BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
November 10, 1959

EXAMINER HEARING

IN THE MATTER OF:

Application of Cabot Carbon Company for an oil-oil dual completion and for permission to commingle the production from two separate pools. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of its Howard Fleet Well No. 1, located 1980 feet from the South line and 660 feet from the East line of Section 35, Township 13 South, Range 37 East, Lea County, New Mexico, in such a manner as to permit the production of oil from an undesignated Pennsylvanian oil pool and the production of oil from the King-Devonian Pool through parallel strings of 1½-inch tubing. Applicant further seeks permission to commingle the Devonian and Pennsylvanian production from said Howard Fleet Well No. 1.

Case 1804

BEFORE:
Elvis A. Utz, Examiner

TRANSCRIPT OF HEARING

MR. UTZ: The hearing will come to order, please. The first case on the docket will be Case 1804.

MR. PAYNE: We received the request from Cabot Carbon that this case be continued until the first Examiner Hearing in December, which will be December 11, before a different Examiner, so we'll readvertise the case.

MR. UTZ: Any objection to the continuance of Case 1804? Without objection it will be continued to the month of December.

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 19th day of November, 1959.

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. 1804, heard by me on Nov. 20, 1959.

, Examiner
New Mexico Oil Conservation Commission

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

IN THE MATTER OF:	)	
	)	
Application of Cabot Carbon Company for an oil-oil dual completion and for permission to commingle the production from two separate pools.	)	Case 1804 (Continued)

December 11, 1959.

DEARNLEY - MEIER & ASSOCIATES
INCORPORATED
GENERAL LAW REPORTERS
ALBUQUERQUE, NEW MEXICO
3-6691 5-9546

NEW MEXICO OIL CONSERVATION COMMISSION

EXAMINER HEARING - (Daniel S. Nutter)

SANTA FE, NEW MEXICO

REGISTER

HEARING DATE DECEMBER 11, 1959 TIME: 9 a.m.

NAME:	REPRESENTING:	LOCATION:
W. T. Tomlinson	Atlantic	Roswell
Joe M Daniel	Cabot Carbon Co	Pampa, Tex
P. G. O'Quinn	Cabot Carbon Co.	Midland, Tex
John McKelley	Independent	Roswell NM
T.O. Webb	The Ohio Oil Co	Hobbs, N. Mex
P. T. McGrath	U. S. G. S.	Farmington
Victor T. Lyon	Continental Oil Co	Eunice, N. M.
Jason Kellahin	Kellahin & Fox	Santa Fe, N. M.
J. H. Hoover	Gulf Oil Corp	Roswell, N. M.
W U Kastler		
J. E. Robinson, Jr.	Texaco Inc.	[redacted] Midland
L. O. White		Santa Fe, N. M.

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
December 11, 1959

EXAMINER HEARING

IN THE MATTER OF:

Application of Cabot Carbon Company for an oil-oil dual completion and for permission to commingle the production from two separate pools. Applicant, in the above-styled cause, seeks an order authorizing the dual completion of its Howard Fleet Well No. 1, located 1980 feet from the South line and 660 feet from the East line of Section 35, Township 13 South, Range 37 East, Lea County, New Mexico, in such a manner as to permit the production of oil from an undesignated Pennsylvanian oil pool and the production of oil from the King-Devonian Pool through parallel strings of 1½-inch tubing. Applicant further seeks permission to commingle the Devonian and Pennsylvanian production from said Howard Fleet Well No. 1.

Case 1804
(Continued)

BEFORE:
Daniel S. Nutter, Examiner

TRANSCRIPT OF HEARING

MR. PAYNE: "Application of Cabot Carbon Company for an oil-oil dual completion and for permission to commingle the production from two separate pools.

MR. BRATTON: Howard Bratton, Roswell, New Mexico, appearing on behalf of the Applicant, Cabot Carbon. We have one witness, Mr. Daniel, and I ask that he be sworn.

(Witness sworn.)

(Marked Applicant's Exhibits Nos. 1, 2 and 3, for identification.)

MR. BRATTON: In connection with the application, I might note that as advertised, the Applicant wishes to commingle the production from said Howard Fleet Well, and I believe we have asked to withdraw that. At any event, we will not present any testimony in connection with that, we will not ask for any order to commingle.

JOE M. DANIEL

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

DIRECT EXAMINATION

BY MR. BRATTON:

Q Will you please state your name?

