BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
September 16, 1970

REGUALR HEARING

IN THE MATTER OF:

Application of Mobil Oil Corporation for a waterflood expansion, Lea County, New Mexico.

Case No. 4367
(De Novo)

AND

IN THE MATTER OF:

Application of Mobil Oil Corporation for a waterflood expansion and amendment of rules governing same, Lea County, New Mexico.

Case No. 4368

BEFORE: A. L. Porter, Jr., Member & Secretary
Alex J. Armijo, Member

Volume II

TRANSCRIPT OF HEARING

(Whereupon, the Hearing was reconvened at 9:00 A.M., on September 17, 1970.

MR. PORTER: The Hearing will come to Order. Mr. Lopez, I believe we had concluded with Marathon's first witness. Will you call your next witness?

MR. LOPEZ: If the Commission please, I would like to call Mr. Paxton.

JOHN W. PAXTON

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

DIRECT EXAMINATION

BY MR. LOPEZ:

Q Would you please state your full name and with whom you are employed?

A I am John W. Paxton. I live in Midland, Texas. I am employed by Marathon Oil Company on the District Engineer's Staff. I specialize in waterflood projects.

Q Did you testify previously in this case?

A I have not testified in this case before.

Q Are you familiar with the vacuum field in Lea County, New Mexico?

A I have studied the performance of the waterflood.

Q And you are familiar with the Application of

Mobil Oil in these two cases we are hearing today?

A Yes, I am.

Q Have you testified before the New Mexico Oil Conservation Commission before and are your qualifications a matter of record?

A I have.

MR. LOPEZ: Are his qualifications acceptable?

MR. PORTER: Yes.

BY MR. LOPEZ:

Q Mr. Paxton, have you prepared or had prepared under your supervision some exhibits in this case?

A Yes, I have.

Q Referring to Exhibit No. 6, Marathon Exhibit No. 6, would you please describe to the Commission what this exhibit stands for?

A This is a map showing the north portion of the Vacuum field. It shows Mobil's Bridges State Waterflood Project outlined in green on the map and Grayburg-San Andres wells are shown in the code or ledgend at the bottom of the map with a small dot and a circle around it; Mobil's injection wells and proposed injection wells are shown by the circle and the other operators' injection wells are shown on here also. This is the large circle on

the map. The wells that were to be drilled under this Application are shown in the triangle. Wells producing from the deeper horizons are shown as small dots on the map.

Q Isn't it true, now, that Mobil as a matter of record has abandoned their proposal to drill the two new wells indicated by triangles and rather convert, at some future date, Well No. 13 that is indicated by the black dot directly north of Marathon-McCallister Lease?

A Yes, I understand that they have withdrawn their application to drill.

Q Were you ever made aware before yesterday morning of Mobil's intent to change its Application?

A No, I was not.

Q Do you have anything further to offer in connection with this exhibit?

A I have a color code on this exhibit showing the time sequence that Mobil was able to put on injections. Their initial pilot injection wells that were put on in 1958 are shown in green; their expansions in 1963 are lavender; the 1967 and '68 expansion which came very close to the same time are in orange and blue respectively. Their current proposed waterflood

expansion is shown by the red injection wells. This map is effective based on information we had in June of this year.

Q Now, referring to Marathon's Exhibit No. 7, would you please explain to the Commission what this means or what your studies produced?

A Yes, sir. I was interested in the performance of Mobil's waterflood. I plotted the performance of 22 injection wells in their pilot area. Beginning with Figure "1" in this booklet, I will discuss this in more detail than the ones later on. I have shown on these curves, the average daily oil producing rate each year for producing wells in the pilot area. I plotted the oil in the solid black line and the water in a dash line. At the top of this figure, I show the configuration of wells with the injection wells coded on the map. The number of the well, the plotted data for it is indicated on here and the year that the particular injection well was converted to injection is also shown. I have shown on these figures the cumulative oil prior to waterflood. This is here to give us an idea as to what kind of well it had been before. I show on here the oil that was produced during waterflood and the

present oil to water ratio for the period of January 1st, 1970 to July 1st, 1970.

To discuss these curves in groups, to save time, the first two curves are the center wells in Mobil's five-spot pilot. This one that we are looking at on Figure 1, we see there waterflood response occurring in 1961. Then it increased in 1964 after Mobil apparently increased their injection rates. The peak oil rate on this curve is 44 barrels per day and the peak water production rate is 126 barrels per day. This high water production is a characteristic of essentially all of the curves in this exhibit.

Going to Figure No. 2, a very similar performance from this well. In both of these center wells we see production produced during the waterflood approaching that that was produced before waterflood.

Then the next group of wells, five wells located on the outside of Mobil's pilot area, we go first to No. 54.

Q Is this on Figure 4 or Figure 3?

A I skipped a figure.

Q Yes, you skipped a figure.

A I am sorry. Let me go back to Figure 3. The group of wells that are plotted here I will point out

right now to save time in picking them up. I will begin with No. 59 located in Section 13 near the west line. We go from 59 to 54, 55, 34 and then 67. This is a group of wells that experienced a one and two-way push from the injection wells, you will be able to see by the configuration at the top of the exhibit. This Figure No. 3, Well No. 59, shows performance very similar to the center producing wells, however, the oil rate does not approach that of the center wells, reaching 21 barrels per day in 1964 and the water rate has risen up to 90 barrels per day.

Going on to Figure No. 4, this well had a two-way push in 1958 and then in 1967 it benefited from a four-way push as a result of the 1967 expansion. Typically, we see that during the waterflood program, these wells have not produced the quantity of oil that the center wells did. Their response is substantially less throughout.

Going on to Figure No. 5, again, in this case a one-way push for a period of time from 1958 until 1963; then a two-way push from '63 until '67 when it was made a center producer four-way push. Again, lesser response than the center well and higher water production up to 135 barrels per day in this group here which is

typical of the rest of the wells in this group.

We see on Figure No. 6 and Figure No. 7, very large volumes of water from Wells Nos. 6 and 7. We went off scale here and reached 368 barrels per day in the year 1965.

Then, those interested in the next row of wells --

Q (Interrupting) Beginning with Figure No. 8?

A Yes, we will go to Figure No. 8 for Well No. 24. These wells were converted to injection in 1967, so I examined the production from the time the pilot was initiated until they were put on injection. This row of wells begins with No. 24 in the southwest corner of Section 13 and moves southwest through 21 and into 7 and then back up to No. 31 northwest and then into 62. Looking at the configuration, we see an injection well that was put on in 1958 and there are two producting wells on a line in between the injection well and Well No. 24. This particular well was the best of this group in its response. It reached 15 barrels per day of oil and 38 barrels of water per day. Typically, this group of wells was very slightly affected by the injection program as we can see, turning to Figure No. 9

and Figure No. 10, Figure No. 11, Figure No. 12, this curve on Well -- on Figure No. 13, doesn't belong to any particular group. This was plotted because of my interest in the performance of wells in this flood. I understand that the reports are in error so I will not discuss this further.

No. 10 Well is another that doesn't belong to any particular group that benefited from only a one-way push from 1963 until 1967 when the expansion put it in a four-way push. It received some response after 1963, and then in 1967 it responded substantially and predominantly in water production. It reached a maximum water production, it is off scale on this curve, at 420 barrels per day. The well received a good response on the oil production going to 61 barrels per day early in 1969. But again you see the large volume of water produced in this well.

Then the next group of wells are eight wells that are located in the expansion area that was started in 1967 and 1968. The first six of these are center producers. The first one that I have plotted here is on Figure No. 15, Well, No. 9, located in the south part of Section 13. This is the best of this group.

Its response reached 122 barrels of oil per day in June of 1969 and has suffered a very sharp decline since then to the rate of 61 barrels per day in June of 1970. The water production is increasing rapidly. At this time, having reached a rate of 79 barrels of water per day in June of 1970.

Figure No. 16, probably more typical of this group of wells was in a four-well push. Its response occurred apparently in January of 1969. The water and oil appeared about the same time. The oil rate rached about 99 barrels per day in February of 1969 and then 118 barrels per day in June of that year. The water production has increased steadily since response and still trends upward. In June of 1970 it reached 217 barrels per day average. This is another curve that is characterized by rapidly increasing water rates and sharply declining oil producing rates.

No. 53 shown on Figure 17, very similarly, this well reached 232 barrels of water per day. Again we see the sharp decline in oil rates and increasing water rates. It reached 232 barrels of water per day.

Well No. 8 is somewhat anomalous to this group shown on Figure 18. It did not realize the

response that the other wells have which I have no explanation for this.

Pertaining to Figure No. 18, another typical well in this group.

Figure No. 20, a similar situation for this group.

Continuing to Figure No. 21, this well experienced a three-well push, you can see on the configuration on the top. This is a Mobil State G No. 1 located in Section 24, location "B". It responded to a rate of 46 barrels of oil per day in June of 1969 and declined to three barrels per day in June of 1970. The water is up to 53 barrels per day at the present time.

On Figure No. 22, this was another well that was just barely beginning to respond and I was searching in the expansion area for other wells that experienced a two-way push and had shown some response, but I did not find any because some of the high spot elements were not developed in the San Andres zone yet. The example of this is in Section 26, Location "B" and in Section 26, Location "F". We see that referring to Exhibit No. 6, that there are no San Andres wells yet

in these two five-spot elements.

Q Have you been able to draw any conclusions in your study of these charts?

A Yes. These curves demonstrate that response to injection at the producing wells will occur in about one to two years characterized by large volumes of water production which beings at the first oil response or soon thereafter. The water rates reach 200 to 300 barrels per day very often. In one instance, a well produced more than 400 barrels per day in this expansion area. The expansion area, of course, is more interesting to me because it was closer to Marathon's tracts. The peak oil rates from these wells are short lived. They experience a sharp decline in oil production accompanied by rapidly increasing water rates.

