

CASE 3336: Application of SHELL
OIL COMPANY for special rules for
EAST HIGHTOWER-UPPER PENN. POOL.

371

ASE No.

3336

Application,

Transcripts,

Small Exhibits

ETC.

GOVERNOR
JACK M. CAMPBELL
CHAIRMAN

State of New Mexico
Conservation Commission



P. O. BOX 2088
SANTA FE

November 9, 1966

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

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

Re: Case No. 3336
Order No. R-3005-A
Applicant:

SHELL 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

Aztec OCC

OTHER

Mr. Thomas W. Lynch, Amerada Petroleum Corporation

Post Office Box 2040, Tulsa, Oklahoma

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. 3336
Order No. R-3005-A

APPLICATION OF SHELL OIL COMPANY
FOR SPECIAL RULES FOR THE EAST
HIGHTOWER-UPPER PENNSYLVANIAN POOL,
LEA COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on November 2, 1966, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this 9th day of November, 1966, 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 by Order No. R-3005, dated December 3, 1965, temporary Special Rules and Regulations were promulgated for the East Hightower-Upper Pennsylvanian Pool, Lea County, New Mexico.

(3) That pursuant to the provisions of Order No. R-3005, this case was reopened to allow the operators in the subject pool to appear and show cause why the East Hightower-Upper Pennsylvanian Pool should not be developed on 40-acre spacing units.

(4) That the evidence establishes that one well in the East Hightower-Upper Pennsylvanian Pool can efficiently and economically drain and develop 80 acres.

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CASE No. 3336

Order No. R-3005-A

(5) That the Special Rules and Regulations promulgated by Order No. R-3005 have afforded and will afford to the owner of each property in the pool the opportunity to produce his just and equitable share of the oil in the pool.

(6) That in order to prevent the economic loss caused by the drilling of unnecessary wells, to avoid the augmentation of risk arising from the drilling of an excessive number of wells, to prevent reduced recovery which might result from the drilling of too few wells, and to otherwise prevent waste and protect correlative rights, the Special Rules and Regulations promulgated by Order No. R-3005 should be continued in full force and effect until further order of the Commission.

IT IS THEREFORE ORDERED:

(1) That the Special Rules and Regulations governing the East Hightower-Upper Pennsylvanian Pool, promulgated by Order No. R-3005, are hereby continued in full force and effect until further order of the Commission.

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

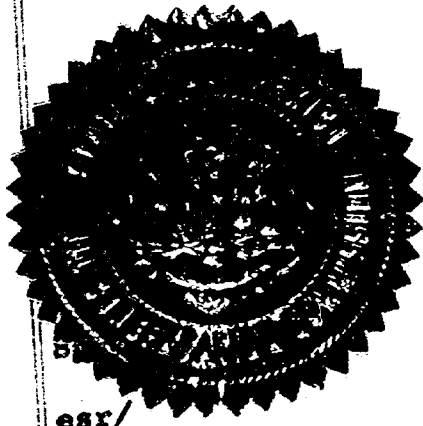
DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Jack M. Campbell
JACK M. CAMPBELL, Chairman

Guyton B. Hays
GUYTON B. HAYS, Member

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



esr/

Case 3336

Heard 11-2-66

Res. 11-4-66

1. Grant Shell a permanent 80 Ac.
spacing order R-3005 for East
Hightower Upper Penn Pool.

Shull W.

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. 3336
Order No. R-3005

APPLICATION OF SHELL OIL COMPANY
FOR SPECIAL RULES FOR THE EAST
HIGHTOWER-UPPER PENNSYLVANIAN POOL,
LEA COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on November 23, 1965, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 3rd day of December, 1965, 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, Shell Oil Company, seeks the promulgation of temporary special rules and regulations for the East Hightower-Upper Pennsylvanian Pool in Section 25, Township 12 South, Range 33 East, NMPM, Lea County, New Mexico, including a provision for 80-acre spacing units.

(3) That in order to prevent the economic loss caused by the drilling of unnecessary wells, to avoid the augmentation of risk arising from the drilling of an excessive number of wells, to prevent reduced recovery which might result from the drilling of too few wells, and to otherwise prevent waste and protect correlative rights, temporary special rules and regulations providing for 80-acre spacing units should be promulgated for the East Hightower-Upper Pennsylvanian Pool.

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CASE No. 3336
Order No. R-3005

(4) That the temporary special rules and regulations should provide for limited well locations in order to assure orderly development of the pool and protect correlative rights.

(5) That the temporary special rules and regulations should be established for a one-year period in order to allow the operators in the subject pool to gather reservoir information to establish the area that can be efficiently and economically drained and developed by one well.

(6) That this case should be reopened at an examiner hearing in November, 1966, at which time the operators in the subject pool should be prepared to appear and show cause why the East Hightower-Upper Pennsylvanian Pool should not be developed on 40-acre spacing units.

IT IS THEREFORE ORDERED:

That temporary Special Rules and Regulations for the East Hightower-Upper Pennsylvanian Pool are hereby promulgated as follows:

SPECIAL RULES AND REGULATIONS
FOR THE
EAST HIGHTOWER-UPPER PENNSYLVANIAN POOL

RULE 1. Each well completed or recompleted in the East Hightower-Upper Pennsylvanian Pool or in the Upper Pennsylvanian formation within one mile thereof, and not nearer to or within the limits of another designated Upper Pennsylvanian oil pool, shall be spaced, drilled, operated, and produced in accordance with the Special Rules and Regulations hereinafter set forth.

RULE 2. Each well shall be located on a standard unit containing 80 acres, more or less, consisting of the W/2, S/2, E/2, or W/2 of a governmental quarter section; provided, however, that nothing contained herein shall be construed as prohibiting the drilling of a well on each of the quarter-quarter sections in the unit.

RULE 3. The Secretary-Director of the Commission may grant an exception to the requirements of Rule 2 without notice and hearing when an application has been filed for a non-standard unit comprising a governmental quarter-quarter section or lot or the unorthodox size or shape of the tract is due to a variation in

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CASE No. 3336

Order No. R-3005

the legal subdivision of the United States Public Land Surveys. All operators offsetting the proposed non-standard unit shall be notified of the application by registered or certified mail, and the application shall state that such notice has been furnished. The Secretary-Director may approve the application upon receipt of written waivers from all offset operators or if no offset operator has entered an objection to the formation of the non-standard unit within 30 days after the Secretary-Director has received the application.

RULE 4. Each well shall be located within 150 feet of the center of a governmental quarter-quarter section or lot.

RULE 5. The Secretary-Director may grant an exception to the requirements of Rule 4 without notice and hearing when an application has been filed for an unorthodox location necessitated by topographical conditions or the recompletion of a well previously drilled to another horizon. All operators offsetting the proposed location shall be notified of the application by registered or certified mail, and the application shall state that such notice has been furnished. The Secretary-Director may approve the application upon receipt of written waivers from all operators offsetting the proposed location or if no objection to the unorthodox location has been entered within 20 days after the Secretary-Director has received the application.

RULE 6. A standard proration unit (79 through 81 acres) shall be assigned an 80-acre proportional factor of 4.77 for allowable purposes, and in the event there is more than one well on an 80-acre proration unit, the operator may produce the allowable assigned to the unit from the wells on the unit in any proportion.

The allowable assigned to a non-standard proration unit shall bear the same ratio to a standard allowable as the acreage in such non-standard unit bears to 80 acres.

IT IS FURTHER ORDERED:

(1) That the locations of all wells presently drilling to or completed in the East Hightower-Upper Pennsylvanian Pool or in the Upper Pennsylvanian formation within one mile thereof are hereby approved; that the operator of any well having an unorthodox location shall notify the Hobbs District Office of the Commission in writing of the name and location of the well on or before December 15, 1965.

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CASE No. 3336

Order No. R-3005

(2) That each well presently drilling to or completed in the East Hightower-Upper Pennsylvanian Pool or in the Upper Pennsylvanian formation within one mile thereof shall receive a 40-acre allowable until a Form C-102 dedicating 80 acres to the well has been filed with the Commission.