A Joe M. Daniel, Jr., of Pampa, Texas.

Q By whom are you employed and in what capacity?

A I am employed by Cabot Carbon Company as their Senior Petroleum Engineer.

Q Have you previously testified before the New Mexico Oil Conservation Commission as an engineer in matters similar to this application?

A Yes, sir.

Q Are you familiar with the Application filed in this matter?

A Yes, sir.

Q Do you consider all the facts stated in this Application to be true and correct to the best of your knowledge?

A Yes, sir.

MR. BRATTON: Are the witnesses qualifications acceptable?

MR. NUTTER: Yes. Please proceed.

Q Will you please explain to the Commission the purpose of the Application?

A The Application is to dually complete as an oil-oil well, using two tubing strings, the Cabot Carbon Company's Howard Fleet, et al No. 1 well, which is located 1980 feet from the south line and 660 feet from the east line of Section 35, Township 13 South, Range 37 East, Lea County, New Mexico, in the King Field. This well is currently producing from the Devonian formation.

We propose to perforate the 5-1/2 inch casing opposite the Pennsylvanian formation from 10,702 feet and 10,726 feet and conduct a production test through straddle packers. If the Pennsylvanian interval is productive, we will set a Baker Model D at approximately 10,750 feet which will separate the Devonian and the Pennsylvanian formations in the well bore. The Pennsylvanian interval will be produced until the equipment for the dual

completion can be obtained.

After arrival of the dual completion equipment, we propose to set packers at approximately 10,750 feet and 10,675 feet and produce each zone through 1-1/2 inch tubing.

Q Have you conducted tests on this well?

A Yes, sir.

Q Please explain the manner of current completion of this well and the tests taken and the results thereof.

A The subject well has 5-1/2 inch casing set at 12,826 feet and cemented with 500 sacks. Top of cement behind 5-1/2 inch casing was found at 10,115 feet by a temperature survey. The casing opposite the Devonian formation was perforated from 12,525 feet to 12,518 feet, from 12,503 feet to 12,488 feet, and from 12,466 feet to 12,451 feet. These perforations were treated with 1000 gallons of acid and on initial potential the well flowed 500 barrels of oil in 12 hours on a 24/64" choke.

The well started making water in August, 1958, and on a test dated September 4, 1958, the well flowed 225 barrels of oil and 150 barrels of water in 24 hours with a gas-oil ratio of 1503 cubic feet per barrel. A bridging plug was set at 12,440 feet and the casing perforated opposite the Devonian formation from 12,368 feet to 12,328 feet. The well would not flow and gas lift valves were installed. The well would produce 50 to 60 barrels of oil and 10 barrels of water per day. In May, 1959, the

bridging plug was driven to total depth, and all perforations exposed. Gas lift valves were run and the well tested 150 barrels of oil and 150 barrels of water per day. The well is currently producing 111 BOPD and 75 BWPD by gas lift.

The Pennsylvanian formation indicated its productivity by a drillstem test. A DST from 10,652 feet to 10,727 feet was open for 44 minutes. Gas to the surface in 4 minutes, oil in 10 minutes. Flowed 34 barrels of 43° gravity oil in 30 minutes. Initial Flowing Pressure 1610 psi. Final Flowing Pressure 2975 psi. A 2-hour and 10-minute shut-in pressure was 4000 psi.

Q Have the tests which have been made indicated that the well is susceptible to production of oil in more than one zone?

A Yes, sir. The subject well was completed and is still producing from the Devonian horizon. The Pennsylvanian appears to be productive by the previously mentioned DST; however, the procedure for the dual completion workover will permit thorough testing and evaluation of the Pennsylvanian prior to ordering the dual completion equipment. The workover procedure was outlined in our Application.

Q I refer you to Exhibit #1 and ask that you identify it.

A Exhibit #1 is a plat of the King Pool showing the location of our Howard Fleet, et al No. 1 well, and further showing all offset wells, their producing horizons, and offset property owners.

Q I refer you to Exhibit #2 and ask that you identify it.

