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Requested by

Ø. Reinertsen

Subtitle

Reservoir fluid study on separator and RFT samples from well 15/9-11

Co-workers

Title

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RESERVOIR FLUID STUDY FOR STATOIL, WELL 15/9-11

STATOIL EXPLORATION & PRODUCTION LABORATORY

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Approved 3/824

SUMMARY

This report presents PVT and compositional data on samples collected from 15/9-11.

Compositional analysis were performed on 5 sets of samples, two from DST No. 1, one from DST NO. 2, one from DST No. 3, and one from RFT chamber collected at 2812 m.

Constant mass and constant volume experiments were performed on one set of samples from DST No. 1.

This report also include a preparative destillation of the liquid from DST No. 1.

A qualitative comparison on the basis of GC. runs of liquids from DST No. 2 and No. 3, 15/9-11, and the liquid from 15/9-9 is also included.

Representative data of the fluid system are set up on the next page.

Reservoir fluid	composition (mole %)	Molecular weight	Density
Carbondioxide	2.86		
Nitrogene	1.52		
Methane	71.17		
Ethane	9.01		
Propane	6.47		
iso-Butane	0.98		
n-Butane	1.97		
iso-Pentane	0.65		
n-Pentane	0.74		
Hexanes	0.81	85*	0.669
Heptanes	0.98	90*	0.733
Octanes	0.93	106	0.758
Nonanes	0.52	121	0.778
Decanes+	1.39	202*	0.846*
	100.00		

Summary of representative data from analysis

Dew pt. pressure : 292 Barg (4234 psig) Density of reservoir fluid at 299.5 Barg and 103.5^oC : 0.271 g/cm³ Molecularweight of reservoir fluid : 27.4 g/g mol Gas formation volume factor at 299.5 Barg and 103.5^oC : 233.5 SM³/M³ (1311 SCF/BBL) Maximum Liquid dropout : 7.6 % of DP. Vol.

Densities and molecular weights are measured values from TBP destillation.

 Calculated values (Measured values from destillation M10+ 200, Density 10+ 0.825)

1 INTRODUCTION

Statoil Prolab were requested by the 15/9 license to perform PVT analysis on different samples from Well 15/9-11.

Two seperator sets from DST No. 1, one set from DST No. 2, two sets from DST No. 3, and one RFT sample from 2812 m.

The request was to perform a complete PVT study at 103.5° C on one set from DST No. 1, and compositional analysis on the other samples.

Due to bad sampling on the rig, only one of the 3 sets taken during DST No. 3 could be used for further analysis.

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2 SAMPLE DESCRIPTION

2.1 Samples from DST No. 1.

Two sets of separator samples collected during the gas test in Perforated interval 2797 - 2807 m.

The bottles from PVT set No. 2 were marked: Oil: 8088 - 86 Gas: A 7636 / A 4286 Validity check of the samples are summarized in table no. 1. The bottles from PVT set No. 3 were marked: Oil: 8088 - 51 Gas: A 7148 / A 11342 Validity check of the samples are in table no. 8.

2.2 Samples from DST No. 2

Only one set of samples was taken during DST No. 2. The set of samples was collected during the gas test in perforated interval 2432 - 2449 m.

The bottles were marked: Oil: 9209 - 100 Gas: A 4987 / A 10915 Validity check of the samples are in table no. 14.

2.3 Samples from DST No. 3

One set of separator samples collected during DST No. 3 from perforated interval 2395 - 2415 m.

The bottles from PVT set No. 1 were marked: Oil: 9214 - 368

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Gas: A 12060 / A 12056 Validity check of the samples in table no. 17.

2.4 RFT sample from 2812 m

A 1 gal. RFT chamber (No. 40RFSAD) was collected at 2812 m. The opening pressure of the RFT chamber was 145 Barg at ambient temperature. The RFT chamber was pressured up to 400 Barg and kept under that pressure for 72 hours. Approx. 600 cm³ of the content was then transferred to a high pressure oil bottle (No. 80 - 192/162).

The pressure was then released, and the remaining liquid collected.

The chamber contained approx. 250 cm³ of liquid. No water or filtrate was observed.

3 METHODS AND EQUIPMENT

3.1 Compositional analysis

Component analysis are performed using a Hewlett Packard 5880 gas chromatographic systems. For gas analysis, non hydrocarbons are determined on a poropack R 1/8" x 3 m steel column with TC detector, and hydrocarbons in chromapack Cp $\frac{\text{tm}}{\text{m}}$ Sil 5 50 m x 0.22 mm quartz capillary column with FI detector. Oil analysis are performed on a gas chromatograph fitted with chromapack Cp $\frac{\text{tm}}{\text{m}}$ Sil 5 25 m x 0.22 mm quartz capillary column and FI detector. Molecular weight is determined by freezing point depression of benzene, density by Paar DMA 602 frequency densiometer.

3.2 PVT analysis

PVT analysis are performed on our Elf designed gas condensate cell produced by ACB, NANNTES. This is a cell of the sloane type and does offer a liquid readability down to 0.1 cm³. Total volume of cell is 3.5 dm^3 .

Separator gas was charged to this cell, and separator liquid added in order to yield the corrected separator GOR. The GOR's were taken from the sampling sheets, this because the test report was not available at this time.

$$GOR_{corr.} = GOR_{sep.} \qquad \frac{\cancel{2} rig \cdot Zrig}{\cancel{2} lab \cdot Zlab}$$

A constant mass pressure volume relationship and a constant volume depletion were performed.

Single flash of the RFT sample was performed in a RUSKA Flash Separator. The gas was samples in a RUSKA Gasometer.

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3.3 Preparative destillation

To confirm GC analysis and also to determine physical properties of $C_6 - C_{10}$ cuts a preparative destillation is run on a Fisher HMS 500 mini destillation still. The fractions are collected according to the boiling point ranges of the various hydrocarbongroups.

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The composition of the gas and the light-end fractions of the crude is determined by capillary gas-chromatography.

Density and molecular weight of each cut and of the crude oil were measured by a density measuring cell, and by freezing point depression respectively. 4 RESULTS

4.1 Results from DST No. 1

4.1.1 Set No. 2

Results of single flash of separator oil are given in table 2. Table 3 contains hydrocarbon analysis of separator products and calculated reservoir fluid composition. Table 4 presents results of a single flash of the recombined reservoir fluid from the condensate cell.

The dew point is determined to 292 Barg and the max. liquid drop out to 7.6 % from the constant mass pressure volume relationship. (see table 5 and fig. 1). Results from the constant volume depletion are given in table 6 and 7.

Stage No. 1 and 2 contained enough liquid to measure molweight. The other values of molecular weight and density are calculated on the basis of the total composition from the gas chromatografic analysis. The liquid drop out curve from this experiment is presented in fig. 1 (table 7). The variation in composition with pressure is plotted in

fig. 2-15.

4.1.2 Set No. 3

Table 9 contains results from single flash of separator oil. Hydrocarbon analysis of separator products and calculated reservoir fluid composition are given in table no. 10.

4.2 Results from DST No. 2

Table 16 contains results from single flash of separator oil. Hydrocarbon analysis of separator products and calculated reservoir fluid composition are given in table 17.

4.3 Results from DST No. 3

Table 19 contains results from single flash of separator oil. Hydrocarbon analysis of separator products and calculated reservoir fluid composition are given in table 20.

4.4 Results from the RFT sample (2812 m)

The hydrocarbon analysis of the oil and gas from the single flash, and the recombined reservoir fluid are presented in table 11.

4.5 Results from TBP destillation

Table no. 12 contains the weight %, density and molecular weight of the collected liquid fractions. The composition of the gas and the light-end of the crude oil is in table no. 13. Table 14 gives a comparison of the composition of the crude oil from C_1 to C_{10+} , analysed by GC and TBP destillation respectively.

5 DISCUSSION

5.1 DST No. 1 and RFT from 2812 m

If we compare the composition from the RFT sample with the separator samples, they are equal. This might be a good indication that the results is reprenstative for the reservoir fluid composition. One should also notice the good agreement between the composition obtained from the single flash of the recombined fluid (table 4), and the recombination of the separator fluids (table 3). The CO₂ content in this formation is higher than what was found in the Heimdal formation of 15/9-9 and 11, but lower than for eg. 15/9-7. The C₂ and C₃ content is lower than what was found in Heimdal of 15/9-9 and 11, but higher than 15/9-7. The C₁₀₊ content is higher than in the Heimdal formation of 15/9-9 and 11.

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5.2 DST No. 2 and No. 3

The liquid samples from 15/9-11, DST No. 2 and No. 3, and 15/9-9, DST No. 2 and No. 3 have been analysed on a 25 m fused silica WCOT column, with resolution from C_2 to C_{40} .

If we compare these samples they seem to be identical. The reservoir composition of 15/9-11 DST No. 3 is equal to the composition of 15/9-9.

15/9-11 DST No. 2 however is heavier than DST No. 3. Looking at separator gas from the Heimdal formation of 15/9-9 with compareable separator conditions, it is likely to believe that this separator gas has a too low C_1 content.

If this assumption is correct, the reservoir fluid composition reported from DST No. 2 is too heavy.

6 CONCLUSION

6.1 DST No. 1 and RFT from 2812 m

The very good agreement in composition obtained from the RFT - sampler and the separator samples gives us the reason to beleive that the results given in the report are representative for the reservoir fluid system.

6.2 DST No. 2 and No. 3

Taking into account the results obtained from 15/9-9 and the assumptions mentioned in the discussion it is likely to beleive that the composition obtained from DST No. 3 is the best.

