ARMSTRONG ENERGY CORPORATION

NORTHEAST LEA DELAWARE POOL

DE NOVO HEARING

SPECIAL POOL RULES CASE # 10653
POOL EXTENSION AND ABOLISHMENT CASE # 10773

ENGINEERING DATA

JANUARY 13, 1994

EXHIBIT NO. 10

PECOS PETROLEUM ENGINEERING, INC.
ROSWELL, NEW MEXICO

ARMSTRONG ENERGY CORPORATION
NORTHEAST LEA DELAWARE FIELD
HEARING FOR SPECIAL POOL RULES CASE # 10653
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The Delaware Mountain Group (Bell Canyon, Cherry Canyon and Brushy Canyon) has generally been classified as one common source of supply, subject to the standard 40 acre spacing pattern, standard depth bracket allowable (5000' to 5999'; 107 BOPD) and standard 2000 to 1 GOR limit. Development of the Northeast Lea Delaware Field and the Quail Ridge Delaware Field has shown these Delaware pools contain a multitude of separate reservoirs extending over both fields.

The Northeast Lea Delaware and Quail Ridge Delaware fields, as presented in Exhibit B, has twenty-four (24) producing wells and two (2) wells being completed. The list includes all Delaware Wells within a one mile radius of the Mobil Lea State wells and all other wells in the two fields.

The First Sand, as identified on the type log, Exhibit C, from the Mobil Lea State #2, from 5520' to 5706', is productive or potentially productive in all wells in both pools except the West Pearl State #1 and the Mescalaro Ridge Unit #3. The first sand is the main pay in the Quail Ridge Field with the Mark Federal #1, 2, 3, 5 & 6, the North Lea Federal # 4, 5, 6, 7, 8 & 9, and the Snow Oil & Gas Company wells producing from this interval. The Armstrong Mobil Lea State #1, 2, 3 and 4 and West Pearl State #2 have good shows and log response from this interval and should be productive from the First Sand. The Mid Continent Energy, Inc. Mobil State #1 has produced approximately 76,000 barrels of oil from the first sand interval in the Northeast Lea Delaware Field.

The First Sand has produced over 500,000 barrels of oil to date from the Quail Ridge and Northeast Lea Pools and the daily production is in excess of 700 BOPD. This sand indicates it may have a strong water drive as evidenced by constant GOR's and flat production curves. A definite oil-water contact has not been established in the first sand, but water saturations gradually increase to 60% at -2043 in the North Lea Federal #1-Y in the SE/4 of section 10. This sand can be seen on logs of wells located in Sections 11, 15 and 14, indicating a large water leg in relation to the oil column. No gas cap is present, indicating the reservoir is undersaturated and above bubble point.

The oil column of the first sand covers the SE/SE/4 of Section 4, NE/NE/4 Section 9, N/2 Section 10, N/2S/2 Section 10, S/2 Section 3, SE/4 Section 2, NW/NW/4 Section 11, NW/SE/4 section 2 and SW/NE/4 section 2. This area totals approximately 1200 acres. The productive area of the First Sand covers approximately three times the area of the Third Sand.

The Second Sand from 5745' to 5840', as identified on the type log, Exhibit C, from the Mobil Lea State #2 log, has good porosity and shows, but has been determined to be wet over this area by tests in the West Pearl State #2 and Mark Federal #5 and #8. This interval produces in the Pennzoil Mescalaro Ridge Unit #3, but is an equivalent limestone zone. The Mescalaro Ridge Unit #3 has produced 26,000 BO.

The Third Sand from 5870' to 6048' as indicated on the type log, Exhibit C, from the Mobil Lea State #2 log, is the main pay in the Northeast Lea Field and the North Lea Federal #6 and #10 and the Mark Federal #4 produce from this zone in the Quail Ridge Field. The North Lea Federal #5 and #8 produce from a limestone which is equivalent to the Third Sand. An oil-water contact, Exhibit G, has been established in the third sand, at -2269' water saturations start to increase and at -2275' the saturations are over 60% and the zone is considered wet. No gas cap is present, indicating the reservoir is undersaturated and above bubble point. The reservoir dips to the South or Southeast at approximately 2 to 2.5 degrees.

The Third Sand has produced over 234,000 barrels of oil to date from both pools and the daily production is in excess of 750 BOPD. This zone is believed to have a strong water drive as evidenced by constant GOR's, stable BHP, flat production rates and Material Balance Analysis. Evidence of this sand can be seen in logs in Section 11, SE/4 of Section 10 and NE/4 of Section 15, indicating an extensive water leg.

The Third Sand produces in N/2/NE/4 Section 10, E/2/N~~E~~W/4 Section 10, SE/SE/4 Section 3, SW/4 Section 2, SW/NE/4 Section 2 and NE/NE/4 Section 2. This area totals approximately 400 acres. The Third Sand reservoir covers approximately one third the area the First Sand covers.

A Fourth Sand produces in two wells, the North Lea Federal #5 and the SCJ Federal #1. This zone has not been a significant producer in these fields.

Therefore, there are two main sources of supply in the Quail Ridge and Northeast Lea fields. The First and Third Sands are the main pay zones and they are separated by the Second Sand, which is wet. There are three other zones which make a minor contribution to production in these fields, the Second Sand lime equivalent, the Third Sand Lime equivalent and the Fourth Sand.

The First and Third Sands in the Northeast Lea and Quail Ridge Delaware fields are some what unique among Delaware Reservoirs. Most Delaware Sand reservoirs produce by solution gas drive with minor contributions from water influx. As can be seen in the production decline curves in Exhibit D, the typical well has a high initial production rate with a steep decline for the first year. This is flush production generated by the initial stimulation procedure with the primary energy coming from reservoir fluid and rock compressibility. After the flush production is expended and the decline rate moderates bubble point is reached and gas-oil ratios increase. A moderate decline rate is observed for approximately two years, which is related to linear flow around the induced fracture. After producing for a total of three years production stabilizes at a low decline rate for the remaining life of the well, this period occurs when the zone is producing under radial flow conditions.

The good wells producing from the Quail Ridge and Northeast Lea Delaware fields do not exhibit a typical Delaware production decline. The edge wells, with lower permeability, less net pay and less influx of water do exhibit typical production curves. As can be seen in Exhibit E, the good wells exhibit constant producing rates, low GOR's (with little or no increase), high fluid levels and steady water production. Using the Material Balance Equation to account for compressibility, fluid removal, and gas expansion it becomes evident that a strong water drive is present, which causes constant producing rates, maintains the reservoir pressure above bubble point and consequently keeps gas in solution.

Because of the high quality of the pay in the First and Third sands, almost every well completed in either or both sands is capable of producing at top allowable for an extended period of time. The North Lea Federal #5, 6, 7, & 8, Mark Federal #1, 2, 4 & 6 and Mobil Lea State #1, 2 & 3 all produce at top allowable. The North Lea Federal #4 produced at top allowable until January 1993, when a casing leak was discovered and subsequently squeezed, resulting in a 30 BOPD drop in production. The Mobil Lea State wells, which are completed only in the Third Sand, are capable of producing in excess of 300 BOPD as indicated by production tests and reservoir calculations.

Water production in the Northeast Lea and Quail Ridge fields has been characterized by stable rates and in some wells a decrease in water cut. The Mobil Lea State #1 had a initial water cut of 15% and after a year of production the cut is 10%. The Mobil Lea State #2 had an initial cut of 10 % water and presently has a 7% cut. During production tests as high as 300 BOPD no increases were seen in the water cuts. We attribute this to the laminated nature of the Delaware with thin shale beds dispersed throughout the sand body creating barriers to vertical permeability. Therefore, water influx will be from the edge and efficiently displace the oil. The reduction of water cut seen in some wells can be attributed to reduction of mobile water down to the irreducible water saturation.

Water production in the Quail Ridge Field has exhibited similar production traits. The North Lea Federal #4 had an initial water cut of 20% and now has a 3% cut. The mark Federal #1 & 2 have exhibited constant water cuts of 28% and 7 % respectfully. A few wells have shown increases in water cut, but most of this can be attributed to opening additional pay and stimulation treatments which went out of zone.

With the presence of a strong water drive the displacement of the oil by the water is important. The calculated mobility ratio, using Exhibits H and I, between the oil and water is 1.78. This indicates the oil has a tendency to move through the formation almost twice as easily as the water, at the present oil saturation of 45%. Therefore, the oil should be efficiently displaced by the water influx. The Mobility Ratio was derived by determining the mobility of the oil by dividing the percentage permeability to oil at 45% water saturation, 45%, divided by the viscosity of the oil, 1.4 cp. The same calculation was performed to determine the mobility of the water phase. The permeability to water at 45% water saturation is 18% and the viscosity of formation water is 1.004 cp. this results in .45/1.4 divided by .18/1.004, which results in the mobility ratio of 1.78.

The conclusion we arrived at is, water influx will be from the edge of the reservoir. A bottom water drive and the problems associated with coning should not be a major factor in producing these reservoirs because of the laminated nature of the Delaware and the resulting reduction of vertical permeability. Water rates should not increase until the water influx cusps into the producing wells.

The Gas-Oil Ratio exhibited by wells producing from the First and Third sand in the Northeast Lea and Quail Ridge Delaware Fields has been constant at approximately 400 cu. ft. /bbl. The Mobil Lea State #1 & 2 started producing with a GOR of 300 cu.ft./bbl. and in May 1993 the producing method was changed and the GOR increased to 400 cu.ft./bbl. Since May the GOR has been constant. The wells in the Quail Ridge Field have had constant GOR's of approximately 400 cu.ft./bbl., with slight increases to almost 500 cu.ft./bbl.

The constant GOR is indicative of high bottom hole pressure which keeps the reservoir pressure above the bubble point and does not allow any free gas to form in the reservoir. The wells which have indicated modest increases in GOR, for example the Mark Federal # 2 had an initial GOR of 280 and has increased to 400 and the North Lea Federal #4 had an initial GOR of 350 and has increased to 490. These increases may indicate the bottom hole pressure is at the bubble point close to the wellbores of these wells. There are now two rows of producers between these wells and the influx of water from the South, indicating a possible draw down of pressure in the Northwest quadrant of the First Sand Reservoir.

The initial bottom hole pressure in the First and Third Sands was estimated from Drill Stem Test Data, Exhibit L. The pressure gradient is calculated to be .43 psi/ft., which indicates a Bottom Hole Pressure of 2539 psi in the Mobil Lea State #1. Bottom hole producing pressures have been calculated from fluid levels measured during the past year, Exhibit M. Fluid levels indicate that the bottom hole producing pressures never reached the bubble point pressure of 1200 psi, even with rates as high as 300 BOPD. This is substantiated by the GOR data indicating constant GOR's. The subsequent reduction in producing rates since July 1993, has allowed the reservoir to repressure and now fluid levels are at the surface, this indicates the producing bottom hole pressure is now over 1800 psi at a producing rate of 126 BOPD. And if allowed to the Mobil Lea State #1 & 2 will flow at rates of 30 to 50 barrels per hour. This is another strong indication of water influx maintaining reservoir pressure.

The productivity index was calculated for the Mobil Lea State #1, This calculation can be examined in Exhibit N. The calculation indicates this well is capable of making of 1000 BOPD under a pumped off condition. Permeability of this reservoir is approximately 12 md. These calculations indicate theses wells are capable of high production rates and at a production rate of 300 BOPD the well is producing at approximately 30% of it's capacity. This is why the reservoir has remained above bubble point, because of it's ability to transmit fluids and the influx of water.

To make later calculations using the Material Balance Equation, a volume of oil-in-place was calculated using Volumetric Analysis, Exhibit U. The assumed area was 400 acres, the average net height was 40 feet, the average porosity is 20%, the average water saturation is 45% and the oil formation volume factor is 1.24. The resulting calculation indicates there is 11,011,000 barrels of oil in place in the third sand reservoir.

Using the Material Balance Equation for initially undersaturated oil reservoirs, with an active water drive, above bubble point, Exhibit V, we can estimate the volume of reserves recoverable from each drive mechanism. Exhibit W is a graph indicating oil recovery due to compressibility of the reservoir system as the bottom hole pressure is reduced to the bubble point. This calculation indicates approximately 240,000 BO would be recovered by the reduction of reservoir pressure to the bubble point. Exhibit X is an estimation of the present status of the reservoir, with approximately a 300 psi reduction in average reservoir pressure and at the present recovery of 234,000 Bo an approximate water influx of 270,000 BW and recovery due to compressibility of 56,000 BO. Exhibit Y indicates the recoveries related to a draw down of pressure to the bubble point, oil recovered due to compressibility of the reservoir system would be approximately 240,00 BO and any additional oil recovered would be due to water influx.

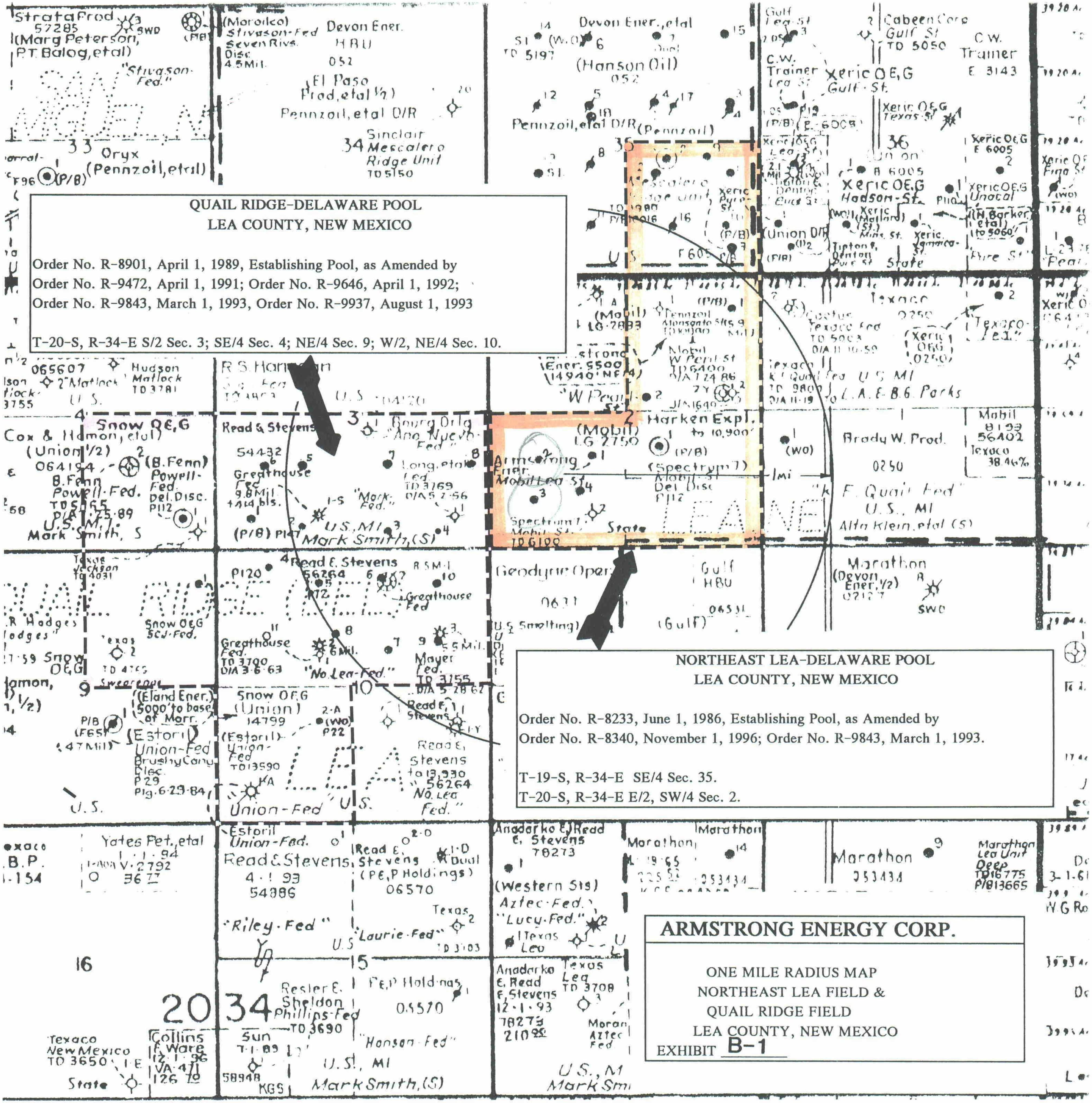
Because of the strong water drive and the resulting high bottom hole producing pressures, oil in the updip part of the reservoir on the opposite side of the wells from the water influx is essentially trapped and no mechanism is available to move these reserves from their present position to a producing well. This is attributable to the laminated nature of the reservoir and the reduction of vertical permeability eliminating a bottom water drive and the high bottom hole producing pressures limiting the expansion of the reservoir fluids due to compressibility. Of the 240,000 BO which could be recovered due to expansion of reservoir fluids over half, 120,000 BO, would come from the updip part of the reservoir opposite the water influx and from the area between wells where the water influx cusps toward the producers.

After the reservoir is brought to bubble point pressure any further reduction in pressure would liberate free gas from solution. This process would be advantageous to recovery of additional reserves in the updip part of the reservoir and areas between wells not swept by the water influx. A gas cap could be formed against the updip permeability pinchout which could efficiently displace reserves from the updip position. Further study will be needed to determine the effects of draw down below bubble point and the ultimate effects on recovery of oil reserves from this reservoir.

While data on the First Sand is not as complete as data on the Third Sand a qualitative assessment indicates that recoveries from the first sand reservoir could also be enhanced by reducing reservoir pressures and allowing expansion of reservoir fluids. Some early signs of the Northwest wells increasing the GOR indicate bottom hole pressures can be reduced now that there are three rows of wells between the North edge and the water influx to the South.

Correlative rights of all producers in these pools would be better served with a higher allowable. Because of the need for a combined effort to manage these reservoirs to maximize recovery, higher allowables would allow each operator to produce their wells at an optimum rate to optimize recovery. Under the present allowable system the operators can not manage their reservoirs to maximize recovery and in the case of Armstrong Energy the allowable is not sufficient to allow them to open all of the pay, the First Sand, which is being produced in offset wells on both sides of their property.

We therefore respectfully request the abolishment of the Quail Ridge Delaware Pool and the expansion of the Northeast Lea Delaware Pool to include the area covered by the Quail Ridge Delaware Pool. Also, to allow the operators of wells in these fields to maximize recoveries of oil and gas we request allowable be increased to 300 BOPD.


QUAIL RIDGE-DELAWARE POOL
LEA COUNTY, NEW MEXICO
Order No. R-8901, April 1, 1989, Establishing Pool, as Amended by
Order No. R-9472, April 1, 1991; Order No. R-9646, April 1, 1992;
Order No. R-9843, March 1, 1993, Order No. R-9937, August 1, 1993
T-20-S, R-34-E S/2 Sec. 3; SE/4 Sec. 4; NE/4 Sec. 9; W/2, NE/4 Sec. 10.
NORTHEAST LEA-DELAWARE POOL
LEA COUNTY, NEW MEXICO
Order No. R-8233, June 1, 1986, Establishing Pool, as Amended by
Order No. R-8340, November 1, 1996; Order No. R-9843, March 1, 1993.
T-19-S, R-34-E SE/4 Sec. 35.
T-20-S, R-34-E E/2, SW/4 Sec. 2.
ARMSTRONG ENERGY CORP.
ONE MILE RADIUS MAP
NORTHEAST LEA FIELD &
QUAIL RIDGE FIELD
LEA COUNTY, NEW MEXICO
EXHIBIT B-1

:LAWARE WELLS LOCATED IN THE NORTHEAST LEA FIELD AND QUAIL RIDGE FIELD

OPERATOR	WELL NAME	LOCATION	PERFORATIONS UPPER	LOWER	
MSTRONG ENERGY CORP.	MOBIL LEA ST. #1	K-2-T20S-R34E	5890	5930	3rd SAND
MSTRONG ENERGY CORP.	MOBIL LEA ST. #2	L-2-T20S-R34E	5890	5930	3rd SAND
MSTRONG ENERGY CORP.	MOBIL LEA ST. #3	M-2-T20S-R34E	5918	5946	3rd SAND
MSTRONG ENERGY CORP.	MOBIL LEA ST. #4	N-2-T20S-R34E			
MSTRONG ENERGY CORP.	W.PEARL ST. #1	A-2-T20S-R34E	5890	5910	3rd SAND
MSTRONG ENERGY CORP.	W.PEARL ST. #2	G-2-T20S-R34E	5928	5948	3rd SAND
			5744	5805	2nd SAND, WET
AD & STEVENS INC.	N. LEA FED. #4	D-10-T20S-R34E	5618	5651	1st SAND CASING LEAK 4059-4090
AD & STEVENS INC.	N. LEA FED. #5	C-10-T20S-R34E	6058	6078	4th SAND
			5910	5925	3rd SAND LIME EQUIVELENT
			5636	5668	1st SAND CASING LEAKS, 4393-4248 & 3892-4029
AD & STEVENS INC.	N. LEA FED. #6	B-10-T20S-R34E	5900	5920	3rd SAND
			5602	5656	1st SAND
			5514	5548	1st SAND
AD & STEVENS INC.	N. LEA FED. #7	G-10-T20S-R34E	5942	5962	3rd SAND, WET
			5620	5674	1st SAND
			5556	5592	1st SAND
AD & STEVENS INC.	N. LEA FED. #8	F-10-T20S-R34E	6184	6220	4th SAND, WET
			5934	5960	3rd SAND LIME EQUIVELENT
			5636	5660	1st SAND
AD & STEVENS INC.	N. LEA FED. #9	H-10-T20S-R34E	5892	5904	LIME, WET
			5610	5676	1st SAND
AD & STEVENS INC.	N. LEA FED. #10	A-10-T20S-R34E	5910	5930	3rd SAND
AD & STEVENS INC.	MARK FED. #1	M-3-T20S-R34E	5644	5664	1st SAND
AD & STEVENS INC.	MARK FED. #2	N-3-T20S-R34E	5610	5640	1st SAND
AD & STEVENS INC.	MARK FED. #3	O-3-T20S-R34E	5628	5680	1st SAND
			5534	5546	1st SAND
AD & STEVENS INC.	MARK FED. #4	P-3-T20S-R34E	5912	5922	3rd SAND
AD & STEVENS INC.	MARK FED. #5	K-3-T20S-R34E	5650	5670	1st SAND
AD & STEVENS INC.	MARK FED. #6	L-3-T20S-R34E	5652	5674	1st SAND
AD & STEVENS INC.	MARK FED. #8	I-3-T20S-R34E	6030	6038	4th SAND, WET
			5910	5986	3rd SAND, WET
			5698	5727	2nd SAND, WET
			5548	5572	1st SAND, WET

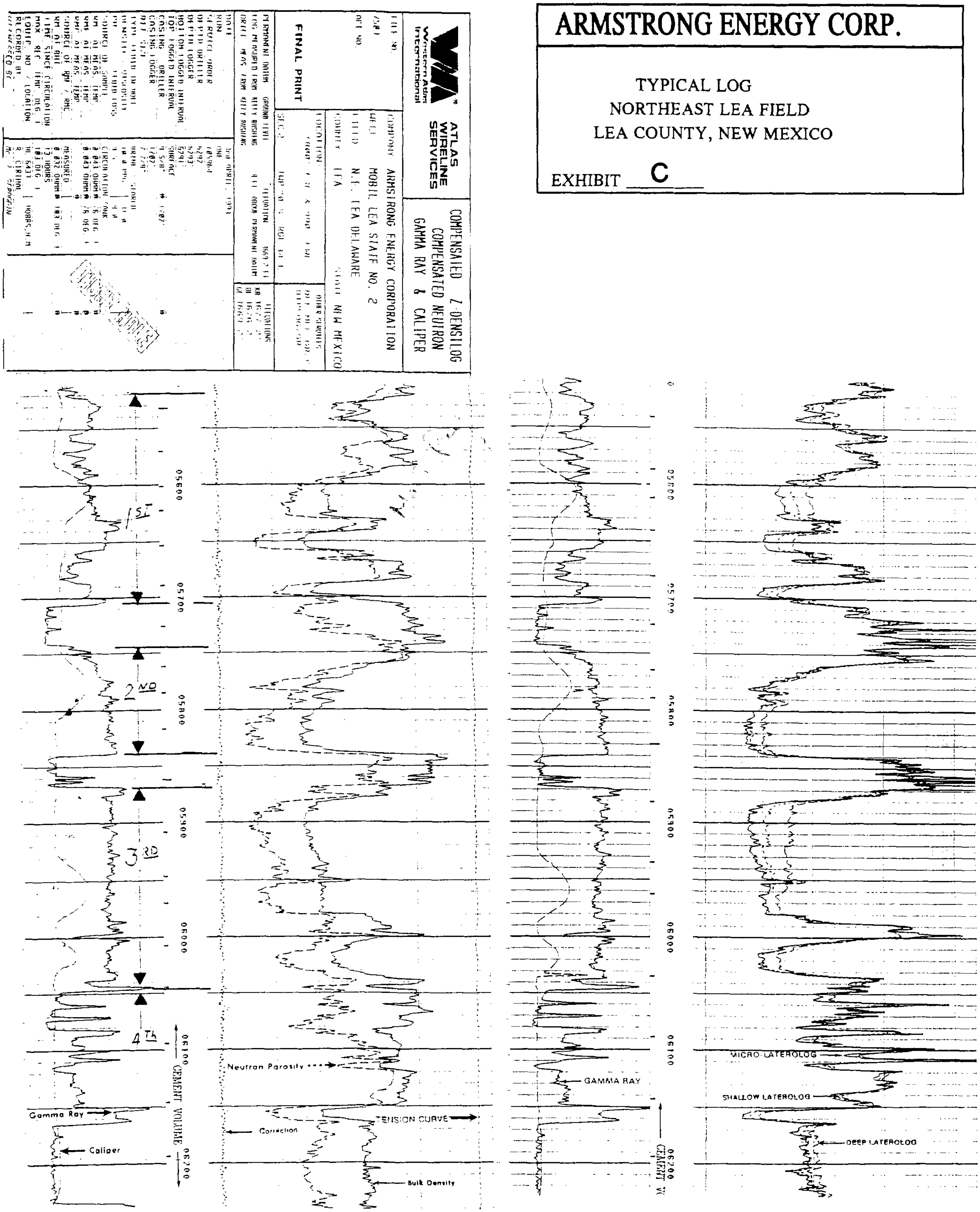
EXHIBIT B-2

OPERATOR	WELL NAME	LOCATION	PERFORATIONS UPPER	PERFORATIONS LOWER	
PENNZOIL E &P CO.	MESCALERO RIDGE #3	P-35-T19S-R34E	5780	5805	2nd SAND LIME EQUIVELENT
MID-CONTINENT ENERGY	MOBIL ST #1	J-2-T20S-R34E	5625	5695	1st SAND
SPECTRUM 7 EXPL.	MOBIL STATE #2	N-2-T20S-R34E	5698	5716	1st SAND P/A, -2081'
SNOW OIL & GAS INC.	FED. SCJ #1	A-9-T20S-R34E	5662	5682	1st SAND
			6075	6100	4th SAND
SNOW OIL & GAS INC.	POWELL FED. #1	P-4-T20S-R34E	5658	5674	1st SAND
SNOW OIL & GAS INC.	UNION "A" FED. #2	K-10-T20S-R34E	5660	5690	1st SAND

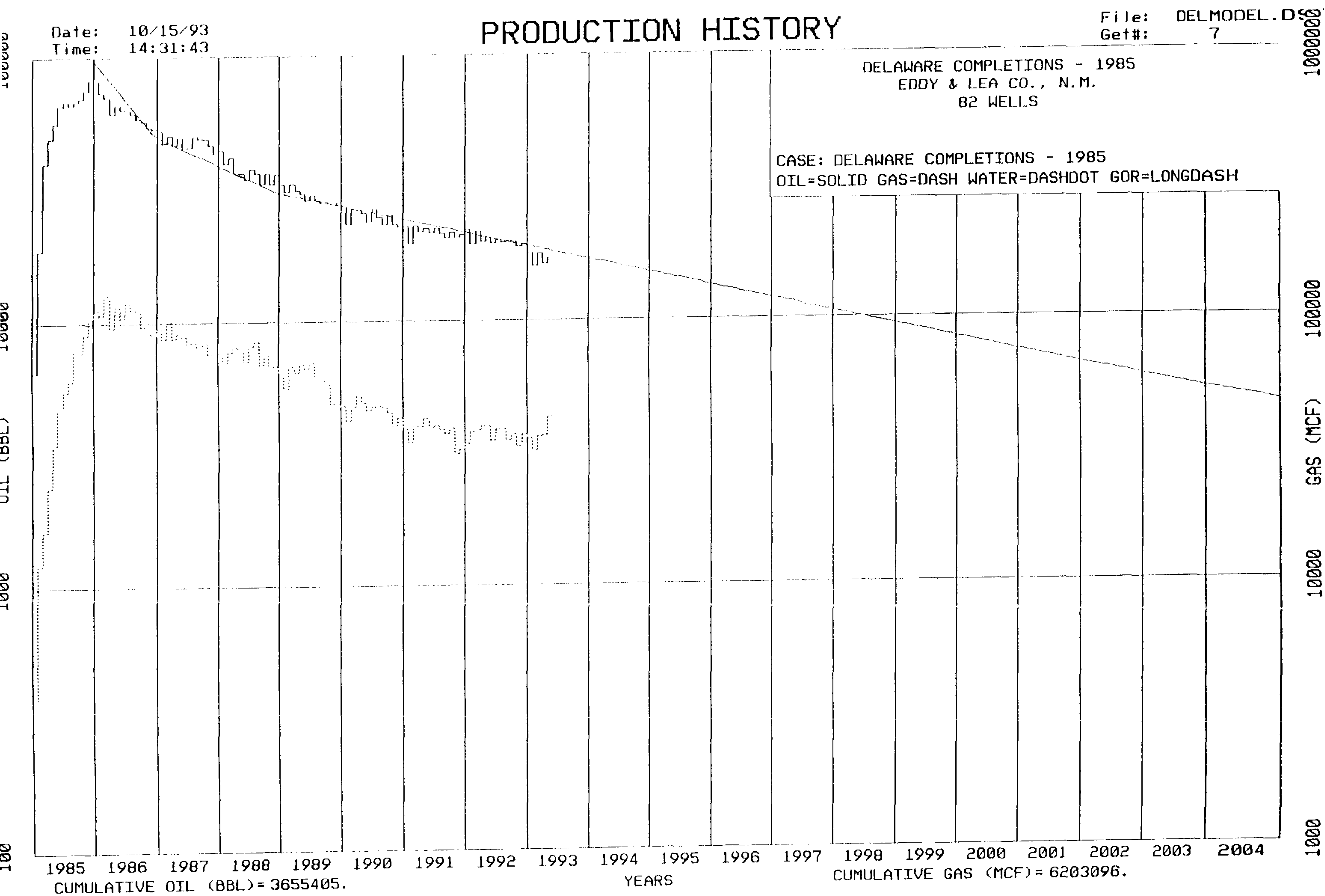
ARMSTRONG ENERGY CORP.

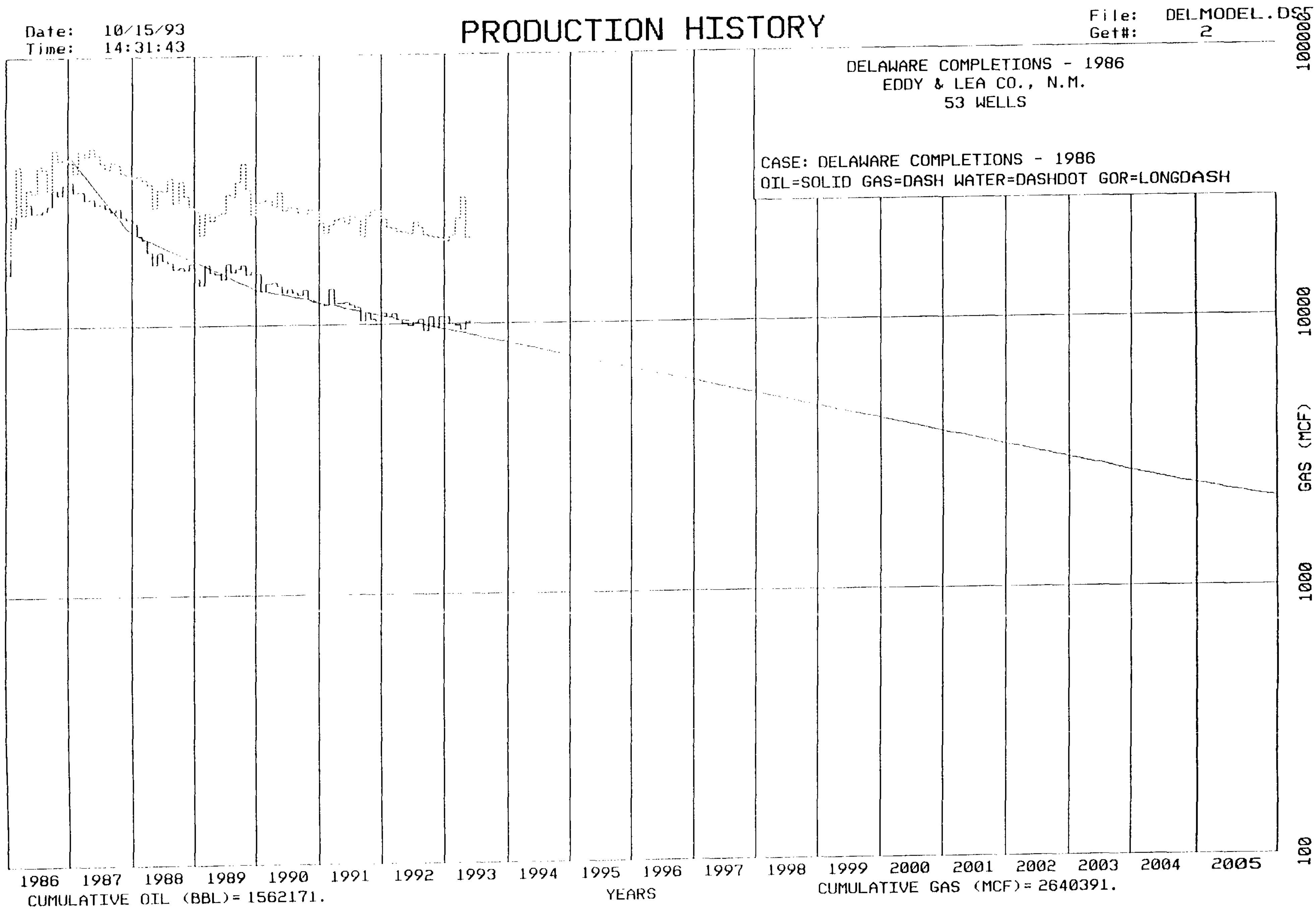
TYPICAL LOG
NORTHEAST LEA FIELD
LEA COUNTY, NEW MEXICO

EXHIBIT C



PRODUCTION HISTORY




Date: 10/15/93
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PRODUCTION HISTORY
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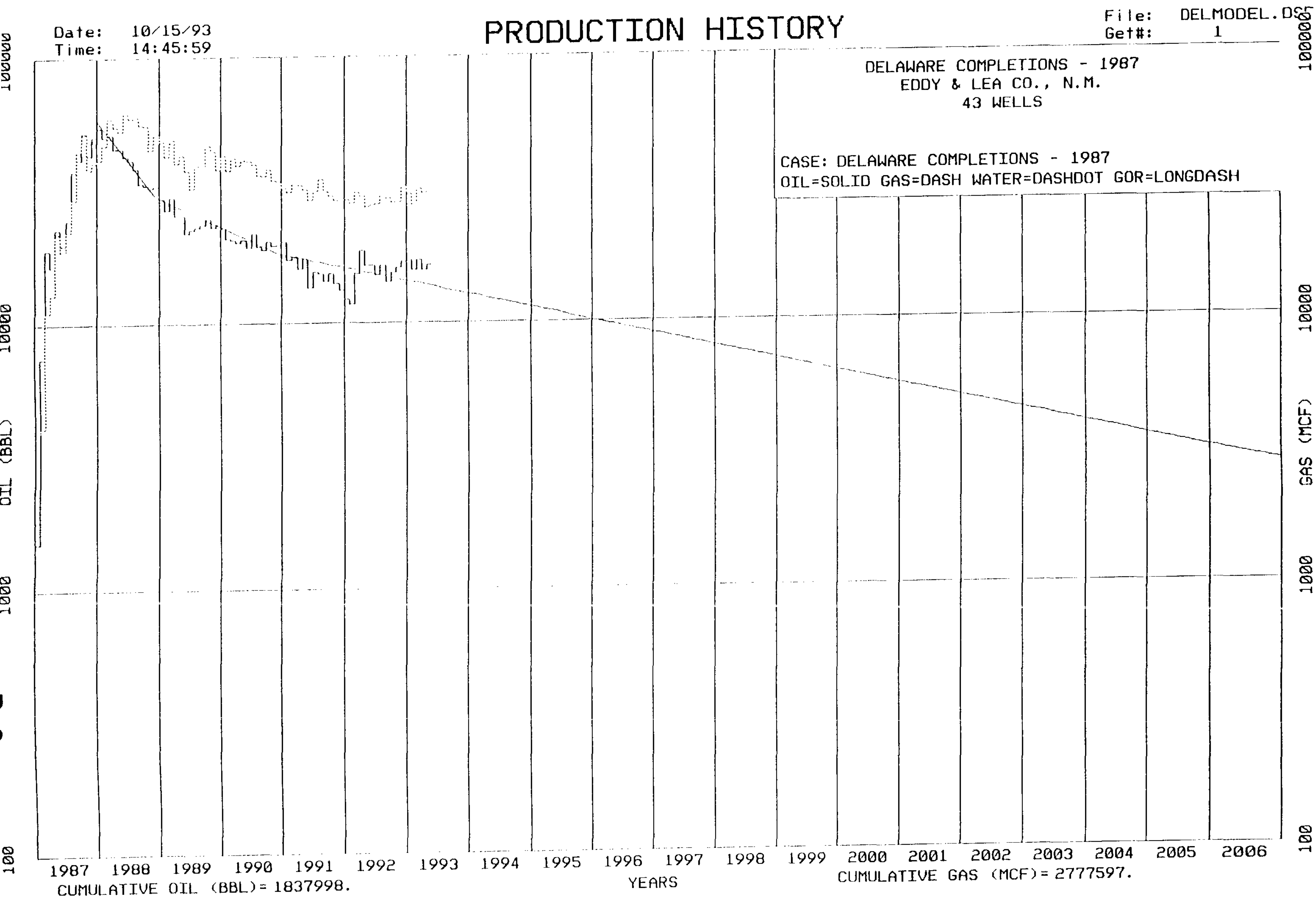
DELAWARE COMPLETIONS - 1986
EDDY & LEA CO., N.M.
53 WELLS
CASE: DELAWARE COMPLETIONS - 1986
OIL=SOLID GAS=DASH WATER=DASHDOT GOR=LONGDASH
100000
10000
GAS (MCF)
1000
100
1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005
YEARS
CUMULATIVE OIL (BBL)= 1562171.
CUMULATIVE GAS (MCF)= 2640391.

PRODUCTION HISTORY



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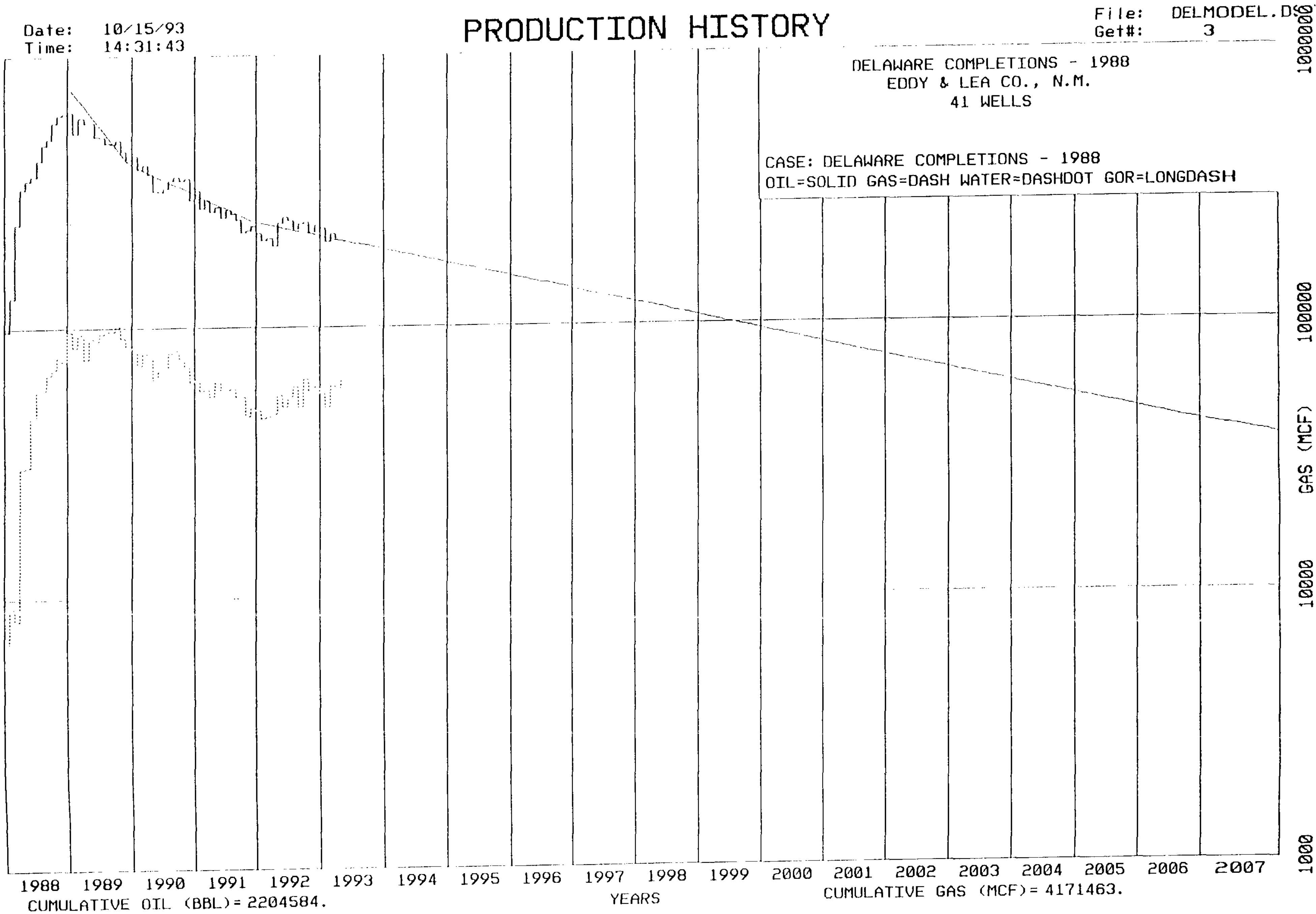

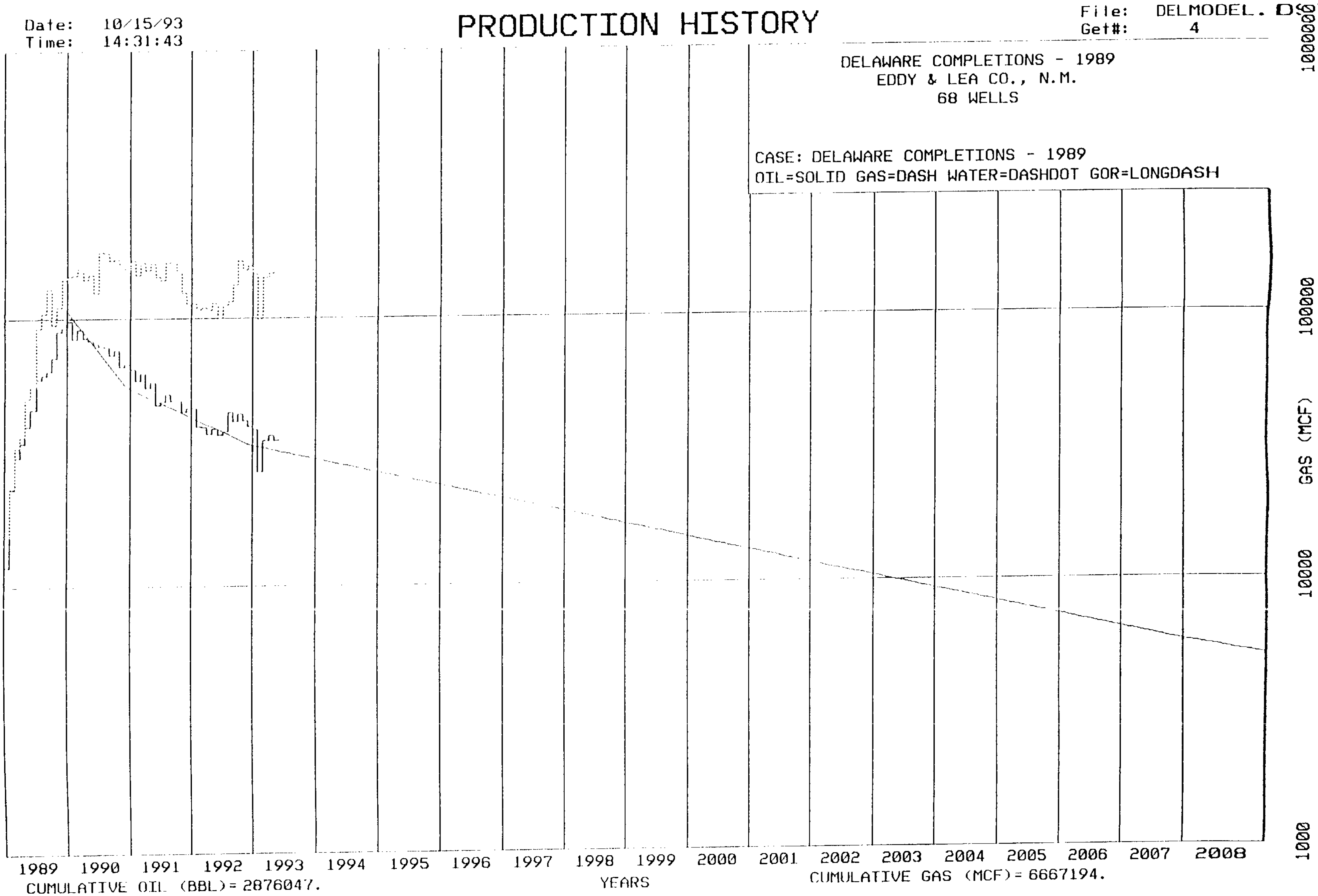

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PRODUCTION HISTORY
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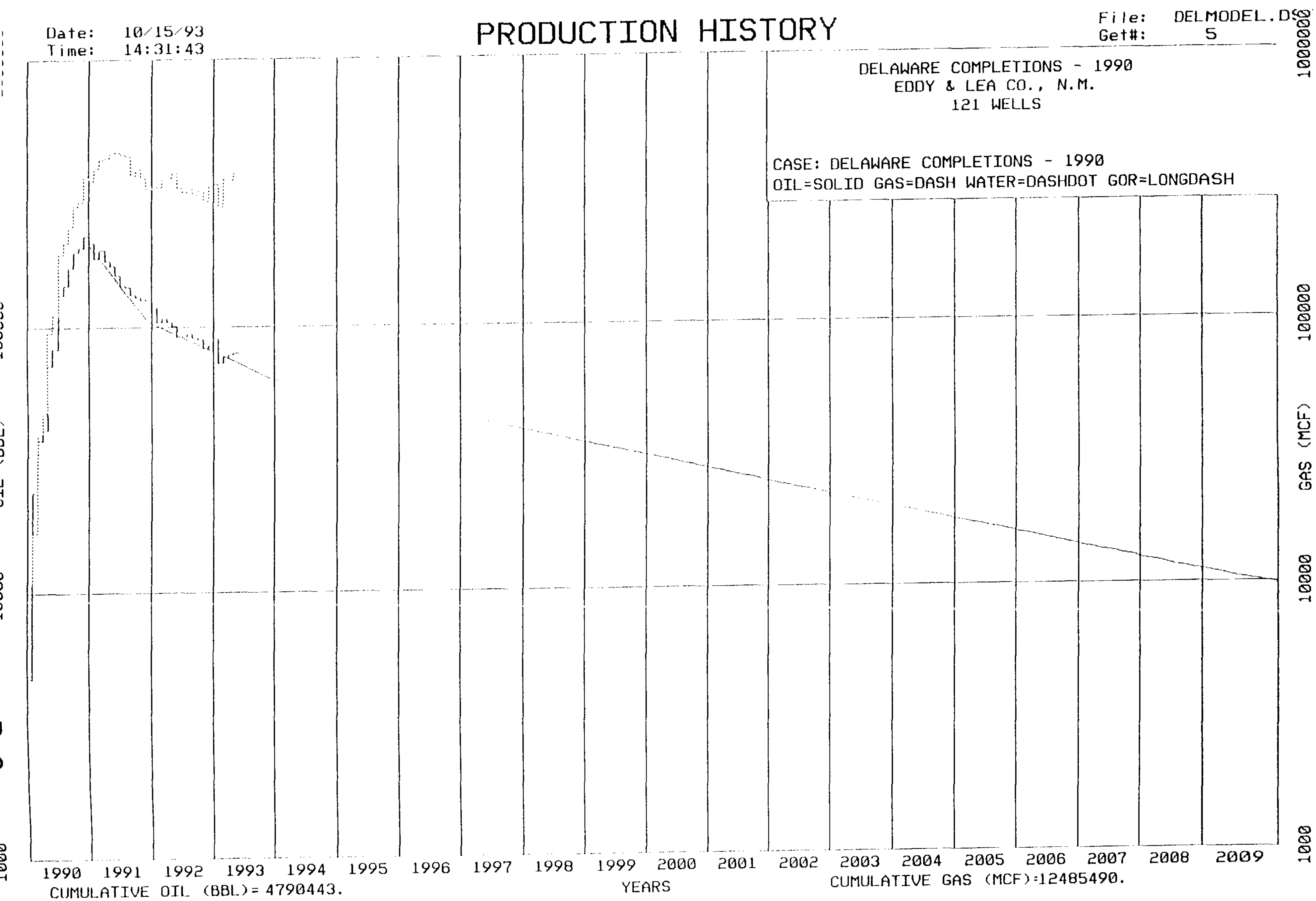
DELAWARE COMPLETIONS - 1989
EDDY & LEA CO., N.M.
68 WELLS
CASE: DELAWARE COMPLETIONS - 1989
OIL=SOLID GAS=DASH WATER=DASHDOT GOR=LONGDASH
1000000
100000
GAS (MCF)
10000
1000
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
YEARS
CUMULATIVE OIL (BBL)= 2876047.
CUMULATIVE GAS (MCF)= 6667194.



