

CASE 4037: Application of ANADARKO  
FOR SEVERAL WATERFLOOD PROJECTS  
AND WATERFLOOD BUFFER ZONES.

- dse Number

4037

Application

Transcripts.

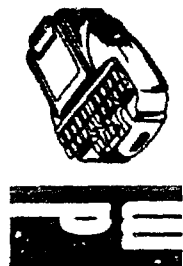
Small Exhibits

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SPECIALIZING IN: DEPOSITIONS, HEARINGS, STATEMENTS, EXPERT TESTIMONY, DAILY COPY, CONVENTIONS

1120 SIMMS BLDG. • P. O. BOX 1092 • PHONE 243-6691 • ALBUQUERQUE, NEW MEXICO



BEFORE THE  
NEW MEXICO OIL CONSERVATION COMMISSION

Santa Fe, New Mexico

February 5, 1969

EXAMINER HEARING

-----  
IN THE MATTER OF: )

Application of Anadarko )  
Production Company for )  
several waterflood )  
projects and waterflood )  
buffer zones, Eddy County, )  
New Mexico. )  
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Case No. 4037

BEFORE: Daniel S. Nutter,  
Examiner

TRANSCRIPT OF HEARING

MR. NUTTER: We will call Case No. 4037.

MR. HATCH: Case 4037, application of Anadarko Production Company for several waterflood projects and waterflood buffer zones, Eddy County, New Mexico.

MR. KELLAHIN: Jason Kellahin, Kellahin & Fox, appearing for the applicant. I have one witness I would like to have sworn.

(Witness sworn.)

(Whereupon, Applicant's Exhibits Numbers 1 through 7, inclusive, were marked for identification.)

C. W. STUMHOFFER

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q State your name, please.

A C. W. Stumhoffer.

Q By whom are you employed and in what position?

A I am employed by Anadarko Production Company as superintendent of the secondary recovery division.

Q Have you testified before the Oil Conservation Commission and made your qualifications a matter of record?

A Yes, I have.

MR. KELLAHIN: Are the witness's qualifications acceptable?

MR. NUTTER: Yes, they are.

Q Mr. Stumhoffer, are you familiar with the application of Anadarko Production Company in Case 4037?

A Yes, I am.

Q What is proposed by Anadarko in this application?

A We propose to expand the existing Square Lake Federal Waterflood Project area, and to include Anadarko's Etz Federal Lease located in the north half of the southeast quarter, and the south half of the southwest quarter of Section 19, Township 16 South, Range 31 East, and a portion of Anadarko's Grier Federal Lease located in the north half of the southeast quarter of Section 20, the same Township and Range.

Q How many injection wells will be included in this project?

A On the subject area, there will be two injection wells operated by Anadarko Company.

Q And then there are offsetting injection wells which will affect the Anadarko properties, is that correct?

A Right.

Q Referring to what has been marked as Exhibit Number 1, would you identify that exhibit?

A Exhibit Number 1 is a map of the area in question, showing the present development and the proposed development.

Q Is there a waterflood project presently operating to the south of Anadarko's proposed waterflood?

A Yes, there is.

Q Who is the operator of that?

A Newmont Oil Company.

Q Has that been in operation for some time?

A It was initiated -- the pilot was initiated during 1959.

Q And it has been operating approximately since that date?

A Right.

Q Now, are you familiar with the allowables assigned to the Newmont project?

A They were capacity allowables.

Q Has the Anadarko property received any response from this offsetting waterflood?

A Yes, they have.

Q Now, at the present time, do you feel it is necessary in order to protect the correlative rights of Anadarko Production Company, that you institute a waterflood on your own properties?

A Yes.

Q Referring to what has been marked as Exhibit Number 2, would you identify that exhibit?

A Exhibit Number 2 is a portion of the county map showing all wells in the area under consideration, showing all off-setting operators within a two-mile radius of the subject lease.

Q Now, referring to what has been marked as Exhibits 3 and 4, would you identify those exhibits?

A Exhibits 3 and 4 are logs of the two injection wells that Anadarko proposes to complete.

Q Would you identify those wells and give the location, please?

A Exhibit 3 is a density log, gamma ray density log of Etz No. 3, located in the northeast of the southeast of Section 19, 16 South, 31 East. And the other log is a gamma ray neutron log of Grier No. 14, located in the northeast of the southeast of Section 20, 16 South, 31 East.

Q Now, with reference to these logs, what formation will you be injecting water into?

A Grayburg and San Andres.

Q Is this the same formation that the Newmont waterflood is operating in?

A Yes, it is.

Q Are the zones marked on the logs?

A They are not marked on the logs, no.

Q Would you give the depth on them?

A We have. That is on Exhibit 5.

Q Referring to Exhibit 5, would you identify that exhibit?

A Exhibit 5 is a diagrammatic sketch of each of the two proposed injection wells, showing the casing program, and the cementing record, and the proposed tubing, setting points, and the perforations that will be injected into.

Q Exhibit 5 does not reflect the cement tops? Have you made a calculation of what those are?

A The estimated top of the cement in Etz Federal No. 3 is 2,429 feet. The estimated top of the cement in the Grier Federal 14 is 2,861 feet.

Q On your injection wells, will you inject through tubing and under a packer?

A Yes.

Q Will the tubing be internally coated?

A Yes.

Q Will your injection be through both the tubing and annulus?

A That's correct. The wells will be dually completed for injection into the Lovington Sand under the packer, and into



the Premier Sand of the Grayburg down the annulus between the packer and casing.

Q What is the reason for this dual injection?

A This is necessary due to the injectivity of the two sands. The Lovington Sand requires approximately 2,600 pounds PSI at the surface to accept water in the required quantities; and the Premier Sand requires pressures, surface pressures of approximately 2,100 PSI.

Q Is this the same type of injection program that has been followed by Newmont?

A Yes, it is.

Q In their waterflood project?

A Yes.

Q And the same dual injection completions have been approved by this Commission?

A Yes.

Q Referring to Exhibit Number 6, will you explain that?

A Exhibit 6 is a prediction of the performance of the Etz Federal Lease as previously described under waterflood developments. It also shows the producing history during the past ten years of the lease.

Q Does that reflect that this lease is at an advanced stage of depletion?

A Yes, sir. Well, it indicates that it was at an advanced stage of depletion, and has received response to the waterflood operation.

Q And Exhibit Number 7, will you identify that exhibit?

A Exhibit 7 is a production curve of the Grier Federal Lease as described previously, and on which we show the production history since 1961, and then the predicted waterflood performance.

Q Does that indicate that this also shows an advanced stage of depletion and a response to the offsetting waterflood?

A This portion of the Grier Lease shows advanced stage of depletion, but has shown no response.

Q It has shown no response on this one? On your projected recovery, does this indicate that you will be able to recover oil that would not otherwise be recovered by the institution of this waterflood?

A Yes.

Q Could you give an estimate of the ratio of recovery?

A Approximately. We are estimating that recovery will be on the Grier, 60,000 barrels of oil; and on the Etz, 120,000 barrels.

Q This is oil that would not otherwise be recovered?

A That's correct.

Q Now, what will your source of injection water be?

A It will be fresh water to be purchased from a commercial water company, to be mixed with produced water from these leases, and other Anadarko leases in the area.

Q Will there be any corrosion problems since you are injecting down the annulus?

A No, we will inhibit the injected fluid.

Q And your tubing will be internally coated?

A Yes.

Q Were Exhibits 1 through 7 prepared by you?

A Yes.

MR. KELLAHIN: I would like to offer Exhibits 1 through 7.

MR. NUTTER: Anadarko's Exhibits 1 through 7 will be admitted into evidence.

(Whereupon, Applicant's Exhibits Numbers 1 through 7, inclusive, were admitted in evidence.)

Q Turning back to your Exhibit Number 1, Mr. Stumhoffer, will the injection pattern which you propose to follow on this particular project, or these projects, I should say, fit in with the offsetting waterflood projects?

