

CASE 6742: ARCO OIL AND GAS COMPANY FOR
AN ADMINISTRATIVE PROCEDURE, EDDY COUNTY,
NEW MEXICO

Case No.

6742

Application

Transcripts.

Small Exhibits

ETC.

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
28 November 1979

EXAMINER HEARING

IN THE MATTER OF:

Application of ARCO Oil and Gas Com-) CASE
pany to drill a horizontal drainhole,) 6720
Eddy County, New Mexico.)

and)

Application of ARCO Oil and Gas Com-) CASE
pany for an administrative procedure,) 6742
Eddy County, New Mexico.)

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: Ernest L. Padilla, Esq.
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: Conrad Coffield, Esq.
Hinkle Law Firm
P. O. Box 3580
Midland, Texas

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I N D E X

RYAN STRAMP

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CASE 6720

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CASE 6742

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MR. STAMETS: We'll call next, Case 6720.

MR. PADILLA: Application of ARCO Oil and Gas Company to drill a horizontal drainhole, Eddy County, New Mexico.

MR. STAMETS: Call for appearances.

MR. COFFIELD: Conrad Coffield, with the Hinkle Law Firm, appearing on behalf of the applicant, and if the Examiner please, we can have the subsequent case, 6742, called at the same time and proceed into that case after we've presented this first one with the same witness.

MR. STAMETS: Okay, since it concerns basically the same information we'll consolidate the two cases for purposes of testimony. I'd like to have you call Case 6742.

MR. PADILLA: Application of ARCO Oil and Gas Company for administrative procedure, Eddy County, New Mexico.

MR. COFFIELD: I have one witness in these cases and the witness is Mr. Ryan Stramp, who testified previously in Case 6741, and I trust the Examiner will consider him qualified and sworn.

MR. STAMETS: The record shall show that Mr. Stramp is qualified and sworn in this case, these cases.

RYAN STRAMP

being called as a witness and having been duly sworn previously upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. COFFIELD:

Q Mr. Stramp, are you familiar with the applications 6720 and 6742?

A Yes, I am, sir, familiar with both applications.

Q First, with respect to 6720, what is it that ARCO seeks in that case?

A ARCO Oil and Gas Company seeks permission to drill the Empire Abo Unit Well J-213 and to complete this well in the Abo Reef formation with a horizontal drainhole approximately 200 feet in length. The proposed location of the J-213 is 2050 feet from the north line and 100 feet from the west line of Unit Letter E, Section 6, Township 18 South, Range 28 East.

The terminus of the drainhole is targeted to be in a 400-foot by 400-foot square in the northwest quadrant from the surface location. We also seek from the Division a determination that this well is necessary to effectively and efficiently drain that portion of the reservoir covered by the existing production unit on which the well is

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1 to be drilled.

2 Q Mr. Stramp, refer to what we've marked as
3 Exhibit One in this Case 6729 and explain that exhibit to the
4 Examiner.

5 A Exhibit Number One is a map of the Empire
6 Abo Unit. The proposed location for the J-213 is indicated
7 by the arrow. The heavy dashed lines indicate the unit
8 boundaries.

9 Q Go now to Exhibit Two and explain what that
10 exhibit represents.

11 A Exhibit Number Two is a plat showing the
12 proposed location for the J-213 once again with respect to
13 the offset wells. Once again the heavy dashed line repre-
14 sents the unit boundary. All of the offsetting proration
15 units for the J-213 location are committed to the Empire
16 Unit. The proposed target area is indicated by the shaded
17 area to the northwest of the surface location. The range of
18 current gas/oil ratios of the offset wells is also indicated
19 in this plat. The single open circles represent wells with
20 GORs in excess of 2000 cubic feet per barrel of oil. The
21 double open circles represent wells with GORs of 2000 cubic
22 feet per barrel or less.

23 Q Why was this particular location selected
24 and why are you planning a horizontal drainhole completion
25 for this J-213?

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A. As Exhibit Number Two shows, there are no low GOR producers in the immediate vicinity of the proposed location. The current oil production rate from this area is quite low as a result of the high gas production. Due to the absence of low gas/oil ratio producing wells in the area and also the slow rate of gravity drainage down dip, oil remaining under the J-213 location will not be produced by conventional means during the life of the unit.

Conventional infill drilling in this area has performed poorly. Gas coning seems more severe in this particular section of the unit than in any other area. We feel that a natural, that is a well requiring no acid treatment, horizontal drainhole completion at the J-213 location will recover significant reserves that would not otherwise be produced during the life of the unit.

Q. Go to what we've marked as Exhibit Number Three, Mr. Stramp, and explain that, please.

A. Exhibit Number Three is a plot of cumulative oil recovery versus time for a 200-foot horizontal drainhole in the unit and also for a conventional vertical completion. These curves are based on numeric simulation study of horizontal drainholes in the Empire Abo Unit. This numeric model incorporated geologic properties, such as porosity and permeability characteristics typical of the Abo Reef in the unit.

Empire Abo Reservoir is a vuggy, fractured,

1 dolomitized reef, exhibiting a high degree of vertical perme-
2 ability. These geologic reservoir properties combined with
3 the presence of a large gas cap overlying the oil column re-
4 sult in a producing well at Empire being very susceptible to
5 gas coning. Once a well begins to cone free gas, the oil
6 rate declines very rapidly as a result of the relative perme-
7 ability characteristics of the reservoir.

8 The additional reserves expected to be re-
9 covered by horizontal drainholes in the Empire Abo Unit come
10 from a reduction in gas coning through the dispersion of the
11 withdrawal points in the reservoir.

12 Q Mr. Stramp, go to what we've marked as
13 Exhibit Four and explain that exhibit to the Examiner, please.

14 A Exhibit Number Four is a wellbore diagram
15 for the J-213. We propose to drill a vertical hole to ap-
16 proximately 6225 feet. We will then log and drill stem test
17 the well to locate the gas/oil contact. A target zone will
18 be selected from the logs, casing will be set, and the drain-
19 hole drilling operations will begin. A whipstock will be
20 used to initiate the turn. Flexible drill collars will be
21 used to drill a drainhole extending approximately 200 feet
22 in a northwesterly direction from the kickoff point. The
23 vertical hole will be surveyed with a gyroscopic multi-shot
24 directional survey prior to the initiation of the drainhole
25 drilling. Several magnetic directional surveys will also

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1 be run during the drilling of the drainhole in the drainhole
2 portion of the wellbore.

3 Upon the completion of the drainhole drilling
4 we will submit a brief report to the Division detailing the
5 directional survey data and giving the location of the drain-
6 hole terminus.

7 Q Have these exhibits One through Four been
8 prepared by you or under your supervision?

9 A Yes sir, they were.

10 Q What other comments do you have in this
11 connection, Mr. Stramp?

12 A I would like to state that we're confident
13 that we have resolved the problems that resulted in the pre-
14 mature termination of the drilling of the first horizontal
15 drainhole in the Empire Abo Unit and that we fully expect to
16 drill the full 200 feet of drainhole in the J-213.

17 Q Now, as a related matter, let's go to
18 matters in connection with Case Number 6742. What is it that
19 ARCO seeks by this application?

20 A ARCO Oil and Gas Company seeks an admini-
21 strative procedure through which the Oil Conservation Division
22 may rule on any future application by ARCO to drill directional
23 wells or horizontal drainholes in the Empire Abo Unit.

24 Q Does an administrative procedure currently
25 exist for approval of conventionally drilled infill wells in

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1 the Empire Abo Unit?

2 A Yes, sir. Rule 14 of the special rules and
3 regulations for the Empire Abo Unit Pressure Maintenance Pro-
4 ject contained in Division Order R-4549 and later modified
5 in Order R-4549-B sets forth an administrative procedure for
6 the drilling of conventional producing and injecting wells
7 within the unit.

8 Q Please describe and identify what we've
9 marked as Exhibit One in this Case 6742.

10 A Exhibit Number One is a copy of the Division
11 Order R-4549-B. Page five of this order contains special
12 rule 14 for the Empire Abo Unit. As I mentioned, this rule
13 sets forth an administrative procedure for the approval of
14 conventional infill and producing --- excuse me, conventional
15 infill producing and injecting wells. Rule 14 also details
16 the necessary contents of an application to drill under this
17 administrative procedure.

18 Q What restrictions do you propose be placed
19 on the locations of horizontal drainholes and other deviated
20 wells to be granted administrative approval?

21 A We propose that the new administrative
22 procedure apply to any horizontal drainhole or other direction-
23 ally drilled well whose targeted bottom hole location is no
24 closer than 330 feet from the nearest unit boundary and whose
25 surface location is no closer than 10 feet to any quarter

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1 quarter section line. We also propose that the new procedure
2 cover directionally drilled water or gas injection wells whose
3 targeted bottom hole location is no closer than 1320 feet
4 from the nearest unit boundary.

5 Q Mr. Stramp, what information do you propose
6 be contained in an application for permission to drill under
7 the new administrative procedure?

8 A The contents of an application under the
9 new administrative procedure will be very similar to the con-
10 tests required in an application for a conventional well.
11 First of all, a letter stating a proposed plan for the drilling
12 of the well. Second, a map of the Empire Abo Unit indicating
13 those lands committed to the unit and also showing the sur-
14 face location of the proposed well, the location of all other
15 wells within the unit area, and also identifying all offset
16 operators. Third, a more detailed plat showing the surface
17 location of the proposed well, the targeted bottom hole
18 location, and all Abo wells on the proration unit on which
19 the well is to be drilled, and also all Abo wells on offsetting
20 proration units, and in addition, any nearby unit boundaries.
21 Fourth, a schematic wellbore drawing of the proposed well,
22 indicating a proposed casing plan, wellbore configuration,
23 and all pertinent depths. Fifth, a letter stating that all
24 offset operators to the proposed well have been furnished a
25 complete copy of the application and the date of such noti-

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fication. And sixth, upon completion of the drilling of the well, ARCO will submit a brief report to the Division describing the bottom hole location of the wellbore.

Q Mr. Stramp, are there any further specific points that you would like for the new administrative procedure to include?

A Yes, sir. We would like to have a provision in the procedure to allow for an administrative amendment of the proposed target area for horizontal drainholes and other directionally drilled wells if their final bottom hole locations do not fall within the previously described target area and the actual bottom hole location is within the authority of the administrative procedure.

Q Mr. Stramp, in your opinion will the approval of the two applications in Cases Numbers 6720 and 6742 be in the interest of prevention of waste and protection of correlative rights?

A Yes, sir.

MR. COFFIELD: Mr. Examiner, I move the admission of Exhibits One through Four in Case 6720 and Exhibit One in Case 6742.

MR. STANETS: These exhibits will be admitted.

MR. COFFIELD: And I have no further questions of Mr. Stramp on direct examination.

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CROSS EXAMINATION

BY MR. STAMETS:

Q Mr. Stramp, do you have a proposed rule that you were reading from there that you intended to submit to the Division?

A A proposed rule.

Q Right, you had a number of specific proposals.

A No, those were just in the administrative procedure for a conventional well. They have the different contents of the application enumerated and I just numbered mine, too. I'll be happy to give you a copy of this testimony so you can --

Q Very good, that's what I need.

A Okay.

Q Have you, let's see, back on the first case, 6720, you have a 400 by 400 foot target area, is that correct?

A Yes, sir.

Q North and west of the well location. So the wellbore could wind up actually in two proration units, I would assume.

A Yes, sir, that would be a possibility. Both

proration units are committed to the unit and I don't know what administrative problems that might result in, but that is a possibility.

MR. STAMETS: Are there any questions of the witness? He may be excused.

Anything further in this case, these cases? We'll take the cases under advisement.

(Hearing concluded.)

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REPORTER'S CERTIFICATE

I, SALLY W. BOYD, a Certified Shorthand Reporter,
DO HEREBY CERTIFY that the foregoing and attached Transcript
of Hearing before the Oil Conservation Division was reported
by me; that the said transcript is a full, true, and correct
record of the hearing, prepared by me to the best of my
ability from my notes taken at the time of the hearing.

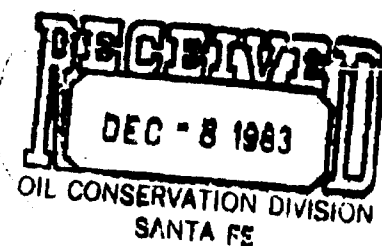
Sally W. Boyd, C.S.R.

I do hereby certify that the foregoing is
a complete record of the proceedings in
the Examiners hearing of Case No. _____,
heard by me on _____, 19____.

_____, Examiner
Oil Conservation Division

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ARCO Oil and Gas Company
Permian District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 684 0100



December 2, 1983

Mr. Joe D. Ramey
Director - Oil Conservation Division
Energy and Minerals Department
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Ramey:

In compliance with Order No. R-4549-E of the Division, ARCO Oil and Gas Company seeks administrative approval to drill four "horizontal drainholes" from existing wells in the Empire Abo Unit, Eddy County, New Mexico. These four wells are designated as the "Empire Abo Unit G-312, J-27, K-15, and K-182". Their locations are as follows:

<u>Well</u>	<u>Locations</u>
G-312	1550' FSL & 2511' FEL, Sec. 33-17S-28E
J-27	1610' FNL & 2310' FEL, Sec. 5-18S-28E
K-15	1980' FSL & 1980' FEL, Sec. 2-18S-27E
K-182	1533' FSL & 2370' FWL, Sec. 1-18S-27E

A schematic drawing of each well and a plat of the Unit and non-Unit lands within the field are attached for your inspection.

By a complete copy of this application, all offset operators are being notified of our intention to drill drainholes from these wells. All copies and this letter were mailed on the date shown on the above heading.

Please notify us if additional information is needed to grant approval of this application.

Sincerely,

V. M. Hearne

V. M. Hearne
Associate Engineering Technician

VMH:dmm

Xc: Offset Operators
(list attached)

EMPIRE ABO UNIT

OFFSET OPERATORS

Aminoil U.S.A., Inc.
600 Western United Life Building
Midland, Texas 79701

Cactus Drilling Corporation of Texas
P. O. Box 2068
Hobbs, New Mexico 88240

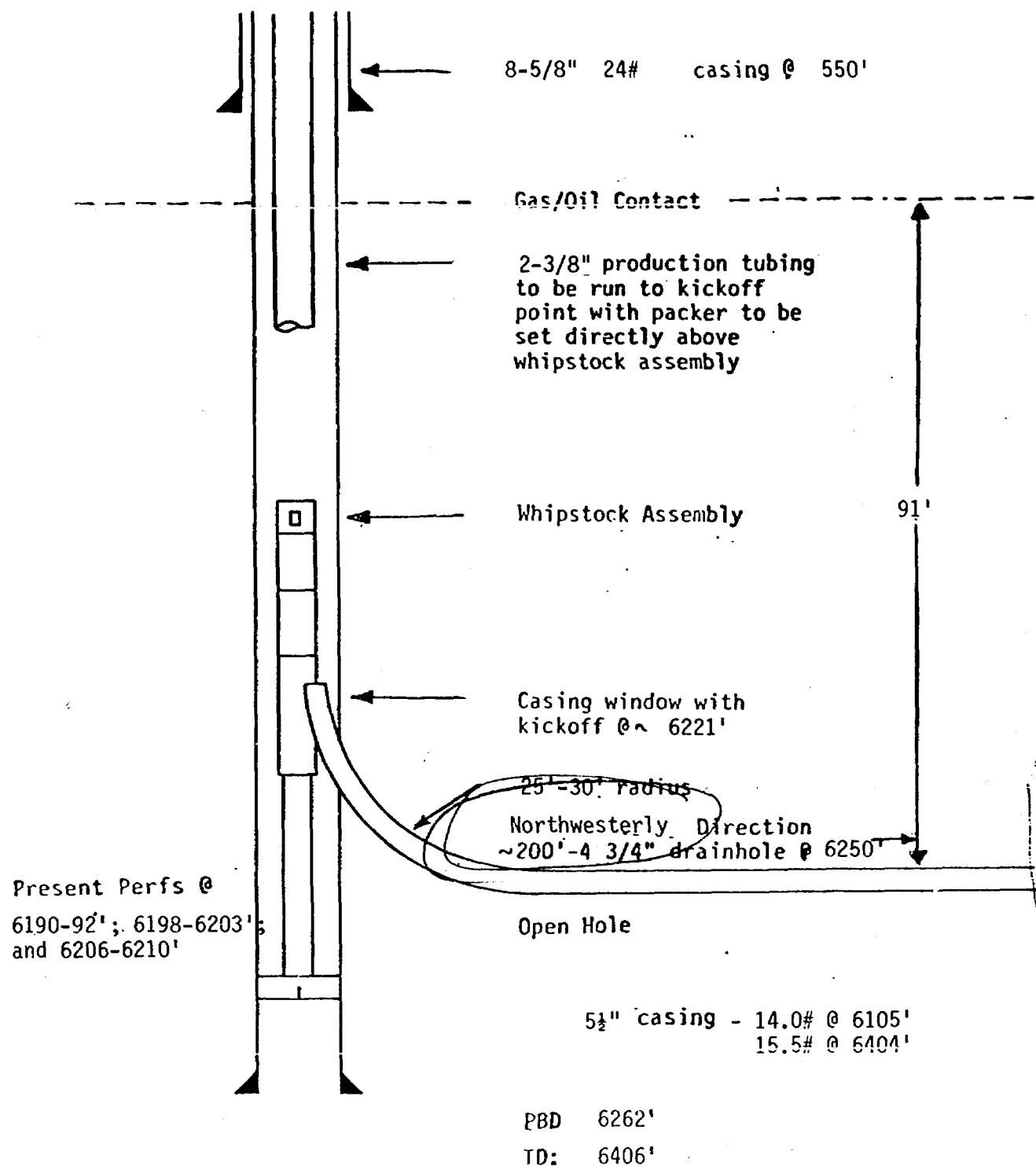
Cities Service Company
P. O. Box 1919
Midland, Texas 79702

