Case No.

954

Application, Transcript,
Small Exhibits, Etc.

CORE ANALYSIS REPORT

FOR

AMERADA PETROLEUM CORPORATION

JICARILLA APACHE NO. E-1 WELL

WILDCAT

RIO ARRIBA COUNTY, NEW MEXICO

LOCATION: SEC. 30-T24N-R4W

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

October 5, 1955

REPLY TO
1020 PATTERSON BLDG.
DENVER, COLORADO

Amerada Petroleum Corporation
Box 2040
Tulsa 2, Oklahoma

Attention: Mr. J. O. Hathaway

Subject: Core Analysis
Jicarilla Apache No. E-1 Well
Wildcat
Rio Arriba County, New Mexico
Location: Sec. 30-24N-4W

Gentlemen:

Diamond coring equipment and water base mud were used to core the Pictured Cliffs formation from 2469 to 2529 feet. Engineers of Core Laboratories, Inc. selected and quick-froze samples for analysis, and transported these samples to the Farmington laboratory. Results of the analysis are presented in this report.

Pictured Cliffs formation between 2469 and 2529 feet is interpreted to be essentially gas productive where permeable. The samples indicated in the probable production column on the Coregraph by an asterisk have higher than normal water saturations. Average core analysis values are given on page one for the 15 feet of formation interpreted to be gas productive on the Coregraph. The average permeability for these 15 feet is 0.5 millidarcy, and the productive capacity is 7.5 millidarcy-feet. A commercial producer will be dependent upon the success of a formation fracturing treatment.

Thank you for the opportunity to make this analysis for you.

Very truly yours,

Core Laboratories, Inc.

J D Harris (PE)
J. D. Harris,
District Manager

JDH:PE:ma

FORM F-11A

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS

Page 1 of 1
File RP-3-201 FC
Well Jicarilla Apache No. E-1

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

CORE SUMMARY

FORMATION NAME	Pictured Cliffs			
DEPTH, FEET	2471.0-2502.0			
% CORE RECOVERY	100			
FEET OF PERMEABLE, PRODUCTIVE FORMATION RECOVERED	15.0			
AVERAGE PERMEABILITY MILLIDARCYS	0.50			
CAPACITY — AVERAGE PERMEABILITY × FEET PRODUCTIVE FORMATION	7.5			
AVERAGE POROSITY, PERCENT	16.9			
AVERAGE RESIDUAL OIL SATURATION, % PORE SPACE	0.0			
GRAVITY OF OIL, °A.P.I.				
AVERAGE TOTAL WATER SATURATION, % PORE SPACE	52.2			
AVERAGE CALCULATED CONNATE WATER SATURATION, % PORE SPACE	48			
SOLUTION GAS-OIL RATIO, CUBIC FEET PER BARREL (1)				
FORMATION VOLUME FACTOR—VOLUME THAT ONE BARREL OF STOCK TANK OIL OCCUPIES IN RESERVOIR (1)				
CALCULATED RECOVERABLE OIL	Prediction dependent upon complete isolation of each division. Structural position of well, total permeable thickness of oil zone and drainage area of well should be considered.			
BY NATURAL OR GAS EXPANSION, BBLS. PER ACRE FOOT (2)	(4)			
INCREASE DUE TO WATER DRIVE, BBLS. PER ACRE FOOT	(4)			
TOTAL AFTER COMPLETE WATER DRIVE, BBLS. PER ACRE FOOT (3)	(4)			

Core Laboratories, Inc.

J D Harris (PE)
J. D. Harris

NOTE:

(*) REFER TO ATTACHED LETTER.

(1) REDUCTION IN PRESSURE FROM SATURATION PRESSURE TO ATMOSPHERIC PRESSURE.

(2) AFTER REDUCTION FROM ORIGINAL RESERVOIR PRESSURE TO ZERO POUNDS PER SQUARE INCH.

(3) RESERVOIR PRESSURE MAINTAINED BY WATER DRIVE AT OR ABOVE ORIGINAL SATURATION PRESSURE.

(4) NO ESTIMATE FOR GAS PHASE RESERVOIRS.

Distribution of Final Reports

2 Copies	Amerada Petroleum Corporation Box 2040 Tulsa 2, Oklahoma Attention: Mr. J. O. Hathaway
2 Copies	Amerada Petroleum Corporation Box 2040 Tulsa 2, Oklahoma Attention: Mr. J. E. Low
2 Copies	Amerada Petroleum Corporation Drawer "C" Monument, New Mexico Attention: Mr. D. C. Capps
2 Copies	Amerada Petroleum Corporation Box 2040 Tulsa 2, Oklahoma Attention: Mr. C. V. Millikan
2 Copies	Amerada Petroleum Corporation P. O. Box 312 Midland, Texas
2 Copies	Amerada Petroleum Corporation Box 2249 Casper, Wyoming Attention: Mr. L. R. Dreveskracht
1 Copy	Amerada Petroleum Corporation Box 2040 Tulsa 2, Oklahoma Attention: Mr. C. S. Agey
1 Copy	Amerada Petroleum Corporation Totah Motel Farmington, New Mexico Attention: Mr. W. G. Smith
1 Copy	Amerada Petroleum Corporation Avery Hotel Farmington, New Mexico Attention: Mr. Darrell Hopkins

BEFORE THE

Oil Conservation Commission

SANTA FE, NEW MEXICO

September 15, 1955

IN THE MATTER OF:

CASE NO. 954

TRANSCRIPT OF PROCEEDINGS

ADA DEARNLEY AND ASSOCIATES

COURT REPORTERS

605 SIMMS BUILDING

TELEPHONE 3-6691

ALBUQUERQUE, NEW MEXICO

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
September 15, 1955

IN THE MATTER OF:

Application of Amerada Petroleum Corporation, for an order establishing 320 acre drilling and proration units consisting of two contiguoug governmental quarter sections with wells being drilled not closer than 660 feet from the boundary of either quarter section of any subject unit for the Pictured Cliffs common source of supply in Township 25 North Range 5 West, Township 24 North, Range 5 West and N/2 of Township 23 North, Range 5 West, Rio Arriba County, New Mexico; top of said common source of supply is found at a depth of 2184 feet in the Amerada-Jicarrilla Apache Well No. 1 "B" located SE/4 NW/4 of Section 20, Township 24 North, Range 5 West, Rio Arriba County, New Mexico.

Case No. 954

BEFORE:

Honorable John F. Simms
Mr. E. S. (Johnny) Walker
Mr. William B. Macey

TRANSCRIPT OF HEARING

MR. MACEY: The next case on the docket is Case 954.

MR. KELLAHIN: If the Commission please, Jason Kellahin, representing R and G Drilling Company, Incorporated; J. J. Harris, Independent; Wilson Oil Company and Elliott Hall. At this time we would like to move for a continuance of Case 954, for the reason that we have planned to put on some testimony and the time has been so short we have been unable to get our testimony and witnesses together and would not be prepared to proceed as of today.

MR. WOODWARD: If the Commission please, Don Woodward, with Amerada Petroleum Corporation. We greatly appreciate counsel for the protestants notifying the Commission of their intention of asking for a continuance in advance of putting on our case, but we cannot accede in that request and possibly such a motion. I think adequate notice has been given of the case. We are present and prepared to proceed. It is, of course, discretionary with the Commission as to whether or not such a continuance is to be granted. I think his basis for citing that, it is necessary to know whether the continuance is requested purely as a matter of delay or what particular features of this application witnesses are to be called by the protestants in opposing the application. In the absence of any tangible tender of proof, I move that the Commission proceed with the case.

MR. KELLAHIN: Are you asking us to state who our witnesses will be?

MR. WOODWARD: No, we are interested, of course, and I am sure the Commission is, in understanding the purpose of the delay.

MR. KELLAHIN: The purpose of the delay is to prepare the case for presentation to the Commission. It is not interposed for the mere purpose of delaying the hearing. What development may come in the preparation of our case I cannot forecast at this stage, because I do not know.

MR. WOODWARD: I have the greatest confidence in Mr. Kellahin's word, but it is a matter for the Commission to decide whether it should continue this thing. I think there is something of a matter of principle involved here. Amerada's witnesses and counsel have come here from Tulsa; most of these people are operating within the

State, of course. I don't think that a continuance is a matter of grace, and time after time we are confronted in the preparation of our case and the presentation of our application by a motion for continuances. I think in the absence of some good and compelling reason now is the time to put the docket on a current basis and go forward with these things after a reasonable notice to all parties has been afforded as it has in this case.

MR. RUSSELL: William C. Russell, R and G Drilling Company. We received no notice of this application. I wasn't aware of it until I arrived this morning, and I saw it on the docket.

MR. WOODWARD: The published notice is constructive notice, and that is all we are required and able to give in many instances. I understand we did attempt to send a notice to R. and G. Drilling and had it returned, apparently the wrong R and G Drilling Company.

MR. KELLAHIN: Could I ask a question? Are you standing on your original application as drawn?

MR. WOODWARD: No, it is our intention to amend that application by deleting certain features from it, but not to add any feature to the application, that is, not now. We are going to ask the Commission to permit us to amend to draw in the north boundary. We are not taking in any additional scenery. We are excluding some, as a matter of fact, that is under consideration as part of the South Blanco Pool. We also are asking for drilling and proration units as the notice reads, we will be asking for drilling units with no recommendation whatever as to the final formula to be fixed for allocating production.

MR. KELLAHIN: While that does constitute a reduction in the application it will materially affect the provision of the Statute

under which the application is proceeding, and would affect our presentation of any objections thereto. That, I think, is a further reason for continuance in this case.

MR. WOODWARD: If the Commission please, the notice in this case is the application of Amerada Petroleum for an order. Every issue and every statute that we are now relying on was involved in the original application. We have simplified it and eliminated certain features. As far as adequate notice, all the issues were present in the original application, and there is no surprise or change in position. I think under the circumstances --

MR. MACEY: Mr. Kellahin, the question of continuance, as you know, this Commission grants continuances on pretty good reasoning. I think that Amerada's deletion of the so-called proration unit question in the formula doesn't change their application in that the same issues are at stake. However, I might point out to both of you that our staff is concerned in this matter, too. I seriously doubt whether they were even close to being ready, as far as the question involved, whether they made much of a study on it. If you desire to go ahead and put your case on as to what you are proposing with the understanding that we would continue the case in either event, all well and good. If you do not want to put your case on, why, and prefer to wait until next month, all well and good.

MR. WOODWARD: In the event that the Commission is ruling that there will be a continuance of this case, we feel that our position would be, of course, somewhat prejudiced by a piecemeal presentation. We would point out, however, that the consideration of these issues and opportunity for hearing is not finally foreclosed until after the rehearing period has elapsed. It is just

about six of one and half a dozen of the other whether you continue this thing for a couple of months or go ahead with the hearing with leave to reconsider it if such application is made.

If the ruling is that such a continuance will be made, we would prefer to wait. We are vigorously opposed to continuances that delay the development in the fixing of a pattern in a field at the time when it will be of some value. We think that time is of essence in this application, in other words.

MR. MACEY: Mr. Woodward, I don't like to continue cases any more than anybody else.does. I am afraid if we went ahead and heard the case the thing would probably drag out for an extremely long length of time anyway, not only from the standpoint of the other people involved, but from the standpoint of our own personnel. I really and truly believe that we would be better off if we did continue the case to a particular day in the near future, not necessarily the regular hearing, in order that we dispose of the matter at one time and not have a bunch of continuances. If the testimony is rather sketchy, or is not complete on both sides, we have a difficulty in arriving at an order. Sometimes it is better if we do continue the cases. I would like to know exactly in exceptions you are amending your application, for our own information and for the purpose of the other people involved in the matter.

MR. WOODWARD: Purely, I think as a service to other interested operators, to provide all the actual supplemental notice that can be provided, we would suggest that a supplemental notice of the application, as amended, be gotten out if there is to be a continuance. What Amerada specifically proposes to do is to amend the present application by excluding from Township 25 the top two

tiers of section and the east half of the third tier, which would be Sections 1 through 15, and the north half of Sections 23 and 24, all in Township 25 North, Range 5 West. In addition to that we would move the Commission to strike from our application any reference to proration units, or the establishment of an allowable formula for production, which would leave an application for 320-acre drilling unit in this area. I feel that we can rely upon the good faith of the other operators in the area to take no action that is prejudicial to this application between now and the time that it is heard. Of course, I would assume that any permit for a well would be held in abeyance until such a hearing is held.

MR. MACEY: That latter part that you mentioned there is very difficult for us since almost all the land involved is Indian land or Federal land, and we do not approve the applications.

MR. WOODWARD: For drilling permits?

MR. MACEY: That is right.

MR. WOODWARD: I think there is a collateral question there as to your authority to do so. So, your practice in the discussion of control, I wouldn't go into that.

MR. MACEY: We haven't been following the practice of approving applications on Federal land or Indian land. Do you intend to file an amended application and ask us to readvertise the case?

MR. WOODWARD: We will upon request. I don't think it is particularly necessary. It is just a matter of striking, amending and striking one provision of our application.

MR. MACEY: We will let you discuss that with our legal staff and determine whether they think it is necessary. Do you have any definite date, Mr. Kellahin, that you would be ready?

MR. KELLAHIN: If we can have as much as two weeks we will be ready.

MR. WOODWARD: It would be a little easier if it were a day or two before the regular hearing. Maybe by that time the Examiner's Rule will be out and we will have an examiner hearing.

MR. KELLAHIN: That would be perfectly satisfactory with us.

MR. MACEY: Unfortunately that is not possible. We will continue the case to the regular October hearing which is October 13th. Our docket is rather large on that day; with the understanding that everybody is going to be ready. Does anyone else want to make an appearance in the case?

MR. HOWELL: El Paso Natural would like to make an appearance in the case.

MR. GREINER: I would like to make an appearance in the case.

MR. SELINGER: Skelly Oil Company would like to make an appearance in the case.

MR. HINKLE: I would like to have the appearance of Humble Oiland Refining.

MR. HILTZ: I would like to make an appearance for the Stanolind Oil Company.

MR. HINKLE: I also want to enter an appearance on behalf of Superior Oil Company.

MR. MACEY: We will continue the case until October 13th.

STATE OF NEW MEXICO)
: ss.
COUNTY OF BERNALILLO)

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

IN WITNESS WHEREOF I have affixed my hand and notarial seal this 10th day of October, 1955.

Ada Dearnley
Notary Public, Court Reporter

My Commission Expires:

June 19, 1959

BEFORE THE

Oil Conservation Commission

SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASE NO. 954

TRANSCRIPT OF PROCEEDINGS

ADA DEARNLEY AND ASSOCIATES

COURT REPORTERS

605 SIMMS BUILDING

TELEPHONE 3-6691

ALBUQUERQUE, NEW MEXICO

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
October 13, 1955

IN THE MATTER OF:

CASE 954

(Readvertisement) Application of Amerada Petroleum Corporation: Requesting establishment of 320 acre drilling units for a common Source of supply in the Pictured Cliffs Formation in Rio Arriba County, New Mexico.

BEFORE:
Honorable John F. Simms
Mr. E. S. (Johnny) Walker
Mr. William B. Macey

TRANSCRIPT OF HEARING

MR. MACEY: I suggest that everyone who wishes to testify in this case stand now and be sworn; this is case 954, for the record. (Witnesses sworn.)

MR. WOODWARD: In this case, some of our friends have acused us of trying to catch a whale with a set of pot hooks; we do not believe that on the merits our situation is that hopeless; on the contrary, we feel that there are good and compelling reasons why three hundred and twenty acres should be established in this area covered by our application in case 954.

Let me say a word about that area; at the last hearing we admitted it in the application as ammended, is the one that we are bringing before the Commission at this time. The case was readvertised without a description, but in the informal notices sent by us to the other operators and those persons who have entered an appearance in this

case, a typographical error appears in that in Township 25, Range 5 West, the application describes in part Sections 25 through 31; it should have described 25 through 36; on the basis of that typographical error, we understand that those in opposition to this application have omitted that from their Exhibits, but we do not understand that any prejudice has resulted from that situation and ask, of course, that their Exhibits be considered as emboding this whole area.

The purpose of our applications have been -- briefly is that the area covered by our case 954 is a separate common source of supply that is separated from any other area that has heretofore been spaced by the Commission. Unfortunately, in spacing any pool, we do not have complete information; to wait until such information is complete, means waiting until spacing is of no practical importance, and the development of this field has not been static; there have been developments outside of the area which we have included within this outline and which are within the call of this Hearing and which, of course, cannot be considered at this time except that we wish to know that in the future, pursuant to a proper call, some adjustment in the area outlined probably should be considered by the Commission. In other words, we don't say with certainty that we have got the whole animal within this outline or that there are not more than one; we think we have got a hold, at least, of a part of a common source of supply which has not heretofore been spaced.

The second point that we will undertake to make is that one well drilled in the outlined area can be efficiently and economically drained by one well. That is, taking the field as a whole. With those preliminary statements we would like to call our first Witness, Mr. James W. Snider.

JAMES W. SNIDER,

called as a Witness, having been previously duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. WOODWARD:

Q Mr. Snider, will you state your full name and tell the Commission where you live?

A J. W. Snider; I live in Tulsa, Oklahoma.

Q By whom are you employed, Mr. Snider?

A By the Amerada Petroleum Corporation.

Q And in what capacity? A As a geologist.

Q Will you state the extent of your educational experience as a Geologist?

A I am a graduate of the Mississippi School of Mines and Metalurgy; I have worked eight years with the Amerada Petroleum Corporation as a Geologist.

Q What particular experience have you had as a Petroleum Geologist in the area covered by the Application in in Case 954?

A Within this area, I have supervised generally the geological work of our company for about two -- the two and a half last years.

MR. WOODWARD: Are Mr. Snider's qualifications accepted as an expert Witness as a Petroleum Geologist?

MR. MACEY: They are.

Q Mr. Snider, What has been marked as Amerada's Exhibit "A" has been placed on the board; are you familiar with this Exhibit?

A Yes, I am.

Q Was it prepared under your direction and supervision?

A It was.

Q Mr. Snider, what does the blue outline represent on Exhibit A?

A The outline enclosed within this outline is the area to be spaced under Amerada's Application, Case 954, for the establishment or request for 320 acre drilling units from a common source of supply.

Q On what interval is this Exhibit contoured?

A The map is contoured on top of the Pictured Cliffs Formation; the contour interval is 50 feet.

Q And what depth is the Pictured Cliffs Formation found in this area?

A The depth to the Pictured Cliffs ranged somewhere from 2,000 and 3,000 feet, and Amerada's No. 1 Jicarilla Apache "D" in Section 36, 24N 9W, the top of the Pictured Cliffs was encountered at 2,332 feet.

Q What structural feature is shown by this Exhibit, Mr. Snider?

A Well, the structural feature, this map represents a segment of the southwest flange of the San Juan Basin, as you will notice, the strike of the Basin in this area, is somewhat to the southeast, northwest. The rate of dip across this area from southwest to northeast is in the neighborhood of 90 to 100 feet per mile; there are no indications from the well data available that there are any structural anomalies present other than a few undulations in the contours caused by some dense well controlling.

Q What type of trap do you have within this area for the accumulation of gas, Mr. Snider?

A Well, essentially, the Pictured Cliffs Formation, and in this area, the type of trap a reservoir, the stratographic type.

Q Mr. Snider, have you studied well locations taken on Electric logs taken on wells in this area?

A Most of those which are available.

Q Have you examined cores from any wells in this area?

A I have examined cores on two wells in this area.

Q Based on your study of logs and cores, what are the physical characteristics of the Pictured Cliffs Formation?

A Well, the physical characteristics of the Pictured Cliffs Formation as examined visually, by sample study and core analysis, indicates that the sand or the Pictured Cliffs Formation is essentially a sandstone; however, within this stone, the lithology varies from a clay stone to a clay stone imbedded with sand grains all the way up to somewhat of a fine medium grain, in some cases coarse grain cement or sandstone with some cementing matrix.

Q Mr. Snider, Amerada's Exhibit B has been placed on the board; are you familiar with this exhibit? A Yes, I am.

Q Was it prepared under your direction and supervision?

