STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

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

ADMINISTRATIVE ORDER

NFL 24

INFILL DRILLING FINDINGS 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-A

I.

Operator Amerada Hess Corp. Well Name and No. State LM "T" Well No. 9

Location: Unit C Sec. 36 Twp. 23S Rng. 36E Cty. Lea

II.

THE DIVISION FINDS:

(1) That Section 271.305(b) of the Federal Energy Regulatory Commission 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 that the infill 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.

(2) That by Order No. R-6013-A, dated February 8, 1980, 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 completed in the Eumont Gas Pool, and the standard spacing unit in said pool is 640-acre acres.

(4) That a 160-acre proration unit comprising the NW/4 of Sec. 36, Twp. 23 S, Rng. 36 E, is currently dedicated to the State LM "T" Well No. 2 located in Unit F of said section.

(5) That this proration unit is ( ) standard (X) nonstandard; if nonstandard, said unit was previously approved by Order No. NSP-1194.

(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 0.987 BCF ~~XXXX~~ MCF of gas from the proration unit which would not otherwise be recovered.

(8) That all the requirements of Order No. R-6013-A 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.

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 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 23rd day of February, 19 81.

DIVISION DIRECTOR X EXAMINER ____

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

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

ADMINISTRATIVE ORDER

NFL 24

AMENDED FOR POOL DESIGNATION ONLY.

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

(4) That a 160 -acre proration unit comprising the NW/4 of Sec. 36, Twp. 23 S, Rng. 36 E, is currently dedicated to the State LM "T" Well No. 2 located in Unit F of said section.

(5) That this proration unit is ( ) standard (X) nonstandard; if nonstandard, said unit was previously approved by Order No. NSP-1194.

(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 0.987 BCF ~~XXXX~~ MCF of gas from the proration unit which would not otherwise be recovered.

(8) That all the requirements of Order No. R-6013-A 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.

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(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 23rd day of February, 19 81.

DIVISION DIRECTOR X EXAMINER ____

AMERADA HESS CORPORATION

P. O. BOX 840
SEMINOLE, TEXAS 79360
915-758-6700

February 10, 1981

Mr. R. L. Stamets
Technical Support Chief
New Mexico Energy and Minerals Department
Oil Conservation Division
P.O. Box 2088
State Land Office Building
Santa Fe, New Mexico 87501

Re: Request for Infill Findings
State LMT Well No. 9
Jalmat Gas Pool
Lea County, New Mexico

Dear Mr. Stamets:

Enclosed please find the information you requested in your letter of November 14, 1980. We sincerely hope this will meet with your approval and will allow you to make a ruling in our favor on the subject filing.

Sincerely yours,

William A. Merrick
Operations Engineer

WAM/eh

State LM "T" No.9
Jalmat Gas Pool
780 FNL, 1860 FWL, Sec. 36, T23S, R36E
Lea County, New Mexico

Completion Summary

Elevation: 3333 G.L., 3342 D.F., 3343 K.B.

Total Depth: 3340'

Casing: Surface: 8-5/8" 24# K-55, @ 341', 275 sx cement circulated cement.

Production: 5-1/2" 17# K-55, @ 2895', 900 sx cement circulated cement.

Tubing: 1-1/2" @ 3340' set open ended.

Producing Interval: Open hole; 2895' to 3340', 445' air drilled open hole, no stimulation.

Logging Program: Open hole producing interval. Schlumberger F.D.C. w/G.R., Caliper & collars; S.N.P. w/G.R.; single induction.

Log Analysis:
Gross Interval; 445'
Net Producible Pay (Ø greater than 6%); 172'
Average Porosity Ø; 14.8%
Average Water Saturation; 36.9%

Production Tests:
Drilling gas guages (orifice well tester)
2895', 1,377 MCF/D, 48/64" choke, 80 psi
3140', 1,933 MCF/D, 1" choke, 65 psi
Pressure readings
3140', 2 minute SITP 100 PSIG
4 minute SITP 110 PSIG
12 hour SITP 135 PSIG
3340' T.D.
12 hour SITP 145 PSIG
120 hour shut-in BHP 162 PSI

Northern Natural Gas 4 Point Test:
Final Flow Rate 151 MCF/D, FTP 110 PSI
CAOF. 800 MCF/D
Initial Gas Sales - Northern; 530 MCF/D FTP 59 PSI

State LM "T" No.9
Jalmat Gas Pool

Volumetric Reserves
160 Acres

$$N = \frac{43560\ A\ h\ \phi\ (1 - S_w)\ (P_i)\ 35.35\ (R.F.)}{T_i\ (Z_i)\ 1 \times 10^9} \text{ B.C.F.}$$

N	= Gas in Place in B.C.F	
A	= Acreage	160
h	= Net Pay	172'
ϕ	= Porosity (average)	14.8%
S_w	= Water Saturation	36.9%
P_i	= Initial Pressure	162 psi
R.F.	= Recovery Factor	90%
T_i	= Initial Temperature	545° R.
Z_i	= Gas Compressibility	.985

43560 & 35.35 Numericle Constants.

$$N = \frac{43560\ (160)(172)(.148)(1-\ .369)(162)(35.35)(.9)}{(545)(.985)(1 \times 10^9)}$$

N = 1.074 BCF Gas in Place.

State LM "T" No.9
Jalmat Gas Pool

Anticipated Recovery

The anticipated recovery has been calculated using the time rate curves of several adjacent wells in the Jalmat Pool (curves attached). A decline rate was calculated for each well using the following formula;

$$a = \frac{\left[-\ln\left(\frac{Q_i}{Q_t}\right)\right]}{T}$$

a = Monthly Decline Rate
Q_i = Rate at Beginning of Period
Q_t = Rate at End of Period
T = Period in Months

Anticipated recovery was calculated using the equation;

$$N = \frac{Q_i - Q_a}{a}$$

N = Cumulative Gas Production
Q_i = Initial Production Rate MCF/Mo.
Q_a = Abandonment Rate MCF/Mo.
a = Monthly Decline Rate for Area

The following rates were calculated.

Amerada Hess, State LM "T" No. 2	.0173
ARCO, John P. Combest, No. 1	.0195
Cities Service, State "Q" No. 1	.0153
Conoco, Lynn B. 25 No. 2	.0118
Average decline rate for area	.0159

The State LM "T" No. 9 had an initial rate of 16,000 MCF/Mo. applying this to the preceding equation we calculate the following recovery.

$$N = \frac{(16{,}000 - 300)}{.0159}$$

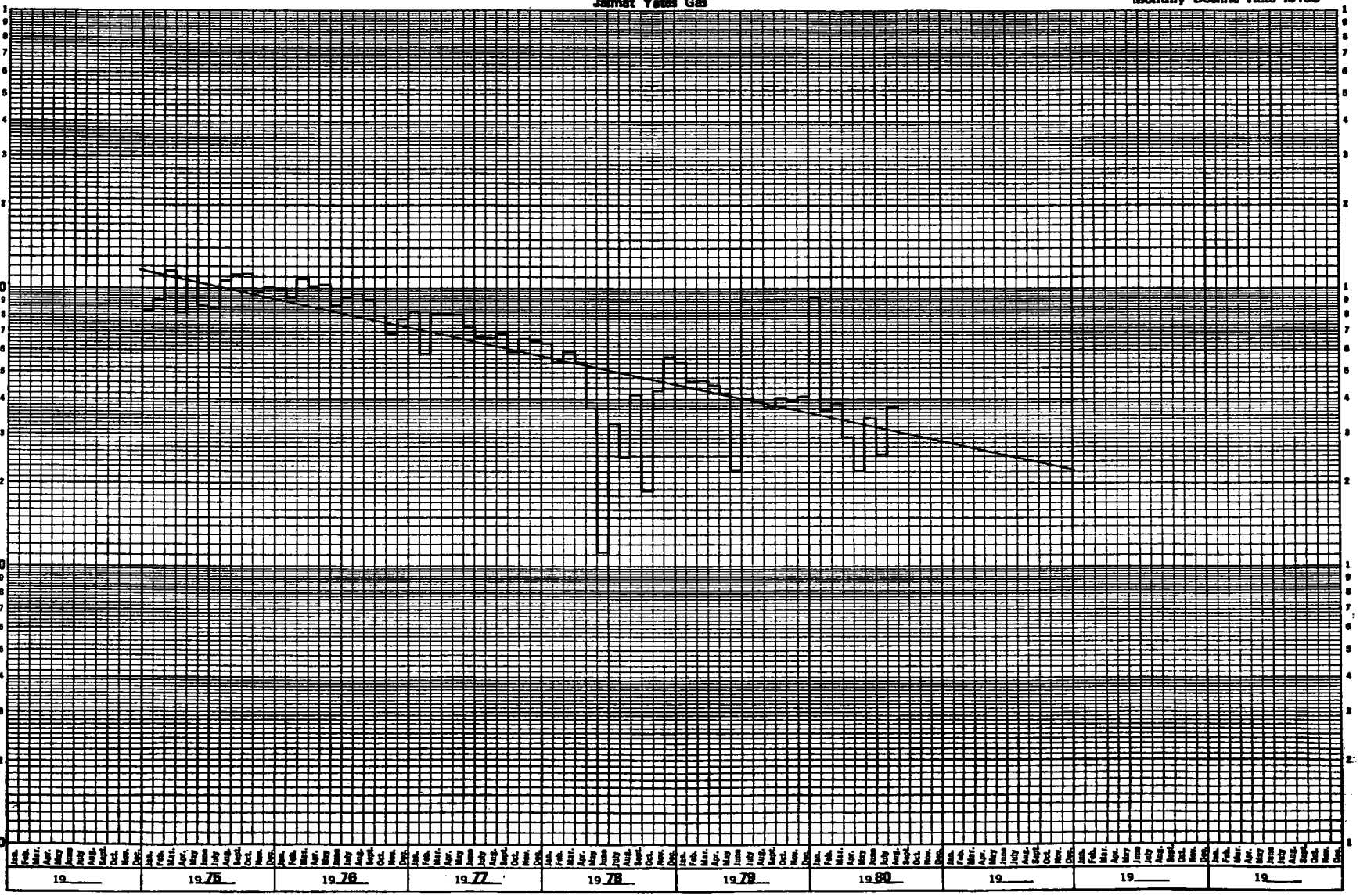
N = .987 BCF gas

Recovery was also calculated using the shut in pressure recorded after the completion of the well. The pressure was plotted on a BHP/z vs cumulative production graph and the same slope exhibited by the State LM "T" No. 2 was applied to it. (plot attached) This method showed anticipated recovery to be 1.2 BCF.

Since the two methods closely agree a reasonable anticipated recovery figure is 1.0 BCF.

