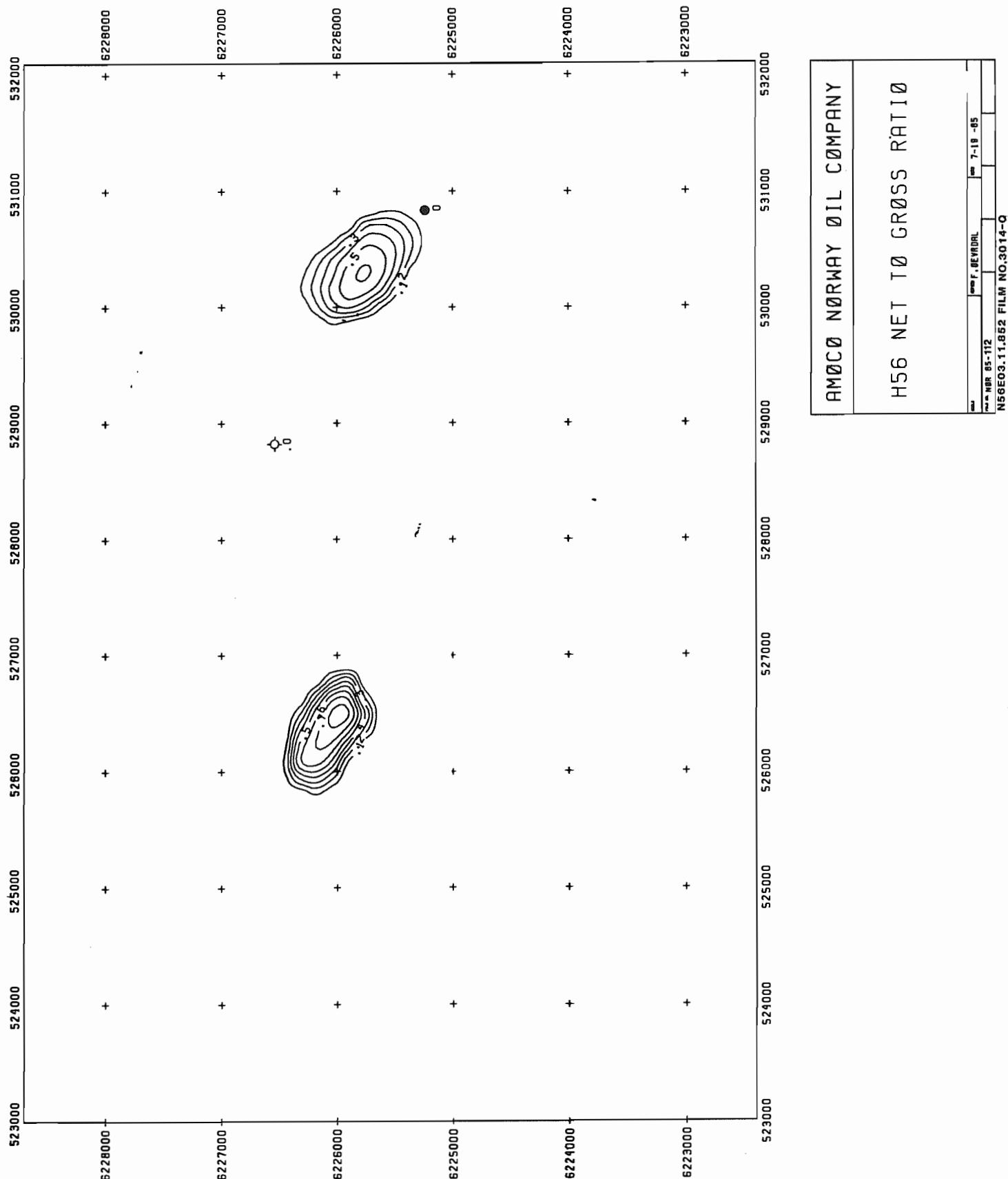
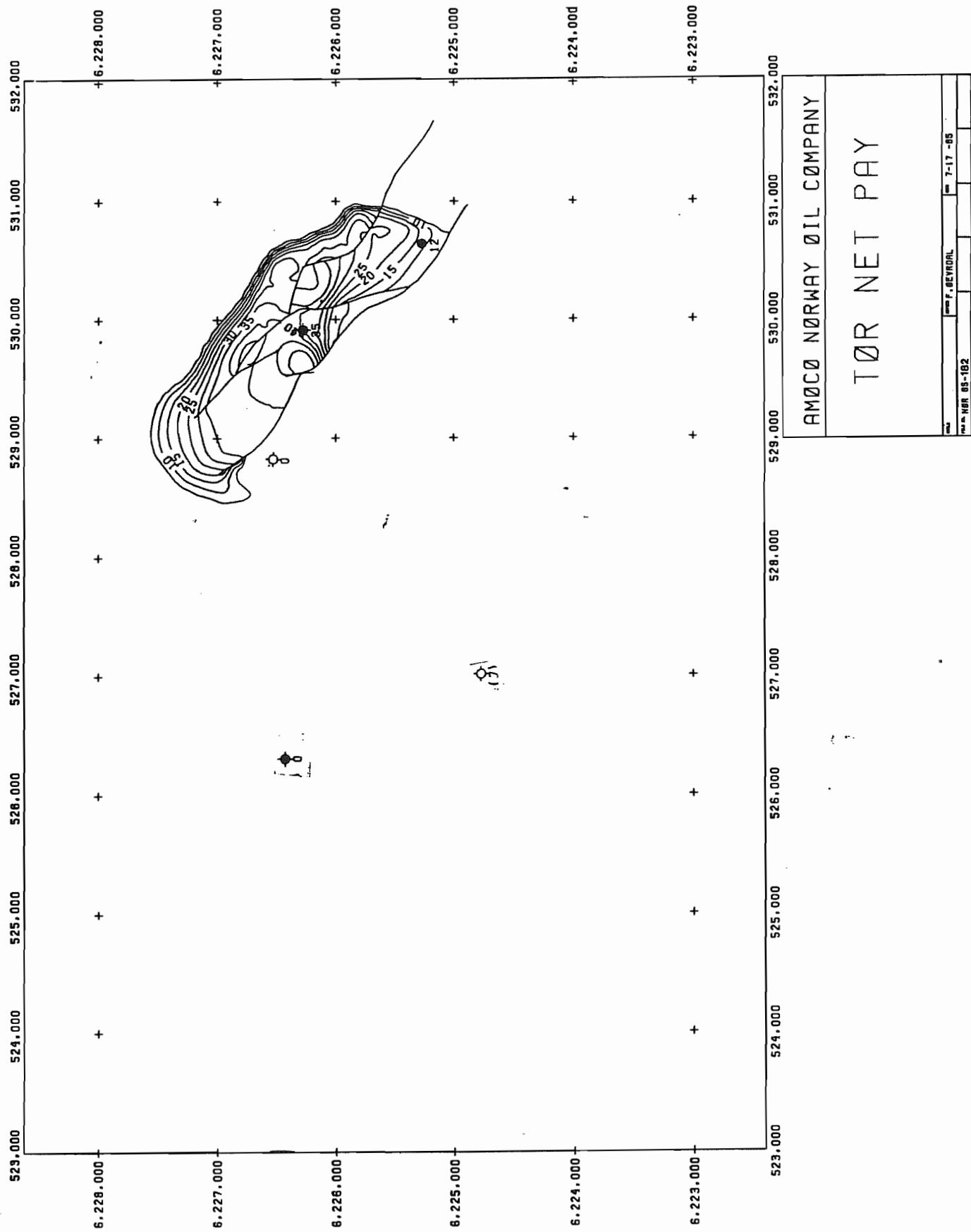
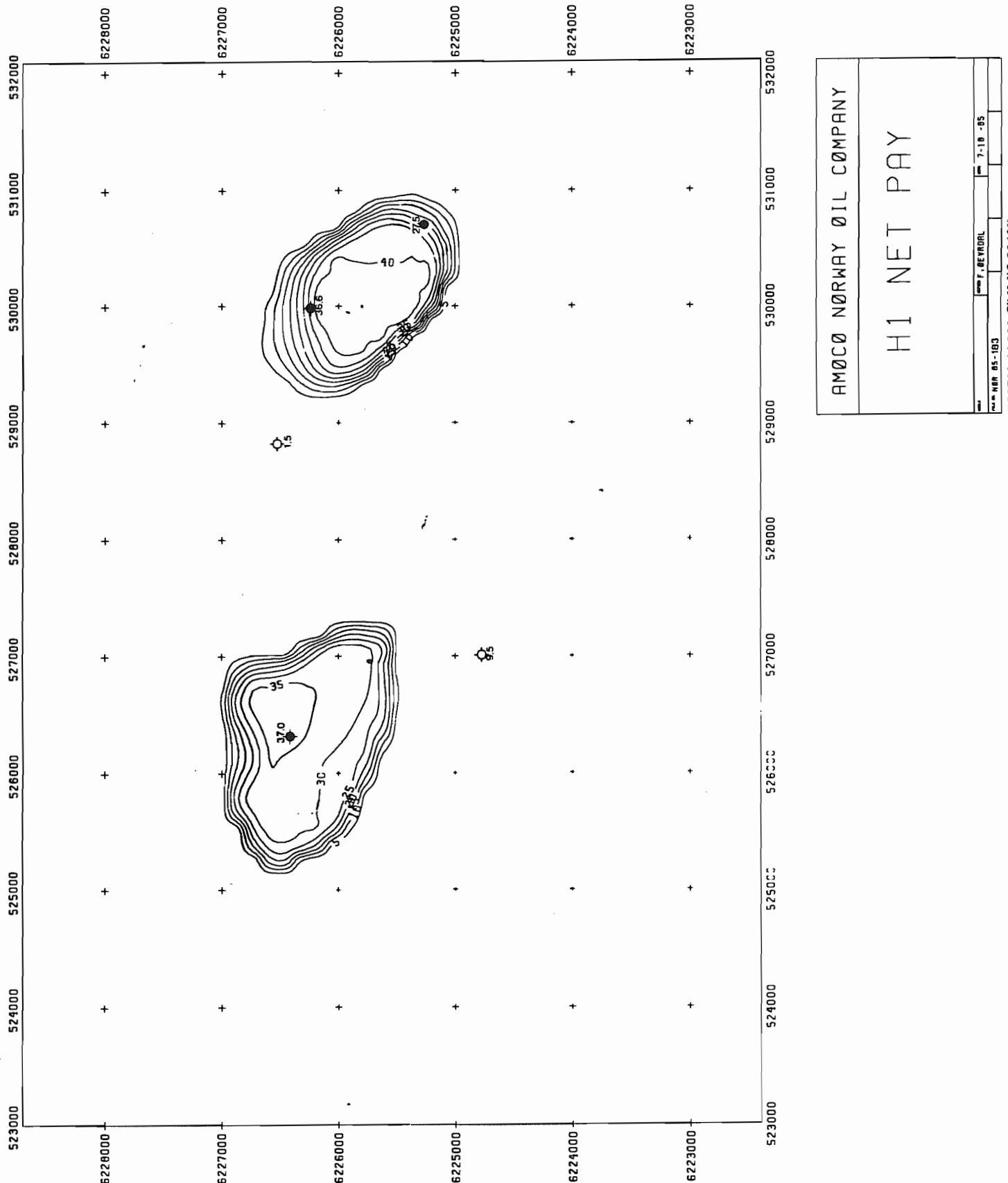


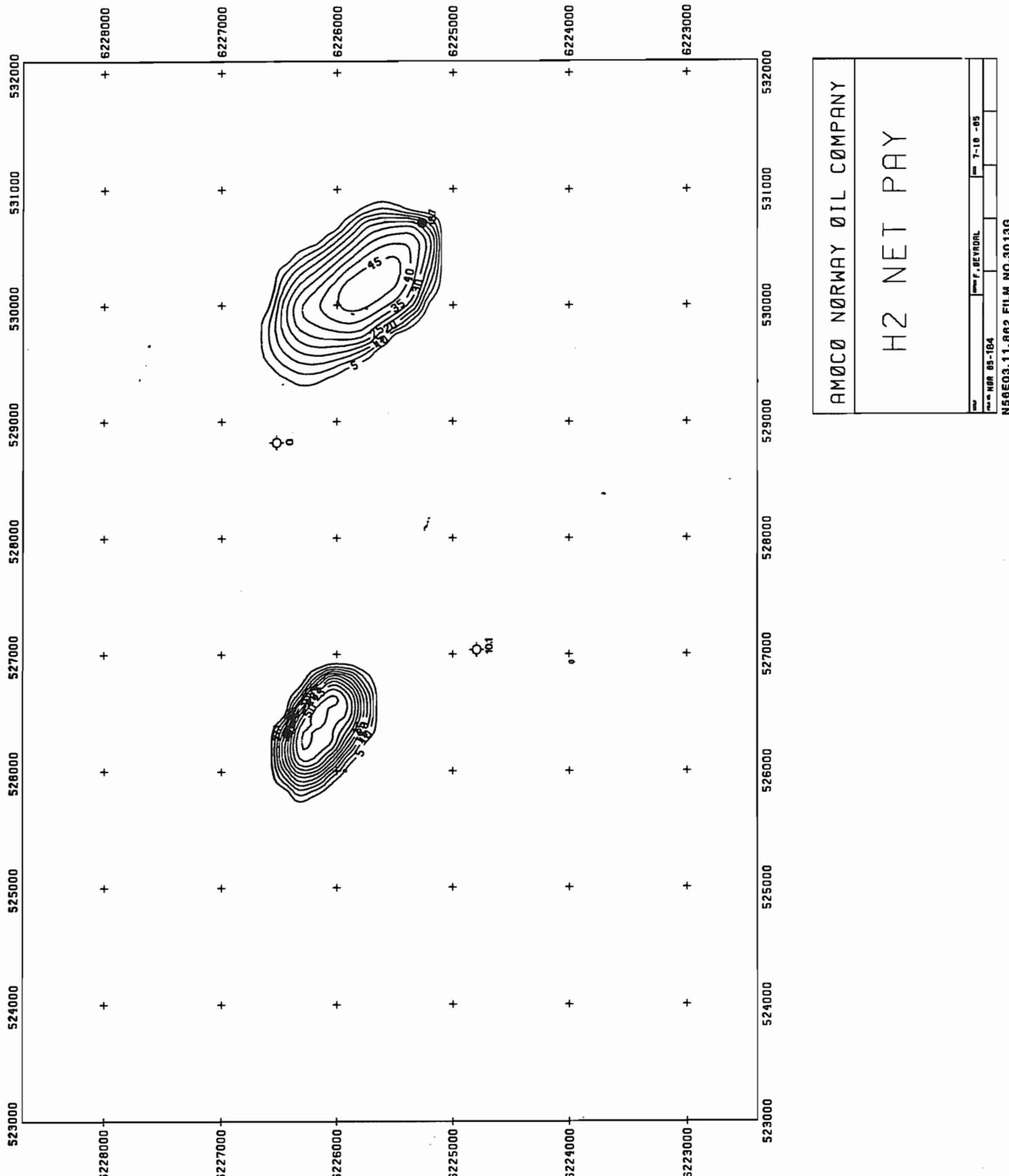
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H4 NET TO GROSS RATE	
DATE	FORM F. BEWORL
NOV 1985	7-1B -85
N58E03-11.652 FILM NO.3014-C	





**Ex. 3.79**

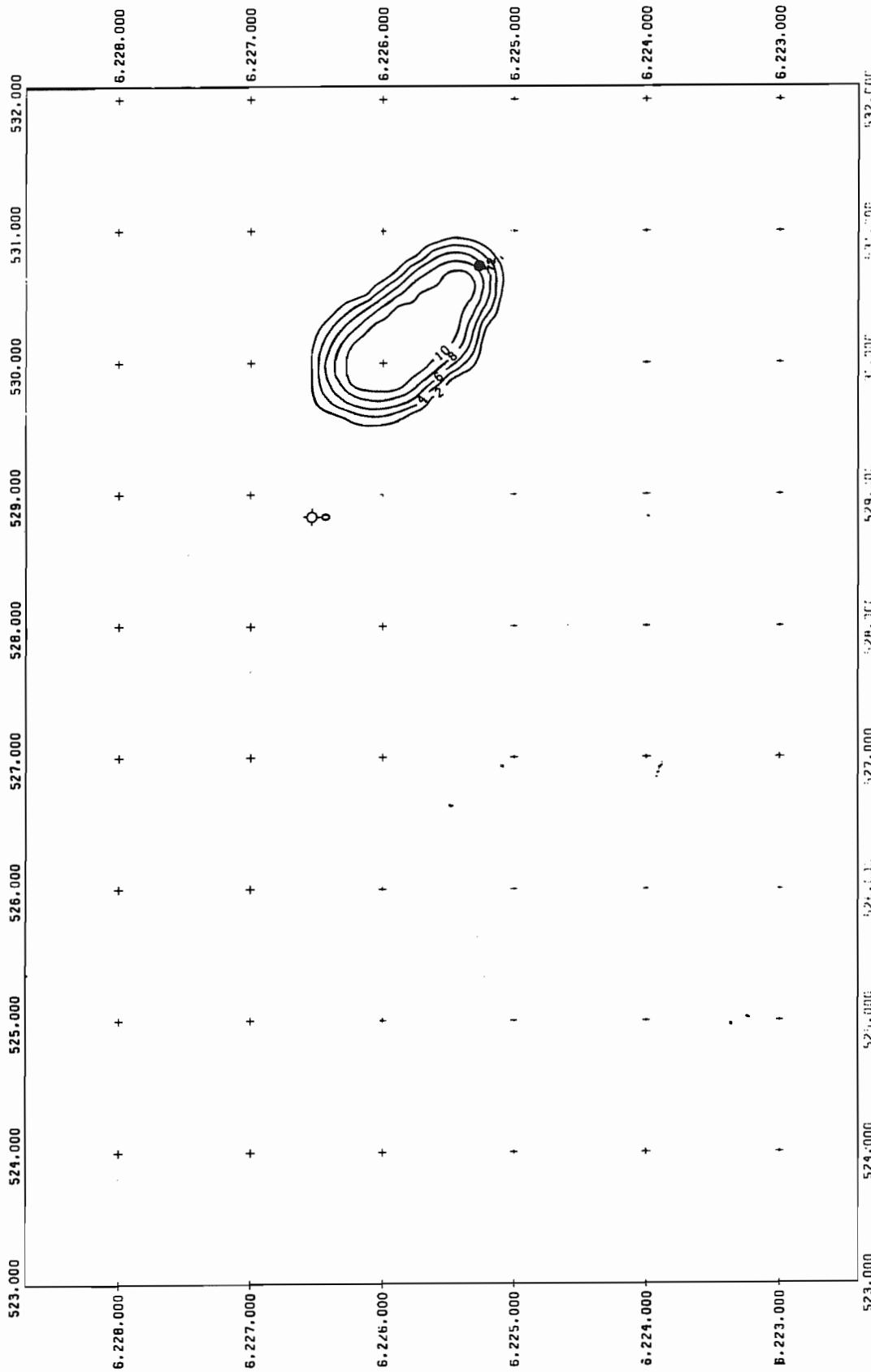




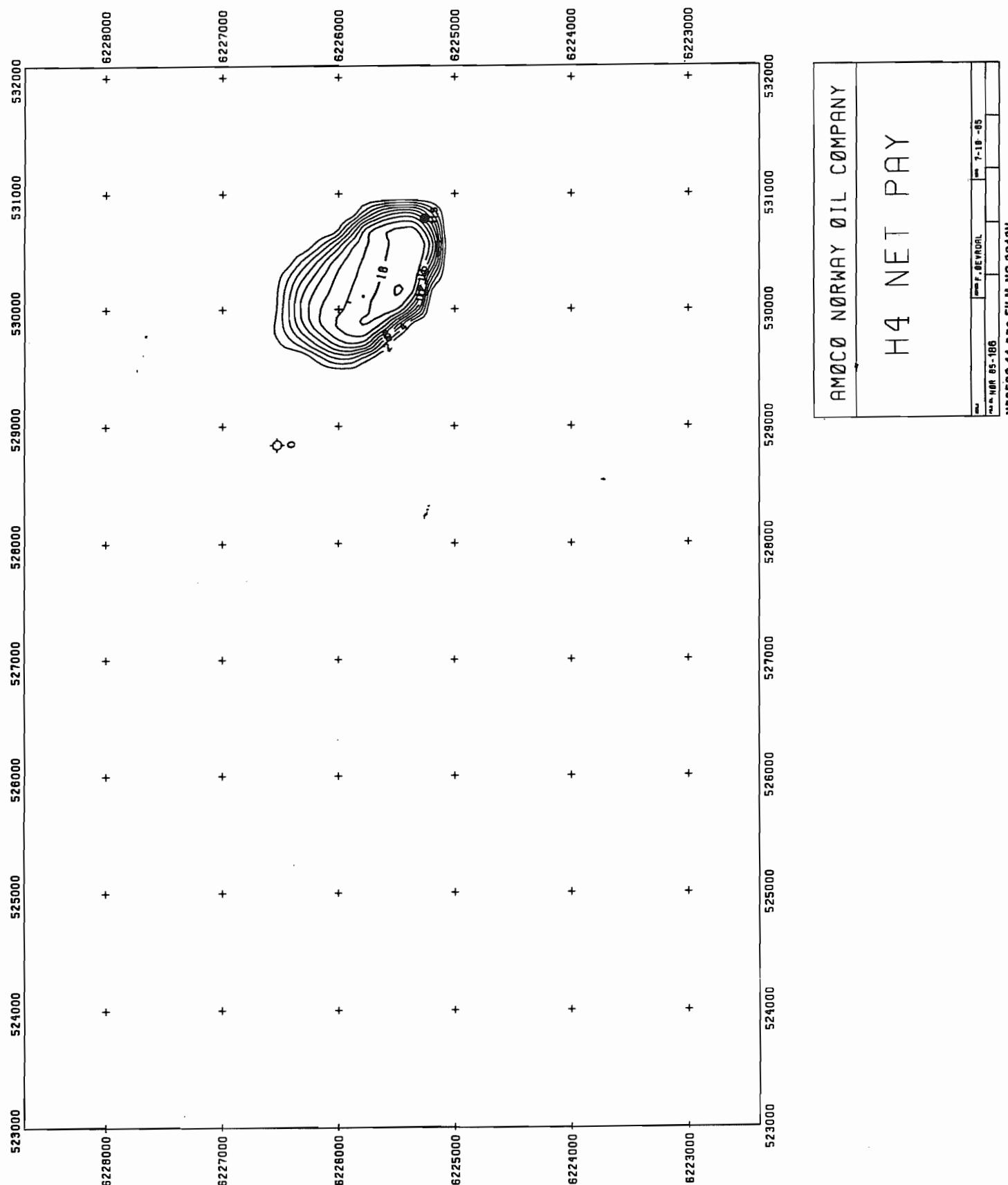
H2 NET PAY

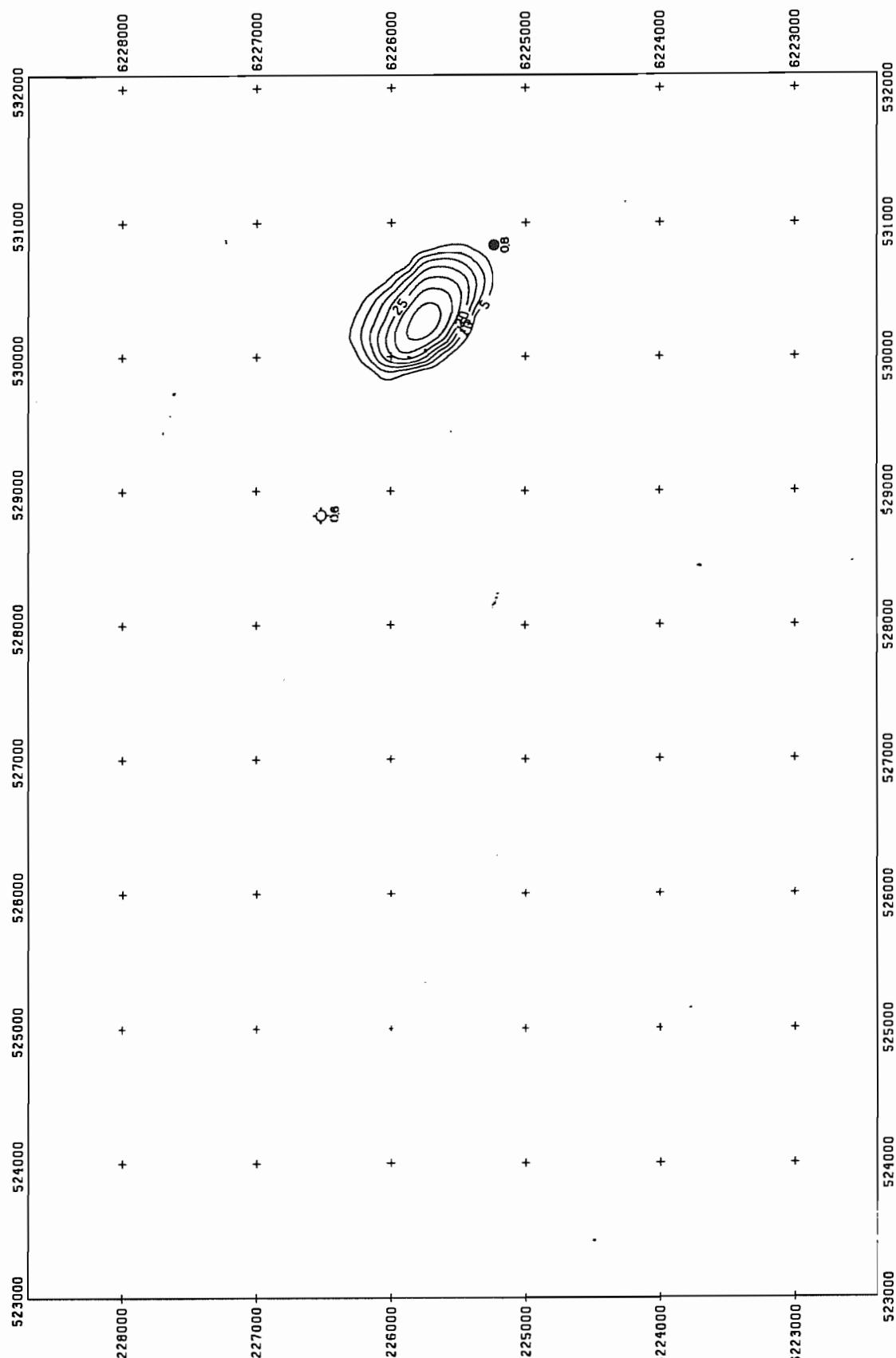
AMOCO NORWAY OIL COMPANY

MAP	HEIR 85-184	F. REVORL	7-10-85
N56E03.11.862 FILM NO.3013G			



1125,000  
HBR 05-185  
000003.1862 'FILM NO





AMOCO NORWAY OIL COMPANY									
H56 NET PAY									
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5228000		5227000		5226000		5225000		5224000	
5223000									

