Petroleu	ABORATORIES, IN 1977 In Reservoir Engineering DALLAS, TEXAS		00796 SAKSB: ARKIV:	*30.9.68
			le RFL 5	152B
	Data Carrie	_		
			<u>le 4, 1968</u>	
Well 7/11-1X, DST 3	Province	<u></u>		
Field Block 7/11	Country	<u>No:</u>	rth Sea, No	rway
FORMATIC	ON CHARACTERIS	rics		
Formation Name			·····	<u> </u>
Date First Well Completed		· · · ·	·	, 19
Original Reservoir Pressure			PSIG @	Ft
Original Produced Gas-Liquid Ratio				$\SCF/Bb$
Production Rate		<u> </u>		<u>Bbls/Day</u>
Separator Pressure and Temperature	and the second second		PSIG	° F.
Liquid Gravity at 60° F.				° API
Datum			· · · · · · · · · · · · · · · · · · ·	_Ft. Subsea
	CHARACTERISTICS	8		
Elevation		· · · · · · · · · · · · · · · · · · ·	·	Ft.
Total Depth				Ft.
Producing Interval	· · · · · · · · · · · · · · · · · · ·	9770-980		Ft.
Fubing Size and Depth	· · ·	<u></u>		Ft.
Open Flow Potential				MSCF/Day
Last Reservoir Pressure		5705	PSIG @	<u>9779</u> Ft.
Date				, 19
Reservoir Temperature	•	235	<u> </u>	Ft.
Status of Well	•			
Pressure Gauge			· · · · · · · · · · · · · · · · · · ·	
	LING CONDITIONS			DBIC
Flowing Tubing Pressure			·	PSIG
Flowing Bottom Hole Pressure Primary Separator Pressure		250	· · · · · · · · · · · · · · · · · · ·	PSIG
Primary Separator Temperature		<u>250</u>	,	PSIG ° F.
Secondary Separator Pressure		_{_1		PSIG
Secondary Separator Temperature				PSIG
Field Stock Tank Liquid Gravity			· • •	PI @ 60° F.
Primary Separator Gas Production Rate		5613	11	MSCF/Day
	· · · · ·		· · · · · · · · · · · · · · · · · · ·	
Pressure Base	14.696 <b>PSIA</b>			
Pressure Base	1 <u>4.696</u> <b>PSIA</b> 60 ° <b>F</b> .			
Pressure Base Temperature Base	60° <b>F</b> .	4. 1		
Pressure Base Temperature Base Compressibility Factor (F <sub>pv</sub> )	60° <b>F</b> . 1.024			
Pressure Base Temperature Base Compressibility Factor (F <sub>pv</sub> ) Gas Gravity (Laboratory)	60° <b>F</b> .			
Pressure Base Temperature Base Compressibility Factor (F <sub>pv</sub> )	60° F. 1.024 0.693 1.2013	417		Bbls/Day
Pressure Base Temperature Base Compressibility Factor (F <sub>pv</sub> ) Gas Gravity (Laboratory) Gas Gravity Factor (F <sub>g</sub> )	60° F. 1.024 0.693 1.2013 F.	<u>417</u> 13460		Bbls/Day SCF/Bbl
Pressure Base Temperature Base Compressibility Factor (F <sub>pv</sub> ) Gas Gravity (Laboratory) Gas Gravity Factor (F <sub>g</sub> ) <u>Stock Tank</u> Liquid Production Rate @ 60° Primary Separator Gas/ <u>Stock Tank</u> Liquid	60° F. 1.024 0.693 1.2013 F.		B	• -
Pressure Base Temperature Base Compressibility Factor (F <sub>pv</sub> ) Gas Gravity (Laboratory) Gas Gravity Factor (F <sub>g</sub> ) <u>Stock Tank</u> Liquid Production Rate @ 60° Primary Separator Gas/ <u>Stock Tank</u> Liquid Core Laboratories, Inc., Engineer	60° F. 1.024 0.693 1.2013 F. d Ratio	13460	B	SCF/Bbl
Pressure Base Temperature Base Compressibility Factor (F <sub>pv</sub> ) Gas Gravity (Laboratory) Gas Gravity Factor (F <sub>g</sub> ) <u>Stock Tank</u> Liquid Production Rate @ 60° Primary Separator Gas/ <u>Stock Tank</u> Liquid	60° F. 1.024 0.693 1.2013 F. d Ratio	13460	B	SCF/Bbl
Pressure Base Temperature Base Compressibility Factor (F <sub>pv</sub> ) Gas Gravity (Laboratory) Gas Gravity Factor (F <sub>g</sub> ) <u>Stock Tank</u> Liquid Production Rate @ 60° Primary Separator Gas/ <u>Stock Tank</u> Liquid Core Laboratories, Inc., Engineer	60° F. 1.024 0.693 1.2013 F. d Ratio	13460	B	SCF/Bbl
Pressure Base Temperature Base Compressibility Factor (F <sub>pv</sub> ) Gas Gravity (Laboratory) Gas Gravity Factor (F <sub>g</sub> ) <u>Stock Tank</u> Liquid Production Rate @ 60° Primary Separator Gas/ <u>Stock Tank</u> Liquid Core Laboratories, Inc., Engineer	60° F. 1.024 0.693 1.2013 F. d Ratio	13460	B	SCF/Bbl
Pressure Base Temperature Base Compressibility Factor (F <sub>pv</sub> ) Gas Gravity (Laboratory) Gas Gravity Factor (F <sub>g</sub> ) <u>Stock Tank</u> Liquid Production Rate @ 60° Primary Separator Gas/ <u>Stock Tank</u> Liquid Core Laboratories, Inc., Engineer	60° F. 1.024 0.693 1.2013 F. d Ratio	13460	B	SCF/Bbl