I confirm that the waterflood reserves from the closed five-spot elements are going to be substantially less than primary oil recovery, something like 50 percent of primary reserve.

As you would expect, wells located outside of the five-spot element having a two-well push or one-well push and in some instances a three-well push don't respond nearly as well as the center producing wells. In fact, these are particularly very poor performers.

I don't see anything in the performance of these wells that would demonstrate that there is much difference in the permeability distribution characteristics from the pilot area on down through the wells that I have production data on with response to the waterflood. In fact, some of these wells in the expansion area which is closer to Marathon's lease seem to produce higher water cuts and certainly larger daily volumes of water.

I think these are about the main general conclusions that I have arrived at from this review of the waterflood performance to date.

Q Have you been able to draw any conclusion as to the probability of water saturation as a result of Mobil's proposed injection underneath the Marathon-McAllister Lease?

A Yes.

Q Especially under the San Andres or the lower San Andres?

A Yes. Referring to Marathon's Exhibit No. 6, we see that in the northwest quarter of Section 25 which is part of Mobil's Bridges State Lease adjoins Marathon's tract on the north, there are no producing wells in the San Andres at this time. Of course, we have established

that there is no production from the upper San Andres under Marathon's Lease, the McAllister State. There is a production from the San Andres to the south of Marathon's Lease and, generally speaking, both zones produce south of Marathon's Lease. The upper San Andres and the lower.

In considering Mobil's Well No. 13, which is now the proposed injection well, it is not shown this way on Marathon's Exhibit No. 6 because we weren't aware that this proposal would be made. In considering the pressure under the -- in this area, we have a recently measured pressure under Marathon's Lease in the Grayburg of about 750 P.S.I., and I am sure it is not greater in the upper San Andres and probably much less. Since there is no production under Mobil's tract to the north in the northwest quarter of Section 25, probably the pressure has tended to equalize in time between these two Leases. Since Mobil is starting injection in Section 25 in the northeast corner of Section 26 at Wells 32 and 38, I would expect the pressure to increase under Mobil's quarter section of the Marathon tract. This establishes a pressure gradient from Marathon's -- not from Marathon's -- but from Mobil's Lease through Marathon's Lease decreasing

further into the area south of Marathon's lease.

If Mobil starts injection through Well No. 13, I believe that the water will move in all directions from this well initially. It will go toward Marathon's Lease just as it will toward,to the north and west and east,toward Mobil's producing wells. If anything, the pressure gradient favors its movement to the south. The water will not move as a sharp front. It will advance more rapidly in the permeable strata and probably from the performance that I have discussed just previously, it will cause a substantial increase in water saturation under Marathon's Lease, particularly under Well No. 4. In time, I believe it will get to Well No. 3, particularly in the more permeable strata.

Q Mr. Paxton, just a point of clarification, I believe that you said that the pressure Marathon is now experiencing in the lower San Andres was a maximum of 700. At what pressure does Mobil intend to inject into Wells 13 and 14, the ones that bound Marathon's Lease?

A Mobil's injection pressure will typically be in excess of 200 P.S.I. and the bottom hole injection pressure would then be approaching 4000 P.S.I. rather

than the 3800 P.S.I. that was previously established. This certainly establishes a higher pressure gradient from the injection Well No. 13 toward Marathon's Lease. Sorry I failed to point this out.

Q Now, turning your attention to Wells 25 and 13 which Mobil has testified to the fact that they plan to seal off these wells so as to inject on the upper San Andres. What is your opinion of the effectiveness of their proposed sealing-off procedure?

A Knowing that the pressure in the San Andres is probably in the neighborhood of 750 P.S.I. or less and that their bottom hole injection pressure will be 3800 P.S.I. or thereabouts, I am concerned about the differential pressure between these two zones which we have considered as two reservoirs for the purpose of this Hearing.

This Well No. 13 which is in the injection Application at this time I believe is shown on Marathon's Exhibit No. 4. I would like to look at the log on this well. It was originally drilled to a T.D. at 4763 feet in October of 1938. The well was shot with 320 quarts of nitroglycerine from 4390 to 4550 feet, and if you look at the log, there is a caliper log track that shows a

big hole from about just above 4400 feet to about 4595 feet. This is a very large hole. Then this well was deepened to a T.D. of 6800 feet.

I am going to refer you to Mobil's diagrammatic sketch on this well. I don't have the Exhibit number. Can somebody tell me what that exhibit is?

A VOICE: 13.

A (Continuing) Exhibit No. 13. It is the next to the last page in this group of pictures. This well was drilled to 6800 feet or deepened to 6800 feet and a liner was run to that depth, and the liner was cemented. Then, the top of the liner was cemented with 15 sacks. I am concerned about the evidence that there would be a cement coverage across the San Andres formation. In view of the differential pressure between the upper zone in the San Andres and the lower San Andres, I am also concerned about the quality of the cement behind the pipe in this well. I think there is a good possibility that channeling could occur in a well such as this since this cement job had to come back up 2000 feet around this liner.

With regard to Well No. 25, it shows on Marathon's Exhibit No. 5 which is another Mobil injection

well. This well was drilled originally to a T.D. of 4750 feet and completed in the San Andres formation in February of 1939. It was an open hole from 4200 feet to T.D. You can see on this Exhibit with notes under the log of the Well No. 25, there is a remedial work note that came out in September of this year that Mobil would plan to set a whip-stock and drill around the junk in the hole in the old T.D. of 4750 feet. I understand that this work has been done. If they set a whip-stock to drill around junk, they have drilled another hole at a slight angle beside this one because that is what a whip-stock is for.

In this case I am quite concerned about their ability to effectively plug back both of these zones to the depth of 5600 feet as they have indicated that they intended to do.

Q Now, turning your attention back to Marathon's Exhibit No. 6, what is your opinion of the effect on the Marathon Lease especially their Well No. 2 will feel from the injection of Mobil's Well No. 14?

A With regard to injection in Well No. 14, so long as Mobil's Well No. 11, immediately to the west of No. 14 and Texaco's Well No. 3 -- I am sorry, No. 11 is

not a producer in the San Andres -- I am assuming that they will have a producer at approximately the location of No. 11 or thereabouts -- and Texaco's Well No. 3 south of Mobil's Well No. 14, we will not suffer damage from injection into Well No. 14, however, we have no control over Mobil's location east -- I am sorry -- west of 14 or Texaco's Well No. 3 in the event of a failure of either of these wells. We could suffer some water encroachment under our Lease from No. 14. This is the substance of our objection to Well No. 14 as an upper San Andres injection well.

Q Did Mobil ever ask Marathon to cooperate in a waterflood expansion project?

A Yes. Mobil wrote us a letter in August of 1969 and invited Marathon to cooperate with them in this program by conversion of Wells 2 and 5 on Marathon's McAllister State Lease, however, No. 5 was not a San Andres well and we assumed that they intended that we convert Well No. 3. Marathon declined for a number of reasons. We had three top allowable wells and one good well on our Lease. Our primary efficiency we could see was very excellent and we were not sure that a waterflood program now would increase the ultimate

recovery of this lease. Another reason is that waterflooding at this time interrupts our plan for depletion of this Lease which was covered in Mr. Zeman's testimony yesterday. In this cooperation, Marathon would have been required to convert two good wells to production -- to injection -- and these would have been No. 2 and No. 3 with a substantial loss of income, substantial expenditures would have been required for the conversion of the two injection wells, installation of water lines, larger pumping equipment and the purchase of water. Another thing, referring to Exhibit No. 6 again, assuming that No. 2 and No. 3 on Marathon's McAllister State Lease were injection wells, the No. 4 well would have been the only center five-spot producer benefiting from approximately an 80-acre five-spot element and part of this element was located in an area of the reservoir that was not as good as that under Marathon's.

Well No. 1 would have been located where it would have had only push from two wells and as we have seen, this situation is not good. Wells of this nature perform very poorly under the waterflood program, so we would have benefited from the waterflood reserve under maybe 120 acres rather than the 160 that we have

under our Lease. We had no way to offer Getty, who is the offset operator to the south, or Texaco to the east an opportunity to cooperate with us since we did not have a water supply to offer them, and in view of the good performance on Getty's Lease and generally wells south of Marathon's Lease, we would not have expected cooperation in that direction.

We feel that at such time when secondary recovery is appropriate in this area where the small tracts are that the operators will join in a study to determine the feasibility of the waterflood program, and that if waterflooding is attractive,that they will unify where we will have the flexibility of operation offered in a large unit area. The oil recovery would certainly be better than under the cooperative situation and the cost will be less. No doubt, it will devise the most efficient and equitable program possible under a unified program.

Q Mr. Paxton, do you have anything further to offer?

A I believe this concludes my coverage of these exhibits except for the fact that we don't enjoy offset injection wells where we have very good primary

performance because we have no control if something goes wrong which is a good possibility in this case considering the condition of Mobil's injection Wells 13 and 25. Ordinarily the wells outside of the waterflood area don't enjoy good response. You have no flexibility regarding allowables and no way of obtaining increased allowables should you realize any help from an injection program. I feel that we should have some safeguard from preventing injection offsetting us in this case.

Q This is why you again reiterate your objection to their proposal as modified to inject into Wells 25 and 13 and 14?

A Yes, sir.

MR. LOPEZ: At this time I would like to offer Marathon's Exhibits 6 and 7 into evidence.

MR. PORTER: If there are no objections, Exhibits 5 and 6 will be admitted.

MR. LOPEZ: 6 and 7.

MR. PORTER: Yes, 6 and 7.

(Whereupon, Marathon's Exhibits Nos. 6 and 7 were offered and admitted in evidence.)

MR. LOPEZ: This concludes the testimony of this witness.

MR. PORTER: Mr. Sperling, do you have any questions?

MR. SPERLING: Yes.