Table 1. Validity check of sepa	rator samples
(DST No. 1, Flow 2)	
Gas compo	sition (Mole %)
Gas Bottle A 7636	Gas Bottle A 4286
CO ₂ 3.08	
N ₂ 1.64	
C ₁ 76.58	Air in sample
c9.34	
C ₃ 6.15	
$ \begin{array}{cccc} N_2 & 1.64 \\ C_1 & 76.58 \\ C_2 & 9.34 \\ C_3 & 6.15 \\ i-C_4 & 0.80 \\ \end{array} $	
n-C ₄ 1.46	
i-C ₅ 0.33	
n-C ₅ 0.32	
C ₆ 0.18	
с ₇ 0.09	
C ₈ <u>0.03</u>	
100.00	
Separator conditions	: 30.7 Barg (445 psig) and 35° C (95°F)
Bubble point pressure of	
separator oil at ambient	: 25.4 Barg (370 psig)
temperature	
Opening pressure of gas	
bottle at sep. temp	: 30.7 Barg (445 psig)
Calculated gas gravity at	
sep. cond. from composition	: 0.75
	0.70
Gas gravity reported from rig	: 0.73
Calquiated 7 factor at con	
Calculated Z factor at sep. cond	• • • • • • • • • • • • • • • • • • •
from composition	; V.7U0
Z factor reported from rig	• 0 913
2 factor reported from fry	

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Component	C	Dil	Separator gas	Recombined	Mole	Density
	wt%	mole%	Mole %	separator fluid	-	
- <u></u>	. <u> </u>	<u></u>		Mole %	g/g mol	g/cm ³
Carbondioxide	_	-	1.15	0.36		
Nitrogen	-	-	0.15	0.05		
Methane	-	-	28.70	8.87		
Ethane	0.078	0.30	16.01	5.16		
Propane	1.135	3.01	26.35	10.22		
iso-Butane	0.950	1.91	5.64	3.07		
n-Butane	3.087	6.21	11.71	7.91		
iso-Pentane	2.950	4.78	3.30	4.32		
n-Pentane	4.031	6.54	3.29	5.53		
Hexanes	7.871	10.83	1.95	8.08	85*	0.669
Heptanes	12.155	15.74	1.25	11.26	90*	0.733
Octanes	14.590	16.10	0.45	11.27	106	0.758
Nonanes	9.657	9.34	0.05	6.47	121	0.778
Decanes+	43.496	25.24	0.00	17.43	202*	0.846*
	100.000	100.00	100.00	100.00		

Table 2.	Hydrocarbon analysis of oil and gas from f	<u>lash of</u>
	Separator oil (DST No. 1, Flow 2)	

Properties of stock tank liquid and single flash results:

Density of oil at 15 ⁰ C	:	0.758 g/cm^3		
Mean molecular weight		117 g/g mol		
GOR of separator liquid		$68.5 \text{ sm}^3/\text{m}^3$	(385	SCF/BBL)
Skrinkage of separator liquid	:	1.310 M^3/M^3		
Oil bottle	:	8088-86		

Densities and molecular weights are measured values from TBP destillation.

 Calculated values (Measured values from destillation M10+ 200, Density 10+ 0.825)

Component	Separator	Separator	Reservoir	Mole	Density
	liquid	gas	fluiđ	weight	
	Mole %	Mole %	Mole %	g/g mol	
Carbondioxide	0.36	3.08	2.86		
Nitrogen	0.05	1.64	1.52		
Methane	8.87	76.58	71.17		
Ethane	5.16	9.34	9.01		
Propane	10.22	6.15	6.47		
iso-Butane	3.07	0.80	0.98		
n-Butane	7.91	1.46	1.97		
iso-Pentane	4.32	0.33	0.65		
n-Pentane	5.53	0.32	0.74		
Hexanes	8.08	0.18	0.81	85*	0.669
Heptanes ·	11.26	0.09	0.98	90*	0.733
Octanes	11.27	0.03	0.93	106	0.758
Nonanes	6.47	- .	0.52	121	0.778
Decanes+	17.43		1.39	202*	0.846*
	100.00	100.00	100.00		
Separator and re	ecombination d	lata:			
Primary separato	or conditions		: 30.7 Bar	g and 35 ⁰ 0	2
Calculated separ	rator gas grav	vity (air=1.0)	: 0.75		
GOR at separator	c conditions		: 1952.9 S	M ³ /sep M ³	
			(10965 S	CF/sep BBI	.)
Oil bottle			: 8088-86		
Gas bottle			: A 7636		
Reservoir fluid	properties:				
Molecular weight			: 27.4 g/g	•	
Density of research	rvoir fluid at	dew. point.	: 0.267 g/	cm ³	

Table 3.	Hydrocarbon analysis of separator products and calculated	
	reservoir fluid composition (Test sep.). (DST No. 1, Flow 2)	_

Densities and molecular weights are measured values from TBP destillation.

 Calculated values (Measured values from destillation M10+ 200, Density 10+ 0.825)

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Table 4. <u>Hydrocarbon analysis of oil and gas of single flash from</u> <u>Condensate cell</u>

Component	Oil		Gas	Recombined	
	wt8	mole%	mole %	reservoir fluid	
				Mole %	
Carbondioxide	-	-	2.93	2.85	
Nitrogen	-	-	1.39	1.36	
Methane	-	-	73.49	71.59	
Ethane	0.009	0.05	9.21	8.98	
Propane	0.061	0.21	6.64	6.48	
iso-Butane	0.051	0.14	1.01	0.99	
n-Butane	0.183	0.49	2.02	1.98	
iso-Pentane	0.283	0.61	0.65	0.65	
n-Pentane	0.470	1.01	0.72	0.73	
Hexanes	2.032	3.69	0.71	0.79	
Heptanes	5.984	10.08	0.71	0.95	
Octanes	12.212	17.69	0.42	0.86	
Nonanes	11.868	15.20	0.09	0.48	
Decanes+	66.847	50.83	0.01	1.31	
	100.000	100.00	100.00	100.00	

Calculated Decane+	properties		
Density at 15 ⁰ C		:	0.831 g/cm ³
Mol. weight		:	204 g/g mol

Properties of stock tank liquid	and single flash results
Density at 15 ⁰ C	: 0.802 g/cm ³
Mean mol. weight	: 155 g/g mol
GOR	: 4673 SM ³ /M ³ (26239 SCF/BBL)

Gas Grav, = 0. 8195 (cale.)

Pressure	Rel vol	Liquid	
(Barg)	(vol/vol at DP)	(% of D.P.vol)	2-factor
399.7	0.850		1.116
369.5	0.882		1.071
330.4	0.935		1.015
299.5	0.985		0.971
292.0 (Dew po	int) 1.000	0	0.961
290.1	1.004	< 0.02	
275.8	1.034	0.38	
250.8	1.103	1.63	
221.8	1.213	3.41	
190.4	1.385	5.33	
162.1	1.615	6.59	
131.0	2.002	7.32	
106.4	2.491	7.54	
83.3	3.226	7.37	
03.3			

Table 5. Constant mass pressure volume relation at 103.5°C

Gas formation volume factor at 292 Barg and $103.5^{\circ}C$: 230.0 SM³/M³

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Component		Reser	voir pre	ssure (B	ARG)		
	292	251	211	169	129	96	64
Carbondioxide	2.86	2.85	2.88	2.91	2.91	2.97	2.97
Nitrogen	1.52	1.34	1.60	1.46	1.47	1.55	1.47
Methane	71.17	72.33	72.53	73.05	73.69	74.24	73.41
Ethane	9.01	9.10	9.09	9.20	9.27	9.16	9.38
Propane	6.47	6.54	6.49	6.53	6.53	6.40	6.76
iso-Butane	0.98	1.00	0.99	0.99	0.97	0.94	1.02
n-Butane	1.97	1.98	1.94	1.93	1.90	1.84	1.99
iso-Pentane	0.65	0.64	0.62	0.61	0.59	0.56	0.60
n-Pentane	0.74	0.73	0.70	0.69	0.65	0.62	0.65
Hexanes	0.81	0.75	0.72	0.71	0.63	0.59	0.61
Heptanes	0.98	0.88	0.78	0.78	0.65	0.59	0.62
Octanes	0.93	0.66	0.67	0.62	0.45	0.40	0.41
Nonanes	0.52	0.28	0.31	0.22	0.14	0.12	0.10
Decanes+	1.39	0.92	0.68	0.30	0.15	0.02	0.01
	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Mol wt of C10+	202	174	163	147	142	142	142
Density of C10+	0.846	0.80	0.79	0.78	0.78	0.78	0.78
Real gas deviatio	on						
factor, Z	0.961	0.891	0.855	0.854	0.810	0.888	0.919
Mole % Produced	0	9.5	10.5	15.1	15.0	12.8	12.1
Cum % of initial	0	9.5	20.0	35.1	50.1	62.9	75.0

Table 6. <u>Constant volume depletion exp. at 103.5^OC</u> <u>Hydrocarbon analysis of produced wellstream</u>

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able 7.	Liquid dropout duri	ng constant
	volume depletion at	103.5 ⁰ C
	Pressure	% liquid drop out
	(Barg)	(% of D.P vol)
	292.0	0
	250.7	1.68
	211.2	3.96
	168.6	5.71
	128.5	6.24
	95.5	6.05
	63.7	5.53
	0	3.42

