Gulf Oil Corporation

EXPLORATION AND PRODUCTION DEPARTMENT—U. S. OPERATIONS
ROSWELL DISTRICT

T. W. Kidd
DISTRICT MANAGER
M. I. Taylor
DISTRICT PRODUCTION MANAGER
F. O. Mortlock
DISTRICT EXPLORATION MANAGER
H. A. Rankin
DISTRICT SERVICES MANAGER

P. O. Drawer 1938
Roswell, New Mexico 88201

May 20, 1968

Secretary Director
Oil Conservation Commission
State of New Mexico
Post Office Box 2088
Santa Fe, New Mexico 87501

Re: Application of George L. Buckles Company (Case No. 3772, May 22, 1968) For Three Waterflood Projects in The Langlie Mattix Pool, Lea County, New Mexico

Dear Sir:

Gulf is operator of the Stuart Langlie Mattix Unit, located in Sections 2, 10 and 11 of T-25-S, R-37-E, Lea County, New Mexico. This Unit offsets much of the Langlie Mattix Pool property for which George L. Buckles Company has recently made application to the Oil Conservation Commission for authority to institute three waterflood projects in this Pool.

We have discussed the development plans of these projects with the Buckles Company and concur with their injection pattern and lease line drilling locations. The Unit plans to cooperate with the proposed projects and has secured tentative approval of a line well agreement.

Yours very truly,

M. I. Taylor

LCS:sz

cc: George L. Buckles Company
Post Office Box 56
Monahans, Texas 79756

'68 MAY 21 AM 8 58

Gulf

George L. Buckles Company
OIL PRODUCTION
CONSULTANTS - OPERATORS
Monahans, Texas 79756
P. O. BOX 56
PHONE 943-2755

July 11, 1968

'68 JUL 12 AM 8 24

Mr. A. L. Porter, Jr.
Secretary-Director
New Mexico Oil Conservation Commission
P. O. Box 2088
Santa Fe, New Mexico 87501

Re: Commission Order No. R-3426
George L. Buckles Company
Langlie-Mattix Waterflood Projects

Dear Mr. Porter:

In your letter to Mr. Jason Kellahin dated June 17, 1968 regarding the Commission's approval of Order No. 4-3426, you outlined procedures to be followed in drilling and completing water injection wells with reference to casing and cementing practices.

We are in agreement with all of these requirements with the possible exception of the use of a DV tool in the long casing string to be set at the top of the salt section at an approximate depth of 1,300 feet from the surface and the subsequent cementing through the tool with a minimum of 50 sacks. The alternative to setting the DV tool was to cement behind the long casing string to the top of the Rustler formation at an approximate depth of 1,050 feet from the surface. The purpose of this extra cementing job was to prevent possible contamination of the upper fresh water sands with Rustler water and to prevent possible entry of this water into oil or gas formations below the salt section. We are convinced that our proposed casing and cementing program, coupled with our continued surveilance after completion, will adequately protect all porous formations from contact with Rustler water.

Our injection wells are to be drilled from top to bottom with cable tools. This practice enables us to log all porous formations encountered and to identify any fluid contained in these formations. It also enables us to drill a straight hole, which would be important when a well is drilled close to a lease property line.

Ever since we have operated in this area, we have pioneered methods to

Mr. A. L. Porter, Jr.
Santa Fe, New Mexico

protect the fresh water formations. In all of the wells we have drilled surface casing was set through all fresh water sands, even though in some cases this amounted to 700 feet of pipe while only 250 feet was required.

Our experience in this area indicates that if we set surface casing through the Rustler formation we would be unable to cement to the surface behind the pipe. Therefore, we set 8-5/8" casing below all fresh water sands at approximately 700 feet and circulate cement to the surface using 500 sacks of cement. This casing will protect these sands from any contamination for the life of the flood. At abandonment, a cement plug will be set in the 8-5/8" casing at the bottom and the top.

In drilling ahead through the 8-5/8" casing, the Rustler water zone is encountered between 1,200 and 1,300 feet. In order to drill in a dry hole below the Rustler, we run an intermediate string of 7" casing and set in anhydrite at approximately 1,300 feet. This string is not cemented and is pulled after the long casing string (4-1/2" OD) is cemented. The well is drilled through the 7" casing to total depth and then the 4-1/2" casing is set in a dolomite zone immediately above the first oil pay zone in the Queen formation and cemented with sufficient cement to come above the Yates formation. Thus the Yates, Seven Rivers and Queen formations are protected with cement behind the 4-1/2" casing and the upper fresh water sands are protected by the cement behind the 8-5/8" casing.

It is noted that we cannot cement behind the 4-1/2" casing to the top of the Rustler formation because our 7" intermediate casing string is set below the Rustler formation. Finally, we believe it highly unlikely, if not impossible, to cement off the Rustler formation through a DV tool in a cable tool drilled well.

We have calculated that the added cost to us for the installation of the DV tool, including equipment, cementing and rig time, would approximate $2,000.00 per well. Since we plan to drill seventeen new injection wells in this project, the added cost to us would be considerable.

Since we keep daily records of injection pressure and volume for each well during the life of the flood, we would readily detect any casing leaks and remedial measures would be instigated at once. Our plan is to keep an

Mr. A. L. Porter, Jr.
Santa Fe, New Mexico

inert fluid between the tubing and 4-1/2" casing and between the 8-5/8" and 4-1/2" casing strings. In our opinion the Rustler water in this area is non-corrosive unless it comes into contact with oxygen. This latter cannot happen with the fluid we will place between the 8-5/8" and 4-1/2" casing strings.

In view of the above, we respectfully request the elimination of the added cement job as outlined in your letter.

Enclosed is a plat showing the area of our flood projects colored in yellow and a drawing showing the well completion practice as it relates to casing and cementing requirements.

