

CASE 3502: Appli. of YATES PETR.

for pool rules for Eagle Creek-
San Andres & Penasco Draw SA-Yeso

CASE No.

3502

Application,

TRANSCRIPTS,

SMALL Exhibits

ETC.

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BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
December 16, 1966

REGULAR HEARING

IN THE MATTER OF:)

Application of Yates Petroleum)
Corporation for pool consolidation and)
extension, Eddy County, New Mexico.)

-and)

Application of Yates Petroleum)
Corporation for special pool rules, Eddy)
County, New Mexico.)

Cases No. 3454 (De
Novol and
3502)

BEFORE: A. L. PORTER, Examiner

TRANSCRIPT OF HEARING

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MR. PORTER: We will take up Case 3454.

MR. HATCH: Case 3454. Application of Yates Petroleum Corporation for pool consolidation and extension, Eddy County, New Mexico.

MR. LOSEE: Mr. Chairman, A. J. Losee.

MR. PORTER: Mr. Losee.

MR. LOSEE: Losee and Stewart, Artesia, appearing for the applicant.

If we could maybe take a recess now, it would permit us to put the exhibits on the board.

MR. PORTER: Will ten minutes be long enough, Mr. Losee?

MR. LOSEE: Yes.

MR. PORTER: We will have a ten minute recess.

(Whereupon, a recess was taken.)

(Whereupon, Yates Petroleum Corporation Exhibits 1 through 7 marked for identification.)

MR. PORTER: Hearing will come to order, please.

Mr. Losee, it has been indicated to me by Mr. Hatch that you would like to move for consolidation of Cases 3454 and 3502, is that right?

MR. LOSEE: Yes, sir. Mr. Chairman, I would like to make a statement with respect to both of them and then move to

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consolidate.

MR. PORTER: All right, sir. Why don't you proceed with your statement at this time?

MR. LOSEE: Partially in explanation; Case 3454 is actually here before the Commission on an application for De Novo hearing, in which Yates Petroleum Corporation, the applicant, asks that the expressed or implied requirement written in the order of the commission, pursuant to an earlier Examiner's Hearing held in September, I believe, the expressed or implied requirement that more than one strain of casing be set through both fresh water zones be eliminated from the order.

Now, actually, our evidence of necessity will cover matters that were requested in our original application; that is, to consolidate the Penasco-San Andres and four mile San-Andres Pools to extend the vertical limits of those pools to include the Yeso and San-Andres formations. Now, that request was granted by the Commission pursuant to this earlier Examiner's Hearing.

Our application in this case did not request authority to set only one string of casing through the fresh water zone because completion with only one string has been proved in numerous instances in which the area in which these fields are located.

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The portion of the Commission's order which puts in this expressed or implied requirement is numbered Five of the old conclusion, that the application for the open hole completion of said wells, in said pools throughout the lower San-Andres and Yeso pay with a single string of casing set at the top of the pay, is hereby denied.

It is only this portion of the order and the findings that support that conclusion which the applicant is attacking here in this De Novo hearing.

Now, Case No. 3502 is an original hearing before the Commission, not having heretofore been heard by an examiner. It is an application for special pool rules for the consolidated Penasco Draw San Andres-Yeso Pool, which was consolidated in Case 3454 and also for the Eagle Creek-San Andres Pool, which is similar in characteristics and located in this general vicinity.

These special pool rules were designed by applicant to permit the running and setting of a minimum of one string throughout the fresh water zones and, also, if trouble with fresh water develops to provide for a warning to both the operator and to the Commission of that condition and to have the whole in such condition that remedial action can be taken as directed by the Commission's representatives.

With that explanation, we feel like the testimony in

one case will be substantially the testimony in the other, and for that reason we would move to consolidate Cases 3454 and 3502.

MR. HATCH: This would be for the purpose of testimony only?

MR. LOSEE: Yes, sir.

MR. PORTER: And you would expect two separate orders to be entered in the cases?

MR. LOSEE: I think of necessity they have to be, yes sir.

MR. PORTER: Are there any objections to the consolidating of these cases for the purpose of taking testimony and making the record? The cases will be consolidated.

Are there any other appearances in this case? Anyone desire to make another appearance at this time, or anyone desire to present testimony?

Mr. Losee, you may proceed with your witness.

MR. LOSEE: I have two witnesses, Mr. Yates and Mr. Gray.

MR. PORTER: Please stand and be sworn at the same time.

(Witnesses sworn.)

RALPH L. GRAY, called as a witness, having been previously duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. LOSEE:

Q Would you state your name, please?

A Ralph L. Gray.

Q Where do you live, Mr. Gray?

A Artesia.

Q What is your occupation?

A Consulting petroleum engineer.

Q How long have you been engaged in that occupation?

A Approximately eight and a half years.

Q How long have you been in the engineering field,
petroleum engineering?

A Approximately twenty-seven years.

MR. LOSEE: Mr. Chairman, are Mr. Gray's qualifications
as a petroleum expert satisfactory to the Commission?

MR. PORTER: Yes, sir, they are.

Q (By Mr. Losee) Mr. Gray, do you have before you a
set of the applicant's proposed special rules and regulations
for the Eagle Creek-San Andres and Penasco Draw-San Andres
Pools?

A Yes, I do have.

Q Would you go through these rules and explain the
applicant's position with respect to each rule and the purpose
for which it was designed?

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A Rule Number 1 states that these wells in the Eagle Creek-San Andres and the Penasco Draw San Andres-Yeso Fields will be operated in accordance with the general statewide rules of the New Mexico Oil Conservation Commission unless such general rules or regulations are in conflict with the special rules in which the applicant is recommending at this time. In that event, the special rules would apply.

Rule Number 2 provides that a single string of casing of sufficient size to accommodate the running of additional strings of casing if ever deemed necessary, but in no event less than 4 1/2 inch O.D., shall be required for all wells in the pool; and it further states that the casing shall be set at a point at least 150 feet below the base of the Artesian underground water zone, and such base is identified at a point 942 feet below the surface and the Yates Petroleum Corporation, Yates A.S.C. No. 1 Well located in the Northeast quarter of the southwest quarter of Section 25, Township 18 South, Range 25 East. The purpose of Rule Number 2 is to designate a definite point at which this string of casing will be set and to insure that the mechanical conditions of the whole will be such that a second string of casing can be run if there is ever a need for it.

Rule Number 3 provides that, if practicable, sufficient cement will be used in cementing this casing in order to fill

back to the surface of the hole, provided, however, that the authorized field personnel of the Commission may at their discretion allow exceptions to this rule when abnormal conditions are encountered. Actually, this rule is actually following the same practice that exists at this time. Occasionally, it is necessary to deviate from normal practice due to lost circulations zones and in a number of cases it is necessary for approval to be obtained from the Field Office of the Oil Commission in order to cement these unusual conditions in a satisfactory manner.

Rule Number 4 states that the casing shall be tested in accordance with the regular testing provisions of Rule 107 of the Rules and Regulations of the Commission.

Rule Number 5 states that after recovering load water, if any well makes 20 barrels of water per day, or more, then the operator shall immediately notify the District Office of the Oil Commission in writing of this fact, and at the same time shall furnish the Commission with an analysis of the water being produced from the well. Thereafter, the operator shall take such remedial steps, if any, as may be directed by the authorized field personnel of the Commission.

Now, the purpose of Rule 5 is to insure that if there ever is a case where the shallow fresh waters communicate with the oil reservoir, due to casing failure or other means, that

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this condition will at that time come to the attention of the Commission and proper remedial measures then can be worked out to make the necessary repairs.

Rule Number 6 states that if a well is shut-in or temporarily abandoned for a continuous period of sixty days, the operator shall set a plug in the casing at such depths as may be suitable for isolating the producing zone in the well, unless authorized field personnel of the Oil Commission shall in writing extend the time for setting this plug.

The purpose of Rule 6 is to insure that no well will be temporarily abandoned or shut-in for any long period of time without coming to the attention of the Commission.

The thought in mind there is that should some operator shut a well in for a long period of time, and during this time should corrosion or other circumstances cause the casing to fail and permit water from these fresh water sands to come in contact with the oil reservoir below, if there wasn't a plug or some method used to isolate them, this could occur without anyone knowing about it. So, under Rule 6 we feel that this will insure that should a well be shut-in for any length of time, the operator will be required to set this plug, and there will be no chance for the two floods to come in contact with one another.

Q Mr. Gray, an enlarged portion of Exhibit 1 is on the

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board, which is the map showing the location of these fields. Would you explain to the Commission what this exhibit reflects?

A Exhibit 1 is a map of this general area; the pool boundaries of the Eagle Creek Draw Pool are shown with a red line on the map, and also the pool limits to the Penasco-San Andres Yeso Pool are also shown with a red line designating the pool boundaries.

Also, wells producing from the San Andres formation are designated on the map with red circles around each of those wells, in each pool, and then in the case of the Penasco-San Andres Yeso Pool we have indicated the wells that are producing from the San Andres Yeso formation by a green circle around each well. That will identify the zones that each well is producing from, and, in addition, we are going to introduce a cross section which we will call Exhibit No. 2 and the traverse of this cross section is indicated on this map with the red dotted line and these will be identified later in connection with the wells.

Q Will you please refer to what has been marked Exhibit 2, which is the cross section that you have just referred to, and explain what is portrayed by that exhibit?

