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

EXAMINER HEARING

IN THE MATTER OF:

Application of Continental Oil Company for a dual completion, San Juan County, New Mexico. Applicant, in the above-styled cuase, seeks permission to complete its Rattlesnake Well No. 140, located in Unit H of Section 11, Township 29 North, Range 19 West, San Juan County, New Mexico, as a dual completion (conventional) in the Organ Rock and Pennsylvanian-Paradox formations in the Rattlesnake-Pennsylvanian Field, with the production of oil and gas from the Pennsylvanian-Paradox formation to be through 2 7/8-inch tubing at a depth of 6658 to 6710 feet. Applicant proposes to dispose of salt water into the Organ Rock formation at a depth of 4175 to 4320 feet through a parallel string of 2 7/8 inch tubing.

CASE NO. 2617

BEFORE: Daniel S. Nutter, Examiner

TRANSCRIPT OF PROCEEDINGS

MR. NUTTER: We will call next case, 2617.

MR. FLINT: Application of Continental Oil Company for a dual completion, San Juan County, New Mexico.

Mr. Examiner, the applicant has requested that this case be continued until the August 29th examiner hearing.

MR. NUTTER: Case number 2617 will be continued to the same place on August the 29th.

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

I, ADA DEARNLEY, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached transcript of hearing was reported by me in stenotype and that the same was reduced to typewritten transcript under my personal supervision and contains a true and correct record of said proceedings, to the best of my knowledge, skill and ability.

Ada Dearnley
NOTARY PUBLIC

My Commission Expires:
June 19, 1962

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2617, heard by me on Aug 8, 1962.

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

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BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
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EXAMINER HEARING

IN THE MATTER OF:

Application of Continental Oil Company for a dual completion, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks permission to complete its Rattlesnake Well No. 140, located in Unit H of Section 11, Township 29 North, Range 19 West, San Juan County, New Mexico, as a dual completion (conventional) in the Organ Rock and Pennsylvanian-Paradox formations in the Rattlesnake-Pennsylvanian Field, with the production of oil and gas from the Pennsylvanian-Paradox formation to be through 2 7/8 inch tubing at a depth of 6658 to 6710 feet; applicant proposes to dispose of salt water into the Organ Rock formation at a depth of 4175 to 4320 feet through a parallel string of 2 7/8 inch tubing.

CASE 2617 (Continued)

BEFORE: Daniel S. Nutter, Examiner

TRANSCRIPT OF HEARING

MR. NUTTER: We call Case 2617.

MR. DURRETT: Case 2617: Application of Continental Oil Company for a dual completion, San Juan County, New Mexico.

MR. GRIFFITH: I am Bill Griffith, again representing Continental Oil Company in this case. We have one witness, George Brown, who should be sworn to testiry.

(Witness sworn.)

GEORGE BROWN

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

DIRECT EXAMINATION

BY MR. GRIFFITH:

Q Would you please state your name and occupation?

A My name is George A. Brown. I'm a petroleum engineer with Continental Oil Company in the Durango District Office in Durango, Colorado.

Q Have you ever testified before the New Mexico Oil Conservation Commission before?

A No, sir, I have not.

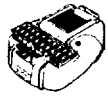
Q Would you briefly state your educational background and practical experience as a petroleum engineer?

A I graduated from the University of Arizona in 1958 with a Bachelor of Science Degree in Geological Engineering. I was employed by Continental Oil Company in 1959 as a production engineer. For the past two years I have been assigned to the Durango District Office in Colorado. Most of this time has been spent in development and well completion work in the Rattlesnake Field in San Juan County, New Mexico.

MR. GRIFFITH: Would the Commission accept Mr. Brown's qualifications as an expert witness as a petroleum engineer?

MR. NUTTER: We would. Please proceed.

Q (By Mr. Griffith) Generally, what is the nature of



Continental's application in this case?

