BEFORE THE

OIL CONSERVATION COMMISSION

Santa Fe, New Mexico

"Notice of Publication
State of New Mexico
Oil Conservation Commission

"The Oil Conservation Commission, as provided by law, hereby gives notice of the following hearings to be held at Santa Fe, New Mexico, at 10:00 o'clock A.M., April 15, 1947:

CASE NO. 92

"In the matter of the Application of Gulf Oil Corporation for issuance of a special order permitting the production of more than one horizon or pool through a single well bore in the Hobbs Pool, Lea County, N. M.

CASE NO. 93

"In the matter of the Application of Gulf Oil Corporation for the issuance of a special order permitting the production of more than one horizon or pool through a single well bore in the Paddock, Drinkard, Brunson, Jones and Blinbry Pools, Lea County, New Mexico.

CASE NO. 94

"In the matter of the Application of Gulf Oil Corporation for the promulgation of a General Order permitting and controlling production from more than one horizon or pool through a single well bore.

NOTE: These cases were in part heard January 10, 1947, and are continued to April 15th as indicated above.

Given under the seal of said Commission at Santa Fe, New Mexico on March 27th, 1947.

OIL CONSERVATION COMMISSION

By: /s/ R. R. SPURRIER, Secretary

S E A L"

Said meeting convened at the appointed hour, on the 15th day of April, 1947, in the Coronado Room of the La Fonda Hotel, Santa Fe, New Mexico, with the Commission sitting as follows:

Hon. T. J. Mabry, Governor, Chairman
Hon. John E. Miles, State Land Commissioner, Member
Hon. R. R. Spurrier, Secretary, Oil Conservation Commission, Member
Hon. George Graham, Attorney

REGISTER

NAME	COMPANY	ADDRESS
Russell Glowe	Gulf Oil Corporation	Tulsa, Oklahoma
Paxton Howard	Shell Oil Company	Midland, Texas
C. W. Faris	Shell Oil Company	Midland, Texas
Lloyd L. Gray	Gulf Oil Corporation	Tulsa, Oklahoma
W. E. Hubbard	Humble Oil Company	Houston, Texas
H. D. Pressler	Humble Oil Company	Houston, Texas
J. W. House	Humble Oil Company	Midland, Texas
R. S. Dewey	Humble Oil Company	Midland, Texas
Eugene Hunford	Gulf Oil Corporation	Tulsa, Oklahoma
V. S. Welch	Gulf Oil Corporation	Artesia, New Mexico
Neil B. Watson	Attorney	Artesia, New Mexico

NAME	COMPANY	ADDRESS
Emery Carper	Carper Drilling Company	Artesia, New Mexico
Elmer Patman	The Superior Oil Company	Houston, Texas
W. R. Bollinger	Shell Oil Company	Hobbs, New Mexico
John M. Kelly	Independent	Roswell, New Mexico
Harry J. Gibbons	Skelly Oil Company	Tulsa, Oklahoma
J. N. Dunlavey	Skelly Oil Company	Hobbs, New Mexico
G. W. Selinger	Skelly Oil Company	Tulsa, Oklahoma
Chuck Aston	Consultant for Aston & Fair	Artesia, New Mexico
Donald S. Bush	Lawyer	Artesia, New Mexico
Bert Aston	Aston & Fair	Roswell, New Mexico
M. K. Rouskop	Grayburg Oil Company	Artesia, New Mexico
R. F. Miller	Grayburg Oil Company	Artesia, New Mexico
R. J. Heard	Grayburg Oil Company	Artesia, New Mexico
W. B. Macey	N. M. Oil Conservation Commission	Artesia, New Mexico
H. C. Laird	Otis Engineering Corporation	Dallas, Texas
Paul C. Evans	Gulf Oil Corporation	Hobbs, New Mexico
E. J. Gallagher	Gulf Oil Corporation	Hobbs, New Mexico
J. C. Lowe	Amerada Petroleum Company	Ft. Worth, Texas
W. G. Ricketts	Amerada Petroleum Company	Tulsa, Oklahoma
G. H. Gray	Repollo Oil Company	Midland, Texas
W. N. Little	Tidewater Association	Midland, Texas
D. R. McKeithan	Phillips Petroleum Company	Bartersville, Okla.
E. H. Foster	Phillips Petroleum Company	Amarillo, Texas
Burney Braly	Continental Oil Company	Ft. Worth, Texas
C. B. Wentz	Continental Oil Company	Ponca City, Okla.
Edgar Kraus	Atlantic Refining Company	Dallas, Texas
A. B. Tanco	Atlantic Refining Company	Dallas, Texas
S. B. Christy, Jr.	Sun Oil Company	Roswell, New Mexico
D. A. Powell	Drilling & Exploration Company	Hobbs, New Mexico
H. F. Beardmore	Barnsdall Oil Company	Tusla, Oklahoma
F. E. Heath	Sun Oil Company	Dallas, Texas
Martin A. Row	Sun Oil Company	Dallas, Texas
J. E. Regent	Sun Oil Company	Midland, Texas
D. A. Miller	Phillips Petroleum Company	Midland, Texas
H. B. Hurley	Continental Oil Company	Ft. Worth, Texas
M. H. Dubrow	Continental Oil Company	Ft. Worth, Texas
A. L. Decker	Continental Oil Company	Ft. Worth, Texas
Claig H. Perry	Warren Petroleum Corporation	Tulsa, Oklahoma
R. E. McMillan	Ohio Oil Company	Midland, Texas
N. R. Lamb	N. M. Bureau of Mines & Mineral Research	Artesia, New Mexico
Roy T. Durst	Rowan Drilling Company	Midland, Texas
C. B. Williams	Texas Company	Ft. Worth, Texas
A. E. Willig	Texas Company	Ft. Worth, Texas
H. D. Murray	Texas Company	Midland, Texas
R. G. Schuehle	Texas,Pacific Coal & Oil Company	Midland, Texas
D. S. Googins	Standard of Texas	Midland, Texas
J. E. Wooton	Stanolind Oil & Gas Company	Ft. Worth, Texas
N. H. Card	Stanolind Oil & Gas Company	Ft. Worth, Texas
Lewis Finch, Jr.	Stanolind Oil & Gas Company	Ft. Worth, Texas
J. O. Seth	Stanolind Oil & Gas Company	Santa Fe, New Mexico
Ralph L. Gray	Stanolind Oil & Gas Company	Hobbs, New Mexico
Glenn Staley	Lea County Operators	Hobbs, New Mexico
Arch L. Rowan	Rowan Drilling Company	Ft. Worth, Texas
R. W. Tesch	Texas-Pacific Coal & Oil Company	Ft. Worth, Texas
Henry Forbes	Continental Oil Company	Midland, Texas
S. V. McCollum	Continental Oil Company	Midland, Texas
Foster Morrell	U. S. Geological Survey	Roswell, New Mexico

P R O C E E D I N G S

MR. ELMER PATMAN, Superior Oil Company:

With the permission of Judge Lowe, I would like to make this observation and inquiry. As I understand this series of hearings - of three hearings - is a continuation of hearing before this Commission, which began in January of this year and that

necessarily the record made upon that occassion together with this record will be taken together by the Commission in enacting a rule or formulating an opinion on this matter, or these matters. With that in mind and in the belief that the suggested procedure - I am going to make, will be in the interest of all, I am going to ask the Commission for permission to recall Mr. Dewey who testified in the original hearing. I believe he has already been sworn in this procedure. Before I do that, I believe this statement would be in order -

I would like to first make it very clear the Superior Oil Company is only a small person in New Mexico for considerable undeveloped acreage. We hope to have more production in this state, I would like to make it clear we have no wells presently that are susceptible of multiple completions; so, for that reason, I would like the participation we make in this hearing to be considered in connection with the general policy. We do not like to see or believe it to be right for this Commission or any other commission to arbitrarily close the door upon what we consider the right to complete a well in a manner that would affect the untimate recovery. I have no desire, and I hesitate in making this statement, but I have read the transcript of the January hearing and I find in that transcript and through it in a great many instances, in fact most references and most observations were references made to experiences in Texas. I realize and believe I know few wells in factual survey and as I understand this investigation - it is factual investigation you necessarily have to make decisions upon the facts of the individual reservoir and to have a well, so consequently we well know an experience we might have had in Texas with a particular well might not necessarily apply to a situation in this State. However, I believe I am sufficiently realistic to also know that things that go on in one state have a tendency to wash over the state lines. As an example, after your January 10th hearing, the Railroad Commission of Texas, which is our regulatory body, called a similar hearing and had it in March and I might say your January hearing kind of washed over in Austin in March.

I make those objections of making references to other states.

MR. LOWE: (Amerada Petroleum Company)

There are three cases, 92, 93 and 94. It was our intention that 94 be heard first and the other two followed, but in some manner they got in this place on the Docket. Number 94, as we understand it, is proposing a state-wide Order granting the right to make dual completions, it is not that anyone could goeut and complete any well you might want to complete in that manner. If the Order is made, if any operator desires to make dual completions he would have to make application to this Commission and the Commission would set a hearing to be had if necessary, and determine whether or not dual completions could be had in that well. The Order requested in Case No. 94 is not giving everyone the right to make dual completions as they choose. The application in Case No. 92 is an application for a specific well and West Grimes #4 is the well that is being considered in this connection. It would simply be permission to dually complete one well, would not necessarily stand on what the Commission might make in West Grimes #4. Case No. 93 is for a number of pools which boils down to one - one application to one specific well. We do not want anything for a man to complete a well dually if he wants to.

MR. R. R. SPURRIER (Secretary, Oil Conservation Commission)

Judge Lowe, in Case No. 92, the advertisement actually reads as ~~near~~ Hobbs pool and not West Grimes #4.

MR. LOWE:

We will ask to amend the application.

MR. HERMAN PRESSLER (Humble Oil Company)

My understanding of the transcript of the testimony taken on the hearing held January 10, the testimony of Mr. Gray, they had withdrawn and requested to be withdrawn their request for general state-wide order permitting dual completions and had confined their request to the application for an order in certain specific fields as a preliminary order to special orders for individual wells. As we understand the Gulf's proposal, the Commission would enter an order to the effect that dual completions may be permitted in a certain field or pool provided such application was made on each well and a special hearing held on that well. That is the way we understood the testimony of Mr. Gray.

MR. LOWE:

I think further on you will find a statement to the contrary.

MR. PRESSLER:

On page 8 of the transcript, Mr. Selinger asked Mr. Gray -

"I understand you now on behalf of your Company, you do not wish to press your application on Case No. 94 - - - - - -?"

(Mr. Gray) "I think our position on that is, we will leave up to the wishes of the Commission, if that fails it will be best we would have no objection, neither would we have any objection if it was decided to not change the general rules but treat these applications as exceptions, that is 92 and 93."

MR. PATMAN:

I would like to make a statement before Mr. Dewey takes the stand.

I would like to call the Commission's particular attention to the testimony of the first hearing. I would like to be put in the clear on the Gulf's position with reference to Case No. 94.

MR. LOWE:

I think it is in the statement of Mr. Spurrier on page 37 - Mr. Gray left it to the wishes of the Commission - it seems the Commission has already settled it because for cases 92, 93 and 94, he states:

"Cases 92, 93 and 94 are continued until the definite date of April 15, 1947 at 10 o'clock A. M., for the purpose of further testimony in these three cases."

MR. PATMAN:

Do I understand Case No. 94 is continued on because of wanting a General Order permitting dual completions generally?

MR. SPURRIER:

Yes.

MR. LOWE:

I would like to make a statement now or later as to Humble's position generally.

Humble's position is there should be only, when it is essential for dual completions. We have dual completion of a well to recover oil which because of the economic conditions would not otherwise be recovered. We think dual completions should be avoided whereever possible, and in most instances they can be avoided. We do not believe a general practice of multiple completion is consistent with the prevention of waste or conservation problem. Unless all reservoirs are controlled, it induces migration of oil or gas from one reservoir to another.

The results are waste which is irrecoverable. As to the migration of oil from one reservoir to another, we believe very few multiple completions can result in this migration, but most completions may be entirely adequate and one or two in the field might result in the loss. Because of the complex factors involved, we believe there should be no general statewide rule, we believe there should be a general rule for a pool to determine whether or not multiple completion should be allowed in that pool, should be looked at the pool as a whole - as a complete pool, then that that general rule for the pool should not allow indiscriminate dual completions in the pool. After the determination by the Commission, dual completions should be made in the pool looked at as a whole, then before a dual completion of any well is permitted a special application should be made for that well, then a hearing should be had and permit issued.

MR. PATMAN:

Is it not true that so far as the Humble Company is concerned they have one pool in New Mexico and another one in Texas on this question?

MR. LOWE:

I don't know of any difference in our policy where the facts in a given field or pool are the same.

MR. PATMAN:

Page 96 of the offical transcript before the Railroad Commission of Texas, which was heard March 5, 1947; from a statement of the Humble Oil and Refining Company - from a statement made by a representative at that hearing - after several hours had passed of hearing testimony, the Humble Company put on their representative -

By Mr. Nelson Jones:

"I believe that the evidence which has been introduced at this hearing may fairly be summarized by saying it establishes that in some fields oil or gas or both oil and gas can be produced without waste from a dually completed well. This evidence was not introduced by the Humble Company, but it does support the position of the Humble Company, which is simply this: 'We believe that the Commission should handle this question on a field-wide rather than a statewide basis. Especially is that so in view of the testimony you have had here today. We believe that before the Commission permits dual completion or multiple completion of a well it should hear evidence which convinces the Commission that the dual completion will not result in waste, or in impairment of correlative rights, and the fluids involved are not of such characteristics as will result in corrosion which might cause a blow-out or underground waste of oil and gas. That, briefly, is our position in the matter."

MR. PATMAN: Mr. Jones further stated as follows:

"Would it make any difference if we said reservoir-wide or field-wide? That is what I meant by my statement."

MR. PRESSLER:

We do not agree with that statement, and see no conflict between the two statements.

EXAMINATION OF MR. R. S. DEWEY

(After being duly sworn, Mr. R. S. Dewey testified as follows)

MR. PATMAN:

Your name is R. S. Dewey?

MR. DEWEY:

That is right.

MR. PATMAN:

You are the same R. S. Dewey that testified before this Commission on January 10, 1947, and with reference to the subject multiple completions of oil and gas wells or both?

MR. DEWEY:

I don't recall the date but I did testify.

MR. PATMAN:

The hearing was held January 10, 1947, and you did testify - you wouldn't deny that?

MR. DEWEY;

Oh, no.

MR. PATMAN:

You are employed by the Humble Oil Company?

MR. DEWEY:

Yes, sir.

MR. PATMAN:

And you are the Division Engineer of the Humble Company at Midland, Texas?

MR. DEWEY:

West Texas, New Mexico area.

MR. PATMAN:

How long have you been in Midland?

MR. DEWEY:

Approximately 11 years.

MR. PATMAN:

Where were you before you were sent to Midland?

MR. DEWEY:

In McCamey.

MR. PATMAN:

That is still in West Texas?

MR. DEWEY:

That is correct.

MR. PATMAN:

How long have you been in West Texas?

MR. DEWEY:

17 or 18 years.

MR. PATMAN:

Does that approximately date the period of your employment with the Humble?

MR. DEWEY:

No, I have been with the Humble a little over 20 years.

MR. PATMAN:

There were no dual completions in the wells except during the last 17 years so far as you know?

MR. DEWEY:

I don't recall any.

MR. PATMAN:

If there were any you would remember?

MR. DEWEY:

None that I had any contact with.

MR. PATMAN:

You have not had any experience on the Gulf Coast in the last 17 years?

MR. DEWEY:

That is correct.

MR. PATMAN:

You testified here in January with reference to some 46 multiple completions the Humble had had experience with in the State of Texas?

MR. DEWEY:

I do not recall that testimony.

MR. PATMAN:

You recall generally talking about it?

MR. DEWEY:

Yes, sir.

