

## OIL CONSERVATION DIVISION

STATE OF NEW MEXICO  
ENERGY AND MINERALS DEPARTMENTP. O. Box 2088  
SANTA FE, NEW MEXICO  
87501

ADMINISTRATIVE ORDER

NFL 10INFILL 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 Emon V Well No 109  
Location: Unit N Sec. 14 Twp. 20 S Rng. 37 E 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 Emon V Gas Pool, and the standard spacing unit in said pool is 640 acres.

(4) That a 200-acre proration unit comprising the SW/4 and SW/4 SE/4 of Sec. 14, Twp. 20 S, Rng. 37 E, is currently dedicated to the SEMU Emon V Well No 66 located in Unit L of said section.

(5) That this proration unit is ( ) standard (X) nonstandard; if nonstandard, said unit was previously approved by Order No. NSP1073.

(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 \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_\_.

DIVISION DIRECTOR \_\_\_\_\_ EXAMINER \_\_\_\_\_

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. 109  
Location: Unit N Sec. 14 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 200-acre proration unit comprising the SW/4 and SW/4 SE/4 of Sec. 14, Twp. 20 S, Rng. 37E, is currently dedicated to the SEMU Eumont Well No. 66 located in Unit L of said section.
- (5) That this proration unit is ( ) standard (X) nonstandard; if nonstandard, said unit was previously approved by Order No. NSP-1073.
- (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 7th day of January, 19 80.

  
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

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. 109 - Eumont Gas Pool - 660 FSL and 1980 FWL,  
Sec. 14, T-20S, R-37E, Lea County, New Mexico

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Conoco Inc. respectfully requests certification of the need for a second well on the previously approved 200-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. 109 will be completed in the Eumont gas Pool which has a standard proration unit of 640 acres.
3. The 200-acre proration unit on which the SEMU Eumont No. 109 will be located was established under Order No. NSP 1073.
4. The SEMU Eumont No. 109 has not been spudded.
5. One well, the SEMU Eumont No. 66, located 1980' FSL and 660 FWL of Sec. 14, T-20S, R-37E, has been drilled in the proration unit. This well was spudded on 5-26-56 and completed 6-20-56 in the Eumont Gas Pool. The well tested at a rate of 360 MCFGPD on 10-12-79.
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

$k = .00003$  darcies

$\phi = 11\%$

$h = 18$  feet

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

More Permeable Sands

$k = .029$  darcies

$\phi = 14\%$

$h = 47$  feet

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

NMOCD

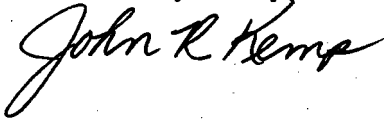
December 17, 1979

Page Three

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.

Conoco is the operator of all wells offsetting this proration unit.

Yours very truly,

A handwritten signature in cursive script, appearing to read "John R. Kemp".

JWH-JS

CC: USGS-Hobbs  
ARCO-Hobbs  
Amoco-Hobbs  
Amoco-Houston  
Chevron-Midland

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.

