

Case 8111

APPLICATION FOR CLASSIFICATION AS HARDSHIP GAS WELL

Operator Doyle Hartman Contact Party Michelle Hembree
Address Post Office Box 10426, Midland, Texas 79702 Phone No. (915) 684-4011
Lease Gulf-Greer Well No. 1 UT L Sec. 21 TWP 22-South RGE 36-East
Pool Name Jalmat (Gas) Minimum Rate Requested 120 mcfpd
Transporter Name El Paso Natural Gas Company Purchaser (if different) Northern Natural Gas Co.
Are you seeking emergency "hardship" classification for this well? XXX yes no

Applicant must provide the following information to support his contention that the subject well qualifies as a hardship gas well.

- 1) Provide a statement of the problem that leads the applicant to believe that "underground waste" will occur if the subject well is shut-in or is curtailed below its ability to produce. (The definition of underground waste is shown on the reverse side of this form)
- 2) Document that you as applicant have done all you reasonably and economically can do to eliminate or prevent the problem(s) leading to this application.
 - a) Well history. Explain fully all attempts made to rectify the problem. If no attempts have been made, explain reasons for failure to do so.
 - b) Mechanical condition of the well (provide wellbore sketch). Explain fully mechanical attempts to rectify the problem, including but not limited to:
 - i) the use of "smallbore" tubing; ii) other de-watering devices, such as plunger lift, rod pumping units, etc.
- 3) Present historical data which demonstrates conditions that can lead to waste. Such data should include:
 - a) Permanent loss of productivity after shut-in periods (i.e., formation damage).
 - b) Frequency of swabbing required after the well is shut-in or curtailed.
 - c) Length of time swabbing is required to return well to production after being shut-in.
 - d) Actual cost figures showing inability to continue operations without special relief
- 4) If failure to obtain a hardship gas well classification would result in premature abandonment, calculate the quantity of gas reserves which would be lost
- 5) Show the minimum sustainable producing rate of the subject well. This rate can be determined by:
 - a) Minimum flow or "log off" test; and/or
 - b) Documentation of well production history (producing rates and pressures, as well as gas/water ratio, both before and after shut-in periods due to the well dying, and other appropriate production data).
- 6) Attach a plat and/or map showing the proration unit dedicated to the well and the ownership of all offsetting acreage.
- 7) Submit any other appropriate data which will support the need for a hardship classification.
- 8) If the well is in a prorated pool, please show its current under- or over-produced status.
- 9) Attach a signed statement certifying that all information submitted with this application is true and correct to the best of your knowledge; that one copy of the application has been submitted to the appropriate Division district office (give the name) and that notice of the application has been given to the transporter/purchaser and all offset operators.

GENERAL INFORMATION APPLICABLE TO HARDSHIP GAS WELL CLASSIFICATION

1) Definition of Underground Waste.

"Underground Waste as those words are generally understood in the oil and gas business, and in any event to embrace the inefficient, excessive, or improper use or dissipation of the reservoir energy, including gas energy and water drive, of any pool, and the locating, spacing, drilling, equipping, operating, or producing, of any well or wells in a manner to reduce or tend to reduce the total quantity of crude petroleum oil or natural gas ultimately recovered from any pool, and the use of inefficient underground storage of natural gas."

