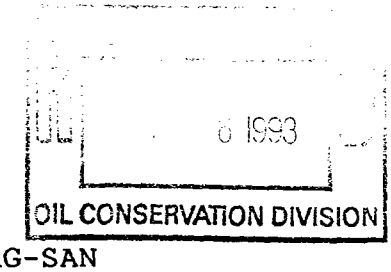
STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION



IN THE MATTER OF THE APPLICATION OF PHILLIPS PETROLEUM COMPANY TO QUALIFY FIVE PORTIONS OF ITS EAST VACUUM GRAYBURG-SAN ANDRES UNIT PRESSURE MAINTENANCE PROJECT FOR THE RECOVERED OIL TAX RATE PURSUANT TO THE "NEW MEXICO ENHANCED OIL RECOVERY ACT," LEA COUNTY, NEW MEXICO

CASE NO 10779

A P P L I C A T I O N

Comes now PHILLIPS PETROLEUM COMPANY, by its attorneys, Kellahin & Kellahin, and pursuant to the New Mexico " Enhanced Oil Recovery Act" applies to the New Mexico Oil Conservation Division for the recovered oil tax rate for enhanced oil recovery for the expanded use of enhanced oil recovery technology in five portions of its East Vacuum Grayburg-San Andres Unit Pressure Maintenance Project, an existing EOR project and in support states:

(1) Phillips Petroleum ("Phillips") is the current operator of the East Vacuum Grayburg-San Andres Unit Pressure Maintenance Project, Vacuum Grayburg-San Andres Pool, Lea County, New Mexico ("Existing EOR Project") which originally was approved by Division Order R-5897 issued effective January 16, 1979.

(2) On November 16, 1981 the Division issued Order R-6856 which amended Order R-5897 and approved the Existing EOR Project to include the injection of carbon dioxide and for approval of a portion of the Project as a Qualified Tertiary Oil Recovery Project.

(3) At the time of unitization on November 27, 1978, the Project comprised 169 wells encompassing 7025 acres. Waterflood operations were initiated during 1980 on 80-acre inverted nine-spot patterns.

(4) To date, ultimate primary oil recovery from the Project has been 76,781.6 Mbbls. As of January 1993, total oil production from the Unit was 117,099.1 Mbbls. Under the current 80-acre invert nine-spot patterns, ultimate secondary oil recovery is estimated to be 66,548.8 Mbbls.

(5) The Project is currently producing at a rate of 7900 BOPD and 38,000 BWPD from 199 active producers with 100 currently active injection wells. Approximately 26,000.0 Mbbls. of recoverable reserves remain under the current mode of operations.

(6) Phillips seeks to expand portions of this Project by means of a significant change in the process used for the displacement of crude oil which will be a modification of well configurations in five selected areas of the unit. A description of each area and its changes is described in Paragraph (9)(d)(8) below.

(7) By separate application and pursuant to Division Rule 701, Phillips will apply to the Division for injection approval for the various injections wells described in this application.

(8) The estimated amount of recoverable oil attributable to a Positive Production Response from the Expanded Use of enhanced oil recovery technology for this portion of this existing EOR Project is 1.056 million barrels of additional oil.

(9) In accordance with Division Order R-9708, the following is submitted:

a. Operator's name and address:

Phillips Petroleum Company
4001 Penbrook
Suite 401
Odessa, Texas 79762

b. Description of the Expanded Use area:

(1) Plat outlining Expanded Use area:

See Exhibit "A"

(2) Description of the Expanded Use Area:

PROJECT AREA 1: Located within the NW/4 of Section 5, T18S, R35E, NMPM, and being an area contained within the following specific description: commencing at Well 0524-008 located 660 feet FNL and 660 feet FWL, then proceeding south to Well 0524-112 located 1655 feet FNL and 330 feet FWL, then southeast to Well 0524-003, located 1980 feet FNL and 660 feet FWL, then southeast to Well 0524-007 located 2100 feet FNL and 1450 feet FWL, then northeast to Well 0524-045 located 1650 feet FNL and 1650 feet FWL, then northwest to Well 0524-002 located 950 feet FNL and 1350 feet FWL and thence back to the point and place of beginning at Well 0524-008.

PROJECT AREA 2: Located within the S/2 of Section 32, T17S, R35E, NMPM, and being an area contained within the following specific description: commencing at Well 3202-004, located 1987 feet FSL and 660 feet FEL, then proceeding south to Well 3202-006 located 1320 feet FNL and 1594 feet FEL, then west to Well 3229-004 located 660 feet FSL and 1980 feet FWL, then northwest to Well 3229-005 located 1110 feet FSL and 1290 feet FWL and then northeast to Well 3229-003 located 1980 feet FSL and 1980 feet FWL and thence east back to the point and place of beginning at Well 3202-004.

PROJECT AREA 3: Located within a portion of Section 33, T17S, R35E, NMPM, and being an area contained within the following specific description: commencing at Well 3308-002, located 660 feet FNL and 2200 feet FWL, then proceeding southwest to Well 3366-029, located 1980 feet FNL and 660 feet FWL, then south to Well 3374-003 located 2630 feet FSL and 400 feet FEL, then southeast to Well 3374-001 located 1980 feet FSL and 660 feet FWL, then southeast to Well 3328-002 located

1310 feet FSL and 1160 feet FWL and then northeast to Well 3333-003 located 1980 feet FNL and 1980 feet FEL, then northwest back to the point and place of beginning at Well 3308-002.

PROJECT AREA 4: Located within a portion of Section 33 and a portion of the SW/4 of Section 34, T17S, R35E, NMPM, and being an area contained within the following specific description: commencing at Well 3440-005 located 1600 feet FSL and 900 feet FWL in Section 34, and then proceeding northwest to Well 3333-004 located 1380 feet FNL and 1280 feet FEL in Section 33, then southwest to Well 3333-008 located 2650 feet FSL and 2650 feet FEL of Section 33, and then southeast to Well 3315-004 located 990 feet FSL and 990 feet FEL of Section 33 then east to Well 3440-003 located 990 feet FSL and 330 feet FWL of Section 34 and then northeast back to the point and place of beginning at Well 3440-005.

PROJECT AREA 5: Located with a portion of the N/2 of Section 34, T17S, R35E, NMPM and being an area contained within the following specific description: commencing at Well 3236-007 located 200 feet FNL and 2550 feet FWL and then proceeding southwest to Well 3236-005 located 1491 feet FNL and 1203 feet FWL, then southeast to Well 3236-004 located 1980 feet FNL and 1980 feet FWL, then east to Well 3202-019 located 2065 feet FNL and 2540 feet FEL, then east to Well 3202-016 located 1980 feet FNL and 1980 feet FEL, then northeast to Well 3202-003 located 1180 feet FNL and 1480 feet FEL, then northwest back to the point and place of beginning at Well 3440-007.

(3) Total acres in Five Expanded Use Areas:

540 acres, more or less

(4) Name of the subject Pool and formation:

San Andres formation of the
Vacuum Grayburg-San Andres Pool

c. Status of operations in the project area:

(1) unit name:

East Vacuum Grayburg-San Andres Unit
Order R-5871 issued November 27, 1978

(2) N/A
(3) N/A

d. Method of recovery to be used:

(1) injected fluids: water and carbon dioxide

(2) Approved by Order R-5897
issued January 16, 1979 and by
Order R-6856 issued November 19, 1981

(3) N/A

e. Description of the Expanded Use Area:

(1) a list of producing wells:
See Exhibit "B"

(2) a list of injection wells:
See Exhibit "B"

(3) Capital cost of additional facilities:

$3,958,825.

(4) Total Project Costs:

$5,976,249.

(5) Estimated total value of the additional production that will be recovered as a result of this Expanded Use Area:

An additional 1.056 million barrels of oil with a current undiscounted value of $19,505,308 dollars

(6) Anticipated date of commencement of injection:

as soon as possible after OCD approval, if granted.

(7) the type of fluid to be injected and the anticipated volumes:

water injected at an estimated rate of 40,000 BWPD and CO2 injection at a rate of 30 MMCFPD.

(8) Explanation of changes in technology:

AREA 1: A 60-acre area designated as Area 1 on Exhibit A. This area is not in the existing CO2 injection project. The CO2 project area will be geographically expanded into Area 1 by conversion of Well 0524-129 to water alternating CO2 injection ("WAG") and the drilling of infill Well 0524-007. The entire area including Wells 0524-008, 0524-045, 0524-002, 0524-112, and 0524-003 will be affected by this change which will significantly change the process used for displacement of crude oil in the entire 80-acre area.

AREA 2: A 90-acre area designated as Area 2 on Exhibit A. This area will include three additional infill Wells: 3202-020, 3202-021 and 3229-013. Well 3202-001 will be converted to WAG injection. The impact of these changes will significantly change the process used for displacement of crude oil by improving sweep efficiency and contacting additional areas of the reservoir that currently are not being CO2 flooded. As a consequence, the following wells should experience an improvement in oil recovery through improved sweep efficiency: Wells 3202-004, 3202-006, 3202-012, 3202-015, 3229-003, 3229-004 and 3229-005.

AREA 3: A 160-acre area designated as Area 3 on Exhibit A. This area is being converted from two 80-acre nine-spot patterns to a 160-acre line drive pattern. Well 3333-002 will be converted to injection and Wells 3308-006, 3366-001 and 3373-002 will be drilled offset to the line drive injection. The combination of these changes will alter the displacement process significantly by improving sweep efficiency and contacting additional zones of the reservoir that presently are not being efficiently CO2 flooded. In addition to the new infill wells, Wells 3308-002, 3308-003, 3360-029, 3373-028, 3333-008, 3333-003, 3328-002, 3374-003, and 3374-001 should experience an improvement in oil recovery through improved sweep efficiency.

AREA 4: A 150-acre area designated as Area 4 on Exhibit A. This area is being converted from one 80-acre nine-spot pattern and one 70-acre seven spot pattern to a 150-acre line drive pattern. Well 3315-001 will be converted and Well 3340-007 will be drilled to accomplish these changes in operations. The combination of these changes will alter the oil displacement process significantly by improving sweep efficiency and contacting additional zones of the reservoir that presently are not being efficiently CO2 flooded. In addition, the following wells should experience an improvement in oil recovery through improved sweep efficiency: Wells 3440-001, 3440-003, 3440-005, 3333-004, 3333-007, 3333-001, 3315-004, 3315-005 and 3315-002.