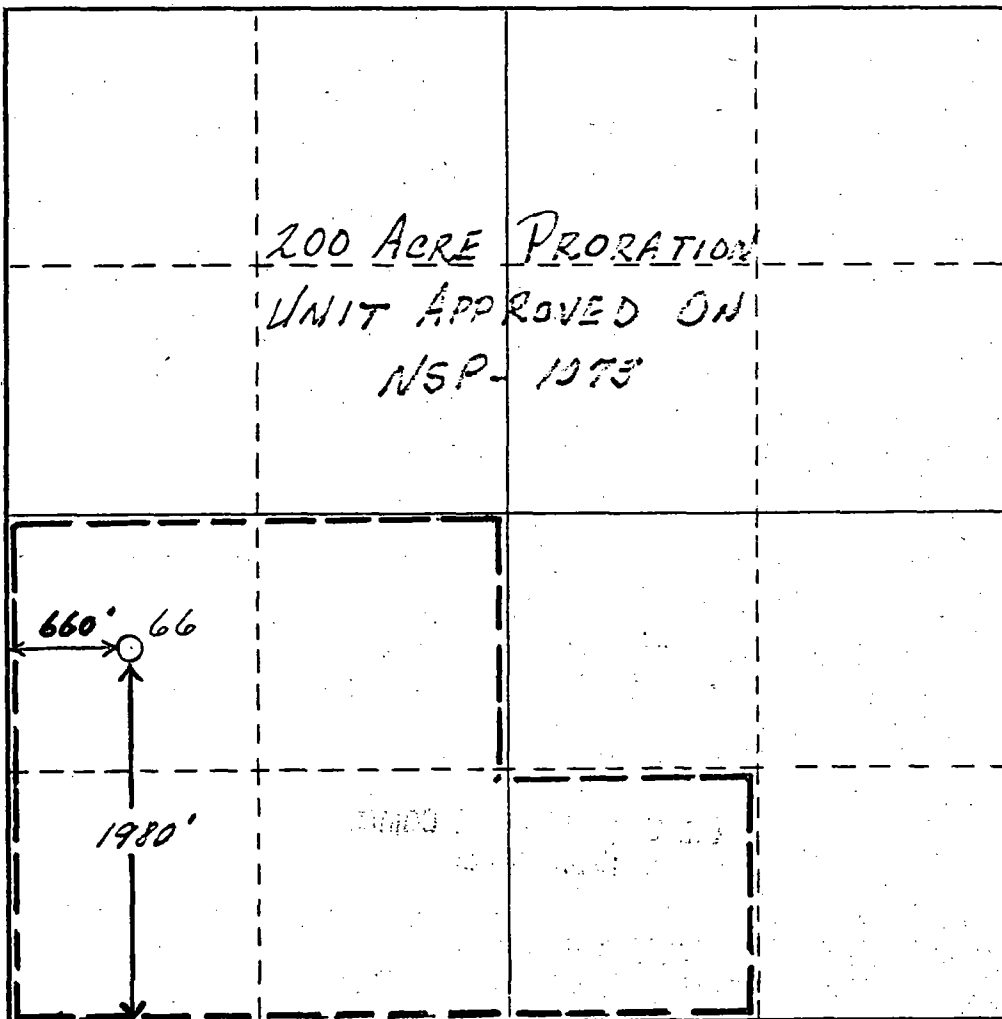
Operator <b>CONTINENTAL OIL COMPANY</b>		Lease <b>SEMU EUMONT</b>		Well No. <b>66</b>	
Unit Letter <b>L</b>	Section <b>14</b>	Township <b>20-S</b>	Range <b>37-E</b>	County <b>LEA</b>	
Actual Footage Location of Well: <b>1980</b> feet from the <b>SOUTH</b> line and <b>660</b> feet from the <b>WEST</b> line					
Ground Level Elev. <b>3549'</b>	Producing Formation <b>EUMONT</b>		Pool <b>EUMONT QUEEN GAS</b>	Dedicated Acreage: <b>200</b> Acres	

- Outline the acreage dedicated to the subject well by colored pencil or hachure marks on the plat below.
- If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).
- 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  
**Ben H. Lee**

Position  
**Gen. Supt.**

Company  
**Continental Oil Co.**

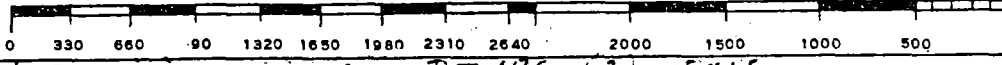
Date  
**12-19-77**

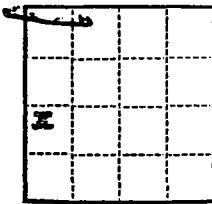
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed \_\_\_\_\_

Registered Professional Engineer and/or Land Surveyor \_\_\_\_\_

Certificate No. \_\_\_\_\_





(SUBMIT IN TRIPLICATE)

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

Land Office Las Cruces  
Lease No. LC 031620 (3)  
Unit H. N. P. U.

