STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION
P. O. Box 2088
SANTA FE, NEW MEXICO
87501

ADMINISTRATIVE ORDER
NFL 12

INFILL DRILLING FINDINGS AND WELL-SPACING WAIVER
MADE PURSUANT TO SECTION 271.305(b) OF THE
FEDERAL ENERGY REGULATORY COMMISSION REGULATIONS,
NATURAL GAS POLICY ACT OF 1978 AND OIL CONSERVATION DIVISION
ORDER NO. R-6013

I.

Operator Conoco Inc. Well Name and No. SEMU Eumont Well No. 111

Location: Unit K Sec. 26 Twp. 20S Rng. 37E Cty. Lea

II.

THE DIVISION FINDS:

(1) That Section 271.305(b) of the Federal Energy Regulatory Commission Interim Regulations promulgated pursuant to the Natural Gas Policy Act of 1978 provides that, in order for an infill well to qualify as a new onshore production well under Section 103 of said Act, the Division must find, prior to the commencement of drilling, that the well is necessary to effectively and efficiently drain a portion of the reservoir covered by the proration unit which cannot be so drained by any existing well within that unit, ~~and must grant a waiver of existing well spacing requirements.~~

(2) That by Order No. R-6013, dated June 7, 1979, the Division established an administrative procedure whereby the Division Director and the Division Examiners are empowered to act for the Division and find that an infill well is necessary.

(3) That the well for which a finding is sought is to be completed in the Eumont Gas Pool, and the standard spacing unit in said pool is 640 acres.

(4) That a 400 -acre proration unit comprising the W/2 and W/2 SE/4 of Sec. 26, Twp. 20S, Rng. 37E, is currently dedicated to the SEMU Eumont Well No. 91 located in Unit C of said section.

(5) That this proration unit is ( ) standard (X) nonstandard; if nonstandard, said unit was previously approved by Order No. NSP-970.

(6) That said proration unit is not being effectively and efficiently drained by the existing well(s) on the unit.

(7) That the drilling and completion of the well for which a finding is sought should result in the production of an additional 168 M MCF of gas from the proration unit which would not otherwise be recovered.

(8) That all the requirements of Order No. R-6013 have been complied with, and that the well for which a finding is sought is necessary to effectively and efficiently drain a portion of the reservoir covered by said proration unit which cannot be so drained by any existing well within the unit.

(9) That in order to permit effective and efficient drainage of said proration unit, the subject application should be approved ~~as an exception to the standard well spacing requirements for the pool.~~

IT IS THEREFORE ORDERED:

(1) That the applicant is hereby authorized to drill the well described in Section I above as an infill well on the existing proration unit described in Section II(4) above. The authorization for infill drilling granted by this order ~~is an exception to applicable well spacing requirements and~~ is necessary to permit the drainage of a portion of the reservoir covered by said proration unit which cannot be effectively and efficiently drained by any existing well thereon.

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

DONE at Santa Fe, New Mexico, on this 31st day of January, 19 80.

DIVISION DIRECTOR + EXAMINER

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION
P. O. Box 2088
SANTA FE, NEW MEXICO
87501

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ORDER NO. R-6013

I.

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Location: Unit K Sec. 26 Twp. 20S Rng. 37E Cty. Lea

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(2) That by Order No. R-6013, dated June 7, 1979, the Division established an administrative procedure whereby the Division Director and the Division Examiners are empowered to act for the Division and find that an infill well is necessary.

(3) That the well for which a finding is sought is to be completed in the Eumont Queen Gas Pool, and the standard spacing unit in said pool is 640 acres.

(4) That a 400 -acre proration unit comprising the W/2 and W/2SE/4 of Sec. 26, Twp. 20S, Rng. 37E, is currently dedicated to the SEMU Eumont Well No 91 located in Unit C of said section.

(5) That this proration unit is ( ) standard (X) nonstandard; if nonstandard, said unit was previously approved by Order No. NSP970.

(6) That said proration unit is not being effectively and efficiently drained by the existing well(s) on the unit.

(7) That the drilling and completion of the well for which a finding is sought should result in the production of an additional 168 MMCF of gas from the proration unit which would not otherwise be recovered.

(8) That all the requirements of Order No. R-6013 have been complied with, and that the well for which a finding is sought is necessary to effectively and efficiently drain a portion of the reservoir covered by said proration unit which cannot be so drained by any existing well within the unit.

(9) That in order to permit effective and efficient drainage of said proration unit, the subject application should be approved ~~as an exception to the standard well spacing requirements for the pool~~.

IT IS THEREFORE ORDERED:

(1) That the applicant is hereby authorized to drill the well described in Section I above as an infill well on the existing proration unit described in Section II(4) above. The authorization for infill drilling granted by this order ~~is an exception to applicable well spacing requirements and~~ is necessary to permit the drainage of a portion of the reservoir covered by said proration unit which cannot be effectively and efficiently drained by any existing well thereon.

