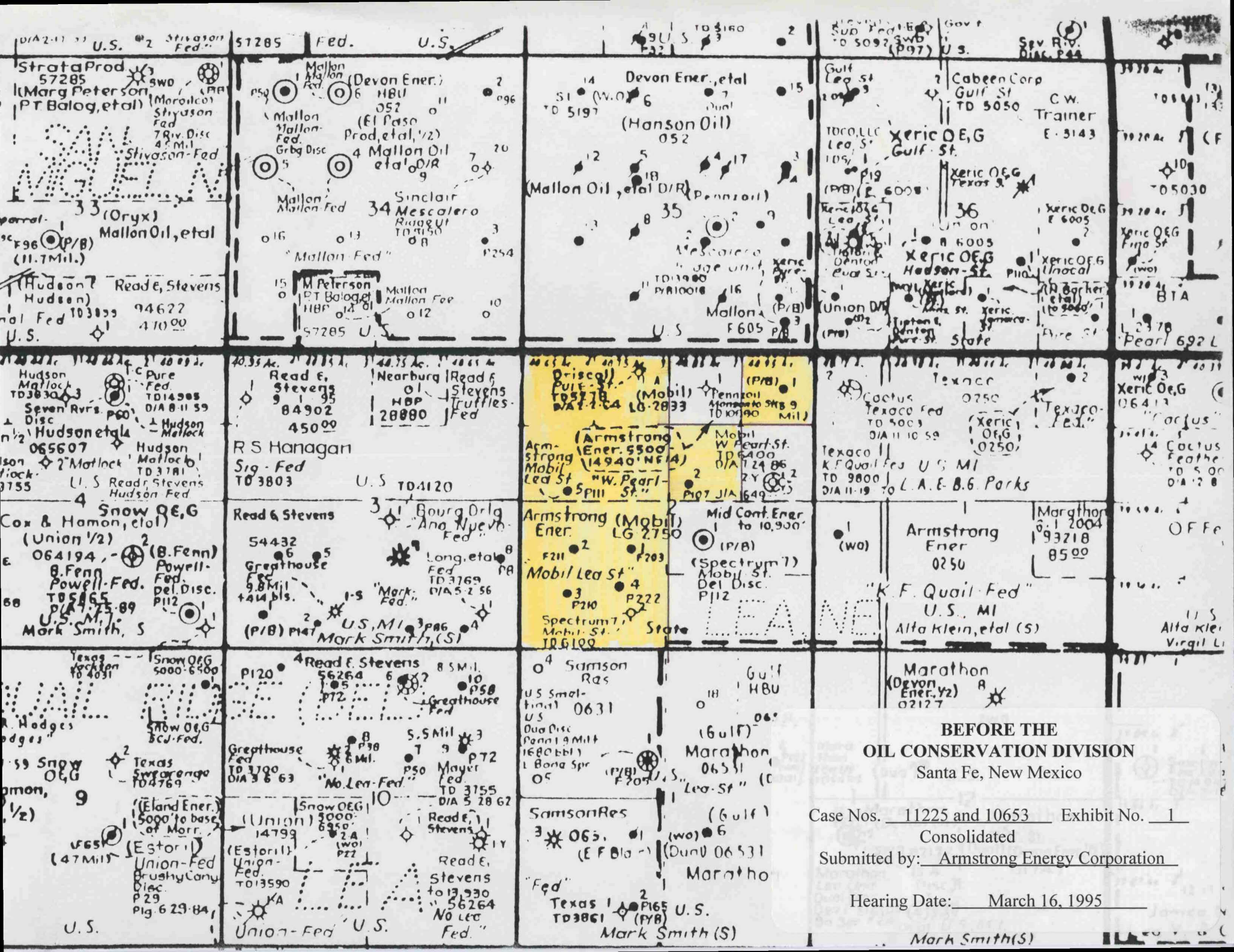

BEFORE THE
OIL CONSERVATION DIVISION
Santa Fe, New Mexico

Case Nos. 11225 and 10653 Exhibit No. 1
Consolidated
Submitted by: Armstrong Energy Corporation

Hearing Date: March 16, 1995

LARGE FORMAT EXHIBIT HAS BEEN REMOVED AND IS LOCATED IN THE NEXT FILE

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ARMSTRONG ENERGY CORPORATION

NORTHEAST LEA DELAWARE FIELD
SPECIAL POOL RULES (CASE 10,653)
AND
SPECIAL GAS-OIL RATIO (CASE 11,225)

MARCH 16, 1995

BEFORE THE
OIL CONSERVATION DIVISION
Santa Fe, New Mexico

Case Nos. 11225 and 10653 Exhibit No. 8
Consolidated
Submitted by: Armstrong Energy Corporation

Hearing Date: March 16, 1995

PECOS PETROLEUM ENGINEERING, INC.
ROSWELL, NEW MEXICO

CONTENTS

ARMSTRONG ENERGY CORPORATION
NORTHEAST LEA DELAWARE FIELD
HEARING FOR SPECIAL POOL RULES (CASE # 10653)
HEARING FOR SPECIAL GAS-OIL RATIO (CASE #11225)

March 16, 1995

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 has shown these Delaware pools can contain a multitude of separate reservoirs, each capable of producing the 107 BOPD allowable. In March 1994 temporary special pool rules were approved, which provided a 300 BOPD allowable for the Northeast Lea Delaware Pool. These special rules are necessary to allow efficient reservoir management and to protect correlative rights.

The Northeast Lea Delaware Field, as presented in Exhibit B-2, has twenty-six (26) producing wells, one (1) plugged well, one (1) Morrow well (Mark Federal #7) which is presently being completed in the Delaware, and one (1) new well drilled by Samson Resources. The list includes all Delaware Wells within a one mile radius of the Mobil Lea State wells and all other wells in the field.

<u>First Sand Characterization</u>

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 west side of the field with the Mobil Lea State #5, the West Pearl state #2, 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 have good shows and log response from this interval and plans are being formulated to complete these intervals in the near future. The West Pearl State #2 was completed in the First Sand in December 1994. The results were disappointing because the reservoir pressure had been drawn down by the Mobil State #1 well. This completion resulted in an increase of 10 BOPD. The Mid Continent Energy, Inc. Mobil State #1 has produced approximately 79,600 barrels of oil from the first sand interval on the far east side of the Northeast Lea Delaware Field.

The First Sand has produced over 886,000 barrels of oil to date from the Northeast Lea Delaware Pool and the daily production is in excess of 800 BOPD. This sand indicates it may have a strong water drive as evidenced by low GOR's and low decline rates. 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. With the drilling of the Mark Federal #7 there is a strong indication the first sand may extend north into the N/2 of section 3. The reservoir area of the first sand totals approximately 1200 acres. The productive area of the First Sand covers approximately three times the area of the Third Sand.

Second Sand Characterization

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 Mallon Oil Company Mescalaro Ridge Unit #3, but is an equivalent limestone zone. The Mescalaro Ridge Unit #3 has produced 26,000 BO.

Third Sand Characterization

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 producing pay in the east side of the Northeast Lea Field. The North Lea Federal #6 and #10 and the Mark Federal #4 produce from this zone , as well as the Mobil Lea State #1, 2, 3, and 4. The North Lea Federal #5 and #8 produce from a limestone which is equivalent to the Third Sand. An oil-water contact 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 was originally undersaturated and above bubble point. The reservoir dips to the South or Southeast at approximately 2 to 2.5 degrees (+/- 200 ft. per mile).

The Third Sand has produced over 569,000 barrels of oil to date 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 on wells close to the oil-water contact, 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, 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.

Additioal Producing Zones

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 this field. The Mark Federal #7 is testing a Upper Brushy Canyon sand from 7502' to 7512' which swab tested 25 BO per hour.

Producing Zone Summary

Therefore, there are two main sources of supply in the Northeast Lea Delaware Field. The First and Third Sands are the main pay zones and they are separated by the Second Sand, which is wet.

There are four other zones which make a minor contribution to production in these fields, the Second Sand lime equivalent, the Third Sand Lime equivalent, the Fourth Sand, and possibly a Upper Brushy Canyon zone which could be capable of producing over the 107 BOPD allowable.

Producing Characteristics

The First and Third Sands in the Northeast Lea Fields are some what unique among Delaware Reservoirs. Most Delaware Sand reservoirs produce by solution gas drive with minor contributions from water influx. A typical Delaware 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 Northeast Lea Delaware field 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. The good wells exhibit constant producing rates, low GOR's, 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 or was capable of producing at rates over 100 BOPD. The North Lea Federal #5, 6 and 9, Mark Federal #1 and 5 and Mobil Lea State #1, 2 , 3 and 4 all currently produce at rates in excess of 100 BOPD. The North Lea Federal #4 produced at a rate over 100 BOPD until January 1993, when a casing leak was discovered and subsequently squeezed, this leak resulted in a 30 BOPD drop in production.

Water Production

Water production in the Northeast Lea Field 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 two years of production the cut is 10%. The Mobil Lea State #2 had an initial water cut of 10 % and still has a 10% 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 Sands, 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 west side of the field has exhibited similar production traits. The North Lea Federal #4 had an initial water cut of 20% and now has a 2% cut. The Mark Federal #1 has exhibited a constant water cut of 40%. A few wells have shown increases in water cut, this can

be attributed to opening additional pay zones, stimulation treatments which went out of zone and wells close to the oil-water contact are starting to see the advancing water front, such as the North Lea Federal #10, Exhibit G-10.

Mobility Ratio

With the presence of a strong water drive the displacement of the oil by the water is important. The calculated mobility ratio 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 55%. 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 and 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.

Gas-Oil Ratio

The Gas-Oil Ratio exhibited by wells producing from the First and Third sand in the Northeast Lea Delaware Field was initially 375 to 400 cu. ft./bbl. Due to the planned drawdown of the north end of the third sand zone, the Mobil Lea state wells have had an increase in GOR to 2000 to 1. The wells in the First Sand had initial GOR's of 350 to 400 cu.ft./bbl., GOR's have increases to 750 cu.ft./bbl in the past year. This indicates some areas of the first sand are now below the bubble point.

The reduction of reservoir pressure in the north end of the third sand zone will cause this part of the reservoir to be produced under solution gas drive until water influx occurs. Under a typical solution gas drive mechanism the G.O.R. increases as reservoir pressure is drawndown.

The SPE Petroleum Engineers Handbook[1] discusses in detail solution gas drive reservoirs and simulation studies by Mr. R.L Ridings and his conclusions concerning solution gas drive reservoirs. Mr. Ridings concluded:

1) "Ultimate recovery is essentially independent of rate and spacing, and agrees closely with recovery predicted by the conventional Muskat method."

2) "GOR depends somewhat on rate and spacing. For high rates or close spacing, GOR's initially are higher, but later become lower than a Muskat prediction would indicate. At low rates or wide spacing, GOR behavior approaches a Muskat prediction."

3) Computed depletion time agreed closely with conventional analysis (productivity index method) at low pressure drawdown, but differed more for high drawdowns. This is in

qualitative agreement with results obtained by Vogel.

4) "Intermittent operation greatly affects instantaneous GOR behavior, but the cumulative GOR is not affected significantly. Also, oil recovery is not affected." This refers to the cumulative oil recovery, not the amount of oil recovered in a given time period.

These conclusions are substantiated by analysis of the material balance equation. All of the variables except the produced gas-oil ration are a function of pressure and the properties of the reservoir fluids. Since the nature of the reservoir fluids are fixed, the recovery is fixed by the PVT properties of the reservoir fluid and produced gas-oil ratio. Since the cumulative GOR is not significantly affected by rate the ultimate recovery will not be significantly affected by the production rate.

Production of the north end of the third sand zone by solution gas drive is the most efficient method of recovery of reserves in the updip portion of the reservoir. By lowering the pressure, gas expansion will move these reserves to the producing wells. Later in the life of the zone water influx will sweep downdip oil to the producers.

A 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 700 and the North Lea Federal #4 had an initial GOR of 350 and has increased to 900. 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.

Bottom Hole Pressure

The initial bottom hole pressure in the First and Third Sands was estimated from Drill Stem Test Data. 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.

Volumetric Analysis

To make later calculations using the Material Balance Equation, a volume of oil-in-place was calculated using Volumetric Analysis. The reservoir was characterized and digitized, Exhibit F-1, a water saturation is 45% and the oil formation volume factor is 1.24 were used to calculate the OOIP. The resulting calculation indicates there is 5,450,353 barrels of oil in place in the Third Sand Reservoir. A similar calculation, Exhibit D-1, indicates there is 20,925,000 bbls. of OOIP in the First Sand Reservoir.

Third Sand Material Balance Analysis

Using the Material Balance Equation for initially undersaturated oil reservoirs, with an active water drive, above bubble point, we can estimate the volume of reserves recoverable from each drive mechanism. Exhibit H-9 is a model of the third sand reservoir used to determine the effects of pressure and water influx. This model indicates approximately 250,000 BO would be recovered

by the reduction of reservoir pressure to the bubble point. The estimated present status of the reservoir, with a 1300 psi reduction in average reservoir pressure and at the present recovery of 569,000 BO (total voidage is estimated at 1,120,000 barrels) an approximate water influx of 450,000 BW and recovery due to compressibility of 226,000 BO. Daily voidage is approximately 1800 barrels and water influx at this pressure differential is approximately 1500 barrels per day.

Third Sand Reservoir Management Plan

The initial analysis of the Third Sand indicates a reservoir with a 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 was essentially trapped and no mechanism was available to move these reserves from this updip position to a producing well. This was 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 and gas expansion. 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.

To maximize recovery from the Third Sand a management plan was developed to bring the North end of the reservoir to the bubble point pressure any further reduce the pressure to 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. In March 1994 producing rates were increased, the resulting increase in GOR's indicated the BHP reached the bubble point. In May 1994 production rates were decreased to maintain BHP in the south part of the reservoir at or above the bubble point. On June 1, 1994 the BHP pressure in the Mobil Lea State #1 was measured at 930 psi. This indicated the reservoir pressure had been lowered as planned and production rates could be used to reduce the BHP. The maximum efficient production rate is determined to be the rate which allows the north end of the field to produce under gas expansion and the south part of the field to take advantage of the water drive and keep the reservoir pressure at the bubble point.

As the pressure is decreased in the north part of the field GOR's will increase. The GOR's have increased from 350 to 400 cu. ft/bbl. to 2000 cu.ft./bbl. GOR's have started leveling out and are not expected to increase above 3000 to 1. A special field rule increasing the allowable GOR to 3000 to 1 will be needed to continue the draw down of the north part of the field.

The Mobil Lea State #3 well was chosen as the control well, BHP measurements have been taken periodically and production rates adjusted to maintain a mid-field reservoir pressure above the bubble point. a history of these measurements is presented in Exhibit H-7. Presently the BHP is believed to be above 2000 PSI in the Southern water leg, 1300 psi in the middle of the zone and approximately 600 psi in the north end of the zone. A representation of this pressure gradient is presented in Exhibit H-8.

Water influx is estimated by the Material Balance Equation, and compares to actual field results.

Because of a thinning and reduced reservoir quality along a line running just west of the north-south section line, the Third Sand is divided into two fingers, considering the production in each finger and predicting the advancement of the water front, production histories match the model. The water front is predicted to be almost to the North Lea Federal #6 and 10 wells. These wells have shown an increase in water production in the past few months. The water front is predicted to still be south of the Mobil Lea State #3 and 4 wells, they have not seen any increase in water production.

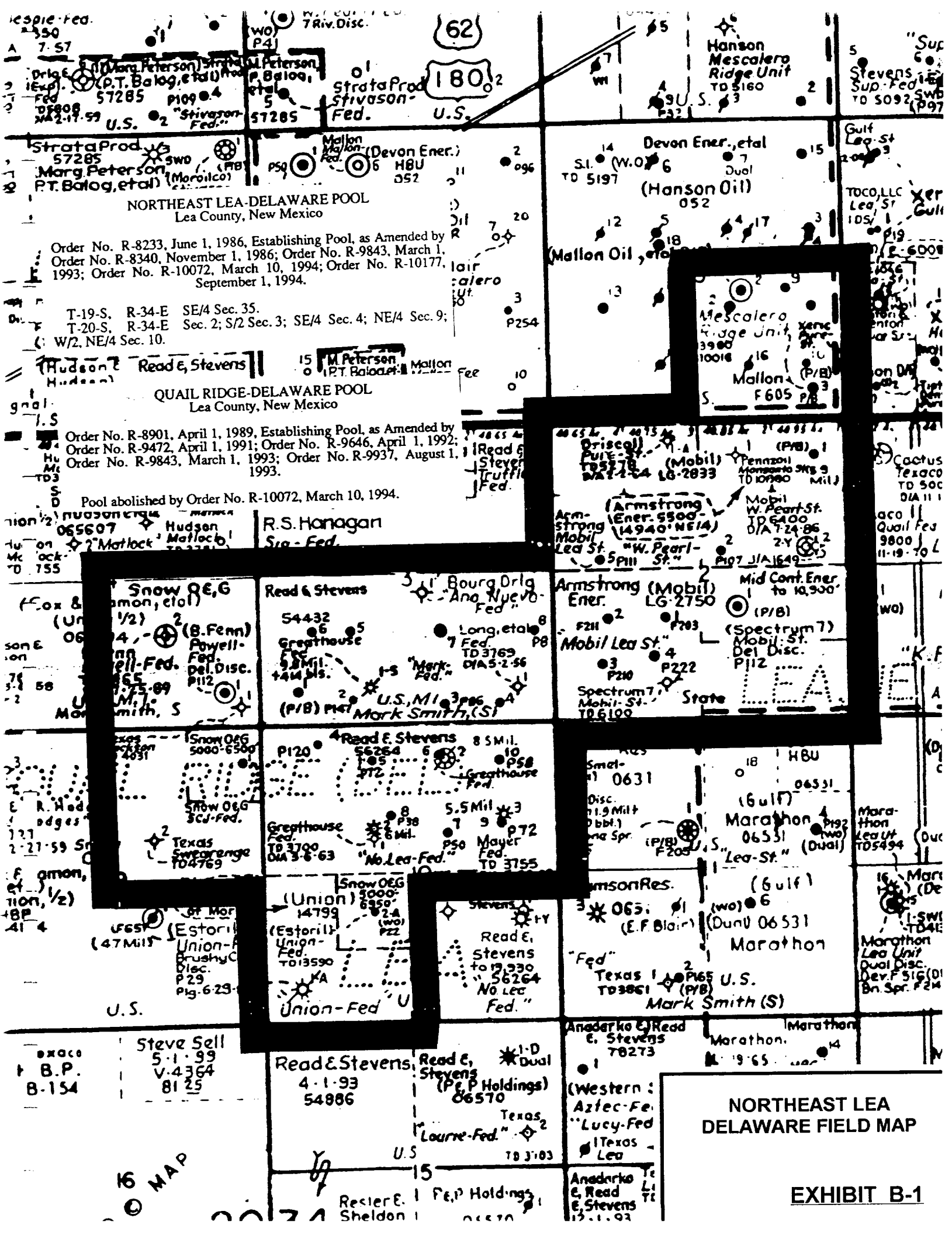
It is planned to continue drawing down the north end of the third sand zone to recover the maximum amount of reserves due to solution gas drive. Withdrawal will be regulated to maintain the reservoir at bubble point in the south part of the zone. Water influx will continue sweep oil to the updip wells. Ultimate recovery from the third sand reservoir is estimated to be greater than 27% of the original-oil-in-place.

Correlative Rights

Correlative rights of all producers in this pool would be better served with a higher allowable. Because of the need for a rates in excess of 100 BOPD, per zone, to manage these reservoirs to maximize recovery, higher allowables would allow each operator to produce their wells at an optimum rate. Under the present allowable system the operators can not manage their reservoirs to maximize recovery and compete with offset operators in all of the different pay zones. For example, the First Sand is being produced in some wells and the Third Sand in other wells, this leads to depletion of a reservoir before an operator has a chance to produce the zone on his lease.

We therefore respectfully request permanent field rules to allow a 300 BOPD allowable which would provide a mechanism to maximize recoveries of oil and gas and protect correlative rights.

1 Bradley,Harold B.: Petroleum Engineers Handbook, Society of Petroleum Engineers, Richardson, Texas (1987), p. 37-21.


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, 1986; Order No. R-9843, March 1, 1993; Order No. R-10072, March 10, 1994; Order No. R-10177, September 1, 1994.
T-19-S, R-34-E SE/4 Sec. 35.
T-20-S, R-34-E Sec. 2; S/2 Sec. 3; SE/4 Sec. 4; NE/4 Sec. 9; W/2, NE/4 Sec. 10.
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.
Pool abolished by Order No. R-10072, March 10, 1994.
NORTHEAST LEA DELAWARE FIELD MAP
EXHIBIT B-1

DELAWARE WELLS LOCATED IN THE NORTHEAST LEA FIELD AND WITHIN ONE MILE

OPERATOR	WELL NAME	LOCATION	PERFORATIONS UPPER	LOWER	
ARMSTRONG ENERGY CORP.	MOBIL LEA ST. #1	K-2-T20S-R34E	5890	5930	3rd SAND
ARMSTRONG ENERGY CORP.	MOBIL LEA ST. #2	L-2-T20S-R34E	5890	5930	3rd SAND
ARMSTRONG ENERGY CORP.	MOBIL LEA ST. #3	M-2-T20S-R34E	5918	5946	3rd SAND
ARMSTRONG ENERGY CORP.	MOBIL LEA ST. #4	N-2-T20S-R34E	5910	5940	3rd SAND
ARMSTRONG ENERGY CORP.	MOBIL LEA ST. #5	E-2-T20S-R34E	5910	5940	1st SAND
ARMSTRONG ENERGY CORP.	W.PEARL ST. #1	A-2-T20S-R34E	5890	5910	3rd SAND
ARMSTRONG ENERGY CORP.	W.PEARL ST. #2	G-2-T20S-R34E	5928	5948	3rd SAND
			5744	5805	2nd SAND, WET
			5596	5610	1st SAND DECEMBER 1994
READ & STEVENS INC.	N. LEA FED. #4	D-10-T20S-R34E	5618	5651	1st SAND CASING LEAK 4059-4090
READ & 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
READ & STEVENS INC.	N. LEA FED. #6	B-10-T20S-R34E	5900	5920	3rd SAND
			5602	5656	1st SAND
			5514	5548	1st SAND
READ & STEVENS INC.	N. LEA FED. #7	G-10-T20S-R34E	5942	5962	3rd SAND, WET
			5620	5674	1st SAND
			5556	5592	1st SAND
READ & 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
READ & STEVENS INC.	N. LEA FED. #9	H-10-T20S-R34E	5892	5904	LIME, WET
			5610	5676	1st SAND
READ & STEVENS INC.	N. LEA FED. #10	A-10-T20S-R34E	5910	5930	3rd SAND
READ & STEVENS INC.	MARK FED. #1	M-3-T20S-R34E	5644	5664	1st SAND
READ & STEVENS INC.	MARK FED. #2	N-3-T20S-R34E	5610	5640	1st SAND
READ & STEVENS INC.	MARK FED. #3	O-3-T20S-R34E	5628	5680	1st SAND
			5534	5546	1st SAND
READ & STEVENS INC.	MARK FED. #4	P-3-T20S-R34E	5912	5922	3rd SAND
READ & STEVENS INC.	MARK FED. #5	K-3-T20S-R34E	5650	5670	1st SAND
READ & STEVENS INC.	MARK FED. #6	L-3-T20S-R34E	5652	5674	1st SAND
READ & STEVENS INC.	MARK FED. #7	J-3-T20S-R34E			1st SAND, MORROW WELL
READ & 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
READ & STEVENS INC.	HUDSON FEDERAL #1	H-4-T20S-R34E			MORROW TEST, SHOW IN DELAWARE

EXHIBIT **B-2**

OPERATOR	WELL NAME	LOCATION	PERFORATIONS UPPER	LOWER		
MALLON OIL COMPANY	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	
SAMSON RESOURCES	#5 FEDERAL	E-11-T20S-R34E			3 RD SAND WET, TESTING FIRST SAND	
MALLON OIL COMPANY	#1 MALLON "34" FED.	D-34-T190S-R34	5094	5138	GRAYBURG	IPP 50 BO, 100 BWPD, 9/27/94
MALLON OIL COMPANY	#2 MALLON "34" FED.	A-34-T190S-R34	5878	5946	DELAWARE	IPP 192 BO, 768 BWPD, 10/22/94
MALLON OIL COMPANY	#3 MALLON "34" FED.	I-34-T190S-R34	5842	5882	DELAWARE	IPP 254 BO, 80 BW, 80 MCF, 11/23/94

EXHIBIT B-2

NORTHEAST LEA DELAWARE FIELD PRODUCTION

THROUGH 12-31-94

		1 st SAND			3 rd SAND		
OPERATOR	WELL NAME	OIL	GAS	WATER	OIL	GAS	WATER
ARMSTRONG ENERGY CORP.	MOBIL LEA ST. #1				122,122	90,020	9,188
ARMSTRONG ENERGY CORP.	MOBIL LEA ST. #2				98,481	97,450	8,211
ARMSTRONG ENERGY CORP.	MOBIL LEA ST. #3				63,952	66,136	9,697
ARMSTRONG ENERGY CORP.	MOBIL LEA ST. #4				50,535	62,520	3,200
ARMSTRONG ENERGY CORP.	MOBIL LEA ST. #5	4,373	3,184	1,687	9,697		
ARMSTRONG ENERGY CORP.	W.PEARL ST. #1				38,087	24,447	5,123
ARMSTRONG ENERGY CORP.	W.PEARL ST. #2	300	120	0	16,993	9,661	20,351
READ & STEVENS INC.	N. LEA FED. #4	81,668	34,189	299			
READ & STEVENS INC.	N. LEA FED. #5	119,668	57,441	9,580			
READ & STEVENS INC.	N. LEA FED. #6				95,807	29,681	104,056
READ & STEVENS INC.	N. LEA FED. #7	70,972	28,285	51,401			
READ & STEVENS INC.	N. LEA FED. #8	40,629	22,289	71,062			
READ & STEVENS INC.	N. LEA FED. #9	64,663	25,620	63,039			
READ & STEVENS INC.	N. LEA FED. #10				43,398	30,526	56,192
READ & STEVENS INC.	MARK FED. #1	145,292	68,963	7,854			
READ & STEVENS INC.	MARK FED. #2	125,161	45,056	121			
READ & STEVENS INC.	MARK FED. #3	33,000	15,983	36,499			
READ & STEVENS INC.	MARK FED. #4				28,983	14,754	2,981
READ & STEVENS INC.	MARK FED. #5	47,904	13,700	22,874			
READ & STEVENS INC.	MARK FED. #6	19,367	13,676	24,059			
READ & STEVENS INC.	MARK FED. #7						
READ & STEVENS INC.	MARK FED. #8				1,360	1,774	10,903
MALLON OIL COMPANY	MESCALERO RIDGE #3						
MID-CONTINENT ENERGY	MOBIL ST #1	79,633	62,060	1,054			
SPECTRUM 7 EXPL.	MOBIL STATE #2						
SNOW OIL & GAS INC.	FED. SCJ #1	3,176	100	3,105			
SNOW OIL & GAS INC.	POWELL FED. #1	46,676	23,970	583			
SNOW OIL & GAS INC.	UNION "A" FED. #2	4,356	135	9,376			
	TOTAL	886,838	414,771	302,593	569,415	426,969	229,902

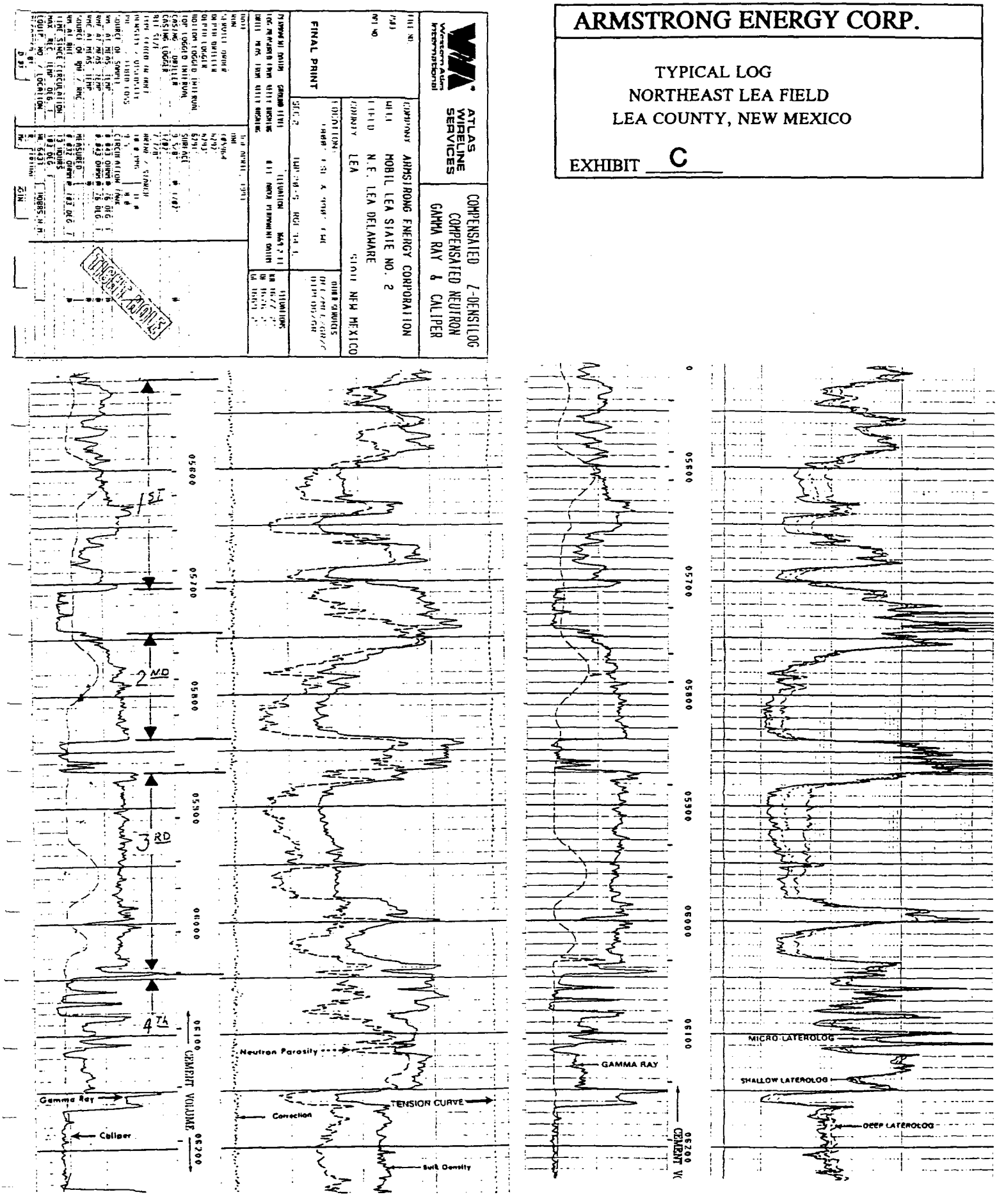
1 st SAND ESTIMATED OOIP, BBLS	20,925,000	4.24%	
1 st SAND ESTIMATED OGIP, MCF	7,846,875		5.29%
3 rd SAND ESTIMATED OOIP, BBLS	5,450,353	10.45%	
3 rd SAND ESTIMATED OGIP, MCF	2,043,882		20.89%

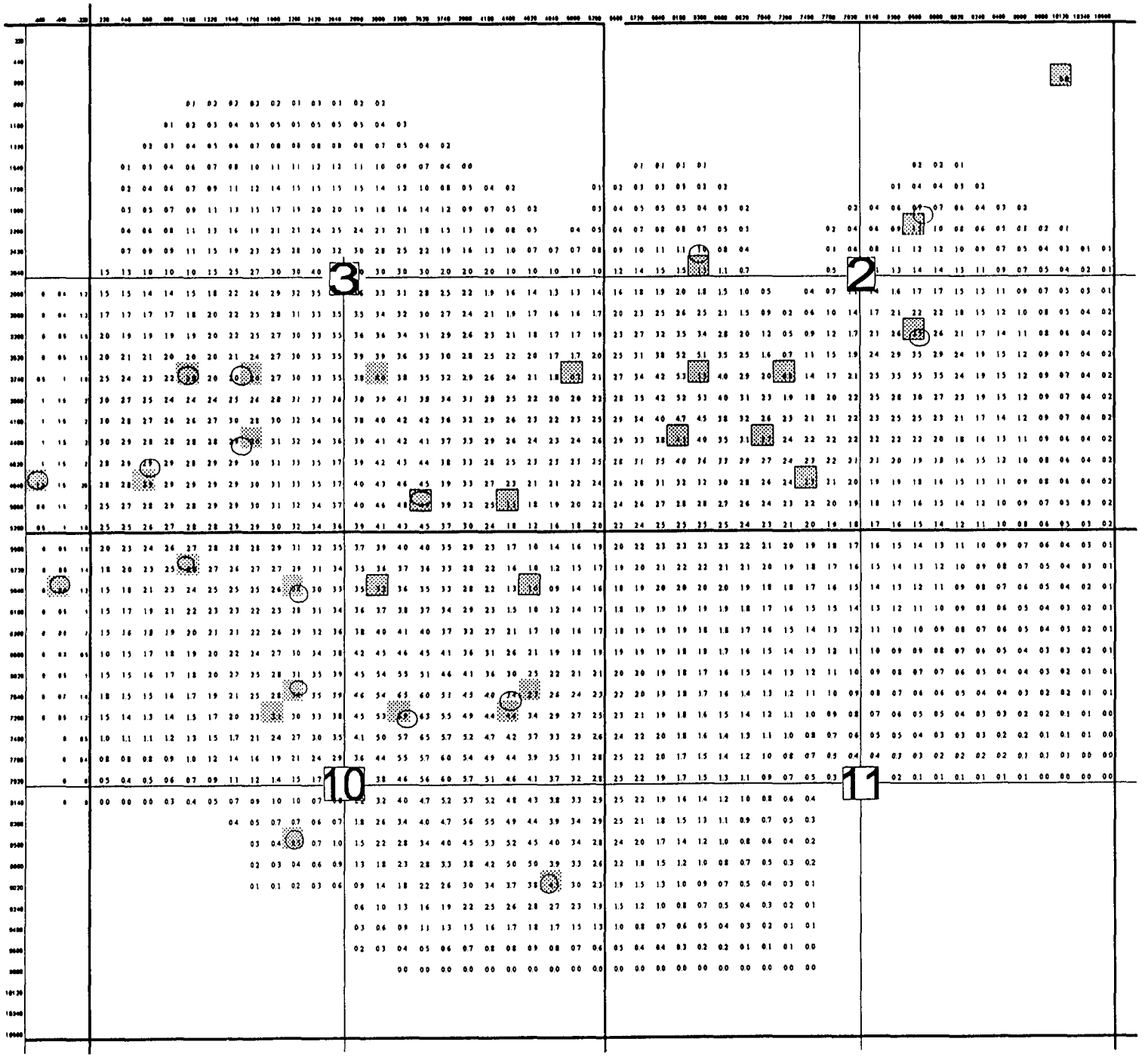
EXHIBIT B-3

ARMSTRONG ENERGY CORP.

