BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
OIL CONSERVATION COMMISSION CONFERENCE ROOM
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO
Wednesday, September 27, 1972

EXAMINER HEARING

IN THE MATTER OF:

Application of Mobil Oil Corporation for a unit agreement, Lea County, New Mexico. Case No. 4830

and

IN THE MATTER OF:

Application of Mobil Oil Corporation for a pressure maintenance project, Lea County, New Mexico. Case No. 4831

BEFORE: Elvis A. Utz,
Examiner

TRANSCRIPT OF HEARING

ILLEGIBLE



NEW MEXICO OIL CONSERVATION COMMISSION

EXAMINER HEARING

SANTA FE, NEW MEXICO

Hearing Date SEPTEMBER 27, 1972 TIME: 9 A.M.

| NAME | REPRESENTING | LOCATION |
|---|---|---|
| J. E. Sperling | Morrell, Sperling & Al | Abq. |
| E. R. Frazier | Mobil Oil Corp. | Midland |
| A. J. Lambiridis Jr. | Mobil Oil | Midland |
| Jeffy A. Smith | Mobil Oil | Midland |
| Larry D. Heavell | Oil Devel. Co. of Texas | Roswell |
| [illegible] | [illegible] | Roswell |
| Jack R. McGraw | Coastal States | Midland Texas |
| Fred K. Yates | Coastal States | Midland Texas |
| [illegible] | Independent | Roswell, N. M. |
| Joe Don Cook | Independent | Roswell, N. M. |
| Tom Kellahin | Kellahin & Fox | Santa Fe |
| Jack Cooley | Shell Cooley | Farmington |
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |

MR. UTZ: Case 4830.

MR. SPERLING: James E. Sperling of Modrall, Sperling, Roehl, Harris and Sisk, appearing for the applicant.

Mr. Examiner, Case 4830 and 4831 are really companion cases and in as much as the first of those cases relates to the unit agreement and formation of the unit area and the second, 4831, represents the evidence supporting the establishments of a pressure maintenance project for that area, for that reason we would like to ask that the two cases be combined for the purposes of the testimony.

MR. UTZ: Cases 4830 and 4831 will be combined for purposes of the testimony in this case and in these cases separate orders will be written on each case.

MR. HATCH: Case 4830: Application of Mobil Oil Corporation for a unit agreement, Lea County, New Mexico. Case 4831: Application of Mobil Oil Corporation for a pressure maintenance project, Lea County, New Mexico.

MR. SPERLING: For the record the same appearance for the applicant in both cases. We have two witnesses to be sworn.

MR. UTZ: Other appearances in this case? You may proceed.

E. R. FRAZIER,

was called as a witness and after being duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. SPERLING:

Q Please state your name, your place of residence, your employer and the position in which you are employed.

A My name is E. R. Frazier. I am employed by Mobil Oil Corporation in Midland, Texas and I am a joint interest assistant.

Q Have you previously testified before the Commission so that your qualifications in the position in which you hold are a matter of record?

A No, sir, I have not.

Q Give us a very brief resume of your background and experience qualifying you for the position which you hold and the testimony which you are about to give.

A I graduated from the University of Texas in 1950 with a B.S. in petroleum engineering. I worked in various engineering capacities with Mobil Oil Corporation until 1967 at which time I came into the position I now have as joint interest assistant.

MR. SPERLING: Are the witness' qualifications acceptable?

MR. UTZ: Yes, they are.

Q (By Mr. Sperling) Mr. Frazier, your testimony, I understand, relates primarily to the unit agreement which is the subject of the application in Case Number

4830; is that correct?

A That's true.

Q Would you please identify what has been marked as Exhibit 1 in Case 4830 and tell us what that is?

A Exhibit 1 is a copy of the unit agreement of the North Vacuum-Abo Unit. The unit agreement is for the unitization of the Abo formation only and there interval being unitized to describe in Section 2U Page 3 of the unit agreement. Exhibit A in the unit agreement is a map of the Unit area showing the unit outline and the tract numbers.

Q As of the present time, Mr. Frazier, what is the extent of the sign up of the interest owners within the designated Unit area as shown on the map you have referred to?

A As of September the 26th, yesterday, we had 99.08 per cent of the working interest owners signed in this Unit area.

Q Do you have tabulations which would indicate the extent of the sign up by tract number?

A Yes, sir. Exhibit 2 is a list of the tracts showing the per cent of the working interest signed in each tract.