(3) That this case shall be reopened at an examiner hearing in November, 1966, at which time the operators in the subject pool may appear and show cause why the East Hightower-Upper Pennsylvanian Pool should not be developed on 40-acre spacing units.

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

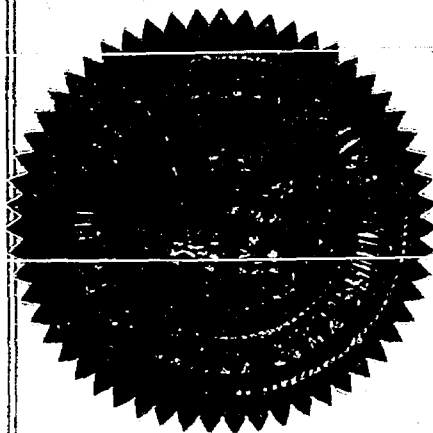
DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Jack M. Campbell
JACK M. CAMPBELL, Chairman

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

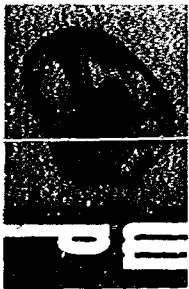


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PAGE 1

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
November 23, 1965

EXAMINER HEARING

IN THE MATTER OF:

Application of Shell Oil Company for special
rules for the East Hightower-Upper
Pennsylvanian Pool, Lea County, New Mexico.
Applicant, in the above-styled cause, seeks
the promulgation of special pool rules for
the East Hightower--Upper Pennsylvanian Pool
in Section 25, Township 12 South, Range 33
East, Lea County, New Mexico, including a
provision for 80-acre proration units.

Case No. 3336

BEFORE: DANIEL S. NUTTER, Examiner.

TRANSCRIPT OF HEARING

MR. NUTTER: The hearing will come to order. The next case will be 3336.

MR. DURRETT: Application of Shell Oil Company for special rules for the East Hightower-Upper Pennsylvania Pool, Lea County, New Mexico.

MR. BUELL: Sumner Buell of Seth, Montgomery, Federici and Andrews appearing on behalf of the Applicant. I have one witness and ask that he be sworn.

(Witness sworn.)

(Whereupon, Applicant's Exhibits 1 through 5 marked for identification.)

R I C H A R D D. S E B A, a witness, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. BUELL:

Q Would you state your name, by whom you are employed, and where and in what position?

A I am Richard D. Seba with Shell Oil Company in Midland.

MR. NUTTER: How do you spell that?

THE WITNESS: S-E-B-A.

MR. NUTTER: Thank you.

THE WITNESS: And I'm a reservoir engineer with the Western Division.

Q (By Mr. Buell) Have you previously testified before



this Commission?

A Yes, I have.

Q Are you familiar with the application in Case Number 3336?

A Yes.

Q What does Shell seek by that application?

A Shell Oil Company seeks special pool rules for the East Hightower-Upper Pennsylvanian Pool located in the southeast quarter of Section 25, Township 12 south, Range 33 east of Lea County, New Mexico. The special rules sought include establishment of 80-acre proration units and the limits of the pool were previously established by the New Mexico Oil Conservation Commission in 3319(e).

Q And what were those limits?

A The limits as defined previously were determined in the Shell State "HTA" Number 1 and they were stated that the top would be 9750 and the base to be 10,010 feet in that particular well.

Q And what was the horizontal extent?

A The horizontal extent of the pool would be limited to the southeast quarter, Section 25, Township 12 south, Range 33 east.

Q Referring you now to what has been marked as Exhibit Number 1, would you state what it is and what it shows?



A Exhibit 1 is a map of the East Hightower Field and adjacent area with contours drawn on a marker at 9800 and the discovery well which is the "HTA" or "HT Number 1". This is located approximately in the center of the map and sits in the southeast quarter of Section 25. Now, the map is drawn on the 9800 rather than the 9750 as stated in the pool limits because this was a little better marker than the top as designated by the Commission and there is no pay above this 9800 interval.

Also on this map, I've indicated four other wells. The well in Section 36 in the northeast quarter of Section 36 is currently testing and in the process of completion in the subject reservoir.

The well in the northwest quarter of Section 31 is currently in the process of drilling and we anticipate that it will also encounter pay in the subject reservoir.

There are two other wells I've also shown on the plat: One located in Section 30 in the southwest quarter is a PanAm well, their "CY" Number 1 which is completed in the lower pen and is not completed in the upper pen. They've found only three feet of pay in the upper pen and are not able to make a completion. The other well, in the northeast quarter of Section 30, labeled "Texam Oil Corp. 1-30" is also a producer in the lower pen and is not completed in the upper pen. So, currently there is only one well completed in the East Hightower-Upper Pen field and

that is the one located in Section 25, Shell Oil "HT" Number 1.

Also on this map, I've shown the lease ownership. The leases with the stripe around them are Shell leases and adjacent to the Shell lease in Section 25, the two offset operators are Amerada and PanAm.

Q Also in Exhibit 1, do you have a cross section drawn on there?

A Yes. I have indicated a line of cross section -- west-east cross section through the three wells being the "HT" Number 1, the PanAm "CY" Number 1 and the Texam Oil Corporation Number 1, and this cross section is presented in Exhibit Number 2.

Q Okay. Would you explain Number 2, please?

A Exhibit Number 2 is a log cross section through the three wells that had logs available on them at the time the exhibit was prepared; being specifically the Shell "HT" Number 1, the PanAm State "CY" Number 1 and a Texam State 30, Number 1.

Also in this cross section I have indicated two correlation lines: One labeled "Top East Hightower Upper Pennsylvanian Field Pay" which I would like to point out is on 9800-foot point in the discovery well as opposed to the official top being 9750 and this was done so that it would correlate with the contour map as previously presented. The base which is labeled "Top East Hightower Lower Pennsylvanian" is as

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specified by the Commission.

Also on this cross section, I wish to call your attention to the legend which indicates the interval open in each well. The interval drill stem tested in each well could involve each well and the interval production tested but not open to production.

I will limit my precise discussion to the Shell "HT" Number 1 since it is the only completion in the East Hightower Upper Pennsylvanian Pool at the present time.

We are completed in the interval 9835 to 9853 as shown by the Roman numeral "I". We cored the bottom part of that interval shown by the heavy line. We also drill stem tested that interval.

I would like to point out that drill stem test number 1 over this interval which had oil to the surface in 34 minutes has subsequently been completed and, I believe, at the present time is producing top allowable.

Q Are the drill stem tests shown on this exhibit?

A Yes. The drill stem tests for all the wells presented in the cross section are indicated at the bottom of the log.

Q Referring now to what has been marked as Exhibit 3, will you explain that, please?

A Exhibit 3 is a summary of the reservoir properties of the East Hightower Upper Pennsylvanian Pool as determined in the

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discovery well. And I would like just to read through those.

We found a net pay of 12 feet and this 12 feet was spread over a total interval of 15 feet. It has an average porosity of 6 per cent, a permeability of approximately 4 milidarcies, water saturation of 40 per cent, reservoir temperature of 156 degrees Fahrenheit and original reservoir pressure of 3550 feet. Our fluid properties are rather limited in our knowledge. We feel that the original solution gas/oil ratio is approximately 1378 and the produced oil has a stock tank gravity of 44.9 degrees, API.

Q Would you also explain Exhibit 4?

A Exhibit 4 is further evidence of the reservoir properties presented in Exhibit 3 being a core-gamma correlation. The curve on the extreme left is the surface gamma ray readings made on the core. The second column is permeability, the third porosity and the fourth oil saturation and you will notice that I have changed the depth from the printed figure to those in red to correlate with the logs presented in Exhibit 2. This correlation was based on the core-gamma presented in the left-hand column so there was a 16 foot correction necessary to bring this in line with the logs presented. As stated before, this core was taken over the bottom portion of the producing interval substantiates that the core analysis or the reservoir properties as presented in enclosure 3.