Yours very truly,

George L. Buckles

GLB/b

Enclosure - Plats

cc - Mr. Joe Ramey
Oil Conservation Commission
Hobbs, New Mexico 88240

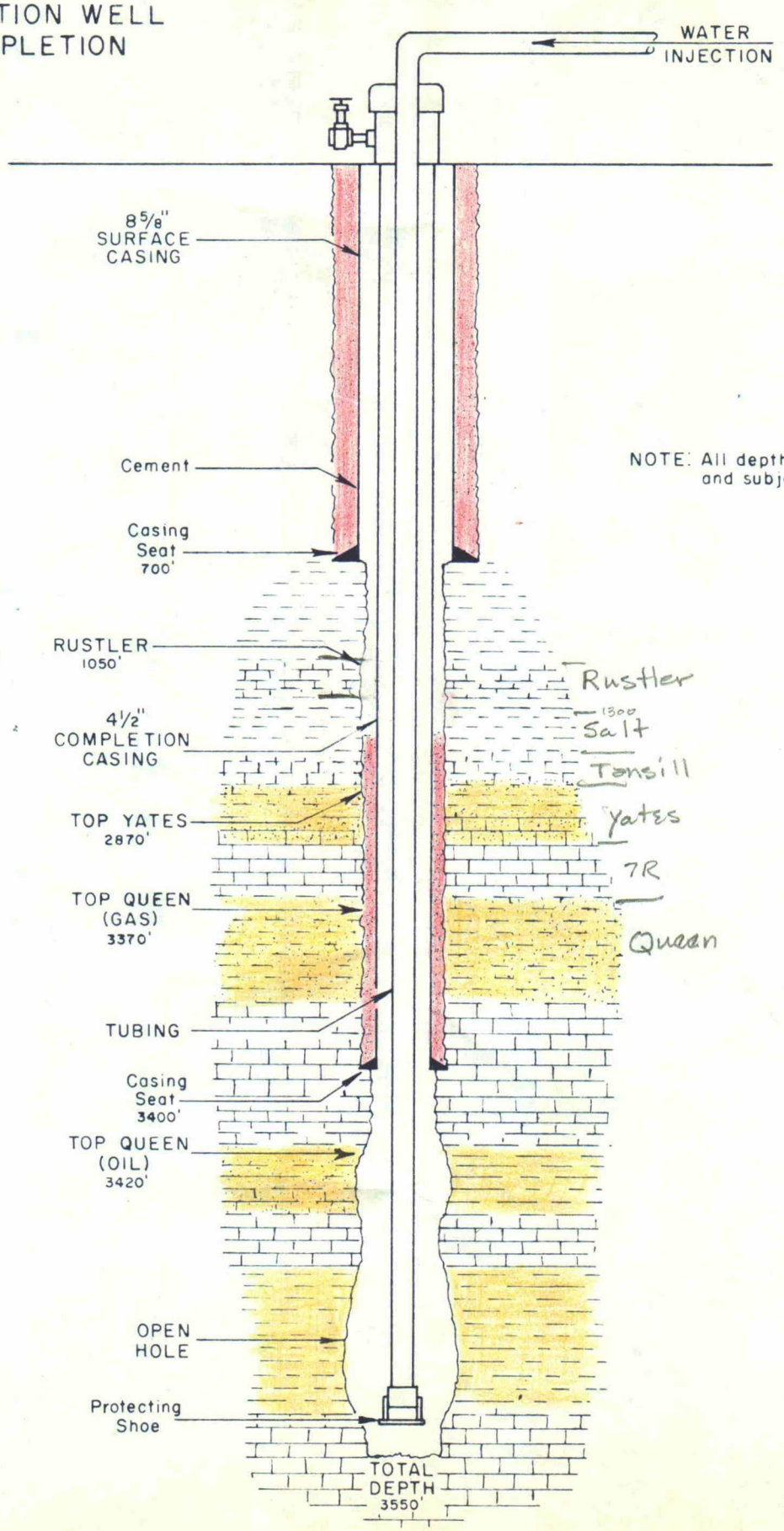
Mr. Jason Kellahin
P. O. Box 1769
Santa Fe, New Mexico 87501

Prepared By:
GEORGE L. BUCKLES CO.

GEORGE L. BUCKLES COMPANY LEASES
1420 ACRES MORE OR LESS
LANGLIE-MATTIX FIELD

TWP. 25 SOUTH,
RANGE 37 EAST,
LEA COUNTY, NEW MEX.

TYPICAL INJECTION WELL COMPLETION



NOTE: All depths approximated and subject to change.

Prepared By:
GEORGE L. BUCKLES CO.

Memo

6/3

From
D. S. NUTTER
CHIEF ENGINEER

To Joe Lamey -

Here's the diagrammatic on Geo. Buckles proposed water injection wells.

As you can see, 8 5/8" surface pipe will be set & circulated from about 700' which is supposed to be deep enough to case off all fresh water.

Then they will drill to the base of the Rustler and mud-in 7" intermediate.

Then they will drill to about 3400' and run 4½" and cmt w/ 100-125 sxs. The calculated fillup is to ~~2650~~ 2500' to 700', which would place the top of cmt @ 2650 to 2900 or just above or just below

the top of the Yates. After cmt has set 36 hrs. they propose to pull the 7".

Some of the mud from the 7" may face down to the top of the cmt but for the most part the 4½" will be exposed to those corrosive Rustler waters from maybe 700 ~~to~~ 2900.

Do you think this is adequate or should we specify more cement on the long string?

Memo

From

J. D. Ramey, Supervisor &
Oil & Gas Inspector

To Dan Nutter:

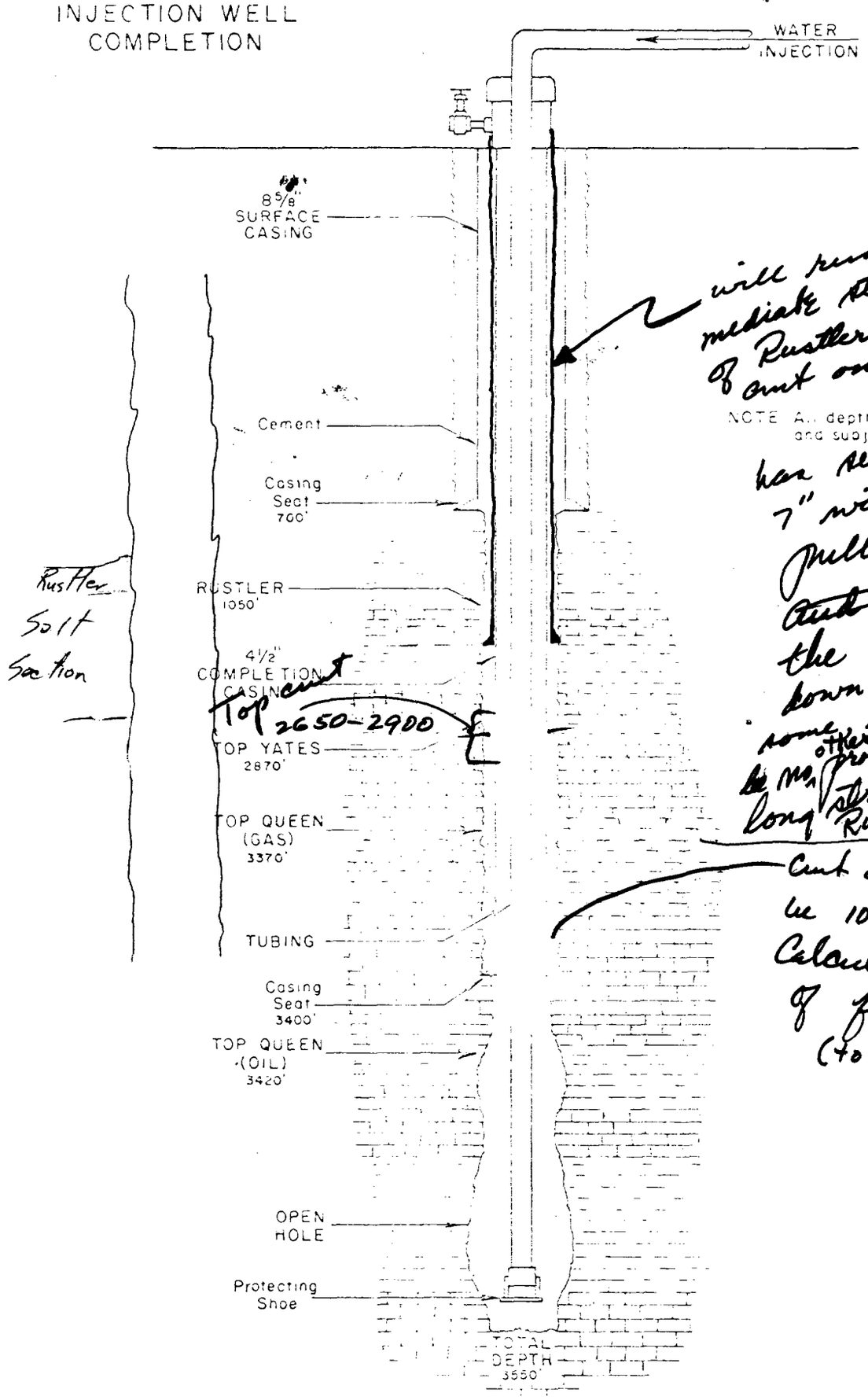
I would recommend giving them a choice of either bringing cement from bottom of casing over the Rustler or utilizing a DV tool @ top of salt & cementing through DV tool with 50 sacks.

