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

EXAMINER HEARING

IN THE MATTER OF:

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, and
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

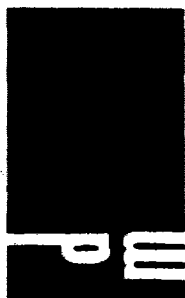
Case No. 3339
and 3340

BEFORE:

wells located in Sections 25, 26, 27, 34,
35, and 36, Township 14 South, Range 37
East, Lea County, New Mexico.

BEFORE: Daniel S. Nutter, Examiner.

TRANSCRIPT OF HEARING



MR. NUTTER: The Hearing will come to order, please.
The next Case will be number 3339.

MR. DURRETT: Application of Socony-Mobil Company,
for a unit agreement, Lea County, New Mexico.

MR. SPERLING: I'm J. E. Sperling of Modrall, Seymour,
Sperling, Roehl and Harris in Albuquerque and I'm appearing for
the Applicant. I would like to request, Mr. Examiner, that
Cases 3339 and 3340 be combined for testimony purposes.

MR. NUTTER: We will call the next case, 3340.

MR. DURRETT: Application of Socony-Mobil Oil Company
for a waterflood project, Lea County, New Mexico.

MR. NUTTER: Cases 3339 and 3340 will be consolidated
for testimony.

MR. SPERLING: In these two Cases, Mr. Examiner, we
have two witnesses: Mr. White and Mr. White.

(Witnesses sworn.)

(Whereupon, Applicant Exhibit 1,
Case 3339 and Exhibits 1, 2, 3,
3-A and 4-A through 4-L marked
for identification.)

J. L. W H I T E, having been first duly sworn, was examined
and testified as follows:

DIRECT EXAMINATION

BY MR. SPERLING:

Q Would you state your name, please?

A J. L. White.

Q By whom are you employed and in what capacity, Mr. White?

A I'm employed by Mobil Oil Company in the capacity of Joint Interests Coordinator in the Division office located in Midland, Texas.

Q Now, in connection with the performance of your duties, are you familiar with the application of Socony-Mobil Oil Company in Case 3339 for approval of a unit agreement in Denton North Wolfcamp area?

A Yes, I am.

Q I believe that attached to the application, Mr. White, is a copy of the proposed form of unit agreement. Can you tell us a little bit about the form of that agreement and its present status?

A Yes. The unit agreement generally follows the standard API model form for unit agreement and has been modified to fit the laws of the State of New Mexico and certain requirements of the U.S.G.S. The unitized reservoir is the Wolfcamp occurring at 9180 to 9860 in Mobil's T. D. Pope Number 10 located in Section 26, Township 14 South, Range 37 East, U. S. Public Land Survey, Lea County, New Mexico. The area unitized comprises about 2640 acres in Township 14 South, Range 37 East, in Lea County and is indicated on Exhibit A of

unit agreement, a copy of which I understand, has been submitted in evidence. Exhibit A has been further separated into appropriate tracts. 99.33 per cent of the working interests ownership and 86.52 per cent of the royalty ownership has ratified this agreement as of November 22, 1965. Only significant working interest owner not signed is designated at the "TEC Corporation" who owns 40 acres, being the southeast of southwest of Section 25 and contains one well.

Q In connection with the present status of sign-up insofar as the unit agreement is concerned, I will call your attention to what has been marked as Exhibit 1 in case 3339 and ask you if this was prepared by you or under your supervision reflecting the tract numbers, the tract participation, working interests and royalty interests, percentage of sign-up?

A That is correct. It was prepared under my supervision. I might state that in addition to the one mentioned working interest owner who has not ratified the agreement, the U. S. Government has not ratified as royalty owner under tract number 1. They have locally recommended this and have submitted it for approval to Washington and we do anticipate their approval.

Q Other than the Federal tract which you mentioned, what is the nature of the basic royalty ownership as to the unit area?

A These are fee lands in which we have included a zero

percentage for the government tract, we have 86.52 per cent of the royalties signed.

Q I see. Is there any lands of the State of New Mexico involved in the unit area?

A No, sir.

Q It's on all fee land or in the case of the one a Federal tract?

A Correct.

Q Federal lands?

A I might say that the TEC Corporation at this time has indicated a favorable response.

MR. NUTTER: They may yet?

THE WITNESS: I actually believe they will sign an agreement although we have stated to the U.S.G.S. and will state here that we feel sufficient control can be had over the secondary recovery method that we can effectively flood this area without their participation.

Q (By Mr. Sperling) Now, you indicated to me prior to the Hearing, Mr. White, that there was some urgency in connection with the approval of this unit agreement by this Commission?

A Yes, sir. This agreement has an ipso facto termination date of 1-1-66 and, therefore, it's important for us that we obtain as expeditiously as possible Commission

action. We have been working on this unit approximately six years.

