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BEFORE THE  
NEW MEXICO OIL CONSERVATION COMMISSION  
Santa Fe, New Mexico  
January 5, 1966

EXAMINER      HEARING

-----  
IN THE MATTER OF: )  
Application of General American Oil Company )  
of Texas for a waterflood expansion, Eddy )  
County, New Mexico. Applicant, in the above- )  
styled cause, seeks authority to expand its )  
Burch-Keely Waterflood Project, authorized by )  
Order No. R-2327 in the Grayburg-Jackson Pool )  
by the conversion to water injection, in )  
stages, of from 10 to 15 wells in Sections 23 )  
and 26, Township 17 South, Range 29 East, )  
Eddy County, New Mexico. )  
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Case No. 3358

BEFORE:

Daniel S. Nutter, Chief Engineer  
J. D. Ramey, Supervisor and Oil and Gas Inspector

TRANSCRIPT OF HEARING

MR. DURRETT: Application of General American Oil Company of Texas for a waterflood expansion, Eddy County, New Mexico.

MR. RUSSELL: John F. Russell, Roswell, New Mexico, and I have one witness, Mr. Roy Crow.

(Witness sworn.)

R O Y C R O W, a witness, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. RUSSELL:

Q Will you please state your name, address, by whom you're employed, and in what capacity?

A My name is Roy Lee Crow. I live at 1504 Sears, Artesia, New Mexico. I'm employed by General American Oil Company of Texas, the New Mexico District, located in Loco Hills, in the capacity of District Engineer.

Q And you have previously qualified to testify before this Commission and Examiner?

A I have.

Q Are you familiar with the application of General American Oil Company of Texas--

A I am.

Q --in Case Number 3357? It's my understanding that what you are attempting to do is expand the project authorized by an

Order R-2327, entered in this Case Number 2639, is that correct?

A This is correct.

Q And what you are proposing to do is to expand by means of a peripheral flood in a possible three stages, is that correct?

A This is correct.

(Whereupon, Applicant's Exhibits 1, 2, 3, 4, 5, and 6 marked for identification.)

Q Referring you to what has been marked as Applicant's Exhibit Number 1, will you explain to the Examiner what this shows?

A This is a plat of two mile radius of the pilot area. It shows the three plans which we have proposed to possibly flood this Keeley Zone under. Plan One as marked in blue, is our original intention of a peripheral pattern; Plan Two, which is marked in red, would be an additional conversion of three wells to modify this peripheral to a slightly closer spacing, and should this not be sufficient to recover the oil, Plan Three marked in green would show the conversion of two additional wells which would give us a more pattern type flood including four areas.

Q Referring you to the area to the Northwest portion of your flood area in which it shows four wells which would be indicated in your Plan One, actually the three wells to the

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West of your area are Sunray DX wells, are they not?

A This is true.

Q And your one well there on the other corner was authorized for injection under Sunray DX's prior application?

A This is correct.

Q Other than those, the remaining wells which are circled in blue, are your wells which you propose to inject?

A This is true.

Q Would you point out what well is presently being used as an injection well under your prior order?

A In the Southeast portion of the unit area there you will note a Number 13 Well, Keeley "B" 13, which is the pilot injection well and is currently injecting at this time.

Q How long has that been on injection, do you know?

A Since February of 1963.

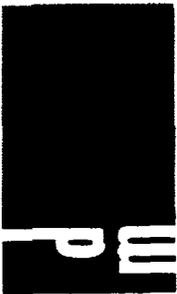
Q Now, I want to call to your attention this area which is outlined with hash marks. Is that the area covered by proposed flood?

A This is true.

Q And is that also the boundaries of a participating Federal unit which has been approved?

A Yes, sir.

Q What effect has the conversion of that Number 13 well had upon the production? I'll refer you to what has been



marked as Applicant's Exhibit Number 2 for this purpose.

A Exhibit Number 2 is a graph showing the Keeley production from the date of discovery, Keeley "C" 27, in 1948, to the present time. The noteworthy part of this exhibit is the last two years of flattening and slight upturning in points of the unit production as a whole above the extrapolated decline.

Q Now, this indicates that the production from the unit as a whole, this decline, has been stopped or leveled out, is that correct?

A This is correct.

