Mr. Eaton, to ascertain the area that Well Number 83 was draining?

A Yes, sir, I have.

Q Have you reduced that to exhibit form?

A Yes, sir. That is Exhibit Number 5.

Q What, briefly, is the basis of Exhibit Number 5?

A Exhibit Number 5 is a Material Balance Projection of the theoretical performance of Well Number 83 if it were draining 80-acres, or 160-acres, or 320-acres, or 480-acres. The projection that is made on Exhibit 5 is a graph of bottom-hole pressure performance as a function of the cumulative production from

the well. Having made these theoretical projections from material balance considerations, taking into account the volume of oil in place as shown by the average net pay in the Simpson-Gallup area, together with the other average reservoir properties, these projections were then mapped with a data point obtained on July 1st, 1962. That data point is a bottom-hole pressure measurement taken on that day, plotted as a function of the cumulative production as of the same time. These data show that on July 1st, 1962, the bottom-hole pressure measured in Gallegos Canyon Unit Number 83 was 1225 PSIG. At that time, the well had produced a cumulative oil of 86,698 barrels. That point is shown in red on Exhibit Number 5, having an actual data point that could be plotted on the material balance projections; and trying to find the best match between actual data and the theoretical calculations shows that the Well Number 83 more nearly closely matches a drainage area of 480-acres than it does either of the remaining curves.

Accordingly, it might be said that these data show that Gallegos Canyon Unit Number 83 was draining slightly less than 480 acres, as measured by the bottom-hole pressure point taken on July 1st, 1962.

Q Mr. Eaton, according to the data shown on Exhibit 5, if Well Number 83 had been draining only 80 acres, it would already have been abandoned, would it not?

A Yes, sir, it would have.

Q So that although the oil in place under this well was

extremely low, the fact that good drainage did exist and it could drain a larger area is the reason that it is still producing today?

A That is true.

Q Do you feel that these data reflected on Exhibit 5 conclusively prove that a well in the Simpson-Gallup Oil Pool will effectively and efficiently drain in excess of 80 acres?

A I believe the data are conclusive in showing that a well can be expected to so drain an area in excess of 80 acres.

Q Mr. Eaton, since it's obvious that the oil in place in this pool is of a rather low magnitude, can 80 acres economically support a well?

A Actually, complete development of the pool down to an 80-acre density, based on the existing average net feet of pay as shown by the first five wells, would be a marginal operation. There is some evidence that the average net pay in the pool will increase with additional development. Although the correlation between the gross sand, as shown by the Isopac lines on Exhibit 2, and the net sand Isopac, are not constant percentage, it can generally be stated that where the gross sand increases, so does the net sand increase. Now, then, in that regard, you'll notice that the most recent well drilled, which is Gallegos Canyon Unit Number 128, that's the well in the NE/$\frac{1}{4}$ of Section 25, had a gross sand of 15 feet, which was more than the picks that have been made on any of the other wells. Accordingly, it's quite conceivable to me that while the average net pay in the pool now

is only on the order of six feet, that number might be expected to improve somewhat with additional development.

Q Mr. Eaton, would you visualize that if these average properties, average net pay does not increase with subsequent development, do you visualize that Pan American may have to come back to the Commission and ask for 160-acre units in order to economically support a well in this pool?

A Yes, sir, that is quite possible; if our expectation for the improvement in this net pay factor are not realized, then we may be back to ask for 160-acre spacing unit order.

Q Going back again to our Exhibit Number 2, it was your testimony that the Simpson-Gallup Oil Pool was on the same strand line as the Totah-Gallup Oil Pool. Approximately what is the distance that separates these pools at this time?

A They are separated by an area of approximately four to four and a half miles.

Q In your opinion, do you think that these two pools will ever connect, or are actually in communication?