RECEIVED

MAY 22 1956

U. S. GEOLOGICAL SURVEY  
LEASING, NEW MEXICO

SUNDRY NOTICES AND REPORTS ON WELLS

NOTICE OF INTENTION TO DRILL	<input checked="" type="checkbox"/>	SUBSEQUENT REPORT OF WATER SHUT-OFF	
NOTICE OF INTENTION TO CHANGE PLANS		SUBSEQUENT REPORT OF SHOOTING OR ACIDIZING	
NOTICE OF INTENTION TO TEST WATER SHUT-OFF		SUBSEQUENT REPORT OF ALTERING CASING	
NOTICE OF INTENTION TO RE-DRILL OR REPAIR WELL		SUBSEQUENT REPORT OF RE-DRILLING OR REPAIR	
NOTICE OF INTENTION TO SHOOT OR ACIDIZE		SUBSEQUENT REPORT OF ABANDONMENT	
NOTICE OF INTENTION TO PULL OR ALTER CASING		SUPPLEMENTARY WELL HISTORY	
NOTICE OF INTENTION TO ABANDON WELL			

(INDICATE ABOVE BY CHECK MARK NATURE OF REPORT, NOTICE, OR OTHER DATA)

SEMU EUMONT No. 66

~~Stamps B-14 for 1~~

Hobbs, New Mexico May 16, 1956

Well No. 1 is located 1980 ft. from IN line and 660 ft. from WE line of sec. 14

3 1/4 Section 14 20S 37S H. N. P. U.  
(1/4 Sec. and Sec. No.) (Twp.) (Range) (Meridian)  
Eumont Lea New Mexico  
(Field) (County or Subdivision) (State or Territory)

The elevation of the derrick floor above sea level is \_\_\_\_\_ ft.

DETAILS OF WORK

(State names of and expected depths to objective sands; show sizes, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other important proposed work)

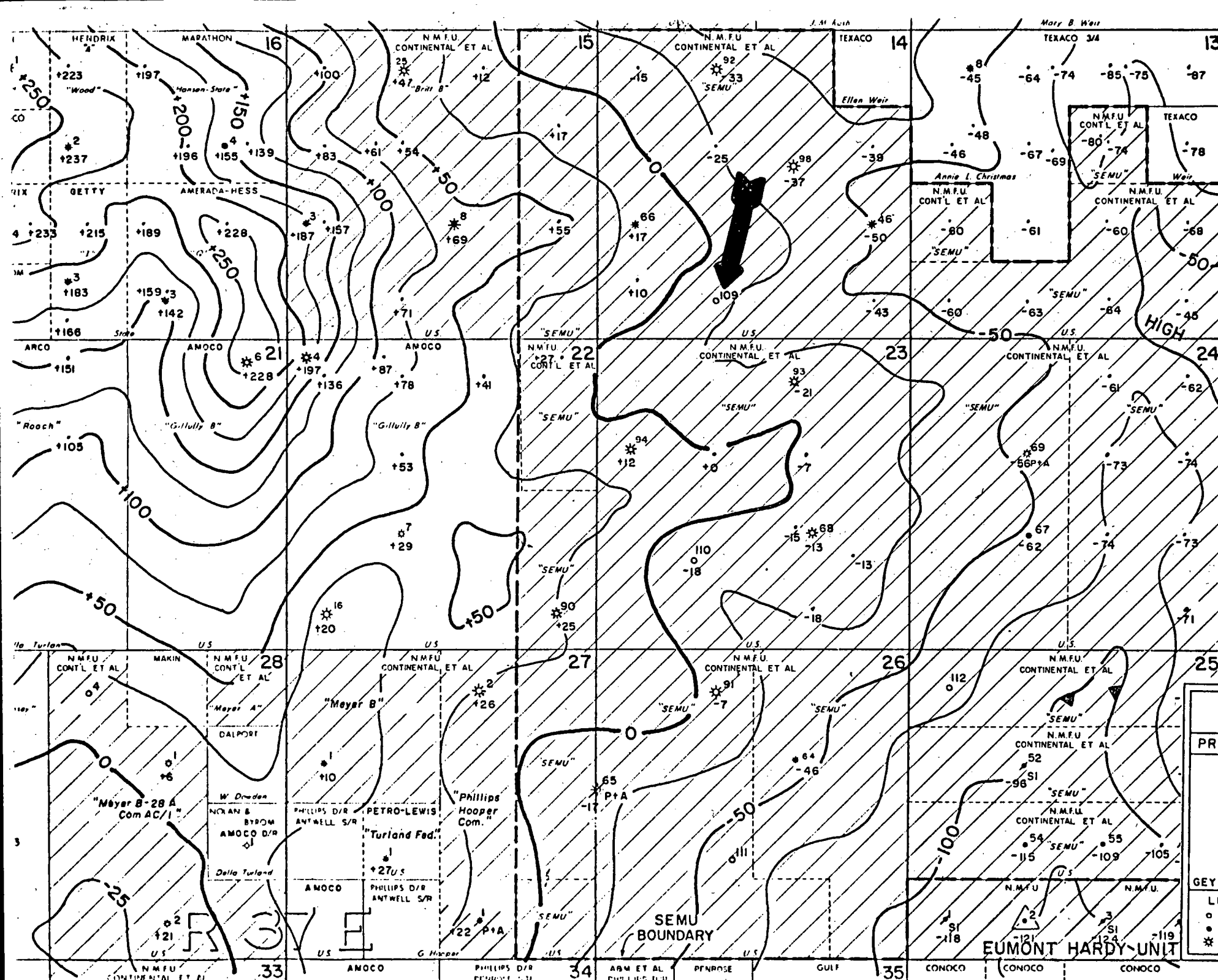
It is our intention to drill a well at the above location to a total depth of approximately 3300' with rotary tools in an attempt to develop high pressure gas reserves under the subject lease and to meet U.S. demands to develop the high pressure gas in the immediate area.

