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Attorneys at Law

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Jason Kellahin
Of Counsel

Santa Fé, New Mexico 87504-2265

Fax: 505/982-2047

July 25, 1989

Mr. William J. LeMay
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87501

RECEIVED

JUL 26 1989

OIL CONSERVATION DIVISION

Re: Application of Phillips Petroleum
Company for Amendment to Division
Order R-3668-A to Change the Previously
Approved Unorthodox Locations, and Add
the San Andres Formation Into its Carbon
Dioxide Waterflood Project, Lea County,
New Mexico

Case 9737

Dear Mr. LeMay:

On behalf of Phillips Petroleum Company, please find enclosed our application for approval of an amendment to Division Order R-3668-A to change the locations of the wells and to add the San Andres Formation, a previously approved waterflood project in the Maljamar Grayburg-San Andres Pool.

Phillips Petroleum Company seeks to drill the wells at amended unorthodox locations as follows:

Philmex Well No. 38 - 1,307' FSL and 1,245' FWL, Unit M
Philmex Well No. 39 - 1,478' FSL and 1,175' FWL, Unit L
Philmex Well No. 40 - 1,682' FSL and 1,090' FWL, Unit L
(All wells located in Section 26, T17S, R33E)

These well locations had to be changed as a high pressure NGL pipeline is located in the immediate Pilot area (plat attached).

Enclosed is an amended C-108 Application for Authority to inject for the subject case. All offset operators and surface owners remain the same.

We would appreciate this application being set for hearing at the next available examiner's docket now scheduled for August 23, 1989.

KELLAHIN, KELLAHIN and AUBREY

Mr. William J. LeMay
July 25, 1989
Page 2

By copy of this letter to all parties, we are notifying them by certified mail-return receipt, that they have the right to appear at the hearing, to make a statement to the Division, to present evidence and cross-examine witnesses either in support of or in opposition to the Application. Those parties are directed to contact the Division or the applicant's attorney to determine what additional rights they may have.

Very truly yours,



W. Thomas Kellahin

WTK/rs
Encl.

cc: William Mueller (Phillips-Odessa)

Certified Mail-Return Receipt to all parties listed on Exhibit D of the Application, w/encl

STATE OF NEW MEXICO
DEPARTMENT OF ENERGY, MINERALS AND NATURAL RESOURCES
OIL CONSERVATION DIVISION

APPLICATION OF PHILLIPS PETROLEUM
COMPANY FOR AMENDMENT TO DIVISION
ORDER R-3668-A TO CHANGE THE
PREVIOUSLY APPROVED UNORTHODOX
LOCATIONS, AND ADD THE SAN ANDRES
FORMATION INTO ITS CARBON DIOXIDE
FLOOD PROJECT, MALJAMAR GRAYBURG-
SAN ANDRES POOL, LEA COUNTY,
NEW MEXICO

RECEIVED

JUL 26 1989

OIL CONSERVATION DIVISION

CASE NO. 9737

A P P L I C A T I O N

COMES NOW PHILLIPS PETROLEUM COMPANY, by and through its attorneys, Kellahin, Kellahin and Aubrey, and applies to the New Mexico Oil Conservation Division for the Amendment of Division Order R-3668-A to add the San Andres formation into its previously approved Maljamar Grayburg-San Andres Carbon-Dioxide Waterflood project and to amend the unorthodox locations of its injection wells and two observation wells, Lea County, New Mexico and in support thereof would show:

1. Applicant, Phillips Petroleum Company, is the operator of the Maljamar Grayburg-San Andres Waterflood project for the "Philmex" Properties.

2. The Division Order R-3668 entered January 24, 1969 approved this project area for waterflood operations.

3. Division Order R-3668-A entered June 15, 1989, copy attached as Exhibit A, authorized injection of carbon dioxide into this waterflood project through the Philmex #38 Well, a new well to be drilled within the waterflood project at an unorthodox location 1440 feet FSL and 1340 feet FWL of Section 26, T17S, R33E, NMPM and two observation wells in close proximity to the Philmex #38 well as follows:

- a. Philmex Well #39, at an unorthodox location 1552 feet FSL and 1261 feet FWL of Section 26, and;
- b. Philmex Well #40, at an unorthodox location 1702 feet FSL and 1156 FWL of Section 26.

5. The Applicant now seeks to change the previously approved location to avoid a high pressure pipeline with the new unorthodox locations as shown on Exhibit B and as follows:

Philmex Well No. 38 - 1,307' FSL and 1,245' FWL, Unit M
Philmex Well No. 39 - 1,478' FSL and 1,175' FWL, Unit L
Philmex Well No. 40 - 1,682' FSL and 1,090' FWL, Unit L
(All wells located in Section 26, T17S, R33E)

6. In addition, the Applicant seeks to clarify Order R-3668-A to include the San Andres formation with the Grayburg formation.

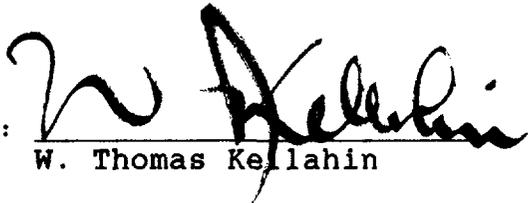
7. Division Form C-108 is attached hereto as Exhibit C and incorporated by reference herein as part of this application.

8. Notice has been provided to all parties shown on Exhibit D in accordance with Division Notice Rules.

9. Applicant seeks a Division Examiner hearing to be held on August 23, 1989 in Santa Fe, New Mexico.

WHEREFORE, applicant requests that after notice and hearing this application be granted as requested.

Respectfully submitted,

By: 
W. Thomas Kellahin

Kellahin, Kellahin & Aubrey
Post Office Box 2265
Santa Fe, New Mexico 87504

(505) 982-4285

STATE OF NEW MEXICO
ENERGY, MINERALS, AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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

CASE NO. 9678
Order No. R-3668-A

APPLICATION OF PHILLIPS PETROLEUM
COMPANY TO AMEND DIVISION ORDER
NO. R-3668 BY AUTHORIZING A CARBON
DIOXIDE PILOT PROJECT, LEA COUNTY,
NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 8:15 a.m. on May 24, 1989, at Santa Fe, New Mexico, before Examiner David R. Catanach.

NOW, on this 15th day of June, 1989, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS THAT:

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

(2) By Order No. R-3668, dated January 24, 1969, the Division authorized the applicant, Phillips Petroleum Company, to institute a waterflood project on its Philmex Lease, comprising all or portions of Sections 26, 27, 28, 34 and 35, Township 17 South, Range 33 East, NMPM, Lea County, New Mexico, by the injection of water into the Grayburg and San Andres formations, Maljamar Grayburg-San Andres Pool, through its Philmex Well No. 5 located in Unit N of said Section 27.

Exhibit A

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Order No. R-3668-A
Page -2-

(3) The applicant, Phillips Petroleum Company, seeks to amend said Order No. R-3668 to authorize the injection of carbon dioxide into said previously approved Maljamar Philmex Waterflood Project through its Philmex Well No. 38 to be drilled at an unorthodox location 1440 feet from the South line and 1340 feet from the West line (Unit K) of Section 26, Township 17 South, Range 33 East, NMPM, Lea County, New Mexico.

(4) The applicant further seeks authority to drill two observation wells at unorthodox locations in said Section 26 as follows: Philmex Well No. 39 to be drilled 1552 feet from the South line and 1261 feet from the West line (Unit L) and Philmex Well No. 40 to be drilled 1702 feet from the South line and 1156 feet from the West line (Unit L).

(5) The applicant proposes initially to inject carbon dioxide only into certain sand members of the Grayburg formation from a depth of approximately 4150 feet to 4500 feet.

(6) Except for the area surrounding the Philmex Well No. 5, the original water injection well in the project, the Philmex Lease, which comprises approximately 1680 acres, has not been subject to secondary recovery operations.

(7) The proposed carbon dioxide pilot project is of an experimental nature to determine the effectiveness of carbon dioxide injection in an area not previously subject to waterflooding, and is further designed to gather sufficient reservoir data to determine the feasibility of a full scale carbon dioxide injection project on the subject lease and on six of the applicant's offsetting leases which comprise some 8600 acres.

(8) Testimony by the applicant further indicates that reservoir conditions within the Maljamar Grayburg-San Andres Pool in this area are especially conducive at the present time to carbon dioxide injection.

