CASE 3075: Application of MARATHON OIL CO. for a special gas well, Eddy County, N. M.

CASE NO.
3075

Application,
Transcripts,
Small Exhibits
ETC.

4000 to 1. Applicant further seeks the establishment of an administrative procedure whereby interference tests could be conducted and allowables transferred.

CASE 3074: Application of Continental Oil Company for an amendment of Order No. R-2385, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Order No. R-2385 to substitute for water injection purposes a well located in Unit H of Section 9, Township 17 South, Range 29 East, Eddy County, New Mexico, for the presently authorized well in Unit I of said Section 9.

CASE 3075: Application of Marathon Oil Company for a special gas well test, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to produce and flare approximately 1000 MCF per day for a period of not less than three nor more than 30 days from Tom Brown Drilling Company's Antelope Sink Unit Well No. 1, located in Unit G of Section 18, Township 19 South, Range 24 East, Eddy County, New Mexico, in an effort to evaluate the reservoir.

CASE 3076: Application of Marathon Oil Company for a non-standard oil proration unit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of an 80-acre non-standard proration unit comprising the SE/4 NW/4 and NE/4 SW/4 of Section 31, Township 17 South, Range 35 East, Vacuum-Upper Pennsylvanian Pool, Lea County, New Mexico, said unit to be dedicated to its State Warn A/1 Well No. 3, located in Unit F of said Section 31.

CASE 3038: (Reopened)
Application of Kennedy Oil Company for a waterflood project and for designation of a waterflood buffer zone, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Square Lake Pool by the injection of water into the Grayburg-San Andres formation through one well located in Unit L of Section 20, Township 16 South, Range 31 East, Eddy County, New Mexico. Applicant further seeks the designation of the N/2 SW/4 of said Section 20 as a buffer zone offsetting Newmont Oil Company's Waterflood Project immediately south.

Docket No. 18-64

DOCKET: EXAMINER HEARING - WEDNESDAY - JULY 1, 1964

9 A.M. - OIL CONSERVATION COMMISSION CONFERENCE ROOM, STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

The following cases will be heard before Elvis A. Utz, Examiner, or Daniel S. Nutter, alternate examiner:

CASE 3063: (Continued from June 10th Examiner Hearing)
Application of R. C. Davoust Company for a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Turkey Track Section 3 Unit Area comprising 480 acres of State land in Section 3, Township 19 South, Range 29 East, Eddy County, New Mexico.

CASE 3064: (Continued from June 10th Examiner Hearing)
Application of R. C. Davoust Company for a waterflood expansion, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the expansion of the Turkey Track Queen Waterflood Project in Section 34, Township 18 South, Range 29 East and Section 3, Township 19 South, Range 29 East, Turkey Track Field, Eddy County, New Mexico, to include the Grayburg formation.

CASE 3070: Application of Nearburg & Ingram and Kincaid & Watson Drilling Company for a waterflood project, Eddy County, New Mexico. Applicants, in the above-styled cause, seek authority to institute a waterflood project in the Square Lake Pool by the injection of water into the Grayburg formation through three wells located in Section 6, Township 17 South, Range 30 East, Eddy County, New Mexico.

CASE 3071: Application of Texas Pacific Oil Company for a dual completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the dual completion (conventional) of its J. P. Collier Well No. 1 located in Unit F of Section 10, Township 11 South, Range 33 East, Lea County, New Mexico, to produce oil from the North Bagley-Upper Pennsylvanian Pool and an undesignated Middle Pennsylvanian Pool through 2 1/16 inch tubing.

CASE 3060: (Reopened)
Application of Frank Darden for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Artesia Pool in his Cowtown Unit Area by the injection of water into the Grayburg and San Andres formations through two injection wells in Sections 13 and 24, Township 18 South, Range 28 East, Eddy County, New Mexico.

CASE 3072: Application of Coastal States Gas Producing Company for the extension of a pool and for special temporary pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the extension of the Flying "M" San Andres Pool in Township 9 South, Range 33 East, Lea County, New Mexico, and temporary special rules therefor, including a provision for 80-acre well spacing and proration units.

CASE 3073: Application of Texaco Inc., for the creation of a new oil pool and for special temporary pool rules, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new oil pool for Pennsylvanian production for its Navajo Tribal AL Well No. 1 located in Unit H of Section 28, Township 26 North, Range 18 West, San Juan County, New Mexico, and for the establishment of temporary pool rules including a provision for 160-acre spacing and a GOR limitation of

MARATHON OIL COMPANY
FORMERLY THE OHIO OIL COMPANY

P. O. BOX 552
MIDLAND, TEXAS

June 9, 1964

New Mexico Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico
Attention Mr. Daniel S. Nutter

Re: Reservoir Limits Test
Tom Brown Drilling Company's
Antelope Sink Unit Well No. 1
Eddy County, New Mexico

Dear Sir:

Marathon Oil Company requests permission to conduct a reservoir limits test on Tom Brown Drilling Company's Antelope Sink Unit Well No. 1, located 1890' FNL and 2070' FEL of Section 18, T-19-S, R-24-E, Eddy County, New Mexico. This well is located in the Antelope Sink Unit comprised of 3721.2 acres and is completed in the Cisco formation of Pennsylvanian age from 6148' to 6366'. Marathon proposes to flow the subject well to the atmosphere at a daily rate of approximately one million cubic feet of gas for a period of from three to thirty days. It is proposed to produce this well at this rate until the limits of the reservoir have been determined or sufficient reserves have been proved to justify subsequent drilling operations. The gas will be flowed through conventional surface separating facilities and the bottom hole conditions will be recorded continuously with a bottom hole pressure gauge. Under the Unit Agreement the drilling of the next development well will have to be commenced before September 24, 1964. A period of several weeks may be needed to analyze the results of this test and commence drilling operations.

Tom Brown Drilling Company as operator of this well, and Carper Drilling Company and Southern Minerals Corporation as other operating interests have been contacted and have given their approval for Marathon to conduct this test.

It is Marathon's belief that no correlative rights would be damaged as a result of this test.

There is no present market for the production from the subject well and no reasonable expectation of a market unless additional proven reserves are in the area.

We respectfully request administrative authority to conduct the proposed test to the full extent deemed appropriate by the Commission. In the event that administrative approval cannot be granted, it is requested that this application be set for the Examiners Docket for July 1, 1964. We are sending a copy of this letter to the State Land Commissioner's office and request their concurrence.

Yours very truly,

Ned R. Daniels

Ned R. Daniels
Petroleum Engineer

NRD/jh

cc: State Land Commissioner
Santa Fe, New Mexico

New Mexico Oil Conservation Commission
Artesia, New Mexico

Re: Reservoir Limits Test,
Tom Brown Drilling Company's
Antelope Sink Unit Well No. 1,
Eddy County, New Mexico

I hereby authorize Marathon Oil Company to conduct a Reservoir Limits Test on the Tom Brown Drilling Company's Antelope Sink Unit Well Number 1, located 1890' FNL and 2070' FEL of Section 18, T-~~19~~-S, R-~~34~~-24-E, Eddy County, New Mexico. Marathon proposes to flow the subject well to the atmosphere at a daily rate of approximately 1,000,000 cubic feet of gas for a period of from three to thirty days. It is proposed to produce this well at this rate until the limits of the reservoir have been determined or sufficient reserves have been proved to justify subsequent drilling operations.

