Case No.

188

Large Exhibits

LANE WELLS

RADIOACTIVITY LOG

COMPANY

Location of Well

3329' D.F.

COMPANY: GULF OIL CORP.
WELL: HOLT "B" NO. 1
FIELD: LANGLIE MATTIX
COUNTY: LEA STATE: N.M.
LOCATION: 1980' FSL 660' FEL
OF SEC. 36-23S-36E

COMPANY: GULF OIL CORP.
WELL: HOLT "B" NO. 1
FIELD: LANGLIE MATTIX
COUNTY: LEA STATE: N.M.
LOCATION:

LOG MEASURED FROM ROTARY TABLE ELEVATION 3330.5'
DRILLING MEASURED FROM R. TABLE ELEVATION 3330.5'
PERMANENT DATUM 5½" BRADEN HEAD ELEVATION 3320.2'

RUN NUMBER	1	1		
TYPE OF LOG	GAMMA RAY	NEUTRON		
DATE	5-14-49	5-14-49		
COMPANY DEPTH STRAIN	3610'	3610'		
MAXIMUM DEPTH REACHED	3617'	3617'		
WELL FLUID	10.7# MUD	10.7# MUD		
FLUID LEVEL	FULL	FULL		
MAXIMUM TEMPERATURE				
O.D. OF INSTRUMENT—INCHES	3 5/8	3 5/8		
SENSITIVITY REFERENCE	274	275		
RECORDED BY	SCHLOTTERBACK			
WITNESSED BY	STACH	STACH		

CASING RECORD

RUN NO.	SIZE—IN.	WT.—LB.	INTERVAL
1	5 1/2		SURFACE TO 3457'
			TO
			TO
			TO
			TO

OPEN HOLE RECORD

BIT SIZE—IN.	INTERVAL
4 3/4	3457' TO T.D.
	TO
	TO
	TO
	TO

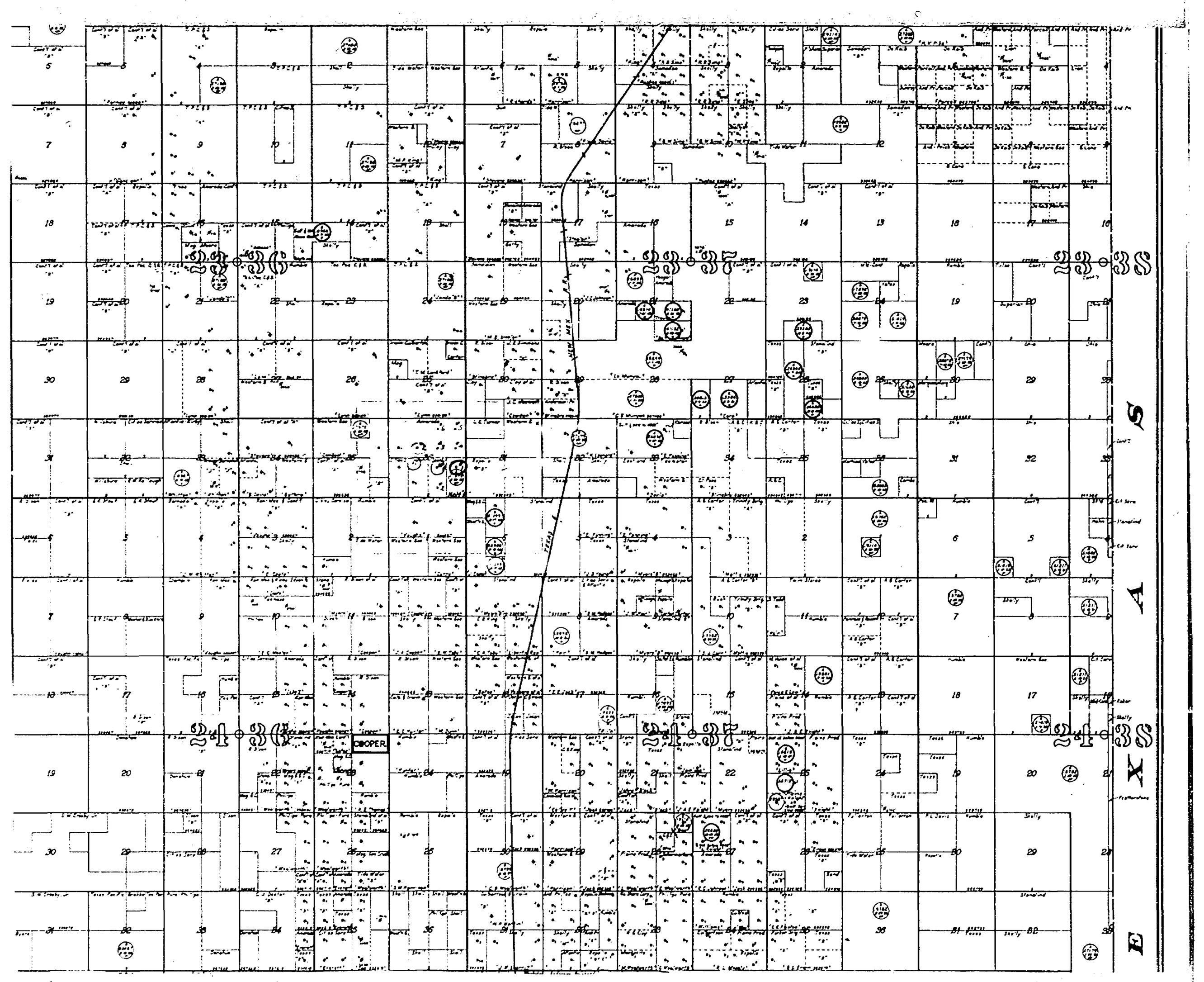
REMARKS OR OTHER DATA

GAMMA RAY	CASING & COLLAR LOG DEPTH	NEUTRON
RADIATION INTENSITY INCREASES		RADIATION INTENSITY INCREASES

124

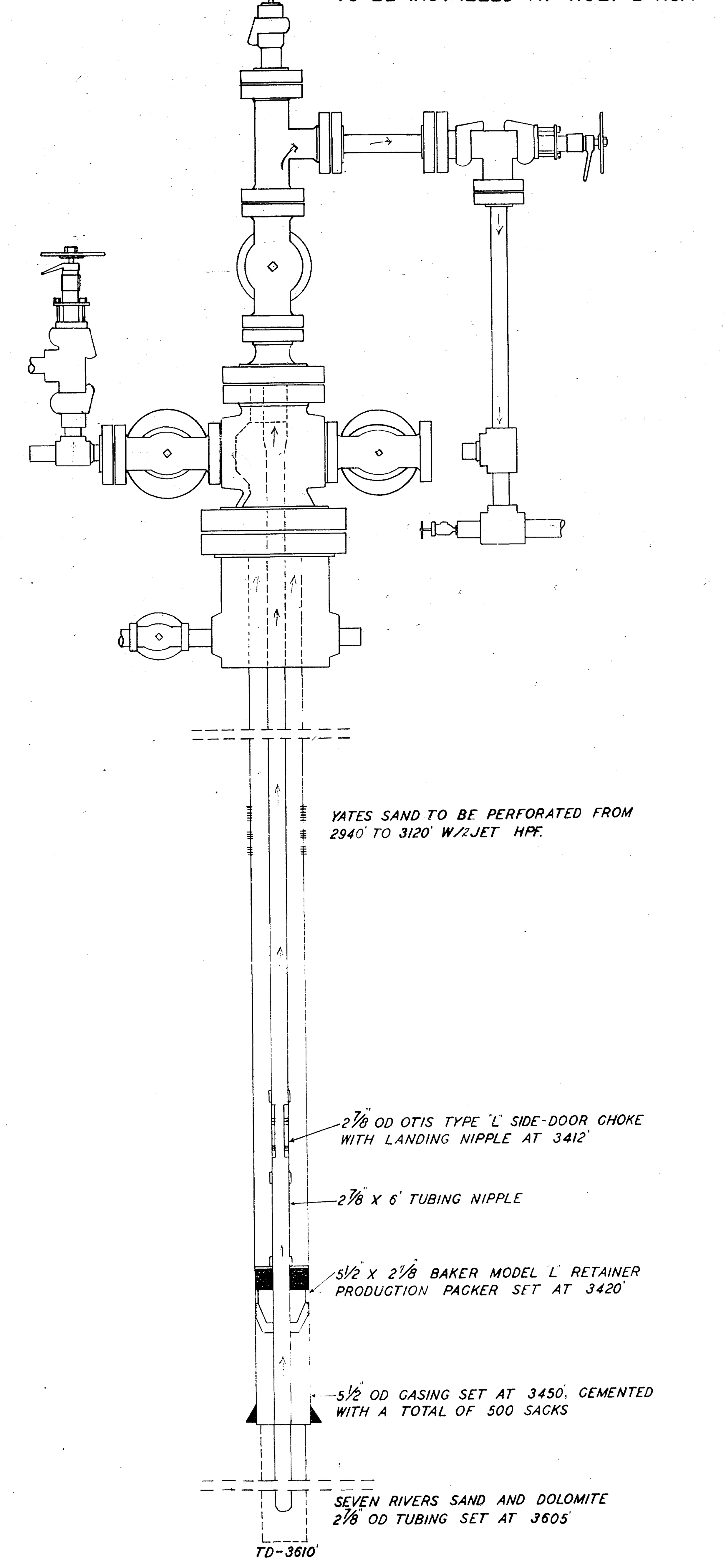

NEUTRON
RADIATION INTENSITY INCREASES
5.28"
CASING & COLLAR LOG
DEPTH
2300
2400
2500
2600
2700
2800
2900
3000
3100
3200
3300
3400
3500
3600
5 1/2"
2900
3000
3100
3200
3300
GAMMA RAY
RADIATION INTENSITY INCREASES
4.29"
R. D. 3615'
T. D. 3617'
GULF OIL CORP.
HOLT "B" No 1
LANGLIE MATTIX

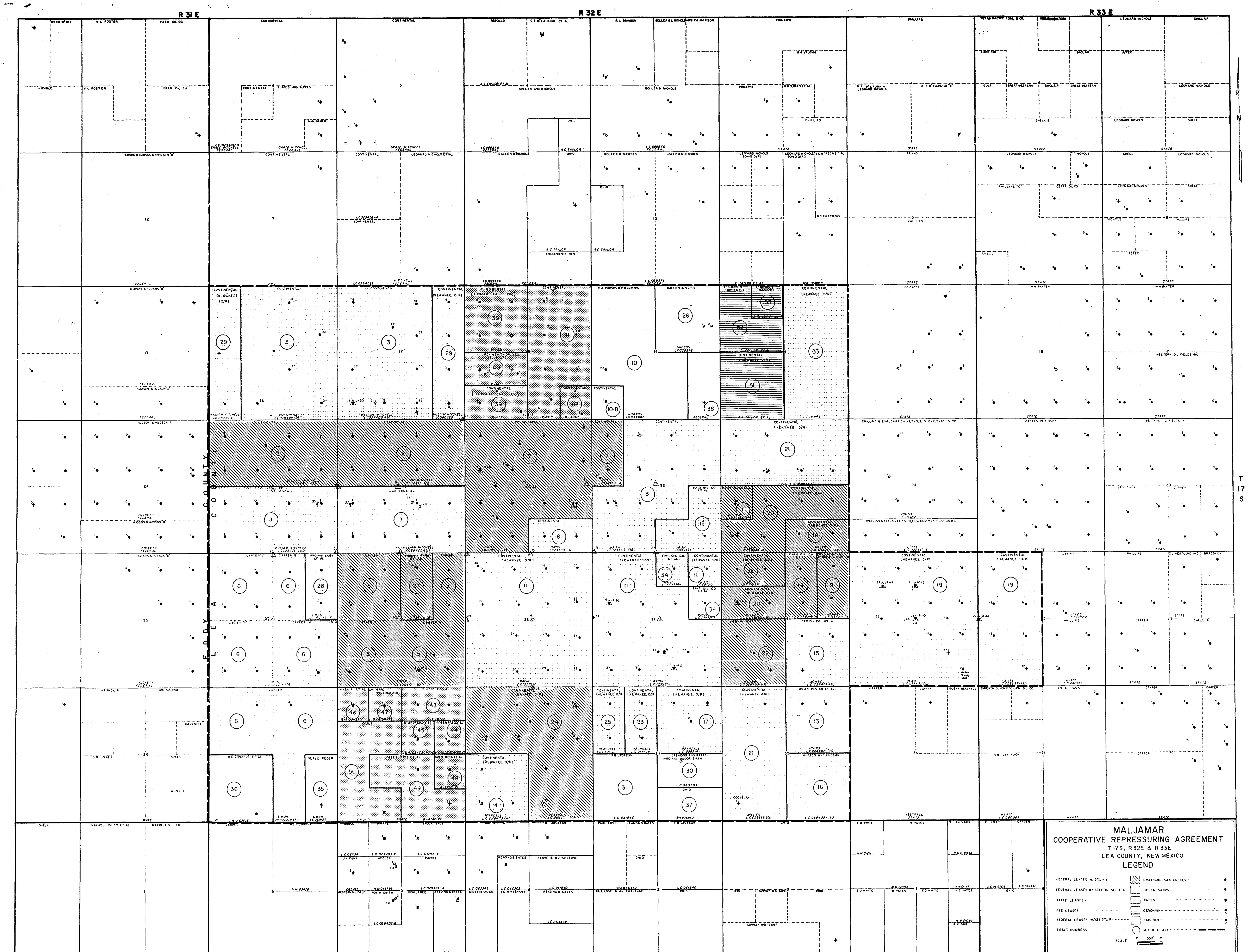
125

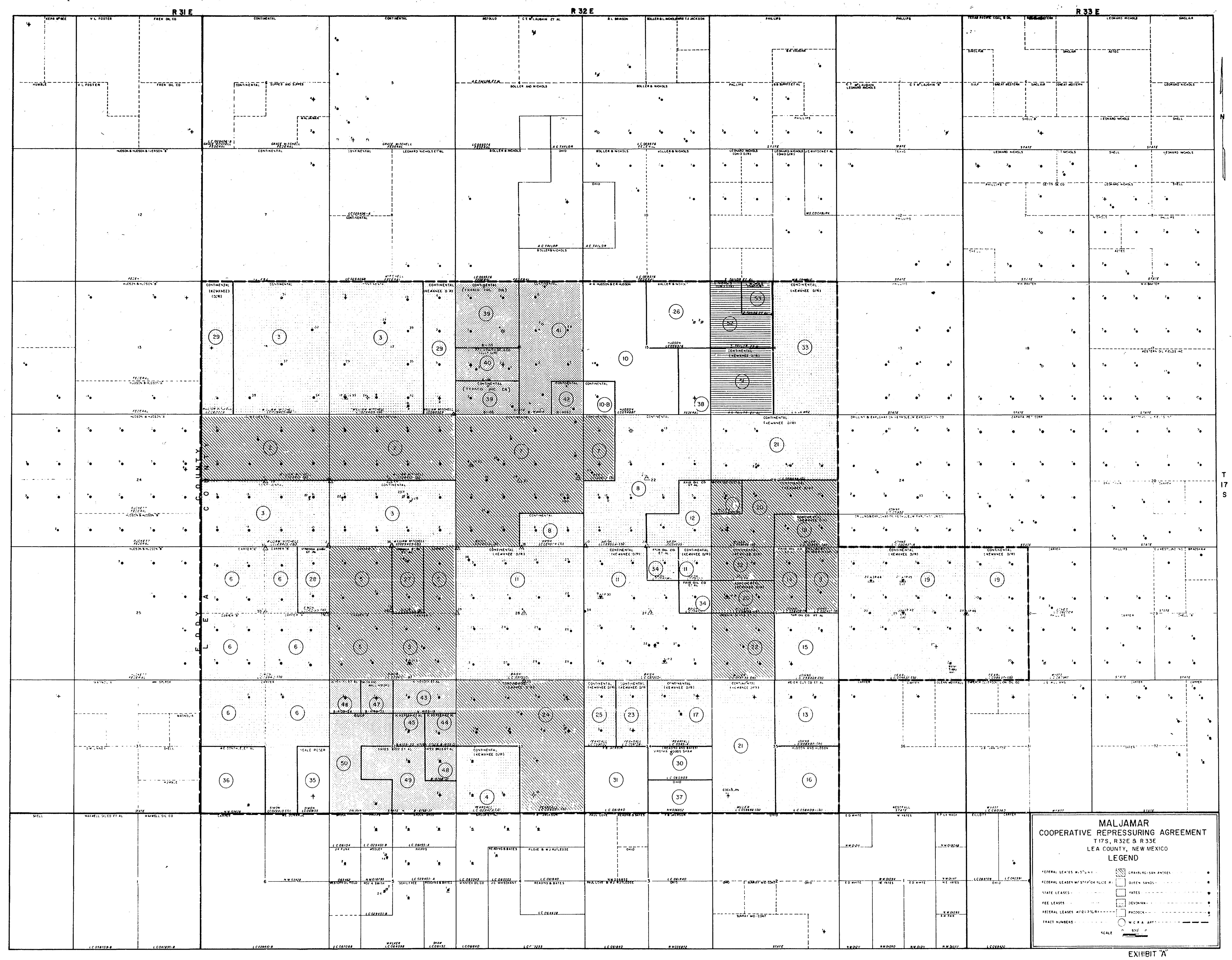


126

DUAL COMPLETION EQUIPMENT
TO BE INSTALLED AT HOLT B NO. 1




R 31 E
R 32 E
R 33 E
T 17 S
MALJAMAR
COOPERATIVE REPRESSURING AGREEMENT
T17S, R32E & R33E
LEA COUNTY, NEW MEXICO
LEGEND
GRAYBURG-SAN ANDRES
QUEEN SANDS
STATE LEASES
YATES
FEE LEASES
DEVONIAN
PADDOCK
TRACT NUMBERS
SCALE
EXHIBIT "A"


R 31 E
R 32 E
R 33 E
T 17 S
EDDY COUNTY
MALJAMAR
COOPERATIVE REPRESSURING AGREEMENT
T17S, R32E & R33E
LEA COUNTY, NEW MEXICO
LEGEND
STATE LEASES
FEE LEASES
TRACT NUMBERS
QUEEN SANDS
YATES
PADDOCK
SCALE
EXHIBIT "A"

I [illegible] CERTIFY, That the foregoing transcript of proceedings before the Oil Conservation Commission of New Mexico in Santa Fe, New Mexico, on December 20, 1949, is the true record of such proceedings to the best of my knowledge, skill, and ability.

Dated at Albuquerque, New Mexico, this 27th day of December, A. D. 1949.

____
Reporter.

NOTICE FOR PUBLICATION
STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

The State of New Mexico by its Oil Conservation Commission hereby gives notice, pursuant to law, of the following public hearings to be held September 8, 1949 beginning at 10:00 o'clock A.M. on that day in the City of Santa Fe, New Mexico in the Senate Chambers.

STATE OF NEW MEXICO TO:

All named parties in the following cases, and notice to the public:

Case 190

In the matter of the application of [illegible] Oil Corporation for an order unitizing the NE/4SE/4 of Section 4, Township [illegible] South, Range 37 East, N.M.P.M. or in the alternative, authorizing the drilling of a well or wells upon the following described lands:

Beginning at a point [illegible] feet west of the southeast corner of NE/4SE/4 of Section 4, Township [illegible] South, Range 37 East, N.M.P.M., thence in a direct line north [illegible] feet, thence in a direct line west, [illegible] feet, thence in a direct line south 420 feet, thence in a direct line east [illegible] feet, containing approximately [illegible] acres of land [illegible]

Case [illegible]

In the matter of application of Amerada Petroleum Corporation for the establishment of proration units and uniform spacing of wells for the common source of supply discovered in Amerada-State BTA No. 1 Well in NW/4 SE/4 Section 2, Township 12 South, Range 33 East, N.M.P.M., in Lea County, New Mexico.

Case 192

In the matter of the application of Gulf Oil Corporation for an order authorizing dual completion and production from the [illegible] formation (Drinkard pool) and from the Ellenburger formation ([illegible] pool) from a single well bore in the Eunice King No. 17 well, located [illegible] feet from the north line and 2310 feet from the west line (NE/4 NW/4) of Section 28, Township 21 South, Range 37 East, N.M.P.M., in Lea County, New Mexico.

Case 193

In the matter of the application of Shell Oil Company for a special exception

Case 193 (Continued)

from the provisions of Order No. 72 relating to central tank batteries with respect to State oil and gas leases E-1830, B-9446, B-7849 and E-276 under conditions existing in the West Wilson pool, Lea County, New Mexico.

Case 194

In the matter of the application of the Oil Conservation Commission upon its own motion at the suggestion of the proration office, to amend Section 3-A of Commission Order #724 also known as the Gas-Oil Ratio Order of September 16, 1943, by adding the following:

"When remedial work on a well has been completed by an operator to correct for high gas-oil ratio in a pool having a limiting gas-oil ratio the adjusted allowable shall become effective on the date the new test is completed as indicated by Commission Form C-116."

or such other wording in the premises as may be determined from testimony adduced in open hearing.

Given under the seal of the Oil Conservation Commission of New Mexico at Santa Fe, New Mexico, on August 19, 1949.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

R. R. SPURRIER, SECRETARY

SEAL

NOTICE FOR PUBLICATION
STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

The State of New Mexico by its Oil Conservation Commission hereby gives notice, pursuant to law, of the following public hearing to be held December 20, 1949 beginning at 10:00 o'clock A.M. on that day in the City of Santa Fe, New Mexico, in the House of Representatives.

STATE OF NEW MEXICO TO:

All named parties in the following cases, and notice to the public;

Case [illegible]

In the matter of application of Amerada Petroleum Corporation for the establishment of proration units and uniform spacing of wells for the common source of supply discovered in Amerada-State BTA [illegible] in NW/4 SE/4 Section 2, Township 12 South, Range 33 East, N.M.P.M., in Lea County, New Mexico. This is a readvertisement.

Case 207

In the matter of application of Stanley L. Jones, Inc., [illegible] State No. 13, 330 feet south of the north line and [illegible] feet [illegible] of the east line NE/4 NE/4 [illegible] of Section 23, Township [illegible] South, Range [illegible] East, N.M.P.M., in the Artesia pool, Eddy County, New Mexico.

Given under the seal of the Oil Conservation Commission of New Mexico at Santa Fe, New Mexico, on December [illegible], 1949.

SEAL

Affidavit of Publication

APPLICATION

129

BEFORE THE OIL CONSERVATION
COMMISSION OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF
AMERADA PETROLEUM CORPORATION FOR
THE ESTABLISHMENT OF PRORATION UNITS
AND UNIFORM SPACING OF WELLS FOR
THE COMMON SOURCE OF SUPPLY DIS-
COVERED IN AMERADA-STATE BTA NO. 1
WELL, NW/4 SE/4 SEC. 2, TOWNSHIP
12 SOUTH, RANGE 33 EAST,
LEA COUNTY, NEW MEXICO.

APPLICATION

Harry D. Page
Booth Kellough,
Attorneys for Applicant,
Amerada Petroleum Corporation,
P.O. Box 2040
Tulsa 2, Oklahoma

BK:P 1/27/50 (10)

BEFORE THE OIL CONSERVATION COMMISSION OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF AMERADA PETROLEUM CORPORATION FOR THE ESTABLISHMENT OF PRORATION UNITS AND THE UNIFORM SPACING OF WELLS IN THE BAGLEY SILURO-DEVONIAN POOL IN LEA COUNTY, NEW MEXICO	CASE NO. 191 ORDER NO. R-2

OIL CONSERVATION COMMISSION SANTA FE, NEW MEXICO RECEIVED FEB 7 - 1950

APPLICATION FOR REHEARING

Comes, now, Amerada Petroleum Corporation, Applicant herein, and alleges that on January 23, 1950, the Commission entered its order in the above styled case after due notice and hearing held on December 20, 1949, which said order denied the application heretofore filed herein by Amerada Petroleum Corporation for eighty-acre proration units and uniform spacing of wells in the Bagley Siluro-Devonian Pool, Lea County, New Mexico, and that such order is believed by Applicant to be erroneous in the following particulars, to wit:

1. That the Commission erred in finding the evidence insufficient to prove that the proposed plan of spacing would avoid the drilling of unnecessary wells, secure the greatest ultimate recovery from the pool, or protect correlative rights.

2. That the Commission erred in finding the evidence insufficient to prove that one well drilled on each eighty-acre tract would efficiently drain the recoverable oil from the pool.

3. That the order entered herein is contrary to and in disregard of the evidence introduced at the hearing which established by a preponderance thereof that eighty acres is the area that may be efficiently and economically drained and developed by one well, and that the establishment of eighty-acre proration units and uniform spacing of wells, as requested by Applicant, will prevent waste, avoid the drilling of unnecessary wells and protect the correlative rights of all parties interested in said pool.

4. That the order entered herein is contrary to law.

WHEREFORE, Applicant respectfully requests that a rehearing be granted and after rehearing that the Commission enter its order establishing eighty-acre proration units and uniform spacing of wells in the Bagley Siluro-Devonian Pool, in Lea County, New Mexico, as requested by the application filed herein and evidence presented at the hearing in support thereof.

SETH & MONTGOMERY

By Oliver Seth

Harry D. Page
Harry D. Page

Booth Kellough
Booth Kellough

Attorneys for Applicant,
Amerada Petroleum Corporation.

-2-

BEFORE THE OIL CONSERVATION COMMISSION OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF AMERADA PETROLEUM CORPORATION FOR THE ESTABLISHMENT OF PRORATION UNITS AND UNIFORM SPACING OF WELLS IN THE BAGLEY SILURO-DEVONIAN POOL IN LEA COUNTY, NEW MEXICO.	CASE NO. 191 ORDER NO. R-2

MEMORANDUM BRIEF IN SUPPORT
OF
APPLICATION FOR REHEARING

Amerada Petroleum Corporation filed its application for eighty-acre proration units and uniform spacing of wells in the Bagley Siluro-Devonian Pool, Lea County, New Mexico. The matter came on for hearing on December 20, 1949. Texas-Pacific Coal and Oil Company appeared in opposition to the application. At the close of the evidence the Commission requested that both sides furnish suggested findings of fact and conclusions of law and took the case under advisement. Pursuant to this request by the Commission, suggested findings of fact and conclusions of law and memorandum brief in support thereof was filed by Amerada Petroleum Corporation. Texas-Pacific Coal and Oil Company also filed its suggested findings of fact and conclusions of law. On January 23, 1950, the Commission entered its order denying the application. An application for rehearing has now been filed.

The merits of this case have been presented in the brief heretofore filed. However, there is a matter of great significance to the oil industry in its operations in New Mexico applicable to this case and other similar cases which has not heretofore been presented and which is worthy of the most careful consideration.

The Bagley Siluro-Devonian Pool is a deep pool. It is located more than 10,000 feet below the surface. The nearby Knowles Pool is also a very deep pool, being located approximately 12,500 feet below the surface. The drilling of wells into these pools is a very expensive and hazardous undertaking. The discovery well in the Bagley Siluro-Devonian Pool cost approximately $312,000.00 and the estimated cost of future wells was approximately $225,000.00. The discovery well in the Knowles Pool cost approximately $350,000.00, and the estimated cost of future wells in that pool was estimated to cost between $260,000.00 and $270,000.00. This is a tremendous sum of money for any operator, big or small, to risk in the drilling of one well. In addition to that the geophysical operations necessary to discover these pools require the expenditure of enormous sums of money.

There are undoubtedly many more deep pools below the depth of 10,000 feet in New Mexico, and if these pools are to be adequately explored and developed it is economically necessary to permit them to be developed on proration units larger than forty acres. The Commission has already considered the testimony as to the probable drainage area of one well in the Bagley Siluro-Devonian Pool and we do not think there is any serious controversy in that regard. The technical

-2-

witnesses who have studied that pool, and other pools, were of the opinion that one well would adequately drain at least eighty acres. Even if there be some doubt in the minds of the Commission as to the accuracy of these opinions, in view of the great depths of the wells and the tremendous cost and risk involved, it would seem only fair that the operators be permitted to develop the pools on the basis of eighty acres in accordance with their own beliefs and convictions as to drainage, and thereby obtain additional information from which other estimates with respect to drainage could be made if the original opinions appear to have been in error. It is economic waste to require the operators to spend an additional half-million dollars drilling two additional wells in each quarter section when it may ultimately be determined that this expenditure was unnecessary and that the oil could have been recovered without these extra wells. The only time the operator can be helped is in the early stage of the development of the pool. After the pool has been developed on forty acres it is too late. No one can be hurt by wide spacing during the exploratory period in the development of an oil pool. Additional wells can always be drilled but money wasted on unnecessary wells can not be recovered. The statement in the Order that it shall not be construed to require one well to forty acres, or as a determination that such spacing constitutes reasonable development under the implied covenants of the oil and gas leases, is a platitude that as a practical matter is of no value or assistance to the operator. As a matter of law, the order would not have that effect in any event.

-3-

It is our sincere belief that if the deep pools in New Mexico are to be adequately explored and developed that the Commission should permit such development on wider spacing than forty acres. We sincerely believe that to adhere to a rule of thumb requiring forty-acre proration units, regardless of the depth of the pools and the cost of the wells, is economically unsound, detrimental to the operators and contrary to the best interests of the State of New Mexico.

It is true that there may be some cases where the operator can recover the cost of his well by even drilling a well to every forty acres in certain parts of the pool. But in many cases it will be uneconomical to drill a well to such great depth on every forty acres in the pool. If an operator knows in establishing its budget for drilling expenses that it will be required to drill a well on every forty acres in the event oil is discovered at a cost of approximately $250,000.00 per well, it may well look elsewhere to spend its money. On the other hand, if an operator knows that when oil is discovered at great depths it will be permitted to develop the properties on wider spacing than forty acres, it will be encouraged to spend its money in search for the deep pools in New Mexico. To any company, large or small, a dry hole at the cost of a quarter-of-a-million dollars is not and can not be lightly considered. Every operator knows that in the development of any oil pool there will be dry holes. If in addition to that the operator has to contemplate the drilling of unnecessary wells at such tremendous costs it would be poor business judgment not to question the advisability of attempting to develop deep pools in New Mexico.

-4-

These remarks are not only applicable to the case at hand involving the Bagley Siluro-Devonian Pool, but are equally applicable to other pools discovered and yet to be discovered in New Mexico below the depth of 10,000 feet.

As far as concerns the question of uniform spacing, we have presented our views in the brief heretofore filed, and wish only to further add that we earnestly believe that the best and most equitable way to develop any oil pool so as to protect the rights of all parties is on a uniform spacing pattern providing for exceptions in exceptional cases, with proper adjustments of allowable to meet the particular situation then existing.

We respectfully submit that it will be inimical to the interests of the State of New Mexico and unfair to the applicant to deny its application for eighty-acre proration units and uniform spacing in wells in the Bagley Siluro-Devonian Pool as requested in this case.

Respectfully submitted,

SETH & MONTGOMERY

By Oliver Seth

Harry D. Page
Harry D. Page

Booth Kellough
Booth Kellough

Attorneys for
Amerada Petroleum Corporation.

-5-

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. 191
ORDER NO. R-8

IN THE MATTER OF THE APPLICATION OF AMERADA PETROLEUM CORPORATION FOR THE ESTABLISHMENT OF PRORATION UNITS AND UNIFORM SPACING OF WELLS IN THE BAGLEY-SILURO/DEVONIAN POOL IN LEA COUNTY, NEW MEXICO.

ORDER DENYING REHEARING

BY THE COMMISSION:

Amerada Petroleum Corporation having filed herein an application for rehearing on the alleged grounds that Order No. R-2 heretofore entered on 23 January 1950 was erroneous, and the Commission having considered said motion and having concluded that it is not well taken,

IT IS THEREFORE ORDERED that the application for rehearing filed by Amerada Petroleum Corporation will be denied.

DONE this 8th day of February, 1950, at Santa Fe, New Mexico.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

THOMAS J. MABRY, CHAIRMAN

Guy Shepard
GUY SHEPARD, MEMBER

R. R. Spurrier
R. R. SPURRIER, SECRETARY

130

BEFORE THE

OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO

PROCEEDINGS

The following matter came on for consideration before a hearing of the Oil Conservation Commission of the State of New Mexico, pursuant to legal notice, at Santa Fe, New Mexico, on September 8, 1949, at 10:00 A. M.

NOTICE FOR PUBLICATION
STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

The State of New Mexico by its Oil Conservation Commission hereby gives notice, pursuant to law, of the following public hearings to be held September 8, 1949, beginning at 10:00 o'clock A.M. on that day in the City of Santa Fe, New Mexico in the Senate Chambers.

STATE OF NEW MEXICO TO:

All named parties in the following cases, and notice to the public:

Case 190

In the matter of the application of Twin Oil Corporation for an order unitizing the NE/4NE/4 of Section 4, Township 22 South, Range 37 East, N.M.P.M. or in the alternative, authorizing the drilling of a well or wells upon the following described lands:

Beginning at a point 660 feet west of the southeast corner of NE/4NE/4 of section 4, Township 22 South, Range 37 East, N.M.P.M., thence on a direct line north 420 feet, thence on a direct line west, 210 feet, thence on a direct line south 420 feet, thence on a direct line east 210 feet, containing approximately 2 acres of land more or less, and fixing an allowable therefor.

Case 191

In the matter of application of Amerada Petroleum Corporation for the establishment of proration units and uniform spacing of wells for the common source of supply discovered in Amerada-State BTA No. 1 Well in NW/4 SE/4 Section 2, Township 12 South, Range 33 East, N.M.P.M., in Lea County, New Mexico.

Case 192

In the matter of the application of Gulf Oil Corporation for an order authorizing dual completion and production from the Yeso formation (Drinkard pool) and from the Ellenburger formation (Brunson pool) from a single well bore in the Eunice King No. 17 well, located 660 feet from the north line and 2310 feet from the west line (NE/4 NW/4) of section 23, Township 21 South, Range 37 East, N.M.P.M., in Lea County, New Mexico.

Case 193

In the matter of the application of Shell Oil Company for a special exception from the provisions of Order No. 72 relating to central tank batteries with respect to State oil and gas leases E-1830, B-9446, B7849 and E-276 under conditions existing in the West Wilson pool, Lea County, New Mexico.

Case 194

In the matter of the application of the Oil Conservation Commission upon its own motion at the suggestion of the proration office, to amend Section 3-A of Commission Order #784 also known as the Gas-Oil Ratio Order of September 10, 1948, by adding the following:

"When remedial work on a well has been completed by an operator to correct for high gas-oil ratio in a pool having a limiting gas-oil ratio the adjusted allowable shall become effective on the date the new test is completed as indicated by Commission Form C-116."

or such other wording in the premises as may be determined from testimony adduced in open hearing.

Given under the seal of the Oil Conservation Commission of New Mexico at Santa Fe, New Mexico, on August 19, 1949.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

By /s/ R. R. Spurrier
R. R. SPURRIER, Secretary

SEAL

BEFORE:

Hon. Guy Shepard, Chairman
Hon. R. R. Spurrier, Secretary

REGISTER:

M. B. Penn
Tulsa, Oklahoma
For Mid-Continent Petroleum Corporation

E. J. Pierce
Midland, Texas
For Mid-Continent Petroleum Corporation

J. P. Hammond
Tulsa, Oklahoma
For Amerada Petroleum Corporation

Booth Kellough
Tulsa, Oklahoma
For Amerada Petroleum Corporation

Roy O. Yarbrough
Hobbs, New Mexico
For the New Mexico Oil Conservation Commission

G. L. Shoemaker
Midland, Texas
For Stanolind Oil Purchasing Company

Frank R. Lovering
Hobbs, New Mexico
For Shell Oil Company

Paxton Howard
Midland, Texas
For Shell Oil Company

E. T. Adair
Fort Worth, Texas
For Texas Pacific Coal & Oil Company

R. G. Schuehle
Midland, Texas
For Texas Pacific Coal & Oil Company

Carl Barnhart
Midland, Texas
For Amerada Petroleum Corporation

R. S. Christie
Fort Worth, Texas
For Amerada Petroleum Corporation

J. W. House
Midland, Texas
For Humble Oil Company

Herman Pressler
Houston, Texas
For Humble Oil Company

Lloyd L. Gray
Tulsa, Oklahoma
For Gulf Oil Corporation

E. J. Gallagher
Hobbs, New Mexico
For Gulf Oil Corporation

C. D. Borland
Hobbs, New Mexico
For Gulf Oil Corporation

R. E. Canfield
Roswell, New Mexico
For the U. S. Geological Survey

Foster Morrell
Roswell, New Mexico
For the U. S. Geological Survey

Paul S. Johnston
Lubbock, Texas
For the Texas Tech. College

R. S. Blymn
Hobbs, New Mexico
For the Oil Conservation Commission

E. L. Shafer
Hobbs, New Mexico
For Continental Oil Company

I. H. Hinchfeld
Hobbs, New Mexico
For Lea County Operators

Elvis A. Utz
Santa Fe, New Mexico
For the Oil Conservation Commission

E. E. Kinney
Artesia, New Mexico
For New Mexico Bureau of Mines

E. C. Anderson
Socorro, New Mexico
For New Mexico Bureau of Mines

Dan McCormick
Carlsbad, New Mexico
For the Oil Conservation Commission

MR. SHEPARD: The meeting will please come to order. Mr. Graham, will you please read the first case.

(Mr. Graham read the notice of publication in Case No. 190.)

MR. KELLOUGH: May it please the Commission, I am attorney for Amerada. I don't know whether anybody is here to represent the Twin Oil Corporation or not. This application is an application to unitize a lease covering two acres owned

by a cemetery tract in a 40-acre tract in which Amerada owns the lease on the other thirty-eight acres. The agreement has been entered into between the Twin Oil Corporation and the Cemetery Association and Amerada. We are, however, still negotiating with some of our lessors, to ask their joining in this agreement. If there is no objection, we would like to ask this matter be continued for sixty or ninety days so that we may complete the settlement. The case as between the Twin Oil Corporation and the Cemetery Association has been settled, and we would like the matter just continued over until we can finally get it wound up.

MR. SHEPARD: Is there anyone representing the Twin Oil Company or the Cemetery Association here? Does anyone have any objection to this being carried over? If not, it will be carried over until the next hearing. Would you want ninety days?

MR. KELLOUGH: That would be agreeable--thirty, or sixty or ninety.

MR. SHEPARD: We will allow ninety days.

MR. KELLOUGH: That will be all right. We feel certain we will have it worked out in a few weeks.

MR. SHEPARD: Read the next case, please.

(Mr. Graham reads the notice of publication in Case No. 191.)

MR. KELLOUGH: If the Commission please, I would like to make a statement for the record in connection with this matter. We came here yesterday prepared to present our evidence in this case with the understanding that all the operators were in agreement to our application. However, yesterday afternoon we were advised by the Texas Pacific Coal Company that they desired a continuance of this matter.

We have some properties which will be jointly owned in the 80-acre units if they are granted, and also the Texas Pacific Coal Company is now drilling a well located in the southeast of the northeast of Section 2, Township 12 South, Range 33 East, and they have requested that this matter be continued over until they complete their well. At the present time, it will be set down as soon as possible after the completion of their well. Their request is based upon the fact that additional information will be obtained from this well which is now drilling, and further that it will give us an opportunity to work out some arrangements with respect to these jointly owned leases. On behalf of Amerada, we have agreed to such a continuance with the understanding with Mr. Adair, the attorney for the Texas Pacific Company, that they will not seek any further continuance of this matter when it is set down as soon as possible after the well is completed and also with the understanding that any wells drilled in the meantime will not be located off of the pattern which Amerada has proposed in our application. Now, Mr. Adair, is that a correct statement?

MR. ADAIR: The well drilled by our company--I think possibly some other companies are involved--but any drilled by our company will conform to the proposed pattern.

MR. KELLOUGH: And y will not seek any further continuance after the matter is set down after the completion of this well?

MR. ADAIR: That is true.

MR. KELLOUGH: There are other operators interested in the area, and I wish to state to the Commission at this time

that it is possible that we now have sufficient evidence for 80-acre units in this field, and that we are not agreeing to the continuance with any hesitancy on our part that we do not have sufficient evidence, but because of the request of the Texas Pacific Coal Company, if there are any other operators here in the area, why then, of course, personally, I think I would welcome any statement they have to make as to their attitude on the continuance in this matter.

MR. SHEPARD: How long a continuance do you want?

MR. KELLOUGH: I don't believe a definite time can be specified. Mr. Adair advises me he believes their well can be completed in approximately ninety days. Rather than set it down--it may be completed sooner. I don't know how they are getting along with the drilling. I believe they are down around seven or eight thousand feet, but we would be most anxious to advise the Commission immediately upon the completion of the well to have the matter set down as soon as possible, because we are urging it very strongly, and we don't want to be delayed any more than we possibly can.

MR. SHEPARD: Any objections? If not, it will be continued indefinitely until you ask for it. Case 192.

(Mr. Graham reads notice of publication in Case 192.)

MR. GRAY: We would like to ask for a continuance in that case also. At the present time, we have a well completed as an Ellenburger Well. There is some indication it may be making a little bit of water. We would like to observe it a longer period of time before we put on testimony since we may want to withdraw the application.

MR. SHEPARD: Can we set that down for the first of November?

MR. GRAY: Yes, I think that will be all right.

MR. SHEPARD: If there is no objection, it will be continued until the first of November hearing. Case No. 193.

(Mr. Graham reads the notice of publication in Case No. 193.)

MR. HOWARD: Paxton Howard and Frank Lovering for the Shell Oil Company. We ask that Mr. Lovering be sworn.

(Witness sworn.)

FRANK R. LOVERING, having been first duly sworn, testified as follows:

DIRECT EXAMINATION BY MR. HOWARD:

Q. State your name, please.
A. Frank R. Lovering.
Q. You live at Hobbs, New Mexico?
A. Yes, sir.
Q. And are employed by the Shell Oil Company, Inc.?
A. That's right.
Q. In what capacity?
A. Superintendent.
Q. In your capacity as superintendent you have jurisdiction of and are familiar with the field designated as the West Wilson Field, Lea County, New Mexico?
A. I do.
Q. You are familiar with the contents of the application filed for this hearing?
A. I am.
Q. I will hand you--will you identify--and please mark this as Exhibit A--please identify this.
A. This is a plan showing--Exhibit A is a plat showing the development to date in the West Wilson pool.

Q. It was prepared under your supervision?
A. That's right.

MR. HOWARD: I ask that it be admitted, please.

MR. SHEPARD: It will be admitted.

Q. Now, Mr. Lovering, will you point out to the Commission the Shell leases that are involved in this application.
A. In this particular application the leases involved are stated in the application, State Nos. E-1830, B-7849, B-9446, E-276. For purposes of well nomenclature we have designated them as our Shell State Leases A, B, C, and D.
Q. Those leases are all owned by Shell Oil Company, Inc.?
A. That's right.
Q. They are all state leases?
A. That's right.
Q. Now, will you state to the Commission the history of the development in the West Wilson pool, please.
A. We are confronted here with a very unusual problem, as noted on this plat, the territory involved here is surrounded by four dry holes by the Vickers Petroleum up on the northwest corner of the plat, Davidson and Clower in the western portion, Cities Service well which was recently completed as a dry hole up in Section 16, and J. W. Brown with a similar well in Section 22. Further than that the J. C. Clower well No. 2 and the Shell State A-2 in the southeast quarter of Section 16 are very weak wells and determine the eastern limits of the field. So that at the present time the center of the possible development there centers around four or five leases there, and it is indicated that production will probably be limited to about one well per lease. There is no room to the north. The

eastern limits are already defined, and it looks like about a six-well field.

Q. Mr. Lovering, what was the discovery well?
A. It was the J. C. Clower No. 1.
Q. When was the discovery?
A. About a year ago.
Q. In what formation?
A. The formation is reef-type bump, drilled at a depth of about 3960 immediately below the Yates formation.
Q. And it is your belief from the present indications that each of the leases involved in this application will probably be limited to one well, is that correct?
A. That is correct. The only exception to that would be to while there may be a possible extension southward, but the indications of the well drilled on State B-1 is that the pay is pinching out, and the development southward is only problematical. The pay is only about eleven to fourteen feet in thickness which overlies a water strata, and production is rather limited. All wells were brought in under the pump rather than open flow.
Q. In the present application you ask to be relieved from the necessity of having a separate tank battery on each lease and ask permission to use a central tank battery for all State leases?
A. That's right.
Q. At the present time, what type of battery facilities do you have in contemplation?
A. At the present time, we have two high 500-barrel tanks and one separator. We are at the present time installing heating and treating facilities which will include a 750-

gun barrel and a jug-type water heater. We anticipate if our petition is accepted that we will add another 500-barrel tank to the battery, one additional separator which will permit us to test any of the possible five wells that may be turned into that battery. We will be able to test them at any time at the pleasure of the Commission or any other authority.

Q. The tank battery is on Shell A as shown in the plat?
A. Directly between wells 1 and 2.
Q. And what is the estimated cost of the installation of this tank battery?
A. Between sixteen and eighteen thousand dollars. It has been generally--we like to carry at least four and a half tank production in our batteries. And it has been, and it generally runs between five and six dollars a barrel exclusive of heating, treating, and settling facilities.
Q. Now, to construct separate tank batteries on each of the leases, do you have an estimate as to what the cost would be as to each lease?
A. With heating and treating facilities it would run around $12,000.00, to state a rough estimate.
Q. Yes, sir, that's right.
A. The engineers gave us a figure here, I believe.
Q. Well, it is stated in the application, and in your opinion that cost as regards each of these separate leases would be for the sole purpose of taking care of what at this time appears to be just one well?
Q. By asking the central tank battery, there can be saved the cost of these separate installations and in

addition to that the central tank battery can be equipped so that separate tests can be taken on all of these wells?
A. That's right.
Q. In your opinion will the granting of this application in any manner aid in conservation and prevention of the waste of natural resources?
A. It will.
Q. In what manner?
A. In reduced further maintenance cost and operational cost. It will reduce operational cost in the neighborhood of 60 per cent. It will cut down maintenance cost tremendously, just the difference between one tank battery and four or five.
Q. And that matter will prolong the economic life of the various leases?
A. It will make it possible to continue producing those wells for a longer period of time due to the reduced operating and maintenance cost.
Q. All the royalty is the same, owned by the State?
A. That is correct.
Q. Do you have anything else to add?
A. No, I would be glad to answer any questions.

MR. HOWARD: Does the Commission have any questions?

MR. McCORMICK: How about overriding royalties or oil payments?

A. None that I know of.

MR. McCORMICK: None on the other leases?

A. We were informed the royalties were all the same.

MR. HOWARD: That is our information that the royalties were all the same.

131

MR. GRAHAM: Does your information disclose the institutional ownership of all the four leases? Is it the same institution? Do they all belong to the schools?

MR. HOWARD: Yes, sir.

MR. McCORMICK: Do you have the leases with you, Mr. Howard?

MR. HOWARD: No, sir, I do not.

MR. McCORMICK: What system will you have for actually measuring the oil produced from each separate lease?

A. The facilities will be there to make periodic tests of at least two wells at a time, weekly, monthly, which we normally do anyway, and it would be no different than any other battery with the same facilities.

MR. McCORMICK: How do you know exactly how much oil each well produces each month during a proration period?

A. We never know exactly any more than we know on any two wells in the State of New Mexico. That is our general practice; it is based on period production. We can make those at the rule of the Commission, or at any specific interval, or at any time you wish for that matter.

MR. McCORMICK: This testing device you will have to test the production, it can be run for any period?

A. Any predetermined period, that is right.

MR. HOWARD: Whatever tests the Commission requires, we are ready to make. We do have a peculiar problem, and it looks like it will be a very small field. They are all leases with a common royalty.

MR. SHEPARD:: Any objections? Does anyone have anything to say? If not, then it will be granted.

MR. HOWARD: Thank you.

MR. SHEPARD:: Case 194.

(Mr. Graham reads the notice of publication in Case No. 194.)

MR. SHEPARD:: Mr. Staley, do you have anything to offer on this?

MR. STALEY: Under the present Commission the changing of allowable between the first of one proration period until the beginning of the next proration period on any new allowable--I mean new wells--are given an allowable. That is, during the opening and closing of any proration period; from time to time the operators have done remedial work and been able to correct for high gas-oil ratio on wells in fields having limited ratios, but it has been necessary to wait until the beginning of the next proration period before assigning an allowable to that well; that is, a new allowable based on the new gas-oil ratio tested after the remedial work is completed. Therefore, the Commission was requested to make a ruling regarding the placing of high gas-oil ratios--that is, giving a new allowable to a well that is penalized under the present system.

MR. SHEPARD: Mr. Morrell, do you have anything to say on this?

MR. MORRELL: I see no objection to it.

MR. SHEPARD: Any other objections? Anyone have anything to say? If not, it will be granted. There being no further business, we will stand adjourned.

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I HEREBY CERTIFY That the foregoing transcript of proceedings before the Oil Conservation Commission is a true record of the matters therein set forth.

DONE at Santa Fe, New Mexico, this 20th day of September, 1949.

E. E. Greeson

E. E. GREESON
Notary Public

My Commission Expires 8-4-52.

BEFORE THE
OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO

The following proceedings before the Oil Conservation Commission, State of New Mexico, came on pursuant to legal notice of publication, and at the time and place as set out below.

NOTICE FOR PUBLICATION
STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

The State of New Mexico by its Oil Conservation Commission hereby gives notice, pursuant to law, of the following public hearing to be held December 20, 1949, beginning at 10:00 o'clock A.M., on that day in the City of Santa Fe, New Mexico, in the House of Representatives.

STATE OF NEW MEXICO TO:

All named parties in the following cases, and notice to the public;

Case 191

In the matter of application of Amerada Petroleum Corporation for the establishment of proration units and uniform spacing of wells for the common source of supply discovered in Amerada-State BTA No. 1 Well in NW¼SE¼, Section 2, Township 12 South, Range 33 East, N.M.P.M., in Lea County, New Mexico. This is a readvertisement.

Case 207

In the matter of application of Stanley L. Jones, Inc., a New Mexico Corporation, for an order approving an unorthodox location for Stanley L. Jones, Inc., State No. 13, 338 feet south of the north line and 73 feet west of the east line NE¼NE¼NE¼ of Section 23, Township 18 South, Range 27 East, N.M.P.M., in the Artesia pool, Eddy County, New Mexico.

Given under the seal of the Oil Conservation Commission of New Mexico at Santa Fe, New Mexico, on December 5, 1949.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

/s/ R. R. Spurrier
R. R. SPURRIER, SECRETARY

SEAL

I N D E X

EXHIBITS

BEFORE: Hon. Guy Shepard, Chairman
Hon. R. R. Spurrier, Secretary and Member

REGISTER:

Don G. McCormick, Carlsbad, N.M., for Oil Conservation Commission.

George A. Graham, Santa Fe, N.M., for Oil Conservation Commission.

Booth Kellough, Tulsa, Okla., for Amerada Petroleum Corporation.

J. O. Seth, Santa Fe, N.M., for Amerada Petroleum Corp.

Oliver Seth, Santa Fe, N.M., for Amerada Petroleum Corp.

R. S. Christie, Ft. Worth, Texas, for Amerada Petroelum Corporation.

John A. Veeder, Midland, Texas, for Amerada Petroleum Corporation.