5230000 5240000 5250000 5260000 5270000 5280000 5290000 5300000 5310000 5320000

5228000 5227000 5226000 5225000 5224000 5223000

5223000 5224000 5225000 5226000 5227000 5228000 5229000 5230000 5231000 5232000

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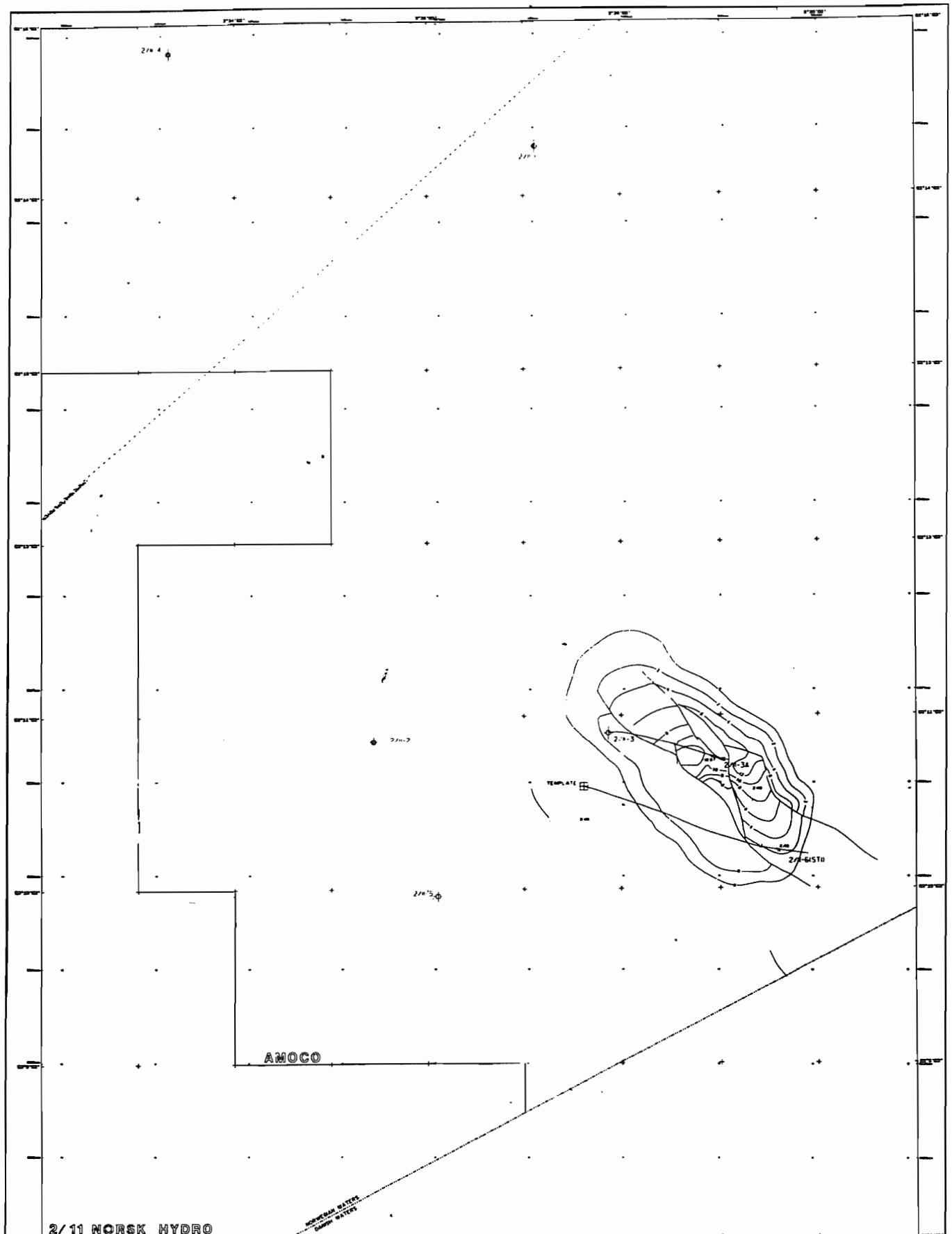
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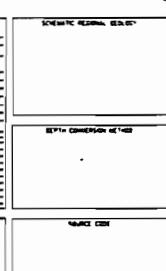
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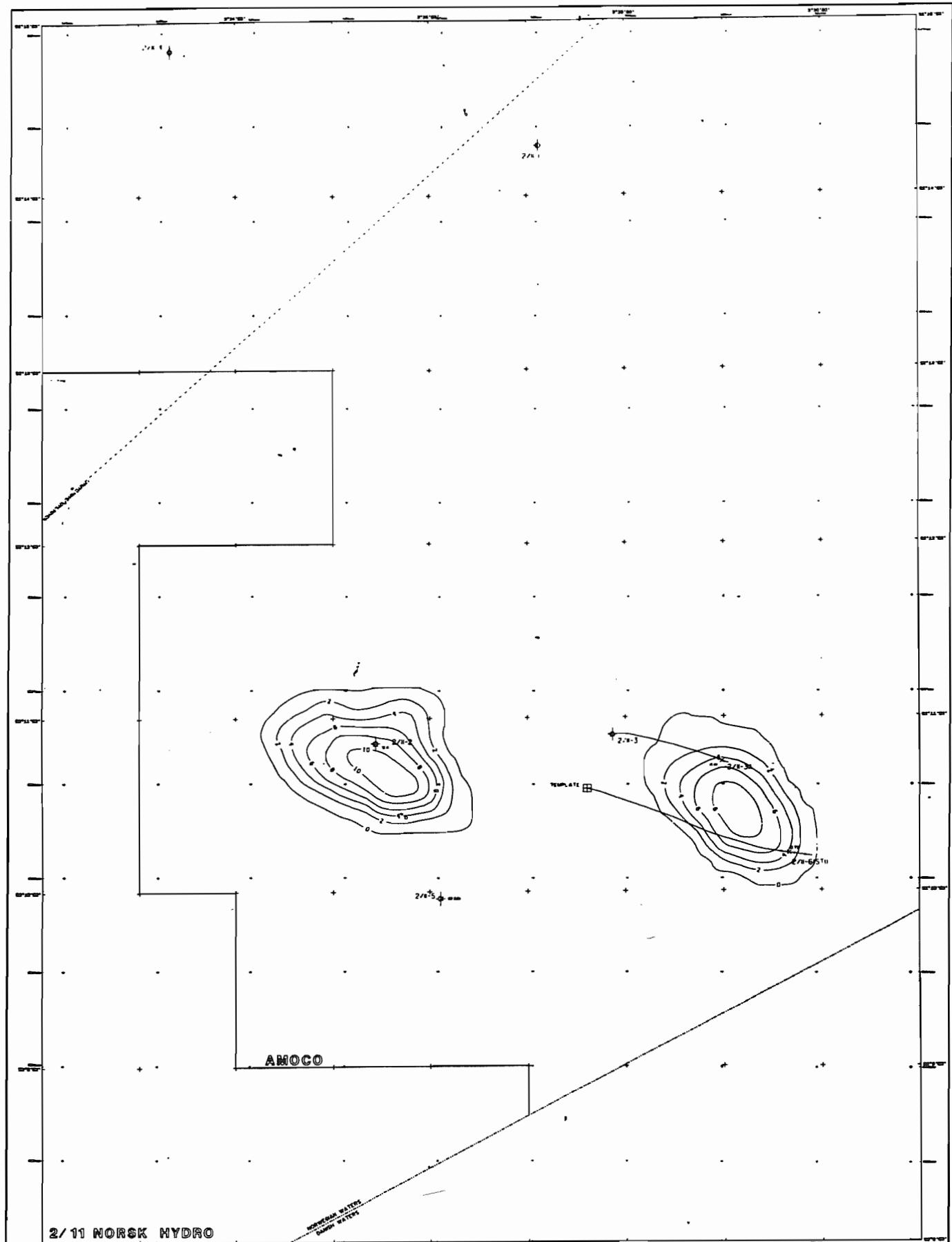
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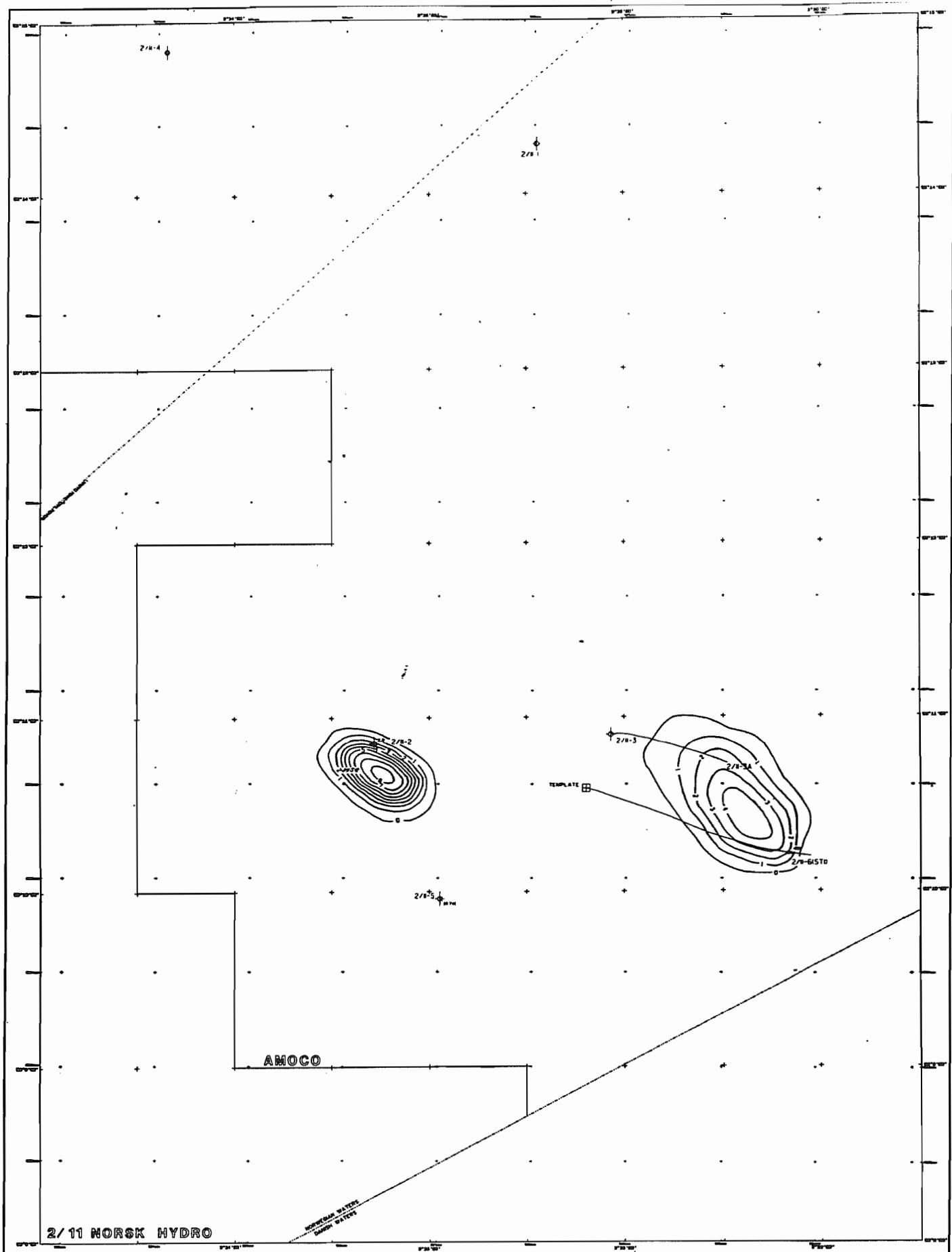
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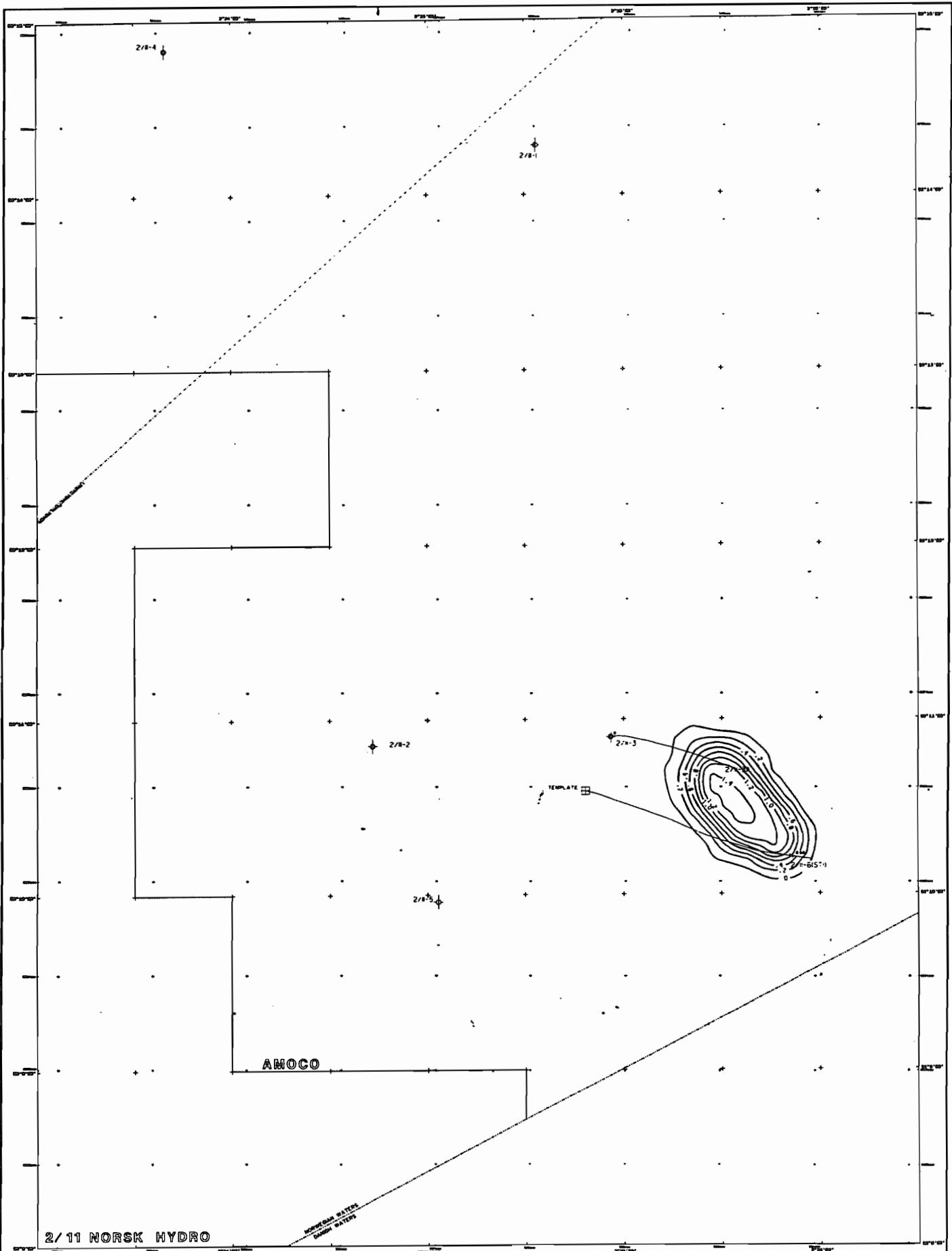


MAP REFERENCE DATA  
MAP PROJECTION  
MAP COORDINATES









**MAP REFERENCES DATA**

**SCHMATIC REGIONAL SURVEY**

**DEPTH CONVERSION OF TESTS**

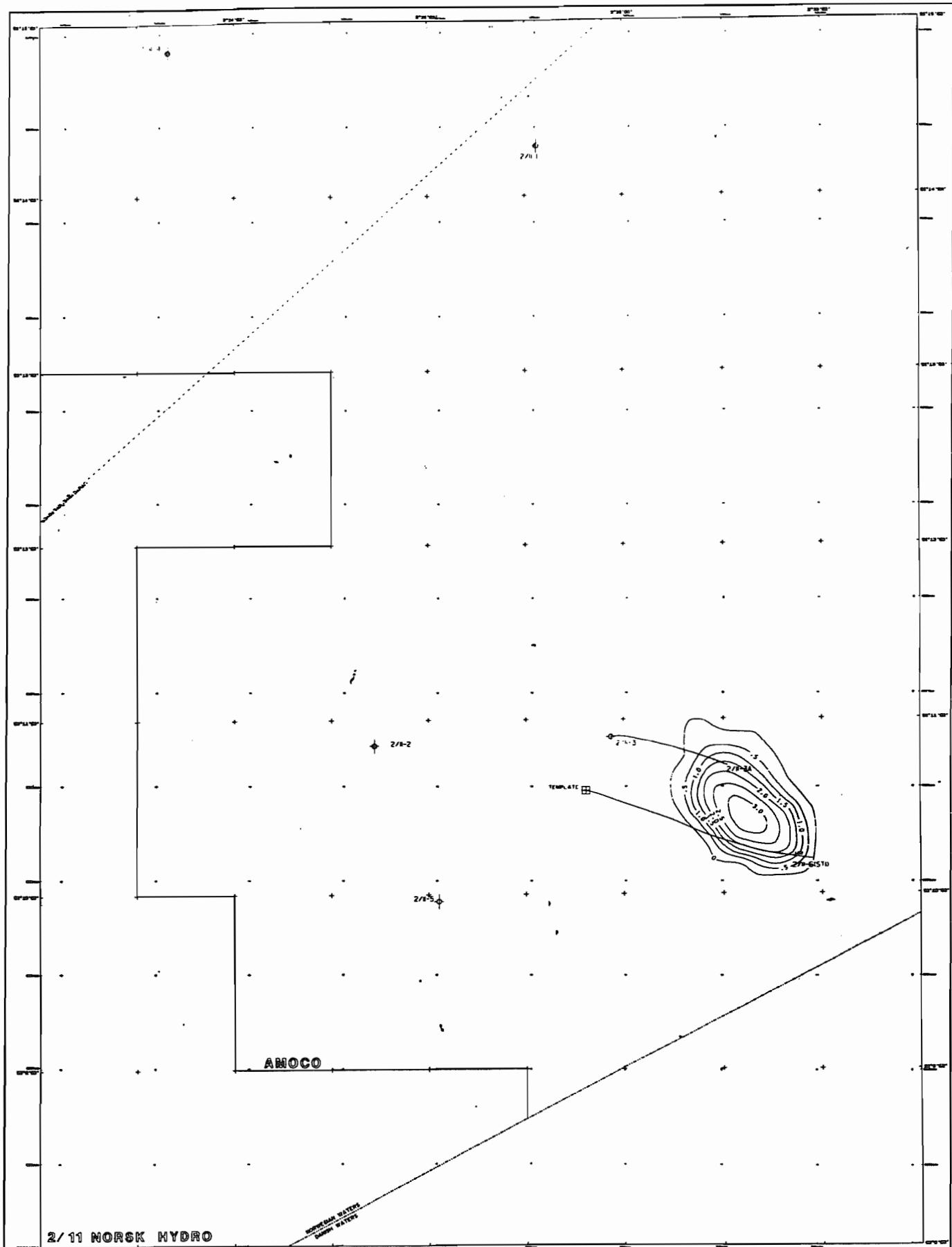
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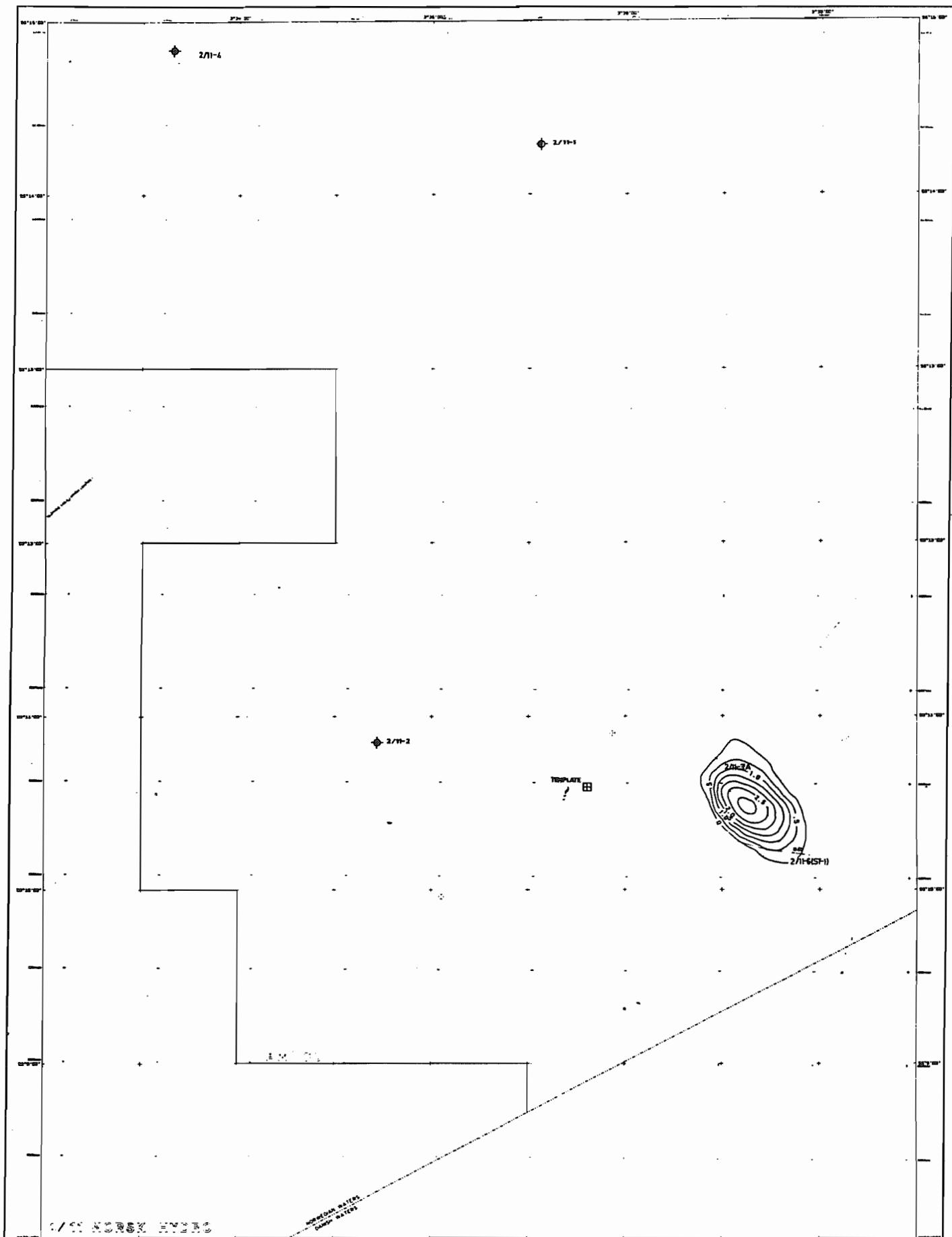
**MAP INDEX**

**LEGEND**

**INTERBEDDED FINE VOLCANIC ROCKS**

**Ex. 3.88**





卷之三

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DAMNS RATED

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APPENDIX

- I: A Summary of the Hod Field Petrophysical Parameters
- II: Statistical Relationship of  $S_w$  Versus  $\phi$  and Depth
- III: Statistical Relationship of Net to Gross Ratio Versus Gross  $S_w$
- IV: Statistical Relationship of Net to Gross Ratio Versus Net  $S_w$

## APPENDIX I

		2/11-2	2/11-3	2/11-3A	2/11-5	2/11-6 ST-1
<b>NET POROSITY</b>						
Tor	NP	34.4	NP	35.3	17.8	30.5
H1	27.2	27.2	20.5	30.5	21.0	28.1
H2			0	NR	22.8	25.2
H3			0	NR	NR	26.7
H4	NP	NP	0	NP	NP	25.2
H5, 6			18.5	NP	NP	24.2
<b>NET SW</b>						
Tor	NP	24.2	NP	17.3	59.2	33.9
H1		70.1	72.3	58.0	66.7	49.1
H2			100	100	67.9	67.7
H3			100	100	68.9	68.9
H4			100	100	64.6	64.6
H5, 6			79.4	79.5		
<b>GROSS POROSITY</b>						
Tor	NP	34.4	NP	34.7	17.1	30.2
H1		25.1	21.0	28.8	20.0	25.1
H2			17.5		19.8	19.6
H3			17.9			25.0
H4			17.2			23.6
H5, 6			15.8			18.4
<b>GROSS SW</b>						
Tor	NP	24.2	NP	19.0	89.9	32.9
H1		80.2	98.2	61.6	72.9	58.8
H2			100			81.0
H3			99.7			73.1
H4			99.7			74.8
H5, 6			98.5			94.7

## APPENDIX I (Cont..)

	2/11-2	2/11-3	2/11-3A	2/11-5	2/11-6 ST-1
<b>ISOPACH</b>					
Tor	NP			35.5	12.0
H1	37.0	45.0		42.0	36.5
H2	61.5	75.0		NR	48.5
H3	0	13.0		NR	10.5
H4	NP	18.5		NP	20.5
H5,6	NP	90.5		NP	60.5
<b>NET PAY</b>					
Tor	NP			35.5	* 6.4
H1	37.0	1.5		36.6	* 9.5
H2	27.1	0			*10.1
H3		0			
H4		0			
H5,6		0.6			
<b>NET/GROSS RATIO</b>					
Tor	NP			1.0	*0.18
H1	1.0	0.03		0.87	*0.75
H2	0.44	0			*0.32
H3		0			0
H4		0			0
H5,6		0			0

NP = Not Present

NR = Not Reached

\* = Not Pay, See Chapter 3.2.2

## APPENDIX II

### EAST HOD

T1,2:

$$\emptyset > 35\% \text{Sw} = 42.97 + 16.69 \text{DDXP}^2 - .8686 * \emptyset, \text{DDPX}^2 = ((\text{DEPTH} - 8548)/100)^2 / \emptyset$$

$$\emptyset < 35\% \text{Sw} = 30.95 + 51.96 \text{DDXP}^2 - .4438 * \emptyset, \text{DDPX}^2 = ((\text{DEPTH} - 8548)/100)^2 / \emptyset$$

$$H1: \text{Sw} = 119.4 + 2.343 \text{DDX}^2 - 3.190 * \emptyset, \text{DDX}^2 = ((\text{DEPTH} - 8625)/100)^2$$

$$H2: \text{Sw} = 135.0 + 1.415 \text{DDX}^2 - 2.792 * \emptyset, \text{DDX}^2 = ((\text{DEPTH} - 8950)/100)^2$$

$$H3: \text{Sw} = 135.0 + 1.415 \text{DDX}^2 - 2.792 * \emptyset, \text{DDX}^2 = ((\text{DEPTH} - 8950)/100)^2$$

$$H4: \text{Sw} = 119.4 + 2.343 \text{DDX}^2 - 3.190 * \emptyset, \text{DDX}^2 = ((\text{DEPTH} - 8950)/100)^2$$

$$H5: \text{Sw} = 103.8 + 1.619 \text{DDX}^2 - 2.247 * \emptyset, \text{DDX}^2 = ((\text{DEPTH} - 8950)/100)^2$$

$$H6: \text{Sw} = 108.8 + 0.9047 \text{DDX}^2 - 1.729 * \emptyset, \text{DDX}^2 = ((\text{DEPTH} - 8950)/100)^2$$

### WEST HOD

T1,2:

$$\emptyset > 35\% \text{Sw} = 42.97 + 16.69 \text{DDXP}^2 - .8686 * \emptyset, \text{DXPX}^2 = ((\text{DEPTH} - 8548)/100)^2 / \emptyset$$

$$\emptyset < 35\% \text{Sw} = 30.95 + 51.96 \text{DDXP}^2 - .4438 * \emptyset, \text{DXPX}^2 = (\text{DEPTH} - 8548)/100^2 / \emptyset$$

$$H1: \text{Sw} = 119.4 + 2.343 \text{DDX}^2 - 3.190 * \emptyset, \text{DDX}^2 = ((\text{DEPTH} - 8330)/100)^2$$

$$H2: \text{Sw} = 147.2 + 0.591 \text{DDX}^2 - 2.637 * \emptyset, \text{DDX}^2 = ((\text{DEPTH} - 8400)/100)^2$$

$$H3: \text{Sw} = 135.0 + 1.415 \text{DDX}^2 - 2.792 * \emptyset, \text{DDX}^2 = ((\text{DEPTH} - 8400)/100)^2$$

$$H4: \text{Sw} = 119.4 + 2.343 \text{DDX}^2 - 3.190 * \emptyset, \text{DDX}^2 = ((\text{DEPTH} - 8400)/100)^2$$

$$H5: \text{Sw} = 103.8 + 1.619 \text{DDX}^2 - 2.247 * \emptyset, \text{DDX}^2 = ((\text{DEPTH} - 8400)/100)^2$$

$$H6: \text{Sw} = 108.8 + 0.9047 \text{DDX}^2 - 1.729 * \emptyset, \text{DDX}^2 = ((\text{DEPTH} - 8400)/100)^2$$

### APPENDIX III

T1: NGR = .6224 + .02652 Sw - .0003516 Sw<sup>2</sup>

T2: NGR = .6224 + .02652 Sw - .0003516 Sw<sup>2</sup>

H1: NGR = .5061 + .03129 Sw - .0003913 Sw<sup>2</sup> R<sup>2</sup> = 96%

H2: NGR = 1.894 - .005801 Sw - .0001514 Sw<sup>2</sup> R<sup>2</sup> = 97%

H3: NGR = 4.018 - .05513 Sw + .0001262 Sw<sup>2</sup> R<sup>2</sup> = 94%

H4: NGR = .6224 + 0.2652 Sw - .0003516 Sw<sup>2</sup> R<sup>2</sup> = 96%

H56: NGR = 1.894 - .00580 Sw - .0001514 Sw<sup>2</sup>

where

R<sup>2</sup> = correlation quality

Sw = percent gross water saturation

NGR = ratio of net thickness to gross thickness

#### APPENDIX IV

T1: NGR = -1.300 + .1025 Sw - .001090 Sw<sup>2</sup>

T2: NGR = -1.300 + .1024 Sw - .001090 Sw<sup>2</sup>

H1: NGR = -10.10 + .371 Sw - .003149 Sw<sup>2</sup> ; R<sup>2</sup> = 90%

H2: NGR = -2.303 + .1331 Sw - .00132 Sw<sup>2</sup> ; R<sup>2</sup> = 91%

H3: NGR = 5.701 - .08029Sw - .00009674Sw<sup>2</sup> ; R<sup>2</sup> = 88%

H4: NGR = -1.300 + .1024 Sw - .001090 Sw<sup>2</sup> ; R<sup>2</sup> = 90%

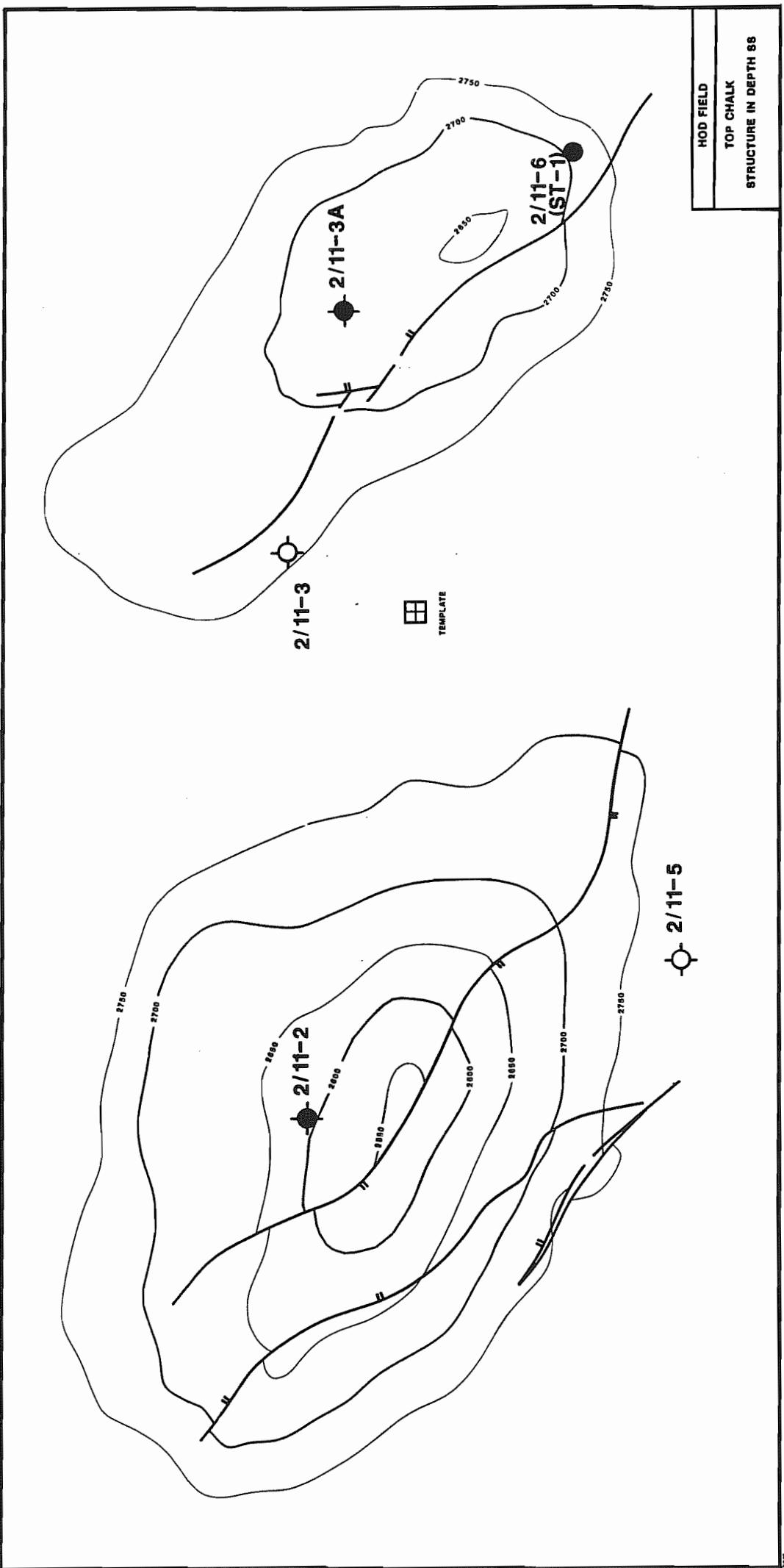
H56: NGR = -2.303 + .1331 Sw - .00132 Sw<sup>2</sup>

where

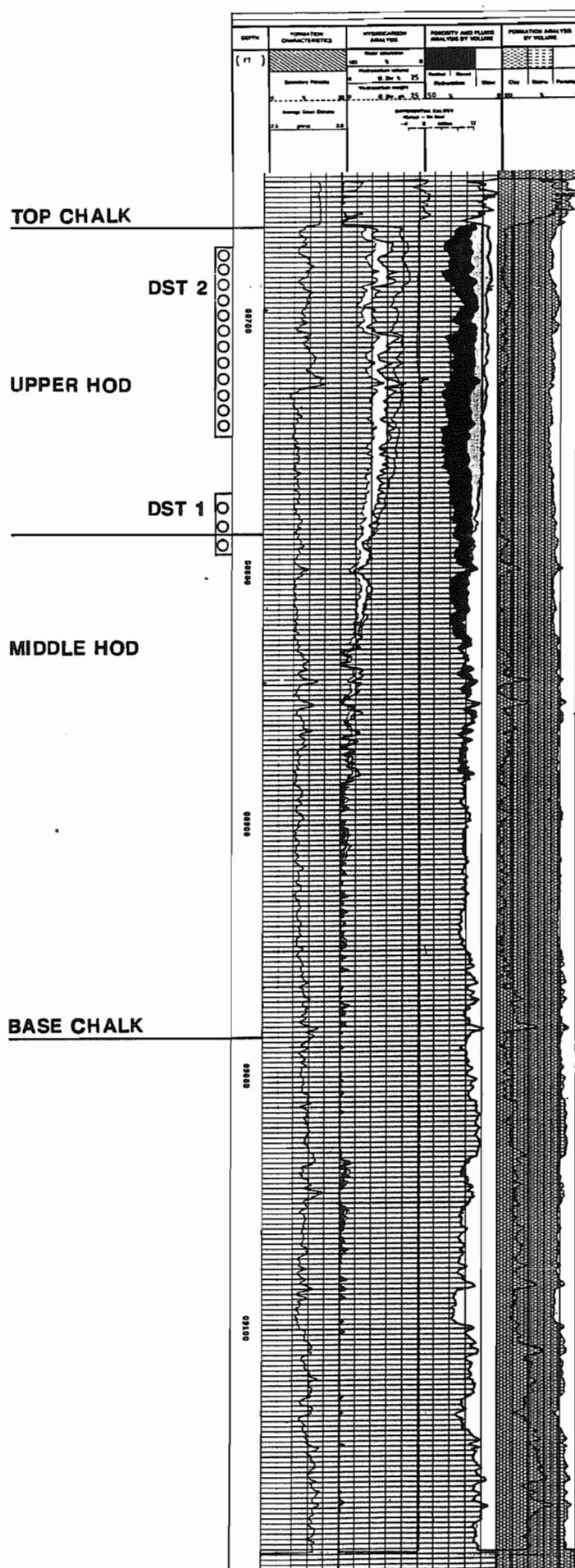
R<sup>2</sup> = correlation quality

Sw = percent net water saturation

NGR = ratio of net thickness to gross thickness



**HOD FIELD  
WELL 2/11-2  
LOG SECTION**



Well 2/11-2 DST Results

Interval (m TVD SS)	Formation	Average Rate (BOPD)	GOR (SCF/STB)	P <sub>i</sub> (PSIG)	P.I. (BOPD/PSI)	k (mD)	Skin Factor
<u>DST1</u>							
2636.3 - 2644	Upper Hod/ Middle Hod	No flow measurement taken due to test tool plugging or premature closure - of test tool.					
		Observations of the flow suggested that the well may have flowed 1500 BOPD prior to the tool plugging					
<u>DST2</u>							
2606.9 - 2629.8	Upper Hod	1435	1065	6520 at 2596.9mSS	0.29	1.5	-0.8
	(Pre-acid)						
2606.9 - 2629.8	Upper Hod	2700	1065	6520 at 2596.9mSS	1.96	2.8	-3.3
	(Post-acid)						
<u>DST3</u>							
1463.9 - 1487.7	Silty Shale			Gas and intermittent oil rates too low to measure			
				P <sub>i</sub> = 3960 psig at 1492.9mss			

**HOD FIELD  
WELL 2/11-3  
LOG SECTION**

DEPT.	FORMATION CHARACTERISTICS	HYDROCARBON ANALYSIS	WATER + AN- TICHEMICAL ANALYSIS BY VOLUME		WATER ANALYSIS BY VOLUME	
			Water	Antic.	Water	Antic.
(M)	S.P. 1  C Average Grain Diameter 2.5 mm	50 3.0	Water Salinity			
			Water %	Antic. %	Water %	Antic. %
			0.30	0.30	0.00	0.00

