

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
April 5, 1961

EXAMINER HEARING

IN THE MATTER OF:)

Application of General American Oil)
Company of Texas for permission to)
institute a waterflood project in the)
Loco Hills Pool and for special allowables) Case 2238
in connection therewith. Applicant, in)
the above-styled cause, seeks permission)
to institute a waterflood project in the)
Loco Hills Pool by the injection of water)
into the Grayburg formation through 7 wells)
in Sections 31 and 36, Township 17 South,)
Ranges 29 and 30 East, Eddy County, New)
Mexico, and for the assignment of special)
allowables to said project.)

Application of Ambassador Oil Corporation for)
permission to institute a waterflood project)
in the Loco Hills Pool and for special allow-)
ables in connection therewith. Applicant, in) Case 2239
the above-styled cause, seeks permission to)
institute a waterflood project in the Loco)
Hills Pool by the injection of water into the)
Grayburg formation through 5 wells in Section)
31, Township 17 South, Range 30 East, Eddy)
County, New Mexico, and for the assignment of)
special allowables to said project.)

Application of Fair Oil Company for permission)
to institute a waterflood project in the Loco)
Hills Pool and for special allowables in con-)
nection therewith. Applicant, in the above-) Case 2240
styled cause, seeks permission to institute a) Consolidated
waterflood project in the Loco Hills Pool con-)
sisting of acreage in Section 36, Township 17)
South, Range 29 East, Eddy County, New Mexico,)
and for the assignment of special allowables)
to said project. -----)

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BEFORE: Daniel S. Nutter, Examiner.

TRANSCRIPT OF HEARING

MR. MORRIS: Case 2238. Application of General American Oil Company of Texas for permission to institute a waterflood project in the Loco Hills Pool and for special allowables in connection therewith.

MR. CAMPBELL: Mr. Examiner, I am Jack M. Campbell, Campbell and Russell, Roswell, New Mexico, appearing on behalf of the Applicant. At this time I would like to move that Cases Number 2238, 2239 and 2240 be consolidated for the purpose of hearing only, so that testimony and evidence that we desire to offer may be incorporated in each of the three cases.

MR. NUTTER: All right. Will you first call case 2239?

MR. MORRIS: Case 2239. Application of Ambassador Oil Corporation for permission to institute a waterflood project in the Loco Hills Pool and for special allowables in connection therewith.

MR. NUTTER: Then we'll call Case 2240.

MR. MORRIS: Case 2240. Application of Fair Oil Company for permission to institute a waterflood project in the Loco Hills Pool and for special allowables in connection therewith.

MR. NUTTER: Is there objection to the consolidation of Cases 2238, 2239 and 2240 for the purpose of taking testimony? The cases will be consolidated, Mr. Campbell.

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MR. CAMPBELL: I have three witnesses to be sworn.

Will you gentlemen stand, please?

(Witnesses sworn.)

KENT NICHOLSON

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

DIRECT EXAMINATION

BY MR. CAMPBELL:

Q Will you state your name, please?

A Kent Nicholson.

Q Where do you live? A Dallas, Texas.

Q By whom are you employed and in what capacity?

A General American Oil Company of Texas, as a secondary recovery engineer.

Q Will you advise the Examiner as to your educational and professional background?

A I have a B. S. Degree in geological engineering from the University of Oklahoma. I have had five years' experience as an exploration geologist, three and a half years' experience with my present employer as a secondary recovery engineer.

Q Are you acquainted with the applications of General American, Ambassador and Fair Oil Companies in Cases 2238, 2239 and 2240 for waterflood operations in the Loco Hills Pool?

A Yes, sir, I am.



(Whereupon, Applicant's Exhibit No. 1 was marked for identification.)

Q Mr. Nicholson, I have handed you what has been identified as Applicant's Exhibit No. 1 in this case. Will you state what that is, please?

A This is the proposed plan of waterflood operations and a summary of the production data for the leases operated in the subject area by General American Oil Company, Ambassador Oil Corporation and Fair Oil Company. In the proposed plan of waterflood operations we have outlined the wells that each of these operators propose to convert to water input wells and new wells to be drilled to use as water input wells to effectively flood the Loco Hills sand under this project area.

Q Referring to the plat that is attached at the back of the plan of operation, and utilizing the proposed plan of operation to the extent that is necessary, will you please advise the Examiner as to what your plans are for the flooding of this area if the applications filed herein are approved?

A Each of these operators, Ambassador, Fair and General American, propose to flood their leases separately as a separate operator, but we will cooperate along common lease lines in the conversion of wells to input for drilling new wells to adequately flood each lease and to protect all rights under each lease.

The wells that we propose to convert input or drill are as

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outlined on the attached plat. We have used color designations for each company. Fair Company lease is outlined in green, which is located in Section 36, Range 29 East, Township 17 South. This is Fair Oil Company State "A" Lease. They have two wells on the lease, which is Wells No. 1 and 3. Both of these wells will remain as producers. They are cooperating in the drilling of two line input wells to the Loco Hills sands to provide input wells for the B lease; these wells being the No. 2 well, which will be located on General American State "B" Lease located in the Southeast Quarter of Section 36. This well will be drilled 25 feet South of the North lease line of General American State "B" Lease and 330 feet from the Northwest corner of General American's State "B" Lease. This well will be drilled as a joint project. ✓ General American will operate it, and that is the reason for locating it on our property.

Over on the West side of Fair's State "A" Lease and at the Northwest corner of General American Beeson "F" Lease, which is located in the Southwest Quarter of Section 31, another line input well will be drilled 25 feet out of the Northwest corner of General American's Beeson "F" Lease. This well will be shared jointly with Ambassador, General American and Fair; being located on General American's land, they will operate the lease. This is the second well that will help effectively flood Fair's Lease.

In the Southwest corner of Fair's State "A" Lease, or



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correction, I should say in the Northwest corner of Newmont Oil Corporation's State "A" Lease which is located also in the Southwest of the Southeast Quarter of Section 36, another well will be drilled 25 feet out of that corner, which will be drilled by Newmont, but also will be shared in the drilling with Fair Oil Company, which will give a third well to help flood Fair's State "A" Lease.

Moving over to General American's Beeson "F" Lease, which is-- all of General American's properties are outlined in the color orange, in the Southwest Quarter of Section 31, General American will convert their present No. 2 Beeson "F" Well to an input well. The No. 4 Beeson "F" Well on the same lease will also be converted to an input well.

Up on the North boundary line of the Southwest Quarter of Section 31 of General American's Beeson "F" Lease, General American will drill a well designated as No. 16 Beeson "F" Well through the Loco Hills sand, to be completed as an input well. General American, on their portion of the Beeson "F" Lease which falls in the Northeast Quarter of Section 31, Wells No. 5 Beeson "F" and Wells No. 11 Beeson "F", which are presently producing wells, will be converted to input wells.

Ambassador Oil Corporations leases on this plat are outlined in the color of purple. They have their Federal "M" Lease, is located in the West Half of the Southeast Quarter of Section 31.