## CORE LABORATORIES, INC. Petroleum Reservoir Engineering DALLAS, TEXAS

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Page	2	of	4	

RFL 5152B File\_\_\_\_

Well 7/11-1X, DST 3

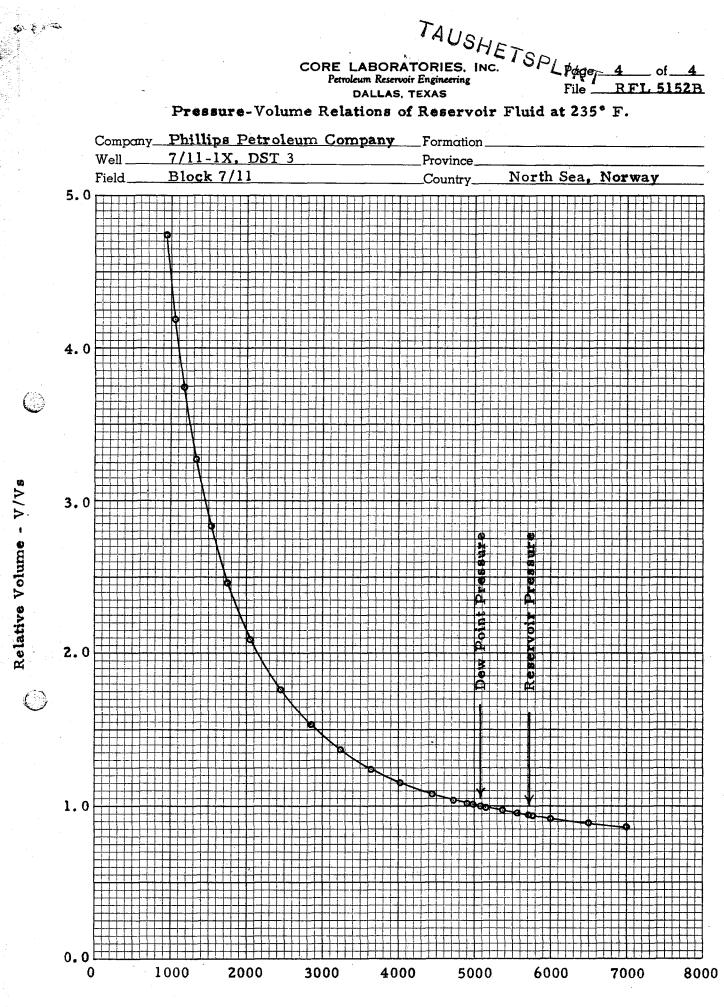
### Hydrocarbon Analyses of Separator Products and Calculated Well Stream