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

DONE at Santa Fe, New Mexico, on this _____ day of _____, 19_____.

DIVISION DIRECTOR ___ EXAMINER ___

L. P. Thompson
Division Manager

John R. Kemp
Assistant Division Manager

Production Department
Hobbs Division
North American Production

Conoco Inc.
P. O. Box 460
1001 North Turner
Hobbs, NM 88240
(505) 393-4141

NFL-12
1-31-80

January 8, 1980

Oil Conservation Division of the New Mexico
Department of Energy and Minerals
P.O. Box 2088
Santa Fe, New Mexico 87501

RE: Application for Administrative Approval
Natural Gas Policy Act Infill Finding
SEMU Eumont No. 111 - Eumont Gas Pool
1650' FSL & 2310' FWL, Sec. 26, T-20S, R-37E
Lea County, New Mexico

Attention: Mr. R. Stamets

Additional copies of the subject application for infill finding have been sent by certified mail, in accordance with rule No. 11 under Order No. R-6013, to the following offset operators:

Gulf Oil Corporation
P.O. Box 670
Hobbs, New Mexico 88240

Petro Lewis Corporation
P.O. Box 2250
Denver, CO 80202

Yours very truly,

John R Kemp

John R. Kemp

REM/dlb

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR
LARRY KEHOE
SECRETARY

January 4, 1980

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

Conoco Inc.
P. O. Box 460
Hobbs, New Mexico 88240

Re: Application for NGPA Infill Well
Findings Under Provisions of
Order No. R-6013 SEMU Eumont
Well No. 111, Eumont Gas Pool,
Lea County, New Mexico

We may not process the subject application for infill findings until the required information, forms, or plats checked on the reverse side of this letter are submitted.

Sincerely,

R. L. STAMETS
Technical Support Chief

RLS/dr

- [ ] A copy of Form C-101 must be submitted.
- [ ] A copy of Form C-102 must be submitted.
- [ ] The pool name must be shown.
- [ ] The standard spacing unit size for the pool must be shown.
- [ ] Give the Division Order No. which granted the non-standard proration unit.
- [ ] Please state whether or not the well has been spudded and give the spud date, if any.
- [ ] Information relative to other wells on the proration unit is incomplete. _____

_____

_____

_____

- [ ] The geologic and reservoir data is incomplete or insufficient.

_____

_____

_____

_____

- [X] Other:

There must be a statement that the offset operators were notified of the application by certified or registered mail.

L. P. Thompson
Division Manager

John R. Kemp
Assistant Division Manager

Production Department
Hobbs Division
North American Production

Conoco Inc.
P. O. Box 460
1001 North Turner
Hobbs, NM 88240
(505) 393-4141

December 17, 1979

Oil Conservation Division of the New
Mexico Department of Energy & Minerals
P.O. Box 2088
Santa Fe, New Mexico 87501

Gentlemen:

Application for Administrative Approval - Natural Gas Policy Act Infill Finding - SEMU Eumont No. 111 - Eumont Gas Pool - 1650 FSL & 2310 FWL, Sec. 26, T-20S, R-37E, Lea County, New Mexico

Conoco Inc. respectfully requests certification of the need for a second well on the previously approved 400-acre proration unit to effectively and efficiently drain Eumont Pool gas reserves that will not be drained by the existing well in this unit. In accordance with special rules and regulations set forth under Order No. R-6013, the following information is submitted in support of our proposal:

1. Copies of Forms 9-331 (C-101) and C-102 for all Eumont gas wells in the established proration unit are attached.

2. The SEMU Eumont No. 111 will be completed in the Eumont gas Pool which has a standard proration unit of 640 acres.

3. The 400-acre proration unit on which the SEMU Eumont No. 111 will be located was established under Order No. NSP 970.

4. The SEMU Eumont No. 111 has not been spudded.

5. One well, the SEMU Eumont No. 91, located 660' FNL and 1980' FWL of Sec. 26, T-20S, R-37E, has been drilled in the proration unit. This well was spudded on 5-18-74 and completed 6-15-74 in the Eumont Gas Pool. The well tested at a rate of 218 MCFGPD on 9-17-79.

6. A structure map on the top of the Penrose member of the Queen formation is attached, showing the proposed location.

7. The western half of our Southeast Monument Unit is located on the extreme eastern flank of the Eumont Gas Pool. The

Eumont pay zones thin toward the edge of the pool and become increasingly anhydritic with corresponding decreases in porosity and permeability. Conoco's SEMU Eumont Nos. 91, 93, and 98 have been drilled and completed on the eastern flank of the Eumont Gas Pool within the past five years. Logs of these three recently drilled wells show a number of low permeability sand stringers that are correlative between the wells and extend throughout this portion of the pool. Copies of these log sections are attached as Exhibits Nos. 1 - 3.