It is planned to use the following casing pattern: 8 5/8" casing to be set at 900' and cemented with approximately 600 sacks, cement to be circulated; 5 1/2" casing to be set at total depth and cemented with approximately 1113 sacks, or as determined by survey, and to be perforated opposite the pay zone.


Approval to produce this well upon completion is also requested.

I understand that this plan of work must receive approval in writing by the Geological Survey before operations may be commenced.

Company Continental Oil Company  
Address Box 427  
Hobbs, New Mexico  
By [Signature]  
Title Senior Production Foreman



N  
T  
20  
S



PRODUCTION DEPARTMENT      HOBBS DIVISION

LEA COUNTY, NEW MEXICO  
EUMONT GAS POOL  
STRUCTURE ON TOP PENROSE

SCALE      CI=25'

0      1000      2000      1/4m

LEGEND:

○ LOCATION	⚠ DRY HOLE	⊕ SALT WATER
● OIL WELL	⚡ INJECTION WELL	⊖ DISPOSAL WELL
✳ GAS WELL	✳ ABANDONED WELL	⊙ DEEPER WELL
	✳ SHUT-IN WELL	⊙ ZONE UNTESTED

GEY 6-79

EUMONT HARDY-UNIT



**Schlumberger** **COMPENSATED NEUTRON FORMATION DENSITY**

COUNTY LEA FIELD EUMONT GAS LOCATION SEMU 91 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, Other Services: DLL

