

BEFORE THE  
OIL CONSERVATION COMMISSION  
Santa Fe, New Mexico  
April 11, 1962

EXAMINER HEARING

-----  
IN THE MATTER OF:

Application of Shell Oil Company for a dual completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks permission to complete its State GA Well No. 2, located in Unit N of Section 16, Township 15 South, Range 36 East, Lea County, New Mexico, as a dual completion (conventional) in the Caudill Permo-Pennsylvanian and Caudill-Devonian Pools with the production of oil from the Permo-Pennsylvanian zone to be through a string of 1 inch tubing and the production of oil from the Devonian zone to be through a parallel string of 2 1/16-inch tubing, a hydraulic casing pump and the casing-tubing annulus.

CASE 2522

-----  
BEFORE: Daniel S. Nutter, Examiner

TRANSCRIPT OF HEARING

MR. NUTTER: We will call the next case, 2522.

MR. MORRIS: Case 2522: Application of Shell Oil Company for a dual completion, Lea County, New Mexico.

MR. HANNAHS: Fred Hannahs with Seth and Montgomery, Federici and Andrews, in behalf of the Applicant, Shell Oil Company. We have only one witness.

MR. MORRIS: Would you stand and be sworn, please?

(Witness sworn.)

DEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.  
PHONE 325-1182

ALBUQUERQUE, N. M.  
PHONE 243-6691



## NEW MEXICO OIL CONSERVATION COMMISSION

EXAMINER HEARING - DANIEL S. NUTTERSANTA FE, NEW MEXICOREGISTERHEARING DATE APRIL 11, 1962 TIME: 9 A.M.

NAME:

REPRESENTING:

LOCATION:

*D. S. Nutter*  
*James Kellahan*  
*James E. Farnham*  
*W. L. Manning*  
*A. R. Luedtke*  
*F. Norman Woodruff*  
*Ben R. Howell*  
*D. S. Nutter*

*Cities Service Petr. Co.*  
*Kellahan & Fox*  
*Consolidated Oil & Gas Inc.*  
*El Paso Natural Gas*  
*OCC*  
*El Paso Natural Gas Co.*  
*OCC*

*Hobbs*  
*Santa Fe*  
*Denver, Colo*  
*El Paso, Tex*  
*Albuquerque*  
*El Paso*  
*Santa Fe*

ILLEGIBLE

(Whereupon, Applicant's Exhibits  
1 and 2, marked for identi-  
fication.)

WILLIAM R. GREEN

called as a witness, having been first duly sworn on oath, testi-  
fied as follows:

DIRECT EXAMINATION

BY MR. HANNAHS:

Q Will you please state your name, address, and occupa-  
tion?

A William R. Green, 1403 West Seventh Street, Roswell,  
New Mexico. I'm an engineer with Shell Oil Company, Division  
Production Engineer.

Q Have you previously testified before this Commission?

A No, I haven't.

Q Will you please give us a brief resume of your educa-  
tional experience, background, insofar as it pertains to the oil  
industry?

A I graduated from Texas A & M in 1952 with a B.S. degree  
in Mechanical Engineering. I joined Shell that year; after spend-  
ing two years in the Army, I finished Shell's training program  
and was assigned as a Mechanical Engineer in Hobbs, New Mexico.  
I spent four years in that capacity. I spent a year and a half  
in a field training assignment and was assigned to Roswell, New  
Mexico as Division Production Engineer a year and a half ago, and  
have been in that capacity ever since.

DEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.  
PHONE 325-1182

ALBUQUERQUE, N. M.  
PHONE 243-6691



MR. HANNAHS: Are the witness' qualifications acceptable?

MR. NUTTER: Yes, sir. Please proceed.

Q (By Mr. Hannahs) You are familiar with Shell's application filed in this case, are you not?

A Yes.

Q I wonder if you would please tell the Examiner what Shell is seeking by its application?

A We are seeking to dually complete State GA No. 2, Caudill Field. It is presently a Devonian producer. We wish to dually complete in the Permo-Pennsylvanian pay. We wish to ask exception to Rule 112-A, in that we would like to run a one-inch flow string for the Permo-Pennsylvanian, and we also wish to produce the Devonian production up the casing-tubing annulus.