Hanover Petroleum Corporation
211 North Ervay, Suite 1500
Dallas, Texas 75201

Estate of Fred Turner, Jr.
P. O. Box 910
Midland, Texas 79701

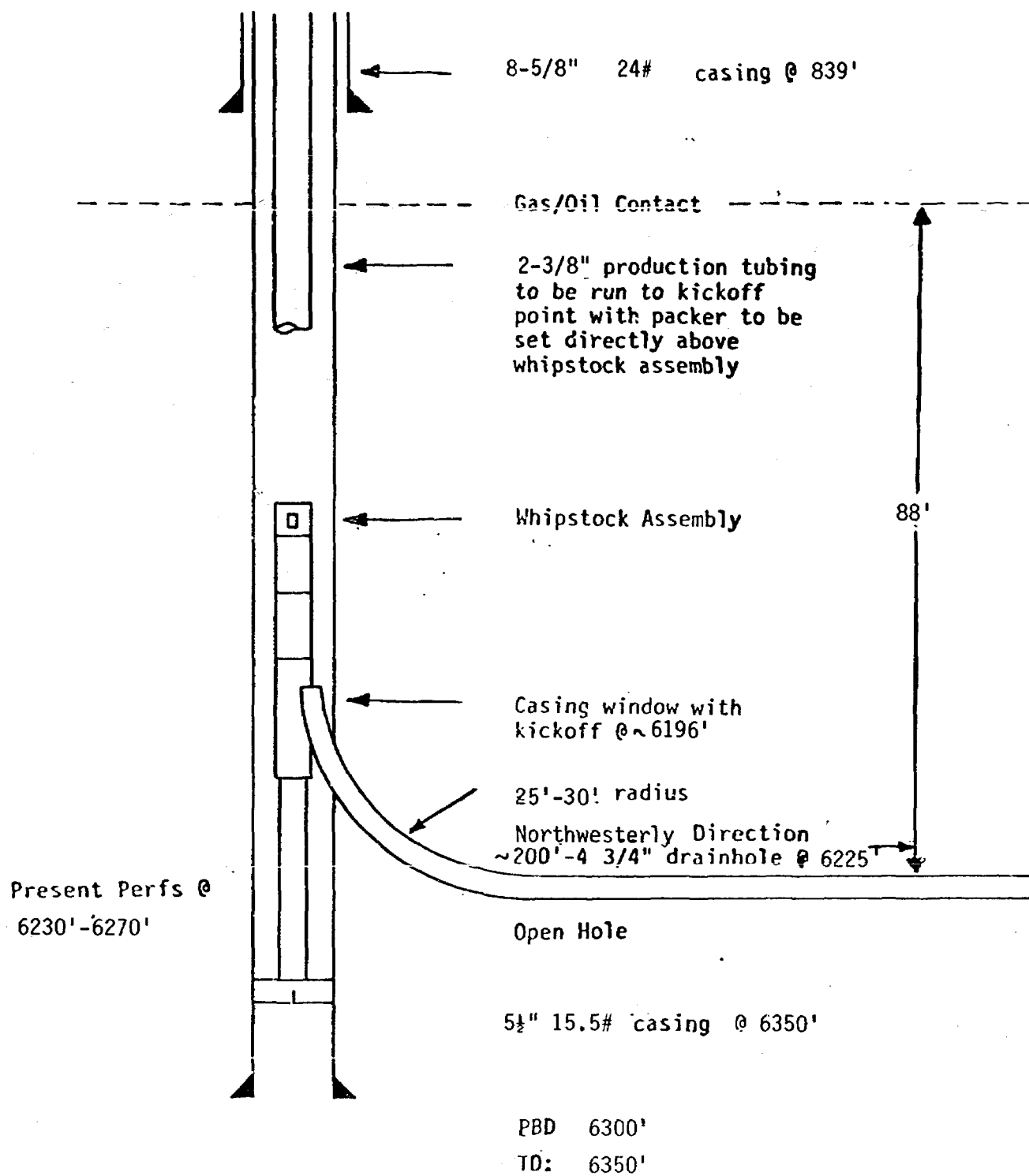
Rhonda Operating Company
Shelton Building
511 North Main
Midland, Texas 79701

EMPIRE A80 UNIT G-312
SCHEMATIC OF PROPOSED DRAINHOLE KICKOUT

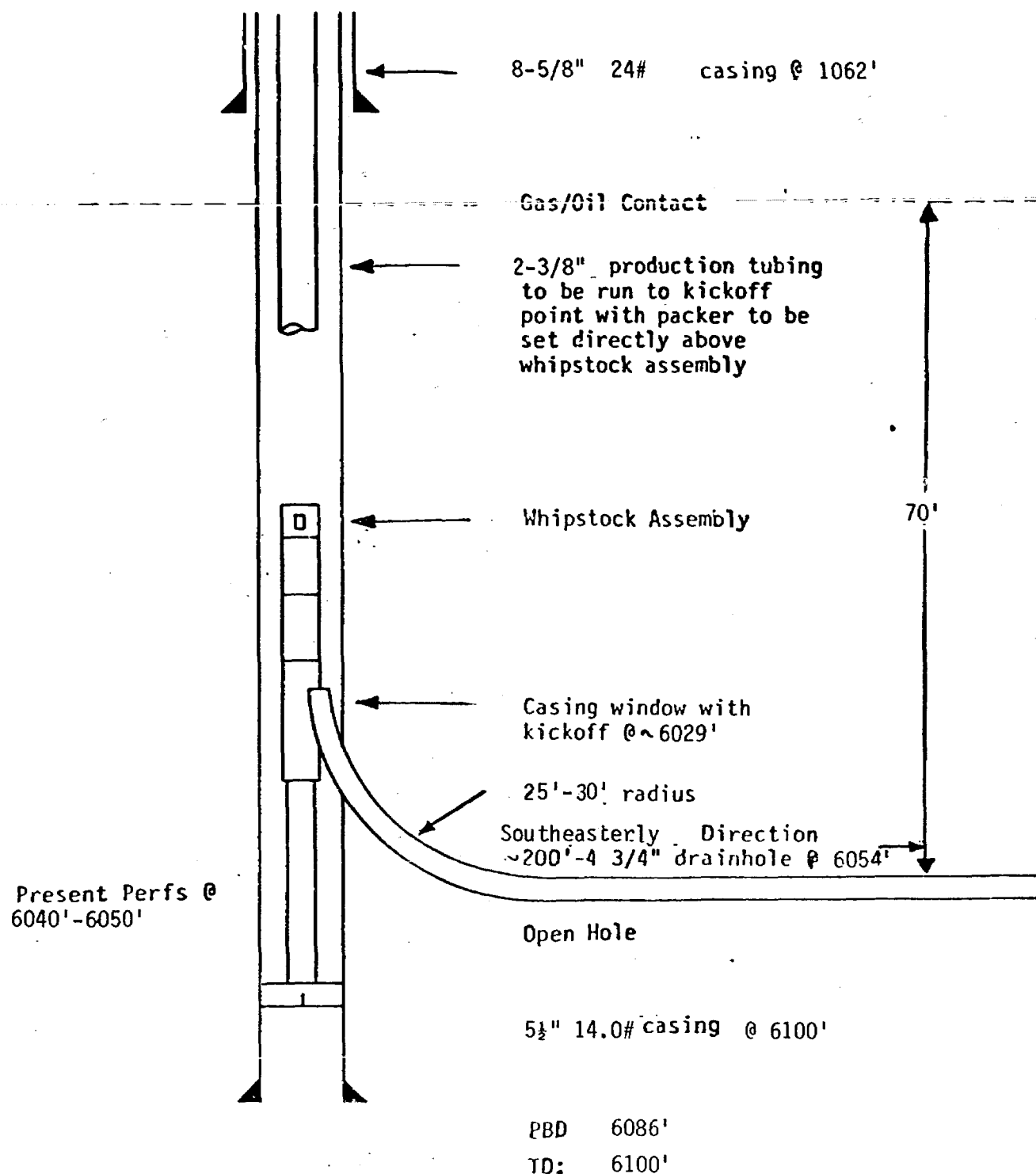


EMPIRE ABO UNIT J-27

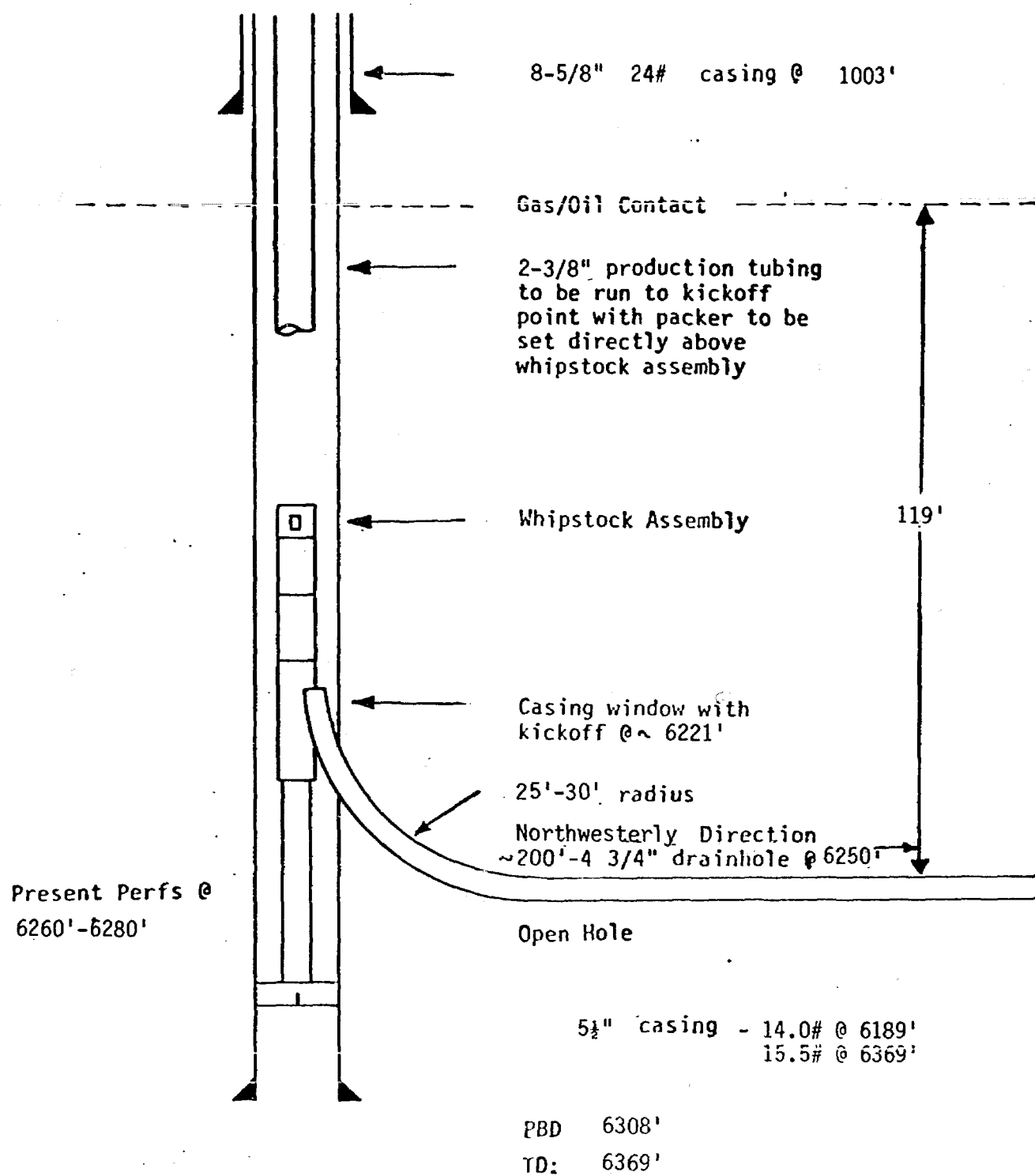
SCHEMATIC OF PROPOSED DRAINHOLE KICKOUT



EMPIRE ABO UNIT K-15
SCHEMATIC OF PROPOSED DRAINHOLE KICKOUT

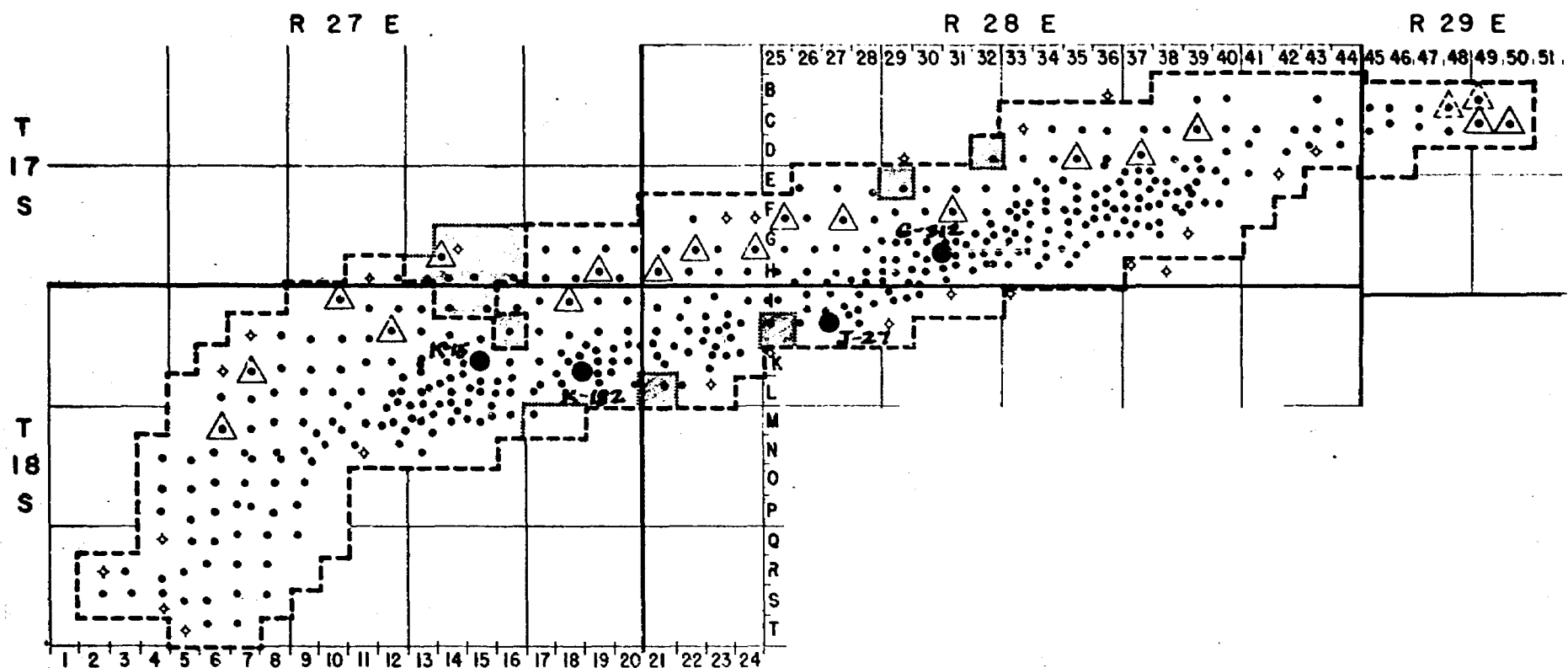


EMPIRE ABO UNIT K-182
SCHEMATIC OF PROPOSED DRAINHOLE KICKOUT



EMPIRE ABO UNIT

Eddy County, New Mexico



Non-Unit Lands are Represented
by Shaded Areas



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

TONEY ANAYA
GOVERNOR

January 6, 1984

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

ARCO Oil and Gas Company
P. O. Box 1610
Midland, Texas 79702

Attention: V. M. Hearne
Associate Engineering Technician

Re: Horizontal Drainholes

Dear Mr. Hearne:

Pursuant to your application dated December 2, 1983, and the provisions of RULE 14 B of New Mexico Oil Conservation Division Order No. R-4549, as amended, Special Rules and Regulations for the Empire Abo Pressure Maintenance Project, approval is hereby granted to drill a single "horizontal drainhole" from each of the following four existing wells:

- (1) Empire Abo Unit "G" Well No. 312, the surface location being 1550 feet from the South line and 2511 feet from the East line (non-standard location previously approved by Division Administrative Order No. NSL-743) of Section 33, Township 17 South, Range 28 East, NMPM, Eddy County, with the horizontal drainhole section projected approximately 200 feet in a northwesterly direction from a kick-off point at a measured vertical depth of approximately 6221 feet;
- (2) Empire Abo Unit "J" Well No. 27, the surface location being 1650 feet from the North line and 2310 feet from the East line of Section 5, Township 18 South, Range 28 East, NMPM, Eddy County, with the horizontal drainhole section projected approximately 200 feet in a northwesterly direction from a kick-off point at a measured vertical depth of approximately 6225 feet;

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Letter to ARCO Oil and Gas Company
January 6, 1984

- (3) Empire Abo Unit "K" Well No. 15, the surface location being 1980 feet from the South and East lines of Section 2, Township 18 South, Range 27 East, NMPM, Eddy County, with the horizontal drainhole section projected approximately 200 feet in a southeasterly direction from a kick-off point at a measured vertical depth of approximately 6029 feet; and
- (4) Empire Abo Unit "K" Well No. 182, the surface location being 1533 feet from the South line and 2370 feet from the West line (non-standard location previously approved by Division Order No. NSL-743) of Section 1, Township 18 South, Range 27 East, NMPM, Eddy County, with the horizontal drainhole section projected approximately 200 feet in a northwesterly direction from a kick-off point at a measured vertical depth of approximately 6221 feet.

In accordance with RULE 14 D of said Division Order No. R-4549, as amended, the applicant shall file the required reports on each well within 20 days following completion thereof.

Sincerely,

JOE D. RAMEY
Director

JDR/MES/fd

cc: OCD Artesia
Engineering Committee Hobbs
Case File 6742
Well Files

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 6742
Order No. R-4549-E

APPLICATION OF ARCO OIL AND GAS
COMPANY FOR AN ADMINISTRATIVE
PROCEDURE, EDDY COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on November 28, 1979, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 28th day of January, 1980, the Division Director, 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 Division has jurisdiction of this cause and the subject matter thereof.
- (2) That the applicant, ARCO Oil and Gas Company, is the operator of the Empire Abo Pressure Maintenance Project, Empire-Abo Pool, Eddy County, New Mexico, which project was authorized by Division Order No. R-4549, and is governed by operating rules included in said order as amended by Orders Nos. R-4549-A through R-4549-D.
- (3) That the applicant seeks the amendment of Rule 14 of the Special Rules and Regulations for said project adopted by Order No. R-4549, as amended, to additionally provide for an administrative procedure for authorizing the drilling, for production or injection purposes, of "horizontal drainholes" within such project.
- (4) That the drilling of said horizontal drainholes within the boundaries of said project should result in the recovery of oil and gas therefrom which might not otherwise

-2-

Case No. 6742
Order No. R-4549-E

be produced thereby preventing waste.

(5) That correlative rights will not be violated provided that no perforated or openhole portion of any horizontal drainhole shall be closer than 330 feet to the outer boundary of the Empire Abo Unit or any tract not committed to said unit nor, in the case of a well to be used for injection, closer than 1650 feet to such boundary or tract.

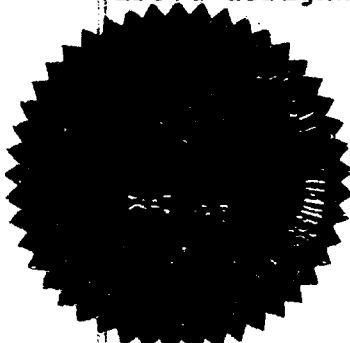
(6) That the application for administrative procedure should be approved by amending said Rule 14 to read in its entirety as shown on Exhibit "A" attached to this order.

IT IS THEREFORE ORDERED:

(1) That Rule 14 of the Special Rules and Regulations for the Empire Abo Pressure Maintenance Project is hereby amended to read in its entirety as shown on Exhibit "A" to this order.

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

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



S E A L

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

Joe D. Ramey
JOE D. RAMEY
Director

fd/

EXHIBIT "A"
ORDER NO. R-4549-E

RULE 14 A. The Director of the Division is hereby authorized to approve such additional producing wells and gas injection and water injection wells at orthodox and un-orthodox locations within the boundaries of the ARCO Empire Abo Unit Area as may be necessary to complete an efficient production and injection pattern, provided said wells are drilled no closer than 660 feet to the outer boundary of said unit nor closer than 10 feet to any quarter-quarter section or subdivision inner boundary and provided that no well shall be approved for gas or water injection when such well is located closer than 1650 feet to a tract which is not committed to the unit and on which is located a well producing from the same common source of supply. To obtain such approval, the project operator shall file proper application with the Division Director, which application, if it seeks authorization to convert additional wells to injection or to drill additional production or injection wells shall include the following:

(1) A plat identifying the lands committed to the unit agreement and those lands not committed to said agreement, and showing the location of the proposed well, all wells within the unit area, and offset operators.

(2) A schematic drawing of the proposed well which fully describes the casing, tubing, perforated interval, and depth.

(3) A letter stating that all offset operators to the proposed well have been furnished a complete copy of the application and the date of notification.

RULE 14 B. The Director of the Division is hereby authorized to approve the drilling of "horizontal drainholes" for the purposes of production or injection within the boundaries of the ARCO Empire Abo Unit Area as may be necessary to complete an efficient production and injection pattern, provided no perforated or openhole portion of said wells shall be closer than 330 feet to the outer boundary of said unit or to any tract not committed to such unit nor, in the case of a well to be used for injection closer than 1650 feet to such boundary or tract. To obtain such approval, the project operator shall file proper application with the Division Director, which application, if it seeks authorization to convert additional wells to injection or to drill additional production or injection wells shall include the following:

-2-

Exhibit "A"

Order No. R-4549-E

(1) A plat identifying the lands committed to the unit agreement and those lands not committed to said agreement, and showing the location of the proposed well, all wells within the unit area, and offset operators.

