BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
October 17, 1957

IN THE MATTER OF:

Case No. 1330

TRANSCRIPT OF PROCEEDINGS

DEARNLEY-MEIER AND ASSOCIATES
COURT REPORTERS
605 SIMMS BUILDING
TELEPHONE 3-6691
ALBUQUERQUE, NEW MEXICO

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
October 17, 1957

IN THE MATTER OF:

Application of Northwest Production Corporation for an order for the extension of the South Blanco-Pictured Cliffs Pool in Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks an order extending the South Blanco-Pictured Cliffs Pool to include the following area:

TOWNSHIP 25 NORTH, RANGE 4 WEST
All of Sections 5 & 6
Section 7: E/2
All of Section 8

Case 1330

BEFORE:

Mr. A. L. Porter
Mr. Murray Morgan
Governor Edwin L. Mechem

TRANSCRIPT OF PROCEEDINGS

MR. PORTER: We have just a few minutes before 12:00 o'clock, not enough time to complete one of the longer cases. I believe, however, that we may be able to dispose of Case 1330, which we have listed on page 6 as number 13.

MR. COOLEY: Application of Northwest Production Corporation for an order for the extension of the South Blanco-Pictured Cliffs Pool in Rio Arriba County, New Mexico.

(Witness sworn.)

W. R. JOHNSON

a witness, of lawful age, having been first duly sworn on oath, testified as follows:

DIRECT EXAMINATION

By MR. COOLEY:

Q Would you state your name and position, please?

A W. R. Johnson, manager of production operations for Northwest Production Corporation.

Q Have you previously testified before the Oil Conservation Commission as an expert witness?

A I have.

Q Are you acquainted with the special conditions in the South Blanco-Pictured Cliffs Pool in Rio Arriba County, New Mexico?

A I am.

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

MR. PORTER: Yes, sir.

Q Would you proceed with your recommendations?

A I would like to introduce as Exhibit 1 a plat showing the location of Northwest Production's acreage in Township 25, 5; 25,4; 26, 4, Rio Arriba County. This shows the relationship of our acreage to the South Blanco-Pictured Cliffs Pool wherein one - half of Section 7 is presently included in that Pool. The northern two sections, Sections 29 and 30 of 26, 4, are influenced by the Tapicito-Pictured Cliffs Pool in that the Tapicito Field rules require that the rules shall apply within two miles of the field

limits. The acreage in between the two pools is at present undesignated Pictured Cliffs and therefore under wildcat rules. Our reason for proposing this be included in South Blanco is that we would like to clarify the rules on our acreage, and there have been two dry holes drilled between our northern acreage and the Tapico-Pictured Cliffs Pool. Therefore, we feel it should be included in South Blanco, and that the fields will go together into South Blanco, or as an alternative, that it should be a separate Pictured Cliffs Gas Pool.

Q Does that conclude your direct recommendation?

A Yes, it does.

Q Would you identify and locate the two dry holes lying between your acreage and the Tapicito-Pictured Cliffs Gas Pool?

A The Southern Union Gas Company No. 1-H in Section 20, 26, 4; Southern Union No. 1-F completed in the Mesaverde in Section 27 of 26, 4, but dry in the Pictured Cliffs. Also, for the record, we have a well presently temporarily abandoned in Section 29. It did have a little gas sand, roughly seven feet, and it is possible that we will go back and set pipe on it, but it definitely shows that the sand is disappearing to the north. I might add for the record, although it is not shown here, that the Southern Union 6-E completed in the lower Gallup, did not have what Southern Union considered commercial sand. It is located in Section 21, which is also between the two fields.

MR. PORTER: Mr. Utz.

By MR. UTZ:

Q Is there anything to prohibit you from drilling on 160 in those sections now?

A There is in Sections 29 and 30.

Q Because of --

A (Interrupting) Of the Tapicito two-mile rule.

Q The nearest well that you propose to put in the Pool is about a mile and three-quarters from the Pool boundaries, is it not?