Marshall Rowley, Exec. Vice-Pres.
CARPER DRILLING COMPANY, INC.
Date June 22, 1964

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
Marathon EXHIBIT NO. 2
CASE NO. 3075

Re: Reservoir Limits Test,
Tom Brown Drilling Company's
Antelope Sink Unit Well No. 1,
Eddy County, New Mexico

I hereby authorize Marathon Oil Company to conduct a Reservoir Limits Test on the Tom Brown Drilling Company's Antelope Sink Unit Well Number 1, located 1890' FNL and 2070' FEL of Section 18, T-19-S, R-~~34~~-24-E, Eddy County, New Mexico. Marathon proposes to flow the subject well to the atmosphere at a daily rate of approximately 1,000,000 cubic feet of gas for a period of from three to thirty days. It is proposed to produce this well at this rate until the limits of the reservoir have been determined or sufficient reserves have been proved to justify subsequent drilling operations.

J. H. Winters

SOUTHERN MINERALS CORPORATION

Date 6-22-64

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
Maria Hunt EXHIBIT NO. 5
CASE NO. 5075

Re: Reservoir Limits Test,
Tom Brown Drilling Company's
Antelope Sink Unit Well No. 1,
Eddy County, New Mexico

I hereby authorize Marathon Oil Company to conduct a Reservoir Limits Test on the Tom Brown Drilling Company's Antelope Sink Unit Well Number 1, located 1890' FNL and 2070' FEL of Section 18, T-19-S, R-~~34~~ 24-E, Eddy County, New Mexico. Marathon proposes to flow the subject well to the atmosphere at a daily rate of approximately 1,000,000 cubic feet of gas for a period of from three to thirty days. It is proposed to produce this well at this rate until the limits of the reservoir have been determined or sufficient reserves have been proved to justify subsequent drilling operations.

Thomas C. Brown
TOM BROWN DRILLING COMPANY - President
Date June 18, 1964

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
Marathon EXHIBIT NO. 4
CASE NO. 2955

MARATHON OIL COMPANY
FORMERLY THE OHIO OIL COMPANY

MAIN OFFICE OCC
1964 JUN 10 AM 11:35

P. O. BOX 552
MIDLAND, TEXAS
June 9, 1964

New Mexico Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico
Attention Mr. Daniel S. Nutter

Re: Reservoir Limits Test
Tom Brown Drilling Company's
Antelope Sink Unit Well No. 1
Eddy County, New Mexico

Dear Sir:

Marathon Oil Company requests permission to conduct a reservoir limits test on Tom Brown Drilling Company's Antelope Sink Unit Well No. 1, located 1890' FNL and 2070' FEL of Section 18, T-19-S, R-24-E, Eddy County, New Mexico. This well is located in the Antelope Sink Unit comprised of 3721.2 acres and is completed in the Cisco formation of Pennsylvanian age from 6148' to 6366'. Marathon proposes to flow the subject well to the atmosphere at a daily rate of approximately one million cubic feet of gas for a period of from three to thirty days. It is proposed to produce this well at this rate until the limits of the reservoir have been determined or sufficient reserves have been proved to justify subsequent drilling operations. The gas will be flowed through conventional surface separating facilities and the bottom hole conditions will be recorded continuously with a bottom hole pressure gauge. Under the Unit Agreement the drilling of the next development well will have to be commenced before September 24, 1964. A period of several weeks may be needed to analyze the results of this test and commence drilling operations.

Tom Brown Drilling Company as operator of this well, and Carper Drilling Company and Southern Minerals Corporation as other operating interests have been contacted and have given their approval for Marathon to conduct this test.

It is Marathon's belief that no correlative rights would be damaged as a result of this test.

There is no present market for the production from the subject well and no reasonable expectation of a market unless additional proven reserves are in the area.

DOCKET MAILED
Date 6-17-64

We respectfully request administrative authority to conduct the proposed test to the full extent deemed appropriate by the Commission. In the event that administrative approval cannot be granted, it is requested that this application be set for the Examiners Docket for July 1, 1964. We are sending a copy of this letter to the State Land Commissioner's office and request their concurrence.

Yours very truly,

Ned R. Daniels

Ned R. Daniels
Petroleum Engineer

NRD/jh

cc: State Land Commissioner
Santa Fe, New Mexico

New Mexico Oil Conservation Commission
Artesia, New Mexico

Case 3075

TRANSWESTERN PIPELINE COMPANY
FIRST CITY NATIONAL BANK BUILDING
HOUSTON, TEXAS
MAIL ADDRESS
P. O. BOX 1502
HOUSTON 1, TEXAS

June 19, 1964

New Mexico Conservation Commission
Santa Fe, New Mexico

Gentlemen:

With regard to the hearing scheduled for July 1, 1964, concerning application of Marathon Oil Company to produce and flare approximately 1000 Mcf of gas per day for three to 30 days from Tom Brown Drilling Company's #1 Antelope Sink Unit well (Sec. 18, T19S, R24E, Eddy County, New Mexico):

As soon thereafter as possible may we please have copies of any engineering and geological exhibits entered in the hearing.

Yours very truly,

Lewis Rogers

LWR:ee

Lewis W. Rogers, Jr.

GOVERNOR
JACK M. CAMPBELL
CHAIRMAN

State of New Mexico
Oil Conservation Commission

LAND COMMISSIONER
E. S. JOHNNY WALKER
MEMBER

P. O. BOX 871
SANTA FE

STATE GEOLOGIST
A. L. PORTER, JR.
SECRETARY - DIRECTOR

July 15, 1964

Mr. Richard S. Morris
Seth, Montgomery, Federici & Andrews
Attorneys at Law
Post Office Box 2307
Santa Fe, New Mexico

Case No. 3075
Order No. R-2741
Applicant:
Marathon Oil Company

Dear Sir:

Enclosed herewith are two copies of the above-referenced Commission order recently entered in the subject case.

Very truly yours,

A. L. Porter, Jr.

A. L. PORTER, Jr.
Secretary-Director

ir/

Carbon copy of order also sent to:

Hobbs OCC x
Artesia OCC x
Aztec OCC
OTHER Mr. Warren B. Leach, Jr.

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. 3075
Order No. R-2741

APPLICATION OF MARATHON OIL COMPANY
FOR A SPECIAL GAS WELL TEST, EDDY
COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on July 1, 1964, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this 15th day of July, 1964, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, 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 conduct a reservoir limits test in the Antelope Sink Unit Area by producing and venting not more than one million cubic feet of gas per day for a period not to exceed 30 days from the Tom Brown Drilling Company Antelope Sink Unit Well No. 1, located 1890 feet from the North line and 2070 feet from the East line of Section 18, Township 19 South, Range 24 East, NMPM, Eddy County, New Mexico.

(3) That approval of the subject application will permit the applicant to gather valuable information concerning reservoir characteristics in the Antelope Sink Unit Area.

(4) That the proposed venting of gas will constitute beneficial use of natural gas.

(5) That the reservoir information obtained from the proposed reservoir limits test should enable the unit operator to develop the Antelope Sink Unit Area in a more efficient and orderly manner, thereby preventing waste.

IT IS THEREFORE ORDERED:

(1) That the applicant, Marathon Oil Company, is hereby authorized to conduct a reservoir limits test in the Antelope Sink Unit Area by producing and venting not more than one million cubic feet of gas per day for a period not to exceed 30 days from the Tom Brown Drilling Company Antelope Sink Unit Well No. 1, located 1890 feet from the North line and 2070 feet from the East line of Section 18, Township 19 South, Range 24 East, NMPM, Eddy County, New Mexico.

(2) That Marathon Oil Company shall notify the District Supervisor, Oil Conservation Commission, District No. 2, Artesia, New Mexico, in writing of the exact time and date the gas well test authorized by this order will commence.

