BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
November 8, 1961

EXAMINER HEARING

IN THE MATTER OF:

Application of Iverson & Welch for an order extending the limits of the Shugart and the North Shugart Pools and abolishing the Culwin & Culwin-Yates Pools, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order abolishing the Culwin and Culwin-Yates Pools both of which are located in Townships 18 and 19 South, Ranges 30 and 31 East, Eddy County, New Mexico. Applicant further seeks an order extending the vertical limits of the Shugart and North Shugart Pools to include the Yates, Seven Rivers, Queen and Grayburg formations and establishing the horizontal limits of said pools as follows:

CASE NO. 2425

NORTH SHUGART POOL:

TOWNSHIP 18 SOUTH, RANGE 31 EAST

Section 8: S/2
Section 9: S/2, NE/4
Section 10: S/2, S/2 NE/4
Section 11: S/2, NE/4
Section 12: All
Section 13: N/2, SE/4
Section 14, 15, 16, 17, and 18: All
Section 22: N/2 N/2
Section 24: N/2 N/2 NE/4

SHUGART POOL: Remaining portion of the North Shugart Pool, as presently defined, plus that acreage contained in the Shugart, Culwin and Culwin-Yates Pools, as presently defined.

BEFORE: Elvis A. Utz, Examiner

TRANSCRIPT OF HEARING

EXAMINER UTZ: We will call Case No. 2425.

MR. WHITFIELD: Application of Iverson & Welch for an order extending the limits of the Shugart and the North Shugart Pools and abolishing the Culwin & Culwin-Yates Pools, Eddy County, New Mexico.

MR. KELLAHIN: Jason Kellahin, Kellahin & Fox, Santa Fe, appearing for the Applicant.

EXAMINER UTZ: Are there any other appearances?

MR. WHITE: Charles White, Gilbert, White & Gilbert, appearing for the Sunray Mid-Continent Oil Company for William R. Loar and myself as resident counsel.

MR. MORRIS: Dick Morris appearing for the Commission staff.

EXAMINER UTZ: Are there other appearances?

You will have one witness, Mr. Kellahin?

MR. KELLAHIN: Yes.

MR. WHITE: We will have one witness.

MR. MORRIS: And I will have one witness.

EXAMINER UTZ: If you have any exhibits to post, we will recess for ten minutes.

(Recess taken.)

EXAMINER UTZ: You may proceed, Mr. Kellahin.

MR. KELLAHIN: If the Examiner please, this case is

called for the purpose of seeking a consolidation of the areas involved in the Shugart and North Shugart Pools, the Culwin and Culwin-Yates Pools.

Under the present set up, the North Shugart Pool's vertical limits include the Queen formation, the Culwin includes the Queen, the Shugart includes the Yates, Seven Rivers, Queen and Grayburg. The Culwin-Yates Pool, the Yates formation. The situation is just one of these which has grown up over a period of years and has finally reached a point where we feel some corrective measures should be taken on the part of the Commission for the reason - - as we will attempt to show - - economics do not justify dual completions in this area; and unless the Pool's vertical limits are realiened, there will be resulting loss of oil in the reservoir in our opinion.

We have one witness I'd like to have sworn, Mr. Ralph Gray.

RALPH GRAY

called as a witness by and on behalf of the Applicant, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Will you state your name, please.

A Ralph L. Gray.

Q What business are you engaged in, Mr. Gray?

A Consulting petroleum engineer.

Q Have you previously testified before the Oil Conservation

Commission and made your qualifications as a petroleum engineer a matter of record?

A Yes, sir.

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

EXAMINER UTZ: Yes, sir.

Q (By Mr. Kellahin) Mr. Gray, in connection with your business as a consulting petroleum engineer, have you been employed by Iverson and Welch in connection with Case No. 2425 before this Commission?

A Yes, I have.

Q Have you made a study of the area involved in the application?

A Yes, sir.

Q Would you state briefly what is proposed in the application of Iverson and Welch?

A We are proposing that the Culwin-Yates and Culwin-Queen and the Shugart Pools be consolidated into one Pool, horizontally speaking, and that the present vertical limits in the Shugart field which include the Yates, Seven Rivers, Queen and Grayburg be extended to include the Culwin-Yates and Culwin-Queen areas also.

Q Now, referring to what has been marked Exhibit 1, would you discuss the information shown on that Exhibit, please?

A Exhibit 1 shows the Shugart, North Shugart, Culwin-Yates,

Culwin-Queen Pools essentially as they are at the present time, although these boundaries do not exactly follow the descriptions as given in the Commission's rules and regulations.

The North Shugart Pool, which is in the green area, was discovered way back in 1937 and up until very recently this area only included the area north of the yellow line as we show it on the map. The Shugart Pool, which is shown within the blue area, was also discovered in 1937 and it had a rather slow development but is an old field along with the North Shugart Pool.

Then, recently, within the last two years, development has progressed in a westerly direction and more or less between the two old areas. The Culwin-Queen Pool, I believe, was designated in 1959 to include the area shown presently within the purple boundaries and then in 1960 the Culwin-Yates Pool was designated as a separate pool and this is shown by the areas producing within the red boundaries.

Q Actually, the Culwin-Yates and the Culwin-Queen Pools overlap horizontally?

A Yes, sir.

Q Although they do not appear in the Exhibit?

A The Culwin-Yates, of course, includes all of the eighty producers within that area.

Q And the Culwin-Queen, the Queen producers?

A Yes.

Q You have prepared an exhibit showing the structure map

on top of the Queen.

A Yes. That is Exhibit 2, a structural map.

Q Would you discuss the information shown on Exhibit 2?

A Exhibit 2 shows the structure with contour lines drawn on top of the Queen formation and as will be noted from this map, there are no real structural features in the area. One structural feature really covers the entire area, and it's just, merely a dipping formation and accumulation of oil within this area which is due to the stratigraphic accumulation rather than to the structural condition.

Q There is no structural reason for separation of the various pools involved here, is that your conclusion?

A Yes, sir.

Q The accumulation is based soley upon the stratigraphic conditions?

A That's right.

Q Have you prepared cross sections - - referring back to your Exhibit No. 1, did you prepare a cross section of the wells in the area?

A Yes. I prepared two cross sections, one north-south and one west-east cross section.

Q Are they shown by the red lines on Exhibit 1?

A The north-south cross section is shown by the red dotted line on Exhibit 1 and it extends from the North Shugart field down in the Shugart field. The west-east cross section is also indicated

on Exhibit 1 by the red dashed lines and it originates in the Culwin-Queen Pool and it goes on through part of the North Shugart and Culwin-Yates Pool and then back over into the Shugart Pool.

Q Referring to what has been marked Exhibit 3, would you discuss the information shown on that Exhibit?

A Exhibit 3 is a cross section through four producing wells showing the gama neutron or gamasonic logs. This starts with the Johnson A-1 in the North Shugart Pool and this shows the top of the Queen formation going from north to south, the top of the Penrose sands which is also a member of the Queen and indicates some points on what we call the top of the Grayburg formation.

I'd like to explain at this time that the top of the Grayburg is a very controversial point and we have no firm argument either way on the thing. We use certain points which we correlate through the area. I know that there are other operators who have a different zone that they call the top of the Grayburg. There are some differences of opinion as to what is the proper top of the Grayburg.

Q Mr. Gray, would that difference of opinion have any material bearing on the question before the Commission in this case?

A No, sir, I don't think so.

Q Would you explain the area designated as the Queen formation?

A Well, we have shown the top of the Grayburg relatively

high. To some operators, some operators would call what we consider Grayburg, they would consider that part of the Queen formation.

Q If there is a difference there could that not result in the opening of the formation in the one pool and not in another? Has the Grayburg opened in the Queen formation or vice versa?

A Of course, it would be a matter of nomenclature as to what zone you would call it.

Q The Commission has never yet defined the vertical limits of the pool to the extent of designating the markers at the top of the Grayburg?

A Not that I know of. We might just carry this a little bit further. Now, on the Federal Johnson A-1 well in the North Shugart Pool, the vertical limits within this Pool include the Red sands which is shown by the red interval on the log and the Grayburg formation which is shown by the purple interval on the log and then as we progress south, also within the limits North Shugart field, Red sands which is the top member of the Queen formation is one of the predominant producing zones and then also some of the wells produced from the Penrose sands and then there are some producers in the Grayburg.

Then, as we progress on southward, you will note six different zones which we have shown in color and in the Shugart field, all of these are included within the vertical limits of the Shugart Pool, which includes the Yates formation, shown by the green color,

the Seven Rivers which we show as a yellow zone, a zone which we call Middle Queen which is below the Red sands and above the Penrose sands and we have indicated that zone by the dark blue color on the cross section. The Penrose sands, which is shown in bright blue, and then the Grayburg producing interval which we show as the purple interval on the cross section.

Q The Shugart Pool has two wells shown on the cross section. Are they in the Shugart Pool?

A Yes.

Q In the Shugart Pool all of those zones are shown open in the well bore?

A That's right.

Q In some instances they are all open in the well bore, is that correct?

A I don't know if there are any instances where all sections of the zones produce in any one well. I doubt it, but these sands are changeable. In some wells you will have one or two or more of these sands producing, while maybe in an offset well you will have a different set of zones producing.

Q Mr. Gray, in your opinion is there vertical communication aside from within the well bore between the zones shown on the Exhibit?

A No, sir, I don't think so.