(9) The proposed pilot project will occur well within the boundaries of the applicant's Philmex Lease, and as such, will not impair correlative rights.

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Order No. R-3668-A
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(10) The producing wells within the Philmex Lease are currently marginally productive, with average production approximately 10 barrels of oil per day.

(11) Approval of the proposed pilot project and unorthodox well locations will allow the applicant to determine the effectiveness of carbon dioxide injection as well as the feasibility of full scale carbon dioxide injection, which, if successful, may ultimately result in the recovery of a substantial amount of otherwise unrecoverable oil, thereby preventing waste.

(12) The applicant further requested the establishment of an administrative procedure whereby the subject pilot project may be expanded by placing additional wells on production and/or injection.

(13) In order for the Division to properly assess the effectiveness of the subject pilot project and potential for waste, said pilot project should be expanded only after notice and hearing.

(14) The injection should be accomplished through 2 3/8-inch plastic-lined tubing installed in a packer set at approximately 4050 feet; the casing-tubing annulus should be filled with an inert fluid; and a pressure gauge or approved leak-detection device should be attached to the annulus in order to determine leakage in the casing, tubing, or packer.

(15) Prior to commencing injection operations, the casing in the subject well should be pressure-tested throughout the interval from the surface down to the proposed packer-setting depth, to assure the integrity of such casing.

(16) The injection well or system should be equipped with a pressure-limiting switch or other acceptable device which will limit the wellhead pressure on the injection well to no more than 1700 psi, provided, however, that the applicant should be required to conduct a step-rate injection test prior to injection in order to accurately determine the fracture pressure of the Grayburg formation.

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Order No. R-3668-A
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(17) The Director of the Division should be authorized to administratively approve an increase in the injection pressure upon a proper showing by the operator that such higher pressure will not result in migration of the injected waters from the Grayburg and San Andres formations.

(18) The operator should notify the supervisor of the Hobbs district office of the Division of the date and time of the installation of injection equipment, of the initial step-rate injection test, and of the mechanical integrity pressure-test in order that the same may be witnessed.

(19) The operator should take all steps necessary to ensure that the injected carbon dioxide enters only the proposed injection interval and is not permitted to escape to other formations or at the surface.

(20) Inasmuch as the proposed application has no direct bearing on Division Order No. R-3668, said order should not be amended at this time and therefore all provisions contained in said order should remain in full force and effect.

IT IS THEREFORE ORDERED THAT:

(1) The applicant, Phillips Petroleum Company, is hereby authorized to initiate and conduct a pilot carbon dioxide injection project in its previously approved Maljamar Philmex Waterflood Project, by the injection of carbon dioxide into the Grayburg formation, Maljamar Grayburg-San Andres Pool, through its Philmex Well No. 38 to be drilled at an unorthodox location 1440 feet from the South line and 1340 feet from the West line (Unit K) of Section 26, Township 17 South, Range 33 East, NMPM, Lea County, New Mexico.

(2) The applicant is further authorized to drill two observation wells at unorthodox locations in said Section 26 as follows: Philmex Well No. 39 to be drilled 1552 feet from the South line and 1261 feet from the West line (Unit L) and Philmex Well No. 40 to be drilled 1702 feet from the South line and 1156 feet from the West line (Unit L).

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Order No. R-3668-A
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(3) The tubing in the Philmex Well No. 38 shall be internally plastic-lined; the casing-tubing annulus shall be filled with an inert fluid; and a pressure gauge shall be attached to the annulus or the annulus shall be equipped with an approved leak-detection device in order to determine leakage in the casing, tubing, and/or packer.

(4) Prior to commencing injection operations, the casing in the subject well shall be pressure-tested to assure the integrity of such casing in a manner that is satisfactory to the supervisor of the Division's district office at Hobbs.

(5) The injection well or system shall be equipped with a pressure-limiting switch or other acceptable device which will limit the wellhead pressure on the injection well to no more than 1700 psi, provided that prior to injection, the applicant shall conduct a step-rate injection test to accurately determine the fracture pressure of the Grayburg formation.

(6) The Director of the Division may authorize an increase in injection pressure upon a proper showing by the operator of said well that such higher pressure will not result in migration of the injected carbon dioxide from the Grayburg formation.

(7) The operator shall notify the supervisor of the Hobbs district office of the Division of the date and time of the installation of disposal equipment, of the initial step rate injection test, and of the mechanical integrity pressure test in order that the same may be witnessed.

(8) The operator shall immediately notify the supervisor of the Division's Hobbs district office of the failure of the tubing, casing, or packer, in said well or the leakage of carbon dioxide from or around said well and shall take such steps as may be timely and necessary to correct such failure or leakage.

(9) The subject project shall be known as the Maljamar Philmex Pilot CO2 Injection Project, and the initial project area shall consist of the SW/4 of said Section 26.

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Order No. R-3668-A
Page -6-

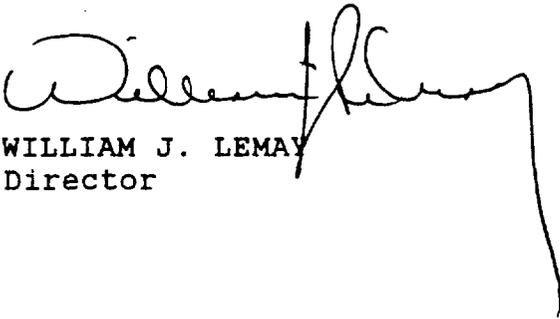
(10) The pilot project area may be expanded by placing additional wells on production and/or carbon dioxide injection only after notice and hearing.

(11) The subject pilot project shall be governed by the provisions of Rules 701 through 708 of the Division Rules and Regulations, and the operator shall submit monthly reports to the Division in accordance with Rules 706 and 1115.

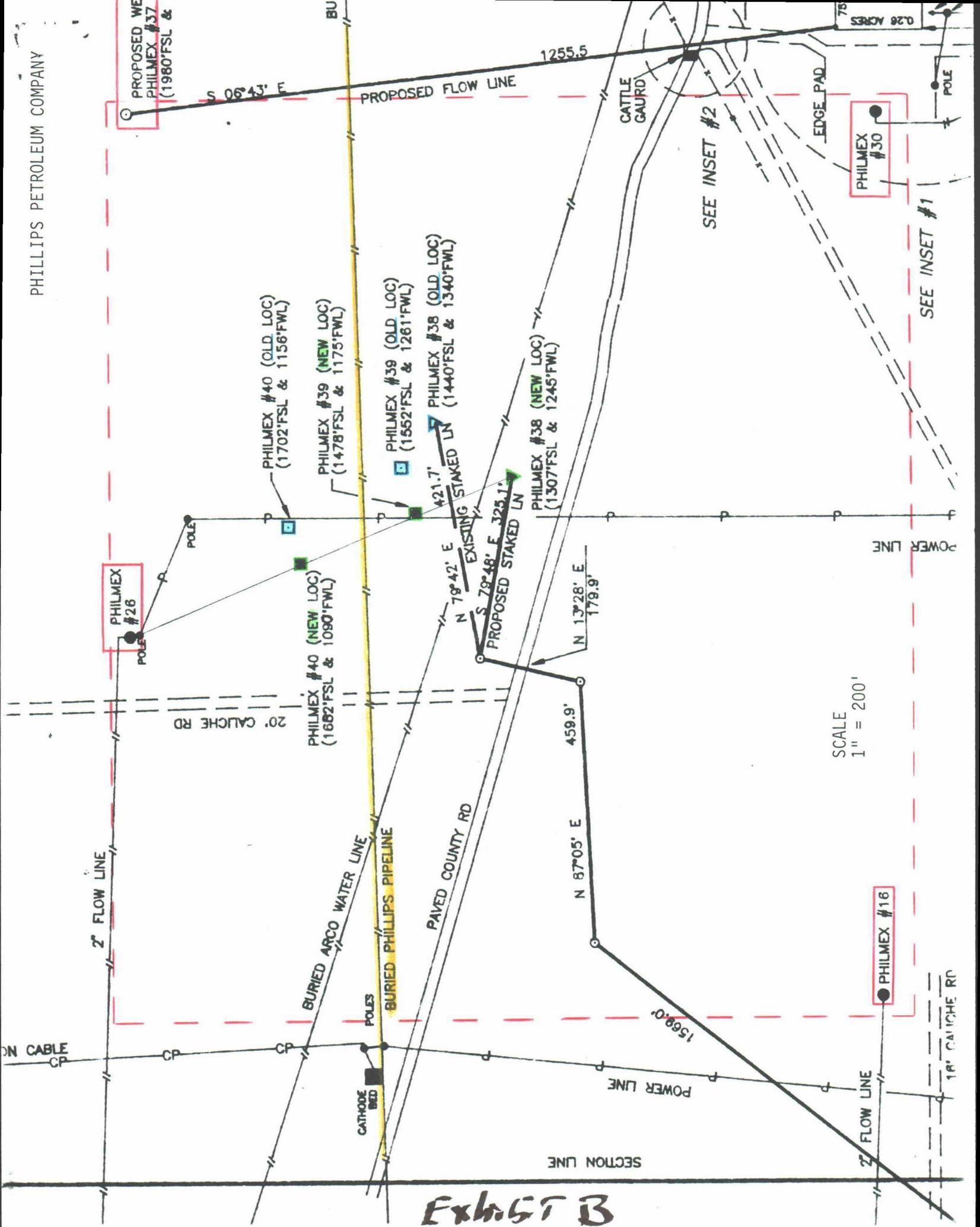
(12) Jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