A Exhibit No. 2 is a cross section that extends from the original four-mile draw area, which is located in parts of

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Sections 3 and 4 in Township 19 South, Range 25 East, extending up into the Penasco-San Andres Yates area in Sections 25 and 26 in Township 18 South, Range 25 East, both of which of these areas are now consolidated into one pool.

The log on the left side of the Exhibit No. 2 is a gamma ray neutron survey of Yates Petroleum Corporation State AX No. 1 and this well is located in the northeast quarter of Section 4, 19 South, 25 East; the center log on the cross section is the Martin-Yates, the 3rd LDY No. 1 well and this well is located in the northwest quarter of Section 26 of 18 South, 25 East.

The log on the extreme right side of the cross section is the Yates Petroleum Corporation's Girard AW No. 1 well, and this well is located in the southeast quarter of Section 25, 18 South, 25 East.

The purpose of this cross section is to show the geological formation encountered within the vicinity of the producing zone. The location of the four and a half-inch casing is indicated on the cross section, and these particular wells, in the case of the State AX No. 1 well, the four and a half casing was set down throughout the shallow water bearing formation. In the case of the LDY No. 1 well, the four and a half was actually set deeper; this being one of the earlier wells in which the operator was attempting to obtain information

and at the time the character of the pay was not as well established as they are at this time.

In the Girard AW No. 1 well, the four and a half-inch casing is also set below the shallow water bearing formation. Each of these wells have open hole -- it has been exposed below the four and a half. The top of the San Andres zone is shown on the cross section and it is identified as such.

Additional zones are shown on the cross section, these being merely correlation zones for correlation purposes.

The top of the Glorieta Formation, and the top of the Yeso Formation are also indicated on the cross sections. The individual detailed explanations of the pay will be further described in Exhibits 3 and 4.

Q Now, Mr. Gray, this cross section actually extends across the entire limits of this Penasco-San Andres-Yeso Pool, does it not?

A Yes, sir.

Q When you said, referred to the depth at which the casing was set in the State AX No. 1 and the Girard AW No. 1, I believe you stated that it was set through the shallow water formations. Actually, do you not mean that that was set through both the shallow and the artesian underground water?

A That's correct. It is set through all of the water

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zones, down to and including the top portion of the San Andres formation.

My reference to the shallow water is strictly my interpretation there, more properly they would be identified as all waters, including the san andres waters.

Q Would you now refer to what has been marked as Exhibit 3, being the gamma ray neutron log of the Yates Petroleum Corporation "AS" Fee #1 well, which is also on the board, and explain what it portrays?

A All right. The location of the Yates "AS" No. 1 well is in the northwest quarter of Section 25, 18 South, 25 East. Exhibit No. 3 shows the top of the San Andres formation, which is encountered at a depth of approximately 711 feet from this log. The base of the artesian water zone is indicated on Exhibit 3 with a green line which is indicated at a depth of approximately 943 feet. The proposed casing point, as set out in these proposed rules, is indicated on Exhibit 3 by the red arrow, at a depth of approximately, 1,093 feet, on this log. This point represents the minimum distance that the operator shall have between the base of the artesian waters and the casing points. The operator, of course, has the option to set the pipe lower than that point if he desires. Then the top of the pay as encountered in the AS No. 1 well is indicated on this log with a dotted red line which was encountered at a

depth of approximately 1,235 feet.

Now, one of the problems encountered in completing these wells is that there are a series of very thin, widely scattered zones of porosity and permeability which extends over a very thick vertical interval. In some cases this vertical interval is in the neighborhood of 1200 feet, so you will notice on the log that there are numerous zones of porosity kicks that are reflected on the log. It is difficult in some cases to establish just which one of these little intervals will actually contribute to production. The method of setting casing through all of these zones and going back and perforating and treating them offers a major problem. One problem is that many of these zones have a thickness of perhaps six inches or a foot. They're very thin zones. If casing is set through and you have to go in and perforate these zones, exceptional accuracy is demanded in order to put perforations in the proper places.

Also, in many cases, perhaps one or two holes would be -- would exist in the pipe into these little thin zones, and under those conditions it is practically impossible to frack those individual zones with volumes and injection rates that are demanded to insure a successful treating job.

As a result of the unusual condition the operator has found by experience that in order to get a successful

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completion it is very essential that all of these zones be left open, and at the present time he has developed a treating technique which involves starting at the bottom of these open holes. In cases where the Yeso is open also, the operator treats these zones and intervals of approximately 200 feet at a time, and the method used is to first set a suitable packer in the open hole, above the zone that will be treated. These zones are broken down with acid and then the packer is pulled and the well is fracked down the casing. This being necessary in order to get the high injection rates that are necessary to treat the formation properly, and since the lower zones have already been broken down with acid, well, then frack treatment so far goes in to these treated zones that have been broken down, and that portion of the wellbore is treated. Then the operator feels that this treated zone back with zone over this interval, this same technique then is carried in steps on up the hole, so in some cases, as many as five stages are necessary to treat all these individual zones in a particular well.

I think that pretty well shows the problem.

Q Mr. Gray, now in the area of these pools, the Penasco Draw and the Eagle Creek Pools, have you made a study to determine if there is any water present or that has been found present in either the oil bearing portion of the San Andres and

the Yeso?

A Well, it has been shown by various completion methods used that there are no zones in this area, either in the San Andres or the Glorieta or the Yeso, which are normally penetrated and are open in completions.

There are no zones in these vertical limits that contribute any substantial amount of waters. Now, the character of these reservoirs is such that we normally obtain small volumes of water sometimes in producing the wells, the formations in both the San Andres and the Yeso have very low permeability and porosity and normally where you have these conditions there is a high water saturation in the reservoir, that is a high connate water saturation. Many of these wells make very small amounts of water but nothing substantial.

Now I think there has been some apprehension in the minds of some people that perhaps the Glorieta will carry water, and I think their objections in having open hole completions were based on the fear that water might exist in the Glorieta formation. I would just like to comment on some of the wells that have been drilled through this formation to show that water is not present in the Glorieta in this area.

The Yates Scout No. 1 well located in Section 34 of 18 South, 25 East, was drilled with cable tools and this well penetrated to a depth below the Glorieta. No water was

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encountered in the hole in the Glorieta on that well. Yates Federal No. 1 well located in Section 25 of the same Township and Range was also drilled in with cable tools and the well penetrated the Glorieta and no water was encountered in that well in the Glorieta. The Yates Girard AW No. 1 Well, located also in Section 25, was completed with the Glorieta formation open in the wellbore, and no water is being produced there. The same condition with the open hole completion exists in the Martin-Yates, the 3rd LDY No. 1 Well, which is located in Section 26 of the same Township and range. The Yates Schevrich No. 1 Well, which is located in Section 3, Township 19 South, Range 25 East, was drilled through the Glorieta section with air and in this case no water was found to exist in the Glorieta.

The Yates Petroleum State AX No. 1 Well, located in Section 4 of Township 19 South, Range 25 East is also completed with open-hole through the Glorieta and no water is being produced from the formation here; so I think it is pretty evident that in this area we don't have a problem of having to isolate any water zones from the normal producing sections.

Q Mr. Gray, would you now refer to Exhibit 4 which is again on the board, being the gamma ray neutron log of the Yates Petroleum Corporation Gissler "AV" No. 1 and explain generally what is portrayed by that exhibit?

A Exhibit No. 4 is a gamma ray neutron log of the Yates Petroleum Corporation Gissler "AV" Number 1 Well. This well was located in the northeast quarter of the northwest quarter of Section 23, Township 17 South, Range 25 East. The purpose in showing this log is to show a typical log in the Eagle Draw Field.

The top of the San Andres formation is indicated on the log with a red dotted line, which is found at a depth of approximately 714 feet. Then the base of the artesian water zone, which is in the San Andres formation, is indicated by the green horizontal line which is encountered at a depth of approximately 1056 feet. The proposed casing point as proposed by these rules and regulations are indicated by the red arrow at a depth of approximately 1209 feet on Exhibit 4.

The top of the pay is indicated on this log by a red dashed line which is shown at a depth of approximately 1285 feet. These exhibits 3 and 4 are just merely shown to show a typical log and also to show a numerous scattered zone of porosity and permeability which are normally encountered.

Q One of those logs, the first one, Exhibit 3, is of a well in the Penasco Draw Field and the other one is a log of a well in the Eagle Creek Field.

A Yes, sir, that's right.

Q I think the witness might sit down, now. Mr. Gray, in

your study of these two fields, do you have an opinion as to whether the characteristics of these water bearing, fresh water bearing formations are similar in both fields?

A Yes. They appear to be similar.

Q Please refer to what has been marked as Exhibit 5, and explain what is reflected by this tabulation of production figures.

A Exhibit No. 5 shows a tabulation of oil and water production for wells in the Penasco-San Andres-Yeso Pool and also for wells located in the Eagle Creek-San Andres Pool.

Annual oil production and water production figures are shown for the period up through 1963, then beginning with January, 1964 through October, 1966, these tables show monthly oil and water production figures and in addition, the cumulative oil production figures for each well is shown at the lower portion of the pages for each well as of November 1, 1966.