A The general nature is to obtain permission to complete existing Rattlesnake Well No. 140 located in the Rattlesnake-Pennsylvanian Pool in San Juan County as a conventional dual completion in the Organ Rock formation and in the Pennsylvanian-Paradox formation, with oil and gas production from the lower zone of the Pennsylvanian and proposed water injection into the upper zone of the Organ Rock formation.

Q Do you have an exhibit showing the location of this well?

A Yes, I do.

MR. GRIFFITH: Would you mark this Exhibit A for identification?

(Whereupon, Applicant's Exhibit A marked for identification.)

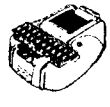
Q (By Mr. Griffith) Was Exhibit A prepared by you or under your supervision?

A Yes, sir.

Q Would you explain what Exhibit A purports to show?

A Exhibit A shows all of Continental's leases in the Rattlesnake area outlined in yellow. The various leases are broken into separate blocks there; they are also outlined in yellow. All the wells on the lease, the leases, are shown on the map, and proposed dual completion is outlined with red arrows.

Q There are quite a few wells shown on here. What's the difference between the large dots and the small dots on the map for the different wells?



A The large dots are the Pennsylvanian wells that have recently been completed, they are numbered. The smaller dots mostly are shallower Dakota wells in the area, which most of them have been plugged and abandoned.

Q I believe you have already given the location of the proposed dual completion well?

A It is in the Southeast of the Northeast, Section 11, Township 29 North, Range 19 West.

Q In the last hearing we had considerable testimony on the 140 Well, but would you please give a brief history of this well to the Commission?

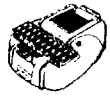
A This well was completed in February, 1962 as a Lower Paradox formation; as stated previously, the well is now shut in, was shut in March 31, 1962, for the purpose of conducting pressure interference tests. The well is presently temporarily shut in to continue tests. The well was produced for a short time. Cumulative production on the well is 1,790 barrels of oil, 660 barrels of water, and 23,374 MCF of gas.

Q What is the completion program of this well to date?

A For this I would like to refer to the diagrammatic sketch I have of the existing status of the well and the proposed dual completion.

MR. GRIFFITH: Would you mark this Exhibit B for identification?

(Whereupon, Applicant's Exhibit B marked for identification.)



Q (By Mr. Griffith) Was Exhibit B prepared by you or under your supervision?

A Yes, it was.

Q Now, referring to Exhibit B, what is the completion program of this well to date?

A Before I start, I would like to note a correction in the top of the cement in the 9-5/8 inch casing. On the application it was 2600 feet,allowing for hole washout, that has been changed to approximately 3,000 feet. This is a calculated cement top.

The well is completed originally, as it is now, we have set surface pipe 13-3/8 OD surface casing at 306 feet and circulated this to the surface with 300 sacks of regular cement. 9-5/8 was run from surface to 4512 feet, and a stage collar was installed at 977 feet to cement the Dakota formation. Casing was cemented through the shoe with 160 sacks of strata concrete cement, with 150 sacks of regular, and then followed with 75 sacks of regular cement. The calculated top of the cement is 3,000 feet.

The Dakota formation was cemented through the stage collar with 130 sacks of regular cement and calculated top of the cement at 500 feet. We then ran a 7-inch liner from 4338 feet to 6532 feet. We had 174 feet of overlap of the 7-inch in the 9-5/8 inch casing. This liner was cemented over the entire length of the liner with 140 sacks of strata concrete,with 140 sacks of regular and followed with 100 sacks of regular.

We then attempted to drill to the bottom of the

Rattlesnake zone, as noted in the last hearing in the last case, and due to the high GOR we attempted to deepen the well and we ran another liner, attempting to shut off some of the gas, and this liner was run from 6444 feet to 6728 feet, which is the total depth of the well now. This liner was also cemented over the entire length with 40 sacks of regular cement.

Q Was there also an overlap on this last?