**TOP CHALK**

**UPPER HOD**

### MIDDLE HOD

### **LOWER HOD**

**HOD FIELD  
WELL 2/11-3A  
LOG SECTION**

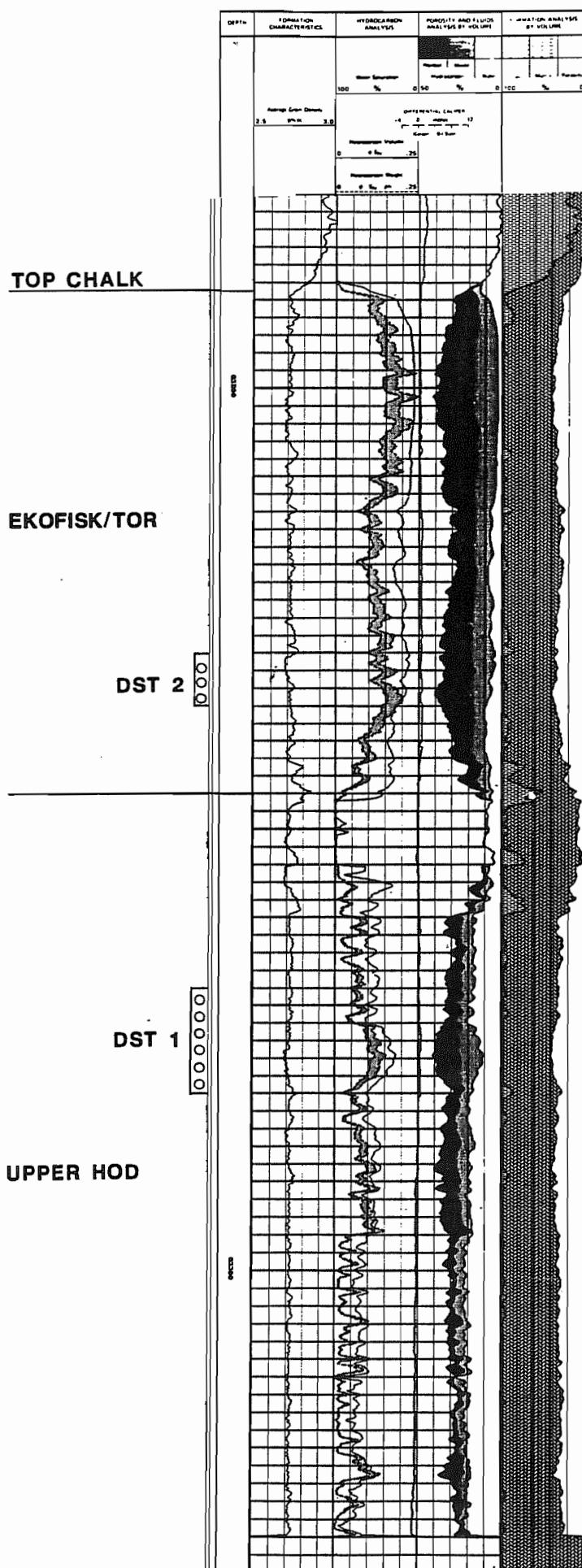
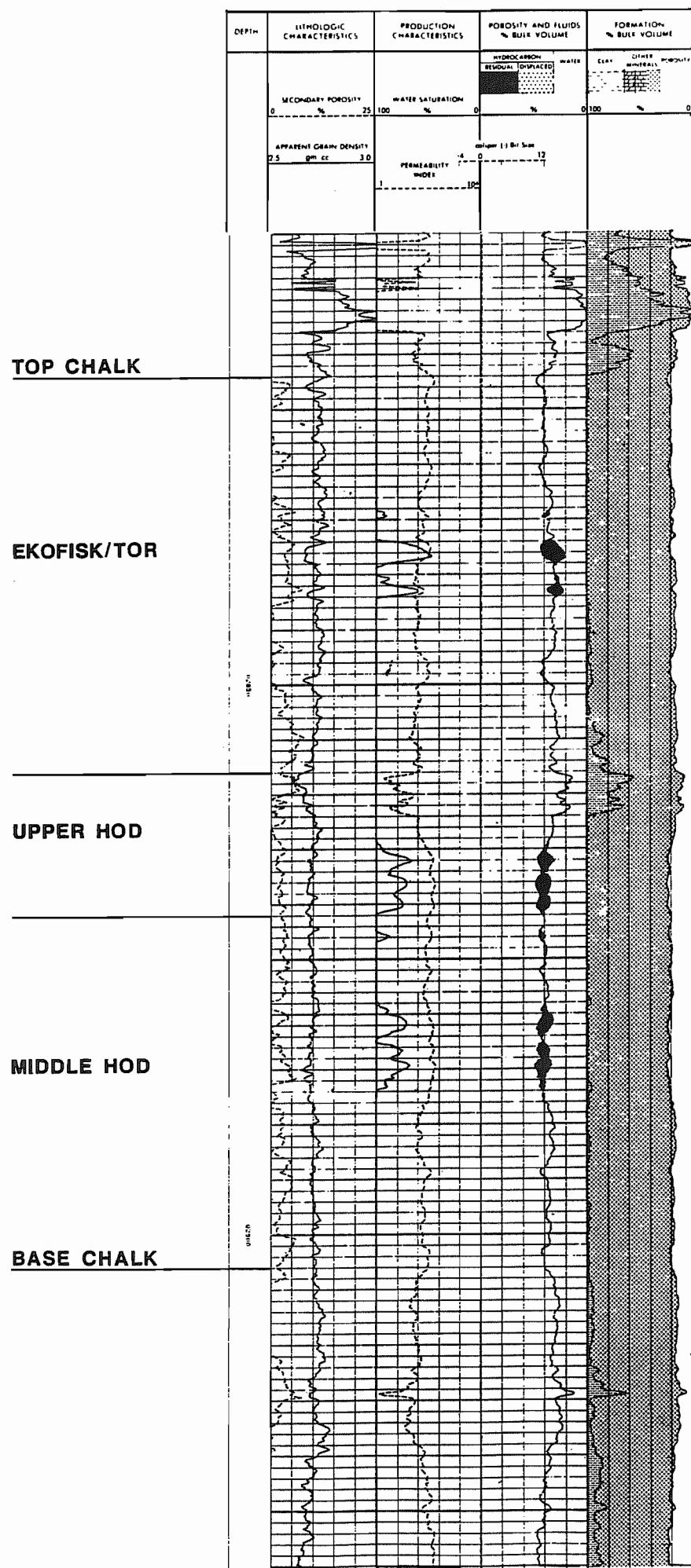


EXHIBIT 4.5

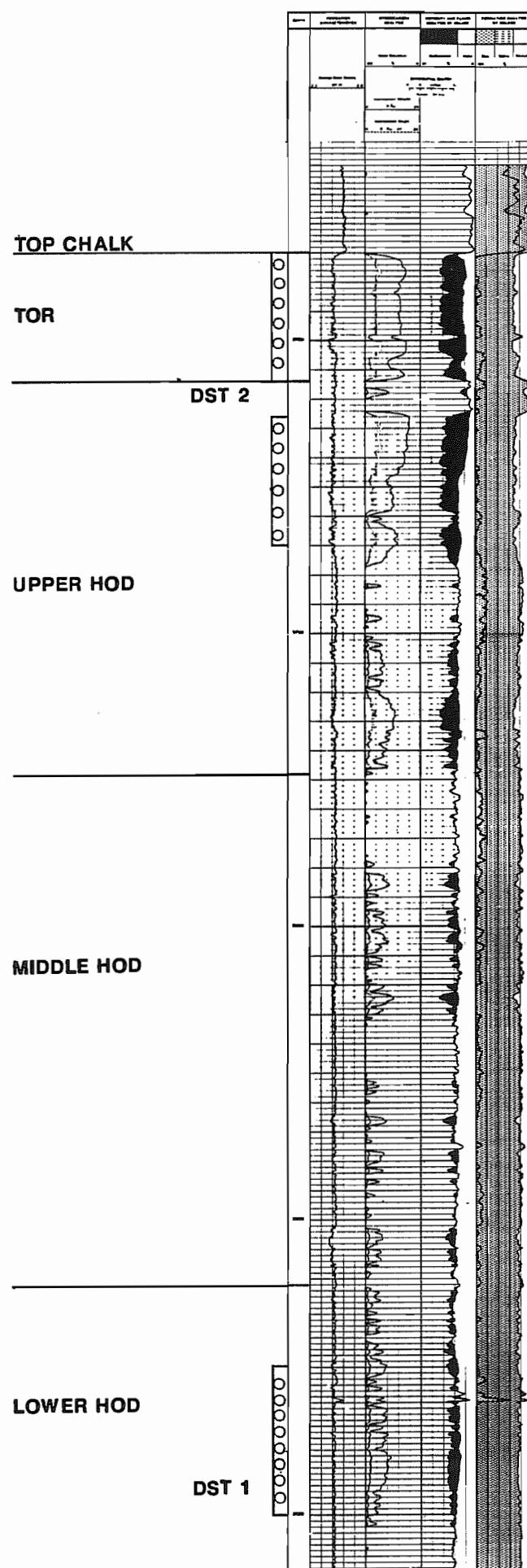
WELL 2/11-3A DST RESULTS

Interval (m TVD SS)	Formation	Average Rate (BOPD)	GOR (SCF/STB)	P <i>i</i> (PSIG)	P.I. (BOPD/PSI)	k (mD)	Skin Factor
<u>DST1</u>							
2753-2758	Upper Hod	422	1044	6850	0.1	8.30	3.8
2747-2758	Upper Hod	628	792	6850	0.12	8.50	44.0
<u>DST2</u>							
2717-2722 (Pre-acid)	Tor	148	-	6792	0.045	11.0	20.0
2717-2722 (Post-acid)	Tor	3260	688	6792	2.74	17.0	1.0
2717-2722 (Post-acid)	Tor	5753	634	-	2.42	-	-

**HOD FIELD**  
**WELL 2/11-5**  
**LOG SECTION**



HOD FIELD  
WELL 2/11-6(ST-1)  
LOG SECTION



WELL 2/11-6(ST-1) DST RESULTS

Interval (m TVD SS)	Formation	Average Rate (BOPD)	GOR (SCF/STB)	P <sub>i</sub> (PSIG)	P.I. (BOPD/PSI)	k (mD)	Skin Factor
<u>DST1</u>							
2825-2841	Lower Hod	65.5	-	6883	0.03	0.23	-1.10
<u>DST2</u>							
2825-2841	Lower Hod	2292	630	6223	1.80	10.68	-3.20
2704-2717 2721-2735 (pre-acid)	U Hod/Tor	1400	590	7059	0.49	2.20	-1.83
2704-2717 2721-2735 (Post-acid)	U Hod/Tor	2450	605	6795	3.02	7.43	-3.96
2704-2717 2721-2735 (Post-acid)	U Hod/Tor	5850*	558	-	2.62	-	-

\* Flow rate measured after 13 hour flow period.

SUMMARY OF HOD FIELD CORES

<u>Well</u>	<u>Interval Cored (m. MD SS)</u>	<u>Recovery</u>
2/11-2	2661.0 - 2670.0	100 %
2/11-3	2776.5 - 2789.0	100 %
	2789.0 - 2792.5	14 %
	2792.5 - 2811.0	100 %
2/11-3A	3192.4 - 3202.4	63 %
	3202.4 - 3206.8	96 %
	3206.8 - 3226.0	18 %
	3226.0 - 3231.9	70 %
	3231.9 - 3235.9	95 %
	3235.9 - 3240.9	65 %
	3240.9 - 3250.3	100 %
2/11-5	No Core	
2/11-6	3667.0 - 3676.0	52 %
	3676.0 - 3683.5	68 %
	3683.5 - 3689.5	45 %
	3689.5 - 3694.0	83 %
	3694.0 - 3698.5	83 %
	3698.5 - 3707.0	49 %
	3707.0 - 3715.0	89 %
2/11-6(ST-1)	No Core	

## WELL 2/11-2 CORE ANALYSIS

Por = Porosity (%)  
 Kah = Horizontal Air Permeability(MD)  
 Klh = Horizontal Liquid Permeability(MD)  
 Kav = Vertical Air Permeability(MD)  
 Klv = Vertical Liquid Permeability(MD)  
 Rhog = Rock Density(g/cc)

<u>Depth</u>	<u>Permeability</u>						
	<u>Feet</u>	<u>Por</u>	<u>Kah</u>	<u>Klh</u>	<u>Kav</u>	<u>Klv</u>	<u>Rhog</u>
8731	29.2	0.8					
8731	31.1	2.9	2.1	2.2	1.6	2.70	
8732	33.3	3.5	2.5			2.70	
8733	34.4	2.6	1.9	2.1	1.5	2.67	
8734	34.4	3.5	2.5	2.6	1.9	2.69	
8735	37.8	2.7	1.9	0.7	0.46	2.68	
8735	36.6	1.8				2.69	
8735	36.7		1.12				
8735	36.9	2.2				2.63	
8735	37.2		1.42				
8735	37.4	2.1				2.68	
8736	36.0	1.25					
8736	31.3	2.3	1.6	1.0	0.68	2.69	
8737	35.1	2.9	2.1	1.1	0.75	2.69	
8738	8.0	0.05	0.03	0.04	0.02	2.69	
8739	36.5	3.1	2.2	2.4	1.7	2.68	
8740	30.2	4.8	3.6			2.70	
8741	34.7	2.0	1.4	1.8	1.3	2.68	
8742	33.5	1.9	1.3	3.7	2.7	2.68	
8743	40.7	3.8	2.8	2.5	1.8	2.69	
8744	40.0	3.7	2.7	2.4	1.7	2.68	
8745	35.5	4.9	3.7	2.0	1.4	2.69	
8745	39.3						
8746	37.5	4.2	3.1	2.8	2.0	2.68	
8747	33.1	4.1	3.0	1.4	1.0	2.70	
8748	28.6	2.8	2.0			2.69	
8749	35.0	4.6	3.4	2.1	1.5	2.68	
8750	30.9	3.5	2.5	2.0	1.4	2.70	
8751	25.7	1.4	1.0		-	2.69	
8752	42.2	5.1	3.8	3.1	2.2	2.69	
8753	27.4	2.3	1.6	2.4	1.7	2.70	
8754	39.6	4.7	3.5			2.69	
8754	34.0	1.2				2.67	
8755	35.7	2.88					
8755	35.3	3.4				2.63	
8755	34.4	5.4	4.0			2.68	
8756	40.4	5.6	4.2	4.2	3.1	2.68	
8757	39.9	3.5	2.4	2.7	1.9	2.67	
8758	39.5	3.4	2.5	2.8	2.0	2.68	
8759	34.8	4.4	3.3	2.7	1.9	2.68	
8760	35.5						

WELL 2/11-3 CORE ANALYSIS

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Por = Porosity(%)  
Kah = Horizontal Air Permeability(MD)  
Kh = Horizontal Liquid Permeability(MD)  
Kav = Vertical Air Permeability(MD)  
Klv = Vertical Liquid Permeability(MD)  
Rhog = Rock Density(g/cc)

Depth Feet	Permeability				
	Por	Kah	Kh	Kav	Klv
9110	20.0	0.4		0.12	2.65
9120	18.7	0.08			2.67
9121	19.1				2.71
9122	17.4	0.05			2.72
9136	19.4	0.07		0.06	2.71
9147	17.0	0.07			2.72
9150	24.3	0.04			2.72
9163	30.8	0.10			2.73
9169	18.5	0.01			2.71
9176	21.7	0.08		0.03	2.69
9179	18.6	0.01		0.01	2.69
9189	24.2	0.07			2.71
9191	17.9	0.01		0.01	2.68
9197	19.4	0.01			2.68
9201	21.5	0.04			2.72
9206	20.3	0.01		0.01	2.71
9216	18.1	0.01			2.68
9219	20.4	0.01			2.70

## WELL 2/11-3A CORE ANALYSIS

Por = Porosity(%)  
 Kah = Horizontal Air Permeability(MD)  
 Klh = Horizontal Liquid Permeability(MD)  
 Kav = Vertical Air Permeability(MD)  
 Klv = Vertical Liquid Permeability(MD)  
 Rhog = Rock Density(g/cc)

Depth Metres	Permeability					Rhog
	Por	Kah	Klh	Kav	Klv	
3192.0	23.2	0.02				2.80
3194.3	22.5	0.28				2.72
3194.6	19.5	0.20				2.71
3194.9	23.0	0.14				2.71
3195.1	24.0	0.24				2.70
3195.4	21.0	5.17				2.71
3195.8	23.9	0.30				2.71
3196.3	17.9	0.15				2.65
3196.6	23.5	0.39				2.65
3196.9	32.3	1.20				2.70
3197.2	28.4	0.27				2.71
3197.6	29.7	0.96				2.70
3197.9	29.6	0.92				2.70
3201.6	37.7	4.12				2.69
3201.9	35.8	5.38				2.71
3202.2	34.9	5.02				2.66
3202.5	35.1	4.35				2.68
3202.8	36.8	5.59				2.69
3203.1	37.6	3.76				2.70
3203.3	37.3	3.53				2.70
3203.6	37.3	3.72				2.70
3204.0	40.2	4.87				2.70
3204.3	39.1	4.58				2.69
3204.6	40.9	5.97				2.66
3204.9	41.1	6.12				2.66
3205.3	38.6	3.98				2.70
3205.5	44.4					2.70
3205.8	39.6	4.96				2.70
3206.3	39.0	4.33				2.70
3206.4	36.7	4.60				2.65
3206.7	36.1	4.44				2.68
3207.0	34.0	2.94				2.68
3207.3	43.6					2.69
3207.6	39.3	4.15				2.68
3207.9	33.3	4.25				2.68
3208.2	43.4	7.27				2.70
3208.5	45.7	9.64				2.67
3208.8	43.5	7.90				2.69
3209.2	38.7	15.22				2.70
3226.0	27.9	0.83				2.69
3226.3	30.6	1.11				2.68
3226.8	30.5	2.99				2.68
3227.0	30.8	1.55				2.69
3227.4	30.8	1.32				2.71
3227.7	37.3					2.72
3228.1	30.7	1.33				2.71
3228.4	31.3	1.15				2.70
3228.7	30.0	1.11				2.67
3229.0	25.0	0.28				2.65
3229.3	23.3	0.76				2.66
3229.6	29.7					2.66

(Continued)

**WELL 2/11-3A CORE ANALYSIS**

-----  
 Por = Porosity (%)  
 Kah = Horizontal Air Permeability (MD)  
 Kh = Horizontal Liquid Permeability (MD)  
 Kav = Vertical Air Permeability (MD)  
 Klv = Vertical Liquid Permeability (MD)  
 Rhog = Rock Density (g/cc)

Depth						Permeability							
Metres	Por	Kah	Kh	Kav	Klv	Rhog	Metres	Por	Kah	Kh	Kav	Klv	Rhog
3229.9	29.5	0.56				2.68	3242.4	34.2	0.61				2.70
3230.1	30.5					2.69	3242.7	33.8	0.53				2.70
3231.9	32.0	0.38				2.71	3243.0	33.3	0.80				2.71
3232.3	31.3	0.36				2.72	3243.3	32.1	0.87				2.68
3232.5	34.6	2.47				2.69	3243.6	35.9	2.53				2.68
3232.8	31.6	1.43				2.68	3243.9	41.6	4.22				2.69
3233.4	34.0	1.91				2.69	3244.2	41.6	4.49				2.69
3233.7	30.4	1.10				2.68	3244.5	38.0	3.45				2.70
3234.2	31.5	1.21				2.69	3244.8	40.4	4.09				2.69
3234.6	32.7	0.48				2.68	3245.1	42.9	3.97				2.70
3234.9	34.8	1.45				2.72	3245.4	31.4	0.19				2.72
3235.2	26.0	0.09				2.72	3245.7	43.4	4.83				2.69
3235.5	26.9	0.31				2.66	3246.0	42.8					2.69
3235.7	25.4	0.06				2.69	3246.3	38.3	3.29				2.69
3236.4	27.4	0.37				2.68	3246.6	37.8	2.18				2.67
3236.6	23.7					2.68	3246.9	33.9	1.06				2.70
3236.8	26.4	0.26				2.69	3247.2	34.8	1.48				2.70
3237.2	32.6	1.09				2.72	3247.5	28.5	0.15				2.69
3237.5	29.3	1.62				2.72	3247.8	32.3	0.38				2.72
3237.7	24.8	0.19				2.72	3248.1	29.8	1.13				2.70
3238.0	30.4	1.12				2.70	3248.4	30.9	1.57				2.70
3238.3	29.7	1.38				2.70	3248.7	27.2	0.35				2.71
3238.6	32.5	1.74				2.71	3249.0	38.7	2.84				2.70
3239.1	30.3	1.52				2.71	3249.3	39.9	3.74				2.71
3240.9	41.9	4.45				2.72	3249.6	38.1	3.01				2.71
3241.2	42.0	4.45				2.69	3250.2	41.7	3.56				2.70
3241.5	41.5	4.55				2.70	3250.5	34.7	2.75				2.68
3241.8	44.0	5.21				2.70	3250.8	39.0	3.29				2.70
3242.1	43.5	4.58				2.69	3251.1	35.6	0.32				2.70
							3251.4	35.4	0.17				2.70
							3251.7	40.8	3.69				2.70
							3252.0	38.7	3.34				2.70
							3252.3	37.8	3.22				2.70

**WELL 2/11-6 CORE ANALYSIS**

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Por = Porosity(%)  
 Kah = Horizontal Air Permeability(MD)  
 Klh = Horizontal Liquid Permeability(MD)  
 Kav = Vertical Air Permeability(MD)  
 Klv = Vertical Liquid Permeability(MD)  
 Rhog = Rock Density(g/cc)

Depth Metres	Permeability				
	Por	Kah	Klh	Kav	Klv
3693.10	33.1				2.69
3693.60	34.6				2.69
3694.10	33.1	1.76			2.71
3694.35	32.4				2.69
3694.85	32.0				2.71
3695.10	32.9	0.67			2.70
3695.35	29.4	0.29			2.70
3695.75	30.6				2.69
3696.60	28.8				2.70
3697.40	24.2				2.67
3702.20	32.3				2.70
3702.20	30.4			1.71	2.70
3702.40	29.1	0.94			2.69
3702.40	30.5			0.32	2.69
3702.65	32.2	1.72	.074		2.69
3702.65	32.2			0.46	2.70
3702.85	42.0	1.05	0.41		2.70
3702.85	33.8			3.61	2.70
3703.10	33.0	0.41	.101		2.70
3703.10	34.6			0.50	2.70
3703.35	32.8	0.28			2.70
3703.60	34.4	0.36			2.69
3703.60	35.3			0.33	2.70
3703.85	34.9	2.20			2.70
3703.85	35.1			0.38	2.70
3704.10	35.3	0.45	.063		2.70
3704.10	34.9			0.77	2.69
3704.35	34.4	0.26	.058		2.70
3704.35	34.3			0.27	2.69
3704.85	27.7				2.68
3705.00	38.9	0.46	.147		2.71
3705.10	38.6	0.45	.132		2.69
3705.10	38.4		.072	0.51	.153
3705.60	37.2	0.36	.087		2.70
3705.60	38.0			0.48	.073
3705.80	38.2				2.70
3705.85	39.4	0.60	.133		2.68
3705.85	35.5			0.34	.089
3708.10	35.7	1.54	.069		2.70
3708.10	37.8			2.21	.085
3708.60	33.5	0.54	.080		2.70
3708.85	31.5				2.70
3709.60	33.5	0.63	.108		2.69
3710.05	13.0	0.15	.012		2.71
3710.10	15.7	10.10	.182		2.71
3710.35	23.8	4.90			2.70
3716.05	32.7	4.16	.331		2.70
3716.35	30.0	0.65	.109		2.70
3717.35	13.2				2.72
3717.85	13.6	1.98			2.71
3719.00	4.1				2.70
3720.10	9.3	0.18	.008		2.71
3720.10	7.0			0.03	.0001
					2.70

EXHIBIT 4.14

(Continued)

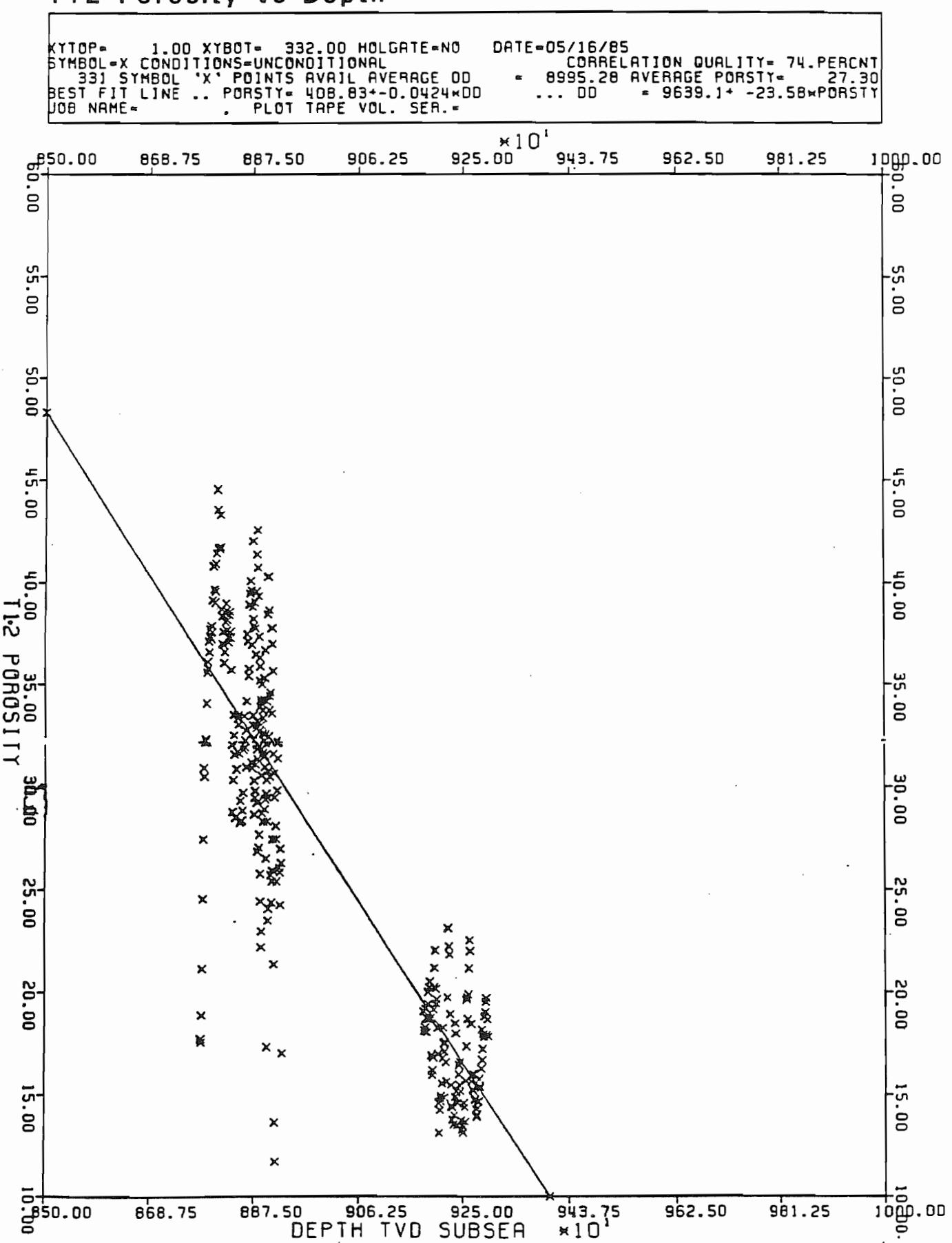
WELL 2/11-6 CORE ANALYSIS

Por = Porosity (%)  
Kah = Horizontal Air Permeability (MD)  
Kh = Horizontal Liquid Permeability (MD)  
Kav = Vertical Air Permeability (MD)  
Klv = Vertical Liquid Permeability (MD)  
Rhog = Rock Density (g/cc)

Depth Metres	Permeability					
	Por	Kah	Kh	Kav	Klv	Rhog
3720.35	8.2	.013	.0001			2.71
3720.70	5.8	.0023	.0001			2.71
3721.10	4.8	.0004	.0001			2.71
3721.10	4.9			.002	.0001	2.71
3721.35	4.0	.0001	.0001			2.70
3721.35	4.7			.0008	.0001	2.71
3721.70	5.1	.0012	.0001			2.71
3721.70	4.5			.0007	.0001	2.71
3721.85	4.8	.0014	.0001			2.71
3721.85	5.4			.17	.117	2.72
3722.00	5.6	.0076	.0001			2.71
3722.00	4.8			.0001	.0001	2.71
3722.35	23.9	0.58	.112			2.70
3722.35	10.7			.045	.009	2.71
3722.60	10.9					2.70
3723.10	27.2					2.70
3724.80	32.5	2.21				2.70
3724.80	28.0				.41	2.71
3725.10	24.3	0.58	.221			2.71
3725.10	24.9			.56	0.24	2.71
3725.50	23.3					2.70
3725.50	23.3			.48	0.17	2.70
3725.60	30.4	0.83	.213			2.70
3725.60	26.8			.58	0.23	2.70
3726.10	33.6	1.62	.438			2.70
3726.10	33.0				.39	2.70
3726.60	32.3					2.68
3726.60	29.8				.17	2.70
3727.00	27.0	0.55	.215			2.71
3727.50	27.0	0.43	.111			2.70
3727.50	27.8			.53	0.17	2.70
3727.75	27.0					2.68
3727.75	28.6				.36	2.70
3728.50	27.5	0.52	.122			2.71
3728.50	29.1			.54	0.15	2.70
3733.20	30.1					2.68
3733.35	32.1	0.24	.038			2.70
3733.35	30.9			.24	.049	2.70
3733.60	32.2		.070			2.71
3734.10	31.3		.023			2.70
3734.35	27.7					2.69
3734.85	28.1					2.69
3735.10	33.1	1.00	.061			2.71
3736.10	29.4					2.69
3736.35	37.1	0.27	.008			2.70
3737.60	34.4					2.69
3738.30	32.7					2.71
3738.85	38.4	0.64	.129			2.69
3738.85	35.7			.36	.036	2.69
3739.30	38.3					
3739.35	37.9					2.67

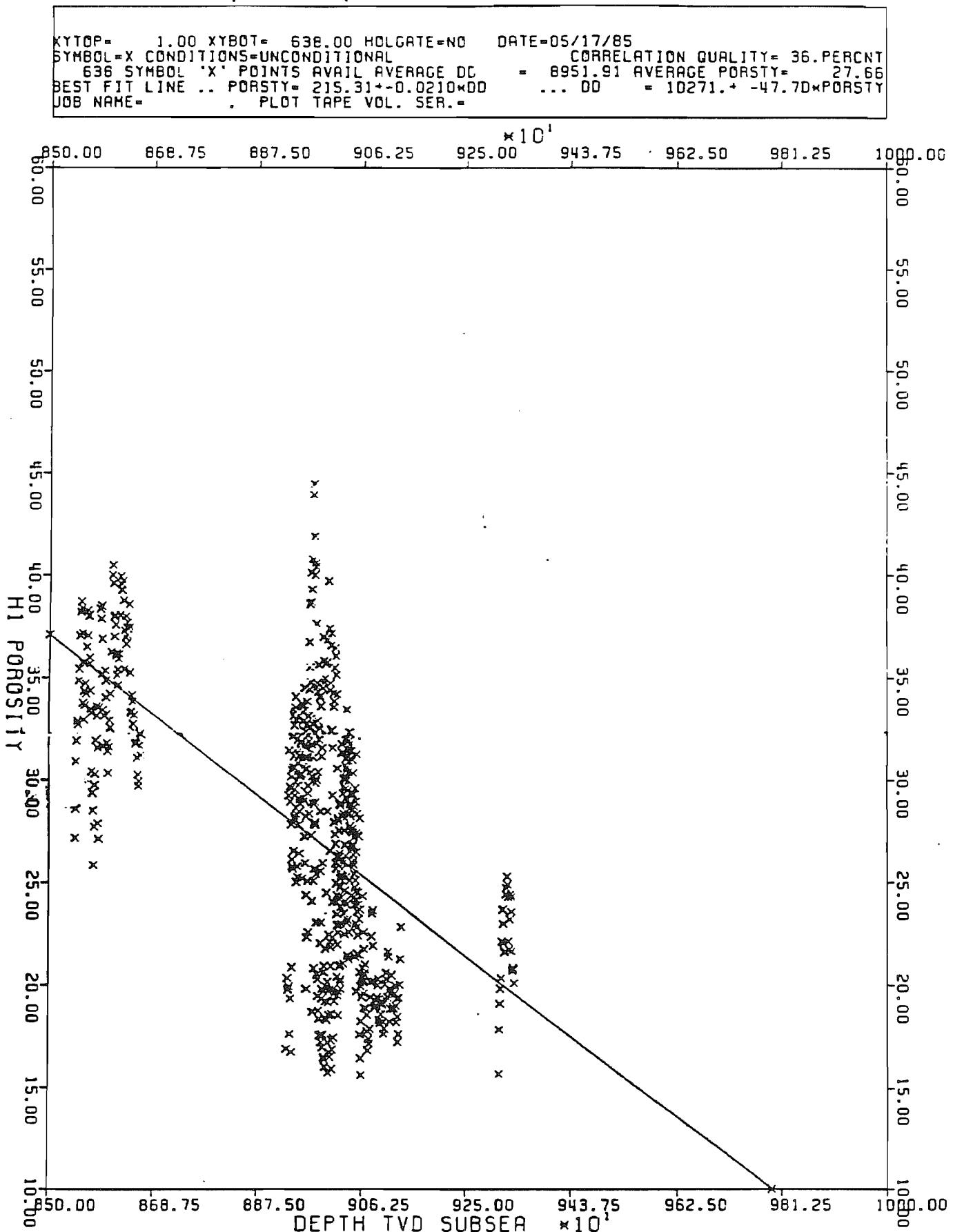
EXHIBIT 4.14  
(CONTINUED)