- 2) The only acceptable basis for obtaining a "hardship" classification is prevention of waste with the burden of proof solely on the applicant. The applicant must not only prove waste will occur without the "hardship" classification, but also that he has acted in a responsible and prudent manner to minimize or eliminate the problem prior to requesting this special consideration. If the subject well is classified as a "hardship" well, it will be permitted to produce at a specified minimum sustainable rate without being subject to shut-in by the purchaser due to low demand. The Division can rescind approval at any time without notice and require the operator to show cause why the classification should not be permanently rescinded if abuse of this special classification becomes apparent.
- 3) The minimum rate will be the minimum sustainable rate at which the well will flow. If data from historical production is insufficient to support this rate (in the opinion of the Director), or if an offset operator or purchaser objects to the requested rate, a minimum flow ("log off") test may be required. The operator may, if he desires, conduct the minimum flow test, and submit this information with his application.
- 4) If a minimum flow test is to be run, either at the operator's option or at the request of the Division, the offset operators, any protesting party, the purchaser and CCD will be notified of the date of the test and given the opportunity to witness, if they so desire.
- 5) Any interested party may review the data submitted at either the Santa Fe office or the appropriate OCD District Office.
- 6) The Director can approve uncontested applications administratively if, in his opinion, sufficient justification is furnished. Notice shall be given of intent to approve by attaching such notice to the regular examiner's hearing docket. Within 20 days following the date of such hearing, the affected parties will be permitted to file an objection. If no objection has been filed, the application may be approved.
- 7) Should a protest be filed in writing, the applicant will be permitted to either withdraw the application, or request it to be set for hearing.
- 8) An emergency approval, on a temporary bases for a period not to exceed 90 days, may be granted by the District Supervisor, pending filing of formal application and final action of the OCD Director. This temporary approval may be granted only if the District Supervisor is convinced waste will occur without immediate relief. If granted, the District Supervisor will notify the purchaser.
- 9) After a well receives a "hardship" classification, it will be retained for a period of one year unless rescinded sooner by the Division. The applicant will be required to certify annually that conditions have not changed substantially in order to continue to retain this classification.
- 10) Nothing here withstanding, the Division may, on its own motion, require any and all operators to show cause why approval(s) should not be rescinded if abuse is suspected or market conditions substantially change in the State of New Mexico.
- 11) A well classified as a "hardship well" will continue to accumulate over and under production (prorated pools). Should allowables exceed the hardship allowable assigned, the well will be permitted to produce at the higher rate, if capable of doing so, and would be treated as any other non-hardship well. Any cumulative overproduction accrued either before or after being classified "hardship" must, however, be balanced before the well can be allowed to produce at the higher rate.

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APPLICATION FOR CLASSIFICATION AS
HARDSHIP GAS WELL
Doyle Hartman-
Gulf-Greer No. 1
SW/4 Section 21
T-22-S, R-36-E
Lea County, New Mexico
Jalmat (Gas) Pool

1. Applicant expects that restriction of gas production from this well below a minimum of 120 mcf per day will result in "underground waste" (as defined by 1) GENERAL INFORMATION APPLICABLE TO HARDSHIP GAS WELL CLASSIFICATION). This expectation is predicated upon the observation that this well has produced water at daily volumes of from 34 bbls/day to 45 bbls/day since December, 1979, when water production from this well was initially observed. Unless sufficient gas is produced so that water flowing into the wellbore is produced (and not allowed to accumulate and eventually flow from the largely water saturated volumes of reservoir rock to the substantially gas saturated volumes of reservoir rock), loss of reserves will probably occur due to both loss of relative permeability to gas and/or loss of absolute permeability to all fluids.
2. A) Water production cannot be eliminated or reduced by remedial completion practices, since the well is completed in the Seven Rivers portion of the Jalmat Pool interval between depths of 3479 feet and 3585 feet. Since no water was initially produced, none of the several Seven Rivers sands in which the well is completed had any indigenous water saturation. Any attempt to determine the source of water within the vertical formation section would require "killing" the well; the damage that this application is seeking to avoid would (or could) likely occur during the attempt to isolate the water bearing section. Even if the source of water were found to be a limited portion of the vertical section, there is a substantial risk that attempts to squeeze cement this section would also result in the reduction or elimination of gas production.

B) This well has a 57-D rod-pumping unit installed with a 1½" pump and 54" stroke pumping at 8 strokes per minute. Water is pumped from the tubing, while gas production flows from the casing-tubing annulus. Fluid cannot be effectively pumped from the well unless accompanied by sufficient gas production so that reduction of pump volumetric efficiency does not occur due to "gas locking" of the pump valves.
3. Initial production of this well occurred in May, 1978, but no water production was observed until December, 1979. Since December, 1979, water production has varied between about 35 bbls per day and