A Yes, they will.

Q Now, you are not putting an injection well on one of

those tracts, is that correct?

A That's correct. In the south half of the southwest quarter of Section 19, or the left portion of the Etz Federal Lease will not have an injection well.

Q But it will be a portion of the waterflood by the effect of the offsetting flood?

A That's correct.

Q Where is the offsetting injection well?

A The offsetting injection well -- the offsetting injection well will be Kennedy Oil Company Carper Federal No. 2, and Newmont Oil Company Vickers Federal No. 6. At the present time, this part of the lease is offset by injection wells to the south operated by Ryder Scott on their Loe Federal Lease, which is covered by a co-op agreement in other parts of the field.

Q Do you have a cooperative agreement with the offsetting operators?

A There is one being in the process of being agreed to. We have a verbal agreement, and the instrument is now being circulated for signatures.

MR. KELLAHIN: That is all I have on direct.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Stumhoffer, this lease has shown a response,

according to Exhibit 6. Has all of that response been in the south half of the southwest, or has the north half of the southeast also responded?

A Both have responded. The north half of the southeast are new wells. They were completed in the past six months, and we have determined both wells to experience response.

Q Has this No. 1 well in the southwest of the southwest of 19 ever been restored to production?

A No.

Q So No. 2 is the only producing well on that tract, and it has an injection well immediately south, it will have one to the north and one to the east?

A That's correct. We do not plan to re-enter No. 1. We feel like we can adequately drain this with the No. 1 well.

Q As far as your flood over here on the Grier Lease is concerned, you put your No. 14 on injection, and then the No. 13 would be the producing well on that tract? It would have an injection well east and west, and southeast, but that would be all of the injection on that well?

A That's correct.

Q There is a case docketed today for Kennedy Oil Company for these additional wells offsetting this property here, is there not?

A Yes. Newmont has previously had their part of the hearing. Of course, theirs was covered by -- they had approval of their area for waterflood prior to this.

Q What about your produced water, would you return that to Newmont or Ryder Scott?

A No, it will be returned to our plant in Section 31, Township 16. We have an active project going in Section 31.

Q So your produced water will be shipped on south, and the only water you will be using here will be the water you purchase from Ryder Scott?

A Well, we will furnish the water from our plant in Section 31 to these leases. The water will be purchased from a commercial water company, but the pressured water will come from our plant located in the southeast of the northwest --

Q So you will have two water sources, then?

A Well, one water source from our plant. These leases will be served from our plant located in Section 31, and all our produced water will be shipped back to that plant for disposal.

Q What about this water that is going to come from Ryder Scott?

A We are not purchasing any water from Ryder Scott.

Q Well, this Exhibit Number 5 indicates 250 barrels per

day of fresh water and produced water, fresh water purchased from Ryder Scott?

A They operate a commercial water company in the area, and we are buying water from their system for our plant.

Q To go into your plant?

A Right.

Q And all your produced water will be put into your plant, plus this fresh water?

A Right. Ryder Scott operates a commercial water system in the area, and we are buying from them.

Q Will the water be brought in under a single system? You mentioned you have two pressures to inject under.

A It will be operated at 2,600 pounds, and we will reduce the pressure at the well head for the upper zone.

Q And your injected water will be a mixture of fresh and produced water?

A Yes.

Q But it will be inhibited to prevent corrosion?

A Yes.

Q On the Etz No. 3, the estimated top was 2,429?

A That's correct.

Q And on the other, the estimated top was 2,861?

A That's right.

Q Now, you mentioned that the Newmont flood to the south had been operated with capacity allowables. Are you, therefore, seeking a buffer zone treatment to that capacity flood for this acreage?

A Yes.

Q Do you know whether the capacity allowables have been of benefit to Newmont Oil Company, or could those wells have been operated under New Mexico Oil Conservation Waterflood Allowables over the years?

A At the present time, they would not be needed. I do not have the information, never have checked it to see whether it would have needed it in the past.

Q Are any wells in the vicinity here in the north half of Sections 25, 30, or 29, or in Sections 19 or 20, are any of these wells producing at such a rate as would indicate that capacity allowables were required?

A There have been some wells that would have needed capacity allowables.

Q For a period of time?

A Yes, during their peak stages.

Q And I presume that these injection rates that you indicate on Exhibit 5, 100 barrels into the Lovington and 150 barrels into the Premier, would stand for both wells?



A That's correct.

MR. NUTTER: Any further questions? You may be excused. Do you have anything further, Mr. Kellahin?

MR. KELLAIN: Nothing.

MR. NUTTER: Does anyone have anything they wish to offer in Case 4037?

MR. HATCH: The Commission has received a letter from Newmont Oil Company supporting the application.

MR. NUTTER: If there is nothing further, we will take the case under advisement.

I N D E X

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

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

Samuel Mortelette  
 COURT REPORTER

I do hereby certify that  
 the foregoing is a true and correct  
 transcript of the hearing held on  
 the 2/5/59 at 4037  
 C9  
Samuel Mortelette  
 New Mexico Oil Conservation Commission



## OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO

P. O. BOX 2088 - SANTA FE

87501

GOVERNOR  
DAVID F. CARGO  
CHAIRMAN

LAND COMMISSIONER  
ALEX J. ARMijo  
MEMBER

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

February 14, 1969

Mr. Jason Kallahin  
Kallahin & Fox  
Attorneys at Law  
Post Office Box 1769  
Santa Fe, New Mexico

Re: Case No. 4037  
Order No. R-3677  
Applicant:  
Anadarko Production Co.

Dear Sir:

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

Very truly yours,

A. L. PORTER, Jr.  
Secretary-Director

ALP/ir

Copy of order also sent to:

Hobbs OCC x

Artesia OCC x

Aztec OCC           

Other State Engineer Office

BEFORE THE OIL CONSERVATION COMMISSION  
OF THE STATE OF NEW MEXICO

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

CASE No. 4037  
Order No. R-3677

APPLICATION OF ANADARKO PRODUCTION  
COMPANY FOR SEVERAL WATERFLOOD PROJ-  
ECTS AND WATERFLOOD BUFFER ZONES,  
EDDY COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on February 5, 1969,  
at Santa Fe, New Mexico, before Examiner Daniel S. Mutter.

NOW, on this 13th day of February, 1969, 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, Anadarko Production Company, seeks  
authority to institute two waterflood projects in the Square Lake  
Pool by the injection of water into the Grayburg and San Andres  
formations by the conversion to water injection of its Etz Federal  
Well No. 3 and its Grlier Well No. 14, located, respectively, in  
Sections 19 and 20 of Township 16 South, Range 31 East, NMPM,  
Eddy County, New Mexico.

(3) That the wells in the project areas are in an advanced  
state of depletion and should properly be classified as "stripper"  
wells.

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CASE No. 4037

Order No. R-3677

(4) That the proposed waterflood projects should result in the recovery of otherwise unrecoverable oil, thereby preventing waste.

(5) That the applicant further proposes that the S/2 SW/4 and the N/2 SE/4 of said Section 19 be designated a waterflood buffer zone and that the N/2 SE/4 of said Section 20 be designated a waterflood buffer zone.

(6) That the S/2 SW/4 and the N/2 SE/4 of said Section 19 are offset on the south, east, and southeast by capacity-type waterflood projects.

(7) That the N/2 SE/4 of said Section 20 is offset on the west, southwest, and southeast by capacity-type waterflood projects.

(8) That approval of the proposed buffer zones will afford the applicant the opportunity to produce its just and equitable share of the oil in the pool.

(9) That the subject application should be approved and the projects should be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations, provided however, that capacity allowables may be assigned to the wells in the S/2 SW/4 and the N/2 SE/4 of said Section 19, and that capacity allowables may be assigned to the wells in the N/2 SE/4 of said Section 20.

