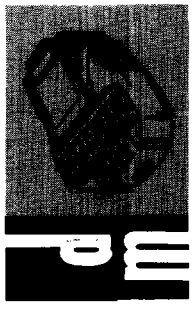

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
February 26, 1969

EXAMINER HEARING

IN THE MATTER OF:

Application of Union Oil Company of California for the creation of a new pool, assignment of discovery allowable, and the promulgation of special pool rules, Lea County, New Mexico

Case No. 4069

BEFORE: Elvis A. Utz, Examiner.

TRANSCRIPT OF HEARING

MR. UTZ: Case 4069.

MR. HATCH: Application of Union Oil Company of California for the creation of a new pool, assignment of discovery allowable, and the promulgation of special pool rules, Lea County, New Mexico.

MR. RUSSELL: John F. Russell, Roswell, New Mexico, appearing on behalf of the applicant, and I have two witnesses to be sworn.

(Witnesses sworn.)

J. B. JORDAN,

called as a witness, having been first duly sworn, was examined and testified as follows:

BY MR. RUSSELL:

Q Will you please state your name, address, name of your employer, and the capacity in which you are employed?

A My name is J. B. Jordan, from Roswell, I'm employed by the Union Oil Company of California as a Development Geologist.

Q And you have previously qualified to give testimony before the Commission and the Examiner?

A Yes, I have.

Q Are you familiar with the application of Union Oil Company of California, Case Number 4069?

A Yes, I am.

Q What do you seek by that application?

A The Union Oil Company of California has made application for the creation of a new pool, assignment of the discovery allowable, and the promulgation of special field rules in Lea County, New Mexico.

Q And have you prepared some exhibits in connection with this application?

A Yes, I have.

Q Referring you to what has been marked as Applicant's Exhibit Number One, will you explain what that shows?

A Exhibit Number One is a plat, showing the location of all wells, which have been drilled within the radius of more than two miles from the discovery well, which is shown by the red arrow. The plat also shows the lease owners of record.

Q Will you give the location of the discovery well?

A The discovery well is located 2310 feet from the north and west of Section Twelve, Township 17 South, Range 36 east of Lea County, New Mexico.

Q And are you presently completing another well which is shown on this exhibit?

A We are presently completing another well, which is located 810 feet from the north line, and 1980 from the east line of Section Twelve.

MR. UTZ: Give me that again, please?

A 810 feet from the north line, and 1980 feet from the east line of Section Twelve.

Q That's the circle- -

A It's the blank circle, which is shown on the plat.

MR. RUSSELL: Now, will you also, from this map, tell the Examiner what acreage is covered by Union's leases or operating rights in this pool field?

A We have a operator's unit, which covers all of Section Twelve, the southwest quarter of Section One, and the southwest quarter of Section Seven, Township 17 South, Range 37 East.

Q Do you own the operating rights to all depths?

A The rights covered by the Union is from 9400 feet to the bottom.

Q And in the area where the discovery well was drilled, you only owned from 9400 feet down; is that correct?

A That is correct.

Q All right. I refer you to what has been marked as Applicant's Exhibit Number Two, and ask if you will explain that exhibit?

A Exhibit Number Two is a complete Gamma Ray Neutron Log of the discovery well, the Union Oil Company of California, Number One Midway State. This log has the geologic tops marked on it. It also indicates the pay zones, which are producing in the nearby fields. It also shows the perforations that this well was completed from.

Q Now, on Exhibit Two -- on this printed portion, it indicated that it was Amerada State Number Twelve dash One, and that has been changed to Midway State Number One, and that is because you changed the name after - -

A After we started- -

Q After you started drilling- -

A - -after the well was drilled -- the name was changed.

Q And this is the log of the discovery well- -

A Yes- -

Q - -reflected on Exhibit Number One?

A That is correct.

Q Okay. Now, I refer you to what has been marked as Exhibit Number Three, and ask you to explain what that exhibit portrays.

A Exhibit Number Three is a structural map. It is a geologic and seismic interpretation of the -- at the Devonian level in this field. It shows three dry Devonian wells, which were drilled to the northeast of the discovery. Also, a test -- a deep test, which did not reach the Devonian, to the southwest, which we projected a Devonian top in -- it is approximately 1200 feet low to the discovery well.

Q And there is also a dry Devonian in the southeast quarter of Section 32, which is not shown on this map; is that correct?

A That is right. It is more than two miles

away.

Q Now, it looks like your Number One Well came pretty close to hitting in the middle of the high structure; does it not?

