BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
February 23, 1966

EXAMINER HEARING

IN THE MATTER OF:

Application of Socony-Mobil Oil Company for a unit agreement, Eddy County, New Mexico. Case No. 3377

Application of Socony-Mobil Oil Company for a waterflood project, Eddy County, New Mexico. Case No. 3378

BEFORE: Daniel S. Nutter, Examiner.

TRANSCRIPT OF HEARING

NEW MEXICO OIL CONSERVATION COMMISSION

EXAMINER HEARING

SANTA FE, NEW MEXICO

REGISTER

HEARING DATE FEBRUARY 23, 1966 TIME: 9 A.M.

NAME:	REPRESENTING:	LOCATION:
Harley Reavis	[illegible]	[illegible], Tex
J. T. Johnapelus	Texaco Inc	Midland, Texas
J. F. [illegible]	Mobil Oil Co	Albuquerque
R. W. White	Mobil Oil Co.	Hobbs, N. M.
John F. Russell	Tom Ingram	Roswell, N. M.
[illegible] Kelly	Texaco [illegible]	S F.
N [illegible]	[illegible] Ingram [illegible]	S F.
Frank E. Irby	State Engineer	Santa Fe
Ralph L. Gray	Tom Ingram	Artesia
John Cooney	Mobil Oil Co	Albuquerque
Tom L. Ingram	Tom L. Ingram	Roswell

MR. NUTTER: The hearing will come to order. The first case this morning will be Case 3377.

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

MR. SPERLING: J. E. Sperling and John Cooney of Modrall, Seymour, Sperling, Roehl and Harris, Albuquerque, appearing for the applicant. We would like to ask that for the purposes of the testimony that Case 3377 be combined with Case 3378.

MR. NUTTER: We will call next Case 3378.

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

MR. NUTTER: Cases 3377 and 3378 will be consolidated for the purposes of testimony. Would you proceed, please?

MR. SPERLING: We have one witness, Mr. White, if he may be sworn.

MR. NUTTER: Stand and be sworn, please.

(Witness sworn.)

ROBERT W. WHITE

called as a witness, 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, Senior Production Engineer, Mobil Oil Company, Hobbs, New Mexico.

Q Mr. White, are you familiar with the application which has been filed on behalf of Socony-Mobil Oil Company in Case No. 3377, which is for approval of a unit agreement?

A Yes, I am.

(Whereupon, Exhibit No. 1 in Case 3377 was marked for identification.)

Q Now, submitted with the application as originally filed with the Commission was a copy of the unit agreement. We have had marked as Exhibit 1 in Case 3377 a unit agreement which has been designated as the unit agreement for the West Henshaw Premier Unit, Eddy County, New Mexico. In what respects, if any, did this unit agreement vary from the unit agreement which was submitted with the application?

A It is the same.

Q It's content is the same?

A The exhibits have been added to this agreement that may have not been submitted with the original, the exhibits A, B and C in the attachment.

Q What do those exhibits consist of?

A They consist of a map of the unit area, which is Exhibit A, and Exhibit B to the unit agreement is the description of the tract and ownership, and Exhibit C is the tract participation.

Q Can you tell us whether or not the unit agreement

has been submitted to the United States Geological Survey and to the Commissioner of Public Lands for the State of New Mexico and what the status of approval is?

A Yes. We have submitted and received tentative approval from the United States Geological Survey and from the State Land Commissioner.

Q I assume that the unit agreement has been circulated among the operators which are shown on the exhibits to the unit agreement as interest owners in the unit area?

A Yes, it has.

Q Can you tell us what the status of signup is insofar as royalty interest is concerned, overrides and working interest?

A The royalty interest is all state and federal lands. The working interest, we have received or have indicated seventy-two percent approval on the unit agreement.

Q Do you anticipate total approval by all of the interest owners in the unit area?

A There is a one-well tract shown on Exhibit A as Tract 7-B, Kemsee and Cahoun Hinkle Federal No. 1 that has indicated that they will not joint the unit.

Q Is that a 40-acre tract?

A Yes, it is.

Q Is this unit agreement of the usual form required

by the United States Geological Survey in connection with proposed unit operations as contemplated by the agreement?