IT IS THEREFORE ORDERED:

(1) That the applicant, Anadarko Production Company, is hereby authorized to institute the two following waterflood projects in the Square Lake Pool by the injection of water into the Grayburg and San Andres formations through the following-described wells in Township 16 South, Range 31 East, NMPM, Eddy County, New Mexico:

Anadarko Square Lake Etz Waterflood Project

Injection well:

Anadarko Etz Federal Well No. 3 located in  
Unit I of Section 19

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CASE No. 4037

Order No. R-3677

Anadarko Square Lake Grier No. 2 Waterflood Project

Injection well:

Anadarko Grier Well No. 14 located in Unit  
I of Section 20

(2) That the subject waterflood projects shall be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations, provided however, that the S/2 SW/4 and the N/2 SE/4 of said Section 19 is hereby designated a waterflood buffer zone and that the N/2 SE/4 of said Section 20 is hereby designated a waterflood buffer zone.

(3) That water can be injected and wells produced in each of the aforesaid buffer zones at rates comparable with the capacity-type waterflood projects offsetting each of said buffer zones and described in Findings Nos. (6) and (7) above.

(4) That monthly progress reports of the waterflood projects herein authorized shall be submitted to the Commission in accordance with Rules 704 and 1120 of the Commission Rules and Regulations.


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

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

STATE OF NEW MEXICO  
OIL CONSERVATION COMMISSION

  
DAVID F. CARGO, Chairman

  
ALEX J. ARMIJO, Member

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

esr/

DOCKET: EXAMINER HEARING - WEDNESDAY - FEBRUARY 5, 1969

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

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

CASE 4036: Application of Mobil Oil Corporation for a dual completion, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks approval for the dual completion (conventional) of its C. L. O'Brien Well No. 1 located in Unit A of Section 7 Township 8 South, Range 30 East, Chaves County, New Mexico, to produce oil from an undesignated Pennsylvanian oil pool and the Lightcap (Devonian) Pool through parallel strings of tubing.

CASE 3975 (Reopened):

In the matter of Case No. 3975 being reopened pursuant to the provisions of Order No. R-3618, which order established 80-acre spacing units for the East Bluitt-San Andres Pool, Roosevelt County, New Mexico, for a period of approximately two months. All interested parties may appear and present evidence as to whether the subject area is indeed a separate common source of supply or an extension of the Bluitt-San Andres Gas Pool.

CASE 4010: (Continued from December 27, 1968 and January 8, 1969 Examiner Hearings)

Application of John H. Trigg for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project by the injection of water into the Grayburg-San Andres formations through his Empire "J" Federal Well No. 1 located in Unit F of Section 1, Township 18 South, Range 26 East, Red Lake Grayburg-San Andres Pool, Eddy County, New Mexico.

CASE 4037: Application of Anadarko Production Company for several waterflood projects and waterflood buffer zones, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute several waterflood projects by the injection of water into the Grayburg and San Andres formations of the Square Lake Pool by the conversion to water injection of its Etz Federal Well No. 3 and its Grier Well No. 14 located, respectively, in Sections 19 and 20 of Township 16 South, Range 31 East, Eddy County, New Mexico. Applicant further seeks the designation of the S/2 SW/4 of said Section 19, the N/2 SE/4 of said Section 19, and the N/2 SE/4 of said Section 20 as waterflood buffer zones with capacity allowables.



CASE 4038: Application of Kennedy Oil Company for a waterflood project and waterflood buffer zone, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project by the injection of water into the Grayburg and San Andres formations of the Square Lake Pool by the conversion to water injection of its Carper Federal Well No. 2 located in Unit K of Section 19, Township 16 South, Range 31 East, Eddy County, New Mexico. Applicant further seeks the designation of the N/2 SW/4 of said Section 19 as a waterflood buffer zone with capacity allowable.

CASE 4039: The application of the Oil Conservation Commission upon its own motion for an order granting an exception to the ninth paragraph of Chapter II, Section 2 of Order No. R-333-F to permit shutting in gas wells for the required shut-in test at some period during the 1969 test season other than immediately following the 7-day deliverability flow test; further to permit measuring the shut-in test pressure during the 8th to 15th day of shut-in of the well rather than on the 8th day as presently required. The above exceptions would be for the 1969 annual deliverability test season only and would be applicable to all wells in San Juan, Rio Arriba, McKinley and Sandoval Counties, New Mexico, subject to the testing requirements of Chapter II of Order No. R-333-F.

CASE 4023: (Continued and readvertised from the January 15, 1969 Regular Hearing)

Application of Ernest A. Hanson for salt water disposal, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Queen formation in the perforated interval from approximately 1724 feet to 1736 feet in his Welch Federal Well No. 2 located 1650 feet from the North line and 2310 feet from the West line of Section 22, Township 19 South, Range 28 East, East Millman Queen-Grayburg Pool, Eddy County, New Mexico.

CASE 4040: Application of Cities Service Oil Company for the institution of gas prorationing in the Buffalo Valley-Pennsylvanian Gas Pool, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks the limitation of gas production from the Buffalo Valley-Pennsylvanian Gas Pool in Chaves County, New Mexico, to reasonable market demand and to the capacity of gas transportation facilities, and that the subject pool be governed by the general rules and regulations for the prorated gas pools of Southeastern New Mexico insofar as said general rules and regulations are not inconsistent with the special rules and regulations governing the subject pool. Further, the applicant proposes that the allowable production from the pool be allocated among the wells in the pool on a 100% surface acreage basis.

CASE 4041: Application of Tamarack Petroleum Company, Inc. for salt water injection, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to inject produced salt water into the Queen formation in the perforated interval from 4955 feet to 5030 feet in its Texaco Motor Well No. 2, located in Unit H of Section 22, Township 19 South, Range 35 East, Pearl Queen Pool, Lea County, New Mexico.

CASE 4042: Application of El Paso Natural Gas Company for an amendment to Order No. R-2948, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Order No. R-2948, which order established a number of non-standard gas proration units in the Basin-Dakota Gas Pool, Rio Arriba County, New Mexico. Applicant proposes to change the acreage dedication comprising units 12 and 13 of Township 28 North, Range 6 West and Units 16 and 17 of Township 28 North, Range 7 West to comprise the following:

<u>TOWNSHIP 28 NORTH, RANGE 6 WEST</u>		
Unit	Acres	Description
12	320	Section 33: N/2
13	330.71	Section 33: S/2

<u>TOWNSHIP 28 NORTH, RANGE 7 WEST</u>		
Unit	Acres	Description
16	320	Section 35: N/2
17	322.40	Section 35: S/2

CASE 4017: [Continued from the January 8, 1969 Examiner Hearing.]  
Application of [redacted] for compulsory pooling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Morrow formation underlying Section 8, Township 21 South, Range 34 East, North Indian Hills-Morrow Gas Pool, Eddy County, New Mexico. Said acreage to be dedicated to a well to be drilled in the SE/4 of said Section 8. Also to be considered will be the costs of drilling said well, a charge for the risk involved a provision for the allocation of actual operating costs, and the establishment of charges for supervision of said well.

CASE 4043: Application of David Fasken for compulsory pooling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Morrow formation underlying Section 8, Township 21 South, Range 24 East, North Indian Hills-Morrow Gas Pool, Eddy County, New Mexico. Said acreage to be dedicated to a well to be drilled 1980 feet from the North line and 2105 feet from the East line of said Section 8. Also to be considered will be the costs of drilling said well, a charge for the risk involved, a provision for the allocation of actual operating costs, and the establishment of charges for supervision of said well. Case No. 4043 will be consolidated for purposes of hearing with Case No. 4017 which is the application of Corinne Grace for compulsory pooling of the same section.