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

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

JACK M. CAMPBELL, Chairman

E. S. WALKER, Member

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

esr/

MARATHON OIL COMPANY

MAIN OFFICE OCC

July 21, 1964

1964 JUL 22 PM 1:19

P. O. Box 220
Hobbs, New Mexico

Case 3076

New Mexico Oil Conservation Commission
Drawer DD
Artesia, New Mexico

Attention: Mr. Mose Armstrong,
District Director

Re: Reservoir Limits Test,
Tom Brown Drilling Company's
Antelope Sink Unit, Well #1,
Unit "G", Sec. 18, T. 19S. R. 24E
Eddy County, New Mexico

Dear Sir:

Reference is made to Commission Order No. R-2741 wherein Marathon Oil Company was granted authority to conduct a reservoir limits test on the above referenced well. Authority was granted to conduct the test for a period of three to thirty days duration and at a flow rate not greater than 1000 MCF per day. It is Marathon's intention to start the subject reservoir limits test on the morning of July 27, 1964.

Yours very truly,

MARATHON OIL COMPANY
Engineering Department

John R. Barber
Area Petroleum Engineer

JRB:bje

cc: NMOCC - Santa Fe

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
July 1, 1964

EXAMINER HEARING

IN THE MATTER OF:

Application of Marathon Oil Company for a special gas well test, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to produce and flare approximately 1000 MCF per day for a period of not less than three nor more than 30 days from Tom Brown Drilling Company's Antelope Sink Unit Well No. 1, located in Unit G of Section 18, Township 19 South, Range 24 East, Eddy County, New Mexico, in an effort to evaluate the reservoir.

Case No. 3075

BEFORE: ELVIS A. UTZ, Examiner

TRANSCRIPT OF HEARING

MR. UTZ: Case 3075.

MR. DURRETT: Application of Marathon Oil Company for a special gas well test, Eddy County, New Mexico.

MR. LEACH: Mr. Examiner, I'm Warren B. Leach, Junior, representing Marathon. I'm a member of the Texas Bar. I believe Mr. Richard Morris has made an appearance for me in this case.

MR. UTZ: Yes, sir, he did.

MR. LEACH: I have one witness.

(Witness sworn.)

MR. LEACH: As a preface to our testimony in this case, I would like to state this, that there are some aspects of this testing procedure about which we'll testify, particularly the formula, the mathematics, and one thing and another involved in the analysis of the results of the actual production of the well that are extremely complex in nature. We'll do our best to explain this in an understandable manner.

We'll make every effort to give you enough information, background about the area, and the basis for the test that it might be understandable; and we'll be happy to answer any questions we can, but it is a very difficult and complex thing to explain.

ROBERT P. SCOTT

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

DIRECT EXAMINATION

BY MR. LEACH:

Q State your full name.

A Robert P. Scott.

Q By whom are you employed?

A I am employed by Marathon Oil Company in the Houston Division Office as a Petroleum Engineer.

Q Mr. Scott, have you testified before the New Mexico Oil Conservation Commission before?

A I have.

Q And your qualifications as an expert witness were there recited?

A Yes.

MR. LEACH: Are his qualifications acceptable?

MR. UTZ: Yes, sir.

Q (By Mr. Leach) Are you familiar with Marathon's application in this case for authority to conduct a special gas well test of the Antelope Sink Unit Well No. 1?

A Yes, sir, I am.

Q Will you state just generally what the maximum rates and maximum times were that were included?

A Our application asks for permission to test the well for a period from three to thirty days at a rate not to exceed a million cubic feet per day.

Q What type of test is this; what is it known as?

A Probably the most descriptive name for this particular test is a drawdown test, bottom hole pressure drawdown test. It is sometimes called a reservoir limit test.

Q Have you prepared or had prepared under your supervision and direction a plat showing the location of this well and other data?

A Yes.

(Whereupon, Applicant's Exhibit No. 1 marked for identification.)

MR. LEACH: I believe one copy of this map has now been marked as an exhibit.

MR. UTZ: Right.

MR. LEACH: This is Marathon's Exhibit 1, then.

Q (By Mr. Leach) What does this exhibit reflect?

A This exhibit reflects the location of the well in Section 18, Township 19 South of Range 24 East. The well is circled in red on the map. It shows outlined in green the Antelope Sink Unit.

Q Now the Antelope Sink Unit is the northeasterly area outlined in green, is that correct?

A That's right.

Q What is the southwesterly area outlined in green?

A That is the West Antelope Sink Unit.

Q The unit involved in this hearing is which of these units?

A The Antelope Sink Unit.

Q Who is the operator of this unit?

A Tom Brown Drilling Company.

Q Why is it that Marathon is the Applicant in this case instead of Tom Brown Drilling Company?

A Marathon has a thirty percent working interest in this unit. Marathon has conducted several of this type of tests in the past. Marathon has available to it as equipment from our Denver Research Center some very specialized bottom hole pressure equipment which will be used in the testing of the well. The other working interest owners don't have this equipment available to them.

Q Have the working interest owners consented to and authorized Marathon to conduct this test?

A They have.

MR. LEACH: May I ask that these be marked 2, 3, and 4?

(Whereupon, Applicant's Exhibits Nos. 2, 3, and 4 marked for identification.)

Q (By Mr. Leach) Are you familiar with the letters which Marathon has received from the operators, authorizing this test to be conducted?

A Yes, I am. The letters that are just being marked as Exhibits 2, 3, and 4 are letters from the other working interest owners.

Q These are all of the working interest owners in the Antelope Sink Unit?

A Yes.

Q In addition to Marathon?

A Yes, in addition to Marathon. Carper Drilling, Southern Minerals, and Tom Brown Company.

Q Have they all agreed to share their proportionate share of the cost of running the test?

A They have, although it is not set out in the letters. They have agreed to share in the cost of the test.

Q Now, Mr. Scott, referring to your exhibit, will you describe the formation in which this Antelope Sink Unit Well No. 1 is completed, and other pertinent data concerning the nature of the production?

A On the left hand side of this exhibit there is a log section of the Tom Brown Drilling Company Antelope Sink Unit No. 1. In an interval titled Lower Wolfcamp on the log at about a 6200-foot depth, this is the interval which is perforated in this well.

Q It's perforated at approximately 6200 feet?

A Approximately 6200 feet. Actually there are several such perforations scattered through an interval there.

Q What is the nature of the productive horizon?

A It is a carbonate.

Q What is the nature of the production itself?

A The production from this zone is, as indicated by the multi-point back pressure test run on the well, it is a gas well. The multi-point back pressure test indicated it to be a dry gas

completion.

Q What is the potential of this well?

A The multi-point back pressure test indicated a calculated open flow of 2.1 million cubic feet per day.

Q When was the well completed?

A The well was completed in September of 1963.

Q Directing our attention to the desirability for the running of this particular test, do the operators in this unit know anything concerning this reservoir except that which they have gained from the drilling and completion of this Antelope Sink Unit Well No. 1?

A No. What information was gained from the drilling and the logging of this well, and the open flow test, is all the information that's available to us. There's no core information available on the well. We have log analysis to give us an indication of porosity; we have log analysis to give us an indication of effective pay such as this.

Q Are there any other wells in the area productive in this horizon?

A No, there are not.

Q So that Marathon and the other operators really have a very limited knowledge of the nature of this reservoir?

A That's right.

Q Where is the nearest pipeline market to this area?

A At the present time the closest pipeline outlet to this particular unit area is some sixteen miles to the northeast in the Atoka Pool area.

Q Are the reserves that are known as a result of the completion of this Unit Well No. 1 adequate to justify construction of a pipeline to that market?

A It would be my conclusion from the information available at the present time that there is not sufficient knowledge of the reserves available. Any reserve knowledge that we would have at this time would be based strictly on volumetric calculations which must of necessity assume a drainage area.

Q Are there other gas reserves presently in existence closer to this Antelope Sink Unit Area?

A Than the Atoka, yes, there is the Indian Basin Field Area which is some twelve miles to the south-southeast.

Q Is there a pipeline there?

A No, there is not, and Marathon is a working interest owner in this area and it is our expectation that it will be another two years until we have a pipeline connection in that field.