Table 7 dropout during constant T i a

Table 8. <u>Validity check of s</u>	separator samples (DST No. 1, Flow 3)
Gas co	mposition (Mole %)
Gas Bottle A 7	
co ₂ 3.07	3.07
N ₂ 1.61	1.63
C ₁ 76.24	76.14
$\begin{array}{ccc} C_{1} & 76.24 \\ C_{2} & 9.40 \\ C_{3} & 6.22 \\ i-C_{4} & 0.82 \end{array}$	9.43
C ₃ 6.22	6.26
i-C ₄ 0.82	0.83
n-C ₄ 1.50	1.51
i-C ₅ 0.35	0.35
n-C ₅ 0.35	0.35
$\begin{array}{ccc} n-C_{5} & 0.35 \\ C_{6} & 0.22 \\ C_{7} & 0.15 \\ C_{8} & 0.06 \\ C_{9} & 0.01 \end{array}$	0.22
C ₇ 0.15	0.15
C ₈ 0.06	0.05
C ₉ <u>0.01</u>	0.01
100.00	100.00
Separator conditions	: 30.3 Barg (440 psig), 36 ⁰ C (96 ⁰ F)
Bubble point pressure of	
separator oil at ambient	: 25.4 Barg (370 psig)
temperature	
Opening pressure of gas	
bottles at sep. temp.	: 30.3 Barg
Calculated gas gravity at	
sep. cond. from composition	: 0.75
Gas gravity reported from rig	J: 0.73
Calculated Z factor at	
sep. cond. from composition	: 0.907
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Z factor reported from rig.	: 0.914
Bottle No. A 7148 was used fo	or analysis

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Component	C)il	Separator gas	Recombined	Mole	Density
	wt8	molet	Mole %	separator f	luid weight	
·				Mole %	g/g mol	g/cm ³
Carbondioxide	-	-	1.47	0.46		
Nitrogen	-	-	0.13	0.04		
Methane	-	-	30.69	9.50		
Ethane	0.062	0.24	16.92	5.41		
Propane	1.101	2.92	26.42	10.20		
iso-Butane	0.950	1.91	5.48	3.02		
n-Butane	3.081	6.20	11.00	7.69		
iso-Pentane	2.921	4.74	2.81	4.14		
n-Pentane	4.008	6.50	2.68	5.32		
Hexanes	7.823	10.76	1.39	7.86	85*	0.669
Heptanes	12.034	15.58	0.79	11.00	90*	0.733
Octanes	14.463	15.96	0.21	11.09	106	0.758
Nonanes	9.587	9.27	0.01	6.40	121	0.778
Decanes+	43.970	25.92	0.00	17.87	199*	0.846*
	100.000	100.00	100.00	100.00		

Table 9.	Hydrocarbon analysis of oil and gas from flash of	2
	Separator oil (DST No. 1, Flow 3)	-

Properties of stock tank 1	iquid and single flash results:
Density of oil at 15 ⁰ C	: 0.758 g/cm ³
Mean molecular weight	. 117

Mean molecular weight	•	117
GOR of separator liquid	:	68.7 SM ³ /M ³ (386 SCF/BBL)
Skrinkage of separator liquid	:	1.320
Oil bottle	:	8088-51

Densities and molecular weights are measured values from TBP destillation.

 Calculated values (Measured values from destillation M10+ 200, Density 10+ 0.825)

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Table 10.	Hydroc	arbon analysi	is of separ	ator products a	nd	
	calcul	ated reservoi	ir fluid co	omposition (Test	sep.)	
	(DST N	0. 1, Flow 3)	-			
Component		Separator	Separato	or Reservoir	Mole	Density
		liquid	gas	fluid	weight	
		Mole %	Mole %	Mole %	g/g mol	g/cm ³
Carbondiox	ide	0.46	3.07	2.87		
Nitrogen		0.04	1.61	1.48		
Methane		9.50	76.24	70.97		
Ethane		5.41	9.40	9.09		
Propane		10.20	6.22	6.54		
iso-Butane	:	3.02	0.82	1.00		
n-Butane		7.69	1.50	1.98		
iso-Pentan	e	4.14	0.35	0.65		
n-Pentane		5.32	0.35	0.74		
Hexanes		7.86	0.22	0.82	85*	0.669
Heptanes		11.00	0.15	1.01	90*	0.733
Octanes		11.09	0.06	0.93	106	0.758
Nonanes		6.40	0.01	0.51	121	0.778
Decanes+		17.87		1.41	199*	0.846*
		100.00	100.00	100.00		

Separator and recombination data:		
Primary separator conditions	:	30.3 Barg, 36 ⁰ C
Calculated separator gas gravity (air=1.0)	:	0.75
GOR at separator conditions	:	1961.6 SM ³ /sep M ³
		(11014 SCF/sep BBL)
Oil bottle	:	8088-51
Gas bottle	:	A 7148

Densities and molecular weights are measured values from TBP destillation.

* Calculated values (Measured values from destillation M10+ 200, Density 10+ 0.825)

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Component	(Dil	Gas	Recombined		
	wt8	mole%	mole %	reservoir fluid		
				Mole %		
Carbondioxide	-	-	2.61	2.53		
Nitrogen	-	-	1.61	1.56		
Methane	-	-	73.64	71.20		
Ethane	0.017	0.08	9.31	9.00		
Propane	0.172	0.56	6.57	6.37		
iso-Butane	0.134	0.33	1.03	1.01		
n-Butane	0.467	1.16	2.13	2.10		
iso-Pentane	0.606	1.21	0.69	0.70		
n-Pentane	0.968	1.93	0.76	0.80		
Hexanes	3.353	5.65	0.70	0.86		
Heptanes	8.376	13.14	0.62	1.03		
Octanes	14.412	19.40	0.29	0.92		
Nonanes	11.702	13.93	0.04	0.50		
Decanes+	59.793	42.61		1.42		
	100.000	100.00	100.00	100.00		

Table	11.	Hydrocarbon	analysis	of	oil	and	gas	from	single	flash	of
		RFT chamber	(2812 m)								

Calculated Decane+ properties	
Density at 15 ⁰ C	: 0.835 g/cm ³
Mol. weight	: 202 g/g mol

Properties of stock tank liqui	d and single flash results
Density at 15 ⁰ C	: 0.793 g/cm ³
Mean mol. weight	: 144 g/g mol
GOR .	: 3798 SM ³ /M ³ (21326 SCF/BBL)

Table 12

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Collected fracti	Collected fractions and their densities and mol	ities and molecula	ecular weights		
Hydrocarbon group	boiling ranges (^O C)	<pre>% by weight of charge</pre>	<pre>% by weight destilled</pre>	density at 15 ⁰ C (g/cc)	mol. weight
gas	< 36	10.222	10.222	* 0.5979 *	63.93
c ₆	69	9.534	19.759	0.669	88
c7	66	11.771	31.527	0.733	86
c ₈	126 ′	13.272	44.799	0.758	106
c ₉	151	10.438	55.237	0.778	121
c10+	>151	44.763		0.8254	200
Crude oil analysis:	is:				

* Calculated values from G.C. composition

:0.7601 g/cm³

Density at 150C

Molecular weight : 117 g/g mol

Table 13.	Total composition of the gas and the light-end
	fractions determined by G.C. (Weight % of charge:)

Hydrocarbon group	Weight % of charge
C,	0.049
c_2	0.211
c ₃	0.406
nC ₄	0.310
nC ₅	6.774
sc ₆	0.182
sc ₇	0.006

LAB 82.10

Table 14. A comparision of the composition of the crude oil from C_1 to C_{10+} analysed by capillary gas chromatography and by TBP destillation.

Hydrocarbon	Amount (%	by weight)
group	GC analysis	TBP destillation
c ₁	-	0.049
c ₁ c ₂	0.118	0.211
c ₃	1.284	0.406
с ₃ с ₄ с ₅	4.102	2.595
C ₅	6.861	6.774
c ₆	7.708	9.716
с ₆ с ₇	11.955	11.777
C ₈	14.380	13.271
cg	9.520	10.438
c ₁₀₊	44.071	44.763

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LAB 82.10

Gas c	composition (Mole %)
Gas Bottle A	4987 Gas Bottle A 10915
CO ₂ 0.25	
N ₂ 1.42	
C ₁ 74.72	Air in sample
C ₂ 11.35	
C ₂ 7.98	
C ₃ 7.98 i-C ₄ 1.18	
n-C ₄ 1.88	
i-C ₅ 0.45	
$n-C_{5}$ 0.39	
C ₆ 0.21	
c ₇ 0.12	
C ₈ <u>0.05</u>	
8 100.00	
Separator conditions	: 9.9 Barg (144 psig) and
·	18 ⁰ C (65 ⁰ F)
Bubble point pressure of	
separator oil at ambient	: 9.5 Barg (138 psig)
temperature	
-	
Opening pressure of gas	
bottle at sep. temp.	: 10.0 Barg (145 psig)
Calculated gas gravity at	
sep. cond. from composition	: 0.76
Gas gravity reported from ri	.g : 0.72
Calculated Z factor at	
sep. cond. from composition	: 0.960
Z factor reported from rig.	: 0.964

Table 15. Validity check of separator samples (DST No. 2)