A It was.

Q Mr. Snider, will you tell us what it shows, if anything, about the possibility of communication between the area outlined in blue and any other area heretofore spaced by the Commission?

A Well, it --

Q You can use that pointer, I think.

A Well, all right. I will use this pencil. On Exhibit A, there outlined in blue, the only other spaced area is the South Blanco-Pictured Cliffs which extends down into the northern part of Township 25 in 5W. In answer to your question, any other spaced area, this would be the only one that would make a comparison to it; we have construed a cross section, made up of ES logs, all of them in this case run by the Schlumberger Company; in these various wells -- you have your

Exhibit there in front of you, you will notice a little sketch map here that shows you the line of section of these wells. It starts at the south with the Humble well in Section 15, 23N 5W, continues on up almost in a due south to north direction and tying into the the Stanolind's 4 Jicarilla Apache well in Section 10, 25N 5W. That would be the extreme right hand.

Q Directing your attention to what the individual well logs show, now, have you reached a conclusion about possibility of communication through the Pictured Cliffs pay of running from the south of the area outlined in blue to the South Blanco Field to the north?

A Well, If you study this Electric log cross section and using Electric logs for basis of correlation and interpretation to some extent of the reservoir characteristics of the Pictured Cliffs Formation, you can readily see in a direction north south across this area in these particular wells; the characteristics as shaded here by the self-potential curve, to straight the varying texture or the varying qualities of the S.P. values, in these various wells and this well to the north is an E.S. log down to position about the top of the Pictured Cliffs. Stanolind, in this case, elected to run a Gamma Ray induction log through the hole, but in the industry, you can usually get a reasonable correlation as to what the section is from that log, comparing it with the other E.S. log you will notice you get quite a variance in the second of the Pictured Cliffs, there are -- this R. and G. Drilling Company No. 9 appears to have fairly good reservoir characteristics in their pick of the sand, the Amerada well here has varying sections that look like deeper down in the Pictured Cliffs Formation there might have been some reservoir sand. J. J. Harris No. 2 Jicarilla well shows probably the best log in the cross section as far as reservoir character-

istics concerned as shown by the self-potential curve.

Main thing between these wells which are essentially the only ones available in this area that penetrate the entire Pictured Cliffs Formation or at least the major part of it, you can see that going from north to south, that this is not one continuous sand body.

Q You mean it is not a continuous sand body or there is not continuous communication through the Formation?

A Well, both. I don't think that the sandstone in this well is -- can be communicated with the sandstone in this well. In other words, the reservoir characteristics of the sand in that well is quite a bit different than the reservoir characteristics in this well.

Q Now, in current time, as opposed to geologic time, would you expect production from this part of the field to have any effect on production on this part of the field or vice versa, would you expect communication to result with any current time concept?

A Based on the data we have now, I sure would not.

Q Then, you have decided -- you have deduced there is some separation between this area and the South Blanco, is that right?

A Right.

Q Now, turning your testimony to the west line of the area outlined in blue, on what basis does that -- was that line drawn?

A Well, this line essentially was drawn a reasonable distance from production; I mean at the time the well was -- the outline was drawn, then the nearest production at that time, I think, was about nearly three miles west of that line that is separating from production now within the area outlined.

Q Now, have there been some subsequent developments since this Application was filed which would change your opinion or might change

your opinion to any extent as to the area limits of the common source of supply found within the blue outline?

A Well, yes; the well has been completed here in Section 24 of 24 North, 6 West, immediately adjacent to the outlined area. It has been completed as a gas well. I surely think that there is common source of supply in the same reservoir and the rest of the wells here in the pool.

Q Now, if positional drilling, in these sections, indicate that they are productive and such well have the same producing characteristics do you think it would be appropriate to realineate the field to include such additional acreage?

A At that time, yes.

Q Now, is there any evidence or indication to your knowledge that the unit area as it might be so extended, connects with acreage tnat has heretofore been spaced by the Commission,trending, now, in a northwesterly direction?

A You mean going in a direction northwest from this outlined area?

Q Yes.

A To another area which the Commission has spaced?

Q Is there any evidence of communication at this time of such connections?

A The only evidence would be trends, and I am not sure that although these line up on trends that necessarily the trend will extend for, say, 60 to 70 miles and a well at one end and a well at the other will be in communication with one another.

Q Mr. Snider, let me ask if you heard Mr. Greer's testimony in Case 908?

A Yes.

Q Also, in the interest of time, I would like to ask if there is

any interested person here who did not hear that testimony? What I I am getting at is we generally concur with at least -- I am going to ask Mr. Snider if he concurs generally with Mr. Greer's historical picture of the geology of the Basin, and from that, base one question. If that will expedite matters I will proceed to ask Mr. Snider if he generally concurs with the geology interpretation of Mr. Greer in Case 908. If there are no objections --

MR. MACEY: Is there any objection to that procedure? If not, proceed, sir.

Q Mr. Snider, you, having heard Mr. Greer's testimony, and, as I understand it, you generally agree with his interpretation of the geology of the Basin, is that correct? A Generally, yes.

Q Now, I believe he testified that coarse sand bodies were laid down along a beach line that was perhaps not stable, and that the finer sediments were laid down offshore some distance; assuming that situation, what, in your opinion, would be the extent of shore line development of coarse sand along that shore line? In other words, along the strike we have shown here on this map, how far would this shore line extend with well development porosity and permeability being continuous, are there any factors which would interrupt such continuity along the strike'

A In other words, what you mean, if we had a beach essentially a beach deposit some X number of miles long that has good clean, well sorted sandstone grains deposited in this beach and then covered up at some later date became a reservoir rock of good character, what you are asking, then, is if this is the case, would you expect that to be continuous?

Q Yes, and to what extent. We realize we can't be infinite, but what geologic factors would terminate or break the continuity of your

beach line?

A Well, one of the things, of course, would be any entrance into the sea of any streams in the area, which would deposit the other clay materials or even quartz or boulder material which would break into the shore line and deposit material on out further from where these beach sands had been deposited. From the present day, studies of beaches, you know they are anywhere from a few hundred feet long to maybe a hundred miles long, but the longer they are the more subject they are to interruptions in their lineal extent by outside forces of either wave action or stream action or anything else that could enter into that.

Q As a practical matter today, the only way you could substantiate communication over long distance along the strike would be through drilling wells, is that correct? A I would say so.

Q Are there gaps in the drilling program between this area and any other area previously spaced by the Commission?

A At the present time there are; they are not shown on this map, but I think anyone of the maps that the Commission might have in its possession would show gaps of nondevelopment in any direction from this particular area.

Q Based on the information that we now have available, does the area outlined in blue represent at least a portion of a separate common source of supply which is not in effective communication with any other area previously spaced by the Commission? A I would say, yes.

MR. WOODWARD: That is all we have on Direct Examination at this time.

MR. MACEY: Anyone have any question of the Witness?

CROSS EXAMINATION

BY MR. KELLALIN:

Q Mr. Snider, would you tell me again, I didn't quite get clear on your testimony, do the wells shown on your cross section all lie within the area which is under consideration?

A No, sir.

Q What area isn't covered?

A There is one well without the outlined area.

Q Which well is that?

A It is the well on the extreme right hand corner, right here on --

Q Would you designate the well by name?

A No. 4 Jicarilla Apache, I think I did so designate.

Q I believe you did.

A Yes, sir, it is Stanolind's 4 Jicarilla Apache, southeast quarter of Section 10, 25 north, 5 West, Rio Arriba County, New Mexico.

Q Aside from that one well, all the others lie within the area under consideration in 954? A What?

Q I say all the other wells lie within the area under consideration, is that right? A Yes, sir, they do.

Q Now, referring to your cross section, Mr. Snider, what is the designation of the third well over from the left?

A This well?

Q The next one. A This one?

Q No, the fourth one, I guess. A This one?

Q Yes, sir, what is the designation of that?

A You mean the name?

Q Yes, sir.

A Amerada Petroleum No. 1 Jicarrilla Apache C.

Q Where is that located on the plat?

A Well, let's see. Right here.

Q Now, is that well productive? A No, sir.

Q Are there any other wells within the area uncer consideration which are dry holes?

A You mean wells in the area, or on the cross section?

Q On the cross section.

A On the cross section that are dry holes in what?

Q In the Pictured Cliffs Formation.

A There are two wells, all-told.

Q That is, lying along the line of the cross section?

A Right.

Q Would you mark those on the map and give the locations, please?

A One well is the Lowrey 1-A Jicarilla Apache well, located in SW/4 of Section 11, 24 Northwest, Rio Arriba County, New Mexico; the second well is the one that has been previously stated, No. 1 Jicarilla Apache C.

Q This area has not yet been defined as a pool?

A To my knowledge, it has not.

Q Is it your contention that it is a common source of supply, Mr. Snider? A What do you mean?

Q I mean a common source of supply as required by the Commission.

A You mean the whole area?

Q Yes, the area under consideration.

A The whole area as a common source of supply --

Q Your contention.

A -- for Pictured Cliffs gas?

Q Yes, sir.

A I think there possibly are similar ones within the spaced outline

that will eventually become separate individual sources of supply.

Q Now, referring to the connection to the northwest, have you any evidence in connection with your testimony as to this shoreline or beach, have you any evidence of any break or eminent shoreline between this area and this area to the northwest which is spaced?

A I have no evidence.

Q You have no evidence either way, is that right?

A No, sir.

MR. KELLALIN: That is all, thank you.

MR. MACEY: Anybody else have any questions of the witness? Nothing further --

MR. KITTS: I have a couple.

CROSS EXAMINATION

BY MR. KITTS:

Q I believe you did testify that you do not believe there is any communication within the Pictured Cliffs sand, between the area inside the blue outline and the other area outside it, is that correct?

A That is correct.

Q I also believe I understood you, and correct me if I am wrong, to say that your main reason for that is a lack of information as to any communication, rather than positive information of no communication?

A Well, maybe partially both; one thing, on the electric - log cross section, there is evidence that the Skelly well drilled in Section 2, 25N 5W, and the heretofore mentioned Stanolind well in Section 10; I am not sure that the two wells, -- in other words, that a communicable sand exists between the two wells.

Q Even within the blue area?

A No, I am speaking -- this is going without the area; in other

words, the Stanolind Oil on the north and the Skelly well -- in other words, the line is between those two, and this helps to substantiate that there is possibly no communication between the two wells.

Q But you also testified that even within this area outlined in blue, you feel that eventually it might be shown that there are several different common sources of supply?

A Within the blue outline, yes, sir. I mean, I don't think one would be that necessarily the whole blue outline will be one solid sandstone reservoir.

CROSS EXAMINATION

BY MR. ARNOLD:

Q I would like to enlarge due to the fact that you do have such a permeability source across the area and maybe several differnt sources of supply, don't you think that would make it more difficult to drain 320 acres with one well? A I don't know.

Q I mean perhaps you have a permeability area cutting across a 320 acre tract so that 160 acres is productive of gas while the other isn't?

A Well, the only way that that could be proven would be if there is a well drilled offsetting this 320 acre tract that was not productive due to permeability bearing.

Q Don't you believe that those permeability areas where you get small marginal wells it is probably very difficult to drain 160 acres?

MR. WOODWARD: If the Commission please, Mr. Snider has testified only as to geology and as to the drainage pattern of individual wells, I believe Mr. Christie, the Petroleum Engineer, will be much better qualified to answer that kind of question.

MR. MACEY: Can you confine your questions to geology?

Q Mr. Snider, what particular characteristics in the Stanolind well makes you draw the conclusion that there is not a similar -- that there are separate reservoirs from the location?

A Well, in other words, you have a sandstone reservoir in this Stanolind 4 well which, from the reports that I get, made a pretty fair well. It recovered quite a bit of gas natural, as I recall, and the Skelly well ran a drill stem test of the same for this upper interval, or Pictured Cliffs, recovered no fluid at all except some drilling mud; using that information to supplement your Electric log correlation, I don't know; I mean I would not -- I would be willing to correlate the top of the Pictured Cliffs, but I would not be willing to correlate for you that lense by lense, this lense of sand here is the same lense as appear over here in this well.

Mr. MACEY: Do you think that the failure of Skelly to obtain any gas on a drill stem test is conclusive proof that there is no gas productivity there?

A That there is no gas productivity there, no, sir, I do not.

MR. MACEY: Does anybody else have any questions of the Witness? If not, the Witness may be excused.

MR. WOODWARD: We ask that Amerada's Exhibits A, B and C be admitted in evidence.

R. S. CHRISTIE,

called as a Witness, having been previously duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. WOODWARD:

Q Mr. Christie, will you state your full name and address?

A R. S. Christie, Pulse, Texas.

Q By whom are you employed, Mr. Christie, and in what capacity?

A Amerada Petroleum Corporation, Petroleum Engineer.

Q Have you previously testified before this Commission as an expert Witness and Petroleum Engineer?

A Yes, sir, I have.

MR. WOODWARD: Are Mr. Christie's qualifications accepted?

MR. MACEY: They are.

Q What has been marked as Amerada's Exhibit C has been placed on the board; are you familiar with that Exhibit?

A Yes, sir, I am.

Q Was it prepared under your direction and supervision?

A Yes, sir.

Q Mr. Christie, what does Exhibit C show about pressures in the area outlined in red and adjacent areas?

A The pressures shown on Exhibit C indicate that the pressures in the area outlined in blue are somewhat lower than the pressures to the north in the South Blanco extension.

Q Will you point out those pressures, pressure differentials, and indicate the magnitude of the differences in pressure.

A The pressures in the south end of the proposed area average slightly above ;700 pounds, and I might point out that this is relatively new development area, so that production problem hasn't influenced it, at least we don't think so. As you progress northward, the pressures increase until you get up to the south end of the South Blanco Field; the pressures in that area exceed 1,000 pounds, so that in effect you have a differential there in the neighborhood of 250 pounds, which indicates that there is certainly a separation between a designated production area and the area to the north that is already designated

pool.

Q Mr. Christie, is it your testimony that the pressures to establish Mr. Snider's testimony, that there is not effective communication between the South Blanco area and the red outline?

A Yes, sir, it does.

Q If communication does exist between these two areas, is there any way you can account for these pressure differences?

A No, I couldn't account for it; I don't see how there could be communication and have that much differential. I might add that the differential is great enough where it is not a question of stabalized pressures or anything like that, too much difference there.

Q Would those factors be relevant?

A Yes.

MR. KELLALIN: Will you speak a little louder?

MR. WOODWARD: I will repeat that question. I just asked Mr. Christie if the pressure differentials were so great as to make relevant the type of pressure tests generally, as to the accuracy of different pressure tests which may be taken in the area.

A My answer to that was, no.

Q Mr. Christie, what has been marked Amerada's Ehibit D has been placed before you; are you familiar with this Exhibit?

A Yes, sir, the Amerada Exhibit D is copies of two core analyses that we have taken on two of our wells; the Amerada Apache D-1 and Apache E-1. I might point those locations out on the map. The E-1 lies outside the designated area and is just now in the process of being completed; it is in Section 30, 24 4, and the Amerada Apache D-1 is located in Section 35, in Township 24S R5W -- north, rather. That is in this position on the map.

Q What does this core analysis identified as Exhibit B show about the permeability and porosity of the particular Pictured Cliffs in this area?

A The data indicate that we have a good porosity, but the permeability is fairly low.

Q Would you indicate the magnitude of the porosity and permeability ranges here?

A The average permeability in our Apache D-1 is .71 millidarcies; the average porosity for the cored area was 18.7 per cent, in the Apache E-1; the permeability was .5 millidarcies and the average porosity was 16.9 per cent.

Q Mr. Christie, Amerada's Exhibit E has been placed before you; are you familiar with this Exhibit?

A Yes, sir.

Q Was it prepared under your direction and supervision?

A Exhibit E was simply a map showing the ownership in the designated proposed area and some of the surrounding acreages.

Q What does Exhibit E indicate about the feasibility of 320 acre spacing units as opposed to 160 spacing unit or any other size or shape of unit?

A The ownership, generally, in this area is enlarged tracts. Usually approximately 260 acre lots, of course, lends itself very easily to wide spacing.

Q Now, returning to the engineering information available in this area, Amerada's Exhibit F has been placed in front of you; are you familiar with this Exhibit? A Yes, sir.

Q Was it prepared under your direction and supervision?

A Yes, sir, it was.

Q Mr. Christie, will you describe this Exhibit and tell what it shows?

A Exhibit F has a tabulation showing the completion data on Amerada wells in this area, it lists the well, location, elevation, top of Pictured Cliffs, producing interval, the size and type of treatment and frac treatment, and the potentials.

Q Now, Mr. Christie, considering your testimony concerning the pressures in this area, permeability, porosity and production history to date, what area, in your opinion, can be efficiently drained by one well?

A Based on the facts available to me from experience and other fields, other reservoirs, it is my opinion that a well in this area that is capable of production will drain at least 320 acres.

Q Have you made an estimate of recoverable gas from one well on 320 acres?

A Referring to Exhibit D on our Apache B-4, I have made an estimate based on the information obtained from the Core analysis, and have calculated recoverable gas on our Apache B-4 would be 450,000 M. C., F., based on 320 acre units.

Q Have you made an estimate of the recoverable gas from one well on 160 acres?

A Well, if we assume that one well will drain 320, then the recoverable gas from 160 would be just half of that, or 225,000 MCF.

Q Have you made any estimate of the value or expected price of the gas of this area?

A I understand we are trying to get a contract with El Paso, and I believe the quoted price is ten cents, I don't know whether that is an average for the area or not, somewhere around ten cents.

Q Assuming that a price of ten cents per MCF and the amount of recoverable gas from one well on 320 acres and one well on 160 acres, have you made any estimate of the value of such recoverable gas from these two areas?

A Simple arithmetic, ten times the amount of gas, you would arrive at an income of $45,000 for the well on 320 and $22,500 for the well on 160 acres.

Q That is based on the value of recoverable gas underlying the 160 acres on which that well is located, is that correct?

A Yes, sir.

Q What are the costs of wells in this area?

A Cost of our wells average approximately $30,000.

Q Have you any opinion as to the expected length of pay out on these wells within the area outlined in blue on Amerada's Exhibit A?

A Well, I think it is -- depends a good deal on the market demand and deliverability of the well; if you have a well that has a good deliverability, it will pay out quicker, if you have one and deliverability is very little, it would take a longer time, I would estimate if it will pay out at all, it will pay out somewhere between ten and twenty years; I am talking about now, particularly of low permeability wells.

Q Now, concerning a cost of somewhere in the neighborhood of $30,000 for wells, anticipated operating expenses and interest in investment of a period of pay out, what recovery, in your opinion, is required to make drilling profitable in this area?

A I think you necessarily must have a profit that would be at least twice the cost of the well.

Q That is your gross profit? A Gross profit, yes.

Q Does that compensate for your operating expenses and interest during this period of pay out? A No.

Q It does not? A No.

Q Mr. Christie, I believe you testified a few minutes ago that the values of recoverable gas underlying a 160 acres surrounding a particula well of Amerada, was in the neighborhood of $22,500, is that correct?

A That is correct.

Q Let me ask you this, if that well does not drain an area in excess of 160 acres, can you expect that well to pay out?

A No, I wouldn't expect it to.

Q Could you expect an additional drilling immediately offsetting the well, if the reservoir conditions were similar?

A No, you would have the same situation, neither well would pay out.

Q Now, in your experience, Mr. Christie, will the spacing set by the Commission or any other body ultimately determine the number of wells which can be and ultimately will be drilled in this field?

A I think not. I think that economics will be the controlling factor in the total number of wells drilled in this particular field.

Q When drilling in relation to reserves reaches a saturation point, what would be your expectation as to additional development?

A Would you restate that, please?

Q When drilling, in relation to reserves, reaches a saturation point on amount of development that can be economically carried on, what is your expectation as to further or future development?

A Well, any additional wells, of course, would be unnecessary wells.

Q Is it your opinion that spacing will affect or determine in any way the distribution of the wells which are and can be drilled in the

field?

A Yes, I think that spacing will cause more orderly and uniform development.

