# AMERADA HESS CORPORATION

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

August 17, 1982

State of New Mexico
Energy and Minerals Department
Oil Conservation Division
P. O. Box 1980
Hobbs, New Mexico 88240

Re: Gill Deep No. 2
Request To Down-hole Commingle
The Blinebry and Drinkard Zones

Dear Sir:

Amerada Hess Corporation is requesting approval for an exception to Rule 303-C to permit down-hole commingling of the Blinebry and Drinkard oil-oil zones in the wellbore of the Gill Deep No. 2 in order to produce both these zones economically. This well was completed in November of 1975 and upon initial completion, both zones flowed. Permission to dually complete the well was authorized by administrative order MC-2368. In January of 1976 the Blinebry zone was placed on pump. Gas locking problems lead to the temporarily abandonment of this zone. Two years later the Blinebry commenced to flow in February of 1978. In November of 1981, the Drinkard zone was shut-in due to low production and down-hole mechanical problems.

In the wellbore, the Drinkard zone is perforated from 6518'-6675' and the Blinebry zone is perforated from 5431'-5869'. Our last test on the Drinkard, the lower most pool, show the zone produced four barrels of oil. From previous production data the combined water production from both zones average about 2 BPD. Both fluid productions fall within the limit of 40 BPD as stated in rule no. 1, paragraph A, subsections 1 and 3.

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 August 5-9. The results of these test were as follows:

Blinebry-853 psig @ 5007', 72 hour survey
Drinkard-630 psig @ 6007', 24 hour survey

A 24 hour test was selected for the Drinkard because the well has been closed in since November 20, 1981. From these results and assuming a 75% drawdown on each zone, we estimate the producing bottom-hole pressures to be 640 psig for the Blinebry and 470 psig for the Drinkard zone.

Laboratory test have been run on each crude oil. A combination of the fluids yields an API gravity of 36.30° @ 60 F with no formation of precipitates which might damage the formation. This was expected since both Blinebry and Drinkard oil have been commingled at the battery since early 1976 with no problems encountered up to this point in time.

Assuming 100 BPD total production, 27 BPD allociated to the Blinebry and 73 BPD to the Drinkard, the combined stream value of the zones would be $3,190 while the sum of the individual streams would total $3,146. Therefore combination of these two zones will not reduce the crude oil 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 furture 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 L, 2080' FSL, 614' FWL, Sec. 31, T-21S, 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 50%, 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 Form C-116's are encluded which show the production of each zone as follows:

| Zone | Oil | Gas | Water | Date |
|---|---|---|---|---|
| Drinkard | 4 bbl | 7 mscf/d | 1 bbl | 11-20-81 |
| Blinebry | 10 bbl | 169 mscf/d | 1 bbl | 8-15-82 |

The Drinkard zone test is not within the current 30 day limit as specified in section 2, paragraph D because mechanical problems, a swab cup lodged in the tubing, prohibit an accurate test to be conducted. Therefore, a representative test, also the last good test taken on the Drinkard zone, has been submitted for your review.

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

| Zone | Decline Rate |
|---|---|
| Drinkard | 0.150496601/yr. |
| Blinebry | 0.206736209/yr. |

Using these rates, a combined decline rate was calculated as 0.165648297/yr. with this rate, an allocation of 27% to the Blinebry and 73% 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. I will await your decision on this procedure.

Sincerely,

Randall L. Howell

Randall L. Howell
Associate Petroleum Engineer

dg

Encl:

xc: Division Director (2) ✓
District Office
Offset Operators:

## OFFSET OPERATORS

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

Shell Oil Co.
Box 2352
Odessa, Texas 79760

Millard Deck
Loop 18
Eunice, New Mexico 88231

El Paso Natural Gas Co.
1800 Wilcox Bldg.
Midland, Texas 79701

Hanson Oil Corp.
504 N. Shipp
Hobbs, New Mexico 88240

Gulf Oil Corp.
Box 670
Hobbs, New Mexico 88240

Jack Markham
First National Pioneer Bldg.
Suite 1212
1500 Broadway
Lubbock, Texas 79401