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

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION


WILLIAM J. LEMAY
Director

S E A L



SCALE
1" = 200'

Exhibit B

Case 9737

APPLICATION FOR AUTHORIZATION TO INJECT

I. Purpose: Secondary Recovery Pressure Maintenance Disposal Storage
Application qualifies for administrative approval? yes no

II. Operator: Phillips Petroleum Company

Address: 4001 Penbrook, Odessa, TX 79762

Contact party: L. M. Sanders Phone: 367-1488

III. Well data: Complete the data required on the reverse side of this form for each well proposed for injection. Additional sheets may be attached if necessary.

IV. Is this an expansion of an existing project? yes no
If yes, give the Division order number authorizing the project _____.

V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.

* VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.

VII. Attach data on the proposed operation, including:

1. Proposed average and maximum daily rate and volume of fluids to be injected;
2. Whether the system is open or closed;
3. Proposed average and maximum injection pressure;
4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and
5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).

*VIII. Attach appropriate geological data on the injection zone including appropriate lithologic detail, geological name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such source known to be immediately underlying the injection interval.

IX. Describe the proposed stimulation program, if any.

* X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division they need not be resubmitted.)

* XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.

XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground source of drinking water.

XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.

XIV. Certification

revised

I hereby certify that the information submitted with this/application is true and correct to the best of my knowledge and belief.

Name: William J. Mueller Title Reservoir Eng. Supervisor

Signature: [Signature] Date: 17 July 1989

* If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be duplicated and resubmitted. Please show the date and circumstance of the earlier submittal. CASE NO. 9678 (Order No. R-3668-A)

Hearing on May 24, 1989

DISTRIBUTION: Original and one copy to Santa Fe with one copy to the appropriate Division district office.

Exhibit C

Application for Authorization to Inject

**PHILLIPS PETROLEUM COMPANY
PHILMEX WELL NO. 38**

III. WELL DATA

(See Attachment No. 1 - Wellbore Schematic)

A. Injection Well

1. Name and Location Philmex Well Number 38
1307' FSL and 1245' FWL
Section 26, T-17-S, R-33-E
Lea County, New Mexico
2. Casing
 Surface: 8 - 5/8" OD, 24#, K-55 set at 1480'
 (12 - 1/4" hole). To be cemented with
 1000 sxs Class C; calculated TOC** at
 surface (circulate).

 Production: 5 - 1/2" OD, 15.5#, K-55 set at 4800'
 (7 - 7/8" hole). To be cemented with
 1300 sxs Class C; calculated TOC** at
 surface (circulate).
3. Tubing: 2 - 3/8" OD, 8rd EUE, J-55 set 100'
 above top perforation (internally
 plastic coated).
4. Packer: Guiberson Uni-Pac VI Retrievable Packer
 set 100' above top perforation.

Observation Wells

1. Names and Locations: Philmex Well Number 39
1478' FSL and 1175' FWL
Section 26, T-17-S, R-33-E
Lea County, New Mexico

 Philmex Well Number 40
1682' FSL and 1090' FWL
Section 26, T-17-S, R-33-E
Lea County, New Mexico
2. Casing
 Surface: 9 - 5/8" OD, 32.3#, H-40 set at 1480'
 (12 - 1/4" hole). To be cemented with
 800 sxs Class C; calculated TOC** at
 surface (circulate).

 Production: 5 - 1/2" OD, 15.5#, J-55 set at 4050' **AND**
 5 - 1/2" OD fiberglass from 4050' to
 4850' (8 - 1/2" hole). To be cemented
 based on caliper + 30% excess.

NOTE: two observation wells will be drilled in close proximity to injection well

** actual TOCs will be reported on Form C-105

Application for Authorization to Inject

**PHILLIPS PETROLEUM COMPANY
PHILMEX WELL NO. 38**

III. WELL DATA (con't)

- B.
1. Formation: Maljamar (Grayburg/San Andres)
 2. Interval: 4130' - 4530'***
 3. Original Intent: Well drilled for CO₂ injection.
 4. Perforated Intervals: no other perforated intervals; no bridge plugs in wellbore
 5. Productive Zones Higher: Queen - 3770'
(1 1/2 miles southwest)
Lower: Corbin Abo Reef - 8200'
(1 1/4 miles south)

V. AREA OF REVIEW

(See Attachments No. 2 and 3 - Project Map and Detail Map)

VII. PROPOSED CO₂ INJECTION OPERATIONS

1. CO₂ Rates: estimated average - 400 mcfpd
estimated maximum - 500 mcfpd
2. System: closed
3. Pressures: average - 1400 psi
maximum - 1700 psi
4. Fluid: CO₂ source from McElmo Dome in Colorado; transported by Shell in the Cortez line and by Big Three in the Llano pipeline. Compatibility with receiving formation is evidenced by Phillips Petroleum East Vacuum Unit and Conoco's MCA (respectively, six miles east and west of Philmex lease).

*** actual perforations will be reported on Form C-105

Application for Authorization to Inject

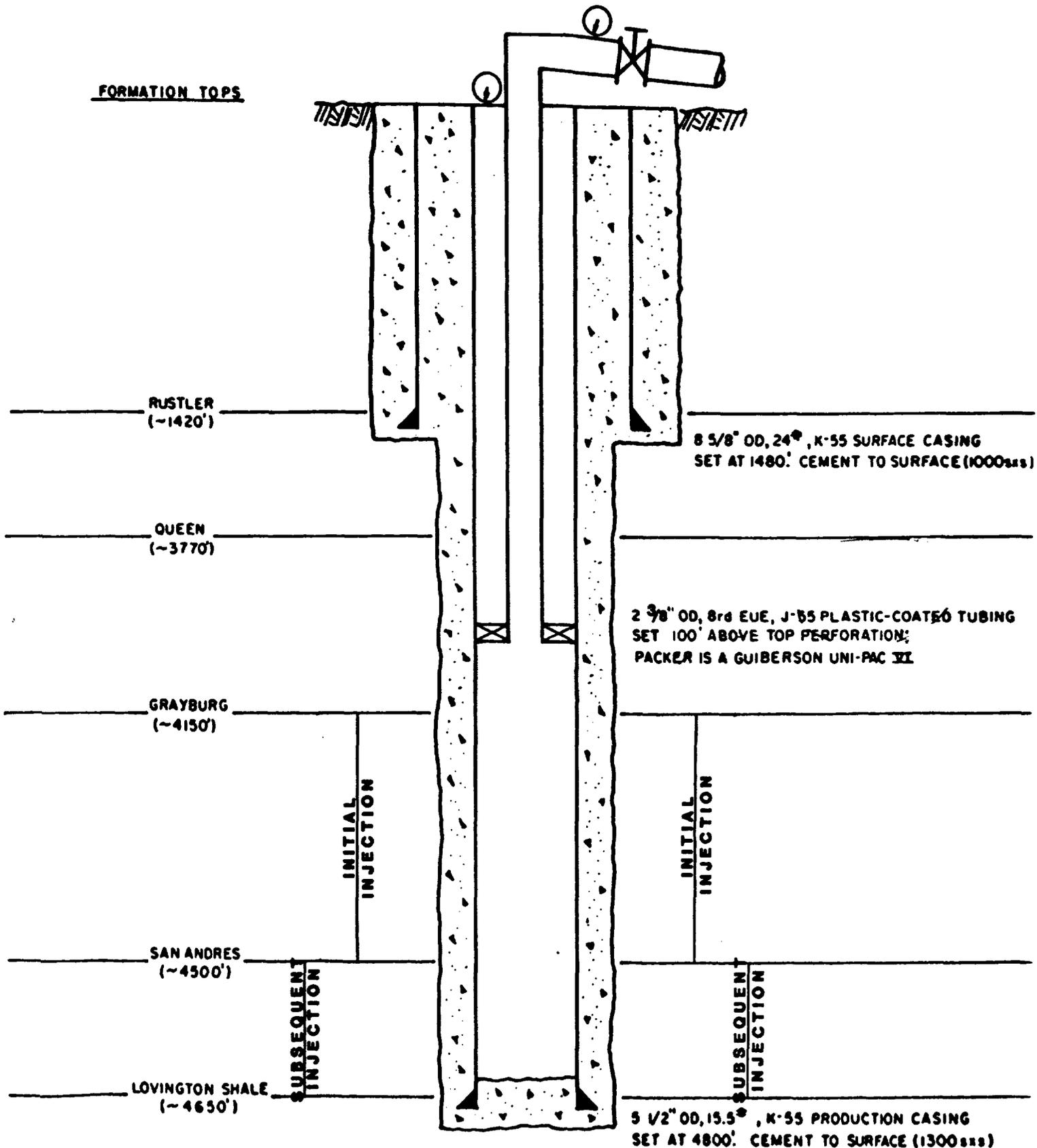
PHILLIPS PETROLEUM COMPANY
PHILMEX WELL NO. 38