CASE 4044: Application of Continental Oil Company for a non-standard gas proration unit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the consolidation of two existing non-standard gas proration units into one 481-acre unit comprising the E/2 and E/2 W/2 of Section 3, Township 20 South, Range 36 East, Eumont Gas Pool, Lea County, New Mexico, to be dedicated to its Reed A-3 Wells Nos. 2 and 3 located in Units H and I, respectively of said Section 3, to be effective as of January 1, 1967. Applicant further seeks authority to produce the allowable assigned to said unit from either of the aforesaid wells in any proportion.

CASE 4045: Application of H & S Oil Company for an amendment to Order No. R-3357, as amended by Order No. R-3357-A, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Order No. R-3357, as amended by Order No. R-3357-A, which order authorized the H & S West Artesia Unit Waterflood Project. Applicant proposes to substitute the Roach Drilling Company-Leonard Well No. 18 located in Unit D of Section 17 as a water injection well in said project in lieu of the Cities Service-Mell Well No. 17 located in Unit M of Section 8, both in Township 18 South, Range 28 East, Artesia Pool, Eddy County, New Mexico.

CASE 4030: (Continued from the January 22, 1969 Examiner Hearing)

Application of Argus Production Company for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Seven Rivers formation in the perforated and open-hole interval from approximately 3554 feet to 3775 feet in its J. T. Lynn A-28 Well No. 3 located 2310 feet from the South line and 1650 feet from the East line of Section 28, Township 21 South, Range 36 East, Jalmat Yates-Seven Rivers Pool, Lea County, New Mexico.

NEWMONT OIL COMPANY

ROOM 303, FIRST NATIONAL BANK BUILDING

P. O. BOX 1305

ARTESIA, NEW MEXICO 88210

January 30, 1969

NEW MEXICO  
DISTRICT OFFICE

A. L. Porter, Jr.,  
Secretary-Director  
New Mexico Oil Conservation Commission  
P. O. Box 2088  
Santa Fe, New Mexico 87501

Dear Sir:

Newmont Oil Company as offset operator wishes to support the  
application of Anadarko Production Company for their Waterflood Project  
in Section 19 and 20 of Township 16S, Range 31E, Eddy County, New Mexico  
to be heard in Case No. 4037.

Yours truly,

NEWMONT OIL COMPANY

*Herman J. Ledbetter*

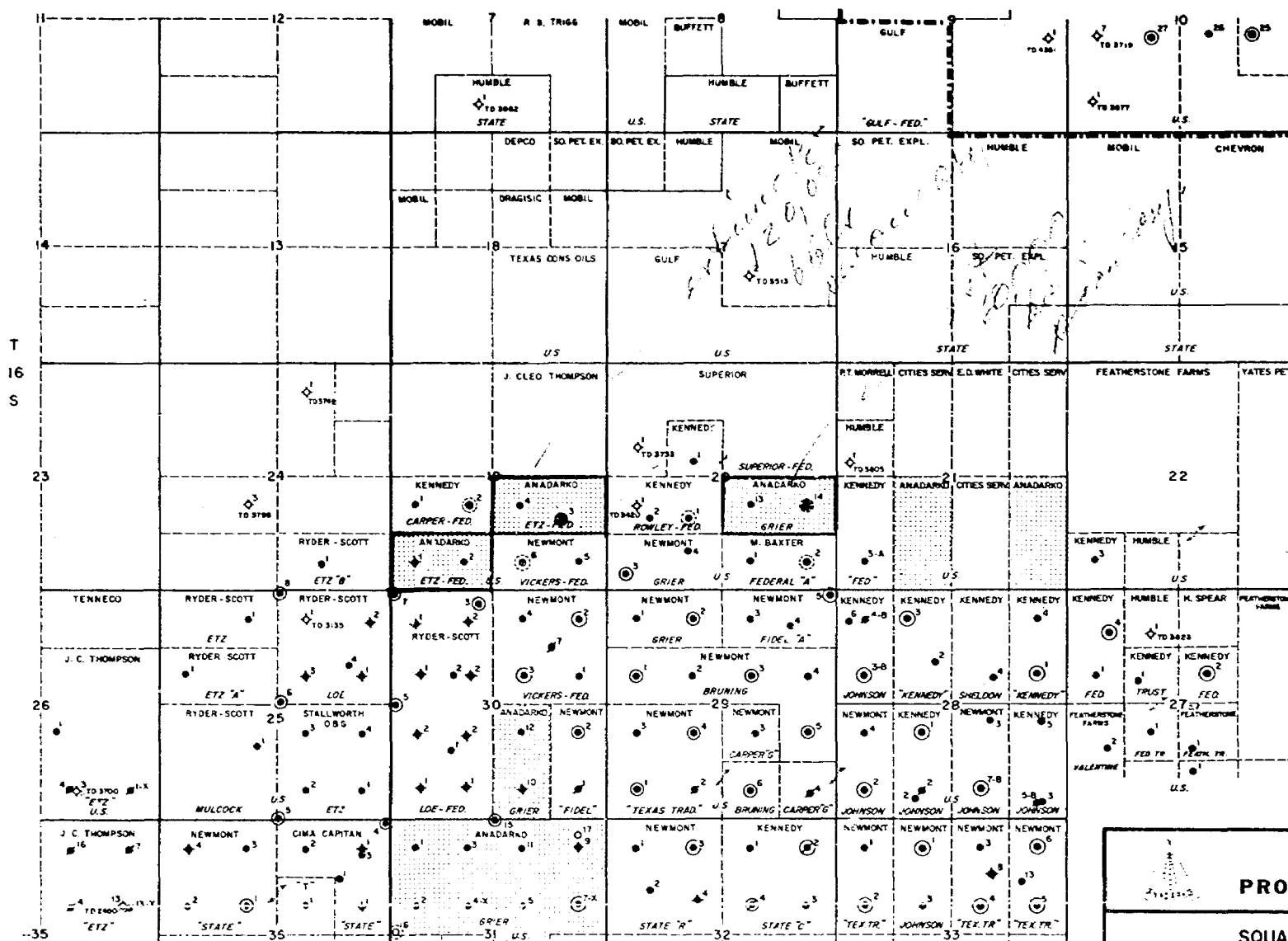
Herman J. Ledbetter  
Division Superintendent

HJL/saf

*BNH*  
*file - Case 4037*

R - 30 - E

R - 31 - E



## LEGEND

- Location
- Oil Well
- ◆ Plugged & Abandoned
- ⬢ Temporarily Abandoned
- ◇ Dry & Abandoned
- ⊙ Proposed Water Injection Well
- ⊕ Water Injection Well
- ▭ Anadarko Acreage
- ▨ Mobil Operated
- N.E. Square Lake Unit