AREA 5: An 80-acre area designated as Area 5 on Exhibit A. The conversion of Well 3202-033 will alter this pattern from an 80-acre inverted nine-spot pattern to an 80-acre line drive pattern. This change will alter the oil displacement process significantly by improving sweep efficiency and contacting additional zones of the reservoir that presently are not being CO2 flooded. The following wells should experience an improvements in oil recovery through improved sweep efficiency: Wells 3202-003, 3202-019, 3202-016, 3236-007, 3236-003, 3236-004 and 3236-005.

f. Production data:

Attached are the following graphs, charts and supporting data to show the production history and production forecast of oil, gas, casinghead gas and water from the project area:

Exhibit C: structure map
Exhibit D: porosity map figure 2.19
Exhibit E: porosity may figure 2.17
Exhibit F: porosity map figure 2.21
Exhibit G: structural cross-section A-A'
Exhibit H: structural cross-section B-B'
Exhibit I: production histories (5 pages)
Exhibit J: Production forecasts (5 pages)

Wherefore, Applicant requests that this application be set for hearing and that after said hearing, the Division enter its order approving this application.

Respectfully submitted,

W. Thomas Kellahin
KELLAHIN & KELLAHIN
P.O. Box 2265
Santa Fe, New Mexico 87504
(505) 982-4285

Elizabeth Harris, Esq.
Phillips Petroleum Company
401 Penbrook
Odessa, Texas 79762

Attorneys for Applicant

CERTIFICATION

STATE OF TEXAS)
) SS
COUNTY OF ECTOR)

I, James E. Stevens, having been first duly sworn, state that I am a petroleum engineer, a duly authorized representative of Phillips Petroleum Company, have knowledge of the facts herein and therefore certify that the facts are set forth in this Application are true and accurate to the best of my own knowledge and belief.

James E. Stevens

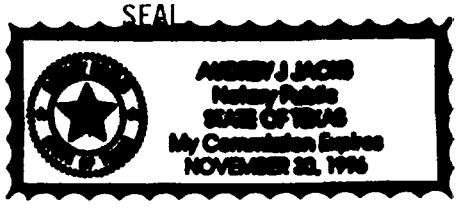
The foregoing certificate was acknowledged before me this 2nd day of July, 1993 by James E. Stevens.

Audrey J. Jacks
Notary Public

My Commission Expires:

November 30, 1996

SEAL



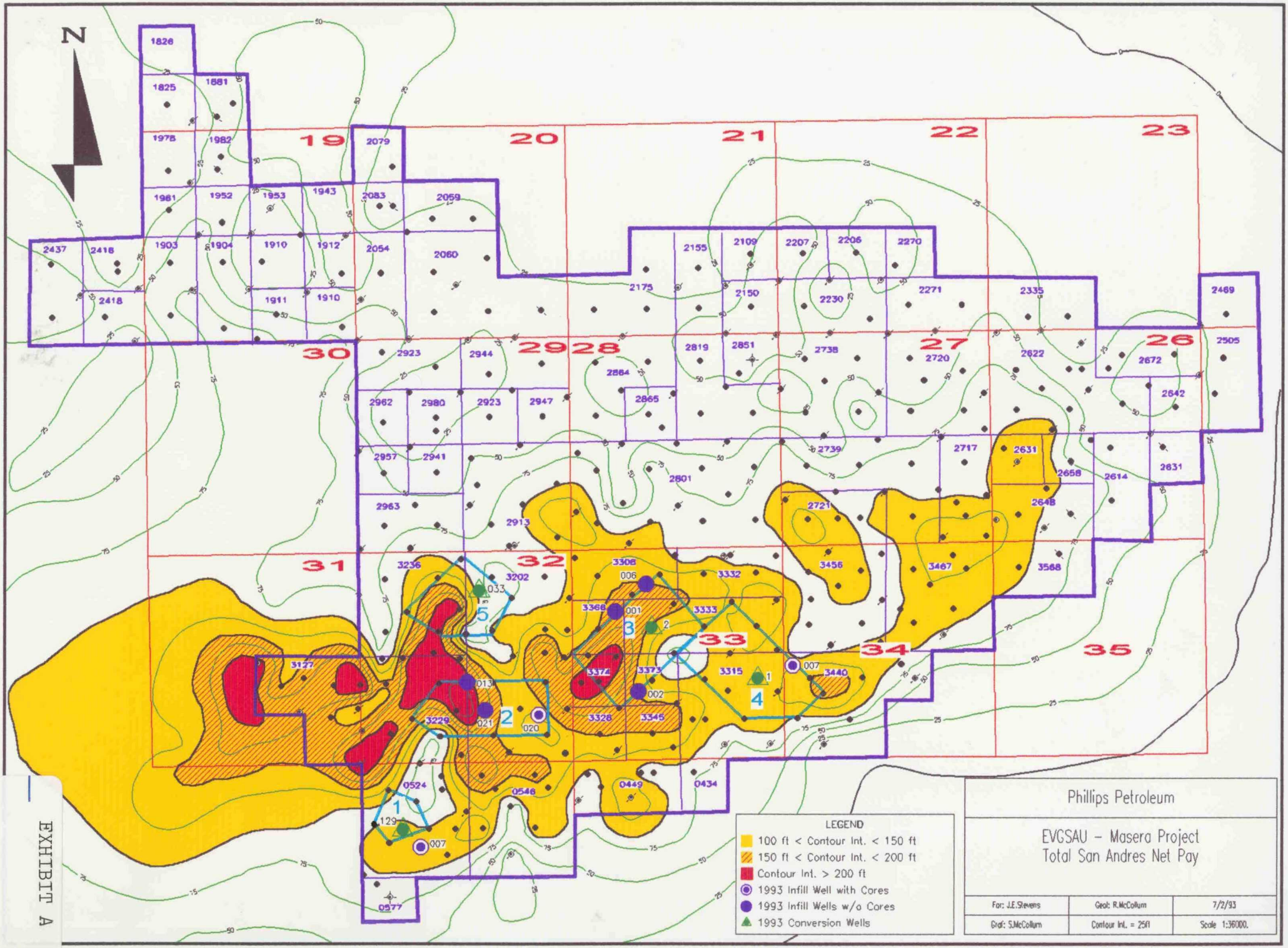

N
19
20
21
22
23
30
29
28
27
26
31
32
33
34
35
LEGEND
100 ft < Contour Int. < 150 ft
150 ft < Contour Int. < 200 ft
Contour Int. > 200 ft
1993 Infill Well with Cores
1993 Infill Wells w/o Cores
1993 Conversion Wells
Phillips Petroleum
EVGSAU – Masera Project
Total San Andres Net Pay
For: J.E.Stevens
Geol: R.McCollum
7/2/93
Grid: S.McCollum
Contour Int. = 25ft
Scale 1:36000.

EXHIBIT A

EXHIBIT "B"

AREA 1:

Injectors:
0524-129

Producers:
0524-008
0524-045
0524-002
0524-003
0524-112
0524-007

AREA 2:

Injectors:
3229-008
3202-001

Producers:
3202-004
3202-006
3202-012
3202-015
3202-020
3202-021
3229-003
3229-004
3229-005
3229-013

AREA 3:

Injectors:
3333-005
3333-002
3374-002

Producers:

3308-002
3308-003
3308-006
3328-002
3333-008
3333-003
3366-002
3366-029
3373-002
3373-028
3374-001
3374-003

AREA 4:

Injectors:

3315-001
3315-006
3315-008

Producers:

3333-003
3333-004
3333-008
3315-002
3315-004
3315-005
3440-001
3440-003
3440-005
3440-007

AREA 5:

Injectors:

3236-006
3202-033

Producers:

3236-003
3236-004
3236-005
3236-007
3202-003
3202-016
3202-019

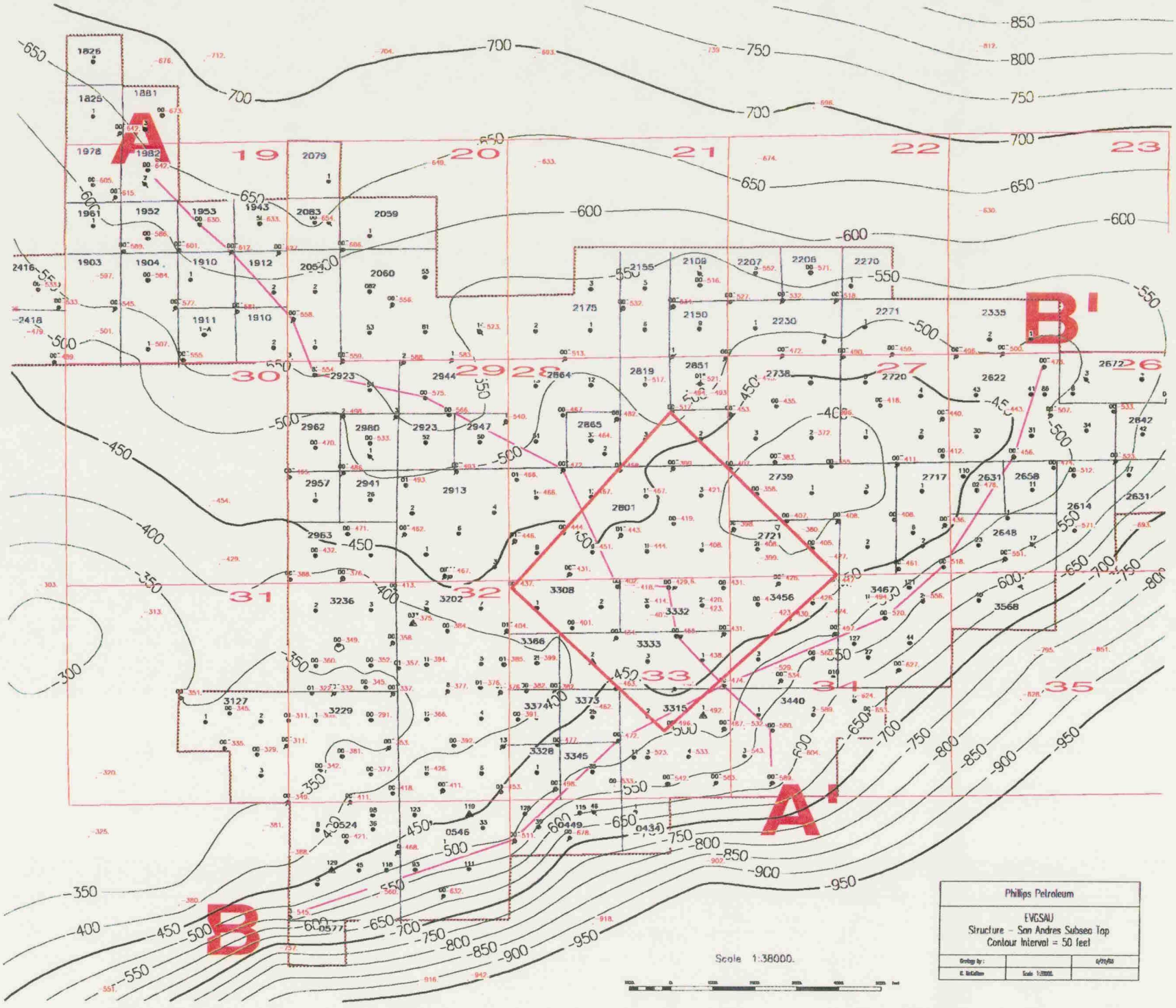

A
A'
B
B'
Phillips Petroleum
EVGSAU
Structure – San Andres Subsea Top
Contour Interval = 50 feet
Scale 1:38000.