ARCO
John P. Combest No. 1
Unit H, Sec. 35 T23S, R38E
Monthly Decline Rate .0196

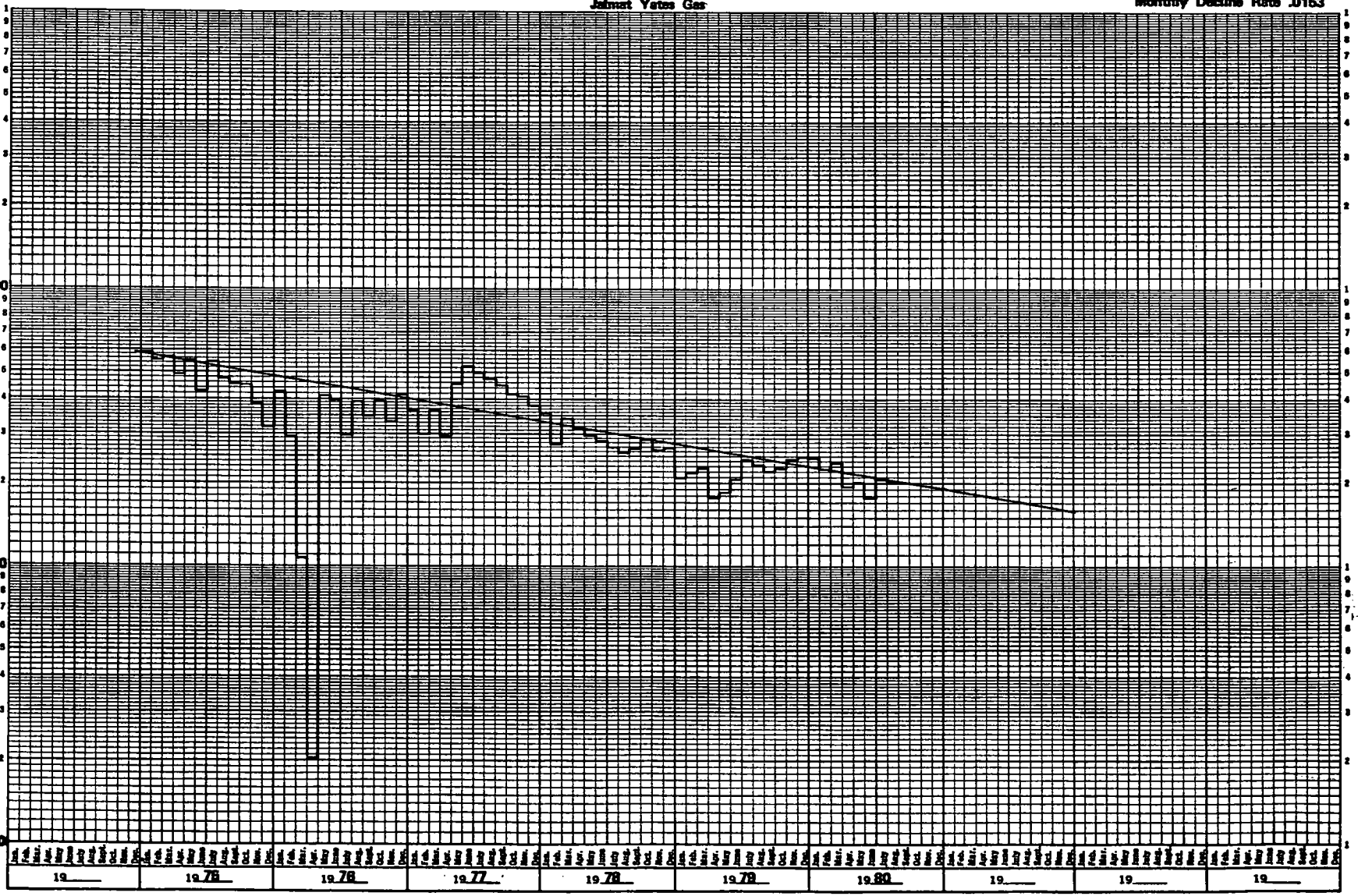
Jalmat Yates Gas



K&E 10 YEARS BY 3 MONTHS 47 0743
X 3 LOG CYCLES
KEUFFEL & ESSER CO.

CITIES SERVICE
State 'Q' No. 1
Unit 'L' Sec. 38 T23S, R36E
Monthly Decline Rate .0153