Q Are there sufficient reserves known in the Antelope Sink Unit as a result of this one well to justify the construction of a pipeline to the Atoka -- What was this?

A From the Atoka Pool, some sixteen miles. I would have to assume there is not, from my knowledge of it.

Q Are you familiar with the Unit Agreement for the Antelope Sink Unit?

A I have looked it over. I'm not thoroughly familiar with it.

Q Are you familiar with the fact that the operator of this unit has advised the New Mexico Land Commissioner that his present plans are to commence the drilling of a second well in the Antelope Sink Unit on or before September 25, 1964?

A Yes, sir, I am.

Q Is it desirable, from an operator's standpoint, then, to gain as much information as possible concerning this reservoir prior to that time?

A Yes, it is my conclusion that it would be.

Q With regard to the benefits that might be obtained as a result of running this test, Mr. Scott, if the test reflects the existence of a large reservoir, what effect will this have upon the economics of constructing a pipeline to the nearest market?

A If, in the tests that we propose, if we find what is indicated to be a large reservoir, or if we find that we do not define the limits of a reservoir by this test, this will give us additional information which would assist us in our evaluation of the prospects of drilling additional wells. The drilling of additional wells is the only thing that will bring a pipeline into this field.

Q If this test reflects that this is an extremely small reservoir, what benefit would be gained by running the test?

A The benefit that would be gained is that Marathon and the other working interest owners would not have to drill an unnecessary well.

Q Now then, let's describe generally, Mr. Scott, the nature of the equipment that will be used in connection with this test. Will you please describe the nature of the equipment in the hole and on the surface that will be used?

A Well, briefly, in the hole there will be an extremely accurate bottom hole pressure gauge. This gauge is the gauge that has been constructed by Marathon's Research Center in Denver. This will be connected to the surface through a three-conductor cable tool recording device. The indication of pressure will be recorded on the surface.

Q Now the interesting feature of this gauge or bomb is that whereas most bombs record pressure internally in the hole, at the bottom of the hole, this one records continually the pressure on the surface, is that correct?

A It can be made to record continually the pressure on the surface. That is, the recording is being made on the surface while the pressure is being sensed at the bottom of the hole.

Q What other equipment will there be in the hole?

A No other equipment in the hole, other than the tubing

that the well produced through. On the surface, the well will be produced through a heater, a line heater, and then two-stage separation equipment. The gas will be metered through a meter. There will be a tank provided for the accumulation of any condensate or gas well liquids that might be produced. This is pretty much standard equipment.

Q What are the particular facts that will be obtained during the course of the test? Is it pressure only that will be recorded?

A Well, no, not only, however, this is the most important factor. The gauge in the hole will send a signal to the surface which will give an indication of the bottom hole pressure performance during the test. There will also be, as an added factor, there will also be a measurement of temperature sent from down the hole to the surface. This is built into the same gauge, though.

Q Will you describe, please, the procedure that will be followed in actually getting this equipment to the well site, in the hole, and then actually running the test procedure?

A Upon receiving approval to run this test, we would move our production equipment, that is, it's mostly rental equipment to be moved to the location. We would request our Denver Research Center to send the bottom hole pressure measurement equipment to the location.

When all of this equipment arrived on location, the

bottom hole pressure gauge would be lowered in the hole, set at the pressure measurement depth. There will then be a brief flow period during which the production equipment will be pressure tested and checked for functional operation, proper functional operation. At the same time, the pressure temperature sensing equipment will be tested with the bomb in the hole.

Q As the test is conducted, will you explain that, please?

A Well, following this necessary pressure testing and functional checking of the equipment, we will allow sufficient time -- I imagine it would be from one to three days -- to allow the reservoir pressure, the bottom hole pressure to reach a static built-up condition. As soon as we are assured that the pressure has reached a static condition, we will then open the well to a choke size which we think will give us an appropriate production rate.

We will attempt to maintain this production rate as accurately as we can. We will take a continuous measurement of the bottom hole pressure performance while the well is being produced. Specifically, this measurement of pressure will be recorded at the surface on magnetic tape. This will be an electronic signal generated at the bottom of the hole, which will be an indication of the pressure being measured by the gauge. This electronic signal will be recorded on magnetic tape at the surface on a tape recorder device.

For the first part of the test we would probably, we would run a continuous measurement of pressure. This will take about, well, very close to two hours to fill one tape. That tape would then be removed, another tape put in its place on the tape recorder. The indication of pressure cannot be read out while it is being measured, but only after the tape has been removed from the recorder. When we put another tape on the machine, we would either run another continuous tape, and this would be determined by well conditions at the time, what information we'd gained during the early part of the test -- either run another continuous test or we would change the timing on the recording equipment at the surface and we would record a two-minute pressure indication every fifteen minutes.

This would take about twelve hours, then, to fill one tape. After we had used this tape, we would replace it with another tape. We would take a two-minute pressure signal or indication every thirty minutes, and this would give us twenty-four hours on one tape.

Q Then during the course of the test, all of the data gathered during the test is actually recorded on this tape?

A That's right.

Q What is done with the tape?

A The tape, upon its removal from the tape recorder, is run thrcugh a playback machine, an on-location read-out machine that

will give us a numeric display of the pressure indicating signal. Now this numeric display will actually be in laits. It will not actually read pressure directly but it will give us a numeric indication of the signal which we can convert with a calibration chart or curve to bottom hole pressure.

Q This can be done at the well site?

A This can be done at the well site. This will be done at the well site as well as in Marathon's Midland District Office where the analysis of the test results will be made. In addition, these tapes as they're removed from the machine after they are read out on the location, will be mailed to our Denver Research Center. There they will be fed through an electronic computer which will give us a highly accurate read-out and print-out of the bottom holb pressure. This information will then be transmitted to our Midland District Office where, as I say, the analysis of this test is to be made.

Q Now am I correct in believing that in most bombs that are run in a hole for recording bottom hole pressure, the internal chart in that bomb is removed every third day?

A This is a very common thing, yes.

Q And in this particular gauge or bomb that Marathon will use, in the early stages of the test we'll be able to remove that and observe the pressure performance initially on a two-hour interval and later on a twelve-hour interval and then possibly in

a test on a twenty-four hour interval?

A That's right.

Q And by reading the pressures at the well location, we will be able to determine more rapidly whether the test should be continued or should be terminated, rather than wait for the end of a three-day period?

A Yes, with this continuous recording pressure gauge, and with the timing on the tape chase, we don't have to wait three days. We don't have to pull the gauge out of the hole before we can begin to interpret the pressure performance.

Q In analyzing this pressure data, what is it that Marathon will be looking for that would be of some significance or assistance to it in analyzing this reservoir?

A We will be looking for indications from the pressure performance of either a continuous reservoir with no observable changes, or we'll be looking for a limited reservoir.

Q How will this be detected from the data you get on the tape?

A This will be -- well, the test will be analyzed two ways. One will be a graphical analysis. One, of course, will be a mathematical analysis. The graphical analysis is probably the easier to describe. It's merely a plotting of pressure versus time and other calculated functions.

Q Then the formulas for analyzing this test result are

mathematical formulas devised by Marathon's Denver Research Laboratory?

A By ourselves and other research people. This is a widely accepted method.

Q Graphically, then, when this data is recorded on a chart, you will be able to graphically see some changed condition, some changing condition in the reservoir that will allow an interpretation of the nature or extent of the reservoir?

A Yes. The theory tells us that so long as we have a reservoir which is of a uniform thickness, uniform permeability, and so long as we get a certain pressure performance indication, that we can assume that we're reading an ever larger reservoir, interpreting an ever larger reservoir.

Now changes in that pressure, predicted pressure performance, would tell us one thing or another, either that the permeability had increased or that we might have reached a barrier or a reservoir limit.