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

A Yes, Exhibit No. 2.

Q Will you please explain to the Examiner what is shown by this exhibit?

A The subject well is circled in red; the offset wells marked with a "P" are the present Permo-Pennsylvanian producing wells; the wells marked with a "D" are the Devonian producing wells. It can be seen that the subject well is offset, a direct offset to the east and a diagonal offset in three directions.

DEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.  
PHONE 325-1162

ALBUQUERQUE, N. M.  
PHONE 243 6691



DEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.  
PHONE 325-1182

ALBUQUERQUE, N. M.  
PHONE 243-6691

Q How many wells are there producing from the Permo-Pennsylvanian in that immediate area?

A We're offset by four wells.

Q Four. Is it necessary for you to produce from the Permo-Pennsylvanian to protect drainage, insofar as your well is concerned?

A We feel that it is, since this section is shown on our logs.

Q Is the well in question presently in production?

A Yes, it is. It's presently a Devonian producer.

Q What is the condition of the casing in this well?  
How old a well is it?

A It's seven years old; it was new casing when it was run in, 17 pound and 20 pound. We have no evidence of any casing corrosion.

Q Do you know of any experience of corrosion in the other wells, the Permo-Pennsylvanian, in the immediate area?

A No, we do not.

Q Do you have any reason to believe that you would have any corrosion problem?

A We are presently inhibiting against corrosion in this well. Production is being made through a hydraulic pumping system where the pump is actuated through power oil string, the production and the power oil are both produced up the tubing-casing annulus. We inject corrosion-inhibiting material in the power oil



string and it inhibits casing corrosion.

Q Have you had any paraffin problem or do you anticipate any paraffin problem if the application is granted?

A No, we do not.

Q Do you have an exhibit showing the physical equipment or hook-up proposed for this well?

A Yes, Exhibit No. 2.

Q Will you explain what Exhibit No. 2 shows?

A The lower packer, permanent packer at 13,000 feet is the present packer that we are using. We'll leave it there; it does not have a flapper on it. We will install a permanent packer at 10,600 feet; that's the second packer from the bottom. It will have a lower flapper to protect from commingling the zones in the well bore while the well is being completed, and subsequently. The small string on the left is the Permo-Pennsylvanian string. It will be one-inch integral joint Hardy Griffin DDS N-80 tubing. This small size tubing is necessary in order that we may produce the Devonian zone at its present capacity.

The Devonian string on the right, we wish to make two and three-eighths integral joint Hardy Griffin DDS N-80 tubing and this will be our power oil string for the Devonian pay.

This well presently is producing approximately 100 barrels of water a day and 900 barrels of oil; so we need a large displacement type pump in order to produce at this rate. This hydraulic casing double-acting pump, we'll get more volume than

DEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.  
PHONE 325-1182

ALBUQUERQUE, N. M.  
PHONE 243-6691



## DEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.  
PHONE 325-1182ALBUQUERQUE, N. M.  
PHONE 243-6691

we could expect from any other type. The size of this J-latch assembly disengaging tool below the hydraulic pump is such that the only other size tubing that we could pass for the Permo-Pennsylvanian production would be one-inch tubing. That's the largest size we could pass by the J-latch disengaging tool. We need the disengaging tool in order to pull and repair the hydraulic casing pump.

Q What type packers do you intend to use?

A The lower pump, the one shown in the middle here, will be a Baker Model "D" permanent packer with a flapper valve.

Q How about the upper one?

A The upper packer will be a Baker Model "J" dual set compression packer.

Q Has Shell Oil Company used the Baker Model "D" packer in any of its other wells?

A Yes, it's used extensively in our operations.

Q Is that a permanent type packer?

A It is permanent.

Q The Model "J", is that a permanent or retrievable type?

A That is a retrievable type.

Q Do you know if that packer has been used, or is generally used?

A It is generally used, according to the Baker Tool Company. We haven't used it in New Mexico, to my knowledge.

Q Has this type packer been used in dual completion areas



that you know of?

A Yes, it has.

Q Will a packer leakage test be made?

A Yes.

Q Will you describe how such test will be conducted?