On this Federal "M" Lease, Ambassador will convert their No. 1 Federal "M" Well to an input well. You will notice on the plat on this Federal "M" Lease that a location for an input well has been designated as Federal "M" No. 6 and is also designated on this plat as Option No. 1. Immediately below that there is Option No. 2 and 3. At the time this report was prepared, it was not definite as to which well Ambassador might convert to an input well. Since that time they have definitely decided that they will drill a well located at the designated location of the Federal "M" No. 6 Well through the Loco Hills sand.

MR. NUTTER: So, Option 2 is out, then?

A Yes, they will not, Examiner. The well there that is designated as Option 2 will be used as a producing well. The Option No. 3, which was originally the proposed location possible for an oil well, that well will not be drilled. We feel it is not necessary that they have that well since they have decided to drill their Federal "M" No. 6 Well.

Ambassador's Federal "L" Lease, which is in the Northwest Quarter of Section 31, Ambassador will convert their No. 1 Federal "L" Well to an input well. As shown on the map, there's a location for Federal "L" Well No. 5, the well to be drilled through the Loco Hills sand for an input well. That well is located 25 feet off of Federal "L"'s East lease line. That is a joint well that will be used by Ambassador and General American Oil Company



as an input well. And Ambassador will operate the well with it being located on their property.

I have outlined all of the input wells to be drilled and proposed wells to be converted to input wells for Fair, Ambassador and General American.

Q I notice, Mr. Nicholson, that on the plat attached to Exhibit 1 there's certain of the wells which indicate that they are completed in both the Loco Hills and the Premier sands, is that correct?

A That's correct.

Q Are those the wells that are shown half in red and half in black?

A That is correct.

Q What do you plan to do with regard to the wells that are completed in both of those zones?

A The wells that are completed in the Loco Hills and Premier sands, the Premier sand being the lower sand, these wells will be plugged back above the Premier sand and below the Loco Hills sand by an acceptable means, so that all fluid injection will be confined to the Loco Hills sand.

Q Now, with regard to the drilling of the new input wells and the actual injection of water into this particular area, how do you plan to do that, at one time or in stages?

A We propose to drill the necessary input wells that need

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to be drilled and to convert the present producers to input wells all at one stage.

Q Why is that?

A We feel that it is very necessary that all of these wells be put on input status at the same time because Newmont Oil Corporation has a flood that is presently in operation to the immediate South of this flood area. General American, Fair and Ambassador's Newmonts No. 2 Yates "A" Well is a direct offset to General American's Beeson "F" Lease to the South and is, presently water is being injected into it and has been for some time.

Immediately to the South of that, Newmont has additional input wells, as so designated, and they have been flooding for some time and have had very good response and built up a flood bank that is advancing towards Ambassador's and General American's and Fair's properties. With this flood bank being built up, in fact, I might state that General American's No. 2 and 3 Beeson "F" Wells and Ambassador's No. 1 Federal "M" Well, have received a response from this flood, we we know we have a flood bank built up in that direction. We feel it is necessary that we convert the other wells to the, that lie to the North, and some that run in a North-west direction, to build up a flood bank in opposite directions that will offset the present flood bank.

If this is not done, the oil that is being swept from the South will reach some of the wells, as, for instance, General

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American's Beeson "F" No. 1 and 12 Wells, the oil will reach those wells before any oil is being pushed from the North. Subsequently, after the oil reaches it, a water bank will follow that. If it is not backed up, we will produce our oil from the South, the water will reach those wells, we will not have any push from the North and from the North we'll be trying to push oil against a water bank to the South.

Around the center wells here that are listed as producing wells, you can build up a very high water-oil ratio that could prohibit pushing any of the oil from the North to these wells, thereby resulting in a waste of oil. It is conceivable that under such a pattern, that we were not allowed to put oil wells on injection at one time, that we could waste approximately fifty percent of the oil that could be recovered under that lease, conceivably.

Q With regard to these input wells that are along the lease lines, have verbal agreements been entered into between the parties to these applications, and Newmont Oil Corporation, in connection with the drilling of these wells and the injection of water therein?

A Yes, a verbal agreement has been reached among all parties, including Newmont Oil Corporation, as to what wells will be converted to input wells and what wells will be drilled as input wells.



Q At such time as the Commission acts on these applications, is it the intention of the parties to formalize the lease line agreements?

A That is correct.

Q Will you state to the Examiner what is the present producing status of the oil wells in the Loco Hills sands in the areas that are involved in this application in regard to their stripper stage?

A All the wells are in a stripper stage, averaging around two barrels of oil per day per well. General American's lease will average probably closer to four barrels of oil per day per well, and that is due to the slight response that we've had on the Southern part of our lease.

Q What is the source of water that you intend to use for the flooding of these properties?

A General American intends to use water that was developed in some of their leases to the North here in a Pennsylvanian limestone, and it is a salt water and used in the pilot operation in that area that we have abandoned, and we intend to use that water and bring it down here to flood with. It may be that we won't have adequate water. It may be necessary that we could purchase some additional water from outside sources, and our water companies in the area that water is available for purchase from. Ambassador Oil Corporation plans to purchase their water

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from one of the water companies. Fair Oil Company, not having any input wells located on their properties, will not be furnishing water of their own. Their water will be supplied, the operators that are operating the joint line wells that affect their lease.

Q Do you believe that you have an adequate supply of water from both the salt water that you have available for your lease and the water that you can purchase from water companies to properly flood this area?

A Yes, sir. There should be plenty of water available.

Q Is it correct, Mr. Nicholson, that these properties that you are intending to flood lie at the Northeast boundary or limits of the Loco Hills Pool?

A Yes, sir, that's correct.

(Whereupon, Applicant's Exhibit No. 2 was marked for identification.)

Q I refer you to what has been identified as Applicant's Exhibit No. 2 and ask you to state what that is, please.

A This exhibit is a contour map showing the structure on the top of the Loco Hills sand.

Q What does that reflect with regard to the area that's involved in this application as to its situation in connection with the limits of the pool?

A This particular map shows that the Loco Hills sand is dipping in the main direction to the Southeast, and to the North



the Loco Hills sand either pinches out or becomes ineffective due to a permeability barrier. This particular exhibit mainly shows the structure. I think that our isopach exhibit will show the limits of the sand better.

(Whereupon, Applicant's Exhibit No. 3 was marked for identification.)

Q I now hand you what has been identified as Applicant's Exhibit 3 and ask you to state what that is.

A This is an isopach of the effective gross Loco Hills sand. I would like to explain what is meant by effective gross Loco Hills sand. These wells were all drilled back in the 30's. The only information available on them is from drillers' logs and descriptions of the formations. We have taken these drillers' logs and attempted to arrive at the number of feet of oil pay in each well. You will note to the North there is a zero isopach line drawn, which is meant on this map as the line of the limit of the effective area of oil that could be produced by primary means. It does not mean that that is the zero line of the sand.

