)CASE 2795

### DEARNLEY-MEIER REPORTING SERVICE, Inc.

SANTA FE, N. M. PHONE 983-3971

FARMINGTON, N. M. PHONE 325-1182

BEFORE THE OIL CONSERVATION COMMISSION Santa Fe, New Mexico April 24, 1963

### EXAMINER HEARING

IN THE MATTER CF:

Application of Marathon Oil Company for a multiple completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order authorizing the triple completion (conventional) of its State McCallister Well No. 5, located in Unit M of Section 25, Township 17 South, Range 34 East, Lea County, New Mexico, to produce oil from the North Vacuum Abo, the Vacuum-Wolfcamp, and the Vacuum-Devonian Pools through parallel strings of tubing.

BEFORE: Elvis A. Utz, Examiner

### TRANSCRIPT OF HEARING

MR. UTZ: Case 2795.

MR. DURRETT: Application of Marathon Oil Company for a multiple completion, Lea County, New Mexico.

MR. MORRIS: Mr. Examiner, I'm Richard Morris of Seth, Montgomery, Federici and Andrews, Santa Fe, New Mexico, appearing in this case on behalf of the Applicant, Marathon Oil Company. We will have one witness in this case, Mr. John Barber. I ask that he stand and be sworn in at this time.

(Witness sworn.)

MR. UTZ: Are there other appearances in this case? You may proceed.

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(Whereupon, Applicant's Exhibits
1, 2, and 3 marked for identification.)

### JOHN R. BARBER

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

### DIRECT EXAMINATION

### BY MR. MORRIS:

- Q Mr. Barber, will you please state your name and position?
- A John R. Barber, employed by the Marathon Oil Company in the capacity of Area Petroleum Engineer at Hobbs, New Mexico.
- Q Mr. Barber, have you previously testified before the Cil Conservation Commission or one of its Examiners?
  - A No, sir, I have not.
- Q Then would you briefly outline your education and experience in the oil business?
- A I graduated from Texas A & M College in May, 1954.

  I reported to Hobbs in June, 1954, for employment with the Ohio
  Oil Company as a Petroleum Engineer. I have worked in and
  around Hobbs since that date, and I was appointed to a supervisory capacity in February, 1963.
- In the past few years, Mr. Barber, has your work entailed working with multiple completions in the Hobbs area?
  - A Yes, sir, it has.
  - Q Are you familiar with the application of Marathon in



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this case?

- A Yes, sir, I am.
- Q Would you state what it is that Marathon is seeking by its application?

A Marathon seeks authority to complete its State

McCallister Well No. 5 located in Unit M, Section 25, Township

17 South, Range 34 East, as a triple completion, conventional,

to produce oil from the North Vacuum Abo, Vacuum-Wolfcamp,

and Vacuum-Devonian Pools through parallel tubing strings.

- Q Do you have prepared an exhibit showing a plat of the area and the well which is the subject of this hearing?
  - A Yes, sir, I have.
  - Q Has that been marked as Exhibit No. 1 in this case?
  - A Yes, sir, it has.
- Q Referring to that exhibit, would you point out the pertinent data?

A Exhibit No. 1 is a plat of the State McCallister lease. This lease contains 160 acres and has been outlined in yellow.

Marathon owns a 100 percent working interest in this lease. The offset operators have been indicated, to the best of my knowledge, as well as the pool designation for each individual well.

Now the State McCallister Well No. 5, the subject of this application, has been outlined in red. It is located 660 feet from the south line, 560 feet from the west line of Section 25.



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Q Also shown on this plat, Mr. Barber, is Well No. 95, the Mobile Bridges State Well No. 95, which is a west offset of your Well No. 5, is that correct?

A Yes, that is correct.

Q And has that well been completed in the same pools as your Well No. 5?

A Yes, sir, it has.

ious times in this hearing?

A I will.

Q Still referring to the Exhibit No. 1, would you state the acreage that has been dedicated to each zone of your proposed triple completion?

A The Vacuum-Devonian zone was created by Commission Order R No. 2410. Temporary special rules were set forth in Commission Order No. 2423, and provides for 80-acre proration units. A form C-128 has been filed with the Conservation Commission dedicating the West Half of the Southwest Quarter of Section 25 to the Vacuum-Devonian Pool.

With respect to the Wolfcamp, what is the situation?