Q Would you propose to separate the zones which you show to be in the Queen formation?

A They're all separate. If we want to be strict about it, I think all of these sands are probably individual little reservoirs.

Q As a practical matter, would it be practical to produce them as such?

A No, sir, it would not.

Q Turning to what has been marked Exhibit No. 4, would you explain the information shown on that Exhibit?

A Exhibit 4 contains much the same information as we showed on Exhibit 3 except that Exhibit 4 is a west-east cross section which originates in the Culwin Pool and goes through the Culwin-Yates, North Shugart and then back over into the Shugart Pool. There again, we show in color the zones that produce in each of these little individual areas.

In the case of the Hale Federal No. 1, which is in the Culwin-Queen Pool, most of the wells in that area produce from the Red sands which is indicated by the red interval on the log. As we progressed eastward, this would be in part of the Culwin-Yates, North Shugart Pool, we find Red sand producers, the Penrose sands and also the Grayburg formation. Then, of course, progressing over to the eastern limit of this we find the same condition as we had on the cross section in Exhibit 3, where all six zones are producing.

Q The last two on the Exhibit are within the Shugart Pool, is that correct?

A Yes, sir; that's right.

Q What conclusion, then, do you draw from the two cross sections, Mr. Gray?

A Well, I think that we would probably say that geologically speaking this whole area is probably - - can be considered as one geological area. There is no indication of any separate geological areas that I can see. It's more or less a continuous thing although the sands, the characteristics of the sands change but we can't really say that there is a separate geological structure, anything like that, as far as the present pool designation is concerned and we can also see that it is indicated by the existence of these several zones and they produce various areas whose characteristics are very changeable.

So, we have a situation where it would not be practical to try to produce each one of these separate zones as a separate reservoir.

Q In your opinion, is this any more reason for separation of the Yates from the Queen and the Grayburg in the Culwin-Yates Pool than in the Shugart?

A No, sir. I can't see any basis for it. For many years the Yates has been combined with other zones in the Shugart Pool and they have been produced in common tankage. I can't see any justification for setting up a separate Yates Pool in the Culwin-Yates area.

Q Is there any justification for setting up a separate

Queen pool in the Culwin Pool?

A Not that I can see.

Q Is your reasoning the same as you just gave for the Yates?

A Yes. It's a question of economics, largely.

Q If it were to be separated is there any reason for the North Shugart to be not included in the Yates and Seven Rivers formation?

A No. I think that both areas should have the same vertical limits which would be the Yates through the Grayburg.

Q Have you prepared a plat showing the producing wells and the zones in which they are open?

A Yes. Exhibit 5 is a map of the same area as shown on the previous maps and this map shows by various colors the zones that are producing in each separate well. The legend indicates the position which each zone represents and then it's further shown by a particular color for that position around the well.

Now, this map - - I think the main purpose of this map will show that these sands have very very changing characteristics and you may - - well, for instance, in Section 34 in the northeast of the southeast, that particular well is producing from the Red sands in the Seven Rivers. You can go south one location and have an off set well that is producing from the Penrose and the Red sands and then you can go one location to the southwest of that well and it's a Yates producer, so it becomes very clearly evident

in studying this map that these sands are very changeable in their characteristics and they change from location to location, but they may be found over the entire area at some locations.

Q Now, are some of the wells shown on the Exhibit dual completions?

A Yes, they were.

Q Could you mention the ones that were duals, to your knowledge?

A To my knowledge, there is a dual completion in Section 32 of 18-31, in the northeast of the northwest quarter, dually completed in the Yates and Grayburg and in one off set to the east of that well, there is a similar dual completion.

There is a dual completion in the southwest of the northeast of that same section and it's producing from the Yates and Penrose zones. In the same section, in the northwest of the northwest quarter, there is a dual completion producing from the Yates and the Penrose.

EXAMINER UTZ: That is No. 2?

THE WITNESS: No. 2.

EXAMINER UTZ: Would you call them by number, Mr. Gray?

THE WITNESS: All right. The last one mentioned was the Chambers-Kennedy Monterey Stake No. 2.

The well that we have just described to you, the Chambers-Kennedy Monterey Stake No. 2 and 3, and on my map I show a Sunray Mid-Continent dual completion which they call their Y No. 1 well.

Then I believe there is another dual completion over in Section 1 of 19-30, the O'Neil No. 3 well which is producing from the Yates in the Red sands.

Q (By Mr. Kellahin) Have you studied the production from any of these wells?

A Yes, I have.

Q Referring to what has been marked as Exhibit 6, would you discuss the information shown on that Exhibit?

A Exhibit No. 6 shows the monthly oil production for the past several months for the Sunray Mid-Continent Y No. 1 well which is a dual, and the Chambers Kennedy Monterey Stake No. 2 and No. 3 wells.

As you will notice on this table, the production is broken down by zones. In the case of Sunray Mid-Continent well, the production is broken down by the Yates and Penrose zones. I think it's pertinent.

The production from both the Yates and Penrose zones for the month of July, 1961, total production from the well was only 821 barrels which is less than top allowable.

Q That was production from both zones?

A That's correct. In the case of the two wells on the Chambers-Kennedy Monterey State Lease No. 2 and 3 wells as of July we note that the total production during that month for both zones and both wells, which would be four producing zones, total production was 1353 barrels, which, again, for that month, was less

than one full top allowable for each well. That is, assuming that it's broken down evenly.

Q Now, have you made a study of the producing characteristics of the area as a whole?

A Yes, I have.

Q Referring to what has been marked Exhibit No. 7, would you discuss the information shown on that Exhibit?

A Exhibit No. 7 shows various data from all four of these pools. The Shugart Pool as of the 1st of January, 1961, had 51 wells producing. Accumulative oil recovery at that time was 1,831,476 barrels. The average accumulative production per well for the pool since 1937 amounted to 35,911 barrels of oil per well and daily average per well as of January 1, 1960, was down to 19 barrels per well average.

In the case of the North Shugart Pool, the pool has seven producing wells and it had recovered 2,294,808 barrels of oil which gives this pool an average cumulative recovery per well of 34,250 barrels. At that time the average daily production per well was only seven barrels.

The Culwin-Queen and the Culwin-Yates Pools were carried past January 1, 1961, since they were only recently developed and so this same data was carried through August 1961 for these two pools. As of August 1961 there were 16 wells producing with accumulative oil recovery of 60,232 barrels which gives these wells an average cumulative recovery per well of only 3,765 barrels of oil; and at

time, the daily average production per well was only 15 barrels.

In the case of the Culwin-Queen Pool, there are 22 producing wells as of August, 1961. These wells have recovered 213,704 barrels of oil. The average cumulative production per well was 9,714 barrels, with an average daily production per well at that time of only 9 barrels oil per well.

Q Now, is the characteristic of this area that the well production drops off rather rapidly after initial drilling?

A Yes, sir. That's the general rule. I have studied many production curves in this area, various wells and leases and can say that it's a very common characteristic to have rapid decline in production.

Q Which of the four pools involved here would you consider the most economical to develop, the most productive?

A Well, I think that probably the Shugart Pool is a more prolithic pool because they have more of the producing zones present apparently and I think there will be probably substantially more average per well than in any of these other areas.

Q In that pool it's permissable to open all the zones encountered?

A That's right.

Q Now, from an economic point of view is it practical in your opinion to segregate these sands into separate pools?

A No, sir, I don't think it is.

Q Would they pay out the well costs in your opinion?

A I think that the well in any of these areas under discussion, I think that your average condition would show a comparatively slow pay out time; in many cases, a very doubtful pay out. It's been my observation in making these various studies in these areas that even the better wells are not too lucrative. Certainly, there are a lot of leases where it is very questionable that they will ever pay out.

Q Have you made any evaluation studies in this area?

A Yes, sir; several.

Q On the basis of these studies, what did you find?

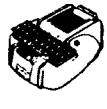
A Well, I found the same thing that - - generally speaking - - that alot of the wells start declining initially from the very first month and they will decline quite rapidly. In the case of the better wells, they will produce top allowable over a period of several months. I think there were cases where perhaps some of the wells made top allowable for a year, but generally, most wells will start declining less than one year. They will decline quite rapidly.

Q Now, do you feel, does your client feel, that dual completions are feasible?

A No.

Q For what reason?

A We know from experience in the field and operating that we have certain operating problems to handle. Probably the major one is the salt deposition problem. We have found by experience



that quite a number of the wells have a salt deposition in the well bore over a period of time and we don't know of any way to combat this problem other than to flush fresh water down the casing and desolve the salt.

As a matter of fact, that's regular practice on several of the wells that I know of.

Q What formation is that encountered in, Mr. Gray?

A Well, I think it's encountered in more than one of these zones, but probably the Red sands is one of the main zones where salt trouble is experienced.

Q Is it feasible to flush out in the manner you have described where you have a dual completion?

A No. I don't know of any way that you could do it where you have packer above the zone in which you are having the deposition trouble.

Q What has your client done in that situation, then?

A Well, in the case of the 40-acre unit which would be the southeast quarter of the southwest quarter, Section 29, on the Shugart A lease, my client has drilled twin wells, the Shugart A-2 well, drilled and completed it to the Grayburg formations; and then subsequently he twinned this well with the Shugart A-8 well and drilled it to the Yates formation and completed this in the Yates.

Q Would you recommend that they continue that practice?

A No. In evaluating the production trends and the cost of the wells, I think it is very evident that this area cannot be

developed in that way because it would not be economical.