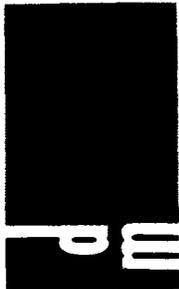
Q But there's been no significant response in any one of the wells?

A That is true, no one individual well.

Q And what is the reason for going to the peripheral at this time? In your opinion what effect will that have?

A From the basis of Exhibit 2 where the unit production as a whole has flattened, we believe that the injection into 13 has slightly repressured the area, and that the peripheral type flood would sufficiently recover all which will otherwise not be recovered.

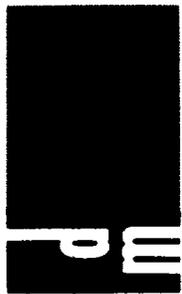
Q And Stages Two and Three are merely proposed in the event the initial plan does not appear to effectively recover such oil, is that correct?



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A This is correct.

Q All right. Now, I will hand you what has been identified as Applicant's Exhibit Number 3, and ask you what that is?

A Exhibit 3 is a type log showing the typical conversion to injection of these wells. The casings as shown on this well are similar in all wells; 8 5/8" production string, and a 5 1/2" liner. One thing outlined from this, the top of the cement did come back to the lower productive stringer of the San Andres, so the 5 1/2 is cemented from the San Andres pay completely to the bottom, and it shows that 2" tubing will be used. It will be plastic coated and will be run with a Totem Tension type packer set approximately 50 feet inside the 5 1/2" liner.

Q And your injection will be through that plastic coated tubing?

A This is correct.

Q Although this particular diagram refers to a particular well, it is what you propose as a typical completion for conversion purposes?

A Yes.

Q Now, I refer you to what has been marked as Applicant's Exhibit 4 and ask you what that reflects?

A Exhibit 4 is a detailed listing of all pertinent data

on all wells which are proposed in either Plan One, Two or Three to be converted to water injection showing the total depth; the elevation; the location; the surface casing; production stringing; the liner, and any stimulation work which was performed on the Keeley Zone.

Q Now, does this Exhibit Number 4 cover all of your proposed injection wells?

A It covers all proposed injection wells except Keeley "B" 13, which is approved and currently injecting.

Q All right. Now, I'll refer you to what's been marked as Applicant's Exhibit 5, and ask you what that represents?

A Exhibit 5 is a photostatic portion of all available logs on wells to be converted to injection. The only two not available are Keeley "C" 1, and Keeley "C" 14.

Q Is there anything in particular with reference to those well logs that you feel essential to bring out at this time?

A I don't believe so.

Q All right. Now, you have previously stated that this entire flood area is within a Federal Unit. Have you secured approval for the proposed flood operation? I'll hand you what has been marked as Applicant's Exhibit 6 and ask you if that is a letter of approval from the Department of

Interior, United States Geological Survey?

A Exhibit Number 6 is a plan of operation covering the year January 1, '66 through December the 31st, '66, which points out our intentions for this year which includes the conversion of three wells at this time. But it did state that we would seek the Commission's approval for the ultimate flood plan to the entire unit area, and it was approved by John Anderson.

Q Now, under the unit agreement for this unit, is the production allocated on the basis of acreage, solely?

A This is true. It's solely on an acreage basis.

Q If this application is granted, do you propose to use fresh water from the Caprock, or the Double Eagle Corporation which are being used in the pilot project?

A Yes, sir.

Q Were these exhibits prepared by you or under your supervision and direction?

A They were.

MR. RUSSELL: I at this time offer Applicant's Exhibits 1 through 6.

(Whereupon, Applicant's Exhibits 1 through 6 offered into evidence.)

MR. NUTTER: If there is no objection the exhibits will be admitted into evidence.

(Whereupon, Applicant's Exhibits 1 through 6 admitted into evidence.)

MR. RUSSELL: I have no further questions of this witness.

MR. NUTTER: Any questions of Mr. Crow?

CROSS-EXAMINATION

BY MR. IRBY:

Q Mr. Crow, are you going to recirculate the produced water in this flood?

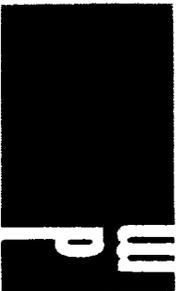
A At the time this became a sufficient quantity we probably would recycle the water.

Q Now, the testimony you gave with respect to the cementing of the liner and the setting of the tubing and packer, is that testimony applicable to all of the wells?