CROSS EXAMINATION

BY MR. SPERLING:

Q Mr. Paxton, you expressed general concern, I believe, as to the effect upon Marathon of the injection by Mobil into Wells 13 and 25, but I don't believe you explained the actual basis of that concern in view of the fact in your statement that the Marathon wells were not producing from the upper San Andres?

A Well, I am sorry. I think there is a possibility here that the seal between the upper San Andres and lower San Andres would not be effective because of the mechanical condition of these two wells.

Q Do you mean the mechanical condition of 13 and 25?

A 13 and 25, yes, I think there is a good possibility that water would enter the lower San Andres formation and this is a zone that we, of course, are producing from and this is the reason for my concern about these two wells, as far as the lower San Andres is concerned. There are other reasons for objecting so

far as the upper San Andres is concerned.

Q Well, what would be your suggestion as to how to handle the mechanical completion of those wells to insure against them?

A I don't think we should suggest to Mobil how they complete these two wells for injection. I think we should be protected from injection in the Grayburg-San Andres.

Q Well, let me put it this way: If these wells were your wells, what would you do?

A I have not considered this matter. I think the No. 25, assuming that there are two holes or in practice there are two holes, I think it would be unlikely that a person could remedy this situation with junk in one of them. I don't know the details of the whip-stock job. I don't know where the whip-stock was set. I think the problem would occur below the whip-stock point.

Q Well, your concern, then, following your explaination to means that it is based primarily on possibilities?

A Yes, sir. In fact,in this case, I think a probability due to the differential of pressure between

the two zones.

Q You don't have any pressure information on the upper San Andres, do you?

A No. I think the pressure information that we have on the upper San Andres alone is probably -- there is probably not any -- it has been produced along with the lower zone, so I am assuming that the pressure is probably similar in the two zones; if anything, less than the lower. That is, the upper zone would be less than the lower because of the different elevations of the two. We know that the original pressure was somewhere in the neighborhood of 1600 plus and the pressure has been depleted to a large extent, we also know by years and years of production from these two zones. The wells are mostly pumping, so I don't think there is any question that the pressure is substantially depleted in both the upper and the lower San Andres.

Q Would you expect the pressure differential of Mobil's Well No. 27 which is shown on your Exhibit 6 and the pressure differential in the San Andres producing Well No. 12 of Mobil's as shown on your Exhibit to be less than the pressure underlying Marathon's Lease?

A Well No. 27 and -- where is Well No. 12?

Q Well No. 12 is in the southeast corner of Section 26.

A Oh, I see. Would I expect the differential to be --

Q (Interrupting) Well, would you expect the pressure to be lower in the vicinity of Wells 12 and 27 and thus include a producing well in the vicinity of No. 11 which is in Section 25 to the north of Marathon's Lease; would you expect the pressure to be lower in the vicinity of those producing wells than on Marathon's Lease?

A In the case of Well No. 12, I would expect it to be lower. No. 27 is indicated to be producing from some other horizon. I wouldn't expect it to be different appreciably from Marathon's pressure. The pressure in the vicinity of Well No. 11 would probably also be similar to the pressure under Marathon's Lease because of the injections to the north. It might even be higher than under Marathon's Lease.

Q You did indicated that you expected a producing San Andres well to be drilled in that location or in the vicinity of that location?

A Yes, sir.

Q And the Texaco No. 3 Well also in Section 25 is producing from the San Andres, is it not?

A That's the indication that I have here.

Q Would you expect the pressure to be lower in the area of that upper San Andres producing well than on the Marathon Lease?

A I don't know that that is an upper San Andres producing well. It is more than likely in both zones.

Q Well, the upper San Andres is open?

A Yes, sir. Yes, I would expect it to be lower than Well No. 22 as far as the San Andres is concerned because of production at that point. The drainage should be in that direction.

Q Right. So, in fact, assuming of course the completion of the producing well in the upper San Andres in the vicinity of 11 -- Mobil has indicated 11 Well --

A (Interrupting) All right.

Q And the 14 Well. Now, that is an injection. And the Texaco No. 3 Well, and the Mobil No. 12 Well, you have the Marathon Lease bracketed with areas of lower pressure, don't you?

A I am sorry. There is not a producing well at the location of No. 11.

Q I know, but you stated that you assumed that a producing well would be drilled there, didn't you?

A Yes, sir, but at this time it is not.

Q I am making that same assumption, and if that assumption is correct, then, don't you have the Marathon Lease bracketed by wells which are open in the upper San Andres; whereas, the Marathon wells are not open in the upper San Andres?

A There are wells all the way around the Marathon Lease except to the north side producing from the upper San Andres.

Q And you expect the pressure, as a result of the San Andres being open, to be lower in those areas than on the Marathon Lease?

A Yes, sir.

Q Well, then, how do you reach the conclusion that until such time as the Marathon-Upper San Andres is open that all of the water is going to go over on Marathon?

A I didn't say "all of the water." The injection --

Q (Interrupting) Enough to water them out, then?

A Injection in Well No. 13 and Well No. 25 will create a pressure higher at these two wells. We are talking about a pressure level of 3800 P.S.I. This would

give us some 3000 pounds of differential pressure from these injection wells toward Marathon's Lease. I think we have all agreed that movement of fluid would be from the high pressure to the low pressure points.

Q Do you know whether the Texaco No. 3 Well is a good well?

A I can look up that right quickly, I believe. Texaco's "Q" No. 3 during June of this year averaged 25 barrels of oil per day.

Q Are you aware of any objection from Texaco to the injection of water in this Well No. 13?

A No, I haven't discussed this with Texaco.

Q Mr. Paxton, you made reference, I believe, to Mr. Kelly's testimony and your acceptance of that testimony concerning the bottom hole pressures in the water injection wells in the neighborhood of 3800 P.S.I.?

A Yes, sir.

Q To what point beyond the injection well would you anticipate that pressure would be maintained?

A Well, that pressure profile would decline from the injection well outward in all directions in the case of Wells Nos. 13 and No. 25 when they are initially put

on injection.

Q At what rate would it decline?

A Well, sir, I cannot tell you this. Perhaps if Mobil had some pressure fall-off tests,we could analyze these things.

Q Well, could you give an opinion as to what you think the pressure would be assuming 3800 pounds of bottom hole pressure in Well No. 13 at the lease line between Marathon and Mobil?

A No, it would be between 3800 pounds and whatever the reservoir pressure is under, say, Well No. 4 on Marathon's Lease, and we don't know what that is except that we know that it is substantially depleted from the initial pressure.

Q You wouldn't give an opinion as to whether it might have declined to 1500 pounds or 900 pounds?

A Yes, sir. As I stated, we think the pressure in the San Andres horizon is about 750 P.S.I. under Marathon's Lease.

While we are talking about No. 13, injection into that well, the water advanced from that well in all directions. Their flow to the north will be resisted to some extent when they encounter influence from the

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other two injection wells, No. 105 and 32, and this will tend to restrict the flow to the north. The same thing applies to Well No. 25.

Q Do you expect that resistance to be minimized by the withdrawal of fluids from producing wells to the south?

A To the south?

Q Yes.

A No.

Q And north?

A The producing wells to the north is between the -- I mean the injection well is between the producing well to the north and the low pressure area to the south.

Q What low pressure area to the south?

A Well, under Marathon's Lease and on the end of those tracts adjoining Marathon to the south.

I have said that burrow (sic) of magnitude the pressure is about 750 P.S.I. in this area or less.

Q Do you have any pressures to the south, measured pressures?

A No, sir.

Q That you are aware of?

A No, sir.

Q The Getty Wells 1, 2, 3 and 4 are producing from the San Andres, is that not true?

A Yes, sir.

Q Mr. Paxton, I want to pursue a little bit farther your statement concerning the resistance afforded by injection wells to the north of the Marathon Lease which I believe are Wells 105 and 32. The statement you made, I believe, was that injection into Well 13 would encounter resistance as a result of injection into those two wells to the north?

A Yes, sir.

Q And I believe you said that you would expect that to be counteracted to some extent by the producing wells which are served by those two injection wells. Now, do you have an opinion as to whether or not or to what order of magnitude there would be in the resistance offered by injection into Wells 105 and 32 as compared to the resistance offered by the pressure underlying the Marathon Lease where there is no upper San Andres production?

A Possibly to clarify, injection will be occurring in all of Wells 13, 32 and 105 simultaneously. Water will advance radially from these three injection wells

assuming that there are no directional permeability problems in the reservoir. At some time the water advanced from each of Wells Nos. 32 and 38 will come in contact with that from No. 13. This is called interference between injection wells and this will tend to resist the injection into No. 13 and through the reservoir from Well No. 13. In addition to that, as the water advances through the reservoir the resistance flow increases.

Q I think as a part of my question I asked you to make a comparison, if you could, as between the extent of the resistance which you have stated is likely to occur at some point with water injected into 13 when it meets water injected in 32 and 105. The comparison I wanted you to make was the magnitude between that resistance and the resistance already present by reason of the fact that there is no production on the Marathon Lease in the upper San Andres.

A The point that I hoped to make here was that there was some additional resistance to the north that would tend to cause water to flow toward the south in addition to the pressure differential to the south which is quite substantial; 3800 P.S.I. at the injection well and 700 P.S.I. in the reservoir to the south.

Q Well, do you have an opinion as to whether or not that pressure differential that you are speaking of now would be minimized by the reduction of the injection rate into Well No. 13?

A A reduction in injection rate in Well No. 13 would reduce the pressure at No. 13. It reduce the flow in all directions from that well.

Q Do you have a recommendation as to the injection rate into Well No. 13?

A No, sir. I am objecting to the injection into Well No. 13.

Q At all?

A Yes, sir.

MR. PORTER: I think his recommendation is zero.

BY MR. SPERLING:

Q You've got to agree that a reduced injection rate into that well would minimize the problem.

A I am not sure what we are talking about "reduced injection rate." I understand that the injection rate will probably start out at 1000 barrels per day and be reduced to 500 barrels per day shortly.

Q Well, "injection rate" is a word of art in your business?