approximately 45 bbls per day (except for June, 1981, when water production averaged 67 bbls per day), while the observed water-gas ratio (as illustrated by the attached graph of the logarithm of water-gas ratio as a function of time) has increased irregularly. These facts serve to demonstrate that the water production is relatively invariant, while, as gas production rates decline because of depletion and pipeline proration, the water-gas ratio increases. Examination of the water-gas ratio trend for the period August, 1983 through March, 1984 reveals a water-gas ratio irregularly increasing from about 0.2 bbl/mcf to approximately 0.27 bbl/mcf. The water-gas ratio of 0.27 bbl/mcf occurred in December, 1983, and, during that month, gas production averaged 120 mcfpd; therefore, this experience indicates that restriction of the gas production rate below 120 mcf/d will result in accumulation of water inside the wellbore and, ultimately, in "underground waste". Further, at water production rates of 35 bbls/day and with the current southern Lea County rate of \$1.31 per bbl, 16.5 mcf/day must be produced to pay for water hauling and disposal costs alone, without any consideration of other necessary costs of operation.

4. Failure to obtain a hardship well classification could result in loss of substantial gas reserves for this well; this loss can be documented as follows:

Estimated Original Gas-in-Place:
Between 1124 mmcf and 1319 mmcf

Estimated Deliverability Projected Gas Recovery Factor, Fraction of Original Gas in Place:
0.8974

Estimated Ultimate Gas Recovery, mmcf:
Decline curve projection: 1009.0
Deliverability projection: 1003.00

Cumulative Gas Recovery, mmcf at April 1, 1984:
583.914

Estimated Remaining Gas Recovery, mmcf:
Decline curve projection: 425.1
Deliverability projection: 419.1

5. Special daily tests were made for this well during the period April 17-22, 1983 with the following results:

<u>DATE</u>	<u>Produced Volumes</u>		<u>Water-Gas</u>	<u>Wellhead</u>
	<u>GAS,mcf/d</u>	<u>Water,bbl/d</u>	<u>Ratio</u>	<u>Pressure</u>
			<u>bbl/mcf</u>	<u>psi</u>
17	28	36	1.29	90
18	72	19	0.26	88
19	94	36	0.38	86
20	134	24	0.18	81
21	143	48	0.34	76
22	175	42	0.24	70

These data substantiate that, in order to prevent the probable occurrence of "underground waste", the Doyle Hartman Gulf-Greer No. 1 must be produced at a minimum rate of 120 mcf per day.

