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

October 13, 1964

EXAMINER HEARING

IN THE MATTER OF: Application of Continental Oil Company for special pool rules, Lea County, New Mexico.

Case No. 3123

BEFORE: Elvis A. Utz, Examiner

TRANSCRIPT OF HEARING

MR. UTZ: We will now call Case 3123.

Application of Continental Oil Company for special pool rules, Lea County, New Mexico.

MR. KELLAHIN: I am Jason Kellahin of Kellahin & Fox, representing the Applicant. We have one witness.

I would like to have Exhibit's One through Nine marked for identification at this time.

(Whereupon, Applicant's Exhibit's One through Nine marked for identification.)

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

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Would you state your name, please?

A Jack Bob Levine.

Q By whom are you employed, and what position?

A Continental Oil Company, Senior Engineer.

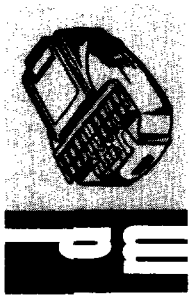
Q Where are you located?

A Hobbs, New Mexico.

Q Have you ever testified before the Commission before?

A Yes, sir.

Q And you have made your qualifications a matter of



record?

A Yes, sir.

MR. KELLAHIN: Are the witness' qualifications acceptable?

MR. UTZ: Yes, sir, they are.

Q Mr. Levine, are you familiar with the application in Case Number 3123?

A Yes, sir.

Q Will you state briefly what is proposed by Continental in this Application?

A Case Number 3123 is the Application of Continental Oil Company for permanent pool rules providing 80-acre drilling and spacing units in the Monument Tubb Oil Pool in Lea County, New Mexico, and to increase the GOR limits of the pool.

Q Now, referring to what has been marked as Exhibit Number One, will you identify that Exhibit and discuss the information shown on it?

A Exhibit Number One is a location and ownership plat showing the boundaries of the Monument Tubb Oil Pool in red, the wells producing from the Monument Tubb Pool only, and the surrounding acreage. The ownership of the properties in the area is shown on each lease in the conventional manner.

Q Now, what was the discovery in this pool?

A The discovery well is Amerada Petroleum Corporation's

State "Q" Number One, shown on Exhibit Number One, located 1980 feet from the south line and 2310 feet from the east line of Section 16, Township 20 South, Range 37 East. This well was drilled to a total depth of 6938 feet and completed in the Monument Tubb on June 20, 1959.

Q How many additional wells have been completed in the Pool?

A Nineteen additional wells have been completed as oil producers in the pool and one gas well, Britt "B" Number 13, which has been shut-in after recompletion and found the lower Tubb to be a marginal completion.

Q What kind of development pattern has been followed by the operator in drilling these wells?

A An irregular pattern has been followed which will readily lend itself to 80-acre spacing.

Q Would you describe, for the benefit of the Examiner, the reservoir rock?

A The Tubb formation has been cored in two wells, Britt "B" Number 22 and SEMU DT 70. The average porosity in the pay sections is 15 percent and the permeability is 10.5 millidarcies which has been further substantiated by pressure build-up analyses. The Tubb formation is primarily a fine to very fine crystalline dolomite with anhydrite inclusions. Vertical fractures were observed in a large portion of the cores.

MR. UTZ: Excuse me. What was the two wells? Number 70 in Section 15: and what --

A Yes, sir.

MR. UTZ: was the other one?

A Britt "B" Number Two in the southeast quarter of Section 10.

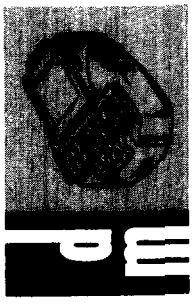
MR. UTZ: Thank you.

Q (By Mr. Kellahin) Now, referring to what has been marked as Exhibit Number Two, will you state what that is?

A Exhibit Number Two is a structure map of the Monument Tubb Pool and the surrounding area. The contours are on the top of a sand stringer in the producing interval which is correlative throughout the pool. The structural control is from those wells having penetrated the Tubb and supplemented by structural control of overlying shallow beds which is widely developed in the area. The Monument Tubb structure is shown to be a northwest southeast trending anticline.

Q In order to refer to what has been marked as Exhibit Number Three, will you identify that Exhibit and discuss it?

A Exhibit Number Three is a north-south cross-section through seven of the producing wells in the field. The cross section covers a distance of approximately 8200 feet extending from Continental's Britt "B" Number 20 through Continental Britt "B" Numbers 18, 19, 10, 9, and 11, and to Pan American



Gillully Number 10. Each well is represented by the Gamma Ray-Sonic or Gamma Ray-Neutron log run in the wells. The cross-section shows the wells related to a common subsea datum so that structural differences between wells are shown. The shaded yellow area depicts one porosity zone which is correlative through each well indicating that the porosity is continuous through the pool.