MR. UTZ: Sir, is that an exhibit shown in the back of your unit agreement?

MR. SPERLING: I believe it is just inside the cover of this.

Q (By Mr. Sperling) The exhibit to which you have just referred is by tract and tract number and showing the participation in the unit production of that particular tract and the interest owners percentage sign up is in the third column on the right; is that correct?

A That's correct.

Q What is the situation with reference to Tract 16, that is the last tract shown?

A Tract 16 does not have any of the working interest sign it. There is none signed in 16.

Q But the total percentage interest signed does represent 99.08 per cent?

A That's correct.

Q What is the nature of the basic royalty or mineral interest ownership under the Unit area?

A The State of New Mexico has all of the mineral interest ownership in this unit.

Q Have you consulted with the Commissioner of Public Lands concerning the formation of the unit and the unit agreement?

A Yes, sir. In Exhibit 3 is a letter from the Commissioner of Public Lands Office from the Director of Oil and Gas Department indicating they had reviewed

this agreement and are in agreement with its contents.

Q Under the terms of the unit agreement as of this time, have all of the tracts in the unit had sufficient working interest ownership approval to qualify?

A All tracts have sufficient working interest owners approval to qualify except Tract 3 and 16. Tract 3 has 50 per cent sign up. However, Marathon is the operator of that tract and they have not signed the joinder and as we mention it, Tract 16 has no sign ups, so actually as far as the sign up goes those two tracts would be the only ones that could not qualify. However, if you notice Tract 1 there -- if Tract 3 does not qualify then Tract 1 would be disqualified because it would not be a contiguous tract. So, with that in mind as of now all tracts would qualify as working interest owner sufficient approval except Tract 1, 3 and 16.

Q Are there any particularly unique provisions contained in the unit agreement, that is, those not ordinarily found in agreements approved by the Commissioner of Public Lands?

A No, sir.

Q You stated that unit agreement had been submitted and that Exhibit 3 indicated the conditional acceptance of the unit agreement by the Commissioner's office subject

to the order of this Commission and the other conditions as reflected in Exhibit 3. What is the course of the form of the agreement?

A The course of the form was a form that was sent to us at our request from Mr. Graham of the Oil and Gas Department of the New Mexico State Lands Office.

Q I believe it is on Page 20 of the unit agreement, Mr. Frazier, there is a provision for the ipso facto termination of the unit agreement if requirements have not been met by October 1st, 1972. What is the situation with regard to that provision?

A Mobil has requested approval from the working interest owners to extend this termination date for six months as provided for in the agreement. Working interest owners with 94.76 per cent have approved this extension which will extend the ipso facto termination date to April 1, 1973.

Q Do you have anything further to add?

A Pending approval of this Commission and the State Public Lands Office, we anticipate making this unit effective on November 1, 1972.

Q Anything further?

A No, sir.

MR. SPERLING: I will offer Exhibits 1 through 3 in Case 4830.

MR. UTZ: Without objection Exhibit 1 through 3 will be entered into the record of this case.

Any questions of the witness? You may be excused.

A. J. HANKINSON,

was called as a witness and after being duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. SPERLING:

Q Please state your name and your place of residence, your employer and the position in which you are employed.

A My name is A. J. Hankinson, Junior. I reside at 2201 Huntington, Midland, Texas. I am employed by Mobil Oil Corporation as an associate engineer.

Q Have you on any previous occasion testified before the Commission so that your qualifications as petroleum engineer are a matter of record?

A No, sir, I have not.

Q Please give us a brief resume of your educational background and your experience background in this field.

A I graduated from the University of Oklahoma in 1951 with a B.S. in petroleum engineering. I have worked in various engineering capacities, field reservoir economics groups since that time and I have attended, oh, a number of courses offered at the universities and

also at a field research laboratory concerning reservoir engineering.

Q Is the Unit area which is the subject of the application in 4830 and Case 4831 an area for which you have prime responsibility from an engineering standpoint?

A Yes, sir. The company assigns responsibilities by area and I am called a project engineer for this particular area.

Q In that capacity you are thoroughly familiar with the Unit area and the wells within the Unit area and their respective characteristics and particularly the Abo reservoir underlying the area?

A Yes, sir, I am.

Q Have you prepared or had prepared under your supervision or direction certain exhibits in support of the application for the establishment of the pressure maintenance project which is the subject of this application?

A Yes, sir, I did.

Q Would you now please refer to exhibit marked Number 1 in this case and explain what it is?