Component	Separator Liquid Mol Per Cent	Separator ( Mol Per Cent	GPM	Well Strea Mol Per Cent	GPM
¥T 1.					
Helium		Trace		·	
Hydrogen		Trace		, ,	
Hydrogen Sulfide	0 54	Nil			
Carbon Dioxide	0.54 0.03	2.58 0.86		2.44	
Nitrogen	6.98			0.80	
Aethane		83.47		78.07	
Ethane	3.92	7.48	0 951	7.23	0 905
Propane	5.34 2.19	3.10	0.851	3.26	0.895
iso-Butane	5.22	0.57	0.186 0.311	0.68	0.222
n-Butane	<b>5.</b> <i>22</i> <b>4.</b> 17	0.99		1.29	0.406
iso-Pentane	4.17	0.29 0.27	0.106	0.56 0.57	0.204
n-Pentane	4.52 9.54	0.20	0.098 0.081	0.86	0.206
Hexanes					0.350
Heptanes plus	<u>57.55</u> 100.00	$\frac{0.19}{100.00}$	$\frac{0.086}{1.719}$	4.24	$\frac{2.466}{4.740}$
	100.00	100.00	1. /19	100.00	4.749
Properties of Heptanes plus					
API gravity @ 60° F.	47.6			a second	
Specific gravity @ 60/60° F.				0.788	
Molecular weight	147	103		145	
Moleculur weight	<u></u>				
'alculated separator gas gravity Calculated gross heating value for per cubic foot of dry gas @ 14.	or separator gas $=$				
Primary separator gas collected Primary separator liquid collecte					
Primary separator gas/separator Primary separator liquid/stock t Primary separator gas/well stre Stock tank liquid/well stream ra	ank liquid ratio <u>1.</u> am ratio <u>929</u>	880 SCF/Bbl @ 133 Bbls @ 60° 44 MSCF/MMS 0.05 Bbls/MMSC	F./Bbl SCF		

ID/OLJE TAUSHETSPLIKT 00796 \*30.9.68 SAKSB: ARKIV: DALLAS, TEXAS 3 4 Page\_ of RFL 5152B File\_ 7/11-1X, DST 3 Well

# Pressure-Volume Relations of Reservoir Fluid at 235° F. (Constant Composition Expansion)

	Pressure	Relative		Deviation Factor
	PSIG	Volume		Z
	7000	0.8658		1.184
	6500	0.8923	•	1.133
	6000	0.9237		1.083
	5739	0.9424		1.057
1. A.	5705 Reservoir Pressure	0.9450		$1.054  b_{g} = .00064$
	5679	0.9468		1.051
	5571	0.9554		1.040
	5375	0.9728		1.022
	5189	0.9901		1.004
	5131	0.9962		0.999
	5090 Dew Point Pressure	1.0000		0.995
	5062	1.0028		2
	4992	1.0108		
	4906	1.0199		•
	4712	1.0431		
	4430	1.0842		
	4014	1.1592		
	3637	1.2476		
	3232	1.3728		C. S. A.
	2843	1.5363		
	2447	1.7664		
,	2058	2.0953		
	1754	2.4606 .		
	1531	2.8329		
	1332	3.2705		
	1169	3.7444		
	1047	4.1976		
	929	4.7498		
				and the second