A Is a word of what?

Q Art. I mean it does have a definite meaning. It relates to volume of water produced through an injection well?

A Yes, sir.

Q I am asking you if you agree that a reduced rate of injection into Well No. 13 would minimize the problem that you foresee insofar as the effect of injection on that well on the Marathon Lease?

A Yes, it would reduce the water's advance on Marathon's Lease, certainly.

Q Now, just one more short -- I hope -- series of questions with reference to your statement concerning injection into Well No. 14 which is a diagonal offset to your Marathon Lease. I believe you stated that you didn't feel, assuming that there was a producing well in the vicinity of Well No. 11 on the Bridges Lease and with the upper San Andres being open under Texaco Q-3 Well, that there was any great danger to Marathon's Lease from the injection of that well; is that substantially what you said?

A Yes, I will agree with that. I have observed that fluid did not move past the row of producing wells

in any large degree.

Q Well, do you see any difference in degree of objection by Marathon to the injection in Well No. 14 as compared to Well No. 13?

A Yes, sir. I have less objection to No. 14 than I do No. 13 and 25.

Q Why is that?

A Because of those -- we can establish that there will be production at the vicinity of Well No. 11 on Mobil's Bridges State Lease and Well No. 3 on Texaco's "Q" Lease. Perhaps I just didn't understand your question.

Q Well, you do have production from a well in the vicinity of 11 Well which I assume will be served by the 14 Well, you stated. Also, production will be experienced as a result of the injection in the 13, won't it; in other words, you have a pressure differential between the well in the vicinity of 11, between injection in 13 the same as you do in 14, correct?

A I don't follow you. There is not a row of producing wells between No. 13 and 25 and our Well No. 14 -- No. 4, I am sorry -- our Well No. 4.

Q I am talking now about 11, 13 and 14.

A All right.

Q You stated that you had no objection, no substantial objection to injection into 14 in view of the fact that there was going to be a producing well in the vicinity of 11?

A Yes, sir. We have no control over this 11 and 3. That is our objection in this regard.

Q My point is that injection into 13 is going to result in production from 11 too as well as injection into 14, isn't it?

A Yes, I would expect that No. 11 would respond from injection into No. 13, however, production from No. 11 and Marathon's No. 4 only protects to some extent Well No. 2. I have shown -- going back to my Exhibit No. 7 -- there is a group of wells in there of the configuration that we are speaking of here. Let me refer you to Figure No. 11. This has Well No. 31 as a producing well and we can liken that to Marathon's Well No. 2. Of course, you see an injection well in that configuration. Then there are two producing wells in this pattern, and if you will notice the effect on -- well, I will liken these two producing wells to Well No. 11 on Mobil's Bridges State and Texaco's No. 3 on the "Q" Lease, State "Q" Lease, I believe that is, and Well No. 31

to our No. 2. There is not much effect this way with this configuration, and this is what we have between No. 14 and No. 2. Now, there is no such configuration between Well No. 13 and Well No. 4.

Q Isn't it true that your Figure 11 shows that there was about two years before there was any response as a result of injection into that well, and then that the pressure increase was not substantial?

A Well, I don't have any pressure on here.

Q Is there a comparison between production and pressure in a waterflood?

A Comparison between production and pressure?

Q Yes. Pressure pushes the oil, doesn't it, with that pressure generated under water?

A It pushes water and oil.

Q Well, is there a relationship, then, between pressure and production?

A Perhaps you are asking me why in this configuration, Well No. 31 did not respond too appreciably to their injection?

Q Yes.

A And my answer to this is because there is a withdrawal with these other two producing wells on this

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configuration. There is not much fluid that will pass a row of producing wells which are indicated here by wells that are shown and that are not numbered. I believe that is what is to be expected.

Q Doesn't that support Mr. Kelly's conclusion yesterday that there would be very little encroachment upon the Marathon Lease?

A No, sir. I think we have to consider the configuration of the injection and producing wells in this matter. I think the injection into Well No. 13 and Well No. 25 is going to advance in the reservoir very similar to the way it did in --

Q (Interrupting) Would your conclusion be the same if there is a producing well in the vicinity of Well No. 27 which is diagonal offset to Marathon?

A It would be a center five-spot?

Q Yes.

A Yes, that's true. The advance of fluids toward No. 27 would not be appreciably different from the advance of the fluids toward Well No. 4 on Marathon's Lease. The configuration is identical.

Q With No. 4 not being open to the upper San Andres?

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A Well, the pressure in the reservoir is low under Marathon's Lease at Well No. 4, much less than it is at these two injection wells, 13 and 25.

Q Would you expect oil to be pushed in advance of the water as a result of the injection into Wells 13 and 25?

A Yes, oil will be pushed in advance.

Q Into the vicinity of Well No. 4?

A Now, wait a minute. I would like to say that the water advance will be proceeded by an advance in oil and that the advance will be predominately in the more permeable strata, so we are not talking about a sharp front. We are talking about a movement of water and oil in the reservoir.

Q Do you believe that any resaturation of upper San Andres with oil will occur as a result of injection of wells into 13 and 25?

A Resaturation?

Q Yes.

A It will resaturate the type of rock with oil where there is a gas saturation as the water advances.

Q You don't think will occur in the permeable sections, pay sections; you don't think there will be

saturation there too as well as the denser rock?

A The oil will -- from the more permeable rock will move into the tighter rock replacing the gas saturation and will not be displaced until the pressure is increased in the reservoir and the water advances in the lower permeable strata. This is apparently one of the problems in this waterflood. I think that it is pressure sensitive from examining the performance of Mobil's five-spot. The production response improved when they did raise the pressure and injection rate. I believe this is the reason that this happened.

Q Are you saying, then, that the picture changes insofar as the permeability pattern is concerned, changes markedly in this area?

A I don't have any information about the permeability in the different areas of the reservoir. My review of these producing wells does not indicate that there is any marked difference in the permeability from one area to another.

Q Well, then, you are not saying that there is a high permeability streak insofar as the Marathon Lease is concerned?

A Oh, I think in all of these reservoirs there

is permeability variations that can be quite substantial from very tight rock on the order of a tenth of a millidarcy permeability up to even 100 millidarcy of permeability. I don't have any core data in this area, but this is characteristic of carbonate reservoirs that the permeability does vary considerably.

Q But you don't have any specific information with reference to Marathon in that regard; you are just assuming that from --

A (Interrupting) I don't have to assume this, I don't think. It is a characteristic that we don't find exceptions to in our reservoirs in this area.

Q Then I take it you don't agree with the permeability streaks indicated on Mobil's Exhibit as being present in the northern end of the field as distinguished from the southern end?

A I don't challenge the permeability streak in the north end of the field. I don't see evidence from my study that it is or is not father on to the south. As we move south from the pilot area toward Marathon's Leases, I think I have shown that the water break-through was more substantial than it was in the pilot area.

MR. SPERLING: That's all I have.

MR. PORTER: Does anyone else have any questions of Mr. Paxton?

He may be excused.

(Witness dismissed.)

MR. LOPEZ: Mr. Porter, I believe that concludes our case.

MR. PORTER: Mr. Kellahin, I believe you indicated that you have a witness?

MR. KELLAHIN: Yes, sir.

VICTOR T. LYON

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Would you state your name, please?

A Victor T. Lyon.

Q By whom are you employed and in what position, Mr. Lyon?

A I am employed by Continental Oil Company as Conservation Coordinator in the Hobbs Division Office located in Hobbs, New Mexico.

Q Are you a Petroleum Engineer?

A Yes, sir, I am.

Q Have you testified before the Oil Conservation Commission and made your qualifications a matter of record?

A Yes, I have.

Q Mr. Lyon, you have made a study of the area involved in the Application that is presently before this Commission?

A I have made a general study and am generally familiar with our State H-35 Lease in the immediately surrounding area, and I am very generally familiar with the Vacuum Pool.

Q You testified in previous Hearings in this case, did you not?

A Yes, I did.

MR. KELLAHIN: Are the witness' qualifications admitted?

MR. PORTER: Yes.

BY MR. KELLAHIN:

Q Mr. Lyon, referring to what has been marked as Continental's Exhibit No. 1, would you identify that Exhibit?

A Yes, sir. Exhibit No. 1 is a location and ownership plot showing approximately in the center, Continental Oil Company's State H-35 Lease. The Lease

is shown outlined in red and consists of the $NE\frac{1}{4}$ and the $E\frac{1}{2}$ of the $NW\frac{1}{4}$ of Section 35, Township 17 South, Range 34 East. It also shows surrounding Leases and wells and the ownership and the formations on which they are completed by a letter symbol, the legend for which appears in the lower lefthand corner of the Exhibit. Mobil-Bridges Lease or a portion of it is shown outlined in the green color. Continental's State H-35 Lease has seven wells which are producing from the Grayburg-San Andres Pool in the Vacuum Field and it also has wells producing in Glorieta, Wolfcamp and the Abo, and these wells are shown on the plat.

Q Now, referring to what has been marked as Exhibit No. 2, can you identify that Exhibit?

A Exhibit No. 2 is a copy of a portion of the Gamma Ray Resistivity Log on the State H-35 No. A which is a twin well to the State H-35 No. 2. They are both located in unit A of Section 35. We did not have a log of Well No. 2 and consequently we have used the log on Well No. "A". We have superimposed on the log the casing seat and the total depth and the resulting open-hole interval in Well No. 2. As you can see, there is an open-hole interval of over 500 feet. We have also

indicated on the log the top of the San Andres, the base of the Lovington Sand and the top of what we have designated the 9th Massive zone.

Q Now is this particular well open in what we have referred to as the upper San Andres and the lower San Andres?

A It is open in the upper San Andres and it is also open in the lower San Andres and has penetrated to some extent the 9th Massive zone.

Q So this well would be affected by injection in the upper San Andres assuming the water would reach it, is that correct?

A Yes, it would.