Q I take it from your testimony you do not consider dual completions economical, either.

A Well, in this particular area, I don't think dual completions are satisfactory because of the possibility of these mechanical situations developing.

Q In that event, then, is it your recommendation that all of the zones be opened to one pool?

A Yes, I think the Shugart vertical limits that are presently existing in the Shugart Pool should be extended to include the Culwin-Yates area.

Q From the point of view of a petroleum engineer, in your opinion, would that result in the present pool delineations being continued?

A Well, I think it will hamper development. I think that nearly all of these operators in this area have to take a real close look at the economics of these wells. In many cases the pay outs are doubtful and I know of cases where they have hesitated to drill wells, so that I think that if the present vertical pool limits are maintained, that development in this area will be discovered and I think that in many cases less will go undeveloped whereas by including all of these zones within the vertical limits I think that probably they will be developed.

Q Will it have any effect upon pressures in the ultimate recovery to be obtained from the reservoirs?

A Well, yes, I think so. I think there will be cases in which wells are dually completed where these mechanical problems will crop up and there probably will be cases with their having to abandon these zones prematurely.

Q Would that constitute waste?

A Yes, sir.

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

A Well, I would just like to point out that a lot of these wells are drilled with rotary methods and a lot are drilled with cable tools and we know from the cable tool wells that all of these sands are very tight, permeability is very low and in many cases only a few gallons of oil per hour are obtained in some of these zones. I'd say that if you can get a zone that produces as much as 1 barrel of oil per hour natural it's one of the real good wells, one of the best in the area; and so, therefore, it's necessary to fracture these sands very heavily in order to get a well at all.

So, from that type of condition we know that the production from these wells generally speaking is going to fall off very rapidly and that although today you may have a well that will possibly make top allowable from the Yates and also one of these other zones where it's dually completed, I think in a matter of a very few months based on what we know of these other wells, you can expect the total production to decline quite rapidly.

Q In the case of dual completions, Mr. Gray, would you

have any objection to granting full allowable to each zone in which the well has been dually completed until such time as it will no longer make it?

A I rather think that probably that's a Commission problem rather than ours, but I would have to say personally no, I wouldn't object to it because I don't feel that they're going to be able to produce in that manner for very long.

Q On your Exhibit No. 1, what is the yellow line shown on that Exhibit?

A The yellow line is a rather arbitrary division line which we have suggested as a manner in which to divide the North Shugart from the Shugart Pools.

Q You are familiar with the recommendation which has been made by Gulf to include the Shugart Pool, the north half of the north half of Sections 22, 23 and 24, are you not?

A Yes, sir.

Q Would you be in agreement with that change?

A Yes, I think that would be agreeable to conform with their request because that is an arbitrary line and I think it can be changed in order to conform with Gulf's request and still fit into the picture.

Q Were Exhibits 1 through 7 prepared by you or under your supervision?

A Yes, sir.

MR. KELLAHIN: I offer in evidence Exhibits 1 through 7.

EXAMINER UTZ: Without objection, Exhibits 1 through 7 will be entered into the record.

MR. KELLAHIN: That's all the questions I have, Mr. Utz.

EXAMINATION

BY EXAMINER UTZ:

Q Mr. Gray, if you are recommending that both pools be completed in the vertical limit of both pools, that they be the same, why make any division at all?

A Quite frankly, I think you could combine the whole area under one common pool designation. I personnaly would have no objection to that.

Q Do you have any information on pressures in these various zones?

A No, I have very little if any bottom hole pressure information available. I think that we might go ahead and explain probably why. Nearly all of these wells are pumping. In some cases the wells will be completed as flowing wells and some of them will flow for a few months, but there are very few flowing wells in the area. Approximately all are pumping. It's more difficult to get satisfactory bottom hole pressure under those conditions.

EXAMINER UTZ: Are there any other questions of the witness?

EXAMINATION

BY MR. LOAR:

Q Going to your cross section, Mr. Gray, either one, in fact, from that are we to infer that for instance the Yates is continuous and connected across the entire limits that you have shown or do you find separate stringers within the Yates?

A My observation of the log characteristics is that these sands are probably continuous. In other words, I don't think you will find areas in there where the sands are cut out altogether and change into some other material, like shale.

Q Do you find the same Yates stringers in one well that you'll find in the next well?

A As far as sand is concerned, yes, sir. I think you probably would. Now, it may not produce continuously because characteristics change. You have this diminishing permeability and porosity in some areas. In some cases operators haven't made an attempt to complete certain areas because they haven't showed up well in drilling throughout those zones, but I think that probably in tracking all of these areas that you will probably find some kind of a slight show through those sands. I think the sands are present and the sands carry over the entire interval.

Q In other words, if we pick a particular stringer in a particular well you are saying that the same stringer would be several locations away?

A I think in most cases it would, yes, sir.

Q And that would or would not be productive?

A It may or may not be productive because of the permeability

conditions.

Q All right, sir. Would the same type of testimony apply to what we find in the Commission's designated Queen-Grayburg portion of the pool?

A I think that same condition applies all over the whole area. In various zones there we find that these zones are very changeable, all of them, and as pointed out on Exhibit 5 - - I believe it is - - you will note from the color symbols on that map that these zones are present in a very irratic manner, so you have that changeable condition, I think, in all the sands.

Q Now then, within the area, the west-east cross section, do we find a total of 700 feet from the top of the Yates to the base of the Queen-Grayburg formation?

A Yes, sir.

Q And several hundred feet of separation in some cases between producing horizons, right?

A Yes, sir.

Q Does Iverson and Welch have any pool completions within the area?

A No, they do not have.

Q So that - - I am curious. When did Iverson-Welch develop their production within the area of the North Shugart, Queen-Grayburg pools and Culwin-Yates pool? Has it been recently or - -

A Yes. This area that we are talking about is a recently

developed area. I'd say it was since, during 1959 and 1960 that these wells have been developed.

To answer your question more specifically, Iverson and Welch Shugart A-1 well was completed in April 1960 and all their wells in this area have been drilled and developed since that time.

Q Then, that was since the establishment of the two separate pools in the area of Section 32 which established the Yates as one pool and the Queen-Grayburg production as another pool?

A Yes, sir.

Q Where is well eight on your Shugart A lease perforated?

A It is perforated from 2590 to 2610.

EXAMINER UTZ: Where is it located, Mr. Gray?

THE WITNESS: The Shugart A lease is located in the southeast quarter of the southwest quarter, Section 29, 18-31.

Q (By Mr. Loar) Within the limits of the Culwin-Yates pool?

A Yes.

Q Where is the number two twin perforated?

A The Shugart A-2 is perforated from 3616 to 3642 which, according to our designation, is in the Grayburg zone.

Q All right, sir. I believe that you testified that there were one, two, three, four dual completions within the area of Section 32 and the south half of 29, is that right?

A Yes. There are at least that many. There may be more,

but I know there are at least that many.

Q So far as you know, those were all dually completed pursuant to connection order?

A I assume they were.

Q All right, sir. On your Exhibit 6, some of my information doesn't quite carry with yours. Let's see if we can reconcile it. Do you know what well number three on the Chambers-Kennedy Monterey State is producing from the Grayburg formation?

A Well - -

Q For instances, for the month of August?

A According to the information that I have, the Monterey State Chambers-Kennedy State No. 3 well is producing from the Yates and the Grayburg formation.

Q All right, sir. Do you know what the production was from each of the two zones for the month of August?

A Well, you have referred me to Exhibit 6.

Q Yes.

A This Exhibit includes both numbers two and three wells together. That doesn't break them down by wells.

Q Can you go behind that Exhibit and develop that information?

A I can get that information, yes, sir. We are talking about which one, two or three?

Q Number three is the one that I am interested in, Mr. Gray.

A Well, from the Yates formation the August records of the

Oil Commission show that the number two well produced 430 barrels during the month.

Q Was that number two or three?

A Number two and also the same amount of oil from the number three, 430 barrels.

Q For well number three. What about the Grayburg production from well number three?

A The number three well produced 772 barrels.

Q All right, sir. That would make a total of 1202 barrels production from well number three for the month of August?

A Yes. Now, the only thing is this, though, the number two made 303 barrels oil and I don't know if they have a means of segregating the oil production between those two wells or not or whether that's an estimate figure.

Q The total production from these two zones, for wells number two and three is 34 barrels a day allowable, which I understand was the allowable in the month of August, would be 1020 barrels, wouldn't it?

A I think so.

Q That would give you approximately 222 barrels for the month over a single allowable, is that right?

A Yes, sir.

Q In the neighborhood of seven barrels a day for that one well?

A Well, you have lost me now.

Q All right, sir. We have 1202 barrels of production for the month of August for well number three under the present rules?

A Yes.

Q If these zones are combined, as I understand your recommendation, there is a possibility that the Commission would establish a single well allowable.

Using the month of August figures for the comparable basis, the allowable in this area would be 34 barrels a day for a single zone, is that correct?

A I assume that the Commission would - - well, I say I assume - - I should say I do not know what the policy of the Commission will be in regard to these presently dually completed wells.

Q I am trying to develop through you, Mr. Gray, to save a little bit of time the fact that there were several wells in this area which would definitely hurt. Now then if these zones are combined wouldn't Iverson and Welch expect a 34-barrel-a-day allowable from a 40-acre tract?

A Yes, sir.

Q All right, sir. Now then that would give you 1020 - - no, 1054 barrels for a 31-day month, is that right?

