BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
May 24, 1967

EXAMINER HEARING

IN THE MATTER OF: Application of Morris R. Antweil for a unit agreement, Eddy County, New Mexico	CASE NUMBER 3586
and	
IN THE MATTER OF: Application of Morris R. Antweil for a waterflood project, Eddy County, New Mexico.	CASE NUMBER 3587 (Consolidated)

BEFORE:

ELVIS A. UTZ, Examiner

TRANSCRIPT OF HEARING

MR. UTZ: Case 3586 and Case 3587.

MR. HATCH: Case 3586, Application of Morris R. Antweil for a unit agreement, Eddy County, New Mexico. Case 3587, Application of Morris R. Antweil for a waterfloor project, Eddy County, New Mexico.

MR. KELLAHIN: If the Examiner please, Jason Kellahin, Kellahin and Fox, appearing for the applicant and we would like to have the two cases that have just been called consolidated for the purposes of the record.

MR. UTZ: They will be consolidated for purposes of testimony, a separate order. Any other appearances? Will the witness stand and be sworn, please.

(Witness sworn.)

MR. KELLAHIN: If the Examiner please, attached to the applications that were filed with the Commission are the exhibits which are required to be filed at that time and we would like to utilize those exhibits in connection with the testimony that will be presented at this Hearing. It consists of the --

MR. UTZ: In both cases?

MR. KELLAHIN: In both cases, yes, sir.

MR. UTZ: You may proceed.

ROBERT M. WILLIAMS

called as a witness on behalf of the applicant, first having

been duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Would you state your name, please?

A Robert M. Williams.

Q What business are you engaged in, Mr. Williams?

A I am a petroleum engineer for Morris R. Antweil.

Q Are you employed by Morris R. Antweil?

A Yes.

Q Have you ever testified before the Oil Conservation Commission?

A No, I haven't.

Q Where are you located, Mr. Williams?

A In Hobbs, New Mexico.

Q Would you state briefly, for the benefit of the Examiner, your education and experience as a petroleum engineer?

A I am a graduate of Pennsylvania State University with a degree, Bachelor's degree in petroleum and natural gas engineering. I graduated in 1953, was employed by Shell Oil Company from 1953 to 1957 in the capacity of a field engineer and a reservoir engineer. In 1957 I went to work for Monterey Oil Company in Hobbs, New Mexico; employment with Shell was also there in Hobbs. I worked with Monterey and subsequently Humble Oil Company who purchased Monterey from 1957 until 1966

in the capacity of unit reservoir engineer for the Fullerton-Clear Fork Unit, which was engaged in a waterflood operation in Andrews County, Texas.

In 1966 in October I went to work for Morris R. Antweil in the capacity of an engineer.

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

MR. UTZ: Yes, sir, they are.

Q (By Mr. Kellahin) Now, Mr. Williams, are you familiar with the application of Morris R. Antweil in Cases 3586 and 3587?

A Yes, sir. I prepared these applications.

Q And 3586 is an application for approval of a unit agreement, is that correct?

A That's correct.

Q Has a copy of the unit agreement been filed with the Commission?

A With the application, yes, sir.

Q Is Morris R. Antweil designated as unit operator in the proposed unit?

A Yes, sir.

Q What is the name of the unit?

A It is the Malaga Unit.

Q Now, what acreage does it cover?

A It covers 838 acres of Federal and fee lands located in Sections 12 and 13 of Township 24 South, Range 28 East, and Sections 7 and 18, Township 24 South, Range 29 East, all in Eddy County, New Mexico.

Q Now, is there attached to the exhibit a map showing the unit area?

A Yes, sir, a map showing the unit area is attached with the exhibit and also, of course, encompassed in the unit agreement.

Q And in addition to that, there is an exhibit attached to the unit agreement showing the acreage and the ownership of working interests and royalty interests, is that correct?

A Yes.

Q As a normal unit?

A Exhibits A, B and C of the unit agreement.

Q Has the unit agreement been submitted to the U.S.G.S. for approval?

A Yes, sir. We submitted it to the U.S.G.S. by application for final approval on the 11th of May and is currently being processed.