(2) Schematic drawings of the proposed well which fully describes the casing, tubing, perforated or open-hole interval, kick-off point, and proposed trajectory of the drainhole section.

(3) A letter stating that all offset operators to the proposed well have been furnished a complete copy of the application and the date of notification.

RULE 14 C. The Director may approve the proposed well if, within 20 days after receiving the application, no objection to the proposal is received. The Director may grant immediate approval, provided waivers of objection are received from all offset operators.

RULE 14 D. Within 20 days following completion of any horizontal drainhole the operator shall submit a report to the Division Director with sufficient detail to locate the kick-off point and the trajectory of the deviated portion of the well bore with respect to any quarter-quarter section(s) penetrated by such well and any 40-acre tract directly or diagonally offsetting such quarter-quarter section(s).

The Director may approve the final location of the horizontal drainhole by acceptance of such report.

The Director may rescind the authority for any horizontal drainhole if the perforated or openhole portion of such hole is located closer to the unit boundary or any uncommitted tract than permitted by these rules or if it should appear that such rescission is necessary to prevent waste or protect correlative rights.



BRUCE KING
GOVERNOR

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

August 2, 1982

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

ARCO Oil and Gas Company
Post Office Box 1610
Midland, Texas 79702

Attention: Ingrid Burton

Re: Horizontal Drainholes

Gentlemen:

Pursuant to your application dated July 27, 1982, and the provisions of Rule 14 B of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project, approval is hereby granted for the drilling of the following horizontal drainholes:

- (1) Empire Abo Unit F Well No. 354, the surface location to be 1850' FNL and 2550' FEL of Section 34, Township 17 South, Range 28 East, with the horizontal drainhole section projected 200 feet northwesterly, and
- (2) Empire Abo Unit G Well No. 301, the surface location to be 1315' FSL and 1315' FWL of Section 33, Township 17 South, Range 28 East, with the horizontal drainhole section projected 200 feet northwesterly.

In accordance with Rule 14 B of said special rules and regulations, ARCO must file reports locating the kick-off point and trajectory of each of said wells within 20 days following completion thereof.

Yours very truly,

JOE D. RAMEY
Director

JDR/RLS/fd

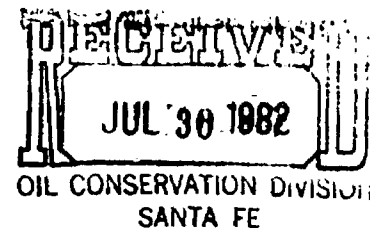
cc: Oil Conservation Division - Artesia
Oil & Gas Engineering Committee - Hobbs
✓Case File 6742

ARCO Oil and Gas Company
Permian District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 684 0100



July 27, 1982

Mr. Joe D. Ramey
Director - Oil Conservation Division
Energy and Minerals Department
P. O. Box 2088
Santa Fe, New Mexico 87501



Dear Mr. Ramey:

In compliance with Order No. R-4549-E of the Division, ARCO Oil and Gas Company seeks administrative approval to drill two "horizontal drainholes" from existing wells in the Empire Abo Unit, Eddy County, New Mexico. These two wells are designated as the "Empire Abo Unit F-354" and the "Empire Abo Unit G-301". Their locations are as follows:

<u>Well</u>	<u>Locations</u>
F-354	1850' FNL & 2550' FEL, Sec. 34, T-17-S, R-28-E
G-301	1315' FSL & 1315' FWL, Sec. 33, T-17-S, R-28-E

A schematic drawing of each well and a plat of the Unit and non-Unit lands within the field are attached for your inspection.

By a complete copy of this application, all offset operators are being notified of our intention to drill drainholes from these wells. All copies and this letter were mailed on the date shown on the above heading.

Please notify us if additional information is needed to grant approval of this application.

Sincerely,

Ingrid Burton

Ingrid Burton
Associate Engineer

ITB:dmm

Xc: Offset Operators
(list attached)

EMPIRE ABO UNIT

OFFSET OPERATORS

Aminoil U.S.A., Inc.
600 Western United Life Building
Midland, Texas 79701

Cactus Drilling Corporation of Texas
P. O. Box 2068
Hobbs, New Mexico 88240

Cities Service Company
P. O. Box 1919
Midland, Texas 79702

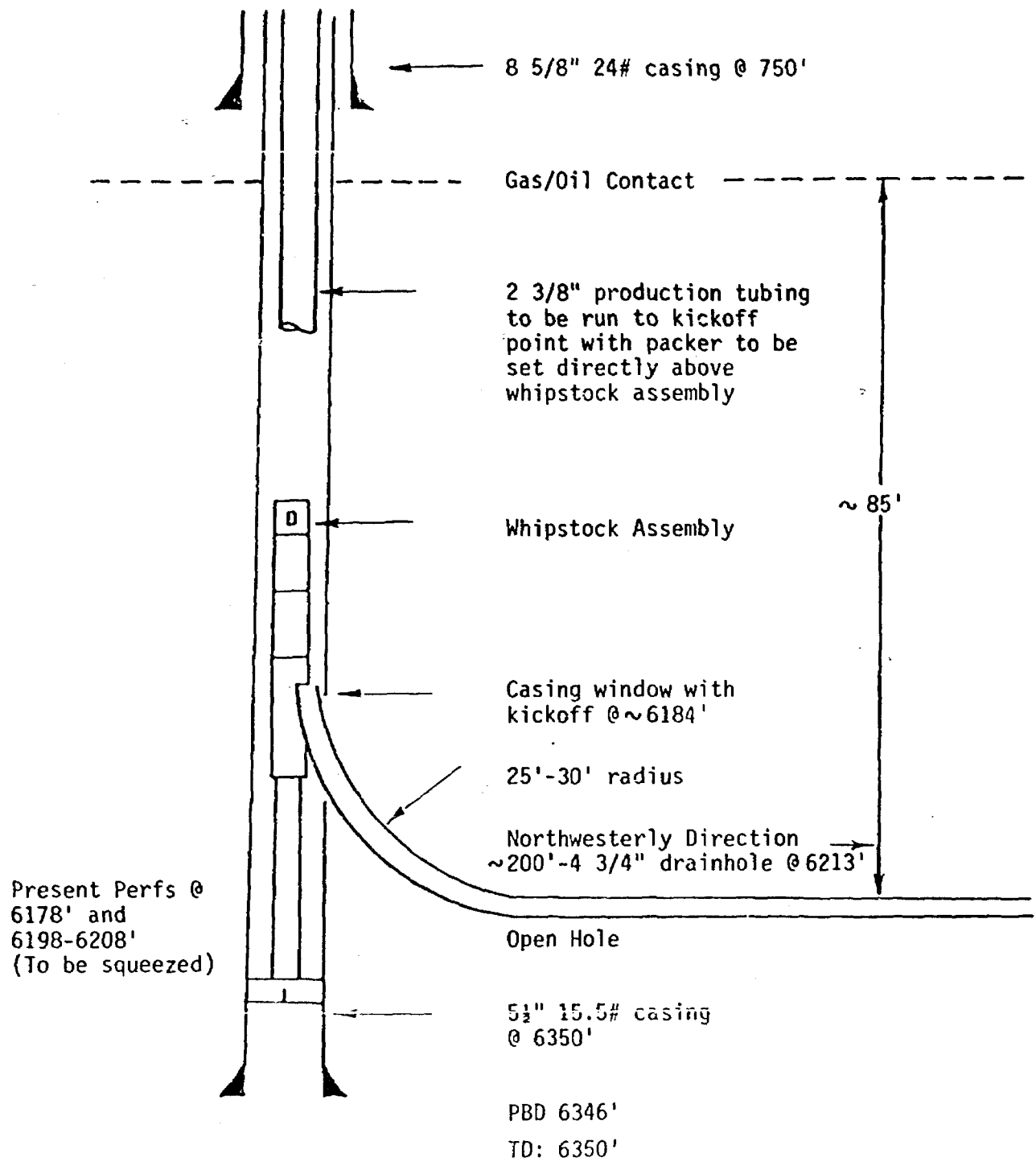
Hanover Petroleum Corporation
211 North Ervay, Suite 1500
Dallas, Texas 75201

Estate of Fred Turner, Jr.
P. O. Box 910
Midland, Texas 79701

Rhonda Operating Company
Shelton Building
511 North Main
Midland, Texas 79701

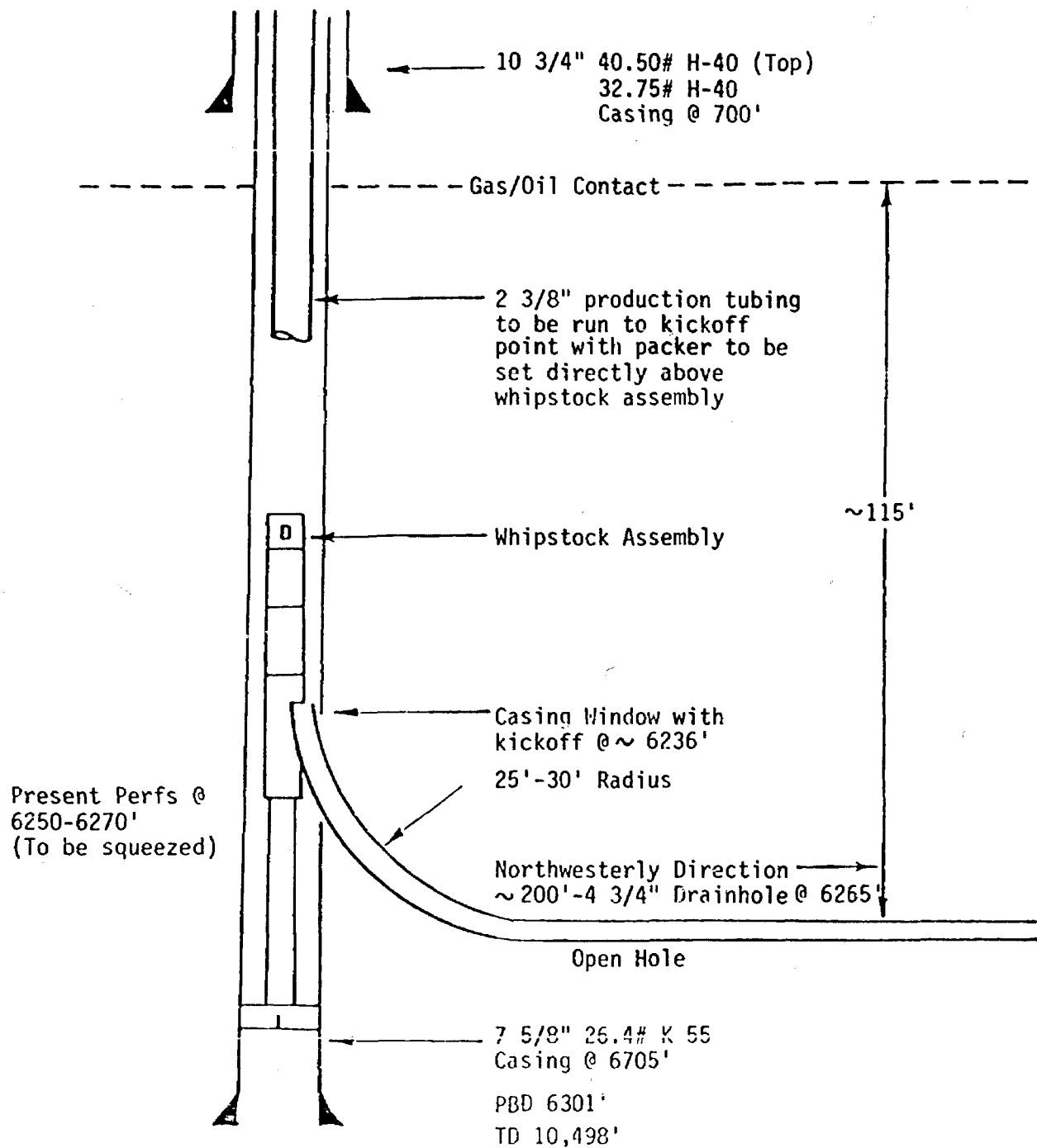
EMPIRE ABO UNIT F-354

SCHEMATIC OF PROPOSED DRAINHOLE KICKOUT

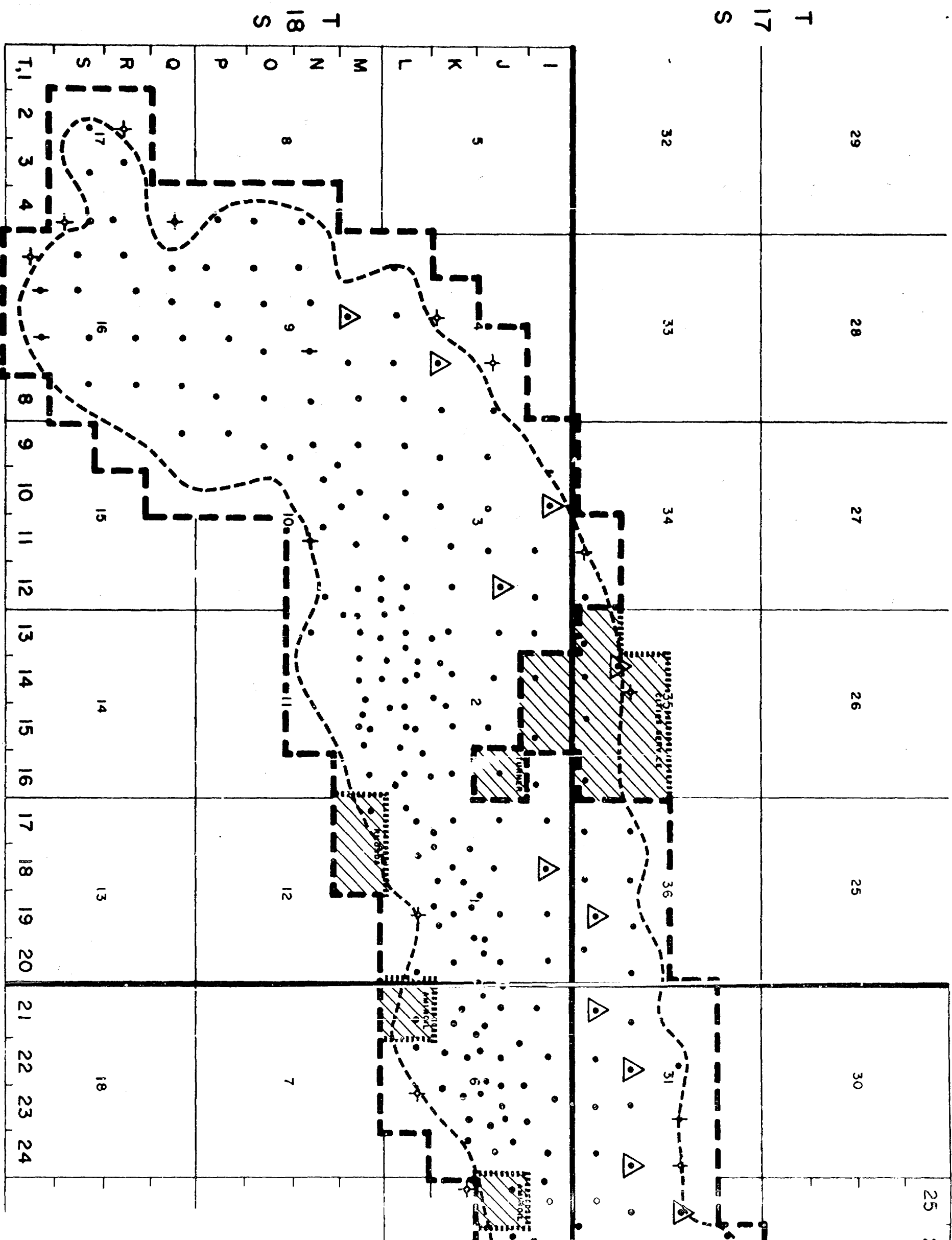


EMPIRE ABO UNIT G-301

SCHEMATIC OF PROPOSED DRAINHOLE KICKOUT

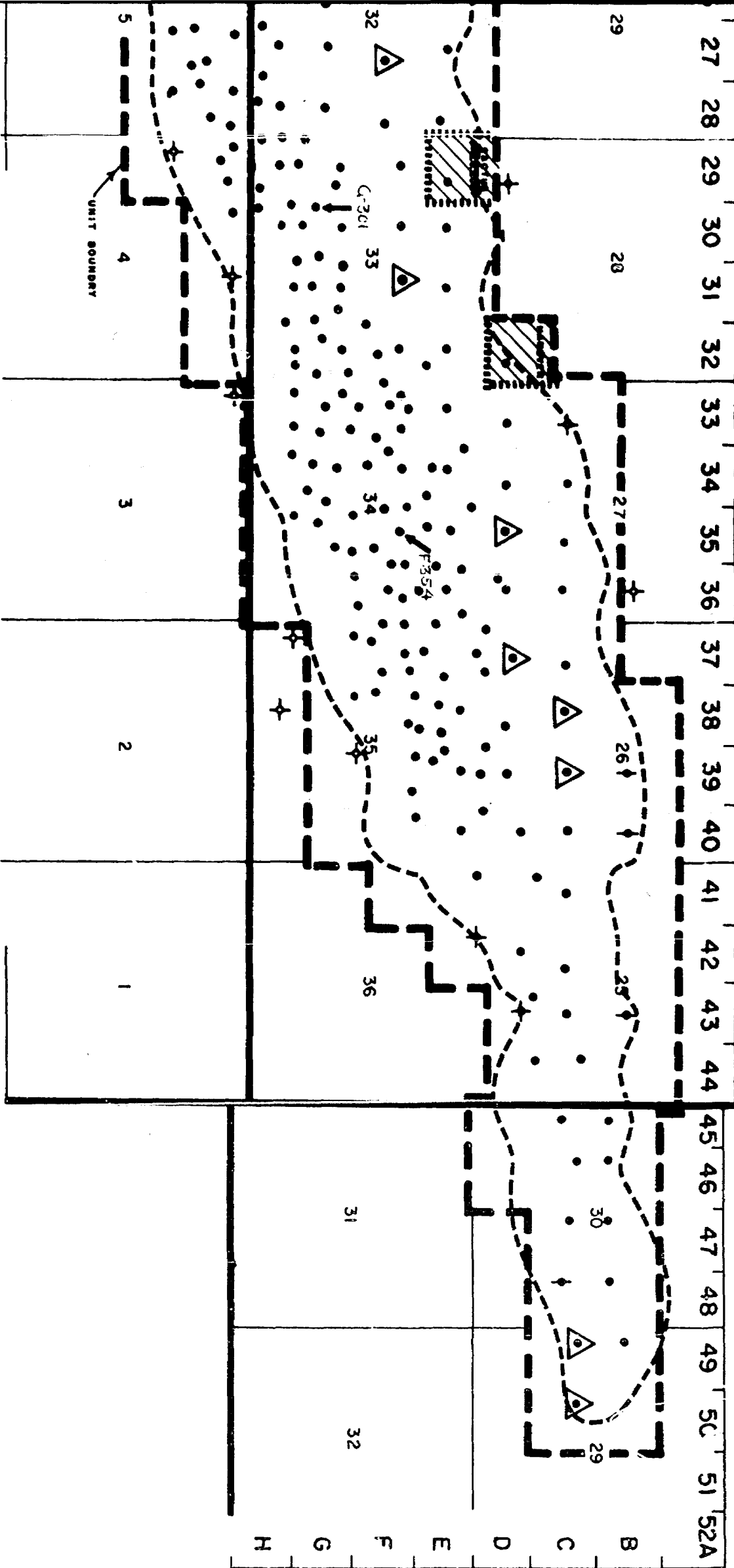


R 27 E



R 28 E

R 29 E



ARCO Oil and Gas Company <small>Division of Atlantic Richfield Company</small> Permian District Midland, Texas			
EMPIRE ABO POOL EDDY COUNTY, NEW MEXICO			
0 1/4 1/2 1-Mi.			
By: _____ Date: 10/10/80 Dept: WEST / RCA ENG. DEPT.	Drawn by: R.C.T. Revised by: _____ Date: _____	Date: 10-10-80	



August 3, 1982

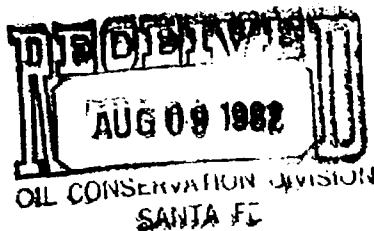
Mr. Joe D. Ramey
Director - Oil Conservation Division
Energy and Minerals Department
P. O. Box 2088
Santa Fe, New Mexico 87501

Case file 1742

Dear Mr. Ramey:

Aminoil USA, Inc. has been notified that ARCO Oil and Gas Company has made application for administrative approval to drill horizontal drain holes in their Empire Abo Unit Well Nos. F-354 and G-301, located in Sections 34 and 33, T-17-S, R-28-E, Eddy County, New Mexico.