HOD FIELD  
T1-2 Porosity vs Depth



# HOD FIELD

## H1 Porosity vs Depth

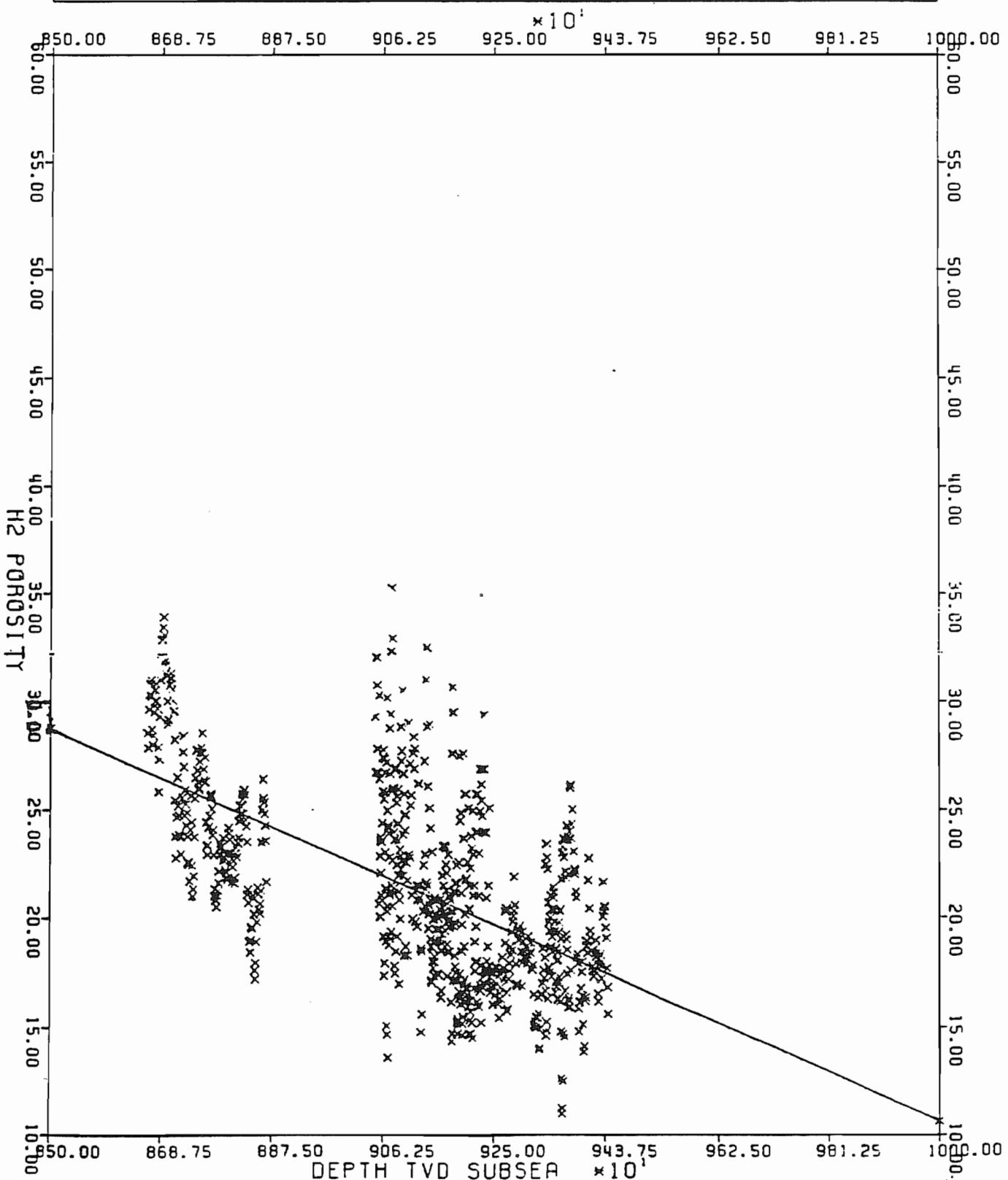


# HOD FIELD

## H2 Porosity vs Depth

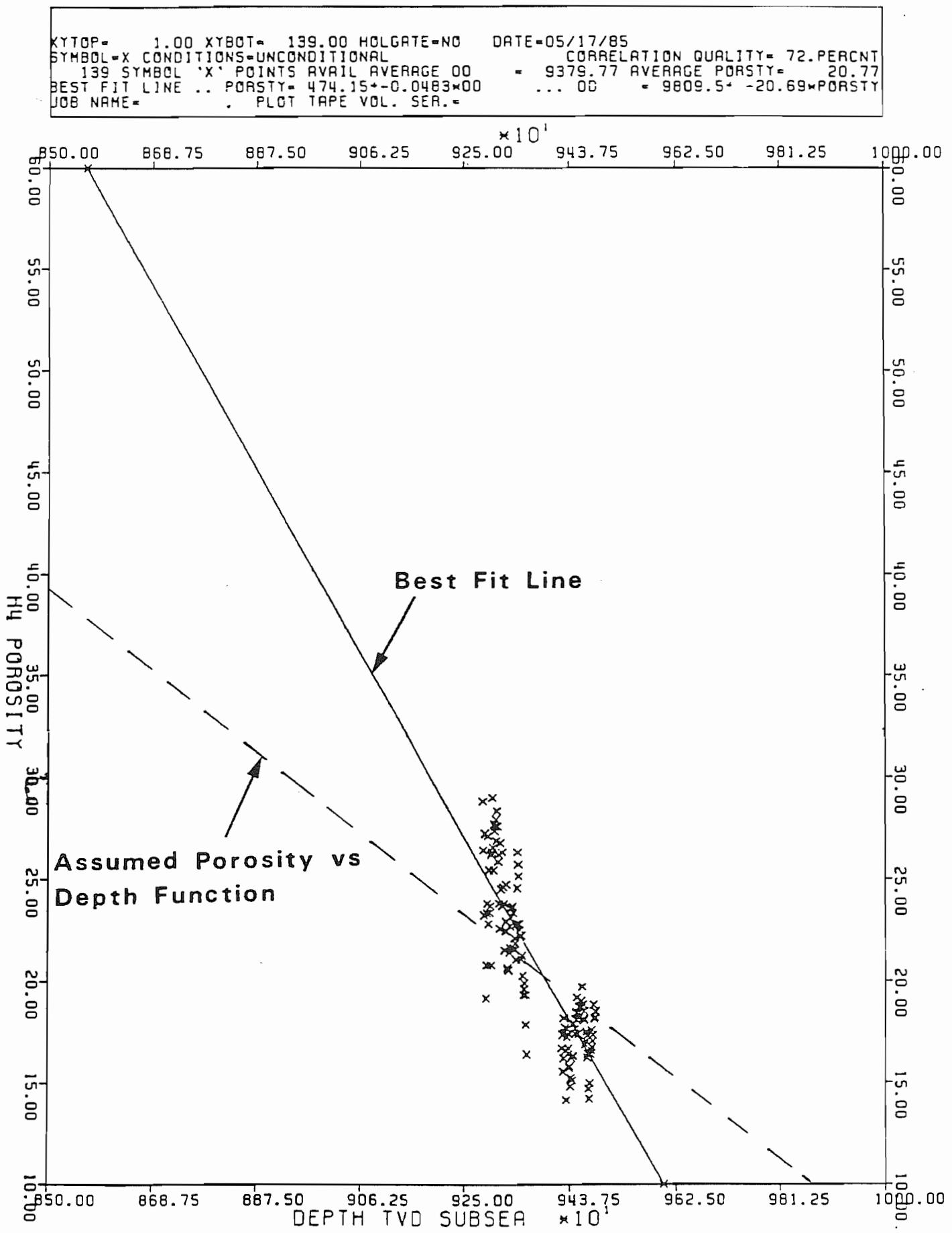
```

XYTOP= 1.00 XYBOT= 827.00 HOLGATE=NO DATE=05/17/85
SYMBOL=X CONDITIONS=UNCONDITIONAL CORRELATION QUALITY= 39. PERCNT
797 SYMBOL 'X' POINTS AVAIL AVERAGE DD = 9111.38 AVERAGE PORSTY= 21.37
BEST FIT LINE .. PORSTY= 131.31+-0.0121*DD ... DD = 10883. + -82.88*PORSTY
JOB NAME=. PLOT TAPE VOL. SER.=
```



# HOD FIELD

## H4 Porosity vs Depth

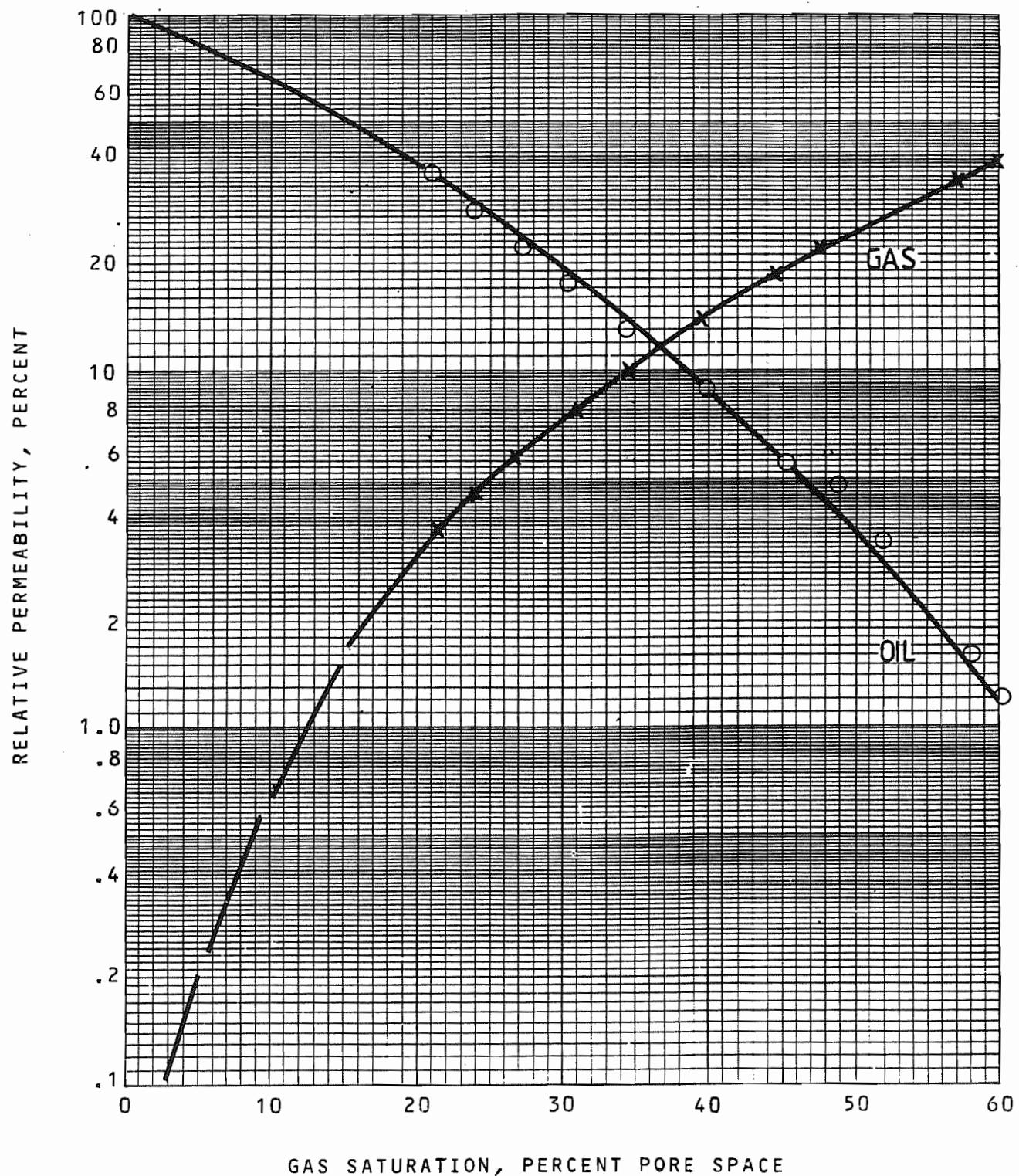


AVERAGE POROSITY FOR EACH HOD FIELD WELL LOCATION

<u>Well</u>	<u>Formation</u>	<u>Average Gross Porosity (%)</u>
2/11-2	Ekofisk/Tor	Not Encountered
	Upper Hod	34.4
	Middle Hod	25.1
	Lower Hod	Not Encountered
2/11-3	Ekofisk/Tor	Not Encountered
	Upper Hod	21.0
	Middle Hod	17.5
	Lower Hod	17.2
2/11-3A	Ekofisk/Tor	34.7
	Upper Hod	28.8
	Middle Hod	Not Penetrated
	Lower Hod	Not Penetrated
2/11-5	Ekofisk/Tor	17.1
	Upper Hod	20.0
	Middle Hod	19.8
	Lower Hod	Not Encountered
2/11-6(ST-1)	Ekofisk/Tor	30.2
	Upper Hod	25.1
	Middle Hod	19.6
	Lower Hod	23.6

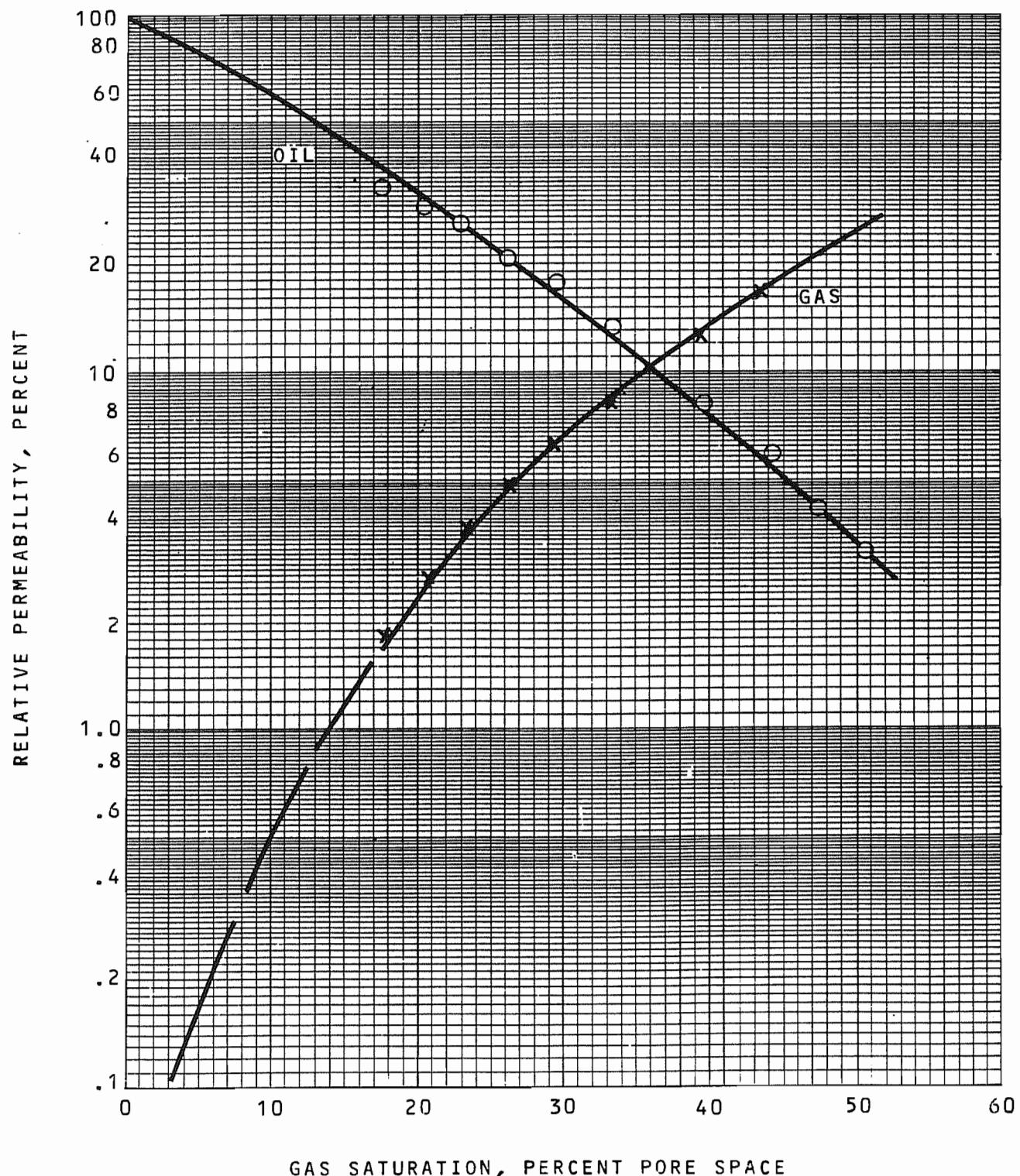
# GAS - OIL RELATIVE PERMEABILITIES

FIELD: HOD, NORWAY  
FORMATION: UPPER CRETACEOUS  
DEPTH, FT.: 8735  
SAMPLE NO.: 1  
WELL: AMOCO NORWAY 2/11-2  
POROSITY, PERCENT: 36.7  
PERM. TO OIL AT 0.0% S(WI) = 1.12 MDS



## GAS - OIL RELATIVE PERMEABILITIES

FIELD: HOD, NORWAY  
FORMATION: UPPER CRETACEOUS  
DEPTH, FT.: 8735  
SAMPLE NO.: 2  
WELL: A110CO NORWAY 2/11 2  
POROSITY, PERCENT: 37.2  
PERM. TO OIL AT 0.0% S (WI) = 1.42 MDS



## GAS - OIL RELATIVE PERMEABILITIES

FIELD: HOD, NORWAY

FORMATION: UPPER CRETACEOUS

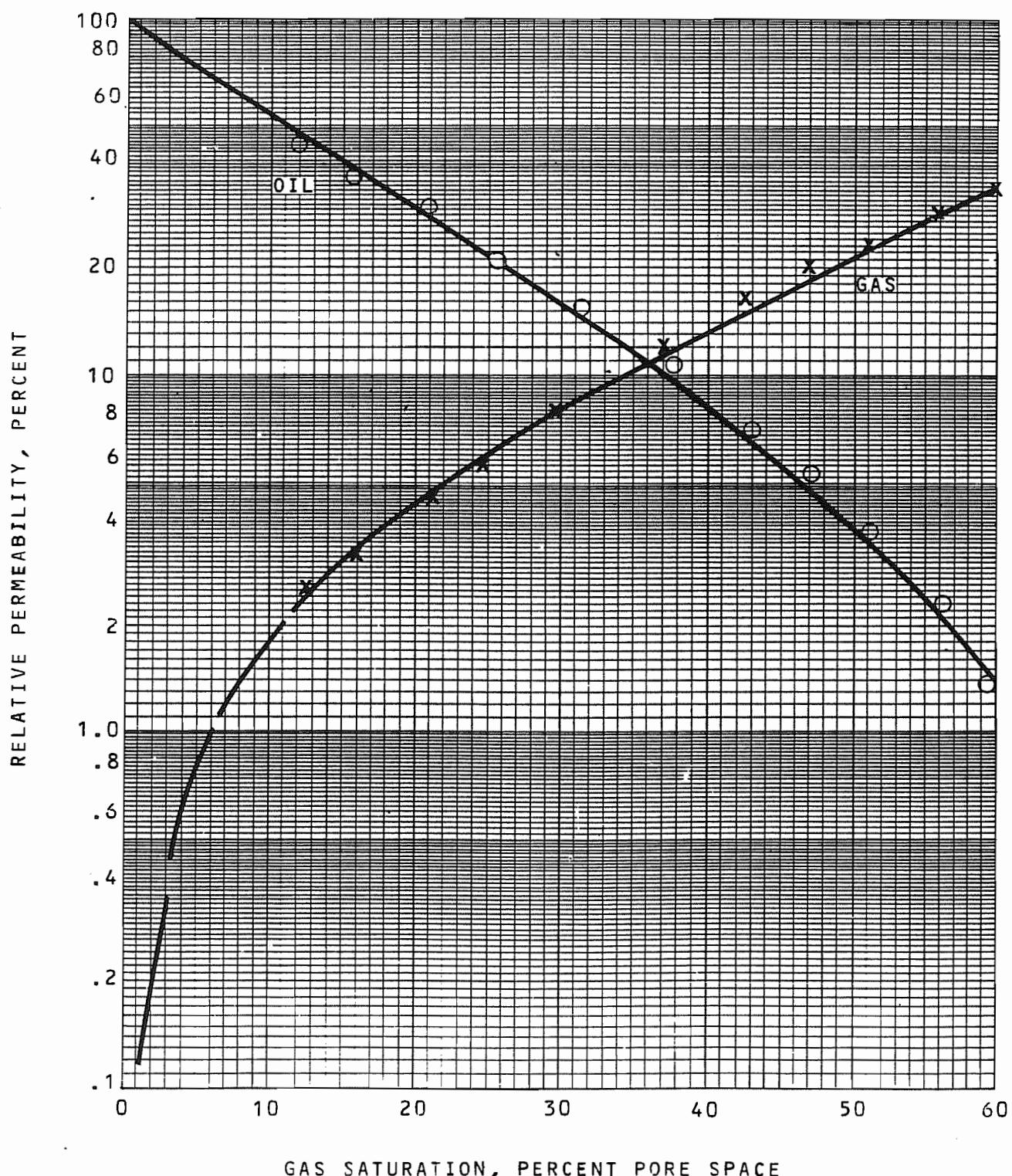
DEPTH, FT.: 8754

SAMPLE NO.: 4

WELL: AMOCO NORWAY 2/11-2

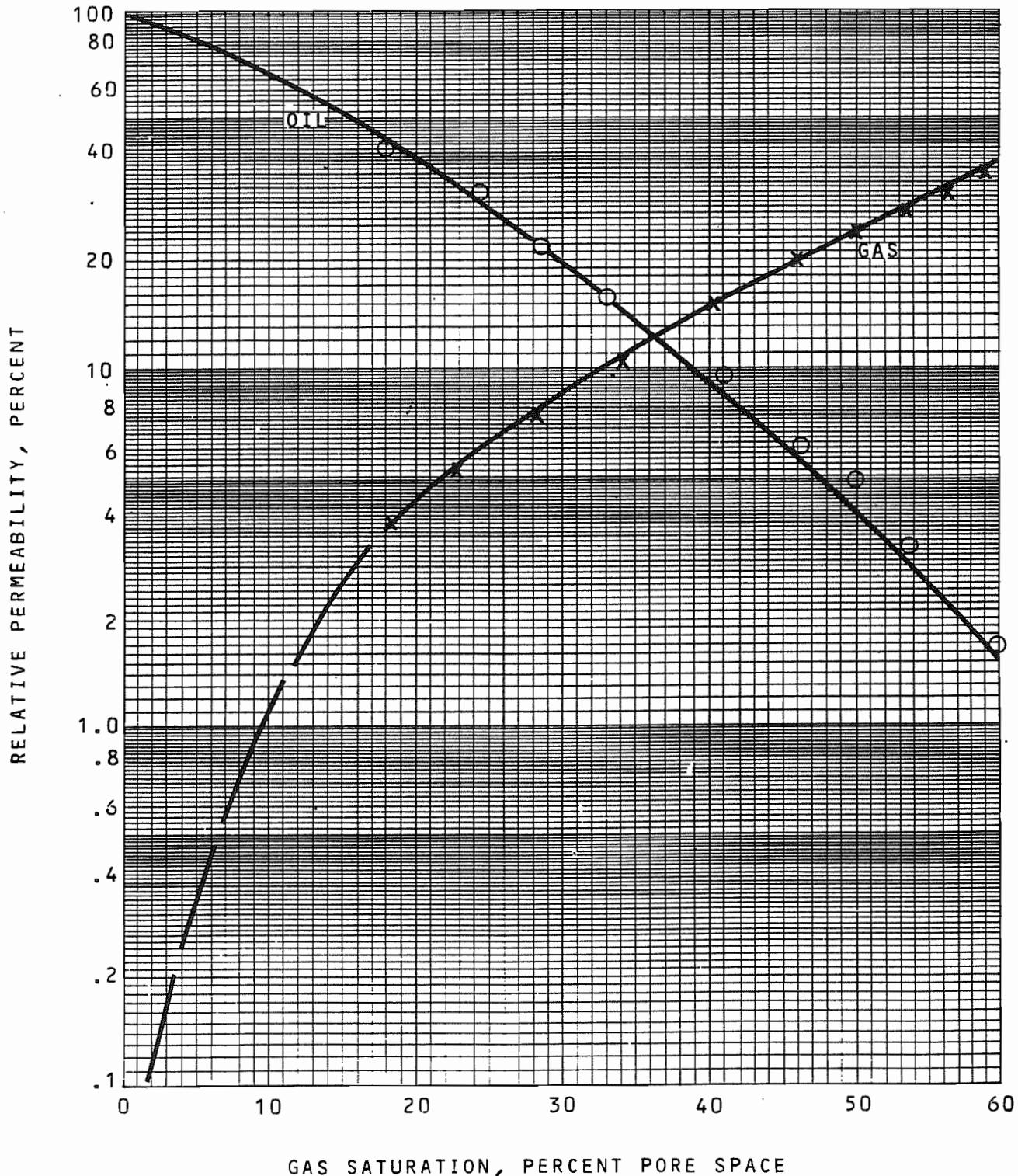
POROSITY, PERCENT: 34.7

PERM. TO OIL AT 0.0% S(WI) = 0.76 MDS



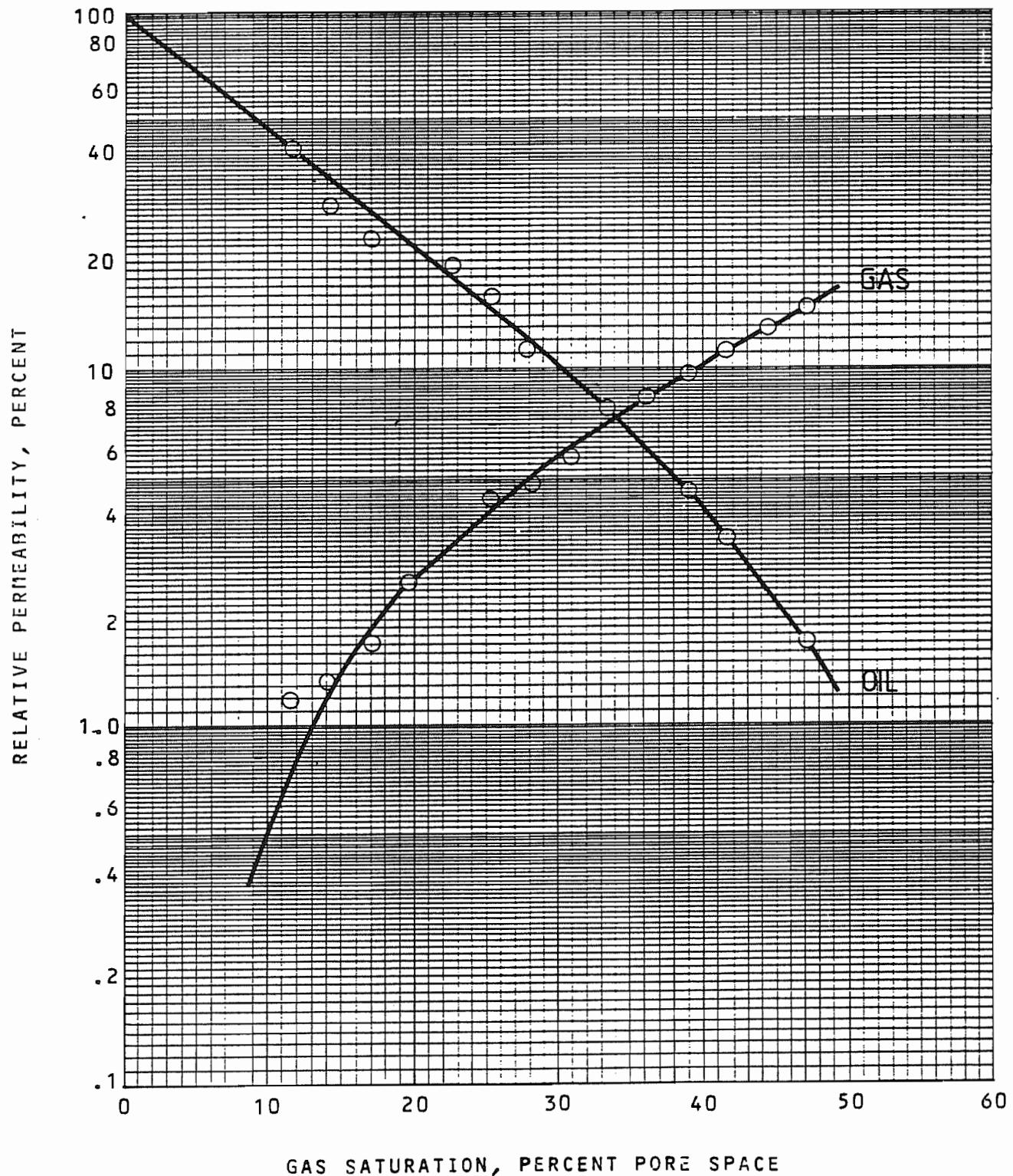
## GAS - OIL RELATIVE PERMEABILITIES

FIELD: HOD, NORWAY  
FORMATION: UPPER CRETACEOUS  
DEPTH, FT.: 8755'  
SAMPLE NO.: 5  
WELL: AMOCO NORWAY 2/11-2  
POROSITY, PERCENT: 37.3  
PERM. TO OIL AT 0.0% S(WI) = 1.20 MDS.



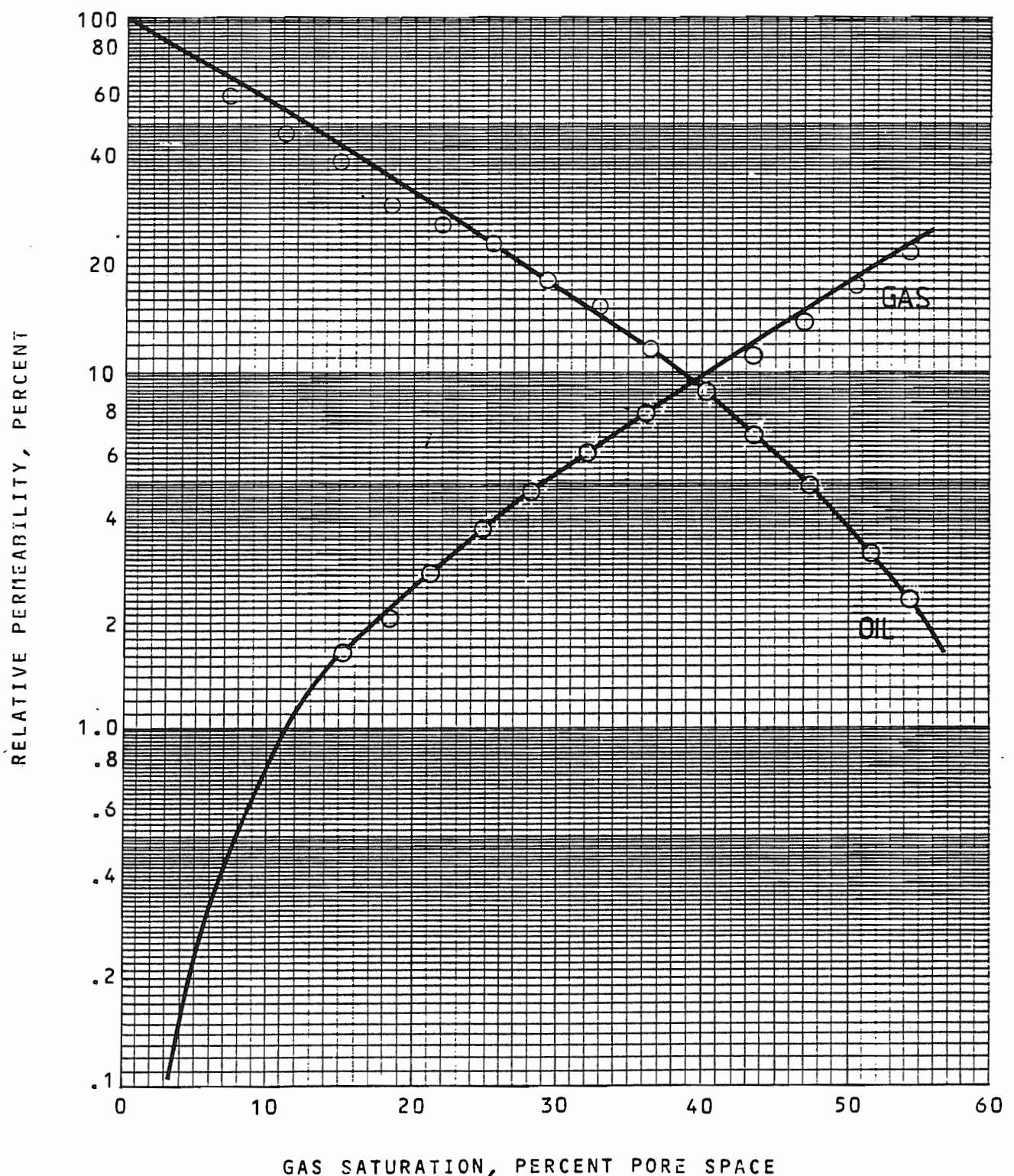
## GAS - OIL RELATIVE PERMEABILITIES

FIELD: Hod, Norway  
FORMATION: Tor  
DEPTH, M.: 3192  
SAMPLE NO.: 1 ("Fresh")  
WELL: 2/11-3A  
POROSITY, PERCENT: 30.4  
PERM. TO OIL AT 11.2 %Swi: .319 md.



