MEXICO

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CASE NO.

7599

APPLICATION,

TRANSCRIPTS,

SMALL EXHIBITS,

ETC.

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
9-7 June 1982

EXAMINER HEARING

IN THE MATTER OF:

Application of Barber Oil, Inc., for an exception of Rule 705-A, Eddy County, New Mexico.

CASE 7599

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division:

W. Perry Pearce, Esq.
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant:

MR. STAMETS: We'll call first Case 7599.

MR. PEARCE: That is the application of Barber Oil, Incorporated, for an exception to Rule 705-A, Eddy County, New Mexico.

MR. STAMETS: At the request of the applicant this case will be continued until the July 21st Examiner Hearing.

(Hearing concluded.)

CERTIFICATE

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd CSR

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 7599, heard by me on 6-9 19 82

Richard L. Stamets, Examiner
Oil Conservation Division

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
21 July 1982

EXAMINER HEARING

IN THE MATTER OF:

Application of Barber Oil, Inc., for an exception to Rule 705-A, Eddy County, New Mexico. CASE 7599

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: W. Perry Pearce, Esq.
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: George H. Hunker, Jr.
HUNKER, FEDRIC P. A.
P. O. Box 1837
Roswell, New Mexico 88201

I N D E X

E X H I B I T S

MR. NUTTER: Call Case Number 7599.

MR. PEARCE: That is the application of Barber Oil, Inc., for an exception to Rule 705-A, Eddy County, New Mexico.

MR. HUNKER: I am George H. Hunker, Junior, Hunker, Fedric, P. A., Roswell, New Mexico, appearing on behalf of Barber Oil, Inc.

I have two witnesses that I'd like to have sworn.

(Witnesses sworn.)

MR. NUTTER: We'll resume with Case Number 7599.

ROBERT S. LIGHT

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. HUNKER:

Q Mr. Light, for the record will you identify yourself, giving your name and address and occupation?

A I'm Robert S. Light, Post Office Box 1658,

Carlsbad, New Mexico. I'm President of Barber Oil, Incorporated.

Q. Is Barber Oil, Inc., fully qualified to conduct oil and gas operations on Federal, State, and fee lands in the State of New Mexico?

A. Barber Oil, Inc., has been in operation as a corporation since 1958, and prior to that in a partnership since approximately 1942.

Q. And you are qualified in every respect to do business in New Mexico, is that correct?

A. We feel that we're highly qualified and have met every requirement of the law.

Q. The bonds included, is that correct?

A. Yes, all of our bonds are in good order.

Q. I'd like for you briefly this morning to give the Examiner the history of your own personal involvement in connection with the Russell Pool from the time you became acquainted with it, down to the present time, Mr. Light.

A. Would you prefer that I stand because people might --

Q. Please, go ahead.

A. I came to New Mexico in 1952 with Continental Oil Company and I was with their geophysical division as their seismologist.

I'm a graduate electrical engineer and I was three years with Continental Oil in geophysical work.

Upon arriving in Carlsbad, doing Continental's work, I met my wife, who is the daughter of Neil H. Wills. We were married a year later and I joined him in business shortly thereafter and he was an independent producer at that time, having operated in the Eddy County area.

And as a background of history of this particular property, this is the Russell Pool of Eddy County, and it's located in Township 20 South, Range 28 East. It's a pool that has no offsetting operators. We have 100 percent of the production in this property. The pool is a Yates Sand, the Permian age. It's approximately 850 feet deep and it is drilled on five acre spacing.

Now, each one of these wells represent an 850-foot hole originally, and the yellow exhibit and the green are the wells in question. They're the 37 wells that we've been asked to plug and abandon --

Q And that --

A -- or set a bridge plug or protect the -- whatever potable water might be available.

Q Then you're familiar with the application that's been filed on behalf of Barber Oil in connection with matter, is that correct?

A. That is correct.

Q. And what is the purpose of that application?

A. Well, the purpose of that application is the protection of fresh water, drinkable water, any water that might be potable in the area, and in our opinion, because, since in a section of this field, and we have a camp right here, we have a house and a man's been living there since inception, which, this field was actually first produced in 1942. The first well was drilled in 1942 and it was the Wills No. 1, that well right there.

MR. NUTTER: Mr. Wills, where is the camp, right near the Well No. 1?

A. Yes, it's right here.

MR. NUTTER: Now, the record won't show where "right here" is.

A. Yeah.

MR. NUTTER: Describe the location, please.

A. I would say it's located, the road -- I didn't put the road on here, Mr. Nutter.

MR. NUTTER: Near a well.

A. But as you come through with the road and the camp would be right here, and I would say it's right close to No. 10-X.

MR. NUTTER: South of 10-X there?

A. I would say south of 10-X. I don't have it located on there.

MR. NUTTER: Okay.

A. It's never been of real importance. The house is there. We moved it out there and the man's been living there since inception.

Q. Referring to what's been marked Applicant's Exhibit Number One, will you identify on that exhibit the wells that are used for water injection?

A. All right. The water injection wells on this exhibit, which is before you, as well as this one, are the darkened, the locations with a circle around it, and they are, according to the legend, are the injection wells of the pool.

Now, they're also on this map the ones without any color on them. These are the present injection wells, and the yellow ones, which are also circled here, are the wells in question.

The green ones are the wells under re-operation at this time. We're working those over at this time.

Q. What do you mean by reworking, Mr. Light?

A. Well, for instance, this well which is right next to the road as you enter the property --

Q. Identify --

A. -- just had a new packer set in it and new tubing.

Q. And identify it, if you will.

A. This would be Well T-21. T-21 is the old Turner lease, which we call T-21.

Q. And the other four wells in the northern part of the map?

A. They're the Wills Wells 5, 22, 23, and 24.

Q. What's the nature of the workover that you're performing on those wells?

A. All the wells are getting the same work-over. There'll be packers set with new tubing down to just above the producing formation.

Q. And they will be used again as injection wells , is that correct?

A. Oh, yes, they'll be returned to injection.

Q. What wells shown on this exhibit are the presently producing wells?

A. The producing wells are the ones shown in black.

Q. On the exhibit that's been marked Number One they are uncolored, is that correct? They're simply the --

A. They're also the black wells on Number One, according to its legend. The legend on this sheet which

I have presented to you as an exhibit is accurate. That is exactly like this one and set out according to the legend.

The colors merely indicate those that are in question at this time.

Q. In connection with that same exhibit, I notice that a well designated as C-3, as NO. 31, and as No. 24 --

A. 31 is this one; 24 is that one.

Q. -- and as Numbers 1, 1, and 2, down in Section 24, those are what?

A. Those are dry holes defining the property.

Q. And they were dry and not productive in the Russell pay, is that correct?

A. That is correct.

Q. You referred to the pay as being the Yates pay. Describe the nature of that, of that pay.

A. The Yates pay is at a depth of 850 feet. It's approximately 20 feet in thickness, varied throughout the field from 10 to 20 feet. It's a round grained sand of Permian age and very susceptible to flooding.

Q. How long have these wells been drilled for the most part, Mr. Light?

A. Well, the initial well was drilled in 1942, and the initial wellsdrilled by Wills and Turner were

completed in about 1948. There's about a six year drilling program.

Then it was put into a gas repressuring system, was installed in approximately 1949, and shortly thereafter a consideration was given to a waterflooding operation, which was given serious consideration in 1952, and initiated in 1953 with additional drilling.

Then it was -- some more drilling was done in approximately 1962 and brought up to the present number of wells, which are 69 wells in the field.

Q. The company made an application in March for an exception to Rule 705. What was the result of that application?

A. Well, we asked, based on the fact that we felt all of these wells are viable for our future use, we asked an exception to that ruling, 705-A, based on the fact that we felt there is no danger to any surface fresh water; drinking water would not be endangered with this property.

We have hauled our water for drinking purposes ever since we put a man in the field, which was at the inception of the property. We haul all of our drinking water and we pick it up over at the potash mines, which is approximately six miles away.

They have access to the Caprock water,

which is a very high quality water, and they give the water to any oil property -- any oil producer that would like to come to their property and pick it up. We haul it on our own truck, and have for forty years.

MR. NUTTER: Do you have a water well at the camp there?

A. Yes, we do have a water well at the camp, approximately sixty feet.

MR. NUTTER: And what is that water used for?

A. We use that in the house for washing, bathing, and also we use it for some watering the grass.

MR. NUTTER: What kind of water is it?

A. Well, it's very gyppy and not drinkable. It is not drinkable.

Q. You don't use that water in the waterflood project?

A. Oh, no. No, the quality is -- the quality is bad and there's no quantity to it. There's not enough quantity to flood there.

So our flooding water initially, even though now we're re-injecting water, all produced water, our flooding water came from two wells in the Capitan Reef, which is just underneath our Russell pay, and it is also poor

quality but a large quantity.

Q. By poor quality, what do you mean, Mr. Light?

A. Oh, it has sulphur in it. It has hydrogen sulphide in it. It's brackish. It's high mineral content and a high sulphur. It is not usable water except for purposes of this type.

Q. About how deep are those wells in which you obtain that water?

A. Well, our Russell pay is at 850 and the Capitan Reef would be 100 feet, approximately 100 feet under that. This well is, I think, drilled at 950. I don't have that exact depth, but it's probably 100 feet under the Russell pay.

Q. In connection with the application that the company prepared, did you furnish the Commission at that time with schematic drawings of each of the wells that -- that the Commission asked you to either submit set bridge plugs in?

A. We did.

Q. And the --

A. The first letter requesting a variance, or an exception to the rule, they fired right back and said you must supply us with an individual well schematic, which

we provided for them on -- returned to them on March 1st, and we do have an exhibit --

MR. HUNKER: Mr. Examiner, I have not marked this as an exhibit, but your records will reflect that there has been furnished to the Commission a schematic drawing of each of the 37 wells that the Commission has asked be submitted or that bridge plugs be set in.

MR. NUTTER: Now these were filed with the letter for administrative --

MR. HUNKER: That's correct.

MR. NUTTER: -- approval.

MR. HUNKER: We didn't think it was necessary to submit another official exhibit, but I'd like for you to have it in this case.

MR. NUTTER: All right. It's not in this particular file so I'm glad to have it here.

Q. In connection with these 37 wells, what are your plans for either secondary or tertiary recovery, Mr. Light?

A. Well, we work closely with the engineering firm, Stevens Engineering out of Wichita Falls. They have from inception been the engineers on this property from the time gas repressuring was put in. They designed and -- we built it but they designed the waterflood property to begin

with, the injection system, and they are still on retainer with us and we have an excellent set of records throughout the years of what's happened to this property, and they still look after it.

Now, what we're interested in is preserving this property for tertiary or some enhanced recovery, something that will produce more oil. We know that well over 60 percent of the oil is still in place, and when we have a property that is drilled in this pattern, I feel it is to our benefit to retain the wells for trying to recover as much of that 60 percent of oil in place as we can, and it's important to us, we consider all of these wells viable, even though not in use, but we feel they're viable to the future production of this property.

We hope to recover a portion of some 60 percent of the oil still in place. When we have produced primary some 800,000 barrels of oil; we've produced secondary approximately 15 -- 1,500,000 barrels of oil, for a total of 2,300,000 barrels of oil, and we feel that there's well in excess of 3,000,000 still underground and quite a bit of it to be recovered through a tertiary or enhanced program.

Now we have just agreed through the recommendation of our engineers to go into a surfactant injection program, which we tried on a very limited basis years ago.

We felt like that a surfactant, which will allow you to inject a certain type of soap into your injection water -- detergent, let's call it a detergent, not really a soap -- it's a detergent, and it will let the sand release its oil a little better and as a result, the oil will flow.

Now, we didn't do this but for about a six months period, and we saw very little, if any, increase in production, so we just quit doing it. It was -- had some expense attached to it, not very expensive, but some expense.

Now, it has been proven in another property that Stevens Engineering looks after, that this is a successful program, and we plan to initiate the program of surfactant injection into this area.

Q Are there other possibilities for the use of these 37 holes?

A There -- there is definitely one other possibility. It's one of those, I would call it almost a wildcat, but it has some merit.

There is a well down here that does not produce --

Q Identify the area that you're talking about.

A All right. This is Section -- let me identify this entirely.

This is Section 13, and because of trying to get this as enlarged as I could, and this is to scale, one inch equals 200 feet on this map -- on this plat, and Section 13 would come over here, approximately, and go down here and back. That would be one square mile.

Now, in the cornering section, Section 23, 660 from the north and east, is the Sudderth and Hicks Well that was drilled into the Capitan Reef limestone, and it is a producing well of approximately seven barrels a day. Now it's not a prolific well but it certainly has economic capability.

At the time it was drilled it has questionable economic capability because oil was very cheap in those days. And these three wells were drilled at that same time this one was drilled and they were plugged as noncommercial.

Q. Those are the wells in Section --

A. Or did they have --

Q. Those are the wells in Section 34, is that correct?

A. These are the wells in 24.

Q. 24, excuse me.

A. This well is in Section 23. They're offset wells to this one. And this well in particular had a free oil show. It's the one I have the records on. I do not

have records on this well. It was not drilled by us. It was a different lease at that time.

But this is all part, now, this property here, as well as this, is part of a consolidated Federal oil and gas lease, Las Cruces 050797. It contains 1200 acres. We have the rights to 1200 feet and Cities Service owns the rights below 1200 feet.

Cities Service has in turn drilled a Morrow test in the north half of this section with, to my knowledge, and I'm not familiar with the well because we have nothing but a royalty interest in it; the north half is communitized, and it is the north half of Section 13.

They also have two Morrow wells in Section 14, and there is the north half and the south half in Section 14.

This well is particularly poor in the Morrow. The Government R and the Government T in Section 14 are both better wells, and they're Morrow wells at an approximate depth of 13,000 feet.

Q And your company owns none of the leasehold rights below 1200 feet, is that correct?

A That is correct.

Q So if these wells were deepened, they would be deepened only to as deep as 1200 feet, is that cor-

rect?

A. Right. And we contend there's the possibility of deepening these wells into this lime formation, which would be another 150 feet, and our rights go to 1200. We retained those rights. We had all rights but sold out everything below 1200 to Cities.

Q. In the thirty years that you have supervised the operation of this particular pool, has any damage been done to any drinking water or to any drinking water zone?

A. No. In my opinion, no, sir, has any damage been done to any shallow waters. We have found -- in our opinion, no damage has been done to any shallow waters above the pay, and of course, the wells only go down to the Capitan Reef and, of course, we don't penetrate that in this field.

Q. In your opinion is there a continuing need for these wells to be kept as they are, unplugged and uncemented?

A. Well, economically there is -- they're viable to our operation. If we plug them it may be the end to even thinking of a tertiary program. It doesn't necessarily sign its death warrant but it certainly doesn't help.

We feel they are viable to a future use, even if it's deepening into another formation.

Q. Do you have anything else to add, Mr. Light,

with regard to this exhibit or with regard to your knowledge of this particular area?

A. I think the area, being close to Carlsbad, has some significance to me. Of course, it has a lot of feeling to me. It was a field that my father-in-law, who is deceased now, he died two months ago, discovered in 1942, and it's been something that we have enjoyed working with. It's something that is kind of part of the company, and I just hate to see it terminated in any way, and we'd like to continue producing it, and in the interests of conservation we feel that there's a lot of oil in place, that we can get it out if we have time and the economics prove capable to do it.

MR. HUNKER: I have no other questions at this time of this witness.

MR. NUTTER: Are there any questions of Mr. Light? Mr. Simpson?

QUESTIONS BY MR. SIMPSON:

Q. You say there's no drinking water to be affected or can be affected.

Are you aware that the Oil Conservation Division has responsibility of protecting all waters of 10,000 milligrams, or less, total dissolved solids?

A. I am aware of that. In fact I read the --

the directive from the Federal government, there regulations where you were assigned that duty last November, I believe it was, when you took on the duty to do that on behalf of the Federal government. This is a Federal oil and gas lease, that's true.

Q. All right. You say in your -- you testified, I think, or you stated that to your knowledge no wells have polluted or caused any harm to the drinking water down there.

A. Well, there is no drinking water. We haul all of our drinking water.

Q. Well, we consider potable water anything -- not potable water, but water we have to protect with 10,000 milligrams or less of solids. Now for conceivable use, you have stock use, and you said that there's been no damage. What we would like to have shown here, or you had proved, that nothing has deteriorated in these decked wells and affected that zone, but it still has use for stock.

A. Well, there's no stock watering in this area. Now, there's a -- we do have a lagoon-type, which is under the Bureau's permission, we have a lagoon located at our water plant, and that is located just south of T-16, and we have a fresh water lagoon that we pump water from this well into it. Now it is a sulphur water and after standing awhile, why it will lose its hydrogen sulphide content, just

from aeration, and we do find that even that water, the birds, some birds will actually drink that water, but it's not drinking water, and the cattle do not drink water in this area; to my knowledge, never have.

You know there's only eight head to the section and the waterings are very sparse in our area, and I can't even tell you where they water their cows. I know they don't do it in the Russell area.

You may have one watering, you know, in ten or fifteen sections.

But there is no drinking water. We have always hauled it from inception. We've done this on all of our leases that are the northeast quadrant of Eddy County. Every house we have, we have three houses on three separate properties, and we've always hauled all our water.

A few years ago the potash mines allowed us to put in a pipeline from their mine over to one of our leases. It's approximately a half mile distance, and so one of our leases is served by piped water, with fresh water.

MR. SIMPSON: I don't have any more questions.

REDIRECT EXAMINATION

BY MR. HUNKER:

Q. I'd like to call your attention to Rule 705-A, Mr. Light, and ask you again if you ... if in your opinion these 37 wells, if they are continued in their present state will endanger underground sources of drinking water?

A. My answer to that would be an affirmative no. Very strongly.

MR. HUNKER: I call your attention, Mr. Examiner, to the language of the regulation, rather than to the parts per million contamination referred to by Mr. Simpson.

We're operating under the rules of the Commission.

I have no further questions for Mr. Light.

Q. It's been my pleasure to appear before you today.

MR. NUTTER: Yes, sir. Well, you're not quite through yet.

A. Oh.

MR. NUTTER: Mr. Hunker, I think what Simpson was referring to was the statute that charges the Oil Conservation Division with protecting water supplies designated by the State Engineer, and the State Engineer, under his statutory mandate, has advised the Oil Conservation Division that he considers to be protected under that statute to

be those waters which contain 10,000 parts per million, or less.

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Light, have you had any record of casing failure of any consequence in this area?

A. Well, we've had, you know, in its original downhole injection, we were allowed in the very beginning to inject down casing, open casing downhole injection, which we did. And if, for instance, the downhole casing were to have a hole in the casing, we would then set packers and run tubing in order to get effective injection. And we could tell that immediately by the excess injection water that's handled in each of the casings, and we had some casing that would not have what you'd call great (inaudible). They still do the job for us. We merely know that if we have a defective casing we set a packer and inject through tubing.

Q. Now, is --

A. All of our injection at the present time is through packers, but this was initially we were injecting down casing.

Q. Well, what I'm thinking about is the -- is the possibility of these wells, if they're sitting idle for a

period of years, the casing corroding and any possible back flow of this injection water back up into this water zone that Mr. Simpson is concerned with.

Q Well, I can see the possibility. Who is to say, except I see no change in that shallow water. It's not drinkable but it's still about the same as it's been since 1942.

MR. SIMPSON: Well, even if you see no change, you got any water analysis to show that?

A No, we just barely use it in the house, and that's the best water analysis that I know of, as long as they can use it in the house and run it through the faucets and take showers in it, why they seem to be happy. We've had no complaints from our people.

We never analyzed it because we felt as long as it's useable, that's --

QUESTIONS BY MR. SIMPSON:

Q What concentration of water are you injecting? Do you have any feel for it as far as total dissolved solids or --

A Our engineer can tell you exactly what the composition of that water is we're injecting, if you'll ask him.

And, of course, all of our returned water is reinjected. We collect all of the water at the surface and reinject it.

MR. NUTTER: Well, now you're not putting any outside water into the project now, are you?

A. Oh, yes. We add water from this well. This is the only well that's in operation -- excuse me, the plant well's the only one in operation at this time. This one is still there and shut in.

MR. HUNKER: Referring to Well No. --

A. T -- I need my glasses. It's a dry hole originally and we deepened it to make a water well.

MR. HUNKER: T-5?

A. T-5. T-5 is one of our water makeup wells. Another one was drilled just south of T-16 and it is close to our plant and the one that we use because -- originally we had to have both of them to give enough quantity of water to inject. Now that we are on a scaled down injection program, one well is enough to make our makeup water, additional water.

MR. NUTTER: Why are you injecting any water at this time, Mr. Wills? You've got such a reduced water injection program, you have no injection whatsoever north of Injection Wells 3 and 40?

A. Well --

MR. NUTTER: I'm just wondering --

A. I'd better let the engineer answer that. It's a matter of economics. We have more or less through the years, knowing that the future of the field was in a tertiary recovery, are holding, just pending time, waiting for the time that's right in order to produce this property on a tertiary basis, and as a result, why, our -- our production curve is very flat.

If you would refer to Exhibit -- I think it will be Exhibit Number Two. Have you handed that --

MR. HUNKER: Number Three.

A. Number Three is a production curve on this propperty, and you'll notice that through the years, and this is taking somewhat away from the engineer, that it has flattened out to the point that there's very little production, but it's necessary to continue to inject water even though the makeup water is probably small, makeup water that's new water.

MR. NUTTER: But even with this reduced -- with the reduced number of injection wells, though, you're injecting more than you're producing; you are using some make-up water?

A. Oh, yes, we've always injected more than we produce.

MR. NUTTER: Well, to satisfy Mr. Simpson, Mr. Light, will you get an analysis of that water well that's at the camp there?

A. I'll be glad to.

MR. NUTTER: The one that's south of 10-X?

A. I'll be glad to get a water analysis.

MR. SIMPSON: I thought you said that your engineer knew what the water qualities are?

A. No, they're speaking of the water that we take out of the Capitan Reef.

MR. SIMPSON: Right.

A. Well No. 5.

MR. JOHNSON: He's speaking of fresh water. Fresher.

MR. NUTTER: The fresher.

MR. JOHNSON: Whatever, just --

A. The 65 foot water we have never made an analysis on. Like I say, we've been using it in the house for forty years.

MR. NUTTER: But you'll get an analysis of that and send to us.

A. Okay.

MR. STOGNER: Mr. Nutter, I'd like to --

MR. SIMPSON: And what your injection wate

is, too, your makeup water is, too. We'd like to see that.

MR. JOHNSON: We have that already.

MR. NUTTER: He'll have that.

MR. HUNKER: We have that.

MR. SIMPSON: Okay.

MR. STOGNER: Mr. Nutter, if I might.

QUESTIONS BY MR. STOGNER:

Q. This lease house that you keep talking about,is it airconditioned by any chance?

A. Well --

Q. By an evaporative cooler?

A. Oh, yes.

Q. What water is used by the evaporative cooler?

A. Well, it's the same water that comes out of the -- out of the water well, and that would be the brackish water.

Q. It's pretty corrosive on the --

A. Oh, well, you change the pads more than once a year. They would lime up quickly. Anything that brackish is going to have a lot of mineral in it. When you evaporate it to cool, why it's just going to make a block of mineral out of your pads. That's just the way it works.

MR. STOGNER: That's all.

MR. NUTTER: Are there any further questions or Mr. Light? He may be excused.

JOE. L. JOHNSON, JR.

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. HUNKER:

Q Mr. Johnson, will you identify yourself for the record, giving your name, address, and occupation?

A I'm Joe L. Johnson, Junior. I live at 2409 Brentwood, Wichita Falls, Texas. I'm a partner in Stevens Engineering; also a partner in S & J Operating Company.

Graduat[illegible] of Texas A & M University. Graduated in 1952 with a degree in petroleum engineering and a degree in mechanical engineering.

Q Have you previously testified before the Commission and have your qualifications as a petroleum engineer been acceptable?

A Yes.

Q Referring to what's been marked Applicant's Exhibit Number Two, will you tell the Examiner who Fred Stevens

is and what Cable Engineering was?

A. What was the exhibit number?

Q. Two.

A. Exhibit Number Two is a reprint of a paper presented before the Interstate Oil Compact Commission in Santa Fe, New Mexico, on December 1, 1955. This paper was presented by my partner, who is Fred Stevens. At that time he was employed by Cable Engineering. Later Cable Engineering became Cable and Stevens; then later Stevens Engineering.

When I became a partner, we decided to leave the name as is and it has been Stevens Engineering since.

Q. Are you familiar with the application that has been filed in on behalf of Barber Oil, Inc., in the matter before the Examiner today?

A. Yes, I am.

Q. What is Barber seeking by this application?

A. Seeking to continue control and use of the approximately 37 wells which, as I understand, are requested that they plug and abandon.

Q. How long has your firm been involved in connection with Russell Pool production?

A. We began work in the Russell Pool in 1948. We put in a gas injection program at that time and continued that program until the early fifties. I believe it was about

1952 that the decision was reached that a pilot waterflood project be installed. This program was approved and I believe in 1953 the pilot project began.

Then as a result of the response to the pilot project, it was expanded in 1955. At the time Cable Engineering handled the gas injection and also into the pilot project.

And then, as an employee of Stevens, I worked for Cable Engineering at that time, I went to work with them in mid-1956; took over the Russell Pool project in 1958; and have been on the project as the consulting engineer since that date.

Q So you're rather familiar with all of the wells in this pool, is that correct?

A It is almost part of the family. I have been on the project now for approximately 24 years.

Q How many secondary recovery projects does your firm supervise in the States of Oklahoma, Texas, and New Mexico?

A Approximately sixty.

Q How many are in New Mexico?

A Five.

Q How many projects in other states and in foreign countries?

A. We handle approximately ten outside of that general area, up into Canada.

Q. Would you please refer to what's been marked Exhibit Number Three, and tell the Examiner what this instrument shows?

A. Exhibit Number Three is a reservoir performance curve on the Russell Pool. It should be noted here that this curve begins in 1953 at the time water injection began in the project in the pilot area.

It shows the expansion that occurred as a result of the production increase. This expansion occurred in late fifties -- or '55.

Then it shows the performance of the project from that date on over onto the second page up to date, which is in mid-1982.

It should be noted that the black dots on the curve indicate oil production in barrels per month. Maximum production rate achieved by the property occurred in late 1957, early 1958, at approximately 500 barrels of oil per day.

MR. NUTTER: Mr. Stevens, if I may.

A. Johnson.

MR. HUNKER: Johnson.

MR. NUTTER: Mr. Johnson, if I might, I

recognize this has been a very successful flood. I wonder it you could just bring us up to 1980. Apparently in 1980 you had been injecting approximately 40,000 barrels of water.

A. Correct.

MR. NUTTER: Then suddenly the water was decreased to about 20,000 barrels --

A. That is correct.

MR. NUTTER: -- per month.

Okay, then oil production has leveled off here at approximately 700 barrels a month.

Would you just take it from that point forward and what your outlook is for the future?

A. Yes. At the present time we've maintained production from 1977 forward to 1982 at a relatively flat rate. The reason for this is we're knowlegeable of each of the producing wells as well as the injection wells.

In mid-1980 you'll note the decline in injection and the primary reason for that decline was to reduce operation cost. The whole thing, to keep this thing alive, ever since it started on the decline back in the fifties has been economics.

MR. NUTTER: Was that when the bulk of these 37 wells that are the subject of this hearing --

A. No.

MR. NUTTER: -- were taken off injection?

A. No. I think that was scattered through that period; probably some of them, but not the bulk of them.

What we've been doing is as a well becomes non-effective, or is not beneficial, in our opinion, we will TA that well or leave it shut down for a period of time.

We've gone through processes, too, where we've brought these wells back on as a means of helping offset producers. As a producing well declines as a result of the injection being taken from the well, then we may come back to that well and put in limited amounts in effort -- but the whole thing has been keyed to the economics.

The injection rate decline here primarily was, again, in an effort to do away with additional expense created as a result of a non-effective injection.

So what we were doing at that point, basically, was trimming down our injection points.

MR. NUTTER: And you -- you've put injection wells on and off depending --

A. Yes.

MR. NUTTER: -- on the need of the offset producing wells.

A. Yes.

MR. NUTTER: Now, is that the crux of what

you plan to do with these 37 wells that we're talking about today?

A. No. No.

MR. NUTTER: Or are these going to remain off injection for --

A. No. We plan to utilize these wells in the future in several diffent means.

MR. NUTTER: But these won't be on again off again injection wells, however?

A. No. No, they'll be utilized -- I'll cover this later, but generally speaking, what we plan to do is utilize these as an effective injection point for the use of surfactants type injection, and we can't come on and off.

If you'll recall in the previous testimony we tried briefly surfactant injection back in the early seventies; decided it was too expensive; oil prices had not moved up; therefor, it was costing us more to operate than we could really justify, so we decided to do away with it.

We have another project that we handle in the Oklahoma area that did not make that decision. It took it roughly five years to respond to surfactant. So we have positive proof at this point that it did respond and that it was commercial and that it would apply to Russell, and we have recently made a recommendation to that effect, and has

been, that recommendation has been approved.

We plan to start this work in the immediate future.

Q. Mr. Johnson, are there any other technical proposals that have been made for studies of the Russell Pool area?

If there have been, will you please identify them? I'm referring particularly to Exhibit Number Four.

A. We have had several, I guess you would refer to these as attacks or considerations being given for enhanced recovery or other methods.

I mentioned previously the fact that we had attempted a surfactant injection and discontinued this.

I believe it was in the -- about 1975 we had an approach, or an approach was made from New Mexico Tech and what they were interested in is installing a polymer as well as improved water, I think they referred to it as. It was really more of a surfactant type injection, in the Russell Pool. We worked with them for a period of approximately two years. They attempted to obtain funding in various different manners due to the anticipated high initial expense; were really unable to obtain this from the Federal and/or State sources, and eventually this project died on the vine, so to speak.

One of the things that did come out of the investigation, however, was the fact that Russell really fit perfectly into this type program. It had several distinct advantages.

Item one, it had had a -- it has a shallow depth; therefor, shallow depth, indicating small operation expenditures, makes it extremely attractive.

Most of the enhanced projects that have been done to date, like Maraflood (sic), some of the other projects, are always in shallow depths, because of the fact that they can do more testing, they can find out what's going on much easier and at much less expense; therefor, Russell became a prime target.

Secondly, one of the greatest things that they brought out, and is obvious, too, to anyone involved with an analysis, is the fact that it has close, 5-acre spacing. This is very beneficial to it. You have a chance to monitor very quickly your effects of your enhanced production.

The third factor that came out was the target, the target being we had a successful primary period, a successful primary recovery somewhere in the vicinity of 10 to 15 percent of the oil in place.

We have a successful waterflood. It recovered

an additional 15 to 20 percent or so.

So we're on the opinion that this time, that there's still 65 percent of the original oil in place. This is a very heavy target for an enhanced project. A lot of the projects that have been successful within the New Mexico, Texas, Oklahoma, wherever, don't have this type oil in place. This shallow depth here has allowed this to occur in Russell; therefor, makes it a very attractive target for enhanced.

The last factor that they brought out that was interesting to me was the fact that we have a one owner, one engineer-type firm that has handled the project since the inception; therefor, we have good records. We don't have a lapse of records that occur due to change in operations, due to change in engineering firms. This was a factor.

Their feeling was that with this type project, which they were going to design even further into the laboratory, they could recover an additional 1.5 to 1.6 million barrels out of Russell, in excess of what we have obtained to date.

Q This would be necessary, I mean the 5-spot location system would be necessary to accomplish this kind of recovery. Is that --

A That is correct. You've got to have -- in Russell we learned very early that we have low injection

rates. We've got to be able to monitor those injection rates. We've got to able to get as much water in the ground as we possibly can effectively. That means into the pay zone.

With that condition existing, we realize we're going to have to have as much injection, as many injection points as possible in an enhanced project.

Q. Is Exhibit Number Four a true copy of the literature in --inconnection with the proposal that you've just been discussing that New Mexico Tech came up with?

A. Yes, it is.

Q. Turning now to Exhibit Number Five, Mr. Johnson, will you tell the Examiner what your firm has proposed be done in this area?

A. Well, as mentioned previously, we attempted a surfactant type injection program approximately five to ten years ago. There were several attempts made on this same -- throughout several of our waterflood projects, namely the ones that were in the latter stages of flooding, the theory being that a surfactant would improve oil recovery.

As an example of this, I'd like to use a very simple example. Take, for example, that you have a bucket of oil, oil is -- in Russell is generally in about a 36 to 38 range degree gravity -- put your hands in that oil and get them nice and gooey. Reach over after you've taken

that, and you wipe these hands clean. What you have at this point I'm referring to as primary. It is -- it's given the amount of oil that it can without any help.

Now, in order to clean your hands further, you take it and stick it under the sink and you've got water running. This is good water. You wash your hands there and we get some more of the oil off. That is secondary.

The third process is, my hands are still greasy. I reach under there and I pick up some detergent my wife uses to wash dishes, or I pick up some Comet or whatever and sprinkle on my hands. I wash my hands here and my hands will come clean. That is tertiary.

And what I'm saying is that the process that we have used to date, while being effective, is truly inefficient. With additives into the -- into the water, we can obtain additional oil recovery.

That was the theory that was used also in the case of Bridwell Oil Company out of Wichita Falls, their Oscar Field, Jefferson County, Oklahoma. This is also a shallow field. This was handled from the beginning, which was in mid-1973 to early 1982 by our firm; one of our engineers handled it beginning to end.

In that particular project we've taken the data that has been obtained from it. We have the decline

curve attached, showing the results of the surfactant injection. We have the flood pump postions shown on a map. If you'll notice, in that particular case they began surfactant injection at a rate of about 100 parts per million and maintained that position from mid-1973 to date.

Now, in early 1982 they began a polymer project. This project has not responded yet, so it is not part of this discussion, but if you'll notice back on the decline curve, which is the next to the last page in this exhibit, we have projected what we anticipated recovery from that field to be without surfactant. You'll notice from mid-1973, when surfactant began, until early 1977 the production trend followed perfectly along the projected path, but in early 1977 it began to flatten.

This, in conjunction with well test information and with water analysis, indicated that the surfactant was now becoming effective.

So it moves -- starts moving away from the curve and we have additional recovery established as a result of surfactant injection beginning in 1977.

It's very apparent that it took a period of one, two, three, and a half years of injection before we began to see the results from this. The results obtained indicated a recovery as a result of the surfactant injection

of approximately 88,680 barrels. This amounts to roughly $2,000,000 to the working interests.

The total cost of the project as of January 1 was $112,000 for surfactant up to '81 -- or excuse me, '82, and it's estimated to have a future life of approximately five years. During that five year span they anticipate spending approximately $55,900 for surfactant and $751,000 for operation. This would indicate a total cost of $929,175; therefor, a profit potential as a result of surfactant injection of $1,127,082, or roughly $7000 per acre.

Applying this to Russell, the potential then for surfactant would be roughly 434,000 additional barrels of recovery at an additional profit of $5,500,000.

Q. And this is what you're recommended that BArber do?

A. This has been recommended and approved.

Q. Referring now to Exhibit Number Six, will you explain this report to the Examiner?

A. Exhibit Six is a monthly report prepared by Stevens Engineering for Barber Oil Company on the Russell Pool and it gives the data for the month of June, 1982.

It has the letter contained with the monthly report. Then over on the data sheet section we itemize the amount of water injection, the amount of water production

calculated, the water/oil ratio, the amount of oil produced during the month, 656, the total cumulative waterflood oil recovery, 1,521,224, the primary obtained prior to flooding, 842,221, and the total cumulative production as of July 1, 1982, 2,363,445. It gives the various injection wells, the water amount injected therein, showing a total of 615 barrels of water injected daily; also shows on page one that we're injecting in excess of 5000 barrels of water per -- in excess of 5000 barrels of water for the amount of fluid withdrawn, both oil and water, so we have a plus in the voidage column, and we've maintained that plus position throughout the flood.

Also, in the back portion of the report you have the various producing wells, the last well test obtained on that well, the cum production allocated to the -- each well for both the south, middle, and north battery areas.

Also attached to it is a reservoir performance curve starting in 19 -- early 1969 to date, and a map of the project showing the wells that are presently in the project area.

Q Mr. Johnson, your current recommendation is that Barber institute an enhanced recovery project. What will this involve, specifically?

A Basically what we'll be doing would be injecting a surfactant that is compatible with the water into the

water at the plant, treating the majority of the system; however, not all of the system. We'll have a test area.

Q. Referring to the Exhibit One, how many of the wells that the Commission has asked be plugged will be used in that initial pilot project?

A. Eight.

Q. If that's successful, would you plan to expand upon that program?

A. Yes.

Q. How long is it going to take to know whether or not the plan is successful?

A. Working on some of the wells at the present; the other wells will require additional reworking, I'm sure. Probably it will take at least two years; possibly longer than that.

Q. To know whether or not the project is successful?

A. Yes. We'll get an indication of this. We've got a pretty good feel for these injection points as to effective water. In other words, by using pressure as a result of injection rate, knowing the past history of those wells, I think we'll be able to tell if we're headed for an effective position earlier than was obtained in the Bridwell project.

Q. The application filed by Barber indicates that they're requesting an exception for a period of three years, within which to become further involved in a tertiary recovery program.

Is this a reasonable period of time to request under the circumstances?

A. Yes.

Q. In connection with the water that is used in the waterflood project, apparently that's being produced from Well T-5 down in -- shown on Exhibit Number One?

A. Yes.

Q. Has that water been tested?

A. Yes, we have a test on it, and I think I have -- I know I have a water analysis. Now whether I have it with me, I'm not positive.

Q. If you don't have it with you can you furnish it?

A. Oh, yes.

Q. Generally speaking, what does it reflect, from your memory?

A. Well, it smells like the devil. It's very bad water. It's Capitan Reef water, sulphur water. I'm not sure of the chloride count. I do have a partial analysis that is referred to in Exhibit Two, I believe.

Exhibit Two identifies the -- under the column, Water Supply; Water supply for the pilot waterflood project is obtained from the Capitan Reef lime formation, penetrated at approximately 900 feet. This water contains 291 parts per million of hydrogen sulphide, 178 parts per million of free carbon dioxide, a calcium carbonate stability, super saturation of 175 parts per million, and has a ph of 6.8.

The water gave considerable difficulty throughout the flood project but we were able to maintain control over the corrosion rate through various means, one of which was the injection of corrosion inhibitors, but at points in the early stages of the project corrosion rates were very difficult to maintain because of this type of water. It's pretty bad water.

Q. Is any of the ground water found at the 60-foot level used at all in the waterflood project?

A. No, it's -- this water is, in that general vicinity, is referred to as quote gyp water. It's low quality, low quantity. We wouldn't have -- we'd have to have a jillion of those little wells in order to get any water at all, and nowhere near the amount of water necessary with which to flood this; there's no way that you could do it.