MR. PATMAN:

How many of those 46 dual completions were made under your jurisdiction?

MR. LOWE:

It was 36 wells instead of 46 wells.

MR. PATMAN:

Well, of the 36, how many of those 36 dual completions were made under your jurisdiction?

MR. DEWEY:

I think in the testimony I stated there are two. Two made in West Texas and none in New Mexico.

MR. PATMAN:

So far as you know, there have never been any multiple completions in New Mexico?

MR. DEWEY:

By the Humble?

MR. PATMAN:

By anybody?

MR. DEWEY:

I don't know of any.

MR. PATMAN:

Do you know how many dual completions have shown gas-gas, oil-oil or gas-oil?

MR. DEWEY:

I have no idea.

MR. PATMAN:

Would 1,000 be about right?

MR. DEWEY:

I wouldn't commit myself to that number.

MR. PATMAN:

Do you know what percentage in Texas the Humble has made?

MR. DEWEY:

I have no idea.

MR. PATMAN:

I believe the testimony in Austin, the Sun Oil Company has made 90, do you know about that?

MR. DEWEY:

I do not.

MR. PATMAN:

There have been hundreds of dual completions in Texas. The Humble you say has made 36, and based upon this 36 you told this Commission dual completions cause waste and should not be granted.

MR. DEWEY:

That is my idea of it, exactly.

MR. PATMAN:

You base that on experience, hearsay, or what do you base it on?

MR. DEWEY:

I base it on partly what I read and have read in the literature - I think we furnished the Commission an A. P. I. paper, which to my mind indicated that dual completions contributed to waste.

MR. PATMAN:

How?

MR. DEWEY:

Inefficient operations.

MR. PATMAN:

How do you mean, inefficient operations?

MR. DEWEY:

In the practice to recovery of oil.

MR. PATMAN:

Why aren't they practical?

MR. DEWEY:

They result in more losses.

MR. PATMAN:

Give me some of them.

MR. DEWEY:

Once when you have dual completions you have a lot of junk in the hole.

MR. PATMAN:

What is it?

MR. DEWEY:

Lot of gadgets.

MR. PATMAN:

Name them.

MR. DEWEY:

Tubing and other things.

MR. PATMAN:

You have tubing in single completions?

MR. DEWEY:

That is right.

MR. PATMAN:

The same things in single completions?

MR. DEWEY:

Have the cross-over tools in dual completions.

MR. PATMAN:

Not necessarily.

MR. DEWEY:

In certain instances.

MR. PATMAN:

Name instances.

MR. DEWEY:

In some wells.

MR. PATMAN:

Suppose the well is flowing.

MR. DEWEY:

That is the honeymoon stage.

COMMISSIONER MILES:

Please explain what you mean by the honeymoon stage.

MR. DEWEY:

The honeymoon stage is when everything looks very rosy and the well is flowing quite a bit of oil, and it has not yet been determined just what the outcome will be.

MR. PATMAN:

Give me some more equipment you are going to have in this hole, more in dual completions and not in single completions.

MR. DEWEY:

The packers.

MR. PATMAN:

You have packers in single completions.

MR. DEWEY:

You have several packers - I don't favor packers in single completions, there are circumstances you may have to use a packer.

MR. PATMAN:

Why would setting of packers in dual completions cause difficulty that would make that dual completion impractical?

MR. DEWEY:

The packer may fail, and has often been known to fail.

MR. PATMAN:

Have you ever known a packer to fail in single completions?

MR. DEWEY:

Indeed I have.

MR. PATMAN:

Have you experienced packer failures in single completions?

MR. DEWEY:

Yes, sir.

MR. PATMAN:

You have seen packers in single completions?

MR. DEWEY:

Yes, sir.

MR. PATMAN:

You have seen formation packers?

MR. DEWEY:

Yes, sir.

MR. PATMAN:

You have seen them outside the casing?

Mr. DEWEY:

That is right.

MR. PATMAN:

You have had failures in both instances?

MR. DEWEY:

That is right.

MR. PATMAN:

You wouldn't, in turn, recommend to this Commission that they stop the drilling of all wells in New Mexico where packers are being set, because they fail in single completions?

MR. DEWEY:

I would make no such recommendation, would you?

MR. PATMAN:

I am asking the questions.

MR. PATMAN:

Would you say the packer failures in single completions are greater or less than in dual completions?

MR. DEWEY:

I have no idea - packer failures in single completions are bad enough.

MR. PATMAN:

Generally, isn't it true when you set a packer in dual completions you set it in the casing perforating below and above, running tubing through it?

MR. DEWEY:

Our experience we have had in the two we have set, we did it that way.

MR. PATMAN:

Isn't that a more ideal method of securing an effective packer seal than on the outside casing where the hole might not be even and you are setting it against the hole or pipe ?

MR. DEWEY:

Of course the pipe is a little better than open formation. There are lots of different kinds of packers, different ways of setting them. Lots of circumstances that do not make it ideal.

MR. PATMAN:

My question was - you are more likely to secure effective packer seal set in the casing than you are when you set it against the formation or outside the casing?

MR. DEWEY:

I would say your hopes are higher.

MR. PATMAN:

Are you familiar with the equipment designed to effectuate this purpose?

MR. DEWEY:

I listened to Mr. Gray's explanation.

MR. PATMAN:

That is all you know about it?

MR. DEWEY:

I have had no practical experience with it.

MR. PATMAN:

You say in your testimony you wouldn't recommend them because you have corrosion - do you remember that general statement?

MR. DEWEY:

I think that is a very true statement.

MR. PATMAN:

Tell me why you would have more corrosion in two reservoirs than you would in one - more likely to have corrosion in two reservoirs than

you would have in single completions of the same reservoirs?

MR. DEWEY:

Corrosion is general - it is very hard to predict corrosion. If you operate two reservoirs, either one or both may be corrosive, and if one of them is corrosive and the other not corrosive you have ruined that in your good reservoir with the corrosive one. If you open the one that is non-corrosive, you will probably not get a material amount of trouble, but the other one may be very corrosive and require the replacing of equipment.

MR. PATMAN:

The fact that you set that packer between the two horizons?

MR. DEWEY:

If you experience a condition like that, one corrosive and the other non-corrosive, the corrosive reservoir may corrode all the extra equipment and you might be out there working on that corrosion and all the time you are losing production during that interrim from the other reservoir. The costs in operations are greatly increased.

MR. PATMAN:

Do you know of any situations like that - where you have this bad situation?

MR. DEWEY:

I can cite an example.

MR. PATMAN:

Give me an example of this bad condition where you have gotten your packer out working on it in this corrosion.

MR. DEWEY:

I did not say necessarily packer.

MR. PATMAN:

Give me an example.

MR. DEWEY:

We have had some wells in our fields.

MR. PATMAN:

You got dual completions there?

MR. DEWEY:

No, sir. Corrosion in the Hardin-Glascock field.

MR. PATMAN:

Dual completions there?

MR. DEWEY:

Not on our property.

MR. PATMAN:

Anywhere?

MR. DEWEY:

No so far as I know.
Gold-Smith field is very corrosive, the old Anlon field is very corrosive and a large number of West Texas-New Mexico fields are corrosive.

MR. PATMAN:

In all of those fields which you have named, and in which you state you have the problem of corrosion, are you constantly working on those wells to the extent that you do not ever get to produce them?

MR. DEWEY:

The Smith well is so uneconomical that the cost of corrosion and replacement of equipment far exceeds the amount of money we can get from production.

MR. PATMAN:

How about the Goldsmith?

MR. DEWEY:

It is a monument to corrosion.

MR. PATMAN:

Let us assume that well is two separate horizons and that you had dually completed that well, and the other horizon you are going to find, and which you did not find - you have closed your well in on single completion.

MR. DEWEY:

And the casing is leaking - -

MR. PATMAN:

You have closed your well in.

MR. DEWEY:

Closed it temporarily.

MR. PATMAN:

You could run a string inside.

MR. DEWEY:

You wouldn't have room.

MR. PATMAN:

You have set too small casing.

MR. DEWEY:

What size do you advocate when you run a 4 inch casing you are just out of hole.

MR. PATMAN:

Would the fact that you dually completed a well cause more corrosion than if you had completed those two reservoirs singly?

MR. DEWEY:

Mr. Patman, I do not cause corrosion.

MR. PATMAN:

Multiple completions don't cause it either do they?

MR. DEWEY:

I have little hearsay evidence on that - it is something I do not understand, perhaps you will. I have been told in the Goldsmith field where packers have been set that they find the setting of the packer inside the casing, for some unknown reason has stimulated the corrosion so that the tubing is very badly eaten out.

MR. PATMAN:

That is a single completion well - Would a dually completed be worse?

MR. DEWEY:

I think so.

MR. PATMAN:

Isn't it the chemical characteristics of the liquids from that formation and then the packer?

MR. DEWEY:

If you have an uneconomical situation.

MR. PATMAN:

Answer my question.

MR. PRESSLER:

Mr. Patman is talking about what causes corrosion, it will be the same from the chemicals in oil of dually or singly completed tests - as to what causes corrosion and if corrosion what will be the effect in single and dual completions.

It is the effect of corrosion in dual completions, and I think that is the question that is concerning the Commission.

MR. DEWEY:

I cannot explain so, but the people that told me about it are convinced that the setting of that packer, for some unknown reason, accelerates corrosion. They don't know the cause, they aren't able to tell it to me.

MR. PATMAN:

That is a singly completed well?

MR. DEWEY:

Yes, sir.

MR. PATMAN:

Isn't it true the Gulf is producing in the Goldsmith?

MR. DEWEY:

Yes, sir.

MR. PATMAN:

They have had considerably more experience in Goldsmith than you have?

MR. DEWEY:

You think because they have had more wells, they have had more experience?

MR. PATMAN:

They have had more opportunity haven't they?

MR. DEWEY:

We are concerned in what causes corrosion - by the economic effect of corrosion, if you have two zones producing, dually completed wells, and one or two zones with terrific corrosion and it is continually working, it is uneconomical.

MR. PATMAN:

Who is the technical expert, you or your lawyer?

MR. DEWEY:

I imagine I have had a little more experience than he has. I imagine I have - - -

COMMISSIONER MILES:

Would the Gulf be willing to consider this on an individual well basis?

MR. GRAY:

The Gulf would be willing.

MR. PRESSLER:

The Humble agrees if there were any dual completions made in the field they be considered on individual well basis.

MR. PATMAN:

That would presuppose then, a permissive order - in other words, there would be no state-wide prohibitive order and in turn would be a state-wide permissive order?

COMMISSIONER MILES:

We would get down to the individual well basis and argue on that standpoint.

MR. PATMAN:

You couldn't do that if you had a prohibitive rule to start with instead of a permissive rule. If the permissive rule was in effect, provided the particular facts of the particular application warranted the particular

application. With that understanding I have no objections.

MR. PRESSLER:

I would like to call Mr. Patman's attention to Rule 41:

> "Rule 41. Conflicts between General and Special Rules and Regulations.
>
> "In case of conflict between a general and a special rule or regulation, the special rule or regulation shall prevail without regard to the effective dates of the respective rules ro regulations, unless the contrary is clearly prescribed by the Commission."

I did not mean to be taking what I said as the Humble thinks there should be any general permissive rule over the State as a separate rule.

MR. PATMAN:

I want to be sure you understand the difference - what he says is generally true with reference to orders to the effect that such rules prevail over general rules unless the general rule specifically provides. Otherwise, I don't want any general rule to expressly provide a special rule cannot be had.

You are going to see you have to have a general permissive rule or you are going to have to have your general rule provide definitely - from what I read you are going to have to have it provide in the event the particular facts of the particular application warrants the granting of it - you are going to have to do it.

MR. LOWE:

My theory is this - In any event you are going to have to have an application for a specific well. The Commission has power when an application is filed to make an order for that specific well, and that is satisfactory to us.

MR. SELINGER:

I think we are all arguing about the same thing. In Texas and Oklahoma, and all other states, as in New Mexico, the general state-wide rules provide that in more than one horizon of production through the same bore - each state recognizes there are exceptions and each application is considered on the present well basis as an exception to that general rule, therefore, no additional orders or modifications are necessary in the present rule - merely have to go into individual applications on a specific well. Nothing the Commission has to do on specific orders - all we have to do is go into the individual kinds of exceptions - the Drinkard and Paddock, etc. This state like other states have similar orders, nothing is done about it.

MR. E. H. FOSTER (Phillips Petroleum Company)

We are not opposed to dual completions generally, but we do think each one should stand on its own merits.

I have a statement to present to the Commission:

"Under ordinary competitive peace-time operations we believe the production of two oil reservoirs by means of a dual-completion is in general unwise and should be definitely discouraged in almost all future instances. There is little doubt but that in a vast majority of cases such practice will lead to smaller ultimate recovery of oil from at least one of the reservoirs involved. In addition we feel that added

operating problems are numerous and dangerous and far out-weigh any savings that might be realized in the initial development costs. It is likewise perfectly obvious to us that producing oil through the annulus is inefficient and will certainly result in shortening the flowing life of wells.

"We further believe that with proper well spacing it is entirely possible to economically develop each producing oil reservoir in a field on an individual well basis, thus mostly eliminating the need for dual-completions. There are some instances where extremely thin sand sections or lean reservoirs cannot be spaced in a manner to permit individual well development of each oil reservoir. Under such circumstances, if segregation of production is considered necessary, dual-completions might rightly be the solution to the problem.

"When development is being carried on in conjunction with a plan of controlled pressure maintenance there are undoubtedly certain other instances where dual oil completions might be amply justified.

"Dual oil-gas and dual gas-gas c mpletions are not so susceptible to the many problems consistently found in the dual completion of oil-oil wells. We, therefore, feel that the range of application is considerably broader and should be looked upon with greater general favor. However, it is suggested that even in this type of dual-completion, each case should stand on its own merits.

"In conclusion, we would like to urge the Commission to adopt a policy of holding hearings and carefully checking each individual well application for all types of dual-completions and that permits be issued only after suitable evidence has been received."

MR. A. B. TANCO (Atlantic Refining Company)

I have a statement I would like to introduce into the record, setting forth our views - the views of the Atlantic Refining Company with respect to dual completions.

"The Atlantic Refining Company does not believe that the Oil Conservation Commission of New Mexico should adopt any state-wide rule permitting the dual completion of wells in the State because conditions vary in the different fields.

"Our experiences elsewhere with respect to dual completions have been varied in that some instances we have met with considerable success while elsewhere the success of these operations is doubtful. It is for this reason that the Atlantic Refining Company does not favor the adoption of any state-wide rule with respect to dual completions.

"The Atlantic Refining Company, does, however, favor a policy with respect to dual completion whereby the dual completion of any well will be permitted by the Commission after the Commission shall have determined, at public hearing held after the issuance of notice to interested parties, that such dual completion is feasible as to such well."

MR. TANCO:

We, of course are not in favor of the adoption of any state-wide rule permitting dual completions, for this reason we do not favor the adoption of a state-wide plan.

MR. LOWE:

The state-wide order would not grant any rights at all. We would have to file an application with this Commission if we had a well to dual complete. This involves the intent to adopt a state-wide order that each well must be made a specific case.

MR. PATMAN:

I want to make sure our position is not misunderstood. It has not been our position anywhere that a well should be permitted to be dually completed without an order after notice and hearing be set by a regulatory body, and we think after doing that, that well should be properly policed. That is our position everywhere we operate, and we think it is right. We think we can do it, and have done it non-wastefully and we did not want to see - there was recommendation made in that record - of this Commission to adopt a policy denying it. We do not want to see that, we do not believe it is right. We know particular facts of particular fields that will not warrant that condition. We believe we have recovered fields non-wastefully and wouldn't have been done otherwise.

MR. LEWIS FINCH, JR. (~~Standard~~ Stanolind Oil Company)

Standard Oil Company is not opposed generally to dual completions, we feel that each individual well or case should be considered on its merit, and that notice should be filed with the Commission and proper permit issued.