Ambassador's Federal "L" Wells No. 3 and 4 are just outside this zero line. They did encounter shows in these wells, but did not produce any oil by primary means. On General American's Beeson "F" Lease in the Northeast Quarter of Section 31, Well No. 10 penetrated the sand and had slight shows but was not an effective oil producer, but it did have sand in it. That is the

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only control we have in that direction. It is possible that this sand does extend in a farther direction and that by pressuring the formation up by the injection of water, that some of the additional area may produce under secondary means, but it did not produce under primary means.

MR. NUTTER: Did that No. 5 dry hole show any sign of oil at all?

A On Fair's Lease?

MR. NUTTER: Yes.

A It had some slight shows and some water was shown in the oil. It was drilled with cable tools and the oil was junked because the cable tools were caught in the hole and they could not bring the tools out. It did show some shows of oil in it.

Q (By Mr. Campbell) It is possible that by secondary means there may be some recovery of oil to the North of what appears to the zero line on your isopach, the zero line being a zero line stated upon the primary recovery of oil, is that correct?

A That is correct.

Q In your opinion, is there a definite either pinchout or permeability barrier lying somewhere to the North of that presently producing well in the Ambassador and General American Lease?

A Yes, I am sure there is zero line of productive oil either by secondary, by primary, it can not be determined with the information at this time as this flood is put in and additional



wells to be drilled, further information may be gained that could be further determined better at a future date.

Q It's noted that you have not unitized this area for the purpose of water flood. Will you state to the Examiner the reasons that you have been unable to unitize and prefer to proceed on the basis of lease line agreements and separate approaches?

A Yes. You will note readily that between General American's Beeson "F" Lease and Ambassador's "M" and "L" Leases that the well density on Ambassador's lease is much denser than on General American's. Due to this more dense well spacing, Ambassador has recovered more oil by primary means per acre foot than General American has, and also the data that was available to compute acre feet was somewhat doubtful, was not definite.

So, about the only factors that were available to consider for unitization was cumulative oil production and acre feet of oil sand. On the acre feet of sand we were not able to reach agreement. We felt the parties could not, because the data was not too reliable; due to the more denser well spacing, Ambassador's cumulative production was greater per acre foot than General American's, so we felt that cumulative production was not a fair basis for unitization, and also due to General American's leases having fewer wells per acre, there is the possibility that more oil remains under that lease to be recovered by secondary means that might be adjacent leases due to the different factors that

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are varied and could not come up with an accurate determination of them to come out with some participation perimeters. All parties felt it was better to proceed along cooperative lease lines than to try to unitize.

Q Do you believe that if you are permitted to flood these properties under your proposed plan that you will as efficiently recover the secondary oil as if you had unitized and operated properties as a unit?

A Yes, I do.

Q What is the present rate of water injection being used in the Newmont flood to the South of these properties?

A Newmont's Well Yates "A" No. 2, which is an input well offsetting General American's BE Beeson "F", for the month of February, approximately 463 barrels of water per day. In previous months to this, water was injected at great rates, and back in approximately July of 1960 it was as great as a thousand barrels of water per day had been injected into the well. Some of the Newmont wells, input wells farther to the South, there are a number of them that have injected at the rates of 800 to 1000 barrels of water per day.

Q What, in your opinion, would be the reservoir effect of varying the rates of injection in the wells on the properties involved in these applications, these rates on the offsetting properties of Newmont?

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A If the rates were varied, I think it would greatly affect the chances of recovering the remaining oil in place that may be recovered by water flooding. I think it would also set up an imbalance of pressures across lease lines which could result in not protecting the correlative rights of each lease.

Q Do you believe that actual waste would occur if you were required to inject water at lower rates than is being injected in the Newmont wells?

A Yes, sir, I do believe waste would be created.

Q Do you believe that this waste factor is emphasized by virtue of the fact that these properties lie on the edge of this particular pool?

A Yes, I do.

Q Why?

A These properties being located on the edge, if we were not allowed to inject our water at equivalent rates to the offset operator to set up a backup, so-to-speak, to force our oil into the wells that we want to produce the oil from, we could push oil on to the North which would reach this zero line of oil sand. We have no way of knowing how effective that zero line is. It's most likely a permeability barrier of some nature, or it could be a pinchout. We're quite certain there's sand there. We did not inject water at equivalent rates to build up a back pressure. We could push oil into this sand to the North that could possibly



not be recovered.

Q At what rates of injection is your plan proposed to inject water into the injection wells if this application is approved?

A We propose to inject water at the rate of one barrel of water per day per acre foot of sand per lease.

Q Do you believe that that will approximate the same rate that is being used in this area by Newmont Oil Company?

A We do not have the exact acre feet of Newmont's flood, but we feel this will be a very equivalent rate to theirs.

Q Does the rate of injection on an equivalent basis call for the corollary of a similar permission for rates of production from the producing wells?

A Yes, it does. If you have got to produce as much total fluid as is injected to have an efficient flood, if you don't, oil will migrate beyond your boundaries.

MR. CAMPBELL: We attached to the applications of General American and Ambassador the logs of the wells which we had available and the casing programs. We did not attach to those applications the production history of these leases, and I would like to have marked and offered in evidence for the record the production history of the wells on the General American Oil Company of Texas leases and the Ambassador Oil Corporation's leases, being exhibits, General American's being Exhibit 4.

A Ambassador's being Exhibit 5.

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MR. NUTTER: Do you have the production also for the Fair wells?

MR. CAMPBELL: I was going to say that the Fair production history is, I believe, attached to the application in the Fair Oil Company case, which is 2240.

MR. MORRIS: We'll have the logs and casing and production records on all three applications?

MR. CAMPBELL: That's correct, after these exhibits are admitted in evidence.

Q (By Mr. Campbell) Mr. Nicholson, do you approve that the approval of these applications is necessary under the circumstances in order to prevent waste and to protect the correlative rights of the owners of properties in the areas involved?

A Yes, sir, I do.

MR. CAMPBELL: I believe that's all the questions I have of this witness. I might state that in the applications here we have simply made a request of the Commission to grant us, under Rule 701, special allowables. We have not undertaken to state the specific basis for the granting of special allowables, but I might say that it appears to me that there are three possibilities within the rule by which allowables can be granted here. The first one would be on that provision of the original order which provided that the limitations on allowables would not be applicable to waterflood projects heretofore authorized by the

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Commission or to legitimate expansions thereof.

To my knowledge, the Commission has not had occasion to define what is meant by legitimate expansions thereof. I think the testimony here certainly reflects that this is an extension and expansion of the Newmont flood. Whether or not that is the meaning of this within the Commission's intention is something, of course, the Commission will have to determine, but it would appear to me that that could be a possibility for approving this application for special allowables.

There are two other provisions, as I'm sure the Examiner is well aware. One of them is with regard to the buffer zone, which, likewise, has not been defined to my knowledge, specifically in orders of the Commission, or in any general order. It is apparent, from the testimony and from the exhibits here, that there is, generally speaking, a line running in a Northeast-Southwest direction of injection wells on the edge of this pool that do not extend much beyond a single line of wells running in that direction, and a line running generally North and South along the East flank of these properties. So, it seems to me that within the definition of a buffer zone there might be some area for exception to Rule 701.