Q Now, referring to Exhibit Number Four, will you state what that is?

A Exhibit Number Four is a west-east cross-section extending over a distance of 6800 feet starting at Amerada's State Q Number One thorugh Amerada State Q Number Four, Continental Britt "B" Number 14 and Britt "B" Number Nine to Continental SEMU DT Number 70. This cross-section is presented in the same manner as the previous exhibit and once again shows one zone of correlative porosity throughout the pool.

Q Then based on the information as shown on Exhibits Three and Four, would you conclude that there is a continuous zone across the area involved here?

A The continuity of permeable and porous zones is excellent through the pool and is further substantiated by pressure data.

Q What was the original pressure measured in the pool?

A The original reservoir pressure of 2612 psi at a subsea datum of minus 2900 feet was measured in Britt "B" Number Nine on August 14, 1959.

Q Now, has any well completed in the pool, since the completion of Britt "B" Number Nine, encountered this pressure again?

A No, sir.

Q Would you please explain what has been marked as Exhibit Number Five?

A Exhibit Number Five is a tabulation of original pressures in each of the wells in the Monument Tubb Pool, where pressures were taken. Column three is the actual measured pressure at a subsea datum of minus 2900 feet. Column four of the tabulation shows the calculated anticipated original pressure for each of the wells and Column five is the percent deviation of the calculated pressures from the actual measured pressures. It should be noted that the original pressure measured in Britt "B" Number Nine was never again reached in any subsequent completion. This is shown in Column six where the drawdown from the original pressure has been recorded.

Q Now, why is it that the Britt "B" Number 14 completed in October, 1962, had a lower original bottom hole pressure than Britt "B" Number 21, which was completed almost two years later in April, 1964?

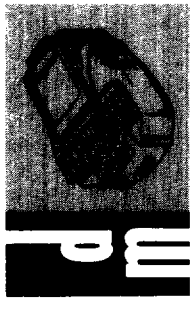
A The reservoir withdrawals in the vicinity of Britt "B" Number 14 were higher as this was the most densely developed portion of the pool. Britt "B" Number 21 was widely separated from the more heavily drained portion of the pool but still suffered some drainage as is indicated by a drawdown of 129 psi from the original reservoir pressure.

Q Now what were the basic parameters in your calculation in the example calculation in Exhibit five based upon?

A The fluid characteristics such as oil viscosity, compressibility, and formation volume factor were taken from the fluid analyses taken in the Britt "B" Number 10 and Britt "B" Number 22. The permeability was determined from core analyses of the Tubb zone in SEMU DT Number 70 and Britt "B" Number 22 along with permeabilities calculated from pressure build-up analysis. The value, H, or net effective pay, is the pay section as determined from logs and cores. The two factors, K and H, are only average figures and are the reason for the inability to more accurately calculate the pressure in each well. The term "T" is the number of days each well produced to the completion of the next well; and, Q, is the average barrels of oil per day production time, "T".

Q Then it is your opinion, there is lateral communication throughout the pool?

A Yes, sir, it is. The ability to correlate zones of



porosity and permeability throughout the pool, plus the postive proof of pressure drawdown from the original in new completions, are postive indications that communication exists from one producer to the next.

Q What is your recommendation to the Commission in regard to well density in this pool?

A I recommend that the pool be further developed on 80-acre spacing and the existing wells and future completions be granted 80-acre allowables.

Q Is it your opinion that it will effectively drain, and economically drain 80 acres in this pool?

A Yes, sir.

Q Referring to what has been marked Exhibit Number Six, is this a map showing the method by which you would divide the presently producing wells into 80-acre proration units?

A Yes, sir. Exhibit Six shows the acreage which we would dedicate to each well. The only 80-acre unit that has two wells on it is the northwest half of the northwest quarter of Section 15; however, one well, Britt "B" Number 13 was recently recompleted in the lower Tubb as marginal producer and is presently shut-in.

Q You said the, "Northwest half", you mean the west half of the northwest quarter?

A Yes, sir.

Q Do you recommend this spacing on a permanent or temporary basis?

A I recommend that 80-acre spacing be placed in effect on a permanent basis. It has been proved that one well will drain 80-acres, and no additional information can be gained that is not now available.

Q What type of drive is present in the reservoir?

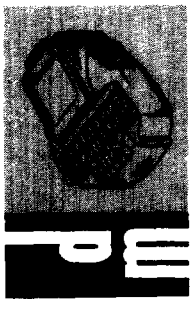
A Presently available data indicate that the primary producting mechanism is solution gas drive. Two fluid samples were analyzed and both indicated the reservoir to be under-saturated.