Aminoil USA, Inc. has no objections to this application and supports ARCO in this matter.



AMINOIL USA, INC.

Jerry L. Harper

Jerry L. Harper
West Texas/New Mexico Area
Production Manager

JLH/sh

cc: State "E" & "M" Well Files
ARCO Oil and Gas Company

Aminoil USA, Inc., Loraine Center, 601 N. Loraine St.,
Midland, Texas 79701 (915) 682-8231

ARCO Oil and Gas Company
Permian District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 684 0100

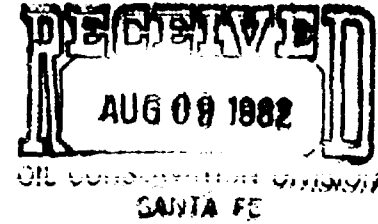
W. L. F.
J. Harper



July 27, 1982

Well Files
State "E" No. 1
State "M" No. 1

Mr. Joe D. Ramey
Director - Oil Conservation Division
Energy and Minerals Department
P. O. Box 2088
Santa Fe, New Mexico 87501



Dear Mr. Ramey:

In compliance with Order No. R-4549-E of the Division, ARCO Oil and Gas Company seeks administrative approval to drill two "horizontal drainholes" from existing wells in the Empire Abo Unit, Eddy County, New Mexico. These two wells are designated as the "Empire Abo Unit F-354" and the "Empire Abo Unit G-301". Their locations are as follows:

<u>Well</u>	<u>Locations</u>
F-354	1850' FNL & 2550' FEL, Sec. 34, T-17-S, R-28-E
G-301	1315' FSL & 1315' FWL, Sec. 33, T-17-S, R-28-E

A schematic drawing of each well and a plat of the Unit and non-Unit lands within the field are attached for your inspection.

By a complete copy of this application, all offset operators are being notified of our intention to drill drainholes from these wells. All copies and this letter were mailed on the date shown on the above heading.

Please notify us if additional information is needed to grant approval of this application.

Sincerely,

Ingrid Burton
Ingrid Burton
Associate Engineer

8/2/82
Have no objection
J. L.

ITB:dmm

Xc: Offset Operators
(list attached)

RECEIVED

AUG 2 1982

ARCO Oil and Gas Company is a Division of Atlantic Richfield Company

MINOIL LAND DEPT.—MIDL

EMPIRE ABO UNIT

OFFSET OPERATORS

Aminoil U.S.A., Inc.
600 Western United Life Building
Midland, Texas 79701

Cactus Drilling Corporation of Texas
P. O. Box 2068
Hobbs, New Mexico 88240

Cities Service Company
P. O. Box 1919
Midland, Texas 79702

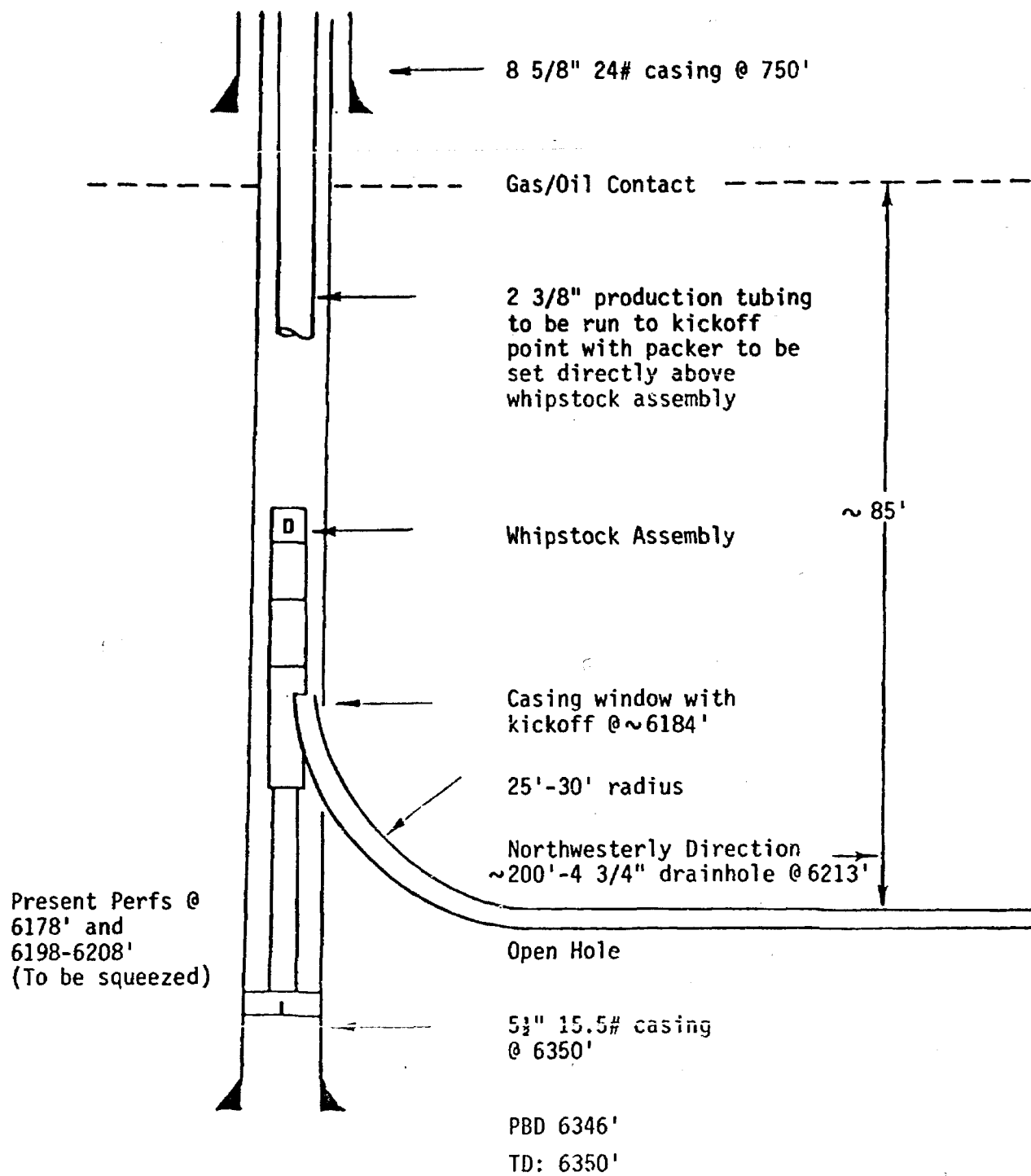
Hanover Petroleum Corporation
211 North Ervay, Suite 1500
Dallas, Texas 75201

Estate of Fred Turner, Jr.
P. O. Box 910
Midland, Texas 79701

Rhonda Operating Company
Shelton Building
511 North Main
Midland, Texas 79701

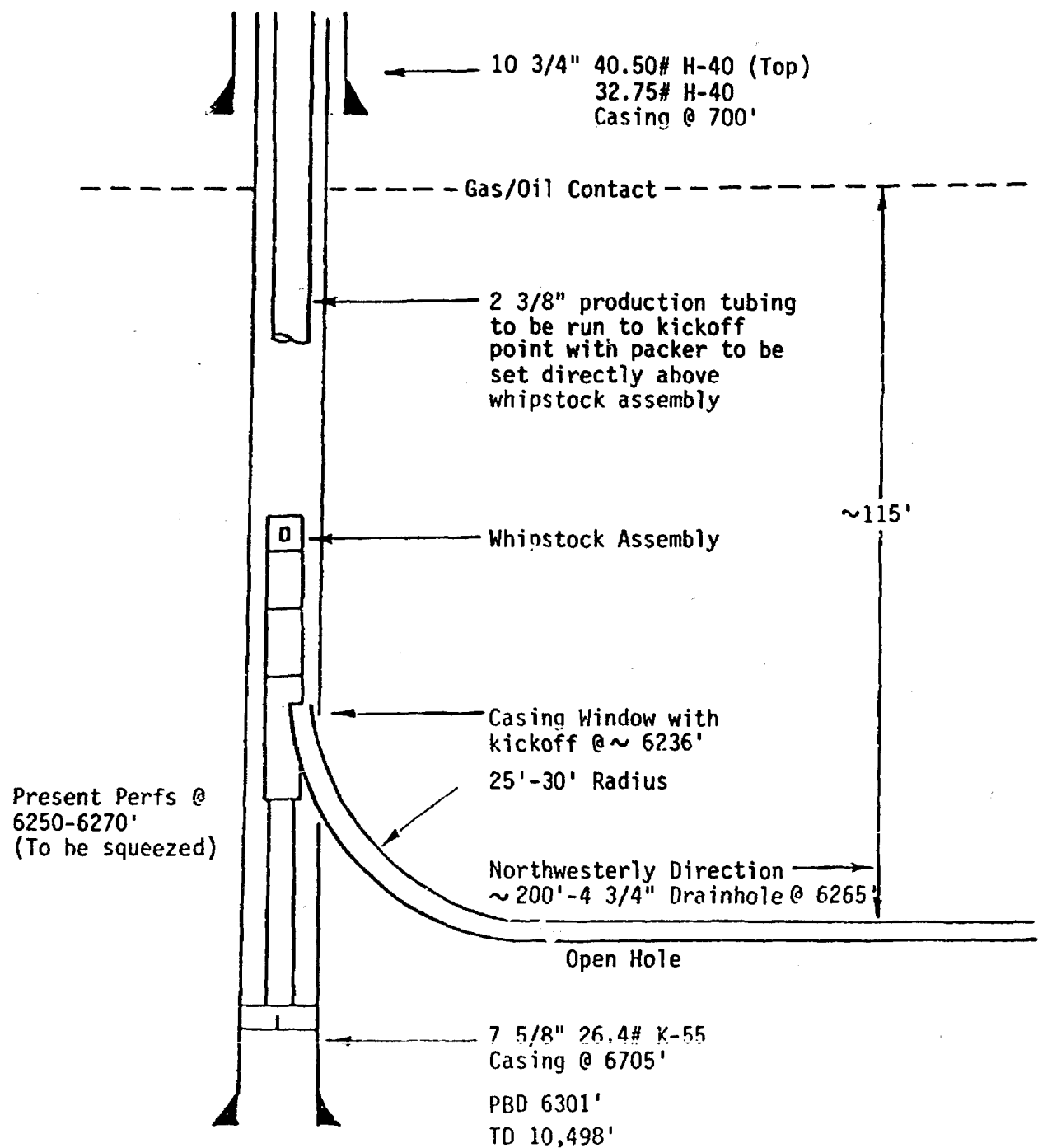
EMPIRE ABO UNIT F-354

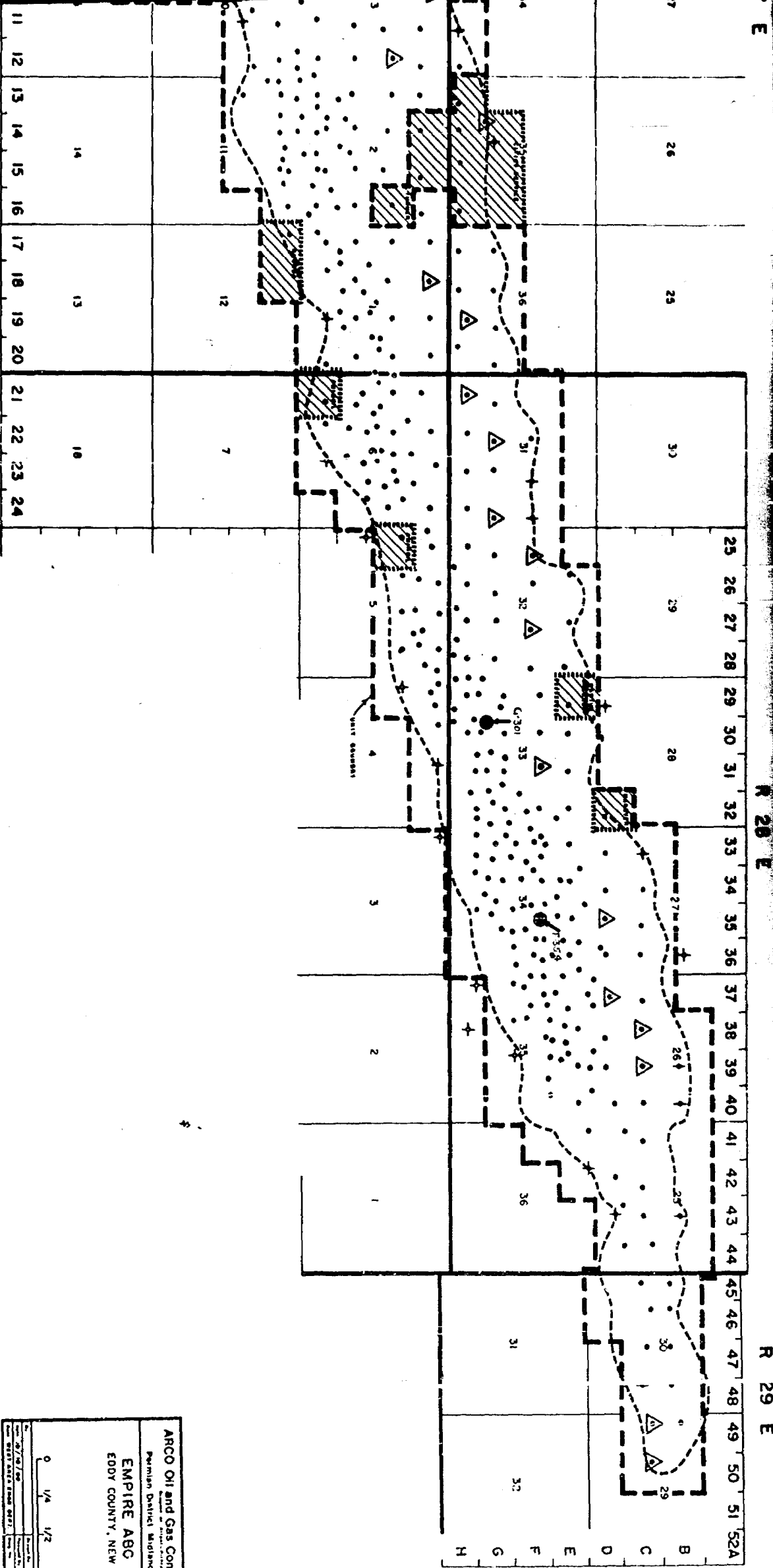
SCHEMATIC OF PROPOSED DRAINHOLE KICKOUT



EMPIRE ABO UNIT G-301

SCHEMATIC OF PROPOSED DRAINHOLE KICKOUT





ARCO Oil and Gas Company
 Permian District Midland, Texas
 EMPIRE ABC POOL
 EDDY COUNTY, NEW MEXICO

0 1/4 1/2 1-M.

DATE: 10/10/80
 BY: [Signature]
 CHECKED: [Signature]
 APPROVED: [Signature]



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

November 12, 1980

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

ARCO Oil and Gas Company
P. O. Box 1610
Midland, Texas 79702

Attention: Mr. James L. Cawvey

Re: Horizontal Drainholes

Gentlemen:

Pursuant to your application dated October 15, 1980, and the provisions of Rule 14 B of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project, approval is hereby granted for the drilling of the following horizontal drainholes:

- (1) Empire Abo Unit J Well No. 241, the surface location to be 1950' FNL and 660' FEL of Section 6, Township 18 South, Range 28 East, with the horizontal drainhole section projected 200 feet northwesterly, and
- (2) Empire Abo Unit K Well No. 211, the surface location to be 1950' FSL and 1000' FWL of Section 6, Township 18 South, Range 28 East with the horizontal drainhole section projected 200 feet northwesterly.

In accordance with Rule 14 B of said special rules and regulations, ARCO must file reports locating the kick-off point and trajectory of each of said wells within 20 days following completion thereof.

Sincerely,

JOE D. RAMEY,
Director

JDR/RLS/dr

cc: Oil Conservation Division - Artesia
Oil & Gas Engineering Committee - Hobbs
✓ Case File 6742



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

January 30, 1980

Mr. Conrad E. Coffield
Hinkle, Cox, Eaton, Coffield
& Hensley
Attorneys at Law
Post Office Box 3580
Midland, Texas 79702

Re: CASE NO. 6742
ORDER NO. R-4549-E

Applicant:

ARCO Oil and Gas Company

Dear Sir:

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

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

Copy of order also sent to:

Hobbs OCD	<u>x</u>
Artesia OCD	<u>x</u>
Aztec OCD	

Other



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR
LARRY KEHOE
SECRETARY

September 24, 1981

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

ARCO Oil and Gas Company
Post Office Box 1610
Midland, Texas 79702

Attention: Ingrid Burton

Re: Horizontal Drainholes

Gentlemen:

Pursuant to your application dated September 2, 1981, and the provisions of Rule 14 B of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project, approval is hereby granted for the drilling of the following horizontal drainholes:

- (1) Empire Abo Unit K Well No. 171, the surface location to be 1370' FSL and 1050' FWL of Section 1, Township 18 South, Range 27 East, with the horizontal drainhole section projected 200 feet northwesterly,
- (2) Empire Abo Unit K Well No. 221, the surface location to be 1740' FSL and 1750' FWL of Section 6, Township 18 South, Range 28 East, with the horizontal drainhole section projected 200 feet northwesterly, and
- (3) Empire Abo Unit L Well No. 161, the surface location to be 450' FSL and 390' FEL of Section 2, Township 18 South, Range 27 East, with the horizontal drainhole section projected 200 feet northwesterly.

In accordance with Rule 14 B of said special rules and regulations, ARCO must file reports locating the kick-off point and trajectory of each of said wells within 20 days following completion thereof.

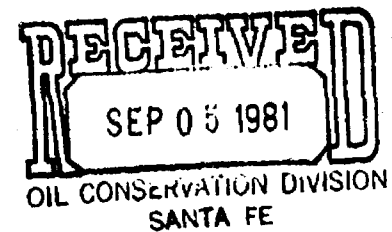
Sincerely,

JOE D. RAMCY
Director

JDR/RLS/fd

cc: Oil Conservation Division - Artesia
Oil & Gas Engineering Committee - Hobbs
Case File 6742

ARCO Oil and Gas Company
Permian District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 684 0100



September 2, 1981

Mr. Joe D. Ramey
Director - Oil Conservation Division
Energy and Minerals Department
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Ramey:

In compliance with Order No. R-4549-E of the Division, ARCO Oil and Gas Company seeks administrative approval to drill three "horizontal drainhole" wells in the Empire Abo Unit, Eddy County, New Mexico. These three wells will be designated as the "Empire Abo Unit K-171", the "Empire Abo Unit K-221", and the Empire Abo Unit L-161". Their locations will be as follows:

<u>Well</u>	<u>Location</u>
K-171	1370' FSL & 1050' FWL, Sec. 1, T-18-S, R-27-E
K-221	1740' FSL & 1750' FWL, Sec. 6, T-18-S, R-28-E
L-161	450' FSL & 390' FEL, Sec. 2, T-18-S, R-27-E

A schematic drawing of each well and a plat of the Unit and non-Unit lands within the field are attached for your inspection.