A The Wolfcamp or Vacuum-Wolfcamp Pool was created by Commission Order R No. 2422. It also provides for 80-acre proration units, and a form C-128 has been filed with the Conservation Commission dedicating the West Half of the Southwest Quarter of Section 25 to the Vacuum-Wolfcamp zones.



SANTA FE, N. M. PHONE 983-397 Q With respect to the Abo formation, what is the situa-

A The North Vacuum-Abo Pool was created by Commission Order R-2421, and it also provides for 80-acre proration units. Here again we have submitted form C-128 dedicating the West Half of the Southwest Quarter of Section 25 to the Abo zone.

- Q Has your Well No. 5 already been drilled?
- A Yes, sir, it has.
- Q What is the present state of its completion?
- A It's at the present in the final stages of completion.
- Q Has the well been logged?
- A Yes, it has.
- Q Do you have its log available at this time?
- A Exhibit No. 2, a gamma ray sonic log on the State McCallister Well No. 5.
- Q Mr. Barber, would you state when the well was spudded, and give some additional information concerning the actual drilling of the well?
- A Yes, sir, I might add that the total depth, the tops of the producing zones, and the respective perforated intervals have been indicated on this log. The subject well was spudded on December 20, 1962, and it was drilled to a total depth of 12,195 feet. After we ran the open hole logs, 7-inch, 32-pound casing was run and set to 12,193 feet.
  - Q Referring to Exhibit No. 2 where applicable, give to

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the Examiner the information concerning the completion and testing data on each of the three zones in this well.

A The Devonian zone was perforated from 12,004 to 12,018 and from 12,024 to 12,034. It was tested on April 2nd, 1963, after treatment with a total of 6,250 gallons of acid, for 229.35 barrels of oil and 3.54 barrels of acid water in 12 hours, flowing on a 17/64ths inch choke with a GOR of 2282 to 1. The gravity of the crude was 47.8 degrees API at 60 degrees Fahrenheit.

The top allowable for wells in the Vacuum-Devonian Pool is 279 bopd. From this test, we assume that the well will produce top allowable.

We have not run a static bottom hole pressure in this well as yet, except on DST. Now we obtained a pressure of 4514 psig in the Devonian zone from 12,065 to 12,117. The pay section for the Devonian is a fine crystalline dolomite, pinpoint to vuggy porosity. It is my opinion that the reservoir mechanism for the Devonian zone is an active water drive.

- Q The perforations that you indicated for the Devonian are indicated on your Exhibit No. 2?
  - A Yes, sir, they are.
- Q Now referring to the Wolfcamp formation, could you give the information concerning that?
- A The Wolfcamp zone was selectively perforated from 9848 to 9951. It was tested on April the 9th, 1963, after treat-



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ment with a total of 6,000 gallons of acid for 114 barrels of oil and 6 barrels of acid water in eight hours, flowing through a 16/64ths inch choke with a GOR of 1509 to 1. The gravity of its crude was 39.2 degrees API, 60 degrees Fahrenheit.

The top allowable for wells in the Vacuum-Wolfcamp Pool is 172 bond. From this test it may be noted that this well is capable of producing top allowable. This Wolfcamp zone remains shut in at the present time. We have not determined a static bottom hole pressure for the Wolfcamp zone. However, Mobile on their State Bridges No. 95 obtained a pressure of 3624 psig for the Wolfcamp zone on DST.

- And because of the proximity, in the absence of other information, you would expect a test on your well to be similar?
  - Yes, sir, we would.
- Do you have some information concerning the Wolfcamp pay section?
- The pay section in the Wolfcamp zone, a light color dense to fine crystalline chalky lime. It contains up to seven percent porosity, and it is my opinion that the reservoir mechanism for this zone is a solution gas drive.
- Now referring to the Abo formation, would you give the Examiner the completion and testing data concerning that?
- Α The Apo zone was selectively perforated from 9,072 to It was tested on April the 18th, 1963, after treatment with a total of 13,500 gallons of acid. It flowed 148.7 barrels



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of oil and 4.6 barrels of water in twelve hours through a 22/64ths inch choke with a GOR of 991 to 1. The gravity of its crude was 40.0 degrees API, 60 degrees Fahrenheit.

Here again we have not determined a static bottom hole pressure in this well. However, a pressure for the Abo zone of 3205 was determined in Mobile's State Bridges No. 95 on DST. The pay section for this Abo zone is a light-colored finely crystalline dolomite containing up to five percent porosity. It is my opinion this is also a solution gas drive type of reservoir.