Q I refer you to what has been marked as Exhibit No. 3. Would you identify that Exhibit?

A Exhibit No. 3 is a copy of a portion of the Gamma Ray Log on the State H-35 No. 7 which is a twin well to State H-35 No. 3, both of which are located in Unit B of Section 35. Here again we have shown superimposed on the log, the open-hole interval resulting from the depth that the casing is set to the total depth of the well. It also has a very large open-hole interval and is open both in the upper and lower

San Andres.

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

A Mr. Kellahin, let me go back and put in some additional testimony on Exhibits 2 and 3, please?

Q Yes, sir.

A We also show production data on the two wells. I am going back to Exhibit 2 which is the log of State H-35 No. 8 which is a twin well to State H-35 No. 2. The latest test in State H-35 No. 2 which was taken in April was 60 barrels of oil per day and no water with a gas-oil ratio of 1733. It has accumulative production of 469,477 barrels. State H-35 No. 8 is producing 20 barrels of oil and 6 barrels of water from the Glorieta formation.

Now, going back to No. 3 which is the log of No. 7, a twin well toNo. 3. Well No. 3 tested in April, 31 barrels of oil and no water, a gas-oil ratio of 1806 and has accumulative production of 446,000. This is to January 1st, 1970. Twin Well No. 7 is producing down-hole co-mingle from the Abo and Wolfcamp and in July, tested 18 barrels of oil and no water per day.

Q Now, go to Exhibit No. 4.

A Exhibit No. 4 is a copy of the Gamma Ray Sonic Log of State H-35 No. 11 which is a twin well to State H-35 No. 6, both of which are located in Unit C of Section 35. We have superimposed on the log, the open-hole interval in No. 6. No. 6 is producing from the upper San Andres and has barely penetrated the top of what we designate the 9th zone, but has not penetrated the top of the 9th Massive zone. In April, Well No. 6 produced 12 barrels of oil per day and 4 barrels of water with a gas-oil ratio of 1141. It has produced approximately 345,000 barrels of oil, cumulative. The between well, No. 11 was junked and abandoned in 1964.

Q Now, referring to Continental's Exhibit No. 5, would you identify that Exhibit?

A Exhibit No. 5 has two pages to it. Page No. 1 shows a copy of a portion of the Gamma Ray Neutron log on State H-35 No. 4. Page 2 shows the data on this well. There is no twin well to this well, and we do have a log on the well so that we can show the actual log on the well. The open-hole interval is indicated by the placement of the symbol representing the casing shoe at approximately 4153 and the total depth is 4708. As shown, the well has produced from the upper San Andres

and does not appear to have penetrated the 9th Massive zone. This well has been stimulated twice. In 1962 it was frac'd with 20,000 gallons and in 1969 we attempted a blast-frac which is a relatively new stimulation method involving an explosive. Both stimulation attempts were unsuccessful. It was last tested in December of 1969 for zero barrels of oil production, 15 barrels of water per day. The well is temporarily shut in.

Q What is the cumulative production on that well?

A I don't seem to have it on this. Yes, I do. Cumulative production was 377,518 barrels as of January 1st, 1970.

Q Now, referring you to what has been marked as Continental's Exhibit No. 6, would you identify that Exhibit?

A Exhibit No. 6 is a copy of the Gamma Ray Sonic in Well No. 10 which is a twin well to No. 5, both of which are located in Unit G of Section 35. The open-hole interval in No. 5 is shown as we have shown on the other exhibits. It is quite a large open-hole interval. No. 5 penetrated to a little bit into the

9th Massive zone. It is also open in the San Andres, of course. This is a very interesting situation. This is the situation which we described to the Commission, to the Examiner at the last Hearing. The work which we had proposed at that time has been completed. Well No. 10 has been recompleted in the lower Massive. It was previously a Blinebry well which was non-commercial. We plugged the well back and perforated additional sections lower in the 9th Massive zone. The two wells together are now producing top allowable, 70 barrels per day. Well No. 10 tested on August 13, 41 barrels per day. No. t in April tested 27 barrels of oil per day.

Q Now, this recompletion in the deeper zone, is it comparable to the recompletions that were testified to by Marathon's witness?

A Yes, sir. As a matter of fact, Marathon's work helped to stimulate and help us in the planning of this job. At the last Hearing, we said we felt that we had additional reserves in the 9th Massive zone and I believe that this work has positively demonstrated that we do have additional reserves in that zone.

Q You have given testimony about these various zones, Mr. Lyon, the upper San Andres, the lower

San Andres and this 9th Massive zone which you are now referring to. Those are all one common pool, are they not, as defined by this Commission?

A Yes, they are.

Q They are in the Grayburg-San Andres Pool?

A Yes, sir, it includes the Grayburg also.

Q But none of the wells we are dealing with here are completed in the Grayburg, right?

A The Grayburg is open, but I do not believe it is contributing production.

Q Now, referring to what has been marked as Exhibit No. 7, would you identify that Exhibit?

A Exhibit No. 7 is a copy of a portion of the Gamma Ray Sonic log on State H-35 No. 12 which is a twin well to No. 1. Again, we have shown superimposed on the log the open-hole interval in Well No. 1. Both of these wells are located in Unit H of Section 35. No. 1, last tested in April produced 22 barrels of oil, 4 barrels of water per day with a gas-oil ratio of 3217. It has a cumulative production of 454,433 barrels as of January 1st. Well No. 12, last tested in June, 72 barrels of oil per day, 28 barrels of water, producing from the Glorieta formation. This location has

another well, Well No. 9 which tested in July, 41 barrels of oil per day, 61 barrels of water per day from the Abo formation.

Q Mr. Lyon, will you turn to Continental's Exhibit No. 8 and identify that Exhibit, please?

A Exhibit No. 8 is a very simplified cross-section running through our wells and nearby wells. If you look at the right side of the exhibit there is a plat showing the trace of the cross-section. From left to right, the cross-section goes from Phillips' Mable No. 3 eastward through the lower tier of wells on Continental State H-35 Lease over to Texaco State-O No. 1. Then, north to Getty State-BA No. 3,and then west through the northern row of wells on Continental State H-35 Lease,and then northeast to Mobil-Bridges No. 15, then eastward to Mobil-Bridges No. 12 and on eastward to Marathon's McAllister No. 3. We have simply shown on this a simplified cross-section, the completion intervals in the wells.

Q How was this information determined for the purpose of preparing this Exhibit?

A We have prepared this on the basis of logs and scout tickets and information which was available

in our files.

Q Go ahead with your discussion of the Exhibit.

A These wells are arranged on a datum so that the effect of structure is shown. We have connected the tops of the San Andres, the base of the Lovington Sand and the top of the 9th Massive zone through all of the wells. Now, these are the same points which are shown on Exhibits 2, 3, 4, 5, 6 and 7. So that the points shown on those exhibits correlative to the tops of these zones which we have shown on this cross-section.

At the far righthand side of the cross-section itself in the Marathon-McAllister No. 3, you can see the recompletion interval of the well in what we designate the 9th Massive zone. This well has -- it is still, I believe, producing top allowable production. The Mobil-Bridges No. 12 and also No. 15 have both penetrated this zone and it is our understanding, based on what MObil has told us and has told the Commission at this Hearing, that these wells will be plugged back at the lower pay which I presume would be at least up to the base of the Lovington Sand.

Going to the left of the Exhibit again, you

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will note that State H-35 No. 6 has not penetrated the top of the 9th Massive. We believe that this location, this well has excellent recompletion or remedial prospects by deepening it approximately 100 feet to get into the 9th Massive zone.

Going to the left again, State H-35 No. 3 has topped the 9th Massive, but we believe that additional penetration will give us very likely additional reserves in that zone.

State H-35 No. 2 is the well which produces approximately 60 barrels per day and we believe that it has penetrated enough into the 9th Massive to demonstrate why its production has held up so well.

Q Your No. 5 has indicated you have penetrated this 9th Massive zone?

A Yes, sir.

Q Is that correct?

A Yes, sir. Well No. 5 is located the third well from the left. It is the twin well to No. 10 and you can see on the cross-section a comparison of the wells, that the fact that we opened up additional pay lower into the 9th Massive we believe explains why we were able to get additional oil out of the zone to the point that the wells

producing together are producing at top allowable rates. We believe also that State H-35 No. 4 has possibilities by deepening into the 9th Massive.

The well on the lefthand side of the Exhibit, Phillips-Mable No. 3 is producing in the interval between the top of the San Andres and the base of the Lovington Sand which has been referred to in this Hearing as the upper San Andres. It also is producing in the top of the 9th zone, but does not have the 9th Massive open. This well was drilled as a twin to our No. 1 and has recovered considerable additional oil.

Q How long have your wells been producing from the Vacuum Pool?

A Approximately 30 years.

Q Do you anticipate a continued life for these wells?

A Yes, sir. I believe we have several more years of primary producing life. I might point out that the lease certainly is not considered a stripper production, and I don't believe under the Commission's present rules could qualify as a waterflood project even if we were inclined to install a waterflood project at this time.

Q In other words, you are saying it is not at an

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advanced stage of depletion, is that correct?

A That is correct.

Q Have you made any comparisons of this pool with any other pool?

A Yes, sir. There are two factors which have brought about the study which we agreed to put into this. First, the lease was producing at virtually top allowable rates until recently when allowables have increased. Also, we have done a great deal of detailed study in the Maljamar Pool which is to the same trend with the Vacuum Pool and we find the formation characteristics to be very very similar.

Q It is also a Grayburg-San Andres Pool?

A Yes, sir, it is. We, incidentally, have done several recompletions in the 9th Massive in that zone and they have been very very successful.

Q Now, Mr. Lyon, the fact that Mobil has at this Hearing proposed to limit its waterflood to the upper San Andres formation, whereas, at the previous Hearing, they were talking about the entire San Andres, does that change your position in any way in opposition to Mobil's proposal?