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Component	0)il	Separator Gas	Recombined	Mole	Density
	wt%	mole%	Mole %	separator fl	-	
				Mole %	g/g	mol g/cm ³
Carbondioxide	_	_	0.15	0.03		
	-	-	0.12			
Nitrogen	-	-	-	0		
Methane	-	-	18.79	3.09		
Ethane	0.082	0.29	15.85	2.85		
Propane	1.427	3.46	30.25	7.87		
iso-Butane	1.330	2.45	7.43	3.27		
n-Butane	3.771	6.94	14.34	8.16		
iso-Pentane	3.812	5.65	4.67	5.49		
n-Pentane	4.612	6.84	4.27	6.42		
Hexanes	9.078	11.41	2.25	9.90	85*	0.662
Heptanes	13.361	15.84	1.29	13.45	90*	0.731
Octanes	17.337	17.50	0.69	14.73	106	0.766
Nonanes	10.230	9.05	0.01	7.56	121	0.789
Decanes+	34.960	20.57	0	17.19	182*	0.892*
	100.000	100.00	100.00	100.00		

Table 16. <u>Hydrocarbon analysis of oil and gas from flash of</u> Separator oil (DST No. 2)

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Properties of stock tank liquid and single flash results:

Density of oil at 15 ⁰ C	:	0.757 g/cm^3
Mean molecular weight		107 g/g mol
GOR of separator liquid		$33 \text{ SM}^3/\text{M}^3$ (185 SCF/BBL)
Skrinkage of separator liquid	:	1.181 M^3/M^3
Oil bottle	:	9209/100

Densities and molecular weights are measured values from TBP destillation (LAB 81.65)

 Calculated values (Measured values from destillation M10+ 183, Density 10+ 0.825)

Table 17.	Hydro	carbon analys	sis of separat	tor products a	ind	
	calcu	lated reserve	oir fluid com	position (Test	sep.)	
	DST	No. 2)				
Component		Separator	Separator	Reservoir	Mole	Density
componente		liquid	gas	fluid	weight	Densiey
		Mole %	Mole %	Mole %	g/g mol	g/cm ³
Carbondioxi	de	0.03	0.25	0.23		
Nitrogen		0	1.42	1.32		
Methane		3.09	74.72	69.40		
Ethane		2.85	11.35	10.71		
Propane		7.87	7.98	7.97		
iso-Butane		3.27	1.18	1.34		
n-Butane		8.16	1.88	2.35		
iso-Pentane	2	5.49	0.45	0.82		
n-Pentane		6.42	0.39	0.84		
Hexanes		9.90	0.21	0.93	85*	0.662
Heptanes		13.45	0.12	1.11	90*	0.731
Octanes		14.73	0.05	1.14	106	0.766
Nonanes	•	7.56	0	0.56	121	0.789
Decanes+		17.18	0	1.28	182*	0.892*
		100.00	100.00	100.00		

Separator and recombination data:		
Primary separator conditions	:	9.9 Barg and 18 ⁰ C
Calculated separator gas gravity (air=1.0)		
GOR at separator conditions	:	2113 SM 3 /sep M 3
		(11864 SCF/BBL)
Oil bottle	:	9209/100
Gas bottle	:	A 4987

Densities and molecular weights are measured values from TBP destillation.

 Calculated values (Measured values from destillation M10+ 183, Density 10+ 0.825)

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Table 18. Validity check of	sepa	arator samples (DST No. 3, Flow 1)
Gas co	mpos	sition (Mole %)
Gas Bottle A 1	206	0 Gas Bottle A 12056
co ₂ 0.27		
N ₂ 1.48		
C. 76.36		Air in sample
C ₂ 11.17		
$\begin{array}{c} c_{1} & 76.36 \\ c_{2} & 11.17 \\ c_{3} & 7.26 \\ i-c_{4} & 1.00 \end{array}$		
i-C _A 1.00		
n-C ₄ 1.53		
i-C ₅ 0.35		
n-C ₅ 0.29		
C ₆ 0.16		
C ₆ 0.16 C ₇ 0.09		
C ₈ 0.04		
100.00		
Separator conditions	:	33.5 Barg (485 psig) and 32 ⁰ C (90 ⁰ F)
Bubble point pressure of		27 5 Down (200
separator oil at ambient temperature	:	27.5 Barg (398 psig)
Opening pressure of gas		
bottle at sep. temp.	:	33.5 Barg (485 psig)
Calculated gas gravity at sep. cond. from composition	:	0.74
Gas gravity reported from rig	:	0.73
Calculated Z factor at		
sep. cond. from composition	:	0.891
Z factor reported from rig.	:	0.901

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Component	C	Dil	Separator Gas	Recombined	Mole	Density
	wt%	mole%	Mole %	separator fluid	weight	
	·		·····	Mole %	g/g mol	g/cm ³
Carbondioxide	_	_	0.18	0.08		
	-	-				
Nitrogen	-	-	0.08	0.03		
Methane	-	-	25.37	10.88		
Ethane	0.068	0.24	16.83	7.36		
Propane	1.319	3.23	28.32	13.99		
iso-Butane	1.308	2.43	6.64	4.24		
n-Butane	3.777	7.02	12.08	9.19		
iso-Pentane	3.895	5.83	3.59	4.87		
n-Pentane	4.712	7.05	3.17	5.39		
Hexanes	9.159	11.62	1.93	7.46	85*	0.662
Heptanes	11.910	14.36	1.24	8.73	90*	0.731
Octanes	17.336	17.50	0.52	10.21	106	0.766
Nonanes	10.566	9.43	0.05	5.41	121	0.789
Decanes+	35.950	21.29	<u>ھ</u>	12.16	182*	0.854*
	100.000	100.00	100.00	100.00		

Table 19. <u>Hydrocarbon analysis of oil and gas from flash of</u> Separator oil DST No. 3, Flow 1)

Properties of stock tank liquid and single flash results:

Density of oil at 15 ⁰ C	:	0.749 g/cm ³
Mean molecular weight		108 g/g mol
GOR of separator liquid		123.2 SM ³ /M ³ (692 SCF/BBL)
Skrinkage of separator liquid	:	1.485 M^3/M^3
Oil bottle	:	9214/368

Densities and molecular weights are measured values from TBP destillation (LAB 81.65)

 Calculated values (Measured values from destillation M10+ 183, Density 10+ 0.825)

Table 20.	Hydrocarbon analysis of separator products and calculated reservoir fluid composition (Test sep.)						
	(DST No. 3, Flow	1)					
Component	Separator	Separator	Reservoir	Mole	Density		
	liquid	gas	fluid	weight	_		
	Mole %	Mole %	Mole %	g/g mo]	3		
	•						
Carbondioxi	ide 0.08	0.27	0.26				
Nitrogen	0.03	1.48	1.37				
Methane	10.88	76.36	71.28				
Ethane	7.36	11.17	10.88				
Propane	13.99	7.26	7.78				
iso-Butane	4.24	1.00	1.25				
n-Butane	9.19	1.53	2.12				
iso-Pentane	e 4.87	0.35	0.70				
n-Pentane	5.39	0.29	0.69				
Hexanes	7.46	0.16	0.72	85*	0.662		
Heptanes	8.73	0.09	0.76	90*	0.731		
Octanes	10.21	0.04	0.83	106	0.766		
Nonanes	5.41	-	0.42	121	0.789		
Decanes+	12.16		0.94	182*	0.854*		
	100.00	100.00	100.00				

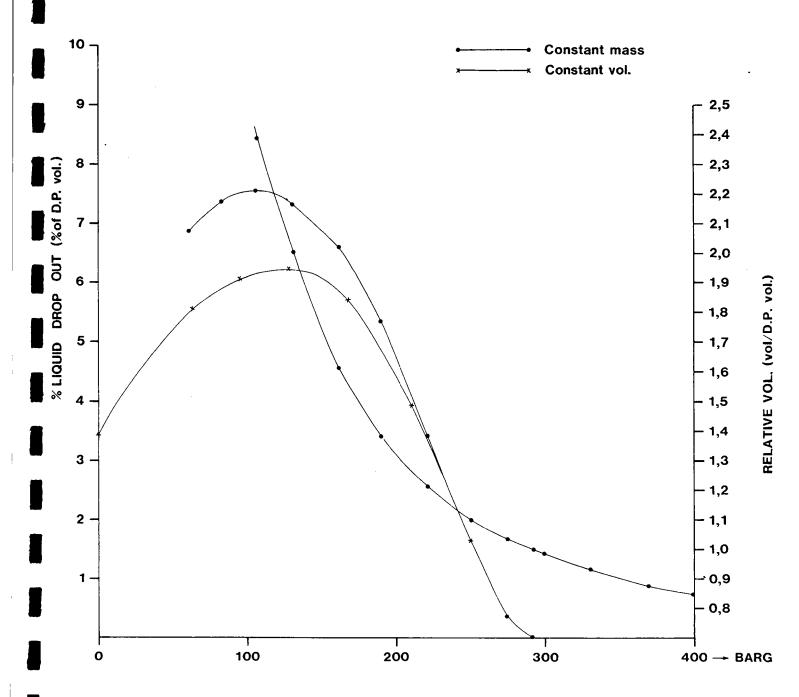
Separator and recombination data:

Primary separator conditions	: 33.5 Barg and 32 [°] C
Calculated separator gas gravity (air=1.0)	
GOR at separator conditions	: 2305 SM ³ /M ³ (12943 SCF/BBL)
Oil bottle	: 9214/268
Gas bottle	: A 12060

Densities and molecular weights are measured values from TBP destillation.