A The lower packer will be checked in the conventional manner by shutting in both zones until the pressures are stabilized, and then producing the Devonian zone while watching the Permo-Pennsylvanian for pressure change. If there is a pressure change, this will indicate a leak in the packer.

The upper packer will be checked by closing in the casing and pressuring up with the hydraulic pump and holding a pressure on the casing. If there should be a leak in the upper packer, this pressure would bleed off into the Permo-Pennsylvanian zone.

Q What is the differential in the pressure zones, differential in pressure in the zones?

A The Devonian zone is approximately 5200 pounds pressure at the present. It's a strong water drive reservoir, so we expect this to remain relatively constant.

The Permo-Pennsylvanian zone, approximately 3,000 feet higher, we expect to have a pressure of 3200 pounds initially. The pressure differential across the lower packer will depend on the fluid above the Devonian zone, since it's 90 percent water, this will hold enough pressure on the Devonian zone so that the





differential across the lower packer will be practically nil until we begin producing the Permo-Pennsylvanian pay, and if this is drawn down, then the pressure differential may be in the order of 3,000 pounds. The differential across the upper packer will always be from the top after the well is in production, because the Devonian production will be above the compression set packer, tending to set it more.

In addition to the hydraulic head on the packer, we'll have approximately 10,000 pounds from the weight of the tubing. So any pressure differential from under the compression packer will not be as much as the differential from above it. In other words, it will be tending to set more all the time.

Q Will you please describe your cementing program on this well?

A The 13-3/8th was circulated to surface, and the 8-5/8th was circulated to surface. The 5-1/2 inch 17 and 20 pound oil string was cemented back to 8,000 feet.

Q Is the cementing job satisfactory, in your opinion?

A Yes, it was checked with a temperature survey and found at 8,000 feet.

Q Is there any difference in the oil in the two zones, and if so, can it be identified?

A Devonian production is 60-degree gravity and it's a light kerosene color. The Permo-Pennsylvanian production is approximately 44-degree gravity and it's darker.



## DEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.  
PHONE 325 1182ALBUQUERQUE, N. M.  
PHONE 243 6691

Q I notice on Exhibit No. 2 you changed the tubing from 2 1/16th to 2-3/8th inch. I believe the application said 2-1/16th inch tubing. You intend to amend your application to that extent, is that correct?

A Yes. We can run 2-3/8th due to the fact that the J-latching assembly will be the largest OD tool in the hole. The 2-3/8ths coupling OD will be smaller than the J-latching assembly, so it would not be a limiting factor. In order to run the hydraulic casing pump with the least friction drop, we can use 2-3/8th tubing.

Q Will the proposed completion in your opinion give assurance of complete separation between the producing formations?

A Yes. We have no reason to believe that it will not.

Q Is it adequate to protect the zones when only one zone is being produced?

A Yes, it is. We have had very few failures with the Model "D" permanent packer, and in the case of the compression set packer, the pressure differential will be tending to set it more, in this case.

Q Have you made any test to determine if production from a one-inch string, as you have proposed here, would be feasible?

A Yes, our company has been working on this problem for years, as well as other companies have. In this particular one-inch string, we calculate from our gradient data that we'll have approximately 1440 pounds pressure loss through this string.



That's assuming a top allowable production of 164 barrels of oil per day with a GOR of 2,000.

Q What, if any, devices or methods will be used which will indicate a mechanical failure, or any mechanical failure?

A If there were a failure in the Devonian power oil string, this would be obvious from the power pressure loss and the production loss from the Devonian zone. A failure in the Permo-Pennsylvanian tubing string would be evident from water production in the Permo-Pennsylvanian, from the Permo-Pennsylvanian zone, and it would also kill the flowing Permo-Pennsylvanian, possibly. Also if there was any commingling it would be evident in the gravity of the oil change.

Q Is the proposed dual completion in this well of a similar type which has heretofore been approved by the Commission, so far as you know?

A Humble's Case 2518 was of a similar type. They had, they requested permission for an inch and a quarter tubing to produce the Permo-Pennsylvanian, whereas we requested one-inch.

Q Do you have any figures on the economics of this well as a dual completion, as opposed to a new well?