These low permeability pay intervals are shown on the dual laterologs of these three wells, by high resistivities and by stacking of the curves. An average of 18 feet of these tighter sands was encountered in the SEMU Eumont Nos. 91, 93, and 98 as indicated by the arrows on the dual laterologs in Exhibits Nos. 1 - 3.

The more permeable sand intervals are being adequately drained with the current well spacing on the Southeast Monument Unit. However, the effective drainage radius of the low permeability intervals is considerably smaller and the efficient drainage of this portion of the pay zone will require a denser well spacing to recover existing reserves from these tight sands.

The contrast in the drainage efficiency of the tight and more permeable intervals is controlled primarily by the following parameters:

Tight Sands	More Permeable Sands
k = .00003 darcies	k = .029 darcies
ϕ = 11%	ϕ = 14%
h = 18 feet	h = 47 feet

(k and ϕ values were obtained from core analysis on our SEMU Eumont No. 68)

It is anticipated that an infill well in this part of the Eumont Pool will have a 10 year life and that the maximum drainage radius attained in the tight pay will be 1180 feet, representing an areal extent of 100 acres.

Reservoir pressure at the proposed infill locations should be 350 psi in the more permeable pay and is conservatively estimated at 700 psi in the tight pay intervals. Volumetric calculations, utilizing a 100 acre drainage area, 18 feet of tight pay, and a 300 psi abandonment

pressure in the tight pay, show that 168 MMCF of additional gas reserves will be recovered from these low permeability sands that will not be effectively drained by the existing wells on the wider spacing. These calculations are included as Exhibit No. 4.

A copy of this application has been sent to the following offset operators.

Gulf Oil Corporation
P. O. Box 670
Hobbs, New Mexico 88240

Petro Lewis Corporation
P. O. Box 2250
Denver, CO 80202

Yours very truly,

John R Kemp

JWH-JS

CC: U. S. G. S. - Hobbs

ARCO-Hobbs
Amoco-Hobbs
Amoco-Houston
Chevron-Midland

3

NEW MEXICO OIL CONSERVATION COMMISSION
WELL LOCATION AND ACREAGE DEDICATION PLAT

Form C-102
Supersedes C-128
Effective 1-1-65

All distances must be from the outer boundaries of the Section.

Operator: Continental Oil		Lease: SEMU EUMONT		Well No. 91
Unit Letter: C	Section: 26	Township: T-20S	Range: 37-E	County: LEA
Actual Footage Location of Well: 660 feet from the north line and 1980 feet from the WEST line				
Ground Level Elev.: 3515	Producing Formation: EUMONT GAS	Pool: EUMONT QUEEN		Dedicated Acreage: 400 Acres