COMPANY Doyle Hartman

WELL Gulf-Greer No. 1

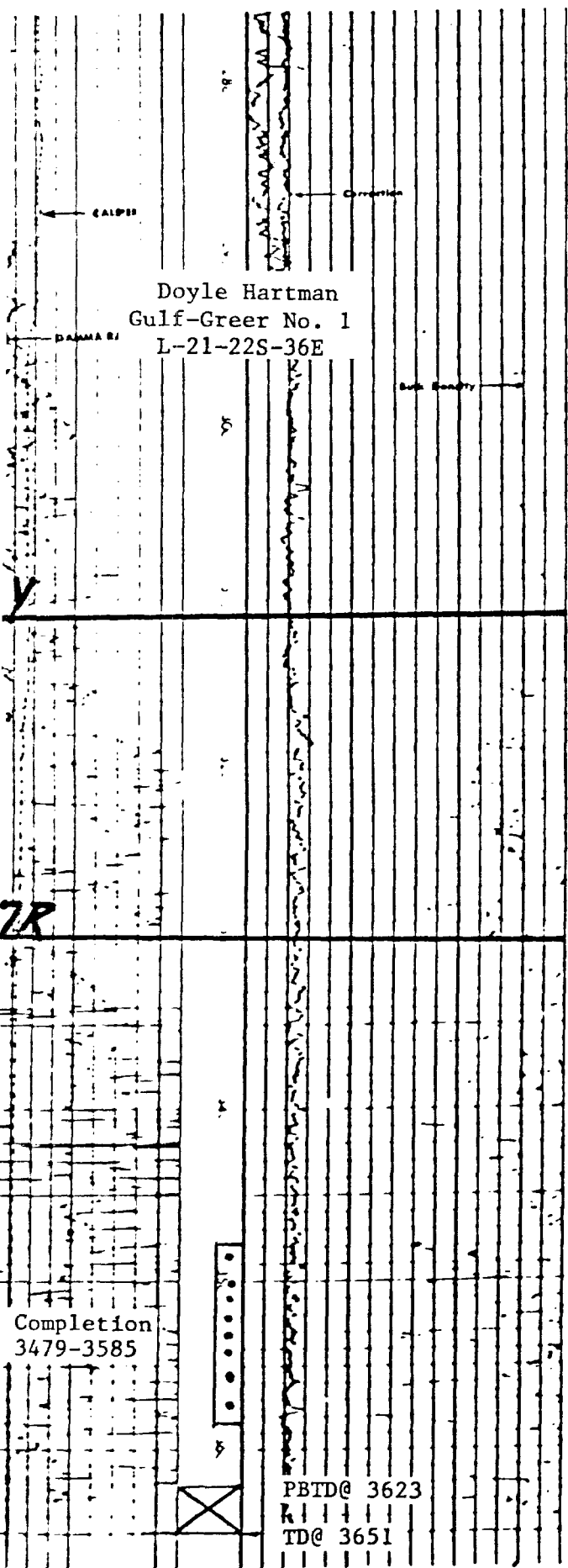
FIELD Jalmat

LOCATION 1980 FSL & 990 FWL (L)
Section 21, T-22-S, R-36-E
(22-36-21-L)

COUNTY Lea

STATE New Mexico

ELEVATIONS: KB _____
DF _____
GL 3536



COMPLETION RECORD

SPUD DATE 4-1-78 COMP. DATE 5-20-78

TD 3651 PBD 3623

CASING RECORD 8 5/8 @ 475 w/325
4 1/2 @ 3651 w/950

PERFORATING RECORD Perf: 3479-3585 w/14

STIMULATION A/8200
SWF/40,000 + 80,000

IP IPF = 652 MCFPD + 36 BWPD

GOR _____ GR _____

TP 91 CP 91

CHOKE 32/64 TUBING 2 3/8 @ 3594'

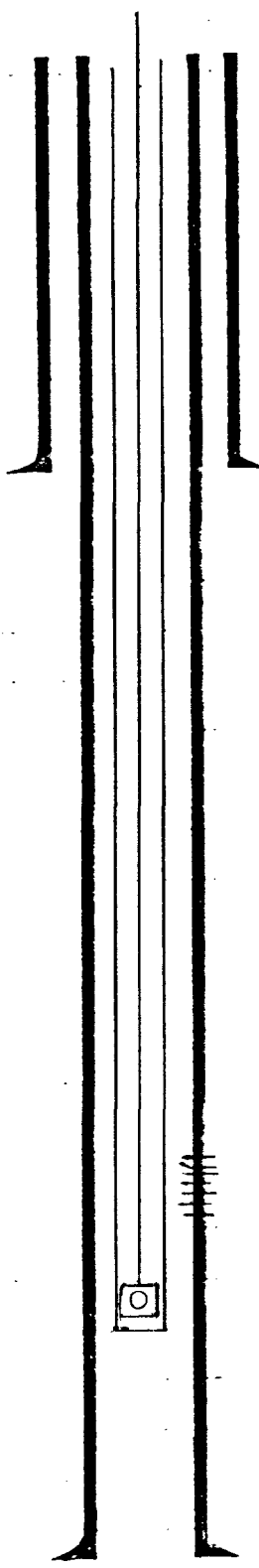
REMARKS Well Test (4-20-83)
Gas: 234 MCFPD
Water: 35 BWPD
Choke: 52/64
TP: 41

Current Pump Arrangement
(10 x 54 x 1-1/4)

Current Tubing Depth: 3588'

L-21-22S-36E

WELLBORE SKETCH
GULF GREER WELL NO. 1



8-5/8" set at 475'
cement 325 sacks

The sketch shows a vertical wellbore with two main casing sections. The upper section is labeled '8-5/8" set at 475' cement 325 sacks'. The lower section is labeled '4-1/2" set at 365' cement 950 sacks'. Inside the casing, there is a '2-3/8" EUE Tubing' section with a '2" Insert Pump' at the bottom. Perforations are indicated by a series of short horizontal lines on the tubing, with a list of depths: 3479, 3483, 3487, 3495, 3499, 3503, 3531, 3535, 3538, 3560, 3563, 3578, 3581, 3585. A small square with a circle inside is located near the bottom of the tubing.