A No, sir, I don't believe they ever will. Although they evidently are on the same strand line, and possibly there is gross pay in this area between the two pools, it is evidently separate from either the Totah-Gallup and the Simpson-Gallup, because the most southeasterly well in the Totah-Gallup Pool -- that's the one in the NW/NW of Section 18, 28, 12 -- is a marginal well. Likewise, the most northwesterly well in the Simpson-Gallup Pool,

which is Gallegos Canyon Unit Number 126 -- that's the well in the NW/¼ of Section --

MR. NUTTER: Southwest quarter.

A --excuse me, SW/¼ of Section 23 -- that well is also a marginal well. So evidently even though there might be another sand buildup in between these two pools, I believe it would still be a third Gallup Pool on the same Totah-Simpson strand line.

Q (By Mr. Buell) Mr. Eaton, although you feel that based on the data available to you today that these two pools will not be connected and will not join, assuming for the purpose of this question that they should join and be one accumulation of oil, since you are recommending essentially the same rule for the Simpson-Gallup Oil Pool that exists in Totah, under your recommendation will conservation be served and correlative rights be protected should the two pools join?

A Yes, sir, there would be no conflict between the two rules, since the rules that I am recommending for the Simpson-Gallup Pool are substantially identical to the ones that now exist in the Totah-Gallup Pool.

Q Do you have anything else that you would care to add at this time, Mr. Eaton?

A Only this: I believe, in the event that it does become necessary or desirable or both for Pan American to call a hearing to consider the adoption of the 160-acre proration units in the Simpson-Gallup Pool, the present development in the Simpson-Gallup

Pool has been such that 160-acre units could be adopted with no conflict with existing development. To date the Pool has been developed on a pattern where only one well has been drilled per quarter section, so in the event that conditions dictate the necessity for a quarter spacing rule, then the current development picture in the pool would fit that pattern as well as the recommended 80-acre pattern.

MR. BUELL: Mr. Examiner, that's all we have at this time on direct, and I would like to formally offer Pan American's Exhibits 1 through 5, inclusive.

MR. NUTTER: Pan American's Exhibits 1 through 5 will be entered in evidence. Does anyone have any questions of Mr. Eaton?

(No response.)

CROSS-EXAMINATION

BY MR. NUTTER:

Q The Number 83 was the discovery well?

A Yes, sir.

Q What was its completion date again?

A It was completed in February, 1959.

Q What was the date?

A February 6th, I believe. I'm sorry, Mr. Nutter, the map shows February 29th.

Q What is the top of the perforation in that well, Mr. Eaton?

A The top of the perforations in Well Number 83 is 5548.

Q Approximately when were the other wells completed in the pool, Mr. Eaton?

A The Gallegos Canyon Number 123 was the second well completed, it was completed in June, 1962, June 7th, 1962.

Q The third well?

A The third well was -- I beg your pardon. The Gallegos Canyon 125 is the second well completed; it was completed May 7th, 1962. The third well is Gallegos Canyon Unit Number 123, completed June 7th. The fourth well, Gallegos Canyon Unit Number 126 was completed September 9th, 1962; and the fifth well, Gallegos Canyon Unit Number 128 was completed October 3rd, 1962.

Q Was the bottom-hole pressure measured on the Number 83 at the time of its completion?

A No, sir, it wasn't.

Q Where does this 1640 pound initial pressure come from then?

A That 1640 pounds original pressure is an estimate. I will tell you how it was estimated. The original bottom-hole pressure in the Totah-Gallup Pool had a datum of Plus-200 feet; it is pretty well documented at 1623 PSIG. The bottom-hole pressure in the Chacha-Gallup Pool had a datum of Plus-400 feet; is pretty well documented as a 1560 PSIG. I went back through a number of the bottom-hole pressure measurements that had been made by Pan American and others in the Totah-Gallup Pool, and found that the

gradient measure on the, by far the greatest number of those was .2 PSI per foot. If you take a gradient of .32 PSI per foot, and correct the bottom-hole pressure in the Totah-Gallup Pool to the same datum as the pressure in the Chacha-Gallup Pool had been taken, the calculation matches the observed pressure in the Chacha-Gallup Pool. That led me to believe that the normal pressure gradient existed in the Gallup formation in this particular area. So, now, taking the bottom-hole pressure measurement again in the Totah-Gallup Pool, and using this same .32 gradient and correcting it to the average depth of the perforated interval in the Simpson-Gallup Pool, number 1640 PSIG is computed. That fell in line with the normal pressure gradient in the Gallup, so I used it as an estimate of the original pressure in the Simpson-Gallup Pool. It is an estimate.