Q Is there anything further you would like to add in connection with the unit agreement or any provisions in it?

A I have nothing further unless there is some questions.

Q MR. SPERLING: I would like to submit in case 3339 the tract participation sign-up as distinguished as between the working interests and royalty interests. This will be Exhibit 1 in 3339.

MR. NUTTER: Mobil's Exhibit 1 will be admitted.

(Whereupon, Applicant's Exhibit 1 was offered and admitted into evidence.)

THE WITNESS: Perhaps I should say that one of the provisions of the agreement requires 100 per cent working interests' signature for a tract to be qualified. We do anticipate those tracts which are indicated as not having 100 per cent signature to be indemnified into the unit prior to the effective date.

MR. NUTTER: Are there any questions of Mr. White?

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. White, I wonder if you would go into the participation formula for the various tracts and explain how that operates, please?

A Yes, sir. The participation formula is a two-phase formula: Phase one being calculated or being made up of 50 per cent of the each tracts remaining primary reserve percentage and 50 per cent of the tracts' current production percentage.

Q And when is the remaining primary reserve completed from?

A The primary reserves as of June 1, 1964.

Q So that was phase one?

A Correct. And phase one is in effect until the sum of the all tracts production is 3,196,000 barrels as of June 1, 1964.

Q Phase one is in effect until what, until the sum of the production of all tracts equals 3,196,000 barrels?

A As of June 1, 1964, so that you have a tract one volume of this many barrels.

Q Oh, I see.

A Starting June 1, 1964.

Q And what about phase two then?

A Well, phase two then is also a split formula being 90 per cent of a tract primary ultimate recovery percentage and 10 per cent of the tracts' total acre percentage and it will be in effect as long as the unit is effective immediately following the termination of phase one.

Q And the tract participation is a part of the unit

agreement and has been ratified by 99.39 per cent of the working interests?

A Yes, sir.

MR. NUTTER: Thank you. Any further questions? Mr. White may be excused.

MR. SPERLING: Mr. Robert White.

R O B E R T W. W H I T E, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. SPERLING:

Q Would you state your name, please?

A Robert W. White.

Q By whom are you employed and in what capacity, Mr. White?

A I'm employed by Mobil Oil Company in Hobbs as production engineer.

Q Have you on a prior occasion testified before the Commission?

A No, sir, I have not.

Q Would you, for the record, please give us your educational and experience background with reference to the duties that you perform for Mobil?

A I graduated from the University of Texas, Bachelor of Science in Petroleum Engineering, in 1958. For the past year and

a half I have been employed by Mobil in the reservoir group working the north part of Lea County, New Mexico. Prior to that I was employed with Irving Secondary Recovery Company, a consulting firm, in Abilene, Texas.

Q In the performance of your duties have you had occasion to make a study of the Wolfcamp reservoir in the proposed Denton North Wolfcamp area?

A Yes, I have.

Q And with reference to the unit area and the state of development that has occurred in that area, would you please refer to what has been marked as Exhibit 1 and describe what that is, please?

A Exhibit 1 is a lease map which shows the lease ownership within a two-mile radius of the proposed injection wells. The proposed unit boundary is shown in a dashed line on the plat. The proposed Wolfcamp injection wells are shown in red. Devonian wells which are also on the structure are designated separately by triangles. There are no dual completion wells. All wells are single completions.

Q Now, would you describe for us the proposed unitized interval for this Wolfcamp production?

A The unitized interval is from the interval from the top of the Wolfcamp at 9,180 feet subsurface and the base which is found at 9,860 feet subsurface on Schlumberger electric log

dated July 29, 1953, for the Socony-Mobil T. D. Pope #10.

Q Now you have explained that Exhibit 1 indicates the unit area and the leasehold ownership within the required two mile radius. Would you now please refer to the Exhibit 2 and explain what this portrays?

A Exhibit 2 is an enlargement of Exhibit 1 which is designated "Proposed injection pattern." Only Wolfcamp wells are shown in this exhibit.

Q Are these presently producing wells or do you propose to convert to injection wells in connection with the operation of the project?

A Yes, they are. They all presently are completed in the Wolfcamp formation with the exception of the Sinclair Mann A-3 well which is presently a Devonian completion which will be completed in the Wolfcamp interval as a Wolfcamp injector.

Q Now, would you please refer to what has been marked Exhibit 3 and also Exhibit 3-A and advise the Examiner what these exhibits consist of?

A Exhibit 3 is a typical log of the injection wells which depicts the pay zone in the perforated interval.

Exhibit 3-A is the type log defining the unitized interval which shows the complete unitized interval.

Q These two logs are not of the same well as I understand it?

A No, sir, they are not.

Q And Exhibit 3-A is a log of a well which is defined in the unit agreement as the well or the typical well upon which the unitized vertical area is based?