A Exhibit Number 1 is a map of the multi-reservoir Vacuum Pool showing all wells within a two-mile radius of the proposed Unit area. It identifies the unit outline. It identifies each producing well by

producing horizon using a color code as shown on the lower left side under column called Legend.

Q From the Legend it appears that it certainly is a multi-reservoir pool.

A Yes, sir, it is. One of the later exhibits will help to clarify the Unit area by deleting some of the other reservoirs that are not directly concerned with the application.

Q Would you give us a brief history of the Abo Pool which is the subject of this application?

A Well, first the Abo Pool is located near the town of Buckeye about 25 miles northwest of Hobbs in Lea County. The first well completed in the pool was Mobil's Bridges-State Number 112 for flowing potential of approximately 312 barrels a day on June 15, 1966. The reservoir produces by solution gas drive. There is no evidence of water encroachment. The original pressure was approximately 3230 and 30 psi. Oil gravity is 36 degrees API and is a dark green in color.

Q Would you describe the reservoir characteristics that your studies have revealed to be present in the Abo?

A The North Vacuum Abo Pool has two oil productive reservoirs. The shallower reservoir, which we designate as "Abo", occurs at an average depth of 8600 feet. The deeper reservoir, herein designated the "Lower Abo",

occurs at an average depth of 9300 feet and is separated from the 8600 foot "Abo" by a zone of dense anhydritic dolomite. Production from the "Lower Abo" reservoir is present in only the southeastern corner of the proposed North Vacuum Abo Unit area. That is down here in Section 25 at the very southeast corner of Section 26.

Q That is represented by the color code which appears to be sort of dark gray in color?

A Yes, sir. Really, the red designates the "Abo" and the pencil or black the "Lower Abo". About in the middle of that legend is the color that designates the "Lower Abo".

Q Would you please refer to what has been marked as Exhibit Number 2 and explain that exhibit?

A Exhibit 2 is a structure map contoured on top of the Abo pay. In addition to that we have shown porosity limits to the north and to the south.

Q Do you have a type log which indicates the Abo structure datum upon which the contour lines are drawn?

A Yes, sir, we do. Exhibit 3 is a cross-section and Exhibit 4 is the pipe log and all of these three pieces of geologic information go to find the Abo reservoir. 3 is a cross-section. I might comment on Exhibit 3. This cross-section begins, if you will notice the little

legend underneath there, from A to A-A'. If you look on your structure map there you can perhaps see the wells a little bit better, but it begins at Pennzoil's Rock Island State Number 1 in the upper left-hand corner and goes down across the top of the structure down to the other A' point ending in Texaco State in Number 6. The significance of the cross-section is that we show porosity limits at one end. We go into a good reservoir pay qualities. Red color on each log is the porosity above 6 per cent and then the porosity deteriorates at the other end showing the limit that has been marked as porosity pinch out from A-A'. Exhibit Number 4 is the pipe log of Mobil's Bridges-State Well Number 126. The unit interval is defined as that portion of the Abo horizon between 8300 and ten feet to 9070 feet subsurface. Our Abo pressure maintenance project will be restricted to the red interval or the Abo oil reservoir which is found essentially in 8600 feet. You might note here that the Abo structural datum and the point used in preparation of the structure map is shown on this log as about 8525 and it is identified as Abo Structual Datum top of Abo. The reservoir is a back-reef deposit of anhydritic dolomite with interbedded shales. As you can see, the gross reservoir is rather thick, approximately 550 feet. It is capped with

dense anhydritic dolomite. Productive interval within this gross section is limited almost entirely to the top 100 feet. The porosity within this producing interval has good continuity which is shown on the previous exhibit on the cross-section. I might point out that although the Abo reservoir does show structural closure it is a stratigraphic trap. The porosity pinches out to the north and to the south. We believe its boundaries are being defined on the west by porosity deterioration. However, the eastern limits of the field haven't been defined yet.

Q Exhibit Number 4 which is the type log does show the Lower Abo to which you previously referred. What is the nature or characteristic of the interval which separates the Abo from the Lower Abo?

A It is about 500 feet of dense anhydritic dolomite. No permeability and very, very low porosity. It effectively separates these two reservoirs except where they have been comingled and well bores were on C.C. approval.

Q Would you refer to what has been marked as Exhibit 5?