C. V. Millikan, Tulsa, Oklahoma, for Amerada Petroleum Corporation.

Eugene T. Adair, Ft. Worth, Texas, for Texas-Pacific Coal & Oil Company.

Jack M. Campbell, Roswell, N.M., for Texas-Pacific Coal & Oil Company.

G. H. Carter, Midland, Texas, for Texas-Pacific Coal & Oil Company.

R. G. Schaehle, Midland, Texas, for Texas-Pacific Coal & Oil Company.

Foster Morrell, Roswell, N.M., for U.S.G.S.

J. M. Crocker, Tulsa, Oklahoma, for Mid-Continent Petroleum Corporation.

Glenn Staley, Hobbs, N.M., for Lea County Operators.

Roy O. Yarbrough, Hobbs, N.M., for Oil Conservation Commission.

Robert C. Anderson, Roswell, for Malco Ref. Inc.

Howard Jennings, Roswell, N.M., for Malco Ref. Inc.

Elmer A. Utz, Santa Fe, N.M., for Oil Conservation Commission.

E. E. Kinney, Artesia, N.M., for N.M. Bureau of Mines.

Hon. Thos. J. Mabry, Santa Fe, N.M., for Oil Conservation Commission.

COMM. SHEPARD: The meeting will come to order.

There has been a request made that Case 207 be continued until 10 o'clock on the morning of the 27th, and the record will show, without objection, that it has been continued to that time.

At this time we will take up Case 191. Will you read it, Mr. Graham, please?

(Reads the notice of publication in Case No. 191).

MR. KELLOUGH: My name is Booth Kellough. I am attorney for Amerada Petroleum Corporation. I believe it would be helpful to make a very brief statement of our position in this case before we come to our evidence.

This is Amerada's application for a proration of units and uniform spacing of wells in the pool which has been denominated as the Bagley Pool in Lea County. Our request is for 80-acre proration units and a uniform spacing pattern.

The probable productive limits of this pool have been delineated by our geologist and the request is for the location of the units that they comprise, the W½ and the E½ of each quarter section; that is, they run north and south, with certain -- I believe about eight exceptions, running each and west, which we are recommending, due to the ownership conditions.

We are also asking for a uniform pattern for the spacing of wells whereby the wells will be located in the northwest 40-acre tract, or the NW¼ and the SE¼ of each quarter section. In order to clarify that statement, each quarter section of 160 acres will be divided by a line running north and south, making the west units and the east units, the wells to be located in the NW¼ and the SE¼. Now, that is the pattern which we are asking for.

The discovery well was the BTA Well. It was drilled to a depth of approximately -- well, put it this way: I believe our evidence would show it producing at a depth of approximately 10,000 feet, and our evidence will further show that the well cost in the neighborhood of $312,000.00 to drill the discovery well. Our evidence will further show that the estimated cost of future wells in the area will be approximately $225,000.00.

Not only because of the deep pool and the expensive wells, but our application for 80-acre proration units is based upon the belief -- and we are satisfied that our evidence will support it -- that this is a reservoir of very good quality and it has an effective water drive, so that one well will adequately and economically drain at least an area of 80 acres. Our evidence will further show that this pool is analogous to other pools in the area which have been successfully produced on 80 acres.

There is one particular point that I wish to call the Commission's attention to, with reference to our spacing pattern. It will be our recommendation that if an order is granted as we request, that it provide that the Commission for good cause shown, may grant an exception to the spacing pattern for a well to be located off of the pattern for structure or other reasons, suitable to the Commission, in which event, the allowable for the well will be reduced, the amount of the reduction to be determined by the Commission on the evidence produced at a hearing.

In other words, it is our thought that in order to assure all of the owners a recovery of their fair share of the oil from their reservoir, that it should be developed on the 80-acre spacing -- well spacing pattern, which we recommend, with the provision that the exceptions be granted, but in the event they

are granted, the Commission should then look at the evidence and determine to what extent the allowable should be cut in order that the party making the off-pattern location will not obtain an undue advantage over his neighbor.

There are other operators in this area. In addition to Amerada, there is the Gulf and the Phillips and the Mid-Continent and the Texas and Pacific Coal & Oil Company. We are informed that the Gulf and the Mid-Continent and the Phillips are favorable to our application. It is our belief that when we lay the evidence before this Commission, that you will agree that this pool should be developed on 80-acre units with a uniform spacing pattern.

MR. CAMPBELL: May it please the Commission --

MR. SHEPARD: Give your name please.

MR. CAMPBELL: Jack M. Campbell, representing Texas and Pacific Coal and Oil Company. Before the first witness is called, and without the thought of trying to suggest to the applicant how or when to present his case, we feel that the opening statement should include, for the benefit of the Commission and other operators and royalty owners interested, a statement -- or that the first witness should definitely make a statement as to what type allowable is to be requested for the 80-acre proration unit, that is, whether it will be the present 40-acre top unit allowable, as in previous order, or whether there is to be some change.

I also feel -- perhaps I missed it in the opening statement -- that the Commission should know and the interested parties should know if the proposed locations within the quarter sections suggested, are to be in the center, or if there is to be some leeway requested when the ultimate request by

the applicant is before this Commission.

MR. KELLOUGH: On the last point first, our application -- the one we filed provides that the well location should be in the center of the particular quarter section involved, with a tolerance of 150 feet in any direction for surface obstructions, in order to avoid surface obstructions.

Now, as to Mr. Campbell's request as to the manner in which we present our case, I only have this to say: that we will present to the Commission all of our evidence, and I am sure they will have ample opportunity to examine any of our witnesses on proper subjects, and I believe that any of his doubts as to our position will probably be settled by our evidence; so with the permission of the Commission, we will proceed with the evidence in this case.

COMM. SHEPARD: Call your first witness, please.

MR. KELLOUGH: I don't believe they have been soorn.

COMM. SHEPARD: Mr. Graham, will you swear them, please.

JOHN A. VEEDER

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

By Mr. Kellough:

Q Will you please state your name to the Commission?

A John A. Veeder.

Q Where do you live, Mr. Veeder?

A Midland.

Q And by whom are you employed?

A Amerada Petroleum Corporation.

Q In what capacity are you employed?

A Assistant District Geologist.

Q How long have you been a geologist for Amerada?

A Thirteen years.

Q Have you previously testified before this Commission in the capacity of a geologist on geological matters?

A I have.

Q Mr. Veeder, are you familiar with the Amerada B.T.A. No. 1 Well located in the center of the NW¼SE¼, Section 2, Township 12 South, Range 33 East, Lea County, New Mexico?

A I am.

Q I hand you what has been marked as Applicant's Exhibit No. 1, and ask you to state, please, what that is?

A This is the outlined area of Bagley Area, in which we would recommend our required or designated spacing.

Q This map then shows by the red line the area asked to be covered by the spacing order in this application, is that correct?

A That's right.

Q The map also shows the location of the wells drilled on the Devonian formation, is that right?

A That is right.

Q And does it also show the wells drilled on the Pennsylvanian formation?

A That is so.

Q Now, that is indicated on the exhibit itself, is it not?

A That's right. The Pennsylvanian wells are two of them and they are marked, designated on the map by the smaller circle.

Q And the map further shows the proposed location of any wells which might be drilled on the pattern asked for in our application?

A That's right.

Q Now, those are indicated by a cross, is that correct?

A Right.

Q The map further shows the location of the units by dotted line, which do not conform to the W½ or the E½ of the quarter sections, is that right?

A That is right.

Q Do you have the Schlumberger of the B.T.A.? Thank you. Will you mark this please? (Done).

I hand you what has what has been marked, Applicant's Exhibit No. 2, and ask that you please state to the Commission what this instrument is?

COMM. SHEPARD: Exhibit No. 1 and No. 2, will be received and admitted in evidence.

(Applicant's Exhibits Nos. 1 and 2, received in evidence).

Q (By Mr. Kellough) Will you state to the Commission what that is and what it shows?

A That is Schlumberger of the Amerada No. 1, State B.T.A. Schlumberger is marked at the top from the Mississippian on down to the basic and these are Schlumberger tops.

Q Do you have Schlumbergers on any other of Amerada's wells which have been supplied in this Bagley?

A I have Schlumbergers on the Amerada No. 1, State B.T.A. and B.T.C.

Q Now I hand you what has been marked Applicant's Exhibit No. 3, and ask you to please state to the Commission what that instrument is and what it shows.

A This well is also in Schlumberger electrical log under said well, showing the top of the formation, and also the section below in the Devonian from which we are producing.

Q Do you have any other Schlumberger on any other wells drilled

132

by Amerada?

A I have one other Schlumberger, the Amerada State B.T.D.

Q Now, Mr. Veeder, I hand you what has been marked Applicant's Exhibit No. 4, and ask you to state to the Commission what that instrument is and what it shows.

A This is also a Schlumberger electrical log on the Amerada No. 1, State B.T.D., which is also a Devonian producer. On the log we have marked the top of the Devonian.

Q When was the discovery well, B.T.A. No. 1 completed?

A The B.T.A. was completed June 16, 1949.

Q Did that well discover, in your opinion, a new reservoir, or a new common source of supply not heretofore producing?

A It did.

Q What is the producing formation in that well?

A The producing formation in Amerada No. 1, State B.T.A., is the Devonian.

Q Will you please give to the Commission the detailed description of how that well was completed?

A The Amerada No. 1, State B.T.A. was drilled on the Devonian, which was topped at 10,734. Drill stem tests were taken in the Devonian where we had flowing oil production. The well cemented casing, that is 5½ inch casing at 11,200, and continued to drill the rest of the section above the basement. Those tops below the Devonian were called as follows: -- and these are Schlumberger tops. The top Montoya was called at 11,344; the top of the Simpson at 11,604; the top of the Ellenberger, 11,670; and the top of the basement, 11,709; a total depth of 11,766 was reached.

This well was then plugged back, casing perforated in the Devonian at 11,000 to 11,015. The drill stem test was taken

which was opened 8½ hours with a recovery of 4,000 feet of oil plus 640 feet of salt water. The perforations were squeezed with cement and the casing was re-perforated 10,950 to 965. This well was then acidized with 250 gallons of acid and was completed for i.p. of flow 400 barrels of oil and 5½ hours, that is, through 1/2 inch choke, gas-oil ratio of 28 to 1; gravity of oil 44.4.

I would like to make a correction on the completion date. That was 7-26-49.

Q You mean, July 26, 1949?

A July 26, 1949, right.

Q What in your opinion is the top of the pay section?

A The top of the pay section, we consider as 10,790 feet.

Q And what, in your opinion, is the base of the pay section?

A The base of the pay section would be at approximately 10,980, that is, 15 feet below the top of the perforations where we completed the well.

Q Mr. Veeder, the map marked --

MR. ADAIR (Interrupting): Excuse me. I wasn't following you; I didn't get your last statement as to the base of the pay section. Would you mind repeating that?

THE WITNESS: Well, the base of the pay section, we would consider as being 15 feet below the last perforations where we completed the well.

MR. ADAIR: In feet, what is that?

THE WITNESS: That would be 10,980.

Q (By Mr. Kellough): Mr. Veeder, Applicant's Exhibit No. 1 is a map of the area -- shows by a red line the area which is asked to be covered by this spacing application. Does that area represent the probable productive area of this producing formation?

A That is so, to the best of our knowledge at the present time.

Q This map further shows other wells drilled or now drilling in this area. Would you please, for the information of the Commission point out the other wells shown on the map and explain to the Commission the present status of those wells?

A Other wells in this area completed are the Amerada No. 1, State B.T.C., located in the SE¼SW¼, Section 35, 11 South, 33 East. This well reached a total depth of 10,980, with a Schlumberger call on the top of the Devonian as 10,662. The well was completed as follows: 7-5/8" casing at total depth, 10,980. Casing perforated 10,959 to 79 with 80 shots. Well completed with i.p. of flow at the rate of 1127 barrels of oil, 24 hours. Gas-oil ratio of 33 to 1 with a gravity of 46.2.

Another well completed by Amerada in this area is the Amerada No. 1, State B.T.D. This well is located in the SE¼SW¼, Section 2, Township 12 South, Range 33 East. This well reached a total depth of 10,995. We called the top of the Devonian at 10,870. Completion history as follows: Total depth 10,995; 5½" casing, 10,980; acid 500 gallons; i.p. flow 800 -- 929 barrels of oil in 24 hours and 1/2" choke; gas-oil ratio, 32 to 1, with a gravity of 45.5.

Q Now, any other wells which have been completed in this area?

A There is one other well completed for an oil well in the Devonian, which was completed by Texas-Pacific. This well is in the SE¼SE¼ of Section 2, Township 12 South, Range 33 East.

Q Now, will you point out to the Commission the wells which are now being drilled in this area?

A Those wells now drilling are the following: The Amerada No.2, State B.T.D., which is located in the NW¼SE¼, Section 35, 11 South,

33 East. This well is drilling in the Permian at a depth of 7,000 feet.

Amerada is also drilling No. 1, Simmons, located in the NW¼NW¼, Section 11, 12 South, 33 East. This well is also drilling in the Permian at 3685.

One further well drilling is a Texas and Pacific, No. 1, State C, which is located in the NW¼NE¼ of Section 2, 12 South, 33 East; and this well is also drilling in the Permian below 4,000 feet.

Q Now, there are two additional wells shown on the map by small dots. Will you describe those wells?

A The two wells shown as small dots are Permian wells. The one well is Mid-Continent No. 1, State 65, which is located in the SW¼NW¼ of Section 1, Township 12 South, Range 33 East.

The other well is the Amerada No. 1, Caudle. This well is located in the SE¼NE¼ of Section 10, 12 South, 33 East.

Q Then, neither of those wells is producing from the formation sought to be covered by this application, is that right?

A That is right.

Q Mr. Veeder, from the samples which you have seen from the wells just described, do you have an opinion with reference to the quality of this producing formation?

A I would say that from the samples and cores I have seen, I would say it had good porosity and apparently permeability.

Q Are you familiar with any other pools in the vicinity which are also producing from the Devonian formation?

A Similar pools, I would say, would be the Hightower Pool to the south; the Crossroads Pool; Jones Ranch Pool, and also the Knowles Pool.

Q Would you compare those pools which you have named, geolo-

gically with this Bagley Pool?

A I would say all pools are producing from the upper part of the Devonian.

Q Do the pools which you have named generally have the same type of porosity?

A All pools have what we would term as solution type porosity.

Q Mr. Veeder, does the production history of these other pools, as well as the information which you have from the wells in the Bagley Pool, substantiate your opinion that this is a reservoir of good porosity and permeability?

A That's right. Our completions to date would compare with wells in the other pools.

MR. KELLOUGH: That's all.

MR. ADAIR: Excuse me, Mr. Kellough --

COMM. SHEPARD: Give your name, please.

MR. ADAIR: Eugene T. Adair, representing the Texas-Pacific Coal and Oil Company. Mr. Kellough, do you intend to have this witness inform the Commission and other operators present, the allowable that you ask to be assigned to 80-acre units?

MR. KELLOUGH: Not by this witness, but we have another witness.

MR. ADAIR: If the Commission please, then, I request the Commission to defer my cross examination of this witness until that information is in the record.

COMM. SHEPARD: Granted.

MR. KELLOUGH: Mr. Christie, will you take the witness stand?

R. S. CHRISTIE

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

By Mr. Kellough:

Q Will you please state your name to the Commission?

A R. S. Christie.

Q Where do you live, Mr. Christie?

A Ft. Worth, Texas.

Q And by whom are you employed?

A The Amerada Petroleum Corporation.

Q In what capacity are you employed?

A Division Petroleum Engineer.

Q And how long have you been an engineer for Amerada?

A Since 1929.

Q Now, you have previously testified before this Commission in your capacity as an engineer, on engineering matters?

A Yes, sir.

Q Mr. Christie, you are familiar with the Amerada B.T.A. No. 1 well about which Mr. Veeder testified, are you not?

A Yes, sir.

Q Do you have any information with reference to the bottom-hole pressure of that well?

A Yes, sir.

Q Will you please give the Commission the information you have?

A The most recent bottom-hole pressure taken on the State -- Amerada State BTA No. 1 was taken in November, '49. The static bottom-hole pressure at that time was 4247 pounds. That was some four months after the well was completed. At the same time, we ran a 24-hour flow test on the well. It showed a production activity index of 4.5 barrels of oil per pound drop in the bottom-hole pressure, flowing at the rate of 50 barrels per hour.

Q Mr. Christie, is that a daily production activity index?

A That is a daily production activity index.

Q What, in your opinion, is the source of energy of this Bagley reservoir?

A Water drive.

Q What is the cost of the discovery well?

A The discovery well cost approximately $312,000.00.

Q And what, in your opinion, is the estimated cost of future wells?

A We estimate the average cost of future wells would be approximately $225,000.00.

Q Mr. Christie, do you have an opinion as to the area which may be effectively drained by one well from this reservoir?

A In my opinion, one well will adequately drain 80 acres -- at least 80 acres.

Q Then, in your opinion, a proration unit of 80 acres, or one-half of a quarter section, would represent that area which may be efficiently and economically developed by one well, is that correct?

A That is right.

Q And you recommend to this Commission that a proration unit of 80 acres be established for this pool, is that right?

A Yes, sir, I do.

Q Now, will you state to the Commission what recommendations you have with reference to the location of the various units in the area; and will you please take Exhibit No. 1, the map, and point out to the Commission in brief, the location of those units?

A In the whole area?

Q Yes, not by description, but simply tell the Commission how you recommend that the units be established in this area.

A We would recommend that the wells be drilled in the center of the Northwest 40, and the Southeast 40, of each quarter section.

Q Now, what is -- let me put it this way: Do you recommend then, that the 80-acre units comprise the East half and the West half of each quarter section?

A Yes, sir, with the -- except where it is necessary to make exceptions.

Q And the dotted line on the map shows the exceptions which you are recommending?

A That's right, yes, sir.

Q Do you have any recommendation to make with reference to the Mid-Continent well located in the SW¼NW¼ of Section 1, 11 South, Range 33 East?

A If the Mid-Continent No. 1 State well should be carried to the Devonian, we would suggest that be made an exception to the spacing pattern because the well was started prior to the completion of the discovery well in the pool.

Q Now, do you have any recommendation with reference to the future off-pattern wells which may or may not be granted by the Commission?

A Well, it would seem reasonable that if a well is located off-pattern, that the well should be penalized in the allowable, and cut to some extent determined by the conditions surrounding that particular tract, which will be brought out in evidence, I presume, at an open hearing if our request is granted.

Q It is your recommendation, then, that reduction in the allowable be not any fixed formula, based upon surface acreage for smaller units, or that it neither be based upon necessarily productive or non-productive acreage in the unit; but it is your

recommendation that in the event there is an off-pattern well drilled, that the Commission, from the evidence submitted, determine to what extent the allowable should be reduced? Is that a correct statement of your recommendation?

A That is correct. I think each well presents a separate problem of its own.

Q Now, Mr. Christie, what recommendation do you have with reference to allowables?

A Until such time as we have sufficient reservoir history and producing history of the reservoir, we would recommend the top 40-acre allowable, with the deep-pool adaptation. At this time, it would be approximately 197 barrels, I believe, for that depth.

Q Now, is it your further recommendation that regardless of the exact boundaries encompassed by this red line, that the order cover the reservoir or the common source of supply as it is developed?

A Yes, that is correct. I think the entire reservoir should be included in this spacing pattern if it develops there are tracts outside the designated area at this time.

Q Do you have any special field rules which you wish to recommend?

A No, we suggest the State-wide rules apply in this case.

Q But you do recommend a tolerance of 150 feet in any direction to avoid surface obstructions, is that correct?

A Yes, that is correct.

Q Mr. Christie, are you familiar with any other Devonian pools in this area which you may wish to compare with this pool?

A Yes, sir. I am familiar with the Hightower area and the Knowles area in New Mexico, and the Jones Ranch area in Texas, which is just across the Texas-New Mexico State line.

Q Now, those pools are being produced on 80 acres, is that correct?

A Yes, sir.

Q Will you describe in what way they are comparable, if they are comparable to this Bagley Pool?

A The Jones Ranch Pool is approximately four years old, and therefore we have a four-year-old history on that particular pool; and it also, as testified by Mr. Veeder, is a Devonian reservoir. The bottom-hole pressures reflect the Jones Ranch reservoir to be a water-drive field. The allowable is slightly higher than the allowable would be in wells of this depth in New Mexico, but there seems to be no particular damage to this reservoir producing at that rate and under that spacing pattern.

MR. McCORMICK: How deep is the Jones Ranch Pool?

THE WITNESS: The Jones Ranch Pool is between -- below 11,000 -- between eleven and twelve thousand feet.

MR. SPURRIER: What is the allowable?

THE WITNESS: The allowable is 240 barrels. Of course, we have a number of shut-down days, you know, over in Texas at the present time, so that the average allowable would probably be less than 197 barrels now, per day.

Q (By Mr. Kellough) Is it your opinion, Mr. Christie, from your experience with the Jones Ranch Pool, and also the information you have here, that the pool, this pool, should be developed on the uniform spacing pattern, with 80-acre units, which we are now recommending?

A I certainly think it would be desirable, yes, sir.

Q In your opinion, would that prevent the drilling of unnecessary wells, and prevent waste?

A Yes, sir, it would.

MR. KELLOUGH: That's all.

MR. McCORMICK: Mr. Christie, how deep was the Amerada Caudle well in Section 10?

THE WITNESS: The original total depth?

MR. McCORMICK: Yes. Did you penetrate the Devonian? That's what I wanted to find out.

THE WITNESS: I believe Mr. Veeder could answer that more intelligently than I can.

MR. VEEDER: The total depth on the Caudle well was 11,083. We topped the Devonian at 11,008. We took a drill stem test from the top of the Devonian from 11,008 to 83. That drill stem test, open 4 hours, recovery 4410 feet of sulphur water, with no shoals of water.

MR. McCORMICK: How deep was Mid-Continent No. 1 in Section 1? Did it go to the Devonian?

THE WITNESS: No, it did not go to the Devonian.

MR. VEEDER: The total Mid-Continent was 3935, sir.

COMM. SHEPARD: Anyone want to cross examine?

MR. ADAIR: May I cross examine Mr. Veeder before I cross examine Mr. Christie?

COMM. SHEPARD: Yes.

CROSS EXAMINATION OF MR. VEEDER

Q (By Mr. Adair) Mr. Veeder, the tract upon which the discovery well in this area was drilled, or Amerada B.T.A. No. 1, was a farm-out from Texas-Pacific Coal and Oil Company, is that correct?

A I understand that is correct.

Q In other words, Texas-Pacific Coal and Oil Company assigned to Amerada its lease covering that 80-acre tract, and Amerada

obligated itself to drill a well, is that your understanding?

A That is my understanding.

Q In that farm-out, were there any restrictions made as to where you would drill your well on that tract?

A I can't say. I imagine there would be, but I can't testify as to the restrictions.

MR. ADAIR: Is there someone else here with Amerada who would like to answer that question if Mr. Veeder doesn't know? Mr. Millikan, do you know?

MR. MILLIKAN: I can't answer it. If you have the evidence there, perhaps you can put it in. I think the facts will stand on their own without expert testimony.

Q (By Mr. Adair) I hand you here a letter agreement between Amerada, which has been marked Texas-Pacific's Exhibit No. "A", and ask you, or any other Amerada representative present if they desire to examine that, and tell us whether or not that constitutes the farm-out agreement between Amerada and Texas-Pacific?

MR. KELLOUGH: Well, I wish to say to the Commission that we have produced here an engineering and a geological witness. This copy of a letter, which purports to be a farm-out agreement assigned by the Texas-Pacific Coal and Oil Company, is addressed to Amerada and was accepted by Amerada on October 13, 1949. I cannot say, and I can tell the Commission, I don't know whether it is the particular farm-out agreement, involving this lease, or not; but if Mr. Adair testifies it is, we have no objection to it's being introduced in evidence to show what it is. In other words, it may or may not be. If he says it is, I assume it is.

MR. McCORMICK: Does the T.P. so state?

MR. ADAIR: That is the only one we have with Amerada.

133

MR. McCORMICK: It will be accepted then.

MR. ADAIR: Covering this.

MR. McCORMICK: Yes.

MR. ADAIR: Without taking the time, if the Commission please, to read it, if I may state into the record, that this is the agreement and there are no restrictions as to where the well will be drilled on the 80-acre tract, nor are there any restrictions or provisions calling for 80-acre spacing. We request that it be received in evidence.

COMM. SHEPARD: It will be received.

(Tex-Pac. Exhibit No. "A" was received in evidence).

Q (By Mr. Adair) Now, Mr. Veeder, you testified as to the top of the Devonian, as to where you picked the tops in the various wells drilled?

A That's right.

Q Which is the highest well in the field from the standpoint of the top of the Devonian formation?

A The highest well in the field is the Amerada No. 1 State B.T.C. That well is located in the SE¼SW¼, Section 35, 11 South, 33 East.

MR. SPURRIER: Mr. Veeder, excuse the interruption. In describing these wells, let's cut out the exact description because from this sheet we have here, it is obvious which well you are talking about.

THE WITNESS: All right.

Q (By Mr. Adair) Now, the next highest well on the Devonian?

MR. MORRELL: If the Commission please, we can't hear. What was the top of the Devonian formation on the Amerada No. 1 State B.T.C.?

THE WITNESS: The Schlumberger top, our call on that was minus 6410.

MR. MORRELL: And the depth was --

THE WITNESS (Interrupting) That equivalent depth would be 10,662.

Q (By Mr. Adair) And the next highest well on the Devonian formation in the field was what?

A The next highest well on the Devonian in the field, on our Schlumberger correlations would be the Texas and Pacific No. 1, State B.

Q Would you give the top again on it?

A Our calling on that well would be a minus 6479.

Q So looking at your figures here, your B.T.C. is approximately 69 feet higher on the Devonian than the Texas-Pacific No. 1, State B well?

A That's right.

Q Now, the next highest well on the Devonian field?

A The next highest well would be the discovery well, Amerada No. 1, State B.T.A.

Q And the subsea datum on that is what?

A Minus 6495.

Q And the next highest well in the field -- that only leaves one, excuse me, the B.T.D. That is the next, is that correct?

A That's right.

Q What is the subsea datum on that?

A The subsea datum on that is minus 6620.

Q Mr. Veeder, you have picked the top of the Devonian right at the bottom of the black shale zone that lies at the bottom of this formation, is that right?

A Right, and use a Schlumberger correlation.

Q In order to correct your sample logs?

A That's right, to get away from the human error, we would

rather accept the Schlumberger tops.

Q In addition to human error in picking tops of formations, you also have an error caused by the lag of the samples coming from the bottom of the holes up to the surface, don't you?

A That's right.

Q There is a tendency there, is there not, for your samples to carry over from previous formations that you have cut, or higher formations you have cut through, is that not correct?

A That would depend largely on the condition of your hole, yes.

Q I noticed one or two sample logs -- it may not have been your work or it may not have been Amerada's work, -- on your B.T.A. well, it appeared, for example, there was a shale carry-over all the way down to the bottom of the hole, that was possibly a result of the carry-over from drilling through black shale formation, and then the samples remain in the mud until you get down through the formation.

A I don't believe you can drill a well without having some degree of carry-over, as you say.

Q Regardless of the formation you went through, you would have some carry-over?

A In an un-cased hole, that is right.

Q So that due to the error you mention and the carry-over and the lag in your sample that you will have, it is extremely difficult to be accurate in picking the top of any formation, is that not correct, that that alone --

A (Interrupting) I should say by samples that would be a -- there would be a variance in the tops.

Q And by the same token, it would be difficult to pick any intermediate zones within a single formation such as the Devonian formation? In other words, the top of your pay -- it would

be difficult to pick the top of your pay within the Devonian formation by samples alone and well cuttings alone, is that correct?

A I would put a limit on that, in the difficulty to pick it as to feet, right.

Q What would you consider a reasonable error? Thirty feet, forty feet?

A No. I think on particular wells that are lagged -- samples are lagged, such as we handle our samples, I should say it should be within three to five feet.

Q Now, you picked the top of the pay section distinct from the top of the Devonian section down in the Devonian, is that right?

A That --

Q (Interrupting) In other words, there is a dense area, or an area of no porosity up on the top of the Devonian section, that doesn't produce oil, is that correct? In the well so far drilled, is that correct?

A Right.

Q Where do you pick the base of the pay section, at the water-oil contact, is that where you pick the base of the pay section?

A We would roughly say so.

Q Where have you determined the water table to be, subsea datum point?

A For the discovery well we used a minus 6775.

Q Have you cut the water in any other well drilled in the field other than the discovery well, your B.T.A.? Didn't you attain water in your Caudle well?

A Yes, we drilled into water.

Q Did you find a water table there, essentially the same depth?

A On the Caudle, we took a drill stem test 11,028. That is

roughly the same depth, yes, sir.

Q Then you assume from the information that you have available at the present time that the field is underlaid with a level water table, is that correct?

A Right.

Q Now, it has been testified here that -- and I believe you testified that you have determined in your opinion that the field is both porous and permeable, is that your statement?

A I said it was porous, right.

Q And you also testified that in your opinion it was also permeable?

A Apparently permeable.

Q And you determined -- you made that determination from well cuttings?

A And cores.

Q And what well have you cored, or on what well has core information been available to you?

A The only well we have core information on, is your well, the Texas-Pacific producer.

Q Do you have the advantage or the benefit of a core analysis in that well?

A I do not.

Q You merely base your opinion upon an examination of the core, is that correct?

A That is correct.

Q Did you examine it yourself?

A I did.

Q What methods are used by geologists to determine the permeability of a reservoir, Mr. Veeder?

A The geologist can only determine the apparent permeability.

Q Will you distinguish for the benefit of the Commission here and for the record, between porosity and permeability?

A Surely. Porosity is your openings in a formation. Your permeability would be considered as your connections between your openings.

Q In other words, porosity is the space that holds the oil, and permeability are the pipes that carry the oil to the well hole, does that state it in a rough way; is that more or less correct?

A Right.

Q And permeability is more or less a measure of the rate of flow, is that correct?

A Yes.

Q The flow of oil through the reservoir?

A That is right.

Q So for one well to drain 80 acres that has been requested and recommended here, you must assume a more or less uniformly high degree of permeability throughout the entire reservoir, is that correct?

A That is right.

Q And similarly, you must assume the same degree of uniformly high permeability throughout each 80 acres, or 80-acre unit in the reservoir?

A Right.

Q And if there are any dense zones or dense streaks within the reservoir, you do not have that uniformly high degree of permeability necessary for one well to drain 80 acres? When we are talking about draining 80 acres -- before you answer the question -- by that I mean, drain all recoverable oil under the 80-acre tract.

A Well, of course, if you have a dense zone, you don't have --

you will have no permeability in that particular zone, that's right.

Q So you would say then that if your reservoir contained dense areas and dense zones and dense streaks, you would not have the uniformly high degree of permeability necessary for one well to drain 80 acres, is that correct?

A You would not be able to recover oil that is not there, that is correct.

Q Wouldn't there be some oil that would be trapped behind the dense zones that wouldn't get to the well hole on the basis of one well to 80 acres?

A Not any more than wells in smaller locations, I would say -- smaller spacings.

Q In other words, your testimony is that one well will drain as much recoverable oil as two wells in an 80-acre tract?

MR. KELLOUGH: Now, just a moment, please. I do not want in any manner to thwart the cross examination, but counsel is asking questions about reservoir engineering about which this witness did not testify, and about which he is obviously not called on to answer. We have an engineer present. And if he was a reservoir engineer, why we could qualify him as such and he could make him his own witness, if he wants to; but he is not qualified in that respect.

COMM. SHEPARD: Do you have a witness here who could testify to that later?

MR. KELLOUGH: Yes, we have a witness, Mr. Christie; and we also have Mr. Millikan and we would be glad to put him on the stand.

COMM. SHEPARD: Then you can question them, Mr. Adair.

MR. ADAIR: All right, sir.

Q (By Mr. Adair) Now, I don't think the answer to this question requires any engineering information, Mr. Veeder. Assuming the same rate of flow from each well, two wells on an 80-acre tract will produce more oil in a given length of time than one well located on an 80-acre tract, will they not?

A If you have the same allowable?

Q Same rate of flow.

A Well, that is apparent.

Q That is correct, is it not?

A Yes.

Q As you say, that is apparent. So in order to take care of the royalty and lease operator and the State, who wants its taxes; the royaltor only wants to spend his money during his lifetime -- you have to increase the rate of flow from one well on 80 acres to the point that it will drain the 80-acre tract, in substantially the same length of time as two wells on the 80-acre tract?

MR. KELLOUGH: If the Commission please, I would like to request the Commission to ask Mr. Adair to limit his questions to questions of the witness. If he wishes to make a closing argument, I am sure he will have an opportunity to do so. I think it would simplify the proceeding if he be instructed to ask the question rather than to engage in argument.

COMM. SHEPARD: You may go ahead, Mr. Adair; but they have other witnesses, probably, who are better qualified to answer the question, so try to cut it down.

THE WITNESS: I would rather stay with the geology. That's my field.

MR. ADAIR: The point, if the Commission please, -- Amerada has actually closed their main case as to the hearing

and they have presented the testimony of a geologist and an engineer, and some of these matters were not covered. We think that in asking for 80-acre spacing -- fixed-pattern spacing, that these various possibilities and probabilities should be considered not only from the standpoint of the argument but from the standpoint of the witnesses, who are the only ones available who can testify with reference to it.

MR. KELLOUGH: But we contend that whether the State collects taxes and how much, and whether the individual spends his money in his lifetime, is not the interest in this particular hearing.

MR. ADAIR: Let me re-word this question then, and eliminate those factors.

Q (By Mr. Adair) In order to drain 80 acres within a reasonable time with one well, as compared to two wells on 80 acres, you would obviously have to give the one well a higher allowable, wouldn't you?

A No, it is just a longer period of time to drain the acreage.

Q I said, within the same reasonable time.

A If you're working on the same time, yes.

Q And here again, if this is an engineering question and you don't prefer to answer it, we will let Mr. Christie answer it later. And, assume that you give such a well this higher allowable in order for it to support the higher rate of flow. You must assume again the uniformly high degree of permeability through the reservoir, is that not correct?

A State your question again.

Q Assuming that we have given this one well on one 80-acre tract a higher allowable in order that it will drain a recoverable amount of oil within substantially the same time as two

wells, you have to assume the same uniformly high degree of permeability throughout the 80 acres, the 80-acre tract, and throughout the reservoir, so that it will support this increased rate of flow, don't you?

A In general, I guess that's right.

Q Now, in your examination of the well logs and Schlumberger logs in the field, did you notice any abnormalities within it, such as dense zones and streaks?

A I have not.

Q Would you say if they are found in one well, it is reasonable to expect them to be found in all of them?

A I have found, in all wells examined, in what evidence we have had, we see no separation. It is a continuous porous zone.

Q A continuous porous zone?

A Right.

Q But that is not an answer to my question. If such a dense zone were found in one well, is it reasonable to assume that it might be present in other wells drilled?

A If we have found that dense zone. We have not found it.

Q And the only way, though -- due to the lag in samples, as you testified awhile ago, and the human element in picking samples, the only way you can be sure of a dense zone is by coring?

A That's right.

Q So as to determine the dense zone. By the samples, even though your depths might be three feet off, your dense zone would still be there in your section.

A Right.

Q And you can determine it by samples. Now, you have had available to you, samples of all wells drilled so far, and that

is the way you have of making your examination, based upon the samples from all Devonian wells in the field, is that correct?

A Yes, sir.

Q And by the same token, you have examined the Schlumberger surveys of all the wells in the field?

A Yes.

Q Let's talk a minute, Mr. Veeder, about the characteristics of Devonian structures and those Devonian fields you mentioned a minute ago, of Hightower, Knowles and Crossroads Pools. Are or are not these Devonian reservoirs characterized by steep dips on one side or another?

A I would say some of them are. We don't have enough evidence on all the fields mentioned.

Q Are they not also sometimes characterized by faulting?

A Faulting has been interpreted in one particular field, I would say.

Q In the Crossroads Field Pool?

A That's right.

Q Do you agree with that interpretation?

A It can be interpreted as such.

Q In such a case where you have very steep dips or faulting, it is possible to go from productive to non-productive from one end of an 80-acre tract to the other, isn't that right?

A That's right.

Q That was the case in Crossroads, was it not?

A In which particular instance are you talking about?

Q In the Santa Fe application?

A Which well?

Q Just a minute. I think the matter I am referring to is a

matter of public record, which the Commission has heard and is probably familiar with. The well to which I refer is this well here. (Indicating). It is upside down. Will you identify it?

A That's right. That is the Santa Fe well, and that is a low well. It would -- I would not say that that definitely had to be on the down-flow side of the fault.

COMM. SHEPARD: Which well is that?

MR. ADAIR: This well, if the Commission please, was considered in the Santa Fe's application for an exception. They drilled a dry hole on fixed pattern spacing on this side and asked for an exception, to drill over here where they thought the oil was present.

Q (By Mr. Adair) Let's look at the Hightower Field, Mr. Veeder. Would you say that the Devonian structure was characterized by very steep dips?

A On the wells we have evidence of, there are steep dips, by the three wells drilled at the present time.

Q On the wells drilled at the present time. Will you tell the Commission how much lower on structure, your Amerada No. 1 roach is than on your discovery well?

A That is another field. I could give that roughly.

Q I mean, you and Mr. Christie testified as to these fields being characteristic of Devonian reservoirs. Now, is it not true that your Amerada No. 1 roach drilled under a fixed pattern, 80-acre spacing plan, granted by the Commission, was dry in the Devonian 1 location south of the discovery well?

A That well was dry. I cannot say that the location was authorized by the Commission.

Q No, I didn't mean to say that location was authorized by the

134

Commission. I mean, it was on fixed pattern, 80-acre spacing plan.

A Right.

Q That is correct, isn't it?

A That is right.

Q Now, had that well been drilled on the 40-acre tract, part of the 80-acre unit closest to the discovery well, 330 feet from the unit line as authorized by the present State-wide rules, that well might have produced oil, might it not?

A And also, that well might have been a dry hole.

Q You had water in the Devonian, did you not?

A I beg your pardon?

Q You had water in the Devonian.

A Under roach?

Q Yes.

A We did. I mean, if we had moved it to the north, there is the possibility it could have been a dry hole.

Q And also, there is the possibility that it could have been an oil well?

A That's right. We did not know that when we staked the location.

Q That's the point I'm making. Fixed patterns of 80-acres result in dry holes, don't they?

A In all steps, wherever you make a location, I don't care what the spacing is, you take a chance on a dry hole.

Q The 80-acre spacing in the Crossroads Pool resulted in a dry hole, didn't it? Whereas, had it been drilled in the 40 closest to the production, 330 feet from the 40-acre line as permitted by State-wide rules, it would probably have gotten an oil well, wouldn't it?

A I couldn't say whether there would have been any oil. The well has not been drilled.

Q I'm asking your opinion.

A I would say you do not have the evidence of it.

Q You have no opinion?

A You're closer to production, but still it is a gamble.

Q The closer you are, would you state, to production, the less chance of getting a dry hole?

A Under normal conditions.

Q So, we have two cases in the two reservoirs which you have mentioned, the Devonian reservoirs, the Crossroads and the Hightower, where conforming to fixed-pattern, 80-acre spacing, resulted in dry holes, and you admit the possibility at least of their having gotten oil wells had they moved closer to production, 330 feet from the lease line as permitted by State rules?

A That is correct. Well, there is the same possibility when they started the well that is a dry hole now.

Q We are talking about the results as known now.

A I understand it is a dry hole, that's correct.

Q That is correct. All right, sir. Look at the Knowles area, which you testified about. There Amerada drilled its discovery well, its Hamilton, in the center of a 40-acre tract.

A That is correct.

Q While we are trying to find a Knowles map, Mr. Veeder, I have one more question about this Hightower area. There is another well presently being drilled, is there not, on the fixed pattern, 80-acre spacing, in the Hightower area, which is Gulf No. 1 well, located diagonally to the northwest of your discovery well?

A That's right.

Q Do you have any information? Has it as yet discovered oil on the Devonian?

A I have information -- no, I haven't information that it has oil or water in the well.

Q Is it not true, it is over 500 feet low to the discovery well on the Devonian?

A I believe that is untrue.

Q How much lower is it?

A Roughly, according to memory, I would say a little over 100 feet.

Q Over 100 feet low?

A That is my memory.

Q In total depth, how much deeper is it than your discovery well in Hightower?

A I do not have that information with me on Hightower.

Q Our information -- and we will put it on by witness -- this is our information, some 575 feet lower, and still no oil.

A There are Schlumbergers on those two wells.

Q That is our information. We will have a chance to examine our geologist on it. Now, getting over to the Knowles Tract. The hearing was held on that here not long ago, and the Commission, I think, is familiar with that.

MR. McCORMICK: No, the order has not been signed.

MR. ADAIR: I didn't mean to infer it had. I meant the hearing had been held on it.

MR. McCORMICK: Yes.

Q (By Mr. Adair) Your Amerada discovery well in the Knowles Pool was drilled in the center of a 40-acre tract, is that correct?

A I believe that's right.

Q You do not know of your own knowledge?

A I can probably get it from the gentlemen around here. I'm sure someone here has it.

Q Then your second well in the Knowles Pool was drilled on the 40-acre tract immediately north of the discovery well, is that not correct?

A Is that correct, Mr. Christie? Yes, that is correct.

Q And the third well drilled in the Knowles Pool, also by Amerada, was drilled in the 40-acre tract immediately south of the discovery well, is that not correct?

A That is correct.

Q So that so far as those three wells are concerned, you have essentially 40-acre spacing? You have them on three adjoining 40-acre tracts, that is correct is it not?

A I can say, well -- that is correct with the exception that the north well was -- the location was made originally for a Permean test.

Q But the point is, the three wells have been completed in the Devonian on adjoining 40-acre tracts; all three are producing oil wells, is that not correct?

A That's right.

Q So we have the situation here of two places where you have 80-acre fixed pattern spacing which resulted in dry holes; in the Hightower, three wells drilled, one dry for sure, and one running mighty low; while, in the Bagley, where you have drilled and developed on 40 acres, you have three wells drilled, and three oil wells.

MR. KELLOUGH: Are we just asking for understanding, or asking a question.

MR. ADAIR: That is correct.

A You have four wells at Bagley, I believe.

Q (By Mr. Adair) Of the three I asked you about all three --

A (Interrupting) Bagley, that is the area you are talking about?

Q I'm talking about Knowles.

A Yes, three at Knowles.

Q Yes. Was my statement correct?

A Essentially so.

Q In what respect was it wrong, Mr. Veeder?

A I misunderstood you about the number of wells in Bagley.

Q In Knowles you mean?

A In Bagley -- you said Bagley.

Q If I said Bagley, correct it to three wells in Knowles, I'm sorry. Now, Mr. Veeder, did you say definitely that the conditions which resulted in dry holes in Crossroads and Hightower did not exist within the limits of the Bagley Devonian reservoir?

A We don't have enough information at the present time to say either yes or no.

Q And by the same token, you do not have enough information then at the present time to say that 80-acre fixed-pattern spacing should be placed into effect?

A Yes, I think we do. You have to have a spacing.

Q Are you familiar with the Shafter Lake Devonian Field just across the line in Andrews County?

A Yes, to what extent?

Q Where it is located geographically?

A I am.

Q Do you know whether or not it developed on 40 or 80-acre spacing pattern?

A Yes, I think it has been developed on 40.

Q Are you familiar with the Fullerton Devonian Field, located across the State line in Andrews County, its geographical location?

A Is that the Fullerton Pool or Field?

Q The Fullerton Pool.

A Right.

Q And do you know whether it developed on 40 or 80-acre spacing?

A The pattern would be considered as 40.

Q Now, one last question, Mr. Veeder, on this particular subject. In what way do the rules that you propose here, fixed pattern, 80-acre spacing, in what way would they prevent waste?

A In this way: we figure we have good porosity and good permeability. If we drill one well in an 80-acre tract, it would cover the same amount of oil -- I'm not going to make that a time limit -- as if we drilled two wells in that same 80 acres. That certainly would be a saving.

Q To whom?

A Well, I think it would be a saving to everybody in the end. That is just waste, waste of materials and whatever you want.

Q Who pays for the second well?

A Well, the operator, if you are talking about the operator's lease.

Q In this area, you also have a Pennsylvanian formation that is productive, do you not, in the Bagley area?

A That's right.

Q Is it co-extensive with the Devonian, that is, does the Pennsylvanian produce everywhere where the Devonian does, and vice versa?

A To date, all wells have had either gas or distillate showings

on drill stem tests.

Q In the Pennsylvanian?

A In the Pennsylvanian.

Q And to date one well has been dry in the Devonian?

A That's right.

Q Indicating at least that they are not productive, each zone is not productive throughout?

A Each well would not produce out of both zones, is that what you mean?

Q And by the same token, each 40-acre tract might not produce in each zone, is that not a probability?

A That is possible.

Q So that in forming an 80-acre unit out of two separately owned 40-acre units, you would have the difficulty of adjusting correlative tracts, based upon one 40 acres possibly being productive in both zones, and the second 40 being productive in the Pennsylvanian only?

MR. KELLOUGH: May I interrupt a minute? This application which we filed asked for spacing in the Devonian. Now, if he intends to ask that the Pennsylvanian formation be included, that, I understand, is a separate reservoir. I don't believe it is proper proceeding. He is asking this witness now if he is going to encounter difficulties in trying to pool the Denovian oil with the Pennsylvanian oil. I don't know that it has anything to do with this. It is already determined as two different pools.

COMM. SHEPARD: We will confine ourselves to the application, Mr. Adair.

MR. ADAIR: If the Commission please, I believe I am doing that. Their application here and certainly their exhibit

would indicate that the Amerada had declared themselves partners in with us in the well presently drilling in No. State B.C. 1 or C. 1, it is, and would indicate in order to form that unit, some pooling or unitization or something would be necessary. Also, it would indicate that down in the S½SE¼ of 2, that additional pooling was necessary. Their state ownership map here -- I mean, ownership map here, indicates separately owned 40-acre tracts, either by fee ownership or by lease ownership; and that in order to form their 80-acre units, it would be necessary to pool.

MR. McCORMICK: Possibly to pool as to the Devonian, not as to the Pennsylvanian, isn't it, Mr. Adair?

MR. ADAIR: I don't know, sir. I have been advised by New Mexico counsel that there is considerable doubt as to whether the state can prove by zone, and I'm not attempting to answer that question.

MR. McCORMICK: Well, if you farm out a lower zone, you could also pool a lower zone, couldn't you?

MR. ADAIR: I don't know. Now on unitization, you had better ask a New Mexico lawyer about that. I prefer not to try to answer. It sounds logical that you could do so. But under unitization, talking about state unitization, I understand that the lease itself has to be unitized. There is no provision in the statute for unitization of zones.

MR. McCORMICK: Isn't that usually accomplished by the operating agreement?

MR. ADAIR: Yes, sir, generally entered into prior to the time the well is started. I merely wish to indicate that in any pooling or unitization, the question is going to be complicated due to the fact that you have two productive zones in the area

rather than one.

Q (By Mr. Adair) Mr. Veeder, would you kindly point out on the map that has been placed in evidence here, the various 40-acre tracts on which Amerada has a lease, on which there are either over-riding royalties outstanding, or oil or production payments outstanding, particularly with reference to the state leases?

A I do not have that information.

Q Would it be possible for you to get the information during the noon hour from someone representing Amerada?

MR. KELLOUGH: If the Commission please, in the interest of saving time, I will stipulate into the record what our files show with reference to the location of over-riding royalty interests.

Our files reflect there is an over-ride, and I am unable to state the amount or to whom --

COMM. SHEPARD: Doesn't matter.

MR. KELLOUGH: But our files reflect an over-ride which covers the W½NE¼ of Section 3. There is another over-ride which covers the NE¼NE¼ of Section 3. In other words, the NE¼NE¼, that is a 40-acre tract.

MR. McCORMICK: Straight over-ride?

MR. KELLOUGH: Straight over-ride. Then the third over-ride covers the SE¼NE¼ of Section 3. The third over-ride covers the W½, and two more, covering the other two 40s. Now, coming down to the SE¼ of Section 3, there is an over-ride which covers the E½SE¼, and there is another one covering the NW¼SE¼, so there is a 40, and another 80 down there. Now, move over to the NW¼ of Section 2. There is one over-ride which covers the W½NW¼, Section 2. That same over-ride also covers the NE¼SW¼,

and the SW¼SE¼ of Section 2. In other words, it covers the 80 acres in the W½NW¼, and the two diagonal 40s.

Then there is a further over-ride which covers this tract. It is two 40s. It covers the SW¼NE¼ and the NW¼SE¼ of Section 2. That is an 80-acre tract. That is the unit in which the discovery well is located, and which I understand is a farm-out from T.P., and I believe the over-ride is to them. I can't say for a certainty, but my information is that is all the over-rides in that area.

MR. McCORMICK: What about payments?

MR. KELLOUGH: I'm speaking of oil payments and over-rides as one group. As a matter of fact, I think they are all oil payments. Perhaps a certain percentage is not oil, and a certain percentage is uncovered.

MR. McCORMICK: Well, the T.P. is.

MR. KELLOUGH: Well, that may be.

MR. ADAIR: Is that an over-ride there? (Indicating).

MR. KELLOUGH: I can't say.

MR. McCORMICK: May we have it identified for our people?

MR. KELLOUGH: He is referring to the NE¼NE¼ of Section 2, a 40-acre tract, and I cannot say for a fact. Mr. Adair is informed, and I'm going to accept that for your purpose in this hearing.

COMM. SHEPARD: We will stand in recess until 1:30.

MR. KELLOUGH: For the purpose of the record, I wish to offer in evidence all exhibits marked.

COMM. SHEPARD: They will be received in evidence.

(Applicant's Exhibits Nos. 3 & 4, received in evidence).

(Whereupon, at 11:50 o'clock, A.M., the hearing was recessed).

AFTERNOON SESSION

(The hearing re-convened at 1:30 o'clock, P.M.).

COMM. SHEPARD: The meeting will come to order, and you may proceed, Mr. Adair.

MR. ADAIR: Mr. Shepard, if the Commission please, we have no further questions of Mr. Veeder at this time. Thank you very much, Mr. Veeder.

MR. KELLOUGH: Before Mr. Adair continues his cross examination of Mr. Christie, I would like to ask Mr. Veeder a couple of questions on redirect.

COMM. SHEPARD: Go ahead.

REDIRECT EXAMINATION OF MR. VEEDER

Q (By Mr. Kellough) Mr. Veeder, I would like to clear up one point that might have been misinterpreted. You testified I believe, that this reservoir had continuous permeability, did you not?

A Yes, continuous porosity.

Q Continuous porosity.

MR. ADAIR: I didn't hear that. I'm sorry.

MR. KELLOUGH: I asked if he didn't testify that this reservoir had continuous porosity.

MR. ADAIR: And permeability, didn't you ask that, too?

A And I referred to it as apparently permeable, I believe.

Q (By Mr. Kellough) Now, did you intend to convey the impression to the Commission that it had uniform porosity?

A I did not. I meant the word as continuous, as I said.

Q It is not your testimony, then, that each and every part of the reservoir is equally porous?

A That's right.