A Yes, sir, it is.

Q Now, would you please explain for the record what your study of the reservoir characteristics of this reservoir has revealed?

A Cumulative production from the proposed unit area August 1, 1965, was 7,500,000 barrels. The remaining primary for the unit area as of the first, 1-1-66, is estimated at approximately 2.7 million barrels which might be recovered over the remaining life of 20 years. The additional recovery over continued primary to be gained by waterflooding the unit area is estimated at approximately two and a half million barrels. The productive life required to recover the remaining primary and the additional waterflood reserves is estimated to be about 12 years. So that as of 1-1-66, continued primary and waterflood reserves are estimated at approximately 5.2 million barrels.

Q What is the current cumulative production from the wells in the unit area?

A Current cumulative to August 1, 1965, was 7,510,000 barrels. The unit area for July, 1965, the unit area production

during that month was 2,287 barrels of oil from 41 producing wells which is an average daily oil production of 17 barrels per well per day. There are also 9 shutin wells within the unit area.

Q Can you state whether or not the Wolfcamp formation within the unit area is in an advanced stage of depletion as of the present time?

A Yes, sir, it is. The original bottom hole pressure was approximately 3,680 pounds per square inch. The current bottom hole pressure is estimated at 400 to 500 pounds per square inch.

Q Now, what do you propose to inject, that is, rate-wise on a daily basis into the reservoir under the program that you have outlined?

A It is proposed to initiate injection at a total unit rate of 18,000 barrels per day which will be into an inverted nine-spot pattern as shown on Exhibit 2. The wellhead pressure after a 50 per cent fillup is anticipated to be approximately 2,000 pounds. Injection equipment will be designed for a wellhead with a pressure up to 2,500 pounds. All water injected facilities will be externally coated. Injection will be through corrosion protective tubing below tension packers. The angular spacing in the injection wells will be filled with corrosion inhibited water.

Q What is the source of the water which you propose to inject?

A Water will be obtained from Denton Water Disposal System which disposes of salt-produced water from the Denton Devonian Reservoir in the south portion of the Devonian Wolfcamp which are active water drive reservoirs. They are currently disposing of about 22,000 barrels of water per day by injection into the Devonian formation.

Q And all of this water will be available for use in the project under discussion?

A Yes, sir, it will.

Q Now, would you review for the record the basic reservoir data of the area?

A The basic reservoir data in volumetric numbers might be summarized as follows: Productive area is approximately 2,640 acres within the unit boundary. The average pay thickness is 48 feet. The average porosity is 6.8 per cent. The original conic water saturation, 21.5 per cent. Original formation pressure approximately 1.235 pounds per barrel. The original saturation pressure is estimated at approximately 896 pounds per square inch.

Q It is contemplated that at a future date it will be necessary to convert additional wells to injection wells or to drill additional injection wells? What are the plans?

A Yes, sir. It is. We contemplate adding additional injection wells along the north portion of the reservoir in the spaces where there are no Wolfcamp wells indicated on Exhibit 2. There are Devonian wells which are now at those locations which are nearing abandonment or nearing the economic limit. As they are abandoned they will be converted or recompleted in the Wolfcamp. Some will be injectors and some will be producers.

Q And under the application, you are seeking administrative authority for the conversion of those additional wells in the future as required?

A Yes.

Q And, in addition, you are seeking assignment of allowables insofar as this unit is concerned on the basis of the present provision of the Rule 701 of the Commission?

A Yes, sir.

Q Now, I would like to call your attention to Exhibits 4-A through 4-L and ask you to explain what they show?

A The exhibits show pertinent completion data of the proposed injection wells, the casing size and depth, volumes of cement, cement tops are shown on all the casing strings, the Wolfcamp perforation interval is shown for the individual injection wells, the total depth and the plugback total depths are shown for each proposed injection well.

Q Is there any substantial difference in these exhibits

A through L which should be called to the attention of the Examiner or are they basically the same or if there are differences, what are they?

A They are basically the same. The only difference is in the long string of the oil string. In some cases it goes all the way to the surface from 9,000 feet while in others it is set as a liner with the top being at approximately 4,800 feet. Exhibit 4-F is an example of the wells with liners.

Q Is the proposed well completion program including the exhibits to which we have been referring as well as all other other exhibits concerning which you have testified here in the application been submitted to the Office of the State Engineer for the State of New Mexico?

A Yes, sir, it has.

Q And have you been advised of the approval of that agency insofar as the proposed program is concerned assuming that the program which we have outlined here as a part of the application is carried out?

A Yes, sir, I have.

Q I believe that there is included in the file a letter addressed to Mr. Porter from the State Engineer indicating what I've just stated?

MR. EXAMINER: That will be made a part of the record later.