Q Now, concerning your testimony that one well will efficiently drain 320 acres, and the field cannot be drained to a density of 160 acres overall, which plan will result in a more uniform action?

A I think the wider spacing; the one well to 320 acres.

Q Do you think this field can economically be drained to the density of 160 acres?

A You mean you can economically drill?

Q Well, can it be economically drilled?

A I think some wells on even 320 wouldn't pay out, if you take in the whole area, but certainly it would be better developed on a wider spacing than on a lesser spacing.

Q Under which plan, 320 or 160 acres, would you expect reserves to be more quickly proven out?

A I think the 320 would prove out the acreage much quicker.

Q Is there any risk of physical waste of gas in an irregular or nonuniform development of the field as a whole?

A I think there is some risk, generally speaking, on a denser drilling pattern, the wells are cluttered around the top of the structure and better part, and as you approach the periphery, you have less wells, and, therefore, some gas may never be produced, at least economically.

Q Is there any prejudice to correlative rights that may result in such distribution?

A Of course, if the area was not properly developed uniformly, I think correlative rights would be prejudiced.

Q Mr. Christie, do you have any recommendations as to the size

and shape of spacing unit which should be adopted in this area?

A I would recommend 320 acre units in the form of a rectangle be adopted.

Q Do you have any recommendations as to the respect of location of wells in the unit?

A I think it would be logical and proper to locate the wells in either the 160 acre units and spaced in accordance with the present Commission rules.

Q Which is 660 feet from a Quarter Section Line?

A Yes, sir.

Q Have you any recommendations with respect to existing wells that may not conform to this pattern?

A I think exception to the spacing should be made with respect to the wells now presently drilled and completed.

Q Is it your recommendation, Mr. Christie, that any two adjacent 160 acre tracts may be constituted a drilling unit, and that the unit well may be located in either of the 160 acre tracts, at least a distance of 660 feet from the Quarter Section Line?

A Yes, sir.

Q And all existing wells or off-pattern contrary to that rule be permitted as exceptions to it? A Yes, sir.

Q Have you any further recommendations to make?

A I believe not.

MR. WOODWARD: That is all.

MR. MACEY: Any questions of the witness?

MR. KELLALIN: I didn't catch his name, the witness's name. What is it?

MR. MACEY: Christie.

CROSS EXAMINATION

BY MR. SILVER:

Q Mr. Christie, are you familiar with the Exhibit you presented relative to the Jicarilla Apache E-1?

A Yes, sir.

Q You know how this core was handled in the field before, when the coring process was done?

A I wasn't on the job, no, sir.

Q Have you looked at the water saturation in this?

A Yes, sir.

Q Do you feel that it was, in light of other evidence in past cases, present before this communication that this water saturation was unusually low in relation to the type of core present?

A No, I didn't think so.

Q Wouldn't you say as entire possibility based on the type of permeability indicated in this log, that the water saturation could be much higher? A Yes.

Q And your reserve could be lower?

A I didn't give any reserves on this particular well, but that could be true, yes, sir.

Q Yes, sir. Therefore, it is entirely possible that the economics you presented are even less favorable than those you have presented?

A It could well be, yes, sir.

Q And that that would lend further evidence to the fact that additional allocation for wells is necessary in this area?

A Additional allocation?

Q Yes, sir, that is addition to the regular 160?

A Yes.

MR. WOODWARD: You are asking for an additional allocation of acreage at this point, I think that is beyond our call; I think his meaning is clear, however.

MR. MACEY: Are you referring to an additional allocation?

MR. SILVER: : Yes, I want to bring out evidence in support of Mr. Christie's testimony, as an independent operator, I am in support of that, and I want to see that everything pertinent is brought out supporting his side of the story.

A I agree with you, yes, sir.

MR. MACEY: Does anybody else have a question of the Witness?

CROSS EXAMINATION

BY MR. KELLALIN:

Q Mr. Christie, as I understand it, in regards to these pressures, you say there is such a differential that the type of test doesn't mean anything, is that correct?

A Well, I don't mean to infer that the type doesn't mean anything, but I don't think you need to quibble whether it is a seven day shut-in or fifteen.

Q As a matter of fact, you don't have any build-up curbs, do you?

A No, sir.

Q You don't have any production history available which would show the area other than that one well?

A Not on our wells, no, sir. We produce very little gas from our wells.

Q You haven't run any interference tests?

A No, sir.

Q Now, when you testified as to the ownership of this acreage, Mr. Christie, could you tell us what the royalty on that is?

A It is all Indian Land.

Q Do you know whether there is any demand for development that has been made by anyone in regards to those lands?

A No, except from the-- our obligation from the lease standpoint.

Q Has there been any demand made under your lease obligation, Mr. Christie?

A Not that I know of, no.

Q Now, in regard to these permeability figures which you gave, do you find any trend as to direction under these permeability trends?

A If you are speaking of the northwest - south - --

Q Yes.

A -- east trend, I don't know that there is any variation, particularly in the permeability, but we do know that the trend is northwest - southeast.

Q In other words, a zone of relatively high permeability would trend northwest - southeast, and one of low permeability would follow the same direction adjacent to it, perhaps?

A I think that is probably true, yes, sir. They all run parallel, more or less.

Q Do you find any permeability barriers in this?

A Barriers to be based on the dry holes drilled in the area.

Q At least there are some areas of tremendously low permeability?

A Yes, sir.

Q Now, Mr. Christie, in regard to getting back to these pressures again, you were referring to the pressure differential; you have the pressure of the well located in Section 19, 24N 5W?

A Whose well is that?

Q I don't have it.

A What is the section again?

Q Amerada well, I believe, Section 19, 24 5.

A Should be about right here. We have two wells.

Q The northwest corner?

A We have no pressure on that.

Q No pressure on that well?

A Yes, we do, it is 535 pounds.

Q Now, do you have a pressure on the well located in Section 24, 24 6, approximately half a mile from that well?

A West?

Q Yes, sir?

A Yes, sir, this shows 662 pounds.

Q In other words, a pressure differential of half a mile or approximately thereof, of what? A Oh, 127 pounds.

Q A hundred and twenty-seven pounds. Now, your testimony as to this ownership, I believe you said that most of the ownership was in large areas; did you take into consideration any farm-outs which have been made by your Company and other companies?

A Well, I was speaking generally of the large blocks of four sections. There are a number of smaller tracts that have been farmed-out.

Q What size?

A Most of them, I believe, are 160's.

Q Then, they are checkerboarded?

A Some 320's, yes, sir.

Q Most part they are 160's?

A No, sir, some of them 320's.

Q How many?

A I don't know what these farm-outs are on the Harris tract, what they were originally, doesn't show on this map.

Q What about those originally given by you to Lowery?

A I believe they are checkerboarded 160. We also farmed-out to Ken Blackburn 320 acre units.

Q How recently have you made any 160 farm-outs, do you know?

A I don't know the date on either of these or any of them.

Q Do you know an approximate date, Mr. Christie, were they this year?

A Yes, I think this year.

Q The early part of this year? A I don't know.

Q Now, in regard to your recoverable reserves, Mr. Christie, am I correct that you based that on reserves under your B 4 Jicarilla Apache well? A Yes, sir.

Q As a matter of fact, that is a rather poor producer, is it not?

A Yes, sir.

Q You have better ones in the area, don't you?

A We have some that show higher permeability -- I mean higher potential.

Q And higher pressure, too, don't you?

A Well, probably so.

Q Well, your Jicarilla Apache A-1, why didn't you use that to figure the recoverable reserve?

A I didn't have a core analysis on it.

Q You didn't have the core analysis on it?

A No, sir.

Q Are you familiar with Harris 6 well?

A Generally, yes.

Q Do you know what the initial potential of that well was?

A According to our potential information here, it was five million seven hundred and twenty-seven thousand MCF.

Q Had you used a well such as that, your figures on pay out would have been quite different than those presented?

A The pay out might be, may not be any more gas under it.

Q But your pay out figure, you said, ten to twenty years, did you not?

A Yes, I qualified that by saying I was talking about the wells of low permeability.

Q As a matter of fact, we are using a well of low permeability, and -- A Yes.

Q -- there is much better wells -- A Yes.

Q -- that isn't even an average well, is it, your B-4?

A It apparently is not an average of the potentials that we have shown here, a little lower than the average.

Q Now, under your proposal to contribute the 320 acres to a well as a drilling unit, do you think there is any damage to contributing dry acres? A What?

Q Attributing dry wells -- dry acreage to a well under that system?

A Well, that is pretty hard to tell with the present development.

Q Now, I am referring again to the Harry S 6 well; didn't Amerada drill a well to the north and east of that location?

A Yes, sir.

Q Did they get a dry hole?

A It is shown there as a dry hole.

Q Assuming then, that you were going to attribute to the Harry S 6 well the northeast quarter, wouldn't it be fair to infer that that

is dry?

A Well, I think you might argue the point out that that well i one of our first wells drilled up there and we haven't -- we weren't very well versed in the mechanics of drilling on Pictured Cliffs or any of those wells, as a matter of fact. I think we might go back there and make a well out of it.

Q You have no plans to go back and work it over?

A No, sir.

Q You don't even own that acreage now, do you?

A That, I couldn't say; we might own deep rights.

Q Now, you, in your testimony, said that under the system such as you are advocating, even some wells on 320 acres wouldn't pay out; that would be true in any oil or gas pool, would it not?

A Yes.

Q In other words, you will drill a poor well or a dry hole?

A That is right.

Q That is a risk which you will run into in any pool, depending on where you drill your well, is that true?

A Yes, sir.

Q Now, you said under a nonuniform spacing that correlative rights would be prejudiced, did I understand you correctly?

A Might tend to be that way, yes, sir.

Q What makes you say that you would have nonuniform spacing, Mr. Christie?

A Well, I am speaking of some areas that are definitely more densely than others, and the proposal we are making, I don't think limits anybody to one well on 320 acres; they might want to drill them on 160's.

Q I am afraid you didn't answer my question; you said nonuniform spacing.

A That would be nonuniform, if you had a certain area 160 and the rest 320 and that would be nonuniform, in any estimation.

Q I agree with you. Now, if you had it all on 320, that would merely result, would it not, Mr. Christie, in the drilling of fewer wells in the area of production and the skipping of those areas where there wouldn't be any production anyway, would it not?

A That is probably true.

Q Now, you asked to locate your well within either of the 160 acre tracts within the unit with exception of wells which are built; you mean the exception allowing them 160 acres?

A Yes, I think they would be entitled to 160.

Q In the event of prorationing, what recommendation would you have, Mr. Christie?

A Well, that would be several ways; the Commission might handle that -- I would rather let them handle that problem.

Q It is a problem which should be taken in consideration with any spacing.

A I think there would be a number of cases where they could pick up additional acreage and form 320's, or the allocation be based on some formula where you wouldn't have draining across property lines.

Q In some cases that would enable Amerada to attribute some of that acreage they have given someone on farm-outs, would it not?

A That would be a possibility to work something out like that.

Q It is even probable?

MR. WOODWARD: I object to that type of question, I think it goes into a species of speculation and inference that is not in the case

MR. KELLALIN: I intend to -- I agree with Mr. Woodward. The fact that Amerada has made farmouts on the basis of 160 acres drilled in good faith, certainly is a factor to be considered in setting up spacing at this time in setting up this pool.

MR. MACEY: Is there a question up to the witness at this time?

A I don't know.

MR. KELLALIN: I will waive the answer. Thank you.

MR. MACEY: Does anybody else have any questions? Mr. Crenier, Southern Union Gas Company.

CROSS EXAMINATION

BY MR. CRENIER:

Q Mr. Christie, does the character of ownership have anything to do with the underlying reserves?

A No, sir.

Q Would it make any more or less gas underneath, whether it is part of the 160 or 320 acre tract? A No, sir.

MR. CRENIER: Thank you very much. Mr. Christie, do you have any information as to the effective area of the sand tract as to, say, 160 acres and 320 acre patches? A No.

MR. CRENIER: That is all.

MR. MACEY: Does anybody else have a question?

CROSS EXAMINATION

BY MR. McLAIN:

Q Mr. Christie, I want to be sure I understand your reserve estimates; were you intending to give your estimate of recovery for wells in general in that entire area under discussion when you said that you thought the average recoverable gas per well, based on a 320 acre spacing pattern was 450,000 MCF, was that correct?

A Four hundred and fifty thousand, but I was referring to that one specific well. Obviously, if you have more porosity in a thicker section that figure wouldn't hold, so it wouldn't be an average figure, no.

Q What would you think would be an average figure?

A I haven't the slightest idea.

Q You don't know how much recoverable gas you would estimate under the average 320 acre section of that area?

A No, sir.

MR. MCLAIN: Are you making any recommendation -- I don't know whether to direct this to the Witness or Counsel -- are you making any specific recommendations to the Commission as to any action which should be taken with respect to any wells that may have already been drilled on the 160 acres?

MR. WOODWARD: Only to permit those wells which have already been drilled as exceptions to the well location rule in the event that they have been drilled closer than 660 feet to a quarter section line. That is the only recommendation with respect to the exceptions.

MR. MCLAIN: You are making no other recommendation to any other action that might be taken subsequently in the event of proration?

MR. WOODWARD: That is a separate subject; we are only applying here for drilling unit, and I think that is an allocation problem.

MR. MCLAIN: Thank you.

CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Christie, referring to your Exhibit C which is your pressure map, referring further to a group of Stanolind wells which are now in the South Blanco, in Sections 4 and 10 and 25 North 5 West, where those pressures are shown to be slightly in excess of 1,000 pounds--

A Yes.

Q Didn't you testify that you didn't think there was communication between that from the unit covered in your application?

A Yes, sir.

Q Do you think there is any communication between that group of wells and the three wells which are located as follows: 24 and 5, southwest of Section 3, and northwest -- northeast of Section 11?

A I think there is a possibility that there might be very little migration between those, and we may have another northeast southwest trending high pressure area or different zone of porosity.

Q Now, do you think there is communication between the well system referred to in Section 3 and 11 and the wells in 24, 5 in the vicinity of Section 17, 20, 28, 27?

A Will you designate those again?

Q The first area was in 24, 5; the well in Section 3, and well in Section 11, which has a pressure of a -- one of them of 900?

A Yes, sir.

Q And the wells in the same Township and Range, in Section 17, 19, 20, 21, 27, 28; my question is, do you think there is communication between those two areas?

A I think it might be limited, if any.

Q Isn't there quite a differential there?

A Yes, sir.

Q Now, referring to the last group of wells, where the pressures are in the vicinity of 700 pounds, slightly over, is that correct?

A Beg your pardon?

Q The pressures in the area referred to are slightly over 700 pounds, is that correct, as shown on your map?

A Yes, sir.

Q Do you think there is any communication between that group of wells and the three wells shown on your Exhibit C and 24 North and 6 West, which show a pressure of 702 pounds, 706 and 712?

A I think it is quite likely that they should be in the same trend.

Q Are you familiar with the pressure in Canyon Largo Pool now designated?

A No, sir.

MR. UTZ: That is all.

A I say I am not familiar, I have a map with all those pressures on it, but I haven't looked at it closely.

Q Do we agree that they are slightly over 700 pounds?

A If you say so, I will agree.

Q Do you think there is a possibility between this area and Canyon Largo?

A I think there is a possibility, but there is certainly a wide area needs development there yet and it is going to be a long time until we get in pipe lines and I don't think that has any particular bearing on whether this application is approved or disapproved; if they do join, I think the situation can be handled very nicely.

Q Should Canyon Largo area and the area covered in this application join up with Ballard-Pictured Cliffs, what would be your opinion now based on 160 acres --

MR. WOODWARD: That is stating facts here that is going to be before the Commission if that happens and it would require some study, I am sure, to make any valid or relevant recommendations; I think Mr. Christie has answered that that matter can be handled, but I don't think the question is really a fair one.

MR. UTZ: I didn't ask him as to his present knowledge as it

exists in that trend, if he can answer the question, good.

A I am not familiar enough with the general area to answer it very authoratively.

Q I have some more questions, referring to your reserve figure, did I understand you correctly to say that your reserve figure was two hundred and twenty-five million on 160 acre tracts?

A Yes, sir, on that one particular well.

Q Based on one well? A Yes, sir.

Q And that well was Jicarilla 1-D? A D-4.

Q D-4. Did you have any information available as to porosity?

A It all is in Exhibit D, the Core Lab information report.

Q All in the report? A Yes, sir.

Q Does the pressure also show in there?

A No, sir.

Q What abandonment pressure did you use?

A I didn't use any.

MR. MACEY: Your reserves were reserves in place?

A In place, and I used a ninety per cent recovery factor to arrive at the recovery.

Q And is the net pay also shown in this Exhibit?

A Yes, sir, I used the net pay shown in the Exhibit.

MR. UTZ: I believe that is all I have.

MR. MACEY: Does anybody else have a question of the Witness?

CROSS EXAMINATION

BY MR. MANKIN:

Q Mr. Christie, the permeability of the wells in this area are quite similar, are they not, to the permeability of the wells in other Pictured Cliffs area?

A To my understanding; I am not too familiar with other areas, but it is my understanding that they are generally the same.

Q Have low permeabilities, Millidarcy less?

A Seem to be quite a variation.

Q Is it not also true that the potentials in this area are very high in comparison to a lot of Pictured Cliffs previously spaced and is economic --

A I don't -- couldn't answer that, I don't believe. I understand there are some low potentialities in the older areas and also some high potential.

Q Cost of drilling here is not much greater than in other Pictured Cliffs areas, is it?

A Primarily a function of depth, the deeper you go the more it costs, but on an average, I think it would be comparable.

Q You do recognize there is permeability area across this area?

A I think it is quite possible that there would be a slight migration across some of those bariers, may not be bariers, but permeability.

MR. MAININ: That is all.

MR. MACEY: Does anybody else have a question of the Witness?

MR. WOODWARD: I would like to recall him on Redirect Examination for a moment.

REDIRECT EXAMINATION

BY MR. WOODWARD:

Q Mr. Christie, I would like to clear up something here for the record; is this Apache 4 well which you discussed ir respect to the recoverable oil and gas underlying the wells situated on a hundred and sixty acres or three hundred and twenty acres an outstanding striker

V Reserved to Tike

in the field or does it represent -- is it a representation which may be general in the field?

A Well, it just happens to be one of the wells we cored and that is the only one I could use for that type of information; whether it is an average or below or above, it is pretty hard to tell until we have more development.

Q Is it either possible or probable that you have similar conditions concerning your permeability and sand thickness in other parts of the area for common source?

A I think so, yes, sir.

Q Your data to date isn't sufficient to estimate to what extent that condition may or may not exist, is that correct?

A Yes, sir.

MR. WOODWARD: That is all we have.

MR. MACEY: Any more questions?

A I might say that I don't think the permeability varies over wide ranges, but I think the porosity doesn't vary so much so your gas in place probably won't vary as much,as based on the porosity we have seen, probably wouldn't vary so much over the entire area. It might have the same amount in place in the entire area of permeability, and whether you recover it or not --

MR. MACEY: What about sand thickness, do you think the sand thickness will vary?

A Yes, it appers to get thicker as you go into the basin.

MR. MACEY: Does anybody else have a question of the Witness? If not, the Witness may be excused. Do you have anything else?

MR. WOODWARD: Now, we, as Applicant, would like to reserve the right of making a closing statement as soon as all other evidence is

put on.

MR. MACEY: Do you offer all your exhibits?

MR. WOODWARD: I am not sure about that; let me do it again, if I haven't. I would like to offer Amerada's exhibits C through F.

MR. MACEY: Without objection, they will be received. Does anybody else have any testimony in this Case? How much time do you have?

MR. KELLALIN: It will take between twenty and thirty minutes on our Direct.

MR. WOODWARD: Does anybody else have any direct testimony?

MR. KELLALIN: We do have one large Exhibit we would like to put up there.

MR. MACEY: Are you ready?