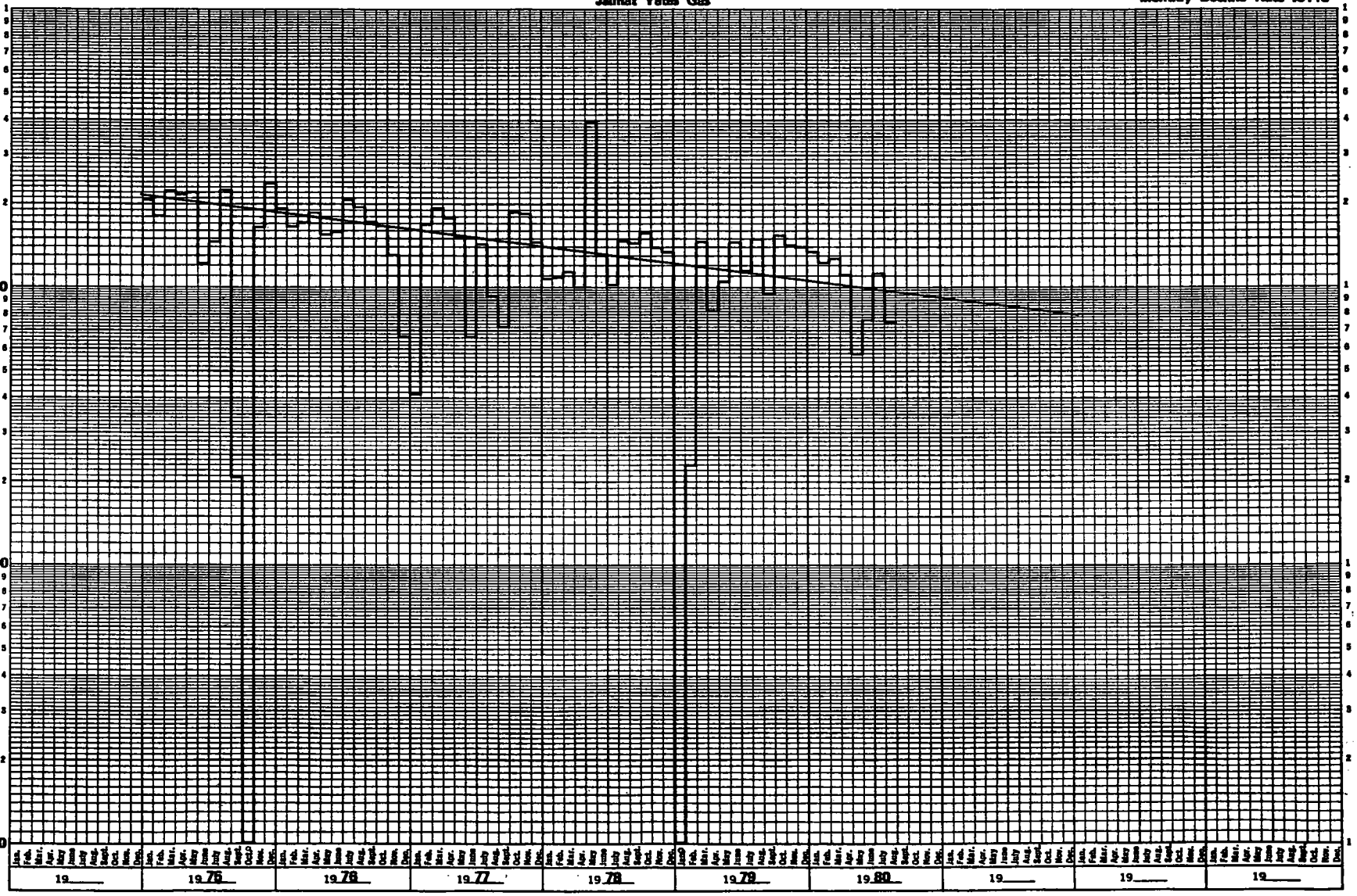
Jalmat Yates Gas



K&E 10 YEARS BY MONTHS 2 X 3 LOG CYCLES KEUFFEL & ESSER CO. 47 6743

CONOCO
Lynn B 25 No. 2
Unit M, Sec. 25 T23S, R36E
Monthly Decline Rate .0118

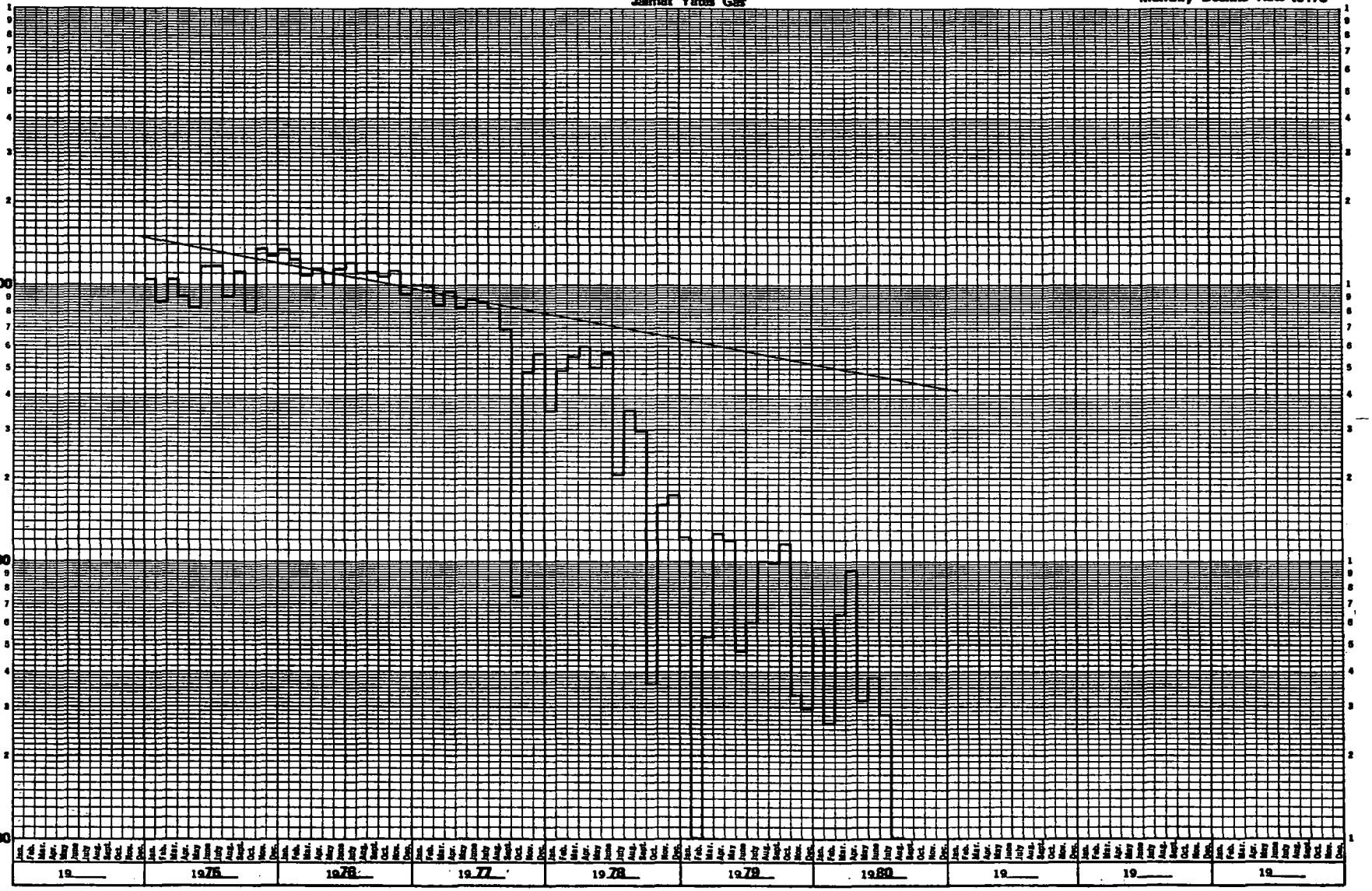
Jalmat Yates Gas



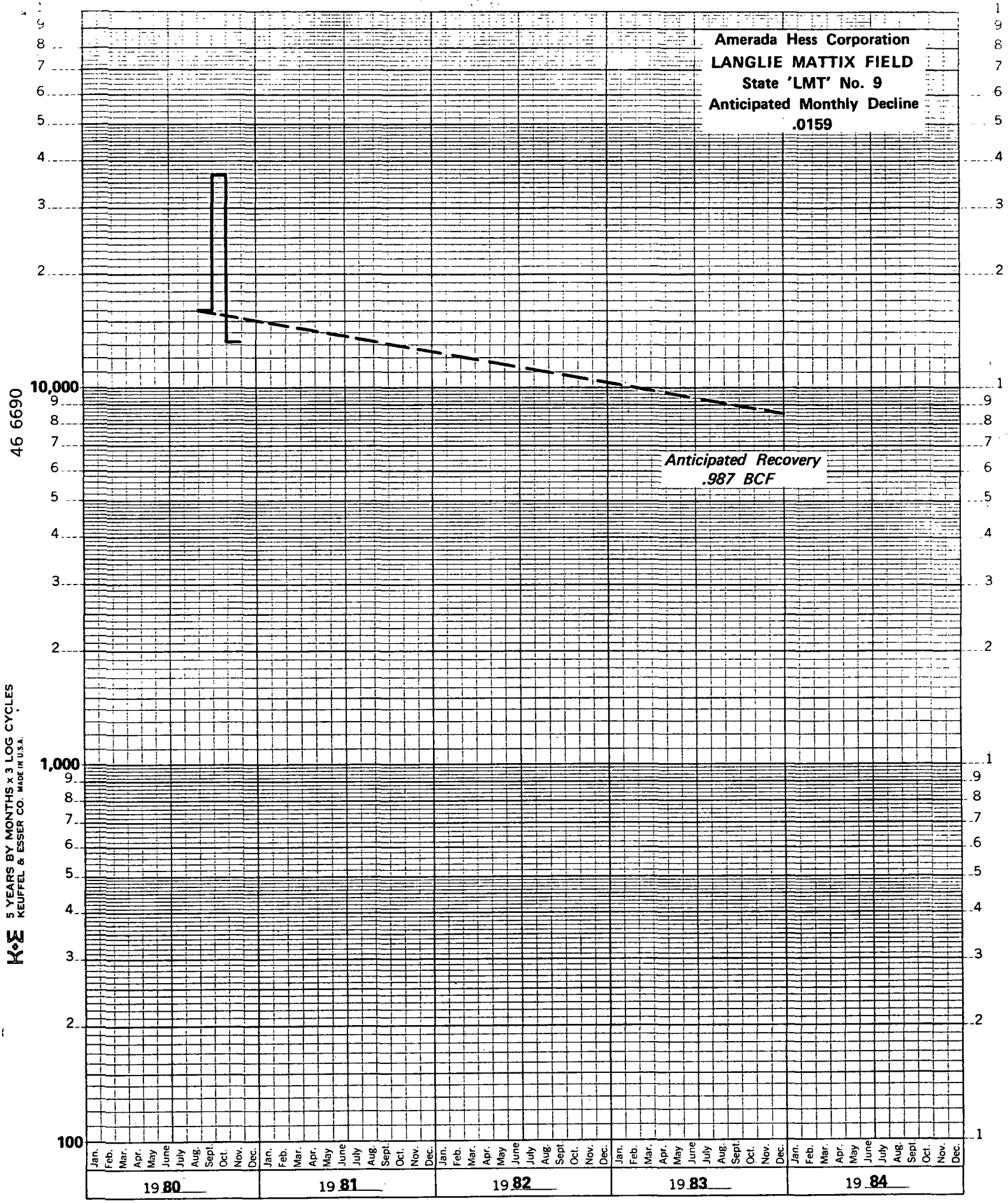
K&E 10 YEARS BY MONTHS 47 0743
2 X 5 LOG CYCLES
KEUFFEL & ESSER CO.

AMERADA HESS CORP.
State 'LMT' No. 2
Unit F, Sec. 36 T23S, R38E
Monthly Decline Rate .0173

Jalmat Yates Gas

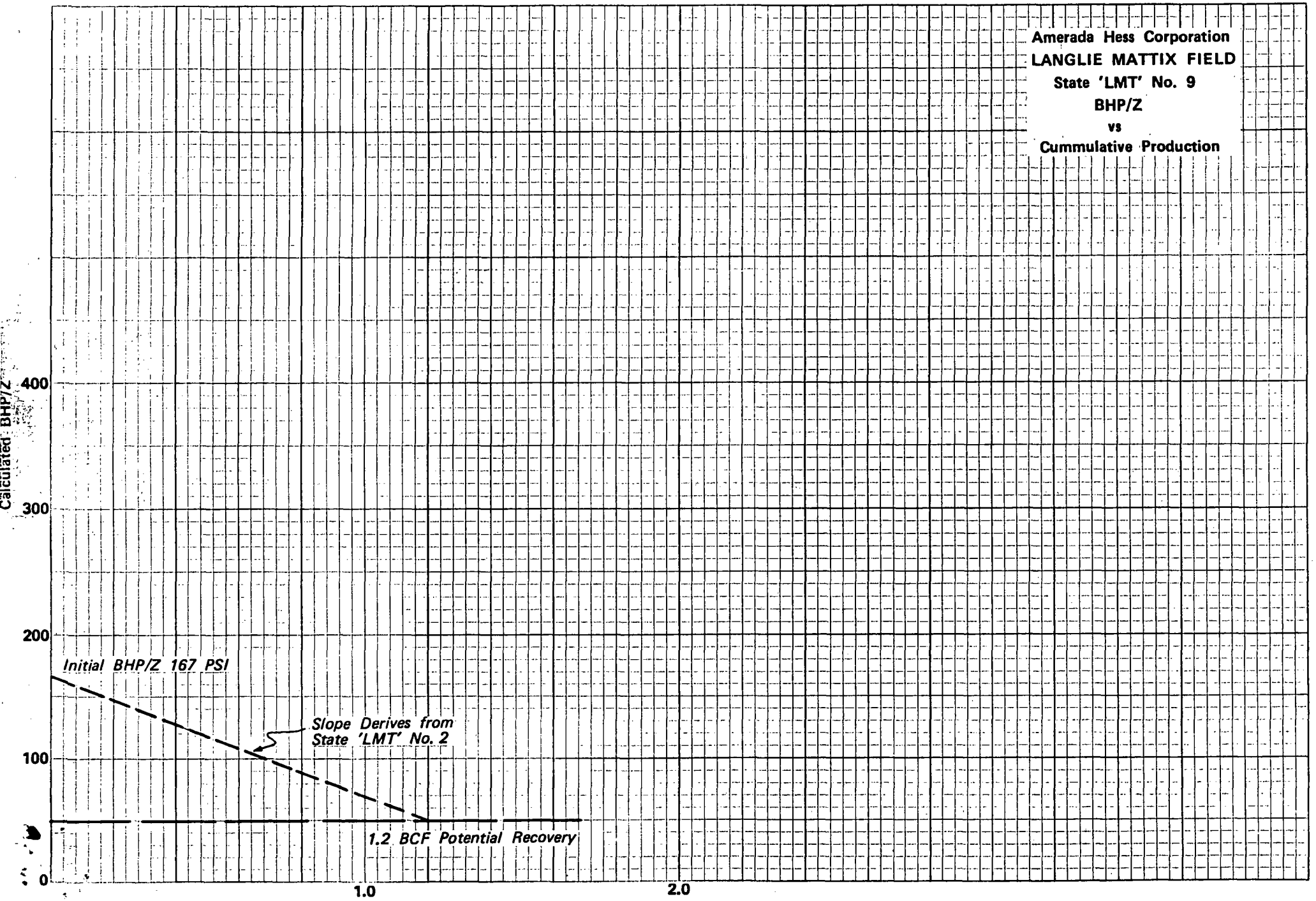


K&E 10 YEARS BY MONTHS 47 0743
X 9 LOG CYCLES
KEUFFEL & ESSER CO.



46 6690

KE 5 YEARS BY MONTHS x 3 LOG CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.



AMERADA HESS CORPORATION

P. O. BOX 840
SEMINOLE, TEXAS 79360
915-758-6700

New Mexico Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87501

Re: Request for Administrative NGPA infill well finding, State LM "T" Well No. 9, Eumont Gas Pool, Lea County.

Attn: Mr. R. L. Stamets
Technical Support Chief

Gentlemen:

The Amerada Hess Corporation respectfully requests that an administrative finding be made under the Oil Conservation Division Order R-6013 that the drilling of the AHC State LM "T" Well No. 9 infill well was necessary to effectively and efficiently drain a portion of the Eumont Gas Pool (Yates, Seven Rivers and Queen formations) covered by a proration unit which cannot be drained by any existing well within the unit.

The following data is submitted to comply with the filing requirements of the order:

1. (Rule 5.) A copy of the approved Form C-101 for the infill well and Form C-102 showing the proration unit dedicated to the infill well is attached.

2. (Rule 6.) The standard proration unit size for the Eumont Gas Pool is 640 acres as designated by Order R-521, dated August 12, 1954, succeeded by Order R-1670.

3. (Rule 7.) The non-standard proration unit dedicated to the subject well was approved by Division order NSP-1194, dated May 26, 1980.

4. (Rule 8.) There are two wells drilled on this proration unit that are, or have been completed in the Eumont Gas Pool. The data on the first well is as follows:

    a. The AHC State LM "T" Well No. 2, located 1980' FNL and 1980' FWL Sec. 36-23S-36E, Lea County.
    b. Spud date: October 29, 1948.
    c. Completion date: November 19, 1948 (Eumont, March, 1959).

d. The Eumont Gas zone was an annular completion of a water injection - gas zone dually completed well, producing through the 2-3/8" tubing and 5-1/2" casing annular area. On September 10, November 1, and November 27, 1979 the tubing was pulled. This is indicative of past tubing problems (corrosion) due to the oil zone operations. The Eumont Gas zone has apparently been damaged by injection and load water during these operations. Beginning in 1977 the completion experienced a sharp decline in production.

e.,f. The Eumont Gas zone was abandoned August 13, 1980. PA Report in file

g. The well would have been incapable of draining all of the reserves covered by this proration unit. The following geological and reservoir data discussion indicates that Well No. 2 would have been capable of effectively and efficiently draining only 6.9 Bcf of the estimated 10.5 Bcf of recoverable gas underlying this proration unit, even is the formation had not been damaged during the operation to repair the tubing.

The data on the second (infill) well completed in the Eumont Gas Pool on this proration unit is as follows:

a. The State LM "T" No. 9, located 780' FNL and 1860' FWL, Sec. 36-23S-36E, Lea County.

b. Spud date: February 1, 1980.

c. Completion date: March 31, 1980.

d. This well was completed by the open hole method using air as the drilling fluid. This method of completion may have resulted in a higher well bore permeability and/or additional productive stringers available to the well bore to contribute additional production that is not available to the well bore of the first well.

e.,f. Well No. 9 has been shut-in since completion waiting on the sales line connection. The well has a shut-in tubing pressure of 164 psi and an indicated open flow potential of 800 Mcf/day.

g. It is apparent from a projection of the producing history of the existing well in this proration unit that only 6.9 Bcf of the total calculated recoverable 10.5 Bcf underlying the unit could have been produced by that well. The new well No. 9 has the potential of producing the calculated 4.93 Bcf remaining under the unit that has been developed by a superior completion method. In addition, Well No. 9 is thirteen feet higher on structure than Well No. 2 and in a more advantageous location to drain the reserves underlying the unit.

5. (Rule 9.) Geological and reservoir information presented in support of a finding as to the necessity for an infill well includes:

a. A Yates formation structure map with the subject proration unit outlined is attached.

b. It is anticipated that the State LM "T" Well No. 9 will recover 4.93 Bcf of gas that could not be recovered by the existing gas well on the proration unit. This increase was determined from the difference of the volumetric calculations of the recoverable

gas reserves contained in this 160 acre proration unit and the estimated ultimate reserves that may have been recovered from Well No. 2, described as follows:

1. One accepted method of reserve determination for a volumetric (depletion-type) gas reservoir is the application of the principle of conservation of mass in the standard material balance equation:

$$G_i = Q_t \frac{(P_i/Z_i)}{P_i/Z_i - P_t/Z_t}$$

The solution of this equation at any time, t, and cumulative gas production, Q_t, will result in a single value for original gas in place, G_i. Values for G_i derived from calculations at different times may be averaged to determine an average value of the original gas in place.

A more convenient expression of the equation is:

$$P_t/Z_t = P_i/Z_i - CQ_t, \text{ where } C = \frac{(P_i/Z_i)}{G_i}$$

As indicated by the equation, a graph on coordinate paper of BHP/Z versus cumulative gas production will yield a linear plot. Extrapolation of a best fitting straight line to a zero value of P_t/Z_t will determine the gas-in-place in the reservoir. Recoverable gas would be a fraction of this amount as dictated by the abandonment pressure.

The Eumont Gas Pool has performed as a depletion-type reservoir as is demonstrated by the linear plot of P/Z versus cumulative production on Well No. 2 included in the attached. As this decline indicates no departure from its established trend, it can be assumed that the drainage volume of the well has remained constant and it is reasonable to expect it would not have changed in the short remaining life of the well. An extrapolation of the trend to the abandonment pressure of 50 psi dictated by sales line pressure in the area indicates the well could have recovered an ultimate 6.9 Bcf of gas before the well was unable to flow into the sales line.

2. A volumetric calculation of the recoverable gas reserves contained in this 160 acre proration unit is included in the attached. The calculations yield an estimation of 10.5 Bcf for the unit which is 4.93 Bcf more than the above estimated ultimate gas recovery from Well No. 2.

c. A cumulative production/pressure decline curve for Well No. 2 is attached.
d. Calculations for initial recoverable gas for Well No. 2 are also attached.