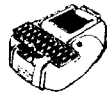
A Yes, showing 88 feet of overlap with 4-1/2 feet of the 7-inch. The well was then perforated at 6700-6710 feet, which is a porosity zone a little bit below the producing zone, in an attempt to get production with less gas. This we didn't get, so we perforated above in the Rattlesnake zone at 6680 feet to 6674 feet, and at 6661 to 6667 feet; at 6658 to 6660 feet. Those are the present perforations. All perforations are open at this time.

Q What is the size of the tubing in the hole now?

A We have 2-7/8 inch tubing now run to the Paradox.

Q Would you please explain to the Commission what the proposed completion will entail?

A The proposed completion, as stated, we have the Paradox formation open. We plan to set a Model D Retainer Production Packer at approximately 6400 feet in the 7-inch casing. We will go in and perforate the Organ Rock, propose perforating at 4175 to 85, 4205 to 15, and 4272 to 4282, 4305 to 4315. These are all separate sand benches in the Organ Rock formation. We then propose to separate, to run the Model K Snap Set Dual Retrievable Production



Packer at approximately 4,000 feet on the long string of tubing. The long string will go through the lower packer to produce the Paradox formation.

A parallel string of 2-7/8 inch tubing will then be run and set in the Model K Dual Packer, and the packer will be set at approximately 4,000 feet. This string of tubing will be proposed to utilize this string to dispose of salt water into the Organ Rock formation. I would like to mention now that the cementing program as mentioned before completely covers the Organ Rock formation, and the calculated top of the cement above the Organ Rock is 1,076 feet above the Organ Rock, which is indicated at 4,076 feet.

Q Will this proposed manner of completion, will it be accomplished in such a manner to allow packer leakage tests, measurement of the oil from the Rattlesnake-Pennsylvanian Pool, the gas-oil ratio, and bottom hole pressure?

A Yes, it will.

Q All these tests can be accomplished?

A All these tests can be run.

Q Do you have logs showing the perforations, and perforations to be perforated?

A Yes, I submitted the logs with the application for administrative approval. I have further copies here, if they would like to have these copies.

MR. GRIFFITH: Would the Commission desire to examine the

logs,other than the one submitted with the application?

MR. NUTTER: No, sir, we have these logs.

Q (By Mr. Griffith) What is the source of the salt water to be injected?

A The source of the salt water is produced water from the Paradox formation, produced along with the oil from all the wells completed in the field now.

Q How does this get into Well No. 140?

A Well, all the production from the producing wells is treated at a central facility and the produced salt water is to be separated at the central facility and will be gathered into a surge or storage tank where it will there be disposed of into Rattlesnake 140 down a short string of 2-7/8 inch tubing.

Q Do you have an estimate of the amount of salt water that will be disposed in this well?

A Presently it is approximately 1,000 barrels per day, and anticipated that there will be some increase.

Q Some increase?

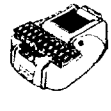
A Yes.

Q How is the salt water that is being produced in the field now being disposed of?

A Just by pit evaporation.

Q Has the U.S.G.S. approved our proposed salt water injection program?

A They have approved the application by a letter dated



July 25, 1962, from the U.S.G.S.

MR. GRIFFITH: Would you mark this as Exhibit C for identification?

(Whereupon, Applicant's Exhibit C marked for identification.)

MR. GRIFFITH: Exhibit C is a letter indicating the approval of the U.S.G.S. to Continental's proposed salt water injection program.

Q (By Mr. Griffith) Do you feel that there is any danger or threat of contamination of fresh water supplies by this salt water injection program?

A No, I don't believe there will be. The cement covers all the fresh water zones, separating them from it.

Q Has the State Engineer of the State of New Mexico been informed of our proposed program?

A Yes, the proposed application was approved by the State Engineer's office by a letter directed to A. L. Porter, Secretary-Director of the New Mexico Oil Conservation Commission, dated June 20, 1962.

MR. GRIFFITH: Would you mark this as Exhibit D?

(Whereupon, Applicant's Exhibit D marked for identification.)