* Calculated values (Measured values from destillation M10+ 183, Density 10+ 0.825) Reservoir fluid study 15/9-11 DST no.1, recombined sample GOR 1529,9 sm³/sep m³

Fig.1 P-V and liquid drop out curves at 103,5°C



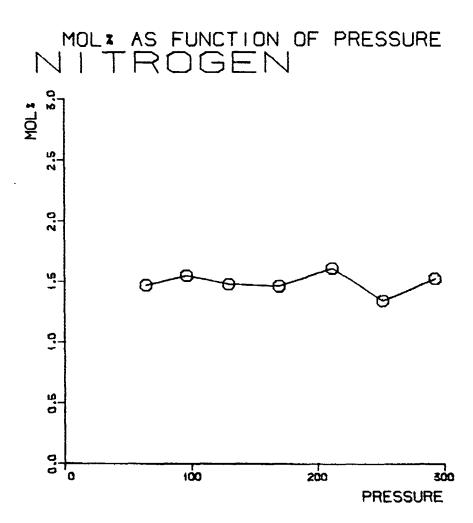


FIG. 2

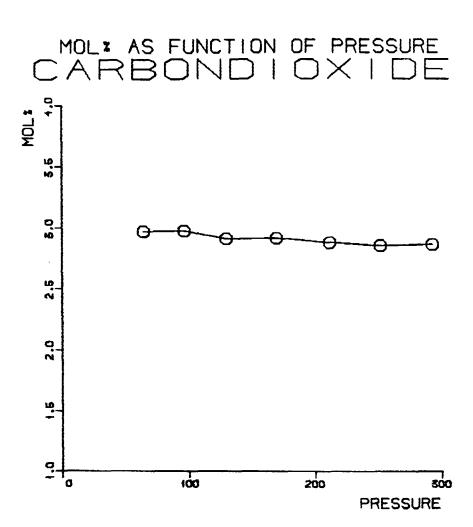


FIG. 3

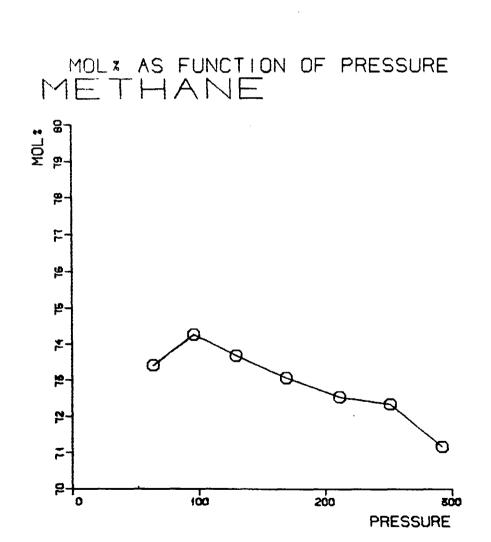
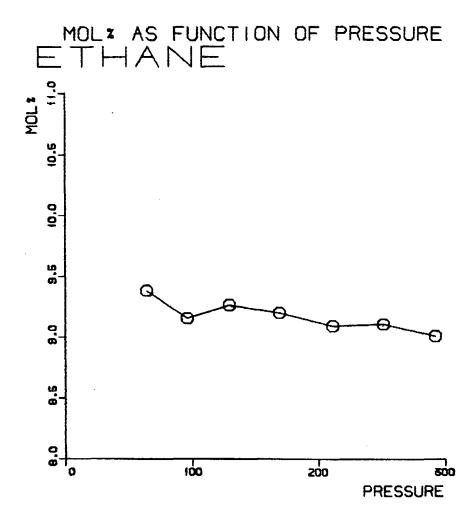
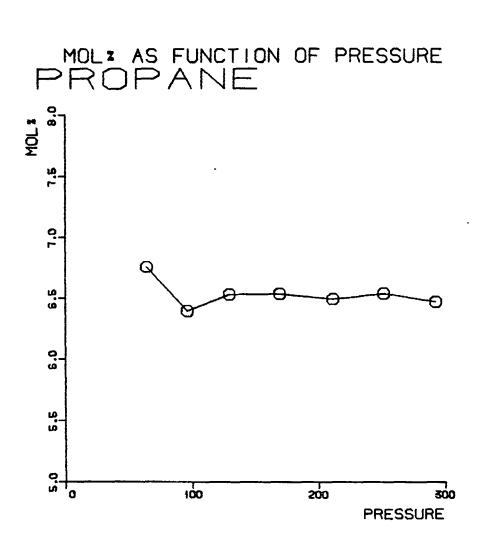


FIG. 4



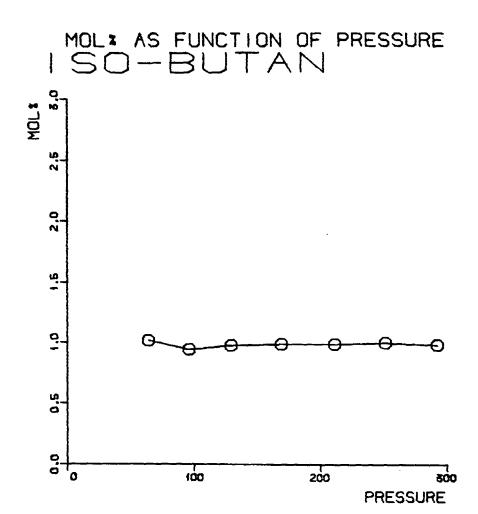


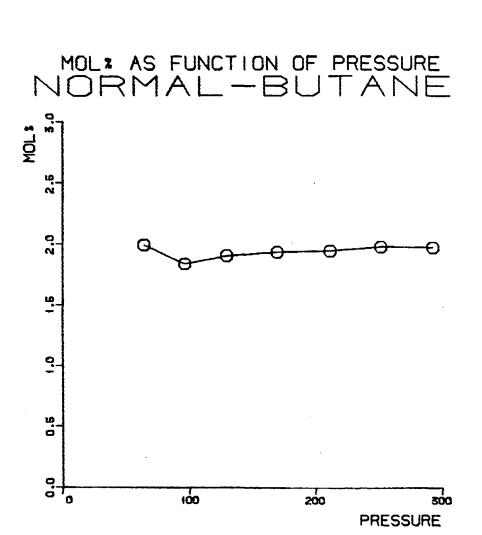


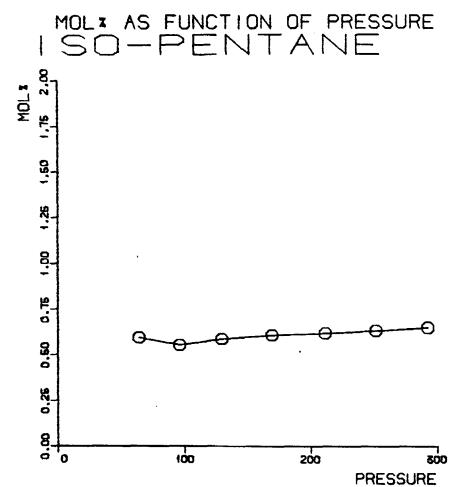
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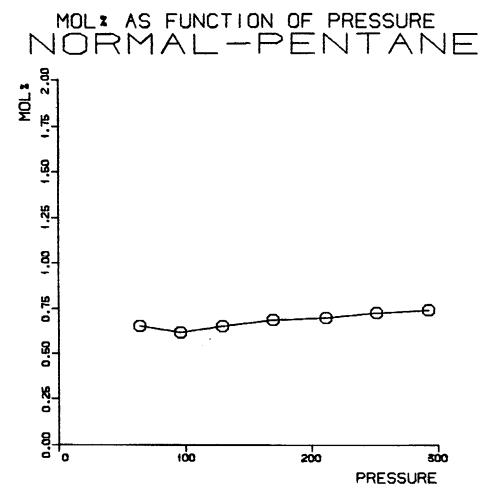
FIG. 6