IX. PROPOSED STIMULATION PROGRAM

After perforation, well will be acidized with 15% NEFE HCl and fractured with 60-Quality CO₂ Foam. Exact sand volumes will be determined after well logs are available.

PROPOSED INJECTION WELL SCHEMATIC

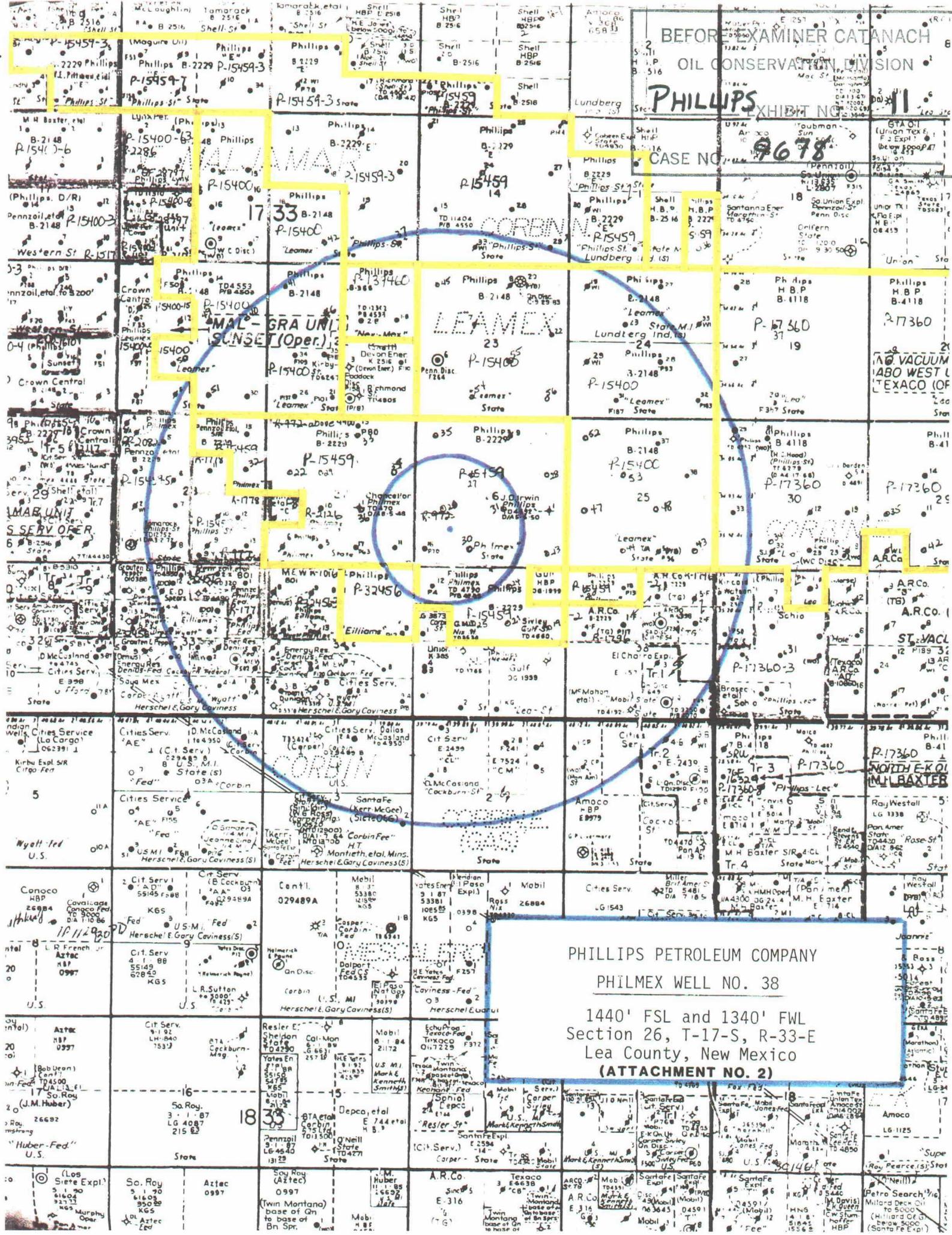
PHILLIPS PETROLEUM COMPANY
PHILMEX WELL NUMBER 38
1307' FSL & 1245' FWL
SECTION 26, T-17-S, R-33-E
LEA COUNTY, NEW MEXICO