A That is correct. It appears that it may be near the crest of the structure, and the Number Two Well -- we have a datum on it of a minus 7569, which, essentially, fits the contours within reason.

Q Now, in your rules for this -- the proposed rules for this field, you have asked that the well be located in either the north half, the south half, the east half, or the west half of a governmental quarter quarter section; have you not?

A That is correct.

Q What is the reason for this request in the rules?

A The reason for this request is to give us a little better control, where we can more optimally locate these wells, to more efficiently drain the reservoir.

Q Now, you've also asked for 80-acre spacing.

In your opinion, will one well in this field efficiently drain 80 acres?

A Yes, I believe it will.

Q And what is your opinion based upon?

A It's based on the knowledge of other Devonian Fields; the reservoir rocks are very similar, it is a vuggy dolomite, which is fractured, and it usually has good communications.

Q Now, what field, if any, are you specifically referring to?

A Well, the one that I am more familiar with is the South Vacuum Field. The reservoir rocks are very similar, in that it has a lime cap on top, as we have found in the Midway Field.

Q And is that by Commission Rules, established on 80-acre spacing?

A It has been.

MR. UTZ: South Vacuum?

A South Vacuum.

MR. RUSSELL: All right, now, I refer you to what has been marked and identified as Applicant's Exhibit Number Four and ask you to explain that

exhibit.

A Exhibit Number Four is a cross section. It is two cross sections of the lower part of the Union Number One Midway State, and the Amerada Well to the northeast. The cross section on the left has been set up on a structural datum. The cross section on the right is set up on a stratigraphic datum, which is the -- what we think is the equivalent verocity zones. It is color-coated, so that you can pick out the permeability, verocity, water saturation, perforated intervals, drill-stem test. Essentially, you can see at a glance the core houses as compared to the log.

Q Did you identify the two wells from which the cross section was made?

A Yes -- the one on the right is the Union Number One Midway State; the one on the left is the Amerada LC State. There is a little plat map at the bottom, which you can locate the wells on.

Q Anything further in that exhibit you want to bring out?

A I don't think so.

Q Were Exhibits One through Four prepared by

you or under your supervision and direction?

A Yes, they were.

Q At this time I move the introduction of Exhibits One through Four.

MR. UTZ: Without objection, Exhibits One through Four will be entered into the Record.

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

MR. UTZ: If you had had a cross section like this on that offshore well, it would have never blown out - -

A It never would.

Q What is the interval perforation shown on your log?

A The interval is 11-4-76 to 11-5-20.

Q Did we use Exhibit Number Two?

MR. RUSSELL: Yes; that's the Log.

MR. UTZ: Are there any other questions of the witness? You may be excused.

- - - - -

D. G. HOLLAND,

called as a witness, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. RUSSELL:

Q Will you please state your name, address, name of your employer, and the capacity in which you are employed?

A My name is D. G. Holland, Midland, Texas, I work for Union Oil Company of California, employed as a Petroleum Engineer.

Q Have you previously qualified to give expert testimony before the Commission or its Examiner?

A No, sir.

Q Will you give a brief resume of your educational background and professional experience as an engineer?

A I have a Bachelor of Science Degree in Petroleum Engineering from the University of Texas, and I've worked as a Petroleum Engineer for approximately thirteen years in West Texas and Southeastern New Mexico.

Q And you are familiar with the area- -

A Yes, I am.

Q - -which the application is directed?

A Yes- -

Q Are the witness' qualifications acceptable?

MR. UTZ: Yes, they are.

MR. RUSSELL: Now, you are familiar with Union Oil Company of California's Application in this case; are you not?

A Yes, sir.

Q Have you prepared some exhibits in connection with the application?

A Yes, sir; I have.

Q I'll direct your attention to exhibit -- which has been marked as Applicant's Exhibit Number Five, and ask you to explain what that is.

A Okay, sir. It is a commercial service company's report of a bottom low build up test, that ran for a duration of 143 hours. It also shows the stabilized flowing rate, prior to shutting in the stabilized flowing bottom hole pressure, both at the recorded depth and the extrapolated depth of the mid-perforations at 11,498 feet. At the bottom, it

shows the accummulated oil production to that date, and shows the theoretical time for the flowing period, based on that stabilized flow rate.

Q At this time, let me ask you one thing. Exhibit Five consists of four pages; is that correct?

A That is correct.

Q Okay -- go ahead.

A It consists of five pages, sir.

Q Five -- correct.