1. Outline the acreage dedicated to the subject well by colored pencil or hachure marks on the plat below.

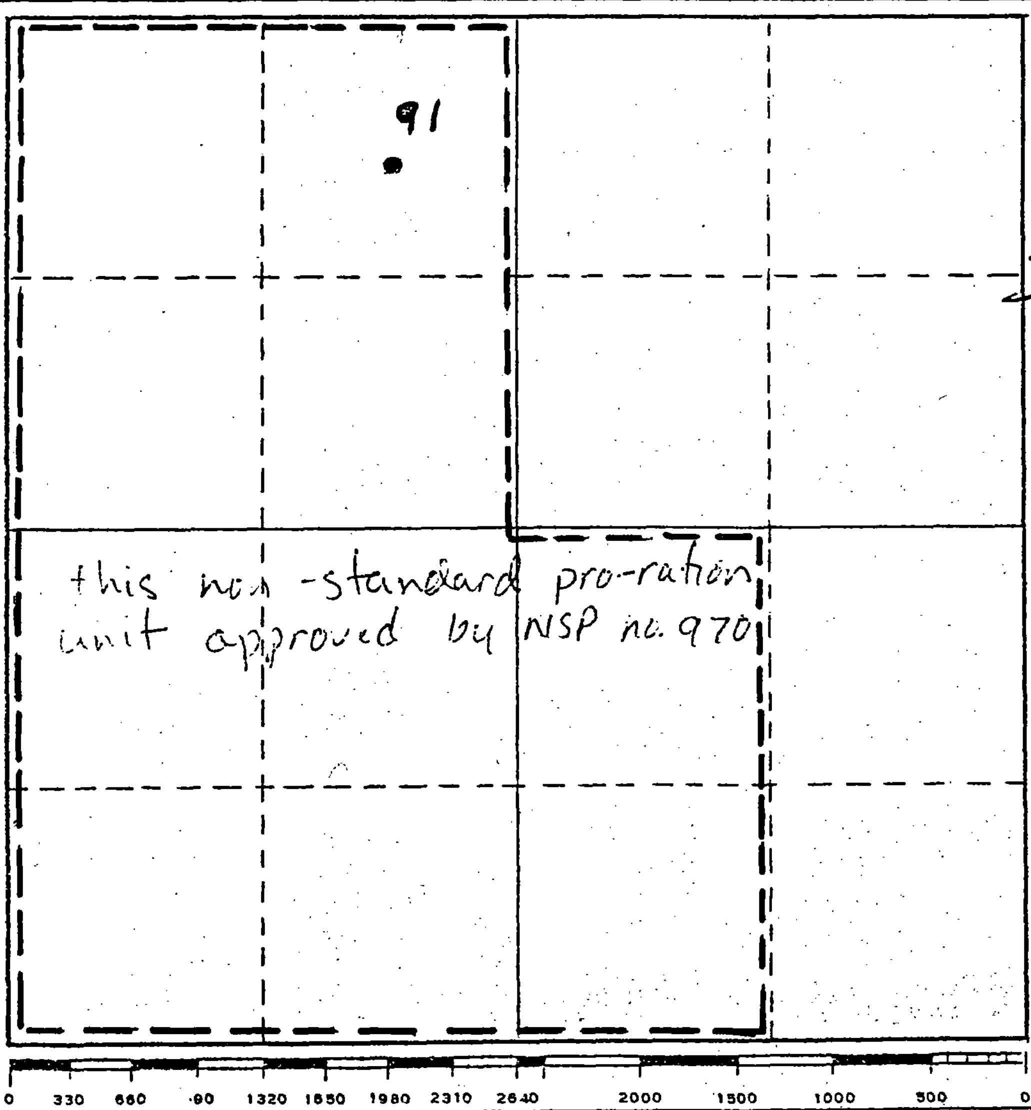
2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).

3. If more than one lease of different ownership is dedicated to the well, have the interests of all owners been consolidated by communitization, unitization, force-pooling. etc?

☐ Yes ☐ No If answer is "yes," type of consolidation ______

If answer is "no," list the owners and tract descriptions which have actually been consolidated. (Use reverse side of this form if necessary.) ______

No allowable will be assigned to the well until all interests have been consolidated (by communitization, unitization, forced-pooling, or otherwise) or until a non-standard unit, eliminating such interests, has been approved by the Commission.



CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief.

Name: [signature]