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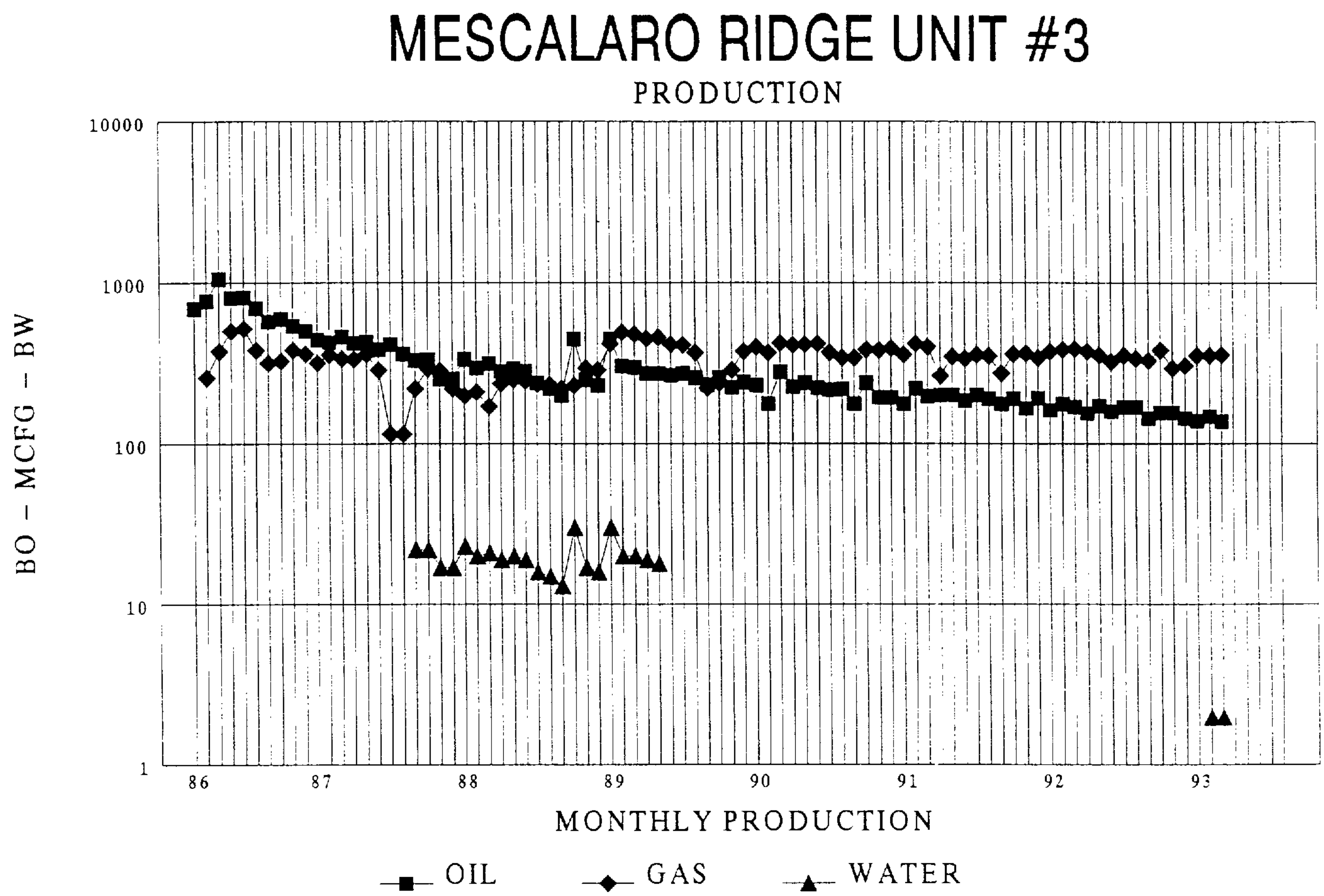
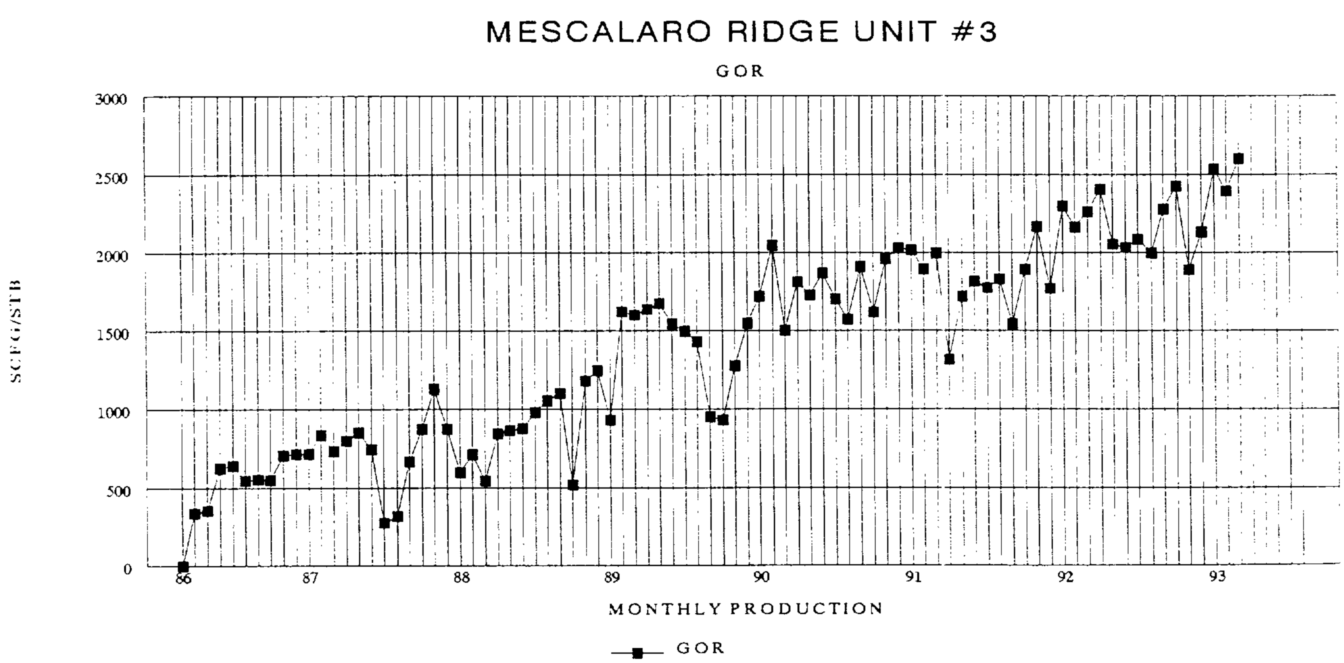
DELAWARE COMPLETIONS - 1990
EDDY & LEA CO., N.M.
121 WELLS
CASE: DELAWARE COMPLETIONS - 1990
OIL=SOLID GAS=DASH WATER=DASHDOT GOR=LONGDASH
1000000
100000
GAS (MCF)
10000
1000
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009
YEARS
CUMULATIVE OIL (BBL)= 4790443.
CUMULATIVE GAS (MCF)=12485490.





MESCALERO RIDGE UNIT #3 UNIT P SECTION 35-T19S-R34E

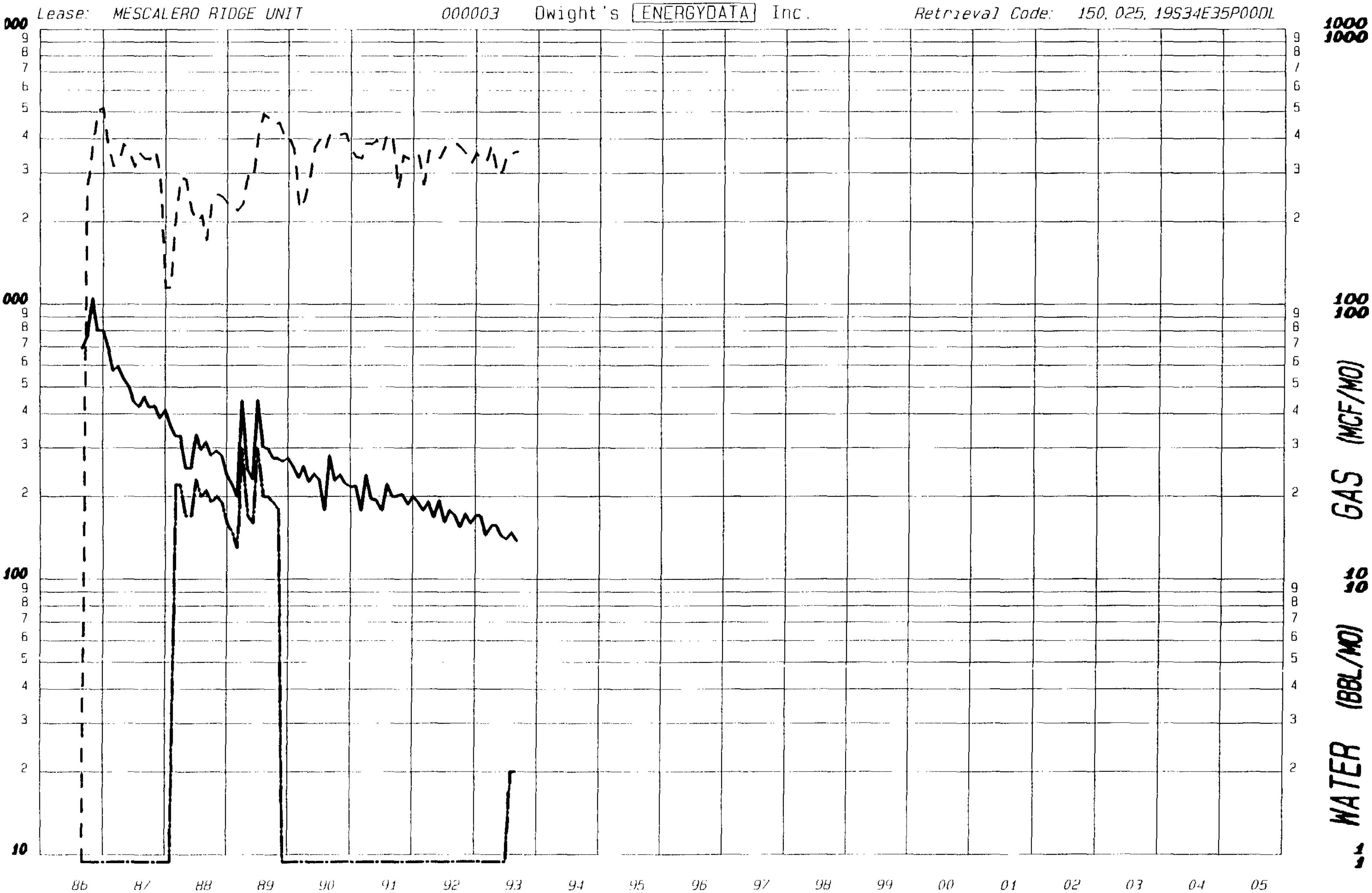
CUM. PRODUCTION

SECOND SAND LIME EQUIVALENT, 5780'-5805'.

25,569 BO
28,175 MCF
418 BW

EXHIBIT E-1

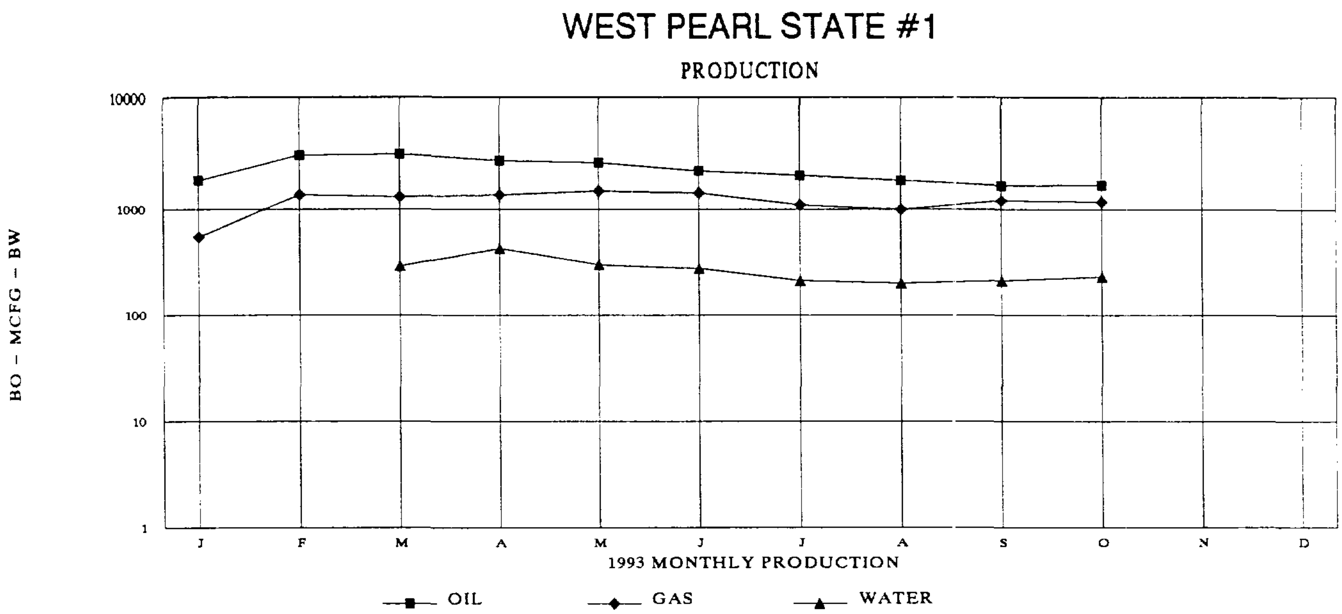
Lease: MESCALERO RIDGE UNIT 000003 Dwight's ENERGYDATA Inc. Retrieval Code: 150.025.19S34E35P00DL

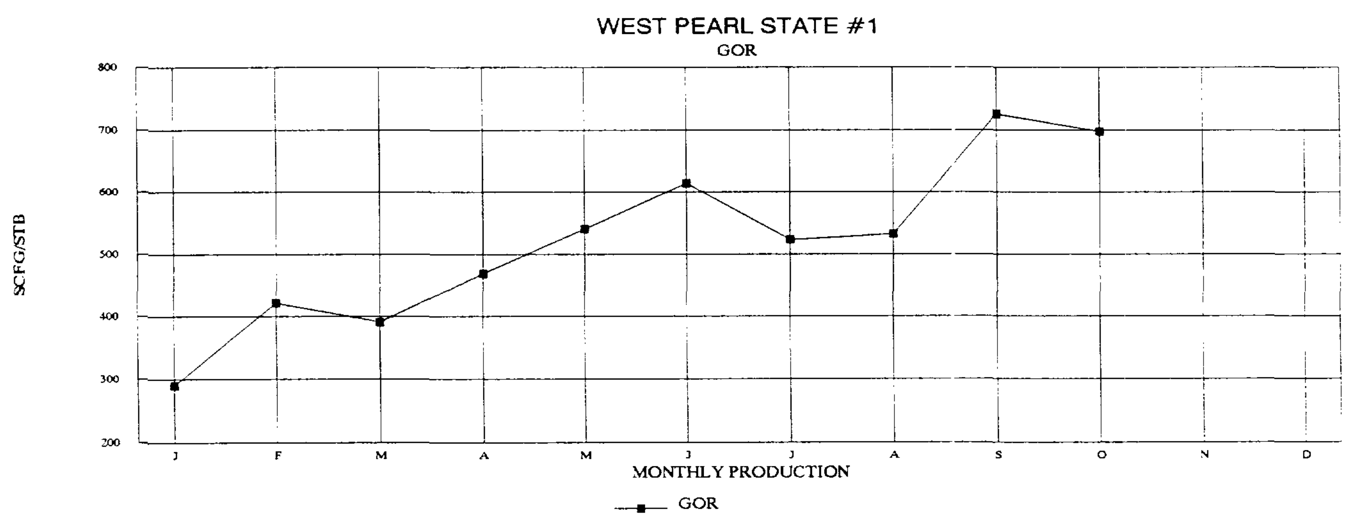


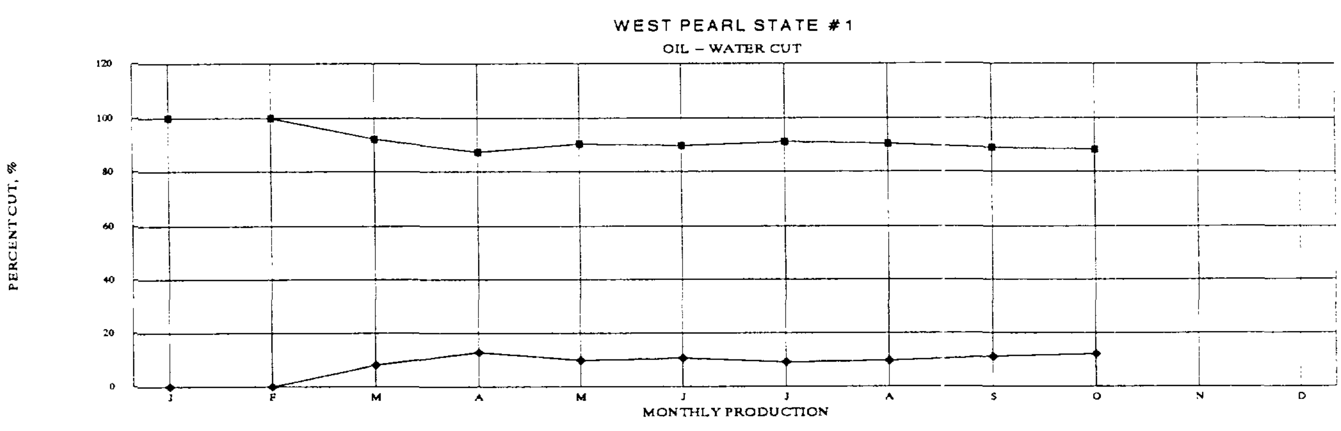
County: LEA State NM
Field: LEA NE (DELAWARE) DI
Reservoir: DELAWARE
Operator: PENNZOIL EXPL & PROD CO
Oil Cum: 25569 Gas Cum: 28175
Location: 35P 19S 34E

F P Date 08-86

Date: 12-20-93







WEST PEARL STATE #1

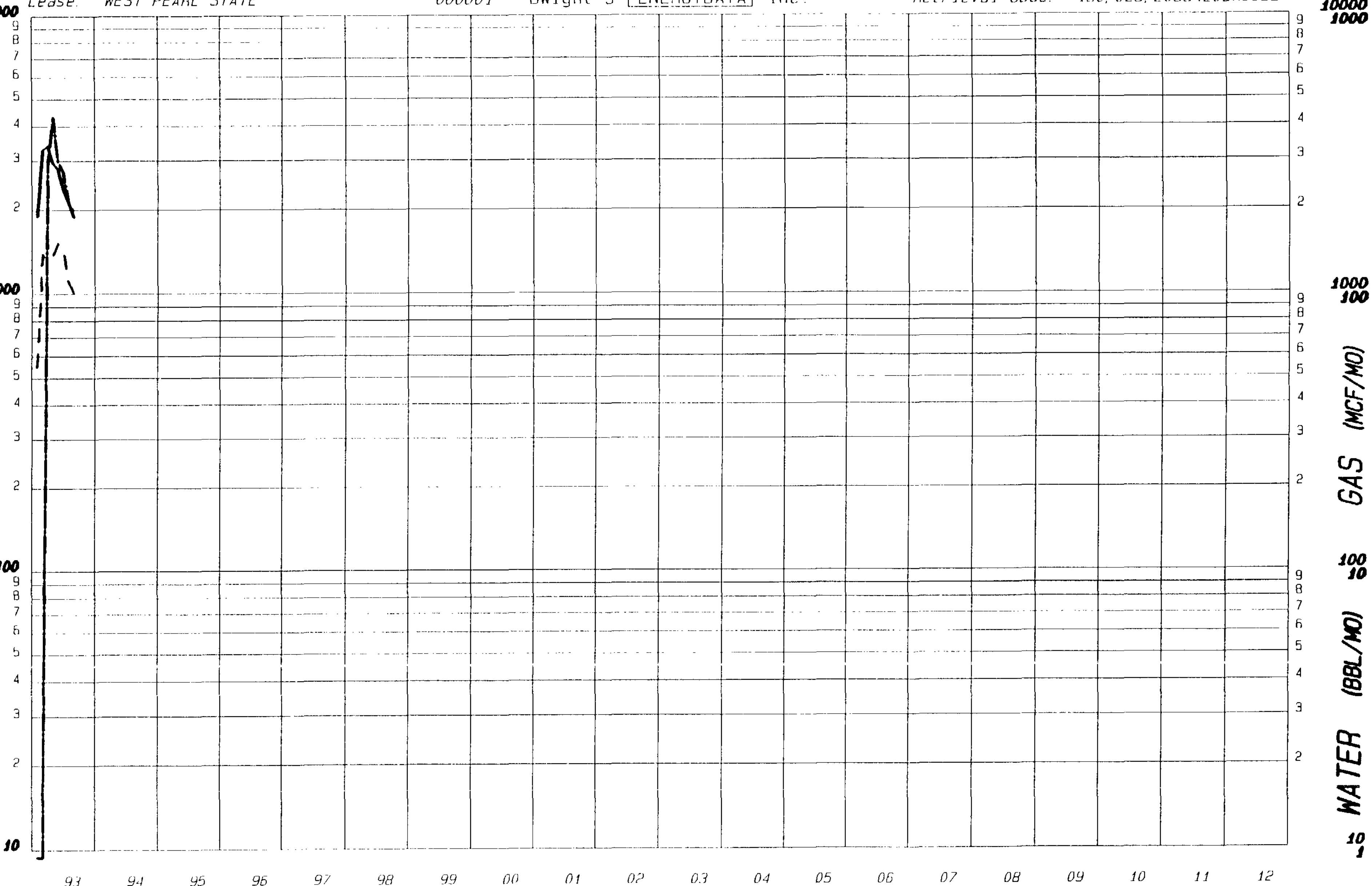
UNIT A SECTION 2-T20S-R34E

COMPLETED IN THIRD SAND, 5890' - 5910'.

EXHIBIT E-3

CUM. PRODUCTION
24,133 BO
12,167 MCF
2,149 BW

Lease: WEST PEARL STATE 000001 Dwight's ENERGYDATA Inc. Retrieval Code: 150, 025, 20S34E02A00DL

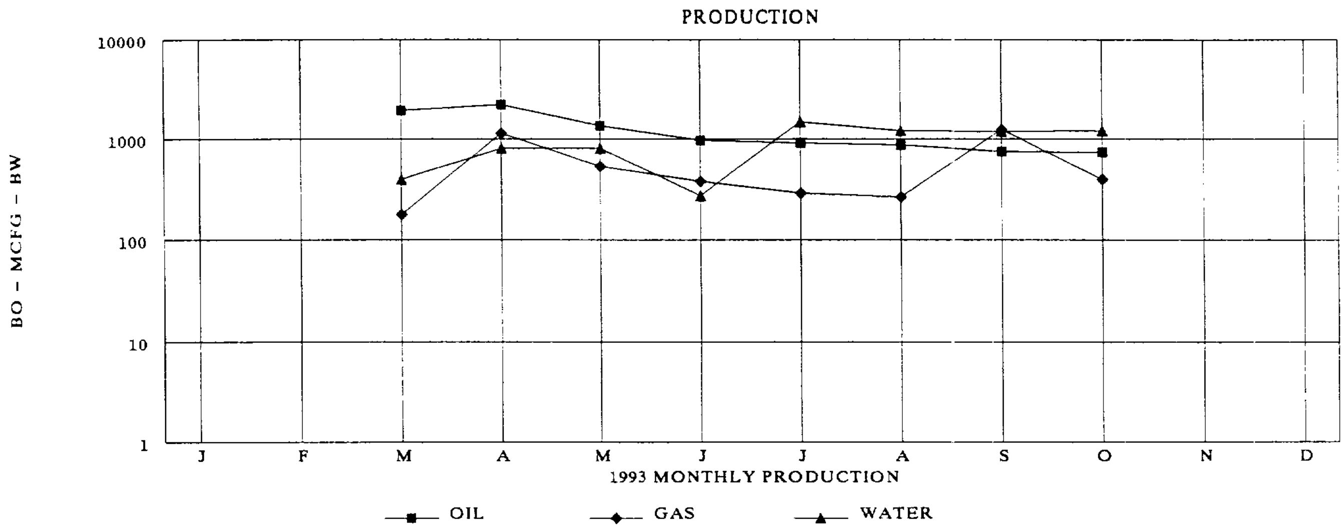


County: LEA State: NM
Field: LEA NE (DELAWARE) DL
Reservoir: DELAWARE
Operator: ARMSTRONG ENERGY CORP
Oil Cum 20724 Gas Cum 9742
Location 2A 20S 34E

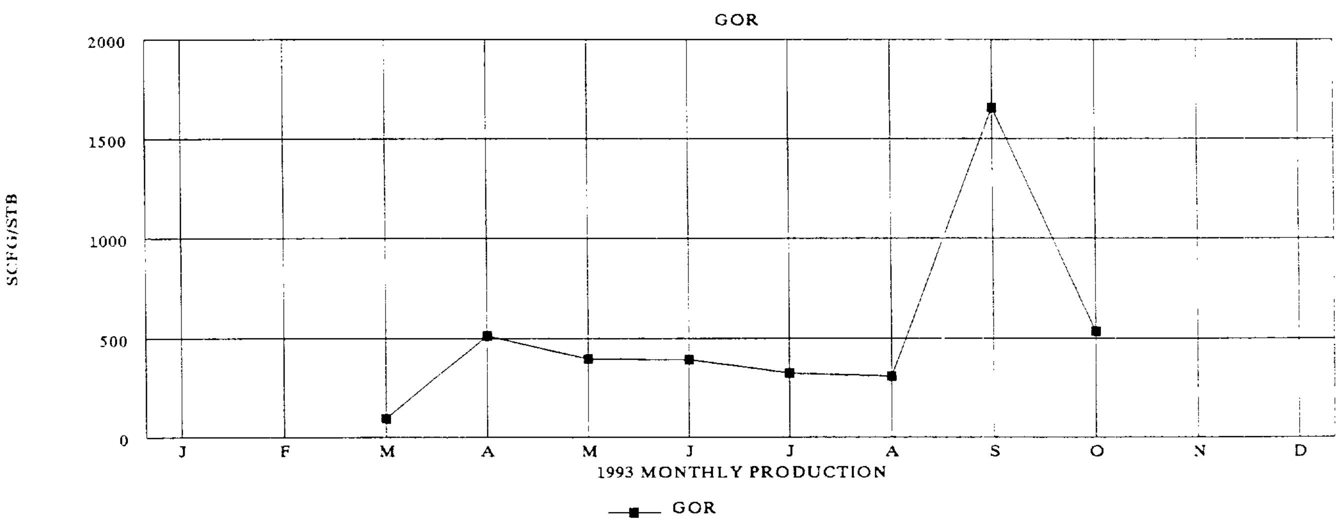
F P Date 01 93

Date: 12-20 93

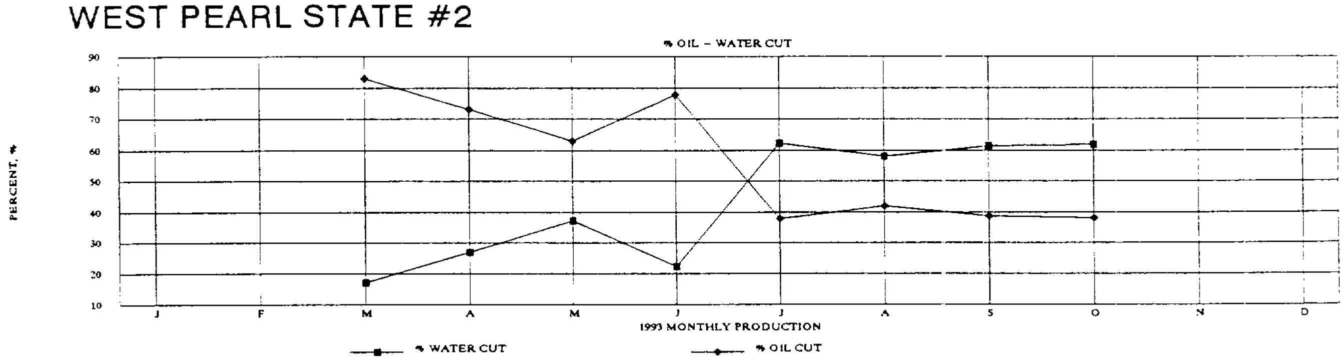
WEST PEARL STATE #2



WEST PEARL STATE #2



WEST PEARL STATE #2



WEST PEARL STATE #2 UNIT G SECTION 2-T20S-R34E

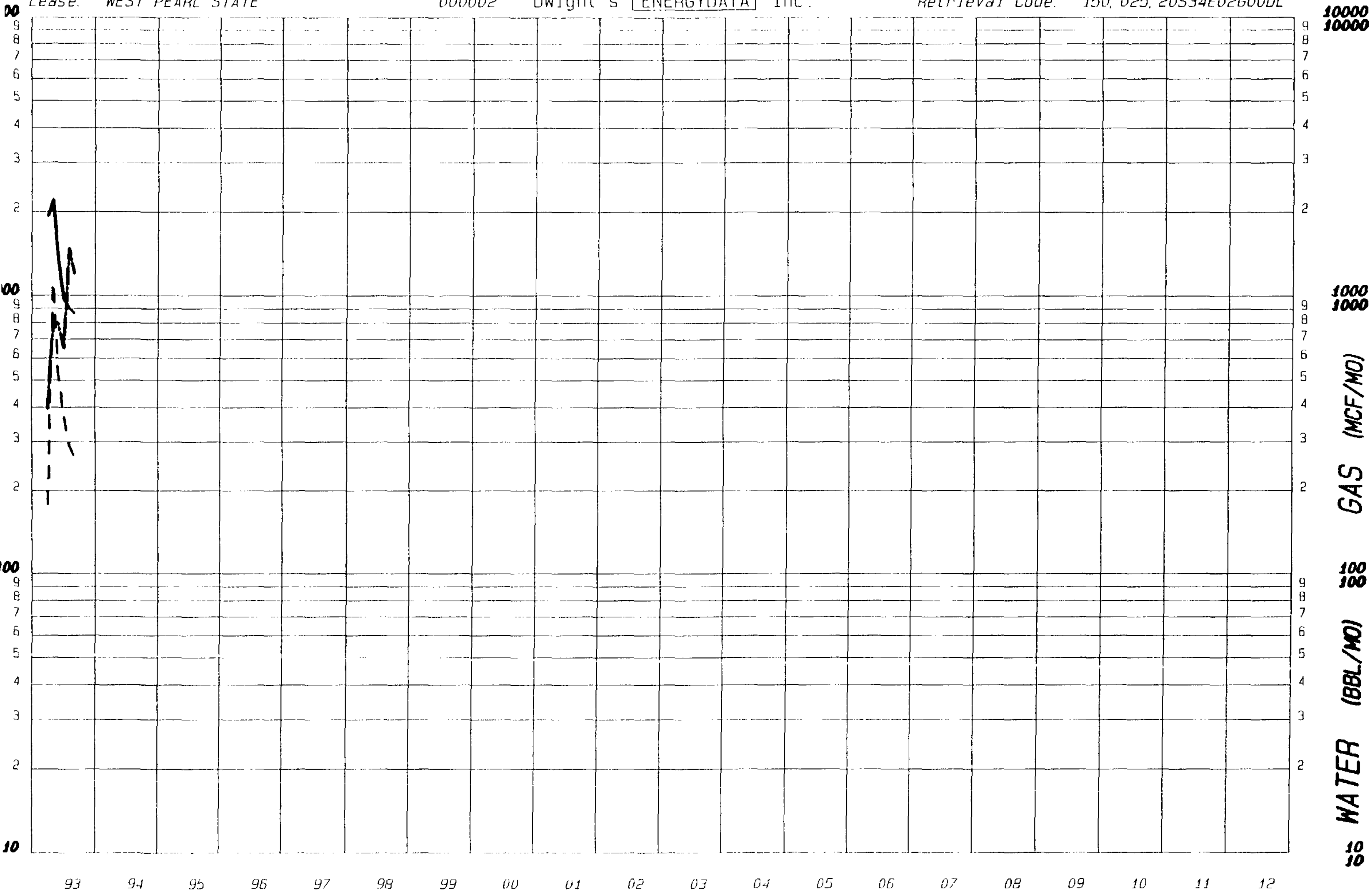
COMPLETED IN THIRD SAND, 5928' - 5948'.

TESTED SECOND SAND, 5744' - 5805', INCREASED WATER, NO OIL.

<u>CUM. PRODUCTION</u>
9,705 BO
4,401 MCF
7,340 BW

EXHIBIT E-5

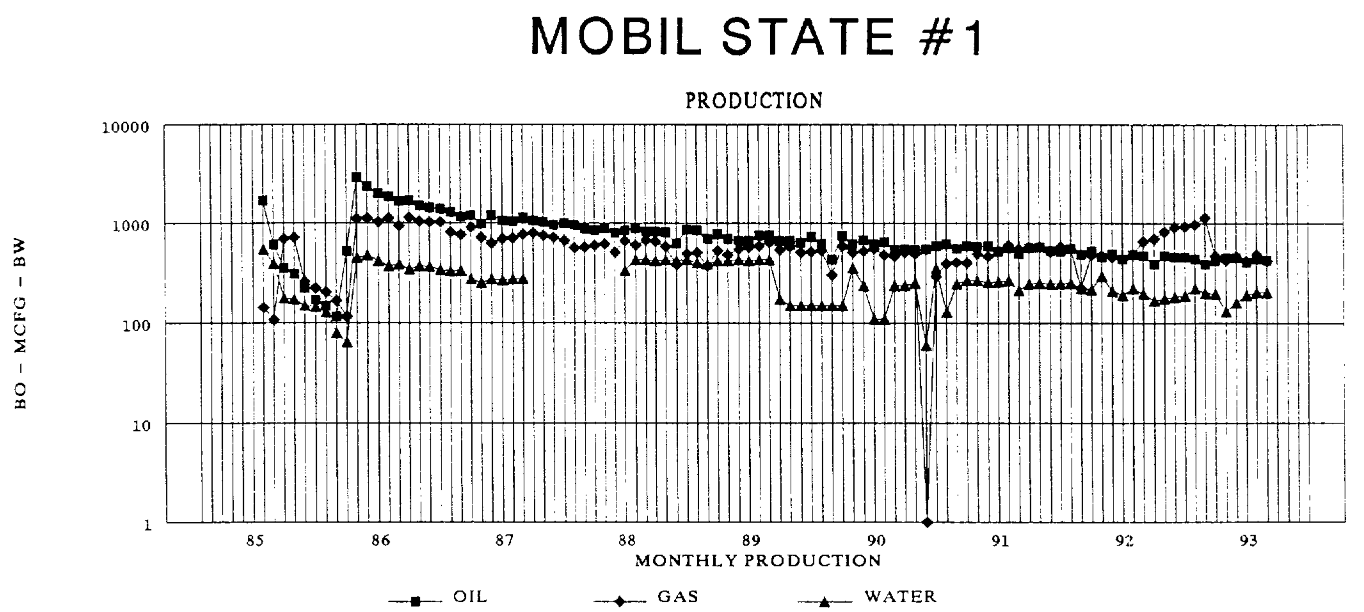
Lease: WEST PEARL STATE 000002 Dwight's ENERGYDATA Inc. Retrieval Code: 150, 025, 20S34E02600DL

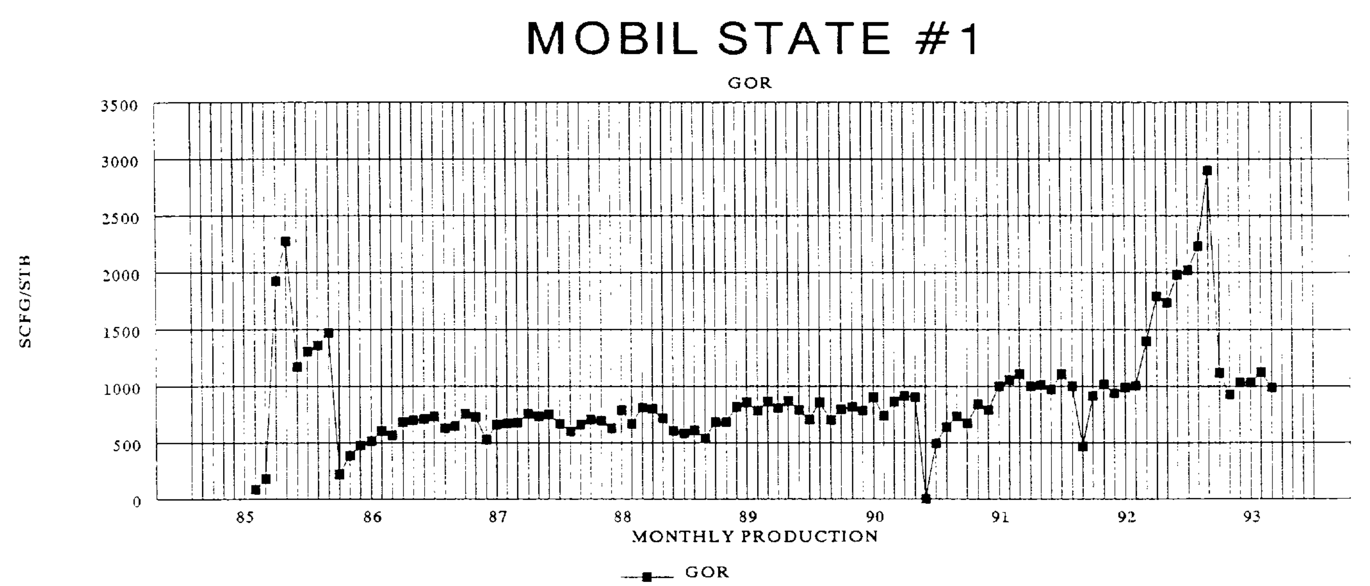


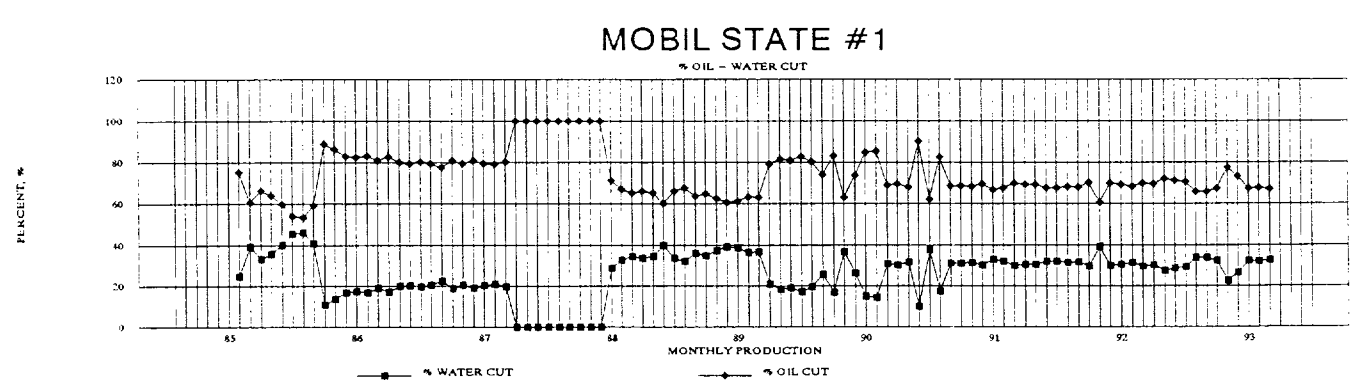
County: LEA State: NM
Field: LEA NE (DELAWARE) DI
Reservoir: DELAWARE
Operator: ARMSTRONG ENERGY CORP
Oil Cum: 8219 Gas Cum: 2770
Location: 26 20S 34E

F.P. Date 03-93

Date: 12-20-93







MOBIL STATE #1

UNIT J SECTION 2–T20S–R34E

COMPLETED IN FIRST SAND, 5625' – 5695'.

THIRD SAND IS WET, TOP @ –2263'.