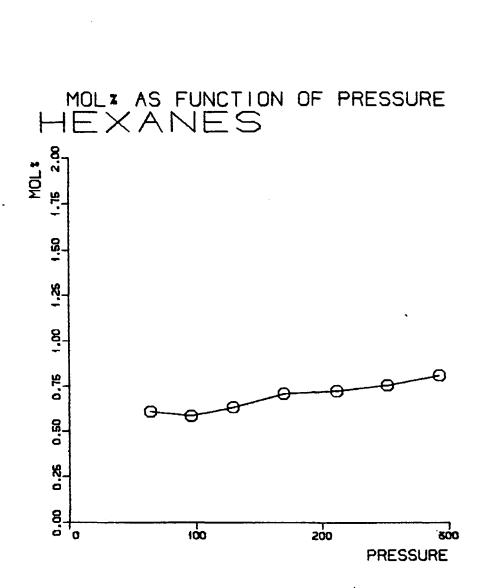


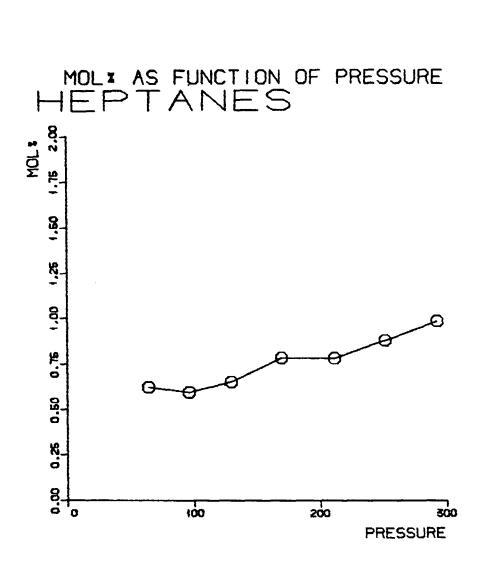


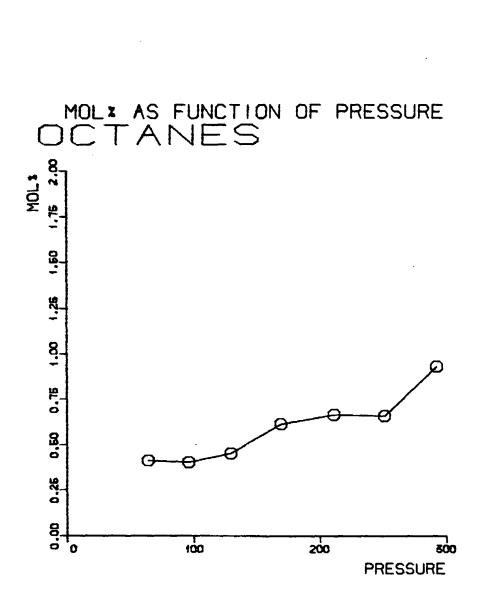


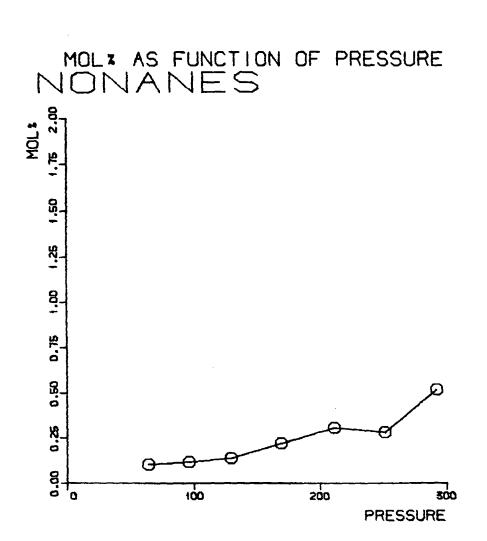


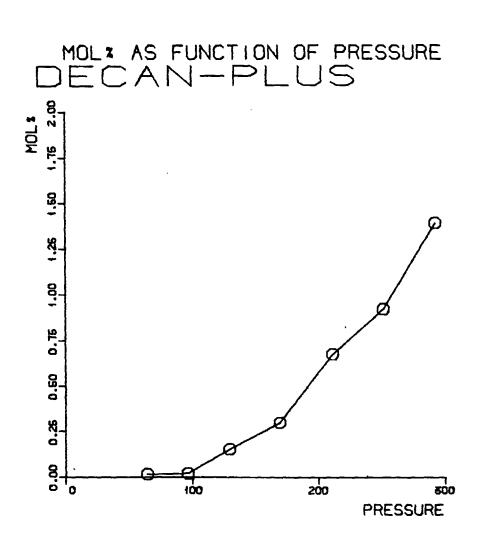












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APPENDIX

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FLOF	PETRO	Client :	STATOL		Section : ANNEX
Base : <u>51</u>	AVANGER		<u>5/9 - GAM</u> 5/9 - 11	IMA	Page : Report N°:
D:	57 # {	SURFACE SAM	PLING	PVT SE	t
Date of same	lina: Dec 1si je			- 	mpling No. :4
Sample natur	ling: <u>Dec. 1 si 1</u> e e : <u>Condens</u>	at.	Sampling	point : <u>Sep</u> .	cil outlet
Producing to	A-RESE	RVOIR AND WELL C			
Depth origin Surface eleva	ation : $111 m$	Shoe :	2792 m	Casin Shoe	g Dia. : <u>7" Liner</u> : <u>2950 m</u>
Bottom hole	Intial pressure	: 4338 PS	(A at dep	1h:278712	.4m_ date : 2/12 - 8
static		sured : 4332 PS	<u>) A</u> at dep	1h: 2787,2	$\frac{41}{12}$ date: $\frac{2}{12} - \frac{3}{12}$
conditions	Temperature				
	n sample was taken:		Time elap	sed since stabil	
	Choke size : <u>42/64</u> Bottom hole pressure	- since : 11.26 • 410 2 PSIA	Well head pro	essure : <u>247</u>	2. ¹⁵ Well head temp.
dynamic conditions	- · · · ·	103,5	at depth :	2793,7-m	date : $\frac{1}{12} - 81$
Flow measur	ement of sampled gas -	Gravity (air: 1) :).73	Factor Fpv =	= <u>1</u> : <u>/.0468</u>
	or calculations : See	e Chis report.			VZ
Separator	Pressure : <u>4</u> PS Temp. : <u>96</u> °F	IG Rates - Gas Oil (separator c	: <u>19.43</u> ond.) : <u>1797</u>	<u>6</u> BOP	$\begin{array}{c} \bigcirc & \bigcirc $
Stock		4.73 PSI mmHg		Oil at 60°F :_	1564.82 BOPD
tank	Tank temperature :		°F	il grav. 57	API
BSW :	º/o WLR :	0/0		0	· .
Transfering f	luid :Mercury	ý	Transfer du	ration :	lC min
	ons of the shipping both		<u>∤ ··── ·── ·── ──</u> 	<u></u>	······································
Pressure : 🚣	30_PSIGTemp. :			······	
	He No. : <u>3088 96</u>		by:		Shipping order No. :_
Coupled wit	h [LIQUID)		GAS
, , , , , , , , , , , , , , , , , , ,	hole samples No.	·			
·					
	· · · ·	······			o
Surface	samlpes No.			<u>A- 428</u>	<u> </u>
		B Meter - ith shrinkage tester -	БС	C orrected with ta	Dump - nk -
Measurment o A Tank -	a Corrcted wi		- استنبا		*
					Vica Chief On
A Tank -	D-REMARKS				Visa Chief Op Hunt Ne

	PETRO	Client :	STATOIL	Section :	ANNEX 4
Base : <u>5</u>	TAVANGER		15/9 - GAMI	MA Page : Report N	•:
DS	7#1	SURFACE SAM	APLING	PVT set # Z.	•
Date of samp	ing : <u>Dec.</u> 1 ^s	Service ord	ler :	Sampling N	o.: <u>6</u>
Sample nature		RESERVOIR AND WELL (1 0	
Producing zo		C Perforations :			al :
Depth origin		Tubing Dia. :	_5" VAM	Casing Dia. :	7 "Liner
Surface eleva	tion :M_m_	Shoe : Tail pipe	2792 m.	Shoe :	2950 m
Bottom hole	Intial pressure	: <u>4338 P</u> measured : <u>4332 P</u>	$\frac{(5)}{A}$ at depth	: 2787124m da	te : $\frac{2/12 - 81}{2/12 - 81}$
static conditions	Latest pressure Temperature	$\frac{105'}{105'}$	<u></u> at depth	: 1787, 21m da	te : $\frac{-712}{12} - 81$
	B - /	MEASUREMENT AND SA	MPLING CONDI		<u></u>
Time at which		n: <u>21.40</u>			
Bottom hole	Choke size : 42	164" since; 11.26	Well head press	ure : 2472 PSIA Well	head temp. : //
dynamic	Bottom hole pres	ssure : <u>407 PSIA</u> p. : <u>193,6°C</u>	at depth: <u>27</u> at depth: 27	$\frac{\times}{23}$, $\frac{1}{7}$ date date	: 1/12 = 81
conditions		ic i			
		gas - Gravity (air: 1) :			1.0468
·····	or calculations :	_see Otis repe			DR : 11/89 · 8
Separator	Pressure : $\underline{773}$ Temp. : $\underline{45}$	PSIG Rates - Gas - °F Oil (separator c	:ond.) : <u>1792</u>		parator cond.)
Stock	Atmosphere	: 14.73 HSI mmHg.	<u>60`_</u> °F Oi	at 60°F : 1560-6	4_BOPD
tank	Tank temperature	e :	°F Oı	Igrav. 57 AP	/ B B
BSW :	º/o W	/LR : º/d			
Transfering fl	uid : <u>Evacuat</u>	id container	Transfer durat	ion:20 m	in
Final conditic	ons of the shipping	a bottle :	<u></u>	·	· .
		mp. : <u>46 • F Amb.</u>	-		
		C - IDENTIFICATI			
1	the No. : $A \cdot 42^{\circ}$	86 sent on :	by:	Shipping	order No. :
Addressee :	<u> </u>				۶
Addressee : Coupled wit	n		D	G,	AS
Addressee : Coupled wit			D	G.	AS
Addressee : Coupled wit	n		D		AS
Addressee : Coupled with Bottom I	n nole samples No.		D	G. A-763b	AS
Addressee : Coupled with Bottom I Surface	n nole samples No. samipes No.		D		AS
Addressee : Coupled with Bottom I	n nole samples No. samlpes No. onditions.				AS
Addressee : Coupled with Bottom I Surface Measurment c	n nole samples No. samlpes No. onditions.	B Meter - B Meter -		A - 7636 C Dump - rected with tank -	
Addressee : Coupled with Bottom I Surface Measurment c	n nole samples No. samipes No. onditions. a Corrcte	B Meter - B Meter -	ЪCorr	A-7636 C Dump - rected with tank -	AS isa Chief Operat