Here is an analysis on the water supply well

number two, which I believe is -- is the well up near the plant. Is that right, Bob?

MR. LIGHT: That -- that would be correct. The plant is just south of T-16.

A. Okay, that would be -- both water -- both water supply wells, there are two, both of them are coming from the same source.

This analysis was made in 1958 and indicates the chloride count of 24,000; total hardness, 4800; calcium hardness 2400; total alkalinity, 504; sulfate content, 3740; dissolved solids, 27,500; no barium; ph of 7.8.

Q. Will you give me a copy of that instrument so that I can have a copy made for the Examiner?

A. Here's another one on water supply well number one; very little difference. It does have a chloride of 27,000 as opposed to 24.

Q. May I have a copy of that?

MR. NUTTER: Now this is Capitan Reef water you're talking about?

A. Yes.

Q. Will you supervise the testing of the water from the well at the camp, the 60-foot water zone, and furnish the Examiner and me with a copy of that analysis?

A. Yes, I can get you one. I'm not sure where

that well is but I'll get one.

Q. In your opinion, then, Mr. Johnson, to prematurely abandon these 37 wells in accordance with Rule 705-A would not be in the public interest, is that correct?

A. Correct. What we're -- I guess what every engineer is probably trying to do today, not only to obtain additional oil by means of additional development, but one of our primary purposes, I guess, has been to obtain additional oil through the injection of chemicals and what have you.

Our company is built primarily around this supervision of waterfloods, secondary, mini-tertiary type projects, mini, M-I-N-I, but the thing that bothers me, I guess, the most on this, is the fact that we know we have 1.6 - 1.5 million barrels sitting here. Now that's a factual, evident, proof, we've got it. The question is, how can we get it out.

Now, if we run around the countryside and start abandoning these type projects where you know it's there and you can't do anything with it because of economics at the present, what you're going to do is you're going to end up with more and more reliance on OPEC, what have you.

We can't -- we really can't find that much oil within the United States today, whether it be New Mexico, Texas, or what. We've got to come back to these projects, and a project that is sitting there available is one that is

going to be there first, not that the one that's been abandoned and has to be redrilled.

One of the difficulties of an enhanced is that up-front load. You have an extremely high cost. And the problem is that you've got to put all or the majority of that money in before you know whether it's going to respond or not. So as a result, the majority of the independents are staying away from enhanced. The only ones that are doing anything in this field today that I know of are generally majors, but eventually we've got to get it into a position where we can do something with it, and we'll get there, because we don't control our destiny, in my opinion, today. If Saudi wants to get $40.00 for their oil, they're going to get it, and we're going to pay it.

It's projects like this that give us the possibility of moving away from that position.

Q. Then in your opinion, then, Mr. Johnson, it would constitute waste and not be in the interest of conservation to -- for Barber to be compelled to plug out these wells.

A. That's correct. If you plug these wells just right off then forget it. 37 wells out of the 69, forget it; there's no way I can commence it; no way anyone could.

Q. In the period of time that you've been

concerned with this pool, has any damage occurred to drinking water?

A. Not to my knowledge, no. I didn't -- really until this came up, I didn't think we even had any out there. It's been so minimal that, you know, of no consequence; low quality, low quantity. Which is more important?

MR. NUTTER: Whichis more important than what?

A. Okay, to us, to you --

MR. NUTTER: Well, I'll tell you, Mr. Johnson, when you don't have very much water it gets awful important, and if you don't have any, it's most important.

A. I agree, but we have -- we're not talking about any quantity of water. We're not talking about any quality of water.

We are talking about --

MR. NUTTER: Well, we don't know yet what the analysis of the water is because we don't have an analysis on the water.

Now I've personally been to one of those houses down there with Mr. Light, and tasted the water that came out of that windmill, and it's pretty bad water, I grant you. But if there isn't any other water, it's darned good water, and those cows were drinking it the day I was there

with Mr. Light.

MR. LIGHT: That's at our -- the Barber property, the Barber Pool.

MR. NUTTER: Well, maybe that was the Barber Pool.

MR. LIGHT: That's about six miles east, and that windmill does exist, and even though they're not using it today, we have a pipeline out from the potash mine, we'd waste that windmill.

MR. NUTTER: Yeah, well --

MR. LIGHT: It was not good water but it was good enough for cows.

MR. NUTTER: Yeah.

MR. LIGHT: But cows do better if they have better water.

MR. NUTTER: Oh, sure.

MR. LIGHT: And they now have Caprock. They have the Caprock water, which is --

MR. NUTTER: Well, if you're close enough you can tap the pipeline; that's the idea.

MR. LIGHT: In fact, it's beautiful. In fact the ranchers love it to be close to the potash mines because they have a source of really high quality water. It's better water -- the potash mines have better water than the

City of Carlsbad.

MR. NUTTER: The point I was trying to make is so often we hear people come in here and they say, well, there's not very much water out here, so why worry about it, but that's when water should be protected, when there's not very much.

Anyway, you've recommended a project here for tertiary recovery and you think it will be instituted; you think within three years you would know whether it would be expanded or not, is that correct?

A. That is right.

MR. NUTTER: Okay.

Are there any further questions of Mr. Johnson?

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Johnson, now Mr. Light submitted on April the 1st all these schematic diagrams. I don't know if you've seen them or not.

A. Yes, sir, I have.

Q. Is there any way of knowing what the mechanical integrity of these casing and cementing jobs in on these wells that are going to be abandoned for a proposed

3- year period, and how do we establish what the integrity of this is, how well that integrity is maintained over that period of time?

A. You're speaking of wells -- let me clarify it. Are you talking about the wells that I'm going to be using for injection purposes?

Q. I'm talking about the 37 wells that are the subject of this hearing. Barber Oil Company has requested temporary abandonment for up to three years.

A. The wells that we'll be using for injection purposes, we'll be able to tell mechanical integrity by the effectiveness of the injection.

Q. Right.

A. Okay, the effect -- this is very obvious in the case or Barber -- in the case of Russell.

The shallow depth, the amount of injection, the amount of pressure required, will tell us immediately as to whether that well is putting water into the pay zone or going somewhere else.

We've got so many years of history here that immediately you can tell; we fact, we've spotted this way in the past that this well must be a bad injection point, therefor a non-effective point because it was taking too much water and all the water was not showing at the surface.

Q. Okay, now that's the wells you're using. I'm talking about the 37 --

A. I'm talking about the ones in which we plan to use.

Q. Right.

A. Okay, that's -- they're part of that 37. Of the ones that we --

Q. Well, Mr. Light, said that these 37 wells are not going to be on again, off again, that they're going to be temporarily abandoned injection wells and won't be used.

A. Mr. Nutter, previously I testified that -- to the fact that there were 37 points in which you had requested, or the State had requested, that they be plugged and abandoned. I also testified that there were six of these wells that would be utilized for injection purposes under the surfactant program --

Q. Under the surfactant program, okay.

A. -- which had recently been approved.

Q. Okay.

A. Which leaves 31 wells there.

Q. Now when will this surfactant program be initiated?

A. It's been approved. I would imagine within the next few months; as soon as we can get our surfactant

on location and get our pumps in place.

Q. You have to have some kind of a little system where you inject this stuff --

A. Yes, sir.

Q. -- at the rate of 100 parts per million, or whatever --

A. Yes, sir.

Q. -- in the injection water.

A. Yes, sir. It has to be premixed and brought into the system through -- I mean you're not bringing it in in the concentrated form. You're premixing it and then bringing it in a mixed form into the injection wells.

Q. Okay, so there you've reduced the 37 to 31.

A. That's correct.

Q. Okay.

A. As to the 31, I have no means in which to tell you whether they are mechanically good or bad. There is no way that I can tell. Only thing that I know is that the casing is still in place and that's all I can tell you.

I really have no way of proving it.

MR. SIMPSON: You can't run any kind of test that you know of?

A. How would you -- I don't know how you would run this test.

Q. The only way you could do it would be to put a bridge plug down in the hole and pressure it up occasionally, that I can think of.

A. Well, I'd be -- I'd be awful scared to do that --

Q Yeah,

A. -- because I'm afraid it might blow my casing --

Q. -- afraid it might blow the casing out.

A. -- all to -- and that would ruin my well and it would be proved now that we've got bad casing, but I've also lost my well.

Q. Yeah.

A. That would be kind of hard to do.

Q. But on the other hand you may develop bad casing and never know it.

A. Well, this is a possibility, but I think over the fact -- utilizing the fact that we've injected out there since 1953 and at the time we were allowed by State law to inject down casing, and yet we have not bothered the low quality, low quantity water supply, to our knowledge, almost speaks for itself, that, you know, we really have not had this problem.

Q. But even back in 1956 when your partner

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Q. But even back in 1956 when your partner

gave this paper to the IOCC, he said in this paper that there was a severe corrosion problem.

A. That is correct. That is correct. There was a severe corrosion problem.

Q. And he was treating the water to reduce corrosion.

A. Used RKM 900. We used that, as well as other factors, and were able to keep it under control and eventually did go, though, to tubing injection. The primary reason for going to the tubing injection was not the fact of averting a leak or casing failure. The reason turned out at a later date to be, a lot of these wells when they were drilled in the forties, set on top of what is referred to now as the Connelly formation. This is about 60 feet or so above the Russell pay zone.

Unbeknown to everybody for a period of three or four years water was going into the Connelly, coming across to the offset producer and getting some oil response, but it was channeling, and it became a severe channeling problem.

We ran tracer flow surveys. These surveys did not identify this problem. They said, no, the water is all going down here in the Russell pay. Later in the development of the field in the -- it would be in 1957 or '58, about

'58, we ran into a waterflow in drilling Well No. 26, I believe, and it was in the Connelly; we hadn't gotten to the Russell pay yet, which then said those pressure flow surveys that you took a year ago were false, and sure enough, we found out they were false. They were performed by a company that did it incorrectly. Not -- they didn't know that they did, but they admitted it later.

As a result of that, what we did is go back and use Lyons ~~and vertical~~ straddle type packers.

Q. I notice you have formation packers in a lot of these wells.

A. Yes, sir. We used the second Lyons packer that ever was put on the market, as far as a purchase type packer. There were a lot of rentable Lyons packers but not purchase.

We also, I think, bought the next ten that came off the assembly line; put those -- used those, then, to isolate so that water could only enter into the Russell pay, and it was set on a lime shelf immediately above the pay zone, and this proved successful. We had no difficulty from the Connelly and we could tell immediately whenever we had a tubing leak and/or packer failure, because the pressures changed automatically.

In fact, one day I recall being out there

where a well began to flow, a producing well offsetting this injection point. We came back over to the injection point that we suspected was giving difficulty, shut the well in and the well quit flowing immediately.

So it's immediate. We know when we've got trouble.

Q. All right.

A. But as the mechanical integrity, all I can say is that to our knowledge they are satisfactory, but I cannot prove this point. I don't know how I could, really, effectively, without endangering the wells.

I guess the only thing we can really point out is we haven't hurt the water in thirty-something years, so why should be begin to hurt it now.

MR. HUNKER: Mr. Nutter, I'd like to offer in evidence Exhibits One through Six and the two reports of water injection analysis that I have obtained.

MR. NUTTER: Okay, do you want to mark those?

MR. HUNKER: I'd mark them Numbers Seven and Eight.

MR. NUTTER: Exhibits One through Eight will be admitted in evidence.

Are there any further questions of Mr.

Johnson? He may be excused.

Do you have anything further, Mr. Hunker?

MR. HUNKER: No, sir, I have nothing further. There may be some people in the audience who have a statement that they might want to make.

MR. NUTTER: Does anyone have anything they wish to offer in Case 7599?

MR. LAYTON: I do, Mr. Nutter.

MR. NUTTER: Yes, sir.

MR. LAYTON: I'm Donald R. Layton, and I represent the Layton Enterprises, Inc., of Lubbock, Texas.

As an independent mineral owner in Eddy County, New Mexico, we would like to urge the Oil Conservation Commission to approve the exception requested by Barber Oil, Inc.

We believe that failure to grant exceptions in this and other similar cases will result in an unnecessary economic burden on many legitimate operators of marginal properties. This in turn will undoubtedly promote premature plugging and abandonment of possibly several hundred wells, resulting in both physical and economic waste.

MR. NUTTER: Thank you, Mr. Layton. Anyone else?

We'll take the case under advisement.

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd C.S.R.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 7599, heard by me on 8-21 1980.

, Examiner
Oil Conservation Division

SALLY W. BOYD, C.S.R.
P. O. Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

October 28, 1982

Mr. George Hunker
Hunker-Pedric
Attorneys at Law
Post Office Box 1837
Roswell, New Mexico 88201

Re: CASE NO. ~~7599~~
ORDER NO. ~~R-7115~~

Applicant:

Barber Oil Inc.

Dear Sir:

Enclosed herewith are two copies of the above-referenced Division order recently entered in the subject case.

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

Copy of order also sent to:

Hobbs OCD x
Artesia OCD x
Aztec OCD

Other

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 7599
Order No. R-7115

APPLICATION OF BARBER OIL INC.
FOR AN EXCEPTION TO RULE 705-A,
EDDY COUNTY, NLW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on July 21, 1982, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 28th day of October, 1982, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Barber Oil Inc., is the operator of a waterflood project in the Russell Pool, Eddy County, New Mexico, which flood was originally authorized by Order No. R-263, dated February 10, 1953, and which has been expanded on several occasions pursuant to subsequent orders of the Division.

(3) That by applications dated March 4, 1982, and April 1, 1982, applicant requested administrative approval for an exception to Rule 705-A of the Division Rules and Regulations to permit 37 former injection wells to remain on standby status without having the cement plug or bridge plug installed therein as required by said rule for any temporarily abandoned injection well.

(4) That on April 12, 1982, the Division Director denied the application for administrative approval for such exception, citing as the reason for such denial failure of the applicant to demonstrate good cause to be entitled to such exception.

(5) That subsequent to said denial, applicant filed an application for a hearing in this matter, requesting that as an

exception to the provisions of Rule 705-A of the Division Rules and Regulations, 37 temporarily abandoned water injection wells in its Russell Pool Waterflood Project be permitted to remain inactive for a period of up to three years without the required cement or bridge plug being installed therein to isolate the injection zone.

(6) That according to the evidence presented at the hearing, of the original 5.3 million barrels of oil in place in the Russell Pool, applicant produced 800,000 barrels on primary recovery and has produced 1.5 million barrels on secondary recovery, leaving approximately 3 million barrels still in the reservoir.

(7) That the applicant has under study a plan for the installation of a tertiary recovery system in the Russell Pool, by means of which perhaps another 1.5 to 1.6 million barrels of oil could be recovered.

(8) That said tertiary recovery system would begin as a pilot project, utilizing eight of the 37 wells which are the subject of this case, and if successful, would be expanded to include some or all of the remaining 29 wells.

(9) That the applicant should be permitted to retain said wells for use in the tertiary recovery system, provided however, that there should be a time limit on such retention without cement or bridge plugs and provided further, that the integrity of the existing casing in the wells should be established by adequate testing.

(10) That three years should be adequate time in which to determine the success of the pilot tertiary recovery system and the feasibility of expansion thereof to include the entire pool.

(11) That the integrity of the casing in each of the wells should be established by successful completion of such testing procedure as may be required by the Supervisor of the Division's Artesia District Office.

(12) That subject to the provisions of Findings Nos. (10) and (11) above, approval of the application will not cause waste nor impair correlative rights and should be granted.

IT IS THEREFORE ORDERED:

(1) That the applicant, Barber Oil Inc., is hereby authorized to retain on a temporarily abandoned status, without the installation of a cement plug or bridge plug to isolate the injection zone, the following described wells, all in Township

20 South, Range 28 East, NMPM Russell Pool, Eddy County, New Mexico.

Lease	Well No.	Location	Section
Crosby Fed	1	330' FSL & 2310' FEL	12
" "	2	330' FSL & 1650' FEL	12
" "	4	663' FSL & 2000' FEL	12
Turner Fed	2	1980' FSL & 1980' FWL	13
" "	3	1980' FSL & 1970' FEL	13
" "	6	660' FNL & 1980' FWL	13
" "	12	2322' FSL & 2339' FWL	13
" "	13	332' FNL & 2340' FWL	13
" "	15	331' FSL & 1669' FWL	13
" "	18	1658' FNL & 2339' FWL	13
" "	21	959' FSL & 2339' FWL	13
" "	22	2322' FSL & 1669' FEL	13
Wills Fed	2	660' FSL & 660' FWL	13
" "	5	990' FNL & 330' FWL	13
" "	6	996' FSL & 1005' FWL	13
" "	8	996' FNL & 1005' FEL	13
" "	10x	2322' FSL & 1005' FWL	13
" "	14	330' FSL & 330' FEL	13
" "	15	996' FSL & 330' FEL	13
" "	17	1656' FSL & 330' FWL	13
" "	18	338' FSL & 352' FWL	13
" "	19	2322' FNL & 2333' FEL	13
" "	21	1656' FNL & 1665' FEL	13
" "	23	330' FNL & 1665' FEL	13
" "	25	660' FNL & 2000' FEL	13
" "	26	1305' FNL & 1980' FEL	13
" "	27	1325' FSL & 660' FWL	13
" "	30	2310' FNL & 990' FEL	13
" "	33	1330' FSL & 1980' FWL	13
" "	34	2630' FNL & 1980' FWL	13
" "	35	1980' FNL & 2630' FEL	13
" "	36	660' FNL & 1310' FEL	13
" "	37	660' FNL & 2630' FEL	13
" "	39	2630' FNL & 1980' FEL	13
" "	41	1310' FNL & 1310' FEL	13
" "	42	1330' FSL & 1330' FWL	13
" "	45	1328' FNL & 2635' FEL	13

PROVIDED HOWEVER, that within 90 days after entry of this Order, applicant shall take such tests on each of the above-described wells as may be required by the Supervisor of the Division's Artesia District Office to ensure the integrity of the casing in said wells, and provided further, that if any such well tests in such a manner as to indicate poor condition

of the casing, remedial steps shall be taken immediately to remedy this condition.

PROVIDED FURTHER, that this authority for the applicant to maintain the aforesaid wells in a shut-in condition without having cement plugs or bridge plugs installed therein shall expire three years after entry of this order.

(2) That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

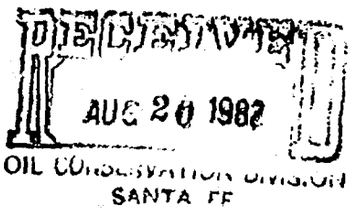
STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY,
Director

S

BARBER OIL, INC.
111 West Mermod
Post Office Box 1658
CARLSBAD, NEW MEXICO 88220
(505) 887-2566

August 16, 1982



New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, NM 87501

Attn: Daniel S. Nutter

Re: Case No. 7599
Barber Oil, Inc.
Exception to Rule 705A

Gentlemen:

As requested in the hearing of July 21, 1982 I submit the enclosed report of water analysis as prepared by Naclo Chemical Company. This analysis was specifically requested by Mr. Oscar Simpson III.

Very truly yours,

BARBER OIL, INC.

Robert S. Light
President

CC: George H. Hunker, Jr.
P. O. Box 1837
Roswell, NM 88201

Encl: 1

PETROLEUM CHEMICALS DIVISION
VISCO CHEMICALS

NALCO CHEMICAL COMPANY
ROUTE 2, BOX 246 · WICHITA FALLS, TEXAS 76301 · AREA 817-541-2246

July 26, 1982

Mr. Joe Johnson
Stephens Engineering
6th and Lamar
Wichita Falls, Texas 76301

Dear Joe:

We at Nalco appreciate this opportunity to be of service to you at Stephens Engineering. We are providing the attached water analysis of the sample given to us Friday July 23, 1982.

As you will notice, the chloride level of 2210 mg/l makes the potability of this water questionable. Total dissolved solids of 4820 mg/l fall in the same category.

Thank you,

David A Cooper

David A. Cooper
Sales Representative
NALCO CHEMICAL COMPANY

DAC:tc

Enclosure

RECEIVED
AUG 20 1982
OIL CONSERVATION DIV.
SANTA FE

NALCO

REPORT OF WATER ANALYSIS

Company Stephens Engineering
Wichita Falls, Texas

Date 7/26/82
Analysis No.
Sampling Date
Date Sample Rec'd.

Sample Marked

DISSOLVED SOLIDS			RESULTS AS COMPOUNDS	
Cations	mg/l	meq/l		mg/l
Sodium, Na (Calc.)	483	21	as NaCl	
Calcium, Ca	748	37	as $CaCO_3$	2930
Magnesium, Mg	258	21	as $CaCO_3$	1060
Barium, Ba	0	0	as $BaSO_4$	0
Cations Total	1489	79		
Anions				
Chloride, Cl	1341	38	as NaCl	2210
Sulfate, SO_4	1866	39	as Na_2SO_4	2760
Carbonate, CO_3	0	0	as $CaCO_3$	0
Bicarbonate, HCO_3	124	2	as $CaCO_3$	102
Anions Total	3331	79		
Total Dissolved Solids (Calc.)	4820			
Total Iron, Fe			as Fe	0.50
Acidity to Phenolphthalein, CO_2	0		as $CaCO_3$	0

OTHER PROPERTIES		$CaCO_3$ STABILITY INDEX
pH	7.0	@ 70° F.
Specific Gravity	1.002	@ 120° F.
Turbidity (JTU)		@ 160° F.
		Method of Stiff & Davis

Remarks:

NALCO CHEMICAL COMPANY
VISCO CHEMICALS
P. O. BOX 87 • SUGAR LAND, TEXAS 77478

NALCO Trademarks of Nalco Chemical Company.

BENSON-MONTIN-GREER DRILLING CORP.
221 PETROLEUM CENTER BUILDING
FARMINGTON, NEW MEXICO 87401
PHONE: 325-3874

APR 26 1982
OIL CONSERVATION DIVISION
SANTA FE

April 23, 1982

Mr. Dan Nutter
Hearing Examiner
New Mexico Oil Conservation Division
Box 2088
Santa Fe, NM 87501

Re: CASE 7516: UNITIZATION OF
JICARILLA LANDS, TOWNSHIP 27 NORTH,
RANGE 1 WEST, RIO ARRIBA COUNTY

Dear Mr. Nutter:

As discussed with you on the phone today, our next meeting with the MMS people and the Jicarilla Tribe regarding the captioned matter is now planned for the week of May 3rd; so in response to your question about whether we would be ready for the OCD to hear this matter May 26, I feel we probably will not be ready and we may as well plan now for a continuance to a later date.

It does appear at this point, however, that there is some hope of our reaching agreement with them in a few more weeks - at least the parties are willing to discuss the issues.

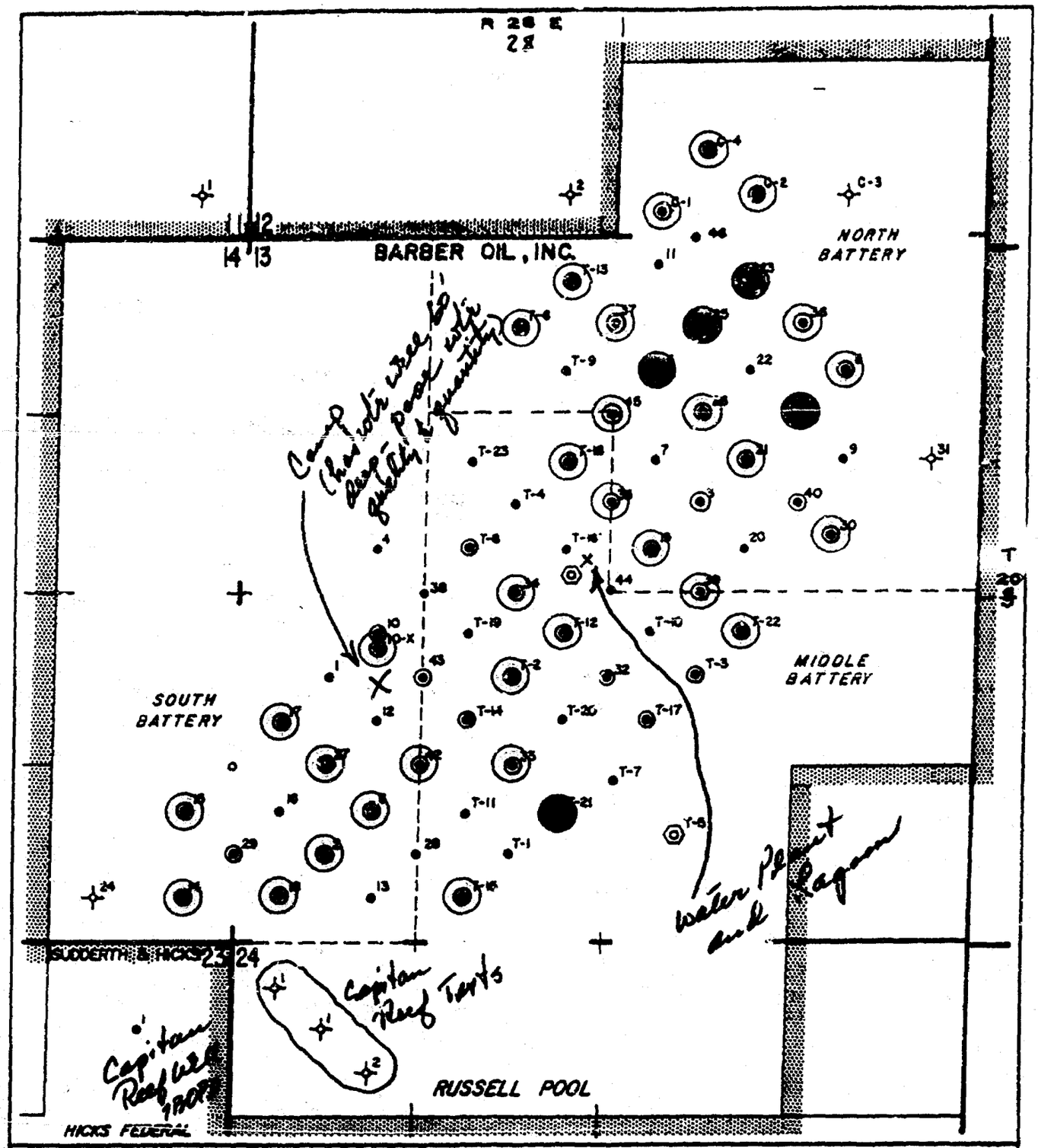
Regards,

BENSON-MONTIN-GREER DRILLING CORP.

BY: _____
Albert R. Greer, President

ARG/tlp

cc: Tom Kellahin



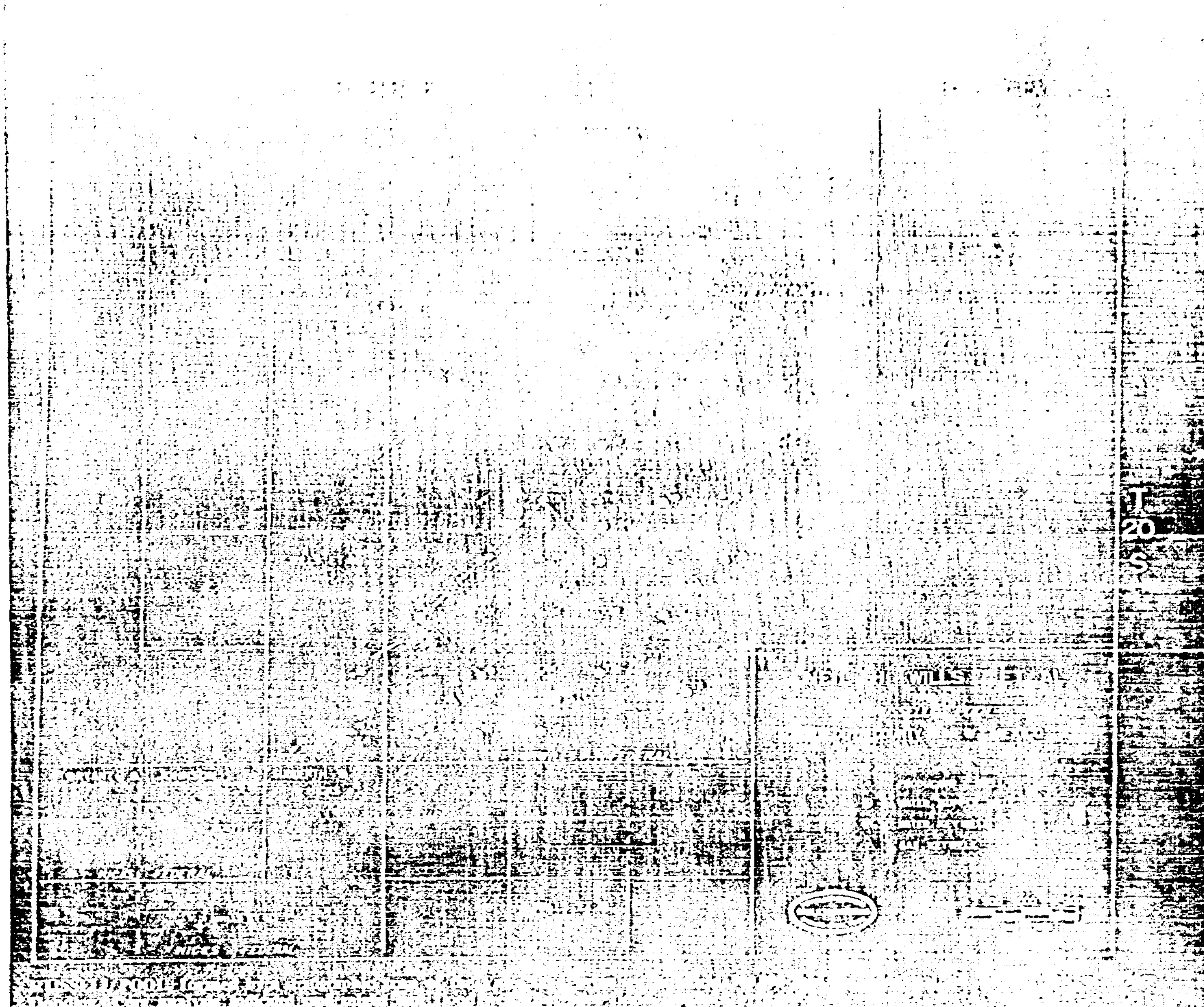
LEGEND

- PRODUCING OIL WELL
- WATER INJECTION WELL
- WATER SUPPLY WELL
- DRY HOLE
- LEASE AREA

BARBER OIL, INC.
RUSSELL POOL
EDDY COUNTY, NEW MEXICO

SCALE

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Appl. EXHIBIT NO. 1
CASE NO. 7599



Water-flood program follows gas repressuring. This

Russell Pool Gets Its Second Wind

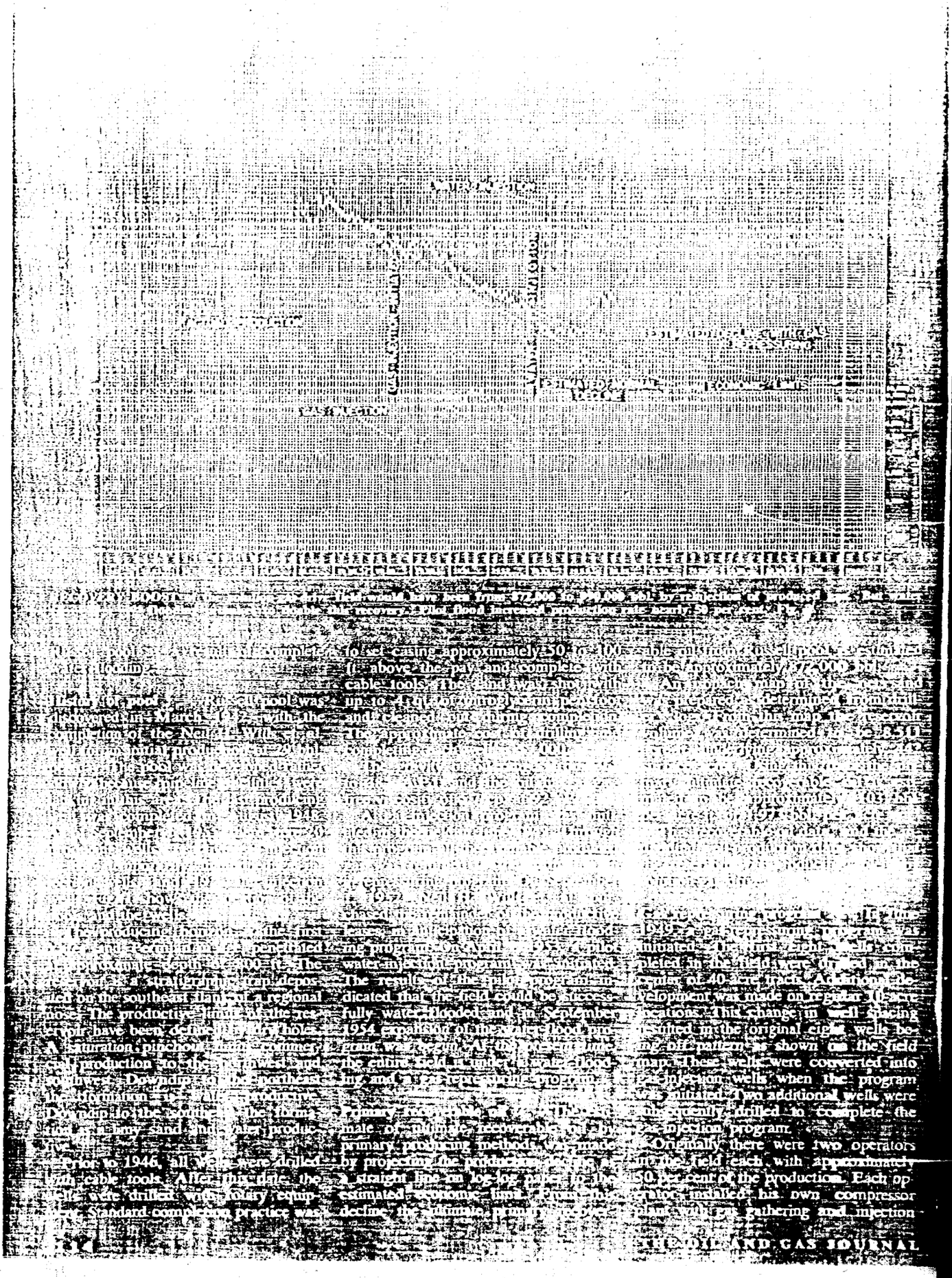
Here's a 450-acre flood that may pay $[illegible],100,000. Results of a pilot water flood indicate that the Russell pool water flood will be one of the first successful projects in New Mexico.

by Fred [illegible]

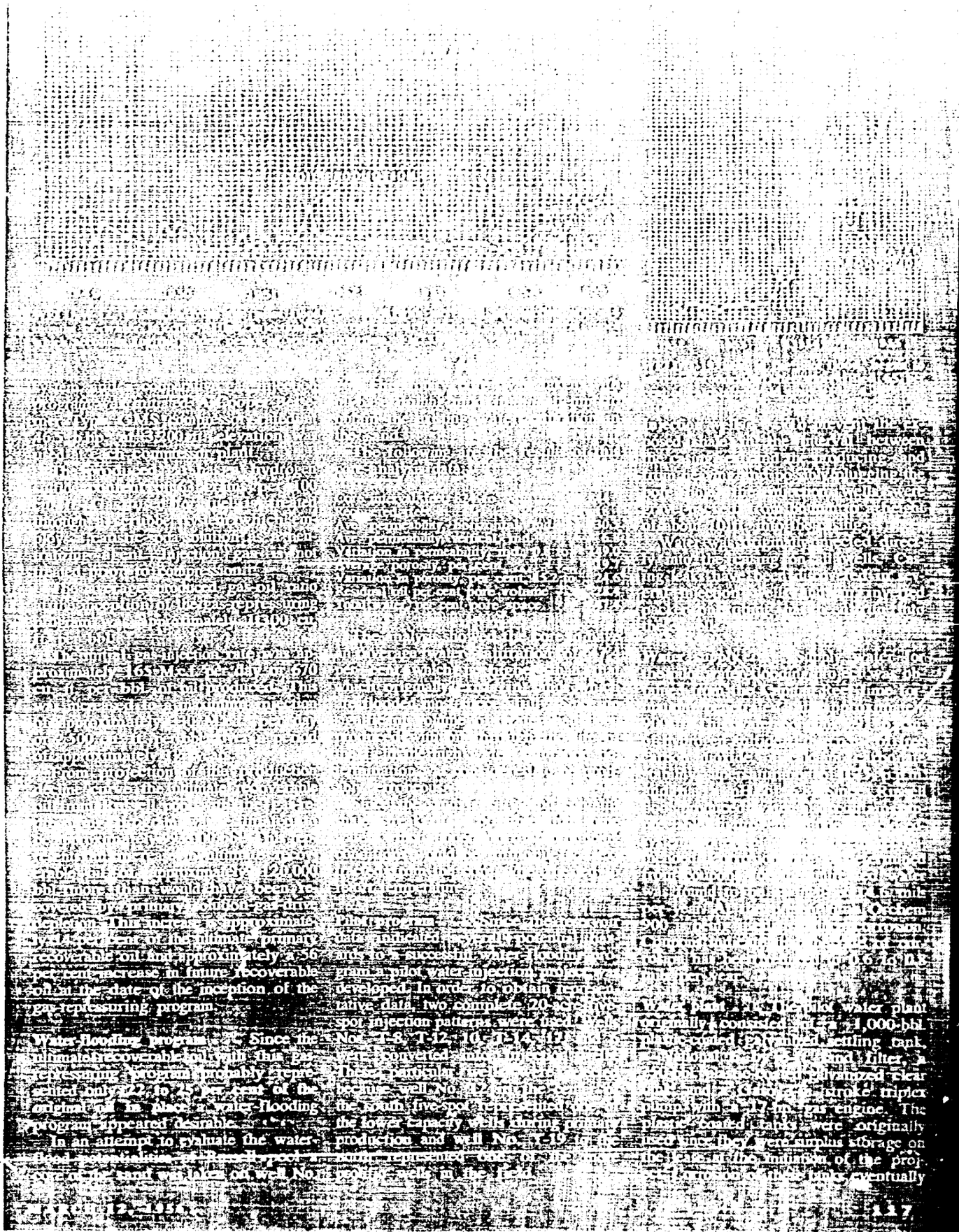
FIFTEEN years after the discovery [illegible] Russell pool in Eddy County, New Mexico, is starting a second [illegible] of oil production as a result of water flooding. This water-flooding project is coming on the heels of a [illegible]