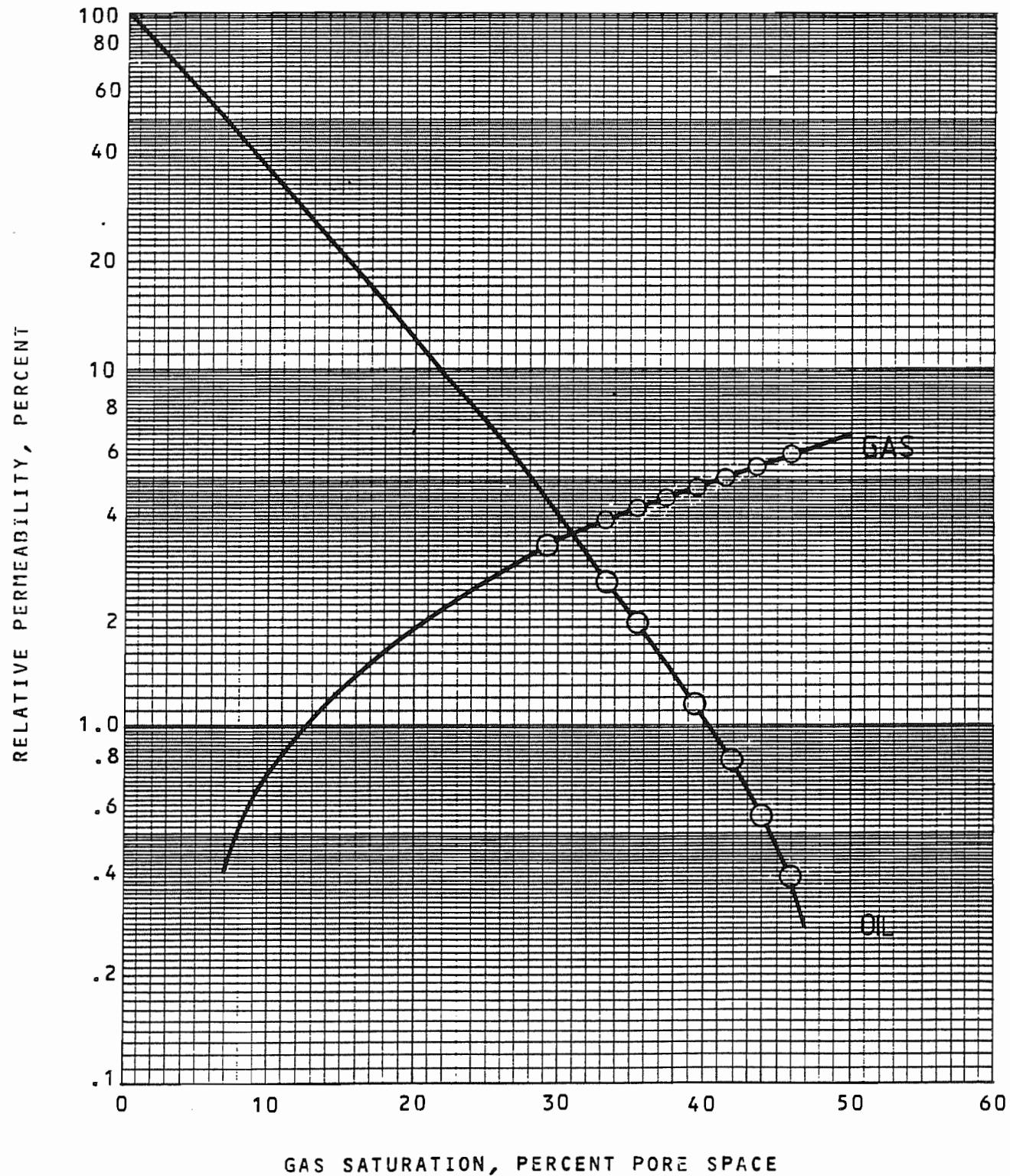
# GAS - OIL RELATIVE PERMEABILITIES

FIELD: Hod, Norway  
FORMATION: Tor  
DEPTH, FT.: 3196  
SAMPLE NO.: 2 ("Fresh")  
WELL: 2/11-3A  
POROSITY, PERCENT: 23.0  
PERM. TO OIL AT 9.1 %SWI: .216 md., and at 0.0 %SWI: .402md



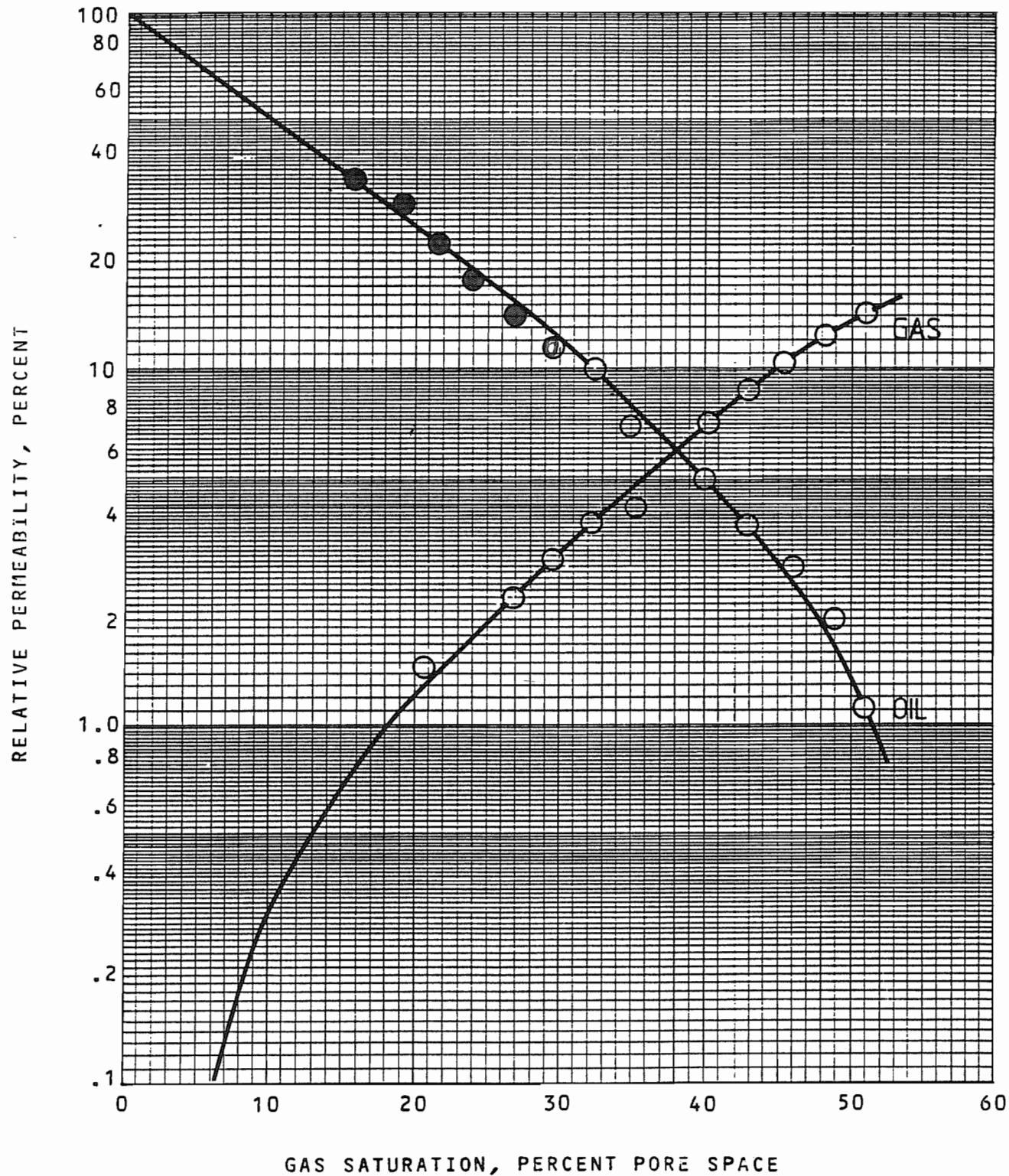
# GAS - OIL RELATIVE PERMEABILITIES

FIELD: Hod, Norway  
FORMATION: Tor  
DEPTH, M.: 3201  
SAMPLE NO.: 3 ("Fresh")  
WELL: 2/11-3A  
POROSITY, PERCENT: 40.4  
PERM. TO OIL AT 10.0 %Swi: .161 md.



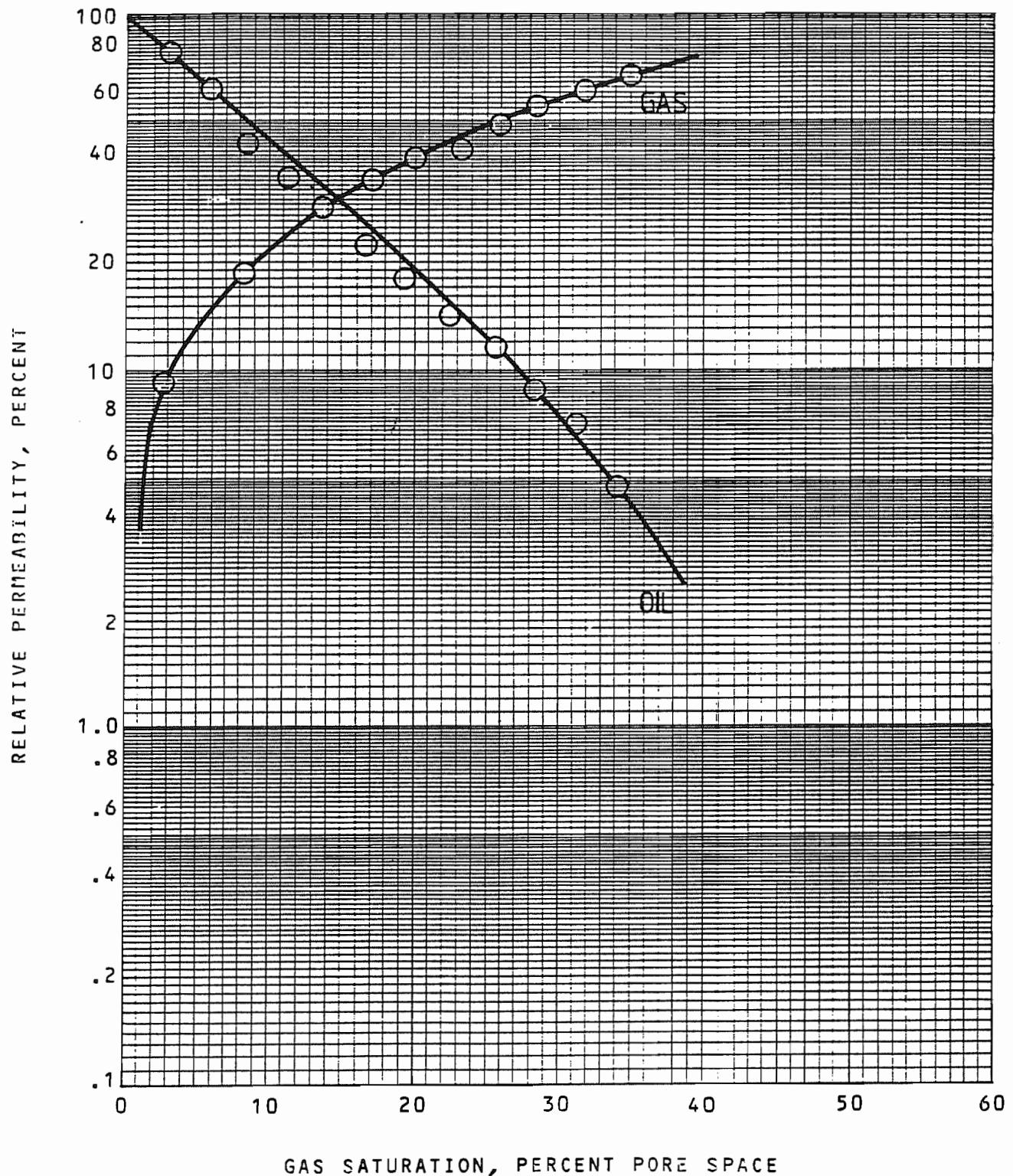
## GAS - OIL RELATIVE PERMEABILITIES

FIELD: Hod, Norway  
FORMATION: Tor  
DEPTH, FT.: 3203  
SAMPLE NO.: 4 ("Fresh")  
WELL: 2/11-3A  
POROSITY, PERCENT: 35.8  
PERM. TO OIL AT 8.9 %Swi: .713 md.



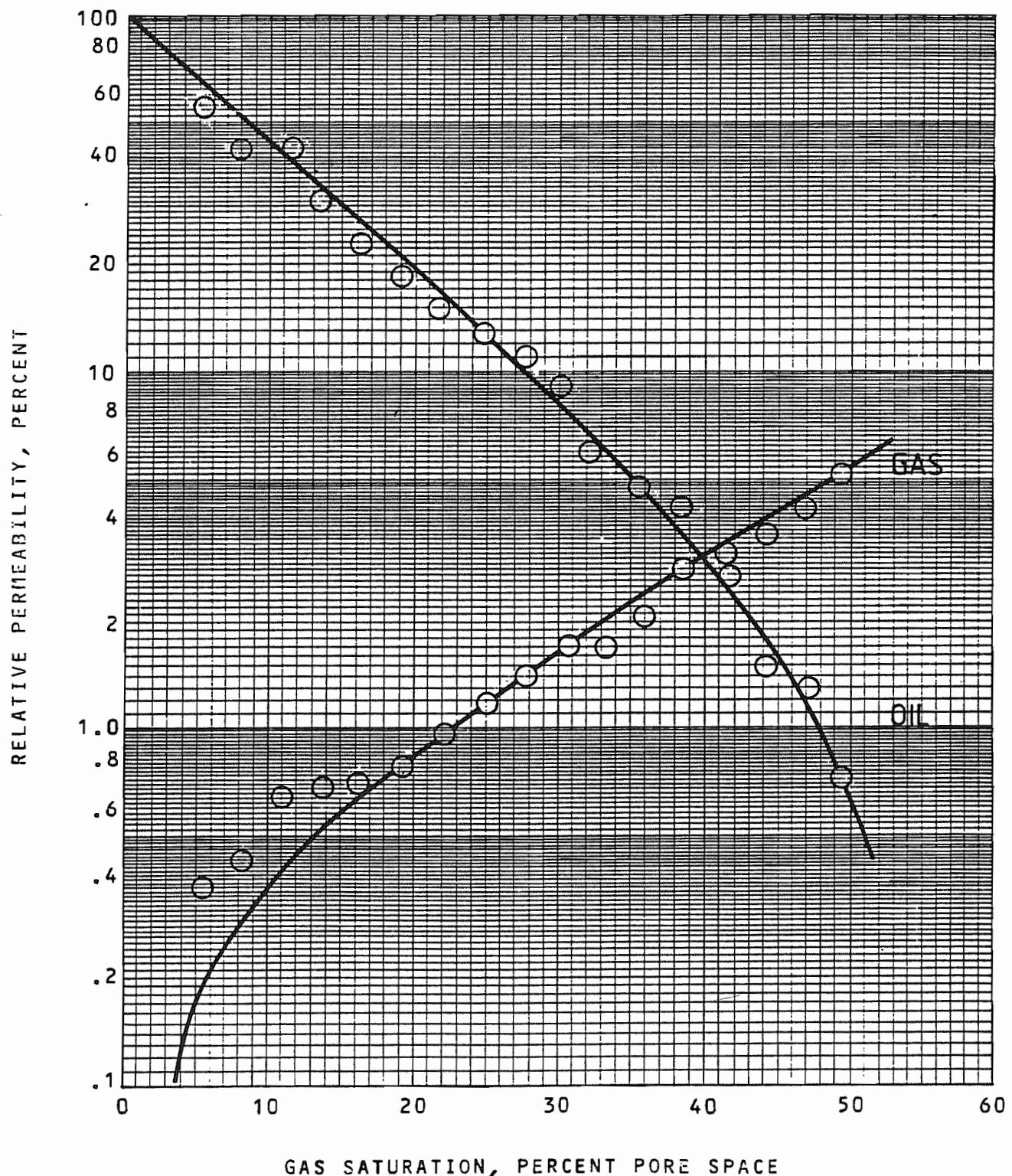
## GAS - OIL RELATIVE PERMEABILITIES

FIELD: Hod, Norway  
FORMATION: Tor  
DEPTH, M.: 3228  
SAMPLE NO.: 5 ("Fresh")  
WELL: 2/11-3A  
POROSITY, PERCENT: 28.8  
PERM. TO OIL AT 23.5% Swi: .487 md.



## GAS - OIL RELATIVE PERMEABILITIES

FIELD: Hod, Norway  
FORMATION: Tor  
DEPTH, M.: 3229  
SAMPLE NO.: 6 ("Fresh")  
WELL: 2/11-3A  
POROSITY, PERCENT: 31.5  
PERM. TO OIL AT 9.6% SWI: .228 md.



## GAS - OIL RELATIVE PERMEABILITIES

FIELD: Hod, Norway

FORMATION: Tor

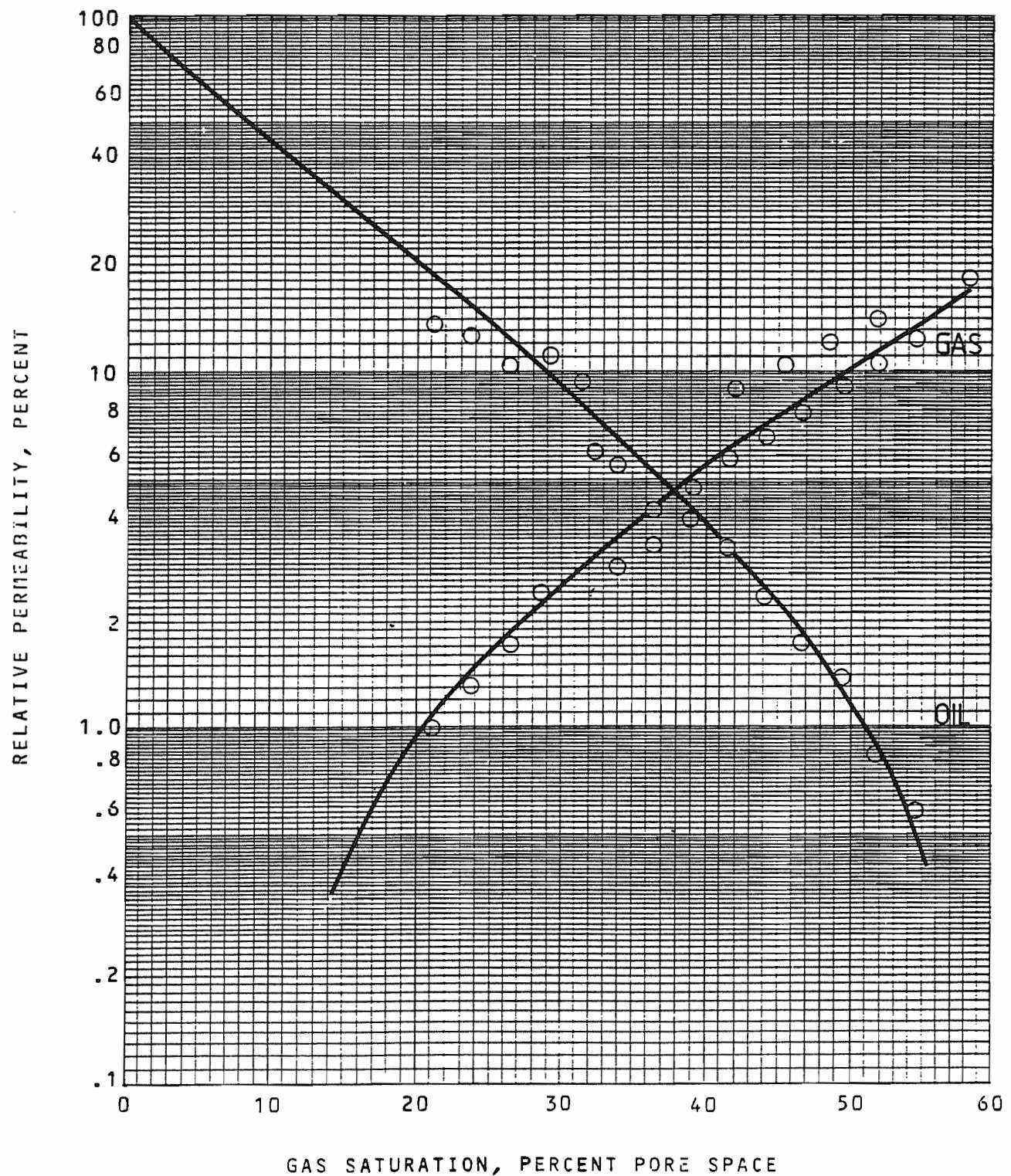
DEPTH, FT.: 3236

SAMPLE NO.: 7 ("Fresh")

WELL: 2/11-3A

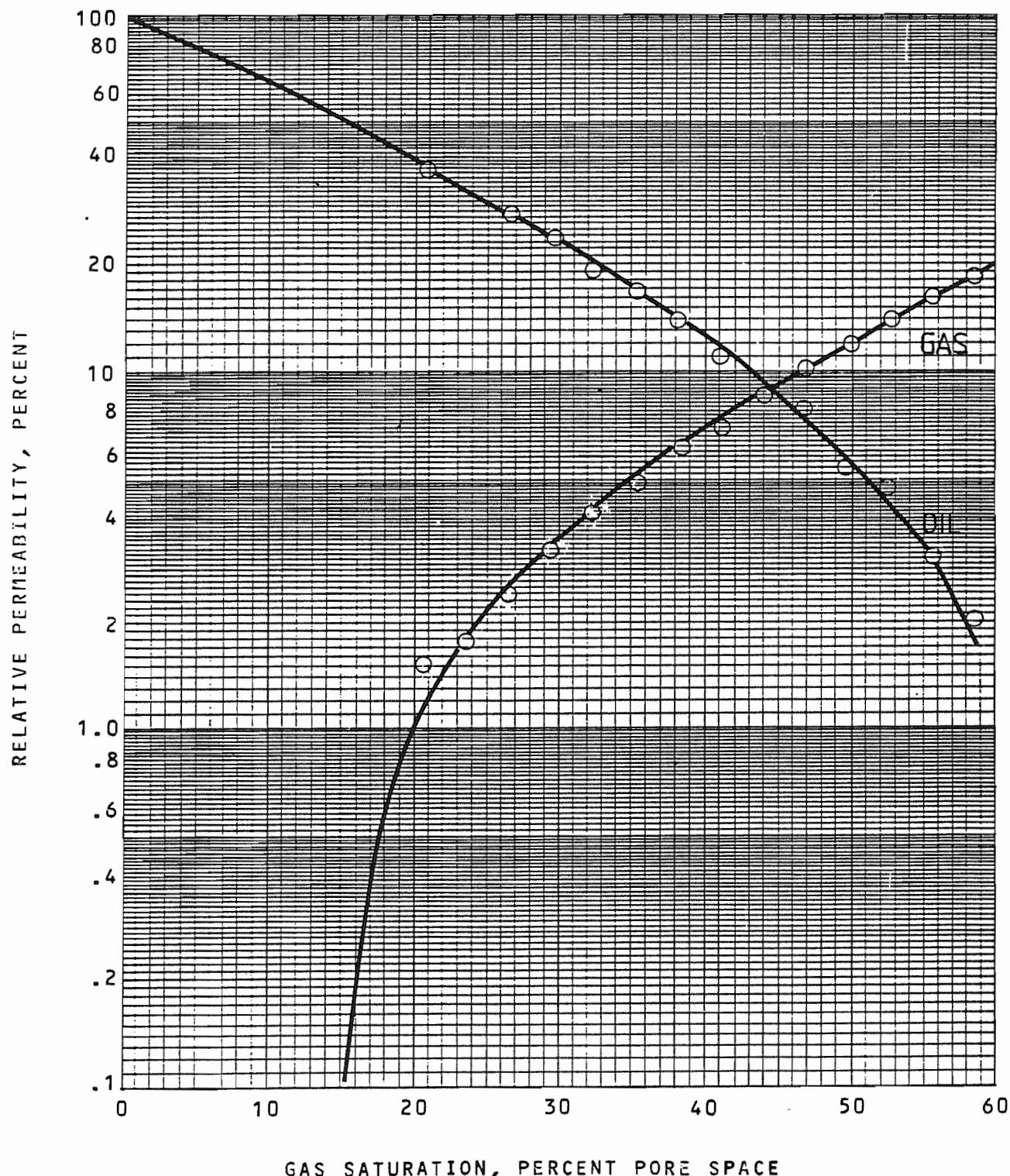
POROSITY, PERCENT: 25.9

PERM. TO OIL AT 11.6 %Swi: .479 md., and at 0.0%Swi: 1.10md



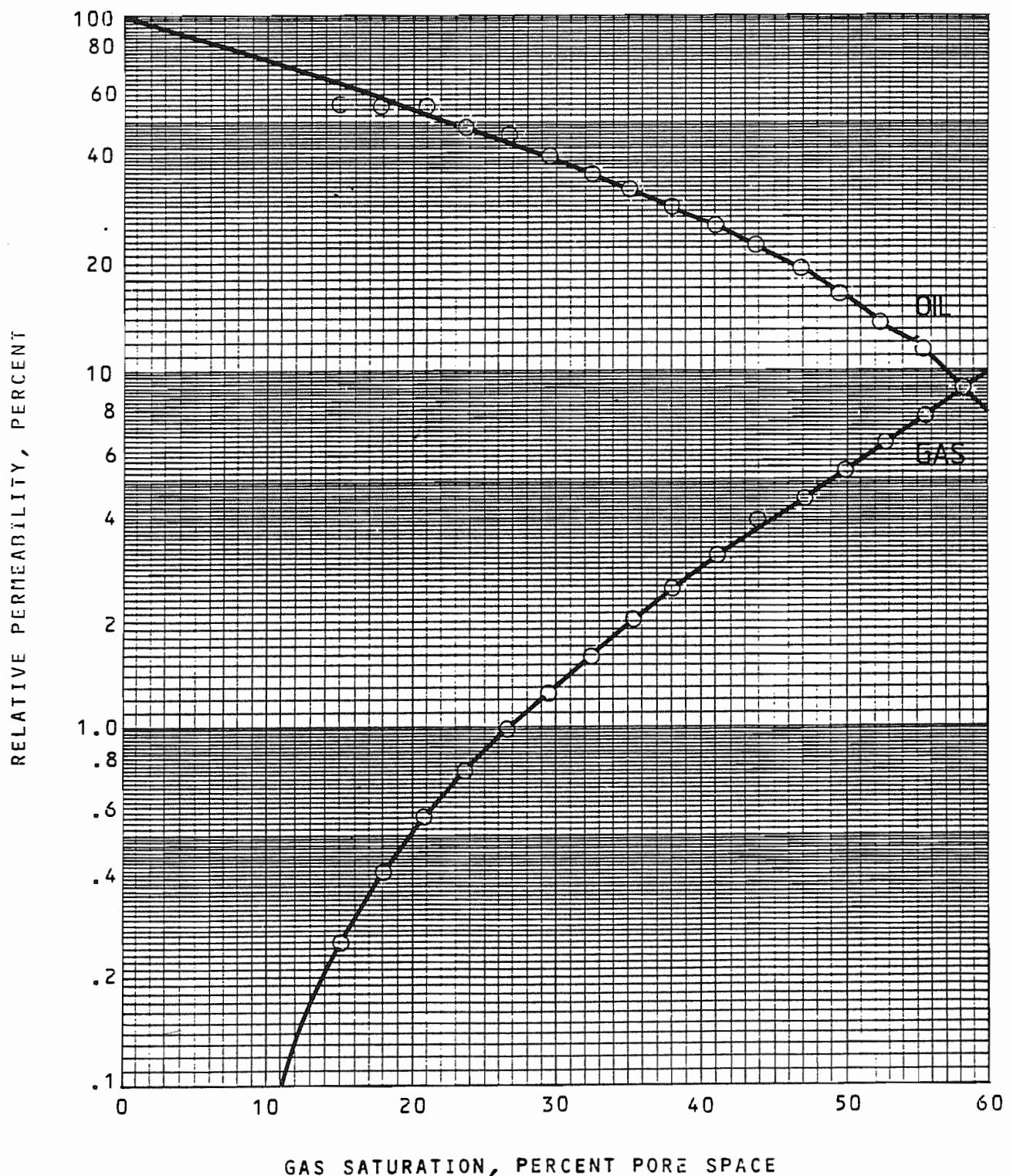
## GAS - OIL RELATIVE PERMEABILITIES

FIELD: Hod, Norway  
FORMATION: Tor  
DEPTH, FT.: 3241  
SAMPLE NO.: 8 ("Fresh")  
WELL: 2/11-3A  
POROSITY, PERCENT: 28.4  
PERM. TO OIL AT 8.0 %Swi: .886md.



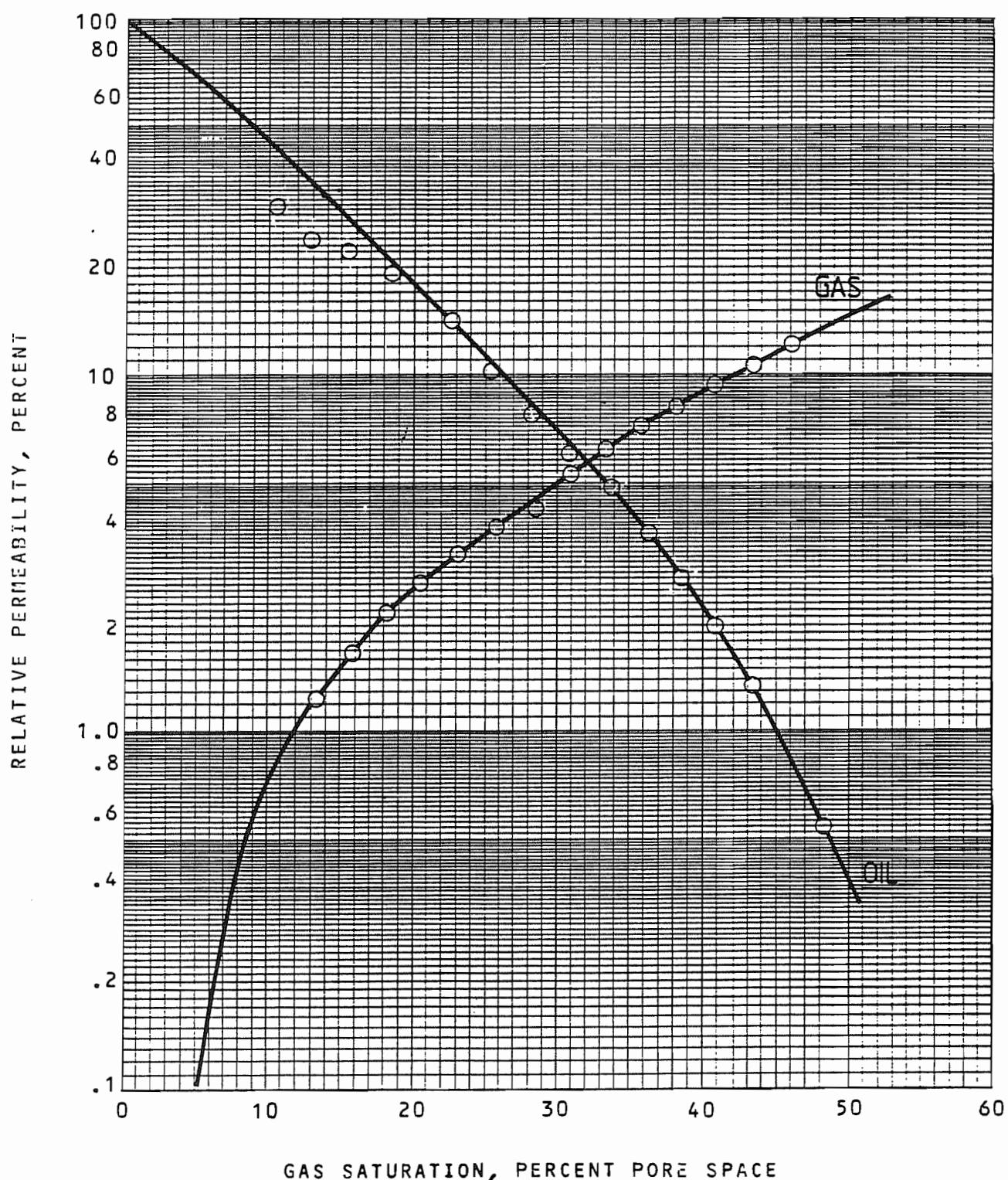
# GAS - OIL RELATIVE PERMEABILITIES

FIELD: Hod, Norway  
FORMATION: Tor  
DEPTH, M.: 3245  
SAMPLE NO.: 9 ("Fresh")  
WELL: 2/11-3A  
POROSITY, PERCENT: 28.3  
PERM. TO OIL AT 8.6 %Swi: 3.03 md.



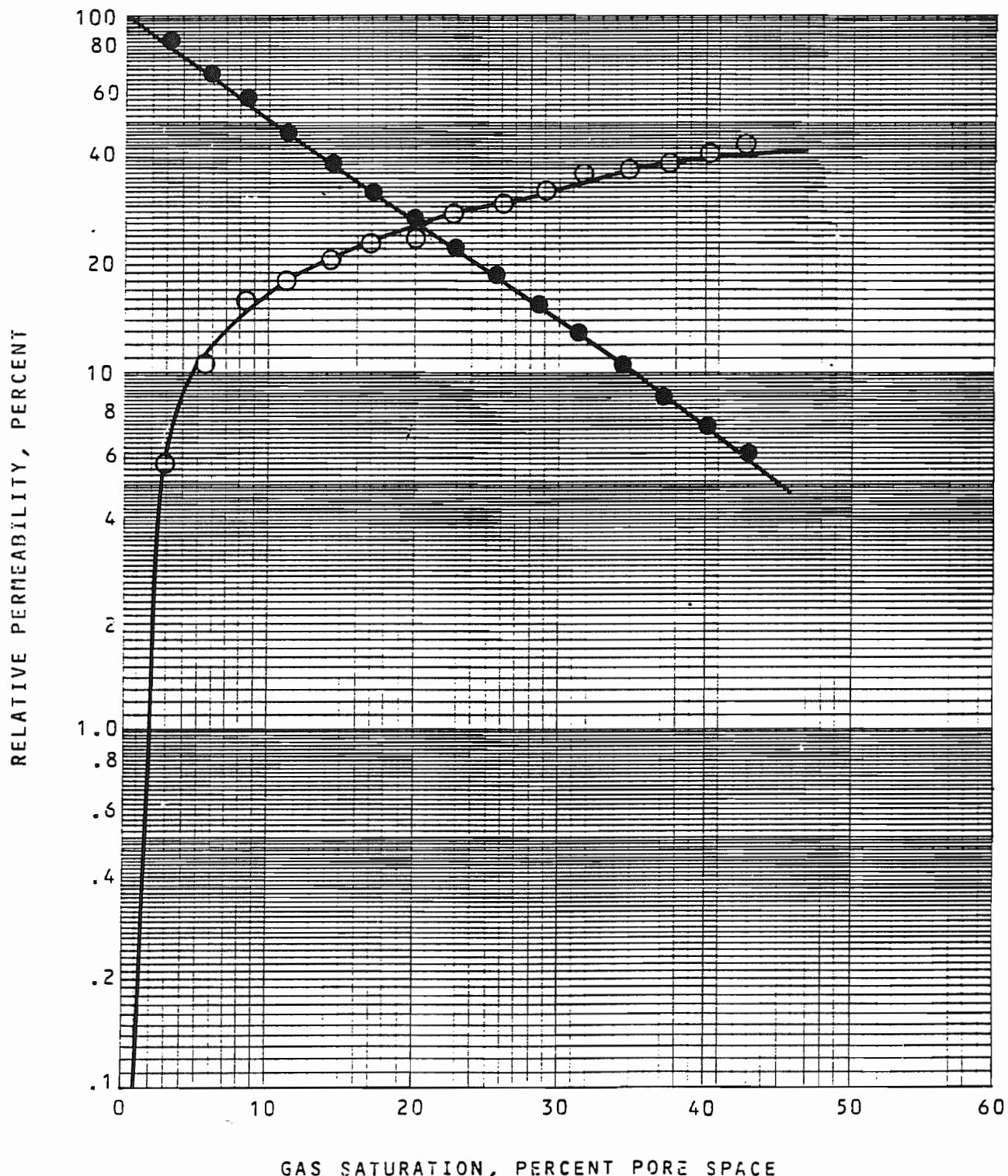
# GAS - OIL RELATIVE PERMEABILITIES

FIELD: Hod, Norway  
FORMATION: Tor  
DEPTH, FT.: 3247  
SAMPLE NO.: 10 ("Fresh")  
WELL: 2/11-3A  
POROSITY, PERCENT: 33.0  
PERM. TO OIL AT 12.3 %Swi: .202 md.



