Memo

From
Gilbert P. Quintana
Petroleum Engineer

To File

Discussions with Randall Howell on May 2, 1983 show that condensate production was determined by regularly scheduled swabbings of the well. Allocations were determined by the condensate production history. Randall indicated he will send the production figures to be included in the file. Fluid compatability was based on offset examples in the area.

Gilbert Quintana

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

ADA HESS CORPORATION

RECEIVED
MAR 22 1983
OIL CONSERVATION DIVISION
SANTA FE
P. O. DRAWER "D"
MONUMENT, NEW MEXICO 88265

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Zones

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AMERADA HESS CORPORATION

P. O. DRAWER "D"
MONUMENT, NEW MEXICO 88265

March 18, 1983

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

Re: Eugene Wood #10
Request to Downhole Commingle the
Blinebry and Drinkard Gas Zones

Dear Mr. Ramey:

Amerada Hess Corporation is requesting approval for an exception to Rule 303-C to permit downhole commingling of the Blinebry and Drinkard gas-gas zones in the wellbore of the Eugene Wood #10. These gas zones have experienced wellbore condensate precipitating against the sandfaces and with declining bottom hole pressures have been unable to unload themselves of this fluid. Repeated swabs have proven uneconomical to perform due to fluid encroachment returning quickly to the sand faces and placing the well back on marginal production status. If this application is approved, both gas zones will be turned together and placed on sucker rod pump so as to apply a continuous swabbing action in the wellbores and permit the flow of natural gas into the wellbore at a much more economical rate.

In the wellbore, the Blinebry zone is perforated from 5440-5565' and the Drinkard zone is perforated from 6234-6302'. Both zones will require artificial lift which in the past has been impractical due to the dual completion. The conclusion to place the well on beam pump was arrived at after pressure surveys were taken from February 27-28 and from the past swabbing inefficiencies of each zone. The following bottom-hole pressures were calculated with the method documentated in the following attachments.

The results of these calculations were as follows:

Blinebry - 244.5 psia @ 5503', 24 hour shut-in

Drinkard - 368.3 psia @ 6268', 24 hour shut-in

Adjusted to a common datum, the results were as follows:

Blinebry - 249.1 psia @ 6268'

Drinkard - 368.3 psia @ 6268'

If these zones are placed on pump we estimated the producing bottom-hole pressure will be 186 psia for the Blinebry and 278 psia for the Drinkard assuming a 75% drawdown on each zone.

Fluid samples were not available since line pressures are high enough to bar the flow of any fluid from the wellbore. We foresee no formation precipitates which might damage the formation. This assumption was based on previous experience.

Assuming 100 mcf/day total production, 61 mcf/day allociated to the Drinkard and 39 mcf/day to the Blinebry, the combined stream value of the zones would be $78.90 while the sum of the individual streams would total $78.90. Therefore combination of these two zones will not reduce the gas value of the well. Detailed calculations used to arrive at this conclusion are encluded at the end of this letter.

At present the well is not envolved in a secondary recovery project. If a future recovery project were to be considered we foresee no problems with this commingling prospect jeopardizing the efficiency of a secondary recovery operation.

If commingling is approved, Amerada Hess Corporation, Drawer D, Monument, New Mexico 88265, will be the operator of the said well located on Unit H, 1880' FNL, 860' FEL, Sec. 22, T-22S, R-37E, Lea County, New Mexico, Blinebry Oil & Gas Pool and Drinkard Pool. Amerada Hess has common ownership of both zones with a working interest of 100%, 1/8 royalty and no overriding royalty.

A plat of the area, with the proposed well to be commingled marked in yellow, is attached at the end of this letter. Two Division From C-116's are encluded which show the production of each zone as follows:

Zone	Oil	Gas	Water	Date
Blinebry	0	10 mcf/day	0	2-28-81
Drinkard	0	24 mcf/day	0	2-28-81

Production decline curves, dating back to January, 1977, have been supplied for both producing formations. These indicate the following nominal decline rates.

