AMERADA HESS CORPORATION

August 22, 1984

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

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

Re: AB BAKER #4, UNIT P, Sec. 10, T22S, R37E.

Request to downhole commingle the Tubb/Drinkard and the Blinebry/Drinkard Gas Zones.

Dear Sir:

Amerada Hess Corporation is requesting approval for an exception to Rule 303-C to permit the downhole commingling of the Tubb and Drinkard gas zones in the A. B. Baker #3 and the Blinebry and Drinkard gas zones in the A. B. Baker #4. Permission to dually complete these wells was authorized by administrative orders MC-2085 and MC-2072, respectively.

In the A. B. Baker #3, the Tubb zone is perforated from 5960'-6135' and the Drinkard zone from 6205'-6404'. In 1984, both zones have made more fluid than in previous years and gas flow rates have decreased. If downhole permission to commingle is received this well will be placed on sucker rod pump to effectively lift formation fluids from the wellbore resulting in increased gas flow rates. The A. B. Baker #4 is perforated in the Blinebry zone from 5422'-5686' and in the Drinkard zone from 6220'-6473'. The Drinkard side of this wellbore is temporarily abandoned due to 1100' of fluid on the formation face which has killed the gas flow. Before the fluid encroachment the Drinkard zone was capable of producing 20,000 to 30,000 MCFPM. With the approval to downhole commingle, this well will also be placed on sucker rod pump to remove formation fluids. This will result in a significant increase in gas production from this wellbore.

Shut-in pressures from packer leakage tests and fluid levels revealed from acoustic well sounders were utilized to determine bottom hole pressures. These results are presented below.

A. B. Baker #3	Tubb Gas	SBHP = 364 psia
A. B. Baker #3	Drinkard Gas	SBHP = 234 psia
A. B. Baker #4	Blinebry Gas	SBHP = 497 psia
A. B. Baker #4	Drinkard Gas	SBHP = 376 psia

These pressures are corrected to a common datum and the small pressure differences between zones indicate no crossflow problems will exist. Details of the method used to derive these figures is attached with this proposal.

The fluid characteristics of each zone are similar and there is no indication there will be incompatibility problems in the wellbore.

The value of the commingled production will not be less than the sum of the values of the individual streams since Amerada Hess is receiving $1.10/MCF for the gas from all zones in consideration in both wellbores.

To figure the allocation of production to each zone, decline curves were used. This method revealed the following and details of it are attached.

Production Allocations To Each Zone:

A. B. Baker #3	Tubb	4%
A. B. Baker #3	Drinkard	96%
A. B. Baker #4	Blinebry	13%
A. B. Baker #4	Drinkard	87%

The ownership of the zones to be commingled is common with respect to working interest, royalty and overriding royalty.

All offset operators have been notified of this proposal by receipt of this recommendation. If you have any questions concerning this matter, please contact me.

Respectfully,

D. W. Holmes

D. W. Holmes
Sr. Petroleum Engineer

AMERADA HESS CORPORATION
Drawer "D"
Monument, New Mexico 88265

Phone: (505-393-2144)

DWH/dg

Enclosures:

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

OFFSET OPERATORS

Gulf Oil
Gulf Building
Midland, Texas 79702

Getty Oil
Box 1231
Midland, Texas 79702

Marathon
Box 552
Midland, Texas 79702

Exxon Company, USA
Box 1600
Midland, Texas 79701

John H. Hendrix
525 Midland Tower
Midland, Texas 79701

Sun Production Company
Two Lincoln Centre
Dallas, Texas 75240

Anadarko Production Co.
Box 2497
Midland, Texas 79702

Sun Texas Co.
1700 One Main Place
Dallas, Texas 75250

Robert L. Parker
Eight East Third
Tulsa, Oklahoma 74103

CALCULATION OF STATIC BOTTOM-HOLE PRESSURES

Equations To Be Used:

$P_{sfs} = P_{whs} \times e^{c/\bar{z}}$ Where: $c = \frac{(\gamma g)(TVD)}{53.34\ \bar{T}}$

P_{sfs} = Static sandface pressure, psia
P_{whs} = Static wellhead pressure, psia
e = 2.7183
γg = Gas gravity
TVD = True vertical depth, feet
$\bar{T}$ = Average temperature, °R
$\bar{z}$ = Average compressibility factor

Assumptions:

P_{atm} = 13.025 psia
Temp. Grad. = 0.017 °F/ft.
Avg. Surf. Temp. = 60°F
γg = 0.70

A. B. Baker #3

Tubb Zone:

γg = 0.70
P_{whs} = 310 psia from pkr. leak. test
TVD = 6,048' (mid perfs.)
$\bar{T}$ = (60 + 103)(1 = 82°F = 542°R

$$c = \frac{(0.7)(6048)}{53.34\ (542)} = 0.146$$

$P_{pc} = 668$ psia $\qquad T_r = 542/390 = 1.39$

$T_{pc} = 390°R$

Assume: $P_{sfs} = 360$ psia $\qquad \bar{P} = (360 + 310)/2 = 335$ psia

$P_r = 335/668 = 0.50 \quad \therefore \bar{Z} = 0.938$

$P_{sfs} = (310)\ e^{.146/.938} = 362$ psia

Assume: $P = (362 + 310)/2 = 336$ psia

$P_r = 336/668 = 0.50 \quad \therefore \bar{Z} = 0.938$

$P_{sfs} = (310)\ e^{.146/.938} = 362$ psia

$P_{sfs} = 362$ psia for Tubb zone

Drinkard Zone:

$\gamma_g = 0.70$

$P_{whs} = 200$ psia from pkr. leak. test

TVD = 6305' (mid perfs.)

$\bar{T} = (60 + 107)/2 = 84°F = 544°R$

$$C = \frac{(0.7)(6305')}{53.34\ (544)} = 0.152$$

$P_{pc} = 668$ psia $\qquad T_r = 544/390 = 1.39$

$T_{pc} = 390°R$

Assume: $P_{sfs} = 250$ psia $\qquad \bar{P} = (250 + 200)/2 = 225$ psia

$P_r = 225/668 = 0.34 \quad \therefore \bar{Z} = 0.950$

$P_{sfs} = (200)\ e^{.152/.95} = 235$ psia

Assume: $\bar{P} = (235+200)/2 = 218$ psia

$P_r = 218/668 = 0.33 \quad \therefore \bar{z} = 0.960$

$P_{sfs} = (200)\, e^{.152/.96} = 234$ psia

$P_{sfs} = 234$ psia for Drinkard zone

To correct Tubb press. to common datum of 6305':

$\bar{T} = (82 + 84)/2 = 83°F = 543°R$

$P_{pc} = 668$ psia $\qquad T_r = 543/390 = 1.39$

$T_{pc} = 390°R$

$$c = \frac{(0.7)(257)}{53.34(543)} = 0.0062$$

Assume: $P_{sfs} = 365$ psia $\quad \bar{P} = (365 + 362)/2 = 364$ psia

$P_r = 364/668 = 0.54 \quad \therefore \bar{z} = 0.935$

$P_{sfs} = (362)e^{.0062/.935} = 364$ psia

$P_{sfs} = 364$ psia for Tubb zone at common datum of 6305'

Tubb zone SBHP at 6305' = 364 psia
Drinkard zone SBHP at 6305' = 234 psia

A. B. Baker #4

Blinebry Zone:

$\gamma_g = 0.70$

$P_{whs} = 420$ psia from pkr. leak. test

TVD = 5564' (mid perfs.)

$\bar{T} = (60 + 95)/2 = 78°F = 538°R$

$$c = \frac{(0.7)(5564)}{53.34(538)} = 0.136$$

$P_{pc} = 668$ psia $\qquad T_r = 538/390 = 1.38$

$T_{pc} = 390°R$

Assume: P_{sfs} = 470 psia $\quad \bar{P}$ = (470+420)/2 = 445 psia

P_r = 445/668 = 0.67 $\quad \therefore \bar{z}$ = 0.918

P_{sfs} = (420) e $^{.136/.918}$ = 487 psia

Assume: $\bar{P}$ = (487 + 420)/2 = 454 psia

P_r = 454/668 = 0.68 $\quad \therefore \bar{z}$ = 0.917

P_{sfs} = (420) e $^{.136/.917}$ = 487 psia

P_{sfs} = 487 psia for Blinebry zone

Drinkard Zone:

This gas zone has been TA'd since 1979. It is capable of producing gas at high volumes as long as formation fluids are removed from the wellbore. An acoustic well sounder has revealed 1073' of fluid in the hole. Using a 45°API oil gravity and 0 psi tubing pressure, the bottom hole static pressure in the Drinkard zone in this well is 376 psi.

To correct Blinebry press. to common datum of 6347'

$\bar{T}$ = (78 + 108)/2 = 93°F = 553°R

P_{pc} = 668 psia $\qquad T_r$ = 553/390 = 1.42

T_{pc} = 390°R

$$c = \frac{(0.7)(783)}{53.34(553)} = 0.019$$

Assume: P_{sfs} = 500 psia $\quad \bar{P}$ = (500 + 487)/2 = 494 psia

P_r = 494/668 = 0.74 $\quad \therefore \bar{z}$ = 0.910

P_{sfs} = (487) e $^{.019/.910}$ = 497 psia

P_{sfs} = 497 psia for Blinebry zone at common datum of 6347'.