TYPICAL LOG
NORTHEAST LEA FIELD
LEA COUNTY, NEW MEXICO

EXHIBIT C

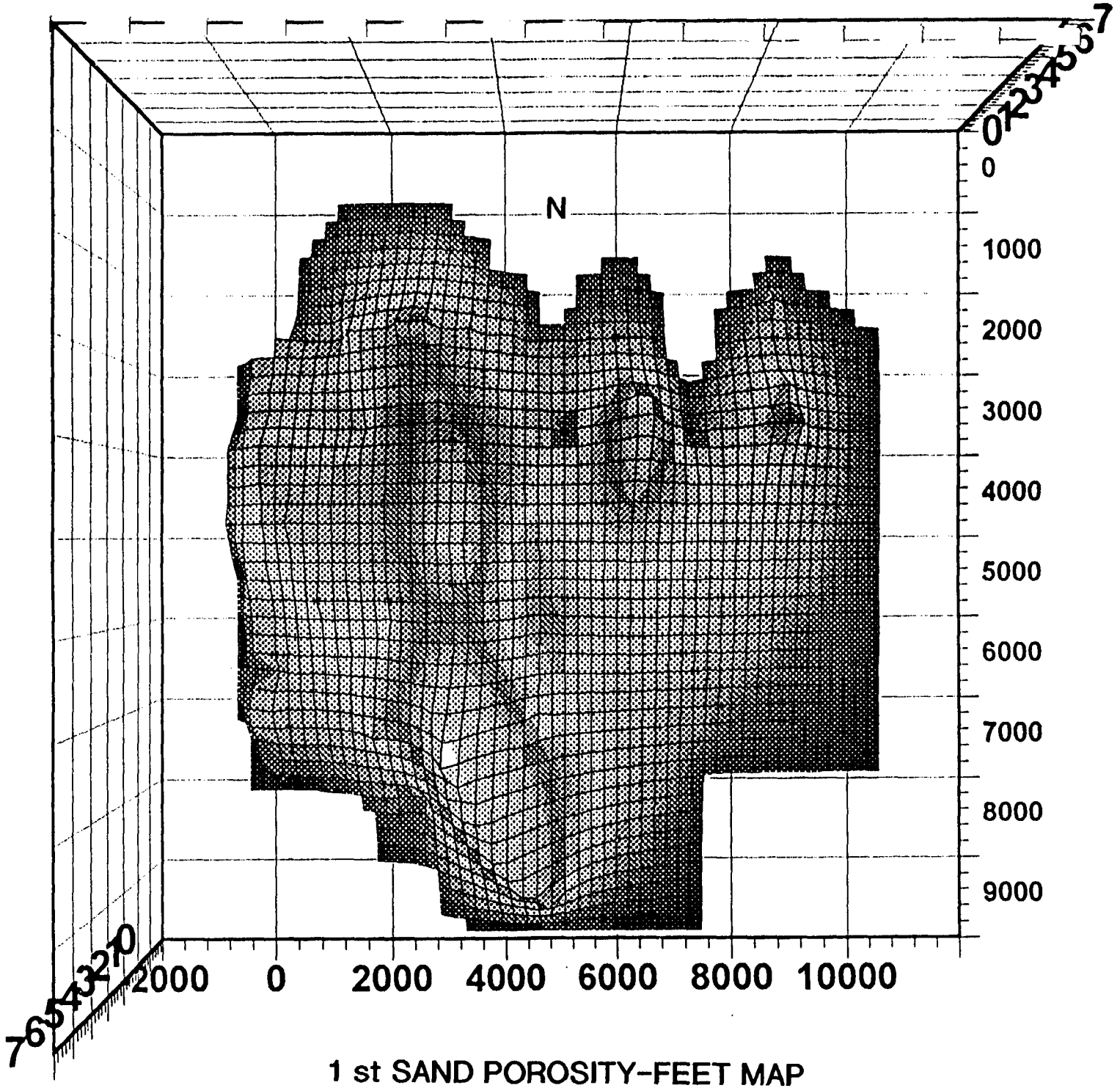




1st SAND OIL-FT MAP

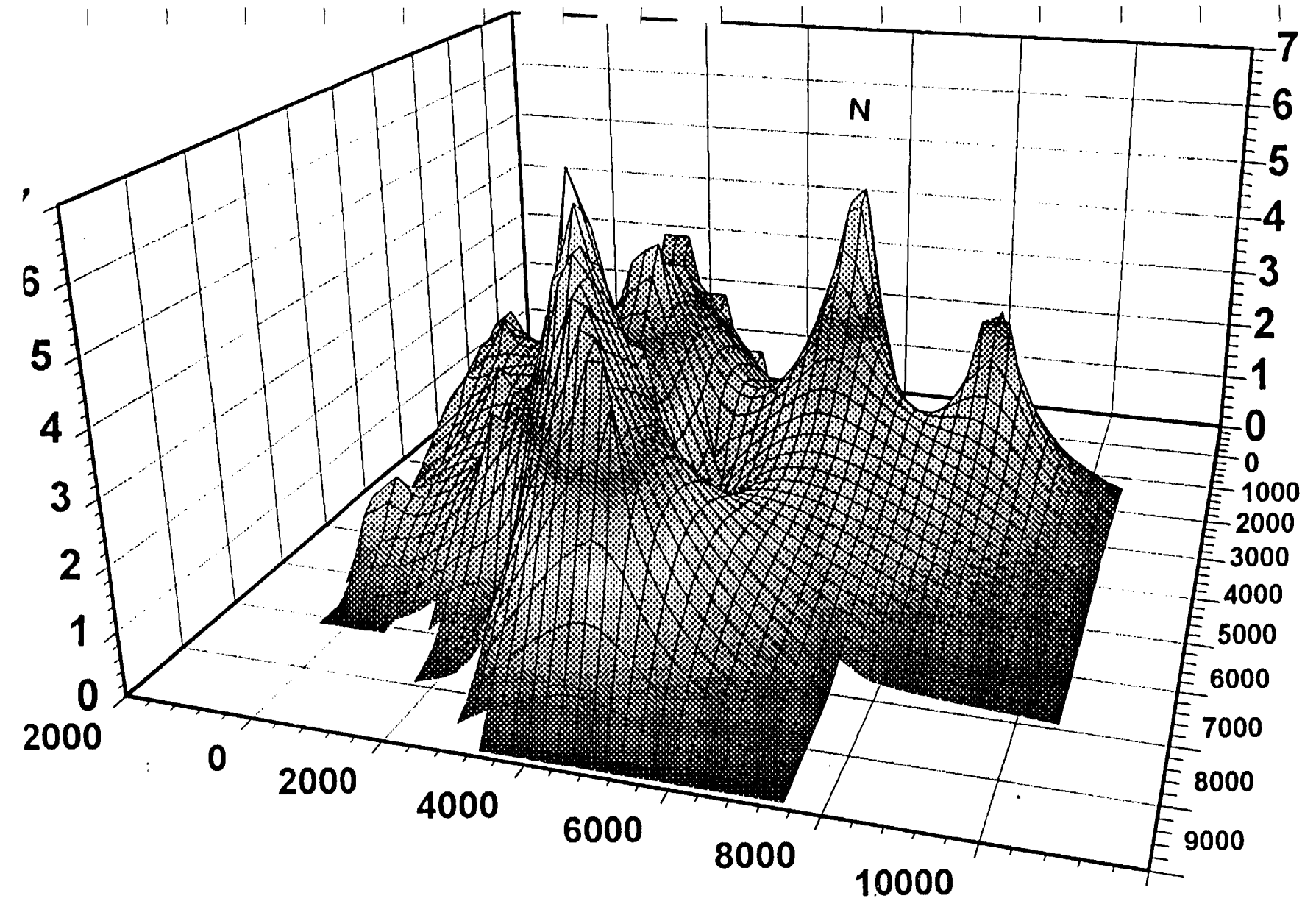
220' X 220'

EXHIBIT D-1



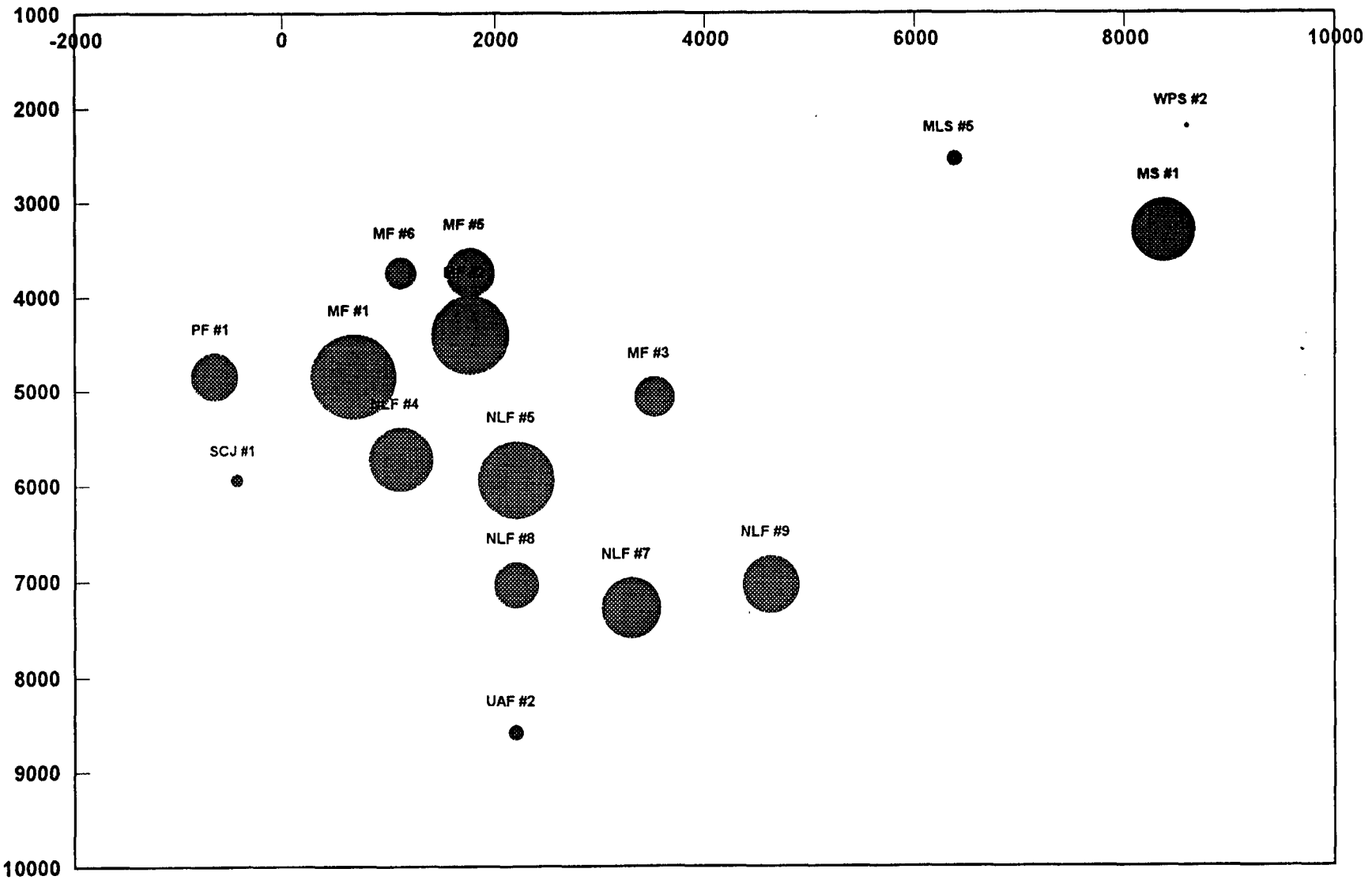
1 st SAND POROSITY-FEET MAP

EXHIBIT D-2



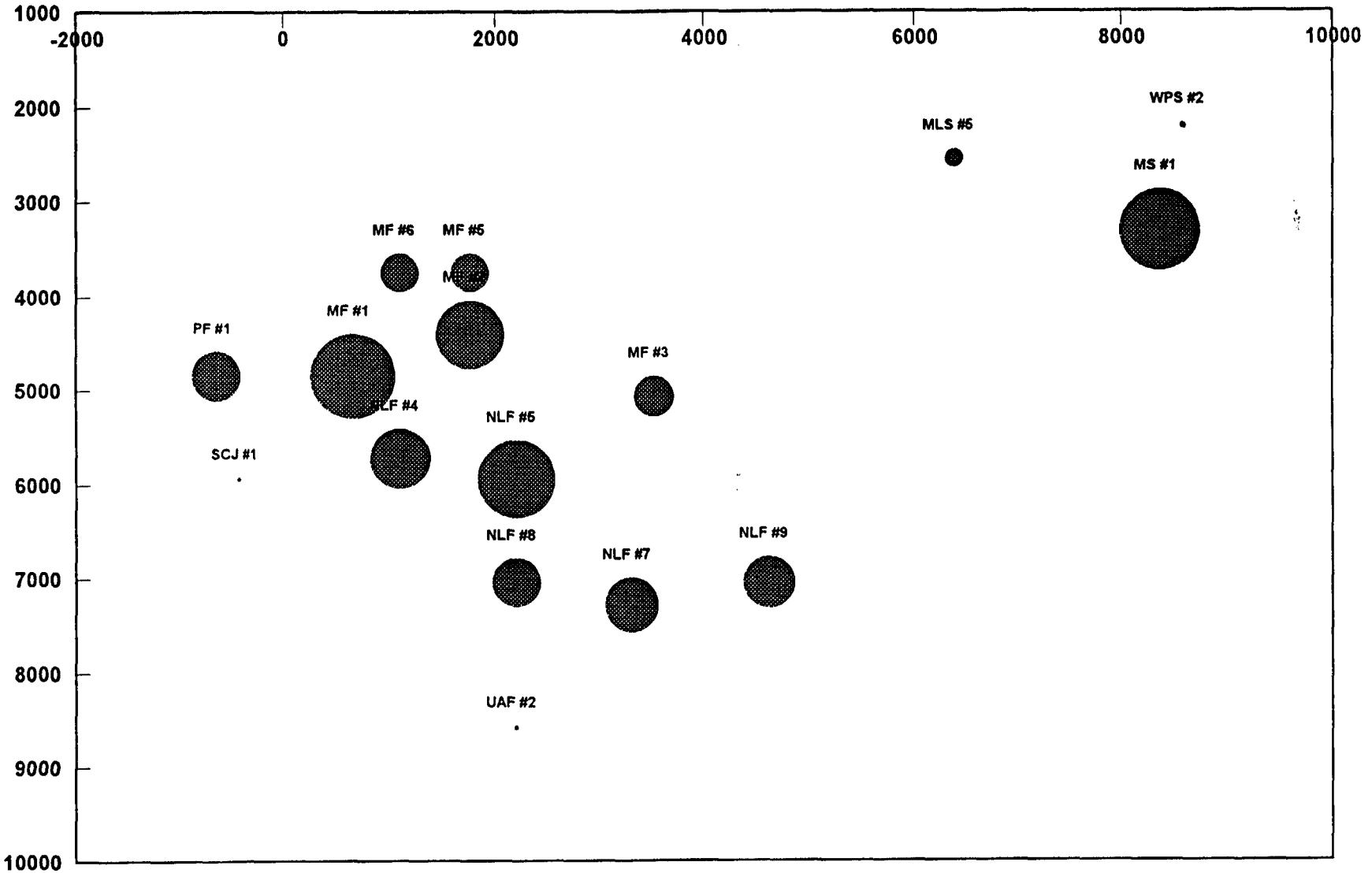
1 ST SAND POROSITY-FEET MAP

EXHIBIT D-3



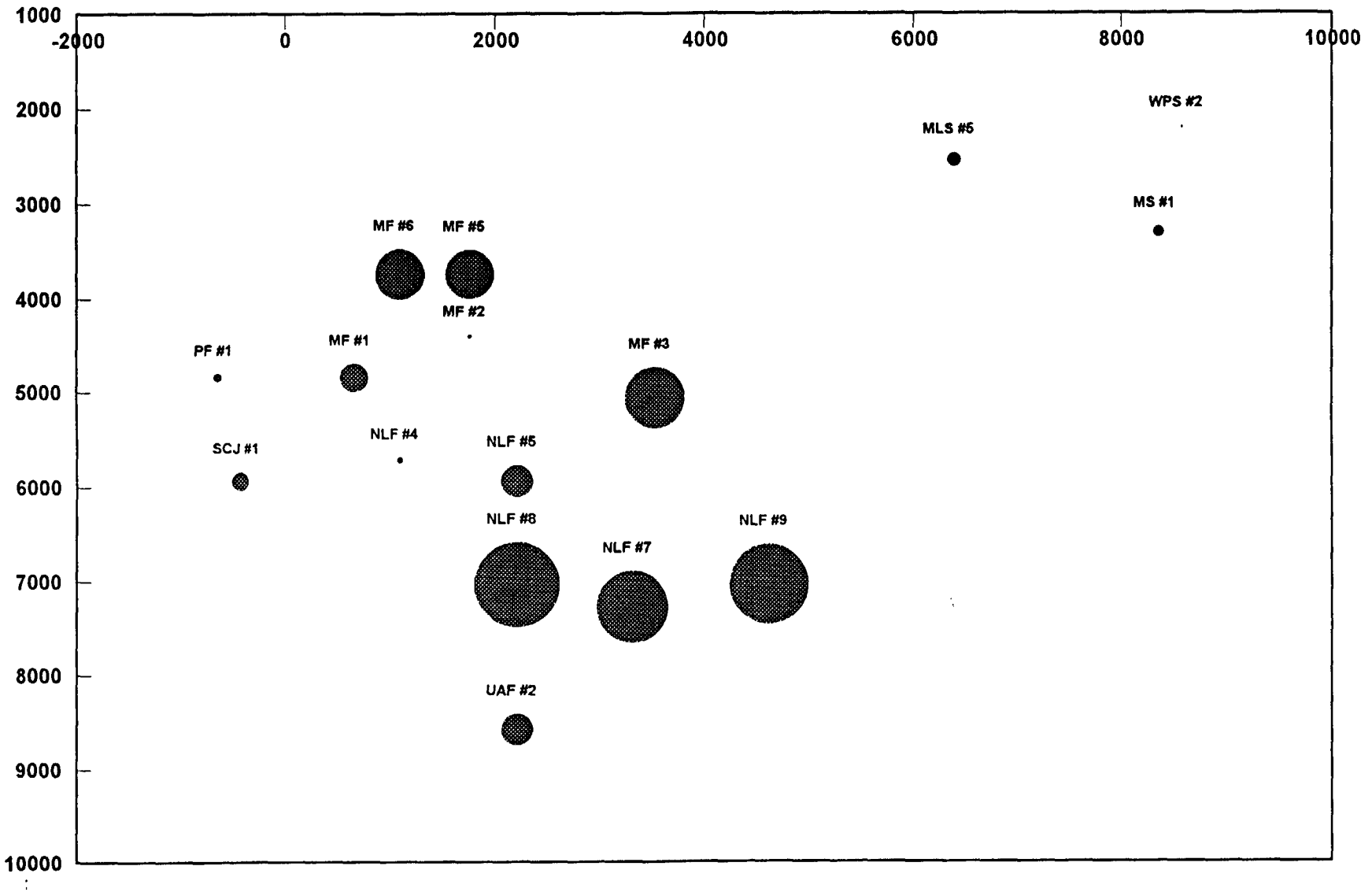
1 st SAND OIL PRODUCTION

EXHIBIT D-4



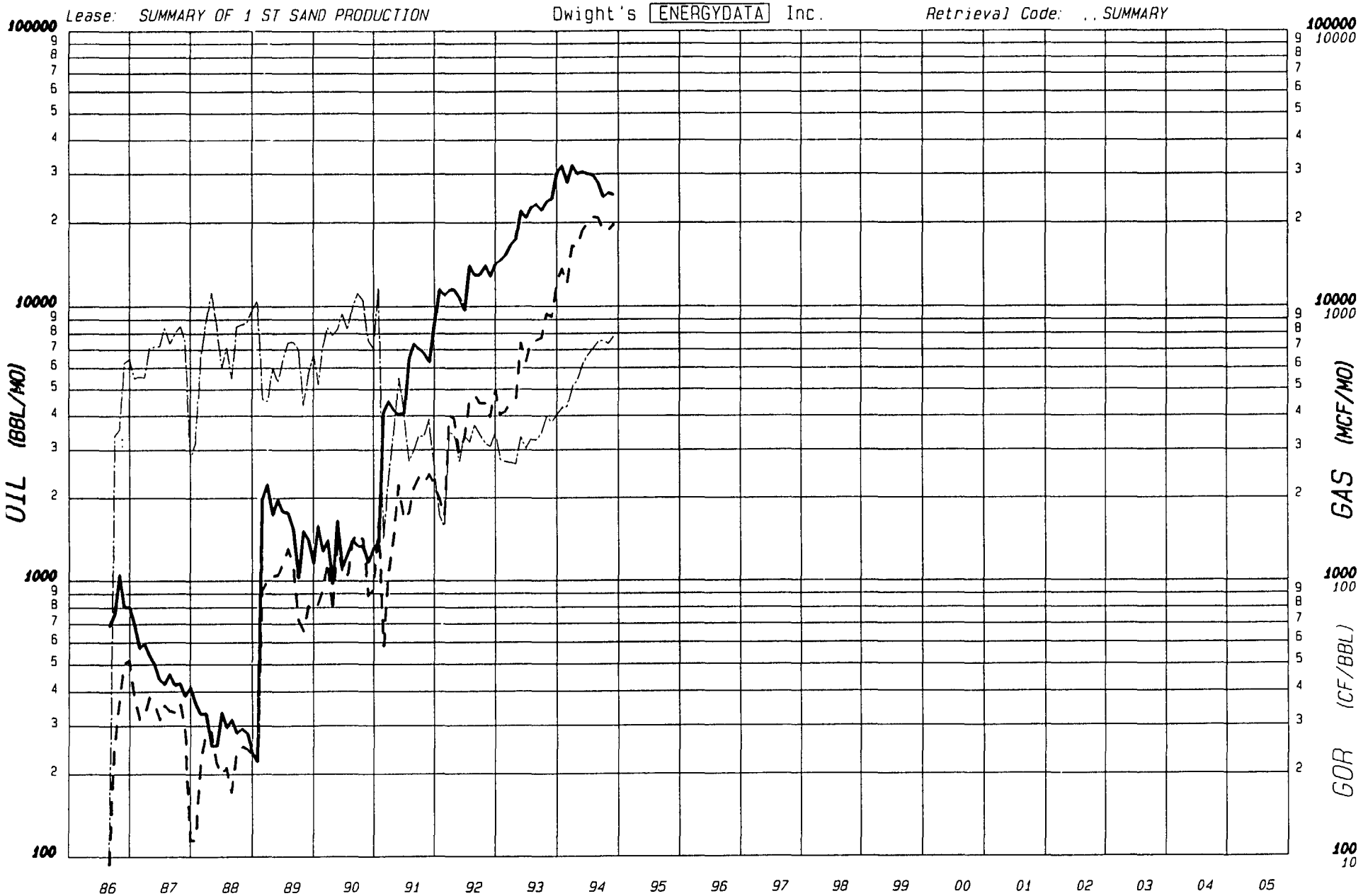
1 st SAND GAS PRODUCTION

EXHIBIT D-5



1 st SAND WATER PRODUCTION

EXHIBIT D-6

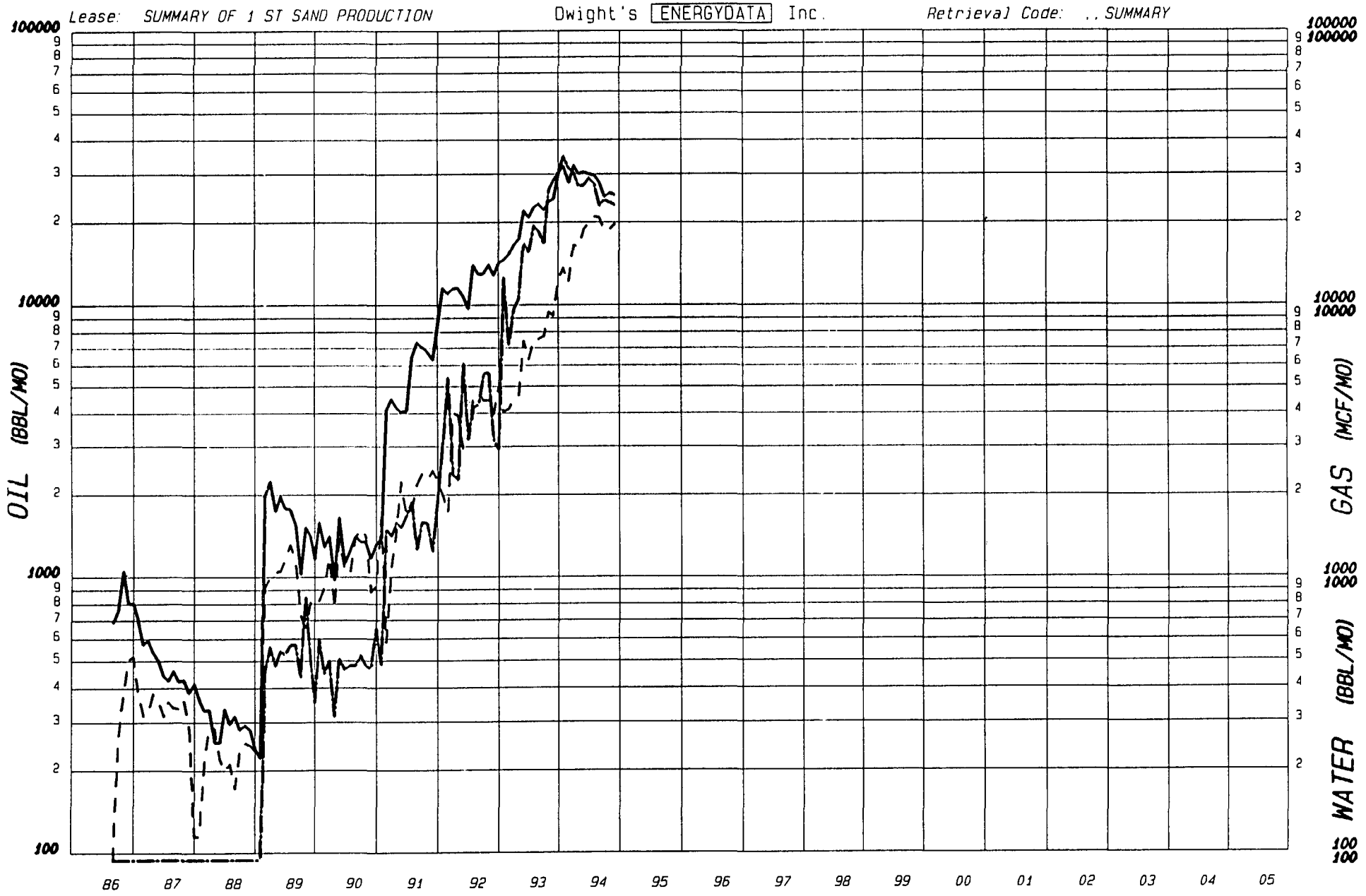


County: State:
Field:
Reservoir:
Operator:
Oil Cum: 827862 Gas Cum: 380032
Location:

F.P. Date

Date: 02-04-95

EXHIBIT D-7

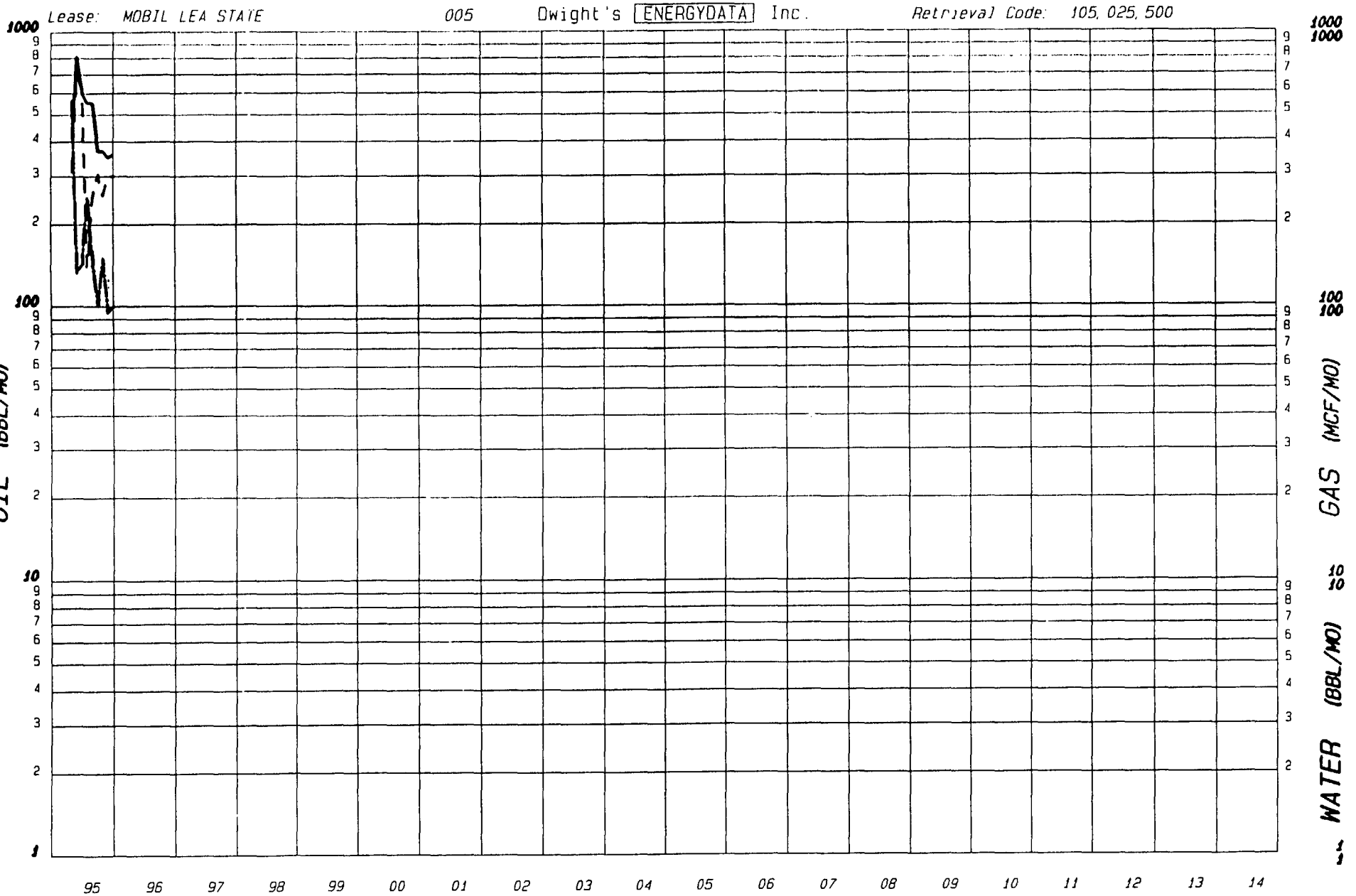


County: State:
Field:
Reservoir:
Operator:
Oil Cum: 827862 Gas Cum: 380032
Location:

F P Date

Date: 02-04-95

EXHIBIT D-8

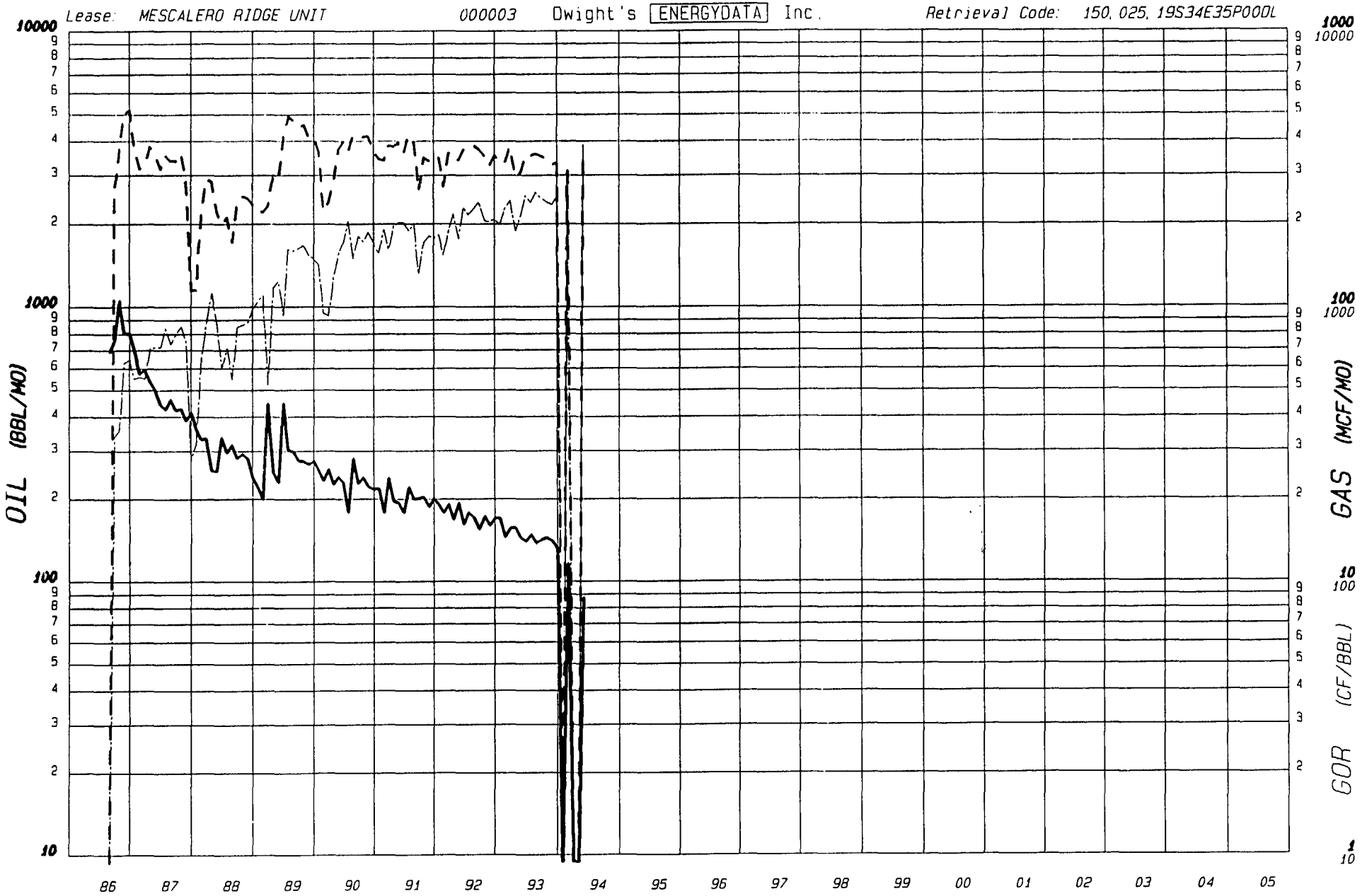


County: LEA State: NM
Field: LEA NE (DELAWARE) DL
Reservoir: DELAWARE
Operator: ARMSTRONG ENERY CORP.
Oil Cum: 4373 Gas Cum: 3184
Location: 2E 20S 34E

F.P. Date

Date: 01-29-95

EXHIBIT E-1

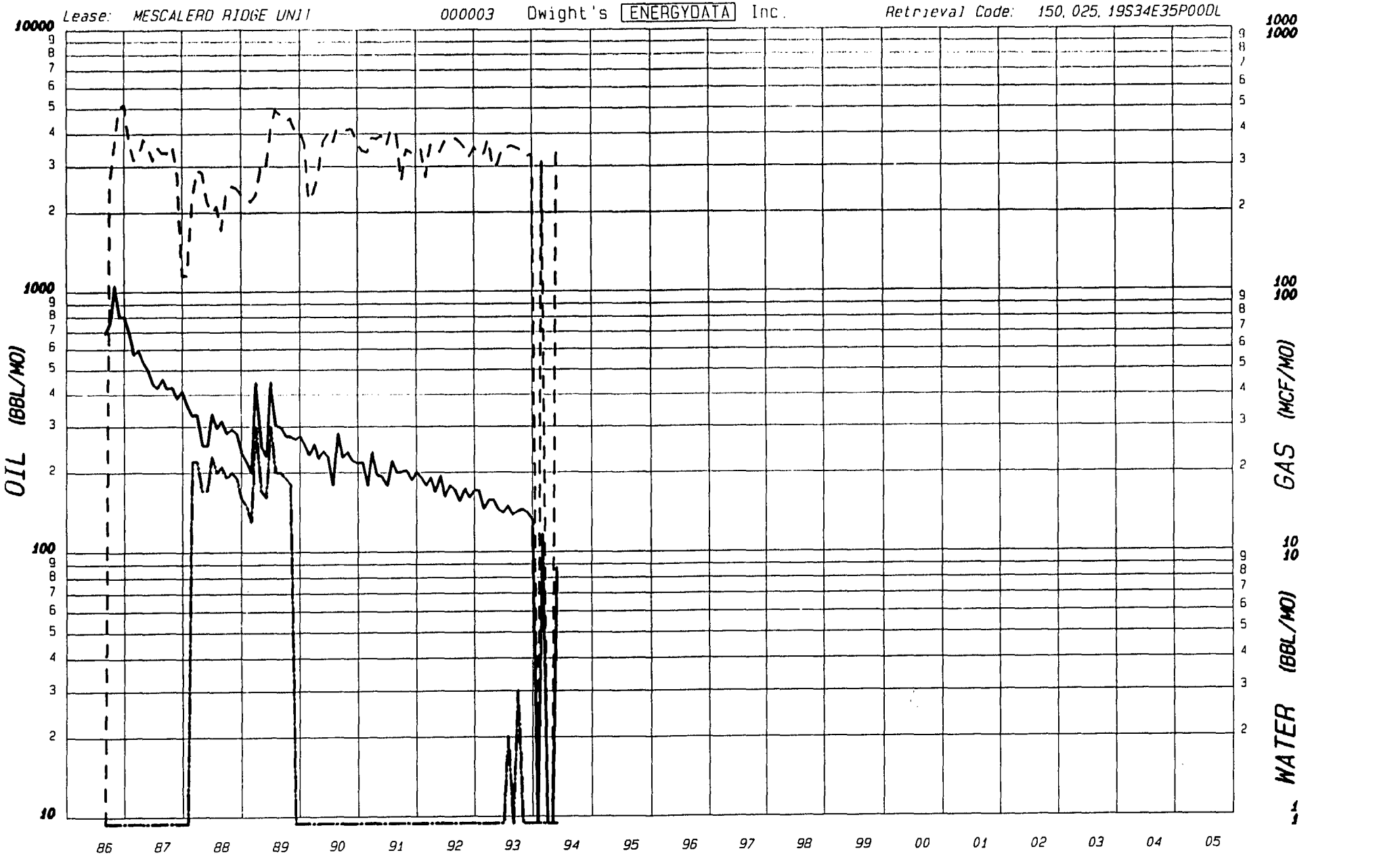


County: LEA State: NM
Field: LEA NE (DELAWARE) DL
Reservoir: DELAWARE
Operator: MALLON OIL CO
Oil Cum: 26330 Gas Cum: 30182
Location: 35P 19S 34E

F.P. Date 08-86

Date: 01-29-95

EXHIBIT E-2



County: LEA State: NM
Field: LEA NE (DELAWARE) DL
Reservoir: DELAWARE
Operator: MALLON OIL CO
Oil Cum: 26330 Gas Cum: 30182
Location: 35P 19S 34E

F P Date 08-86

Date: 01-29-95

EXHIBIT E-3

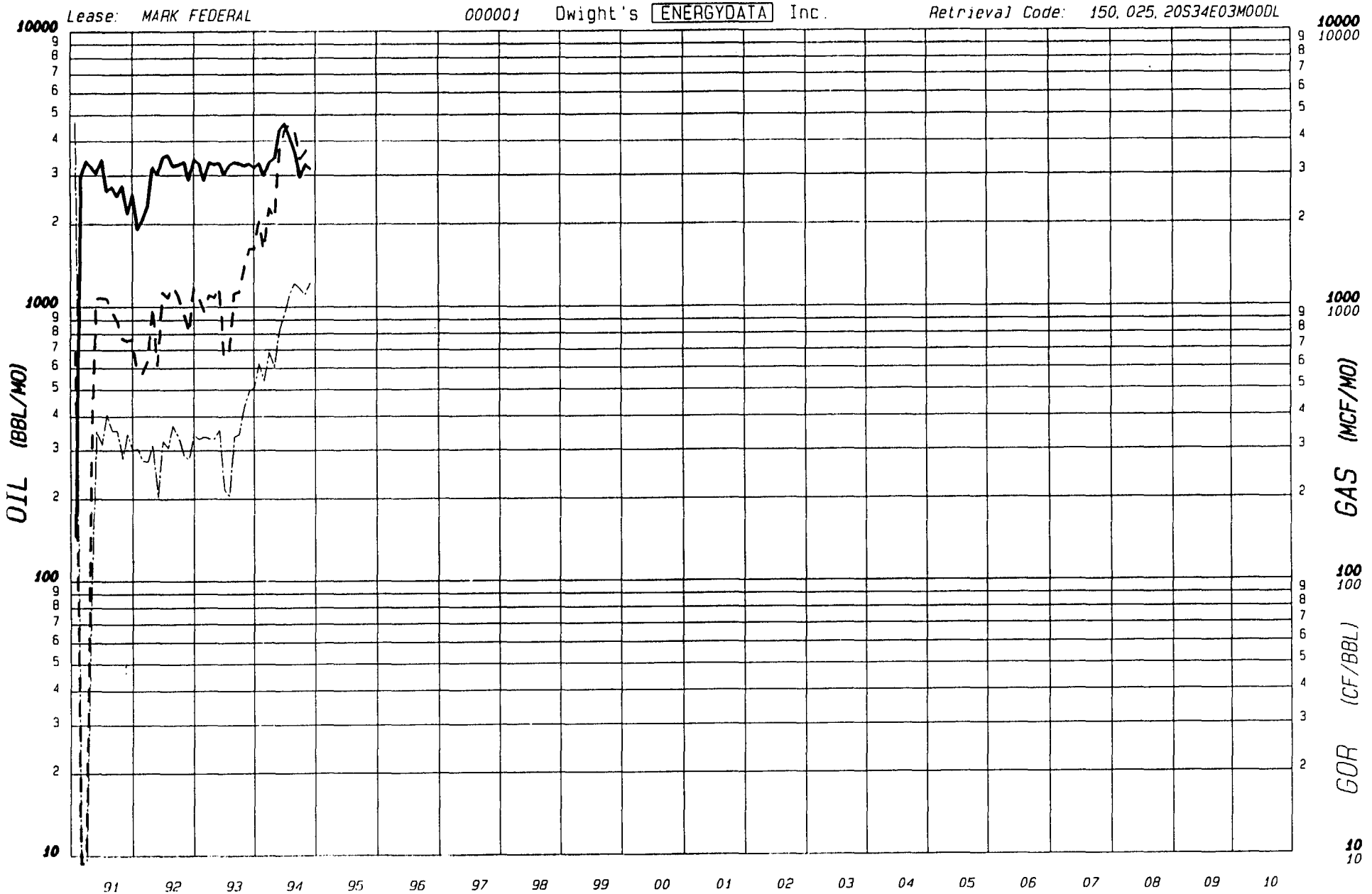

Lease: MARK FEDERAL
000001 Dwight's ENERGYDATA Inc.
Retrieval Code: 150, 025, 20S34E03M00DL
OIL (BBL/MO)
GAS (MCF/MO)
GOR (CF/BBL)
10000
1000
100
10
91 92 93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10
County: LEA
State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 145292
Gas Cum: 611963