The Schevrich Federal No. 1 Well is one of the older wells in this area and this well was completed in 1957. Since 1957, this well has recovered a total of 4020 barrels of oil. You will note in reading Exhibit 5 that in general the oil productivity of most of these wells is very low. Some of them producing one or two barrels a day on up to ten barrels or so and then there are areas -- there is one well that at the present time is producing about 60 barrels per day.

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I'd like to call your attention to Yates "AS" Fee No. 1 Well, which started producing in April, 1966, and through October has produced 4487 barrels of oil; but you will note that the oil production through September averaged only about 12 barrels of oil per day. Then, in October, 1966, the operator went back into this well and treated the zones in the new manner which has been described previously, and this work was successful in increasing the oil production so that the oil produced during October was 1860 barrels of oil. The operator is convinced that this completion technique can be applied to other wells and will result in more prolific completions being made. Of course, under the normal completion procedure under which most of these other wells were completed, well, I think it's perfectly obvious that these wells would not pay out and certainly an improvement would have to be accomplished in order to insure that the commercial wells can be completed.

In the case of the wells in the Eagle Draw Pool, you will also note that these wells are very low in productivity and the same completion provisions apply to this area as well as the Penasco area.

Q Mr. Gray, please refer to what has been marked as Exhibit 6 entitled San Andres Water Analysis and Explain what is reflected by this exhibit.

A Exhibit 6 has been prepared to show typical formation waters that have been produced from wells located in the Penasco-San Andres-Yeso field.

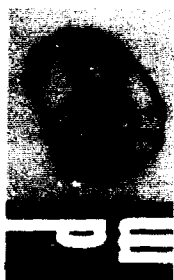
The specific gravity on -- Well, first, may I state that these water samples on the Girard AW No. 1 and the AS Fee No. 1 wells were obtained approximately three days ago so they are recent samples. The samples on the Grissler AD No. 1 was obtained several months ago.

The specific gravity as shown by Exhibit No. 6 varies between 1.074 for the Gissler AV No. 1 Well, up to 1.135 for the AS Fee No. 1 Well. The chloride content is the tool that is most used for identifying water, and in the case of the AW--Girard AW No. 1 Well, the chloride was 121,500 parts per million the chloride content was 121,500 parts per million chloride for the AS Fee No. 1 Well, and the Gissler AV No. 1 well was 61,600.

We do not have an analysis of the artesian water zones at this time. We think perhaps, that other regulatory bodies do have analyses of the artesian waters, but we do know them to be fresh water and the analysis we are certain will be distinct, and will have no similarity at all with the water analyses on these formation waters.

Q Now, Mr. Gray, the Girard No. 1 and the AS Fee No. 1 are located in the Penasco Draw Pool, are they not?

A Yes, sir.



Q And the Gissler No. 1 is in the Eagle Creek Pool?

A Right.

Q Now, the sample from the Gissler No. 1 was taken, was it not, shortly after the well was initially drilled?

A Let's see. The date of this sample analysis was September the 24th of 1966. Now, the Gissler No. 1 Well actually was completed in 1960, but the well was shut-in for several years and actually this sample analysis represents a rather recent -- I'm sorry, I beg your pardon. Yes, the Gissler No. 1 Well in which I referred to as being completed in 1960 was the Miller Brothers Gissler No. 1 Well, so the Yates Gissler No. 1 Well was completed in 1966. That's correct.

Q And actually, Mr. Gray, the difference in the chloride content from the water of this well and the other two Penasco Draw Wells might well be contributed to the completion procedure used in the completion of the Gissler Well?

A Would you restate that, now?

A The distinction in the chloride content between the two Penasco Draw Wells and the Eagle Creek Well might well be attributed to the fact that the Gissler well had recently been completed, and treated with fresh water when it was completed?

A Yes, that is a possibility, because these wells are

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fracked with fresh water, and usually it takes a fairly long time for all of the fresh water to be recovered, so it is very possible that a sample from the Gissler well was still contaminated to some extent with the fresh treated water.

Q Please refer to what has been marked as Exhibit 7 entitled "Well Cost with Lease Equipment Committed" and explain what is the purpose of this exhibit.

A The purpose of Exhibit No. 7 is to show what we consider to be representative cost for completing wells under various conditions in these areas.

The first column is headed "Two Casing Strings, One Set Through the Pay". Costs under this column are the approximate costs for wells which would be completed in accordance with the present rules of the Commission.

Then the second column is headed "One Casing String Complete in Open Hole" and the figure shown in this column represents normal cost that would be expected for wells which would be completed in accordance with the proposed rules and regulations.

The third column shows the difference in cost of the two methods. The first figure of \$36,240.00 is for a San Andres completion at depth of approximately 2,000 feet. This compares with a figure of approximately \$30,710.00 for a San Andres completion at this depth, only using one string of pipe

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in open hole completion. The saving here would be \$5,530.00.

Then the next line shows a cost of \$44,980.00 which is an estimated figure for a Yeso-San Andres completion at a depth of 2,600 feet for two strings of casing, and one set through the pay. This compares with the figure of \$36,240.00 for a Yeso-San Andres completion using one casing string and the well being completed in open hole. This difference is \$8,740.00.

Now, these figures shown for the two-string program and one string set through the pay, actually, we feel that these figures are very low, and it is entirely possible, in fact probably, that these figures would be even higher than those shown.

As an example, the Yates Girard AW No. 2 Well, which is now in the process of being completed, this well was drilled and completed in a manner which was prescribed by the present rules of the Oil Commission which involved setting two strings of casing and one string being set through all of the pay zone and completion being made by perforating individual zones and treating in stages.

The perforating cost alone on this well has been \$4,000.00 and the total monies spent up to this time is now over \$60,000.00 for the well.

I think that is a pretty clear indication that this is

so excessive that certainly the operator couldn't or wouldn't want to proceed on a development program if the well costs are going to be this high because the chances for payout are extremely doubtful with well cost in the neighborhood of this figure.

Q Now, Mr. Gray, Rule 2 proposed, provides for the minimum size of the casing to be 4 1/2 inch O.D. Would you explain how this size casing and what other size casing would permit in the event of trouble, casing failure, the running of a second string of casing a subsequent date, if such were needed?

A The normal weight of 4 1/2 O.D. casing used in these completions is 9.5 pounds casing which has an internal diameter of 4.09 inches. Now, it is possible to run a second string of casing through this using 2 7/8 O.D. regular non-upset type, which has a coupling O.D. of 3 1/2 inches. The outside diameter of the pipe body itself, of course, is 2 7/8 inches and the internal diameter of this pipe is 2.347 inches.

Now, the use of this 2 7/8 O.D. second string of casing would accomodate a production string of tubing of 1.9 inch O.D. which we customarily refer to as 1 1/2 inch tubing. This tubing has an O.D. of 2.2 inches, and if additional room is needed, a special clearance joint can be obtained which has the O.D. of 2.104 inches, so it can be seen that even

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with pipe as small as 4 1/2 O.D. casing that it is possible to run a smaller string of casing and then run the 1 1/2 inch of production tubing.

Now, in cases where the operator would like more room 5 1/2 inch O.D. 13 pound casing can be used. This has an internal diameter of 5.044 inches. This would accomodate a second string of 3 1/2 O.D., a non-upset casing which has a coupling O.D. dimension of 4.25 inches and an I.D. of 2.943 inches.

So we feel that the use of casing down to as small as 4 1/2 inch casing will permit the running of a second smaller string of casing at a later date if this should be required.

Q Mr. Gray, in the event of a casing failure, due to corrosion or excessive frack pressure, but if it does occur, what procedure could be taken to further isolate the fresh water?

A Well, of course, the extreme case would be to run the second string of casing, if that's required. The extent of the casing failure and the location, of course, would dictate what type of remedial measures were actually necessary. I can visualize that there would be some conditions in which the repair could be made, possibly, even without running a second string casing through either squeezing the zone or by the use

of seals which are available for casing failures, but certainly in the extreme case it would be possible to run the second string of casing and make the repair.

Q Mr. Gray, in your twenty-eight years' experience in the oil field, how many wells have you had an opportunity to be closely associated with, would you estimate?

A I made a rough calculation the other day, I think it would be somewhere around 2,000 wells.

Q Out of those approximately 2,000 wells, in how many cases was there a casing failure by corrosion or fracking treatment?

A Actually, I could not recall more than perhaps four or five wells in all that number, but there has been a casing failure to my knowledge.

Q So that actually the ratio of casing failures within your experience has been somewhere of a fraction of five over two thousand?

A I think that is a reasonable estimate.

Q Mr. Gray, using the blackboard, would you draw a diagram for the Commission which compares the one string casing program proposed by these rules to the two string program expressly or impliedly required by the Penasco order?

A Diagram No. 1 shows a hypothetical case where the heavy solid line represents the lower portion of the casing.

The cross-hatched portion on each side of that represents cement in the hole behind the casing, then below the casing point there will be open hole.

There has been some fear in the minds of some that it might be possible that the cement bond, for example, between the formation and the casing could fail and would permit communication with upper fresh artesian water zones. This, of course, could occur by a failure in the bond between the cement formation, and it's conceivable that you could have communication develop along some plane existing between the formation and the cement bond.

Also, there is a possibility, of course, that in fracking the oil formations below, that there would be communication develop between the upper artesian waters and the oil pay below through, let's say, vertical communication through fractures that might be developed in the formation. Actually, these conditions haven't been found to exist but there are some who think that these conditions could exist under certain conditions, however, I think that even if we run two strings of casing that we are not actually getting away from these possibilities.