A Yes, it would be as one could refer to the Exhibit 4 and I could submit the actual tops of the cements on all but two wells, which was omitted from this detailed listing, but all wells would be very typical to this type log of Keeley "B" 4.

Q To make it a little clearer to me, is the cement on each of the liners above the shoe of the 7", or the production casing?

A No, it is not. The 7" casing is set on top of the San Andres production and all these wells were completed as an open hole and they produced from the upper San Andres



formation before being completed in the Keeley. And at the time of completion the liners were run and cemented and in all cases the cement returned to the lower portion of the San Andres pay, but it did not overlie the San Andres pay.

Q Then the liner is exposed to whatever may be in the San Andres?

A This is true.

Q Then maybe I can get at this another way. Is this packer on the end of the tubing in each instance set below the bottom of the San Andres?

A The packer would be set approximately 50 feet from the bottom of the liner which is as in the type log--let's see, it's 200 feet below the San Andres.

MR. NUTTER: Below the top of the San Andres?

A Below the top of the San Andres.

Q (By Mr. Irby) Below the top. Well, now, is the San Andres from that point on down impermeable?

A There is an interval in between the lower San Andres and the Keeley. At this time I could not state an average depth, but there is considerable length there as will be noted on the logs, that is not permeable.

Q And we have cement between that formation and the liner?

A That is true.

Q Now, I believe your statement was that the packers would be set approximately 50 feet above the bottom of the liner?

A Bottom of the 5 1/2, approximately 50 feet inside the 5 1/2.

MR. IRBY: Thank you.

CROSS-EXAMINATION

BY MR. NUTTER:

Q Mr. Crow, were the liners in all of the wells cemented with 35 sacks except one, it had 41 sacks, but there's no figure shown on one of the wells; that would be the Burch "C" 7 on the second page. How much cement was used on that liner?

A Well, this is omitted, I'm sorry, at this time. I'm sure it was probably 35 sacks, which I could supply you with later.

MR. RUSSELL: Do you have the top of the cement?

A The top of the cement is at 2746 by temperature survey. This was omitted, which I stated that I could give on all but two wells.

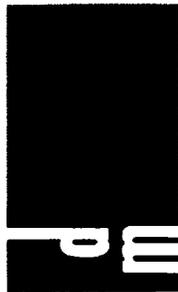
Q (By Mr. Nutter) Would that be on the 7" as well as the 5 1/2?

A No. The temperature survey was only on the 5 1/2

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liner.

Q You don't have any on the 7"?

A Just what we could calculate.

Q Could you run through them and give us the tops on liners?

A Exhibit 4?

Q Yes, sir.

A Burch "B" Number 4, the top of the cement on the liner is 2750; Burch "B" Number 5, 2740; Burch "B" Number 7, 2810; Burch "B" Number 8, 2835; Burch "C" Number 1, is one that's not available; Burch "C" Number 2, 2810; --

Q 2817?

A 2817. Burch "C" Number 6, 2620; Burch "C" Number 7, 2746; Burch "C" Number 8, 2760.

Q What was that again?

A Burch "C" Number 8. That should be the last one on the third page, 2760. Keeley "B" Number 1, 2915; Keeley "B" Number 4, 2935; Keeley "C" Number 1, 2840; Keeley "C" Number 9, not available; Keeley "C" Number 14, not available; I'm sorry, there was three.

Q Let's see, I've got two tops for one well. I must have written it down wrong.

A Which well?

Q I put down 2835 as well as 2760 for "C" 8. Probably

one of those should be "B" 8.

A 2860 is the Burch "C" 8.

Q Yes.

A And Burch "B" 8 is 2735.

Q That is where I was wrong. And the "C" 1 was one that was unavailable?

A Burch "C" 1.

Q And "C" 9 and "C" 14?

A This is correct.

Q Now, in order to compute the top of the cement or try to compute the top of the cement on the 7", what size of a hole was drilled on that?

A It would be an 8" hole.

Q In all cases?

A In all cases.

Q Now, you have your Number 13 Well on injection at the present time, and it has been for some three years?

A This is correct.

Q Has Sunray started injection on the Dodd Lease as yet?

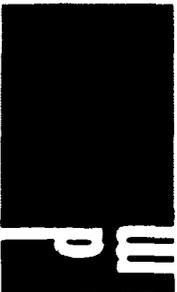
A They have not.