A Possibly. It sounds correct.

Q If you subtract the allowable from what the Chambers-Kennedy well number three produced you would come up with approximately 200 barrels a month less allowable.

A At this particular time.

Q All right, sir. That would be in the neighborhood of seven barrels a day?

A Yes, sir.

Q Now then, let's go to the North Star well or the Westwater well in the northwest of the northeast of 32.

Do you disagree with my information that that well produced 796 barrels from the Yates and 1020 barrels from the Grayburg during the month of August?

A I will take your word for it.

Q I am working from the same information you have there.

A All right.

Q Again, you are penalizing the North Star approximately 796 barrels for the month.

A Well, it would be perhaps for a month or two.

Q All right, sir. Are you familiar with the figures on Sunray Mid-Continent State Y?

A Only as we have indicated on Exhibit 6.

Q Would you go to your reports that you are using and give me the figures on Sunray Mid-Continent State Y No. 1.

A For what month?

Q For the month of August.

A The oil production for the North Star?

Q No. Sunray Mid-Continent's well number AY No. 1.

A For the State Y 1, State Y No. 1 produced 1031 barrels

from the Yates in August.

Q All right, sir. What about from the Grayburg, by Commission designation, the Grayburg.

A This shows that it produced 609 barrels during August from the Grayburg.

Q Then the Yates produced at approximately that allowable for the month of August, is that correct?

A Yes, sir.

Q You would be penalizing Sunray Mid-Continent if the Commission follows a combination of these pools and a single allowable for these dually completed wells by approximately 20 barrels a day?

A Yes, sir, for one or two months.

Q Now then, are you familiar with the decline curve on this Sunray Mid-Continent Well?

A I have constructed decline curves on a large percentage of the wells within all these areas that we are talking about.

Q I am referring to Sunray Mid-Continent State Y No. 1.

A I believe I probably have constructed those curves because they are new wells. I don't think that they have had time to establish much of a decline yet.

Q That would be obvious since the Yates formation is still producing at allowable, is that correct? We couldn't have a decline if you're still producing at allowable.

A During the month of July the production report shows

that the well only produced 411 barrels from the Yates zone.

Q All right.

A Which is way below top allowable.

Q Now then, based on the August figures we have established at least three wells would suffer a loss in allowable if the Commission adopted a single allowable for the 40-acre tract. Did I understand your recommendation to be you would have no objection if these pools are combined to permitting the operator to produce - - of the dual completed wells - - to continue to produce two allowables from their dual completions?

A Well, I'd like to state it this way: I think that particular question is a matter of policy which the Commission itself is going to have to determine and I would make no recommendation as to what their policy would be. I will say that insofar as my client is concerned, if the Commission decided to allow double allowables, we might say, that I am sure that he would not object because it is our opinion this is a very temporary thing, that within a matter of a few months we expect production to be down. Anyhow, I don't think those zones will continue to make top allowable for any appreciable period.

MR. LOAR: That's all the questions we have of this witness at this time.

EXAMINATION

BY MR. MORRIS:

Q Mr. Gray, the Iverson and Welch wells in the southeast

quarter of the southwest quarter of 29 would be in the same position as a dually completed well with respect to the problem that Mr. Loar was just discussing?

A Yes, sir, that's right.

Q Do you have two wells that are located on the same 40-acre tract, one from the Yates and one from the Grayburg?

A Yes.

Q Are those wells top allowable at the present time?

A I believe so. This is a very good lease and it's within the better area and I believe - - I haven't checked the last month or two, but I believe that up until that time both of these wells are still producing top allowable from both the Grayburg and Yates zones.

Q What was the completion date on each of these two wells? Do you have that handy?

A Yes. The Shugart A-2 was completed June 1960 and the Shugart A-8 was completed June 16, 1961.

Q Have you noticed any rapid decline in production from these two wells?

A Well, first in the case of the Shugart A-8 it's been producing such a short period that I don't think I have anything significant on that. In the case of the Shugart A-2, at the last report I had, I believe it probably is still top allowable.

Q In the event your application was granted you would favor some exception in favor of these two wells, I presume?

A No, we wouldn't ask for an exception if the Commission thought it proper to limit the allowable for the 40-acre unit to one top allowable, I am sure my client would be agreeable to one top allowable for both of these wells.

Q Why were these wells completed individually rather than dually completed?

A Well, I think as I have previously stated that my client does not feel that dual completions in this area are practical because of these mechanical problems which we know exist and rather than to have a situation which might hamper our operation he has felt and I am sure still feels that dually completing these wells is not a practical matter.

Q Mr. Gray, I believe you have testified that these formations appeared and disappeared rather irratically throughout this area. Have you found that any one of the formations or any one pay is continuous throughout this area in question?

A If we assume that show of the samples, a little show of gas would constitute a significant definition of your question there, I think that in most cases that your Red sands has some, is developed to some extent in a large part of this area that we are talking about. It's one of the predominant zones; and then we find the Grayburg is present over a very large part of it although it may not be actually producing over the entire area but in particular, I think that those two zones are likely to have some kind of show in a very large part of this area that we are

talking about.

Q Now, the wells producing in the area which you would have designated as the North Shugart Pool are all producing from the Red sands in the Grayburg formation. There is no production there from the Yates or Seven Rivers?

A As far as I know there is no well completed in the Yates, although I do know of some shows that were found in the Yates. I think it is very possible that at some time an attempt will be made to test the Yates and some of the wells within this pool.

Q At the present time, there would be no reason, though, for the Commission to include the Yates, Seven Rivers formation within the vertical limits of your proposed North Shugart Pool, would there?

A No, sir. I think that it would be quite proper if the Commission so desired to eliminate the Yates from the vertical limits of the North Shugart Pool if they will restrict the Pool description to the area which we show north of the yellow line in Exhibit 1.

Q I see. Mr. Gray, you testified as to the economic situation existing if completions in this area were limited to single formation. Have you made any study as to the reserve estimates or could you give us reserve estimates on a pool wide basis for each of these formations? Do you have that handy?

A I have knowledge of the evaluation in the area but I have

not attempted to estimate the ultimate recovery that might be recovered from the total pool.

Q I see. Then, could you give me any particular figure for each zone as to how much a well would have to recover, how many barrels of oil a well would have to recover, to be economical in that formation?

A No. I couldn't give you a figure because these figures change so much. Some of these wells are drilled with rotary methods and in some cases the operator will go to quite a lot of trouble in coring all the zones and then other wells are drilled with cable tools and in some cases the operator will drill down through the Grayburg to perhaps a depth of 3900 or 4000 feet while in other cases the operator might elect to drill down to the Red sands and quit and he might drill to 3300 or lower or perhaps even to the Yates at 2600 or 2700 feet, so that conditions vary to such an extent that I don't think that we could just set a certain figure and say that would apply. It depends on the programs and also depends on the rate upon which the oil is recovered from this well and that varies considerably.

If you recover, say, 40,000 barrels of oil over a three-year period, well that's one thing, but if you recover 40,000 over a ten or fifteen-year period, well, that's something else. They both would have to have different pay outs.

Q From your experience in this pool, what would be the cost of a typical well drilled to the Grayburg, let's say?

A I would say that including pumping equipment and batteries and all lease equipment that average well would be within the range of $50,000 to $60,000 per well.

Q Would the cost be substantially less if it were drilled to one of the more shallow formations?

A Yes, it would be less if you drilled at the Yates.

MR. MORRIS: I believe that's all.

EXAMINER UTZ: Are there other questions of the witness?

EXAMINATION

BY MR. NUTTER:

Q Mr. Gray, so that I will understand this, as I understand it the Queen is the producing formation for the Culwin Pool, is that correct?

A Yes, sir.

Q What is the producing formation for the Culwin-Yates?

A The Yates only.

Q How about the North Shugart?

A The North Shugart includes the Queen and Grayburg formations.

Q And then the Shugart Pool has the Yates, Seven Rivers, Queen and Grayburg?

A That's right.

Q I see. Now, when you were going over Exhibit No. 7 you were mentioning the cumulative oil produced from these various pools and the average cumulative production per well as well as the

average daily production per well. What was that range in cumulative production per well as far as the Shugart is concerned?

A Well, the range will vary from the lowest well to the highest. I don't have the exact figure available to me but I do know there are some wells that probably have recoveries less than 20,000 barrels of oil. I am sure there are other wells - - we feel there are two wells in particular that I know that have produced in excess of 150,000 barrels of oil from the Yates zone but that is a very unusual situation.

I think they are the only two in the whole field that even come close to that.

Q But the range would run from less than 10,000 to more than 150,000?

A Yes, sir.

Q How about the average daily production per well? What does it range from?

A Well, I think I would be safe in saying from one barrel to thirty-four barrels.

Q Up to top allowable?

A Yes, sir.

Q Now, has there been any recent development in the Shugart Pool?

A Yes, sir. There have been a number of wells in the Shugart field drilled, I'd say, within the last two years and I know of one case of where a well was just completed within the last

month or two.

Q Of the 51 wells in the Shugart, how many of these wells are top allowable wells?

A I will have to refer back to one of your publications. I don't have that information.

Q Do you have any estimate as to how many top allowable wells there are - -

A No, I don't.

Q - - without opening the book?

A No, sir, I don't.

Q How about the North Shugart, Mr. Gray, what is the average cumulative production per well range from?

A Well, it ranges over a wide range. I don't know the limits.