Q But that there are some sections of the reservoir which are

more porous than others?

A Right.

Q There is a variance, in other words?

A There is a variance in the porosity.

Q Now, is that a typical characteristic of Devonian pools?

A Very much so, I would say.

Q One other point. On cross examination, you were asked with reference to the Hightower Pool.

A That is right.

Q I believe Mr. Adair assumed a set of facts whereby had you drilled a well on the 40-acre tract immediately south of the B.T.B. producing well, that you would have obtained a producing well?

A He gave that assumption.

Q He assumed that set of facts. From your information that you have of that reservoir, is that a correct assumption of fact?

A I beg your pardon?

Q Is that a correct assumption?

A I do not think it is.

Q Now, assuming that it is -- assuming the assumption, the set of facts assumed by Mr. Adair, that instead of dropping down to the 40-acre tract once remove from the B.T.B. well, that you had drilled another well immediately south of the B.T.B. well on the 40-acre tract immediately south -- assuming that you had done that; and further assuming as Mr. Adair did that you discovered an oil well, would you then have been required to drill an additional well at the location where the roach well was drilled?

MR. ADAIR: Just a minute, Mr. Veeder. I believe that

135

calls for a conclusion of law, as to what you believe, what you mean by required. I have no objection to you leading the witness any at all.

Q (By Mr. Kellough) Would you have recommended to your company that a well be drilled?

A That is right.

MR. ADAIR: What is right?

THE WITNESS: That I would recommend -- if you had a 40-acre off-set discovery well, B.T.B., and assume it made a good well, I normally would recommend a south off-set to it, which would be the well in question.

Q (By Mr. Kellough) The roach well?

A Yes.

Q The fact is, that was a dry hole?

A That's right.

Q Now, the result would be what?

A We would have two oil wells, and one dry hole.

Q And under the testimony given here, you would have two wells where one would recover the oil under that area?

A That's right.

MR. KELLOUGH: That's all the redirect I have.

MR. ADAIR: That brings forth one more question.

RECROSS EXAMINATION

Q (By Mr. Adair) If the royalty or over-ride royalty ownership happened to be different between the two wells that you drilled that resulted in dry holes, I mean, between those two tracts, the two adjoining 40-acre tracts, then the royalty owner under the South 40 would have never had a well drilled on his land, would he?

A I wouldn't know why not.

Q Put it this way: in view of the fact you have drilled a dry hole now on the fixted pattern location, you would not at this time recommend moving up on the 40 just to the north of the well?

A It wouldn't be logical.

Q And you base that opinion, in part at least, upon the dry hole, is that right?

A That is right.

MR. McCORMICK: Mr. Veeder, have you attempted to estimate the amount of oil in place in this Bagley area?

THE WITNESS: I have not.

MR. McCORMICK: Well, have you attempted to estimate the oil under place, under each 80?

THE WITNESS: The amount of oil in the field?

MR. McCORMICK: Under each 80?

THE WITNESS: No, I have not. My method has been by comparison, not as to the specific amount of oil, that is, to the barrel, that's what you inferred?

MR. McCORMICK: Yes.

COMM. SHEPARD: Any further questions?

MR. KELLOUGH: I have no further questions of this witness.

MR. ADAIR: No.

COMM. SHEPARD: Does the T.P. wish to offer any witnesses?

MR. ADAIR: If the Commissioner please, not until Mr. Christie is cross examined.

COMM. SHEPARD: Proceed.

MR. MORRELL; Foster Morrell, U.S. Geological Survey. I have one question from Mr. Veeder.

COMM. SHEPARD: All right.

MR. MORRELL: Mr. Christie, on the exceptions as to the spacings of the units that are cited on the map which you have, could you enumerate or specify those exceptions, specify the exceptions?

MR. CHRISTIE: You are asking Mr. Veeder that question?

MR. MORRELL: Mr. Christie testified on that.

MR. CHRISTIE: Those 80-acre tracts as outlined by the dotted line would be the exceptions.

MR. MORRELL: Well, I don't have the dotted lines.

MR. CHRISTIE: Well, they are in evidence with the Commission. (Document handed to Mr. Morrell).

MR. MORRELL: That answers my question.

MR. McCORMICK: Do you want to proceed with the examination?

MR. ADAIR: Yes, I would like to do so now.

CROSS EXAMINATION OF MR. CHRISTIE

Q (By Mr. Adair) Mr. Christie, I believe you testified that P.I. tests that you took indicated to you good permeability throughout the reservoir, is that correct?

A Yes, sir.

Q Now, in what well or wells were these P.I. tests taken?

A We have taken productivity tests on our B.T.A. No. -- State B.T.A. No. 1, State B.T.C. No. 1, and State B.T.D. No. 1.

Q For the purposes of illustration, will you get before you the data on the B.T.A. No. 1?

A Yes.

Q First, to save time, will you tell us how much of the pay section is open in that well?

A The pay section in the B.T.A. No. 1 is open between 10,950 and 10,965, or 15 feet.

Q And how much pay section did you have in that B.T.A. well in the Devonian?

A Maybe Mr. Veeder can give you that better than I can.

MR. VEEDER: The top of the pay would be regarded as 10,790, -- 190 feet.

MR. ADAIR: One hundred ninety?

MR. VEEDER: Yes, sir.

Q (By Mr. Adair) So actually, you are basing your conclusion on -- from 15 feet that is perforated out of 190 feet of what you consider the pay section?

A Yes, sir.

Q Now, actually a P.I. text would indicate permeability somewhere up or down the well bore in the pay section. It doesn't necessarily indicate uniform permeability or continuous permeability up and down the well bore, does it?

A It doesn't necessarily indicate that but we are --

Q (Interrupting) You are making that assumption?

A We are reasonably sure we have continuous permeability, if it is a water-drive field which we have testified to.

Q Actually, the drive which you get from your P.I. Test in the B.T.A. could be coming from the bottom, we will say, of the pay section, could it not, so far as you know?

A Well, it would be limited to the 15 feet, I believe.

Q That you have exposed to your well bore?

A Yes, sir, and if there is continuous permeability, it is possible that the area above and below that 15 feet, might be contributing to the production through the perforations.

Q Yes, sir. I notice you said, "if". It is possible, then, that there could be dense zones within the pay section, both above and below your perforations, that is possible, and wouldn't

be indicated one way or the other from your P.I. tests?

A No, I don't believe it would.

Q I believe Mr. Veeder said there was a dense zone at the top of the Devonian of various degrees of thickness, before you actually got into the pay section?

A That's right.

Q So, assuming a similar dense zone down in the pay section -- to put it this way: the P.I. test does not rule out those dense zones at all?

A No, sir.

Q All right. Now, Mr. Christie, what types of reservoir drives do you have? What primary types of reservoir drives do you have?

A Well, there --

Q (Interrupting) I notice you speak of water drive as one.

A Well, ordinarily speaking, there are three types of different reservoir drives -- water drive, gas drive, or gas cap.

Q Now, do we have a gas cap here ?

A No, we do not.

Q So that type of drive is not furnishing any energy in this particular reservoir, is it?

A Not to our knowledge, no, sir.

Q Now, how about your gas drive? Do we have an effective gas drive within this reservoir?

A No, I believe it is not contributing very much to the productivity.

Q In other words, if you had a gas drive alone, why, one well would not drain 80 acres, would it?

A Yes, it could easily.

Q I'm not talking geologically at this time now. I am talking about during your lifetime, or within twenty, thirty, forty years.

A Yes, if you had sufficient permeability, I think it would.

Q Now, I'm not talking about a gas drive as such. I am talking about the gas drive you have present in this reservoir. What was the highest gas-oil ratio you got on the Devonian?

A The highest was 33 cubic feet per barrel on Amerada State B.T.C. No. 1.

Q You could certainly say that the gas drive could not be very effective at all; would you not say that, from such a low ratio?

A Yes, I think that is reasonable to assume.

Q And they do not happen to have a bottom-hole flood analysis?

A No, we have not run a flood analysis -- a bottom-hole flood analysis.

Q So we have ruled, out of the three drives you have mentioned -- we have ruled out the expanding gas cap and the gas drive, as effective factors in drainage of this reservoir?

A Yes, thatis, initially, at least.

Q At the present time?

A I think that is correct.

Q So you hope that you have an effective water drive?

A Yes.

Q Or at least, a partially effective water drive?

A We hope we have an effective water drive.

Q I believe Mr. Veeder testified that you were of the opinion there was a level water table under the reservoir?

A That seems to be the indication at the presenttime, yes, sir.

Q Now, Mr. Christie, let's speak for a moment, if you will, in simple terms, so I can understand it, about the characteristics of a water-drive reservoir. You have, do you not, what would be, let's say, in the form of an inverted saucer or bowl, or something that serves as a trap for the oil coming up under-

neath it -- that type of structure?

A That's about as simply stated as you could state it, yes, sir.

Q To keep it simple, as I say, so I can understand it. And underneath that, you have a level water table?

A Presumably, yes, sir.

Q Now, the thrust or drive comes from the -- the water drive comes from the water pushing up the oil, is that what happens?

A It could be, or it could be horizontally from some entrance from the side, depending on whether your acquafer -- depending on the content.

Q Well, it could be deflected by dense zones, could it not?

A I don't understand the question.

Q All right. I'll start over again. The water coming up underneath the oil, is shoving it up into this structure that has trapped the oil above it.

A Yes.

Q As your oil is removed, the water table will presumably rise, and your water table will rise right up as the oil is removed, is that what you said?

A That's right.

Q So that the wells that are located on the flank of the structure will be washed out first, will they not?

A Yes, sir.

Q And the last well to produce oil on that structure would be the well that might be situated right at the apex or top of the structure?

A That is assuming that you have the same allowable and produce the same amount out of the wells.

Q So the fellow who has a lease down on the flat of a structure had better get his oil as it goes by; otherwise, he will never get it, is that correct?

A Yes.

Q In other words, your drainage is up-structure. Is that what you would say?

A Yes, sir. He is in a very unfavorable position if he is on the edge of a structure.

Q Now, what do you mean by saying he is in an unfavorable position, other than just the location?

A Well, just as you stated -- he will be -- his tract will be washed out before the well in the higher up structure will be washed out.

Q Now, with a water drive, such as you assume to be present here, what effect does unequal permeability have on that drive?

A I beg your pardon?

Q Now, originally here, we had testified, or we had assumed a uniform permeability throughout the reservoir.

MR. VEEDER: I beg your pardon.

Q (By Mr. Adair) Now that has been corrected, and you assume continuous permeability throughout the reservoir, is that correct?

A Yes.

Q And there may be zones of low permeability, or zones of high permeability.

A Yes, sir.

Q In a water drive reservoir, what effect, if any, do those various zones of unequal permeability have?

A Well, it would depend on your rate of production from individual wells. Ordinarily, we would expect the oil to travel

through the more permeable sections easier.

Q And first?

A Easier and first.

Q Followed by water?

A Yes, sir.

Q So you would have what is known as fingering or tonguing of of water going into the reservoir?

A Well, you might have if you produced at such a rate where you have a differential in pressure. If you maintain the pressure uniformly, I think it would flush out the less permeable streaks as well as the more permeable streaks.

Q And if you have those uneven areas of permeability or unequal areas of permeability down flank with the flank of the structure, that further aggravates the down-flank lease operator's position, doesn't it?

A If you assume those conditions, I think it would, probably, yes.

Q Well, you are not willing to say that there is uniform permeability, and you think that probably there are varying degrees of permeability throughout the reservoir, is that not correct?

A Yes, that is characteristic of limestone and dolomites.

Q Now, with a water drive, Mr. Christie, let's assume for the moment that we have dense zones running through the reservoir, such as we find at the top of the reservoir. Now, what would be the effect there in a water-drive reservoir?

A Well, I don't know just what kind of an answer you want there.

Q Well, let's tie it down to our immediate problem here. Let's assume 80-acre spacing, with one well to 80 acres. And let's

assume that between the 40 that the well is located on and the 40 that goes with that well tract in order to make up your 80-acre unit, let's assume that there happens to be a dense zone or area. Now, how will the oil from the off-side of this dense zone or area, be produced through the well in a water-drive reservoir?

A Well, it may not be produced in that one particular well. It will be produced in some other well of the field.

Q And probably some other lease or fee owner, too?

A Yes, just like you would get under any spacing.

Q Well, in the situation we have assumed, the dense zone lying somewhere in the middle part of the 80-acre tract, 40-acre spacing would get at least part of the oil, wouldn't it, that moved off and was drained through some other oil well?

A Not necessarily. If the well happened to drain half that area, it might get but very little.

Q It would get some, but it wouldn't get all, if you just relied upon one well to 80 acres?

A It would probably get its -- depending on the reservoir conditions, it would probably get its share of the reservoir oil.

Q Now, Mr. Christie, you do not contend, do you, that when you say one well will drain 80 acres, you don't contend that the drainage area will follow your lease lines, or your 80-acre tract lines, do you?

A No, sir.

Q What is the shape of the drainage area?

A Well, generally, it is a radial.

Q Circular in shape?

A Circular, yes, sir.

Q So it would be a circle that would contain at least 80 sur-

face acres under the --

A (Interrupting) Generally speaking.

Q On the assumption and the rules you are asking for here, is that right?

A Correct.

Q At least 80 acres?

A Yes.

Q Now, of course, locating your well in the center of a 40 and drawing a circle around it, that would contain 80 acres, why, you are going to take in some of your neighbor's land around, aren't you?

A Yes, sir.

Q You are going to drain some of your neighbor's oil?

A Just like any other well will drain some of your neighbor's oil, yes, sir. That is the primary reason for a -- for uniform spacing, is to allow everyone to get his share of the oil.

Q In other words, we will assume then, a series of over-lapping circles, of circulating over-lapping circles of drainage throughout the field?

A Yes.

Q If you get some of your neighbor's oil, and your neighbor gets some of yours, it all balances out, is that your assumption?

A Yes, sir.

MR. ADAIR: If the Commission please, we have here an ownership map of this particular area. It may or may not cover more land than the map we had here this morning. I've lost mine during the noon hour. But it has the wells located thereon and we tender it here to Mr. Christy, since it has not

been marked --

COMM. SHEPARD: (Interrupting) All right.

Q (By Mr. Adair) Mr. Christy, what is the last well Amerada completed in that reservoir?

A State B.T.D. No. 1.

Q Will you take a pencil, please, and draw around that well the area you think will be drained by this particular well?

A Roughly will be satisfactory?

Q Yes, sir, unless you --

A That's too large, isn't it?

Q Make any changes you wish.

A No, that is it, roughly.

Q That is roughly the area you think will be drained?

A We will assume, roughly, an 80-acre circle.

Q Well, this morning you said at least 80 acres and it might be -- might drain more?

A Yes.

Q Are you going to confine yourself at this time now to 80 acres?

A If all the wells in the field are spaced on 80 acres, it will be confined more or less to 80 acres.

Q Now, this morning -- do you mind if we put this up on the board? (Done). This morning, Mr. Veeder testified that the highest well in the field, I believe, was this well located here. (Indicating). Can you see, Mr. Veeder?

MR. VEEDER: Yes.

Q (By Mr. Adair) And that the next highest well in the field was, I believe, the T.P. well located here, Texas-Pacific well No. 1. That the next highest well in the field was Amerada's B.T.A. well, and that the lowest well in the field was Amerada's

B.T.D. well. So we see, do we not, that coming down this line here from Texas-Pacific B.1 well, to Amerada's B.T.D. well, we are going down-structure, is that correct?

A Yes, sir.

Q And I believe you testified that the drainage of oil was up-structure in a water-drive reservoir such as you assume this to be.

A I didn't say drainage. The migration is up-structure.

Q Would you say that of the final drainage area of this down-structure unit, that more of the oil will come from down-structure than will come from up-structure?

A Depends in which direction your water-drive is coming from.

Q We here have assumed, have we not, a level water table?

A That is correct. Also assume that we have an aquafer out from the field somewhere supplying the water and that will be the direction of your water drive.

Q You have no information on that?

A No, we do not have, at least, I do not know which direction the water drive is from.

Q It could be coming from this direction (indicating) as well as from any other point on the compass, couldn't it?

A Well, as far as my knowledge is concerned, it could, yes, sir.

Q This direction -- I'm moving in towards the northeast. So in such a case, if your water drive is coming from this direction, and you cannot say it is not, -- most of the oil produced by the B.T.D. well is going to come from down-structure, isn't that sound engineering?

A Assuming that the water drive is from that direction, yes, sir.

Q So in that case, if you were called upon to define the drainage area of this B.T.D. well, you would move your circle south, that is, in a southwest direction, or drop it south. You drop it down-structure?

A Well, I am not concerned with what area this particular well would drain; I am concerned more with how much oil that well will get from the reservoir as a whole.

Q Unfortunately, Mr. Christy, you have to adjust the relative rights as I understand it, under the New Mexico law, based upon giving the land owner a fair share, to produce the recoverable oil under his land, is that correct?

A Well, that is a legal question apparently.

MR. KELLOUGH: Just a minute, please. He is arguing the law with the witness now, and he has got to know just exactly what it is. I don't think it is fair to this witness to argue the law with him, New Mexico law, on the point. That may be a matter which we can discuss at the time.

COMM. SHEPARD: You shouldn't ask any more legal questions of the witness, Mr. Adair. Confine yourself to engineering questions.

Q (By Mr. Adair) So actually, assuming the facts as we have heretofore stated them, your area of drainage drawn around this B.T.D. well, would show more oil coming from down-structure up to the well than would come from up-structure down to the well?

A Theoretically, yes, sir, if your water drive is from that direction.

Q In such case, then, Mr. Christie, the owner of these two leases would be afforded a better opportunity of recovering the oil under his tract if he drilled his wells up within 330 feet of the lease lines?

A Well, he would so far as the north edge of those leases are concerned; but on the other hand, if he drilled within 330 feet and crowded the field, he wouldn't be entitled to as much oil.

Q Well, now, isn't that last statement a conclusion? We'll let it end for whatever it is.

MR. ADAIR: I have no objection. That's all we have of this witness.

REDIRECT EXAMINATION

Q (By Mr. Kellough) Mr. Christie, adopting the assumed set of facts which Mr. Adair assumed, which is that there is a water drive going north by east, wouldn't the same drainage characteristics apply to the Texas-Pacific Coal Company well farther up the assumed dip?

A If they drilled a well, yes, sir.

Q Is it not true in any water-drive reservoir that there are locations which will be more productive than others in the field?

A Yes, sir.

Q Can you say as an engineer that in any oil field or, particularly in any water-drive field, that each and every lease will recover the same amount of oil as each and every other lease?

A We have no way of controlling the oil underneath the boundary line, though we have ways of controlling oil by the mechanics of the reservoir. It makes no difference whether the spacing is 10 acres, 20 acres, 40 or 80. We will continue to get the share of the oil in the reservoir and not underneath any particular lease, depending on the mechanics of the reservoir.

Q Would it seem to you, then, as an engineer, reasonable to

assume that a spacing program should not attempt to equalize recovery by surface acreage, but should, as much as possible, assure that each owner recovers the proportion of the amount of oil to which, structurally, he would be entitled to recover?

A That is correct. It would be a very involved matter to devise a formula in any type of reservoir whereby each lease owner would get exactly his share of the oil underneath his particular tract.

Q If any inequities in any material degree should be developed by future evidence, wouldn't it be your recommendation that the Commission be authorized to grant an exception and reduce the allowable, probably separately; and would that in your opinion be sufficient to assure the owners of recovering the oil to which they are justly entitled?

A Well, if they had some way of determining how much they are justly entitled to under reservoir mechanics, I think it would, yes, sir. They would have that right.

RECROSS EXAMINATION

Q (By Mr. Adair) In any event, Mr. Christie, the owner of a separate tract would be more likely to get the oil, to recover the oil under his tract with two wells than he would with one, wouldn't he?

A Well, he would get the same amount of oil, but it might be coming off of somebody else's tract; but eventually, he would get the same amount of oil from the pool.

Q Assuming continuous permeability?

A Yes, sir.

Q That is a factor in your answer, isn't it?

A Yes, sir.

MR. ANDERSON: May I ask Mr. Christie a question?

COMM. SHEPARD: Yes. Give your name.

MR. ANDERSON: Bob Anderson of Roswell, representing Malco Refineries of Roswell, New Mexico.

Mr. Christie, have you any estimate of recovery in the Devonian?

THE WITNESS: No, I haven't made those observations.

MR. ANDERSON: Well, do you think, in effect, the basic pattern can be determined before you have any idea of recovery per acre?

THE WITNESS: I don't see that recovery has any bearing on it.

MR. ANDERSON: Well, I should think it would.

THE WITNESS: Except from an economic standpoint.

MR. ANDERSON: Well, that, I should think, would be one of the Commission's principal concerns. In other words, the principal reason, I should think, for increasing the acreage pattern would be to make it economically feasible. In other words, if the wells are not commercially productive on 40-acre spacing, it would be necessary to increase the pattern so that it can become commercially productive. There might be a saving of the oil and of course, the Commission and everybody is interested in conservation. But there is a question, too, will the wells be profitable? I think the testimony is 190 feet of pay and with the water drive, that recovery from acreage is very, very, -- substantially much higher in most fields in New Mexico. The 40 acres would not, for instance, be necessarily profitable, or more profitable than if you had less cost of development per acre.

MR. KELLOUGH: If the Commission please, I'm sorry I'm not acquainted with the gentleman. He is testifying, and if

he has an interest in this area, if his company does --

COMM. SHEPARD (Interrupting) He's just asking a question.

MR. KELLOUGH: That is for information --

COMM. SHEPARD (Interrupting) Well, of course. Mr. Adair, do you have any more questions?

Q (By Mr. Adair) The answer is, you get the same amount of oil --

A If you get the same amount of oil, or substantially the same amount of oil, why spend from $225,000.00 to get it, which the public eventually is going to have to pay for.

COMM. SHEPARD: Any further questions?

MR.KELLOUGH: No.

MR. McCORMICK: Do you rest?

MR. KELLOUGH: Yes. If the Commission please, we rest, with the privilege of calling a rebuttal witness, if we may have it.

COMM. SHEPARD: All right. We will take about a five or ten minute recess.

(Whereupon, at 2:25 o'clock, P.M., a recess was taken, the hearing being re-convened at 2:35 o'clock, P.M.).

COMM. SHEPARD: The meeting will come to order.

At this time, I want to introduce Governor Mabry. (Applause).

GOV. MABRY: Thank you a lot.

MR. ADAIR: If the Commissioner please, our witnesses have not yet been sworn.

COMM. SHEPARD: Will you swear them, Mr. Graham? (Done). You may proceed, Mr. Adair.

MR. ADAIR: Thank you, sir.

G. R. CARTER

being first duly sworn, testified as follows:

DIRECT EXAMINATION

Q (By Mr. Adair) Will you state your name to the Commission, please?

A G. R. Carter.

Q Where do you live, Mr. Carter?

A Midland, Texas.

Q By whom are you employed?

A Texas-Pacific Coal and Oil Company.

Q What capacity?

A Division Geologist.

COMM. SHEPARD: Speak louder, please.

Q (By Mr. Adair) Will you state briefly your training and experience as a geologist?

A I am a graduate from the University of Oklahoma, have a Bachelor's Science Degree in geology. I have worked as a geologist for 13 years, eleven and a half of those being for the Gulf Oil Corporation, and since 1947, for the T.P. Coal and Oil Company.

Q In your position as a geologist for Texas-Pacific Coal and Oil Company, are you familiar with the area known as the Bagley-Area in Lea County, New Mexico?

A I am.

Q Does Texas-Pacific Coal and Oil Company own leases in that area?

A They do.

Q How many different or separate leases do they own in the Bagley area?

A They own three.

MR. ADAIR: At this time, Mr. Commissioner, I offer in evidence photostatic copies of three leases, mentioned by Mr. Carter, and the purpose for putting them in evidence will be apparent when I ask Mr. Carter this next question.

Q (By Mr. Adair) Mr. Carter, do you have a 40-acre tract in the Bagley Area that is covered by a single lease?

A Yes, we do.

Q And that lease in turn covers additional acreage not located within the Bagley Area?

A That's right.

MR. ADAIR: If the Commission please, I offer these in evidence.

MR. KELLOUGH: No objection.

COMM. SHEPARD: They will be admitted.

(Tex.-Pac. Exhibit No. "B" was received in evidence).

MR. McCORMICK: Which 40-acre tract is that?

MR. ADAIR: The SE¼SE¼ of Section 1, 12 South, 33 East.

Q (By Mr. Adair) Mr. Carter, I now ask that you turn around and face the board. I now refer you to the plat on the lands, the plat on the board, which is marked, Texas-Pacific Coal and Oil Company's Exhibit "C", and ask you to explain, please, what that plat is.

A That is a lease ownership plat. The red indicates the leases held by the Amerada; the yellow, leases by the T.P. Coal and Oil Company; and the brown, leases on other companies.

Q I refer you next to the plat immediately to the right, which is marked, Texas-Pacific Coal and Oil Company's Exhibit "D", and ask you what that plat represents?

A That is a mineral fee ownership plat, the blue indicating the

state owned leases, the yellow or orange, the federal leases, and the green, individual leases.

Q All right. I refer you next to the plat that is located immediately to the right of the mineral ownership plat, and ask you what that plat represents? It is marked Texas-Pacific Coal and Oil Company's Exhibit "E".

A That is an interpretation on the geology on top of the Glorieta Sand in the Bagley Area.

Q Now, when you say that is an interpretation, you do not mean that you will -- that that is the way it actually exists under the ground, but in your opinion, that is a reasonable interpretation, is that right?

A That's right.

Q Based upon the wells that have now been drilled?

A That's right.

Q I refer you now to the plat located immediately below, and marked, Texas-Pacific Exhibit "F", and ask you what that represents?

A That is a contour map of the Bagley Area as interpreted on the top of the Pennsylvanian Formation.

Q There again, you do not mean that that is exactly as the conditions in the Pennsylvanian formation will be found underground, but that is a reasonable interpretation, in your opinion, based upon the wells that have now been drilled in the area?

A That's right.

Q I refer you to the plat remaining on the board, marked Texas-Pacific's Exhibit "G", and ask you what that plat represents?

A That is an interpretation of the geology in the Bagley Area as contoured on the top of the Devonian, I mean, to the base of

the black shale.

Q Which Amerada calls the top of the Devonian in testimony here in this hearing?

A Right.

Q Now, there again, Mr. Carter, I ask you whether or not you say that is exactly the way the contour of the Devonian formation will be after the field is drilled up?

A That is not. It is merely an interpretation from the data we now have.

Q In your opinion, it is a reasonable interpretation?

A Right.

Q Is there any portion of that contour there about which you can feel reasonably certain?

A I can feel reasonably certain in the immediate area between these wells, extending from T.P. State B, down through and including the Amerada No. 1 Caudle well.

Q Now, also referring you to the same map, Exhibit "G", what does that blue line which follows closely the red line around the contouring, indicate?

A That is our estimate of the water level.

Q Found in the Devonian?

A Yes.

Q That assums a level water table?

A Yes, sir, that's right.

Q And that also would mark -- according to that contouring interpretation -- that would mark the limits of production where you have it contoured?

A That's right.

Q In the Devonian?

A That's right.

MR. ADAIR: If the Commission please, we offer all these

plats in evidence.

COMM. SHEPARD: They will be accepted.

(Tex.-Pac. Exhibits Nos. "A", "B", "C", "D", "E", "F", and "G", received in evidence).

MR. McCORMICK: I would like to ask who made these interpretations, you?

THE WITNESS: The geologist in the Ft. Worth office and myself.

MR. McCORMICK: Under your supervision?

THE WITNESS: Yes.

MR. ADAIR: Any other questions, Mr. McCormick?

MR. McCORMICK: No.

MR. MORRELL: May I ask a question of this witness?

MR. ADAIR: Yes.

MR. McCORMICK: Wait until he is through, Mr. Morrell.

MR. ADAIR: I have no objection.

MR. McCORMICK: I think it is better order to wait until after you are through entirely.

Q (By Mr. Adair) How many wells has Texas-Pacific Coal and Oil Company completed in the Devonian reservoir in the Bagley Area?

A The Texac-Pacific Coal and Oil Company has completed one.

Q Will you give the geological data to the Commission on that one well?

A The well was completed November 23, 1949, total depth 10,914, with base of the black shale being encountered at 10,721 feet. Based on Schlumberger interpretation, we considered the top of pay encountered 10,770 feet. The well was drilled to 10,824

and a core taken from 10,824 to 874, an interval of 50 feet, of which 47 feet 2 inches were recovered. The well was then cored from 10,874 to 914, an interval of 40 feet, of which 39 feet were recovered. Drill stem tests in the bottom from 874 to 914 showed flowing production, and the well was acidized with 500 gallons of mud acid and 5,000 gallons of regular acid, completed with an initial potential of 2848 barrels, or at the rate of 202 barrels per hour.

Q Did you mention what the casing size was?

A This well was drilled to a total depth of 10,914, and casing was set at 10,765 feet. That was 7" casing.

Q So that if it is necessary to go back into the well, you have a large enough casing to do so?

A That's right.

Q And drill deeper or otherwise?

A Right.

Q Do you have a Schlumberger log of this well?

A I do.

MR. ADAIR: If the Commission please, we offer in evidence the Schlumberger log covering Texas-Pacific Coal and Oil Company State B 1 well, concerning which Mr. Carter has been testifying.

EXAM. SHEPARD: It will be received.

(Tex.-Pac. Exhibit No. "H" was received in evidence).

Q (By Mr. Adair) Do you have a core analysis? Did you have a core analysis made, Mr. Carter, of any part of that core recovery that you have?

A Yes. we cored from 824 to the total depth of 10,914, two cores on which I stated the recovery, and the upper 13 feet of

137

the core from 824 to 874 was analyzed; and all of the core from 10,874 to 914 was analyzed.

Q Is that the core graph?

A It is.

MR. ADAIR: If the Commission please, we offer that in evidence.

COMM. SHEPARD: It will be received.

(Tex.-Pac. Exhibits Nos. "I", "J", "K", "L", were received in evidence).

MR. McCORMICK: Will you have him explain in lay terms just what that core graph shows?

THE WITNESS: The core graph was made by the Rotary Engineering Company of Midland, and it shows the porosity, the permeability on this side, the green being the oil saturation and the red the water saturation in the core.

Q (By Mr. Adair) Now, referring to that core graph, you have varying degrees of porosity and permeability, do you not?

A That's right.

Q Going all the way from dense which would mean impermeable?

A That's right.

Q Insofar as oil is concerned at least, to a permeability of some 170 millidarcies?

A That's right.

Q Now, permeability is generally measured in millidarcies, is that right?

A Right.

Q You have a porosity running all the way from within -- what ranges?

A Porosity ranges from as much as 7 -- no, that's in the upper portion. The upper core shows from 7 percent to approximately 1 percent.

Q Porosity 7 percent to 1 percent?

A The lower section shows from -- the minimum appears to be approximately 3 percent and the maximum 12 percent.

MR. McCORMICK: How does that compare with other pools?

THE WITNESS: Well, I am --

MR. McCORMICK: (Interrupting) I mean, is it good or bad or medium, or what, so far as porosity is concerned?

THE WITNESS: I would say it is approximately average in the type of reservoir that we have here.

MR. McCORMICK: Approximately what?

THE WITNESS: Approximately average for the type of reservoir that we have here. It might be a little higher than average.

MR. McCORMICK: That is the porosity?

THE WITNESS: Yes.

MR. McCORMICK: And the permeability, is that higher? Higher than the average?

THE WITNESS: Well, I am not in a position to give those -- I just don't know. Porosity is in portions.

Q (By Mr. Adair) You qualified your answer by saying it is higher than average in porosity in portions?

A Yes.

Q Now, why did you say that?

A Well, for instance, in dealing with Andrews production, you have got a different type of porosity than you have got in this well in this area.

Q Well, now, referring to this particular well, why would you say that in portions only it was higher than average, or was average? Do you or do you not have a dense zone in your coring in this well?

A We did, extending from 10,830 to 10,874.

Q And by dense you mean there was absolutely no oil or no porosity or permeability within that zone?

A That's right.

Q Do you have with you a copy -- I mean, a portion of the core that was taken out of that dense zone?

A We do.

Q Now, you actually had a portion of this dense section analyzed, did you not?

A Yes, we did, from 830 to 824.

Q What were the results of that analysis?

A It showed no permeability, and porosity of 1 percent or less, and water saturation up to 30 percent.

MR. ADAIR: If the Commission please, we offer this core in evidence.

COMM. SHEPARD. It will be accepted.

(Tex.-Pac. Exhibit No. "M" was received in evidence).

Q (By Mr. Adair) Now, in addition, do you have a piece of the core that was taken out of the bottom of the hole?

A That's right, production 10,913 feet.

Q And you said -- this is the core I have in my hand?

A That's right.

Q And you said this particular area was analyzed, did you not?

A Right.

Q What did that show with reference to porosity and permeability?

A Porosity approximately 6 percent and permeability of about 12 millidarcies.

Q Would you say that was more or less than average for this

type of reservoir?

A Well, based on this core graph, I would say it was less.

Q In other words, based upon the core graph which you have in front of you, it would appear the formation was tightening up down where you bottomed your hole?

A That's right.

MR. ADAIR: We offer this in evidence.

COMM. SHEPARD: It will be received.

(Tex.-Pac. Exhibit No. "N" was received in evidence).

Q What are these black flakes or streaks in this core, Mr. Carter?

A That is black residual material with flakes of some shale in it.

Q Is that shale permeable?

A It is not.

Q In any event, based upon your coring of this Texas-Pacific B 1 Well, you have found that the reservoir is intercepted by a thick, dense zone and in those portions of the reservoir that are permeable, the permeability varies to a great degree, is that correct?

A That is right.

Q And based upon what you have found in this well, and based upon your comparison of the Schlumbergers of this well and Schlumberger survey of the Amerada B.T.A. No. 1 well, would you say that it is likely that Amerada drilled through a similar dense zone in that well?

A That is possible.

Q In other words, you found coring kicks which you thought you could possibly correlate, or could be correlated?

A That's right. Now, based on those kicks, I don't think they would have had quite as thick a zone, but I do think there was a dense zone in the upper part.

GOV. MABRY: We can't hear.

THE WITNESS: Based upon the interpretation of the Schlumberger, I do not think their zone was possibly as thick as we had in this well, but I do believe that there was a dense zone in the upper part of their reservoir.

Q Of their pay section?

A Right.

Q Now, it doesn't make any difference, does it, how thick this dense zone is, if it is present it is sufficient to stop the migration of oil or the flow of oil, is that correct?

A That is right, if it is present.

Q Mr. Carter, I will ask you what this exhibit is here, that has been marked Texas-Pacific Exhibit "O"?

A That is an overlay contoured on top of the Devonian, the copy of the map, the contour map that is shown as Exhibit "G".

MR. ADAIR: We offer that in evidence.

COMM. SHEPARD: It will be received.

(Tex.-Pac. Exhibit No. "O" was received in evidence).

Q (By Mr. Adair) I will ask you, Mr. Carter, to place that overlay over the lease ownership map that is marked as Texas-Pacific's Exhibit -- what is the exhibit number on that, Bob?

MR. SCHAEHLE: Exhibit "C".

Q (By Mr. Adair) -- Exhibit "C". Now, your overlay is -- your contouring on this overlay, as you said, is exactly the same as you have it here?

A That's right.

Q And you said when this was offered in evidence, that this is not what you guaranteed that would be found down in the Devonian reservoir, but was a reasonable interpretation of it, as a geologist, based upon the information you have from the wells now drilled in the reservoir, is that right?

A That is right.

Q And you further said that you did feel fairly definite and certain about that portion of the contour map which extends from Texas-Pacific B 1 well down to Amerada Caudle well?

A That's right.

Q That is because you have more controls in that area?

A That is correct.

Q Now, assuming such a situation, without saying that it is so, as is indicated upon this contour map, what do you find with reference to these leases located along this area that I am now drawing within the lines 67-50 contour?

A That would indicate to me that in that band of contours between 6700 and 6750, there would be a possibility of 50 feet of pay within that band in the Devonian reservoir.

Q Going down to what?

A Water.

Q To water?

A Yes.

Q And all leases lying outside this blue band, assuming the correctness of this interpretation, would be dry?

A That's right.

Q All right. Now, let's move this overlay and place it over the mineral fee ownership. (Done). Now, the same would hold true, of course, on that, that the leases outside the blue line or water line would be -- would probably be dry, and the

leases inside would have a chance to produce?

A That's right.

Q Now, applying this contour map to this area right here, what do you fine? First, before you answer that -- there are a lot of little circles on these maps. What do they mean?

A They represent the proposed pattern of the Amerada, for the proposed pattern of spacing.

Q All right. Now, placing this overlay on this map and tracing these contours that we have talked about, and assuming they are no more than an interpretation, but they are an interpretation, what do you find here in the N½NE¼ of Section 2?

A I find that well would be too low to produce in the Devonian.

Q While this tract here, which would be next to it, would produce in the Devonian?

A It could possibly produce. It would be higher than that structure if that interpretation is right. It could produce.

Q It could produce in the Devonian?

A Yes.

Q Now, coming down to this area down in here, what do you find with reference to this 80 acres, this 80-acre unit, which is the E½NW¼ of Section 11?

A I find that based on that interpretation, that the NE¼ of that quarter would have a chance of production in the Devonian, whereas on the center leases in the 40, the SE¼NW¼ would be out of the picture.

Q In other words, following the pattern proposed here at that particular 80-acre tract, you would get a dry hole, while you would have a chance to get an oil well by moving up here?

A That's right.

MR. VEEDER: May I ask a question?

MR. ADAIR: Surely.

MR. VEEDER: I would like to ask Mr. Carter what control he has for contours over here. (Indicating). You have a control here, whereas your control for your contours --

THE WITNESS (Interrupting) That was based on spacing of controus, keeping the same spacing that you would in an area where you definitely do have control.

MR. ADAIR: Mr. Veeder, it may save some time if you will wait until I finish with Mr. Carter, and then ask him any way you want to.

Q (By Mr. Adair) You don't say, Mr. Carter, that this falls off this way for sure, do you?

A No, that is just my interpretation.

Q But you do say it falls off somewhere?

A Right.

Q And some way over here? (Indicating).

A Right.

Q And you do say that through here, you are fairly certain of your work?

A That's right.

Q Let's take the overlay off and place it upon the map on which Mr. Christie drew the circle there. (Done). Now, Mr. Carter, this circle was assumed by Mr. Christie in a rough manner, to represent the drainage area of the State BTD well No. 1. Now, looking at that circle through the overlay, and looking at the fixed- pattern location, which is right there in the S½ -- it is not on the map, so we will put it there. You find, do you not that by fixed-pattern spacing, you will get a dry hole down here, whereas actually you would get some oil up here?

GOV. MABRY: Better identify your location there.

MR. ADAIR: Yes.

THE WITNESS: SE¼NE¼, Section 11, based upon that interpretation, would not produce. It would be dry in the Devonian, whereas, the NE¼NW¼ of Section 11, based on this interpretation, would have a chance for production in the Devonian.

Q (By Mr. Adair) And B.T.D. well would drain some oil from underneath this tract to which you have referred, which will not be compensated for along the lines that Mr. Christie talked about, by draining on fixed-pattern spacing?

A I believe that's right, providing that is his interpretation of unitization. I think that's right.

Q All right, Mr. Carter. Will you come back around. Now, Mr. Carter, I refer you here to what has been marked as Texas-Pacific Exhibit "P", and ask you what that represents?

A That is a cross section from southwest to northeast, through the Amerada Caudle, the Amerada B.T.D., the Amerada State B.T.A., Texas-Pacific Coal and Oil Company, State B 1; and east to the Mid-Continent State No. 165, Pennsylvanian producer.

Q Now, that cross section is cut across the line that is shown in blue in Texas-Pacific Exhibit "O", -- that piece of acetate there?

A That is true.

Q The line runs from "A" to "A" prime, and on the piece of acetate is a red line of that cross section?

A That's right.

Q What do these colors across the top represent?

A Those colors indicate the ownership lease, ownership in the Bagley Area, the red being the Amerada acreage, the organge or the yellow, the Texas-Pacific, and the brown, the Mid-Continent.

Q The next colors across the exhibit, what does that mean?

A That is the fee ownership, or mineral ownership.

Q Explain that, please.

A The orange is the federal; the green, the individual; the blue, the state.

Q And the brown lines running down through the exhibit, what do they mean?

A They are property lines.

Q Separating the various leases and/or mineral fee ownership?

A That's right.

Q Now, will you explain what these various interpretations down this way mean?

A The base of the dark blue and the top of the light blue is the top of the Pennsylvanian formation, as interpreted by us, by the T.P. Coal and Oil Company. The blue is all Pennsylvanian down to this point, which is the top of the Mississippian line. This next zone is the top of the black shale at the base of the Mississippian line; and this line is the base of the black shale, or, as I believe from the testimony this morning, is considered the top of the Devonian by the Amerada.

Q What have you considered the top of the Devonian in this interpretation of this c ross section?

A I have considered the base of the black shale.

Q No, I mean, what you considered the top of the Devonian?

A Well, I have considered it down within, below the base of the black shale, based on sample interpretation and electric log interpretation.

Q I simply point that out as there is some difference between you and Amerada's geologist in picking the top of the Devonian strata. The area delineated in red down at the base of our map

is the area which the Amerada has considered as the pay section through the well, is that right? You heard their testimony?

A I believe -- I wouldn't know whether that exact top is the top of their considered pay.

Q Will you go over to the Texas-Pacific B 1 well; and you find a box down around the bottom of it. Will you explain that box and explain the enlargement?

A This is an enlargement of cored section of the State B well, in other words, from a depth of 10,824 feet to a depth of 10,914 feet.

Q Just a minute. You don't mean to say all of this was cored? Your coring actually started somewhere in here?

A Yes, it was from a depth of subsea datum 8651 to a depth of minus 6755, is the way we considered the water level.

Q That is assuming a uniform level water table throughout the field?

A That's right.

Q What does this greyish colored area represent?

A Dense zone, which we cored from 10,830 to 10,874.

Q And which, from the interpretation of Schlumberger logs, you feel was found in Amerada's log to possibly some lesser extent?

A Possibly so.

Q In the B.T.A. No. 1 well?

A Yes. There is a kick that is indicative that it could be the same zone -- same dense zone as we found.

Q And I believe you testified, did you not, Mr. Carter, that from your information, your examination of the well sample, the sample log, as well as your examination of the core and core analysis, that there was no uniform permeability through-

out the pay section?

A Yes, that is based primarily on the cored section, plus the interpretation that was put on the electric log as seen opposite that core section.

MR. ADAIR. All right. We wish to offer this in evidence.

COMM. SHEPARD: It will be admitted.

(Tex.-Pac. Exhibit No. "P" was received in evidence).

MR. ADAIR: That is all.

CROSS EXAMINATION

Q (By Mr. Kellough) Mr. Carter, since you have the cross section on top, I want to ask you a question about that. With reference to this box arrangement here, if it perforated the whole section you could recover the oil from both of those areas indicated in red, could you not?

A You could recover it opposite those preforations in those red zones. There will be no object in recovery in the dense zone.

Q You are not contending that you need to drill an extra well in order to cover this by one well, and this by another well, are you?

A No, sir.

MR. McCORMICK: You are referring to Exhibit "P", for the record.

MR. KELLOUGH: For the record, I might state, the two zones I was referring to are shown in the box in red.

Q (By Mr. Kellough) Now, referring to Exhibit "E", this I believe you stated was a contour of the Glorieta Sand?

A As we interpret it, it is a contour of the Glorieta Sand.

138

Q That is not the Devonian?
A No, it is not.
Q And that is not a sand or formation that is involved in this hearing here, is that right?
A No, sir.
Q I also refer you to exhibit marked "F", that "F", I believe you stated was a contour of the Pennsylvanian formation?
A That's right.
Q And that is not the Devonian?
A No.
Q And that is not any formation referred to in this proceeding?
A That's right, so far as I know.
Q You also introduced in evidence a core analysis of T.P. well.
A That's right.
Q And I understood you to state that core analysis did not show a uniform porosity or permeability of the reservoir, is that correct?
A That is correct.
Q But did you also state that it did not show any continuity?
A I did not state that.
Q And I believe you testified that the core analysis showed a condition which is characteristic or average, I believe, was the word you used, of all Devonian Pools?
A To my knowledge.
Q To your knowledge, and in certain parts it was superior, I believe you testified?
A What?
Q And in certain sections it was superior?

A That's right.
Q Now, referring to Exhibit T. P. "O", which you interposed on Exhibit "B" and on the two exhibits showing the royalty and lease ownership over on the board. It is true, is it not, that in any oil field, regardless of the spacing pattern, that you will also have edge wells?
A I'm not --
Q (Interrupting) You will always reach the edge of pools at some time?
A I'm not a reservoir specialist. I'd rather not answer the question. I would rather that would be referred to an engineer.
Q Well, you have testified with reference to the drainage of this well, have you not?

MR. ADAIR: He testified with reference to the drainage area as delineated by Mr. Christie.

Q (By Mr. Kellough) Can you explain to the Commission how any spacing pattern will prevent a well from draining across a lease line?
A No, I can't.
Q It is not your position that a spacing pattern should be developed and based according to surface ownership, is it?
A Will you state your question over?
Q Are you taking the position that a spacing pattern should be developed according to lease ownership?

MR. ADAIR: If the Commission please, I don't believe the witness has taken any position with reference to that at all. If Mr. Kellough wishes to make him his own witness in that matter, it is perfectly all right. But I wish to call the attention of the Commission to the fact that he has not testified on that point at all.

GOV. MABRY: Well, he is probably entitled to ask him.

He is testing his conclusions as a geologist.

MR. ADAIR: All right, sir.

A You are asking if I am in a position to testify that those spacings should be placed on surface-acreage pattern, is that the way you worded it -- surface spacing?
Q In your testimony, I believe you endeavored to show, and prepared a number of exhibits to show that according to the spacing pattern which is being asked for at this hearing by the applicant, that it would result in the drilling of certain dry holes?
A That's right.
Q And also by the preparation of these exhibits and by the reference of counsel to the drainage area shown, you also, as I understand your testimony, infer or attempt to leave with the Commission the impression that a well will drain some oil from under somebody else's lease?
A In that instance, it would drain some oil from under somebody else's lease.
Q Now, then, will you explain to the Commission first, how you can avoid drilling dry holes by arranging the spacing?
A By structural position, if you have correct structural position. I'm not saying you won't drill dry holes, because all this is, is an interpretation up here. It was not exactly brought out, but using that as a basis, and if that be fairly correct, then wells drilled within -- outside of the blue line zone here, in all probability would be dry. They would be too low, assuming you have a level water table.
Q That's right. Now, that location you referred to of the proposed leases in the E½NW¼ of Section 11 --
A (Interrupting) That was the location south?

Q South of the water line.
A Yes.
Q And you testified that a well drilled in that location would, in your opinion, result in a dry hole?
A If my interpretation of the structure is right.
Q Now, you heard the testimony of witnesses for the applicant this morning?
A Yes, sir.
Q Now, in your opinion, is there anything in their testimony which would prevent, if those circumstances are true, the drilling of a well in the N½ of that particular unit?
A I'm not familiar -- I haven't looked at the map this morning, on the north-south line-up that you had, and what your exceptions were going to be on the east-west line there. You said there would be some specific exceptions there.
Q Did you hear the testimony that in event of -- for good cause shown, and an exception is subsequently desired, that it was our recommendation that such an exception be allowed by the Commission?
A I did.
Q And did you not hear the further testimony that in that event, it was our recommendation that the Commission, under the facts which then exist, determine to what extent the allowable should be reduced?
A That's right.
Q Now, is it your position that a unit, whether it be 40 acres or 80 acres, which contains non-productive acreage, should receive the full allowable?
A In that particular instance where you have got a 40-acre unit, the low water table as assumed, and with structural in-

formation to definitely confirm that, I would not think so. But that would be contingent upon information that would show that.
Q Then, it is your opinion that if a unit does contain non-productive acreage, it should receive a reduction in allowable, am I correct in that statement?
A Well, if you are -- as you have implied, we will assume the 80 acres for a well. I would think that the 40 acres -- all this is contingent upon the fact that the structural position would show that the other 40 acres was definitely out -- would be definitely dry.
Q Now, assuming that to be true, would it be your contention that a unit containing 40 acres of non-productive and 40 acres of productive, should receive a full allowable? Do you contend that should be done?
A In other words, you are asking me --
Q (Interrupting) I'm asking you if you should reduce the allowable because there is any non-productive acreage within a unit.

MR. ADAIR: An 80-acre unit?

Q (By Mr. Kellough) Either 40 or 80-acre unit.
A If there is any -- whether the allowable should be reduced?
Q That's what I'm asking you, assuming, you know, that it is non-productive?
A I wouldn't think so. I wouldn't think that it should be reduced.
Q You would think that an operator or a person is entitled to receive the same amount of oil?
A That's right.
Q From a unit which is in part non-productive and is a person

who has a well upon a unit all of which is productive, is that your testimony to this Commission, is that correct?
A That is correct.
Q All right. Now, then, if this field pool were developed on 40 acres, would there be any unit that would be partially non-productive?
A There probably would be. I would have to throw up that acetate and see. I would like specific instances.
Q Well, as a matter of fact, there would be, wouldn't there?
A Well, there probably would, but I don't know. I mean, I would rather have a specific instance there that you would like to ask me about -- my opinion.
Q I'm asking you whether, under the structure, your map which you have prepared, if that was developed on 40 acres, would there be any unit which would contain in part non-productive acreage?
A Based on that, this portion would right here (indicating), of that 40 acres.

GOV. MABRY: The witness said, "right here," pointing his finger at something.

THE WITNESS: It is the E½SE¼NW¼ of Section 1, 12 South, 33 East.

Q (By Mr. Kellough) In other words, were this developed on 40 acres, you would have some units which would contain non-productive acreage?
A That's right.
Q So that it would not correct the situation which you testified about to change the spacing pattern, is that right?
A I wouldn't think that; you would be reducing your amount of acreage that would be non-productive, whereas you would have a

chance to -- a change on State-wide rules of placing that on the 330 location, as the State-wide rules now apply.
Q Now, referring once more to Exhibit "O", as superimposed on Exhibit "B", it was the purpose of your testimony to convey the impression to the Commission that this well would drain, the B.T.D. well, from under leases owned by other parties than the owners of that well?
A That is based upon your engineer's testimony, as that being the drainage pattern.
Q Now, that would not be corrected by drilling one well to every 40 acres throughout the field, would it?
A In this particular instance, it would be corrected.
Q But you cannot correct or change the drainage in an oil field by the density of spacing?
A You cannot change the drainage, no, sir.
Q Is it or is it not your opinion that well spacing should be based upon lease ownership?

MR. ADAIR: If the Commission please. I don't believe the witness is qualified or has been qualified to answer that. He is not an engineer. He qualified as a geologist.

MR. McCORMICK: Are you qualified to answer that?

THE WITNESS: I'm not qualified as an engineer, no, sir. I think that would fall within the reservoir study.

MR. McCORMICK: Do you have anything you wish to state on this subject?

THE WITNESS: No, sir.

MR. McCORMICK: No opinion you wish to state on this subject?

THE WITNESS: None I wish to make.

MR. McCORMICK: Nothing you could back up, is that right?