CUM. PRODUCTION

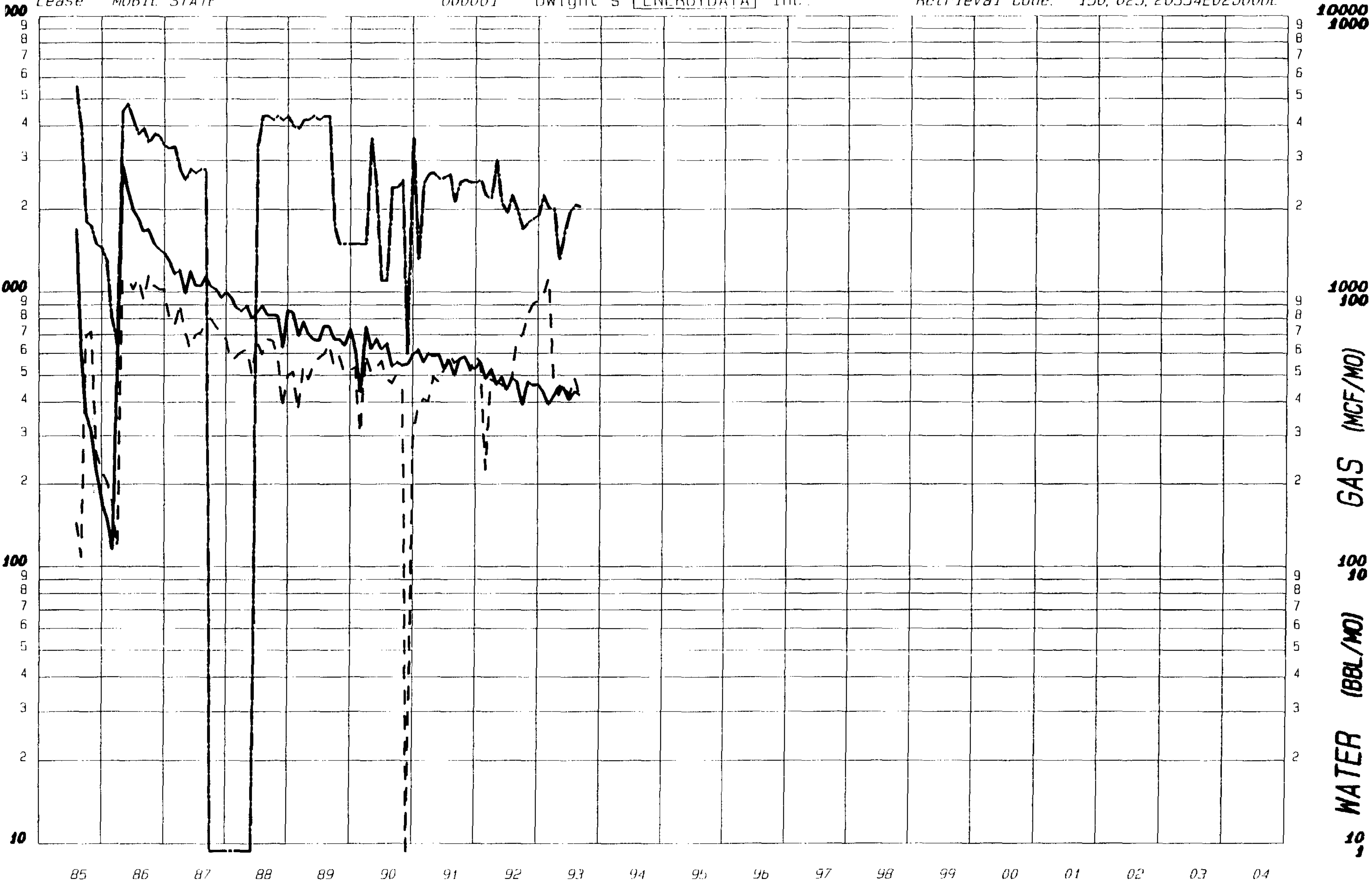
75,727 BO

57,970 MCF

24,049 BW

EXHIBIT E-7

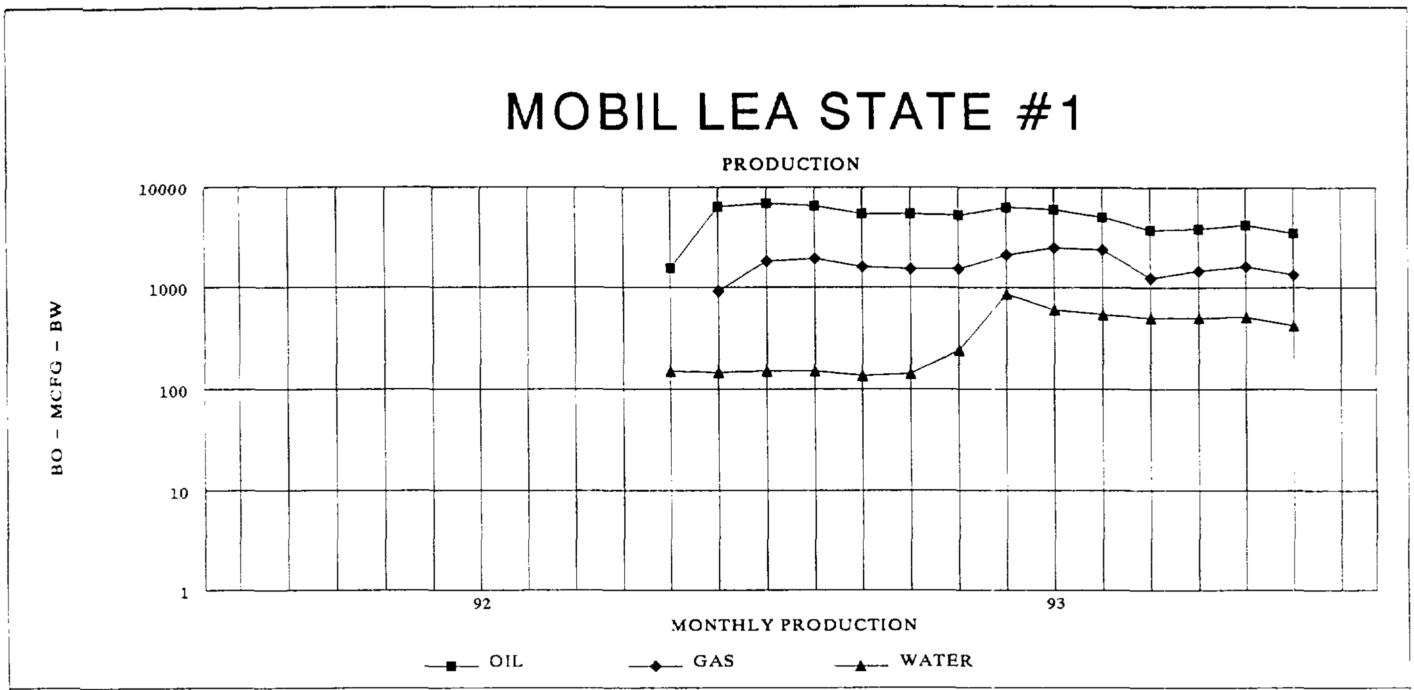
Lease: MOBIL STATE 000001 Dwight's [ENERGYDATA] Inc. Retrieval Code: 150, 025, 20S34E02J000L

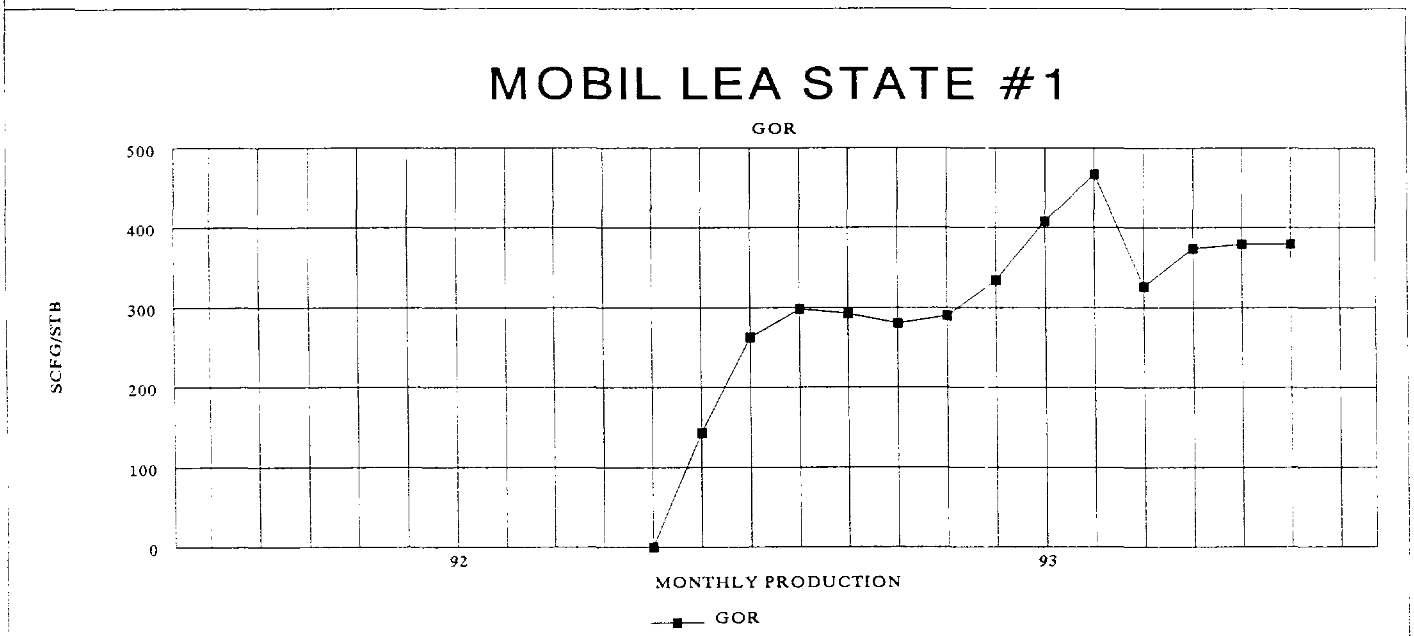


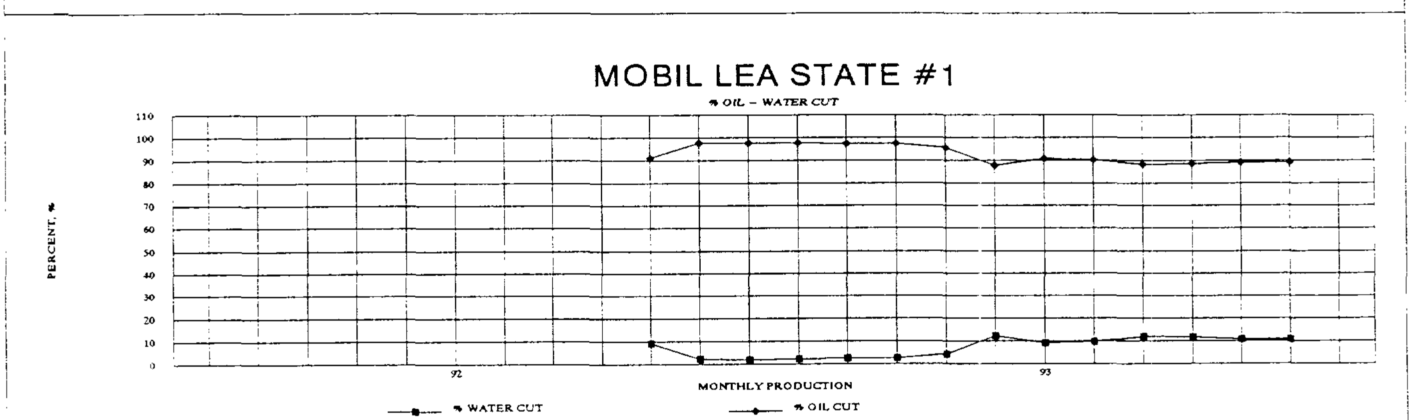
County: LEA State: NM
Field: LEA NE (DELAWARE) DL
Reservoir: DELAWARE
Operator: MID CONTINENT ENERGY INC
Oil Cum: 75727 Gas Cum: 57970
Location: 2/ 20S 34E

I P Date 07-85

Date 12-20-93







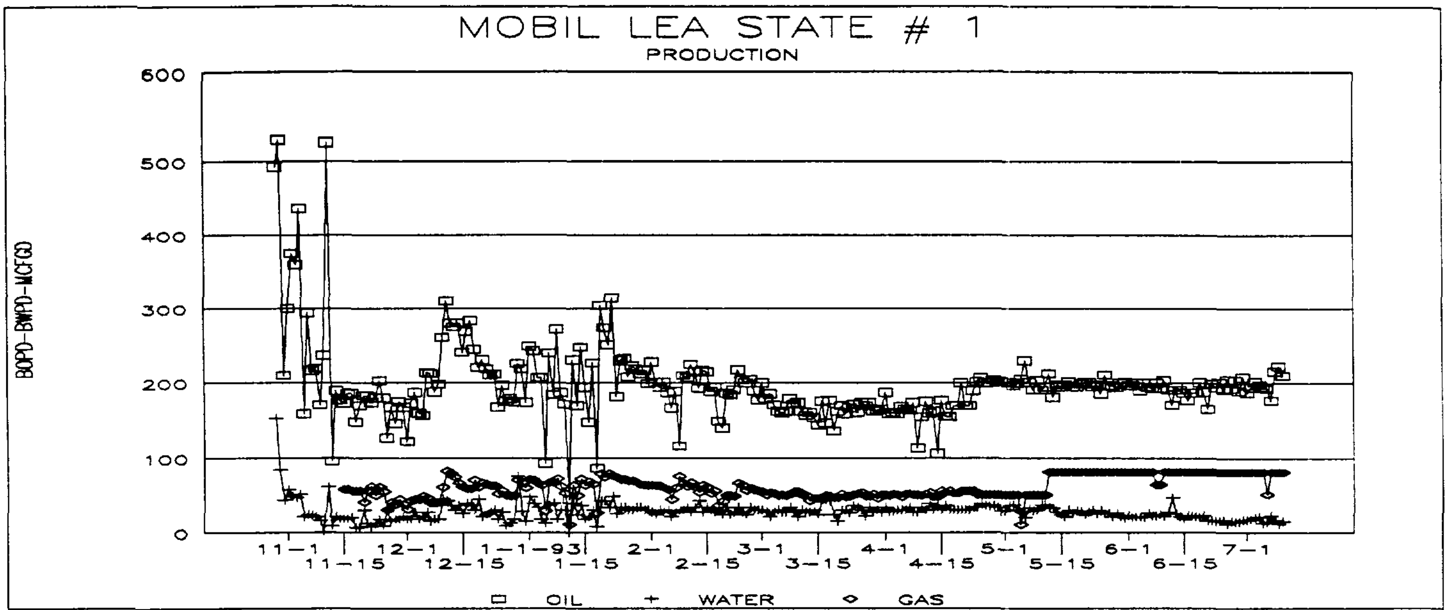
MOBIL LEA STATE #1

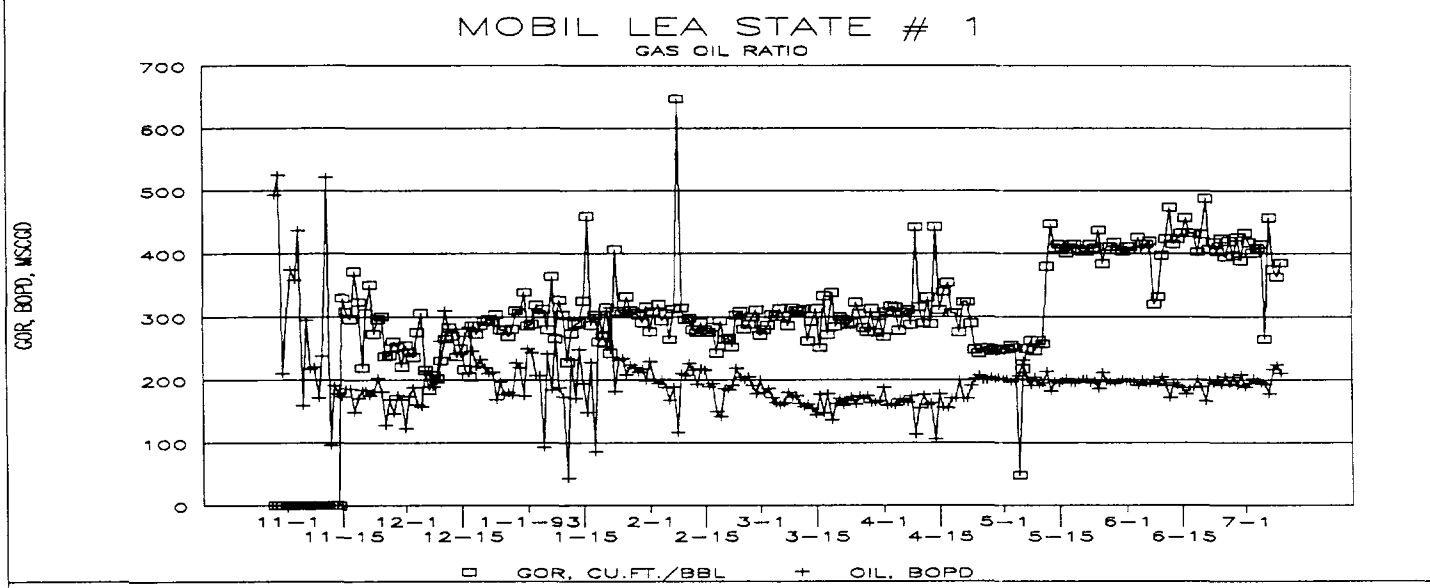
UNIT K SECTION 2-T20S-R34E

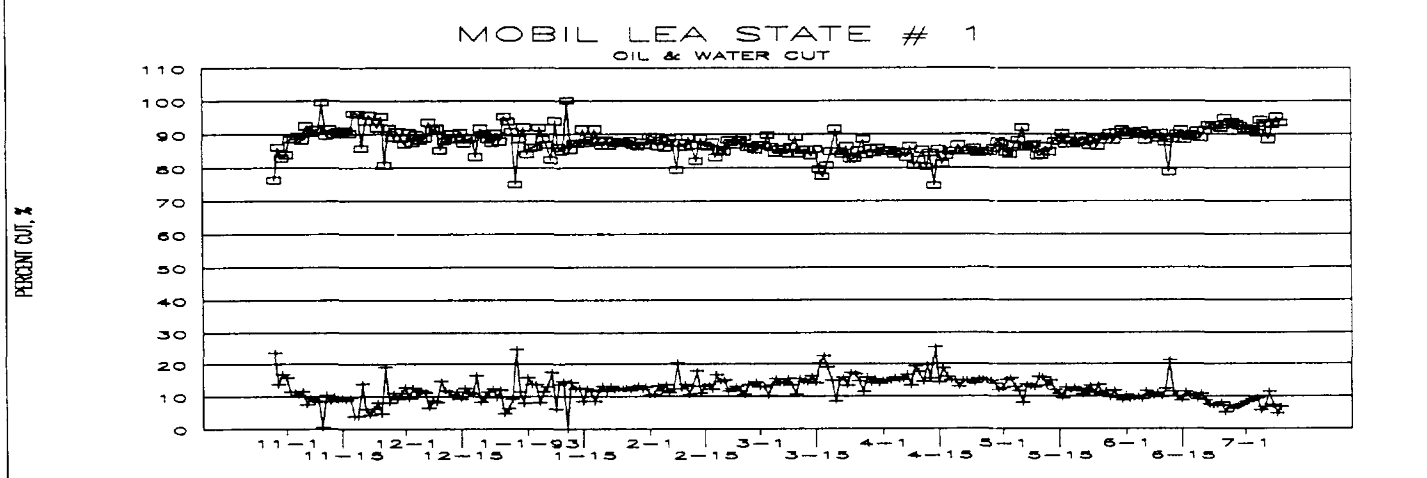
CUM. PRODUCTION
69,174 BO
21,519 MCF
5,042 BW

COMPLETED IN THIRD SAND, 5890' - 5930'.

EXHIBIT E-9







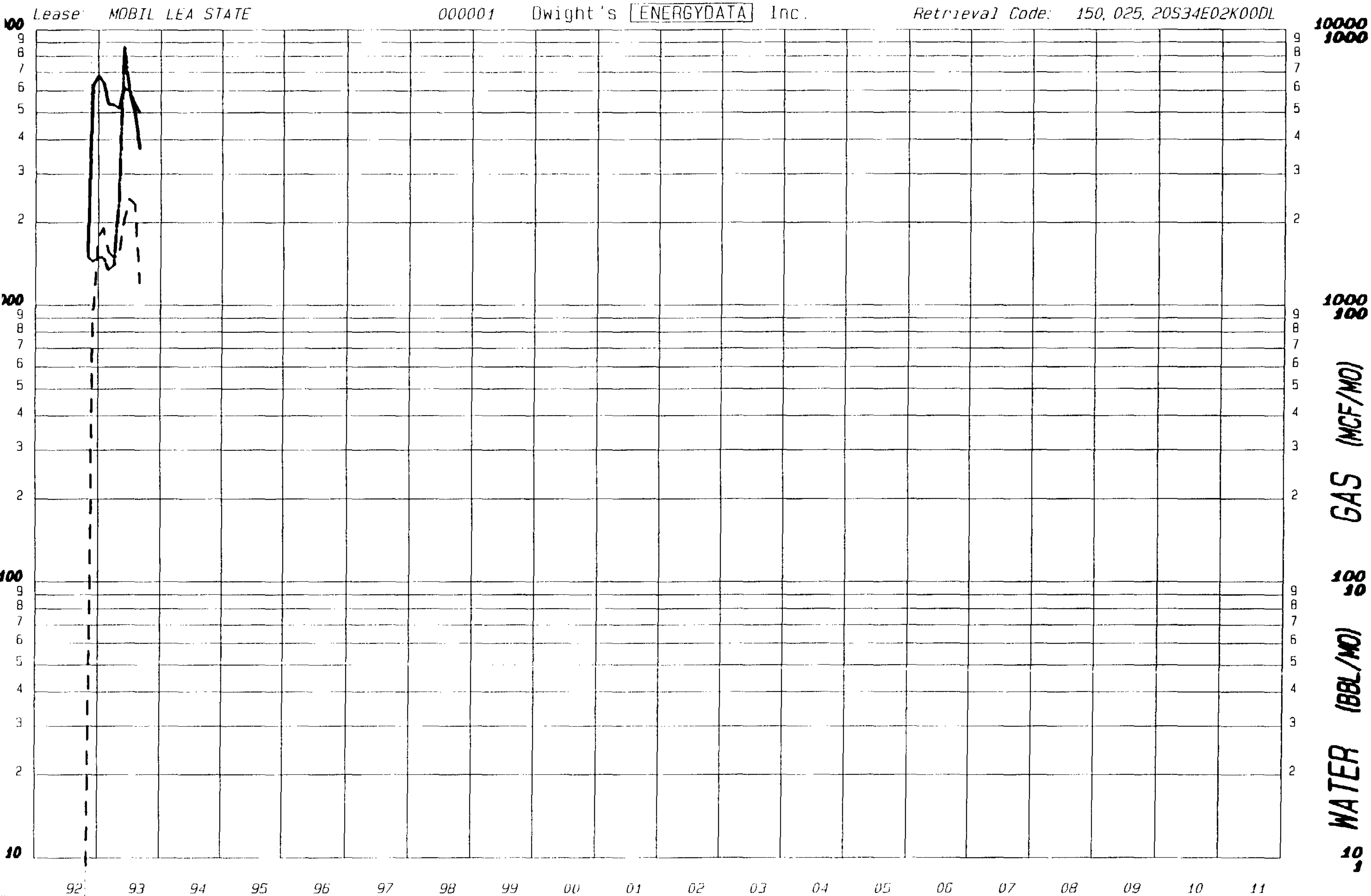
MOBIL LEA STATE #1

1800' FSL & 1980' FWL SECTION 2-T20S-R34E

3 rd SAND COMPLETION 5890'-5930', MAY 93 OPENED ANNULUS AND GOR INCREASED TO 400 CU.FT./BBL. GOOD SHOWS AND LOG RESPONSE IN 1st SAND, POSSIBLE PAY ZONE.

EXHIBIT E-10

Lease: MOBIL LEA STATE 000001 Dwight's ENERGYDATA Inc. Retrieval Code: 150, 025, 20S34E02K00DL

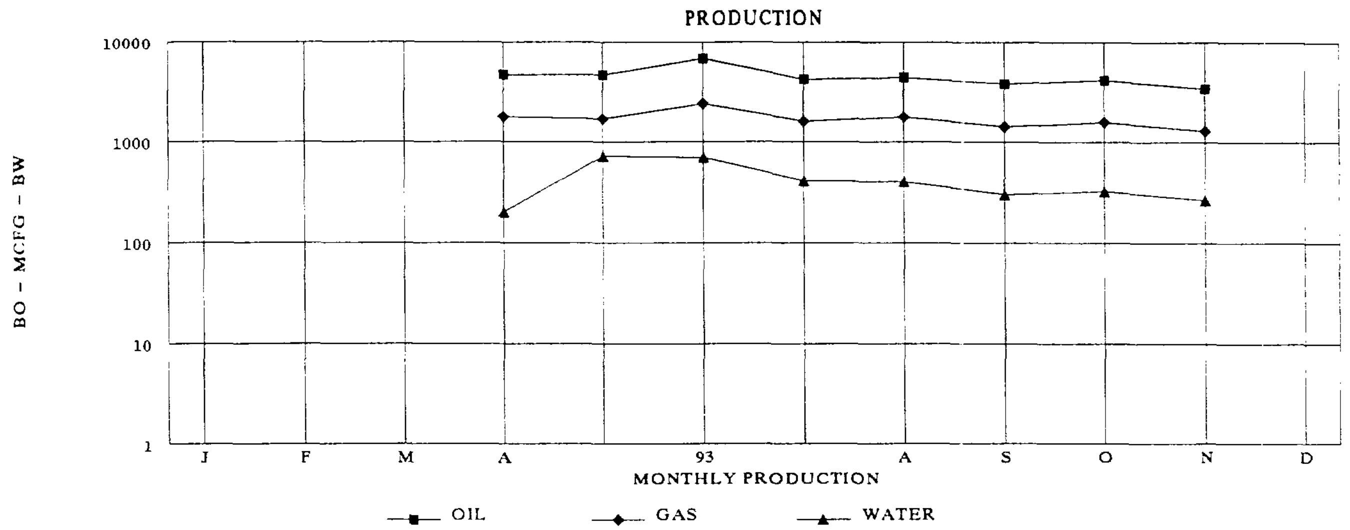


County: LEA State: NM
Field: LEA NE (DELAWARE) DL
Reservoir: DELAWARE
Operator: ARMSTRONG ENERGY CORP
Oil Cum: 57745 Gas Cum: 17206
Location: 2K 20S 34E

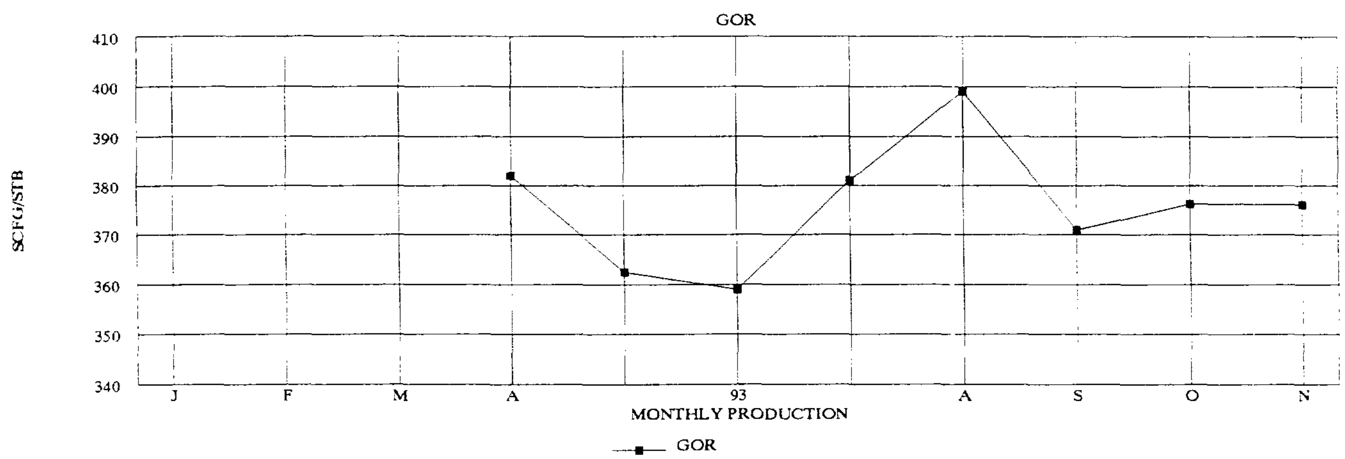
F. P. Date 10-92

Date: 12-20-93

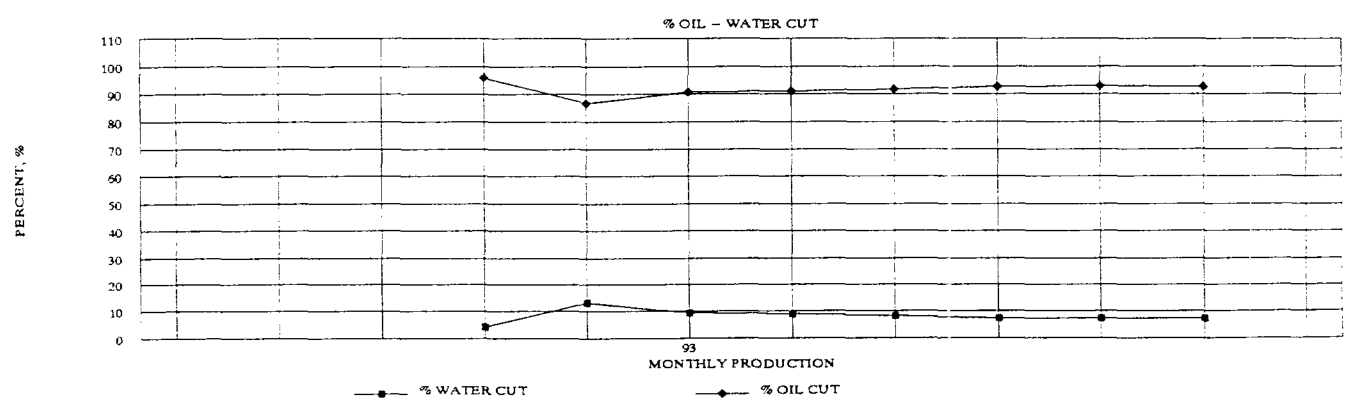
MOBIL LEA STATE #2



MOBIL LEA STATE #2



MOBIL LEA STATE #2



MOBIL LEA STATE #2

UNIT L SECTION 2-T20S-R34E

COMPLETED IN THIRD SAND, 5890' - 5930'.

FIRST SAND IS A POTENTIAL PAY.

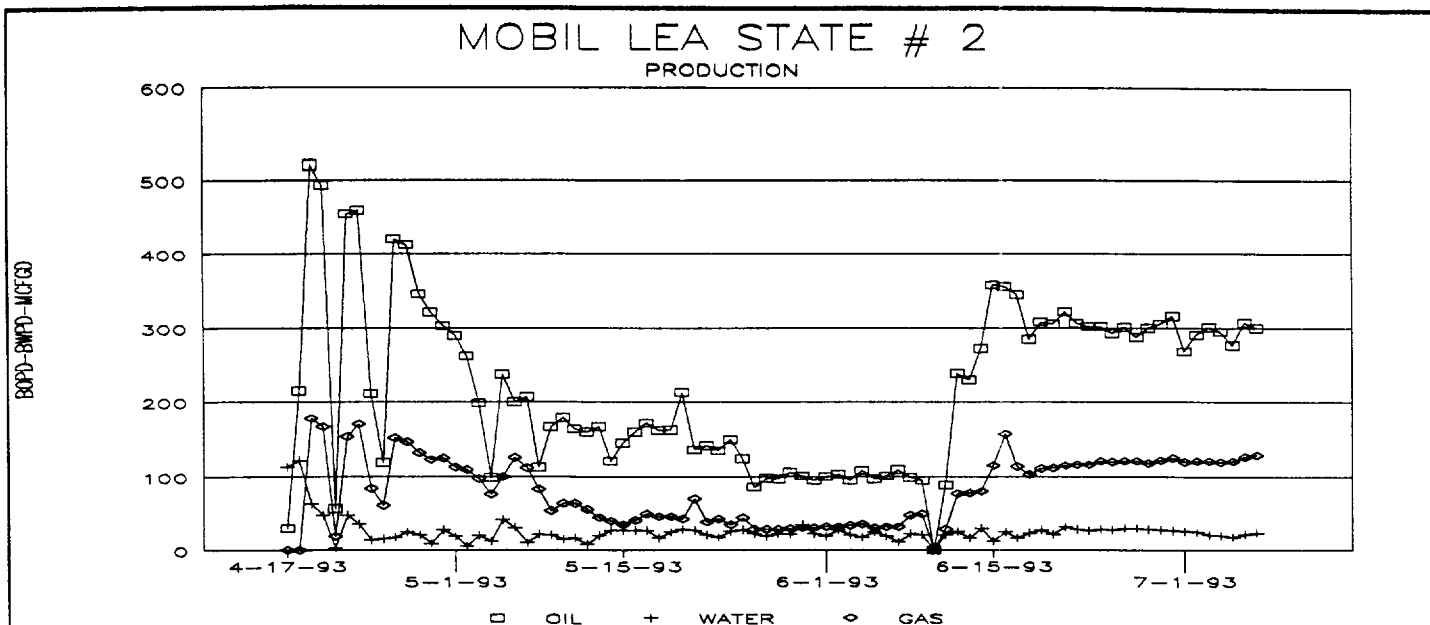
CUM. PRODUCTION

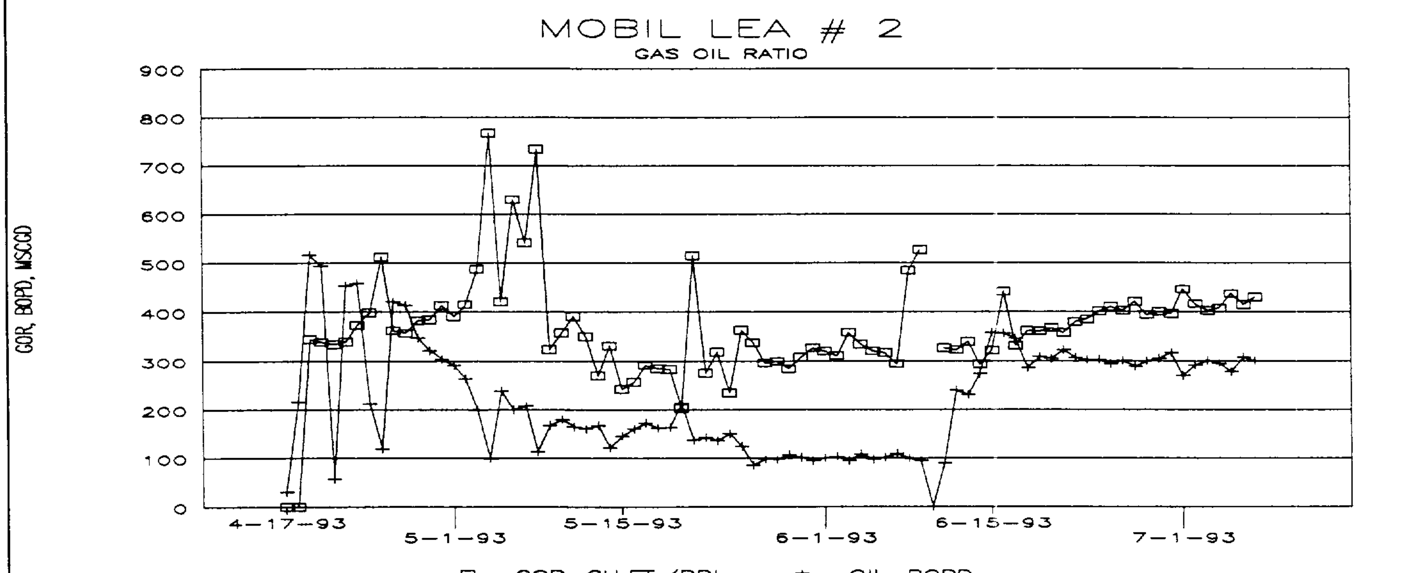
36,072 BO

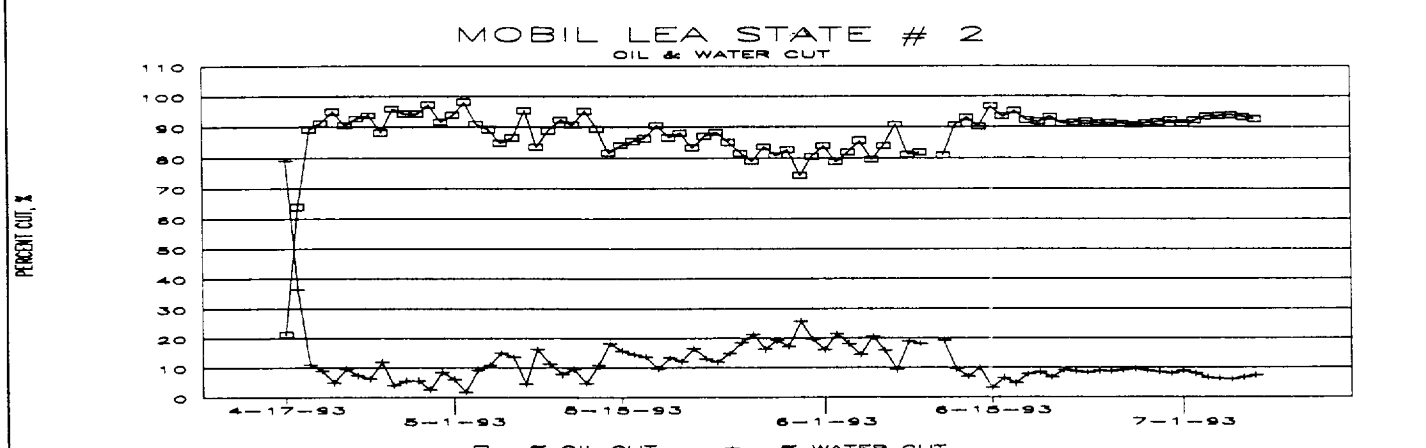
13,518 MCF

3,302 BW

EXHIBIT **E-12**





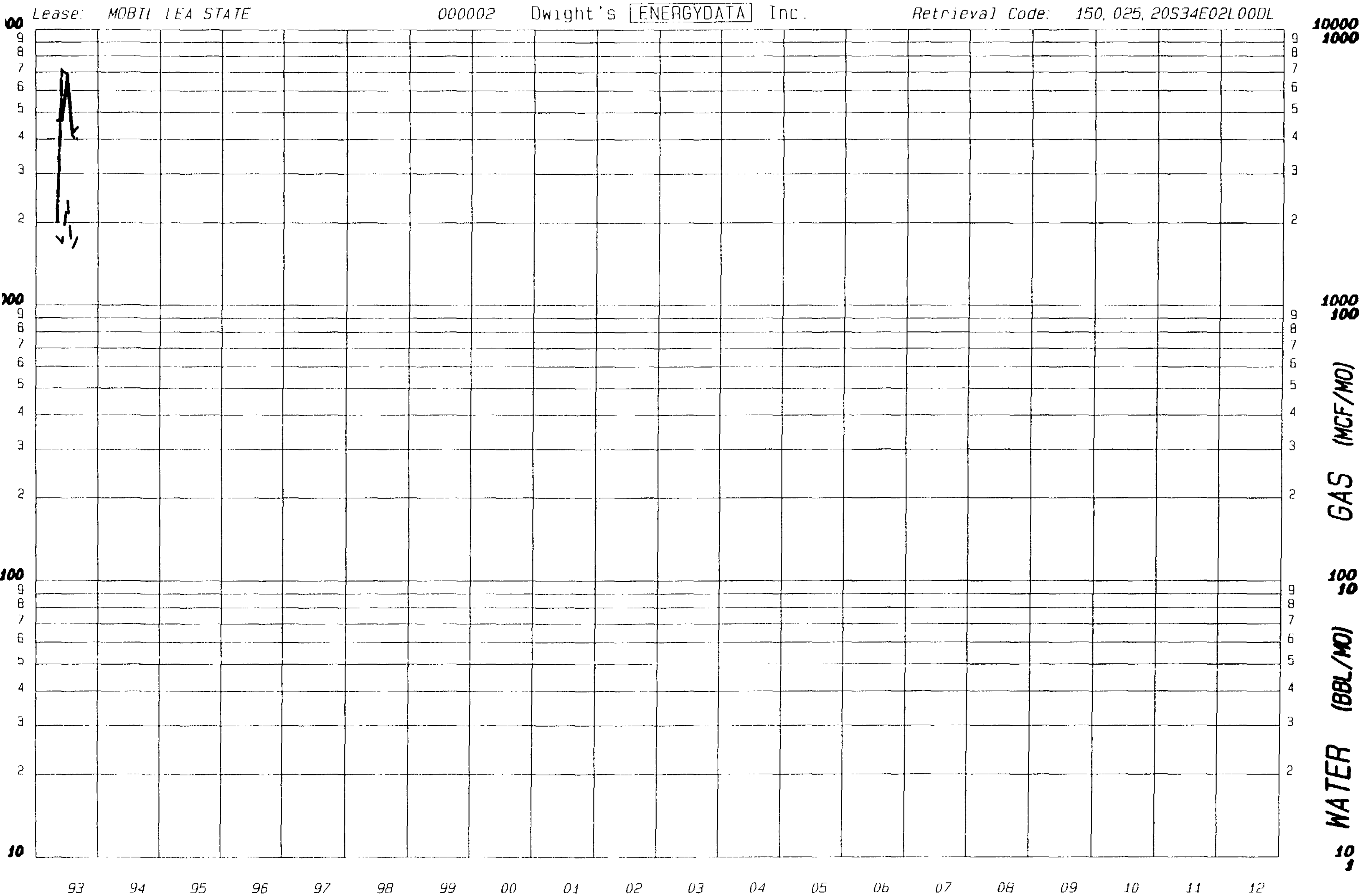


MOBIL LEA STATE #2 1800' FSL & 990' FWL SECTION 2-T20S-R34E

3 rd SAND COMPLETION 5890'-5930', GOOD SHOWS AND LOG RESPONSE IN 1 sT SAND, POSSIBLE PAY ZONE. TESTED AT 300 BOPD FROM JUNE 12, 1993 TO JULY 12, 1993.

EXHIBIT E-13

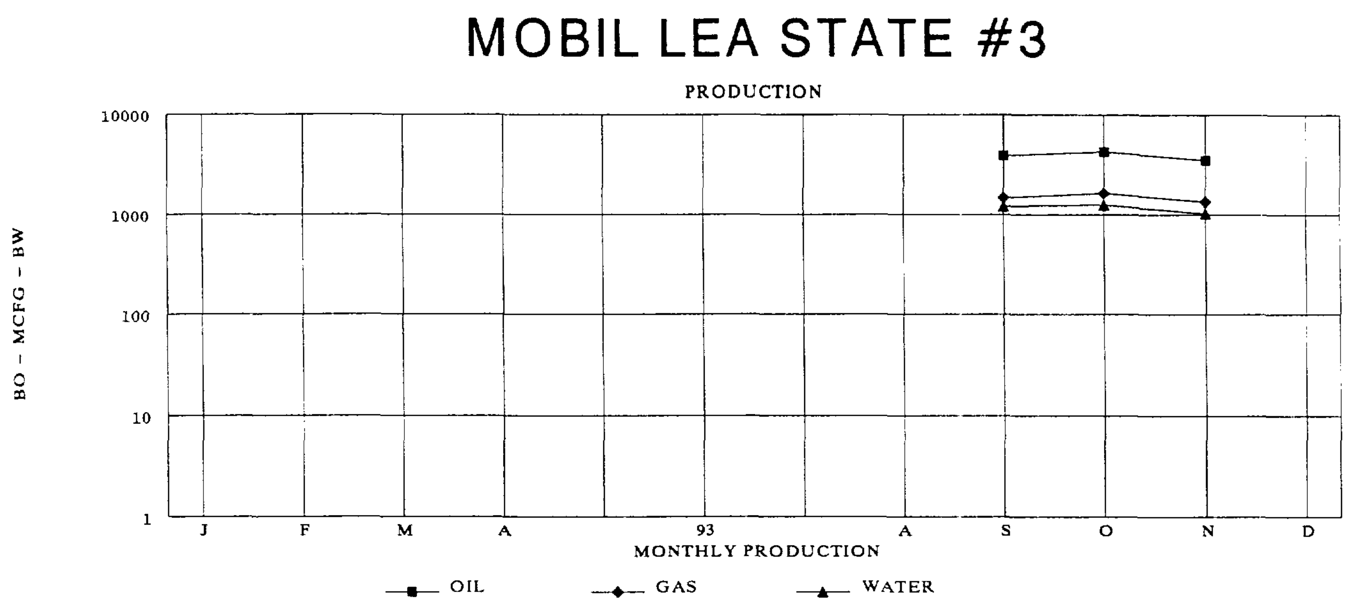
Lease: MOBIL LEA STATE 000002 Dwight's ENERGYDATA Inc. Retrieval Code: 150, 025, 20S34E02L00DL

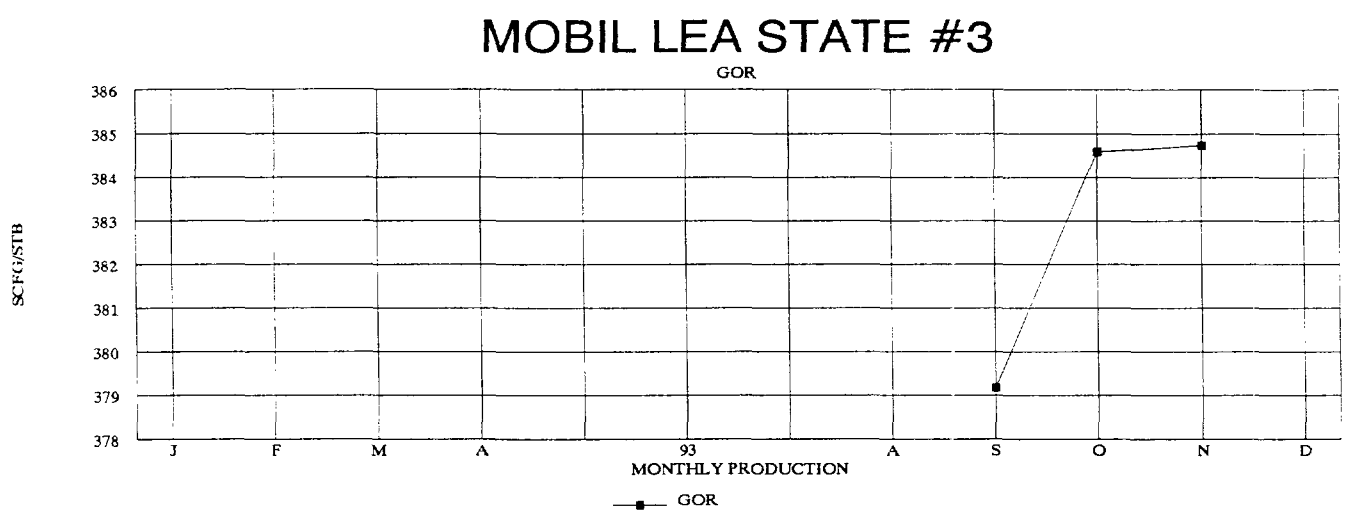


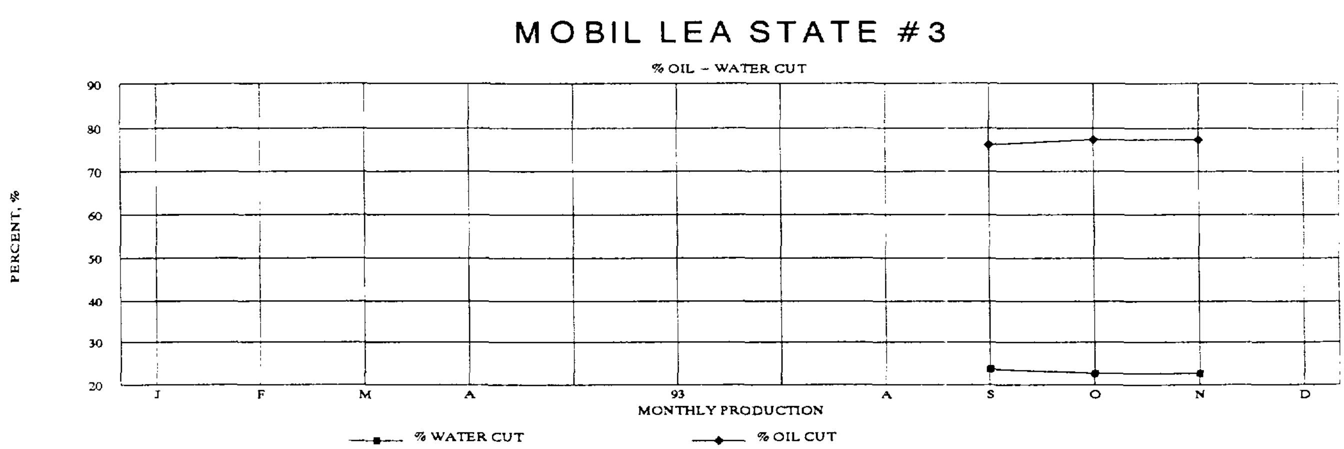
County: LEA State: NM
Field: LEA NE (DELAWARE) DL
Reservoir: DELAWARE
Operator: ARMSTRONG ENERGY CORP
Oil Cum 24662 Gas Cum 9246
Location: 2L 20S 34E

F P Date 04-93

Date 12-20-93







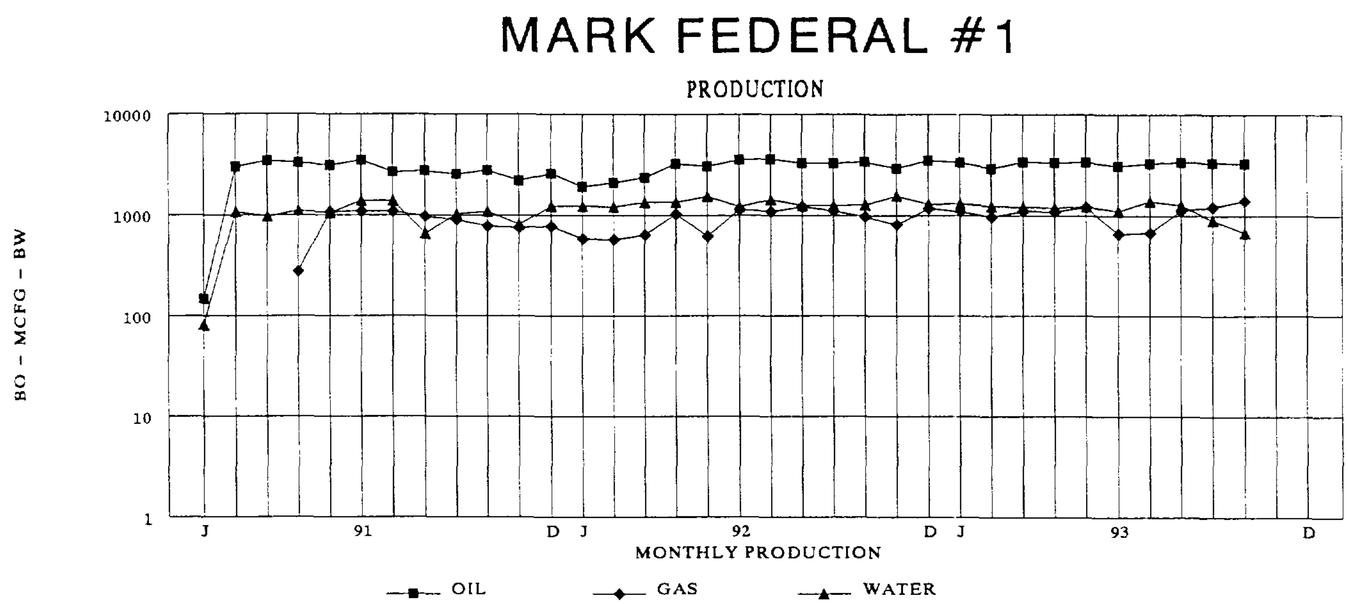
MOBIL LEA STATE #3

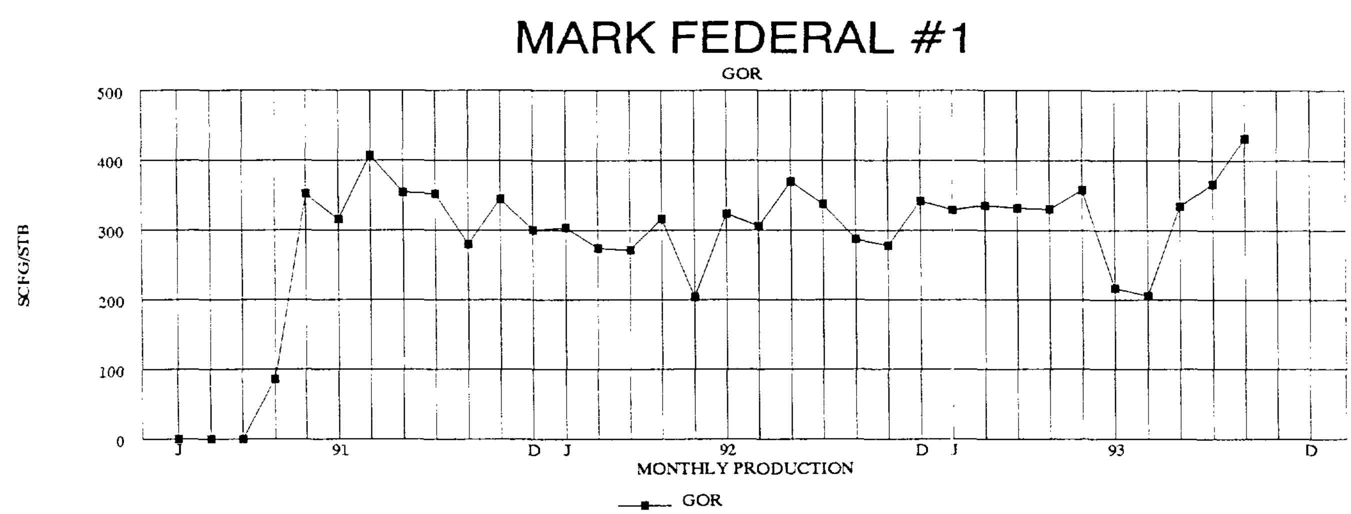
UNIT M SECTION 2-T20S-R34E

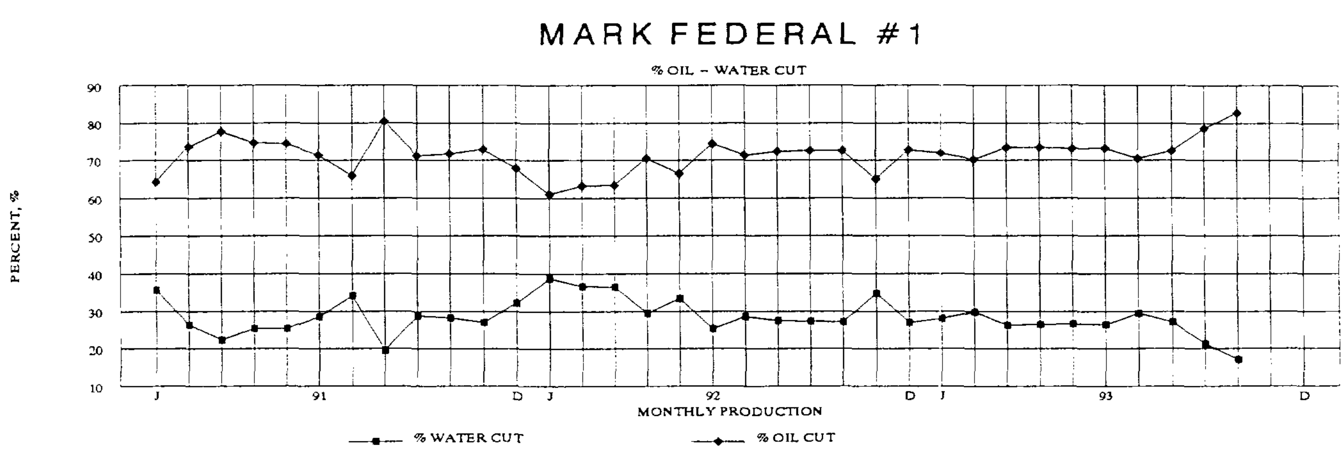
COMPLETED IN THIRD SAND, 5918' - 5946'.
FIRST SAND IS A POTENTIAL PAY.