The third one, of course, is the general provision in Rule 701 that nothing in the rule prohibits the Commission from granting special allowables if it is satisfied that the correlative

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rights of the parties would be seriously affected if such allowances were not granted. So, we're not here asking for any change, of course, in Rule 701 at this time, but we do believe that the rule contains ample provisions for special allowable in this type of situation, for the Commission to grant them as it sees fit.

This is all the questions I have of this particular witness at this time. I would like to offer in evidence Applicant's Exhibits 1 through 5.

MR. NUTTER: Applicant's Exhibits 1 through 5 will be entered into evidence. What would be the general line of testimony of your other two witnesses?

MR. CAMPBELL: The other two witnesses are simply to generally confirm the testimony of this witness, since they are separate cases and separate projects, I felt it appropriate to have a witness from each of the other two companies confirm these opinions. There are no new exhibits and no new basic testimony from these particular witnesses.

MR. NUTTER: In other words, Mr. Nicholson has covered the engineering aspects of these three projects?

MR. CAMPBELL: That's right. I may ask some of the witnesses some questions in connection with the cost and ultimate recovery from their particular properties, but other than that there would be no new evidence.

MR. NUTTER: Does anyone have any questions?

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MR. PAYNE: Yes, sir.

CROSS EXAMINATION

BY MR. PAYNE:

Q Mr. Nicholson, you testified that efforts at unitization had been unsuccessful due to coming up with an adequate formula. How about efforts at reaching a joint operating agreement, say where Newmont would operate your properties as well as theirs, and then you'd pay them some fee for doing that?

A This has not been considered because each of these companies have other properties in the area that we operate and we like to operate our own properties when we can.

Q I take it that this was originally a solution gas drive reservoir?

A That's correct.

Q So it's your opinion, then, that when you get up to the impermeable barrier, if there is one, or this slow pinchout, that there might still be dry gas sands there into which some of this oil might migrate?

A I think that possibility exists, yes, sir.

Q You don't think it might hit the barrier and come back around into the unit area or the general area?

A I think that the exact limits of that barrier do not determine at this time just how far North it could go. We don't know, so there could be some area in between, say Ambassador's

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No. 4 Federal "L" Well, and wherever this barrier might be there could be dry sands in an area in there or there might be slight saturations that oil would be pushed up into and they would not push it back into the present well.

Q In other words, because the present wells would be able to produce it fast enough if they were restricted to an allowable set forth in Rule 701?

A If they were restricted, if they were restricted to produce at a rate less than the injection rate to offset properties, I think the oil would be pushed by them, we could not produce the oil out of them.

Q Where would this oil come from that's being pushed by?

A Some of it, if we put the whole plan in as we have asked to do, probably most of the oil that would be pushed into that area would be off of Ambassador's Federal "L" Lease itself. If those wells were not able to produce all the oil that was pushed to them, but it would be pushed on past them. If we were not allowed to put the flood plan in as is now, the wells that are along the Northern line of Ambassador's Beeson "F" Lease in the Southwest Quarter, there would be oil pushed from that lease on past those wells into that area.

Q What is the general producing capacity at the present time of the wells in this area of the Newmont flood? Have these all responded, the wells up here just offsetting the Fair and



Ambassador's properties?

A The only wells that I know have responded are Beeson "F" No. 2 and 3 Wells and Ambassador's Federal "M" No. 1 Well.

Q What are those making?

A Approximately thirty-five barrels per day.

Q Do you look for a fairly rapid increase from now forward?

A I don't think that those wells will increase too much greater than they are with just the present injection from Newmont's flood because the injection rate in Newmont's Yates "A" No. 2 Well has been decreased over what it was in present months, so for the last month or so the production in these wells has been about constant due to the cutback in rates in their well.

When our flood is put in, all these wells were permitted to put them in, we will have a considerable increase in production.

Q Was this cutback to keep from pushing oil on your properties from theirs?

A It seemed very reasonable that it was.

Q If they maintained this cutback producing rate and you injected at the same rate, what's the result there?

A Well, if we inject at the same rate that they are at their present cutback, we would be very close to the rate we requested, of one barrel per day per acre foot of sand, which would permit us to operate the flood efficiently, and in a balanced manner, to recover the greatest amount of oil under water flood.

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Q If they do inject at that rate, you feel that the total production from your area would exceed that that would be permitted under Rule 701?

A Yes, I believe it would be.

Q I believe you testified you are only going to flood the Loco Hills sand instead of both that and the Premier, is that right?

A That's correct.

Q You said you were going to plug back to the Loco Hills?

A Well, to the zone in the base of the Loco Hills sands and the top of the Premier sand; the Loco Hills and Premier are separated by an approximate of 255 interval feet. Each operator will plug his wells back by some means of retainers or packers.

Q That's what I was getting at, you are going to continue to produce the Premier zone at the same time that the waterflood is going on in the Loco Hills?

A You mean in the present producing wells?

Q Yes.

A No, I believe that it's the plan of the operators to also plug back their producing wells between the Loco Hills sand and Premier sands, **because** your production from the Premier sand is at a very stripper stage of one to two barrels a day and it isn't economical.

Q These line agreements that the three parties have with



Newmont, do those line agreements only go to location of injection wells or do they also go to rates of injection?

A They go to the location of wells and we also intend to include a clause for the rates of injection, and that was our reason that we didn't finalize them before the hearing, because we wanted to insert a rate in there that the Commission would permit, and we have been in a number of floods of this type in various areas on a cooperative basis and we like to tie down injection rates because that's the only thing that insures us protection along our leases' line. Verbally, all of the wells, as shown here, including Newmont's input wells that offset ours, have been verbally agreed on by all parties, and everyone is agreed that those wells will be converted to input wells.

Q Now, speaking for General American, have you made any estimates as to the additional oil that you will recover from your property from this water flood?

A We estimate that our water flood recoveries will be equal to our cumulative primary recoveries. We say cumulative primary recovery because we are in a stripper stage and it's practically the same as ultimate primary recovery.

MR. PAYNE: Thank you.

BY MR. NUTTER:

Q Mr. Nicholson, how much is the primary recovery on this Beeson "F" Lease and on the State "B" Lease that belonged to

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General American?

A The Beeson "F" Lease of General American, as of the end of December, 1960, produced a cumulative production of 628,347 barrels. General American's State "A", 128,437 barrels from the Loco Hills sands only. That does not include Premier production.

Q You said the State "A". I think you meant the State "B".

A The General American State "A".

Q Where is that lease?

A It's located, I believe it is designated on that map as State "B". I'm perhaps in error there in my plan of operation. It would be State "B", which is located in the Southeast, Southeast of Section 36.

Q That lease has produced 128,437 barrels?

A Yes.

MR. CAMPBELL: Those figures are on page 6 of the plan, if you need to check them.

MR. NUTTER: I see.

MR. CAMPBELL: That is a total of what, from your lease?

A From our two leases, 756,784 barrels.