EXHIBIT C

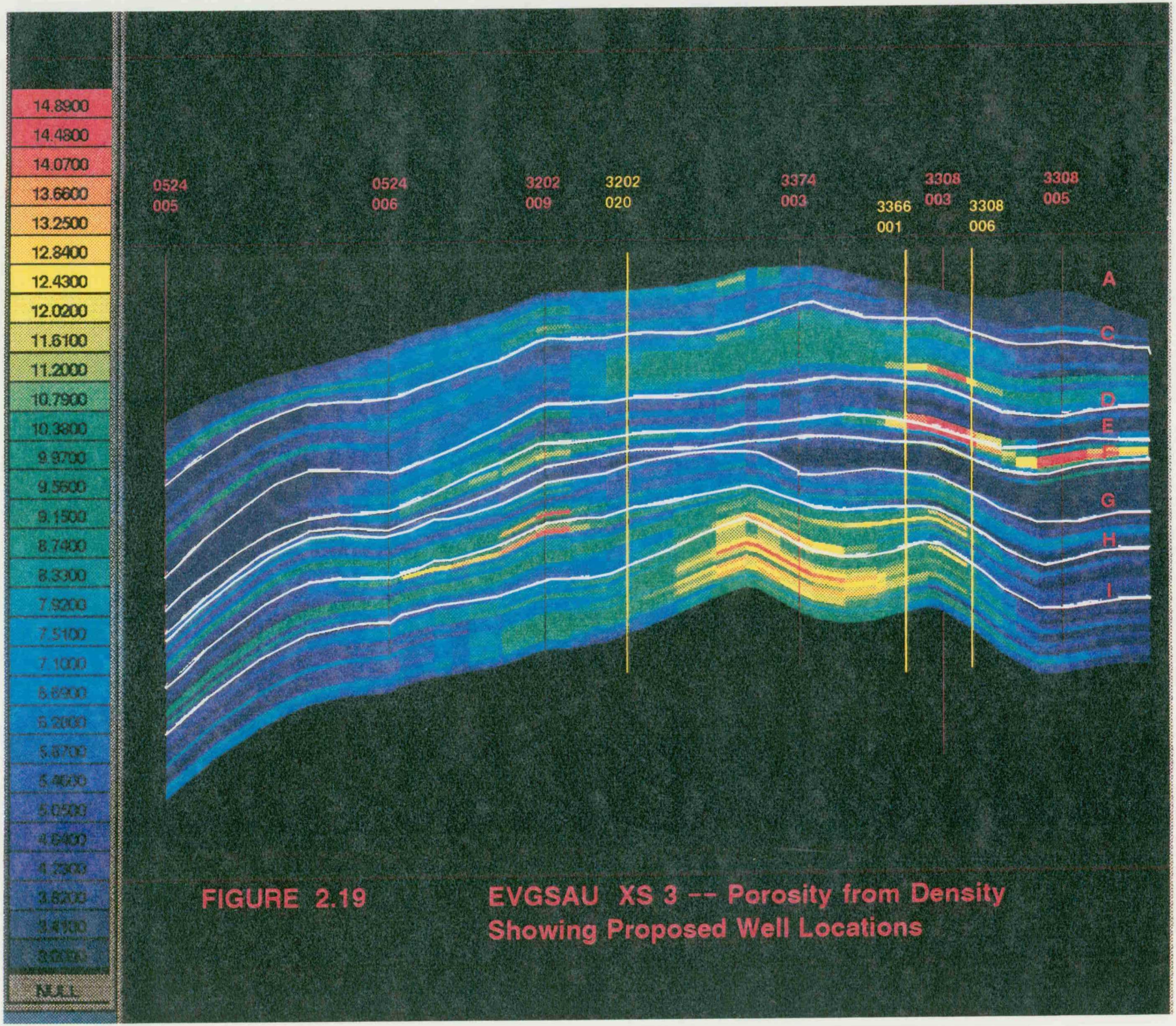


FIGURE 2.19 EVGSAU XS 3 -- Porosity from Density Showing Proposed Well Locations

EXHIBIT D

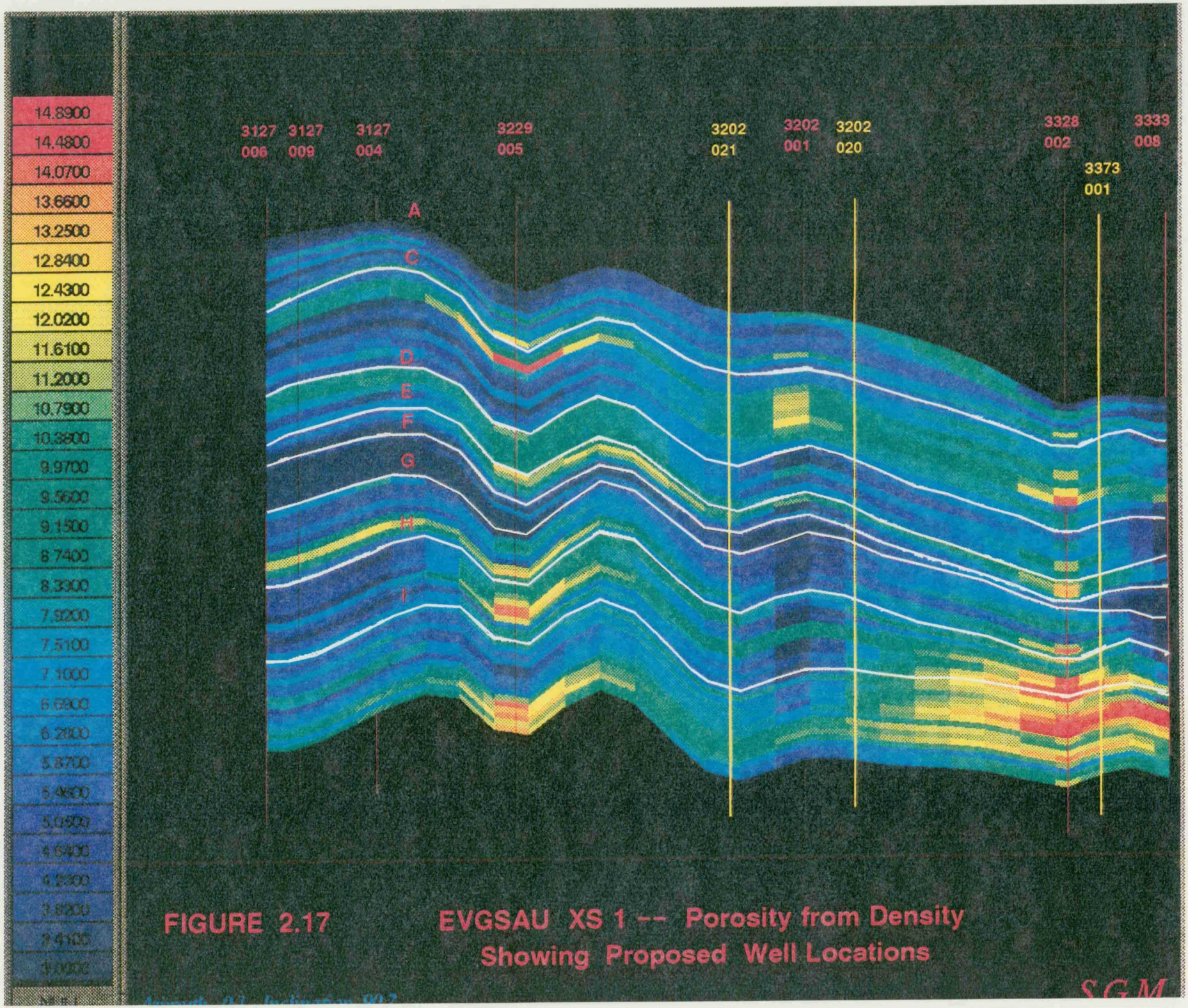


FIGURE 2.17 EVGSAU XS 1 -- Porosity from Density Showing Proposed Well Locations

SGM

EXHIBIT E

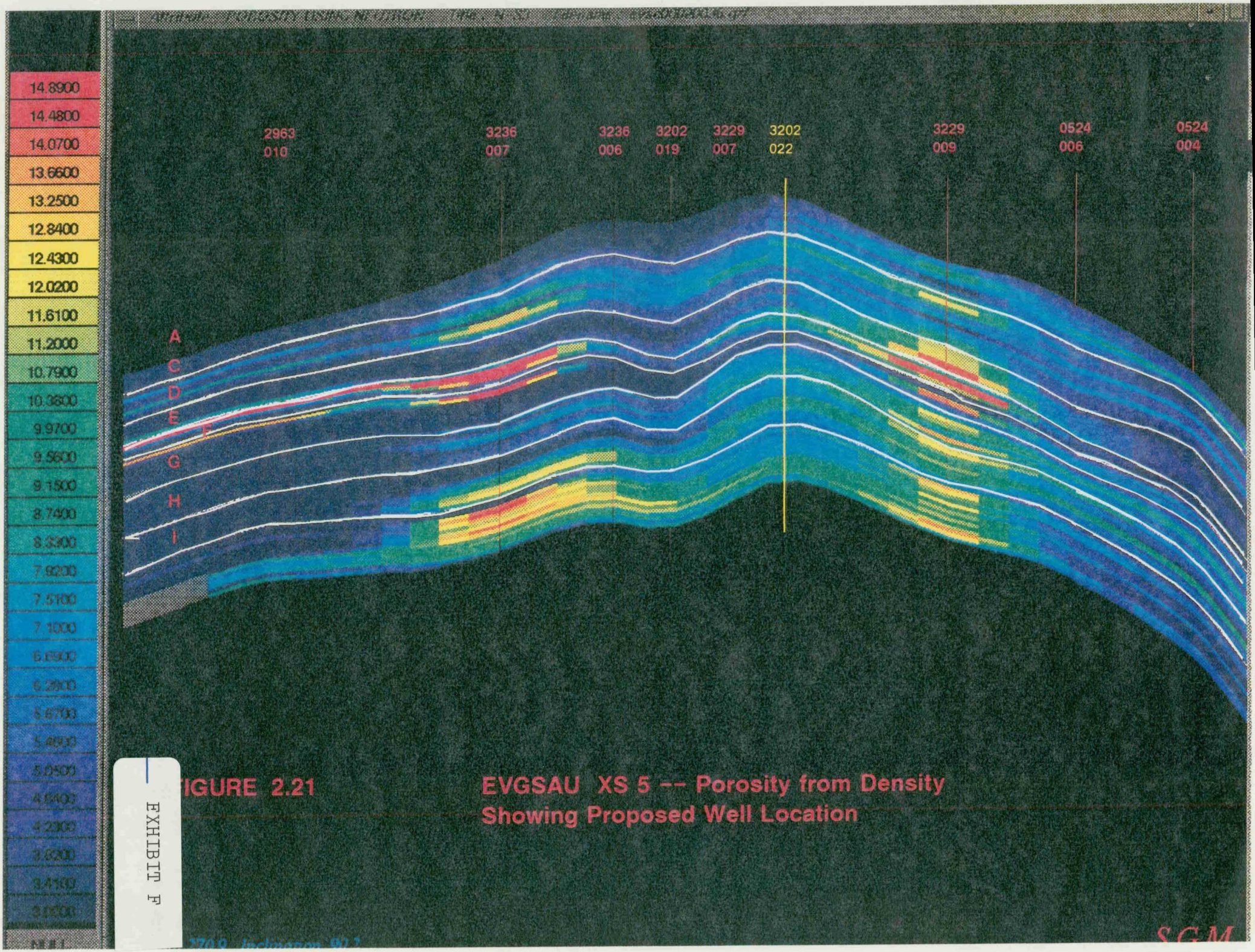


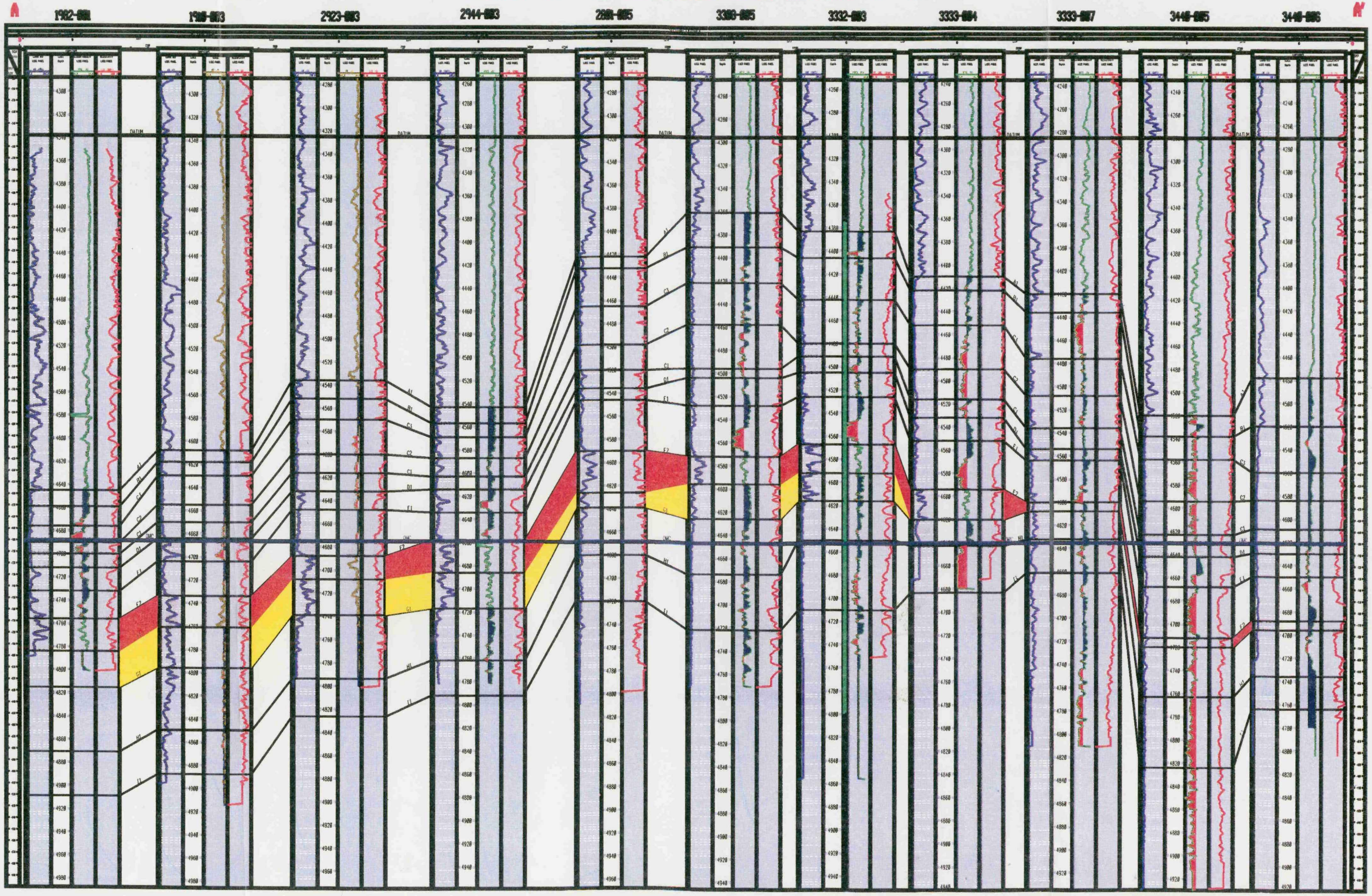
FIGURE 2.21

EVGSAU XS 5 -- Porosity from Density
Showing Proposed Well Location

EXHIBIT F

EXHIBIT G

EVGSAU NW - SE STRUCTURAL CROSS-SECTION A - A'



EVGSAU NW - SE STRUCTURAL CROSS-SECTION A - A'