Sec. 26 Twp. 20-S Rge. 37-E

**Schlumberger** **DUAL LATEROLOG**

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

COMPANY CONTINENTAL OIL COMPANY

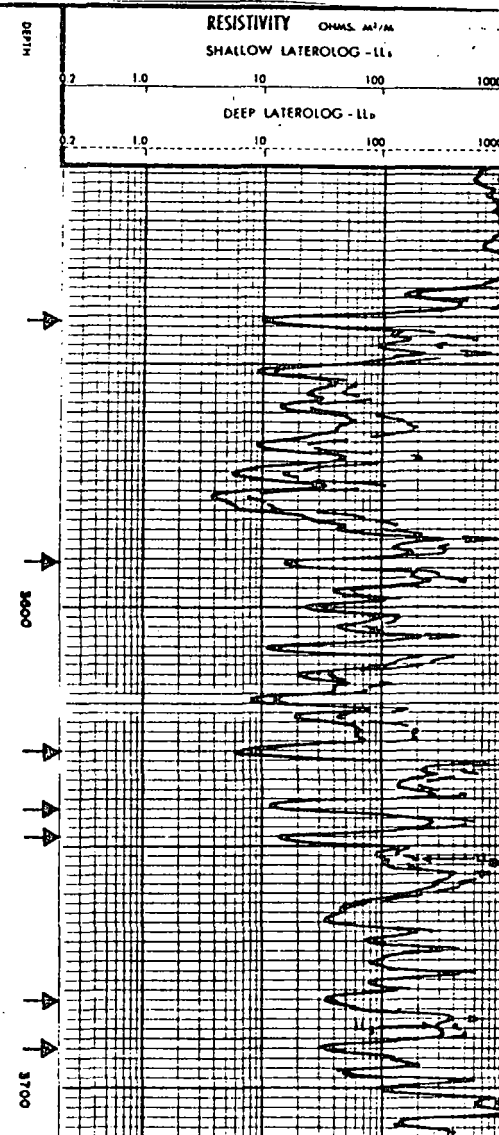
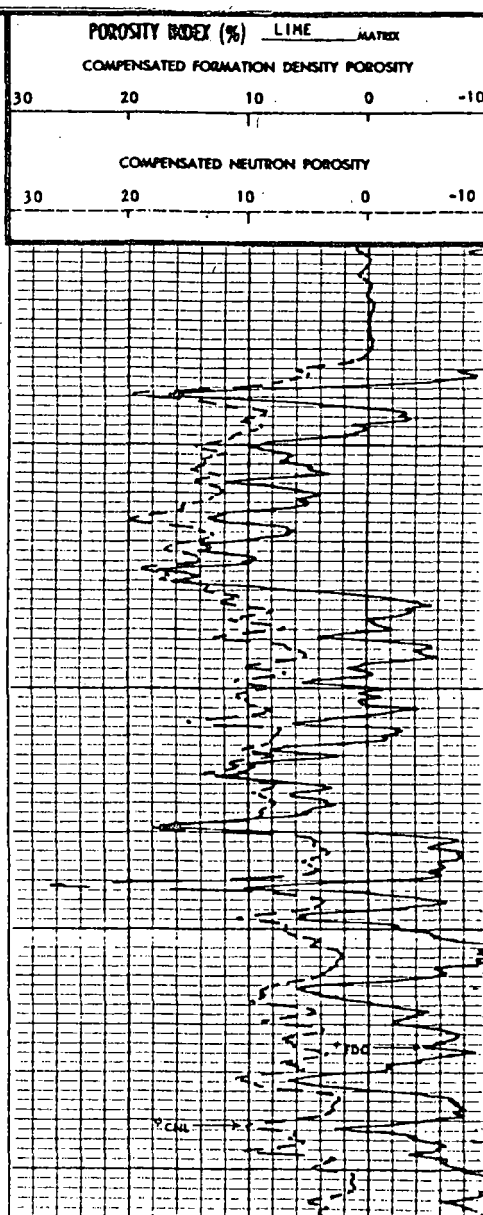
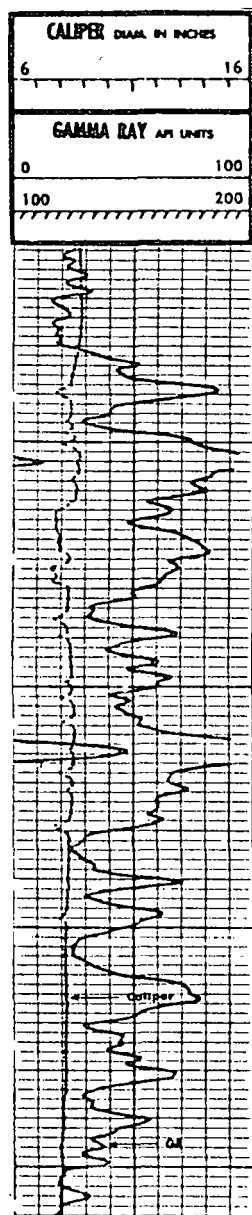
WELL SEMU #91