A Yes -- the second page is simply a plot of the log accummulative shut-in time and hours versus the extrapolated bottom hole pressure at mid-perforations. The third page represents a theoretical calculation of the "T" plus Delta "T" over "T" versus the extrapolated bottom hole pressure at mid-perforations. This is for the purpose of determining the true extrapolated bottom hole pressure and the permeability of the perforated interval. Page four represents a flowing bottom hole pressure gradient to use in extrapolating -- well, in this particular case, it's used to determine the flow and bottom hole pressure for purposes of PI calculations. Page five represents

the static gradient with the well shut in for the purposes of extrapolation from the recorded depth, or the bomb depth to the midpoint of perforations.

Q I now refer you to what has been marked as Applicant's Exhibit Number Six, consisting of three pages, and ask you to explain that exhibit.

A This is a commercial core lab report, giving the whole core analysis of the two cores taken on our Midway State Number One Well. The first core being from 11,444 to 11,499. The second core being from 11,500 to 11,541. The third page of Exhibit Six is a graphical representation of the core analysis on a log scale for purposes of comparing with electric logs.

Q Referring you again to Exhibit Number Six, on pages one, two and three, where the well designation is, it indicates Midway State Number One dash twelve; that twelve should be stricken; should it not?

A On the copy that I have, it has Amerada State One dash twelve; it should be Midway State Number One.

Q Which is the discovery well?

A Yes, sir.

Q Now, I refer you to what has been marked as Applicant's Exhibit Number Seven, consisting of four pages, and ask you to explain that exhibit.

A Okay. Briefly, the first paragraph sets out the status of the wells at this time. The Union Oil Company Number One Midway State Well, completed December the twenty-third, 1968, for perforations at 11,476 to 520, flowing 538 barrels of oil a day, on a half-inch choke, with sixty-five pounds tubing pressure, and a measured gas-oil ratio of 170. This completion was after treatment with 750 gallons of fifteen per cent hydrocloric acid. The cumulative production through February twenty-third, '69, from the Number One Well, is 20,260 barrels of oil. Farther, this -- the test capacity of the well indicates that current capacity is equivalent to the initial potential. The Union Oil Company of California Number Two, Midway State Well, was drilled to 11,600 feet, and is currently in the process of being completed from perforations at 11,578 to 11,594 feet.

Under "a" on the first page, there is a summary of the reservoir and fluid properties from this reservoir, along with the gas analysis that we have. On the second page, under "b", we have summarized the reservoir properties from an average of the two wells that have been drilled to date. Under the number one item, we show an average of 94 feet of net pay thickness. This is based on 115 feet, from the Number One Midway Well, and 73 feet from the Number Two Midway Well. The lower portion, there is a -- well, under average recoverable reserves, for the two wells -- there is a calculation made that volumetrically gives our recoverable reserves. The 7758 represents a constant, which is barrels per acre foot. The point 062, represents the average porosity from the two wells. The point 65, represents one less the water saturation. The point 25, represents our estimated recovery factor, and in the lower portion, the one point one five, represents our estimated formation volume factor.

The next heading is Economics, and is based on the current oil price we are receiving, without any

truckage charges. At this time, we are trucking -- this cost is, assuming that we get a pipeline connection; the gross gas price is based on what we expect to receive for gas. However, we do not, as of this date, have a -- a gas connection. The royalty represents the royalty under the wells we've drilled to date -- there's state taxes, of course. Under "b", we have our estimated operating costs, based on experience. And under "c", we have our calculated economic limit, based on operating costs abandoned. The $2,000 is the cost we expect to have at the time we abandon the well. The three-sixteen is the price-- the oil price, the point 875 is our working interest, the point 9384 is one less our percentage state taxes, and our thirty point four is our average days per month, which gives us the 25 point four barrel per day, economic limited. Under "d", we- -

MR. UTZ: What did you say the 9384 was?

A It's one less the state tax rate -- one less -- point 0616.

Q And 875 is your interest?

A Our working interest; yes, sir.

Q And the 316 is the price?

A Yes, sir. Under "d", we have our average well cost, which the first portion is our drilling costs and completion costs -- proportionate cost of tank battery, and proportionate cost of any salt water disposal system that we will have to put in. Our number two item, under cost, is the cost of pumping equipment, when the well goes on artificial lift. Our "e" is the results of our economic calculations, based on the previous figures, with the discount rates of six, seven, eight, and nine per cent being shown for a forty-acre well, versus an eighty-acre well, and, also, the pay-out time, in years, being shown at the bottom.

MR. RUSSELL: The figure which you used for state taxes is based upon the hopeful assumption that the present legislature doesn't increase taxes; is that correct?

A Yes, sir. It's the figure we are using as of this date.

Q In your opinion, will one well in this field efficiently drain eighty acres?