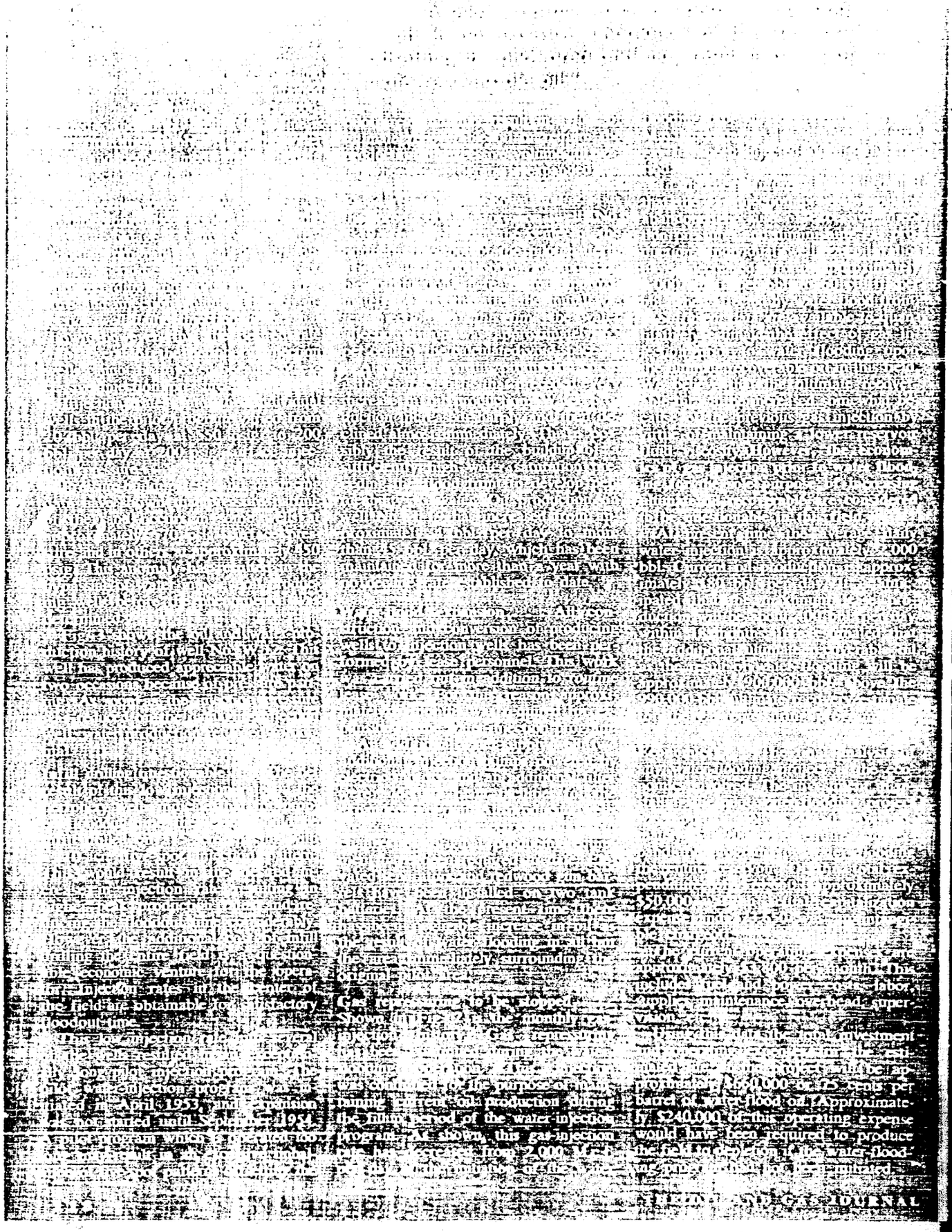
[illegible] the oil in place after completion of the gas repressuring program. With water flooding the recovery may reach [illegible] 50 per cent of the [illegible] oil in place. [illegible] installing the water flood [illegible] about [illegible] This cost [illegible] with the monthly operating ex[illegible] makes the [illegible] investment [illegible] operating expenses of the project [illegible] each barrel of water-flood oil will cost about 75 cents. On [illegible] an estimated additional profit [illegible],400,000 would be realized from

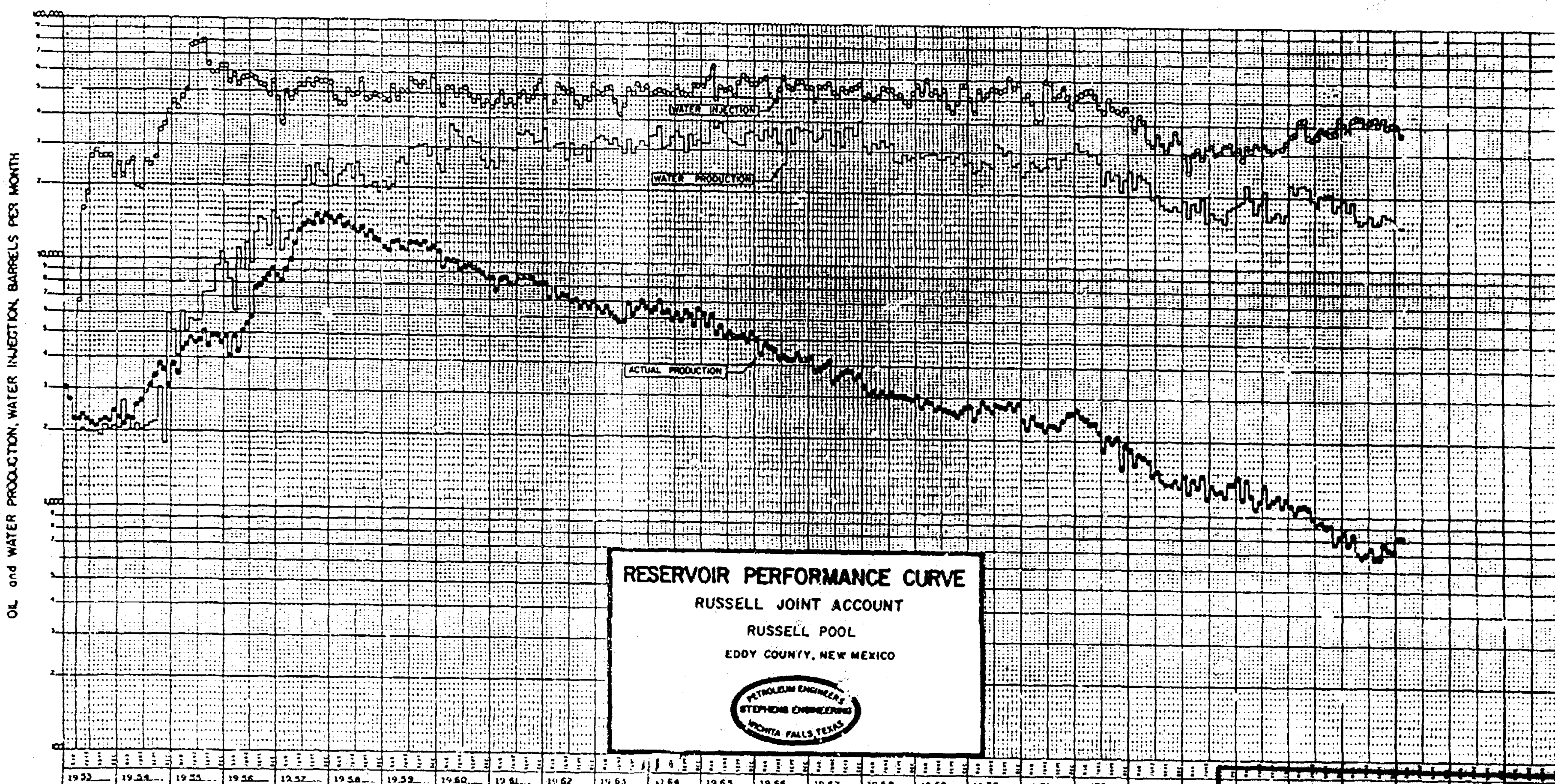
Author is with [illegible] Wichita Falls, Tex. Paper presented [illegible] Interstate Oil Compact Commission [illegible] Dec. [illegible] 1955.



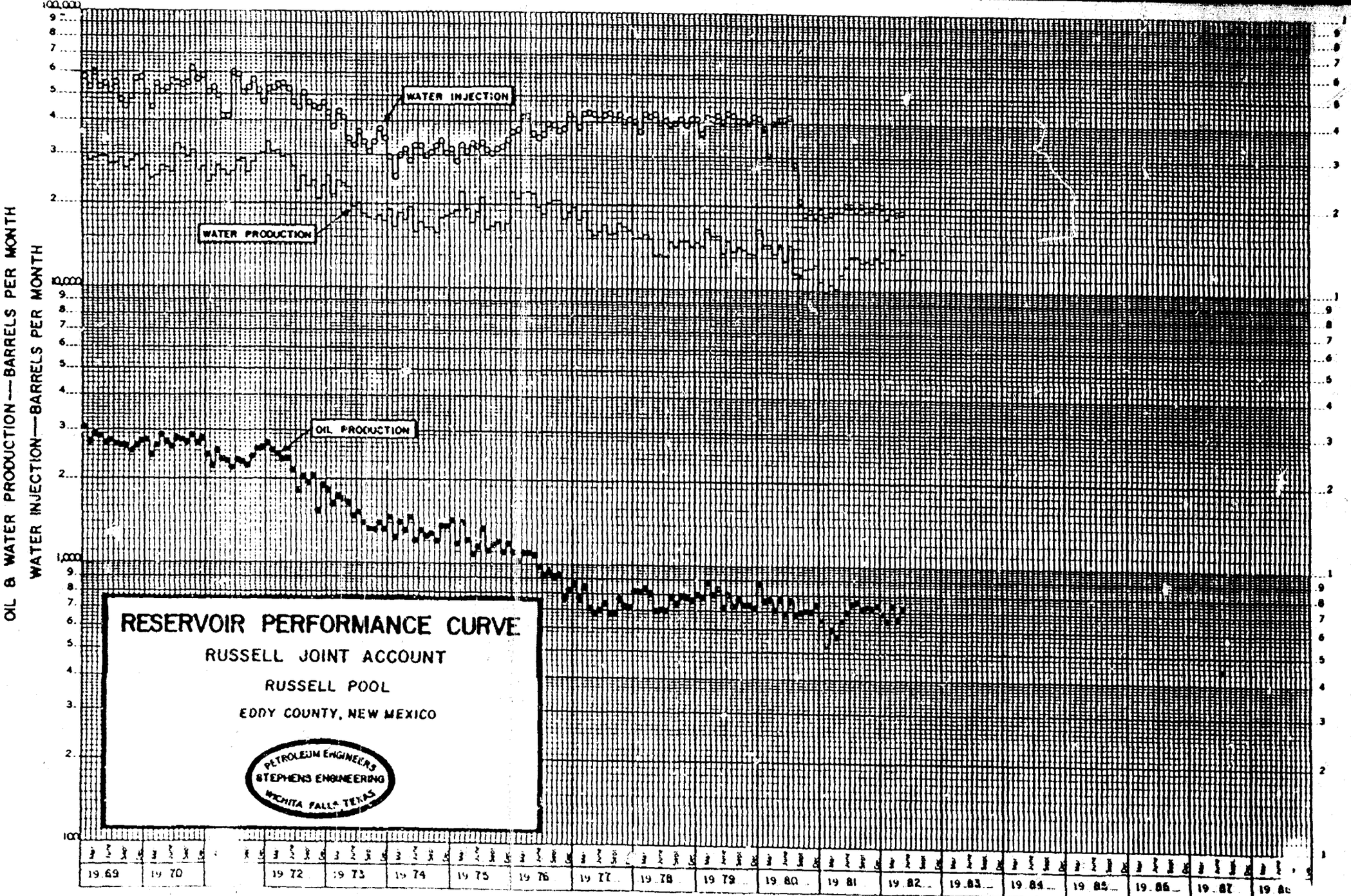
OIL AND GAS JOURNAL







BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
App. EXHIBIT NO. 3
CASE NO. 7599


OIL & WATER PRODUCTION—BARRELS PER MONTH
WATER INJECTION—BARRELS PER MONTH
WATER INJECTION
WATER PRODUCTION
OIL PRODUCTION
RESERVOIR PERFORMANCE CURVE
RUSSELL JOINT ACCOUNT
RUSSELL POOL
EDDY COUNTY, NEW MEXICO
PETROLEUM ENGINEERS
STEPHENS ENGINEERING
WICHITA FALLS, TEXAS
100,000
10,000
1,000
100
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New Mexico Institute of Mining and Technology
Proposal Routing Sheet

Provide the information requested below, attach this sheet to the original proposal, and route the original and two extra copies of the proposal to the persons designated at the bottom of this sheet. Each signature signifies endorsement of the proposal in the area of concern of that individual. Normally allow four working days for this review process. The cover sheet of the proposal itself should carry the signatures of the Principal Investigator(s), the Department Chairman or Division Director, and the President (unless the agency receiving the proposal requires more).

1. Brief title of proposal Development and Demonstration of an Enhanced Oil Recovery Process for a New Mexico Independent Oil Producer

2. Agency to which proposal is being submitted ERDA

3. New proposal or renewal? New Dates: From Apr. 1978 to Apr. 1980

4. Principal Investigator(s) David Martin

5. Department or Division Petroleum Recovery Research Center

6. Requested funding
   (a) Direct costs $ 178,840
   (b) Indirect costs 9,320
   (c) Total 188,160

7. Dollar amount requested from agency for student support
   (a) undergraduate 0
   (b) graduate 900
   (c) total 900

8. (a) Approximate hours of computer time needed 20
   (b) Percent of computer cost to be covered by agency funds 50

9. Institute support committed in proposal
   (a) state dollars already budgeted 0
   (b) state dollars not previously budgeted 0

10. *Existing* equipment and facilities at Tech that will be used for this project
Space and equipment in new PRRC Building, core cutting equipment, pumps, core holders, high pressure liquid chromatograph.

11. Space needs of the project
   (a) already available space (room numbers, approximate ft^2)
   (b) additional space (approximate ft^2) 3,000 sq. ft. (in new PRRC Bldg.) 500 sq. ft. (Office)

12. Will this project require remodeling of existing space? No If yes,
   (a) cost to be borne by Institute
   (b) cost to be borne by agency funds

Endorsements:

Principal Investigator(s)	David Martin	Date 9/28/79
Department Chairman or Supervisor	[illegible]	Date 9/30/79
Vice President for Academic Affairs or Division Director	[illegible]	Date 9-29-79
Business Manager	[illegible]	Date
Vice President for Administration	[illegible]	Date 29 Sept 79
President	K. W. Ford	Date 9/30/79

Comments:

Matching funds are requested from New Mexico Energy Institute.

RESEARCH PROPOSAL SUBMITTED TO THE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

Petroleum Recovery Research Center

New Mexico Institute of Mining and Technology

Socorro, New Mexico 87801

Development and Demonstration of an Enhanced Oil Recovery Process for a New Mexico Independent Oil Producer

Amount Requested from ERDA	$188,160	Proposed Effective Date	April 1978	Proposed Duration	2 years

Principal Investigator: David Martin

Title: Head, Improved Water and Polymer Flooding

Senior Advisor: J. J. Taber

Title: Director (PRRC) Adjunct Professor - Petroleum Engineering

Address: Petroleum Recovery Research Center
New Mexico Institute of Mining and Technology
Socorro, New Mexico 87801

Telephone: 505/835-5142

ENDORSEMENTS:

Principal Investigator	David Martin	David Martin	Date 9/28/77
Director (PRRC)	J. J. Taber	J. J. Taber	Date 9/28/77
Vice President for Academic Affairs	Guy Donaruma	[illegible]	Date [illegible]
Business Manager	William E. Hemenway	[illegible]	Date
Vice President for Administration	Stephen Mitchell	Stephen Mitchell	Date 29 Sept 77
President	Kenneth W. Ford	Kenneth W. Ford	Date 30 Sept. 1977

ABSTRACT

Recent estimates are that under existing economic and technological conditions, 10.7 billion barrels of oil will remain unrecovered in New Mexico reservoirs at termination of primary and secondary recovery processes. Enhanced oil recovery techniques will be capable of producing a significant percentage of this trapped residual oil; however, these techniques are costly, currently not attractive economically, primarily experimental, and unproven in New Mexico reservoirs. Much of this oil that is unrecoverable by conventional techniques is held by the independent oil producers. Independents vary from major oil companies in that they:

- do not normally have capital resources to afford heavily front end loaded projects
- do not have research facilities to evaluate and design exotic enhanced oil recovery processes
- do not have a large number of projects and thus must have a reasonable prospect of profit on every large capital expenditure.

On the other hand, major oil companies may conduct field research, at little or no profit, and apply the experience gained to another project. Therefore, there is a need for the development of enhanced oil recovery processes to enable the New Mexico independent oil producer to profitably recover a significant amount of this residual oil that otherwise will remain trapped underground.

Consequently, the objective of this proposal is to develop and demonstrate an economical surfactant/polymer system in a mature waterflood operated by Barber Oil Company in Southeast New Mexico. The project is the Russell Field which, although quite successful, will leave greater than 60% of the original oil in place unrecovered when the secondary waterflood reaches the economic limit of production in the near future. It is estimated that of this

greater than 4 million bbls of conventionally unrecoverable oil, a properly designed surfactant/polymer system could recover approximately 1.5 million bbls.

This project has several attributes which make it desirable for this enhanced oil recovery process:

- shallow depth of 800 feet
- close 5-acre spacing
- greater than 60% of original oil in place remains unrecovered
- good records, same engineering firm for complete life of project.

Specifically, this proposal will provide for drilling of four new injection wells to provide cores for laboratory testing and allow more accurate determination of residual oil saturation. These wells will also further reduce the time required to observe production response.

Once the process has been developed in the laboratory, it will be demonstrated in the field by injecting the chemical slug in the four injection wells. Oil production in the interior producing well will then be monitored. Information obtained will be disseminated to encourage other oil producers in the state to consider similar processes to increase oil production from their leases.

TABLE OF CONTENTS

I. INTRODUCTION

During the first three years of this decade, the United States consumed 2 1/2 billion bbls more oil than it produced, which led to increased crude oil imports and eventually to the so-called "energy crisis." Much of the confusion that arose from this situation resulted from people failing to make distinctions between the shortage of cheap available energy and energy resources. There is a shortage of cheap, available, domestic energy, but this country has an appreciable quantity of energy resources.

Known crude oil resources can be defined as the original oil in place less oil produced to date. Crude oil reserves are the estimated quantities of oil which are recoverable from known reservoirs under existing economic conditions and existing technology. Recent estimates by the American Petroleum Institute indicate there are 299 billion bbls of known resources that will never be produced under current economical and technological conditions. With 100% efficiency, this quantity of oil could provide sufficient energy for the U.S., exclusive of any other domestic production or imports, for almost 50 years. Recovery of this potential additional 299 billion bbls of oil is a problem that must be confronted by engineers and scientists engaged in secondary and tertiary recovery processes. If this nation is ever to approach self-sufficiency in energy needs, techniques must be developed to recover much of the oil that is known to be underground but cannot be recovered with conventional techniques.

Within the State of New Mexico, current estimates are that 10.7 billion bbls of oil will be left in the ground, under existing conditions, when primary and secondary oil recovery projects are abandoned. It is estimated that by using new high efficiency, exotic enhanced oil recovery techniques, recovery of the original oil in place can be increased 15%. A 10% increase

would add over one billion bbls to New Mexico oil reserves. However, these new techniques are costly, largely experimental, uncertain economically, and unproven in New Mexico reservoirs.

Of the 588 million bbls of present proven crude oil reserves, 96% are estimated to occur in Southeast New Mexico. Much of these oil reserves are held by the "independent oil operator" who, unlike a large major oil company, does not have the resource of a large research organization to properly evaluate and design these new exotic recovery systems. Independents vary from major oil companies in that they do not have a large number of projects that would justify field research on one project, at little or no profit, so that the information and experience could be applied to another project. Independents cannot spend money without a reasonable prospect of profit, and normally cannot afford the heavy front-end capital expense with the uncertain prospect of additional revenue several years down the road.

Clearly, the need exists in New Mexico for the development of enhanced oil recovery processes to enable the independent oil producer to profitably convert known resources to recoverable oil. If these processes are to have broad application, they must have utility on projects that have been waterflooded and are in advanced stages of depletion. Therefore, the purpose of this proposal will be to develop and demonstrate an economical enhanced oil recovery process in a mature waterflood in Southeast New Mexico. The property selected is the Russell Pool operated by Barber Oil Co.

The 800 feet deep Yates Sand Russell Pool, located about 14 miles northeast of Carlsbad, New Mexico, was discovered in 1942. By 1948, forty-nine wells had been drilled in the Pool. Due to the relatively low primary

production, the operator initiated a gas repressuring program in 1949. In 1953, with about 86% of the original oil in place remaining unrecovered, the operator installed a waterflood program. Although the waterflood has been quite successful, the project is nearing the economic limit with greater than 60% of the original oil in place still unrecovered. Based on the total productive 8511 acre-feet, this represents more than 4 million bbls of oil that will be left in the ground at the termination of secondary recovery operations. A properly designed enhanced oil recovery process should be capable of recovering an additional 1.5 million bbls of oil if the flood efficiency is maintained at the same level as during the secondary program. In order to determine whether this oil recovery potential is profitably obtainable, a field pilot program is proposed.

II. OBJECTIVES

Objectives of this research proposal are to:

1. Develop, in the laboratory, an improved oil recovery process for the Russell Field that is technically feasible and economically attractive to independent oil producers.

2. Demonstrate, in the field, the efficacy of the designed process and the economic feasibility of expanding the pilot test to field-wide injection.

3. Disseminate the information obtained to encourage other oil operators in the state to consider enhanced oil recovery processes to increase production from their leases.

In accomplishing these objectives, knowledge in the area of enhanced oil recovery will be advanced; engineering students at New Mexico Tech will be exposed to various aspects of oil recovery techniques; and, most importantly, processes will evolve to help New Mexico and this Nation meet their energy needs of the future.

III. RESEARCH PLAN AND PROCEDURES

Although the wells in this project are drilled on a close five-acre spacing, injection into a pilot area would still take several years to fully evaluate. In order to shorten this response time, additional wells will be drilled for the pattern area. Information obtained from these wells would be valuable in evaluating the present conditions in the reservoir and more clearly defining the enhanced oil recovery potential. Cores obtained from the wells will be used for laboratory evaluation of improved oil recovery processes. Drilling four wells around an existing producing well would be equivalent to 2.5-acre spacing which would be desirable for evaluating the pilot injection. These four wells would serve as injectors for the enhanced oil recovery compounds. While the process is being designed in the laboratory, tracers will be injected into these four wells to obtain an accurate picture of sweep efficiency in the pilot pattern area. Any severe permeability heterogeneity or channeling of injection water can be corrected before the enhanced oil recovery slug is injected.

Based on reservoir parameters and current state of the art, laboratory tests will be directed primarily toward surfactant/polymer investigation. Tests to be conducted will include:

- Determination of basic core data such as porosity, permeability, and residual oil saturation.

- Measurement of interfacial tension between oil/water and oil/surfactant solutions.

- Determination of the viscosities of various polymers in field water samples.

- Oil displacement tests in reservoir cores with both water and surfactant/polymer solutions.

- Determination of critical displacement ratios.

- Polymer shear degradation tests.

- Determination of optimum slug size and concentration of chemical flooding additives.

The first phase of the program will be to screen a variety of commercially available surfactants to determine the most cost-effective materials in reducing interfacial tensions. Similarly, commercially available polymers will be screened on a cost-performance basis to provide the required mobility control. Compounds displaying the desired properties will then be evaluated in dynamic flow tests in field reservoir cores. Loss of compounds as a result of adsorption or entrapment will be measured to determine the quantity of chemicals required to displace residual oil. Different slug sizes and concentrations will be investigated to determine the optimum concentrations of the chemical flooding additives. Additional compounds will be evaluated in an attempt to reduce loss of the surfactants and polymers to the reservoir rock. Requirements for buffer solutions will be determined. Incompatabilities or interactions between the various slug components will be studied. The goal of the laboratory testing will be to develop a process that will be economically acceptable to the independent oil operator.

When the process has been optimized in the laboratory, it will be scaled up to pilot test proportions. Cooperation with the field operator and the engineer for the project will include assistance in design of the field pilot project. This design assistance will include suggestions regarding such variables as optimum injection rates, volumes and composition of fluid injection systems as well as appropriate monitoring methods for produced fluids.

Information obtained from this investigation will be disseminated

in a series of technical reports. Detailed reports will be issued when the laboratory studies have been completed, and also after an evaluation of the pilot test production results.

IV. RELATED RESEARCH

Although the program outlined in this proposal is oriented toward a practical solution and is, by nature, applied research, the results of this testing will be correlated with more basic studies in progress at the New Mexico Petroleum Recovery Research Center. Capillary numbers and critical displacement ratios for the Yates Sand will be compared to the basic studies being conducted in both unconsolidated and consolidated porous media. Comparison will be made with reservoir rock samples obtained from other sources in New Mexico. When a sufficient amount of such data is available, it should be possible to predict the interfacial tension required for a successful enhanced oil recovery process.

V. FUNDING REQUIREMENTS

The Russell Field is in the last stage of waterflood production. It is nearing the economic limit and is not making significant money for the operator. Since production costs are kept to a minimum, the operator is able to keep the project in operation. Like most independent oil producers, the operator does not have the relatively large amount of capital necessary to design and conduct an enhanced oil recovery project. Therefore, unless measures are taken in the near future, this project will be abandoned, leaving unrecovered a significant amount of crude oil. Without financial assistance from the government, these measures cannot be taken. While it may be possible to conduct an enhanced oil recovery field trial after a waterflood project has been abandoned, there are economic and technological reasons to dictate that such trials be initiated before abandonment.

The Petroleum Recovery Research Center is a state agency with base funding of $290,000 per year. In addition, the State of New Mexico Legislature has been setting aside $2,000,000 per annum for research on new energy sources, of which no less than 15% is to be used for work on enhanced recovery of oil and gas provided that matching Federal funds are made available. This fund presently stands at $900,000. If this proposal is approved, the 50% funding from State sources for the proposed work will become available immediately.

VI. PROJECT PLAN OF EVENTS

A milestone chart showing major events is listed below:

Drill and Log 4 New 800' Injection Wells	Spring 1978
Core First Well Drilled	May 1978
Complete Wells and Inject Tracers	July 1978
Conduct Laboratory Testing	July-Oct. 1978
Evaluate Laboratory/Reservoir Data	Nov. 1978
Conduct Field Trial	First Quarter 1979
Evaluate Production Response	Spring 1979-Spring 1980
Disseminate Information	April 1980

VII. Premises, Facilities, Equipment and Materials Furnished by Contractor

The New Mexico Petroleum Recovery Research Center is temporarily located in the City of Socorro Research and Industrial Building. Permanent facilities on the campus of the New Mexico Institute of Mining and Technology are under construction and scheduled for completion by March 1, 1978. The new structure has been designed specifically for research on reservoir fluid mechanics of enhanced oil recovery processes.

The temporary laboratory is currently being furnished with equipment that is common for this type of research. Equipment presently on hand includes:

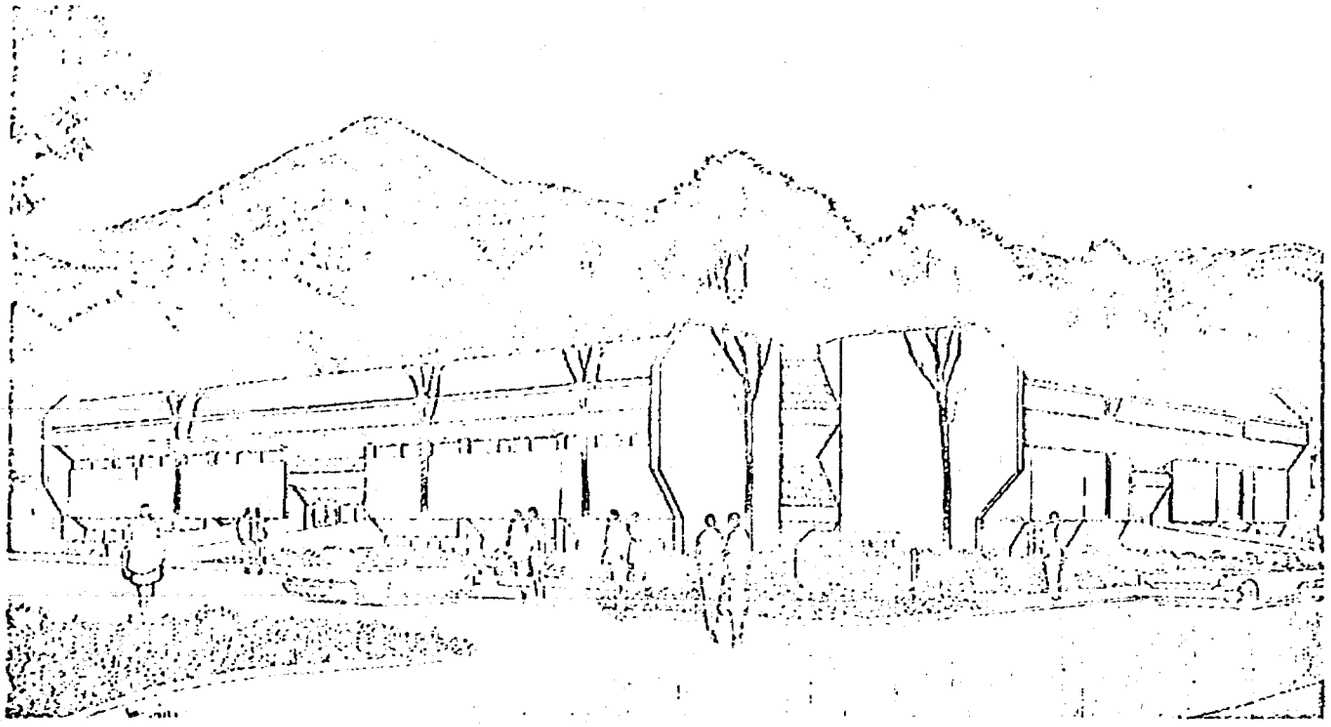
Micro-permeameter	$ 5,500
Core Holders	2,885
Ruska Positive Displacement Pump	29,000
Syringe Pump	2,800
Pressure Transducers & Recorder	6,000
Coring and Core Cutting Equipment	1,700
Spinning Drop Interfacial Tensiometer	4,000
Fraction Collector	1,500
5 Pumps (injection and vacuum)	1,950
Stereoscopic Microscope	1,115
Analytical and Top Loading Balances	8,300
Spectrophotometer	1,500

Various items common to laboratories of this type:

- Extraction Equipment
- Refrigerator
- Ovens
- Constant Temperature Bath
- Brookfield Viscometer
- pH Meters
- Centrifuge
- Surface Tensiometer

Items currently out for bid include:

High Pressure Liquid Chromatograph	$22,000
Porosimeter Modified for Capillary Pressure	6,800



ARCHITECT'S DRAWING OF THE NEW MEXICO PETROLEUM RECOVERY RESEARCH CENTER

12.

STAFF (December, 1976)

J. J. Taber, Director

Norman Morrow, Senior Scientist--Fundamental Studies of Oil Displacement

David Martin, Engineer--Improved Water and Polymer Flooding

B. Jack Gallaher, Business and Laboratory Manager--Structural Properties of Reservoir Rocks

Richard Nelson, Engineering Assistant--Core Preparation and Laboratory Flow Studies

Kartikay Sonrexa and Javed Arshed, Research Assistants--Loco Hills Tertiary Oil Recovery Project

Dora Kelley, Executive Secretary

Recruitment is underway for additional professional and support staff.

FOR ADDITIONAL INFORMATION: write or phone J. J. Taber or one of the above individuals at the New Mexico Petroleum Recovery Research Center, New Mexico Tech, Socorro, N. M. 87801.

Phone (505) 835-2910

New Mexico PETROLEUM RECOVERY RESEARCH CENTER

a division of

New Mexico Institute of Mining and Technology

Socorro, N. M. 87801

An Equal Opportunity/Affirmative Action Institution

WHAT IS THE CENTER?

The New Mexico Petroleum Recovery Research Center was established by the Board of Regents of New Mexico Institute of Mining and Technology in 1975 in response to the need for more research on the problems of oil recovery in the State of New Mexico. The Center's activities will span the range from basic laboratory research to field tests conducted jointly with industrial partners and other agencies such as ERDA.

BACKGROUND

In 1974 the New Mexico State Legislature provided funds from the Severance Tax Income to support energy research under the administration of the Board of Educational Finance. In 1975 the State Legislature transferred the responsibility for overseeing energy research to the Energy Resources Board. The research funds appropriated by the Legislature ($2,000,000 per year to date) may be used for all energy research areas. However, the Legislature has directed that no less than 15% of the funds shall go for research and demonstration projects in secondary and tertiary oil recovery if Federal matching funds are available. The Petroleum Recovery Research Center was established in response to this farsighted action by the Legislature.

LOCATION

The New Mexico Petroleum Recovery Research Center is a division of New Mexico Institute of Mining and Technology and has a close relationship with the Department of Petroleum and Mining Engineering as well as with the New Mexico Bureau of Mines and Mineral Resources. Graduate and undergraduate students work on research projects in the Center and some of the Petroleum Center staff members hold adjunct faculty appointments at the Institute.

The Center is now utilizing office and laboratory space in the City of Socorro Research and Industrial Building (former Eagle-Picher Building) a mile north of Socorro and only three minutes by car from the New Mexico Tech Campus.

NEW BUILDING

The Petroleum Recovery Research Center will move into a new building on the Tech Campus in December 1977. The two-story building will be solar heated and will provide modern laboratory and office space for approximately fifty people.

RESEARCH AREAS

Early emphasis will be placed on studies designed to get a good tertiary oil recovery process started in a New Mexico reservoir. Special attention will be given to the impact of the geological characteristics of the target reservoirs on the process considered. In addition, the Center will carry on research to improve established production methods such as water flooding.

Ultimately it is hoped that the Center will be composed of five or six major sections as follows:

Geology of New Mexico Reservoirs

Surfactant Flooding

Improved Water (and Polymer) Flooding

Miscible Flooding and Gas Injection

Basic Studies of the Oil Displacement Process

Thermal Recovery

NEW MEXICO TECH

New Mexico Institute of Mining and Technology is a small publicly supported university offering technical education through the doctoral level and conducting research and development in earth sciences, other basic sciences, and mineral engineering fields. Its four divisions are the College, the Research and Development Division, the State Bureau of Mines and Mineral Resources, and the Petroleum Recovery Research Center.