THE WITNESS: That's right.

MR. KELLOUGH: I believe that's all. I have no further questions.

COMM. SHEPARD: We will take a five-minute recess.

(Whereupon, at 3:30 p.m., a recess was taken, the hearing being re-convened at 3:40 P.M.).

MR. SPURRIER: Are you ready?

MR. ADAIR: If the Commission please, I had one or two more questions of Mr. Carter.

REDIRECT EXAMINATION

Q (By Mr. Adair) Mr. Carter, I'm afraid you might have left the wrong impression in answer to Mr. Kellough's question awhile ago. Is there or not continuous permeability through the pay section of the Devonian reservoir in the Bagley?
A There is not, based on the dense zone we have found.
Q Second, do you as a geologist, see any reason why you should get away from the State-wide rules at this time in the development of this Bagley Devonian reservoir?
A I see no reason whatsoever.

MR. ADAIR: That's all.

MR. McCORMICK: Mr. Morrell, do you have a question you wanted to ask Mr. Carter?

MR. MORRELL: I wanted to ask Mr. Carter, why the bulge in the south end of the structure as you had interpreted it?

THE WITNESS: On the Devonian?

MR. MORRELL: On the Devonian.

THE WITNESS: You pull it down from the B.T.D., with a subsea datum amounting to minus 6615, to the Caudle amounting to minus 6749. The spacing is coming off from here (indicating) to here, and increases down this way, which necessitates pull-

ing the contours down to make this point.

MR. MORRELL: Is that the -- that is a mechanical interpretation? It doesn't necessarily follow the geological evidence?

THE WITNESS: Well, Mr. Morrell, I don't know whether I understand you or not.

MR. MORRELL: Did you generally find the structure with a bulge on one end of your closure to the high as the limit?

THE WITNESS: That's right.

MR. MORRELL: Normally, as you go down-structure, that same elipse would be reflected?

THE WITNESS: I think this is the most conservative manner of contouring.

MR. MORRELL: Well, I would agree on that. It is ultra-conservative.

THE WITNESS: That was my statement.

MR. McCORMICK: Any other questions?

MR. KELLOUGH: No further questions of this witness.

MR. SPURRIER: Mr. Carter, just for information, of course, how did you determine this water contact?

THE WITNESS: That was based on the B.T.A. well, which, after they ran pipe, 11,200 approximately -- that I'm not positive of -- about these figures. They tested from 11,010 to 11,020, and these are rough figures. You have the figures somewhere in the testimony -- they got 4,000 feet of oil plus 6,000 -- excuse me, I mean 600 feet of water. Then they plugged back to 10,980, perforated and got all oil from, I believe it was from 956 to 80, is that right?

MR. VEEDER: No, perforation from 950 to 965 they tested there.

THE WITNESS: Anyway, the interpretation was based on tests where they got the water.

MR. SPURRIER: Then, did I understand you to say that your cores, or the core, I guess I should say --

THE WITNESS: (Interrupting) There were two cores.

MR. SPURRIER: You stopped taking the bottom core at what you considered to be the water-oil contact?

THE WITNESS: No, I didn't.

MR. SPURRIER: That was strictly a misunderstanding, then.

THE WITNESS: Yes.

Q (By Mr. Adair) Is it true that on the map here, no matter how high your hole at the bottom, above to where you assume the water-oil contact to be is represented by that dash, the red section there in the box?
A Yes, that's right.
Q And from minus 6671 to minus 6675 would be 4 feet?
A Yes, it would be four feet.

MR. SPURRIER: Thank you.

MR. McCORMICK: Any other questions of this witness? Your next witness, Mr. Adair.

R. G. SCHAEHLE

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

Q (By Mr. Adair) Mr. Schaehle, you have testified and qualified before the Commission, before, have you not?
A Yes. That is R. G. Schaehle.
Q Mr. Schaehle, I hand you here what is marked as Texas-Pacific Exhibit No. "Q". We'll put it up on the board. (Done). I will ask you to explain to the Commission please, what that

represents?
A That is a generalized or schematic section, cross section through a water-drive reservoir.
Q Based upon what assumptions, Mr. Schaehle?
A There are several assumptions to make. First, let me say this does not apply by scale to any specific area, or it does not follow this cross section. There are certain assumptions here. One, the uniform porosity and permeability throughout, which we wouldn't have here, but uniform porosity and permeability is assumed. That assumption is like taking a set of marbles, all uniform, all the same size, and you would have a number of toys exactly alike. Further, it was assumed that the oil-water level, or oil-water contact is level. On this thing then we show 5 wells through there, through property lines. In addition to that we have put an idealized faulting on one flank. That is this line here, showing an off-set. Then, you see a heavy blue line at this point. Let us say first, under initial conditions, everything above this line marked, "Water line," was oil bearing in this typicalized section; that after the period of production, the water has moved vertically in this particular section, assuming the wells are produced correctly, and after some ex-period of production, it has reached this point.
Q By "this point" you mean --
A (Interrupting) Indicated by this line, and this is the water line after period of production, and this hatching here shows that recoverable oil has been withdrawn and been replaced with water.

This section shows certain features, shows flank or moderate or edge wells exemplified here and intermediate wells, and

a crestal well.

Let me call your attention to the property line which comes down through here. This edge well is washed out. It is done, when the water level gets to here.

Q There again is the same point that is marked there on the map as what?
A As water line after period of production.
Q Now, assuming that you took this edge well, Mr. Schaehle, and assuming that it is located in the center of the 40 as proposed by these rules --
A (Interrupting) That's right.
Q Will you assume that you have moved that well up within the 330 feet of your property line and will you demonstrate and explain to the Commission what happened?
A There the well, located in the center of a 40 of a fixed pattern, it could be there, down-structure, on an 80, after it is exhausted there and done, it leaves this much oil bearing formation, this much oil, that will never be recovered by this well.
Q That is the oil that was under that particular piece of property?
A That's right. If it is ever recovered it is going to migrate across property lines, as has been testified. However, if this is moved under -- let's say 330 feet, or applying State-wide standard rules at the present time, this well will be in this vicinity when it is drawn up. That well would continue to produce until this water level has gone to this point.
Q To the point which you have marked there with your pencil?
A That's right; and they would recover in addition, this much more oil that was under this property.

Q All right, Mr. Schaehle. Now, we can see down below that the oil-bearing portion of the Bagley Area, the Bagley reservoir, as indicated in Texas-Pacific Exhibit "P" -- now does that same situation that you have been talking about, moving the well up-structure to within 330 feet of the property line, would that apply anywhere on Texas-Pacific Exhibit "P"?

A Yes, it would apply several places. This, I assume is the location being drilled, and since they are all on circles, a well is located mid-ways. This is the property line, from here to there. At this point (indicating), you would probably get additional oil to what this well can produce.

Q And that would apply anywhere --

A (Interrupting) In here, the same in here.

Q Anywhere down-structure side of the reservoir?

A Anywhere you got off the crest of the structure.

Q All right, sir. Is there anything you wish to show or explain to us with reference to this generalized cross section?

A I haven't mentioned this fault. I believe the testimony earlier in the day was probably something like this. There is an idealized fault, a text-book thing. This well drilled down on the side exhausted this volume of oil, and it was washed out, and all the rest of the time, this amount of oil, from here to there has been gone.

Q You say, "from here to there," you are talking about the oil from the east, on the map?

A From the up-throw side of the fault right here. This oil that is under this piece of property has been produced by a well somewhere up-structure.

Q In other words, the property owner will -- we are assuming that well is located in the center of a forty, and assuming that by moving 330 feet of the property line you can get on the up-side of the fault?

A That is correct.

Q That property owner under these circumstances here is losing a tremendous quantity of oil that will never be produced through his well?

A That is correct.

Q I will ask you this, Mr. Schaehle. Is there any reason as an engineer that you know of, why the Bagley Devonian reservoir should be at this time developed on any other basis, other than under the present State-wide rule?

A I do not.

Q Do you think -- in your opinion, do you believe that one well to 80 acres as proposed here will effectively drain all recoverable oil under the 80 acre tract, or under 80 acres of oil if you want to put it on that basis, in attempting to get away from correlative rights and move -- say you got Jim Doe's oil, some of his oil, and he got some of yours. In any event, one well, regardless of how it is located, will not, in your opinion, regain effectively all recoverable oil under 80 acres?

A No, it won't. It will not.

Q You base that opinion upon both the geological and engineering data that has been available to you and which you have heard here today?

A I do.

MR. ADAIR: I believe we have no further questions at this time. I would like to offer this exhibit in evidence.

COMM. SHEPARD: It will be received.

(Tex.-Pac. Exhibit No. "Q" received in evidence).

MR. McCORMICK: Any questions that anybody else has of Mr. Schaehle?

MR. ADAIR: If the Commission please, I would like at this time to make sure I have introduced all exhibits -- that all exhibits I have introduced are offered in evidence.

MR. McCORMICK: All of the T.P. Exhibits, from "A" to "Q" have been admitted in evidence.

MR. ADAIR: Thank you.

MR. McCORMICK: Mr. Adair, Mr. Spurrier wants to ask you some questions.

MR. ADAIR: Yes, sir.

MR. SPURRIER: Does the record show that you just showed that 80-acre spacing would limit correlative rights?

MR. ADAIR: No, I didn't intend to leave that impression. The impression I got from the Amerada questions and answers was that they were disregarding property lines in fixing their drainage pattern and drainage area, and I questioned whether or not that was proper.

MR. SPURRIER: Thank you.

MR. McCORMICK: Any other witnesses, Mr. Adair?

MR. ADAIR: No further witnesses.

MR. KELLOUGH: I would like a five minute recess, and I believe we would like to put on a rebuttal witness.

COMM. SHEPARD: Very well. We will have a five-minute recess at this time.

(Whereupon, at 4:00 o'clock, P.M., a recess was taken, the hearing being re-convened at 4:05 o'clock, P.M.).

COMM. SHEPARD: The hearing will come to order.

REBUTTAL

C. V. MILLIKAN

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

Q (By Mr. Kellough) Will you please state your name and occupation to the Commission?

A My name is Millikan -- initials C. V.

MR. SPURRIER: Mr. Millikan has qualified many times for the Board. It is not necessary to qualify him.

MR. KELLOUGH: All right.

Q (By Mr. Kellough) Mr. Millikan, in your opinion on this Bagley Reservoir, will one well adequately and efficiently drain an area of at least 80 adres?

A I believe it will.

Q Would you care to make any statement to the Commission in explanation of your conclusion?

A I think we have several points that indicate that it is a good water-drive reservoir. I don't believe there has been any controversy of the testimony that it is a rather -- that it is permeable, I would say more-than-average permeable reservoir. As a general rule, we find that low gas-oil ratios are present where we do have a good water drive, that in itself not being conclusive, however; but as a general rule that condition does exist.

We have a pressure there that is about equal to hydrostatic head and about normal for that depth of reservoir. We have found a good quantity of water to the side and below the oil reservoir itself. The indications, I believe, are fairly good that we have a large aquafer, although we don't have sufficient control to demonstrate it definitely. We have, also, some other pools established in that same stratographic position that is the top of the Devonian in this general area, and on two of those, I think we have evidence of a good water drive. One of those is Crossroads. I am not familiar too much with the detail of that, but it is my understanding there has been no declining pressure in the approximate year and a half that those wells have been in. I believe two of them are producing some water and the dry holes that have been drilled around them have shown evidence of an ample quantity of water. That also has a low gas-oil ratio, but not as low as is present in these Bagley wells.

This field on which we have more history is just across the state line in Texas, in which there are eight wells in the field, which has been developed on 80-acre spacing, and that pressure under an allowed of 240 barrels a day on the 31 a day allowed, did have a little decline in pressure; earlier this year when the production was reduced we had an increase in pressure, during the first eight months of this year. I think, combining all of that gives very good evidence that it is quite reasonable to expect a good water drive in the Bagley.

Q Mr. Millikan, do you have any comment which you wish to make to the Commission with reference to the testimony regarding the dense areas which appeared in the core analysis introduced by the Texas-Pacific Coal Company?

A Well, those dense areas are, I think, as they stated, not anything unusual in these Devonian reservoirs, or for that matter in lime reservoirs, or for that matter, in any reservoirs. We have areas or intervals or stratums of varying permeability, and very often the strata is of greater or lesser thickness that might not even show any presence of oil, which I believe in our examination of samples have rather consistently shown oil and I think the permeabilities have been, perhaps, too low to get any appreciable amount of oil. I think probably some of the testimony might be a little misleading regarding continuous or discontinuous, or uniform porosity and permeability. I think, it seems to me, in summing it up that there was not a clear distinction between vertical permeability and horizontal permeability.

Now, it is quite true, as was testified, I believe, by Mr. Schaehle, or Mr. Carter, or perhaps both, that where we run into these dense areas, that we probably do not have vertical permeability through those. In other words, this water that exists apparently entirely under this structure -- the water movement is not directly vertical. I don't believe the point was made clear, but I think that we do have lateral permeability through this reservoir. In the first place, that is a common thing to expect in reservoirs. We have that in all reservoirs, and I think the concrete evidence of that is the fact that we do have an accumulation of oil above water, with such evidence as we have being that it is a a relatively flat or level water table. And if we didn't have a continuous permeability through there, then how did the oil all get up there just in this, as someone referred to this morning, equivalent of a bowl turned upside down. And if we are going to have a water drive, which I think all have indicated probably exists -- and if you are going to have a water drive, you have got to have that continuity of permeability throughout the reservoir.

Q I have one further question, Mr. Millikan. Do you have any comments which you care to make as to whether the 80-acre spacing pattern, which has been proposed by Amerada, will result in a disruption of the correlative rights of the parties in the pool, which could be remedied by any other spacing program?

A I do not see that 80-acre spacing, or 160-acre spacing, or 40-acre spacing or 10-acre spacing, changes that picture at all. Certainly we have -- in any oil pool, we reach the edge of the pool, and we find certain parts, whatever the spacing unit may be, that probably lie beyond the limits of oil production, or beyond the limits of economic oil production. There may be some oil there, but it is not economic to drill. Then, that is, for all practical purposes, it becomes the limit of the pool. And there were no land lines there when that oil pool was formed. They have been put there subsequently, and they, as a general rule, are curve lines, as has been indicated in the testimony here; and regardless of the spacing, I think that those same conditions will exist. And the fact that we cannot recover all of the oil by 80-acre spacing, I don't see that it introduces any problems that wouldn't exist under any other spacing unit.

Q Then, in your opinion, the spacing pattern which we have presented here will not prevent any of the owners in that reservoir from obtaining their fair and equitable share of the oil in the reservoir?

A I think that under the recommendations that we have made here as to spacing and allocation, they will provide each operator, each land owner, each royalty owner, the opportunity to obtain his fair and equitable share of the oil from the reservoir.

MR. KELLOUGH: That's all.

CROSS EXAMINATION

Q (By Mr. Adair) Mr. Millikan, do you know what the virgin bottom-hole pressure in this reservoir was?

A About -- I believe according to Mr. Christie, it was 4261.

Q For your information, and Mr. Schaehle can verify this, the bottom-hole pressure in our well was 4390.

A What depth?

MR. SCHAEHLE: We may be able to correct that. It is -- 24 feet from total depth of State B 1, is 10,890.

THE WITNESS: Well, that would show a little higher pressure than ours, reduced to the same datum.

Q (By Mr. Adair) Well, reduced to the same datum, what would 4390 be in the B.T.A. well?

A 44 -- about 4407.

Q 4407, and Mr. Christie testified that after 4 months' production, the bottom-hole survey was run, and what was the bottom-hole pressure?

A 4247.

Q Will you subtract those and give us the drop of the pressure -- the drop of the bottom-hole pressure in 4 months' production from your B.T.A. No. 1 well?

A Now, you want the difference in pressure?

Q The drop in pressure.

A You want the difference?

Q Assuming you converted our 4390 to whatever it was for your B.T.A. well, did you not?

A I'm assuming your pressure is correct.

Q And assuming our pressure is correct.

A That would be a decline of 260 pounds.

Q In four months' production?

A And assuming your pressure is correct.

Q Is such a decline alarming?

A Not to me, because I don't believe it exists that much. Our own pressure, taking the same pressure element, gets a variation of difference in pressure in the well there on the order of a quarter and a half of a percent.

Q You don't mean to say, at the same subsea datum point in the reservoir that the pressure would be different, would you?

A I'm maintaining they will be the same.

Q Then what you don't have any confidenc e in is our bottom-hole pressure, is that correct?

A Well, I don't think I would go that far. Maybe our pressures are wrong. But at least, they were taken with the same instrument and relatively they ought to be about correct.

Q Well, assuming such a drop, would that not indicate that the water drive is not as effective as you have --

MR. KELLOUGH (Interrupting) Well, he is asking the witness to assume a set of facts which the witness has said does not exist, or rather, which the witness did not admit.

MR. McCORMICK: That is improper --

GOV. MABRY (Interrupting) We can't hear counsel. We can hear the witness clearly, but not counsel.

MR. ADAIR: Sorry, Governor. I asked Mr. Millikan to correlate the bottom-hole pressure found in our well to be 4390 pounds, into the pressure he would expect to find in his well at his depth, and he got a pressure of 4407 pounds, I believe. Mr. Christie testified that after four months' production, they took a bottom-hole pressure in the B.T.A. well, which is the well we are talking about; and he found it to be 4200 and what?

THE WITNESS: 47 pounds -- 4247 pounds.

MR. ADAIR: 4247 pounds, a decline in pressure, not based upon assumption, but based upon actual pressures found at the subsea datum of the B.T.A. Well, resulting in a decline of pressure of how much? How many pounds, Mr. Millikan?

THE WITNESS: Well, the difference in pressure is 260 pounds.

MR. ADAIR: A decline in pressure of 260 pounds after four months' production.

THE WITNESS: But that is not the decline in pressure, in my opinion, because the decline which we found between our original pressure and the pressure after four months production, was only a difference of 14 pounds, taken at the same level and with the same instrument, which is as close as you can read pressures at a pressure -- that is, as close as the instrument can be read.

Q (By Mr. Adair) Now, my next question, to go on, Mr. Millikan, either you or anyone who knows, Mr. Kellough, can answer. To save time, I don't want to have to read the application of Amerada here. Will one of you tell me whether or not your application for this hearing made any request for definite 80-acre units such as you have asked for today, based upon the east and west 80s of a 160-acre tract?

MR. KELLOUGH: The application speaks for itself and the testimony is all in.

MR. ADAIR: I was trying to save time. I guess I'll have to read it.

GOV. MABRY: Somebody can tell us that. Your testimony is in. What did you show?

MR. McCORMICK: The application speaks for itself.

GOV. MABRY: True enough. and we'll get into that if you don't know.

MR. ADAIR: That's perfectly all right.

MR. KELLOUGH: The application asked for 80-acre proration units, and we did not, in the application, recite the description of the particular units, but we did describe the location of the wells which we were asking, or requesting the hearing on.

MR. ADAIR: That answers my question perfectly. Thank you.

Q (By Mr. Adair) Now, Mr. Millikan, will you refer to the T.P. Exhibit on the far left over there, No. "C"? If you will refer to the T.P. lease shown here in yellow, which is shown on this map as being T.P. Lease, NO. 211, being the E½NW¼ and the NW¼NE¼ of Section 2, 12 South, 33 East, you will see from that Exhibit that that is all one lease, will you not?

A That is the way you show it on the map.

Q Well, assuming that to be true, Mr. Millikan, based upon your application as originally filed, is there any reason why T.P. cannot form its 80-acre unit out of these two quarter sections of 240-acre tracts, which would be the NE¼NW¼ and the NW¼NE¼ of said Section 2?

A Is there any reason why that can't be done?

Q Yes.

A I don't know of any.

Q Still, here you come in today with your Exhibit "C", Amerada Exhibit "C", or your map, and request that -- first let me say the testimony shows, if the Commission please, a well now being drilled by T.P. at this point, which is now 4,000 feet deep, or more; and your application here -- and what I'm getting at is that you have stated in your testimony that you thought this was fair from the standpoint of correlative rights to the operators. You have requested that the T.P. take in Amerada, which owns this lease, the NE¼NE¼ -- as a partner, and form an 80-acre unit, taking the 40 acres off of the 120 acres which we had there, together, and form with Amerada an 80-acre unit as shown by our dotted lines here on Amerada Exhibit No. 1.

A That was our recommendation. We did not say it was a request. That was our recommendation only.

MR. ADAIR: The notice of this hearing, if the Commission please, if I may so state, which did not, in my opinion, encompass a pooling or a unitization hearing; and the result of the adoption -- the result of such a proceeding by Amerada here, if adopted, would be the first step for such a request for unitization. We have conferred, if the Commission please, in drilling of this well, to the proposed pattern. At the time we started the well, we had no idea at all that they would ask for east 80s and west 80s of quarter sections. We have 80 acres up there.

MR. McCORMICK: Mr. Adair, the application asks only for 80-acre spacing, and this tendered Exhibit here, No. 1, I believe, merely suggested a pattern; and the Commission, if it should adopt 80-acre spacing, could adopt that pattern, or any other pattern it wanted to work out.

MR. ADAIR: I'm just pointing out the Amerada proposal that they proposed for the pattern to be formed as shown on the Exhibit, which would require unitization.

MR. McCORMICK: That's right.

Q (By Mr. Adair) Mr. Millikan, if I may direct your attention here to the Texas-Pacific Exhibit No. "C" --

A (Interrupting) As superimposed on Exhibit "C"?

Q Yes, sir. Referring [illegible] again to Texas-Pacific well C.S. 1, which is now drilling, and Amerada's 40-acre tract immediately to the east, would you say that, assuming this contour map to be correct, would you say there was as much oil under the Amerada 40-acre tract as there is under the Texas-Pacific 40-acre tract?

140

A I don't know. If you want to make some point of that, why, I'll take either side of it.

Q I am not referring to taking some point of it, Mr. Millikan; I may ask you a question. Assuming the contour lines are correct, would you say or wouldn't you say there was less oil under the Amerada tract than there would be under the T.P. tract?

A Well, I think the point you make, Mr. Adair, that you --

Q (Interrupting) Well, can you answer the question, Mr. Millikan?

A No, I can't answer directly; but I would say there is a possibility there may be less.

Q Thank you.

MR. ADAIR: That's all.

A (Continuing) Is that all that you wanted? But there, that same thing might apply to any other set of contours that may be assumed or eventually proven in regard to that lease or any other lease in the field, the same as it exists in any other field in New Mexico, or in any other part of the country.

Q That's right. Well, while we are talking of fields in other parts of the country, other than the B. T. A. or the Hightower area, other than the Crossroads area and other than the Jones Ranch Field that you mentioned in Texas, do you know of any other Devonian field in New Mexico or Texas that has been developed on 80 acres fixed-pattern spacing?

A No, I don't have knowledge -- I don't know of any others, but I think probably there are others that would be just as well off had they been developed on 80-acre spacing. The mere fact that they have been developed on 40-acre spacing is not prima facie evidence that they may not have been developed with

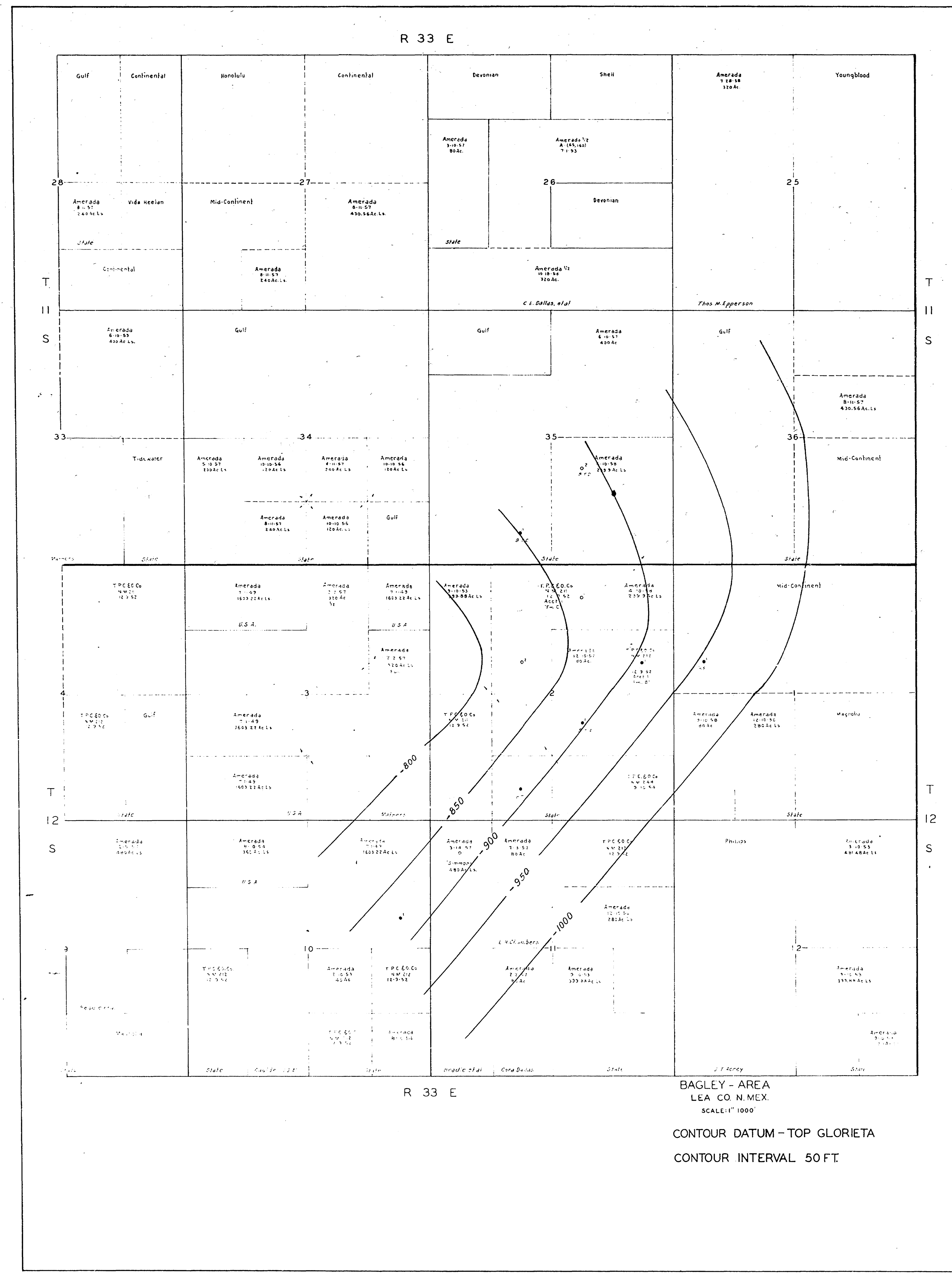
AMERADA PETROLEUM CORPORATION,
CASE NO. 8485, DISTRICT COURT OF LEA COUNTY

AMERADA EXHIBITS - original — IN EVIDENCE

Exhibit "E" map — page 68

Contour Datum - top Glorieta

OCC Case No. 191


R 33 E
T 11 S
T 12 S
-800
-850
-900
-950
-1000
BAGLEY - AREA
LEA CO. N. MEX.
SCALE: 1" = 1000'
CONTOUR DATUM - TOP GLORIETA
CONTOUR INTERVAL 50 FT.

141

142

ORIGINAL

AMERADA PETROLEUM CORPORATION,
CASE NO. 8485, DISTRICT COURT OF LEA COUNTY

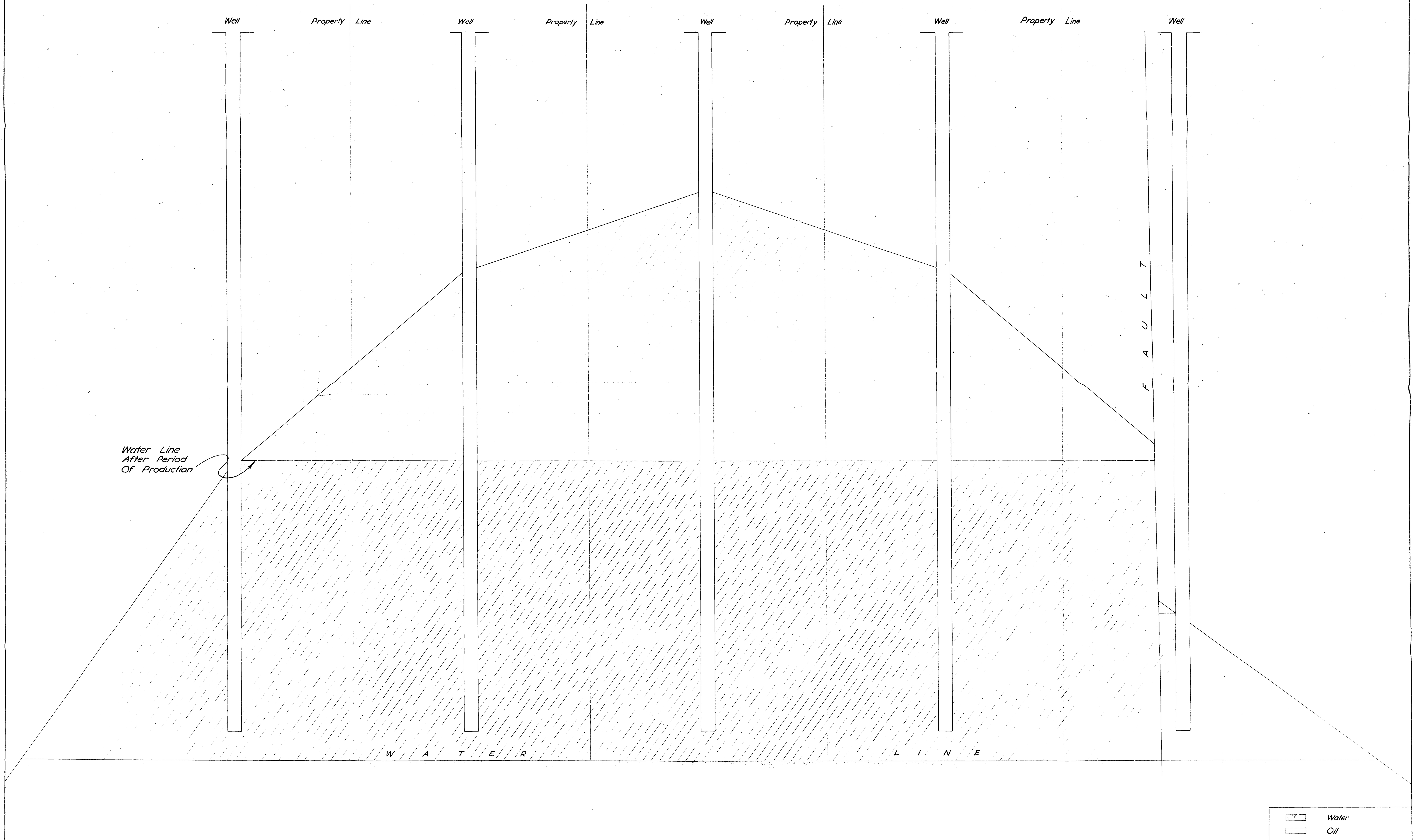
T P COAL & OIL EXHIBITS — IN EVIDENCE

Exhibit "Q" — page 95

Oil Conservation Commission Case No. 191

GENERALIZED CROSS-SECTION WATER DRIVE RESERVOIR

Uniform Permeability & Porosity



Tex-Pac Ex No. "G"

144

ORIGINAL

AMERADA PETROLEUM CORPORATION,
CASE NO. 8485, DISTRICT COURT OF LEA COUNTY

T P COAL & OIL EXHIBITS	IN EVIDENCE
Exhibit "H"	page 69
Exhibit "I", "J", "K", "L"	70

Oil Conservation Commission Case No. 191

SCHLUMBERGER
WELL SURVEYING CORPORATION

Location of Well

1980' FNL & 660' FEL
Sec. 2 12S-33E

Elevation: D.F.:
K.B.:
or G.L.:

COMPANY: T. & P. COAL & OIL CO.

WELL: STATE B #1.

FIELD: BAGLEY

LOCATION: SEC. 2 12S-33E

COUNTY: LEA

STATE: NEW MEXICO

FILING No.

COUNTY: LEA
FIELD OR LOCATION: BAGLEY
WELL: STATE B #1
COMPANY: T. & P. COAL & OIL CO.

RUN NO.	I	II			
Date	7-13-49	11-13-14-49			
First Reading	3938 3938	10901 10901			
Last Reading	332 0	3938 3938			
Footage Measured	3606 3908	6973 6973			
Csg Shoe Schlum.	332'	–			
Csg Shoe Driller	335 Est.	3933			
Max. Depth Reached	3941	10904			
Bottom Driller	3941	10914			
Depth Datum	R.T.	RT or 11' above Gr.			
Mud Nature	Salt Gel	Salt Gel.			
" Density	11.4	9.8			
" Viscosity	34.5	55			
" Resistivity	.05 @ 70 °F	.32 @ 55 °F	@ °F	@ °F	@ °F
" Resistivity BHT	@ °F	.24 @ °F	@ °F	@ °F	@ °F
" pH	@ °F	@ °F	@ °F	@ °F	@ °F
" Water Loss	CC 30 Min.	6 CC 30 Min.	CC 30 Min.	CC 30 Min.	CC 30 Min.
Maximum Temp. °F	122	210			
Bit Size	12"	[illegible]			
Spacings — AM	10"	10'			
A					
AO	32"	32"			
E.S. Rig Time	3½ hours	7½ hrs.			
Truck No.	279	279			
Recorded By	Hamilton	Cargill			
Witnessed By	Catlett	Gupton			

REMARKS

Run 2 - Filter Cake - 1/32"

(H)

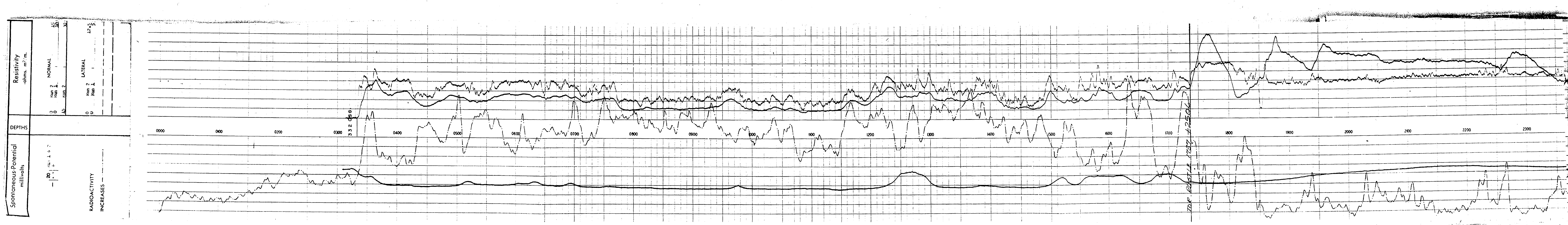
Tex-Pac Ex No. " "

145

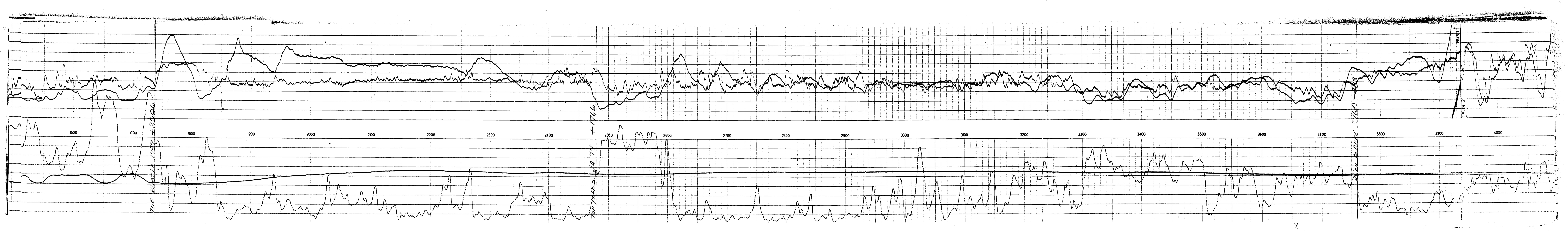

0100
0200
0300
332 056
0400
0500
0600
0700
0800
0900
1000
1100
1200
1300
1400
1500
1600
1700
TOP
1797 #2566
1800
1900
2000
2100

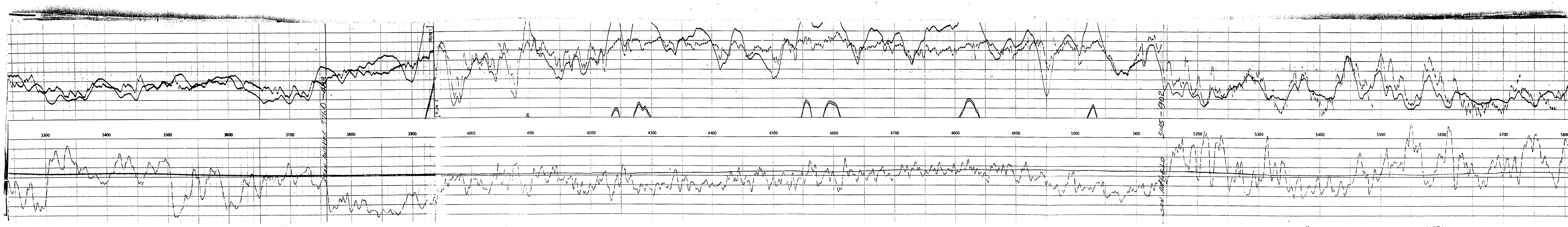
1800
1900
2000
2100
2200
2300
2400
2500
2600
2700
2800
2900
3000
3100
3200
3300
3400
3500
3600
3700
3800
TOP YATES 2477
+1766

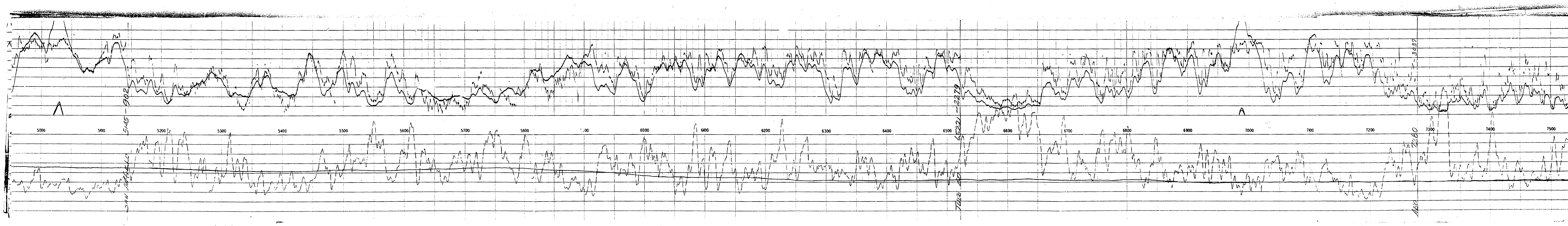
147


Resistivity
NORMAL
LATERAL
DEPTHS
Spontaneous-Potential
millivolts
RADIOACTIVITY
INCREASES

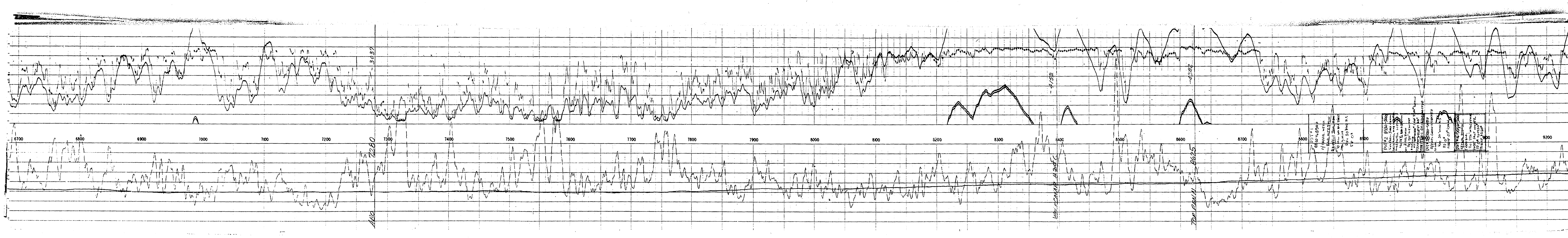
146

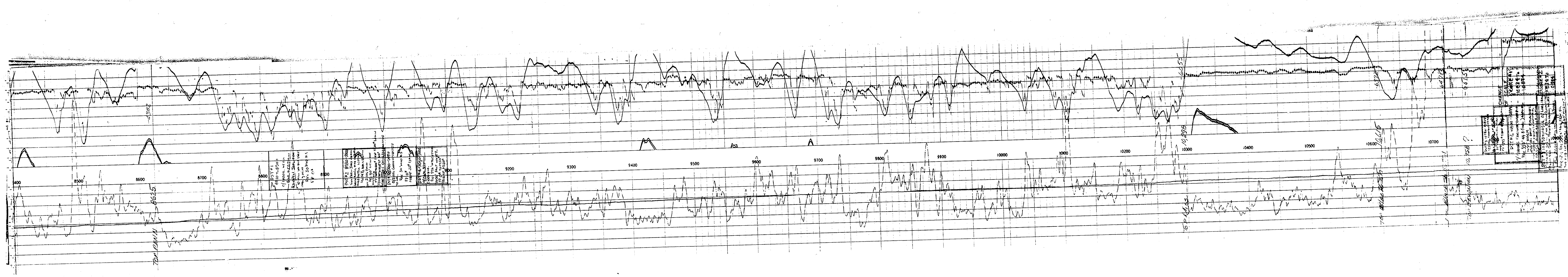


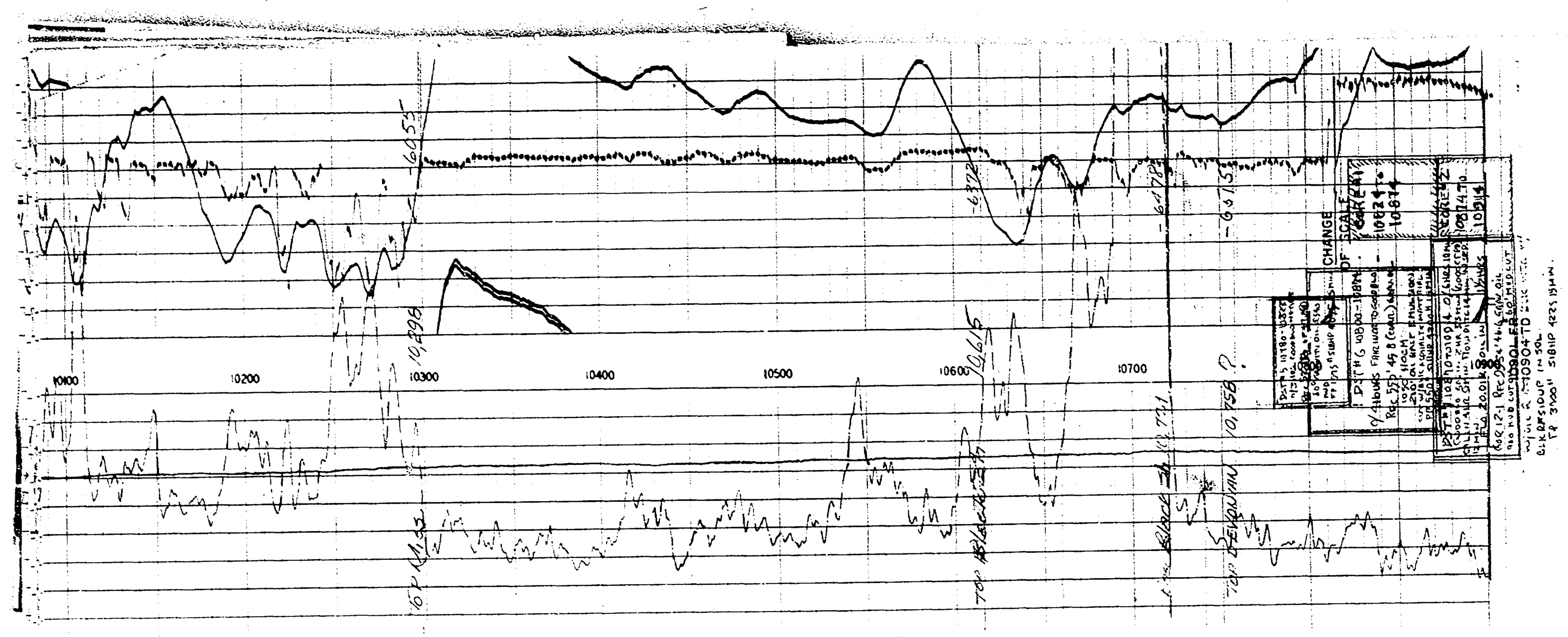


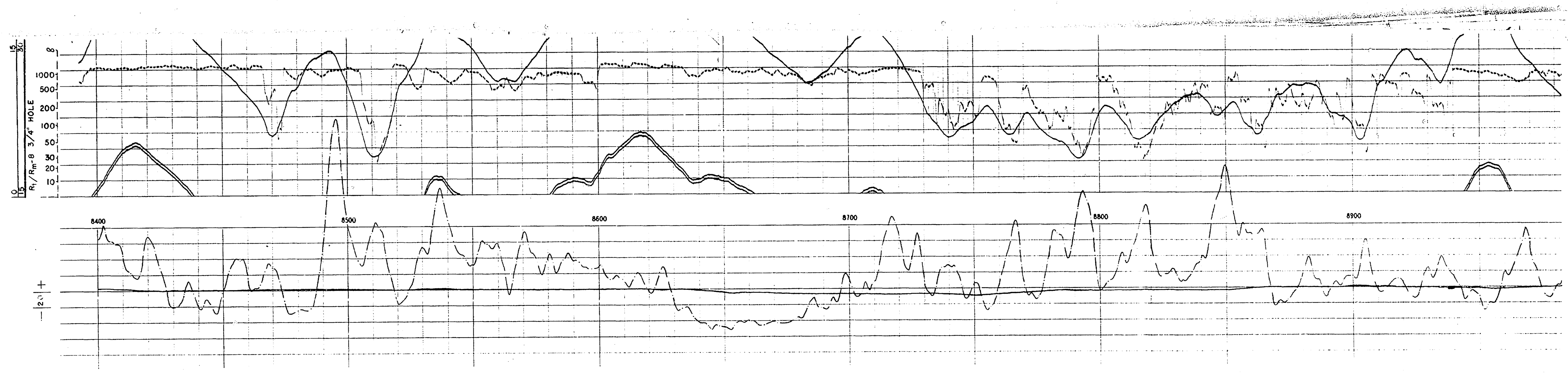


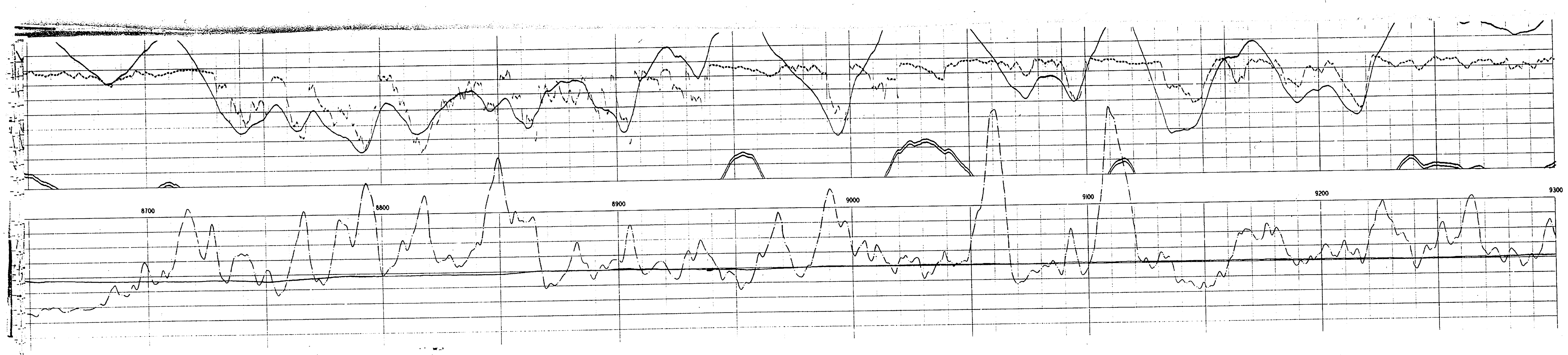
149

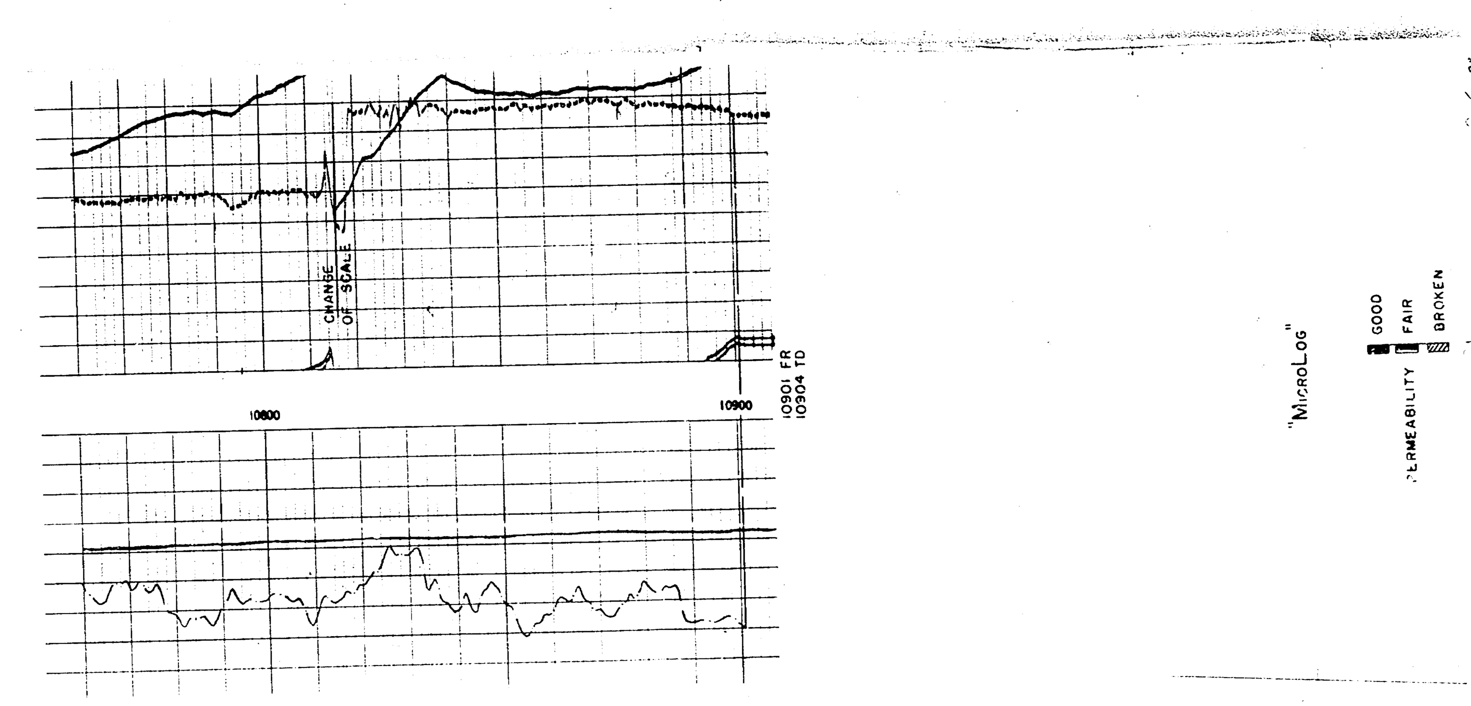


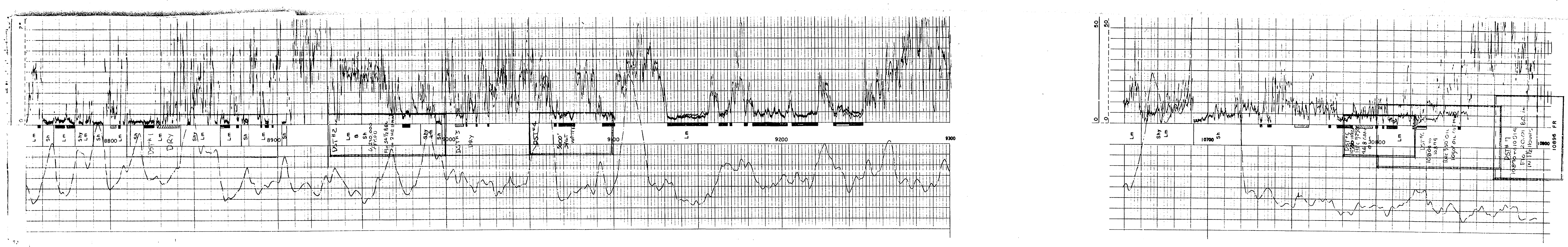





8400
8500
8600
8700
8800
8900







T. P. COAL & OIL CO.
STATE B NO. 1
BAGLEY FIELD
LEA CO., N. MEX

154

155

ROTARY ENGINEERING & MFG. CO., INC.