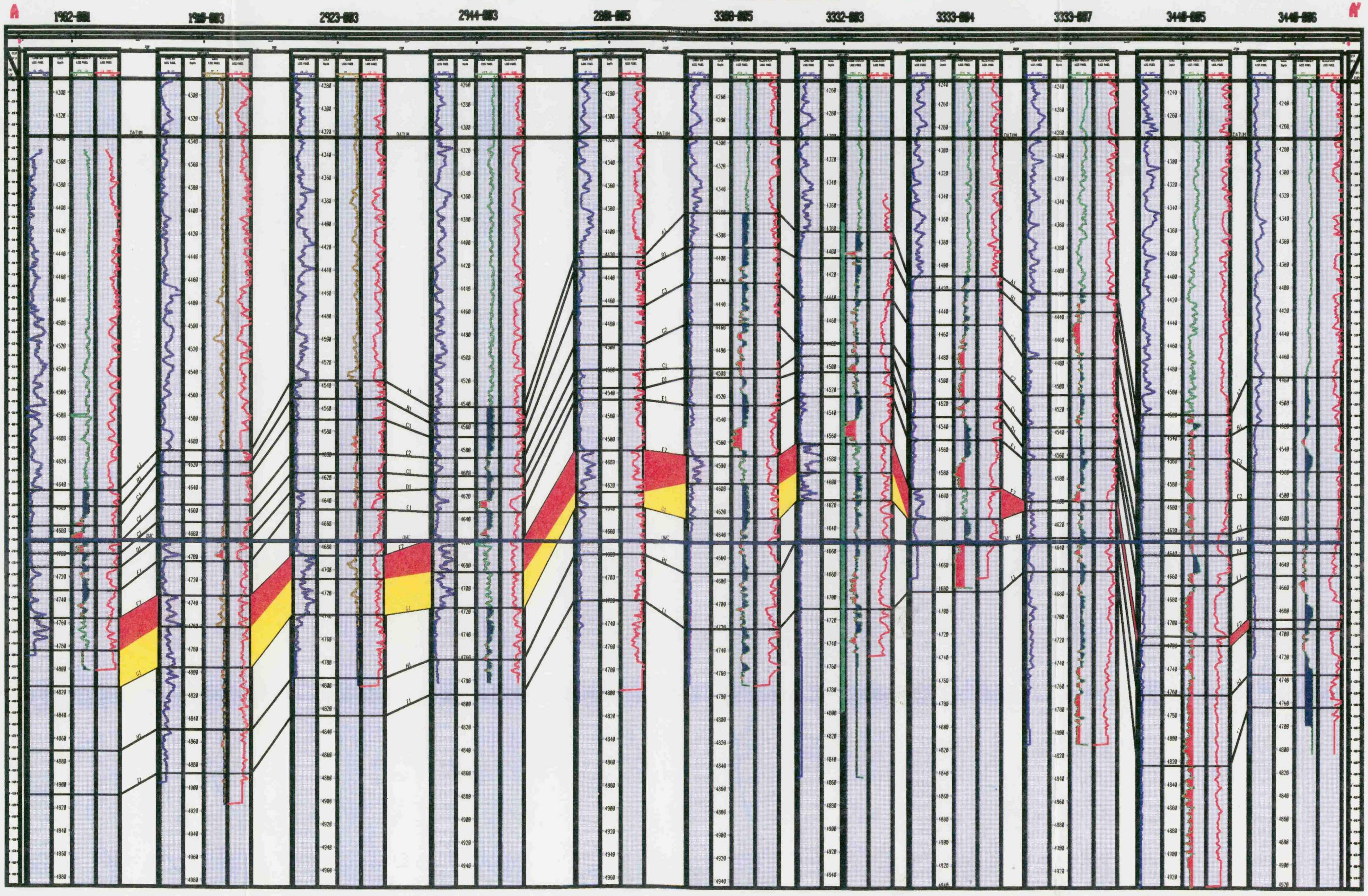


EXHIBIT H

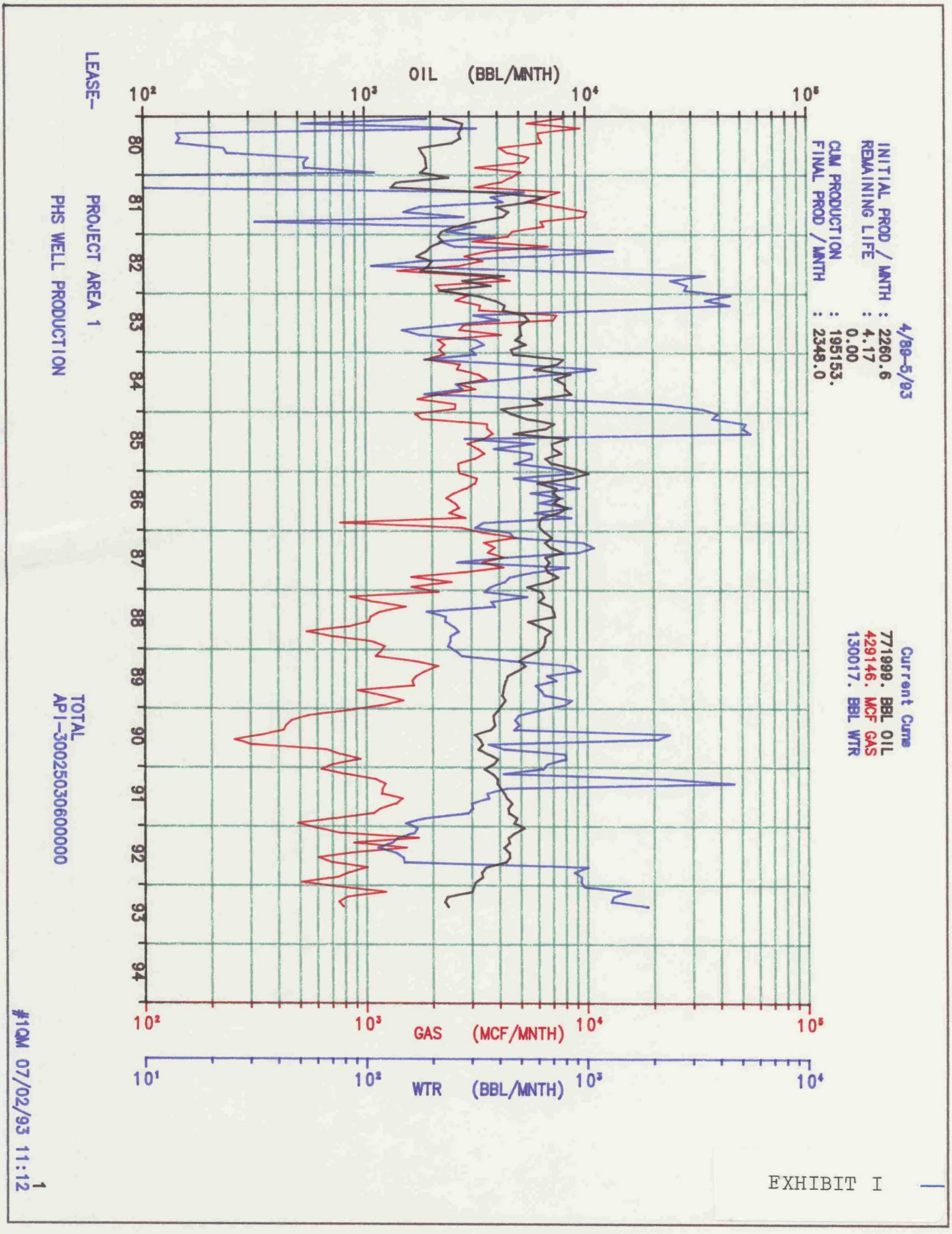
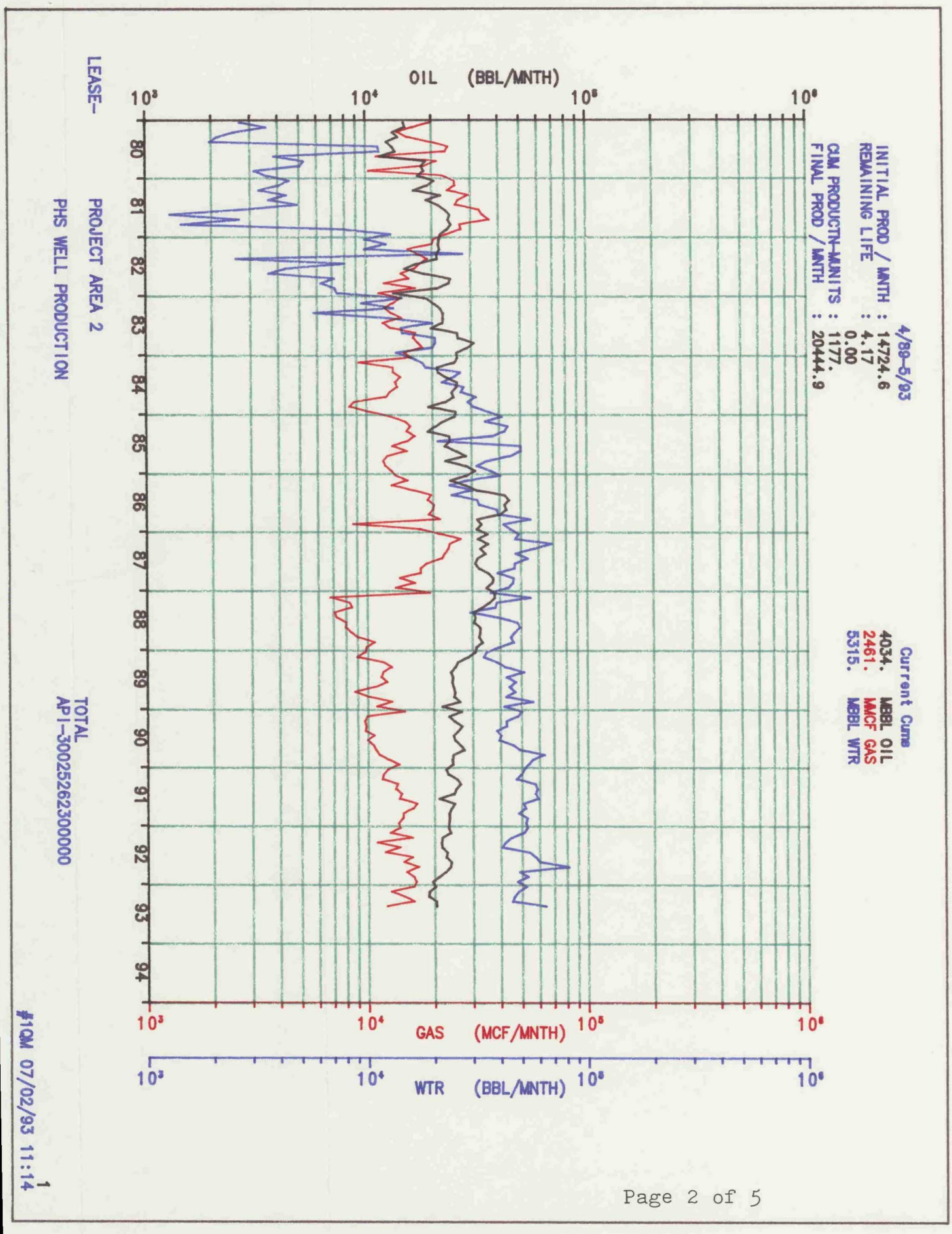