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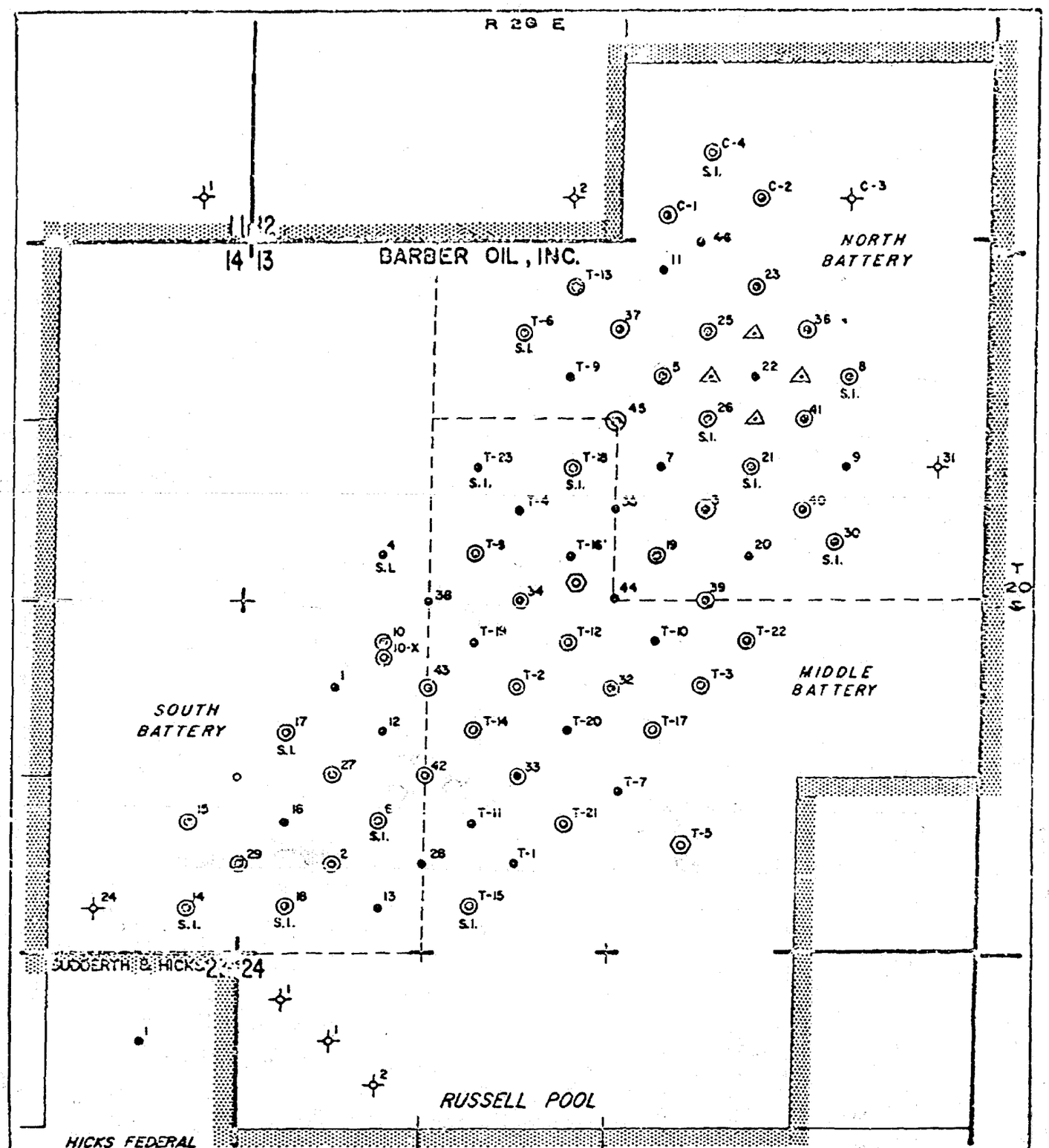
WELL LOCATIONS AND PROPOSED PILOT AREA

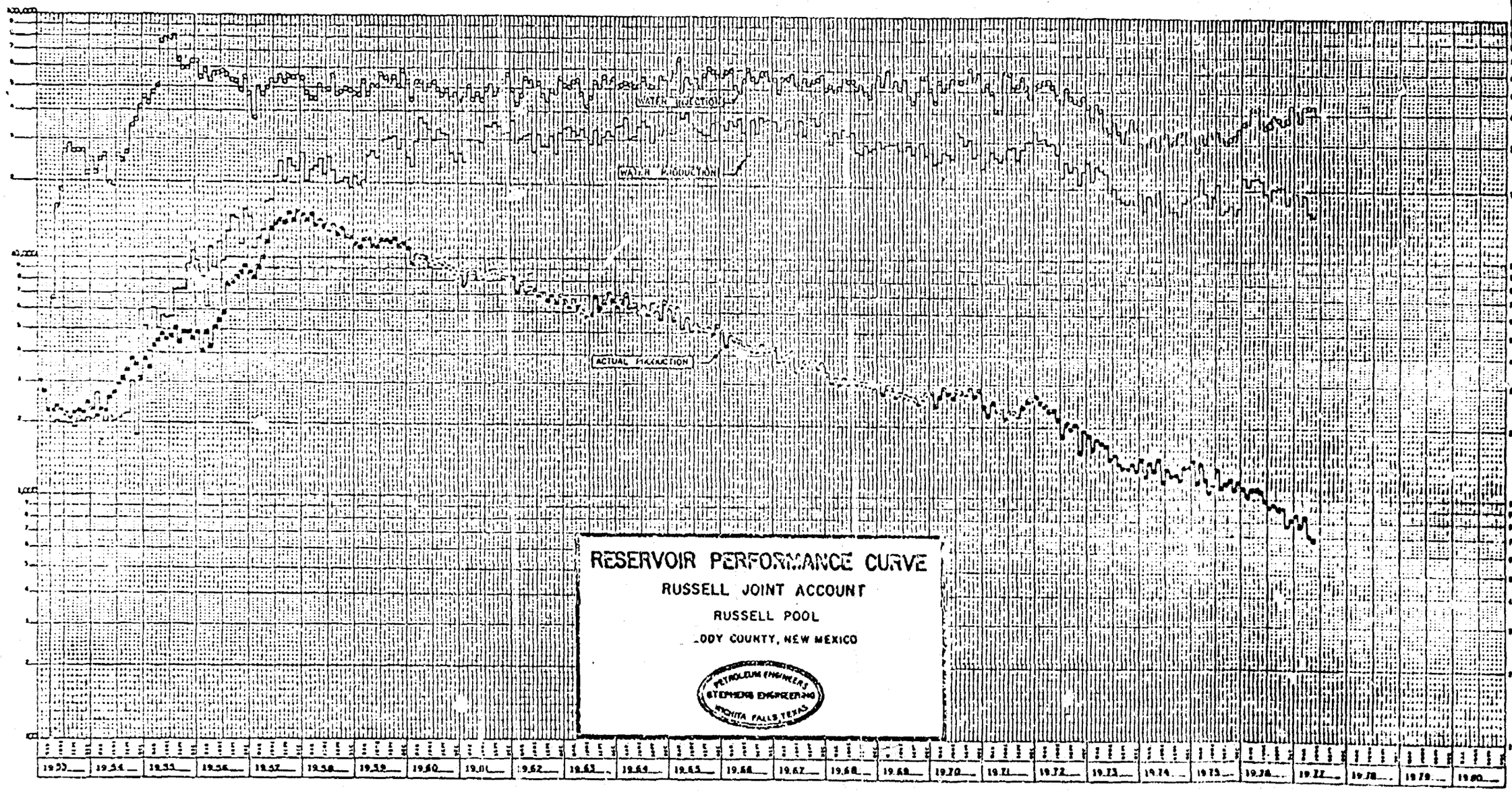


BARBER OIL, INC.
RUSSELL POOL
EDDY COUNTY, NEW MEXICO

SCALE

STEPHENS ENGINEERING
PETROLEUM ENGINEERS
WICHITA FALLS, TEXAS

△ Proposed Injection Wells to be Drilled


WATER INJECTION
WATER PRODUCTION
ACTUAL PRODUCTION
RESERVOIR PERFORMANCE CURVE
RUSSELL JOINT ACCOUNT
RUSSELL POOL
EDDY COUNTY, NEW MEXICO
PETROLEUM ENGINEERS
STEPHENS ENGINEERING
WICHITA FALLS, TEXAS
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CORE ANALYSIS DATA

WELL	10-X	30	27	26*	Average of These 4 Wells
Date	5/11/62	2/7/57	12/5/56	3/15/51	
Thickness, ft.**	14	13	19	20	***
Avg. Permeability, md	46	26	29	31	33 md
Avg. Porosity, %	20.7	16.3	16.2	19.7	18.2%
Residual Oil, %	11.6	24.8	21.4	28.4	21.6%
Connate Water, %	47	47	47	47.4	47%
Oil Place, Bbl/AF	810	633	633	705	695 Bbl/AF

*Well #26 was cored with oil, all others with water base mud.

**Oil bearing and horizontally permeable.

***Wells 10-X and 30 are edge wells where reservoir is thin and not representative of entire pool.

RESERVOIR CALCULATIONS

Reservoir Volume:	8511 Acre Ft.		
Total Primary Production		842,221 Bbls	99 Bbl/AF
Gas Repressure		152,867	18
Waterflood to Date		1,333,583	157
	Total	2,328,671 Bbls	274 Bbl/AF

Total Cumulative Water Injected to Date: 13,548,947 Bbls

Reservoir Pore Volume:

8511 AF x 7758 Bbl/AF x 0.182 = 12,017,157

Original Oil in Place

100-47 = 53% PV

0.53 x 12,017,157 = 6,369,093 Bbls

Total Oil Displaced:

$$\frac{2,328,671 \text{ Bbl}}{6,369,093 \text{ Bbl}} = 0.366 = 36.6\% \text{ of OOIP}$$

$$\frac{2,328,671}{12,017,157} = 0.194 = 19.4\% \text{ PV}$$

Current Oil Saturation in Reservoir:

100% - Oil Produced - Connate Water =

100 - 19.4 - 47 = 33.6% PV

0.336 x 12,017,157 = 4,037,765 Bbl

Enhanced Oil Recovery Potential

Assuming 40% efficiency

$0.40 \times 4,037,765 = 1.6 \times 10^{6}$ Bbls Oil

BUDGET

1.	Salaries and Wages *		$ 23,300
2.	Fringe Benefits		3,500
3.	Permanent Laboratory Equipment *		20,100
4.	Expendable Equipment and Supplies		2,500
5.	Engineering Costs *		7,000
6.	Cost of Report		1,000
7.	Other Direct Costs:		
		Computer	3,000
		Phone and Postage	400
8.	Field Costs *		322,200
9.	Total Direct Costs		$ 383,000
10.	Indirect Costs	(40% Salaries, Line 1)	9,320
11.	Total Project Costs		392,320
12.	Less Amount Contributed by Oil Producer		16,000
13.	State and Federal Sponsored Costs		$ 376,320
14.	Amount to be Contributed by New Mexico State Funds	(50%, Line 13)	$ 188,160
15.	Amount Requested from ERDA	(50%, Line 13)	$ 188,160

* See Detailed Attached Sheet

DETAIL OF BUDGET ITEMS

A. Salaries and Wages

Principal Investigator	12.5% of Yearly Rate for 2 Yrs.	$7,222
1 Petroleum Engineer	Full-time for 3 months	5,430
1 Graduate Student	Full-time for 3 months	1,800
1 Technician	Full-time for 3 months	2,250
Director - Petroleum Recovery Research Center	2.5% of Yearly Rate for 2 Yrs.	2,333
Section Leader - Basic Studies Petroleum Recovery Research Center	2.5% of Yearly Rate for 2 Years	1,644
Lab Manager	2.5% of Yearly Rate for 2 Yrs.	1,021
Secretary	15% of Yearly Rate for 2 Yrs.	1,600
		$23,300

B. Permanent Equipment

Additional core holders injection pumps, pressure transducers, pressure recorders, gas chromatograph	$20,100

C. Engineering Costs

Travel, record keeping, design, calculations, reporting:	
PRRC	2,000
Outside Engineering	5,000
	$ 7,000

D. Field Costs

Drill, log and core 1 well	20,000
Drill and log 3 wells @$15,000	45,000
Tubing and packers for 4 wells 3200' at $2.00/ft.	8,000
Surface lines, 2000' at $1.75/ft.	3,500
Injection pump	3.700
Separate production facilities	5,000
Cost of tracers	1,000
Operating cost (5 wells) Estimated - $8,000/year, 2 years	16,000
Chemical Slug Costs Estimated	220,000
	$322,200

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Apc EXHIBIT NO. 4
CASE NO. 7599

WATER FLOODING VALUATIONS RESERVOIR STUDIES

TELEPHONE - 817-723-2166

PETROLEUM ENGINEERS
STEPHENS ENGINEERING
WICHITA FALLS, TEXAS

POST OFFICE BOX-2249

WICHITA FALLS, TEXAS
76307

June 15, 1982

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
App. EXHIBIT NO. 5
CASE NO. 7599

Barber Oil, Inc.
P. O. Box 1658
Carlsbad, New Mexico 88220

Attn: Mr. Robert Light

Re: Proposed Surfactant Injection Program
Barber Oil Company
Russell Pool
Eddy County, New Mexico

Dear Mr. Light:

Reference is made to our letter of May 3, 1982 which indicates not only our recommendation that wells which are presently temporarily abandoned not be plugged and abandoned but further indicates the potentialities of future enhanced production from the Barber Oil, Inc., Russell Pool, Eddy County, New Mexico.

Following the writing of our letter of May 3, 1982, we have investigated other possibilities towards installing an enhanced recovery process on the above referred to property. This investigation has revealed that a successful surfactant injection program was carried out recently by Bridwell Oil Company in the Oscar Field, Jefferson County, Oklahoma. This particular process has the distinct advantage of utilizing the old wells which presently are not in use in the Russell Pool Area, but also offers additional recovery for a very limited capital outlay. Attached hereto is a Progress Report prepared on the Bridwell Oil Company, Oscar Field, Jefferson County, Oklahoma, as of January 1, 1982. As indicated in the attached report, the additional recovery from surfactant injection which began in mid 1973 was 22,800 gross barrels as of January 1, 1982. Additional recovery estimated from the project as of January 1, 1982 to the date in which the property will be plugged and abandoned is estimated at 65,880 gross barrels of oil. It is therefore indicated that the total additional recovery as a result of the surfactant injection program will be 88,680 barrels. As a result

of this recovery, the working interest income is estimated to be approximately $2,056,267 (88680 x .875 x $26.50). The total cost of the project to January 1, 1982 has been $112,000 for the purchase of the surfactant and after 1982 it is estimated to be $65,900 for surfactant and $751,275 for operations. This would indicate a total cost for the surfactant program of $929,175. Based on the previously anticipated working interest income and the expenses as quoted, a profit of $1,127,082 is indicated for this project. The acreage within the Oscar project is approximately 160 acres; therefore, the profit per acre of reservoir was $7,044.

Utilizing this data in relationship to the Russell Pool, which has approximately 783 productive acres the anticipated profit from a surfactant program is estimated to be $5,515,452. The additional recovery potential from a surfactant program is also estimated at 433,978 barrels based on the data obtained concerning the Bridwell-Oscar surfactant program.

As a result of obtaining this information, it is recommended that Barber Oil, Inc. approve a surfactant flood for installation in the Russell Pool Area. The area requested for test purposes is generally in the North Battery vicinity and utilizes wells No. 5, 25, 23, 26, 36, 21, 41 and 8 as injection points. This program should indicate maximum response at well No. 22 and partial response at wells No. 11, 46, 9, 20, and 7. Should this test prove satisfactory, additional injection points will be selected in order to expand the test facility towards the remaining portion of the Russell Pool Area. We are of the opinion that this test will take from four to six years in order to determine the benefits which were derived in the Oscar Field program. We are also of the opinion that this test should prove economical in the Russell Pool and derive additional profits and oil recovery for both the working interest and royalty interest ownerships.

Please review this recommendation and should you and your Board of Directors approve such a program, the installation of same can be accomplished in the very near future.

Should there be any questions concerning this recommendation, please do not hesitate to contact us.

Yours very truly,

STEPHENS ENGINEERING

Joe L. Johnson, Jr.

JLJjr/dk

PROGRESS REPORT
SURFACTANT AND POLYMER
INJECTION PROGRAM
AS OF JANUARY 1, 1982
BRIDWELL OIL COMPANY
OSCAR FIELD
JEFFERSON COUNTY, OKLAHOMA

WATER FLOODING VALUATIONS RESERVOIR STUDIES

TELEPHONE - 817-723-2166

PETROLEUM ENGINEERS
STEPHENS ENGINEERING
WICHITA FALLS, TEXAS

POST OFFICE BOX - 2249

WICHITA FALLS, TEXAS
76307

February 26, 1982

Bridwell Oil Company
P. O. Drawer 1830
Wichita Falls, Texas 76307

Attn: Mr. Bill Lane

Re: Progress Report
As of January 1, 1982
Surfactant and Polymer Injection Program
Bridwell Oil Company
Oscar Field
Jefferson County, Oklahoma

Gentlemen:

We have updated the performance data for the surfactant and polymer injection program in the Deese Sand reservoir underlying the Oscar Field in Jefferson County, Oklahoma, as of January 1, 1982. This will be the final Stephens Engineering progress report on this project.

We have furnished you in a separate letter average well tests and cumulative oil production by individual wells from April, 1973 through December, 1981 so that this information can be updated in the future by your office. We are also furnishing you a Page 1 of our normal monthly report showing the cumulative water injection prior to surfactant and the current and cumulative surfactant injection to date. This Page 1 also shows the cumulative oil production and pertinent recovery figures.

Included herein is a tabulation showing the monthly surfactant injection history along with average monthly concentration of Pluronic L64 surfactant. The cumulative surfactant injection as of January 1, 1982 was 5,595,140 barrels. Also included herein is the surfactant flood front map showing the locations of the flood fronts as of January 1, 1982. These flood front locations indicate that the majority of the reservoir has now been invaded

with surfactant treated water. In addition, we have included a tabulation showing the polymer injection history for wells No. 8 and 15 and an oil and water production history tabulation to bring the records up to date for the daily gauged oil production and for the water production based on the calculated water-oil ratios from well tests. Also included herewith is a reservoir performance curve showing the oil and water production and surfactant injection plotted through December, 1981.

The surfactant injection program has now progressed to the point where most of the reservoir has been invaded with surfactant treated water. Polymer was injected during 1981 into injection wells No. 8 and 15. The polymer injection history shown herein shows a total of 51,788 barrels of polymer solution injected for a total active polymer injection of 7,500 pounds. The Wohlgemuth well No. 8 took 2,190 pounds and well No. 15 took 4,310 pounds of polymer. The polymer injection commenced May 28, 1981 and ended September 7, 1981. The polymer initially was planned for maximum concentrations in the early stage of the polymer slug tapering to a low concentration by the end. However, problems with the polymer feed pumps resulted in the maximum polymer concentration being injected during the mid part of the slug. It was tapered thereafter over a period of approximately six to seven weeks. The polymer was preceded and followed by fresh water into each of these wells in order to act as a buffer to keep the reservoir brine from coming into direct contact with the polymer. It should be noted that the tabulations included herein showing cumulative surfactant injection include the fresh water and polymer solution injected into wells No. 8 and 15.

The enlarging of the farm stock pond to gain additional fresh water storage resulted in providing adequate water for the injection of polymer. The settling pit was constructed and worked satisfactorily although there was a problem initially with caving of the walls of this pit and some problems related to keeping the water clear. If polymer is injected into additional wells in the future, it is suggested that the pit be lined in some manner so as to prevent the caving problem. The chemicals utilized to clear up the water proved satisfactory and could be utilized later for this same purpose. The polymer was fed continuously throughout the 14.6 week period although some problems were encountered initially with the feed of the polymer into the fresh water system. These problems were corrected during the first few weeks of the polymer program.

The injection of polymer has not yet resulted in any appreciable increase in oil production on the project. The attached reservoir performance curve does show the oil production rate to have increased during the latter part of 1981; however, this may be the result of increased water injection into the reservoir during this same period of time. Additional time will be needed to determine if the polymer will result in any appreciable increase in oil production and to determine if polymer injection would be feasible

into other injection wells in the project. It is not believed that sufficient time has lapsed since polymer injection for the polymer to sweep an oil bank to the producing wells. Also it is too soon to determine if oil banks have actually been established in the reservoir from the polymer slugs injected into the Wohlgemuth wells No. 8 and 15.

It should be emphasized that the surfactant program followed by the injection of polymer into wells No. 8 and 15 is still in the experimental stage as a tertiary recovery project. It is believed that the surfactant definitely has shown increased incremental oil by flattening the oil production decline trend. The theory behind the program is to inject the surfactant over an extended period of time in order to invade a large portion of the reservoir with surfactant. The experimental work to date has indicated that the surfactant will make the reservoir pressure sensitive whereas a normal water flood is not pressure sensitive. The purpose of the polymer following the surfactant is to take advantage of the pressure sensitive reservoir by injecting the more viscous polymer slug which should result in the movement of additional mobile oil in the reservoir. The surfactant has not increased the oil production as much as had been anticipated, or actually as much as had been indicated during the early stage of the program when a definite increase in oil production occurred as the surfactant front reached well No. 14. The surfactant fronts have progressed by other wells in the reservoir without appreciable increases in oil production rates at these wells. As previously discussed, sufficient time has not passed to evaluate the injection of the polymer into the reservoir. If the polymer injection is successful in increasing the oil recovery, then the potentialitiy of injecting polymer into other injection wells should be evaluated.

The polymer injection did result in increasing the injection pressure at both wells No. 8 and 15. Well No. 8 was taking the fresh water prior to polymer injection at an average pressure of approximately 740 psig. The pressure showed an immediate increase within a few days to 840 psig after polymer injection was started and gradually increased to a maximum of 1,125 psig at the end of the polymer slug. Following this, the pressure declined to approximately 1,040 pounds one month after terminating polymer injection, and the pressure was still in this range during December, 1981 although the total injection rate has been increased into this well. Well No. 8 was returned to surfactant treated salt water injection on October 14, 1981. The Wheatley injection pump which had been utilized for the polymer was moved to the main plant and connected to well No. 8 to provide the higher pressure needed to inject water into this well. The injection pressure into well No. 15 was approximately 350 psig while injecting the fresh water buffer prior to polymer injection. The pressure increased to approximately 425 psig after one month of injecting polymer and remained relatively constant throughout the remaining polymer injection. The rate was increased into this well on October 14, 1981 when surfactant treated

salt water was resumed into this well and the pressure has averaged slightly over 400 psig since that time. Larger increases in pressure had been hoped for, particularly at well No. 15. Since it was desirable to establish a 25 psig pressure differential at the leading edge of the polymer bank in order to take full advantage of the surfactant injection, it was hoped that a pressure increase several times this magnitude would be achieved. If the polymer injection in time shows the feasibility of utilizing polymer injection into other wells, it is suggested that the concentration of polymer be increased, particularly in the first few weeks of the program. It is believed that it will take higher concentrations of polymer to accomplish higher viscosities for the pressure differential desired.

We will be pleased to discuss this progress report with you at your convenience.

Yours very truly,

STEPHENS ENGINEERING

Peyton S. Carnes, Jr.

PSCjr/dk

BRIDWELL OIL COMPANY
OSCAR FIELD
JEFFERSON COUNTY, OKLAHOMA

SURFACTANT INJECTION DATA

		Monthly Surfactant Injection, Bbl.	Pluronic L-64 Concentration, PPM
1973	Jun	26,706	200.0
	Jul	53,819	150.0
	Aug	53,694	104.4
	Sep	53,698	104.9
	Oct	55,455	104.1
	Nov	52,030	102.5
	Dec	55,724	101.2
1974	Jan	57,159	98.7
	Feb	51,938	96.6
	Mar	57,876	97.0
	Apr	57,618	98.5
	May	59,765	93.3
	Jun	57,097	97.1
	Jul	58,795	99.3
	Aug	59,238	97.5
	Sep	53,357	103.9
	Oct	59,399	96.2
	Nov	56,533	98.0
	Dec	59,391	96.8
1975	Jan	59,364	99.1
	Feb	50,001	104.0
	Mar	57,258	104.3
	Apr	56,211	103.7
	May	55,546	105.7
	Jun	55,711	103.2
	Jul	57,855	99.8
	Aug	57,973	100.3
	Sep	56,214	99.8
	Oct	57,067	100.8
	Nov	56,440	99.9
	Dec	59,093	99.4
1976	Jan	56,751	101.3
	Feb	53,023	102.9
	Mar	55,599	101.4
	Apr	54,573	103.1
	May	56,639	101.5
	Jun	55,102	101.7
	Jul	57,017	103.1
	Aug	56,609	103.0
	Sep	54,828	102.3

BRIDWELL OIL COMPANY
OSCAR FIELD
JEFFERSON COUNTY, OKLAHOMA

SURFACTANT INJECTION DATA (Cont'd)

		Monthly Surfactant Injection, Bbl.	Pluronic L-64 Concentration, PPM
1976	Oct	57,949	100.5
	Nov	55,600	100.2
	Dec	56,556	104.4
1977	Jan	54,513	112.5
	Feb	50,377	102.6
	Mar	57,349	102.3
	Apr	55,148	101.2
	May	54,424	104.0
	Jun	54,615	104.7
	Jul	53,655	98.2
	Aug	54,934	105.3
	Sep	54,159	103.1
	Oct	57,993	102.1
	Nov	55,396	101.8
	Dec	57,039	101.7
1978	Jan	55,832	105.3
	Feb	50,911	104.4
	Mar	59,151	99.6
	Apr	54,751	104.0
	May	55,900	103.7
	Jun	53,207	103.8
	Jul	55,041	99.3
	Aug	55,010	106.4
	Sep	56,786	100.4
	Oct	56,380	103.8
	Nov	55,918	100.2
	Dec	54,171	104.8
1979	Jan	55,557	100.4
	Feb	50,244	99.9
	Mar	50,549	114.9
	Apr	49,447	113.3
	May	53,915	107.6
	Jun	51,069	103.9
	Jul	52,862	106.9
	Aug	51,432	104.4
	Sep	50,686	109.7
	Oct	54,794	105.5
	Nov	53,014	105.0
	Dec	54,714	104.0

BRIDWELL OIL COMPANY
OSCAR FIELD
JEFFERSON COUNTY, OKLAHOMA

SURFACTANT INJECTION DATA (Cont'd)

		Monthly Surfactant Injection, Bbl.	Pluronic L-64 Concentration PPM
1980	Jan	52,889	104.0
	Feb	51,811	102.1
	Mar	53,888	106.3
	Apr	47,984	107.8
	May	54,202	104.9
	Jun	46,483	117.9
	Jul	46,774	114.2
	Aug	53,618	103.9
	Sep	48,880	100.6
	Oct	53,398	110.6
	Nov	48,438	108.4
	Dec	50,607	103.3
1981	Jan	54,173	108.5
	Feb	48,248	106.0
	Mar	51,543	109.5*
	Apr	54,330	132.1*
	May	56,383	128.9*
	Jun	55,862	131.4*
	Jul	58,633	131.6*
	Aug	55,370	144.1*
	Sep	50,557	143.5*
	Oct	49,778	122.5*
	Nov	52,562	101.3
	Dec	60,521	87.7

Cumulative surfactant injection as of 1-1-82 was 5,595,140 barrels. This total includes the fresh water and polymer solution pumped into wells No. 8 and 15.

*Adjusted for actual salt water injection excluding fresh water and polymer solution.

BRIDWELL OIL COMPANY
OSCAR FIELD
JEFFERSON COUNTY, OKLAHOMA

POLYMER INJECTION HISTORY

Year	Month	Polymer Injection					
		Well No. 8		Well No. 15		Total	
		Total Bbls.	Pounds 90L	Total Bbls.	Pounds 90L	Total Bbls.	Pounds 90L
1981	May	529	115	732	159	1,261	274
	Jun	6,636	909	8,545	1,171	15,181	2,080
	Jul	6,554	1,482	9,424	2,132	15,978	3,614
	Aug	7,049	614	8,765	764	15,814	1,378
	Sep	1,608	70	1,946	84	3,554	154
		22,376	2,190	29,412	4,310	51,788	7,500

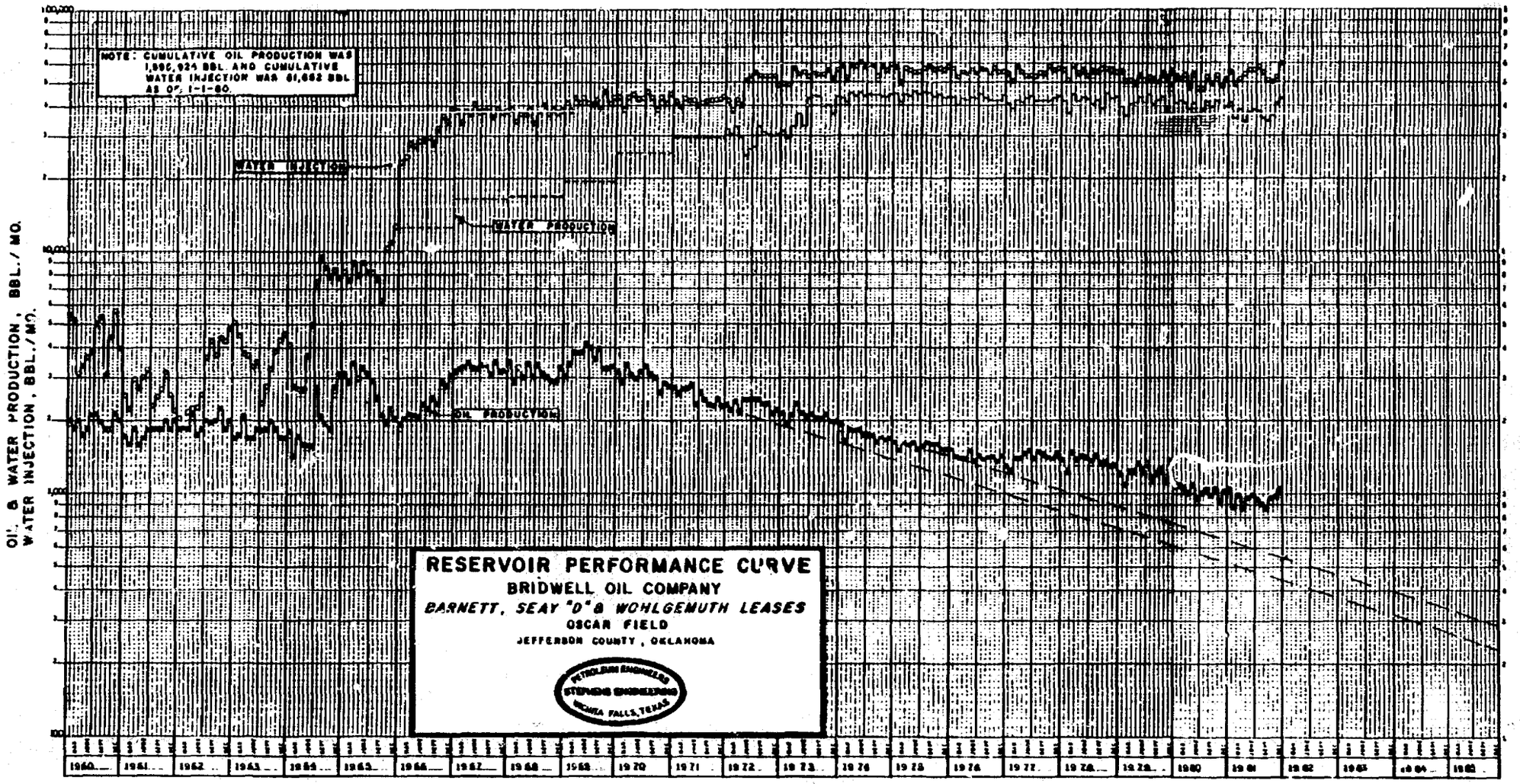
Note: Started Alcomer 90L Polymer on May 28, 1981 and finished on September 7, 1981 for total period of 102 days or 14.6 weeks. Injected fresh water buffer pad before and after polymer into each well as follows:

Well No.	Fresh Water Prepolymer Buffer		Fresh Water Postpolymer Buffer	
	Barrels	No. Days	Barrels	No. Days
8	13,352	63	8,058	37
15	15,316	63	9,704	37

BRIDWELL OIL COMPANY
OSCAR FIELD
JEFFERSON COUNTY, OKLAHOMA

OIL AND WATER PRODUCTION HISTORY
(Oil is daily gauged production and water production based on WOR)

Lease		Barnett		Seay "D"		Wohlgemuth		Total Oil Production		Total Water Production	
Year	Mo.	Avg. Mo. Oil Prod. Bbls.	Tot. Yrly Oil Prod. Bbls.	Avg. Mo. Oil Prod. Bbls.	Tot. Yrly Oil Prod. Bbls.	Avg. Mo. Oil Prod Bbls.	Tot. Yrly Oil Prod. Bbls.	Avg. Mo. Oil Prod. Bbls.	Tot. Yrly Oil Prod. Bbls.	Avg. Mo. Water Prod. Bbls.	Tot. Yrly Water Prod. Cbls.
Cum. Oil Prod. During Water Flood to 1-1-73			63,677		57,533		305,111		426,321		2,775,706
1973		248	2,975	333	3,992	1,496	17,953	2,077	24,920	38,215	458,577
1974		227	2,719	300	3,605	1,243	14,912	1,770	21,226	43,959	527,502
1975		208	2,502	253	3,035	1,125	13,496	1,586	19,033	44,084	529,007
1976		190	2,276	221	2,656	1,016	12,197	1,427	17,129	43,139	516,668
1977		187	2,240	194	2,327	1,031	12,376	1,412	16,943	42,155	505,861
1978		183	2,201	174	2,089	1,014	12,165	1,371	16,455	42,023	504,280
1979		177	2,122	150	1,803	910	10,918	1,237	14,843	41,650	499,795
1980	Jan	168		141		751		1,060		40,640	
	Feb	158		148		774		1,080		41,407	
	Mar	174		133		750		1,057		40,564	
	Apr	157		121		739		1,017		38,992	
	May	193		143		737		1,073		41,177	
	Jun	167		139		649		955		36,615	
	Jul	159		123		726		1,008		38,608	
	Aug	144		123		778		1,045		41,405	
	Sep	160		124		714		998		39,581	
	Oct	170		115		767		1,052		41,722	
	Nov	167		93		679		939		37,241	
	Dec	161	1,978	119	1,522	725	8,789	1,005	12,289	39,898	477,850
1981	Jan	171		139		726		1,036		40,912	
	Feb	152		129		612		893		35,265	
	Mar	187		119		671		977		38,542	
	Apr	184		154		530		868		34,277	
	May	187		157		613		957		37,792	
	Jun	179		145		660		984		38,858	
	Jul	173		153		632		958		37,831	
	Aug	186		131		594		911		35,936	
	Sep	173		128		578		879		34,712	
	Oct	178		127		630		935		36,923	
	Nov	167		112		697		976		40,855	
	Dec	159	2,096	118	1,612	765	7,708	1,042	11,416	43,660	455,563
Cum. to 1-1-82			84,786		80,174		415,625		580,585		7,250,809


NOTE: CUMULATIVE OIL PRODUCTION WAS 1,892,924 BBL. AND CUMULATIVE WATER INJECTION WAS 81,682 BBL AS OF 1-1-60.
WATER INJECTION
WATER PRODUCTION
OIL PRODUCTION
OIL & WATER PRODUCTION, BBL./MO.
WATER INJECTION, BBL./MO.
RESERVOIR PERFORMANCE CURVE
BRIDWELL OIL COMPANY
BARNETT, SEAY "D" & WOHLGEMUTH LEASES
OSCAR FIELD
JEFFERSON COUNTY, OKLAHOMA
PETROLEUM ENGINEERS
STEPHENS ENGINEERING
WICHITA FALLS, TEXAS
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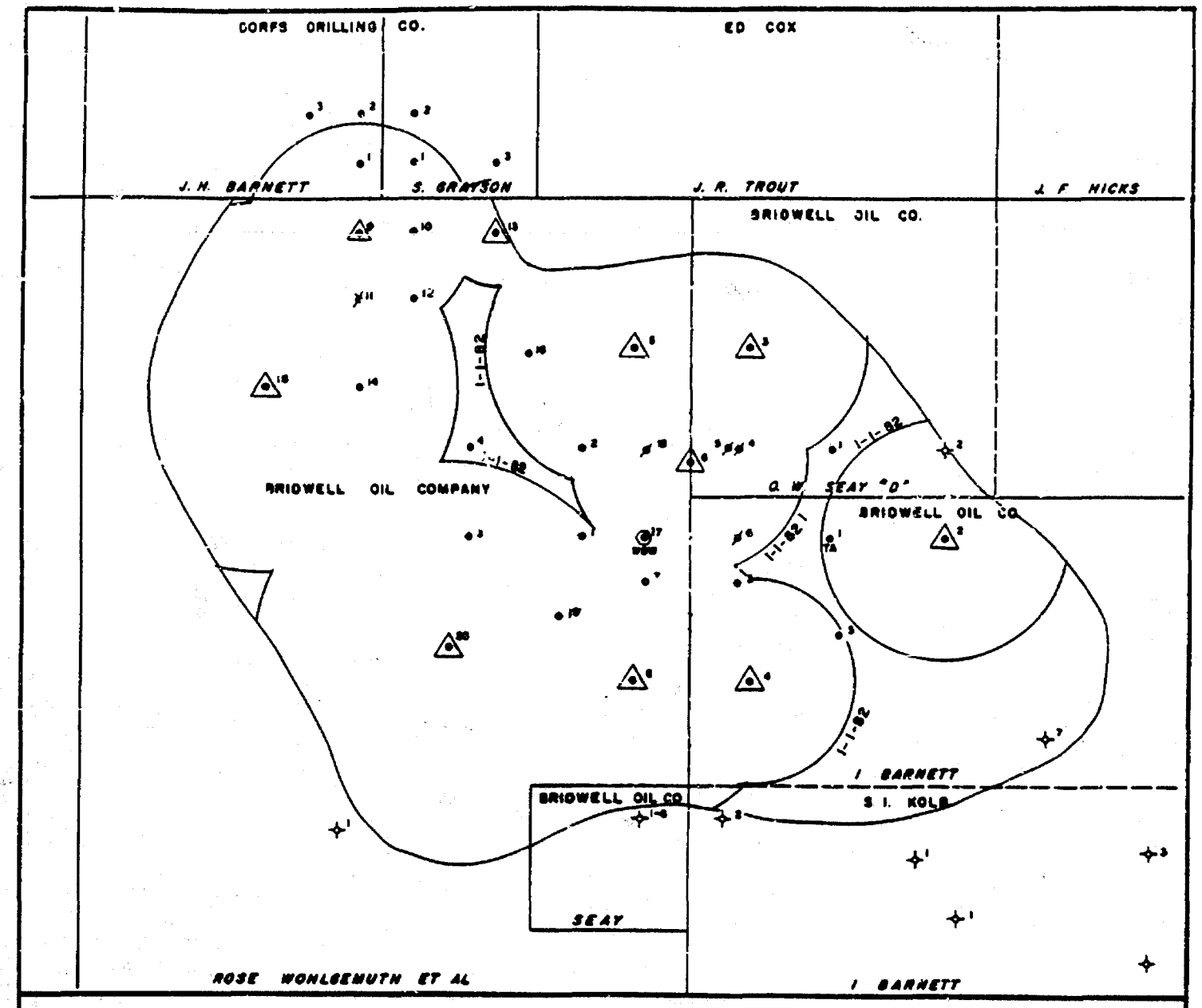

BRIDWELL OIL COMPANY

ROSE WOHLGEMUTH, O.W. SEAY "D" & I. BARNETT LEASES

OSCAR FIELD

JEFFERSON COUNTY, OKLAHOMA

◉ PRODUCING WELL
△ WATER INJECTION WELL
PLUGGED & ABANDONED
DRY HOLE

SURFACTANT FLOOD FRONTS
JANUARY 1, 1982

0' 330'

TELEPHONE - 817-723-2166

STEPHENS ENGINEERING
PETROLEUM ENGINEERS
WICHITA FALLS, TEXAS

POST OFFICE BOX-2249

WICHITA FALLS, TEXAS
76307

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
App. EXHIBIT NO. 6
CASE NO. 7599

July 19, 1982

Barber Oil, Inc.
P. O. Box 1658
Carlsbad, New Mexico 88220

Re: June, 1982, Monthly Report
Russell Pool Water Flood
Eddy County, New Mexico

Gentlemen:

Submitted herewith is the June, 1982 monthly report for the water flood operation being conducted on the Russell Pool Water Flood, Eddy County, New Mexico.

Following is a tabulation indicating the performance of this project over the past several months:

Month	North Battery BPD	South & Middle Batt., BPD	Avg. Prod. BPD	Total Water Injected	Input W/O Ratio, Mo.
May, 1982	4.8	18.5	23.3	19,276	26.66
June, 1982	4.4	17.4	21.8	18,462	28.14

As shown on the above tabulation, oil production from this project averaged 21.8 barrels of oil per day and can be compared to a production rate of 23.3 barrels of oil per day produced during the previous month. Based on this information, a decline in oil production of 1.5 barrels of oil per day has occurred in the project area during June, 1982. Analysis of the individual batteries indicate the majority of this decline in production occurred in the South and Middle Batteries Area.

Water injection into the project area averaged 615.4 barrels of water per day and can be compared to 621.8 barrels of water per day injected during the previous month. Based on this information, a decline in water injection of approximately 6.4 barrels of water per day has occurred in the project area during June, 1982.

Plans remain towards the increase in water injection in the North Battery Area. This work was due to begin during July, 1982, after being delayed due to weather conditions and trouble on other leases. Workovers are anticipated on several of the injection points during the next month in an effort to improve the injectivity and results of this work will be carried in future monthly reports.

Should there be any questions concerning this project, please do not hesitate to contact us.

Yours very truly,

STEPHENS ENGINEERING

Joe L. Johnson, Jr.

Ted H. Smith, Jr.

JLJjr/dk

MONTHLY WATER FLOOD REPORT June, 19 82

OPERATOR Barber Oil, Inc. LEASE Russell Pool

Water Flood Started April, 1953

PRODUCTION DATA

Water Input Month Bbls.	Mo. Net Inj. Bbls.	Mo. Prod. W/O Ratio	Mo. Prod. Water Bbls.	Monthly Prod. Oil & Water Bbls.	Accum. Water Prod. Bbls.
18,462	+5,324	19.58	12,842	13,138	-

AVERAGE DAILY OIL PRODUCTION 23.3 BBLS. (PREVIOUS MONTH)
AVERAGE DAILY OIL PRODUCTION 21.3 BBLS. (THIS MONTH)

Oil Prod. Month Bbls. *	Oil Prod. Month By Flooding Est. Bbls	Oil Prod. Month Normal Recovery Est. Bbls.	Accum. Prod. By Flooding Est. Bbls	Accum. Prod. by Normal Recov. During Flooding Est. Bbls	Accum. Prod. Prior To Flooding Bbls.	Total Accum. Prod. Bbls.
656	656	0	1,521,224	See Note	842,221	2,363,445

TOTAL ACRE FEET IN PROJECT 8,511
TOTAL ACRE FEET UNDER FLOOD 8,511
PRODUCTION PER ACRE FOOT PRIOR TO FLOODING 98.61 BBLS.
NORMAL PRODUCTION PER ACRE FOOT DURING FLOODING **BBLS.
PRODUCTION PER ACRE FOOT BY FLOODING 178.74 BBLS.
TOTAL PRODUCTION PER ACRE FOOT 277.35 BBLS.