Zone	Decline Rate
Blinebry	0.319237440/yr.
Drinkard	0.229072683/yr.

Using these rates, a combined rate was calculated as 0.263941232/yr. with this rate, an allocation of 39% to the Blinebry and 61% to the Drinkard was calculated. Detailed procedures arriving at these figures follow later.

All offset operators have been notified of the proposed commingling by a copy of this memo. If you have any questions regarding this proposed action, please feel free to contact me.

Sincerely,

Randall L. Howell

Randall L. Howell
Assoc. Petroleum Engineer

RH/dg

Enclosure

xc: Division Director (2)
Hobbs District Office
Offset Operators
File

WOOD LEASE OFFSET OPERATORS

1. Conoco Inc.
   Box 460
   Hobbs, New Mexico 88240

2. Anadarko Production Co.
   Box 2497
   Midland, Texas 79702

3. Carter Foundation Production Co.
   Box 1036
   Fort Worth, Texas 76101

4. Texas Pacific Oil Co., Inc.
   Box 4067
   Midland, Texas 79701

5. Exxon Company U.S.A.
   Box 1600
   Midland, Texas 79701

6. ARCO Oil & Gas Co.
   Box 1610
   Midland, Texas 79701

7. John H. Hendrix Corp.
   1310 North 18th St.
   Eunice, New Mexico 88231

WOOD #10 SBHP'S

Blinebry Perfs - 5440' to 5565' Avg. Depth - 5503'
Drinkard Perfs - 6234' to 6302' Avg. Depth - 6268'

Blinebry $_{G}$ - 0.694
Drinkard $_{G}$ - 0.7020

Assume P_{atm} = 13.2 psia
Assume Temp. Grad. = 0.4°F/100'
Assume Avg. Surface Temp. = 74°F

$$BHT\ (Blinebry) = 74°F + 5503' \left[\frac{0.4°F}{100'}\right] = 96°F$$

$$BHT\ (Drinkard) = 74°F + 6268' \left[\frac{0.4°F}{100'}\right] = 99°F$$

P_{whs} (Blinebry) = 213.2 PSIA
P_{whs} (Blinebry) = 63.2 PSIA q = 10 mcf/day

P_{whs} (Drinkard) = 313.2 PSIA
P_{whs} (Drinkard) = 53.2 PSIA q = 24 mcf/day

(Blinebry Zone):

$$P_{sfs} = P_{whs} \times e^{\frac{C}{\bar{Z}}} \quad \text{Where:} \quad C = \frac{(\partial_8)(TVD)}{53.34\ \bar{T}}$$

$$\bar{T} = \frac{74°F + 96°F}{2} + 460°R = 545°R$$

$$C = \frac{(0.694)(5503')}{(53.34)(545°R)} = 0.131$$

Ppc = 666.5 PSIA
Tpc = 388.5 °R

$$Tr = \frac{545°R}{388.5°R} = 1.40$$

Assume P_{sfs} = 256 PSIA $\quad \overline{P} = \frac{256 \text{ PSIA} + 213.2 \text{ PSIA}}{2} = 234.6$ PSIA

$P_r = \frac{234.6 \text{ PSIA}}{666.5 \text{ PSIA}} = 0.35 \longrightarrow \overline{\overline{z}} = 0.955$

$T_r = 1.40$

$P_{sfs} = (213.2 \text{ PSIA})\, e^{\frac{0.131}{0.955}} = 244.6$ PSIA

Assume $\overline{p} = \frac{244.6 \text{ PSIA} + 213.2 \text{ PSIA}}{2} = 228.9$ PSIA

$P_r = \frac{228.9 \text{ PSIA}}{666.5 \text{ PSIA}} = 0.34$

$T_r = 1.40 \longrightarrow \overline{\overline{z}} = 0.956$

$P_{sfs} = (213.2 \text{ PSIA})\, e^{\frac{0.131}{0.956}} = 244.5$ PSIA

P_{sfs} = 244.5 PSIA (Blinebry Zone)