Would you care to make any comparisons, Mr. Barber, on the data that you have obtained on your Well No. 5 with the Mobile Bridges State Well No. 95?

. The gas-oil ratios that we obtained on our well compares very favorably with the GOR's obtained on Mobile's well. except that in the Abo zone our ratio was slightly lower. gravity of the crudes were very close to the gravity that Mobile obtained on their State Bridges No. 95.

I believe you stated previously, Mr. Barber, that the Well No. 5 is in the final stages of completion at this time. Are you far enough along that you can give to the Examiner the mechanical installation that will exist in that well?

Α Yes, sir.

Do you have that information prepared in the form of an exhibit?



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Α Exhibit No. 3 is a diagrammatic sketch of the proposed triple completion illustrating the down hole equipment that we used in completion of this well. The casing program which was utilized is indicated thereon. This program conforms with the provisions of Rules 106 and 107 of the General Rules and Regulations, and adequately protects all oil, gas, and waterbearing strata which were encountered in the drilling of this well.

Mr. Barber, on the Exhibit No. 3 that we are submitting, I'm sure it will be noted by the Examiner and by the Commission that some of the information that was originally placed on the exhibit, typed in, has been marked out and changed. Were the changes that have been indicated, are they due to the very recent completion of this well: and does this information that is shown now on this represent the very latest and up-to-date information concerning the mechanical installation of this well?

Yes, sir, it does. We just yesterday completed the final stages of setting our packers. That brought about the changes in the exhibit.

Would you briefly describe the procedure that has been used or will be used to effect this completion?

Α After we perforated the Devonian section, we ran an Otis Type WA packer on wireline and set this packer at 11,850 This packer was run with the tailpipe, the end nipple. and the circulating valve attached. Following this, the Devonian



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section was treated and tested. Upon completion of the test of the Devonian section, the circulating valve was closed. This isolated the Devonian section.

We then ran a Halliburton retrievable bridge plug and set it at 10,050 feet. We then perforated the Wolfcamp zone, treated and tested it. The bridge plug was then moved to 9264 and the Abo zone was perforated, treated, and tested.

Following the test on the Abo zone, the bridge plug was removed from the well and the number one or Devonian tubing string was run, and this tubing string included the upper and middle packers. Also the Wolfcamp tubing string between the upper and middle packers was run at the same time that the number one tubing string was run. Next the number two or Wolfcamp tubing string was run and latched into the upper packer. Finally, the number three tubing string was run and latched into the upper packer.

The I.D. of the number one and number three tubing strings is the same, or 1.995 inches, while the I.D. of the number two string is 1.67 inches. The well head equipment that we used conforms with the provisions of Rule 115 of the General Rules and Regulations.

Mr. Barber, you have referred to these various packers that have been used in the completion of this well. Would you describe in a little more detail the operation, the character-istics of those packers?



A The upper packer is a Brown HS-173C packer. This packer is set running a blanking plug and putting in the landing nipple on the number three tubing string. Pressure is then applied to the tubing. This actuates a cylinder built within the packer, which engages your slips against the casing. This pressure is maintained by check valve arrangement built within the packer.

Now the middle packer is a Brown HS-212C. This is very similar to the upper packer, with the exception it has two three-quarter inch steel rods built within the packer. These rods have slips that are actuated against them when you set the packer. These slips on these two rods maintain a mechanical positive set of the packer at all times.

- Q Have you covered the bottom-most packer?
- A The bottom-most packer is an Otis WA packer. This is run and set on a wireline and it has opposing sets of slips and is very similar to a Baker Model "D" packer.
- Mr. Barber, in your opinion is the installation as you have described it in accordance with sound engineering and conservation practices?
- A Yes, sir, it is. This type of installation has proven satisfactory throughout the Permian Basin.
- Q Will it be possible with this installation to make the necessary tests required by the Commission and for your own use?



By utilizing this equipment it is possible Yes, sir. to measure the reservoir pressure from each separate zone without having to shut in the zones not being tested. The surface equipment is such that the oil and gas production can be separately and accurately measured.

Will you have a corrosion problem with respect to any of these three zones?

We anticipate no corrosion problem with these zones. This conclusion is arrived at due to the fact that these zones are characteristically sweet and offer little or no corrosion problem.

Now referring to the Devonian reservoir here, would you amplify your remarks concerning the drive mechanism that you expect in that pool and then go into the method by which you expect to produce that zone?