Q (By Mr. Nutter) Then you would expect, off-hand, for secondary to equal primary?

A That's our estimate, we feel it's very reasonable.

MR. NUTTER: Any other questions of Mr. Nicholson?

BY MR. PAYNE:



Q If you had to use the so-called buffer zone rule and come up with something for these projects, what would be your recommendations?

A I don't feel I can answer that question because I don't know what the buffer zone will be. I could add that I think to effectively flood these leases and to prevent waste and recover the most oil that we can that the entire area here, as outlined by these companies, would have to be considered as a buffer zone if that was the designation that was used.

Q One of the reasons for that would be that you are right at the edge of the pool now, this acreage is?

A That would be one reason.

Q If you were in the middle, presumably, and had a larger block of acreage some time or other, you would get that oil as it was passing you by?

A We would have more chance to move out and get it.

Q Here, once it gets to dry gas sands, you feel it might be lost forever?

A Plus that and plus the fact that we wish to flood our leases separately and each one of us wants to recover all the oil on our lease, and that it doesn't migrate to one of the adjacent leases.

Q Whether you operate one of the projects, you do change injection rates from time to time in various wells, do you not?

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You don't continually inject at the same rate in an injection well from the time you start, do you?

A We endeavor to. That depends on the kind of conditions. We would like to keep it constant. Sometimes you would have different well bore things, the wells won't take it, but we would like to keep it at a constant rate.

MR. PAYNE: Thank you.

BY MR. NUTTER:

Q In other words, your injection rates, Mr. Nicholson, are the same after fillup as prior to fillup?

A Well, if the wells will take it at the permissible pressure. Of course, we don't want to inject at a pressure that would cause fracturing of the formations, and after fillup there could be a slight reduction in the input due to the pressure, we couldn't go over an excessive pressure.

Q Fillup is often accomplished by an increase in pressure?

A Yes.

Q At which time it's reasonable to assume that sometimes injection rates have to be dropped?

A If the producing rates are great, producing rates of total fluid are great enough to equal the input rate, well, that reduction in pressure will be much less greater than if producing rates were restricted.

Q These dry gas sands that I have heard mentioned a few



times, it wasn't your testimony that there were any dry gas sands out there?

A I don't think they were gas sands. I don't know of any gas cap in here. It would possibly be low saturated oil sands or could possibly not have any oil saturation in them.

Q It may be a zone of no permeability or porosity, either one?

A That's correct.

Q There is no indication from any of the wells on the North flank of the pool, is there, that there are any correlations between the location along the zero isopach line and high gas-oil ratios or anything of that nature?

A No, sir, not to my knowledge.

BY MR. PAYNE:

Q If it is an impermeable barrier, where would the oil go when the water pushed it up against this?

A If it's impermeable?

Q Yes.

A When it reached the barrier it would have to stop and spread in a lateral direction along that.

Q Coming back into the same general area that's being waterflooded now?

A I doubt it very much, the area that's to be waterflooded would be mostly back to the South. I think when it hit the barrier most of the oil would go in a lateral direction,

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more or less East and West would be my assumption. I think it's most reasonable what would happen.

Q When you are operating an approach like this in conjunction with three other operators, what would you do, for instance, if the three of you decided that due to the injection rates and the pattern, you were pushing an undue proportion of oil to the Fair Lease, then wouldn't you decide to change your injection rates?

A If we felt that existed we would, but the pattern that we have laid out, and we intend to have a clause in our injection rates that will balance our flood pattern so that this will not occur. We feel that's very necessary in an effective flood, and we so balance our rates that we will not push oil from one lease to the other, and that's considered in locating our input wells.

Q You didn't feel that you needed any input well on the Fair tract?

A The only reason it wasn't put on the Fair tract, they have a small lease with only two wells in it and they felt that they couldn't go to the expense of putting in a plant to, water plant to furnish water for other wells. Therefore, we located the wells just across the lease line so it would be on the property of adjacent leases so the other operator could operate these wells being on his land and furnish water to them, which, in turn, will give them an effective flood. That's the only reason that the

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wells were not located on their lease.

Q Do you feel that this General American Well No. 17, wait, maybe it's 5 --

MR. CAMPBELL: 17.

Q The well that you can't tell whether it's on the General American tract or the Fair tract.

A Is that the Well 17?

Q Yes. Do you feel that will properly back up the two Fair wells in the North?

A Back up their wells to the North?

Q Yes, you are worried about oil being pushed to the North that isn't recovered at that time. Do you feel that this well will prevent that from happening?

A There, partially, I think, after the plan is put into operation, and they see the effect of the flood, I think they might consider that they might place an input well to the North there.

MR. PAYNE: Thank you.

BY MR. NUTTER:

Q Mr. Nicholson, what would you call the pattern for this water flood?

A Well, I don't believe you can give it a technical name. It's the type of a pattern flood we realize it's a kind of an odd ball, but the wells are also located, when they were

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originally drilled, in a very odd ball fashion, and this was the best pattern we could arrive at that we thought could efficiently flood our acreage and protect the lease lines without having to do excessive drilling that would make the project uneconomical.

Q Are the injection wells, which you have depicted with triangles down in the Newmont acreage, already on injection?

A The ones that have a triangle inside a circle are wells that are input wells now.

Q Those are all active input wells?

A Yes, I believe that's correct, to the best of my knowledge.

Q Do you happen to have with you a tabulation of the injection rates into the various Newmont wells in the latest month for which such figures are available?

A No, sir, I do not have one with me.

Q It won't be necessary to submit it. I think probably the Commission records would provide that.

A Yes, I would think so.

Q I thought maybe you had it with you. In some cases, Mr. Nicholson, there will, of necessity, be some migration of oil across lease lines as a result of this flood, will there not?

A The pattern we have proposed?

Q Yes.

A We don't think so. If we keep our flood balanced



in all directions. We feel that we have located our input wells either on the lease line or in a staggered offset fashion along common lease lines among the different operators, that from one well of General American we may be pushing oil say to Ambassador, but in another well they would be pushing equivalent oil back to us, so in that manner we will be pushing oil across lease lines, but we are compensating for it by offset.

Q There will be some migration of oil across lease lines?

A Yes, in that manner.

Q But you anticipate that an equal amount of oil will come back from the other lease to compensate for the migration?

A Yes, sir.

Q You stated that your injection rates are going to be approximately one barrel per acre foot per day per well?

A Yes.

Q In an area --

A Let me correct you, not per well. Injection rates of one barrel per day per acre foot of sand for the lease then depending on how many wells you have, it would break down what the injection per well will be. That is a total.

Q This rate would vary from well to well on account of the acre feet that this injection well will be serving?

A Well, before fillup is reached, before pressure is built up, we probably will have to do some allocation to sand

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thickness after you reach a pressure, then you operate at a constant pressure where the wells that have more sand will take a greater volume than the ones that have a lesser sand.

Q Some of your injection wells may take more than one acre foot per day?

A Well, it's not each well taking a barrel of water per day per acre foot. We are trying to effectively get water in that will be equivalent to one barrel of water per day per acre foot sand for each of the leases. Of course, we'll try to balance the wells as much as possible.