MR. KELLALIN: Yes. If the Commission please, Jason Kellalin, representing protestants, at which I entered an appearance last month. Before starting our testimony, I would like to state for the record that Mr. Harris, who is a Witness here owns an interest in the area under consideration which would be affected by Amerada's proposal and the R. & G. Drilling Company owns the following acreage which they secured by farm-outs from Southern Union Gas Company, in Township 24, Range 5 West, Section 3, south half; Section 4, southwest quarter; 9, northwest quarter, from Amerada Petroleum Company, in Township 24 North, Range 5 West, Section 13, southwest quarter; Section 14, northeast quarter and southwest quarter; Section 23, northeast quarter, from Stanolind Oil and Gas Company, Township 24 North, Range 5 West, Section 2, southeast quarter; Section 11, northeast quarter and southeast quarter; and in Section 12, southwest quarter. I also represent Wilson Oil Company and Elliott and Hall who do not own acreage in the

area deleniated by Amerada but do own acreage adjacent and maybe whose interests may be affected by this. Our Witness will be Mr. Harris.

J. J. HARRIS,

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

DIRECT EXAMINATION

BY MR. KELLALIN:

Q State your name, please? A J. J. Harris.

Q You have been sworn in this Case, have you, Mr. Harris?

A Yes, sir.

Q Mr. Harris, have you ever testified before this Commission before

A No.

Q What educational qualifications do you have, Mr. Harris?

A Graduate of Texas Christian University, and majored in Geology; I had two years previous Engineering before I went into Geology and when I did my graduate work, I don't have my Master's, but I did part of it at Texas Christian.

Q What field did your graduate work cover?

A Geology.

Q Have you had any experience since your graduation ?

A Yes, sir, I worked -- started to work for Stanolind Oil and Gas, worked for them in the production Department for about -- before I went into the Service.

Q For how long?

A Oh, about two or three years, and then I was transferred after I got out of the Service into the Geological Department in Albuquerque, and January, 1947, I came out there; I worked part-time while I was going to school doing graduate work in a Title Survey office in

Fort Worth, and I worked from 1940, January forty-seven, to January of fifty-three for Stanolind in Albuquerque District office.

Q What area were you concerned with in that office, Albuquerque office?

A The western half of New Mexico, primarily the San Juan Basin.

Q What were your duties in connection with that?

A I did geological work, sitting on wells, all type work for them, and the last two years I was with them I was Area Geologist.

Q Will you describe briefly your experience in the San Juan Basin from that --

A I have been a consulting geologist since January, 1953, and been connected with the drilling, doing the geological work and completion of work on any number of wells.

Q Have you had any experience in the area which has been set up by Amerada in their Application in Case 954?

A We drilled a discovery well in that particular area.

Q "We," who do you mean by "we"?

A I was operator of the well, took it from Magnolia, and drilled several wells in the northeast quarter Section 28, 24 North, 5 West.

Q Did you supervise the drilling of that well?

A Yes.

MR. KELLALIN: Are the Witness's qualifications acceptable?

MR. MACEY: Yes, sir.

Q Mr. Harris, have you prepared a map of the area involved in this application?

A Yes, I have prepared a map which covers in general the area in question and also to show these other trends in the area and the line out here is a potential map.

Q Is that marked, Harris Exhibit 1? A That is right.

Q How is the area affected by Amerada's Application deleniated on that?

A Outlined in red, and it is a typographical error left out this tier of sections which should be included in the area.

Q What type map?

A Map contoured on the initial potential of these wells drilled to the Pictured Cliffs Formation which we have found we can delenia te the trend along that shore line better by that method than any other.

Q What interval is that contoured on, MCF's, outside, --

A This last line is one million MCF. In other words, wells inside those lines there, I consider Commercial wells.

Q Now, does that map show any separation with the common source of supply within the area proposed?

A It shows two distinct separations as I believe it does, by the dry holes here and here.

Q Now, would you say where, now?

A In the dry hole in the Section Amerada's 1 C, I believe, in the NW 1/4 of Section 26, 24N, 5W; R & G Drilling Company well located in the NE 1/4 of Section 23, 4N, 5W, and that is primarily the barriers in those, in this area, between these two trends and here is a slight barrier here, this Skelly well indicated no production as I understand in the Pictured Cliffs.

Q Where is that?

A In the southeast Section 22 25 northwest.

Q Now, the pinch out area, where does that lie from that well?

A Just a small area covered in here, going into the Stanolind trend, where the Stanolind has drilled all these wells.

Q To the northeast? A That is right.

Q Now, is there any indication shown on that map on the same basis of a pinch-out, or lack of permeability through the area under consideration in this case?

A You mean these dry holes show a lack of permeability? Definitely. I think everybody agrees that this is of a northwest-southeast direction. Cutting across your map, if there were a well drilled along the edge of these trends, in the southwest quarter, as you have in this Gulf Well, --

Q Southwest quarter?

A Section 17, 24N 5W. You might drill a well in the northwest quarter and get a dry hole or considerably weak well as the well here indicated, 632; as you move to the northeast quarter of this same Section, you probably would get a higher well than that under 500,000, I would say.

Q In your estimation, would you get a producing well, say, in the southeast quarter to which the northeast quarter could be attributed?

A Yes, you could probably get a well in the southeast quarter of that section.

Q And would a portion of the northwest quarter be dry, in your estimation?

A No, I think the northwest quarter would produce. Your northeast quarter and your southeast will be dry.

Q Portions of the southeast quarter will be dry?

A Might be marginal. We didn't --

Q Are there any other instances shown on your map?

A In Section 27 down here, there is a well in the No. 2 Jicarilla drilled here in the northwest quarter of Section 27 and has never been completed as a commercial producer. It may be able to, it has much gas. We have got a well here in the Haris A-2, located in the southeast quarter of that Section. I feel if you move to the northeast quarter of that Section you get a dry hole because Amerada got a dry hole there.

Q Part of that would be dry, in your estimation?

A Yes, I wouldn't drill a well there.

Q Does this map show any connection with any area between the area under consideration and Amerada's Application and any area where 160 acre spacing has already been established?

A I think it does; presently, it is my opinion that it does. We will go on to that on cross section to show that.

Q Yes, referring to your permeability, your potential trends, what does that show?

A That it goes through here and connects with the Ballard area. When we drilled this discovery hole here, there were no other -- were none of these drilled from here to here.

Q That is referring to wells like, to the northeast?

A Northwest, in this trend here, as I have deleniated it here, Superior had drilled this well.

Q What is that?

A It is located in Section 24, 25N 7W, and I had projected this trend to that well and using the Schlumberger on the Amerada Jicarilla 1-A dry hole here. It projected on down there and extended from this well to here.

Q Do you use those factors in locating that well?

A Yes, that.

Q In your estimation, is there a connection between the two?

A In my opinion, there is. I think subsequent development has shown that the wells come back in this direction. It is just a matter of a little more, I imagine, the end of this year will see them connected.

Q Do you find any possibility of connection between the area under consideration and South Blanco? A No.

Q Referring to the northeast corner of the area in consideration, do you think there is any connection there?

A In this area here?

Q Yes, sir.

A I don't think there is any connection at all.

Q Have you made a cross section of the area shown on this map, Mr. Harris?

A I have cross sectioned a small one north south cross section starting from the Harris A-1 to the Lowery well in Section 11; this is Section 27 here.

Q Is this area marked on your map?

A It is marked in yellow. It is hard to see there.

Q I see.

A The map shows two permeability areas in that.

Q How is that marking designated, Mr. Harris?

A How is what?

Q How is that marking designated on Exhibit 1?

A With the yellow line from the Harris Jicarilla A-2 to the Amerada well in the northwest of 26, to the R. & G. well in the southwest of 14 to the Lowery well in southwest 11.

Q Now, referring to Exhibit 2, --

A And it is called a 2-A prime.

Q Now, referring to Exhibit 2, is that the cross section which you had reference to?

A This is the cross section, Harris A-2, initial potentiality of four million four hundred and forty MCF per day.

Q What well was that?

A That is the J. J. Harris Jicarilla 2.

MR. MACEY: You said four million four hundred and forty MCF; is is that the correct figure?

A That is what I said the first time. It should be forty-four forty MCF, is what it is.

MR. MACEY: Okay.

A Four million four hundred and forty thousand.

Q Now, referring to the second well on Exhibit 2, what is that?

A Amerada Jicarilla T-1, northwest quarter of 26, 24N 5W, slightly northeast of this well, about three quarters of a mile, and it is a dry hole for all practical purposes.

Q Now, referring to the third well on Ehibit 2, what is that?

A This is the R. & G. Drilling Jicarilla 9, southwest of Section 14, 24N 5W; we do not have an initial potentiality on that well since it is just in the process of being completed now. The Schlumberger does not indicate production and Mr. Russell told me it would make a -- it would make in excess of a million and a half cubic feet.

Q The fourth well, what is that?

A Lowery et al Jicarilla A-1, located in the southwest of 11, 24N 5W; that was a well I believe originally drilled by Lowery, R. & G. went back into it, tried to rework it, frac it and make a well

and it is still a dry hole, but it does indicate permeability barriers between this well and this well.

Q Now, would you say which wells, please, Mr. Harris?

A There is a permeability between the Harris A-2, Section 27, and the R&G Drilling Jicarilla 9, located in Section 14, same Township.

Q Would it also indicate a permeability barrier north of the latter well?

A It also indicates that you have another in Section 11.

Q Mr. Harris, are you familiar with R&G Drilling Company's 14 well?

A That is the one we got the Schlumberger on yesterday. Now you want to know the location of it?

Q You have examined the log? A Yes.

Q What does it indicate as to that -- well, first, give us the location of the well, point it out on the map.

A It is located in the NE/4, Section 23, 24N 5W.

Q And what does the log --

A The log, to me, would indicate a dry hole. It shows no permeability or porosity, as far as the log is concerned.

Q Does that fact further support your testimony that there are permeability barriers lying between the area under consideration --

A I think there are several there, distinctly there.

Q Now, --

MR. WOODWARD: Excuse me, would you have him repeat the name of that well?

A R&G Drilling Company Jicarilla Apache 14.

MR. WOODWARD: Where is that well located?

A In the northeast quarter, Section 23, 24N 5W. We have just

the one copy. That is all we have, just the field print.

Q Mr. Harris, have you prepared a cross section lying from the northwest to the southeast of the area shown by Exhibit 1?

A That is right. I have prepared cross sections under my supervision from the J. J. Harris Jicarilla A-2 located in Section -- southeast 27, 24N 5W, and the -- it begins actually, up here and ends down there. It goes to the -- I have the cross section up here, indicated by a green line. That is the Southern Union.

Q How is it marked on the map?

A By a green line from well to well as correlated in the log. This is the cross section up here.

Q Is it designated by any numbers?

A From B to B prime.

Q Referring to Exhibit 4, is that the cross section?

A This is the cross section here, starting at the Southern Union 4.

Q Where is it?

A In the northeast of Section 27, 26N 8W.

Q Now, what does that log show, Mr. Harris?

A Well, this log has -- this well was a small well, 573 MCF. All the wells on here are productive.

Q Would you designate what the wells are, Mr. Harris?

A This well is C. J. Warren 1 Federal, located in southeast quarter Section 5, 25N 7W. We don't have initial potentiality on that well, there was -- it was making in excess of two million feet of gas, as I worked on it, and water came in behind the pipes in process of being worked over. The Superior Hightower Government 1-24, in northwest quarter, Section 24, 25N 7W, initial potentiality 2,085 MCF; Superior

Slagel Government 1-19, located in northwest of Section 19, 25N 6W, the well was potentail for 1606 MCF; next well south is Superior Phillips Government 1-3, located in northeast 3, 24N 6W, initial potentiality 1883 MCF; Skelly Jicarilla B-1, located southwest of Section 6 24N 5W, potentiality 156 9 MCF; next well, cross section Golf Oil Apache Federal 1, southwest 17, 24N 5W, potential 118 4 MCF; and next well Amerada Jicarilla Apache D-2, southeast 20, 24N 5W, initial potentiality 2404 MCf: next Section J. J. Harris Jicarilla 1, northeast 28, 24 N 5W, initial potentiality 3848 MCF; last well, farthest southeast, Harris Jicarilla 2, located southeast Section 27, 24 5, potential 4440 MCF per day.

Q Now, Mr. Harris, with reference to Exhibit 4, does that show anything in regard to connection or continuity of formation between the area under consideration in Amerada's Application and any other area here already developed on 160 acre spacing?

A I think it shows a probable connection between this Ballard area through here and the area under consideration. You have got some spaces in there.

Q It isn't all the way across, in other words?

A No, subsequent development, just developed in this area, has come from here to here.

Q What is that? That is from -- A From --

Q Just designate the wells by name?

A Harris A-2 and this would be Superior well, I am not sure which one, Hightower Government.

Q And you say that has been in the past year?

A That has been this year.

Q Is the pay section shown on Exhibit 4 the same throughout on

those wells?

A The pay sections vary in thickness; some not all the way through and some are drilled all the way through, but in any sandstone formation, you will find part of the section is not net pay.

Q Is it the same zone of production?

A I think the top of the Pictured Cliffs is correlative.

Q Do all the wells shown on 4 produce?

A All except 1 Federal.

Q Does that, in your opinion, show possibility of production?

A It indicates production. I worked on the well when it was being drilled and after it was fracked, measured it about two hours after the frack started showing back at two million four hundred thousand and we shut it in for a gauge after 36 hours of blowing and it filled with water.

Q Is anything being done to that well at the present time?

A It has been squeezed three times and is in process of being worked again.

Q Now, Mr. Harris, are you familiar with the Pictured Cliffs Formation in the Fulcher Kutz Pool?

A Yes, sir, I am; worked on lots of wells there.

Q In your opinion, is there any difference between that area and the area covered by Amerada's application?

A Other than a shoreline which I understand that is -- that would be the sand, and coarseness, but essentially, I think they are the same.

Q Are the general characteristics --

A The general characteristics are the same.

Q Have you prepared a section showing the pressures in the Fulcher Kutz Pool?

A I prepared an Exhibit just on the -- this is Exhibit 5?

Q Yes, sir.

A It is not shown on this map, it goes to 28 North Range 10 West, Section 25, 26, 35 and 36; it covers that area.

Q Now, what is that exhibit shown in connection with pressure?

A Well, The Delhi drilled six wells located in Section 26 35; the last well was completed in March, 1951; those wells have been on production since that date, and I have the original -- I mean the last shut-in gauge that was taken on those wells, shall I give those gauges?

Q Just --

A This offset well there?

Q Just give roughly the pressures on the Delhi wells after production.

A After production history of that long, the well in the northeast quarter Section 36 has 480 pounds shut-in pressure.

Q Was there an offset well drilled?

A Last November and December, I worked, supervising the taking of completion of some of these other wells, some offset wells. Eight wells drilled by McMillin Whitby and the offset to the well in the northeast quarter. We drilled one in the northwest at 25; showed an initial shut-in pressure of 614 pounds after seven days.

Q Was that -- do you know whether that compares with the original reservoir pressure?

A That is approximately the original reservoir pressure in that area, ,650.

Q Now, in your opinion, is the Fulcher Kutz Pool connected with the area in consideration in this Case?

A I think it is, we have quite a small break here that hasn't

been drilled, but about five miles here, we have production, light production on the edge of this which indicates that the wells are just drilled in the wrong place.

Q Does Exhibit 5 show that one well would effectively and economically drain 320 acres?

A From the shut-in pressure alone on the Delhi Humble well in the northeast section of 26, now 480 pounds, we got just as close to it as we could in the northwest of Section 25 and got approximately the original reservoir pressure, so I would say it is not draining over 160, if that.

Q Now, do you think the same situation would prevail in the area included in Amerada's Application?

A I think so.

MR. KELLALIN: We offer in evidence Harris Exhibit 1 through 5 inclusive.

MR. MACEY: Without objection, they will be received.

Q Mr. Harris, do you have any wells which you are operating in the area under consideration?

A I have two full-interest wells and one third-interest in two other wells in the area.

Q Now, how did you secure those acreages for those wells, Mr. Harris?

A I secured the original acreage from a farm-out from Magnolia, 1,920 acre farm-out in here covering Sections -- you want me to give you the description?

Q Yes, please.

A Of the farm-out, covers sections 28, 29 and -- wait a minute, covers all of 28, that was wrong; the west half of 27, south half of 21,

I believe the north half of 33, and the northwest of 34.

Q Have you any other farm-outs you secured from other companies?

A I secured one from Amerada Petroleum Corporation, 160 acres in the northeast quarter of Section 24, 160 acres in the southeast of Section 27, 24 N 5.

Q That would be contiguous 320 acres?

A In two different Sections?

Q In two different Sections?

A Yes, sir.

Q Did you ask at the time for two drilling locations or one?

A Two.

Q When did you secure those?

A I originally asked them before I drilled the Magnolia well for some acreage which they refused, and later, around April 1, Mr. Handy, who is the land man for Land Division, I guess, the head of their Land Department in Tulsa, called me by phone and offered me -- wanted to know if I still wanted a farm-out. I said, "yes, two locations." We had only about ten days to finish a well.

Q You considered that as two locations, did you?

A Yes.

Q How many wells do you have in that area, Mr. Harris?

A I have the 5 Jicarilla in southeast of Section 21; 6 Jicarilla in the southeast of 28, and two Amerada wells, one in northeast 34; the other in the southeast of 27. I think is those --

Q Are you familiar with the cost of drilling wells in this area?

A I know what those cost me.

Q Yes, sir, on the average, what did they cost you?

A About $21,500, twenty-two five.

Q Have you had any return from those wells, Mr. Harris?

A Yes, the 6 Jicarilla put on the line the fifth of June, the A-1 Jicarilla on the sixteenth day of June and the A-2 the first of August, and they have paid approximately ten thousand dollars for my interest in them.

Q Up to what date?

A Up to September.

Q Now, based on that return, Mr. Harris, and cost of your wells, what would you estimate the pay-out on those wells would be.

A At the present rate of production, less than eighteen months.

Q Have you had any appraisal made of your reserves?

A I had to have an independent geologist make an appraisal.

Q What did that show?

A In reserves?

Q Yes.

A It was made for the Albuquerque National Bank; they wouldn't accept my own on my own stuff, and it was in excess of fifteen million feet per acre.

Q Do you knowof any other farm-outs made by any of the companies in this area, to your knowledge?

A Only farm-outs I know are in R. & G. farm-outs.

Q Would you know what basis, acreage basis those were made on?

A Just by talking to Mr. Russell.

MR. WOODWARD: I object to that as hearsay.

Q Did you have an opportunity to take those farm-outs, Mr. Harris?

A There was one farm-out over there offered to me by Amerada, the last, I think they made to Ken Blackburn.

Q What acreage was that?

A I can't remember the Section of it, I know Section 25.

QHow much acreage did it cover?

A I don't remember, I know it covered all of 25 and part of other sections in there, some 160's, some 320's.

Q Mr. Harris, based on your studies of this area, and your experienc with Pictured Cliffs Formation, and the Exhibits and testimony which you have given at this Hearing, in your opinion, will one well efficiently and economically drain and develop 320 acres in the area under consideration?

A I don't believe it would. It has been the history of the Pictured Cliffs, it is a low permeability sand, I don't believe it could efficiently drain that due to that factor alone.

Q In your opinion, would a 320 acre spacing order promote the full development of the area?

A I don't think so.

Q In your opinion, would the creation of 320 acre units result in the attribution of dry acreages to producing wells?

A In specific instances, I think it would.

MR. KELLALIN: That is all.

CROSS EXAMINATION

BY MR. CRENIER:

Q Mr. Harris, isn't it a fact that at between 320 acre spacing and 160 in an area of this size, there is approximately the same risk in either case? A Uh-huh.

Q After attributing what has been referred to as "dry acreage" to wells which are drilled --

A There is the same risk in drilling them, yes.

Q There is, and there will be approximately the same amount of

acreage, dry acreage which gets attributed to wells in either case, is that correct?

A It is possible.

Q Would you say that it would be more in one case or the other?

A Just depends on how your acreage is blocked out.

Q That is right, but has there been enough development in this area and can you see enough about how the area is blocked out to predict whether going to 320 acre in stead of 160 will or will not result in more dry acreage per hole?

A I can't say at the present time.

Q Now, which way is a man more apt to drill a well, if he knows he is going to be in an area where people aren't going to get closer to him than an average of 320 acres or where he knows they might muscle up to him in a 160 density?