I would also like to state at this time that this reservoir is quite similar in properties to several other Pennsylvanian reservoirs that are producing in the vicinity. In particular, we feel this is similar to the Inbe Field, the Ranger Lake, the Lane, the South Lane and North Bagley Pools and all of these have sufficient performance to substantiate the fact that we feel that one well will drain 80 acres.

Q Referring you now to Exhibit 5, would you run that briefly, please?

A Number 5 is an economic analysis of two specific spacing patterns.

The data at the top of the page is basic information applicable to both being that the oil value is \$2.95, currently it is being purchased by the Permian Corporation. We estimate that a gas value is 11 cents per thousand cubic feet. Prior to the present time there is not a gas purchaser. Production taxes will be 21.8 cents per barrel. Lifting costs are estimated to be 33.5 cents per barrel and the investment to drill a well in this Pool plus the lease facilities and pumping unit require would total \$174,000. Shell's net interest in the discovery well is 87-1/2 per cent.

Specifically, I would like to call your attention to several items in the economic analysis. First of all that we estimate from an analogy with similar reservoirs in this



vicinity that we would recover 75,000 barrels on 40-acre spacing and 150,000 barrels on 80-acre spacing.

Just going down the column, this is calculations leading up to the final profit for such a venture, including operating costs, production taxes, leading to a net income for 40 acres of \$190,000 and for 80 acres of \$381,000, subtracting off the investment for each which is the same, \$174,000, would yield a profit for a 40 acre well of only \$16,600 whereas for a 80 acre well we would derive a profit of \$207,200.

One convenient way of looking at the profit available as criteria for such a venture would be to compare that profit-to-investment in item 12 as product venture for both wells based on this. This indicates that we would expect about a 9-1/2 per cent profit for a 40-acre spacing which we feel would not be what a prudent operator would be able to accept and continue development in this field. However, on 80-acre spacing we would derive approximately 119 per cent profit which we feel would be acceptable and lead to further and full development of this oil pool.

Q Mr. Seba, do you feel that one well can effectively drain 80 acres?

A Yes, I do and I base this on analogy with similar Pennsylvanian Reservoirs in the vicinity that have recurred what must be under 80 acres.

Q Do you also feel that this draining of 80-acre proration units would prevent waste and protect correlative rights?

A Yes, I do. I believe it would prevent waste and the fact that it would lead to full development of this reservoir whereas the economics on smaller spacing would not lead to full development.

Q Have you contacted any of your adjoining interest owners there in regards to this hearing?

A Yes. Both Pan American Petroleum Corporation, and Amerada were contacted and asked whether they would be in favor of 80-acre spacing for the pool and both of them indicated that they would be happy to accept and would support 80-acre spacing for this pool.

Q Were Exhibits 1 through 5 prepared by you or under your supervision?

A Yes.

MR. BUELL: I would like to move the introduction of Exhibits 1 through 5 as evidence.

MR. NUTTER: They will be admitted as evidence.

(Whereupon, Applicant's Exhibits 1 through 5 were offered and admitted into evidence.)

MR. BUELL: I have no further question.





MR. NUTTER: Does anyone have further questions of Mr. Seba?

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Seba, this "HTA" well, number 1, which is presently drilling is pretty far down, isn't it?

A Yes. I stated that it's in the process of testing and completion. We have not made a completion. The last information I had, they were still testing and trying to determine which one or both that they should complete in, whether it would be the Upper Pennsylvanian and or the Lower Pennsylvanian.

Q Have tests been made in each of the two zones to date?

A I'm not aware of the results of the test. When I left Midland, they were just in the process. They had run the pipe through both zones and were in the process of testing them.

Q Then you don't know the drill stem tests or any other tests that were made or conducted to date?

A No, sir, I don't.

Q How about your "HTB Number 1", has drilling commenced on that?

A Yes. We are down three to four thousand feet. I'm not sure of the precise depth but we are drilling on that well.

Q Now, to what extent did Pan American test this upper



pen zone, do you know?

A Yes. The drill stem tests for this is presented on Exhibit Number 2. They did encounter only three feet of pay on this and on drill stem tests they recovered 50 feet of oil and 900 feet of gas-cut mud and 3807 feet of salt water. To my knowledge they did not attempt to complete in this zone.

Q Well, that drill stem test number 1 actually isn't in the same equivalent zone that you're producing from, would you say on examination of your cross section?

A No, it is not and this is the only zone that they found porosity in -- in the Upper Pennsylvanian, only this 3 feet of pay and they did test that 3 feet of pay. Actually in the correlative zone with the "HT" 1 it was completely tight.

Q I see. Now, there has been an Upper Pen pool and a Lower Pen pool designated by the Commission?

A Yes, at a hearing I think it was in October 13th in Case Number 3319(e) on the motion of the Commission. The limits of the East Hightower Pennsylvanian were contracted and two pools were set up.

Q The vertical limits were split and two pools were set up?

A Where previously the Texam well was prorated in the East Hightower Pennsylvanian, but now it is in the East Hightower Lower Pennsylvanian.



Q Now, do you know whether there any 80-acre rules for the original Hightower Pennsylvanian. I mean, the original East Hightower Pen prior to this time?

A I don't think there were any field rules, any pool rules, no, sir.

Q And there's only that one well in that pool and that would be the PanAm well?

A No, there are two: Texam well which was the discovery well and the PanAm "CY" Number 1 are both in the Lower Pennsylvanian.

Q I see. Now, you haven't actually made a computation of the reserves in this area based on your porosity and water saturation and such other reservoir and this 75,000 barrels of recoverable oil for 40 acres is an estimate analogous to some other pools --

A Yes.

Q -- of a similar nature in the county?

A The reason that we approached the problem in this manner is that in fields of rock of this nature we have in the past tried to make a volumetric calculation based upon the reservoir properties that we see in the individual wells and we found these to be grossly in error when we compared our original estimates to what we actually produced from these reservoirs; that we have gone to analogy barrels per net feet

that we have produced from similar reservoirs in the area. If anything, it's my opinion that a volumetric calculation using these reservoir perimeters would even come out lower than the 75 and 150,000 barrels.

Q Do you by any chance know what the formation volume factor is here?

A I don't know precisely but I would imagine that it was in the vicinity of 1.2 to 1.3.

MR. NUTTER: Are there any other questions of Mr. Seba? You may excused.

Do you have anything further, Mr. Buell?

(Counsel nods head.)

Does anyone have anything further they wish to state in Case 3336?

We will take the case under advisement and call Case 3337.

(Whereupon, Case Number 3336 was concluded.)



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I N D E X

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E X H I B I T S

<u>EXHIBIT</u>	<u>MARKED FOR IDENTIFICATION</u>	<u>OFFERED</u>	<u>ADMITTED</u>
App's. 1	2	10	10
App's. 2	2	10	10
App's. 3	2	10	10
App's. 4	2	10	10
App's. 5	2	10	10

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STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, DEAN A. ROBINSON, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me; and that the same is a true and correct record of the said proceedings, to the best of my knowledge, skill and ability.

Witness my Hand and Seal this 3rd day of December, 1965.

Dean A. Robinson
NOTARY PUBLIC

My Commission Expires:

October 16, 1969.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner's Hearing of Case No. 3336 heard by me on 11/23, 1965.

[Signature], Examiner
New Mexico Oil Conservation Commission

MAILED
NOV 2 1965

BEFORE THE NEW MEXICO OIL CONSERVATION COMMISSION

APPLICATION OF SHELL OIL COMPANY
FOR THE ESTABLISHMENT OF SPECIAL
RULES AND REGULATIONS IN THE EAST
HIGHTOWER-UPPER PENNSYLVANIAN
POOL, LEA COUNTY, NEW MEXICO.