WATER INJECTION DATA

Input Well No.	Avg. Press. Lbs.	Total Water Inj. Bbls.	Avg. Daily Input Bbls.	Rec. Daily Input Bbls.	Accum. Tot. Water Injected Bbls.	Acre Feet Invaded 100% Eff.	Recom. Daily Input Next Month Bbls.	Remarks
South Battery Area Injection								
2	0	0	0.0	0	603,501	-	0	
5	0	0	0.0	0	169,284	-	0	
10	0	0	0.0	0	293,167	-	0	
14	0	0	0.0	0	51,308	-	0	
15	0	0	0.0	0	374,691	-	0	
16	0	0	0.0	0	34,642	-	0	
18	0	0	0.0	0	74,735	-	0	
27	0	0	0.0	0	334,040	-	0	
28	0	0	0.0	0	61,860	-	0	
29	0	0	0.0	0	67,923	-	0	
42	0	0	0.0	0	78,141	-	0	
43	0	1,335	44.5	50	170,096	-	50	
Sub-Total		1,335	44.5	50	2,313,288	-	50	

TOTAL

NOTE: Daily Gauges, not E.B. Production **Includes 152,687 bbls. production recovered by gas injection during flooding as well as normal production. This total is included in the area total of accumulative production by flooding.

713 City National Building

P. O. Box 2249 — Phone 723-2167

MONTHLY WATER FLOOD REPORT June, 1982 1-A

OPERATOR Barber Oil, Inc. LEASE Russell Pool

Water Flood Started April, 1953

WATER INJECTION DATA

Input Well No.	Avg. Press. Lbs.	Total Water Inj. Bbls.	Avg. Daily Input Bbls.	Rec. Daily Input Bbls.	Accum. Tot. Water Injected Bbls.	Acre Feet Invaded 100% Eff.	Recom. Daily Input Next Month Bbls.	Remarks
Middle Battery Area Injection								
T-2	0	0	0.0	0	608,875	-	0	
T-3	0	0	0.0	0	465,943	-	0	
T-4	0	0	0.0	0	20,862	-	0	
T-8	700	4,226	140.9	150	1,079,658	-	150	
T-13	0	0	0.0	0	882,298	-	0	
T-14	700	1,556	51.9	60	1,227,139	-	60	
T-15	0	0	0.0	0	133,182	-	0	
T-17	0	445	14.8	10	104,921	-	10	
T-18	0	0	0.0	0	427,235	-	0	
T-21	0	0	0.0	0	333,815	-	0	
T-22	0	0	0.0	0	252,150	-	0	
32	700	3,336	111.2	140	274,846	-	140	
33	0	0	0.0	0	217,052	-	0	
34	0	0	0.0	0	436,798	-	0	
Sub-Total		9,563	318.8	360	6,464,774	-	360	
North Battery Area Injection								
3	700	2,225	74.2	100	357,449	-	100	
5	0	0	0.0	0	1,294,152	-	0	
8	0	0	0.0	0	747,615	-	0	
19	0	0	0.0	0	275,336	-	0	
21	0	0	0.0	0	786,666	-	0	
25	0	0	0.0	0	65,005	-	0	
30	0	0	0.0	0	141,346	-	0	
35	0	0	0.0	0	804	-	0	
36	0	0	0.0	0	125,364	-	0	
37	0	0	0.0	0	288,042	-	0	
TOTAL								

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MONTHLY WATER FLOOD REPORT June, 1982 1-A

OPERATOR Barber Oil, Inc. LEASE Russell Pool

Water Flood Started April, 1953

WATER INJECTION DATA

Input Well No.	Avg. Press. Lbs.	Total Water Inj. Bbls.	Avg. Daily Input Bbls.	Rec. Daily Input Bbls.	Accum. Tot. Water Injected Bbls.	Acre Fee Invade: 100% Eff.	Recom. Daily Input Next Month Bbls.	Remarks
North Battery Area Injection (Contd)								
38	0	0	0.0	0	95,858	-	0	
T-6	0	0	0.0	0	86,188	-	0	
T-13	0	0	0.0	0	491,206	-	0	
C-1	0	0	0.0	0	65,414	-	0	
C-3	0	0	0.0	0	386,726	-	0	
C-4	0	0	0.0	0	131,728	-	0	
40	700	5,339	178.0	200	304,647	-	200	
41	0	0	0.0	0	156,517	-	0	
45	0	0	0.0	0	225,906	-	0	
Sub-Total		7,564	252.1	300	6,791,942	-	300	
TOTAL		18,462	615.4	710	15,770,005	-	710	

713 City National Building

P. O. Box 2249 — Phone 723-2167

MONTHLY WATER FLOOD REPORT

Barber Oil, Inc. **OPERATOR** Russell Pool **LEASE**

June 19 82

INDIVIDUAL WELL TESTS

Well No	Test	Oil Bbl	Water Bbl	Total Fluid Bbl	Pump Capacity	Cumulative Oil Prod. Bbls.	Remarks
	Previous		SOUTH BATTERY AREA				
	This Mo.						
1	Previous	5	26	32	84	57,847	
	This Mo.	NT				57,892	
2	Previous	Shut-in					
	This Mo.						
12	Previous	2	19	21	71	62,694	
	This Mo.	NT				62,739	
13	Previous	2	10	12	96	44,438	
	This Mo.	NT				44,483	
14	Previous	Converted to Water Injection				0	
	This Mo.						
15	Previous	Converted to Water Injection				15,996	
	This Mo.						
16	Previous	2	6	8	96	15,390	
	This Mo.	NT				15,420	
28	Previous	1	23	24	72	15,741	
	This Mo.	NT				15,786	
38	Previous	1	20	21	84	13,106	
	This Mo.	NT				13,151	
42	Previous	Converted to Water Injection				0	
	This Mo.						
43	Previous	Converted to Water Injection				1,940	
	This Mo.						
	Previous						
	This Mo.						
	Previous						
	This Mo.						
	Previous						
	This Mo.						
	Previous						
	This Mo.						
	Previous						
	This Mo.						

	Previous Month	This Month
Total Oil Tests		
Total Water Tests		
Total Fluid Tests		
Avg. Prod. WOR		

713 City National Building

STEPHENS ENGINEERING

P. O. Box 2249—Phone (817) 723-2167

MONTHLY WATER FLOOD REPORT

Barber Oil, Inc. **OPERATOR** Russell Pool **LEASE**

June 19 82

INDIVIDUAL WELL TESTS

Well No	Test	Oil Bbl.	Water Bbl.	Total Fluid Bbl.	Pump Capacity	Cumulative Oil Prod. Bbls.	Remarks
	Previous						
	This Mo.		MIDDLE BATTERY AREA				
32	Previous	Converted to Injection Well				19,403	
	This Mo.						
33	Previous	Converted to Injection Well				5,732	
	This Mo.						
34	Previous	Converted to Injection Well				1,674	
	This Mo.						
44	Previous	Shut-in				10,879	
	This Mo.						
T-1	Previous	Shut-in				8,185	
	This Mo.						
T-2	Previous	Converted to Injection Well				9,936	
	This Mo.						
T-3	Previous	Converted to Injection Well				468	
	This Mo.						
T-4	Previous	1	62	63	100	21,046	
	This Mo.	NT				21,091	
T-7	Previous	Shut-in				7,245	
	This Mo.						
T-10	Previous	2	26	18	126	101,783	
	This Mo.	NT				101,813	
T-11	Previous	1	27	28	144	93,117	
	This Mo.	NT				93,162	
T-16	Previous	12	144	156	300	160,566	
	This Mo.	NT				160,609	
T-19	Previous	3	84	88	145	116,766	
	This Mo.	NT				116,811	
T-20	Previous	2	68	70	171	94,604	
	This Mo.	NT				94,664	
T-23	Previous	Shut-in				4,626	
	This Mo.						
	Previous						
	This Mo.						

	Previous Month	This Month
Total Oil Tests		
Total Water Tests		
Total Fluid Tests		
Avg. Prod. WOR		

713 City National Building

PETROLEUM ENGINEERS STEPHENS ENGINEERING WICHITA FALLS, TEXAS

P. O. Box 2249—Phone (817) 723-2167

MONTHLY WATER FLOOD REPORT

Barber Oil, Inc. **OPERATOR** Russell Pool **LEASE**

June, 19 82

INDIVIDUAL WELL TESTS

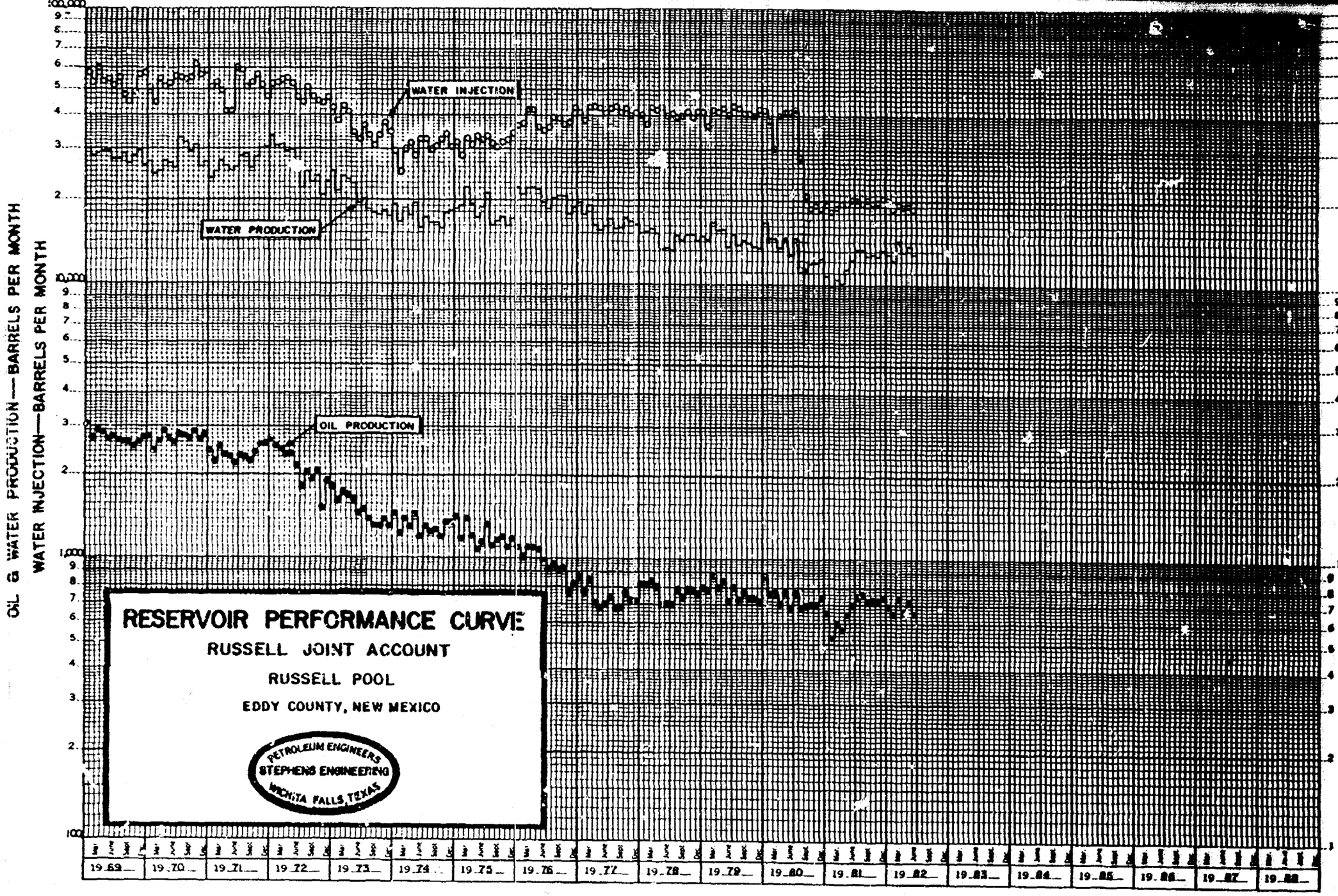
Well No.	Test	Oil Bbl.	Water Bbl.	Total Fluid Bbl.	Pump Capacity	Cumulative Oil Prod. Bbls.	Remarks
	Previous						
	This Mo.		NORTH BATTERY AREA				
7	Previous	1	68	69	230	104,644	
	This Mo.	NT				104,674	
9	Previous	1	24	25	76	43,789	
	This Mo.	NT				43,804	
11	Previous	6	35	41	144	154,022	
	This Mo.	NT				154,035	
20	Previous	1	12	13	59	45,090	
	This Mo.	NT				45,105	
22	Previous	1	28	29	132	86,187	
	This Mo.	NT				86,217	
35	Previous	Shut-in				15,520	
	This Mo.						
46	Previous	3	120	123	300	9,466	
	This Mo.	NT				9,496	
T-6	Previous	Shut-in				21,482	
	This Mo.						
	Previous						
	This Mo.						
	Previous						
	This Mo.						
	Previous	Note: The following wells converted to injection indicated the cumulative oil production prior to conversion.					
	This Mo.						
		3				26,601	
	Previous	25				2,920	
	This Mo.	26				6,789	
		36				14,241	
	Previous	39				12,214	
	This Mo.	40				4,190	
		41				8,340	
	Previous	45				505	
	This Mo.	C-1				35,308	
		C-2				8,807	
	Previous						
	This Mo.						

	Previous Month	This Month
Total Oil Tests	47	NT
Total Water Tests	795	
Total Fluid Tests	842	
Avg. Prod. WOR	16.91	

713 City National Building

STEPHENS ENGINEERING WICHITA FALLS, TEXAS

P. O. Box 2249—Phone (817) 723-2167


OIL & WATER PRODUCTION—BARRELS PER MONTH
WATER INJECTION—BARRELS PER MONTH
WATER INJECTION
WATER PRODUCTION
OIL PRODUCTION
RESERVOIR PERFORMANCE CURVE
RUSSELL JOINT ACCOUNT
RUSSELL POOL
EDDY COUNTY, NEW MEXICO
PETROLEUM ENGINEERS
STEPHENS ENGINEERING
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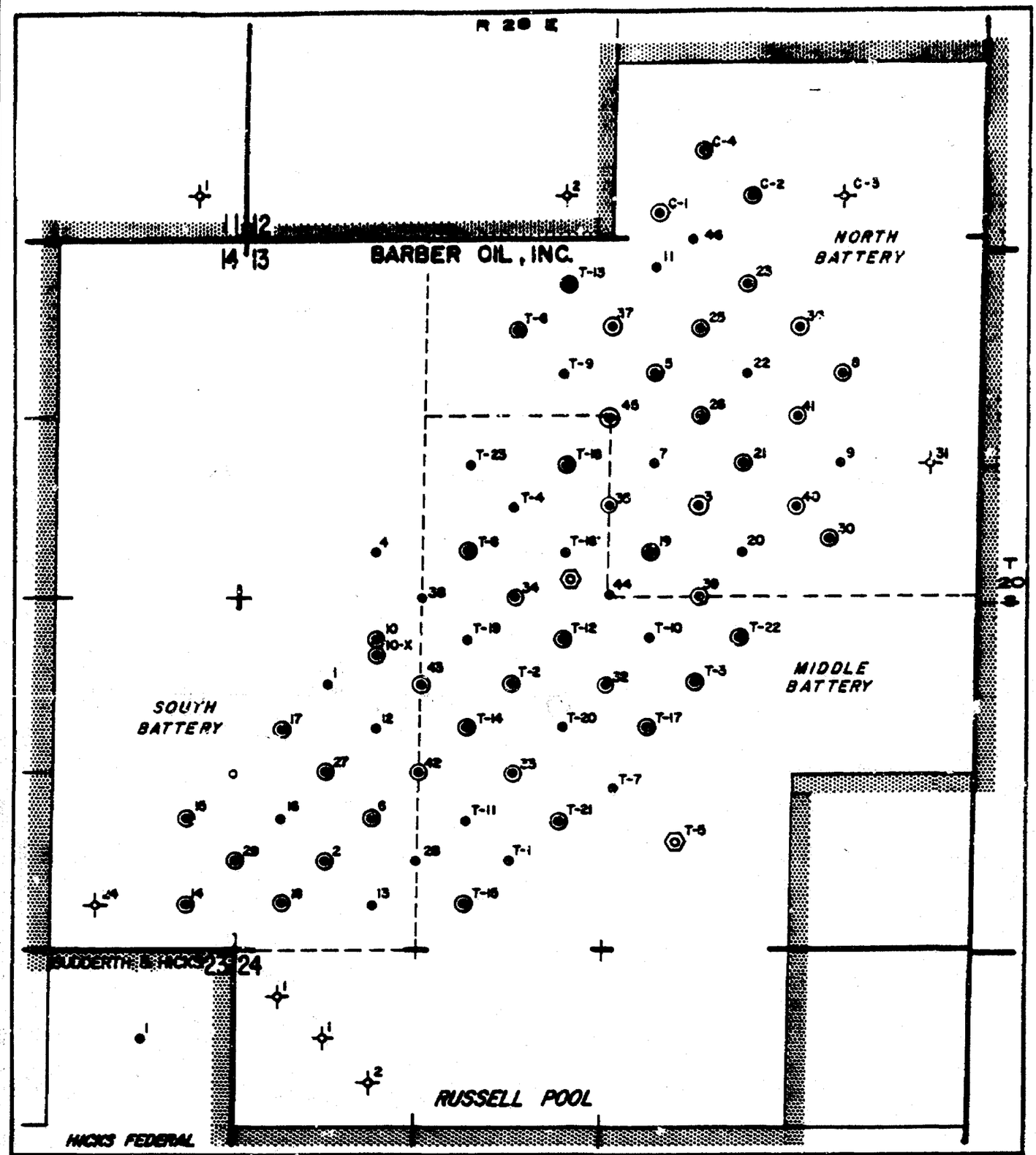

LEGEND

- PRODUCING OIL WELL
- WATER INJECTION WELL
- WATER SUPPLY WELL
- DRY HOLE
- LEASE AREA

BARBER OIL, INC.
RUSSELL POOL
EDDY COUNTY, NEW MEXICO

SCALE

halco®

NATIONAL ALUMINATE CORPORATION
6216 West 66th Place Chicago 38, Illinois

REPORT OF INJECTION WATER ANALYSIS

From Russell Joint Acct.
Carlsbad, New Mexico

Analysis No. 194953
Sampling Date 3/28/58
Date Sample Rec'd 4/4/58

Sample Marked No. 1 Supply Well

MILLIGRAMS PER LITER

Chloride (as NaCl)	27,000
Total Hardness (as $CaCO_3$)	5,200
Calcium Hardness (as $CaCO_3$)	2,900
Total Alkalinity (as $CaCO_3$)	548
Acidity to Phenolphthalein (as $CaCO_3$)	36
Sulfate (as Na_2SO_4)	4,130
Total Iron (as Fe)	1.6
Suspended Solids	30*
Precipitated By Sulfate (as $BaSO_4$)	0
Dissolved Solids	29,700
Barium as $BaSO_4$	0
pH	7.20
Specific Gravity	1.0175

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
EXHIBIT NO. 7
CASE NO. 7599.

*ESTIMATED

4/29/58

Head, Analytical Laboratory

halco®

NATIONAL ALUMINATE CORPORATION
6216 West 66th Place Chicago 38, Illinois

REPORT OF INJECTION WATER ANALYSIS

From Russell Joint Acct.
Carlsbad, New Mexico

Analysis No. 19495
Sampling Date 3/28/58
Date Sample Rec'd 4/4/58

Sample Marked No. 2 Supply Well

	MILLIGRAMS PER LITER
Chloride (as NaCl)	24,000
Total Hardness (as $CaCO_3$)	4,800
Calcium Hardness (as $CaCO_3$)	2,400
Total Alkalinity (as $CaCO_3$)	504
Acidity to Phenolphthalein (as $CaCO_3$)	0
Sulfate (as Na_2SO_4)	3,740
Total Iron (as Fe)	2.4
Suspended Solids	70
Precipitated By Sulfate (as $BaSO_4$)	0
Dissolved Solids	27,500
Barium as $BaSO_4$	0
pH	7.80
Specific Gravity	1.0154

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
EXHIBIT NO. 8
CASE NO. 1599

*ESTIMATED

4/29/58

Head, Analytical Laboratory

Dockets Nos. 25-82 and 26-82 are tentatively set for August 4 and August 18, 1982. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: EXAMINER HEARING - WEDNESDAY - JULY 21, 1982

9 A.M. - MORGAN HALL, OIL CONSERVATION DIVISION, STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO.

The following cases will be heard before Daniel S. Nutter, Examiner, or Richard L. Stamets, Alternate Examiner.

ALLOWABLE: (1) Consideration of the allowable production of gas for August, 1982, from fifteen prorated pools in Lea, Eddy, and Chaves Counties, New Mexico.

(2) Consideration of the allowable production of gas for August, 1982, from four prorated pools in San Juan, Rio Arriba, and Sandoval Counties, New Mexico.

CASE 7560: (Continued from July 7, 1982, Examiner Hearing)

In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Charles H. Heisen, Fidelity and Deposit Company of Maryland, Surety, and all other interested parties to appear and show cause why the Crownpoint Well No. 1, located in Unit F, Section 18, Township 18 North, Range 13 West, McKinley County, should not be plugged and abandoned in accordance with a Division-approved plugging program.

CASE 7599: (Continued from June 9, 1982, Examiner Hearing)

Application of Barber Oil Inc. for an Exception to Rule 705-A Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an exception to the provisions of Rule 705-A of the Division Rules and Regulations to permit 37 temporarily abandoned injection wells in its Russell Pool waterflood project to remain inactive for a period of up to three years without the required cement or bridge plugs being installed therein to isolate the injection zone.

CASE 7622: Application of El Ran, Inc. for a waterflood project, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in the Chaveroo-San Andres Pool by the injection of water into the perforated interval from 4169 feet to 4276 feet in its U. S. Well No. 1, located in Unit N of Section 34, Township 7 South, Range 32 East.

CASE 7516: (Continued from May 12, 1982, Examiner Hearing)

Application of Benson-Montin-Greer for a unit agreement, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval for the North Canada Ojitos Unit Area, comprising 12,361 acres, more or less, of Jicarilla Apache Indian lands in Township 27 North, Range 1 West.

CASE 7623: Application of C & K Petroleum, Inc. for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Abo formation underlying the SE/4 SE/4 of Section 28, Township 16 South, Range 37 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of the applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7620: (Continued from July 7, 1982, Examiner Hearing)

Application of Mesa Petroleum Company for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in all formations from the surface through the base of the Abo formation underlying the SW/4 of Section 8, Township 5 South, Range 33 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7624: Application of John Yuronka for an unorthodox gas well location and compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Jalmat Gas Pool underlying the SW/4 of Section 31, Township 22 South, Range 37 East, to form a non-standard gas proration unit to be dedicated to a well to be drilled at an unorthodox location 990 feet from the South line and 330 feet from the West line of said Section 31. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7618: (Readvertised)

Application of Doyle Hartman for an unorthodox gas well location and simultaneous dedication, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a gas well to be drilled 1450 feet from the South line and 1980 feet from the East line of Section 20, Township 20 South, Range 37 East, Eumont Gas Pool, the SE/4 of said Section 20 to be simultaneously dedicated to said well and to the State A-20 Well No. 1 located in Unit I of said Section 20.

CASE 7625: Application of GHW Corp. for designation of a tight formation, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Pawnee Strawn Reservoir underlying Sections 9 and 10, 14 thru 16, 21 thru 24, and 26 and 27, Township 26 South, Range 36 East, containing 7,040 acres, more or less, as a tight formation pursuant to Section 107 of the Natural Gas Policy Act and 18 CFR Section 271. 701-705.

CASE 7626: In the matter of the hearing called by the Oil Conservation Division on its own motion for an order creating, contracting, and extending certain pools in Rio Arriba, San Juan, McKinley, and Sandoval Counties, New Mexico.

(a) That the Otero-Gallup Oil Pool in Rio Arriba County, New Mexico, as heretofore classified, defined and described, is hereby contracted by excluding:

TOWNSHIP 25 NORTH, RANGE 5 WEST, NMPM
Section 35: W/2 SW/4

(b) That a new pool in Rio Arriba County, New Mexico, classified as a Chacra Pool for gas production, is hereby created and designated the Adobe-Chacra Pool, comprising the following described area:

TOWNSHIP 24 NORTH, RANGE 4 WEST, NMPM
Section 13: S/2
24: E/2

(c) That a new pool in San Juan County, New Mexico, classified as a Gallup Pool for oil production, is hereby created and designated the Armenta-Gallup Oil Pool, comprising the following described area:

TOWNSHIP 29 NORTH, RANGE 10 WEST, NMPM
Sections 26: SW/4
27: S/2
28: E/2 SW/4 and SE/4
33: E/2 NW/4 and NE/4
34: N/2
35: N/2 and N/2 SE/4

(d) That a new pool in San Juan County, New Mexico, classified as a gas pool for Fruitland production, is hereby created and designated the Glades-Fruitland Pool, comprising the following described area:

TOWNSHIP 32 NORTH, RANGE 11 WEST, NMPM
Section 31: NW/4

TOWNSHIP 32 NORTH, RANGE 12 WEST, NMPM
Sections 35: N/2 and SE/4
36: N/2 and SW/4

(e) That a new pool in Sandoval County, New Mexico, classified as a Mancos pool for oil production, is hereby created and designated the San Ysidro-Mancos Oil Pool, comprising the following described area:

TOWNSHIP 21 NORTH, RANGE 3 WEST, NMPM
Section 29: S/2 SW/4
30: E/2 E/2 and SW/4 SE/4

(f) That the Albino-Pictured Cliffs Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 32 NORTH, RANGE 8 WEST, NMPM
Sections 11: S/2
13: W/2 and NE/4
14: E/2 and SW/4
26: NE/4

TOWNSHIP 32 NORTH, RANGE 7 WEST, NMPM
Section 18: NW/4

(g) That the Angel Peak-Gallup Associated Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 27 NORTH, RANGE 10 WEST, NMPM
Sections 22: All
27: N/2

(h) That the Aztec-Fruitland Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 28 NORTH, RANGE 10 WEST, NMPM
Section 9: SE/4

TOWNSHIP 29 NORTH, RANGE 11 WEST, NMPM
Sections 25: SE/4
33: N/2

(i) That the Aztec-Pictured Cliffs Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 31 NORTH, RANGE 12 WEST, NMPM
Sections 14: SE/4
35: NE/4

(j) That the B S Mesa Gallup Pool in Rio Arriba County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 26 NORTH, RANGE 4 WEST, NMPM
Section 9: W/2 and SE/4

(k) That the Ballard-Pictured Cliffs Pool in Rio Arriba, Sandoval, and San Juan Counties, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 23 NORTH, RANGE 3 WEST, NMPM
Sections 25: All
36: N/2

TOWNSHIP 24 NORTH, RANGE 5 WEST, NMPM
Sections 6: NW/4
16: SE/4

TOWNSHIP 25 NORTH, RANGE 6 WEST, NMPM
Sections 27: SW/4
34: N/2
35: NW/4

TOWNSHIP 26 NORTH, RANGE 7 WEST, NMPM
Section 19: N/2 and SE/4

TOWNSHIP 26 NORTH, RANGE 8 WEST, NMPM
Sections 9: SE/4
10: All
15: NE/4

(l) That the Bisti-Farmington Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 25 NORTH, RANGE 12 WEST, NMPM
Section 3: SW/4

TOWNSHIP 26 NORTH, RANGE 12 WEST, NMPM
Sections 31: E/2
32: All

(m) That the Bisti-Lower Gallup Oil Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 24 NORTH, RANGE 10 WEST, NMPM
Section 9: N/2 NW/4

(n) That the Blanco Mesaverde Pool in Rio Arriba and San Juan Counties, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 25 NORTH, RANGE 3 WEST, NMPM
Sections 8: E/2
16: All
17: All
20: N/2
21: W/2

TOWNSHIP 25 NORTH, RANGE 5 WEST, NMPM
Sections 1: All
2: All

TOWNSHIP 26 NORTH, RANGE 5 WEST, NMPM
Sections 17: W/2
18: E/2
20: W/2
27: S/2

TOWNSHIP 26 NORTH, RANGE 6 WEST, NMPM
Sections 23: All
24: W/2

TOWNSHIP 27 NORTH, RANGE 9 WEST, NMPM
Section 6: E/2

TOWNSHIP 29 NORTH, RANGE 10 WEST, NMPM
Sections 7: All
15: N/2
18: All
19: All
30: All

TOWNSHIP 29 NORTH, RANGE 11 WEST, NMPM
Sections 1, 12, 13, 24, 25: All

TOWNSHIP 30 NORTH, RANGE 11 WEST, NMPM
Sections 8: All
9: All

TOWNSHIP 31 NORTH, RANGE 5 WEST, NMPM
Sections 7: All
8: W/2

TOWNSHIP 31 NORTH, RANGE 12 WEST, NMPM
Section 31: All

(o) That the Blanco-Pictured Cliffs Pool in Rio Arriba, San Juan, and Sandoval Counties, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 28 NORTH, RANGE 7 WEST, NMPM
Section 8: All

TOWNSHIP 29 NORTH, RANGE 7 WEST, NMPM
Section 31: SE/4

TOWNSHIP 30 NORTH, RANGE 8 WEST, NMPM
Section 20: S/2

TOWNSHIP 31 NORTH, RANGE 10 WEST, NMPM
Section 25: NW/4

TOWNSHIP 32 NORTH, RANGE 10 WEST, NMPM
Section 29: NE/4

TOWNSHIP 32 NORTH, RANGE 11 WEST, NMPM
Section 10: W/2

TOWNSHIP 32 NORTH, RANGE 12 WEST, NMPM
Sections 15: S/2
35: NW/4

(p) That the East Blanco-Pictured Cliffs Pool in Rio Arriba County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 30 NORTH, RANGE 4 WEST, NMPM
Sections 11: SE/4
14: E/2
26: W/2
35: NW/4

(q) That the South Blanco-Pictured Cliffs Pool in Rio Arriba, Sandoval, and San Juan Counties, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 24 NORTH, RANGE 1 WEST, NMPM
Sections 17: SW/4
18: W/2

TOWNSHIP 26 NORTH, RANGE 7 WEST, NMPM
Section 17: SE/4

TOWNSHIP 26 NORTH, RANGE 8 WEST, NMPM
Sections 3: S/2 and NW/4
4: SE/4

TOWNSHIP 28 NORTH, RANGE 7 WEST, NMPM
Sections 10: All
11: All
15: NW/4

(r) That the Bloomfield-Chacra Pool in San Juan County,New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 29 NORTH, RANGE 10 WEST, NMPM
Section 30: N/2

TOWNSHIP 29 NORTH, RANGE 11 WEST, NMPM
Sections 20: W/2
25: SE/4
26: S/2
29: All
30 NE/4
31: N/2
32: N/2
33: N/2 and SE/4

(s) That the Bloomfield-Farmington Oil Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 29 NORTH, RANGE 11 WEST, NMPM
Sections 25: SW/4
26: SE/4 SE/4

(t) That the Cha Cha-Gallup Oil Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 28 NORTH, RANGE 13 WEST, NMPM
Section 22: W/2 SW/4

TOWNSHIP 29 NORTH, RANGE 14 WEST, NMPM
Sections 7: S/2 SW/4
18: N/2

TOWNSHIP 29 NORTH, RANGE 15 WEST, NMPM
Sections 1: S/2 SW/4
13: NW/4

(u) That the Chacon-Dakota Associated Pool in Rio Arriba and Sandoval Counties, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 22 NORTH,RANGE 2 WEST, NMPM
Section 7: SW/4

TOWNSHIP 22 NORTH, RANGE 3 WEST, NMPM
Sections 1: E/2
3: NW/4
10: E/2
11: All
12: All

TOWNSHIP 23 NORTH, RANGE 3 WEST, NMPM
Sections 2: W/2
11: NE/4
36: SW/4

TOWNSHIP 24 NORTH, RANGE 3 WEST, NMPM
Sections 15: SW/4
16: E/2 and NW/4
22: NW/4
26: NW/4
27: NE/4

(v) That the Choza Mesa-Pictured Cliffs Pool in Rio Arriba County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 29 NORTH, RANGE 3 WEST, NMPM
Section 29: SW/4

(w) That the Crouch Mesa-Mesaverde Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 29 NORTH, RANGE 11 WEST, NMPM
Section 6: SE/4

(x) That the Cuervo-Gallup Oil Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 24 NORTH, RANGE 8 WEST, NMPM
Section 20: SW/4 SW/4

(y) That the Dufers Point Gallup-Dakota Oil Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 24 NORTH, RANGE 8 WEST, NMPM
Sections 3: S/2 SW/4
4: S/2 SE/4

(z) That the Farmer-Fruitland Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 30 NORTH, RANGE 11 WEST, NMPM
Sections 8: All
9: W/2

(aa) That the Flora Vista-Fruitland Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 31 NORTH, RANGE 12 WEST, NMPM
Section 34: SE/4

TOWNSHIP 30 NORTH, RANGE 12 WEST, NMPM
Section 15: NW/4

(bb) That the Flora Vista-Gallup Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 30 NORTH, RANGE 12 WEST, NMPM
Sections 5: N/2
6: NE/4
11: NW/4

(cc) That the Fulcher Kutz-Pictured Cliffs Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 27 NORTH, RANGE 11 WEST, NMPM
Sections 1: W/2
12: W/2

TOWNSHIP 28 NORTH, RANGE 11 WEST, NMPM
Section 36: W/2

(dd) That the South Gallegos Fruitland-Pictured Cliffs Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 26 NORTH, RANGE 11 WEST, NMPM
Section 18: NE/4

(ee) That the Gallegos-Gallup Oil Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 26 NORTH, RANGE 11 WEST, NMPM
Section 12: SW/4

(ff) That the Gobernador-Pictured Cliffs Pool in Rio Arriba County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 29 NORTH, RANGE 5 WEST, NMPM
Sections 4: SW/4
9: NE/4
15: NE/4
25: NE/4
26: NE/4

TOWNSHIP 30 NORTH, RANGE 5 WEST, NMPM
Section 34: NW/4

(gg) That the Gonzales-Mesaverde Pool in Rio Arriba County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 25 NORTH, RANGE 5 WEST, NMPM
Sections 4: E/2 and NW/4
9: NE/4
10: All

TOWNSHIP 26 NORTH, RANGE 5 WEST, NMPM
Sections 31: NW/4
32: SE/4
33: W/2

(hh) That the Harris Mesa-Chacra Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 27 NORTH, RANGE 9 WEST, NMPM
Sections 5: NW/4
6: NE/4

TOWNSHIP 28 NORTH, RANGE 9 WEST, NMPM
Sections 19: SE/4
29: NW/4
30: NE/4

(ii) That the Horseshoe-Gallup Oil Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 30 NORTH, RANGE 15 WEST, NMPM
Section 19: N/2 SW/4

(jj) That the Hospah-Dakota Oil Pool in McKinley County, New Mexico, as heretofore, classified, defined and described, is hereby extended to include:

TOWNSHIP 17 NORTH, RANGE 8 WEST, NMPM
Section 6: SW/4 SE/4

(kk) That the West Kutz-Pictured Cliffs Pool in San Juan County, New Mexico, as heretofore classified,defined and described, is hereby extended to include:

TOWNSHIP 26 NORTH, RANGE 11 WEST, NMPM
Section 3: NW/4

TOWNSHIP 27 NORTH, RANGE 11 WEST, NMPM
Sections 11: W/2
29: W/2
30: All
31: All
32: NW/4
33: All
34: W/2

TOWNSHIP 28 NORTH, RANGE 11 WEST, NMPM
Sections 34: NE/4
35: All

(ll) That the Largo-Chacra Pool in Rio Arriba and San Juan Counties, New Mexico, as heretofore classified,defined and described, is hereby extended to include:

TOWNSHIP 27 NORTH, RANGE 7 WEST, NMPM
Section 22: NE/4

TOWNSHIP 27 NORTH,RANGE 8 WEST, NMPM
Sections 2: SW/4
9: NW/4

(mm) That the South Lindrith Gallup-Dakota Oil Pool in Rio Arriba County, New Mexico, as heretofore classified, defined, and described, is hereby extended to include:

TOWNSHIP 23 NORTH,RANGE 4 WEST, NMPM
Section 3: NW/4 NE/4

TOWNSHIP 24 NORTH, RANGE 4 WEST, NMPM
Sections 27: S/2 S/2
28: SE/4
33: E/2
34: All

(nn) That the West Lindrith Gallup-Dakota Oil Pool in Rio Arriba County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 24 NORTH, RANGE 3 WEST, NMPM
Section 6: N/2

TOWNSHIP 24 NORTH,RANGE 4 WEST, NMPM
Sections 10: SW/4
14: SE/4
36: NE/4

TOWNSHIP 25 NORTH, RANGE 4 WEST, NMPM
Sections 14: SE/4
15: NE/4
35: E/2

TOWNSHIP 25 NORTH,RANGE 5 WEST, NMPM
Section 35: SW/4

(oo) That the North Los Pinos-Fruitland Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 32 NORTH, RANGE 8 WEST, NMPM
Section 23: N/2

(pp) That the South Los Pinos Fruitland-Pictured Cliffs Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 31 NORTH, RANGE 7 WEST, NMPM
Sections 7: SE/4
10: SW/4
12: W/2

TOWNSHIP 32 NORTH, RANGE 7 WEST, NMPM
Sections 26: SW/4
27: SE/4
34: NE/4
36: NW/4

(qq) That the Lybrook-Gallup Oil Pool in Rio Arriba and Sandoval Counties, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 23 NORTH, RANGE 6 WEST, NMPM
Section 29: E/2 NW/4

TOWNSHIP 23 NORTH, RANGE 7 WEST, NMPM
Sections 2: W/2 NW/4
6: NE/4 SE/4
9: N/2 SW/4

TOWNSHIP 24 NORTH, RANGE 8 WEST, NMPM
Sections 22: SE/4 SE/4
25: SE/4 NW/4, SW/4 NE/4, and NW/4 SE/4
26: NW/4, W/2 NE/4, and NE/4 SE/4
27: N/2, N/2 SW/4, and NW/4 SE/4

(rr) That the Marcelina-Dakota Oil Pool in McKinley County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 16 NORTH, RANGE 10 WEST, NMPM
Section 13: S/2 SE/4

(ss) That the Meadows-Gallup Oil Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 29 NORTH, RANGE 15 WEST, NMPM
Sections 2: SW/4 SW/4
3: NW/4,NE/4 SW/4, N/2 SE/4 and SE/4 SE/4
4: NE/4 and NW/4 SE/4
10: NE/4 NE/4

TOWNSHIP 30 NORTH, RANGE 15 WEST, NMPM
Sections 28: SW/4 SW/4
29: SE/4 SE/4
33: N/2 NW/4 and SE/4 NW/4

(tt) That the Miguel Creek-Gallup Oil Pool in McKinley County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 16 NORTH, RANGE 6 WEST, NMPM
Sections 20: S/2 NE/4
21: W/2 SW/4 and NE/4 SW/4
28: SW/4 NW/4

(uu) That the Mt. Nebo-Fruitland Pool in San Juan County, New Mexico, as heretofore classified, defined, and described, is hereby extended to include:

TOWNSHIP 32 NORTH, RANGE 10 WEST, NMPM
Sections: 28: NW/4
29: E/2
32: NE/4

(vv) That the Ojito Gallup-Dakota Oil Pool in Rio Arriba County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 25 NORTH, RANGE 3 WEST NMPM
Sections 7: W/2
18: W/2 and NE/4
20: N/2
21: W/2 NW/4

(ww) That the Otero-Chacra Pool in Rio Arriba County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 25 NORTH, RANGE 5 WEST NMPM
Sections 13: SW/4
14: SE/4
23: NE/4
34: S/2
35: SW/4
36: SE/4

TOWNSHIP 25 NORTH, RANGE 6 WEST, NMPM
Sections 23: SW/4
26: NW/4

TOWNSHIP 26 NORTH, RANGE 6 WEST, NMPM
Sections 24: SW/4
25: NW/4

TOWNSHIP 26 NORTH, RANGE 7 WEST, NMPM
Sections 2: W/2
16: NE/4

TOWNSHIP 27 NORTH, RANGE 7 WEST, NMPM
Sections 34: S/2
35: W/2

(xx) That the Otero-Gallup Oil Pool in Rio Arriba County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 24 NORTH, RANGE 5 WEST, NMPM
Section 3: N/2 NE/4

(yy) That the North Pinon-Fruitland Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 28 NORTH, RANGE 12 WEST, NMPM
Sections 9: All
16: NE/4

(zz) That the Pinon-Gallup Oil Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 28 NORTH, RANGE 12 WEST, NMPM
Section 13: W/2 NW/4

(aaa) That the Potwin-Pictured Cliffs Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 24 NORTH, RANGE 8 WEST, NMPM
Section 8: NE/4

(bbb) That the Ute Dome-Dakota Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 32 NORTH, RANGE 13 WEST, NMPM
Section 31: N/2

(ccc) That the Ute Dome-Paradox Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 32 NORTH, RANGE 13 WEST, NMPM
Section 19: All

(ddd) That the WAW Fruitland-Pictured Cliffs Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 25 NORTH, RANGE 12 WEST, NMPM
Section 5: NE/4

TOWNSHIP 26 NORTH, RANGE 12 WEST, NMPM
Section 9: S/2

TOWNSHIP 26 NORTH, RANGE 13 WEST, NMPM
Section 25: NE/4

(eee) That the Whitewash Mancos-Dakota Oil Pool in San Juan County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 24 NORTH, RANGE 9 WEST, NMPM
Sections 10: SE/4 SE/4
11: W/2 SW/4

(fff) That the Wildhorse-Gallup Pool in Rio Arriba County, New Mexico, as heretofore classified, defined and described, is hereby extended to include:

TOWNSHIP 26 NORTH, RANGE 3 WEST, NMPM
Section 18: NE/4

Docket No. 16-82

Dockets Nos.19 -82 and 20-82 are tentatively set for June 23 and July 7, 1982. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: COMMISSION HEARING - WEDNESDAY - JUNE 2, 1982
OIL CONSERVATION COMMISSION - 9 A.M.
MORGAN HALL, STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO

CASE 7522: (DE NOVO - Continued from May 17, 1982, Commission Hearing)

Application of Santa Fe Exploration Co. for an unorthodox gas well location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of an unorthodox location 660 feet from the North and West lines of Section 14, Township 20 South, Range 25 East, Permo-Penn, Strawn, Atoka and Morrow formations, the N/2 of said Section 14 to be dedicated to the well.