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Pressure - PSIG

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	eservoir Engineering LAS. TEXAS	SAKSB: ARKIV:
		Page1of2
		File RFL 5152A
Company Phillips Petroleum Company	Date SampledJ	une 10, 1968
Well 7/11-1X (DST 4)	Province	
<b>Field</b> Block 7/11		orth Sea, Norway
Formation Name	CHARACTERISTICS	
Date First Well Completed		. 19
Original Reservoir Pressure		, 10, PSIG @F
Original Produced Gas-Liquid Ratio		1510 @1 SCF/B
Production Rate		Bbls/Da
Separator Pressure and Temperature		PSIG ° 1
Liquid Gravity at 60° F.		° AI
Datum		Ft. Subse
WELL CHA	RACTERISTICS	
Elevation	· · ·	F
Total Depth		F
Producing Interval	9527-9	9697F
Tubing Size and Depth		In. toF
Open Flow Potential		MMSCF/Da
Last Reservoir Pressure	5328	PSIG @9529F
Date	· · · · · · · · · · · · · · · · · · ·	, 19
Reservoir Temperature	230	F. @ F
Status of Well		
Pressure Gauge		·
SAMPLING	G CONDITIONS	•
Flowing Tubing Pressure	<u></u>	PSI
Flowing Bottom Hole Pressure		PSI
Primary Separator Pressure	1000	PSI
Primary Separator Temperature	_118	° ]
Secondary Separator Pressure		PSI
Secondary Separator Temperature	<u> </u>	o. I
Field Stock Tank Liquid Gravity		° API @ 60° F
Primary Separator Gas Production Rate	<u>26108</u>	MSCF/Da
Pressure Base	1 <u>4.696</u> <b>PSIA</b>	
	6 <u>0</u> • <b>F</b> .	
Compressibility Factor $(\mathbf{F}_{pv})$	1.080	
• • • • • •	0 <u>.704</u> 1.1918	
Gas Gravity Factor $(F_g)$ Stock Tank Liquid Production Pote $\bigcirc 60^\circ$ F		Dhie Ma
<u>Stock Tank</u> Liquid Production Rate @ 60° F. Primary Separator Gas/ <u>Stock Tank</u> Liquid Ra	tio <u>855</u> 30536	Bbls/Day
	00 <sup>°</sup>	SCF/Bb Bbls/MMSCI
Core Laboratories, Inc., Engineer	r <u>34.75</u>	DDIS/11111501
REMARKS:	·	

CORE LABORATORIES, INC.



Petroleum Reservoir Engineering DALLAS. TEXAS

TAU		Page	2_of2	
		File	RFL 5152A	
Company_Phillips_Petroleum_Company	Formation			
Well 7/11-1X (DST 4)	Province			
Field Block 7/11	Country	North Sea.	Norway	

HYDROCARBON ANALYSIS OF <u>Sep</u>

Separator

GAS SAMPLE

COMPONENT	MOL PER CENT	GPM
Helium	Trace	
Hydrogen	Trace	
Hydrogen Sulfide	Nil	
Carbon Dioxide	2.65 Vela	n an Anna Mae
Nitrogen	0.81	
Methane	83.37	
Ethane	7.12	1.794
Propane	2.94	0.807
iso-Butane	0.58	0.189
n-Butane	1.05	0.330
iso-Pentane	0.37	0.135
n-Pentane	0.36	0.130
Hexanes	0.28	0.114
Heptanes plus	0.47	0.213
	100.00	3.712

Calculated gas gravity (air = 1.000) = 0.704

Calculated gross heating value = 1164 BTU per cubic foot of dry gas at 14.696 psia at 60° F.

Collected at 1000 psig and 118 ° F.