FORE PLANNING

LOCATION MAP

4037

Exhibit I

# ANADARKO PRODUCTION COMPANY

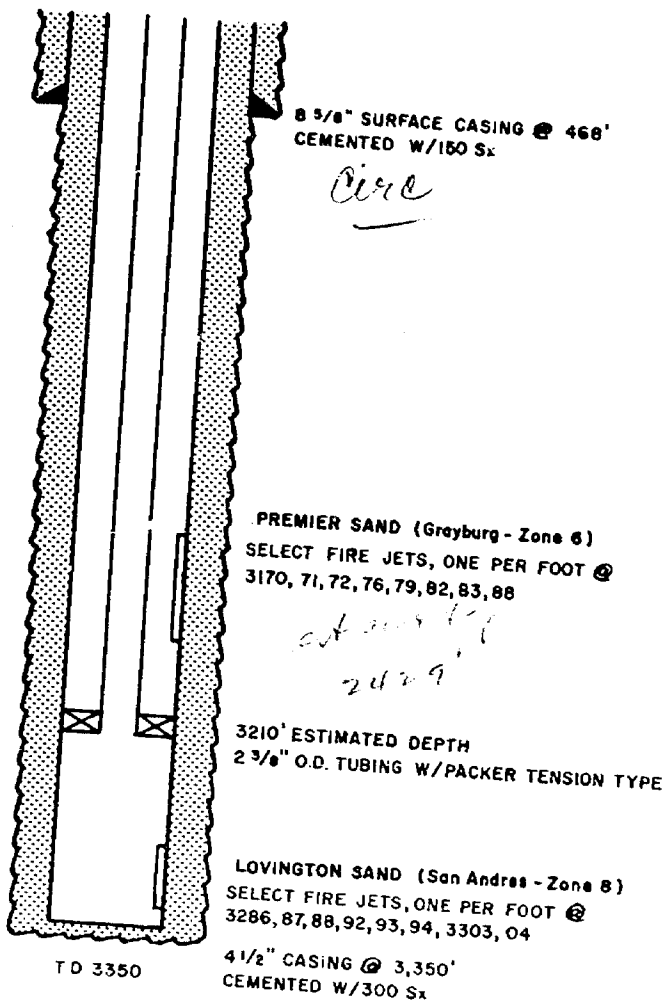
**SQUARE LAKE FIELD**  
EDDY COUNTY, NEW MEXICO  
**EXPANSION OF WATERFLOOD PROJECT AREA**  
**AND**  
**PROPOSED WATERFLOOD DEVELOPMENT**  
N/2 SE/4 AND S/2 SW/4  
SECTION 19, T16S - R31E  
**AND**  
N/2 SE/4 SECTION 20, T16S - R31E





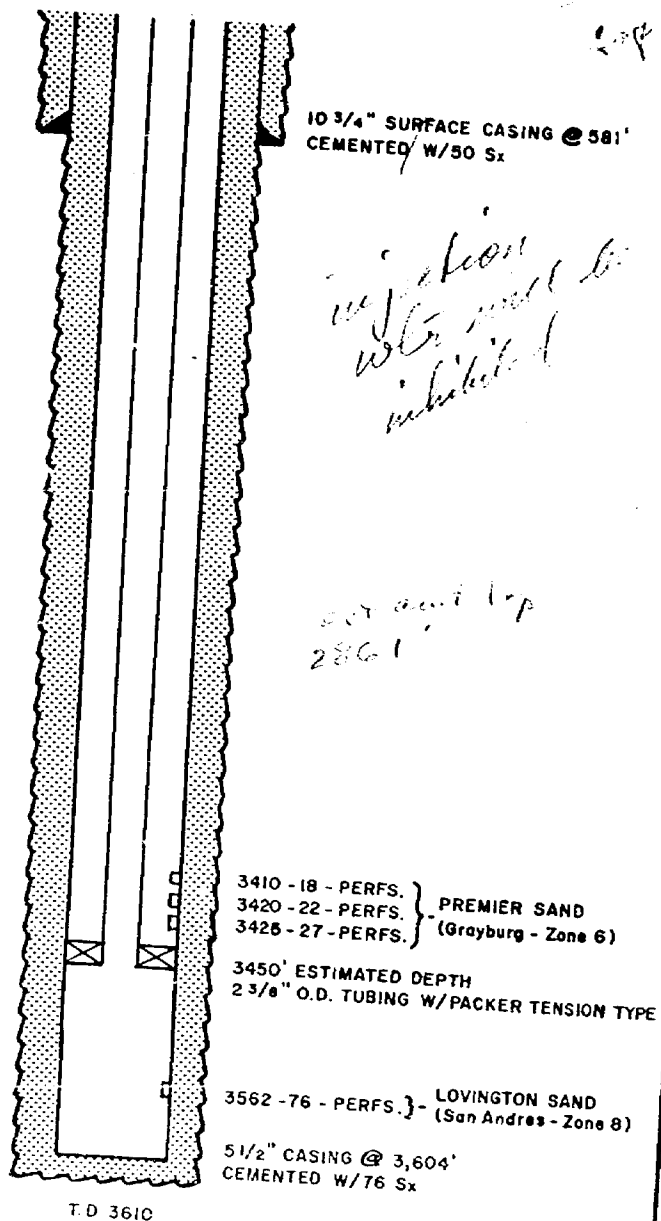
ANADARKO PRODUCTION CO.  
ETZ FEDERAL NO. 3

990' FSL & 1650' FSL  
SEC. 19 - T16S - R31E



ANADARKO PRODUCTION CO.  
GRIER FEDERAL NO. 14

1980' FSL & 660' FSL  
SEC. 20 - T16S - R31E



FLUID to be INJECTED  
250 BARRELS PER DAY OF FRESH WATER  
AND PRODUCED WATER. FRESH WATER  
PURCHASED FROM RYDER SCOTT MANAGEMENT COMPANY

EST. 100 BPD into LOVINGTON  
150 BPD into PREMIER

Exhibit V



ANADARKO  
PRODUCTION COMPANY

SQUARE LAKE FIELD  
EDDY COUNTY, NEW MEXICO  
SCHEMATIC DIAGRAM  
OF  
WATER INJECTION WELL COMPLETIONS  
IN  
EXPANSION OF WATERFLOOD PROJECT AREA  
N/2 SE/4 AND S/2 SW/4  
SECTION 19, T16S - R31E  
& N/2 SE/4 SECTION 20, T16S - R31E

4037

CLARENCE E. HINKLE  
W. E. BONDURANT, JR.  
S. B. CHRISTY IV  
LEWIS C. COX, JR.  
PAUL W. EATON, JR.  
CONRAD E. COFFIELD  
HAROLD L. HENSLEY, JR.  
MICHAEL R. WALLER  
STUART D. SHANOR  
C. D. MARTIN  
PAUL J. KELLY, JR.

LAW OFFICES  
HINKLE, BONDURANT & CHRISTY  
600 HINKLE BUILDING  
ROSWELL, NEW MEXICO 88201

January 6, 1969

MIDLAND, TEXAS OFFICE  
521 MIDLAND TOWER  
(915) MU 3-4891  
OF COUNSEL: HIRAM M. DOW

TELEPHONE (505) 622-6510  
POST OFFICE BOX 10

*Case 4037*

New Mexico Oil Conservation Commission  
State Land Office Building  
Santa Fe, New Mexico 87501

Attention: Mr. A. L. Porter, Jr.

Gentlemen:

We hand you herewith in triplicate Application and Entry of Appearance in connection with the application of Anadarko Production Company for approval of expansion of water flood project area and proposed water flood development operations in the Square Lake Field in Sections 19 and 20, Township 16 South, Range 31 East, N.M.P.M., Eddy County, New Mexico.

We would thank you in advance to docket the enclosure and advise us, and Anadarko, of the date the matter is set for hearing.

Respectfully,

HINKLE, BONDURANT & CHRISTY

By *S. B. Christy IV*  
S. B. Christy IV

SBC:md  
enci.

cc: Anadarko Production Company

DOCKET MAILED

Date 1-23-69

*[Signature]*



BEFORE THE OIL CONSERVATION COMMISSION

OF THE STATE OF NEW MEXICO

APPLICATION OF ANADARKO PRODUCTION )  
COMPANY FOR APPROVAL OF EXPANSION OF )  
WATERFLOOD PROJECT AREA AND PROPOSED )  
WATERFLOOD DEVELOPMENT OPERATIONS IN )  
THE SQUARE LAKE FIELD, IN SECTIONS 19 )  
AND 20, TOWNSHIP 16 SOUTH, RANGE 31 )  
EAST, EDDY COUNTY, NEW MEXICO )

Case No. 4037

ENTRY OF APPEARANCE

COMES NOW the undersigned attorneys, duly licensed to practice law in the State of New Mexico, and enter their appearance in this cause in behalf of the applicant, Anadarko Production Company.

The undersigned attorneys have associated in this case with Mr. John D. Townsend, an attorney licensed to practice law in the States of Kansas and California, Mr. Irley Bonnette, an attorney licensed to practice law in the State of Texas, and Mr. T. J. Guinan, an attorney licensed to practice law in the State of Kansas, and request that the Commission permit Mr. Townsend, Mr. Bonnette and Mr. Guinan to present evidence in behalf of the applicant at the hearing in this cause.