A Which way is he going to drill?

Q Well, which way would he be more apt to drill a semi-marginal well, one that is not dead sure of, is he going to be influenced by the fact that if he gets it he is not going to be drained by anyone closer than on a 320 acre space?

A I don't know whether he would or not; I would be influenced, or I would stay as close to production as possible.

Q And doing that, still you wouldn't take into account whether or not if you got it, somebody else could come in and offset you on either 160 or 320 basis, wouldn't that have something to do with your thinking, in a certain way?

A In a certain way, but I don't believe, in my opinion, it wouldn't bother me, because I don't think they can drain over 160 acres.

Q Is that true of all these wells in this area or just of your own,

you don't think your wells or any of them would drain 320 economically and efficiently?

A Your wells that have an unusual high permeability might drain 320, I don't believe I have -- I don't believe any of my wells would.

Q But you think there might be some in the deleniated area that would perhaps drain 320?

A Apparently the Golf well is the only big well in the area. They have moved up, oh, approximately to the north, just across the Section line, they got 632,000 foot well where it is a eleven million foot well there, so apparently that well is not draining it, I know, I --

Q Now, that is just measuring it against one side?

A That is right.

Q And you don't know what they might be draining in the other direction, except in that one particular --

A My wells down here, wells offsetting mine, this three million eight hundred and forty-eight thousand, the wells directly offsetting, we got as close to it as possible, barely made a million cubic feet of gas; I don't think those are correct at all, definitely they are -- I don't think they are connected in any way; definitely they are not draining each other.

Q Which is the more conservative method, to develop a pool, start with larger units and if later contingencies prove that it is necessary or appropriate to go to smaller, or to start with smaller and hope you can scramble your way back to larger?

A I think that depends on your economic position, how fast you want your money back and how fast your wells will make your pay-back.

Q Can you ever un-drill any well?

A No, but everybody is taking that risk, if you own 160 acres, those wells producing, at the present rate they will pay for themselves in eighteen months, and less than eighteen months.

Q And they would still pay for themselves on a 320 acre tract?

A That is right, but the recovery, as far as I am concerned, the recoverable reserves would be cut in half, approximately.

Q You think that you would be cutting recoverable reserves in half?

A If it wouldn't have, it will only drain 160 acres, you only get what is under your 160 acres.

Q Yet, you just got through saying that you felt probably some of the wells in the area might drain as much as 320 acres?

A Maybe one well out of the entire area in that I can see.

Q Are there some wells in the area that aren't even going to drain as much as 160?

A I think that is right.

Q So you are not really, what you would say, the average is going to be -- you don't know what the average is going to be for the area?

A I would say the average well, if it is that, it will drain 160 acres, in my opinion.

Q No more, no less?

A A hundred and forty, hundred and ninety; I don't think anybody can prove that.

Q All you are sure of is that it is not as much as 320?

A That is my opinion.

Q Now, you mentioned that reserve calculation for the purpose of the Albuquerque National Bank; who calculated those?

A Paul Black.

Q Do you know what he used?

A No, I just turned him the logs, core analysis.

Q You have no information how he did or how he arrived at that result?

A I have a copy of his letter.

Q Have you seen the core analysis?

A I have the core analysis on the 6 Jicarilla.

Q Now, you mentioned this Delhi well in saying that, trying to tell us that a well wouldn't drain more than 160 acres; what was the caption of that, what was that well?

A I can't give you the name of it; if it was the Delhi Armor, I don't know the number; it is in the northeast quarter of Section 26, 28N 7 West.

Q What was the capacity of that well?

A Initial potential?

Q Initial potential.

A I don't have the notes on there. I don't have the initial potentials on any of those wells. I just have pressures.

Q You think it would be less than a million?

A Yes, I think it is less than a million, because the ones of the older wells show, the well we offset it with made two million one hundred and ninety thousand.

MR. CRENIER: Thank you.

CROSS EXAMINATION

BY MR. WOODWARD:

Q Mr. Harris, I believe you testified that there is a probability of connection between the area outlined in red and the South Ballard Pool: is that correct?

A Yes, I think there is a possibility of it.

Q Is it just a possibility?

A I think it very probable.

Q Now, is it probable that it goes --

A That it goes on into Fulcher Kutz?

Q Also part of this?

A The trend is there, yes.

Q Do you think you have effective communication the length of this trend?

A Along that permeability trend, I think you might find one tied into it somewhere here, maybe.

Q Would you bypass that tight spot and communicate all right?

A I think so.

Q If you have 160 spacing here and 320 here, would you expect some prejudice in this area?

A I think so, if they continue this 160 development here on down, you are going to have two spacings in the same area in the same circumstances, rather, in the same pool.

Q You think that in time there would be some?

A I think in time it would be.

Q You think there is any prejudice at the present time, in other words, do you think there is any possibility of drainage from this area up this trend?

A You mean from here to here, or here to here?

Q Along the trend, the direction.

A There will be draining along the trend, yes.

Q Do you think it will be appreciable?

A Not much on the 160.

Q In other words, you think there is communication along, all the

way up here?

A I think the zones may be tight places, but --

Q That is about a distance of thirty-five miles?

A That's right.

Q Now, if you have got communication over an area of thirty five miles, why don't you have some drainage outside of 160 acres aound the well?

A You might, in this direction, but not in this direction.

Q We will just assume that this is the common source right here, and that this is outside of the common source, and there is a possibility of communication over a trend thirty-five miles long, and yet, the wells aren't going to drain outside of 160 acres?

A It might beyond my life time, but I am not interested beyond that.

Q If the communication is that slow, there is no effective conn connection between this and this, since we are bringing this down to current time, then there is no prejudice that would result from a differ ent spacing up here than down here since you are not going to have this communication?

A I think it is prejudice whenever [illegible] acre spacing comes up against 320.

Q At the present time, do we have [illegible] this [illegible]?

A No.

Q We don't have. Is there any present possibility of prejudice in that area, at this now?

A I think there is a possibility of some development on 160's in that area; you asked the question of Mr. Germany, he is probably figuring on developing 160 acres in this area where he has a well here.

Q Now, if these things aren't draining outside of 160 acres, what is the possibility of prejudice there?

A I think there is nothing in the regulations to prevent you from drilling on that, if you want to.

Q That is not the question. You testified that these wells wouldn't drain an area greater than 160 acres?

A That is right.

Q If that is so, what is the possibility of prejudice if you have a different space plan, there is just going to drain --

A That is right, Amerada's on the northeast quarter of this which is essentially dry, I have got a well here, a good well, you dedicate that half section to it, you are dedicating your acreage to it --

MR. WOODWARD: Let me take that out by making a statement. The purpose of this Application has never been to obtain drilling units which would enforce the communitization of any acreage of this of anybody who has drilled in 160 acres; we will make this known to the Commission that we have not been an Applicant before you for the purpose of applying for a compulsory integration order which would bring any of our acreage in with anybody else's development or proven acreage as things now stand. I am talking about now, of the wells that have been drilled, that is not our purpose or intent, and if our acreage is not considered valuable, voluntary communitization can be refused and we will reserve the proper value. I would like to make that commitment at this time to clear any feeling that the Application has to do to attempt to take back anything given.

Q I don't know whether that satisfies you Mr. Harris, but you can rely we will never be an Applicant --

A If it doesn't drain over 160 acres, the royalty owners and

everybody else will be affected on it; you are not going to recover all your gas.

Q If you are correct, that these wells will not drain an area larger than 160 acres, then I think that is a correct statement. Now, I gather, then, as a result of varied type nature of this permeability and very small permeabilities involved, you don't, in current time, expect any communication through this sand body which you believe is nevertheless connected?

A I think that is right.

Q Now, in view of these gaps in here, Mr. Harris, would you recommend to this Commission that they execute this part of the South Ballard field at this time?

A No, I would recommend that they do any approval limits as they do and as the limits are extended, extend the pool limits.

Q Are you saying that the Commission, in the time being, are going to have to consider this as a separate common source of supply until they are linked by a closer line?

A I think so. The development may be enough this year to connect them.

Q But until that development is had, the only assumption the Commission can operate on is that there is some limit to this pool?

A That is right.

Q Is that right? A Yes.

Q Now, Mr. Harris, you testified that the estimated recoverable reserves underlying this particular 160 acre tract were on the order of fifty million? A In excess, yes.

Q On what 160 acre tract was that estimate made?

A The southeast quarter of Section 28, also the northeast quarter

of Section 34. Both of those came under that.

Q The estimate is about the same on both of them?

A A little higher on the number six, it is in the southeast quarter of 28.

Q When was that development completed?

A The number six, oh, I forgot the date, but it was tied into the line the fifth of June.

Q What was the initial pressure on completion?

A Oh, 719, I believe.

Q Do you have any idea what those pressures are now?

A No.

Q Do you have any figures on the production from that well?

A The production -- it produced approximately an excess of seventy million feet of gas already.

Q That well has produced in excess of seventy million cubic feet of gas?

A Wait a minute, let's see. Thirty-one million the first twenty-five days of production, yes, it has produced in excess of that.

Q And it had about fifteen million cubic feet place under that 160 acre tract?

A Yes.

Q Where did the rest of it come from?

A Fifteen million feet per acre; one hundred and sixty gives you quite a bit more gas.

Q I misunderstood you, I stand corrected. Now, tell me, are you familiar, Mr. Harris, with the per barrel balance method of calculating the drainage area for a well?

A I am not an engineer, I am a geologist.

Q You are not familiar with that method of computation. Now, on the basis of this arithmetic, I get about two million forty thousand MCF on a fifteen million MCF for 160 acres, and you have been producing how long, Mr. Harris?

A That well since the fifth of June.

Q You have produced about seventy million MCF?

A I imagine so.

Q You estimate then, the pay-out on that well will be some eighteen months, is that correct?

A At the present rate of production. I do have deliverability tests on that, on the A-1.

Q You have not conducted or ordered any draw out tests which would allocate the expected production in pressure in relation to completion of just reserves under 160 acres?

A No.

MR. WOODWARD: That is all we have.

MR. MACEY: Any other questions of the Witness? If not, the Witness may be excused. Does anyone have any other testimony in this Case?

MR. ANDERSON: I would like to make a statement. This area that we have been talking about is thirteen miles long by six miles wide, forty-eight thousand acres is all Jicarilla Indian tribal land; the land immediately to the north and east of this Jicarilla land all is under lease, to the south it is under lease Jicarilla tribal land to the west side. The Township 23, 24 North are bordered by Canyon Largo Unit, and to the west of 25 North, the land in Federal ownership private ownership, and State ownership. All of the original leases in this forty-eight thousand acres were owned by ten leases; since

the royalty ownership is common, there is no offset requirements between these leases and any offsets that would be necessitated from one lease to another which would be occasioned by the lessee.

As far as development is concerned, and all that has been done -- practically all of it has been done in the last year -- there is about four thousand acres that is included in the farm-out agreements that have been testified to; that leaves about forty-four thousand acres still in the hands of the original leases, several producing wells have been drilled and up to three or four dry holes, three or four drillings, twelve producers completed on the other forty-four thousand acres. From what information we have in the testimony today, we see some question as to whether a well will drain 320 acres. Why we come into the picture is because of the Indian ownership of the land; under our cooperative agreement with the Bureau of Indian Affairs, and under the terms of leases we are charged with the responsibility of seeing that the Indian lands are developed on a comparable basis as to other lands in the area or field. The question arises to us as to whether if this Application is granted, and only one well be required to 320 acres, whether the amount of gas that would be taken from the productive area and the rate of production would be comparable with Pictured Cliffs elsewhere.

Nowhere else in the San Juan Basin of New Mexico is there 320 acre spacing in the Pictured Cliffs. I want to make one point certain and that is that we are not necessarily advocates of close spacing, 120 acres may be all right, but in this particular case, we don't know whether the Commission would consider or would grant a double allowable for wells drilled on 320 acres, and if it were granted, we don't know whether a well drilled on 320 acres would produce twice the allowable

of a well drilled on 160. Since we have so many of these things, we don't know the answers to, development in the area except on these forty-four thousand acres that have been farmed out, doesn't necessarily have to be done on 160; we are not going to require it, we are of the opinion that if an order were entered setting up 320 acre spacing at this particular time, that the rights of the Indian lessors might be prejudiced. I can't make that statement for certain, but there is one thing that I do know, that if this order is issued on 320 acres and there is no computation for granting increased withdrawal so that this acreage is developed and produced on a comparable basis with other areas in the San Juan Basin, that we, although we are charged with seeing tnat it is, would be helpless to do anything about it without coming to the Commission and asking them to back up and rescind the order and give us an opportunity to take care of our job.

I think that is one of the principal reasons why at this time we are opposing the issuance of the order as sought in Case 954.

MR. MACEY: Anything further? Mr. Anderson, I take it that you feel that the creation of any drilling unit other than the present 160 acre size unit in the absence of a proration formula that would take acreage into consideration on an equal basis wouldn't be consistent, is that what you are driving at?

MR. ANDERSON: I certainly do think so.

MR. MACEY: Does anybody else have a statement they wish to make?

MR. HINKLE: Clarence E. Hinkle, Humble. The Humble Company would like to go on record as being concurring in the Application in the position of its being brought in this Case. The Humble has, I believe, approximately eight sections involved in the area under consideration.

It has been brought out here that there is some economic hazard involved. The Humble believes that the best approach to this matter is to start out on a 320 basis, and, if it later proves that one well will not actually drain as much as 320, you can always go back and drill the other 160, but if you start out on 160, you can never go the other way around. If it proves, from the economic side of it, that these wells are not going to pay out, as a good many of them will not, then there is going to be an economic loss caused unless we go the 320 route.

We believe further that the 320-acre spacing will cause a more uniform development and,by causing a more uniform development, prevent waste, but, also, we would like to go on record on behalf of Superior Oil and Gas Company as being in favor of the application of Amerada.

MR. MACEY: Does anybody else have a statement?

MR. SETH: Oliver Seth, appearing on behalf of Stanolind. We would also like to go on record showing that we concur in the position taken by Amerada.

MR. WOODRUFF: F. Norman Woodruff, El Paso Natural Gas Company. Subject to final approval an agreement being negotiated by Continental in El Paso, approval by the proper Government or Tribual Agent, we become successor to the acreage indicated as being Continental; we wish to go on record as being in favor of the application.

MR. CRENIER: A. S. Crenier, Southern Union Gas Company. We wish to go on record as approving the Amerada Application and particularly as outlined by Mr. Hinkle, it seems to us that there are good reasons for consent as pressed by Mr. Anderson, but that we are not at a point where those things are critical yet, and, as Mr. Hinkle pointed out, these development probabilities, it is easy to prove in one direction; to cure difficulty by too-wide spacing, but you can never move in the

other direction. That is why we think -- why we look at it as a temporary order. Whether we do or not, we think the Amerada application should be approved.

MR. GERMANY: We are not in this area in discussion, but we do off-set it on the west, and Mr. Snider testified that that area might, in the future, be included in such a spacing regulation. We are opposed to the 320 spacing unit.

MR. KELLALIN: Briefly, please, at the outset, I would like to point out that there is nothing in the Statutes and Rules and Regulations of this Commission that would require the development of this acreage on 160-acre development at the present time. As Mr. Anderson has pointed out in behalf of the royalty owners, there is no requirement from them at the present time for development on 160 acres, and the operators involved in this area can go ahead with the development on 320 acres without an order of this Commission. There is no requirements imposed on them. In fact, the tests show that no demand has been made. In connection with the testimony which has been offered here today, it is remarkable, the similarity between that offered by the Applicant and that offered by the Protestants. I appreciate the frankness with which Amerada has presented their case and the frank and fair manner in which their witnesses have stated their positions.

In connection with the testimony, I would like to call attention to the fact that Mr. Woodward, at the outset, said that this is a separate common source of supply. The first witness said there are several within the area; he never did testify that the area which they now propose to include in one common reservoir is a common source of supply. In connection with Mr. Christie's testimony, he stated that in

his opinion that one well would efficiently and economically drain and develop 320 acres. However, no testimony was offered, as far as I can see, which would indicate in any remote way that one well would efficiently and economically drain and develop 320 acres, and that, of course, is the foundation for their application. They have no interference tests; they have no shut-in pressure tests; they have none of the usual type of evidence and testimony which is generally offered in cases of this nature.

In effect, we have here a group of operators who hold a large amount of acreage coming up and saying, "We want 320 acres because it is convenient for our purpose." Now, we don't need to go into what their purpose is, I think it has been obvious to the Commission what it is. The whole point of the case is: They have not supported their application by any competent or sufficient evidence. Meanwhile, all of the companies and the testimony so shows -- I shouldn't say "all," but a number of the companies, have proceeded to give farm-outs to individual operators on the basis of checker-boarded 160-acre units.

Now, they say that has no bearing on the application in any sense of the word. To me, it does, because you are immediately confronted with the protection of correlative rights of those producers who have developed their acreage on 160 acres. Mr. Woodward says they are not going to try to pool their acreage with those units so drilled; he says, in effect, and the application so states, that an automatic exception would be granted to such acreage. In other words, those wells would be sitting on 160-acre units.

Somewhere down the road, we are going to be faced with the problem of prorating the gas in this pool and immediately confronted

with a question similar to that which is present in the West Kutz case as to what is a fair proration schedule to protect the money of those who had spent their money in good faith and developed on the basis of 160 and pardon those on 320.

I think Mr. Harris' testimony clearly shows, as does the testimony offered by Amerada, that there are numerous impentrable zones in the area. On the basis of those alone, one well will not drain and develop 320 acres. The result would be the attribution of acreage which is not reasonably presumed productive to wells drilled within the producing area. There is nothing fair or just or right about such a situation as that. If the area is productive, let it be proved by the drilling on 160-acre spacing. If it isn't productive, it certainly should not be presumed by this Commission to be productive and allowed on 320-acre units.

We oppose the application and ask the Commission to deny it.

MR. WOODWARD: If the Commission please, if there is any surreptitious motive for 320-acre spacing in this area, I haven't been told about it by my company or anybody else. I would like to clarify our position again, because we keep going back to this business of checker-board of farm-outs. We have demonstrated a willingness to cooperate if the operator of a producing well desires a reasonable contribution to the well; if he doesn't want to communitize his interest, we will never be here as an applicant to do so. He has got his acreage and he is entitled to all the participations that that acreage calls for, but we didn't farm out all of our acreage in this area, and I think we have a direct stake in the participation of being afforded an opportunity to participate in the production from the acreage which we have retained in the area.

We have this statement to make concerning the separate character of the common source of supply: Mr. Snider and Mr. Christie have both indicated the possibility that we may have more than one common source of supply here; the possibility also has been suggested that it goes outside.

The only thing that we want to get across is that for all practical purposes, we have no evidence that this area is connected with any other area for which 160-acre spacing has been ordered.

We agree that there is no communication across it in the direction and across the strike, no practical possibility, and the testimony today indicates the unlikelyhood of any effective communication in this direction. Particularly, Mr. Harris' testimony that these wells aren't draining 160 acres, aren't draining outside 160 acres, with any current time concept would rule out any amount of effective communication along that strike. Actually, we think that there is probably more than that, but the possibility has also been pointed out that over a 35-mile shoreline some break from streams entering the Basin is more than a possibility. Only drilling can determine those facts.

Mr. Kellalin has also pointed out something that I want to concur in thoroughly, the general lack of information, complete information, to determine at this time what the spacing in the area should be. He points out the fact that we have no interference tests, we have no material balance tests; that is perfectly true. Neither do they. Only through continued development and study of it will we ever know what the spacing pattern should be. All we are trying to do is keep the field in a shape so that it can, at the appropriate time and with the appropriate information, be placed on the proper spacing, and it is

perfectly apparent, if you have a dense drilling program on 160 acres, you are very soon going to freeze the pattern and tie your hands so you will be unable to do that.

These wells of Mr. Harris' are draining an area considerably larger than the 160 acres which, we believe, in fact can be demonstrated by appropriate tests and additional information about the field. As sure as 160-acre spacing is permitted to develop to the extent that the field is frozen, no intelligent disposition of this problem can be made.