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Date of sampling : $Dcc. [S7]_{1981}$ Sample nature:GQSA - RESERVOIProducing zone:JuraDepth origin:Surface elevation :	Field : Well : SURFACE SAMI - Service orde IR AND WELL CI - Perforations : $\frac{1}{4}$. Tubing Dia. : Fail pipe : $\frac{4}{3}38$ PS d: \frac{4}{3}38 PS d: $\frac{4}{3}38$	Ar : HARACTER 2797m - 2 5° VAN 2792 ~ 21A at de 1A at	PVT PVT ISTICS- 2807 m STICS- 2807 m STICS- 270 m STICS	Pag Rep Sct # Sct # Sampling Casing D Shoe 87,24m 87,24m 87,24m 87,24m 87,24m 87,24m 87,24m 87,24m 87,24m 87,24m 87,24m	ling No. : <u>5</u> <u>gqs_cutlit</u> interval : <u>100000000000000000000000000000000000</u>	//8º
DST # 1. Date of sampling : <u>Dcc.</u> (ST 1981 Sample nature : <u>Gas</u> A - RESERVOI Producing zone : <u>Jura</u> Depth origin : <u>PKB</u> Surface elevation : <u>111 m</u> Bottom hole Intial pressure Latest pressure measured Temperature B - MEASURE Time at which sample was taken : <u>2</u> Bottom hole Choke size : <u>42/64</u> ° si Bottom hole pressure : <u>41</u> Bottom hole temp. : <u>4</u> Flow measurement of sampled gas - Grav Values used for calculations : <u>Sce</u> (Separator Pressure : <u>445</u> PSIG Temp. : <u>95</u> °F	SURFACE SAMI Service orde IR AND WELL CI Perforations : 4 Tubing Dia. : Shoe : : 4332 PS : 4332 PS	PLING PLING ARACTER HARACTER 2797m - 2 5 VAN 2792 ~ 21A at de 1A at de 1A at de MPLING CO Time ela Well head p at depth : 2 at depth : 2 0.73	PVT $ressure: 23, 7$	Sct # Sep. of Sep. of Sampling i Casing D Shoe 87,24m 87,24m 87,24m 87,24m 87,24m 87,24m 87,24m 87,24m 87,24m	port N°: 2 . ling No. :5 ggs_cutLit interval : tia. : _7 "_Lincr : _2950 m date : $\frac{2}{12} - \frac{81}{2}$ date : $\frac{2}{12} - \frac{81}{2}$ ion : Well head temp, : 1 date : $\frac{10}{2} - \frac{81}{2}$	//80
Date of sampling : Dcc. [\$7] 1981 Sample nature Gas A - RESERVOI Producing zone Jura Depth origin Producing zone Surface elevation : 111 m Bottom hole Intial pressure static Latest pressure measured conditions B - MEASURE Time at which sample was taken : 2 Bottom hole Choke size : $42/b4^{\mu}$ si Bottom hole temp. Image: Addition to the temp. Flow measurement of sampled gas - Grave Values used for calculations : Sce (Conditions) Separator Pressure : 445 PSIG Temp. 95 °F	Service orde IR AND WELL CI Perforations : 2 Tubing Dia. : Tubing Dia. : Shoe : Shoe : : <u>4338 P5</u> d: <u>4332 P5</u> d: <u>43532 P5</u> d: <u>4355 C</u> wity (air: 1) : (2)	Ar : HARACTER 2797m - 2 5° VAN 2792 ~ 21A at de 1A at	ng point : ISTICS- 2807 m 907 m 90	Sampling Sep. of Sampling Casing D Shoe 87,24m 8	ling No. : <u>5</u> <u>gqs_cutlit</u> interval : <u>100000000000000000000000000000000000</u>	//80
A - RESERVOI Producing zone : Jura Depth origin : <u>Producing Zone</u> Surface elevation : <u>Producing Zone</u> Bottom hole Intial pressure static Latest pressure measured conditions Temperature Bottom hole Choke size : <u>Producing Zone</u> Gynamic Bottom hole pressure : <u>Producing Zone</u> Conditions Bottom hole temp. <u>Producing Zone</u> Flow measurement of sampled gas - Grav Values used for calculations : Sce Cone Separator Pressure : <u>Producing Zone</u> <u>Producing Zone</u>	IR AND WELL CI Perforations : a Tubing Dia. : Shoe : Tail pipe : : 4338 PS d: 4332 PS d: 4332 PS d: 4332 PS d: 4332 PS d: 4332 PS d: 4332 PS d: 105 °C EMENT AND SAN 21.10 ince : 11.26 102 PS (A 103,5 °C	HARACTER 2797m - 2 5 VAN 2792 ~ 21A at de 1A at de 1A at de MPLING CO Time ela Well head p at depth : 2 at depth : 2 0.73	ISTICS- 2807 m s 2807 m s 4 pth : 27 pth : 27 pth : 27 NDITIONS psed since pressure : 2 7 8 3, 7	Shoe Shoe 87,24m 87,24m 87,24m 87,24m 87,24m 87,24m 87,24m 87,24m	interval : ia. : _7 "incr : _2950 m date : $\frac{2}{1/2} - \frac{81}{2}$ date : $\frac{2}{1/2} - \frac{81}{2}$ ion : Well head temp, : 1 date : $\frac{1}{2} - \frac{81}{2}$	//80
Producing zone Jura Depth origin : <u>PKB</u> Surface elevation : <u>IILm</u> Bottom hole Intial pressure static Latest pressure measured conditions Temperature Bottom hole Choke size : <u>42/b4</u> " si Bottom hole temp. : Flow measurement of sampled gas - Grav Values used for calculations : sce (Conditions) Separator Pressure : <u>445</u> PSIG Temp. : <u>95</u> °F	Perforations : 4 Tubing Dia. : Shoe : Tail pipe : 4338 P5 d: 4332 P5 : 105 °C EMENT AND SAM 21.10 ince : 11.26 102 PSIA 103.5 °C wity (air: 1) : 0	$\frac{2797m - 2}{5 \cdot VAn}$ $\frac{5 \cdot VAn}{2792 }$ $\frac{21A}{2792} $ at de the the term of the term of the term of ter	$\frac{807m}{pth} : \frac{27}{27}$ $pth : \frac{27}{27}$ $pth : \frac{27}{27}$ $NDITIONS$ $psed since$ $ressure : 2$ $\frac{7}{27} : \frac{7}{3} : \frac{7}{7}$	Casing D Shoe 37,24m 87,24m 87,24m 87,24m 87,24m stabilisati	Dia. : 7 " Liner : 2950 m n date : $\frac{2}{12} - 81$ date : $\frac{2}{12} - 81$ ion : Well head temp, : 1 date : $\frac{10}{2} - 81$	//80
Surface elevation :	- Shoe :- Tail pipe :- : <u>4338 P5</u> : <u>4332 P5</u> : <u>105 °C</u> EMENT AND SAM 21.10 ince : <u>11.26</u> 102 PSIA 103,5 °C wity (air: 1) : 0	2792 ~ 1A at de 1A at de 1A at de at de WPLING CO Time ela Well head p at depth : 2 at depth : 2 0.73	pth : 27 pth : 27 pth : 27 NDITIONS psed since pressure : 2 783,7	Shoe 87,24m 87,44m 87,24m 87,4	$\frac{2950 \text{ m}}{2950 \text{ m}}$ $\frac{1}{2} \text{ date } \frac{2}{12} - \frac{81}{2}$ $\frac{1}{2} \text{ date } \frac{2}{12} - \frac{81}{2}$ $\frac{1}{2} - \frac{81}{2}$	//80
Bottom hole static conditions Intial pressure Latest pressure measured Temperature B - MEASURE Time at which sample was taken : 2 Bottom hole dynamic conditions Choke size : $\frac{42/b4^{\mu}}{5}$ si Bottom hole pressure : $\frac{41}{5}$ Flow measurement of sampled gas - Grav Values used for calculations : Sec (1000) Separator Pressure : $\frac{445}{5}$ PSIG Temp. : $\frac{95}{5}$ °F	Tail pipe : <u>4338 P5</u> : <u>4332 P5</u> : <u>105 °C</u> EMENT AND SAN 21.10 ince : <u>11.26</u> 102 PSIA 103.5 °C wity (air: 1) : 0	DIAat de IAat de IAat de IAat de MPLING CO Time ela Well head p at depth : 2 at depth : 2 0.73	pth : 27 pth : 27 pth : 27 NDITIONS psed since pressure : 27 783, 7	87,24m 87,24m 87,24m 87,24m 87,24m 87,24m	$\frac{1}{2} = \frac{12}{2} +	//80
static conditions Latest pressure measured Temperature B - MEASURE Time at which sample was taken : Bottom hole dynamic conditions Choke size : $\frac{42/by^{\mu}}{5}$ si Bottom hole pressure : si Bottom hole pressure : Flow measurement of sampled gas - Grav Values used for calculations : See (Separator Pressure : $\frac{445}{5}$ PSIG Temp. : PSIG (Separator	d: <u>4332 PS1</u> : <u>105 °C</u> EMENT AND SAM 21.10 ince: <u>11.26</u> 102 PS1A 103,5 °C	A at de at de MPLING CO Time ela Well head p at depth : ₽ 0.73	pth : 17 pth : 17 NDITIONS psed since pressure : 27 7 83 , 7	87,24m 87,24m stabilisati	date : $\frac{2}{12} - \frac{81}{81}$ date : $\frac{2}{12} - \frac{81}{81}$ ion : Well head temp, : 1 date : $\frac{10}{80} - \frac{87}{81}$	//80
Time at which sample was taken :2Bottom holeChoke size : $\frac{42/b4*}{5}$ sidynamicBottom hole pressure :4conditionsBottom hole temp. :4Flow measurement of sampled gas - GravValues used for calculations :5 ce (CSeparatorPressure :445_ PSIGTemp. :95 °F	21.10 ince: <u>11.26</u> 102.PSIA 103.5°C	Time ela Well head p at depth : 2 at depth : 2	psed since pressure : 2 7 83, 7	1472 PSIA	Well head temp, : 1 date : <u>10 - 87</u>	
dynamic conditionsBottom hole pressure : _4 Bottom hole temp. : _4Flow measurement of sampled gas - Grav Values used for calculations : _sce Conditions : _sce Temp. : _95_ °F	102 PS1A 103.5 C wity (air: 1): 0	at depth : 쉽 at depth : 완 0.73	1783,7	m	date : $\frac{1}{0} - 87$	
Values used for calculations : See (Separator Pressure :445PSIG Temp. :95°F	vity (air: 1) : <u>(</u> Otis report	0.73				·
Values used for calculations : See (Separator Pressure :445PSIG Temp. :95°F	Ctis report		Factor	Fpv =_	<u>1</u> : <u>1.0468</u>	
Separator Pressure : <u>445</u> PSIG Temp. : <u>95</u> °F						
	Rates - Gas	:19.9	731 MM 7.6	1 SCFD BOPD	GOR : <u>//087</u> B (separator cond.)	<u>6</u>)
					Y.SZ BOPD	
	:		Oil gra	<u>v. 57</u>	API	<u></u>
BSW : º/o WLR :	%					
Transfering fluid : Evacuated conte	ainer	Transfer d	uration : _	20	min.	
Final conditions of the shipping bottle : Pressure : <u>445 P\$16</u> Temp. :	46°F Amb.			<u></u>	- <u> </u>	<u> </u>
	IDENTIFICATIO					
Shipping bottle No. : <u>A - 7636</u> se Addressee :	•	<u> </u>		Shi _l	pping order No. :	
Coupled with	LIQUID				GAS	
Bottom hole samples No.	<u>`</u>					
Surface samipes No.	86		A-	4286		
Measurment conditions. A Tank - a Corrcted with shi	B Meter - rinkage tester -	Ь	Corrected	C Duwith tank		
D - REMARKS -					Visa Chief Oper	ator
÷ .					Kuit Nero	_