EXHIBIT E-4

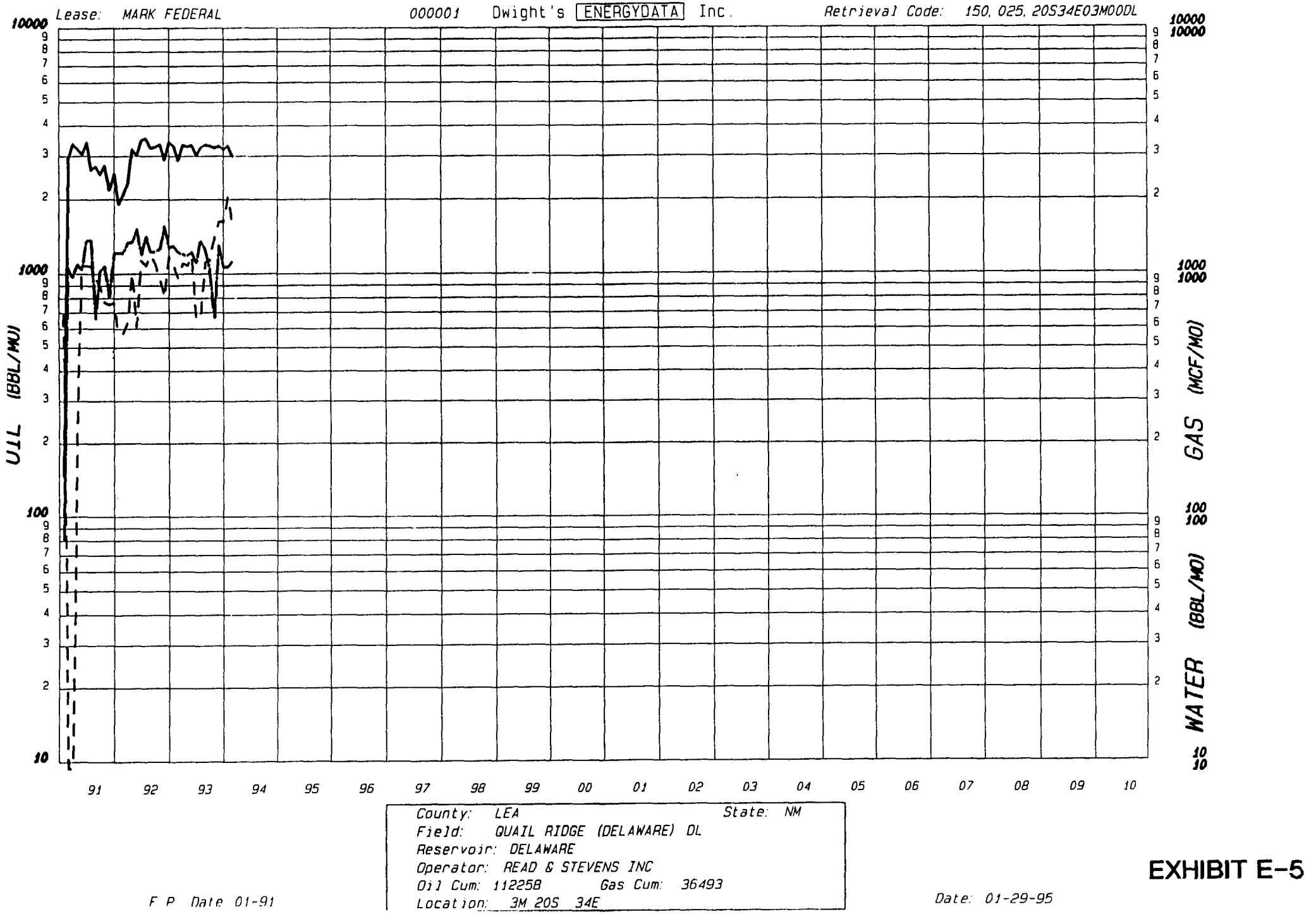
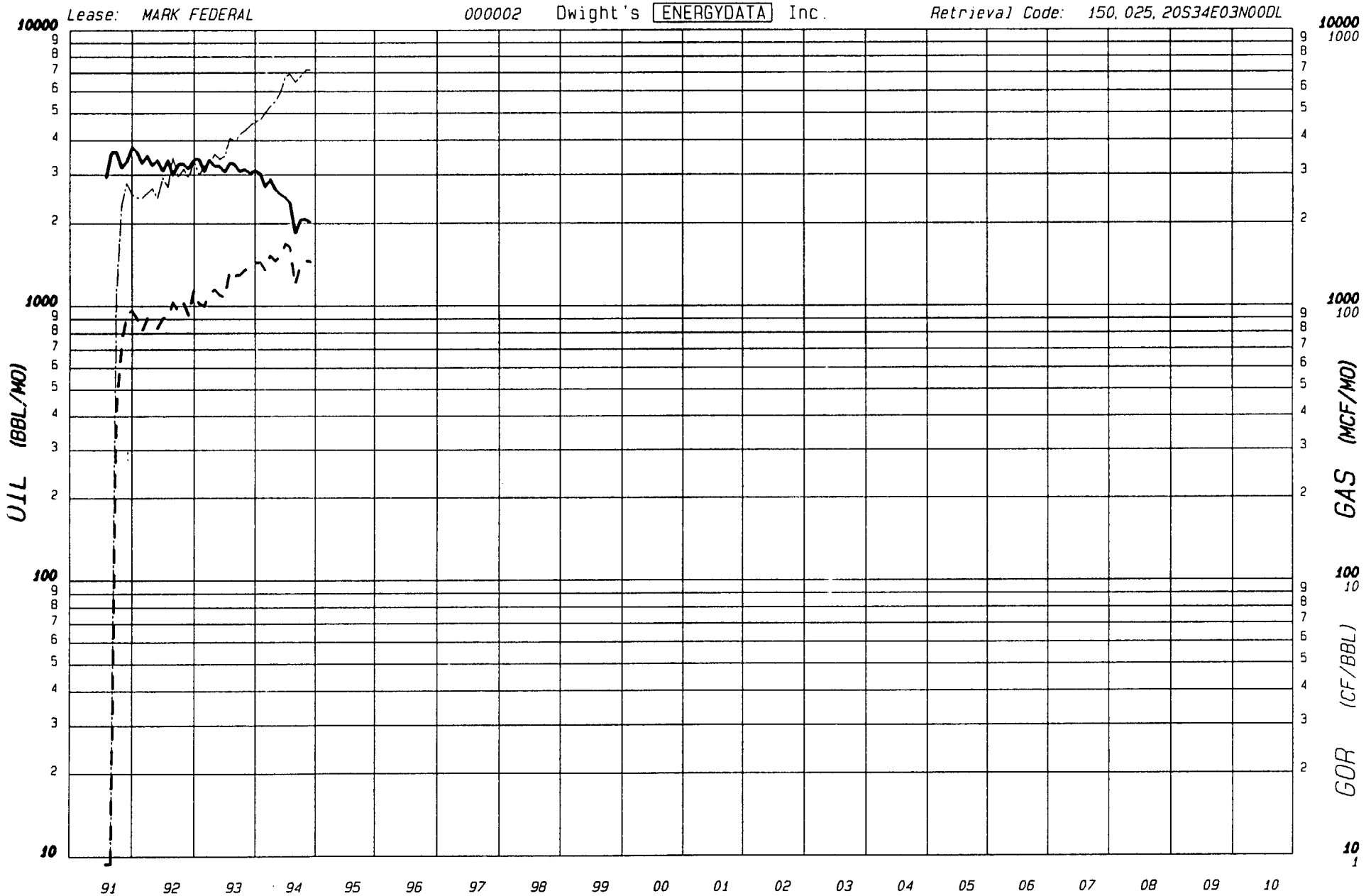

Lease: MARK FEDERAL
000001 Dwight's ENERGYDATA Inc.
Retrieval Code: 150, 025, 20S34E03M00DL
OIL (BBL/MO)
GAS (MCF/MO)
WATER (BBL/MO)
10000
1000
100
10
91 92 93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10
County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 112258 Gas Cum: 36493
Location: 3M 20S 34E
F P Date 01-91
Date: 01-29-95

EXHIBIT E-5



County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 125161 Gas Cum: 45056
Location: 3N 20S 34E

F.P. Date 07-91

Date: 01-29-95

EXHIBIT E-6

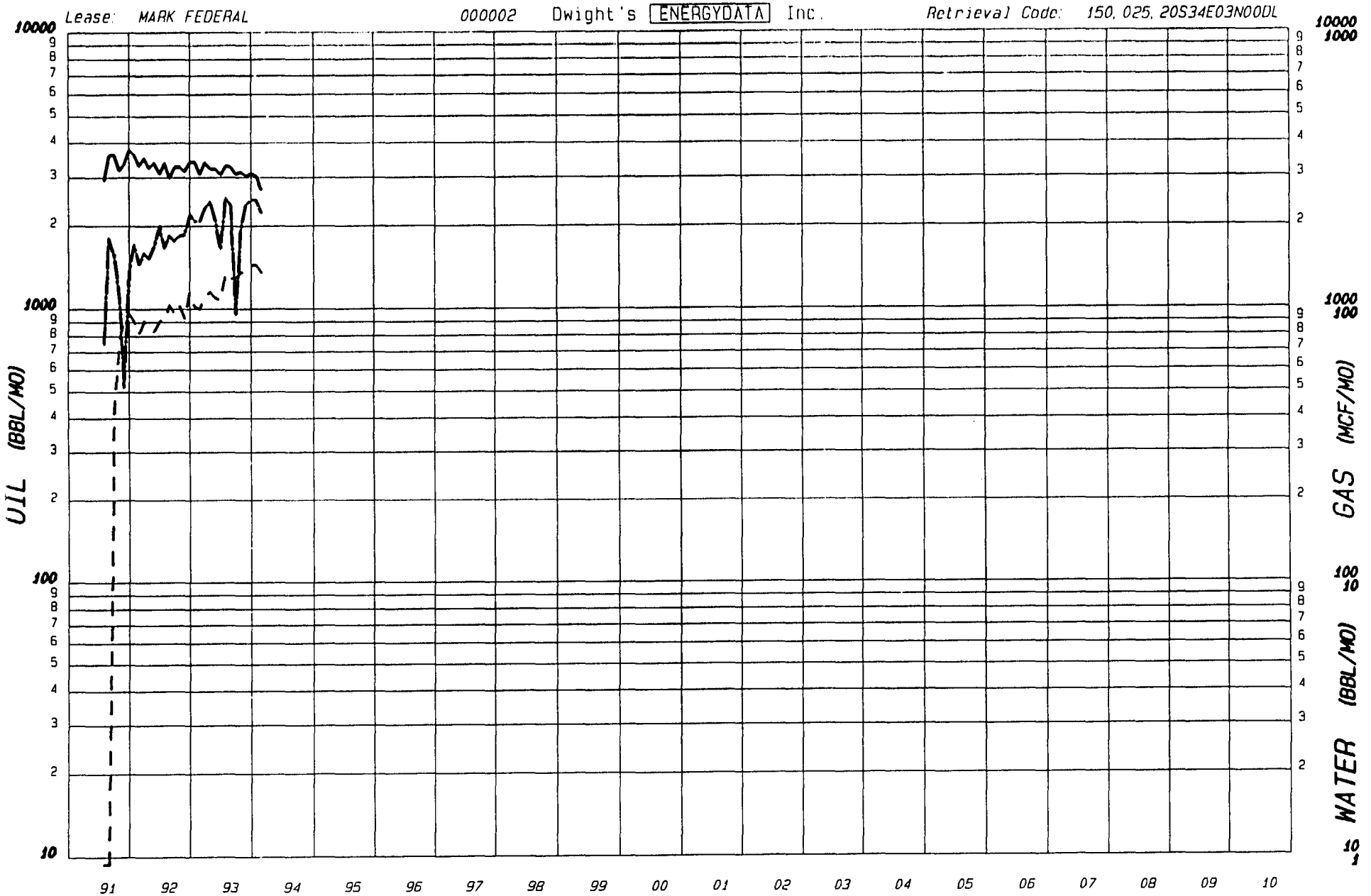

Lease: MARK FEDERAL
000002 Dwight's ENERGYDATA Inc.
Retrieval Code: 150, 025, 20S34E03N00DL
OIL (BBL/MO)
GAS (MCF/MO)
WATER (BBL/MO)
91 92 93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10
County: LEA
State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 104210
Gas Cum: 31694
Location: 3N 20S 34E
L P Date 07 91
Date: 01-29-95

EXHIBIT E-7

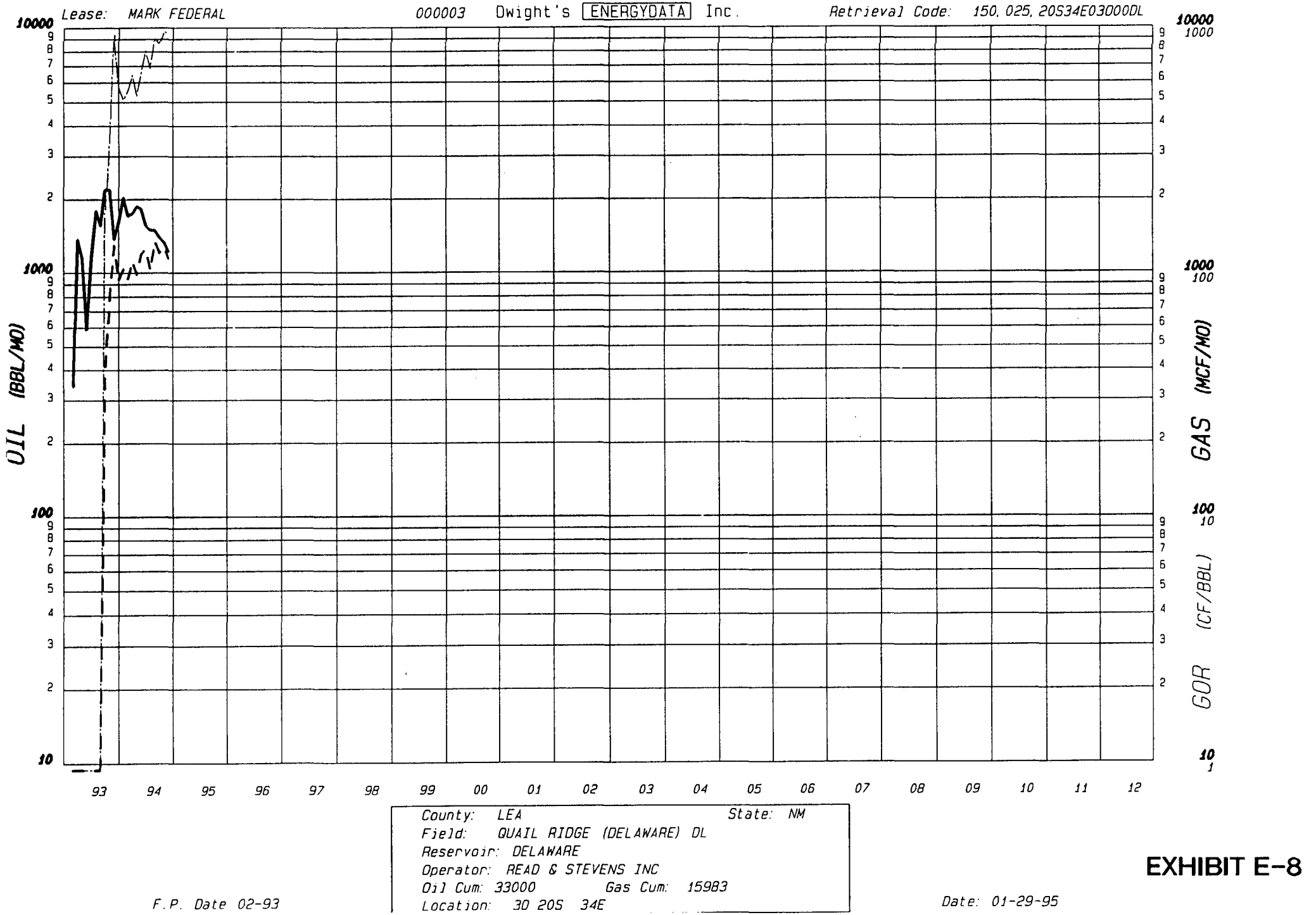
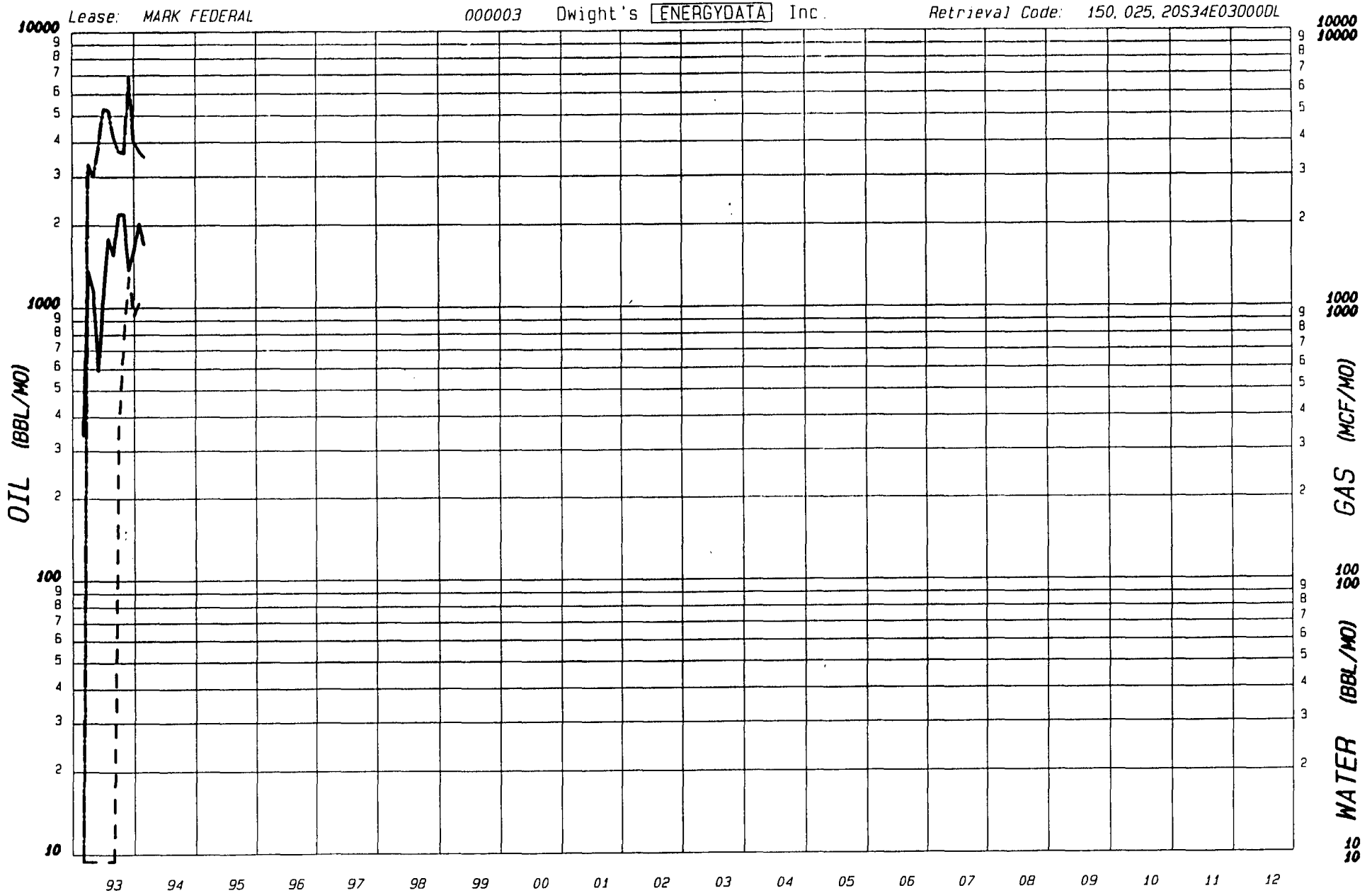

Lease: MARK FEDERAL
000003 Dwight's ENERGYDATA Inc.
Retrieval Code: 150, 025, 20S34E03000DL
OIL (BBL/MO)
GAS (MCF/MO)
GOR (CF/BBL)
93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10 11 12
County: LEA
State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 33000
Gas Cum: 15983
Location: 30 20S 34E
F.P. Date 02-93
Date: 01-29-95

EXHIBIT E-8



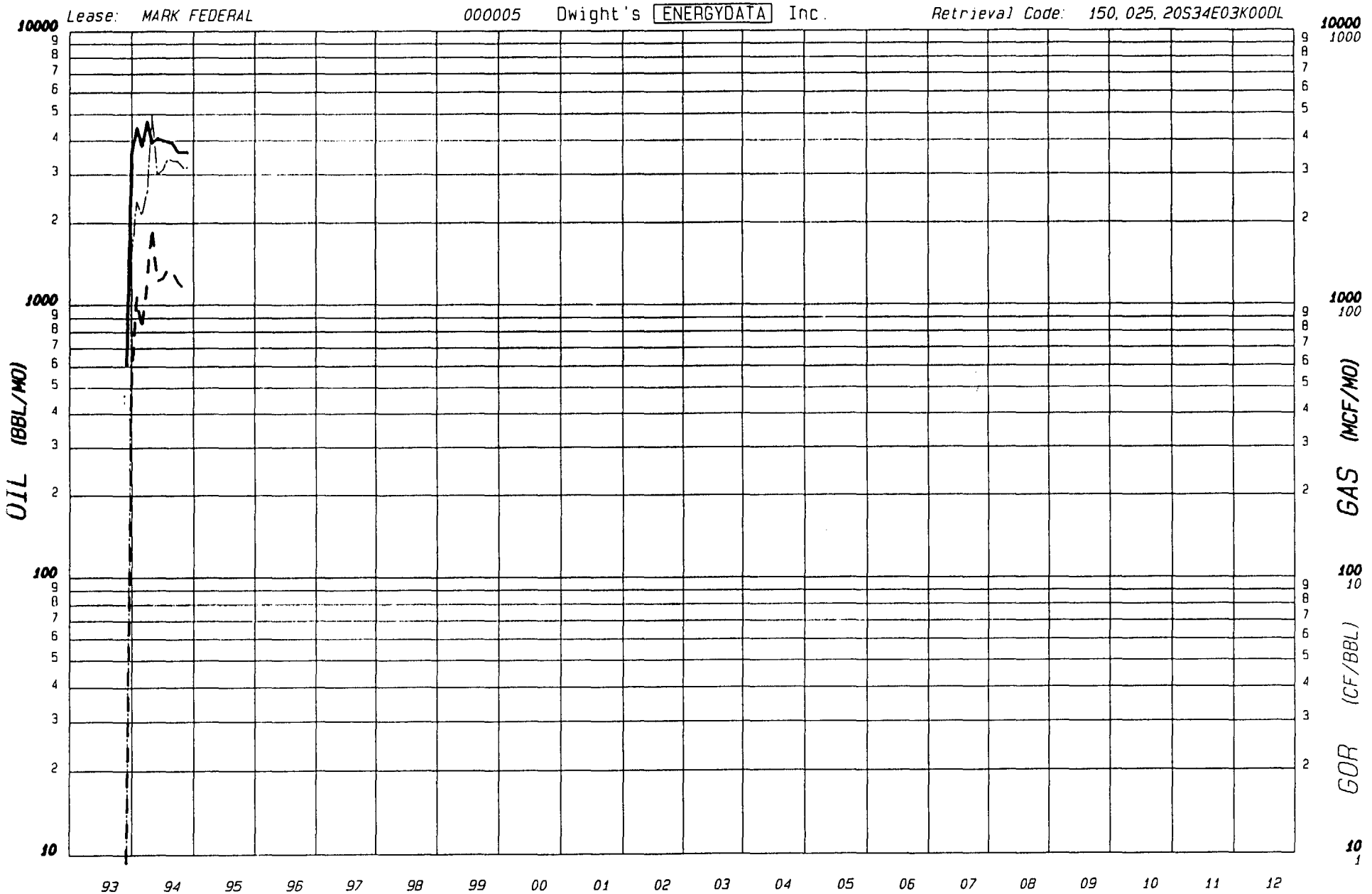
County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 19080 Gas Cum: 5402
Location: 30 20S 34E

F P Date 02-93

Date: 01-29-95

EXHIBIT E-9

Lease: MARK FEDERAL 000005 Dwight's ENERGYDATA Inc. Retrieval Code: 150, 025, 20S34E03K00DL



County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 47904 Gas Cum: 14243
Location: 3K 20S 34E

F.P. Date 11-93

Date: 01-29-95

EXHIBIT E-10

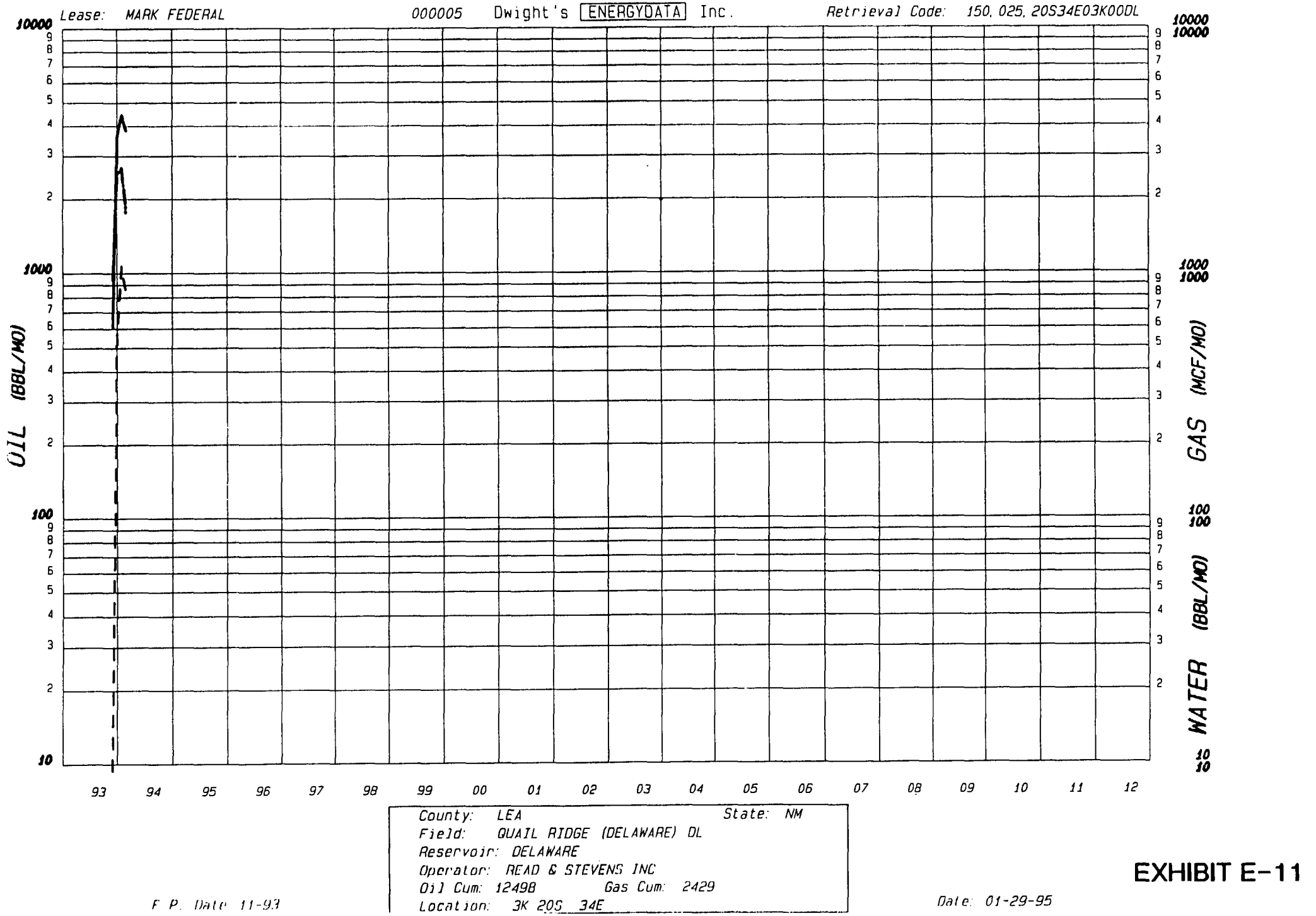
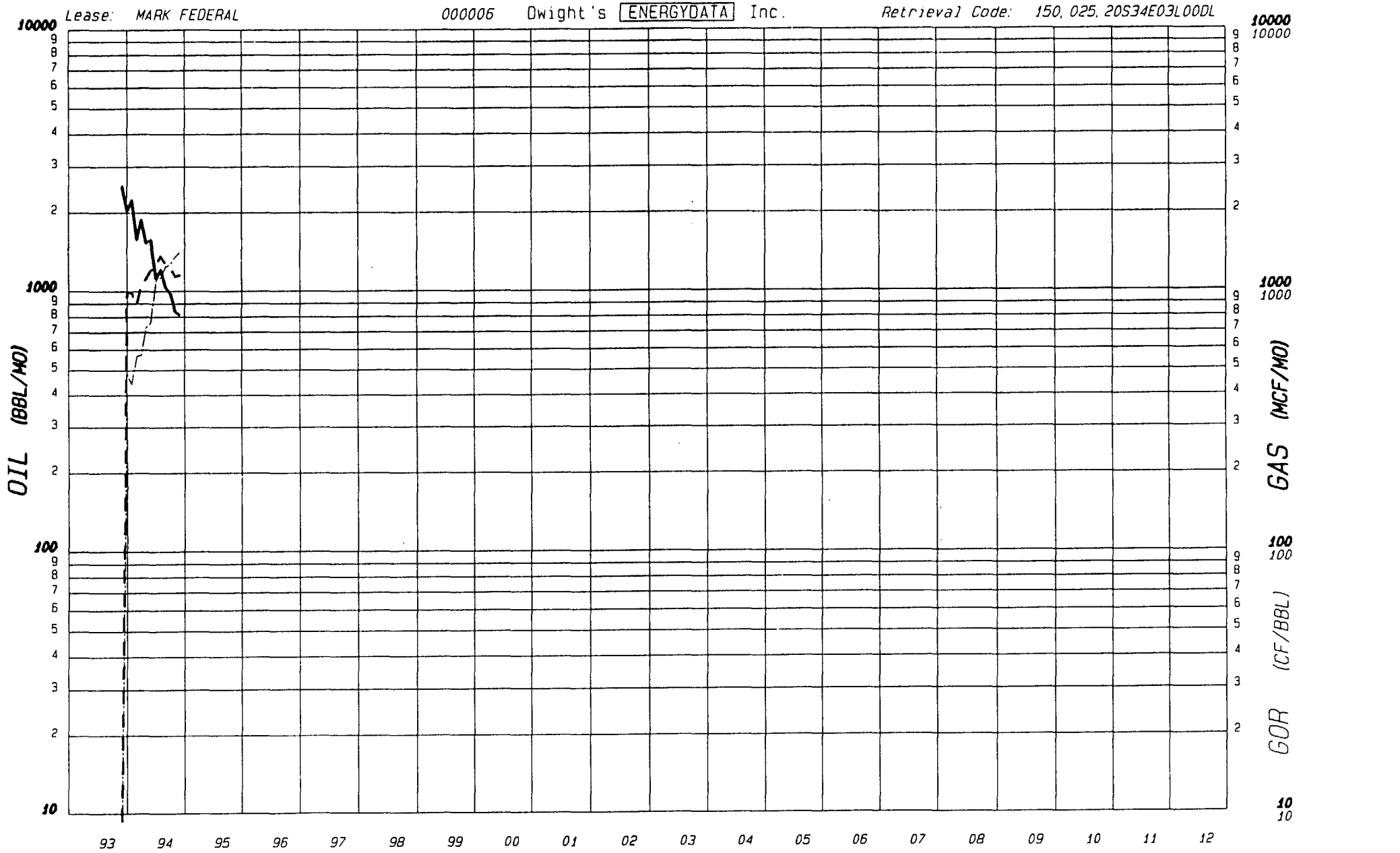

Lease: MARK FEDERAL
000005 Dwight's ENERGYDATA Inc.
Retrieval Code: 150, 025, 20S34E03K00DL
OIL (BBL/MO)
GAS (MCF/MO)
WATER (BBL/MO)
10000
1000
100
10
93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10 11 12
County: LEA
State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 12498
Gas Cum: 2429
Location: 3K 20S 34E
F P. Date 11-93
Date: 01-29-95

EXHIBIT E-11

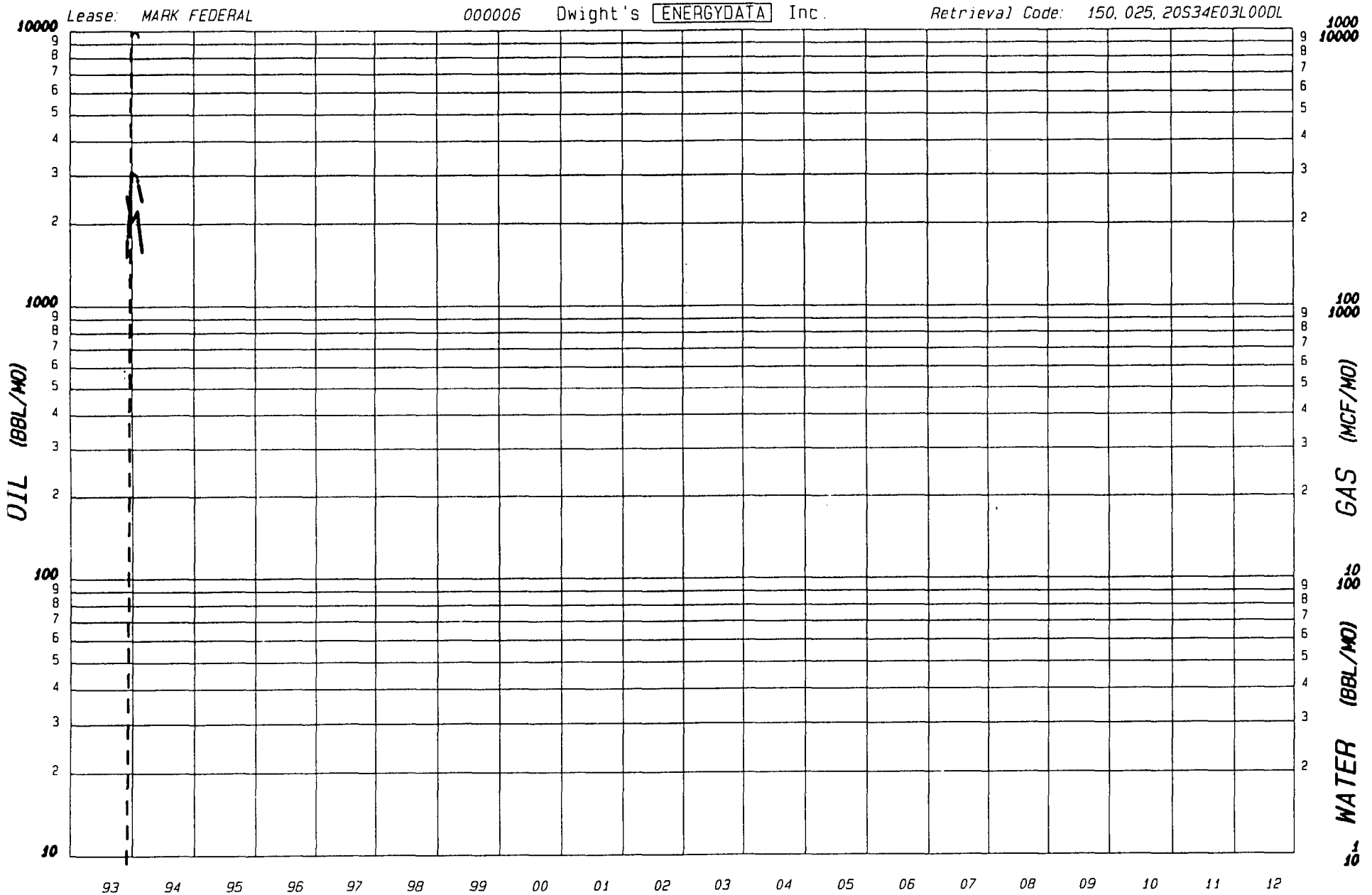


County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 19367 Gas Cum: 13676
Location: 3L 20S 34E

F.P. Date 11-93

Date: 01-29-95

EXHIBIT E-12

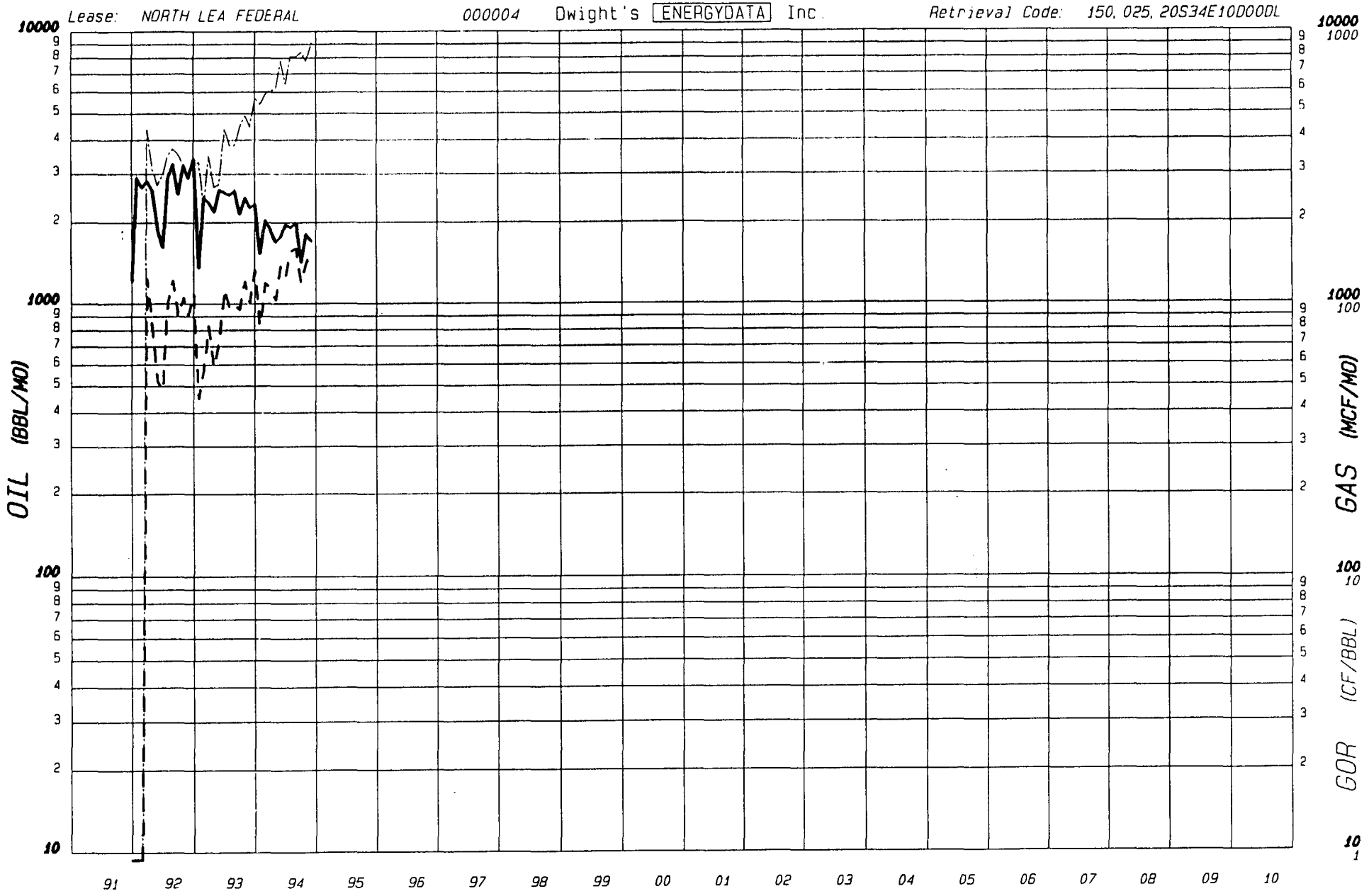


County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 8385 Gas Cum: 2873
Location: 3L 20S 34E

F.P. Date 11-93

Date: 01-29-95

EXHIBIT E-13



County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 81668 Gas Cum: 34189
Location: 10D 20S 34E