Blinebry zone SBHP at 6347' = 497 psia
Drinkard zone SBHP at 6347' = 376 psia

Allocation Of Production To Each Zone

A. B. Baker #3

Decline Rate Computations:

Tubb Zone

qi = 670 MCF/mo.
q = 330 MCF/mo.
t = 4 years

$$a_N = \ln \frac{(670/330)}{4}$$

$$a_{N(Tubb)} = 0.17705/yr.$$

Drinkard Zone

qi = 14,000 MCF/mo.
q = 8,400 MCF/mo.
t = 4 years

$$a_N = \ln \frac{(14,000/8,400)}{4}$$

$$a_{N(Drink.)} = 0.12771/yr.$$

Tubb/Drinkard Combined

qi = 14,670 MCF/mo.
q = 8,730 MCF/mo.
t = 4 years

$$a_N = \ln \frac{(14,670/8,730)}{4}$$

$$a_{N(Comb.)} = 0.12976/yr.$$

Actual Allocation:

X = Tubb Allocation
X-1 = Drinkard Allocation

$$0.12976 = (X)(0.17705) + (1-X)(0.12771)$$
$$0.12976 = (X)(0.17705) + (0.12771) - (X)(0.12771)$$
$$0.00205 = (X)(0.04934)$$

X = 0.04155
1-X = 0.95845

Therefore:

Tubb Production Allocation = 4%
Drinkard Production Allocation = 94%

Allocation Of Production To Each Zone

A. B. Baker #4

Decline Rate Computations:

Blinebry Zone

qi = 7,200 MCF/mo.
q = 1,900 MCF/mo.
t = 4 years

$$a_N = \ln \frac{(7{,}200/1{,}900)}{4}$$

$$a_{N(Blin.)} = 0.33306/yr.$$

Drinkard Zone

qi = 30,000 MCF/mo.
q = 23,700 MCF/mo.
t = 4 years

$$a_N = \ln \frac{(30{,}000/23{,}700)}{4}$$

$$a_{N(Drink.)} = 0.05893/yr.$$

Blinebry/Drinkard Combined

qi = 37,200 MCF/mo.
q = 25,600 MCF/mo.
t = 4 years

$$a_N = \ln \frac{(37{,}200/25{,}600)}{4}$$

$$a_{N(Comb.)} = 0.09343/yr.$$

Actual Allocation:

X = Blinebry zone
X-1 = Drinkard zone

$$0.09343 = (X)(0.33306) + (1-X)((0.05893)$$
$$0.09343 = (X)(0.33306) + (0.05893) - (X)(0.05893)$$
$$0.03450 = (X)(.27413)$$

$$X = 0.12585$$
$$1-X = 0.87415$$

Therefore:

Blinebry Production Allocation = 13%
Drinkard Production Allocation = 87%

Equations Used:

Decline Rates

$$a_N = \frac{qi/q}{t}$$

a_N = nominal decline, per yr.
qi = initial rate, MCF/mo.
q = later rate, MCF/mo.
t = time between rates, yrs.

Allocation

$a_{N(Comb.)}$ = Combined decline rates

$a_{N(Blin.)}$ = Blinebry decline rate

$a_{N(Drink.)}$ = Drinkard decline rate

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)	Scheduled ☐	Completion ☐	Special ☒
Drawer "D", Monument, New Mexico 88265				

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.
A. B. Baker	3	I	10	22-S	37-E	8-15-84	F	2"	-	-	24	0	-	.25	272	1,088,000
A. B. Baker	4	P	10	22-S	37-E	8-15-84	F	2"	----------	----------	zone TA'd	----------	----------	----------	----------	----------

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.

D. M. Holmes
(Signature)

Sr. Petroleum Engineer
(Title)

8-22-84
(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: Amerada Hess Corporation
Pool: Blinebry (Pro Gas)
County: Lea
Address: Drawer "D", Monument, New Mexico 88265
TYPE OF TEST - (X): 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
A. B. Baker	4	P	10	22-S	37-E	8-15-84	F	2"	-	66	24	0	-	0	35	-

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R. W. Holmes
(Signature)

Sr. Petroleum Engineer
(Title)

8-15-84
(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	Tubb (Pro 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
A. B. Baker	3	I	10	22-S	37-E	8-15-84	F	2"	-	9	24	0	-	0	8	-

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.