Core Laboratories, Inc. Reservoir Fluid Analysis

P. L. Moses HS

P. L. Moses Manager

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		Fi	le <u>RFL 5</u>	.52
Company Phillips Petroleum Company	Date Sam	pled June	<u>e 11, 1968</u>	
Well 7/11-1X, DST 5	Province			
Field Block 7/11	Country	Nor	th Sea, No	rway
FORMATION	CHARACTERIS'	TICS		
Formation Name	н 1			
Date First Well Completed		·		, 19
Original Reservoir Pressure			PSIG @	Ft
Original Produced Gas-Liquid Ratio	•	· · · · · · · · · · · · · · · · · · ·		SCF/Bb
Production Rate				Bbls/Day
Separator Pressure and Temperature			PSIG	° F
Liquid Gravity at 60° F.				<u>• AP</u>
Datum				Ft. Subsea
	IARACTERISTIC	S		
Elevation				Ft.
Total Depth			~	Ft.
Producing Interval		9440-945		Ft.
Tubing Size and Depth		<u> </u>	In. to	Ft.
Open Flow Potential		<u> </u>		MMSCF/Day
Last Reservoir Pressure		5260	_PSIG @	
Date Bacarrain Transmission		228		, 19
Reservoir Temperature Status of Well		220	<u>•</u> F. @	Ft.
Pressure Gauge			· · · · · · · · · · · · · · · · · · ·	<u></u>
-				
Flowing Tubing Pressure	IG CONDITIONS			PSIG
Flowing Bottom Hole Pressure		. <u></u>	<u> </u>	PSIG
Primary Separator Pressure		210		PSIG
Primary Separator Temperature	j.	54		• F.
Secondary Separator Pressure				PSIG
Secondary Separator Temperature			· · · · · · · · · · · · · · · · · · ·	• F.
Field Stock Tank Liquid Gravity			• A	PI @ 60° F.
Primary Separator Gas Production Rate	•	6161		_MSCF/Day
Pressure Base	<u>14. 696</u> <b>PSIA</b>			_ , .
Temperature Base	<u>60                                    </u>			
Compressibility Factor (F <sub>py</sub> )	1.023			
Gas Gravity (Laboratory)	0.674		•	
Gas Gravity Factor $(F_g)$	1.2181			•
Stock Tank Liquid Production Rate @ 60° F		508		Bbls/Day
Primary Separator Gas <u>/ Stock Tank</u> Liquid I	Ratio	12128	<u> </u>	SCF/Bbl
Your I shoustoning The The sta	or	82.45	B	bls/MMSCF
Core Laboratories, Inc., Engineer				
REMARKS:				

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## CORE LABORATORIES, INC. Petroleum Reservoir Engineering DALLAS. TEXAS

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Well 7/11-1X, DST 5

## Hydrocarbon Analyses of Separator Products and Calculated Well Stream

	Separator Liquid	Separator (	Gas	Well Strea	am
Component	Mol Per Cent	Mol Per Cent	<u>GPM</u>	Mol Per Cent	<u>GPM</u>
Helium		Trace			
Hydrogen		Trace			
Hydrogen Sulfide		Nil			
Carbon Dioxide	0.24	2.55		2.38	
Nitrogen	0.03	0.79		0.73	
Aethane	5.93	85.06		79.27	
Ethane	3.46	7.01		6.75	
	4.69	2.68	0.736	2.83	0.777
Propane	1.96	0.49	0.160	0.60	0.196
iso-Butane	5.46	0.49	0.100	1.13	0.355
n-Butane	3.42	0.22	0.080	0.45	0.164
iso-Pentane	5.18	0.19	0.069	0.45	0.202
n-Pentane	10.79	0.12	0.089	0.90	0.366
Hexanes	•				
Heptanes plus	<u>58.84</u> 100.00	0.10	$\frac{0.045}{1.387}$	$\frac{4.40}{100.00}$	$\frac{2.605}{4.665}$
	100.00	. 100.00	1.501	100.00	1,000
Properties of Heptanes plus	•				
API gravity @ 60° F.	47.4				
Specific gravity @ 60/60° F.	0.7909			0.790	
Molecular weight	149	103		148	
())alculated separator gas gravity	(air = 1.000) = (	0.674			
Calculated gross heating value fo	r separator gas $=$	<u>1120 BTU</u>			
per cubic foot of dry gas @ 14.6	396 psia and 60° F.	•			
Primary separator gas collected	@ 210 psig and	1 <u>54</u> °F.			
Primary separator liquid collected					
• • • • • • • • • • • • • • • • • • • •	C 10				
Primary separator gas/separator		1137_SCF/Bbl @			
Primary separator liquid/stock t	ank liquid ratiol	.089 Bbls @ 60°	F./Bbl	r	