Q Have any pressures been taken on the four wells that have been subsequently completed?

A Yes, sir. Also on July 1st, 1962, a bottom oil pressure measurement was taken on both Gallegos Canyon Unit Number 125 and Number 123. The measured pressure on Gallegos Canyon Unit Number 125, after a shut-in period of 73 hours, was 1346 PSIG. These pressures I'm going to give you here, are all corrected to a datum of Plus-150 feet. That appears to be at that time, and still does, to be the approximate average datum of the Gallup sand in the Simpson area. The bottom-hole pressure on Gallegos Canyon Unit Number 123 on July 1st, 1962, was 1518 PSIG; that is

also a 73-hour shut-in. At the same time, you recall the bottom-hole pressure on Gallegos Canyon 83 was 1225 PSIG, which means that it is more depleted in the vicinity of that well than the average of the reservoir.

Q What was the shut-in time of that 1225?

A 71.5 hours. More recently a bottom-hole pressure was taken on Gallegos Canyon Unit Number 128, after that well had produced only 514 barrels of oil; that pressure was taken twice, as a matter of fact, once after 26-hour shut-in, and once after 74-hour shut-in. The same pressure was taken on both measurements, which was 1538 PSIG; the date was October 8th, 1962.

Q That was after only 500 barrels?

A Yes.

Q You didn't take another pressure on the Number 83 that day?

A No, sir, we didn't. I will tell you why, that well is a dual completion and normally you don't have trouble with losing a bomb in the hole, but if you do have trouble in losing a bomb in a hole on the dual completion, it could be an expensive operation. That is one consideration that determined our not taking any more pressure measurements in Gallegos Canyon Number 83.

Q Pressure then on July 1st, on the Number 125, 1346 pounds, and the pressure taken on the Number 123 is 1518, and yet the Number 123 is closer to the 83 than the 125 is?

A Yes.

Q How would you explain the pressure in Number 125 is considerably lower?

A The only way I can explain -- Well, really probably the best explanation is that the drainage in the vicinity of Number 83 has not been completely radial. In other words, there our radial drainage has to be assumed in a case like this, but this is probably evidence that in this particular case the drainage has not been radial. The other explanation which might partly account for it, is that Gallegos Canyon Unit Number 125 had on September 1st, I mean, July 1st, 1962, produced a total of 4625 barrels of oil, whereas, Number 123 had only produced 1190 barrels of oil.

Q So the possibility is that they were not fully stabilized pressures then?

A Based on the experience that we got in Number 128 when the pressure was shown to be built up in 26 hours, I believe that pressure in the vicinity of the -- Well, after 73-hour shut-in time, is probably representative of the true pressure in the vicinity of that well.

Q 128 exhibits the best quality of sand of all the wells?

A Yes, sir, it sure does. Not only is there more of it, but the porosity and permeability development in that well is far better than any of the others. The log shows it too.

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

(No response.)

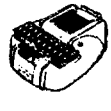
MR. NUTTER: He may be excused. Do you have anything further, Mr. Buell?

MR. BUELL: That's all we have.

MR. NUTTER: Does anyone have anything they wish to ovver in Case 2682?

(No response.)

MR. NUTTER: We will take the case under advisement.



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STATE OF NEW MEXICO)
) ss.
COUNTY OF BERNALILLO)

I, ADA DEARNLEY, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission at Santa Fe, New Mexico, is a true and correct record to the best of my knowledge, skill and ability.

IN WITNESS WHEREOF I have affixed my hand and notarial seal this 4th day of December, 1962.