F.P. Date 12-91

Date: 01-29-95

EXHIBIT E-14

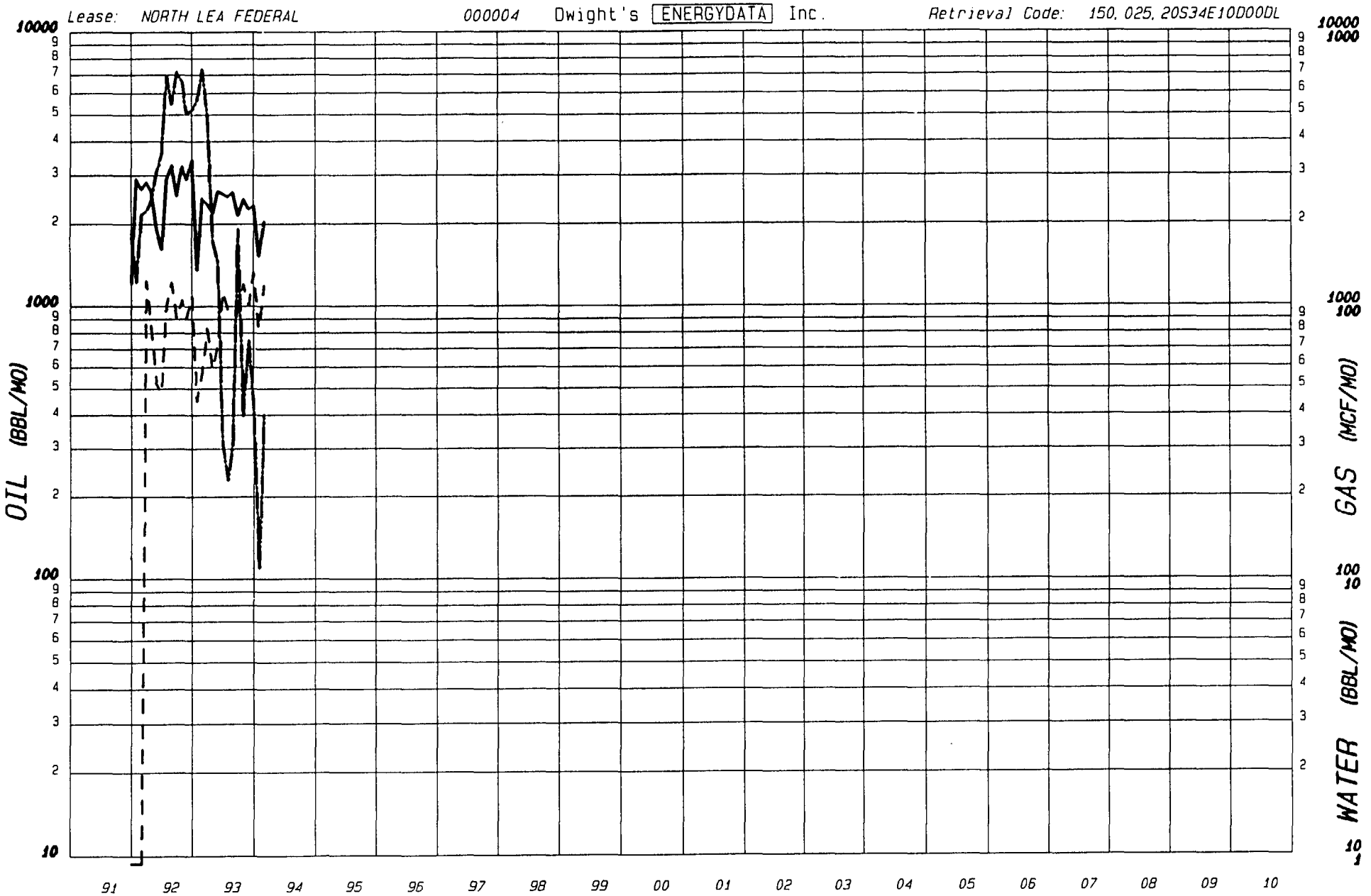
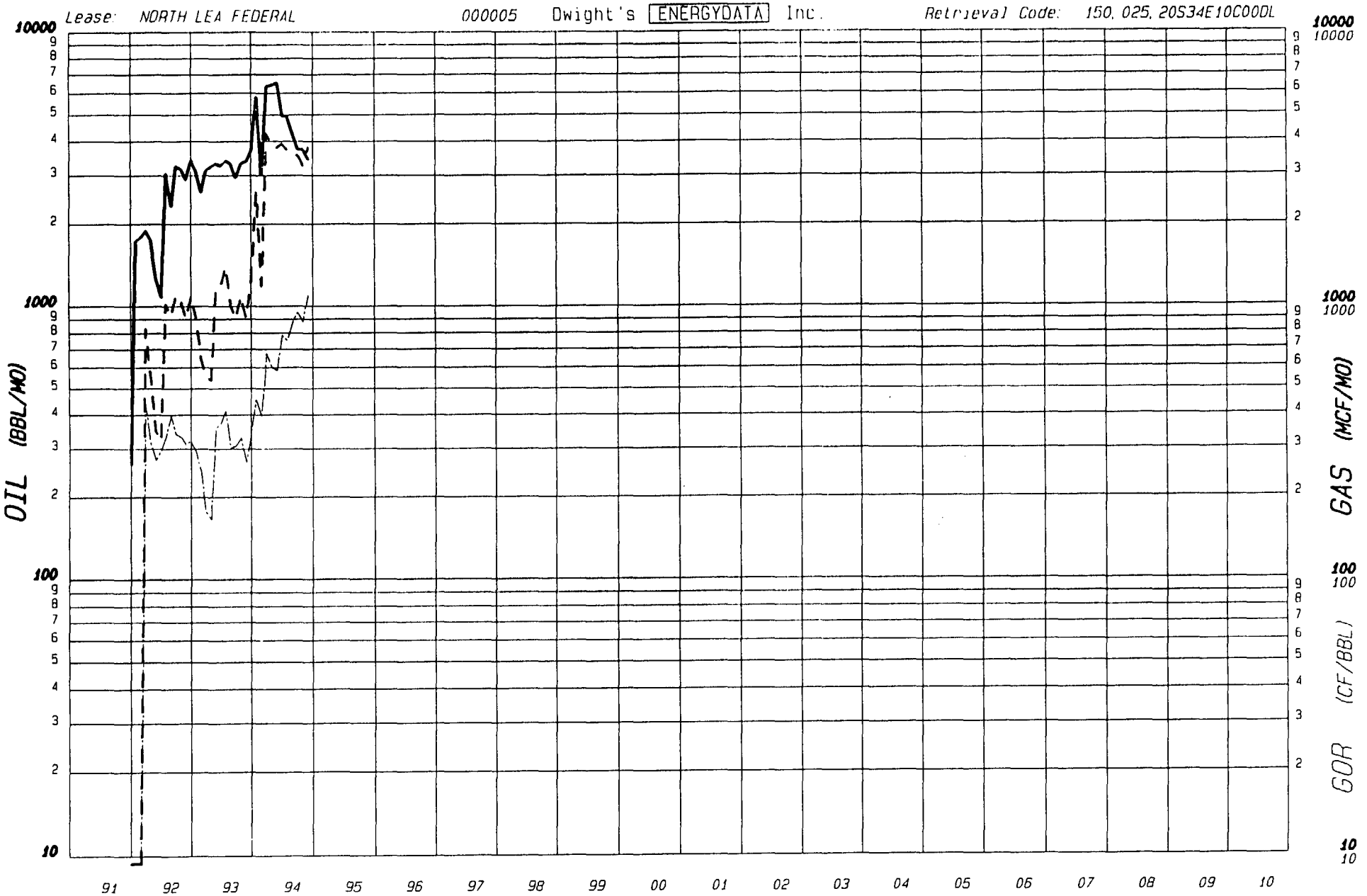

Lease: NORTH LEA FEDERAL
000004 Dwight's ENERGYDATA Inc.
Retrieval Code: 150, 025, 20S34E10D00DL
OIL (BBL/MO)
GAS (MCF/MO)
WATER (BBL/MO)
91 92 93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10
County: LEA
State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 65511
Gas Cum: 22052
Location: 10D 20S 34E
F P Date 12-91
Date: 01-29-95

EXHIBIT E-15

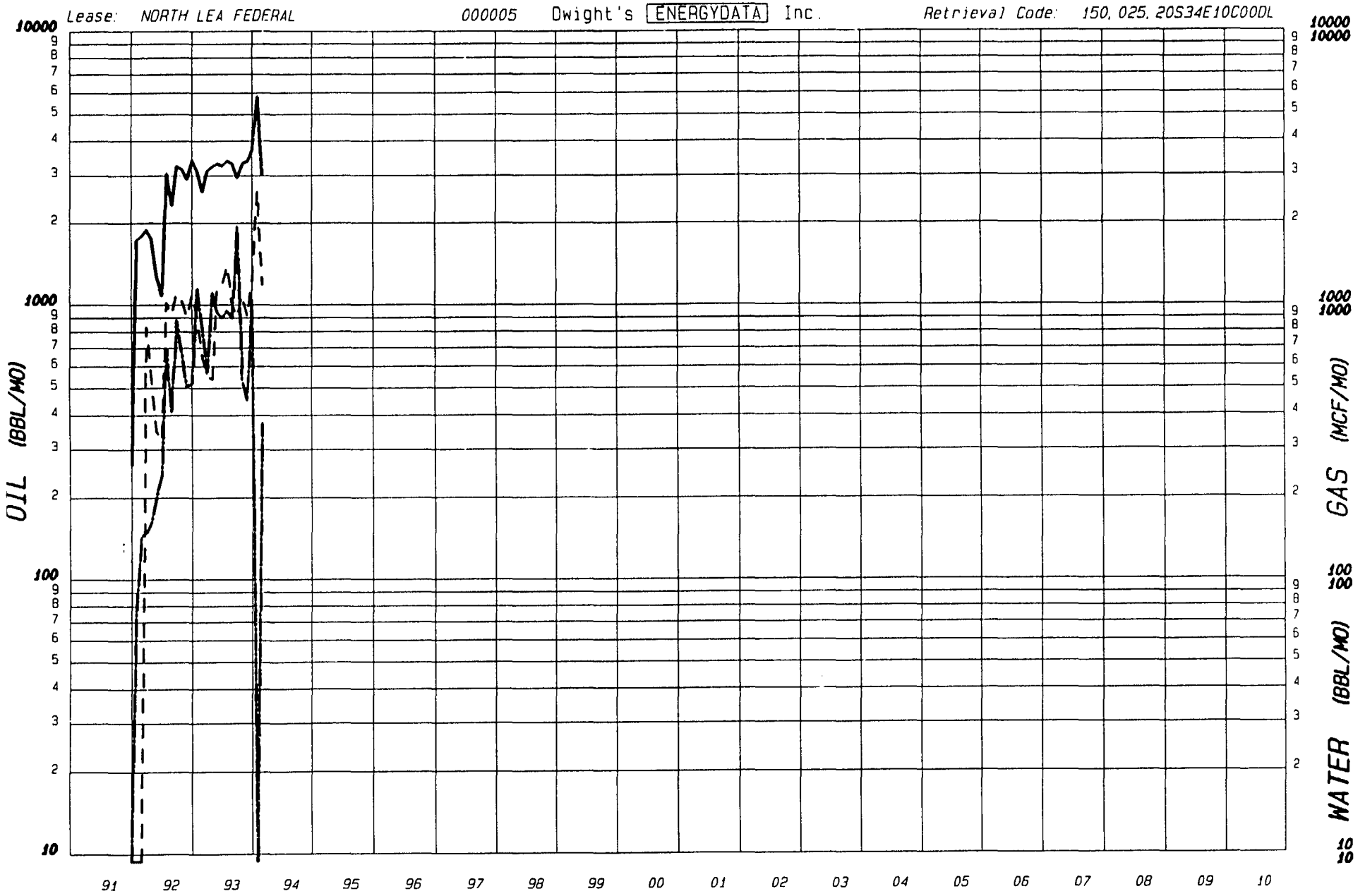


County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 119668 Gas Cum: 57441
Location: 10C 20S 34E

F P Date 12-91

Date: 01-29-95

EXHIBIT E-16

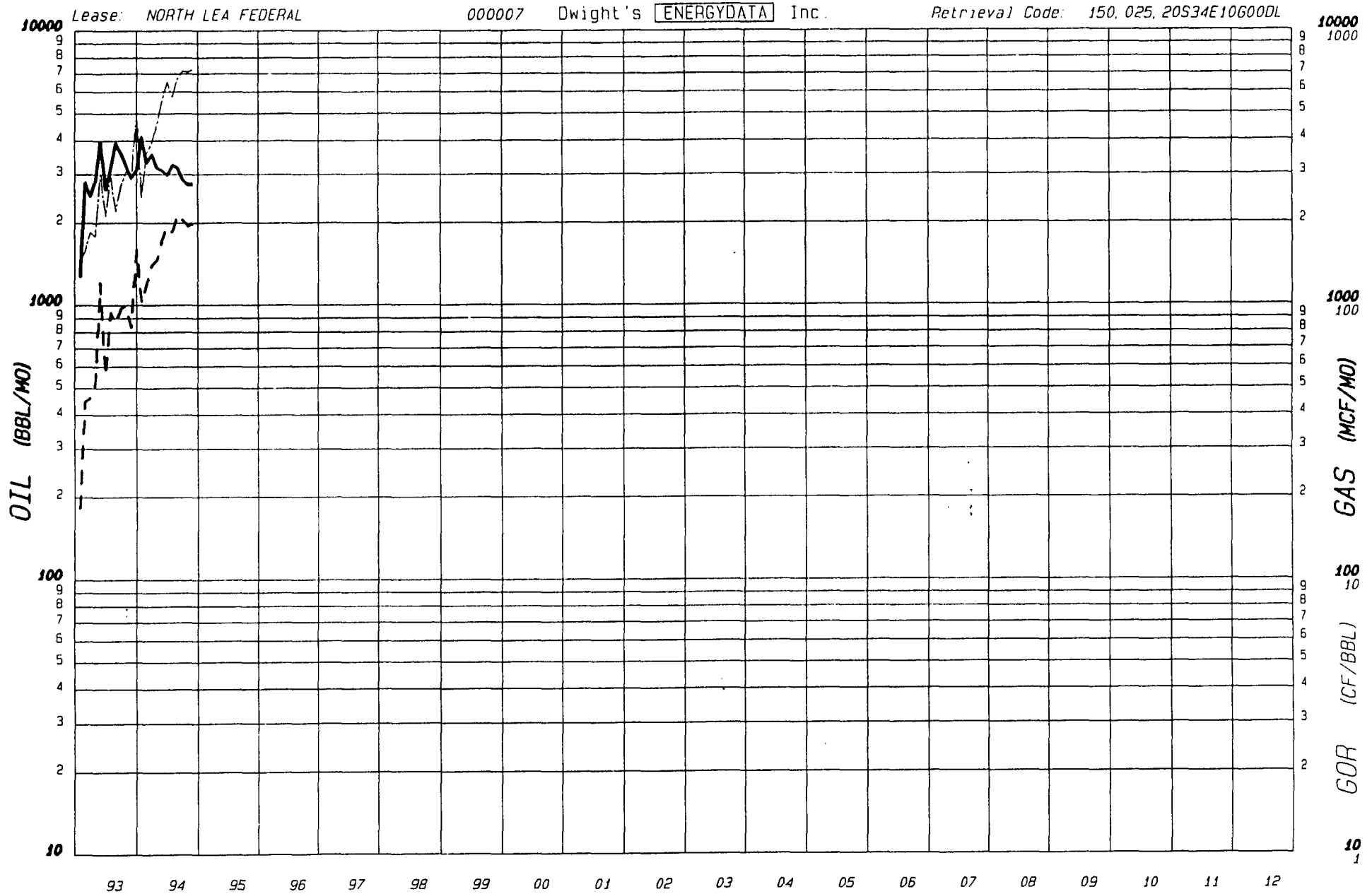


County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 75393 Gas Cum: 23579
Location: 10C 20S 34E

F P Date 12 91

Date: 01-29-95

EXHIBIT E-17

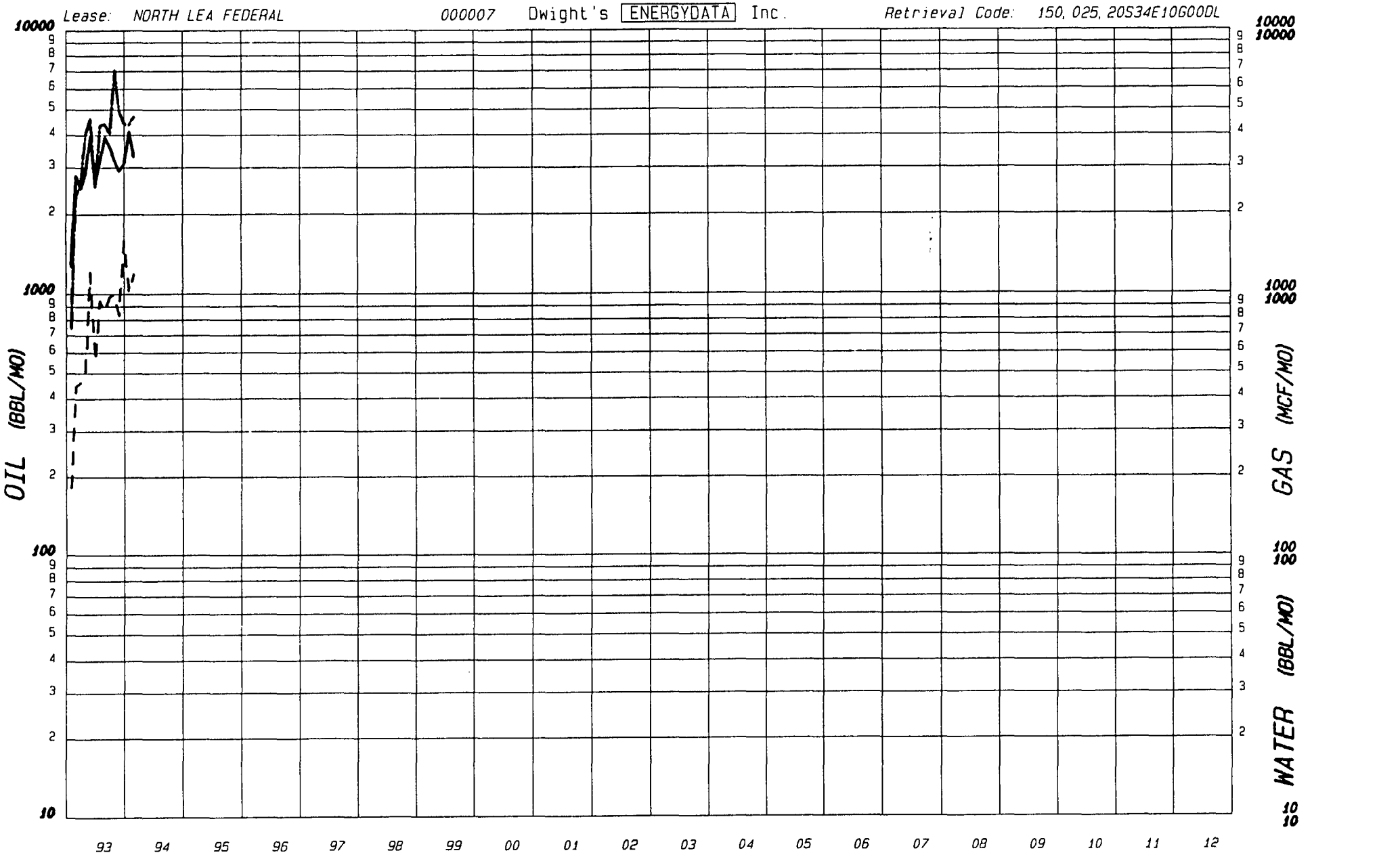


County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 70972 Gas Cum: 28285
Location: 10G 20S 34E

F.P Date 01-93

Date: 01-29-95

EXHIBIT E-18



County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 43359 Gas Cum: 11773
Location: 10G 20S 34E

F.P. Date 01-93

Date: 01-29-95

EXHIBIT E-19

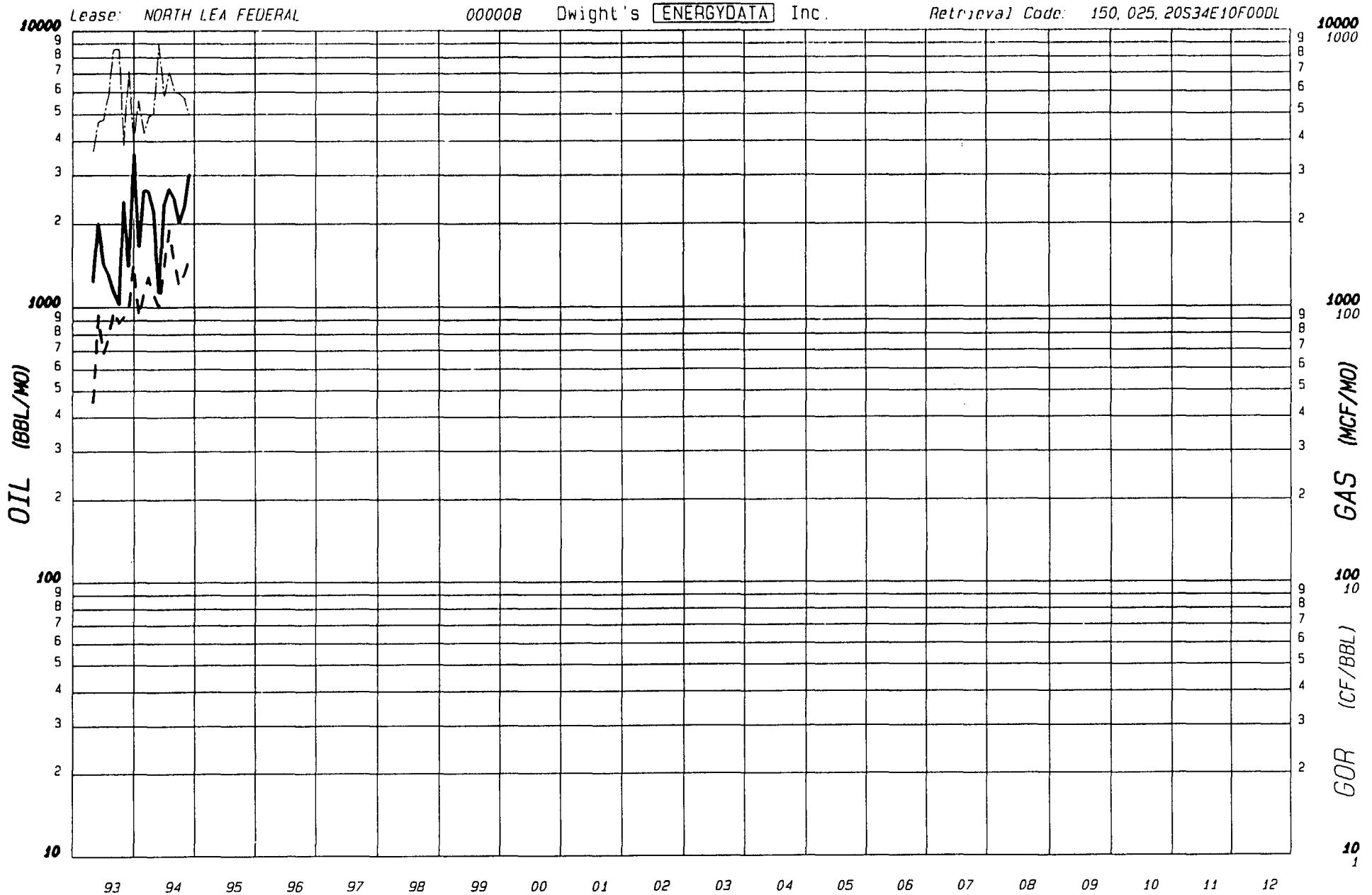

Lease: NORTH LEA FEDERAL
000008 Dwight's ENERGYDATA Inc.
Retrieval Code: 150, 025, 20S34E10F00DL
OIL (BBL/MO)
GAS (MCF/MO)
GOR (CF/BBL)
10000
1000
100
10
1
93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10 11 12
County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 40629 Gas Cum: 22289
Location: 10F 20S 34E
F P. Date 04-93
Date: 01-29-95

EXHIBIT E-20

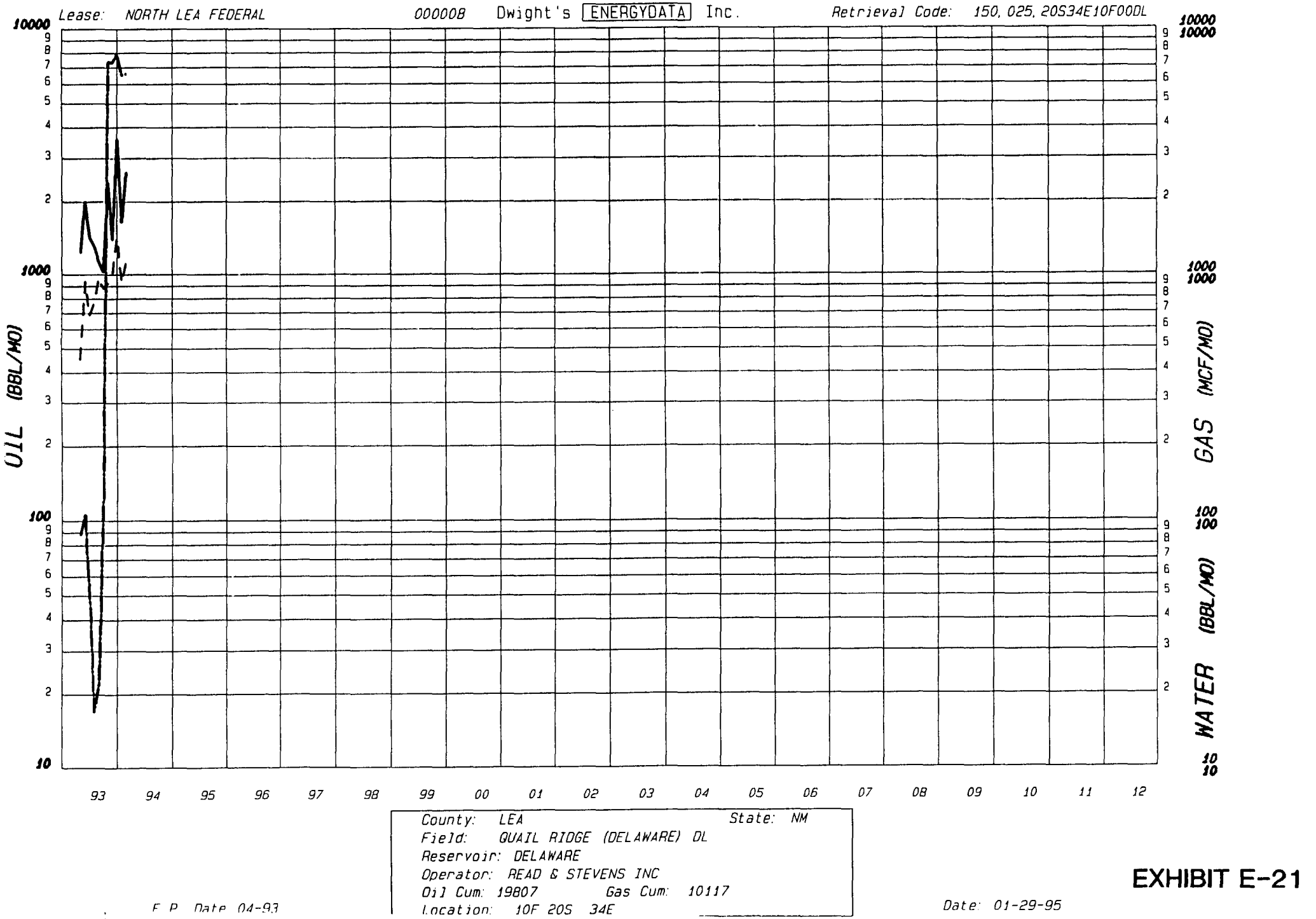
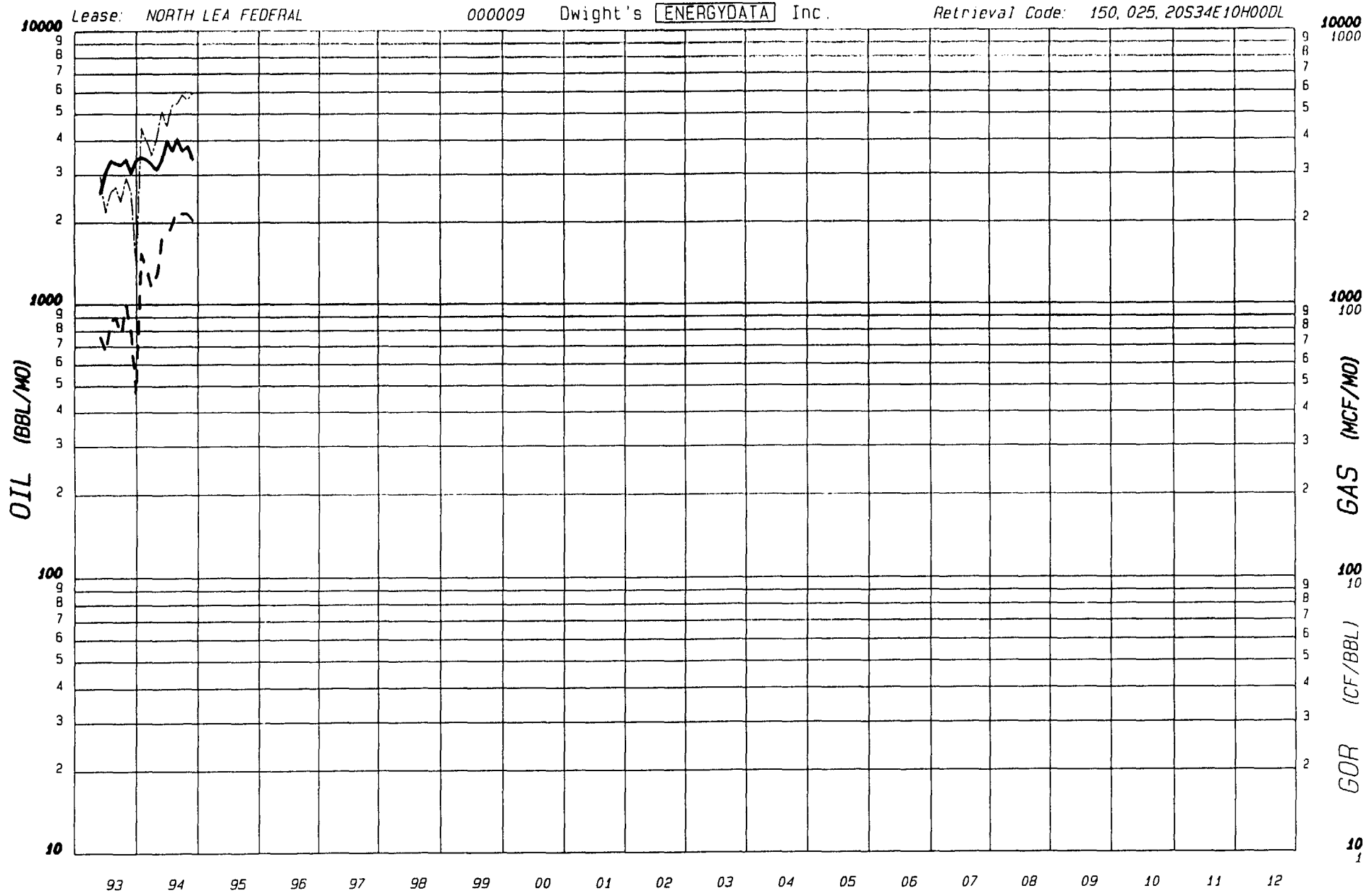

Lease: NORTH LEA FEDERAL
000008 Dwight's ENERGYDATA Inc.
Retrieval Code: 150, 025, 20S34E10F00DL
OIL (BBL/MO)
GAS (MCF/MO)
WATER (BBL/MO)
10000
1000
100
10
93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10 11 12
County: LEA
State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 19807
Gas Cum: 10117
Location: 10F 20S 34E
F P Date 04-93
Date: 01-29-95

EXHIBIT E-21

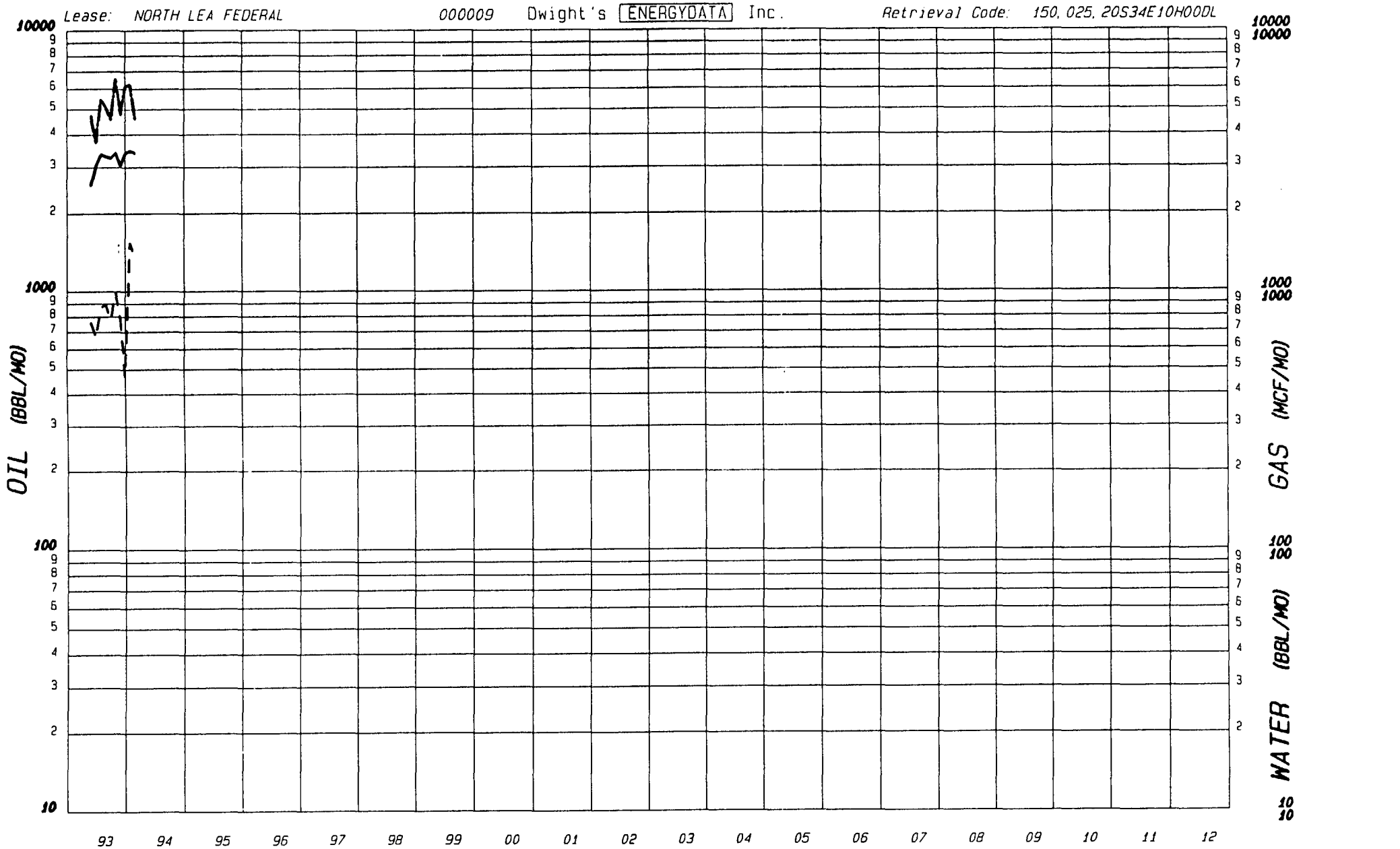


County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 64663 Gas Cum: 25620
Location: 10H 20S 34E

F.P. Date 05-93

Date: 01-29-95

EXHIBIT E-22

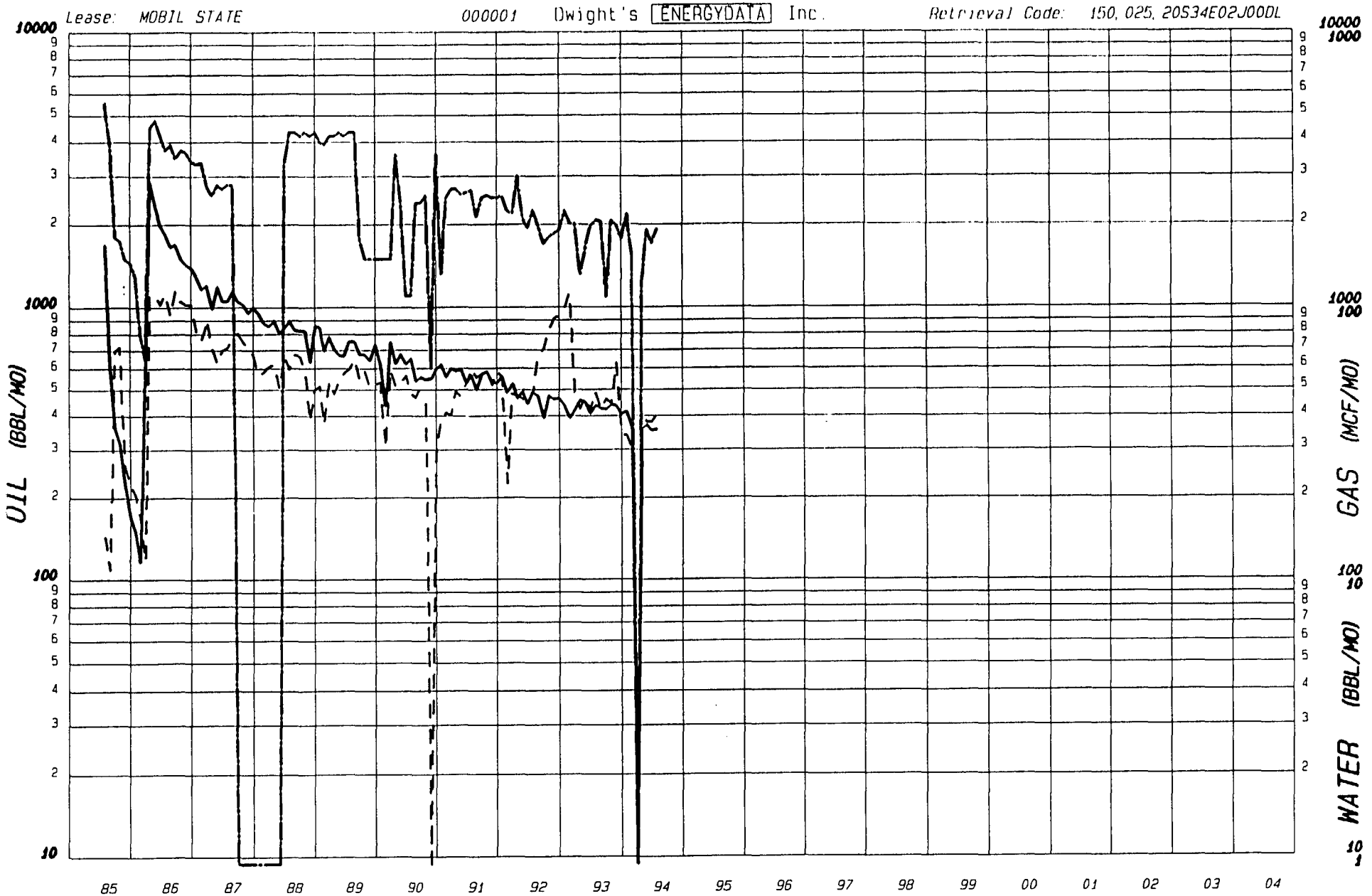


County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: READ & STEVENS INC
Oil Cum: 32264 Gas Cum: 9112
Location: 10H 20S 34E

F.P. Date 05-93

Date: 01-29-95

EXHIBIT E-23

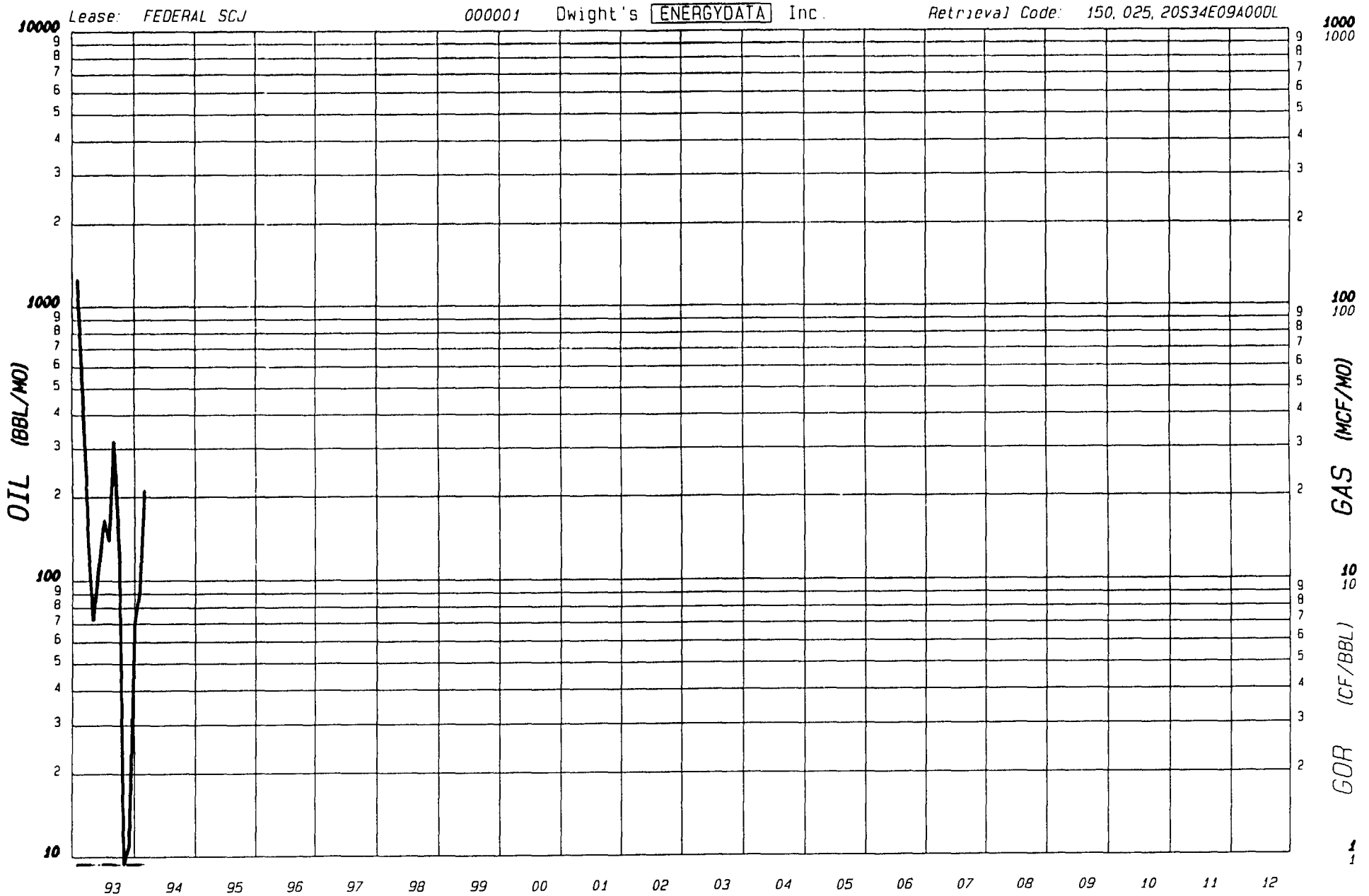


County: LEA State: NM
Field: LEA NE (DELAWARE) DL
Reservoir: DELAWARE
Operator: MID CONTINENT ENERGY INC
Oil Cum: 79633 Gas Cum: 62060
Location: 2J 20S 34E