COMMISSIONER MILES:

Any matter you want to bring up, we will be glad to listen to it - If not is there any other matter to come before the Commission?

We will proceed with the Hobbs Case.

EXAMINATION OF MR. LLOYD L. GRAY

(After being duly sworn, Mr. Gray testified as follows)

MR. LOWE:

Mr. Gray, you testified in the previous hearing on this case?

MR. GRAY:

That is right.

MR. LOWE:

I wish you would detail the facts and circumstances in regard to West Grimes #4 well, which you think would justify dual completion.

MR. SPURRIER:

This is what you consider to be a continuation of Case No. 92?

MR. LOWE:

Yes, sir.

MR. GRAY:

I testified at the last hearing regarding the characteristics of the two formations - I might just briefly summarize the West Grimes #4 which now produces from the Byers formation which is gas sand with some distillate.

Our proposal is to dual complete that well in the Byers and Bowers. The Bowers formation being oil productive sand apparently with gas cap at the top of the structure. Since the last hearing there has been a well completed directly east of the enterprising unit on which #4 was located which was completed as a gas well in the Bowers sand. For that reason it is more important a dual com-

pletion be attempted at this well, since we would certainly not drill a well at the Bowers sand for completion of a gas well. We proposed to kill the well, perforate opposite the Bowers sand which is located at approximately 3,150 feet in depth; set a packer on tubing at an approximate depth of 3600 feet. We will probably set a side-door choke in the tube at about 3,170 feet and a safety joint a short distance above the packer bringing the well in to produce the Byers formation, or the gas well through the tubing and the Bowers formation through the annulus between the tubing and casing.

This well, I feel, will be an ideal well to test the feasability of dual completion. This is the only well we have in the Hobbs pool which is producing from the Byers sand. Both of the formations have substantially little bottom hole pressure. That is generally true to the south in the deeper horizons, it is an initial supplement project to the dual completion of West Grimes #4 is fully justified. I do not believe it will be possible to detail the exact test would be made on the well, however, any information we obtain through the dual completion of this well, we will certainly submit it to the Commission for their information.

MR. LOWE:

You would be willing for the Commission to have a representative present while making your dual completion, and have knowledge of everything done?

MR. GRAY:

Yes, I believe I would, and the Commission should retain jurisdiction to make adequate tests after the job is done.

MR. LOWE:

In the event, after this is completed and the Commission is of the opinion it is not workable, you could plug off one formation and produce with the other without any trouble?

MR. GRAY:

That is correct. We would submit a typical digram showing the type of completion proposed.

MR. LOWE:

That is all the direct examination.

(The gentleman who made the following statements would not give his name)
Jack Cusack
They can get accurate tests on the various formations and also lay down a rule of necessity with these companies, but I question whether those things can happen, if each company comes within the economic factor. If you are going to take the economic factor you must take it as an overall picture. That, of course, would be without aid to Greece - the national figure. If we have drilled two wells we must picture these laborers, you have got to think of these laborers that go out there and process this deal, and their children and families. It is a big picture which we call in the Land Department the Big Picture. I think those things should be taken into consideration. Every condition has to be for the good of all. If you can put down a rule that each formation will get another barrel I think it is a darn good thing - the next thing is necessity.

(2:30 P. M., Governor Mabry joined the meeting)

(Continuation of above statements)

I am sure that this Commission will take into consideration the things we can do to keep people living and not particularly starve to death. That is a little far fetched, but after all, our problems are usually far fetched.

MR. R. W. TESCH (Texas, Pacific Coal and Oil Company)

I did not get all the facts. Is this to be an oil-oil or oil-gas dual completion?

MR. GRAY: I think a number of the operators did not clearly understand that it will be either oil to gas or gas to gas.

MR. TESCH:

How many wells in the Hobbs production from the Byers sand?

MR. GRAY:

Possibly five.

MR. TESCH:

All produce gas?

MR. GRAY:

To the best of my knowledge, they are.

MR. TESCH:

How many producing from the Bowers sand?

MR. GRAY:

Either producing or drilling or gas wells - 11 wells.

MR. TESCH:

11 wells producing from the Bowers sand?

MR. GRAY:

One drilling and one gas well.

MR. TESCH:

Is it your intention to gaslift the Bowers sand from Byers sand through a side door choke?

MR. GRAY:

No, not through side door choke at the present time. The Bowers sand has presently 1900 pounds of bottom hole pressure which is adequate for it to flow. We do not think for quite a period of time it will be of necessity for artificial lift. As it is used it will be brought to the surface, measured and controlled.

MR. TESCH:

You do not think it will be feasible to control gaslift from Bowers sand from side door choke?

MR. GRAY:

I think it could be, but would have difficulty in showing how much gas is used from Byers.

MR. W. N. LITTLE (Tidewater Association)

Do you know the reservoir pressure of the Byers now?

MR. GRAY:

I believe about 1100 pounds.

MR. LITTLE:

I would like to get myself straight, if the Bowers is a gas well, what sort of pro-ration would there be on that gas?

MR. GRAY:

I really don't know what the pro-ration would be. Probably the same as other dry gas wells in the State.

MR. LITTLE:

Are the other dry gas wells in the state in gas fields or sometimes in the same reservoirs with oil - that is, underlined with oil?

MR. GRAY:

I don't know of any gas wells I could definitely state were producing from the oil reservoirs, although they may be.

MR. LITTLE:

I believe Tidewater's position would be they would definitely not like to see a well producing gas as a gas well with an oil reservoir.

MR. GRAY:

I think I could tell you we have a gas well in the Bowers, no particular need to produce in the Bowers, and I feel there is no particular need to produce it as a gas well. I think the only problem would be the protection of the rights.

MR. FINCH: (Standard Oil Company)

Mr. Gray, when was this well drilled, West Grimes #4?

MR. GRAY:

I believe in 1930.

MR. FINCH:

Was it ever produced from the St. Andres?

MR. GRAY:

For a short period, approximately two years.

MR. FINCH:

Then was it plugged off?

MR. GRAY:

It was plugged back to 3,884 feet.

MR. FINCH:

When did you re-cap the well as a gas well in the Byers field?

MR. GRAY:

I believe in 1940.

MR. FINCH:

Do you have any factor in there now?

MR. GRAY:

No.

MR. FINCH:

You have tubing in the well?

MR. GRAY:

That is right.

MR. FINCH:

Do you know what condition the casing is in?

MR. GRAY:

We have made no tests of the condition inside the casing, except made pressure tests when we recapped the well.

MR. FINCH:

Have you had any trouble in the Hobbs pool with casing corrosion?

MR. GRAY:

Had one well - replaced the casing, and one well outside corrosion from liquids in the boiler. Replaced top joint of intermediate casing and three joints of oil string casing.

MR. FINCH:

Do you think the casing in this well is in satisfactory shape for dual completion?

MR. GRAY:

I think it is in satisfactory shape for dual completion as for a single completion. You realize it has pressure at the present time.

MR. PAXTON HOWARD (Shell Oil Company)

You have not run a ~~dog~~ log survey on that well?

MR. GRAY:

Not on that particular well, we have run surveys, and as I recall, they showed no serious corrosion.

MR. HOWARD:

There is a corrosion problem in the Hobbs field?

MR. GRAY:

Yes, sir.

MR. HOWARD:

Do you have any information as to how much pressure under your completion program?

MR. GRAY:

I doubt whether the actual surface pressure would be any higher under dual completions than under present conditions. If the well is completed as an oil well that collection of oil would be such that the bottom hole pressure in the Bowers would be 1900 pounds and still not have to be much over 1100 pounds at the surface.

MR. HOWARD:

The corrosion would interfere with the effectiveness of dual completion program?

MR. GRAY:

Not in this particular well - in the dual completion.

MR. HOWARD:

The result could be more disastrous than in single completions, would it not?

MR. GRAY:

I don't believe it would make a great deal of difference.

MR. HOWARD:

Do you have any plans for further tests for sets if it is in condition to carry through?

MR. GRAY:

I think there should be pressure tests.

MR. HOWARD:

At what pressure?

MR. GRAY:

I would suggest slightly in excess of 200 pounds.

MR. FOSTER MORRELL (U. S. Geological Survey)

The matter discussed by the Representative for Tidewater Oil Company - The matter of a gas well producing from an oil reservoir - we have such wells, two of them, that were definitely established to be producing dry gas from oil reservoirs. Those wells were shut in, because we feel the gas produced from the oil reservoir should be conserved for the benefit of oil production. They were allowed to operate to produce gas (if they were), the gas cap was not feasible to take that. I think you mentioned if it was a dry gas well possibly it would be shut in so far as the Bowers well is concerned.

MR. GRAY:

I think cases of that sort are not peculiar to dual completions.

MR. PRESSLER:

If you were denied the right to dual complete this well, would you drill twin wells?

MR. GRAY:

In this particular well I think there is some doubt, for the reason that recently there has been a gas well completed east of this well. We certainly wouldn't be drilling a well there for a gas well.

MR. PRESSLER:

The reason you would not drill single wells is for the danger of obtaining a gas well in the Bowers field?

MR. GRAY:

In this particular instance I do not think that would be true. If the Bowers produces oil it would be much more valuable than a gas well. All we now have is gas well, the gas is being handled and being sold.

MR. PRESSLER:

You wouldn't drill another well to the Bowers sand?

MR. GRAY:

No, sir.

MR. HOWARD:

Mr. Gray, I understood this well was to be handled more or less as an experiment well?

MR. GRAY:

For the purpose of information we will be glad to turn all information obtained there over to the Commission. I think we will be quite willing to have the information published if necessary.

MR. GEORGE SELINGER (Skelly Oil Company)

Do you have any figures showing the economics of the dual completions in this particular well as compared to twin wells?

MR. GRAY:

I did at the last hearing.

MR. SELINGER:

You gave it on the other fields, but you did not give it on the Hobbs.

MR. GRAY:

So far as the drilling cost is concerned, I believe a well drilled to the Bowers would cost in the neighborhood of $20,000 - dual completion depends on how much it will be, would probably range from 6,000 to 10,000 dollars. I think you recognize also at the present time we have much greater shortage of material than we have had even during the war period.

MR. SELINGER:

Calling your attention to the Bowers horizon, I believe you said there were 15 or 18 wells to the Bowers sand?

MR. GRAY:

I believe I said 11. Ten complete, one drilling and one gas well.

MR. SELINGER:

What are the initial productiveness, general average on the range?

MR. GRAY:

From three barrels up to a very substantial capacity.

MR. SELINGER:

What is the maximum?

MR. GRAY:

418 barrels per day - the Continental No. 4 State A, that is probably a 24 hour test.

MR. SELINGER:

Do you have any figures as to the ultimate recovery from that sand?

MR. GRAY:

No, I don't. It isn't a thick sand, the recoveries aren't going to be so awfully high.

MR. SELINGER:

In drilling a twin well at a cost of $20,000, and dual completion at a cost of $6,000 to $10,000, you have approximately $10,000 to $14,000 difference?

MR. GRAY:

That is correct.

MR. SELINGER:

Do you think the operator would recover as economical a return on drilling that well?

MR. GRAY:

The question isn't whether the Bowers would pay for another well, it is whether the Byers would pay for another well. If we re-capped this well in the Bowers, it is very doubtful if we could afford to drill a well to the Byers.

MR. SELINGER:

The well is now producing from the Byers gas sand?

MR. GRAY:

That is right.

MR. SELINGER:

You want to complete the Byers and what other zone?

MR. GRAY:

Bowers.

MR. SELINGER:

The economics of drilling a well to the Bowers oil sand - you understand that?

MR. GRAY:

Yes, sir.

MR. SELINGER:

I was asking you the difference in the cost in drilling a well to the Bowers and the cost of dually completing the present Byers formation and Bowers oil formation - the extent of $6,000 to $10,000 , would you recover the difference of between $10,000 to $14,000 from the ultimate recovery of that well?

MR. GRAY:

I think so.

MR. HOWARD: :

I believe you stated there was about a 600 foot interval between the Byers and the Bowers?

MR. GRAY:

Between 500 and 600.

MR. HOWARD:

What you state as your plan to do behind the pipe in order to prevent commingling between the two zones?

MR. GRAY:

This well was cemented with 400 sacks, which should be adequate to well more than cover the Bowers sand. It will be tested to see whether it is making a chanel behind the pipe, and if it is it will be scraped and re-perforated.

MR. TESCH:

Under present regulations you could plug back this present well from Byers to Bowers sand without much trouble?

MR. GRAY:

I believe that is right.

MR. TESCH:

You wouldn't be required to have a special permit.

MR. GRAY:

Wouldn't require a hearing.

MR. TESCH:

If you did that you would have to plug off the Byers sand - would you drill another well to the Byers sand?

MR. GRAY:

No.

MR. TESCH:

If you are not permitted to dual complete this well and have to plug off Byers sand, would that be wasted?

MR. GRAY:

I think it would.

MR. SELINGER:

If the Gulf drilled a twin well to the Bowers oil sand, to their present Byers gas well, would these wells - both wells - recover more oil and gas than a dual completion well to those formations?

MR. GRAY:

In that particular instance I don't believe there will be any difference.

MR. SELINGER:

You mean if you received a flowing oil well in the Bowers sand that if the well had to be placed on the pump you could produce as much oil from that dually completed well as you would if that was a single well completion?

MR. GRAY:

We are not proposing to put the well on the pump. I believe we can take it to the economic limit or gas or lift.

MR. SELINGER:

It will not necessitate going to the pumping stage to reach the ultimate recovery?

MR. GRAY:

I doubt it. We have had greater - and actually taken wells off the pump and put them on gas lift with increased production. We feel there is a good chance of operating wells with gas - artificial lift.

MR. SELINGER:

Is your answer the same with reference to the Byers gas sand?

MR. GRAY:

I am not sure I understand your question.

MR. SELINGER:

If you drilled twin wells to the Bowers oil sand, and you produced your present gas well from it, the Bowers gas sand, would you produce as much gas from that Byers gas well on a single completion as you would from a dual completion?

MR. GRAY:

It probably would produce as much on a single completion.

MR. SELINGER:

Would a single permit the well to produce more than on dual completion?

MR. GRAY:

In this particular circumstance, I don't think it would.

MR. SELINGER:

You are going to flow the gas through the annulus?

MR. GRAY:

That is correct.

MR. SELINGER:

Do you think the pressure of the formation is such that you will produce as much oil through the annulus as you would if your oil were being produced through the tubing?

MR. GRAY:

Some of those questions I think you would have to have a crystal ball to get the right answer.

MR. SELINGER:

You have gone into some explanation as to what might happen - If you don't know, just say you don't know.

MR. GRAY:

If it gets down to a question of whether or not the Bowers ceases to flow through the annulus, we can put a cross over and produce the oil through the tubing and the gas through the annulus.

MR. SEILINGER:

When you put in a cross-over how many packers do you set?

MR. GRAY:

Two - two packers on the tubing.

MR. SELINGER:

You got the cross-over in the well producing your gas through the annulus, you think that well will produce as much gas through the annulus as it would as a single completion?

MR. GRAY:

If there was a question about that we would go through a small string of tubing and produce them through tubing.

MR. SELINGER:

A cross-over packer with two separate packers and macaroni string in your well?

MR. GRAY:

On your assumption those wells won't flow.

MR. SELINGER:

In order for that well to produce the greatest ultimate oil or gas, won't those factors have to be working in unison, in perfect order with each other?

MR. GRAY:

No, I think we should take care of those problems when they occur. At the present time we cannot forecast but can solve the problem if it becomes necessary.

MR. SELINGER:

Supposing you flow the gas through the annulus, will it flow as much gas through the annulus as through the tubing?

MR. GRAY:

If no trouble - yes.

COMMISSIONER MILES:

What do you refer to of no trouble?

MR. GRAY:

Some tendency for the condensate to build up in the annulus and gradually the pressure is reduced to where the well won't flow. In that event you remove the side-door choke and it produces for some time. If that becomes too troublesome you can install the macaroni string.