A No, sir, it does not. If you will look at our

Exhibit 8, with the exception of Phillips' Mabel No. 3 on the extreme lefthand side and our State H-35 No. 10, and Marathon's McAllister No. 3, all of these wells have large open-hole intervals. We have no way to protect ourselves from water intrusion into the wells.

Q How would that water intrude into those wells; could you be specific?

A If water is injected into wells which would offset our wells, I would expect that within a relatively short time we would be having water intrusion in our wells as a result of --

Q (Interrupting) That would be in the upper San Andres. Would that cause damage to the lower San Andres?

A We feel that it could jeopardize our production. Of course, we would want to have the wells producing, those that we can afford to produce. As long as we keep the wells pumped off, we should not have any damage to the lower formations, but we do think the fact that water is pumped into our wells, we would have to pump the water out.

Q That would increase your cost?

A It sure would. It would also probably cause us

to install larger lift capacity.

Q Now, you heard Mr. Kelly's suggestion that Continental should run liners in these wells and shut off its upper formations to keep out the water they are injecting. Do you have any comments on that?

A Well, yes. We would rather not spend the money. We don't see that -- you know, we would like to cooperate and will cooperate at the appropriate time with Mobil -- but this is not the time. If Mobil doesn't inject offsetting our Lease, we don't need to run those lines.

Q In the use of liners in your experience, is the liner always successful in shutting off an upper zone of this nature?

A Not always.

Q Now, referring to what has been marked as Exhibit No. 9, would you identify that Exhibit?

A Yes, sir. Exhibit No. 9 is a tabulation showing the cumulative oil production to January 1st, 1970 and July production of oil, water and gas on Continental's State H-35 wells and on the direct and diagonal offsets. You can see that in most of the wells on this exhibit, there are substantial cumulative

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production. You will also notice that,with the exception of the Mobil wells and a few others, that the current producing rate is quite high. Particularly, I would like you to notice the Phillips' Hale No. 1, 2 and 3. These wells are directly south of our State H-35 Lease. Those wells are producing at a top allowable. I don't believe that Phillips is in any position to even consider a cooperative waterflood at this time, and if we were to place one or more of our wells on injection, our waterflood pattern would not be backed up, just as Mobil's waterflood pattern is not being backed up at the edge of their lease.

Q In your opinion, would it be possible for Mobil to wait until the period when the south has been further depleted for injecting into the wells they are proposing to use for injection?

A Yes, of course, this is possible.

Q Would it result in any substantial loss to Mobil Oil?

A Well, I can understand that this would cause a deferrment of the waterflood oil from their lease. I don't believe that it would cause any substantial loss of oil.

Q In conclusion, Mr. Lyon, is it Continental's

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position that as of today, it is not practical or feasible for them to cooperate with Mobil as has been requested?

A I am sorry, I didn't --

Q (Interrupting) Is Continental in a position today to cooperate in a lease line agreement?

A No.

Q In your opinion, would the utilization of the offsetting wells for injection as proposed by Mobil cause any damage to Continental?

A Yes, sir, we think so. We think that the injection of water into offset wells would jeopardize the primary reserves which we have under our lease. We think that in addition it would jeopardize secondary recovery prospects which we have on our lease.

Q Do you have any conclusions to state, Mr. Lyon?

A Well, I would like to summarize our position to the effect that we recognize that Mobil has a problem. They are ready to waterflood their lease, and we have been in this position and are in this position in many places. We would like to be able to cooperate with them, but because of the primary producing rates which we have

on our lease, we cannot cooperate with them. We do not desire to interfere with their waterflood project so long as it does not endanger our primary reserves or our secondary reserves prospects. As soon as we can complete the evaluation of our reserves and our situation, we will attempt to work with Mobil to find some mutually satisfactory method of recovering these reserves, but until we have done this, we must renew our objection to their placing wells offsetting our lease or converting wells directly offsetting our lease to injection.

Also, I might point out that we have a small lease, 240 acres, 6 wells or 6 locations. Mobil has quite a large lease. Since it is obvious that Phillips to the south of us is not anywhere near ready to flood, we are not ready to flood, Mobil is ready to flood, there has got to be somewhere a place where the injection wells stop. There has got to be a change in pattern. I might refer to the exhibits up here on the board to try to illustrate what we feel that Mobil is trying to do to us. If you will look at Exhibit No. 4, the red area over there is what you might term the area of inefficiency. This area is not going to be flooded as efficiently as it is where the producing wells are

completely enclosed.

If you look over here on Exhibit No. 6, they have shown the wells that have a three-way push in a different color and then the wells that have a one or two-way push and I am differentiating here to show what Mr. Kelly referred to as a one-way push in that there are two-way pushes in there also. But what Mobil is asking to do is to move this area, the yellow area down toward our lease, and if you will refer to the other Exhibit No. 7, I believe it is, they are moving some of that blue area down against our lease and they are moving the red area onto our lease. We don't believe that this is really proper. We feel that our correlative rights are being jeopardized.

Q In other words, they are just passing their problem on to Continental?

A Yes, sir.

Q Is that the sum of it?

A Yes, sir.

Q Mr. Lyon, you heard the testimony of Mobil this morning or yesterday, I believe it was, to the effect that Phillips Petroleum Company has given them a waiver of objection as to their Bridges Well No. 29 in

Section 26. Does that change Continental's position in any way on that well?

A Yes, it does. We feel that Phillips is more directly concerned in the injection into No. 29 than we are, and since this is a diagonal offset, we feel that the danger or possible danger to our No. 6 is minimal -- I am not saying it isn't there, but we think it is minimal -- and to demonstrate our willingness, our eagerness to cooperate as far as we can, if Phillips would waive their objection to this well, we will also waive it.

Q Is that based on the assumption, Mr. Lyon, that their Well No. 26 and the Phillips Mabel No. 2 will continue to produce and serve some protection to your lease?

A Yes, sir.

Q Were Exhibits 1 through 9 prepared by you or under your supervision?

A Yes, they were.

MR. KELLAHIN: At this time I would like to offer into evidence, Exhibits 1 through 9 inclusive.

MR. PORTER: If there are no objections, the Exhibits will be admitted.

(Whereupon, Continental's Exhibits Nos. 1 through 9, were offered and admitted in evidence.)

MR. PORTER: Let's give the Reporter a 10 minute break and try to get back and conclude this.

(Whereupon, a short recess was held.)

MR. PORTER: Mr. Sperling, do you have any questions?

CROSS EXAMINATION

BY MR. SPERLING:

Q Mr. Lyon, you in the explanation of your Exhibits indicated particularly with reference to the cross-section which as I understand it is correlated to the Exhibits previously referred to by you and that very few of the Continental wells are completed at this time other than by open-hole completion; is that substantially correct?

A Those that are producing from the Grayburg-San Andres, that's true; with the exception of No. 10, they are all open-hole.

Q Now, even recognizing that fact, do you have an opinion as to the extent of the contribution of the so-called upper San Andres to the current production being experienced by your wells?

A I have no way of evaluating how much of the production is coming from the upper San Andres as compared to the lower in those wells which are open in both.

Q Could you base any sort of opinion on the experience that you have had with the work-over, with the recompletion in the lower San Andres with substantially increased production; does that lead you to any kind of conclusion as to whether the upper San Andres or the lower San Andres is making the greatest contribution?

A Well, the only conclusion that I draw from that work is that there are additional zones in the 9th Massive which we have potentially productive.

Q Well, then, I take it you have no opinion either way as to the state of depletion of the upper San Andres?

A I have not investigated that particular thing so I have no opinion.

Q You indicated that you were quite optimistic as a result of the success that you enjoyed in the one work-over that you have completed as to the productivity of the lower San Andres and that only recently has that completion been made?

A Yes, sir.

Q Is there any particular reason why you delayed completion by this method as to the other wells?

A Well, this work was done in July, and I think that it is a very businesslike procedure to evaluate after you have done work. Also, as you probably know, in large Corporations, it sometimes takes a little time to get approval to do this work.

Q You stated that your observation of the success of Marathon in completing their wells included, as I understand it, the running of liners, and did influence you in going ahead with the remedial work that you have taken, is that right?

A Yes, sir.

Q Do you know when that remedial work commenced by Marathon?

A Not for certain. I haven't looked at those particular scout tickets. Some of the recompletions have been in the last two or three years, as I understand it.

Q Well, there were some earlier than that, were there not?

A I think this is true, but I have not looked

at the dates of recompletion on them. I am sure that the Commission has records of those things that we can check.

Q Well, at least their success dates back over a period of two or three years, whereas, yours dates only from July?

A That's true.

Q So with that being the case, it does take quite a while to sell management?

A Yes, and I think that when you start a remedial program, in order to do it most effectively, you need to evaluate each job because each job isn't exactly identical to the one before it.

Q Now, you stated that in your opinion, Continental would suffer damage as a result of Mobil's proceeding in the fashion which they are requesting of the Commission. I don't believe you were very specific as to what that damage would consist of or how you appraised it and its magnitude. Could you do that for us?

A I can give you a general idea of the areas that I am concerned about. I cannot give you an appraisal of the exact damage because this is speculative and I haven't made this type of a study. The damage that I have

in mind is the fact that we feel certain that water will be pushed to our open-hole completions; that we will have to lift this water together with the oil that we are producing from those wells. We also feel that the fluid saturation will be disturbed to the extent that when we are ready to waterflood on our lease, our flood will be less efficient than if you had not injected directly offsetting our lease.

Q Well, would you recognize that in the course of pushing water toward your lease that it might also push some oil?

A We would certainly hope this would be the case.

Q Well, would you think the oil pushed to you would be greater if the last row of injection wells were foregone or if the last injection wells proposed by Mobil were drilled?

A Would you state that again, please?

Q Would there be more incremental oil pushed to you by the foregoing of the drilling of the last row of injection wells as proposed by Mobil or by the drilling of the last row of injection wells; in other words, if the last row isn't drilled, are you going to have more oil pushed to you or less oil than if the last row of

wells is drilled?