(Drinkard Zone)

$\overline{T} = \frac{74°F + 99°F}{2} + 460°R = 546.5°R$

$C = \frac{(0.702)(6268')}{(53.34)(546.5°R)} = 0.151$

$P_{pc} = 659.6$ PSIA

$T_{pc} = 390°R$

$T_r = \frac{546.5°R}{390.°R} = 1.40$

Assume P_{sfs} = 360.2 PSIA $\quad \overline{p} = \frac{360.2 \text{ PSIA} + 313.2 \text{ PSIA}}{2} = 336.7$ PSIA

$P_r = \frac{336.7 \text{ PSIA}}{659.6 \text{ PSIA}} = 0.51 \longrightarrow \overline{\overline{z}} = 0.932$

$T_r = 1.40$

$P_{sfs} = (313.2 \text{ PSIA})\, e^{\frac{0.151}{0.932}} = 368.3$ PSIA

Assume $\bar{p} = \frac{368.3 \text{ PSIA} + 313.2 \text{ PSIA}}{2} = 340.8 \text{ PSIA}$

$$P_r = \frac{340.8 \text{ PSIA}}{659.6 \text{ PSIA}} = 0.52 \longrightarrow \bar{z} = 0.931$$

$$T_r = 1.40$$

$$P_{sfs} = (313.2 \text{ PSIA}) e^{\frac{0.151}{0.931}} = 368.4 \text{ PSIA}$$

$$\boxed{P_{sfs} = 368.4 \text{ PSIA (Drinkard Zone)}}$$

Blinebry SBHP - 244.5 PSIA @ 5503'
Drinkard SBHP - 368.3 PSIA @ 6268'

Common datum assumed to be @ 6268' ∴ Blinebry zone SBHP needs to be adjusted 765'.

$$\bar{T} = \frac{96°F + 99°F}{2} = 460°R = 557.5°R$$

$$P_{pc} = 666.5 \text{ PSIA}$$

$$T_{pc} = 388.5°R$$

$$T_r = \frac{557.5°R}{388.5°R} = 1.44$$

$$C = \frac{(0.694)(765)}{(53.34)(557.5°R)} = 0.018$$

Assume $P_{sfs} = 281.2$ PSIA $\quad \bar{p} = \frac{281.2 \text{ PSIA} + 244.5 \text{ PSIA}}{2} = 262.9 \text{ PSIA}$

$$P_r = \frac{262.9 \text{ PSIA}}{666.5 \text{ PSIA}} = 0.39 \longrightarrow \bar{z} = 0.950$$

$$T_r = 1.44$$

$$P_{sfs} = (244.5 \text{ PSIA}) e^{\frac{0.018}{0.950}} = 249.2 \text{ PSIA}$$

$$\bar{p} - \frac{(249.2 \text{ PSIA}) + 244.5 \text{ PSIA}}{2} = 246.9 \text{ PSIA}$$

$$P_r = \frac{246.9 \text{ PSIA}}{666.5 \text{ PSIA}} = 0.37 \longrightarrow \bar{Z} = 0.956$$

$$T_r = 1.44$$

$$P_{sfs} = (244.5 \text{ PSIA}) e^{\frac{0.018}{0.956}} = 249.1 \text{ PSIA}$$

$$\bar{p} = \frac{244.5 \text{ PSIA} + 249.1 \text{ PSIA}}{2} = 246.8 \text{ PSIA}$$

$$P_r = \frac{246.8 \text{ PSIA}}{666.5 \text{ PSIA}} = 0.37 \longrightarrow \bar{Z} = 0.956$$

$$T_r = 1.44$$

$$P_{sfs} = (244.5 \text{ PSIA}) e^{\frac{0.018}{0.956}} = 249.1 \text{ PSIA}$$

P_{sfs} = 249.1 PSIA (Blinebry Zone adjusted to common datum of 6268'

Drinkard Zone SBHP = 368.3 PSIA @ 6268'
Blinebry Zone SBHP = 249.1 PSIA @ 6268'

50% of high press. zone (Drinkard) = 184.2 PSIA

Since low press. zone (249.1 PSIA) is greater than 50% of high prss. zone (184.2 PSIA) no cross flow problem should exist.