6. (Rule 11.) All operators of proration units offsetting the unit for which this infill finding is sought have been notified of this application by certified mail.

Thank You,
Amerada Hess Corporation

Norman A. Garrett
Regional Operations Engineer

Reserve Calculations
State LM "T" Well No. 2
160-Acre Proration Unit

Initial recoverable gas in unit, G_i:

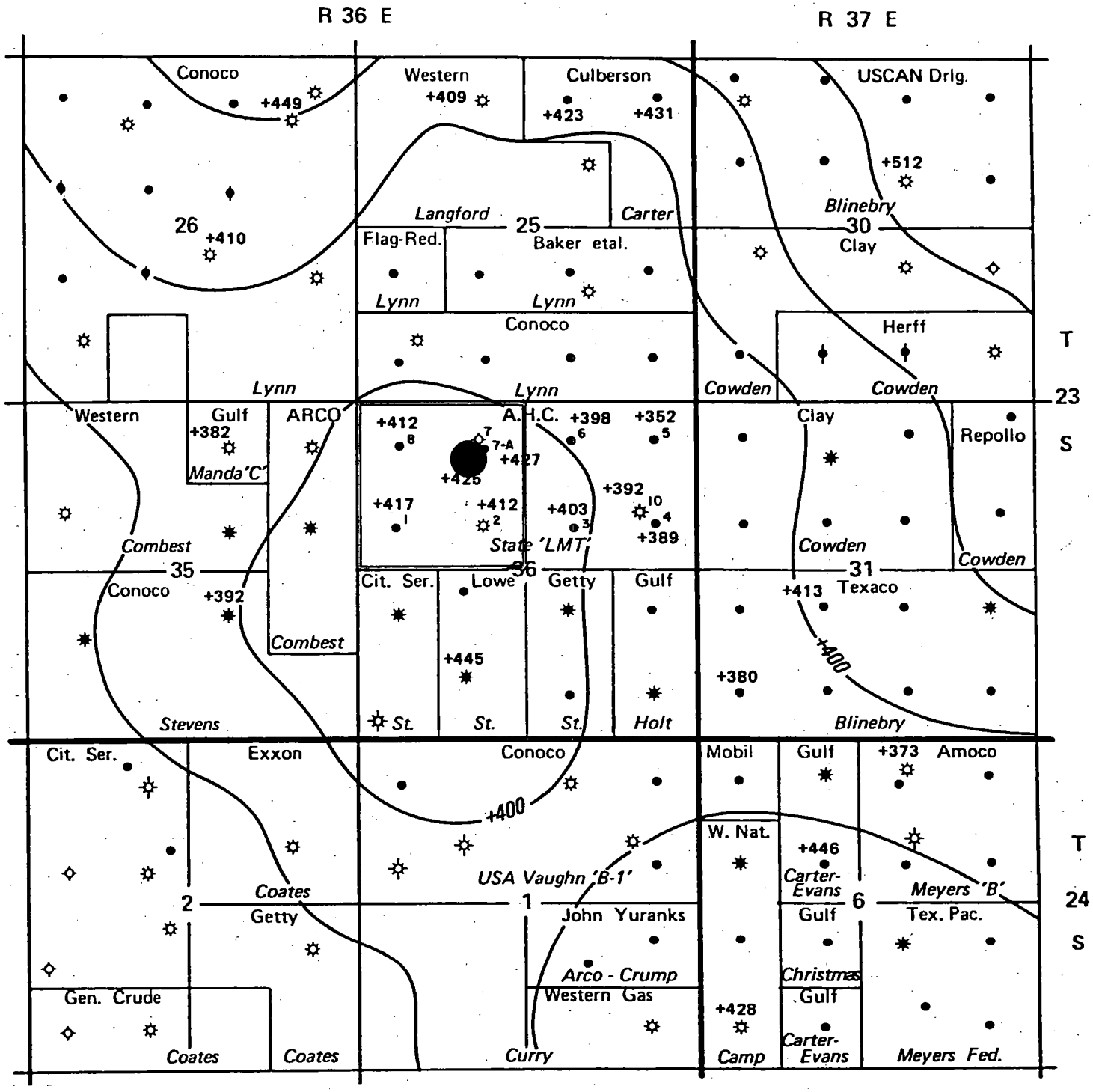
$$G_i = 43560\ A\ h\ \emptyset\ (1 - SW)\ B_{gi}\ R$$
$$= 43560\ (160)(250)(.130)(1 - .300)(73.59)(.9)$$
$$= 10.50\ Bcf$$

Where:

Area (a) = 160 acres
Net pay thickness (h) = 250 'average
Porosity ($\emptyset$) = 15.6%
Water Saturation (SW) = 30.0%
Initial reservoir pressure = 1100 psi
Gas gravity = .691
Formation temperature = 98^0 F.
Initial compressibility factor (Z_i) = .947
Recovery efficiency (R) = 90%
Reservoir volume factor (B_{gi}) = 73.59 scf/ft^3

$$\text{from: } B_{gi} = 35.35 \frac{P_i}{Z_i\ T_i}$$

$$= 35.35 \frac{1100}{.947(558)} = 73.59$$



Infill Gas Well

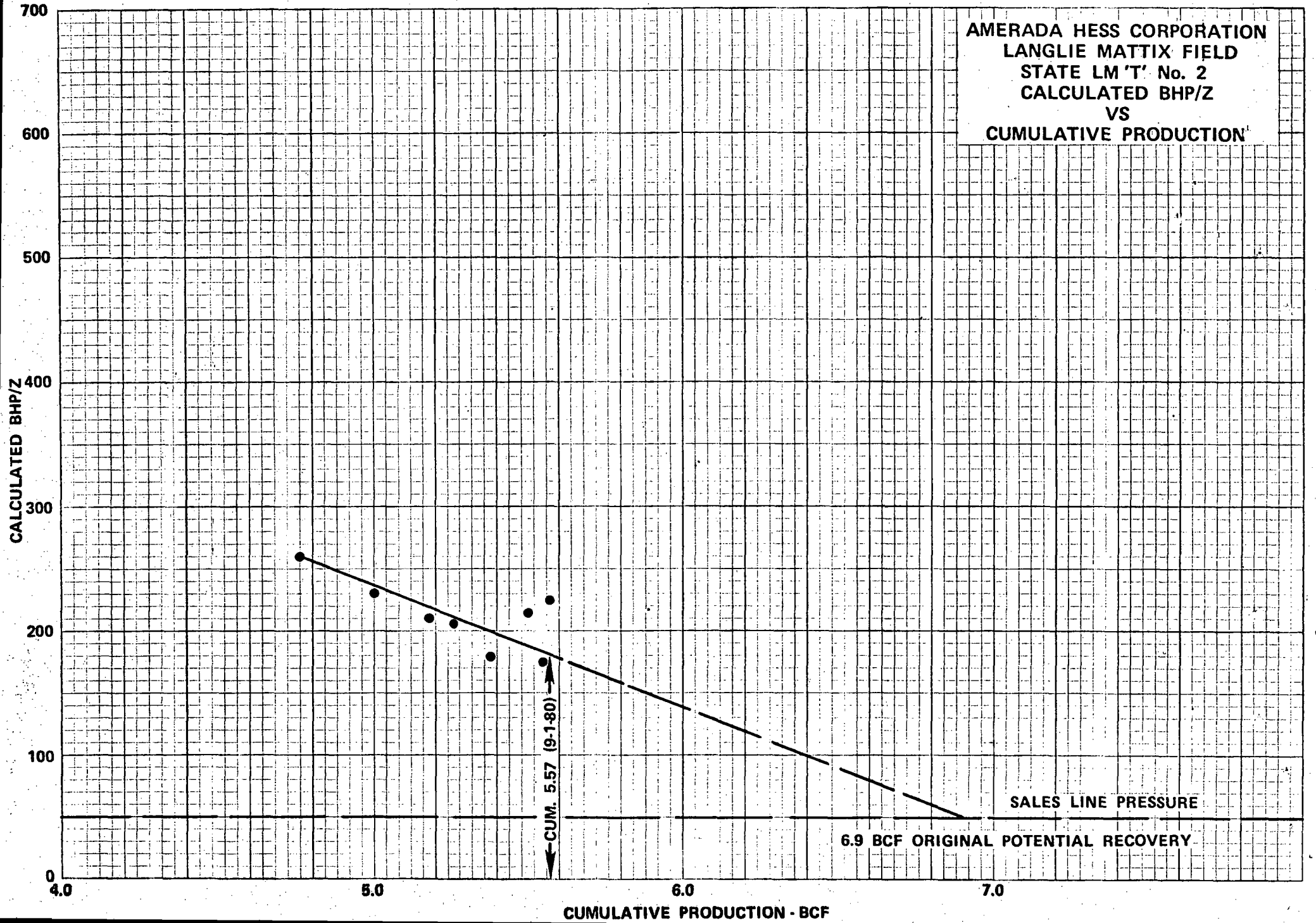
Unit Outline

0 ½ 1

Scale in Miles

SOUTHWEST PRODUCTION REGION
LANGLIE MATTIX FIELD
STATE 'LMT' LEASE
Lea County, New Mexico

STRUCTURE
TOP / YATES
Contour Interval = 50'
Geology by P. E. Nelson 9/1/80



30-025-26616

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NEW MEXICO OIL CONSERVATION COMMISSION

Form C-101
Revised 1-1-65

5A. Indicate Type of Lease: STATE [X] FEE [ ]

5. State Oil & Gas Lease No.: B 1413

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

Type of Work: DRILL [X] DEEPEN [ ] PLUG BACK [ ]

Type of Well: OIL WELL [ ] GAS WELL [ ] OTHER SINGLE ZONE [ ] MULTIPLE ZONE [ ]

7. Unit Agreement Name:

8. Farm or Lease Name: State LM "T"

Name of Operator: Amerada Hess Corporation

9. Well No.: 9

Address of Operator: Drawer "D" Monument, New Mexico

10. Field and Pool, or Wildcat: Jalmat

Location of Well: UNIT LETTER C LOCATED 780 FEET FROM THE North LINE

1860 FEET FROM THE West LINE OF SEC. 36 TWP. 23 S RGE. 36 E NMPM

12. County: Lea

19. Proposed Depth	19A. Formation	20. Rotary or C.T.
3500	Yate-7 Rivers	Rotary

Elevations (Show whether DF, RT, etc.)	21A. Kind & Status Plug. Bond	21B. Drilling Contractor	22. Approx. Date Work will start
3333 G.L.	Blanket	Cactus	Jan 1980

PROPOSED CASING AND CEMENT PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	SACKS OF CEMENT	EST. TOP
12 1/4	8 5/8	32#	325	200	Circulate
7 7/8	5 1/2	15#	3500	750	Circulate

Drill 12 1/4 inch hole and set 8 5/8 surface pipe, circulate cement. Drill out with 7 7/8 bit and drill to 3500' and set 5 1/2" casing, circulate cement. Complete in the Yates-7 Rivers Sands.

Blowout Equipment, consists of 10" Cameron Type "F" Series 900 Dbl.Hyd w/Payne closing Unit, Gas separator and de-gasser complete w/Auto.Choke. All BOP equipment will be checked periodically by a Cactus Drilling Company driller and Amerada Hess well site drilling supervisor.

Gas dedicated to purchaser.

RECEIVED
OCT 20 1980
OIL CONSERVATION DIVISION
SANTA FE

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: IF PROPOSAL IS TO DEEPEN OR PLUG BACK, GIVE DATA ON PRESENT PRODUCTIVE ZONE AND PROPOSED NEW PRODUCTIVE ZONE. GIVE BLOWOUT PREVENTER PROGRAM, IF ANY.