Q There are wells that have produced more than 100,000 barrels?

A I really couldn't say about the particular properties. I know definitely - - I would say that maximum on those properties is less than our average figure which we show of 34,000 but there are some wells producing in the field that have been producing since 1937. I would assume that by this time that some of these wells have probably produced in excess of 100,000 per well.

Q How about the range of production per well per day? Your average is seven. Would that be from the small figure to top allowable again?

A Probably.

Q Have there been any recent developments in the North Shugart Pool?

A Yes. There have been some Grayburg completions in Section 9 of 18-31. I understand they are very poor wells.

Q When was the development in Section 21 and 29? Was that in the last couple of years, Mr. Gray?

A The development in Section 29 concerned number one and two wells in the northeast quarter of Section 29. They're old producers, producing for a great number of years. I think practically all of the other wells in that Section have been drilled within the last three years. In Section 21, I think those are probably pretty good wells.

Q Which of these pools did you say overall you would consider to be a better pool?

A From my observation in making all of these evaluations, it is my opinion that the average ultimate recovery from the Shugart Pool as we now designate it will be greater than any other recoveries from these other areas.

Q Will you explain why in a pool like the Shugart which has such a gay panorama on Exhibit No. 5 indicating a lot of zones being open, is this going to be condusive to good water flood operation if water flooding should ever be considered in the area?

A I don't think it's an insurmountable problem at all. In nearly all cases these wells have casing set through the pay

zone, have been perforated, I think that control of the individual zones is possible.

Q What about the permeability of the various zones in the area?

A I can't make any estimate at this time as to the feasibility of water flooding the various zones but I don't see any problem connected with having all of the zones open.

Q This would have to be isolated in all probability and injection rates at different rates for the various zones?

A Well, of course, it depends alot on the kind of program you had. These wells are drilled on a 40-acre space. Whether or not you'd go in and drill, just what sort of spacing program you'd have. That would control the thing to a large extent.

Q You were answering some questions for Mr. Morris with regard to completing wells in the various formations. What would the average dual completion cost?

A I don't have any cost on those.

Q Did your client, Iverson and Welch carry on an active development program in ~~any~~ of these fields?

A They have until very recently and have quite an additional un-developed area to be developed.

Q Where abouts is that?

A Well, in Section 30, for example, of 18-31. They have all of the north half of Section 30 and then in Section 20 - - 19 - - they have acreage and I think down in Section 33 they have

the north half of Section 33 and part of 34 that hasn't been fully developed.

Q At the present time do they have wells in all of the pools that are under consideration?

A I don't believe they have any wells at the present time which are included in the Culwin-Queen Pool.

MR. NUTTER: I believe that's all; thank you.

EXAMINATION

BY EXAMINER UTZ:

Q Mr. Gray, do you foresee any problem - - first let me ask this: I believe you stated that due to the nature of most of these zones that artificial stimulation was necessary?

A Yes, sir.

Q Do you foresee any problem in stimulating these various zones in one well bore?

A No. I think that where the operator has casing set clear throughout all the zones that it is possible to go in and stimulate any individual zone very easily.

Q Using a saddle packer?

A Or a temporary plug and packer. There are various techniques.

Q Would that type of program be your recommendation to your client?

A Well, I would hesitate to say just what I'd recommend. I mean usually every well is a particular problem and they have

varying conditions present. I have had contact with a number of work overs in the past and they haven't been done the same way. Usually we try to fit the particular program to the individual circumstances. I don't think we can say that there is any one particular way we'd recommend for all cases.

Q Well, if you didn't use that type of program do you feel there would be a possibility of leaving oil that would otherwise be produced in the lower permeable zones?

A Well, I think in all cases it's up to the operator to evaluate and know what zones he has in his individual well, what he considers as being commercial and in some cases he will probably open all of them up to start with and in most cases probably he will just open part of them up to start with and then later on he may go back in and recomplete from the other zones, but that is a problem that has been facing every operator in drilling a well, to know just what zones are present that would produce commercially.

Q Do you feel that all these zones might promote inadequate completion procedures?

A No, sir, not at all.

Q How thick are most of these zones?

A They vary. It's pretty difficult to say. We can take a gama ray neutron log, for example, and we can arrive at a thickness for any particular sand zone, but it doesn't necessarily follow that all of that zone is saturated with oil and you just about have to core all of those sands to know exactly how much

thickness exists in each one of those zones and they have quite a lot.

Q On your cross section, we will take the Queen, for example. The red areas that you have colored there, what is the vertical scale on that? That would be the thickness of your area?

A I believe the vertical scale is two and a half inches per hundred feet, if I am not mistaken and the gross interval of that Red sand is probably around 40 to 50 feet overall.

Let me explain a little bit better. Maybe I can answer you this way: For instance, in the Yates formation some of the wells will produce oil, say, out of the lower section of the sand member. We have it shown on the cross section and maybe in another area a few locations away they will be getting their oil out of the upper member of that sand and we find those varying conditions all through the field. As to these saturated zones, they come in at various intervals within the zone.

Q In other words, the net pay varies from gross pay considerably?

A Yes, it does.

MR. PORTER: Mr. Gray, you didn't testify as to specific water bottom hole pressure for each of these different zones.

A I don't have any bottom hole pressure information available to me.

Q (By Mr. Porter) Well, from your observation of this area,

would you expect you would have a differential in pressure as between those various zones?

A No, I don't think it's important because most of the sands are very tight and as I say, they wouldn't give up anything or very little naturally and they require breaking down, fracturing, before you can recover any substantial amount of oil from them; so, I think under those conditions that the possibility of oil from one zone going into another I think the possibilities are very remote.

MR. PORTER: That's all I have.

EXAMINER UTZ: One clarifying question.

What you have been referring to, what is referred to on your Exhibit 5 as the Red sand is what the Commission chose to call the Queen, is that correct?

A Yes, sir. The Red sand is the top sand member of the Queen.

EXAMINER UTZ: Are there any other questions of the witness?

EXAMINATION

BY MR. LOAR:

Q This gay panorama of color that I believe Mr. Nutter referred to, Mr. Gray, is that your - - as I understand it those are your own designations and not the designations as set forth in the Commission's nomenclature?

A Yes, that's right. I break these zones down individually.

Some operators might like to call the Red sand. What we call the middle they may elect to just call the Queen because they are all members of the Queen formation. We like to break the individual zones down and designate them separately because they do act as individual zones more or less.

Q If we follow the Commission's nomenclature we would only have, as I understand it, two colors on this Exhibit No. 5.

A Well, no. I think we'd have three colors, four colors; the Yates, Seven Rivers, Queen and Grayburg.

MR. LOAR: That's all.

MR. PORTER: How many different zones are there in the Grayburg in this particular area?

A There are several. I don't know just how many.

Q Less than twelve, would you say?

A Well, I am readily familiar that there are as many as three or four zones that produce.

Q Aren't those zones as high as any zone in the area?

A Mr. Porter, for instance, in the Grayburg Jackson or the Malgemar we defined the Grayburg as including zones three, four, five and six, I believe. We are pretty well out in the basin here. In the area that we are discussing the sediment changes materially and you lose identity of some of the formation. The thing we are calling Grayburg is not all similar to the Grayburg-Queen up on the shelf.

EXAMINER UTZ: Are there any other questions of the

witness?

The witness may be excused.

(Witness excused.)

EXAMINER UTZ: Do you have anything further, Mr. Kellahin?

MR. KELLAHIN: No, nothing further.

EXAMINER UTZ: The hearing will be recessed until 1:15.

(Noon recess taken.)

(Hearing resumed at 1:15.)

EXAMINER UTZ: The hearing will come to order, please. We will continue with Case No. 2425.

Do you have a witness, Mr. Morris?

MR. MORRIS: The Staff would like to put on one witness in this case, Mr. Stamets.

R. L. STAMETS

called by and on behalf of the Commission, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. MORRIS:

Q Mr. Stamet, will you please state your name and position for the record, please.

A R. L. Stamets, geologist with the Oil Conservation Commission in Artesia, New Mexico.

Q Mr. Stamets, does the area under consideration here today come within the jurisdiction of the Artesia District Office?

A It does.

Q Have you made a study of this area to present at this hearing?

A I have.

Q In that connection, have you prepared some exhibits reflecting the results of that study?

A I have. Exhibit No. 1 and Exhibit No. 1A which is a map of the information on Exhibit 1.

Q The Exhibit that you have posted is Exhibit 1?

A 1A.

Q That's 1A and Exhibit 1 is a compilation of data with respect to each well in this area?

A Right.

Q What does your Exhibit No. 1 show with respect to each well?

A I have included here all the wells which are currently producing within the boundaries, undesignated wells outside the boundaries of the pools involved in this case.

I have shown their location, their IP for twenty-four hours, the completion interval plus the type of completion, whether perforated or open hole. The formation will - - I will say here that we have a difference of opinion as to where the top of the Grayburg is. The top which I have used is some one to 150 feet

lower than Mr. Gray used. The completion date is next, cumulative to 1-1-61. Then I have a calculation of production per acre per year to 1-1-61. That was merely to more or less try and bring these cumulative production down to figures which would be comparable among the wells.

Next is the August daily production and gravity.

Q Mr. Stamets, under the heading of formation, you have shown the formation from which each well is producing as being from one or more of the formations, the Seven Rivers, Queen and Grayburg.

A I have not broken each one down into individual sections.

Q Where did you obtain the information that you incorporated into Exhibit 1?