Case No. 3336

A P P L I C A T I O N

Comes now Shell Oil Company by its attorneys and applies to the New Mexico Oil Conservation Commission for the establishment of special rules and regulations in the East Hightower-Upper Pennsylvanian Pool, Lea County, New Mexico, and in support of its application states:

1. Shell Oil Company has completed its HT State Well No. 1 located in Unit P, Section 25, Township 12 South, Range 33 East, Lea County, New Mexico, as a producer of oil from the Pennsylvanian formation in the interval 9,750 feet to 10,010 feet.

2. Pursuant to hearing on October 13, 1965, on Case No. 3319(e) the Commission has entered its order creating the East Hightower-Upper Pennsylvanian Pool with horizontal limits comprising the Southeast Quarter of Section 25, Township 12 South, Range 33 East, Lea County, New Mexico.

3. Shell Oil Company requests the establishment of special rules and regulations for the East Hightower-Upper Pennsylvanian Pool to provide for 80-acre proration units and an allocation factor of 4.77 times the normal unit allowable.

4. Upon the basis of the limited information now available, it appears that the East Hightower-Upper Pennsylvanian Pool can be efficiently and economically drained and developed under special rules and regulations providing for 80-acre proration units.

DOCKET MAILED

Date 11-10-65

5. Approval of this application will prevent waste and protect correlative rights.

WHEREFORE, Shell Oil Company requests that this application be set for hearing before the Commission or one of its examiners and that the Commission enter its order establishing special rules and regulations for the East Hightower-Upper Pennsylvanian Pool providing for 80-acre proration units as set forth in this application.

SETH, MONTGOMERY, FEDERICI & ANDREWS

By *Sumner G. Sumner*
350 East Palace Avenue
Santa Fe, New Mexico

Attorneys for Shell Oil Company

State of New Mexico
Oil Conservation Commission



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

December 3, 1965

Shell Oil Company

Date 10-2-76

Very truly yours,

A. L. Porter, Jr.
Secretary-Director

Carbon copy of order also sent to:

Hobbs OCC ^x
 Artesia OCC
 Aztec OCC

Other _____

DOCKET: EXAMINER HEARING - TUESDAY - NOVEMBER 23, 1965

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

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

CASE 3294 (Continued from the September 22, 1965, Examiner Hearing)

In the matter of the hearing called by the Oil Conservation Commission on its own motion to permit Harold J. Sechler, dba S. & S. Oil Producers, and all other interested parties to show cause why the Bond Well No. 1 located in the SW/4 NE/4 of Section 17, Township 9 North, Range 14 West, Valencia County, New Mexico, should not be plugged and abandoned in accordance with a Commission-approved plugging program.

CASE 3333: Application of William A. and Edward R. Hudson for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Queen formation through six wells in Sections 10, 11, and 15, Township 18 South, Range 31 East, Shugart Yates-Seven Rivers-Queen-Grayburg Pool, Eddy County, New Mexico.

CASE 3334: Application of Felmont Oil Corporation for an unorthodox location, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks authority to drill its Federal 9 Well No. 1 at an unorthodox location 660 feet from the North and East lines of Section 9, Township 8 South, Range 37 East, Bluitt-San Andres Gas Pool, Roosevelt County, New Mexico.

CASE 3335: Application of Monsanto Company for an unorthodox location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of an unorthodox oil well location 1200 feet from the South line and 660 feet from the West line of Section 32, Township 16 South, Range 33 East, West Kemnitz-Lower Wolfcamp Pool, Lea County, New Mexico.

CASE 3336: Application of Shell Oil Company for special rules for the East Hightower-Upper Pennsylvanian Pool, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the promulgation of special pool rules for the East Hightower-Upper Pennsylvanian Pool in Section 25, Township 12 South, Range 33 East, Lea County, New Mexico, including a provision for 80-acre proration units.

CASE 3337: Application of Shell Oil Company for the creation of a new gas pool and for special pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new gas pool for Morrow production in Sections 3 and 4, Township 22 South, Range 34 East, and Section 34, Township 21 South, Range 34 East, Lea County, New Mexico, and the establishment of special pool rules, including a provision for 640-acre spacing units.

November 23, 1965, Examiner Hearing

- CASE 3338: Application of Socony-Mobil Oil Company, Inc. for pool-lease commingling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to commingle Glorieta, Blinbry, Upper-Pennsylvanian, Lower-Pennsylvanian, Devonian, Abo and Wolfcamp production from its State Bridges (Military Institute) Lease in Section 25, Township 17 South, Range 34 East, and from its State Bridges (Common School) Lease in Sections 3, 10 through 15, 22, 23, 24, and 26 and 27, Township 17 South, Range 34 East, Lea County, New Mexico, after separately metering the Military Institute production, allocating production to each lease by means of the subtraction method.
- CASE 3339: Application of Socony-Mobil Oil Company, Inc. for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Denton North Wolfcamp Unit Area comprising 2,640 acres, more or less, of Federal and fee lands in Township 14 South, Range 37 East, Lea County, New Mexico.
- CASE 3340: Application of Socony-Mobil Oil Company, Inc. for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in its Denton North Wolfcamp Unit by the injection of water into the Wolfcamp formation through twelve wells located in Sections 25, 26, 27, 34, 35, and 36, Township 14 South, Range 37 East, Lea County, New Mexico.
- CASE 3341: Application of Tenneco Oil Company for an administrative procedure, San Juan and Rio Arriba Counties, New Mexico. Applicant, in the above-styled cause, seeks the establishment of an administrative procedure whereby wells presently completed in the Blanco-Mesaverde Pool could, without notice and hearing, be recompleted in the Blanco-Mesaverde and/or Basin-Dakota Gas Pools by means of setting a whipstock above the Mesaverde producing interval and directionally drilling around the old interval of completion which was originally shot. Operators utilizing such administrative procedure would be required to conduct appropriate deviation tests to ensure that no well would be completed nearer than 200 feet to the outer boundary of its proration unit.
- CASE 3342: Application of Sunray DX Oil Company for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Grayburg-Jackson Pool, Eddy County, New Mexico, by the injection of water into the Keeley zone of the San Andres formation through four wells in Sections 22 and 23, Township 17 South, Range 29 East.
- CASE 3343: Application of Sunray DX Oil Company for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Grayburg-Jackson Pool, Eddy County, New Mexico, by the injection of water into the Metex zone of the Grayburg formation through four injection wells in Sections 14 and 15, Township 17 South, Range 29 East.

- 3 -

November 23, 1965, Examiner Hearing

CASE 3344: Application of Texaco Inc. for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the West Vacuum Unit Area comprising 2000 acres, more or less, of State land in Township 17 South, Range 37 East, Lea County, New Mexico.

CASE 3345: Application of Texaco Inc. for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in its West Vacuum Unit by the injection of water into the Grayburg-San Andres formations through six injection wells located in Sections 3 and 4, Township 18 South, Range 34 East, and Sections 33 and 34, Township 17 South, Range 34 East, Vacuum Pool, Lea County, New Mexico.

CASE 3346: Application of Sinclair Oil & Gas Company for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Maljamar Pool by the injection of water into the Grayburg-San Andres formations through eight wells in Section 24, Township 17 South, Range 32 East, Lea County, New Mexico.

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

Date 11/24/65

CASE 3386

Hearing Date 9 am 11/23/65

DSN @ 8F

My recommendations for an order in the above numbered cases are as follows:

Enter an order approving
temporary pool rules for
the East Hightower - Upper
Pennsylvanian Pool in Lea
Co N.M. Pool ^{at present} comprises

SE 1/4 Sec 25, T 12S, R 33E

be good for 1 year and
Pool rules should provide for
80-acre proration units with
wells to the dividend within 150
feet of the center of either 40-acre
tract.

Horizontal limits of

Vertical limits are from 9750 feet
to the marker @ 10010 feet on the log
of Shell Oil Company #1 State Well No 1, loc
in Unit P of 25-12S-33E.

Call pool backing for
hearing in November of 66.