A Exhibit #2 is a diagrammatic sketch showing the proposed mechanical completion of the well in question. We propose to perforate and complete in the Pennsylvanian horizon between the depths of 10,702 feet and 10,726 feet. A Baker Model "D" permanent type packer is to be set at approximately 10,750 feet. This packer will separate the two pay zones in the casing. The 1-1/2 inch tubing through which the Devonian will be produced will be run next. We will have some 1750 feet of 2" Hydril Type "A" tubing as tail pipe below the Model "D" packer. Above the Model "D" packer seating element we will have some 75 feet of 2-3/8 inch EUE tubing which will be externally wrapped with fiber glass and plastic to protect this interval of tubing from abrasion. The upper packer will be a Baker Model "GB" packer, to be set at approximately 10,675 feet. This packer will be run on the first string of tubing. Above the upper packer we will run approximately 10,675 feet of 1-1/2 inch tubing with Hydril CS couplings. Gas lift valves will be spaced out in this string to be used to lift the Devonian fluid. After the Devonian string of tubing is in place with the upper packer set, we will run the short tubing string to the Pennsylvanian pay. The upper tubing string will also be 1-1/2 inch with Hydril CS couplings. The top 5000 feet of each tubing will be internally coated with plastic for paraffin control.

Q Are the two reservoirs involved separated in the subject well behind the casing?

A Yes, sir. They are separated by some 1600 feet of interval and 500 sacks of cement.

Q Are all fresh water zones and other producing horizons protected?

A Yes, sir. We used 2300 sacks of cement behind the intermediate 8-5/8 inch casing set at 4587 feet. The cement behind the 349 feet of 13-3/8 inch surface casing was circulated to the surface.

Q In your opinion do you feel that there is any possibility of communication or migration of fluids between the Pennsylvanian and Devonian in the annulus between the casing and the well bore?

A No, sir.

Q In your opinion is the proposed dual completion installation in accordance with good engineering practices and principles?

A Yes, sir.

Q Has this type of dual completion installation proven successful in actual field tests?

A Yes, sir.

Q Is the proposed dual completion the type customarily used in the Lea County area?

A There are quite a few dual string installations using

2 inch tubing in Lea County. However, I understand there are very few installations using 1-1/2 inch tubing. Cabot Carbon Company has two 1-1/2 inch dual string installations in operation in this field.

Q Would you explain Cabot Carbon Company's experience with 1-1/2 inch tubing in a dually completed well?

A In April, 1958, Cabot received permission to dually complete their H. L. Lowe "B" No. 1 well in the Devonian and Wolfcamp formations. This was Case No. 1365 and Order No. 1126-A. The well was dually completed in July, 1958. The Wolfcamp would not flow and gas lift valves were installed. The Wolfcamp is currently producing 65 barrels of oil and 5 barrels of water per day. The Devonian formation is capable of flowing top allowable through 1-1/2 inch tubing with a flowing tubing pressure of several hundred pounds higher than when the well was producing through 2-3/8 inch tubing. A comparison of flowing pressures, choke sizes, and production rates was explained in the testimony given on our application to dually complete our J. L. Reed No. 2 well.

In February, 1959 we received permission to dually complete our J. L. Reed no. 2, Case No. 1587 and Order No. R-124-42.

The dual completion was performed, the Wolfcamp tested 135 barrels of oil, and 14 barrels of water in 24 hours on a 3664 choke. The well flowed for only a short period and 6 gas lift

valves were installed. The Wolfcamp is currently producing 65 barrels of oil per day. The Devonian, after the dual completion, tested 250 barrels of oil in 24 hours with a GOR of 1483 cubic feet per barrel on a 12-6/4 inch choke. The tubing pressure was 950 pounds, which is 250 pounds higher than previously noted on well test when using, 2-3/8 inch tubing was being used, and yet the shut-in bottomhole pressure has been reduced almost 400 pounds over the same three-year period.

Q Why has Cabot Carbon Company proposed using two strings of 1-1/2 inch tubing when other operators use 2 inch?

A It is a matter of clearance. In wells with 7 inch casing it is possible to use two strings of 2 inch tubing. This well was originally completed with 5-1/2 inch casing and it is a physical impossibility to get two strings of 2 inch tubing in 5-1/2 inch casing.

Q How do you propose to lift the fluid from either or both pays when artificial lift is required?

A The Devonian oil is currently being gas lifted and we plan to continue this method of lifting for the Devonian. The Pennsylvanian interval is expected to flow; however, when necessary we have been insured by several manufacturers of lift valves that we can produce 200 barrels of fluid from each of the reservoirs.