Position: Adm. Supervisor

Company: Continental Oil

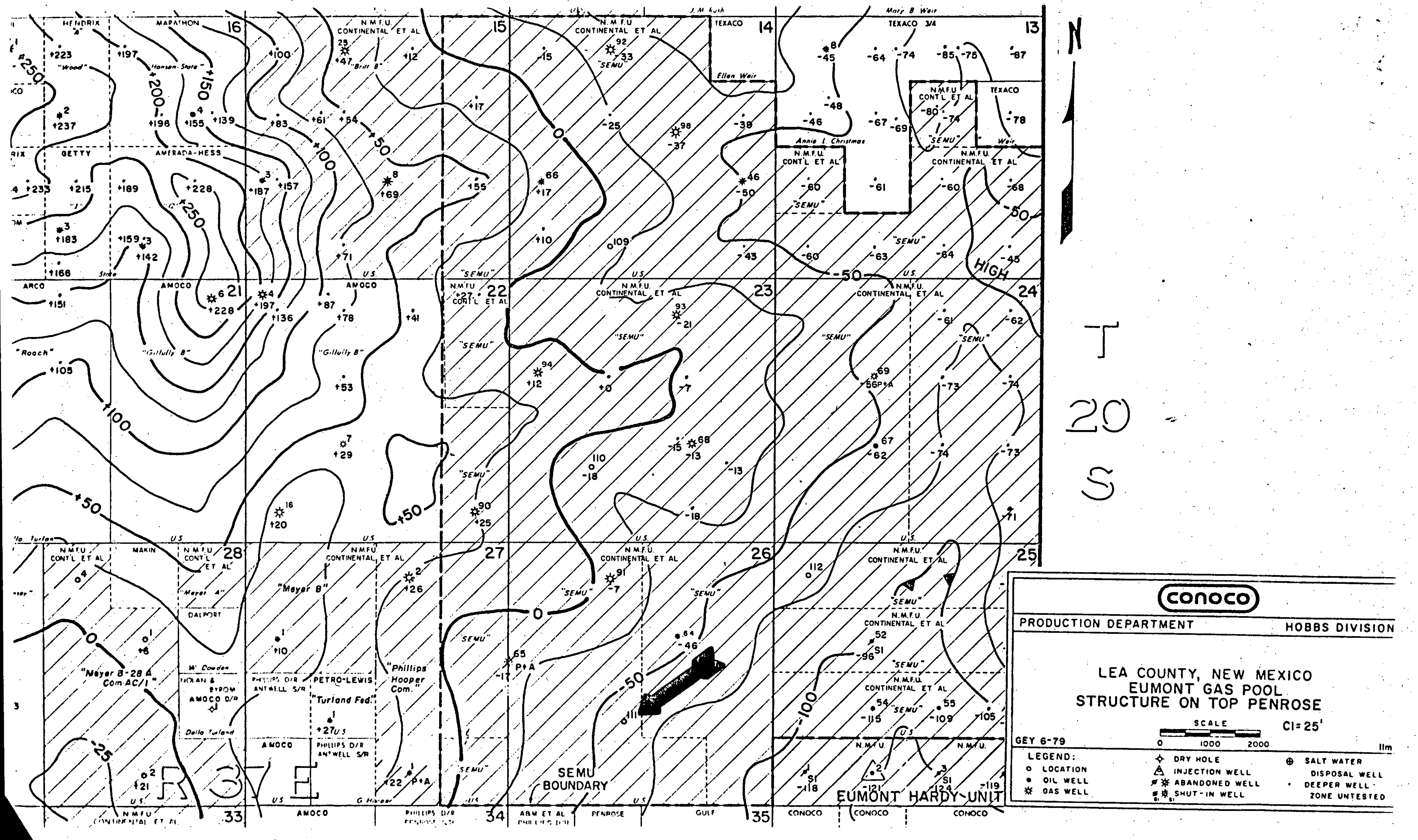
Date: 9-23-74

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed

Registered Professional Engineer and/or Land Surveyor

Certificate No.


CONOCO
PRODUCTION DEPARTMENT
HOBBS DIVISION
LEA COUNTY, NEW MEXICO
EUMONT GAS POOL
STRUCTURE ON TOP PENROSE
SCALE
0 1000 2000
CI = 25'
GEY 6-79
LEGEND:
LOCATION
OIL WELL
GAS WELL
DRY HOLE
INJECTION WELL
ABANDONED WELL
SHUT-IN WELL
SALT WATER DISPOSAL WELL
DEEPER WELL - ZONE UNTESTED
T 20 S
R 37 E
SEMU BOUNDARY
EUMONT HARDY UNIT
HIGH
N

Schlumberger

COMPENSATED NEUTRON-FORMATION DENSITY

COUNTY LEA
FIELD or LOCATION EUMONT GAS
WELL SEMU #91
COMPANY CONTINENTAL OIL

COMPANY CONTINENTAL OIL COMPANY
WELL SEMU #91
FIELD EUMONT GAS
COUNTY LEA STATE NEW MEXICO
Location: 660' FNL & 1980' FWL.
Sec. 26 Twp. 20-S Rge. 37-E
Other Services: DLL

Schlumberger

DUAL LATEROLOG

COUNTY LEA
FIELD or LOCATION EUMONT GAS
WELL SEMU #91
COMPANY CONTINENTAL OIL

COMPANY CONTINENTAL OIL COMPANY
WELL SEMU #91
FIELD EUMONT GAS
COUNTY LEA STATE NEW MEXICO
LOCATION: 660' FNL & 1980' FWL.
Sec. 26 Twp. 20-S Rge. 37-E
Other Services: CNL-FDC

CALIPER DIAM. IN INCHES
6 16

GAMMA RAY API UNITS
0 100
100 200

POROSITY INDEX (%) LIME MATRIX
COMPENSATED FORMATION DENSITY POROSITY
30 20 10 0 -10
COMPENSATED NEUTRON POROSITY
30 20 10 0 -10

RESISTIVITY OHMS M²/M
SHALLOW LATEROLOG - LLs
0.2 1.0 10 100 1000
DEEP LATEROLOG - LLd
0.2 1.0 10 100 1000

DEPTH
3600
3700

Caliper
GR
FDC
CNL

EXHIBIT NO. 1

Schlumberger

COMPENSATED NEUTRON-FORMATION DENSITY

COUNTY LEA
FIELD OR LOCATION EUMONT GAS
WELL SEMU EUMONT #93
COMPANY CONTINENTAL OIL

COMPANY CONTINENTAL OIL COMPANY
WELL SEMU EUMONT #93
FIELD EUMONT GAS
COUNTY LEA STATE NEW MEXICO
Location: 660' FNL & 1980' FEL
Sec 23 Twp. 20-S Rge. 37-E
Other Services: DLL

Schlumberger

DUAL LATEROLOG

COUNTY LEA
FIELD OR LOCATION EUMONT GAS
WELL SEMU EUMONT #93
COMPANY CONTINENTAL OIL

COMPANY CONTINENTAL OIL COMPANY
WELL SEMU EUMONT #93
FIELD EUMONT GAS
COUNTY LEA STATE NEW MEXICO
LOCATION: 660' FNL & 1980' FEL
Sec 23 Twp. 20-S Rge. 37-E
Other Services: FDC-CNL-GR