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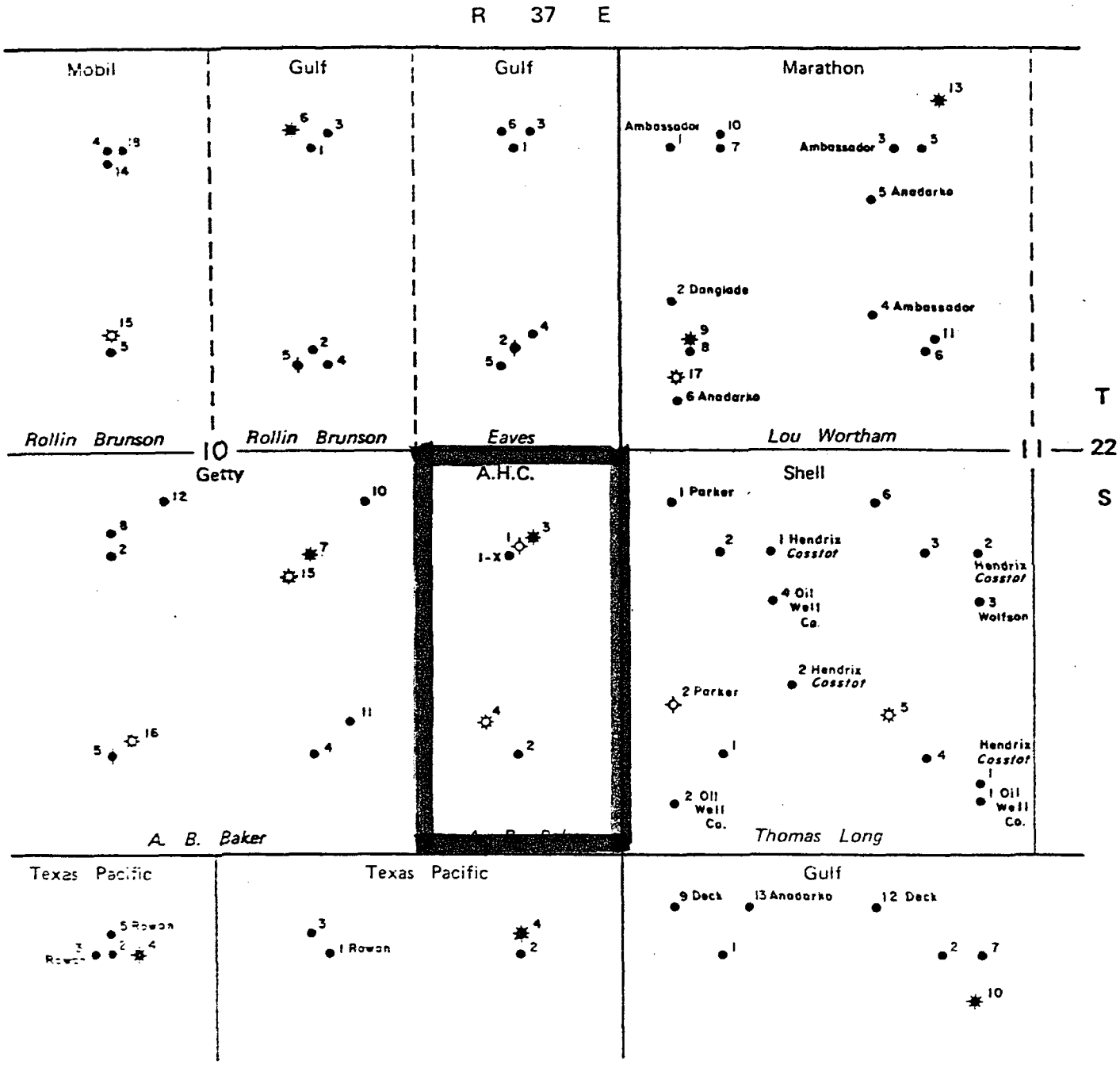
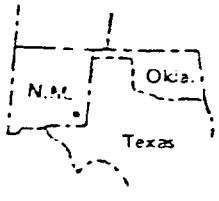
(Signature)

Sr. Petroleum Engineer
(Title)

8-15-84
(Date)