BEFORE EXAMINER CATANACH
OIL CONSERVATION DIVISION

PHILIPS EXHIBIT NO. 11

CASE NO. 9678

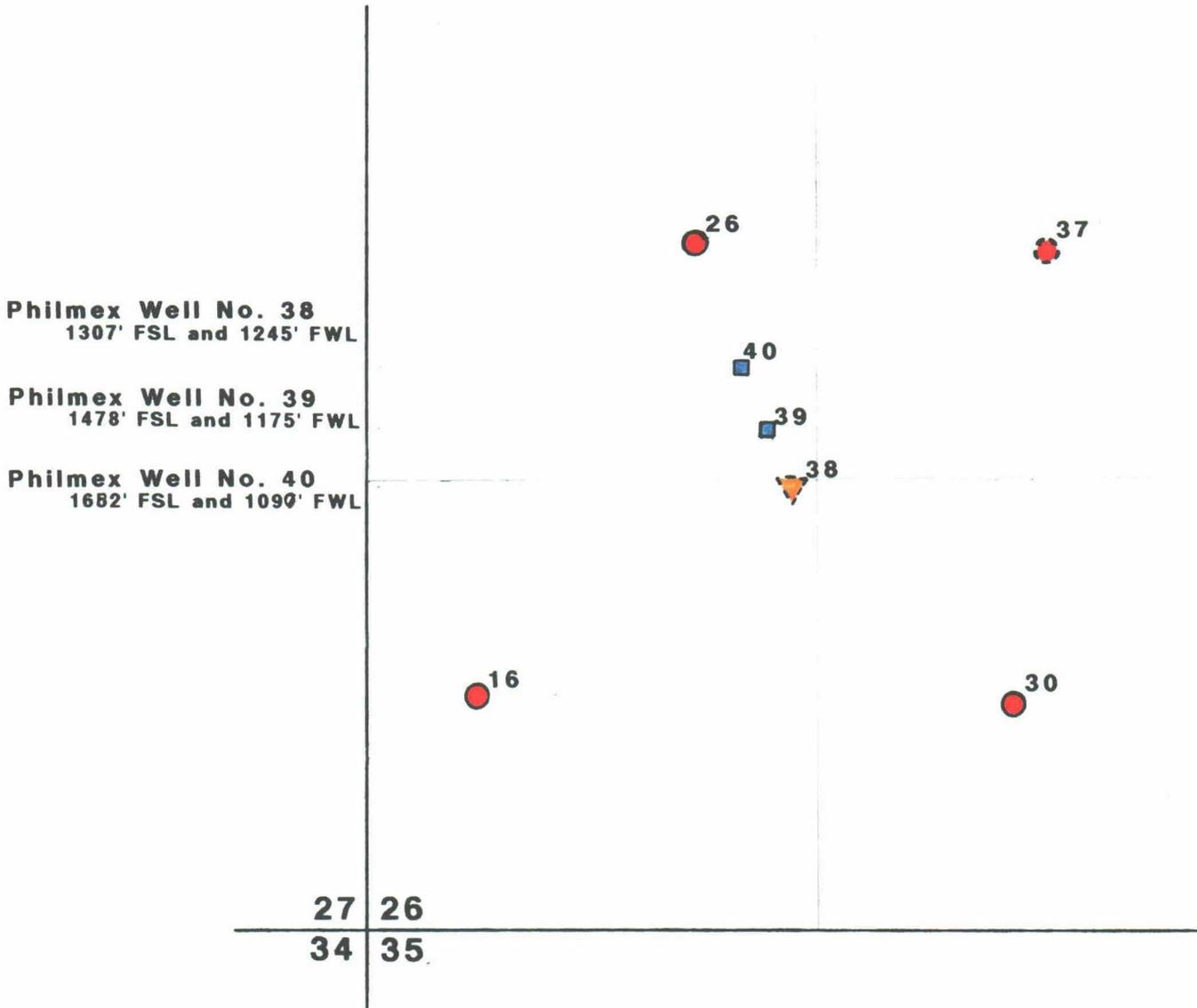


PHILLIPS PETROLEUM COMPANY
PHILMEX WELL NO. 38

1440' FSL and 1340' FWL
Section 26, T-17-S, R-33-E
Lea County, New Mexico
(ATTACHMENT NO. 2)

MALJAMAR CO₂ PILOT PROJECT

MALJAMAR GRAYBURG/SAN ANDRES FIELD



40 ACRE 5-SPOT
PHILMEX LEASE
SW/4 SEC 26-17S-33E
LEA COUNTY, NEW MEXICO

 **OBSERVATION WELL**
 **TO BE DRILLED**

Exhibit "D"

The following are the surface owners and offset operator within one-half mile radius of our proposed Philmex Well No. 38.

Offset Operator

Harvey E. Yates
P. O. Box 1933
Roswell, NM 88202
(SW NW Sec 35, 17S, 33E)

Surface Owner

The State of New Mexico
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, NM 87504-1148

KELLAHIN, KELLAHIN and AUBREY

Attorneys at Law

W. Thomas Kellahin
Karen Aubrey

El Patio - 117 North Guadalupe
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Jason Kellahin
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Fax: 505/982-2047

July 25, 1989

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We would appreciate this application being set for hearing at the next available examiner's docket now scheduled for August 23, 1989.

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Very truly yours,

A handwritten signature in black ink, appearing to read 'W. Thomas Kellahin', written in a cursive style.

W. Thomas Kellahin

WTK/rs
Encl.

cc: William Mueller (Phillips-Odessa)

Certified Mail-Return Receipt to all parties listed on Exhibit D of the Application, w/encl

STATE OF NEW MEXICO
DEPARTMENT OF ENERGY, MINERALS AND NATURAL RESOURCES
OIL CONSERVATION DIVISION

APPLICATION OF PHILLIPS PETROLEUM COMPANY FOR AMENDMENT TO DIVISION ORDER R-3668-A TO CHANGE THE PREVIOUSLY APPROVED UNORTHODOX LOCATIONS, AND ADD THE SAN ANDRES FORMATION INTO ITS CARBON DIOXIDE FLOOD PROJECT, MALJAMAR GRAYBURG-SAN ANDRES POOL, LEA COUNTY, NEW MEXICO

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CASE NO. 9737

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WHEREFORE, applicant requests that after notice and hearing this application be granted as requested.

Respectfully submitted,

By: 
W. Thomas Kellahin

Kellahin, Kellahin & Aubrey
Post Office Box 2265
Santa Fe, New Mexico 87504

(505) 982-4285

STATE OF NEW MEXICO
ENERGY, MINERALS, AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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

CASE NO. 9678
Order No. R-3668-A

APPLICATION OF PHILLIPS PETROLEUM
COMPANY TO AMEND DIVISION ORDER
NO. R-3668 BY AUTHORIZING A CARBON
DIOXIDE PILOT PROJECT, LEA COUNTY,
NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 8:15 a.m. on May 24, 1989, at Santa Fe, New Mexico, before Examiner David R. Catanach.

NOW, on this 15th day of June, 1989, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS THAT:

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

(2) By Order No. R-3668, dated January 24, 1969, the Division authorized the applicant, Phillips Petroleum Company, to institute a waterflood project on its Philmex Lease, comprising all or portions of Sections 26, 27, 28, 34 and 35, Township 17 South, Range 33 East, NMPM, Lea County, New Mexico, by the injection of water into the Grayburg and San Andres formations, Maljamar Grayburg-San Andres Pool, through its Philmex Well No. 5 located in Unit N of said Section 27.

Exhibit A

(3) The applicant, Phillips Petroleum Company, seeks to amend said Order No. R-3668 to authorize the injection of carbon dioxide into said previously approved Maljamar Philmex Waterflood Project through its Philmex Well No. 38 to be drilled at an unorthodox location 1440 feet from the South line and 1340 feet from the West line (Unit K) of Section 26, Township 17 South, Range 33 East, NMPM, Lea County, New Mexico.

(4) The applicant further seeks authority to drill two observation wells at unorthodox locations in said Section 26 as follows: Philmex Well No. 39 to be drilled 1552 feet from the South line and 1261 feet from the West line (Unit L) and Philmex Well No. 40 to be drilled 1702 feet from the South line and 1156 feet from the West line (Unit L).

(5) The applicant proposes initially to inject carbon dioxide only into certain sand members of the Grayburg formation from a depth of approximately 4150 feet to 4500 feet.

(6) Except for the area surrounding the Philmex Well No. 5, the original water injection well in the project, the Philmex Lease, which comprises approximately 1680 acres, has not been subject to secondary recovery operations.

(7) The proposed carbon dioxide pilot project is of an experimental nature to determine the effectiveness of carbon dioxide injection in an area not previously subject to waterflooding, and is further designed to gather sufficient reservoir data to determine the feasibility of a full scale carbon dioxide injection project on the subject lease and on six of the applicant's offsetting leases which comprise some 8600 acres.

(8) Testimony by the applicant further indicates that reservoir conditions within the Maljamar, Grayburg-San Andres Pool in this area are especially conducive at the present time to carbon dioxide injection.

(9) The proposed pilot project will occur well within the boundaries of the applicant's Philmex Lease, and as such, will not impair correlative rights.

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(10) The producing wells within the Philmex Lease are currently marginally productive, with average production approximately 10 barrels of oil per day.

(11) Approval of the proposed pilot project and unorthodox well locations will allow the applicant to determine the effectiveness of carbon dioxide injection as well as the feasibility of full scale carbon dioxide injection, which, if successful, may ultimately result in the recovery of a substantial amount of otherwise unrecoverable oil, thereby preventing waste.

(12) The applicant further requested the establishment of an administrative procedure whereby the subject pilot project may be expanded by placing additional wells on production and/or injection.

(13) In order for the Division to properly assess the effectiveness of the subject pilot project and potential for waste, said pilot project should be expanded only after notice and hearing.

(14) The injection should be accomplished through 2 3/8-inch plastic-lined tubing installed in a packer set at approximately 4050 feet; the casing-tubing annulus should be filled with an inert fluid; and a pressure gauge or approved leak-detection device should be attached to the annulus in order to determine leakage in the casing, tubing, or packer.

(15) Prior to commencing injection operations, the casing in the subject well should be pressure-tested throughout the interval from the surface down to the proposed packer-setting depth, to assure the integrity of such casing.

(16) The injection well or system should be equipped with a pressure-limiting switch or other acceptable device which will limit the wellhead pressure on the injection well to no more than 1700 psi, provided, however, that the applicant should be required to conduct a step-rate injection test prior to injection in order to accurately determine the fracture pressure of the Grayburg formation.

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(17) The Director of the Division should be authorized to administratively approve an increase in the injection pressure upon a proper showing by the operator that such higher pressure will not result in migration of the injected waters from the Grayburg and San Andres formations.

(18) The operator should notify the supervisor of the Hobbs district office of the Division of the date and time of the installation of injection equipment, of the initial step-rate injection test, and of the mechanical integrity pressure-test in order that the same may be witnessed.