Q Marathon has requested authorization to flow this well at a maximum rate of 1,000 MCF per day, is that correct?

A That's right.

Q This is a maximum rate, is that true?

A This is a maximum rate;from what little we do know of this reservoir, we do predict that this would be a maximum rate necessary for the analysis that we want to make.

Q It is entirely possible that at the time that we are set up and ready to commence the test, that a determination will have been made by that time that a lesser rate would be an appropriate rate for this test?

A It's quite possible.

Q But the 1,000 MCF is the maximum that we consider could be appropriate for running the test?

A Yes.

Q What factors, Mr. Scott, go into determining the appropriate rate at which the well should be flowed during this test?

A Well, directly, the factors are the net effective pay thickness and the permeability. We have a good -- what we consider to be a good interpretation of the net effective pay from the logs. We do not have sufficient knowledge of the permeability to be able to accurately predict precisely what the most appropriate production rate should be at this time. We have no way of gathering that, except by study of pressure performance.

Q Is it possible that in this short period during which the well will be flowed for purposes of pressure testing your equipment and testing your equipment in the hole, that you would be able then to better determine the most appropriate rate for the flowing of this well?

A Well, by close analysis of the pressure performance during this functional check of the equipment, we will attempt to make a

better interpretation of what would be an appropriate rate.

Q Am I correct in believing that one of the things that you are aiming for here is to choose a rate for the flowing of this well which can be maintained as uniform as possible throughout the life of the test?

A Yes, that and other things. We do want to be able to select a rate that can be maintained, as you say, as uniformly as possible. We think we can do this easily at a million a day, and most certainly at a lower rate if we find that to be appropriate. We want a rate that will be sufficient to give us a large enough character to the pressure drawdown performance that we can make an easy interpretation of the result.

Q Easy and accurate?

A Easy and accurate. If the rate were to be restricted to a lower rate, we would find that the drawdown performance would be, shall I say, flat on a graphical analysis of it, or flatter, and the changes that we might be looking for would not show up as quickly. It might require a longer, maybe days longer to detect these changes with assurance.

Q One of the things that you say that you don't know for a certainty at this time is the permeability in this formation?

A Right.

Q Is a more accurate determination of the permeability necessary to an accurate analysis of the test results?

A Yes. We will get this more accurate determination, or we hope to get this more accurate determination of the permeability from the pressure performance during the test. This is the factor that can be calculated from the pressure performance.

Q Now referring to the time during which this test will be run, Marathon in its application asked for a minimum of three and a maximum of thirty days period of time during which to conduct this test?

A That's right.

Q Thirty days is a maximum, and the test may not be run that long, is that correct?

A That's quite so.

Q Can you at this time, Mr. Scott, predict how long it would be necessary or desirable to run this test to gain some usable information with regard to the reservoir?

A Well, a minimum of time of about three days is what we predict, because we don't think that a shorter time would give us sufficient information to make any accurate interpretations. However, as to the other end of it, the thirty days is what we considered to be a time that would be most appropriate. Frankly, we didn't think we could get a longer time than that.

Q But this was a maximum period during which we thought we would desire to run the test?

A Yes, sir, it is.

Q And this does not mean that Marathon will actually run this test for thirty days under all circumstances?

A No. If we shoudl sense by interpretation of this pressure performance that we have reached the reservoir limits, have detected a reservoir limit at some shorter time, we will stop the test.

Q Will it be possible to observe these factors or conditions as a result of the field reading of pressures from the magnetic tape?

A Yes. Although it wouldn't be done in the field, it will be done in the Midland office by the reservoir engineers there. They will take the data sent to them from the field and they will daily make an interpretation of the information that has been gathered in the preceding day and over the whole period of the test, so that we will have a continuous observation of pressure, the continuous interpretation of the test results.

Q And there will be sufficient information to determine within a day or so whether or not the test should be terminated because of conditions observed?

A Yes, if in the early part of the test we find some change in pressure performance that looks to us as if it's a barrier or reservoir limit, we will be able to interpret this with assurance more quickly than we could if we hit the same type of thing at twenty-five days or something.

Q Now, Mr. Scott, when the test is completed, do you have

any idea as to how long it will take to thoroughly and completely analyze all of the data that has been gained during the test period?

A To give a completely thorough analysis of all the pressure performance that we will have witnessed, my estimate would be that it would take three to four weeks to truly do it justice. This does not mean, though, that we will be able to interpret a reservoir limit in a short time.

Q At an earlier date?

A Yes.

Q When is Marathon in a position to commence this test, if it is authorized by the Commission?

A We could commence this test within a week after receiving approval for the test.

Q Mr. Scott, referring to the economics of this test, what is the estimated cost of running this particular test?

A We estimate that this cost should be between $2500.00 and $5,000.00 for all the working interest. Marathon's Research Center is furnishing most of the expensive equipment for this test and we think we will give them a little price consideration on that.

MR. NUTTER: In your $2500.00 to $5,000.00, you are talking about the use of the equipment, the time in the field, and the time in the office to analyze it?

A No, this is the charges that will be made for the pressure measuring equipment, the charges that would be made for the rental

of the production equipment. We will have a contract engineering company representative on the location at all times. His charges will be included. Marathon's engineering personnel will not be charged to this test.

MR. NUTTER: So the test would cost more than that if you included the engineers' time in the office and the computer time and all this?

A No, the computer time is in this; the computer time is included.

Q (By Mr. Leach) Mr. Nutter I think is asking,if you included the time spent on the test by Marathon personnel, would that increase the cost of the test?

A Yes, if we were to charge the other working interest owners with the cost of our personnel for the test, it would. We don't intend to charge it.

Q What is the cost of drilling a well in this area, Mr. Scott?

A I don't have the figures for the first wildcat well. We have estimated that any second well that will be drilled would be a tubingless completion, we estimate it would cost in the range of $120,000.00 to $125,000.00.

Q Has Marathon ever run this test before?

A Yes, Marathon has run it in oil and gas wells.

Q What sort of success has Marathon had in gaining valuable

information with regard to the nature of the reservoir?

A We have been what we consider quite successful in evaluating reservoirs with this type of test.

Q Has this test been run in New Mexico before?

A Yes, it has.

Q In what places?

A Well, specifically, the Marathon State "NPA" No. 1 Well in the Scarb Pool, and also this was a gas well test; and also in the Lea Unit it was run on the Devonian oil well.

Q Has the result of the test in either of these instances been confirmed by production history?

A Yes, in the case of the State "NPA" No. 1, the test indicated a limited reservoir, and there was an estimate made from the test of the reserves indicated by the test. Our production history on that zone showed that we recovered within ten percent of what the estimated reserve was. We think this is a very accurate determination.

MR. NUTTER: And the pool was produced to depletion already?

A Yes.

Q (By Mr. Leach) Mr. Scott, in your opinion would the authorization of the running of this test and the running of it, in your opinion, endanger the correlative rights of any party?

A No, it would not.

Q In your opinion, is the use of the volume of gas that

would be necessary to conduct this test a beneficial use of this produced gas?

A In my opinion it is, just as other gas well tests are considered to be beneficial uses.

Q This is your opinion, even though the produced gas, after the liquids are removed, will be flared?

A That's right.

Q In your opinion, will the authorization of this test or the running of it cause waste?

A In that this will be very beneficial use of the gas, in my opinion, no, it will not be waste.

Q Is it possible, Mr. Scott, if this test reflects a small reservoir, that the authorization of this test and the running of it might prevent the drilling of unnecessary wells?

A This is quite likely.

MR. LEACH: Mr. Examiner, this is all we have on direct testimony. I would at this time offer Marathon's Exhibits 1 through 4.

MR. UTZ: Without objection the Exhibits 1 through 4 will be entered into the record of this case.