→ while
the marker at
9750 feet
on the log
of the dry well,
assign
80 acre
proportionate
of 4.74

Docket No. 27-66

DOCKET: EXAMINER HEARING - WEDNESDAY - NOVEMBER 2, 1966

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 3479: Application of Gulf Oil Corporation for an exception to Rule 8 of Order No. R-1638 and to Rule 301, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks an exception to Rule 8 of Order No. R-1638 and to Rule 301 of the Commission rules and regulations to permit discontinuance of individual gas-oil ratio tests in its West Bisti-Lower Gallup Sand Unit, Bisti-Lower Gallup Pool, San Juan County, New Mexico. Applicant proposes to report gas production and ratios on a unit-wide basis rather than individual well GOR data.

CASE 3480: Application of Tidewater Oil Company for a capacity allowable, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Order No. R-3007 which permitted its GO State "J" Well No. 1 located in Unit H of Section 7, Township 17 South, Range 33 East, Lea County, New Mexico, which directly offsets the Malmar Unit Waterflood Project, to be produced at capacity for a period not to exceed 90 days from date of said order. Applicant seeks additional time in which to produce said well at capacity and the establishment of an administrative procedure for further extensions.

CASE 3336 (Reopened)

In the matter of Case No. 3336 being reopened pursuant to the provisions of Order No. R-3005, which order established 80-acre spacing units for the East Hightower-Upper Pennsylvanian Pool, Lea County, New Mexico, for a period of one year. All interested parties may appear and show cause why said pool should not be developed on 40-acre spacing units.

CASE 3481: Application of Sinclair Oil & Gas Company for a non-standard gas proration unit and an unorthodox location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of a 160-acre non-standard gas proration unit comprising the NW/4 of Section 7, Township 22 South, Range 36 East, Jalmat Gas Pool, Lea County, New Mexico, to be dedicated to its State 157 "B" Well No. 1 located at an unorthodox location for said pool 330 feet from the North line and 2310 feet from the West line of said Section 7.

- CASE 3482: Application of Sinclair Oil & Gas Company for a special gas well test, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to produce and flare up to three million cubic feet of gas per day, for a maximum of 30 days, from its Hackberry Hills Unit Well No. 4 located in Unit F of Section 22, Township 22 South, Range 26 East, Eddy County, New Mexico, as a reservoir limit test to determine the economic feasibility of a pipeline connection to said well.
- CASE 3483: Application of H. S. Moss for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water in the Wolfcamp formation in the interval from 9751 to 9850 feet in its D. P. Peck Well No. 1 located in Unit C of Section 26, Township 12 South, Range 37 East, Gladiola Field, Lea County, New Mexico.
- CASE 3484: Application of Phillips Petroleum Company for a pilot waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a pilot waterflood project by the injection of water into the Grayburg-San Andres formation through its Santa Fe Well No. 14 located in Unit P of Section 20, Township 17 South, Range 35 East, Vacuum Field, Lea County, New Mexico.
- CASE 3485: Application of Phillips Petroleum Company for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project by the injection of water into the Grayburg-San Andres formation through three injection wells located in Sections 8, and 9, Township 17 South, Range 33 East, Vacuum Field, Lea County, New Mexico.
- CASE 3486: Application of Shenandoah Oil Corporation for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project by the injection of water into the Grayburg-San Andres formation through four injection wells located in Sections 7, 8 and 16, Township 17 South, Range 33 East, Vacuum Field, Lea County, New Mexico.
- CASE 3487: Application of Amerada Petroleum Corporation for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of its State "SN" Unit Area comprising 692 acres, more or less, of State land in Sections 3 and 4, Township 15 South, Range 33 East, Lea County, New Mexico.

- CASE 3488: Application of Amerada Petroleum Corporation for a waterflood expansion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to expand its Saunders SB Waterflood Project by the injection of water into the Permo-Pennsylvanian zone through its Texaco-State "AQ" Well No. 2 located in Unit E of Section 3, Township 15 South, Range 33 East, Saunders Permo-Pennsylvanian Pool, Lea County, New Mexico.
- CASE 3489: Application of William A. and Edward R. Hudson for a waterflood expansion, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to expand their Puckett A Waterflood Project by the injection of water into the Grayburg-San Andres formation through their Puckett A Well No. 30 to be drilled at an unorthodox location 1345 feet from the North line and 25 feet from the West line of Section 24, Township 17 South, Range 31 East, Maljamar Pool, Eddy County, New Mexico.
- CASE 3490: Application of Sunray DX Oil Company for pool redelineation, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks the redelineation of the Todd-San Andres Pool, Roosevelt County, New Mexico, into two separate pools: The Todd Upper-San Andres Gas Pool comprising that portion of the San Andres formation above the anhydrite bed found at 4200 feet in the Franklin, Aston and Fair Mark Federal Well No. 1 located in Unit M of Section 26, Township 7 South, Range 35 East, and the Todd Lower-San Andres Pool comprising that portion of the San Andres formation below said anhydrite bed, said Todd Lower-San Andres Pool to be governed by the existing rules for the present Todd-San Andres Pool. Also to be considered at said hearing will be such matters as the effective date of the aforesaid redelineation, the period of time in which to effect dual completion of the affected wells, the distribution of the affected wells' accumulated status in the present pool (overproduction and underproduction) to each of the new pools, and such other pertinent matters as may relate to the aforesaid pool redelineation. Also to be considered will be special pool rules for the proposed Todd Upper-San Andres Gas Pool, including 320-acre spacing for wells located therein.

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BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
November 2, 1966

EXAMINER HEARING

IN THE MATTER OF:

Case Number 3336 being re-opened
pursuant to provisions of Order
Number R-3005, which Order established
eightyacre spacing units for the East
Hightower-Upper Pennsylvanian Pool
Lea County, New Mexico.

Case No. 3336
(Re-opened)

BEFORE: Elvis A. Utz, Examiner.

TRANSCRIPT OF HEARING

MR. UTZ: Case 3336.

MR. HATCH: Case 3336 Re-Opened, in the Matter of Case Number 3336 being re-opened pursuant to provisions of Order Number R-3005, which Order established eighty acre spacing units for the East Hightower-Upper Pennsylvania Pool, Lea County, New Mexico, for a period of one year.

MR. MORRIS: May the Examiner please, I am Dick Morris of Montgomery, Federici and Andrews, Santa Fe, New Mexico, appearing on behalf of Shell Oil Company, which was the company that is the Applicant for the Special Rules in the East Hightower Pool when Case 3336 was first considered by the Commission.

We will have one witness, Mr. Dave Frawley, and I ask that he stand and be sworn at this time.

(Whereupon, the witness was sworn.)

DAVID FRAWLEY

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

DIRECT EXAMINATION

BY MR. MORRIS:

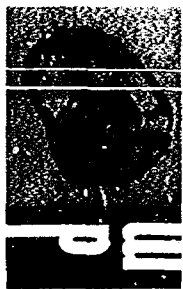
Q Mr. Frawley, will you please state your name, where you reside, by whom you are employed, and in what capacity?

A My name is David Frawley. I reside in Midland, Texas, and I am employed by Shell Oil Company as Senior

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Reservoir Engineer in our Western Production Division.

Q Have you previously testified before the New Mexico Oil Conservation Commission or one of its Examiners?

A No, I have not.

Q Would you briefly state your education and experience in the oil industry?

A I graduated from the University of Tulsa in January, 1958 with a Bachelor of Science degree in petroleum engineering. I accepted permanent employment with Shell Oil Company upon graduation. I spent approximately one year in training in south Louisiana and south Texas. I was then assigned to Shell's Billings, Montana Division as a Field Exploitation Engineer. I spent approximately two years as a field engineer. I was then assigned to Shell's Billings Reservoir Engineer Division where I spent approximately three years. I was then assigned to Shell's foreign affiliates, P. T. Shell, Indonesia, for one and a half years. Upon returning to the United States, I was assigned to Shell's Drilling Division in New Orleans for approximately one year and, in June of this year, I was assigned to Shell's Western Production Division in our Midland area as Senior Reservoir Engineer.