F.P. Date 07-85

Date: 01-29-95

EXHIBIT E-24

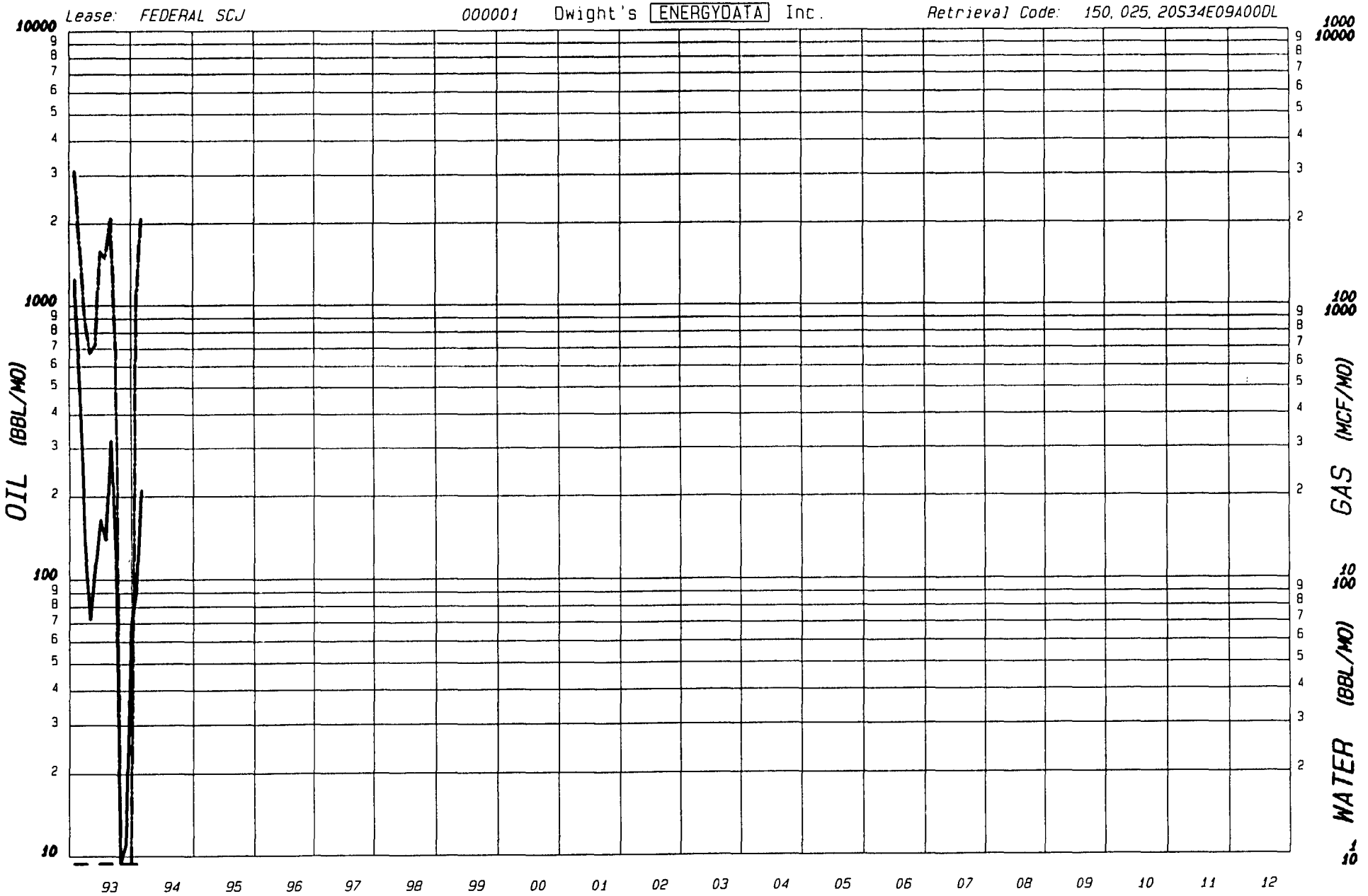


County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: SNOW OIL & GAS INC
Oil Cum: 3176 Gas Cum: 0
Location: 9A 20S 34E

F P Date 01-93

Date: 01-29-95

EXHIBIT E-25



County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: SNOW OIL & GAS INC
Oil Cum: 3176 Gas Cum: 0
Location: 9A 20S 34E

F.P. Date 01-93

Date: 01-29-95

EXHIBIT E-26

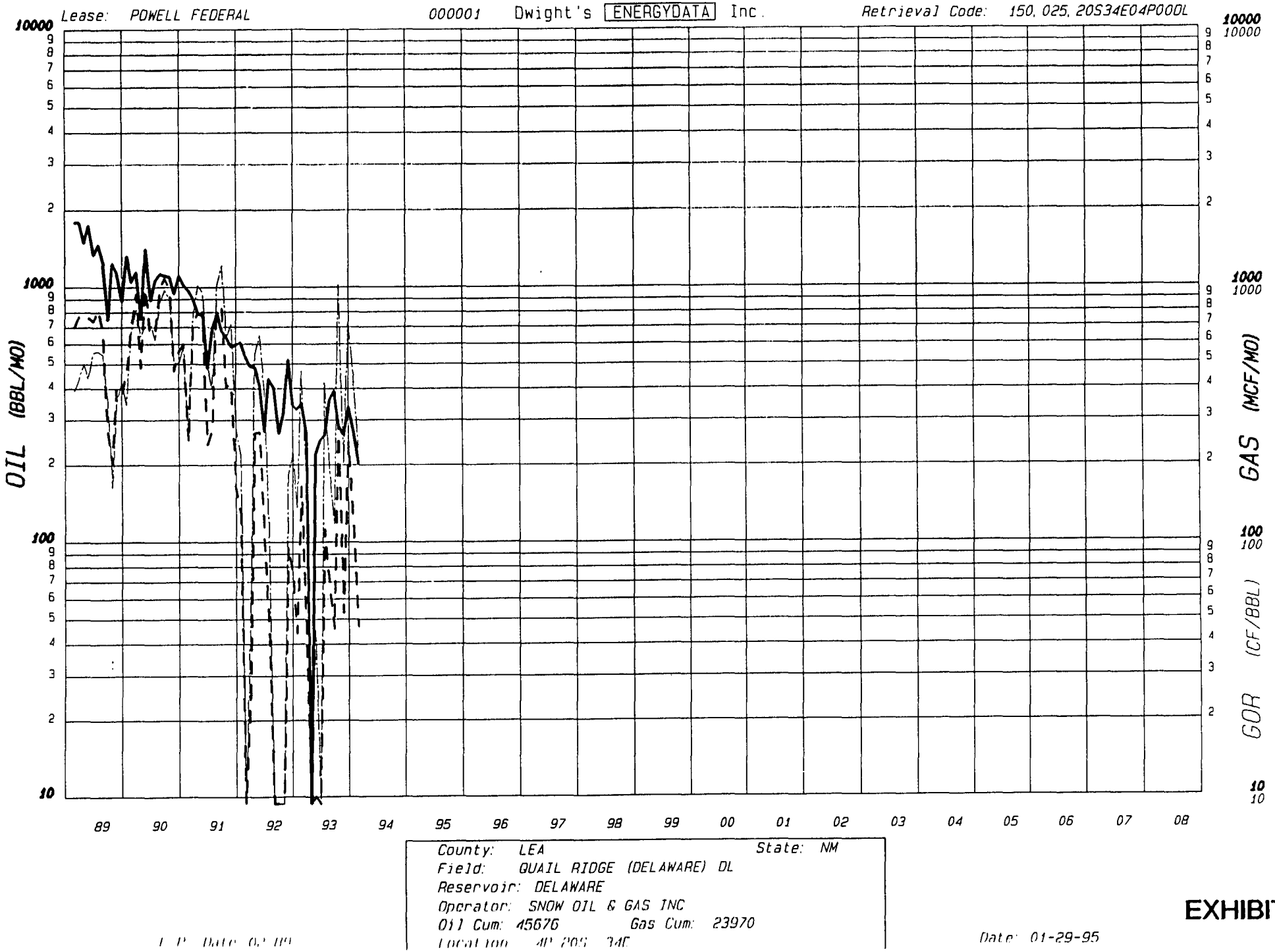
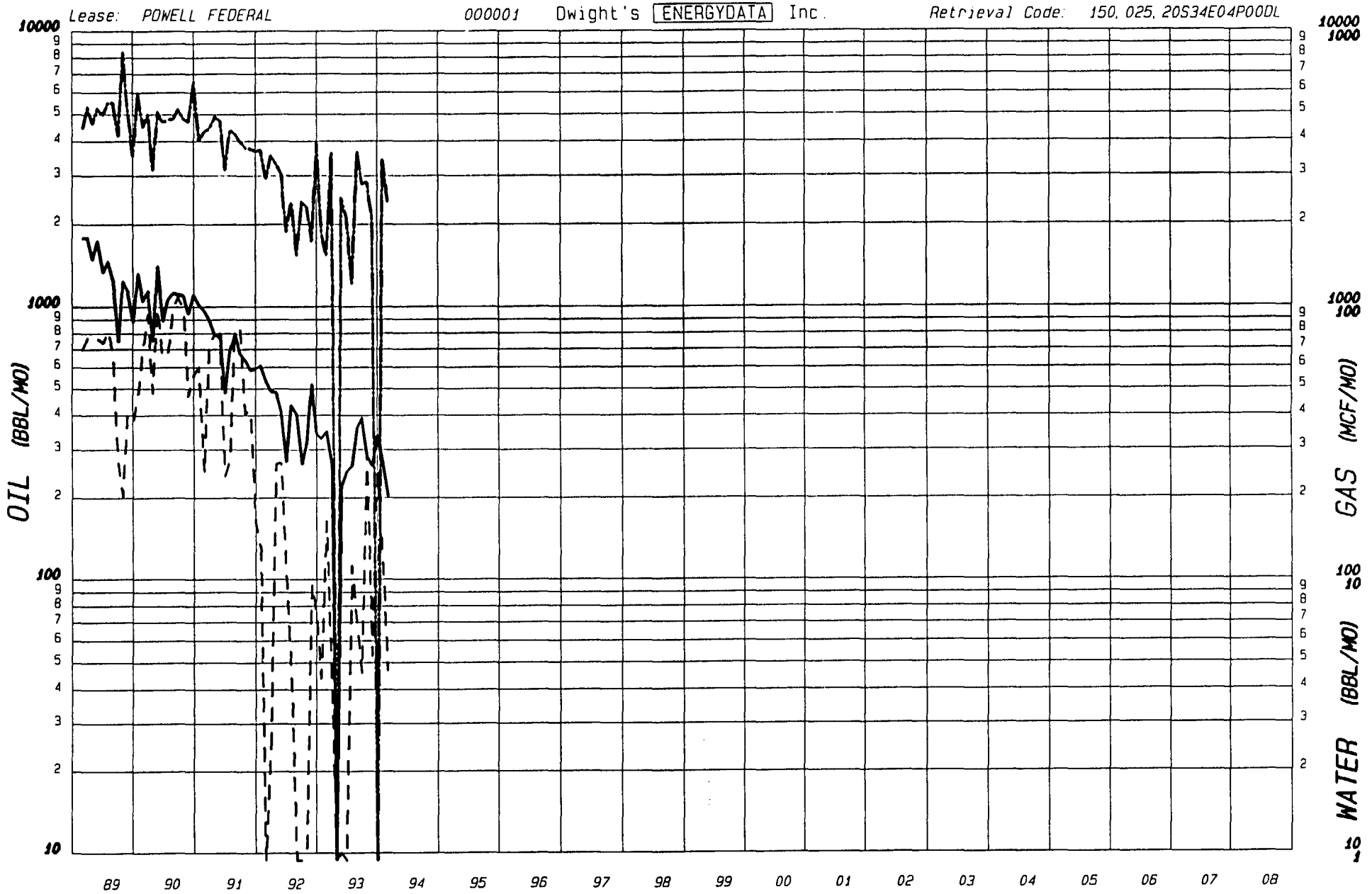

Lease: POWELL FEDERAL
000001 Dwight's ENERGYDATA Inc.
Retrieval Code: 150, 025, 20S34E04P000L
OIL (BBL/MO)
GAS (MCF/MO)
GOR (CF/BBL)
10000
1000
100
10
89 90 91 92 93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 08
County: LEA
State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: SNOW OIL & GAS INC
Oil Cum: 45676
Gas Cum: 23970
Location 4P 20S 34E
Date: 01-29-95

EXHIBIT E-27



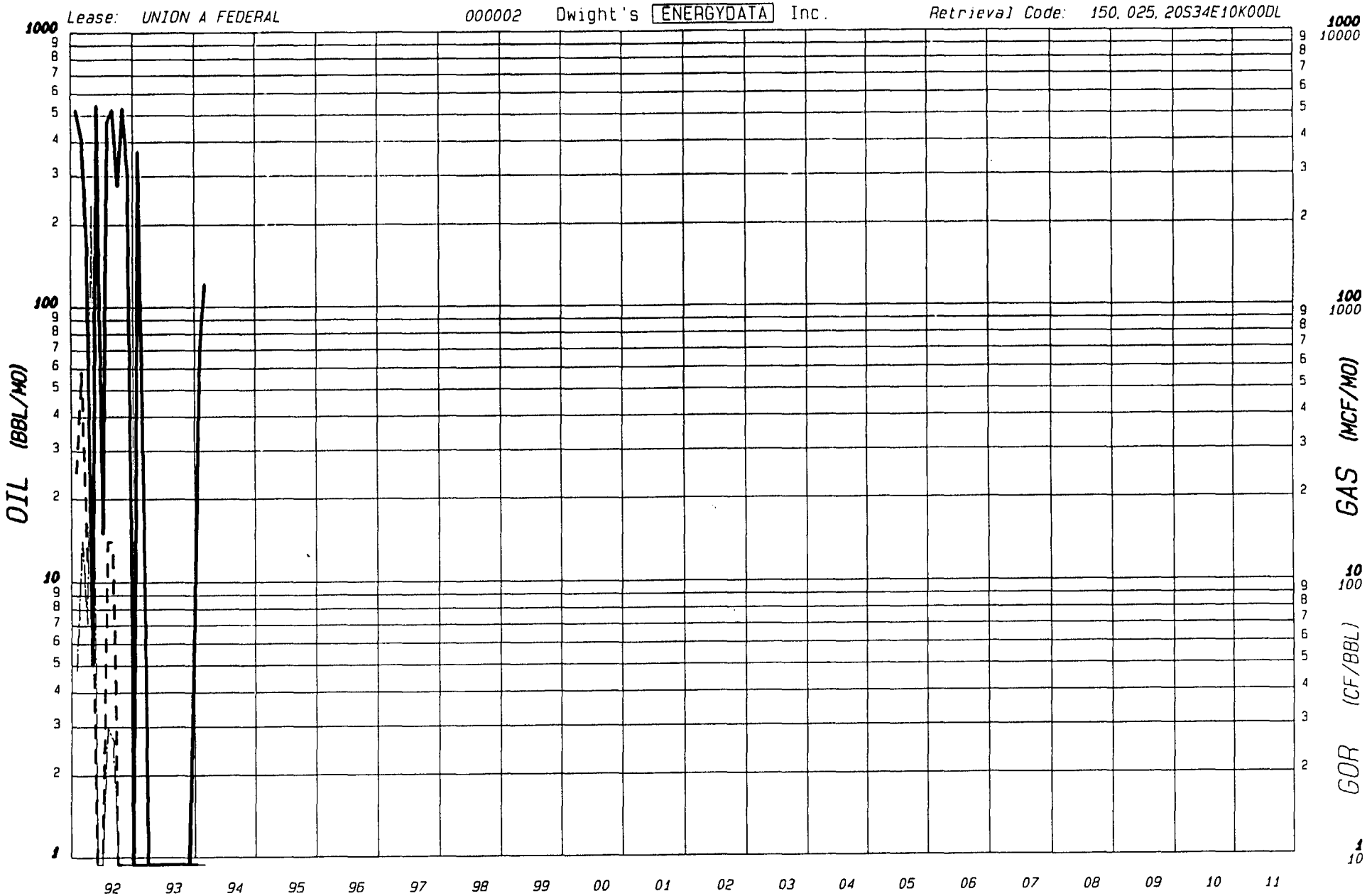
County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: SNOW OIL & GAS INC
Oil Cum: 45676 Gas Cum: 23970
Location: 4P 20S 34E

F P Date 02-89

Date: 01-29-95

EXHIBIT E-28

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



County: LEA State: NM
Field: QUAIL RIDGE (DELAWARE) DL
Reservoir: DELAWARE
Operator: SNOW OIL & GAS INC
Oil Cum: 4356 Gas Cum: 135
Location: 10K 20S 34E

F D Date: 01-02

Date: 01-29-95

EXHIBIT E-2

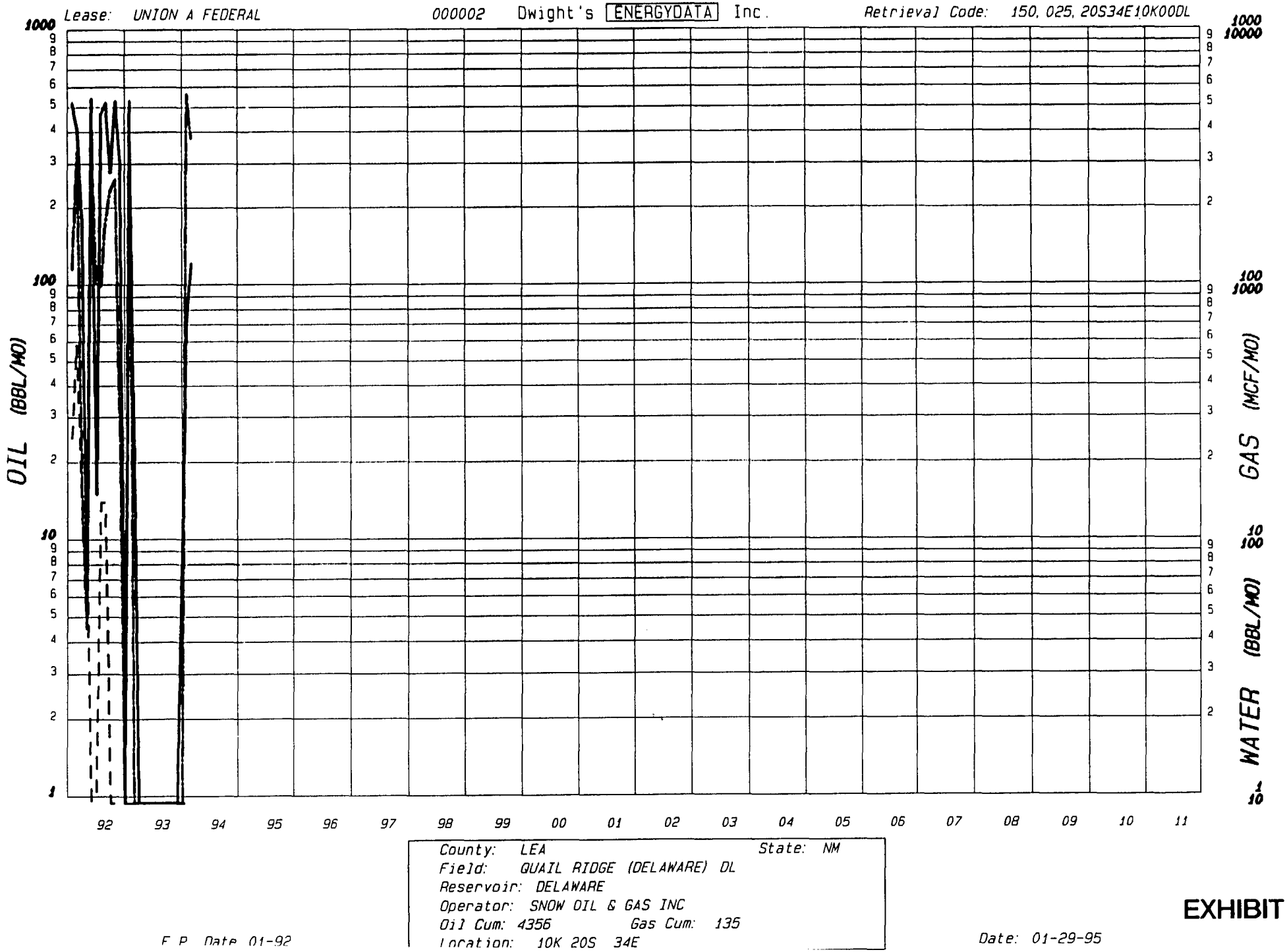
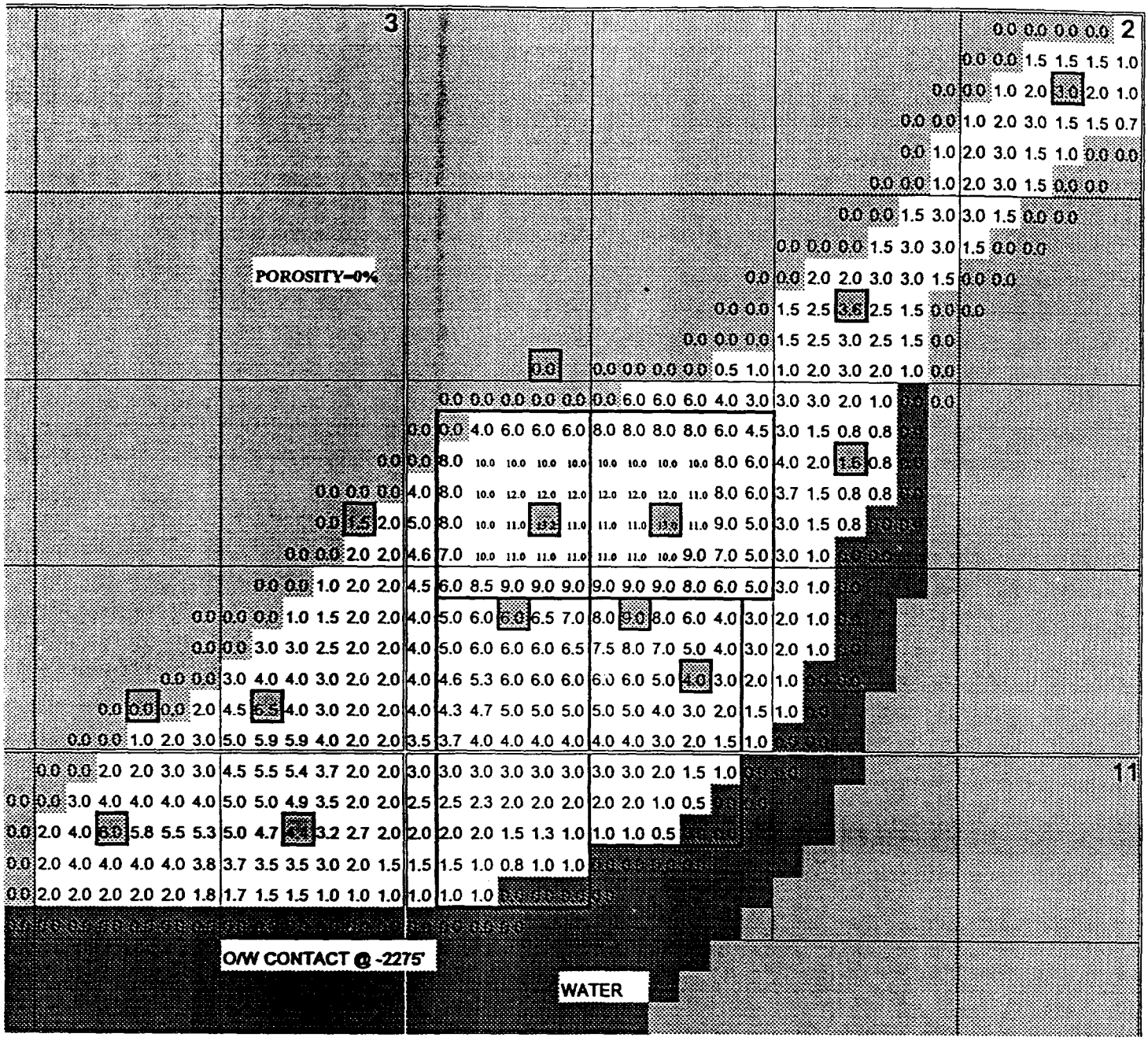

Lease: UNION A FEDERAL
000002 Dwight's ENERGYDATA Inc.
Retrieval Code: 150, 025, 20S34E10K00DL
OIL (BBL/MO)
GAS (MCF/MO)
WATER (BBL/MO)
92 93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10 11
County: LEA
State: NM
Field: QUAIL RIDGE (DELAWARE) OL
Reservoir: DELAWARE
Operator: SNOW OIL & GAS INC
Oil Cum: 4356
Gas Cum: 135
Location: 10K 20S 34E
F P Date 01-92
Date: 01-29-95

EXHIBIT E-30



T20S-R34E

PORSITY-FEET MAP OF THE THIRD SAND

WELL

220'X220' = 1.111 ACRES

POROSITY PINCHOUT

OIL - WATER CONTACT

EXHIBIT F-

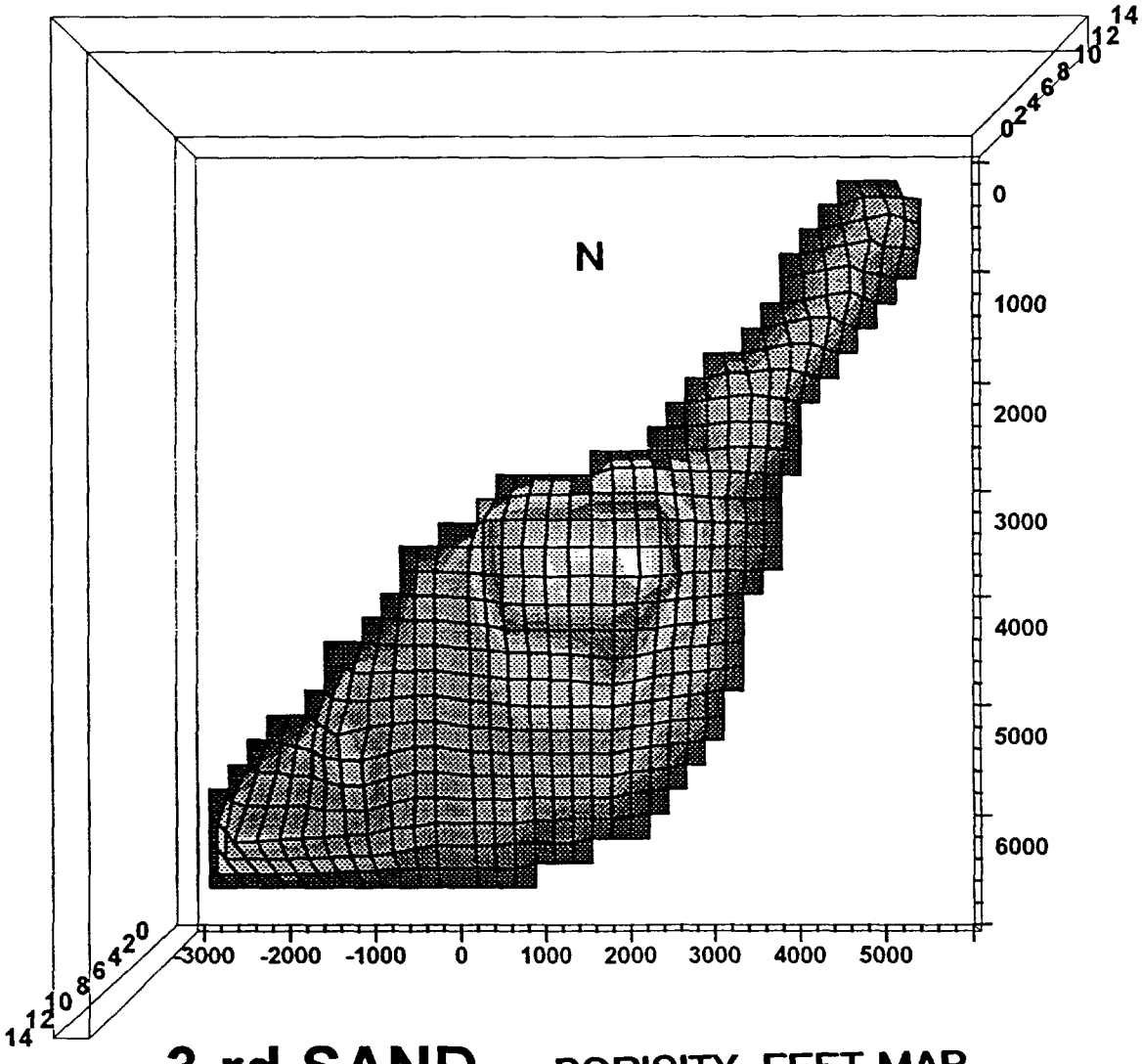
WELL	INITIAL BHP	Bo	ACREAGE FACTOR	POROSITY-FEET	OOIP	RECOVERY FACTOR	RECOVERABLE RESERVES
1	2539	1.24	1.11	352	1,210,102	27%	330,028
2	2539	1.24	1.11	299	1,027,344	27%	280,185
3	2539	1.24	1.11	192	659,343	27%	179,821
4	2539	1.24	1.11	158	544,833	27%	148,591
RES.	2539	1.24	1.11	1583.9	5,450,353	100%	5,450,353

	#	OOIP	R.F.	RECOVERABLE
316.5	1	1210102.0	0.27	330027.8
268.7	2	1027344.1	0.27	280184.8
172.5	3	659343.1	0.27	179820.8
142.5	4	544832.7	0.27	148590.7
	BBLS. OOIP			
1425.5	R	5,450,353	100	5,450,353

DATA

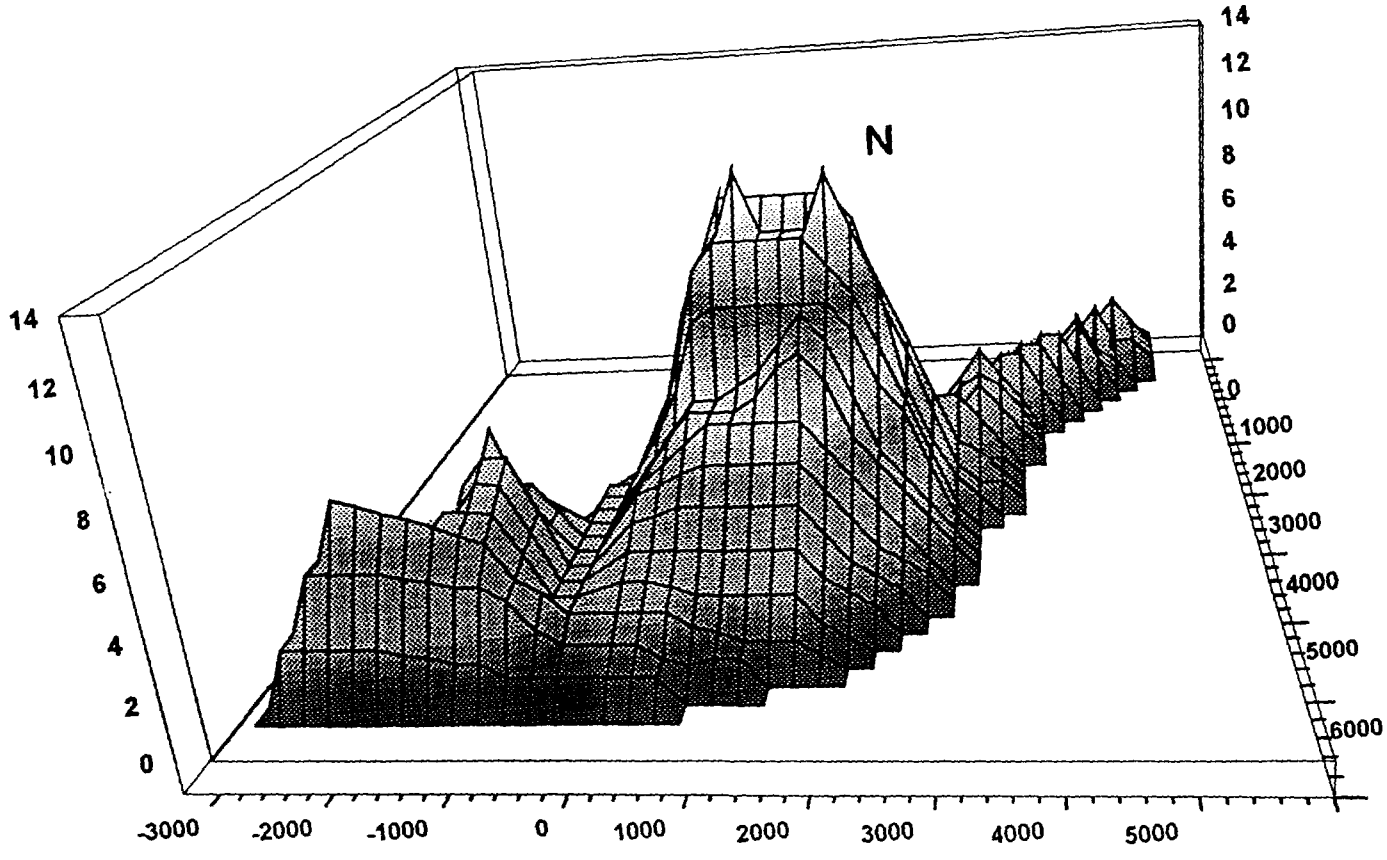
OIL VISCOSITY	1.4	cp
FORMATION WATER VISCOSITY	1.004	cp
S.G. FORMATION WATER	1.14	
Cl	132,995	PPM
RES. @70 F	0.057	OHMS-M
RW @ BHT	0.04	OHMS-M
O/W CONTACT	-2275.00	FT.
GAS BTU	1488.00	DRY
GAS S.G.	0.972	
OIL DENSITY	44.7858	LBM/CU.FT.
OIL GRAVITY	38	DEG. API
Bg @ 2500 PSI	0.0035	
Bg @ 1200 PSI	0.0080	
Bg @ 800 PSI	0.0150	
Bg @ 500 PSI	0.0320	
BUBBLE POINT	1200	PSI
Boi	1.24	BO/BSTO
Cf	3.70E-06	
Co	0.0000119	
Cw	3.03E-06	

EXHIBIT F-2



3 rd SAND - POROSITY-FEET MAP

EXHIBIT F-3



3 rd SAND - POROSITY-FEET MAP

EXHIBIT

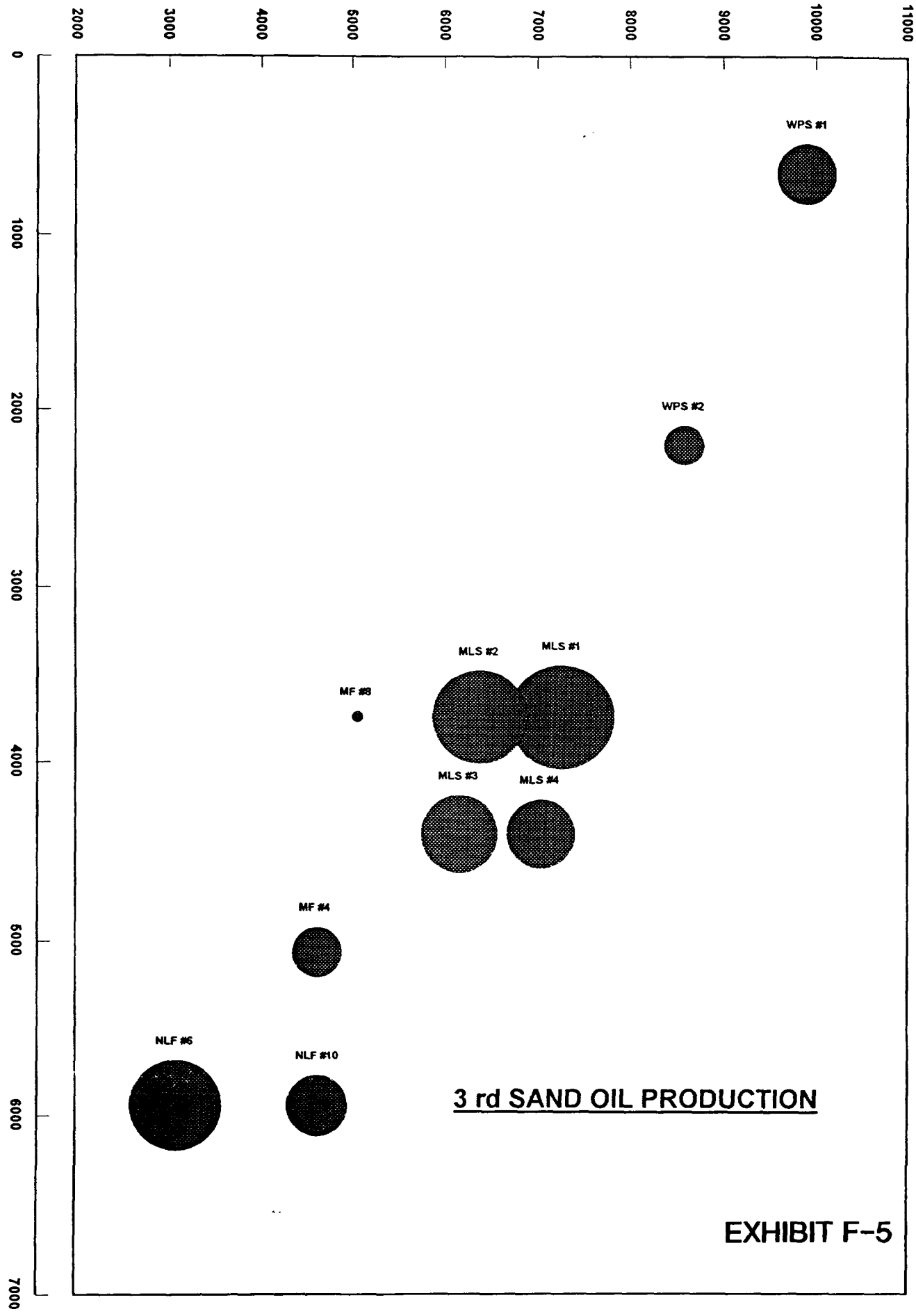

2000
3000
4000
5000
6000
7000
8000
9000
10000
11000
0
1000
2000
3000
4000
5000
6000
7000
WPS #1
WPS #2
MLS #2
MLS #1
MF #3
MLS #3
MLS #4
MF #4
NLF #5
NLF #10
3 rd SAND OIL PRODUCTION