WOOD #10 GAS STREAM VALUES

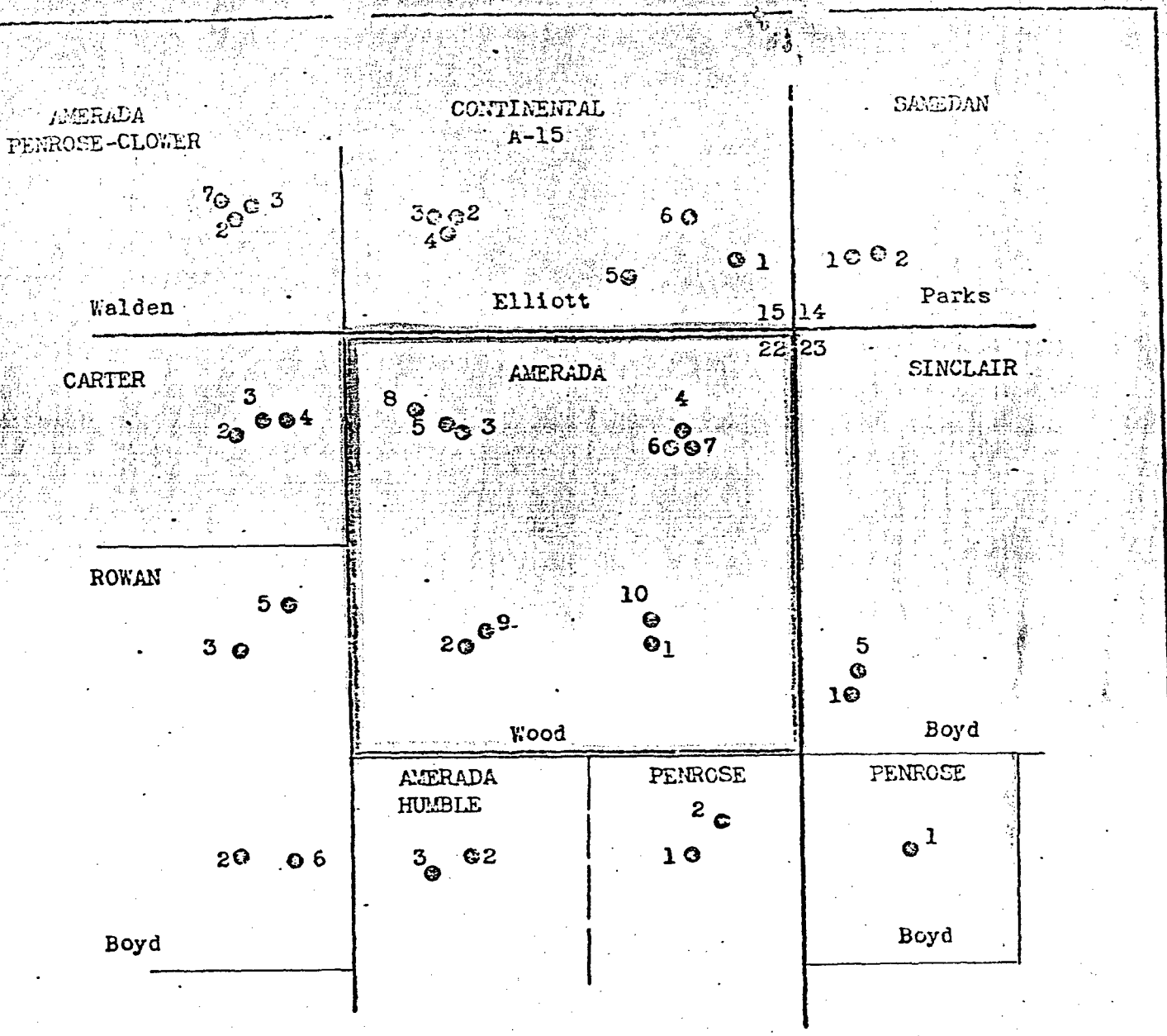
NGPA Gas Price as of 4/82:
Drinkard - $0.7890/mcf
Blinebry - $0.7890/mcf