CALIPER DIAM. IN INCHES
6 16

GAMMA RAY API UNITS
0 100
100 200

POROSITY INDEX (%) LIME MATRIX
COMPENSATED FORMATION DENSITY POROSITY
30 20 10 0 -10
COMPENSATED NEUTRON POROSITY
30 20 10 0 -10

RESISTIVITY OHMS M²/M
SHALLOW LATEROLOG - LLs
0.2 1.0 10 100 1000 2000
DEEP LATEROLOG - LLd
0.2 1.0 10 100 1000 2000

DEPTH
3600
3700

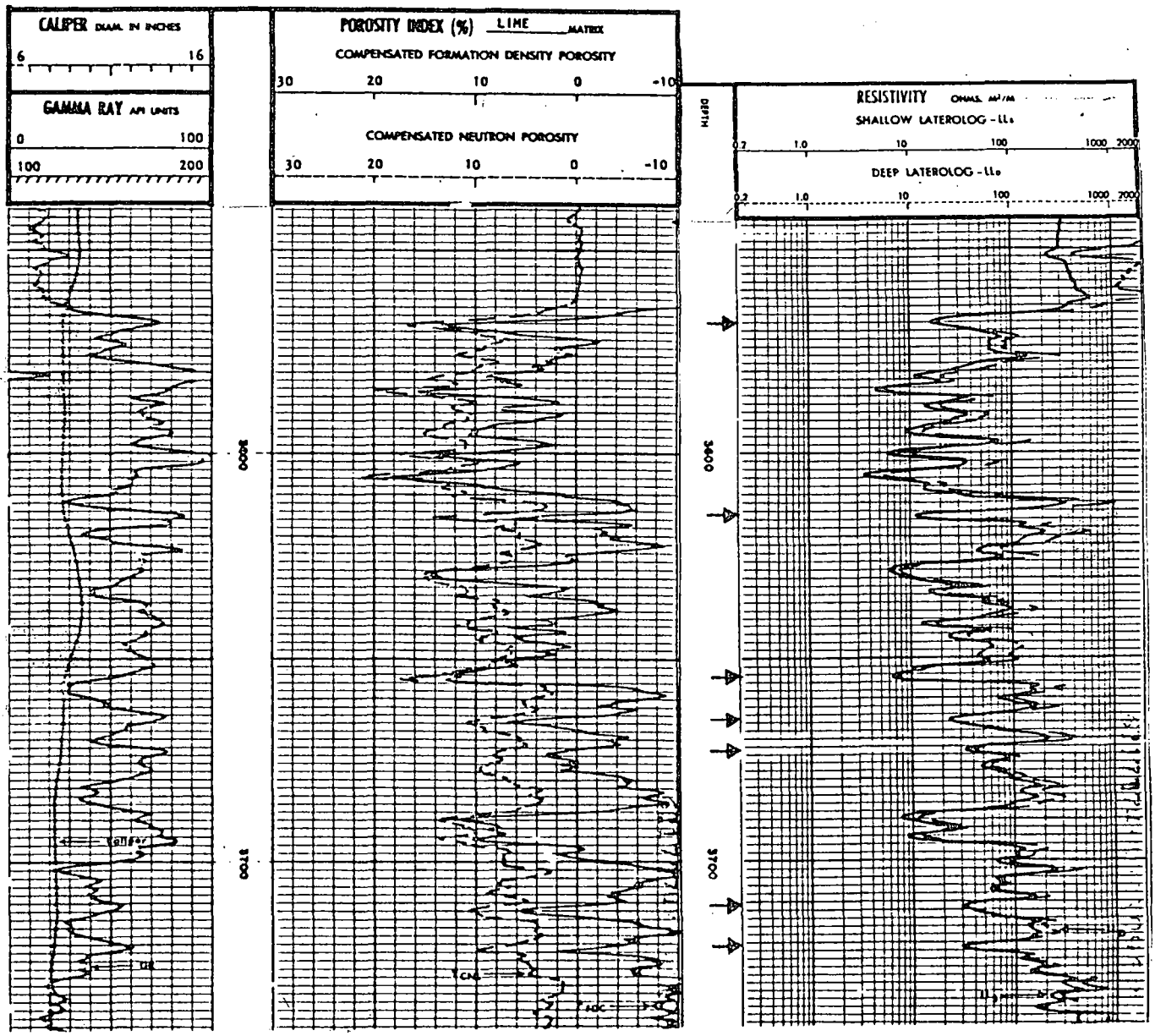


EXHIBIT NO. 2

Schlumberger

SIMULTANEOUS
COMPENSATED NEUTRON FORMATION DENSITY

COUNTY: LEA
FIELD: EUMONT GAS
LOCATION:
WELL: SEMU EUMONT NO. 98
COMPANY: CONTINENTAL OIL CO.