By a complete copy of this application, all offset operators are being notified of our intention to drill the proposed wells. All copies and this letter were mailed on the date shown on the above heading.

Federal approval is being concurrently requested for the Empire Abo Unit L-161 since it lies on federal land.

Mr. Joe D. Ramey

Page 2

Please notify us if additional information is needed to grant approval of this application.

Sincerely,

Ingrid Burton

Ingrid Burton

ITB:cn

cc: Aminoil U.S.A., Inc.
600 Western United Life Building
Midland, Texas 79701

Cactus Drilling Corporation of Texas
P. O. Box 2068
Hobbs, New Mexico 88240

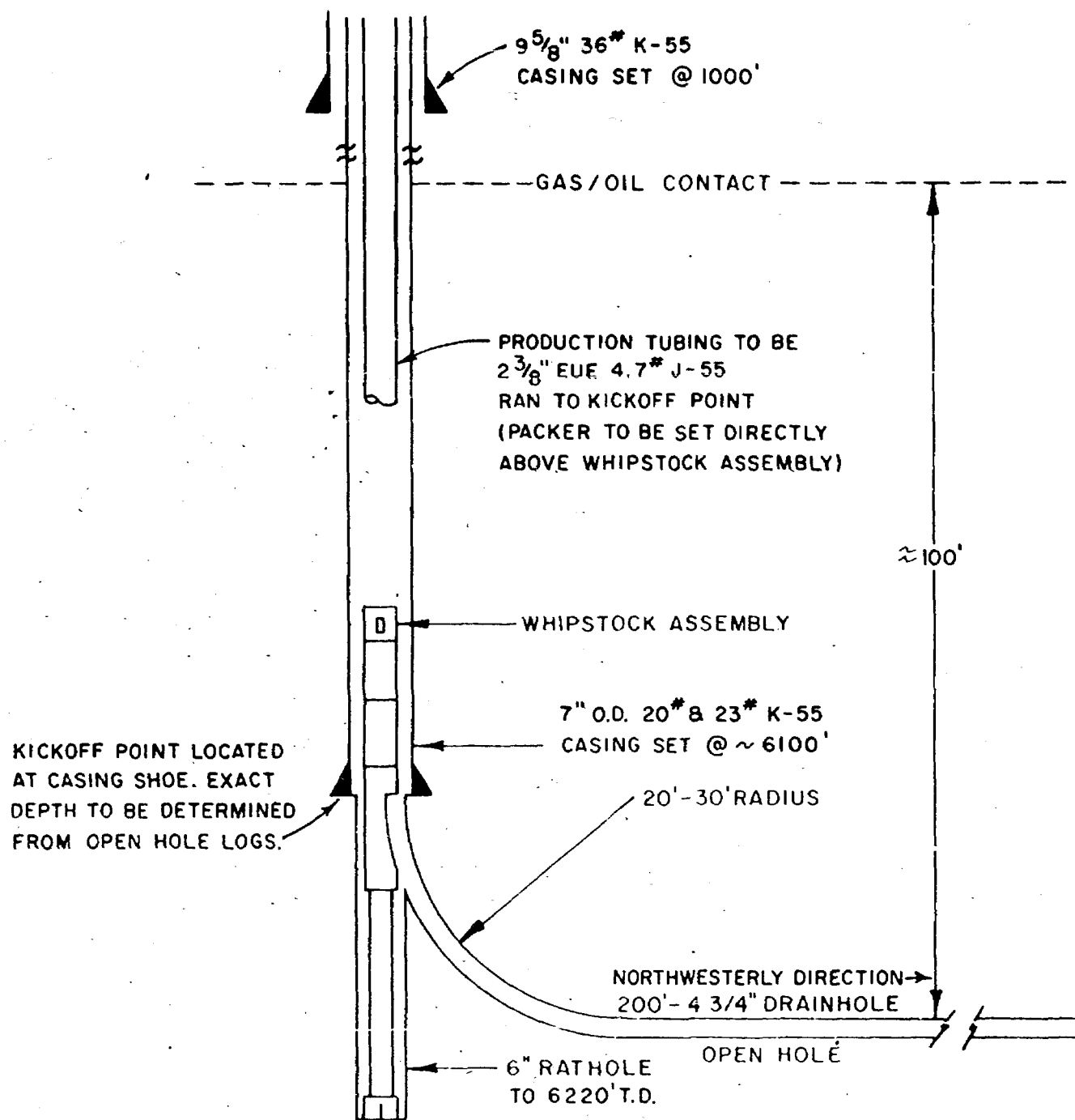
Cities Service Company
P. O. Box 1919
Midland, Texas 79702

Hanover Petroleum Corporation
211 North Ervay, Suite 1500
Dallas, Texas 75201

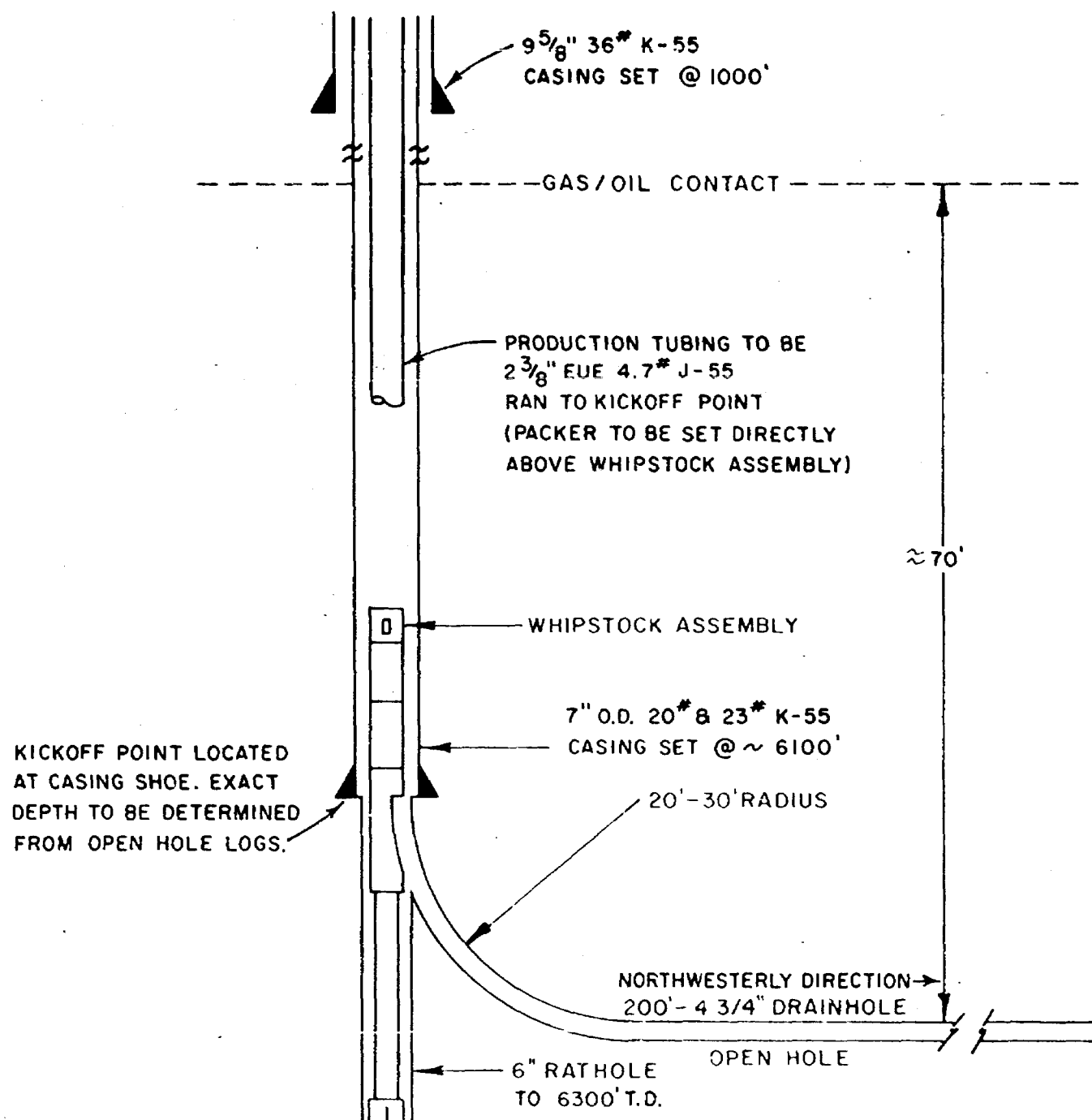
Estate of Fred Turner, Jr.
P. O. Box 910
Midland, Texas 79701

Rhonda Operating Company
Shelton Building
511 North Main
Midland, Texas 79701

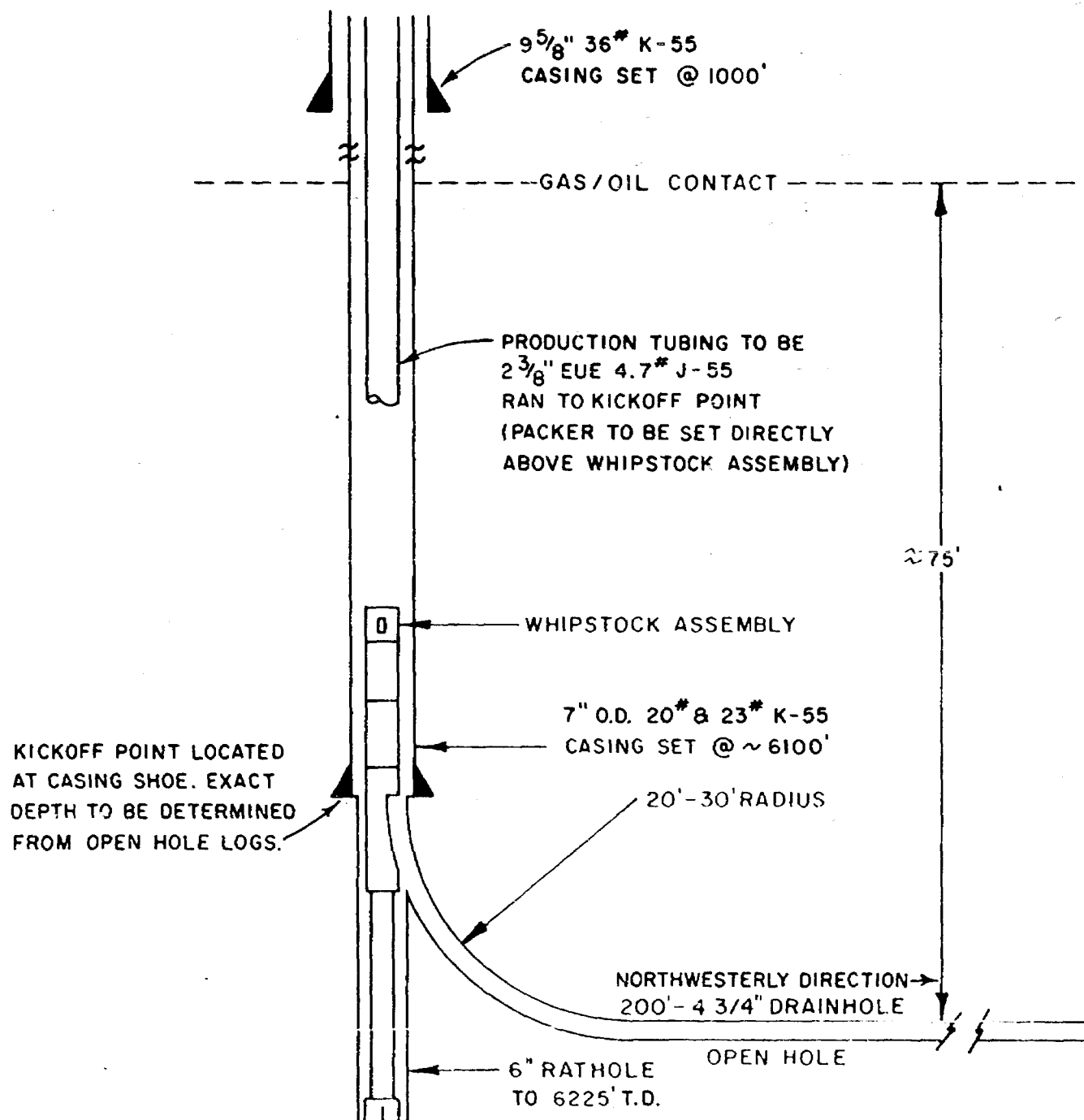
EMPIRE ABO UNIT K-171
SCHEMATIC OF PROPOSED DRAINHOLE



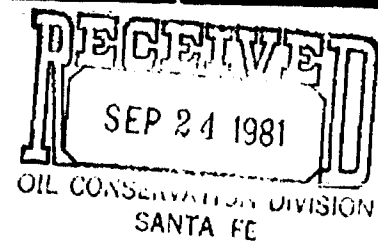
EMPIRE ABO UNIT K-221
SCHEMATIC OF PROPOSED DRAINHOLE



EMPIRE ABO UNIT L-161
SCHEMATIC OF PROPOSED DRAINHOLE



ARCO Oil and Gas Company
Permian District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 684 0100



September 21, 1981

Mr. Joe D. Ramey
Director, Oil Conservation Division
Energy and Minerals Department
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Ramey:

As we discussed by phone, I am enclosing a plat of the Empire Abo Unit and non-Unit lands to complete our application to drill horizontal drainhole wells K-171, K-221, and L-161.

If I can assist you in any way, please call me at (915) 684-0165.

Sincerely,

A handwritten signature in cursive script that reads "Steve Sills".

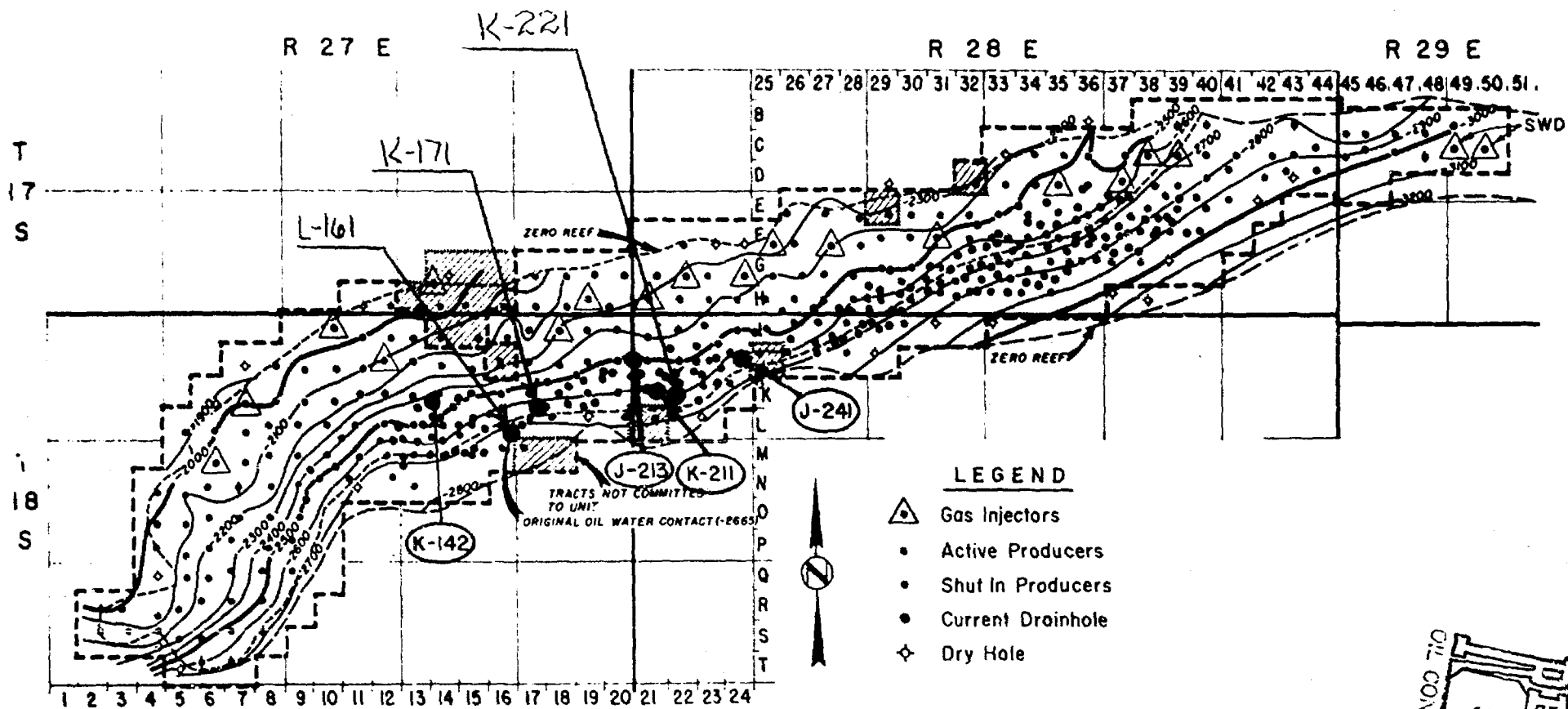
Steve R. Sills

SRS:cn

Attachment

EMPIRE ABO UNIT

EDDY CO., NEW MEXICO



RECEIVED
SEP 24 1981
OIL CONSERVATION DIVISION
SANTA FE

ARCO Oil and Gas Company
Permian District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 684 0100



Rec'd Sept. 4, 1981

September 2, 1981

Mr. Joe D. Ramey
Director - Oil Conservation Division
Energy and Minerals Department
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Ramey:

In compliance with Order No. R-4549-E of the Division, ARCO Oil and Gas Company seeks administrative approval to drill three "horizontal drainhole" wells in the Empire Abo Unit, Eddy County, New Mexico. These three wells will be designated as the "Empire Abo Unit K-171", the "Empire Abo Unit K-221", and the Empire Abo Unit L-161". Their locations will be as follows:

<u>Well</u>	<u>Location</u>
K-171	1370' FSL & 1050' FWL, Sec. 1, T-18-S, R-27-E
K-221	1740' FSL & 1750' FWL, Sec. 6, T-18-S, R-28-E
L-161	450' FSL & 390' FEL, Sec. 2, T-18-S, R-27-E

*200 ft
Northwest*

[Signature]

A schematic drawing of each well and a plat of the Unit and non-Unit lands within the field are attached for your inspection.

By a complete copy of this application, all offset operators are being notified of our intention to drill the proposed wells. All copies and this letter were mailed on the date shown on the above heading.

Federal approval is being concurrently requested for the Empire Abo Unit L-161 since it lies on federal land.

*4953
6742*

Mr. Joe D. Ramey

Page 2

Please notify us if additional information is needed to grant approval of this application.