Primary separator liquid/stock tank liquid ratio Primary separator gas/well stream ratio Stock tank liquid/well stream ratio

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<u>11137</u> SCF/Bbl @ 60° F. <u>1.089</u> Bbls @ 60° F./Bbl <u>926.85</u> MSCF/MMSCF <u>76.42</u> Bbls/MMSCF

#### CORE LABORATORIES, INC. Petroleum Reservoir Engineering DALLAS, TEXAS

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Well	7/1	<u>1-1X,</u>	DST	5	

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# Pressure-Volume Relations of Reservoir Fluid at 228° F. (Constant Composition Expansion)

Pressure PSIG	Relative Volume	Deviation Factor
7000	0.9051	1.191
6500	0.9332	1.141
6000	0.9663	1.091
5692	0.9903	1.060
5647	0.9940	1.056
5606	0.9975	1.052
5593	0.9984	1.051
5576 Dew Point Pressure	1.0000	1.049
5553	1.0018	1.047
5528	1.0041	1.044
5442	1.0116	1.036
5344	1.0216	1.027
5260 Reservoir Pressure	1.0301	1.020
5129	1.0442	
4878	1.0741	
4511	1.1278	
4137	1.1962	
3757	1.2847	
3359	1.4061	
2973	1.5616	
2579	1.7802	
2189	2.0932	
1838	2.4973 -	2.
1573	2.9342	
1352	3.4319	
1189	3.9240	
1029	4.5540	

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CORE LABORATORIES, INC. Petroleum Reservoir Engineering DALLAS, TEXAS

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File	RFL 5152		
Well	7/11-1X,	DST 5	

## Retrograde Condensation During Gas Depletion at 228° F.

Pressure PSIG	Retrograde Liquid Volume Per Cent of Hydrocarbon Pore Space	
5576 Dew Point Pressure	0.00	
5260 Reservoir Pressure	0.25	
4800 First Depletion Level	0.71	
3800	3.61	
2800	6.46	
1800	6.78	
1000	6.57	
500	6.30	
0	5.75	