Respectfully,

HINKLE, BONDURANT & CHRISTY

By S. B. Christy IV

S. B. Christy IV  
as a member of the firm

Post Office Box 10  
Roswell, New Mexico 88201

BEFORE THE OIL CONSERVATION COMMISSION  
OF THE STATE OF NEW MEXICO

APPLICATION OF ANADARKO PRODUCTION )  
COMPANY FOR APPROVAL OF EXPANSION OF )  
WATERFLOOD PROJECT AREA AND PROPOSED )  
WATERFLOOD DEVELOPMENT OPERATIONS IN )  
THE SQUARE LAKE FIELD, IN SECTIONS 19 )  
AND 20, TOWNSHIP 16 SOUTH, RANGE 31 )  
EAST, EDDY COUNTY, NEW MEXICO )

Case No. 4037

A P P L I C A T I O N

COMES NOW Anadarko Production Company, hereinafter referred to as "Applicant," and in support of this Application states:

1. Applicant is a corporation, duly organized and existing under the laws of the State of Delaware, and authorized to do business in the State of New Mexico. Applicant's principal office and post office address is Post Office Box 9317, Fort Worth, Texas.

2. Exhibit I attached hereto is a map of a portion of the Square Lake Field in Eddy County, New Mexico. Among other acreage shown upon Exhibit I, Applicant is the operator of the Etz Federal Lease covering the South Half of the Southwest Quarter (S/2 SW/4) and the North Half of the Southeast Quarter (N/2 SE/4) of Section 19 and the Grier Lease in the North Half of the Southeast Quarter (N/2 SE/4) of Section 20, all in Township 16 South, Range 31 East. Applicant, Kennedy Oil Company (Kennedy), Newmont Oil Company (Newmont), and Murphy H. Baxter, an individual, are entering into co-operative lease-line waterflood injection agreements pertaining to the above described Anadarko leases and immediately adjacent area. These agreements contemplate that Anadarko will convert to injection wells the following described wells:

Anadarko Etz Federal No. 3 located in the Center of the Southwest Quarter of the Northeast Quarter of the Southeast Quarter (C SW NE SE), Section 19, and

Anadarko Grier No. 14 located in the Center of the Northeast Quarter of the Southeast Quarter (C NE SE), Section 20.

Kennedy Oil Company will convert to water injection wells the following:

Kennedy Carper Federal No. 2 located in the Center of the Northeast Quarter of the Southwest Quarter (C NE SW), Section 19, and

Kennedy Rowley Federal No. 1 located 1650 feet North of the South line and 1980 feet East of the West line of Section 20.

Newmont Oil Company will convert the following to a water injection well:

Vickers Federal No. 6 well located in the Center of the Southwest Quarter of the Southeast Quarter (C SW SE), Section 19.

Pursuant to a separate informal agreement with Applicant, Murphy H.

Baxter will convert the following to a water injection well:

Murphy Baxter Federal "A" No. 2 located in the Center of the Southeast Quarter of the Southeast Quarter (C SE SE), Section 20.

The purpose of such agreements is to provide for waterflood operations in the following formations in the Square Lake Field:

Zone 6 of the Grayburg, also known as the Premier Sand, and

Zone 8 of the San Andres, also known as the Lovington Sand.

Applicant understands Newmont, Kennedy and Murphy H. Baxter will each make whatever applications are necessary with respect to their obligations and proposed operations to complete this waterflood development.

3. Oil production from the wells in Sections 19 and 20 above referred to has declined to the point that the wells are in an advanced stage of depletion and are regarded as what is commonly referred to as "stripper" wells. Applicant believes, and therefore alleges, that waterflood operations as herein described will be in the interest of conservation of oil and the prevention of waste.

4. Waterflood operations of the South Half of the Southeast Quarter (S/2 SE/4) of Section 19 and the South Half of the Southwest Quarter (S/2 SW/4) of Section 20 and Sections 29 and 30 to the South were authorized and implemented by the following orders of this Commission: Order Nos. R-1110, R-1110-A, R-1110-B, R-1110-C, R-1110-D, R-1505, R-2064, R-2358, R-2752, R-2828, R-2920, R-2977, R-3217. Such previously authorized waterflood operations have demonstrated the engineering and economic feasibility of waterflooding the Premier and Lovington Sands.

5. Inasmuch as Applicant's leases in Sections 19 and 20 directly offset a capacity-type waterflood, Applicant requests that such leases be designated as a waterflood buffer zone.

6. Exhibit I shows the location of the proposed injection wells and all other wells within a two mile radius of Applicant's leases which are completed in the Premier and Lovington Sands. Exhibit II attached hereto is a land map of the subject area showing all wells, regardless of completion zone, and the lessees of record of such leases. Exhibits I and II together give the information required by Rule 701 B 1.

7. Exhibits III and IV attached hereto are Gamma Ray-Neutron and Density logs of Applicant's proposed injection wells, showing the stratigraphic position of the producing formations, as required by Rule 701 B 2.

8. Exhibit V attached hereto is a diagrammatic sketch of the proposed completion of both injection wells to be converted from producing status, as required by Rule 701 B 3. Exhibit V also gives other pertinent information required by Rule 701 B 4.

9. Exhibits VI and VII attached hereto are graphic representations of the anticipated waterflood performance with respect to Applicant's Etz and Grier leases above described.

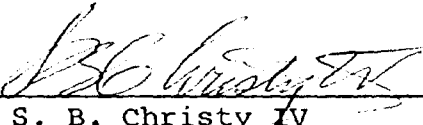
10. Applicant alleges that the proposed waterflood operation will prevent the premature abandonment of wells, will result in increased ultimate recovery of oil, and thus will prevent waste.

WHEREFORE, Applicant requests that the necessary notice be given and this matter be set for hearing, and that following such hearing the Commission approve the proposed waterflood operations in the Square Lake Field in Sections 19 and 20, Township 16 South, Range 31 East, Eddy County, New Mexico, as herein requested, and for such other and further relief as may seem just and equitable in the premises.