Q What was the solution gas-oil ratio determined to be from these fluid analyses?

A The fluid analyses from Britt "B" Number 10 run on March 17th, 1961, showed the solution GOR to be 768 cubic feet per barrel and the recent sample taken from Britt "B" Number 22 on July 9, 1964, indicated the solution GOR to be 659 cubic feet per barrel.

Q Have the producing GOR's verified these laboratory analyses?

A Yes. The wells are normally completed with gas-oil ratios in this general range; however, due to the fact that the bottom hole pressure is only slightly higher than the saturation pressure, the GOR's increase rapidly after only limited production.



Q Are the laboratory analyses of such accuracy that a gas cap can be overruled?

A The fact that two fluid samples obtained three years apart have both indicated the reservoir to be undersaturated is considered significant. However, the Britt "B" Number Nine was initially completed as a gas well. Recently we attempted to recomplete this well lower in the Tubb in an effort to reduce the GOR. This work was not successful so we feel that either Number Nine was completed in a small local gas cap or had an isolated gas stringer open in the completion interval. This well currently has a GOR of about 12,000 which is not considered excessive and indicates that if this well was initially completed in a gas cap it would have had to be of very limited size and would not have been important as a reservoir drive mechanism.

Q Is it anticipated that other wells in the pool will have this increased gas-oil ratio in the future?

A As the bottom hole pressures fall below the saturation pressures, gas will break out of solution and it can be expected that the gas-oil ratios will increase. This is an inherent characteristic of a solution gas drive reservoir.

Q Is this shown in what has been marked as Exhibit Number Seven?

A Exhibit Number Seven is a graph showing cumulative production versus bottom hole pressure, and GOR shows this very

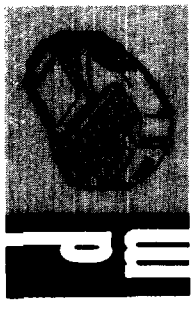
clearly. After a cumulative production from the pool, excluding Britt "B" Number Nine, in the amount of 115,000 barrels of oil, the saturation pressure of 2265 psi was reached, and shortly thereafter the GOR increased rapidly and has stayed high. As previously mentioned cores have shown evidence of fracturing and high GOR's are typical of fractured carbonate reservoirs producing by solution gas drive.

Q Now, will you explain what is marked Exhibit Number Eight?

A Exhibit Number Eight is the production history of one well in the Monument Tubb Pool, Britt "B" Number 10; that clearly depicts the GOR before and after reaching the saturation pressure. An attempt was made to isolate and shut off the gas production with no success. This well has the potential of producing at a rate of 900 barrels of oil per day but is penalized to 29 barrels or oil per day. Now, it is believed that a gas zone above the oil productive interval is contributing to the gas production and furthur remedial work is required to lower the GOR that is presently developed in Britt "B" Number 15.

Q Now, would the fact that no water drive is present tend to dispute the need for an increase in the GOR limit?

A No, sir, just the contrary is true. Should a water drive be present, it is generally advantageous to minimize the gas withdrawal rates so that water enroachment could keep pace



with total reservoir withdrawals. In a infinite water drive reservoir, the pressure can only decline when the reservoir voidage is greater than the water intrusion and this becomes obvious when the producing gas-oil ratio exceeds the solution GOR.

Q Would correlative rights be impaired by raising the gas-oil ratio limit?

A No, sir. As a matter of fact, the raise in the GOR limit would protect the correlative rights. As has been proven, one well will drain in excess of 80 acres, the operators who did not enjoy the benefits of early development have suffered a pressure decline under their acreage. This has in turn increased the producing gas-oil ratio, thereby forcing these operators to accept a penalized oil allowable after only limited production.

Q Will waste be created by increasing the gas-oil ratio limit?

A No. Waste will be created as a market is readily available for the increased gas production. Warren Petroleum has stated that they can accept the anticipated increase in gas volume with existing facilities.

Q What is the GOR limit for the Monument Tubb Pool?

A It is requested that the gas-oil ratio limit be raised from 2000 to 6000 per barrel in order to protect correlative rights without creating waste.

Q What is your recommendation to the Commission with regard to well locations?

A Each well completed or recompleted in the Monument Tubb Oil Pool shall be located on a standard unit containing 80 acres, more or less, consisting of the north half, south half, east half, or west half of a single governmental quarter section; and that no well be located closer than 330 feet from the boundaries of a single governmental quarter-quarter section.

Q Have you prepared a proposed set of field rules for the Commission for their consideration?

A Yes, I have a set of proposed rules embodying the recommendations which I have made during this hearing.

Q Has that been marked as Exhibit Number Nine?