CORE ANALYSIS — WELL LOGGING SERVICE — WATER ANALYSIS

COREGRAPH

COMPANY TEXAS PACIFIC COAL & OIL
WELL STATE B-1
FIELD BAGLEY SLURO - DEVONIAN
COUNTY LEA
STATE NEW MEXICO

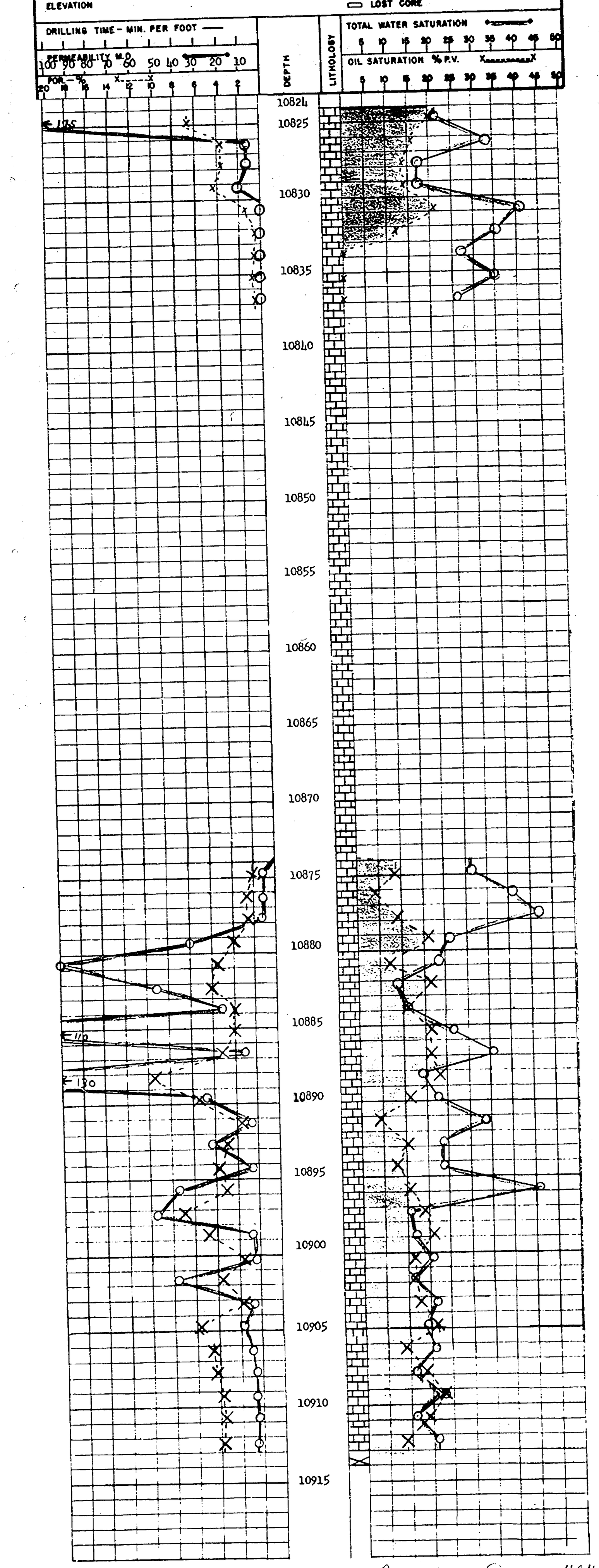
DEPTH FROM 10824 TO 10914
DATE 11-20-49
ANALYST J.S., L.C.L.

REMARKS

TYPE CORE BARREL DIAMOND

ELEVATION

SANDSTONE
LIMESTONE
DOLOMITE
SHALE
CHERT
ANHYDRITE - GYP
COAL
LOST CORE



Dev-Vac Ex No. "L"

TEXAS & PACIFIC COAL & OIL CO.
State B-1
Lea County, New Mexico

ROTARY ENGINEERS LIMITED
CORE ANALYSIS TABULAR DATA

COMPANY Texas & Pacific Coal & Oil — WELL State B-1 — FIELD Bagley Sluro - Devonian
COUNTY Lea — STATE New Mexico — DATE 11-20-49 — ANALYST LCL, JS
FORMATION Devonian — TYPE ANALYSIS Special — JOB NO. L-65
REMARKS Analysis of entire core cut with diamond bit.

SAMPLE NUMBER	DEPTH	MATRIX POROSITY %	FRACTURED PORE %	TOTAL POROSITY %	EFFECTIVE POROSITY %	PERMEABILITY M.D.	TOTAL WATER SATURATION % P.V.	RESIDUAL OIL SATURATION % P.V.	PROBABLE PRODUCTION	REMARKS
1	10824-25.5				6.5	175	22.0	20.0	Oil	
2	25.5-27.0				3.8	5	33.4	16.4	"	
3	27.0-28.5				3.5	5	17.5	14.7	"	
4	28.5-30.0				4.5	10	17.5	14.3	"	
5	30.0-31.5				1.2	-.1	41.4	21.2	None	
6	31.5-33.0				0.4	-.1	55.4	12.4	"	
7	33.0-34.5				0.2	-.1	27.3	0.0	"	
8	34.5-36.0				0.2	-.1	35.2	0.0	"	
9	36.0-37.5				0.2	-.1	26.7	0.0	"	
10	10874.0-75.5				2.0	4	27.5	8.4	Oil	
11	75.5-77.0				2.6	4	36.4	4.3	"	
12	77.0-78.6				2.2	5	42.7	9.7	"	
13	78.5-80.0				4.0	40	21.3	16.8	"	
14	80.0-81.5				5.7	100	18.6	7.4	"	
15	81.5-83.0				6.0	55	16.7	8.9	"	
16	83.0-84.5				4.0	25	12.9	12.4	"	
17	84.5-86.0				7.4	110	22.6	16.3	"	
18	86.0-87.5				5.0	15	31.0	16.8	"	
19	87.5-89.0				11.5	130	14.7	18.7	"	
20	89.0-90.5				7.1	33	17.6	12.3	"	
21	90.5-92.0				3.4	13	29.7	4.7	"	
22	92.0-93.5				4.7	32	18.3	10.6	"	
23	93.5-95.0				5.8	12	19.7	7.8	"	
24	95.0-96.5				4.9	49	41.8	10.2	"	
25	96.5-98.0				9.0	58	10.6	14.5	"	
26	98.0-99.5				6.6	12	12.7	16.2	"	
27	99.5-10901.0				3.7	11	16.7	12.3	"	
28	10901.0-02.5				5.6	49	12.7	12.7	"	
29	02.5-04.0				3.7	12	18.4	13.6	"	
30	04.0-05.5				7.6	19	14.3	6.8	"	
31	05.5-07.0				6.5	13	16.7	9.7	"	
32	07.0-08.5				6.1	12	12.7	14.3	"	
33	08.5-10.0				5.8	15	18.3	18.4	"	
34	10.0-11.5				5.7	11	12.4	14.3	"	
35	11.5-13.0				5.7	12	16.6	9.2	"	

ROTARY ENGINEERING AND MANUFACTURING CO., INC.
DRILLING ENGINEERS
BOX 1007
MIDLAND, TEXAS

November 25, 1949

Texas & Pacific Coal & Oil Co.
601 West Missouri Street
Midland, Texas

Attention: Mr. O. R. Carter.

Gentlemen:

We are submitting to you eight (8) copies of our core analysis in both tabular and graphic forms on your State B No.1 well, Bagley-Sluro-Devonian Field in Lea County, New Mexico. These cores having been analyzed for porosity, permeability and fluid saturation as percent pore space occupied.

The porosities were obtained by resaturating eighteen (18) inch sections of the core, starting with vacuum and goinf to 1000 pounds applied pressure. The total volume of fluid injected was assumed to be the effective pore space. Volume, time and pressure measurements were made at 12 different intervals during the resaturation of each sample and the permeability was computed from these measurements. Thus the permeability measurements are non directional.

Curves are submitted showing resaturation characteristics of each sample.

Fluid saturation as percent pore space is believed to be unreliable due to the vuglar nature of the formation.

We wish to thank you for the consideration and cooperation shown us and our personnel in securing the information on this well.

Yours very truly,

ROTARY ENG. & MFG. CO., INC.

L. C. Locke

L. C. Locke

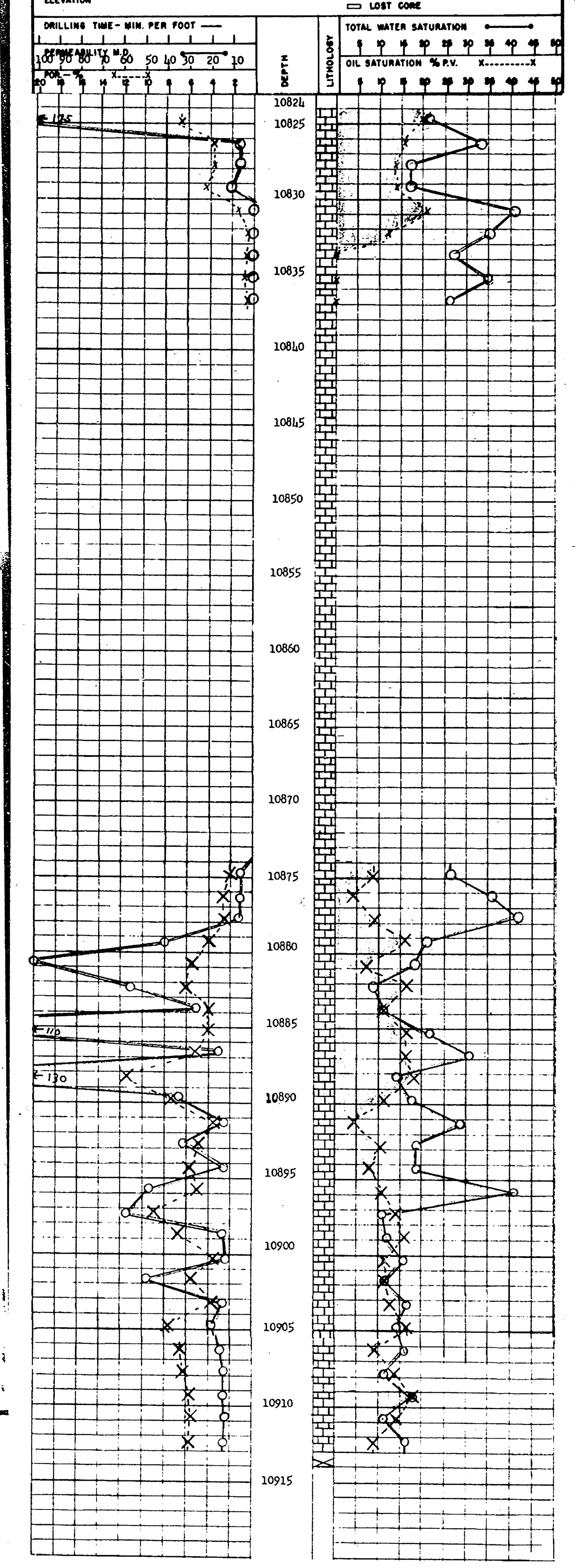
LCL:mp
Enclosure

ROTARY ENGINEERING & MFG. CO., INC.
CORE ANALYSIS — WELL LOGGING SERVICE — WATER ANALYSIS
COREGRAPH

COMPANY TEXAS PACIFIC COAL & OIL
WELL STATE B-1
FIELD BAGLEY SLURO - DEVONIAN
COUNTY LEA
STATE NEW MEXICO
DEPTH FROM 10824 TO 10914
DATE 11-20-49
ANALYST J.S., L.C.L.

REMARKS
TYPE CORE BARREL DIAMOND
ELEVATION

SANDSTONE
LIMESTONE
DOLOMITE
SHALE
CHERT
ANHYDRITE - GYP
COAL
LOST CORE

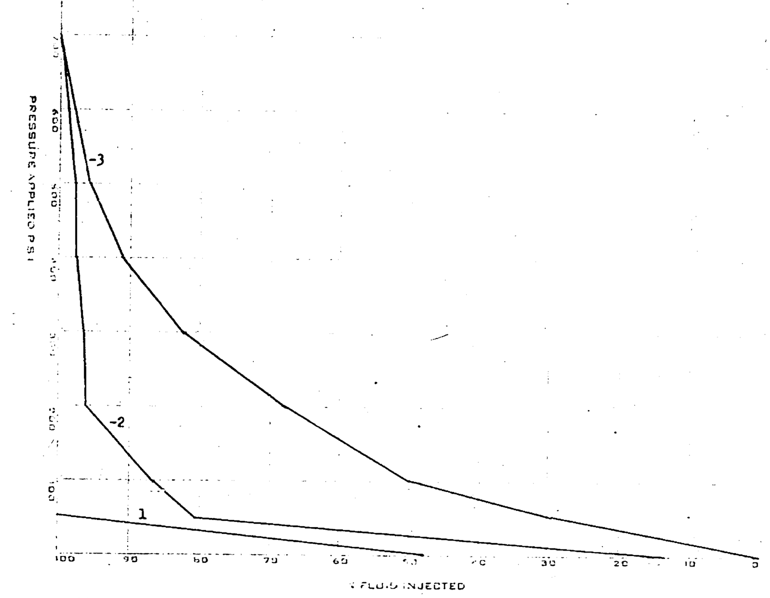


156

ROTARY ENGINEERING & MANUFACTURING CO.
CORE ANALYSIS GRAPHIC DATA

COMPANY TEXAS & PACIFIC COAL & OIL — PAGE 1
WELL State B #1 — JOB NO. L-65
COUNTY Lea County, — ANALYST JS, LCL
STATE New Mexico

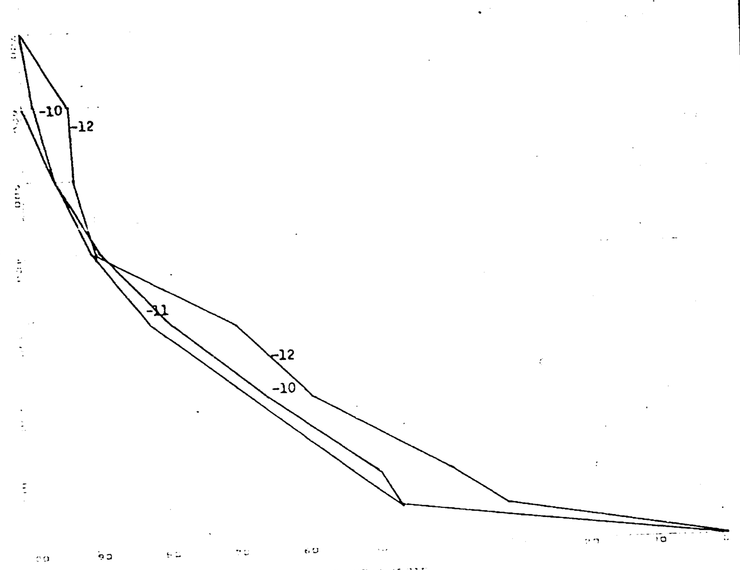
1	6.5	175
2	3.8	5
3	3.5	5



ROTARY ENGINEERING & MANUFACTURING CO.
CORE ANALYSIS GRAPHIC DATA

COMPANY TEXAS & PACIFIC COAL & OIL — PAGE 2
WELL State B #1 — JOB NO. L-65
COUNTY Lea — ANALYST JS, LCL
STATE New Mexico

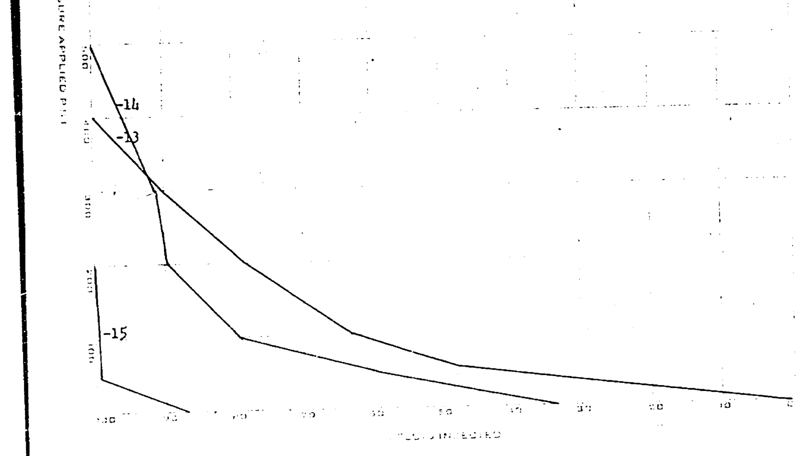
10	2.0	4
11	2.6	4
12	2.2	5



ROTARY ENGINEERING & MANUFACTURING CO.
CORE ANALYSIS GRAPHIC DATA

COMPANY TEXAS & PACIFIC COAL & OIL — PAGE 3
WELL State B #1 — JOB NO. L-65
COUNTY Lea — ANALYST JS, LCL
STATE New Mexico

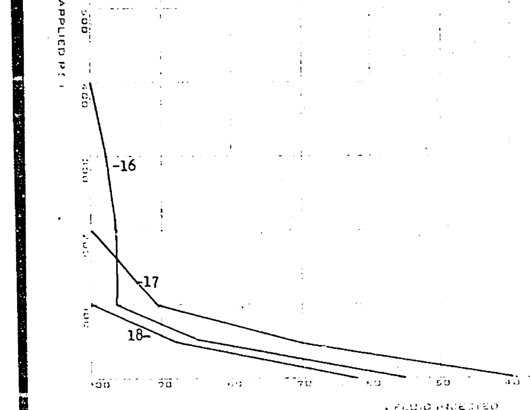
13	4.0	40
14	5.7	100
15	6.0	55



ROTARY ENGINEERING & MANUFACTURING CO.
CORE ANALYSIS GRAPHIC DATA

COMPANY TEXAS & PACIFIC COAL & OIL — PAGE 4
WELL State B #1 — JOB NO. L-65
COUNTY Lea — ANALYST JS, LCL
STATE New Mexico

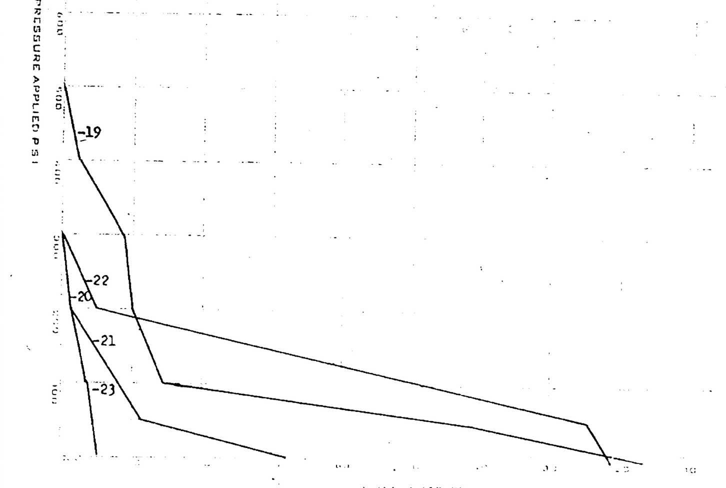
16	4.0	25
17	7.4	110
18	5.0	15



ROTARY ENGINEERING & MANUFACTURING CO.
CORE ANALYSIS GRAPHIC DATA

COMPANY TEXAS & PACIFIC COAL & OIL — PAGE 5
WELL State B #1 — JOB NO. L-65
COUNTY Lea — ANALYST JS, LCL
STATE New Mexico

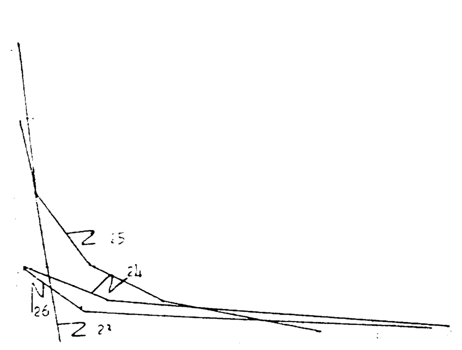
19	11.5	130
20	7.1	133
21	3.4	13
22	4.7	32
23	5.8	12



ROTARY ENGINEERING & MANUFACTURING CO.
CORE ANALYSIS GRAPHIC DATA

COMPANY TEXAS & PACIFIC COAL & OIL — PAGE 6
WELL State B #1 — JOB NO. L-65
COUNTY Lea — ANALYST JS, LCL
STATE New Mexico

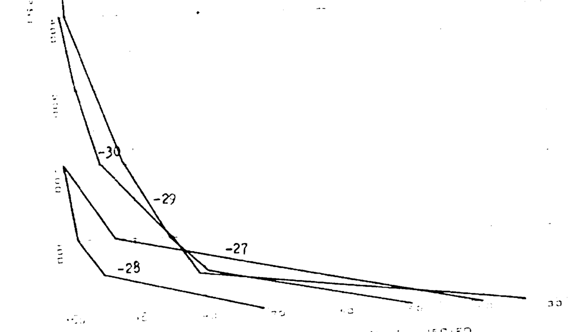
23	5.8	12
24	4.9	49
25	9.0	58
26	6.6	12



ROTARY ENGINEERING & MANUFACTURING CO.
CORE ANALYSIS GRAPHIC DATA

COMPANY TEXAS & PACIFIC COAL & OIL — PAGE 7
WELL State B #1 — JOB NO. L-65
COUNTY Lea — ANALYST JS, LCL
STATE New Mexico

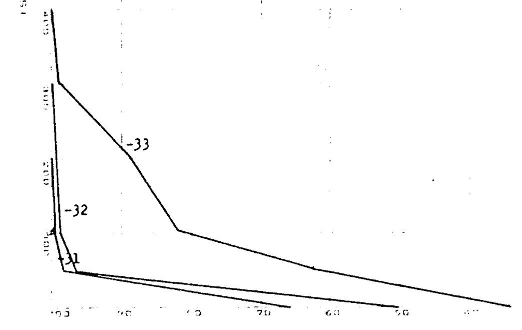
27	3.7	11
28	5.6	49
29	3.7	12
30	6.5	13



ROTARY ENGINEERING & MANUFACTURING CO.
CORE ANALYSIS GRAPHIC DATA

COMPANY TEXAS & PACIFIC COAL & OIL — PAGE 8
WELL State B #1 — JOB NO. L-65
COUNTY Lea — ANALYST JS, LCL
STATE New Mexico

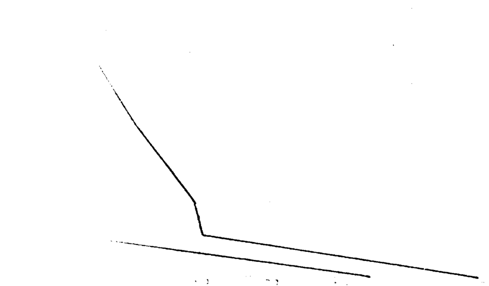
31	6.5	13
32	6.1	12
33	5.8	15



ROTARY ENGINEERING & MANUFACTURING CO.
CORE ANALYSIS GRAPHIC DATA

COMPANY TEXAS & PACIFIC COAL & OIL — PAGE 9
WELL State B #1 — JOB NO. L-65
COUNTY Lea — ANALYST JS, LCL
STATE New Mexico

34	5.7	11
35	5.7	12

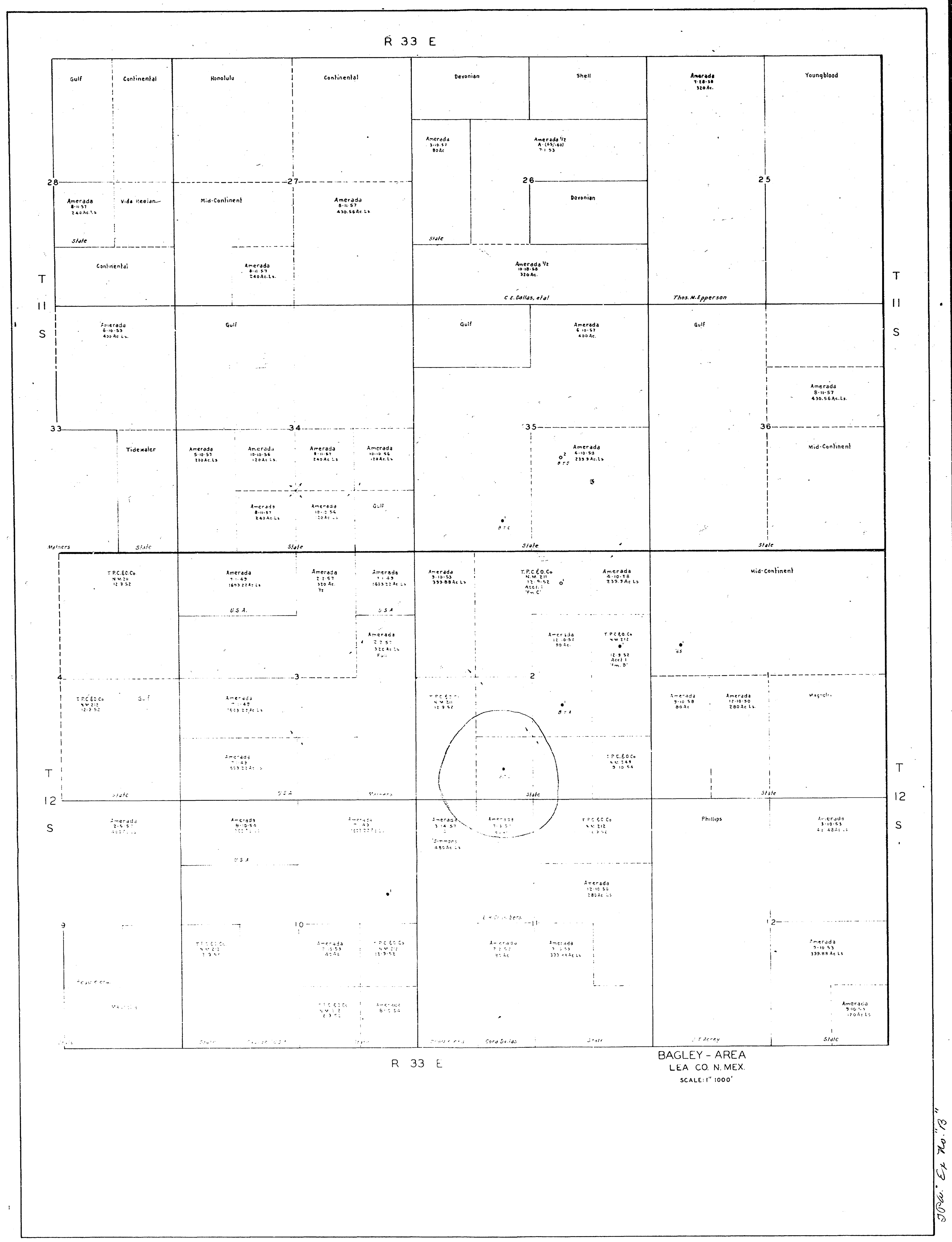


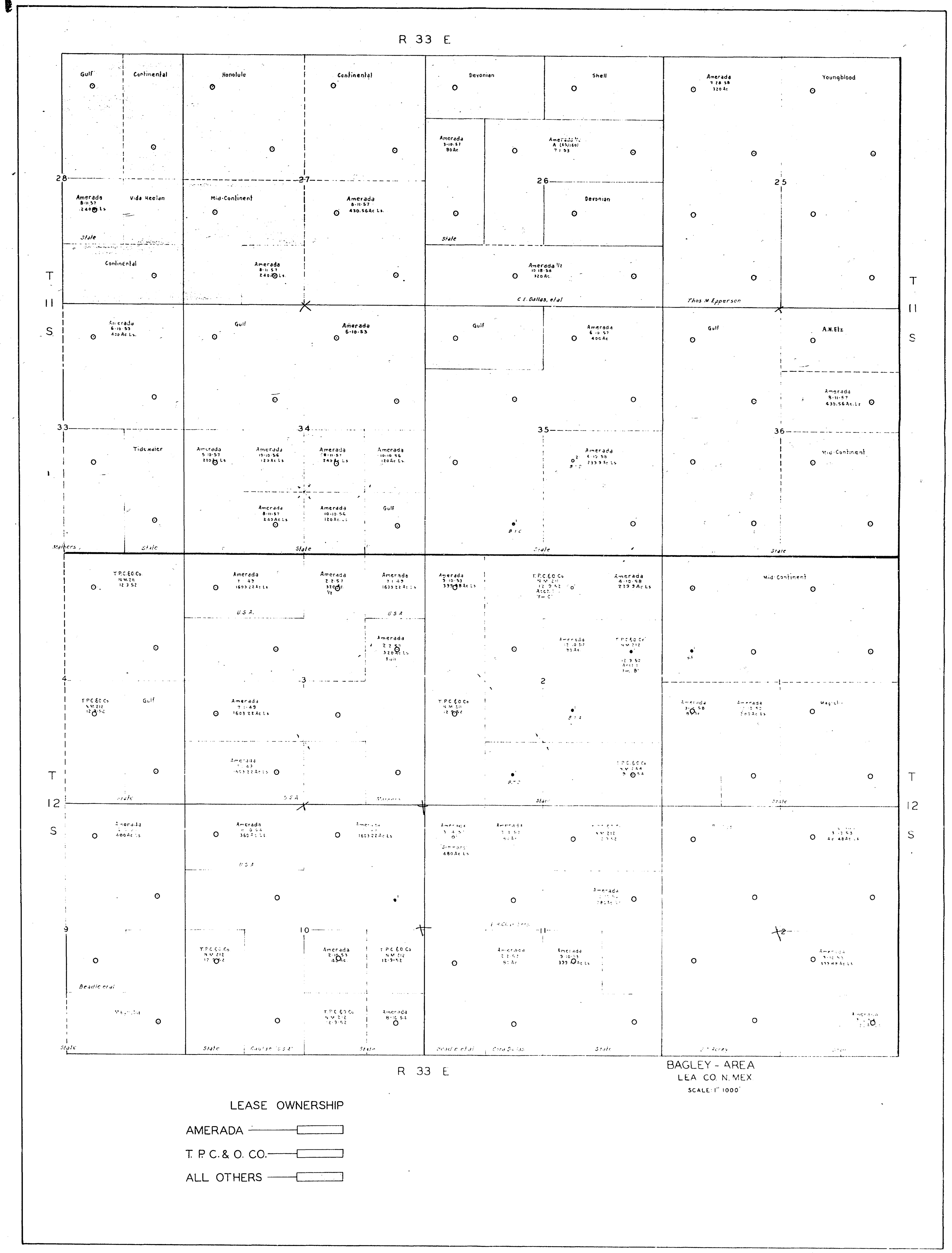
ORIGINAL

AMERADA PETROLEUM CORPORATION,
CASE NO. 8485, DISTRICT COURT OF LEA COUNTY

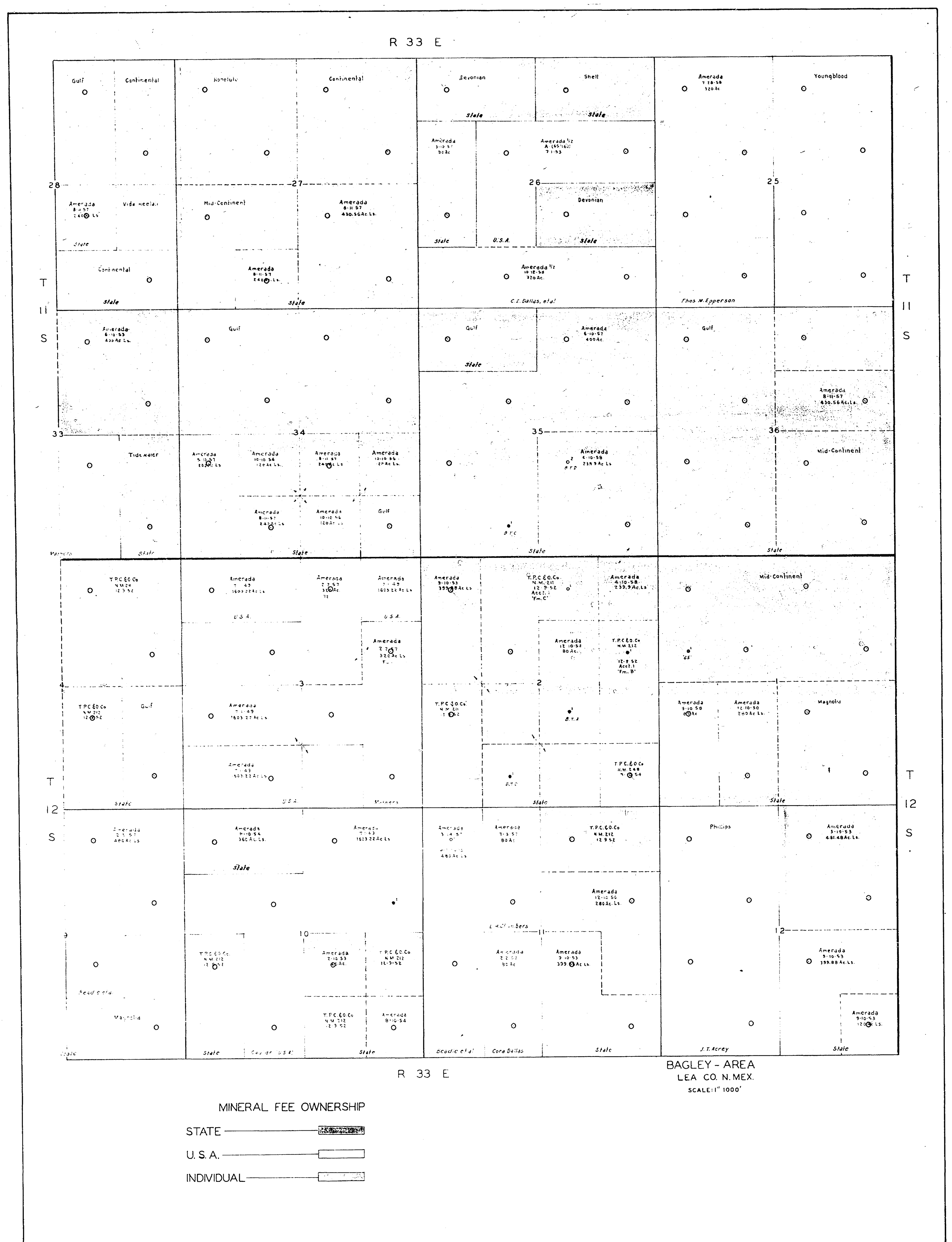
TEXAS-PACIFIC COAL & OIL EXHIBITS	IN EVIDENCE
Exhibit "A"	page 22
Exhibit "B"	65
Exhibits "C", "D", "E", "F", "G"	68

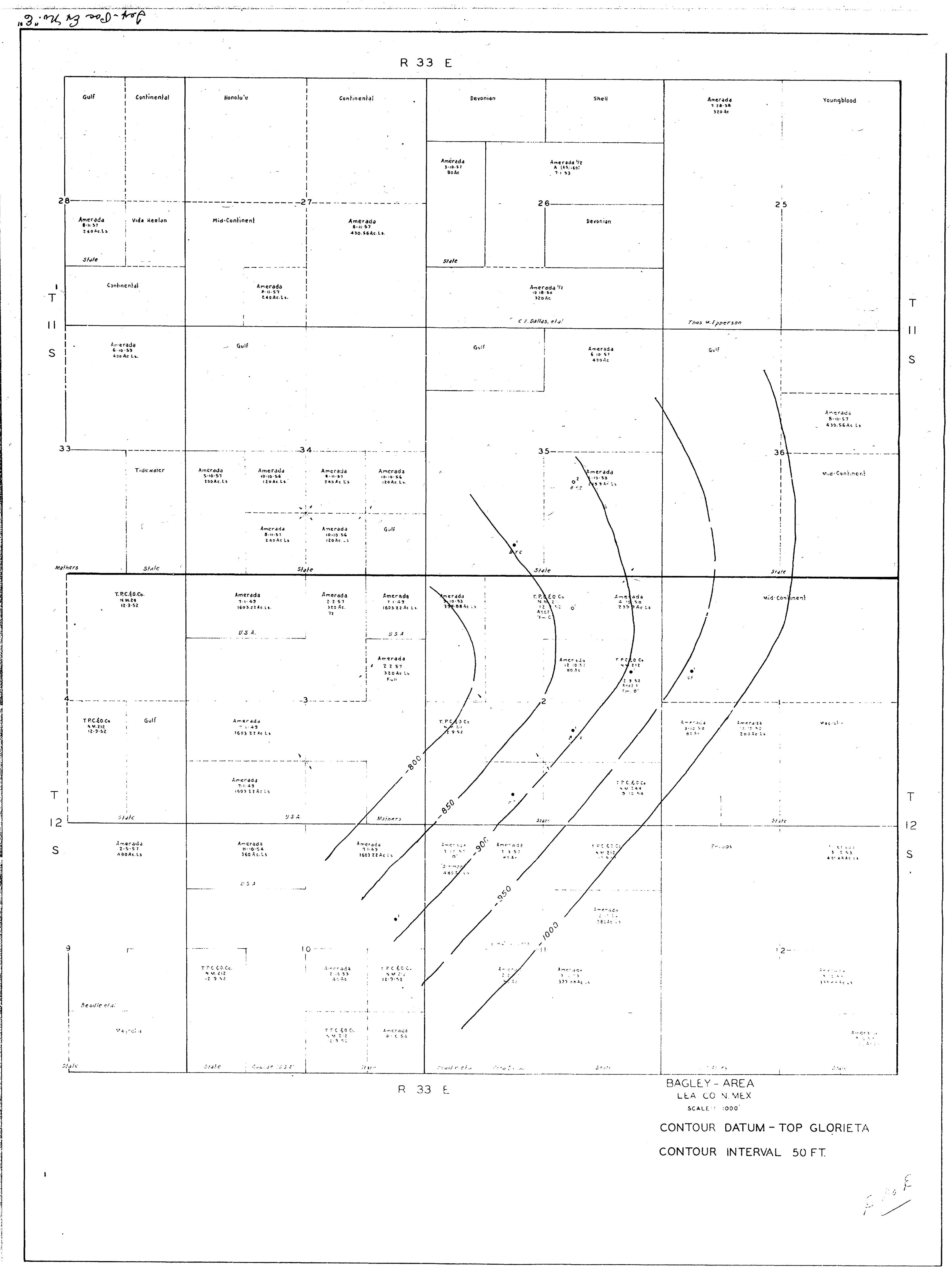
Oil Conservation Commission Case No. 191





Tex. Pac. Ex. No. "C"


R 33 E
T 11 S
T 12 S
BAGLEY - AREA
LEA CO. N. MEX.
SCALE: 1" = 1000'
MINERAL FEE OWNERSHIP
STATE
U.S.A.
INDIVIDUAL
Gulf
Continental
Honolulu
Devonian
Shell
Amerada
Youngblood
Mid-Continent
Vida Keelan
T-Dewater
T.P.C.&O.Co.
Magnolia
Phillips
State
U.S.A.
C. L. Dallas, et al
Thos. M. Epperson
Tex-Pac Ex. No. "B"

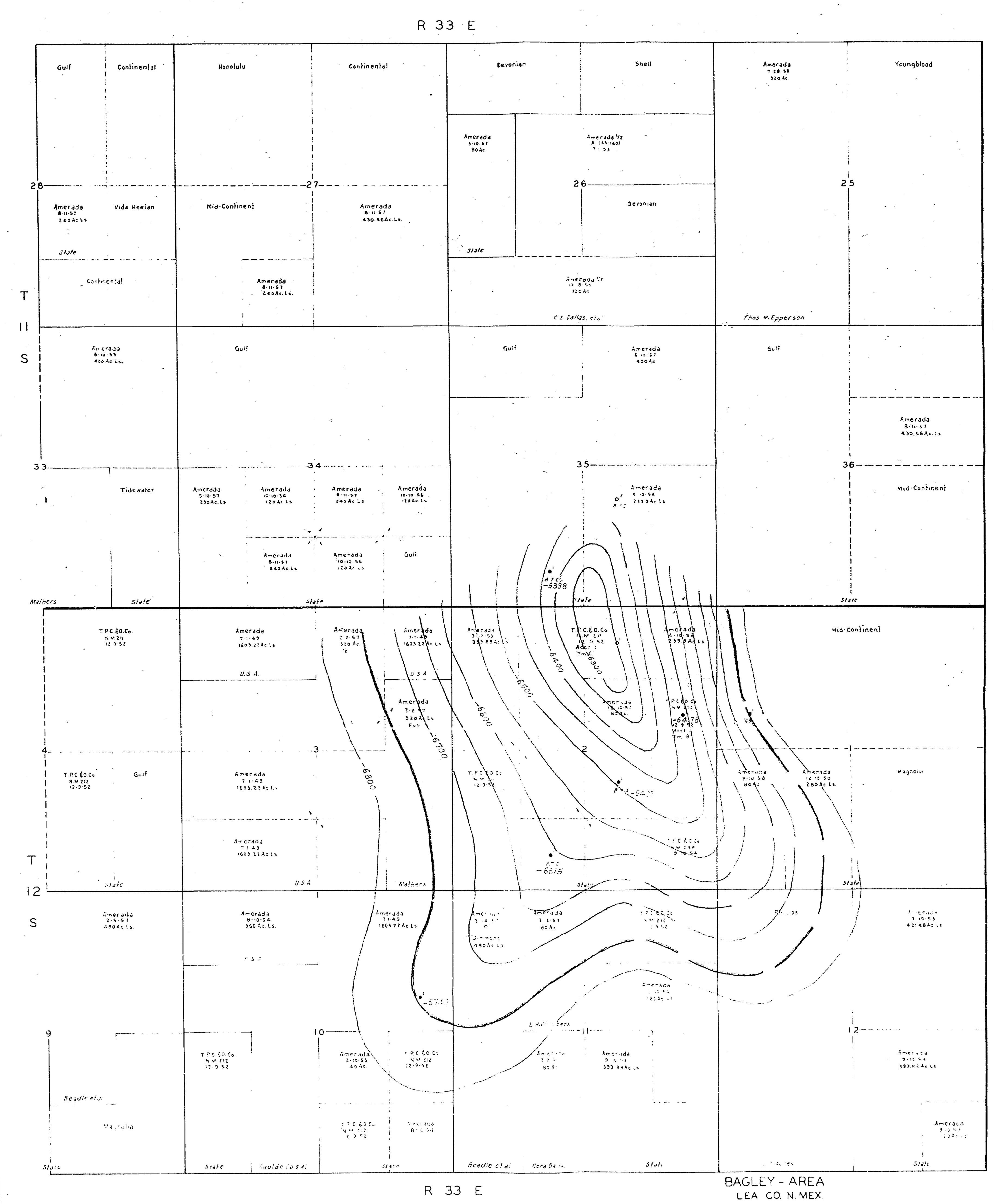

R 33 E
T 11 S
T 12 S
-800
-850
-900
-950
-1000
BAGLEY - AREA
LEA CO. N. MEX.
SCALE: 1" = 1000'
CONTOUR DATUM - TOP GLORIETA
CONTOUR INTERVAL 50 FT.

158

BAGLEY - AREA
LEA CO. N. MEX.
SCALE: 1" 1000'

CONTOUR DATUM - TOP PENNSYLVANIAN
CONTOUR INTERVAL 50 FT

Tex-Pac Ex No. "F"



BAGLEY - AREA
LEA CO. N. MEX.
SCALE: 1" 1000'

CONTOUR DATUM - BASE BLACK SHALE ZONE
CONTOUR INTERVAL 50 FT

Tex Pac Ex No. "G"

cellation shall not be made.

14. All the terms of this agreement shall extend to and bind the heirs, executors, administrators, successors and assigns of the parties hereto.

15. If the lessee shall have failed to make discovery of oil and-/or gas in paying quantities during the primary term hereof, the lessee may continue this lease in full force and effect for an additional term of five years and as long thereafter as oil and gas in paying quantities, or either of them is produced from the leased premises, by paying each year in advance, as herein provided, double the rental provided herein for the primary term, or the highest rental prevailing at the commencement of the secondary term in any rental district, or districts in which the lands or any part thereof, may be situated, if it be greater than double the rental provided for the primary term. (This paragraph (15) shall not be inserted in any lease issued pursuant to the provisions of Section 3 (132-403) of this Act.)

IN WITNESS WHEREOF, the party of the first part has hereunto signed and caused its name to be signed by its Commissioner of Public Lands thereunto duly authorized, with the seal of his office affixed, and the lessee has signed this agreement the day and year first above written.

STATE OF NEW MEXICO
By H. R. Rodgers
COMMISSIONER OF PUBLIC LANDS, Lessor.

ATTEST:

(R. Seibel) Secretary

Texas Pacific Coal and Oil Company
By: [signature] Vice President
Lessee. (C. E. Yager) (SEAL)

Distributed this the 22th day of Dec, 1942

PERSONAL ACKNOWLEDGMENT

STATE OF .... } ss.
COUNTY OF ....

On this the .... day of .... before me .... to me known to be the person ... who executed the foregoing instrument as Lessee, and acknowledged that ... he ... executed the same as ... free act and deed.

IN WITNESS WHEREOF I have hereunto set my hand and affixed my official seal the day and year in this certificate above written.

My Commission Expires: .... Notary Public.

(ACKNOWLEDGED BY ATTORNEY IN FACT)

STATE OF .... } ss.
COUNTY OF ....

On this the .... day of ...., 19...., personally appeared before me .... to me known to be the person ... who executed the forgoing instrument in behalf of .... and acknowledged that ... he ... executed the same as the free act and deed of said ....

IN WITNESS WHEREOF I have hereunto set my hand and affixed my official seal the day and year in this certificate above written.

My Commission Expires: .... Notary Public.

(ACKNOWLEDGMENT BY CORPORATION)

STATE OF TEXAS } ss.
COUNTY OF TARRANT

On this the 19th day of December, 1942, personally appeared C. E. Yager to me personally known, who being by me duly sworn did say that he is the Vice President of Texas Pacific Coal and Oil Company and that the seal affixed to the foregoing instrument is the corporate seal of said corporation, and that said instrument was signed and sealed in behalf of said corporation by authority of its board of directors, and said Texas Pacific Coal and Oil Company acknowledges said instrument to be the free act and deed of said corporation.

IN WITNESS WHEREOF I have hereunto set my hand and affixed my official seal the day and year in this certificate above written.

E. J. Robbins
Notary Public.

My Commission Expires:
June 1, 1943

STATE LAND OFFICE
Dec 24 11 19 AM '42
SANTA FE, N. M.