Now, I would like to point out a connection in the Statute between the general objective of the Act to prevent waste and protect correlative rights and the specific legislation stand for fixing of size and state of proration units to this area which can be efficiently and economically drained by one well. When the area is smaller than the area can be efficiently drained, you tend to have an irregular pattern in the field, spacing does not determine the number of wells that are ultimately drilled; that is a matter of economics. When drilling, in relation to reserves, reaches a saturation point, the drilling stops. If you are off on the wrong foot and you have got too small a pattern, that is permitting a number of unnecessary wells to be drilled, those unnecessary wells cut into production which would help pay off necessary wells, and, I think, as a matter of law, you have got a real risk of waste. Furthermore, there is a highly unequitable production; a man with a small amount can always go in early, he can drill that as densely as possible, not because he has enough reserves to pay off the drilling, but because it is practically impossible to develop the field as a whole to the same density as the earlier operator on top of the structure, and the purpose of a spacing

rule or proration rule which protects correlative rights is to offset that kind of pool-wide drainage which results in a detriment.

It probably isn't involved here, but some operators receive a bonus far in excess of their reserves, while a number of people in less favored positions whose land is in larger tracts and necessarily develop slower, may not get any participation at all for a very small part of what they are entitled to on a basis of any notion of reserves in place or oil and gas underlying their tracts.

Now, with the exception of a few operators, and I think in every instance they are developing a limited amount of acreage, the vast majority in this field have supported 320-acre spacing at this time, and if their feeling is similar to ours, it is that 160-acre spacing, for this field, turns a potentially profitable operation into a salvage operation. Now, any spacing pattern which can result in the inefficient and uneconomical development of the pool as a whole, and which forces, unncecssarily, upon a majority of the operators in the field, the business of conducting salvage operations is not good business for anyone. Possibly the man that has already got his wells drilled, because we can't meet that kind of pattern, and we will protect that, that pattern can't be met through this field.

Now, on the business of allocation and proration, very frankly, that wasn't raised; it was dropped from our application for the reason that the allocation formula is a controverse one. At the present time the demand exceeds the limited supply here. We think, very shortly, the Commission is going to have a problem of prorating production in this area, but bear in mind the facts depend largely on reserves. The wider spacing pattern permits a quicker development, or at least a quicker proving of the reserves in the field and

and that quicker proving up of these reserves authorizes, or is a basis on which the pipeline company gets a certificate for larger takes. Those larger takes are far more important than a denser bunching of wells in the field before you know the extremity, before you know the reservoir characteristics. We didn't ask for a temporary order because we think all are, to a certain extent, temporary.

The Commission has continuing jurisdiction; if this is too large, they can come in and cut it down and I don't think anybody is going to be hurt. If we start off on 160 acres, that pattern is going to be frozen permanently.

We didn't suggest a designation for this area or any nomenclature, but if 160 acres is continued very much longer, we would suggest the title "Fruitless Cliffs Pool" for this area.

MR. MACEY: Does anyone have anything further in this case? Nothing further, we will take the case under advisement.

Tomorrow morning we are going to meet in a different room, Senate Meeting Room No. 1, on the second floor of the old Capitol Building.

We will now adjourn until 9:00 o'clock in the morning.

* * *

STATE OF NEW MEXICO)
: ss
COUNTY OF BERNALILLO)

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

IN WITNESS WHEREOF I have affixed my hand, this, the 7th day of November, 1955.

Thurman J. Moody
Court Reporter.

CORE ANALYSIS REPORT

FOR

AMERADA PETROLEUM CORPORATION

JICARILLA APACHE NO. B-4 WELL

WILDCAT

RIO ARRIBA COUNTY, NEW MEXICO

LOCATION: SEC. 19-T24N-R5W

CORE LABORATORIES, INC. *Petroleum Reservoir Engineering*

COMPANY AMERADA PETROLEUM CORPORATION — DATE ON 9/19/55 — FILE NO. RP-3-197 FC

WELL JICARILLA APACHE NO. B-4 — DATE OFF 9/19/55 — ENGRS. WJC

FIELD WILDCAT — FORMATION PICTURED CLIFFS — ELEV. 6618' KB

COUNTY RIO ARRIBA — STATE NEW MEXICO — DRLG. FLD. DIESEL — CORES DIAMOND

LOCATION 990' FSL, 990' FEL, SEC. 19-24N-5W — REMARKS SERVICE NO. 4

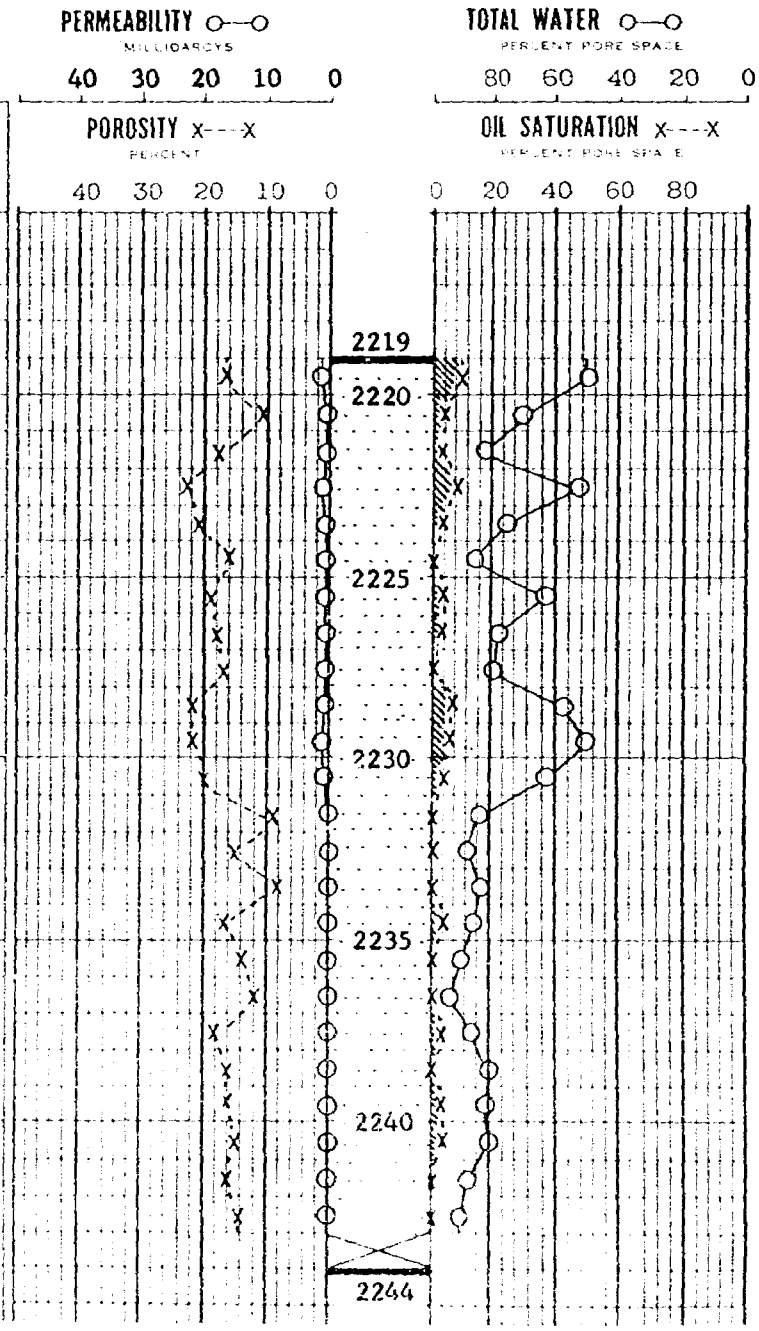
SAND — LIMESTONE — CONGLOMERATE — CHERT

SHALE — DOLOMITE

TABULAR DATA and INTERPRETATION

SAMPLE NUMBER	DEPTH FEET	PERM MD AIR	POROSITY %	RESIDUAL SATURATION % PORE SPACE OIL	RESIDUAL SATURATION % PORE SPACE TOTAL WATER	CHLORIDE PPM	REMARKS
1	2219.5	1.76	17.4	10.4	51.1		GAS
2	20.5	0.21	11.3	5.3	69.9		GAS
3	21.5	0.21	17.5	3.4	82.9		GAS
4	22.5	1.20	23.4	9.0	52.6		GAS
5	23.5	0.72	21.4	2.8	75.3	12,600	GAS
6	24.5	0.47	16.1	0.0	85.1		GAS
7	25.5	0.55	18.7	3.2	63.8		GAS
8	26.5	0.38	17.8	3.4	77.0		GAS
9	27.5	0.55	16.7	0.0	79.7		GAS
10	28.5	0.47	22.0	6.8	57.7		GAS
11	29.5	1.20	21.8	6.4	51.9		GAS
12	30.5	0.85	20.4	4.4	62.9		GAS
13	31.5	0.0	9.3	0.0	83.9		
14	32.5	0.0	14.7	0.0	87.8		
15	33.5	0.0	8.2	0.0	83.0	9,120	
16	34.5	0.0	16.6	5.4	85.5		
17	35.5	0.0	13.6	0.0	89.0		
18	36.5	0.0	12.2	0.0	93.5		
19	37.5	0.0	18.3	3.3	85.9		
20	38.5	0.0	16.3	0.0	80.0		
21	39.5	0.0	16.0	3.8	80.6		
22	40.5	0.0	15.4	3.9	80.0		
23	41.5	0.0	15.9	0.0	86.9		
24	2242.5	0.0	13.6	0.0	89.8		

COMPLETION COREGRAPH



CORE LABORATORIES, INC
Petroleum Reservoir Engineering
DALLAS, TEXAS

September 26, 1955

REPLY TO
1020 PATTERSON BLDG.
DENVER, COLORADO

Calculated Reserves @ 105 Res. abandonment. = 1810 MCF Ac

Amerada Petroleum Corporation
Box 2040
Tulsa 2, Oklahoma

Attention: Mr. Richard J. O. Hathaway

Subject: Core Analysis
Jicarilla Apache No. B-4 Well
Wildcat
Rio Arriba County, New Mexico
Location: Sec. 19-T24N-R5W

Gentlemen:

Diamond coring equipment and diesel oil mud were used to core the interval from 2219 to 2244 feet in the subject well. Samples of recovered formation were selected and quick-frozen by engineers of Core Laboratories, Inc. and were transported to the Farmington laboratory for analysis. The results of the analysis are presented in this report.

Pictured Cliffs formation between 2219 and 2231 feet is interpreted to be gas productive where permeable. The zone is characterized by very low permeability, which ranged from 0.21 to 1.76 millidarcys and averages 0.71 millidarcy. The total productive capacity of the 12 feet of gas productive formation is 8.5 millidarcy-feet, and a commercial producer would be dependent upon the success of a formation fracturing treatment. A summary of the average core analysis data for the gas productive interval from 2219 to 2231 feet is presented on page one of the report.

The remainder of the Pictured Cliffs formation recovered from 2231 to 2243 feet is impermeable and nonproductive.

We sincerely appreciate the opportunity to be of service to you.

Very truly yours,

Core Laboratories, Inc.

J D Harris (PE)
J. D. Harris,
District Manager

JDH:TLK:ma

FORM F-11A

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS

File RP-3-197 FC
Well Jicarilla Apache No. B-4

CORE SUMMARY AND CALCULATED RECOVERABLE OIL

CORE SUMMARY

FORMATION NAME	Pictured Cliffs			
DEPTH, FEET	2219.0-2231.0			
% CORE RECOVERY	100			
FEET OF PERMEABLE, PRODUCTIVE FORMATION RECOVERED	12.0			
AVERAGE PERMEABILITY MILLIDARCYS	0.71			
CAPACITY — AVERAGE PERMEABILITY X FEET PRODUCTIVE FORMATION	8.5			
AVERAGE POROSITY, PERCENT	18.7			
AVERAGE RESIDUAL OIL SATURATION, % PORE SPACE	4.6			
GRAVITY OF OIL, °A.P.I.				
AVERAGE TOTAL WATER SATURATION, % PORE SPACE	67.5			
AVERAGE CALCULATED CONNATE WATER SATURATION, % PORE SPACE	63			
SOLUTION GAS-OIL RATIO, CUBIC FEET PER BARREL (1)				
FORMATION VOLUME FACTOR—VOLUME THAT ONE BARREL OF STOCK TANK OIL OCCUPIES IN RESERVOIR (1)				
CALCULATED RECOVERABLE OIL	{ Prediction dependent upon complete isolation of each division. Structural position of well, total permeable thickness of oil zone and drainage area of well should be considered.			
BY NATURAL OR GAS EXPANSION, BBLS. PER ACRE FOOT (2)	(4)			
INCREASE DUE TO WATER DRIVE, BBLS. PER ACRE FOOT	(4)			
TOTAL AFTER COMPLETE WATER DRIVE, BBLS. PER ACRE FOOT (3)	(4)			

Core Laboratories, Inc.

J D Harris (PE)
J. D. Harris

NOTE:

(*) REFER TO ATTACHED LETTER.

(1) REDUCTION IN PRESSURE FROM SATURATION PRESSURE TO ATMOSPHERIC PRESSURE.

(2) AFTER REDUCTION FROM ORIGINAL RESERVOIR PRESSURE TO ZERO POUNDS PER SQUARE INCH.

(3) RESERVOIR PRESSURE MAINTAINED BY WATER DRIVE AT OR ABOVE ORIGINAL SATURATION PRESSURE.

(4) NO ESTIMATE FOR GAS PHASE RESERVOIRS.

Distribution of Final Reports

2 Copies	Amerada Petroleum Corporation Box 2040 Tulsa 2, Oklahoma Attention: Mr. Richard J. O. Hathaway
2 Copies	Amerada Petroleum Corporation Box 2040 Tulsa 2, Oklahoma Attention: Mr. J. E. Lowe
2 Copies	Amerada Petroleum Corporation Drawer "C" Monument, New Mexico Attention: Mr. D. C. Capps
2 Copies	Amerada Petroleum Corporation Box 2040 Tulsa 2, Oklahoma Attention: Mr. C. V. Millikan
2 Copies	Amerada Petroleum Corporation Box 312 Midland, Texas
2 Copies	Amerada Petroleum Corporation Box 2249 Casper, Wyoming Attention: Mr. L. R. Dreveskracht
1 Copy	Amerada Petroleum Corporation Box 2040 Tulsa 2, Oklahoma Attention: Mr. C. S. Agey
1 Copy	Amerada Petroleum Corporation c/o To-Tah Motel Farmington, New Mexico Attention: Mr. W. G. Smith
1 Copy	Amerada Petroleum Corporation c/o Avery Hotel Farmington, New Mexico Attention: Mr. Darrell Hopkins

[illegible]

1. [illegible]

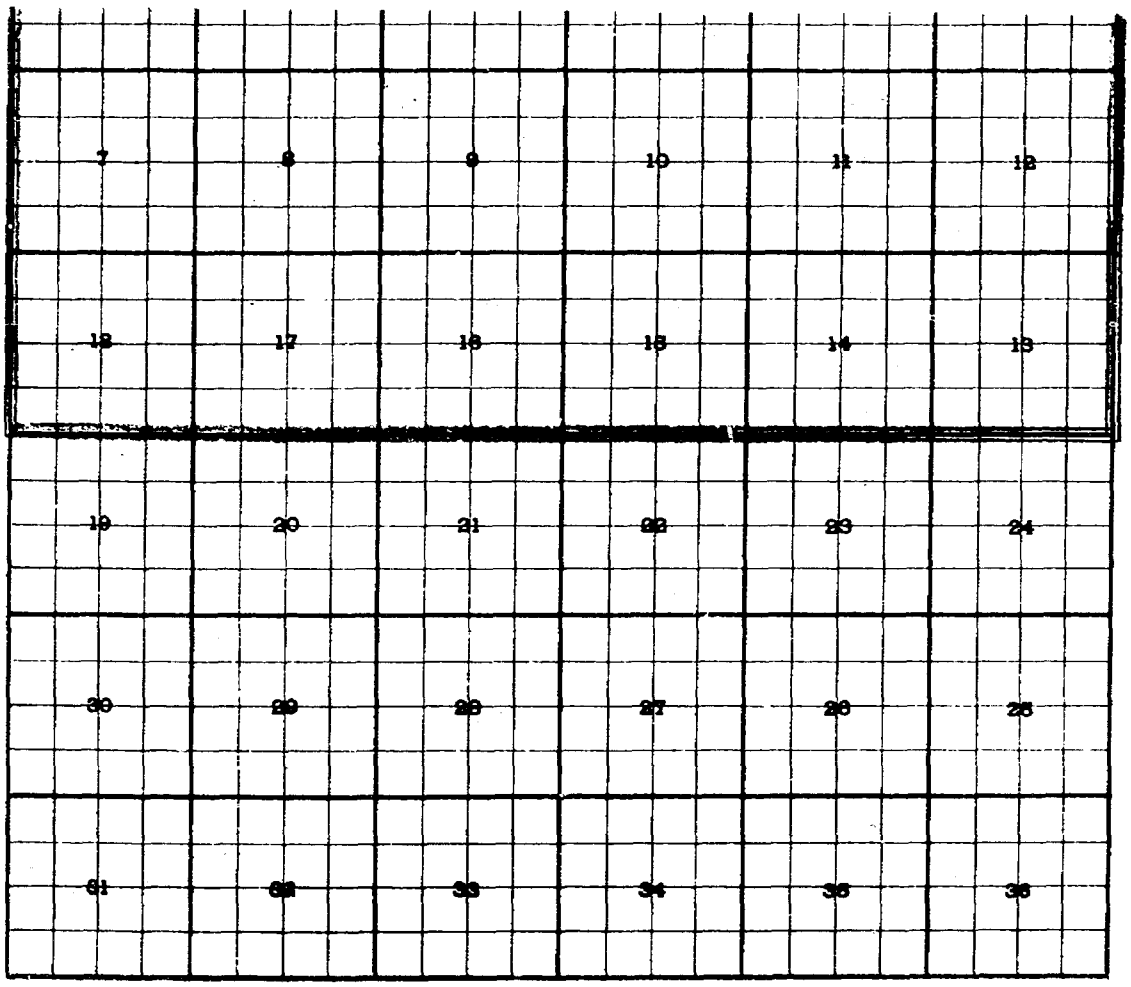
2. Do you have any (information) as to whether [illegible] 1-2, [illegible] and Standard "1 - [illegible] 146 are in the same source of supply?

3. Allowable comparison for 1 - 160 Ac. wells and 1 - 320 wells.
August proration schedule for [illegible] P.C.
Ac. factor = 2854.05
AD " = 14.653973
assuming: 1 well on 160 with a Del of 1000.
1 " on 320 " " " " 1000.

160 = (1.00 × 2854.05) + 1000 × 14.653973 = 17,507.52
320 = (2.00 × 2854.05) + 2000 × 14.653973 = 35,015.09
relationship should be 2:1

4. Do you have information or an opinion as to whether the producing [illegible] in 21N-5W are same source of supply as now designated Canyon Fargo Pool.