Location Map



LEGEND

- Oil
- Gas
- Dry & Abn
- Injection

SOUTHWEST PRODUCTION REGION

EUNICE FIELD

Lea County, New Mexico

AMERADA HESS

A. B. Baker Lease

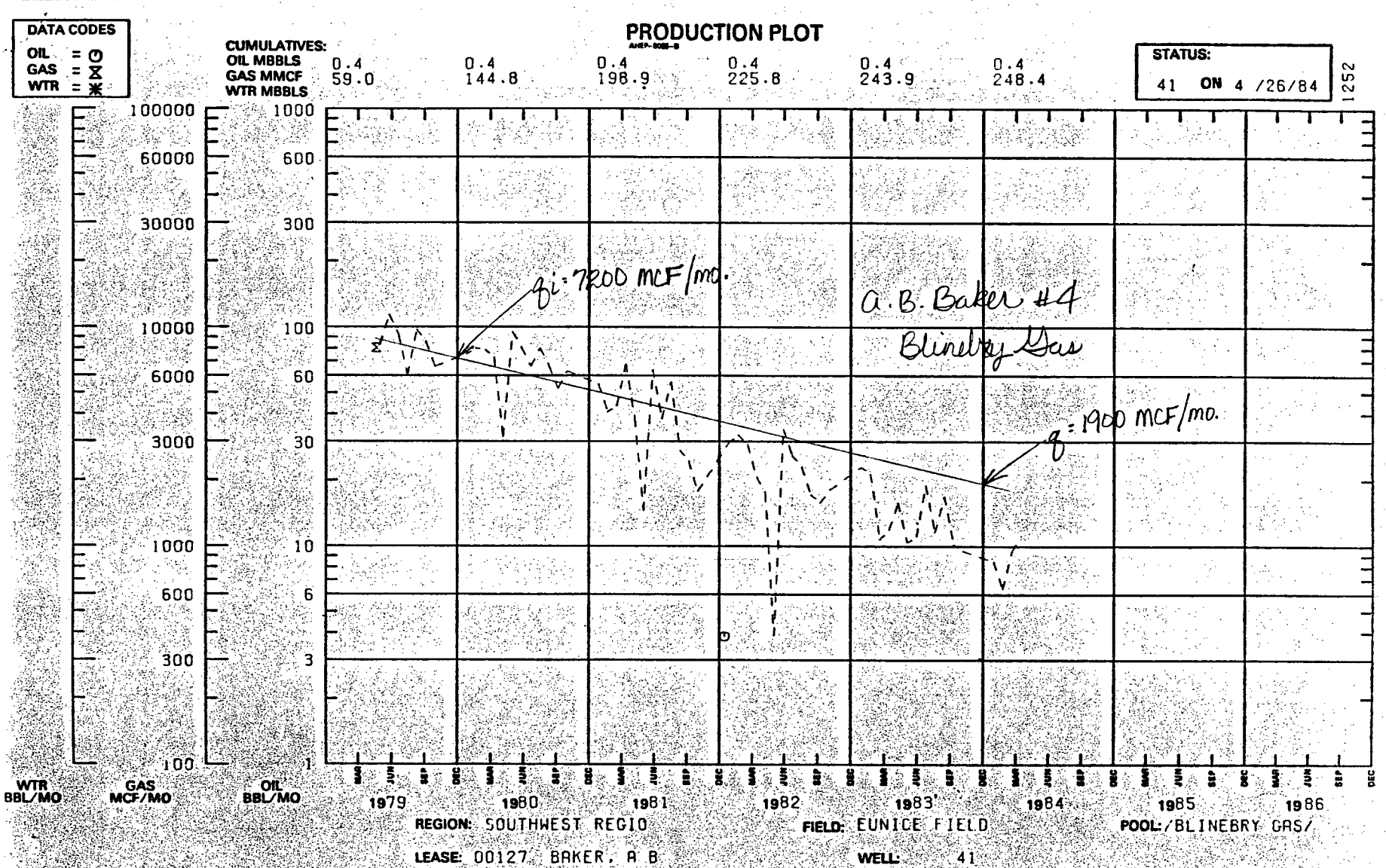
0 1000' 2000'