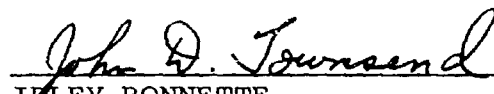
Respectfully submitted,

HINKLE, BONDURANT & CHRISTY

By

  
S. B. Christy IV

as a member of the firm  
Post Office Box 10  
Roswell, New Mexico 88201

  
IRLEY BONNETTE

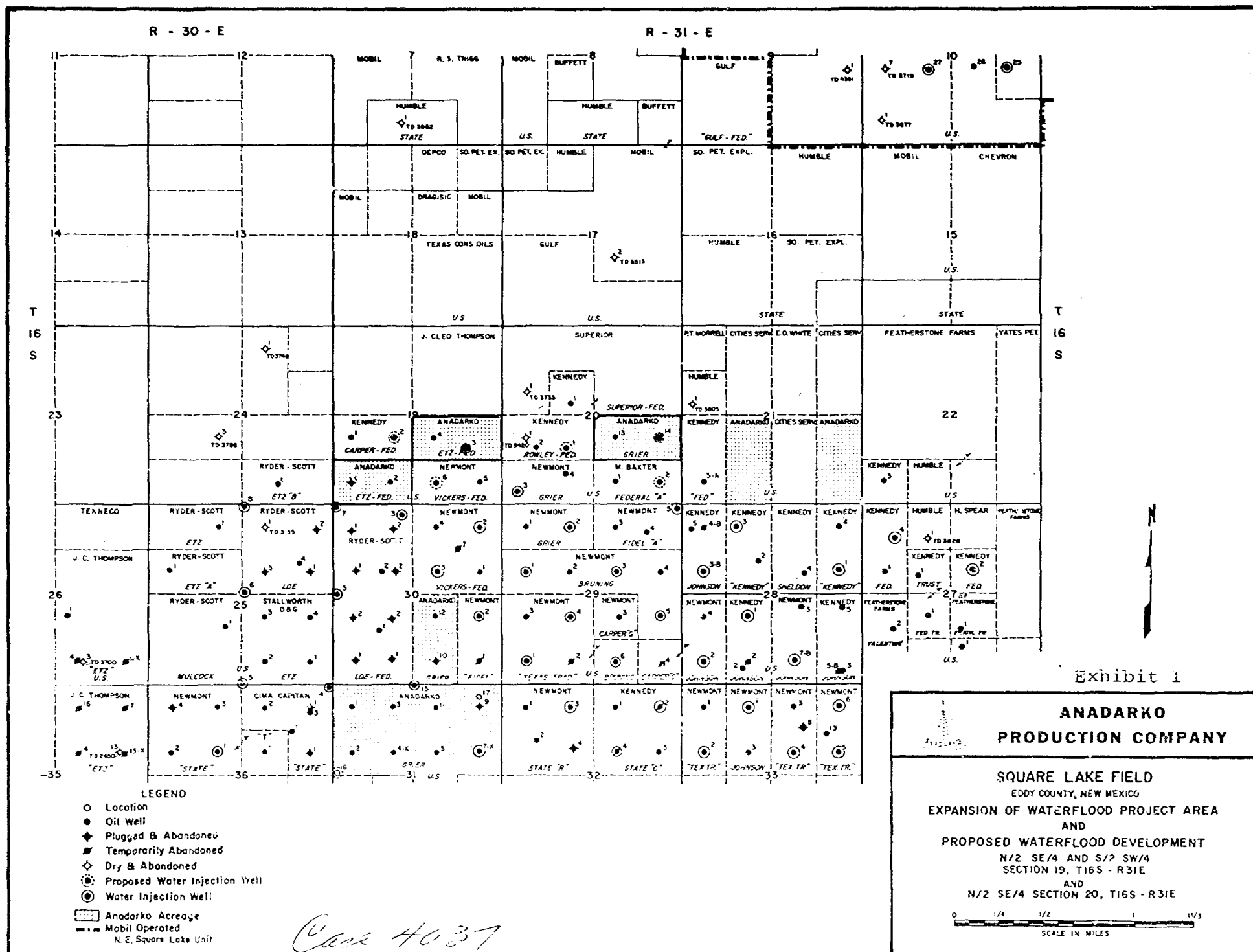
JOHN D. TOWNSEND

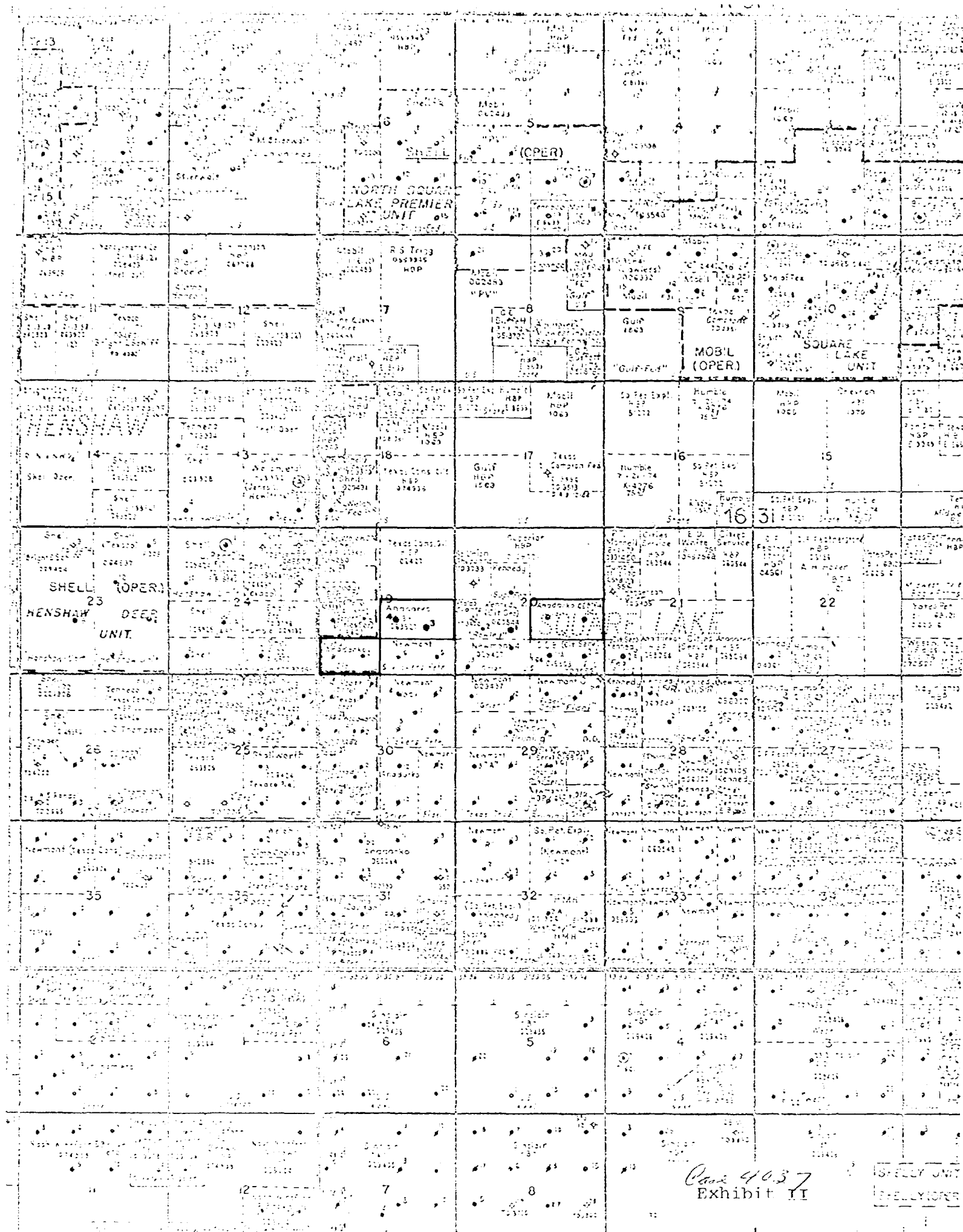
T. J. GUINAN

Post Office Box 9317

Fort Worth, Texas 76107

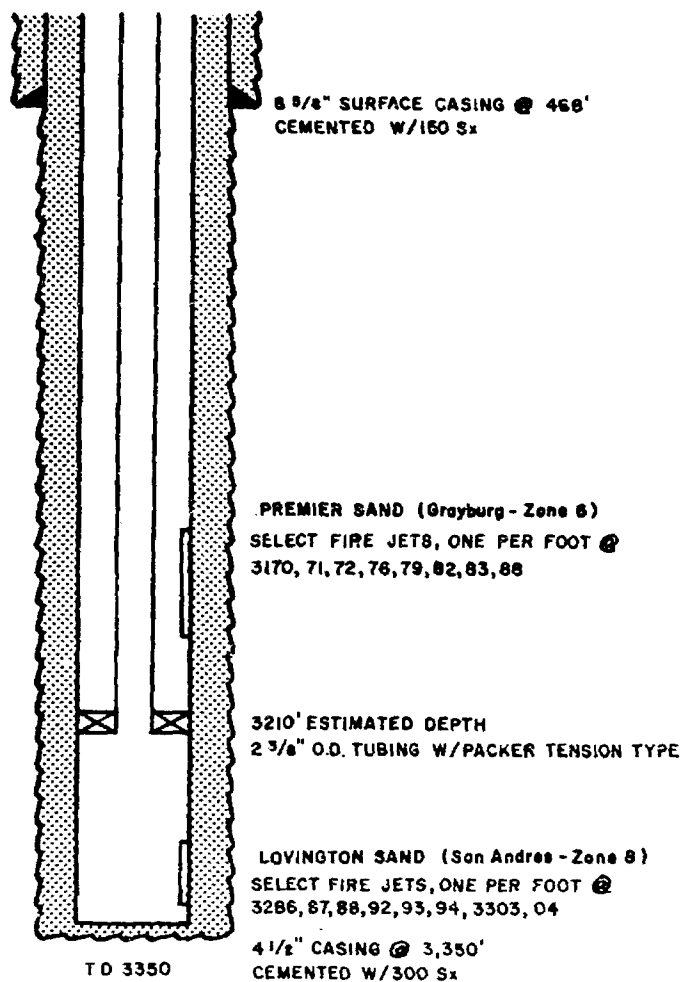
Attorneys for Applicant  
ANADARKO PRODUCTION COMPANY