A No, sir. Well, you'll notice in Section 6, the 6-6 has completed and is only in the nearest quarter to South Blanco. The well on 31. The 15-31 in 26, 4, would be about a mile and a quarter to a mile and a half, so we have wells quite close to South Blanco at the present time.

Q Is that a very recent completion?

A Well, the 15-31, the 6-6, was officially completed on September 25, 1957, the date that the potential was sent to the State.

Q If this were included in the Pool, what would you propose to do with the two quarters that are left in Sections 17 and 18 of 25, 4, and over in Sections 23, 24, 25, 36, of 26, 5?

A I think they should be included. We did not present it because it was not our acreage.

Q Then it would be your opinion that 39, 30, and 31, and 32 be included also?

A That is correct.

Q It stays on the edge of the strike or trend, so to speak,

does it not?

A It looks like it's on the edge of the South Blanco, but we have made fairly good wells throughout the whole section. The least well has an open flow of 2,789,000. The best one is 5,798,000. They are not big Pictured Cliffs wells, but they seem to be the average for that area.

MR. COOLEY: I have no further questions.

MR. PORTER: Does anyone else have a question of Mr. Johnson? The witness may be excused. Did you have an exhibit?

A Yes, I would like to introduce the exhibit.

MR. PORTER: Exhibit 1?

A Yes, sir.

MR. PORTER: Without objection it will be admitted.

(Witness excused.)

MR. WIEDERKEHR: We are the owner of the acreage in the interim east half of 26, all of 25, northeast of 35, all of 36, 5, would be 26, 5, and the three quarters of a Section 1 in 25, 5, Southern Union Gas Company, which would actually lie, in the event this order is granted, between the present boundaries of the South Blanco Field and the new extension, and we certainly feel that that will eventually be drilled. We have plans to drill it next year and when that occurs, it will tie this whole South Blanco together, and we do feel that this acreage of Northwest Production belongs in the South Blanco because of the reasons mentioned by Mr. Johnson, with the three dry holes segregating this from the Tapicito Field.

MR. PORTER: Anyone else have a statement?

MR. COOLEY: May I ask a question of Mr. Wiederkehr? Is it your recommendation that the Southern Union acreage just mentioned be included in the Pool at present or at some very near date in the future, or wait until it is drilled?

MR. WIEDERKEHR: I think there is no doubt that this is a common source of supply and actually, from our contours of the Pictured Cliff sands, this particular sand bar running northwest-southeast as the sand bars do in the area, that it is all one source of supply is no reason for not including it, unless it is just because it is not drilled. I think there is no doubt that it will be drilled, and to eliminate having to come back and do it again, it might as well be put in right now as far as we are concerned.

MR. COOLEY: Thank you.

MR. PORTER: Anything further in this case? We will take the case under advisement and we'll recess the meeting until 1:30.

(Recess.)

C E R T I F I C A T E

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 Proceedings before the New Mexico Oil Conservation Commission was reported by me in stenotype and reduced to typewritten transcript under my personal supervision, and that the same is a true and correct record to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal this day of October, 1957, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

NOTARY PUBLIC

My commission expires:

June 19, 1959.

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
October 24, 1957

TRANSCRIPT OF HEARING

CASE NO. 1330

DEARNLEY - MEIER & ASSOCIATES
INCORPORATED
GENERAL LAW REPORTERS
ALBUQUERQUE, NEW MEXICO
3-6691 5-9546

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
October 24, 1957

IN THE MATTER OF: Application of General American Oil Company of Texas for an order amending Order No. R-1058 concerning its pilot water flood project in the Grayburg-Jackson Pool in Eddy County, New Mexico.	CASE NO. 1300

BEFORE:
MR. DANIEL S. NUTTER, Examiner.

TRANSCRIPT OF HEARING

MR. NUTTER: Next case will be Case No. 1300.

MR. COOLEY: Case No. 1300. Application of General American Oil Company of Texas for an order amending Order No. R-1058 concerning its pilot water flood project in the Grayburg-Jackson Pool in Eddy County, New Mexico.