Upon application of Chama Petroleum Company, this case will be heard De Novo pursuant to the provisions of Rule 1220.

CASE 7521: (DE NOVO)

Application of William B. Barnhill for an unorthodox gas well location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of an unorthodox location 660 feet from the South and West lines of Section 35, Township 19 South, Range 25 East, Permo-Penn, Strawn, Atoka and Morrow formations, the S/2 of said Section 35 to be dedicated to the well.

Upon application of Chama Petroleum Company and William B. Barnhill, this case will be heard De Novo pursuant to the provisions of Rule 1220.

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Docket No. 17-82

DOCKET: EXAMINER HEARING - WEDNESDAY - JUNE 9, 1982
9 A.M. MORGAN HALL, STATE LAND OFFICE
BUILDING, SANTA FE, NEW MEXICO

The following cases will be heard before Richard L. Stamets, Examiner, or Daniel S. Nutter, Alternate Examiner:

CASE 7599: Application of Barber Oil Inc. for an Exception to Rule 705-A Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an exception to the provisions of Rule 705-A of the Division Rules and Regulations to permit 37 temporarily abandoned injection wells in its Russell Pool waterflood project to remain inactive for a period of up to three years without the required cement or bridge plugs being installed therein to isolate the injection zone.

CASE 7600: Application of Gulf Oil Corporation for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Seven Rivers and Queen formations in the perforated interval from 3338 feet to 3448 feet in its Arnott-Ramsay (NCT-B) Well No. 4 located in Unit D of Section 32, Township 25 South, Range 37 East, Langlie Mattix Pool.

CASE 7548: (Continued from April 14, 1982, Examiner Hearing)

Application of Tahoe Oil & Cattle Co. for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the San Andres formation in the perforated interval from 4932 feet to 4992 feet in its Schwalbe Well No. 1, located in Unit P of Section 21, Township 9 South, Range 37 East, West Sawyer-San Andres Pool.

CASE 7601: Application of Claude Walker for an oil treating plant permit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority for the construction and operation of an oil treating plant for the purpose of treating and reclaiming sediment oil at its salt water disposal site in the NE/4 NE/4 of Section 11, Township 10 South, Range 35 East.

CASE 7602: Application of Riqueza, Inc. for an oil treating plant permit, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority for the construction and operation of an oil treating plant for the purpose of treating and reclaiming sediment oil in the NE/4 of Section 26, Township 22 South, Range 29 East.

CASE 7603: Application of Riqueza, Inc. for an exception to Order No. R-3221, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an exception to Order No. R-3221 to permit the commercial disposal of produced brine into an unlined surface pit located near its proposed oil treating plant in the NE/4 of Section 26, Township 22 South, Range 29 East.

CASE 7519: (Continued from May 26, 1982, Examiner Hearing)

Application of S & J Oil Company for special pool rules, McKinley County, New Mexico. Applicant, in the above-styled cause, seeks the promulgation of special pool rules for the Seven Lakes-Menafee Oil Pool to provide for wells to be located not nearer than 25 feet to the quarter-quarter section line nor nearer than 165 feet to lands owned by an offset operator.

CASE 7604: Application of Rio Pecos Corporation for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests from the surface to the base of the Pennsylvanian formation underlying the W/2 of Section 2, Township 19 South, Range 32 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7605: Application of Yates Petroleum Corporation for compulsory pooling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests from the top of the Wolfcamp formation through the uppermost 100 feet of the Mississippian Chester Limestone underlying the W/2 of Section 35, Township 19 South, Range 24 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7606: Application of MTS Limited Partnership Company for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests from the surface through the base of the Abo formation underlying the NW/4 of Section 5, Township 7 South, Range 26 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7592: (Continued from May 26, 1982, Examiner Hearing)

Application of OXOCO for compulsory pooling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests from the surface to the base of the Mesa Verde formation underlying the E/2 of Section 20, Township 32 North, Range 8 West, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7586: (Continued and Readvertised)

Application of Standard Resources Corp. for designation of a tight formation, Chaves and Eddy Counties, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Abo-Wolfcamp formation underlying all or portions of Township 15 South, Ranges 23 through 25 East, Township 19 South, Range 20 East, and Township 20 South, Range 20 East, all in Chaves County; in Eddy County: Township 16 South, Ranges 23 through 26 East, Township 17 South, Ranges 21, 23, 24, and 25 East, and Township 18 South, Ranges 21, 23, 24 and 25 East, Township 19 South, Ranges 21, 23 and 24 East, and Township 20 South, Ranges 21, 23 and 24 East, containing 460,800 acres, more or less, as a tight formation pursuant to Section 107 of the Natural Gas Policy Act and 18 CFR Section 271. 701-705.

CASE 7607: Application of El Paso Natural Gas Company for the abolishment of the Blanco-Pictured Cliffs Pool and the expansion of the South Blanco-Pictured Cliffs Pool in Rio Arriba, Sandoval and San Juan Counties, New Mexico. Applicant, in the above-styled cause, seeks the abolishment of the Blanco-Pictured Cliffs Pool and the expansion of the horizontal limits of the South Blanco-Pictured Cliffs Pool to include the abolished acreage.

Also to be considered will be the appropriate method for institution of gas prorationing for wells effected by the change in pool designation.

CASE 7608: Application of Tenneco Oil Company for designation of a tight formation, San Juan County, New Mexico. Pursuant to Section 107 of the Natural Gas Policy Act of 1978 and 18 CFR Section 271. 701-705, applicant, in the above-styled cause, seeks the designation as a tight formation of the Dakota Producing Interval underlying the following described lands:

All of:

Sections 1 thru 6, Township 29 North, Range 8 West;

Sections 1 and 2, Township 29 North, Range 9 West;

Sections 1 thru 18 and Section 24, Township 30 North, Range 10 West;

Sections 7 thru 9, 16 thru 21 and 25 thru 36, Township 32 North, Range 7 West;

All sections, Township 32 North, Range 8 West; and

All sections, Township 32 North, Range 9 West;

Also:

All of Township 30 North, Range 8 West except Sections 3 thru 5 and Section 35;

All of Township 30 North, Range 9 West except Sections 31 thru 34;

All of Township 31 North, Range 8 West except Section 32; and

All of Township 31 North, Range 9 West except Sections 27 and 28

containing 149,760 acres, more or less.

CASE 7609: In the matter of the hearing called by the Oil Conservation Division on its own motion for an order creating and extending certain pools in Chaves, Eddy, and Lea Counties, New Mexico.

(a) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Middle Bell Canyon production and designated as the Brushy Draw-Middle Bell Canyon Gas Pool. The discovery well is the J. C. Williamson EP-USA Well No. 2 located in Unit O of Section 26, Township 26 South, Range 29 East, NMPM. Said Pool would comprise:

TOWNSHIP 26 SOUTH, RANGE 29 EAST, NMPM
Section 26: SE/4

(b) CREATE a new pool in Lea County, New Mexico, classified as an oil pool for Bone Spring production and designated as the Legg-Bone Spring Pool. The discovery well is the Amoco Production Company State LT Well No. 1 located in Unit K of Section 32, Township 21 South, Range 33 East, NMPM. Said Pool would comprise:

TOWNSHIP 21 SOUTH, RANGE 33 EAST, NMPM
Section 32: SW/4

(c) CREATE a new pool in Chaves County, New Mexico, classified as a gas pool for Atoka production and designated as the White Ranch-Atoka Gas Pool. The discovery well is the Depco, Inc. White Ranch Unit Well No. 1 located in Unit F of Section 8, Township 13 South, Range 30 East, NMPM. Said Pool would comprise:

TOWNSHIP 13 SOUTH, RANGE 30 EAST, NMPM
Section 8: W/2

(d) EXTEND the Austin-Mississippian Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 14 SOUTH, RANGE 36 EAST, NMPM
Section 5: N/2 and SW/4

(e) EXTEND the Baum-Upper Pennsylvanian Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 14 SOUTH, RANGE 33 EAST, NMPM
Section 18: NE/4

(f) EXTEND the Burton Flat-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 20 SOUTH, RANGE 28 EAST, NMPM
Section 8: S/2

(g) EXTEND the East Burton Flat-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 20 SOUTH, RANGE 29 EAST, NMPM
Section 6: S/2

(h) EXTEND the Cedar Lake-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 17 SOUTH, RANGE 30 EAST, NMPM
Section 34: N/2
Section 35: N/2

(i) EXTEND the Crooked Creek-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 24 SOUTH, RANGE 24 EAST, NMPM
Section 3: S/2
Section 10: N/2

(j) EXTEND the EK Yates-Seven Rivers-Queen Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 34 EAST, NMPM
Section 9: SW/4

(k) EXTEND the Elkins-San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 7 SOUTH, RANGE 28 EAST, NMPM
Section 22: S/2 NW/4

(l) EXTEND the Empire-Pennsylvanian Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 17 SOUTH, RANGE 28 EAST, NMPM
Section 20: N/2

(m) EXTEND the East Gruma Ridge-Morrow Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 21 SOUTH, RANGE 35 EAST, NMPM
Section 31: S/2

(n) EXTEND the Hoag Tank-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 24 EAST, NMPM
Section 34: N/2

(o) EXTEND the House-Drinkard Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 38 EAST, NMPM
Section 35: SE/4

TOWNSHIP 20 SOUTH, RANGE 38 EAST, NMPM
Section 2: NE/4

EXAMINER HEARING-WEDNESDAY-JUNE(

(p) EXTEND the South Kemnitz Atoka-Morrow Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 16 SOUTH, RANGE 34 EAST, NMPM
Section 19: S/2

(q) EXTEND the EastLaRica-Morrow Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 34 EAST, NMPM
Section 35: S/2

(r) EXTEND the North Loving-Atoka Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 23 SOUTH, RANGE 28 EAST, NMPM
Section 5: All

(s) EXTEND the North Loving-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 23 SOUTH, RANGE 28 EAST, NMPM
Section 6: S/2

(t) EXTEND the Maljamar-Atoka Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 16 SOUTH, RANGE 33 EAST, NMPM
Section 28: E/2

(u) EXTEND the South Salt Lake-Morrow Gas Pool in Lea County, New Mexico to include therein:

TOWNSHIP 21 SOUTH, RANGE 32 EAST, NMPM
Section 6: Lots 1, 2, 3, 4, 5, 6, 7, and 8

(v) EXTEND the Sand Hills Grayburg-San Andres Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 20 SOUTH, RANGE 39 EAST, NMPM
Section 31: SE/4

(w) EXTEND the Shugart-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 31 EAST, NMPM
Section 4: N/2

(x) EXTEND the Tom-Tom San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 7 SOUTH, RANGE 31 EAST, NMPM
Section 35: NE/4

(y) EXTEND the Travis-Upper Pennsylvanian Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 28 EAST, NMPM
Section 13: N/2 NW/4

(z) EXTEND the North Turkey Track-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 28 EAST, NMPM
Section 27: E/2

Docket 17-82

(aa) EXTEND the White City-Pennsylvanian Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 25 SOUTH, RANGE 26 EAST, NMPM
Section 13: All

(bb) EXTEND the North Young-Bone Spring Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 32 EAST, NMPM
Section 4: SE/4
Section 11: W/2

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Docket No. 18-82

DOCKET: EXAMINER HEARING - THURSDAY- JUNE 17, 1982

9 A.M. - OIL CONSERVATION DIVISION CONFERENCE ROOM, STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

The following cases will be heard before Daniel S. Nutter, Examiner, or Richard L. Stamets, Alternate Examiner:

ALLOWABLE: (1) Consideration of the allowable production of gas for July, 1982, from fifteen prorated pools in Lea, Eddy, and Chaves Counties, New Mexico.

(2) Consideration of the allowable production of gas for July, 1982, from four prorated pools in San Juan, Rio Arriba, and Sandoval Counties, New Mexico.

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

April 12, 1982

filed in Case 469
Case 7599

Barber Oil, Inc.
111 West Mermod
P.O. Box 1658
Carlsbad, NM 88220

ATTENTION: Michael D. Garringer

RE: Exception to Rule 705-A
for Injection Wells

Dear Sir:

Pursuant to Barber Oil, Inc.'s request for exception of thirty-seven (37) injection wells, as listed on TABLE I, from Rule 705-A, the Oil Conservation Division (OCD) hereby denies your request.

Review of your application and history thereof by the Santa Fe and Aztec District offices concludes that you have not demonstrated good cause to be entitled to exception to Rule 705-A.

The OCD requests that Barber Oil, Inc., take appropriate actions as outlined in the OCD Memorandum of September 30, 1981. (See Attachment)

If you have any questions regarding this matter, please do not hesitate to call or contact Oscar Simpson, at (505) 827-2534.

Sincerely,

Joe D. Ramey
Division Director

JDR/OS/dp

Enc.

TABLE I

1.	Crosby Federal Wells	#1,	Section 12,	Township 20 South, Range 28 East
2.		#2	"	" "
3.		#4	"	" "
4.	Turner Federal Wells	#2,	Section 13,	Township 20 South, Range 28 East
5.		#3	"	" "
6.		#6	"	" "
7.		#12	"	" "
8.		#13	"	" "
9.		#15	"	" "
10.		#18	"	" "
11.		#21	"	" "
12.		#22	"	" "
13.	Wills Federal Wells	#2,	Section 13,	Township 20 South, Range 28 East
14.		#5	"	" "
15.		#6	"	" "
16.		#8	"	" "
17.		#10	"	" "
18.		#14	"	" "
19.		#15	"	" "
20.		#17	"	" "
21.		#18	"	" "
22.		#19	"	" "
23.		#21	"	" "
24.		#23	"	" "
25.		#25	"	" "
26.		#26	"	" "
27.		#27	"	" "
28.		#30	"	" "
29.		#33	"	" "
30.		#34	"	" "
31.		#35	"	" "
32.		#36	"	" "
33.		#37	"	" "
34.		#39	"	" "
35.		#41	"	" "
36.		#42	"	" "
37.		[illegible]	"	" "

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

M E M O R A N D U M

TO: ALL NEW MEXICO INJECTION WELL OPERATORS

FROM: JOE D. RAMEY, DIRECTOR

SUBJECT: TEMPORARY ABANDONMENT OF INJECTION WELLS

Division Rule 705A provides in part that "no injection well may be temporarily abandoned for more than six months unless the injection interval has been isolated by use of cement or a bridge plug." The Division Director may delay the cement or bridge plug requirement upon a request by the operator and a showing that such well is mechanically sound, that there is a continuing need for the well, and that the well constitutes no threat to underground sources of drinking water.

Division survey programs have found several hundred injection wells which have not been used for at least six months and which do not have the requisite plugs. Based upon these surveys the Division will be moving to enforce Rule 705A in the near future.

Operators should review the status of their injection wells and within the next six months take one of the following actions relative to injection wells which have been shut in for six months or longer:

(1) Return the well to active operation.

(2) Plug and abandon the well or place a cement or bridge plug above the injection interval.

(3) File a workover or plugging plan and schedule with the appropriate Division district office.

(4) File a request for exception to Rule 705A with the Division Director in Santa Fe.

September 30, 1981
fd/

LAW OFFICES OF
HUNKER-FEDRIC, P. A.
SUITE 210, HINKLE BUILDING
POST OFFICE BOX 1837
ROSWELL, NEW MEXICO 88201

ROSWELL, NM
MAY 7
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1982
88201

USA 20¢

MR. OSCAR SIMPSON
NEW MEXICO OIL CONSERVATION COMMISSION
PO BOX 2088
SANTA FE NM 87501

BARBER OIL, INC.
111 West Mermod
Post Office Box 1658
CARLSBAD, NEW MEXICO 88220
(505) 887-2566

April 1, 1982

State of New Mexico
Energy and Minerals Department
Oil Conservation Division
P. O. Box 2088
Santa Fe, NM 87501

Attn: Oscar Simpson III
Water Resource Specialist

Re: Exception to Rule 705-A
LC-050797, Crosby-Turner-Wills Comm. Btry
Russell Field Waterflood, Eddy Co., NM

Dear Sir:

As per your letter of March 24, 1982 I hereby submit "Injection Well Data Sheets" on all wells listed in our letter of March 4, 1982 with one exception. Wills #29 is currently "Plugged & Abandoned".

The "Injection Well Data Sheets" should complete your information for sub-paragraphs (a) thru (j). Sub-paragraph (m) is not applicable and (k) & (l) are as follows:

(k) All of the injection wells were temporarily discontinued during the months of May and June, 1980.

(l) Injection will resume as soon as a tertiary recovery program is economically feasible.

Again, I must point out that no drinking water sources are located in this area and we consider the wells essential to our future tertiary recovery program.

Very truly yours,

BARBER OIL, INC.

Michael D. Garringer
Manager

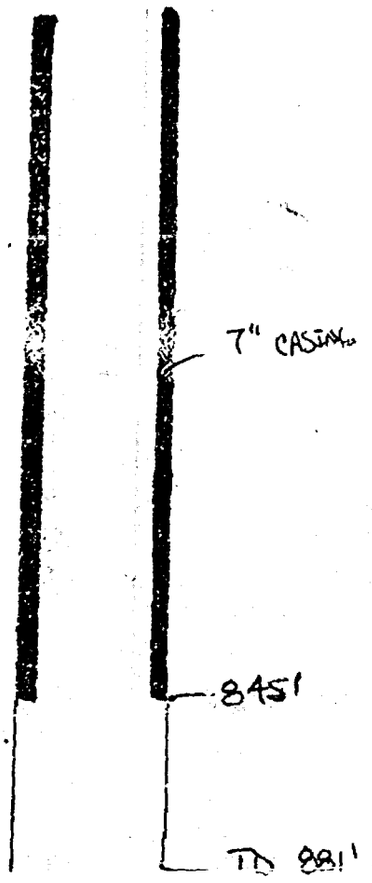
Encl: 37

INJECTION WELL DATA SHEET

BARBER OIL, INC. (OPERATOR) LC-050797 (LEASE) CROSBY FEDERAL

1 (WELL NO.) 330' FSL & 2310 FEL (FOOTAGE LOCATION) 12 (SECTION) 20S (TOWNSHIP) 28E (RANGE)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with 75 sx.

TOC UNKNOWN feet determined by _____

Hole size 8"

Total depth 845

Injection interval

844 feet to 881 feet

(~~perforated~~ or open-hole, indicate which)

Tubing size _____ lined with _____ (material) set in a _____ (brand and model) packer at _____ feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES

2. Name of Field or Pool (if applicable) RUSSELL

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? PRODUCTION

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO

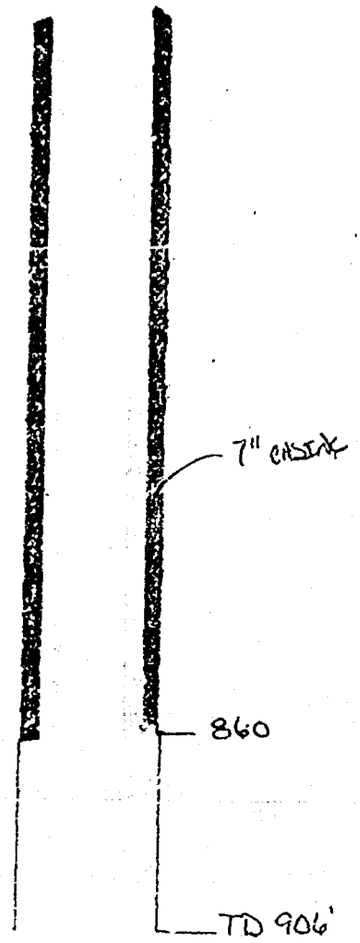
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

Operator: Barrel Oil, Inc. | Lease: CC-056797 Cress Federal

Well No.: 2 | Footage Location: 330' FSL and 1650' FEL | Section: 12 | Township: 20 South | Range: 28 East

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with 75 sx.

TOC UNKNOWN feet determined by _____

Hole size 8 1/2

Total depth 860

Injection interval

863 feet to 906 feet

~~(perforated~~ or open-hole, indicate which)

Tubing size _____ lined with _____ (material) set in a

L (brand and model) packer at _____ feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES
2. Name of Field or Pool (if applicable) RUSSELL
3. Is this a new well drilled for injection? ☐ Yes ☒ No

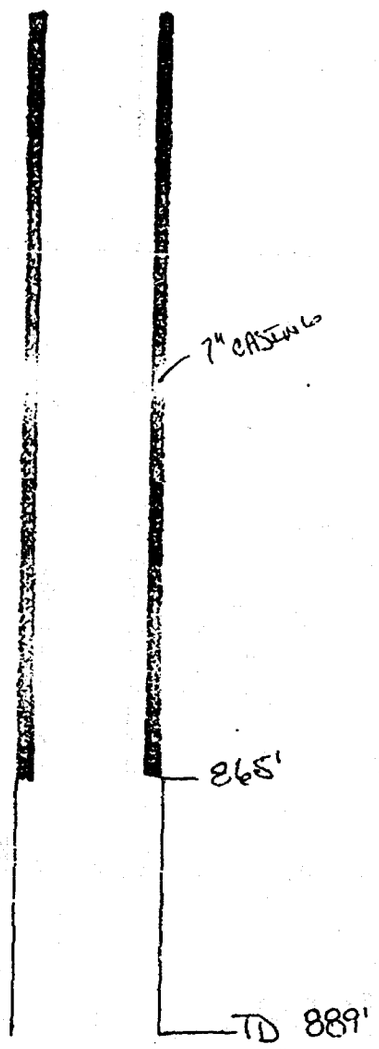
   If no, for what purpose was the well originally drilled? PRODUCTION
4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area.

INJECTION WELL DATA SHEET

Parker Oil Inc. (OPERATOR) LC-050797 (LEASE) Crosby Federal

4 (WELL NO.) 663' FSL and 2000' FEL (FOOTAGE LOCATION) 12 (SECTION) 20 South (TOWNSHIP) 28 East (RANGE)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with 125 sx.

TOC Unknown feet determined by _____

Hole size 8½"

Total depth 865

Injection interval

847 feet to 887 feet

(~~perforated~~ or open-hole, indicate which)

Tubing size _____ lined with _____ (material) set in a

_____ (brand and model) packer at _____ feet

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation Yates

2. Name of Field or Pool (if applicable) Eussell

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? Production

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) No

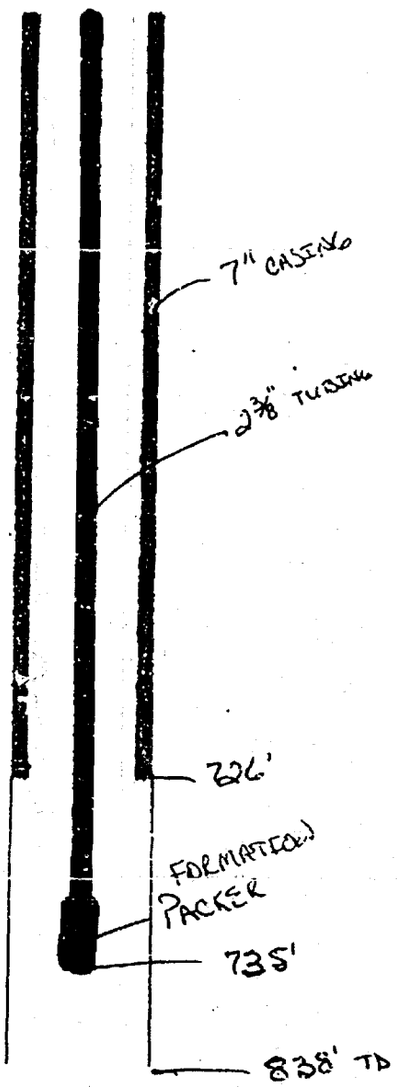
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. None

INJECTION WELL DATA SHEET

OPERATOR	LEASE	
Bayer Oil Inc	LC-050797	Tucker Federal

WELL NO.	FOOTAGE LOCATION	SECTION	TOWNSHIP	RANGE
2	1980' FSL and 1980' FWL	13	20S	28E

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with _____ sx.

TOC UNKNOWN feet determined by _____

Hole size 8"

Total depth 726'

Injection interval

812 feet to 827 feet

(~~perforated~~ or open-hole, indicate which)

Tubing size 2 3/8" lined with CEMENT (material) set in a

GUIBERSON 2"X7" (brand and model) packer at 735 feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES

2. Name of Field or Pool (if applicable) RUSSELL

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? PRODUCTION

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO

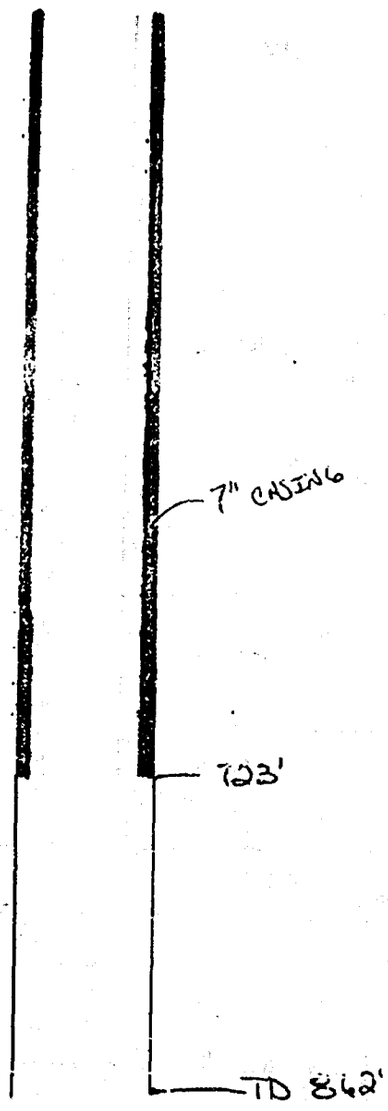
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

Barber Oil, Inc. (LC-050797) Turner Federal
OPERATOR LEASE

3 | 1980' FSL and 1970' FEL | 13 | 20 S | 28 E
WELL NO. | FOOTAGE LOCATION | SECTION | TOWNSHIP | RANGE

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with 50 sx.

TOC UNKNOWN feet determined by _____

Hole size _____

Total depth ~~TD~~ 723'

Injection interval

841 feet to 862 feet
(~~perforated~~ or open-hole, indicate which)

Tubing size _____ lined with _____ (material) set in a _____ (brand and model) packer at _____ feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES

2. Name of Field or Pool (if applicable) RUSSELL

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? PRODUCTION

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) No

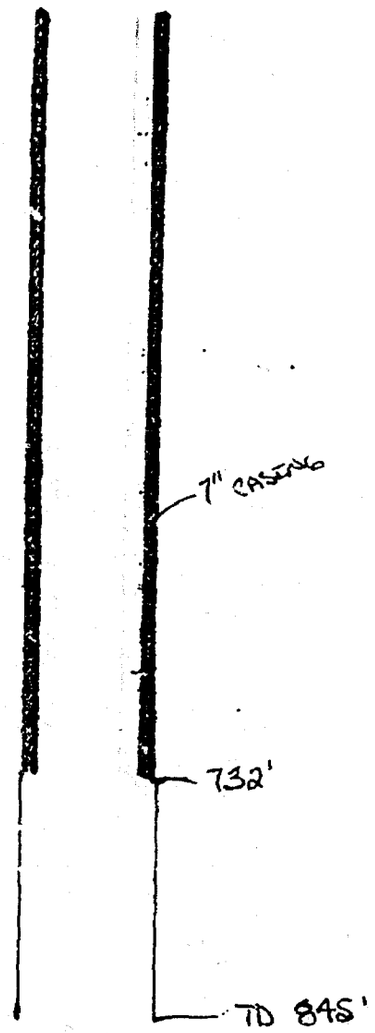
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

BARBER OIL INC. (OPERATOR) LC-050797 (LEASE) TURNER FEDERAL

6 (WELL NO.) 660' FNL AND ~~1980'~~ 1980' FWL (FOOTAGE LOCATION) 13 (SECTION) 20S (TOWNSHIP) 28E (RANGE)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with 100 sx.

TOC UNKNOWN feet determined by _____

Hole size 8"

Total depth 732'

Injection Interval

826 feet to 845 feet

~~(perforated~~ or open-hole, indicate which)

Tubing size _____ lined with _____ (material) set in a _____ (brand and model) packer at _____ feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES
2. Name of Field or Pool (if applicable) RUSSELL
3. Is this a new well drilled for injection? ☐ Yes ☒ No

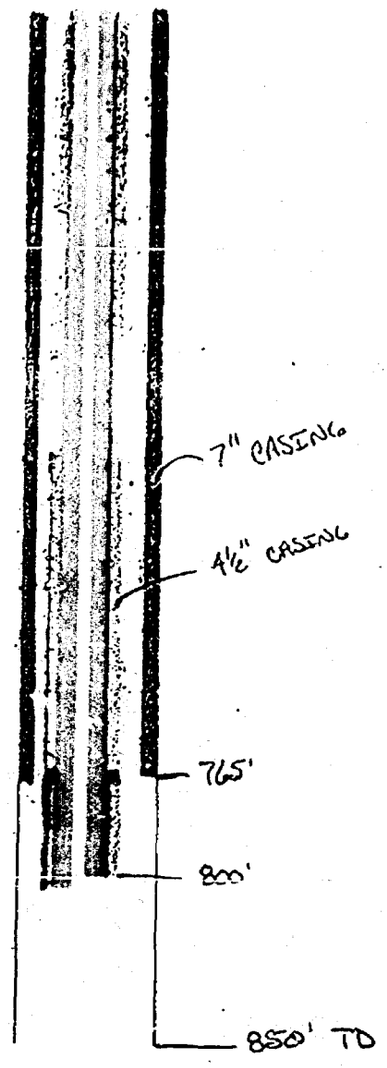
   If no, for what purpose was the well originally drilled? PRODUCTION
4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) No
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

Barber Oil Inc. (OPERATOR) LC-050777 (LEASE) Turner Federal

12 (WELL NO.) 2322' FSL and 2339 FWL (FOOTAGE LOCATION) 13 (SECTION) 20S (TOWNSHIP) 28E (RANGE)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 4½" + 7" Cemented with 100 sx.

TOC UNKNOWN feet determined by _____

Hole size 8"

Total depth 765'

Injection interval

821 feet to 860 feet

(perforated or open-hole, indicate which)

Tubing size _____ lined with _____ (material) set in a

_____ (brand and model) packer at _____ feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation Yates

2. Name of Field or Pool (if applicable) Russell

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? Production

4. Has the well ever been perforated in any other zone(s)? List all such perforated interval and give plugging detail (sacks of cement or bridge plug(s) used) No

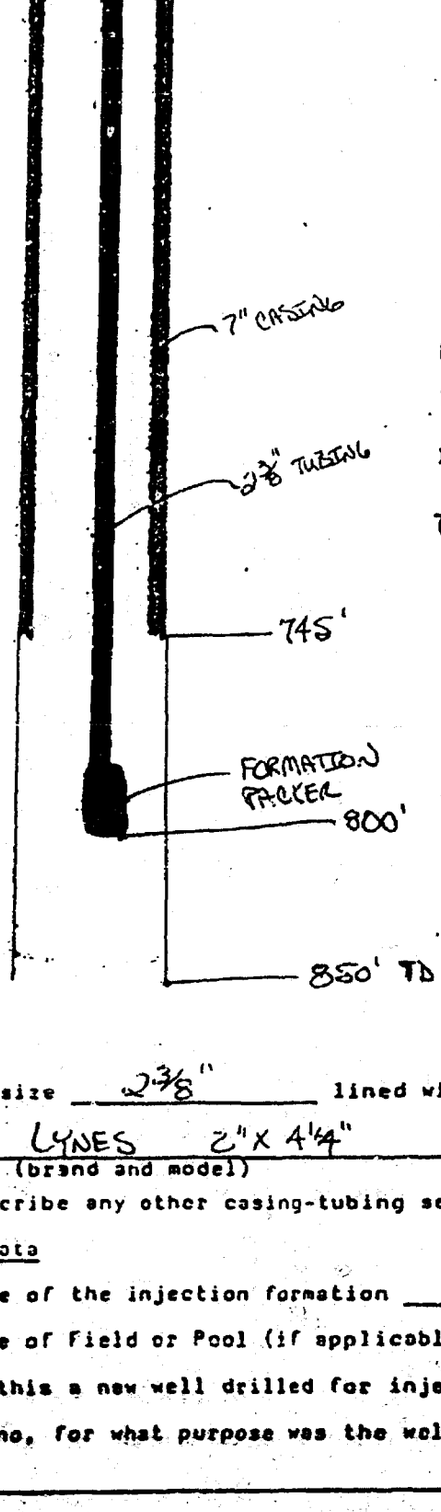
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. None

INJECTION WELL DATA SHEET

Barber Oil Inc. (OPERATOR) LC-050777 (LEASE) Turner Federal

13 (WELL NO.) 332' FNL and 2340 FWL (FOOTAGE LOCATION) 13 (SECTION) 20S (TOWNSHIP) 28E (RANGE)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with 100 sx.

TOC UNKNOWN feet determined by _____

Hole size 8"

Total depth 745'

Injection interval

808 feet to 845 feet

(~~perforated~~ or open-hole, indicate which)

Tubing size 2 3/8" lined with CEMENT (material) set in a LYNES 2"X 4¼" (brand and model) packer at 800 feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES
2. Name of Field or Pool (if applicable) RUSSELL
3. Is this a new well drilled for injection? ☐ Yes ☒ No

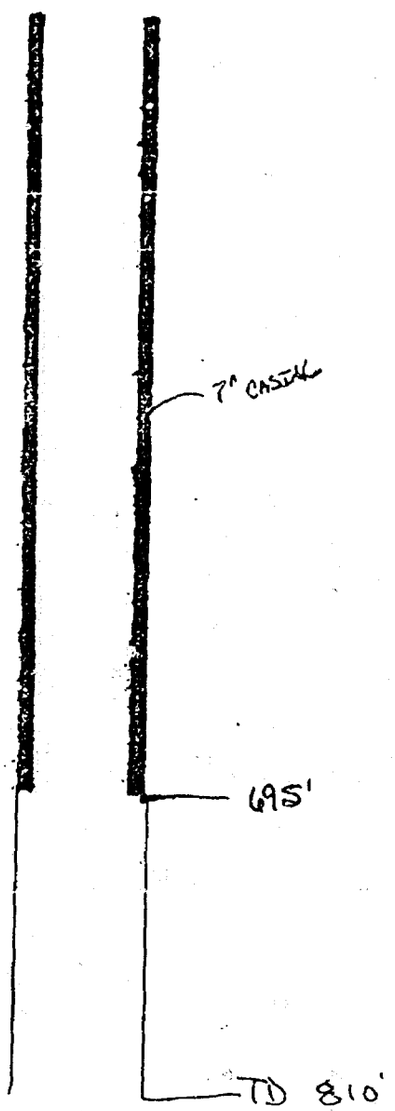
   If no, for what purpose was the well originally drilled? PRODUCTION
4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) No
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

BARBER OIL INC. (OPERATOR) | LC-050797 (LEASE) | TURNER FEDERAL

15 (WELL NO.) | 331 FSL AND 1669 FWL (FOOTAGE LOCATION) | 13 (SECTION) | 20S (TOWNSHIP) | 28E (RANGE)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with 75 sx.