A Yes, it is. It has been circulated in the local office and in Washington and in conference between the United States Geological Survey and the State Land Commission the unit agreement was discussed and received tentative approval from both agencies.

Q This was a joint conference between Mobil as the proposed operator, the Commissioner of Public Lands' representative and the United States Geological Survey?

A Yes.

Q As a result of that conference were certain changes made in the form as originally proposed?

A Some modifications to the agreement were made. They have been encompassed in this unit agreement as presented.

Q What is the purpose of the unit agreement? What does it contemplate?

A The unit agreement is to provide for the most efficient waterflood secondary operation in the West Henshaw reservoir.

Q And the West Henshaw reservoir is made up of approximately what area acreagewise?

A It's made up of approximately 2400 acres that is included in the unit boundary located in Sections 2, 3, 4, 5, 8,

9 and 10, Township 16 South, Range 30 East.

Q And the unit area is, of course, described as well as depicted on the map of the unit area which is contained as an exhibit to the agreement?

A Yes, it is. It's described in the body and shown in Exhibit A.

Q What is the unitized substance?

A The unitized interval is the Premier interval. The unitized formation is defined as that portion of the Grayburg formation underlying the unit area, which includes the continuous stratigraphic interval, occurring between a point one hundred feet above the top of the Premier zone and the base of the Grayburg formation, said interval having been penetrated between 2733 feet and 2860 feet, and the top of the Premier zone having been found at 2833 feet beneath the derrick floor in the Little Lucky Lake Unit Shell Well No. 1, located in Lot 9 of Section 3, Township 16 South, Range 30 East, NMPM, Eddy County, New Mexico, as recorded on the sonic log and Laterolog, said well dated May 28, 1959.

Q Mr. White, in your opinion would the approval of the unit agreement by the Commission be in the best interest of the prevention of waste and protection of correlative rights?

A Yes, it would.

MR. SPERLING: I think that's all I have.

MR. NUTTER: Does anyone have any questions of this witness? The same witness is going to appear in the waterflood case?

MR. SPERLING: Yes.

MR. NUTTER: Go ahead with your waterflood case then.

(Whereupon, Exhibits No. 1 through 3 and 4a through 4z were marked for identification)

Q (By Mr. Sperling) Now, Mr. White, would you refer to what has been marked as Exhibit 1 in Case 3378 and tell us what that shows and what it is?

A Exhibit 1 is the lease map of the West Henshaw Premier area showing all the wells and leases within a two-mile radius of the proposed injection. The unit boundary is outlined and the proposed injection wells are shown on Exhibit 1. Exhibit 2 is an enlargement of Exhibit 1, showing more detail of the pattern. The proposed pattern is a five-spot with certain modifications because of irregular spacing on 40 acres.

Q Well, then, the Exhibit 2 is simply a larger scale indication of the unit area with the injection wells indicated as shown by the legend to the exhibit?

A Yes, it is. There will be twenty-six injection wells in the proposed area.

Q Now, I believe you stated in connection with the

unit agreement the unitized interval which is proposed to this waterflood, I assume that Exhibit 3 is a representative log of the typical injection well as proposed for the project?

A Yes. It's a representative log which shows the unitized interval and the top of the Premier zone, which will be the flooded interval.

Q Would you point out what well the log represents?

A Yes. The log represents the Shell Little Lucky Lake Unit No. 1 well located in Lot 9 of Section 3, Township 16 South, Range 30 East. That will become Tract 2, Well 1.

Q And that is shown on Exhibit 2?

A Yes, it is.

Q Now, would you please refer to Exhibit 4 and tell us what those in combination represent? I believe they're identified as Exhibits 4a through z, is that correct?

A Yes. Exhibits 4a through z are schematic diagrams of the proposed injection well. There's one diagram for each well. In general the wells show the casing size and depth, the number of sacks of cement used, the cement tops, the perforated interval of the Premier or the open hole interval and the tubing string set just to the top of the injection formation set with tension packers. It is proposed that 2-3/8ths inches of cement-lined tubing will be used as the injection string in the annulus between the injection

string and the casing will be filled with inhibited water. All of the sketches are similar or identical with the exception of Exhibit 4c.