This will not only protect the csg. from Rustler water, but will also keep the Rustler water off the

Salt section.

The Rustler is apparently a good aquifer in this area & the waters should be confined in the Rustler.

TYPICAL INJECTION WELL COMPLETION



Prepared By
GEORGE L BUCKLES CO.

Case 3772

OIL CONSERVATION COMMISSION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

July 11, 1968

COPY

Mr. Jason Kellahin
Kellahin & Fox
Attorneys at Law
Post Office Box 1769
Santa Fe, New Mexico

Dear Sir:

Reference is made to your letter of July 2, 1968, inquiring as to the maximum allowable assigned to George L. Buckles Compamy south project in our letter of June 17, 1968. This project, with two others, was authorized by Commission Order No. R-3426 dated June 5, 1968.

The correct maximum allowable for this project (when the Southeast New Mexico normal unit allowable is 42 bopd or less) should be 210 barrels. This is based on 42 barrels for each of the four 40-acre tracts and 14 barrels apiece for each of the three extra wells in the project area.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/DSN/ir

cc: Oil Conservation Commission - Hobbs, New Mexico
U. S. Geological Survey - Roswell, New Mexico

KELLAHIN AND FOX
ATTORNEYS AT LAW
54½ EAST SAN FRANCISCO STREET
POST OFFICE BOX 1769
SANTA FE, NEW MEXICO 87501

JASON W. KELLAHIN
ROBERT E. FOX

TELEPHONE 982-4315
AREA CODE 505

July 2,1968

New Mexico Oil Conservation Commission
Post Office Box 2088
Santa Fe, New Mexico

Re: George L. Buckles Company
Langlie-Mattix Pool Waterflood Projects
Order R-3426

Gentlemen:

In connection with the above order approving three waterflood projects for the Queen Sand of the Langlie-Mattix Pool, it would appear that in your letter of June 17, giving the Commission's calculation of the allowable to be assigned, no credit was given for any injection wells on the south project, located in Section 22, Township 25 South, Range 37 East.

The calculation appears to be based solely on the four producing wells on this project. Upon completion there will be three injection wells, which under Rule 701 E 3 would give one additional unit allowable for the project, or a minimum of 42 barrels.

If you are in agreement with this, would you please give us a letter to that effect.

Yours very truly,

Jason W. Kellahin

JASON W. KELLAHIN

jwk;peg
cc Mr. George L. Buckles

68 JUL 3

OIL CONSERVATION COMMISSION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

June 17, 1968

Mr. Jason Kellahin
Kellahin & Fox
Attorneys at Law
Post Office Box 1769
Santa Fe, New Mexico

Dear Sir:

Reference is made to Commission Order No. R-3426, recently entered in Case No. 3772, approving three waterflood projects for George L. Buckles Company.

Injection is to be through tubing in each of the 21 authorized water injection wells, with the casing-tubing annulus loaded with a hydrostatically-balanced column of inert fluid and equipped with a pressure gauge.

Sufficient surface casing (700 feet minimum) shall be used to case off all fresh water-bearing formations.

In cementing the long string, operator shall either bring the cement up from the casing shoe to the top of the Rustler formation or shall use a DV tool at the top of the salt section and cement around the shoe with at least 100-125 sacks of cement and through the DV tool with a minimum of 50 sacks.

As to allowable, each of the leases in each of the project areas must stand on its own insofar as production is concerned except where the leases have identical ownership throughout (working interest, overriding royalty interest, and royalty interest.)

Transfer of allowable <u>within</u> a project area will be permitted if, pursuant to Order No. (2) of Commission Order No. R-3426, all parties owning interests in the various leases within the project area have agreed to the transfer and to the means of allocating production within the project area.

OIL CONSERVATION COMMISSION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

Mr. Jason Kellahin
Kellahin & Fox
Attorneys at Law
Santa Fe, New Mexico

June 17, 1968

As to the allowable itself, our calculations indicate that when all of the authorized injection wells have been placed on active injection, the maximum allowable which the North Project will be eligible to receive under the provisions of Rule 701-E-3 is 868 barrels per day when the Southeast New Mexico normal unit allowable is 42 barrels per day or less. The maximum allowable for the Center Project is 672 barrels and the maximum for the South Project is 168 barrels.

Please report any error in this calculated maximum allowable immediately, both to the Santa Fe office of the Commission and the appropriate district proration office.

In order that the allowable assigned to the project may be kept current, and in order that the operator may fully benefit from the allowable provisions of Rule 701, it behooves him to promptly notify both of the aforementioned Commission offices by letter of any change in the status of wells in the project area, i.e., when active injection commences, when additional injection or producing wells are drilled, when additional wells are acquired through purchase or unitization, when wells have received a response to water injection, etc.

Your cooperation in keeping the Commission so informed as to the status of the project and the wells therein will be appreciated.