COMMISSIONER MILES:

You said in this particular instance- you said the well would produce as much through the dual completion as the single completion. Is this well - particularly this well, different from any other well in that field?

MR. GRAY:

I don't think it is greatly different, I believe generally we can get as much from dual completion as we can from twin or single completions.

COMMISSIONER MILES:

This well isn't different?

MR. GRAY:

This well is completed in a zone above the Hobbs-Dolman, which is the principal producing zone at Hobbs. For that reason it is not

MR. PRESSLER:

As I understand it, you said the cost to dually complete this well and drilling another well to the Bowers sand would be approximately $6,000 to $10,000.00?

MR. GRAY:

That is correct.

MR. PRESSLER:

If you find that instead of producing the gas through the tubing - the gas from the Byers and the oil from the Bowers through the annulus, then change over to this other method of producing discussed, what additional expense will that work-over job be?

MR. GRAY:

That will be relatively small, it will not occur until the pressures are low.

MR. PRESSLER:

What would be your estimate of that cost?

MR. GRAY:

In the neighborhood of one or two thousand dollars.

MR. PRESSLER:

Has your well any indications of parrafin?

MR. GRAY:

I have nothad any experience with the Bowers sand oil in Hobbs.

MR. PRESSLER:

Do you know whether any corrosive action in the Byers or not?

MR. GRAY:

So far as I know there is no corrosion in that.

MR. PRESSLER:

Or in the Bowers?

MR. GRAY:

We have had small indications, we have had some blow outs at the time of drilling.

MR. PRESSLER:

Have you investigated whether or not there is any corrosion?

MR. GRAY:

We have not pulled the tubing, but the surface equipment has not showed any indication of corrosion.

MR. FOSTER MORRELL:

Do you have any figures on the recovery of gas from the Byers?

MR. GRAY:

I don't believe I have them with me.

MR. MORRELL:

Do you have any idea of the lasting of Byers gas?

MR. GRAY:

I believe that should last for a long period of time.

COMMISSIONER MILES:

This question may have been answered - but it isn't clear in my mind - - This is an individual case your Company is trying, would it affect any other well in the area around it?

MR. GRAY:

I don't believe it would affect any other well whatever. The only danger in these dual completions is in the event of packer failure. As long as they are kept separately there is no harm done.

COMMISSIONER MILES:

But that could happen?

MR. GRAY:

It could just the same as failure of cement behind the pipe, and corrosion of pipe in single completions.

COMMISSIONER MILES:

It wouldn't be likely.

MR. GRAY:

I don't think it is a hazardous proposition.

COMMISSIONER MILES:

I have no further statements, if no one else has any that is all.

MR. SPURRIER:

Before adjourning the meeting I should like to announce we will follow the practice we followed in the last hearing and set a definite date for the next hearing. The last time, after some discussion, we set it for Tuesday, April 15, 1947. I think that July 15, is on a Tuesday also, and if that pleases the majority of the members it is the date we would like to set the next hearing for. In addition to that I will call for your petitions to be in by June 15, which will give us time for the ten days' advertising, and time for communications between the Commission and the Petitioner.

Does anyone have any objection to July 15, 1947, for the next hearing date?

(NO OBJECTIONS)

COMMISSIONER MILES:

I would like to express my appreciation for the cooperation you gentlemen have given to this Commission, and I appreciate the fact that you get together and work out a lot of these problems.

All cases heard today will be taken under advisement, and we will give decisions as soon as possible.

MR. SPURRIER:

Judge Lowe, for Case No. 93, what do you understand is the status of the case?

JUDGE LOWE:

It appears to me the solution of the controversy has been it is not a state-wide order. Each well will be taken up individually and not

necessarily a state-wide order. Our state-wide order - it just contemplated what we are going to do and would have to file separate application on each well. I do not feel the necessity of a state-wide order. I will withdraw Case No. 94.

It was never our intention to have a state-wide order; it would just give permission to the operators to apply to the Commission for an order on a specific well.

MR. SPURRIER:

That is all.

(MEETING ADJOURNED)

BEFORE THE

OIL CONSERVATION COMMISSION

Santa Fe, New Mexico

"Notice of Publication
State of New Mexico
Oil Conservation Commission

"The Oil Conservation Commission, as provided by law, hereby gives notice of the following hearings to be held at Santa Fe, New Mexico, at 10:00 o'clock A.M., January 10, 1947:

"CASE NO. 92

In the matter of the application of Gulf Oil Corporation for the issuance of a Special Order permitting the production of more than one horizon or pool through a single well bore in the Hobbs Pool, Lea County, New Mexico.

"CASE NO. 93

In the matter of the application of Gulf Oil Corporation, for the issuance of a Special Order permitting the production of more than one horizon or pool through a single well bore in the Paddock, Drinkard, Brunson, Jones, and Blinbry pools, Lea County, New Mexico.

"CASE NO. 94

In the matter of the application of Gulf Oil Corporation for the promulgation of a General Order permitting and controlling production for more than one horizon or pool through a single well bore.

"Given under the seal of said Commission at Santa Fe, New Mexico, on December 20, 1946.

OIL CONSERVATION COMMISSION

By: /s/ R. R. Spurrier, Secretary

S E A L"

Said meeting convened at the appointed hour, on the 10th day of January, 1947, in the Coronado room of the La Fonda Hotel, Santa Fe, New Mexico, with the Commission sitting as follows:

Hon. T. J. Mabry, Governor, Chairman
Hon. John E. Miles, State Land Commissioner, Member
Hon. R. R. Spurrier, Secretary, Oil Conservation Commission, Member
Hon. Carl Livingston, Chief Clerk & Legal Adviser, Oil Conservation Commission

R E G I S T E R

NAME	COMPANY	ADDRESS
Glenn Staley	Lea County Operators	Hobbs, New Mexico
W. R. Bollinger	Shell Oil Co., Inc.	Hobbs, New Mexico
H. B. Murray	The Texas Company	Midland, Texas
A. E. Willig	The Texas Company	Ft. Worth, Texas
P. H. Bohart	Gulf Oil Corporation	Tulsa, Oklahoma
Paul C. Evans	Gulf Oil Corporation	Hobbs, New Mexico
Eugene Husford	Gulf Refining Company	Mt. Pleasant, Michigan
H. C. Otis	Otis Pressure Control	Dallas, Texas
H. C. Laird	Otis Engineering Corporation	Dallas, Texas

REGISTER (Cont'd)

NAME	COMPANY	ADDRESS
G. H. Gray	Repollo Oil Company	Midland, Texas
Lloyd Holsapple	Repollo Oil Company	Ft. Worth, Texas
W. N. Little	Tide Water Association Oil Co.	Midland, Texas
Robert L. Bates	N. M. Bureau of Mines & Mineral Resources	Socorro, New Mexico
William B. Macey	Oil Conservation Commission	Artesia, New Mexico
E. J. Gallagher	Gulf Oil Corporation	Hobbs, New Mexico
John M. Kelly	Independent	Roswell, New Mexico
Foster Morrell	U. S. Geological Survey	Roswell, New Mexico
Vernon B. Bottoms	Superior Oil Company	Midland, Texas
R. S. Christie	Amerado Petroleum Corporation	Ft. Worth, Texas
H. L. Johnston	Continental Oil Company	Midland, Texas
S. V. McCollum	Continental Oil Company	Midland, Texas
N. R. Lamb	State Bureau of Mines & Mineral Resources	Artesia, New Mexico
D. R. McKeithan	Phillips Petroleum Company	Bartlesville, Oklahoma
Lloyd L. Gray	Gulf Oil Corporation	Tulsa, Oklahoma
S. A. Sanderson	Gulf Oil Corporation	Tulsa, Oklahoma
J. D. Atwood	Gulf Oil Corporation	Roswell, New Mexico
Charles C. Rodd	Gulf Oil Corporation	Tulsa, Oklahoma
Ralph L. Gray	Stanolind Oil Company	Hobbs, New Mexico
J. E. Wooton	Stanolind Oil & Gas Company	Ft. Worth, Texas
R. Floyd Farris	Stanolind Oil & Gas Company	Tulsa, Oklahoma
Roy O. Yarbrough	Oil Conservation Commission	Hobbs, New Mexico
J. W. House	Humble Oil Company	Midland, Texas
W. E. Hubbard	Humble Oil Company	Houston, Texas
R. S. Dewey	Humble Oil Company	Midland, Texas
George Berlin	Skelly Oil Company	Tulsa, Oklahoma
George W. Selinger	Skelly Oil Company	Tulsa, Oklahoma
J. N. Dunlavey	Skelly Oil Company	Hobbs, New Mexico
E. O. Anderson	New Mexico Bureau of Mines	Hobbs, New Mexico
Lewis Finch Jr.	Stanolind Oil & Gas Company	Ft. Worth, Texas
J. O. Seth (Attorney)-	Stanolind Oil & Gas Company	Santa Fe, New Mexico

DIRECT EXAMINATION

COLONEL ATWOOD, Attorney, for Gulf Oil Corporation:

I represent the Gulf Oil Corporation in this matter, and would like to call Mr. Gray.

(After being duly sworn, Mr. Lloyd Gray testified as follows)

MR. ATWOOD: State your name, please, and residence.

MR. GRAY: Lloyd Gray, Tulsa, Oklahoma.

Q. You the same Mr. Gray that testified in the preceding case?

A. Yes, that is correct.

Q. I would like to make a statement - these four petitions, one calls for a general order allowing dual completions of wells in any pool designated by the Commission after a hearing - Another calls for special orders on about 4 or 5 pools already named in Lea County, which would result in making exceptions to the present Orders. As I understand it, the present rules prohibit dual completions or the commingling of production from two or more pays in the same well. This special Order would call for exceptions to that rule. The third one calls for taking care of a special case in the Hobbs pool, and we would like, if satisfactory to the Commission,to go ahead and take these up in the order of the General Order in connection with the Drinkard Pool, and on with the others, all in one hearing to avoid repeating, but would like the Orders written separately. The purpose in filing two petitions, one for a general order and one for a special order was to give the Commission jurisdiction to make any kind of order it saw fit. If it wanted to go by the way of a general order, or by any pool, it could do that or adhere to the policy of the present order, and distinguish certain pools, and from time to time other pools - they could do that. The Commission can give any kind of order they want.

MR. GRAY:

I might add I don't believe we would object to the entire elimination of the one that has to do with a general order. It could be handled as an exception. Also, in the case of the Hobbs pool, the only thing we had in mind there was dual completion of West Grimes #4. We won't insist on it being a pool wide order.

COMMISSIONER MILES:

The factual data you have - has that been prepared by you or under your direction?

MR. GRAY:

It has been prepared by me or under my direction.

COMMISSIONER MILES:

As I understand it, you sponsor all this factual data, you can vouch for the reasonable accuracy of it?

A. That is correct.

COMMISSIONER MILES:

Will you proceed then to explain the proposal you are making?

A. I feel the matter of dual completion is definitely a conservation proposition, that is the multiple completion of several pools or formations in production through a single well. All the states in which we operate - the states have at one time or another had provisions for multiple completions. In the case of Kansas, it had such a provision but during the past year they rescinded it. In that particular case there was a very good reason for eliminating dual completion. As a matter of fact, we opposed the rule at the beginning on the premises we did not have mechanical means of separating two formations when at least one of them had to be pumped from inception. In this type of completion it was necessary to raise and lower tubing through a packer in order to pump each zone alternately. This practice caused an excessive amount of leakage, or the failure of the packer seal between tubing and packer. I think we highly agree in those instances they should not have dual completion.

We have prepared a fairly lengthy report on the various aspects of multiple completions - I do not believe we should burden the Commission with the reading of all of it. I will be glad to leave the report as evidence and exhibit in the case.

"In the Drinkard area there are two pays, the Blinbry and Tubb, which on the basis of present information appear to be gas-distillate zones. Although data are inadequate for making accurate estimates of recovery, it appears that recovery will probably not exceed 24,000 Mcf gas and 500 bbl of distillate per acre. On this basis, net revenue, after taxes and royalty would amount to $1,050 per acre or $42,000 for a 40-acre well. Assuming $75.00 per month operating expense and a twenty-year life, total operating expense would be $18,000 leaving only $24,000 to pay drilling and equipment expense. Since drilling and equipping wells in these formations will cost approximately $65,000 for Blinbry and $70,000 for Tubb wells, it is obvious that these pays could not be exploited on 40 acre, or even 80-acre spacing. However, the exploitation of these formations would be profitable in a dually completed well, and in cases where the other pays are doubtful the possibility of making a dual completion might well be the deciding factor in determining whether or not to drill a well.

"It also appears that the Paddock, Drinkard and Ellenberger pays will be marginal over certain portions of the area, and the use of dual completions in such cases may have a definite bearing uopn the completeness of development and the overall efficiency of recovery. A case in point is Gulf's L. I. Baker, Section 5-22S-37E, currently being drilled to the Ellenberger pay. This well

appears to be near the edge of the Ellenberger pay and will probably have a thin pay section and produce water early in its life. Overall recovery is expected to be approximately 100,000 bbl, and due to early water production, operating expense will undoubtedly be above average, possibly amounting to 20¢ per barrel. Estimated life of the wells is 8½ years of which 6 years will be required to pay out the drilling cost and net profit will amount only to $17,000. Considering the risk involved, cost of tank batteries, etc., this is a rather poor investment. However, if the Drinkard pay, which in this area appears to be fairly productive, can be exploited through the same well, the Ellenberger oil can be recovered for total additional expense of $62,000 and total profit of $67,000. In the case of the Baker well the Ellenberger pay will be exploited regardless of dual completions but it is doubtful if very many wells of this type would be drilled and certainly wells which might recover only 50,000 or 75,000 barrels could not be drilled".

MR. GRAY:

The tabulation gives the reservoir information, pressures, gas solution and flowing tests, etc.

Economics of dual completion, I think is very important, particularly when wells are drilled to distances of greater than 5,000 feet. Economics average cost-estimated cost of dual completion and savings to be effected --- at the present time our average cost of drilling a well to the Paddock pay has been $72,000, and the present estimated cost due to reduced contract prices largely, is $56,413.00. Likewise for the Drinkard pool, the average cost per well is $97,000, compared with the estimated cost at the present time of $75,000. The Brunson Pool wells, Ellenberger production, average cost is $113,000, the estimated present is $87,200. In addition to the change in contract price there is a number of other things coming into the reduced cost at the present time during the early portion of development, we, naturally, took more tests; and in addition certain wells gave quite a bit of trouble in the processes of completion. Our estimated present cost is probably going to be low on the average. The estimated savings by various pool completions are as follows:

Assuming a Drinkard-Ellenberger completion, the same completion estimated on present cost, considering they are twin wells, a total cost of $170,625, the dual completion cost estimated $160,531, or under present conditions it is estimated there would be a saving of $64,094.00. The same kind of comparison for Hope and Ellenburger showa a saving under present bill of approximately $44,822, Ellenburger and Drinkard completion saving of $45,184. I think probably it is a fair rule that a dual completion will cost about 60% of what two individual completions would cost. That estimate is entirelly with the economics of drilling and various completions.

The economics as applied to marginal pays, I think is even more important when the production horizon gives substantial recovery.

MULTIPLE COMPLETION PRACTICE

"Most multiple zone completions involve only two producing horizons, although a comparatively small number of wells have been completed with three producing horizons being produced separately. In a majority of instances all the horizons flow although they are numerous cases where one zone flows and one zone is lifted artificially, and a few cases where two zones are pumped simultaneously. One or two instances have been reported where two horizons were produced simultaneously by gas lift".