Diagram No. 2 shows the case of where two strings of casing may be used. Each casing string is indicated by a heavily drawn vertical section representing casing and, here

again cement is indicated by cross-hatched portions.

The same condition can be present here. It is possible for the bond between the cement and the formation to fail, and in such a case it's possible that communication with the Artesian waters could be established by this failure of bond between the cement and the formation; but there again, this failure could go right on up past both strings of casing and then the same condition that we referred to on the fracking possibility also could exist here. You could have a system of vertical fractures which could connect with the artesian waters and might possibly establish some type of communication in that manner. But I would just like to emphasize in the case of either of these, the existence of two strings of casing will not prevent this from occurring.

Q Mr. Gray, in your study of these two fields, have you also made a partial study of the Atoka-San Andres field that adjoins -- or not adjoins, but is three or four miles northeast of the Penasco Draw Field?

A In a general way, Yes, sir.

Q Do you know if in any of these three fields there are other wells completed with only one string of casing set throughout the entire fresh water zone?

A Yes, I am aware that there are some.

Q Do you know of any problem that has been encountered

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in any of these three fields from casing failure?

A I don't know of any case, no, sir.

Q Now, I think from looking at the production figures it is rather obvious that the wells have to be pumped, which I think is the case in all of these wells in both fields. Could you explain what protection this factor creates, as far as separating the fresh water zone from the oil producing zone?

A Well, I think it is absolutely essential from the operator's standpoint that the upper artesian water zone be isolated from the oil producing section, because, first of all, these wells are all pumping and the current level that exists under producing conditions is very low, in fact, the wells are kept pumped off, so the operator could not tolerate these upper waters coming into the wellbore and wetting out the oil zones and having to be produced because the capacity of the pumping equipment is very small, and certainly if communication were established with the artesian zones the operator would either have to quit producing the well or would have to take some remedial steps to shut off that water because they couldn't be produced together.

Q Mr. Gray, from your study of this, do you have an opinion as to whether the proposal of applicant in the Eagle Creek and San Andres-Penasco Draw Pools would permit the recovery of oil which might not otherwise be recovered under

existing rules -- completion rules of the Commission?

A Well, the operator indicated to me that it is not economically attractive to develop the area in a manner in which ne had intended if the procedure, the present procedures were followed throughout because the costs were very definitely too high to permit a reasonable possibility for payout, so, it's my opinion that if the present rules continue, that the operator is going to curtail development programs and certainly the areas won't be developed.

If the rules can be established in a manner that will permit cutting of these costs, then it is possible that it will be attractive enough that the operator will want to go ahead and develop these areas.

Q MR. Gray, were Exhibits 1 through 7 prepared by you, or under your direction?

A Yes, sir.

MR. LOSEE: The applicant moves the introduction of Exhibits 1 through 7.

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

(Whereupon, Exhibits 1 through 7 offered and admitted in evidence.)

MR. PORTER: Does anyone have a question of Mr. Gray? Does that conclude your direct?

MR. LOSEE: I just want to ask him one catchall question, Mr. Chairman, please.

Q (By Mr. Losee) Mr. Gray, do you have anything further that you would like to add?

A I don't believe so.

MR. LOSEE: Thank you.

MR. PORTER: Does anyone have a question of the witness?

Mr. Nutter?

CROSS EXAMINATION

BY MR. NUTTER:

Q First of all, that is a broad catchall.

Mr. Gray, before I start asking you questions, I would like to make it clear that the questions that I am directing to you are concerned with Case 3502, the new case for the special pool rules for this area, and I am not directing my questions towards Case 3454, which is a De Novo hearing. I will try to keep my questions separated as to the particular case.

First of all, Mr. Gray, are you acquainted with the order of the State Engineer which is entitled "Order No. 63" and was entered by the State Engineer on September the 11th, 1956 and is an order prescribing specifications to be filed for the installation of the water protection casing string on wells

drilled in artesian bases?

A I have not read a complete copy of the order. I am acquainted with certain aspects that have been outlined in the order, but not the complete order.

Q Are you acquainted with the State Engineer's Order No. 73 which was dated January 20th, 1959 and which is an amendment in effect of Order No. 63?

A No, I am not acquainted with it identified in the manner that you identified it. I may be acquainted with the text of it, I am not certain, I would have to know what the amendment referred to.

Q Well, as I mentioned before, the first order was specifications for the installation of the water protection string and this second order, in essence, contains only two orders, first being as follows: "Any deviations --" it's referring to Order No. 63, and it says, "Any deviations from the above described casing, cementing and testing program must be approved by the USGS and the State Engineer on Federal lands, or the New Mexico Oil Conservation Commission and the State Engineer on all other lands.

In all cases the diameter of the drillhole shall be at least two inches greater than the outside diameter of the casing used through all water producing formations." Those are the only two portions of it that are indicative of the order except

for the finding of it.

A I am familiar with those, yes, sir.

Q Are you acquainted with the general rules and regulations that were entered by the State Engineer's Office? What was the date of those, Frank?

MR. IRBY: Approximately November 1 of 1966.

Q (By Mr. Nutter) Are you acquainted with the general rules and regulations put out by the State Engineer's Office approximately November 1?

A I haven't read the complete set of rules, no, sir.

MR. NUTTER: I would like to request that the Commission take administrative notice of these two State Engineer's orders and also the State Engineer's rules and regulations which are on file in the Commission offices. I think they may be pertinent to the water production string, not to the oil producing string.

MR. LOSEE: Was there a specific portion of the rules and regulations that you wanted to direct our attention to?

MR. NUTTER: Yes, sir. In particular of these general rules of the State Engineer's Office, Sections 4-15, 4016, 4017, and 4-18 refer to the construction and the casing and cementing program for water wells in the artesian water basin.

MR. LOSEE: 4-15 through 4-18, that is limited to the

specifications for the construction of water wells in the artesian water basin.

MR. PORTER: Do you have any comment concerning the proposal for the Commission to take administrative notice of these orders and the general rules and regulations, Mr. Losee?

MR. LOSEE: No, sir. With the specification with respect to the rules just immediately adopted that they will be Sections 4-15, 16, 17 and 18.

MR. PORTER: Specifically?

MR. LOSEE: Specifically.

MR. PORTER: The Commission will take administrative notice.

Q (By Mr. Nutter) Now, Mr. Gray, in proposing your pool rules as shown on your proposed written pool rules, you do not go into any details as to the type of the cement, the diameter of the hole, the casing-shoe or any of these details which are referred to by the State Engineer in his order for the construction of this water protection string. What was your intent in that regard?

A Well, I am assuming first of all, that the bit size used in drilling the hole and which this casing string is to be cemented is sufficient size to comply with the rules. In other words, at least two inches of clearance, and I am also assuming that the type of cement used will be approved in a

program approved by regulatory bodies, which I believe is done at the present time, if I am not mistaken.

Q Well, by being silent on that portion in the pool rules, now you say that these pool rules would apply where they are in conflict with general rules?

A Yes, sir.

Q But the general rules of the Commission do not specify that a hole diameter has to be a certain size and the general rules do not specify that you have to use a certain type of cement on any casing string. Would you, by being silent then on that portion in your pool rules, then those general rules would apply and there would be no requirement as to hole size in above casings and type of cements?

A Well, it is my opinion that we would operate under the present procedure that we use now in that respect.

Q In other words, at any point where your pool rules are silent the present procedure would be followed?

A Yes, sir.

Q And be that the procedure as outlined in the New Mexico Oil Conservation Commission Rule Book, or in this Order No. 63, which is the present current practice for the design and installation of the water protection string. In other words, where your pool rules are silent the present method of operation would continue to be followed?

A Yes, sir.

Q Now, when we get to the Order No. 63, we have one long paragraph on Page 1, which describes how this water protection string is to be designed and installed, and then we get to Page 2 of the short paragraph at the top of that order which reads as follows: "The oil production string or strings shall be landed and cemented as specified by the United States Geological Survey or the New Mexico Oil Conservation Commission." So I take it then, in reading your proposed rules now these State-wide rules -- I mean the State Engineer rules which would be applicable in the absence of a specific exception in your rules, and these statewide or these State Engineer rules would be applicable, and the oil production string would be lined and cemented as specified by the USGS or the OCC. Now, in effect, what you're asking is that the OCC and the USGS not prescribe any oil string at all?

A Well, I think what we intended to show in our testimony was that in this particular area the water protection string and the oil production string are set at approximately the same point and for all purposes, then, two strings aren't actually required, one string is serving both purposes.

Q Well, it becomes a matter of schematics whether we call it the water protection string or the oil production string?

A Yes, sir.

Q But if we call it the water protection string then we have no oil production string?

A Well, it depends on how you want to look at it.

Q If we could, ---

A I prefer to look at it in a manner that we do have an oil production string and we do have a water protection string but they are one and the same.

Q Then you would not call it one or the other, you would call it water protection string and oil production string?

A Yes, sir.

Q You mentioned, Mr. Gray, that as far as you can tell in these particular wells that have been drilled so far, there was no water in the Glorieta?

A That's right.

Q Now, the Glorieta does produce water through many areas of Southeast New Mexico, does it not?

A Yes, in some areas I think it does.