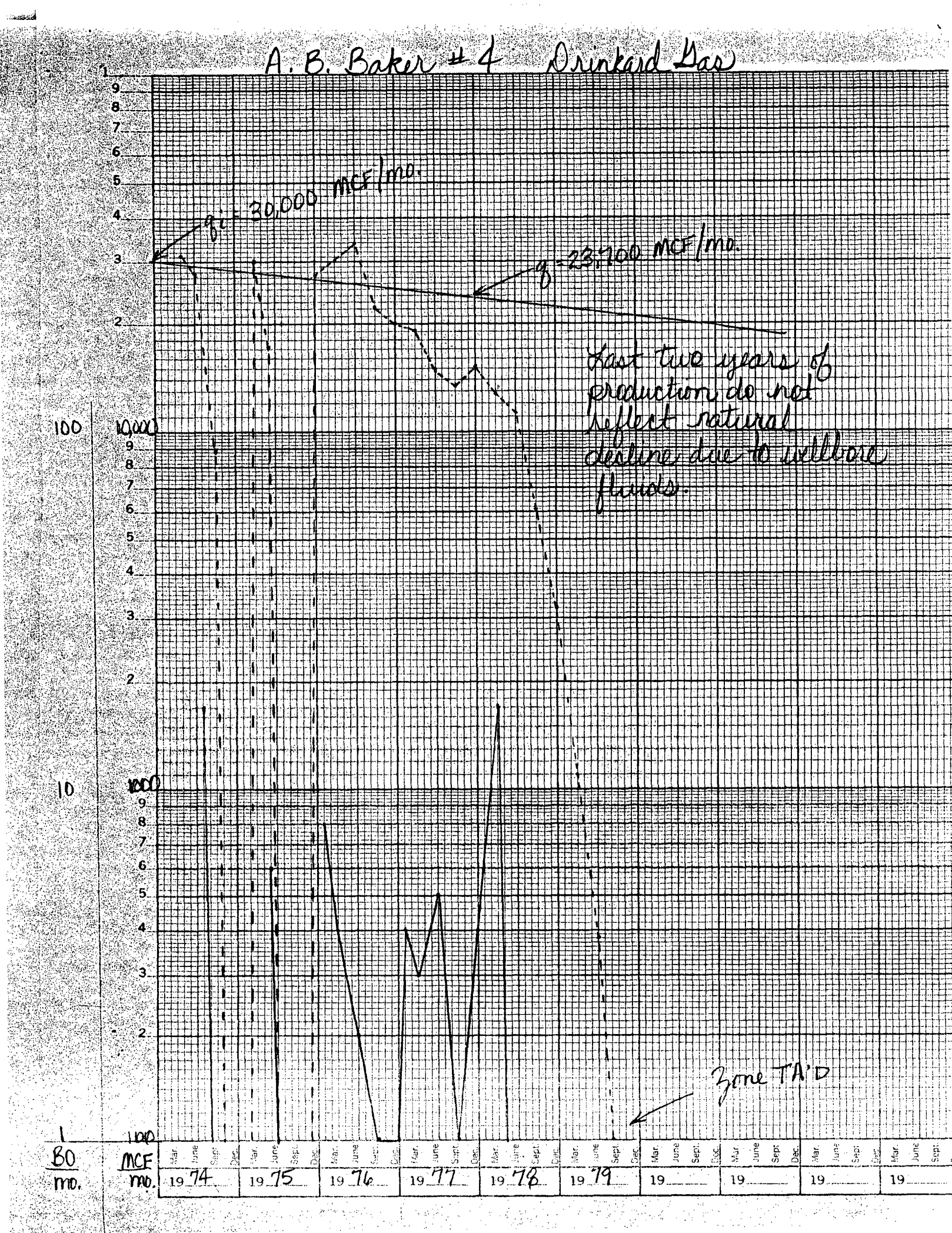
Date:

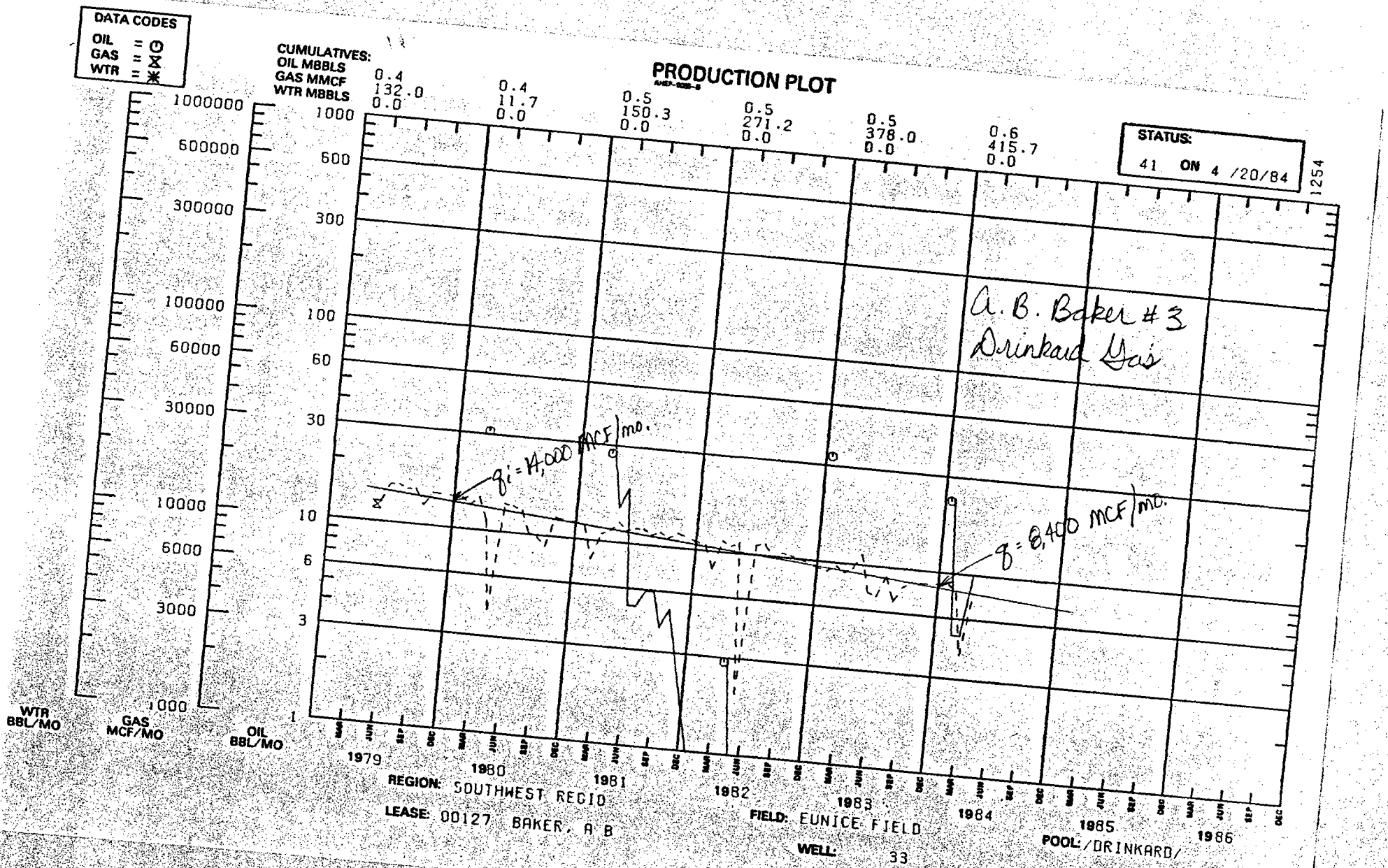
Page No.