A The information in Exhibit 1 comes from the well files and the statistical reports of the Commission.

Q And the cumulative production figures that you have here are only through January 1, 1961?

A To January 1st.

Q To January 1, 1961?

A That's right.

Q Would you refer now to Exhibit 1A which is on the board and explain to the Examiner what that shows and what the color coding system shows.

A Exhibit 1A is a map of the area in question showing the wells involved, both dry holes and producing wells. I have

outlined the pool as described by Commission Order. The North Shugart Grayburg Pool in blue, the Culwin-Queen Pool in green, the Culwin-Yates Pool in orange, the Shugart Pool is outlined in red.

Other information thereon from Exhibit 1 I have put a color code on here around each well to show the formation or formations from which it is producing at this time. I have not taken into consideration the fact that a well may have produced from another formation previously. I have circled the wells producing from the Queen formation, that includes the Penrose, in green. I have circled the wells producing from the Grayburg formation in blue, the Yates formation in orange, the wells producing from the Seven Rivers formation in red; the dual completions in wells completed in multiple zones I have circled with all colors indicated.

Q The wells that have more than one color indicated, then, are not necessarily dual completions?

A That is correct. To give you a little tabulation of these, there are 125 Queen wells, 15 Grayburg wells, 23 Yates wells, one Seven Rivers well, six Queen-Grayburg wells, one Seven Rivers-Grayburg well, three Yates-Queen wells and five Yates-Queen dual completions.

Q Can you draw any conclusions from those?

A Looking at this map here and at my Exhibit 1 I would say the Queen formation overall is more productive in more of the wells than any other formation. I feel that the Yates and Grayburg

and the Seven Rivers are productive in smaller isolated areas than the Queen.

Q Mr. Stamets, would you point out the dual completions that are shown on your Exhibit and identify those by locations, please.

A Perhaps I should take those from my Exhibit 1 as I have slightly more discernible information there.

One dual completion is the G. I. O'Neil Junior Federal A No. 3H in 1-19-30. That was the discovery well for the Culwin-Yates Pool and the original dual completion in this area.

Q That is producing from the dual completion in the Culwin-Yates and Culwin-Queen Pool?

A That is correct. Chambers-Kennedy have two dual completions, the Monterey State No. 2E and 3C in Section 32, 18-31. These are producing from the Yates formation the Culwin-Yates and from the North Shugart Queen-Grayburg Pool.

Another dual completion is the North Star Oil Corporation formerly the Westwater State 32 No. 1B in 32-18-31; and finally, the Sunray Mid-Continent Oil Company State Y 1G in 32-18-31.

Q So there are four wells dually completed in the Culwin-Yates Pool and the North Shugart Pool and all four of these are in Section 32, 18-31; and then there is the first one you mentioned, that is dualled in the Culwin-Yates and Culwin-Queen Pool and located in 1-19-30, making a total of five dual completions?

A Right.

Q Mr. Stamets, you heard the testimony this morning of Mr. Gray with respect to the problems that might be involved and his interpretation of the problems with respect to these dually completed wells. Do you concur in his analysis or do you see any special problem presented by these dually completed wells?

A I am afraid I haven't had as much field experience as Mr. Gray. However, the majority of the dual completions which are in there seem to be producing effectively at this time.

Q In any event, there would be an allowable problem created, would there not, if the Commission should adopt the application, approve the application as requested and make no exception for the dually completed wells?

A That is correct. That is based on the latest figures that I have for production. The Chambers-Kennedy Monterey State No. 3C would lose four barrels of oil per day. The North Star Oil Corporation No. 1B would lose 34 barrels of oil per day and the Sunray Mid-Continent Oil Company No. State Y No. 1G would lose about 20 barrels of oil per day.

Q Are there other situations in the area where operators would lose allowables if this application were granted?

A I believe it has already been testified to that the Iverson-Welch have two wells located in Section 29, 18-31. One is completed in the Yates and the other is completed in the North Shugart Queen-Grayburg which would lose 34 barrels of oil per day

at this time.

Q Mr. Stamets, as the result of your independent study that you have made in this area, that you have made specifically because of this application, what comment would you make as a result of that study?

A Well, I feel that any time you put widely divergent zones into the same pool you increase the difficulty, possibly the expense of treating those zones, difficulties that are insurmountable but they do cost more and they are more difficult to accomplish. Another thing which doesn't appear too great when you first complete a well but which gains in force as the well is produced, when these zones are completed together it becomes difficult, if not impossible, to evaluate the residual oil in these zones after the period of production.

This calculation is important in water floods, determining whether or not you should go back in and attempt to frac a zone or stimulate it. Finally, there are nineteen Yates wells outside the limits of the Shugart Pool. Of these, 13 wells are top allowable wells or within four barrels of being top allowable wells. None of these wells were completed this year. Eleven wells were completed within the past year. Based on this and the fact that they appear to be separate reservoirs to me, separate from the Queen-Grayburg vertically, separated from each other horizontally, I feel we don't have sufficient production records on these wells to make the determination that they were not going

to be good wells, that they wouldn't pay out.

Q Do you feel that it's too early in the life of most of these wells to determine whether their completions in single zones would be economical or not?

A That's correct. I feel that dual completions would be a much better thing to do in this field than attempt to complete in the separate zones at this time. However, further developments may indicate that separate wells would be the best thing or showing the old area would be the best method. I don't feel there is enough evidence at this time.

Q Mr. Stamets, do you have anything further to add with respect to this application as a result of your study?

A I believe that's all I have as direct testimony. However, I would like to point out about three errors on Exhibit 1. This was typed just immediately before I left for Santa Fe and these errors did not all get corrected. On page one, I showed completion date for the G. I. O'Neil Federal E No. 1A as being in 1929. It should be 1959. On page two, the Chambers-Kennedy State No. 1 is shown completed in 1966 and it will be 1960; and on page five the Clemmons Well No. 12A under production per acre per year I show sixteen barrels. This should be the August daily production. The production per acre per year section there too kind of brings that into persepctive. At a current top allowable of 34 BOPD, the production per acre per year for top allowable would be somewhat over 300 barrels of oil per day.

You will see two or three in there which exceed this, but I feel this may be because of minor amounts of over production on new wells and the method with which I calculated this. It tends to give a larger figure on some of these real short very new wells.

Q Do you have anything further you'd like to offer?

A I believe that's all.

MR. MORRIS: If the Examiner please, I will offer Exhibit 1 and Exhibit 1A and that concludes the direct examination of Mr. Stamets.

EXAMINER UTZ: Without objection, Exhibits 1 and 1A will be entered into the record.

EXAMINATION

BY EXAMINER UTZ:

Q Mr. Stamets, let's run over these dual completions with you. The numbers two and three were completed in which pool?

A In the Yates, Culwin-Yates and the North Shugart Queen-Grayburg pool.

Q That's both of them?

A Yes, sir.

Q And the North Star was completed in what pool?

A The same two pools, Culwin-Yates, North Shugart Queen-Grayburg.

Q And the O'Neil?

A That's the one that we had originally. I show each well

in all pools in which it is productive.

Q I believe you had one more on page three. That was the Sunray Mid-Continent State Y 1?

A That is producing from the North Shugart Queen-Grayburg, Culwin-Yates.

Q And that is all of the dual completions in the area in question?

A Yes, sir.

EXAMINER UTZ: Are there any other questions of the witness?

EXAMINATION

BY MR. KELLAHIN:

Q As I understand your definition of the Queen, it would include a portion of what Mr. Gray has defined as the Grayburg?

A Right. The Commission has, as I understand it, historically recognized these formations and a well completed within the Queen formation anywhere would cause the pool to be classified as a Queen pool under normal circumstances unless the operator requested something else.

Q You have had no quarrel including the Grayburg in the Queen in this area?

A I did a little work trying to come up with some definite pool boundaries. The pool boundaries as they are, are not necessarily too good. They include some dry acreage which has been proven by dry holes drilled and I don't believe that they are in

the proper shape. The North Shugart has a few Grayburg wells in the northern part; however, as you come south into the west there is a string of wells in there which are all producing from the Queen. There are two wells located, one well located in the southeast of Section 21, 18-31 - - that is completed in a Grayburg zone which is different from the Grayburg completion in any of the other wells. The same is true for the well in the southeast of the southwest of Section 22, 18-31.

Q How are they different?

A They're in a different stringer. When this was sent in, I believe Gulf Oil Corporation was the owner of these wells. It showed that they are Delaware sand wells.

Q They would run lower than other Grayburg wells?

A Yes.

Q How many Grayburg wells are there in this area as you define the word "Grayburg"?

A There are 13 wells, singly completed in the Grayburg. One in the Seven Rivers, Queen-Grayburg and six are Grayburg wells so that would be a total of 20 wells producing from the Grayburg.

Q Are they in the Shugart Pool?

A Not all of them. There is a total of four in the entire area.

Q Well, they are in the Shugart or North Shugart, isn't that correct?

A That is correct.

Q And you can open the Queen and Grayburg together in both of those pools, is that not correct?

A That is correct.

Q On that basis, do you see any objection to combining the Queen and Grayburg throughout?

A I see no reason to include the Grayburg where it is not productive.

Q Well, there would be no reason if it's not productive. Assuming it to be productive, do you see any objection to combining the Queen and the Grayburg as it has been done in both the North Shugart and the Shugart?