CUM. PRODUCTION
11,512 BO
4,407 MCF
3,446 BW

EXHIBIT E-15







MARK FEDERAL #1

COMPLETED IN FIRST SAND, 5644' – 5664'.

UNIT M SECTION 3--T20S-R34E

<u>CUM. PRODUCTION</u>

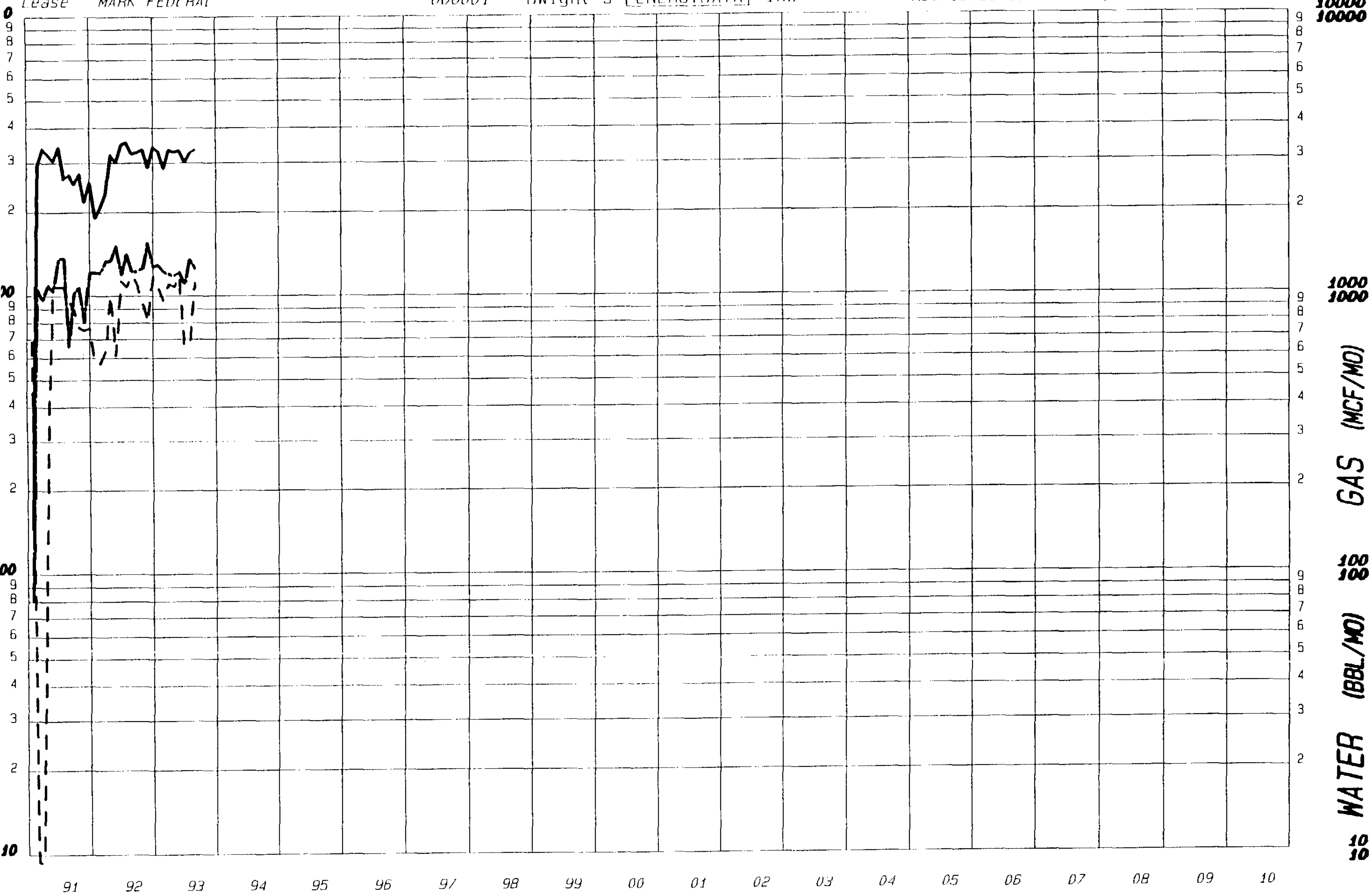
99,455 BO

28,972 MCF

38,944 BW

EXHIBIT **E-16**

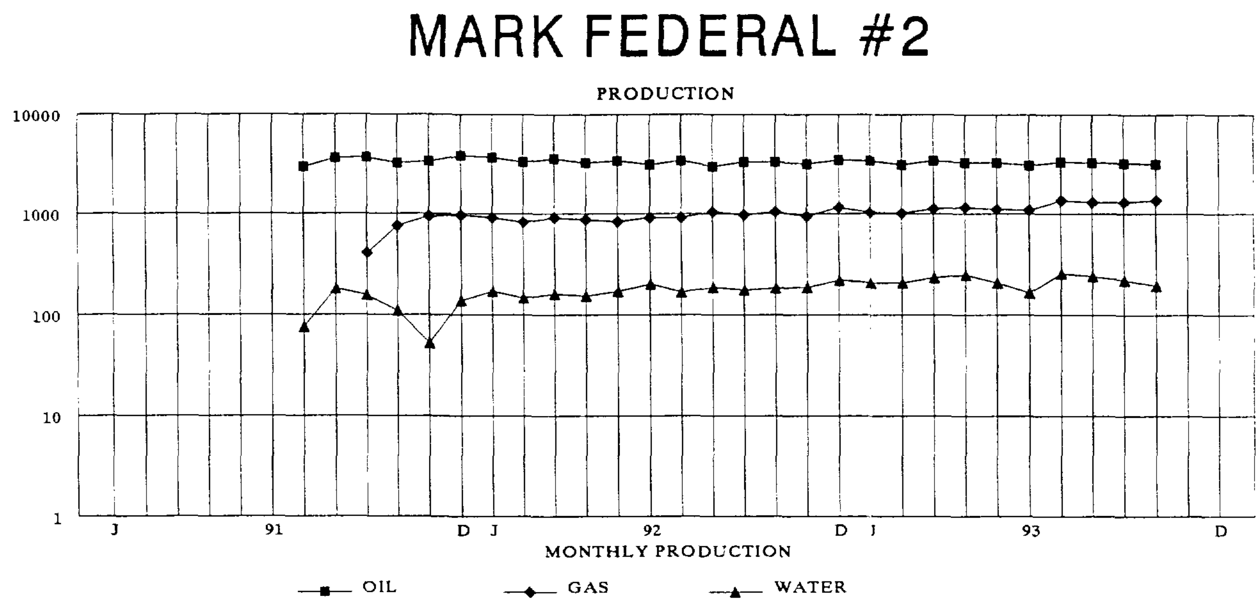
Lease: MARK FEDERAL 000001 Dwight's [ENERGYDATA] Inc Retrieval Code: 150, 025, 20S34E03M00DL

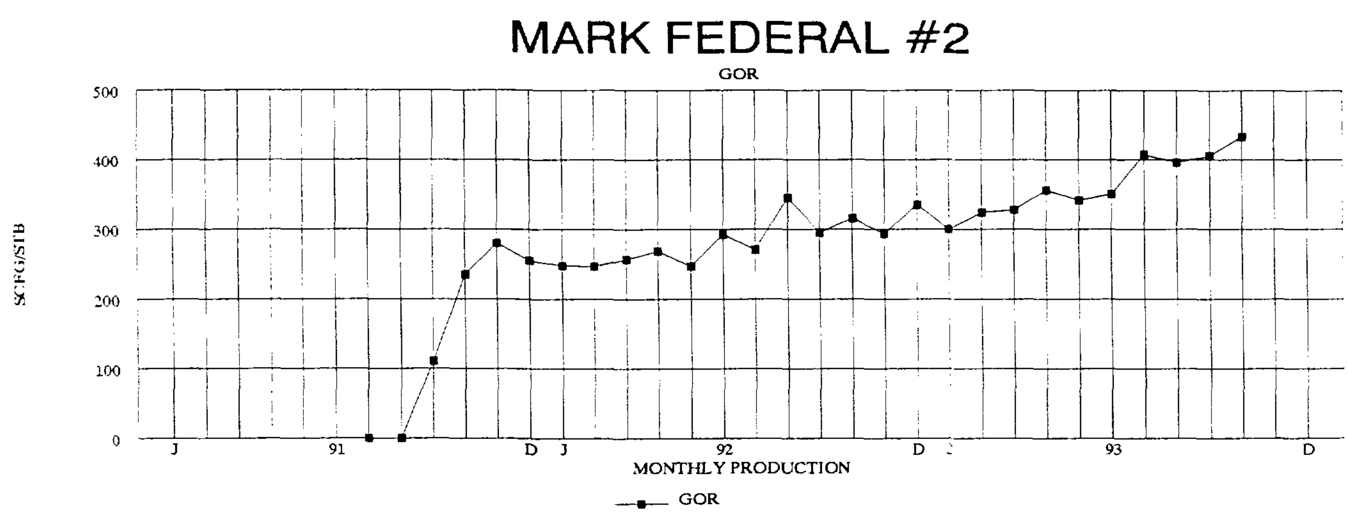


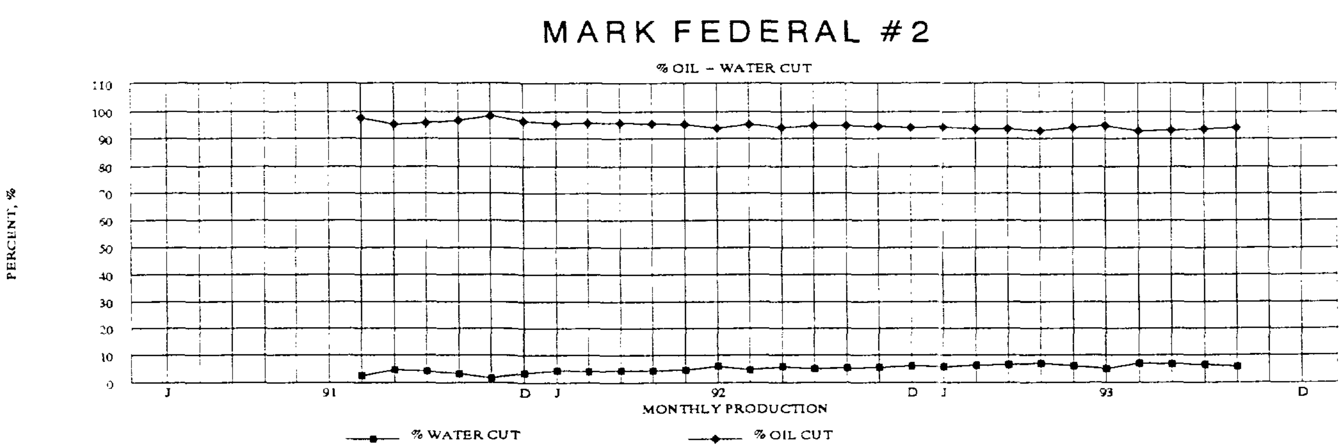
County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 92943 Gas Cum: 27062
Location: 3M 20S 34E

F P Date 01 91

Date: 12-20-93







MARK FEDERAL #2

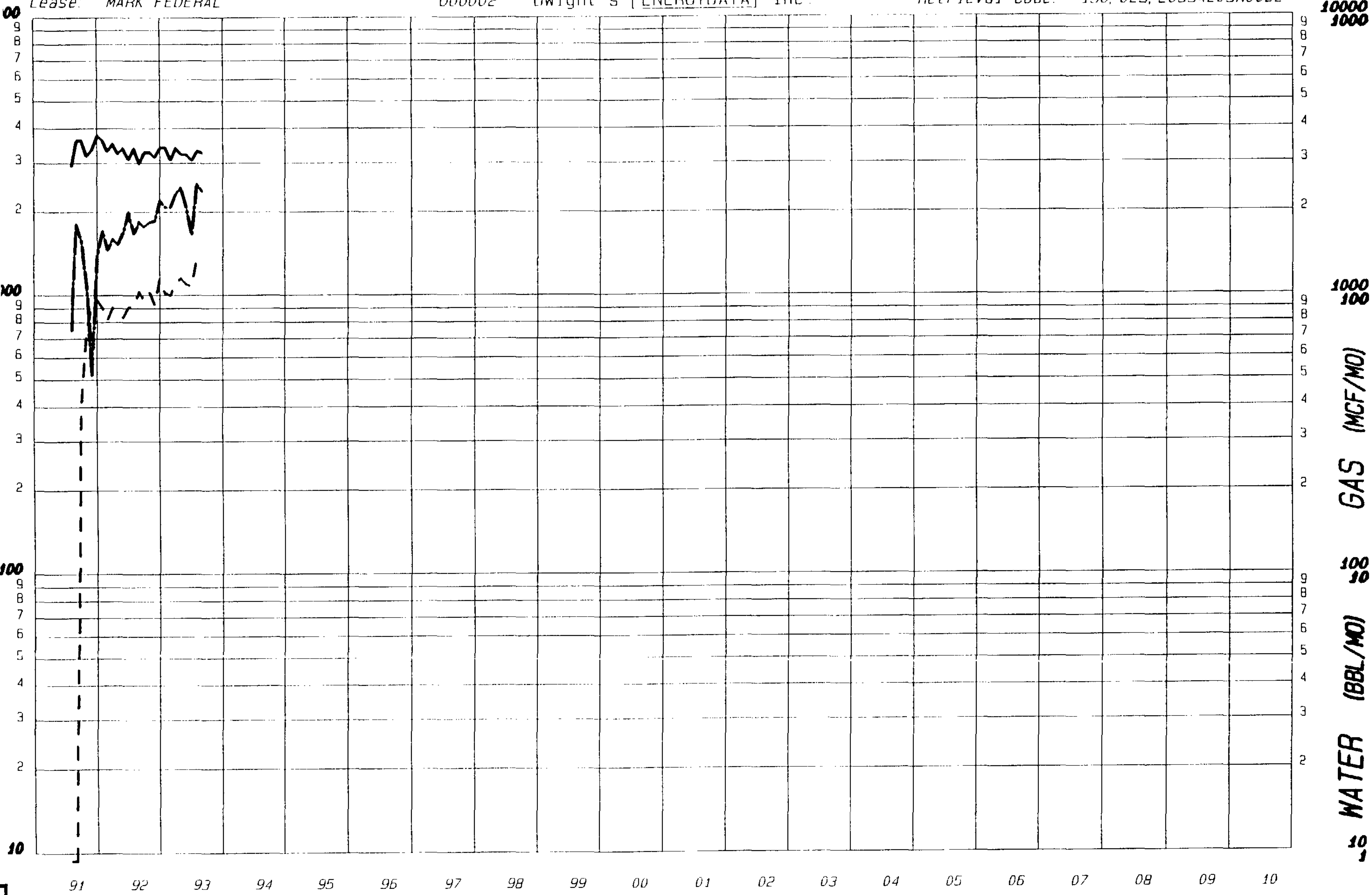
UNIT N SECTION 3-T20S-R34E

COMPLETED IN FIRST SAND, 5610' - 5640'.

CUM. PRODUCTION
92,440 BO
26,077 MCF
5,002 BW

EXHIBIT **E-18**

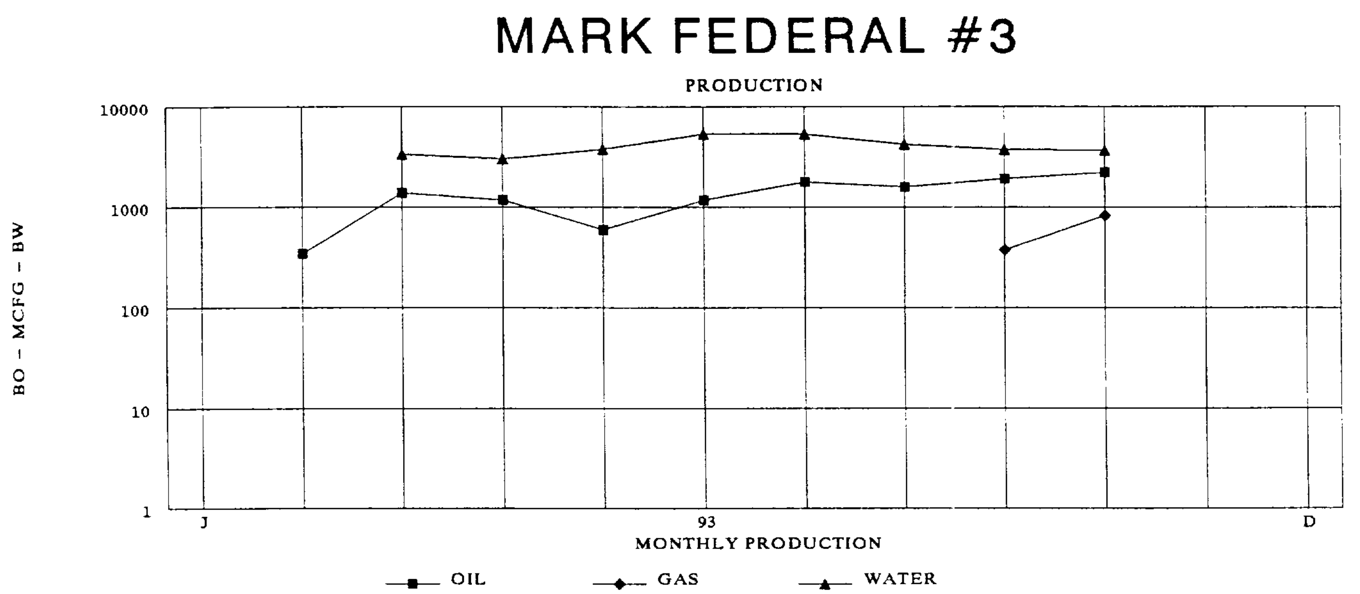
Lease: MARK FEDERAL 000002 Dwight's ENERGYDATA Inc. Retrieval Code: 150, 025, 20S34E03N00DL

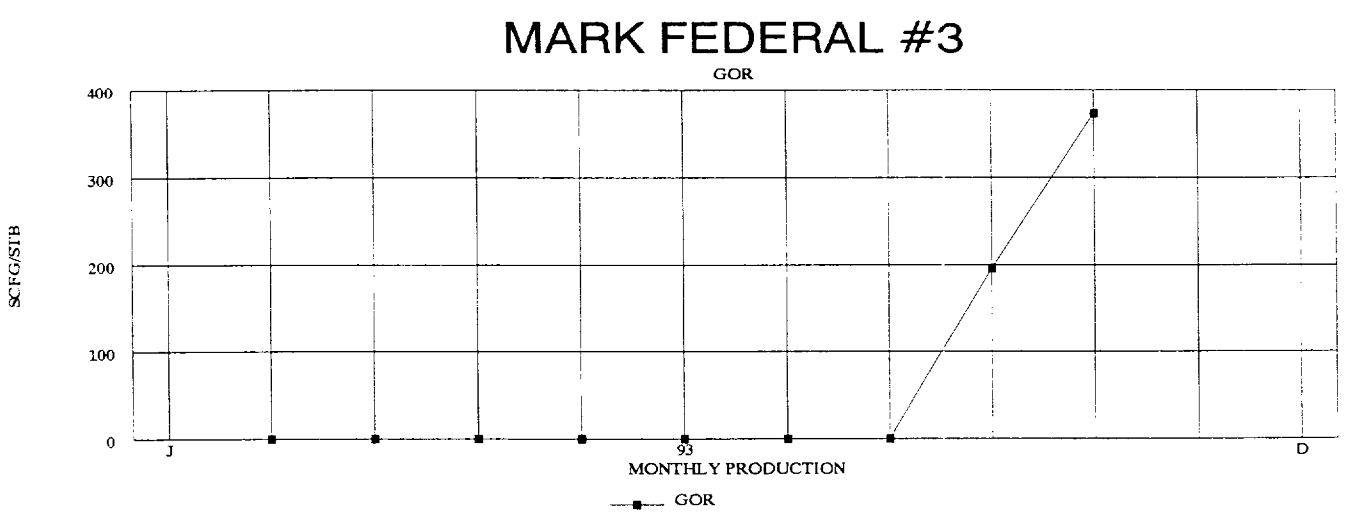


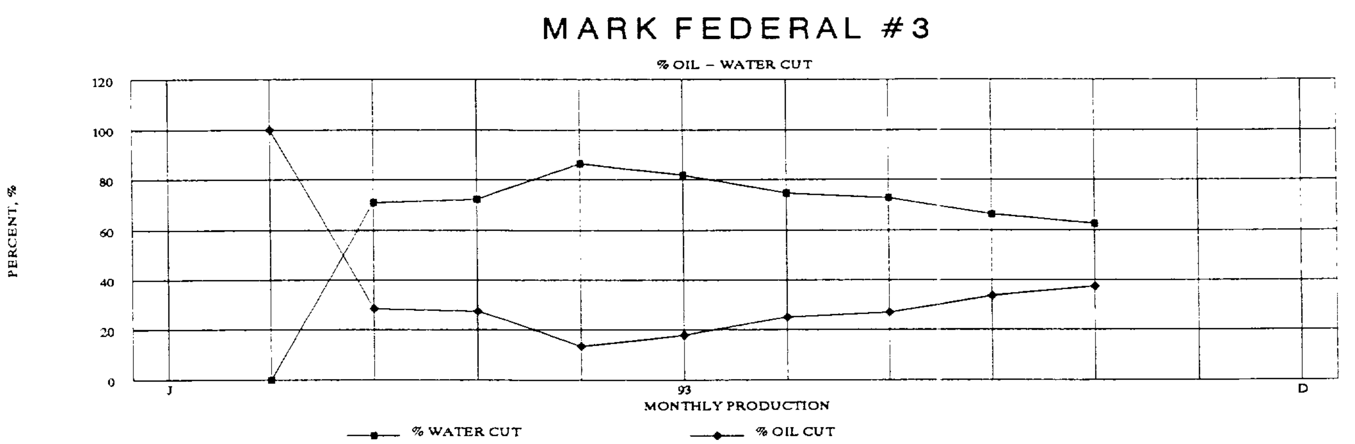
County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 86106 Gas Cum: 23419
Location: 3N 20S 34E

F P Date 07-91

Date: 12-20-93







MARK FEDERAL #3

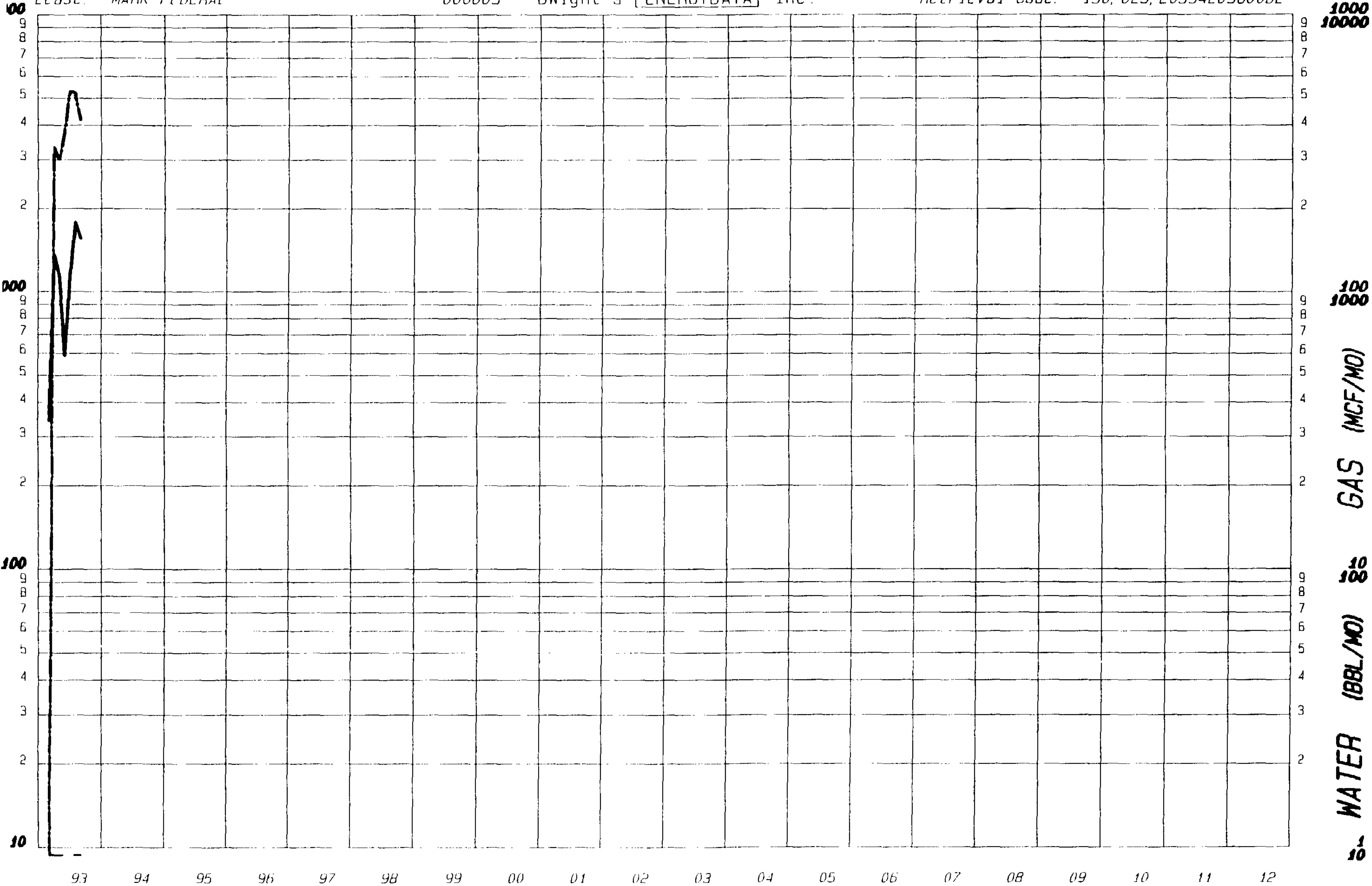
COMPLETED IN FIRST SAND, 5628' - 5680' & 5534' - 5546'.

UNIT O SECTION 3-T20S-R34E

CUM. PRODUCTION
12,041 BO
1,192 MCF
32,191 BW

EXHIBIT E-20

Lease: MARK FEDERAL 000003 Dwight's ENERGYDATA Inc. Retrieval Code: 150, 025, 20S34E03000DL



County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DI
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 2963 Gas Cum: 0
Location: 30 20S 34E

F P Date 02 93

Date 12 20 93

RIG RELEASED 10-8-93

THIRD SAND WAS "TITE".
SECOND SAND, 5814' – 5836', TESTED WET, 100 BWPD, NO SHOW
SECOND SAND, 5720' – 5724', SWAB TESTED WATER.
FIRST SAND, 5650' – 5670', 11-26-93 31 BO, 0 MCF, 84 BLW, 74 BNW, 24 HRS

MARK FEDERAL #5

UNIT K SECTION 3-T20S-R34E

COMPLETED IN FIRST SAND, 5650' – 5670'

CUM. PRODUCTION
0 BO
0 MCF
0 BW

EXHIBIT E-23

RIG RELEASED 10-25-93

FIRST SAND, 5652' – 5674', 11-14-93 123 BO, 0 MCF, 66 BW, 24 HRS

MARK FEDERAL #6

UNIT L SECTION 3-T20S-R34E

COMPLETED IN FIRST SAND, 5652' – 5674'

CUM. PRODUCTION

0 BO

0 MCF

0 BW

EXHIBIT E-24

RIG RELEASED 9-19-93

FOURTH SAND, 6030' – 6038', ACIDIZED, NO SHOW.
THIRD SAND, 5910' – 5986', 10-30-93, 8 BO, 0 MCFG, 240 BW, 24 HRS.
SECOND SAND, 5698' – 5727', 12-1-93, 1 BO, 0 MCFG,
100 BW, 24 HRS, SQUEEZED.
FIRST SAND, 5548' – 5572', 12-8-93, TESTING.

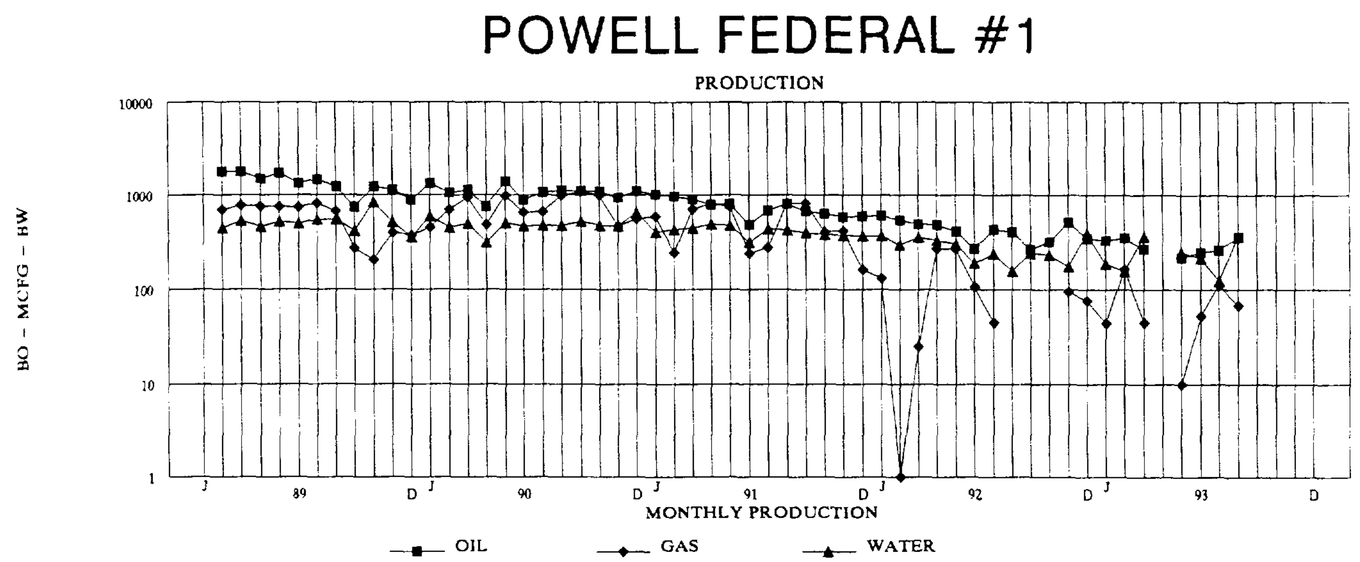
MARK FEDERAL #8

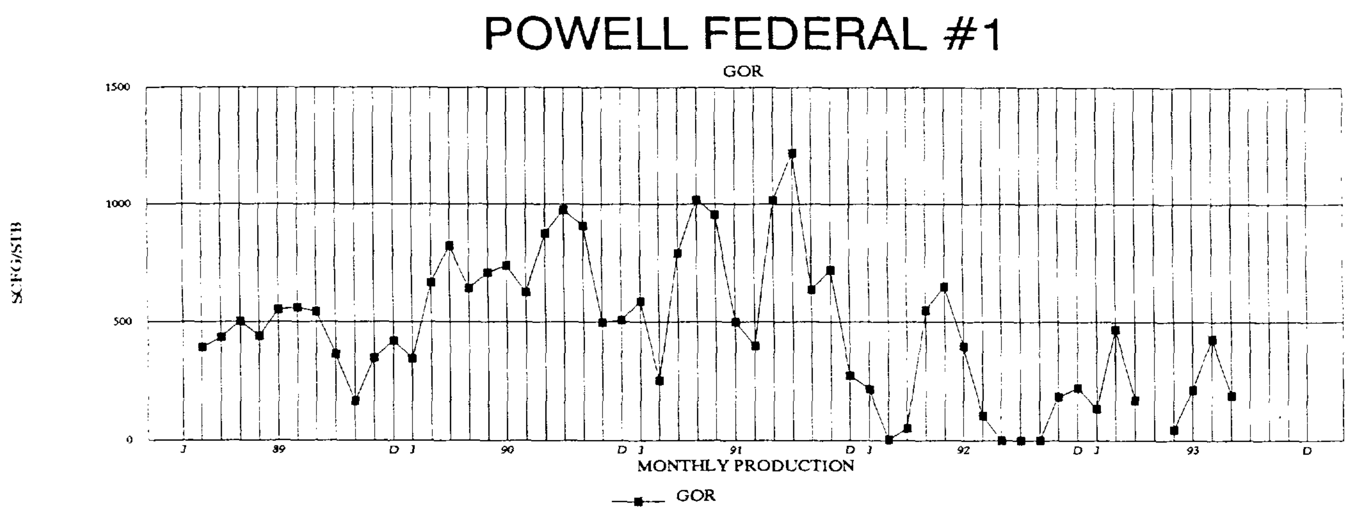
UNIT I SECTION 3-T20S-R34E

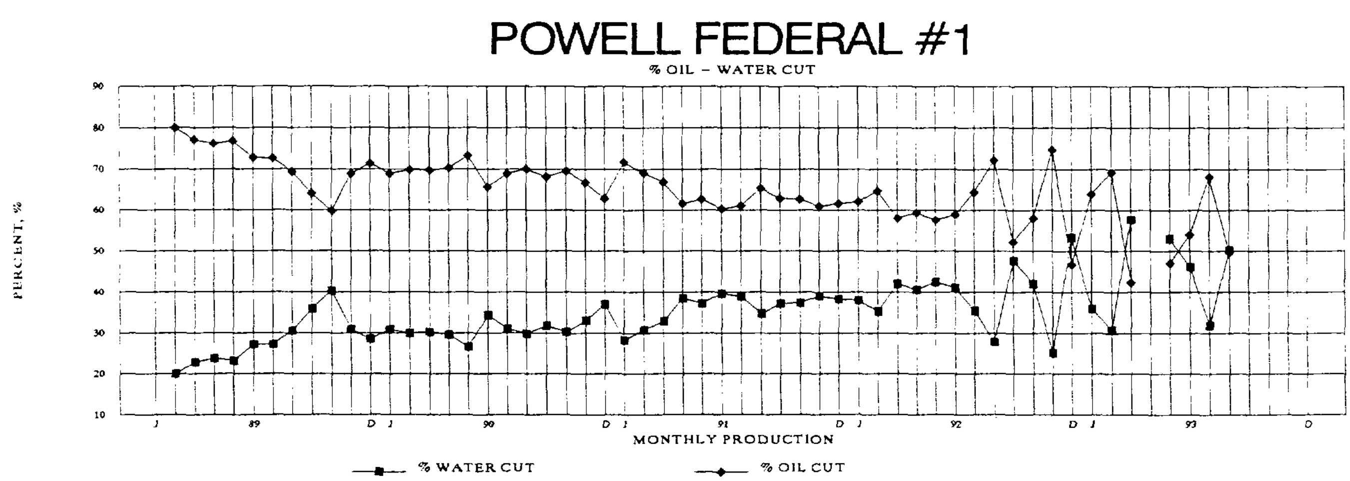
TESTING FIRST SAND, 5548' – 5572'

CUM. PRODUCTION
0 BO
0 MCF
0 BW

EXHIBIT E-25







POWELL FEDERAL #1

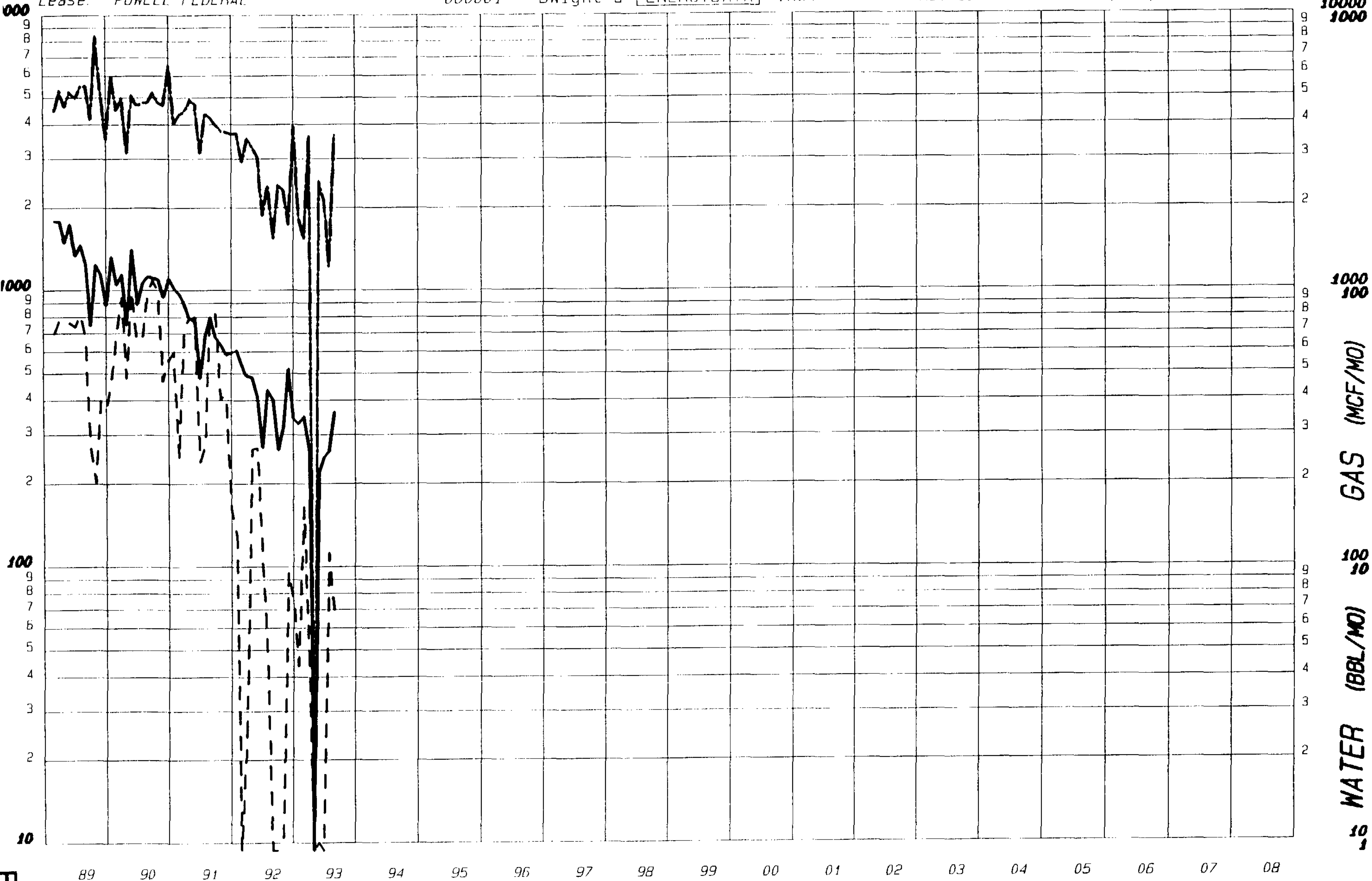
UNIT P SECTION 4-T20S-R34E

COMPLETED IN FIRST SAND, 5658' - 5674'.