Petro-Lewis Corp.
Box 2250
Denver, Colorado 80202

Sohio Natural Resources Co.
Midland Bldg.
Cleveland, Ohio 44115

Wiser Oil Co.
Box 2467
Hobbs, New Mexico 88240

W. B. Yarborough
1800 First National Bank Bldg.
Midland, Texas 79701

# WOLF PETRO LAB, INC.

DIAL 915/366-9701
DIAL 915/366-7171

2411 WEST 42ND STREET

P. O. BOX 643
ODESSA, TEXAS
79760


HYDROCARBON ANALYSIS

## LABORATORY REPORT

Charge Amerada Hess Corporation
Test No. WPL-80-1068
Date of Run 10-20-80
Date Received 9-23-80

A Sample of Crude Oil from Gill Deep Well No. 2
Secured from Blinebry Formation
At Lea County New Mexico Secured by
Purpose Date 9-17-80 Time
Sampling Conditions

### DISTILLATION

| | | |
|---|---|---|
| I B P | 157 | °F |
| 5% | 202 | °F |
| 10% | 230 | °F |
| 20% | 282 | °F |
| 30% | 343 | °F |
| 40% | 430 | °F |
| 50% | 519 | °F |
| 60% | 600 | °F |
| 70% | 680 | °F |
| 75% | 699 | °F |
| 80% | 720 | °F |
| 85% | 732 | °F |
| 90% | 740 | °F |
| 95% | 746 | °F |
| End Point | 751 | °F |
| % ~~Loss~~ Residue | 3.75 | |
| % Recovery | 96.25 | |
| Color | | |

### YIELD

| | | |
|---|---|---|
| Gasoline 300°F | 23.00 | % |
| Gasoline 350°F | 7.75 | % |
| Gasoline 400°F | 6.25 | % |
| Total Gasoline | 37.00 | % |
| Kerosene 525°F | 13.25 | % |
| Diesel Fuel 650°F | 16.75 | % |

### ASTM OR SPECIAL TESTING

Ash Content
Acid or Base Numbers
B. S. & W. (Centrifuge)
Carbon Residue
Carbon Residue on 10% Residue
Cloud and Pour Point to °F
Doctor Test
Flash Point (open or closed)
Fire Point
Gravity, A. P. I. Hydrometer 37.20 @ 60°F.
Hydrogen Sulfide (Crude Oil)
Salt Content (Crude Oil)
Sulfur (lamp method)
Vapor Pressure (Reid)
Vapor Pressure (N.G.A.A.)
Vapor Pressure (Lean Oil)
Viscosity (Saybolt) ~~Max~~ 125°F. SSU 35.90 Seconds
Viscosity (Saybolt) 210°F
Viscosity (Index No.)

Run by: J. Wolf Checked by: J. Wolf Approved:

Additional Data and Remarks

COPIES

4 - Mr. David Holmes
P.O. Drawer "D"
Monument, New Mexico 88265

1 - File

# WOLF PETRO LAB, INC.

DIAL 915/366-9701
DIAL 915/366-7171

2411 WEST 42ND STREET

P. O. BOX 643
ODESSA, TEXAS
79760


HYDROCARBON ANALYSIS

## LABORATORY REPORT

Amerada Hess
Charge Corporation
Test No. WPL-80-1067
Date of Run 10-20-80
Date Received 9-23-80

A Sample of Crude Oil from Gill Deep Well No. 2
Secured from Drinkard Formation
At Lea County New Mexico Secured by
Purpose Date 9-17-80 Time
Sampling Conditions