Perforations: 1 hole each at: 3479, 3483, 3487, 3495,
3499, 3503, 3531, 3535, 3538, 3560, 3563,
3578, 3581, 3585.

2" Insert Pump
2-3/8" EUE Tubing
set at 3588'

4-1/2" set at 365'
cement 950 sacks

DOYLE HARTMAN, OIL OPERATOR
 YEAR-TO-DATE PRODUCTION FOR 1982
 VOLUMES CALCULATED AT 15.025 PSIA

RFI# 000003

RUN ON 4/17/84

DATE ON
 STREAM

LEASE# METER#

780401 61963 GULF-GREER #1 OPERATOR -- DOYLE HARTMAN

5/26/78 .42740900

AVG
 TP

AVG
 CF

AVG
 TP

ITD CUME
 OIL

ITD CUME
 GAS

ITD CUME
 BTU

AVG
 TEMP

LP
 PSIG

LP
 PSIG

LP
 PSIG

LP
 PSIG

LP
 PSIG

LP
 PSIG

LP
 PSIG

LP
 PSIG

LP
 PSIG

48

46

48

48

47

48

45

46

46

41

43

51

430843

435991

444057

450210

456949

464398

471062

478269

485279

492496

499068

504125

30.5

22.6

31.0

29.5

31.5

30.4

31.5

30.8

29.7

31.0

30.0

30.9

1218.00

1640.00

1300.00

1116.00

1137.00

1067.00

1083.00

1092.00

1060.00

1115.00

1130.00

1218.00

14176.00

43723.00

7537

5148

8066

6153

6739

7449

6664

7207

7010

7217

6572

5057

80819

504125

30.5

22.6

31.0

29.5

31.5

30.4

31.5

30.8

29.7

31.0

30.0

30.9

359.4

1663.5

JANUARY

FEBRUARY

MARCH

APRIL

MAY

JUNE

JULY

AUGUST

SEPTEMBER

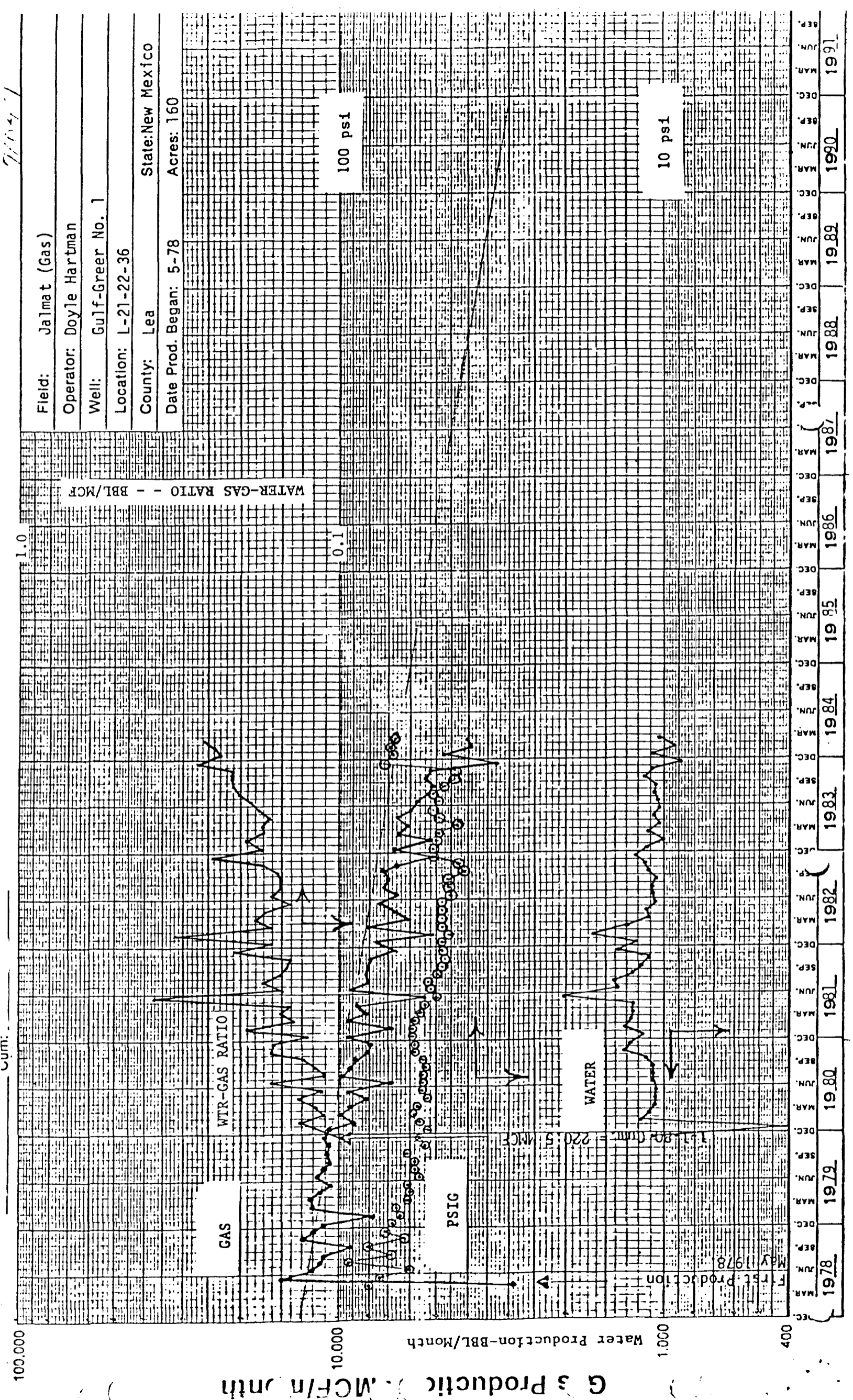
OCTOBER

NOVEMBER

DECEMBER

YTD 1982

ITD



100,000
10,000
1,000
400

Gas Production - MCF/month
Water Production - BBL/month

Cum.

1.0
0.1

Field: Jalmat (Gas)
Operator: Doyle Hartman
Well: Gulf-Greer No. 1
Location: L-21-22-36
County: Lea
State: New Mexico