Q And there is even an indication on the log on your Exhibit No. 2 that Girard AW No. 1, there is even an indication of a small amount of porosity in the Glorieta, although there did not seem to be any oil show there, there appears to be a little porosity there, does it not?

A Well, of course, sometimes there is a small degree

of porosity present in some of these intervals, but most of the time they lack permeability, so in effect, if they don't have permeability for all practicable purposes, well, it's tombstone.

Q Now, isn't it your understanding that the general plan of the operators who are the applicants in this case propose a rather widespread program in this general area? That is, it is not particularly limited to the Eagle Creek and the Penasco Draw Pools, but eventually might even connect the two areas?

A Well, I think the only thing that we can do really, is to provide a set of rules that applies to this particular area at this time. Now, it is possible that some future development might occur which will show that there are some conditions existing some place else that differ from those found up to now, and certainly if there should be an area developed later on that, for example, would have water in the Glorieta, I think the operator would be about the first one to admit that certainly you are going to have to set through that because as I stated before, you can't tolerate the producing of a water zone along with the low productive oil zone.

Q Now, isn't one of the reasons for wanting to use the 4 1/2 inch casing -- Now, I am going outside of the scope of your direct testimony, but recalling some conversations that we had in a meeting a while back, that one of the intents of the

operators here is to be able to have a casing string that's large enough in diameter to get a high injection rate for the fracking and treating process of the well?

A Yes, sir. That's necessary.

Q Now, if you set this 4 1/2 inch pipe and drill on down under that 4 1/2 inch pipe and find that you have porosity in the Glorieta and have to run your 2 7/8 inch casing in there, you wouldn't be able to get those high frack rates then, would you?

A Well, of course, it is rather difficult to foresee just what all the possibilities might be, but if the operator proceeded with the plan that he follows now, well, he will start at the bottom of the Yeso formation and he would work up the hole; well, if he continues on up and finally comes up and treats the zone that proves to have water production in its pay, well, then I am sure that he would want to perform some type of remedial work that would isolate that section, and that may require him to run the second string at that time, and possibly he could open hole the Portion of the Yeso below that point and then possibly perforate the San Andres zone through the second string casing.

Q But he would have already set his 4 1/2?

A Yes, sir.

Q And consequently, he would be limited by the inside

diameter of the 4 1/2 to a small size casing string to be run on down below the Glorieta?

A Well, of course, the portion of the hole that he treated before encountering this water, of course, that would be done down openhole and, of course, when you encounter conditions that are different from any of the conditions that you have encountered up to that time, why, sometimes it is necessary to perform this work in a manner that maybe you wouldn't like to do but of necessity that you have to do it in order to take care of those special conditions.

So, we can visualize any number of special conditions that could be encountered, but the fact of the matter is that there are several wells representing a very wide areal extent and so far in this area there haven't been any conditions develop that the operator thinks can't be handled under these proposed rules.

Q One of the things that you mentioned to remedy a fractured casing, I believe you mentioned one of the possibilities of a casing rupture would be a fracture due to high pressure during the fracking process, and one of the remedies for this was to squeeze the -- if you had a leak in the San Andres would be to squeeze the San Andres formation, correct?

A That would be one possible method, yes, sir.

Q Are you acquainted with instances in Southeast New Mexico, in Eddy County as a matter of fact, where it has taken as many as 26 through 28 squeeze jobs to try to seal off the San Andres?

A Yes, sir. I am familiar with it, and of course, under those extreme conditions, I think probably it would be necessary to run this second string casing.

As we stated before, of course, we think that the possibility of this thing happening is very rare, but should it occur we think that this program will permit you to run that second string of casing.

Q Mr. Gray, Rule 106-B of the Commission's Rules and Regulations reads as follows: "All fresh water and waters of present or probable value for domestic or commercial or stock purposes shall be confined to their respective strata and shall be adequately protected by means approved by the Commission. Special precautions by methods satisfactory to the Commission shall be taken in drilling and abandoning wells to guard against any loss of artesian water on the strata on which it occurs and the contamination of artesian water by objectionable water, oil or gas". Now, I will repeat a portion of that last sentence. "Special precautions shall be taken to guard against any loss of artesian water and the contamination of artesian water." Now, it would appear by reading this, that special

precautions above and beyond what are normally required for the drilling and cementing of wells to protect any fresh water but special precautions in the case of artesian waters must be taken. Now, may I ask you what special precautions you are taking here today?

A Yes, sir. We are taking some special precautions. One precaution is that we state that the operator is required to set a string of casing of sufficient size to accomodate the running of a second string if it is ever required.

Now, I call those "special precautions" because in other areas sometimes operators even make tubing as a completion and that type of thing is ruled out of that area, and secondly, I think that we are taking special precautions by requiring that any well that makes more than 20 barrels of water per day shall be reported to the Commission with an analysis of the water which calls the situation to the attention of the Commission and other people so that if there ever is a case of where communication is established with the artesian water, then all parties will be aware of it and proper remedial measures can be taken.

MR. NUTTER: I believe that's all. Thank you.

MR. PORTER: In other words, that second precaution you are talking about there would be Rule 5 of your proposed rules?

A Well, it would be Rule 2 as well as Rule 5 and even including Rule 6 which pertains to temporarily abandoning or shutting in the wells. I think all three of those rules provide special conditions which normally aren't provided in Statewide rules.

MR. PORTER: Mr. Irby, did you have any questions?

MR. IRBY: I have a statement, Mr. Porter, no questions.

MR. PORTER: Does anyone else have any questions?
The witness may be excused.

(Witness excused)

MR. PORTER: Mr. Losee, how long do you anticipate your direct examination might take on your second witness?

MR. LOSEE: Five minutes.

MR. PORTER: You may proceed.

* * *

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

DIRECT EXAMINATION

BY MR. LOSEE:

Q Would you state your name, please?

A Martin Yates the III.

Q Where do you live, Mr. Yates?

A Artesia.

Q What is your occupation?

A I am an oil producer.

Q How long have you been an oil producer, Mr. Yates?

A About 30 years.

Q Are you familiar with the Atoka-San Andres Field in Eddy County, New Mexico?

A Yes.

Q Now, in general location, is that field located about three miles, three or four miles northeast of the Penasco Draw-San Andres-Yeso Pool?

A Yes.

Q Do you know whether or not the fresh water characteristics that have been found to exist in the Penasco Draw and the Eagle Creek and in the Atoka are similar?

A They are similar, yes, sir.

Q Are all three of these fields located within the Roswell-artesian underground water basin?

A Yes, sir.

Q Mr. Yates, when was the Atoka field discovered?

A In 1940 or thereabouts, I think it was 1940.

Q Approximately how many wells are in the field, now?

A There are approximately 70 wells.

Q When did a great part of the development in this field take place?

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A It took place sometime in the 50's after the advent of fracturing.

Q Do you know if any of the wells in this Atoka field have been completed with only one string of casing set through all of the fresh water zone?

A Yes, there are a number.

Q Do you, or Yates Petroleum Corporation, or any of your brothers with whom you are associated, have any wells in this Atoka field?

A Yes, we have 12 wells between us.

Q Are any of those wells completed with only one string of casing set throughout the entire fresh water zone?

A Yes, sir.

Q Do you have an idea as to how many, approximately?

A Well, I think most of them just have one string.

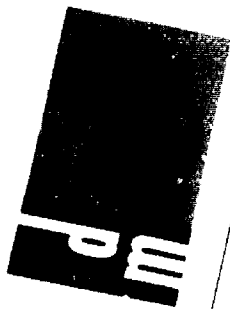
Q To your knowledge, Mr. Yates, have there been any problems in the wells that you have just referred to in which the fresh water has gotten into the wellbore?

A I don't know of any well in the Atoka Pool that the artesian water has gotten into the wellbore hole.

Q That's true not only with your wells but any other wells that you have knowledge of in the field?

A Yes, sir.

MR. LOSEE: I think that's all.



MR. PORTER: Does anyone have a question of Mr. Yates? You may be excused.

(Witness excused)

MR. LOSEE: That is the applicant's case.

MR. PORTER: Does anyone else desire to present testimony?

Are there any statements that anyone would like to make? Mr. Irby.

MR. IRBY: I am Frank Irby, State Engineer's Office. I would say at the outset that the reason for my not participating in the questioning of the witness is that the State Engineer has no desire to assume any of the authority conferred on the Commission by statutes and regulating the oil industry.

Now, some of my remarks may cover points that have been covered by the applicant and by the cross examination, or rather by the questioning of Mr. Nutter, but my statement will vary slightly from the information listed; and with regard to Case 3502, I discussed the special pool rules for these two pools with the district employees of the State Engineer's Office and the other staff engineers and the hydrologist in the organization who are familiar with the Roswell-artesian basin in which both of these pools exist.

We do not believe that the proposed rules provide adequate protection to waters contained in the basin because

of our past experience.

Rule No. 2 provides that only one string of casing in the oil wells to be drilled in the area, and the rule uses 942 below the base of the surface in describing the base of the artesian ground water zone, and information available clearly indicates that it clearly shows that the water zones extend far below this point in the vicinity of the well referred to as Yates AS Fee No. 1. I think this was brought out by one of Mr. Gray's exhibits.

We have case histories on wells constructed in this manner in the past which support our contention that the proposed rules are not adequate.