A Exhibit 5 is a map of the proposed Unit showing Abo wells. Again we have used the color code red for Abo or the zone we are considering in our pressure maintenance program. It shows the proposed injection wells which have penetrated the Abo and wells completed

in the Lower Abo. I think you can see that the Lower Abo is confined to the very southeast part of the project area. The wells that are marked with a dark pencil or sort of a black are Lower Abo completions.

Q You mention an Abo penetration. That is indicated according to the legend on Exhibit 5 with an X. That doesn't necessarily mean completed in the Lower Abo or I mean in the Abo, just that it has penetrated it; is that it?

A That's correct, sir. For example, in Section 23 Well 151 shows to be an Abo penetration. This particular well is a Morrow gas completion at a lower depth. I would like to go ahead a little bit and describe this map a little further. The proposed unit covers 5840 acres and includes 67 active producing wells. The cumulative oil and gas production as of July 1 was 3,646,660 barrels and 4,555,903 MCF respectively. The current oil producing rate from the Unit area is approximately 3000 barrels per day and the average gas-oil ratio was 1511 cubic feet per barrel. Water production is insignificant in the Unit area and amounts to about 5.4 per cent of total fluids produced.

Q With reference to that testimony just given, refer to Exhibits 6 and 7.

Exhibits 6 and 7 are production histories of the North

Abo Unit in tabular and graphic form.

Q Exhibit 8?

A Exhibit 8 is a summary of tests of oil wells which will be involved as either producers and/or injectors in the proposed Unit area.

Q What does the column on the extreme right of Exhibit 8 mean? It is a zone designation and in addition to Abo there are references to other zones. Would you explain that?

A Yes, sir, I certainly will. For example, the first well which is Mobil's Bridges-State 172 had a test on July 9 of this year for 122 oil, no water, and the gas-oil ratio of 918 cubic feet per barrel. It was completed in the Abo zone. We might refer down four wells to the Bridges-State 130. This well is proposed as an injector under our plan. However, at the present time it is completed in the Morrow gas. The test on July 8 of this year was 1731 MCF of gas daily and nine barrels of natural gas liquids.

Q So the zone designation indicates the formation from which the well which is identified by number is presently producing?

A Yes, sir.

Q With reference to the unit and the unit interval vertical limits of the unit, can you give us approximately the

reservoir characteristics of that interval which I believe is somewhere around 21 feet?

A Yes, sir. The effective pay thickness is estimated at 21 feet with the average porosity characteristics of 11.3 per cent and average permeability of 2mb. The oil-in-place is calculated to be 57,000,000 barrels. This is original oil-in-place. We predict an ultimate primary recovery of 9.4 million barrels or approximately 16 and a half per cent of the oil-in-place. Total recovery, primary plus fluid injection, is estimated to be 22.8 million barrels or 40 per cent of the original oil-in-place.

Q So the establishment of the pressure maintenance project has the effect of increasing the ultimate primary recovery substantially?

A Yes, sir, we think it will.

Q Would you please describe for us what Mobil's plans are for the effecting of the pressure maintenance project mechanically and engineering wise?

A Mobil plans to initiate a 5-spot alternating gas-water injection program which we call AGWIP for short in the following manner: The first step would be to inject Ogallala water in all of the wells shown as proposed injectors on Exhibit 5 for a period of approximately six months. Total water injection will amount to about

13,600 barrels per day or about 400 barrels per well per day. The injection pressure is expected to be 3500 psi. This is because of the low permeability of the Abo reservoir. The Ogallala water will be obtained from Mobil water supply wells on the Bridges-State Lease under permits issued by the State Engineering authorizing usage of 1200 acre-feet per year or up to 25,500 barrels per day. All of the above is Step 1.

The second phase will be to convert one half of the injectors to gas injection for four to six month intervals. Gas injection will amount to about 5,000,000 cubic feet per day or about 300 MCF per well per day at 4500 psi well-head pressure. The gas source will be exhaust from the engines driving the compressors which have been stripped of residual oxygen and water. The exhaust gas will then consist of about 89 per cent Nitrogen and 11 per cent $CO_2$. It is our plan to inject one reservoir barrel of gas for each barrel of water injected.