Ada Dearnley
NOTARY PUBLIC-COURT REPORTER.

My Commission Expires:

June 19, 1963.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2282, heard by me on 11-8, 1962.

....., Examiner
New Mexico Oil Conservation Commission

I N D E X

E X H I B I T S

NUMBER	EXHIBIT	MARKED	OFFERED	ADMITTED
Pan Am.#1	Photostat	4	16	16
Pan Am.#2	Map	5	16	16
Pan Am.#3	Cross-Section	7	16	16
Pan Am.#4	Reservoir Comparison	8	16	16
Pan Am.#5	Material Balance Projection	11	16	16

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
January 8, 1964

EXAMINER HEARING

IN THE MATTER OF:

In the matter of Case 2682 being reopened pursuant to the provisions of Order R-2375,

Case No. 2682

BEFORE: DANIEL S. NUTTER, EXAMINER

TRANSCRIPT OF HEARING

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
January 8, 1964

EXAMINER HEARING

IN THE MATTER OF:

Case 2682 being reopened pursuant to the provisions of Order No. R-2375. CASE NO. 2682

BEFORE: DANIEL S. NUTTER, EXAMINER

TRANSCRIPT OF HEARING

MR. NUTTER: We will call next, Case Number 2682.

MR. DURRETT: In the matter of Case Number 2682 being reopened pursuant to Order Number R-2375.

If the Examiner please, we have had a telephone call from George Eaton with Pan American in Farmington. They were originally the applicant in this case. They have requested that this case be continued to the examiner hearing on the 22nd, as they have one or two other cases coming on at that time. They would desire to present them all at the same time.

MR. NUTTER: Case Number 2682 will be continued to the Examiner hearing at nine o'clock A. M., January 22, 1964, in the same place.

* * * *

DEARNLEY, MEIER, WILKINS and CROWNOVER
General Court Reporting Service
Suite 1120 Simms Building Albuquerque, New Mexico Phone 243-6691

STATE OF NEW MEXICO)

COUNTY OF BERNALILLO)

I, ROY D. WILKINS, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me, and that the same is a true and correct transcript of the said proceedings, to the best of my knowledge, skill, and ability.

WITNESS My Hand and Seal of Office, this 8th day of January, 1964.

NOTARY PUBLIC

My Commission Expires:

September 6, 1967.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2682, heard by me on 1-8, 1964.

, Examiner
New Mexico Oil Conservation Commission

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
January 22, 1964

EXAMINER HEARING

IN THE MATTER OF:

Case 2682 being reopened pursuant to the provisions of Order No. R-2375, which order established temporary 80-acre oil proration units for the Simpson-Gallup Oil Pool, San Juan County, New Mexico, for a period of one year. All interested parties may appear and show cause why said pool should not be developed on 40-acre proration units.

Case No. 2682

BEFORE: ELVIS A. UTZ, EXAMINER.

TRANSCRIPT OF HEARING

NEW MEXICO OIL CONSERVATION COMMISSION

EXAMINER HEARING

SANTA FE, NEW MEXICO

REGISTER

HEARING DATE JANUARY 22, 1964 TIME: 9 A.M.

NAME:	REPRESENTING:	LOCATION:
Hal Porter	Cerro Capitan, Inc.	Artesia
Fred A. Watson	" " "	"
Ekirk Newman	Standard Oil Co of Texas	Houston
Alvin E. West	Standard Oil Co. of Texas	Roswell
John Weaver	Texaco Inc	Hobbs
George S. Camden	Shell Oil Co.	Roswell
Richard S. Morris	Seth, Montgomery, Federici & Andrews	Santa Fe
R F Montgomery	Me-Tex Supply Co	Hobbs
[illegible]	Me Tex Supply Co	Hobbs
G. W. EATON	PAN AMERICAN	FARMINGTON
Guy Buell	✓ ✓	FORT WORTH
John Burnside	✓ ✓	Lubbock
A V. Lewis Jr	Union Oil	Roswell
H. H. Sweeney	self	Roswell
John P Carnes	Sun Oil Co	"
Jake Cummins	Continental	Hobbs
Michael L. Klein	Continental	Roswell

NEW MEXICO OIL CONSERVATION COMMISSION

EXAMINER HEARING

SANTA FE, NEW MEXICO

REGISTER

HEARING DATE JANUARY 22, 1964 TIME: 9 A.M.