Q Have you considered using rod pumps as a method of

artificially lifting the fluid when it becomes necessary?

A Yes, but it would require 2-1/2 inch tubing to lift the required volume from our pay depth. The 2-1/2 inch tubing would mean that only one zone could be produced at a time.

Q Is the dual completion technique requested in the Application recognized and accepted in general by oil industry and other state regulatory bodies?

A Yes, sir.

Q Do you feel that corrosion would be a possible objection to your proposed manner of dual completion?

A No, sir. We have observed no corrosion in the King Pool.

Q Does this dual completion technique possess any more possibility for leakage or communication of the reservoirs than any other accepted method?

A No, sir.

Q Will Cabot Carbon Company be willing to make packer leakage tests, separation tests, and other tests which might be required by the Commission to determine if there is any commingling or leakage?

A Yes, sir.

Q Under the proposed method of dualling is it possible to take bottomhole pressures on each separate zone, and if so, please explain how?

A Yes, this is possible. A bottomhole pressure bomb

can be run to the top of the first internal gas lift valve and then the pressure extrapolated to the datum depth for the zone being gas lifted; in the flowing zone, the bomb can be run to the zone of interest.

Q Will it be possible to check at frequent intervals for leakage across the packer separating the two pays?

A Yes, sir. Each zone will have its own separator and storage facilities. The Pennsylvanian pay will have 43° API gravity and the Devonian pay has 45° API gravity. This small gravity difference will provide to some extent a daily check for leakage as any change in gravity will be noted by operating personnel and pipeline gauger. Also, operating personnel will be able to detect down-hole leakage by changes in producing characteristics or rates.

Q Have you made an estimate of oil reserves that will be recovered from the Pennsylvanian formation?

A Yes, sir. I believe the recoverable oil reserves to be in the order of some 68,000 barrels.

Q What will it cost to drill a twin well to the Howard Fleet Well No. 1 to the Pennsylvanian?

A Approximately $175,000.

Q What will it cost to dually complete the Howard Fleet Well No. 1?

A Approximately $75,000.

Q What are the economics involved when comparing expected recoverable oil reserves with the cost of obtaining this oil from the Pennsylvanian?

A The value of one barrel of oil to us after our royalty and tax is $2.20 per barrel. If we assume $0.40 per barrel for lifting cost, which is reasonable, the revenue to be received from our expected oil reserves in the Pennsylvanian at 6% present worth is $105,000. If we drill a twin well, we would not get our money back. If we are permitted to dual the subject well, a reasonable profit may be expected.

Q In your opinion, do you think that the ultimate oil recovery from the Devonian formation will be reduced as a result of this dual completion?

A The ultimate oil recovery from the Devonian will not be affected as a result of this dual completion. I base this on two facts: (1) the producing efficiency of gas lift using small tubing will not reduce ultimate recovery from the Devonian. The Devonian is currently able to produce only 200 barrels of fluid (60% oil) per day. This producing rate can be maintained with 1-1/2 inch tubing, (2) It now appears that the Devonian may become watered out prior to the end of the producing life of the Pennsylvanian. We can plug off the Devonian and produce the Pennsylvanian by any method that is most economical. The small tubing will improve producing efficiency from the Pennsylvanian by

prolonging the flowing life. When and if necessary, gas lift valves can be installed and will permit the Pennsylvanian to be depleted by artificial lift.

Q Mr. Daniel, were the exhibits 1 and 2 prepared by you or under your supervision?

A Yes, sir.

Q Have you submitted with your application a copy of the log of this well?

A Yes, sir.

MR. BRATTON: We would like that log considered as an exhibit. I believe it was attached to the application, and we don't have another copy of it.

MR. NUTTER: The log will be identified as Exhibit No. 3 in this case, Mr. Bratton.

MR. BRATTON; Thank you.

Q Do you have anything further you care to say, Mr. Daniel?

A No.

MR. BRATTON: We would like to offer Exhibits 1 through 3 in evidence.

MR. NUTTER: Exhibits 1 through 3 will be admitted in evidence.

MR. BRATTON: We have nothing further.

CROSS EXAMINATION

BY MR. PAYNE:

Q This Pennsylvanian formation in this area is undesignated, is it not?

A Yes, sir.

Q I believe you testified that you proposed this installation as a matter of clearance. Do you feel that this installation will be as efficient as two inch strings?