FIELD EUMONT GAS

COUNTY LEA STATE NEW MEXICO

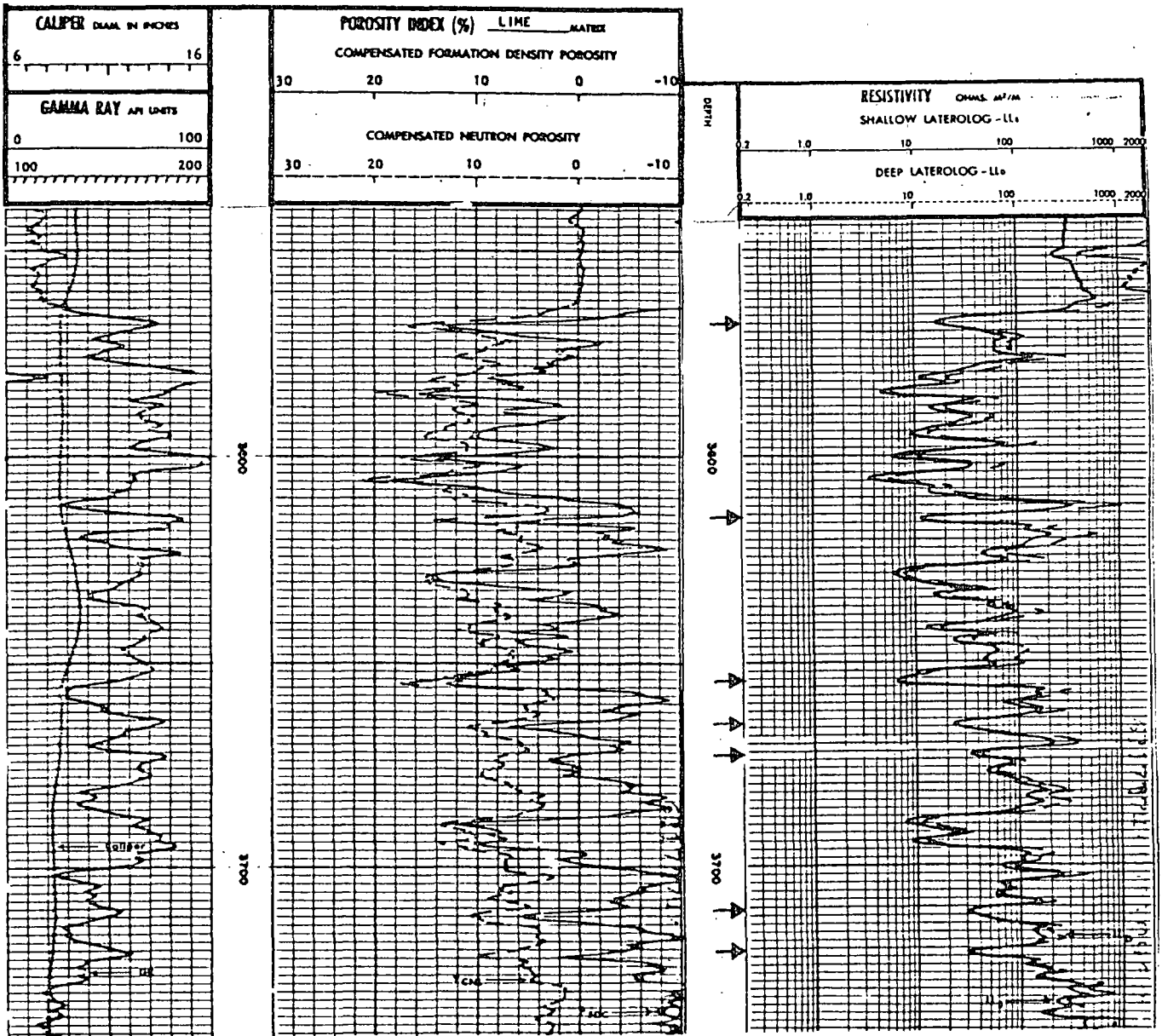
Location: 660' FNL & 1980' FWL, Other Services: CNL-FDC