Leaks have occurred in the past in the water protection string which has shown up in casing collar locator logs, or in other ways. The drill pipe, in completing the well, after the water protection string has been set, may, and sometimes has, caused a hole or a break to develop in the surface casing which in this case would be the water protection stringer.

If the well is fracked and acidized through openhole, sufficient protection will not be afforded, since the acid will often destroy the protection of the cement around the casing shoe by deteriorating that cement. If oil or water leaks develop between the two strings of casing, provided two

are set, and at a point above the shoe of the surface string, they can readily be detected and repaired.

Special Rule 3 appears to me to be a rewording of the Oil Commission Rule 107, but emphasizes the exception to the rule by placing it before the rule. The language "if practicable" at the very beginning of the rule implies a great deal of latitude in the circulating of cement to the surface on the water protection string.

We do not feel that in this particular basin, which is one of the most important basins in the State, because of artesian pressures and the quantity and quality of the water, should be considered for exceptions to the rule which is generally thought to be drafted for use in areas where there is a danger, where there is no danger of contaminating large volumes of fresh water such as, for one example, the Loco Hills area where practically no water is found in the drilling of oil wells.

We feel that the water protection string of casing should be cemented to the surface as is required on all artesian wells drilling within the Basin by State Engineer Rule 4-16.

We feel that in almost every conceivable case in the artesian basin, cement should be circulated to the surface.

We have records showing artesian waters rising to just below the land surface in the area and all of these waters

should be adequately protected.

In Section 22, Township 18 South, Range 25 East, three miles west of the subject well, water levels have risen to a high of 80 feet below the land surface datum, and in a well in Section 5, Township 18 South, Range 26 East, which is 3 1/2 north of the subject well, water levels have risen to a depth of five feet below the land surface.

Both of these wells are artesian water wells used by farmers.

No mention is made in the proposed rules of any water needing protection which is not under artesian pressures and it is our opinion that these waters should also be protected.

One point that Mr. Nutter brought out was the possibility of a squeeze job. Now, if the operator or the driller is unable to circulate cement to the surface for the protection of the water, the water protection stringer then it is highly improbably, if not impossible, to seal this casing from the outer formation by a squeeze job. I think it would more likely be considered impossible than improbable.

It is my opinion that the special rules proposed will not provide the protection required By Section 65-3-11 (2) and this is the reason for my statement to the Commission today.

MR. PORTER: Does anyone else have a statement to make? Mr. Knauf.

MR. KANUF: My name is Jim Knauf. I am with the U.S. Geological Survey at Artesia and I have been asked by Mr. Anderson to read the following statement.

MR. PORTER: Is that Mr. John Anderson?

MR. KNAUF: Yes, sir, Mr. John Anderson.

MR. PORTER: What is his position?

MR. KNAUF: Regional Oil and Gas Supervisor at the USGS in Roswell.

MR. PORTER: Thank you.

MR. KNAUF: The U.S. Geological Survey supervises oil and gas operations on Federal lands and the Penasco Draw, and the Eagle Creek Pools in Eddy County, New Mexico.

The survey feels that the single casing string as proposed in these cases would be a substandard casing program compared with the normal casing program in the United States.

The Survey strongly believes that any casing program for an oil and gas well in any artesian basin such as the Roswell Artesian Basin should consist of a standard or a better casing program.

MR. PORTER: Anyone else, Mr. Losee?

MR. LOSEE: I have a statement, Mr. Porter. Let me direct the first part of my remarks to the rules and the comments that Mr. Irby had to make with respect to Rule 2 first, and then Rule 3.

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The applicant inserted this point 942 feet below as identified in this log to establish a reference point. It is not intended by the rule, nor do I think it is a proposed fact to state that 942 feet throughout the field will be where the pipe will be set, or 150 feet below that point. The rule provides that it will be set 150 feet below the base of the artesian ground water as such was encountered in this well.

And the purpose of inserting that, and frankly the applicant has no objection to deleting the 942 feet encountered in this well, we merely included it for a reference purpose. I think the first phrase of that sentence is the dictatory language requiring that it set 150 feet below the base of the artesian underground water zone.

Under Rule 3, we do not have any objection to deleting the words "if practicable" and start the sentence out reading "sufficient cement." We submitted all of these rules to the regulatory body so that if we were in conflict with respect to language we might change the words. We are not married to any word or any words, I hope, as a lawyer.

I won't attempt to review the evidence. In the first place I cannot do it half as well as my technical witness could on the subject. I would point out one thing, though, that is probably more obvious to a lawyer concerned with the protection of the rights of all people, that a waste will occur, and it

seems obvious, from Mr. Gray's testimony, by not recovering oil that would otherwise be recovered without the adoption of the proposed rules permitting a more economic completion of wells in this marginal area; and that there is not one bit of evidence in this case that one string is not sufficient. To the contrary, it has been shown by experience in a similar producing field in which there is over seventy wells, discovered 26 years ago in the heart of this farming country that there has been no casing failure.

There is not one bit of conflict in evidence that this casing failure is a problem. We recognize that it might occur. We think it is most improbably. The only odds we got were Mr. Gray's and that is fifty-two thousandths; and we think if it does occur the proposed rules are adequate to furnish warning to the Commission and to permit remedial action to be taken.

I would say that in the absence of any evidence on the point which is subject to cross examination by the applicant, showing that these facts that we have offered are not correct, and representative of the field; that the Commission should, and we would hope that you would favorably consider our proposal for the adoption of special pool rules.

MR. PORTER: Anyone else have anything to offer in the case? Mr. Irby.

MR. IRBY: Mr. Commissioner, in view of Mr. Losee's willingness to strike the first two words from Rule 3, it brings another point out. The sentence would then start, "sufficient cement shall be used in the casing to fill the annular space behind the casing to the top of the hole". Now, if they mean that cement will be circulated to the surface that is one thing, but if he just figures on putting in the volume of cement required to fill the annular space, then we can be reasonably confident that a lot of this cement is going to be lost in circulation, when it gets up into these water zones from the shoe, and this would provide no protection whatever to the bare casing wall in the bore-hole.

MR. PORTER: Anyone else have a comment?

MR. LOSEE: Well, I just as well comment. Now, the rule as now written is close to Rule 107 of the Commission which I interpret, to require the circulation of the cement. If the Commission would like to strengthen that language and put in words "of circulation" -- The applicant intends to do that anyway. I think our testimony shows that he has to.

MR. PORTER: If there is nothing further to be offered in the cases, the Commission will take them under advisement. The hearing is adjourned.



I N D E X

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NUMBER	IDENTIFIED	OFFERED	ADMITTED
1 through 7	2	31	31

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STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, DON MCINTYRE, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me; and that the same is a true and correct record of the said proceedings, to the best of my knowledge, skill and ability.

Witness my Hand and Seal this 6th day of January, 1967.

Don McIntyre
NOTARY PUBLIC

My Commission Expires:

July 17, 1970

GOVERNOR
JACK M. CAMPBELL
CHAIRMAN

State of New Mexico
Oil Conservation Commission



LAND COMMISSIONER
GUYTON B. HAYS
MEMBER

P. O. BOX 2088
SANTA FE

STATE GEOLOGIST
A. L. PORTER, JR.
SECRETARY - DIRECTOR

December 28, 1966

Re: Case No. ^{3454 &}
3502
Order No. R-3140-A & R-3169
Applicant:
YATES PETROLEUM CORPORATION

Mr. A. J. Losee
Losee & Stewart
Post Office Box 239
Artesia, New Mexico

Dear Sir:

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

Very truly yours,

A. L. Porter, Jr.
A. L. PORTER, Jr.
Secretary-Director

ir/

Carbon copy of order also sent to:

Hobbs OCC x

Artesia OCC x

Aztec OCC

OTHER Mr. John Anderson, Mr. Frank Irby

DOCKET: REGULAR HEARING - FRIDAY - DECEMBER 16, 1966

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

- ALLOWABLE:
- (1) Consideration of the oil allowable for January, 1967;
 - (2) Consideration of the allowable production of gas for January, 1967 from thirteen prorated pools in Lea, Eddy, and Roosevelt Counties. (Consideration of the allowable production of gas from nine prorated pools in San Juan, Rio Arriba and Sandoval Counties, New Mexico for January, 1967. Presentation of purchaser's nominations for the six-month period beginning February 1, 1967, for that area.

CASE 3473: (De Novo)

Application of Len Mayer for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the NE/4 SE/4 of Section 1, Township 8 South, Range 30 East, Chaves County, New Mexico. Upon application of Pan American Petroleum Corporation, this case will be heard De Novo under the provisions of Rule 1220.

CASE 3454 (De Novo)

Application of Yates Petroleum Corporation for pool consolidation and extension, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the consolidation of Four Mile-San Andres Pool and the Penasco-San Andres Pool, Eddy County, New Mexico, into one pool, and for vertical extension of said pool to include both the San Andres and Yeso formations.

Upon the request of Yates Petroleum Corporation, and pursuant to the provisions of Rule 1220, Case No. 3454 will be heard De Novo to consider modification of Order No. R-3140 to delete any express or implied requirement that more than one single string of casing be set at the top of the pay for wells in the Penasco Draw San Andres-Yeso Pool.