A It would depend on the area involved. There are parts of this area where the Grayburg could possibly have no connection to other Grayburg wells in there. In other words, if they got Grayburg dual completions in Section 25, 18-30, maybe I should say jet Grayburg completions, it could not necessarily be the same pool as found in Section 21 and Section 22 of 18-31.

Q Well, then, you'd have two Grayburg pools.

A Yes. I believe you have a number of Grayburg pools.

Q Isn't that true of the Queen?

A Yes. It is less true of the Queen than any of the other formations.

Q Would you advocate the Commission setting up a Grayburg one and two and treating them as separate pools? Is that what you're saying?

A I would set up a separate Grayburg pool for the two wells in Section 21 and 22, 18-31. I would take out the Queen wells and the southern part of the North Shugart Queen-Grayburg pool and include them in a Queen pool as an alternative to the application.

Q You would recommend - -

A As an alternative, I would not recommend to the Commission that they do that as a result of this hearing but as a separate nomenclature case to be handled at the regular Commission hearing.

Q Well, actually, Mr. Stamets, on the basis of the present pool delineation defining the North Shugart Pool and the Grayburg and Shugart Pool as including the Yates, Seven Rivers, Queen-Grayburg, what we are really - - where are you going to put the Yates, in with the other pool?

A That is correct. I feel that there isn't sufficient evidence at this time to do that. I do not necessarily oppose the application. If the Examiner feels that evidence is sufficient, then, I would definitely say that this should be done. I am in favor of this where separate zones will not produce their allowable.

Q Do you have any cost figures on the dual completions in this area?

A No, I don't. I would assume that because - - I don't - - Sunray Mid-Continent will probably put on some cost figures.

They should run considerably higher than drilling two separate wells.

Q They would run somewhat more than drilling one well, though, wouldn't they?

A They might, unless they recovered additional oil which might not otherwise be recovered.

MR. KELLAHIN: That's all the questions I have, sir. Thank you, sir.

EXAMINER UTZ: Are there other questions of the witness?

MR. LOAR: No questions.

EXAMINATION

BY EXAMINER UTZ:

Q Mr. Stamets, if the applicant's request for combining the pools is granted on the basis of nomenclature submitted, would there not be a void space running down between two producing areas which you might call an alley?

A There is and there isn't. These pools are more or less joined together by Queen production at their bases, their southern extremity. Right now, we have an overlapping which needs to be taken out, the Donnelly Drilling Company, Pan American 1XK 5-19-31 did not have any show in the Yates formation when it was drilled but they are joined there by Queen production. What you have up there is an alley but it's only separating two arms of what would be their pool.

Q Do you think this alley might be productive?

A There have been several wells drilled in it which have not been productive. There may well be a few wells productive. There may be some, I think most of them would be dry.

Q What causes this alley in here? Is it that some of the formation, maybe all the formations, are dry?

A I would say that all the formations may be dry.

Q It's rather unusual to have a dry area in the middle of one pool such as this?

A Well, if you're speaking of an exceptionally well developed reservoir, no, but where you are speaking of sands in which the permeability and porosity come and go, no, it wouldn't be unusual.

Q Mr. Stamets, if the Commission should decide to combine these pools vertically would you see any reason for horizontal delineation between the two areas?

A I feel that at least on the number of wells drilled presently that the North Shugart Queen-Grayburg is actually two pools, at least two pools. The one to the north and then one to the south and I think they definitely should be separated there, possibly more drastic action taken than the applicant has asked for by eliminating the non-productive undrilled acreage.

EXAMINER UTZ: Are there any other questions of the witness?

EXAMINATION

BY MR. NUTTER:

Q Mr. Stamets, I wonder if you'd go through this Exhibit tabulation of the wells in the Shugart Pool and mark the wells that have produced more than 50,000 barrels, please. Just mark them. Mark a little red mark by the cumulative figure. I want to do some adding.

A I believe there are nine in the Shugart Pool.

Q How many wells are there in the North Shugart Pool that have produced more than 50,000 barrels?

A I count 14.

Q Now, on the wells that you have marked in the Shugart Pool, how many of these wells are completed in more than one formation as you have indicated the formation?

A I think we should tread easily because some of these wells may have been completed in other formations previously, the older wells. The newer wells I think - - the perforations as they are reported should probably be the perforations as they were and are. There are two wells having a combined cumulative production of 182,505 barrels. One is open in the Yates, the other in the Queen. The Yates well has produced since 1940, the Queen well has produced since 1952.

Q 182,000 is the cumulative production for both wells?

A That's right. I would presume the Yates well produced most of that.

Q Now, the next well, the 118,000 barrel well.

A That's the Queen. The next one is the Seven Rivers Queen-

Grayburg and we have Queen, Queen, Queen, Queen, Yates - - we'll back up to that last Queen. That's an oil well deepened in 1959. So this part of this cumulative production would be from another zone up in the hole.

Q A Queen zone or another Queen sand?

A Judging from the perforations, probably completed above the Queen.

Q Could it be the Yates?

A I couldn't say without seeing the well file.

Then, after that Queen well, we have the Yates, another case where there are two wells completed on the same unit. The Yates well was completed in 1957, the Queen well in 1959. They have a cumulative production of 158, 215.

Q How about in the North Shugart, Mr. Stamets?

A All of those wells which I have, all 14 wells were completed in the Queen formation.

Q It would appear offhand from observation that there are no wells which have produced more oil which are completed in one formation than in a combination of several formations. Would that be a correct observation?

A Yes, it would.

MR. NUTTER: That's all; thank you.

EXAMINER UTZ: Are there any other questions of the witness?

The witness may be excused.

(Witness excused.)

MR. WHITE: Charles White, representing Sunray Mid-Continent Oil Company. I have one witness, Mr. Statton.

R. E. STATTON

called as a witness by an on behalf of Sunray Mid-Continent Oil Corporation, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. WHITE:

Q Will you please state your name and occupation.

A R. E. Statton, Sunray Mid-Continent Oil Company.

Q You are the district engineer in our Hobbs office?

A Yes.

Q Have you testified before the New Mexico Oil Conservation Commission as a petroleum engineer previously?

A Yes.

Q Were your qualifications accepted at that time?

A Yes.

MR. WHITE: Would you like for me to further qualify Mr. Statton?

EXAMINER UTZ: No, sir.

Q (By Mr. White) Have you made a plat of the Sunray Mid-Continent's lease and the immediate offset wells in the area?

A Yes, I have.

MR. WHITE: We'd like to have that Sunray Mid-Continent

Exhibit No. 1 marked.

(Exhibit marked.)

Q Referring to Sunray Mid-Continent Oil Company's Exhibit No. 1, would you please describe the New Mexico State Y lease?

A The Sunray Mid-Continent No. State Y lease is the south half and the northeast quarter of the northeast quarter of Section 32, Township 18 South, Range 31 East.

Q That consists of 120 acres?

A Yes.

Q In which you have completed three wells?

A Yes.

Q Now, then, would you point out what your colored designations mean, Mr. Statton?

A The yellow wells are the Yates pool wells, the green wells are the North Shugart Queen-Grayburg wells and the wells with two circles colored yellow and green are dual completions in these two pools.

Q Now then, what is Sun's New Mexico State Y well No. 1?

A It is dually completed in the Culwin-Yates pool and the North Shugart Queen-Grayburg pool.

Q As previously brought out, it is a top allowable well?

A Yes, it is.

Q What is the approximate production from the Grayburg-Queen side of the completion?

A 19 barrels a day of oil.

Q What are the methods of producing that well at the present time?

A We are presently flowing the Yates zone and pumping the Queen zone.

Q You are able to flow a top allowable out of the Yates at the present time?

A Yes.

Q What is your GOR from these two zones?

A The Yates has a GOR of 1,000 to 1 and the North Shugart Queen-Grayburg has a GOR of 195 to 1.

Q Is that producing some water?

A Yes. The Yates does not produce any water. The Queen zone produces three barrels of water per day.

Q What is the situation on well number two and three?

A Both are flowing top allowable from the Yates zone with no water.

Q Do you have some kind of a production test on the number one well indicating its producing characteristics or capabilities?

A This well is producing at an intermittent flow, a few hour a day. While producing, it produces at a rate of a little over 200 barrels of oil per day.

Q That is in order to get daily allowable?

A Of 34 barrels a day.

Q Did you attempt to project some kind of decline?

A Yes.

Q On the number one well for both Yates and Queen-Grayburg?

A Yes.

Q Are you able to give me some kind of definitive limit of when the number one well would not be able to produce in excess of a single 40-acre allowable?

A No.

Q Can you extravolate the production from these two zones for quite some length of time?

A Yes.

Q As being in excess of 40-acre, a single 40-acre allowable?

A Yes.

Q Now then, if the Commission combined the entire interval as requested by Iverson and Welch, how would Sunray Mid-Continent produce the New Mexico State Y well No. 1?

A They would continue to produce it as a dual completion pumping the lower zones and the upper zones until necessary to put it on a pump.

Q Would that be necessary in order to effectively deplete these two zones in this number one well, to produce it that way?

A Yes.

Q That's taking into consideration all costs of recompletion and actual depletion?

A Yes.

Q We heard some testimony this morning concerning the fact

that at least in one operator's opinion dual completion practices were not practical in this pool.

If Sunray Mid-Continent had some additional acreage to develop in this pool would you, and based on the present Commission's rules, dually complete that well?

A Yes.

Q Have we encountered any problems in our number one well which would not be encountered in a single completion?

A No.