Q Are you familiar, Mr. Frawley, with the temporary rules, special rules and regulations, that have been adopted



by the Commission for the East Hightower-Upper Pennsylvanian Pool?

A Yes, sir, I am.

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

MR. UTZ: Yes, sir. They are.

Q (By Mr. Morris) Referring to the plat that has been marked as Exhibit Number One in this case, will you state what that exhibit is and the primary features of the exhibit?

A Exhibit One is a structure contour plat, contoured on top of the East Hightower-Upper Pennsylvanian Producing Zone. We have designated on this structure plat, particularly in Section Twenty-Five, Unit "B" in Section Twenty-Five, Twelve South, Thirty-Three East, the discovery well, Shell "HT", State Number One. That well was completed August 13, 1965.

The second well in the East Hightower-Upper Pennsylvanian Pool was the well in the section to the south, Section Thirty-Six, Unit "B", Twelve South, Thirty-Three East. That well was completed December 4, 1965.

At the time of the previous hearing, only the discovery well had been completed, and the second well was being tested.

We have a third well completed in the East Hightower-Upper Pennsylvanian Pool which is the section to the east,

Section Thirty-One, Unit "D", Twelve South, Range Thirty-Four East, and that well is Shell's State "HTB" Number One, completed January 19, 1966.

A fourth well, indicated here, in the vicinity of the structure is in Section Thirty, Unit "M", Twelve South, Thirty-Four East, Pan American's "CY" Well Number One. That well is completed in the East Hightower-Lower Pennsylvanian Pool. I point out, as far as the three wells completed in the Upper Pennsylvanian Pool, that they are spaced on a regular eighty acre pattern.

Q Are these four wells shown on a cross section which has been designated as Exhibit Number Two?

A That's correct.

Q Would you point out the features of that cross section?

A The cross section is designated "AA Prime" which is the line of section that is designated on the structure plat through the "HTA" Number One Well and the "HT" Number One and Pan American's "CY" Number One and Shell's State "HTB" Number One.

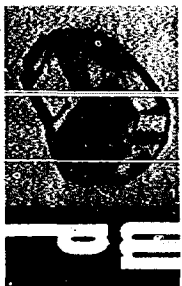
On the cross section, the second well from the left is the discovery well, and we can see that the contour datum which occurs in the discovery well at the depth of approximately ninety-eight hundred feet, is the top of the



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East Hightower-Upper Pennsylvanian Producing Zone and that is correlated across the four wells to the contour data on Exhibit One.

To the left of the section, the log section, for State "HT" Number One, we have the vertical limits delineated for the Upper Pennsylvanian Pool-East Hightower Field, and then the Lower Pennsylvanian Pool.

Q This cross section shows that the Pan American well is definitely completed in the Lower Pennsylvanian, and the three Shell wells are completed in the Upper ?

A That's correct. The three Shell wells are completed in the Upper and the Pan American is completed in the Lower Pennsylvanian Pool.

Incidentally, we do have, on the lower portion of the log of the three Shell wells, information relating to the unsuccessful attempts to establish Lower Pennsylvanian production. I point out that the three Upper Pennsylvanian completions are completed in a correlative limestone stringer that we may correlate across the wells and see that the wells are completed in the same zone which is geological evidence that the pool does extend, in each case, at least eighty acres to the next well.

Q Turning now to Exhibit Number Three, would you state what that is and what it shows?

A Exhibit Three is a summary of production data through September, 1966, for the three wells completed in the East Hightower-Upper Pennsylvanian Pool.

In September, production was 7,932 barrels of oil plus 2,148 barrels of water, for an average water cut of twenty-one percent. Gas production was 9,805 M.C.F., for an average producing gas-oil ratio of 1,236 cubic feet per barrel.

The discovery well, State "HT" Number One is still productive, while the second and third wells, State "HTA" Number One and State "HTB" Number One, are not pumping.

The cumulative reservoir oil production, September 30, 1966, is 96,387 barrels of oil.

Q Do you have any pressure information, Mr. Frawley, that would indicate the drainage by one well in excess of eighty acres?

A Yes, we do have, and that I think is now designated as Exhibit Four. It is a plot of reservoir pressures measured at the datum of 5,625 feet sub-sea versus cumulative oil production from the reservoir.

All the pressures are extrapolated from pressure buildup surveys or drill stem tests, and that are reported in the reservoir datum.

The pressure buildup survey in the discovery well,



Shell State "HT" Number One was taken August 17, 1965, and showed an initial pressure for the reservoir of 3,550 P.S.I. Subsequently, a drill stem test of the second well, completed in the Pool, State "HTA" Number One, was taken November 15, 1965, and showed a reservoir pressure at that time of 3,316 P.S.I. which was a drop in pressure of 234 pounds per square inch from the original pressure. On December 20, 1965, a drill stem test on the third completion in this reservoir, State "HTB" Number One, indicated a reservoir pressure datum of 3,118 pounds per square inch which was a drop in pressure of 432 pounds per square inch from the original reservoir pressure.

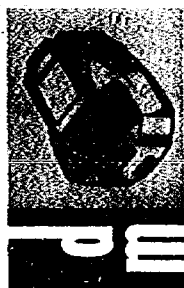
The latest pressure was taken September 26th in State "HT" Number One and showed the reservoir pressure to be 2,385 P.S.I. or 1,165 pounds per square inch less than the original pressure.

I would say that this is definite evidence that the wells are draining in excess of eighty acres. There is a definite pressure connection between the three wells.

Q Do you have any information to present to the Examiner concerning the economics of the drilling and production in this pool?

A Yes, sir, I do. That's designated Exhibit Five, I believe.

Q Will you point out the features of that exhibit?



A I think that the principal feature here is that based on the production performance we have seen in the two wells to date, plus the pressure cumulative information that we have, it is my opinion that the ultimate recovery from the three Shell wells will be approximately 300,000 barrels of oil which is an indicated recovery of 100,000 barrels for the average, eighty acre well, and I base the economics of drilling forty acre spacing versus eighty acre spacing on this indicated recovery of 100,000 barrels for an eighty acre well.

A forty acre well then is seen to recover an ultimate recovery of 50,000 barrels. In Item Nine which is the net income after royalties, taxes and operating costs, is one hundred and fourteen thousand dollars, while the capital investment is estimated to be one hundred and seventy-five thousand dollars, indicating a loss of a well drilled on forty acre spacing to be sixty-one thousand dollars for each well.

On eighty acre spacing, I estimate a recovery of one hundred thousand barrels per well, a net income of two hundred and twenty-eight thousand dollars, a capital expenditure of one hundred and seventy-five thousand dollars for an indicated profit of fifty-three thousand dollars, or thirty percent profit, and it is therefore apparent that forty acre spacing in this pool would be unprofitable while eighty

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acre development would be only moderately profitable.

Q I think you stated at the outset of your discussion on this exhibit, Mr. Frawley, that your estimate of recoverable oil, forty and eighty acres, is based on performance of pressure information, and I ask if you have made any volumetric analysis of the oil influx?

A Yes, I have made a volumetric analysis of the oil in place based on the average net pay and porosity and water saturation we see in the existing wells. The lateral extent of the field is actually rather indefinite which makes a volumetric analysis difficult to say how much oil is in place in the total reservoir, but, under an eighty acre tract, it's my estimate that the recovery would be 100,000 barrels or less volumetrically.

Q And, probably less?

A Probably, yes.

Q Does Shell plan any further development in this pool?

A We have no development planned at this time. The economics, as I pointed out, are indicated that a well, even on eighty acre spacing, would only be moderately profitable, and not sufficiently profitable, in our opinion, to justify the risk of drilling.

There is a second problem, as I pointed out, on the





production exhibit, summary production data. All three of the wells are producing some water which is an additional risk, I feel, to down dip development. We have no immediate plans.

Q What is your recommendation concerning the rules and regulations to govern this pool from this time forward?

A It's my recommendation that the special rules which provided for temporary proration unit spacing of eighty acres be made a permanent spacing of eighty acres.