NAME:	REPRESENTING:	LOCATION:
M. T. Barber	Continental Oil	Ft Worth
A. L. Porter	OCC	Santa Fe
V. T. Lyon	Continental Oil Co	Hobbs
J. W. Wolfe Jr.	"	"
Thomas W. Lynch	Amerada Petroleum Corp	Tulsa
R L Hocker	Amerada	Tulsa
W. W. STEWART	Amerada	Hobbs
Frank S. Irby	State Engr. Office	Santa Fe
Jason Kellahin	Kellahin & Fox	Santa Fe

MR. UTZ: The hearing will come to order, please. The first case on the docket will be 2682, a continued case.

MR. DURRETT: In the matter of Case 2682 being reopened pursuant to the provisions of Order No. R-2375, which order established temporary 80-acre oil proration units for the Simpson-Gallup Oil Pool, San Juan County, New Mexico, for a period of one year.

MR. BUELL: For Pan American Petroleum Corporation, Guy Buell. We have one witness, Mr. Eaton.

MR. UTZ: Any other appearances in this case?

(Witness sworn.)

GEORGE W. EATON

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

DIRECT EXAMINATION

BY MR. BUELL:

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

A George W. Eaton, ~~Junior~~, Senior Engineer for Pan American Petroleum Corporation in Farmington, New Mexico.

Q You have testified at many previous Commission hearings and your qualifications as a petroleum engineer are a matter of public record, are they not?

A Yes, they are.

Q In order that the Examiner can evaluate your testimony, I would like you at the outset to state what your recommendation in this case will be.

A It is my recommendation that the rules in the Simpson-Gallup Oil Pool, which now provide for temporary 80-acre proration units, be made permanent.

(Whereupon, Applicant's Exhibit No. 1 was marked for identification.)

Q In that connection, let me direct your attention to what has been marked as Pan American Exhibit No. 1. What does that exhibit reflect?

A Exhibit No. 1 is a map of a portion of San Juan County, New Mexico showing the area in the vicinity of Township 28 North, Ranges 11 and 12 West, which is the area in which the Simpson-Gallup Oil Pool is located. Exhibit No. 1 shows the Simpson-Gallup Oil Pool as defined by New Mexico Oil Conservation Commission nomenclature orders. The horizontal limits of the pool are shown outlined by a green line. There are presently six wells completed in the Simpson-Gallup Pool. These six wells are colored in green on Exhibit No. 1.

Q Since this is a reopened hearing, it might be well to point out whether or not any of these six wells were drilled

subsequent to the original hearing in this matter.

A There has been one additional well completed since the original hearing.

Q Which well is that and where is it located?

A This is the Pan American T. L. Rhodes No. 1 which is located in the Southeast Quarter, Northwest Quarter, Section 30, Township 28 North, Range 11 West.

Q Mr. Eaton, what is the significance of the contour lines on this exhibit?

A The contour lines on this exhibit represent isopach lines of the net sand pay in the Simpson-Gallup Pool.

Q Normally when we map the Gallup in the past haven't we mapped it on gross pay rather than net pay?

A Yes, we have. It is my feeling that extrapolation of these Gallup sands along the trend lines can best be accomplished by a gross sand map. But, of course, a gross sand isopach map is not suitable for determination of the volumes of oil and gas in place in the reservoir. I have used here a net pay isopach map because I have used this same map to determine the volume of oil and gas in place in the Simpson-Gallup Pool.

Q Were you fortunate in this pool, Mr. Eaton, in that more than ordinary core data were available to you?