A Yes, sir.

Q And what is that opinion based on?

A It's based on work done on other southeastern Devonian Reservoirs in New Mexico, with particular emphasis being on the South Vacuum-

Q Which, again, is on an eighty-acre spacing- -

A Yes, sir.

Q And, in your opinion, if, having expressed an opinion, that one well would efficiently drill -- drain eighty acres, and in your opinion it would be a great economic waste to require two wells to drill the same acreage?

A Yes, sir; I feel it would create economic waste.

Q Now, you have previously filed Forms C-109 with the Commission, requesting a discovery allowable; have you not?

A Yes, sir; we have.

Q And what was your estimate of the discovery allowable?

A Approximately, 57,700 barrels.

Q And all offset operators have been notified of your application for field rules and the discovery allowable have they not?

A Yes, sir; they have.

Q All right, now, let's go there to what has been identified as Applicant's Exhibit Number Eight, and ask you to explain what that is.

A Applicant's Exhibit Number Eight is a set of rules that we propose for the Midway Devonian Pool. This set is identical with that now in use on the Martin Wolfcamp Field. Do you want me to go through each one, one by one?

A I don't think it's necessary -- I think the Examiner is familiar with the rules of that Pool; are you not?

MR. UTZ: I'd better be.

MR. RUSSELL: Now, if the Commission sees fit to adopt these special rules and regulations, in your opinion, will the development of the field, in accordance with them, protect correlative rights of others in the field, and prevent waste?

A Yes, sir. I believe it will.

Q Now, you also are suggesting, are you not, the name of this field be the Midway Devonian Field?

A That's correct, sir.

Q And were Exhibits Five through Eight prepared by you, or under your supervision and direction?

A Yes, sir. They were.

Q Mr. Examiner, at this time I move the introduction of Applicant's Exhibits Five through Eight into evidence.

MR. UTZ: Without objection, Exhibits Five through Eight will be entered into the Record in this case.

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

CROSS EXAMINATION

BY MR. UTZ:

Q On page three of your Exhibit Seven, what did you say the 7758 -- I ought to know - -

A It's barrels per acre foot. It's a constant barrels per acre foot.

Q Now, your last calculation, where you calculated present work at six, seven, eight, and nine

per cent; now, is that done so you are giving us a pick of the percentage that we might want to accept, or are you estimating down to years?

A Well, actually, I was giving you a pick, because right now with the prime rate moving like it is, it's hard to tell.

Q I didn't know whether each one of those percentages might represent so many years- -

A No, sir. The reason we use the four numbers was to give the Commission a chance to pick the one that they felt would fairly represent the current money market.

Q The way it's going up, you could very well apply it to years; couldn't you?

A Yes, sir. It's seven per cent now and expected to go up, I understand.

Q On Exhibit Number Six, I note your permeability graph goes over to -- oh, something in excess of a hundred millidarcies. Did you consider that pretty good permeability?

A Yes, sir. I considered it to be excellent permeability, but probably not actually representative

of the reservoir as a whole.

Q Representative of the core only?

A Yes, sir.

Q Your reserve calculations are based on the extrapolated pressure of 4522?

A No, sir. Now, that 4522 is the service company's estimate. We feel like that -- that the -- according to the Horner Method, the straight line portion of the curve would follow within this portion here (indicating), and would extrapolate to 4490.

Q You mean back down about midway on the- -

A Yes, sir.

Q - -curve here?

A Yes, sir. Between, approximately, on the log, reading at the top, between, approximately, 150 and thirteen, would be the straight line portion, which extrapolates out to 4490. And that, by the way, is checked by an extrapolation of a drill stem test that was taken in the top portion of the reservoir at the time the well was drilled.

Q And that's the pressure you used?

A Yes, sir. 4490 is the pressure we used.

In other words, we feel that the graph is shown -- would break over 4490, instead of continuing on up to 4522.

Q Actually, this problem won't be a very big pool, according to- -

A No, sir. I don't expect it to be.

Q Probably four wells?

A That's in the order of what I expect.

Q Are there any questions of the witness? You may be excused. Are there any statements in this case?

MR. HATCH: I have telegrams from City Service Oil Company, Pan American Petroleum Corporation, W. B. McBee, Junior, and the estate of W. B. McBee, by W. B. McBee, Junior, expressing support.

MR. RUSSELL: Mr. Examiner, Mr. Hocker gave me a statement on behalf of Amerada -- he couldn't stay to read it in, and I would like to read it into the Record. Is that satisfactory?

MR. UTZ: Yes.