COMPANY: CONTINENTAL OIL COMPANY

WELL: SEMU EUMONT NO. 98

FIELD: EUMONT GAS

COUNTY: LEA STATE: NEW MEXICO

LOCATION: 2310'FNL & 1980'FEL

Other Services: DLL

API SERIAL NO	SEC	TWP	RANGE
	14	20-S	37-E

Schlumberger

SIMULTANEOUS
DUAL LATEROLOG

COUNTY: LEA
FIELD: EUMONT GAS
LOCATION:
WELL: SEMU EUMONT NO. 98
COMPANY: CONTINENTAL OIL CO.

COMPANY: CONTINENTAL OIL COMPANY

WELL: SEMU EUMONT NO. 98

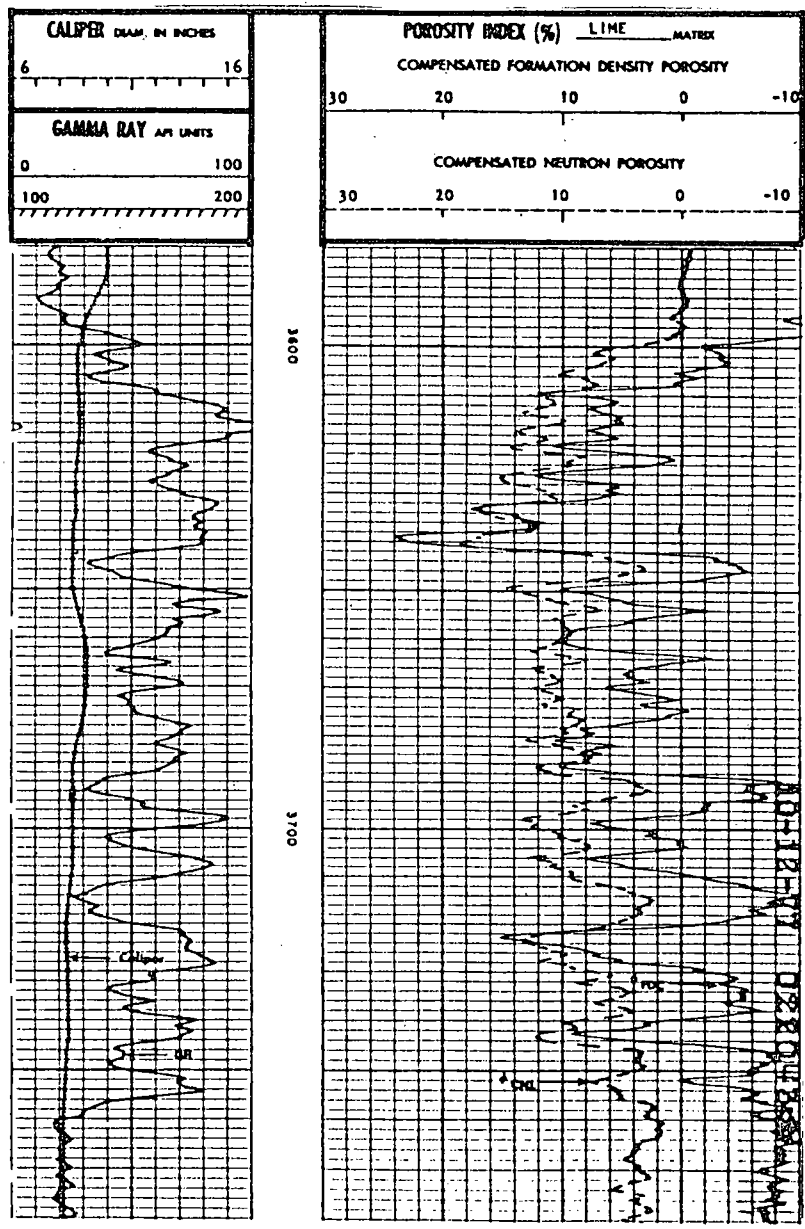
FIELD: EUMONT GAS

COUNTY: LEA STATE: NEW MEXICO

LOCATION: 2310'FNL & 1980'FEL

Other Services: CNL/FDC

API SERIAL NO	SEC	TWP	RANGE
	14	20-S	37-E



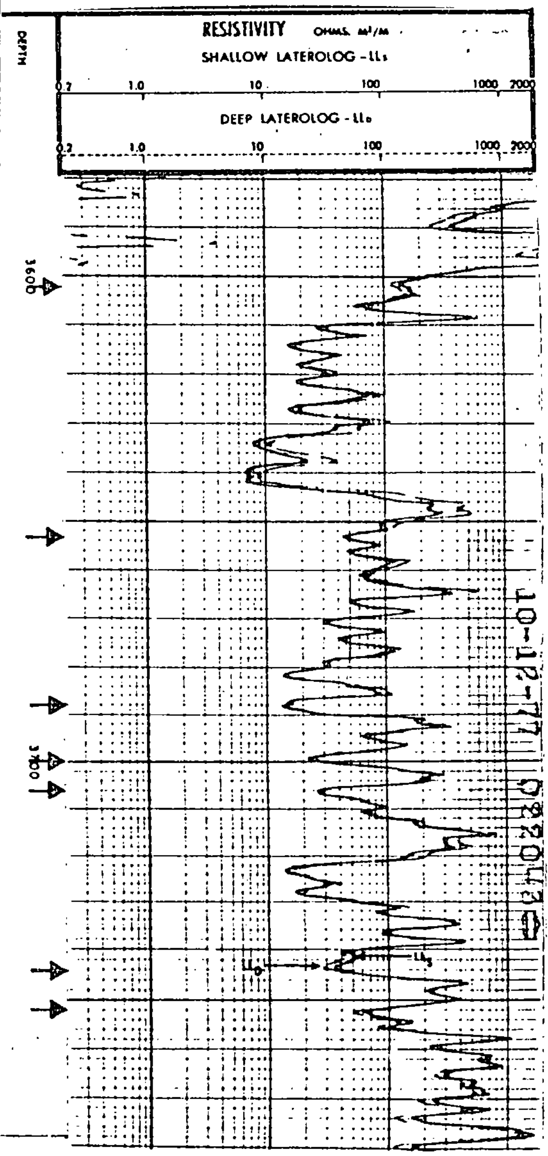


EXHIBIT NO. 3

EXHIBIT NO. 4

Previously drilled infill wells Nos. 90, 91, 92, 93, 94, and 98 should have an average 12 year life as determined by decline analysis. Any additional infill wells are expected to have an average life of 10 years.

Radius of Drainage in Tight Pay After 10 Years

Gas S.G. = .67	P = 700 psi	μ = .011 cp.
T = 555° R	Pc= 670 psi	ϕ = .11
Tc= 380° R	P_R= .52	k = .00003 darcies
T_R= 1.46	z = .945	t_r= 10 years (3650 days)

$dz/dp = -1.82 \times 10^{-4}$ (From Craft & Hawkins, Pg. 271, Fig. 6.9)

$$Cg = \frac{1}{P} - \frac{1}{z}\left[\frac{dz}{dp}\right]$$

$$Cg = \frac{1}{700} - \frac{1}{.945}\ (-1.82 \times 10^{-4})$$