MR. CAMPBELL: Jack M. Campbell, Campbell and Russell, Roswell, New Mexico appearing on behalf of the applicant. I have one witness who needs to be sworn.

(Witness sworn)

MR. CAMPBELL: I'm sure the Examiner will recall the situation in this case; and this matter was presented to Mr. Nutter

at the original hearing and my application for authority to commence the pilot water flood included a statement of limitation on the amount of water to be injected in each well. That was carried forward into the notice and by virtue of that has to be carried forward into the order. The situation that I was afraid might occur has occurred and we are here to explain the necessity for the limitation being removed in order to complete the fill up of this pilot area within a reasonable period of time.

RAYMOND MILLER

having been first duly sworn, testifies as follows:

DIRECT EXAMINATION

BY MR. CAMPBELL:

Q Will you state your name, please?

A Raymond Miller.

Q Where do you live, Mr. Miller?

A Artesia, New Mexico.

Q By whom are you employed?

A General American Oil Company of Texas.

Q In what capacity?

A New Mexico District Engineer.

Q Have you testified before the Examiner of this Commission previously as an engineer?

A I have.

Q Are you acquainted with the order of the Commission

authorizing the commencement of a pilot water flood program in the Grayburg-Jackson cooperative area, unit area?

A I am.

Q Are you aware that that order contains a limitation of 400 barrels per day into each injection well authorized by the order?

A Yes, sir.

Q Has the pilot program, has it been commenced?

A It has, effective 2:00 P. M. October the 2nd, 1957.

Q Will you relate to the Examiner what you have experienced with regard to the capacity of the injection wells to take the water with that limitation?

A Yes, sir. We commenced it, as I said, on October the 2nd, and we started injecting in the four wells there, Burch 8A, 9A, 23A and 24A, and we, of course, experimented with various rates of flow and -- various rates of injection, I beg your pardon -- and we had a portable pump set up. And in two of the wells it required some pressure to inject water which was pumped into 8A and 9A, with 45 pounds surface pressure in 8 and 9, they would take from 100 to 125 barrels per day. The two south wells Burch A-23 and 24 would take up to 35 barrels an hour with from 22 to 24 inches vacuum at the surface. And, of course, this 35 barrel an hour if allowed to proceed for 24 hours would be some in excess of 800 barrels a day.

Q What will the rate be on the two north wells, you say about a 100 barrels a day?

A Yes, that is with 45 pounds surface pressure and we did experiment with up to 250 pounds surface pressure and they would take 250 to 300 barrels a day.

MR. NUTTER: How much?

A From 250 to 300 barrels a day.

MR. NUTTER: At what?

A At up to 250 pounds surface pressure.

Q At the time of the last hearing it was, there was testimony that you had approximately 2000 barrels per day of water available --

A Yes, sir.

Q -- in the area. What is the situation now with regard to the availability of water at this time?

A That volume has been increased to approximately 3200 barrels per day.

Q Where is that additional water being obtained?

A It is available from the Paddock zone and from the Grayburg-Kelly zone.

Q Has that additional water resulted in additional production from those zones?

A That is correct. And additional water-oil ratio in the Grayburg-Kelly zone.

estimated volume of water to be required to accomplish fill up of this pilot area?

A I have.

Q Would you recite to the Examiner what your general conclusions are about the total volume of water necessary?

A Yes, sir. It might be well to say here that in this reservoir there are no core data available, anything like that. But from use of radio activity logs, drillers logs and sample descriptions we have determined a net pay thickness necessary in these various wells and we also have calculated the reservoir space voided. And the, I have particular reference to now, to the area that is surrounded by the four injection wells, 8, 9, 23, and 24 in this area which consists of approximately 50.6 surface acres.

The accumulative production assignable to this area through July 31, 1957, was 514,072 barrels, this is per acre recovery, of 10, 160 barrels and on a per acre foot basis, and a 193 barrels from bottom hole sample analysis, recombined separator samples.