CASE 3502: Application of Yates Petroleum Corporation for special pool rules, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the promulgation of special pool rules for the drilling, casing, cementing, and plugging of all wells drilled to and completed in the Eagle Creek-San Andres and the Penasco Draw San Andres-Yeso Pools, located within the horizontal limits of the Roswell Artesian (underground water) Basin, Eddy County, New Mexico.

-2- December, 1966 Regular Hearing

CASE 3503: Southeastern New Mexico nomenclature case calling for an order for the creation of one pool and the assignment of an oil discovery allowable therein, and the creation, contraction, and extension of certain other pools in Lea, Chaves, and Roosevelt Counties, New Mexico:

(a) Create a new pool in Lea County, New Mexico, classified as an oil pool for Pennsylvanian production and designated the Vada-Pennsylvanian Pool, comprising the following-described acreage:

TOWNSHIP 9 SOUTH, RANGE 34 EAST, NMPM
SECTION 20: NW/4

Further, for the assignment of approximately 48,960 barrels of oil discovery allowable to the discovery well, Midwest Oil Corporation's Vada Lee Pruitt Well No. 1, located in Unit C of said Section 20.

(b) Create a new pool in Lea County classified as an oil pool for Bone Springs production and designated as the Midway-Bone Springs Pool, and described as:

TOWNSHIP 17 SOUTH, RANGE 36 EAST, NMPM
SECTION 13: NE/4

(c) Create a new pool in Lea County classified as an oil pool for Lower Wolfcamp production and designated as the Moore-Lower Wolfcamp Pool, and described as:

TOWNSHIP 11 SOUTH, RANGE 32 EAST, NMPM
SECTION 25: NW/4

(d) Contract the vertical limits of the Moore-Wolfcamp Gas Pool in Lea County, New Mexico, with special vertical limits defined as being from the top of Wolfcamp at 8080 feet to shale break at 8278 feet as in Texaco, Inc., J. H. Moore No. 4, located in Unit C of Section 25, Township 11 South, Range 32 East, NMPM. Redesignate said pool as Moore-Upper Wolfcamp Gas Pool.

(e) Extend the North Bagley-Wolfcamp Pool in Lea County to include therein:

TOWNSHIP 11 SOUTH, RANGE 33 EAST, NMPM
SECTION 14: SE/4

(f) Extend the Blinebry Gas Pool in Lea County to include therein:

TOWNSHIP 22 SOUTH, RANGE 37 EAST, NMPM
SECTION 8: SE/4

-3- December, 1966 Regular Hearing

(g) Extend the Cato-San Andres Pool in Chaves County to include therein:

TOWNSHIP 8 SOUTH, RANGE 30 EAST, NMPM

SECTION 3: SE/4

SECTION 11: SE/4

SECTION 12: SW/4

SECTION 13: NW/4

(h) Extend the Chaveroo-San Andres Pool in Chaves and Roosevelt Counties to include therein:

TOWNSHIP 7 SOUTH, RANGE 33 EAST, NMPM

SECTION 14: E/2

SECTION 23: NW/4

TOWNSHIP 7 SOUTH, RANGE 34 EAST, NMPM

SECTION 18: SE/4

SECTION 29: NW/4

SECTION 30: S/2

TOWNSHIP 8 SOUTH, RANGE 33 EAST, NMPM

SECTION 6: SW/4

(i) Extend the Langlie-Mattix Pool in Lea County to include therein:

TOWNSHIP 24 SOUTH, RANGE 36 EAST, NMPM

SECTION 3: SW/4

(j) Extend the Vacuum-Glorieta Pool in Lea County to include therein:

TOWNSHIP 17 SOUTH, RANGE 34 EAST, NMPM

SECTION 24: NW/4

(k) Extend the Vacuum-Wolfcamp Pool in Lea County to include therein:

TOWNSHIP 17 SOUTH, RANGE 34 EAST, NMPM

SECTION 23: SE/4

CASE 3504: Northwestern New Mexico nomenclature case calling for an order extending existing pools in Rio Arriba, Sandoval, and San Juan Counties, New Mexico.

(a) Extend the Aztec-Pictured Cliffs Pool boundary to include therein:

TOWNSHIP 28 NORTH, RANGE 8 WEST, NMPM

SECTION 7: All of partial section

SECTION 16: NW/4

-4- December, 1966 Regular Hearing

TOWNSHIP 28 NORTH, RANGE 9 WEST, NMPM
SECTION 31: NW/4

TOWNSHIP 29 NORTH, RANGE 9 WEST, NMPM
SECTION 20: SE/4
SECTION 28: W/2
SECTION 29: All
SECTION 33: E/2
SECTION 34: W/2

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

(b) Extend the Blanco-Pictured Cliffs Pool to include therein:

TOWNSHIP 29 NORTH, RANGE 8 WEST, NMPM
SECTION 7: N/2

TOWNSHIP 29 NORTH, RANGE 9 WEST, NMPM
SECTION 12: E/2 & SW/4
SECTION 13: All
SECTION 14: All
SECTION 21: E/2
SECTION 22: E/2 & SW/4
SECTION 23: All
SECTION 24: All
SECTION 26: All
SECTION 27: W/2 & NE/4

TOWNSHIP 30 NORTH, RANGE 8 WEST, NMPM
SECTION 31: E/2

TOWNSHIP 30 NORTH, RANGE 9 WEST, NMPM
SECTION 5: All
SECTION 6: E/2
SECTION 7: E/2
SECTION 8: All
SECTION 13: SW/4
SECTION 14: S/2
SECTION 17: All
SECTION 18: E/2
SECTION 19: All
SECTION 20: N/2
SECTION 23: All
SECTION 26: NE/4
SECTION 27: W/2 & NE/4

TOWNSHIP 30 NORTH, RANGE 10 WEST, NMPM
SECTION 24: E/2

-5- December, 1966 Regular Hearing

- (c) Extend the South Blanco-Pictured Cliff Pool to include therein:

TOWNSHIP 23 NORTH, RANGE 2 WEST, NMPM
SECTION 22: NW/4

TOWNSHIP 25 NORTH, RANGE 6 WEST, NMPM
SECTION 25: N/2 & SW/4

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

- (d) Extend the Blanco-Mesaverde Pool to include therein:

TOWNSHIP 26 NORTH, RANGE 9 WEST, NMPM
SECTION 2: E/2

TOWNSHIP 27 NORTH, RANGE 8 WEST, NMPM
SECTION 34: All

TOWNSHIP 27 NORTH, RANGE 9 WEST, NMPM
SECTION 34: N/2
SECTION 35: All

- (e) Extend the Mesa-Gallup Oil Pool to include therein:

TOWNSHIP 32 NORTH, RANGE 17 WEST, NMPM
SECTION 30: W/2 NW/4

TOWNSHIP 32 NORTH, RANGE 18 WEST, NMPM
SECTION 25: NE/4 NE/4

- (f) Extend the South Blanco-Tocito Oil Pool to include therein:

TOWNSHIP 26 NORTH, RANGE 5 WEST, NMPM
SECTION 21: N/2

- (g) Extend the Table Mesa-Pennsylvanian "C" Oil Pool to include therein:

TOWNSHIP 28 NORTH, RANGE 17 WEST, NMPM
SECTION 27: SE/4 SW/4 & SW/4 SE/4
SECTION 33: NE/4
SECTION 34: NW/4

- (h) Extend the Tocito Dome-Pennsylvanian "D" Oil Pool to include therein:

TOWNSHIP 26 NORTH, RANGE 18 WEST, NMPM
SECTION 9: SW/4

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION :
OF YATES PETROLEUM CORPORATION FOR :
SPECIAL POOL RULES FOR THE PENASCO :
DRAW SAN ANDRES-YESO AND EAGLE CREEK :
SAN ANDRES POOLS, EDDY COUNTY, NEW :
MEXICO :

No. 3502

APPLICATION

COMES YATES PETROLEUM CORPORATION by its attorneys,
Losee and Stewart, and states:

1. That on August 18, 1959, the Oil Conservation
Commission of New Mexico ("Commission"), pursuant to a hear-
ing in Case No. 1737 held on August 13, 1959, entered its
Order No. R-1466 which, among other things, created the
Eagle Creek-San Andres Pool consisting of the following de-
scribed area:

Township 17 South, Range 25 East, N.M.P.M.,

Section 14: SE/4

2. That on October 25, 1966, the Commission, pursu-
ant to a hearing in Case No. 3454 held on September 7, 1966,
entered its Order No. R-3140 which, among other things,
established the horizontal limits of the Penasco Draw San
Andres-Yeso Pool covering the following described area:

Township 18 South, Range 25 East, N.M.P.M.,

Section 25: All
Section 26: All
Section 34: E/2 and SW/4
Section 35: All
Section 36: NW/4

DOCKET MAILED

Date 2-26

Township 19 South, Range 25 East, N.M.P.M.,

Section 3: N/2 and SW/4
Section 4: E/2

3. That applicant is the operator of various developed and undeveloped leases within the boundaries of and within one mile of the boundaries of the Eagle Creek-San Andres and Penasco Draw San Andres-Yeso Pools.

4. That applicant proposes the establishment of special pool rules for the drilling, casing, cementing and plugging of all wells drilled and completed in the Eagle Creek-San Andres and Penasco Draw San Andres-Yeso Pools, and a copy of such proposed rules will be filed with the Commission prior to hearing on this application.