ILLEGIBLE



23 N

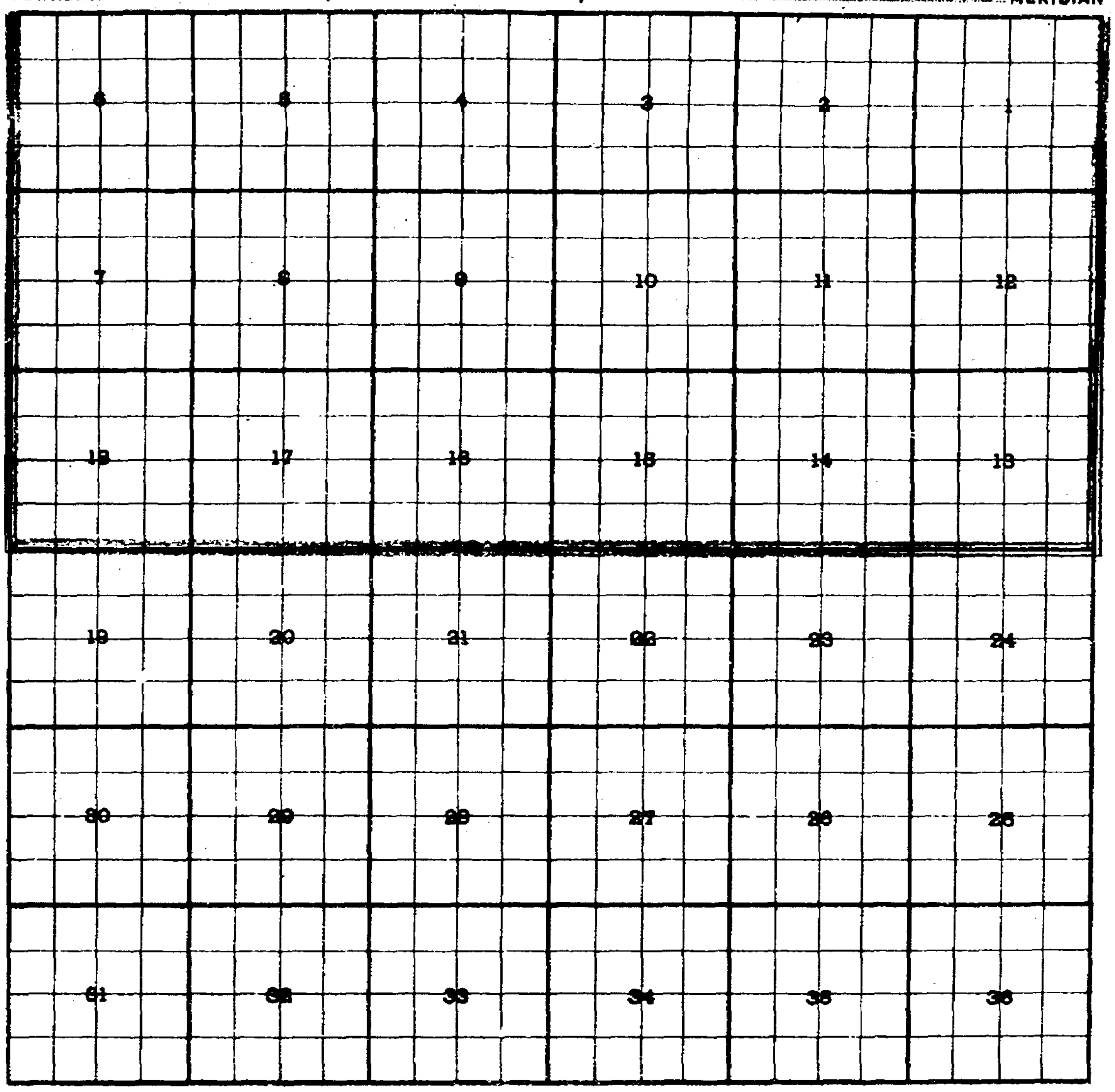
☐ Case 999-Order 689

☑ Recommended For Sept. 55 Hearing

All Morris Wells Are Reported Connected To E.P.

County__________ Pool__________

TOWNSHIP _____ *South*, RANGE _____ *East*, _____ *NEW MEXICO PRINCIPAL* MERIDIAN



23 N

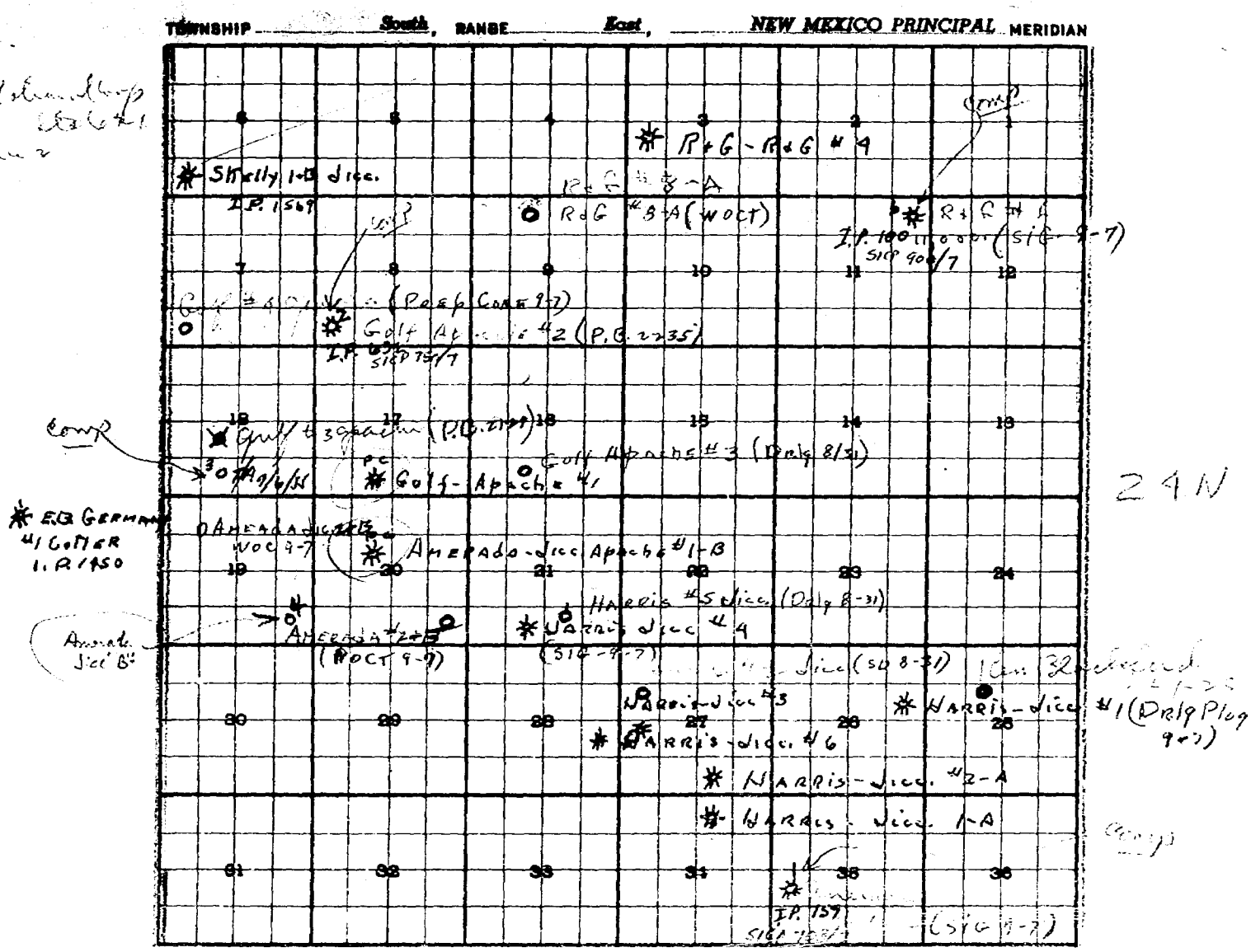
☐ Case 949 - Order 684

☒ Recommended For [illegible] Hearing

All [illegible] wells are reported connected to E.P.

County _____ Pool _____

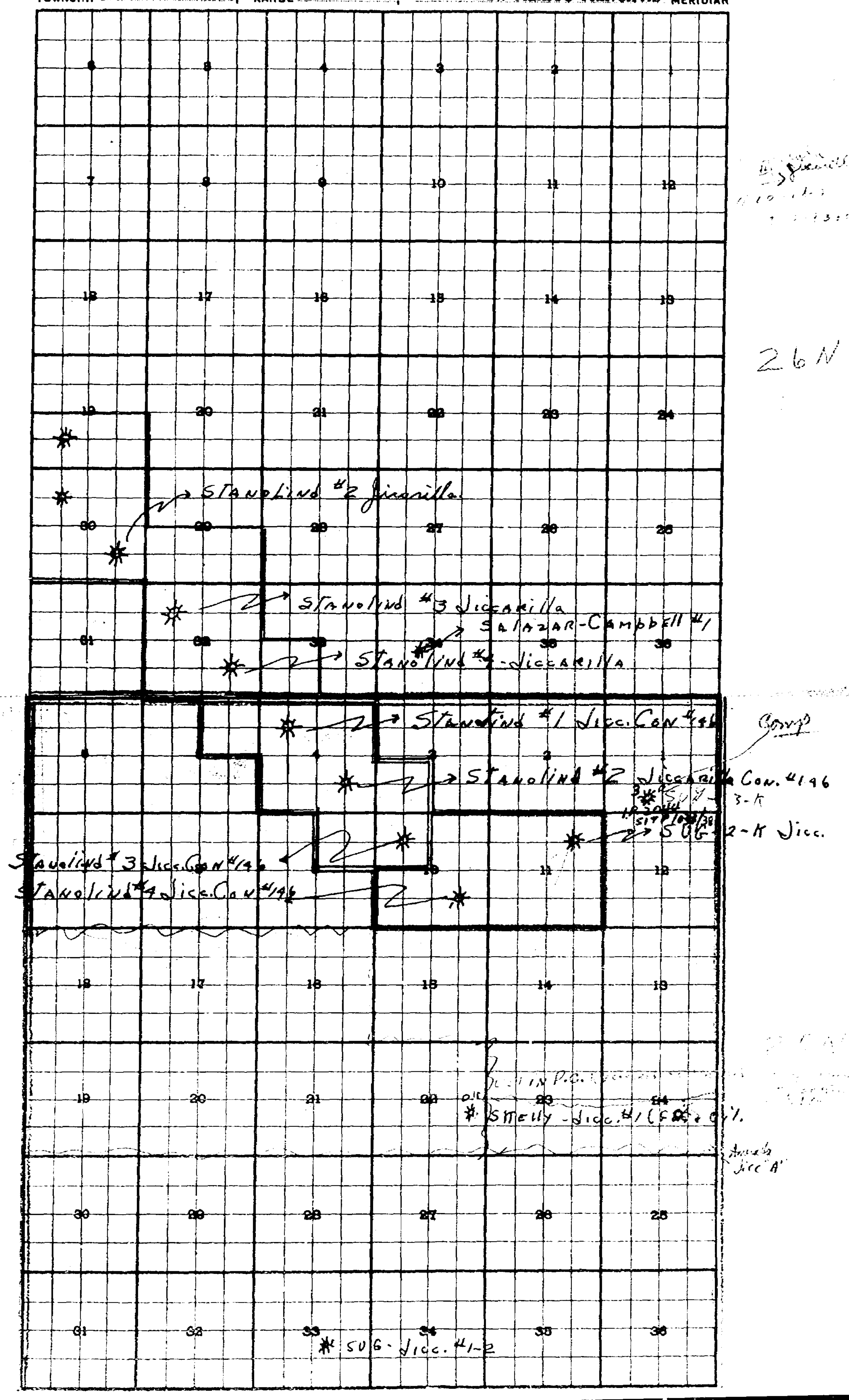
TOWNSHIP 24 South, RANGE 34 East, NEW MEXICO PRINCIPAL MERIDIAN



County Rio Arriba Pool

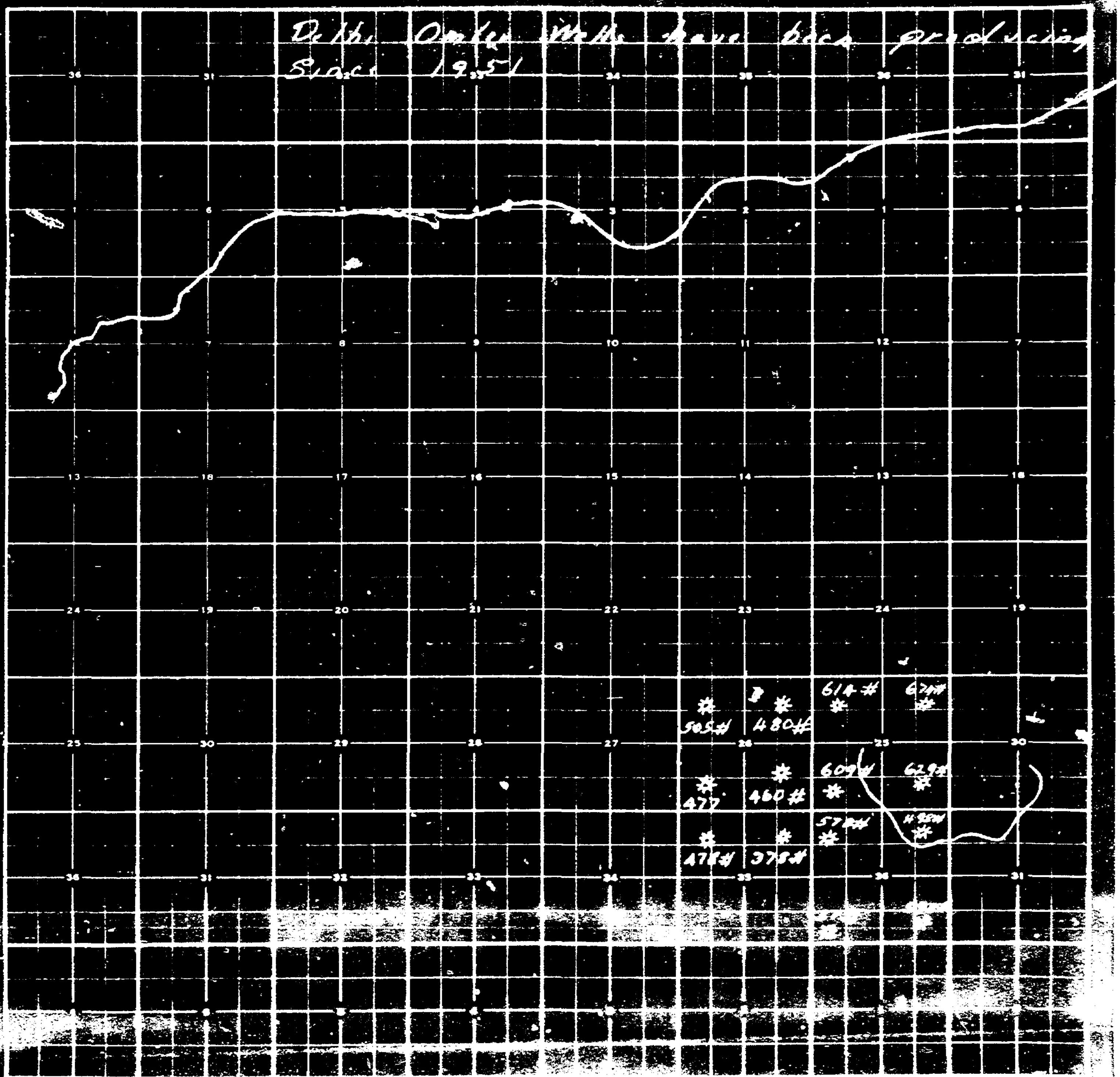
Case 954

TOWNSHIP South, RANGE 5 West, NEW MEXICO PRINCIPAL MERIDIAN



6 5 4 3 2 1
7 8 9 10 11 12
18 17 16 15 14 13
19 20 21 22 23 24
30 29 28 27 26 25
31 32 33 34 35 36
26 N
Stanolind #2 Jicarilla
Stanolind #3 Jiccarilla
Salazar-Campbell #1
Stanolind #4 Jiccarilla
Stanolind #1 Jicc. Con #146
Stanolind #2 Jiccarilla Con. #146
SUG 3-K
SUG 2-K Jicc.
Stanolind #3 Jicc. Con #146
Stanolind #4 Jicc. Con #146
Comp
18 17 16 15 14 13
19 20 21 22 23 24
Skelly - Jicc. #1
30 29 28 27 26 25
31 32 33 34 35 36
SUG - Jicc. #1-2

S[illegible] Wells
In Sec [illegible] as of 5-7-55
and Initial shut-in [illegible] on McMillan-White
Omler wells in Sec. 25 + 36, T28N-R10W.



TOWNSHIP 28N RANGE 10W COUNTY [illegible] STATE N.M.

REMARKS:

SKELLY OIL COMPANY

PRODUCTION DEPARTMENT
J. S. FREEMAN, VICE PRESIDENT

TULSA 2, OKLAHOMA

September 9, 1955

AIR MAIL

Mr. Elvis A. Utz
New Mexico Oil Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Dear Sir:

We have your letter of September 7, 1955, regarding our Jicarilla No. 1 C in the SE/4 Section 22-T25N-R5W, and our Jicarilla No. 1 B, Section 6-T24N-R5W.

With respect to our C well, it was completed as a gas distillate well in the Dakota Sand with a potential of 9½ million/day and approximately 62 barrels/million of 58° gravity distillate. The Pictured Cliffs formation in this well was tested from 2892-2957 (top Pictured Cliffs 2887), tool open 4 hours, recovered 80' drilling mud, initial flow test 95#, final flowing pressure 95#. 30 minute shut-in bottom-hole pressure 190#.

On our B No. 1, it was completed as a Pictured Cliffs well. 7" casing set 2456', plugged back total depth 2500', 0 natural potential, potential after frac 1569 MCF/D, shut-in gas pressure 740#, shut-in tubing pressure 760#. This well was not cored in any formation and completed in August 1955.

By carbon copy of this letter to our superintendent, Mr. P. B. Cooper, we are asking him to send direct to you as soon as possible, copies of each of the two electric logs run on these wells and also to give you any corrections as to the above information for the respective wells.

Very truly yours,

George W. Selinger

George W. Selinger

GWS:mch
cc: Mr. P. B. Cooper

CASE 954: Amerada application for 320 acre drilling and proration units.

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

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

CASE NO. 954
Order R-736

THE APPLICATION OF AMERADA PETROLEUM
CORPORATION FOR AN ORDER ESTABLISHING 320
ACRE SPACING UNITS FOR A COMMON SOURCE OF
SUPPLY IN THE PICTURED CLIFFS FORMATION
UNDERLYING SECTIONS 16 THROUGH 22, S/2
SECTIONS 23 AND 24, ALL OF SECTIONS 25
THROUGH 31, ALL IN TOWNSHIP 25 NORTH,
RANGE 5 WEST, AND ALL OF TOWNSHIP 24
NORTH, RANGE 5 WEST, AND THE N/2 OF
TOWNSHIP 23 NORTH, RANGE 5 WEST, NMPM,
RIO ARRIBA COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m., on October 13, 1955, at Santa Fe, New Mexico, before the Oil Conservation Commission, hereinafter referred to as the "Commission".

NOW, on this 29th day of December, 1955, the Commission, a quorum being present, having considered the records and testimony adduced, and being fully advised in the premises,

FINDS:

1. That due notice of the time and place of hearing and the purpose thereof having been given as required by law, the Commission has jurisdiction of this case and the subject matter thereof.

2. That applicant, Amerada Petroleum Corporation and others, are the owners of oil and gas leases covering lands in Rio Arriba County described as follows: Sections 16 through 22, S/2 Sections 23 and 24, All of Sections 25 through 31, All in Township 25 North, Range 5 West, All of Township 24 North, Range 5 West, and the N/2 of Township 23 North, Range 5 West, NMPM.

3. That applicant, by the preponderance of the evidence, failed to show the existence of a common source of supply under above described properties.

4. That applicant, by the preponderance of the evidence, failed to show that one well will efficiently drain 320 acres.

IT IS THEREFORE ORDERED:

That the application of the Amerada Petroleum Corporation for an order establishing 320 acre spacing units in the Pictured Cliffs formation underlying Sections 16 through 22, S/2 Sections 23 and 24, All of Sections 25

through 31, all in Township 25 North, Range 5 West, and all of Township 24 North, Range 5 West, and the N/2 of Township 23 North, Range 5 West, be and the same is hereby DENIED.

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

JOHN F. SIMMS, Chairman

E. S. WALKER, Member

W. B. MACEY, Member and Secretary

ga

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

January 11, 1956

Mr. John A. Woodward
Amerada Petroleum Corporation
P.O. Box 2040
Tulsa 2, Oklahoma

Dear Sir:

We enclose a copy of Order R-736 issued December 29, 1955, by the Oil Conservation Commission in Case 954, which was heard on October 13th.

Very truly yours,

W. B. Macey
Secretary - Director

WBM:brp
Encl.