The third phase would be the remaining 17 or one half of the injectors would be converted to gas injection. This cycling procedure would be continued for about ten years or so long as the procedure appeared economically attractive. Maximum pressures anticipated later in the project life are 4500 psi for water and 5500 psi for gas.

dearnley, meier & mc cormick
209 SIMMS BLDG.•P.O. BOX 1092•PHONE 243-6691•ALBUQUERQUE, NEW MEXICO 87103
1216 FIRST NATIONAL BANK BLDG. EAST•ALBUQUERQUE, NEW MEXICO 87108

At this point I would like to point out that all of the above constitute our plan of operation. However, there are field conditions that might warrant a change from the ratio of injectors on gas and the injectors of the water at any time from the value of the quoted of 50-50. After we complete our cycling phase of gas-water, all injectors will be placed on straight water injection. Produced water may be reinjected into the Abo when the volume becomes significant. However, our initial plan is to inject it in our Vacuum Grayburg-San Andres flood project which is a shallower flood project. We are also considering injection of a propane slug which would amount to about 5,000 to 10,000 barrels per well in certain areas of the project. We have not completed evaluation of this yet and we need to firm up the availability of our supply and the firm cost. It seems that the cost of our supply goes up weekly with contacting these people, so we are going to really have to work that part out.

We mentioned the water that we are going to inject. Exhibit 9 and Exhibit 10 are analyses of the Ogallala water and produced Abo water. They are on these little pages.

Q Will you intend to use separate systems for the alternating injection of gas and water or is it the same

system or what is your plan with regard to that?

A We plan to use separate systems. A system for gas only and a system for water only which will be cement lined on surface to prevent corrosion activities. Our well-heads will be replaced with high-pressure equipment. Relief valves will be installed on the casing annulus to protect the casing down hole.

Q Would you refer to Exhibit 11?

A Exhibit 11 is a package of 34 well sketches showing the existing wellbore conditions of all proposed injectors. A summary sheet listing the operator, lease name, and well number and section of the proration unit is attached at the front of the package. Injection in a typical well will be through corrosion resistant lined tubing. By this we mean probably an epoxy using mechanical packer or packers to isolate the Abo from other producing horizons. The upper and lower packers, if needed, will be set within 50 feet of the top and the bottom of the Abo perforations respectively.

Q Is the typical injector completion diagramatic sketch shown on Exhibit 12 a single well?

A Yes, sir. This is our proposed typical single well injection completion.

Q What about Exhibit 13?

A 13 is an example of the typical dual well completion

isolating the Abo from any other producing horizons.

Q Now, within the Unit area and in view of the multiple completions that you have previously referred to, do you have any somewhat unique or peculiar areas within the Unit area which require or may require special consideration?

A Yes, sir, we do. If I may refer to the Exhibit Number 5, this is the project map showing the Abo and the Lower Abo. Six of the producers and injectors which are Bridges-State Numbers 108, 109, 119, 120, 124 and 147 may be the subject of a future hearing if it appears feasible to conduct a salvage fluid injection operation in the Upper Penn and Middle Penn reservoirs.

Q Would you locate the wells to which you have referred to generally?

A I certainly will. If you will start at the bottom in Section 25 you will see Well 108 as being location 25F and keep going straight north and you will see 108, 109 and north to 119 and north to 120 and west to 124 and then northeast to 147. The Upper Penn Pool is a rather limited feature through here and we haven't completed our appraisal as to whether it has any fluid injection potential or not. However, this will be done before any conversant operations are attempted and the necessary approval solicited.

Q You are in the course of making a study of that reservoir now also; is that correct?

A Yes, sir, I should have that finished within 30 days.

Q Mr. Hankinson, would you please give us a summary now of what Mobil is seeking by the application in these two cases?

A Firstly, we would like approval of the North Vacuum Unit Agreement and secondly approval of the plan of operation to inject fluids into the Abo formation through the 34 wells described in Exhibit Number 11. Number 3, an allowable formula to be fixed by the Commission to provide for a maximum daily unit allowable not to exceed the number of 80-acre proration units times the daily top unit allowable set for the wells in the North Vacuum Abo Pool. Such unit allowable may be produced from any well or wells on the project area in any proportion. Four, establishment of an administrative procedure whereby the Commission may authorize the completion of a second producing well on the 80-acre proration units at unorthodox locations within said Unit, providing such wells are located no closer than 1,780 feet from the outer unit boundary nor closer than ten feet to any quarter-quarter section or subdivision inner boundary.

MR. UTZ: Do you have this written down in the form

of an exhibit?

THE WITNESS: Yes, sir.

A In explanation of this the 80-acre spacing that the wells are drilled on which results in 160 acre five-spot pattern areas coupled with a low permeability of the reservoir, its effect on project response may make it necessary to infill drill the producers in certain areas of the project. Item five, the project area be fixed as the total area within the boundaries of the said North Vacuum Abo Unit as described in this application, with further provision that the project area may be expanded administratively by the Commission upon satisfactory meeting condition set forth by the Commission.