TOC UNKNOWN feet determined by _____

Hole size 8"

Total depth 695'

Injection interval

789 feet to 808 feet

([redacted] or open-hole, indicate which)

Tubing size _____ lined with _____ (material) set in a

_____ (brand and model) packer at _____ feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES

2. Name of Field or Pool (if applicable) RUSSELL

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? PRODUCTION

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO

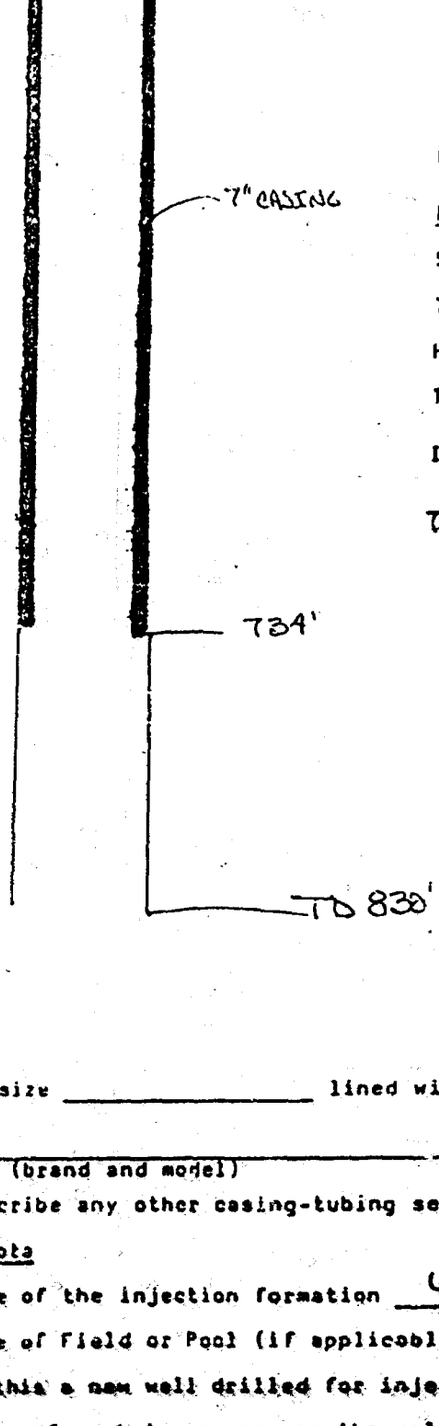
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

Harper Oil, Inc. (Operator) | LC-050797 (Lease) | Turner Federal

18 (Well No.) | 1658' FNL and 2339' FWL (Footage Location) | 13 (Section) | 20S (Township) | 28E (Range)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with 75 sx.

TOC Unknown feet determined by _____

Hole size 8"

Total depth 734'

Injection interval

799 feet to 829 feet

(~~perforated~~ or open-hole, indicate which)

Tubing size _____ lined with _____ (material) set in a _____ (brand and model) packer at _____ feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation Yates

2. Name of Field or Pool (if applicable) Russell

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? Production

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) No

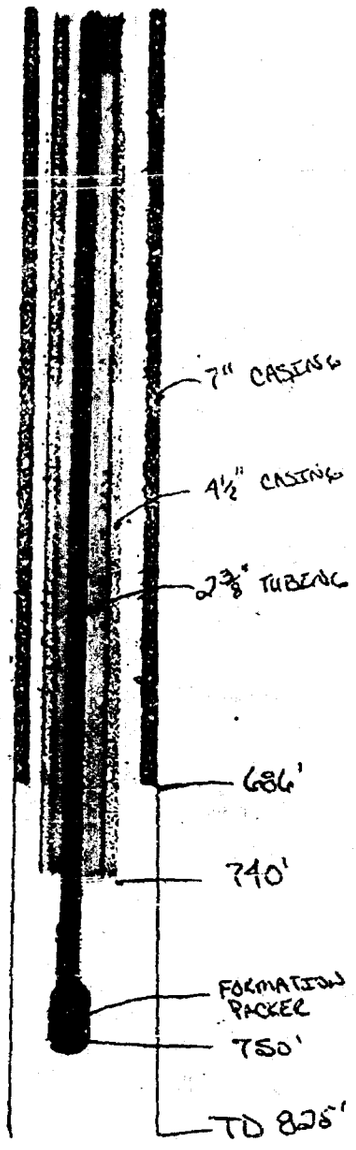
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. None

INJECTION WELL DATA SHEET

BARBER OIL, INC. (OPERATOR) LC-050797 (LEASE) TURNER FEDERAL

21 (WELL NO.) 989' FSL AND 2339' FWL (FOOTAGE LOCATION) 13 (SECTION) 20S (TOWNSHIP) 28E (RANGE)

Schematic



Tubular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 4½ + 7" Cemented with 125 sx.

TOC UNKNOWN feet determined by _____

Hole size 8"

Total depth 686'

Injection interval

789 feet to 819 feet

(~~perforated~~ or open-hole, indicate which)

Tubing size 2⅜" lined with PLASTIC (material) set in a

ARROW TYPE SL 2"X4" (brand and model) packer at 750 feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES

2. Name of Field or Pool (if applicable) RUSSELL

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? PRODUCTION

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO

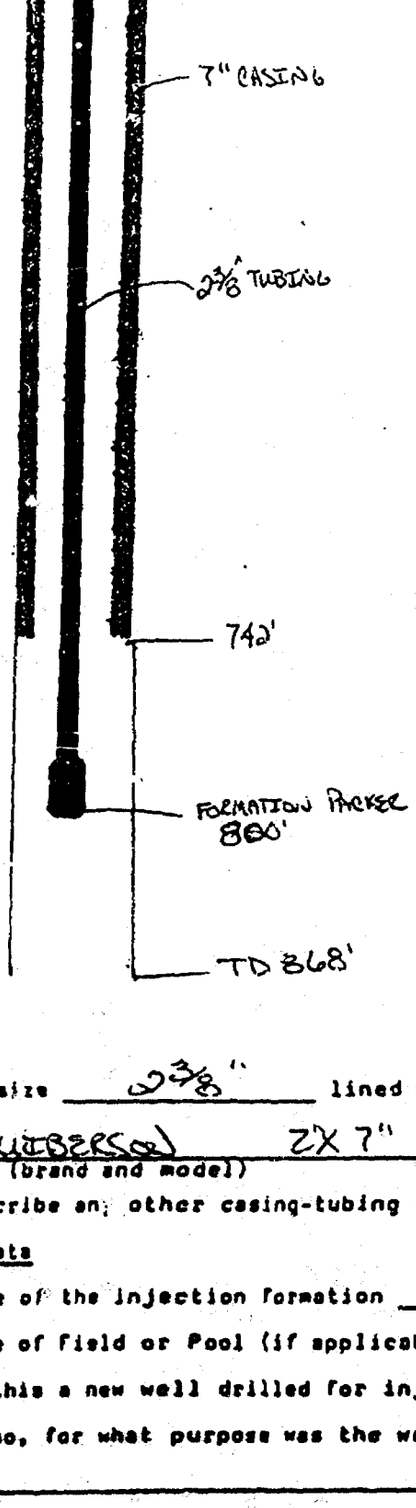
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

BARBER OIL, INC. (OPERATOR) LC-050797 (LEASE) TURNER FEDERAL

22 (WELL NO.) 2322 FSL AND 1669 FEL (FOOTAGE LOCATION) 13 (SECTION) 20S (TOWNSHIP) 28E (RANGE)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with 125 sx.

TOC UNKNOWN feet determined by _____

Hole size 8"

Total depth @ 742'

Injection interval

846' feet to 868 feet

(~~perforated~~ or open-hole, indicate which)

Tubing size 2 3/8" lined with CEMENT (material) set in a (LOKSET) (brand and model) 2X 7" packer at 800 feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES

2. Name of Field or Pool (if applicable) RUSSELL

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? PRODUCTION

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO

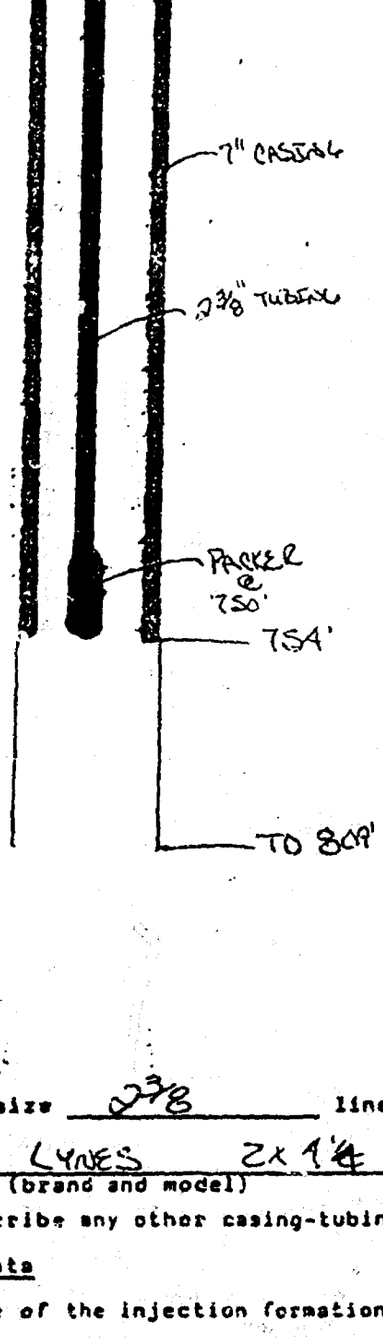
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

Barber Oil, Inc. (OPERATION) LC-050797 (LEASE) Wells Federal

2 (WELL NO.) 660' FSL 660' FWL (FOOTAGE LOCATION) 13 (SECTION) 20S (TOWNSHIP) 28E (RANGE)

Schematic



Tubular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with 50 sx.

TOC UNKNOWN feet determined by _____

Hole size 8"

Total depth 754

Injection interval

785 feet to 809 feet

~~(perforated~~ or open-hole, indicate which)

Tubing size 2 3/8 lined with _____ (material) set in a

LYNES 2x1 1/4 (brand and model) packer at 750 feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES

2. Name of Field or Pool (if applicable) RUSSELL

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? PRODUCTION

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO

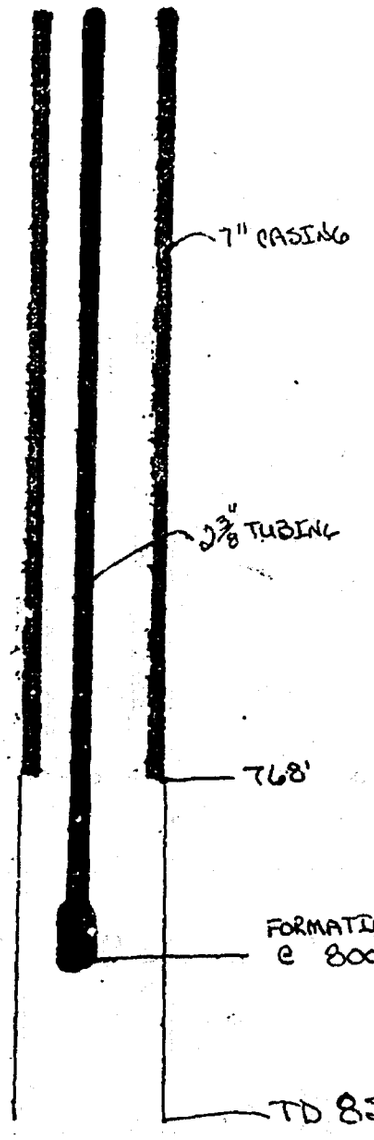
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

BARBER OIL, INC. (OPERATOR) LC-050797 (LEASE) WELLS FEDERAL

5 (WELL NO.) 990' FNL AND 330' FWL (FOOTAGE LOCATION) 13 (SECTION) 20S (TOWNSHIP) 28E (RANGE)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with 125 sx.

TOC UNKNOWN feet determined by _____

Hole size 8"

Total depth 768

Injection interval

828 feet to 856 feet

([redacted] or open-hole, indicate which)

Tubing size 2 3/8" lined with CEMENT (material) set in a

LYNES 2" X 4'4" (brand and model) packer at 800 feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES

2. Name of Field or Pool (if applicable) RUSSELL

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? PRODUCTION

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO

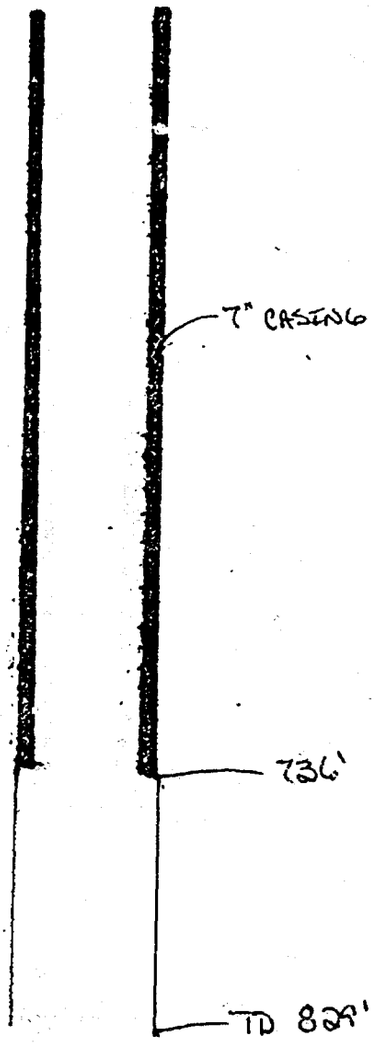
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

Barber Oil Inc. (OPERATION) LC-050797 (LEASE) Wells Federal

1e (WELL NO.) 996' FSL and 1005 FWL (FOOTAGE LOCATION) 13 (SECTION) 20S (TOWNSHIP) 28E (RANGE)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with 75 sx.

TOC (UNKNOWN) feet determined by _____

Hole size 8"

Total depth 736'

Injection interval

803 feet to 829 feet

(perforated or open-hole, indicate which)

Tubing size _____ lined with _____ (material) set in a _____ (brand and model) packer at _____ feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES

2. Name of Field or Pool (if applicable) RUSSELL

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? PRODUCTION

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO

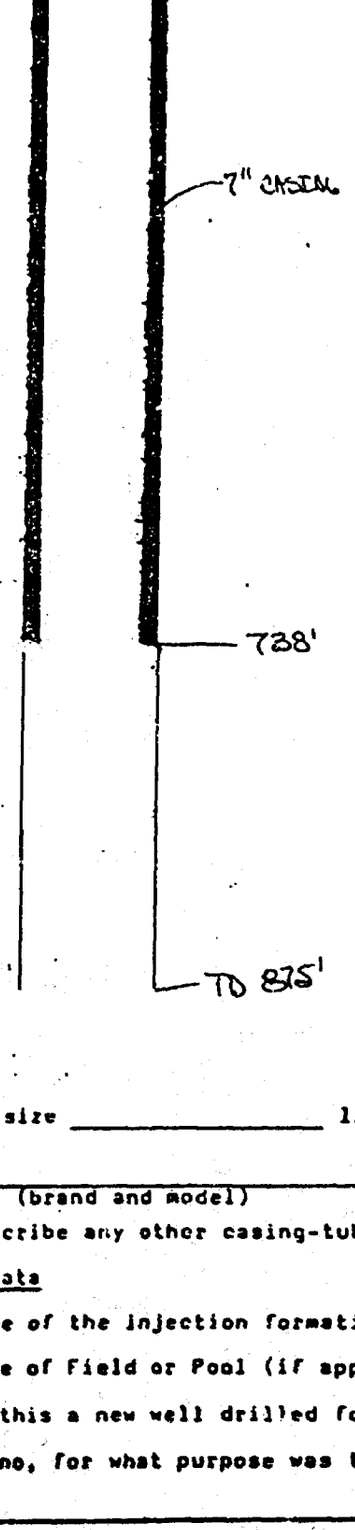
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

Barber Oil Inc (LC-050797) Wills Federal
OPERATOR LEASE

8 WELL NO. 994' FNL 1005 FEL FOOTAGE LOCATION 13 SECTION 20S TOWNSHIP 28E RANGE

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with 100 sx.

TOC UNKNOWN feet determined by _____

Hole size 8"

Total depth 738'

Injection interval

857 feet to 872 feet
(perforated or open-hole, indicate which)

Tubing size _____ lined with _____ (material) set in a _____ (brand and model) packer at _____ feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES

2. Name of Field or Pool (if applicable) RUSSELL

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? PRODUCER

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) No

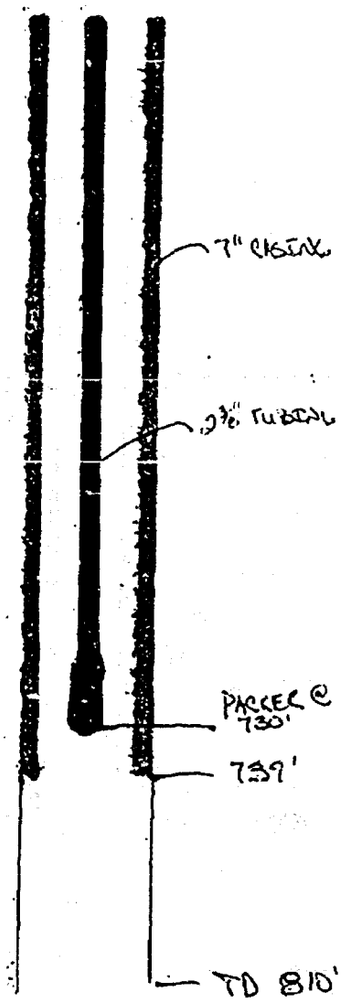
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

Baker Oil, Inc. (LC-050797) Wells Fed.
OPERATION LEASE

10X 2322' FSL AND 1005 FWL 13 20S 28E
WELL NO. FOOTAGE LOCATION SECTION TOWNSHIP RANGE

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with 100 sx.

TOC (Unknown) feet determined by _____

Hole size 8"

Total depth 739'

Injection interval

775 feet to 800 feet
(~~perforated~~ or open-hole, indicate which)

Tubing size 2 3/8" lined with _____ (material) _____ set in a

Guiberson 2"x 7" packer at 730 feet
(brand and model)

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES

2. Name of Field or Pool (if applicable) Russell

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? PRODUCTION

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO

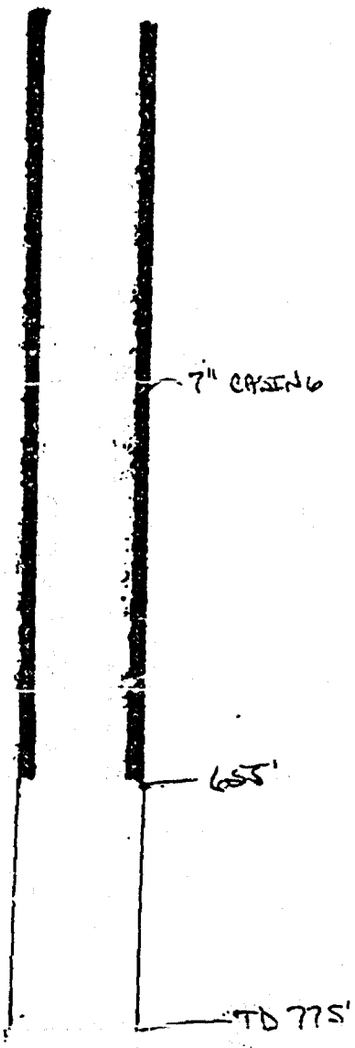
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

Barber Oil Inc. (OPERATION) LC-050797 (LEASE) Wells Fed.

14 (WELL NO.) 330 FSL - 330 FEL (FOOTAGE LOCATION) 13 (SECTION) 20S (TOWNSHIP) 28E (RANGE)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with 125 sx.

TOC UNKNOWN feet determined by _____

Hole size 8"

Total depth 655

Injection interval

756 feet to 770 feet

(perforated or open-hole, indicate which)

Tubing size _____ lined with _____ (material) set in a _____ (brand and model) packer at _____ feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES
2. Name of Field or Pool (if applicable) RUSSELL
3. Is this a new well drilled for injection? ☐ Yes ☒ No

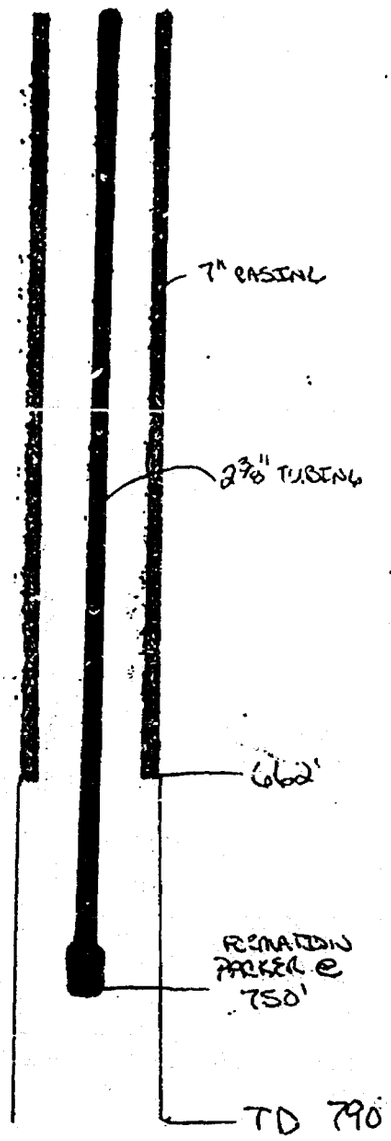
   If no, for what purpose was the well originally drilled? PRODUCTION
4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

Barber Oil, Inc. (Operator) LC-050797 (Lease) Wills Fed.

15 (Well No.) 996' FSL and 330' FEL (Footage Location) 14 (Section) 20S (Township) 28E (Range)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with 125 sx.

TOC UNKNOWN feet determined by _____

Hole size 8½" TO 754 8" TO 754 TO 784

Total depth 662

Injection interval

764 feet to 784 feet

(perforated or open-hole, indicate which)

Tubing size 2 3/8 lined with CEMENT (material) set in a (GUIBERSON) 2"X 7" (brand and model) packer at 750 feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES

2. Name of Field or Pool (if applicable) RUSSELL

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? PRODUCTION

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO

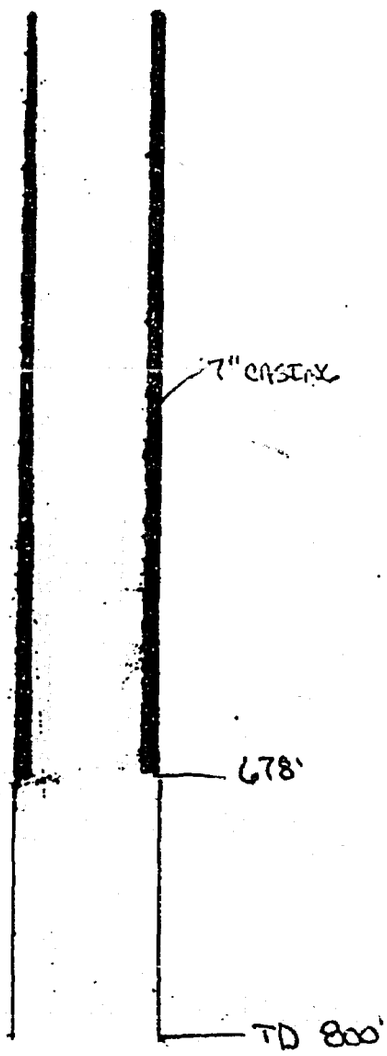
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

Barber Del, Inc. (OPERATOR) LC-050797 (LEASE) Wells Fed

17 (WELL NO.) FOOTAGE LOCATION 13 (SECTION) 20S (TOWNSHIP) 28E (RANGE)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with 125 sx.

TOC unknown feet determined by _____

Hole size 8½"

Total depth 678'

Injection interval

780 feet to 800 feet

(perforated or open-hole, indicate which)

Tubing size _____ lined with _____ (material) set in a

_____ (brand and model) packer at _____ feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation Yates

2. Name of Field or Pool (if applicable) Russell

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? Production

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) No

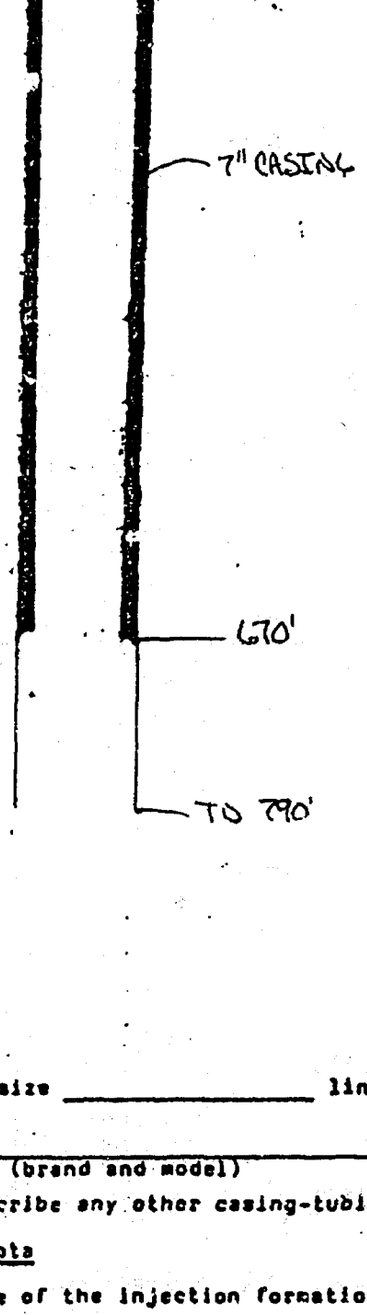
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. None

INJECTION WELL DATA SHEET

Barrel Oil Inc (OPERATOR) LC-050797 (LEASE) Wells Fed.

18 (WELL NO.) 338' FSL & 352' FWL (FOOTAGE LOCATION) 13 (SECTION) 20S (TOWNSHIP) 28E (RANGE)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with 150 sx.

TOC UNKNOWN feet determined by _____

Hole size 8½"

Total depth 670'

Injection interval

767 feet to 782 feet

(perforated or open-hole, indicate which)

Tubing size _____ lined with _____ (material) set in a

_____ (brand and model) packer at _____ feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES

2. Name of Field or Pool (if applicable) RUSSELL

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? PRODUCTION

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO

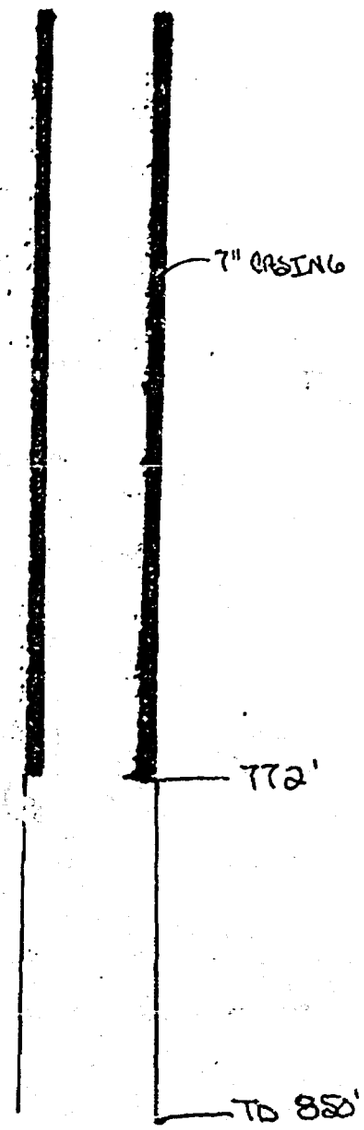
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

Barber Oil, Inc. (LC-050797) Wells Fed.
OPERATION LEASE

19 | 2322' FNL 2333' FEL | 13 | 20S | 28E
WELL NO. | FOOTAGE LOCATION | SECTION | TOWNSHIP | RANGE

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with 150 sx.

TOC UNKNOWN feet determined by _____

Hole size 8½"

Total depth 772'

Injection interval

829 feet to 849 feet
(perforated or open-hole, indicate which)

Tubing size _____ lined with _____ (material) set in a

_____ (brand and model) packer at _____ feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES

2. Name of field or Pool (if applicable) RUSSELL

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? PRODUCTION

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO

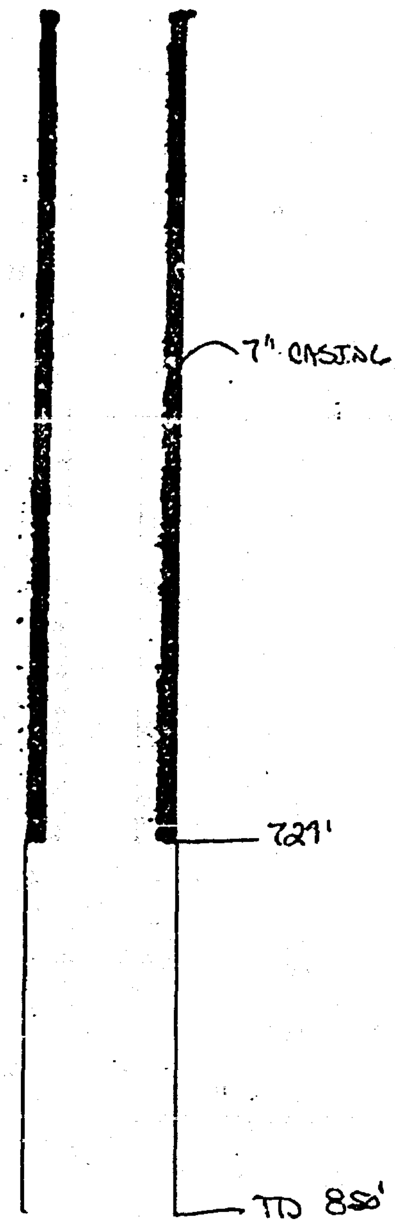
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

OPERATOR	LEASE	
Barber Oil, Inc	LC-050797	Wills Fed.

WELL NO.	FOOTAGE LOCATION	SECTION	TOWNSHIP	RANGE
21	1656' FNL & 1665 FEL	13	20S	28E

Schematic



Tabular Data

Surface Casing

Size ________ " Cemented with ________ sx.

TOC ________ feet determined by ________

Hole size ________

Intermediate Casing

Size ________ " Cemented with ________ sx.

TOC ________ feet determined by ________

Hole size ________

Long string

Size 7 " Cemented with 150 sx.

TOC UNKNOWN feet determined by ________

Hole size 8½"

Total depth 729'

Injection interval

832 feet to 848 feet
([redacted] or open-hole, indicate which)

Tubing size ________ lined with ________ (material) set in a ________ (brand and model) packer at ________ feet.
(or describe any other casing-tubing seal).

Other Data

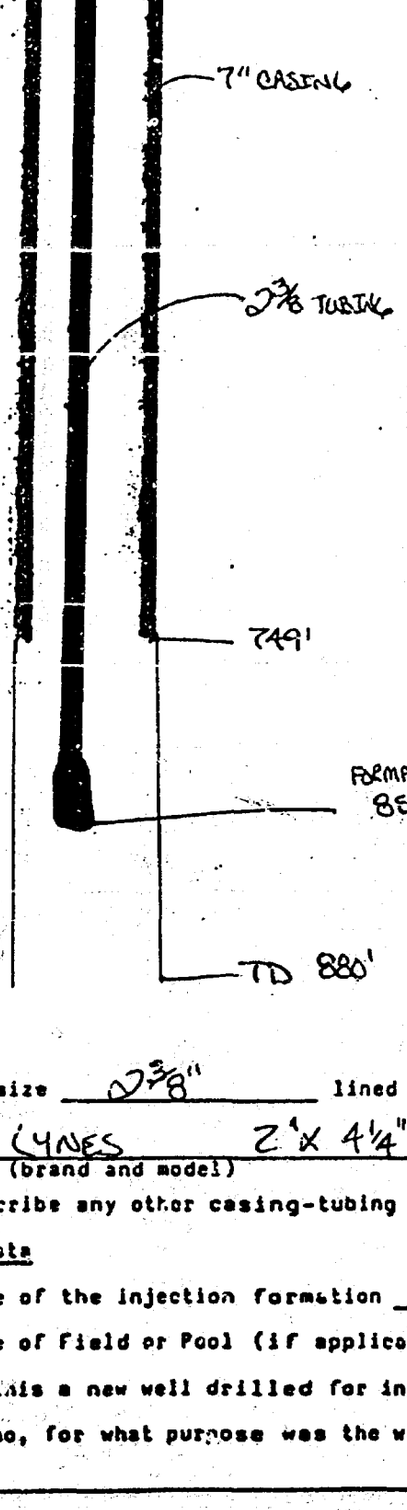
1. Name of the injection formation YATES
2. Name of Field or Pool (if applicable) RUSSELL
3. Is this a new well drilled for injection? /_7 Yes /X/ No
   If no, for what purpose was the well originally drilled? PRODUCTION
4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) No
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

BARBER OIL INC. (OPERATOR) | LC-050797 (LEASE) | WELLS FED.

23 (WELL NO.) | 330' FNL AND 1665' FEL (FOOTAGE LOCATION) | 13 (SECTION) | 20S (TOWNSHIP) | 28E (RANGE)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with 150 sx.

TOC UNKNOWN feet determined by _____

Hole size 8½

Total depth 749

Injection interval

860 feet to 875 feet

(perforated or open-hole, indicate which)

Tubing size 2⅜" lined with CEMENT (material) set in a

LYNES 2"X 4¼" (brand and model) packer at 850 feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES

2. Name of Field or Pool (if applicable) RUSSELL

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? PRODUCTION

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO

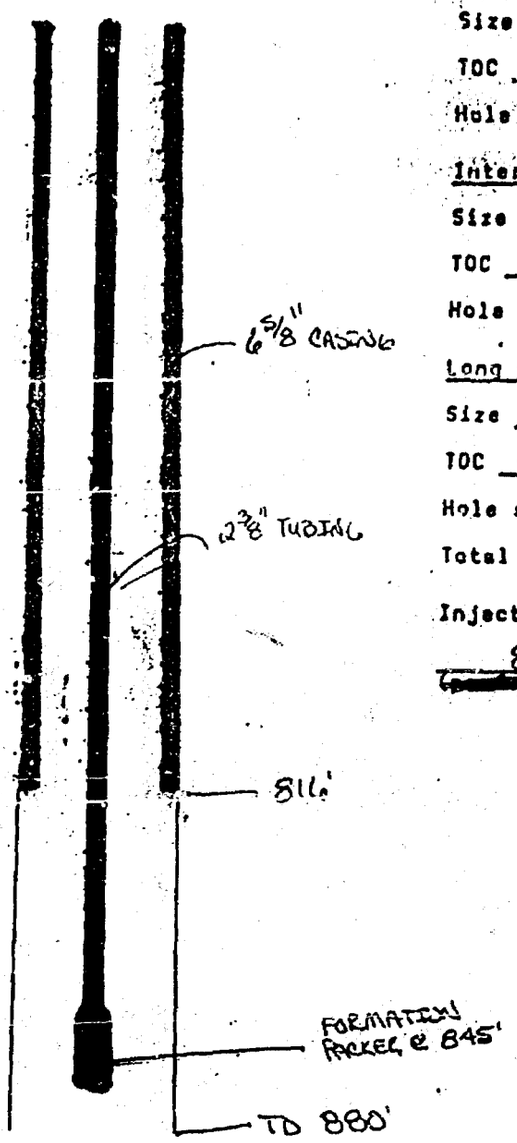
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

Barbel Oil, Inc. (LC-050797) (Wells Fed.)
OPERATOR LEASE

25 | 660' FNL and 2000' FEL | 13 | 20S | 28E
WELL NO. | FOOTAGE LOCATION | SECTION | TOWNSHIP | RANGE

Schematic



Tubular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____ Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 6 5/8" Cemented with 100 sx.

TOC UNKNOWN feet determined by _____

Hole size 8 1/2"

Total depth ~~882'~~ 816'

Injection interval

850 feet to 873 feet

([redacted] or open-hole, indicate which)

Tubing size 2 3/8 lined with _____ (material) set in a

LYNES 2" x 4 1/4" (brand and model) packer at 845 feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES

2. Name of Field or Pool (if applicable) RUSSELL

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? PRODUCTION

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO

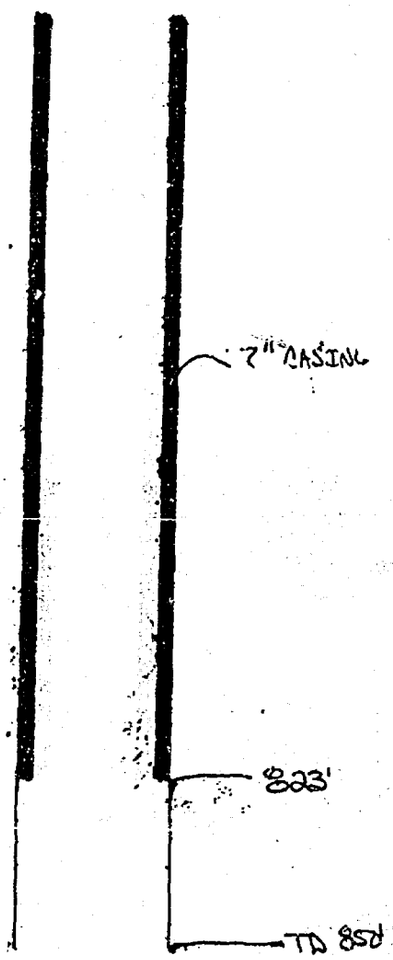
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

Barber Oil, Inc. (LC-050797) Wells Lease
OPERATOR LEASE

24 WELL NO. | 1305' FNL & 1980' FEL FOOTAGE LOCATION | 13 SECTION | 20S TOWNSHIP | 28E RANGE

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 7" Cemented with 100 sx.