A Yes, sir.

Q Do you recommend the adoption of these rules?

A Yes, sir.

Q Will the Unit as proposed by you call for any exceptions to be made on account of present drilling?

A No, sir.

Q Were Exhibit's One through Nine prepared by you or under your supervision?

A Yes, sir.

MR. KELLAHIN: At this time I would like to offer into evidence Exhibit's One through Nine inclusive.

MR. UTZ: Without objection Exhibit's One through Nine will be entered into the record of this Case.

MR. KELLAHIN: That's all I have.

CROSS EXAMINATION

BY MR. UTZ:

Q Number Nine specifies original pattern or flexible pattern? Do you understand what I mean by those two terms?

A If I understand your question correctly; the well can be drilled in either of the --

Q Yes, sir.

A -- Yes, sir. It can be drilled in either of the quarter quarter sections.

Q This pool is pretty well developed?

A Yes, sir, it is.

Q And it is drilled down flexible, right?

A Yes, sir.

Q Now, why do you feel that a 6000 to One GOR will reserve more reservoir energy than a 2000 to One?

A Under this type of drive mechanism with each barrel of oil it depends on the rock characteristic, how much gas is going to be produced. And we have no control over the amount of gas to be controlled with each barrel of oil.

Q Can't that be controlled by completion methods?

A No, sir;not if it is marking solution gas. There is no

way to eliminate the excessive gas.

Q What is the solution gas -- You don't feel you have any gas zones?

A We know that we have gas zones above the oil zone, and we have shut this zone off in Britt "B" Number Nine, and unsuccessfully attempted to do it in Britt "B" Number Ten. The solution gas in Britt "B" Number Nine, which has been measured on four recent tests between six-one hundred and sixty-four hundred GOR is considered to be solution gas because the well, prior to workover was making 12,000 GOR, and we successfully excluded six thousand ratio in excess of solution gas.

Q Are all of these wells producing through tubing?

A Yes, sir.

Q There are no dual completions in the area?

A No, sir. Monument -- Yes, sir, there are. There are some Blinebry completions.

Q But all of the Tubb zones are producing through tubing?

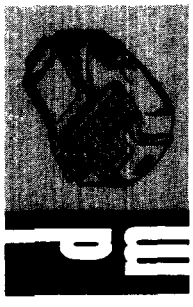
A Yes, sir.

Q All the wells?

A Yes, sir.

Q And which was the discovery well again?

A Amerada State "Q" One. The westerly location on Exhibit Number Six.



Q What is the location of the well. I don't seem to be able to locate it.

A 1980 feet from the south line and 2310 feet from the east line, Section 16, Township 20 South, Range 37 East.

Q These wells are already receiving a depth factor· are they not?

A Yes, sir.

Q And what allowable are you asking for, an 80-acre allowable?

A Yes, sir.

Q Are these wells capable -- I will rephrase the question. Are all the wells capable in this pool of making a 2.77 allowable?

A No, sir; not all wells are capable.

Q How many of them do you think make that much here?

A I would say that approximately four wells would not be able to make the top allowable.

Q But the six thousand to one, they would be able to produce that volume of gas, you anticipate they will produce the volume of gas to 2.77 times six?

A Yes, sir.

Q And still not make an oil allowable?

A No, sir. In two instances Britt "B" Number Eleven will not benefit by any increase in GOR limits because it is a pumping

well and Amerada State "Q" One is also a pumping well, and they will not benefit from any increase in any GOR; however, eleven will benefit because it can pump at a higher capacity than at the present rate.

Q So actually, the producing GOR, the Number Eleven will be higher than six thousand?

A No, not Number Eleven producing GOR: no, sir. It is a pumping well and it will -- the producing GOR is around twelve thousand.

Q And then, it is your opinion that it won't make the gas allowable --

A No, sir.

Q -- of six thousand.

Are there any other questions of this witness?

(No response.)

MR. UTZ: The witness may be excused.

That is the only witness you have?

MR. KELLAHIN: That's all, yes, sir.

MR. UTZ: Are there any other statements in this Case?

The Case will be taken under advisement.

The Hearing is adjourned until 1:30.

(Whereupon, the taking of the Hearing was concluded.)

* * *

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

I, CHARLES FLOYD WALKER, 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 27th day of October, 1964.

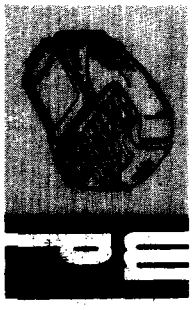
Charles Floyd Walker
NOTARY PUBLIC

My Commission Expires:

March 25, 1968.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 3123, heard by me on Oct. 13 1964.

Examiner
New Mexico Oil Conservation Commission



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