Q Do you see any reason not to recommend to the Commission that dual completion practices are applicable and good operating practices in this pool?

A I don't see any reason to recommend that dual completions not be made.

Q What I am asking you is this, Mr. Statton: Sunray came to the Commission in the latter part of 1960 and early 1961 and requested permission to dually complete well number one and well number two under the same circumstances. Knowing what you know now, would you recommend dual completions?

A Yes.

Q The reason well number two is not dually completed is because of the fact that we had no Grayburg-Queen production?

A I would recommend dual completions in view of the present Commission rules and regulations.

MR. WHITE: That's all I have of this witness,

Mr. Examiner.

EXAMINATION

BY EXAMINER UTZ:

Q Mr. Statton, what kind of pressure do you have in the Yates on your State Y No. 1?

A Bottom hole pressures have decreased from 300 pounds flowing pressure since last February to a present flowing tubing pressure of 175 pounds. This pressure has been constant at 175 pounds for four or five months.

Q I believe you said you were pumping the Queen?

A Yes.

Q Well, isn't it pretty obvious that the pressure in the Yates is considerably more than the pressure in the Queen?

A No, the Queen does make water which could be holding back the bottom hole pressure. It makes approximately 67 per cent water so you have the same bottom hole pressure and have the one zone pumping and the other zone flowing. The only indication we have had on bottom hole pressure was when we fraced both zones in this well. Immediately after the frac job, after we left the well shut in for several hours the fluid level in the Yates zone was 600 feet from the surface and in the Queen zone it was 1000 feet. This is a differential of 400 foot or 20 degrees which would be .4 times 400 or 160 pounds differential. There was more pressure than in the lower zone due to the additional column between the Yates zone and the Queen zone.

Q Part of that column could be water, could it not?

A No. When we fraced it we put refined oil down the tube to flush the tubing with.

Q If you were to produce the Yates and the Queen in a common well bore in this well, would the fact that the Queen is making water have a tendency to contaminate the Yates formation?

A I don't believe there would be any contamination. We don't know whether there would be in the Queen into the Yates but if it does take place, I don't think it would cause contamination. We know it wouldn't as far as oils are concerned because we are commingling the oil with the gas in the common tank batteries with no emulsion problems. I am not sure what effect that water would have on the Yates and produces backed you will get the same amount of oil in both zones.

Q You don't feel the Queen water would injure the producing ability of the Yates formation?

A It might hinder the flowing ability of the Yates. I do not believe it would hinder the oil-producing rate.

Q Then, if the Commission combined the vertical limits of these pools you would continue to produce the well as you have now completed it?

A Yes, sir. I feel it is a tubeless dual completion and if we wanted to just pump that one zone it would be through one string of two and seven-eighths inch tubing. We would have to set our pump above our Yates perforation which would mean that at

some time in the future this Grayburg or Queen bottom hole pressure will be insufficient to push the fluid up through our pump and that would be accomplished by running our pump down to the Queen zone and then using a hollow sucker rod and no packer in our sealing device on the pump, but that would be additional cost which we do not feel would be justified.

Q If we should combine the vertical limits of these pools at some point in the completion of this well would you produce both formations together?

A No, not in this particular well.

Q Not even after the Yates quit flowing?

A No, sir. We would rather pump into the Yates zone and keep pumping from the other zone.

Q Is it your opinion that you would recover more oil from this well by producing it as a separate pool?

A Well, in our present - - if we are going to drill another well I feel we would recover the same amount of oil by having all zones together as one pool because we could then equip the well to where we could pump from bottom and I feel that we could effectively treat all of the zones whether we used selective treatment or rubber ball type treatment. It would depend upon the character of the well as it was drilled.

Q You don't feel, then, by commingling your zones in the well bore there'd be any loss of recoverable oil?

A No, sir.

EXAMINER UTZ: Are there any other questions of the witness?

EXAMINATION

BY MR. NUTTER:

Q Mr. Statton, does Sunray have any other leases in the area besides this State Y lease?

A No, not in this immediate area. We do have a forty undrilled tract in this same section.

Q But these three wells are the only ones involved in any consolidation of pools at this hearing, is that correct?

A Yes, and possibly this undrilled location down here.

Q Did you attempt to dual the number three also or was it only the number two?

A We did not attempt to dual either one of them.

Q You tested the Queen, though, in the number two, didn't you?

A Yes, and it was barren.

Q Did you test the Queen in the number three?

A Yes, and it was barren also.

Q There was no permeability or porosity or did you encounter small shows of oil or what?

A We did not. These wells were drilled with cable tools. We just didn't encounter any free oil.

Q As a practical matter, you'd almost have to continue to produce your number one as two completions since you have two

separate strings of tubing set in the hole?

A That's right.

MR. NUTTER: That's all.

EXAMINATION

BY EXAMINER UTZ:

Q Mr. Statton, at the time that you were planning the completion of this well had the Yates-Queen been considered in the same pool, would you have dualled it?

A No, sir.

EXAMINER UTZ: Are there any other questions of the witness?

EXAMINATION

BY MR. MORRIS:

Q Mr. Statton, do you feel that you lose control, that you would lose control by having two formations open in the single well bore and having a combined production from the two zones which would prevent you from going back in and knowing which zone to treat?

A Yes, I think you would lose that control from an engineering viewpoint. I think in any case if you isolate one zone perforate it, treat the porosity by itself that that is the best engineering way to go about it. I think the economics of doing that are quite obvious.

Q If you lose that control you might cause waste by leaving oil on the ground, might you not?

A Well, that is a possibility. We feel that with the type treatment that we have been using that we can effectively treat all zones with one multiple or one treatment using rubber balls.

Is that what you're referring to?

Q Yes. Thank you; that's all I have.

EXAMINATION

BY MR. KELLAHIN:

Q Mr. Statton, I didn't quite understand your response to one question with regard to predicting a decline on production from your number one well.

Would you go over that again for me, please?

A I attempted to determine how long our number one well would produce the allowable.

Q Is that from both zones?

A No, from the Yates zones. The lower zone we might get it out of the way. The lower zone is making practically as much oil as it was on initial completion and there has been very little decline in it.

The upper zone, the Yates, has the ability to produce the allowable since completion. It has been flowing a few hours a day. It started out flowing at about 300 barrels a day for a few hours a day - - excuse me - - right, 300. It's now down to a capacity of about 210 barrels of oil per day for those few hours a day that it produces. Likewise, the flowing tubing pressure has

declined from 300 pounds last February to 175 pounds at present. Now, this is a decline of a sort, a decline in tubing pressure, but you could extend that decline to a great number of months that this well will produce top allowable, yet, whether or not that will be true I don't know.

Q Would you say more than a year, two years or what would you say?

A I don't know. It could be two years or three years.

Q Have you studied the production decline on any other Yates wells?

A Yes, sir.

Q What do you understand in that regard?

A We found that many of the Yates wells declined rapidly after completion. Our wells are obviously better wells than those wells were.

Q You are to be congratulated.

A I won't take the credit for it. We feel we are in different stringers that have better permeability than the offset wells. All three of our wells are in slightly different stringers themselves.

Q You think your three wells are each in a different stringer?

A Well, there is a - - not all are in one stringer. There are other strings that have come into the number two and three wells and maybe three overlap in some of the wells.

MR. KELLAHIN: That's all the questions I have. Thank you, Mr. Statton.

EXAMINER UTZ: Are there any other questions of the witness?

The witness may be excused.

(Witness excused.)

EXAMINER UTZ: Are there any other statements to be made in this case?

MR. KELLAHIN: Iverson and Welch as a general proposition do not believe in combining the separate producing units into one formation but under the circumstances in this particular area because of the economics, we feel that unless they are combined there is going to be ultimate loss in recovery of oil from the various pools involved. I think our evidence shows and it certainly has been substantiated by that presented by Sunray in that they do have a top allowable Yates well which they can't foresee the date when it will no longer be a top allowable well, but as a general proposition none of these wells will maintain top allowable from any of those formations over any extended period of time and all of the uneconomic situation is going to result in either one or two things: A lack of development in some of these areas or premature abandonment of some of these zones.

The experience which Iverson and Welch have had - - in their opinion, the dual completion particularly in the Queen formation and that Red sands member is just impractical because of the salt

conditions. Now, whether the Sunray Mid-Continent well is completed in that particular member of the Queen or not, I don't know, but as a general proposition, treating the area as a whole, what we are really looking at basically is whether the Yates will be produced with the other formations because the Queen-Grayburg are open in both the Shugart and North Shugart pools, so you have an anomaly in this area in that you've got some zones open in one part and not in another and it just doesn't make sense to continue that situation.

We submit that opening all of the zones in two single pools as proposed by the applicant is the logical situation in that connection. Iverson and Welch who have completed twin wells will certainly accept a single allowable for those two wells.

EXAMINER UTZ: Are there other statements in the case? The case will be taken under advisement.

STATE OF NEW MEXICO)
) ss
COUNTY OF SAN JUAN)

I, THOMAS F. HORNE, Court Reporter, in and for the County of San Juan, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Proceedings before the New Mexico Oil Conservation Commission was reported by me in machine shorthand and reduced to typewritten transcript under my personal supervision, and that the same is a true and correct record to the best of my knowledge, skill and ability.

Thomas F. Horne
Notary Public

My Commission Expires:
10-2-65

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2425, heard by me on Nov. 8, 1961.

..... Examiner
New Mexico Oil Conservation Commission