# GAS - OIL RELATIVE PERMEABILITIES

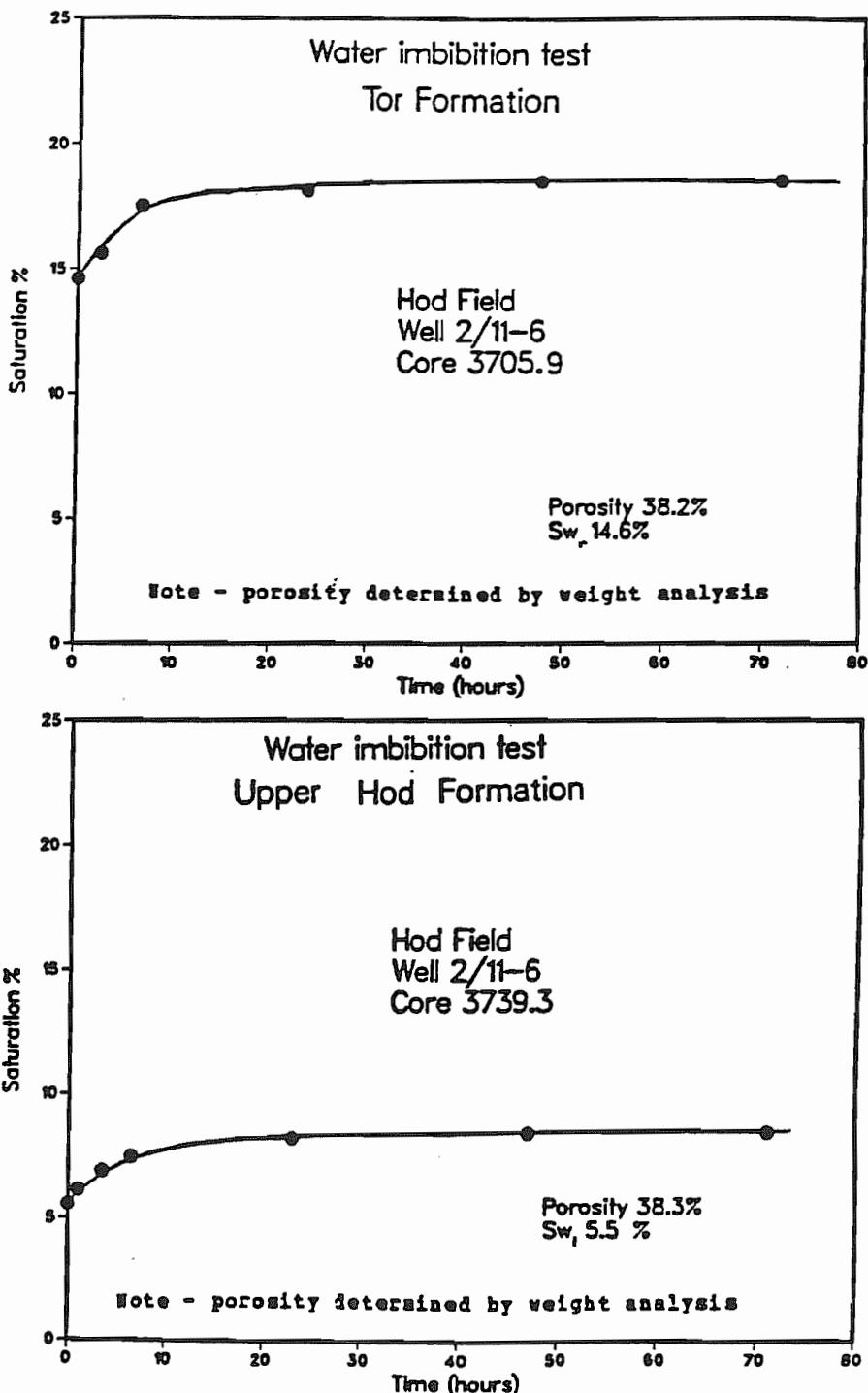
FIELD: East Hod Structure, North Sea(Norway)  
FORMATION: Tor  
DEPTH, FT.: 3695.40  
SAMPLE NO.: 1(Native State)  
WELL: 2/11-6 API No. 975770034800  
POROSITY, PERCENT: 30.0%  
PERM. TO OIL AT 16.7% Swi: .150md.



WATER SATURATION DATA FOR EACH HOD FIELD WELL LOCATION

<u>Well</u>	<u>Formation</u>	<u>Average Gross Water Saturation (%)</u>
2/11-2	Ekofisk/Tor	Not Encountered
	Upper Hod	24.2
	Middle Hod	80.2
	Lower Hod	Not Encountered
2/11-3	Ekofisk/Tor	Not Encountered
	Upper Hod	98.2
	Middle Hod	100.0
	Lower Hod	99.7
2/11-3A	Ekofisk/Tor	19.01
	Upper Hod	61.6
	Middle Hod	Not Penetrated
	Lower Hod	Not Penetrated
2/11-5	Ekofisk/Tor	89.9
	Upper Hod	72.9
	Middle Hod	100.0
	Lower Hod	Not Encountered
2/11-6 (ST-1)	Ekofisk/Tor	32.9
	Upper Hod	58.8
	Middle Hod	81.0
	Lower Hod	74.8

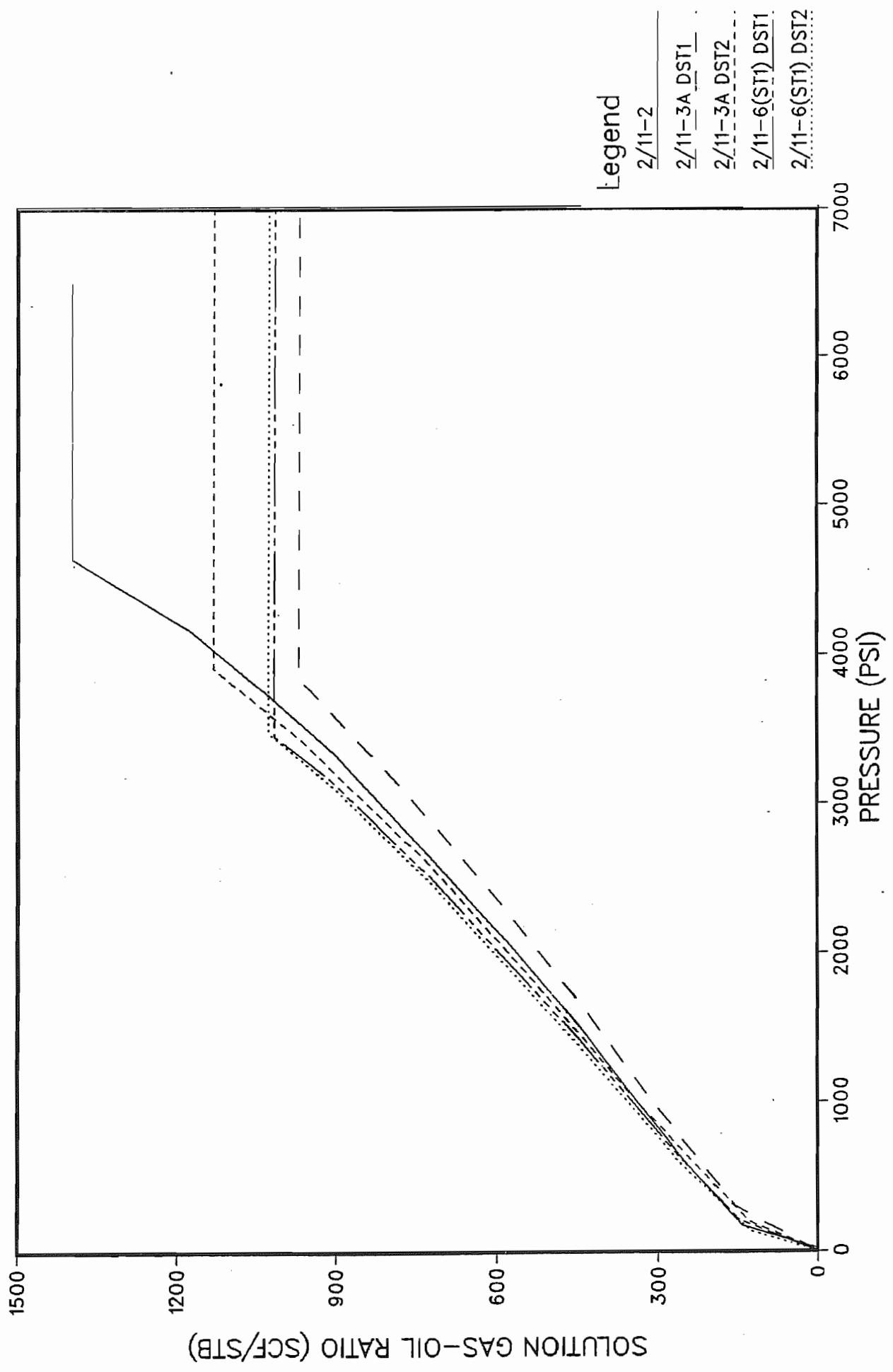
## Water Imbibition Tests for Hod Field



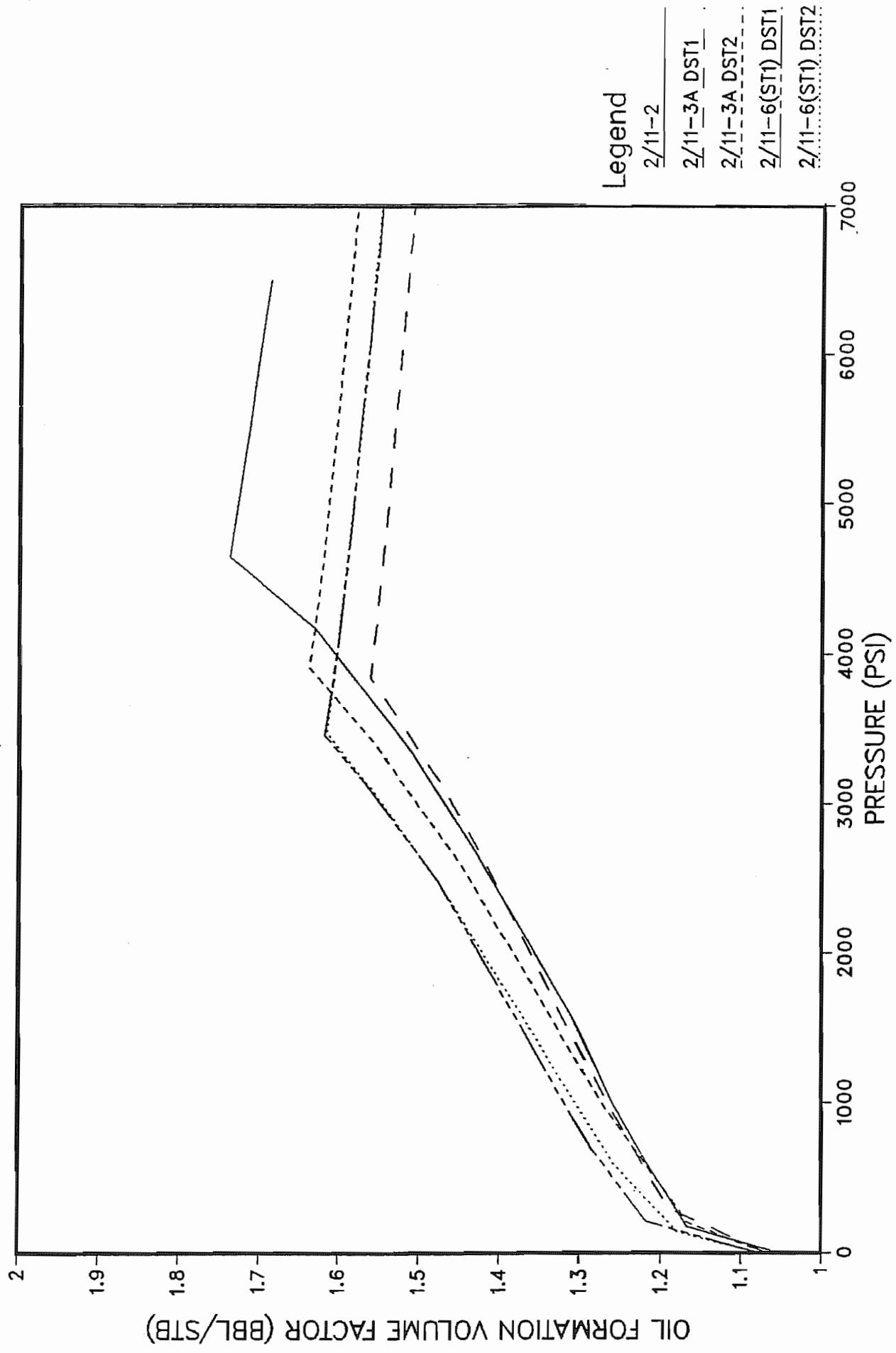
DIFFERENTIAL VAPORIZATION PROPERTIES

Structure Well Formation	West Hod 2/11-2 Upper Hod	2/11-3A Upper Hod	2/11-3A Tor	East Hod 2/11-6(ST-1) Lower Hod	2/11-6(ST-1) U.Hod/Tor
Depth (m SS)	2618	2753	2720	2833	2720
Temp. (°F)	202	208	203	225	220
Initial Pressure (psia)	6500	6771	6751	6965	6865
Bubble Pt Pressure (psia)	4648	3867	3927	3470	3490
Oil Form. Vol. Factor at Initial Conditions (BBL/STB)	1.688	1.512	1.583	1.548	1.551
Oil Visc. at Initial Conditions (cp)	0.41	0.73	0.66	0.49	0.47
oil Density (g/cc)	0.6608	0.703	0.681	0.693	0.697
Solution GOR (SCF/STB)	1398	970	1131	1017	1028

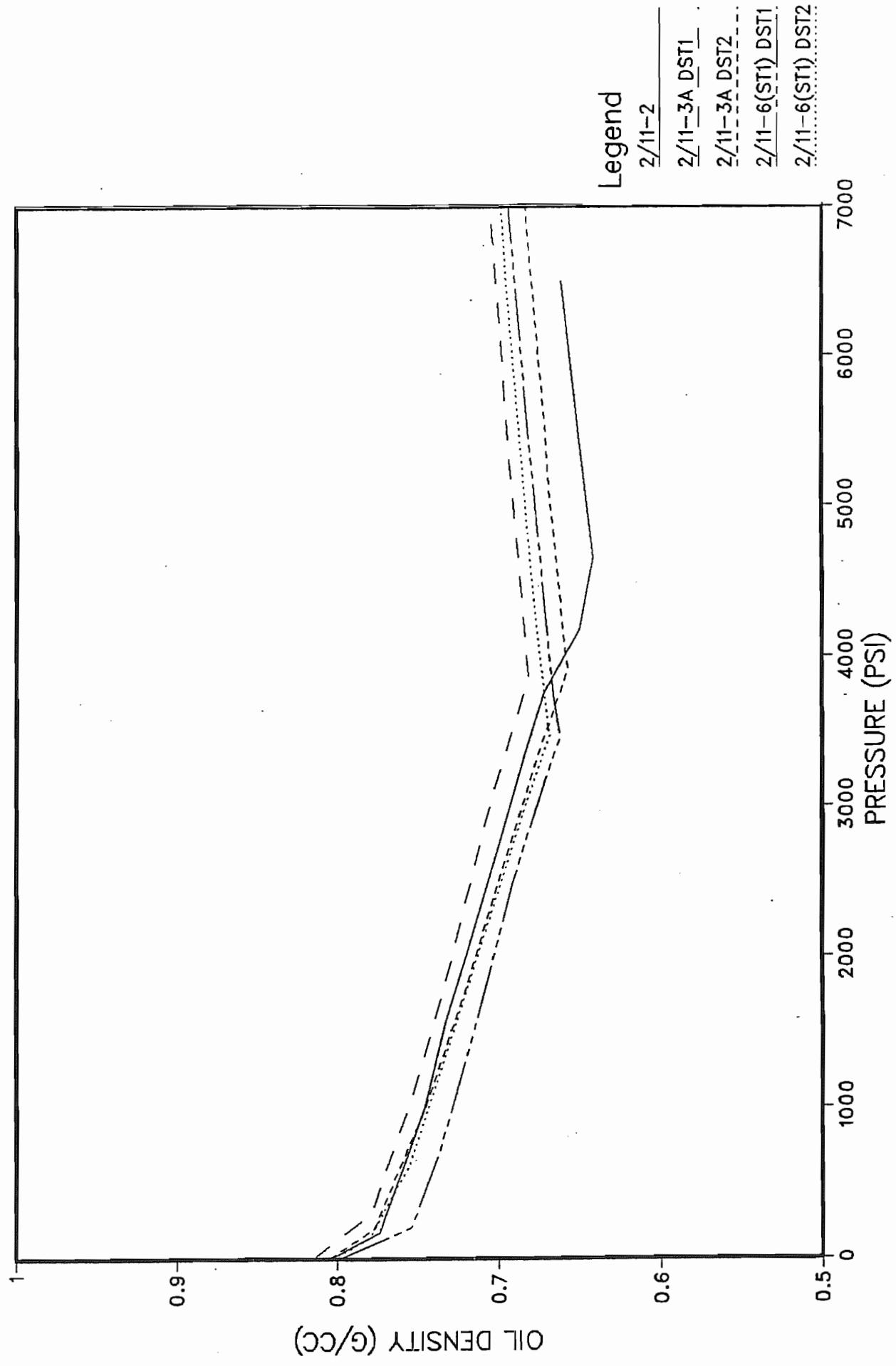
HOD FIELD  
DIFFERENTIAL FLUID DATA



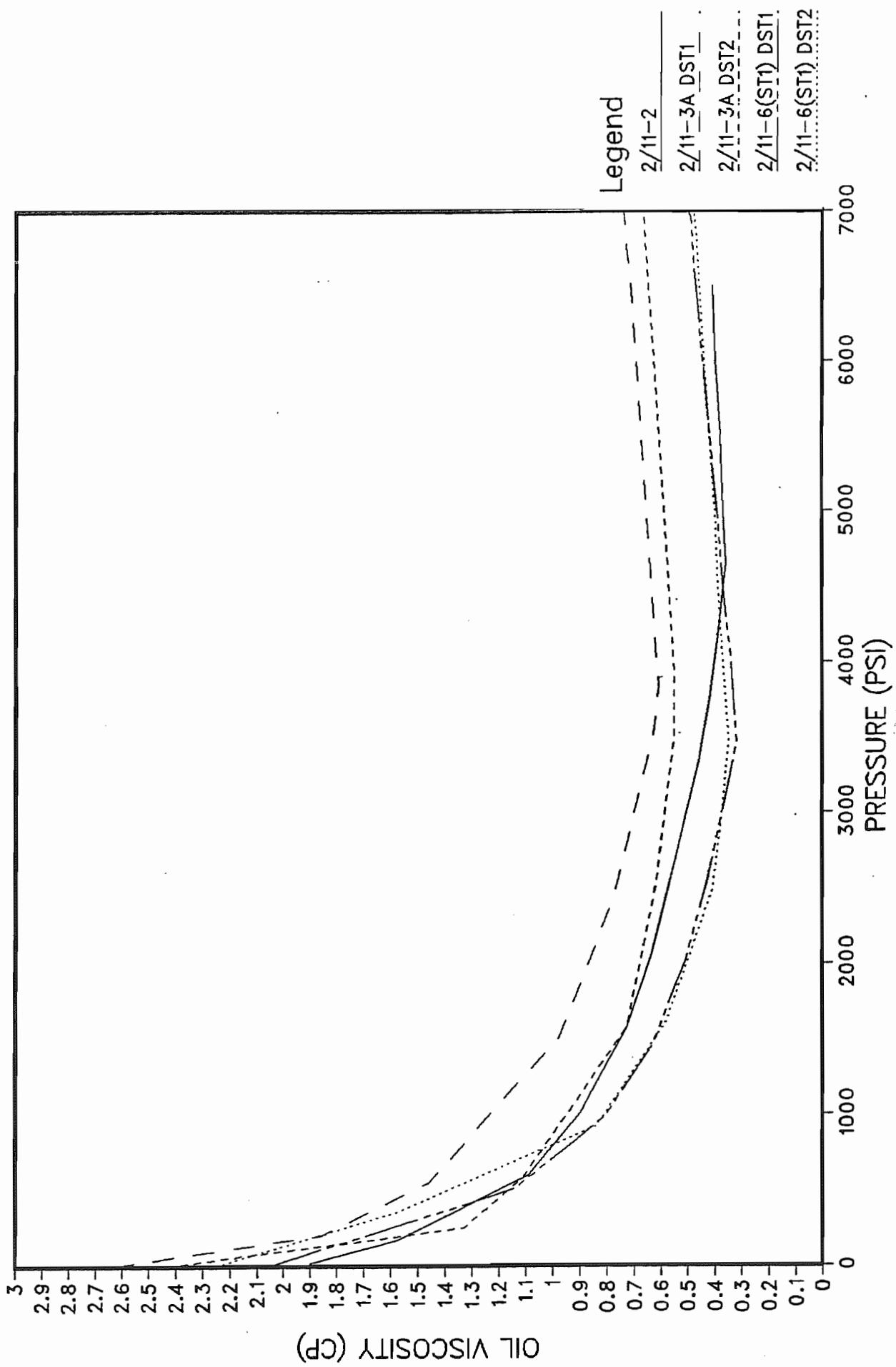
HOD FIELD  
DIFFERENTIAL FLUID DATA



HOD FIELD  
DIFFERENTIAL FLUID DATA



HOD FIELD  
DIFFERENTIAL FLUID DATA



SUMMARY OF STOCK TANK OIL ORIGINALLY  
IN PLACE DISTRIBUTION

	<u>WEST</u>	<u>EAST</u>
FVF* (BBL/STB)	1.5724	1.4448
Ekofisk/Tor	0	58.1
Upper Hod (H1)	48.5	35.9
Middle Hod (H2)	10.4	15.0
Lower Hod		
- H3	0	4.9
- H4	0	10.0
- H5/6	0	4.6
TOTAL	<hr/> 58.9	<hr/> 128.5

TOTAL HOD FIELD - 187.4 MMSTBO

\* Fluid properties corrected for surface separator effects.

