CASE 3741: Application of SIGNAL OIL & GAS CO. TO DIRECTIONALLY DRILL, LEA COUNTY, NEW MEXICO.

Case No.

3741

Application, Transcript,
Small Exhibits, Etc.

GOVERNOR
DAVID F. CARGO
CHAIRMAN

State of New Mexico
Oil Conservation Commission

LAND COMMISSIONER
GUYTON B. HAYS
MEMBER

P. O. BOX 2088
SANTA FE

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

April 9, 1968

Mr. Richard S. Morris
Montgomery, Federici, Andrews,
Hannahs and Morris
Attorneys at Law
Post Office Box 2307
Santa Fe, New Mexico

Re: Case No. 3741
Order No. R-3400
Applicant:

Signal Oil and Gas Company

Dear Sir:

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

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Carbon copy of order also sent to:

Hobbs OCC x
Artesia OCC
Aztec OCC
Other

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

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

CASE No. 3741
Order No. R-3400

APPLICATION OF SIGNAL OIL AND GAS
COMPANY TO DIRECTIONALLY DRILL,
LEA COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on April 3, 1968, at Santa Fe, New Mexico, before Examiner Elvis A. Utz.

NOW, on this 9th day of April, 1968, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

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

(2) That the applicant, Signal Oil and Gas Company, is the owner and operator of the J. C. Williamson B. F. State Well No. 1 which has a surface location in Unit B at a point 2126 feet from the South line and 1887 feet from the East line of Section 1, Township 16 South, Range 33 East, NMPM, Lea County, New Mexico.

(3) That the subject well was drilled by the applicant's predecessor to a total depth of 13,140 feet to test the Devonian formation but was non-productive.

(4) That the evidence indicates the subject well as originally drilled cut a fault.

(5) That the applicant proposes to set a whipstock in the subject well at approximately 10,347 feet, and to directionally

drill in an eastnortheasterly direction to bottom said well in the Devonian formation at a true vertical depth of approximately 13,000 feet and within a 100-foot radius of a point in Unit Q 2160 feet from the South line and 1250 feet from the East line of the aforesaid Section 1 in order to avoid cutting the aforesaid fault.

(6) That approval of the subject application will prevent the drilling of unnecessary wells, prevent waste, and protect correlative rights, provided that Unit Q is dedicated to the subject well if the well is bottomed in Unit Q and that Unit R is dedicated to the subject well if the well is bottomed in Unit R.

IT IS THEREFORE ORDERED:

(1) That the applicant, Signal Oil and Gas Company, is hereby authorized to set a whipstock at approximately 10,347 feet in its J. C. Williamson T. P. State Well No. 1 and directionally drill in an eastnortheasterly direction to bottom said well in the Devonian formation at a true vertical depth of approximately 13,000 feet at a point within a radius of 100 feet of a point in Unit Q 2160 feet from the South line and 1250 feet from the East line of Section 1, Township 16 South, Range 38 East, NMPM, Lea County, New Mexico.

(2) That Unit Q of said Section 1 shall be dedicated to the subject well if the well bottoms in Unit Q.

(3) That Unit R of said Section 1 shall be dedicated to the subject well if the well bottoms in Unit R.

(4) That a continuous multi-shot directional survey shall be made of the well bore with shot points not more than 100 feet apart; that the operator shall cause the surveying company to forward a copy of the survey report directly to the Santa Fe Office of the Commission, Box 2088, Santa Fe, New Mexico; and that the operator shall notify the Commission's Hobbs District Office of the date and time said survey is to be commenced.

(5) That Form C-105 shall be filed in accordance with Rule 1105 and the operator shall indicate thereon the true vertical depths in addition to measured depths.

(6) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary, including the future possible adjustment of the allowable assigned to the well, after notice and hearing.

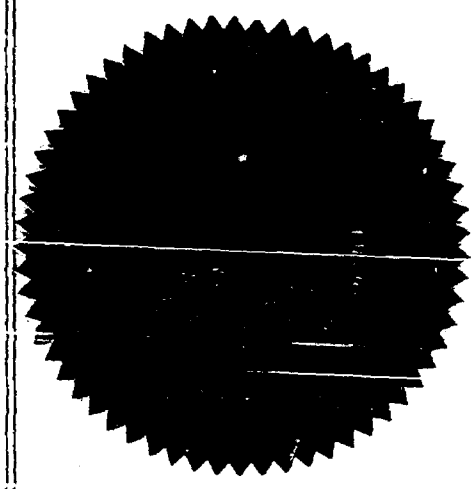
DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

DAVID F. CARGO, Chairman

GUYTON B. HAYS, Member

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



esr/

Hearing

Signal Oil and Gas Company

Domestic Production Department – Southwestern Division Office:

310 West Illinois Avenue • 125 Central Building • Midland, Texas 79701 • Tel: (915) 682-8231
TWX: 915-683-5812

March 5, 1968 Case 3741

New Mexico Oil Conservation Commission
State Land Office Building
Santa Fe, New Mexico

Gentlemen:

Signal Oil and Gas Company assumed operations of the J. C. Williamson T. P. State No. 1 Well located in Unit J, 1887' FEL and 2126' FSL of Section 1, T-16-S, R-38-E, Lea County, New Mexico, at 12:00 midnight February 29, 1968. The well had been drilled to a T.D. of 13,140' and plugged back to 10,000'.

Signal plans to sidetrack the old hole at 10,310' and drill directionally to a measured depth of approximately 13,000' and a bottom hole location of 1250' FEL and 2160' FSL, Section 1.

Because of the cost involved in suspending operations and after discussing our plans with Mr. Ramey in Hobbs, we have proceeded with our plans at our own risk. We request that this matter be placed on the docket for a hearing as soon as possible.

Very truly yours,

SIGNAL OIL AND GAS COMPANY

B. B. Lankford Jr.
B. B. Lankford, Jr.
Production Engineer

MAIL OFFICE
'68 MAR 6 AM 8 41

BBLJr:tc
cc: J. D. Ramey

DOCKET MAILED
Date 3/22/68

Case 3741
Heard 4-3-65
Rec. 4-4-65

1. Grant Signal Oil permission to deviate their ~~J. C. Hathaway #1~~ T. P. State #1 Unit R-1-16 S-38 E. The surface location is 2126'/S, 1887'/E line of sec. They request permission to deviate from 10,347 ft. down the hole to a point in the devonian formation located ~~2310'/S,~~ 2160/S, 1250/E lines of sec. 6.

In addition to controlling the deviation while drilling by the ~~single point~~ use of the single shot bottom hole orientation method they should be required to run a Multiple shot directional survey ~~after completion~~ before producing the well.

Docket No. 10-68

DOCKET: EXAMINER HEARING - WEDNESDAY - APRIL 3, 1968

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

The following cases will be heard before Elvis A. Utz, Examiner, of Daniel S. Nutter, Alternate Examiner:

CASE 3741: Application of Signal Oil and Gas Company to directionally drill, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to directionally drill the J. C. Williamson T.P. State Well No. 1 located 2126 feet from the South line and 1887 feet from the East line of Section 1, Township 16 South, Range 38 East, Lea County, New Mexico. Said well was drilled to a total depth of 13,140 feet and plugged back to 10,000 feet. Applicant proposes to set a whipstock at 10,310 feet and directionally drill to a depth of approximately 13,000 feet and to bottom said well in the Devonian formation at a point 2,160 feet from the South line and 1,250 feet from the East line of said Section 1.

CASE 3742: Application of Texaco Inc. for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project by the injection of water into the Grayburg-San Andres formation through its State "C" NCT-2 Well No. 7 located in Unit G of Section 19, Township 20 South, Range 37 East, Eunice Pool, Lea County, New Mexico.

CASE 3743: Application of Benson-Montin-Greer Drilling Corporation for a pressure maintenance project, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a pressure maintenance project in the West Puerto Chiquito-Gallup Oil Pool by the injection of gas into the Niobrara member of the Mancos shale through one well located in Unit K of Section 13, Township 25 North, Range 1 West, Rio Arriba County, New Mexico. Applicant further seeks the promulgation of special rules for said project, including provision for future expansion, gas injection credit, and transfer of allowables.

CASE 3744: Application of Lloyd B. Taylor for pressure tests, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks authority to shut in his Vic Walker Well No. 1 located in Unit C of Section 6, Township 31 North, Range 13 West, La Plata-Gallup Oil Pool, San Juan County, New Mexico, to conduct pressure build-up tests, and to make up production lost during said tests at a later date.

CASE 3472: (Reopened)

In the matter of Case No. 3472 being reopened pursuant to the provisions of Order No. R-3136, which order established 80-acre spacing units for the Shoe Bar-Pennsylvanian Oil Pool, Lea County, New Mexico, for a period of eighteen months. All interested parties may appear and show cause why said pool should not be developed on 40-acre spacing units.

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
April 3, 1968
EXAMINER HEARING

IN THE MATTER OF:

Application of Signal Oil and Gas Company to directionally drill, Lea County, New Mexico.

Case 3741

BEFORE: Elvis A. Utz, Examiner

TRANSCRIPT OF HEARING

NEW MEXICO OIL CONSERVATION COMMISSION

Examiner Hearing

Santa Fe, NEW MEXICO

Hearing Date APRIL 3, 1968 TIME: 9 A.M.