A This dual completion will cost approximately \$40,000. To drill a new Permo-Pennsylvanian well with 4-1/2 inch oil string would cost approximately \$140,000. A new well would be marginal, as to whether we could complete it at all or not, profitably.

Q Do you have anything further to state in support of



DEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.  
PHONE 325-1182

ALBUQUERQUE, N. M.  
PHONE 243-6691

the Shell Oil Company's application in this case, or any other exhibits that you care to introduce?

A No.

Q Did you accompany your application with copies of the log on this well?

A Yes.

Q Have these been marked?

A No, they haven't been marked.

MR. HANNAHS: Would you like to have these marked?

MR. NUTTER: We would like to have a copy of the log marked as an exhibit.

(Whereupon, Applicant's Exhibit 3 marked for identification.)

Q (By Mr. Hannahs) Were Shell's Exhibits 1 and 2 prepared by you or under your supervision?

A Yes.

Q And in your opinion would approval of Shell's application in this case be in the interest of conservation and prevention of waste?

A Yes.

MR. HANNAHS: That's all we have at this time. We move the acceptance of Shell's Exhibits 1 and 2, as well as the logs which were not accompanied with the application.

MR. NUTTER: Shell's Exhibits 1 through 3 will be admitted in evidence. Does anyone have any questions?



MR. MORRIS: Yes, sir.

CROSS EXAMINATION

BY MR. MORRIS:

Q Mr. Green, would you explain to me an operation of the flapper valve? I'm not an engineer, but I would like to know how this valve works. I can't see how your Devonian production gets into the 2 and 3/8ths inch tubing.

A This flapper valve is part of the permanent packer. When this power oil string and upper packer are run, it sticks through the flapper valve and holds it open. In other words, the tubing goes through that valve a little different than is shown there.

Q So once your tubing is set in the packer, then the valve has no further use?

A Right.

MR. MORRIS: That's all I have.

BY MR. NUTTER:

Q Is there any producing horizon between the shoe of the 8-5/8ths at 4740 and the top of the cement at 8,000 in this area?

A Not to my knowledge.

Q There's none being produced at this present time in this pool, is there?

A No.

Q What is the GOR on the Permo-Pennsylvanian?

A Presently it is ranging from 1400 to 2,000.



DEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.  
PHONE 325-1182

ALBUQUERQUE, N. M.  
PHONE 243 6691

Q And yours hasn't been completed yet so you don't know what it will be on this well?

A Right.

Q And the GOR on the Devonian?

A It's too small to measure.

Q You stated that this one-inch tubing will be adequate to produce the Permo-Pennsylvanian. I believe you stated you would have a drop of 1440 pounds, assuming a top allowable of 164, was it?

A Yes.

Q And a GOR of 2,000. What about artificially lifting the Permo-Pennsylvanian?

A If this becomes necessary, we have one possible arrangement that we could artificially lift it. Should we pass this out?

MR. HANNAHS: Let's mark it as an exhibit.

A I have it marked Exhibit 3. I think he marked the logs as Exhibit 3.

MR. HANNAHS: That should be 4.

(Whereupon, Applicant's Exhibit 4 marked for identification.)

A This is another reason that we wish to run 2-3/8ths tubing instead of 2-1/16th tubing, in the event we have to produce the Permo-Pennsylvanian zone, we could switch the strings and produce the Permo-Pennsylvanian by rod pumping and produce the Devonian pay through the one-inch string hydraulically.

Q (By Mr. Nutter) Would you get adequate power oil down



DEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.  
PHONE 325 1182

ALBUQUERQUE, N. M.  
PHONE 243 6691

one-inch tubing to produce 1,000 barrels of liquid a day?

A We could, but it would be with a higher pressure drop, an additional thousand pounds pressure drop.

Q What's the remaining expected life of the Devonian?

A Five years.

MR. NUTTER: Any further questions of Mr. Green? He may be excused.

(Witness excused.)

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

MR. HANNAHS: I would like to offer Exhibit 4 in evidence.

MR. NUTTER: Exhibit 4 will be admitted in evidence. Do you have anything further?

MR. HANNAHS: No.

MR. NUTTER: Does anyone have anything they wish to offer in Case 2522? We'll take the case under advisement.

\*\*\*