Assuming 100 mcf/day total production:
Drinkard Production - 61 mcf/day
Blinebry Production - 39 mcf/day

Drinkard Production Value - (61 mcf/day)($0.7890/mcf) = $48.13/day
Blinebry Production Value - (39 mcf/day)($0.7890/mcf) = $30.77/day
Total $78.90/day

Combined Stream Value - (100 mcf/day)($0.7890/mcf) = $78.90/day

∴ Commingled value will not be less than the sum of the value of the individual streams.



AMERADA PETROLEUM [illegible] ORATION

Wood Lease
NE/4 Section 22, [illegible] R37E
Lea County, New [illegible]ico

Scale 1" 1000'

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

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

Form C-116
Revised 10-1-78

GAS-OIL RATIO TESTS

Operator	Pool	County
Amerada Hess Corporation	Blinebry Gas	Lea

Address	TYPE OF TEST - (X)			
Drawer D, Monument, New Mexico 88265	Scheduled [ ]	Completion [ ]	Special [X]	

LEASE NAME	WELL NO.	LOCATION U	S	T	R	DATE OF TEST	STATUS	CHOKE SIZE	TBG. PRESS.	DAILY ALLOWABLE	LENGTH OF TEST HOURS	PROD. DURING TEST WATER BBLS.	GRAV. OIL	OIL BBLS.	GAS M.C.F.	GAS - OIL RATIO CU.FT/BBL.
Eugene Wood	10	H	22	22-S	37-E	2-11-83		2"	40	-	24	0	0	0	10	-

No well will be assigned an allowable greater than the amount of oil produced on the official test.

During gas-oil ratio test, each well shall be produced at a rate not exceeding the top unit allowable for the pool in which well is located by more than 25 percent. Operator is encouraged to take advantage of this 25 percent tolerance in order that well can be assigned increased allowables when authorized by the Division.

Gas volumes must be reported in MCF measured at a pressure base of 15.025 psia and a temperature of 60° F. Specific gravity base will be 0.60.

Report casing pressure in lieu of tubing pressure for any well producing through casing.

Mail original and one copy of this report to the district office of the New Mexico Oil Conservation Division in accordance with Rule 301 and appropriate pool rules.

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

Randall L. Howell
(Signature)

Assoc. Petroleum Engineer
(Title)

March 18, 1983
(Date)

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

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

Form C-116
Revised 10-1-78

GAS - OIL RATIO TESTS

Operator	Pool	County
Amerada Hess Corporation	Drinkard Gas	Lea

Address	TYPE OF TEST - (X)			
Drawer D, Monument, New Mexico 88265	Scheduled ☐	Completion ☐	Special ☒	

LEASE NAME	WELL NO.	LOCATION U	S	T	R	DATE OF TEST	STATUS	CHOKE SIZE	TBG. PRESS.	DAILY ALLOWABLE	LENGTH OF TEST HOURS	PROD. DURING TEST WATER BBLS.	GRAV. OIL	OIL BBLS.	GAS M.C.F.	GAS - OIL RATIO CU.FT/BBL
Eugene Wood	10	H	22	22-S	37-E	2-9-83		2"	50	-	24	0	0	0	24	-

No well will be assigned an allowable greater than the amount of oil produced on the official test.