NM-212

Form 44—DUPLICATE
LEASE NO. B-9950
APPLICATION NO. B-9950

OIL AND GAS LEASE

THIS AGREEMENT, dated this the 10th day of December A. D. 1942, made and entered into by and between the STATE OF NEW MEXICO, acting by and through the undersigned, its Commissioner of Public Lands, thereunto duly authorized, party of the first part and hereinafter called the "Lessor," and Texas Pacific Coal and Oil Company, Box 2110, Fort Worth, Texas, party of the second part, hereinafter called the "Lessee," whether one or more,

WITNESSETH:

WHEREAS, the said lessee has filed in the office of the Commissioner of Public Lands an application for an oil and gas lease covering the lands hereinafter described and has tendered therewith the required first payment being not less than the amount required by law and by the rules and regulations of the New Mexico State Land Office; and

WHEREAS, all of the requirements of law relative to said application and tender have been duly complied with and said application has been approved and allowed by the Commissioner of Public Lands:

THEREFORE, for and in consideration of the premises as well as the sum of One Hundred Sixteen and 99/100ths - - - - - - - - ($116.99) Dollars, the same being the amount of the tender above mentioned, paid in cash, and evidenced by official Receipt No. 22377, and of the further sum of $5.00 filing fee, and of the covenants and agreements hereinafter contained on the part of the lessee to be paid, kept and performed, the said lessor has granted and demised, leased and let, and by these presents does grant, demise, lease and let unto the said lessee, exclusively, for the sole and only purpose of exploration, development and production of oil and-/or gas thereon and therefrom with the right to own all oil and gas so produced and saved therefrom and not reserved as royalty by the lessor under the terms of this lease, together with rights of way, easements and servitudes for pipe lines, telephone and telegraph lines, tanks, power houses, stations, gasoline plants, and fixtures for producing, treating and caring for such products, and housing and boarding employees, and any and all rights and privileges necessary, incident to or convenient for the economical operation of said land, for oil and gas, with right for such purposes to the free use of oil, gas, casing-head gas, or water from said lands, but not from lessor's water wells, and with the right of removing either during or after the term hereof, all and any improvements placed or erected on the premises by the lessee, including the right to pull all casing, subject, however, to the conditions hereinafter set out, the following described land situate in the County of Lea, State of New Mexico, and more particularly described as follows:

Line	Institution	Sec.	Twp.	Range	Subdivision Column 1	Column 2	Column 3	Column 4	Acres
1	C.S.	2	12S	33E			SW¼NE¼	SE¼NE¼	80.00
2	"	"	"	"	NE¼SE¼	NW¼SE¼			80.00
3	N.Inst.	4	"	"		NW¼SE¼	SW¼SE¼		80.00
4	C.S.	7	"	"			SW¼NE¼	SE¼NE¼	80.00
5	"	10	"	"		NW¼SW¼	SW¼SW¼		80.00
6	"	"	"	"	N½SE¼		SW¼SE¼		80.00
7	"	11	"	"	NE¼NE¼	NW¼NE¼			80.00
8	"	16	"	"			SW¼NE¼	SE¼NE¼	80.00
9									640.00
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

N. M. 248

OIL AND GAS LEASE

TEXAS PACIFIC COAL AND OIL COMPANY

160

161

ORIGINAL

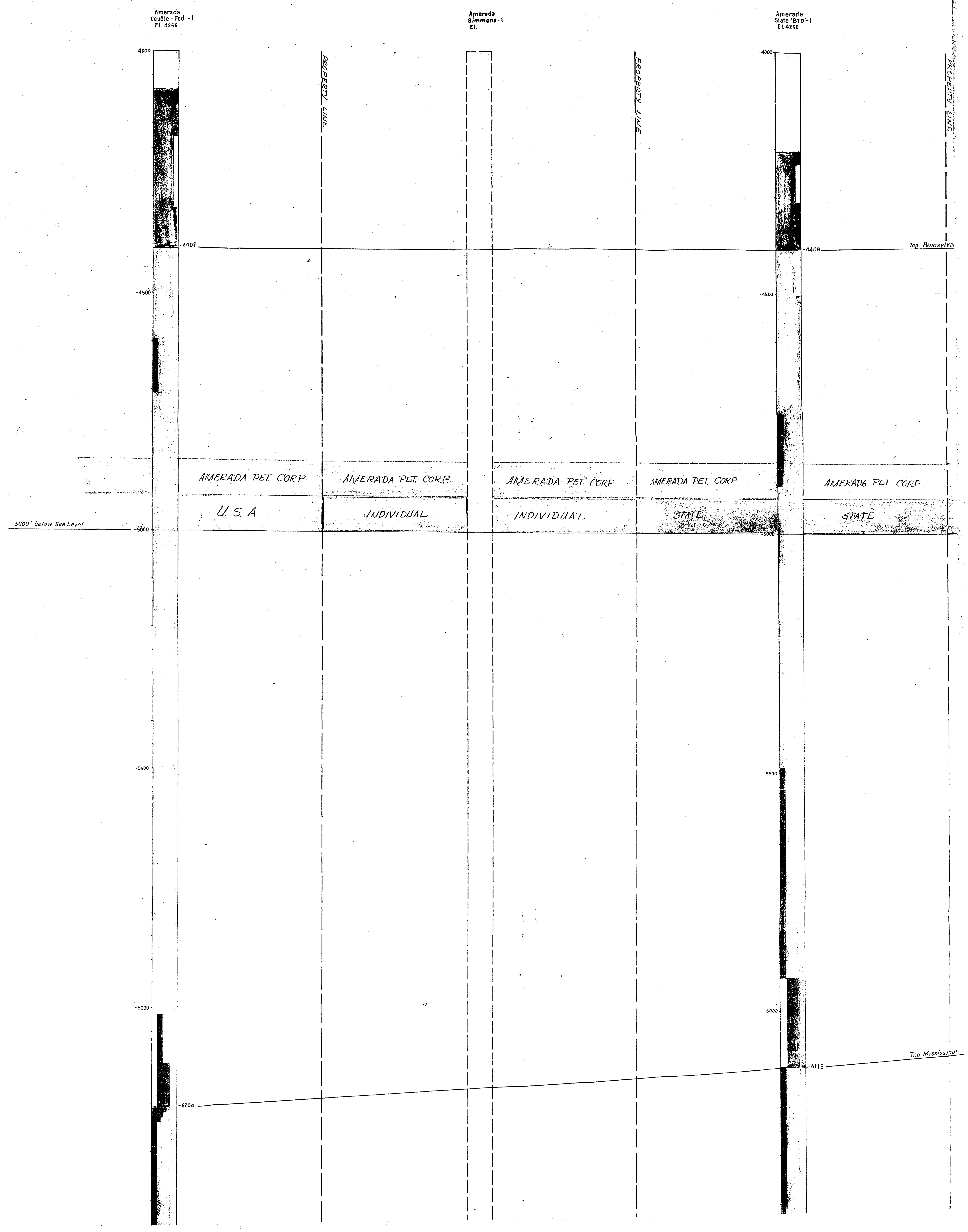
AMERADA PETROLEUM CORPORATION
CASE NO. 8485, DISTRICT COURT OF LEA COUNTY

T P COAL & OIL EXHIBITS — IN EVIDENCE

Exhibit "P" — page 81

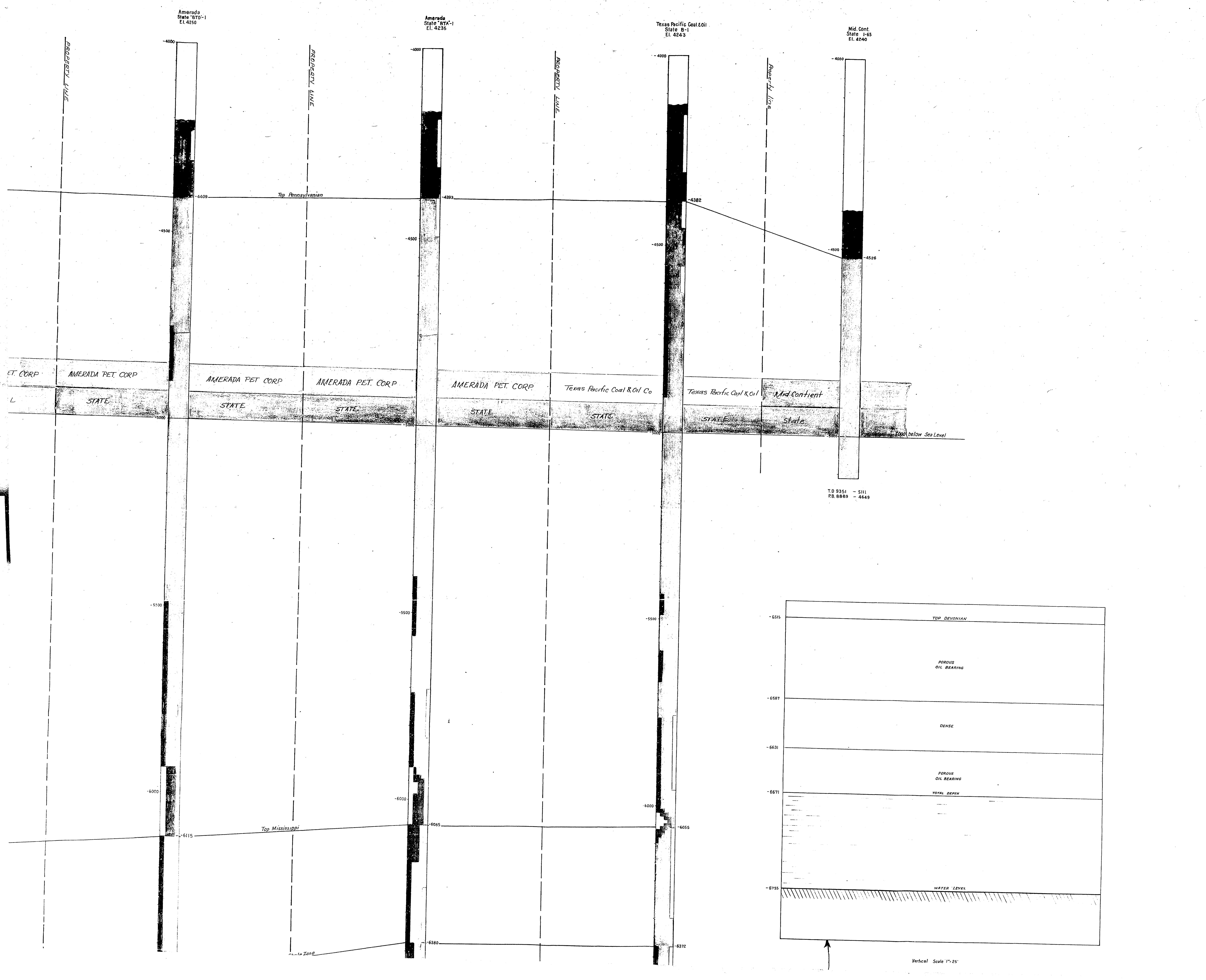
Oil Conservation Commission Case No. 191

Tex-Pac Ex No. "P"

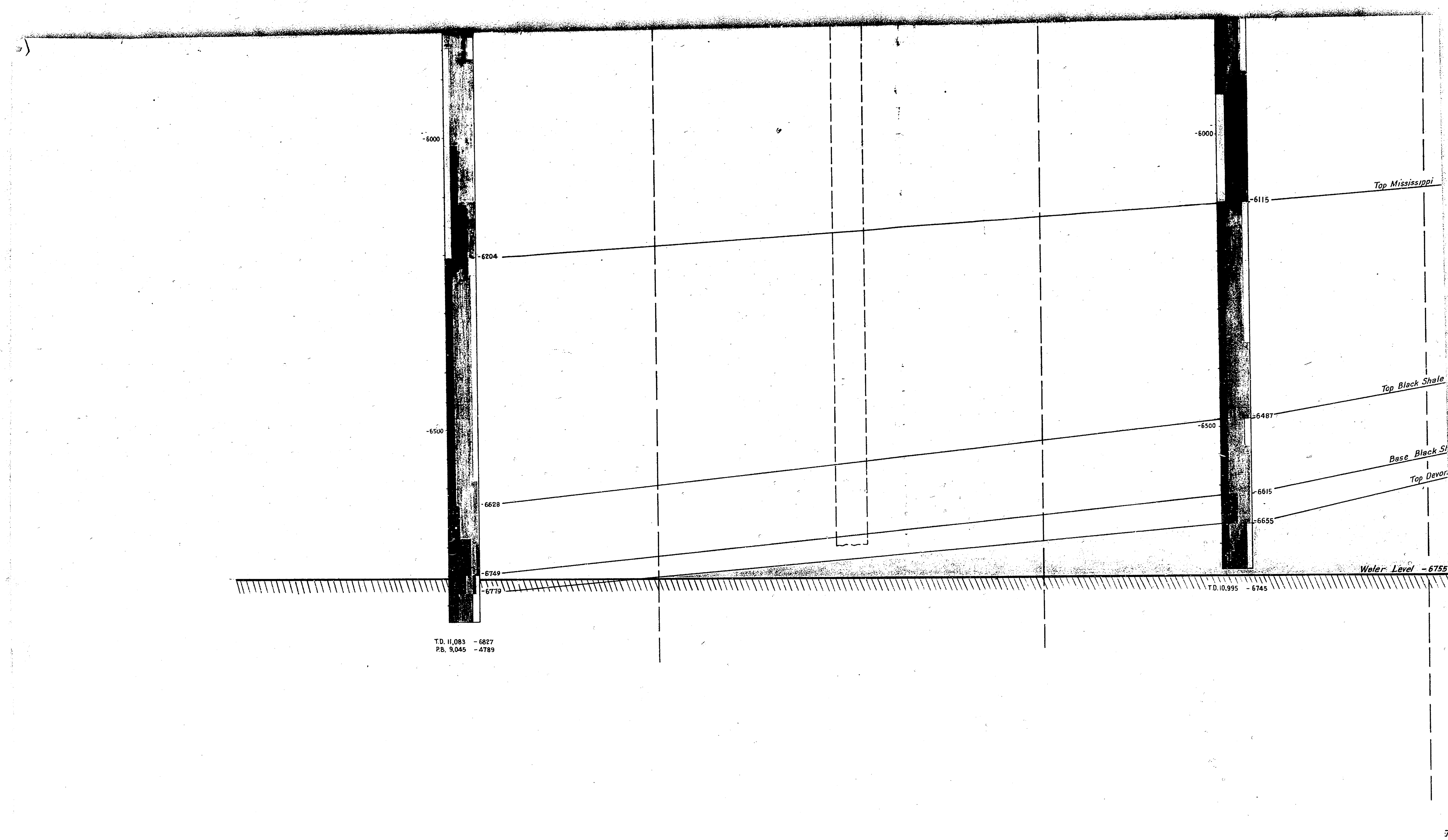


162

163

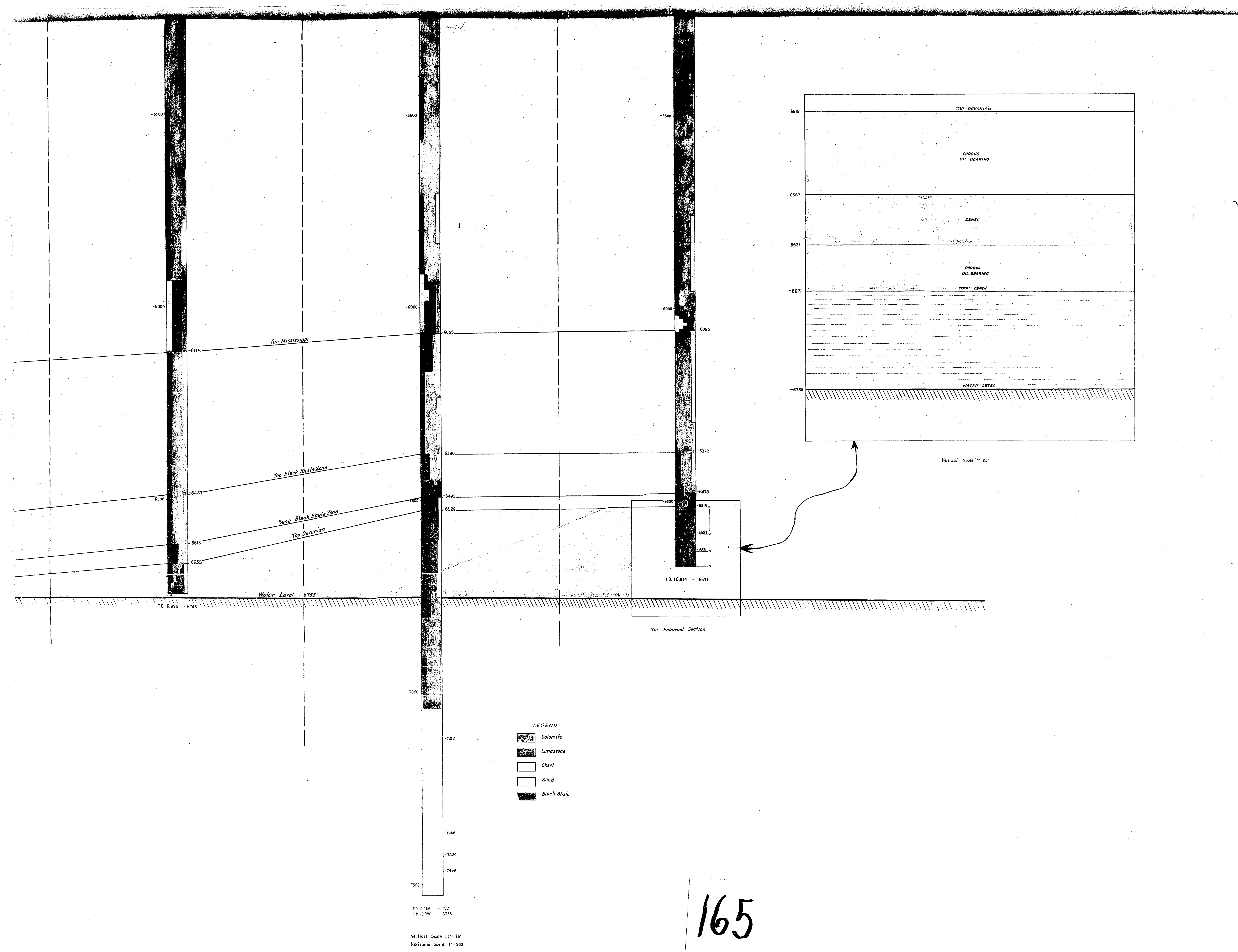


Amerada
State 'BTD'-1
El. 4250
Amerada
State 'BTA'-1
El. 4235
Texas Pacific Coal & Oil
State B-1
El. 4243
Mid. Cont.
State 1-65
El. 4240
PROPERTY LINE
Property line
Top Pennsylvanian
-4409
-4393
-4382
-4526
AMERADA PET. CORP
STATE
Texas Pacific Coal & Oil Co
Texas Pacific Coal & Oil
Mid Contient
State
5000 below Sea Level
T.D 9351 - 5111
P.B. 8889 - 4649
Top Mississippi
-6115
-6065
-6055
-6380
-6372
-6515
TOP DEVONIAN
POROUS OIL BEARING
-6587
DENSE
-6631
POROUS OIL BEARING
-6671
TOTAL DEPTH
-6755
WATER LEVEL
Vertical Scale 1"=25'

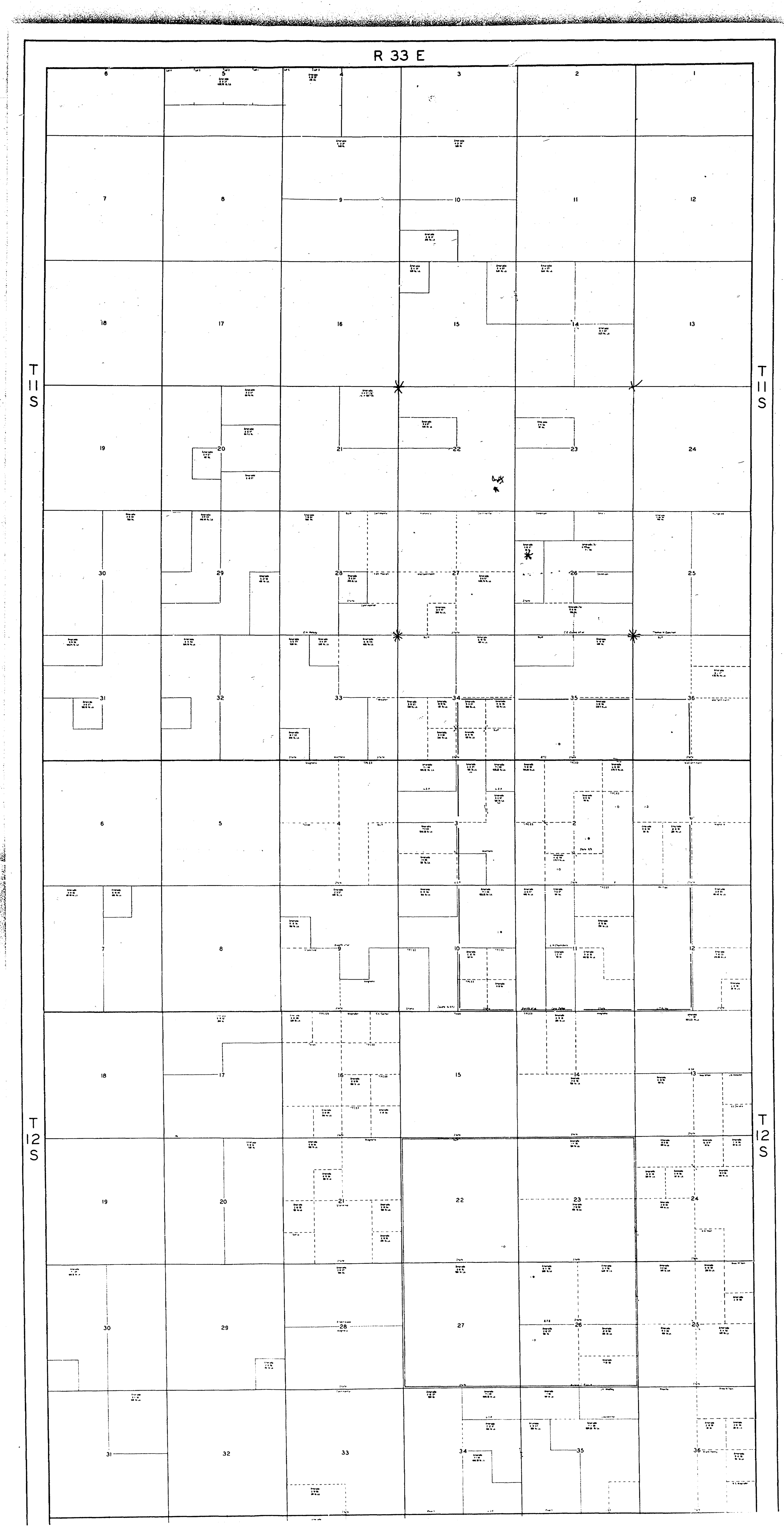


-6000
-6204
-6500
-6628
-6749
-6779
T.D. 11,083 -6827
P.B. 9,045 -4789
-6000
Top Mississippi
-6115
Top Black Shale
-6500
-6487
-6615
-6655
Water Level -6755
T.D. 10,995 -6745

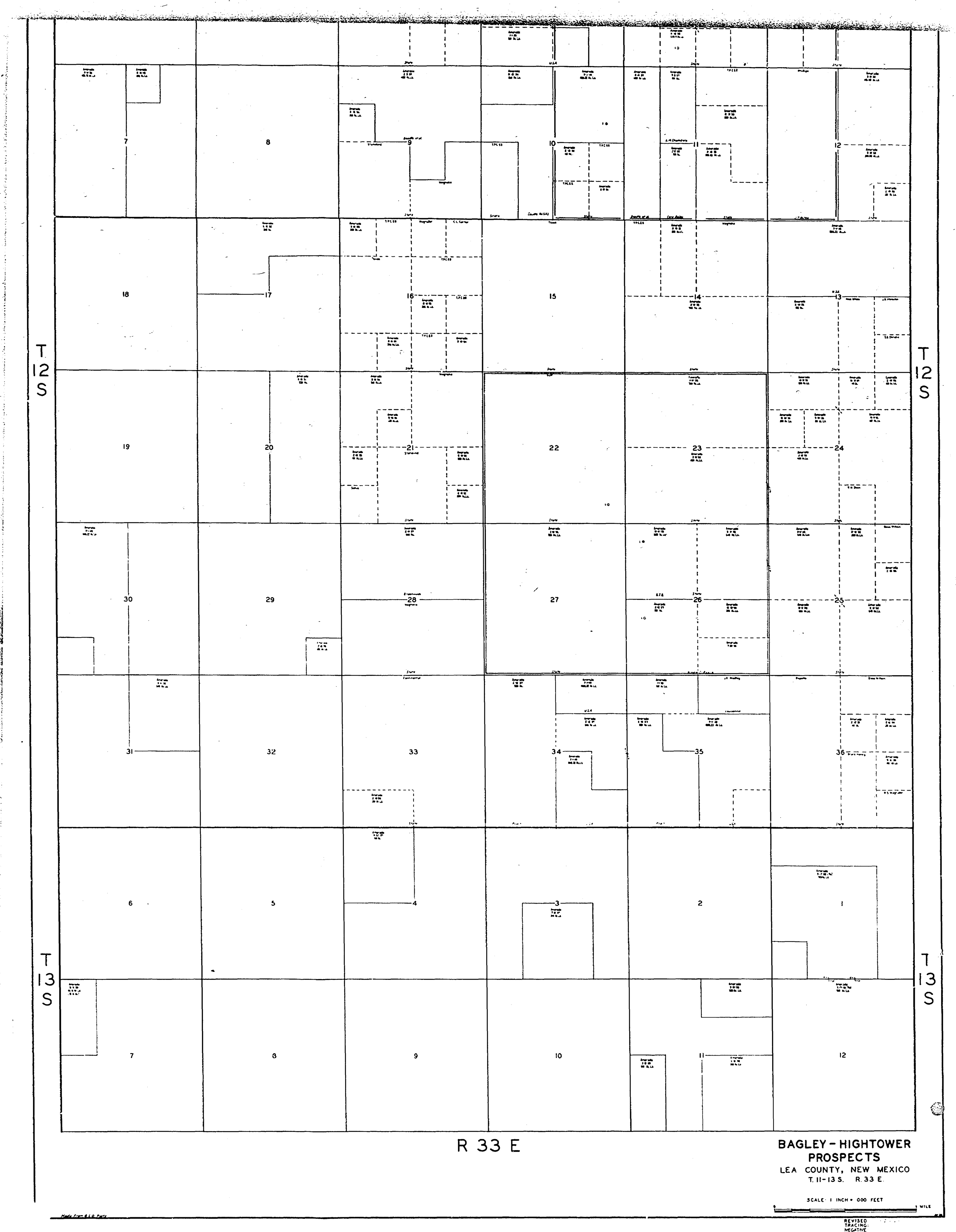
164


Top Mississippi
Top Black Shale Zone
Base Black Shale Zone
Top Devonian
Water Level -6755'
T.D. 10,995 - 6745
T.D. 10,914 - 6671
See Enlarged Section
T.D. 11,766 - 7531
PB 10,990 - 6755
Vertical Scale : 1" = 75'
Horizontal Scale : 1" = 200
LEGEND
Dolomite
Limestone
Chert
Sand
Black Shale
TOP DEVONIAN
POROUS
OIL BEARING
DENSE
POROUS
OIL BEARING
TOTAL DEPTH
WATER LEVEL
-6515
-6587
-6631
-6671
-6755
Vertical Scale 1" = 25'

166



167


T 12 S
T 13 S
R 33 E
BAGLEY - HIGHTOWER
PROSPECTS
LEA COUNTY, NEW MEXICO
T. 11-13 S. R. 33 E.
SCALE: 1 INCH = 000 FEET
1 MILE
REVISED
TRACING:
NEGATIVE
POSITIVE

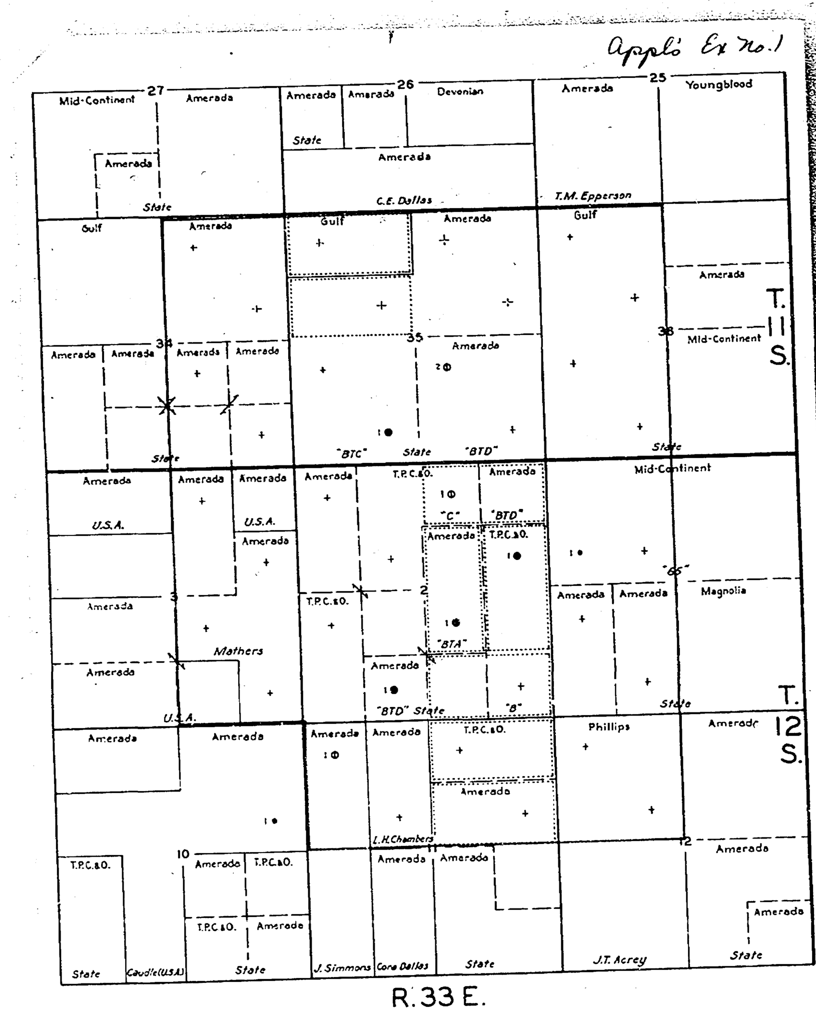
AMERADA PETROLEUM CORPORATION,
CASE NO. 8485, DISTRICT COURT OF LEA COUNTY

AMERADA EXHIBITS - original	IN EVIDENCE
1. Outlined area of Bagley, recommending required or designated spacing	page 8 - 9
2. Schlumberger of BTA	9
3. Schlumberger of BTC	43
4. Schlumberger of BTD	43

Oil Conservation Commission Case No. 191

168

Appl's Ex No. 1

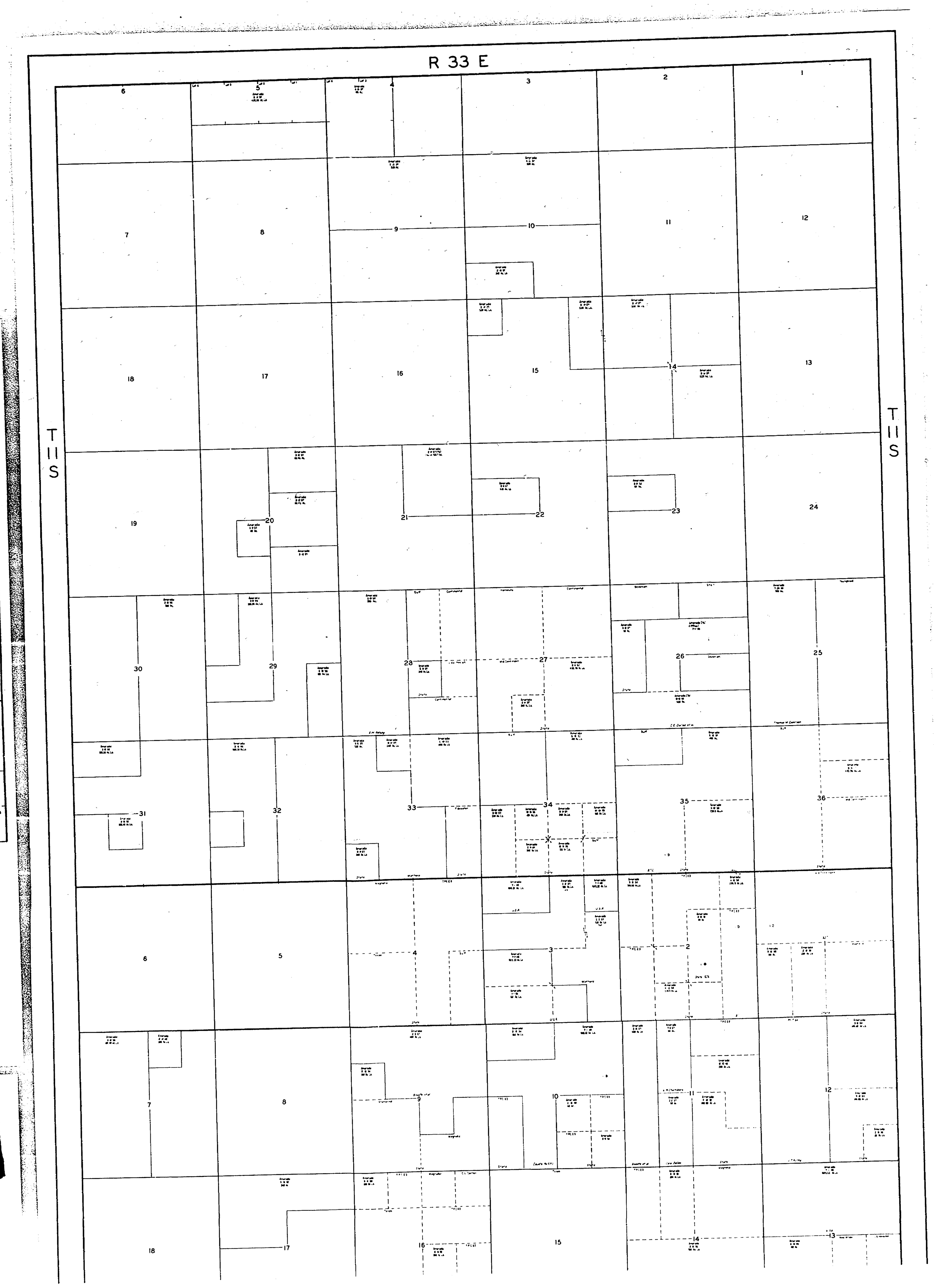


BAGLEY FIELD
LEA COUNTY NEW MEXICO

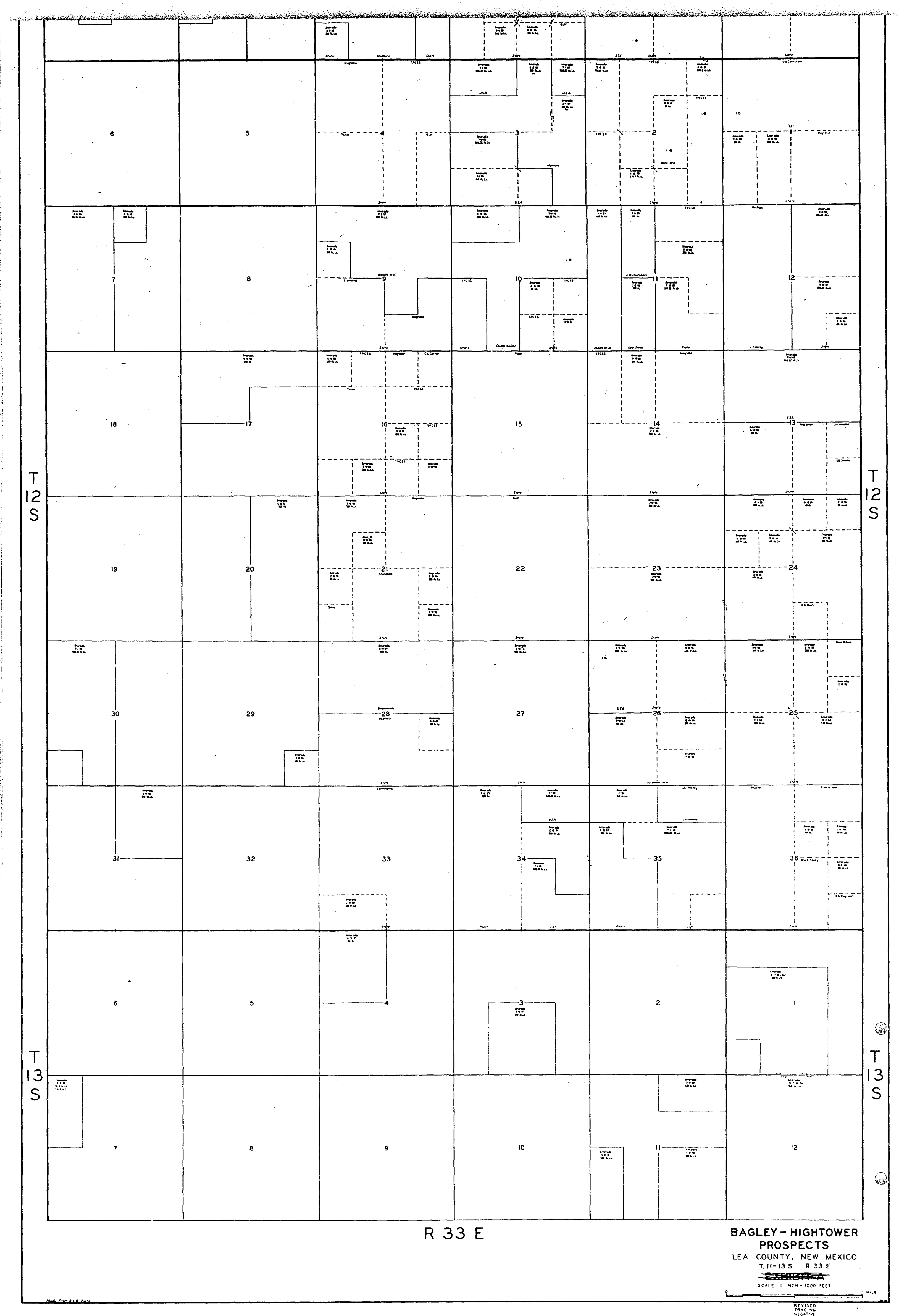
- ● BAGLEY - SILURO-DEVONIAN POOL WELLS
- • BAGLEY - PENNSYLVANIAN POOL WELLS

APPLICATION AMERADA PETROLEUM CORPORATION
DECEMBER 20, 1949

169



170


T 12 S
T 13 S
R 33 E
BAGLEY - HIGHTOWER
PROSPECTS
LEA COUNTY, NEW MEXICO
T. 11-13 S. R. 33 E.
~~EXHIBIT A~~
SCALE 1 INCH = 1000 FEET
0
1 MILE
REVISED
TRACING
NEGATIVE
POSITIVE

SCHLUMBERGER
WELL SURVEYING CORPORATION

Location of Well

660' FSL & 1980' FWL
SEC. 2 12S-33E

Tulsa

Elevation: D.F.:
K.B.:
or G.L.:

COMPANY: AMERADA PETROLEUM CORP.

WELL: STATE B T D #1.

FIELD: WILDCAT

LOCATION: SEC. 2 12S-33E

COUNTY: LEA

STATE: NEW MEXICO

FILING No.

COUNTY: LEA
FIELD OR LOCATION: WILDCAT
WELL: STATE B T D #1
COMPANY: AMERADA PETROLEUM CORP.

RUN NO.	I	II			
Date	8-18-49	11-26-49			
First Reading	3882 3882	10977 10977			
Last Reading	290 0	3882 3882			
Footage Measured	3592 3882	7095 7095			
Csg Shoe Schlum.	290	—			
Csg Shoe Driller	290	—			
Max. Depth Reached	3885	10980			
Bottom Driller	3885	10980			
Depth Datum	18" above RT	1½' abv. RT or 17' abv. Gr.			
Mud Nature	Impermix	Zeogel			
" Density	11	9.4			
" Viscosity	33	85			
" Resistivity	.10 @ 85 °F	.08 @ 65 °F	@ °F	@ °F	@ °F
" Resistivity BHT	@ °F	.023 @ 212 °F	@ °F	@ °F	@ °F
" pH	@ °F	@ °F	@ °F	@ °F	@ °F
" Water Loss	CC 30 Min.	5 CC 30 Min.	CC 30 Min.	CC 30 Min.	CC 30 Min.
Maximum Temp. °F.	130	212			
Bit Size	11"	7 7/8"			
Spacings — AM	10"	10"			
A					
AO	32"	32"			
E.S. Rig Time	4 hours	10½ hrs.			
Truck No.	252	279			
Recorded By	Scott	Cargill			
Witnessed By		Stephenson			

REMARKS
Filter Cake - 2/32"

Spontaneous-Potential millivolts	DEPTHS	Resistivity -ohms. m²/m.

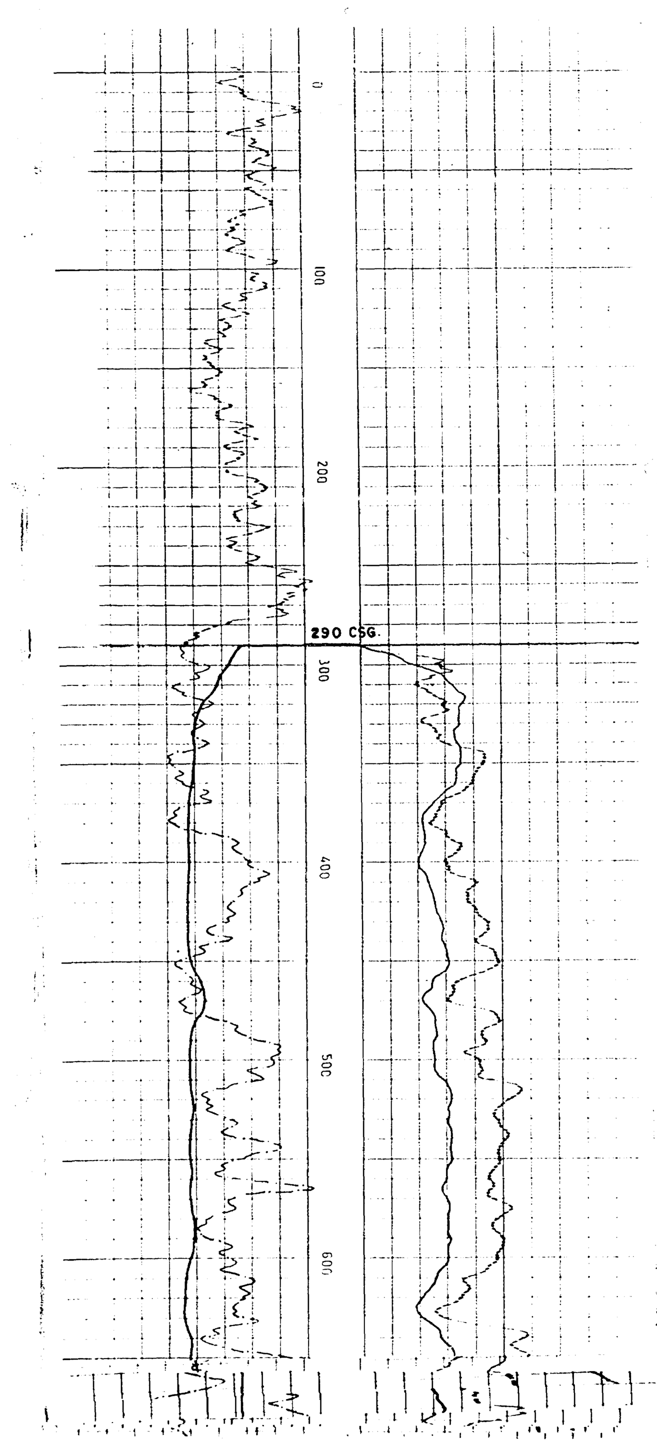
— | 20 | + Run 1 & 2

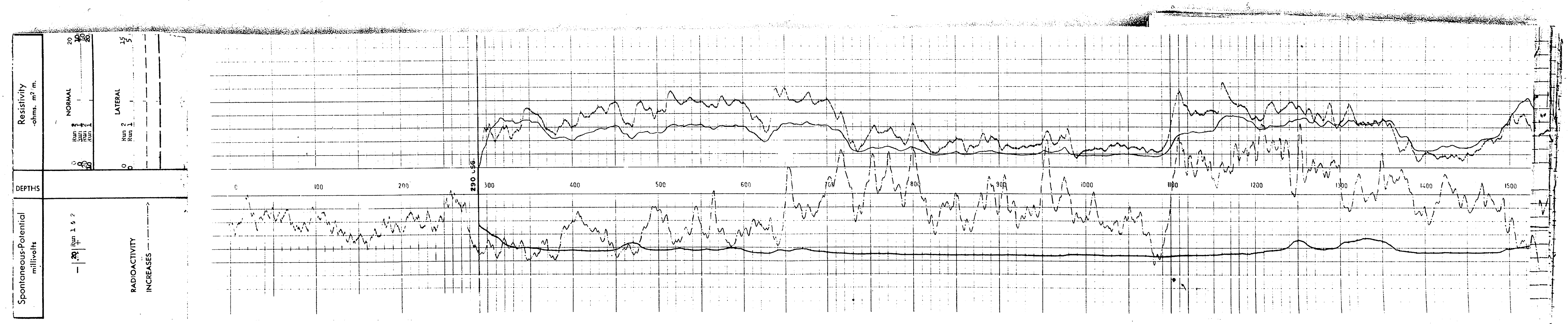
NORMAL
0 Run 2 20
0 Run 1 10
20 Run 2 40
10 Run 1 20

LATERAL
0 Run 2 15
0 Run 1 5

RADIOACTIVITY
INCREASES →

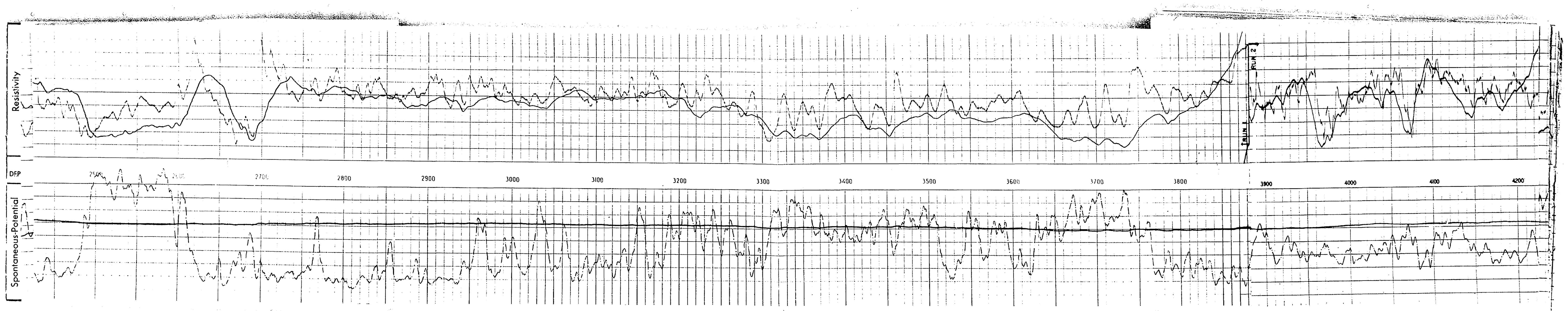
171



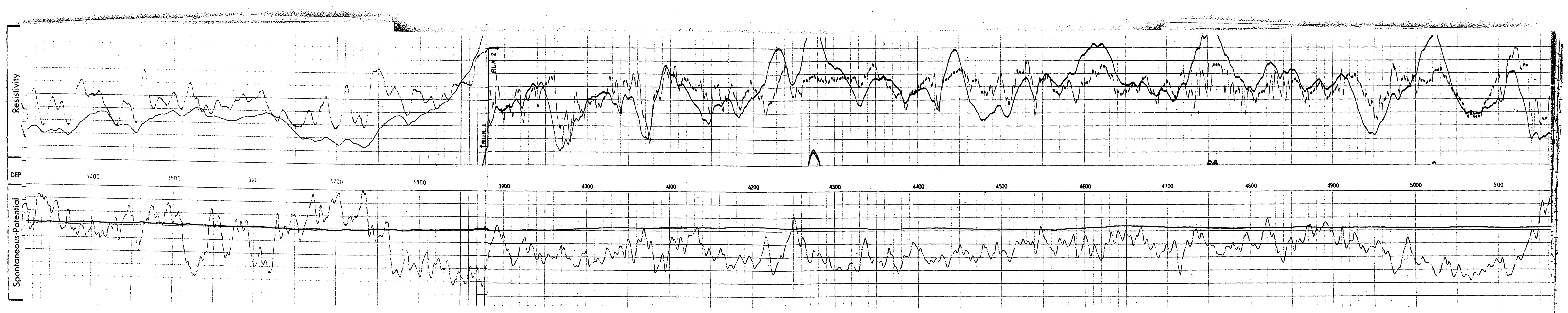

Resistivity
NORMAL
LATERAL
DEPTHS
Spontaneous-Potential
millivolts
RADIOACTIVITY
INCREASES

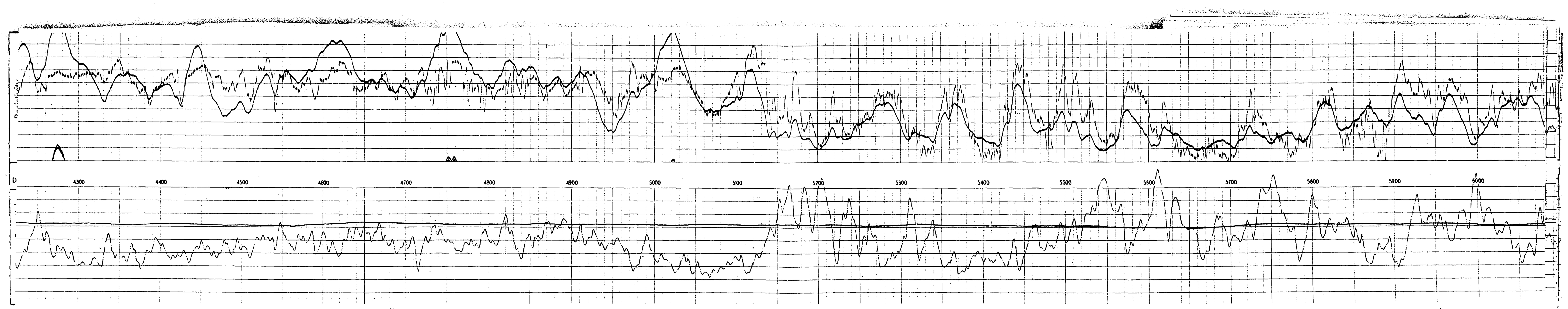
172

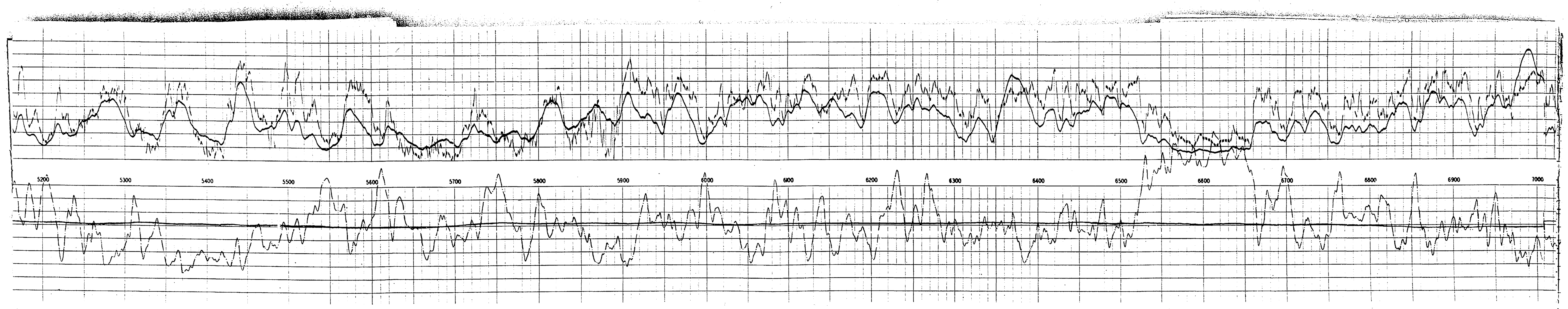

Resistivity
DEPTH
Spontaneous Potential
1200
1300
1400
1600
1700
1800
1900
2000
2200
2300
2400
2700
2800
2900
3000
3200
3300



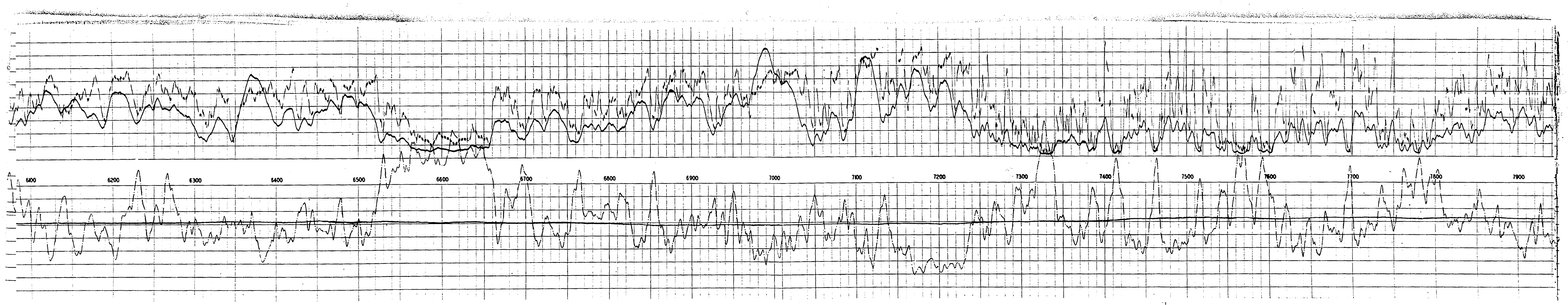
Resistivity
Spontaneous Potential
DFP
2700
2800
2900
3000
3100
3200
3300
3400
3500
3600
3700
3800
3900
4000
4100
4200