A Yes, sir, I was. It was Pan American's intention to

obtain full core coverage on each of its wells, and such an effort was made. We did obtain some core on each one of the wells and would have gotten full coverage except for unavoidable losses and jamming of the core barrel, which in some cases did not result in full recovery of the core, but there was some core data available on each of the six wells in the pool. With this type of core coverage I feel that a better than average net sand isopach map can be constructed.

Q Mr. Eaton, based on your net pay isopach, what is the areal extent of this Gallup reservoir?

A The area within the zero isopach line on the Exhibit No. 1 is approximately 1300 acres.

Q What is the significance of the red line that traverses this field in a northwest, southeasterly direction?

A The line to which you refer has been marked A-A^1 on Exhibit No. 1 and represents the trace of a cross section which has been constructed through the Simpson-Gallup Pool in a northwest to southeast direction.

(Whereupon, Applicant's Exhibit No. 2 was marked for identification.)

Q Mr. Eaton, that cross section has been marked as Pan American's Exhibit No. 2. Would you briefly now comment on that exhibit?

A Exhibit No. 2, which as you know is the cross section, the trace of which is shown on Exhibit No. 1, is so constructed as to have in it each of the six wells in the Simpson-Gallup Pool. The most significant thing that is displayed by that cross section is that the Simpson-Gallup sand can be correlated from well to well throughout the entire pool. The sand so correlated is shown on Exhibit No. 2 with that yellow line.

Q Certainly, Mr. Eaton, based on your Exhibit 2 as well as Exhibit No. 1 there is no geological impediment to the free flow of communication within the reservoir?

A That is correct.

Q This pool, as I recall, had a very unusual development history. It might be well at this time if you would, as briefly as possible, summarize the development history of this pool.

A The initial well in the Simpson-Gallup Pool was the Pan American operated Gallegos Canyon Unit No. 3. That's the well that is located in the Northeast Quarter of Section 26, Township 28 North, Range 12 West. It is a dually completed well with the Dakota formation. This well was completed in February, 1959. The core analysis through the Gallup sand, as well as the log on the well, did not indicate a very well-developed Gallup reservoir. Nevertheless, an attempt at completion was made successfully.

The well produced at much higher rates for much longer period

of time than would be anticipated. Had the well been completed in only a small reservoir having the characteristics that were encountered in that particular well. This led us engineers to believe that the reservoir was much bigger and had much better average pay characteristics than existed in this particular well, so a study was undertaken to see if we could tell from the performance of that well whether or not a bigger reservoir did in truth exist.

Calculations which were made at that time and presented at the original hearing in this case showed that that well was in contact with and was draining a reservoir approximately 480 acres in size. This conclusion led to the additional development which occurred during the year 1962 in the pool and resulted in the completion of an additional four wells, all four of those wells being within the Gallegos Canyon Unit. One well, as has been pointed out previously, has been completed since that time just outside the Gallegos Canyon Unit area.

I believe that the present wells in the pool adequately define the productive limits of the pool and that the pool is now completely defined as far as areal extent is concerned.

Q Let me ask you this, have data that have been acquired subsequent to the original hearing in this case, have they confirmed the fact that No. 83 established that one well will

effectively and efficiently drain off large areas in this Gallup area?

A Yes, subsequent data have confirmed that these wells are capable of draining rather large areas.

(Whereupon, Applicant's Exhibit No. 3 was marked for identification.)

Q Let me direct your attention to what has been marked as Pan American's No. 3. What is that exhibit?

A Exhibit No. 3 is a computation of the approximate drainage area of the average well in the Simpson-Gallup Pool. As I pointed out previously, the studies conducted in 1962 indicated that Well No. 83 was draining 480 acres, or approximately an area of that size. With a reservoir containing only 1300 productive acres and six wells, it certainly is not possible for each of those wells now to be draining an area 480 acres in size. There's just not that much acreage.

In constructing Exhibit No. 3 I have computed the theoretical performance that would be expected if the wells in the pool were draining a reservoir containing a thousand acres or 1250 acres or 1500 acres. The performance that I have chosen to depict here is the relationship between bottom hole pressure and the cumulative oil production.