NAME	REPRESENTING	LOCATION
CARL L. Whigham Jr.	Texaco Inc.	Midland Texas
Boston Kelly	Mobil Oil & Kelly	SF
Wm F. Bullivant	RW Byram & Co.	SF
D.J. Delaney	Sunray DX Oil Co	Midland
C.M. Anderson	Signal Oil & Gas	Tulsa, Okla.
P.T. McGrath	U.S.G.S.	Farmington
A.L. Green	RMG	Farmington
W.J. Cooley	Gene L Cooley	
R.S. Morris	MFAH&M	Santa Fe

MR. UTZ: Hearing will come to order. Case 3741.

MR. HATCH: Case 3741. Application of Signal Oil and Gas Company to directionally drill, Lea County, New Mexico.

MR. MORRIS: I am Dick Morris of Montgomery, Federici, Andrews, Hannahs & Morris of Santa Fe, New Mexico, appearing on behalf of Signal Oil and Gas Company. We will have two witnesses, Mr. Pederson and Mr. Delaney. I will ask that they stand and be sworn at this time.

(Witnesses sworn)

MR. UTZ: Are there other appearances in this case? You may proceed.

C.M. PEDERSON

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

DIRECT EXAMINATION

BY MR. MORRIS:

Q Mr. Pederson, will you please state your name and where you reside?

A I am C.M. Pederson, Signal Oil and Gas, Midland, Texas.

Q What position do you hold with Signal Oil and Gas Company?

A I am Senior Geologist in the Southwestern Exploration Division, Midland, Texas.

Q Have you previously testified before the Commission or one of its Examiners?

A No, I have not.

Q Brifely state your education and experience in the petroleum industry.

A I have a Bachelor of Science Degree in Geology from Texas Tech and spent nine years with Cities Service Oil Company, two and a half years with Hancock Oil Company, nine years with Signal Oil and Gas, all in the Permian Basin area doing exploration and exploitation geology.

Q Are you familiar with the well that is the subject of Case 3741?

A Yes, I am.

(Whereupon, Applicant's Exhibit 1 marked for identification)

Q Have you prepared an ownership plat showing the location of this well and the ownership of the surrounding acreage?

A I have, as Exhibit 1.

Q Will you point out the features of that exhibit?

A In Section 1 the surface location --

MR. MORRIS: We were running a little short on these,

Mr. Examiner, so we just have the one marked set there.

A The surface location as indicated on the map in Section 1 and our expected bottom hole sidetrack location which would be 2,160 feet from the south line and 1,250 feet from the east line of Section 1, Township 16 South, Range 38 East also indicated thereon and other acreage in the block which was assembled by Mr. J.C. Williamson by purchase and farm-in from various companies as indicated on divisions of ownership within the block.

Q In this block Signal and Williamson operate all of the acreage either directly or by farm-in from the companies shown?

A That is correct.

Q The other part of this exhibit is merely a regional map of the area in which the well is located, is that correct?

A Yes, that's just a shot off the ownership map, county ownership map.

(Whereupon, Applicant's Exhibit 2 marked for identification)

Q Will you refer to what has been marked as Exhibit Number 2,now, does this map show in light yellow or yellow-green the same ownership block that you just

referred to on Exhibit 1?

A Yes, it does.

Q Does this show the surface location of the subject well?

A Yes, it does.

Q What other information does this exhibit show?

A This exhibit shows the various locations of the hole on the initial well that Mr. J.C. Williamson drilled. It shows the position of the hole before crossing the fault and also the position of the hole after crossing the fault.

Q And you are referring to the fault that runs in a southeast-northwesterly direction across that acreage?

A Yes, and I might point out at this point, as indicated on Exhibit 2 that before we crossed the fault we were 140 feet high to Amerada Number 1 North Knolls approximately one half mile north, which is shown outside the area of the unit or interest.

Q Now, the subject well was originally drilled by Mr. Williamson, is that correct?

A That's right.

Q What was the total depth of the well as originally drilled?

A Drilled to 13,140 feet.

Q Is the bottom hole location of the original hole shown on this map?

A Yes, it is. It is indicated as the most southwesterly location of the hole and it is across the fault.

Q What is the structure shown on this map?

A This is a seismic Devonian structure map with oil-water contact indicated thereon at minus 9,305. It might be pointed out the Amerada well had or recovered 1,040 feet of oil on drillstem test in the Devonian and had about forty feet of Devonian section above water which is what that oil-water contact is based on.

Q Now, what other well control did you have in addition to your seismic information from which this map was prepared?

A Well, the Superior well in Section 6 indicated thereon, again to the north of our acreage.

Q What is the highest shot point on the map as shown by your seismic information?

A The highest shot point is indicated as immediately northeast of our proposed bottom hole location from this sidetrack hole.

Q Located right --

A It's right on the property line.

Q Right on the quarter-quarter section?

A Quarter-quarter, that's the same ownership actually.

Q Now, what is your proposal in this application?

A We propose to plug back to 10,347 feet and whipstock the hole east-northeast to the bottom hole location as indicated on the plat in an attempt to get away from the fault and we feel that that bottom hole location would be as high as we were on the initial well before we cut the fault in the Mississippian.

Q Now, the proposed bottom hole location would be 2,160 feet from the south line and 1,250 feet from the east line of Section 1?

A Correct.

Q Would you like to have just a little bit of tolerance from that location due to the problems of trying to arrive at the exact location that is proposed?

A Yes, we would. These things you can't always hit right on target. We will aim for that point, but I think Mr. Delaney maybe can explain the problems there a little more than I can.

Q All right, sir. Assuming that you bottom the

hole at exactly the proposed location and that you recover oil in the Devonian Formation, what forty-acre tract would you propose to dedicate to the subject well?

A Well, it would be the northeast forty out of the southeast quarter of that south two-thirds of Section 1, that's about the best way I know to describe that.

Q It's a long section?

A It's a long section, a section and a half actually.

Q So it would be the forty-acre tract on which the bottom hole location of the well would be located?

A That is right.

Q In your opinion, would that forty-acre tract all be productive of oil in the Devonian Formation from the best information that you have available at this time?

A Yes, as indicated on the map, it would all be above the oil-water contact and on the up side of the fault.

(Whereupon, Applicant's Exhibits 3, 4 and 5 marked for identification)

Q Do you have an exhibit prepared in the form of a statement setting forth the proposal that you have just outlined?

A Yes, I do, Exhibit 5.

Q Is there any additional information on that

exhibit that you would like to refer to?

A I have logs on the J.C. Williamson well, which is Exhibit 3 and also log on the Amerada well on which it can be shown --

y The Amerada well, that's Exhibit number 4?

A Amerada's well, Exhibit 4, if you match the logs up on the top of the Chester Formation at approximately eleven -- that's about 11,560 on the Williamson well and about 11,720 as marked on the Amerada well.

Q Mr. Pederson, maybe it would be helpful, if the Examiner wouldn't mind, if you stepped around and referred to the marked exhibits in making this presentation.

A If you match them on the top of the Chester and this is where we feel we cut the fault on the Williamson well at this point, this is a repeated section, these points are comparable. We were 137 feet high to the Amerada at this point, actually I think I mentioned 140 at this point and on the lower Mississippian line we are 92 feet low on the Amerada well and this is the section that was repeated.

Q You are matching a repeated section on the Williamson well, the subject well, with the log of the Amerada well to the north?

A Correct. You can see this section here is comparable and about here is where we cut that fault. This is a repetition of this section.

Q What does that indicate to you, Mr. Pederson?

A It indicates to me that we cut a 210 foot reversed fault at approximately 11,970 feet.

Q What does that indicate to you with respect to the probability of obtaining production in the Devonian at your proposed bottom hole location?

A Well, we feel that with our proposed bottom hole location that we will be as high on the Chester as the J.C. Williamson at this point and if we can hold the normal section that the Amerada well had below from the Chester on that we should have 100 to 150 feet of pay in the Devonian above water.

MR. UTZ: Before you leave, why don't you mark on this log the section that you think is repeated over here.

A Actually it would be this section right here. The two logs, they didn't actually -- at the time this Amerada log was run they didn't, of course, have the sonic log so this is a sonic gamma ray log. The gamma ray curve is the best curve to compare the two wells to, which is this one. This is the section that is actually repeated.

MR. UTZ: So it would be approximately from 11,900 to 12,100?

A Yes, sir, that section there.

Q (By Mr. Morris) Mr. Pederson, were these Exhibits 1, 2 and 5 and the information shown on Exhibits 3 and 4 prepared by you or under your supervision?

A Yes, they were prepared by me.

MR. MORRIS: We offer Applicant's Exhibits 1 through 5 into evidence.

A That seismic map is by Sexton.

Q (By Mr. Morris) The Exhibit 2 was prepared by geophysicists but under your direction?

A Yes, associate.

Q Is the information shown on that exhibit accurate, in your opinion?

A Yes.

MR. UTZ: Without objection, Exhibits 1 through 5 will be entered into the record of this case.

(Whereupon, Applicant's Exhibits 1 through 5 were offered and admitted in evidence.)

MR. MORRIS: That's all we have of Mr. Pederson at this time.

CROSS EXAMINATION

BY MR. UTZ:

Q How far was the surface of the Williamson well, which is the subject well here, from the fault line, in your opinion?

A Less than 100 feet.