This portion has to do with the multiple completion practice. This portion we have had experience for the use of packers in New Mexico for a period beginning about 1933, started in the Hobbs pool, used packers to separate the gas zone and lower oil zone. Also to separate waters from the upper portion and lower portion. We have had almost no trouble with packers. Only one well, and I think, we could

if we estimated, throughout the Lea County area, probably have 50 or 60 wells in which we have formation packers and have not experienced any great difficulty. Packers have certain formations - also for some flow packers were set up in the casing, and there again was no difficulty. In Kansas we have a number of salt water disposal wells; because the water and the corrosion in that area we are not tubing the coat on the inside with the same thing and setting the packers on the bottom so that the water will not compact the casing - and again I do not recall a packer failure - the packer is similar to dual completion.

"The practice of pumping two zones alternately reached considerable proportions in Kansas but was recently discontinued. In this type of completion it was necessary to raise and lower tubing through a packer in order to pump each zone alternately. This practice caused an excessive amount of leakage, or failure of the packer seal between tubing and packer.

"Texas has the greatest number of multiple completions of any mid-west state.

"Most dual completions utilize the annulus between tubing and casing for producing the upper horizon and utilize the tubing for producing the lower zone. A standard packer, run on tubing and set between the two zones, and a side door choke, to facilitate completion and permit access to either formation, is all the special equipment required. This procedure lends itself readily to artificially lifting the lower zone. The principal drawback is the relative inefficiency and difficulty of sustaining flow through the annulus. As an aid in overcoming this difficulty, a double side door choke has been devised which permits both zones to be flowed alternately through the tubing. Vertical movement of four inches is required to change the ports in the tool. This movement is accomplished by a wire line attachment for raising and lowering the choke.

"A device known as the Lewis valve has been used to unload condensate or fluid from the annulus. In this arrangement a packer and the Lewis valve are run on tubing, usually 4 inches. A macaroni string of tubing is run inside the production string and attached to the Lewis valve. Time and pressure actuated surface equipment automatically raises and lowers the macaroni string periodically, permitting the annulus to unload through the macaroni string when the valve is in the raised position. The lower zone produces through the production string at all times and can unload through the macaroni string when the valve is lowered.

"The usual procedure of producing the upper zone through the annulus and the lower zone through the tubing may be reversed, if desirable, by using two packers, one of which is a "cross-over" type. In one type of installation both packers are run on tubing and set simultaneously. In another type of installation, the bottom packer is non-removable and is run on drill pipe or tubing prior to running the upper or "cross-over" type. In one type of installation both packers are run on tubing and set simultaneously. The lower packer is set between the producing zones and the cross-over packer is set above the top zone. A section of flush joint tubing extends through the lower packer".

The purpose of this portion is to show mechanical features of dual completion have been developed and it is not really in an experimental stage. In addition to this portion of the report I would like to enter a reprint which was shown in the Petroleum Engineer in August 1946.

"From the mechanical standpoint, dual completion of a well is largely an outgrowth of the practice of controlling ratios by blocking off a part of the gas-bearing portion situated above oil-bearing portion of a producing formation. Correctly placing the packer to admit the desired amount of gas into the tubing was often very difficult. The packer had to be reset several times in many instances before the desired results were obtained.

"This difficulty led to the development of equipment that made it possible to admit the gas into the tubing at the desired rate from the annulus above a packer that was set near the gas-oil contact or opposite a break between

the oil-gas section of the pay. This type of completion was practiced in the Jefferson field in the latter part of 1935 or early in 1936, followed by its application in Rodessa and Hobbs. This type of completion received some publicity in September, 1936.

"With equipment available for the type of completion just described, it was a simple matter to set a packer between two separate formations and utilize the gas from an upper zone to produce oil from a lower zone. At the same time gas could be produced at the surface from the casing. Some of the earliest dual completions were of this type, that is, upper gas and lower oil".

I might give you a few figures shown in this paper, prepared by Mr. Laird - shows the number of dually completed wells in California approximately 300. For Texas it goes into detail of just what type of dual completion, whether it is oil-oil or oil-gas, or gas-gas. The number has increased since 1940, the grand total is 920 - at the time of this paper. So far as the production rate is concerned, general rules and regulations now in effect in New Mexico are "Before any oil or gas well is completed as a producer, all oil, gas and water strata above the producing horizon shall be sealed or separated, in order to prevent their contents from passing into other strata".

In our application, I believe our proposal was rather general, it suggested that after approval had been given for any particular area that it would then be necessary to submit the detailed information on the construction of the well, then to be approved by the Commission without public hearing.

At a meeting last night (January 9, 1947) some of the other operators said they would like to know more what is going on, and I think it would be entirely satisfactory if we would amend the application to the Commission for dual completion, to submit to the Commission the usual number of copies, also copies to all offsetting operators; and the operator requesting the multiple completion would sign an affidavit that he had given to offsetting operators the information on the well, and a given period of 10 to 15 days for such operators to protest the application, but in event no protest was received that the Commission then, if they believed the application satisfactory, go ahead and approve it without public hearing - but if there be a protest have a public hearing on the case.

We have some information on co-mingling, I don't know if it would be pertinent at this time because we don't anticipate co-mingling at this time. A little later when wells become marginal it may become desirable to permit co-mingling. With regard to suggested plan of reports, we have prepared this proposed form and I might read this - it will be interesting I think to other operators just what procedure is proposed.

"Dual or multiple completion of a well initially would necessitate only a slight change in these reports. Form 101, Notice of Intention to Drill, would be submitted as usual. At the same time, Form 102, Miscellaneous Notices, would be submitted. Under 'Additional Information' on Form 101, it would be specified that the well is to be a dual or multiple zone completion. Form 102 would include a description of the work to be performed, such as zones to be exposed, procedure to be followed in completion, proposed packer setting depth, etc.

"Reconditioning of a multiple zone producer would be submitted as usual on Form 103.

"In lieu of the regular Well Record, Form 105, a special completion report would be submitted showing information on production from the various zones, gas-oil ratios, depth perforated, etc. A proposed well record form for dual or multiple zone wells is attached and could be designated as 105-A."

I believe that is all.

MR. LIVINGSTON:

What is meant by side door lock?

MR. GRAY:

It is a device run inside the tubing - the tubing has a special setting device running on it, has an opening out of the side of the tube. A side door choke is sealed, goes down over that side opening so that it can be sealed off. You can bore a hole between the two packings, also, having another tool, if you want to take bottom-hole pressure. You have got the packer between the upper and lower zone, you can take bottom-hole pressure for the lower zone, but cannot get bottom hole pressure on the outside. By going in and closing off the bottom portion of the tube and pulling the tool opening from the side you get bottom hole pressure on an average. Sometimes the well will load up and cease to flow on the annulus, again you can use the side door lock and seal off the bottom, and start it through the tube.

MR. SPURRIER:

Anyone here who would wish to ask Mr. Gray any further questions?

MR. WILLIG:

The proposal was a slight change from the written petition that you have Mr. Gray, in other words, the hearing procedure in connection with the proposed dual completion?

MR. GRAY:

The application for dual completion in any particular well would be submitted to the Commission as usual, also would go to the offsetting operators, and they would have 10 to 15 days to protest. If they did not want it to be permitted they could protest, and could have a public hearing - if they did not protest the Commission could approve without a public hearing.

MR WILLIG:

You had in mind following that procedure with the original dual completions in each field or subsequent?

MR. GRAY:

On subsequent, I think the original proposal should be a public hearing and get things traced out, but subsequently the individual wells would be handled this way.

MR. WILLIG:

These petitions that have been filed today, are they considered as applications on original dual completions?

MR. GRAY:

The one that has to do with the general Drinkard-Brunson area I think willbe of that nature and subsequently we would submit application as proposed on each individual well.

MR. WILLIG:

There are some other petitions I understand - are they also covered in the original applications?

MR. GRAY:

They might be in the start - we proposed they restrict for Gulf - West Grimes #4, in the so-called gas or packers sand. Our proposal on how

to complete the West Grimes #4 is combined.

MR. ATWOOD:

All combined instead of going ahead with the case in Hobbs?

MR. GRAY:

West Grimes #4.

COMMISSIONER MILES:

Anybody else any questions?

MR. SELLINER:

I think it would be better for Mr. Gray to go ahead with his testimony on that particular well, then we can question him.

MR. GRAY:

This well was drilled early in the life of the Hobbs pool, I believe in early 1941. Two wells on that particular 40 acre pro-ration, one West Grimes #4 and one West Grimes #7. Because of high gas-oil ratio in #4 the well was shut in a number of years ago and the production from that unit - from #7. About 4 years ago we plugged the Hobbs Drinkard Pay. Found gas at approximately 3700 feet. I believe the potential on the well was slightly in excess of 23 million cu. ft. Since that time we have marketed the gas to the Lea County Gas Company, some for domestic and camp purposes and some for the gas system. Recently 5 wells have been completed in the Brunson zone, approximately 3200 feet deep. The location of West Grimes #4 is NE NE NW S32 18S 38E. We proposed to dual complete the well by plugging off the Byers sand and test the Powers sand later, drilling with the plug set packer between the two pays. The Powers gas and oil between the tube and casing, gas between the tubing.

COMMISSIONER MILES:

Anybody else want to ask any questions or bring up any points?

MR. SELLINGER:

Mr. Gray, I understand you now, on behalf of your Company, you do wish to press your application on Case No. 94, for a general order permitting dual completion for the State of New Mexico?

MR. GRAY:

I think our position on that is, we will leave up to the wishes of the Commission, if that fails it will be best we would have no objection, neither would we have any objection if it was decided to not change the general rules but treat these applications as exceptions, that is 92 and 93.

MR. SELLINGER:

Then I take it you are not pressing the Commission for the revocation of the provision for dual or multiple completions in this State?

MR. GRAY:

No.

MR. SELLINGER:

With respect to the procedure for permitting dual completions in a particular pool, as I understand, you are recommending to the Commission that first the application be for a pool wide basis, all whether or not dual or multiple completion should be permitted in that particular pool?

MR. GRAY:

Pool, field, or area. May be several pools.

MR. SELLINGER:

I take it, for each particular pool the application should be first as to whether or not multiple completion should be permitted involving that particular pool?

MR. GRAY::

Yes, sir.

MR. SELLINGER:

If the Commission acts favorably and does permit multiple completion involving that particular pool, it is your recommendation that subsequent applications need not be heard by the Commission itself, but be approved by the Director?

MR. GRAY:

Director, in the usual manner in which they approve applications.

MR. SELLINGER:

In addition, you would place the burden on the operator - requesting the multiple completions, the task of advising the adjacent lease holders?

MR. GRAY:

That is right. I think you should also advise the Commission who is advised.

MR. SELLINGER:

Such notice would be confined to the immediate adjacent 40 acre tracts, the entire lease or just how would you work it out?

MR. GRAY:

In Kansas the requirement is that you send notice to all operators who have a well located within one-half mile of the well under consideration.

MR. SELLINGER:

Lets confine it back to New Mexico; would it only apply to the owners of the 40 acre tracts adjacent to the particular 40 acres involved, or the leaseholders immediately adjacent?

MR. GRAY:

Personally, I don't think it would make any difference. I wouldn't object either way - I don't feel if we want to do a well in one end of the field, we should notify the operator on the other end.

MR. SELLINGER:

Do you not think any operator having production in a particular pool would be interested in knowing whether or not a different source of supply is opened in that particular place by multiple completion - don't you think other operators would be interested and as much involved as the immediate owners?

MR. GRAY:

I think we are all interested, I believe the people immediately offset certainly are going to be more interested than those more remote, so that if those operators are notified it should be sufficient.

MR. SELLINGER:

Mr. Gray, referring to the particular application which is involved - Case No. 92 - with respect to the Hobbs pool, you are asking the Commission to permit similar multiple completion to the various pays in the Hobbs pool, or confining this hearing merely to the Byers gas field and Bowers oil field?

MR. GRAY:

It is neither, has to do only with Gulf West Grimes #4, as a dual composition in the Byers and Bowers in that well only.

MR. SELLINGER:

Then that is a departure to your suggestion previousl - the first application should open the entire pool for multiple completions?

MR. GRAY:

We are willing to do that if the other operators want to - we do not want to push the thing unless other operators want to go along on it.

MR. SELLINGER:

Then, in view of that answer, you are not following your own suggestion - the first application - in a particular pool whether it involves one well or several wells, should open the Commission's action to multiple completions for a well in that pool -

MR. GRAY:

I think you should be permitted to ask for a hearing in any individual case. You may want to go ahead and have it pool wide - I don't think you should be restricted from having a hearing.

MR. SELLINGER:

If another operator in the Hobbs pool desires to do a completion to the Bowers oil sand and the Byers gas sand, under your present suggestion to the Commission, in establishing a procedure, would he be required to file an application with the Commission or can he file his application with the Director, giving notice to the direct offset?

MR. GRAY:

I think that depends entirely on their action here today - we have offered to restrict this to that well only. Any subsequent action would require probably a hearing.

COMMISSIONER MILES:

What do you refer to when you say "director"?

MR. SELLINGER:

I am taking Mr. Gray's suggestion it would be unnecessary on subsequent applications for the operator to file an application to the Commission and have a regular hearing - under Mr. Gray's suggestion, after the first application was filed subsequent applications need not be ordered by a hearing.

MR. ATWOOD:

In the first place, Mr. Gray has not made any suggestions to that effect. The Gulf filed application to know if certain pools have multiple completion, to be followed if that application is granted - the Hobbs application makes no suggestion whatever for throwing open Hobbs - We would appeal direct to the Commission to take that individual well case.

COMMISSIONER MILES:

The point I did not get - if the Commission should grant this and they did not have to come back to the Commission - - - the Director -

MR. GRAY:

It was my own error - sometime back I believe Mr. Kelley was shown as Director of the Commission - handled routine matters, had to do with approval of wells to be drilled. I think the action was under the Commission - I wish you would strike everything that had to do with the Commission.

MR. ATWOOD:

Once the pool has been thrown open by the Commission, therafter an individual well case, unless protested, the individual case can be passed upon without a hearing. Where the pool has not been thrown open - before any one well can be completed it will have to go before the Commission.

MR. SELLINGER:

If the Commission should grant Gulf Oil Corporation permission to multiple completions and West Grimes #4, from the Byers gas sand and the Bowers oil sand - and should another operator desire to do the same thing, under your recommendation will that operator have to file a formal application and have a formal hearing before the Commission?

MR. GRAY:

That is my understanding.

MR. SELLINGER:

I notice in some of the exhibits you introduced, or which you marked, I don't know particularly which one - - -

MR. GRAY:

They are not exhibits.

MR. SELLINGER:

Thap part of your statement with respect to the West Grimes #4, will, in which you state you desire to dual complete - that will fall as to producing gas from your Byers - to approximately what depth?

MR. GRAY:

Approximately 3700 feet.

MR. SELLINGER:

Bowers approximately what depth?

MR. GRAY:

3200 feet.

MR. SELLINGER:

In a case like that, in what part of your mechanical equipment would you produce the oil and what part the gas?

MR. GRAY:

The gas through the tube and oil through the annulus - between the tubing and casing.

MR. SELLINGER:

In order to get an average on the same basis, you mean the gas would be produced inside the tubing and the oil would be produced in that piece between the tube and casing?

MR. GRAY:

That is correct.

MR. SELLINGER:

Of course the space through the annulus is greater to what degree than the space inside the tube and casing?

MR. GRAY:

That is correct.

MR. SELLINGER:

Of course the space through the annulus is greater to what degree than the space inside the tube?

MR. GRAY:

It will be somewhat greater on the annulus than tubing, but we propose - when we submit our equipment we will show 3" tube and the space between the casing and tube will be less.

MR. SELLINGER:

You are probably familiar with the general rules of the Oil Conservation Commission of the State of New Mexico, are you not?

MR. GRAY:

Generally, yes.

MR. SELLINGER:

You are familiar with the rule which requires all flowing wells to be tubed in the State?

MR. GRAY:

I believe that is right.

MR. SELLINGER:

How would you produce this particular well and still comply with the particular provision?

MR. GRAY:

I think this would have to be an exception to that rule - - -

MR. SELLINGER:

If the Commission granted an exception for your particular well, they would have to grant a particular exception to requirement of flowing wells to be tubed, so far as this particular well is concerned.