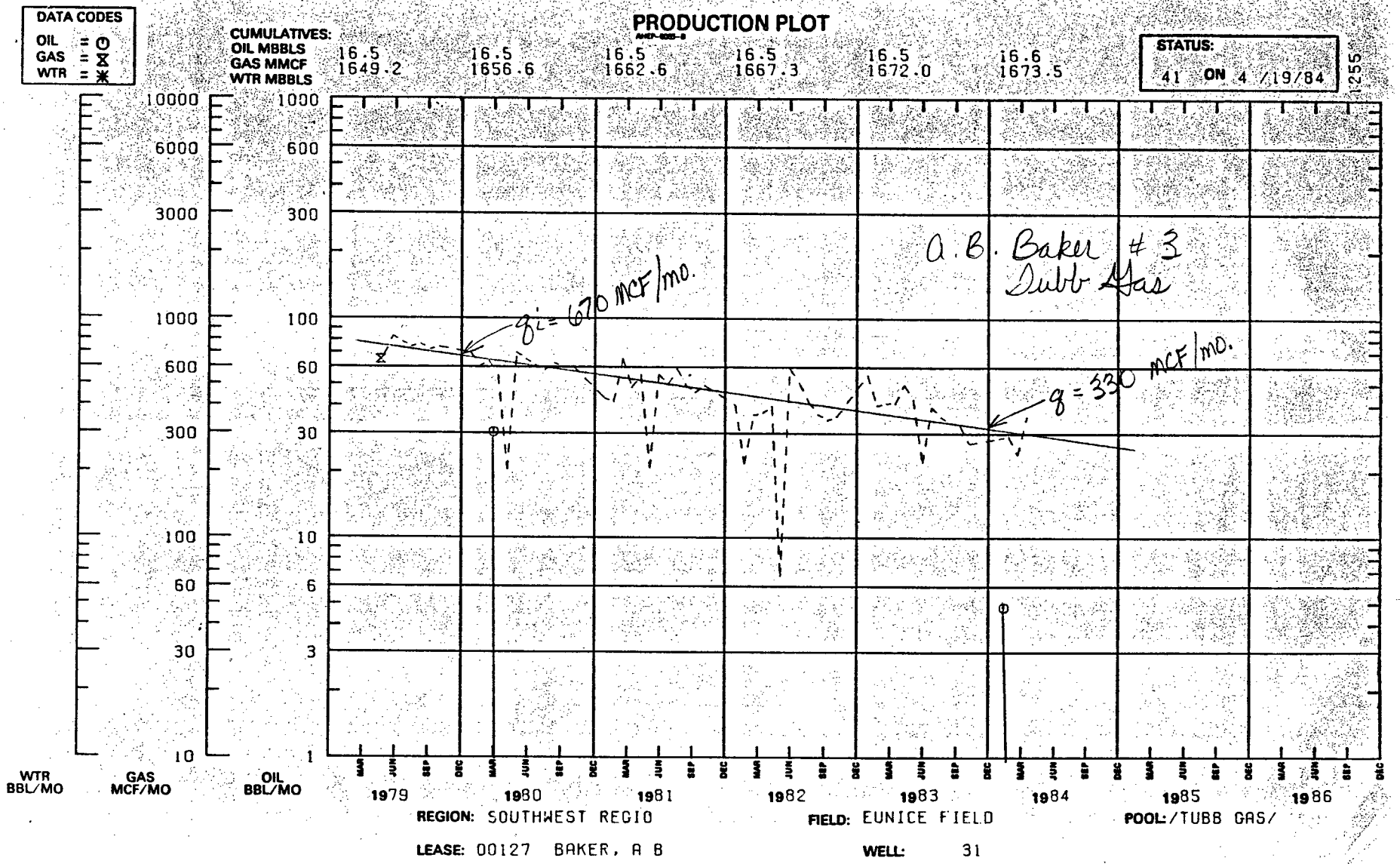
Originator:

Ref. No.