Sec. 26 Twp. 20-S Rge. 37-E



<b>Schlumberger</b>		<b>COMPENSATED NEUTRON FORMATION DENSITY</b>	
COUNTY LEA	FIELD EUMONT GAS	COMPANY CONTINENTAL OIL COMPANY	
LOCATION SEMU EUMONT #93	WELL SEMU EUMONT #93	WELL SEMU EUMONT #93	
COMPANY CONTINENTAL OIL	FIELD EUMONT GAS	FIELD EUMONT GAS	
	COUNTY LEA	STATE NEW MEXICO	
Location: 660' FNL & 1980' FEL	Other Services: DLL		
23			
Sec. 26	Twp. 20-S	Rgn. 37-E	

<b>Schlumberger</b>		<b>DUAL LATEROLOG</b>	
COUNTY LEA	FIELD EUMONT GAS	COMPANY CONTINENTAL OIL COMPANY	
LOCATION SEMU EUMONT #93	WELL SEMU EUMONT #93	WELL SEMU EUMONT #93	
COMPANY CONTINENTAL OIL	FIELD EUMONT GAS	FIELD EUMONT GAS	
	COUNTY LEA	STATE NEW MEXICO	
Location: 660' FNL & 1980' FEL	Other Services: FDC-CNL-GR		
23			
Sec. 26	Twp. 20-S	Rgn. 37-E	



SIMULTANEOUS  
**Schlumberger**  
**COMPENSATED NEUTRON FORMATION DENSITY**

COUNTY LEA FIELD EUMONT GAS 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 14 SEC 20-S TWP 37-E

SIMULTANEOUS  
**Schlumberger**  
**DUAL LATEROLOG**

COUNTY LEA FIELD EUMONT GAS 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 14 SEC 20-S TWP 37-E