Q In what respect does it differ from the others?

A Exhibit 4c represents the completion technique that was used with the cable tool drilling operation with this well at this particular time and it's significant difference is in effect that 8-5/8ths surface string was mudded during the drilling operations and then pulled from the well and fifty sacks of cement were dumped around the top of the 5-1/2 inch casing string. The annulus was then packed off at the surface and a cement sill was placed and the casing was swung from a casing clamp on the cement sill at the surface.

Q Well, within this interval are there any fresh water zones encountered or any water of any kind?

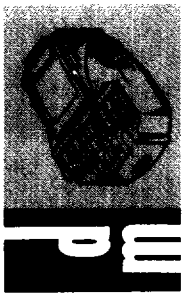
A There is some local water at some sites at about 250 feet to 300 feet above an anhydrite section that indicates to be of minor aerial extent.

Q Is any use being made of this water that you think is present on a rather local restricted area?

A Not to my knowledge.

Q What do you propose to use as a source of water for injection?

A It is proposed to buy fresh water from commercial



water companies operating in the area and likely will be the Double Eagle Corporation of New Mexico for whom we will purchase makeup water for the initial fillup period of the waterflood and as soon as produced water becomes available it will be included and used in the waterflood operation.

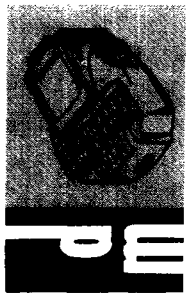
Q Would you give us some of the history of this particular reservoir? Is it in an advanced stage of depletion?

A Yes, it is. The field was discovered in 1957. The unit area of production for September 1965 was 3,475 barrels of oil from 39 wells, which is an average daily oil production of about three barrels per well per day. In addition to the 39 wells there are seven wells which are shut in and two temporarily abandoned.

Now the unit area has reached the advanced stage of depletion. Now the original bottom hole pressure has declined from an original of a thousand and thirty pounds to less than two hundred pounds at the present. The cumulative production from the unit area was 1,717,000 barrels of oil as of January 1, 1966, which represents 99 percent of the estimated unit area ultimate primary of 1,730,000 barrels.

Q I don't believe we covered the proposed tract participation which is set forth, I believe, in Exhibit 1 in Case 3377. What was the basis used for tract participation?

A Tract participation will be on two-phase formula,



phase 1 will be 100 percent current production based on the current production interval from September 1962 to February 29, 1964 which is an eighteen-month period. Phase 2 will be on the basis of 100 percent ultimate primary. Phase 1 will be in effect until a total ultimate primary of 1,750,000 barrels has been produced from the unit area.

Q What is your estimate of the primary recovery which has been recovered?

A To date there has been 1,717,000 barrels produced and the ultimate primary based on a reasonable economic limit is 1,730,000 barrels. It is estimated that the proposed water-flood will recover an additional two million barrels of oil over the remaining primary.

Q At what rate do you propose to inject water initially?

A It is proposed to initiate injection at a total rate of 6,500 barrels of water per day into 26 injection wells, which is at the rate of 250 barrels per well. The well-head pressure after 50 percent fillup is anticipated to be approximately 1800 pounds. Injection equipment will be designated for a well-head working pressure of 2,000 pounds. All the injection facilities will be internally coated.

Q What is the drive mechanism as far as this reservoir is concerned?

A The reservoir produced primarily from solution gas drive with some slight gas cap of minor importance being present. There is no indication of any active water influx. There is no water production from any wells within the unit area.

Q I believe you mentioned that there had been a substantial decline in bottom hole pressure in this reservoir. Did you give the figures on that?

A Yes, I did.

Q Have you made an analysis of the properties of the reservoir?

A The rock and fluid properties of the reservoir from a volumetric standpoint might be summarized as follows: The average depth of Premier production is 2900 feet. The estimated oil-productive area is 1880 acres. The estimated average pay thickness is 11 feet. The estimated average porosity is fifteen and a half percent; the connate water saturation is estimated at 35 percent. The original formation volume factor of the crude is estimated to have been 1.176 barrels per barrel.