### DISTILLATION

| | | |
|---|---|---|
| I B P | 180 | °F |
| 5% | 234 | °F |
| 10% | 268 | °F |
| 20% | 339 | °F |
| 30% | 414 | °F |
| 40% | 477 | °F |
| 50% | 548 | °F |
| 60% | 630 | °F |
| 70% | 694 | °F |
| 75% | 715 | °F |
| 80% | 733 | °F |
| 85% | 742 | °F |
| 90% | 750 | °F |
| 95% | 755 | °F |
| End Point | 757 | °F |
| % ~~Loss~~ Residue | 3.50 | |
| % Recovery | 96.50 | |
| Color | | |

### YIELD

| | | |
|---|---|---|
| Gasoline 300°F | 15.00 | % |
| Gasoline 350°F | 6.75 | % |
| Gasoline 400°F | 5.25 | % |
| Total Gasoline | 27.00 | % |
| Kerosene 525°F | 17.25 | % |
| Diesel Fuel 650°F | 17.75 | % |

### ASTM OR SPECIAL TESTING

Ash Content
Acid or Base Numbers
B. S. & W. (Centrifuge)
Carbon Residue
Carbon Residue on 10% Residue
Cloud and Pour Point to °F
Doctor Test
Flash Point (open or closed)
Fire Point
Gravity, A. P. I. Hydrometer 35.30 @ 60°F.
Hydrogen Sulfide (Crude Oil)
Salt Content (Crude Oil)
Sulfur (lamp method)
Vapor Pressure (Reid)
Vapor Pressure (N.G.A.A.)
Vapor Pressure (Lean Oil)
Viscosity (Saybolt) ~~XXXX~~ 125°F. SSU 39.50 Seconds
Viscosity (Saybolt) 210°F
Viscosity (Index No.)

Run by: J. Wolf Checked by: J. Wolf Approved:

Additional Data and Remarks

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P.O. Drawer "D"
Monument, New Mexico 88265

1 - File

# WOLF PETRO LAB, INC.

DIAL 915/366-9701
DIAL 915/366-7171

2411 WEST 42ND STREET

P.O. BOX 643
ODESSA, TEXAS
79760


HYDROCARBON ANALYSIS

## LABORATORY REPORT

Charge: Amerada Hess Corporation
Test No.: WPL-80-1069
Date of Run: 10-20-80
Date Received: 9-23-80

A Sample of: Commingled (50/50) Crude Oils from Gill Deep Well No. 2
Secured from: Blinebry and Drinkard Formations
At: Lea County New Mexico — Secured by:
Purpose: — Date: 9-17-80 — Time:
Sampling Conditions:

### DISTILLATION

| | |
|---|---|
| I B P | 159 °F |
| 5% | 216 °F |
| 10% | 249 °F |
| 20% | 311 °F |
| 30% | 375 °F |
| 40% | 449 °F |
| 50% | 531 °F |
| 60% | 612 °F |
| 70% | 685 °F |
| 75% | 704 °F |
| 80% | 725 °F |
| 85% | 736 °F |
| 90% | 745 °F |
| 95% | 749 °F |
| End Point | 753 °F |
| % ~~Loss~~ Residue | 3.50 |
| % Recovery | 96.50 |
| Color | |

### YIELD

| | |
|---|---|
| Gasoline 300°F | 19.00 % |
| Gasoline 350°F | 7.75 % |
| Gasoline 400°F | 6.25 % |
| Total Gasoline | 33.00 % |
| Kerosene 525°F | 16.50 % |
| Diesel Fuel 650°F | 17.75 % |

### ASTM OR SPECIAL TESTING

| | |
|---|---|
| Ash Content | |
| Acid or Base Numbers | |
| B. S. & W. (Centrifuge) | |
| Carbon Residue | |
| Carbon Residue on 10% Residue | |
| Cloud and Pour Point to ____ °F | |
| Doctor Test | |
| Flash Point (open or closed) | |
| Fire Point | |
| Gravity, A. P. I. Hydrometer | 36.30 @ 60°F. |
| Hydrogen Sulfide (Crude Oil) | |
| Salt Content (Crude Oil) | |
| Sulfur (lamp method) | .62906 % By Weight |
| Vapor Pressure (Reid) | |
| Vapor Pressure (N.G.A.A.) | |
| Vapor Pressure (Lean Oil) | |
| Viscosity (Saybolt) 100°F SSU | 40.50 Seconds |
| Viscosity (Saybolt) ~~210°F~~ 125°F. SSU | 37.90 Seconds |
| Viscosity ~~Mid-Cont~~ 150°F. SSU | 35.50 Seconds |