CUM. PRODUCTION
43,932 BO
23,215 MCF
21,468 BW

EXHIBIT E-26

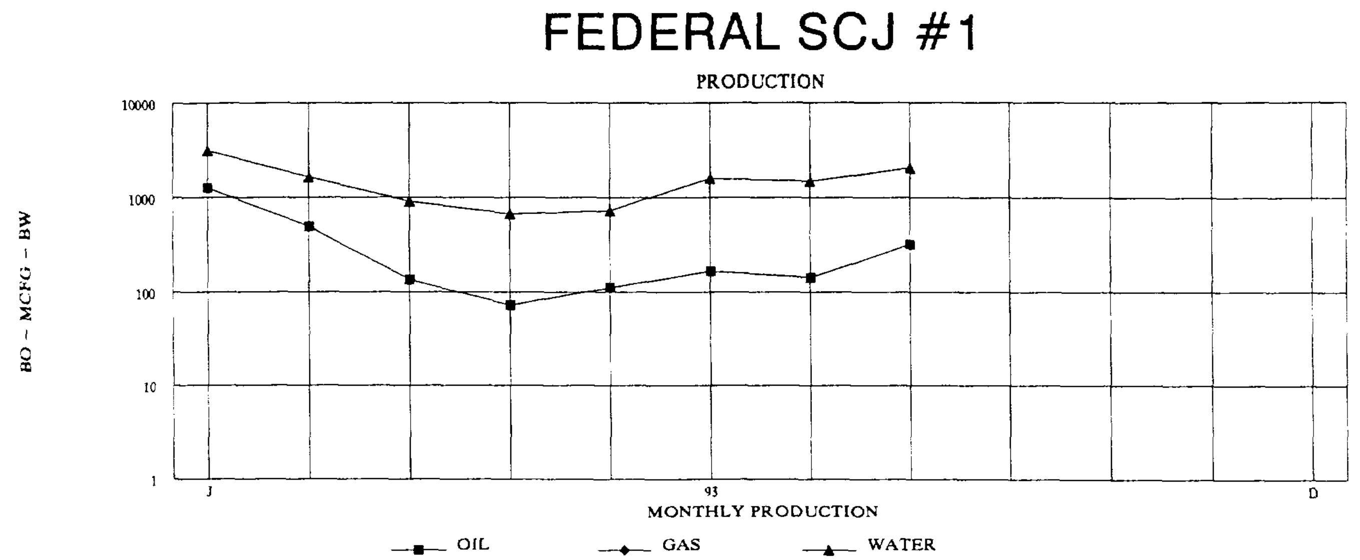
Lease: POWELL FEDERAL 000001 Dwight's ENERGYDATA Inc. Retrieval Code: 150, 025, 20S34E04P00DL

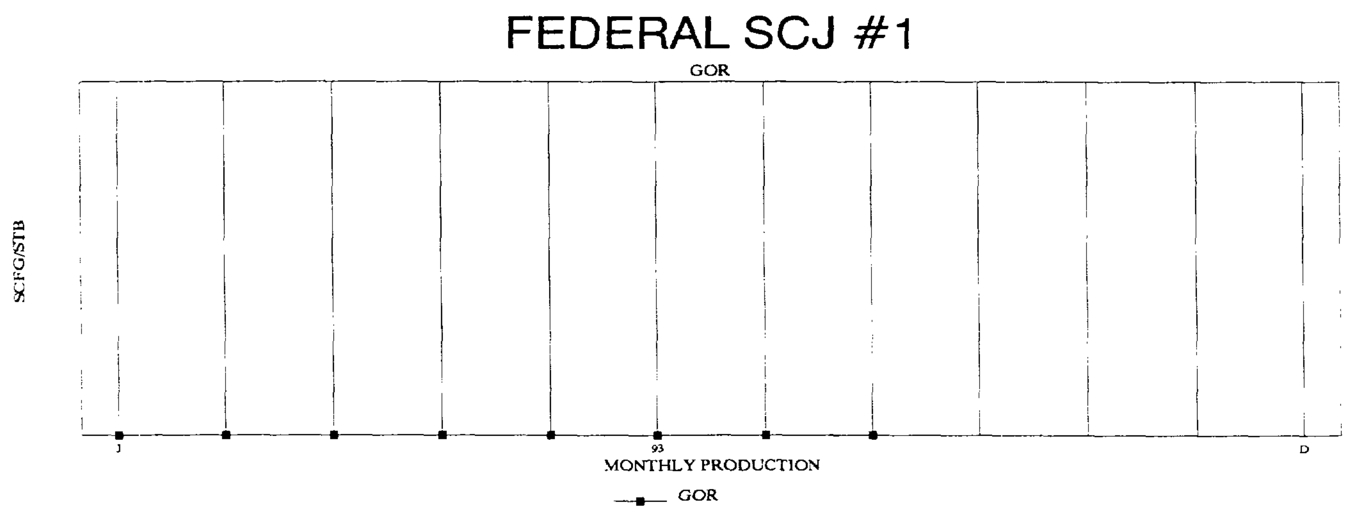


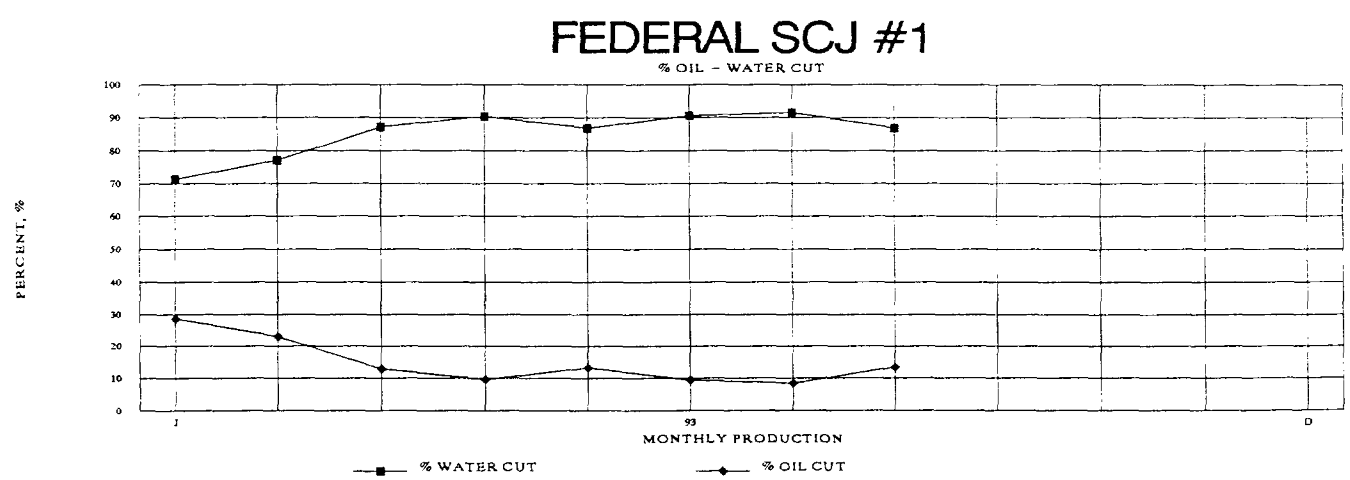
County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: SNOW OIL & GAS INC
Oil Cum: 43932 Gas Cum: 23164
Location: 4P 20S 34E

F P. Date 02-89

Date: 12-20-93







FEDERAL SCJ #1

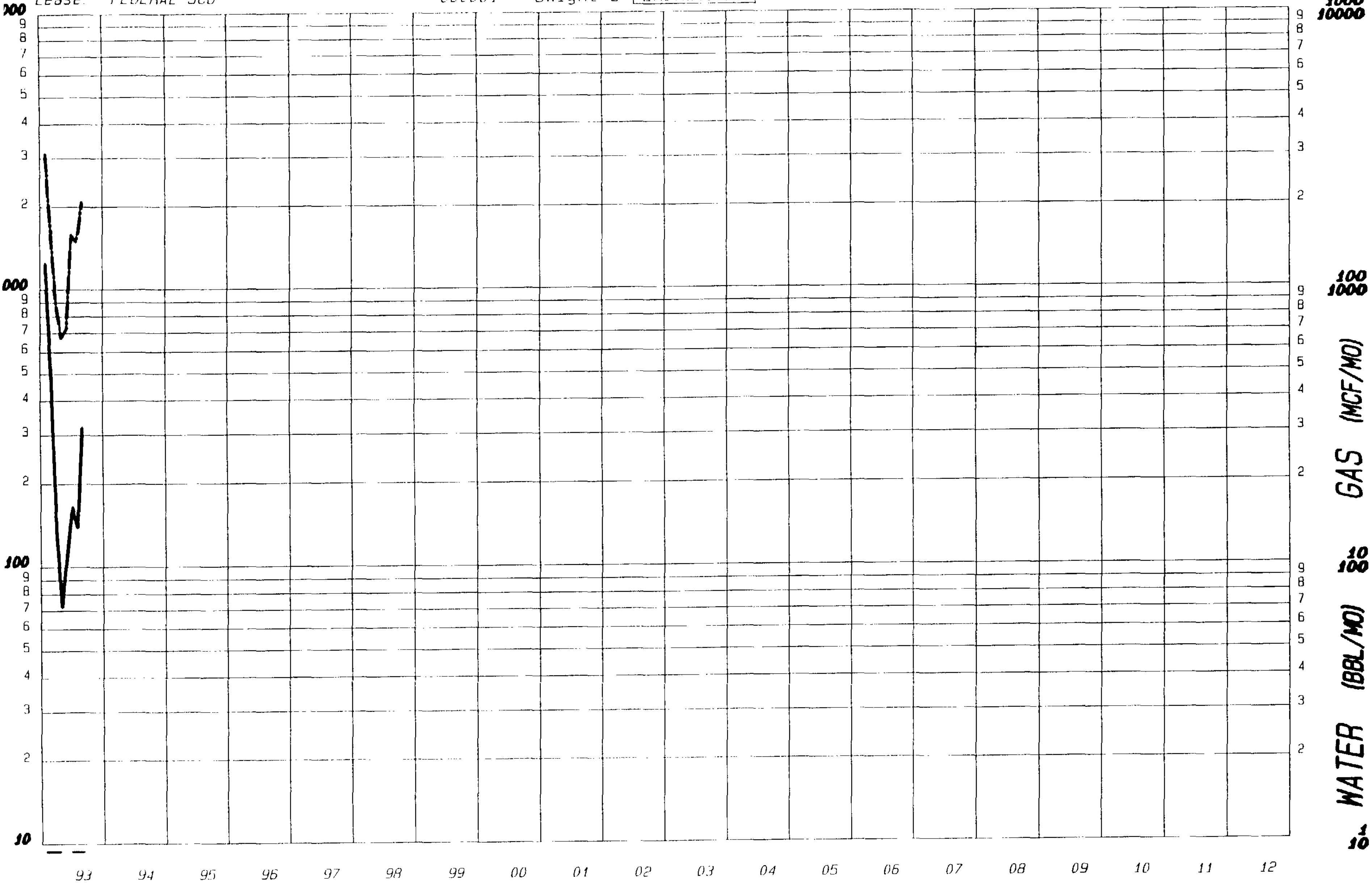
UNIT A SECTION 9-T20S-R34E

COMPLETED IN FIRST SAND, 5662' - 5682'
& FOURTH SAND, 6075' - 6100'.

CUM. PRODUCTION
2,676 BO
0 MCF
12,230 BW

EXHIBIT E-28

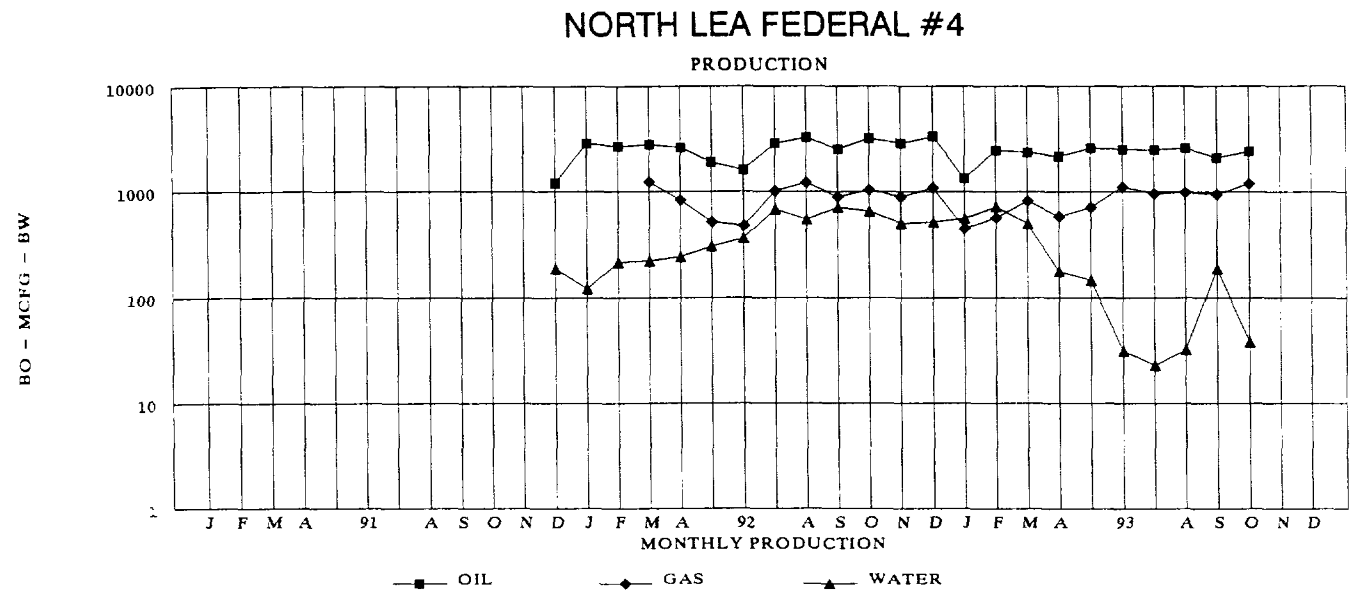
Lease: FEDERAL SCJ 000001 Dwight's ENERGYDATA Inc. Retrieval Code: 150, 025, 20S34E09A00DL

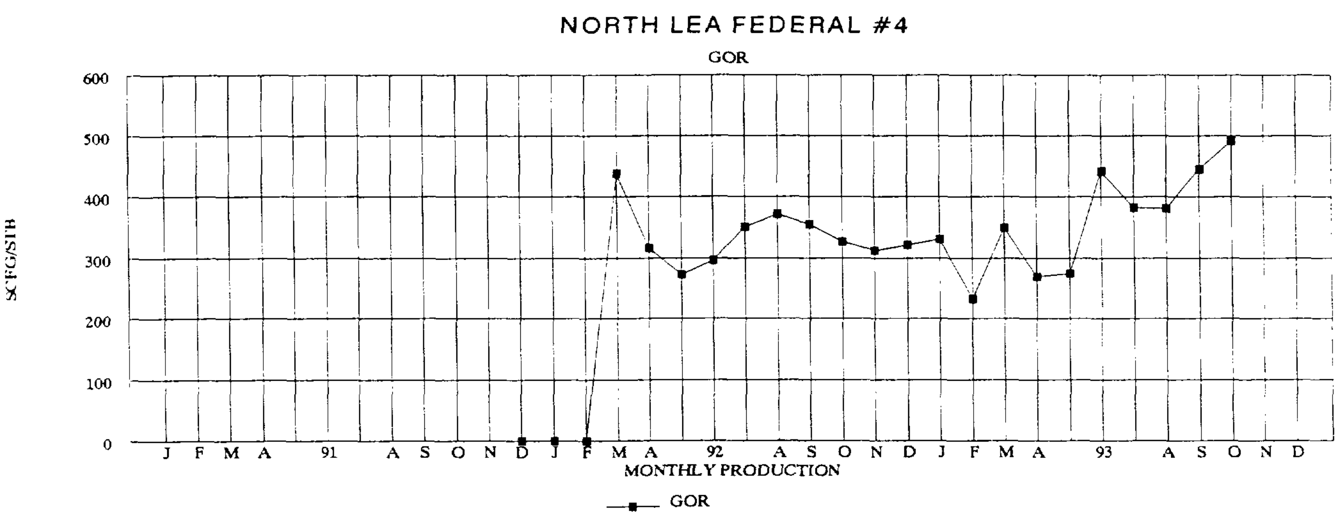


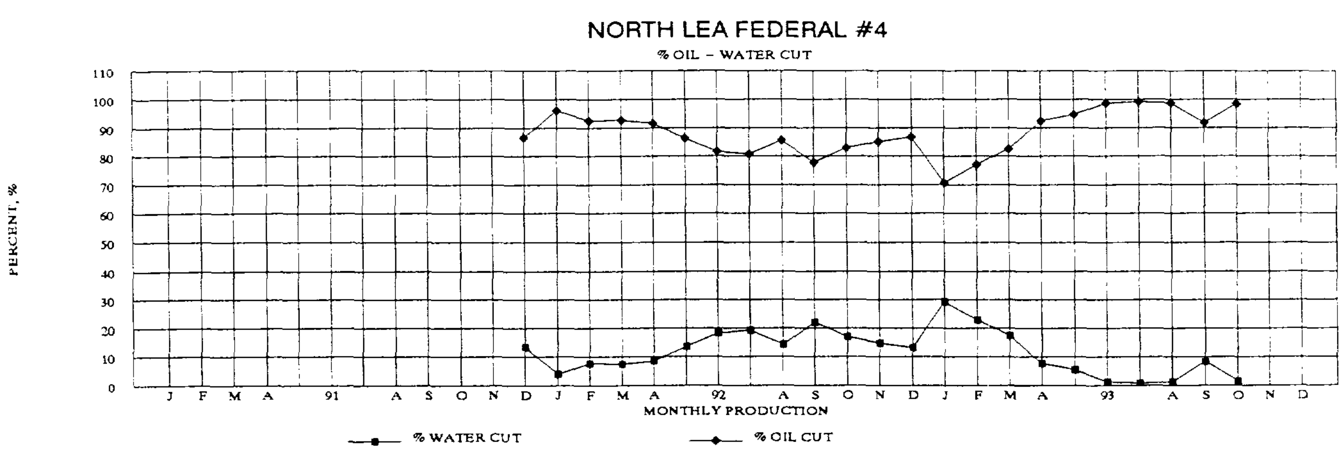
County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) OL
Reservoir: DELAWARE
Operator: SNOW OIL & GAS INC
Oil Cum: 2676 Gas Cum: 0
Location: 9A 20S 34E

F P Date 01-93

Date: 12-20-93







NORTH LEA FEDERAL #4

UNIT D SECTION 10-T20S-R34E

COMPLETED IN FIRST SAND 5618' - 5651'.

1-21-93 CASING LEAK 4059' - 4090', SQUEEZED.

EXHIBIT E-30

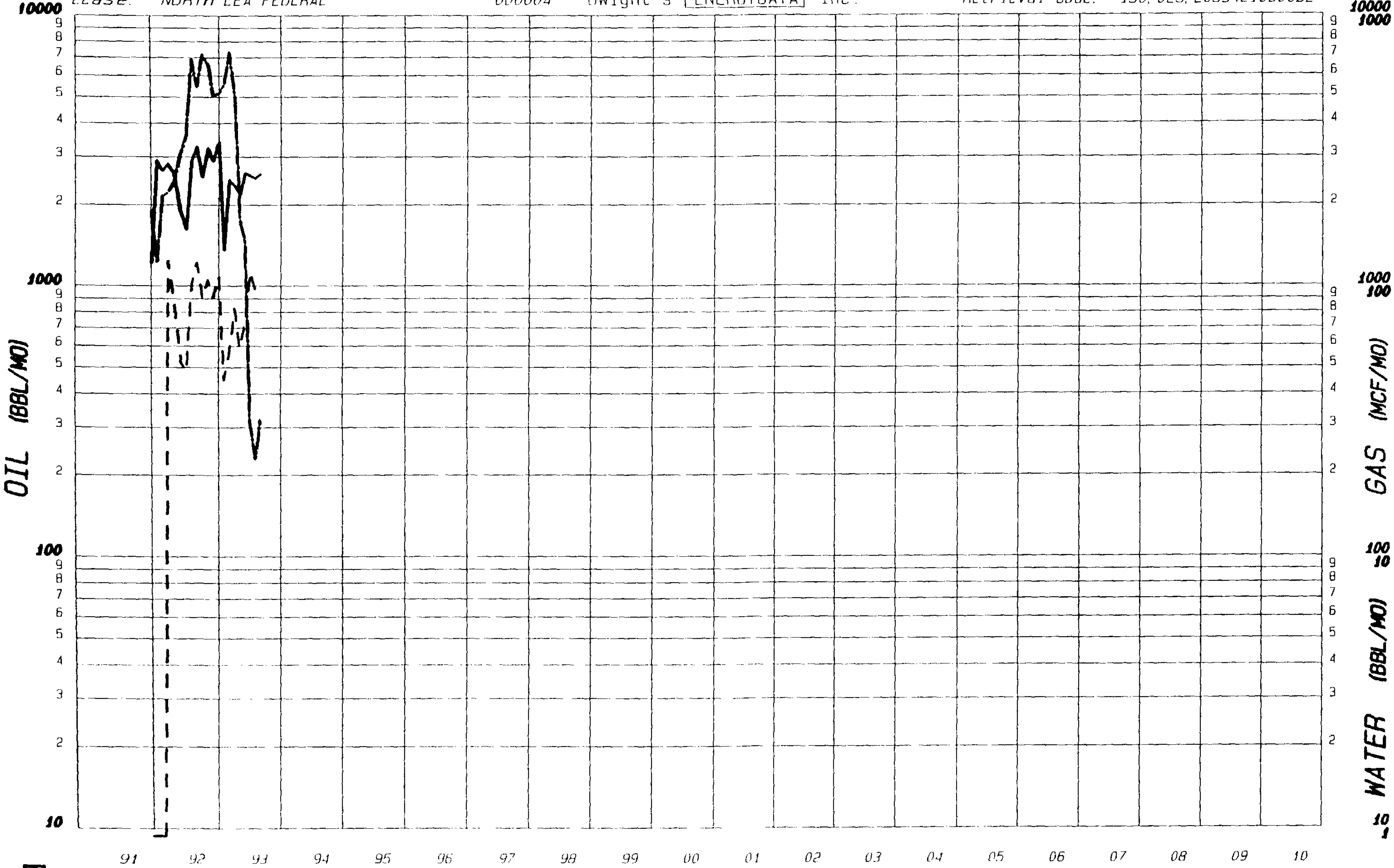
CUM. PRODUCTION

57,349 BO

17,694 MCF

7,729 BW

Lease: NORTH LEA FEDERAL 000004 Dwight's ENERGYDATA Inc. Retrieval Code: 150, 025, 20S34E10D00DL

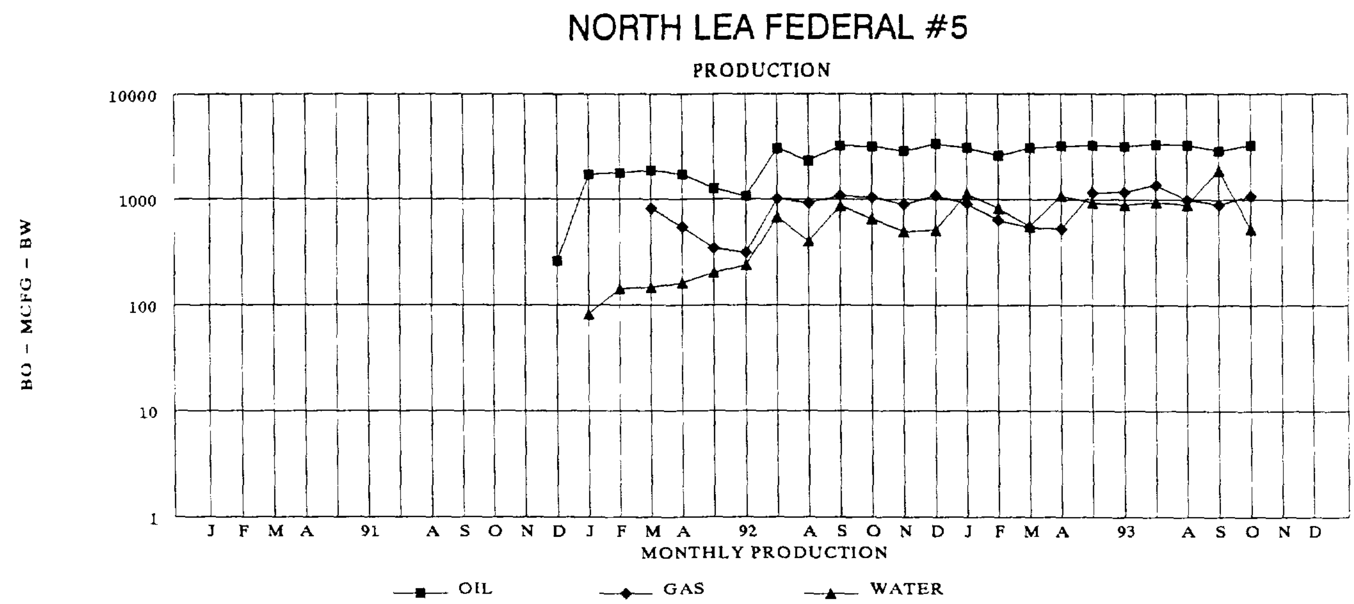


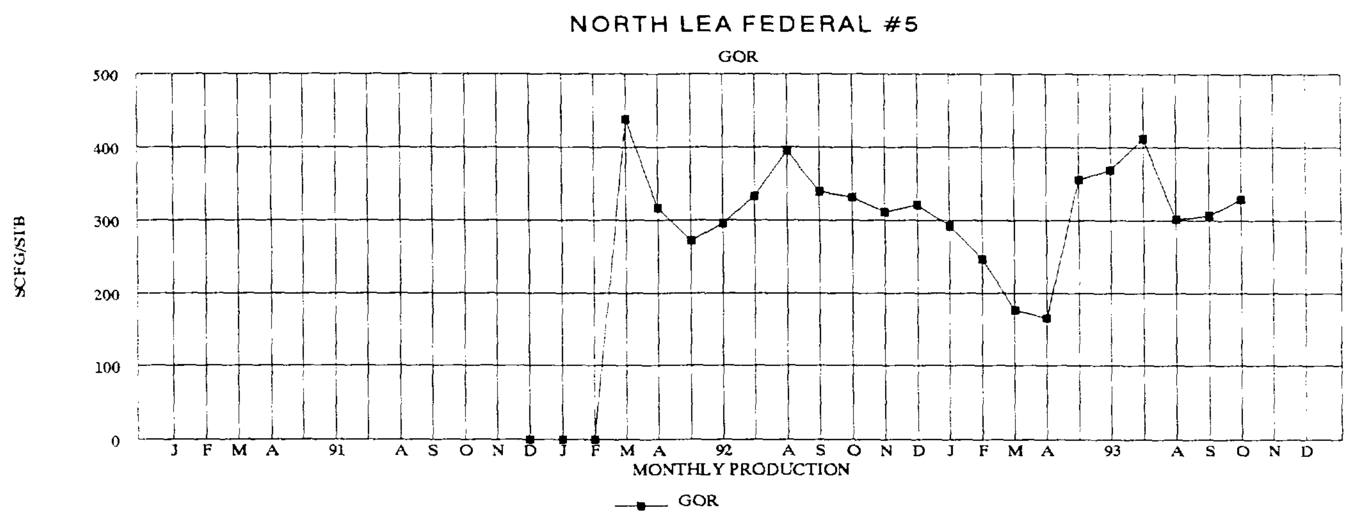
E-31

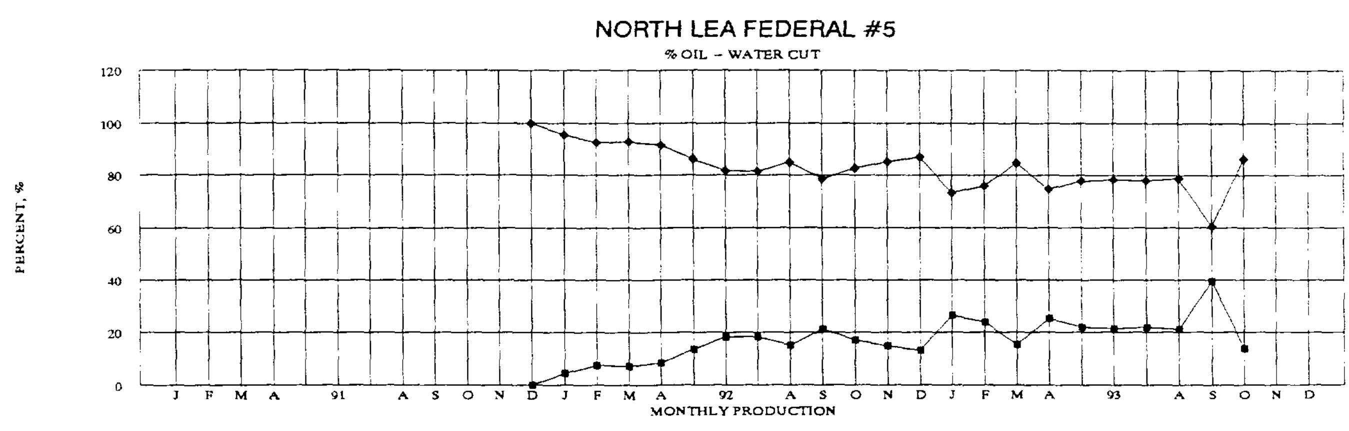
County: LEA State NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum 52751 Gas Cum 15533
Location 10D 20S 34E

F P Date 12-91

Date: 12-20-93







NORTH LEA FEDERAL #5 UNIT C SECTION 10-T20S-R34E

COMPLETED IN FORTH SAND, 6058' - 6078'.

COMPLETED IN THIRD SAND, LIME EQUIVALENT, 5910' - 5925'.

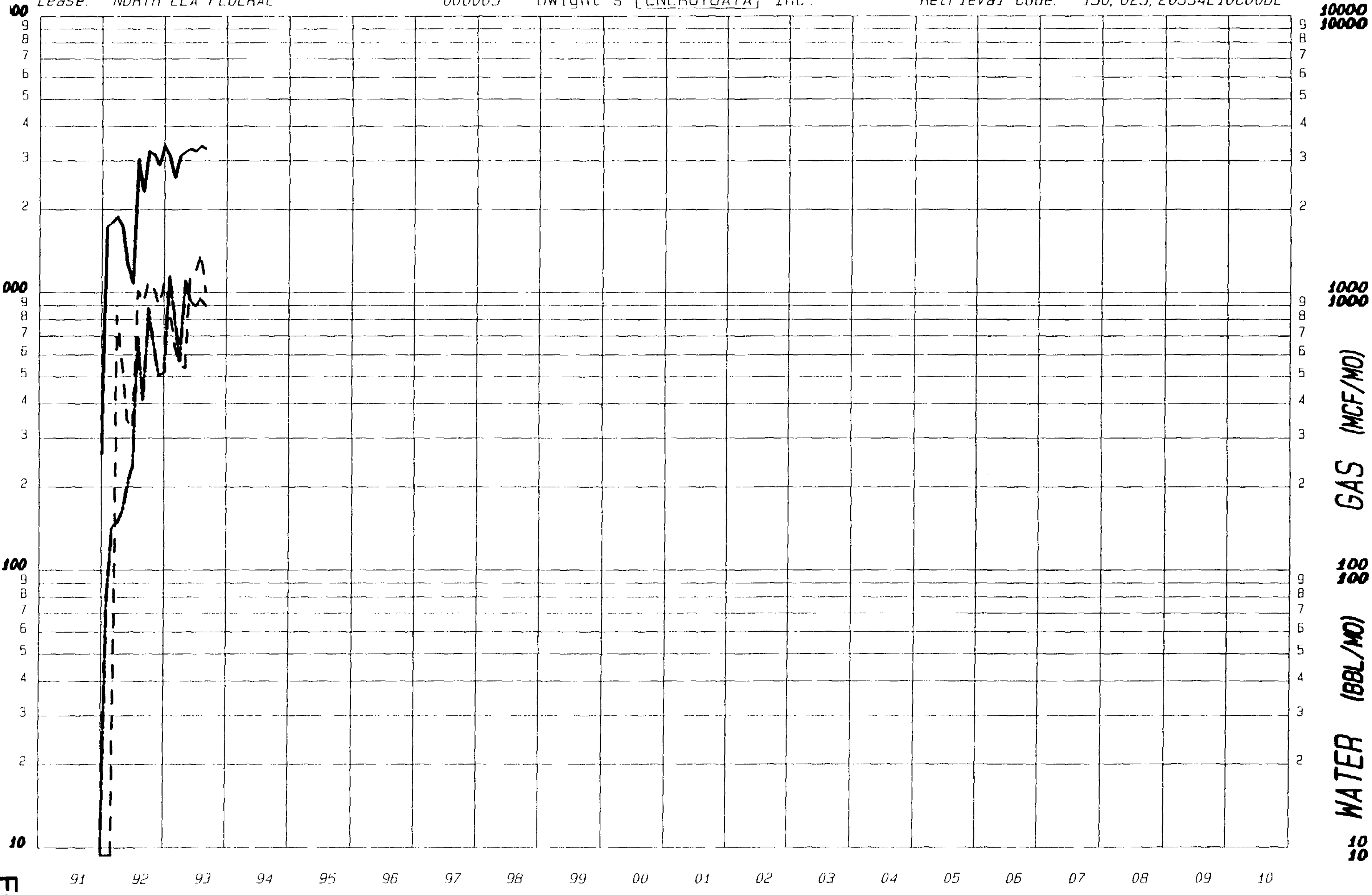
COMPLETED IN FIRST SAND, 5636' - 5668'.

CASING LEAKS 4393'-4248' & 3892'-4029'.

CUM. PRODUCTION
59,494 BO
17,577 MCF
14,429 BW

EXHIBIT E-32

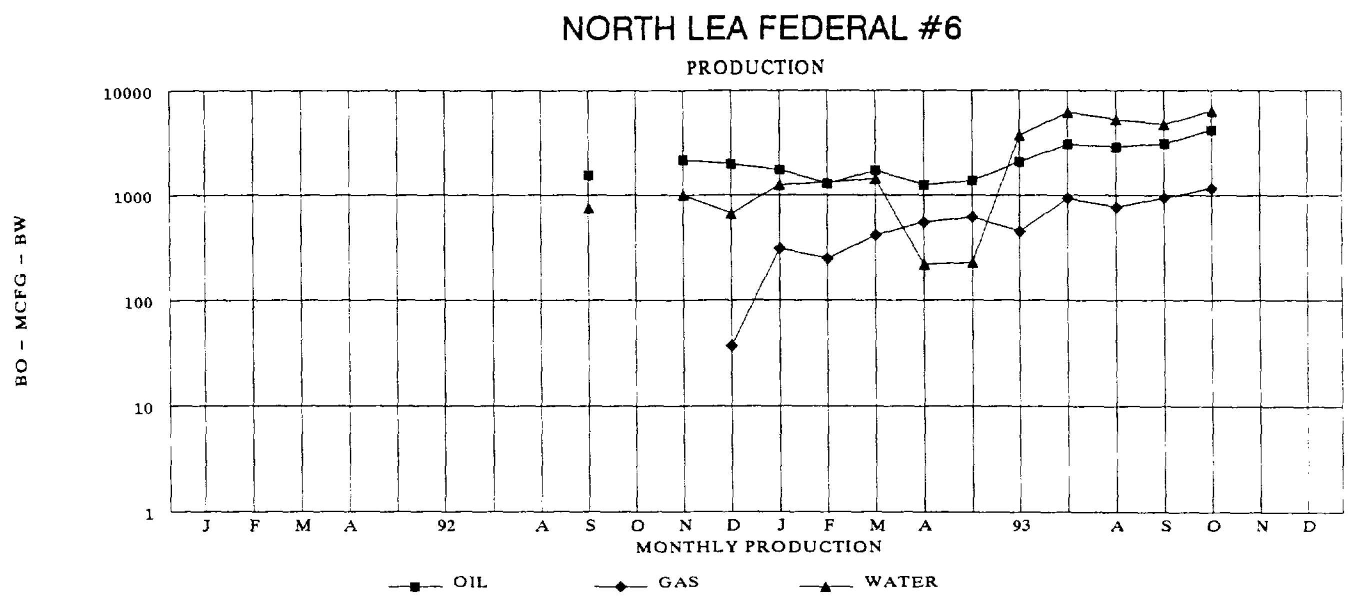
Lease: NORTH LEA FEDERAL 000005 Dwight's ENERGYDATA Inc. Retrieval Code: 150, 025, 20S34E10C00DL

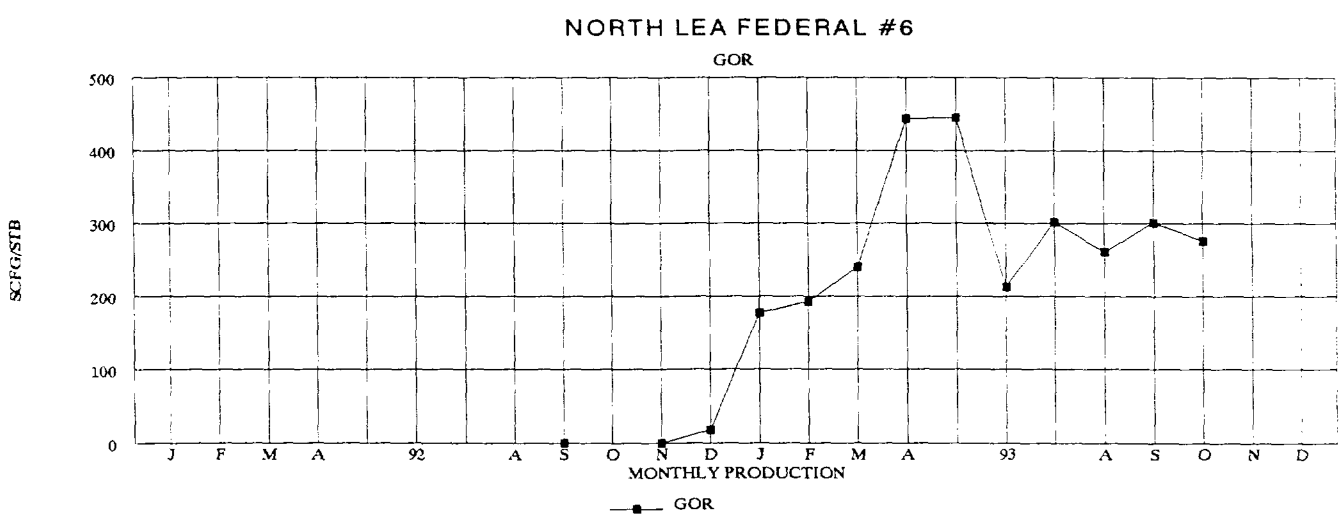


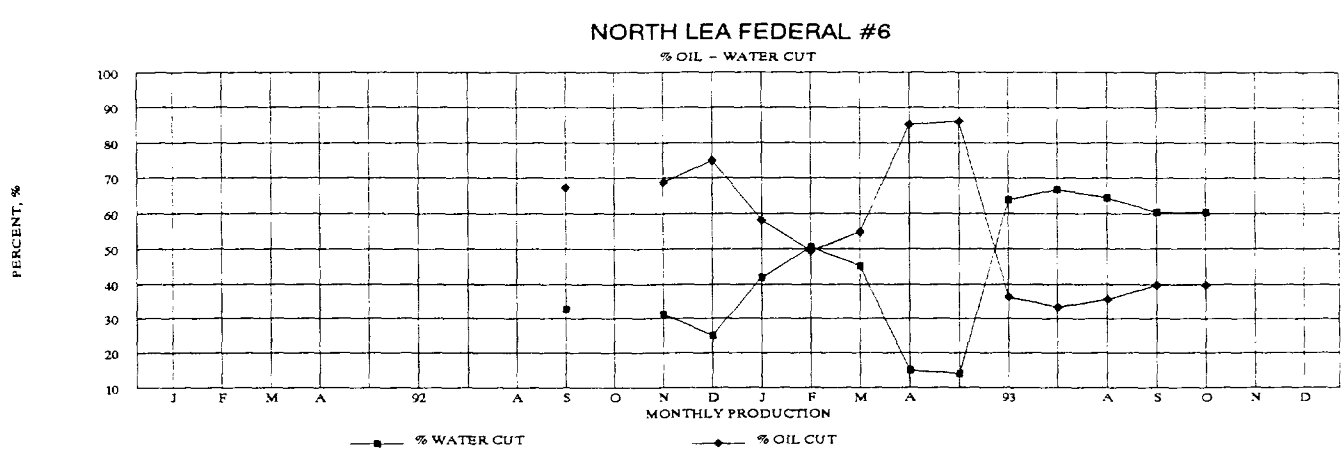
County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 53232 Gas Cum: 15580
Location: 10C 20S 34E

F P Date 12-91

Date: 12-20-93







NORTH LEA FEDERAL #6

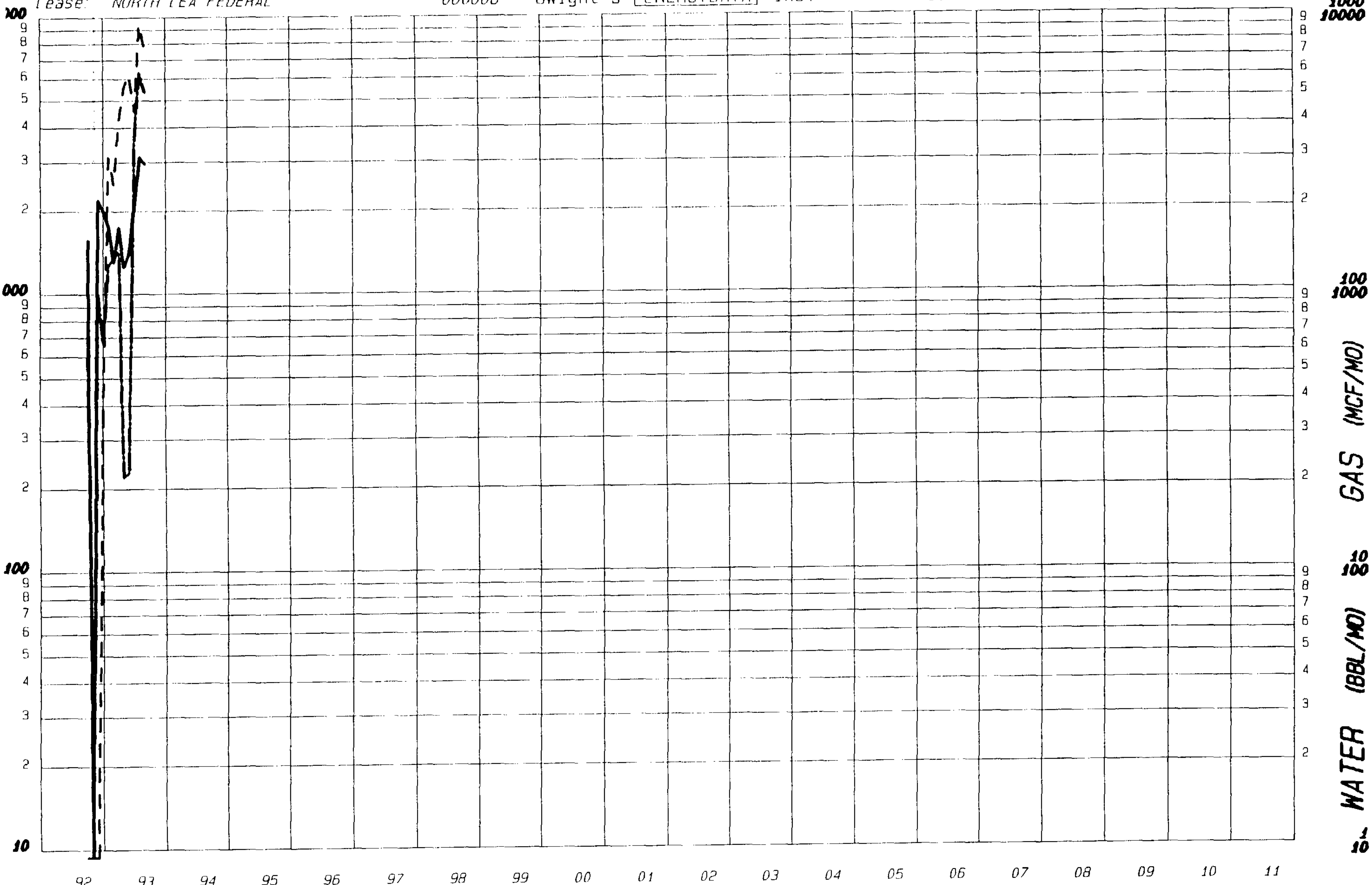
UNIT B SECTION 10-T20S-R34E

COMPLETED IN THIRD SAND, 5900' - 5920'.
COMPLETED IN FIRST SAND, 5602' - 5656'.
COMPLETED IN FIRST SAND, 5514' - 5548'.

<u>CUM. PRODUCTION</u>
28,882 BO
6,502 MCF
33,595 BW

EXHIBIT E-34

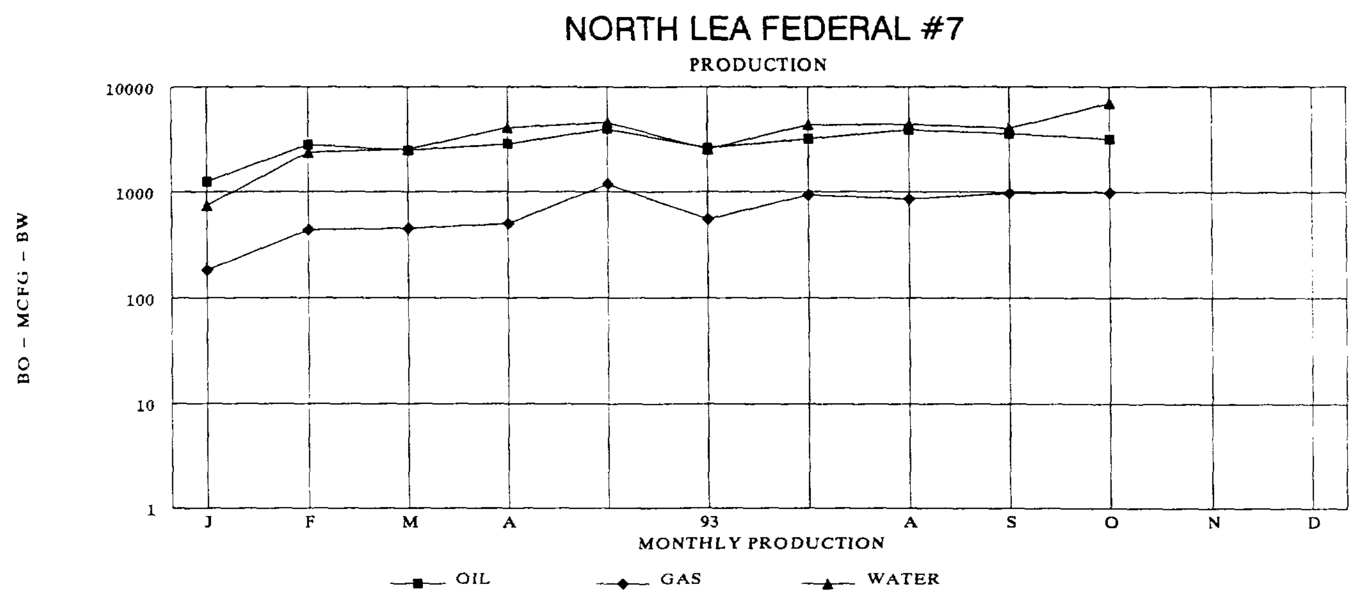
Lease: NORTH LEA FEDERAL   000006   Dwight's ENERGYDATA Inc.   Retrieval Code: 150, 025, 20S34E10B00DL

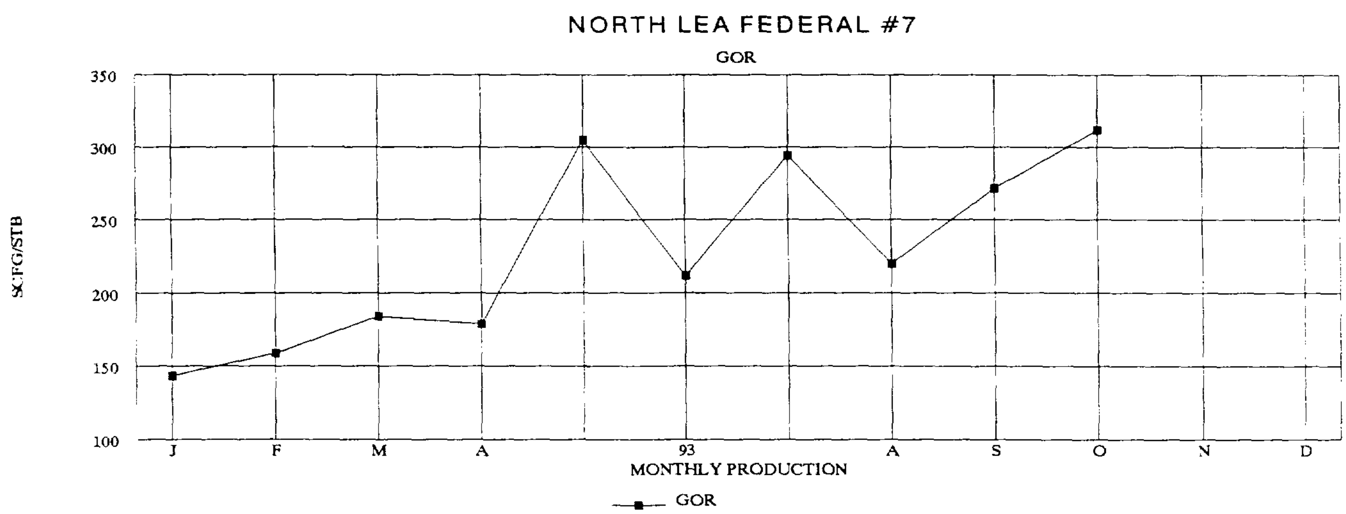


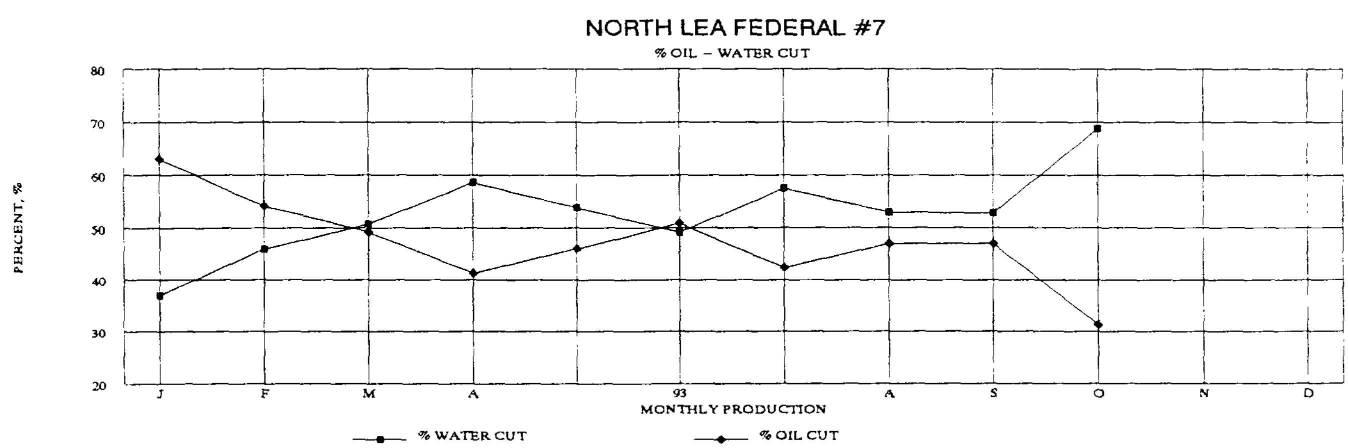
County: LEA   State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 21461   Gas Cum: 4374
Location: 10B 20S 34E

F P Date 09-92

Date: 12-20-93







NORTH LEA FEDERAL #7 UNIT G SECTION 10-T20S-R34E

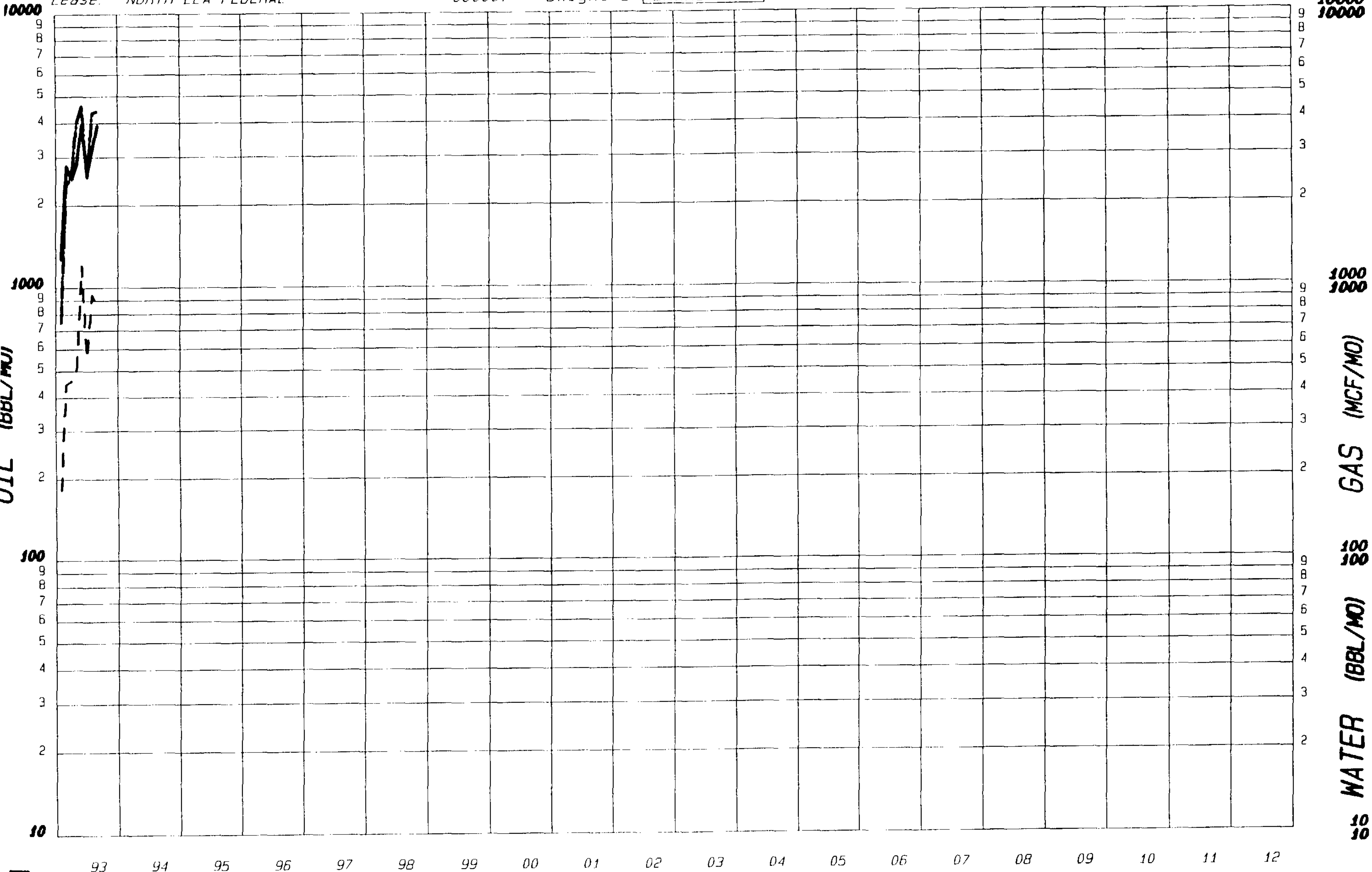
TESTED THIRD SAND, 5942' - 5962', WET.