Q Now, Mr. Williams, have all of the working interest owners signed the unit agreement?

A The one working interest owner, Tenneco, who is the

working interest owner in Tract 1 of the designated unit will not ratify the unit agreement and we are proposing to proceed with the unitization and the Tract 1 and the adjoining Tract 3 will not be included in the proposed unit, in the participating area of the proposed unit.

Q So other than the Tracts 1 and 3, all the other units will be committed by the working interest owners?

A Yes, sir. A hundred per cent of the working interest has ratified the unit agreement.

Q Now, attached to the statement which I handed to the Examiner, is there a summary of the status of ratification of the unit agreement?

A Yes. The status gives the ratification by all working interest owners and royalty interest owners involved in the unit.

MR. KELLAHIN: If the Examiner please, we could have that marked as an exhibit. I see no necessity of putting it into the record, however. Would you like to have it marked as an exhibit?

MR. UTZ: It doesn't make any difference to me.

MR. KELLAHIN: I think the testimony will cover it.

Q (By Mr. Kellahin) Mr. Williams, what is the situation as to the royalty interest ownership?

A The royalty interest ownership, a majority of the

royalty interest ownership, has ratified the unit agreement. There was one difficulty with the royalty owner ratification encountered on Tracts 12 and 13, which are each an 80 acre tract, a total of 160 acres. The basic royalty interest owner is the Valley Land Company at Carlsbad and they refuse to ratify the unit agreement out of a problem of land management that they had. This 160 acres was a portion of a 5,000 acre lease that they had made in 1949 and they are in the process of trying to break this lease. These 160 acres are the only productive acreage in the entire 5,000 acre lease so they felt that they would jeopardize their position in their suit if they ratified the unit agreement. They have no objection to the unit and have indicated that they would probably ratify the unit as to this 160 acres if they could break their lease and not hold the entire 5,000 acre lease with this acreage.

There are small interests on several of the other tracts, small royalty interests that we have been unable to get a reply to as to their ratification, but these are small royalty interests.

Q Mr. Williams, this unit is being formed for the purpose of the secondary recovery project, is it not?

A Yes, sir. The --

Q Will the acreage you just referred to be affected by this secondary recovery project in the immediate future?

A Not immediately. When we get into our application, for our injection wells are located removed from these two unsigned royalty interest tracts and as we foresee we are looking at eighteen months to two years before we would be in a position to expand the unit into this area of the field.

Q Now, is this unit in a form that it has heretofore been approved by this Commission and by the U.S.G.S.?

A Yes. The unit agreement, I think, will follow the normal form of statement there, the normal API form for a unit agreement.

Q And do you have the ratifications to the unit agreement from the working interest owners?

A Yes. They were marked as an exhibit here, the ratification --

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

Q Referring to what has been marked as Exhibit Number 1, a ten-page exhibit, is that the ratifications?

A Yes, sir. This is the ratifications from each of the working interest owners with the exception of Morris R. Antweil. The unit agreement that we submitted with our application is an executed copy by Morris R. Antweil.

Q And there was an amendment to the unit agreement from the form originally submitted, is that correct?

A That's right.

Q Was a copy of that filed with the Commission, the amendment?

A Yes, sir.

Q Do you have any particular effective date for the unit agreement?

A We are proposing to make the unitization effective as of July 1, 1967, pending the approval of the U.S.G.S., but we believe that we will obtain this in time to make it effective the 1st of July.

MR. KELLAHIN: Would you mark that, please?

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

Q Mr. Williams, as you have stated, this unit is being formed for the purpose of a secondary recovery project. Do you have a planned operation for the secondary recovery project?

A Yes, sir. Included with the presentation here that has been marked Exhibit 2 is a plan of waterflood operation which basically discusses the history of the Malaga Field hich was discovered in 1951 and developed with twenty producing wells. The field produces from the Delaware Sand Formation at a depth of approximately 2700 feet. The geology of the Delaware Sand, there is a stratigraphic accumulation located

on a northeast, southwest trending structural nose. The sand is a blanket sand that occurs in this area. The actual oil reservoir, we find, is actually a laminated alternating intervals of high oil saturation and low oil saturation with accompanying high water saturation. The average net pay thickness, we feel, is approximately ten feet in this Delaware Sand zone. The rock properties and fluid characteristics are given in the plan of operations here in Section 3.