Q (By Mr. Sperling) Do you have anything further to add at this time, Mr. Hankinson?

A One thing I would like to mention is that we are going to load the casing annulus on the injection wells with treated fresh water. We will have relief valves and a pressure gauge installed on these casing annuluses to protect down hole from casing rupture and to inform us if and when remedial action should be needed. Materials will be used in the dual well installations to protect from corrosion. We have located some expensive corrosion-resistant material to apply to this 300 to 500 foot

interval between the deeper producing string that would be between the two packers to reduce or eliminate the effects of any corrosion.

Q That is an outer coating for the tube?

A It is a special metal alloy to resist corrosion.

Q Anything further?

A No, sir.

MR. SPERLING: At this time I would like to offer Exhibits 1 through 13.

MR. UTZ: Without objection Exhibits 1 through 13 will be entered into the record of this case.

CROSS-EXAMINATION

BY MR. UTZ:

Q Mr. Hankinson, in regard to your multi-pool completions, is it your request here that they go approved as injector producers? You are going to continue to produce the other zones other than the Abo?

A At this time we would probably plan to continue production especially on the Morrow. We would have a Morrow gas injector-producer combination. We do plan to have the small area outlined here evaluated and any amended hearings necessary to determine whether we go the dual injector or the dual or eliminate the other zone.

Q Does Exhibit 8 list all of the projection wells that you are proposing here?

A It lists all wells to be used as producers or injectors within the project area. Exhibit 11 lists only the injection wells. Exhibit 8 was a well-test summary.

Q In other words, the front page of Exhibit 11 lists only the injection wells?

A Yes, sir.

Q For all three phases?

A Yes, sir.

Q That would be a total of 34 wells?

A Yes, sir.

Q I got your first phase in pretty good shape. The initial water injection will be in all wells?

A Yes, sir.

Q Would you give me the second phase again?

A We plan to convert about half the wells to gas injection.

Q Approximately half?

A Approximately half and operate these wells on gas injection for approximately six months and then convert the remaining half of the wells to gas injection. These wells had been on water and then the cycling process of gas-water-gas-water would be continued at six month intervals for a period of about ten years or perhaps longer if our operating conditions warranted additional cycling. Following that we would go on a striaght water injection.

Q In regard to your unit, are you unitizing only the Abo?
A Yes, sir.
Q At this time?
A That's correct.
Q If you later come in for secondary recovery in the Penn or any other formation, you will have a separate hearing for it?
A Yes, sir.
Q Would this include a unitization, you think, or not?
A I think the pool is so limited that it would probably be 100 per cent Mobil's project in the other reservoir. It is a very narrow feature in there and it is questionable whether the project will be there or not. Some good evidence of water production in these other reservoirs and we haven't completed my study of the efficiency or the natural recovery mechanism yet.
Q At this time you are asking only for the Abo?
A Abo only, sir. The Lower Abo is not part of it.
Q Does the list of injection wells on 11 include your multiple completion wells, too?
A Yes, sir, it does.

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

CROSS-EXAMINATION

BY MR. HATCH:

Q You speak of Abo producers and Lower Abo producers.

There is no distinction. Those are not separately designated pools, are they?

A No, sir.

Q Your injection would be only into the Abo and not into the Lower Abo?

A That's correct, only the marked red above that dense interval.

MR. SPERLING: Is the vertical interval indicated in the unit agreement as a unit interval as well as shown on the -- There is nothing right now to prevent a second well on an 80-acre well but it is only the location that is the problem or am I wrong about the rules of the pool?

MR. HATCH: I did review those rules once but I have forgotten them. I believe the rules say that the Abo wells will be drilled in the center of the northwest and southeast of each governmental quarter section.

What pool are we speaking of here?

THE WITNESS: North Vacuum Abo.

MR. UTZ: Are there any other questions? The witness may be excused.

Statements in the case? The case will be taken under advisement.

STATE OF NEW MEXICO )
) ss
COUNTY OF BERNALILLO )

I, MARCIA HUGHES, 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.

Marcia Hughes
COURT REPORTER

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 4830 heard by me on [illegible] 1972

New Mexico Oil Conservation Commission

# I N D E X

WITNESS

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WITNESS

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| Exhibits 1 - 13 (4831) | 24 | 24 |