A Yes, sir. I feel that our operating condition of depths and gas-oil ratios, our tubing are more efficient, this inch and a half is more efficient than two inch.

Q Has this been your experience in the other two wells that Cabot Carbon has?

A Yes, sir, from the Devonian. The Wolfcamp in both cases are being gas lifted, but we're getting all the fluid that is entering the well bore. Now, in the Devonian we have several hundred pounds higher tubing pressure now than we've ever had before, and we are making the same amount of oil, and over the same interval these wells are about three years old and our bottomhole pressure has declined about 400 pounds in the last three years. So we have a lower shut-in bottomhole pressure, yet we have a higher tubing pressure than we've ever had.

Q You don't feel there's anything peculiar about the Pennsylvanian formation which would make it inefficient to flow through inch and a half tubing?

A No, sir.

MR. PAYNE: Thank you.

BY MR. NUTTER:

Q Mr. Daniel, I believe that this well would be, you might say, a discovery well for the Pennsylvanian in this area, is that correct?

A That is true.

Q What sort of mechanism do you expect that the Pennsylvanian will have as far as reservoir energy is concerned?

A It's only a guess right now since the only data we have is a drillstem test. I expect it to be a solution gas drive.

Q Now, the other dually completed wells in this pool are completed in the Devonian and Wolfcamp, is that correct?

A That is correct.

Q The Devonian in each of the other cases is flowing?

A Yes.

Q I notice that your figures from the Wolfcamp indicated that each of the wells is producing 65?

A That is true.

Q Is this merely the size of the tubing or is it a coincidence?

A I think it's a coincidence.

Q They are making 65 barrels a day?

A We have produced more fluid out of both, but currently

they are producing 65.

Q This subject well is currently being gas lifted, is that correct?

A Yes.

Q What is the fluid level in the hole?

A May I ask my partner out in the audience?

Q Yes, sir. A 2500 feet.

Q So that your gas lift valves probably don't have to go too deep to produce the well?

A That's right.

Q Now, in the event that it would be necessary to gas lift the Pennsylvanian as well as the Devonian here, how would you accomplish that?

A We would gas lift both zones. We have a quotation that we can lift 200 barrels a day. That's the qualifications we asked for because that is all that the Devonian is producing now, and we have been, we have a quotation here that says that we can produce each zone at 200 barrels a day and they have designed the valve so that it will do that.

Q What do you do, put the gas down the annulus?

A The gas will go down the annulus.

Q You have one common gas supply for lifting two zones?

A That is true. The Pennsylvanian, the way we have it planned now, will have fluid operated valve. By that we mean that

the valve will not open unless it is covered by fluid. And the Devonian will have pressure operated valves and they will open by the maximum pressure that we set them at, whether they're covered by fluid or not. That's a rather new technique, but, well, it's not new either, it's been used rather extensively in Texas by Pure, Humble and Continental, and they have been very satisfied with this.

Q Is this a common practice in New Mexico to use one common gas supply source to gas lift two zones?

A I couldn't answer that.

Q You don't know of any wells that are gas lifted in that manner?

A No, sir, I do not know.

BY MR. PAYNE: Has Cabot Carbon any other dual completions in other areas with parallel strings of inch and a half tubing where both zones are being gas lifted?

A I don't believe so.

Q Do you anticipate that you will have to gas lift the Pennsylvanian?

A Well, not for a while anyway, based on the results of the drillstem test, 34 barrels of oil in 30 minutes, that's the strongest drillstem test that we have had in this field. In one of the upper pays on the Wolfcamp's well, I don't believe that any of them flowed, they just had a high oil recovery.

BY MR. NUTTER:

Q Was there any Wolfcamp present in this well?

A No, sir.

Q Would you agree to contact the Oil Conservation Commission prior to using a common source of gas for gas lifting?

A Yes, sir.

Q The two separate zones? A Yes.

Q The reason I asked this, I don't know if this is being done in any other wells.

A Well, I don't either right now. We certainly would be willing to do that though.

MR. NUTTER: Does anyone have any further questions of Mr. Daniel? He may be excused.

(Witness excused.)

MR. NUTTER: Does anyone have anything further for Case 1804? We'll take this case under advisement and take Case 1824.

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 8th day of December, 1959.

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. 1804, heard by me on 12-11, 1959.

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