We have arrived at a formation volume factor in this reservoir of 1.235 so that makes the reservoir space voided in this area for the total area 634,879 barrels.

MR. NUTTER: That's for the area within the four injection wells?

A That is correct, sir. The 50.6 acres, per acre figure,

12,547 barrels per acre foot, 239 barrels. Maybe I should go back and say that this net pay thickness for the area averages 52.5 feet per well. And, of course, with the 50.6 acres total productive acre feet assigned is 2657. In so far as the estimated volume of water necessary to fill up this area, why, with our present knowledge of this reservoir, I believe we must have assumed radial distribution from each injection well, of the water injected. So in effect of the total water injected in these four wells only 25% will be effective water for this 50.6 acres. So, in other words, the total input volume of water to obtain a 100% fill up would be 2,539,516 barrels. Estimated volume of water that would be required to get the percentage fill up at which we might expect to obtain the first results, which I believe to be 60% of total fill up, this volume of water would be 1,523,710 barrels.

Q Now, Mr. Miller, have you made any calculations as to the length of time required to accomplish the fill up to which you refer by various input amounts in the input wells?

A I have.

Q And have you tabulated that?

A I have.

MR. CAMPBELL: I'm going to ask her to mark this and we'll put it in record with all these figures so the Examiner will have that.

MR. COOLEY: Exhibit 1?

MR. CAMPBELL: Exhibit 1, just use both pages, they are both the same type.

MR. NUTTER: This is the same case number we had before.

MR. COOLEY: Call it Exhibit 1A.

MR. CAMPBELL: Yes.

(Marked Applicant's Exhibit 1A.)

Q Do you anticipate that the amount of water available to you will increase somewhat as you go along with your pilot flood and during the fill up period?

A I believe it is quite likely to, yes.

Q You will get additional water production from these zones that you referred to as your source of water?

A We will.

MR. CAMPBELL: I believe that's all the questions I have.

MR. NUTTER: Mr. Miller, on your Exhibit 1A --

A Yes.

MR. NUTTER: -- in this column on the second page marked daily input rate in barrels --

A Yes.

MR. NUTTER: -- is that the total for the four wells?

A Yes, sir.

MR. NUTTER: So at the current --

MR. CAMPBELL: 2000 barrels.

MR. NUTTER: -- rate of injection it would take you approximately -- that 2000 includes that on the current rate of injection which is in the order on the other case 1300 -- would take 31 months to achieve 60% fill up?

MR. COOLEY: If they take it.

MR. NUTTER: If the water went into all the wells equally?

A That is right. Well, we would, I mean but we would be limited to the top amount under the order, as I understand it.

MR. CAMPBELL: In each well.

A Yes.

MR. NUTTER: Does anyone have a question of the witness?

MR. COOLEY: Yes.

BY MR. COOLEY:

Q What maximum limit would you suggest, Mr. Miller?

A Well, if the Commission would like to put a limit on it I would suggest it would be on a reservoir basis. In other words, so many barrels of effective injected water per acre feet of productive pay.

Q Effective barrel is four actual barrels, is that what you mean?

A Well, I mean we must have a sum that in this case I believe, until we know more about the area. Of course, that will be determined with the pilot flood.

Q If this pilot flood is expanded take to any field-wide or area-wide flood your rate of effective water useage would increase considerably, would it not?

A Yes, sir. That's -- you mean for instance if, around one of these injection wells, if we would move it either eastward or westward or something like that.

Q If your flood extended back from this area, say a mile or so, then this, three-fourths of this water that's being injected right now is being lost as far as the present flood is concerned, however, it is filling up reservoir space on away from the --

A That is correct.

Q -- flood?

A In other words, but it would, then you would have more productive acre feet to figure in your calculations, yes, sir.

MR. CAMPBELL: May I inquire here, I have been a little at a loss, what types of maximums has the Commission put in previous orders. Have there been any others on pilot programs, has there been any in any previous case?