DATA CODES
OIL = O
GAS = X
WTR = *
PRODUCTION PLOT
CUMULATIVES:
OIL MBBLS 0.4 0.4 0.4 0.4 0.4 0.4
GAS MMCF 59.0 144.8 198.9 225.8 243.9 248.4
WTR MBBLS
STATUS:
41 ON 4 /26/84
1252
qi = 7200 MCF/mo.
q = 1900 MCF/mo.
A. B. Baker #4
Blinebry Gas
100000
60000
30000
10000
6000
3000
1000
600
300
100
1000
600
300
100
60
30
10
6
3
1
WTR BBL/MO
GAS MCF/MO
OIL BBL/MO
1979
1980
1981
1982
1983
1984
1985
1986
REGION: SOUTHWEST REGIO
FIELD: EUNICE FIELD
POOL: /BLINEBRY GAS/
LEASE: 00127 BAKER, A B
WELL: 41


A. B. Baker # 4 Drinkard Gas
qi = 30,000 MCF/mo.
q = 23,700 MCF/mo.
Last two years of production do not reflect natural decline due to wellbore fluids.
Zone TA'D
100
10
1
1000
BO/mo.
MCF/mo.
Mar. June Sept. Dec.
19 74
19 75
19 76
19 77
19 78
19 79
19
19
19
19


DATA CODES
OIL = ⊙
GAS = ⊠
WTR = ✳
CUMULATIVES:
OIL MBBLS
GAS MMCF
WTR MBBLS
0.4
132.0
0.0
0.4
11.7
0.0
0.5
150.3
0.0
0.5
271.2
0.0
0.5
378.0
0.0
0.6
415.7
0.0
PRODUCTION PLOT
STATUS:
41 ON 4 /20/84
1254
A. B. Baker #3
Drinkard Gas
qi = 11,000 MCF/mo.
q = 8,400 MCF/mo.
1000000
600000
300000
100000
60000
30000
10000
6000
3000
1000
1000
600
300
100
60
30
10
6
3
1
WTR BBL/MO
GAS MCF/MO
OIL BBL/MO
1979
1980
1981
1982
1983
1984
1985
1986
REGION: SOUTHWEST REGION
LEASE: 00127 BAKER, A B
FIELD: EUNICE FIELD
WELL: 33
POOL: /DRINKARD/


DATA CODES
OIL = ⊙
GAS = ⊠
WTR = ✳
PRODUCTION PLOT
CUMULATIVES:
OIL MBBLS 16.5 16.5 16.5 16.5 16.5 16.6
GAS MMCF 1649.2 1656.6 1662.6 1667.3 1672.0 1673.5
WTR MBBLS
STATUS:
41 ON 4 /19/84
A.B. Baker #3
Dubb Gas
q_i = 670 MCF/mo.
q = 330 MCF/mo.
10000
6000
3000
1000
600
300
100
60
30
10
1000
600
300
100
60
30
10
6
3
1
WTR BBL/MO
GAS MCF/MO
OIL BBL/MO
MAR JUN SEP DEC
1979 1980 1981 1982 1983 1984 1985 1986
REGION: SOUTHWEST REGIO
FIELD: EUNICE FIELD
POOL: /TUBB GAS/
LEASE: 00127 BAKER, A B
WELL: 31

STATE OF NEW MEXICO

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION

HOBBS DISTRICT OFFICE

August 30, 1984

TONEY ANAYA
GOVERNOR

POST OFFICE BOX 1980
HOBBS, NEW MEXICO 88240
(505) 393-6161

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

RE: Proposed:

MC	
DHC	X
NSL	
NSP	
SWD	
WFX	
PMX	

Gentlemen:

I have examined the application for the:

Amerada Hess Corp.	A. B. Baker	No. 4-P	10-22-37
Operator	Lease & Well No.	Unit	S-T-R

and my recommendations are as follows:

O.K.---J.S.

Yours very truly,

Jerry Sexton
Supervisor, District 1

/mc

OIL CONSERVATION DIVISION
SEP 04 1984
RECEIVED