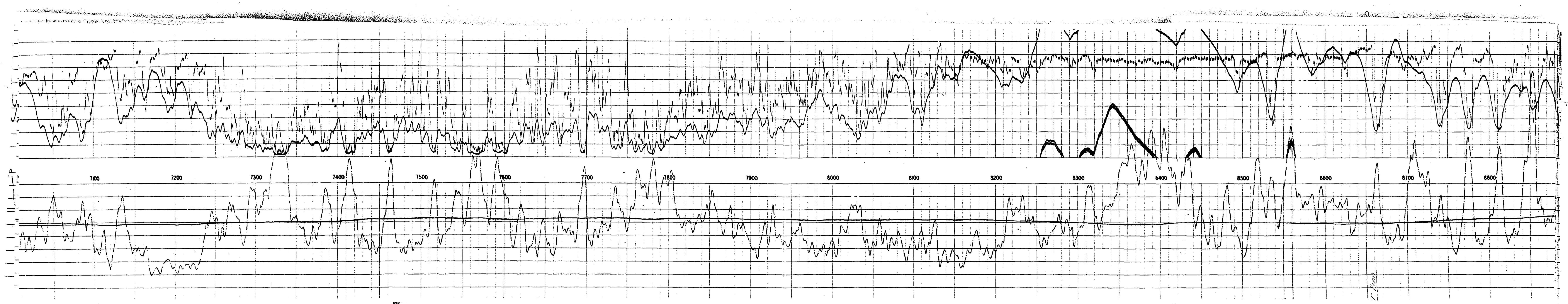

Resistivity
DEP
3400
3500
3700
3800
3900
4000
4100
4200
4300
4400
4500
4600
4700
4800
4900
5000
5100
Spontaneous-Potential


D
4300
4400
4500
4600
4700
4800
4900
5000
5100
5200
5300
5400
5500
5600
5700
5800
5900
6000

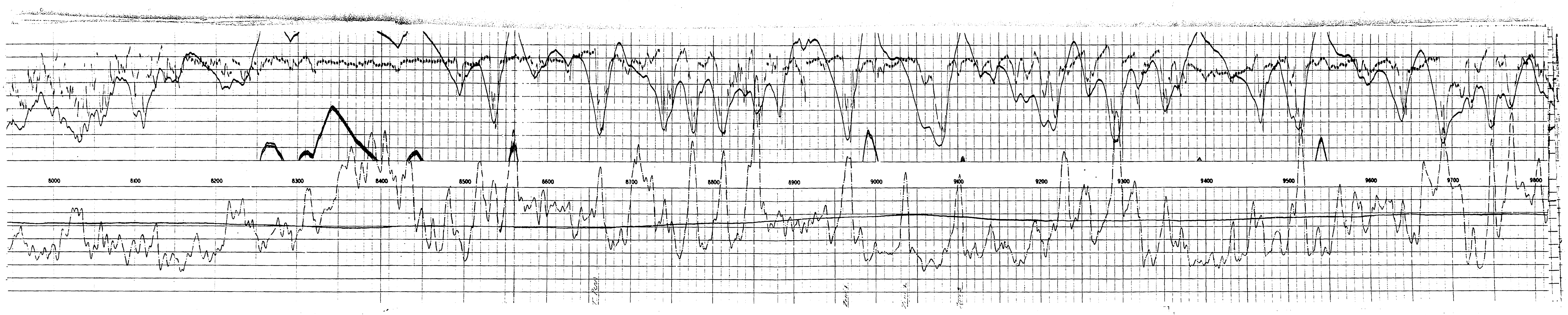

5200
5300
5400
5500
5600
5700
5800
5900
6000
6100
6200
6300
6400
6500
6600
6700
6800
6900
7000

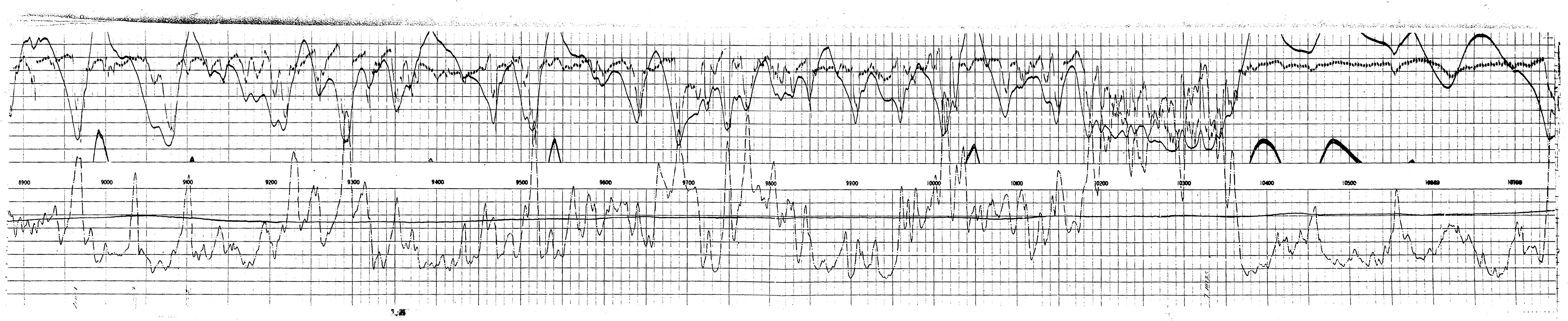
177


6100
6200
6300
6400
6500
6600
6700
6800
6900
7000
7100
7200
7300
7400
7500
7600
7700
7800
7900

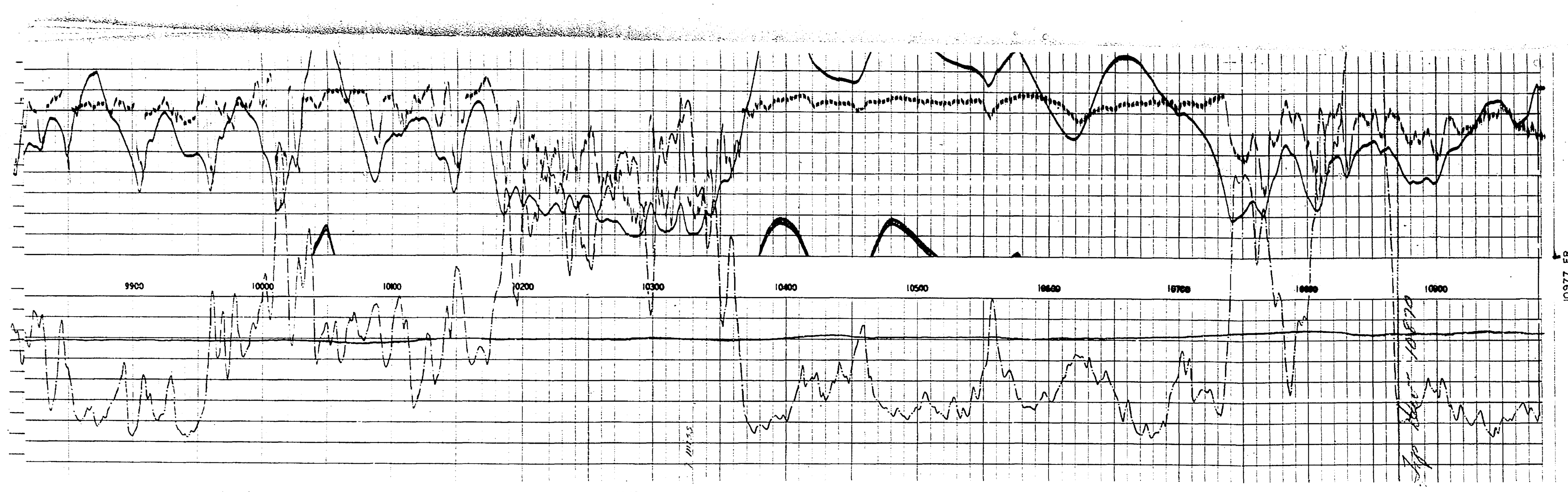

7100
7200
7300
7400
7500
7600
7700
7800
7900
8000
8100
8200
8300
8400
8500
8600
8700
8800

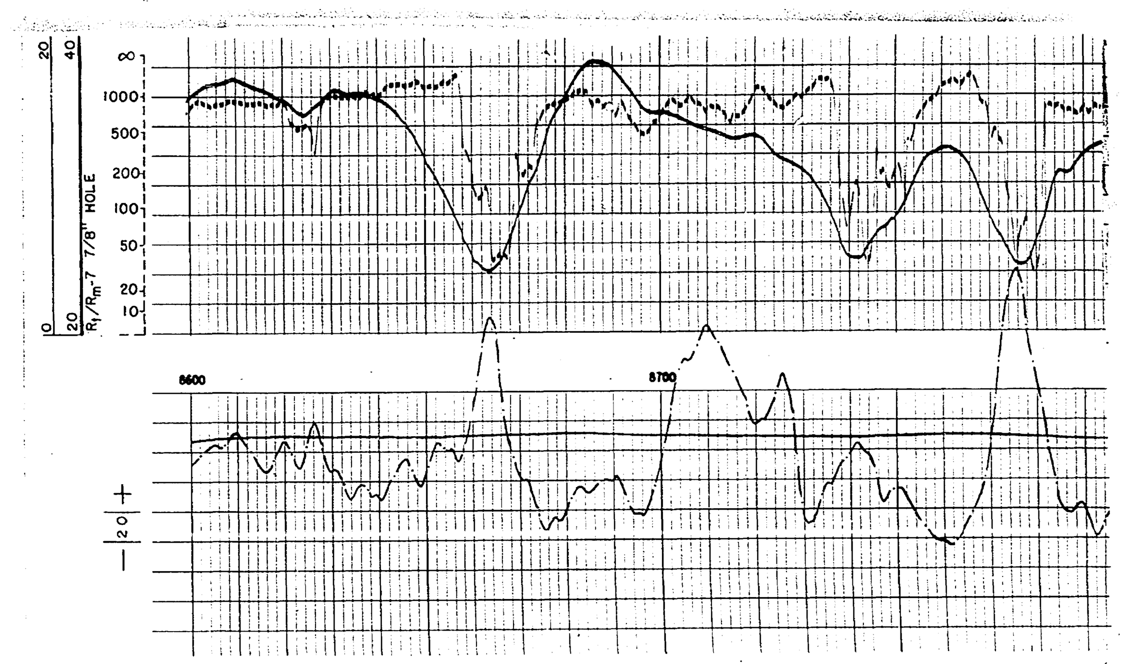
179

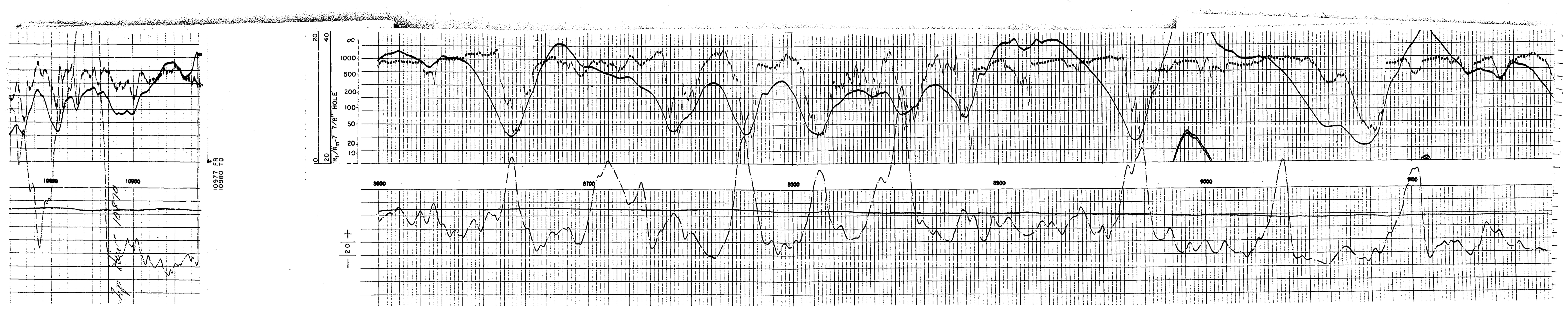

8000
8100
8200
8300
8400
8500
8600
8700
8800
8900
9000
9100
9200
9300
9400
9500
9600
9700
9800

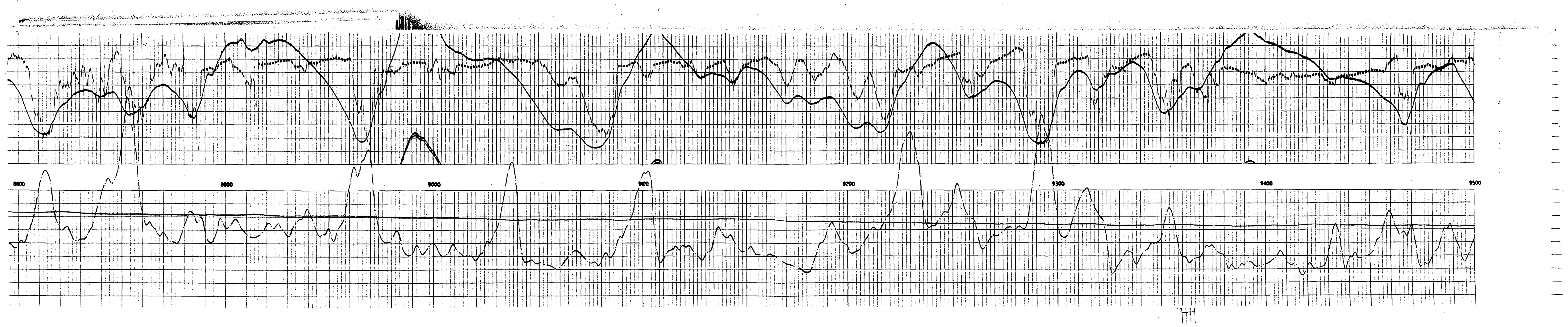


8900
9000
9100
9200
9300
9400
9500
9600
9700
9800
9900
10000
10100
10200
10300
10400
10500

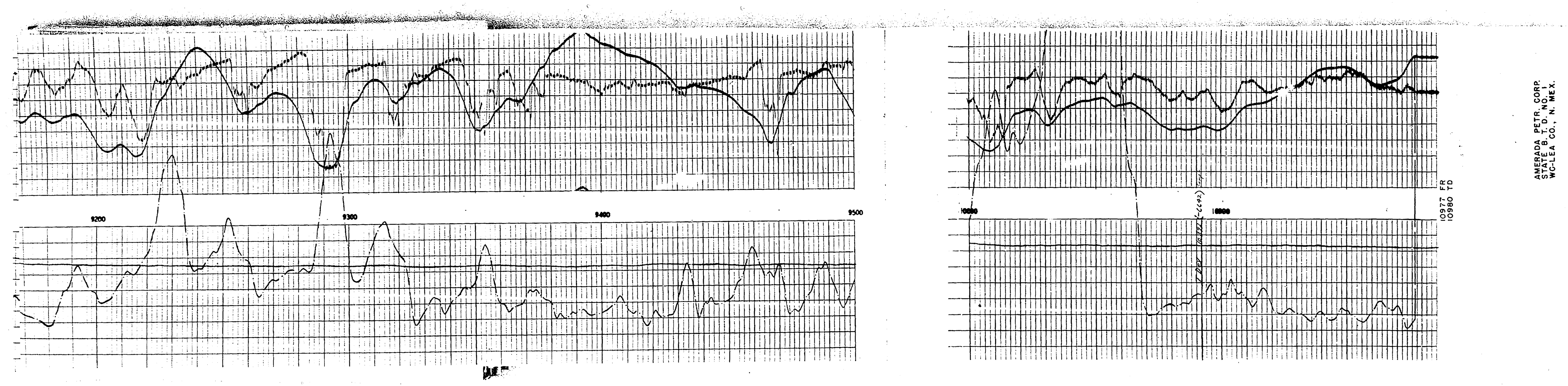








184


9200
9300
9400
9500
10977 FR
10980 TD
AMERADA PETR. CORP.
STATE B. T. D. NO. 1
WC-LEA CO., N. MEX.

FORM 154.B

SCHLUMBERGER

WELL SURVEYING CORPORATION

Location of Well

[illegible]
[illegible] 35 11-33[illegible]

Elevation: D.F.: [illegible]
K.B.:
or G.L.:

COMPANY: [illegible]

WELL: [illegible] 1

FIELD: [illegible]

LOCATION: SEC. 35 11-3[illegible]

COUNTY: [illegible]

STATE: N[illegible]

FILING No.

COUNTY:
FIELD OR LOCATION:
WELL:
COMPANY:

RUN NO.	I	II	III		
Date	[illegible]	[illegible]	10-2[illegible]		
First Reading	[illegible] 3[illegible]32	9[illegible] [illegible]	10969 109[illegible]		
Last Reading	[illegible] 0	3880 3890	9[illegible]33 9[illegible]		
Footage Measured	[illegible]	5603 5603	1[illegible] 1[illegible]		
Csg Shoe Schlum.	[illegible]	3880	–		
Csg Shoe Driller	[illegible]	388[illegible]	–		
Max. Depth Reached	[illegible]	9[illegible]26	10972		
Bottom Driller	[illegible]	9[illegible]95	109[illegible]		
Depth Datum	1' [illegible]	1' above [illegible]	[illegible] 13' above Ground		
Mud Nature	[illegible]	Impermix-[illegible]	[illegible]-Zeogel		
" Density	11.[illegible]	10.1	10		
" Viscosity	[illegible]	13	5[illegible]		
" Resistivity	[illegible] @ salt °F	.32 @ 85 °F	.08 @ [illegible] °F	@ °F	@ °F
" Resistivity BHT	@ °F	.13 @ 190 °F	.026 @ 205 °F	@ °F	@ °F
" pH	@ °F	@ °F	@ °F	@ °F	@ °F
" Water Loss	CC 30 Min.	CC 30 Min.	[illegible] CC 30 Min.	CC 30 Min.	CC 30 Min.
Maximum Temp. °F		1[illegible]	205		
Bit Size	1[illegible] 3/4	9 3/4	[illegible] 3/4		
Spacings – AM	10"	10"	10"		
A					
AO	32"	32"	32"		
E.S. Rig Time	[illegible] hrs.	7½ hrs.	3 hrs.		
Truck No.	214	252	272		
Recorded By	Scott	Scott	Cargill		
Witnessed By			Tilge		

REMARKS

Run III: Filter Cake – 2/32"

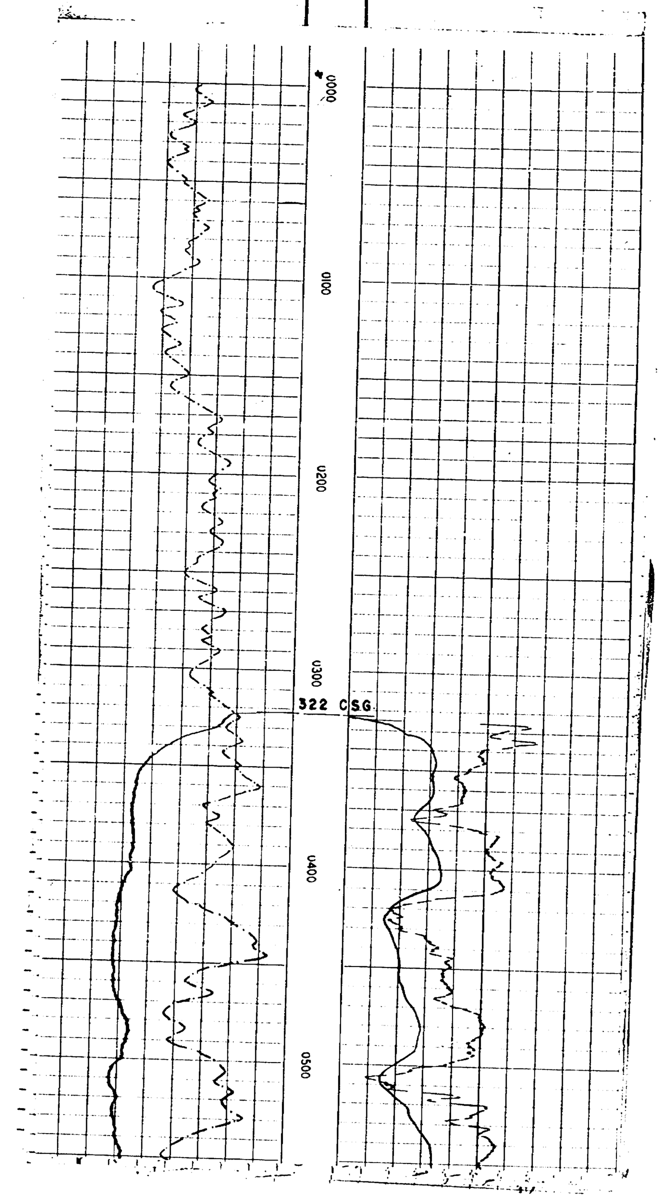
Spontaneous-Potential millivolts	DEPTHS	Resistivity -ohms. m²/m.

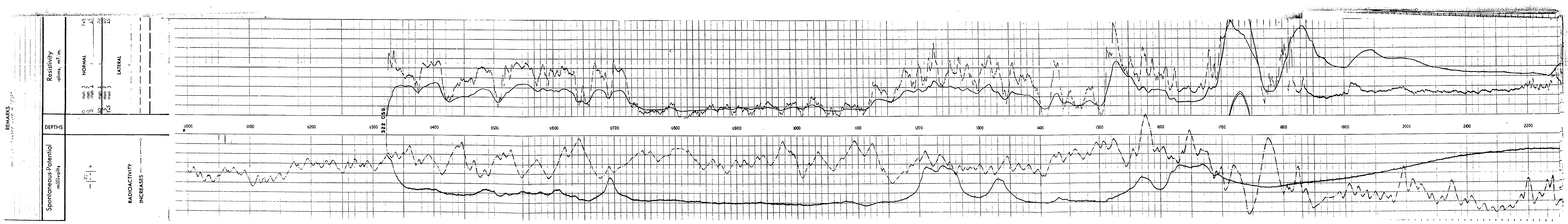
NORMAL

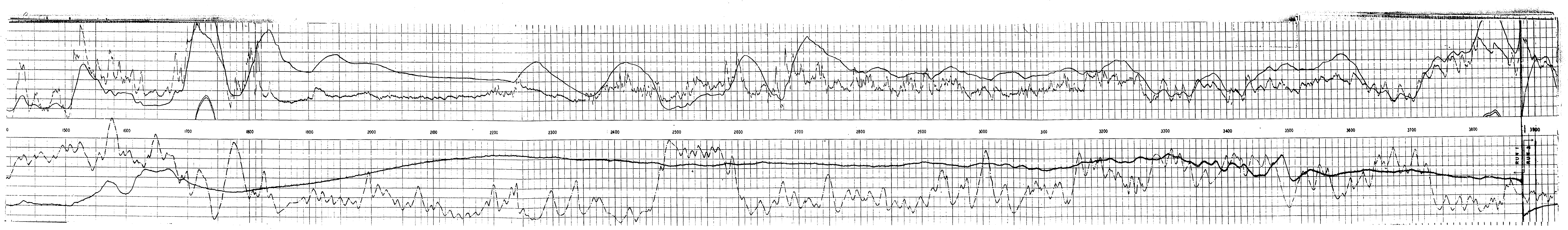
LATERAL

RADIOACTIVITY INCREASES

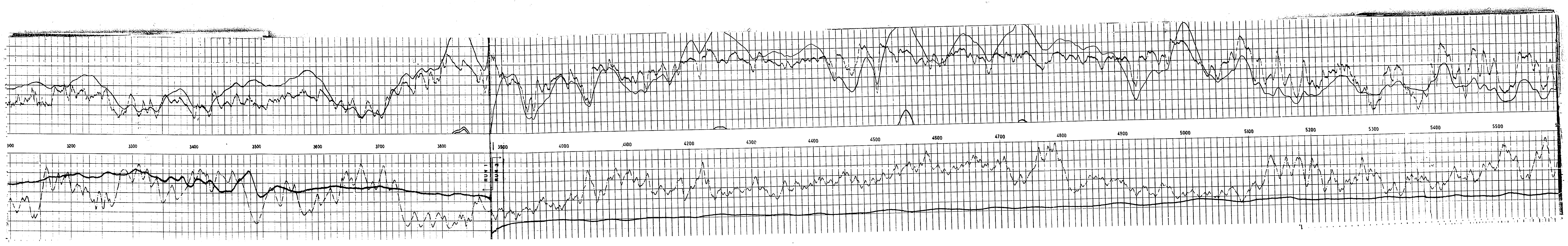
186

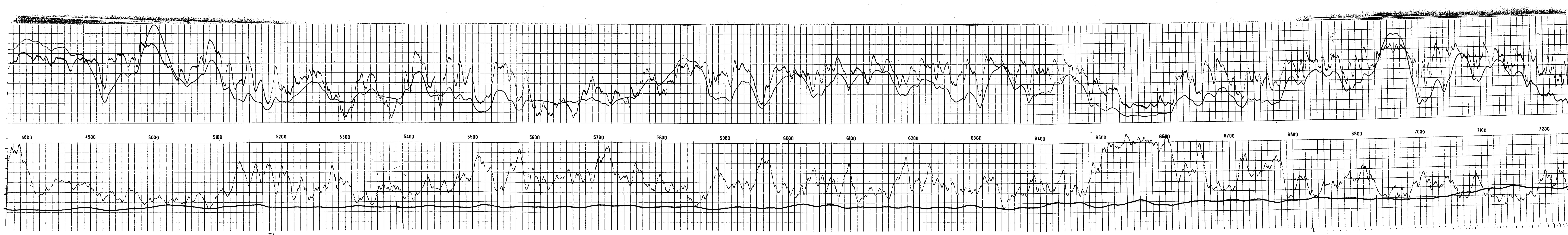



REMARKS
Resistivity
ohms. m²/m.
NORMAL
LATERAL
DEPTHS
Spontaneous-Potential
millivolts
RADIOACTIVITY
INCREASES

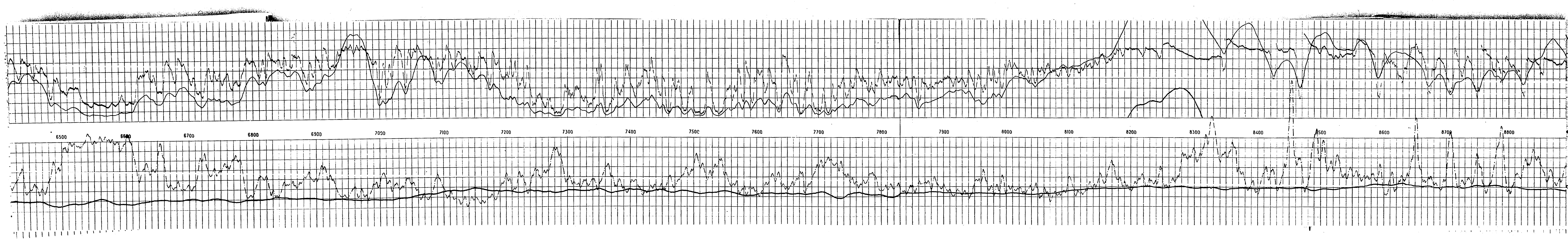

0
1500
1600
1700
1800
1900
2000
2100
2200
2300
2400
2500
2600
2700
2800
2900
3000
3100
3200
3300
3400
3500
3600
3700
3800
3900
RUN 1
RUN 2

188

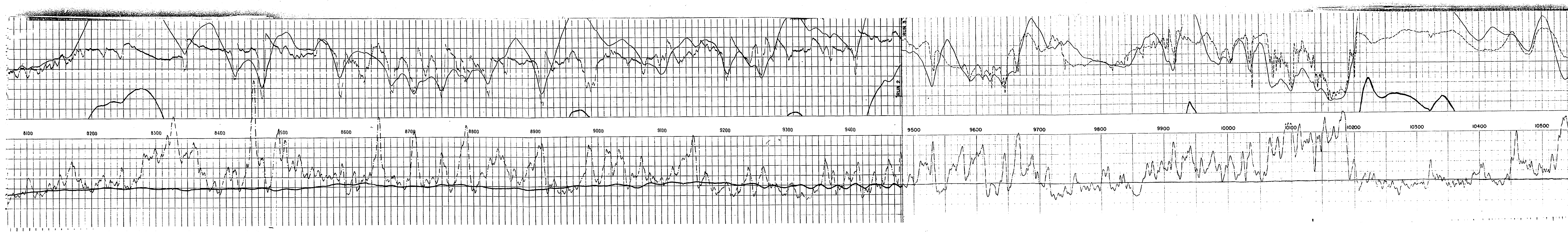



4800
4900
5000
5100
5200
5300
5400
5500
5600
5700
5800
5900
6000
6100
6200
6300
6400
6500
6700
6800
6900
7000
7100
7200

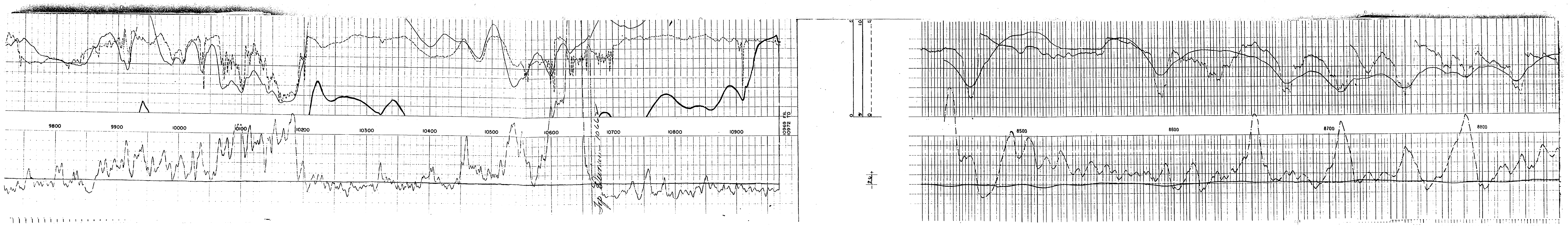
190

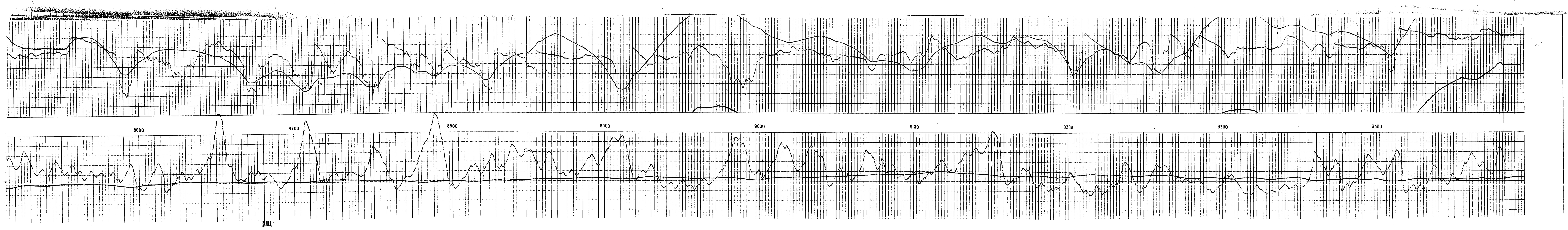

6500
6600
6700
6800
6900
7000
7100
7200
7300
7400
7500
7600
7700
7800
7900
8000
8100
8200
8300
8400
8500
8600
8700
8800

191

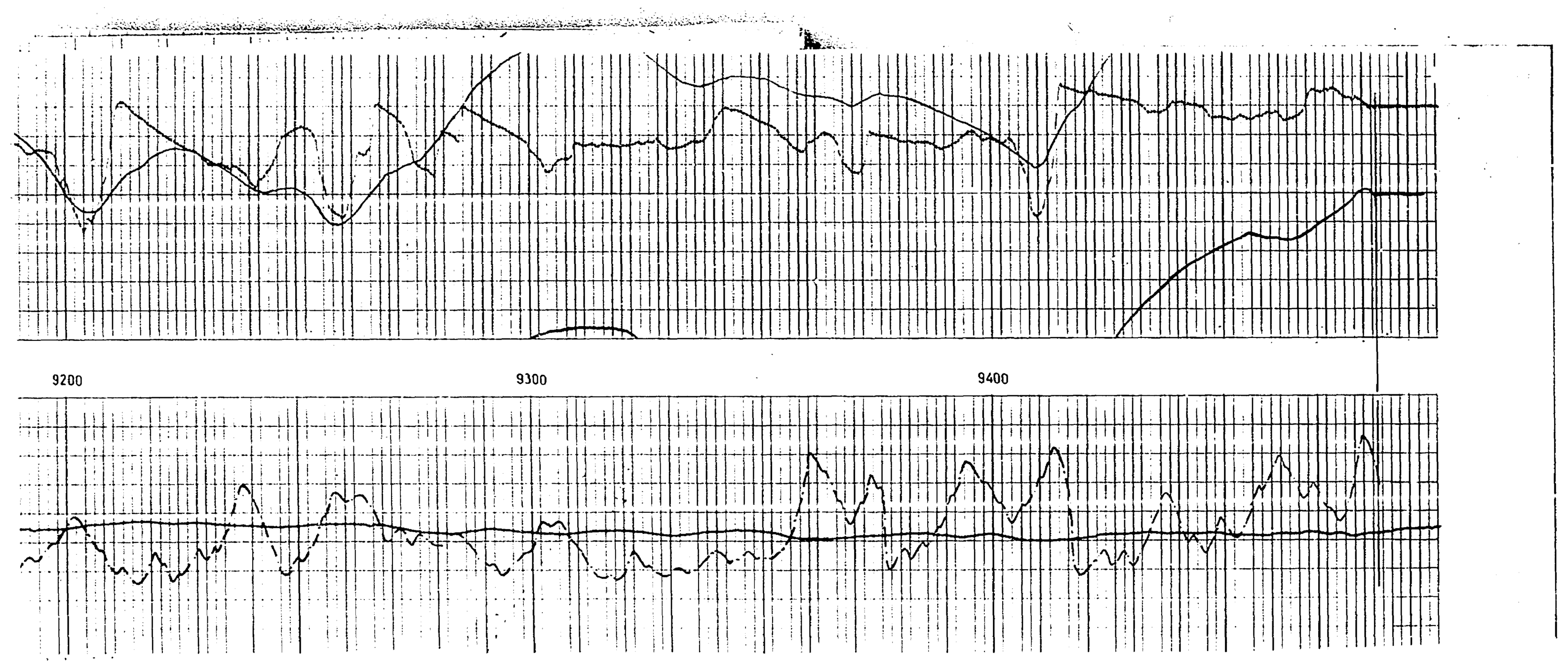

8100
8200
8300
8400
8500
8600
8700
8800
8900
9000
9100
9200
9300
9400
9500
9600
9700
9800
9900
10000
10100
10200
10300
10400
10500

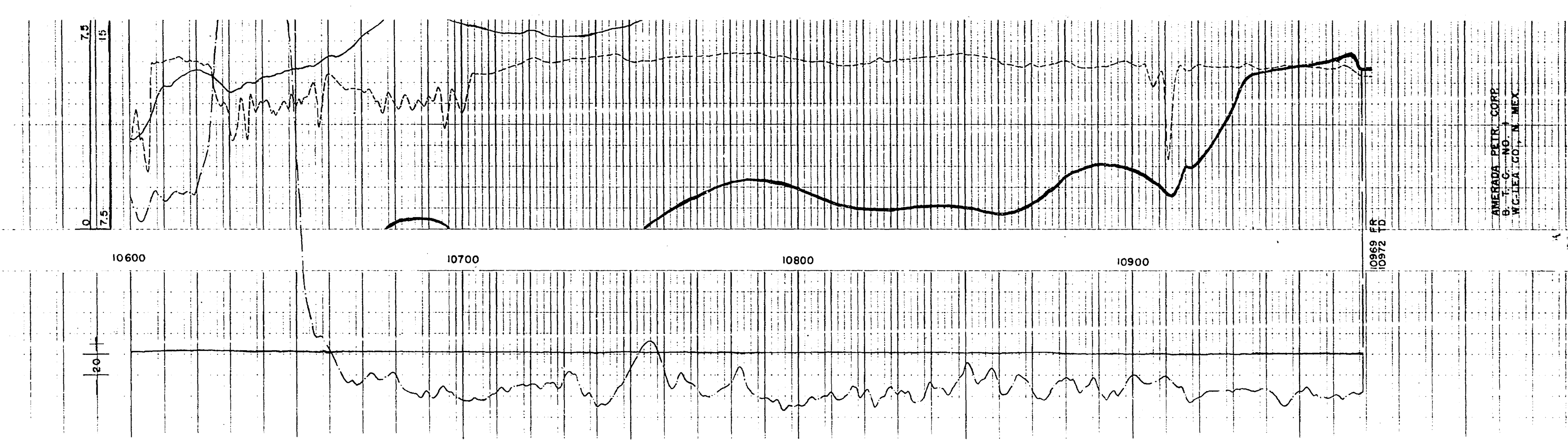
192


9800
9900
10000
10100
10200
10300
10400
10500
10600
10700
10800
10900
8500
8600
8700
8800



194


9200
9300
9400


10600
10700
10800
10900
10969 FR
10972 TD
AMERADA PETR. CORP.
B. T. G. NO. 1
WC-LEA CO., N. MEX.

195

FORM 154.B

SCHLUMBERGER

WELL SURVEYING CORPORATION

Location of Well

1980' FS & E/L
SEC. 2 12S-33E

Elevation: D.F.: 4235'
K.B.:
or G.L.:

COMPANY: AMERADA PETROLEUM CORP.

WELL: STATE B T A #1

FIELD: WILDCAT

LOCATION: SEC. 2 12S-33E

COUNTY: LEA

STATE: NEW MEXICO

FILING No.

COUNTY: LEA
FIELD OR LOCATION: WILDCAT
WELL: STATE B T A #1
COMPANY: AMERADA PETROLEUM CORP.

RUN NO.	I	II	III	IV	V
Date	12-14-48	3-4/5-49	5-18-49	6-7-49	7-8-49
First Reading	3925 3925	9263 9263	11193 11193	11486 11486	11762 11762
Last Reading	289 0	3924 4185	9263 9263	11200 11193	11486 11486
Footage Measured	3636 3925	5339 5078	1930 1930	286 293	276 276
Csg Shoe Schlum.	289	3924	-	11200	-
Csg Shoe Driller	287	3925	-	11200	11200
Max. Depth Reached	3928	9266	11196	11489	11765
Bottom Driller	3930	9265	11205	11490	11766
Depth Datum	1'above RT	1'above RT	1'above RT	1'above RT	1'above RT
Mud Nature	Impermix	Impermix	Sat. Salt	Fresh Water	Aquagel
" Density	11.7	11.7	9.3		8.8
" Viscosity	42	46	67		65
" Resistivity	Sat. @Salt °F	Sat. @Salt °F	.06 @ 65 °F	4.0 @ 70 °F	0.46 @ 75 °F
" Resistivity BHT	@ °F	@ °F	@ °F	@ °F	@ °F
" pH	@ °F	@ °F	@ °F	@ °F	@ °F
" Water Loss	CC 30 Min.	CC 30 Min.	CC 30 Min.	CC 30 Min.	CC 30 Min.
Maximum Temp. °F	122			225	238
Bit Size	12½ to 1725	11" to TD	(2) 7 7/8	4 3/4	4 3/4
Spacings — AM	10"	10"	10"	10"	10"
A					
AO	32"	32"	32"	32"	32"
E.S. Rig Time	2 hours	12½ hours	7½ hours	4 hours	1½ hours
Truck No.	214	214	279	279	277
Recorded By	Hamilton	Cargill	Hamilton-Scott	Hamilton	Hamilton
Witnessed By					

REMARKS

IV. Schlumberger depths were adjusted to operators
Sch. CSG. 11,190
Sch. TD 11,479

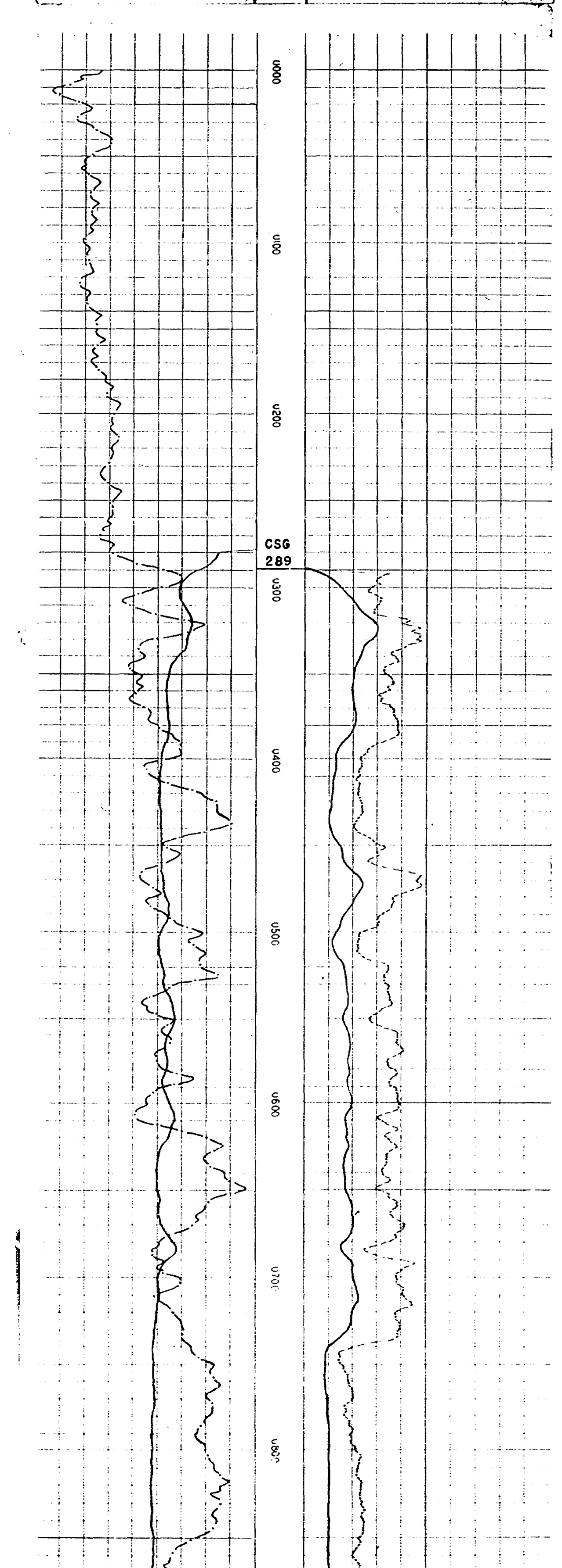
Spontaneous-Potential millivolts	DEPTHS	Resistivity -ohms. m²/m.

Run 1 — |20| +
Run 2 20
Run 3 20
Run 4 20
Run 5 10

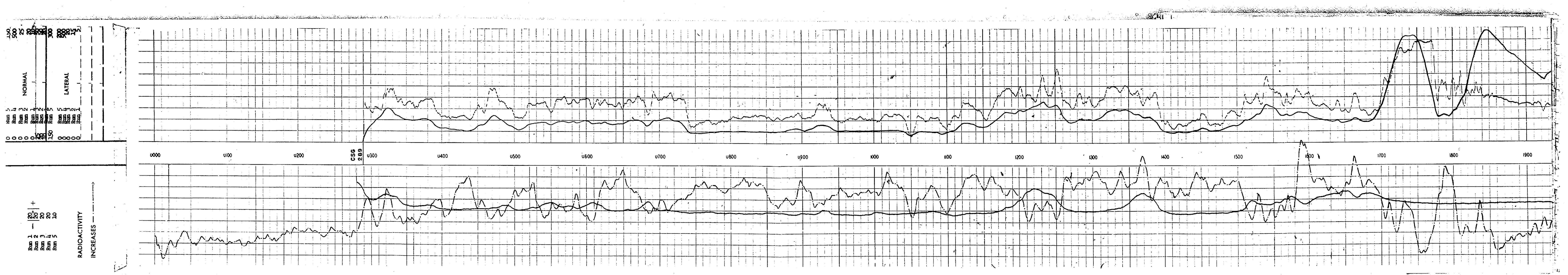
RADIOACTIVITY
INCREASES —·—·—·—>

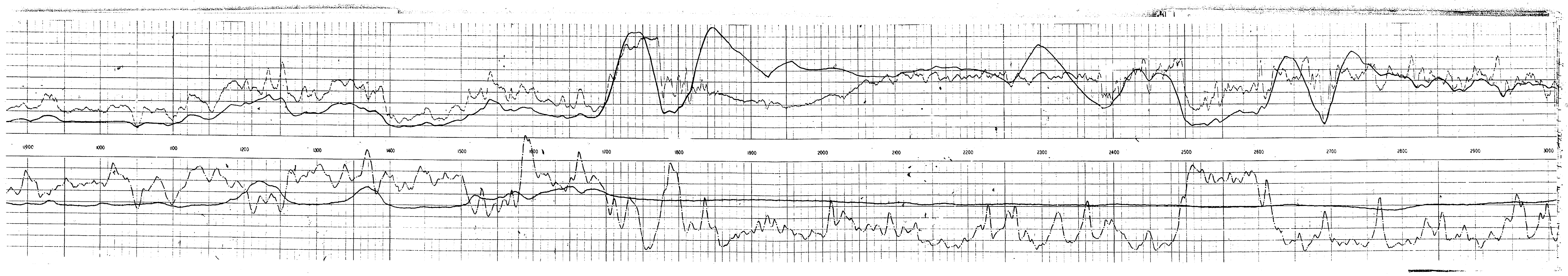
NORMAL
0 Run 5 150
0 Run 4 500
0 Run 3 25
0 Run 2 20
0 Run 1 10
25 Run 3 50
20 Run 2 40
10 Run 1 20
150 Run 5 300