Q But, for instance, the Ambassador Lease, Federal "M" Lease there which is 80 acres, and has two injection wells on it, the injection rates into those two wells may not be the same, is this correct?

A Due to a difference in sand thickness I'm sure there will be some variation in it, yes.

Q Will this variation, due to sand thickness, will the variation in the injection rate provide for an increased or decreased amount of oil, as the case may be, to migrate across the lease line to compensate for oil that's being pushed from another well on another lease which may have a different injection rate due to a different sand thickness?

A That could occur between two wells. I think that when you take all the wells into consideration around each lease that

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that imbalance will balance itself out.

Q What has been the average rate of recovery from the Newmont wells which have experienced a response to the injection of water?

A Are you speaking of cumulative or per day basis?

Q Per day basis.

A I'm not real sure what, they have had wells, I know, that have made in the range of three to five hundred barrels a day and I think they have some that exceed that.

Q Have they sustained that rate of production for very long?

A Yes, some of the wells have sustained it very well. To the best of my knowledge, the results of their total flood, their production is still on the increase. They have not reached their peak yet, I don't believe.

Q Some of these injection wells have just been placed on injection?

A That's correct.

Q Recently?

A That's correct.

Q What has been the response to General American's No. 3 Well to the water injection in Newmont's No. 2 Well?

A It is making approximately 35 barrels of oil per day. I don't recall, I think approximately three months ago it received its first increase and before it reached the increase it



was making two barrels a day.

Q It has gone from two to thirty-five?

A Yes.

Q Is it still increasing?

A No, the last three weeks it's pretty constant.

Q You attributed that, in your direct testimony, to the decrease in injection rates?

A Yes, I think that's the reason.

Q Have they decreased the injection in any of their other wells?

A I don't know too much about their flood. To my knowledge, I don't believe that they have, but I'm not really qualified to answer.

Q Are they injecting water into any other wells that are direct offsets to any other leases that are covered by these applications today?

A No, to my knowledge. Until, it has been recent, but not to my knowledge.

Q No. 2 is the only one?

A That's the only one I know of. There are some not too far off, but not direct offsets.

Q How about up here on their Scheurick Lease, has their water injection program gotten that far yet, that would be in Section 32?



A Not to my knowledge. Well, I don't see any wells here on their Newmont's Tallmadge Lease which falls in the Scheurick Lease. I believe they have a well that's been put on input.

Q That Tallmadge is on input?

A Yes, I believe it is.

BY PAYNE:

Q How deep are those wells, Mr. Nicholson?

A Approximately 2800. The Loco Hills are approximately around 2800 feet.

Q About what does it cost to drill one?

A Oh, to drill one and complete it for an input well it would be approximately \$25,000.

Q More for producing well?

A The equipment on the producing well probably in the neighborhood of \$40,000.

Q Does General American have any present plans to produce any?

A Yes, we have indicated in our plans Beeson "F", there are Wells No. 13, and which is in the Southwest Quarter of Section 1 and Wells No. 14 and 15, which are in the Northeast Quarter of Section 31, we propose to drill those wells as new producing wells. It will be necessary that we do those to recover the oil that is in the area there surrounded by our proposed input wells.



MR. PAYNE: That's all.

BY MR. NUTTER:

Q To your knowledge, Mr. Nicholson, does Newmont propose to drill any wells offsetting the properties under consideration here today with the exception of that No. 2 Well over in Section 36?

A I believe, I think this map is in error. I think on their Brigham Lease just to the East of Ambassador Federal "M" Lease there's a Well No. 5 that shows to be an oil well with a circle around it. I think that's an error in drafting. I think that was just a location. I think they have asked for permission to drill it there, but to my knowledge I don't believe it has been drilled, but I think that is to be drilled as a producing well, which they will need at the time that we are permitted to put this pattern into operation to recover their oil.

Q Do you know if they plan any additional injection wells along the perimeter of their leases offsetting these properties?

A No, sir, I don't. With only one exception, and that is the well located on Newmont State "A" Lease over in Section 36, the wells in the Northwest corner of that lease 25 feet out of the corner that they propose to drill in cooperation with Fair Oil Company.

Q That's the only one that you know of that they propose for drilling or for conversion to injection?

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A No, sir, that's the only one that they propose to drill. They have a number of other wells there that they have verbally agreed to convert to injection, those wells being on Newmont State "A" Lease Well No. 1 and on Newmont Ballard "B" Lease, correction, on Newmont's Yates "A" Lease there, Yates "A" No. 2 Well, which is already an input well, we're considering be used along the lease lines to help balance out, and over on their Brigham Lease their Well No. 1 will be converted to input and on their Brigham Lease their Well No. 3 will be converted to input, and on their Scheurick Lease up in Section 32, their Well No. 1 will be converted to input.

Q Those wells haven't been converted yet?

A They haven't, but Newmont has verbally agreed that they will convert the wells along in cooperation with us, the other operators compensating by the offset wells.

Q By a proposed input well you put the triangle outside?

A Yes.

Q By an active input well you put the triangle inside the circle?

A Yes. That was done, when we submitted our application we were requested to show the producing formations of all wells within a two-mile radius, and we had to go to a color scheme. It was attached to the application and this is the reason this method was used to designate them.



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Q Have you made any computation as to what the allowable would be for this area if it were unitized and if all of the proposed injection wells were put on injection?

A What the allowable is, I am not sure.

Q Under Rule 701, what the permissible allowable is for these three properties, if it were unitized and if all the proposed injection wells were on active injection--

A Yes.

Q -- have you made any computation as to what the permissible allowable would be?

A No, sir, I haven't.

MR. NUTTER: Any further questions of Mr. Nicholson?
He may be excused.

(Witness excused.)

MR. NUTTER: Let's take a fifteen-minute recess before we take this next witness.

(Whereupon, a recess was taken.)

MR. NUTTER: The hearing will come to order, please.
Mr. Campbell, did you have another witness?

MR. CAMPBELL: Yes, Mr. Riley.

E. A. RILEY

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

DIRECT EXAMINATION



BY MR. CAMPBELL:

Q Would you state your name, please?

A E. A. Riley.

Q Where do you live and by whom are you employed?

A I am employed by Ambassador Oil Corporation, located in the Ft. Worth office.

Q What is your position with that company?

A Superintendent of the Secondary Recovery Division.

Q How long have you had that position?

A Five years.

Q Will you give the Examiner a brief resume' of your educational and professional background?

A I received a B.S. in petroleum engineering from Oklahoma University in 1951, served two years with Socony Vacuum Oil Company, serving with Magnolia in the Southwest area of the jointly-owned company in South America, Columbia. Leaving that employment I joined Pure Oil Company as Division Reservoir Engineer in their Ft. Worth office. After serving two years I joined Ambassador Oil Corporation in my present capacity.

Q Are you acquainted with the applications of General American, Ambassador and Fair relative to the development of properties in the Loco Hills Pool?

A I am.