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

Signed R. L. Hamrick Title District Engineer Date 10-26-79

(This space for State Use)

APPROVED BY [signature] TITLE SUPERVISOR DISTRICT I DATE JAN 3 1980

CONDITIONS OF APPROVAL, IF ANY:

NEW MEXICO OIL CONSERVATION COMMISSION

WE LOCATION AND ACREAGE DEDICATI PLAT

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

All distances must be from the outer boundaries of the Section

Operator	Lease	Well No.
AMERADA HESS CORP.	State LMT	9

Unit Letter	Section	Township	Range	County
C	36	23 South	36 East	Lea

Actual Footage Location of Well:
780 feet from the north line and 1860 feet from the west line

Ground Level Elev.	Producing Formation	Pool	Dedicated Acreage:
3333.1	Yates Seven Rivers Queen	Jalmat	160 Acres

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

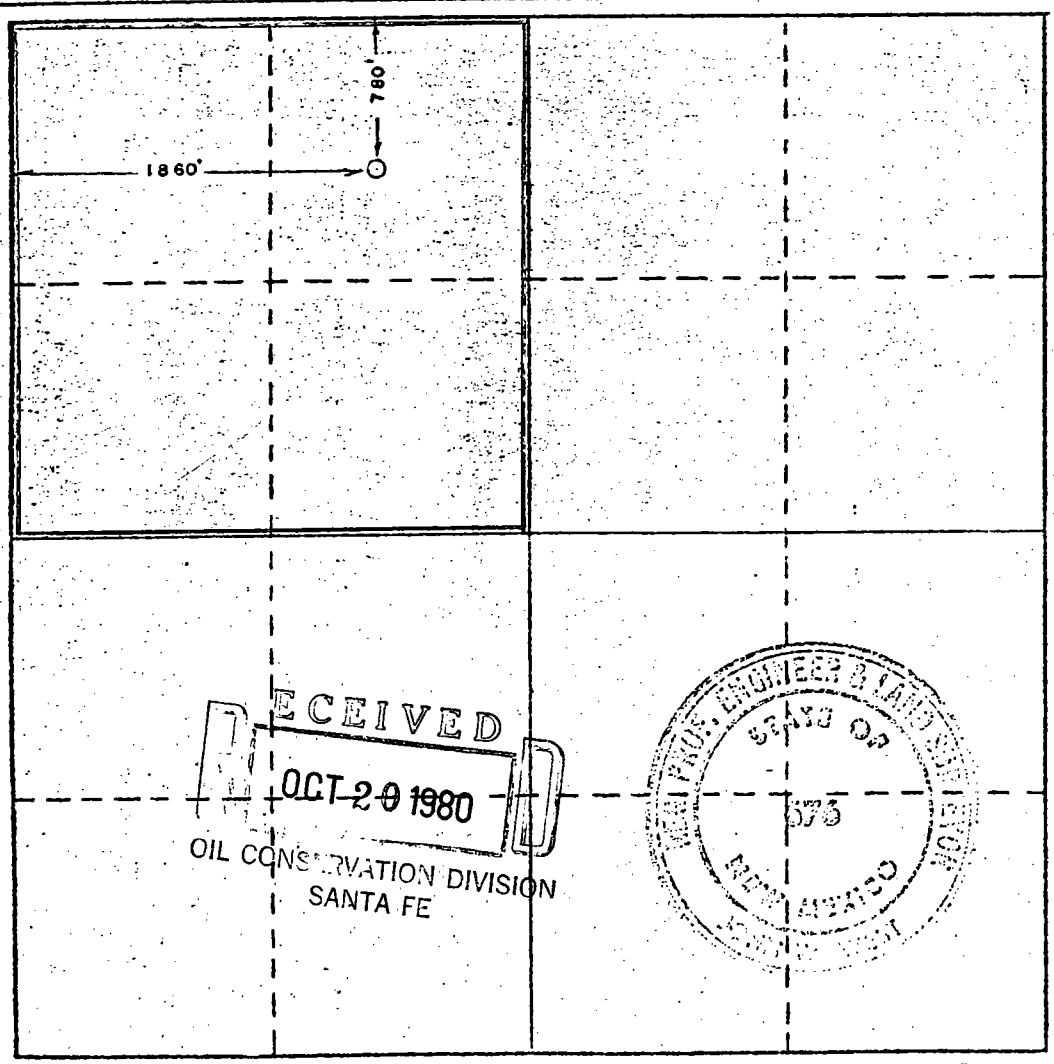
2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).

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

Position
Supv. Adm. Ser.

Company
Amerada Hess Corporation

Date
4-22-80

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
Dec. 8, 1979

Registered Professional Engineer and/or Land Surveyer

Certificate No. John W. West 676
Ronald J. Eidson 3239

AMERADA HESS CORPORATION

P. O. BOX 840
SEMINOLE, TEXAS 79360
915-758-6700

New Mexico Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87501

Re: Request for Administrative NGPA infill well finding, State LM "T" Well No. 9, Eumont Gas Pool, Lea County.

Attn: Mr. R. L. Stamets
Technical Support Chief

Gentlemen:

The Amerada Hess Corporation respectfully requests that an administrative finding be made under the Oil Conservation Division Order R-6013 that the drilling of the AHC State LM "T" Well No. 9 infill well was necessary to effectively and efficiently drain a portion of the Eumont Gas Pool (Yates, Seven Rivers and Queen formations) covered by a proration unit which cannot be drained by any existing well within the unit.

The following data is submitted to comply with the filing requirements of the order:

1. (Rule 5.) A copy of the approved Form C-101 for the infill well and Form C-102 showing the proration unit dedicated to the infill well is attached.

2. (Rule 6.) The standard proration unit size for the Eumont Gas Pool is 640 acres as designated by Order R-521, dated August 12, 1954, succeeded by Order R-1670.

3. (Rule 7.) The non-standard proration unit dedicated to the subject well was approved by Division order NSP-1194, dated May 26, 1980.

4. (Rule 8.) There are two wells drilled on this proration unit that are, or have been completed in the Eumont Gas Pool. The data on the first well is as follows:

    a. The AHC State LM "T" Well No. 2, located 1980' FNL and 1980' FWL Sec. 36-23S-36E, Lea County.
    b. Spud date: October 29, 1948.
    c. Completion date: November 19, 1948 (Eumont, March, 1959).

d. The Eumont Gas zone was an annular completion of a water injection - gas zone dually completed well, producing through the 2-3/8" tubing and 5-1/2" casing annular area. On September 10, November 1, and November 27, 1979 the tubing was pulled. This is indicative of past tubing problems (corrosion) due to the oil zone operations. The Eumont Gas zone has apparently been damaged by injection and load water during these operations. Beginning in 1977 the completion experienced a sharp decline in production.

e.,f. The Eumont Gas zone was abandoned August 13, 1980.

g. The well would have been incapable of draining all of the reserves covered by this proration unit. The following geological and reservoir data discussion indicates that Well No. 2 would have been capable of effectively and efficiently draining only 6.9 Bcf of the estimated 10.5 Bcf of recoverable gas underlying this proration unit, even is the formation had not been damaged during the operation to repair the tubing.

The data on the second (infill) well completed in the Eumont Gas Pool on this proration unit is as follows:

a. The State LM "T" No. 9, located 780' FNL and 1860' FWL, Sec. 36-23S-36E, Lea County.

b. Spud date: February 1, 1980.

c. Completion date: March 31, 1980.

d. This well was completed by the open hole method using air as the drilling fluid. This method of completion may have resulted in a higher well bore permeability and/or additional productive stringers available to the well bore to contribute additional production that is not available to the well bore of the first well.

e.,f. Well No. 9 has been shut-in since completion waiting on the sales line connection. The well has a shut-in tubing pressure of 164 psi and an indicated open flow potential of 800 Mcf/day.

g. It is apparent from a projection of the producing history of the existing well in this proration unit that only 6.9 Bcf of the total calculated recoverable 10.5 Bcf underlying the unit could have been produced by that well. The new well No. 9 has the potential of producing the calculated 4.93 Bcf remaining under the unit that has been developed by a superior completion method. In addition, Well No. 9 is thirteen feet higher on structure than Well No. 2 and in a more advantageous location to drain the reserves underlying the unit.

5. (Rule 9.) Geological and reservoir information presented in support of a finding as to the necessity for an infill well includes:

a. A Yates formation structure map with the subject proration unit outlined is attached.

b. It is anticipated that the State LM "T" Well No. 9 will recover 4.93 Bcf of gas that could not be recovered by the existing gas well on the proration unit. This increase was determined from the difference of the volumetric calculations of the recoverable

gas reserves contained in this 160 acre proration unit and the estimated ultimate reserves that may have been recovered from Well No. 2, described as follows:

1. One accepted method of reserve determination for a volumetric (depletion-type) gas reservoir is the application of the principle of conservation of mass in the standard material balance equation:

$$G_i = Q_t \frac{(P_i/Z_i)}{P_i/Z_i - P_t/Z_t}$$

The solution of this equation at any time, t, and cumulative gas production, Q_t, will result in a single value for original gas in place, G_i. Values for G_i derived from calculations at different times may be averaged to determine an average value of the original gas in place.

A more convenient expression of the equation is:

$$P_t/Z_t = P_i/Z_i - CQ_t, \text{ where } C = \frac{(P_i/Z_i)}{G_i}$$

As indicated by the equation, a graph on coordinate paper of BHP/Z versus cumulative gas production will yield a linear plot. Extrapolation of a best fitting straight line to a zero value of P_t/Z_t will determine the gas-in-place in the reservoir. Recoverable gas would be a fraction of this amount as dictated by the abandonment pressure.

The Eumont Gas Pool has performed as a depletion-type reservoir as is demonstrated by the linear plot of P/Z versus cumulative production on Well No. 2 included in the attached. As this decline indicates no departure from its established trend, it can be assumed that the drainage volume of the well has remained constant and it is reasonable to expect it would not have changed in the short remaining life of the well. An extrapolation of the trend to the abandonment pressure of 50 psi dictated by sales line pressure in the area indicates the well could have recovered an ultimate 6.9 Bcf of gas before the well was unable to flow into the sales line.

2. A volumetric calculation of the recoverable gas reserves contained in this 160 acre proration unit is included in the attached. The calculations yield an estimation of 10.5 Bcf for the unit which is 4.93 Bcf more than the above estimated ultimate gas recovery from Well No. 2.

c. A cumulative production/pressure decline curve for Well No. 2 is attached.
d. Calculations for initial recoverable gas for Well No. 2 are also attached.

6. (Rule 11.) All operators of proration units offsetting the unit for which this infill finding is sought have been notified of this application by certified mail.

Thank You,
Amerada Hess Corporation

Norman A. Garrett
Regional Operations Engineer

Reserve Calculations
State LM "T" Well No. 2
160-Acre Proration Unit

Initial recoverable gas in unit, G_i:

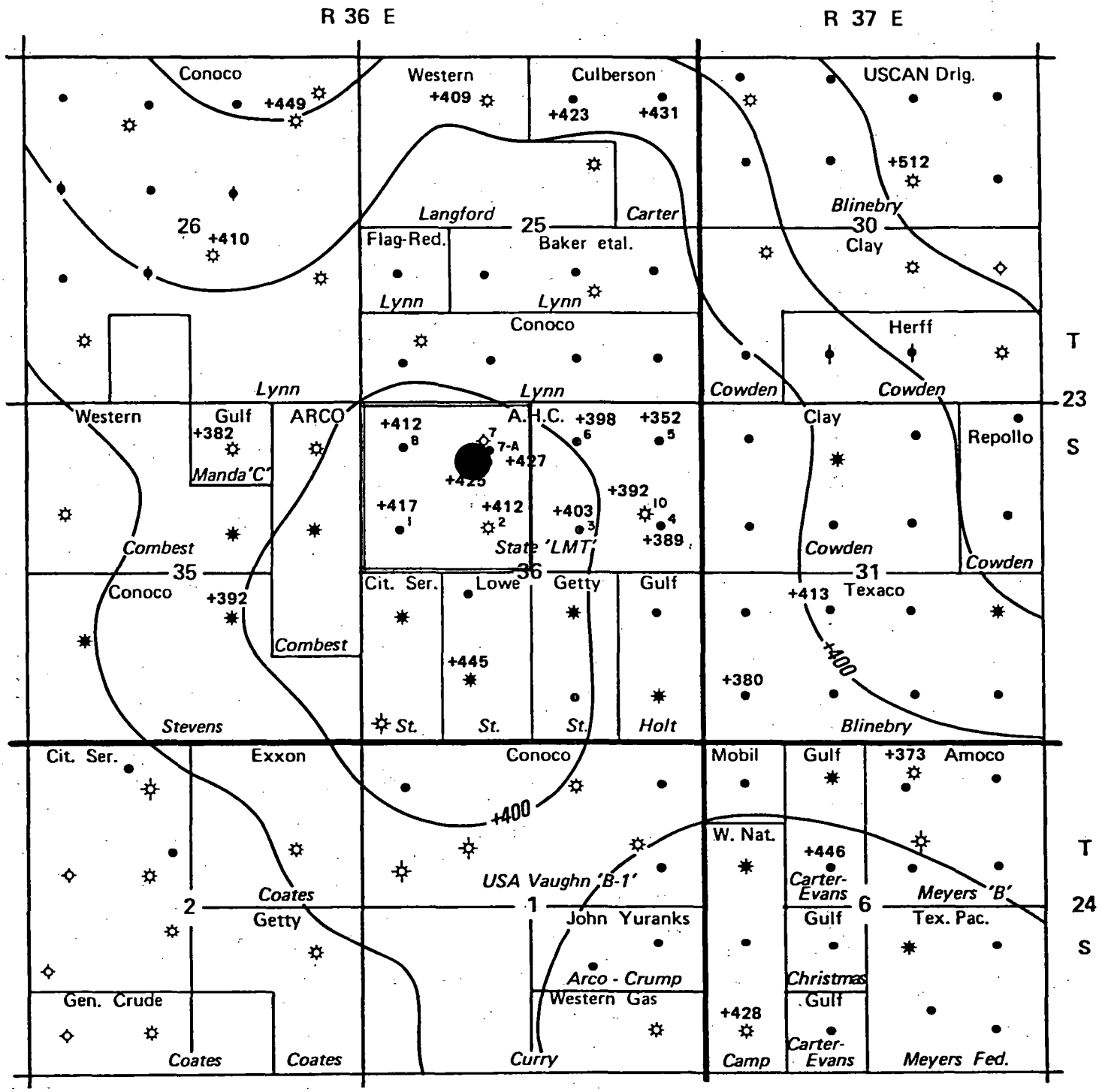
$$G_i = 43560\ A\ h\ \emptyset\ (1 - SW)\ B_{gi}\ R$$
$$= 43560\ (160)(250)(.130)(1 - .300)(73.59)(.9)$$
$$= 10.50\ Bcf$$