EXHIBIT F-5

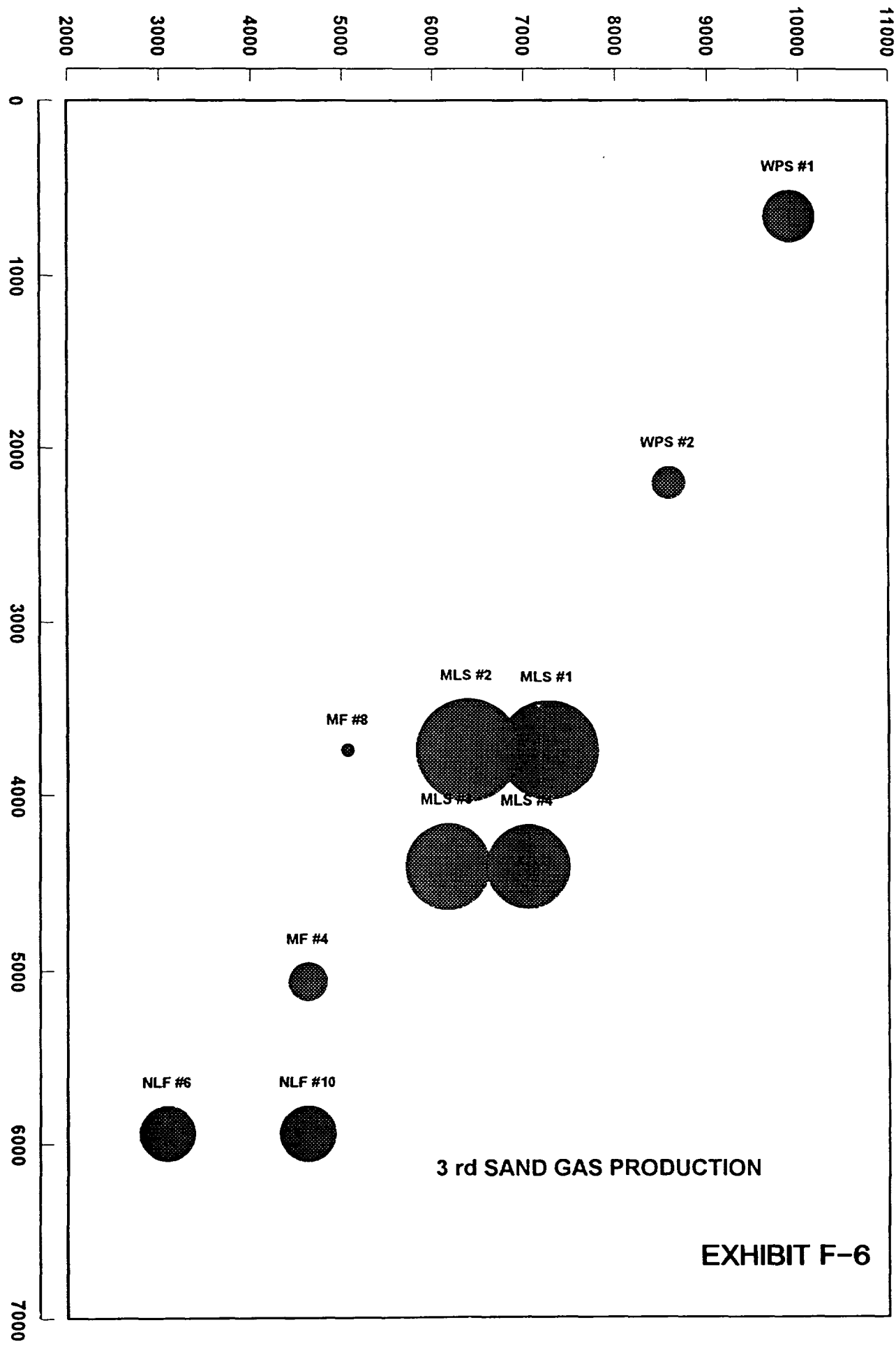

2000
3000
4000
5000
6000
7000
8000
9000
10000
11000
0
1000
2000
3000
4000
5000
6000
7000
WPS #1
WPS #2
MLS #2
MLS #1
MF #8
MLS #3
MLS #4
MF #4
NLF #6
NLF #10
3 rd SAND GAS PRODUCTION

EXHIBIT F-6

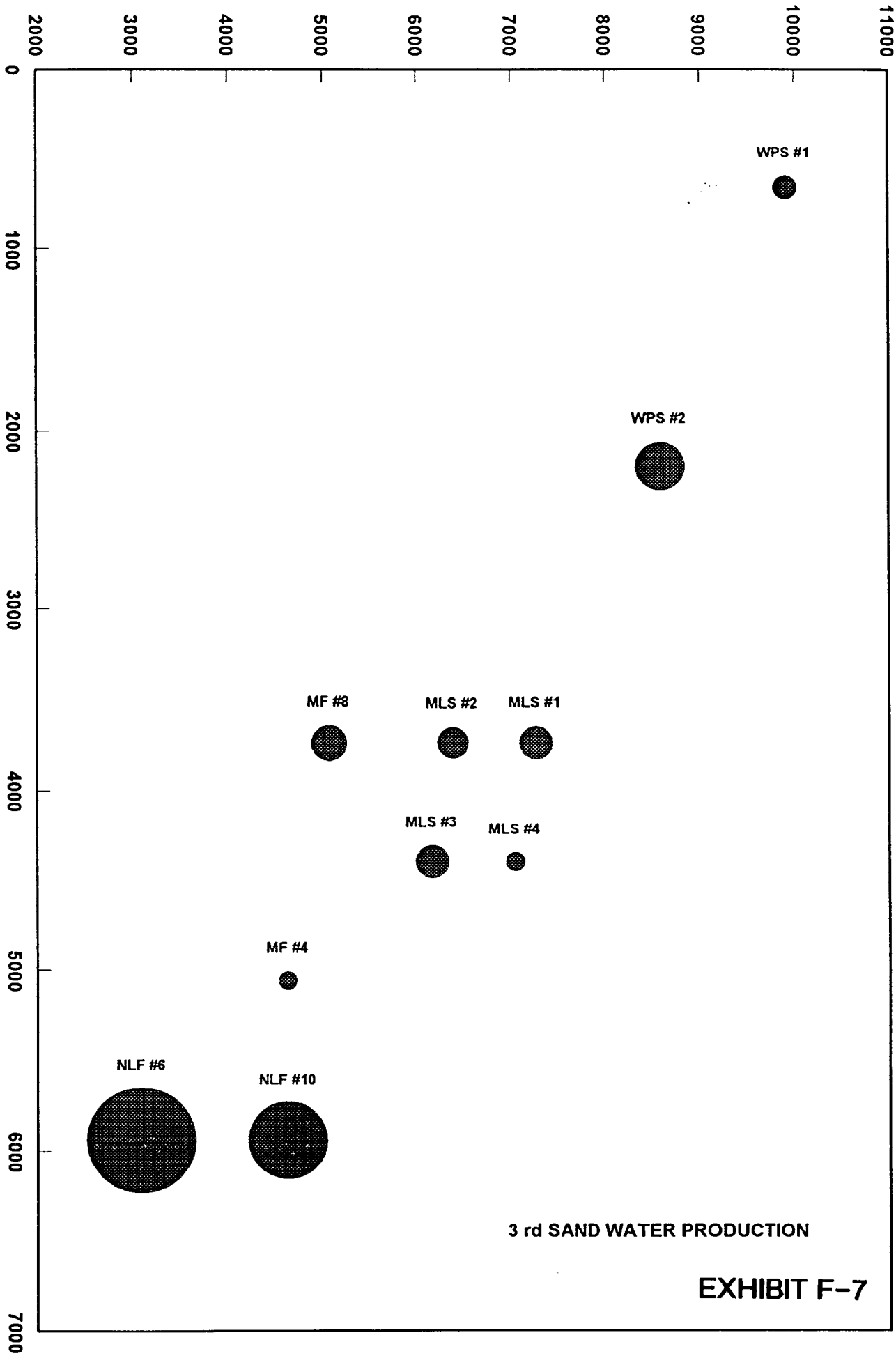
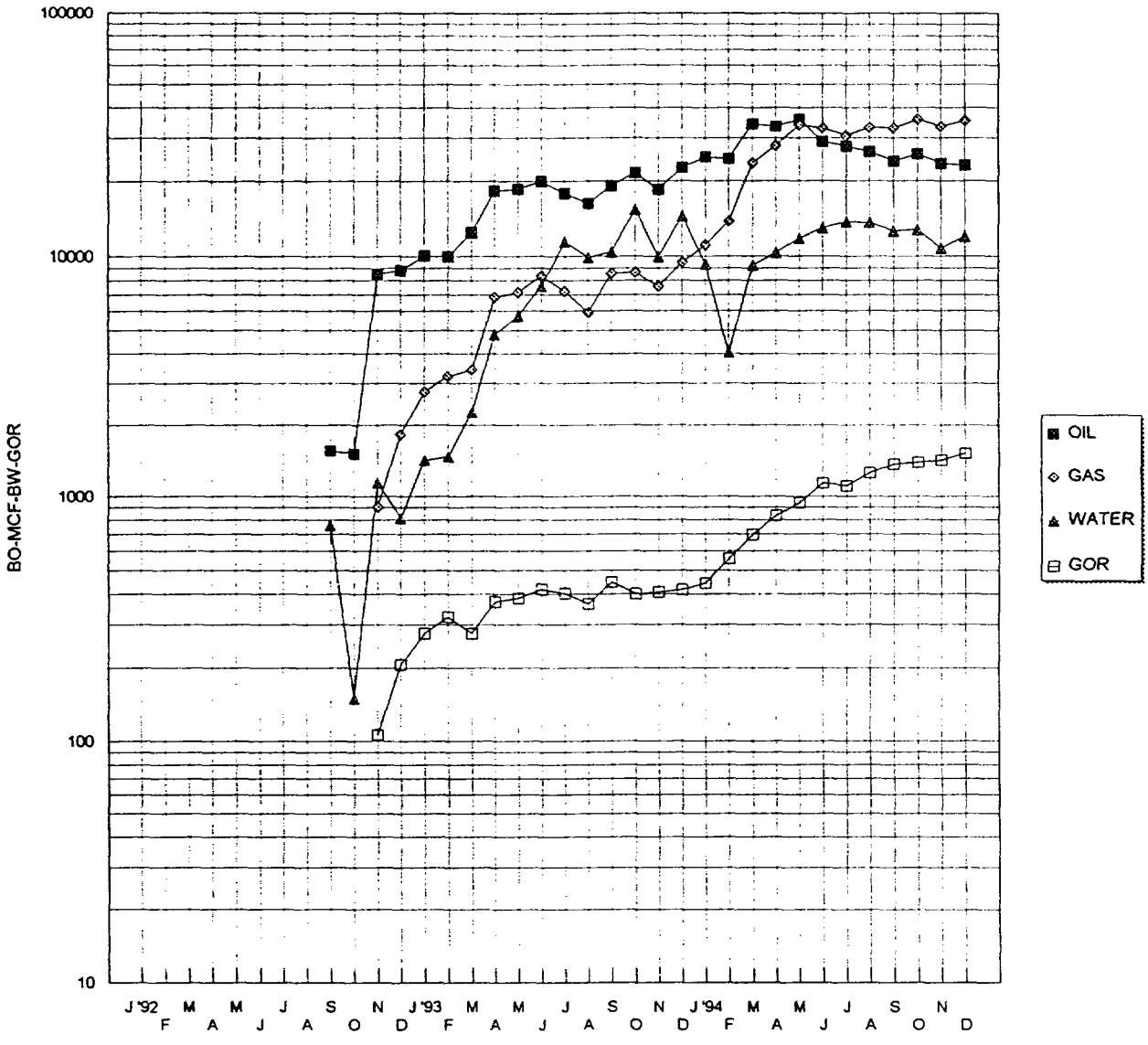

2000
3000
4000
5000
6000
7000
8000
9000
10000
11000
0
1000
2000
3000
4000
5000
6000
7000
WPS #1
WPS #2
MF #8
MLS #2
MLS #1
MLS #3
MLS #4
MF #4
NLF #6
NLF #10
3 rd SAND WATER PRODUCTION

EXHIBIT F-7

THIRD SAND SUMMARY

NORTHEAST LEA DELAWARE POOL



OIL AND WATER CUT

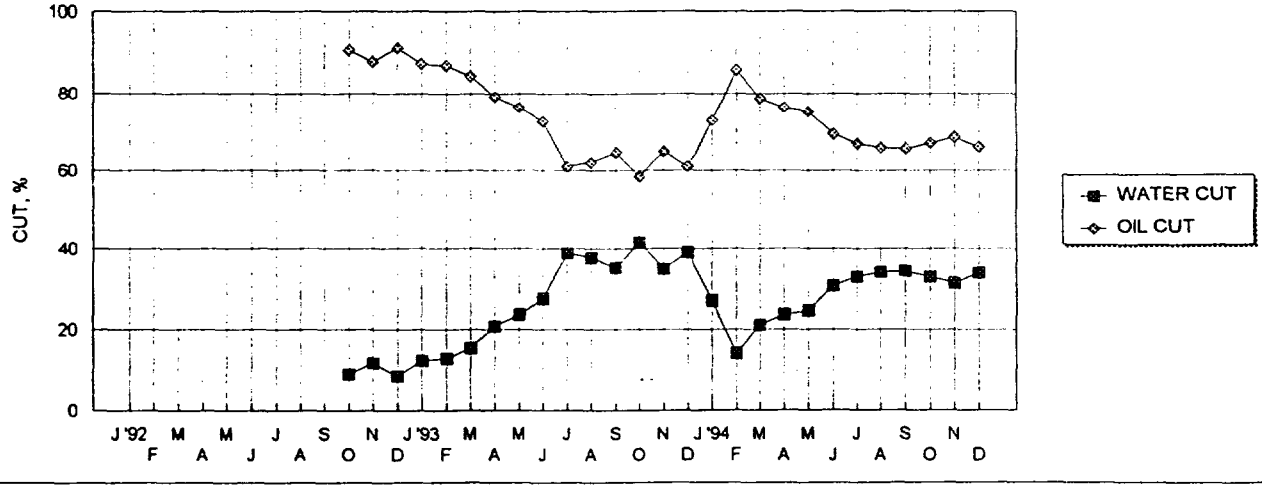
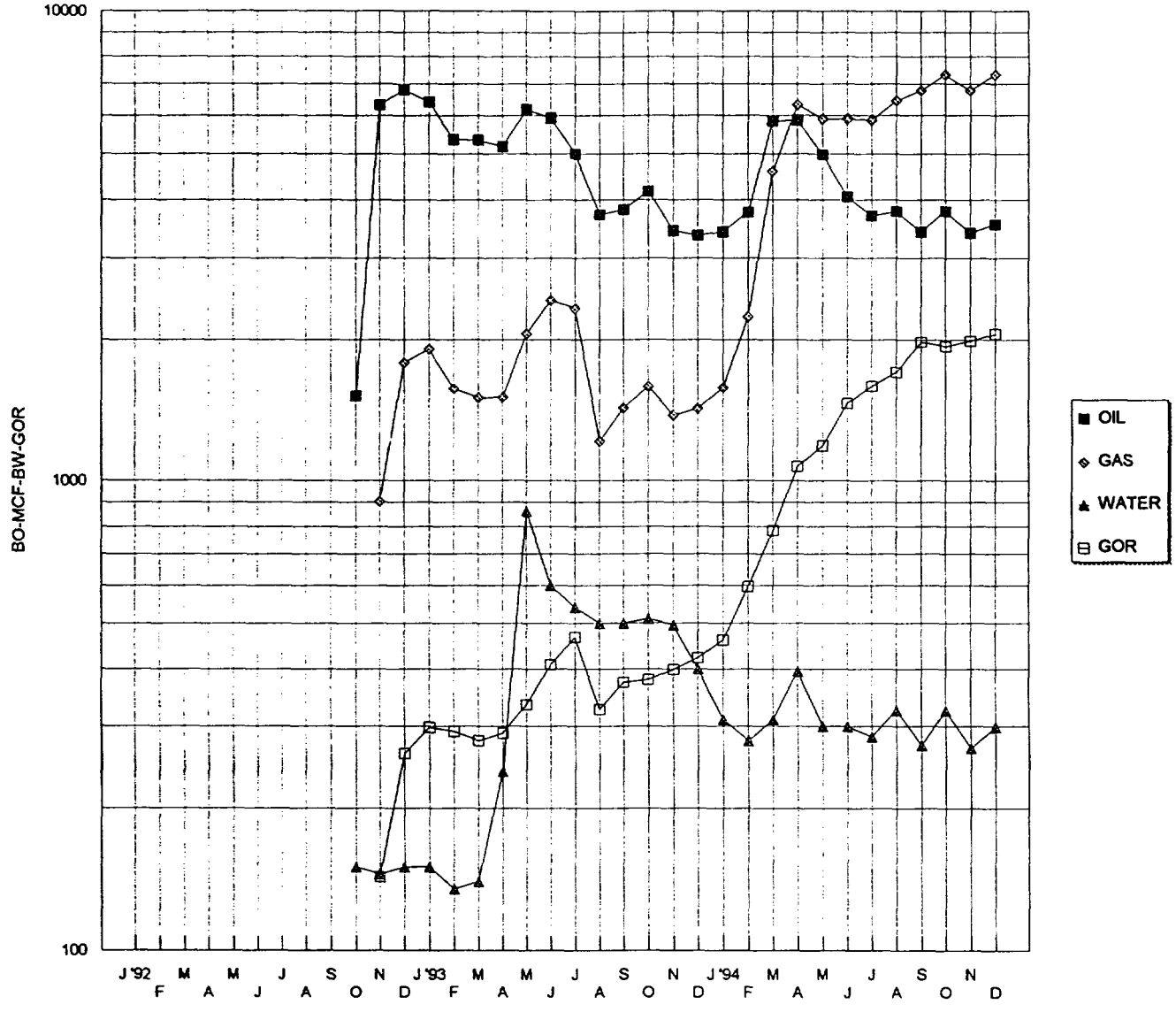


EXHIBIT F-

ARMSTRONG ENERGY CORP.

MOBIL LEA STATE #1



OIL AND WATER CUT

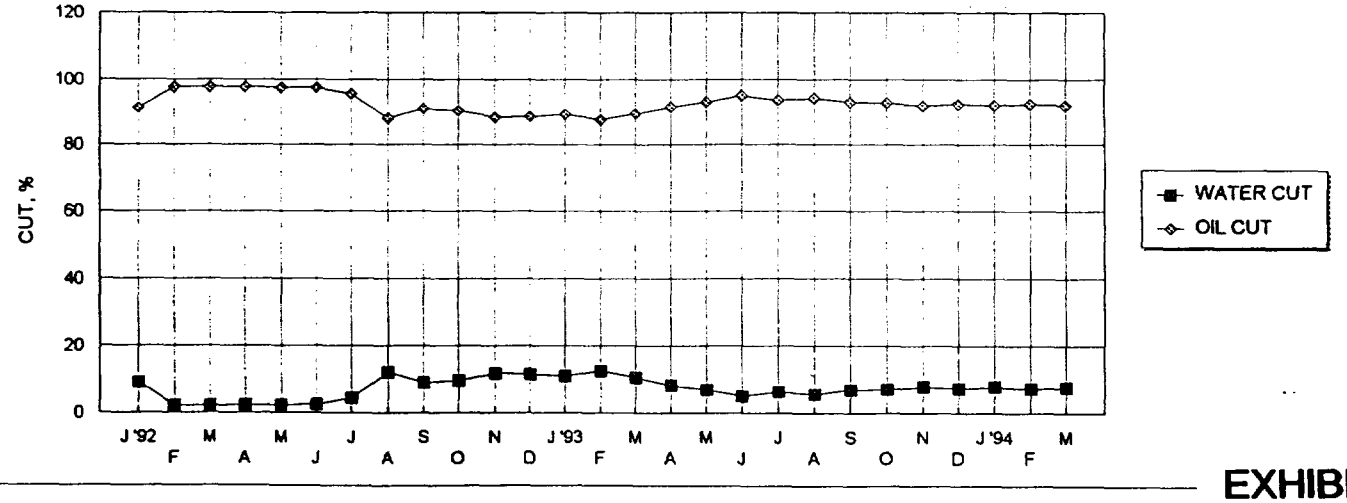
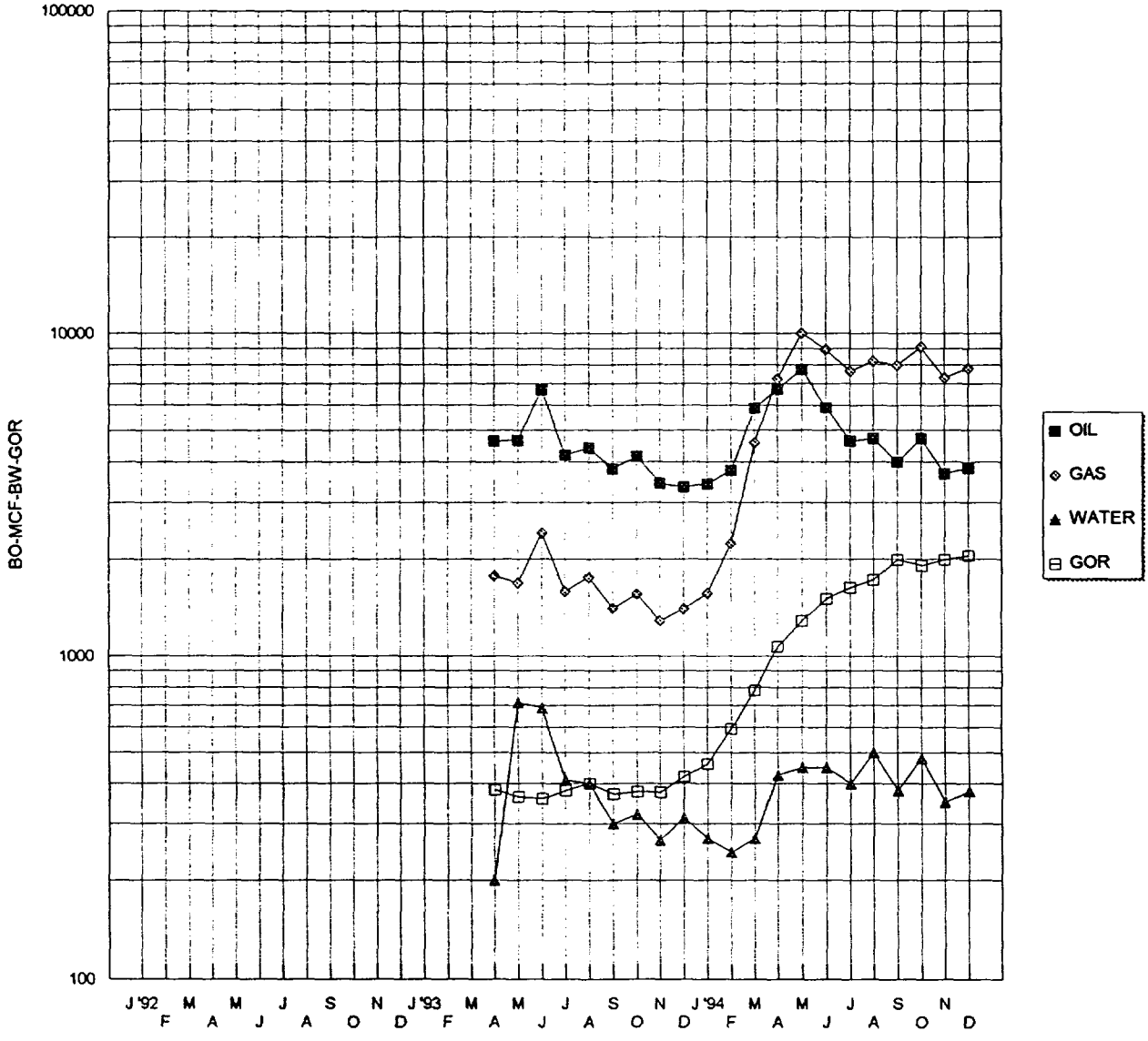


EXHIBIT G-

ARMSTRONG ENERGY CORP.

MOBIL LEA STATE #2



OIL AND WATER CUT

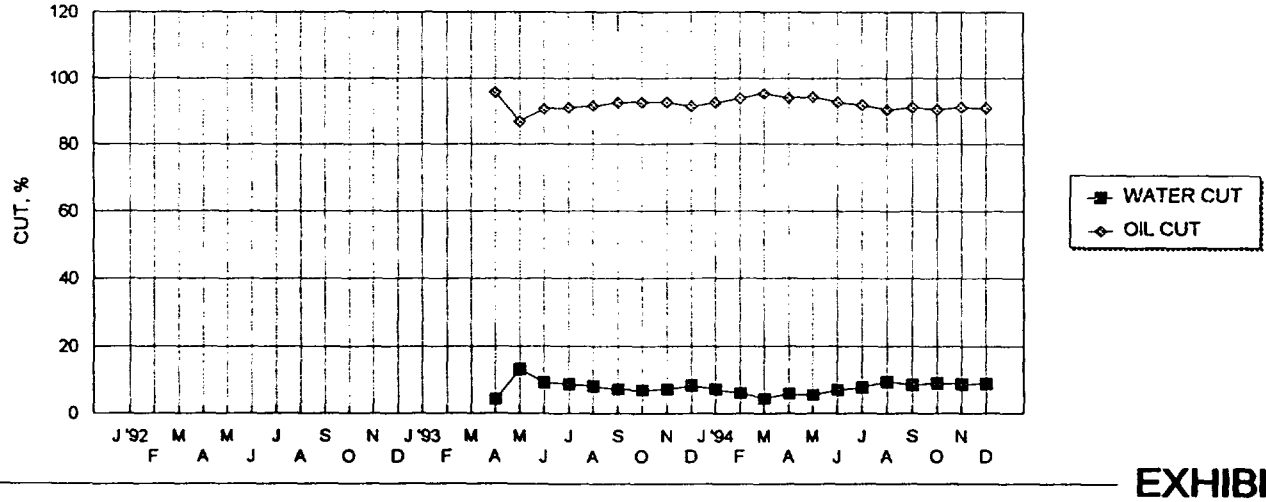
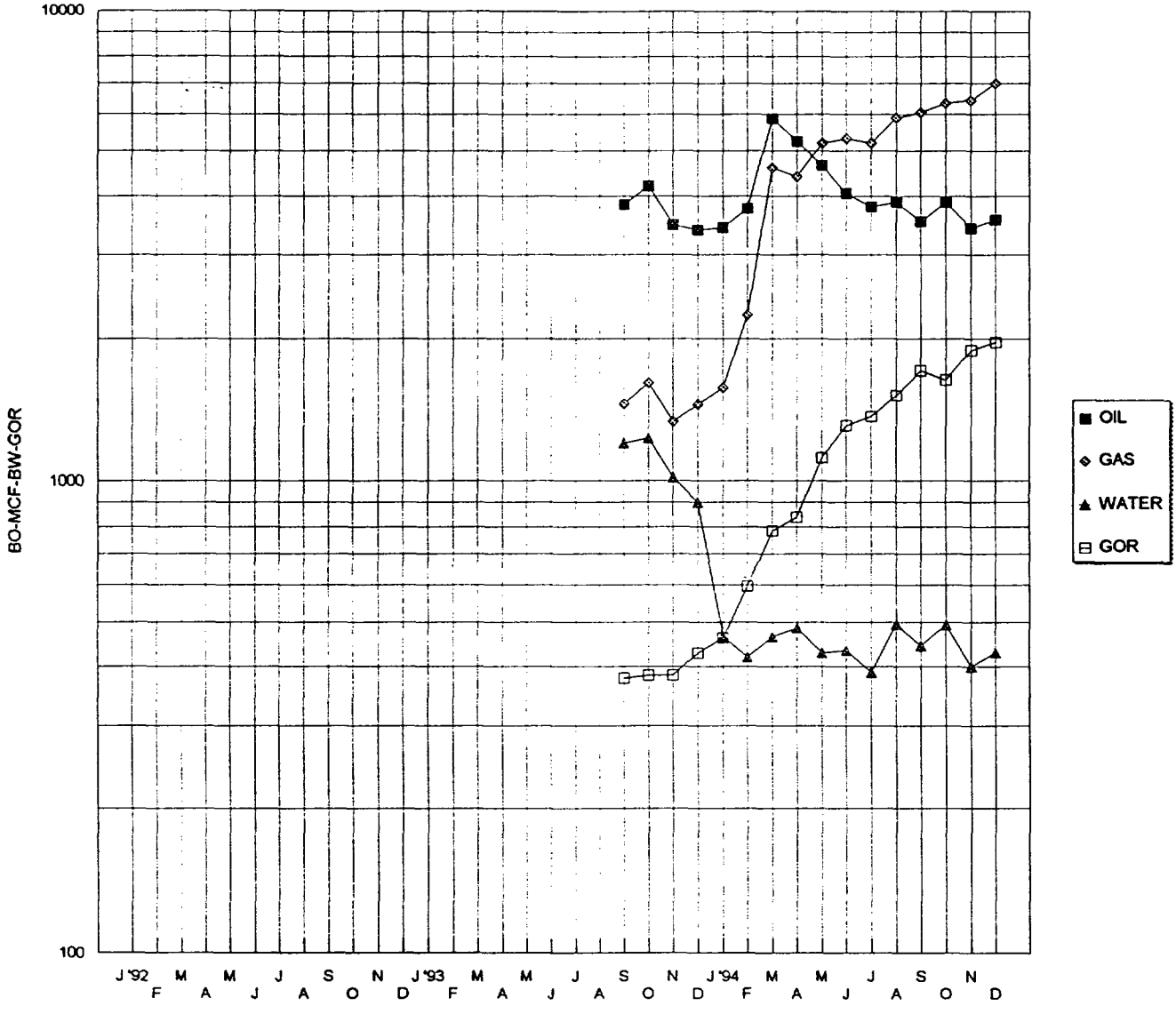


EXHIBIT G-2

ARMSTRONG ENERGY CORP.

MOBIL LEA STATE #3



OIL AND WATER CUT

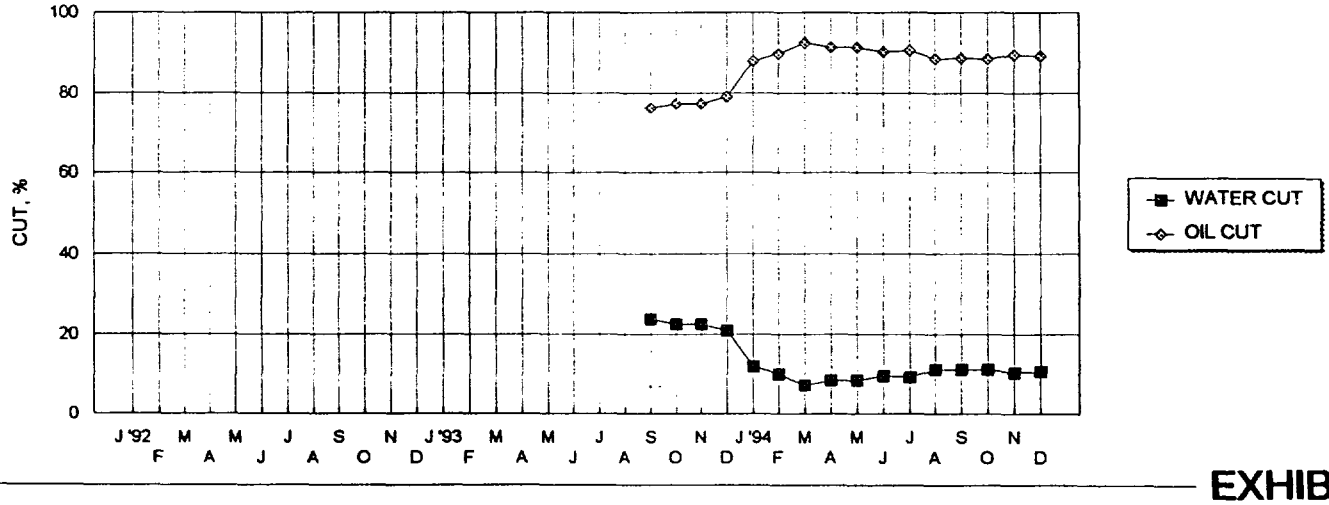
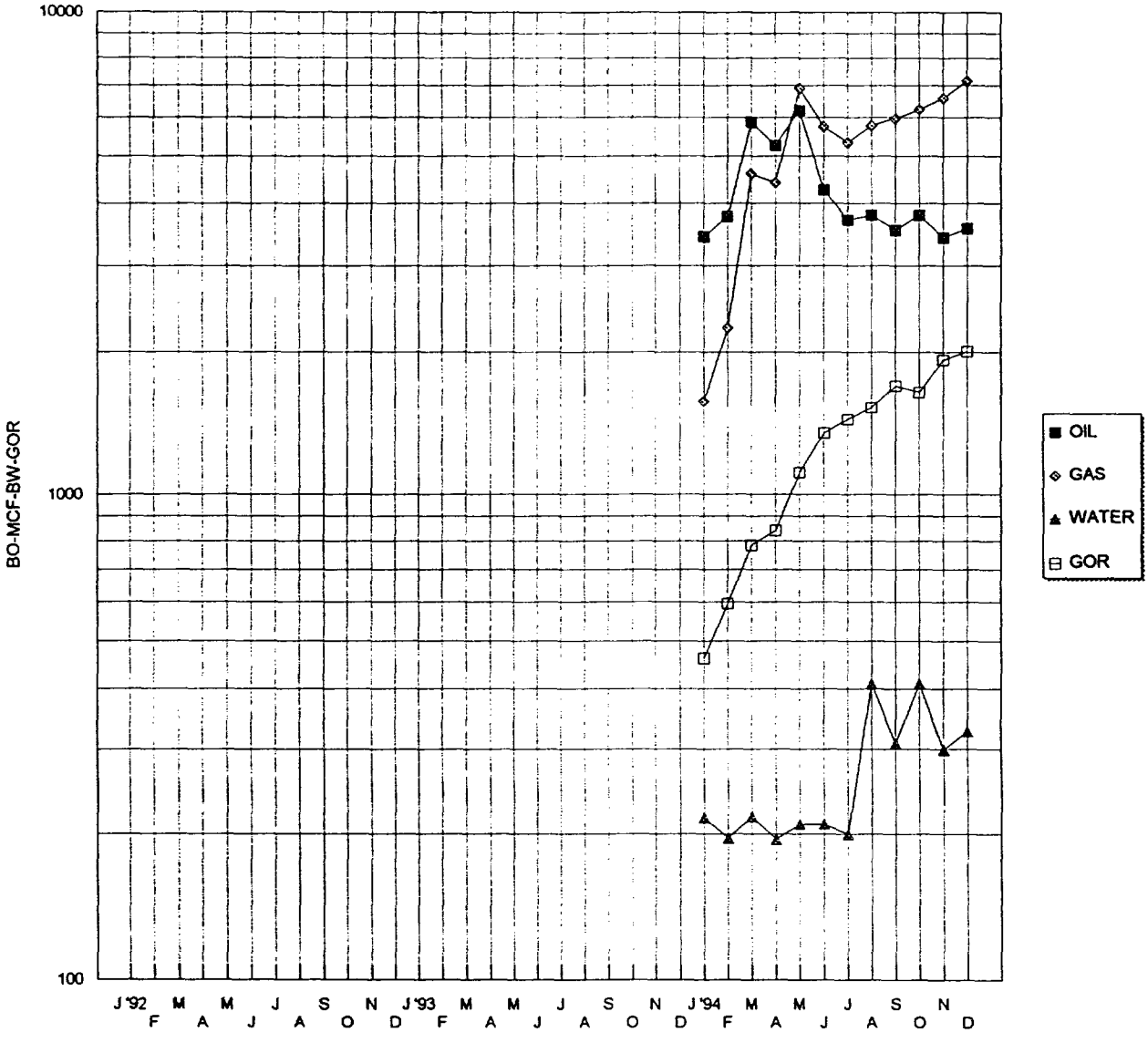


EXHIBIT G-3

ARMSTRONG ENERGY CORP.

MOBIL LEA STATE #4



OIL AND WATER CUT

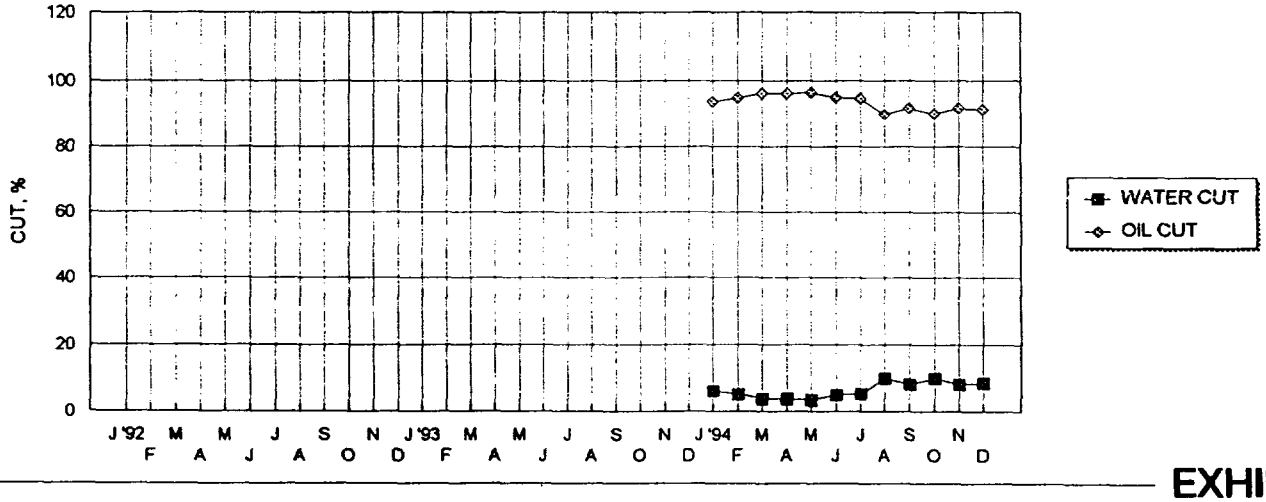
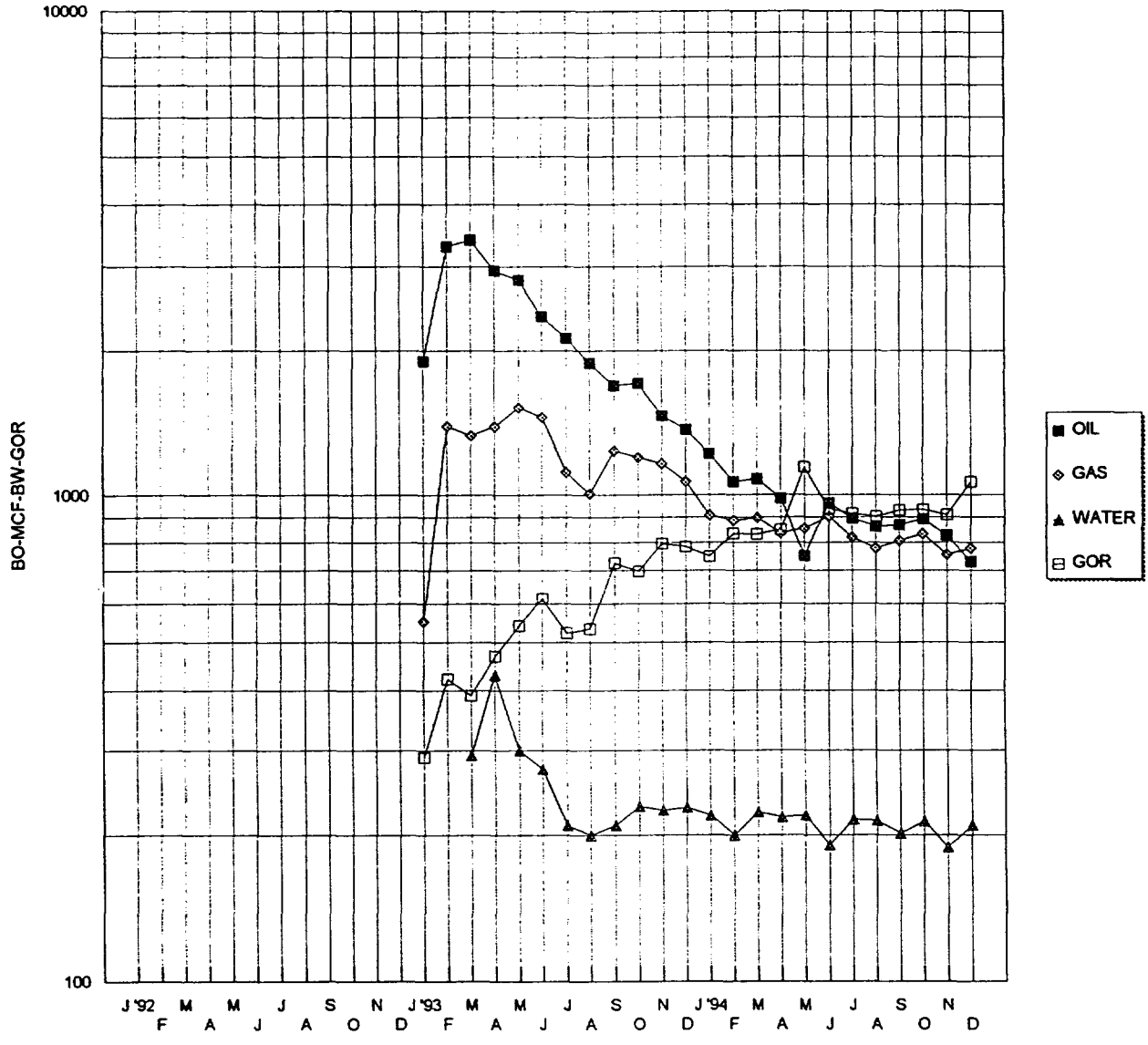


EXHIBIT G-4

ARMSTRONG ENERGY CORP.