LATERAL
0 Run 5 200
0 Run 4 500
0 Run 3 20
0 Run 2 15
0 Run 1 5

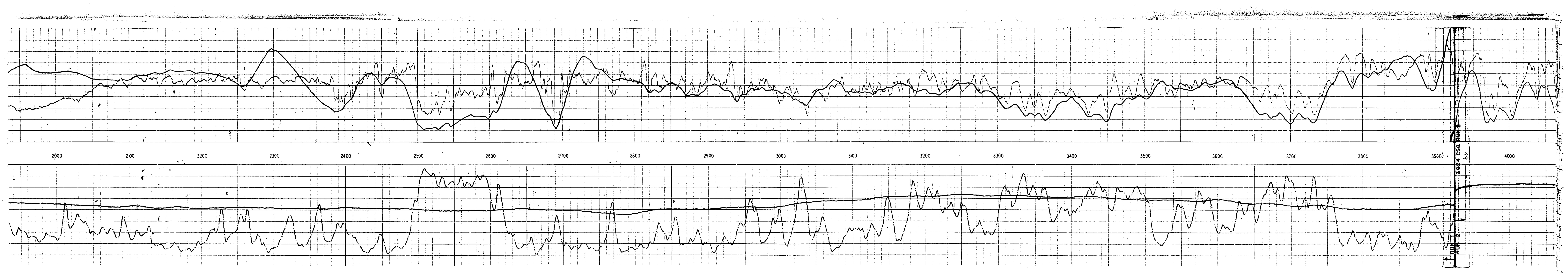


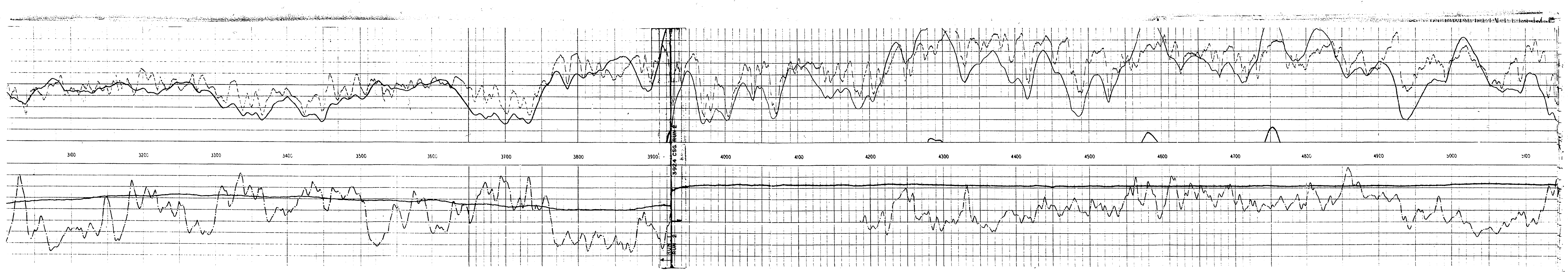
196


NORMAL
LATERAL
RADIOACTIVITY
INCREASES

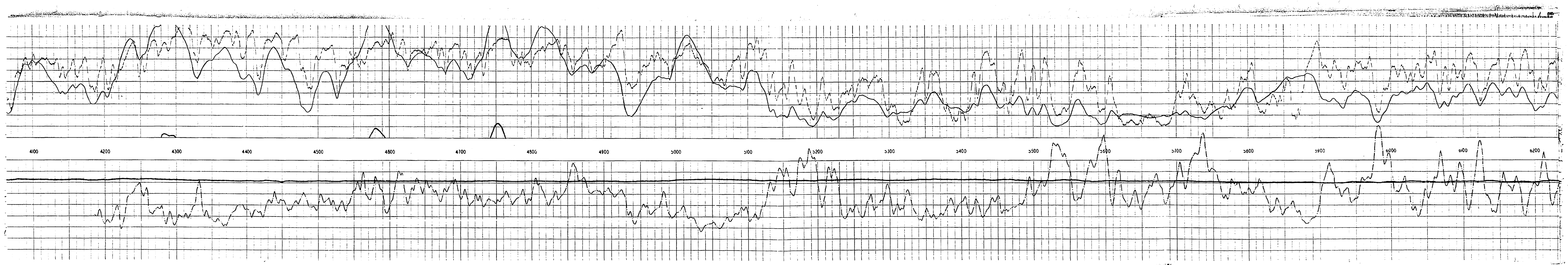


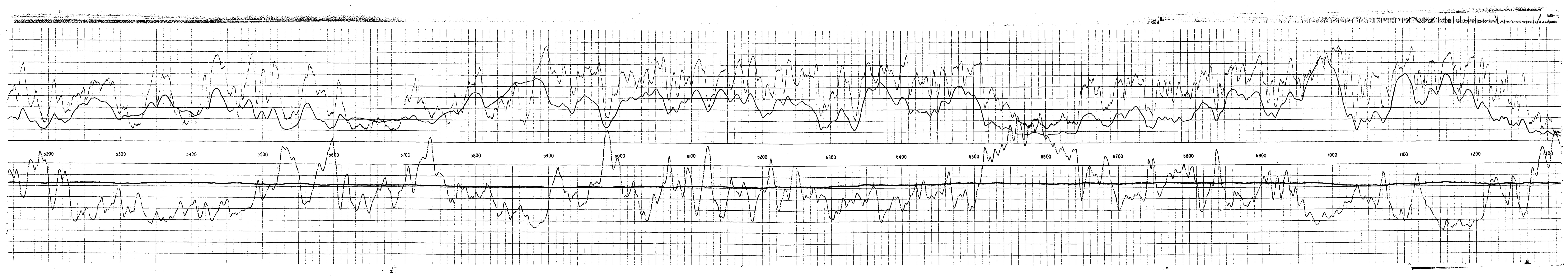
198


2000
2100
2200
2300
2400
2500
2600
2700
2800
2900
3000
3100
3200
3300
3400
3500
3600
3700
3800
3900
4000
3924 CSG RUN E

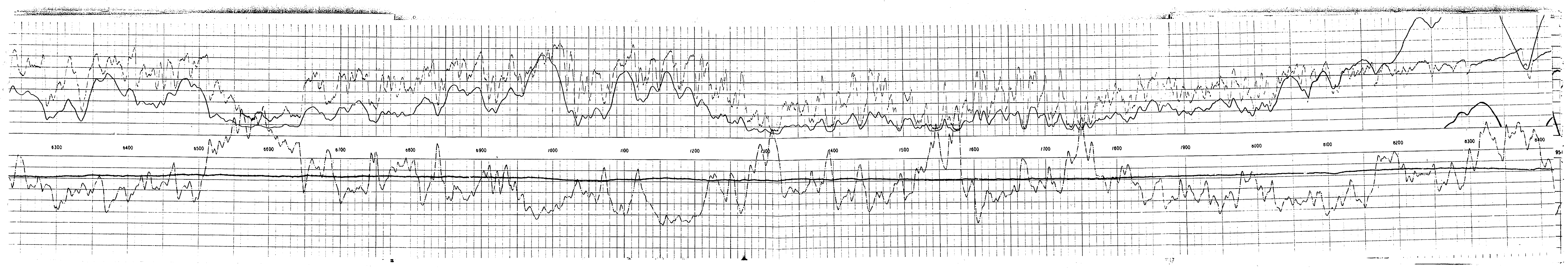

3100
3200
3300
3400
3500
3600
3700
3800
3900
3924 CSG RUN 2
4000
4100
4200
4300
4400
4500
4600
4700
4800
4900
5000
5100

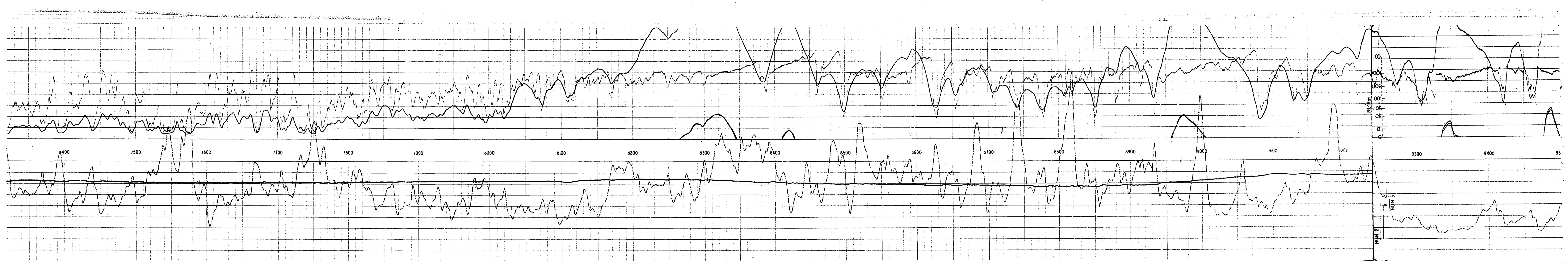
200

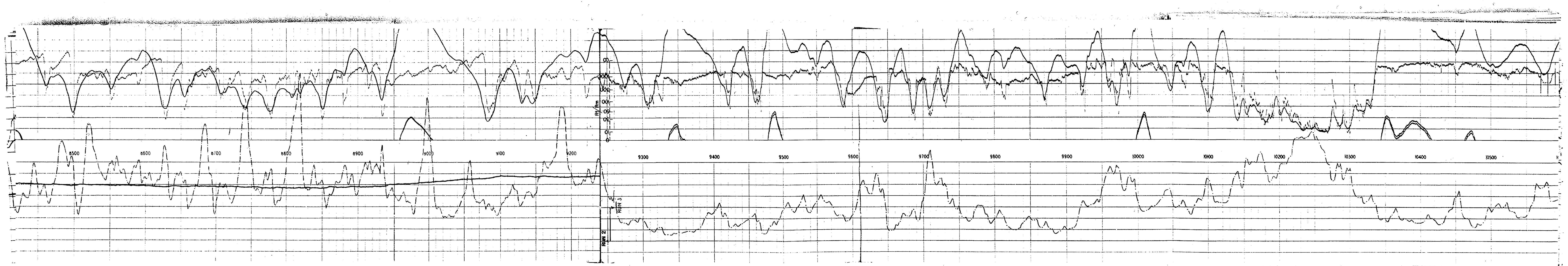

4100
4200
4300
4400
4500
4600
4700
4800
4900
5000
5100
5200
5300
5400
5500
5600
5700
5800
5900
6000
6100
6200



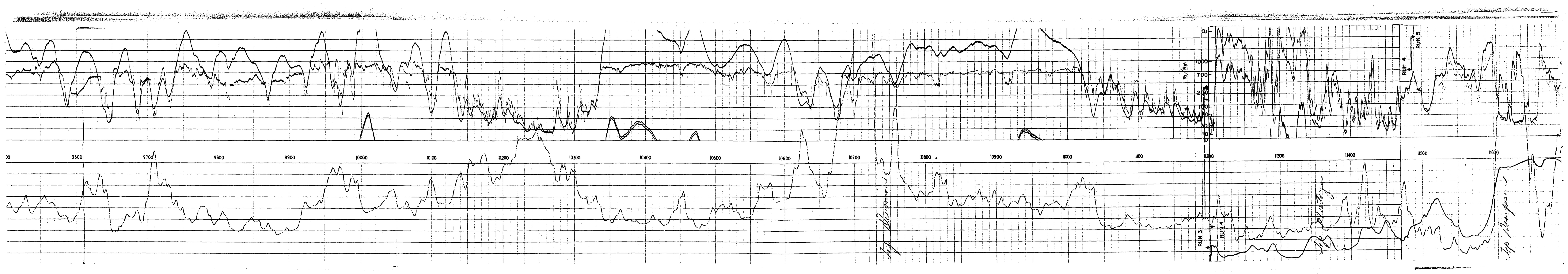
202



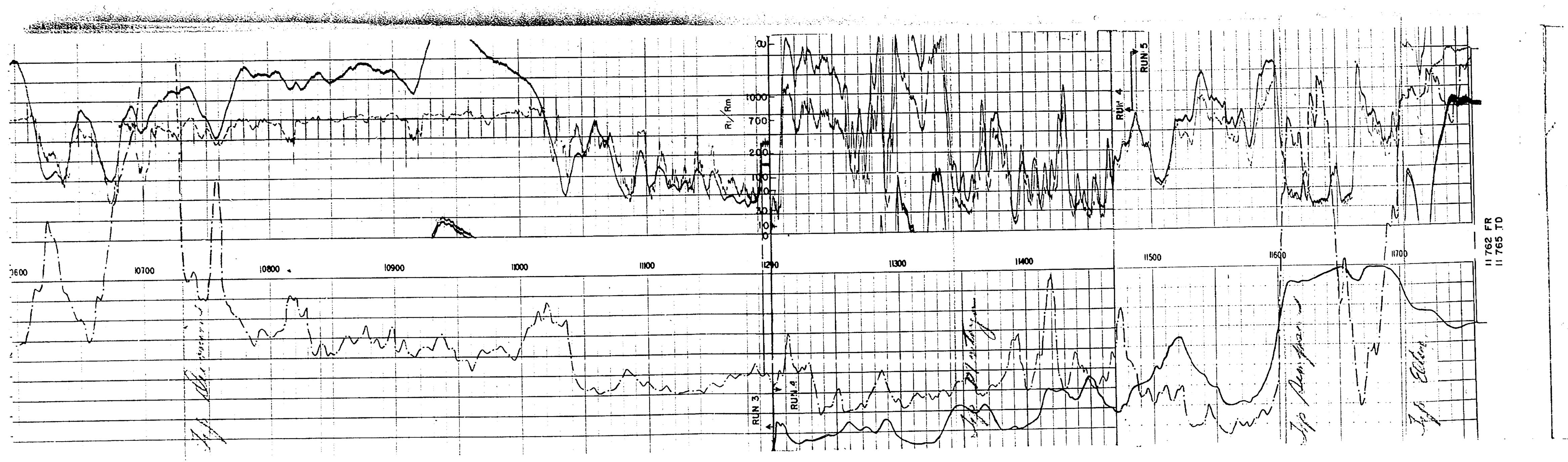


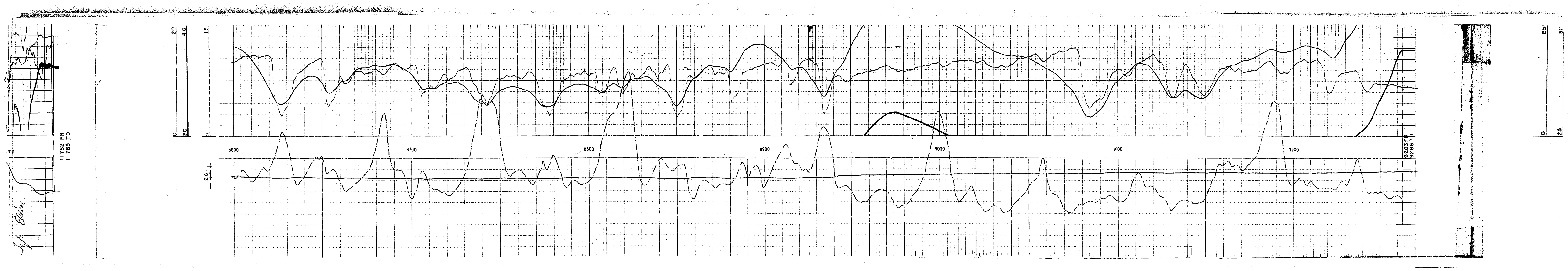

8500
8600
8700
8800
8900
9000
9100
9200
Rt/Rm
RUN 3
9300
9400
9500
9600
9700
9800
9900
10000
10100
10200
10300
10400
10500

205

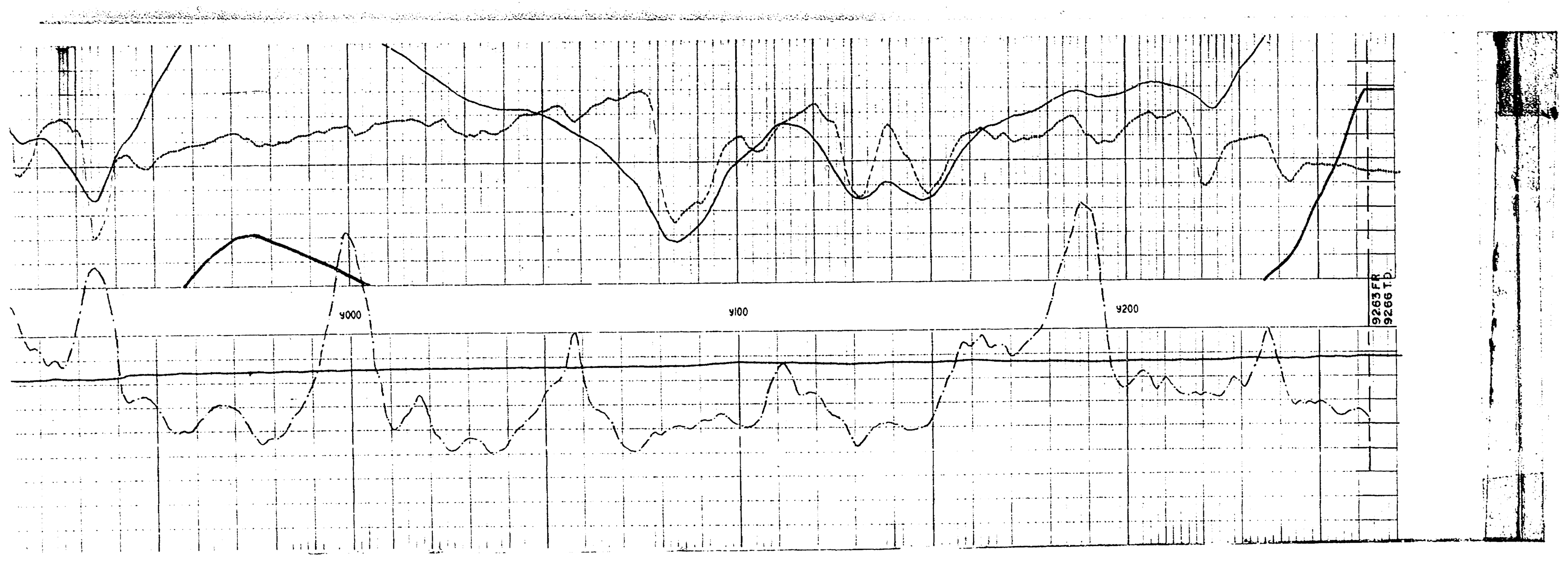

9600
9700
9800
9900
10000
10100
10200
10300
10400
10500
10600
10700
10800
10900
11000
11100
11200
11300
11400
11500
11600
RUN 3
RUN 4
RUN 5

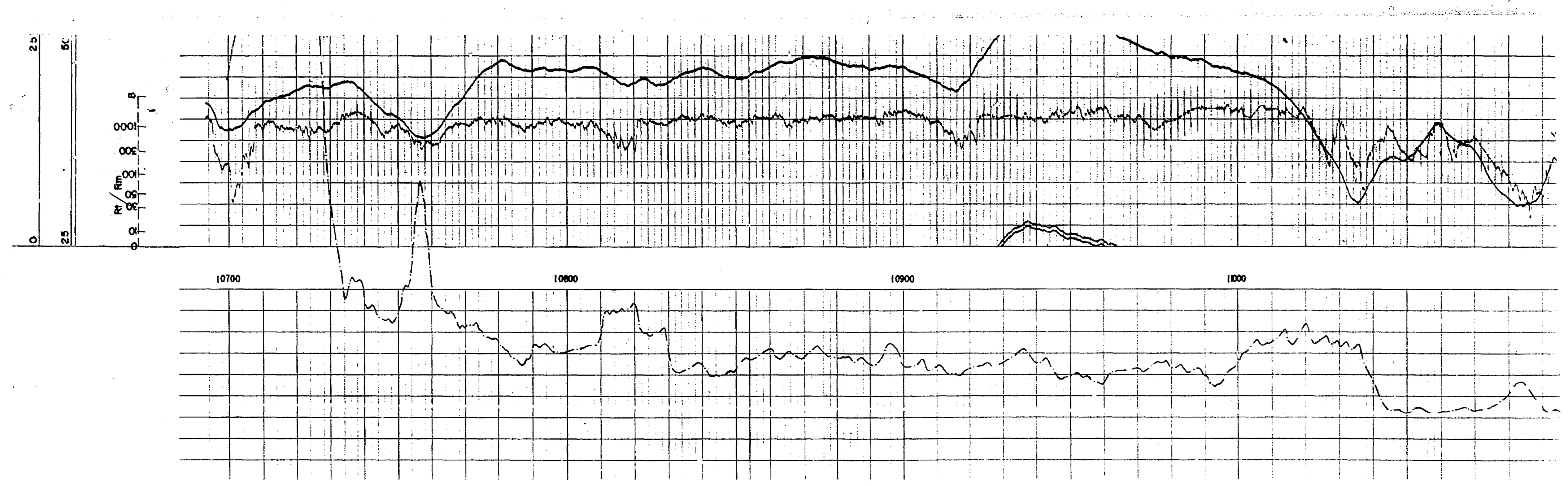
206



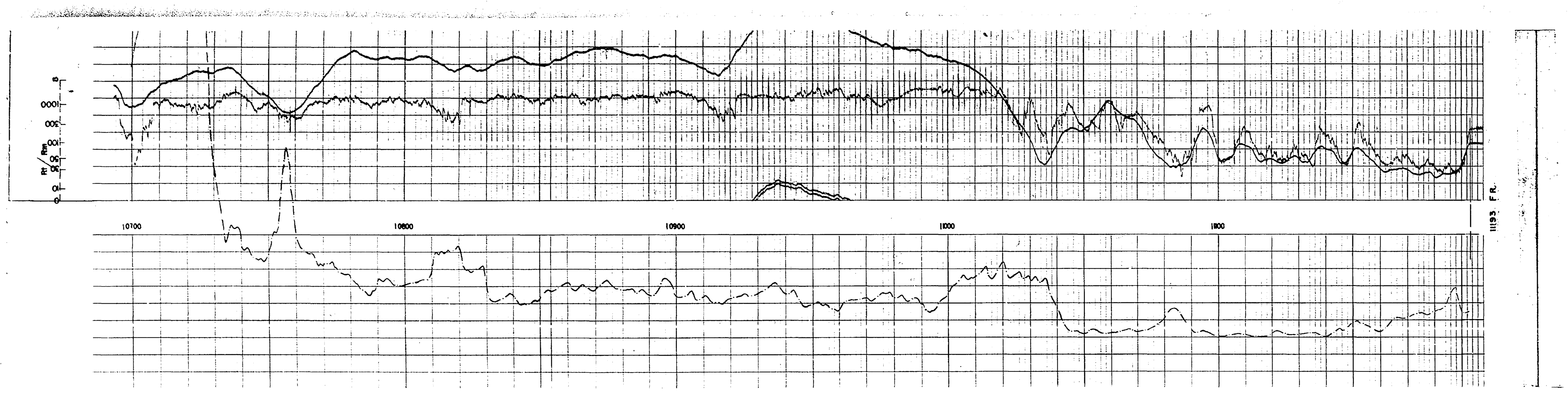


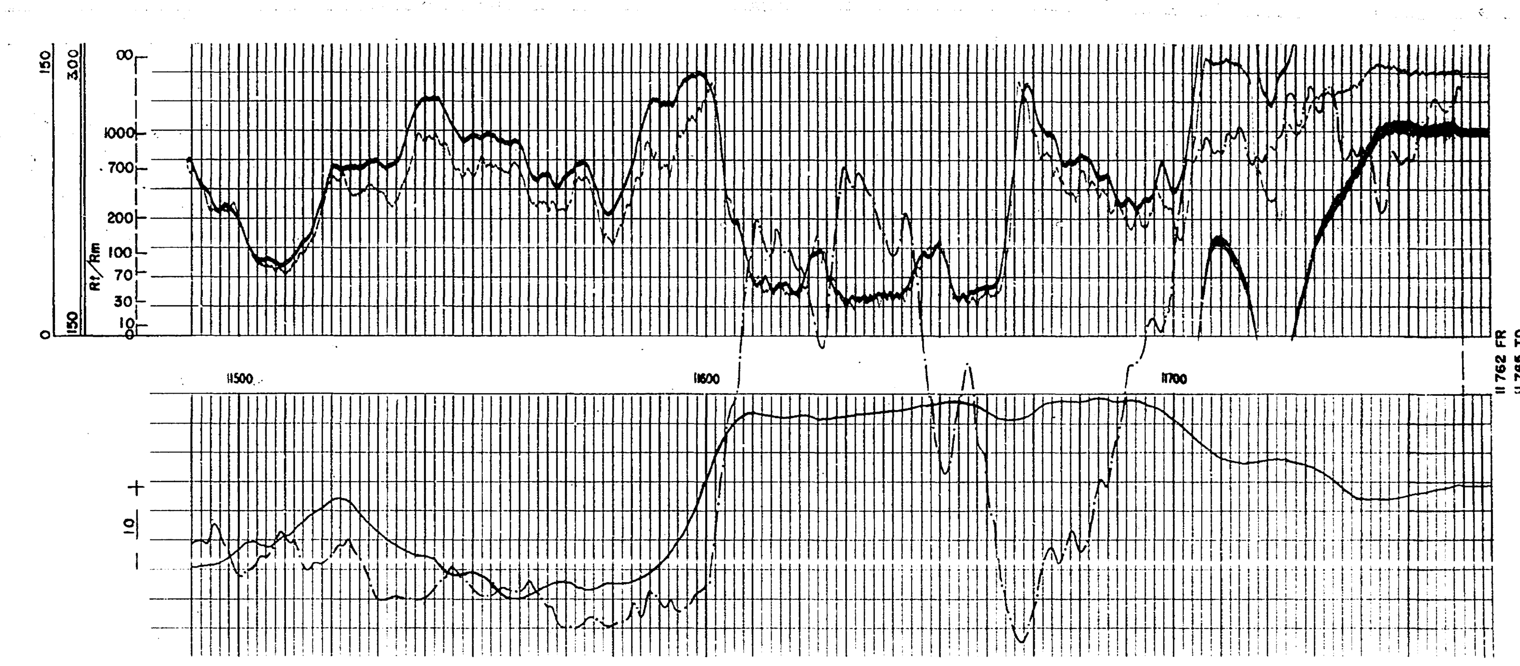
208





209





AMERADA PETR. CORP.
STATE BTA NO. 1
W.C. LEA CO. N.MEX.

210

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
DEC 16 1949

WESTERN UNION

W. P. MARSHALL, PRESIDENT

LA12 KB300

K BRA186 DL PD=BARTLESVILLE OKLA 16 413P=

DEC 16 PM 3 37

Case 191

=NEW MEXICO CONSERVATION COMMISSION=

ATTN OF GUY SHEPARD CHAIRMAN SANTA FE NMEX=

=RE AMERADA APPLICATION SILURO DEVONIAN SPACING AND PRORATION UNITS BAGLEY AREA LEA COUNTY NEW MEXICO SET FOR HEARING DECEMBER 20 1949 DUE TO PRIOR COMMITMENT PHILLIPS REPRESENTATIVE CANNOT BE PRESENT BUT PHILLIPS PETROLEUM COMPANY DESIRES TO ENDORSE THE TESTIMONY AND RECOMMENDATIONS OF THE AMERADA PETROLEUM CORPORATION IN RESPECT TO EIGHTY ACRE SPACING AND PRORATION UNITS=

=C P DIMIT VICE PRESIDENT PHILLIPS PET CO=

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

#191

Copy of Order sent to
Glenn Staley, 2/13/50
(See transmittal letter copy in
Case 211)

GENERAL OFFICES
120 BROADWAY NEW YORK

AMERADA PETROLEUM CORPORATION

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

July 30, 1949

Graham
Get hearing

OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO
RECEIVED
AUG 1 - 1949

Mr. R. R. Spurrier, Secretary
State of New Mexico Oil Conservation Commission
Santa Fe, New Mexico

Dear Mr. Spurrier:

Attached are four (4) copies of an application by Amerada Petroleum Corporation requesting a hearing before the Commission for the purpose of designating 80-acre spacing in the Bagley area, Lea County, New Mexico. We will appreciate your setting this for a hearing at an early date.

You may be interested to know that we have furnished each of the Operators in this area with a copy of this application and they have indicated that this proposal meets with their approval.

Yours very truly,

AMERADA PETROLEUM CORPORATION,

JPH-J

By: John P. Hammond
John P. Hammond

cc: Mr. Foster Morrell, U. S. G. S., Roswell
Mr. Glenn Staley, Lea County Operators, Hobbs
Mr. R. S. Christie, Fort Worth

I HEREBY CERTIFY, That the foregoing transcript of proceedings before the Oil Conservation Commission of New Mexico in Santa Fe, New Mexico, on December 20, 1949, is the true record of such proceedings to the best of my knowledge, skill, and ability.

Dated at Albuquerque, New Mexico, this 27th day of December, A. D. 1949.

/s/ Ruth Warden
Reporter.

March 22, 1950

Mrs. Margaret Powell
312 North Sixth
Albuquerque, New Mexico

Dear Mrs. Powell:

Will you please send an extra copy of the transcript for March 21, to:

Mr. U. M. Rose, Attorney at Law
P. O. Box 1385
Hobbs, New Mexico.

Very truly yours,

R. R. Spurrier
Secretary-Director

RRS:bw

December 28, 1949

Oil Conservation Commission
P. O. Box 1545
Hobbs, New Mexico

Gentlemen:

We are forwarding you today, under separate cover, copy of transcript of hearing held by the Oil Conservation Commission, at Santa Fe, New Mexico, on December 20, 1949.

This is for your records.

Very truly yours,

R. R. Spurrier
Secretary-Director

RRS:bw

December 20, 1949

Oil Conservation Commission
205 Booker Building
Artesia, New Mexico

Gentlemen:

We are forwarding you today, under separate cover, copy of transcript of hearing held by the Oil Conservation Commission, at Santa Fe, New Mexico, on December 20, 1949.

This is for your records.

Very truly yours,

R. R. Spurrier
Secretary-Director

RRS:bw

OIL CONSERVATION COMMISSION HEARING
House of Representatives
December 20, 1949
Santa Fe, New Mexico

Case 191

NAME	ADDRESS	REPRESENTING
Jack M Campbell	Roswell NM	Texas-Pacific Coal & Oil Co.
Eugene T. Adair	Fort Worth, Tex	" " " " "
G. Carter	Midland, Tex	" " " " "
R. G. Schaeble	Midland Tex	" " " " "
Booth Kellough	Tulsa Okla	Amerada Pet Corp
[illegible]	Santa Fe	" "
Foster Morrell	Roswell, N.M.	U.S.G.S.
[illegible]	Santa Fe	Amerada
R. S. Christie	Ft. Worth Tex	—
John A Veeder	Midland Tex	✓
C. J. Milliken	Tulsa Okla	✓
[illegible]	Santa Fe	"
J. J. Hencker	Tulsa Okla	Mid Cont Pet Corp
Glenn Staley	Hobbs N.M.	Lea Co. Operators
Roy O. Yarbrough	Hobbs N.M.	oil cons comm
[illegible]	Roswell	[illegible]
[illegible]		
[illegible] Utz	O.C.C.	Santa Fe [illegible]
[illegible]	[illegible]	Artesia
Don G. McCormick	O.C.C. Carlsbad, N.M.	
Spurrier		
Graham		
Shepard		

NOTICE FOR PUBLICATION
STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

The State of New Mexico by its Oil Conservation Commission hereby gives notice, pursuant to law, of the following public hearing to be held December 20, 1949 beginning at 10:00 o'clock A.M. on that day in the City of Santa Fe, New Mexico, in the House of Representatives.

STATE OF NEW MEXICO TO:

All named parties in the following cases, and notice to the public;

Case 191

In the matter of application of Amerada Petroleum Corporation for the establishment of proration units and uniform spacing of wells for the common source of supply discovered in Amerada-State BTA No. 1 Well in NW/4 SE/4 Section 2, Township 12 South, Range 33 East, N.M.P.M., in Lea County, New Mexico. This is a readvertisement.

Case 207

In the matter of application of Stanley L. Jones, Inc., a New Mexico Corporation, for an order approving an unorthodox location for Stanley L. Jones, Inc., State No. 13, 338 feet south of the north line and 73 feet west of the east line NE/4 NE/4 NE/4 of Section 23, Township 18 South, Range 27 East, N.M.P.M. in the Artesia pool, Eddy County, New Mexico.

Given under the seal of the Oil Conservation Commission of New Mexico at Santa Fe, New Mexico, on December 5, 1949.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

R R Spurrier
R. R. SPURRIER, SECRETARY

SEAL

September 22, 1949

Mr. Glenn Staley
Lea County Operators Committee
Drawer I
Hobbs, New Mexico

Dear Mr. Staley:

We enclose herewith, transcript of record in connection with the hearing held before the Oil Conservation Commission in Santa Fe, New Mexico, on September 8, 1949.

Very truly yours,

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

R. R. Spurrier
Secretary-Director

RRS:bw
encl.

September 22, 1949

Oil Conservation Commission
P. O. Box 1545
Hobbs, New Mexico

Gentlemen:

We enclose herewith, transcript of record in connection with the hearing held before the Oil Conservation Commission in Santa Fe, New Mexico, on September 8, 1949.

Very truly yours,

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

R. R. Spurrier
Secretary-Director

RRS:bw
encl.

September 22, 1949

Oil Conservation Commission
205 Booker Building
Artesia, New Mexico

Gentlemen:

We enclose herewith, transcript of record in connection with the hearing held before the Oil Conservation Commission in Santa Fe, New Mexico, on September 8, 1949.

Very truly yours,

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

R. R. Spurrier
Secretary-Director

RRS:bw
encl.

211

BEFORE THE
OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO

PROCEEDINGS

The following matter came on for consideration before a hearing of the Oil Conservation Commission of the State of New Mexico, pursuant to legal notice, at Santa Fe, New Mexico, on September 8, 1949, at 10:00 A. M.

NOTICE FOR PUBLICATION
STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

The State of New Mexico by its Oil Conservation Commission hereby gives notice, pursuant to law, of the following public hearings to be held September 8, 1949, beginning at 10:00 o'clock A.M. on that day in the City of Santa Fe, New Mexico in the Senate Chambers.

STATE OF NEW MEXICO TO:

All named parties in the following cases, and notice to the public:

Case 190

In the matter of the application of Twin Oil Corporation for an order unitizing the NE/4NE/4 of Section 4, Township 22 South, Range 37 East, N.M.P.M. or in the alternative, authorizing the drilling of a well or wells upon the following described lands:

Beginning at a point 660 feet west of the southeast corner of NE/4NE/4 of section 4, Township 22 South, Range 37 East, N.M.P.M., thence on a direct line north 420 feet, thence on a direct line west, 210 feet, thence on a direct line south 420 feet, thence on a direct line east 210 feet, containing approximately 2 acres of land more or less, and fixing an allowable therefor.

Case 191

In the matter of application of Amerada Petroleum Corporation for the establishment of proration units and uniform spacing of wells for the common source of supply discovered in Amerada-State BTA No. 1 Well in NW/4 SE/4 Section 2, Township 12 South, Range 33 East, N.M.P.M., in Lea County, New Mexico.

Case 192

In the matter of the application of Gulf Oil Corporation for an order authorizing dual completion and production from the Yeso formation (Drinkard pool) and from the Ellenburger formation (Brunson pool) from a single well bore in the Eunice King No. 17 well, located 660 feet from the north line and 2310 feet from the west line (NE/4 NW/4) of section 23, Township 21 South, Range 37 East, N.M.P.M., in Lea County, New Mexico.

Case 193

In the matter of the application of Shell Oil Company for a special exception from the provisions of Order No. 72 relating to central tank batteries with respect to State oil and gas leases E-1830, B-9446, B7849 and E-276 under conditions existing in the West Wilson pool, Lea County, New Mexico.

Case 194

In the matter of the application of the Oil Conservation Commission upon its own motion at the suggestion of the proration office, to amend Section 3-A of Commission Order #784 also known as the Gas-Oil Ratio Order of September 10, 1948, by adding the following:

"When remedial work on a well has been completed by an operator to correct for high gas-oil ratio in a pool having a limiting gas-oil ratio the adjusted allowable shall become effective on the date the new test is completed as indicated by Commission Form C-116."

or such other wording in the premises as may be determined from testimony adduced in open hearing.

Given under the seal of the Oil Conservation Commission of New Mexico at Santa Fe, New Mexico, on August 19, 1949.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

By /s/ R. R. Spurrier
R. R. SPURRIER, Secretary

SEAL

BEFORE:

Hon. Guy Shepard,, Chairman
Hon. R. R. Spurrier, Secretary

REGISTER:

M. B. Penn
Tulsa, Oklahoma
For Mid-Continent Petroleum Corporation

E. J. Pierce
Midland, Texas
For Mid-Continent Petroleum Corporation

J. F. Hammond
Tulsa, Oklahoma
For Amerada Petroleum Corporation

Booth Kellough
Tulsa, Oklahoma
For Amerada Petroleum Corporation

Roy O. Yarbrough
Hobbs, New Mexico
For the New Mexico Oil Conservation Commission

G. L. Shoemaker
Midland, Texas
For Stanolind Oil Purchasing Company

Frank R. Lovering
Hobbs, New Mexico
For Shell Oil Company

Paxton Howard
Midland, Texas
For Shell Oil Company

R. T. Adair
Fort Worth, Texas
For Texas Pacific Coal & Oil Company

R. G. Schuehle
Midland, Texas
For Texas Pacific Coal & Oil Company

Carl Barnhart
Midland, Texas
For Amerada Petroleum Corporation

R. S. Christie
Fort Worth, Texas
For Amerada Petroleum Corporation

J. W. House
Midland, Texas
For Humble Oil Company

Herman Pressler
Houston, Texas
For Humble Oil Company

Lloyd L. Gray
Tulsa, Oklahoma
For Gulf Oil Corporation

E. J. Gallagher
Hobbs, New Mexico
For Gulf Oil Corporation

C. D. Borland
Hobbs, New Mexico
For Gulf Oil Corporation

R. E. Canfield
Roswell, New Mexico
For the U. S. Geological Survey

Foster Morrell
Roswell, New Mexico
For the U. S. Geological Survey

Paul S. Johnston
Lubbock, Texas
For the Texas Tech. College

R. S. Flynn
Hobbs, New Mexico
For the Oil Conservation Commission

E. L. Shafer
Hobbs, New Mexico
For Continental Oil Company

L. E. Hinchfeld
Hobbs, New Mexico
For Lea County Operators

Elvis A. Utz
Santa Fe, New Mexico
For the Oil Conservation Commission

E. E. Kinney
Artesia, New Mexico
For New Mexico Bureau of Mines

E. C. Anderson
Socorro, New Mexico
For New Mexico Bureau of Mines

Dan McCormick
Carlsbad, New Mexico
For the Oil Conservation Commission

MR. SHEPARD: The meeting will please come to order. Mr. Graham, will you please read the first case.

(Mr. Graham read the notice of publication in Case No. 190.)

MR. KELLOUGH: May it please the Commission, I am attorney for Amerada. I don't know whether anybody is here to represent the Twin Oil Corporation or not. This application is an application to unitize a lease covering two acres owned

by a cemetery tract in a 40-acre tract in which Amerada owns the lease on the other thirty-eight acres. The agreement has been entered into between the Twin Oil Corporation and the Cemetery Association and Amerada. We are, however, still negotiating with some of our lessors, to ask their joining in this agreement. If there is no objection, we would like to ask this matter be continued for sixty or ninety days so that we may complete the settlement. The case as between the Twin Oil Corporation and the Cemetery Association has been settled, and we would like the matter just continued over until we can finally get it wound up.

MR. SHEPARD:: Is there anyone representing the Twin Oil Company or the Cemetery Association here? Does anyone have any objection to this being carried over? If not, it will be carried over until the next hearing. Would you want ninety days?

MR. KELLOUGH: That would be agreeable--thirty, or sixty or ninety.

MR. SHEPARD:: We will allow ninety days.

MR. KELLOUGH: That will be all right. We feel certain we will have it worked out in a few weeks.

MR. SHEPARD: Read the next case, please.

(Mr. Graham reads the notice of publication in Case No. 191.)

MR. KELLOUGH: If the Commission please, I would like to make a statement for the record in connection with this matter. We came here yesterday prepared to present our evidence in this case with the understanding that all the operators were in agreement to our application. However, yesterday afternoon we were advised by the Texas Pacific Coal Company that they desired a continuance of this matter.

We have some properties which will be jointly owned in the 80-acre units if they are granted, and also the Texas Pacific Coal Company is now drilling a well located in the southeast of the northeast of Section 2, Township 12 South, Range 33 East, and they have requested that this matter be continued over until they complete their well. At the present time, it will be set down as soon as possible after the completion of their well. Their request is based upon the fact that additional information will be obtained from this well which is now drilling, and further that it will give us an opportunity to work out some arrangements with respect to these jointly owned leases. On behalf of Amerada, we have agreed to such a continuance with the understanding with Mr. Adair, the attorney for the Texas Pacific Company, that they will not seek any further continuance of this matter when it is set down as soon as possible after the well is completed and also with the understanding that any wells drilled in the meantime will not be located off of the pattern which Amerada has proposed in our application. Now, Mr. Adair, is that a correct statement?

MR. ADAIR: The well drilled by our company--I think possibly some other companies are involved--but any drilled by our company will conform to the proposed pattern.

MR. KELLOUGH: And you will not seek any further continuance after the matter is set down after the completion of this well?

MR. ADAIR: That is true.

MR. KELLOUGH: There are other operators interested in the area, and I wish to state to the Commission at this time

that it is possible that we now have sufficient evidence for 80-acre units in this field, and that we are not agreeing to the continuance with any hesitancy on our part that we do not have sufficient evidence, but because of the request of the Texas Pacific Coal Company, if there are any other operators here in the area, why then, of course, personally, I think I would welcome any statement they have to make as to their attitude on the continuance in this matter.

MR. SHEPARD:: How long a continuance do you want?

MR. KELLOUGH: I don't believe a definite time can be specified. Mr. Adair advises me he believes their well can be completed in approximately ninety days. Rather than set it down--it may be completed sooner. I don't know how they are getting along with the drilling. I believe they are down around seven or eight thousand feet, but we would be most anxious to advise the Commission immediately upon the completion of the well to have the matter set down as soon as possible, because we are urging it very strongly, and we don't want to be delayed any more than we possibly can.

MR. SHEPARD:: Any objections? If not, it will be continued indefinitely until you ask for it. Case 192.

(Mr. Graham reads notice of publication in Case 192.)

MR. GRAY: We would like to ask for a continuance in that case also. At the present time, we have a well completed as an Ellenburger Well. There is some indication it may be making a little bit of water. We would like to observe it a longer period of time before we put on testimony since we may want to withdraw the application.

MR. SHEPARD:: Can we set that down for the first of November?

MR. GRAY: Yes, I think that will be all right.

MR. SHEPARD:: If there is no objection, it will be continued until the first of November hearing. Case No. 193.

(Mr. Graham reads the notice of publication in Case No. 193.)

MR. HOWARD: Paxton Howard and Frank Lovering for the Shell Oil Company. We ask that Mr. Lovering be sworn.

(Witness sworn.)

FRANK R. LOVERING, having been first duly sworn, testified as follows:

DIRECT EXAMINATION BY MR. HOWARD:

Q. State your name, please.
A. Frank R. Lovering.
Q. You live at Hobbs, New Mexico?
A. Yes, sir.
Q. And are employed by the Shell Oil Company, Inc.?
A. That's right.
Q. In what capacity?
A. Superintendent.
Q. In your capacity as superintendent you have jurisdiction of and are familiar with the field designated as the West Wilson Field, Lea County, New Mexico?
A. I do.
Q. You are familiar with the contents of the application filed for this hearing?
A. I am.
Q. I will hand you--will you identify--and please mark this as Exhibit A--please identify this.
A. This is a plan showing--Exhibit A is a plat showing the development to date in the West Wilson pool.

Q. It was prepared under your supervision?
A. That's right.

MR. HOWARD: I ask that it be admitted, please.

MR. SHEPARD: It will be admitted.

Q. Now, Mr. Lovering, will you point out to the Commission the Shell leases that are involved in this application.
A. In this particular application the leases involved are stated in the application, State Nos. E-1830, B-7849, B-9446, E-273. For purposes of well nomenclature we have designated them as our Shell State Leases A, B, C, and D.
Q. Those leases are all owned by Shell Oil Company, Inc.?
A. That's right.
Q. They are all state leases?
A. That's right.
Q. Now, will you state to the Commission the history of the development in the West Wilson pool, please.
A. We are confronted here with a very unusual problem, as noted on this plat, the territory involved here is surrounded by four dry holes by the Vickers Petroleum up on the northwest corner of the plat, Davidson and Clower in the western portion, Cities Service well which was recently completed as a dry hole up in Section 16, and J. W. Brown with a similar well in Section 22. Further than that the J. C. Clower well No. 2 and the Shell State A-2 in the southeast quarter of Section 16 are very weak wells and determine the eastern limits of the field. So that at the present time the center of the possible development there centers around four or five leases there, and it is indicated that production will probably be limited to about one well per lease. There is no room to the north. The

eastern limits are already defined, and it looks like about a six-well field.

Q. Mr. Lovering, what was the discovery well?
A. It was the J. C. Clower No. 1.
Q. When was the discovery?
A. About a year ago.
Q. In what formation?
A. The formation is reef-type bump, drilled at a depth of about 3960 immediately below the Yates formation.
Q. And it is your belief from the present indications that each of the leases involved in this application will probably be limited to one well, is that correct?
A. That is correct. The only exception to that would be to while there may be a possible extension southward, but the indications of the well drilled on State B-1 is that the pay is pinching out, and the development southward is only problematical. The pay is only about eleven to fourteen feet in thickness which overlies a water strata, and production is rather limited. All wells were brought in under the pump rather than open flow.
Q. In the present application you ask to be relieved from the necessity of having a separate tank battery on each lease and ask permission to use a central tank battery for all State leases?
A. That's right.
Q. At the present time, what type of battery facilities do you have in contemplation?
A. At the present time, we have two high 500-barrel tanks and one separator. We are at the present time installing heating and treating facilities which will include a 750-

gun barrel and a jug-type water heater. We anticipate if our petition is accepted that we will add another 500-barrel tank to the battery, one additional separator which will permit us to test any of the possible five wells that may be turned into that battery. We will be able to test them at any time at the pleasure of the Commission or any other authority.

Q. The tank battery is on Shell A as shown in the plat?
A. Directly between wells 1 and 2.
Q. And what is the estimated cost of the installation of this tank battery?
A. Between sixteen and eighteen thousand dollars. It has been generally--we like to carry at least four and a half tank production in our batteries. And it has been, and it generally runs between five and six dollars a barrel exclusive of heating, treating, and settling facilities.
Q. Now, to construct separate tank batteries on each of the leases, do you have an estimate as to what the cost would be as to each lease?
A. With heating and treating facilities it would run around $12,000.00, to state a rough estimate.
Q.. Yes, sir, that's right.
A. The engineers gave us a figure here, I believe.
Q. Well, it is stated in the application, and in your opinion that cost as regards each of these separate leases would be for the sole purpose of taking care of what at this time appears to be just one well?
Q. By asking the central tank battery, there can be saved the cost of these separate installations and in

addition to that the central tank battery can be equipped so that separate tests can be taken on all of these wells?
A. That's right.
Q. In your opinion will the granting of this application in any manner aid in conservation and prevention of the waste of natural resources?
A. It will.
Q. In what manner?
A. In reduced further maintenance cost and operational cost. It will reduce operational cost in the neighborhood of 60 per cent. It will cut down maintenance cost tremendously, just the difference between one tank battery and four or five.
Q. And that matter will prolong the economic life of the various leases?
A. It will make it possible to continue producing those wells for a longer period of time due to the reduced operating and maintenance cost.
Q. All the royalty is the same, owned by the State?
A. That is correct.
Q. Do you have anything else to add?
A. No, I would be glad to answer any questions.

MR. HOWARD: Does the Commission have any questions?

MR. McCORMICK: How about overriding royalties or oil payments?

A. None that I know of.

MR. McCORMICK: None on the other leases?

A. We were informed the royalties were all the same.

MR. HOWARD: That is our information that the royalties were all the same.

MR. GRAHAM: Does your information disclose the institutional ownership of all the four leases? Is it the same institution? Do they all belong to the schools?

MR. HOWARD: Yes, sir.

MR. McCORMICK: Do you have the leases with you, Mr. Howard?

MR. HOWARD: No, sir, I do not.

MR. McCORMICK: What system will you have for actually measuring the oil produced from each separate lease?

A. The facilities will be there to make periodic tests of at least two wells at a time, weekly, monthly, which we normally do anyway, and it would be no different than any other battery with the same facilities.

MR. McCORMICK: How do you know exactly how much oil each well produces each month during a proration period?

A. We never know exactly any more than we know on any two wells in the State of New Mexico. That is our general practice; it is based on period production. We can make those at the rule of the Commission, or at any specific interval, or at any time you wish for that matter.

MR. McCORMICK: This testing device you will have to test the production, it can be run for any period?

A. Any predetermined period, that is right.

MR. HOWARD: Whatever tests the Commission requires, we are ready to make. We do have a peculiar problem, and it looks like it will be a very small field. They are all leases with a common royalty.

MR. SHEPARD:: Any objections? Does anyone have anything to say? If not, then it will be granted.

MR. HOWARD: Thank you.

MR. SHEPARD:: Case 194.

(Mr. Graham reads the notice of publication in Case No. 194.)

MR. SHEPARD:: Mr. Staley, do you have anything to offer on this?

MR. STALEY: Under the present Commission the changing of allowable between the first of one proration period until the beginning of the next proration period on any new allowable--I mean new wells--are given an allowable. That is, during the opening and closing of any proration period; from time to time the operators have done remedial work and been able to correct for high gas-oil ratio on wells in fields having limited ratios, but it has been necessary to wait until the beginning of the next proration period before assigning an allowable to that well; that is, a new allowable based on the new gas-oil ratio tested after the remedial work is completed. Therefore, the Commission was requested to make a ruling regarding the placing of high gas-oil ratios--that is, giving a new allowable to a well that is penalized under the present system.

MR. SHEPARD: Mr. Morrell, do you have anything to say on this?

MR. MORRELL: I see no objection to it.

MR. SHEPARD: Any other objections? Anyone have anything to say? If not, it will be granted. There being no further business, we will stand adjourned.

212

STATE OF NEW MEXICO)
: SS
COUNTY OF BERNALILLO)

I HEREBY CERTIFY That the foregoing transcript of proceedings before the Oil Conservation Commission is a true record of the matters therein set forth.

DONE at Santa Fe, New Mexico, this 20th day of September, 1949.

E. E. Greeson
E. E. GREESON
Notary Public

My Commission Expires 8-4-52.

NEW MEXICO
OIL CONSERVATION COMMISSION

GOVERNOR THOMAS J. MABRY
CHAIRMAN
LAND COMMISSIONER GUY SHEPARD
MEMBER
STATE GEOLOGIST R. R. SPURRIER
SECRETARY AND DIRECTOR

P. O. BOX 871
SANTA FE, NEW MEXICO

September 22, 1949

Oil Conservation Commission
205 Booker Building
Artesia, New Mexico

Gentlemen:

We enclose herewith, transcript of record in connection with the hearing held before the Oil Conservation Commission in Santa Fe, New Mexico, on September 8, 1949.

Very truly yours,

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

R. R. Spurrier
R. R. Spurrier
Secretary-Director

RRS:bw
encl.

January 23, 1950

REGISTERED MAIL

Mr. Glenn Staley
Lea County Operators Committee
Drawer I
Hobbs, New Mexico

Dear Mr. Staley:

We enclose herewith, signed copy of Order No. R-2, issued in connection with Case No. 191, heard in Santa Fe, New Mexico, on September 8 and December 20, 1949.

Very truly yours,

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

R. R. Spurrier
Secretary-Director

RRS:bw
encl.

January 23, 1950

Mr. John P. Hammond
Amerada Petroleum Corporation
P. O. Box 2040
Tulsa, Oklahoma

Dear Mr. Hammond:

We enclose herewith, signed copy of Order No. R-2, issued in connection with Case No. 191, heard in Santa Fe, New Mexico, on September 8 and December 20, 1949.

Very truly yours,

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

R. R. Spurrier
Secretary-Director

RRS:bw
encl.

7/28/49 (12)

BEFORE THE OIL CONSERVATION COMMISSION OF
THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATION OF AMERADA PETROLEUM CORPORATION FOR THE ESTABLISHMENT OF PRORATION UNITS AND UNIFORM SPACING OF WELLS FOR THE COMMON SOURCE OF SUPPLY DISCOVERED IN AMERADA-STATE BTA NO. 1 WELL, NW/4 SE/4 SEC. 2, TOWNSHIP 12 SOUTH, RANGE 33 EAST, LEA COUNTY, NEW MEXICO.

CAUSE NO. ________

ORDER NO. ________

APPLICATION

COMES, NOW, Amerada Petroleum Corporation, Tulsa, Oklahoma, and alleges and states:

1. That applicant has drilled and completed a well known as "State BTA No. 1" located in the center of the NW/4 SE/4 Sec. 2-12S-33E, Lea County, New Mexico, and discovered a new common source of supply found in said well at the approximate depth of from 10,770 feet to 11,000 feet, the probable productive limits of said common source of supply to be determined by the Commission.

2. That in addition to the discovery well referred to above, the following wells are now being drilled to said common source of supply in the area:

(a) Amerada-State BTC No. 1, located in SE/4 SW/4 Sec. 35-11S-33E;

(b) Texas, Pacific Coal and Oil Company No. 1, State "B"-Account No. 1, located in SE/4 NW/4 Sec. 2-12S-33E;

(c) Mid-Continent Petroleum Corporation No. 1, State Land 65, located in SW/4 NW/4 Sec. 1-12S-33E;

3. That in addition to the above described wells the following wells have also been drilled, or are now drilling in the area:

(a) Amerada No. 1 Caudle, located in the SE/4 NE/4 Sec. 10-12S-33E, which tested salt water in the same stratigraphic horizon that is producing oil in the discovery well described above, and has been completed as an oil well in a shallower formation;

213

(b) Amerada-State BTB No. 1, located in NW/4 NW/4 Sec. 26-12S-33E, which tested oil in a formation that may be the same common source of supply in which the above described discovery well has been completed;

4. A plat of the area showing the location of the wells referred to above is attached hereto and marked "EXHIBIT A".

5. That in order to bring about the orderly and proper development of said common source of supply, prevent waste and to avoid the drilling of unnecessary wells, and to secure the greatest ultimate recovery therefrom, and to protect the correlative rights of the interested parties therein, it is necessary and proper for the Commission to enter its order providing for proration units of 80 acres each, such being the area which may be efficiently and economically drained by one well, and to provide for the uniform spacing of said wells in the center of the Northwest and Southeast forty-acre tracts of each quarter section, with a tolerance of 150 feet to avoid surface obstructions.

6. That the well now being drilled to said common source of supply known as "Mid-Continent Petroleum Corporation No. 1, State Land 65," located in SW/4 NW/4 Sec. 1-12S-33E, should be granted an exception to the spacing order established by the Commission hereunder and be considered as the well for the proration unit on which it is located.

WHEREFORE, applicant respectfully requests that the Commission set this application for public hearing at the time and place to be fixed by the Commission, that due and proper notice be given as required by law, and that at the conclusion of said hearing the Commission make and enter an order determining and defining the probable productive limits of the common source of supply referred to above, naming the pool, establish proration units of 80 acres each, and provide for a uniform spacing of such wells, designating the location of said wells

in the center of the Northwest and Southeast forty-acre tracts of each quarter section with a tolerance of 150 feet in any direction from said prescribed location to avoid surface obstructions, and to provide for exceptions in the case of the well now being drilled to said common source of supply known as the "Mid-Continent Petroleum Corporation No. 1, State Land 65", described above.

DATED this 29 day of July, 1949.

Harry D. Page
Harry D. Page

Booth Kellough
Booth Kellough

Attorneys for,
Amerada Petroleum Corporation.