Where:

Area (a) = 160 acres
Net pay thickness (h) = 250 average
Porosity ($\emptyset$) = 15.6%
Water Saturation (SW) = 30.0%
Initial reservoir pressure = 1100 psi
Gas gravity = .691
Formation temperature = 98° F.
Initial compressibility factor (Z_i) = .947
Recovery efficiency (R) = 90%
Reservoir volume factor (B_{gi}) = 73.59 scf/ft^3

$$\text{from: } B_{gi} = 35.35 \frac{P_i}{Z_i\ T_i}$$

$$= 35.35 \frac{1100}{.947(558)} = 73.59$$



Infill Gas Well

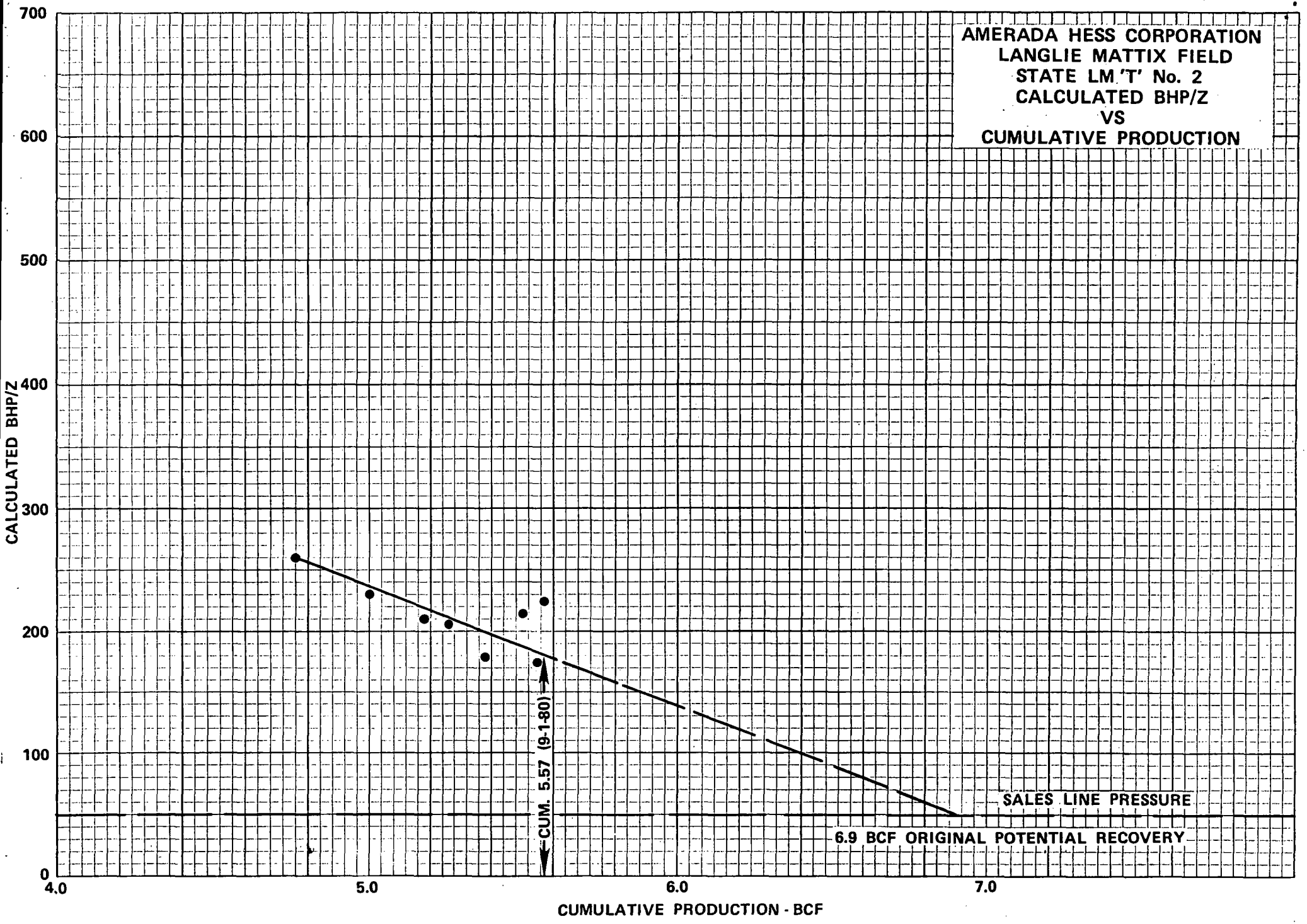
Unit Outline

0 ½ 1

Scale in Miles

SOUTHWEST PRODUCTION REGION
LANGLIE MATTIX FIELD
STATE 'LMT' LEASE
Lea County, New Mexico

STRUCTURE
TOP / YATES
Contour Interval = 50'
Geology by P. E. Nelson 9/1/80



30-025-26616

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OPERATOR		

NEW MEXICO OIL CONSERVATION COMMISSION

Form C-101
Revised 1-1-65

5A. Indicate Type of Lease: STATE [X] FEE [ ]

5. State Oil & Gas Lease No.: B 1413

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

Type of Work: DRILL [X] DEEPEN [ ] PLUG BACK [ ]

Type of Well: OIL WELL [ ] GAS WELL [ ] OTHER SINGLE ZONE [ ] MULTIPLE ZONE [ ]

7. Unit Agreement Name:

8. Farm or Lease Name: State LM "T"

Name of Operator: Amerada Hess Corporation

9. Well No.: 9

Address of Operator: Drawer "D" Monument, New Mexico

10. Field and Pool, or Wildcat: Jalmat

Location of Well: UNIT LETTER C LOCATED 780 FEET FROM THE North LINE

1860 FEET FROM THE West LINE OF SEC. 36 TWP. 23 S RGE. 36 E NMPM

12. County: Lea

19. Proposed Depth	19A. Formation	20. Rotary or C.T.
3500	Yate-7 Rivers	Rotary

Elevations (Show whether DF, RT, etc.)	21A. Kind & Status Plug. Bond	21B. Drilling Contractor	22. Approx. Date Work will start
3333 G.L.	Blanket	Cactus	Jan 1980

PROPOSED CASING AND CEMENT PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	SACKS OF CEMENT	EST. TOP
12 1/4	8 5/8	32#	325	200	Circulate
7 7/8	5 1/2	15#	3500	750	Circulate

Drill 12 1/4 inch hole and set 8 5/8 surface pipe, circulate cement. Drill out with 7 7/8 bit and drill to 3500' and set 5 1/2" casing, circulate cement. Complete in the Yates-7 Rivers Sands.

Blowout Equipment, consists of 10" Cameron Type "F" Series 900 Dbl.Hyd w/Payne closing Unit, Gas separator and de-gasser complete w/Auto.Choke. All BOP equipment will be checked periodically by a Cactus Drilling Company driller and Amerada Hess well site drilling supervisor.

Gas dedicated to purchaser.

RECEIVED
OCT 30 1980
OIL CONSERVATION DIVISION
SANTA FE

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: IF PROPOSAL IS TO DEEPEN OR PLUG BACK, GIVE DATA ON PRESENT PRODUCTIVE ZONE AND PROPOSED NEW PRODUCTIVE ZONE. GIVE BLOWOUT PREVENTER PROGRAM, IF ANY.

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

Signed [signature] Title District Engineer Date 10-26-79

(This space for State Use)

APPROVED BY [signature] TITLE SUPERVISOR DISTRICT I DATE JAN 3 1980

CONDITIONS OF APPROVAL, IF ANY:

NEW MEXICO OIL CONSERVATION COMMISSION

WE LOCATION AND ACREAGE DEDICATI PLAT

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

All distances must be from the outer boundaries of the Section

Operator	Lease	Well No.
AMERADA HESS CORP.	State LMT	9

Unit Letter	Section	Township	Range	County
C	36	23 South	36 East	Lea

Actual Footage Location of Well:
780 feet from the north line and 1860 feet from the west line

Ground Level Elev.	Producing Formation	Pool	Dedicated Acreage:
3333.1	Yates Seven Rivers Queen	Jalmat	160 Acres

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

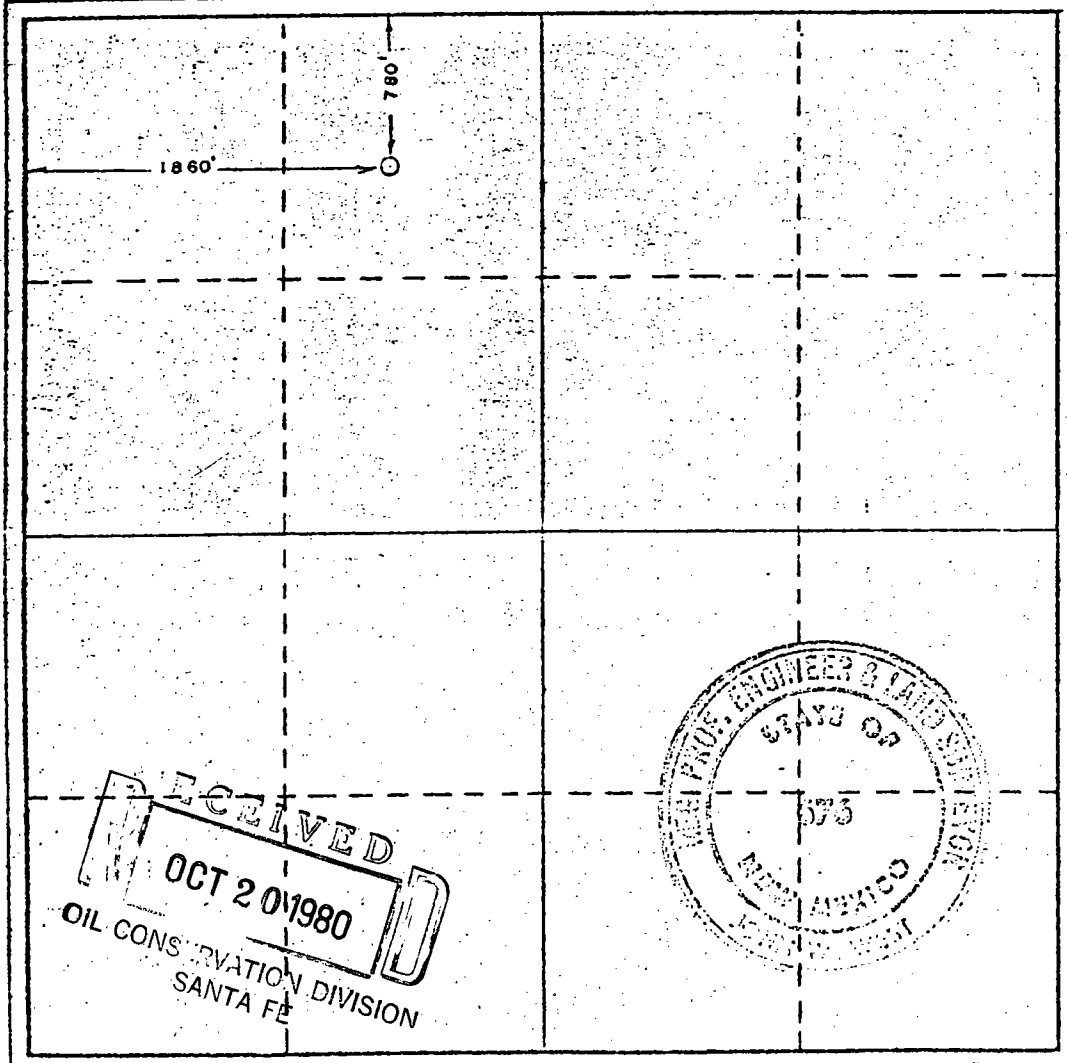
2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).