The primary recovery from the field to the 1st of January, 1967, 641,091 barrels have been recovered under primary production from a solution gas drive reservoir. The reservoir energy has now been depleted, the primary recovery is virtually complete. The twenty active wells in the field produced 942 barrels during February of 1967 for an average of 1.68 barrels per well per day and a production range from .04 to 6.2 barrels per well per day.

Q Would you say this reservoir is at a stripper stage?

A Yes, sir. The primary energy has been depleted. The proposed secondary recovery operation has predicted to recover 591,000 barrels based on the similar waterfloods which are indicated to be recovering approximately nine-tenths times the primary recovery and secondary.

The proposed water injection pattern is shown on the attached map here to the plan of operations. We are proposing

basically a five-spot injection pattern for the Malaga Unit. The pattern conforms very well to the development configuration in the southern part of the unit and these seven wells marked on the map and which were listed in our application we proposed to convert to water injection wells in the immediate future. Also shown on the map are three additional wells which we anticipate to be injection wells in the future if we can work out our royalty interest ratification and our remaining working interest ratification in the northern part of the proposed unit.

Q As I understand, then, you are asking for approval of seven injection wells at the present time, is that correct?

A This is right.

Q Now, do you ask that the Commission set up some administrative procedure for the addition of injection wells whether they have had a response from the flood or not in order to complete your injection pattern for the unit?

A Yes, sir. We would like to request this. In the event that we can clarify our ownership situation and ratification situation in the northern area, we would propose to proceed with these wells.

Q Now, what is the participating formula under the terms of the unit agreement?

A The participating formula was based one hundred per cent on the cumulative primary recovery to January 1st, 1963, when an engineering study of the field was made.

Q What is the source of water you are going to use in this flood?

A The water for injection purposes will be obtained from the shallow water sands underlying the unit area which produce in this area for agricultural use, a water lease authorizing withdrawal from these sands which are contained in the Carlsbad underground water basin has been obtained and a water supply well has been drilled and tested.

Q Has a transfer of the use of the water been approved by the State Engineer?

A Yes, sir, we have a permit from the State Engineer.

Q And this is fresh water that will be injected, is that correct?

A Yes, sir.

Q Now, will you use produced water in connection with your injection program?

A When produced water is obtained from the producing wells, it will be reinjected along with the fresh water into the injection wells.

Q Will this cause any corrosion problems?

A Yes. The produced water we would anticipate would

be corrosive and a corrosion resistive tubing and line pipe would have to be used.

Q And you would install such equipment at such time as you started using the produced water, is that correct?

A Yes, sir. The diagramatic sketches that we filed with our application indicated that we will be injecting down tubing under a packer and we will use corrosion resistant material lining in this tubing.

Q Now, each of your injection wells will be completed for injection through tubing under a packer?

A Yes, sir.

Q Will you use an inert fluid in the casing tubing annulus?

A Yes, and inhibited water would be circulated into this annular space after the packer is set.

Q What volume of water do you anticipate you will inject into this waterflood project?

A We anticipate injection rates of 200 barrels of water per day per each injection well.

Q And will your source of water be adequate to supply this volume?

A Yes, sir. Our permit is adequate to supply this volume of water and the indicated test of the water injection well indicated that this volume of water is available.

Q In your opinion, will the approval of this application result in the recovery of oil that would not otherwise be recovered?

A Yes. The primary recovery mechanism of this reservoir as you stated, is virtually complete and the reservoir energy has been depleted and we anticipate an additional 591,000 barrels can be recoverd from a successful secondary recovery operation.

Q Exhibit Number 1 is a ten-page exhibit consisting of the ratifications to the unit agreement, is that correct?

A Yes. This gives the ratifications to the unit agreement and also the ratifications of the amendment that was made to the unit agreement.

Q And your Exhibit Number 2 is a multiple-page exhibit consisting of the plan of the waterflood operation and pertinent information pertaining to the waterflood, is that correct?