Q Was the deviation that caused the well to go through the fault intentional or accidental?

A No, it was accidental.

MR. MORRIS: I might say, Mr. Examiner, we have and will present, through Mr. Delaney, a directional survey of the original well and a survey of the subject well as far as it has been drilled at the present time and I believe this will help answer that question.

Q (By Mr. Utz) Does this fault come all the way to the surface?

A No, sir.

Q How far up does it come?

A It comes into the Mississippian, that's why you are flat to the Amerada well at the Atoka-Pennsylvanian level and it comes into the Mississippian and that's, of course, where the big unconformity is in that area.

Q You mentioned some type of tolerance. Do you

care to specify any type of tolerance that you might need for bottoming on this hole?

A Well, I would rather let Mr. Delaney answer this.

Q You want to let him stick his neck out?

A Well, he is handling the kickoff. I have picked a target for him out there and it's up to him to hit it. He can decide how much tolerance he needs.

MR. UTZ: Are there other questions of the witness? He may be excused.

(Witness excused)

DONALD J. DELANEY

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

DIRECT EXAMINATION

BY MR. MORRIS:

Q Mr. Delaney, will you state your name and where you reside?

A My name is Donald J. Delaney and I reside in Midland, Texas.

Q By whom are you employed and in what capacity?

A I am employed by Signal Oil and Gas Company as Division Production Engineer.

Q Have you previously testified before the

Commission or one of its Examiners?

A No, I haven't.

Q Briefly state your education and experience in the petroleum industry.

A I graduated from the University of California with a Bachelor of Science Degree in Petroleum Engineering and was employed by Signal Oil and Gas in Los Angeles, California, transferred to Midland, Texas in 1960 and have resided and worked out of there ever since and been involved with the entire Permian Basin in the way of drilling and producing activities.

Q Are you familiar with the drilling and the present status of the subject well?

A Yes, sir, I have been involved with it since it was spudded by Mr. Williamson.

(Whereupon, Applicant's Exhibit 6 marked for identification)

Q Do you have an exhibit prepared showing the directional survey of the well as drilled by Mr. Williamson?

A Yes, I do. It's Exhibit Number 6, the survey was made by Eastman Directional Survey Company.

Q Are you familiar with this survey and did you participate in the making of this survey?

A The survey was made under my direction by

personnel of the Eastman Company. The shot points or the directional pictures were checked by me.

Q Explain this exhibit, please.

A The directional survey consisted of what we call a multi-shot instrument dropped into the drill pipe at the total depth of the old hole. The instrument itself takes a picture of an azmuth compass and a drift indicator, an inclinometer. The instrument takes a picture every two minutes continuously. The survey was made by pulling the drill pipe out of the hole and thus pulling the instrument out and stopping every hundred feet approximately and allowing the instrument to rest and take two pictures up to the intermediate casing point. I might point out that the direction instruments will not work inside of pipe and our drill string. A special drill collar joint is put into the string which is nonmagnetic and allows the direction instrument to function. From the intermediate casing point to the surface only inclinometer readings were taken and there I might point out that the maximum deviation from the vertical was less than two degrees and so for the purposes of determining bottom hole location the hole was assumed vertical at the intermediate casing point.

MR. UTZ: That casing point was what depth?

A 4,978.

Q (By Mr. Morris) Would you refer to the plat showing the bottom hole location of this survey?

A On the last page of the exhibit a plat has been prepared which is a horizontal plane picture of how the hole naturally wandered by itself. From the surface location you can see that it originally took off in a northeasterly direction and then reached a point approximately seventy feet to the east of the surface location then began a gradual southwest drift, ending up at a bottom hole location of 148.81 feet south and 75.58 feet west of the surface location.

Q Was there any intention to make this well go in a southwesterly direction?

A No, sir, this picture represents the natural wandering of the well by itself.

Q At what depth in this well does it appear that the fault was cut or, stated differently, do you agree with Mr. Pederson's interpretation as shown on his log as to the depth at which the fault was cut?

A The only indication we can have from a directional survey as to where we cross a fault or some kind of anomaly

is a change in direction and the only thing that this survey shows is that approximately the depth where our electric logs indicate a repeating of section, we do have change in direction, rather sudden change, which is indicated at about shot number 70. On this wandering you will note that it changes from a southwesterly direction to nearly a westerly direction.

(Whereupon, Applicant's Exhibit 7 marked for identification)

Q Do you have prepared an exhibit showing the diagrammatic sketch of the equipment in the well at the time the well was completed by Mr. Williamson?

A Yes, this is Exhibit Number 7 and shows diagrammatically the surface casing twelve and three quarter inch and the intermediate casing which is eight and five eighths inch and the open hole section from 4,978 feet to the total depth of 13,140 feet. On reaching total depth and drillstem testing the Devonian and recovering water we plugged back to a depth -- Mr. Williamson plugged back to a depth of 10,600 feet with two plugs, one placed at 12980 and the other at 10,600. Signal Oil and Gas assumed operations at this point and placed another plug with a top at 10,000 feet.

Q Now, at what point would you propose to kick off or have you kicked off on your directional drilling?

A When we decided to attempt this directional work in order to get back on the up side of the fault, I might point out that through phone conversation with the District Supervisor in Hobbs we obtained verbal permission to proceed at our own risk and later to obtain formal permission at this hearing and in examining the sample logs of the well and the electric logs and our proposed bottom hole target we decided the best place to sidetrack the old hole was at a measured depth of 10,347 feet which is indicated on this Exhibit Number 7.

(Whereupon, Applicant's Exhibit 8 marked for identification)

Q Would you now refer to Exhibit Number 8 and show what your experience has been since you sidetracked the hole?

A Exhibit Number 8 is the plan which we drew up to directionally control and drill the well to our target location. The portion on the left is a vertical plane showing the drift angle which we must obtain in order to get out as far as we want to. The diagram on the right side of the exhibit again shows the horizontal plane or trace of the bottom hole course. The darker line drawn

from the kickoff point to the target would be a straight line course which in reality never can be obtained. The lighter line drawn from the surface location which is indicated by the cross, wandering down to the circle noted as the kickoff point, this is the natural wandering of the upper part of the hole that was determined by the directional survey. Then the lighter line from the kickoff point indicates our progress since kickoff and to yesterday morning, indicates the direction that we have intentionally to control and drill the hole.

Q Now, the information that is shown on this exhibit from your kickoff point to the point of present progress, how has that been measured?

A It is measured in a single shot survey as opposed to the multi-shot that was taken in the old hole. This instrument is essentially the same with the exception of the number of pictures that are taken and consist of a tool dropped in the hole at various depths, a camera records a picture of an azmuth compass and an inclinometer and each point is plotted at the depth the picture is taken and by this means we can keep a day to day record of where the bottom hole actually is and we can plan our course from that, any corrective measure we need to take to either

bring the direction around if it's wandering in the wrong direction or to increase or decrease the drift angle.

Q At what intervals are the shots taken on this type of survey?

A Normally they are taken every span, approximately every thirty feet, I should say every joint.

Q So by the time the well reaches its objective you will have a plot showing the meanderings of this well by this form of directional survey?

A Right, at the time we reach location we will have as accurate a picture of where the bottom hole location is that we can obtain really by any method.

Q Would you propose to submit the directional survey of the hole as it is finally completed to the Commission?

A Yes, and further, we would propose to present the compilation of these single point measurements as our directional survey.

Q Now, you mentioned a minute ago that the directional survey of the original hole was done by a multi-shot survey. In your estimation, does multi-shot survey give you any more accurate determination of the bottom hole location of the well than a single shot survey?

A In my opinion, I don't think so. The advantage of a multi-shot survey is that you can survey an entire hole at one time; if you haven't had any directional survey as you are drilling the hole then the multi-shot instrument can be run and determine where the bottom hole location is but under normal procedure as was done in the original hole, the interval, the shot density is one per 100 feet approximately, whereas, in our directional drilling work, we take a shot every thirty feet, so I would have to say that probably this directional survey that we are compiling as we drill would be more accurate than a normal multi-shot survey.

Q You have already stated that you would propose to submit this single shot survey to the Commission at the completion of the well. In the event the Commission should for some reason, determine that it wants a multi-shot survey, when would that survey have to be run?

A It would have to be run prior to the setting of any casing. As I point out before, the compass will not function inside of magnetic pipe, which casing is, it would have to be run at reaching total depth and before we set our production string or casing and in the event that the Commission would require an additional survey

of this nature we would like to have notice of this at the present time or shortly hereafter so that we can plan the survey when it's needed before we run the casing in the hole.

Q As I understand your testimony, it's your opinion that the single shot survey that is being conducted should be sufficient and as accurate at least as accurate as a multi-shot survey to show the final bottom hole location of this well?

A Yes, I believe it would be every bit as accurate.

Q During the testimony of Mr. Pederson some discussion was had of the tolerance that might be required with respect to the final bottom hole location of the well. Would you have any suggestion to make in this regard?

A Of course, it's a difficult question and if you ask for a certain amount, when you get to TD you are more than likely going to need more. In my experience in directional work in California and in Texas, and I am sure it will prove out here, I think 100-foot radius is not anything exceptional to expect to miss a target. It can be drilled with closer tolerances, but the expense of the operation increases quite rapidly with any closer tolerances than that.

Q How long do you believe it will be before you reach your objective in this well?