During gas-oil ratio test, each well shall be produced at a rate not exceeding the top unit allowable for the pool in which well is located by more than 25 percent. Operator is encouraged to take advantage of this 25 percent tolerance in order that well can be assigned increased allowables when authorized by the Division.

Gas volumes must be reported in MCF measured at a pressure base of 15.025 psia and a temperature of 60° F. Specific gravity base will be 0.60.

Report casing pressure in lieu of tubing pressure for any well producing through casing.

Mail original and one copy of this report to the district office of the New Mexico Oil Conservation Division in accordance with Rule 301 and appropriate pool rules.

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

Randall L. Howell
(Signature)

Assoc. Petroleum Engineer
(Title)

March 18, 1983
(Date)

WOOD #10 DECLINE RATES

(Blinebry)

qi = 1800 mcf/mo. @ 1/1/77
q = 140 mcf/mo. @ 12/31/84
t = 8 yrs.

$$a = \frac{\ln \frac{1800 \text{ mcf/mo}}{140 \text{ mcf/mo}}}{8 \text{ yrs}}$$

a = 0.319237440/yr.

(Drinkard)

qi = 2000 mcf/mo. @ 1/1/77
q = 320 mcf/mo. @ 12'31'84
t = 8 yrs

$$a = \frac{\ln \frac{2000 \text{ mcf/mo}}{320 \text{ mcf/mo}}}{8 \text{ yrs}}$$

a = 0.229072683/yr

(Combined)

qi = 3800 mcf/mo. @ 1/1/77
q = 460 mcf/mo. @ 12/31/84
t = 8 yrs.

$$a = \frac{\ln \frac{3800 \text{ mcf/mo}}{460 \text{ mcf/mo}}}{8 \text{ yrs}}$$

A = 0.263941232/yr
X = Blinebry Allocation
1-X = Drinkard Allocation

$$0.263941232 = (X)\ 0.319237440 + (1-X)0.229072683$$
$$0.263941232 = 0.319237440\ (X) + 0.229072683 - 0.229072683(X)$$
$$0.263941232-0.229072683=0.319237440(X)-0.229072683(X)$$
$$0.034868549 = 0.090164757(X)$$
$$X = \frac{0.034868549}{0.090164757}$$