MR. RUSSELL: Dated February 26, 1969,

Statement for Amerada Petroleum Corporation in Case 4069, on February 26, 1969. Amerada Petroleum Corporation has a working interest in the two wells drilled by Union Oil of California, in the Midway Devonian Oil Pool. Amerada supports the Application of Union Oil of California in Case 4069 to have discovery oil allowable assigned and to create special pool rules, providing for eighty-acre oil spacing. Signed, R. C. Hocker.

MR. UTZ: All right. The case will be taken under advisement.

* * * * *

I N D E X

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, CA FENLEY, Court Reporter 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.

CA FENLEY - COURT REPORTER

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 4069, heard by me on Feb. 26, 1969.

New Mexico Oil Conservation Commission

LAW OFFICES OF
JOHN F. RUSSELL
412 HINKLE BUILDING
P. O. DRAWER 640
ROSWELL, NEW MEXICO 88201

TELEPHONE 622-4641
AREA CODE 505

'70 MAR 2 AM 8 34

February 27, 1970

GHH new exhibit by Union

Mr. A. L. Porter, Jr.
Secretary-Director
NEW MEXICO OIL
CONSERVATION COMMISSION
Santa Fe, New Mexico

Re: Union Oil Company
of California
Case # 4069

Dear Mr. Porter:

I transmit herewith in triplicate, an exhibit for the above captioned case.

Very truly yours,

John F. Russell

JFR:eb
encl.

LAW OFFICES OF
JOHN F. RUSSELL
412 HINKLE BUILDING
P. O. DRAWER 640
ROSWELL, NEW MEXICO 88201

TELEPHONE 622-4641
AREA CODE 505

February 10, 1969

Mr. Dan Nutter
New Mexico Oil Conservation Commission
State Land Office
Santa Fe, New Mexico 87501

Dear Dan:

I enclose herewith a copy of the Contour Map covering the area of Union Oil Company of California's Midway State Well located in Section 12, Township 17S, Range 36E, Lea County, New Mexico.

Very truly yours,

John F. Russell

JFR/jcg

Enclosure

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
March 4, 1970

EXAMINER HEARING

IN THE MATTER OF:

Case No. 4069 being reopened pursuant to the provisions of Order No. R-3701, which order established 80-acre spacing units for the Lovington-Devonian Pool, Lea County, New Mexico, for a one-year period.

CASE NUMBER
4069

BEFORE:

DANIEL S. NUTTER, Examiner

TRANSCRIPT OF HEARING

MR. HATCH: In the matter of Case No. 4069 being reopened pursuant to the provisions of Order Number R-3101, which order established 80-acre spacing units for the Lovington-Devonian Pool, Lea County, New Mexico, for a one-year period.

MR. RUSSELL: John F. Russell, Roswell, New Mexico, appearing on behalf of the applicant and I have one witness.

(Witness sworn.)

ADRIAN F. TURNEY

called as a witness, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. RUSSELL:

Q Will you please state your name for the record?

A Adrian F. Turney.

Q By whom are you employed and in what capacity?

A Union Oil Company of California.

MR. NUTTER: What is your last name?

THE WITNESS: Turney, T-u-r-n-e-y.

MR. NUTTER: And your first name is Adrian?

THE WITNESS: Yes, sir.

A I'm employed by Union Oil Company of California in Midland, Texas, as Petroleum Engineer.

Q Will you give a brief resume of your educational

background and practical experience?

A I attended Alvin Junior College in Alvin, Texas, and then I went to Texas A and M University where I graduated in January of 1965, with a Bachelor of Science in Petroleum Engineering. From February, 1965 to February, 1969, I was employed as a petroleum engineer by Texaco, Incorporated. From February, 1969 to September, 1969, I was employed as a petroleum engineer by Superior Oil Company. From September, 1969 to present, I'm employed as a petroleum engineer by Union Oil Company of California.

MR. RUSSELL: Are the witness's qualifications acceptable?

MR. NUTTER: Yes, they are.

Q Are you familiar with the application of the Case Number 4069, which is being reopened pursuant to the provision of Order Number R-3701?

A Yes, sir.

Q Now, in connection with this case, have you prepared some exhibits?

A Yes, sir.

(Whereupon, Exhibit Number 1 was marked for identification.)

Q Referring you to what has been identified as

Exhibit Number 1, will you identify that exhibit?

A Exhibit Number 1 is a base map of the Lovington-Devonian field.

Q What is the area outlined in red?

A The area outlined in red is the Midway drilling block that Union Oil of California, the estate of William D. McBee, Cities Service and Amerada are partners in.