A As of yesterday morning we had approximately twelve to 1,300 feet of measured hole to drill and I would estimate an average penetration rate of sixty feet a day, which would put us down approximately twenty days.

Q One more thought on this tolerance matter, Mr. Delaney, your bottom hole location is seventy feet from the quarter-quarter section line. If you were granted a 100-foot tolerance, would you insure that the bottom hole location of the well is in the quarter-quarter section of the proposed bottom hole location before attempting to dedicate that 40-acre tract to the well?

A Right. Well, when we reach objective depth, at this time I can't assure that we can get that far out. The bottom hole location at objective would, of course, determine the tract that would be dedicated to the well. We intend to get the bottom hole location in the 40-acre tract that Mr. Pederson pointed out.

Q Assuming that you do get it in that tract, my point is that if you are asking for 100-foot tolerance, you wouldn't ask for 100-foot tolerance toward the -- you would only ask for seventy foot tolerance toward your quarter-

quarter section line in view of our proposal that we bottom the hole in that particular quarter-quarter section, is that correct? Is that a fair statement?

A Correct. I wouldn't be asking that we would be allowed to have a bottom hole location any any other 40 acre section than that which we intend to dedicate to the well.

MR. MORRIS: At this time, Mr. Examiner, we offer Exhibits 6, 7 and 8 into evidence.

MR. UTZ: Without objection, Exhibits 6, 7 and 8 will be entered into evidence in this case.

(Whereupon, Applicant's Exhibits 6, 7 and 8 were offered and admitted in evidence.)

MR. MORRIS: That's all I have of Mr. Delaney.

CROSS EXAMINATION

BY MR. UTZ:

Q Now, your present intentions are to bottom this thing 1,250 from the east line of Section 1, right?

A That is correct.

Q That would be 100 feet east of the quarter-quarter section line then, am I correct?

A It would be approximately seventy feet.

Q What are the pool tolerances here or is this a wildcat?

A It's a wildcat.

Q So the tolerance would be, according to Rule 701, would be 130 feet, is it, or 320? I haven't read it in so long I can't remember myself now.

A From the property line, 330, I believe.

Q On the quarter-quarter section line?

A I'm not familiar with that part of it.

MR. MORRIS: I would have to look at the rule myself.

Q (By Mr. Utz) I believe it's 330, so actually this is a nonstandard application, as well as the direction of the hole?

MR. MORRIS: Yes, sir.

Q In other words, your proposition was that if you had 100-foot tolerance that it would be bottomed in the quarter-quarter section in which the well -- at which you request or which the well is surfaced in? It wouldn't be the surface.

A No, it would be the bottom hole location.

MR. MORRIS: Of the bottom hole location.

Q (By Mr. Utz) So you might be two feet from the line when you get there, quarter-quarter section line with 100-foot tolerance?

A Well, this would be correct.

Q Now, according to your Exhibit 2, am I correct in that all the colored area is controlled by Signal?

MR. PEDERSON: Yes.

Q So then even though you were, say, one or two feet from the quarter-quarter section line, you wouldn't be crowding anybody but Signal?

A That's correct.

MR. MORRIS: In this regard, Mr. Examiner, it's premature to talk about wide spacing until we see what kind of a well we will have but if the well turns out to have characteristics that would justify wide spacing, Signal definitely would intend to come back to the Commission for an 80-acre spacing and if that were granted, would propose to dedicate the two forties that -- that contain the surface location and the bottom hole location of this well. At that time we realize there might be some question as to the productive acreage involved, but --

MR. UTZ: This really kind of puts the Commission on a spot as far as spacing is concerned, does it not, in other words, it's a little difficult to dedicate the forty on which the well is not located.

MR. MORRIS: Well, the bottom hole location

certainly would be located -- you would be dedicating the forty to the well on which the bottom hole of the well is located and if the -- since the bottom hole location is so close to the quarter-quarter section line, I thought it might be of some interest that number one, the acreage immediately to the west, the forty to the west, is controlled by Signal so there's no problem of crowding, and also, this problem may be taken care of eventually by some form of wide spacing in the pool.

MR. UTZ: In view of the fact that there is a dry hole on the old well, it would be a little difficult to dedicate the entire forty, which would be the northwest of the southeast, since part of it is proven now to be dry, is that correct?

MR. MORRIS: That's right.

Q Now, let's get in a little more to the type of survey. Specifically, what did you call the type of survey that you intend to use?

A It would be called a single shot survey.

Q Tradename or Eastman or what?

A No tradename particularly, just indicating the type of tool that is used to measure the direction and inclination.

Q Who is going to do this for you?

A Eastman. I might point out that Eastman is also doing our directional drilling work.

Q Perhaps I was too busy looking at exhibits, but I didn't quite understand the difference between your single shot and your multi-shot survey.

A The main difference is just in the tool that is used to do the surveying. A multi-shot just as it implies, it takes a number of pictures continuously. The instrument takes a picture every two minutes on a clock of the azmuth compass and the inclinometer, and so you can drop it in your drill string --

Q As it's being lowered or raised in the hole?

A Well, when you reach TD you drop it in your drill string and then the instrument is taking pictures every two minutes, as you pull your drill string to the surface you stop every 100 feet, allow the instruments to come to a rest, and wait four minutes to insure that you have two pictures at this point --

Q This is the one that you use to locate the original hole?

A That is correct. The single shot survey, the tool takes only one picture and again the tool is dropped

in the drill string at whatever point you are drilling, where you want to measure the direction and inclination and as I said, in our drilling procedure we normally take this every thirty feet or every time we make a connection, and it takes only one picture that tells you the attitude and direction of the hole at that point, to allow you to proceed. Now, once you reach TD you have what amounts to a compilation of a multi-shot survey with 30-foot intervals of survey rather than, say, 100 feet.

Q Is the same type instrument used?

A It's essentially the same, the same tool, same azimuth compass and same inclinometer. The only difference being that the camera does not repeat. It takes only one picture.

Q Then you bring it back out?

A Then you bring it back out, right.

Q Actually, your single shot is a multi-shot survey, isn't it, in a sense, taking pictures every thirty feet on the way down?

A That's correct. The only difference in the tool --

Q It takes one picture at a time.

A It's the camera that's used. One camera

continuously takes pictures automatically every two minutes, the other camera takes only one picture until it's reloaded.

Q So actually, using the single shot method, you will have a complete record, that is, you will let the camera stabilize and your compass stabilize every thirty feet and take a picture of it?

A That's correct.

Q So you will have a record every thirty feet on the way down?

A That's correct.

Q And the chances are that taking the so-called multi-shot on the way up you just repeat this process, would you not?

A That is correct.

Q Maybe not thirty-foot intervals, but every three or four hundred foot intervals, as I understand?

A Correct.

Q If you get a well here, as I understand it, it is your intention to at least initially dedicate the northeast of the southeast quarter?

MR. PEDERSON: Correct.

MR. UTZ: Are there other questions?

CROSS EXAMINATION

BY MR. HATCH:

Q Are the royalty interests the same in the two quarters?

MR. PEDERSON: Yes, sir, they are all T-P Coal and Oil acreage that we acquired from them through farmout. You can see it better on this plat here.

MR. HATCH: And is that the same as he has here?

MR. PEDERSON: No, this is a little different.

MR. MORRIS: If you would like, we can mark that as an exhibit.

MR. PEDERSON: It will clear that point up.

MR. UTZ: Well, I think probably we should mark it.

(Whereupon, Applicant's Exhibit 9 marked for identification)

MR. MORRIS: We offer Applicant's Exhibit 9 into evidence.

MR. UTZ: It will be accepted in the record. Other questions? Witness may be excused.

(Witness excused)

MR. UTZ: Statements? Case will be taken under advisement.

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

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

Witness my Hand and Seal this 18th day of April 1968.