Q Have you been present and heard the testimony of Mr.

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Nicholson in connection with this matter?

A I have.

Q Do you confirm that lease line agreements have been entered into on a verbal basis, locating the proposed water injection wells at the points indicated on the plat attached to Applicant's Exhibit No. 1?

A I do confirm.

Q Are these agreements agreeable and satisfactory with your company?

A Yes.

Q Do you believe that if this project is carried out it will protect the correlative rights of the Ambassador?

A They will.

Q What opinion do you have, if any, with regard to the necessity for rates of injection commensurate with rates of injection being used by Newmont Oil on adjacent properties, both in connection with your waste and correlative rights?

A I think it's highly essential that the flood in the area in question be carried on in such a manner to recover the maximum amount of oil.

Q Do you believe that if this project is approved as requested and as outlined in the Applicant's Exhibit No. 1, that there will be a greater ultimate recovery of oil by virtue of the secondary project than would otherwise be recovered?

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A Yes, I do.

Q Do you concur in the opinion with regard to the possibility of waste of oil inasmuch as this is on the flank or on the edge of this pool, do you have some comments with regard to that situation, particularly with reference to your lease in Section 31?

A I think it's highly probable that there is Loco Hills sand existing in the portion of the Northwest Quarter of Section 31 into which oil could be pushed and become unrecoverable if the wells are not allowed to produce all the fluid as it enters the well bore.

Q Do you believe that it was impractical, and is impractical under the circumstances involved in this particular area, to enter into a reasonable unit agreement for secondary recovery with the information that you now have available?

A Yes. That is the reason we did not unitize.

MR. CAMPBELL: That's all the questions I have of this witness.

MR. NUTTER: Any questions of Mr. Riley? Mr. Morris.

CROSS EXAMINATION

BY MR. MORRIS:

Q I notice up here on your 160 acres in the Northwest Quarter of 31 that there are three wells shown there as Premier wells only. It doesn't show that you have any Loco Hills production beyond them at all.



A That is correct. However, this property, Ambassador acquired it from a prior operator who drilled these wells late in the primary life of the Loco Hills Field. Although there were reported oil shows from the Loco Hills sand at the time, there was production being found in the Premier zone, consequently the wells were completed in the Premier zone.

Q Are they going to be also plugged back?

A Yes.

Q And used in the Loco Hills only?

A That is correct.

MR. MORRIS: That's all I have.

BY MR. NUTTER:

Q You do have one well that's completed in the Loco Hills, don't you, your No. 1 Well?

A That is correct.

Q That's colored in black and red both?

A That is correct.

Q The No. 2 was not capable of producing when it was originally drilled?

A In limited quantities from a driller's log data and the sample logs that we have in our records which were acquired with the property, indicated that it might not be commercial, and because of the more attractive zone in the Premier, it was deepened and completed in the Premier.

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Q Do you anticipate that the No. 2, 3 and 4 will produce on waterflood?

A Yes, I certainly do.

Q As I understood Mr. Nicholson's testimony, your No. 6 Well on the Federal "M" Lease will be an injection well?

A That is correct.

Q The No. 3, the No. 7 Well will not be drilled, and the No. 3 Well will be a producer?

A That is correct.

Q Mr. Riley, you stated that in view of the Newmont flood here, that you expected that there would be waste if these special allowables were not permitted. Would it also be your testimony that if there were no Newmont flood here, that there would be waste if these special allowables were not permitted?

A I don't believe I testified in direct reference to the Newmont flood. However, it can be concluded from my testimony that this is the proper allegation. However, as to your question if the Newmont flood was not in --

Q Yes.

A -- do you mean by that that we would not work out an injection pattern with Newmont?

Q No, sir, I meant if Newmont were not flooding their lease down here at all and you were proposing a flood on the acreage that's outlined in orange, green and purple, would it be

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your contention that you would have to have these injection rates of one barrel per day per acre foot to avert the waste that you refer to?

A I would say this, that there would be waste under any circumstances of rate to the South if it was not backed up in the manner in which you prescribed.

Q There would be waste to the South then?

A Yes, because in that case your imbalance would be created in that direction.

Q So that the waste would just be a matter of direction, waste occurring in a direction in which there's no backup of water injection wells?

A That's correct.

MR. NUTTER: Any further questions of Mr. Riley?

BY MR. PAYNE:

Q Mr. Riley, if the rates in your proposed flood were restricted, Newmont's continuing capacity allowables, Newmont continues their injection rates as they did before, they cut back, do you have any estimate of the amount of oil that would be pushed to the Northwest Quarter of Section 31?

A No definite figures as such, but there would be a considerable amount in my opinion.

Q Would it be enough to justify the drilling of a producing well to recover this oil?



A That could only be determined by subsequent performance of the producing wells, and at such time as the wells should respond in that favorable manner, our plans are to consider drilling an injection well in that sector.

Q I'm talking about drilling a producing well. If this oil were pushed up there, it's at least a possibility, is it not, that it would not be irretrievably lost?

A It would be if it's uneconomical to drill a well to recover it.

Q Yes, but it might be that quantities in large enough amounts to justify the drilling of a well there that you could justify it, and you would get the oil back. I mean it's at least a possibility?

A That is possible, that's correct.

MR. NUTTER: Any further questions? Mr. Riley may be excused.

(Witness excused.)

RICHARD L. RAY

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

DIRECT EXAMINATION

BY MR. CAMPBELL:

Q Will you state your name, please?

A Richard L. Ray.

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Q Where do you live? A Tyler, Texas.

Q By whom are you employed and in what capacity?

A Fair Oil Company, Exploration Manager.

MR. NUTTER: How do you spell your last name?

A R-a-y.

Q (By Mr. Campbell) Will you give the Examiner a brief background of your experience in the oil business?

A I have a degree in economics from Centennary College in 1937, started work in the oil field and worked there four years. During that time I took a course in drilling fluid engineering and started to work for the Arkansas Fuel Oil Company as a junior engineer. I worked for the Arkansas Fuel Oil Company for eleven years, in the engineering, geological and land departments. I have been with Fair Oil Company for nine years in the capacity of Exploration Manager. In this capacity I supervise exploration development and production. We have in process of development right now, or in exploitation, eight waterfloods in Louisiana, Texas, Oklahoma. They are all directly under my supervision.

Q Have you testified before the regulatory agencies of those states?

A I have.

Q Are you acquainted with the applications in these three cases involving the development of secondary recovery in this area in the Loco Hills Pool?

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A I am.

Q You heard the testimony of Mr. Nicholson in connection with the proposed plan of development?

A I did.

Q Is your company acquainted with, and does it concur in the proposed plan with regard to the location of injection wells and lease line agreements?

A We do concur and are willing to pay our part of drilling these line wells.

Q Do you believe that if this application is granted that you will be able to recover oil by secondary recovery that would otherwise not be recovered from your properties?

A I do.

Q Do you have anything to add to the testimony of the prior witness concerning the matter with regard to cooperative rates of injection or rates of production between the Newmont area immediately to the South and the area which you are proposing to flood in these applications?