GENERAL OFFICES
120 BROADWAY NEW YORK

AMERADA PETROLEUM CORPORATION

BEACON BUILDING
P. O. BOX 2040
TULSA 2, OKLA.

ROBERT J. STANTON
GENERAL COUNSEL
JOHN S. MILLER
ASSISTANT GENERAL COUNSEL

LEGAL DEPARTMENT

H. O. BUSHNELL
HAROLD J. FISHER
JAMES C. McWILLIAMS
VIRGIL C. MORELLE
ARDEN E. ROSS
JOHN W. STEWART
JOHN A. WOODWARD
ATTORNEYS

October 4, 1955

Oil Conservation Commission
State of New Mexico
State Capitol Building
Santa Fe, New Mexico

Gentlemen:

Copies of the attached letter and amended Application have been sent to all persons appearing in this matter at the September hearing and to all operators of record within that field.

Very truly yours,

John A. Woodward

JOHN A. WOODWARD

JAW:MT
encl.

October 4, 1955

To All Operators and Other Persons
Entering an Appearance in Case 954
Before the New Mexico Oil Conservation
Commission

Gentlemen:

For your information, a copy of Amerada's amended Application in Case No. 954 is attached hereto.

As you know, this matter was continued to October 13, 1955.

Very truly yours,

JOHN A. WOODWARD

JAW:MT
encl.

9-6-55
file for application

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF AMERADA PETROLEUM CORPORATION FOR AN ORDER ESTABLISHING 320 ACRE PRORATION UNITS, WITH ALLOWABLE ADJUSTMENT, FOR A COMMON SOURCE OF SUPPLY IN THE PICTURED CLIFFS FORMATION UNDERLYING ALL OF TOWNSHIP 25 NORTH AND TOWNSHIP 24 NORTH AND THE N/2 OF TOWNSHIP 23 NORTH, ALL IN RANGE 5 WEST, RIO ARRIBA COUNTY, NEW MEXICO.

CASE NO. 724
ORDER NO.

APPLICATION

COMES NOW, Amerada Petroleum Corporation and alleges and states:

1. That it is the owner of oil and gas leases covering lands overlying a common source of supply in the Pictured Cliffs formation located in Township 25 North and Township 24 North and the N/2 of Township 23 North all in Range 5 West, Rio Arriba County, New Mexico.

2. That the top of said common source of supply is found at a depth of 2184 feet in the Amerada-Jicarrilla Apache Well #1 "B" located in the SE/4 NW/4 of Township 24 North, Range 5 West, Rio Arriba County, New Mexico.

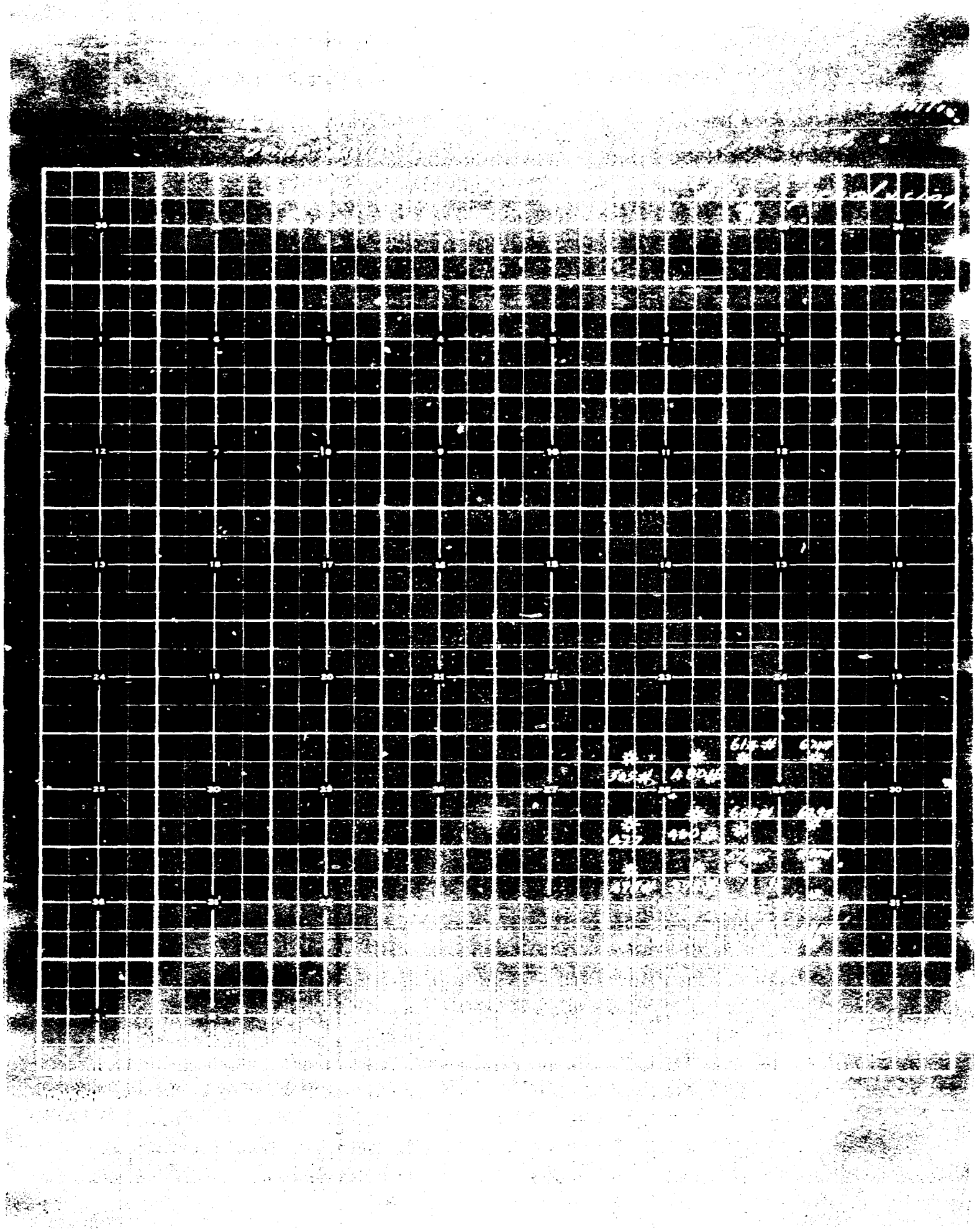
3. That one well completed in said common source of supply will efficiently and economically drain an area of not less than 320 acres.

4. That, for the prevention of waste and the protection of correlative rights, the Commission should enter its order establishing 320 acre proration units in said common source of supply and fix the allowable therefor on an acreage basis.

5. That said 320 acre units shall consist of two contiguous governmental quarter sections, as designated by the operators thereof, and the unit well shall be drilled not closer than 660' from the boundary of either such governmental quarter section included in a unit; provided, that all wells commenced prior to the date the commission issues its order in this case and located closer than 660 feet to the boundary of a governmental quarter section shall be recognized as exception wells.

WHEREFORE, applicant respectfully requests that this matter be set for hearing after due notice as prescribed by law, and upon such notice and hearing the Commission issues its order establishing 320 acre proration units with allowable adjustment for said common source of supply in the manner described herein.

John A. Woodward
Attorney for Applicant



SKELLY OIL COMPANY

Box 426,
Farmington, New Mexico
Sept . 20, 1955

Mr. Elvis A. Utz
New Mexico Oil Conservation Commission
P. O. Box 871,
Santa Fe, New Mexico

Dear Sir:

As requested by Mr. George W. Selinger in his letter of September 9, 1955, we are mailing you copies of each of the two electric logs which were run on our Jicarilla "B" and Jicarilla "C" wells. Mr. Selinger's information regarding these two wells is correct.

Very truly yours,

P. E. Cosper

P. E. Cosper
District Foreman

Need

Gulf. Apache # 9 + 2 + 3 ✓

Amerada 2-B + 1-B ✓

Hanson (any)

R + G. # 6 + # 9

Stanolind # 146 - 2 + 4 Did they go them

R.S.

Jr. Harris 5-0 $47 alk.

Case 959 (Amerada 320 spacing) 9-1-1955

1. Existence common source of supply.

2. effectively drain 320 acres.

3. Connection of these areas to areas being developed on 160 acres.

2 wells on 320. Deliv. 500 each well.

1.00 x 1301.72 + 500 x 1.0 x 10.849380 = 6726.4

1.00 x 1301.72 + 500 x 1.0 x 10.849380 = 6726.4

13,452.8

1 well on 320 with Deliv 1000.

2.00 x 1301.72 + 1000 x 2.00 x 10.849380 = 24302.16

$\frac{24,302.16}{13,452.8} = 1.806$ 80.6 % more allowable than 2 wells on 160 with

4. Do you have any data that would reflect reserves on your Amerada 1-B

30% I.P.

NE/4, 28 — 773548 — 1154

SE/4, 28 — 5727 — 1718

SW/4, 27 — I.P. 2039 — 612

1.0 × 1301. + 1.00 × 1154 × 10.8 = 13,764
1.0 × 1301. + 1.00 × 1718 × 10.8 = 19,855
33,619

2.0 × 1301 + 2.00 × 612 × 10.8 = 9,212.

$$\frac{225,000}{160} =$$ based on Fig. B-4

1,400
160) 225,000,000
160
650
640
100

Porosity —
Interstitial H_2O
Net Pay.
[illegible] 90%
Abandonment Pressure 725# approx.
24 25
65 25

Memo

From 170 Bbls a Day.

To 24+25

30 - 24 - 6
Core Amanda.

Average of 25 ft net Pay in Harris area.

Harris #6 in 20-24-5

Ave. Perm 6.51 Ave. Ht. 31' height.

Porosity 21.7%.

H_2O 61.4

Case 954 (Amerada 320 Spacing)

After reading the transcript and making somewhat of a reserve study as well as a study of the Production history of wells in this area I have the following analysis to make.

1. I cannot anywhere in the testimony see that Amerada proved that one well will drain 320 acres as they stated they would on page 2 of the transcript.

2. The Reserves I calculated are not as pessimistic as Christie's or as optimistic as Paul Umbach. The 3 cores available show the following:

	MCF/Ac	value 160 @ .10	value 320 @ .10
Amerada B-4 P-19-24N-5W	1810	$28,960	$57,920
Amerada 1-E 30-24N-4W	2659	$42,544	$85,088
Harris #6 I-28-24N-5W	3840	$61,939	$122,587

3. The Ave. per day per well production from June 5 to Oct 1 (wells were connected June 5) shows a very good rate of Pay out for P.C. wells in the Basin. This being 1.84 yrs to recover $25,000 without interest taxes etc. and 2.2 yrs for $30,000. Wells in this area should be drilled for $20,000 to $25,000 with care.

When considering spacing in an area I believe we should look at the area as a whole rather than individual cases.

The reservoir picture is not too bright but not really dim as an average.

The Production history is quite good economically.

I believe the request should be denied on the basis of:

1. Failure to prove that one well will drain 320 acres.
2. Failure to prove that there are one well will not pay out in a reasonable time.
3. That there is a distinct possibility of considerable dry acreage being dedicated to wells on both sides of the trends or in unproductive areas within the trends.
4. There is danger of waste when wide spacing is used in low permeability & limited reservoirs as the pictured Cliffs in

1. Page 1. [illegible] other [illegible] by [illegible]

2. One well [illegible] efficiently & economically drain 320.

2. Page 19. Response to [illegible] question on drainage, admitted [illegible] Known.

Reserves: Amenda Fin. B-4-P-19-24N-5W

Porosity - 18.7%

Interstitial H_2O - 67.5%

Net Pay - 12 ft.

Wellhead - 725 psi Approx B.H.P. = 765

Depth - Midpay 2225 ft.

Abandonment Pressure - 100 # wellhead.

GL - 1557

43,560 × 18.7 × (100 - 67.5) = 3161.9 (32.5)

Deviation - $(1.079)^2$ = 1.1642

Temp Factor $\frac{520}{610}$ = .853

Recovery factor $\frac{765 - 105}{765}$ = .862

Pres. Base $\frac{765}{15.025}$ = 50.91

3162 × 1.1642 × .853 × .862 × 50.91 = 150,373.8

12 × 150.8 = (1,810) MCF Ac.

160 × [illegible] × .10 $28,960.

320 × 1810 × .10 $57,920

[illegible] (1,406.)

[illegible] Emerado – [illegible] 1-E 30-29N-9W
Porosity – 14.6
H_2O = 64.9
Net pay – 30
Allowable – 725
Depth midpay – 2990 Orig BHP 780 [illegible]
Abandonment [illegible] psi P 100#
GL = 1740

43,560 × .146 × (100 − 64.9) = 2232   (35.1)

Deviation = $(1.079)^2$ = 1.1642
Temp. factor = $\frac{520}{610}$ = .853
Recovery factor = $\frac{780-105}{780}$ = .865
Pressure Base = $\frac{780}{15.025}$ = 51.91

2232 × 1.1642 × .853 × .865 × 51.91 = 98.502 MCF

98.5 × 27 = 2,659 MCF/Ac
160 × 2659 × .10 = 42,544.
320 × 2659 × .10 = $85,088

3. Page 22 Economics will be controlling factor in No. wells drilled in field. – Christie

4. Page 22 How would correlative rights be prejudiced by non-uniform spacing.

5. Umpach [illegible] 15 million/Ac.

Harris #6 Core.
Porosity - 21.7%
H_2O - 61.4
Net Pay - 25 ft.
Well held - 725
Abandonment . 100
Est. Mid pay. 2200
GL. 1840
Bottom Hole = 725 + 38 = 763
43,560 X 21.7 X (100 - 62.4 [37.6]) = 3554.

Deviation = (1.079)² = 1.1642
Temp = = .553
Recovery = (763 - 105) / 763 = .856
Pres. Base = 763 / 15.025 = 50.73

3554 X 1.1642 X .553 X .866 X 50.73 = 153,239.
153.2 X 25 = 3,840.
160 X 3,840 = 612,939. X .10 = $61,939.
320 X 3,840 = 1,225,878. X .10 = $122,587.

	Jan	Feb	Mar	April	May	June (30)	July (31)	Aug (31)	Sept (30)	Oct (31)	[illegible]	[illegible]
1 [illegible] #6 J-29-4-5						28951	20367	19403	6932	8642	79295	452
2 Widemer #1 C 29-29-5						18692	26744	49633	9560	11997	86626	566
2 [illegible] #2 C 21-29-5								22230	16549	2986	41765 =	453
4 [illegible] #5 21-29-5										119	119 =	3.8
5 [illegible] #1 17-29-5								1083			1083 =	34.9
5 [illegible]ham #1 H 2?-29-5						19881	19308	12600	6505	5551	61845 =	404.2
6 Cunningham #3 L 27-29-5						9798	8788	7088	3238	[illegible]	[illegible] =	243.9
7 [illegible] #4 N 21-29-5						9763	8480	7067	3583	4905	[illegible] =	220.9
						90451	78687	84104	46370	42276	341555	
[illegible]						150	155	217	130	217	919	

372.0 MCF/well/da

368 X.10 = 37.20/dA per well.

Cost approx. $25,000

$\frac{\$25,000}{37.20}$ = 672 days or 1.84 yrs.

37.20 x 365 = 13,578 yr. @ $3.9000 = 2.2 years.

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF AMERADA PETROLEUM CORPORATION FOR AN ORDER ESTABLISHING 320 ACRE ~~PRORATION~~ UNITS, ~~WITH ALLOWABLE ADJUSTMENT~~, FOR A COMMON SOURCE OF SUPPLY IN THE PICTURED CLIFFS FORMATION UNDERLYING ALL OF TOWNSHIP ~~24~~ NORTH AND TO~~WNSHIP~~ NORTH AND THE N/2 OF TOWNSHIP 23 NORTH, ALL IN RANGE 5 WEST, RIO ARRIBA COUNTY, NEW MEXICO.

Drilling

CASE NO. 954

~~E/2 Sec 15 and~~
all of Sec 16 ~~and~~ 22, S/2 Sec 23 & 24
& adj Secs 25 thru 36 in 25 N R 5 W

APPLICATION

COMES NOW, Amerada Petroleum Corporation and alleges and states:

(1) That it is the owner of oil and gas leases covering lands overlying a common source of supply in the Pictured Cliffs formation located in Township 25 North and Township 24 North and the N/2 of Township 23 North all in Range 5 West, Rio Arriba County, New Mexico.

(2) That the top of said common source of supply is found at a depth of 2184 Feet in the Amerada-Jicarrilla Apache Well #1 "B" located in the SE/4 NW/4 of Township 24 North, Range 5 West, Rio Arriba County, New Mexico.

(3) That one well completed in said common source of supply will efficiently and economically drain an area of not less than 320 acres.

(4) That, for the prevention of waste and the protection of correlative rights, the Commission should enter its order establishing 320 acre ~~proration~~ Drilling units in said common source of supply, ~~and fix the allowable therefor on an acreage basis.~~

(5) That said 320 acre units shall consist of two contiguous governmental quarter sections, as desiganted by the operators thereof, and the unit well shall be drilled not closer than 660' from the boundary of either such governmental quarter section included in a unit; provided, that all wells commenced prior to the date the commission issues its order in this case and located closer than 660 feet to the boundary of a governmental quarter section shall be recognized as exception wells.

WHEREFORE, Applicant respectfully requests, that this matter be set for hearing after due notice as prescribed by law, and upon such notice and hearing the Commission issue its order establishing 320 acre ~~proration~~ Drilling units, ~~with allowable adjustment~~ for said common source of supply in the manner described herein.

/s/ John W. Woodward
Attorney for Applicant

New Mexico Oil & Gas Engr. Committee
P. O. Box 127
Hobbs, New Mexico
August 25, 1955

From Warren

Re: Case # 954 12/9/15

To JWG

I recommend the following findings:
① applicant failed to show that
this a common source of supply
② applicant failed to show
that one well will efficiently drain
320 acres.
and then in order:
① To Deny application
WWW

SUPPLEMENTAL DOCKET

REGULAR HEARING NOVEMBER 16, 1955

N. M. Oil Conservation Commission 9 a. m., Mabry Hall, State Capitol, Santa Fe

CASE 978: Application of Phillips Petroleum Company for an order pooling the rights and interests of all persons having the right to drill for, produce or share in the production of gas from the Devonian formation underlying the SE/4 Section 28, Township 25 South, Range 37 East, Lea County, New Mexico, in the Crosby-Devonian Gas Pool.

CLASS OF SERVICE
This is a fast message unless its deferred character is indicated by the proper symbol.

WESTERN UNION
TELEGRAM

W. P. MARSHALL, PRESIDENT

1220 (R 11-54)

SYMBOLS
DL = Day Letter
NL = Night Letter
LT = International Letter Telegram

The filing time shown in the date line on domestic telegrams is STANDARD TIME at point of origin. Time of receipt is STANDARD TIME at point of destination

LA153 KA388

(20)

K TUA737 LONG PD=WUX TULSA OKLA 12 505PMC= 1955 OCT 12 PM 4 28

NEWMEXICO OIL CONSERVATION COMMISSION=

SANTAFE NMEX=

REFERENCE CASE 954. GULF EARNESTLY RECOMMENDS 320-ACRE SPACING. GULF HAS DRILLED FOUR WELLS IN AREA COVERED BY APPLICATION. PRODUCTIVE HISTORY IS LIMITED BUT PRESENT INFORMATION INDICATES ADDITIONAL WELLS ARE UNDESIRABLE IF 160-ACRE SPACING IS REQUIRED. WE ANTICIPATE PROFIT FROM 320-ACRE DEVELOPMENT. GULF BELIEVES 320-ACRE ORDER WOULD ENCOURAGE ADDITIONAL DEVELOPMENT AND WOULD RESULT IN INCREASED ULTIMATE PRODUCTION FROM THE AREA. ACCORDINGLY, 320-ACRE ORDER WOULD BE TRUE CONSERVATION WHEREAS 160-ACRE ORDER, BY DISCOURAGING DEVELOPMENT, WOULD CAUSE WASTE THROUGH PREVENTING ADDITIONAL PRODUCTION=

TULF OIL CORP BY R S KNAPPEN=

954 320 160 320 320 320 160=