(Whereupon, Applicant's Exhibits Nos. 1 through 4 received in evidence.)

* * *

CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Scott, what will be the criterion as to how long you will have to run this test?

A Barring the sensing of a reservoir limit, we will run the test thirty days. If the pressure performance indicates to us that we are testing an ever-increasing area in this reservoir, then we will not shut it down until the end of the thirty-day period.

Q In other words, the criterion would actually be the amount of pressure drop?

A Well, I hestitate to say it exactly that way. It's the way the pressure performs. Pressure drop alone is not it. It is, well, specifically, one of the graphical analyses is pressure squared plotted versus time, the log of time. This should give us a straight line during the period wherein the test is evaluating an infinite reservoir, or apparently infinite reservoir.

Q Your rate of flow has to enter into it some way, too, doesn't it?

A No, directly, the rate of flow does not determine the area tested.

Q I mean the volume of gas flow.

A No, it doesn't. The volume and rate do not determine directly how large an area we're investigating. This is one of the

parts of the theory that it's very difficult for most of us at first glance to take, it is so -- There's a plot, one of the things that is calculated is so-called "Y" function, "Y". The factor "Y" is equal to the term "DP" over "DT" divided by "Q", cubic "T" rate. "TDPDT" represents the slope of a line drawn tangential to the pressure curve at a specific time.

Q I gather that you would be able to, in maybe seven or ten days, determine if the reservoir was an extremely small reservoir?

A This, of course, depends on the permeability. As I say, we do not have the knowledge we would like to have of the permeability. If the permeability is fairly large, we will be able to investigate a pretty good area; I said a pretty good area, this is relative again,in a time period such as seven to ten days. However, if the permeability is quite small, it will require a longer period of time to investigate that same area.

MR. LEACH: This is regardless of the rate of flow?

A Regardless of the rate of flow. The only place rate comes into it is that you do not want to get too much pressure drawdown, in that the only thing that happens here is that the mathematics becomes less rigorous. You want to get sufficient pressure drawdown to give a good, easily read curve, easily interpreted curve. In other words, the chances are pretty good that this test will run thirty days.

MR. NUTTER: I hope.

A I hope so. I certainly do.

MR. LEACH: We all hope so. If it does run thirty days, this will mean to us that we have not detected a reservoir limit in that period. This will mean that we'll have substantial reserves.

MR. UTZ: Any other questions of the witness?

MR. DURRETT: I have a question.

BY MR. DURRETT:

Q Mr. Scott, have you or representatives of your company conferred with the Commissioner of Public Land concerning the desirability of running this test?

A Yes, we have.

Q What did he inform you?

A We conferred with Mrs. Rhea.

MR. LEACH: I might answer that. We spent yesterday afternoon with Mrs. Rhea and some other personnel in her office, and tried to give her and the State as much information as we could; and that they desired with regard to the nature of this test. We did not ask the State to concur or not concur in our application. We gave this information to them for whatever they might desire to use it for, and we didn't ask them whether they wanted to concur or not. We thought if they did not concur, they would sure let the Commission know about it.

MR. DURRETT: They haven't let you know about any speci-

fic objections, as such?

MR. LEACH: No, they have not.

Q (By Mr. Durrett) One other question, Mr. Scott. I believe you stated that the rate that you want to produce could be determined after you had tested your equipment, probably.

A We hope to gain some additional information as to what the most appropriate rate will be. We might not. We might not be able to tell enough in that brief period during which the equipment is being tested. If not, we will use all the information available to us at the time we start the test to come up with a rate at which we will hold the well constantly through the period of this test.

MR. UTZ: The rate would be dependent on your drawdown?

A Yes, actually, if we had a little more pressure history right now, we could make a better calculation of permeability. This is one factor that we will calculate from the pressure performance. We will calculate a better permeability figure. We will be able to tell -- well, there's a factor in here called transmissability in the mathematics, which is the permeability times the effective pay thickness, divided by the viscosity of the fluid.

You can see,the permeability times the reservoir thickness, if either of these factors change, it will change transmissability, it will change pressure performance. However, so long as these are constant, we will be able to calculate what that

constant transmissability is.

We will know the viscosity of the gas very closely, in that we will take a gas sample during this test which will be analyzed by our Denver Research Center to give us more knowledge of the actual analysis of the gas. The actual thickness we will determine from the logs. We think we have a pretty good interpretation of the logs.

Q (By Mr. Durrett) I realize that your application is that Marathon would have the complete control up to the limits that you have requested to determine the rate of production and the number of days involved, up to the limits that you have requested. However, I'm wondering,if the Commission didn't feel that it desired to grant this complete discretion, what would be Marathon's objection to some type of an administrative procedure whereby the Secretary-Director would be authorized to permit the test up to the maximum period you have requested, of course, with the understanding that he could set the rate or the time period by -- it would almost be an administrative approval; in other words, by letter stating that this is the rate and this is the time limit, with the thought in mind that the Commission's District personnel could confer with your personnel on the location, and that your company could furnish this office these test results; I don't understand all the details, but your data, and that your people could confer with our engineers who would advise the Secretary-Director. In other words, so that

the Commission would have a more or less direct hand in determining the rate and the time period as you evaluate this data. Would you see objections to this?

A I would see no objection so long as this is based on an interpretation of the data gained during the test. I do not think we have enough information at the present time to warrant any great restriction over what we have asked presently.

If, during the conduct of the test, something occurs and of course this information is available to the Commission at any time, at all times, I think that it might be appropriate. However, I would say that our people have a pretty good background in this type of testing, and have a pretty fair understanding of this type of testing. It is a very specialized area.

MR. LEACH: May I ask him a few questions along this line and develop this phase of it a little bit?

MR. DURRETT: Yes, I would appreciate it.

REDIRECT EXAMINATION

BY MR. LEACH:

Q Once this test has started, can you shut the well in for any period of time and open it up again and continue your test?

A Not without destroying the results of the test at that time. You would have to shut it down and start all over again.

Q So that if an administrative approval for a longer period of time were involved, it would of necessity, in order to have the

test continue to be effective, be one which could be acted upon promptly to permit continued conduct of the test without any cessation at all?

A Yes.

Q Is this true?

A Yes, I think that the test would have to be, to be effective, will have to be conducted at as constant a rate, probably as constant a rate as we can hold.

Q And you can't stop it?

A You can't stop it.

Q You can't stop it for one day and get approval to continue it and pick it up after one day's shut-in?

A No, sir, nor somehow restrict or increase the rate during the test by any great amount.

Q If we started out producing this well, just let's choose a figure out of the air as a desirable rate at, say, a half a million cubic feet a day, the choke in the well, the choke on the well will be an adjustable choke and they will attempt to keep it at half a million throughout the life of the test?

A That's right.

Q Therefore any administrative approval of a different volume or some volume less than that which the test is being conducted on would also interfere with the effectiveness of the test?

A This would upset the effectiveness of the test.

MR. LEACH: These are the things I wanted to point out because, as I understand the test, Mr. Durrett, once it's started it has to be continued until the test is finally concluded, without interruption; and as near as physically possible, it is desirable to keep the rate of flow constant throughout the life of the test.

MR. DURRETT: I don't think this needs to be directed necessarily to the witness. Let me try to clarify what I'm suggesting as a possibility, and then you can state whether or not you think your company would have objections to it.

The way I understand it is that after this equipment is tested, at that time your people can get together and determine a maximum rate for this well. What I'm suggesting is that an order could possibly be issued, if the Commission felt they wanted to authorize the test at all, stating that the test was authorized; and then your administrative procedure would come in stating that the Secretary-Director was authorized to set a rate up to a certain amount, which you have requested here.