## MODEL GRID BLOCK DISTRIBUTION SHOWN ON HOD FIELD TOP STRUCTURE MAP

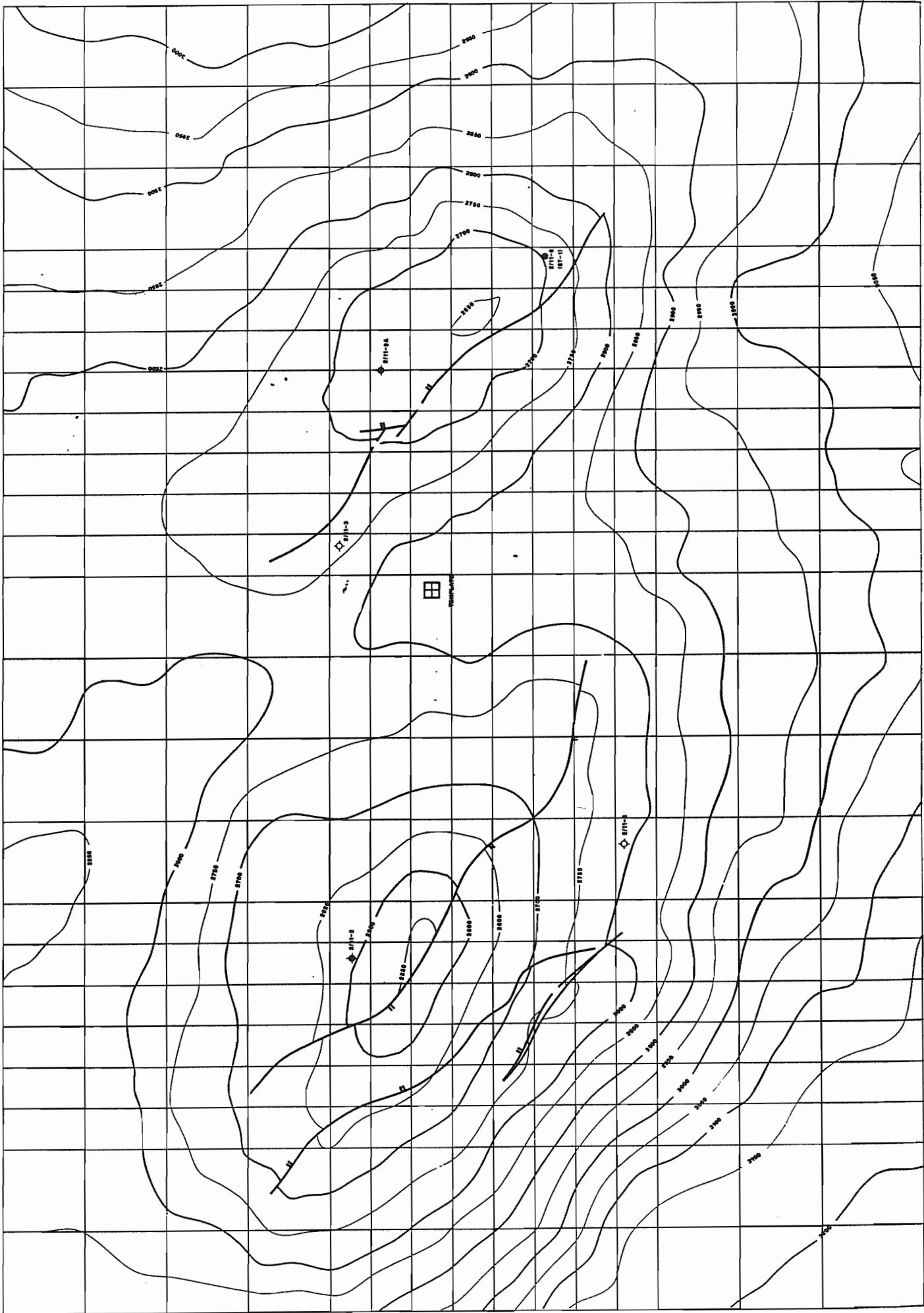


EXHIBIT 4.43

## GAS OIL RELATIVE PERMEABILITIES

### USED IN MODEL

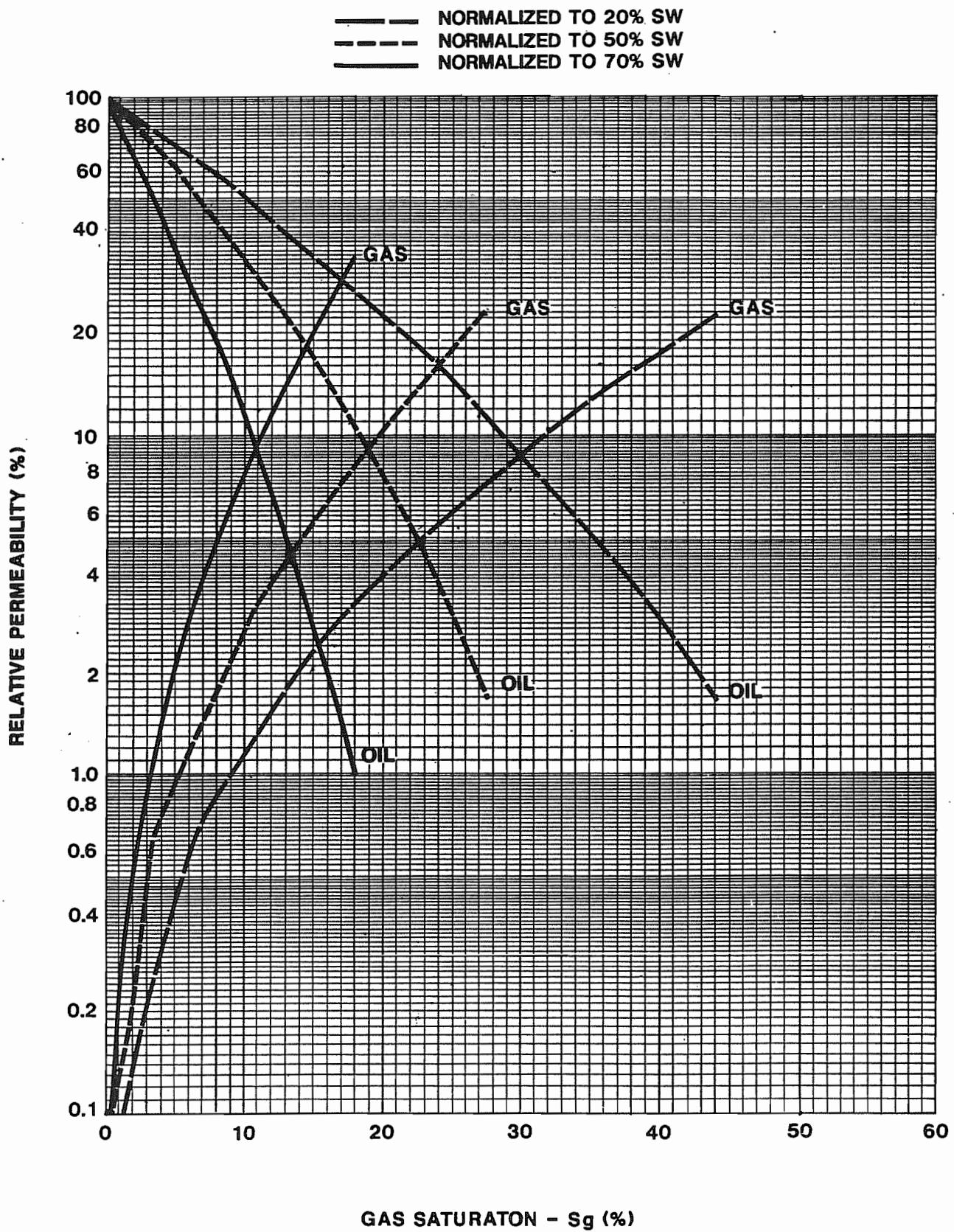


EXHIBIT 4.44

# **WATER OIL RELATIVE PERMEABILITIES USED IN MODEL**

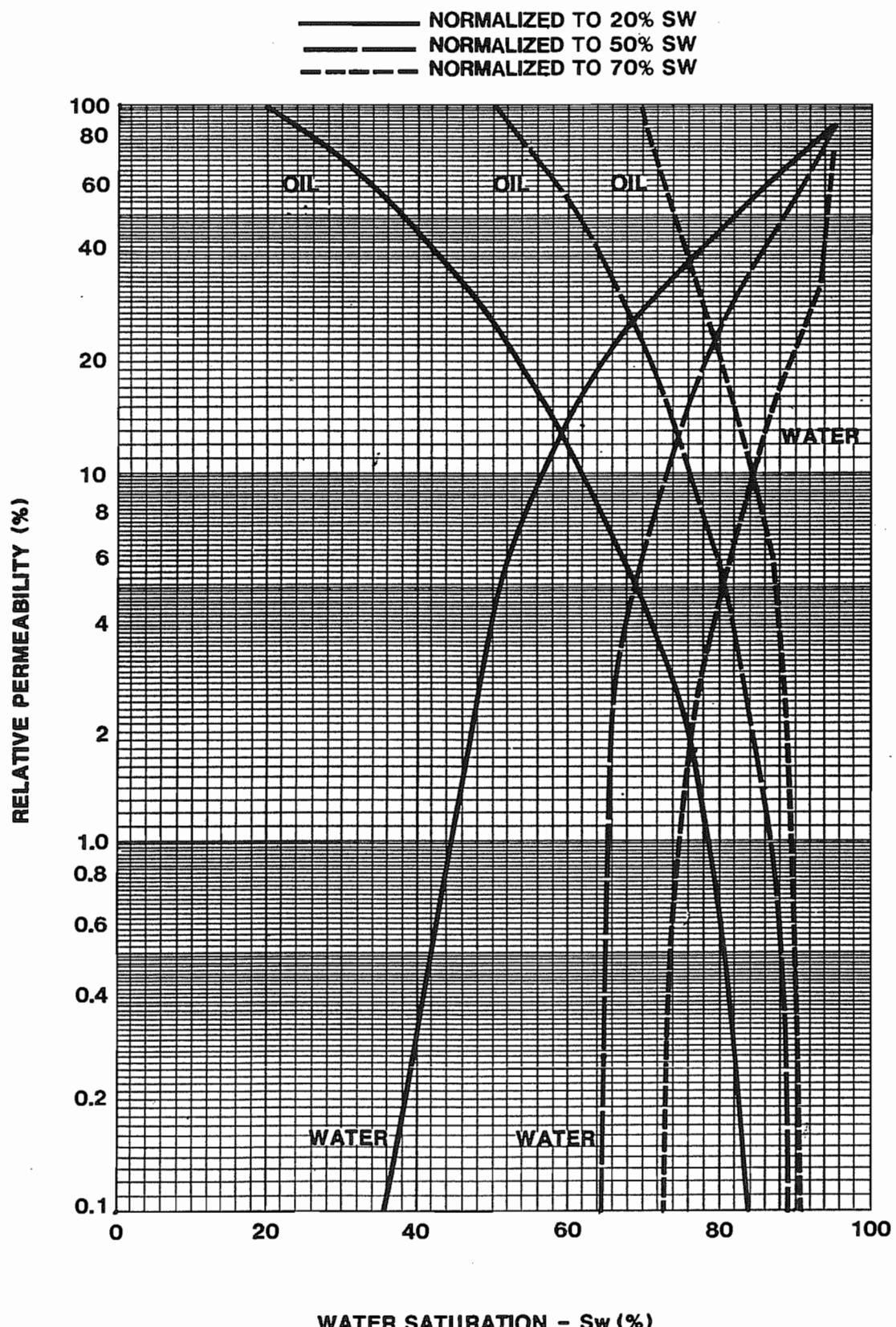
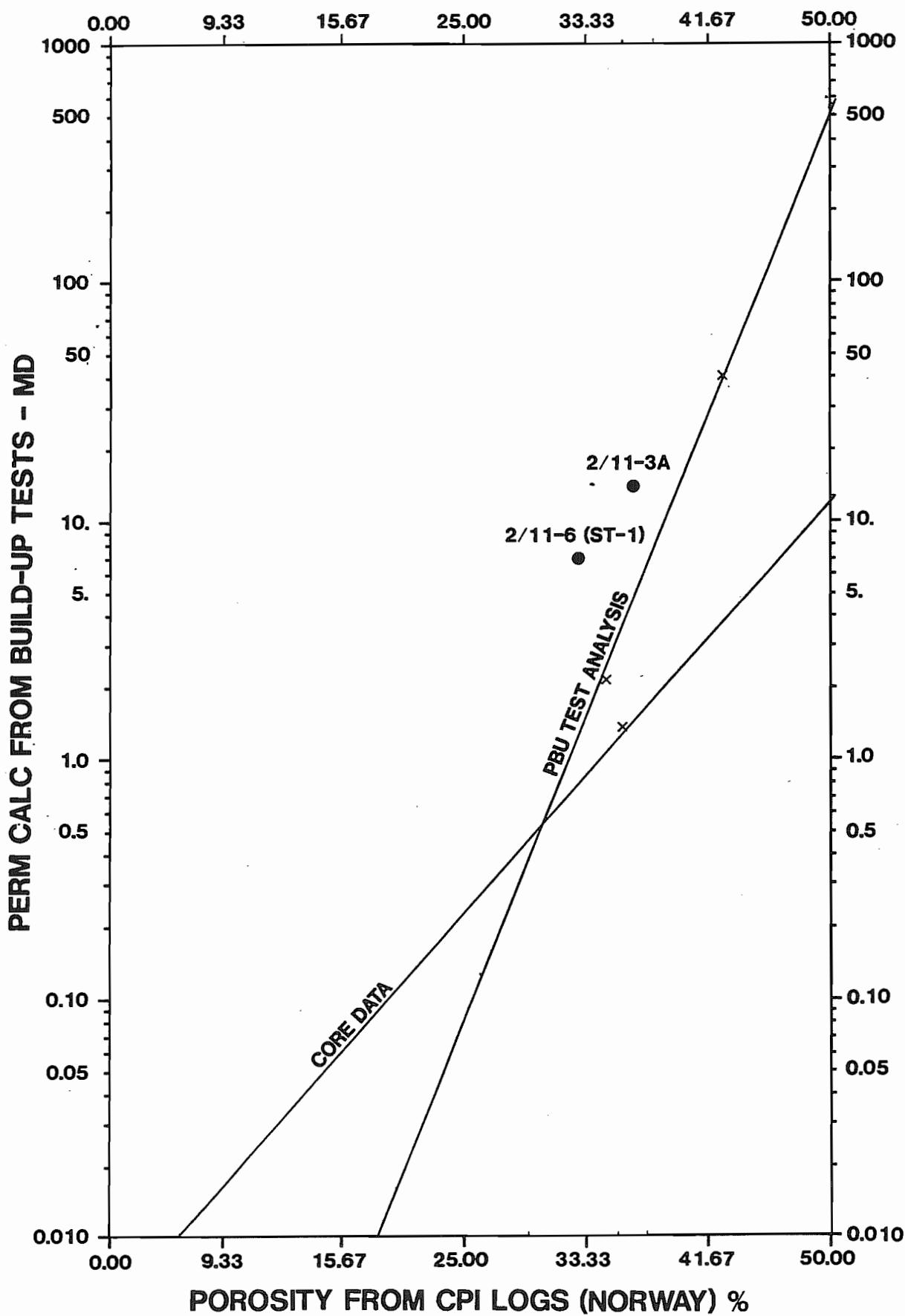


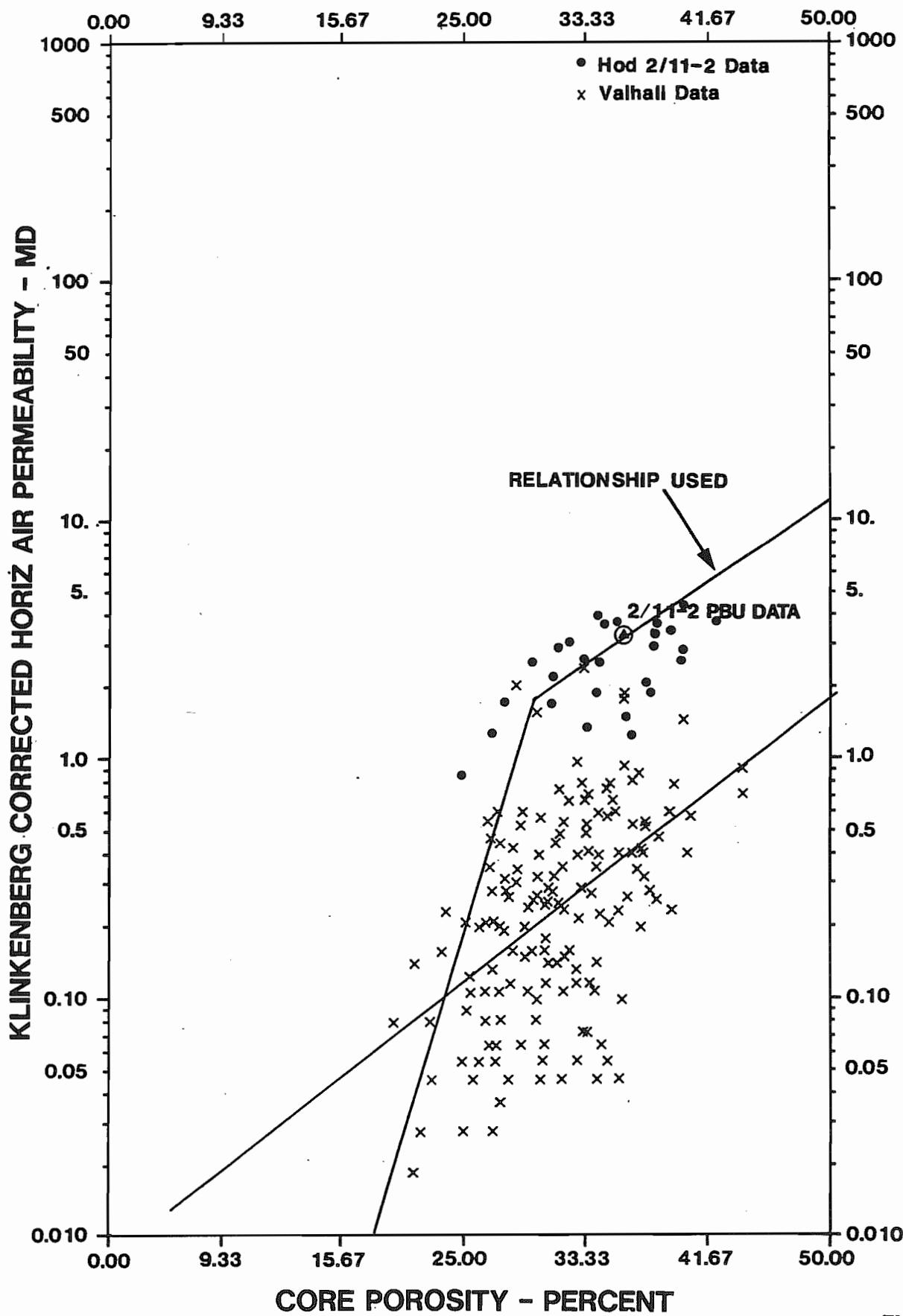
EXHIBIT 4.45

**POROSITY VS PERMEABILITY RELATIONSHIP**  
**VALHALL FIELD TOR FORMATION CORE AND PBU DATA**  
**(SHOWING HOD FIELD DATA)**



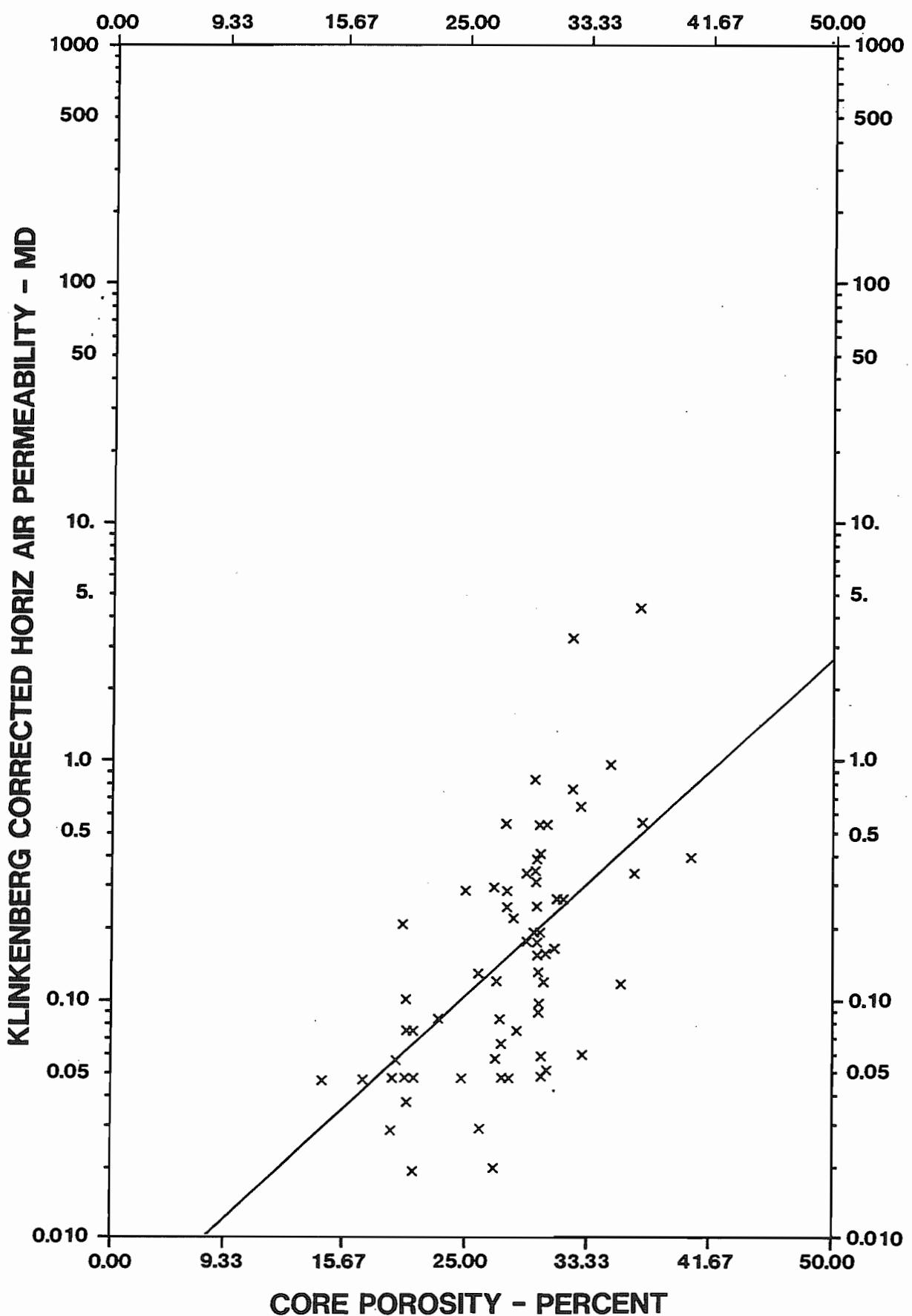
## POROSITY VS PERMEABILITY RELATIONSHIP

### VALHALL AND HOD FIELDS - UPPER HOD FORMATION



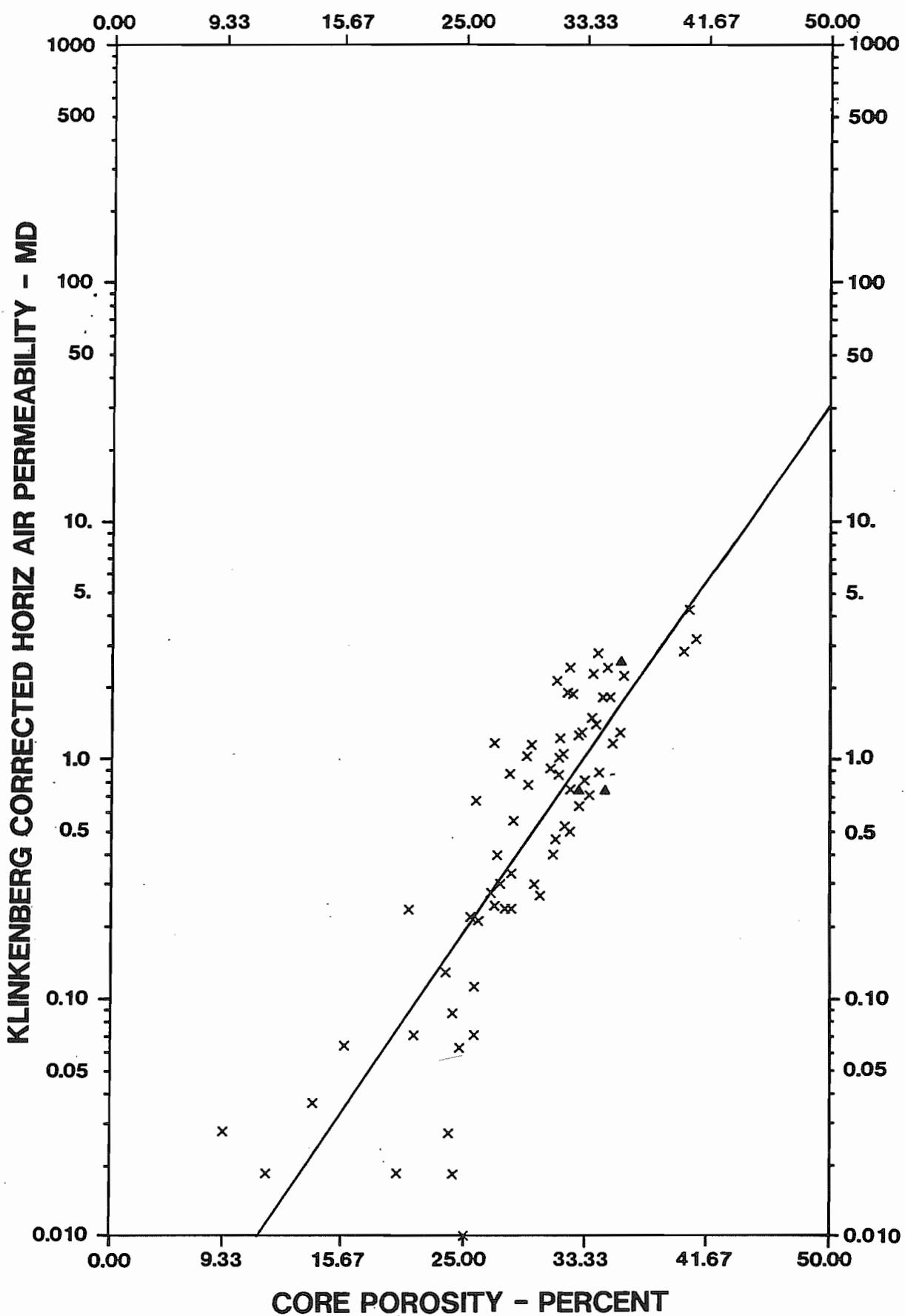
## POROSITY VS PERMEABILITY RELATIONSHIP

### VALHALL FIELD MIDDLE HOD FORMATION



## POROSITY VS PERMEABILITY RELATIONSHIP

### VALHALL FIELD LOWER HOD FORMATION



EAST HOD FLUID PROPERTIES  
 BASED ON DATA FROM WELL 2/11-3A (DST-2)  
 ADJUSTED FOR SURFACE SEPARATOR EFFECTS

Pressure (psi)	Oil Formation Volume Factor (RB/STB)	Oil Viscosity (cP)	Oil Density (g/cc)	Solution G.O.R. (MSCF/STB)
15	1.0000	2.43	0.805	0.0
215	1.0643	1.55	0.777	0.100
1000	1.1610	0.98	0.746	0.261
1805	1.2404	0.75	0.720	0.407
2615	1.3235	0.62	0.697	0.563
3425	1.4212	0.56	0.673	0.744
3927	1.4960	0.55	0.657	0.876
4065	1.4923	0.56	0.659	0.876
4535	1.4823	0.57	0.663	0.876
5040	1.4732	0.59	0.668	0.876
5535	1.4641	0.61	0.671	0.876
6025	1.4568	0.63	0.675	0.876
6505	1.4485	0.65	0.679	0.876
6751	1.4448	0.66	0.681	0.876
7015	1.4412	0.67	0.683	0.876

Pressure (psi)	Gas Formation Volume Factor (RB/MSCF)	Gas Viscosity (cP)	Gas Density (g/cc)
15	226.0	0.0107	0.0016
215	16.107	0.0121	0.0128
1000	2.958	0.0145	0.0547
1805	1.582	0.0168	0.0995
2615	1.073	0.0193	0.1493
3425	0.808	0.0221	0.2116
3927	0.790	0.0222	0.2150

## WEST HOD FLUID PROPERTIES

BASED ON DATA FROM WELL 2/11-2

ADJUSTED FOR SURFACE SEPARATOR EFFECTS

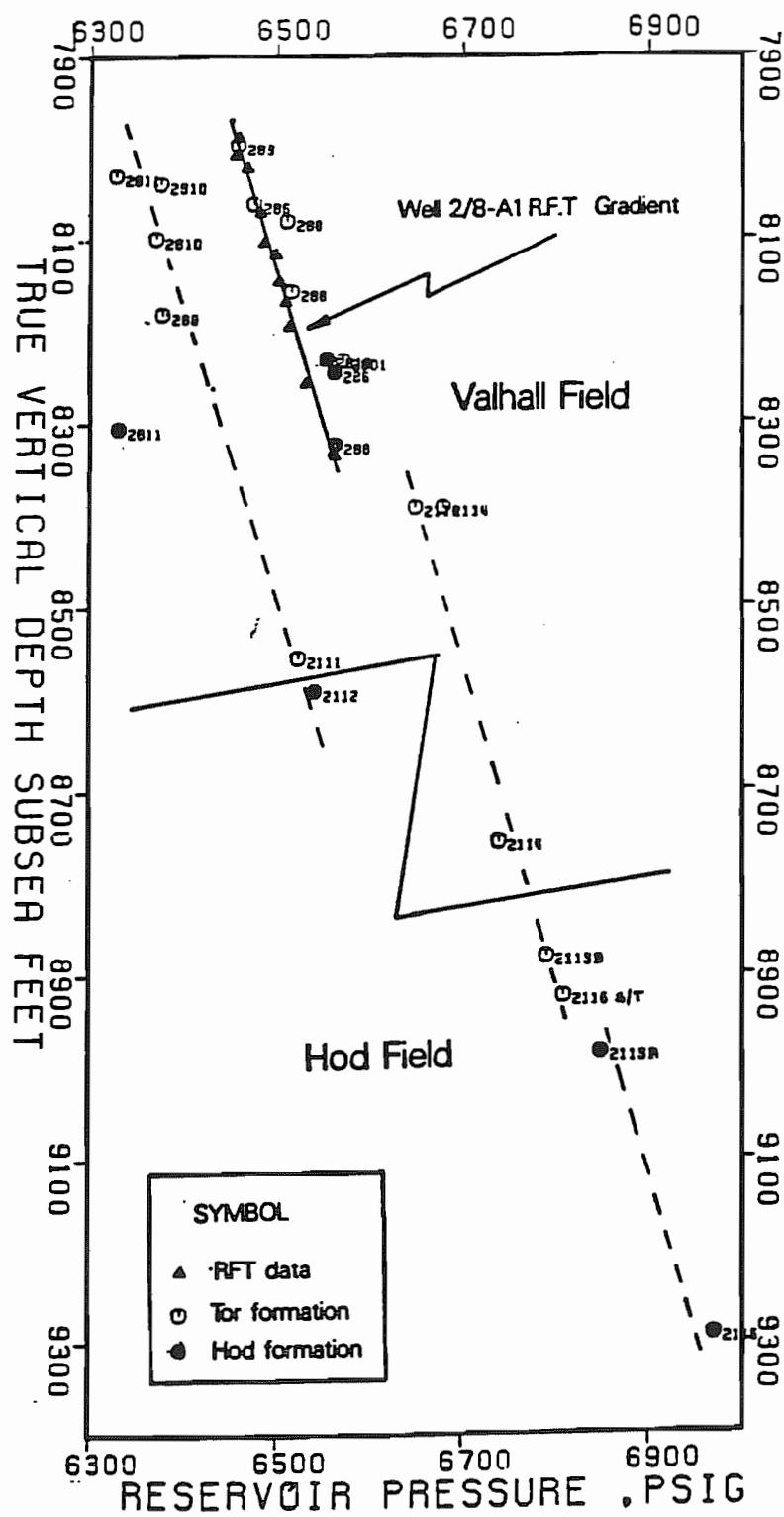
Pressure (psi)	Oil Formation Volume Factor (RB/STB)	Oil Viscosity (cP)	Oil Density (g/cc)	Solution G.O.R (MSCF/STB)
15	1.0000	1.900	0.801	0.0
172	1.0870	1.530	0.774	0.122
600	1.1346	1.090	0.759	0.216
1006	1.1747	0.900	0.746	0.295
1568	1.2194	0.730	0.733	0.397
2050	1.2678	0.640	0.719	0.496
2656	1.3302	0.550	0.702	0.680
3335	1.4047	0.460	0.684	0.780
3750	1.4601	0.420	0.672	0.893
4175	1.5203	0.390	0.660	1.016
4648	1.6190	0.360	0.642	1.207
5000	1.6090	0.370	0.646	1.207
5500	1.5966	0.380	0.651	1.207
6000	1.5845	0.400	0.656	1.207
6500	1.5724	0.410	0.661	1.207
7000	1.5557	0.420	0.670	1.207

Pressure (psi)	Gas Formation Volume Factor (RB/MSCF)	Gas Viscosity (cP)	Gas Density (g/cc)
15	223.399	0.0099	0.0020
172	19.350	0.0125	0.0130
600	5.334	0.0135	0.0347
1006	2.987	0.0143	0.0556
1568	1.856	0.0158	0.0864
2050	1.410	0.0175	0.1145
2656	1.070	0.0200	0.1513
3335	0.865	0.0245	0.1925
3750	0.783	0.0274	0.2179
4175	0.723	0.0293	0.2439
4648	0.686	0.0332	0.2724

PRESSURE DATA FOR HOD FIELD WELLS

<u>Well</u>	<u>Formation</u>	<u>Pressure (psig)</u>	<u>Depth (mSS)</u>	<u>Comment</u>
2/11-2	Upper Hod	6520	2597	Bottom hole measurement
2/11-3	No Reliable Measurement		Taken	
2/11-3A.	Upper Hod	6850	2755	Bottom hole measurement
	Tor	6792	2720	Bottom hole measurement
2/11-6(ST-1)	Lower Hod	6923	2833	Bottom hole measurement
	Tor/Upper Hod	6795	2720	Bottom hole measurement

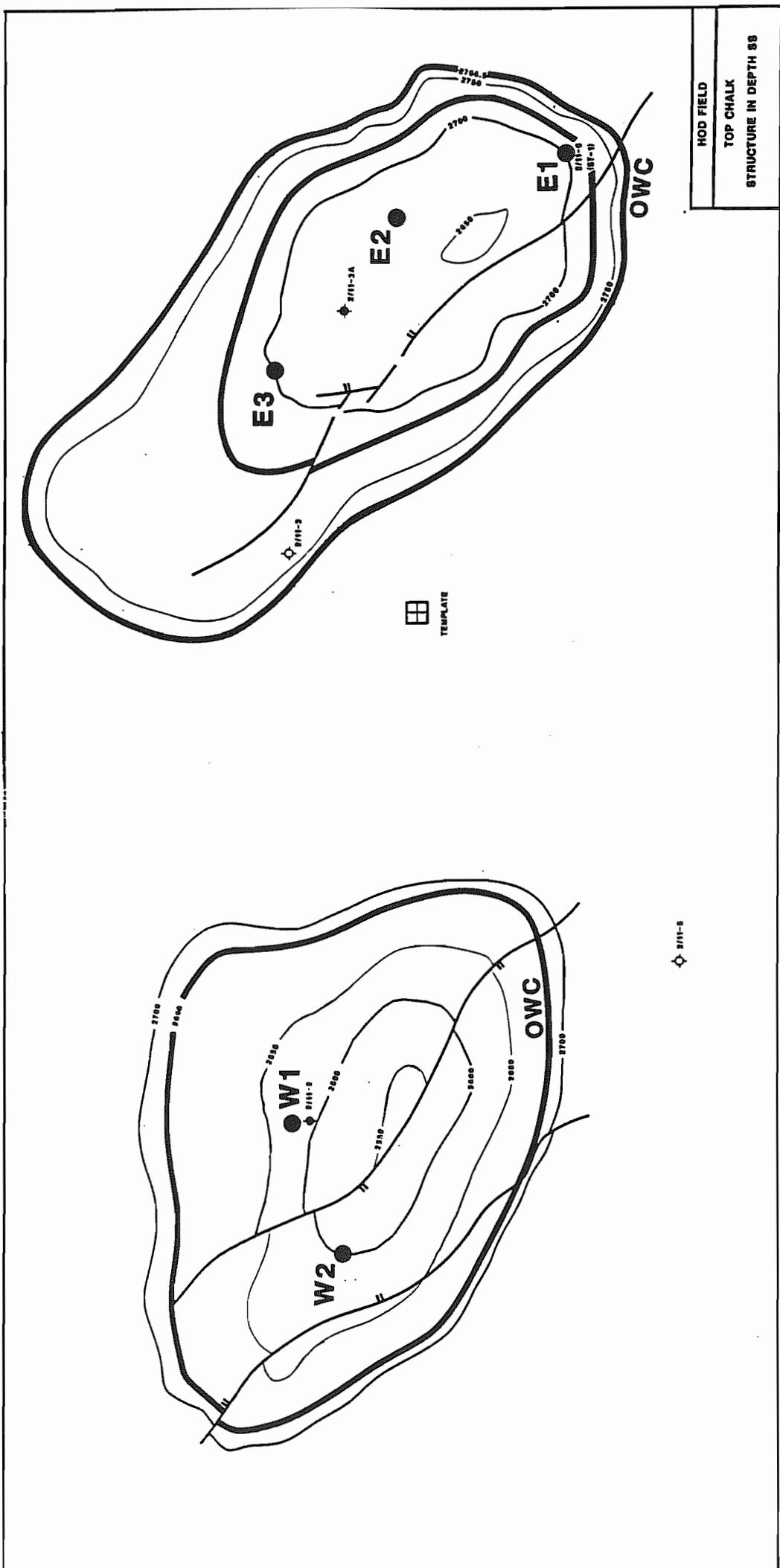
## Valhall and Hod Fields DST Pressures vs Depth



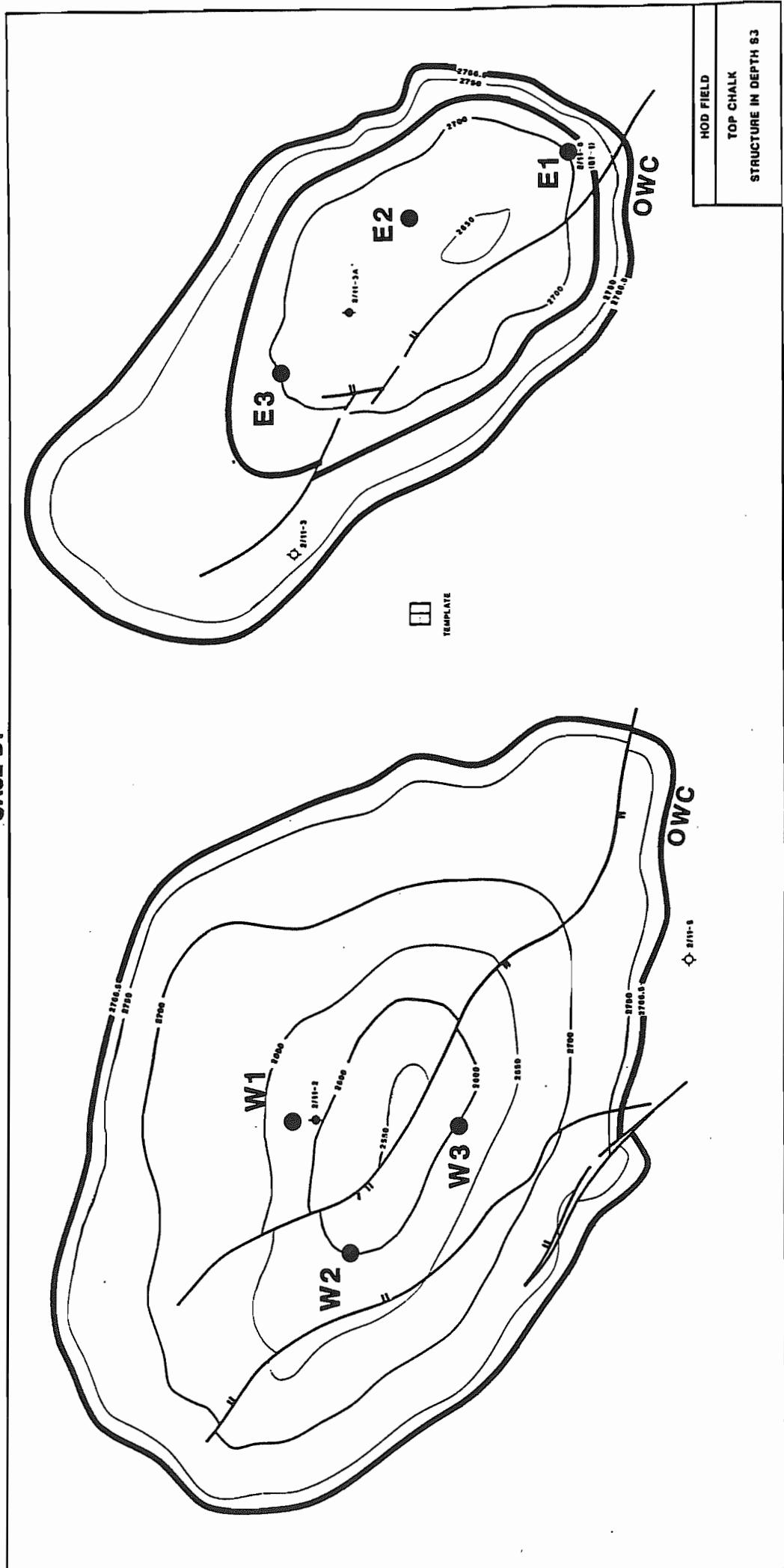
INITIAL PRESSURE DATA USED IN HOD FIELD MODEL

<u>DEPTH</u> <u>m TVD SS</u>	<u>PRESSURE</u> <u>PSIG</u>
1829	5784
2134	6067
2438	6350
2499	6407
2652	6548
2658	6746
2667	6755
2743	6833
3048	7293
3658	8213