COMPLETED IN FIRST SAND 5620' - 5674' & 5556' - 5592'.

CUM. PRODUCTION
29,896 BO
7,137 MCF
36,700 BW

EXHIBIT E-36

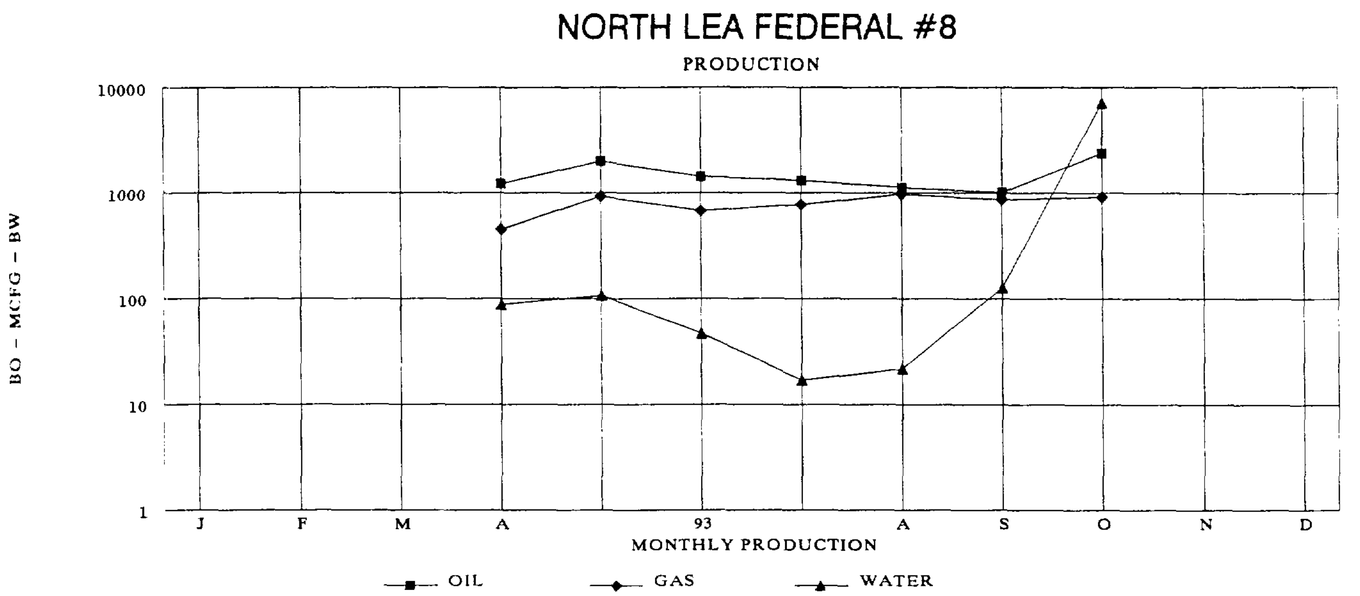
Lease. NORTH LEA FEDERAL 000007 Dwight's ENERGYDATA Inc. Retrieval Code: 150, 025, 20S34E10G00DL

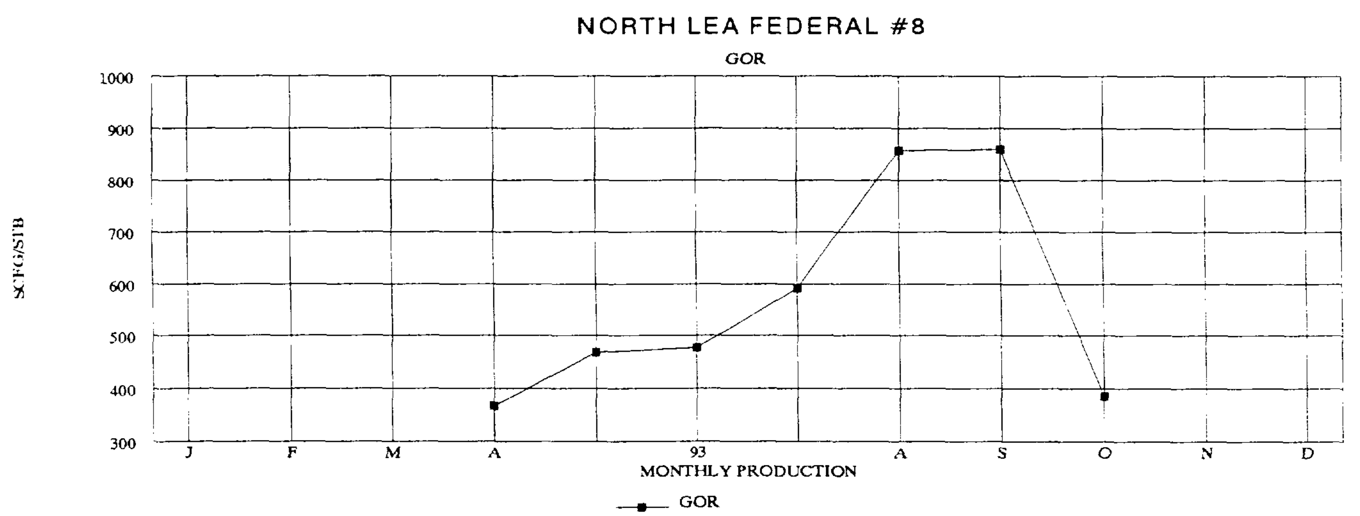


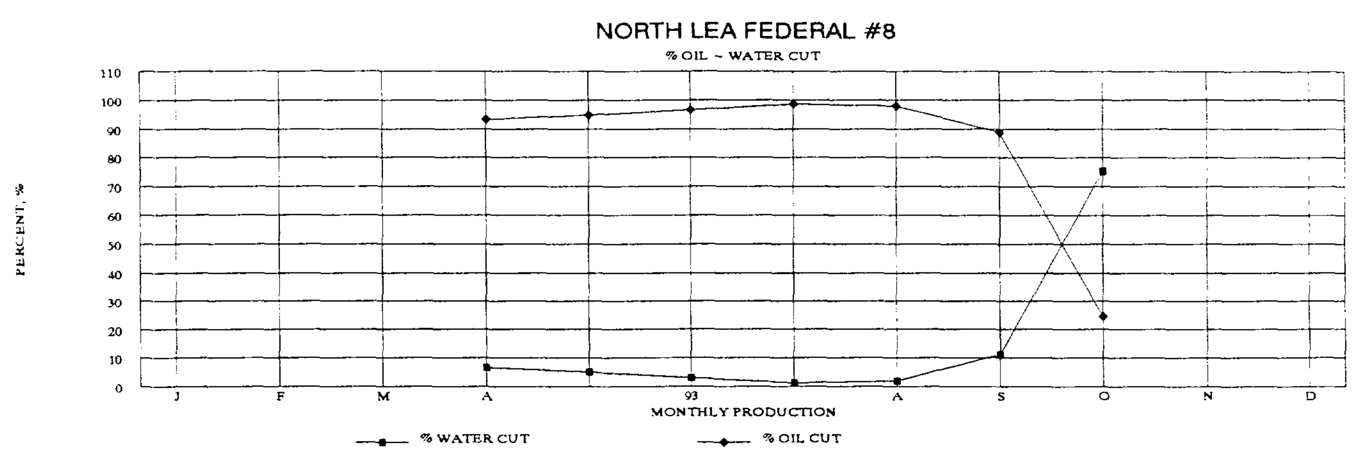
County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) OL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 23105 Gas Cum: 5163
Location: 10G 20S 34E

F P Date 01-93

Date: 12-20-93







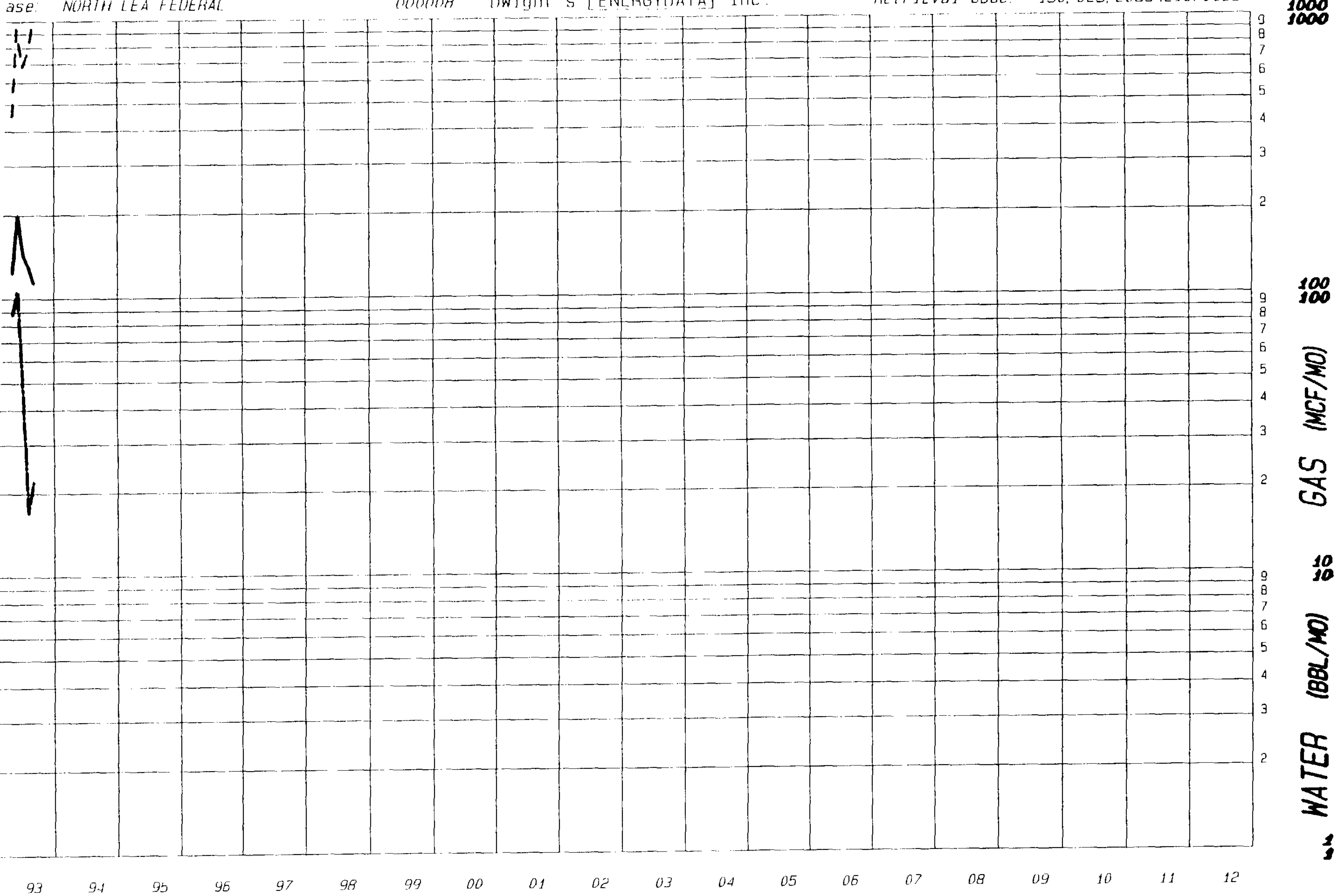
NORTH LEA FEDERAL #8 UNIT F SECTION 10-T20S-R34E

TESTED FOURTH SAND, 6184' - 6220', WET. COMPLETED IN THIRD SAND LIME EQUIVALENT, 5934' -5960'. COMPLETED IN FIRST SAND 5636' - 5660', 10-15-93, 74BO &307 BW. FRAC'D INTO 2nd SAND. COMINGLED 12-1-93, 105 BO, 14 MCFD, 322 BW

EXHIBIT E-38

CUM. PRODUCTION
10,545 BO
5,632 MCF
7,770 BW

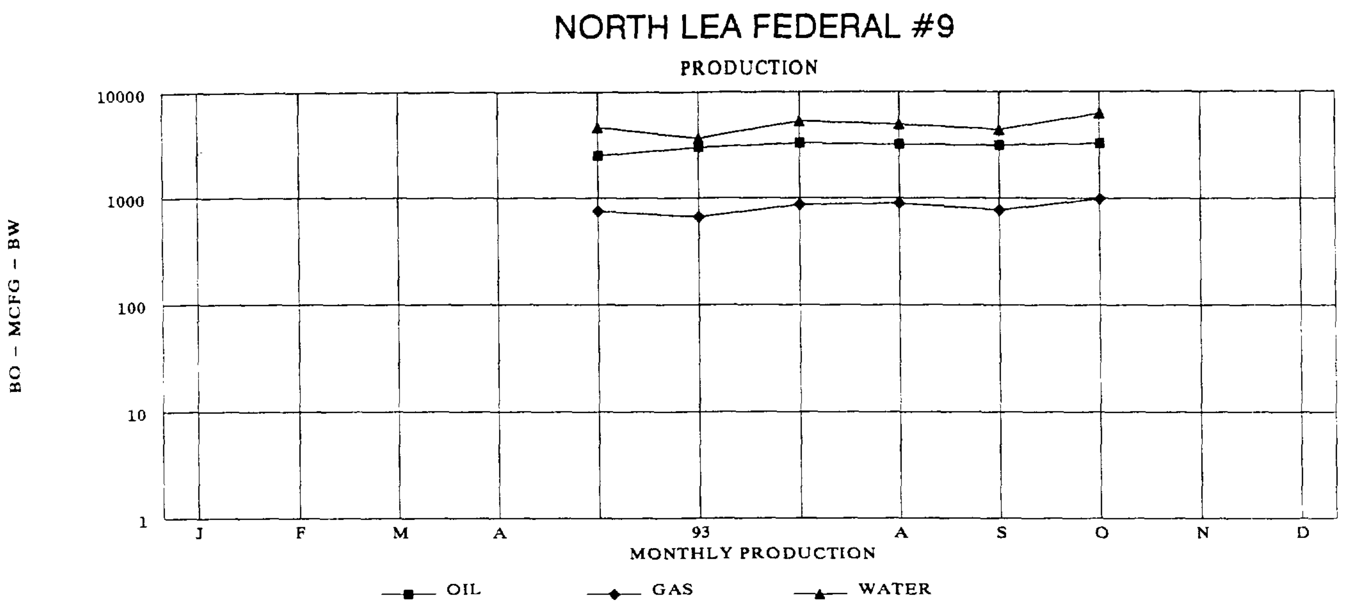
ase: NORTH LEA FEDERAL 000008 Dwight's [ENERGYDATA] Inc. Retrieval Code: 150, 025, 20S34E10F00DL

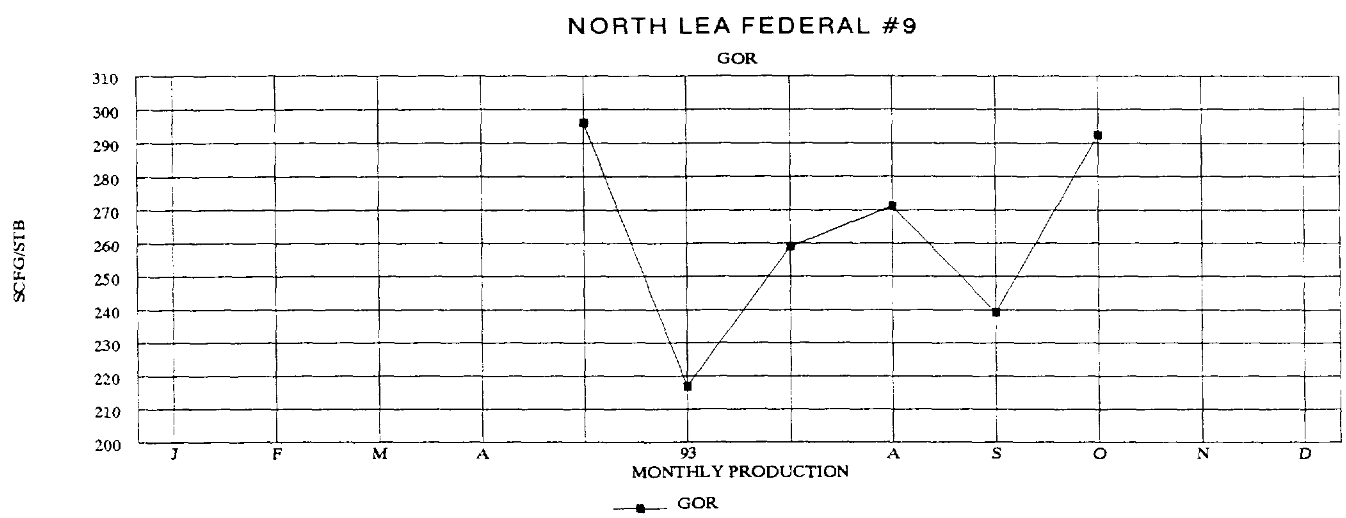


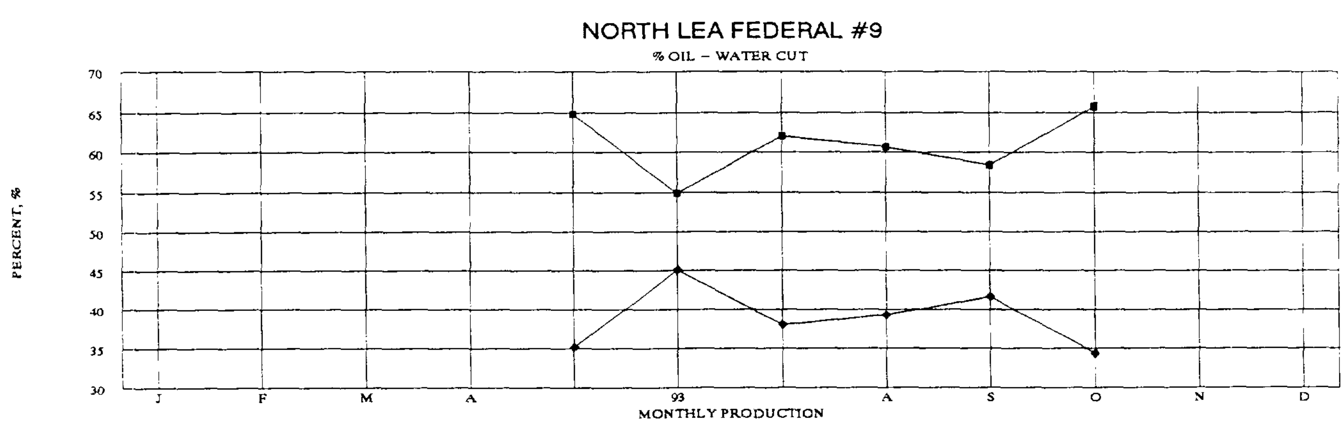
County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 7123 Gas Cum: 3826
Location: 10F 20S 34E

F P Date 04 93

Date: 12-20-93



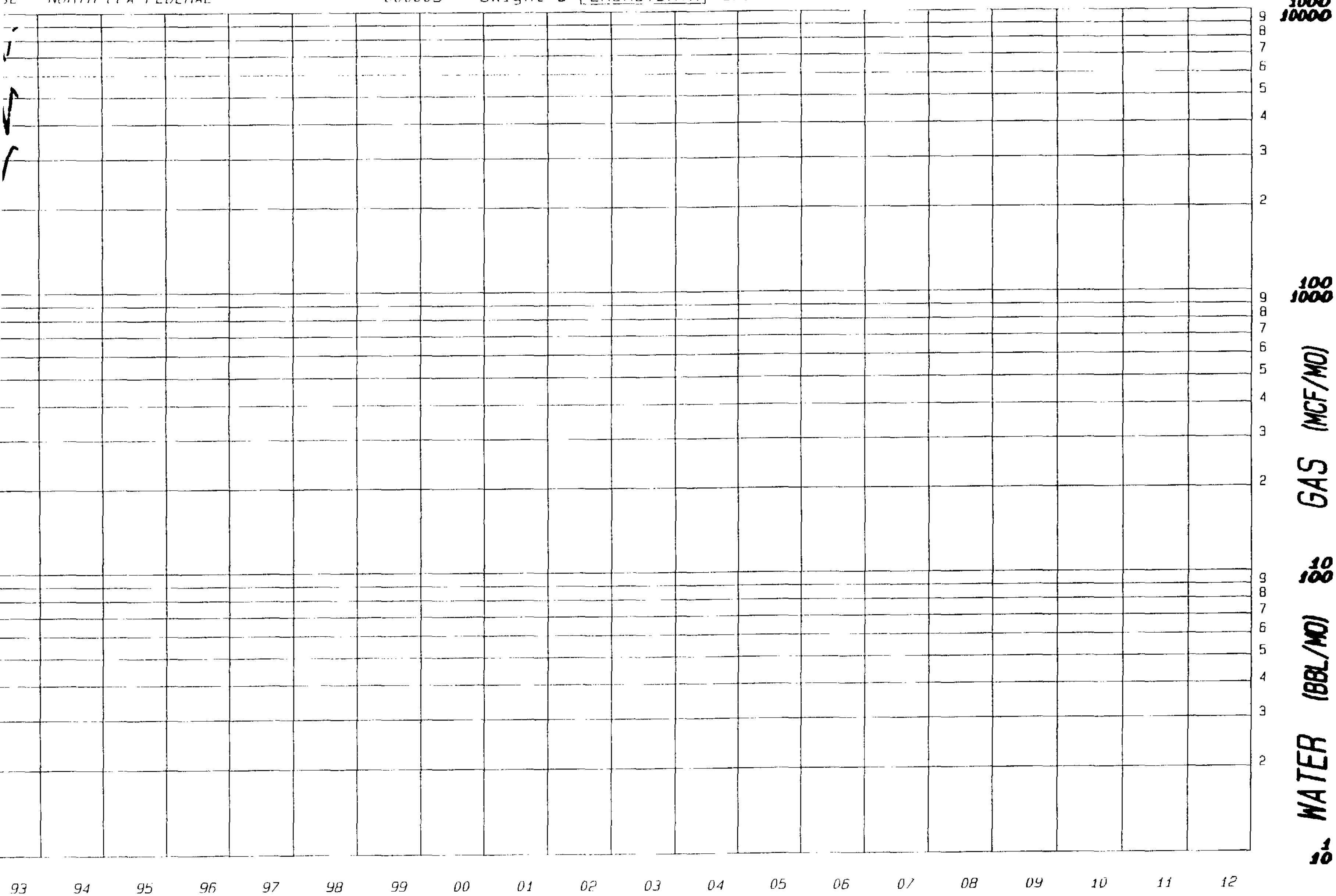




NORTH LEA FEDERAL #9

UNIT H SECTION 10-T20S-R34E

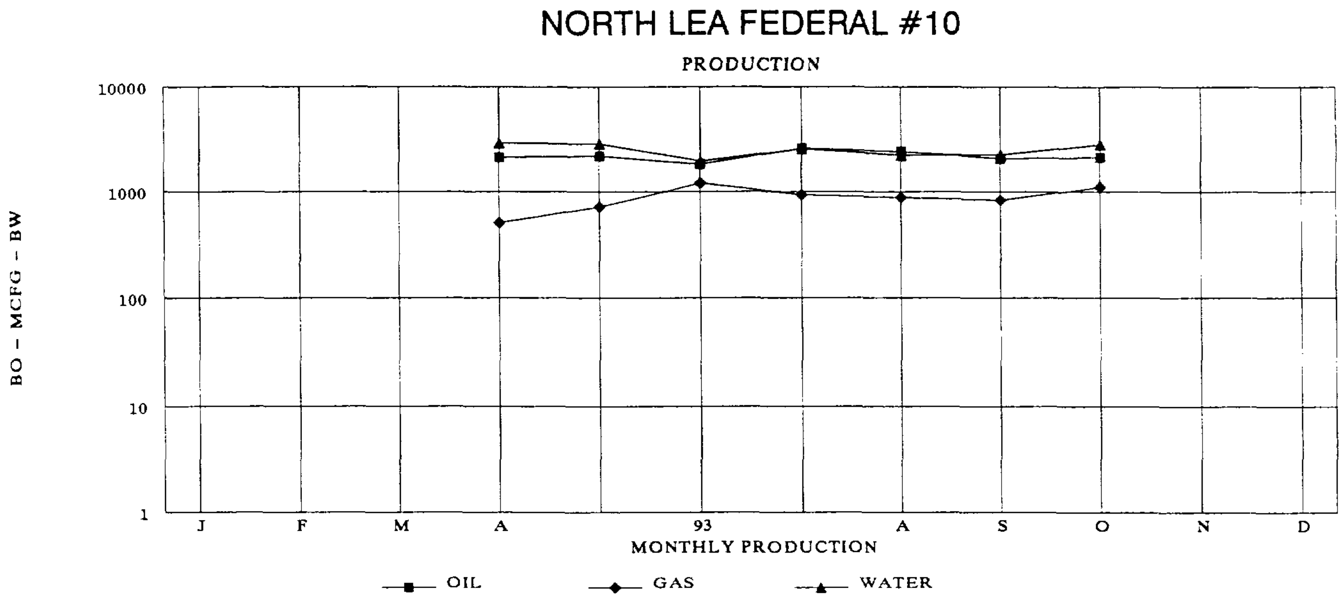
se: NORTH LEA FEDERAL 000009 Dwight's ENERGYDATA Inc. Retrieval Code: 150, 025, 20S34E10H00DL

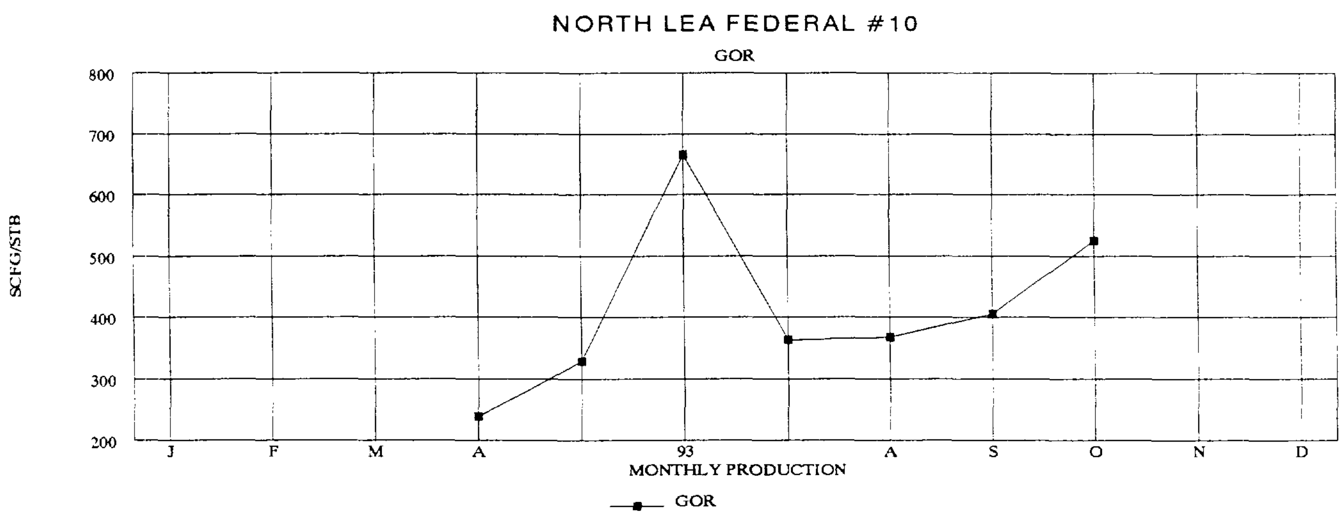


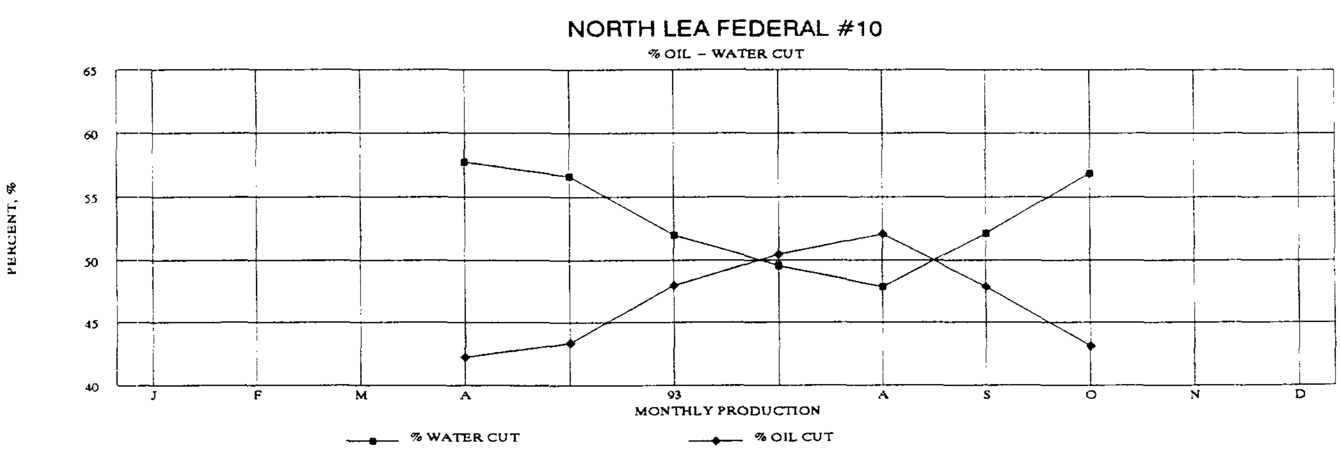
County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 12293 Gas Cum: 3189
Location: 10H 20S 34E

F P Date 05-93

Date: 12-20-93







NORTH LEA FEDERAL #10

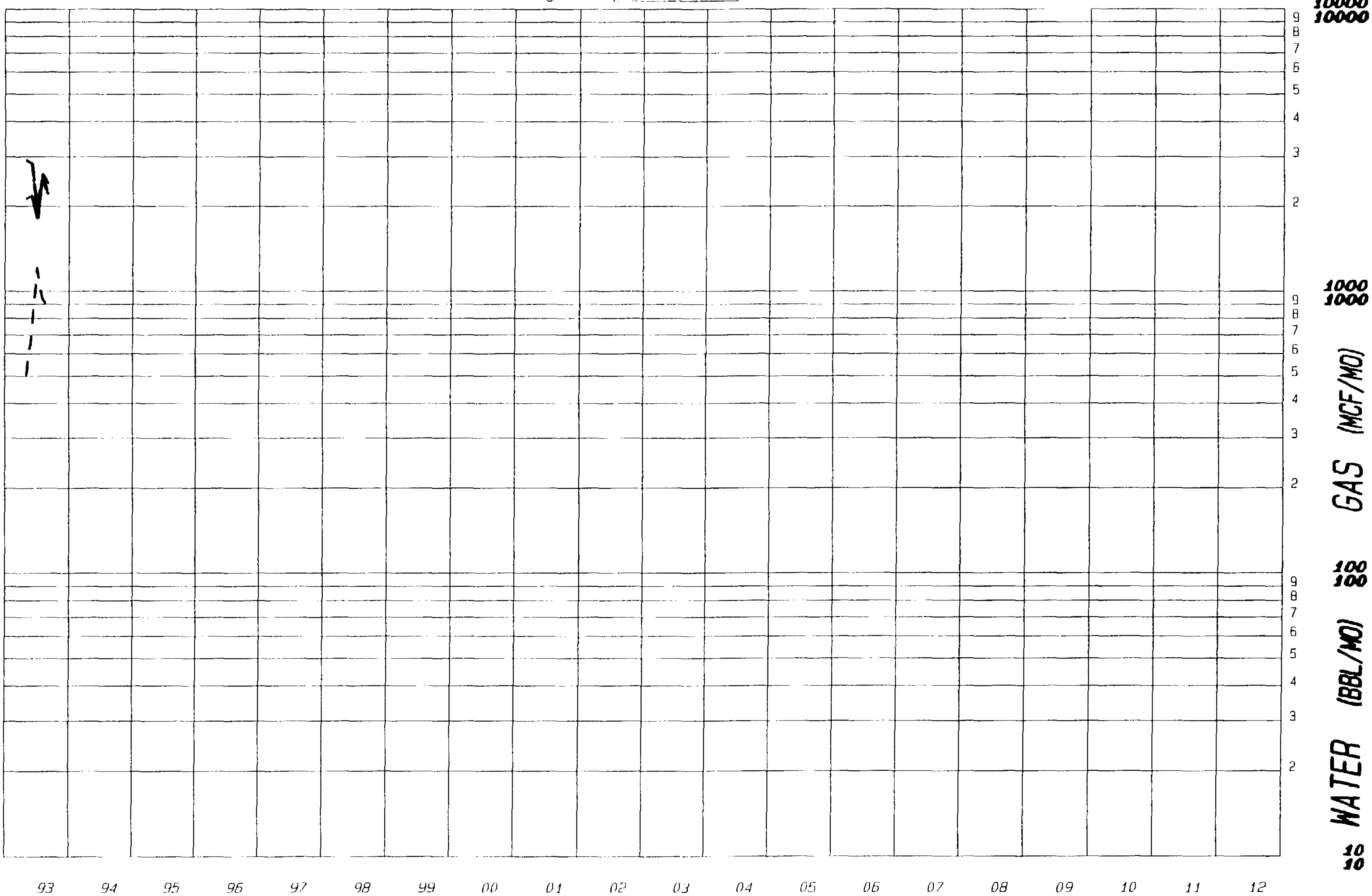
UNIT A SECTION 10-T20S-R34E

COMPLETED IN THIRD SAND, 5910' - 5930'.
FIRST SAND IS A POTENTIAL PAY.

CUM. PRODUCTION
15,331 BO
6,222 MCF
17,555 BW

EXHIBIT E-42

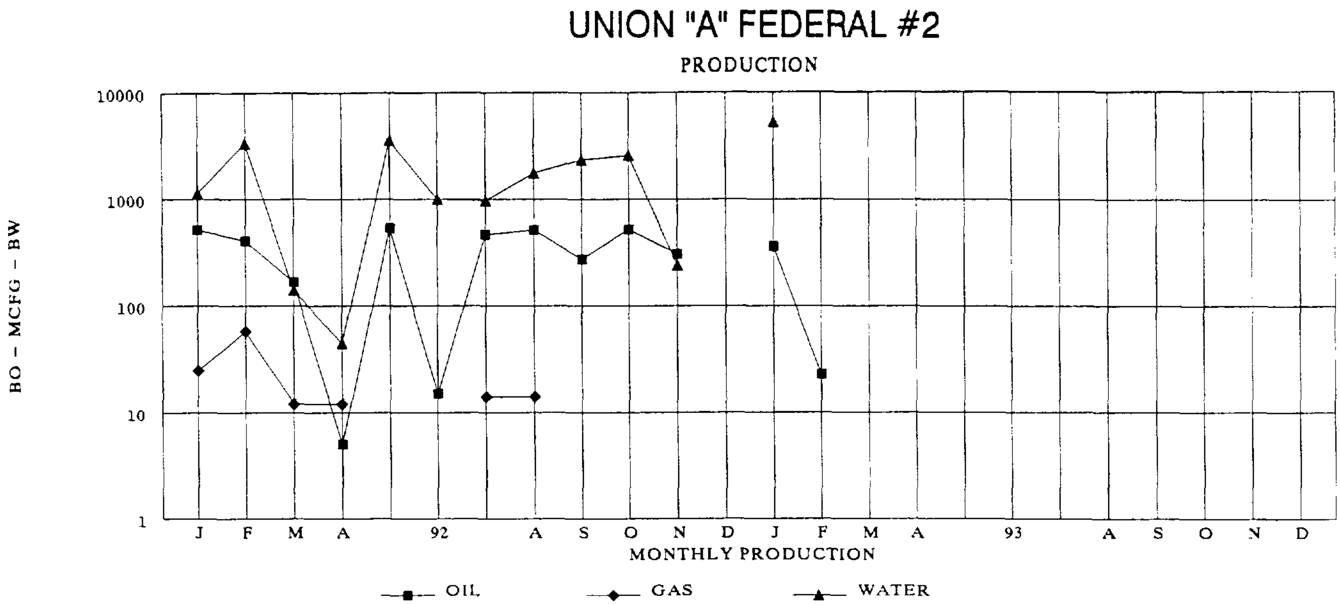
Lease: NORTH LEA FEDERAL 000010 Dwight's ENERGYDATA Inc. Retrieval Code: 150, 025, 20S34E10A00DL

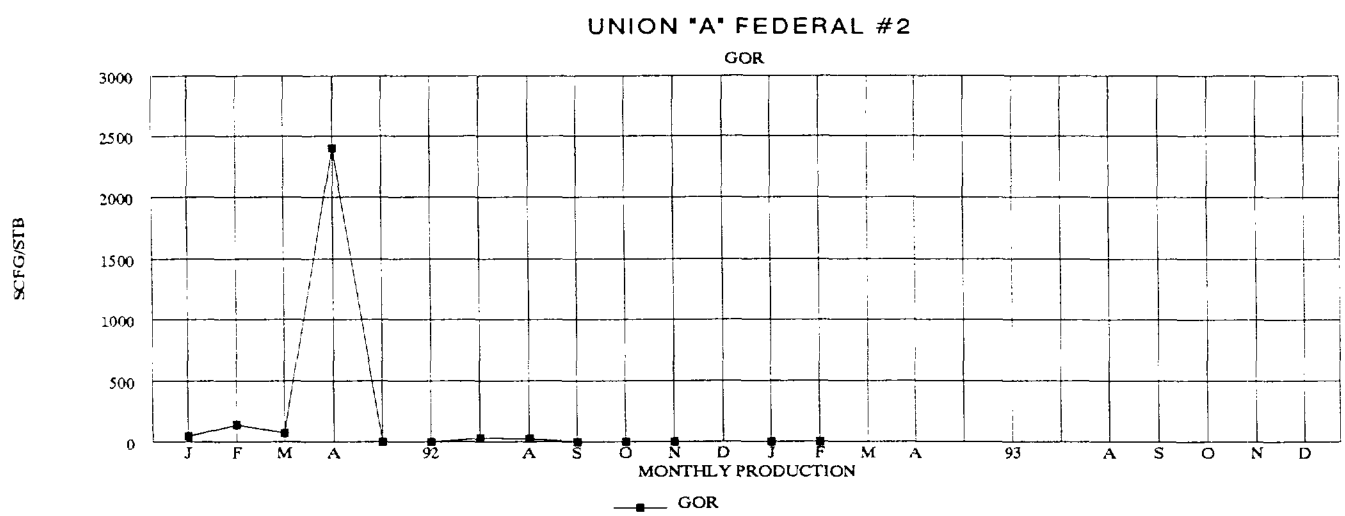


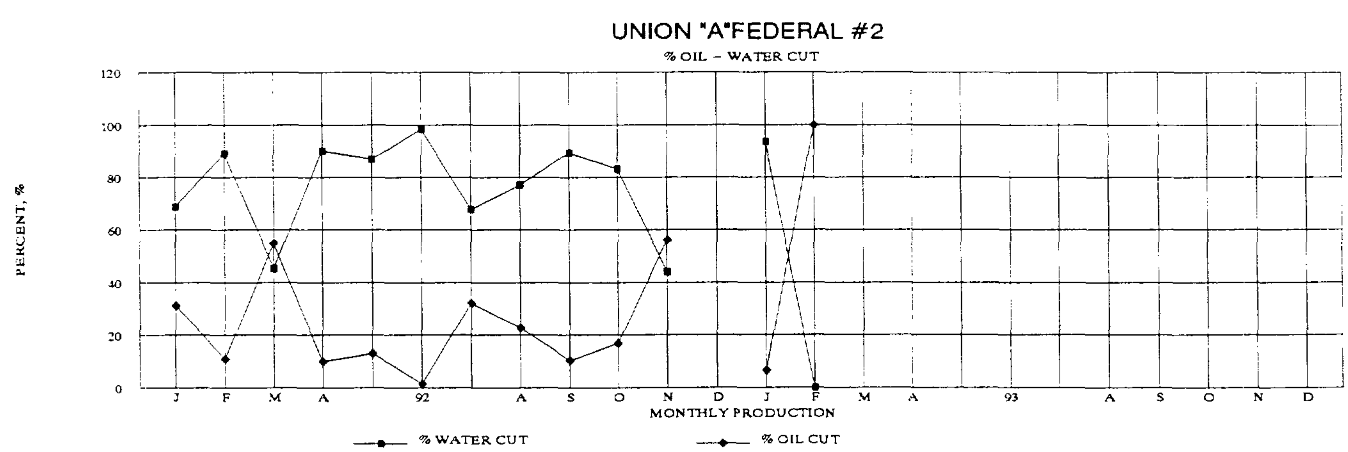
County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 11142 Gas Cum: 4268
Location: 10A 20S 34E

F P Date 04-93

Date: 12-20-93







UNION "A" FEDERAL #2

UNIT K SECTION 10-T20S-R34E

COMPLETED IN FIRST SAND 5660' - 5690'.