Run by: J. Wolf — Checked by: J. Wolf — Approved:

Additional Data and Remarks

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P.O. Drawer "D"
Monument, New Mexico 88265

1 - File

# PRODUCTION ALLOCIATION CALCULATION

Blinebry Zone:

$q_i$ = 230 STB/Mo. @ t = 12/1/76
$q$ = 44 STB/Mo. @ t = 12/1/84
$t$ = 8 yrs.

$$a_n = \frac{\ln \frac{230 \text{ STB/Mo.}}{44 \text{ STB/Mo.}}}{8 \text{ yrs.}}$$

$$a_n = 0.206736209/\text{yr.}$$

Drinkard Zone:

$q_i$ = 500 STB/Mo. @ t = 12/1/76
$q$ = 150 STB/Mo. @ t = 12/1/84
$t$ = 8 yrs.

$$a_n = \frac{\ln \frac{500 \text{ STB/Mo.}}{150 \text{ STB/Mo.}}}{8 \text{ yrs.}}$$

$$a_n = 0.150496601/\text{yr.}$$

Combined Zones:

$q_i$ = 730 STB/Mo. @ t = 12/1/76
$q$ = 194 STB/Mo. @ t = 12/1/84
$t$ = 8 yrs.

$$a_n = \frac{\ln \frac{730 \text{ STB/Mo.}}{194 \text{ STB/Mo.}}}{8 \text{ yrs.}}$$

$$a_n = 0.165648297/\text{yr.}$$

$X$ = Blinebry Allociation

$1-X$ = Drinkard Allocation

$$0.165648297 = (X)\,(0.206736209) + (1-X)(0.150496601)$$

$$0.165648297 = (X)\,(0.206736209) + 0.150496601 - (X)(0.150496601)$$

$$0.01515696 = (X)(0.056239608)$$

$$X = \frac{0.01551696}{0.056239608}$$

$$X = 0.269413258$$
$$1-X = 0.730586742$$

Therefore:

| Zone | Production Allocation |
|---|---|
| Blinebry | 27% |
| Drinkard | 73% |

Formula Used:

$$a_n = \frac{\ln \frac{qi}{q}}{t}$$

Nomenclature:

$a_n$ = nominal decline rate, per year

qi = initial flow rate, STB/mo.

q = later flow rate, STB/Mo.

t = time between rates, years

Explanation:

Production allociation calculations were based on decline curve analysis. Once the decline rate was arrived at for each zone, a combined decline rate was calculated assuming that the combined production curves would be representative of the commingled zones. An algebraic process was employed to arrive at the percentage decline of each zone as compared to the total decline rate for both zones. This was the method used in calculating a production allociation formula.

## STREAM VALUE CALCULATIONS

Blinebry Gravity:

$$\gamma = \frac{141.5}{37.2^\circ + 131.5}$$

$$\gamma = 0.8388$$

Drinkard Gravity:

$$\gamma = \frac{141.5}{35.3^\circ + 131.5}$$

$$\gamma = 0.8483$$

Combined Gravity:

$$\gamma_T = (0.8388)(0.27) + (0.8483)(0.73)$$

$$\gamma_T = 0.8458$$

$$API = \frac{141.5}{0.8458} - 131.5$$

$$API = 35.8^\circ$$

Price for this gravity - 31.90 $/STB

Assuming total production - 100 STB
- Blinebry production - 27 STB
- Drinkard production - 73 STB

Individual Streams:

Blinebry
Price = (27 STB)(30.28 $/STB) = $817.56

Drinkard
Price = (73 STB)(31.89 $/STB) = $2,327.97

Total $3,145.93

Combined Streams:

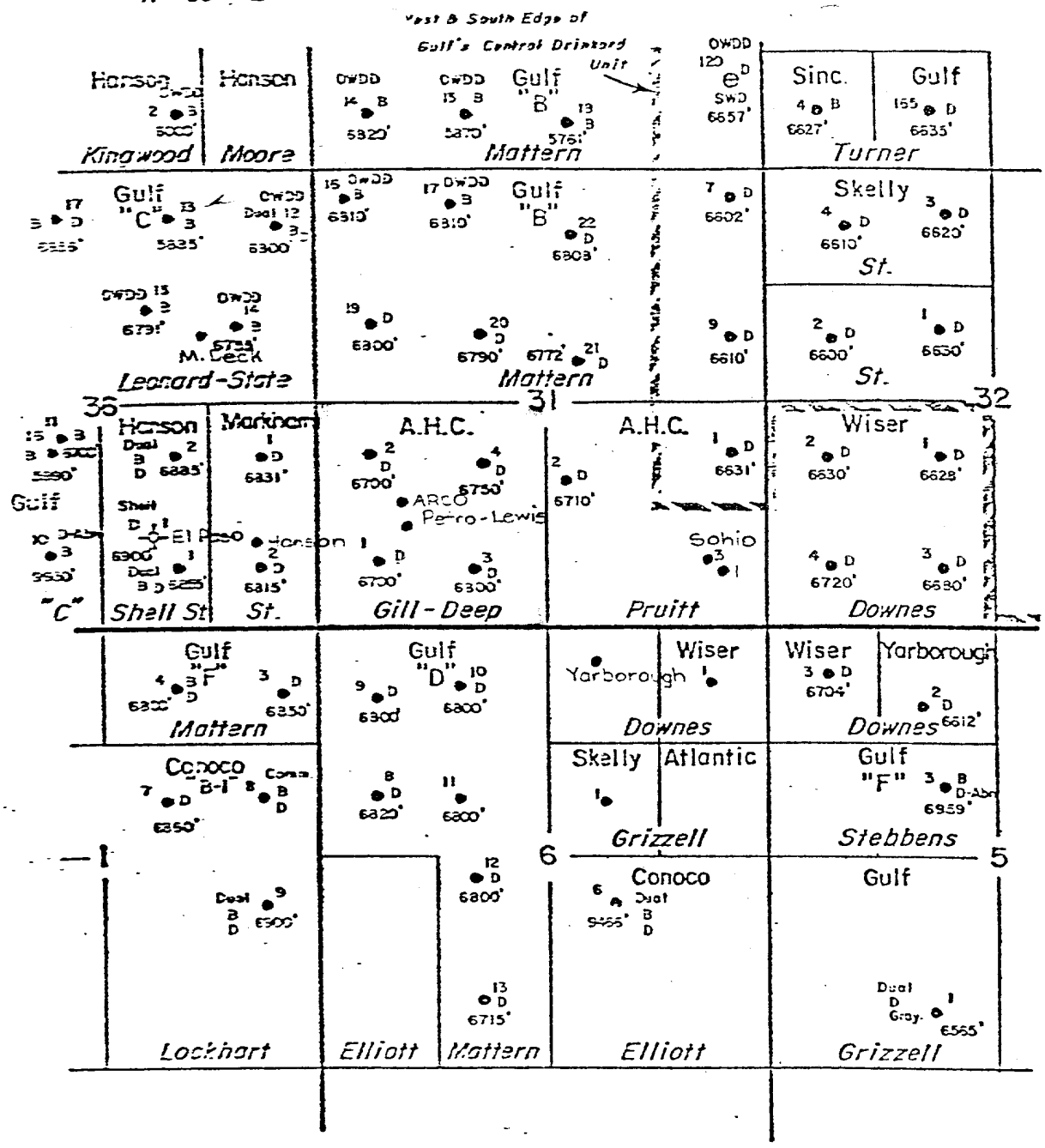
Price = (100 STB)(31.90 $/STB) = $3,190

Formula Used:

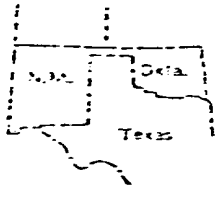
$$\gamma = \frac{141.5}{API - 131.5}$$

Nomenclature:

$\gamma$ - Specific Gravity of Fluids
API - API Degree Gravity of Oil




Location Map




LEGEND

- Oil
- Gas
- Dry & Abn
- Injection

- Wells Below S.A.
- B Blinebry
- D Drinkard
- Proposed Location

BOPD/BWPD
Cum MBO

SOUTHWEST PRODUCTION REGION

EUNICE FIELD
Lea County, New Mexico

AMERADA HESS

GILL & PRUITT LEASES

0 2000' 4000'

Date:

Originator:

Page No.

Ref. No.

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 | Lea |

| Address | TYPE OF TEST - (X) | Scheduled | Completion | Special |
|---|---|---|---|---|
| P. O. 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. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Drinkard Deep | 2 | L | 31 | 21S | 37E | 8-15-82 | | 24/64 | 50 psig | 4 | 24 | 1 | 37.2 | 10 | 169 | 16,900 |

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)

Associate Petroleum Engineer
(Title)

August 16, 1982
(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 | Lea |

| Address | TYPE OF TEST – (X) | | | |
|---|---|---|---|---|
| P. O. 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Drill Deep | 2 | L | 31 | 21S | 37E | 1-16-81 | | 24/64 | 50 psig | 17 | 24 | 1 | 35.3 | 4 | 28 | 7000 |
| NOTE: Well TA on 11/20/81 | | | | | | | | | | | | | | | | |

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

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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)
Associate Petroleum Engineer
(Title)
August 16, 1982
(Date)

# PRODUCTION PLOT

DATA CODES
OIL = O
GAS = X
WTR = *

CUMULATIVES:

| | | | | | | |
|---|---|---|---|---|---|---|
| OIL MBBLS | 6.2 | 8.9 | 12.0 | 13.3 | 14.2 | 14.5 |
| GAS MMCF | 120.5 | 151.5 | 195.8 | 221.8 | 229.4 | 231.3 |
| WTR MBBLS | 19.9 | 19.9 | 19.9 | 19.9 | 20.4 | 20.5 |

STATUS:
1 ON 11-30-81

WTR BBL/MO: 10000, 6000, 3000, 1000, 600, 300, 100, 60, 30, 10
GAS MCF/MO: 100000, 60000, 30000, 10000, 6000, 3000, 1000, 600, 300, 100
OIL BBL/MO: 10000, 6000, 3000, 1000, 600, 300, 100, 60, 30, 10

MAR JUN SEP DEC MAR JUN SEP DEC MAR JUN SEP DEC MAR JUN SEP DEC MAR JUN SEP DEC MAR JUN SEP DEC MAR JUN SEP DEC MAR JUN SEP DEC
1977 1978 1979 1980 1981 1982 1983 1984