MR. GRAY:

I think that is correct.

MR. SELLINGER:

In some part of this statement you made some reference about the inefficiencies - about flowing oil through the annulus space - do you recall that?

MR. GRAY:

Yes.

MR. SELLINGER:

Then I take it the flowing of the oil through the annulus space with particular regards to the West Grimes #4, by your own statement you should be less efficient than if the oil was flowing through the tube?

MR. GRAY:

Possibly it could - wasn't quite indicated - the thing that sometimes happens when the bottom hole pressure decreases, there is some tendency it will load up and cease flowing. In a great many instances we can get just as good ratio through the casing as through the tube. The operator has to revise it either by opening the side door lock or other methods - it still isn't exactly inefficient.

MR. SELLINGER:

What is the purpose of producing wells through the tube instead of the casing?

MR. GRAY:

Quite a number - perhaps sometimes you may get the well to flow longer through the tubing than through the casing.

MR. SELLINGER:

Is that generally true?

MR. GRAY:

Not always true, quite frequently find less flow through the casing and more through the tube.

MR. SELLINGER:

Do you find that very ordinary - to be able to flow through the casing and not through the tubing?

MR. GRAY:

Not uncommon but I imagine on the average they will flow longer through the tubing.

MR. SELLINGER:

You have any other reason why it is preferable to flow oil through the tubing than through the casing?

MR. GRAY:

There are cases you can get better gas-oil ratio.

MR. SELLINGER:

In flowing oil through your casing is there a head of gas forming in regard to working or bringing the well back to flowing - A head of gas you must get rid of?

MR. GRAY: I don't think so.

MR. SELLINGER:

Let us turn to your testimony with respect to Case No. 93, on the Paddock-Drinkard, and other pools which you testified about - turning to those, particularly to the Paddock - what formation is that geologically?

MR. GRAY:

I don't know if I can tell you.

MR. SELLINGER:

What is the common description for that pool?

MR. GRAY:

I do not recall.

MR. SELLINGER:

Glorietta?

MR. GRAY:

I believe that is right.

MR. SELLINGER:

How many wells are producing from the Paddock at the present time?

MR. GRAY:

I will be glad to submit this map in evidence, the wells producing from the Paddock are shown here in light green color.

MR. SELLINGER:

How many are there Mr. Gray?

MR. GRAY:

Looks like there are probably in excess of 50 to 55 wells.

MR. SELLINGER:

In the Paddock area?

MR. GRAY:

Yes, sir.

MR. SELLINGER:

Are all those wells flowing wells?

MR. GRAY:

I think all - I am not sure whether they are all flowing wells or not, The Paddock pay does not have a great deal of gas, they have at least one that has to be kicked off they say by a gas lift.

MR. SELLINGER:

When you say they do not have very much gas, you mean the flowing life will be considerably short?

MR. GRAY:

It may be - on the other hand it may be very long. Right now we have a low gas-oil ratio. If this proves to be a dry gas-oil ratio it will increase. We may have less trouble in six months to a year than now.

MR. SELLINGER:

Do you know what the dominating energy of this field is now?

MR. GRAY:

I believe it is going to be gas dry reservoir.

MR. SELLINGER:

Would that normally result, as time goes on, in higher ratios and in more gas?

MR. GRAY: That is correct.

MR. SELLINGER:

At the present time, however, the ratios are low and from what you know now there is a shortage of gas?

MR. GRAY:

Some of those wells are the nicest flowing wells we have.

MR. SELLINGER:

Are you familiar with the pressures of that area?

MR. GRAY:

Fairly well.

MR. SELLINGER:

Could you tell the Commission whether or not the pressure is sub-normal, normal or ab-normal for that depth?

MR. GRAY:

Initial bottom hole pressure of 2120 the depth about 5100 feet - so I would say the pressures there are about normal.

MR. SELLINGER:

You gave us the initial pressure, do you have any information as to what the present pressures are?

MR. GRAY:

I don't believe I have it here.

MR. SELLINGER:

Do you know what they are?

MR. GRAY:

No, I don't, I can get it for you.

MR. SELLINGER:

Will you supply the record with what the present pressures are for this field?

MR. GRAY:

------- Yes??

MR. SELLINGER:

Mr. Gray, what I am interested in securing is the record of the present average pressure of those 55 wells if you have them.

MR. GRAY:

We do not have them.

MR. SELLINGER:

If you do not - do you have the present pressures of the Gulf wells?

MR. GRAY:

I think we have pressures on all Gulf wells, although I am not certain.

MR. SELLINGER:

That tabulation you have in front of you - in which you give the initial pressures - that covers what - only the Gulf wells?

MR. GRAY:

That is our wells in that area.

MR. SELLINGER:

Is that an average of the Gulf wells in that area?

MR. GRAY:

The static pressure of the Gulf wells in February - February 20, 1945, was 1765 pounds, in May 1946, 1525 pounds.

MR. SELLINGER:

1525 pounds - the latest you have?

MR. GRAY:

November, 1946, 1344 pounds.

MR. SELLINGER:

How much of a decline is that from the initial pressure?

MR. GRAY: Between 700 or 800 pounds.

MR. SELLINGER:

The difference between 2120 and 1344?

MR. GRAY:

Correct.

MR. SELLINGER:

Mr. Gray, you have had considerable experience in the oil business have you not?

MR. GRAY:

Some.

MR. SELLINGER:

What is your opinion as to whether or not that is a pretty good decline for a year's production?

MR. GRAY:

It is a very rapid decline, and the decline tests indicate we have a gas dry reservoir - on the other hand it has been my experience a drop experienced in the early life of the field is much greater than during the later life.

MR. SELLINGER:

In other words, you do not anticipate the same rate of decline for the following year or following periods of time?

MR. GRAY:

I do not.

MR. SELLINGER:

Will you explain to the Commission the value of having high pressures in producing oils?

MR. GRAY:

Less trouble - they flow easier.

MR. SELLINGER:

Is pressure indicative of the flowing life of the field?

MR. GRAY:

Not entirely.

MR. SELLINGER:

Is it an indication of whether or not a field will flow over a longer period of time if you have higher pressures?

MR. GRAY:

If you have higher pressures it will have a greater tendency to flow. It does not make a great difference what pressure if the water gets in excess of 20 or 25 feet you will have trouble.

MR. SELLINGER:

What is the water situation with respect to the Paddock field?

MR. GRAY:

So far not serious.

MR. SELLINGER:

What is the highest percentage of any well you know of - if you do not have that, what is it on the Gulf wells?

MR. GRAY:

I don't know.

MR. SELLINGER:

With respect to your Drinkard pool - how many wells in that field?

MR. GRAY:

Looks like 45.

MR. SELLINGER:

45 wells - how many owned by the Gulf?

MR. GRAY:

Approximately 25, maybe 30.

MR. SELLINGER:

Would you say the pressures in that field are sub-normal, normal, or ab-normal?

MR. GRAY:

I think they are about normal.

MR. SELLINGER:

Was the Gulf the descriptive well of that field?

MR. GRAY:

That is right.

MR. SELLINGER:

What is the initial pressure of that field?

MR. GRAY:

The pay in that field ranges from 6500 down to 6900 feet, it depends on the depth of completion of the well - the pressures show ranges of 2660 to 2812 pounds.

MR. SELLINGER:

Initial pressures?

MR. GRAY:

That is right.

MR. SELLINGER:

What is the latest pressures you have - having in mind the different depths, giving me the minimum and maximum.

MR. GRAY:

1903 to 2213 pounds.

MR. SELLINGER:

How old is that field?

MR. GRAY:

I am not positive about it, but I imagine in the neighborhood of 2 years old.

MR. SELLINGER:

Would you say the pressure has declined in that time - that the decline is considerable or normal?

MR. GRAY:

Substantial decline.

MR. SELLINGER:

Do you anticipate that the wells will continue to decline in their pressure for the present and future as they have in the past?

MR. GRAY:

At the same rate per thousand barrels of oil produced.

MR. SELLINGER:

What kind of deposit is this field?

MR. GRAY:

I believe this is also gas drive.

MR. SELLINGER:

What is the condition of the water?

MR. GRAY:

Some water produced, but not maj or quantities.

MR. SELLINGER:

You anticipate a water increase as time goes on, in this field?

MR. GRAY:

Yes, but not too much quantity of water.

MR. SELLINGER:

With respect to the pressures, would you say the pressures in that field are sub-normal, normal or ab-normal?

MR. GRAY:

Probably fairly well normal. The initial pressure was 3150 pounds, the depth right at 8,000 feet. That is fairly close to normal.

MR. SELLINGER:

What is the last pressure you have on this particular pool?

MR. GRAY:

2990 pounds, November, 1946.

MR. SELLINGER:

How old is that pool?

MR. GRAY:

Between one and one and a half years old.

MR. SELLINGER:

And is that similarly a gas drive field?

MR. GRAY:

No, I believe it will be a water drive in that reservoir.

MR. SELLINGER:

Are any of the wells making water now?

MR. GRAY:

Yes, sir.

MR. SELLINGER:

How many wells in the field?

MR. GRAY:

I count 15.

MR. SELLINGER:

How many owned by the Gulf?

MR. GRAY:

One and part of another.

MR. SELLINGER:

Your request here, Mr. Gray, is for permission to dual complete any two of those mentioned in your application, or for permission to complete as many as are in the zones as your equipment can permit?

MR. GRAY:

We anticipate only dual completion at the present time, we don't want to restrict it just to to dual completion - at the present time we do not have equipment, but certainly expect exploration of more than two horizons. There has been substantial improvement in equipment, and subsequently, we may be able to do it - would not like to see it prohibited for only that.

MR. SELLINGER:

Your request for dual completion - you wish orders to permit multiple completion?

MR. GRAY:

That is correct.

MR. SELLINGER:

Are your wells in these pools able to have multiple completions - that is in excess of two?

MR. GRAY:

Multiple completion?

MR. SELLINGER:

The equipment of your wells, can they at the present time have multiple completions in them, is it possible to make multiple completions on your wells with the present equipment?

MR. GRAY:

We would have to put additional equipment to dual complete - the condition of the wells are such that you could dual complete them.

MR. SELLINGER:

In excess of dual completion, would some of your wells have to have an additional string of casing run?

MR. GRAY:

Might be - might require it, I don't know. Might require an additional string of tubing.

MR. SELLINGER:

Each additional string would necessitate additional packer or two packers?

MR. GRAY:

Each additional one, normally, would require one packer.

MR. SELLINGER:

And would be only three packers on triple completion?

MR. GRAY:

I think so. Although, if we want to put a cross-over packer, it might require four.

MR. SELLINGER:

If you put a cross-over it would necessitate two packers for that cross-over, is that right?

MR. GRAY:

That is correct.

MR. SELLINGER:

Will you explain to the Commission what you mean by cross-over?

MR. GRAY:

A cross-over packer has a provision you can change the flowing string from the tubing to the casing or the reverse. You can take from the annulus and go into the tube. In the case of West Grimes #4 by the installation of a cross-over packer we could produce the gas through the tubing. If we find we are running into high gas-oil ratios, we would anticipate that type of packing.

MR. SELLINGER:

By installing that cross-over it would necessitate your running two packers in that particular well?

MR. GRAY:

That is correct.

MR. SELLINGER:

With regards to the practibility of packer in order to prevent what they call a leak packer, you would have to take of pressure differential between the two zones, would you not?

MR. GRAY:

Yes, sir.

MR. SELLINGER:

Will you explain to the Commission the reason for maintaining pressure between the two zones?

MR. GRAY:

I don't understand the question.

MR. SELLINGER:

Why is it necessary to maintain pressure between the two zones as equally as possible?

MR. GRAY:

I don't think that is necessary.

MR. SELLINGER:

If too much pressure is applied to the packer from one zone, would it have a tendency of blowing out or not holding?

MR. GRAY:

You wouldn't have a good packer.

MR. SELLINGER:

If there is too much pressure on the lower zone, what would the tendency be for the packer?

MR. GRAY:

Depends on what kind of packer you have - the regular wall packer, there would be a tendency to lift it.

MR. SELLINGER:

Do those slips work to prevent the packer from being pushed up?

MR. GRAY:

Only have two sets of slips.

COMMISSIONER MILES:

There are packers that would prevent anything like that?

MR. GRAY:

That is correct.

COMMISSIONER MILES:

Anybody else?

MR. SELLINGER:

I I might say, I understood with regards to the co-mingling, you are not preparing an application for the Com ission at this time?

MR. GRAY:

No, not even in the original application. It was anticipated they would not approve it at this time, but might recognize it at which time it would be desirable - in that case it would take a hearing.

MR. SELLINGER:

Would you recommend the Commission to disregard that?

MR. ATWOOD:

There is nothing in your petition asking for co-mingling.

MR. GRAY:

We just mentioned it might require co-mingling.

MR. ATWOOD:

You stated in your petition co-mingling is not requested at this time. Something you said about the notice given in the case of individual well applications, after a pool had been opened up for dual completion the people interested are to be notified and it submitted to the Commission for hearing if necessary.

MR. GRAY:

Yes, that is just a suggestion. I suggested 10 or 15 days to get the notice circulated and give plenty of time.

MR. ATWOOD:

It is up to the Commission who to notify.

MR. GRAY:

That is correct.

(EXAMINATION OF MR. R. S. DEWEY)

(After being duly sworn, Mr. Dewey testified as follows)

MR. W. E. HUBBARD (Examiner)

Mr. Dewey, will you state your full name, affiliation, and experience?

MR. DEWEY:

My name is Robert S. Dewey, I am employed by the Humble Oil Company and have been employed by them the past 20 years, most of the time in the West Texas and New Mexico area. I am the Division Petroleum Engineer, located at Midland, Texas.

MR. HUBBARD:

You mind stating, Mr. Dewey, what you know of the operations of the Humble Oil Company in dual completions, and the new experience in West Texas, which would have any bearing on the propriety of dual completions.

MR. DEWEY:

A survey made recently of the Humble Company's experience with multiple zone completions indicates out of 36 multiple zone completions made, up until the late Spring of 1946, the Humble Company had 14 failures, and has had to work over 18 of these wells as a direct result of having completed them as dual zone completions. In addition to this, for the past 16 months, ending April 1, 1946, the Humble Company had 78 packer failures; and single zone completions in its operations - of 58, these failures where the cause was known, 27 leaked on test, 12 could not be unseated, 5 hung up going in the hole, and 4 failed to set. The sets gave way on 4 packers when set while running in the hole, and for the other 5 it was considered the channels behind the casing were responsible for failure to obtain shut off. The detail material of which that is a summary - we would be glad to prepare. The show of individual wells at a depth at which the completions were made - the depth at which the packers were set, and the cause of failure as we interpreted it. If the Commission would desire that type of information in detail we would be glad to submit it to them for this hearing.

MR. SPURRIER:

Do you have that information in a form you may submit it right now as an exhibit?

MR. DEWEY:

No - it isn't ready. We have it in a way, but not in a way we would like to handle it.

MR. SPURRIER:

We will put in the record you may prepare it in detail and send it in and we will make it a part of this record.

MR. DEWEY:

That record will cover the Humble's experience in West Texas and New Mexico, as well as being included in the whole. We draw a conclusion from our experience of multiple zone completions based upon failures - we have noted that they have not proved satisfactory and that there is still room for improvement in the manner of both making multiple zone completions and the equipment used. We do not feel that either have reached perfection yet.

MR. SPURRIER:

You think, Mr. Dewey, there is a good chance of doing this, once a great number of wells in the pool have been dually completed?

MR. DEWEY:

I do - I think one or two poorly completed may cause serious migration from one zone to another.

MR. SPURRIER:

Will that cause waste?