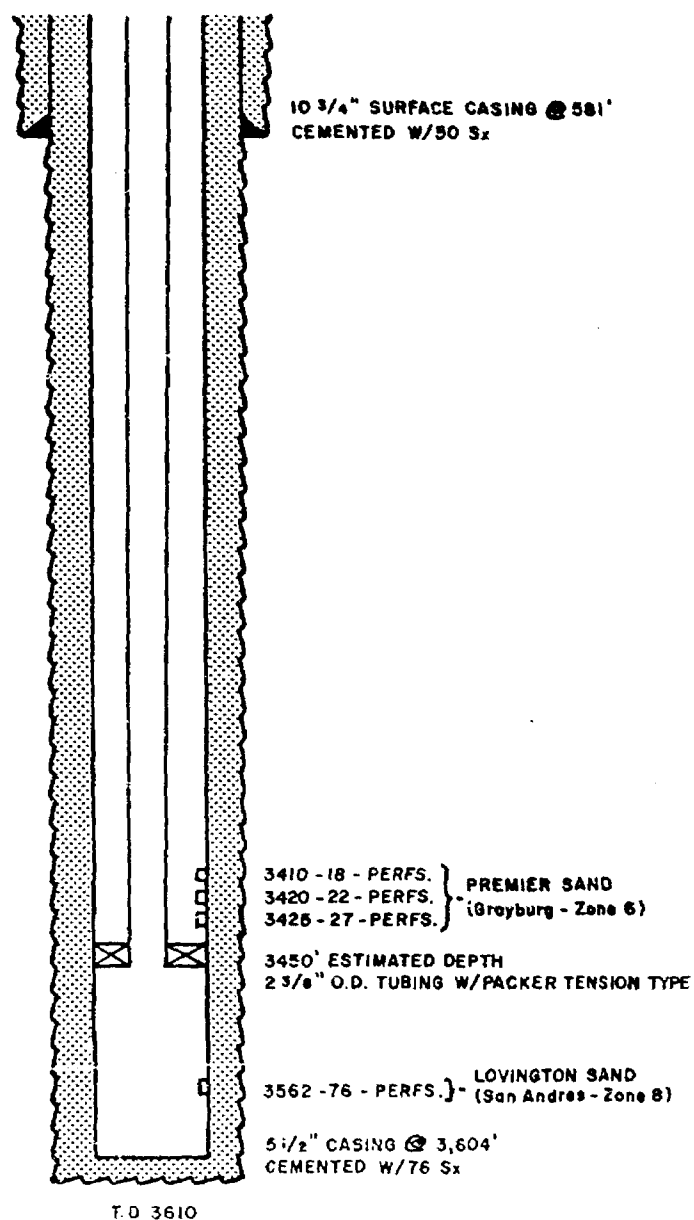
ANADARKO PRODUCTION CO.  
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SEC. 19 - T16S - R31E



ANADARKO PRODUCTION CO.  
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AND PRODUCED WATER. FRESH WATER  
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EST. 100 BPD Into LOVINGTON  
150 BPD Into PREMIER

Exhibit V



ANADARKO  
PRODUCTION COMPANY

SQUARE LAKE FIELD  
EDDY COUNTY, NEW MEXICO  
SCHEMATIC DIAGRAM  
OF  
WATER INJECTION WELL COMPLETIONS  
IN  
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N/2 SE/4 AND S/2 SW/4  
SECTION 19, T16S - R31E  
& N/2 SE/4 SECTION 20, T16S - R31E

*Page 4037*



DRAFT

GMH/esr

Feb. 11, 1969

BEFORE THE OIL CONSERVATION COMMISSION  
OF THE STATE OF NEW MEXICO

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

*A.P.* *Jan*  
APPLICATION OF ANADARKO PRODUCTION  
COMPANY FOR SEVERAL WATERFLOOD PROJ-  
ECTS AND WATERFLOOD BUFFER ZONES,  
EDDY COUNTY, NEW MEXICO.

*9da -  
no spec  
for repd  
can*  
CASE No. 4037

Order No. R- 3677  
*2-11-69*

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on February 5, 1969,  
at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this \_\_\_\_\_ day of February, 1969, 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, Anadarko Production Company, seeks  
authority to institute two waterflood projects in the Square Lake  
Pool by the injection of water into the Grayburg and San Andres  
formations by the conversion to water injection of its Etz Federal  
Well No. 3 and its Grier Well No. 14, located, respectively, in  
Sections 19 and 20 of Township 16 South, Range 31 East, NMPM,  
Eddy County, New Mexico.

(3) That the wells in the project areas are in an advanced  
state of depletion and should properly be classified as "stripper"  
wells.

(4) That the proposed waterflood projects should result in the recovery of otherwise unrecoverable oil, thereby preventing waste.

(5) That the applicant further proposes that the S/2 SW/4 and the N/2 SE/4 of said Section 19 be designated a waterflood buffer zone and that the N/2 SE/4 of said Section 20 be designated a waterflood buffer zone.

(6) That the S/2 SW/4 and the N/2 SE/4 of said Section 19 <sup>are</sup> ~~is~~ offset on the south, east, and southeast by capacity-type waterflood projects.

(7) That the N/2 SE/4 of said Section 20 is offset on the west, southwest, and southeast by capacity-type waterflood projects.

(8) That approval of the proposed buffer zones will afford the applicant the opportunity to produce its just and equitable share of the oil in the pool.

(9) That the subject application should be approved and the projects should be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations, provided however, that capacity allowables <sup>may</sup> ~~should~~ be assigned to the wells in the S/2 SW/4 and the N/2 SE/4 of said Section 19, and that capacity allowables <sup>may</sup> ~~should~~ be assigned to the wells in the N/2 SE/4 of said Section 20.

IT IS THEREFORE ORDERED:

(1) That the applicant, Anadarko Production Company, is hereby authorized to institute the two following waterflood projects in the Square Lake Pool by the injection of water into the Grayburg and San Andres formations through the following-described wells in Township 16 South, Range 31 East, NMPM, Eddy County, New Mexico:

Anadarko Square Lake Etz Waterflood Project

Injection well:

Anadarko Etz Federal Well No. 3 located in  
Unit I of Section 19

Anadarko Square Lake Grier No. 2 Waterflood Project

Injection well:

Anadarko Grier Well No. 14 located in Unit  
I of Section 20

(2) That the subject waterflood projects shall be governed by the provisions of Rules 701, 702, and 703 of the Commission Rules and Regulations, provided however, that the S/2 SW/4 and the N/2 SE/4 of said Section 19 is hereby designated a waterflood buffer zone and that the N/2 SE/4 of said Section 20 is hereby designated a waterflood buffer zone.

(3) That water can be injected and wells produced in each of the aforesaid buffer zones at rates comparable with the capacity-type waterflood projects offsetting each of said buffer zones and described in Findings Nos. (6) and (7) above.

(4) That monthly progress reports of the waterflood projects herein authorized shall be submitted to the Commission in accordance with Rules 704 and 1120 of the Commission Rules and Regulations.

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

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