CUM. PRODUCTION

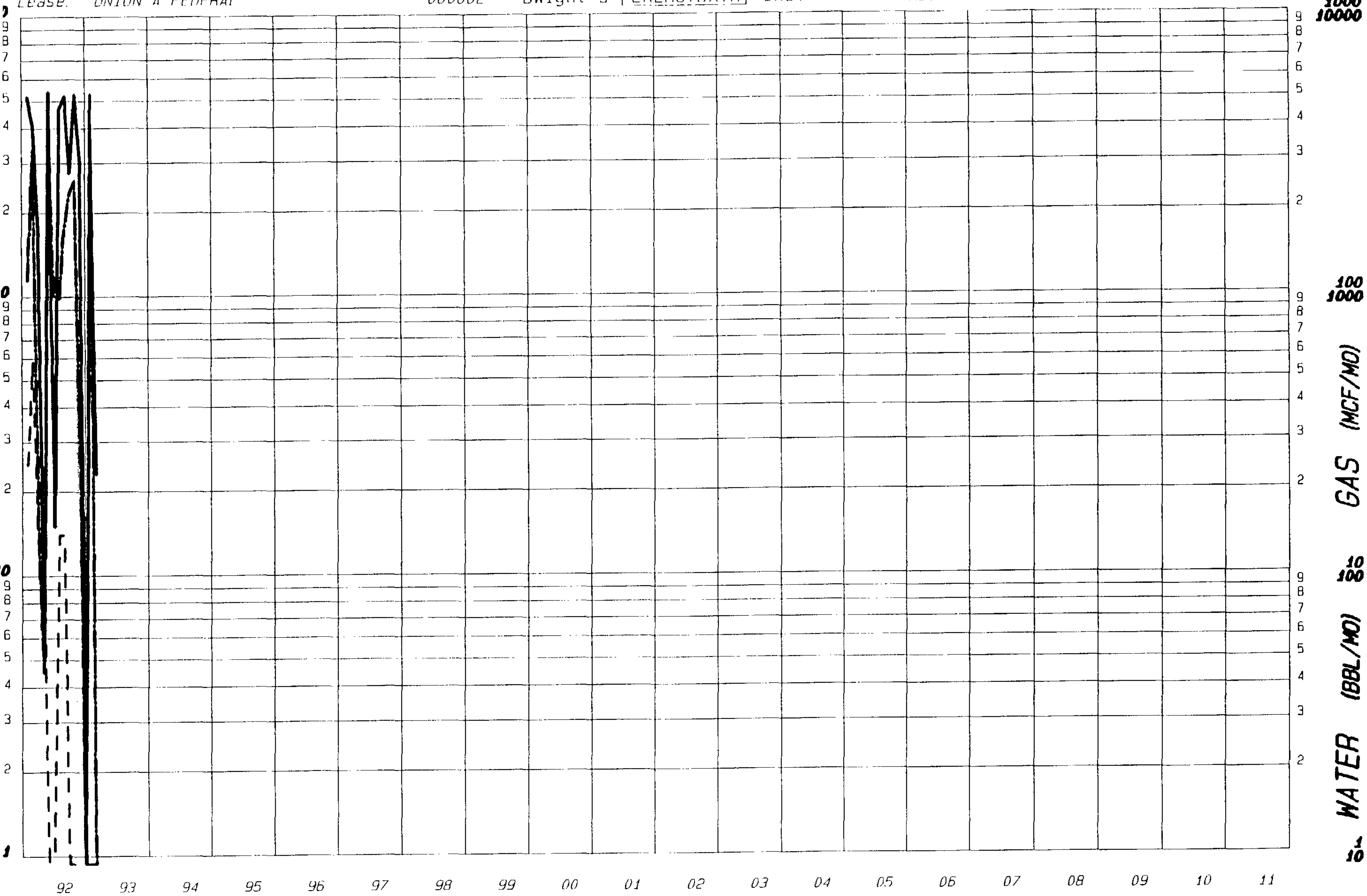
4,155 BO

135 MCF

22,494 BW

EXHIBIT **E-44**

Lease: UNION A FEDERAL 000002 Dwight's ENERGYDATA Inc. Retrieval Code: 150, 025, 20S34E10K00DL



County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DI
Reservoir: DELAWARE
Operator: SNOW OIL & GAS INC
Oil Cum: 4155 Gas Cum: 135
Location: 10K 20S 34E

F P Date 01-92

Date: 12-20-93

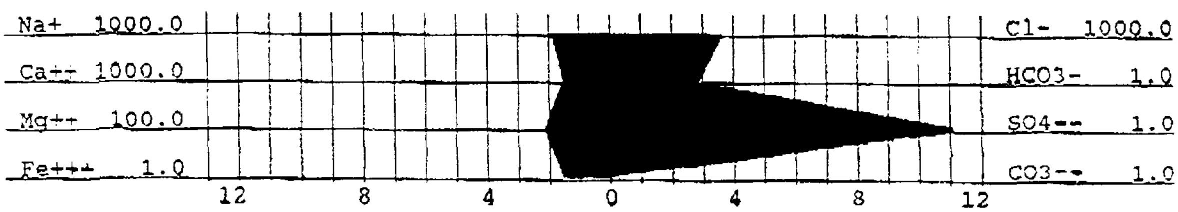
Post-It™ brand fax transmittal memo 7671 | # of pages ▸

To Armstrong	From Don Blackstock
Co.	Co. Baker
Dept.	Phone #
Fax #	Fax #

BAKER PERFORMANCE CHEMICALS
A Baker Hughes company

Date of Analysis:	DECEMBER 9, 1992	**Analysis #:**	1822
Company:	ARMSTRONG ENERGY	**Company Address:**	N/D
State:	N/D	**Field:**	N/D
Lease:	MOBIL LEA ST. #1	**Well #:**	# 1
Oil (bbl/day):	N/D	**Water (bbl/day):**	N/D
Type of Water:	PRODUCED	**Temp.,C:**	16
Sample Source:	WELL HEAD	**Date of Sampling:**	DECEMBER 9, 1992
Representative:	DON BLACKSTOCK	**Analysis By:**	SUZANNE WILLIAMS

WATER ANALYSIS PATTERN
(number beside ion symbol indicates me/l scale unit)



DISSOLVED SOLIDS

CATIONS		**me/l**	**mg/l**
Total Hardness	:	1820.00	
Calcium, (Ca++)	:	1600.00	32076.98
Magnesium, (Mg++)	:	220.00	2673.31
Iron, (Fe+++)	:	1.61	30.00
Barium, (Ba++)	:	N/D	N/D
Sodium, Na+(calc)	:	1939.31	44604.19
Manganese, (Mn++)	:	0.00	0.00
ANIONS			
Chloride, Cl-	:	3746.48	132995.38
Sulfate, SO4--	:	11.45	550.00
Carbonate, CO3--	:	0.00	0.00
Bicarbonate, HCO3-	:	3.00	183.04
Hydroxyl, OH-	:	0.00	0.00
Sulfide, S--	:	0.00	0.00
TOTAL SOLIDS (quant.)	:		213112.90

DISSOLVED GASES

Hydrogen sulfide:		0.00	**mg/l**
Carbon dioxide	:	217.80	**mg/l**
Oxygen	:	N/D	**mg/l**

PHYSICAL PROPERTIES

pH	:	6.65
Spec Grav.	:	1.140
TDS (calc.)	:	213115.89

SCALE STABILITIES

Temp.,C	**CaCO3**	**CaSO4**	**BaSO4**
16.0	1.73	513	2
26.0	N/D	570	1
36.0	N/D	657	2
Max entity, (calc.)		833	0

RESIDUAL HYDROCARBONS: N/D

N/D = not determined

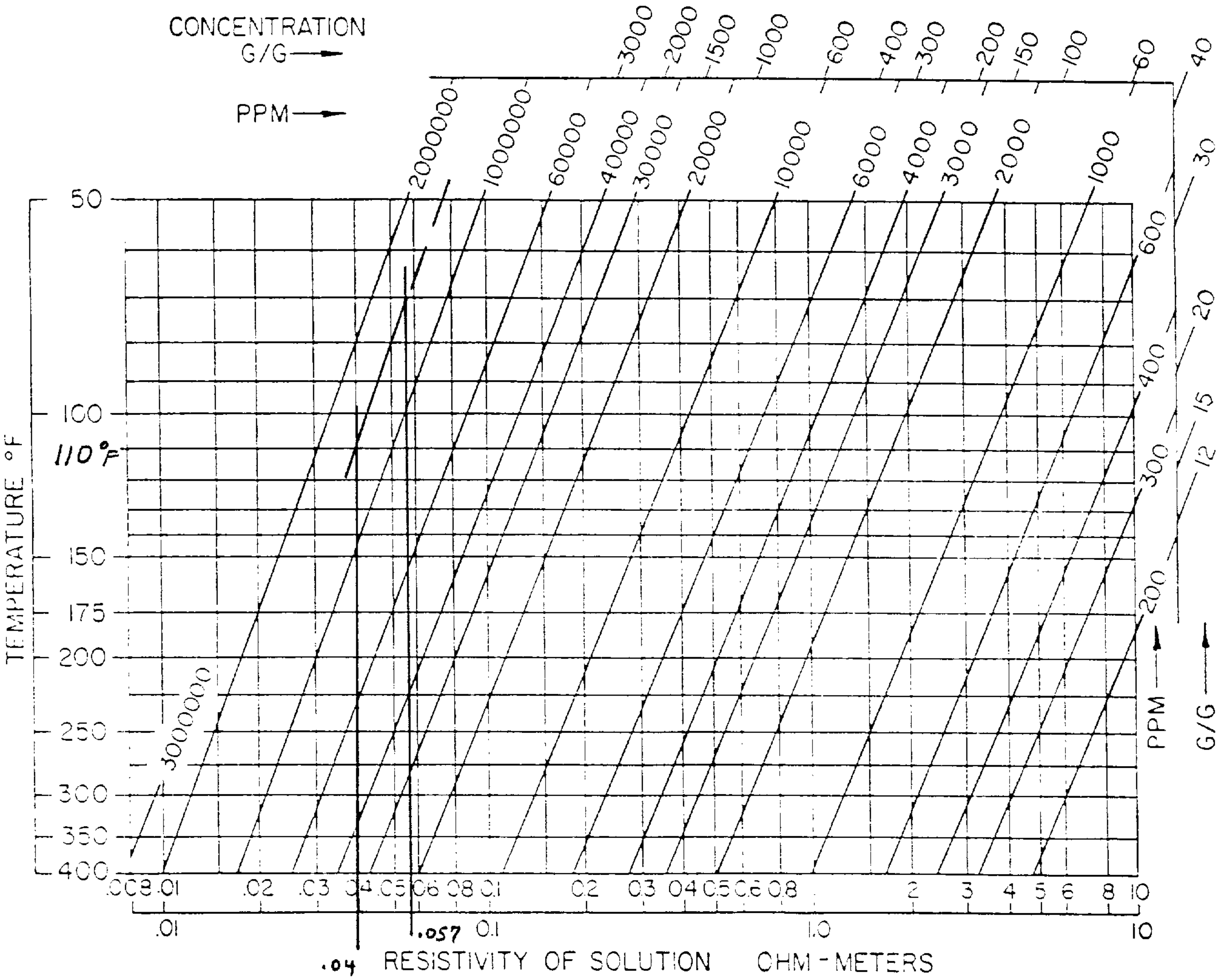
@16'C...CALCIUM SULFATE SCALING IS UNLIKELY .
@16'C...SEVERE CARBONATE SCALING.

RESISTIVITY: 0.057 @ 70°

ARMSTRONG ENERGY CORP.

WATER ANALYSIS
NORTHEAST LEA FIELD
LEA COUNTY, NEW MEXICO

EXHIBIT F-1



Resistivity vs. concentration for NaCl solutions at various temperatures.

$R_w = .04$

ARMSTRONG ENERGY CORP.

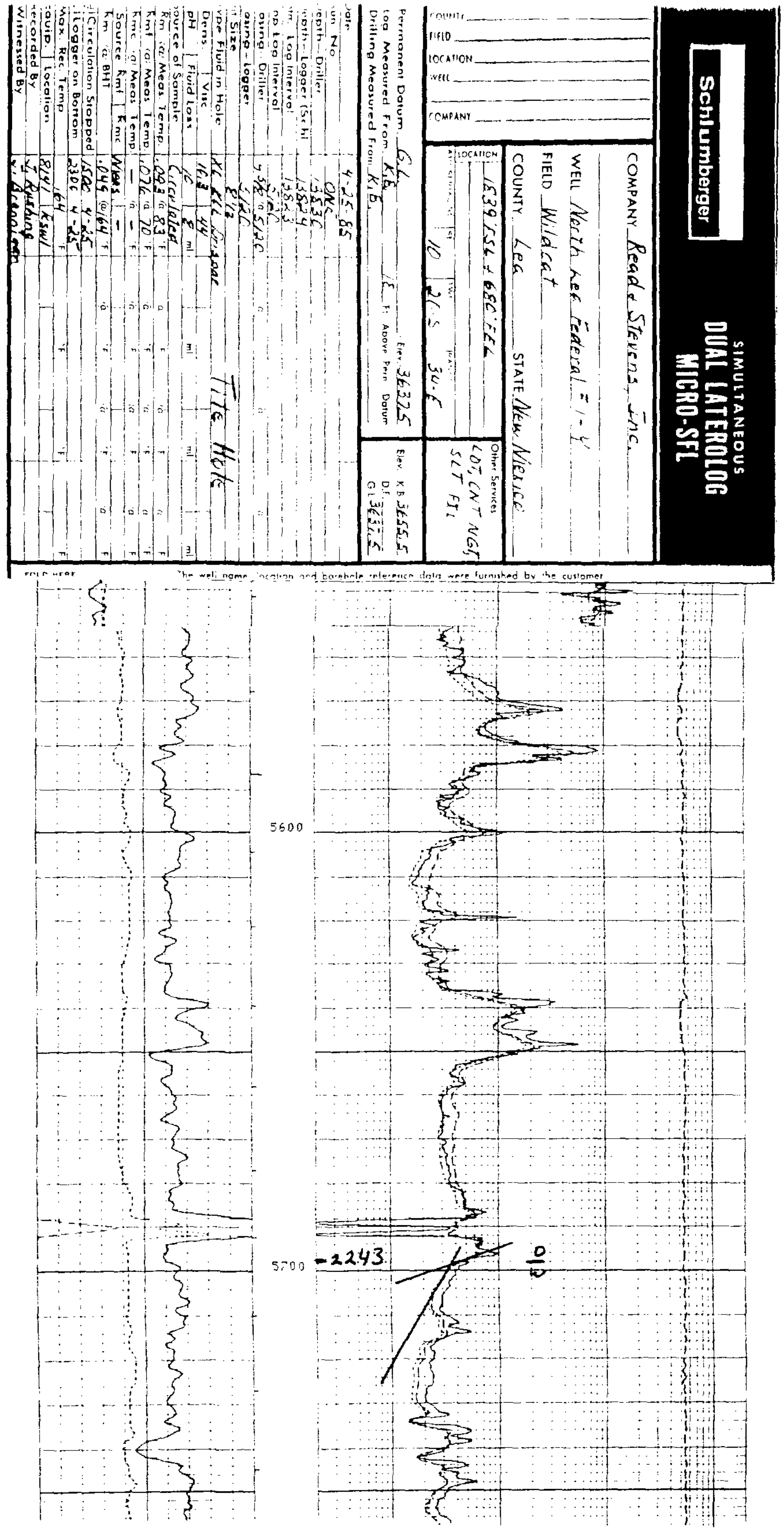
FORMATION WATER RESISITIVITY
NORTHEAST LEA FIELD
LEA COUNTY, NEW MEXICO

EXHIBIT **F-2**

SAND

WATER SATURATION Rw= 0.04

Rt	POROSITY 15.00%	15.50%	16.00%	16.50%	17.00%	17.50%	18.00%	18.50%	19.00%	19.50%	20.00%	20.50%	21.00%	21.50%	22.00%	22.50%	23.00%
F	36.00	33.71	31.64	29.75	28.03	26.45	25.00	23.67	22.44	21.30	20.25	19.27	18.37	17.52	16.74	16.00	15.31
1.00	120.00%	116.13%	112.50%	109.09%	105.88%	102.86%	100.00%	97.30%	94.74%	92.31%	90.00%	87.80%	85.71%	83.72%	81.82%	80.00%	78.26%
1.20	109.54%	106.01%	102.70%	99.59%	96.66%	93.90%	91.29%	88.82%	86.48%	84.27%	82.16%	80.15%	78.25%	76.43%	74.69%	73.03%	71.44%
1.40	101.42%	98.15%	95.08%	92.20%	89.49%	86.93%	84.52%	82.23%	80.07%	78.01%	76.06%	74.21%	72.44%	70.76%	69.15%	67.61%	66.14%
1.60	94.87%	91.81%	88.94%	86.24%	83.71%	81.32%	79.06%	76.92%	74.90%	72.98%	71.15%	69.42%	67.76%	66.19%	64.68%	63.25%	61.87%
1.80	89.44%	86.56%	83.85%	81.31%	78.92%	76.67%	74.54%	72.52%	70.61%	68.80%	67.08%	65.45%	63.89%	62.40%	60.98%	59.63%	58.33%
2.00	84.85%	82.12%	79.55%	77.14%	74.87%	72.73%	70.71%	68.80%	66.99%	65.27%	63.64%	62.09%	60.61%	59.20%	57.85%	56.57%	55.34%
2.20	80.90%	78.29%	75.85%	73.55%	71.39%	69.35%	67.42%	65.60%	63.87%	62.23%	60.68%	59.20%	57.79%	56.44%	55.16%	53.94%	52.76%
2.40	77.46%	74.96%	72.62%	70.42%	68.35%	66.39%	64.55%	62.81%	61.15%	59.58%	58.09%	56.68%	55.33%	54.04%	52.81%	51.64%	50.52%
2.60	74.42%	72.02%	69.77%	67.66%	65.67%	63.79%	62.02%	60.34%	58.75%	57.25%	55.82%	54.45%	53.16%	51.92%	50.74%	49.61%	48.54%
2.80	71.71%	69.40%	67.23%	65.19%	63.28%	61.47%	59.76%	58.15%	56.62%	55.16%	53.79%	52.47%	51.22%	50.03%	48.90%	47.81%	46.77%
3.00	69.28%	67.05%	64.95%	62.98%	61.13%	59.38%	57.74%	56.17%	54.70%	53.29%	51.96%	50.69%	49.49%	48.34%	47.24%	46.19%	45.18%
3.20	67.08%	64.92%	62.89%	60.98%	59.19%	57.50%	55.90%	54.39%	52.96%	51.60%	50.31%	49.08%	47.92%	46.80%	45.74%	44.72%	43.75%
3.40	65.08%	62.98%	61.01%	59.16%	57.42%	55.78%	54.23%	52.77%	51.38%	50.06%	48.81%	47.62%	46.49%	45.40%	44.37%	43.39%	42.44%
3.60	63.25%	61.21%	59.29%	57.50%	55.80%	54.21%	52.70%	51.28%	49.93%	48.65%	47.43%	46.28%	45.18%	44.12%	43.12%	42.16%	41.25%
3.80	61.56%	59.57%	57.71%	55.96%	54.32%	52.76%	51.30%	49.91%	48.60%	47.35%	46.17%	45.04%	43.97%	42.95%	41.97%	41.04%	40.15%
4.00	60.00%	58.06%	56.25%	54.55%	52.94%	51.43%	50.00%	48.65%	47.37%	46.15%	45.00%	43.90%	42.86%	41.86%	40.91%	40.00%	39.13%
4.20	58.55%	56.67%	54.89%	53.23%	51.67%	50.19%	48.80%	47.48%	46.23%	45.04%	43.92%	42.84%	41.82%	40.85%	39.92%	39.04%	38.19%
4.40	57.21%	55.36%	53.63%	52.01%	50.48%	49.04%	47.67%	46.38%	45.16%	44.01%	42.91%	41.86%	40.86%	39.91%	39.01%	38.14%	37.31%
4.60	55.95%	54.15%	52.45%	50.86%	49.37%	47.96%	46.63%	45.37%	44.17%	43.04%	41.96%	40.94%	39.96%	39.04%	38.15%	37.30%	36.49%
4.80	54.77%	53.01%	51.35%	49.79%	48.33%	46.95%	45.64%	44.41%	43.24%	42.13%	41.08%	40.08%	39.12%	38.21%	37.34%	36.51%	35.72%
5.00	53.67%	51.93%	50.31%	48.79%	47.35%	46.00%	44.72%	43.51%	42.37%	41.28%	40.25%	39.27%	38.33%	37.44%	36.59%	35.78%	35.00%
5.20	52.62%	50.93%	49.33%	47.84%	46.43%	45.11%	43.85%	42.67%	41.54%	40.48%	39.47%	38.50%	37.59%	36.71%	35.88%	35.08%	34.32%
5.40	51.64%	49.97%	48.41%	46.95%	45.56%	44.26%	43.03%	41.87%	40.77%	39.72%	38.73%	37.79%	36.89%	36.03%	35.21%	34.43%	33.68%
5.60	50.71%	49.07%	47.54%	46.10%	44.74%	43.47%	42.26%	41.12%	40.03%	39.01%	38.03%	37.10%	36.22%	35.38%	34.57%	33.81%	33.07%
5.80	49.83%	48.22%	46.71%	45.30%	43.97%	42.71%	41.52%	40.40%	39.34%	38.33%	37.37%	36.46%	35.59%	34.76%	33.97%	33.22%	32.50%
6.00	48.99%	47.41%	45.93%	44.54%	43.23%	41.99%	40.82%	39.72%	38.68%	37.68%	36.74%	35.85%	34.99%	34.18%	33.40%	32.66%	31.95%
6.20	48.19%	46.64%	45.18%	43.81%	42.52%	41.31%	40.16%	39.08%	38.05%	37.07%	36.14%	35.26%	34.42%	33.62%	32.86%	32.13%	31.43%
6.40	47.43%	45.90%	44.47%	43.12%	41.85%	40.66%	39.53%	38.46%	37.45%	36.49%	35.58%	34.71%	33.88%	33.09%	32.34%	31.62%	30.94%
6.60	46.71%	45.20%	43.79%	42.46%	41.21%	40.04%	38.92%	37.87%	36.88%	35.93%	35.03%	34.18%	33.36%	32.59%	31.85%	31.14%	30.46%
6.80	46.02%	44.53%	43.14%	41.83%	40.60%	39.44%	38.35%	37.31%	36.33%	35.40%	34.51%	33.67%	32.87%	32.11%	31.38%	30.68%	30.01%
7.00	45.36%	43.89%	42.52%	41.23%	40.02%	38.88%	37.80%	36.77%	35.81%	34.89%	34.02%	33.19%	32.40%	31.64%	30.92%	30.24%	29.58%
7.20	44.72%	43.28%	41.93%	40.66%	39.46%	38.33%	37.27%	36.26%	35.31%	34.40%	33.54%	32.72%	31.94%	31.20%	30.49%	29.81%	29.17%
7.40	44.11%	42.69%	41.36%	40.10%	38.92%	37.81%	36.76%	35.77%	34.83%	33.93%	33.08%	32.28%	31.51%	30.78%	30.08%	29.41%	28.77%
7.60	43.53%	42.12%	40.81%	39.57%	38.41%	37.31%	36.27%	35.29%	34.36%	33.48%	32.65%	31.85%	31.09%	30.37%	29.68%	29.02%	28.39%
7.80	42.97%	41.58%	40.28%	39.06%	37.91%	36.83%	35.81%	34.84%	33.92%	33.05%	32.23%	31.44%	30.69%	29.98%	29.30%	28.64%	28.02%
8.00	42.43%	41.06%	39.77%	38.57%	37.44%	36.37%	35.36%	34.40%	33.49%	32.64%	31.82%	31.04%	30.30%	29.60%	28.93%	28.28%	27.67%

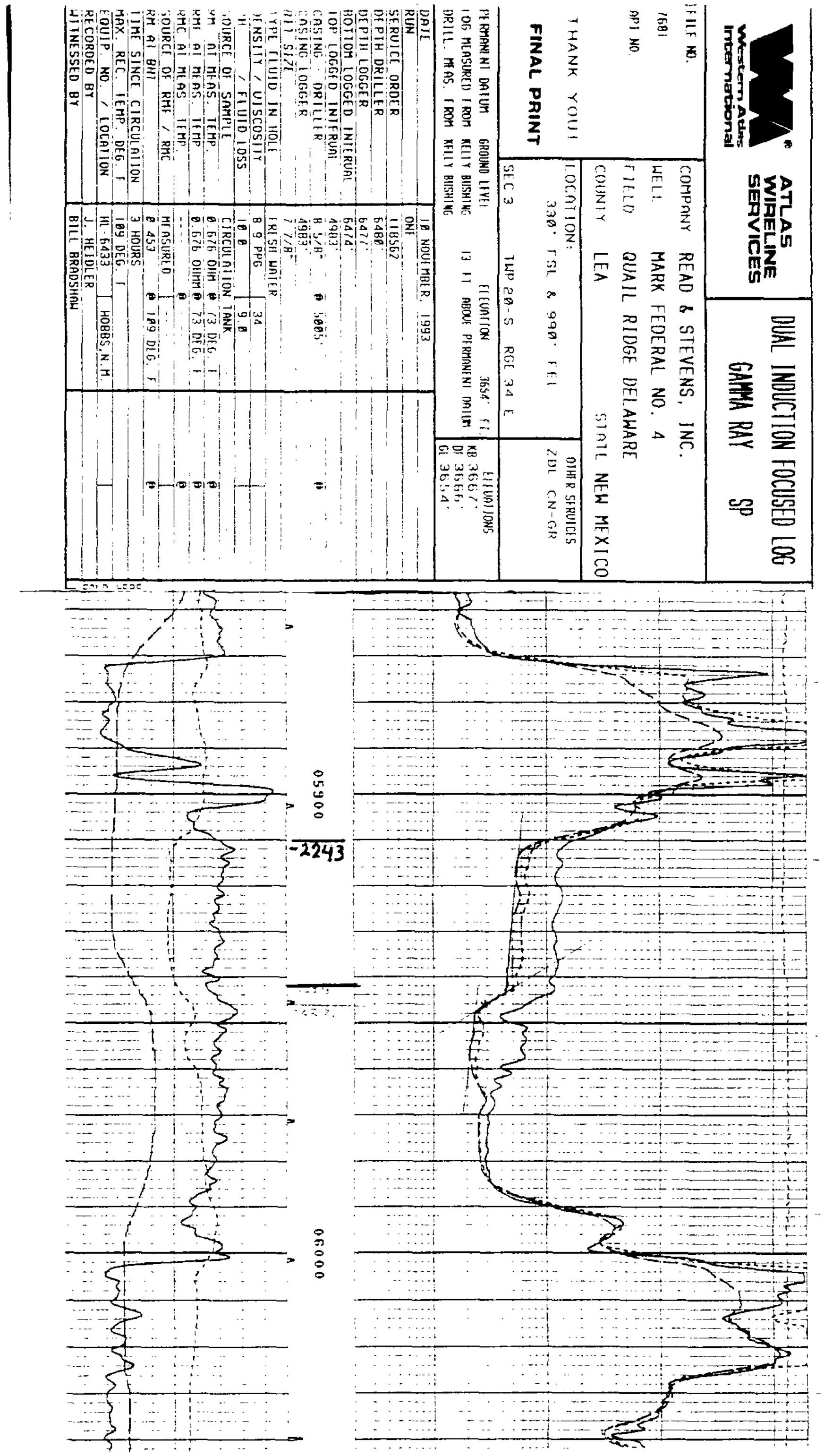


First Sand
Oil-Water Contact @ -2243'

ARMSTRONG ENERGY CORP.

OIL - WATER CONTACT IN FIRST SAND
NORTHEAST LEA FIELD
LEA COUNTY, NEW MEXICO

EXHIBIT G-1



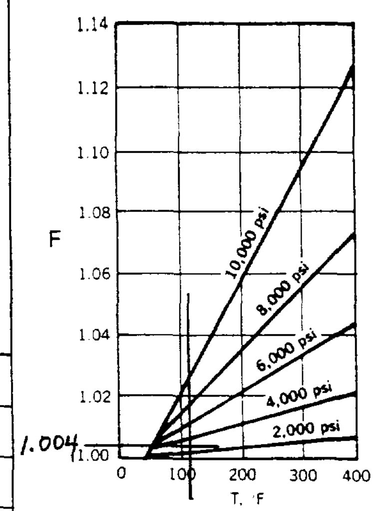
Third Sand O/W contact @ -2275'

ARMSTRONG ENERGY CORP.

OIL - WATER CONTACT IN THIRD SAND
NORTHEAST LEA FIELD
LEA COUNTY, NEW MEXICO

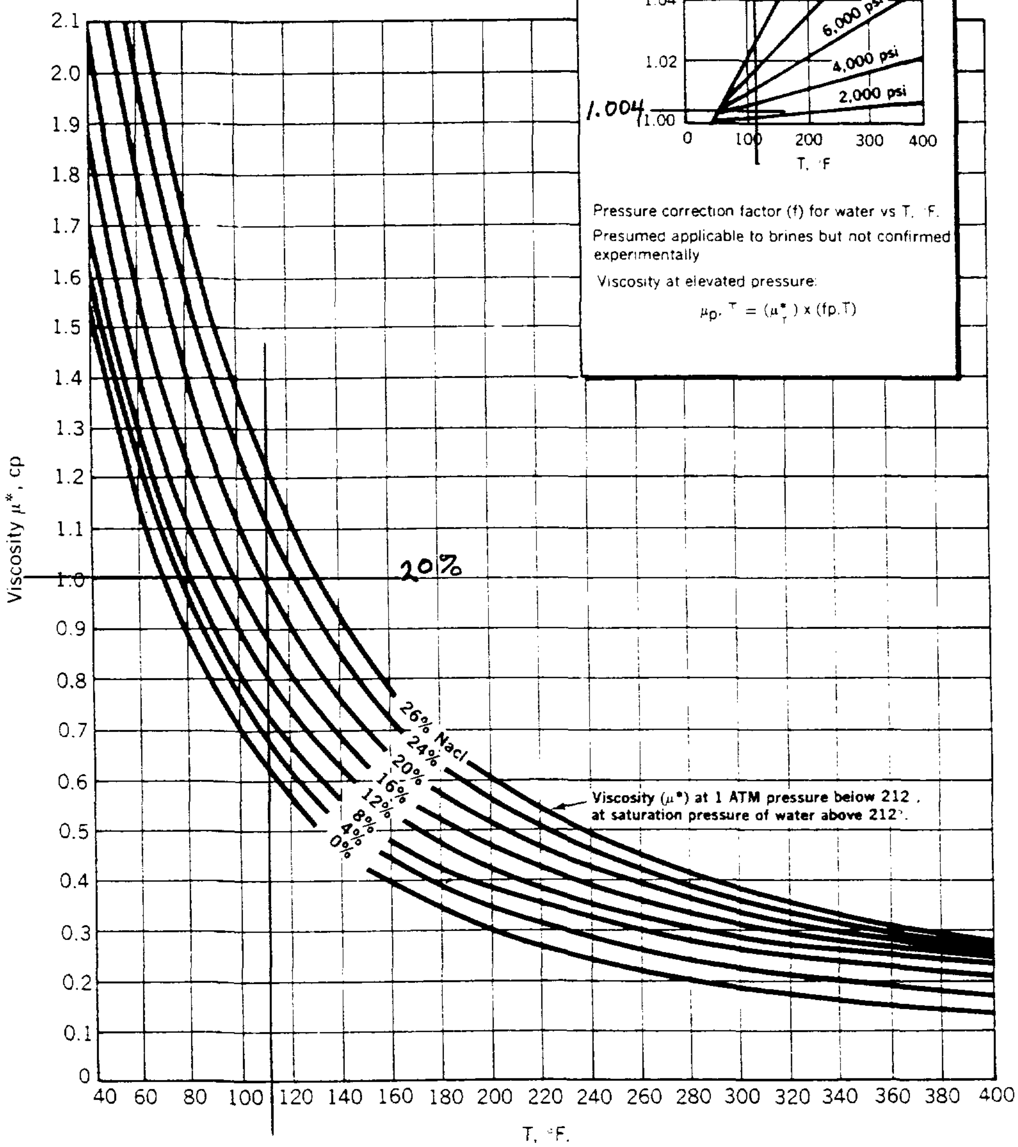
EXHIBIT **G-2**

Estimated max. error		
Temp., °F.	μ^*	f
40°-120°	1%	5%
120°-212°	5%	5%
212-400°	10%	5%



Pressure correction factor (f) for water vs T, °F.
Presumed applicable to brines but not confirmed experimentally
Viscosity at elevated pressure:

$$\mu_{p,T} = (\mu^*_T) \times (f_{p,T})$$

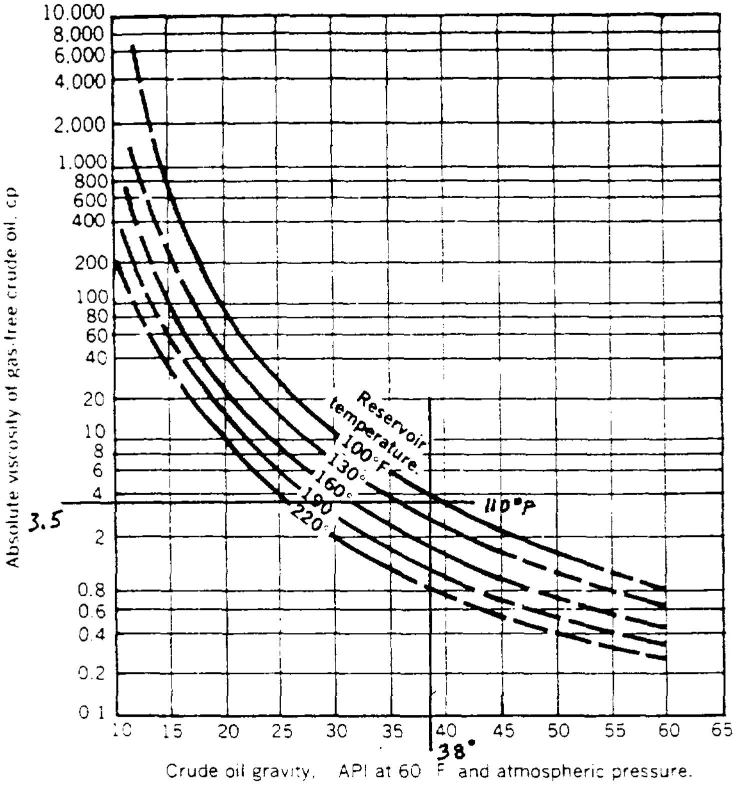


Reservoir water viscosities (From SPE Monograph No. 1, Chesnut, unpublished Shell Development Co. data, Courtesy SPE of AIME.)

$\mu_w = 1.0 \times 1.004 = 1.004$ cp

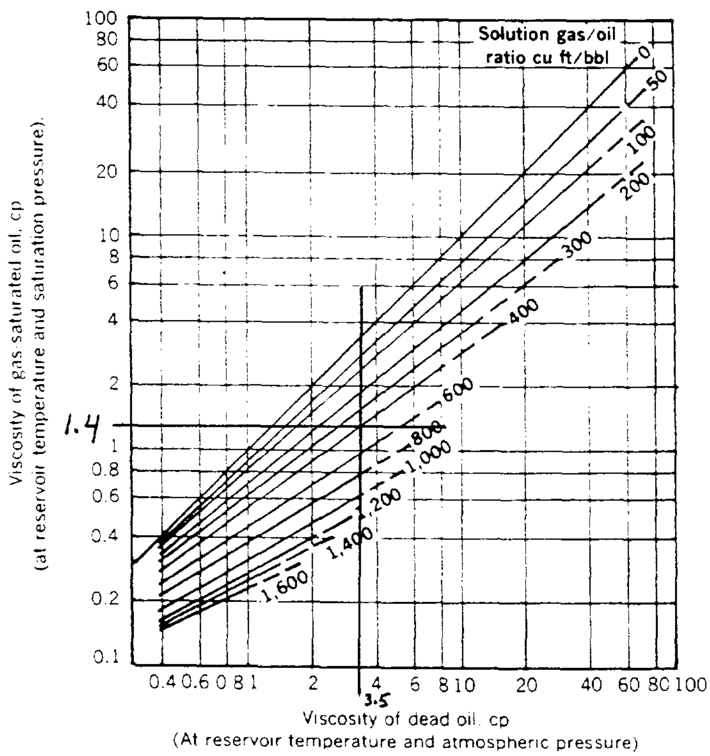
ARMSTRONG ENERGY CORP.

WATER VISCOSITY AT RESERVOIR CONDITIONS
NORTHEAST LEA FIELD
LEA COUNTY, NEW MEXICO
EXHIBIT **H-1**



Viscosity of gas-free crude oil at oil-field temperatures. From Beal. Trans., AIME (1946) 165.94.

$\mu_o = 1.4\ cp$



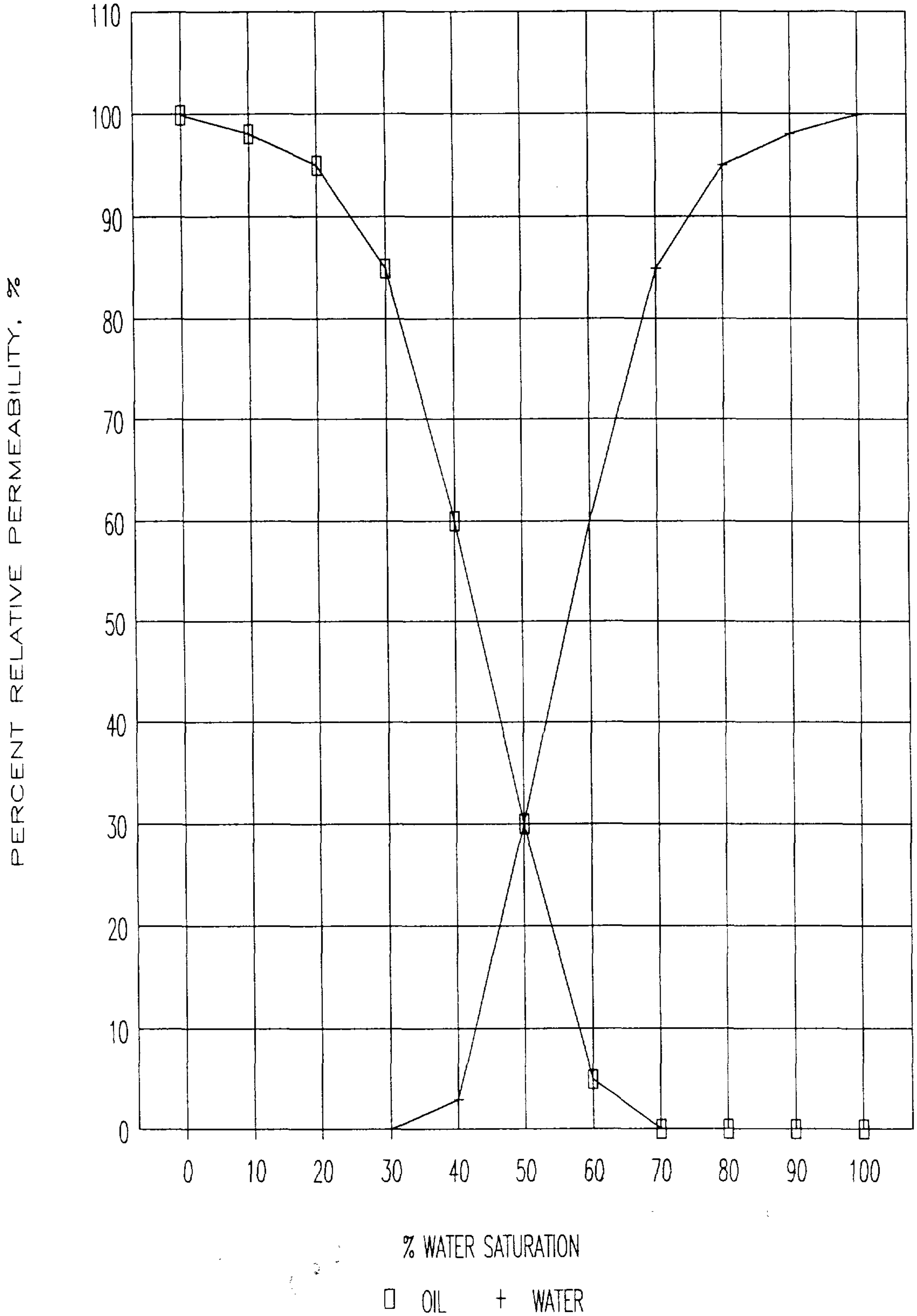
Viscosity of gas-saturated crude oils. From Chew and Connally. Trans., AIME (1959) 216.23.

ARMSTRONG ENERGY CORP.

OIL VISCOSITY AT RESERVOIR CONDITIONS
NORTHEAST LEA FIELD

OIL-WATER RELATIVE PERMEABILITY

TYPICAL DELAWARE ZONE



Laboratory Services

1331 Tasker Drive
Hobbs, New Mexico 88240

Telephone: (505) 397-3713

FOR: GPM Gas Corporation
Attention: Mr. Chip Short
4001 Penbrook
Odessa, Texas 79762

SAMPLE IDENTIFICATION: Mobil Lea State #1
COMPANY: Armstrong Energy Corp.
LEASE:
PLANT:

SAMPLE DATA: DATE SAMPLED: 10-28-92
ANALYSIS DATE: 10-28-92
PRESSURE - PSIG 29.00
SAMPLE TEMP. °F 81.00
ATMOS. TEMP. °F 81.00

GAS (XX) LIQUID ( )
SAMPLED BY: Steve Steadham
ANALYSIS BY: Vickie Walker

REMARKS: H2S < 4 PPM

COMPONENT ANALYSIS

COMPONENT		MOL PERCENT	GPM
Oxygen	(O2)		
Hydrogen Sulfide	(H2S)		
Nitrogen	(N2)	3.38	
Carbon Dioxide	(CO2)	1.14	
Methane	(C1)	50.93	
Ethane	(C2)	15.33	4.104
Propane	(C3)	14.97	4.115
I-Butane	(IC4)	1.98	0.647
N-Butane	(NC4)	4.27	1.342
I-Pentane	(IC5)	1.09	0.399
N-Pentane	(NC5)	0.81	0.291
Hexane	(C6+)	1.05	0.430
Heptanes Plus	(C7)	0.00	0.000
		100.00	11.328

BTU/CU.FT. - DRY		1493
AT 14.650	DRY	1488
AT 14.650	WET	1462
AT 15.025	DRY	1526
AT 15.025	WET	1500

MOLECULAR WT --.----

26# GASOLINE - 1.367

SPECIFIC GRAVITY -
CALCULATED 0.972
MEASURED 0.000

Date 10-28-92
Type Gas CASINGHEAD
State NEW MEXICO
County LEA
Field LEA N.E.
Formation DELAWARE
Company ARMSTRONG ENERGY
Wells #1
Lease MOBIL LEA STATE
SN 4-20-34
Sampler SAS
Baro 662
Atmos. Temp. 81
Trap Press. 29#
Gas Temp. 81°
Type of Trap
Hot / Cool Conv. (
H2S 5 PPM
CO2 —
Choke —
FTP PE
Bomb Press 29#

Sample # OG 7564

Post-It™ brand fax transmittal memo 7671 | # of pages ▸ 1

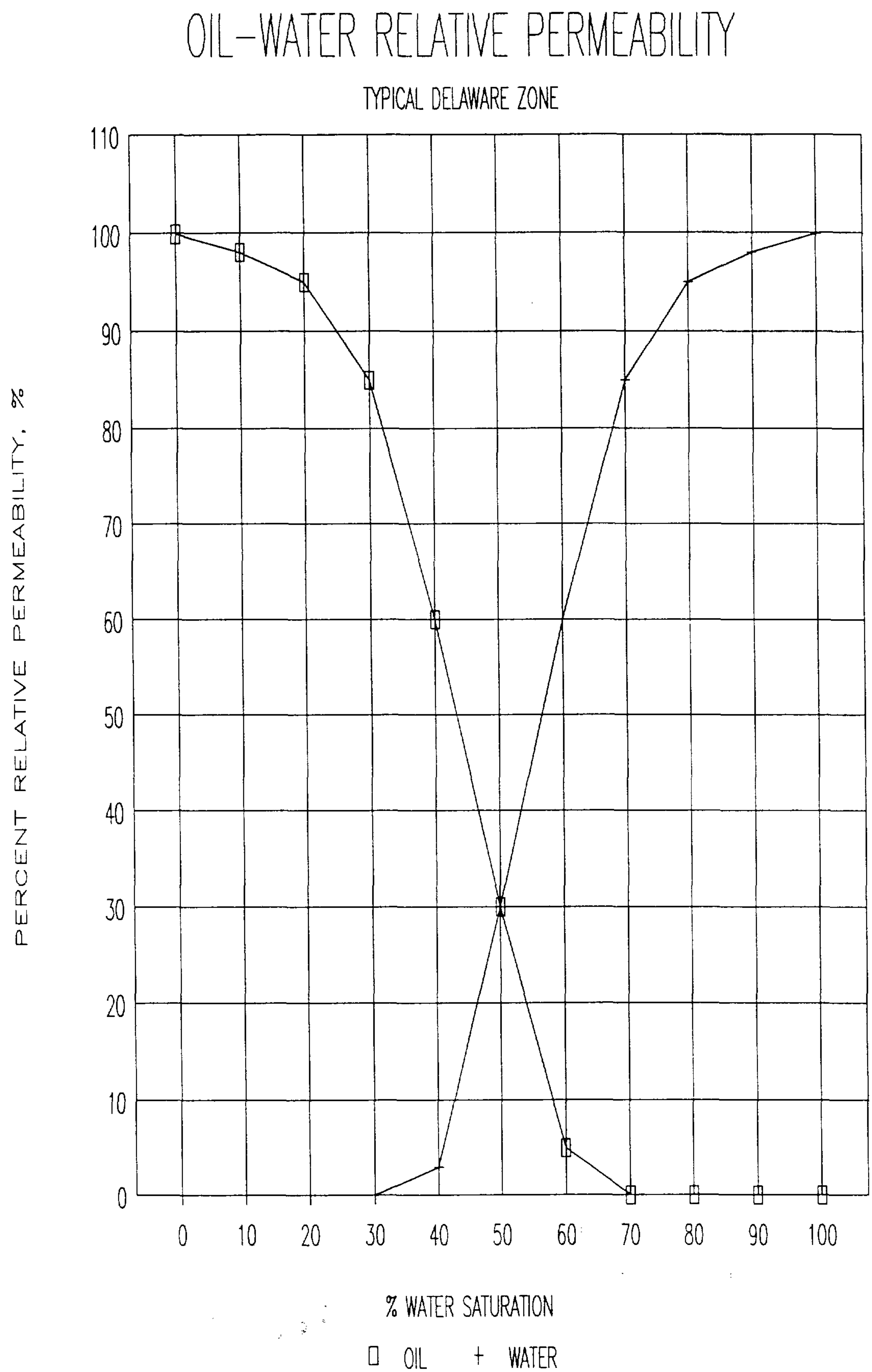
To Bruce	From Tommy
Co.	Co.
Dept.	Phone #
Fax # 623-1777	Fax #

S.G = .972

ARMSTRONG ENERGY CORP.

GAS ANALYSIS
NORTHEAST LEA FIELD
LEA COUNTY, NEW MEXICO

EXHIBIT J


OIL-WATER RELATIVE PERMEABILITY
TYPICAL DELAWARE ZONE
110
100
90
80
70
60
50
40
30
20
10
0
PERCENT RELATIVE PERMEABILITY, %
0
10
20
30
40
50
60
70
80
90
100
% WATER SATURATION
OIL
WATER

OIL DENSITY DETERMINATION
NORTHEAST LEA DELAWARE

$$\text{OIL DENSITY, lbm/CU.FT.} = \frac{(350 \times \text{OIL SPECIFIC GRAVITY}) + (.0764 \times \text{GAS SPECIFIC GRAVITY}) \times Rs}{5.615 \times Bo}$$

Rs= SOLUTION GAS, SCF/STB

Bo= OIL FVF, bbl/SLB

350= DENSITY OF WATER AT STANDARD CONDITIONS, lbm/STB

.0764= DENSITY OF AIR AT STANDARD CONDITIONS, lbm/SCF

5.615= CONVERSION FACTOR, CU.FT./BBL.

.8348= SPECIFIC GRAVITY OF 38 GRAVITY OIL

.972= SPECIFIC GRAVITY OF PRODUCED GAS

OIL DENSITY=	44.7858	lbm/CU.FT.
SPECIFIC GRAVITY=	0.7188	
GRADIENT=	0.3112	PSI/FT.

D:\123\ARMSTRNG\OILDENS.WK1

ARMSTRONG ENERGY CORP.

OIL DENSITY DETERMINATION
NORTHEAST LEA FIELD
LEA COUNTY, NEW MEXICO

EXHIBIT K

INITIAL BOTTOM HOLE PRESSURE

NORTH LEA FEDERAL #3 DST 5891'-5937', THIRD SAND
FSIP 2395 PSI, EXTRAPOLATED PRESSURE 2539 PSI, GRADIENT AT MID-ZONE, 5914', .429 PSI/FT.,

NORTH LEA FEDERAL #2 DST 5630'-5677', FIRST SAND
FSIP 2347 PSI, GRADIENT .415 PSI/FT.
(NOT EXTRAPOLATED)

MOBIL STATE #1 DST 5635'-5714', FIRST SAND
FSIP 2328 PSI, GRADIENT .41 PSI/FT.
(NOT EXTRAPOLATED)

APPROXIMATE PRESSURE GRADIENT FOR BOTH ZONES IS .43 PSI/FT.

ARMSTRONG ENERGY CORP.

INITIAL BOTTOM HOLE PRESSURE DATA
NORTHEAST LEA FIELD
LEA COUNTY, NEW MEXICO

EXHIBIT L

MOBIL LEA STATE # 1
PRODUCING BHP

DATE	CASING PRESSURE (PSI)	FLUID LEVEL (JTS.)	FLUID LEVEL ABOVE PUMP (FT.)	HYDROSTATIC W/ FULL COLUM OF OIL @.3112 PSI/FT	GAS HYDROSTATIC	CALCULATED BOTTOM HOLE PRODUCING PRESSURE (PSI)	PROD. RATE BOPD
12-16-92	230	48	4417	1375	242	1847	250
12-31-92	235	48	4417	1375	247	1857	200
2-8-93	210	56	4169	1297	223	1730	200
3-23-93	220	61	4014	1249	235	1704	170
4-23-93	200	71	3704	1153	215	1568	175
5-10-93	590	127	1968	612	676	1878	180
5-12-93	25	68	3797	1182	26	1233	195
5-28-93	40	56	4169	1297	42	1379	195
6-7-93	40	55	4200	1307	42	1389	195
6-18-93	80	56	4169	1297	85	1462	195
6-28-93	45	47	4448	1384	47	1476	195
7-9-93	35	34	4851	1510	36	1581	200
11-1-93	30	SURF.	5905	1838	0	1868	126

MOBIL LEA STATE # 2
PRODUCING BHP

DATE	CASING PRESSURE (PSI)	FLUID LEVEL (JTS.)	FLUID LEVEL ABOVE PUMP (FT.)	HYDROSTATIC W/ FULL COLUM OF OIL @.3112 PSI/FT	GAS HYDROSTATIC	CALCULATED BOTTOM HOLE PRODUCING PRESSURE (PSI)	PROD. RATE BOPD
5-10-93	430	101	2774	863	479	1772	170
5-21-93	575	116	2309	719	651	1945	150
6-11-93	255	81	3394	1056	278	1589	280
6-18-93	45	63	3952	1230	48	1323	300
6-23-93	40	45	4510	1404	42	1486	300
7-5-93	40	45	4510	1404	42	1486	300
11-1-93	30	SURF.	5905	1838	0	1868	126

MOBIL LEA STATE # 3
PRODUCING BHP

DATE	CASING PRESSURE (PSI)	FLUID LEVEL (JTS.)	FLUID LEVEL ABOVE PUMP (FT.)	HYDROSTATIC W/ FULL COLUM OF OIL @.3112 PSI/FT	GAS HYDROSTATIC	CALCULATED BOTTOM HOLE PRODUCING PRESSURE (PSI)	PROD. RATE BOPD
12-1-93	30	SURF.	5930	1838	0	1868	126

ARMSTRONG ENERGY CORP.