(19) The operator should take all steps necessary to ensure that the injected carbon dioxide enters only the proposed injection interval and is not permitted to escape to other formations or at the surface.

(20) Inasmuch as the proposed application has no direct bearing on Division Order No. R-3668, said order should not be amended at this time and therefore all provisions contained in said order should remain in full force and effect.

IT IS THEREFORE ORDERED THAT:

(1) The applicant, Phillips Petroleum Company, is hereby authorized to initiate and conduct a pilot carbon dioxide injection project in its previously approved Maljamar Philmex Waterflood Project, by the injection of carbon dioxide into the Grayburg formation, Maljamar Grayburg-San Andres Pool, through its Philmex Well No. 38 to be drilled at an unorthodox location 1440 feet from the South line and 1340 feet from the West line (Unit K) of Section 26, Township 17 South, Range 33 East, NMPM, Lea County, New Mexico.

(2) The applicant is further authorized to drill two observation wells at unorthodox locations in said Section 26 as follows: Philmex Well No. 39 to be drilled 1552 feet from the South line and 1261 feet from the West line (Unit L) and Philmex Well No. 40 to be drilled 1702 feet from the South line and 1156 feet from the West line (Unit L).

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(3) The tubing in the Philmex Well No. 38 shall be internally plastic-lined; the casing-tubing annulus shall be filled with an inert fluid; and a pressure gauge shall be attached to the annulus or the annulus shall be equipped with an approved leak-detection device in order to determine leakage in the casing, tubing, and/or packer.

(4) Prior to commencing injection operations, the casing in the subject well shall be pressure-tested to assure the integrity of such casing in a manner that is satisfactory to the supervisor of the Division's district office at Hobbs.

(5) The injection well or system shall be equipped with a pressure-limiting switch or other acceptable device which will limit the wellhead pressure on the injection well to no more than 1700 psi, provided that prior to injection, the applicant shall conduct a step-rate injection test to accurately determine the fracture pressure of the Grayburg formation.

(6) The Director of the Division may authorize an increase in injection pressure upon a proper showing by the operator of said well that such higher pressure will not result in migration of the injected carbon dioxide from the Grayburg formation.

(7) The operator shall notify the supervisor of the Hobbs district office of the Division of the date and time of the installation of disposal equipment, of the initial step rate injection test, and of the mechanical integrity pressure test in order that the same may be witnessed.

(8) The operator shall immediately notify the supervisor of the Division's Hobbs district office of the failure of the tubing, casing, or packer, in said well or the leakage of carbon dioxide from or around said well and shall take such steps as may be timely and necessary to correct such failure or leakage.

(9) The subject project shall be known as the Maljamar Philmex Pilot CO2 Injection Project, and the initial project area shall consist of the SW/4 of said Section 26.

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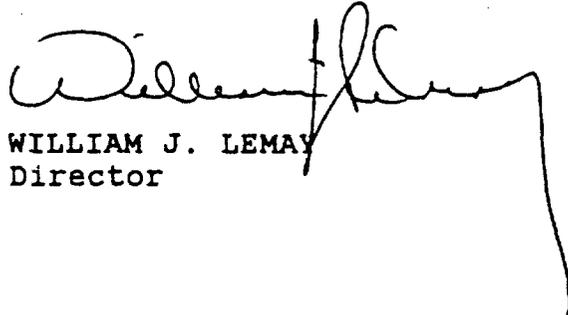
(10) The pilot project area may be expanded by placing additional wells on production and/or carbon dioxide injection only after notice and hearing.

(11) The subject pilot project shall be governed by the provisions of Rules 701 through 708 of the Division Rules and Regulations, and the operator shall submit monthly reports to the Division in accordance with Rules 706 and 1115.

(12) 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



WILLIAM J. LEMAY
Director

S E A L

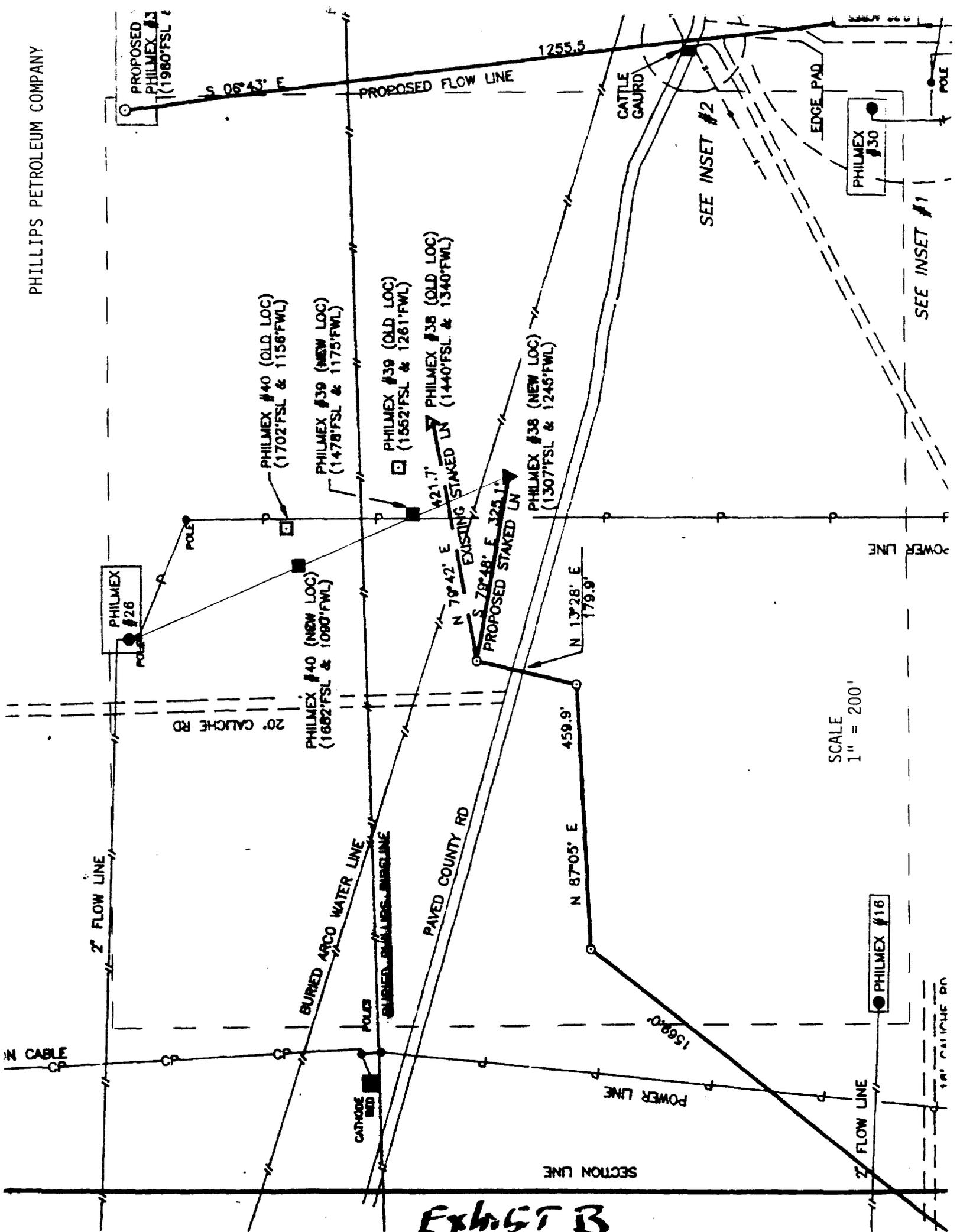


Exhibit B

Case 9737

APPLICATION FOR AUTHORIZATION TO INJECT

- I. Purpose: Secondary Recovery Pressure Maintenance Disposal Storage
Application qualifies for administrative approval? yes no
- II. Operator: Phillips Petroleum Company
Address: 4001 Penbrook, Odessa, TX 79762
Contact party: L. M. Sanders Phone: 367-1488
- III. Well data: Complete the data required on the reverse side of this form for each well proposed for injection. Additional sheets may be attached if necessary.
- IV. Is this an expansion of an existing project? yes no
If yes, give the Division order number authorizing the project _____
- V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.
- * VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.
- VII. Attach data on the proposed operation, including:
 1. Proposed average and maximum daily rate and volume of fluids to be injected;
 2. Whether the system is open or closed;
 3. Proposed average and maximum injection pressure;
 4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and
 5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).
- *VIII. Attach appropriate geological data on the injection zone including appropriate lithologic detail, geological name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such source known to be immediately underlying the injection interval.
- IX. Describe the proposed stimulation program, if any.
- * X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division they need not be resubmitted.)
- * XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.
- XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground source of drinking water.
- XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.
- XIV. Certification

revised

I hereby certify that the information submitted with this/application is true and correct to the best of my knowledge and belief.