Sincerely,

Ingrid Burton

Ingrid Burton

ITB:cn

cc: Aminoil U.S.A., Inc.
600 Western United Life Building
Midland, Texas 79701

Cactus Drilling Corporation of Texas
P. O. Box 2068
Hobbs, New Mexico 88240

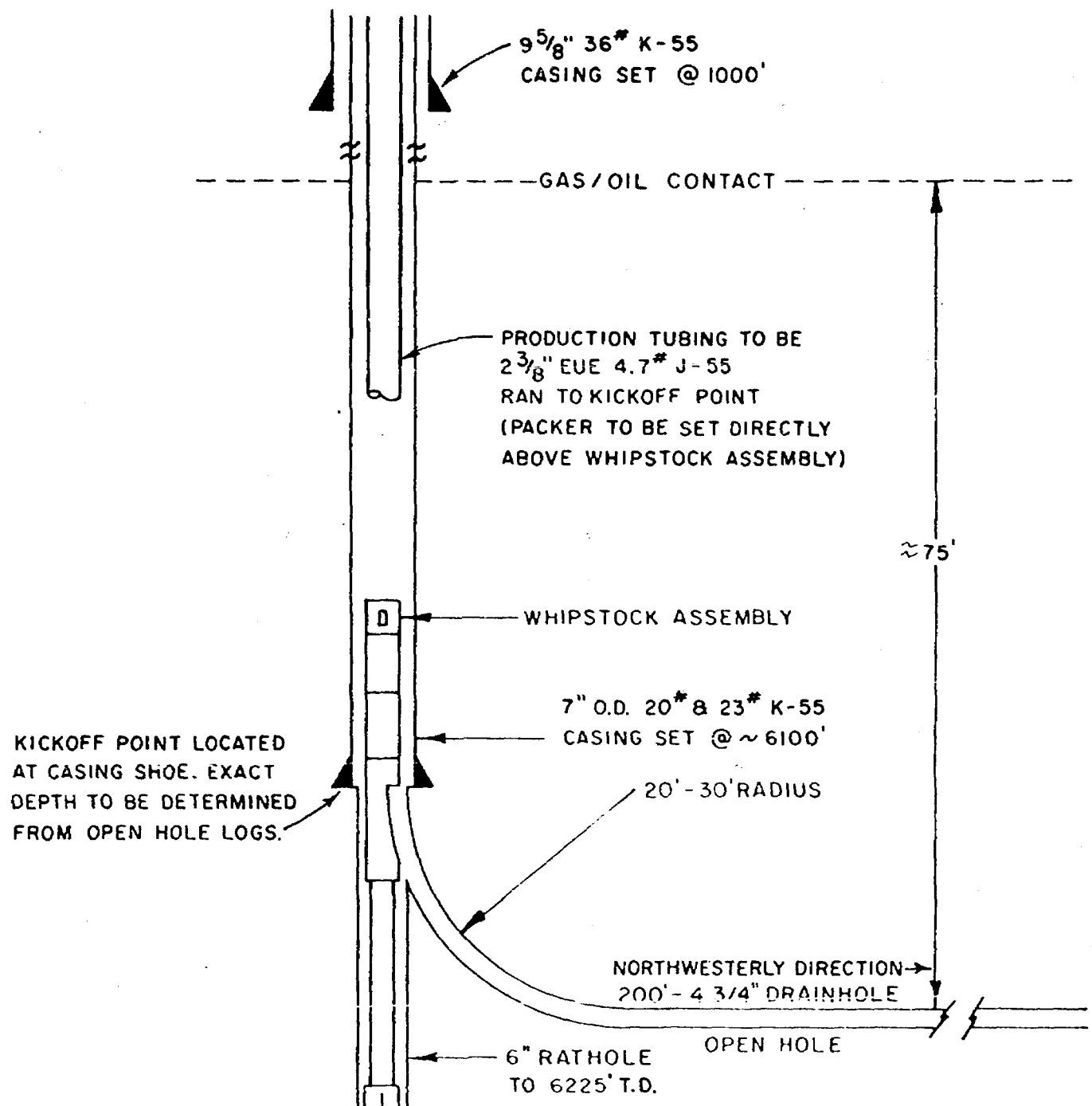
Cities Service Company
P. O. Box 1919
Midland, Texas 79702

Hanover Petroleum Corporation
211 North Ervay, Suite 1500
Dallas, Texas 75201

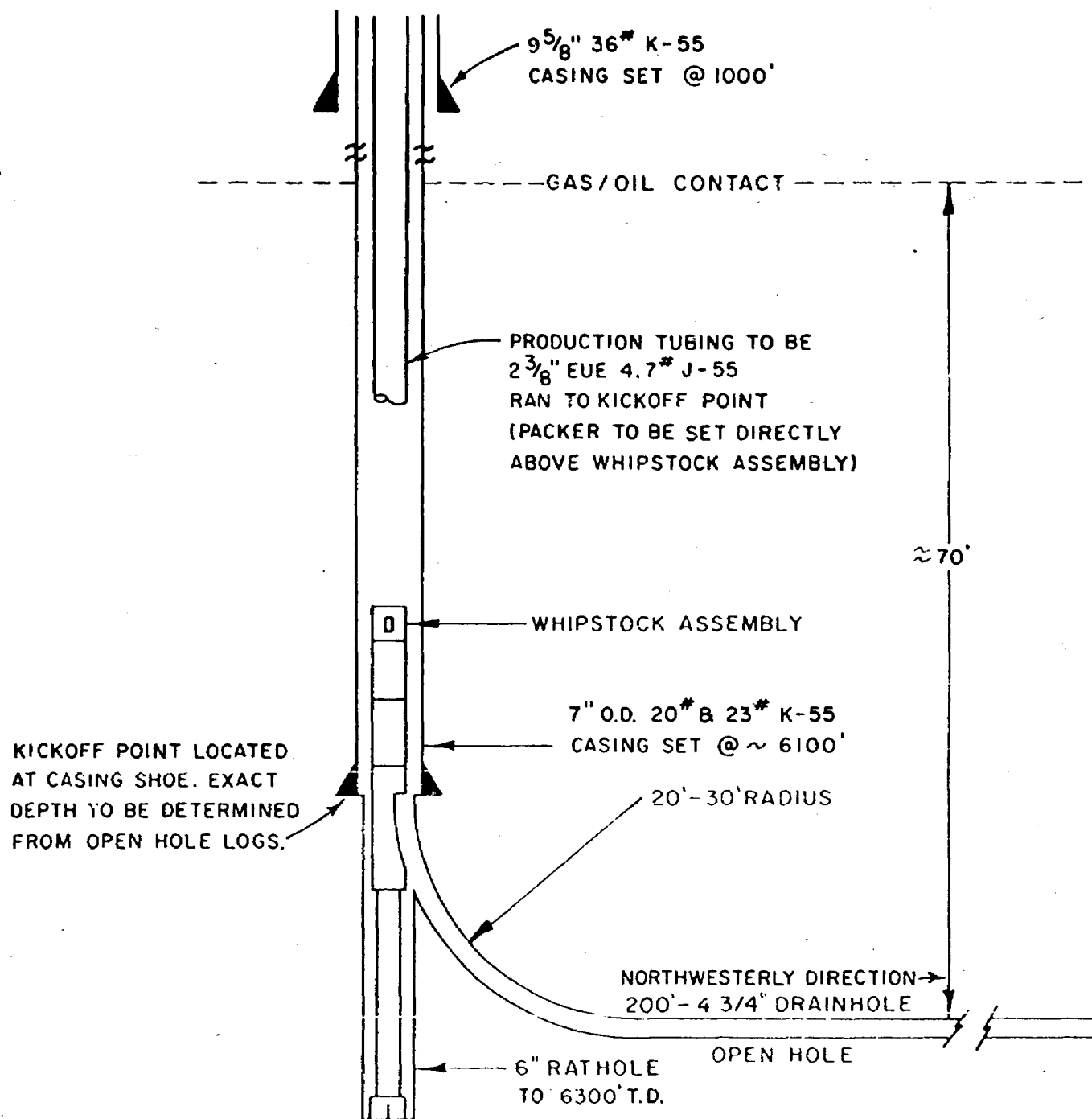
Estate of Fred Turner, Jr.
P. O. Box 910
Midland, Texas 79701

Rhonda Operating Company
Shelton Building
511 North Main
Midland, Texas 79701

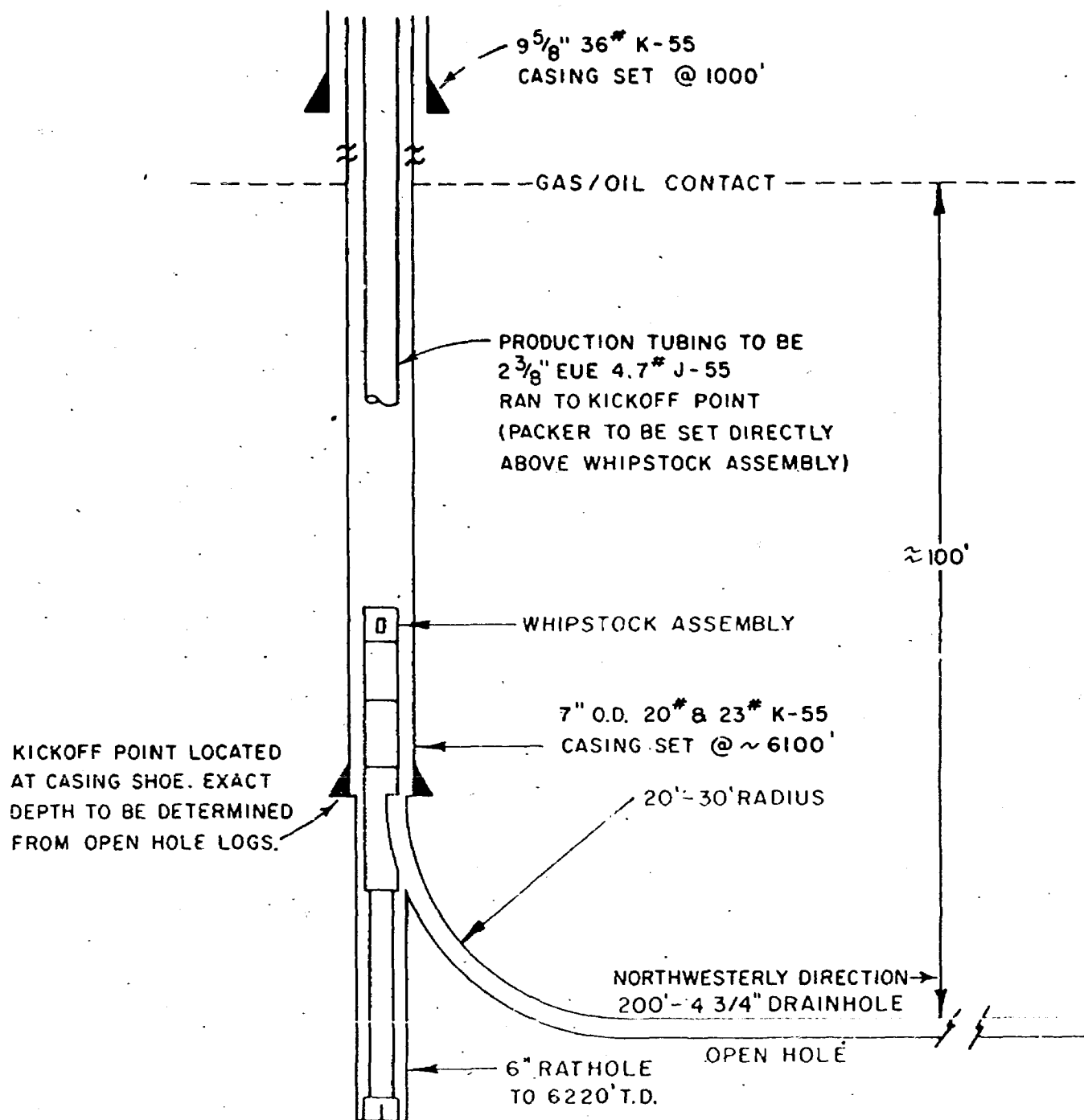
EMPIRE ABO UNIT L-161
SCHEMATIC OF PROPOSED DRAINHOLE



EMPIRE ABO UNIT K-221
SCHEMATIC OF PROPOSED DRAINHOLE



EMPIRE ABO UNIT K-171
SCHEMATIC OF PROPOSED DRAINHOLE





BRUCE KING
GOVERNOR
LARRY KEHOE
SECRETARY

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

November 30, 1981

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

Case 6742

Mr. Steve R. Sills
ARCO Oil and Gas Company
Post Office Box 1610
Midland, Texas 79702

Re: Horizontal Drainholes

Dear Mr. Sills:

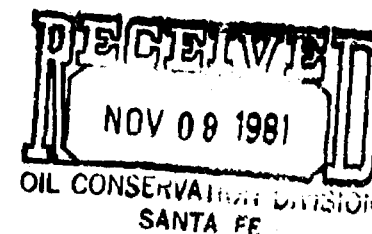
Pursuant to your letter of November 6, 1981, the surface location of your Empire Abo Unit 1 Well No. 161 is hereby amended to 400 feet from the South line and 390 feet from the East line of Section 2, Township 18 South, Range 27 East, Eddy County, New Mexico.

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

ARCO Oil and Gas Company
Permian District
Post Office Box 1610
Midland, Texas 79702
Telephone 915 684 0100



November 6, 1981

Mr. Joe D. Ramey
Director - Oil Conservation Division
Energy and Minerals Department
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Ramey:

RE: Horizontal Drainholes

ARCO Oil and Gas Company submitted an application to you on September 24, 1981, to drill three horizontal drainhole wells in the Empire Abo Unit, Eddy County, New Mexico. We received your approval through the attached letter.

In our application, we asked for approval to drill the Empire Abo Unit Well L-161 at a surface location of 450' FSL and 390' FEL of Section 2, Township 18 South, Range 27 East. This location was requested in error. The correct location is 400' FSL and 390' FEL of Section 2, 18S, 27E.

By a complete copy of this revised application, all offset operators are being notified of this location change. All copies and this letter were mailed on the date of this letter.

Federal approval is being concurrently requested for the Empire Abo Unit L-161 since it lies on Federal Land. If you have any questions regarding this matter, please call me at (915) 684-0165.

Sincerely,

Steve R. Sills

SRS:cn

Attachments

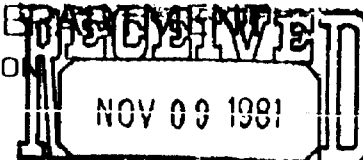
cc: Offset Operators
J. Schmidt, ARCO, Hobbs

*11-29-81
Write letter amending
location of L-161
as approved 9-24-81
JCS*



BRUCE KING
GOVERNOR
LARRY KEHOE
SECRETARY

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION



OIL CONSERVATION DIVISION
SANTA FE

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

September 24, 1981

ARCO Oil and Gas Company
Post Office Box 1610
Midland, Texas 79702

Attention: Ingrid Burton

Re: Horizontal Drainholes

Gentlemen:

Pursuant to your application dated September 2, 1981, and the provisions of Rule 14 B of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project, approval is hereby granted for the drilling of the following horizontal drainholes:

- (1) Empire Abo Unit K Well No. 171, the surface location to be 1370' FSL and 1050' FWL of Section 1, Township 18 South, Range 27 East, with the horizontal drainhole section projected 200 feet northwesterly,
- (2) Empire Abo Unit K Well No. 221, the surface location to be 1740' FSL and 1750' FWL of Section 6, Township 18 South, Range 28 East, with the horizontal drainhole section projected 200 feet northwesterly, and
- (3) Empire Abo Unit L Well No. 161, the surface location to be 450' FSL and 390' FEL of Section 2, Township 18 South, Range 27 East, with the horizontal drainhole section projected 200 feet northwesterly.

In accordance with Rule 14 B of said special rules and regulations, ARCO must file reports locating the kick-off point and trajectory of each of said wells within 20 days following completion thereof.

Sincerely,

JOE D. RAMEY
Director

JDR/RLS/fd

cc: Oil Conservation Division - Artesia
Oil & Gas Engineering Committee - Hobbs
Case File 6742

LAW OFFICES

HINKLE, COX, EATON, COFFIELD & HENSLEY

1000 FIRST NATIONAL BANK TOWER

POST OFFICE BOX 3580

MIDLAND, TEXAS 79702

(915) 683-4691

OF COUNSEL

CLARENCE E. HINKLE

W. E. BONOURANT, JR. (1914-1973)

ROSWELL, NEW MEXICO OFFICE

600 HINKLE BUILDING

(805) 822-6510

ONLY ATTYS. COFFIELD, MARTIN, BOZARTH,
BOHANNON, FOSTER, ALLEN, ALLEN & BURFORD
LICENSED IN TEXAS

LEWIS C. COX, JR.
PAUL W. EATON, JR.
CONRAD E. COFFIELD
HAROLD L. HENSLEY, JR.
STUART D. SHANOR
C. D. MARTIN
PAUL J. KELLY, JR.
JAMES H. BOZARTH

DOUGLAS L. LUNSFORD
PAUL M. BOHANNON
J. DOUGLAS FOSTER
K. DOUGLAS PERRIN
C. RAY ALLEN
JACQUELINE W. ALLEN
T. CALDER EZZELL, JR.
WILLIAM B. BURFORD
JOHN S. NELSON
RICHARD E. OLSON

November 12, 1979

OIL CONSERVATION DIVISION
SANTA FE

Mr. Dan Nutter
Chief Engineer
Oil Conservation Division
Post Office Box 2088
Santa Fe, New Mexico 87501

Case 6742

Dear Dan:

Transmitted herewith you will find triplicate executed copies of an Application of Arco Oil & Gas Company to set up an administrative approval procedure for the drilling of horizontal drainholes and other directional wells in the Empire Abo Unit.

It is my understanding that the docket setting for November 28, 1979 is still available for this matter, and accordingly, we request that it be heard on that date.

I trust that the enclosed copies of the Application are all that is needed in order for this to be set for the November 28, 1979 hearing. However, if anything is needed in addition, please let me know.

Very truly yours,

HINKLE, COX, EATON,
COFFIELD & HENSLEY


Conrad E. Coffield

CEC:rh
Enclosures

xc: Mr. Jerry L. Tweed
Atlantic Richfield Company
Post Office Box 1610
Midland, Texas 79702

BEFORE THE OIL CONSERVATION DIVISION

DEPARTMENT OF ENERGY AND MINERALS

STATE OF NEW MEXICO

APPLICATION OF ARCO OIL AND GAS)
COMPANY, DIVISION OF ATLANTIC)
RICHFIELD COMPANY, UNIT OPERATOR)
OF THE EMPIRE ABO UNIT, TO SET)
UP AN ADMINISTRATIVE APPROVAL)
PROCEDURE FOR THE DRILLING OF)
HORIZONTAL DRAINHOLES AND OTHER)
DIRECTIONAL WELLS IN THE EMPIRE)
ABO UNIT.)

Case 6742

APPLICATION

Comes ARCO Oil and Gas Company, Division of Atlantic Richfield Company, Unit Operator of the Empire Abo Unit, Eddy County, New Mexico, acting by and through the undersigned attorneys, and hereby makes application to set up an administrative approval procedure with the Division for the drilling of horizontal drainholes and other directional wells in the Empire Abo Unit, Empire Abo Pressure Maintenance Project as approved by Orders R-4549, R-4549A, R-4549B, R-4549C, R-4549D, and in support thereof respectfully shows:

1. The Oil Conservation Division, Department of Energy and Minerals, of the State of New Mexico, granted approval of the Empire Abo Unit Agreement by Order R-4548, dated June 15, 1973, and granted approval of the ARCO-Empire Abo Unit Pressure Maintenance Project by Order R-4549 also dated June 15, 1973, as subsequently amended by Order R-4549A dated January 15, 1974, Order R-4549B, dated April 30, 1974, Order R-4549C, dated July 1, 1975 and Order R-4549D, dated November 17, 1975.
2. The Oil Conservation Division issued Order R-5906 on January 16, 1979, approving the drilling of four directionally drilled infill wells in the Empire Abo Unit.
3. The Oil Conservation Division issued Order R-6044 on June 26, 1979, approving the drilling of the Empire Abo Unit Well K-142 and the completion of said well with a single horizontal drainhole approximately 200 feet in length.
4. That applicant proposes to develop an administrative procedure by which the Oil Conservation Division may rule on the drilling conventionally drilled directional wells and horizontal drainhole wells in the Empire Abo Unit.
5. In the opinion of the applicant, said directionally drilled and horizontal drainhole wells are in the interest of conservation, prevention of waste, the protection of correlative rights and will tend to promote the greatest recovery of oil and gas from the unitized area.
6. Applicant requests that this matter be set for hearing at the Examiner's hearing to be held on November 28, 1979.