5. The special pool rules are necessary to prevent crude petroleum oil, natural gas or water from escaping in strata in which they are found into other stratum or strata and are requested pursuant to the enumeration of powers granted to the Commission under Section 65-3-11 NMSA 1953 Comp., as Amended.

6. The special pool rules are in the interest of conservation and will prevent waste of oil and gas.

7. Yates Petroleum Corporation, applicant in Case No. 3454, has requested a de novo hearing before the Commission for the purpose of deleting any express or implied requirement that more than one single string of casing be set at the top of the pay for the wells in the Penasco Draw San Andres-Yeso Pool, and this case should be consolidated with Case No. 3454 for hearing before the Commission.

WHEREFORE, applicant prays the orders of the

Commission, as follows:

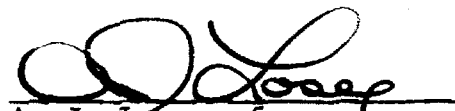
1. That this case be consolidated with Case No. 3454 and such consolidated cases be set for a hearing before the Commission at the next regular hearing date and due notice be given thereof as required by law.

2. That the Commission adopt special pool rules for the drilling, casing, cementing and completing of all wells drilled and completed in the Eagle Creek San Andres and Penasco Draw San Andres-Yeso Pools, Eddy County, New Mexico.

3. For such other relief as may be just in the premises.

YATES PETROLEUM CORPORATION

By



A. J. Losee of
Losee and Stewart
Attorneys at Law
P. O. Drawer 239
Artesia, New Mexico

SPECIAL RULES AND REGULATIONS FOR
EAGLE CREEK-SAN ANDRES AND
PENASCO DRAW SAN ANDRES-YESO POOLS

Rule 1. Each well drilled to and completed within the Eagle Creek-San Andres and Penasco Draw San Andres-Yeso Pools or in the San Andres or Yeso formations within one mile thereof and not nearer to or within the limits of another designated San Andres or Yeso oil pool, shall be spaced, drilled, operated and produced in accordance with the general rules and regulations of the New Mexico Oil Conservation Commission ("Commission") unless such general rules and regulations shall be in conflict with the special rules and regulations hereinafter set forth, in which event the special rules and regulations shall control the spacing, drilling, operating and producing of said wells.

Rule 2. A single string of casing of sufficient size to accommodate the running of an additional string of casing if ever deemed necessary, but in no event less than 4-1/2" OD is all of the casing that shall be required for wells in the pool. This casing shall be set at least 150 feet below the base of the artesian underground water zone as such base was encountered in and identified at a point 942 feet below the surface in the Yates Petroleum Corporation - Yates "AS" Fee #1 well in the NE/4 SW/4 Section 25, Township 18 South, Range 25 East, N.M.P.M.

Rule 3. If practicable, sufficient cement shall be used on the casing to fill the annular space behind the casing to the top of the hole, provided, however, that authorized field personnel of the Commission may, at their discretion, allow exceptions to the foregoing requirement when conditions in a given area render it impracticable.

Rule 4. The casing will be tested in accordance with the testing provisions of Rule 107 of the Rules and Regulations of the Commission.

Rule 5. If after recovering load water any well shall make 20 barrels of water per day, or more, the operator shall immediately notify the District Office of the Commission, in writing, of such fact and furnish such office with an analysis of the water being produced by the well. Thereafter the operator shall take such remedial steps, if any, as may be directed by the authorized field personnel of the Commission.

Rule 6. If a well is shut in or temporarily abandoned for a continuous period of 60 days the operator shall set a plug in the casing at such depth as may be necessary to isolate the producing zones in the well unless authorized field personnel of the Commission shall, in writing, extend the time for setting the plug.

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE No. 3502
Order No. R-3169

APPLICATION OF YATES PETROLEUM CORPORATION
FOR SPECIAL POOL RULES, EDDY COUNTY, NEW
MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on December 16, 1966, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission."

NOW, on this 28th day of December, 1966, the Commission, a quorum being present, having considered the testimony presented and the exhibits received at said hearing, and being fully advised in the premises,

FINDS:

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

(2) That the applicant, Yates Petroleum Corporation, seeks the promulgation of special pool rules for the drilling, casing, cementing, and plugging of all wells drilled to and completed in the Eagle Creek-San Andres and the Penasco Draw San Andres-Yeso Pools, located within the horizontal limits of the Roswell Artesian (underground water) Basin, Eddy County, New Mexico.

(3) That in order to prevent crude petroleum oil, natural gas, or water from escaping from strata in which they are found into another stratum or strata, special pool rules for the drilling, casing, cementing, and plugging of all wells drilled to and completed in the Eagle Creek-San Andres and the Penasco Draw San Andres-Yeso Pools should be promulgated.

(4) That special precautions should be taken in the drilling, casing, cementing, and plugging of all wells in the subject pools

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CASE No. 3502

Order No. R-3169

to guard against any loss of artesian water from the strata in which it occurs, and the contamination of artesian water by objectionable water, oil, or gas.

(5) That the special pool rules as proposed by the applicant do not adequately prescribe such special precautions.

(6) That to adequately guard against any loss of artesian water from the strata in which it occurs, and the contamination of artesian water by objectionable water, oil, or gas, special rules and regulations should be promulgated for the Eagle Creek-San Andres and Penasco Draw San Andres-Yeso Pools, Eddy County, New Mexico.

(7) That the special rules and regulations should provide that each well shall have a water protection casing string set at least 100 feet below the base of the artesian underground water zone.

(8) That sufficient cement should be used on said water protection casing string to fill the annular space behind the casing to the top of the hole.

(9) That wells completed in the subject pools should have an oil production casing string, in addition to the water protection casing string.

(10) That if after recovering load water any well should make 20 barrels of water per day, or more, the operator should immediately notify the Artesia District Office of the Commission, in writing, of such fact and furnish such office with an analysis of the water being produced by the well.

(11) That if a well is shut in or temporarily abandoned for a continuous period of 60 days, the operator should set a plug in the casing at such depth as may be necessary to isolate the producing zones in the well.

IT IS THEREFORE ORDERED:

(1) That Special Rules and Regulations for the Eagle Creek-San Andres Pool and the Penasco Draw San Andres-Yeso Pool are hereby promulgated as follows:

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CASE No. 3502

Order No. R-3169

SPECIAL RULES AND REGULATIONS
FOR THE
EAGLE CREEK-SAN ANDRES AND
PENASCO DRAW SAN ANDRES-YESO POOLS

RULE 1. Each well drilled to and completed within the Eagle Creek-San Andres and Penasco Draw San Andres-Yeso Pools or in the San Andres or Yeso formations within one mile thereof and not nearer to or within the limits of another designated San Andres or Yeso oil pool, shall be spaced, drilled, operated, and produced in accordance with the general rules and regulations of the New Mexico Oil Conservation Commission unless such general rules and regulations shall be in conflict with the special rules and regulations hereinafter set forth, in which event the special rules and regulations shall control the spacing, drilling, operating, and producing of said wells.

RULE 2. Each well shall have a water protection casing string set at least 100 feet below the base of the artesian underground water zone.

RULE 3. Sufficient cement shall be used on the water protection casing string to fill the annular space behind the casing to the top of the hole, provided, however, that authorized field personnel of the Commission may, at their discretion, allow exception to the foregoing requirement when conditions in a given area render compliance impracticable.

RULE 4. A well completed in the San Andres formation only shall have an oil production casing string, in addition to the water protection casing string, and said oil production casing string shall be set at least 100 feet below the water protection casing string shoe and shall be cemented back at least 50 feet into the water protection casing string.

RULE 5. A well completed in both the San Andres and Yeso formations or in the Yeso formation only shall have an oil production casing string, in addition to the water protection casing string, and said oil production casing string shall be set in the Yeso formation and cemented back at least 50 feet into the water protection casing string.

RULE 6. The casing shall be tested in accordance with the testing provisions of Rule 107 of the Rules and Regulations of the Commission.

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CASE No. 3502
Order No. R-3169

RULE 7. If after recovering load water any well shall make 20 barrels of water per day, or more, the operator shall immediately notify the Artesia District Office of the Commission, in writing, of such fact and furnish such office with an analysis of the water being produced by the well. Thereafter the operator shall take such remedial steps as may be directed by the authorized field personnel of the Commission.

RULE 8. If a well is shut in or temporarily abandoned for a continuous period of 60 days, the operator shall set a plug in the casing at such depth as may be necessary to isolate the producing zones in the well unless authorized field personnel of the Commission shall, in writing, extend the time for setting the plug.

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

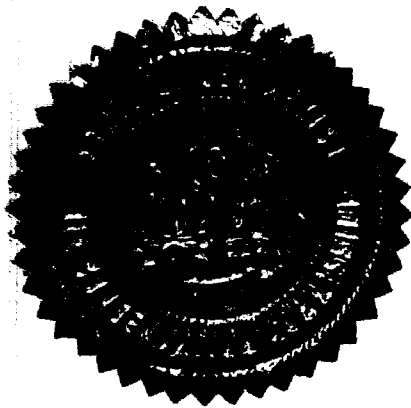
DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Jack M. Campbell
JACK M. CAMPBELL, Chairman

Guyton B. Hays
GUYTON B. HAYS, Member

A. L. Porter, Jr.
A. L. PORTER, Jr., Member & Secretary



esr/