Q What are the two circles that are outlined in red?

A These are the two producing wells in this field, Midway State Number 1, which is located in the southeast quarter of the northwest quarter, Section 12, Township 17 South, Range 36 East, and Midway State Well Number 2, which is located in the northwest quarter of the northeast quarter, Section 12, Township 17 South, Range 36 East.

Q Now, will you give a brief resume or history of the development in this field since the initial well was drilled?

A Four wells have been drilled in this field, total, Well Number 1, Well Number 2, Well Number 3 which was abandoned, and Well Number 4 which was abandoned. Both the last two wells were abandoned as dry holes.

Q They were the last two wells which were drilled?

A Yes, sir.

(Whereupon, Exhibit Number 2 was marked for identification.)

Q I will refer you to what has been marked as Exhibit Number 2, and ask you to tell what that exhibit represents?

A Exhibit Number 2 is a gamma ray neutron log on the Midway State Number 2 Well. It shows formation tops and it also indicates the Devonian zone, the Devonian top at 11,402 feet; the top of the Devonian pay, at 11,513 feet; perforated interval, 11,518 feet to 11,522 feet. We also show an oil-water contact at 11,604 feet.

(Whereupon, Exhibit Number 3 was marked for identification.)

Q Now, I'll refer you to what has been marked as Exhibit, Applicant's Exhibit Number 3, which consists of four pages, and ask you if this is a historical resume of the development in the field or of the two wells which you have completed?

A Yes, sir it is.

Q Will you go through and explain that exhibit?

A First of all, I would like to give the status of the reservoir development. Union Oil Company of California Number 1 Midway State was completed December 23rd, 1968, from perforations 11,476 feet to 11,520 feet, flowing 538 barrels of oil per day on a half-inch choke with sixty-five

pounds of tubing pressure and GOR of 170 standard cubic feet per barrel. Cumulative production to January 1st, 1970, is 133,973 barrels of oil and 16,264 m.c.f. of gas. Current production is approximately 316 barrels of oil per day and six barrels of water per day by flowing. Estimated ultimate primary recovery is approximately 440,000 barrels of oil.

The Union Oil Company of California Number 2 Midway State was completed February 21st, 1969, from perforations 11,518 feet to 11,523 feet, flowing 351 barrels of oil per day and nineteen barrels of water per day on one-half-inch choke with forty pounds of tubing pressure and GOR of 197 standard cubic feet per barrel. Cumulative production to January 1st, 1970, is 42,229 barrels of oil and 7,511 m.c.f. of gas. Current production is approximately 100 barrels of oil per day and 124 barrels of water per day by pumping. Estimated ultimate primary recovery is approximately 93,000 barrels of oil.

The Union Oil Company of California Number 3 Midway State was drilled to TD of 11,637 feet and temporarily abandoned April 23rd, 1969.

MR. NUTTER: Would you locate that for me, please?

THE WITNESS: Yes, sir. That is in the northwest quarter of the southeast quarter of Section 12, Township 17 South,

Range 36 East. It's located on the Tract Union McBee.

MR. NUTTER: Okay.

A The well was recompleted as a salt water disposal well January 18th, 1970, with injection into the Yates and San Andres formation from 4450 feet to 6068 feet open hole.

The Union Oil Company of California Number 4 at Midway State which is located in the northeast quarter of the northwest quarter, Section 12, Township 17 South, Range 36 East, was drilled to TD of 11,697 feet and temporarily abandoned July 13th, 1969. That is the current status of the reservoir development at this time.

Q Continue.

A I have some reservoir and fluid properties to present, oil and gas properties. Oil gravity forty-nine degrees API at sixty degrees Fahrenheit.

Q Is there any variation in this from the evidence which was submitted at the original Hearing?

A Yes. Some of the data is different.

Q Give it, then.

A Solution gas-oil ratio, 135 cubic feet per barrel. Previously this was reported as 170 cubic feet per barrel. Gas gravity 0.919; gas analysis is unchanged from the last presentation. Would you like for me to read it?

MR. NUTTER: No, don't read it if it is already in the record.

A Hydrogen sulphite and gas is unchanged from the previous Hearing. Estimated formation volume factor 1.13. It was previously reported as 1.15. This is due to the difference in the gas-oil ratio. Reservoir properties, average net pay thickness seventy-six feet. This was previously reported as ninety-four feet.

Q Can you explain that?

A The ninety-four feet was determined from the log on the Number 1 Midway State. Subsequent drilling has shown that this contains eighteen feet of pay which just isn't there.