A I believe they've covered it very thoroughly, and I do agree heartily though that in order to protect lease lines' correlative rights and to recover the oil in this area, that it is very important that this cooperative flood be put into effect.

Q Do you have any further testimony with regard to your ~~properties or to the general application here in connection~~



with the development of these properties?

A No.

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

MR. NUTTER: Any questions of Mr. Ray?

MR. PAYNE: Yes.

CROSS EXAMINATION

BY MR. PAYNE:

Q Mr. Ray, why is it that you didn't include the Southeast Quarter of the Southwest Quarter of Section 36 in your proposed area?

A It is not contiguous in that it only joins at the corner and we are --

Q The same is true of General American and Ambassador, is it not?

A Yes, but we are working on plans for unitization of the West portion of the Loco Hills with the other operators in that area. It would be possible to work in this acreage in the Southwest Quarter of 36 where it was not possible to work that in the Southeast Quarter, the East Half of 36.

Q But you are aware, are you not, that in the meantime even if your application is approved here, that that particular well will just continue to draw a regular allowable?

A You mean the allowable, you mean the well in the Southeast of the Southwest of 36?

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Q Yes, sir.

A That is correct. It is not in danger of being affected immediately, and it is hoped that we can work out unitization plans in time to include it in a unit.

Q Either that or at the moment to bring it into this project.

A It is our, it would be our preference to put it in the unit in case that fell through, then we might be back.

Q Let me ask you this, did you get any shows of oil or any production from the well on the Southwest of the Southwest of 36?

A Yes. That well did produce from the Loco Hills. During that period of salvaging all equipment to raise cash for drilling other places, we plugged that well, pulled what casing we could get out of it, although it was at that time producing, oh, a barrel, barrel and a half a day.

Q You have no present plans, at least, to convert that well to an injection well?

A No. That will be included in the unit which is in the hands of a consulting engineer at this time.

Q Is that unit that's being proposed going to directly offset this particular operation proposed here today?

A The area that we are working on will cover the entire West end of the Loco Hills Field.

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MR. PAYNE: Thank you.

REDIRECT EXAMINATION

BY MR. CAMPBELL:

Q Mr. Ray, that does not directly offset the properties involved here today, does it?

A No.

Q It lies to the Southwest?

A That's right.

Q The Loco Hills' production is all to the Southwest of this area, is it not?

A That's right.

Q And the production to the North is other production?

A The pinchout to the North comes through very close to the Southwest corner of our State "A" Lease which more or less separates the "A" Lease, which we're including with General American and Ambassador from our other acreage to the South and West.

RECROSS EXAMINATION

BY MR. NUTTER:

Q Well, there appears to be a line of dry holes which would separate the two areas in that vicinity?

A Yes.

Q Mr. Ray, do you anticipate that you'll open up your No. 5 and produce that?

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A We feel like that that well would have produced. It was drilled by a drilling contractor back in the days when the contractor would move in and drill a well for you just to keep his rig going and he planned to complete it and then sell it to us; if we don't want it, he would keep it. In process of completion he lost a string of tools in the hole and completely junked it. We did not have a man on the well, the driller's log indicates there might be as much as five feet of Loco Hills sand with slight shows. It was drilled later in the field. We have no way of knowing now whether it was non-productive due to lack of porosity and permeability or whether it was non-productive due to loss of pressure through production of the main part of the field.

Q At the time the well was drilled, was it impossible to fish the tools out?

A Quite a bit of time was spent, I feel sure that the hole is junked. It was plugged and it is our feeling that it will be necessary to drill another well on that lease, either a producing well or an injection well, somewhere a little West of No. 5 Well. I believe it would be cheaper and better to drill a well rather than to try to recomplete that one.

Q It's evidenced that there's a strong possibility that another well will have to be drilled to avert the waste to the Northwest?

A That is correct. We are aware of that and intend to do



what is necessary to avoid waste.

Q You've got three wells actually that are going to be input wells offsetting your property, being Newmont's No. 2, General American's State "B" No. 2 and General American's No. 17. Do you think one well is going to adequately back up those three wells?

A Yes, we do, since they are as nearly as they are on the lease lines, of course, we would have preferred for this General American "B" 2 to be at the Southeast corner of our lease. As you can see from the location of wells, that would have been impossible. This is the best possible arrangement of wells using the existing wells insofar as it's possible, and with the sand thickness that we have there, you can not justify very much drilling. We feel like the one additional well, either an injection well or producing well, will adequately drain the lease.

Q A producing well wouldn't back up these injection wells, would it?

A No. The reason for going to a producing well would be if we had to find that there is a clear pinchout near this point, then we might want to get far enough back from the pinchout to get sufficient permeability to produce at reasonable rates and drill a producing well. The other alternative would be to drill a well if you found you were right on the edge of the sand development, then you would want to make it an injection well.

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Q But at this present time Fair Oil Company has no plans to reactivate No. 5 or they don't have any definite location for the new well except that it will be somewhere West of No. 5 and it may be a producer or it may be an injection?

A That is correct, and drilling No. 17 on General American's Lease and Newmont's 2 will give us the information which will enable us to make an intelligent decision.

MR. NUTTER: Any further questions of Mr. Ray?

BY MR. PAYNE:

Q Mr. Ray, I take it then that your acceptance of General American's isopach map here is somewhat qualified, at least?

A To a certain extent only. His isopach map is correct insofar as it depicts what he says, which is effective sand insofar as primary production is concerned. We are in complete agreement that there is additional sand North of there, that somewhere North of there there is a pinchout. Exactly where that point is and whether it's an abrupt pinchout or whether it is a gradual fingering out of permeability lenses, we don't know. We would be inclined to think that is the case.

Q It doesn't necessarily go through the No. 5 Well?

A No, because that well had some sand in it. As to whether or not it's effective is debatable. General American is right to the extent that it was not effective for them to make



a well out of it, although it could have been because the well was junked. It did have shows more than that, we can't say it didn't produce any primary oil.

MR. PAYNE: Thank you.

MR. NUTTER: Any further questions? He may be excused.

(Witness excused.)

MR. NUTTER: Do you have anything further, Mr. Campbell?

MR. CAMPBELL: No, sir.

MR. NUTTER: Then you have nothing further?

MR. CAMPBELL: No, sir.

MR. nutter: Does anyone have anything further to offer in Cases 2238, 2239 and 2240? We will take the case under advisement and the hearing is adjourned.

(Whereupon, the hearing was adjourned.)

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STATE OF NEW MEXICO)
) ss
 COUNTY OF BERNALILLO)

I, ADA DEARNLEY, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission at Santa Fe, New Mexico, is a true and correct record to the best of my knowledge, skill and ability.

IN WITNESS WHEREOF I have affixed my hand and notarial seal this 13th day of April, 1961.

Ada Dearnley
 Notary Public-Court Reporter

My commission expires:

June 19, 1963.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2238, 2239, & 2240 heard by me on 3/8 4/5, 1961.

Stumm, Examiner
 New Mexico Oil Conservation Commission

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