Core Laboratories, Inc. Reservoir Fluid Analysis

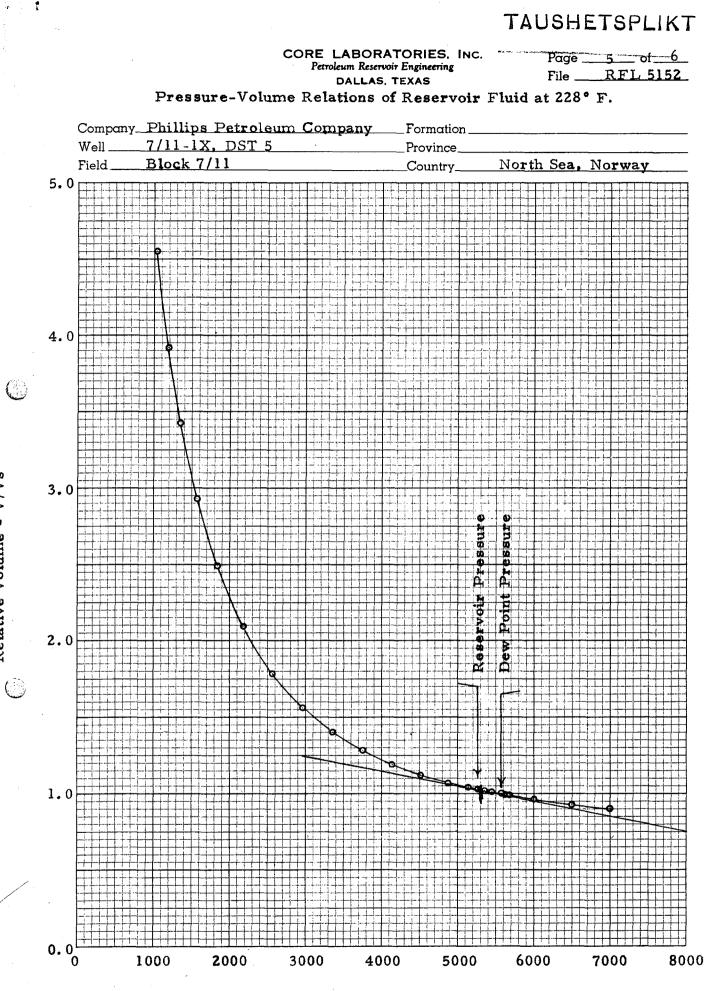
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These analyses, opinions or interpretations are based on observations and material supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representations as to the productivity, proper operation, or profitableness of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

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Relative Volume - V/Vs

Pressure - PSIG

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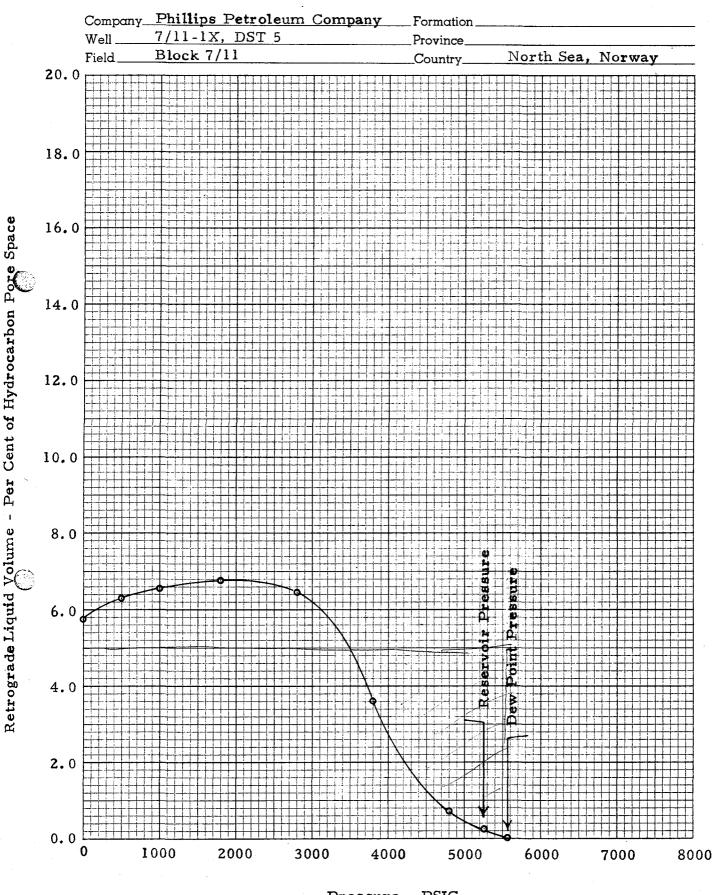
#### CORE LABORATORIES, INC. P Petroleum Reservoir Engineering DALLAS, TEXAS Retrograde Condensation During Depletion

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RFL 5152

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File .



Pressure - PSIG