Respectfully submitted,

HINKLE, COX, EATON,
COFFIELD & HENSLEY

By: 

Conrad E. Coffield
Post Office Box 3580
Midland, Texas 79702
Attorneys for Arco Oil & Gas Company
Division of Atlantic Richfield
Company

BEFORE THE OIL CONSERVATION DIVISION

DEPARTMENT OF ENERGY AND MINERALS

STATE OF NEW MEXICO

APPLICATION OF ARCO OIL AND GAS)
COMPANY, DIVISION OF ATLANTIC)
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HORIZONTAL DRAINHOLES AND OTHER)
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Case 6742

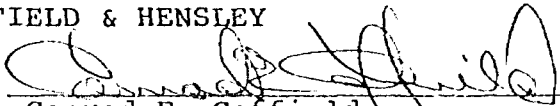
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DEPARTMENT OF ENERGY AND MINERALS

STATE OF NEW MEXICO

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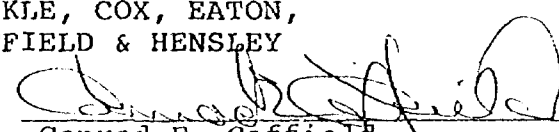
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By: 
Conrad E. Coffield
Post Office Box 3580
Midland, Texas 79702
Attorneys for Arco Oil & Gas Company
Division of Atlantic Richfield
Company

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:

6742
Arco
11/28/79
Hearing Room
CASE NO. 5177
Order No. R-4549-B

APPLICATION OF ATLANTIC RICHFIELD
COMPANY FOR THE AMENDMENT OF ORDER
NO. R-4549, EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on February 27, 1974, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 30th day of April, 1974, 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, Atlantic Richfield Company, is the operator of the Empire-Abo Pressure Maintenance Project, Empire-Abo Pool, Eddy County, New Mexico, which project was authorized by Commission Order No. R-4549, and is governed by operating rules included in said order as amended by Order No. R-4549-A.

(3) That the applicant seeks the amendment of said Order No. R-4549, as amended, to include an increase in the maximum project allowable from 40,192 barrels of oil per day to 40,555 barrels of oil per day because of additional lands committed to the unit and participating in the project and to provide that the maximum project allowable of 40,555 barrels of oil per day would be achieved upon injection of "all available residue gas" rather than "70 percent of the produced gas," as now provided in the project rules.

(4) That the applicant further seeks the amendment of Order No. R-4549, as amended, to include a provision for administrative approval for water injection wells and to include a reservoir voidage replacement credit for water injected into the Abo formation within the project area, and to provide for the establishment of a gas injection credit "bank", against which

injection credit could be drawn in order to maintain full allowables during such times that full gas injection cannot be maintained because of injection plant shutdowns or other mechanical problems.

(5) That the increase in maximum allowable for the Empire-Abo Pressure Maintenance Project from 40,192 barrels of oil per day to 40,555 barrels of oil per day is justified inasmuch as the original 40,192 barrels was based on numeric model studies of the reservoir assuming only those tracts actually committed to the unit at the time of the original hearing would participate; that additional tracts have now been committed to the unit and the maximum permissible allowable should therefore be increased accordingly to 40,555 barrels of oil per day.

(6) That the aforesaid maximum allowable should be made available upon injection of 95 percent of all available residue gas rather than upon injection of 70 percent of the produced gas as is presently provided by Rule 3 of the Project Rules as promulgated by Order No. R-4549, as amended by Order No. R-4549-A; that "Available Residue Gas" should be defined as being all gas produced from the unitized formation less plant shrinkage and plant fuel and lease fuel required for operations; that there should be a prohibition against the sale of gas from the project except during emergency situations of temporary nature.

(7) That in addition to the administrative procedure currently in effect pursuant to Order No. R-4549 for approval of the injection of gas into the Abo formation without notice and hearing, an administrative procedure should be adopted whereby approval could be given for the injection of water into said formation within the project area without notice and hearing, provided certain restrictions regarding proximity to non-participating tracts are observed.

(8) That credit should be allowed in the project's Reservoir Voidage Formula for water injected into the reservoir as well as for gas, as now provided.

(9) That in order to allow for the maintenance of full allowables and full production schedules during such times as injection well failures, injection plant shutdowns, and other temporary conditions of unforeseen nature which prevent the injection of 95 percent of all available residue gas, a provision should be made in the project rules for the establishment of a system for the accumulation of gas injection credits which could be applied in the "Additional Allowable" formula contained in Rule 4 of the project rules; that monthly gas injection credits which may be accumulated should be limited to the volume of gas injected which exceeds 95 percent of the residue gas available for injection during any given month; and that the maximum amount of gas injection credits which should be permitted to

-3-
Case No. 5177
Order No. R-4549-S

accrue to the gas injection credit bank should be equal to 100 percent of the average of the total monthly injection volumes for the previous three months, not including the month being reported.

IT IS THEREFORE ORDERED:

(1) That Rule 3 of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project as promulgated by Order No. R-4549, as amended by Order No. R-4549-A, is hereby amended to read in its entirety as follows:

"RULE 3. That the maximum daily project allowable shall be an amount of oil which will result in reservoir voidage no greater than the average daily reservoir voidage in the project area for calendar year 1972 (56,513 reservoir barrels) or 33,000 barrels of oil per day, whichever is less, except that when injection of 95 percent of all available residue gas is achieved, the maximum daily project allowable shall be an amount of oil which will result in reservoir voidage no greater than the average daily reservoir voidage in the project area for calendar year 1972 (56,513 reservoir barrels) or 40,555 barrels of oil per day, whichever is less."

(2) That Rule 4 of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project is hereby amended to read in its entirety as follows:

"RULE 4. That upon commencement of gas injection and for as long thereafter as such injection continues, extra allowable in addition to the 33,000 barrels per day described above may be assigned to the project area, provided that such additional allowable shall be based upon the proportion of residue gas available for injection which is actually injected into the unitized formation and shall be computed in accordance with the following formula:

Additional Allowable
in Excess of 33,000
BOPD

$$= 39.76 \left[2 \left(\frac{\text{MCF gas inj. previous month} \times 10}{\text{MCF residue gas available prev. month}} \right)^2 + \left(\frac{\text{MCF gas inj. previous month} \times 10}{\text{MCF residue gas available previous month}} \right) \right]$$

That the maximum additional allowable which may be earned by gas injection shall be 7,555 barrels per day. That this maximum may be earned by the injection of 95 percent of the available residue gas into the unitized formation; that gas volumes in excess of said 95 percent which are injected into the unitized formation shall be credited each month to a gas injection bank account which shall be permitted to accrue such gas injection credits up to 100 percent of the average of the total monthly injection volumes for the three previous months, not including the month being reported; that during such times as injection well failures, injection plant shutdowns, and other temporary conditions of unforeseen nature which prevent the injection of at least 95 percent of the available residue gas, said gas injection bank account may be charged a sufficient volume to add to the actual volume of injection achieved to equal 95 percent of the available residue gas for the month. In the event there are insufficient credits accrued to the gas injection bank account to bring actual injection plus applied credits up to 95 percent of available residue gas, production shall be reduced to 33,000 barrels of oil per day plus the amount which the actual injection plus the accrued credits will actually earn. Production beyond this amount shall be considered overproduction and shall be compensated for by underproduction during the following month.

For the purpose of these rules, "Available Residue Gas" shall be defined as being all gas produced from the unitized formation less plant shrinkage, plant fuel, and lease fuel required for operation of the lease.

No raw gas nor plant residue gas attributable to the project shall be sold or otherwise disposed of by any means other than injection into the unitized formation except during emergency situations of temporary nature."

(3) That Rule 5 of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project is hereby amended to read in its entirety as follows:

"RULE 5. That all calculations of reservoir voidage shall be made in accordance with the formula set forth in Attachment "A" to this order entitled "EMPIRE-ABO UNIT AREA-Reservoir Voidage Formula - Gas and Water Injection Credit" utilizing the reservoir and fluid data set forth in Attachment "B" to this order entitled EMPIRE-ABO UNIT AREA - Table of Fluid Properties."

(4) That Rule 14 of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project is hereby amended to read in its entirety as follows:

"RULE 14. The Secretary-Director of the Commission is hereby authorized to approve such additional producing wells and gas injection and water injection wells at orthodox and unorthodox locations within the boundaries of the ARCO Empire-Abo Unit Area as may be necessary to complete an efficient production and injection pattern, provided said wells are drilled no closer than 660 feet to the outer boundary of said unit nor closer than 10 feet to any quarter-quarter section or subdivision inner boundary and provided that no well shall be approved for gas or water injection when such well is located closer than 1650 feet to a tract which is not committed to the unit and on which is located a well producing from the same common source of supply. To obtain such approval, the project operator shall file proper application with the Commission, which application, if it seeks authorization to convert additional wells to injection or to drill additional production or injection wells shall include the following:

(1) A plat identifying the lands committed to the unit agreement and those lands not committed to said agreement, and showing the location of the proposed well, all wells within the unit area, and offset operators.

(2) A schematic drawing of the proposed well which fully describes the casing, tubing, perforated interval, and depth.

(3) A letter stating that all offset operators to the proposed well have been furnished a complete copy of the application and the date of notification.

The Secretary-Director may approve the proposed well if, within 20 days after receiving the application, no objection to the proposal is received. The Secretary-Director may grant immediate approval, provided waivers of objection are received from all offset operators."

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

-6-

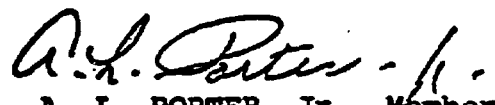
Case No. 5177
Order No. R-4549-3

DONE at Santa Fe, New Mexico, on the day and year herein-
above designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION


I. R. TRUJILLO, Chairman

ALEX J. ARMIJO, Member


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

S E A L

dr/

EMPIRE ABO UNIT AREA

Table of Fluid Properties

$P_{base} = 15.025 \text{ psia}$, $P_{bp} = 2231 \text{ psia}$, $T_{res} = 109^\circ \text{ F (569}^\circ \text{ R)}$

P_r (PSIA)	B_0 (RVBO/STBO)	B_g RVB/MCF	R_s (MCF/BBL)	Z
15.025	1.000	194.696	0	1.0
100	1.125	28.229	.180	.965
200	1.163	13.749	.235	.940
300	1.193	8.970	.290	.920
400	1.218	6.692	.345	.915
500	1.244	5.236	.395	.895
600	1.263	4.276	.445	.877
700	1.285	3.644	.495	.872
800	1.304	3.108	.540	.850
900	1.325	2.746	.585	.845
1000	1.344	2.437	.625	.833
1100	1.364	2.178	.675	.819
1200	1.384	1.962	.725	.805
1300	1.404	1.790	.775	.795
1400	1.425	1.649	.825	.789
1500	1.445	1.516	.875	.777
1600	1.465	1.404	.925	.768
1700	1.485	1.304	.975	.758
1800	1.505	1.220	1.025	.751
1900	1.525	1.147	1.075	.745
2000	1.548	1.053	1.125	.720
2100	1.573	1.000	1.175	.718
2200	1.597	.953	1.225	.717
2231	1.606	.939	1.250	.716

P_r = Reservoir average pressure at datum -2264' subsea, lbs/in² absolute.

B_0 = Oil formation volume factor, reservoir volumetric bbls/stock tank bbl.

B_g = Gas formation volume factor, reservoir volumetric bbls/thousand std. cu. ft.

R_s = Solution Gas/Oil Ratio, Thousand std. cu. ft./stock tank bbls. oil.

Z = Gas Compressibility Factor.

Attachment "B" Order No. R-4549-B

EMPIRE 430 UNIT AREA

Reservoir Voidage Formula - Gas and Water Injection Credit

Equation 1: $V_{rvb} = Q_o \left[B_o + (R_{pn} - R_s) B_g \right] + \left[Q_{wp} - (Q_{wa} + Q_{wi}) \right] B_w$

Where:

- V_{rvb} = Reservoir voidage, bbls. per day
- Q_o = Oil Production rate, Stock tank bbls. per day
- B_o = Oil formation volume factor (1), reservoir volumetric bbls/stock tank bbl.
- R_{pn} = Net producing gas-oil ratio, MCF/S.T.B.O.

$$R_{pn} = R_p \left(1.0 - \frac{G_i}{G_p} \right)$$

Where:

- R_p = producing gas-oil ratio, MCF/BO
- G_i = daily volume of gas injected, MCF/Day
- G_p = daily volume of gas produced, MCF/Day

- R_s = Solution gas-oil ratio (2), MCF/STBO
- B_g = Gas formation volume factor (3), RVB/MCF
- Q_{wp} = Water production rate, S.T.B.W./Day
- Q_{wa} = Aquifer water influx rate, S.T.B.W./Day, determined from reservoir numeric model runs to be 1950 BWPD
- Q_{wi} = Daily volume of water injected, S.T.B.W./Day
- B_w = Water formation volume factor, RVBW/STBW, use 1.0

(1), (2), (3): These values calculated from Table of Fluid Properties, Attachment "B".

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:

6742
Arco
11/28/79
CASE NO. 5177
Order No. R-4549-B

APPLICATION OF ATLANTIC RICHFIELD
COMPANY FOR THE AMENDMENT OF ORDER
NO. R-4549, EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on February 27, 1974, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 30th day of April, 1974, 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, Atlantic Richfield Company, is the operator of the Empire-Abo Pressure Maintenance Project, Empire-Abo Pool, Eddy County, New Mexico, which project was authorized by Commission Order No. R-4549, and is governed by operating rules included in said order as amended by Order No. R-4549-A.

(3) That the applicant seeks the amendment of said Order No. R-4549, as amended, to include an increase in the maximum project allowable from 40,192 barrels of oil per day to 40,555 barrels of oil per day because of additional lands committed to the unit and participating in the project and to provide that the maximum project allowable of 40,555 barrels of oil per day would be achieved upon injection of "all available residue gas" rather than "70 percent of the produced gas," as now provided in the project rules.

(4) That the applicant further seeks the amendment of Order No. R-4549, as amended, to include a provision for administrative approval for water injection wells and to include a reservoir voidage replacement credit for water injected into the Abo formation within the project area, and to provide for the establishment of a gas injection credit "bank", against which

injection credit could be drawn in order to maintain full allowables during such times that full gas injection cannot be maintained because of injection plant shutdowns or other mechanical problems.

(5) That the increase in maximum allowable for the Empire-Abo Pressure Maintenance Project from 40,192 barrels of oil per day to 40,555 barrels of oil per day is justified inasmuch as the original 40,192 barrels was based on numeric model studies of the reservoir assuming only those tracts actually committed to the unit at the time of the original hearing would participate; that additional tracts have now been committed to the unit and the maximum permissible allowable should therefore be increased accordingly to 40,555 barrels of oil per day.

(6) That the aforesaid maximum allowable should be made available upon injection of 95 percent of all available residue gas rather than upon injection of 70 percent of the produced gas as is presently provided by Rule 3 of the Project Rules as promulgated by Order No. R-4549, as amended by Order No. R-4549-A; that "Available Residue Gas" should be defined as being all gas produced from the unitized formation less plant shrinkage and plant fuel and lease fuel required for operations; that there should be a prohibition against the sale of gas from the project except during emergency situations of temporary nature.

(7) That in addition to the administrative procedure currently in effect pursuant to Order No. R-4549 for approval of the injection of gas into the Abo formation without notice and hearing, an administrative procedure should be adopted whereby approval could be given for the injection of water into said formation within the project area without notice and hearing, provided certain restrictions regarding proximity to non-participating tracts are observed.

(8) That credit should be allowed in the project's Reservoir Voidage Formula for water injected into the reservoir as well as for gas, as now provided.

(9) That in order to allow for the maintenance of full allowables and full production schedules during such times as injection well failures, injection plant shutdowns, and other temporary conditions of unforeseen nature which prevent the injection of 95 percent of all available residue gas, a provision should be made in the project rules for the establishment of a system for the accumulation of gas injection credits which could be applied in the "Additional Allowable" formula contained in Rule 4 of the project rules; that monthly gas injection credits which may be accumulated should be limited to the volume of gas injected which exceeds 95 percent of the residue gas available for injection during any given month; and that the maximum amount of gas injection credits which should be permitted to

-3-
Case No. 5177
Order No. R-4549-B

accrue to the gas injection credit bank should be equal to 100 percent of the average of the total monthly injection volumes for the previous three months, not including the month being reported.

IT IS THEREFORE ORDERED:

(1) That Rule 3 of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project as promulgated by Order No. R-4549, as amended by Order No. R-4549-A, is hereby amended to read in its entirety as follows:

"RULE 3. That the maximum daily project allowable shall be an amount of oil which will result in reservoir voidage no greater than the average daily reservoir voidage in the project area for calendar year 1972 (56,513 reservoir barrels) or 33,000 barrels of oil per day, whichever is less, except that when injection of 95 percent of all available residue gas is achieved, the maximum daily project allowable shall be an amount of oil which will result in reservoir voidage no greater than the average daily reservoir voidage in the project area for calendar year 1972 (56,513 reservoir barrels) or 40,555 barrels of oil per day, whichever is less."

(2) That Rule 4 of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project is hereby amended to read in its entirety as follows:

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Additional Allowable
in Excess of 33,000
BOPD

= 39.76

$$\left[2 \left(\frac{\text{MCF gas inj. previous month} \times 10}{\text{MCF residue gas available prev. month}} \right)^2 \right]$$

$$+ \left(\frac{\text{MCF gas inj. previous month} \times 10}{\text{MCF residue gas available previous month}} \right)$$

That the maximum additional allowable which may be earned by gas injection shall be 7,555 barrels per day. That this maximum may be earned by the injection of 95 percent of the available residue gas into the unitized formation; that gas volumes in excess of said 95 percent which are injected into the unitized formation shall be credited each month to a gas injection bank account which shall be permitted to accrue such gas injection credits up to 100 percent of the average of the total monthly injection volumes for the three previous months, not including the month being reported; that during such times as injection well failures, injection plant shutdowns, and other temporary conditions of unforeseen nature which prevent the injection of at least 95 percent of the available residue gas, said gas injection bank account may be charged a sufficient volume to add to the actual volume of injection achieved to equal 95 percent of the available residue gas for the month. In the event there are insufficient credits accrued to the gas injection bank account to bring actual injection plus applied credits up to 95 percent of available residue gas, production shall be reduced to 33,000 barrels of oil per day plus the amount which the actual injection plus the accrued credits will actually earn. Production beyond this amount shall be considered overproduction and shall be compensated for by underproduction during the following month.

For the purpose of these rules, "Available Residue Gas" shall be defined as being all gas produced from the unitized formation less plant shrinkage, plant fuel, and lease fuel required for operation of the lease.

No raw gas nor plant residue gas attributable to the project shall be sold or otherwise disposed of by any means other than injection into the unitized formation except during emergency situations of temporary nature."

(3) That Rule 5 of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project is hereby amended to read in its entirety as follows:

"RULE 5. That all calculations of reservoir voidage shall be made in accordance with the formula set forth in Attachment "A" to this order entitled "EMPIRE-ABO UNIT AREA-Reservoir Voidage Formula - Gas and Water Injection Credit" utilizing the reservoir and fluid data set forth in Attachment "B" to this order entitled EMPIRE-ABO UNIT AREA - Table of Fluid Properties."