X = 0.386720379
(1-X) = 0.613279621

Blinebry Allocation: 39%
Drinkard Allocation: 61%

PRODUCTION PLOT

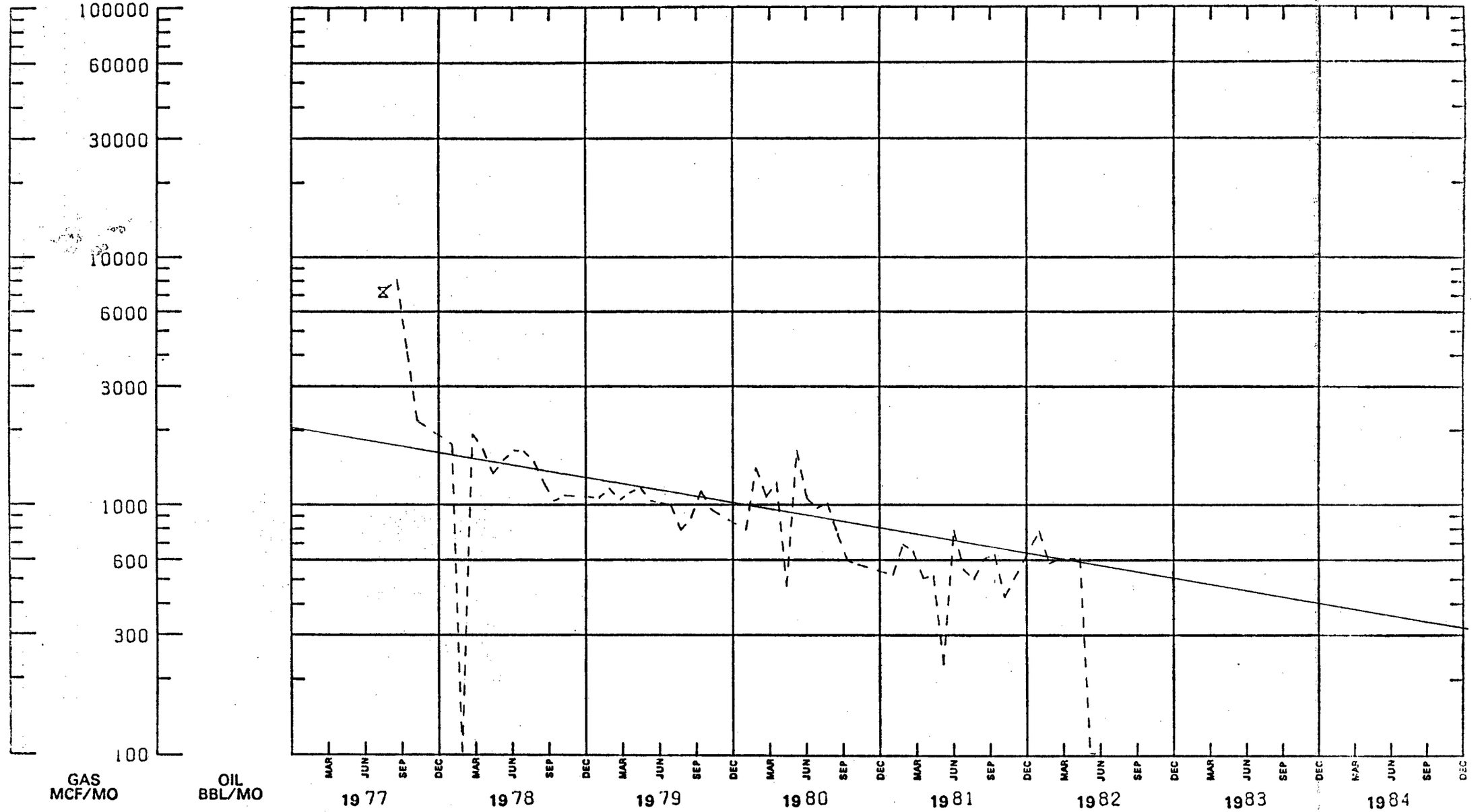
AHEP-5085-B

DATA CODES
OIL = ⓘ
GAS = ⧖
WTR = ✳

CUMULATIVES:						
OIL MBBLS	63.4	63.4	63.4	63.4	63.4	63.4
GAS MMCF	2197.7	2215.5	2228.2	2240.3	2247.2	2251.0
WTR MBBLS	0.5	0.5	0.5	0.5	0.5	0.5