MR. GRIFFITH: Exhibit D for identification is a carbon copy of a letter addressed to the Oil and Gas Conservation Commission indicating that the State Engineer had no objection to our proposed salt water injection program.

Q (By Mr. Griffith) Do you plan to commence immediate production from this well?

A From the lower zone?

Q From the lower zone.

A No, at the present time our plans are to continue using this well as an observation well to obtain pressure data, pressure interference data and pressure decline in the reservoir.

Q Do you feel that the granting of this application would be in the best interest of conservation for the State of New Mexico?

A I do.

MR. GRIFFITH: I have no further questions of this witness.

MR. NUTTER: Anyone have any questions of Mr. Brown?

CROSS EXAMINATION

BY MR. NUTTER:

Q How would you conduct a packer leakage test survey to determine -- what is this, a Model D Packer down below?

A Model D Production Retainer.

Q How would you conduct a test to determine if that packer was leaking or not?

A We would shut the well in in the long string of production from the Paradox formation and continue injection with water into the upper zone. Of course, the pressures will vary, pump pressure, and it will be quite different from the pressure of the Rattlesnake zone below the Model D Packer. If there was a leakage

in this zone, possibly the pump pressure would increase above the pressure in the Paradox formation; also the hydrostatic head of the salt water would indicate an increase in pressure in the lower string, in the lower formation.

Q Where is this long string of 2-7/8 inch tubing set; at what depth?

A The present depth?

Q Yes, sir.

A I don't have the exact figure. It is run approximately to the top of the 4-1/2 inch liner, approximately 6400 feet.

Q Then where will it be set when this well is dually completed, as you've proposed here?

A It will be set in the 7-inch liner at approximately 6400 feet, as noted on the left side of the diagram there, above the 4-1/2 inch liner, and in the 7-inch liner.

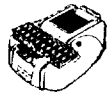
Q In other words, it would be set through the packer and that's just about all?

A Yes, it will be just set through the packer with the seal, and the Model D will have a pressure valve.

Q You have approximately 2300 feet from the lowermost disposal perforation to the uppermost producing perforation, I guess, is that correct?

A Would you state that again?

Q Approximately 2300 feet from the lowermost disposal perforation to the uppermost producing perforation?



A Yes.

MR. NUTTER: Any further questions?

MR. DURRETT: Yes.

BY MR. DURRETT:

Q I have one question, Mr. Brown. I believe you stated on direct examination that you expected approximately 1,000 barrels per day of salt water?

A Yes, sir.

Q Plus some increase?

A Yes.

Q Could you give us some estimation as to what you expect this increase to amount to?

A Well, this is a pretty hard figure to come at. We do anticipate further water withdrawals from conning bottom water or wherever this water is coming from, and we do expect an increase in water cut of the produced oil from all these wells. This has been evident throughout the history of the existing wells; some of the wells came in water-free, and as they were produced, water cut increased, and we expect a further increase in water production.

MR. DURRETT: I believe that's all I have.

MR. NUTTER: Any further questions? Mr. Brown may be excused.

(Witness excused.)

MR. GRIFFITH: Continental would like to move the admission of Exhibits A, B, C, and D.

MR. NUTTER: Continental's A through D will be entered in evidence.

(Whereupon, Continental's Exhibits A, B, C & D entered in evidence.)

MR. NUTTER: Do you have anything further, Mr. Griffith?

MR. GRIFFITH: No, sir.

MR. NUTTER: Does anyone have anything they wish to offer in Case 2617? We will take the case under advisement.

* * * *

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, ADA DEARNLEY, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached transcript of proceedings was reported by me in stenotype and that the same was reduced to typewritten transcript under my personal supervision and contains a true and correct record of said proceedings, to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal this 8th day of October, 1962, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

NOTARY PUBLIC

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. 2617 heard by me on Aug 29, 1962.

New Mexico Oil Conservation Commission, Examiner