WEST PEARL STATE #1



OIL AND WATER CUT

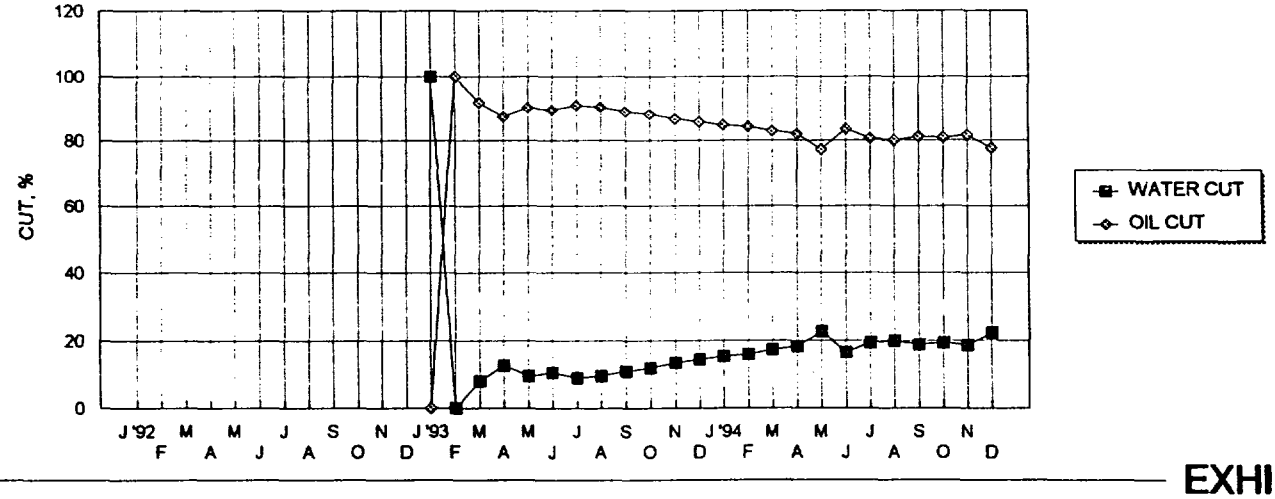
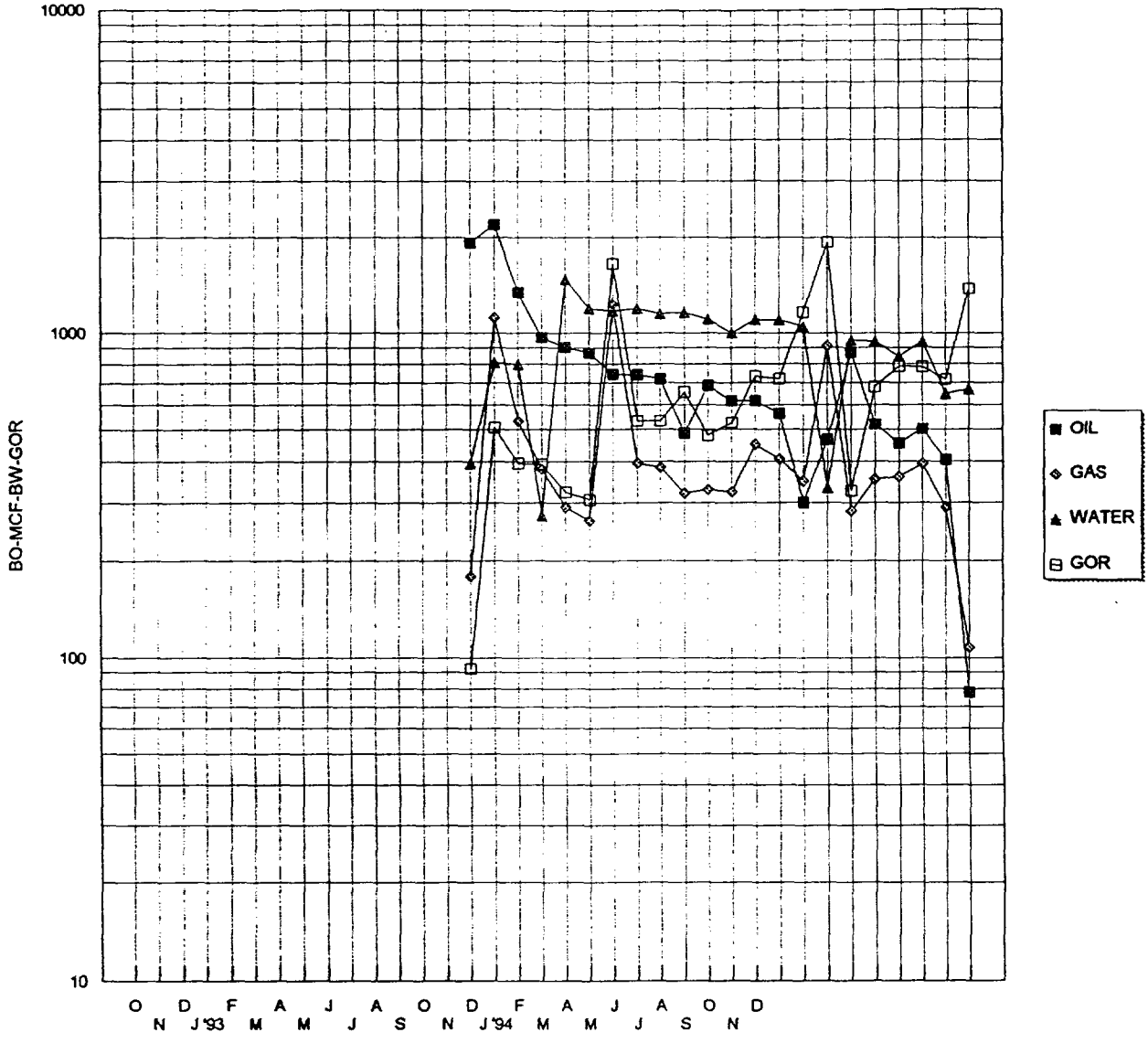


EXHIBIT G-5

ARMSTRONG ENERGY CORP.

WEST PEARL STATE #2



OIL AND WATER CUT

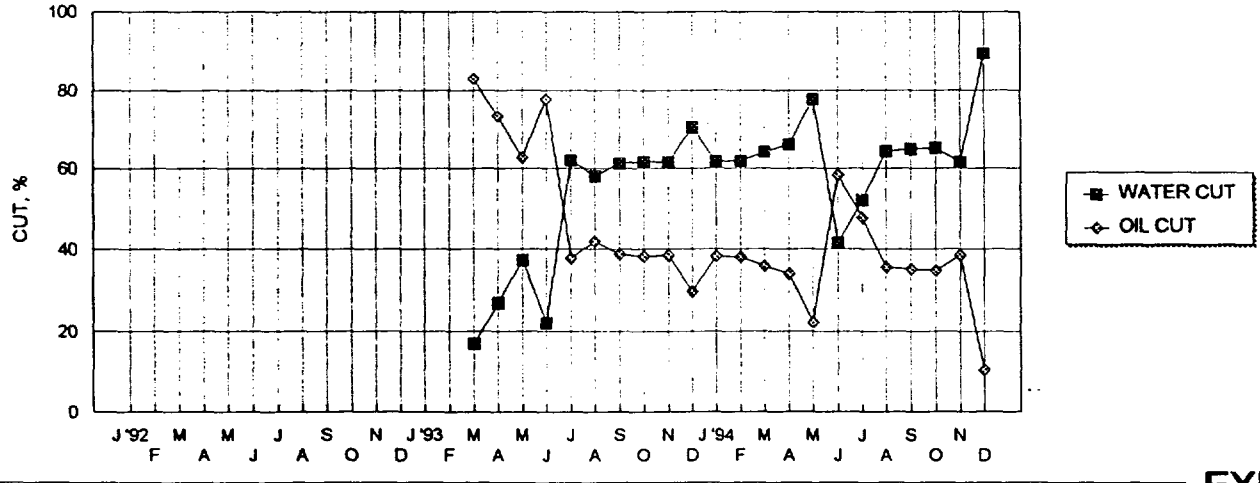
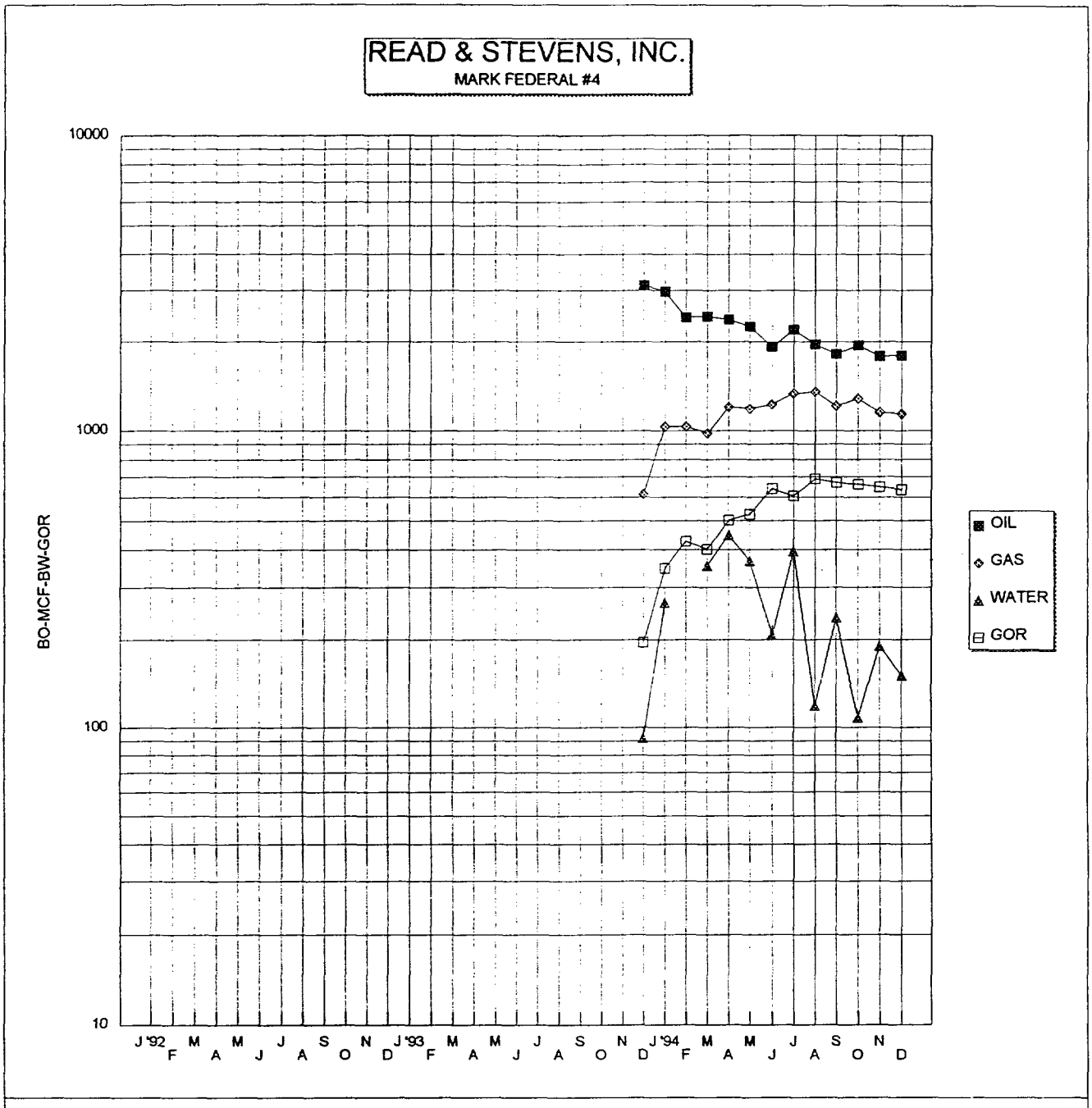


EXHIBIT G-6


READ & STEVENS, INC.
MARK FEDERAL #4
BO-MCF-BW-GOR
10000
1000
100
10
J '92 F M A M J J A S O N D J '93 F M A M J J A S O N D J '94 F M A M J J A S O N D
OIL
GAS
WATER
GOR

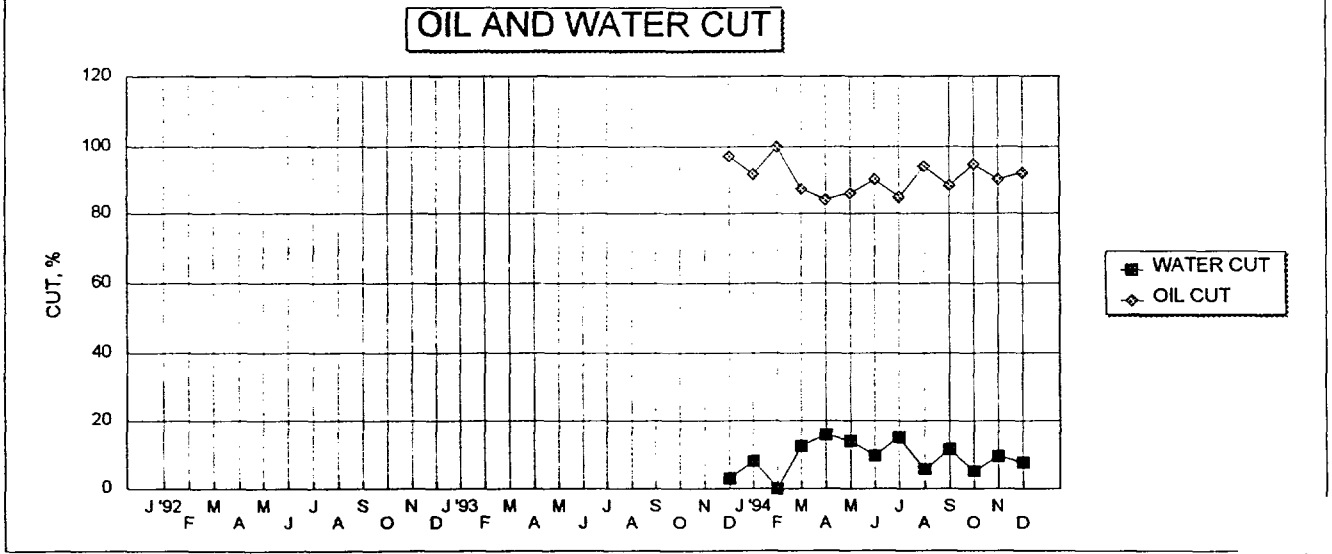
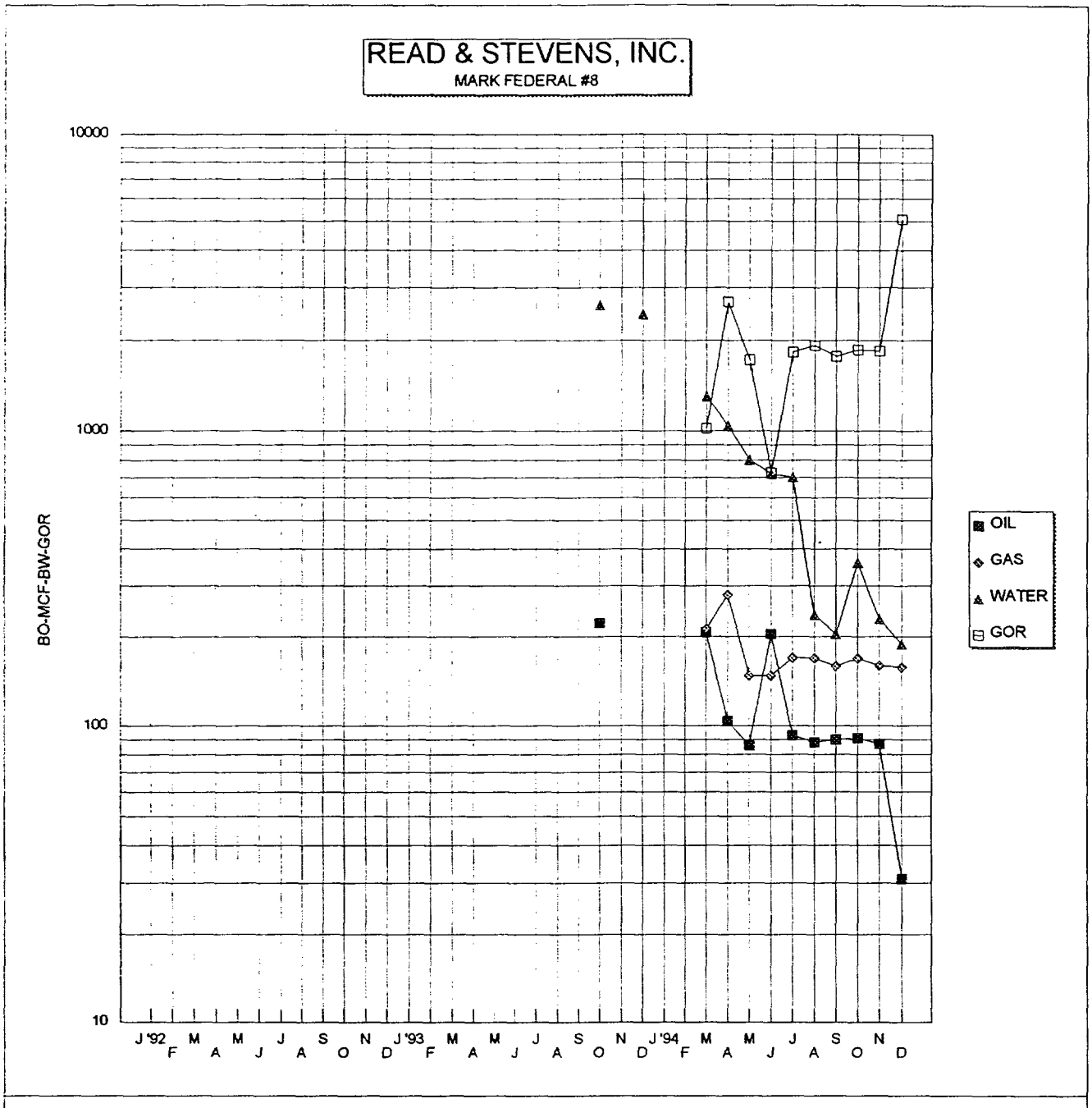

OIL AND WATER CUT
CUT, %
120
100
80
60
40
20
0
J '92 F M A M J J A S O N D J '93 F M A M J J A S O N D J '94 F M A M J J A S O N D
WATER CUT
OIL CUT

EXHIBIT G-7


READ & STEVENS, INC.
MARK FEDERAL #8
10000
1000
100
10
BO-MCF-BW-GOR
J '92 F M A M J J A S O N D J '93 F M A M J J A S O N D J '94 F M A M J J A S O N D
OIL
GAS
WATER
GOR

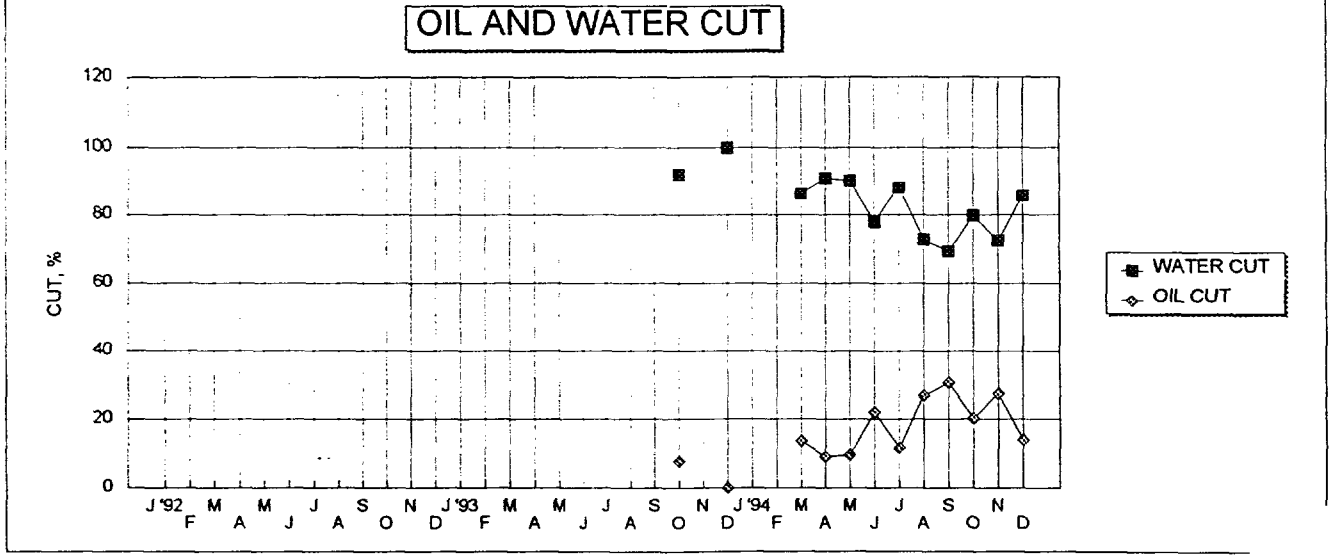

OIL AND WATER CUT
120
100
80
60
40
20
0
CUT, %
J '92 F M A M J J A S O N D J '93 F M A M J J A S O N D J '94 F M A M J J A S O N D
WATER CUT
OIL CUT

EXHIBIT G-

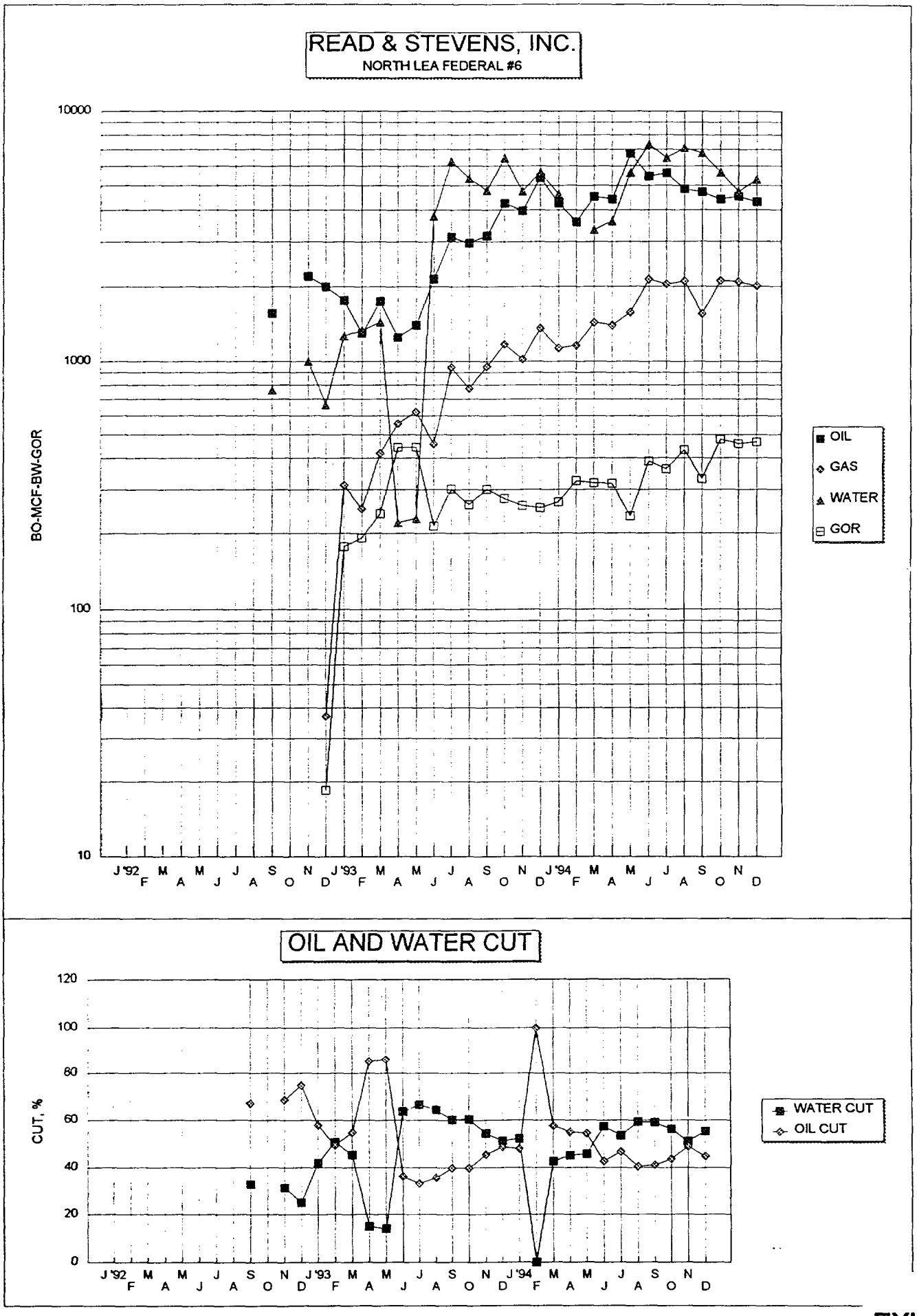
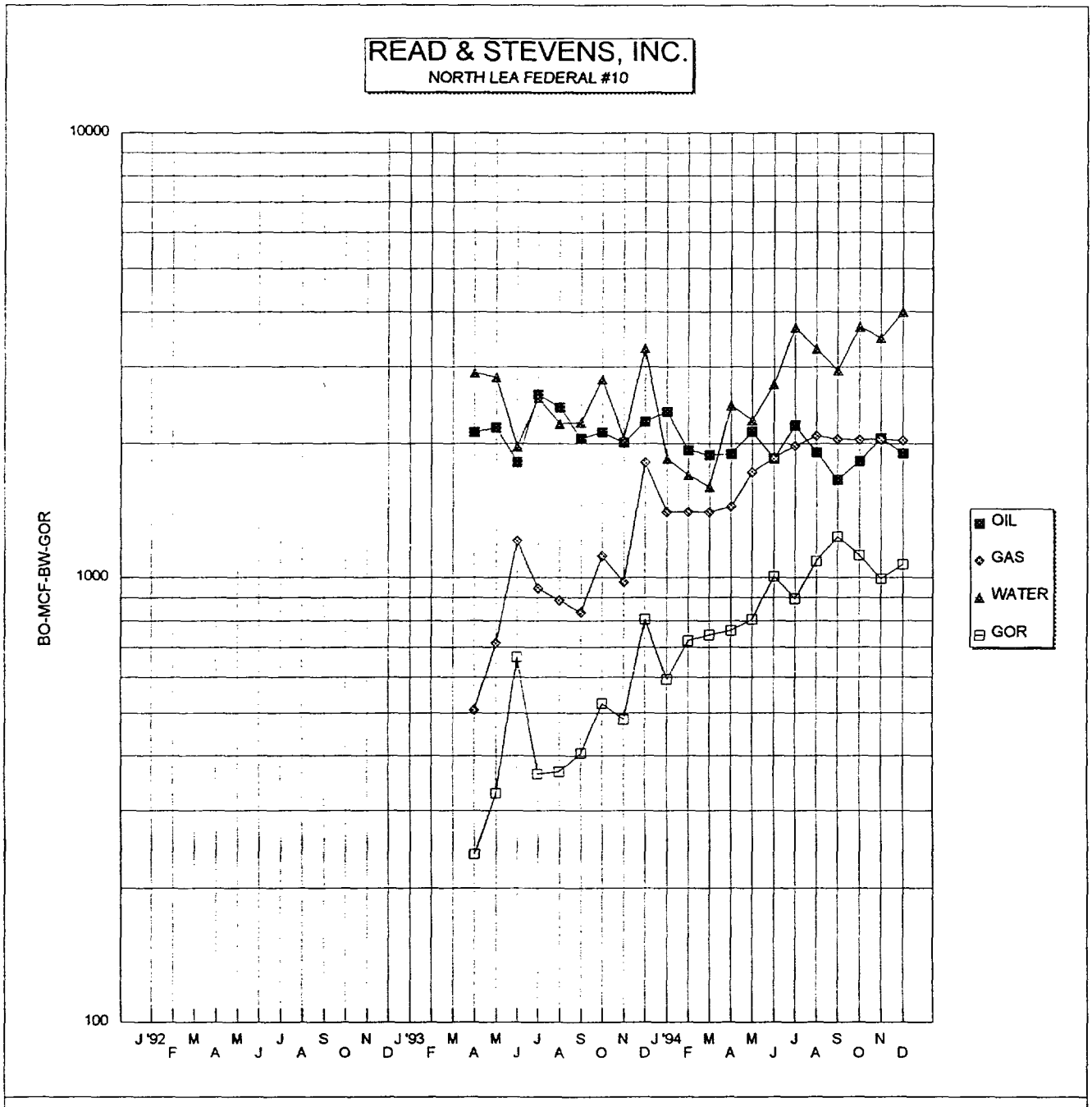

READ & STEVENS, INC.
NORTH LEA FEDERAL #6
BO-MCF-BW-GOR
10000
1000
100
10
J '92 F M A M J J A S O N D J '93 F M A M J J A S O N D J '94 F M A M J J A S O N D
OIL
GAS
WATER
GOR
OIL AND WATER CUT
CUT, %
120
100
80
60
40
20
0
J '92 F M A M J J A S O N D J '93 F M A M J J A S O N D J '94 F M A M J J A S O N D
WATER CUT
OIL CUT

EXHIBIT G-


READ & STEVENS, INC.
NORTH LEA FEDERAL #10
BO-MCF-BW-GOR
10000
1000
100
OIL
GAS
WATER
GOR
J '92 F M A M J J A S O N D J '93 F M A M J J A S O N D J '94 F M A M J J A S O N D

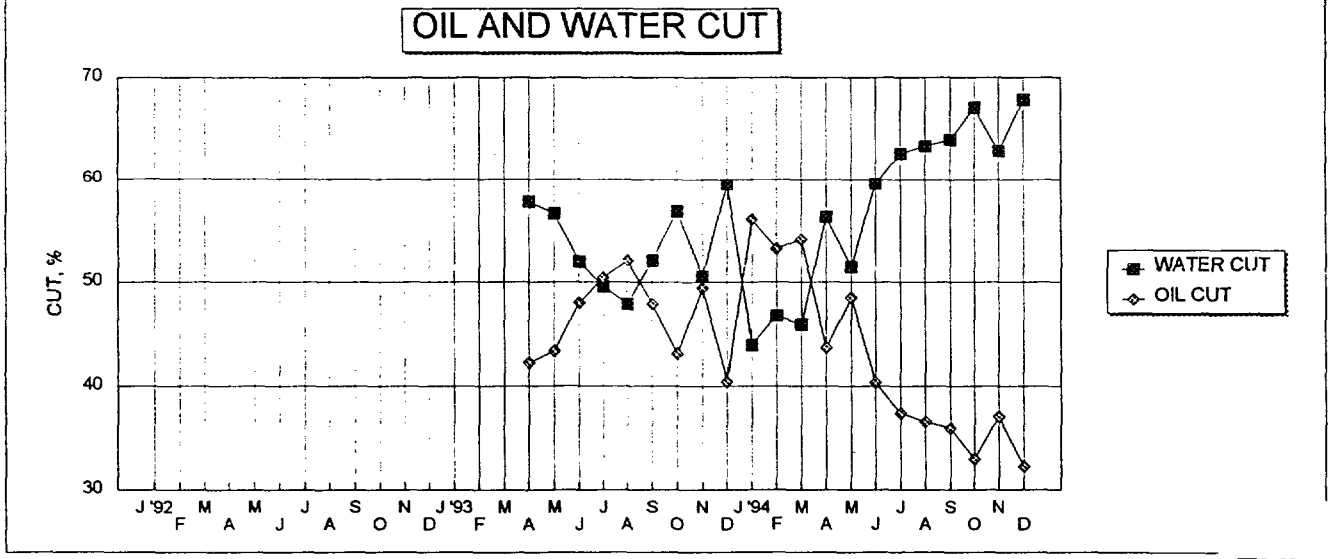
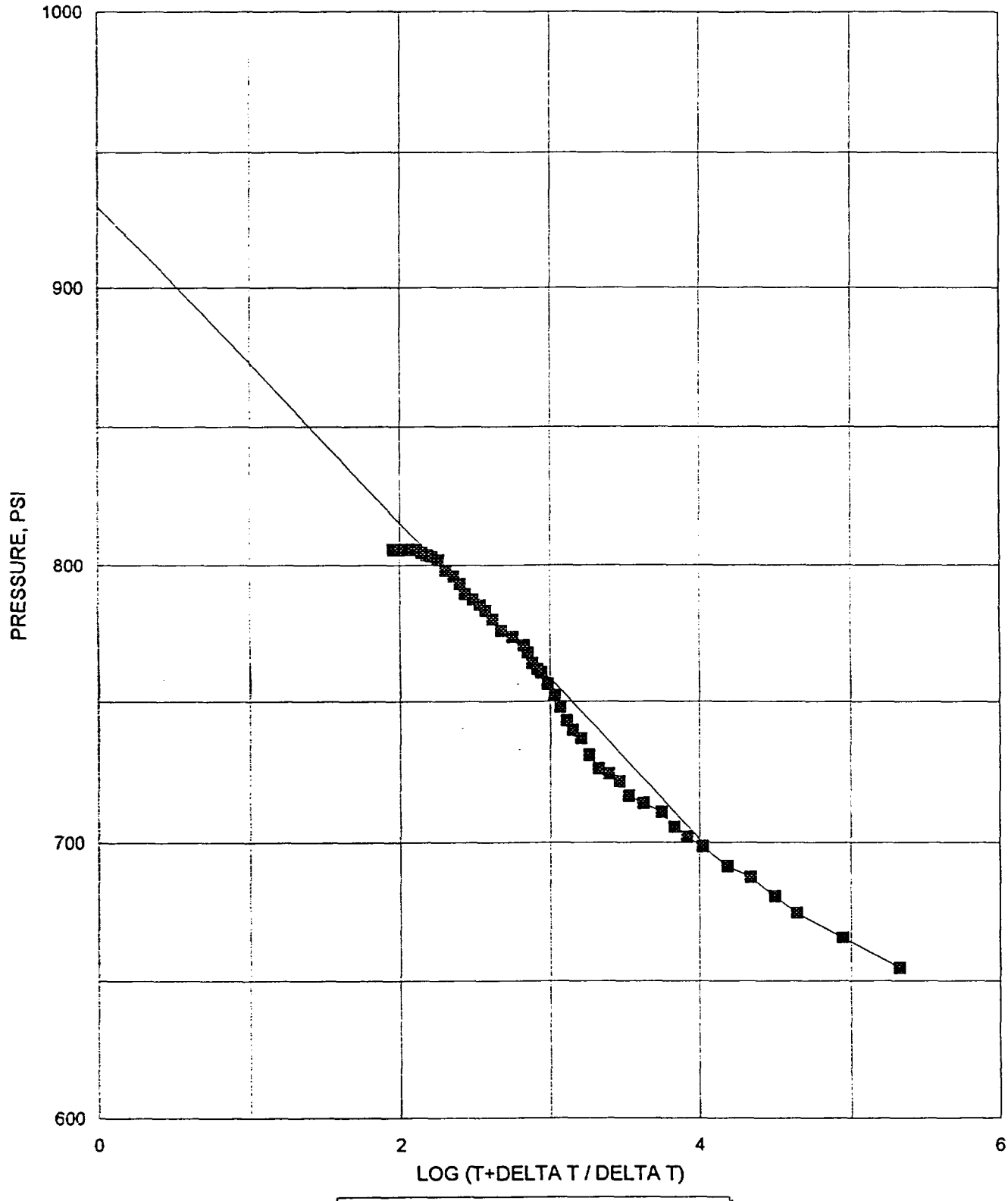

OIL AND WATER CUT
CUT, %
70
60
50
40
30
WATER CUT
OIL CUT
J '92 F M A M J J A S O N D J '93 F M A M J J A S O N D J '94 F M A M J J A S O N D

EXHIBIT G-1(

MOBIL LEA STATE #1

BHP TEST 5-26-94 TO 6-1-94



T=12079 HRS.; P*=930 PSI

CUM. 96135 BO, 43630 MCFG, 7111 BW, 191 BOPD, 227 MCFGD, 12 BWPD

EXHIBIT H-1

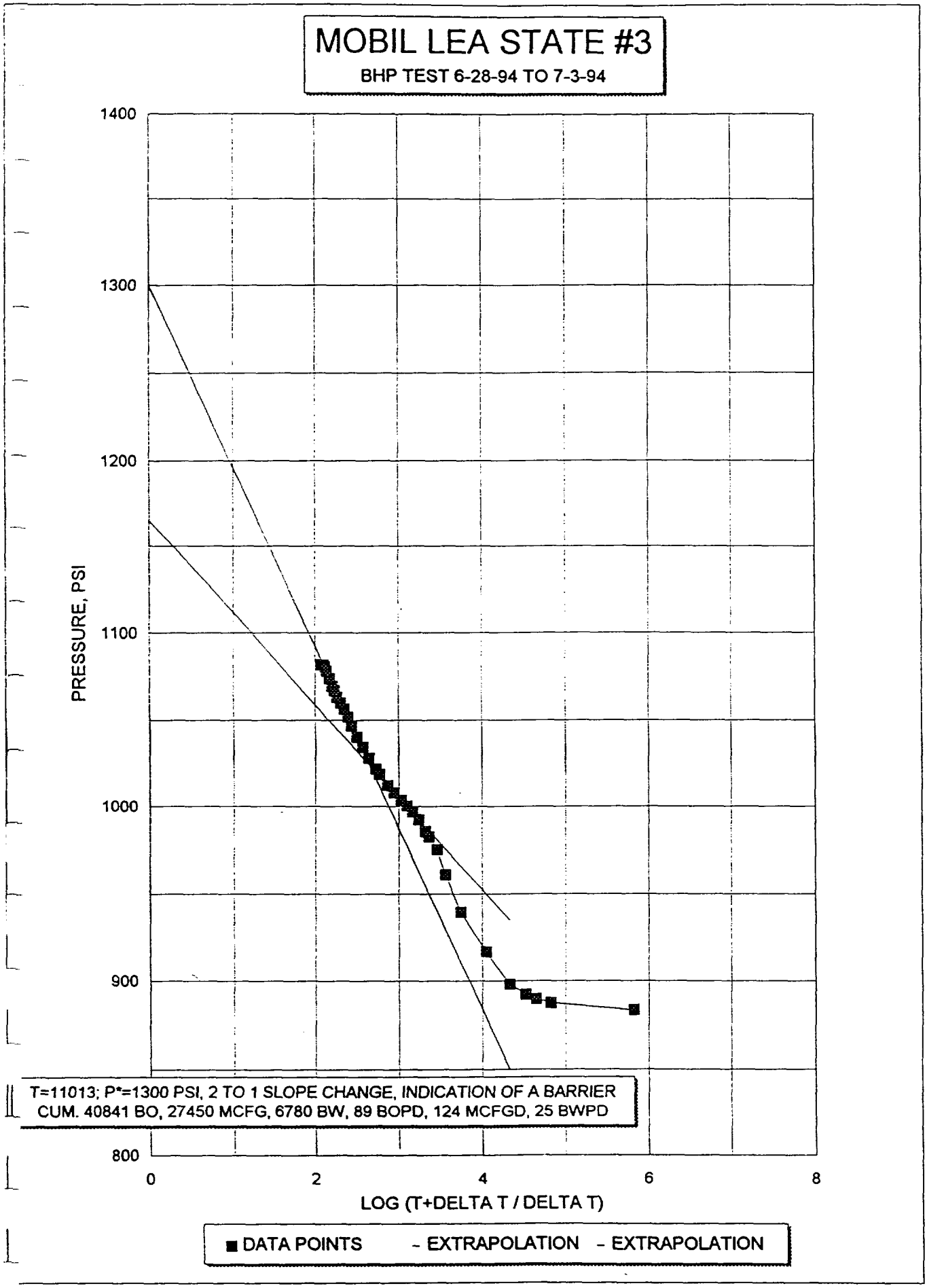

MOBIL LEA STATE #3
BHP TEST 6-28-94 TO 7-3-94
1400
1300
1200
1100
1000
900
800
PRESSURE, PSI
0
2
4
6
8
LOG (T+DELTA T / DELTA T)
T=11013; P*=1300 PSI, 2 TO 1 SLOPE CHANGE, INDICATION OF A BARRIER
CUM. 40841 BO, 27450 MCFG, 6780 BW, 89 BOPD, 124 MCFGD, 25 BWPD
DATA POINTS
EXTRAPOLATION
EXTRAPOLATION