(4) That Rule 14 of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project is hereby amended to read in its entirety as follows:

"RULE 14. The Secretary-Director of the Commission is hereby authorized to approve such additional producing wells and gas injection and water injection wells at orthodox and unorthodox locations within the boundaries of the ARCO Empire-Abo Unit Area as may be necessary to complete an efficient production and injection pattern, provided said wells are drilled no closer than 660 feet to the outer boundary of said unit nor closer than 10 feet to any quarter-quarter section or subdivision inner boundary and provided that no well shall be approved for gas or water injection when such well is located closer than 1650 feet to a tract which is not committed to the unit and on which is located a well producing from the same common source of supply. To obtain such approval, the project operator shall file proper application with the Commission, which application, if it seeks authorization to convert additional wells to injection or to drill additional production or injection wells shall include the following:

(1) A plat identifying the lands committed to the unit agreement and those lands not committed to said agreement, and showing the location of the proposed well, all wells within the unit area, and offset operators.

(2) A schematic drawing of the proposed well which fully describes the casing, tubing, perforated interval, and depth.

(3) A letter stating that all offset operators to the proposed well have been furnished a complete copy of the application and the date of notification.

The Secretary-Director may approve the proposed well if, within 20 days after receiving the application, no objection to the proposal is received. The Secretary-Director may grant immediate approval, provided waivers of objection are received from all offset operators."

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

-6-


Case No. 5177
Order No. R-4549-3

DONE at Santa Fe, New Mexico, on the day and year herein-
above designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION


I. R. TRUJILLO, Chairman

ALEX J. ARMIJO, Member


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

S E A L

dr/

EMPIRE ABO UNIT AREA

Table of Fluid Properties

$P_{base} = 15.025 \text{ psia}$, $P_{bp} = 2231 \text{ psia}$, $T_{res} = 109^\circ \text{ F } (569^\circ \text{ R})$

P_r (PSIA)	B_O (RVBO/STBO)	B_g RVB/MCF	R_s (MCF/BBL)	Z
15.025	1.000	194.696	0	1.0
100	1.125	28.229	.180	.965
200	1.163	13.749	.235	.940
300	1.193	8.970	.290	.920
400	1.218	6.692	.345	.915
500	1.244	5.236	.395	.895
600	1.263	4.276	.445	.877
700	1.285	3.644	.495	.872
800	1.304	3.108	.540	.850
900	1.325	2.746	.585	.845
1000	1.344	2.437	.625	.833
1100	1.364	2.178	.675	.819
1200	1.384	1.962	.725	.805
1300	1.404	1.790	.775	.795
1400	1.425	1.649	.825	.789
1500	1.445	1.516	.875	.777
1600	1.465	1.404	.925	.768
1700	1.485	1.304	.975	.758
1800	1.505	1.220	1.025	.751
1900	1.525	1.147	1.075	.745
2000	1.548	1.053	1.125	.720
2100	1.573	1.000	1.175	.718
2200	1.597	.953	1.225	.717
2231	1.606	.939	1.250	.716

P_r = Reservoir average pressure at datum -2264' subsea, lbs/in² absolute.

B_O = Oil formation volume factor, reservoir volumetric bbls/stock tank bbl.

B_g = Gas formation volume factor, reservoir volumetric bbls/thousand std. cu. ft.

R_s = Solution Gas/Oil Ratio, Thousand std. cu. ft/stock tank bbls. oil.

Z = Gas Compressibility Factor.

Attachment "B" Order No. R-4549-B

EMPIRE ABO UNIT AREA

Reservoir Voidage Formula - Gas and Water Injection Credit

Equation 1: $V_{rvb} = Q_o \left[B_o + (R_{pn} - R_s) B_g \right] + \left[Q_{wp} - (Q_{wa} + Q_{wi}) \right] B_w$

Where:

- V_{rvb} = Reservoir voidage, bbls. per day
- Q_o = Oil Production rate, Stock tank bbls. per day
- B_o = Oil formation volume factor (1), reservoir volumetric bbls/stock tank bbl.
- R_{pn} = Net producing gas-oil ratio, MCF/S.T.B.O.

$$R_{pn} = R_p \left(1.0 - \frac{G_i}{G_p} \right)$$

Where:

- R_p = producing gas-oil ratio, MCF/BO
- G_i = daily volume of gas injected, MCF/Day
- G_p = daily volume of gas produced, MCF/Day

- R_s = Solution gas-oil ratio (2), MCF/STBO
- B_g = Gas formation volume factor (3), RVB/MCF
- Q_{wp} = Water production rate, S.T.B.W./Day
- Q_{wa} = Aquifer water influx rate, S.T.B.W./Day, determined from reservoir numeric model runs to be 1950 BWPD
- Q_{wi} = Daily volume of water injected, S.T.B.W./Day
- B_w = Water formation volume factor, RVBW/STBW, use 1.0

(1), (2), (3): These values calculated from Table of Fluid Properties, Attachment "B".

8. (Answer)

We propose that the new administrative procedure apply to any horizontal drainhole or other directionally drilled well whose targeted bottom hole location is no closer than 330' from the nearest unit boundary and whose surface location is no closer than 10' to a quarter-quarter section line.

We also propose that the new procedure cover directionally drilled water or gas injection wells whose targeted bottomhole location is no closer than 1320' from the nearest boundary.

9. What information do you propose be contained in an application for permission to drill under the new administrative procedure?

The contents of an application under the new administrative procedure will be very similar to the contents required in an application for a conventional well.

(1) A letter stating the proposed plans for drilling the well.

(1) ~~(1)~~ A map of the Empire Abo Unit indicating those lands committed to the Unit and also showing the surface location of the proposed well, the location of all other wells within the Unit area and also identifying all offset operators.

(2) ~~(2)~~ A ~~more~~ detailed plat showing the surface location of the proposed well, the targeted bottom hole location, all Abo wells on the proration unit on which the well is to be drilled, all Abo wells on offsetting proration units, and also any nearby Unit boundaries.

(4) A schematic wellbore drawing of the proposed well indicating the proposed casing plan, wellbore configuration, and all pertinent depths.

(5) A letter stating that all offset operators to the proposed well have been furnished a complete copy of the application and the date of the notification.

(6) Upon the completion of the drilling of the well, ARCO will submit a brief report to the Division describing the bottomhole location of the wellbore.

10. Are there any other specific points that you would like for the new administrative procedure to include?

Yes sir, we would like to have a provision in the procedure to allow for an administrative amendment of the proposed target area for horizontal drainholes and other directionally drilled wells if their final bottom hole locations do not fall within the previously prescribed target area and the actual bottom hole location is within the authority of the administrative procedure.

11. In your opinion will the approval of this application by AROC Oil and Gas Company prevent waste and protect correlative rights?

*Received
S. J. Smith
10/1/71*

*S. J. Smith
10/1/71*

- CASE 6736: Application of Doyle Hartman for compulsory pooling and a non-standard gas proration unit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Jalmat Gas Pool to form a 360-acre non-standard gas proration unit comprising the S/2 SE/4 of Section 36, Township 24 South, Range 36 East; SW/4 of Section 31, Township 24 South, Range 37 East; and the N/2 NW/4 and NW/4 NE/4 of Section 6, Township 25 South, Range 37 East, to be dedicated to a well to be drilled 660 feet from the South line and 990 feet from the West line of said Section 31. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.
- CASE 6707: (Continued from November 14, 1979, Examiner Hearing)
- Application of Gulf Oil Corporation for a unit agreement, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks approval for the Southeast Bisti Unit Area, comprising 7,048 acres, more or less, of State and Federal lands in Townships 24 and 25 North, Range 10 West.
- CASE 6737: Application of Gulf Oil Corporation for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Pennsylvanian formation underlying the W/2 of Section 4, Township 19 South, Range 32 East, North Lusk-Morrow Gas Pool, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.
- CASE 6739: Application of Mobil Oil Corporation for downhole commingling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Gavilan-Pictured Cliffs and Blanco Mesaverde production in the wellbore of its Jicarilla D Well No. 1 located in Unit N of Section 24, Township 26 North, Range 3 West. Applicant further seeks the establishment of an administrative procedure for approval of downhole commingling of the aforesaid pools in others of its wells in Sections 7, 8, 17, 18, and 19, Township 26 North, Range 2 West, Sections 1, 2, 11 thru 14, 23, and 24, Township 26 North, Range 3 West, and Sections 11 thru 15, 22 thru 27, 35, and 36, Township 27 North, Range 3 West.
- CASE 6740: Application of Hondo Oil and Gas Company for an unorthodox gas well location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a Pennsylvanian test well to be drilled 1550 feet from the North line and 660 feet from the West line of Section 10, Township 18 South, Range 28 East, the N/2 of said Section 10 to be dedicated to the well.
- CASE 6741: Application of ARCO Oil and Gas Company for an amendment to Order No. R-6054, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Order No. R-6054 to amend the findings in said order to make said findings more specific as to the necessity for the drilling of infill wells in the Empire Abo Unit in order to recover additional gas pursuant to the Natural Gas Policy Act of 1978; further to amend said order to make such findings applicable to present and future drilling operations including the drilling of horizontal drainholes.
- CASE 6720: (Continued from November 14, 1979, Examiner Hearing)
- Application of ARCO Oil and Gas Company to drill a horizontal drainhole, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval to drill and complete its Empire Abo Unit Well No. J-213, located in Unit E of Section 6, Township 18 South, Range 28 East, Empire-Abo Pool, with a single horizontal drainhole of about 200 feet in length in the Abo formation.
- CASE 6742: Application of ARCO Oil and Gas Company for an administrative procedure, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the establishment of an administrative procedure for approval of the drilling of horizontal drainholes in the Empire Abo Unit, Empire-Abo Pool.
- CASE 6743: (This case will be dismissed.)
- Application of Exxon Corporation for an exception to Order No. R-3221, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an exception to Order No. R-3221 to permit disposal of produced brine in several unlined surface pits located on its Laguna Grande Unit Area in Sections 16, 21, 28, 29, 32, and 33, Township 23 South, Range 29 East.
- CASE 6744: Application of Texas Oil & Gas Corporation for special pool rules, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the promulgation of special pool rules for the Riverside-Morrow Gas Pool to provide for 320-acre spacing rather than 160 acres. In the absence of objection, this pool will be placed on the standard 320-acre spacing for Pennsylvanian gas pools rather than the present 160-acre spacing.

Application for Hearings
called in by Stamp of ARCO

- ① Amend R-6054 to include future additional infill drilling including drainholes and amend findings in said order.
- ② Establish an administrative procedure for approval to drill drainholes

Also request continuance of
Case No. 6720 to Nov 28, 1979

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 6742
Order No. R-4549-D E

APPLICATION OF ARCO OIL AND GAS
COMPANY FOR AN ADMINISTRATIVE
PROCEDURE, EDDY COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on November 28, 1979, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 28th day of January, 1980, the Division Director, 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 Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, ARCO Oil and Gas Company, is the operator of the Empire Abo Pressure Maintenance Project, Empire Abo Pool, Eddy County, New Mexico, which project was authorized by Division Order No. R-4549, and is governed by operating rules included in said order as amended by Orders Nos. R-4549-A through R-4549-D.

(3) That the applicant seeks the amendment of Rule 14 of the Special Rules and Regulations for said project adopted by Order No. R-4549, as amended, to additionally provide for an administrative procedure for authorizing the drilling, for production or injection purposes, of "horizontal drainholes" within such project.

(4) That the drilling of said horizontal drainholes within the boundaries of said project should result in the recovery of oil and gas therefrom which might not otherwise

be produced thereby preventing waste.

(5) That correlative rights will not be violated provided that no perforated or openhole portion of any horizontal drainhole shall be closer than 330 feet to the outer boundary of the Empire Abo Unit or any tract not committed to said unit nor, in the case of a well to be used for injection, closer than 1650 feet to such boundary or tract.

(6) That the application for administrative procedure should be approved by amending said Rule 14 to read in its entirety as shown on Exhibit "A" attached to this order.

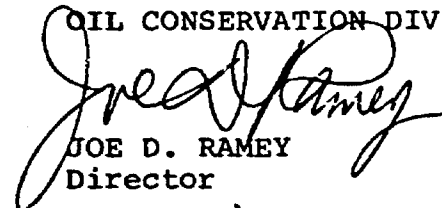
IT IS THEREFORE ORDERED:

(1) That Rule 14 of the Special Rules and Regulations for the Empire Abo Pressure Maintenance Project is hereby amended to read in its entirety as shown on Exhibit "A" to this order.

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

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

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION


JOE D. RAMEY
Director

S E A L

fd/

EXHIBIT "A"
ORDER NO. R-4549-E

RULE 14 A. The Director of the Division is hereby authorized to approve such additional producing wells and gas injection and water injection wells at orthodox and un-orthodox locations within the boundaries of the ARCO Empire Abo Unit Area as may be necessary to complete an efficient production and injection pattern, provided said wells are drilled no closer than 660 feet to the outer boundary of said unit nor closer than 10 feet to any quarter-quarter section or subdivision inner boundary and provided that no well shall be approved for gas or water injection when such well is located closer than 1650 feet to a tract which is not committed to the unit and on which is located a well producing from the same common source of supply. To obtain such approval, the project operator shall file proper application with the Division Director, which application, if it seeks authorization to convert additional wells to injection or to drill additional production or injection wells shall include the following:

(1) A plat identifying the lands committed to the unit agreement and those lands not committed to said agreement, and showing the location of the proposed well, all wells within the unit area, and offset operators.

(2) A schematic drawing of the proposed well which fully describes the casing, tubing, perforated interval, and depth.

(3) A letter stating that all offset operators to the proposed well have been furnished a complete copy of the application and the date of notification.

RULE 14 B. The Director of the Division is hereby authorized to approve the drilling of "horizontal drainholes" for the purposes of production or injection within the boundaries of the ARCO Empire Abo Unit Area as may be necessary to complete an efficient production and injection pattern, provided no perforated or openhole portion of said wells shall be closer than 330 feet to the outer boundary of said unit or to any tract not committed to such unit nor, in the case of a well to be used for injection closer than 1650 feet to such boundary or tract. To obtain such approval, the project operator shall file proper application with the Division Director, which application, if it seeks authorization to convert additional wells to injection or to drill additional production or injection wells shall include the following:

(1) A plat identifying the lands committed to the unit agreement and those lands not committed to said agreement, and showing the location of the proposed well, all wells within the unit area, and offset operators.

(2) Schematic drawings of the proposed well which fully describes the casing, tubing, perforated or open-hole interval, kick-off point, and proposed trajectory of the drainhole section.

(3) A letter stating that all offset operators to the proposed well have been furnished a complete copy of the application and the date of notification.

RULE 14 C. The Director may approve the proposed well if, within 20 days after receiving the application, no objection to the proposal is received. The Director may grant immediate approval, provided waivers of objection are received from all offset operators.

RULE 14 D. Within 20 days following completion of any horizontal drainhole the operator shall submit a report to the Division Director with sufficient detail to locate the kick-off point and the trajectory of the deviated portion of the well bore with respect to any quarter-quarter section(s) penetrated by such well and any 40-acre tract directly or diagonally offsetting such quarter-quarter section(s).

The Director may approve the final location of the horizontal drainhole by acceptance of such report.

The Director may rescind the authority for any horizontal drainhole if the perforated or openhole portion of such hole is located closer to the unit boundary or any uncommitted tract than permitted by these rules or if it should appear that such rescission is necessary to prevent waste or protect correlative rights.

ROUGH

dr/

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 6742

Order No. R-4549-D

APPLICATION OF ARCO OIL AND GAS
COMPANY FOR AN ADMINISTRATIVE
PROCEDURE, EDDY COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on November 28,
19 79, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this _____ day of _____, 1980, the
Division Director, 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 Division has jurisdiction of this cause and the
subject matter thereof.

(2) That the applicant, ARCO Oil and Gas Company, is the
operator of the Empire-Abo Pressure Maintenance Project, Empire-Abo
Pool, Eddy County, New Mexico, which project was authorized by
Division Order No. R-4549, and is governed by operating rules included
in said order as amended by Orders Nos. R-4549-A through R-4549-D.

(3) That the applicant seeks the amendment of Rule 14 of the Special Rules and Regulations for said Project adopted by Order No. R-4549, as amended, to ^{additionally} provide for an administrative procedure for authorizing the drilling, for production or injection purposes, of "horizontal drainholes" within such project.

(4) That the drilling of said horizontal drain holes within the boundaries of said project should result in the recovery of oil and gas therefrom which might not otherwise be produced thereby preventing waste.

(5) That correlative rights will not be violated provided that no ^{perforated or open hole} ~~productive~~ portion of any horizontal drain hole shall be closer than 330 feet to the outer boundary of the Empire Abo Unit or any tract not committed to said unit nor, in the case of a well to be used for injection, closer than 1650 feet to such boundary or tract.

(6) That the application for administrative procedure should be approved by amending said Rule 14 to read in its entirety as shown on Exhibit "A" attached to this order.

IT IS THEREFORE ORDERED:

(1) That Rule 14 of the Special Rules and Regulations for the Empire-Abo Pressure Maintenance Project is hereby amended to read in its entirety as shown on Exhibit "A" to this order.

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

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

1127

EXHIBIT "A"
ORDER NO. R-4549-D

RULE 14 A. The Director of the Division is hereby authorized to approve such additional producing wells and gas injection and water injection wells at orthodox and unorthodox locations within the boundaries of the ARCO Empire-Abo Unit Area as may be necessary to complete an efficient production and injection pattern, provided said wells are drilled no closer than 660 feet to the outer boundary of said unit nor closer than 10 feet to any quarter-quarter section or subdivision inner boundary and provided that no well shall be approved for gas or water injection when such well is located closer than 1650 feet to a tract which is not committed to the unit and on which is located a well producing from the same common source of supply. To obtain such approval, the project operator shall file proper application with the ^{Division} ~~Commission~~ ^{Director,} which application, if it seeks authorization to convert additional wells to injection or to drill additional production or injection wells shall include the following:

(1) A plat identifying the lands committed to the unit agreement and those lands not committed to said agreement, and showing the location of the proposed well, all wells within the unit area, and offset operators.

(2) A schematic drawing of the proposed well which fully describes the casing, tubing, perforated interval, and depth.

(3) A letter stating that all offset operators to the proposed well have been furnished a complete copy of the application and the date of notification.

RULE 14 B. The Director of the Division is hereby authorized to approve the drilling of "horizontal drain holes" for the purposes of production or injection within the boundaries of the ARCO Empire-Abo Unit Area as may be necessary to complete an efficient production and injection pattern, provided no ^{perforated or open hole} ~~productive~~ portion of said wells ^{shall be completed} ~~are~~ drilled closer than 330 feet to the ^{committed} ~~dedicated~~ outer boundary of said unit or to any tract not dedicated to such unit nor, in the case of a well to be used for injection closer than 1650 feet to such boundary or tract. To obtain such approval, the project operator shall file proper application with

Division Director,
the ~~Commission~~, which application, if it seeks authorization to convert additional wells to injection or to drill additional production or injection wells shall include the following:

(1) A plat identifying the lands committed to the unit agreement and those lands not committed to said agreement, and showing the location of the proposed well, all wells within the unit area, and offset operators.

(2) Schematic drawings of the proposed well which fully describes the casing, tubing, perforated or open-hole interval, kick-off point, and proposed ~~track~~ *trajectory* of the drain hole section.

(3) A letter stating that all offset operators to the proposed well have been furnished a complete copy of the application and the date of notification.

RULE 14 C. The Director may approve the proposed well if, within 20 days after receiving the application, no objection to the proposal is received. The Director may grant immediate approval provided waivers of objection are received from all offset operators

RULE 14 D. Within 20 days following completion of any horizontal drain hole the operator shall submit a report to the ^{Division} Director of ~~the Division~~ with sufficient detail to locate the kick-off point and the ~~deviated~~ *trajectory of the* portion of the well bore with respect to any quarter-quarter section ^(s) penetrated by such well and any 40-acre tract directly or diagonally offsetting such quarter-quarter section(s).

The Director may approve the final location of the horizontal drain hole by acceptance of such report.

The Director may rescind the authority for any horizontal drain hole if the ^{perforated or openhole} ~~productive~~ portion of such hole is located closer to the unit boundary or any uncommitted tract than permitted by these rules or if it should appear that such rescission is necessary to prevent waste or protect correlative rights.