Date Prod. Began: 5-78
Acres: 160

1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991

WATER-GAS RATIO - - BBL/MCF

First Production May 1978
1.199 Cum = 220.5 MCF

GAS
PSIG
WATER

WTR-GAS RATIO

OFFSET JALMAT (GAS) OPERATORS

Doyle Hartman-
 Gulf-Greer No. 1
 SW/4 Section 21
 T-22-S, R-36-E
 Lea County, New Mexico
 (160 acres)

<u>OPERATOR</u>	<u>LEASE & WELL NAME(S)</u>	<u>GAS WELL LOCATION(S)</u>	<u>UNIT DESCRIPTION</u>	<u>NUMBER OF ACRES</u>
Sun Exploration & Production Co.	Boren & Greer Lease	No Active Well	E/2 NE/4 Section 20 T-22-S, R-36-E	80
Sun Exploration & Production Co.	Boren & Greer Gas Com No. 2	C-21-22S-36E	NW/4 Section 21 T-22-S, R-36-E	160
Dallas McCasland	Devonian Christmas No. 2	B-21-22S-36E	NE/4 Section 21 T-22-S, R-36-E	160
Dalport Oil Corporation	Annie L. Christmas B No. 1	J-21-22S-36E	SE/4 Section 21 T-22-S, R-36-E	160
Conoco	Myer B-28 Battery 2 Lease	No Active Well	NE/4 Section 28 T-22-S, R-36-E	160
Conoco	Myer B-28 Battery 2 No. 1	E-28-22S-36E	NW/4 Section 28 T-22-S, R-36-E	160
Conoco	Myer A-29 A/C 2 No. 5	A-29-22S-36E	E/2 NE/4 Section 29 T-22-S, R-36-E	80
Conoco	Lamar Lunt No. 2	J-20-22S-36E	SE/4 Section 20 T-22-S, R-36-E	160

Tabulation of Overage/Underage
Doyle Hartman-
Gulf-Greer No. 1
SW/4 Section 21
T-22-S, R-36-E
Lea County, New Mexico
Jalmat (Gas)

For the period extending from January, 1983 through the March, 1984, the Gulf-Greer No. 1 has not accumulated any overage or underage in relation to the Jalmat (Gas) pool allowable.