MR. DEWEY:

It might cause very serious waste, particularly the oil from one horizon got away and got into sand - got into water sand, and the waste might be very extensive. I might illustrate one basis for that conclusion - The operators in the Seminole sand in West Texas decided to employ a consultant to analyze the reservoir characteristics in the field to determine for the current condition of the reservoir and make recommendations, looking toward the future production and possible secondary recovery program or gas maintenance program. In the Seminole reservoir there are two horizons, the upper is the Yates and it is in the central part of the field, it carries ab-normally high gas, the oil productive horizon is in the San Andres formation, a considerable depth below the Yates horizon. The original gas cap in the San Andres formation - this gas cap was under laid by oil in the drilling of the reservoir, the operators found it rather difficult to drill their wells without setting an intermediate set of casing to exclude the Yates sand gas. In fact, the rules and regulations were written by the Texas Railway Commission requiring the central part of the shale each operator would case off the Yates gas sand. The consultant, after analyzing for some 6 or 8 months came to the conclusion that there must be migration downward on the Yates gas sand into the gas cap overlying the oil production and that this migration of free gas from the upper to the lower horizon was of such serious extent they might be unable to complete their analysis - so the Seminole reservoir test confirmed the fact that there was such a migration. At the present time the operators in the Seminole field are concerned over this migration and we are trying to find which well or wells are contributing the gas to the lower horizon. This illustration, to my mind, even where operators use due diligence and have submitted cases, made tests prescribed by the regulatory board, even then perhaps one or two, perhaps more wells can change very greatly the reservoir characteristics from one reservoir flow into another reservoir under multiple zone conditions. A similar thing might happen, in fact an opportunity for it to happen would be greater I think than under the example I have cited. We do know in the Seminole reservoir the corrosion is bad, casing corrosion, and we do know we have casing corrosion in such pools as Hobbs in New Mexico, and other pools in the Hobbs pools. For instance one operator, the Shell Company, had been carrying on a rather extensive program in setting inside strings of casing in a great many of their wells. This Company felt that it was pertinent to protect their investment and future recovery in the Hobbs pool, setting

strings of casing - and a good deal of expense to themselves. I am sure they are not the only operators in New Mexico that have similar conditions.

I think casing corrosion is one of the very serious things that should be considered in writing any general order or any specific order relative to permitting dual completions. As yet, we know very little about preventing casing corrosion. One method that has been tried and is being tried is by lubricating foamites and other compounds down the annulus between the casing and tubing to act as an equalizer to prevent the corrosion from attacking the casing. Under dual completions method where the annulus space is used as a flow string we do not see how an operator can use preventitive measures so far as anything to prevent casing corrosion. We also know that in single completions we have a great deal of trouble with parrafin, wells have a tendency to parrafin up. We don't know just how the multiple zone completions and operator is going to handle the parrafin problem, how he is going to successfully pull the tube and scrape the parrafin that may accumulate in the annulus. We have heard nothing from the relative solution of that problem. I think it is one that should be given consideration in the multiple zone completions in the New Mexico area.

MR. SPURRIER:

Did the Humble Company operate in the field now under construction?

MR. DEWEY:

That is correct - in the Hobbs pool the Humble operates several leases. Our principal is our federal Leonard lease which offsets the Gulf West Grimes lease, in which Mr. Gray has proposed making dual completions. This is a federal lease which, under the current federal regulations, will not permit us to make a dual completion to protect withdrawals from the Bowers sand. Not that we have planned or care to make dual completions; it has been our intention that as the Bowers sand develops we would drill a well to the Bowers sand and to complete it there, and we have had no idea of trying to make dual completion between the present sand and ours and the Bowers sand. In fact, we oppose Mr. Gray's application in that we feel such application sets a precedent in the Hobbs field which we think would be detrimental in any way not only to ourselves, but to the other operators interested in the pool.

COMMISSIONER MILES:

Do you feel that would apply to the other fields?

MR. DEWEY:

We do - we feel the regulations now in force will serve best.

COMMISSIONER MILES:

You feel it will be economical?

MR. DEWEY:

We feel economy over a long range will be better served under single completions as a whole than it will under dual completions. Dual completions indicate a nice initial saving - on down the line the difficulties that can and do arise under it in working wells over and loss of oil, and other things will more than neutralize the initial savings. We think in individual cases perhaps dual completions will effect a nice saving for some particular operator.

COMMISSIONER MILES:

In all particular cases from conservation of the oil?

MR. DEWEY:

If some operators are particularly lucky in the installation and type of reservoir - he might not have parrafin or corrosion trouble, may not have these two things to contend with. Some other operator may be led into following the example.

Just one other thing relative to the Gulf application for dual completion in Hobbs pool, I wish to point out to the Commission if anything was offered in the test relative to what intentions the Gulf had relative to the taking of bottom hole pressure - and other things that might be of interest following the productivity of Bowers sand. It has been the Humble Company's experience that where dually completed wells are permitted it is very difficult to get the same type and quality of production data and pressure data that we feel we need in making our reservoir studies. If we do not have that type of information we are unable to analyze our reservoirs and determine whether consideration should be given to secondary recovery pressure maintenance and other means of increasing the ultimate recovery that might be obtained on just direct flow to abandonment.

I have here a paper that was prepared for presentation before the A.P.I., and Pacific Coast Division of Production, American Petroleum Institute, Los Angeles, California. This is a preprint I have obtained from the API titled "Dual Performance of Multi-Zone Wells in the Wilmington Field, California," by Carlton Beal of the Richfield Oil Corporation, and Read Winterburn, Union Pacific Railroad Company.

I would like to introduce this as an exhibit in the case.

Relative to the Drinkard-Paddock area - for another purpose we prepared a typical cross section of this area which might be of interest in showing and following this discussion of the various zones. We are particularly interested in the Paddock area, due to our development on our New Mexico State lease - Up to December 30, 1946, we had 11 wells completed on that lease, we took some productivity on the State, S9, S10, and S11, and the productivity factor on New Mexico State was taken November 6, 1946, after just 5 hours test - indicated fluid productivity factor of 29 or 35, this fluid productivity became a substantial decline, if the test is extended long enough the productivity factors are rather low, which does not indicate that it is too good producing property. S9 had .83, .43, S10 had .36 to .18, S11 had .77 to .30 - These increasing productivity factors were accomplished by increasing the gas-oil ratio and also by increasing water percentages. We are perturbed on this lease; we have at least 3 horizons in the Paddock Pay, and in these 3 horizons we haven't as yet been able to identify an individual well - just which ones are making water and which ones are not. While the water percentage is not very large as yet, it is increasing and looks to us that this would constitute a very serious problem on that lease before long. We do feel these wells, if they had been dually completed it would have been almost impossible for us to gather the type of information we will need to identify the water - where the water is coming from, and to do the necessary shut off when it becomes too large, without sacrificing production from the lower Drinkard horizon during the time we are working over the well and the expense would be greater than it will be under the condition where each well is produced from one horizon at the time. We do view with alarm the declining pressure Mr. Gray testified to. In the Drinkard field we may have some indications of the gas cap, which may need to be corrected. We feel so far as our property is concerned we would aid to have the Drinkard and Paddock wells dually completed. There is more water being produced from our Drinkard area than there is from the Paddock wells. The gas-oil ratio, the last time we consulted, it was 1732 pounds - a rather high ratio for the length of time the wells have been under production. In

In completing Greenwood in the Brunson field, we found there were two zones of production in the Ellenburger line which were substantially separated from each other by a barren streak - shortly after completion of the well the water percentage increased, at an alarming rate, so that we felt it was necessary to go in and abandon the lower part of the Ellenburger formation.

If you will note from the cross-section submitted to you, that this covers quite an area and it might be possible to get almost any number of wells completed between different zones - it might be possible if the area continues to develop as it has in the past you could go down one well beyond one horizon and follow where it is duly completed and follow down progressively through 6 different steps across the field until you had everything tied from the Paddock Pay clear to the Ellenburger Pay, some gas drives and some water drives, some would necessarily have to be pumped. It would become an exceedingly complicated pattern, and present a problem to any regulatory body to devise any adequate means of policy and maintenance of equities between the operators. We feel that dual completions were justified as a war emergency, but that the war emergency is largely in the past. We might look forward to sufficient steel to give us the necessary casing to make single casing in our wells and not too much undue delay.

In conclusion, I wish to emphasize it is our intention to continue with the single well completions, and we hope we will not be forced to meet offsets that are dually completed.

MR. SELLINGER:

Mr. Dewey, the 58 instances you referred to earlier covered flowing wells did they not?

MR. DEWEY:

That is my understanding.

MR. SELLINGER:

Where you have a dual completion in which one or both are pumping, it would be less satisfactory than a flowing dual completion would it not?

MR. DEWEY:

I think greatly so. That would depend upon whether the upper formations were pumped or the relative amount of trouble you would have with the two.

MR. SELLINGER:

Where one or both are pumped, the problem would be greatly exaggeraged would they not - from a practical point of view?

MR. DEWEY:

That is right, the packing element would be increased. The packers treated as being such simple mechanisms, but besides the principal packer you have to put in a well, there are other packing elements in there, so that you may have from 5 to 8 different elements that have to hold. It isn't just one single packer. Where you are trying to pump through a pack there is a certain amount of wear and the difficulties are greatly increased.

MR. SELLINGER:

That is all.

MR. ATWOOD:

Mr. Dewey, wouldn't it be up to the individual operator in each individual case whether or not the advantages out weighed the disadvantages in making dual completions?

MR. DEWEY:

I think we are in a common reservoir and we all have common interests into those reservoirs, and any damage that is done by one operator may lead to damage to the other operators in there - I do not see why one operator should have the right to go in there and jeopardize the equity the other operators have in the pool to gain maybe temporary economy.

MR. ATWOOD:

Damage can only result through improper completion couldn't it?

MR. DEWEY:

The operator may make a completion with all best intentions and he may feel it is a proper completion, and nobody may detect the damage for a considerable length of time - it is similar to that case I tried to explain to you about the Seminole field. You might not be conscious there is any damage done. The same thing could happen with multiple zone completions, everybody be entirely innocent of the damage.

MR. ATWOOD:

You claim the Seminole pool damage was due to multiple completions?

MR. DEWEY:

No, sir, that was due to something else.

MR. ATWOOD:

And if a failure in completion occurs, or if later a failure occurs, can it not be detected by proper inspection?

MR. DEWEY:

With the operators in the Seminole field, they were as diligent as operators generally are.

MR. ATWOOD:

I am speaking about multiple inspection in Lea County, New Mexico.

MR. DEWEY:

That is a question I could not answer flat yes or flat no - We have none in New Mexico that I know of.

MR. ATWOOD:

If it is permitted - you have said damage could come about through failure - - -

MR. DEWEY:

It could.

MR. ATWOOD:

Cannot that failure be detected?

MR. DEWEY:

I would have to answer that no, because of the fact that it might be detected after the damage is done. It isn't a question I could say yes or no to. It might be detected - there is a very good chance the damage would be done before it was detected.

MR. ATWOOD:

That could also happen in single zone completions.

MR. DEWEY:

Exactly, and does happen, but the damage is not as great, is not as hazardous an operation as packer setting. I think wells that have to be maintained - I don't think the two can be compared.

MR. ATWOOD:

How many cases do you know of where damage from multiple zones or dual completions have happened?

MR. DEWEY:

Frankly, I don't know of any, I am not experienced in multiple zone completions, because we have made but two and both of those were the very simple type or we were producing gas through the annulus and oil through the tubing, and all it required was the simple packer. Did not require a lot of supplemental gadgets such as multiple zone completions may run into.

MR. ATWOOD:

Isn't it possible by use of proper material, skill, and handling - to successfully complete dual zone operations in Lea County?

MR. DEWEY:

I think it is possible, but one or two bad ones may neutralize all good ones.

MR. ATWOOD:

You have just said there were bad ones in single zone operations - completions.

MR. DEWEY:

Yes, we have so many troubles we don't want to complicate them with a lot more.

MR. ATWOOD:

You understand this order is permissive only, and not mandatory?

MR. DEWEY:

Yes, I understand that, but if a permissive order like that is granted it sooner or later becomes almost mandatory by its greater enlargement.

MR. ATWOOD:

Wouldn't that be because of the success of it?

MR. DEWEY:

Not necessarily - no, sir.

MR. ATWOOD:

If it is a failure it would not be mandatory.

MR. ATWOOD (cont'd)

You object, I believe, to the completion of the single well in Hobbs as dual completion well, do you think it will damage the Humble lease to do that?

MR. DEWEY:

If they complete a dual well there, I anticipate the federal authorities will expect us to complete a dual well.

MR. ATWOOD:

Anytime your acreage is offset by production from another zone, you try to offset it don't you?

MR. DEWEY:

Yes, we try to do that.

MR. ATWOOD:

In this case, you would be willing to do it, if Mr. Morrell would let you, wouldn't you?

MR. DEWEY:

I think so.

MR. ATWOOD:

Your objection is ? ?

MR. DEWEY:

The unfairness of it.

MR. ATWOOD:

You own federal leases and they own private leases. You want your federal leases equalized by burdens on the other fields?

MR. DEWEY:

No, we manage to carry our load.

MR. ATWOOD:

You are afraid they are going to do it - - -

MR. DEWEY:

We would like to get characteristics of that well, and be able to get production history and things difficult to get with dual completions.

MR. ATWOOD:

I believe you say down in Texas you have not had very good luck in dual completions ? ?

MR. DEWEY:

We have had two in our area, one of them - - I would say they were both successful so far as the mechanics in dual completion was concerned. One of them was unsuccessful due to the fact that we did not develop the gas reserve we thought we had. The other one was successful, it was done as a war emergency.

MR. ATWOOD:

Other companies have had fair success, have they not?

MR. DEWEY:

I do not like to give a lot of hearsay, but - - -

MR. ATWOOD:

You have heard the testimony of Mr. Gray - the Gulf's experience?

MR. DEWEY:

He was testifying about Kansas and Oklahoma.

MR. ATWOOD:

You think your failure down in Texas was on account of being in Texas?

MR. DEWEY:

The conditions might be different, may be we are just poor operators in Oklahoma.

MR. ATWOOD:

That is all, thank you

MR. S. A. SANDERSON:

On these 58 dually completed wells where you had the 8 failures, do you know in a general way, where they were located.

MR. DEWEY:

Two of them were located in West Texas area, and the others in the operating territory of the Humble. I can give you a general idea, I think, where they were located. We are going to supply this to the Commission.

MR. SANDERSON:

Do you know anything about the conditions with respect to temperature in those cases?

MR. DEWEY:

The temperatures are much higher than they are in the West Texas-New Mexico area. The tabulation will give the depth of those and we can supply the temperatures if you would be interested.

MR. SANDERSON:

In a general way the temperatures down there exceed 200 degrees?

MR. DEWEY:

I could not testify to that, not well enough acquainted with that country to say they exceed 200 degrees.

COMMISSIONER MILES:

Anybody else want to testify, or ask a question, or make a statement.

JUDGE SETH:

We are instructed by Stanolind Oil Company to make no general opposition to the Gulf petition provided, however, an order is so framed everybody

JUDGE SETH (cont'd)

interested will have a chance to be heard on each particular well. We mean every producer from the pools affected so that each well may be considered on its merits. We do, however, object to the consideration of this Grimes well at Hobbs, because we have had no chance to prepare anything on the Grimes well. We object to any consideration at this time of that one particular well.

COMMISSIONER MILES:

Mr. Gray will you take the stand?

I know you stated a number of things in which you thought were in favor of dual-multiple completions - what would you say was the most important contributing factor in favor of the completions?

MR. GRAY:

I think one of the major factors in it is the probable increase in ultimate recovery. We have quite a number - two zones that will definitely not support a well, could not possibly drill single completions in.

COMMISSIONER MILES:

I lost part of that statement.

MR. GRAY:

The Tubbs and the Blinbry pays are largely gas, the estimated gas recover of gas will be insufficient to pay for the investment of drilling, let alone the operating cost. As a matter of fact we could not even go on 80 acre spacing and have those wells pay out. In other zones - the Ellenberger, the Drinkard and the Paddock, and certain portions of the pools - there are going to be wells that couldn't possibly pay off.