Name: William J. Mueller Title Reservoir Eng. Supervisor

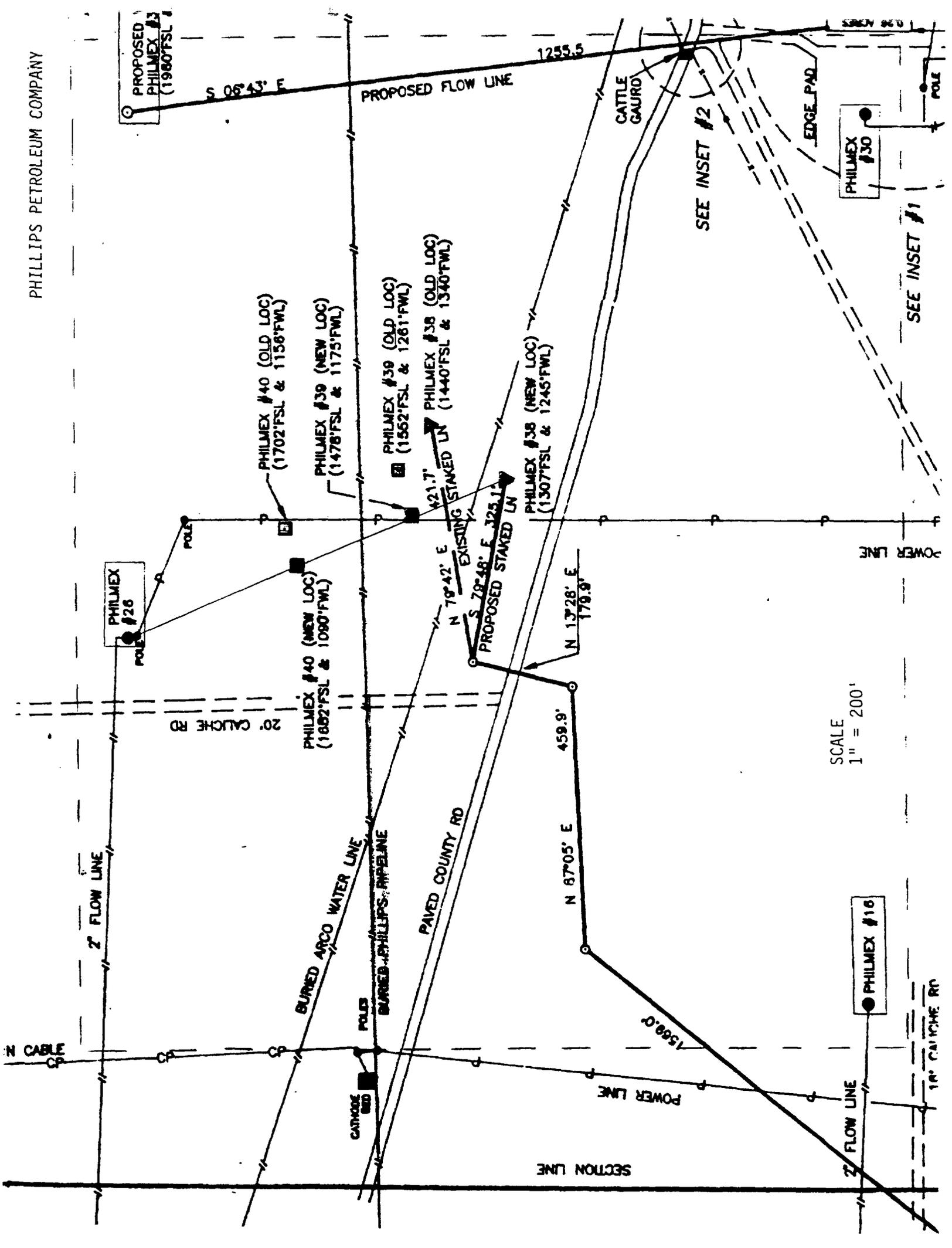
Signature: *[Signature]* Date: 17 July 1989

- * If the information (required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be duplicated and resubmitted. Please show the date and circumstance of the earlier submittal. CASE NO. 9678 (Order No. R-3668-A)

Hearing on May 24, 1989

DISTRIBUTION: Original and one copy to Santa Fe with one copy to the appropriate Division district office.

Exhibit C



Application for Authorization to Inject

**PHILLIPS PETROLEUM COMPANY
PHILMEX WELL NO. 38**

III. WELL DATA

(See Attachment No. 1 - Wellbore Schematic)

A. Injection Well

1. Name and Location Philmex Well Number 38
1307' FSL and 1245' FWL
Section 26, T-17-S, R-33-E
Lea County, New Mexico
2. Casing
 Surface: 8 - 5/8" OD, 24#, K-55 set at 1480'
 (12 - 1/4" hole). To be cemented with
 1000 sxs Class C; calculated TOC** at
 surface (circulate).

 Production: 5 - 1/2" OD, 15.5#, K-55 set at 4800'
 (7 - 7/8" hole). To be cemented with
 1300 sxs Class C; calculated TOC** at
 surface (circulate).
3. Tubing: 2 - 3/8" OD, 8rd KUE, J-55 set 100'
 above top perforation (internally
 plastic coated).
4. Packer: Guiberson Uni-Pac VI Retrievable Packer
 set 100' above top perforation.

Observation Wells

1. Names and Locations: Philmex Well Number 39
1478' FSL and 1175' FWL
Section 26, T-17-S, R-33-E
Lea County, New Mexico

 Philmex Well Number 40
1682' FSL and 1090' FWL
Section 26, T-17-S, R-33-E
Lea County, New Mexico
2. Casing
 Surface: 9 - 5/8" OD, 32.3#, H-40 set at 1480'
 (12 - 1/4" hole). To be cemented with
 800 sxs Class C; calculated TOC** at
 surface (circulate).

 Production: 5 - 1/2" OD, 15.5#, J-55 set at 4050' **AND**
 5 - 1/2" OD fiberglass from 4050' to
 4850' (8 - 1/2" hole). To be cemented
 based on caliper + 30% excess.

NOTE: two observation wells will be drilled in close proximity to injection well

** actual TOCs will be reported on Form C-105

Application for Authorization to Inject

PHILLIPS PETROLEUM COMPANY
PHILMEX WELL NO. 38

III. WELL DATA (con't)

- B.
1. Formation: Maljamar (Grayburg/San Andres)
 2. Interval: 4130' - 4530'***
 3. Original Intent: Well drilled for CO₂ injection.
 4. Perforated Intervals: no other perforated intervals; no bridge plugs in wellbore
 5. Productive Zones
Higher: Queen - 3770'
(1 1/2 miles southwest)
Lower: Corbin Abo Reef - 8200'
(1 1/4 miles south)

V. AREA OF REVIEW

(See Attachments No. 2 and 3 - Project Map and Detail Map)

VII. PROPOSED CO₂ INJECTION OPERATIONS

1. CO₂ Rates: estimated average - 400 mcfpd
estimated maximum - 500 mcfpd
2. System: closed
3. Pressures: average - 1400 psi
maximum - 1700 psi
4. Fluid: CO₂ source from McElmo Dome in Colorado; transported by Shell in the Cortez line and by Big Three in the Llano pipeline. Compatibility with receiving formation is evidenced by Phillips Petroleum East Vacuum Unit and Conoco's MCA (respectively, six miles east and west of Philmex lease).

*** actual perforations will be reported on Form C-105

Application for Authorization to Inject

PHILLIPS PETROLEUM COMPANY
PHILMEX WELL NO. 38

IX. PROPOSED STIMULAION PROGRAM

After perforation, well will be acidized with 15% NEFE HCl and fractured with 60-Quality CO₂ Foam. Exact sand volumes will be determined after well logs are available.