Q Mr. Eaton, let me be sure that I understand the basis of

this exhibit and that is in the Gallup reservoir such as this is, if you know your reserves per acre for any given size reservoir such as a thousand, 1250 or 1500 as you have here, and at any given cumulative you can predict what the pressure would be in that size reservoir?

A That is correct.

Q Go ahead.

A This is the procedure that was used in preparing Exhibit No. 3. Actually we obtained three bottom hole pressure surveys on the four flowing oil wells in the Simpson-Gallup Pool. The pressure obtained from these actual measured bottom hole pressure surveys were then superimposed upon the theoretical calculations, and the best match between the theoretical drainage area and the actual measured pressures was then made. This best match appears to be approximately 1250 acres. With six wells in the pool this means that the wells are draining an average of 208 acres per well.

Q Mr. Eaton, the observed pressure performance of our four flowing wells matching the predicted performance of a 1250-acre reservoir, how did that compare with the reservoir size determination that you have made on Exhibit No. 1 with your net pay isopach?

A As I pointed out, I plenimetered this net pay isopach map and obtained approximately 1300 acres. I think this is a reasonably close match. I don't believe I could say that my isopach is

more accurate than my calculations. I don't know whether I can say that I'm within 50 acres on my calculations or my isopach map. I think that the wells in the pool are draining the entire pool.

Q Certainly, Mr. Eaton, do you feel that these data, as well as the data which were available on Well No. 83, the discovery well, do you feel that these data conclusively show that one well will effectively and efficiently in this reservoir drain in excess of 80 acres?

A Yes, sir, I definitely feel that one well will drain far in excess of 80 acres.

Q In your opinion will correlative rights be protected as well as waste prevented by the making of this temporary pool rule order a permanent order?

A Yes, sir.

Q Is that your recommendation?

A That is my recommendation.

Q Do you have anything else that you would care to add at this time, Mr. Eaton?

A I don't believe so.

MR. BUELL: May it please the Examiner, that's all we have at this time. I would like to formally offer our Exhibits No. 1 through 3.

MR. UTZ: Without objection, Exhibits 1 through 3 will be entered into the record of this case.

(Whereupon, Applicant's Exhibits 1 through 3 were offered and admitted in evidence.)

MR. UTZ: Are there questions of Mr. Eaton? Mr. Durrett.

CROSS EXAMINATION

BY MR. DURRETT:

Q Would you please tell us what date you took your bottom hole pressures on your Exhibit No. 3?

A Yes, sir. The first red point on Exhibit No. 3 is an average bottom hole pressure of 1394 psi obtained January 2nd, 1963. The second red point represents a bottom hole pressure of 1255 psi and was obtained April 9th, 1963. The third point represents an average bottom hole pressure of 904 psi and was obtained October 18, 1963.

Q All three of these red dots on your Exhibit No. 3 are average bottom hole pressures, is that correct?

A That is correct. The wells that are flowing and were suitable for bottom hole pressure measurements are Wells No. 83, 123, that's not too plain on this map, it's in the Northwest Quarter of Section 25. Well No. 128, which is in the Northeast Quarter of Section 25, and Well No. 25, which is in the Southwest

Quarter of Section 25. Those are the four flowing wells in the pool.

Q Those are the four wells that you took the pressures on and averaged to arrive at your red dots?

A Yes, sir.

BY MR. PORTER:

Q What's the cumulative production of these six wells?

A As of January 1st, 1964, the cumulative production was 346,934 barrels, nearly 350,000 barrels.

Q What percentage of your total primary recovery do you think you have at this time?

A I believe this is approximately 75% of it.

Q About 75%?

A Yes, sir.

Q Do you anticipate that your company will try to institute some kind of secondary recovery in here?

A We've sure given a lot of thought to that and as a practical matter have prepared an engineering feasibility report on it. I think that our company probably will institute secondary recovery, but we're having a little difficulty with some of the other projects in the Gallup and we hope that we get these problems ironed out on them so that we do this one without those problems. It may be longer than us engineers would like to wait.