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

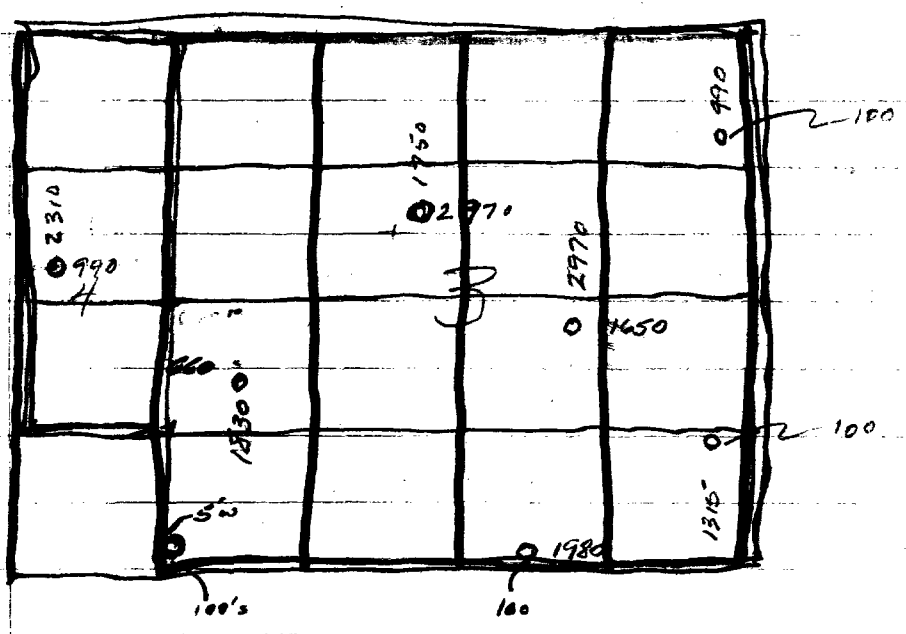
ALP/DSN/ir

cc: Oil Conservation Commission
Hobbs, New Mexico

U. S. Geological Survey
Hobbs, New Mexico

Mr. D. E. Gray
State Engineer Office
Capitol Building
Santa Fe, New Mexico

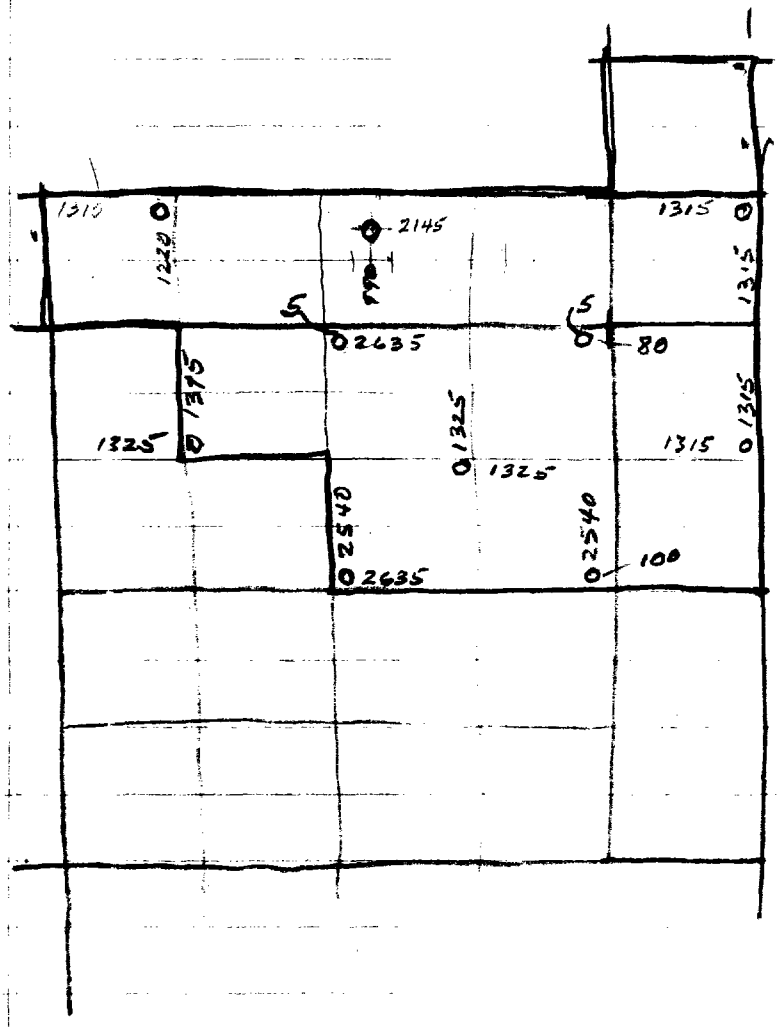
8



A, F, J, L
M, O, & P
See 3

H See 4

10



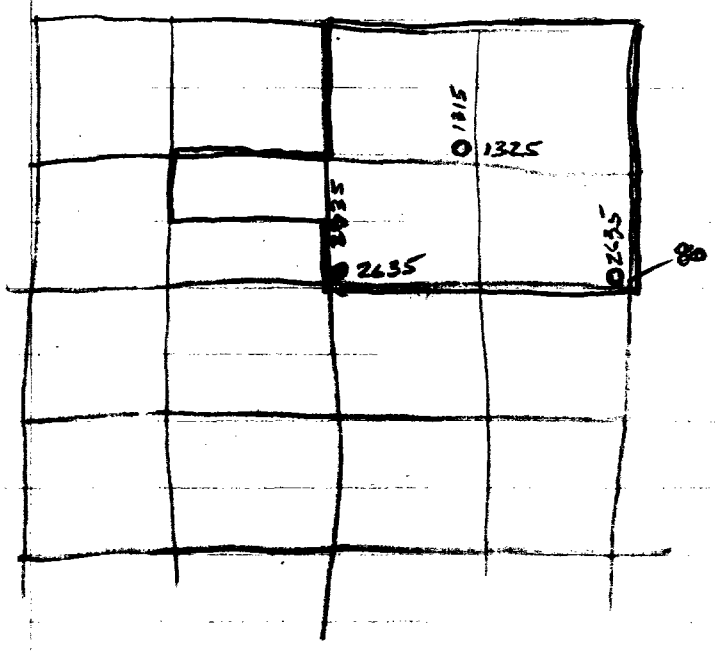
M & O
See 10

M See 11

D See 14

A, B, C, G & H
See 15

3



B, G & H
See 22

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
May 22, 1968

EXAMINER HEARING

IN THE MATTER OF:

Application of George L. Buckles Company for three waterflood projects, Lea County, New Mexico.

Case No. 3772

BEFORE: Daniel S. Nutter, Examiner

TRANSCRIPT OF HEARING

MR. NUTTER: We will call Case 3772.

MR. HATCH: Application of George L. Buckles Company for three waterflood projects, Lea County, New Mexico.

MR. KELLAHIN: If the Examiner please, Jason Kellahin, Kellahin and Fox, Santa Fe, representing the applicant. We have one witness.

(Witness sworn.)

(Whereupon, Exhibits 1 through 5 were marked for identification.)

ROBERT ORR

called as a witness, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Would you state your name, please?

A Robert Orr.

Q By whom are you employed, Mr. Orr?

A George L. Buckles Company.

Q What is your position with George L. Buckles Company?

A Vice President.

Q Mr. Orr, have you ever testified before the Oil

Conservation Commission?

A No, sir.

Q For the benefit of the Examiner, would you give a summary of your education and qualifications?

A Yes, sir. I have a B. S. Degree in petroleum engineering from the University of Texas and I am licensed to practice engineering in Texas and am registered in Texas. I served for two years as production engineer for Gulf Oil Corporation and I was employed by Mr. Buckles and have been employed by him for the past fourteen years doing various engineering assignments with the company and specializing in secondary recovery in West Texas and Southeast New Mexico.

Q In connection with your work for George L. Buckles Company do you do work in the State of New Mexico?

A Yes, I do.

Q Did you have anything to do with the waterflood projects which are the subject matter of Case 3772?

A Yes.

Q Did you do the engineering on those projects?

A Yes, I did, and I am familiar with the area.

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

MR. NUTTER: They are.

Q (By Mr. Kellahin) Briefly stated, what does George Buckles propose in Case 3772?

A At the present time we have a successful flood operating in the Langlie-Mattix field and it's our proposal at this time to develop the remainder of our leases in the Langlie-Mattix field, place them under water injection in cooperation with our offset operators, and try to recover the maximum amount of remaining oil in the reservoir that we can.

Q Does the project consist of three separate tracts at the present time?

A Yes, they do.

Q And the acreage you have under waterflood, where is it located?

A It's located in all of Section 3 and parts of Section 4, 10, 11, 14, 15 and 22 of Township 25 South, Range 37 East in Lea County, New Mexico, and is generally located in the south end of the Langlie-Mattix field.

Q Your other waterflood project is also in the Langlie-Mattix field, is it not?

A It is.

Q Is it located to the north of this area?

A It's located in Section 22, Township 24 South, Range 37 East.

Q Has that been a successful waterflood?

A Yes.

Q Referring to what has been marked as Exhibit 1, would you identify that exhibit, please?