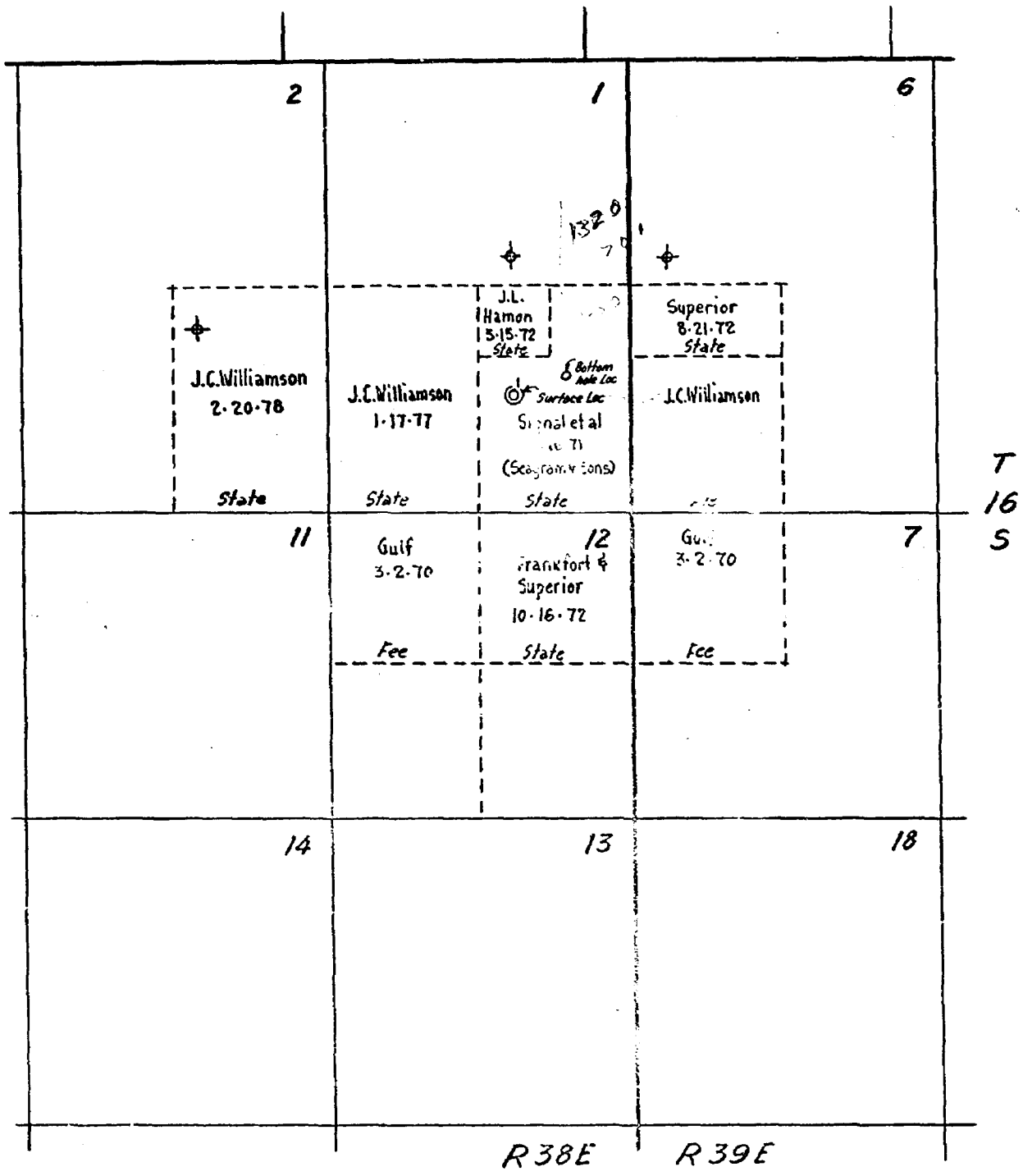
Kay Embree
NOTARY PUBLIC

My Commission Expires:

November 19, 1971

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 3746, heard by me on Apr. 3, 1968.

[signature], Examiner
New Mexico Oil Conservation Commission

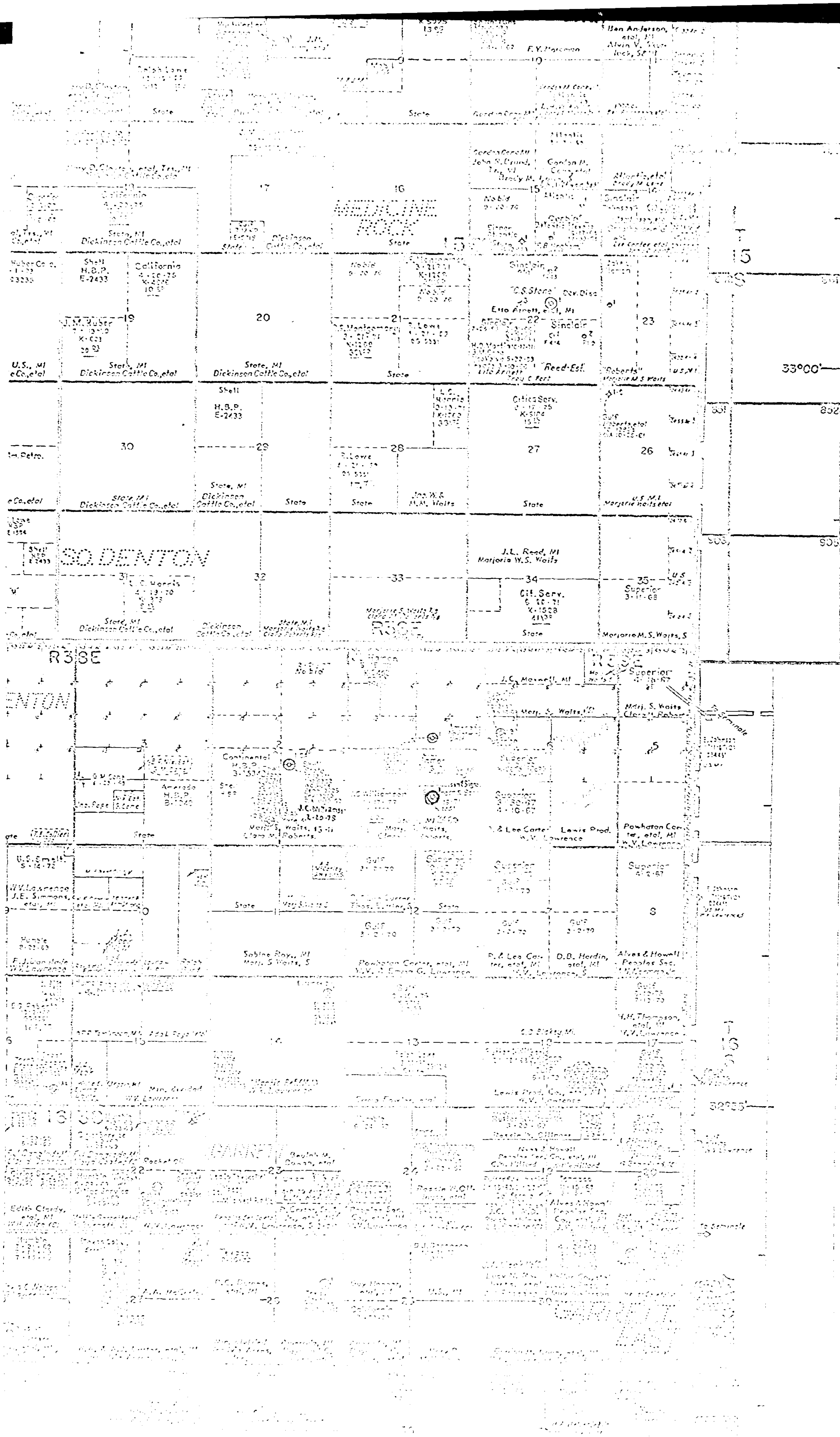


BEFORE EXAMINER UTZ

OIL CONSERVATION DIVISION

Appl. Exhibit No. 1

CASE NO. 3741



Ben Anderson, etal
F.Y. Marcomb
State
MEDICINE ROCK
Dickinson Cattle Co., etal
Shell
H.B.P.
E-2433
California
Sinclair
C.S. State
Etta Arnett, etal, MI
"Reed-Est."
"Roberts"
U.S., MI
State, MI
Dickinson Cattle Co., etal
Cities Serv.
Gulf
Im. Petro.
Jno. W. & M.M. Waits
U.S. MI
Marjorie Waits etal
SO. DENTON
J.L. Reed, MI
Marjorie W.S. Waits
Cit. Serv.
Superior
Marjorie M.S. Waits, S
T 15 S
33°00'
R 35 E
R 36 E
ENTON
J.C. Maxwell, MI
Marj. S. Waits
Continental
H.B.P.
Amerada
H.B.P.
Superior
Lewis Prod.
Powhaton Cor. ter, etal, MI
W.V. Lawrence
Gulf
Sabine Roy., MI
Marj. S. Waits, S
Powhaton Carter, etal, MI
P. & Lee Carter, etal, MI
D.B. Hardin, etal, MI
Alves & Howell
Peoples Sec.
Humble
W.V. Lawrence
J.E. Simmons, etal, MI
H.H. Thompson, etal, MI
Lewis Prod. Co.
T 16 S
32°55'
Edith Clardy, etal, MI
Pocket Oil
Peoples Sec.
To Seminole

SUBJECT: SIGNAL OIL AND GAS COMPANY (FORMERLY J. C. WILLIAMSON) NO. 1 T. P. STATE - SURFACE LOCATION 2126' FSL & 1887' FEL OF SECTION 1, T-16-S, R-38-E, LEA COUNTY, NEW MEXICO

The J. C. Williamson No. 1 T. P. State was drilled to a total depth of 13,140 feet in the Devonian formation, where salt water was recovered on a drill-stem test. In the process of drilling, this well cut a 210-foot reverse fault at approximately 11,970 feet in the Mississippian section, as indicated on the submitted Acoustic-Gamma Ray log. At the top of the Chester (Upper Mississippian), before encountering the fault, this test was 137 feet high to the Amerada No. 1 North Knowles Unit, approximately one-half mile north, which recovered 1,040 feet of oil on a drill-stem test in the top of the Devonian formation.

On the basis of the above information, Signal took over operation of the well and plugged back to 10,347.27 feet for the purpose of whipstocking the hole east, away from the fault, as indicated on the submitted seismic Devonian map. The hole was 2029.35 feet from the south line and 1889.59 feet from the east line of Section 1 at the kick-off point. Signal proposes to whipstock the well northeast to a bottom-hole location of 2160 feet from the south line and 1250 feet from the east line of Section 1, T-16-S, R-38-E. From seismic, this bottom-hole location should be as high, or higher than the original well would have been at the Devonian level, if it had not cut the fault.