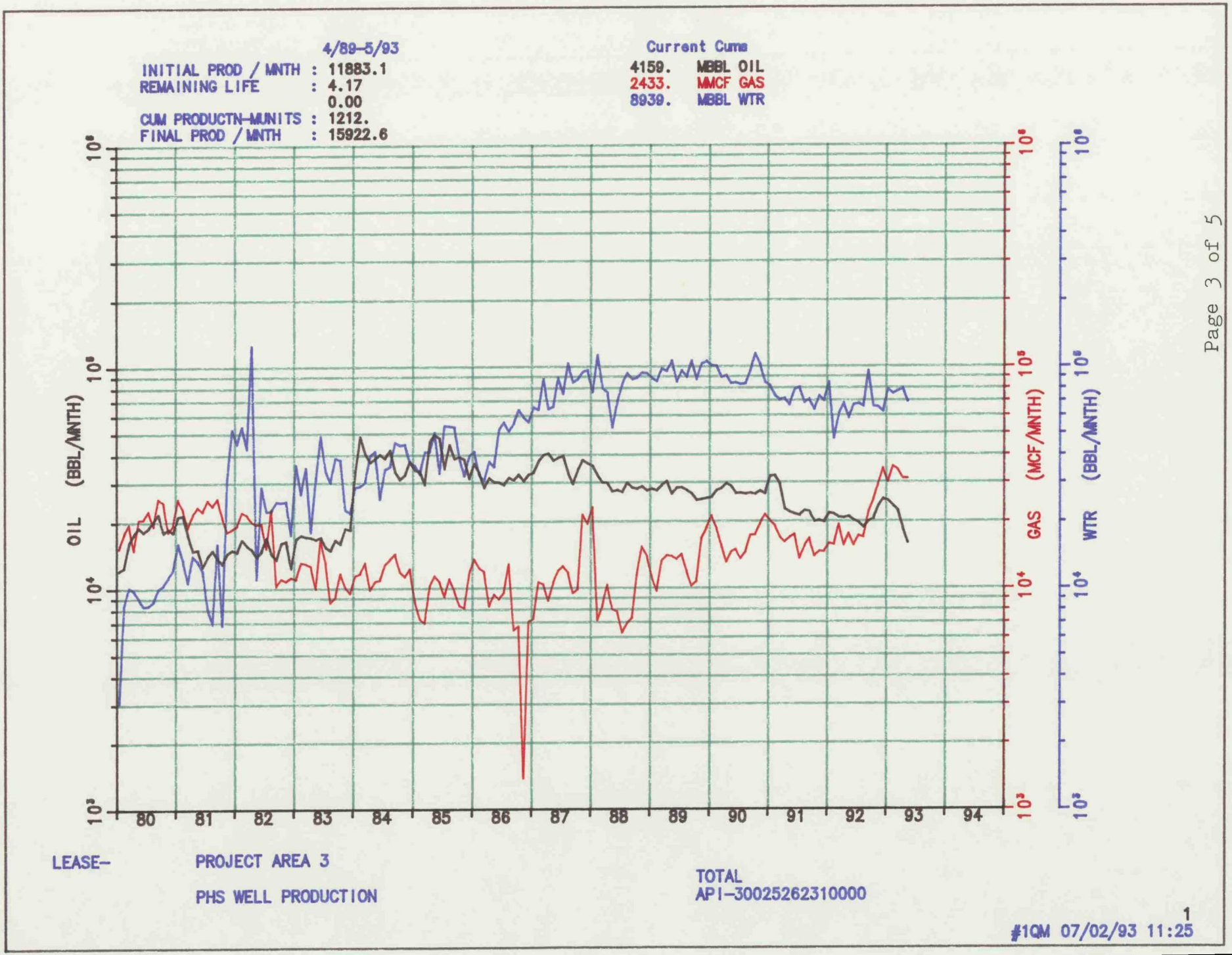
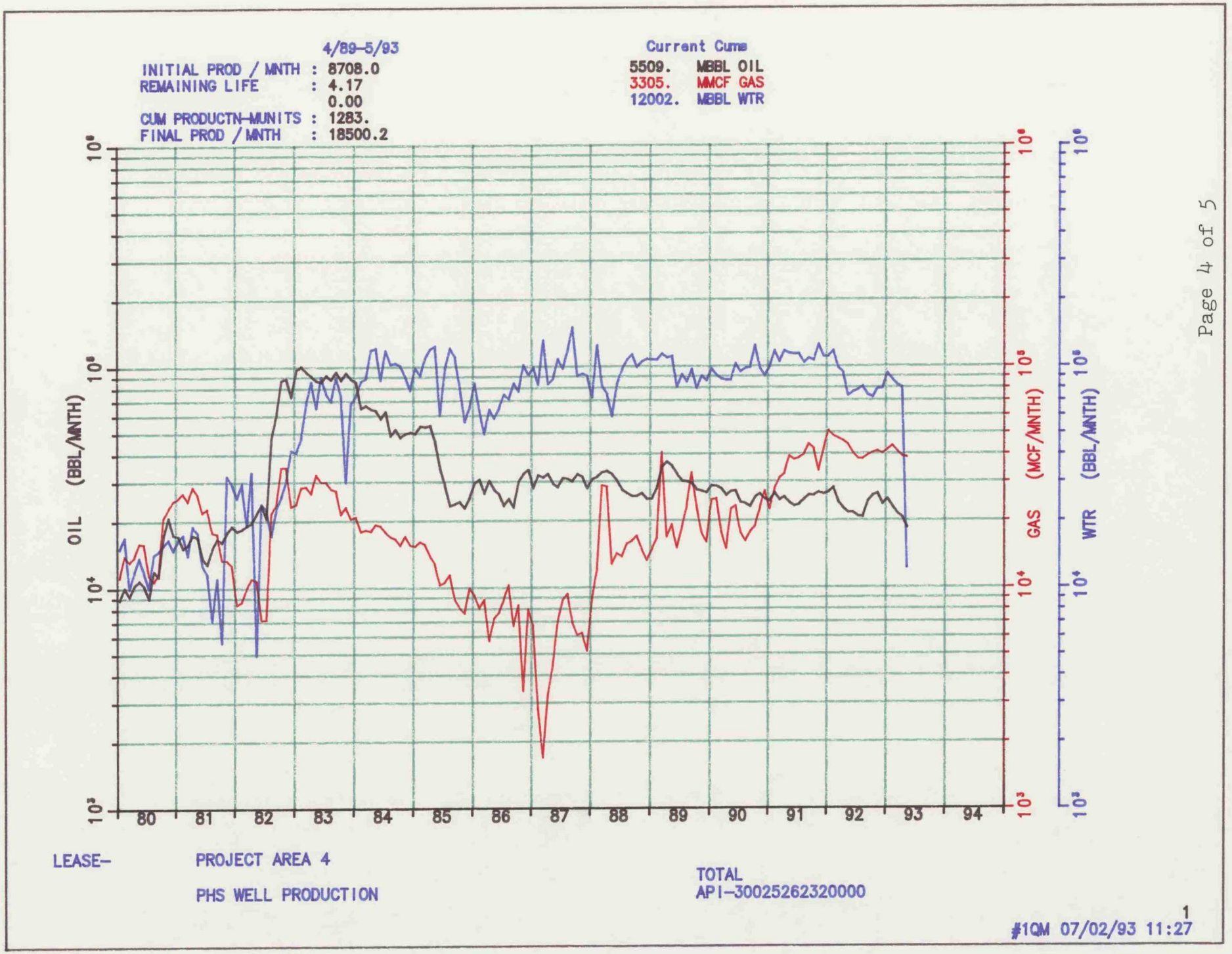
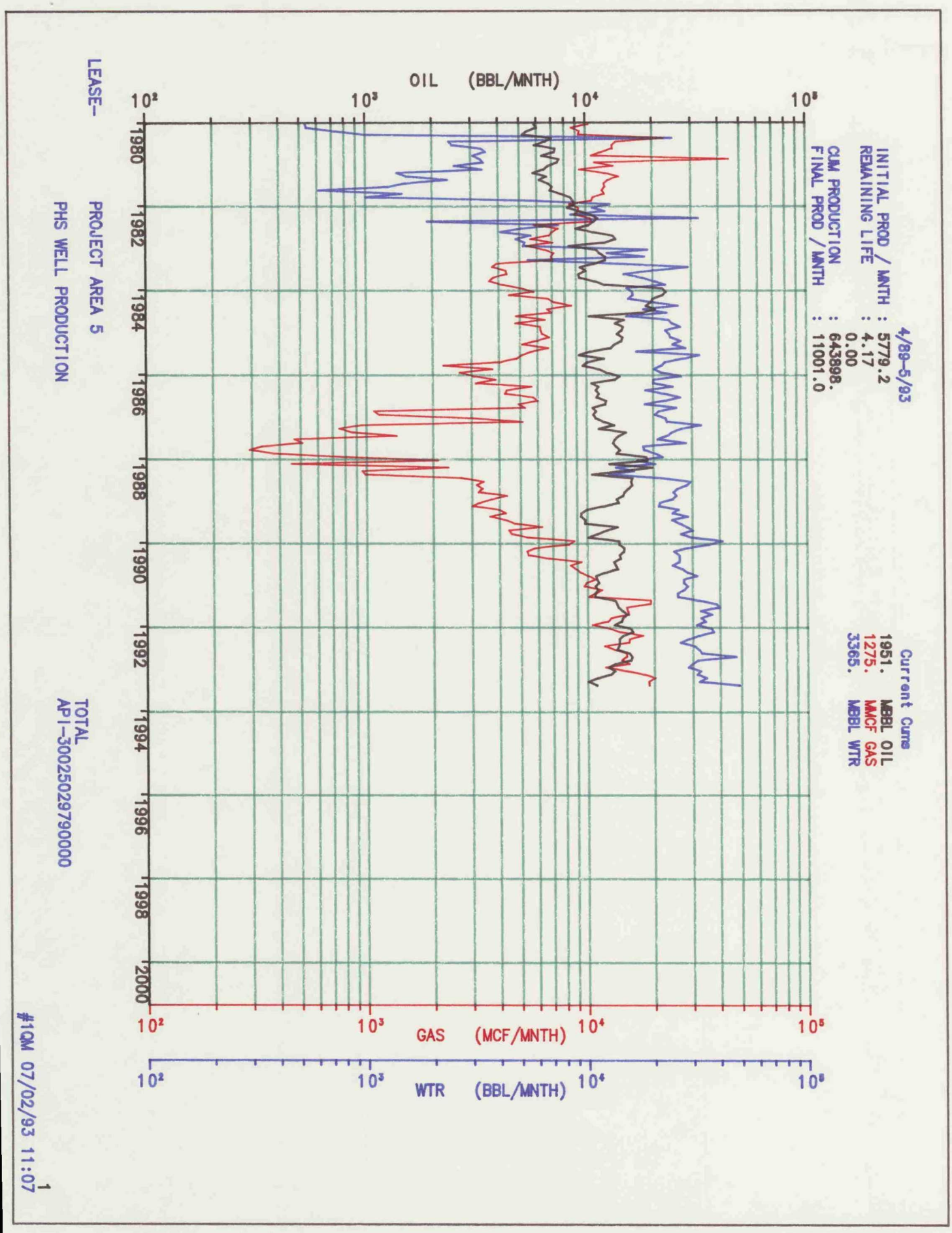