A Yes. This is an exhibit that shows the zone that we anticipate flooding, which is the Queen Sand oil zone, and it has a list of all of the leases showing the acreage, the number of wells currently located on the properties, the cumulative production to 4-1-68, and the average barrels per day per well. It shows that we have 1,460 acres in these three proposed projects with 36 existing wells, and an average barrel per day of production for March 1968 of 87.1, and a cumulative production to 4-1-1968 of 3,734,334 barrels. The current production is 2.3 barrels of oil per day per well and 1.5 barrels of water per day per well, which, in our opinion, is in the final stages of stripper primary production. The gas volumes are small throughout the leases.

Q And you say this is an advance stage of depletion?

A It is.

Q Referring to what has been marked as Exhibit No. 2, would you identify that exhibit?

A This is a plat showing the proposed injection well locations and plan of operation for the three floods, and it

shows also the pattern for the offset operators; the Amerada Langlie-Mattix Woolworth Unit is located on the north end of our properties, the Gulf Stuart Langlie-Mattix Unit is located between the center of the two north properties and this is the plat that shows the proposed injection well program at this time and the cooperation between the various operators in this end of the field.

Q Is the Amerada Woolworth Unit presently under waterflood?

A Yes.

Q Do you have a line agreement with Amerada?

A We have one that we're in the talking stage at this time.

Q You are working on one?

A Yes.

Q Is the Gulf Langlie-Mattix Unit an underwater flood?

A No, it is not.

Q You indicate on Exhibit 2, injection wells that are on the Gulf acreage; is this in accordance with an agreement entered into with Gulf?

A Yes. We have rough draft of agreements with Gulf and we have agreed to these locations and the ones that are shown on our lease and the ones that are shown on our lease

are the ones that we will drill as line wells.

Q That will give a uniform injection pattern throughout the area, is this correct?

A Yes.

Q Is this a type of pattern that you have found successful in the Queen formation?

A Yes. And we have line wells on our successful flood in the wells to the north with the Langlie-Mattix Woolworth Unit and with three other operators in that area, and it is performing successfully and protecting the lease lines.

Q This area involved in Case Number 3772 is not unitized, is it?

A It is not.

Q Referring to what has been marked as Exhibit No. 3, will you identify that exhibit?

A Yes. This is a description of each of the individual leases located in this area and then a description of each injection well, those that will be converted to water injection, and also a description of the wells that will be drilled.

Q You give the location of the injection wells, do you not?

A Yes.

Q Some of the locations appearing on that tabulation, as originally drafted, were 1320 feet. Have you changed those?

A Yes.

Q Would you point out the specific changes that have been made, Mr. Orr?

A We, in an attempt to drill the line wells and cooperate with our offset operators, agreed to drill wells in certain places and these came at the center of the lease lines, and some of these fell in or right on the center of two proration units, and we propose to move these five feet so that they will fall within the proration unit. One of the changes is the Fristoe lease on the proposed injection well, that should be 1315 feet from the South Line and 100 feet from the East Line of Section 3.

Another is on Stuart Tract No. 5 lease. The proposed injection well should be 1315 feet from the North Line and 1315 feet from the West Line, and then on page 3, the center well shown for Tract 9 should be 1325 feet from the North Line and 1325 feet from the East Line of Section 15; the only wells, I believe, fall within an individual proration unit.

Q Some of the individual tracts will not have producing wells on them, is that correct?

A There is one tract that at the present time has a

producing gas well but is not producing from the Queen oil zone.

Q Is that the Stuart Tract No. 8?

A Yes, sir.

Q Do you plan to drill a well on that to produce from the oil zone?

A Yes. Gulf Stuart Unit, they will drill a well on the west side of the unit, and at the time that that well is drilled we'll determine where we shall drill a producing well in Tract 8 and possibly another injection well to back up that lease.

MR. NUTTER: That Tract 8, that is the Southwest Quarter, Southwest Quarter of Section 10?

THE WITNESS: Yes, sir.

MR. NUTTER: You will have a producing well on that?

THE WITNESS: Yes. We have an agreement and option with the -- We don't own the gas rights to enter the gas well that's shown on that lease and complete it in the Queen oil zone, but since we're working out the line agreement with Gulf and they have asked that we drill a well in that corner, it appears that that proposed location is too close to the injection well and we would want to move back on the lease and drill an oil well which we would probably require an injection

well on the west side of Tract 8.

Q (By Mr. Kellahin) All of the owners of interest underlying the Buckles waterflood projects share in the production from the project?

A Yes.

Q Now, referring to what has been marked as Exhibit No. 4, would you identify that exhibit?

A Yes. This is a well log, a typical well log, and we picked Smith Well No. 4, which is located on the north tract, and it was a well that we felt was typical in that area. We have marked on this log the starting from the surface where we are setting surface pipe, which is the minimum depth of 700 feet. It shows the -- We're drilling these wells with cable tools and it shows the temporary oil string set through the Rustler formation at approximately thirteen to fourteen hundred feet. It shows the top of the Yates at approximately 2850 to 2900 feet; then the top of the Queen gas at approximately 3350 feet, and the top of the Queen oil just below 3400 feet. Also the casing seat at the top of the Queen Oil Zone and the wells are completed open hole and drilled to approximate total depth of 3550.

Q Now, referring to what has been marked as Exhibit No. 5, will you discuss that exhibit?

A Yes. This is a typical injection well completion as we propose to complete these wells. It shows some similar information that is shown on the log and a sketch of the tubing and casing that will be located in the well, and also the total depth and the method of injection that we'll use, which is with the tubing set very close to bottom within two or three feet and injection through the tubing.

Q You do not use a packer in this type of completion, is that right?

A That is correct. We clean up our well by reversing the flow and any cavings or sand that might be located in the bottom of the well are reversed to the surface and to a disposal pit to keep the well clean so we can have uniform injection across the Queen pay zone.

Q Have you used this same type of completion in your other Langlie-Mattix flood?

A Yes, we're currently using it in our other flood.

Q Have you found that by reversing the flow and cleaning up the well you have a successful operation?

A Yes.

Q You show the surface string at approximately 700 feet on that exhibit, is that correct?

A That is correct.

Q What is the reason for setting surface string at that depth?

A This is where we feel is the bottom of the fresh water zone in that area.

Q Will that surface string be cemented to the surface?

A It is cemented to the surface and we have circulated cement on all the wells we have drilled.

Q Will that adequately, in your opinion, protect any fresh water zones encountered in the well bore?

A Yes. As I stated earlier, we drilled these wells with cable tools and we feel that when we drill out from under the surface casing we don't, in only one well did we find any fresh water below the surface casing, and in that well we went back and ran a liner through the zone where we found some additional fresh water.

Q What volumes of water do you anticipate you will inject in the wells in this project?

A Our proposal is to initially inject 300 barrels a day per well and then as the flood progresses, to allow the pressures to dictate the performance.

Q Will you reinject produced water?

A Yes, we will, and plan to do it from the beginning.

Q What will your source of water be for this project

other than your produced water?

A We have water rights at this time pending before the State Engineer.

Q You mean you have an application?

A We have an application for water rights pending before the State Engineer.

Q It has not been heard?

A No, it has not.

Q In the event that the application were denied by the State Engineer, do you have any alternative?

A Yes, there are commercial water sources in the area and then there is a possibility of some water at a depth of about 5,000 feet, so there are two other sources of water that we could use should these water rights be denied.

Q Is the water at a depth of 5,000 feet a brackish water?

A Yes, it is.

Q And would not come under the jurisdiction of the State Engineer under the present law?

A That is my understanding.

Q Were Exhibits 1 through 5 prepared by you or under your supervision?

A Yes, they were.