MR. NUTTER: I believe in certain cases there have been, Mr. Campbell. There have been injection rates for so many hundred barrels per well included in previous orders on pilot floods, I'm sure.

MR. CAMPBELL: In some they do and some they don't, is that it?

MR. NUTTER: That's true. Mr. Miller, this in no wise, this application today will in no-wise change the order that was entered in the previous case, being Order R-1058, in so far as the allowables for the unit --

A It will not.

MR. NUTTER: -- and assignment of the allowables to the unit are concerned?

A No, sir, it will not.

MR. NUTTER: Are there any other questions of Mr. Miller?

BY MR. COOLEY:

Q It is your preference, Mr. Miller, that no limit be placed upon the amount of water that can be injected during the fill up period?

A Well, we are limited in the amount of water available to us. Actually we do not have enough water available right now to get what we consider desirable injection rates in this particular area.

Q Even the 3200 acres total available water is not --

A Not in my estimation, no, sir.

MR. NUTTER: Mr. Miller, is the desire of General American Oil Company to have these unrestricted rates of injection more to achieve a quick fill up or what are your principal aims here, Mr. Miller, are you interested in getting this effective 60% fill up --

A Yes.

Q -- more rapidly, is that your desire in unrestricted water flooding?

A That is correct. And it is our belief that the most effective floods operate up to one barrel of effective water injection per acre foot of pay. The history of our company indicates that that is a desirable rate.

MR. COOLEY: You talking about production stage or the fill up stage?

A Fill up stage, initial fill up. In other words, injection rates would have to be varied undoubtedly after initial fill up, but at least for this initial fill up in the pilot stage, we would like to be able to inject up to 1 barrel per acre, productive acre foot.

MR. COOLEY: Is that your opinion, that the ultimate rate of production is in no way connected with the initial rate of fill up?

A Well, I don't believe I'm qualified to answer that question. I haven't had too much experience in water flooding. I don't believe I can answer that question, Mr. Cooley.

MR. CAMPBELL: I expect maybe we'll get some of these answers Monday.

MR. NUTTER: Any further questions of the witness?

by MR. UTZ:

Q How much water would it take to achieve your one barrel per productive acre?

A For this 50.6 acres it would take 10,600 barrels a day.

MR. UTZ: That's all I have.

MR. COOLEY: With the present available water it will take nearly three years to get your 60% fill up?

A Well, with the present available water it will take about sixteen months. With the present limitations of 1600 barrels per day it would take thirty-one months approximately.

MR. NUTTER: What do you consider the capacity to take of the four wells mentioned, the Burch 8, 9, 23, 24?

A Well --

MR. NUTTER: I thought you said top of about a 125, maybe 200 under extreme pressure on the 8 and 9, and 800 per day on the 23 and 24?

A No, that 8 and 9 would take a 100 to 125 at 45 pounds surface pressure and, of course, that's one thing if we are not limited to 100 barrels per day we could then order our pumps and motors and everything to go on up to a higher pressure and higher injection.

MR. NUTTER: Phrase the question this way. Do you feel you can inject the 3200 barrels of available water?

A I believe we can, yes, sir.

MR. NUTTER: Through the four wells?

A Yes, sir.

MR. NUTTER: Any further questions of the witness? If not, he may be excused. Does anyone have anything they wish to offer in Case 1300 at this time.

(Witness excused)

MR. CAMPBELL: Just show that I offered this Exhibit 1A, please.

MR. NUTTER: Without objection Exhibit No. 1A will be received in this case. If nothing further, we will take the case under advisement, and the hearing is adjourned.

STATE OF NEW MEXICO)
: ss
COUNTY OF BERNALILLO)

I, MARIANNA MEIER, 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 in Stenotype and reduced to typewritten transcript by me and/or under my personal supervision; that same is a true and correct record to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal this, the day of November, 1957, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Marianna Meier
NOTARY PUBLIC

My Commission Expires:

April 8, 1960.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 330, heard by me on 10-24, 1957.

Daniel S. Nutter, Examiner
New Mexico Oil Conservation Commission