TOC UNKNOWN feet determined by _____

Hole size 8¼"

Total depth 823'

Injection interval

826 feet to 846 feet

(~~perforated~~ or open-hole, indicate which)

Tubing size _____ lined with _____ (material) set in a

_____ (brand and model) packer at _____ feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES

2. Name of Field or Pool (if applicable) EUNICE

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? PRODUCTION

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO

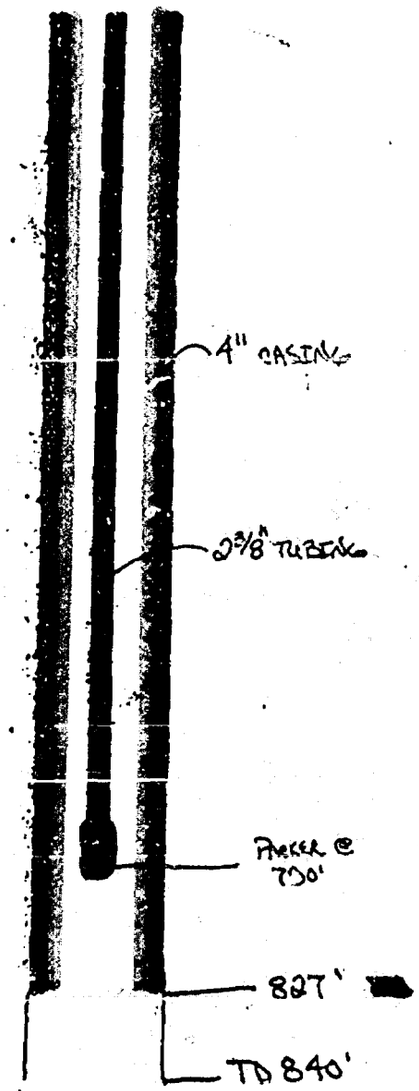
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

BARBER PET. INC. (OPERATOR) LC-050797 (LEASE) WELLS FED.

27 (WELL NO.) 1325' FSL & 660' FWL (FOOTAGE LOCATION) 13 (SECTION) 20S (TOWNSHIP) 28E (RANGE)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 4" Cemented with 450 sx.

TOC UNKNOWN feet determined by _____

Hole size 5 1/2"

Total depth 827'

Injection interval

791 feet to 819 feet

(perforated or ~~open hole~~, indicate which)

Tubing size 2 3/8 lined with CEMENT (material) set in a

GUIBERSON 2"X4" (brand and model) packer at 780' feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES

2. Name of Field or Pool (if applicable) RUSSELL

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? PRODUCTION

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) No

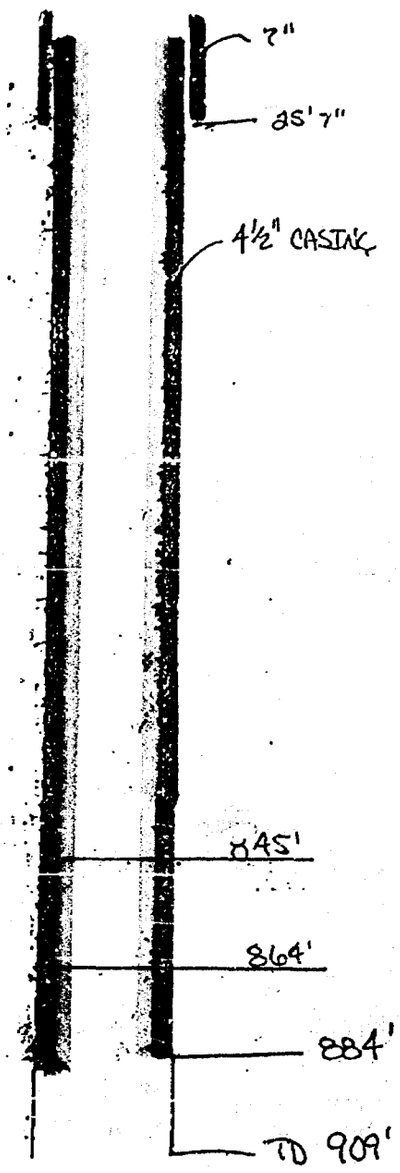
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

Barber Oil, Inc — LC-050797 — Wells Fed.
OPERATOR — LEASE

30 — 2310' FNL + 990' FEL — 13 — 20S — 28E
WELL NO. — FOOTAGE LOCATION — SECTION — TOWNSHIP — RANGE

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing 1 JT.

Size 7" Cemented with 10 sx. as conductor

TOC _____ feet determined by _____

Hole size 8½"

Long string

Size 4½" Cemented with 287 sx.

TOC 225' feet determined by TS

Hole size 6¼"

Total depth 884

Injection interval

845 feet to 864 feet
(perforated or ~~open hole~~, indicate which)

Tubing size _____ lined with _____ (material) set in a _____ (brand and model) packer at _____ feet.

(or describe any other casing-tubing seal).

Other Data

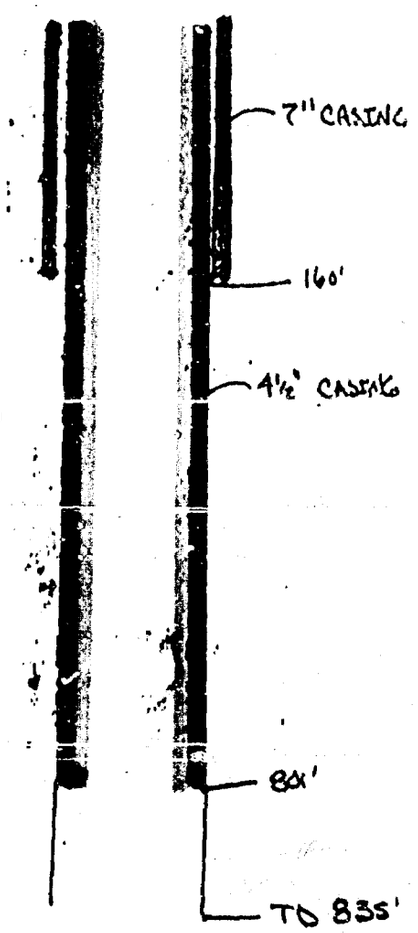
1. Name of the injection formation YATES
2. Name of Field or Pool (if applicable) RUSSELL
3. Is this a new well drilled for injection? ☐ Yes ☒ No
   If no, for what purpose was the well originally drilled? PRODUCER
4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

Barbee Oil, Inc. (OPERATOR) LC-050797 (LEASE) Wells Fed. (WELL NO.)

33 (WELL NO.) 1330' FSL + 980' FWL (FOOTAGE LOCATION) 13 (SECTION) 20S (TOWNSHIP) 28E (RANGE)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size 7" Cemented with 15 sx.

TOC _____ feet determined by _____

Hole size 8½"

Long string

Size 4½" Cemented with 160 sx.

TOC UNKNOWN feet determined by _____

Hole size 6¼"

Total depth 801

Injection interval

800 feet to 800 feet

(perforated or open-hole; indicate which)

Tubing size _____ lined with _____ (material) set in a _____ (brand and model) packer at _____ feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES

2. Name of field or Pool (if applicable) RUSSELL

3. Is this a new well drilled for injection? ___ Yes XX No

If no, for what purpose was the well originally drilled? PRODUCTION

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO

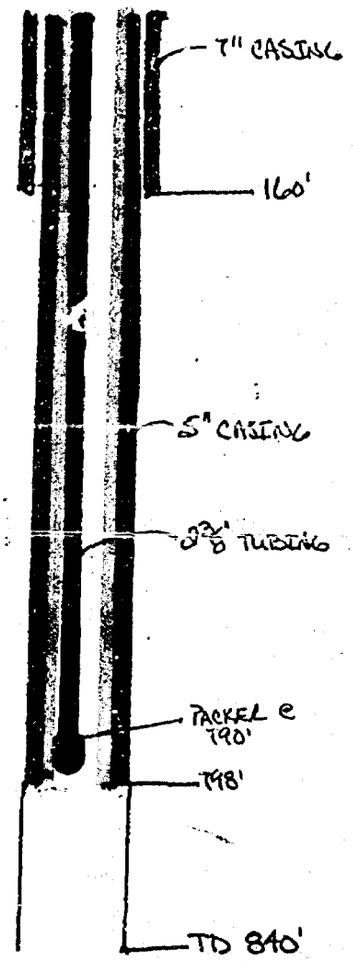
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

BARBER OIL, INC. (OPERATOR) LC-050797 (LEASE) WELLS FED.

34 (WELL NO.) 2630' FNL + 1980 FWL (FOOTAGE LOCATION) 13 (SECTION) 20S (TOWNSHIP) 28E (RANGE)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size 7" Cemented with 15 sx

TOC _____ feet determined by _____

Hole size 8½"

Long string

Size 5" Cemented with 60 sx.

TOC UNKNOWN feet determined by _____

Hole size 6¼"

Total depth 798'

Injection interval

799 feet to 808 feet
(perforated or open-hole, indicate which)

Tubing size 2 3/8" lined with PLASTIC (material) set in a

ARROW TYPE SL 2¼ X 4" (brand and model) packer at 790 feet.

(or describe any other casing-tubing seal).

Other Data

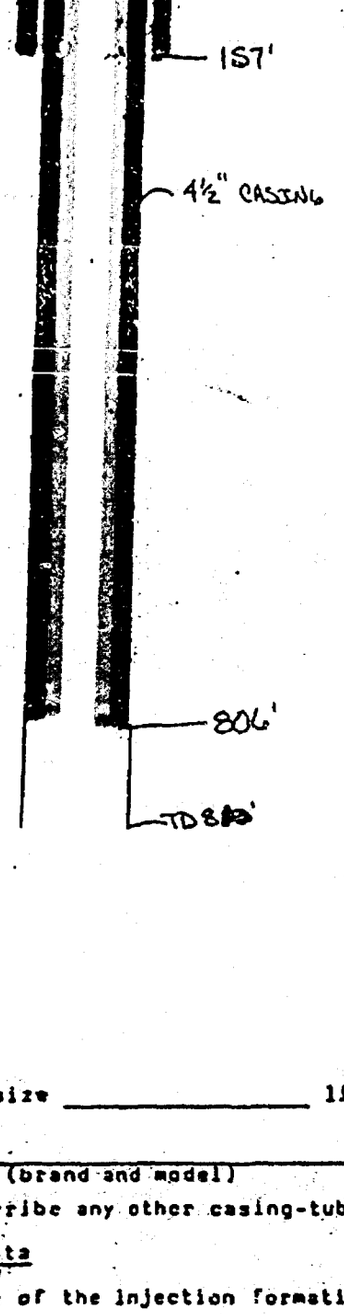
1. Name of the injection formation YATES
2. Name of Field or Pool (if applicable) RUSSELL
3. Is this a new well drilled for injection? ☐ Yes ☒ No
   If no, for what purpose was the well originally drilled? PRODUCTION
4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used): NO
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

Barber Oil, Inc. (OPERATOR) LC-050797 (LEASE) Well Fed.

35 (WELL NO.) 1980' FNL + 2630 FEL (FOOTAGE LOCATION) 13 (SECTION) 20S (TOWNSHIP) 28E (RANGE)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size 7" Cemented with 25 sx.

TOC _____ feet determined by _____

Hole size _____

Long string

Size 4½" Cemented with 60 sx.

TOC UNKNOWN feet determined by _____

Hole size 6 1/4"

Total depth 806

Injection interval

767 feet to 806 feet

(perforated or ~~open hole~~; indicate which)

Tubing size _____ lined with _____ (material) set in a

_____ (brand and model) packer at _____ feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES
2. Name of Field or Pool (if applicable) RUSSELL
3. Is this a new well drilled for injection? ☐ Yes ☒ No

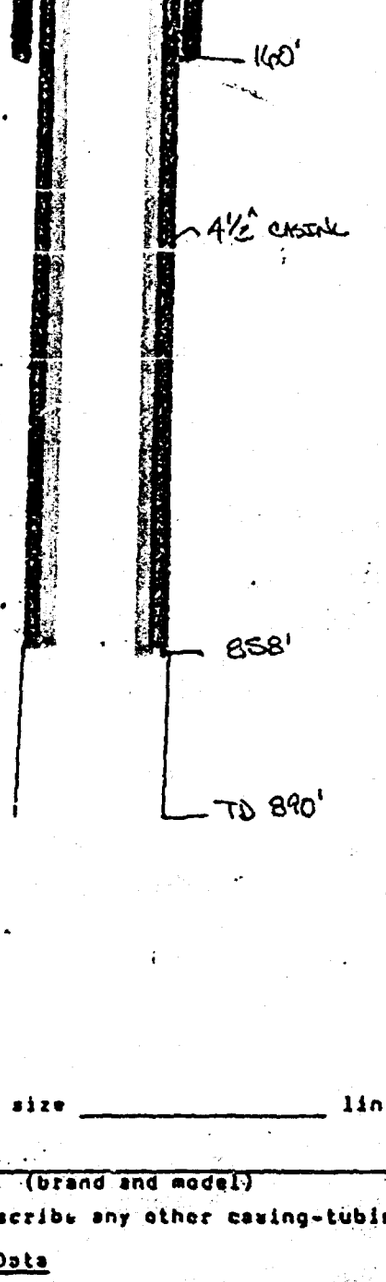
   If no, for what purpose was the well originally drilled? PRODUCTION
4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

Barber Oil, Inc. — LC-050797 — Wells Fed.
OPERATOR — LEASE

36 — 660' FNL & 1310' FEL — 13 — 20S — 28E
WELL NO. — FOOTAGE LOCATION — SECTION — TOWNSHIP — RANGE

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size 7" Cemented with 25 sx

TOC _____ feet determined by _____

Hole size 8½"

Long string

Size 4½" Cemented with 50 sx.

TOC UNKNOWN feet determined by _____

Hole size 6¼"

Total depth 858'

Injection interval

858 feet to 881 feet

(~~perforated~~ or open-hole, indicate which)

Tubing size _____ lined with _____ (material) set in a _____ (brand and model) packer at _____ feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES

2. Name of Field or Pool (if applicable) RUSSELL

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? PRODUCTION

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO

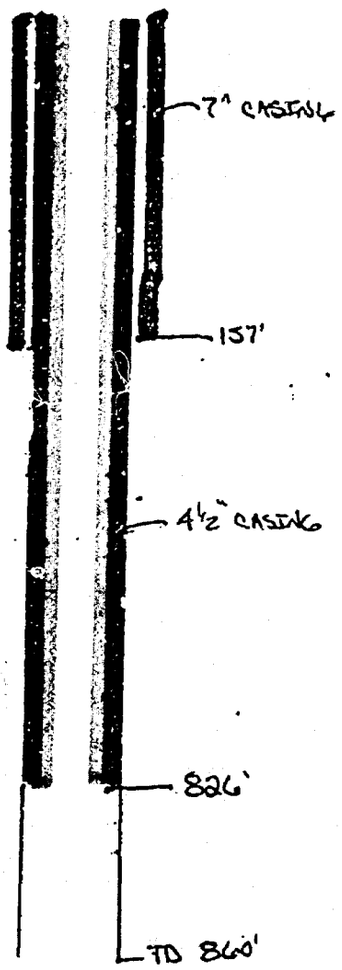
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

Barber Oil, Inc. (OPERATOR) LC-050797 (LEASE) Wells Fed

37 (WELL NO.) 660' FNL + 2630' FEL (FOOTAGE LOCATION) 13 (SECTION) 20S (TOWNSHIP) 28E (RANGE)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size 7" Cemented with 26 sx.

TOC _____ feet determined by _____

Hole size 8½"

Long string

Size 4½" Cemented with 100 sx.

TOC UNKNOWN feet determined by _____

Hole size 6¼"

Total depth 826'

Injection interval

832 feet to 854 feet

(perforated or open-hole; indicate which)

Tubing size _____ lined with _____ (material) set in a _____ (brand and model) packer at _____ feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES
2. Name of Field or Pool (if applicable) RUSSELL
3. Is this a new well drilled for injection? ☐ Yes ☒ No

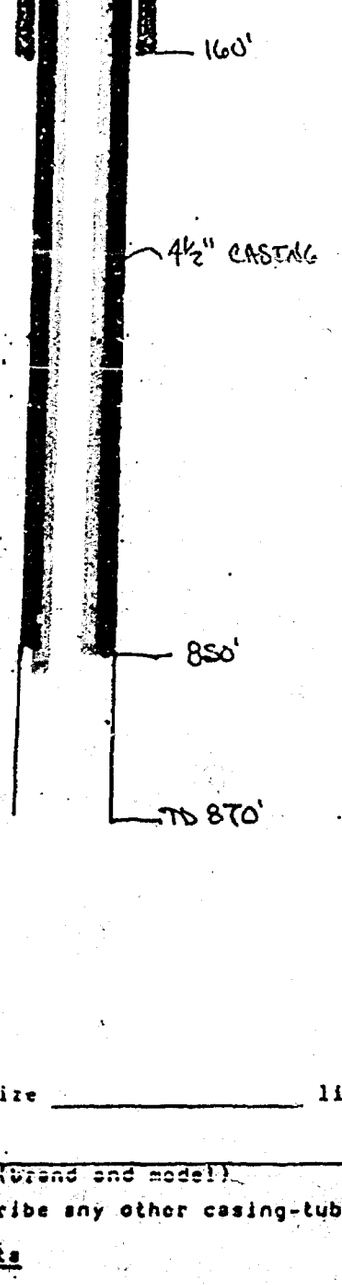
   If no, for what purpose was the well originally drilled? PRODUCTION
4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

BARBER OIL INC. (OPERATOR) LC-050197 (LEASE) WELLS FED.

39 (WELL NO.) 2630' FNL & 1980 FEL (FOOTAGE LOCATION) 13 (SECTION) 20S (TOWNSHIP) 28E (RANGE)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size 7" Cemented with 15 sx.

TOC _____ feet determined by _____

Hole size 8¼"

Long string

Size 4½" Cemented with 60 sx.

TOC UNKNOWN feet determined by _____

Hole size 6¼"

Total depth 850'

Injection interval

850 feet to 863 feet

(~~perforated~~ or open-hole, indicate which)

Tubing size _____ lined with _____ (material) set in a _____ (brand and model) packer at _____ feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES
2. Name of Field or Pool (if applicable) RUSSELL
3. Is this a new well drilled for injection? ☐ Yes ☒ No

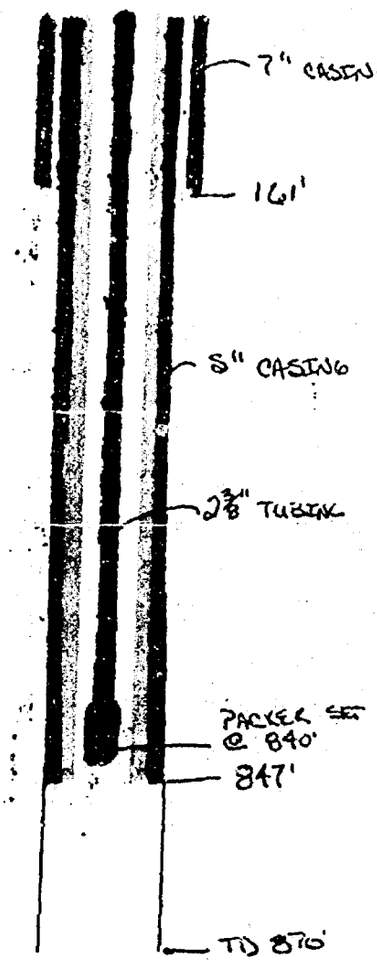
   If no, for what purpose was the well originally drilled? PRODUCTION
4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

Barber Oil, Inc. (Operator) LC-050797 (Lease) Wells Fed.

41 (Well No.) 1310' FNL, 1310' FEL (Footage Location) 13 (Section) 20S (Township) 28E (Range)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size 7" Cemented with 15 sx.

TOC _____ feet determined by _____

Hole size 8½"

Long string

Size 5" Cemented with 60 sx.

TOC UNKNOWN feet determined by _____

Hole size 6 3/8"

Total depth 847'

Injection interval

844 feet to 866 feet

(perforated or open-hole, indicate which)

Tubing size 2 3/8 lined with PLASTIC (material) set in a

ARROW (brand and model) 2'K8" packer at 840 feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES
2. Name of field or Pool (if applicable) RUSSELL
3. Is this a new well drilled for injection? ☐ Yes ☒ No

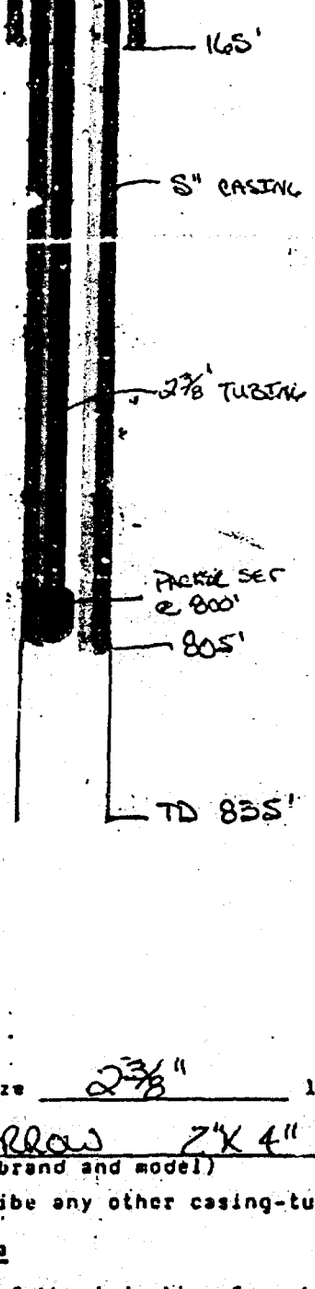
   If no, for what purpose was the well originally drilled? PRODUCTION
4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) No
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE.

INJECTION WELL DATA SHEET

BARTEL OIL INC. (OPERATION) LC-058797 (LEASE) WELLS FED.

12 (WELL NO.) 1330' FSL & 1330 FWL (FOOTAGE LOCATION) 13 (SECTION) 20S (TOWNSHIP) 28E (RANGE)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size 7" Cemented with 15 sx.

TOC _____ feet determined by _____

Hole size 8½"

Long string

Size 5" Cemented with 75 sx.

TOC UNKNOWN feet determined by _____

Hole size 6 3/8"

Total depth 805'

Injection interval

802 feet to 826 feet

(perforated or open-hole, indicate which)

Tubing size 2 3/8" lined with PLASTIC (material) set in a

ARROW 7"X 4" (brand and model) packer at 800 feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES

2. Name of Field or Pool (if applicable) RUSSELL

3. Is this a new well drilled for injection? ☐ Yes ☒ No

If no, for what purpose was the well originally drilled? PRODUCTION

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO

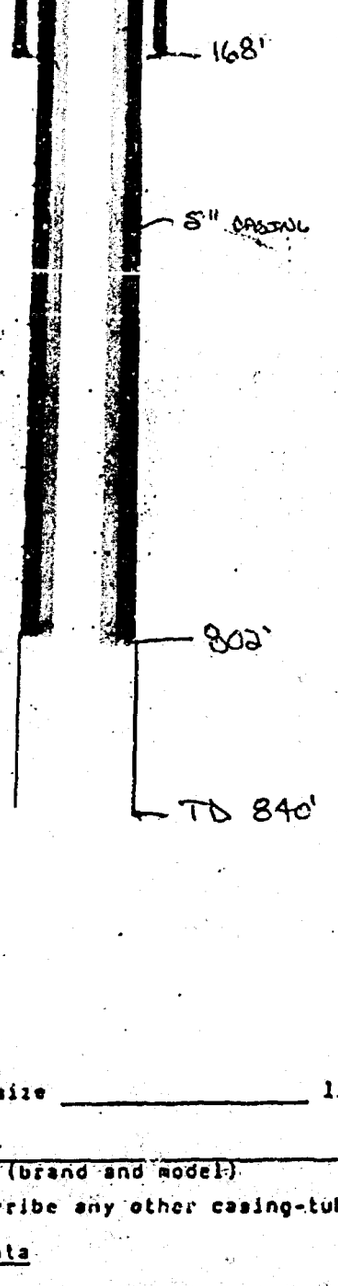
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET

Baker Oil Inc. (OPERATOR) CC-050797 (LEASE) Wills Fed

4S (WELL NO.) 1828 FNL + 2635' FEL (FOOTAGE LOCATION) 13 (SECTION) 20S (TOWNSHIP) 28E (RANGE)

Schematic



Tabular Data

Surface Casing

Size _____" Cemented with _____ sx.

TOC _____ feet determined by _____

Hole size _____

Intermediate Casing

Size 7" Cemented with 15 sx.

TOC _____ feet determined by _____

Hole size 8½"

Long string

Size 5" Cemented with 50 sx.

TOC (UNKNOWN) feet determined by _____

Hole size 6⅜"

Total depth 802

Injection interval

810 feet to 834 feet

(perforated or open-hole, indicate which)

Tubing size _____ lined with _____ (material) set in a _____ (brand and model) packer at _____ feet.

(or describe any other casing-tubing seal).

Other Data

1. Name of the injection formation YATES
2. Name of Field or Pool (if applicable) RUSSELL
3. Is this a new well drilled for injection? ☐ Yes ☒ No

   If no, for what purpose was the well originally drilled? PRODUCTION
4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO
5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NONE

LAW OFFICES OF
HUNKER-FEDRIC, P. A.
SUITE 310, HINKLE BUILDING
POST OFFICE BOX 1837
ROSWELL, NEW MEXICO 88201

GEORGE H. HUNKER, JR.
DON M. FEDRIC

TELEPHONE 622-2700
AREA CODE 505

June 25, 1982

JUN 28 1982

Mr. Joe D. Ramey, Secretary-Director
New Mexico Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87501

Attention: Mr. Richard Stamets

Re: Barber Oil, Inc.
Exception, Rule 705A
Case No. 7599

Gentlemen:

This is to confirm the understanding reached by us recently that the above styled matter would be heard by an Examiner on Wednesday, July 21, 1982.

Due to the press of other business, we would like to have our case appear early on the docket as my witnesses have other business to take care of during the same week. We will arrive in Santa Fe the evening before the hearing date.

Thank you very much for your consideration.

Sincerely yours,

HUNKER-FEDRIC, P.A.

George H. Hunker, Jr.

GHH:dd

xc: Robert S. Light, President
Barber Oil, Inc.
P.O. Box 1658
Carlsbad, New Mexico 88220

MAY 26 1982
OIL CON...
SANTA FE

LAW OFFICES OF
HUNKER-FEDRIC, P. A.
SUITE 210, HINKLE BUILDING
POST OFFICE BOX 1837
ROSWELL, NEW MEXICO 88201

GEORGE H. HUNKER, JR.
DON M. FEDRIC

TELEPHONE 622-2700
AREA CODE 505

May 25, 1982

Mr. Joe D. Ramey, Secretary-Director
New Mexico Oil Conservation Commission
P.O. Box 2088
Santa Fe, New Mexico 87501

Case 7599

Re: Barber Oil, Inc.
Application for
De Novo Hearing
Russell Pool
Exception Rule 705A

Dear Mr. Ramey:

In connection with the above matter, I would like to request that the hearing which we requested before the Full Commission not be set for hearing during the week of June 13, as I will be in Canada on a fishing trip which I have planned for many months. The hearing could be set for sometime during the middle of July.

We would appreciate your cooperation in connection with this situation.

Sincerely yours,

HUNKER-FEDRIC, P.A.

George H. Hunker, Jr.

GHH:dd

xc: Mr. Robert S. Light, President
Barber Oil, Inc.
P.O. Box 1658
Carlsbad, NM 88220

LAW OFFICES OF
HUNKER-FEDRIC, P. A.
SUITE 210, HINKLE BUILDING
POST OFFICE BOX 1837
ROSWELL, NEW MEXICO 88201

GEORGE H. HUNKER, JR.
DON M. FEDRIC

TELEPHONE 622-2700
AREA CODE 505

May 7, 1982

Case 7599

MAY 10 1982

Mr. Joe D. Ramey, Secretary-Director
New Mexico Oil Conservation Commission
P.O. Box 2088
Santa Fe, New Mexico 87501

Re: Russell Pool
Barber Oil de novo hearing

Dear Mr. Ramey:

Reference is made to your letter of April 12, 1982, denying an exception to Rule 705A with respect to Barber Oil's Russell Pool injection wells. We would like to have a de novo hearing in connection with this matter, and our application for such a hearing in triplicate, is enclosed herewith. Will you please advertise and advise us as to the hearing date. A copy of this letter and a copy of the application are being sent to the local office of the Minerals Management Service for the reason that federal lands are involved. We are sending a copy of the letter to Oscar Simpson in your office.

Sincerely yours,

HUNKER-FEDRIC, P.A.

George H. Hunker, Jr.

GHH:dd
Enc.

xc: Mr. James A. Gillham, Area Supervisor,
Minerals Management Service, PO Box 1857, Roswell, NM 88201,
w/enc.
xc: Mr. Oscar Simpson, NMOCC, PO Box 2088, Santa Fe, NM 87501
xc: Mr. Joe L. Johnson, Stephens Engrg., PO Box 2249,
Wichita Falls, TX 76307, w/enc.
xc: Mr. Robert S. Light, Barber Oil, Inc.,
PO Box 1658, Carlsbad, NM 88220, w/enc.

MAY 10 1982
OIL CONSERVATION DIVISION
SANTA FE

STATE OF NEW MEXICO

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION COMMISSION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION COMMISSION FOR THE PURPOSE OF CONSIDERING APPLICATION OF BARBER OIL, INC. FOR AN EXCEPTION TO THE CEMENTING AND BRIDGE PLUGGING REQUIREMENTS OF RULE 705A, RUSSELL POOL, EDDY COUNTY, NEW MEXICO.

CASE NO. 7599

APPLICATION FOR EXCEPTION TO RULE 705A

Barber Oil, Inc., 111 West Mermod, P.O. Box 1658, Carlsbad, New Mexico 88220, by its attorneys, Hunker-Fedric, P.A., P.O. Box 1837, Roswell, New Mexico 88201, hereby makes application to the Oil Conservation Commission for a de novo hearing in connection with the matter of an exception to Commission Rule 705A, and in support thereof shows:

1. That heretofore and on March 4, 1982, Applicant sought administrative approval for an exception to Rule 705A so as to permit Applicant (Operator) to continue to use and not be required to isolate the injection interval by the use of a cement or bridge plug in the following wells in the Russell Pool, Eddy County, New Mexico:

(a) Crosby Federal Wells Nos. 1, 2 and 4 (3 wells)

(b) Turner Federal Wells Nos. 2,3,6,12, 13,15,18,21,22 (9 wells)

(c) Wills Federal Wells Nos. 2,5,6,8,10, 14,15,17,18,19,21,23,25,26,27,30,33, 34,35,36,37,39,41,42,45 (25 wells)

Total: 37 wells

2. That the Applicant is the operator of said wells, all of which are in the Russell Pool (Yates) originally defined in Order No. 850 dated January 1, 1950, covering all of Section 13 and parts of Sections 12 and 14, T. 20S, R. 28E, NMPM. That the lands upon which said wells are located are lands of the United States subject to federal oil and gas leases, and as such must be operated in a manner not prejudicial to the United States or to the public interest.

That prematurely abandoning of said wells is not in the public interest nor in the interest of the United States.

3. That although said wells are not presently being used as injection wells, they are in their present condition a viable asset for the utilization in a future project for enhanced recovery purposes. The shallow depth of the Russell Pool (800 feet) exhibits features regarded as desirable for these purposes, including 5-acre spacing, greater than 60% of the original oil in place, and good records over the present water flood life. In the opinion of qualified petroleum engineers, these wells can be used in a future enhanced recovery project and that an additional 1.6 million barrels of oil can be anticipated to be recovered from such a project.

4. Area reviews find no potable fresh water in the vicinity of the subject wells; hence, no damage can be anticipated from these wells if they are permitted to remain open and available for an enhanced recovery project at a future date.

5. That the plugging of the 37 wells included in this application would severely handicap the potentiality of future projects and would eliminate (for practical purposes) the potentiality for the future recovery of approximately 1.6 million bbls of oil. To require that said well be prematurely abandoned and plugged in accordance with Rule 705A would constitute waste and would not be in the public interest or in the interest of conservation.

6. That the application made on March 4, 1982, was denied by Executive Director of the Oil Conservation Division by letter dated April 12, 1982, and this action is taken in the nature of an appeal from that ruling.

7. That a counterpart of this application is being sent to the Minerals Management Service, P.O. Box 1857, Roswell, New Mexico 88201, the Area Office having jurisdiction over the United States lease or leases involved in this application.

WHEREFORE, Applicant requests that this matter be set down for a de novo hearing before the New Mexico Oil Conservation Commission, and prays that an exception be granted for a period of three (3) years

from the cementing and bridge plug requirements of Rule 705A as to the 37 wells described herein.

Respectfully submitted,

HUNKER-FEDRIC, P.A.

By _____
George H. Hunker, Jr.
Attorneys for Applicant
P.O. Box 1837
Roswell, New Mexico 88201
(505) 622-2700

xc: Mr. James A. Gillham
Area Supervisor
Minerals Management Service
P.O. Box 1857
Roswell, New Mexico 88201

DAN

STATE OF NEW MEXICO

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 7599

Order No. R-7115

APPLICATION OF BARBER OIL INC.
FOR AN EXCEPTION TO RULE 705-A,
EDDY COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on July 21, 1982, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this_____day of October, 1982, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Barber Oil Inc., is the operator of a waterflood project in the Russell Pool, Eddy County, New Mexico, which flood was originally authorized by Order No. R-263, dated February 10, 1953, and which has been expanded on several occasions pursuant to subsequent orders of the Division.

(3) That by applications dated March 4, 1982, and April 1, 1982, applicant requested administrative approval for an exception to Rule 705-A of the Division Rules and Regulations to permit 37 former injection wells to remain on standby status without having the cement plug or bridge plug installed therein as required by said rule for any temporarily abandoned injection well.

(4) That on April 12, 1982, the Division Director denied the application for administrative approval for such exception, citing as the reason for such denial failure of the applicant to demonstrate good cause to be entitled to such exception.

(5) That subsequent to said denial, applicant filed an application for a hearing in this matter, requesting that as an exception to the provisions of Rule 705-A of the Division Rules and Regulations, 37 temporarily abandoned water injection wells in its Russell Pool Waterflood Project be permitted to remain inactive for a period of up to three years without the required cement or bridge plug being installed therein to isolate the injection zone.

(6) That according to the evidence presented at the hearing, of the original 5.3 million barrels of oil in place in the Russell Pool, applicant produced 800,000 barrels on primary recovery and has produced 1.5 million barrels on secondary

recovery, leaving approximately 3 million barrels still in the reservoir.

(7) That the applicant has under study a plan for the installation of a tertiary recovery system in the Russell Pool, by means of which perhaps another 1.5 to 1.6 million barrels of oil could be recovered.

(8) That said tertiary recovery system would begin as a pilot project, utilizing eight of the 37 wells which are the subject of this case, and if successful, would be expanded to include some or all of the remaining 29 wells.

(9) That the applicant should be permitted to retain said wells for use in the tertiary recovery system, provided however, that there should be a time limit on such retention without cement or bridge plugs and provided further, that the integrity of the existing casing in the wells should be established by adequate testing.

(10) That three years should be adequate time in which to determine the success of the pilot tertiary recovery system and the feasibility of expansion thereof to include the entire pool.

(11) That the integrity of the casing in each of the wells should be established by successful completion of such testing procedure as may be required by the Supervisor of the Division's Artesia District Office.

(12) That subject to the provisions of Findings Nos. (10) and (11) above, approval of the application will not cause waste nor impair correlative rights and should be granted.

IT IS THEREFORE ORDERED:

(1) That the applicant, Barber Oil Inc., is hereby authorized to retain as a temporarily abandoned status, without the installation of a cement plug or bridge plug to isolate the injection zone, the following described wells, all in Township 20 South, Range 28 East, NMPM Russell Pool, Eddy County, New Mexico.

Lease	Well No.	Location	Section
Crosby Fed	1	330' FSL & 2310' FEL	12
" "	2	330' FSL & 1650' FEL	12
" "	4	663' FSL & 2000' FEL	12
Turner Fed	2	1980' FSL & 1980' FWL	13
" "	3	1980' FSL & 1970' FEL	13
" "	6	660' FNL & 1980' FWL	13
" "	12	2322' FSL & 2339' FWL	13
" "	13	332' FNL & 2340' FWL	13
" "	15	331' FSL & 1669' FWL	13
" "	18	1658' FNL & 2339' FWL	13
" "	21	959' FSL & 2339' FWL	13
" "	22	2322' FSL & 1669' FEL	13
Wills Fed	2	660' FSL & 660' FWL	13
" "	5	990' FNL & 330' FWL	13
" "	6	996' FSL & 1005' FWL	13
" "	8	996' FNL & 1005' FEL	13
" "	10x	2322' FSL & 1005' FWL	13
" "	14	330' FSL & 330' FEL	13
" "	15	996' FSL & 330' FEL	13
" "	17	1656' FSL & 330' FWL	13
" "	18	338' FSL & 352' FWL	13
" "	19	2322' FNL & 2333' FEL	13
" "	21	1656' FNL & 1665' FEL	13

"	"	23	330' FNL & 1665' FEL	13
"	"	25	660' FNL & 2000' FEL	13
"	"	26	1305' FNL & 1980' FEL	13
"	"	27	1325' FSL & 660' FWL	13
"	"	30	2310' FNL & 990' FEL	13
"	"	33	1330' FSL & 1980' FWL	13
"	"	34	2630' FNL & 1980' FWL	13
"	"	35	1980' FNL & 2630' FEL	13
"	"	36	660' FNL & 1310' FEL	13
"	"	37	660' FNL & 2630' FEL	13
"	"	39	2630' FNL & 1980' FEL	13
"	"	41	1310' FNL & 1310' FEL	13
"	"	42	1330' FSL & 1330' FWL	13
"	"	45	1328' FNL & 2635' FEL	13

PROVIDED HOWEVER, that within 90 days after entry of this Order, applicant shall take such tests on each of the above-described wells as may be required by the Supervisor of the Division's Artesia District Office to ensure the integrity of the casing in said wells, and provided further, that if any such well tests in such a manner as to indicate poor condition of the casing, remedial steps shall be taken immediately to remedy this condition.

PROVIDED FURTHER, that this authority for the applicant to maintain the aforesaid wells in a shut-in condition without having cement plugs or bridge plugs installed therein shall expire three years after entry of this order.

(2) That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO

OIL CONSERVATION DIVISION

JOE D. RAMEY,

Director

S E A L