LEASE-
PROJECT AREA 1
PHS WELL PRODUCTION
TOTAL
API-3002503060000
OIL (BBL/MNTH)
GAS (MCF/MNTH)
WTR (BBL/MNTH)
4/89-5/93
INITIAL PROD / MNTH : 2260.6
REMAINING LIFE : 4.17
0.00
CUM PRODUCTION : 195153.
FINAL PROD / MNTH : 2348.0
Current Cums
771999. BBL OIL
429146. MCF GAS
130017. BBL WTR
#1QM 07/02/93 11:12

EXHIBIT I


LEASE--
PROJECT AREA 2
PHS WELL PRODUCTION
TOTAL
API-3002526230000
OIL (BBL/MNTH)
GAS (MCF/MNTH)
WTR (BBL/MNTH)
4/89-5/93
INITIAL PROD / MNTH : 14724.6
REMAINING LIFE : 4.17
0.00
CUM PRODUCTN-MNITS : 1177.
FINAL PROD / MNTH : 20444.9
Current Cums
4034. MBBL OIL
2461. MMCF GAS
5315. MBBL WTR
#1QM 07/02/93 11:14


4/89-5/93
INITIAL PROD / MNTH : 11883.1
REMAINING LIFE : 4.17
0.00
CUM PRODUCTN-MUNITS : 1212.
FINAL PROD / MNTH : 15922.6
Current Cums
4159. MBBL OIL
2433. MMCF GAS
8939. MBBL WTR
OIL (BBL/MNTH)
GAS (MCF/MNTH)
WTR (BBL/MNTH)
10⁵
10⁴
10³
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
LEASE-
PROJECT AREA 3
PHS WELL PRODUCTION
TOTAL
API-30025262310000
#1QM 07/02/93 11:25


4/89-5/93
INITIAL PROD / MNTH : 8708.0
REMAINING LIFE : 4.17
0.00
CUM PRODUCTN-MUNITS : 1283.
FINAL PROD / MNTH : 18500.2
Current Cums
5509. MBBL OIL
3305. MMCF GAS
12002. MBBL WTR
OIL (BBL/MNTH)
GAS (MCF/MNTH)
WTR (BBL/MNTH)
10⁵
10⁴
10³
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
LEASE-
PROJECT AREA 4
PHS WELL PRODUCTION
TOTAL
API-30025262320000
#1QM 07/02/93 11:27


LEASE--
PROJECT AREA 5
PHS WELL PRODUCTION
TOTAL
API-3002502979000
OIL (BBL/MNTH)
GAS (MCF/MNTH)
WTR (BBL/MNTH)
4/89-5/93
INITIAL PROD / MNTH : 5779.2
REMAINING LIFE : 4.17
0.00
CUM PRODUCTION : 643898.
FINAL PROD / MNTH : 11001.0
Current Cums
1951. MBBL OIL
1275. MMCF GAS
3365. MBBL WTR
#1QM 07/02/93 11:07