If this drills out as mapped on seismic, the bottom-hole location of the whipstocked hole should have excellent prospects for production from the Devonian formation, the primary objective. Also noted on the seismic map is the actual location of the hole in relation to the fault and surface location at various points in the original well.

C. M. Pederson

C. M. Pederson

CMP:sg
Attachments

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
EXHIBIT NO. 5
CASE NO. 3741

DIRECTIONAL DRILLING
EASTMAN
INSTRUMENTATION

"Symbol of Service"

REPORT
of
SUB-SURFACE
DIRECTIONAL
SURVEY

SIGNAL OIL AND GAS COMPANY
COMPANY

T. P. STATE #1
WELL NAME

LEA COUNTY, NEW MEXICO
LOCATION

JOB NUMBER
WT2968

TYPE OF SURVEY
MULTIPLE SHOT
SURVEY

DATE
February 25, 1968

SURVEY BY
E. R. Warner

OFFICE
Odessa, Texas

FORM D-302 R1

RECORD OF SURVEY

CHECKED BY__________

JOB NO. WT2968 DATE February 25, 1968

STATION	MEASURED DEPTH	DRIFT ANGLE	TRUE VERTICAL DEPTH	VERTICAL SECTION	COURSE DEVIATION	DRIFT DIRECTION	ACCUMULATED DEVIATION ASSUMED ONE DIRECTION			
1	276	30'			2 40		2 40			
2	557	15'			1 24		3 64			
3	838	VERT								
4	1121	VERT								
5	1403	VERT	1403							
6	1684	45'			3 68		7 32			
7	1961	15'			1 21		8 53			
8	2231	15'			1 18		9 71			
9	2509	15'			1 22		10 93			
10	2785	VERT	2784 97							
11	3060	VERT								
12	3340	1°			4 90		15 83			
13	3616	1°			4 83		20 66			
14	3895	1°			4 88		25 54			
15	4177	1°30'	4176 70		7 30		32 84			
16	4463	1°15'			6 23		39 07			
17	4644	45'			2 37		41 44			
18	4871	VERT	4870 62				41 44			

FORM NO. D-303P

RECORD OF SURVEY

CHECKED BY_____ JOB NO. WT2968 DATE February 25, 1968

STATION	MEASURED DEPTH	DRIFT ANGLE	TRUE VERTICAL DEPTH	VERTICAL SECTION	COURSE DEVIATION	DRIFT DIRECTION	RECTANGULAR COORDINATES NORTH	SOUTH	EAST	WEST
1	5059	45'			2 46	N 34 E	2 04		1 38	
2	5153	45'			1 23	N 30 E	3 11		2 00	
3	5247	45'			1 23	N 48 E	3 93		2 91	
4	5340	45'			1 22	N 43 E	4 82		3 74	
5	5434	30'	5433 95		82	N 57 E	5 27		4 43	
6	5529	45'			1 24	N 64 E	5 81		5 54	
7	5622	45'			1 22	N 78 E	6 06		6 73	
8	5716	1°			1 65	S 89 E	6 03		8 38	
9	5811	1°			1 66	N 70 E	6 60		9 94	
10	5906	1°	5905 87		1 66	N 75 E	7 03		11 54	
11	6001	1°			1 66	N 64 E	7 76		13 03	
12	6094	1°			1 63	N 49 E	8 83		14 26	
13	6188	1°			1 65	N 66 E	9 50		15 77	
14	6282	1°15'			2 05	N 74 E	10 06		17 74	
15	6377	1°15'	6376 77		1 94	N 88 E	10 13		19 68	
16	6480	1°15'			2 25	S 68 E	9 29		21 77	
17	6594	1°			2	S 80 E	8 94		23 74	
18	6689	1°			1 66	S 80 E	8 65		25 37	
19	6783	1°			1 65	S 77 E	8 28		26 98	
20	6875	1°	6874 67		1 61	S 78 E	7 95		28 55	

FORM NO. D 303P

RECORD OF SURVEY

CHECKED BY_____ JOB NO. [illegible]2968 DATE February 25, 1968

STATION	MEASURED DEPTH	DRIFT ANGLE	TRUE VERTICAL DEPTH	VERTICAL SECTION	COURSE DEVIATION	DRIFT DIRECTION	RECTANGULAR COORDINATES NORTH	SOUTH	EAST	WEST
21	6945	1°			1 23	S 65 E	7 43		29 66	
22	7038	1°30'			2 44	S 78 E	6 92		32 05	
23	7121	1°30'			2 17	S 83 E	6 66		34 20	
24	7214	1°15'			2 03	S 84 E	6 45		36 22	
25	7308	1°15'	7307 57		2 05	S 87 E	6 34		38 27	
26	7401	1°15'			2 03	S 86 E	6 20		40 30	
27	7496	1°			1 66	S 85 E	6 06		41 95	
28	7591	1°15'			2 07	N 75 E	6 60		43 95	
29	7685	1°15'			2 05	N 80 E	6 96		45 97	
30	7779	1°15'	7778 47		2 05	N 80 E	7 32		47 99	
31	7874	1°			1 66	S 73 E	6 84		49 58	
32	7969	1°			1 66	S 73 E	6 36		51 17	
33	8065	45'			1 26	S 69 E	5 91		52 35	
34	8163	1°			1 72	S 26 E	4 36		53 10	
35	8253	1°	8252 38		1 58	S 11 E	2 81		53 40	
36	8345	1°			1 61	S 4 W	1 20		53 29	
37	8440	1°15'			2 07	S 10 E		84	53 65	
38	8557	1°15'			2 55	S 23 W		3 19	52 69	
39	8630	1°15'			1 59	S 20 W		4 68	52 11	
40	8727	1°30'	8726 28		2 54	S 14 W		7 14	51 50	

FORM NO. D -303P

RECORD OF SURVEY

CHECKED BY_____

JOB NO. WT2968 DATE February 25, 1968

STATION	MEASURED DEPTH	DRIFT ANGLE	TRUE VERTICAL DEPTH	VERTICAL SECTION	COURSE DEVIATION	DRIFT DIRECTION	RECTANGULAR COORDINATES NORTH	SOUTH	EAST	WEST
41	8820	1°30'			2 44	S 15 W		9 50	50 67	
42	8913	1°45'			2 84	S 15 W		12 24	50 14	
43	9004	1°30'			2 38	S 18 W		14 50	49 40	
44	9098	2°30'			4 10	S 20 W		18 35	48 00	
45	9211	3°15'	9209 89		6 41	S 22 W		24 29	45 60	
46	9312	4°15'			7 48	S 31 W		30 70	41 75	
47	9407	5°30'			9 10	S 35 W		38 15	36 53	
48	9495	5°15'			8 05	S 36 W		44 66	31 80	
49	9590	5°15'			8 69	S 32 W		52 03	27 20	
50	9685	4°30'	9682 12		7 4	S 33 W		58 29	23 14	
51	9779	4°30'			7 38	S 34 W		64 41	19 01	
52	9873	4°30'			7 36	S 31 W		70 74	15 21	
53	9968	4°15'			7 04	S 36 W		76 44	11 07	
54	10063	4°			6 63	S 39 W		81 59	6 90	
55	10157	4°	10152 82		6 56	S 40 W		86 61	2 68	
56	10252	4°15'			7 04	S 43 W		91 76		2 12
57	10347	4°30'			7 46	S 45 W		97 05		7 31
58	10440	4°			6 49	S 46 W		101 37		12 21
59	10535	4°			6 63	S 39 W		106 52		16 38
60	10628	4°	10622 60		6 49	S 37 W		111 70		20 29

FORM NO D-303P

RECORD OF SURVEY

CHECKED BY_____ JOB NO. WT2968 DATE February 25, 1968

STATION	MEASURED DEPTH	DRIFT ANGLE	TRUE VERTICAL DEPTH	VERTICAL SECTION	COURSE DEVIATION	DRIFT DIRECTION	RECTANGULAR COORDINATES NORTH	SOUTH	EAST	WEST
61	10723	3°15'			5 39	S 36 W		116 06		23 46
62	10817	2°45'			4 51	S 37 W		119 66		26 17
63	10910	2°45'			4 46	S 41 W		123 03		29 10
64	11004	2°45'			4 51	S 49 W		125 99		32 50
65	11097	2°45'	11091 01		4 46	S 55 W		128 55		36 15
66	11191	2°45'			4 51	S 59 W		130 87		40 02
67	11286	2°30'			4 14	S 61 W		132 88		43 64
68	11364	1°45'			2 38	S 16 W		135 17		44 30
69	11459	2°30'			4 14	S 13 W		139 20		45 23
70	11569	2°30'	11562 57		4 80	S 15 W		143 84		46 47
71	11663	2°45'			4 51	S 74 W		145 08		50 81
72	11749	3°15'			4 88	S 85 W		145 51		55 67
73	11835	1°30'			2 25	S 80 W		145 90		57 89
74	11929	2°			3 28	S 87 W		147 07		61 17
75	12016	2°	12009 18		3 04	S 88 W		146 18		64 21
76	12136	2°			4 19	S 79 W		146 98		68 32
77	12207	2°			2 48	S 73 W		147 71		71 69
78	12302	2°			3 32	S 79 W		148 34		73 95
79	12412	1°15'			2 40	N 82 W		148 01		76 33
80	12506	1°	12498 97		1 65	N 55 W		147 06		77 68