A Yes, sir.

Q Was that prepared by you or under your supervision?

A Yes, I prepared this.

MR. KELLAHIN: At this time I would like to offer in evidence Exhibits 1 and 2.

MR. UTZ: Without objection, Exhibits 1 and 2 will be entered into the record of this case.

MR. KELLAHIN: That's all I have on direct examination.

CROSS EXAMINATION

BY MR. UTZ:

Q The list of seven injection wells which you submitted with your application are wells that you are asking for injection wells in this case?

A Yes, sir.

Q Now, what will actually be the names of the wells? You have given the location and you said they were formerly Morris R. Antweil and so forth. What will they be called now?

A With the unitization we would propose to change the designation of these units to a tract-well type designation normally used in the unit and I think the designation was given with the application and is also, this designation is also used on the second page of Exhibit 2 that was given to you. The wells would be called Unit Wells 4-1, 5-1, 7-1, 9-2, 10-2, 11-1 and 11-3. These correspond to the tract designations that are shown on all the unit maps and the unitization agreement which has been furnished.

Q And you would call them the Malaga Unit Wells Number 4-1 and so forth?

A Yes, sir. The normal tract well designations.

Q I believe the State Engineer called our attention

to the fact you didn't show the cement tops, is that correct?

A Yes, sir. The cement tops are unavailable by any measurements that, as far as a temperature survey that were available on these wells. From our records, we do not have available temperature surveys. I have made calculations from the indicated hole size and volumes of cement that were used where the calculated tops of cement would be, which I could furnish.

Q Do you have them there handy?

A Yes, sir. You have the diagramatic sketch that we filed with our application on Well 4-1, the ten and three-quarter inch casing, the 180 sacks of cement was sufficient to have circulated cement to surface. The 100 sacks of cement used on the five and a half inch casing would indicate a calculated top of the cement at 2060. On Well 5-1, the 125 sacks on the eight and five-eighths casing was sufficient to circulate. The 75 sacks used on the five and a half inch casing would give an indicated top of cement at 1820 feet.

On Well 7-1, the 150 sacks on the eight and five-eighths casing was sufficient to circulate. 75 sacks on five and a half inch casing gives a calculated top of cement at 1830 feet. On Well 10-2, the 200 sacks of cement were sufficient to circulate the ten and three-quarter casing. The 608 sacks used on five and a half inch casing calculates to be sufficient to

circulate this annular space.

On Well 11-1, 400 sacks used on a nine and five-eighths casing was sufficient to circulate. The 125 sacks used on five and a half inch casing would give a calculated top of cement at 1940 feet. The Well 11-3, the 300 sacks used on ten and three-quarter inch casing should circulate. The 125 sacks used on seven inch casing gives a calculated top of cement at 1870 feet and on Well 9-2, the 125 sacks should circulate the eight and five-eighths casing and the 200 sacks on the five and a half inch casing gives a calculated top of cement at 1450 feet.

The four and a half inch liner, our records do not reflect the amount of cement used with this liner, but it was a cemented liner and with a short liner of this length, a short liner, our assumption would be that it was circulated to the liner hanger and this should be a fully cemented liner.

Q On your 4-1, that seems to be the only one that would be in question. The top of cement at 2660 and your packer at 2675, you don't have your packer fifteen feet below the top of the cement, right?

A 2060 feet of the calculated top of the cement.

Q Okay. I got 2660.

MR. UTZ: Any other questions of the witness?

CROSS EXAMINATION

BY MR. STAMMETS:

Q You spoke of other floods in this formation. Where are those located?

A The one that we have been particularly interested in in our consideration of flooding the Delaware Sand at Malaga has been the Tunston Flood, which is located about what, thirty, forty miles on down the Pecos River, but in Texas. This is a Delaware Sand Flood that has been in operation now some three or four years and a good response to the water injection has been realized at Tunston and there is every indication that an economic waterflood is in progress there.

MR. UTZ: What is the name of this pool?

THE WITNESS: The Malaga Pool.

MR. UTZ: Any other questions? The witness may be excused.

(Witness excused.)

MR. UTZ: Any further statements in this case? The case will be taken under advisement.