A Well, in the first place, I think Mobil is proposing to drill one well unless something has been changed that I wasn't aware of. The other wells are in existence, and if the wells directly offsetting our lease which we have objected to are placed on injection, I think that probably there will be more oil pushed to our lease than if Mobil withheld injection into these wells. Does this answer your question?

Q Yes. In other words, drilling of the last row of injection wells would result in pushing more oil to you, is that correct?

A Yes, sir.

Q Is that an element of the damage that you are speaking of?

A No, sir. We are not concerned about your pushing oil to us. We are concerned about your changing the fluid saturations on our lease to the extent that the waterflood conducted on our lease when we are in a position to conduct it, will probably make it less efficient; that and the fact that we would prefer not to have to handle the water that you would be pushing

toward us. If it was to our advantage for you to put those wells on there, that is, if we thought it was to our advantage, we wouldn't be here objecting.

Q Didn't you state earlier that you weren't sure of what the effect was going to be, what the damage was going to be?

A That's right.

Q You mentioned the change in position of the so-called red area as shown on Exhibit 4 of Mobil, in effect transposing it down across the line to Continental's Lease. You are aware of the fact, I am sure, that the well proposed to be drilled by Mobil as an injection well is on the south line of the Bridges Lease?

A Yes, sir.

Q It is closer to Mobil's producing well by several hundred feet than it would be to any producing well of Continental's?

A 200 feet.

Q 200 feet. Would you expect that the producing wells served by closing that pattern as Mobil proposes, would water out prior to the sweep reaching your producing wells to the south by reason of that distance?

A I am not sure I completely understood that.

Would you state that again?

Q Well, the Mobil well to be drilled, proposed to be drilled on the south line of the Bridges State Lease is some 200 feet closer to the Mobil producing well to the north, immediately to the north than it is to the closest producing well which I believe is possibly your No. 6 Well to the south?

A Yes, sir.

Q Would you anticipate that the sweep of the water as a result of injection from that well would reach Mobil's producing well prior to the time it reached you?

A Not necessarily.

Q Why?

A Well, in conducting a waterflood, you inject water into injection wells. It has been testified that bottom-hole pressure in the injection wells will be in the neighborhood of 3800 pounds. You have producing wells alternating with the injection wells and the pressure at the rock face in your producing wells, we hope, approaches zero. You push fluids by virtue of differentials in pressure from your injection wells to your producing wells, and so far as we can tell, not

having any detailed information of the formation outside of the well bore, we assume that it goes in a radial pattern until there is some situation which causes it to deviate from this -- and this is the difference in pressure, permeability and this sort of thing -- which as far as permeability, as I say, we have no way of predicting what it does between wells. But you have -- let's see, I can't see the numbers of those wells -- but your No. 29 and your No. 15 are also injection wells. Those wells will have the bottom-hole pressure of approximately 3800 pounds. Now, around Well No. 26, there will be a pressure trough and we hope that the pressure will be approximately zero at the rock face, but when you get out into the formation, the pressure must necessarily increase, otherwise, you get no fluid movement into the well bore. And the same way, away from the injection well, the pressure decreases, otherwise, you would not be able to pump water into the formation.

Well No. 15 and Well No. 29 are pressure peaks, and at some time after you have injected water, you will encounter interference from 15 and 29 to cause the water to move preferentially to an area of lower pressure which is going to be both toward No. 26 and

to No. 6, our well. The area of low pressure, I would think, would be larger to the south and,consequently, I think there is a good possibility that this could change the injection pattern to the extent that they might have water intrusion at the same time.

Q Well, your answer disregards the influence of the well to be drilled 100 feet north of the lease line, doesn't it?

A No, that's the one I am talking about.

Q Well, you designated Well No. 15 as an injector and Well No. 29.

A Well, it is my understanding that you are proposing to put those wells on injection?

Q True.

A Well, in answer to your question, I can't ignore the effect that those wells have on the pressure distribution caused by the well you propose to drill.

Q You mean 100 feet north of the lease?

A Yes, sir.

Q Well, would you agree with me that the effect of the well on the lease line would tend to increase the oil saturation in the vicinity of the well bore of your No. 6 Well?

A It should, yes, ahead of the water.

Q Is that a desirable condition so far as Continental is concerned?

A Well, it depends on how efficient your flood front is. If we were to have a zone of high permeability -- and I don't know whether there is one there or not -- we could get a small amount of oil and then a large amount of water.

Q Do you have an opinion as to whether the rate of injection at that point would have an effect upon the possibility that you mentioned, either minimizing it or increasing it?

A Certainly, the rate of injection has many effects, not the least of which is the rate which the area surrounding the well becomes saturated with water.

Q Are you saying in effect, then, that the reduced injection rate of the well proposed 100 feet north of the lease line of the Bridges State would minimize the danger to Continental's producing wells?

A It would delay the time that there would be any effect noticed in our No. 6 from the injection into that well if the rate is reduced.

Q Now, you mentioned that with reference to

Well No. 29 and injection into that well that you had no objection to that, is that right?

A My statement was that if Phillips is willing to waive -- and it is my understanding that they have waived objection -- that we will also withdraw our objection and will waive objection on that well.

Q Well, did you have that same feeling at the time of the June 10th Hearing?

A Well, at that time I don't believe you had had a waiver from Phillips.

Q But is your objection or lack of it at this time occasioned by the introduction now of Phillips to a waiver or were you of the same substantial opinion that it wouldn't affect you at the time of the June 10th Hearing?

A At the June 10th Hearing, we felt that our interest would be better protected if 29 were not placed on injection.

Q Did you specifically object to the placing of 29 on injection at the time of the June 10th Hearing?

A I believe that our objection was to any well which was located closer than 1650 feet from our lease line and this included Well No. 29.

Q Well, then, you meant to object by that statement to the drilling of the 29 Well at that time or the use of it as an injection well at that time?

A Yes, we did.

Q As I understand the completion methods of Marathon at the present time, they have run liners to isolate the lower San Andres, and then shutting off the upper San Andres in their completion methods, is that correct?

A Yes, sir, that is true.

Q Have you given consideration to a completion such as that in the proposed recompletion program of Continental?

A At the present time we have no plans to run liners in our wells.

Q Your plan is simply to deepen them into what you call the 9th Massive?

A Yes, sir.

Q And in effect, let them remain open-hole completions simply deepened?

A Yes, sir.

Q So to that extent, your recompletions do differ from Marathon's, at which you have apparently been quite

successful?

A Yes, sir. I am not real familiar with the reason which caused Marathon to run the liners, but the fact that they ran liners I don't believe places any obligation on us to run liners in our wells. If we see a need to run liners, then, we will certainly evaluate this and if it appears to be profitable and desirable, we will run liners.

Q Now, you mentioned the Phillips well to the south, and I believe on one of your tabulations on cumulative production you made reference or showed along with the other wells the Mable No. 3 well. As a matter of fact, it appears on your cross-section, I believe.

A Yes, sir.

Q As the well fartherest to the left on the Section. Have you made any investigation of the decline of the production in that well which appears to be completed in the upper San Andres?

A It has been quite sharp.

Q As a matter of fact, in one year it has declined from approximately 1800 barrels a month to

to 765 barrels a month which is shown on your tabulation of current production?

A Right.

Q Can you reach any conclusion from that as to the state of depletion in the so-called upper San Andres in that well?

A Well, you would expect to be pretty well depleted since it is a twin well to No. 1 which had produced 188,000 barrels. I would suspect that it is fairly well depleted.

Q Does that indicate to you any question with reference to reserves in the upper San Andres insofar as the western third of your lease is concerned?

A Well, as I say, I have not made an investigation as to which part of the San Andres our wells are getting their production. I don't believe I am able at this time to make such an evaluation. It might cause us to look at it a little more closely if we were trying to differentiate between zones.

Q What is the current reported production for your No. 6 well and the No. 4 well in the San Andres?

A No. 4 is shut in.

Q It is open only in the upper San Andres; at

least it didn't penetrate the so-called 9th Massive zone?

A Yes, sir.

Q Does that give you any indication as to the state of depletion of the upper San Andres at that location?

A It appears that the zones that are contributing to production there are pretty well depleted.

Q Is the same true of the No. 6?

A No. 6 produced 224 barrels which is about 7 barrels a day in July.

Q Would you consider it to be in an advanced stage of depletion so far as the upper San Andres is concerned?

A Yes, sir, this is why we would like to deepen it. It is the same pool, I might point out.

Q Getting back to the well on the lease line or approximately on the lease line immediately north of your Well No. 6, in view of your prior testimony as to the effect of injection rates into those wells, do you have an injection rate limit to suggest insofar as that well is concerned?

A We would prefer you didn't inject at all.

Q I realize that. As Mr. Porter said yesterday,

we wasted an hour if you and I were in agreement.

Short of total abstinance, do you have a rate to suggest acceptable to Continental?

A No, not at this time.

MR. SPERLING: I believe that's all.

MR. PORTER: Does anyone else have a question at this time?

REDIRECT EXAMINATION

BY MR. KELLAHIN:

Q Mr. Lyon, in answer to questions by Mr. Sperling, I believe you testified that injection of water in a well 100 feet north of your No. 6 well would increase the oil saturation of that well, is that correct?

A I think most probably it would.

Q You heard Mr. Kelly's testimony to the effect that some 5114 barrels of oil would be pished to Continental's No. 6 as waterflood oil, did you not?

A Yes, sir.

Q And over a 15-year life of the pool?

A Yes, sir.

Q Is that volume of oil sufficient to pay for the additional operating cost that would be occasioned by the influction of water in that well?

A I believe we did a little figuring on that and that figures about a barrel of oil a day, and this is not very economical production.

Q Actually, Mr. Lyon, what you are really concerned about is the deeper zones, is it not?

A Yes, sir.