As I have stated, it is my opinion that the Devonian zone is under an influence of an active water drive. Therefore it is reasonable to assume that it will have a relatively long flowing life. It should not be necessary to install artificial lift facilities until our water production is such that the well will not flow with the available bottom hole pressure. If artificial lift does become necessary, it is my opinion that we can efficiently lift the Devonian zone by gas lift means.

It may be noted, as I pointed out, that we have a HS-173C Brown packer. We could install gas lift valves above



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this packer and be able to lift the Devonian production. By equipping this 2-3/8ths inch tubing with gas lift valves approximately 1,000 barrels of fluid per day could be lifted from the Devonian zone. It is my opinion that this zone, the Devonian zone, could be safely, efficiently, and effectively depleted by this method.

Q Those gas lift valves that you are referring to are not presently installed for this zone, however?

A No, sir, that is true. The gas lift valves which are shown on Exhibit No. 3, or in the number three are in the Abo tubing strings. They have been installed at this time.

Could you give us the same information concerning the method by which you expect to produce the Wolfcamp and Abo formations?

A We assume that the Wolfcamp and Abo zones are solution gas drive types of reservoirs. Therefore, they should experience long flowing lives. However, the test that we obtained on the Abo zone was not a real strong test. Therefore, we ran gas litt valves on this tubing string on the initial completion in the form of, you might say, insurance. If we do have to utilize this string of gas lift valves and install gas lift valves on the Wolfcamp zone, I believe that these two zones can efficiently be lifted by gas lift means.

We anticipate approximately four barrels of oil per day can be lifted from the Wolfcamp zone, and approximately 200



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ALBUQUEROUE, N. M. PHONE 243.6691 barrels of oil per day from the Abo zone through gas lift means.

It is my opinion that these two zones can safely, efficiently

and effectively be depleted by this method.

expect to produce these zones, could you also pump the zones by conventional rod pumping methods, if that should be necessary?

A Yes, sir, we could. It would not probably be the best installation, pumping from beneath packers, but it has been done and is being done.

- Q You don't expect to have to do that?
- A No, sir, we don't.
- Q Do you have an estimate of the cost of drilling and completing in this well?

A The calculated cost for drilling and triple completing the State McCallister Well No. 5 is estimated to be \$341,355.00. The calculated cost for drilling a single well to each of these three zones is estimated to be \$690,075.00. Based on these calculations, by triple completing State McCallister Well No. 5 would result in a savings of \$348,720.00.

Q In view of the data that you have on the Abo formation at the present time, would a single zone completion in that formation be feasible?

A No, sir, it would not. As indicated on Exhibit No. 2, we had up to five percent porosity in this zone, and the well did not display strong flowing tendencies. Therefore, it would



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seem uneconomical to drill a single well to this zone.

- Q Then completion in the Abo would be feasible in this area only as part of this multiple completion?
  - A Yes, sir, that is true.
- Q For that reason, would you say that the ultimate recovery of oil from these three zones would be enhanced by being allowed to complete multiply in the three zones?
  - A Yes, sir, I believe that it would.
- By your completion in the manner as you've described it, will oil from any of the three zones be sacrificed?
- A No, sir. We can recover ultimately as much oil through a triple completion as we could through single wells to these three zones.
- Q Would you state generally, Mr. Barber, your opinion with reference to the effect of the approval of this application upon conservation?
- A This authority to triple complete this well is in the interest of conservation and will protect correlative rights.

  It is my opinion it will prevent the drilling of unnecessary wells.
- Were Exhibits 1 and 3 prepared under your direction, and the information that you have yourself placed on Exhibit No. 2 done by you?
  - A Yes, sir, that is true.
    - MR. MORRIS: We offer at this time, Mr. Examiner,



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id . M.

Exhibits 1, 2, and 3, and that concludes our presentation at this time.

MR UT7: Without objection Exhibits 1, 2, and 3

MR. UTZ: Without objection, Exhibits 1, 2, and 3 will be entered into the record of this case.

(Whereupon, Applicant's Exhibits Nos. 1, 2, and 3 admitted in evidence.)