STATUS:
41 ON 7 / /82

1233



REGION: SOUTHWEST REGIO

FIELD: EUNICE FIELD

POOL: /DRINKARD/

LEASE: 02771 WOOD, EUGENE

WELL: 101

PRODUCTION PLOT

AHEP-5005-B

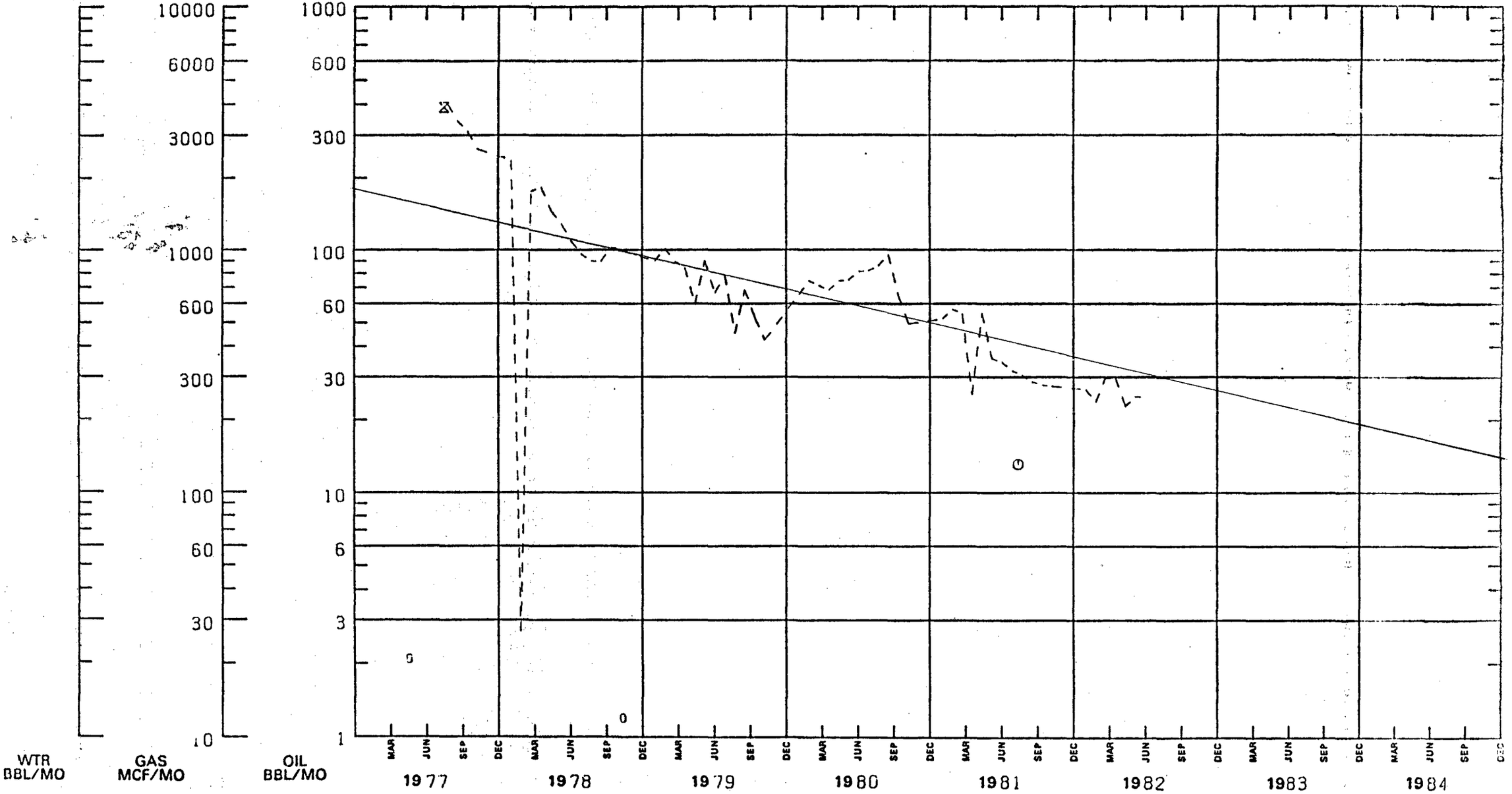
DATA CODES
OIL = ⊙
GAS = ⊠
WTR = ✳

CUMULATIVES:

OIL MBBLS	29.9	29.9	29.9	29.9	29.9	29.9
GAS MMCF	334.4	351.2	360.7	369.8	374.8	376.9
WTR MBBLS	0.2	0.2	0.2	0.2	0.2	0.2

STATUS:
41 ON 7 / / 82

1237



WTR BBL/MO | GAS MCF/MO | OIL BBL/MO

REGION: SOUTHWEST REGIO FIELD: EUNICE FIELD POOL: /BLINEBRY GAS/

LEASE: 02771 WOOD, EUGENE WELL: 102