Samples and testing have indicated that the top portion of the pay is tight. Average porosity 6.2 per cent. Average permeability 12.5 millidarcies. Estimated connate water saturation thirty-five per cent. Reservoir temperature 188 degrees Fahrenheit. Original bottom hole pressure 4490 PSIG at 7664 feet subsea. Estimated recovery factor twenty-five per cent. Assumed water-oil contact 7770 feet subsea. This was originally stated as 7780.

Productivity index of Midway State Number 1, 0.5 barrels of oil per day per PSI.

I have a reserve calculation, recoverable oil in barrels per acre foot. You want me to state the whole thing?

Q Just what was not in the original report.

A In the denominator, we now use 1.13 for a formation volume factor, where originally we used 1.15. This will give us sixty-nine barrels per acre foot, where originally we had sixty-eight barrels per acre foot. This gives us 5,244 barrels per acre, where originally we had 6,390 barrels per acre. This is due to the change in the net pay thickness. This gives us 420,000 barrels per 80 acres recoverable oil. Originally we had shown 511,600 barrels per 80 acres or 210,000 barrels per 40 acres, whereas originally we had shown 255,800 barrels per 40 acres.

I have some economics. Gross oil price, $3.31 a barrel; originally we had used $3.16 a barrel. Gross gas price, nine cents per m.c.f; original, ten cents per m.c.f. Royalties unchanged, twelve and a half per cent. State taxes, 6.16 per cent of value. Direct operating cost, $100 per month per well while flowing. We had originally used $300 per month per well while flowing. $600 per month per well at initiation of pumping, increasing to $2,000 per month per well at abandonment.

Economic limit is 24.2 barrels of oil per day. Originally we had used 25.4. This is due to the change in oil price and also we assumed 30.4 average days per month and no gas sales at abandonment. Average well profit, total cost of completed well, $250,000, including proportionate share of battery with salt water disposal facilities. Total cost of pumping facilities, $40,000 per well.

Dry hole cost, $151,000. This wasn't shown at the last Hearing. Estimated profit after Federal income taxes -- all of these numbers have changed -- the net profit undiscounted for a 40-acre well, $149,919. Previously we had shown $220,611. For an 80-acre well, $494,504. Previous, $655,164.

Present worth at five per cent. I'm showing different discount factors this time, except for the eight per cent. This is more in line with the way Union looks at a profit. Discounted present worth at five per cent, 40-acre well, $131,595. 80-acre well, $436,644. Eight per cent discount factor, $121,584. Previously this had been shown as $176,509. For an 80-acre well, $406,568. This has been previously shown as $551,921.

At ten per cent discount factor for 40-acre well, $115,273. 80-acre well, $388,150. Twenty per cent discount factor, $87,437 for a 40-acre well.

80-acre well, $311,641.

Two new numbers, rate of return of 40-acre well is seventy-two per cent, and 80-acre well is 100 plus per cent. Profitability index, 40-acre well 0.46.

80-acre well, 1.55. Payout 1.0 years for 40-acre well. Previously it had been 1.1 years. For an 80-acre well, it's 0.8 years, unchanged.

The last page of the exhibit is a production summary on the two producing wells in this pool. It shows monthly oil production, days produced, daily average production and monthly gas production. The sum of the monthly oil production and monthly gas production columns are given on the bottom and these totals have been previously mentioned in the development.

The cumulative pool production to January 1st, 1970, 176,202 barrels of oil, 23,775 m.c.f gas. Pool GOR 135 standard cubic feet per barrel.

Q In your opinion, is this a very limited reservoir?

A Yes, sir.

Q What is that opinion based on?

A The drilling of the two dry holes, Numbers 3 and 4 Midway State, and the fact that Well Number 2 Midway State is a limited producer.

Q In your opinion, you feel that the temporary field rules should be made permanent?

A Yes, sir.

Q Do you have any plans at this time for any future drilling in this field?

A We are currently evaluating possibly one more location which would be a south offset to the Midway State Number 1 Well.

MR. RUSSELL: At this time, I would offer Applicant's Exhibits 1, 2 and 3 into evidence.

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

(Whereupon, Exhibit Numbers 1, 2 and 3 were offered and admitted in evidence.

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

CROSS-EXAMINATION

BY MR. NUTTER:

Q Mr. Turney, what does the general structure look like here? Is this an anticlinal structure or what?

MR. RUSSELL: I can put on a geologist for you.

MR. NUTTER: We probably have a structure map in this old case.

MR. RUSSELL: I think there is.

MR. NUTTER: I was just curious, since they have gone to the north to get a dry hole, gone to the northeast and have a limited producer, to the southeast and got another dry hole.