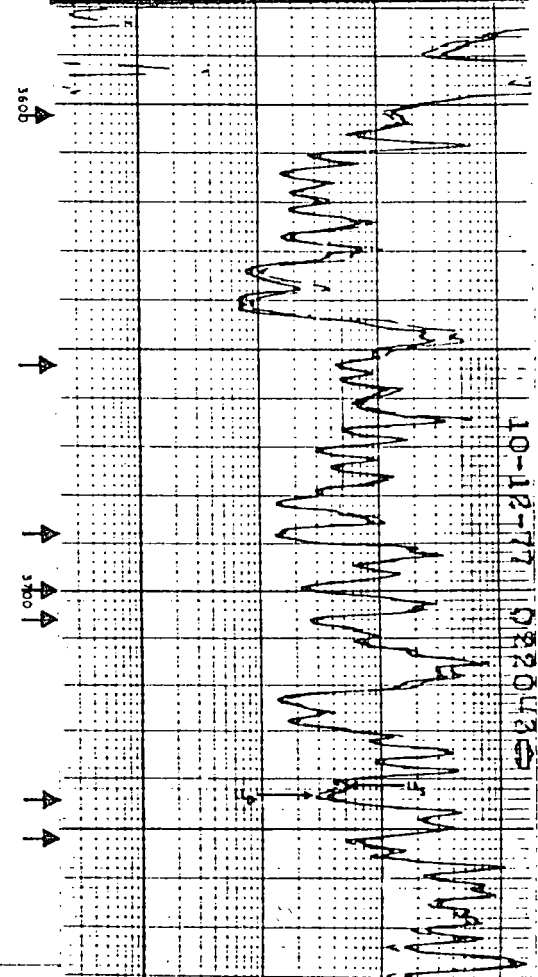
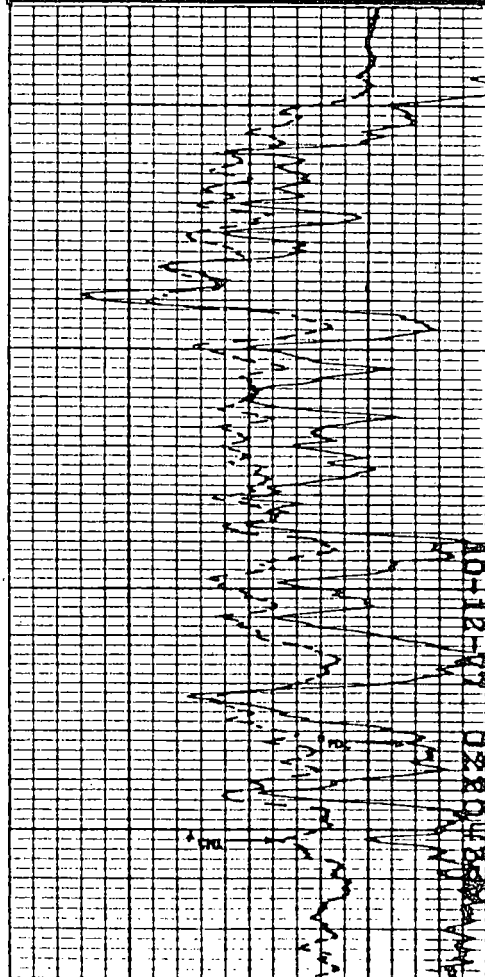
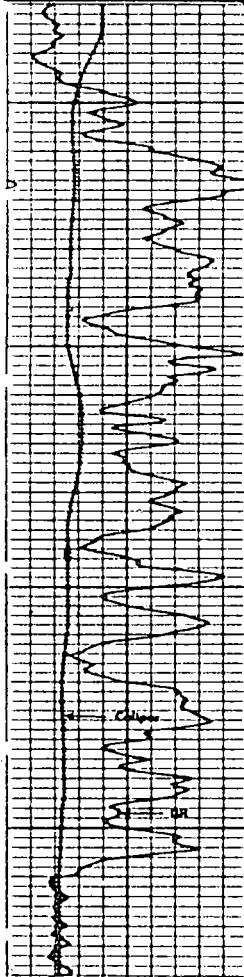
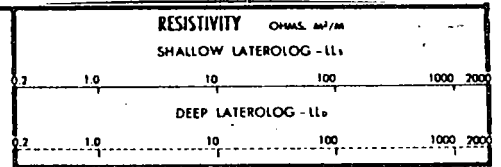
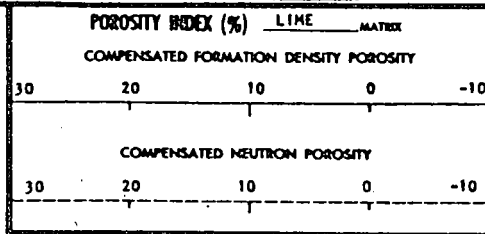
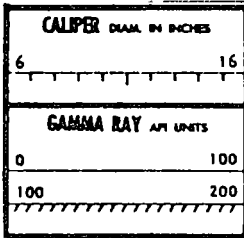


EXHIBIT NO. 4

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	$\mu = .011$ cp.
T = 555° R	Pc = 670 psi	$\phi = .11$
Tc = 380° R	P <sub>R</sub> = .52	k = .00003 darcies
T <sub>R</sub> = 1.46	z = .945	t <sub>r</sub> = 10 years (3650 days)

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

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

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

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

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

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

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

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

Area = 100 acres

Additional Gas Reserves From Tight Sands

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

Z @ 700 psi  
 $P_R = 1.045$   
 z = .89

Z @ 300 psi  
 $P_R = .46$   
 z = .945

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

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

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

Gas Reserves = .04356 ( $\phi$ ) (h) (A) (1-Sw) (Bg<sub>ti</sub>-Bg<sub>ta</sub>) MMCFG

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

Gas Reserves = 168 MMCFG

Nomenclature

- t<sub>r</sub> - readjustment time (time required to reach approximate steady-state conditions at re)
- r<sub>e</sub> - external boundary radius
- C<sub>g</sub> - gas compressibility
- P<sub>mpi</sub> - initial pressure in more permeable pay
- P<sub>ti</sub> - initial pressure in tight pay
- P<sub>ta</sub> - abandonment pressure in tight pay
- Bg<sub>ti</sub> - initial gas formation volume factor in tight pay
- Bg<sub>ta</sub> - abandonment gas formation volume factor in tight pay