Q What completion methods were used in this field in its primary development?

A Some of the wells were drilled by cable tool and the Premier section was open hole completed, others were

completed by the techniques of setting the oil string through and perforating the Premier interval. The individual completions are shown on Exhibit 4a through z.

Q Is there anything further you would like to add, Mr. White?

A No.

Q Do you feel that the approval of this application in 3378 would be in the best interest of prevention of waste and the protection of correlative rights?

A Yes, I do.

MR. SPERLING: I believe that's all.

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

MR. IRBY: I would like to ask a couple of questions.

MR. NUTTER: Okay.

MR. IRBY: Frank Irby, State Engineer's Office.

CROSS EXAMINATION

BY MR. IRBY:

Q Mr. White, referring to your Exhibit 4 nought which is your Mobil Federal "P" No. 8 well --

A Yes.

Q -- where will the packer on the end of the tubing be set with respect to the cement top surrounding the 5-1/2 inch casing?

A It will be set approximately 30 feet above the interval to be perforated, which has not been picked at this date. It would be at approximately 2650 feet or 2750 feet.

Q Then you'd say it would be better than 200 feet below the top of the cement that I asked you about?

A Yes, sir.

Q Now, referring to your Exhibit 4f, which is your Humble State "BC" No. 2, is the casing in that hole actually 2-7/8ths inch?

A Yes, it is.

Q And you intend to put 2-3/8ths inch tubing inside that?

A No, sir, we'll have to use a smaller diameter tubing. That 2-3/8ths inch is incorrect as shown on this sketch and should be corrected to 1-1/2 inch.

MR. IRBY: That's all the questions I have. Thank you.

BY MR. NUTTER:

Q Now, you stated, Mr. White, that there was some water in the range from 250 to 300 feet. I haven't had a chance to look at all of these exhibits, but in each case, with the exception of that one well, is there surface pipe set and cemented below that water?

A Yes, there is.

Q Also in each case you have your production string down there near the pay, either at the top of the pay or through the pay, and perforations and cement on that. Now, what is the minimum height that that cement comes on these wells above the shoe of the casing?

A Minimum would be 250 to 300 feet.

Q And in each one of these cases you are going to run a string of tubing in these injection wells and you are going to set a packer down, within what interval from the casing shoe?

A Within 30 feet of the casing shoe within one joint.

Q Or the perforation?

A Yes, sir.

Q Within 30 feet. That would be on the bottom joint of casing you might say?

A Yes, sir.

Q In each case you will also have inhibited water behind the tubing?

A Yes, sir, we will.

Q I missed the figure that you gave. You said in September of 1965 you produced 3,475 barrels and that was from how many wells?

A That was from 39 wells.

Q For an average of three barrels per well per day?

A Yes.

Q And you've recovered 1,717,000 barrels out of an estimated ultimate primary of 1,730,000?

A Yes.

Q And you estimate two million barrels on secondary?

A Yes, sir.

MR. NUTTER: Are there any other questions of Mr. White? He may be excused.

(Witness excused.)

MR. SPERLING: Mr. Examiner, I would like to offer Exhibit 1 in Case 3377 and Exhibits 1 through 4 in Case 3378.

MR. NUTTER: Exhibit 1 in Case 3377 will be admitted, Exhibits 1 through 3 and 4a through 4z in Case 3378 will be admitted in evidence.

(Whereupon, Exhibit 1 in Case 3377 and Exhibits 1 through 3 and 4a through 4z were offered and admitted in evidence.)

MR. NUTTER: Do you have anything further in either case, Mr. Sperling?

MR. SPERLING: No, sir.

MR. NUTTER: Does anyone have anything they wish to offer in either of these cases?

MR. KELLY: Texaco is a working interest owner and they would like to concur in the cases.

MR. NUTTER: Thank you, Mr. Kelly. Anything further? We will take the cases under advisement.

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

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

Witness my Hand and Seal this 24th day of February, 1966.

Ada Dearnley
NOTARY PUBLIC

My Commission Expires:

June 19, 1967.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 3377 & 3378 heard by me on 2/23, 1966.

, Examiner
New Mexico Oil Conservation Commission

I N D E X