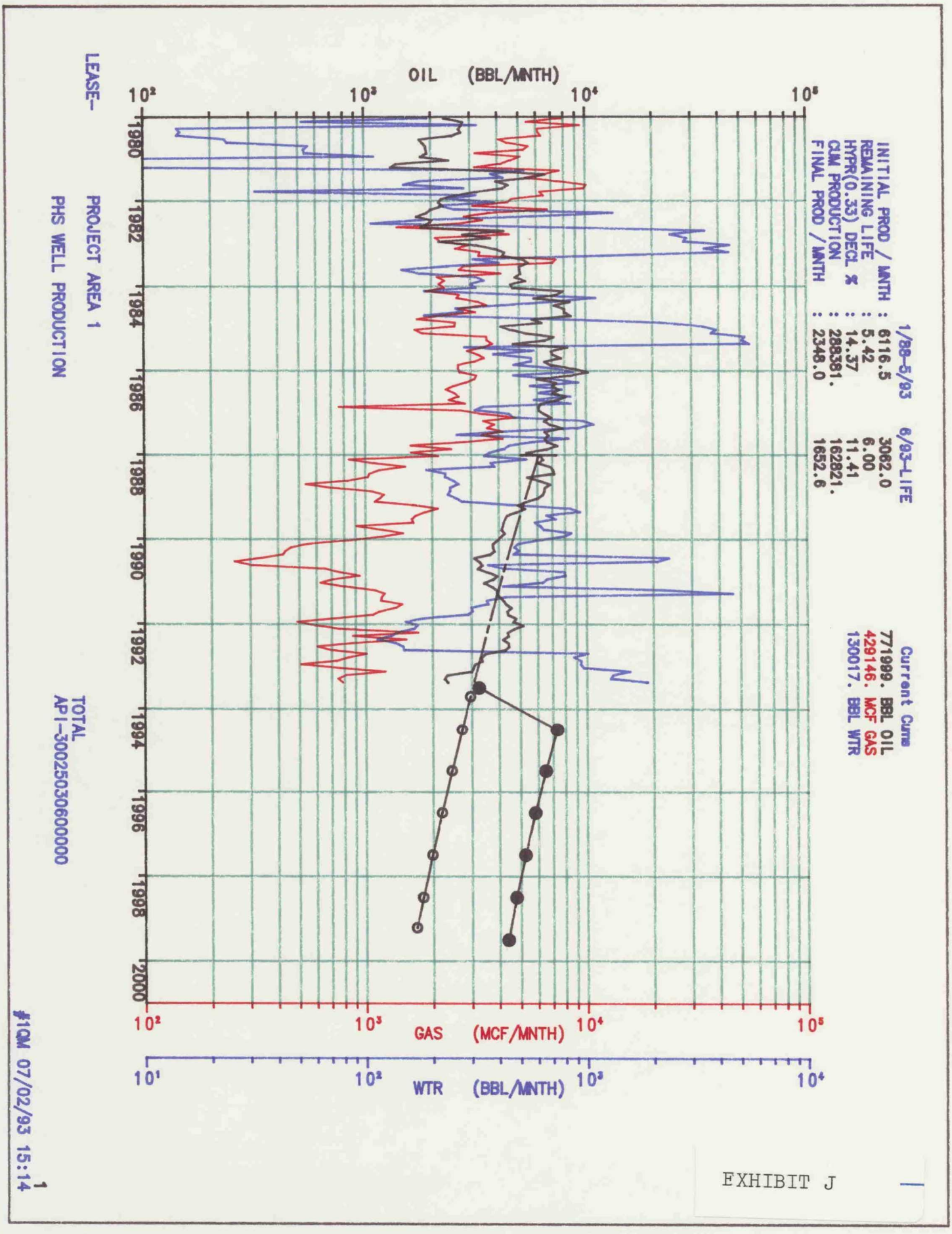
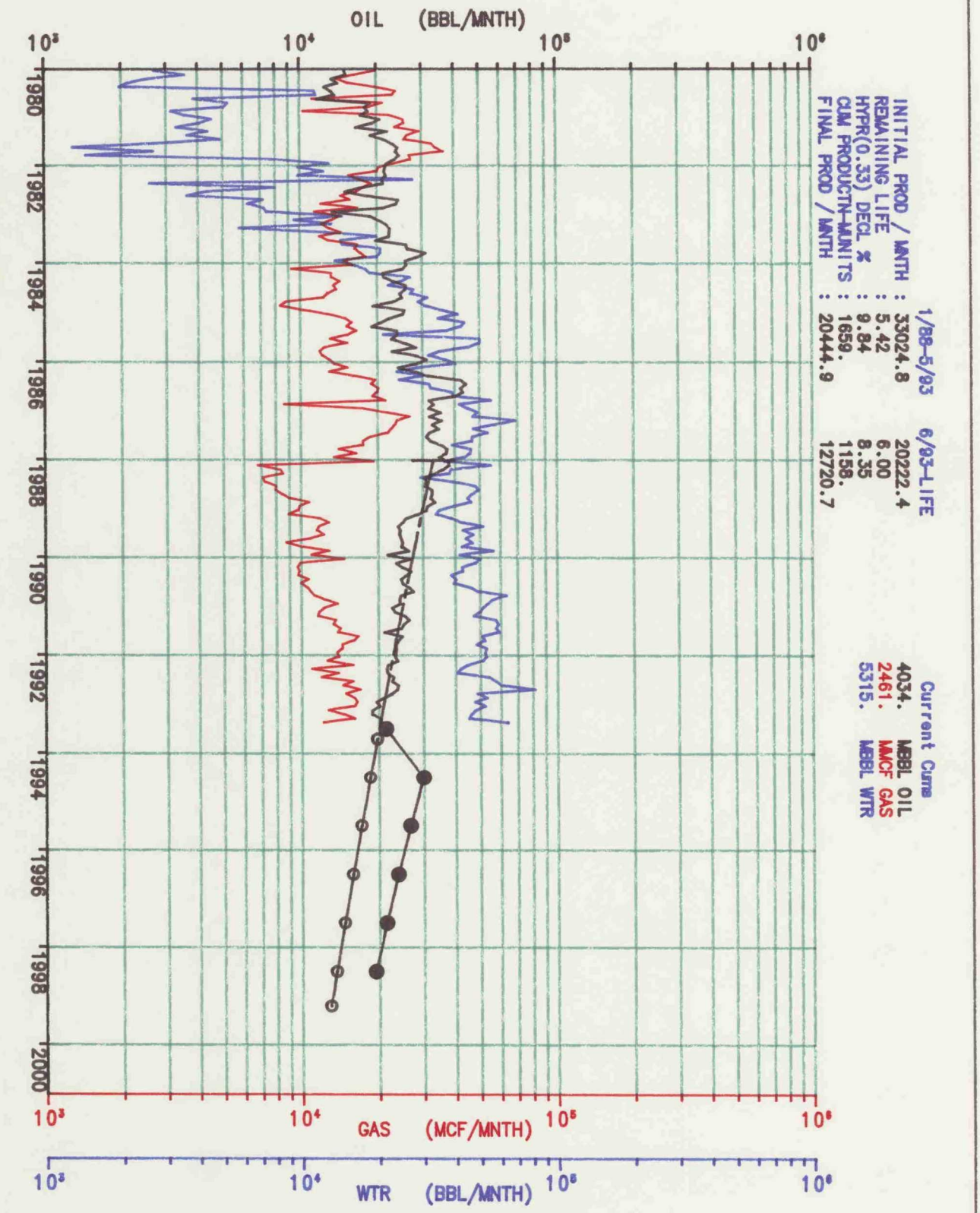

LEASE--
PROJECT AREA 1
PHS WELL PRODUCTION
TOTAL
API-3002503060000
OIL (BBL/MNTH)
GAS (MCF/MNTH)
WTR (BBL/MNTH)
1/88-5/93 6/93-LIFE
INITIAL PROD / MNTH : 6116.5 3062.0
REMAINING LIFE : 5.42 6.00
HYPR(0.33) DECL % : 14.37 11.41
CUM PRODUCTION : 288381. 162821.
FINAL PROD / MNTH : 2348.0 1652.6
Current Cums
771999. BBL OIL
429146. MCF GAS
130017. BBL WTR
#1CM 07/02/93 15:14

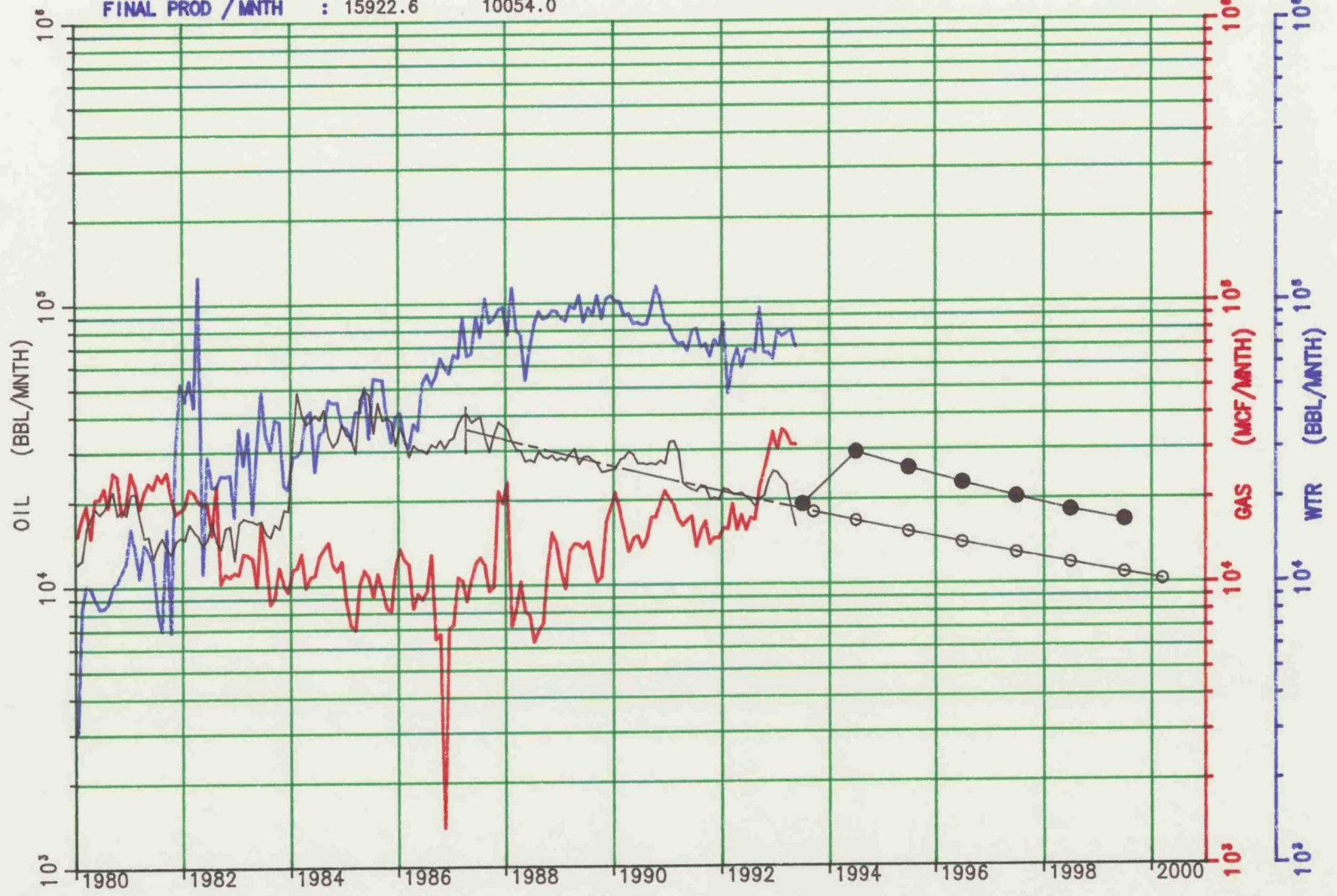
EXHIBIT J


OIL (BBL/MNTH)
10³
10⁴
10⁵
10⁶
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
GAS (MCF/MNTH)
WTR (BBL/MNTH)
1/88-5/93 6/93-LIFE
INITIAL PROD / MNTH : 33024.8 20222.4
REMAINING LIFE : 5.42 6.00
HYPR(0.33) DECL % : 9.84 8.35
CUM PRODUCTN-MNITS : 1659. 1158.
FINAL PROD / MNTH : 20444.9 12720.7
Current Cums
4034. MBBL OIL
2461. MMCF GAS
5315. MBBL WTR
LEASE-
PROJECT AREA 2
PHS WELL PRODUCTION
TOTAL
API-30025262300000
#1QM 07/02/93 15:00
1