PROPOSED INJECTION WELL SCHEMATIC

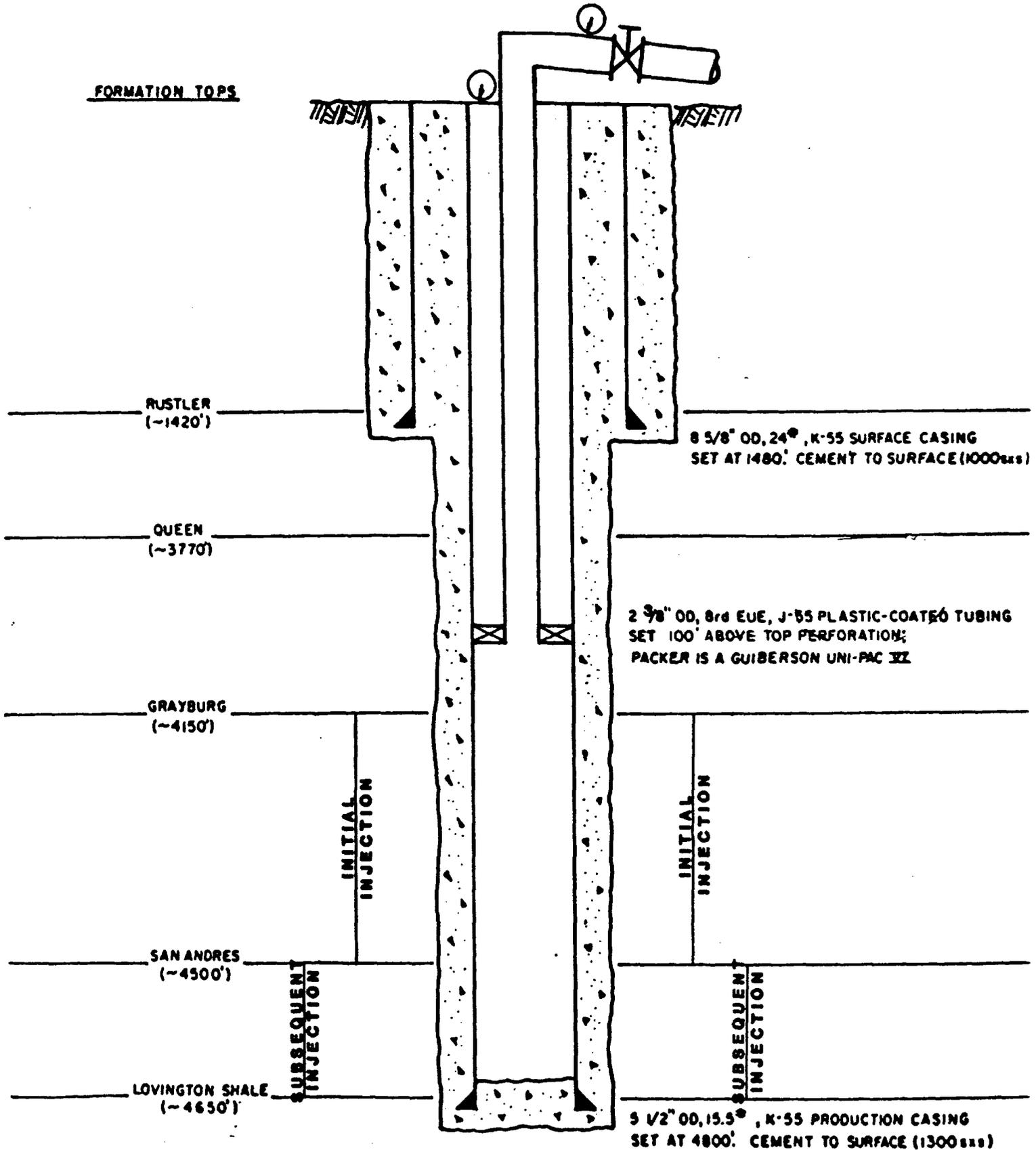
PHILLIPS PETROLEUM COMPANY

PHILMEX WELL NUMBER 38

1307' FSL & 1245' FWL

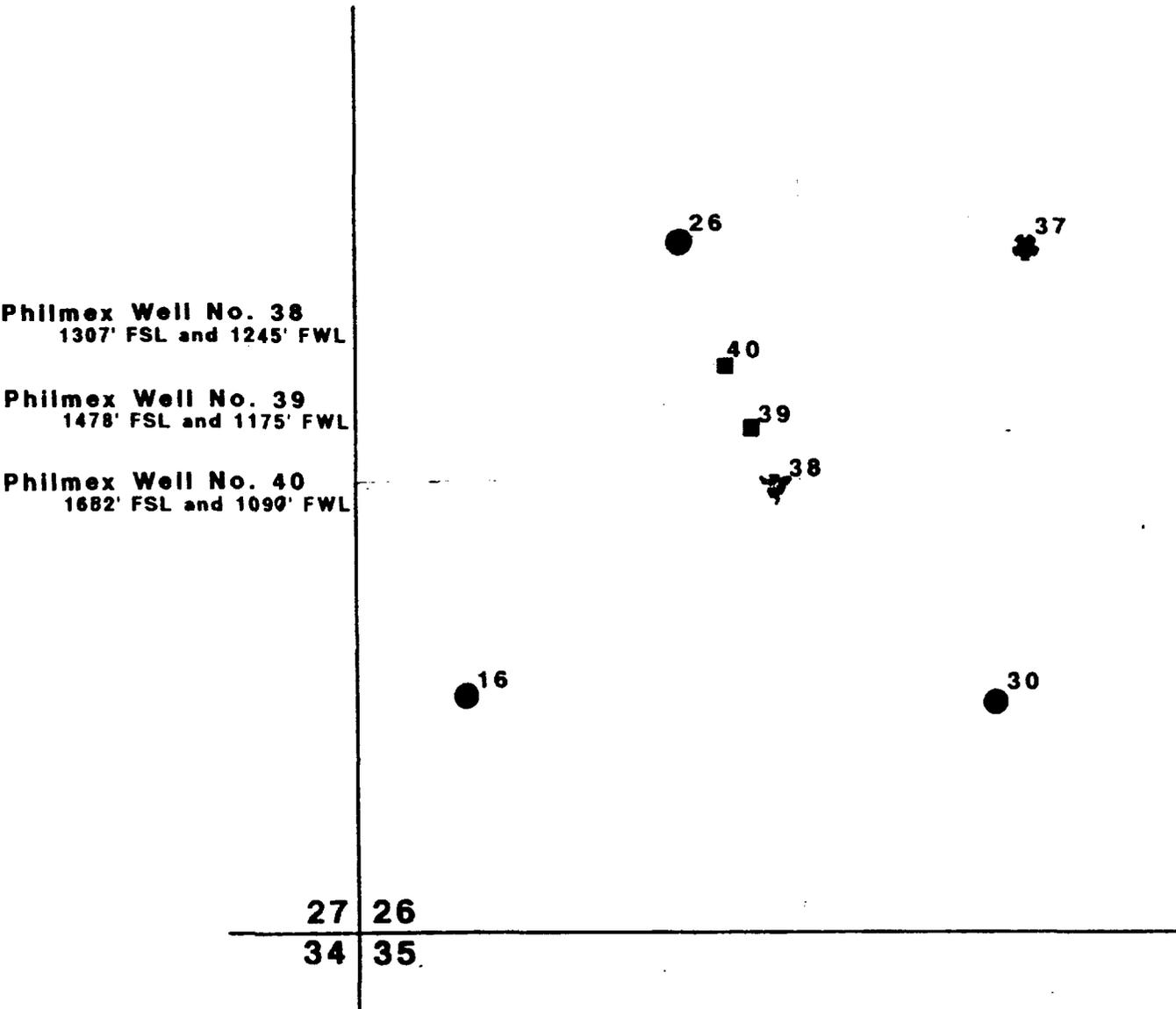
SECTION 26, T-17-S, R-33-E

LEA COUNTY, NEW MEXICO



MALJAMAR CO₂ PILOT PROJECT

MALJAMAR GRAYBURG/SAN ANDRES FIELD



**40 ACRE 5-SPOT
PHILMEX LEASE
SW/4 SEC 26-17S-33E
LEA COUNTY, NEW MEXICO**

■ OBSERVATION WELL
- - - TO BE DRILLED

Exhibit "D"

The following are the surface owners and offset operator within one-half mile radius of our proposed Philmex Well No. 38.

Offset Operator

Harvey E. Yates
P. O. Box 1933
Roswell, NM 88202
(SW NW Sec 35, 17S, 33E)

Surface Owner

The State of New Mexico
Commissioner of Public Lands
P. O. Box 1148
Santa Fe, NM 87504-1148