Q And is it your opinion that the influx of water in No. 6 well would cause a hazard to any future development of those lower zones?

A Well, we feel that it jeopardizes our primary reserves under that well which we believe we have good reason to expect to exist there.

Q Some questions were asked about the position of Continental on the June 10th Hearing in connection with Well No. 29. At that time was Mobil asking for injection only in the upper San Andres formation?

A No, they were not.

Q Would that change your position in connection with Well No. 29?

A Yes, sir. This certainly affected our decision to withdraw our objections on that well.

Q Do you feel that injection of water into Well No. 29 will have no effect whatsoever on your lease?

A I didn't say that.

Q Do you feel that?

A I feel that it will have some effect on our lease, yes.

Q Do you feel it will be minimal?

A Yes, sir.

MR. KELLAHIN: That's all I have.

MR. SPERLING: No further question.

MR. PORTER: If there are no further questions, the witness may be excused.

(Witness dismissed.)

MR. PORTER: If this concludes all of the testimony, we will hear any statements that anyone wishes to make?

MR. MORRIS: Marathon does not believe that it can cooperate with Mobil in the flood that it is proposing in the south end of the Vacuum Field of the San Andres without jeopardizing its primary and secondary reserves which have been shown in this Hearing to be substantial.

Mr. Zeman, you will recall, testified for Marathon that in the upper San Andres zone there were approximately 300,000 barrels of primary oil remaining

to be produced, recoverable reserves, and 400,000 barrels of secondary reserves recoverable. Now, it is obvious here that despite the debate that has gone on between lawyers and witnesses and that sort of thing, that injection by Mobil as proposed is going to adversely affect Marathon's acreage. There is simply no way that Mobil can come along and inject water in quantities and of the pressures that are contemplated without pushing some water over onto Marathon's acreage.

Now, it is certainly true that water injected will move more rapidly toward the area of least pressure. We don't have any quarrel with that as far as it goes, but it is also true that the injected water will move in any direction toward areas of lower pressure. And where you are talking about a 3800 pound injection pressure and the pressure under Marathon's acreage in the upper San Andres of approximately 750 pounds, it is obvious that water is going to move onto Marathon's acreage.

Particularly, I would like to ask the Commission to consider the effect of the injection into a proposed well 13 and 25 and what the effect of that injection would be on Marathon's Well No. 4 where it

is receiving a two-way push in those injection wells by direct offsets, one of the wells being offset to the north and the other offset directly to the west. There is simply no question that that water will move toward and on to Marathon's acreage, and toward and past Marathon's wells. It is just a question of time. Now, that time will be a relatively short time in view of Mr. Paxton's testimony and the study that he has made of the break-through experience in other areas of Mobil's waterflood, particularly in the south area immediately north of Marathon's acreage.

I would like to remind the Commission of the testimony that Marathon's wells 1, 3 and 4, presently are top allowable wells in the lower San Andres and they were made so by work-overs. It is our feeling that Marathon should not be penalized, should not be put in a worse position by having worked over its wells and put them in top allowable shape. Certainly, we are not in any position to participate in a waterflood of the upper San Andres because we cannot protect ourselves by producing the oil that would be swept toward our wells and on by the wells by the proposed injection program.

Now, in addition to jeopardizing Marathon's primary and secondary reserves in the upper San Andres zone, Mr. Paxton also has shown to the Commission that the reserves in the lower zone also are threatened in that the conditions of wells 13 and 25 are not suitable for injection and cannot be made so.

Now, as to proposed injection Well No. 14, we would like very much to cooperate with Mobil, but there are a few "ifs" involved here. We are not in as clear-cut position, unfortunately, as Continental was with respect to the one proposed injection well. We have no assurance from Mobil how its well, its producing Well No. 11 will be operated; nor do we have any assurance nor can we obtain any assurance from Texaco on how its Well No. 3 to the south of the proposed injection Well No. 14 will be operated. Only if these wells are operated and produced at maximum rates will they serve as a buffer and as protection against our Well No. 2.

Lacking the assurances that we need with respect to how the injection into Well No. 14 will affect us, we must also oppose the injection of water into that well.

Finally, we would like to further make specific objections to Well No. 13. It was not within the Notice that was given of this Hearing and we submit that the Commission has no jurisdiction to grant the relief that is being sought with respect to Well No. 13. We also like to observe with respect to that well that there is no present need by Mobil for the authority that they seek to convert Well No. 13 from the Blinbrey Well to an injection well because Mr. Kelly stated that it would not be needed in any event for at least three to five years. We submit that the request for approval of that well in any event is premature.

We respectfully request that the Commission adhere to the Order that was handed down following the Examiner's Hearing in this case and deny the Application of Mobil as respects the injection of water into the three wells that directly offset Marathon's acreage as well as -- I am referring to all three wells; that is, No. 13, No. 14 and No. 25.

MR. PORTER: Mr. Kellahin?

MR. KELLAHIN: If the Commission please, Continental Oil is substantially in agreement with the position that has been stated so ably by Mr. Morris.

I don't think we need to repeat the testimony which he has reviewed. Continental is in a slightly different situation in that we have two direct and one diagonal offset injection wells on our lease, one of which would be located within 100 feet of the lease line.

Now, there has been a lot of talk about the fact that Mobil only proposes to flood the upper San Andres. This is, of course, their privilege if they want to flood a particular zone in a particular pool, but I do not think we should lose sight of the fact that the Grayburg-San Andres Pool in the Vacuum Field is one single pool. It is not incumbent upon Continental or any other operator to run liners to protect themselves against the offset operators as has been suggested by Mobil, at considerable expense, when their wells in full compliance with all of the Rules and Regulations of this Commission have been completed open-hole and all of which are open in the upper San Andres.

Our chief concern, of course, is not so much the volume of oil that remains in the upper San Andres formation. Mr. Kelly testified that the No. 6 well would probably receive 5000 barrels of oil over a period of

15 years and obviously, that is not even economical, assuming there were no extra ordinary costs involved.

If Continental is to be permitted to recomplete its wells in the lower portion of the San Andres, which it has the perfect right to do, it should be able to do so without running the hazard of water encroaching into that well through the activities of Mobil offsetting its lease. For that reason, in order to protect the correlative rights of the operators, we agree with Marathon that the orders of the Commission entered in the case as heard before the Examiner, Orders 3984 and R-3983, should be in all respects affirmed with the exception that insofar as Continental Oil is concerned, we have withdrawn any objection to the Well No. 29.

As indicated by some of the cross examination, perhaps Mobil would like us to restate that objection and if you want us to, we would be happy to do so. If they don't request it, we won't restate it.

MR. SPERLING: I am glad to see that the copy of the waiver which I presented to Mr. Kellahin yesterday and recommended to him highly received some acceptance.

The arguments of counsel for Marathon and Continental seem to proceed on the theory that only the correlative rights of those two companies are involved in this matter. I would like to remind the Commission that there are correlative rights upon both sides of these lines including those lease lines which encompass the Bridges State Lease.

It is unfortunate that the fields aren't all developed at the same time and at the same rate by the same operator and the oil isn't found and produced simultaneously so these problems that are presented from time to time to the Commission don't present such dilemmas. That, unfortunately, is not the way it operates and that's the reason, of course, that we have the Commission to help us solve these problems.

I think the testimony of Mobil has amply demonstrated that the waterflood reserves which they have on the Bridges State Lease must be produced in the interest of conservation. The testimony has also shown -- and I don't recall any testimony of substance to the contrary -- that a considerable amount of otherwise recoverable oil under the Bridges State Lease will be lost irretrievably by the failure to conduct

waterfloods as proposed by Mobil.

The amount of oil already recovered has been substantial and the amount of oil to be recovered, that is potentially recoverable even under Mobil's proposed plan is quite substantial. I recognize that both Marathon and Continental have problems insofar as the development of their respective leases are concerned. By the same token, so does Mobil.

The question really becomes one of whose ox is gored the least in this kind of a situation. We believe that we have shown that what they stand to gain, that is, Marathon and Continental, or if you want to put it another way, what they stand to lose, is minimal compared to what Mobil stands to lose insofar as the operation of its property is concerned with the deferral of the granting of the authority sought in this Hearing, for a period of time ranging up to the highest estimate, I believe, 17 to 18 years. This seems to me unconscionable unless there has been definite testimony satisfying the Commission that there will be substantial damage to the offset operators under the plan proposed by Mobil to deny the obvious benefits accruing to all parties concerned and including the

State of New Mexico as a royalty owner from the operation of the flood proposed by Mobil.

Now, if it does seem to the Commission that there is -- I don't believe it has been shown that there is -- but if there is a substantial as distinguished from minimal hazard to either of these operators, it seems to me conceivable that safeguards could be written by the Commission into an Order which would provide the protection that might be indicated to the extent indicated.

I certainly am not going to tell the Commission how to write its Orders. It has been at it a long time and it does a good job, but I am sure that the Commission has encountered situations which require safeguards in the past if it seems imminently clear that they are indicated and this certainly could be done in this case.

On the other hand, I don't believe that the possibility which has been suggested on behalf of the offset operators in this case outweigh the real benefits to be obtained from the orderly operation and development of this flood proposed to be in operation for some time by Mobil.

MR. PORTER: Does anyone else have any comments or any statements to make in this case?

The Commission will take the case under advisement.

The Hearing is adjourned.

(Whereupon, the Hearing was adjourned at approximately 11:55 A.M.)

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STATE OF NEW MEXICO)
) SS.
COUNTY OF SANTA FE)

I, RICHARD L. NYE, Court Reporter, do hereby certify that the foregoing portion and attached Transcript of Hearing, page through page inclusive, before the New Mexico Oil Conservation Commission was reported by me, and the same is a true and correct record of the said proceedings, to the best of my knowledge, skill and ability.

RICHARD L. NYE, Court Reporter

My commission expires April 8, 1971.

I N D E X

E X H I B I T S