Then the way it would work, as a practical matter, is that your people, when they put the equipment on in the field, would conduct your test; and at that time the Commission's District personnel would be there to advise the Director concerning what the results were. Then the Director would write a letter, after your people have conferred with our people and our

engineers have thought it over, as well as your engineers, then the Secretary-Director would write a letter setting the rate.

MR. LEACH: Before the test is actually commenced?

MR. DURRETT: Well, yes, at the time that your people would make the decision at what rate they wanted to produce it, the Director would approve it or cut it down. Anyway, he would have a hand in the decision as to what the rate would be. He would write a letter setting this rate.

A May I point out there in the test procedure, we would test the surface equipment and then shut the well in and allow the bottom hole pressure to build up again. We would make a determination during that buildup, what is buildup pressure? That we would be able to tell because the pressure sensing equipment was in the hole.

When that pressure built up, then we would be ready to start that test. This would be from one to three days. I'm wondering about the timing.

MR. DURRETT: If we had our people -- I'm not sure I'm really clear on this, but if we had our people there to work with your people, or at least accessible by telephone so that they could be there and look at the results. At some period of time you have to decide the rate. At that time you could present the information to them and they could confer with you and advise the Staff here and the Director, and he would have a hand in

determining this rate. That wouldn't delay you in any way, would it?

A I would hope not.

MR. DURRETT: Assuming this was done, I'm not talking about a two or three week period, I am talking about right away.

MR. LEACH: Mr. Durrett, I believe something along this line could be worked out to the satisfaction of Marathon. We want, of course, for the Commission to have any information they want with regard to this test, and if they desire for the District people to be there at all times, they're welcome to be there. I believe that probably we could. There may be a little bit of something a little bit cumbersome in the working out of these things, but I feel sure we could work out something that could work, and we'd be satisfied with it entirely.

A At the present time, the Commission has in its file all the information that we have that would allow them to calculate the permeability. This is the factor we would have to determine or at least arrive at an assumed permeability before we started the test, from which we would estimate the best production rate.

The Commission does have all the pressures and such, taken during the multi-point back pressure test, which they might attempt to use if they like an interpretation of permeability. This is all we have now. We would have the additional

information that we might gain during this equipment test, so if the Commission would desire to do that they could do a little groundwork on it.

MR. DURRETT: Fine. At any rate, could we state that the only objection that Marathon would have to some type of arrangement whereby the Director would at a subsequent date set the rate or approve the rate and the time, would be the possible time element involved in the approval, and that your company would feel, if there was no delay in the test, that it would have no objection to such an arrangement?

A I might say that with the information that we have available now about permeability, I think that the thirty-day period is not too long a time, even assuming it to be on the highest side.

MR. LEACH: I think Mr. Durrett at this time was talking about the rate and not the period of time.

MR. DURRETT: I was really speaking of both.

MR. LEACH: Of both. In connection with the period of time, even after this initial test period at which we would determine the most desirable rate, we would still be without some accurate or acceptable basis for determining a period of time that would be reasonable for running the test. Something less than thirty days, we would consider at this time we would have gained adequate information that would assist us in

analyzing this reservoir at this time. We'll know more about the period of time during which the test ought to be run as it's conducted, but we will not get any better information about the period of time until we are actually into the test.

MR. NUTTER: Mr. Examiner, may we go off the record a minute?

(Whereupon, a discussion off the record was held.)

MR. UTZ: We will go back on the record. Are there further questions? Mr. Nutter.

RECROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Scott, you mentioned the Atoka Gas Pool to the north and the Indian Hills Pool to the south. In the event that a main line -- of course, the Atoka is on the market right now?

A Yes.

Q There's a line in there;in the event that the Indian Hills should be connected by a line coming from Atoka and connecting those two areas, how far from that main line would this well be?

A I'm sorry, I can't tell you offhand. I don't remember offhand what the Section, Township, Range are.

Q This well would be less than sixteen miles from a market at that time?

A Yes, if the Indian Basin-Indian Hills Area is connected,

that's only twelve miles. If a line was connected between those two, this would be closer to that. I couldn't tell you how much closer.

Q As I understand it, the Unit No. 1 Well was completed in September of '63?

A Yes.

Q And what is it, a plan of development or an obligation under the Unit Agreement, or what, that requires the second well to be drilled or commenced by September of this year?

MR. LEACH: May I answer?

MR. NUTTER: Yes.

MR. LEACH: Mrs. Rhea is sitting over here, too, and she can concur or disagree with me on this. The Unit Agreement says that the operator shall develop the area as a reasonably prudent operator would develop it. It also contains a provision to the effect that the operator, within six months after completing the first well, will file with the Land Commissioner a report showing what development has taken place on the lease and what is planned; and then every twelve months thereafter, a similar report shall be made, that is, reporting what has been done and what is planned.

But the obligation, as I read the Unit Agreement, the contractual obligation is to develop the property as a reasonably prudent operator would develop it, and the reports are giving

the Land Commissioner additional information to see what he is doing in his development as a reasonably prudent operator would develop.

MR. NUTTER: Are you under any commitment at this present time to start the second well by September of this year?

MR. LEACH: I have in my files here a letter from Mr. Tom Brown to the Commissioner, in which he says his plans are to commence the second well on the Unit before September 25, 1964.

MR. NUTTER: Which is the anniversary date of the first well?

MR. LEACH: Yes, sir, I believe that's true.

Q (By Mr. Nutter) Now, Mr. Scott, this test that you are proposing will be to determine the reservoir limits, is this correct, to determine the size of the reservoir, in effect?

A Yes.

Q Is this areal or just volume-wise?

A It will be both, in that we have a porosity number from our logs.

Q And a thickness for this well?

A And we have a thickness from our logs, and with the porosity and the thickness, we can, of course, get from volume, we come up with a number in reservoir barrels converted to gas, of course, and then this is changed to area.

Q The only way you'd be able to convert it to area would be to assume that the same porosity that exists here, and the same volume or thickness of the pay existed across the reservoir?

A Yes, sir.

Q The results of this test, I presume, are going to be a factor in whether this second well will be started in September?

A Marathon will take it into consideration.

Q This is one of the reasons for running the test at this time?

A Yes.

Q Assuming that the pay thickness was the same throughout the area, what areal extent of reservoir would you have to have before you decided you were going to drill that second well?

A I can't give a number exactly like that. I can say this, that we -- and again this goes back to permeability, with the highest permeability that I've been able to estimate which I know is not exactly an accurate figure, the highest figure that I would come up with from any of the calculations, we would probably prove less than a Section, less than 640 acres is my estimate, in thirty days. But I think that if we do not reach a limit, that this would be taken into favorable consideration.

Q In other words, within the thirty-day period, if you estimate that you've got a 640 acre reservoir here, or at least a 640 acre reservoir, then your plans for the second well wouldn't

be altered? Am I putting words in your mouth?

A I'm not in a position to say whether Marathon will drill the well, but this would, of course, be the type of recommendation that would come from this type of test, results like this for the test.

Q Is there any way in this test and the analysis of it to determine the direction of the reservoir?

A No, sir. This testing procedure assumes radial flow, that you are at the center of the circle draining the circle.

Q Your contour map is contoured on the base of the smutty shale?

A This is a map that we had in our files and reproduced hurriedly for this hearing. The contours have no bearing on this reservoir, directly.

Q This well was drilled on down into the Pennsylvanian, wasn't it?

A Yes, it was.

Q No gas in the Pennsylvanian?

A There was a small show but it was insufficient for commercial production.

Q What is the basis for the outline of the Antelope Sink Unit? Was it based on a seismic structure, do you know?

A I am sorry, I wasn't in on the formation. I don't know.

Q So actually we dont' have any picture here of the structure

ore of the Wolfcamp structure, or any reservoir data as far as the formation, or any of the pertinent facts relating to the Wolfcamp?