Q Were Exhibits One through Five prepared by you or under your supervision?

A Yes.

MR. MORRIS: We offer Shell's Exhibits -- I think they have been designated One "R" through Five "R", "R" to indicate re-opened. We offer those exhibits into evidence.

MR. UTZ: Without objection, Exhibits One "R" through Five "R" will be entered into the record in this case.

(Whereupon, Exhibits One "R" through Five "R" were entered into evidence.)

MR. MORRIS: That's all I have of Mr. Frawley at this time.

MR. UTZ: Is it your intention to run any communication test of any nature other than the pressures on your subsequent drilled wells to prove communication in this Pool?

A No, sir. We have no plans to run any communication



tests as such. We do feel that the pressure information is definitive, that it does show pressure connections between the three wells.

MR. UTZ: Is this a water drive or solution drive?

A In my opinion, it is principally a solution drive reservoir. However, there are indications of a partial water drive. I feel that it would be a combination.

MR. UTZ: Were the two pumping wells, flowing wells in the initial stage of production?

A The second well, State "HTA" Number One, was flowed initially then required putting on the pump. The third well, State "HT" Number One, was pumped from the outset.

MR. UTZ: Pan American is the only people that would have any acreage near the crest of the structure other than Shell, is that correct?

A That's correct.

MR. UTZ: And, they did not get a well in the Upper Penn in their location?

A They did not actually test an interval correlative to the interval which is completed in the Upper Penn. Zone in the three Shell wells. However, the development in their wells, as indicated from a sonic log, is quite poor. I wouldn't try to speak for Pan American but, in my opinion, that is probably

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a non-economical completion.

MR. UTZ: Any questions of the witness?

MR. LYNCH: Mr. Frawley, my name is Tom Lynch and I represent Amerada Petroleum Corporation, and you testified that 100,000 barrels of oil in place. Is that recoverable?

A Excuse me, recoverable oil, 100,000 barrels for each eighty acre tract.

MR. LYNCH: That's all I have.

MR. UTZ: Are there other questions of the witness?

The witness may be excused. Any statements in the case?

MR. LYNCH: Mr. Examiner, on behalf of Amerada Petroleum Corporation, my name is Thomas W. Lynch, appearing in association with Jason Kellahin. On behalf of Amerada, who owns substantial lease hold interests in the defined limits of this pool, we support Shell in this proposal.

MR. UTZ: Are there any other statements?

The case will be taken under advisement.

dearnley-meier reporting service, inc.

SPECIALIZING IN: DEPOSITIONS, HEARINGS, STATEMENTS, EXPERT TESTIMONY, DAILY COPY, CONVENTIONS

ALBUQUERQUE, NEW MEXICO
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PHONE 256-1294

1120 SIMMS BLDG.
1703 FIRST NATIONAL BANK EAST

STATE OF NEW MEXICO)
COUNTY OF BERNALILLO) ss.

I, W. DON MCINTYRE, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission Examiner at Santa Fe, New Mexico, is a true and correct record to the best of my knowledge, skill and ability.

IN WITNESS WHEREOF, I have affixed my hand this 19th day of November, 1966.

W. Don McIntyre
Court Reporter

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 3336, heard by me on Nov. 15, 1966.
Thos. G. Mc, Examiner
New Mexico Oil Conservation Commission



EAST HIGHTOWER-UPPER PENNSYLVANIAN POOL
LEA COUNTY, NEW MEXICO
CASE NO. 3336
November 23, 1965

This exhibit is submitted in support of the application of Shell Oil Company for special pool rules for the East Hightower-Upper Pennsylvanian Pool in Section 25, Township 12 South, Range 33 East, Lea County, New Mexico. The special rules sought include the establishment of 80-acre proration units and an allocation factor of 4.77 times the normal unit allowable.

History

Shell State "HT" No. 1, located in Unit P, Section 25, Township 12 South, Range 33 East, is the discovery well of the pool as designated by the Commission, pursuant to hearing on October 13, 1965, on Case No. 3319(e). The limits of the pool established at that time were the interval between 9750 feet and 10,010 feet. Shell is currently drilling the second well in the pool, State "HTA" No. 1, which is not yet complete. A drill stem test within the interval designated as the East Hightower-Upper Pennsylvanian pool - indicated that the well would be productive from this zone, but it has not been confirmed by production tests.

Geology

The Permo-Pennsylvanian zone is composed of alternating thin beds of carbonate and shale and occurs over a wide area of southeastern New Mexico. The East Hightower-Upper Pennsylvanian zone, as designated by the Commission, includes the upper seven members of this group which are productive in the general area. As a point of reference the third member of the group is the Bough "C", which produces at Inbe. The East Hightower-Upper Pennsylvanian pool is a domal structure (see Enclosures 1 and 2) with the limits of the pool being determined by porosity pinchouts.

Reservoir Data

The primary producing mechanism of the East Hightower-Upper Pennsylvanian pool is believed to be solution gas drive. A summary of the reservoir and fluid characteristics is presented in Enclosure 3, and a core analysis on a portion of the pay zone is presented as Enclosure 4. The Pennsylvanian pay zones in this field appear to be similar to that producing in the Inbe, Ranger Lake, Lane, South Lane, and North Bagley Pools, all of which have indicated by performance that one well will drain at least 80 acres. On the basis of this analogy it appears that one well should also drain 80 acres in the East Hightower-Upper Pennsylvanian pool.

Enclosure No. 3

RESERVOIR CHARACTERISTICS
EAST HIGHTOWER-UPPER PENNSYLVANIAN POOL
LEA COUNTY, NEW MEXICO
CASE NO. 3336
NOVEMBER 23, 1965

FORMATION

1. Net Pay, feet	12
2. Porosity, %	6
3. Permeability, md.	4.
4. Water Saturation, %	40
5. Reservoir Temperature, F	156
6. Original Reservoir Pressure, psig @ -5600	3550