BOTTOM HOLE PRESSURE DATA
NORTHEAST LEA FIELD
LEA COUNTY, NEW MEXICO

EXHIBIT M

PRODUCTIVITY INDEX

DECEMBER 17, 1992

OIL PRODUCTION	283 BO		
WATER PRODUCTION	36 BW		
FLUID LEVEL	48 JTS.	1488 FT.	
CASING PRESSURE	220 PSI		

FLOWING BHP CALCULATION

38 GAVITY OIL GRADIENT=	0.3112 PSI/FT.	
MIDDLE OF ZONE	5905 FT.	
CASING PRESSURE	220 PSI	
GAS HYDROSTATIC	242 PSI	
HYDROSTATIC PRESSURE	1375 PSI	
TOTAL	1837 PSI	FLOWING BHP

STATIC BHP CALCULATION

BHP GRADIENT=	0.43 PSI/FT.	(DST ON N. LEA FED. #3)
MID ZONE DEPTH=	5905 FT	

STATIC BHP = DEPTH x GRADIENT = 2539 PSI

PRODUCTIVITY INDEX CALCULATION

$$J = \frac{Qstb}{Pe-Pw} = \frac{283+36}{2539-1837} = 0.4544 \text{ BBLS/PSI}$$

MAXIMUM PRODUCTION - PUMPED OFF CONDITION

Q= .4544 BBLS/PSI x (2539 PSI-100 PSI) = 1108 BPD

Qoil= 88.71% x 1108 = 983 BOPD

Qwtr= 11.29% x 1108 = 125 BWPD

$$J = .4544 \text{ BBL/PSI} = \frac{7.08 \times Ko \times h}{Bo \times uo \times \ln(Re/Rw)} = \frac{7.08 \times ko \times 60}{1.24 \times 1.4 \times \ln(660/.66)}$$

$$\frac{424.8 \times ko}{1.24 \times 1.4 \times 6.907755} = \frac{424.8 \times ko}{11.9918626} = 35.75758 \text{ ko}$$

ko= 0.01270779 DARCIES

ko= 12.7077951 md.

EXHIBIT N

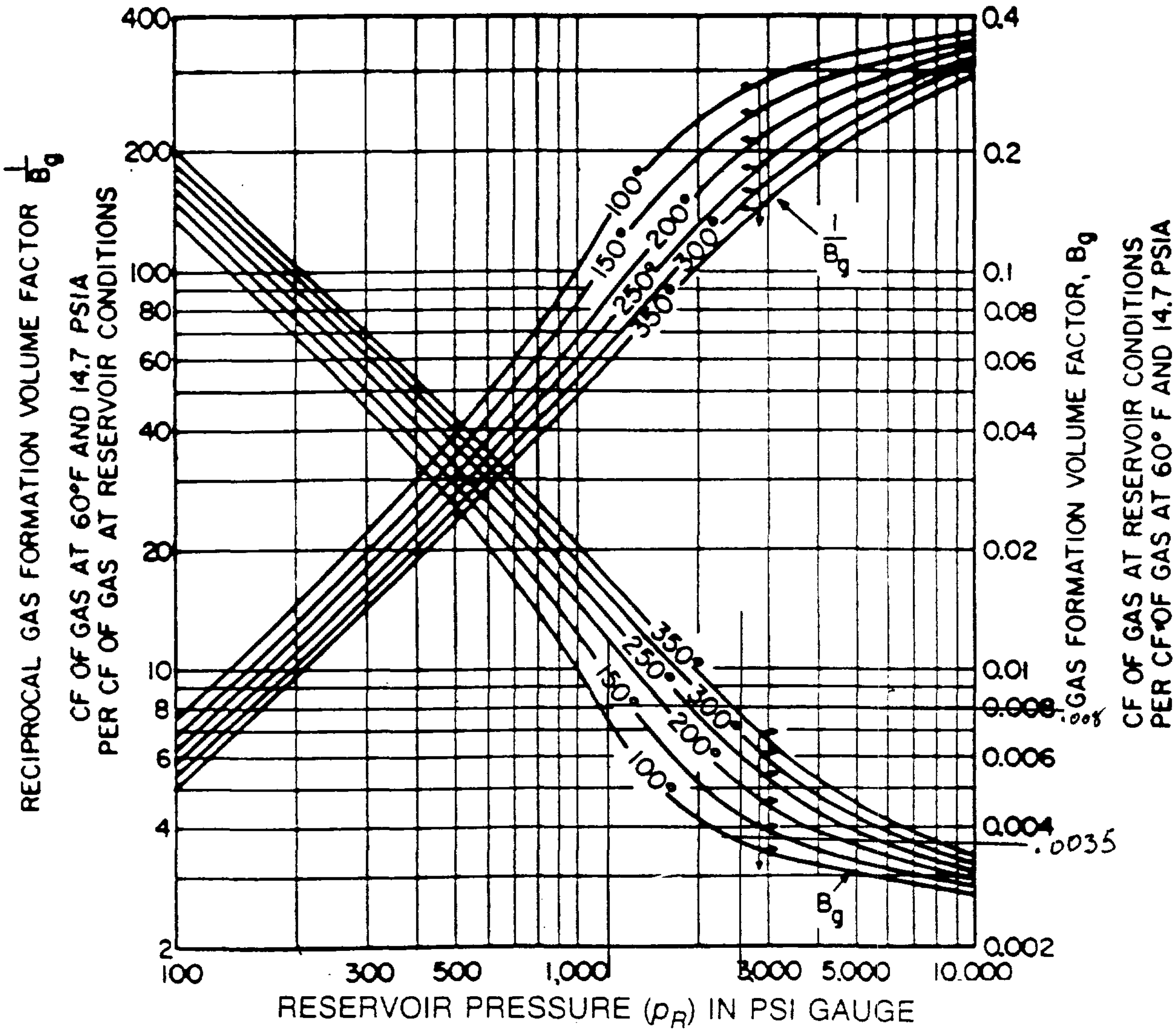


Fig. 40.19—Gas FVF $B_g = \dfrac{14.17}{p_R + 14.7}\,\dfrac{460 + T_R}{460 + 60}\,z$

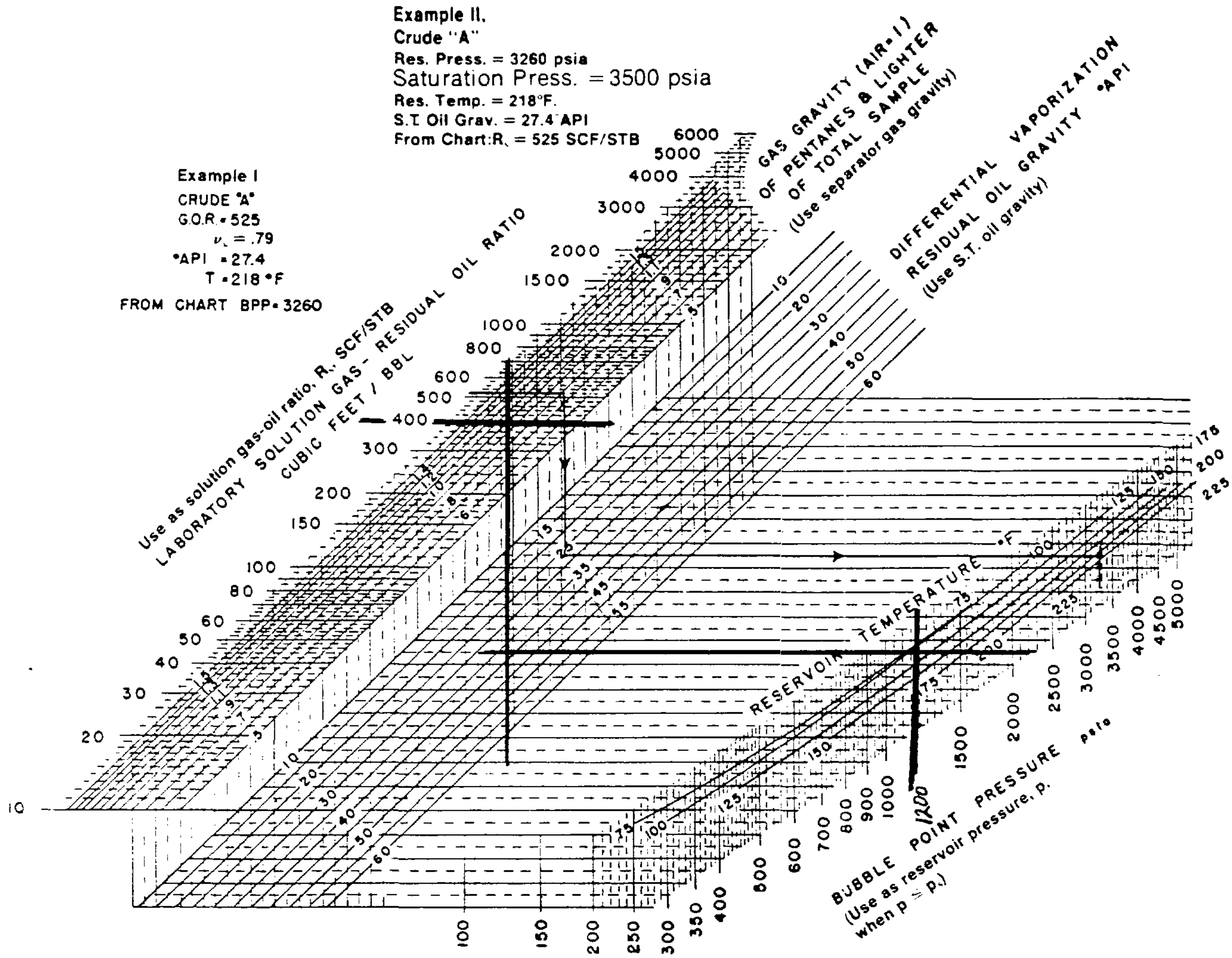
and reciprocal gas FVF

$$\frac{1}{B_g} = \frac{p_R + 14.7}{14.7}\,\frac{460 + 60}{460 + T_R}\,\frac{1}{z}$$

vs. pressure, psig, and temperature, °F.
Gas gravity 1.0 (air 1.0).

$B_g = .0035$ @ 2500 psi
$B_g = .008$ @ 1200 psi

ARMSTRONG ENERGY CORP.
GAS FORMATION VOLUME FACTOR NORTHEAST LEA FIELD LEA COUNTY, NEW MEXICO EXHIBIT O



Gas in solution or bubble-point pressure (From Borden and Rzasa, "Correlation of Bottom Hole Sample Data," *Trans. AIME 192,* 19, 1951)

Bubble Point Pressure 1200 psi

ARMSTRONG ENERGY CORP.

BUBBLE POINT PRESSURE
NORTHEAST LEA FIELD
LEA COUNTY, NEW MEXICO

EXHIBIT P

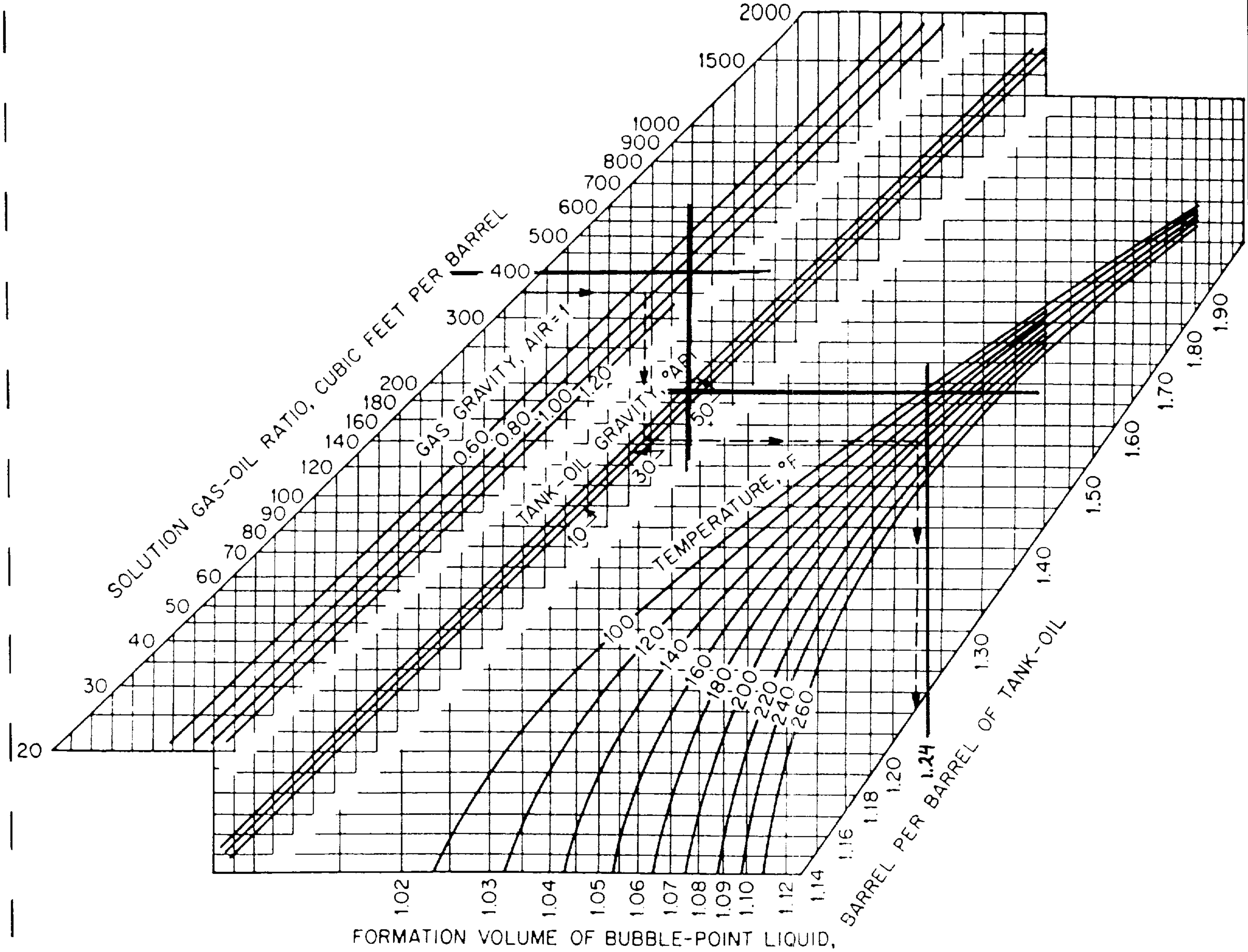


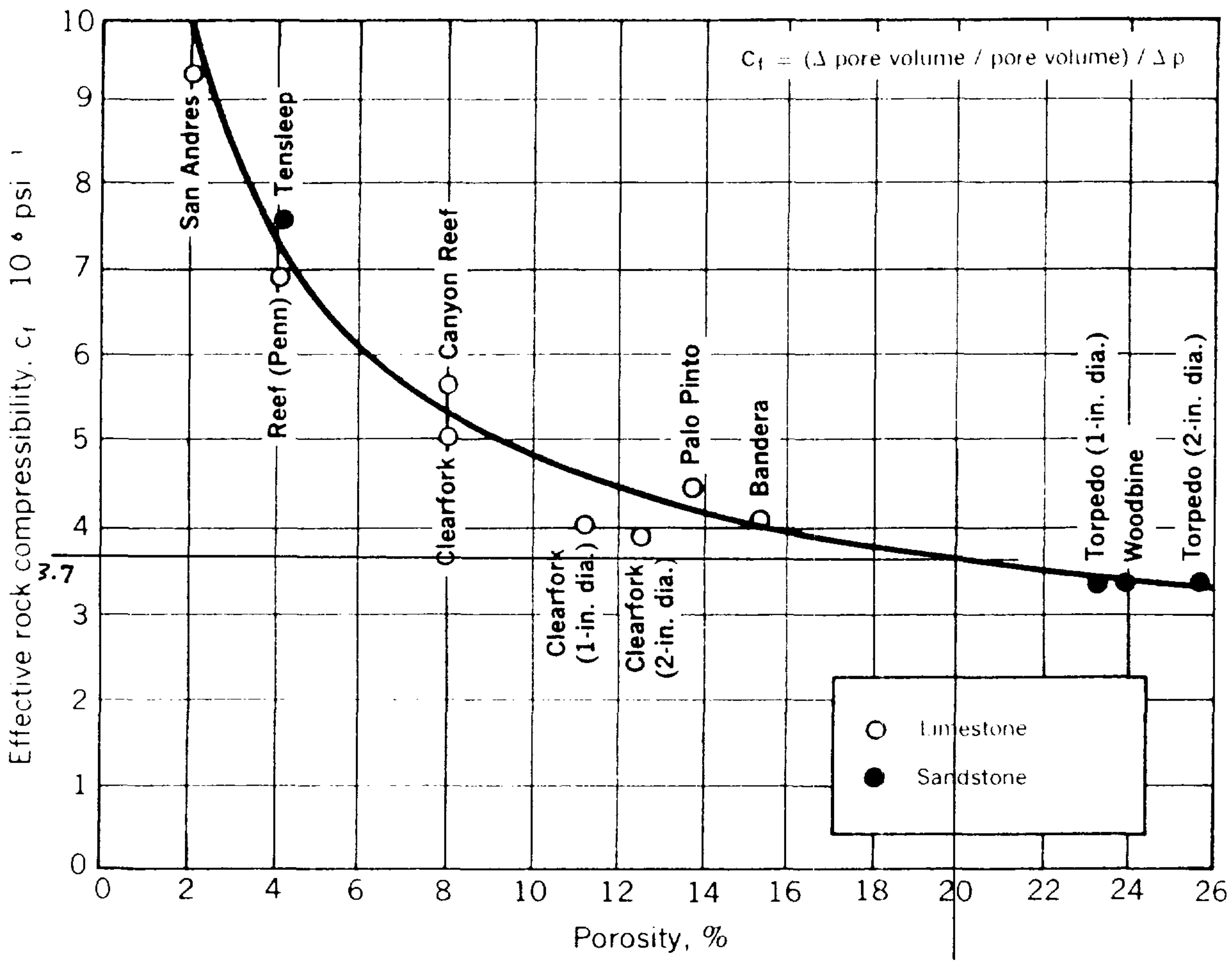
Fig. 22.9—Chart for calculating oil-formation volume by Standing's correlation.

$B_{oi} = 1.24$

ARMSTRONG ENERGY CORP.

OIL FORMATION VOLUME FACTOR
NORTHEAST LEA FIELD
LEA COUNTY, NEW MEXICO

EXHIBIT Q



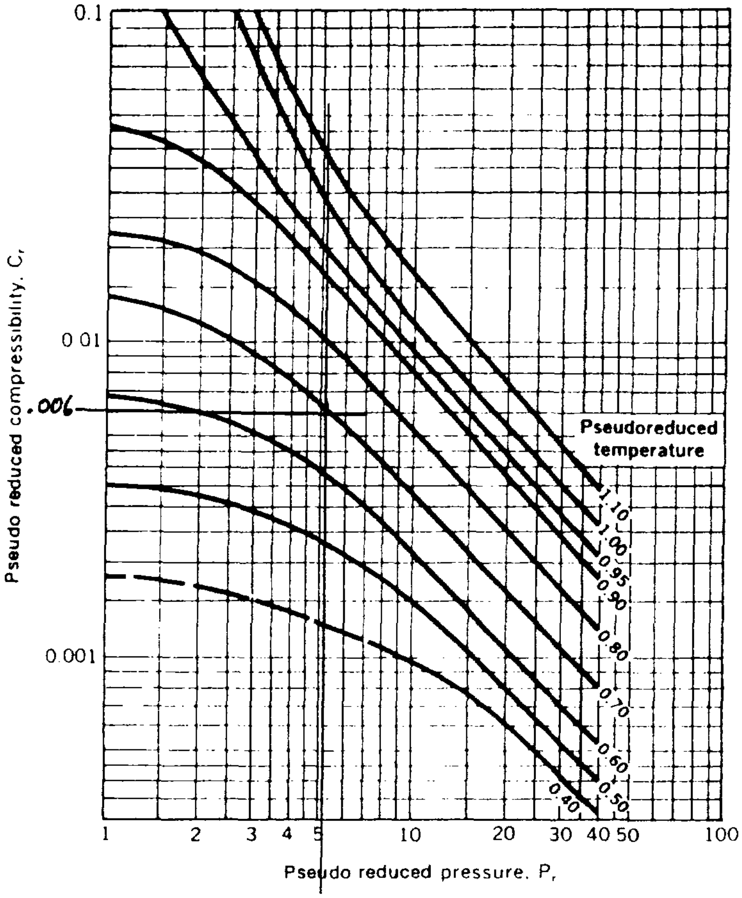
Formation compressibility (From Hall, "Compressibility of Reservoir Rocks," *Trans. AIME*, 1953)

$C_f = 3.7 \times 10^{-6}$

ARMSTRONG ENERGY CORP.

FORMATION COMPRESSIBILITY
NORTHEAST LEA FIELD
LEA COUNTY, NEW MEXICO

EXHIBIT B

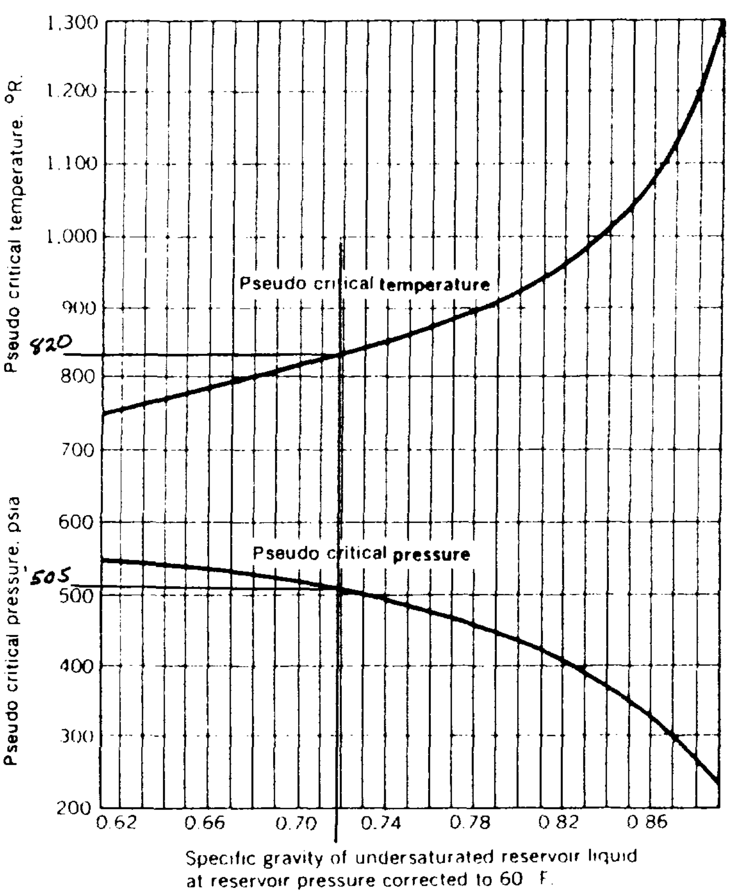


$T_r = (110+460)/820 = .695$

$P_r = 2539/505 = 5.028$

$C_o = \dfrac{C_r}{P_c}$

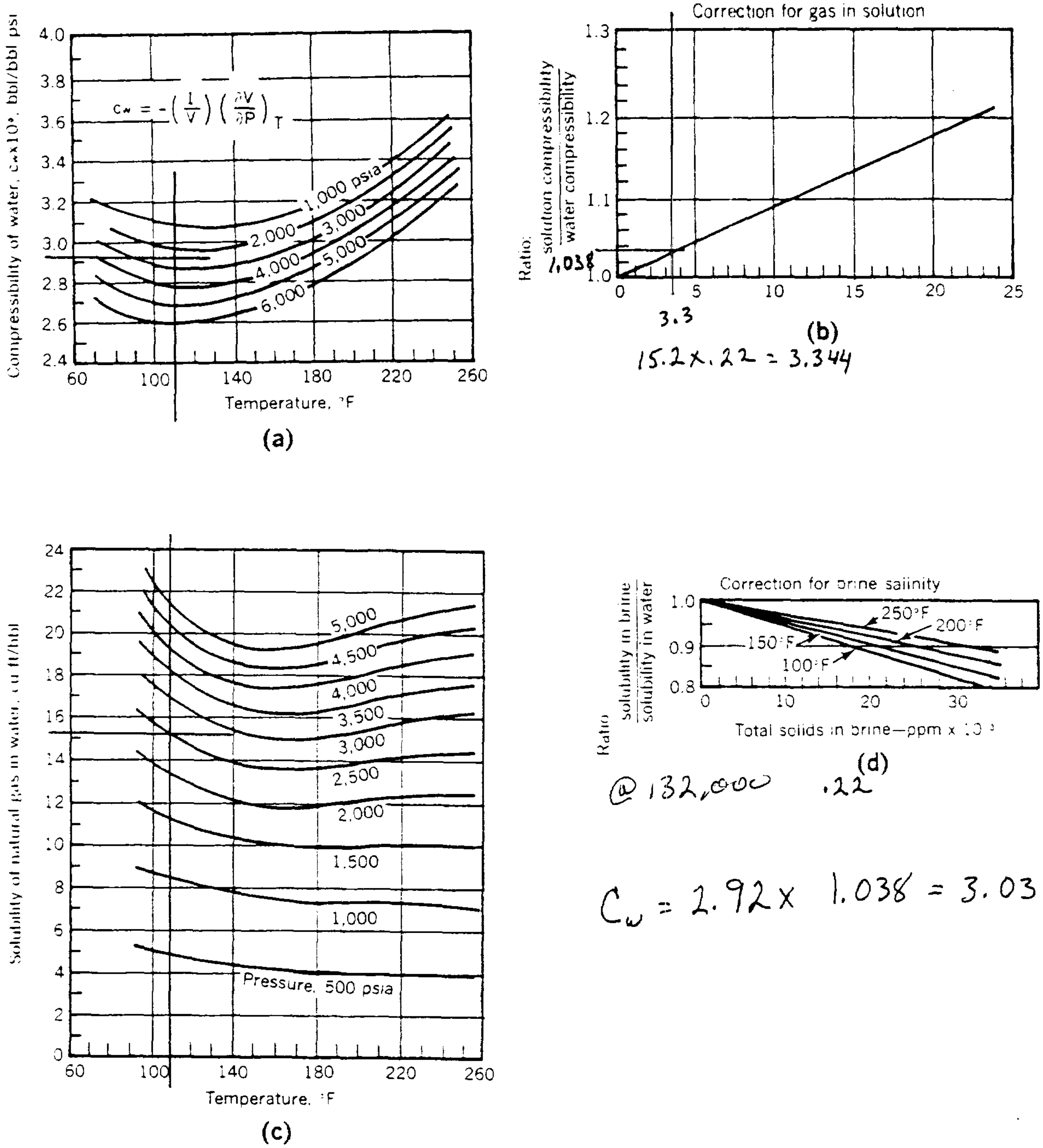
$C_o = \dfrac{.006}{505} = 1.188 \times 10^{-5}$



ARMSTRONG ENERGY CORP.

OIL COMPRESSIBILITY
NORTHEAST LEA FIELD
LEA COUNTY, NEW MEXICO

EXHIBIT S



1.038

3.3

$15.2 \times .22 = 3.344$

@ 132,000 .22

$C_w = 2.92 \times 1.038 = 3.031 \times 10^{-6}$

Compressibility and gas in solution for water. (From Dobson & Standing. "Pressure-volume-Temperature and Solubility Relations for Natural Gas-Water Mixtures." *Drilling and Production Practices*. API. 1944

ARMSTRONG ENERGY CORP.

WATER COMPRESSIBILITY
NORTHEAST LEA FIELD
LEA COUNTY, NEW MEXICO

EXHIBIT T

VOLUMETRIC ANALYSIS
THIRD SAND

$$N = \frac{7{,}758 \; Vo \; \varnothing \; (1-Sw)}{Bo}$$

$\varnothing$	POROSITY	20 %
Vo	RESERVOIR VOLUME, ACRE-FT.	400 AC. X 40'
Sw	WATER SATURATION	45 %
Bo	OIL FORMATION VOLUME FACTOR	1.24

$$N = \frac{7758 \times 400 \times 40 \times .2 \times (1-.45)}{1.24}$$

N= 11,011,355 STB

ARMSTRONG ENERGY CORP.

VOLUMETRIC ANALYSIS - THIRD SAND
NORTHEAST LEA FIELD
LEA COUNTY, NEW MEXICO

EXHIBIT U

MATERIAL BALANCE EQUATION

INITIALLY UNDERSATURATED OIL RESERVOIR; WITH AN ACTIVE WATER DRIVE; ABOVE BUBBLE POINT

$$N = \frac{[Np(1+\Delta pCo)-(We-Wp/Boi)](1-Sw)}{\Delta p[Co+Cf-Sw(Co-Cw)]}$$

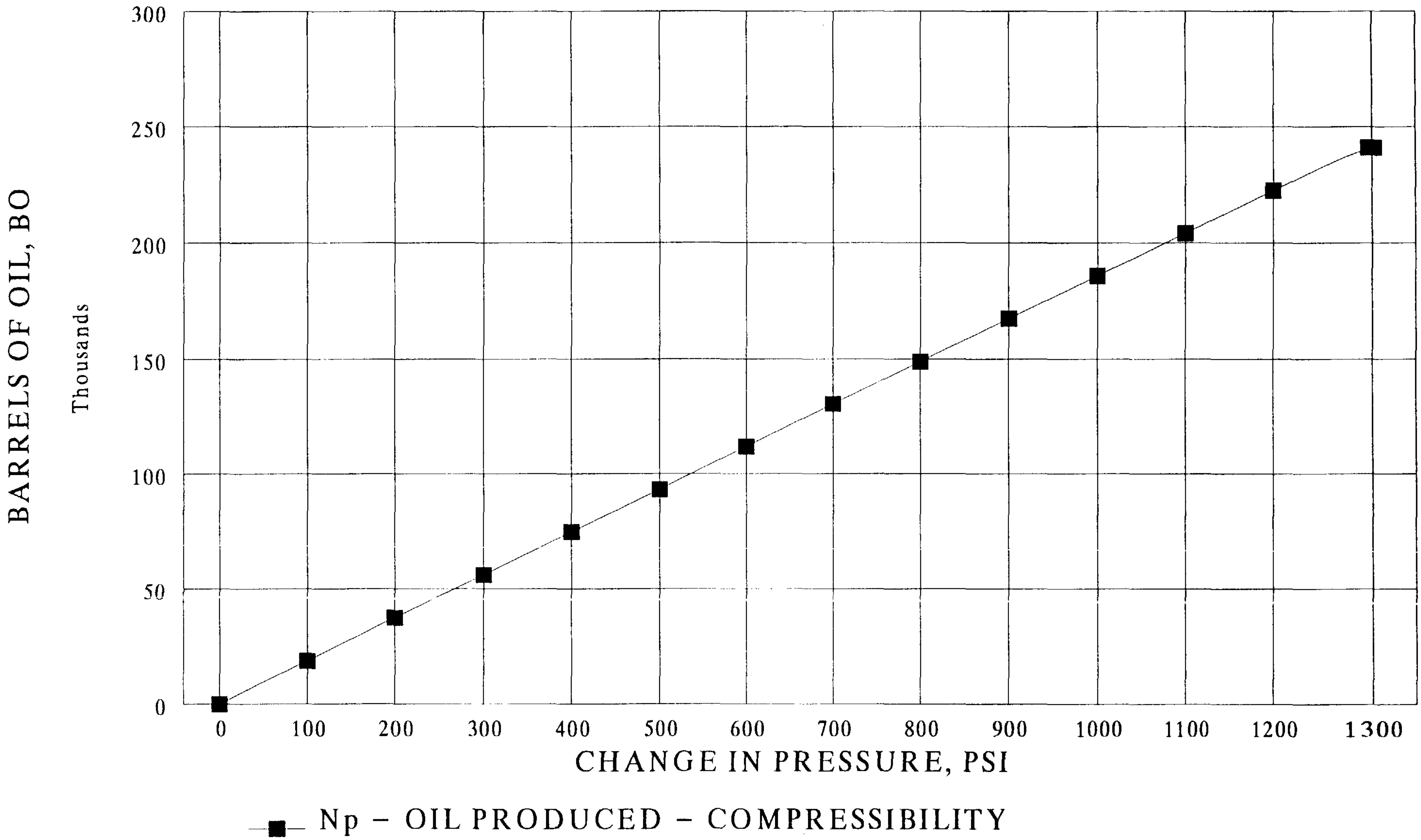
Δp	CHANGE IN PRESSURE
Boi	OIL FORMATION VOLUME FACTOR AT Pi
Cf	FORMATION COMPRESSIBILITY
Co	OIL COMPRESSIBILITY
Cw	WATER COMPRESSIBILITY
N	TOTAL OIL IN PLACE IN RESERVOIR
Np	OIL PRODUCED
Sw	WATER SATURATION
We	CUMULATIVE WATER INFLUX
Wp	CUMULATIVE WATER PRODUCED

EXHIBIT V

Bradley, H.B.: "Petroleum Engineering Handbook", SPE, Richardson, Texas (1987),40 - 7.

MATERIAL BALANCE EQUATION

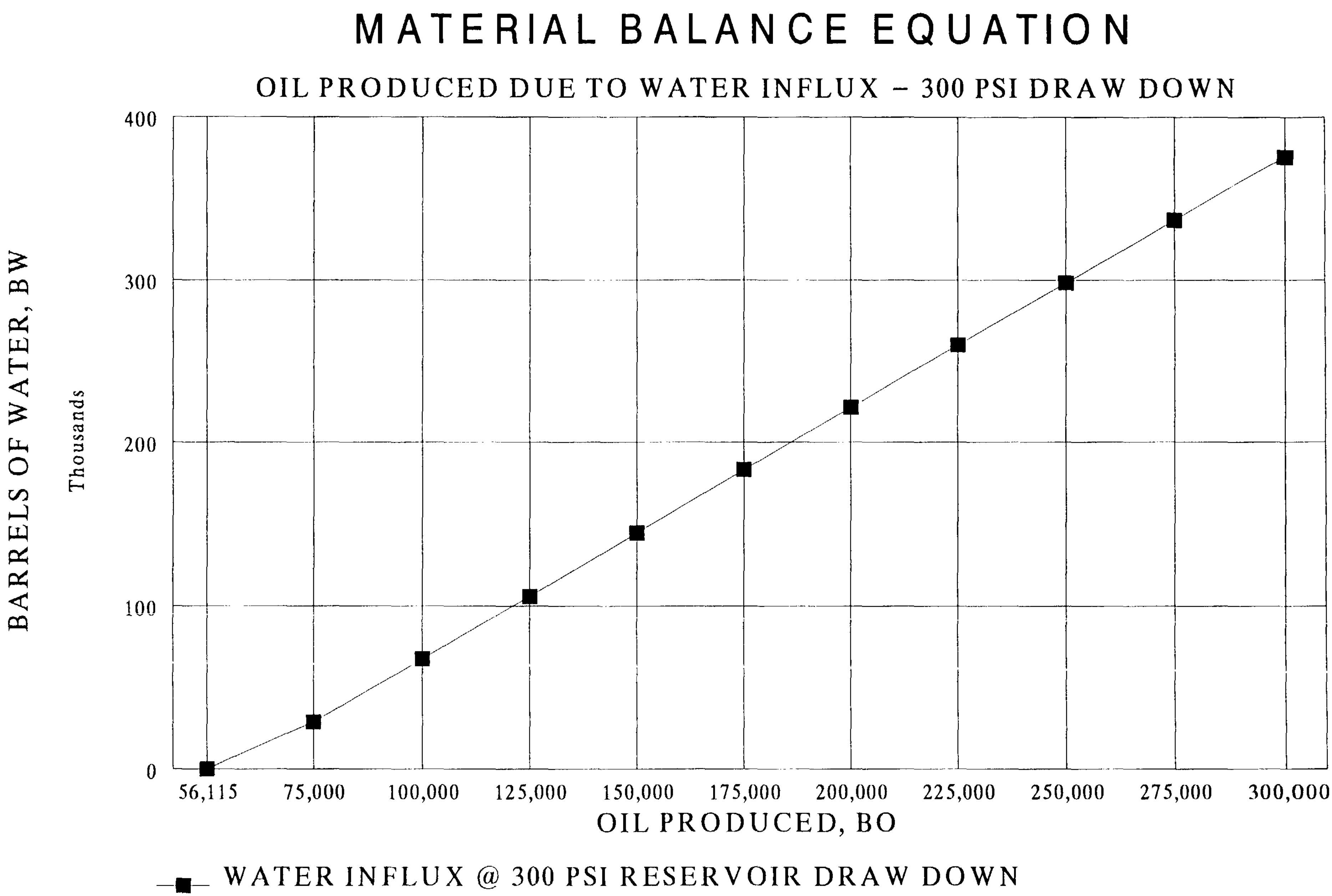
OIL PRODUCED DUE TO CHANGE IN PRESSURE – COMPRESSIBILITY



W

OIL PRODUCTION DUE TO COMPRESSIBILITY

p	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300
Boi	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Cf	3.700E-06	3.700E-06	3.700E-06	3.700E-06	3.700E-06	3.700E-06	3.700E-06	3.700E-06	3.700E-06	3.700E-06	3.700E-06	3.700E-06	3.700E-06	3.700E-06
Co	1.188E-05	1.188E-05	1.188E-05	1.188E-05	1.188E-05	1.188E-05	1.188E-05	1.188E-05	1.188E-05	1.188E-05	1.188E-05	1.188E-05	1.188E-05	1.188E-05
Cw	3.030E-06	3.030E-06	3.030E-06	3.030E-06	3.030E-06	3.030E-06	3.030E-06	3.030E-06	3.030E-06	3.030E-06	3.030E-06	3.030E-06	3.030E-06	3.030E-06
N	11,011,355	11,011,355	11,011,355	11,011,355	11,011,355	11,011,355	11,011,355	11,011,355	11,011,355	11,011,355	11,011,355	11,011,355	11,011,355	11,011,355
Np	0	18,740	37,445	56,115	74,750	93,345	111,910	130,430	148,930	167,380	185,800	204,180	222,540	240,850
Sw	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
We	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wp	0	5,526	11,042	16,547	22,042	27,525	32,999	38,461	43,916	49,356	54,788	60,208	65,621	71,021


MATERIAL BALANCE EQUATION
OIL PRODUCED DUE TO WATER INFLUX – 300 PSI DRAW DOWN
BARRELS OF WATER, BW
Thousands
400
300
200
100
0
56,115
75,000
100,000
125,000
150,000
175,000
200,000
225,000
250,000
275,000
300,000
OIL PRODUCED, BO
WATER INFLUX @ 300 PSI RESERVOIR DRAW DOWN

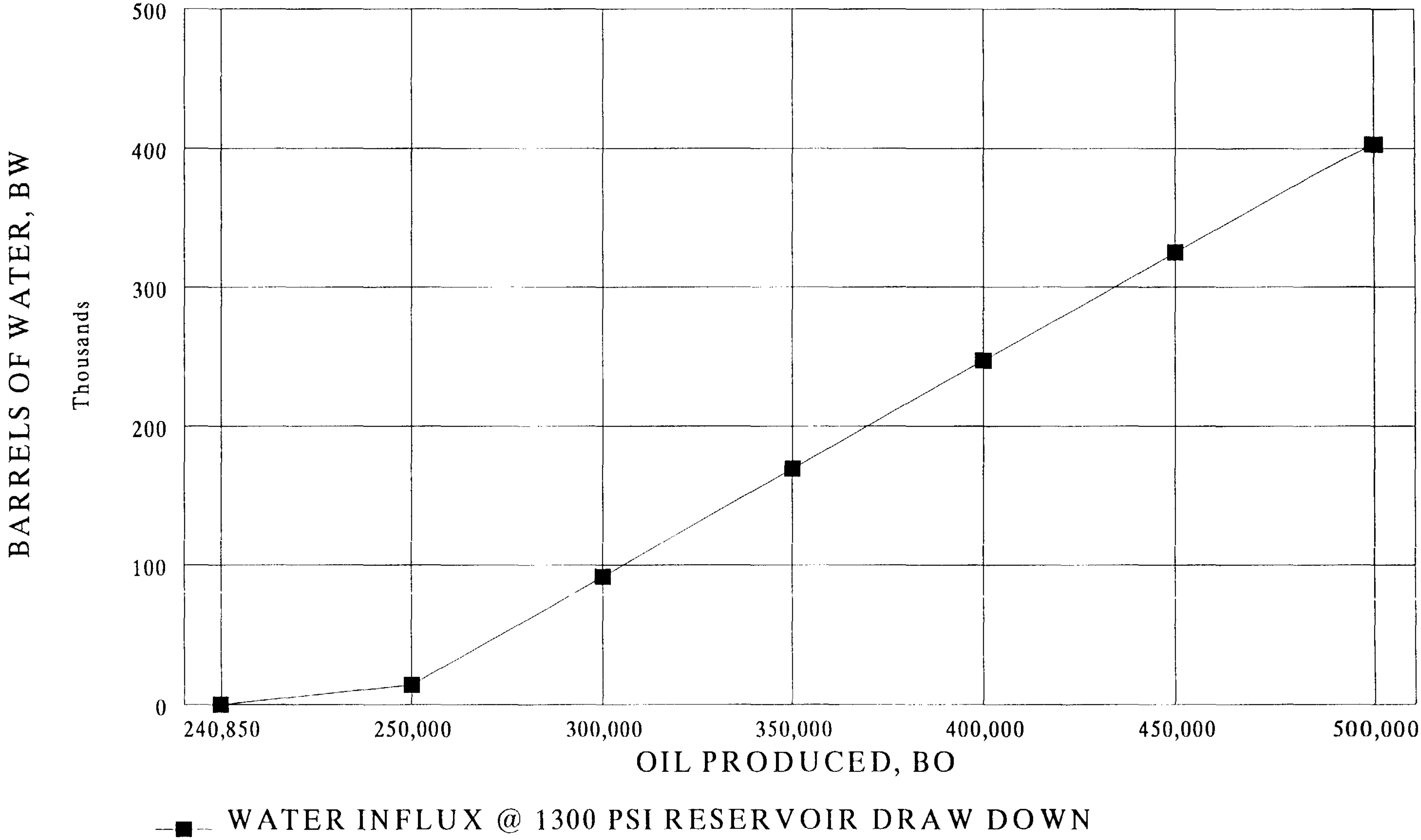
X

OILPRODUCTION DUE TO WATER INFLUX @ 300 PSI DRAW DOWN

p	300	300	300	300	300	300	300	300	300	300	300
Boi	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Cf	3.700E−06	3.700E−06	3.700E−06	3.700E−06	3.700E−06	3.700E−06	3.700E−06	3.700E−06	3.700E−06	3.700E−06	3.700E−06
Co	1.188E−05	1.188E−05	1.188E−05	1.188E−05	1.188E−05	1.188E−05	1.188E−05	1.188E−05	1.188E−05	1.188E−05	1.188E−05
Cw	3.030E−06	3.030E−06	3.030E−06	3.030E−06	3.030E−06	3.030E−06	3.030E−06	3.030E−06	3.030E−06	3.030E−06	3.030E−06
N	11,011,355	11,011,355	11,011,355	11,011,355	11,011,355	11,011,355	11,011,355	11,011,355	11,011,355	11,011,355	11,011,355
Np	56,115	75,000	100,000	125,000	150,000	175,000	200,000	225,000	250,000	275,000	300,000
Sw	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
We	0	29,075	67,550	106,040	144,520	183,000	221,480	259,965	298,450	336,930	375,410
Wp	16,547	22,116	29,488	36,859	44,231	51,603	58,975	66,347	73,719	81,091	88,463

MATERIAL BALANCE EQUATION

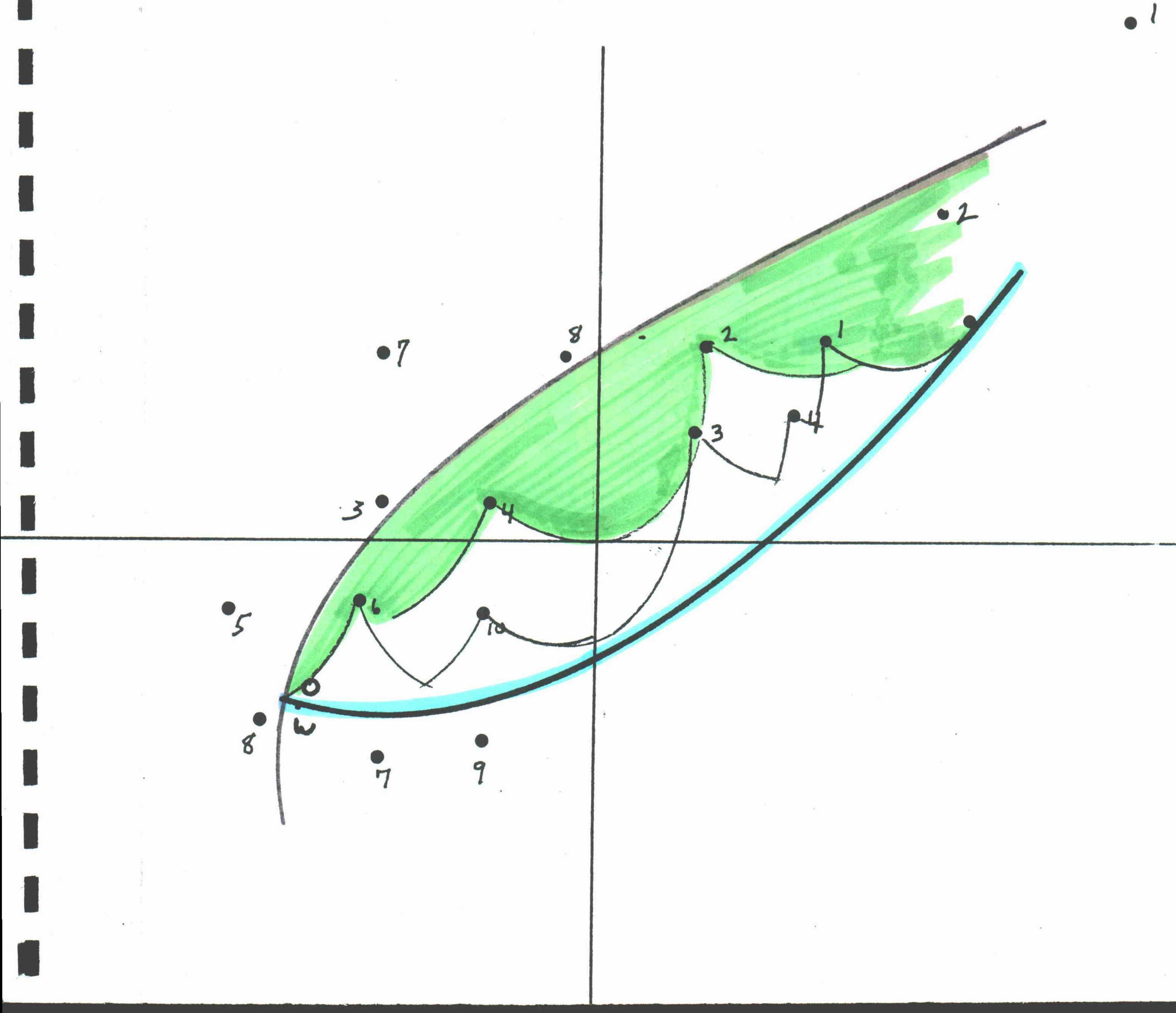
OIL PRODUCED DUE TO WATER INFLUX – 1300 PSI DRAW DOWN



Y

OILPRODUCTIONDUE TO WATER INFLUX @ 1300 PSI DRAW DOWN

p	1300	1300	1300	1300	1300	1300	1300
Boi	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Cf	3.700E−06	3.700E−06	3.700E−06	3.700E−06	3.700E−06	3.700E−06	3.700E−06
Co	1.188E−05	1.188E−05	1.188E−05	1.188E−05	1.188E−05	1.188E−05	1.188E−05
Cw	3.030E−06	3.030E−06	3.030E−06	3.030E−06	3.030E−06	3.030E−06	3.030E−06
N	11,011,355	11,011,355	11,011,355	11,011,355	11,011,355	11,011,355	11,011,355
Np	240,850	250,000	300,000	350,000	400,000	450,000	500,000
Sw	0.45	0.45	0.45	0.45	0.45	0.45	0.45
We	0	14,200	91,900	169,600	247,300	325,030	402,730
Wp	71,021	73,719	88,463	103,206	117,950	132,694	147,438


1
2
7
8
2
1
3
4
3
4
5
6
10
0
w
8
7
9