EXHIBIT H-2

RADIUS OF INVESTIGATION

$$Ri = \sqrt{0.00105 \frac{k \quad t}{\text{POROSITY X VIS. XCOMP.}}}$$

k= PERMEABILITY
t= SHUT-IN TIME

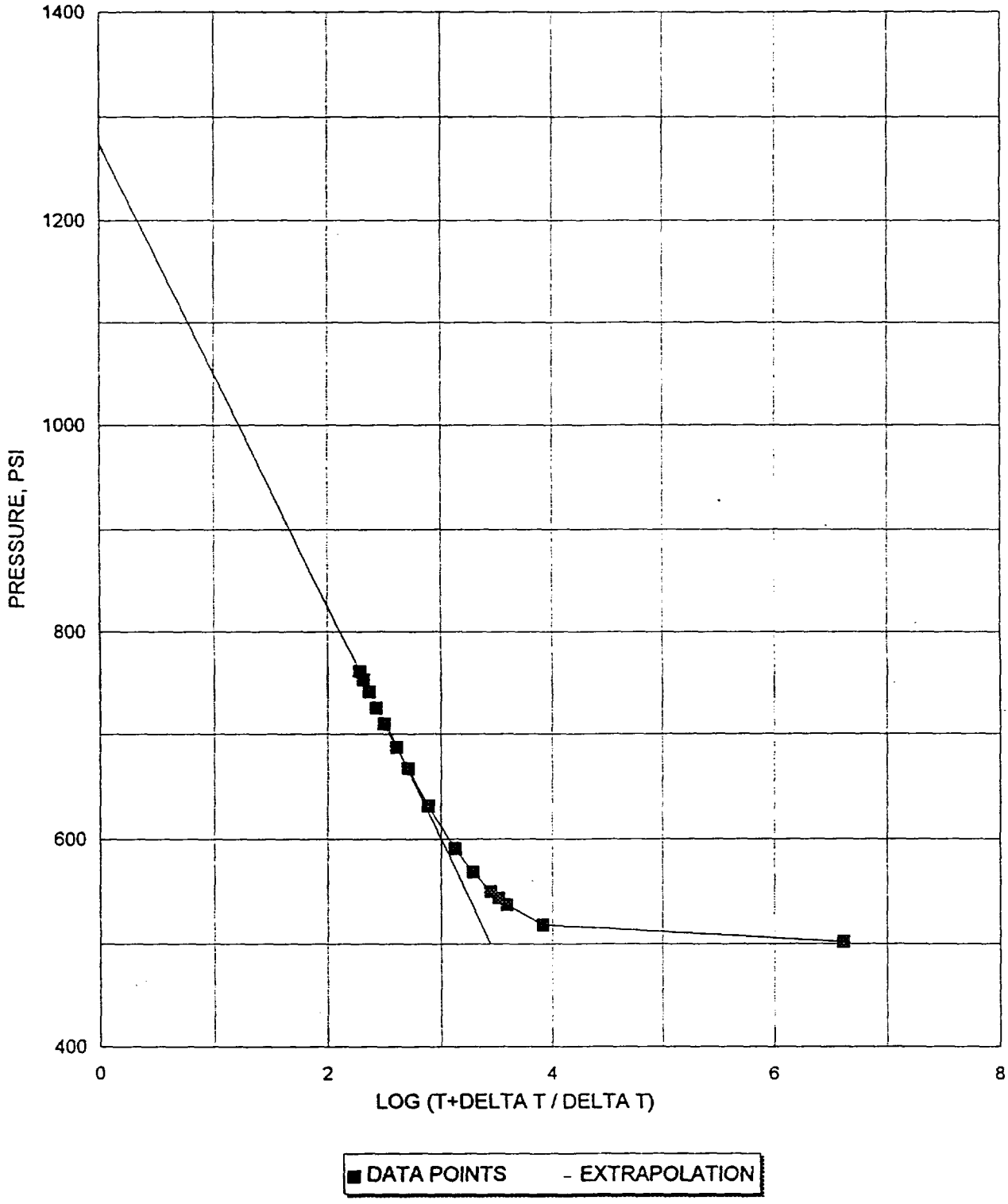
k=24.6MD
t=20 HRS.
POROSITY= 20%
VISCOSITY= .9 cp.
COMPRESSIBILITY= 6.0E-06

Ri= 691.6 FEET

EXHIBIT H-3

MOBIL LEA STATE #3

BHP TEST 10-4-94 TO 10-6-94



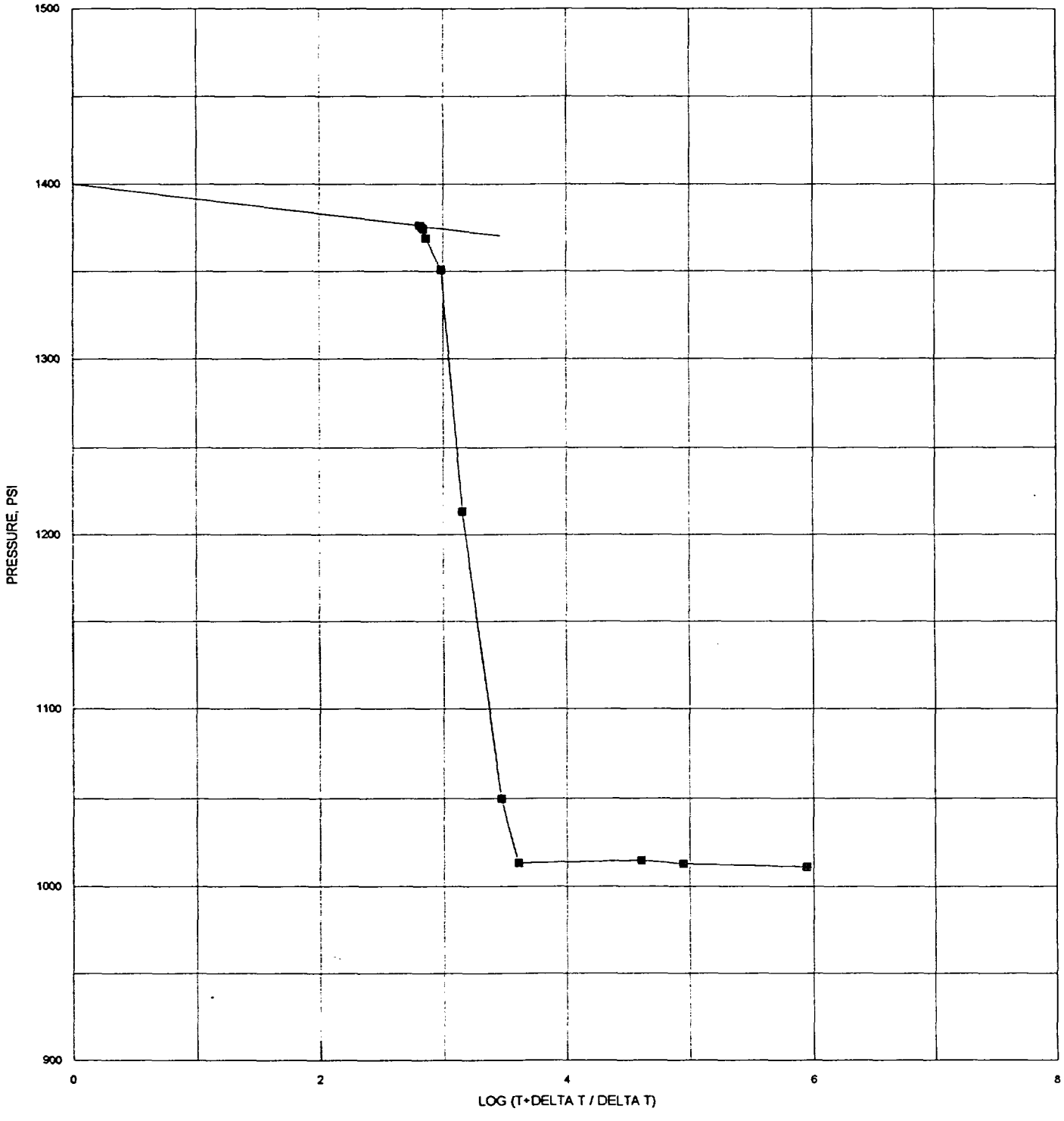
T=8250 HRS. P*=1275 PSI

CUM. 49841 BO, 38450 MCFG, 8580 BW, 145 BOPD, 278 MCFGD, 15 BWPD

EXHIBIT H-4

MOBIL LEA STATE #3

BHP TEST 11-28-94 TO 11-30-94



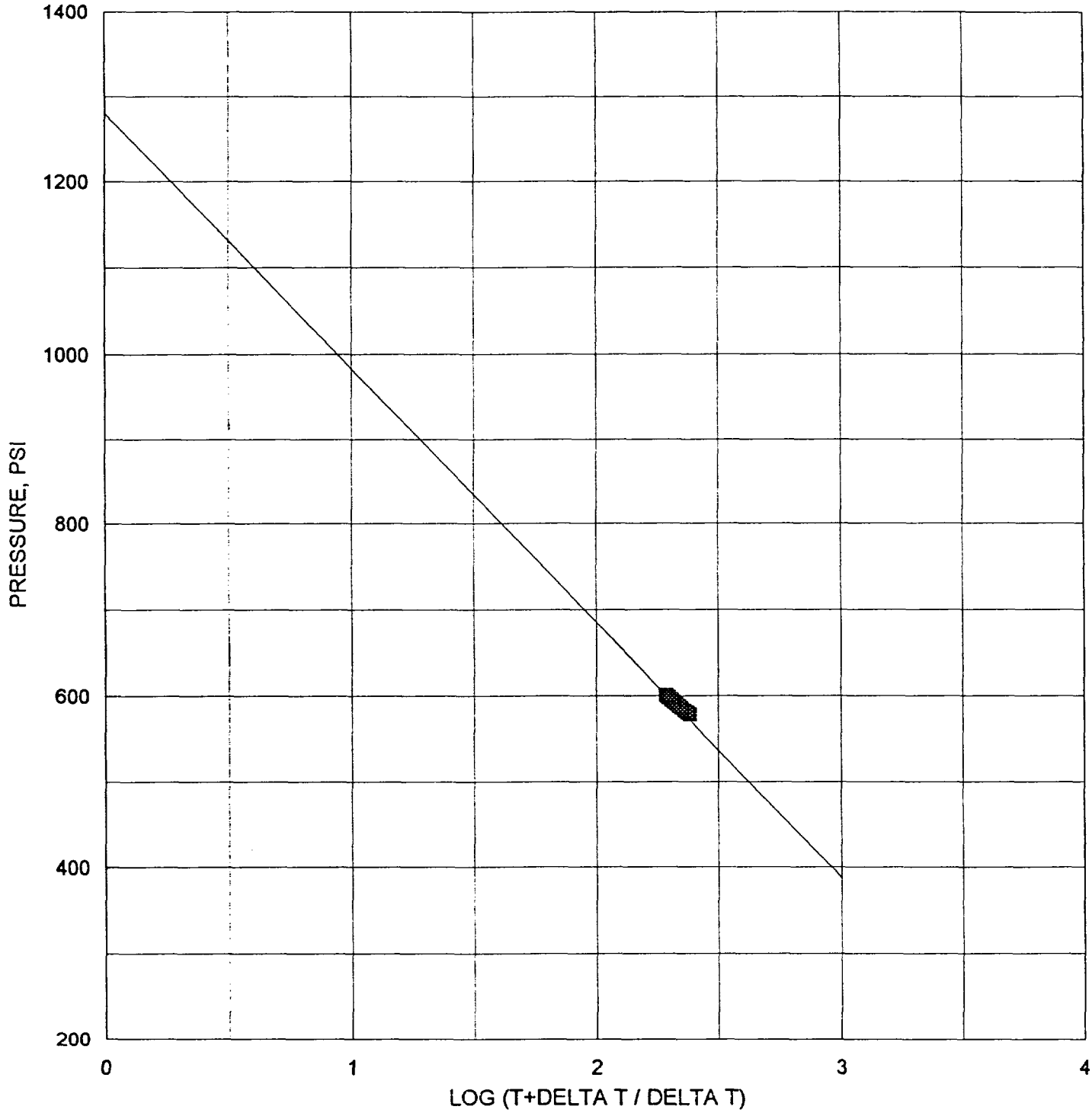
■ DATA POINTS – EXTRAPOLATION

T=14736 HRS. P*=1400 PSI
CUM. 54647 BO, 45146 MCFG, 9390 BW, 89 BOPD, 124 MCFGD, 15 BWPD

EXHIBIT H-5

MOBIL LEA STATE #3

BHP TEST 1-9-95 TO 1-13-95



■ DATA POINTS – EXTRAPOLATION

T=13378 HRS. P*=1280 PSI
CUM. 58532 BO, 52879 MCFG, 9945 BW, 105 BOPD, 209 MCFGD, 15 BWPD

EXHIBIT H-(

MOBIL LEA STATE #3

PRESSURE HISTORY

PRESSURE vs. CUMMULATIVE PRODUCTION

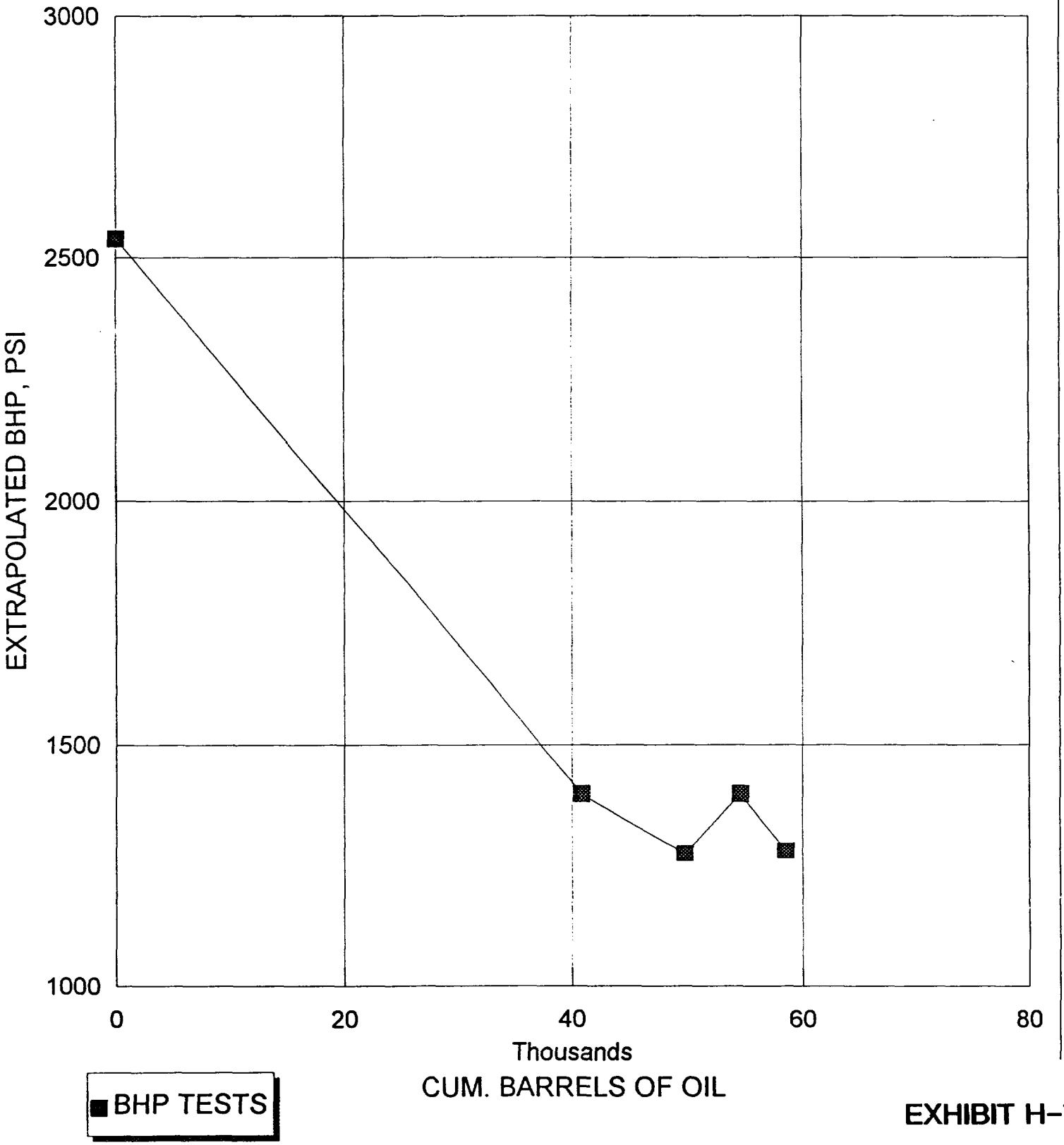


EXHIBIT H-

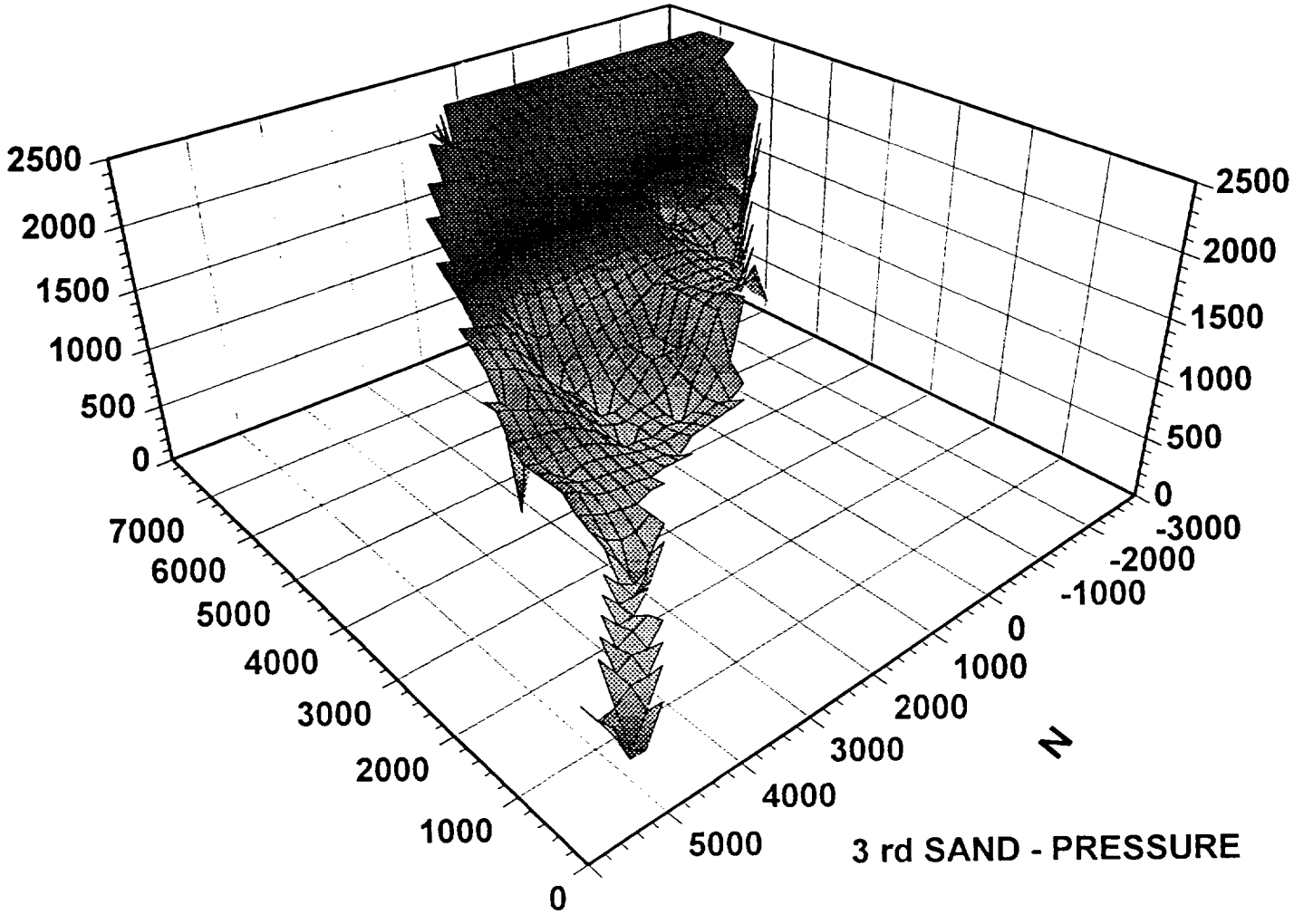

2500
2000
1500
1000
500
0
7000
6000
5000
4000
3000
2000
1000
0
5000
4000
3000
2000
1000
0
-1000
-2000
-3000
N
3 rd SAND - PRESSURE

EXHIBIT H-8

MATERIAL BALANCE MODEL WITH WATER INFLUX

TOTAL OIL
TOTAL GA
TOTAL WA
GOR
BO/BW

CUM. OIL
CUM. GAS
CUM. WTR

DATA

OIL VISCOSITY	1.4	cp
FORMATION WATER VISCOSITY	1.004	cp
S.G. FORMATION WATER	1.14	
Cl	132,995	PPM
RES. @70 F	0.057	OHMS-METER
RW @ BHT	0.04	OHMS-METER
O/W CONTACT	-2275.00	FT.
GAS BTU	1488.00	DRY
GAS S.G.	0.972	
OIL DENSITY	44.7858	LBM/CU.FT.
OIL GRAVITY	38	DEGREES API
Bg @ 2500 PSI	0.0035	CU.FT./CU.FT.
Bg @ 1200 PSI	0.0080	CU.FT./CU.FT.
Bg @ 800 PSI	0.0150	CU.FT./CU.FT.
Bg @ 500 PSI	0.0320	CU.FT./CU.FT.
BUBBLE POINT	1200	PSI
Boi	1.225	BO/BSTO
Cf	3.7000E-06	
Co	0.00001188	
Cw	3.0310E-06	
INITIAL BHP	2539	PSI
POROSITY	20.0%	
WATER SATURATION	45.0%	
IRREDUCIBLE WATER SATURATION	40.0%	
ORIGINAL -OI L-IN PLACE	5,450,959	STBO
ORIGINAL GOR	350	CU.FT./BBL.

OOIP
OIL FORMATION VOLUME FACTOR
Bo AT INITIAL PRESSURE
INITIAL SOLUTION GAS-OIL RATIO
SOLUTION GAS-OIL RATIO
GAS FORMATION VOLUME FACTOR

IRREDUCIBLE WATER SATURATION
CHANGE IN PRESSURE
CUMULATIVE GAS PRODUCTION

GAS FVF @ Pi

CUMULATIVE WATER PRODUCTION

RESERVOIR PRESSURE
GAS DEVIATION FACTOR
TEMPERATURE DEGREES F

BHP Z= @ ? PS
2500
2400
2300
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0

TOTAL RESERVOIR VOLUME	60,703,862	BARRELS
OIL VOLUME - RESERVOIR BARRELS	6,677,425	BARRELS
WATER VOLUME	5,463,348	BARRELS
POROSITY VOLUME	12,140,772	BARRELS
ROCK VOLUME	48,563,089	BARRELS
GAS VOLUME	1,907,835,650	CU.FT.

OIL EXPAN

IRREDUCIBLE WATER	4,856,309
MOBIL WATER	607,039
WATER INFLUX	0

POROSITY

SOLUTION GAS
FREE GAS

GOR FACT

BARRELS

OIL PROD
GAS PROD
WATER PR

GAS ADJU
TOTAL WA

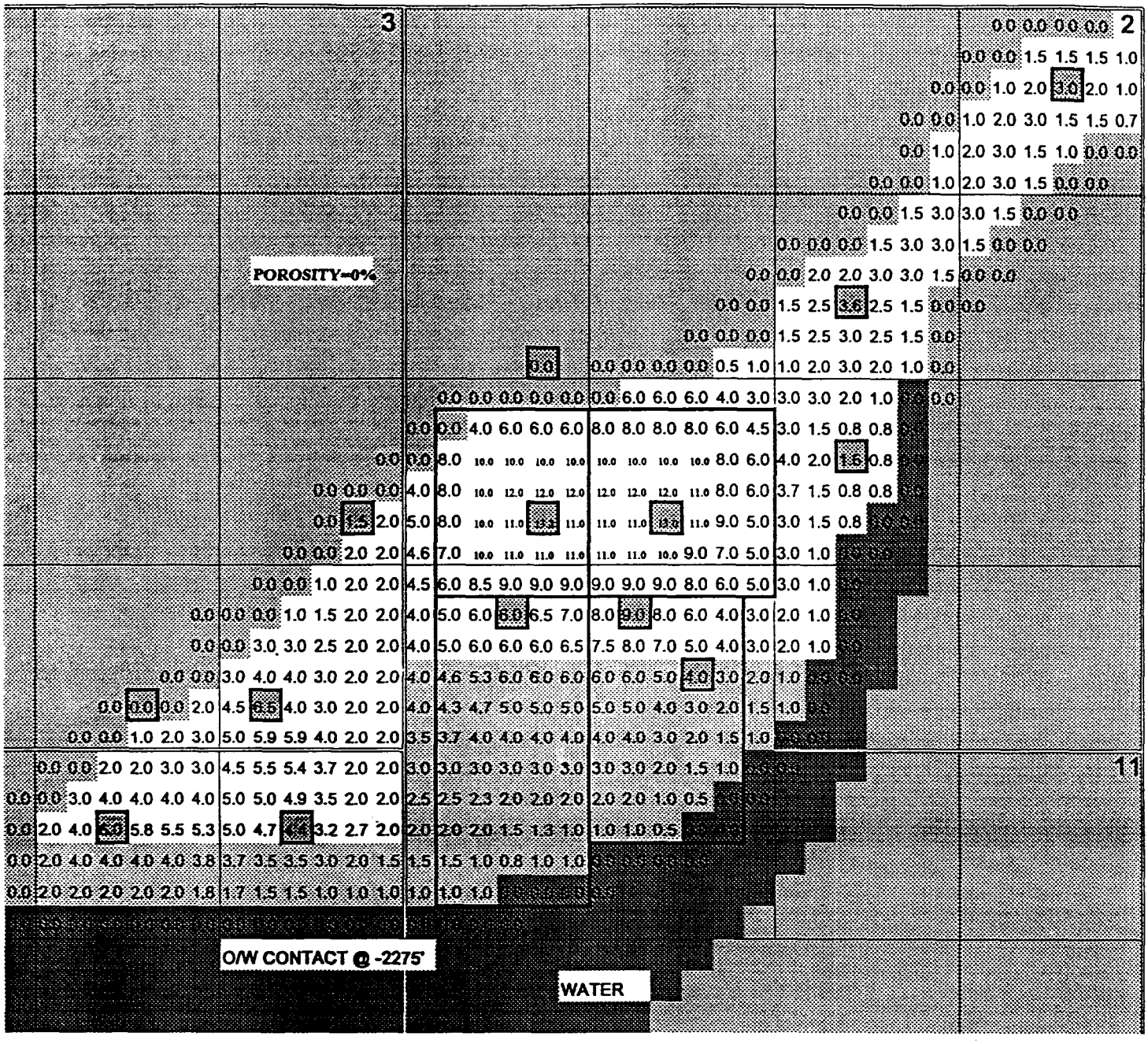
EXHIBIT H-9

	A	S	O	N	DEC. 1992	JAN. 1993	F	M	A	M	J	J	A	S
	0	1,567	1,510	8,512	8,798	10,060	9,958	12,427	18,360	18,574	19,962	17,951	16,274	19,128
	0	0	0	903	1,822	2,773	3,208	3,426	6,849	7,146	8,341	7,229	5,909	8,550
ER	0	764	150	1,145	817	1,423	1,472	2,273	4,813	5,752	7,576	11,461	9,888	10,429
	ERR	0	0	106	207	276	322	276	373	385	418	403	363	447
	ERR	2.051047	10.06667	7.434061	10.76867	7.069571	6.764946	5.467224	3.814669	3.229138	2.6349	1.566268	1.645833	1.834116
	0	1567	3077	11589	20387	30447	40405	52832	71192	89766	109728	127679	143953	163081
	0	0	0	903	2725	5498	8706	12132	18981	26127	34468	41697	47606	56156
	0	764	914	2059	2876	4299	5771	8044	12857	18609	26185	37646	47534	57963
N	5450959	5450959	5450959	5450959	5450959	5450959	5450959	5450959	5450959	5450959	5450959	5450959	5450959	5450959
Bo	1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225
Boi	1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225
Rsi	350	350	350	350	350	350	350	350	350	350	350	350	350	350
Rs	350	350	350	350	350	350	350	350	350	350	350	350	350	350
Bg bbl/cu.ft.	0.000674	0.000676	0.000678	0.000666	0.000677	0.000679	0.000693	0.000699	0.000714	0.000744	0.000766	0.000785	0.000819	0.000862
Cf	3.7E-06	3.7E-06	3.7E-06	3.7E-06	3.7E-06	3.7E-06	3.7E-06	3.7E-06	3.7E-06	3.7E-06	3.7E-06	3.7E-06	3.7E-06	3.7E-06
Co	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012
Cw	3.0E-06	3.0E-06	3.0E-06	3.0E-06	3.0E-06	3.0E-06	3.0E-06	3.0E-06	3.0E-06	3.0E-06	3.0E-06	3.0E-06	3.0E-06	3.0E-06
Swc	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
DELTA p	0	8	15	57	99	148	196	257	345	435	532	619	698	791
Gp														
G	1.9E+09	1.9E+09	1.9E+09	1.9E+09	1.9E+09	1.9E+09	1.9E+09	1.9E+09	1.9E+09	1.9E+09	1.9E+09	1.9E+09	1.9E+09	1.9E+09
Bgi	0.000674	0.000674	0.000674	0.000674	0.000674	0.000674	0.000674	0.000674	0.000674	0.000674	0.000674	0.000674	0.000674	0.000674
We	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wp	0	764	914	2059	2876	4299	5771	8044	12857	18609	26185	37646	47534	57963
Pi	2539	2539	2539	2539	2539	2539	2539	2539	2539	2539	2539	2539	2539	2539
P	2539	2531	2524	2482	2440	2391	2343	2282	2194	2104	2007	1920	1841	1748
Z	0.6	0.6	0.6	0.58	0.58	0.57	0.57	0.56	0.55	0.55	0.54	0.53	0.53	0.53
T	108	108	108	108	108	108	108	108	108	108	108	108	108	108
	2539	2531	2524	2482	2440	2391	2343	2282	2194	2104	2007	1920	1841	1748
0.60	0.60	0.60	0.60	0.58	0.58	0.57	0.57	0.56	0.55	0.55	0.54	0.53	0.53	0.53
0.58	0.58	0.58	0.58	0.58	0.58	0.57	0.57	0.56	0.55	0.55	0.54	0.53	0.53	0.53
0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.56	0.55	0.55	0.54	0.53	0.53	0.53
0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.55	0.55	0.54	0.53	0.53	0.53
0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.54	0.53	0.53	0.53
0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.53	0.53	0.53
0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53
0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53
0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53
0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53
0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53
0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54
0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58
0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ION	0	635	1,190	4,522	7,853	11,741	15,548	20,387	27,368	34,508	42,202	49,104	55,371	62,748
	0	118	221	839	1,457	2,178	2,885	3,783	5,078	6,403	7,831	9,111	10,274	11,643
	0	15	28	105	182	272	361	473	635	800	979	1,139	1,284	1,455
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUME	12,140,772	12,139,335	12,138,077	12,130,530	12,122,984	12,114,179	12,105,554	12,094,594	12,078,782	12,062,610	12,045,181	12,029,548	12,015,353	11,998,643
	0	1,437	2,695	10,242	17,789	26,593	35,218	46,179	61,991	78,162	95,592	111,224	125,419	142,130
	1.91E+09	1.91E+09	1.91E+09	1.91E+09	1.91E+09	1.91E+09	1.91E+09	1.91E+09	1.91E+09	1.91E+09	1.91E+09	1.91E+09	1.91E+09	1.91E+09
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R														
	0	2,205	4,134	15,708	27,281	40,784	54,012	70,822	95,072	119,873	146,604	170,578	192,348	217,976
CED	0	1,650	3,093	11,754	20,415	30,519	40,417	52,996	71,142	89,701	109,703	127,644	143,934	163,112
CED	0	577,386	1,082,599	4,113,876	7,145,153	10,681,643	14,145,960	18,548,529	24,899,776	31,395,370	38,396,176	44,675,250	50,376,938	57,089,052
ODUCED	0	184	344	1,309	2,273	3,399	4,501	5,902	7,923	9,989	12,217	14,215	16,029	18,165
		2531	2524	2482	2440	2391	2343	2282	2194	2104	2007	1920	1841	1748
TMENT- BBLS.		-390	-734	-2139	-2995	-3522	-3771	-4486	-4226	-3921	-3008	-2339	-2269	-804
ER INFLUX		-390	-734	-2139	-2995	-3522	-3771	-4486	-4226	-3921	-3008	-2339	-2269	-804

EXHIBIT H-1(

O	N	DEC. 1993	JAN. 1994	F	M	A	M	J	J	A
21,599	18,516	22,708	25,168	24,661	34,216	33,473	35,839	29,110	27,732	26,774
8,646	7,542	9,458	11,108	13,772	23,781	27,913	33,828	32,473	30,636	33,124
15,379	9,964	14,516	9,341	2,340	9,194	10,374	11,757	13,493	13,688	13,652
400	407	417	441	558	695	834	944	1,116	1,105	1,237
1.404448	1.85829	1.564343	2.694358	10.53889	3.721558	3.226624	3.048312	2.157415	2.026008	1.961178
184680	203196	225904	251072	275733	309949	343422	379261	408371	436103	462877
64802	72344	81802	92910	106682	130463	158376	192204	224677	255313	288437
73342	83306	97822	107163	109503	118697	129071	140828	154321	168009	181661
5450959	5450959	5450959	5450959	5450959	5450959	5450959	5450959	5450959	5450959	5450959
1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225
1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225	1.225
350	350	350	350	350	350	350	350	350	350	350
350	350	350	350	350	350	350	350	350	350	350
0.000930	0.000953	0.000977	0.001022	0.001050	0.001079	0.001151	0.001185	0.001265	0.001275	0.001284
3.7E-06	3.7E-06	3.7E-06	3.7E-06	3.7E-06	3.7E-06	3.7E-06	3.7E-06	3.7E-06	3.7E-06	3.7E-06
0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012	0.000012
3.0E-06	3.0E-06	3.0E-06	3.0E-06	3.0E-06	3.0E-06	3.0E-06	3.0E-06	3.0E-06	3.0E-06	3.0E-06
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
919	959	999	1039	1079	1119	1159	1199	1239	1249	1259
1.9E+09	1.9E+09	1.9E+09	1.9E+09	1.9E+09	1.9E+09	1.9E+09	1.9E+09	1.9E+09	1.9E+09	1.9E+09
0.000674	0.000674	0.000674	0.000674	0.000674	0.000674	0.000674	0.000674	0.000674	0.000674	0.000674
0	0	0	0	0	0	0	0	0	0	0
73342	83306	97822	107163	109503	118697	129071	140828	154321	168009	181661
2539	2539	2539	2539	2539	2539	2539	2539	2539	2539	2539
1620	1580	1540	1500	1460	1420	1380	1340	1300	1290	1280
0.53	0.53	0.53	0.54	0.54	0.54	0.56	0.56	0.58	0.58	0.58
108	108	108	108	108	108	108	108	108	108	108
1620	1580	1540	1500	1460	1420	1380	1340	1300	1290	1280
0.53	0.53	0.53	0.54	0.54	0.54	0.56	0.56	0.58	0.58	0.58
0.53	0.53	0.53	0.54	0.54	0.54	0.56	0.56	0.58	0.58	0.58
0.53	0.53	0.53	0.54	0.54	0.54	0.56	0.56	0.58	0.58	0.58
0.53	0.53	0.53	0.54	0.54	0.54	0.56	0.56	0.58	0.58	0.58
0.53	0.53	0.53	0.54	0.54	0.54	0.56	0.56	0.58	0.58	0.58
0.53	0.53	0.53	0.54	0.54	0.54	0.56	0.56	0.58	0.58	0.58
0.53	0.53	0.53	0.54	0.54	0.54	0.56	0.56	0.58	0.58	0.58
0.53	0.53	0.53	0.54	0.54	0.54	0.56	0.56	0.58	0.58	0.58
0.53	0.53	0.53	0.54	0.54	0.54	0.56	0.56	0.58	0.58	0.58
0.53	0.53	0.53	0.54	0.54	0.54	0.56	0.56	0.58	0.58	0.58
0.53	0.53	0.53	0.54	0.54	0.54	0.56	0.56	0.58	0.58	0.58
0.54	0.54	0.54	0.54	0.54	0.54	0.56	0.56	0.58	0.58	0.58
0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.58	0.58	0.58
0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58
0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
		BUBBLE	POINT							
72,902	76,075	79,248	82,422	85,595	88,768	91,941	95,114	98,287	99,080	99,874
13,527	14,116	14,705	15,294	15,882	16,471	17,060	17,649	18,237	18,385	18,532
1,691	1,764	1,838	1,912	1,985	2,059	2,132	2,206	2,280	2,298	2,316
0	8,000	28,000	50,000	71,000	105,000	140,000	175,000	205,000	240,000	275,000
11,975,643	11,968,456	11,961,269	11,954,061	11,946,894	11,939,707	11,932,519	11,925,332	11,918,145	11,916,348	12,122,984
165,129	172,316	179,504	186,691	193,878	201,066	208,253	215,440	222,628	224,425	226,221
1.91E+09	1.91E+09	1.91E+09	1.91E+09	1.91E+09	1.91E+09	1.91E+09	1.91E+09	1.91E+09	1.91E+09	1.91E+09
0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
253,249	272,272	303,295	336,318	368,341	413,364	459,386	505,409	546,432	584,188	621,943
189,506	203,741	226,955	251,666	275,629	309,320	343,759	378,197	408,895	437,147	465,400
66,327,229	71,309,398	79,434,424	88,083,259	96,470,190	108,261,882	120,315,479	132,369,076	143,113,150	153,001,549	162,889,948
21,104	22,689	25,275	28,026	30,695	34,447	38,282	42,117	45,536	48,682	51,829
1620	1580	1540	1500	1460	1420	1380	1340	1300	1290	1280
-1418	986	2314	4934	10722	23960	43818	70921	103175	130411	161265
-1418	8986	30314	54934	81722	128960	183818	245921	308175	370411	436265

EXHIBIT H-11



T20S-R34E

PORSITY-FEET MAP OF THE THIRD SAND

WELL

220'X220' = 1.111 ACRES

POROSITY PINCHOUT

OIL - WATER CONTACT

CALCULATED WATER INFLUX MAP

EXHIBIT H-12