$$Cg = 1.625 \times 10^{-3}$$

$$t_r = \frac{.04\ \mu\ Cg\ \phi\ r_e^{\,2}}{k}$$ (From Craft & Hawkins, Pg. 275)

$$r_e = \left[\frac{t_r k}{.04\ \mu\ Cg\ \phi}\right]^{1/2}$$

$$r_e = \left[\frac{(3650 \text{ days})(.00003 \text{ darcies})}{.04(.011)(1.625 \times 10^{-3})(.11)}\right]^{1/2}$$

$$r_e = 1180 \text{ feet}$$

Area = 100 acres

Additional Gas Reserves From Tight Sands

Pmpi	= 350 psia	h	= 18 feet	T	= 555° R
Pti	= 700 psia	ϕ	= .11 feet	Tc	= 380° R
Pta	= 300 psia	Sw	= .35	T_R	= 1.46
Pc	= 670 psi	A	= 100 acres		

Z @ 700 psi	Z @ 300 psi
P_R = 1.045	P_R = .46
z = .89	z = .945

$$Bg = 35.35 \frac{P}{zT}$$

$$Bgti = 35.35 \frac{700}{(.89)(555^\circ)} = 50 \text{ SCF/cu.ft.}$$

$$Bgta = 35.35 \frac{300}{(.945)(555^\circ)} = 20 \text{ SCF/cu.ft.}$$

Gas Reserves = .04356 (ϕ) (h) (A) (1-Sw) (Bgti-Bgta) MMCFG

Gas Reserves = .04356 (.11)(18') (100 acres) (1-.35) (50-20) MMCFG

Gas Reserves = 168 MMCFG

Nomenclature

t_r - readjustment time (time required to reach approximate steady-state conditions at re)
r_e - external boundary radius
Cg - gas compressibility
Pmpi- initial pressure in more permeable pay
Pti - initial pressure in tight pay
Pta - abandonment pressure in tight pay
Bgti- initial gas formation volume factor in tight pay
Bgta- abandonment gas formation volume factor in tight pay