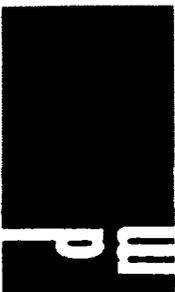
Q Has your Number 1 Burch Well been authorized as yet?

A Under their Order 3012.

Q Your well was authorized?

A Yes.





Q We don't need to include that?

A This is correct.

Q And your Number 13 has been authorized?

A This is correct.

Q Now, what did you have in mind, Mr. Crow? Did you have in mind to seek authority to put all of these wells on injection at this time, or were you proposing that you just be authorized Plan One, and then later on if you needed the additional wells to get administrative approval for those, or just how did you contemplate?

A We would like to have the Plan One through Three approved.

Q Under one Order?

A Under one Order.

Q Now, this has been covered by this cooperative unit agreement which was approved by the U. S. Geological Survey. Are there any overriding royalty owners or any other interest owners than the U.S.G.S.?

A Five percent overriding.

Q Have those overrides been unitized?

A Yes.

Q And they executed the agreement?

A This actual unit agreement has been in effect since 1944.

Q We could consider this one lease. Its already been unitized?

A Yes, since its been established.

Q I see. Now, it looks like we have some infill drilling in some of these 40 acre tracts. You may not know which 40. For instance these in the Southwest quarter of Section 23. Which 40 would that Number 14 be in?

A At this time I couldn't say, definitely.

Q Mr. Crow, could you find out the 40 acre tract attributable to each of these infill wells and let us know so that we'll be able to compute the maximum allowable this project will receive? I presume that Number 14, right there on the line, is a well, too, isn't it?

A Yes, that's Keeley "C" 14.

Q If you can just let us know what 40 acre tract each of the various wells is in?

A Yes.

MR. NUTTER: Any other questions of Mr. Crow?

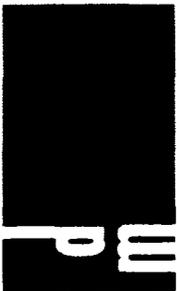
CROSS-EXAMINATION

BY MR. DURRETT:

Q Mr. Crow, how many wells are we talking about, now, as far as the total of all three stages?

A No injection?

Q Yes.



A Maximum of 14 wells.

Q Fourteen?

A Yes.

Q And you are seeking authority to convert by stages, and I assume that you, as far as your authority you're seeking, you would not want authority to put on Stage Two until you completed Stage One, would that be correct?

A Stage Two would only be put into effect at such time as Stage One would not be close enough spacing to sufficiently recover the oil.

Q But in the event you complete Stage One before you started on Stage Two, you would complete each one in stages?

A Yes.

Q Would you state what you're anticipated rates of injection will be in the pressure?

A Until we receive fill-up, or begin to encounter pressure, probably 350 barrels per day per well. At the time fill-up and pressure was encountered, the rates would be determined more by pressure than anything else due to staying below any break down pressure which might be determined.

Q What are the pressures you're anticipating as far as being able to handle on injection.

A At this time, from what testing we've done, we do not feel we would want to exceed 750 pounds. We anticipate that

even after fill-up we can get 350 barrels a day at approximately 1500.

Q Would you give us your projected primary and secondary recovery if you have made such a projection?

A I refer you to Exhibit Number 6 in which I did state that to date the cumulative production from the Grayburg-Keeley Zone is 1,124,574 barrels of oil. I have not at this time tabulated to determine the remaining primary, but all wells--well, the average on the 23 wells is slightly below 8 barrels a day, so a great portion of the primary reserve has been reserved at this time, and we feel that one time primary would be an adequate figure to distribute to secondary recovery.

MR. DURRETT: Thank you.

RE-CROSS-EXAMINATION

BY MR. NUTTER:

Q Mr. Crow, Plan One involves 10 wells, correct?

A This is correct.

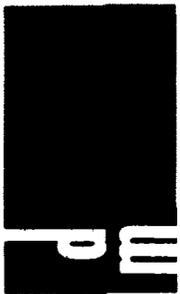
Q But two of those have already been approved?

A This is correct.

Q So we need 8 wells in that one. Plan Two involves three wells and Plan Three involves two wells?

A Correct.

MR. NUTTER: Witness may be excused. Does anyone have



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anything they wish to offer in Case 3358? The Commission will take the case under advisement and call Case 3359.

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