FORM NO. D -303P

RECORD OF SURVEY

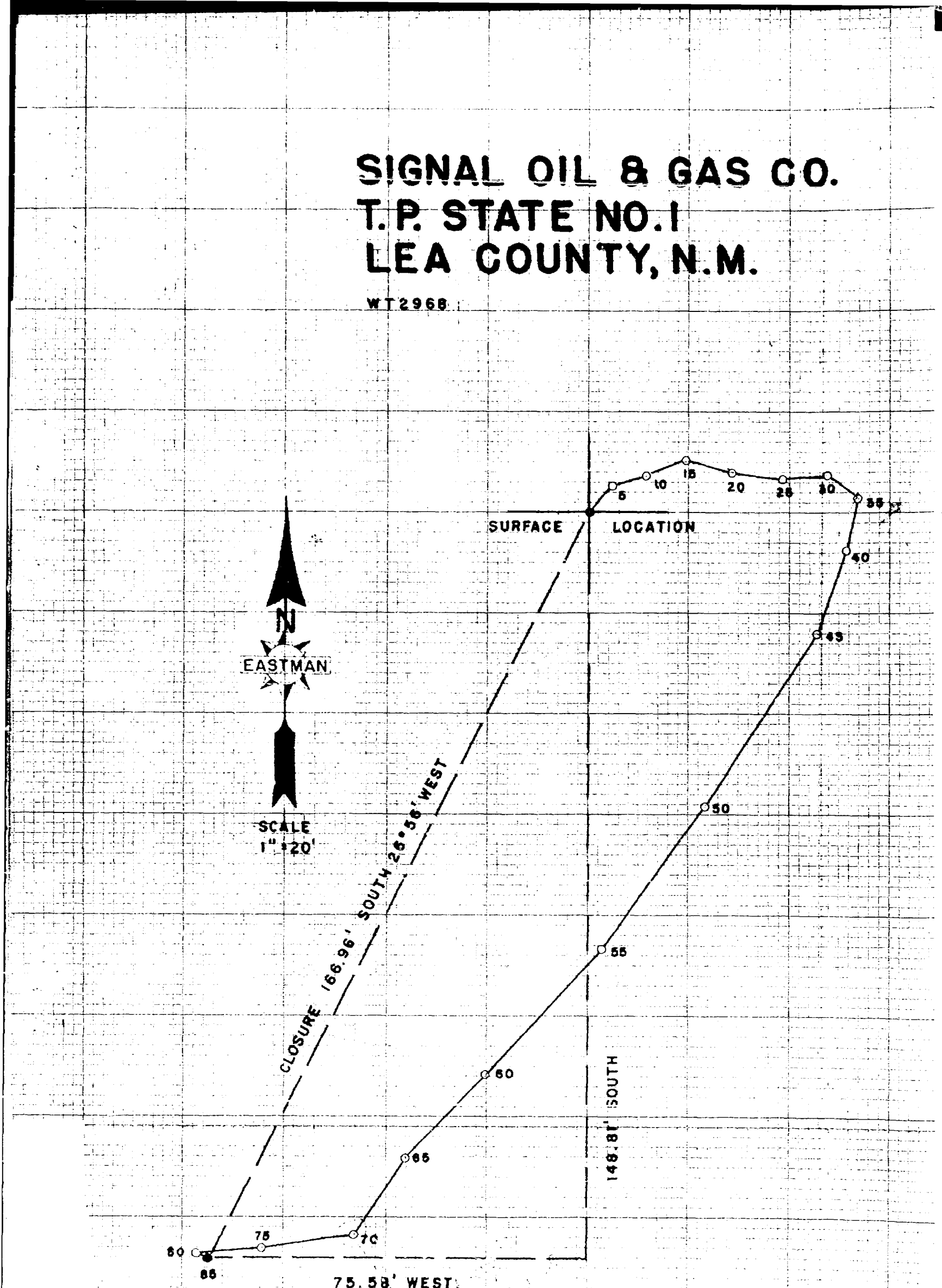
CHECKED BY_____ JOB NO. WT2968 DATE February 25, 1968

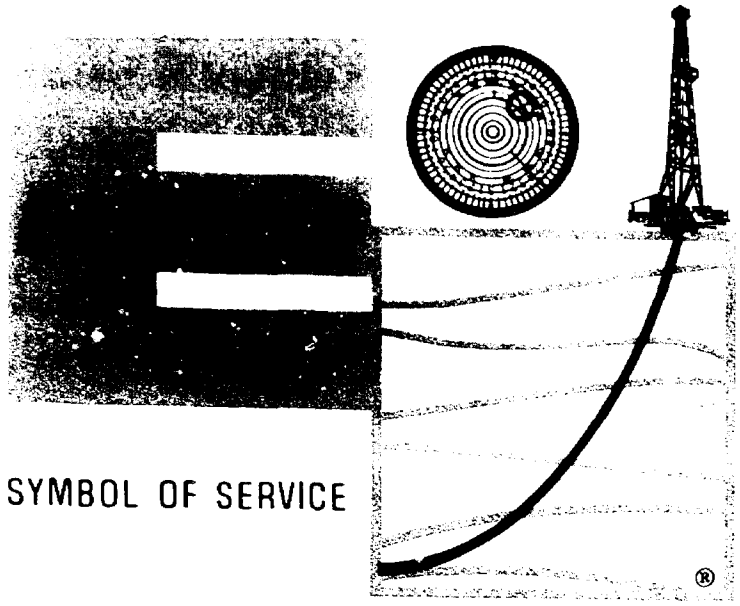
STATION	MEASURED DEPTH	DRIFT ANGLE	TRUE VERTICAL DEPTH	VERTICAL SECTION	COURSE DEVIATION	DRIFT DIRECTION	RECTANGULAR COORDINATES			
							NORTH	SOUTH	EAST	WEST
81	12604	45'			1 28	N 87 W		146 99		78 96
82	12698	30'			82	S 51 E		147 51		78 32
83	12786	45'			1 15	S 58 E		148 12		77 34
84	12880	45'			1 23	S 87 E		148 18		76 11
85	12974	30'	12966 94		82	S 40 E		148 81		75 58
				CLOSURE:	166 96'	S 26° 56' W				

FORM NO. D-303P

SIGNAL OIL & GAS CO.
T.P. STATE NO.1
LEA COUNTY, N.M.

WT2968





SURVEY REPORT

EASTMAN OIL WELL SURVEY COMPANY

DIRECTIONAL DRILLING • TOOLS • INSTRUMENTS • TECHNIQUES

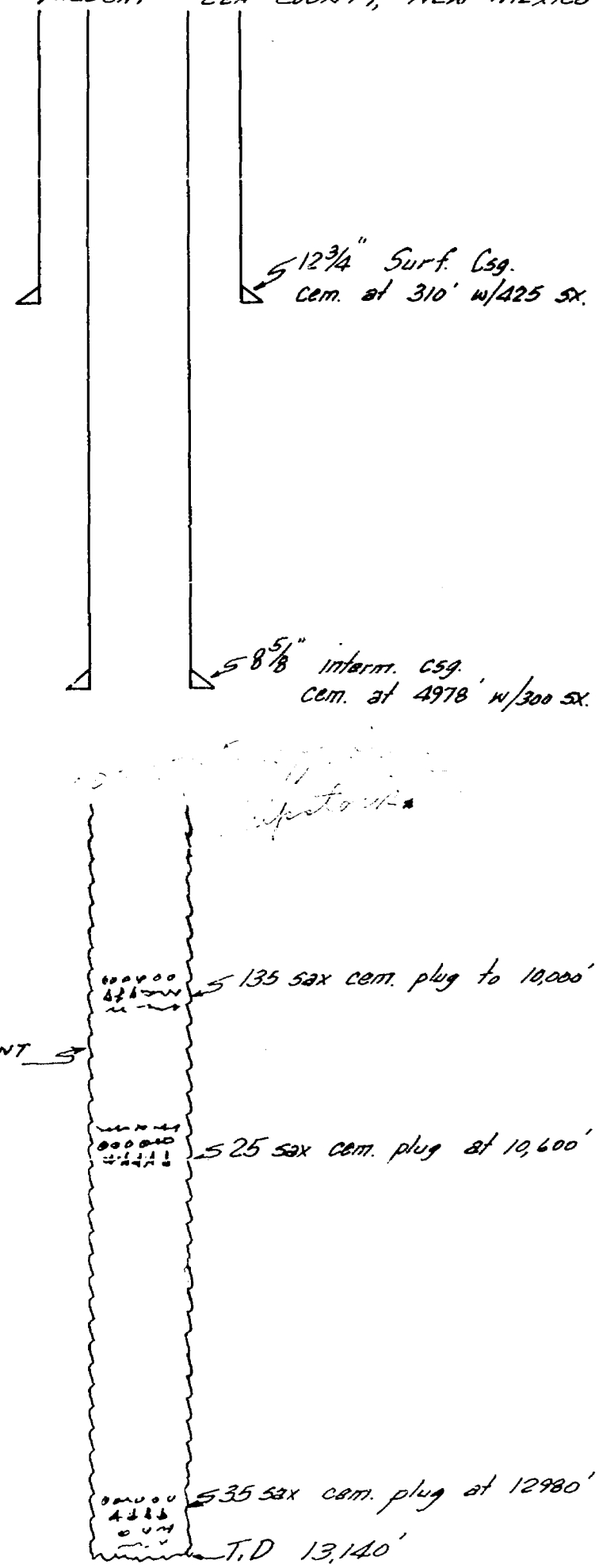
Consult The Yellow Pages For Your Nearest Eastman Office