A No, I would say this, that the contour is, as you commented, on the base of the smutty shale. This is a consistent correlation point through that area. It does show a regional structure dip to the east on that particular horizon.

Q Now this Tom Brown well tht's down here in Section 2 of the township to the southwest,--

A Yes.

Q -- is that in the Wolfcamp or is that a Pennsylvanian well?

A That is a Morrow gas well.

Q And the dry hole in Section 35 penetrated the Wolfcamp as well as the Morrow, I presume?

A Yes.

Q Are there any other Wolfcamp wells anywhere within ten miles of this well?

A I don't know of any.

Q How extensive has the testing that's been conducted on this well to date been?

A The State multi-point back pressure test.

Q Just one multi-point test. Now you are going to be testing your equipment with a preliminary test, and at that time

you'll determine the volume of flow necessary to conduct this test. How long is it going to take to test this equipment and make that determination?

A This will be a very few hours.

Q It will just be a matter of hours?

A Yes, literally, because it will be a static pressure test of the equipment and then a re-flow test, merely to make sure everything operates as it should, the heater, the separators. For this particular test we will make an assumption of what an appropriate flow rate might be and we will start off this functional check on a given choke size.

Q And you'll be changing the choke size while you are making this pre-test?

A We may not. This will be entirely determined on what is found on location at the time. If we change choke size, it will upset any pressure transits that might be set up and would disturb our interpretation, any interpretation we might possibly make from this brief test.

MR. PORTER: That would mean you would have to start out over again?

A No, not for the functional check. We would know then whether the equipment worked or not. If we found too great a drawdown, we'll say that's too high a rate, so the next time we start the test we will start on an A.D. automatic choke. If we

get too small a drawdown, we will start it on a higher choke size, high rate.

Q This test that you might be proposing is up to almost half the well's open flow?

A That's right.

Q You don't know what percent of the shut-in pressure or drawdown you'll get or anything like this?

A No. The operator, Tom Brown Drilling Company, ran the multi-point back pressure test. Marathon did not. It is our understanding that the four points run on the pressures and rates were not stabilized even at the end of the three-hour periods. So it's pretty difficult to draw any real good conclusions from that test.

MR. NUTTER: I believe that's all. Thank you.

MR. UTZ: Any other questions?

MR. DURRETT: I have an additional question, please.

BY MR. DURRETT:

Q Mr. Scott, I think you have been taking some tests using these tapes. How long do those tests take, approximately?

A On the State "NPA" No. 1 in the Sarb area, as I recall, I believe it was a six-day.

Q Well, approximate figures.

A Six to eight day, and this determined a very limited reservoir size, in this period.

Q How about your other test?

A On the Lea Unit on the Devonian, at the end of approximately, slightly over two days, a muchly increased permeability was sensed, at which time the pressure drawdown ceased and we were not able to determine anything except that we had had an increase in the permeability or reservoir thickness. We determined it to be permeability, and therefore we were quickly evaluating a much larger area than we would have had the permeability stayed relatively low.

Q Do you feel those are both rather unusual situations and that you are not really anticipating them here?

A We don't really know what to anticipate. All the information we have is this open flow test. I would hope that we didn't find any reservoir limit, or that perhaps we did hit an increase in reservoir thickness or permeability, but we do not know what to anticipate.

Q In that event, you would be able to shut down pretty quick your test; you'd feel it had been determined?

A Yes. However, I would say this, that it would take longer if you find an increase in permeability or reservoir thickness in this transmissability factor. If you find an increase there, you would want to continue your test for a little longer period to see if you can tell more about it under those conditions than if you hit a reservoir limit. As soon as

you were able to determine that you had reached a reservoir limit, with assurance; I believe you would want to shut the test down.

MR. DURRETT: Thank you.

MR. UTZ: Any other questions? The witness may be excused.

(Witness excused.)

MR. UTZ: Any statements in this case? The case will be taken 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 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 17th day of July, 1964.

Ada Dearnley
NOTARY PUBLIC

My Commission Expires:

June 19, 1967.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 3075, heard by me on July, 1964.

, Examiner
New Mexico Oil Conservation Commission

DRAFT

JMD/esr
July 9, 1964

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

CF Subj. Special Test - Antelope Sink Unit Gas Well

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

CASE No. 3075

Order No. R-2741

APPLICATION OF MARATHON OIL COMPANY FOR A SPECIAL GAS WELL TEST, EDDY COUNTY, NEW MEXICO.

7-10-64

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on July 1, 1964, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this _____ day of July, 1964, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, 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 conduct a reservoir limits test in the Antelope Sink Unit Area by producing and venting not more than one million cubic feet of gas per day for a period not to exceed 30 days from the Tom Brown Drilling Company Antelope Sink Unit Well No. 1, located 1890 feet from the North line and 2070 feet from the East line of Section 18, Township 19 South, Range 24 East, NMPM, Eddy County, New Mexico.

(3) That approval of the subject application will permit the applicant to gather valuable information concerning reservoir characteristics in the Antelope Sink Unit Area.

(4) That the proposed venting of gas will constitute beneficial use of natural gas.

(5) That the reservoir information obtained from the proposed reservoir limits test should enable the unit operator to develop the Antelope Sink Unit Area in a more efficient and orderly manner, thereby preventing waste.

IT IS THEREFORE ORDERED:

(1) That the applicant, Marathon Oil Company, is hereby authorized to conduct a reservoir limits test in the Antelope Sink Unit Area by producing and venting not more than one million cubic feet of gas per day for a period not to exceed 30 days from the Tom Brown Drilling Company Antelope Sink Unit Well No. 1, located 1890 feet from the North line and 2070 feet from the East line of Section 18, Township 19 South, Range 24 East, NMPM, Eddy County, New Mexico.

(2) That Marathon Oil Company shall notify the District Supervisor, Oil Conservation Commission, District No. 2, Artesia, New Mexico, in writing of the exact time and date the gas well test authorized by this order will commence.

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

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

Case 3075
Heard July 1, 64
Rec. - 6/64

1. Grant Marathon permission to conduct a reservoir limits study by flaring ~~max~~ of 1000 MCFD for a max of 30 days.
2. The well to be used for the test is Tom Brown - Antelope Sink Unit #1 1980/N, 2070 E line Sec. 18 - 19S-34E

3. ~~If test~~ If such tests are conducted prior to the end of the 30 day period the operator shall cease the flaring of unnecessary gas.

Chris A. Williams

J. O. SETH (1883-1963)

A. K. MONTGOMERY
WM. FEDERICI
FRANK ANDREWS
FRED C. HANNAHS
GEORGE A. GRAHAM, JR.
RICHARD S. MORRIS
FREDERICK M. MOWRER

SETH, MONTGOMERY, FEDERICI & ANDREWS
ATTORNEYS AND COUNSELORS AT LAW
350 EAST PALACE AVENUE
SANTA FE, NEW MEXICO 87501

POST OFFICE BOX 2307
AREA CODE 505
TELEPHONE 982-3876

June 29, 1964

New Mexico Oil Conservation Commission
State Land Office Building
Santa Fe, New Mexico

Re: New Mexico Oil Conservation Commission Cases Nos. 3075 and 3076, Examiner Hearing of July 1, 1964.

Gentlemen:

This firm hereby enters its appearance in the above referenced cases on behalf of Marathon Oil Company. Associated with us will be Messrs. J. O. Terrell Couch and Warren B. Leach, Jr., of the Houston, Texas bar, who will present the case for the Marathon Oil Company.

Very truly yours,

SETH, MONTGOMERY, FEDERICI & ANDREWS

By Richard S. Morris

RSM:LHS

cc: Mr. J. O. Terrell Couch
Mr. Warren B. Leach, Jr.
Marathon Oil Company
Box 3128
Houston, Texas