In permitting dual completions I think other wells would pay off that otherwise couldn't.

In our packer experience - I recall two packer failures in the Hobbs pool - one of them on a well that produced water, and the other failure, as I recall, on our East Grimes #2, resulted from an acid, tried to acidize the well, and again we knew immediately there was a failure. I do not believe we are going to have a great deal of difficulty in detecting it anytime a packer will fail.

COMMISSIONER MILES:

In the recovery of this oil you speak of through this method is due to the fact that you would not drill perhaps, if it had to be single completion?

MR. GRAY:

That is right.

COMMISSIONER MILES:

Then the expense of drilling enters into the recovery of the oil by drilling one well through two completions to save enough expense to be able to operate them?

MR. GRAY:

Yes.

COMMISSIONER MILES:

Couldn't recover anymore oil than you would if they were single completions?

MR. GRAY:

I don't believe you would recover anymore oil than in single completions, but you couldn't sustain single completions. In so far as obtaining bottom-hole pressure and reservoir information, we would get equipment for that. Also, in case of our West Grimes #4, if we have any trouble we anticipate the cross-over packer.

We have a well in the Byers sand, there is not enough there to justify drilling. We could leave that well the way it is - I believe if we had to make a choice - plug the Byers and develop packers and have gas for other operations. Certainly should be no difficulty in detecting any leaks.

COMMISSIONER MILES:

You are, at the present time, particularly interested in Hobbs?

MR. GRAY:

Yes, sir. So far as corrosion is concerned we will have that in either single or dual completions - of course you cannot get the treating compounds down to the bottom hole. A single string of tubing there is definitely a possibility for each string of casing bring treating compounds down to the bottom of the hole. As I understand, the field work in Hobbs was largely to take care of corrosion - in other words, they have had some cases of corrosion.

MR. ATWOOD:

Mr. Gray, with reference to this abstract of report read by the previous witness, concerning a certain field in California in which multiple completions have been had, in which was brought up repairs have been required from time to time, is that experienced anywhere in any oil well.

MR. GRAY:

Naturally, going to be repairs even on single completions. I think it would be up to the operator to make the choice. There are some instances where even though there would be higher operating costs, you would definitely save money in the long run by dual completion. Your savings would be substantial.

MR. ATWOOD:

I believe you stated the first multiple completions have been completed in California?

MR. GRAY:

It is my understanding there are no rules in California that require the segregation. Such dual completions as they may be must have been voluntary by the operator.

MR. ATWOOD:

Pro-ration is not very highly rated in California anyway is it?

MR. GRAY:

I really don't know.

MR. FOSTER MORRELL:

You speak of the Blinbry and Tubbs formation for possible dual completions - the Tubbs you refer to, is that formation produced in your Gulf Paddock #4?

MR. GRAY:

I believe it is 4 - either 3 or 4.

MR. MORRELL:

SE corner of Section 1?

MR. GRAY:

I think that is right.

MR. MORRELL:

But that one - you produce that from a separate reservoir from the Drinkard ? ?

MR. GRAY:

I think so - it is anticipated we will keep them separate. We speak of dual completion formation from common source of supply. I think the Commission will agree we cannot be too highly technical on the source of supply.

MR. MORRELL:

They established by the Oil Conservation Commission.

MR. GRAY:

That is right - so far as we know there has never been any ruling on the Tubbs.

COMMISSIONER MILES:

Anyone else who would like to be heard?

MR. A. E. WILLIG (The Texas Company)

I take it all the witnesses have expressed themselves in this matter?

COMMISSIONER MILES:

I presume so.

MR. WILLIG:

I would like to make a statement for the Texas Company. The Texas Company, as well as the other operators in Lea County, appreciate the fact that economics can be considered by the Oil Conservation Commission of New Mexico in matters of this kind. This matter of dual completions is apparently primarily an economic one. The Texas Company doesn't consider economics altogether, although they permitted quite a number of dual completions as a war emergency measure, they have lately reluctantly granted additional dual completion permits. It does appear obvious to the Commission here that this matter of dual completions is fought with quite a number of complex problems. I was particularly impressed with the Humboe Company's testimony. The Texas Company has not made any dual completions in West Texas and consequently has no evidence to offer. We believe that is probably inevitable in certain fields they fail from the standpoint of economics and conservation. I don't believe the Commission has too much in the record on the conservation angle. I believe it would be hard to substantiate that as much recovery would be obtained from two zones dually completed as singly completed, we say they are inevitable in certain cases. We don't want to take general exception of the Gulf application, we do not see any need for a general order in this respect since they themselves have suggested each case be a separate exception. We do want to protest the granting of an application in the Drinkard field.

MR. SPURRIER:

Do you know whether the Texas Commission requires a hearing on each and every well in addition to - or in other words a separate hearing?

MR. WILLIG:

Yes, sir, they do. Each well is a separate hearing and the Texas Commission has granted numerous permits - they are defenseless against additional permits, where one has been granted they have to allow another operator the same right.

I think it is very important that the Oil Conservation Commission consider the rules in effect in regard to dual permits on federal lands.

MR. ATWOOD:

May I make this statement in response to the Texas Company concerning federal leases offsetting leases by the operators - our position is that the offset rules apply whether federal, state or individual leases, and an operator on a federal lease drills on a certain horizon, the operator on the offsetting lease must drill to it and produce it. If that operator on the federal drills another well and brings it in at lower production than this operator on the state or individual lease, he must also protect for drainage from that horizon. The fact that the operator on the federal lease drilled separate wells will certainly not create a burden on state wells. We can't help it because the federal government will not get up to date with its regulations.

MR. MORRELL:

Again we have gotten into this subject of dual completions, and the concensus of opinion, after discussion of the matter with a number of major operators of Lea County, and the history of production which is of course the criteria. We have to go as to what might happen with respect to dual completion, and does not lead to a satisfactory conclusion that dual completion would be practical from the standpoint of eliminating waste or obtaining the greatest recovery. Theoritically, dual completions can be made satisfactorily; practically, they present so many problems - as has been presented in testimony to you today, of the mechanics of keeping the packers, cross over and other material necessary, in proper condition and the difficulty of ascertaining whether they are maintained in satisfactory condition. It has been testified before you today that the damage would normally have already occurred before it would be detected. We have an interesting history in Lea County on gas-oil ratios, they have to be satisfactorily controlled in Lea County; in a single well where you could get at it and work it over. It has been presented to you and you have so granted that most of the sand areas have no limited ratio. If you cannot control gas-oil ratios in the open, it is not logical you can do so behind pipe or behind tube.

We have made a survey of most operators of federal lands as to what is their desire, and most, the vast majority, of those operators are not in favor of dual completions, which include all petitions mentioned by the Gulf, except the Ellenburger. Below that, we have an open mind for consideration and presentation of facts. The low porosity and permeability - so many irregularities makes it very difficult to handle the production through open bore hole, much less through completion below the permeam, we may expect lower uniform conditions or higher pressures of water control, which might be susceptible, and I am speaking in all probability in distances of 910 to 12,000 feet completions where your economics over rule your probable laws of ultimate recovery through dual completions. There have been no facts presented, there have been no statements made or opinions expressed that more oil could be recovered by dual completion

that would only be marginal cases which could still be handled by deepening existing wells that are produced at higher levels. If you grant one exception, regardless of how economical or marginal it might seem to that one operator, you open the door for all of them. For that reason we have taken the position you will find the general operation is not in favor of dual completions. Regardless of the offset condition, we would still take the position it is not proper or feasible to permit dual completions on federal lands. The only proof we would have there would be in future developments.

MR. ATWOOD:

I think you could do it - based on the records available from today on - that is why I spoke of the permit of all these wells. You cannot say based upon that dual completion would not be successful, it might be if it was tried.

MR. MORRELL:

You have the opinion it would be, we have the opinion it would not be.

MR. ATWOOD:

If you fellows ride hard on that like you do on other things you will darn near control it.

MR. SELLINGER:

I would like to make a statement for Skelly Oil Company, apparently the discussion of the general order for permission of multiple completions throughout the State is eliminated from the hearing today - with reference to Case No. 92, on the multiple or dual completions in the Hobbs pool, in the Hobbs field - as an operator in that field we object to the issuance of any dual permits in the field at this time.

MR. ATWOOD:

How will Skelly be injured by the dual completion of this one particular well?

MR. SELLINGER:

I refer you to the states in which we have operations, and I have yet to find a single field where it is only one multiple completion - when one starts it spreads.

MR. ATWOOD:

Because it is a good thing.

MR. SELLINGER:

Two states have permitted it as a wartime measure, and have regretted it - at this time one has taken official action, the other, which is my personal opinion, the regulatory body there is very reluctant to issue any permits on fields that have not had permits before.

In Case No. 93, we have production in the Brunson, and we object to dual completion of that.

MR. R. S. CHRISTIE (Amerado Petroleum Company)

The Amerado Petroleum Company feels that perhaps physical waste would result rather than conservation, if dual completion were allowed. We believe in an area like the Paddock-Drinkard and Brunson where the test shows several conditions.

MR. CHRISTIE (cont'd)

We have gas cap, water in some of the formations, low pressures that if you have high ratios that are water in the wells and they are dual completed, the tendency will be to put off remedial work. It is hard enough to go into some well and do remedial work and expect to get good results and two tied together it is more difficult. I think most of our exceptions have been brought out this afternoon. We want to say we are not in favor of dual oil completions with respect to Hobbs. Two of the wells recently drilled at San Andres have been recently completed had two packers - were sand wells, and they are now drilling the second.

MR. VERNON BOTTOMS (Superior Oil Company)

We have no interest whatsoever in Case No. 92 and No. 93, we do not have any wells in those fields, and do not have any feeling about them. We feel it is specific cases in which dual completion should be granted, and those should be based on individual pool hearings and individual well hearings, to determine whether it should be granted or not.

MR. GEORGE GRAY (Repollo Oil Company)

Repollo Oil Company does not favor dual completions generally, but feel if the dual completion is permitted there should be a hearing in order to consider dual completion - we think individual wells should be considered and a hearing called to consider that well.

MR. S. C. McCOLLUM (Continental Oil Company)

The Continental Oil Company would like to make a general statement - that is we object to the principle of dual completions.

MR. W.R. BOLLINGER (Shell Oil Company)

The Shell Oil Company would like to make a statement that Shell does not object to the principle of dual completions, but feels that it is favorable in some cases, feels each well should have its own particular well hearing. Further, due to apparently involved reservoir conditions in the Drinkard area, we object to dual completion in that area.

MR. SPURRIER:

We would like to continue this hearing in cases 92, 93, and 94 until a suitable date in April -

Cases 92, 93 and 94 are continued until the definite date of April 15, 1947 at 10 o'clock A. M., for the purpose of further testimony in these three cases.

In the meantime anybody can make any petitions they want to make, because the Commission will act upon it without prejudice as we try to do all cases. In addition, to these three cases we will have a hearing for the purpose of promulgating an order which will give us a proper gas-oil ratio for the State of New Mexico, not for counties but a State wide order.

We will also consider testimony to show, during this hearing, how any interested operator may be able to use common tank batteries vs. the method of using separate tank batteries and separate tanks for pools. We feel that if any operator can show us how he can effectively separate the production of one well from another by producing those two wells into the same tank, we are willing to issue an order which will allow that. However, we do not interpret our present law to allow that.

COMMISSIONER MILES:

The testimony in this hearing today has been very interesting to me, while I have not formed any opinion as to what should be done. Some of those representing companies had not had time - were not familiar with what was presented, to prepare a statement or testimony. I would appreciate it if they would consider this, as all the information we can receive will be helpful in making a decision on the cases.

MR. SPURRIER:

In view of the fact that we are breaking a precedent in setting a case ahead, I would like for it to also be in the record we will consider on April 15, any case which reaches our office before March 15, 1947, which gives 30 days for objections.

April 15, 1947

Register

Cases 92, 93, 94, 95, 96, 97, 98

Name	Company	Address
Russell G. Lowe	Gulf Oil Corporation	Tulsa Okla
Dayton Howard	Shell Oil Co	Midland, Tex
C. W. FARIS	SHELL	MIDLAND
Lloyd L. Gray	Gulf Oil Corp	Tulsa Okla
W. E. Hubbard	Humble	Houston
K. P. Pressler	"	"
J. W. House	"	MIDLAND
R. S. Dewey		"
Eugene Hoyland	Gulf Oil Corp	Tulsa
J. S. Atlak	Self	Artesia
Neil B. Watson	Attorney	Artesia, N. M.
Emery Carper	Carper Drilling Co	"
Elmer Watson	For Superior Oil Co	Houston, Tex
W. K. Ballinger	Shell	Hobbs
John M. Kelly	Independent	Roswell
Harry J. Gibbons	Shell Oil Co.	Tulsa
J. N. Dunlavey	"	Hobbs
G. W. Selinger	"	Tulsa
Buck Aston	Consultant for Aston & Fair	Artesia
Donald S. Bush	Lawyer	Artesia
Bert Aston	Aston & Fair	Roswell
[illegible]	[illegible] Oil Co.	Artesia
R. [illegible]	[illegible] Oil Co.	Artesia
[illegible]	[illegible]	[illegible]
W. B. Macey	N. M. Oil Conservation Comm.	Artesia, N.M.
H. C. LAIRD	OTIS ENGINEERING CORP.	DALLAS, TEXAS
Orval L. Evans	Gulf Oil Corp.	Hobbs, N.M.
E. J. Gallagher	Gulf	Hobbs, N.M.
J. C. Lowe	Amerada	Ft. Worth
W. G. Ricketts	"	Tulsa
G. H. GRAY	Republic	Midland
W. N. Little	Tide Water Assoc.	Midland
D. R. McKeithan	Phillips Pet. Co.	Bartlesville, Okla.
E. H. Foster	" " " "	Amarillo, Texas
Burney Braly	Continental Oil Co	Fort Worth
C. L. Wentz	" " "	Ponca City, Okla
Edgar Kraus	Atlantic Rfg Co	Dallas Tex
A. B. Tanco	The Atlantic Refining Co	Dallas, Texas
S. B. Christy Jr	Sun Oil Co	Roswell
D. A. Powell	Drilling & Exploration Co	Hobbs
N. F. Beardmore	Barnsdall Oil	Tulsa Okla
F. E. Heath	Sun Oil Co	Dallas Tex
Martin A. Row	Sun Oil Co	Dallas, Tex
J. G. Grant	Sun Oil Co	Midland

Name	Company	Address
D A Muller	Phillips Pet. Co.	Midland Tex.
H.B. Hurley	Continental Oil Co	Ft Worth, Tex.
M. H. Dubrow	"	"
A. L. Decker	"	"
Claiz H. Perry	Warren Pet. Corp.	Tulsa, Okla.
R C McMillan	Odin Oil Co	Midland, Texas
N P Lamb	N.M. Bureau Mines & Min. Res.	Artesia N M
Roy T. Durst	Rowan Drlg. Co	Midland, Tex
C M Williams	Texas Co	Ft Worth
A. E. Willig	"	"
H. D. Murray	"	Midland Texas
R.G. Schnebele	Tex. Pac. Coal & Oil Co	Midland Tex
D. S. Goodwin	Standard of Texas	Midland
A. B. Worthen	Standard Oil & Gas Co	Fort Worth - Tex
M H Card	Standard Oil & Gas	Ft Worth
Lewis Finch Jr.	Standard Oil & Gas Co.	Ft. Worth, Tex.
J. O. Seth,	" " " "	Santa Fe, N.M.
Ralph L. Posey	" " "	Hobbs, N. Mex.
Glenn Staley	Lea County Shoestone	
Archie Rowan	Rowan Drilling Co	Ft Worth Texas
R. W. Terry	T. P. Coal & O. Co.	Ft. Worth
Henry Forbes	Continental Oil Co.	Hobbs, N Mex
S V McCollum	Continental Oil Co	Midland, Tex
Foster Morrell	U.S. Geological Survey	Roswell, N.M.