LONG BEACH • **HOUSTON** • LAFAYETTE

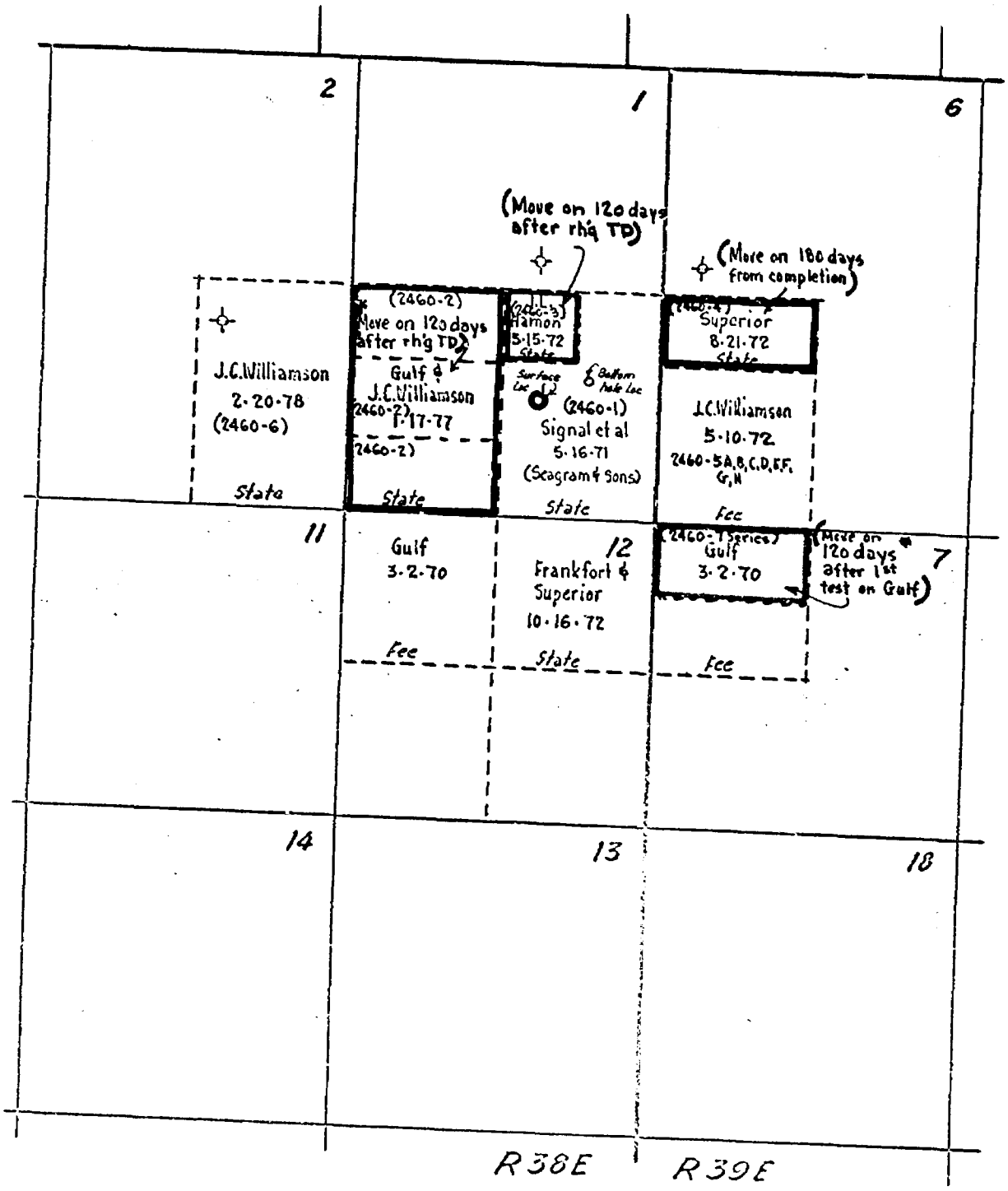
THIS IS A RECORD OF A SUB-SURFACE SURVEY OF YOUR WELL

We have retained a copy of your survey report in our files for your convenience; however, should you so desire, all copies of the survey report will be forwarded to you on written request. All surveys are kept in a locked file and are held in strictest confidence. Additional copies of your survey report can be made from the original by any blueprint company.

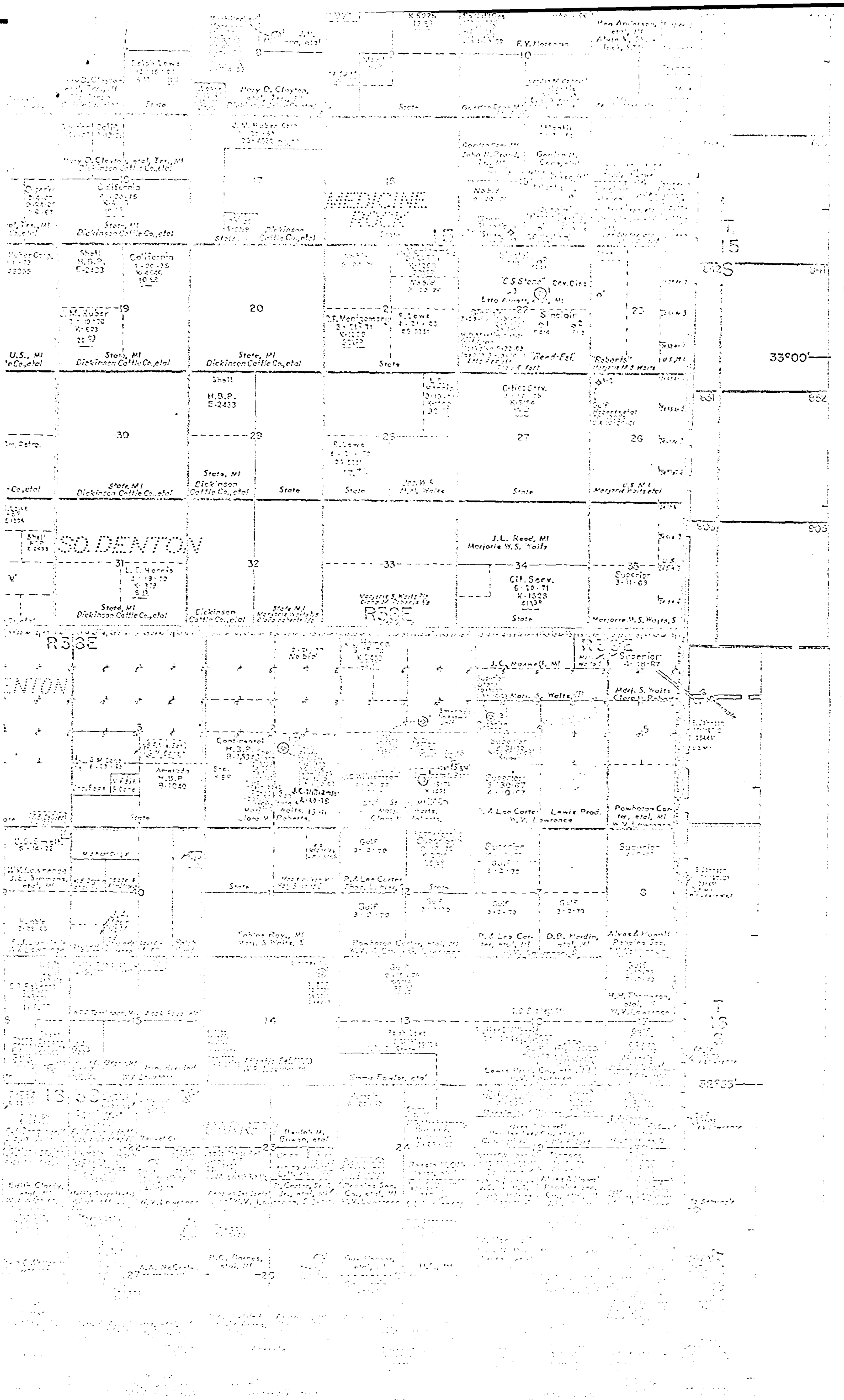
SIGNAL OIL & GAS CO. ET AL
T.P. STATE Nº 1
WILDCAT - LEA COUNTY, NEW MEXICO



~~Pete's copy w/notes~~



Signal et al #1 T.P. State



MEDICINE ROCK
SO. DENTON
R36E
15
33°00'
852
Dickinson Cattle Co., etal
State, MI
State
Shell
H.B.P.
E-2433
California
J.M. Huber
U.S., MI
L.C. Harris
"C.S. Stone"
Sinclair
"Roberts"
Cit. Serv.
J.L. Reed, MI
Marjorie W.S. Waits
Superior
Continental
Amerada
Gulf
Powhatan Corp.
Lewis Prod.
D.B. Hardin, etal, MI
Tobias Roy., MI
H.M. Thompson
Emma Fowler, etal