Q I imagine the structure indicates you have to go to the southwest, doesn't it?

A It's a very small structure, yes, sir.

MR. RUSSELL: We have a structure map and it's slightly different from what the original was and we will put that on --

MR. NUTTER: Okay. That will be fine. I don't have any other questions. Does anyone have any questions of Mr. Turney? He may be excused.

(Witness excused.)

(Whereupon, Exhibit Numbers 4 and 5 were marked for identification.)

(Witness sworn.)

MARVIN ZOLLER

called as a witness, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. RUSSELL:

Q Will you please state your name?

A I am Marvin Zoller, Union Oil Company.

Q In what capacity are you employed?

A Regional Development Geologist.

Q You are familiar with Case Number 4069, are you not?

A Yes, sir.

Q Have you previously qualified to give testimony before the New Mexico Oil Conservation Commission?

A Yes, sir.

Q In connection with this case which has been reopened, have you prepared some exhibits?

A Yes, sir.

Q I'll refer you to what has been marked as Applicant's Exhibit Number 4, and ask you to explain that exhibit.

A Exhibit Number 4 is a structure contour map made on the top of the Devonian and shows the two producing wells and the two dry holes that have been drilled in the immediate area.

It shows the oil-water contact at a minus 7770. It shows that there might possibly be one location left to drill in the field at a south or slightly southwest direction

from the discovery well, the Number 1 Midway State.

Q Does this differ in any way from the original contour map that was introduced in the case?

A Like almost a new world. There's no resemblance to it.

Q What is the difference?

A Well, the original map, of course, was a seismic map. At the time we had that hearing, we had one well completed, another one, I believe, about down, and the same seismic that found the field fell apart on the third and fourth wells, so we kind of gave up on the northwest and the southeast direction, and we're a little leery about going to the southwest because we don't have any seismic at all in the location where we would have to move to.

I think that's about all that Exhibit 4 shows. There's one point I think needs to be made. The top of the pay is roughly 100 feet below the top of the Devonian. Now, on Exhibit 4, this will have the effect of moving the oil-water contact in, reducing the size of the accumulation by about 100 foot on the contour. This is shown, I think, a lot better on Exhibit Number 5.

Q I refer you to Exhibit 5.

A The field is smaller than the structure map would

indicate. Exhibit 5 is a cross-section going from the left of the Union Number 1 Midway State and proceeding northeast to the Union Number 2 Midway State, and then on further northeast to an Amerada dry hole, a mile or so northeast of the field.

It shows the oil-water contact, the core analysis work that was done on the Number 1 Well, where the wells were perforated, what they tested, where the casing is. The greenish color proceeding across the left side, is that porosity which we feel is oil bearing, and then to the east the porosity is colored blue where we feel it to be water bearing.

I believe, other than that, the exhibit is self-explanatory. You would note the wavy line at the top of the Siluro-Devonian is the line we contoured on, but if you move in from that, then, to the top of the green, which is the top of the pay, this is the reduction in the size of the field which I referred to on the map.

Q Were exhibits 4 and 5 prepared by you or under your supervision and direction?

A Yes, sir.

MR. RUSSELL: I offer into evidence Applicant's Exhibits 4 and 5.

MR. NUTTER: Applicant's Exhibits 4 and 5 will be admitted in evidence.

(Whereupon, Exhibit Numbers 4 and 5 were offered and admitted in evidence.)

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

MR. NUTTER: So, it would appear, then, that your anticline is pretty well defined in every direction except in the south and southwest?

THE WITNESS: Except the southwest, we feel, and we just frankly don't know about that direction. We did know that that one fault exists. I don't believe there's any doubt about that.

MR. NUTTER: Maybe you have a chance if you don't have a seismic down there.

THE WITNESS: We have given this some consideration.

MR. NUTTER: Are there any further questions of the witness? He may be excused.

(Witness excused.)

MR. NUTTER: Does anyone have anything they wish to offer in Case 4069?

MR. HATCH: The Commission has received telegrams from Amerada-Hess Corporation, the estate of William D. McBee

and Cities Service Oil Company, concurring with the applicants in this case.

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

MR. RUSSELL: I have nothing further, Mr. Examiner.

MR. NUTTER: If there is nothing further in Case 4069, we will take the case under advisement and call a fifteen-minute recess.

I N D E X

E X H I B I T S

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 7th day of March, 1970.

NOTARY PUBLIC

My Commission Expires:

June 19, 1971

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 4069 heard by me on 3/4, 1970.

, Examiner
New Mexico Oil Conservation Commission