MR. KELLAHIN: At this time I offer in evidence Exhibits 1 through 5, inclusive.

MR. NUTTER: Applicant's Exhibits 1 through 5 will be admitted in evidence.

(Whereupon, Exhibits 1 through 5 were offered and admitted in evidence.)

Q (By Mr. Kellahin) Do you have anything further to add, Mr. Orr?

A Only that we feel that this is, the secondary recovery project of this type is the essence of conservation and prevention of waste and that these leases are currently being operated at an economic loss and that we feel that by injecting water in this reservoir that we will produce at least an equivalent to the primary production that has already been produced in this area.

Q Has that been indicated in any other waterflood project in the Langlie-Mattix?

A It has been. And also by the permanent expansion of the Amerada Langlie-Mattix Woolworth waterflood.

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

CROSS EXAMINATION

BY MR. NUTTER:

Q Is there any means in this type of completion

that you can determine if water is escaping around your casing shoe and coming back up the hole?

A Yes, there is. We read the pressures daily on the well and we leave the bradenhead open so we can check to see if there is any communication in the well. We watch the pressure performance very closely on our wells, and as I testified, we let the pressure dictate rates to us more than we do volumes, and on this basis we are pressure conscious and any change in pressure brings immediate study by our engineering staff.

Q Do you attempt in this type of completion to load the annulus between the casing and the tubing with a hydrostatically balanced head of inert water?

A Yes, we do.

Q Then you do leave the bradenhead open after that, then?

A I am speaking of the bradenhead on the back side of the surface casing to see that we don't have any communication behind the surface pipe. But the bradenhead is closed on the long string.

Q In other words, your casing tubing annulus is closed?

A That is correct. And we do read the pressure on

that casing tubing annulus as is dictated by the pressure on the tubing. In other words, if we see any change at all we start watching the annular pressures also. The two are related.

Q In the course of drilling the well you run this temporary string down through the Rustler, correct?

A That is correct.

Q Where is your setting point for that casing on Exhibit No. 5? Where could I make a mark to show where you set that?

A I believe you'll find it is marked on there at about 1520 feet.

Q Well, on the log. I mean on Exhibit 5 where would it be?

A The top of the Rustler is shown on there at 1,050 feet, which is the top of the Rustler, and then you would show it just below that point and on this typical log it's at 1320 feet, so we actually set through the Rustler and shut the water off with our temporary string.

Q At what point, then, do you pull that casing?

A We usually run the long string and cement it and then wait 36 to 48 hours and then turn the long string loose and pull the seven-inch, strip it out over the 4-1/2-inch casing.

Q How much cement do you use in your 4-1/2-inch?

A It varies between 100 and 125 sacks, and on the hole size that we're drilling, this calculates to be about five to seven hundred fifty feet of fill-up.

Q 500 to 750 feet?

A Yes.

Q Do you run a temperature log to find out the top of the cement?

A No, we don't. Since we have a cable tool on the hole and the hole is dry, we go in and drill out the cement and test the hole and after we pull the string and dump the water behind the four and a half, if we don't have water in the hole we assume we have a shut-off.

Q You pour water in outside the four and a half?

A When we pull the seven-inch we drop the water behind the four and a half, if it doesn't come around the casing shoe we make the assumption that we don't have a leak.

Q Then you do circulate cement on that 700 feet of surface pipe?

A Yes. By turning the 4-1/2-inch loose in the hole, we are putting the whole weight on the cement, and if we didn't have a cement job, it should fall in the bottom since we are about a hundred feet or so off the bottom.

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

MR. SMITH: I am more or less interested in this case, they are operating on my fee land. I'd like to ask some questions, get some things more or less clarified in this.

CROSS EXAMINATION

BY MR. SMITH:

Q Isn't it a fact that when you started the flood in this area that you were speaking of, of Sections 21 and 22, that you started the flood with the Rustler water?

A Yes, we did.

Q And that is very saline water?

A Well, it's not very saline. We submitted water analysis at that time.

Q Isn't that water corrosive?

A I don't know whether it is or not, because we always coat a hundred percent of everything we put in so we didn't have any corrosion problems during the time that we operate.

Q What happened to the pump that you took out?

A The one we pulled out sanded up. What we actually did, we actually lost our Rustler capacity to produce and we pulled the well down and it caved in on us and we drilled

a second Rustler water well and we, between two wells, didn't get sufficient water to flood with.

Q How high does that water stand in that well?

A At the time, the Static fluid level will come in at about 300 feet.

Q I know, but how high up will it rise?

A It will rise to within 300 feet of the surface.

Q And you drilled it at what depth?

A 900 feet.

Q Is there not about 750 feet of water standing in that hole?

A Yes.

Q Has it ever been plugged?

A No.

Q How long has it been there?

A About three years.

Q Now, this well that you spoke of about this setting this pipe and then you had to set a liner because of more fresh water, where did that stray fresh water come from?

A That was on the Humphrey "A" 8, and we found that, I don't have the exact surfact casing setting on that well, but let's assume that it was, say, 750 feet. When we drilled out, we went 125 feet and got additional water and it was

fresh water when we tested it. We ran a liner in the Well No. 8 and set it through the zone. If you remember, it almost burned us out on setting that much surface pipe because we ended up having a big fishing job.

Q I realize you have done pretty good to protect the fresh water. The point is, isn't this Humphrey, doesn't that join Township 26?

A Yes, it does.

Q And it was stated this morning that they set pipe at three hundred some odd feet, there was no pressure water below that. But Bob is right on the pressure water. They did drill and they know where the fresh waters are.

There's one other question I want to ask here. There are other waters besides that, what they call Santa Rosa, is that what you consider you are using the water to flood with?

A No. For our present waterflood?

Q Yes.

A No. We are considering that what I call that surface sand and gravel or recent formation. It's my opinion that it is above the Santa Rosa.

Q What is the depth of the wells you are flooding?

A About 125 to 150 feet.

Q That you are flooding with there on Section 22?

A Right.

Q You would consider that Ogallala water?

A Well, if it is above the Santa Rosa we call it surface sand and gravel. Now, whether it is Ogallala, I don't know. I am not a hydrologist, so I don't know what that is. We have tried to find this same water in some other places and haven't found it.

Q You have told me something I really didn't know. I thought you were using out of the Santa Rosa water. I understood from some information I picked up the other day that this is true, what you are telling me this morning. Isn't it true that those wells within the short distance of my water well there, not a quarter of a mile --

A Yes, I was going to say probably 1500 feet, yes.

Q Where do they set the casing in those water wells up there?

A We set a few feet, I am going to say 50 feet of what I call surface casing.

Q What is a few feet?

A I would say 50 feet. We could submit that for the record. We set a little pipe and cemented it and then drilled a well to total depth and set a string of casing to total depth

and gravel packed it. In other words, it is not cemented.

Q The next question is, are you considering taking this water for this other waterflood project, what depths are you going to get your water there? You said you were figuring on using fresh water.

A Our application is for wells to 500 feet, which in my opinion is Santa Rosa.

Q You found some water below the 700-foot casing?

A Yes. We found water over well below 700 feet in the Rustler. Some areas we found just a little bit of water and others we got what I call a hole full of water.

Q Did you find any different depths of water in drilling that Humphrey down there? I mean 60 or 70 feet and then three and four hundred, 500, 400 and in there.

A Yes. We found what we called sand and gravels through there but we didn't test each individual zone. Once we got water, all we had to go on was the driller's log to see that we either had more water or we thought we had more water just from the performance.