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.



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OCT 20 1980
OIL CONSERVATION DIVISION
SANTA FE

0 330 660 990 1320 1650 1980 2310 2640 2000 1500 1000 500 0

CERTIFICATION

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

Name

Position
Supv. Adm. Ser.

Company
Amerada Hess Corporation

Date
4-22-80

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
Dec. 8, 1979

Registered Professional Engineer and/or Land Surveyer

Certificate No. John W. West 676
Ronald J. Eidson 3239

RECEIVED
OCT 20 1980
Oil Conservation

AMERADA HESS CORPORATION

P. O. BOX 840
SEMINOLE, TEXAS 79360
915-758-6700

New Mexico Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87501

Re: Request for Administrative NGPA infill well finding, State "W" Well No. 5, Eumont Gas Pool, Lea County.

Attn: Mr. R. L. Stamets
Technical Support Chief

Gentlemen:

The Amerada Hess Corporation respectfully requests that an administrative finding be made under the Oil Conservation Division Order R-6013 that the drilling of the AHC State "W" Well No. 5 infill well was necessary to effectively and efficiently drain a portion of the Eumont Gas Pool (Yates, Seven Rivers and Queen formations) covered by a proration unit which cannot be drained by any existing well within the unit.

The following data is submitted to comply with the filing requirements of the order:

1. (Rule 5.) A copy of the approved Form C-101 for the infill well and Form C-102 showing the proration unit dedicated to the infill well is attached.

2. (Rule 6.) The standard proration unit size for the Eumont Gas Pool is 640 acres as designated by Order R-521, dated August 12, 1954, suceeded by Order R-1670.

3. (Rule 7.) The non-standard proration unit dedicated to the subject well was approved by Division Order NSP-1192, dated May 19, 1980.

4. (Rule 8.) There are two wells drilled on this proration unit that are or have been completed in the Eumont Gas Pool. The data on the first well is as follows:

   a. The State "W" Well No. 2, located 1980' FNL and 1980' FEL Sec. 30-20S-37E, Lea County.
   b. Spud date: January 13, 1937
   c. Completion date: February 20, 1937 (Eumont Gas Pool perforated February 19, 1954).

d. The Eumont Gas zone is produced as a single well through 2-3/8" tubing. Present production is low and due to poor mechanical condition any remedial work is impossible.

e.,f. The well produced an average of 101 Mcf/day during July, 1980.

g. The well is incapable of draining all of the reserves covered by this proration unit. The geological and reservoir data discussion that follows the data information on Well No. 5 indicates that Well No. 2 will be capable of effectively and efficiently draining only 0.10 Bcf of the estimated 0.81 Bcf of recoverable gas underlying this proration unit.

The data on the second (infill) well completed in the Eumont Gas Pool on this proration unit is as follows:

a. The State "W" Well No. 5, located 1980' FNL and 780' FWL Sec. 30-20S-37E, Lea County.

b. Spud date: February 21, 1980.

c. Completion date: April 4, 1980.

d. This well was completed by the open hole method using gas as the drilling fluid. A comparison of the permeability-thickness (kh) calculations at initial conditions on both wells on the unit indicate a higher value for the infill Well No. 5. This higher value may be due to the open hole completion method resulting in a higher permeability and for additional productive stringers contributing to the new well.

e.,f. Well No. 5 has been shut-in since completion waiting on the recent sales line connection. The well has a shut-in tubing pressure of 254 psi and an indicated open hole flow potential of 355 Mcf/day.

g. It is apparent from a projection of the producing history of the first well in this proration unit that only 0.10 Bcf of the total calculated 0.81 Bcf underlying the unit can be produced by that well before the flowing pressure declines to the sales line pressure. The higher shut-in pressure and better permeability encountered in Well No. 5 indicates that it has the potential of producing the calculated 0.81 Bcf of gas remaining under the unit.

5. (Rule 9.) Geological and reservoir information presented in support of a finding as to the necessity for an infill well includes:

a. A Yates formation structure map with the subject proration unit outlined is attached.

b. It is anticipated that the State "W" Well No. 5 will recover 0.71 Bcf of gas that could not be recovered by the existing gas well on the proration unit. This increase was determined from the difference of the volumetric calculation of the recoverable gas reserves contained in this 159 acre proration unit and the estimated ultimate reserves that can be recovered from Well No. 2, described as follows:

1. One accepted method of reserve determination for a volumetric (depletion-type) gas reservoir is the application of the principle of conservation of mass in the standard material balance equation:

$$G_i = Q_t \frac{(P_i/Z_i)}{P_i/Z_i - P_t/Z_t}$$

The solution of this equation at any time, t, and cumulative gas production, Q_t, will result in a single value for the original gas in place, G_i. Values for G_i derived from calculations at different times may be averaged to determine an average value of the original gas in place.

A more convenient expression of the equation is:

$$P_t/Z_t = P_i/Z_i - CQ_t, \text{ where } C = \frac{P_i/Z_i}{G_i}$$

As indicated by the equation, a graph on coordinate paper of BHP/Z versus cumulative gas production will yield a linear plot. Extrapolation of a best fitting straight line to a zero value of P_t/Z_t will determine the gas-in-place in the reservoir. Recoverable gas would be a fraction of this amount as dictated by the abandonment pressure.

The Eumont Gas Pool has performed as a depletion-type reservoir as is demonstrated by the linear plot of P/Z versus cumulative production on Well No. 2 included in the attached. As this decline indicates no departure from its established trend, it can be assumed that the drainage volume of the well has remained constant and it is reasonable to expect it will not change in the short remaining life of the well. An extrapolation of the trend to the abandonment pressure of 120 psi dictated by the sales line pressure in the area indicates the well could have recovered an ultimate 0.10 Bcf of gas before the well was unable to flow into the sales line.

2. A volumetric calculation of the recoverable gas reserves contained in this 159 acre proration unit is included in the attached. The calculations yield an estimation of 0.81 Bcf for the unit which is 0.71 Bcf more than the above estimated ultimate gas recovery from Well No. 2.

c. A cumulative production/pressure decline for Well No. 2 is attached.
d. Calculations for initial recoverable gas for Well No. 2 are also attached.

6. (Rule 11.) All operators of proration units offsetting the unit for which this infill finding is sought have been notified of this application by certified mail.

Sincerely,
Amerada Hess Corporation

Norman A. Garrett

Norman A. Garrett
Regional Operations Engineer

NGA/eh

Reserve Calculations
State "W" Well No. 2
160-Acre Proration Unit

Initial recoverable gas in unit, G_i:

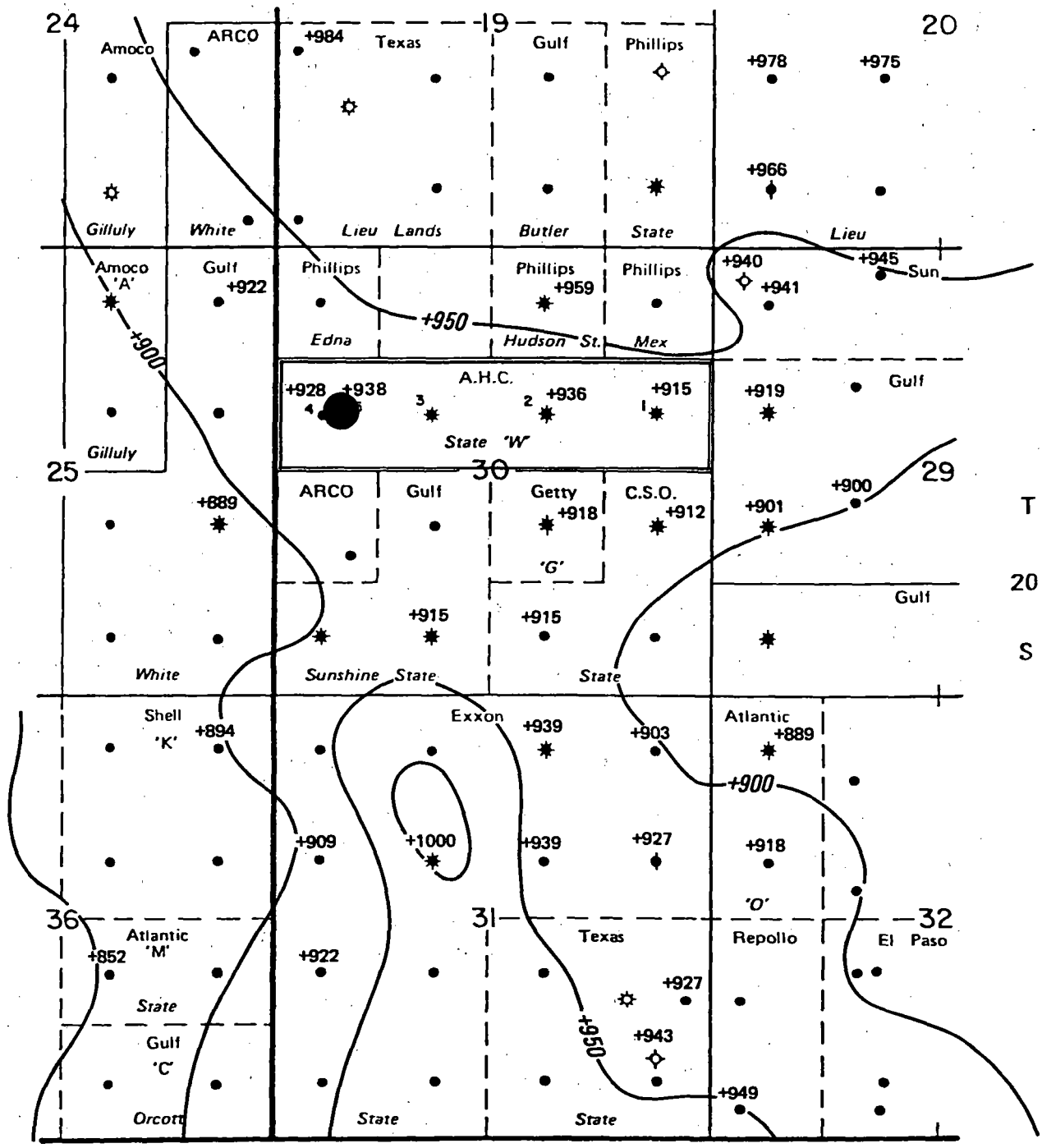
$$G_i = 43560\ A\ h\ \emptyset\ (1 - SW)\ Bg_i\ R$$
$$= 43560\ (159)(64)(.154)(1-.271)(79.86)(.9)$$
$$= 3.58\ Bcf$$

Where:

Area (a) = 159 acres
Net pay thickness (h) = 64' average
Porosity ($\emptyset$) = 15.4%
Water Saturation (SW) = 27.1%
Initial reservoir pressure = 1050 psi
Gas gravity = .65
Formation temperature = 100° F
Initial compressibility factor (Z_i) = .83
Recovery efficiency (R) = 90%
Reservoir volume factor (Bg_i) = 79.86 scf/ft^3

$$\text{from: } B_{gi} = 35.35\ \frac{P_i}{Z_i\ T_i}$$

$$= 35.35\ \frac{1050}{.83(560)} = 79.86$$



Infill Gas Well

Lease Outline

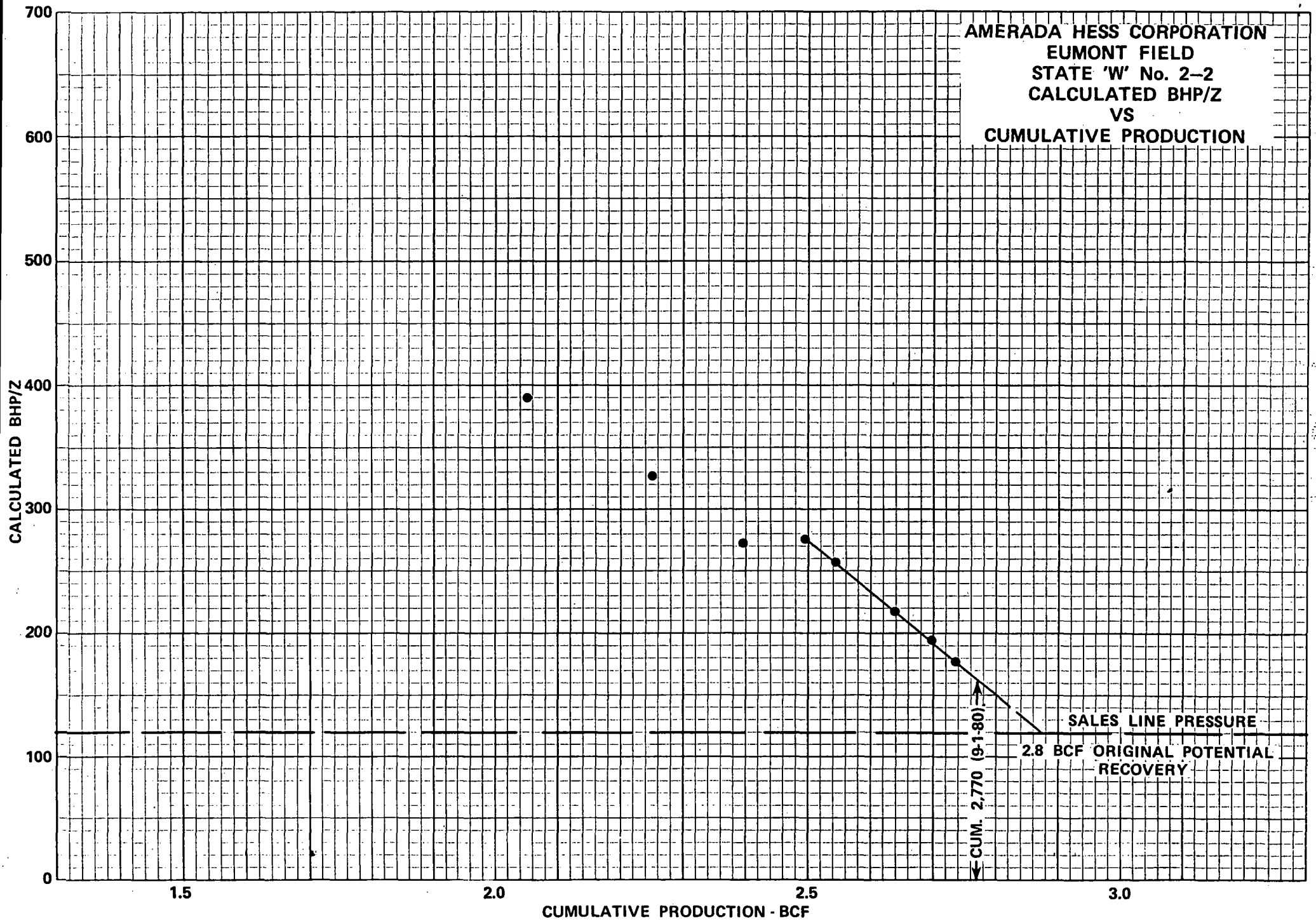
0 ½ 1

Scale in Miles

SOUTHWEST PRODUCTION REGION
EUMONT FIELD
STATE 'W' LEASE
Lea County, New Mexico

STRUCTURE
TOP / YATES
Contour Interval = 50'

Geology by P. E. Nelson 9/1/80



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NEW MEXICO OIL CONSERVATION COMMISSION

Form C-101
Revised 1-1-65

5A. Indicate Type of Lease STATE [X] FEE [ ]

5. State Oil & Gas Lease No. B 3423

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

1a. Type of Work

b. Type of Well: DRILL [X] DEEPEN [ ] PLUG BACK [ ]
OIL WELL [ ] GAS WELL [X] OTHER SINGLE ZONE [X] MULTIPLE ZONE [ ]

7. Unit Agreement Name

8. Farm or Lease Name: State "J"

2. Name of Operator: Amerada Hess Corporation

9. Well No.: 5

3. Address of Operator: Drawer D Monument, New Mexico

10. Field and Pool, or Wildcat: Eumont

4. Location of Well: UNIT LETTER E LOCATED 1980 FEET FROM THE North LINE AND 780 FEET FROM THE West LINE OF SEC. 30 TWP. 20 S RGE. 37E NMPM

12. County: Lea

19. Proposed Depth	19A. Formation	20. Rotary or C.T.
3530	Queen	Rotrav

21. Elevations (Show whether DF, RT, etc.)	21A. Kind & Status Plug. Bond	21B. Drilling Contractor	22. Approx. Date Work will start
3538 G.L.	Blanket	Cactus	Feb. 1980

23.

PROPOSED CASING AND CEMENT PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	SACKS OF CEMENT	EST. TOP
12 1/4	8 5/8	32#	300'	400 sx	Circulate
7 7/8	5 1/2	15#	3330'	700 sx	Circulate

Drill 12 1/4" hole to 300' and run 8 5/8 and cement to surface. Drill out with 7 7/8 bit and drill to 3330 and run Gamma Ray-Neutron. Set 5 1/2" casing and cement to surface. Drill through Queen formation with gas and complete open hole.

Blowout Equipment, consists of 10" Cameron Type "F" Series 900 Dbl. Hyd. w/Payne closing Unit, Gas separator and de-gasser complete w/Auto. Choke. All BOP equipment will be checked periodically by a Cactus Drilling Company driller and Amerada Hess well site drilling supervisor.

Gas dedicated to purchaser.

RECEIVED
OCT 20 1980
OIL CONSERVATION DIVISION
SANTA FE

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: IF PROPOSAL IS TO DEEPEN OR PLUG BACK, GIVE DATA ON PRESENT PRODUCTIVE ZONE AND PROPOSED NEW PRODUCTIVE ZONE. GIVE BLOWOUT PREVENTER PROGRAM, IF ANY.

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

Signed [signature] Title District Engineer Date 12-26-79

(This space for State Use)

APPROVED BY [signature] TITLE SUPERVISOR DISTRICT I DATE DEC 31 1979

CONDITIONS OF APPROVAL, IF ANY:

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	Lease	Well No.
Amerada Hess Corp.	State W	5

Unit Letter	Section	Township	Range	County
E	30	20 South	37 East	Lea

Actual Footage Location of Well:
1980 feet from the North line and 780 feet from the West line

Ground Level Elev.	Producing Formation	Pool	Dedicated Acreage:
3538.0	Yates Seven Rivers Queen	Eumont	160 Acres

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

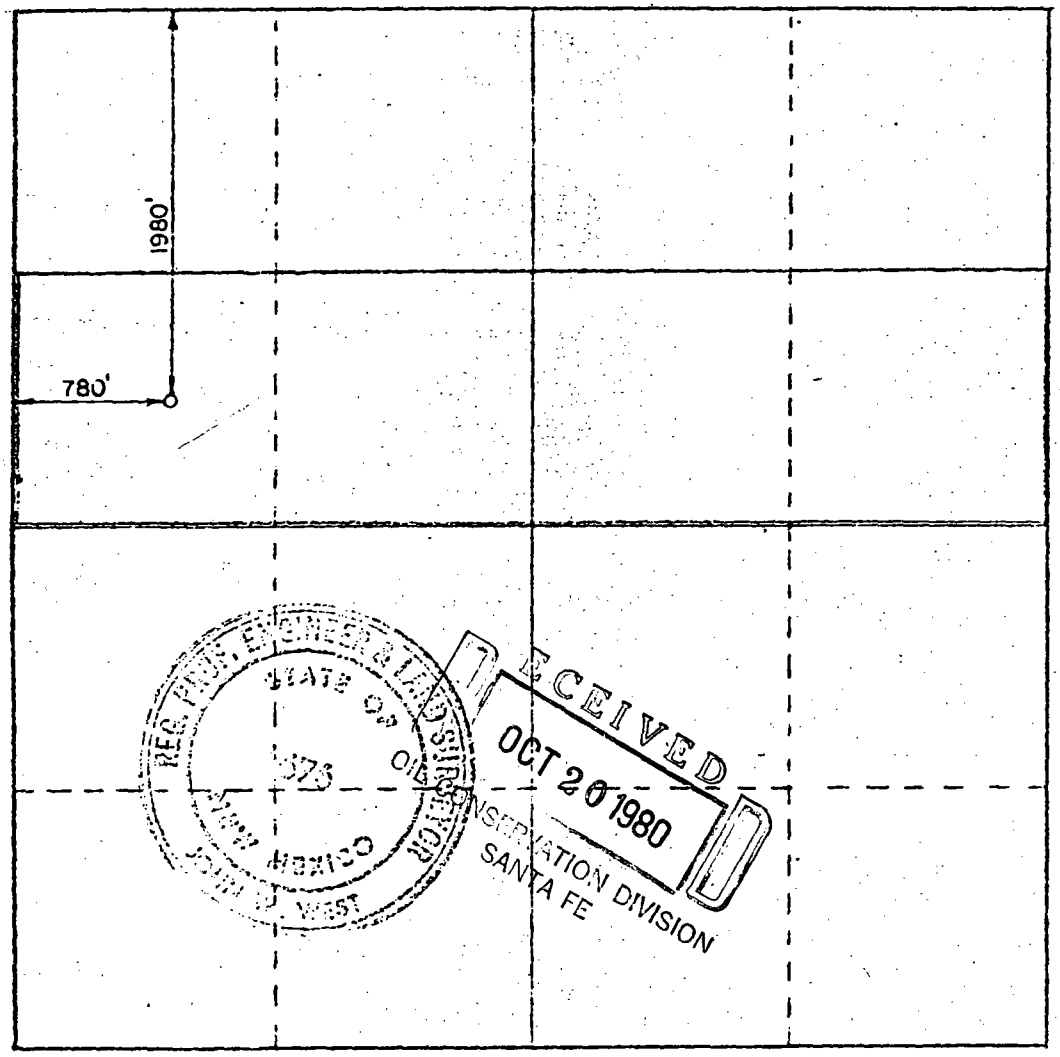
2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).

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.



RECEIVED
OCT 20 1980
OIL CONSERVATION DIVISION
SANTA FE

REG. PROF. ENGINEER AND LAND SURVEYOR
STATE OF NEW MEXICO
3239
JOHN W. WEST

CERTIFICATION

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

Name: E B Fisher
Position: Supv. Adm. Ser.
Company: AMerada Hess Corporation
Date: 4-15-80

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: December 7, 1979
Registered Professional Engineer and/or Land Surveyor
John W. West
Certificate No. John W West 676
Ronald J. Eidson 3239

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

November 14, 1980

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

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

Mr. Norman A. Garrett
Amerada Hess Corporation
P. O. Box 840
Seminole, Texas 79360

Re: Request for Infill Findings
State LM "T" Well No. 9
Eumont Gas Pool, Lea County,
New Mexico

Dear Mr. Garrett:

Referring to the subject infill findings application received October 20, 1980, supplemental information is hereby requested as follows:

(1) Full completion detail on Well No. 9, including pay thickness, porosity, water saturation, pressure, etc.

(2) A volumetric calculation of the reserves under the 160-acre tract at this time based upon completion data from Well No. 9.

(3) A demonstration of what may reasonably be expected to be recovered from Well No. 9. This may be based upon completion data and the performance of nearby or similar wells.

Upon receipt of this additional information we shall proceed to the final processing of the application.

Sincerely,

R. L. STAMETS
Technical Support Chief

RLS/dr