### CROSS EXAMINATION

### BY MR. UTZ:

- Q In regard to your cementing program on your seven-inch, the 330 sacks Inferno, I gather Inferno is the type cement?
  - A Yes, sir, it's a slow-set type of cement.
  - Q What is the top of that cement?
  - A Our seven-inch?
  - Q Yes.
  - A The top is marked at 3470.
  - Q Where is that marked?
- A It's right above the casing shoe of the intermediate string on the left-hand side of the exhibit.
  - Q It was so obvious I couldn't see it.
- A We have two D.V. tools in the seven-inch casing string. This will cement it by three stages.
- Q So you have a solid column of cement from the bottom of the seven-inch up to 3479?
  - A Yes, that is true.
  - Now with reference to the circulating valves shown on



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Exhibit 3, what is the purpose of those valves?

- For spacing the annulus.
- Q I see.
- The one on the number three tubing string has been omitted. The short tubing string, the Abo, it's no longer in there.
- Q Oh, yes. Where did you say your gas lift valves were located?
- Α They are located in the number three or Abo tubing I don't have the spacing on those valves.
- If you use those valves, you will use gas from the surface?
  - A Yes, sir, that is correct.
  - And it will be metered and accounted for?
  - Yes, sir, that is correct.
- Have you accomplished packer leakage tests on this Q well yet?
  - Α No, sir, we have not had sufficient time to do that.
  - You do intend to accomplish those tests and report them?
  - Yes, sir, we do.
- MR. UTZ: Are there other questions of the witness? The witness may be excused.

(Witness excused.)

MR. MORRIS: That's all we have to offer, Mr. Examiner.

MR. UTZ: Are there any statements to be made in this



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The case will be taken under advisement. case?

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 before the New Mexico Oil Conservation Commission was reported by me, and that the same is a true and correct record of the said proceedings, to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal this 3rd day of May, 1963.

My Commission Expires:

June 19, 1963.

I do hereby certify that the foregoing is a complete record of the proceedings in the Excliner hearing of tage Ho. 27.95. heard by he on Ops.

, Examiner New Mexico Oil Conservation Commission



### BEFORE THE OIL CONSERVATION COMMISSION OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION COMMISSION OF NEW MEXICO FOR THE PURPOSE OF CONSIDERING:

> CASE No. 2795 Order No. R-2479

APPLICATION OF MARATHON CIL COMPANY FOR A TRIPLE COMPLE-TION, LEA COUNTY, NEW MEXICO.

### ORDER OF THE COMMISSION

### BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on April 24, 1963, at Santa Fe, New Mexico, before Elvis A. Utz, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 8th day of May, 1963, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Elvis A. Utz, and being fully advised in the premises,

### FINDS:

- (1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.
- (2) That the applicant, Marathon Oil Company, seeks authority to complete its State McCallister Well No. 5, located in Unit M of Section 25, Township 17 South, Range 34 East, NMPM, Lea County, New Mexico, as a triple completion (conventional) to produce oil from the North Vacuum-Abo Pool through 2 3/8-inch tubing, the Vacuum-Wolfcamp Pool through a parallel string of 2-inch tubing, and the Vacuum-Devonian Pool through a parallel string of 2 3/8-inch tubing, with separation of zones by packers set at approximately 8917 feet, 9672 feet, and 11,850 feet.
- (3) That the mechanics of the proposed triple completion are feasible and in accord with good conservation practices.
- (4) That approval of the subject application will neither cause waste nor impair correlative rights.

-2-CASE No. 2795 Order No. R-2479

### IT IS THEREFORE ORDERED:

(1) That the applicant, Marathon Oil Company, is hereby authorized to complete its State McCallister Well No. 5, located in Unit M of Section 25, Township 17 South, Range 34 East, NMPM, Lea County, New Mexico, as a triple completion (conventional) to produce oil from the North Vacuum-Abo Pool through 2 3/8-inch tubing, the Vacuum-Wolfcamp Pool through a parallel string of 2-inch tubing, and the Vacuum-Devonian Pool through a parallel string of 2 3/8-inch tubing, with separation of zones by packers set at approximately 8917 feet, 9672 feet, and 11,850 feet.

PROVIDED HOWEVER, That the applicant shall complete, operate, and produce said well in accordance with the provisions of Rule 112-A of the Commission Rules and Regulations insofar as said rule is not inconsistent with this order.

PROVIDED FURTHER, That the applicant shall take packer-leakage tests upon completion and annually thereafter during the Gas-Oil Ratio Test Period for the Vacuum-Devonian Pool.

(2) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Lanta Fe, New Mexico, on the day and year herein-above designated.

STATE OF NEW MEXICO OIL CONSERVATION COMMISSION

CK M. CAMPBELL, Chairman

E. S. WALKER, Member

A. L. PORTER, Jr., Member & Secretary

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