Q The point I am trying to establish, I am getting some facts here, did you consider these different waters, separate waters?

A I think that from the performance of the water

wells that I have seen on our properties and the zones that we drilled and tested with the cable tool, that they are separate zones. In other words, I think that where we, for example, are getting our fresh water at the present time, that you could even set casing there and cement it and then drill on to 700 feet and you would get additional water, and it's our opinion that that's the Santa Rosa.

Q You say the Santa Rosa, if it is 500 below?

A I don't know. I don't know whether anybody does or not.

MR. NUTTER: How deep do the surface sands and gravels go?

THE WITNESS: We found fresh water to 700 feet.

MR. NUTTER: In sand and gravels?

THE WITNESS: Yes.

MR. NUTTER: Are they continuous on down or red beds in there?

THE WITNESS: There are red beds in between and shale breaks also.

MR. NUTTER: Where the Santa Rosa starts and the surface sand and gravel stop, you don't know?

THE WITNESS: No, I'm not a hydrologist and we have talked to a number of them. There seemed to be some question

about where the definite division in these waters is.

MR. NUTTER: Is there a change in the quality of the water at any particular point?

THE WITNESS: Only the very shallow waters which have some slight contamination, I mean by that, we just found them to be dirty, what we call dirty, from just regular surface drilling, but after at least a few feet we can't tell the difference in the quality of the water until you go to the Rustler formation, which would be some place below this seven or eight hundred feet.

MR. NUTTER: What is a typical parts per million of chlorides in the lower water since 500 to 700?

THE WITNESS: Less than 500.

MR. NUTTER: And then the Rustler water is, it is brine?

THE WITNESS: Well, no, it's not a brine. It is brackish, but it's not a brine. The only way we found it to be a brine is when part of the well bore was open to some of the salt section in the hole, when you leave the Rustler you go right into the salt and if you drill on down into the salt section and start producing, then you do get a brine water, but it's my opinion that the water, by passing over the salt section, becomes a brine and it is not a brine as such in the

natural state in the formation.

MR. NUTTER: What is going to be the effect on these wells of having this Rustler water come into the annulus there down to the top of the cement?

THE WITNESS: That is why we are setting surface pipe to seven or eight hundred feet instead of the 250 feet as required by the State.

MR. NUTTER: It's not going to go any place if it goes up the hole?

THE WITNESS: Yes.

MR. NUTTER: What it is going to do down here, is going to have a detrimental effect on the casing?

THE WITNESS: No, the salt sections are open and this water would also become stagnant in the whole annular space.

MR. NUTTER: There is no mud in the annular space?

THE WITNESS: No, only what we drop with the seven-inch casing when we pull it. We drop that mud in the hole when we pull it and it is in the annular space, but where it is and how much it fills up, we could possibly calculate it but I am not prepared to say at this time.

MR. NUTTER: Did you have anything more?

MR. SMITH: No, I am not through. I have quite a little to go.

Q (By Mr. Smith) All the other waters that you hit above what we consider the Santa Rosa water, do you hit it one place and then another place you don't hit?

A That has been our experience.

Q We don't know because no one has seen it?

A We don't know.

Q I think you know these things, and I think they should be presented --

MR. KELLAHIN: We have no objection to the questions but it's really a matter for the State Engineer in regard to the water supply, and not the Oil Commission. We have no objection to Mr. Smith asking questions, --

MR. SMITH: Well, okay. I am lost, Mr. Kellahin, on what the real facts are down there. I'm trying to find out some of them for my own protection.

Q (By Mr. Smith) This Rustler water, do you find it in all the wells that you drill?

A We did, but we found it to be more prolific in some areas than we did others. We tried to test it in quite a few wells but to use it as a water source for our waterflood, it's our opinion that there's not sufficient quantity of water where we are for waterflood.

Q Well, the Shell has found over there they are

flooding out at that.

MR. SMITH: Now, Mr. Kellahin, the reason I am asking these questions, I have asked the questions of the State Engineer and he doesn't know, and this man does. I think this is important to the oil and gas people. I think it should be important to the State Engineer.

Q (By Mr. Smith) You more or less said this morning that you and Amerada were more or less working together on this thing?

A Yes, as well as with Gulf cooperating between us.

Q I have no objection to that whatever. The thing is, Amerada, and I want to get this before the Commission, and you can check the facts, what I believe don't amount to anything, the facts are, the Amerada is using the Santa Rosa water. When you hit this water at 500 feet down, how much sand there is in this Santa Rosa that you consider Santa Rosa water?

A No, but our well records are probably on file with the Commission and it could be checked.

Q It can be checked?

A You can check to see how much it is.

Q I know that this is water sand from 500 down and we don't know the facts on it, but we have established that fact. We established the fact that Shell is flooding out supposed to

be Rustler water. I don't know if that's a fact either, but that's what it is, brackish water there.

A I am not familiar with their well completion.

Q On drilling these wells, you don't know how far back up you set that cement comes back up in the hole from the bottom of your Queen, which is the Queen formation, when you run cement back? I'd say it might come back to your surface pipe after you pull that intermediate string, or whatever you call it there, in the Rustler water. You are not sure that that cement comes back to the surface?

A No. We haven't run any temperature survey. Purely by calculating the volume.

Q I think the rest of the companies are doing the same thing, more or less. I don't think there's any use of me to say anything further to the oil and gas people. They should know the story on that. Have you had any channeling problems from one well to the other from this flood unit there on Sections 21 and 2?

A Yes. In Section 22 we had what we thought was a pretty direct communication between an injection well and a producer and channeled in the formation, and we went in and squeezed cemented the well and then drilled a cement out, and it is, in our opinion, successfully taking water at this time.

Q I think there will be one more question. Do you know that Capitan Reef water would be available to you to use in that vicinity?

A Well, we have correspondence in our file from people that have it available for sale, that is, that they would like to sell us the water. But we don't have a firm contract, no.

Q Are you anticipating going to this water, San Andres water, which I think is Capitan Reef, I don't know if it is and I doubt if anybody else knows? Let's ask this question first: Do you have a permit from the State Engineer to use the water?

A You mean the 5,000-foot water?

Q No, you don't have to have that.

A No. Our application is pending for water wells and water rights on these three --

Q You have not had any hearing on that?

A No.

Q Whether you can have it or not?

A Right.

Q There was one other question. The water that you have been using there, have you paid the said rancher, J. J. Smith, any money on that for the use of it?

A None.

Q He hasn't received anything. Our water situation in New Mexico is atrocious. It is a fact that people south of us in Texas do receive benefits from the water used on them.

A I might state this for the record: We have never paid for any water that was located on the lease used for waterflooding in Texas or New Mexico.

Q I never give you permission to use it, did I?

A No. We have paid you for water that we have used for drilling.

Q That's right. We have gotten off pretty nicely until right here lately and you were dirty out there. I don't know what we're going to do about that. This pit situation, I don't know what's going to be done about that. I know we have laws or regulations or agreements, I don't know if there is anything set on that that the pits will be done away. I know you oil companies are raising the roof for running that stuff out on us. I am talking about the State Land Commission people and the Federal people should look at this morning and see what they're sitting up here not doing, it's pitiful. They are getting paid to do it. Our land is being polluted and ruined, hundreds of acres of it. Our fresh water is being

polluted by the wells and they know it, well after well down there; besides, they are using it up. We just don't have much that's what we are up here for. I was born in New Mexico, my people homesteaded down there, I would like for this fellow -- I have asked too many questions probably. I don't believe I have asked any unreasonable questions. I am trying, not for me, but for the County of Lea, and I can't understand what people think down there, but it's certainly exciting. Mr. Cooper might have something. He could tell you something about the cement jobs. He could really tell you about what goes on, what has gone on down there and without supervision.