	4/87-5/93	6/93-LIFE
INITIAL PROD / MNTH :	35757.8	18472.6
REMAINING LIFE :	6.17	7.00
HYPR(0.33) DECL % :	11.97	9.62
CUM PRODUCTN-MUNITS :	1976.	1151.
FINAL PROD / MNTH :	15922.6	10054.0

Current Cums

4159. MBBL OIL
2433. MMCF GAS
8939. MBBL WTR

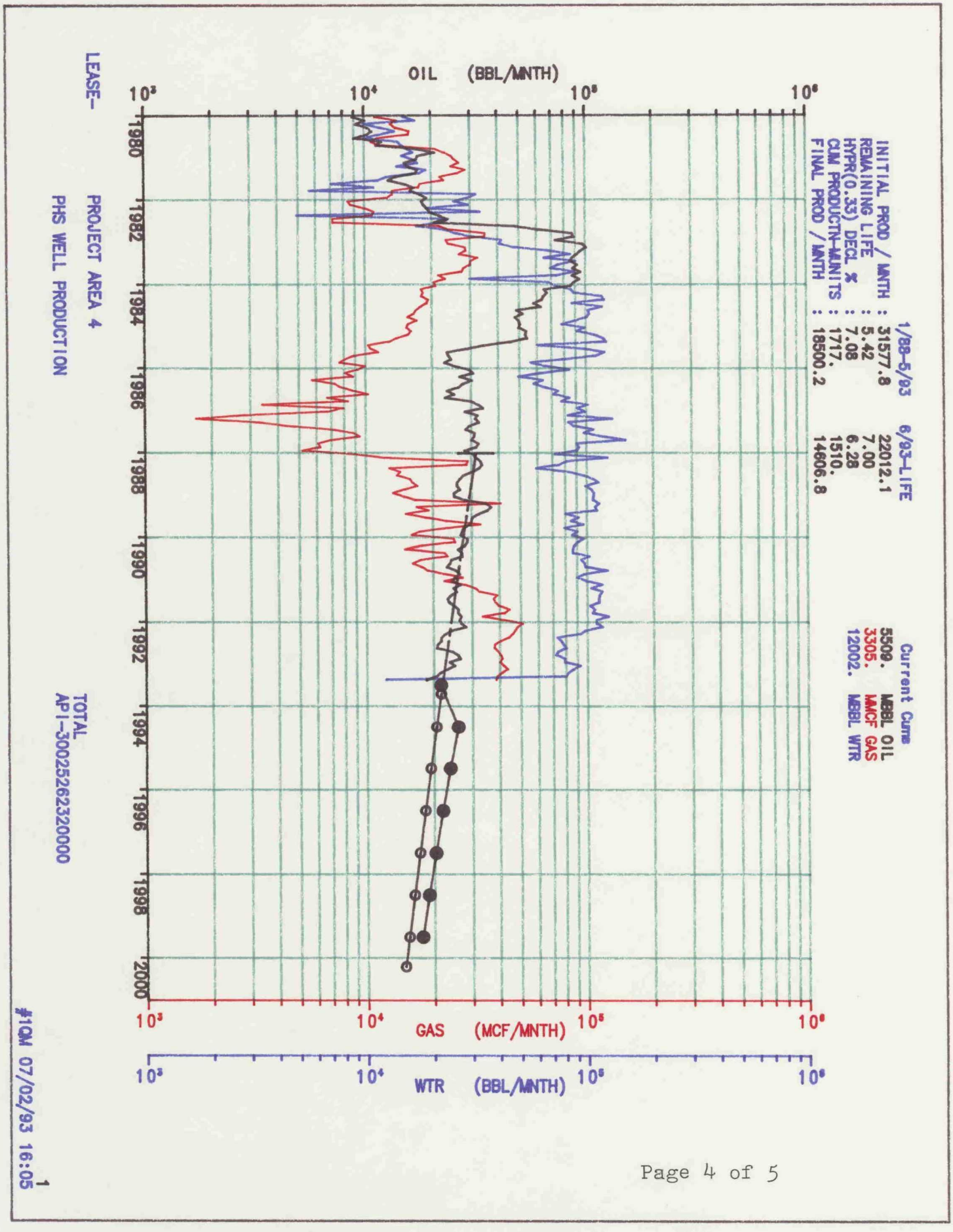


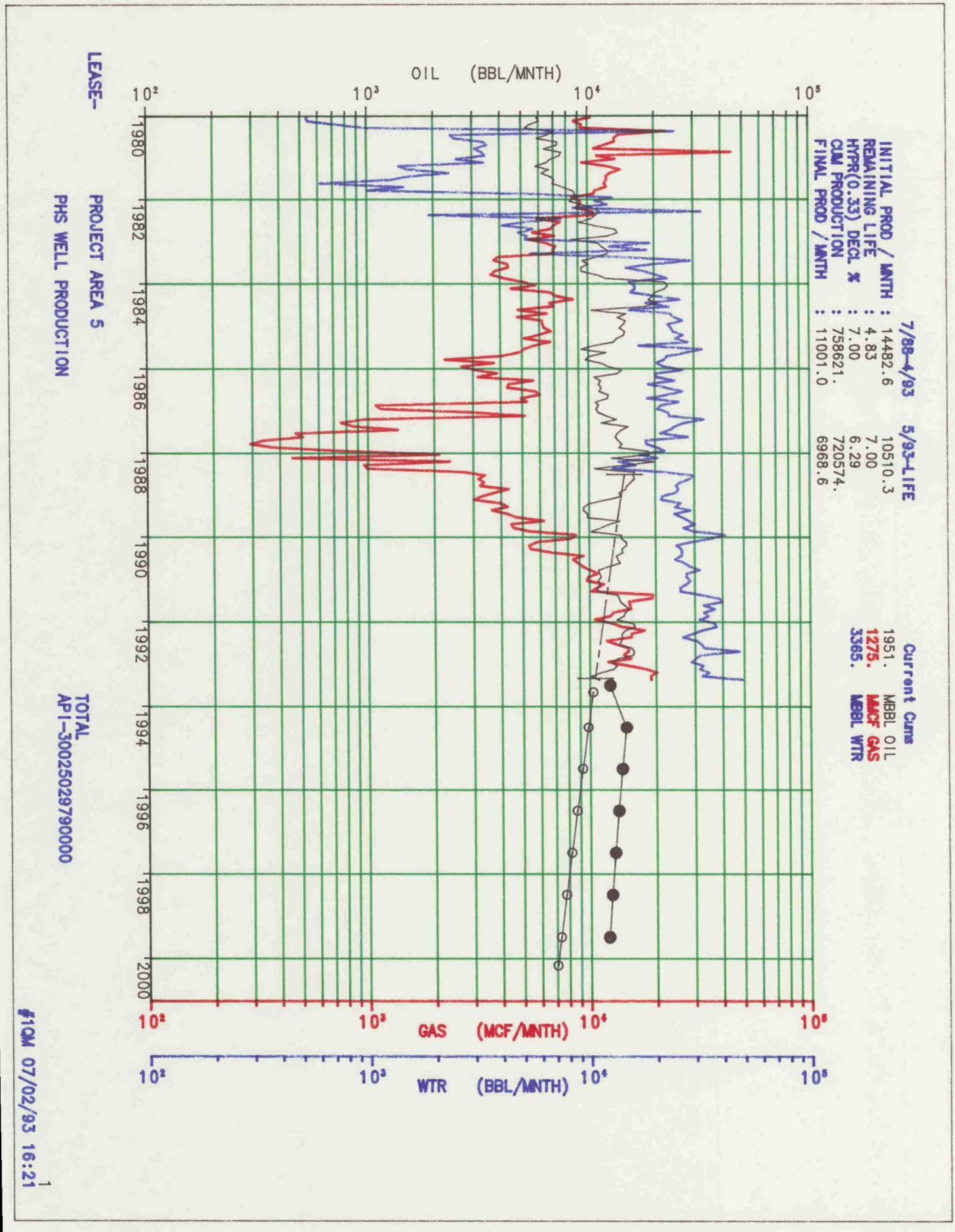
LEASE- PROJECT AREA 3

PHS WELL PRODUCTION

TOTAL
API-30025262310000

#1QM 07/02/93 16:29


OIL (BBL/MNTH)
10³
10⁴
10⁵
10⁶
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
GAS (MCF/MNTH)
WTR (BBL/MNTH)
1/88-5/93 6/93-LIFE
INITIAL PROD / MNTH : 31577.8 22012.1
REMAINING LIFE : 5.42 7.00
HYPR(0.33) DECL % : 7.08 6.28
CUM PRODUCTN-MNITS : 1717. 1510.
FINAL PROD / MNTH : 18500.2 14606.8
Current Cums
5509. MBBL OIL
3305. MMCF GAS
12002. MBBL WTR
LEASE-- PROJECT AREA 4
PHS WELL PRODUCTION
TOTAL
API-30025262320000
#1QM 07/02/93 16:05


LEASE-
PROJECT AREA 5
PHS WELL PRODUCTION
TOTAL
API-3002502979000
OIL (BBL/MNTH)
GAS (MCF/MNTH)
WTR (BBL/MNTH)
7/88-4/93 5/93-LIFE
INITIAL PROD / MNTH : 14482.6 10510.3
REMAINING LIFE : 4.83 7.00
HYPR(0.33) DECL % : 7.00 6.29
CUM PRODUCTION : 758621. 720574.
FINAL PROD / MNTH : 11001.0 6968.6
Current Cums
1951. MBBL OIL
1275. MMCF GAS
3365. MBBL WTR
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