Q Is there anything else you would like to add, Mr. White, with reference to this reservoir and proposed plans for it?

A No, sir.

Q Were these exhibits 1 through 4 and all the letters prepared by you or under your supervision?

A Yes, they were.

MR. SPERLING: At this time I would like to offer Exhibits 1 through 4A-L.

MR. NUTTER: Socony's Exhibits 1, 2, 3, 3-A and 4-A through L will be admitted into evidence.

(Whereupon, Applicant's Exhibits, 1, 2, 3, 3-A, and 4-A through L were offered and admitted into evidence.)

MR. SPERLING: That's all I have.

MR. NUTTER: Any questions of Mr. White?

MR. DURRETT: I have one question.

CROSS EXAMINATION

BY MR. DURRETT:

Q Mr. White, as far as placing the additional wells on injection, I think you mentioned something about administrative procedure?

A Yes, sir.

Q Am I correct that you propose to use the administrative procedure that is presently set out in Rule 701?

A Yes.

Q You are not seeking special administrative procedure?

A No.

MR. DURRETT: Thank you.

BY MR. PORTER:

Q I have one question. You gave us the cumulative figure for the wells in this proposed unit. Do you recall roughly some of the individual recovery figures for some of the wells out there?

A They range substantially from the age periphery wells to, oh, on the order of 50,000 to some of the better wells with half a million barrels individual recoveries.

Q Do you recall about when this pool was discovered?

A The Denton field, the south portion, was originally discovered in 1949. The first well in the north area was completed in 1952 --

Q I see.

A -- in the Wolfcamp interval.

MR. PORTER: That's all I have.

BY MR. NUTTER:

Q Mr. White, does Mobil have any acreage in the south part of the field?

A No, sir, we don't.

Q Do you know whether negotiations are under way to

unitize that end of the field for waterflood operations?

A No, sir, I don't know of any active procedures at this time. Both the Wolfcamp and Devonian are under active waterdrive in the south portion.

Q Your Wolfcamp is, too, then?

A Yes.

Q Is it contemplated that at any time it will be necessary to put additional injection wells along this bottom tier of wells in this north unit?

A Yes, sir, it may be in the later stages of the waterflood development. There is some evidence of active water coming in across that boundary at this time.

Q So the waterdrive that is in the south may be affected in this lower portion of your unit here?

A It may be, yes.

Q I see. Now, I just happened to notice on this Exhibit 3, Mr. White, that this well has two sets of perforations. How many different intervals of pay have been accounted for through the Wolfcamp?

A There are three intervals or zones that have in some well or another produced. Predominately they are producing in these two intervals shown on this exhibit. A major portion of the oil in this north portion of the Wolfcamp reservoir has come from these two intervals.

Q These two shown on Exhibit 3?

A Yes, sir.

Q Now, I haven't had time to look at your diagramatic sketches on your injection wells but do all of these injection wells have these two zones open in them?

A On the edge of the field the second zone interval is not developed. The porosity permeability is not developed as well as it is in the center and some of these wells do not have the second interval open. The interior wells in the pattern do have both zones open.

Q Now, that would apply to the injection wells as well as the producing wells?

A Yes, it does.

MR. NUTTER: Are there any further questions of Mr. White? You may be excused.

MR. SPERLING: I would like to recall Mr. J. L. White. He's made a mistake he's called to my attention.

REDIRECT EXAMINATION

BY MR. SPERLING:

THE WITNESS: I will apologize for the misstatement. I was hurriedly looking for the answer to your question regarding the volume of oil produced as to phase one and the correct number is 3,000,000 barrels rather than the, as I recall I gave you number of, 3,000,194.

MR. NUTTER: Around 3,000,000.

THE WITNESS: Around 3,000,000. Even 3,000,000.

MR. NUTTER: Thank you.

THE WITNESS: I'm sorry.

Q (By Mr. Sperling) Anything else?

A No.

MR. SPERLING: That's all we have, Mr. Examiner.

MR. NUTTER: Does anyone have anything they wish to offer in Case 3339 and 3340.

MR. DURRETT: I would like to state for the record that we do have a letter from the State Engineer dated November 4, 1965, that Mr. Sperling has been referring to.

MR. NUTTER: Thank you. If there is nothing further, we will take the cases under advisement and call case 3341.

(Whereupon, Cases Number 3339 and 3340 were concluded.)

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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>
<u>Case 3339</u>			
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App's. 1	2	16	16
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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 30th day of December, 1965.

Dean A. Robinson
NOTARY PUBLIC

My Commission Expires:

October 16, 1969.

I do hereby certify that the foregoing is a true and correct copy of the proceedings in the New Mexico Oil Conservation Commission No. 333983340
dated and filed 11/23/65
Dean A. Robinson Examiner
New Mexico Oil Conservation Commission