MR. NUTTER: Would you like to make some remarks, Mr. Cooper?

THE WITNESS: In the fresh water that we have drilled, we haven't seen any evidence of contamination on our leases. The waterflood that we put in in Section 22, when we put in the flood, even though we weren't producing more than just a few barrels a day of water, we put in a disposal system at the time we installed our water injection system and we propose to do the same thing here.

MR. NUTTER: I think you mentioned that you would reinject produced water even in the initial stages here so you won't be going to pits with this water --

THE WITNESS: That is correct.

Q (By Mr. Smith) Have you noticed any depreciation in the fresh water that you use, or not?

A No, we have not. We make fluid tests on the wells and the drawdown is the same that it was when we initially started using the water, and the buildup. The time to build back to the same point is the same as when we first started. We feel like this is a pretty prolific water source, where it comes from I can't say.

MR. SMITH: That's their contention and I guess that our problems will be settled between the State water Engineer. You oil and gas people, what would you have to do with this?

MR. NUTTER: We don't have a thing to do with the supply of water, Mr. Smith, except, the only thing we have to do with is that it's our obligation to see that the casing and cementing programs are such to protect the water. We have nothing to do with the allocation or use of it.

MR. SMITH: I called the oil and gas on this water. Amerada was drilling and they were going to set pipe at 250. I objected. We had quite a little confusion over the thing. Then an oil and gas people told me that they were going to cement that bottom. Well, they start out with what they call

a tubing job. They just put tubing and no casing. They wound up putting four or five-inch casing in and they were going to cement back to 2400 feet, which left that all open from -- But we wound up on this by -- You people, are you the oil and gas or are you just -- what part do you play?

MR. NUTTER: I was on the phone with Mr. Porter when we were talking to you. They circulated cement back into the surface pipe --

MR. SMITH: You sent a man down there with the understanding that they would set casing below the water, is that right?

MR. NUTTER: Well, the cement was to come back up into the surface pipe.

MR. SMITH: I know, but from now on, set casing below the water as Mr. Buckles does and most of the other companies. I found that a lot of those people are setting and doing this thing that I objected to. This well that Pan American has just completed, that's going 10,000 feet. .They set at 320 feet surface and set more pipe at forty-two something, I think. They circulated cement back up, they put 1100 sacks in so they don't know where that cement came to and they left open hole.

Here's the thing I want to tell you, they have lost

circulation ever since they set surface pipe. I am doing this for the benefit of everyone concerned. If you killed me over there tomorrow nobody would know any different. If they kill Lea County --

MR. NUTTER: We are just trying to get the facts.

MR. SMITH: I am trying to state facts. I think I have taken sufficient time. I don't think that I need to paint any other pictures, I think you see them all. This fellow might could tell you something that could --

MR. COOPER: I am Fred Cooper from Jal. I don't know that I have a lot to add to that but I would like to ask the Commission to deny this request to the Buckles Oil Company if at all possible until they -- In other words, unless they agree to use the saline water from some other source. This is available there in big quantities. In fact, we gave permission for right-of-way across land so that it would be available. We gave it with one reason, a right-of-way for a saline line to get and encourage the oil companies to use it instead of using our fresh water. We do have a real problem there.

I would like to bring out one other thought there, that is, a lot of people will tell you that the water that the oil companies use produce more taxes than a farmer, which I

will agree, but at the same time we can live without the oil and gas because the people did for many hundreds of years, but we can't live without the food, so looking beyond our lifetime and to our grandchildren and for the development of Lea County, we all need to really consider our fresh water there, because it is precious. We don't have irrigation water. It's very precious.

I just want to put that in, that I asked the Commission to deny it unless they do agree to use saline water. To give you an idea of what I am talking about, here's an example, for example, making one slice of bread requires 37 gallons of water. To produce one pound of beef it takes 3,750. Now, this gets back possibly on your side that you can take this water and produce more taxes from the oil industry, which you can, because it takes a tremendous lot of water. 3,750 gallons to grow one ton of alfalfa. But without our foodstuff and without our product, you can't get along of anything.

This fresh water right down below or in this fellow's flood area, Johnny McOwens has just informed us that his well has gone dry, and it is depleting, whether his records show that it is or is not, it is depleting. The man's own stock water right there at his house has gone dry, Johnny

McOwens on the Stuart lease. It's a fact that it is depleting down there. I ask that they agree to use saline water.

MR. SMITH: One other little addition to his. This would be better for the State Engineer. I am pumping water two mile for my stock use now and to water a few flowers in the yard at my home now on account of the depletion of that water that Buckles is using. I didn't really know this was for sure or I might have thrown a lot more fits than I have thrown. I just make it barely for the house use for the wells that I have there. I have two, and, of course, I don't think that Buckles may be depleting this over there where I am pumping this water to because it's another source, some other people. It's the same water, it's Ogallala water.

There are other things, of course, I think we have taken enough of your time and we thank you for listening to us and anything you do for us or any advice you can give us, we would appreciate it because we are in trouble in Lea County if something is not done.

MR. NUTTER: We appreciate your attendance and your comments. Do you have anything further, Mr. Kellahin?

MR. KELLAHIN: There should be a letter from Gulf Oil Corporation in the file in support of this application,

is there not?

MR. NUTTER: I think it's on my desk.

MR. KELLAHIN: You have received a letter from them?

MR. NUTTER: I received a letter from Gulf. It's on my desk.

MR. KELLAHIN: The only thing that I have to say in connection with statements made by Mr. Smith and Mr. Cooper, this is the first time, I believe, that a land owner has appeared here before the Commission in connection with these waterflood projects and I think it's a very healthy and wholesome thing that they have come to present their side of the case. I would observe, however, in connection with Mr. Cooper's request that the application be denied unless Buckles agrees to use saline waters, I would like to point out that under the laws of the State of New Mexico, both constitution law and statutory, the waters of the State of New Mexico are public waters subject to appropriation for beneficial use. There is an application pending before the State Engineer in connection with this waterflood project. We have mentioned two other sources of water that are available. I don't think it would be a proper exercise of the authority of the Oil Conservation Commission to specify what water is to be used because this is peculiarly under

the jurisdiction of the State Engineer and not the Oil Conservation Commission.

MR. SMITH: In answer to what he said there, we have been over here a little over a year ago and I know little. I stated that the water they received there would get above this 2500-foot water would come under the State Engineer. Am I correct in that statement?

MR. KELLAHIN: That would be my opinion.

MR. SMITH: We can discuss it a long, long -- I understand Mr. Cooper wasn't probably quite as familiar with the law that has been passed as I am, because he wasn't up here as much as I was. You are correct on that, Mr. Kellahin.

MR. NUTTER: Anything further in Case 3772? We'll take the case under advisement.

I N D E X

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 June, 1968.

Ada Dearnley
NOTARY PUBLIC

My Commission Expires:
June 19, 1971.

I do hereby certify that the foregoing is a com[illegible]
the [illegible] 3772
heard [illegible] 5/22 1968
[signature]
New Mexico Oil Conservation Commission