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

LEASE: 05124 GILL DEEP
WELL: 21

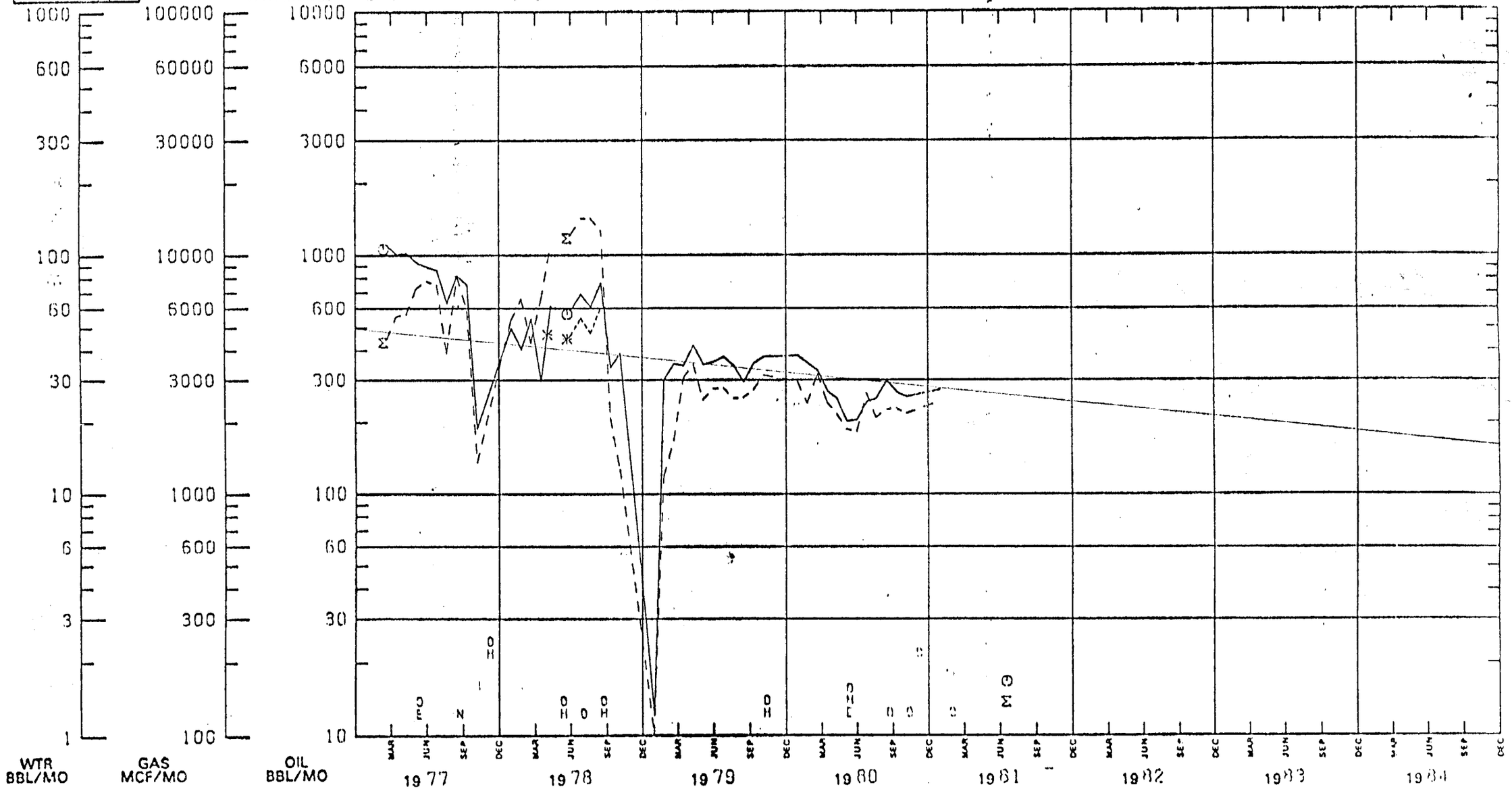
# PRODUCTION PLOT

DATA CODES
OIL = ⊖
GAS = ⧖
WTR = ✳

CUMULATIVES:

| | | | | | | |
|---|---|---|---|---|---|---|
| OIL MBBLS | 35.1 | 40.6 | 44.5 | 47.8 | 48.4 | 48.4 |
| GAS MMCF | 145.5 | 235.1 | 261.3 | 280.8 | 285.0 | 285.0 |
| WTR MBBLS | 0.7 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |

STATUS:
SIP ON 11-30-81




REGION: SOUTHWEST REGIO
FIELD: EUNICE FIELD
POOL: /DRINKARD/

LEASE: 05124 GILL DEEP
WELL: 2