**BASE CASE**



CASE B1



## HOD FIELD DOWNTIME SUMMARY

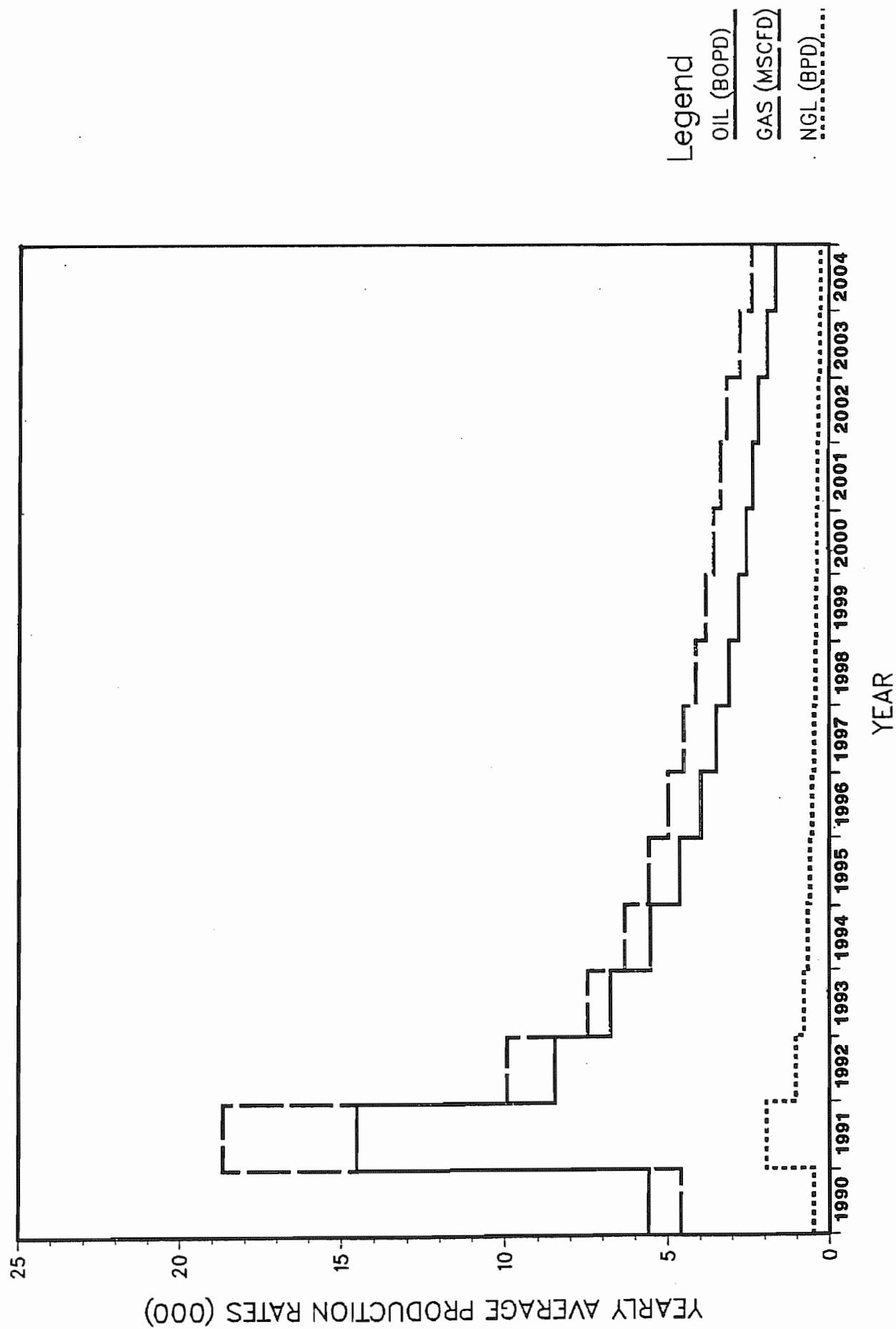
<b>1. <u>Wells</u></b>	<u>%</u>
- Plugged Perforations	3.0
- Stimulation/Treatment	0.3
<b>Total Wells</b>	<b><u>3.3</u></b>
<b>2. <u>Process</u></b>	
- Oil Process	0.2
- Additional Gas Process	1.5
- Total Gas Process	<u>1.7</u>
<b>3. <u>Transportation System</u></b>	
- Planned	1.3
- Unplanned	0.1
- Total	<u>1.4</u>
<b>4. <u>Control System</u></b>	<u>0.5</u>
<b>5. <u>Other</u></b>	<u>1.6</u>

**TOTAL DOWNTIME:**

OIL	7.0%
GAS	8.5%
NGL	<u>8.5%</u>

DJO/03/mhk

## HOD FIELD PRODUCTION PROFILE (2 WELLS WEST + 3 WELLS EAST)

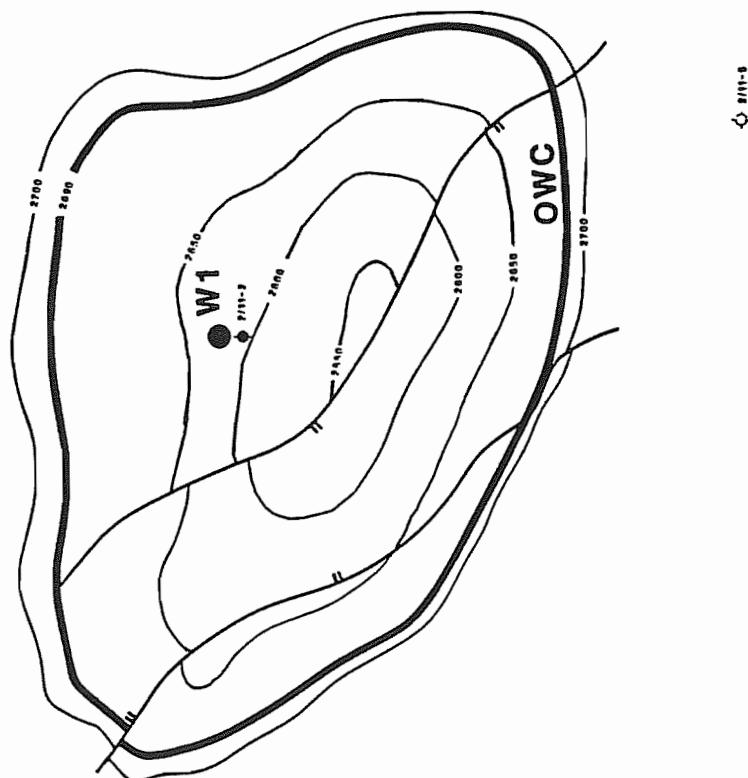
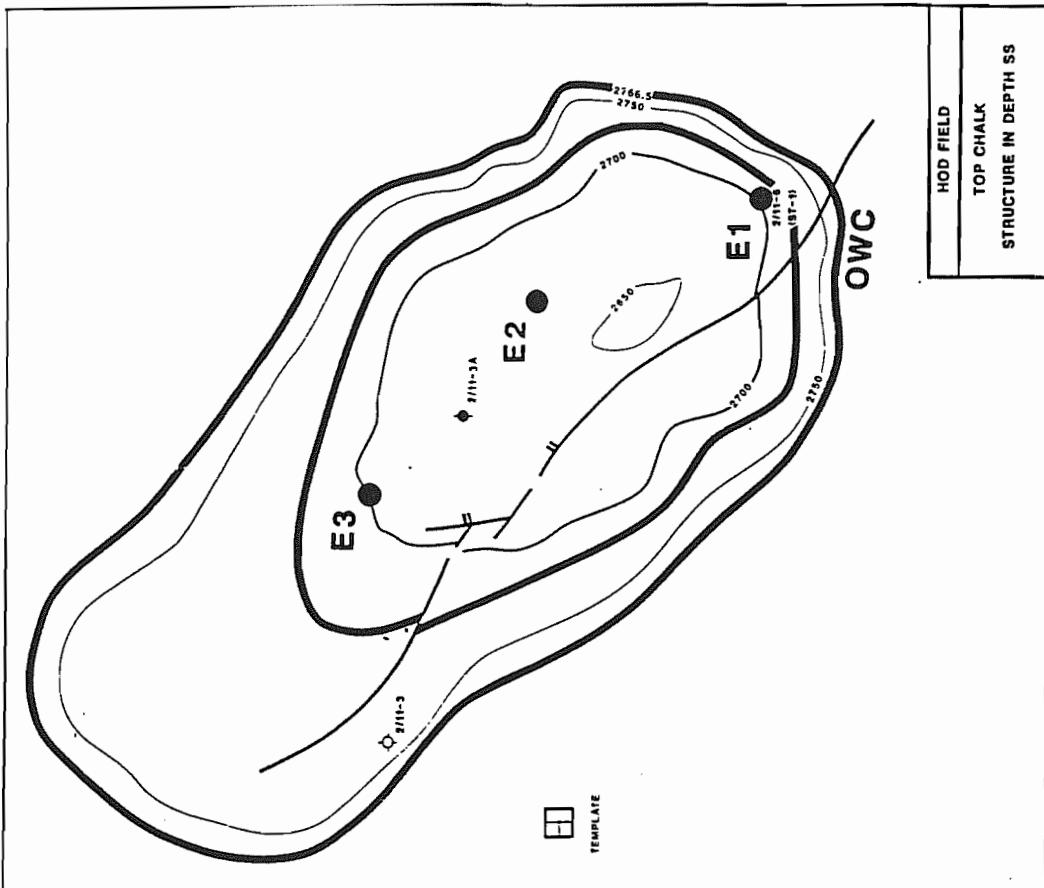


HOD FIELD PRODUCTION PROFILE

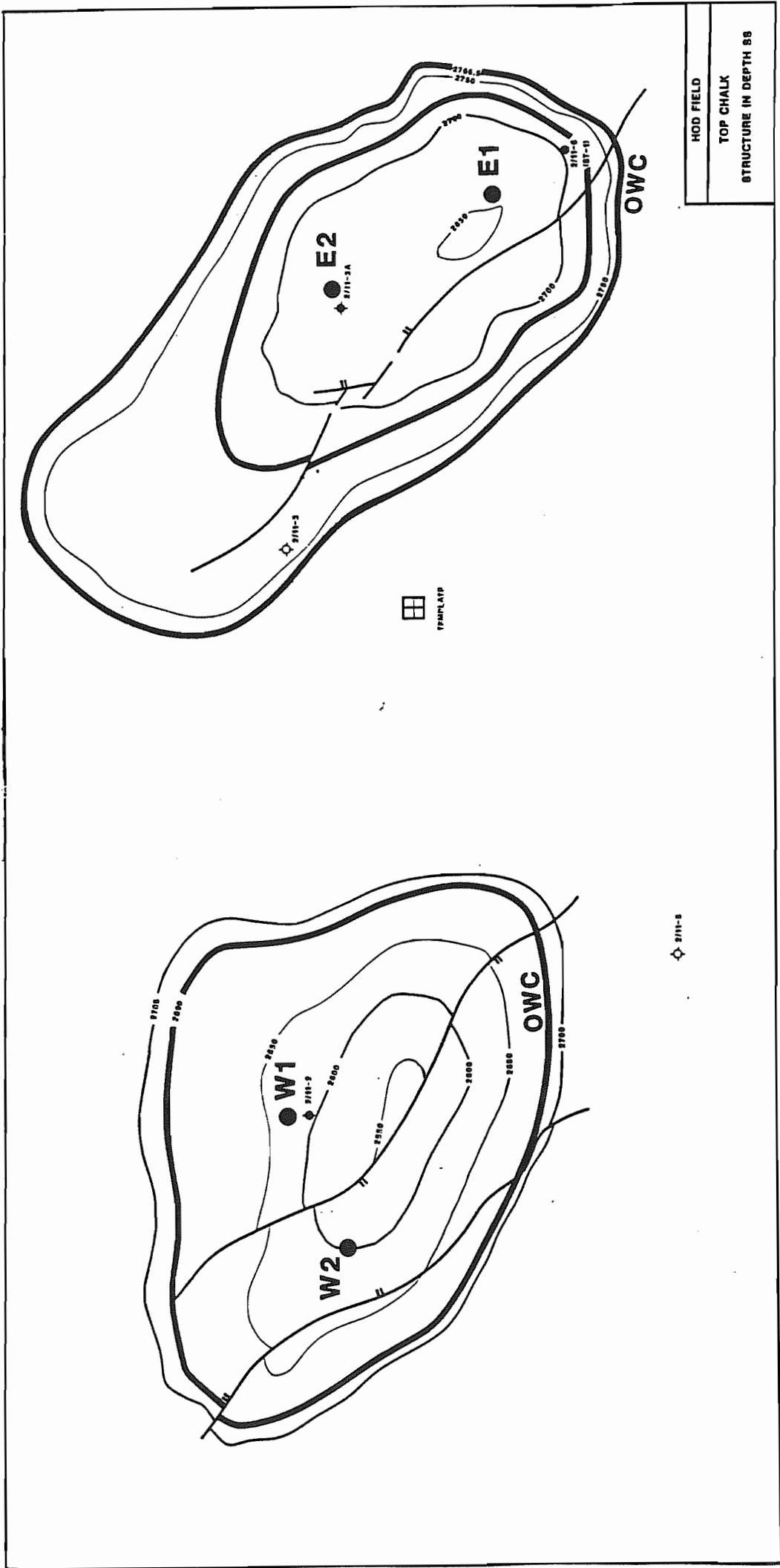
BASE CASE

Year	Oil sales (STBOPD)	Gas sales (MSCFD)	NGL sales (BLPD)
1990	5,580	4,609	484
1991	14,535	18,680	1,962
1992	8,496	9,933	1,043
1993	6,768	7,486	786
1994	5,546	6,347	666
1995	4,645	5,588	587
1996	3,988	5,001	525
1997	3,489	4,531	476
1998	3,102	4,148	436
1999	2,798	3,836	403
2000	2,553	3,575	376
2001	2,352	3,356	352
2002	2,185	3,159	332
2003	1,910	2,770	291
2004	<u>1,656</u>	<u>2,385</u>	<u>251</u>
Cumulative Production	25,405,066 STB	31,172,557 MSCF	3,273,623 bbl

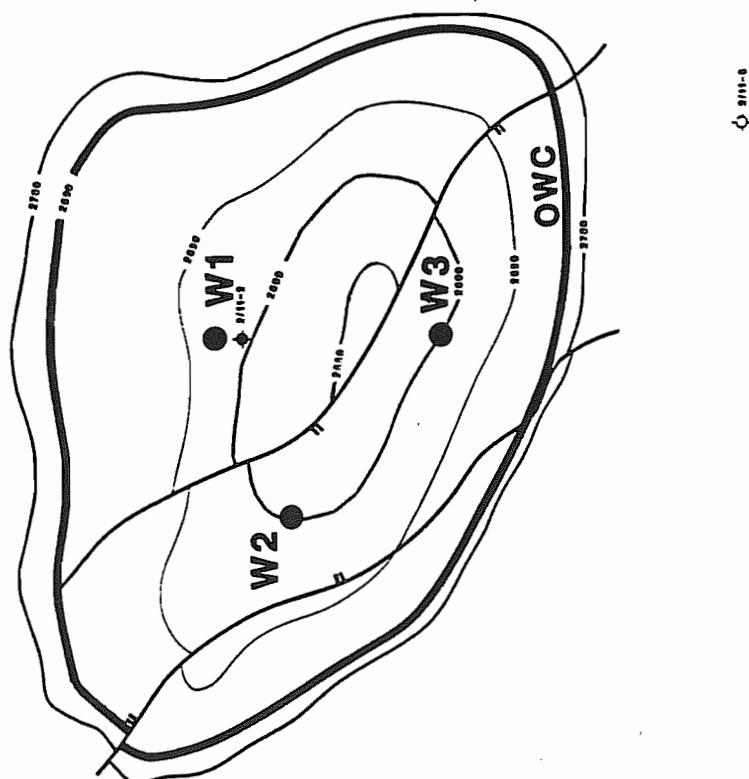
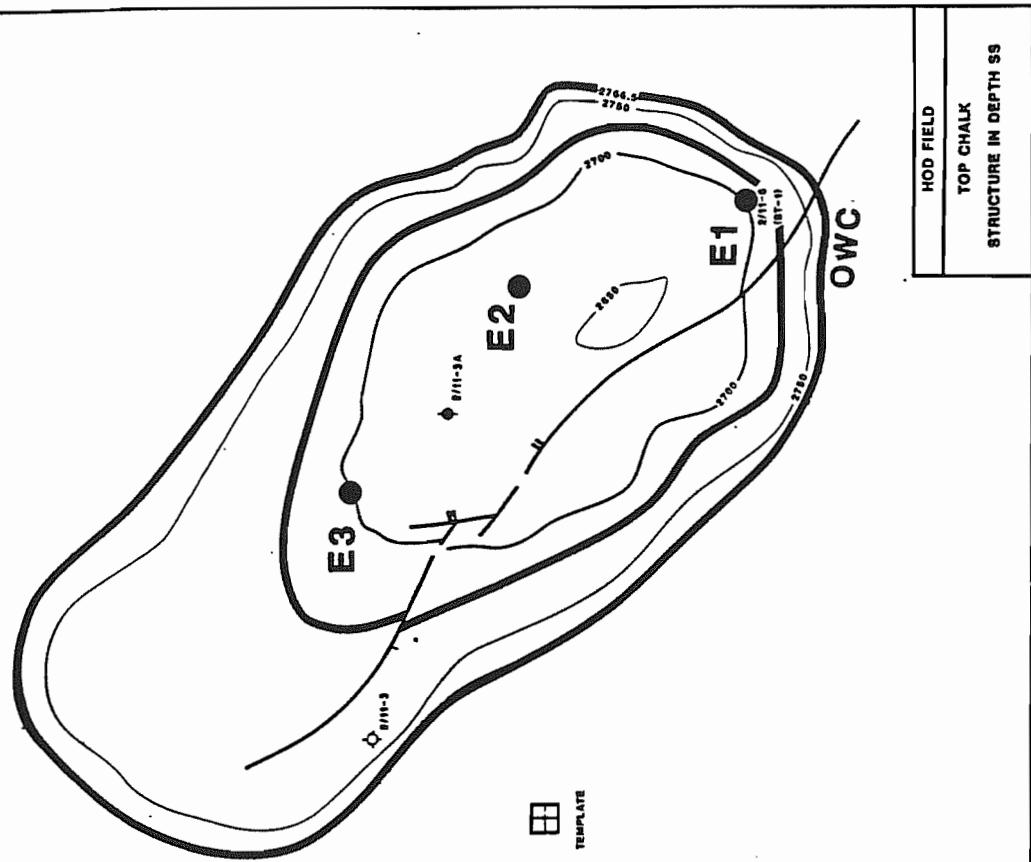
SENSITIVITY A1



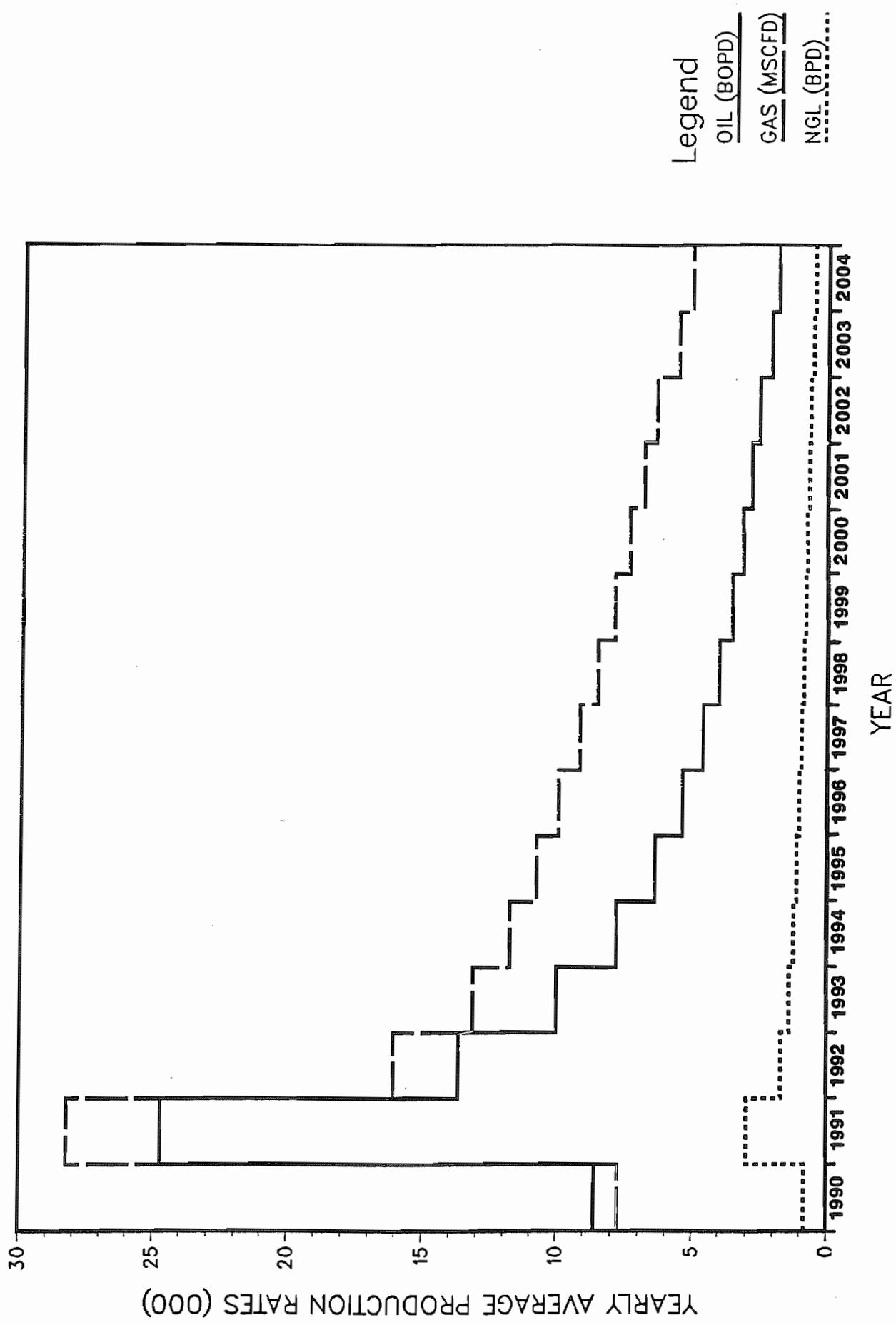
**SENSITIVITY A2**



SENSITIVITY - A3



HOD FIELD PRODUCTION PROFILE  
(3 WELLS WEST + 3 WELLS EAST)



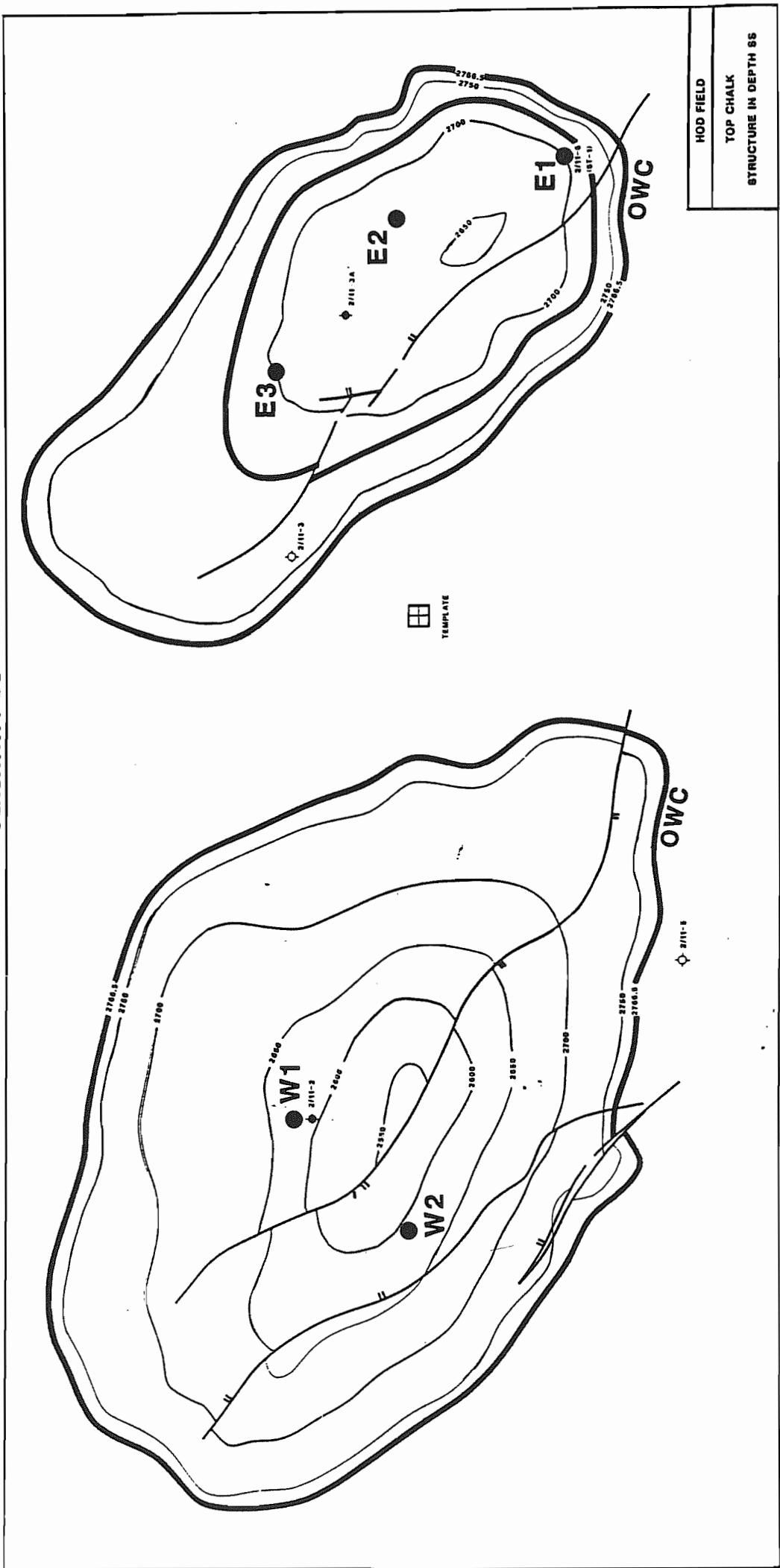
HOD FIELD PRODUCTION PROFILE

POTENTIAL ADDITIONAL RESERVES, CASE B1

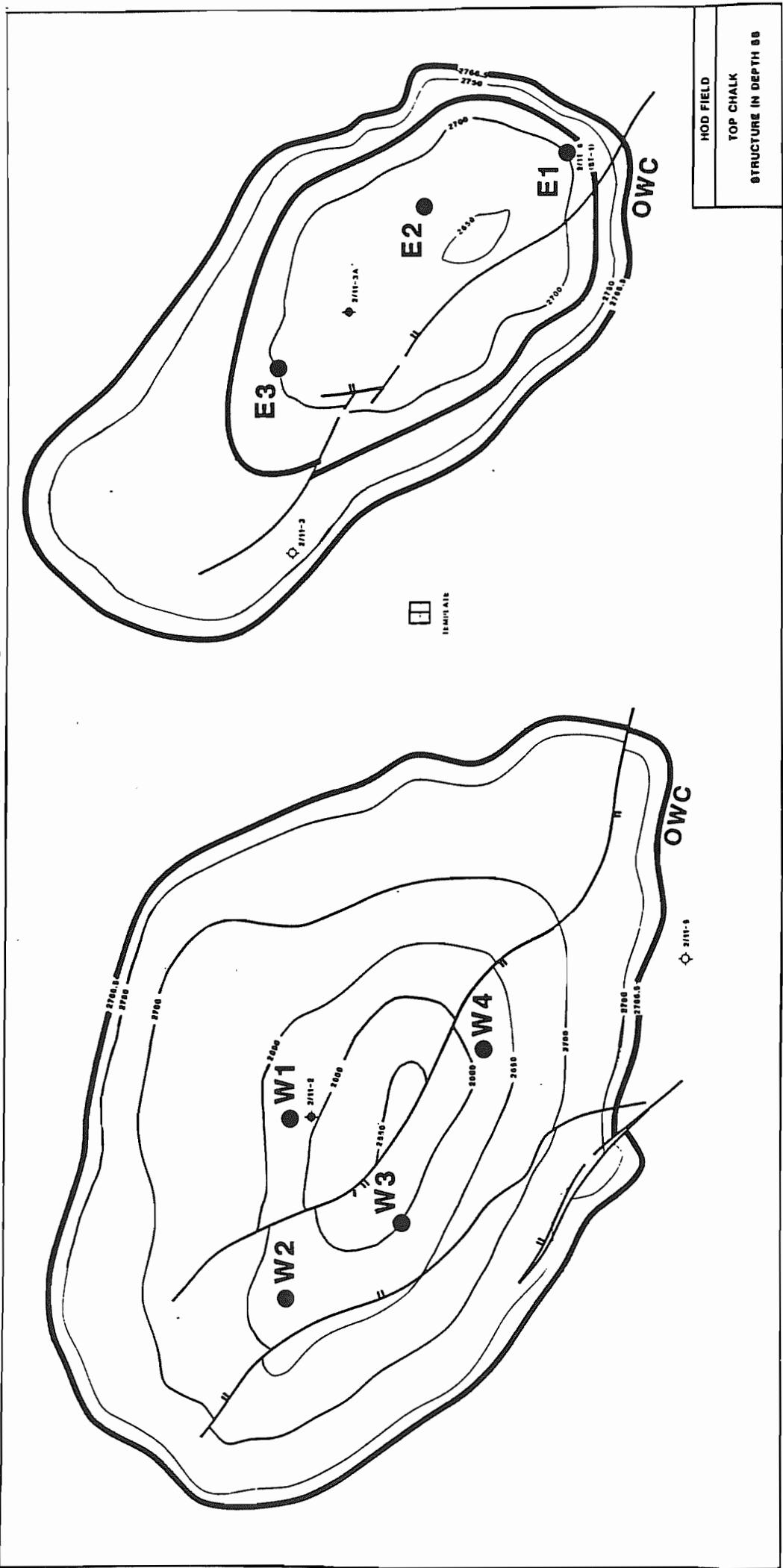
(with Tor Formation in West Hod)

Year	Oil sales (STBOPD)	Gas sales (MSCFD)	NGL sales (BLPD)
1990	8,602	7,744	813
1991	24,731	28,266	2,968
1992	13,663	16,079	1,688
1993	10,039	13,155	1,381
1994	7,869	11,798	1,239
1995	6,435	10,785	1,133
1996	5,434	9,985	1,049
1997	4,661	9,220	968
1998	4,050	8,558	899
1999	3,562	7,966	837
2000	3,168	7,428	780
2001	2,846	6,916	726
2002	2,590	6,463	679
2003	2,175	5,635	592
2004	<u>1,917</u>	<u>5,119</u>	<u>538</u>
Cumulative Production	37,135,933 STB	56,618,031 MSCF	5,945,785 bbl

**SENSITIVITY B2**



SENSITIVITY B3



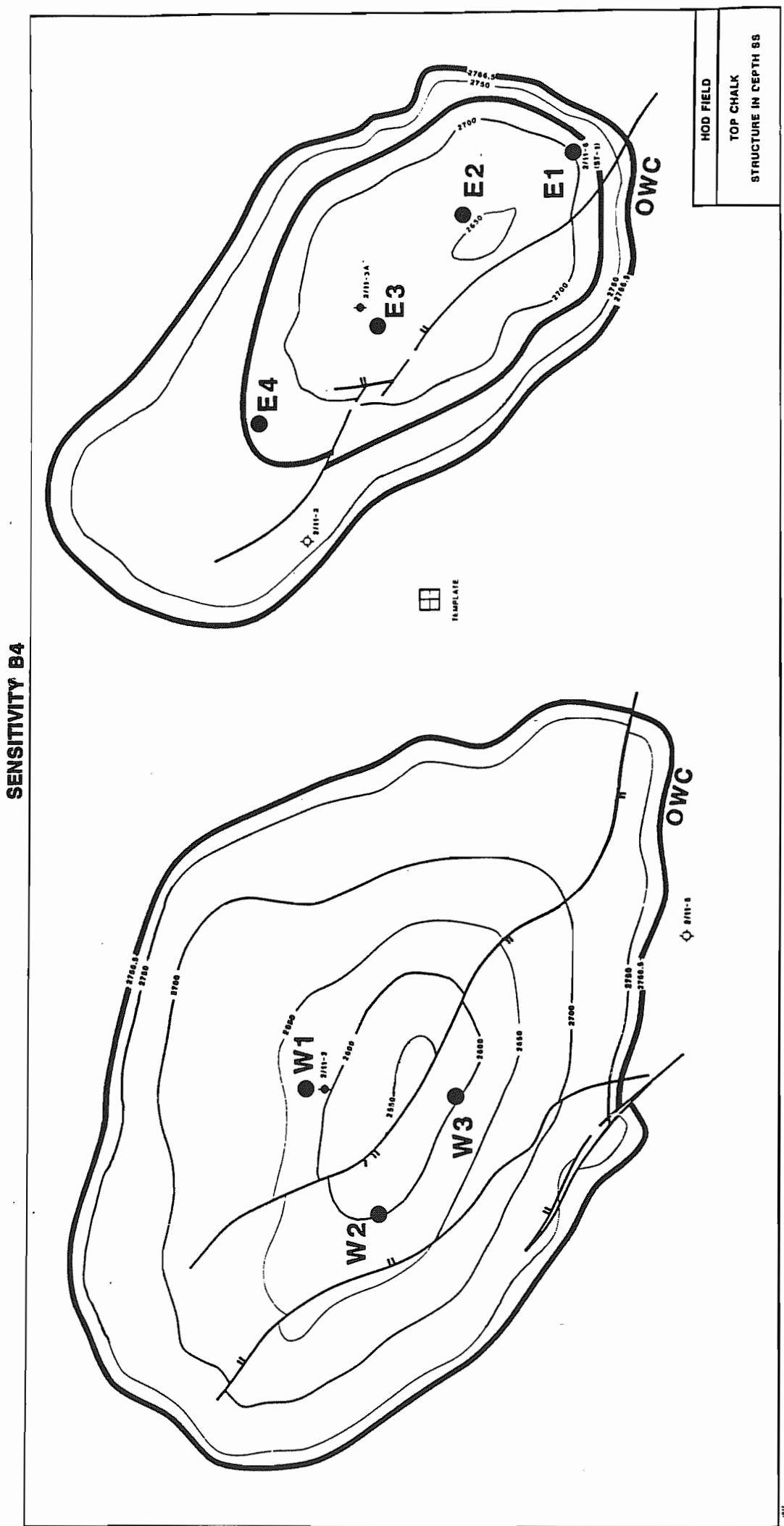


EXHIBIT 4.67