FLUID

1. Original Solution Gas-Oil Ratio, cu. ft./bbl.	1378
2. Stock-Tank Oil Gravity, API	44.9°

B = 1.2 to 1.3

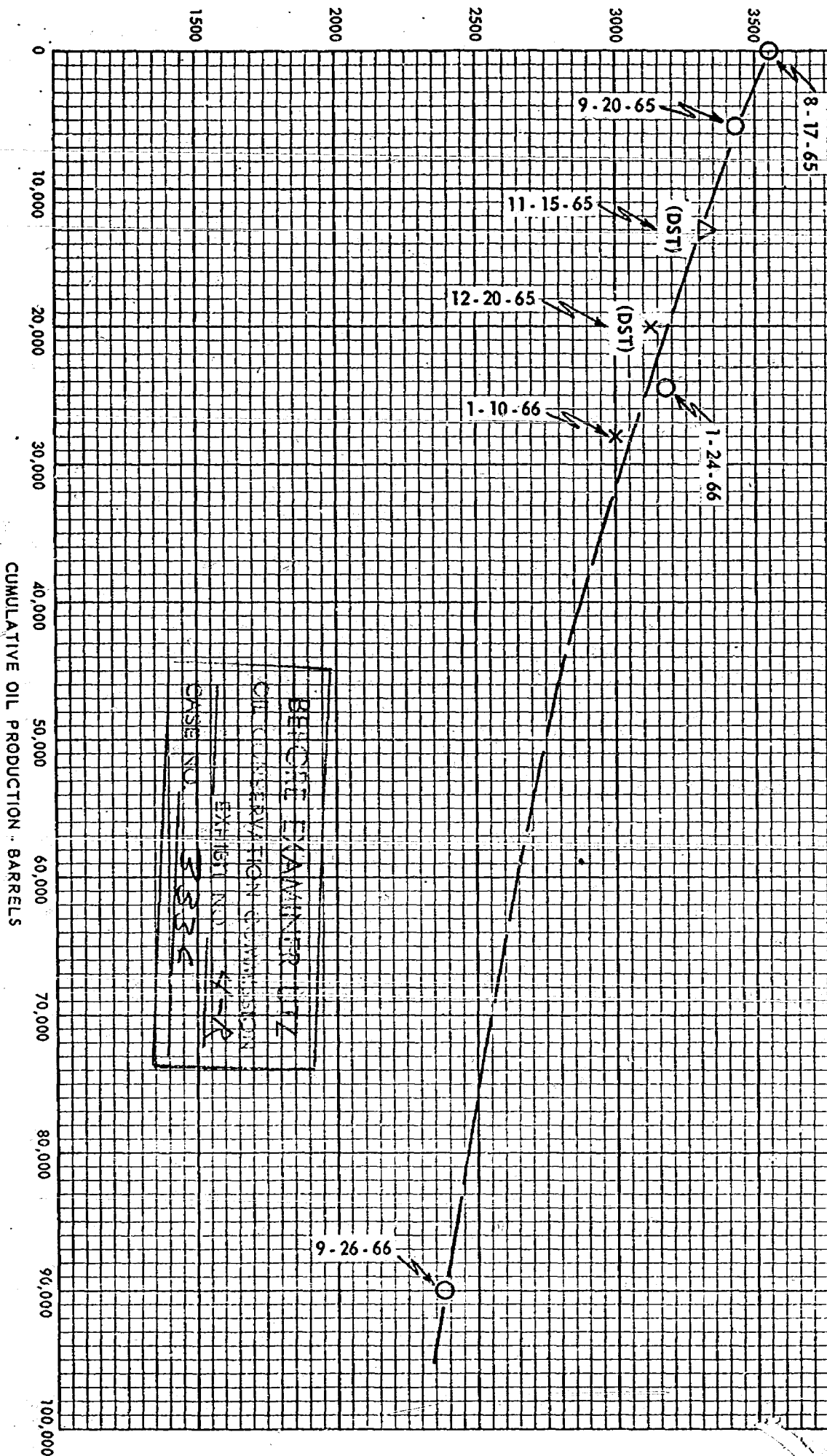
BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 3 R.
CASE NO. 3336



BOTTOM HOLE PRESSURE - PSIG

○ SHELL STATE "HT" NO. 1
 △ SHELL STATE "HTA" NO. 1
 X SHELL STATE "HTB" NO. 1

EAST HIGHTOWER FIELD
 UPPER PENNSYLVANIAN POOL
 LEA COUNTY, NEW MEXICO
 RESERVOIR PRESSURE
 AT -5625 DATUM



BENCH EXAMINER 117
 OIL CONSERVATION COMMISSION
 EXHIBIT NO. 4-2
 CASE NO. 3834

ECONOMIC FOR VARIOUS SPACING SCHEMES
EAST HIGHTOWER UPPER PENNSYLVANIAN POOL
LEA COUNTY, NEW MEXICO
CASE NO. (3336)
NOVEMBER 23, 1965

Basic Data:

1. Oil Value	\$2.95/Bbl.
2. Oil Purchaser	Permian Corporation
3. Gas Value	\$0.11/MCF
4. Gas Purchaser	-
5. Production Taxes	\$0.218/Bbl.
6. Lifting Costs	\$0.335/Bbl.
7. Investment (well lease facilities and pumping unit)	\$174,000
8. Net Interest	87.5%

Economics:

Item	Well Spacing	
	40-Acre	80-Acre
1. Recoverable oil, Bbl.	75,000	150,000
2. Recoverable gas, MMCF	225	450
3. Oil Revenue, \$2.95 x (1)	221,000	442,000
4. Gas Revenue, \$110. x (2)	24,700	49,400
5. Total Revenue, \$ (3) + (4)	265,700	491,400
6. Total Net Revenue after Royalty, \$0.875 x (5)	232,000	464,000
7. Operating Costs, \$.335 x (1)	25,100	50,200
8. Production Taxes, \$.218 x (1)	16,300	32,600
9. Net Income, \$(6)-(7)-(8)	190,600	381,200
10. Investment \$	174,000	174,000
11. Profit, \$(9)-(10)	16,600	207,200
12. Profit-to-Investment Ratio (11) ÷ (10)	0.095	1.190

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. 5R
CASE NO. 3336

EAST HIGHTOWER
UPPER PENNSYLVANIAN POOL
LEA COUNTY, NEW MEXICO

SUMMARY OF PRODUCTION DATA

Lease and Well Number	Completion Date	Perforated Interval	September, 1966 Production			Cumulative Production 9/30/66		
			Oil (Bbls.)	Water (Bbls.)	Gas (MCF)	Oil (Bbls.)	Water (Bbls.)	Gas (MCF)
State "HT" No. 1	Aug. 13, 1965 <i>flowed initially</i>	9848-9863	4539	597	5858	64,003	5,900	71,416
State "HTA" No. 1	Dec. 4, 1965 <i>pump in</i>	9816-9882	2715	1319	2876	22,280	12,440	17,951
State "HTB" No. 1	Jan. 19, 1966 <i>pump in</i>	9833-9841	678	232	1071	10,104	1,443	9,660
TOTAL			7932	2148	9805	96,387	19,783	99,027

BEFORE EXAMINER UTZ
OIL CONSERVATION
EXHIBIT NO. 37A
CASE NO. 3336

ECONOMICS OF 40 AND 80 ACRE SPACING
EAST HIGHTOWER UPPER PENNSYLVANIAN POOL
LEA COUNTY, NEW MEXICO

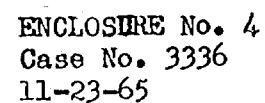
Basic Data:

1. Oil Value	\$2.95/Bbl.
2. Oil Purchaser	Permian Corporation
3. Gas Value	\$0.11/MCF
4. Gas Purchaser	Warren Petroleum
5. Production and Property Taxes	\$0.225/Bbl.
6. Lifting Costs (including overheads)	\$0.365/Bbl.
7. Investment (well, lease facilities and pumping unit)	\$175,000
8. Net Interest	87.5%

Economics of Average Well

<u>Item</u>	<u>Well Spacing</u>	
	<u>40-Acre</u>	<u>80-Acre</u>
1. Recoverable oil, Bbls.	50,000	100,000
2. Recoverable gas, MCF	150	300
3. Oil Revenue, \$2.95 x (1)	147,500	295,000
4. Gas Revenue, \$110. x (2)	16,500	33,000
5. Total Revenue, \$ (3) + (4)	164,000	328,000
6. Total Net Revenue after Royalty, \$0.875 x (5)	143,500	287,000
7. Operating Costs, \$.365 x (1)	18,200	36,500
8. Production Taxes, \$.225 x (1)	11,300	22,500
9. Net Income, \$(6)-(7)-(8)	114,000	228,000
10. Investment \$	175,000	175,000
11. Profit (Loss), \$(9)-(10)	(61,000)	53,000
12. Profit-to-Investment Ratio (11) ÷ (10)	-	0.303

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
EXHIBIT NO. 5-R
CASE NO. 333 C



CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

COMPANY	FIELD	FILE
WELL	COUNTY	DATE
LOCATION	STATE	ELEV.

CORE-GAMMA CORRELATION

These analyses, each done in duplicate, are based on data collected and analyzed separately by the laboratory which, and the, whose services are used. The laboratory is aware that the information generated is not intended to be used for the purpose of identifying individuals, but for the purpose of identifying the source of the information. The laboratory is aware that the information generated is not intended to be used for the purpose of identifying individuals, but for the purpose of identifying the source of the information.

007058 35417 511 1957

CORE-GAMMA SURFACE LOG

CHINESE MAY

230 69-73: 4074416

RELATION

BEFORE EXAMINER NUTTER
OROGRAPH CONSERVATION COMMISSION

CASE NO. 3336 EXHIBIT NO. 4

TOTAL WATER _____
PER CENT TOTAL WATER _____
NO. 60 40 20

1944 RATES

222 82.2 97.4 87.3

50 60 40 20 0

ON SATURDAY

2001年 第2期 总第25期