I think that definitely it will be subjected to secondary recovery.

MR. PORTER: That's all I have.

MR. DURRETT: One additional question.

BY MR. DURRETT:

Q When you took your bottom hole pressures on the four wells that we have discussed picking a given date here, take October 18, 1963, what was the biggest differential that you found in those pressures? I don't have to have an exact figure, just an estimate will be all right.

A 140 psi, between the highest pressure and the lowest.

Q And the lowest pressure?

A Yes.

MR. DURRETT: Thank you.

MR. UTZ: That was for which day?

A That was October 18.

MR. BUELL: He asked you for April.

A I thought he said October.

MR. DURRETT: No, October, that was the figure I was interested in.

A Actually they are becoming closer and closer together with each successive pressure survey. The others had a higher differential than this.

MR. DURRETT: Each date you have taken the bottom hole

pressures and averaged them they have become closer together?

A Yes, sir.

BY MR. UTZ:

Q Did you say you had some core data in this pool?

A Yes, sir. We have some core data on each of the six wells.

Q What did that core data show in the way of permeability and porosity?

A I'm going to go back to an exhibit that I used at the original hearing on the pool which compared the pertinent reservoir data for the Totah-Gallup and the Cha Cha-Gallup and the Simpson-Gallup, and inasmuch as there was only one additional well drilled in the interim period, I didn't actually go back and reaverage these rock characteristics, but I don't think it would change much. The average porosity was 12.6%, the average permeability was 60.7 millidarcies.

Q Sixty?

A 60.7 millidarcies. The average net pay thickness was six feet. This is also confirmed from the plenimeter of this present isopach map in Exhibit No. 1. So I know that particular factor has not changed.

Q Is the Gallup Pool still in the San Juan Basin still of pretty good permeability?

A Yes, sir. It is not as high a permeability as the Totah-Gallup Pool, but this is higher than the Cha Cha-Gallup Pool.

Q You say you think you have this pool outlined. Have you drilled any dry holes up or down-strike on this structure?

A No, sir, not actually dry holes, although we have drilled two marginal wells, one on the northwest end of the pool and one on the southeast end of the pool.

Q Where are those located?

A The Gallegos Canyon No. 126 is located in the Southwest Quarter of Section 23, 28 North, 12 West.

Q Seventy-six?

A 126.

Q I see, okay.

A That well was completed with a potential pumping of only 33 barrels per day. It last produced on test, 11 barrels per day. On the extreme other end of the pool in the south, to the southeast, the T. L. Rhodes No. 1 in the Northwest Quarter of Section 30, Township 28 North, Range 11 West was completed, I believe it's potential was 30 barrels per day. On last test that well produced 42 barrels per day. As you will note from Exhibit No. 1, both of those two wells that I have mentioned had only one effective foot of net sand.

Q Then I gather Pan American does not intend to drill

another well in the South Half of 25?

A We, in our engineering feasibility report, thought that it would be desirable to drill an injection well in the South Half of Section 25. We do not intend to drill a producing well down there unless something unforeseen might happen in drilling an injection well if we did that and it turned out to be a much different looking Gallup section than we anticipate.

MR. UTZ: Any other questions of the witness? The witness may be excused.

(Witness excused.)

MR. UTZ: Are there any statements in this case? The case will be taken under advisement.

DEARNLEY, MEIER, WILKINS and CROWNOVER
General Court Reporting Service
Suite 1120 Simms Building Albuquerque, New Mexico Phone 243-6691

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, ADA DEARNLEY, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission at Santa Fe, New Mexico, is a true and correct record to the best of my knowledge, skill and ability.

IN WITNESS WHEREOF I have affixed my hand and notarial seal this 23rd day of January, 1964.

Ada Dearnley
Notary Public-Court Reporter

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. 2682, heard by me on Jan 22, 1964.

Elvis A. Utz, Examiner
New Mexico Oil Conservation Commission