FLOPETR	Client	STATOIL	Secti	on : ANNEX 42
	Field :	15/9 - GAMMA	Page	e:
Base : <u>STAVANGER</u>	Well :	15/9-11	Rep	ort N°:
DST #1	SURFACE S		PVT set a	#3
Date of sampling : <u>Dcc.</u> Sample nature : <u> </u>	<u> Si 98 </u> Service S	order : Sampling poi	Samplir Int : <u>Sep. ga</u>	ng No.: <u>8</u> s outlet
Producing zone :	- RESERVOIR AND WE			terval :
Depth origin : <u>RK</u> Surface elevation :///				
Bottom hole Intial pressu static Latest press	re : <u>4338</u> ure measured : <u>433</u> 2	PSIA at depth :	2787,24m 2787,24m	date: $\frac{2/12-8/}{2/12-8/}$
E Time at which sample was ta	- MEASUREMENT AND ken : 22.10			n :
dynamic Bottom hole p	42/64"	at depth : 278	317m	date : <u>1/12 - 81</u>
Flow measurement of sampl Values used for calculations	ed gas-Gravity (air: 1): : See Otis rep	<u>0.73</u> F	actor Fpv $= \frac{1}{\sqrt{2}}$	<u>;</u> <u>1.0460</u>
Values used for calculations Separator Pressure : Temp. :	<u>40</u> PSIG Rates - Gas 6 °F Oil (separat	: <u>19.918</u> or cond.) : <u>1790 . 4</u>	MM SCFD BOPD B	GOR : <u>///24•9</u> (separator cond.)
Stock Atmosphere tank Tank tempera	: <u>14.73 PS</u> / mmHe ture :		160°F : <u>155</u> grav, 57	
BSW : º/0	WLR :	9/0.	J	
Transfering fluid :	atid. container	Transfer duratio	n:/5	min.
Final conditions of the shipp Pressure : <u>440</u> PSIG	ing bottle : Temp. : _46 °F A m		<u></u>	
Shipping bottle No. : <u>A-1</u> Addressee :	1342	TION OF THE SAMPL	E Ship	bing order No. :
Coupled with	LIG	UID .		GAS
Bottom hole samples N	lo.		· · · · · · · · · · · · · · · · · · ·	
Surface samipes No.	8088 51		A-7148	
Measurment conditions. A Tank - a Cor	B Meter rcted with shrinkage test		C Dum ted with tank -	1P –
D - REA	AARKS -	······		Visa Chief Operator
	· ·	:		Knut Nerdal
·	· · · ·			YVVVV YVVV

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	PETRO	DL Client :	STATOIL		Section : ANNEX
_	AVANGER	Field :	15/9 - GAI 15/9 - 11	<u>4MA</u>	Page : Report N°:
 ۱) (SURFACE SA		PVT	set # 3
Sample natur	e :Gas		Sampli	ng point : <u>Se</u>	Sampling No. : <u>9</u> p. gas outlit
Producing zc		ESERVOIR AND WELL Perforations			bling interval :
Depth origin Surface eleva	: <u> </u>	Shee	<u>5" VA</u> 2792 ~	<u>M</u> Ca: Sho	sing Dia.: <u>7" Liner</u> De : <u>2950 m</u>
Bottom hole static conditions	Intial pressure Latest pressure Temperature	measured : <u>4332 r</u>	<u>SIA</u> at de	pth: 0787	$\frac{24m}{24m} \text{ date } : \frac{21}{2} - \frac{81}{2}$ $\frac{24m}{24m} \text{ date } : \frac{21}{2} - \frac{81}{2}$ $\frac{24m}{24m} \text{ date } : \frac{21}{2} - \frac{81}{2}$
Time at which		AEASUREMENT AND SA			oilisation :
Bottom hole dynamic conditions	Bottom hole pres	$\begin{array}{r} 64^{"} & \text{since} : 11.26\\ \text{sure} : 410.7 \text{ PS1A}\\ \text{so} : 10^{\circ}; 12^{\circ}; 12$	at depth :_	<u>2783.4m</u>	Well head temp. : 120 date : <u>1/12 - 81</u> date : <u>1/12 - 81</u>
	ement of sampled g	gas-Gravity (air: 1) : _ Sec Ofis repor		Factor Fp	$v = \frac{1}{\sqrt{Z}}: 1.0462$
Separator	Pressure : <u>445</u> Temp. : <u>97</u>	PSIG Rates - Gas	: 20.	268 MM SC 16.16 BC	FD GOR : <u>11284 • 1</u> OPD B (separator cond.)
Stock tank	Atmosphere Tank temperature	:14.73 PSJ mmHg.	<u> 60 </u> °F °F	Oil at 60°F Oil grav.	: <u>1563.6</u> BOPD S7 ABI
BSW :	º/o W	LR : º/o	·		
Transfering f	uid : <u>Evacuated</u>	l container	_ Transfer o	luration :	16 min
Final condition	ons of the shipping <u>445 PSIG</u> Ter	bottle : np. : <u>46° FHmb.</u> :	-		
Shipping bo Addressee :	Hle No. : <u>A-714</u>	C - IDENTIFICATI			_ Shipping order No. :
Coupled wit	h	LIQUI	D		GAS
Bottom	hole samples No.		·		'
Surface	samlpes No.	8088 51		A- 113	342.
Measurment c A Tank -		B Meter - d with shrinkage tester	Ъ	[Corrected with	C Dump - tank -
	D - REMAI	RKS -	<u> </u>		Visa Chief Operato
					Knut Nerda

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	PETRO	DL Client :	STATOIL	Section : ANNEX	42
Base : STA	VANGER	Field : Well :	15/9 - Самма 15/9 - 11	Page : Report N°:	
D.	sī # 1.	SURFACE S		PVi set #3.	
Date of sampli Sample nature	ng: <u>Dcc.</u> /si : <u>Condu</u>	<u>1981</u> Service nsati	order : Sampling point	Sampling No. : : _Sep. gas cutlut	7
Producing zor			L CHARACTERISTICS- s : 2797 m - 280 Jm	 Sampling interval :	
Depth origin	: <u>RK</u> E	2 Tubing Dia		Casing Dia. : 7" Lin	er
Bottom hole static conditions	Intial pressure Latest pressure Temperature		<u>PSIA</u> at depth :	78 7,24m date :2/12 - 78 7,24m date :2/12 - 78 7,24m date :2/12 -	- 81
Time at which		_	SAMPLING CONDITIO		· · ·
dynamic	Choke size : <u>42/</u> Bottom hole press Bottom hole temp	sure: 4107 1951	A	$\frac{2473}{7}$ Well head tem $\frac{7}{7}$ date : $\frac{1429}{112}$ $\frac{112}{7}$	830
Flow measures Values used fo	ment of sampled g or calculations :	as-Gravity (air: 1) : See Ctis rep	<u>0.73</u> Fac	tor Fpv = $\frac{1}{\sqrt{Z}}$: $\frac{1.04}{\sqrt{Z}}$	60
		_PSIG Rates - Gas		M_SCFD GOR : 1/1	24.9
	ressure : <u>770</u> remp. : <u>96</u>	_ °F Oil (separate	prcond.) : <u>1790.4</u>	BOPD B (separator c	ond.)
	ſemp. : <u>96</u>	– °F Oil (separate	prcond.): 1790.4	BOPD B (separator c	ond.) D
Stock tank	Femp. : <u>96</u> Atmosphere Tank temperature	– °F Oil (separate	1790.4 -60_{F} Oil at -60_{F} Oil at -60_{F} Oil at -60_{F} Oil at	BOPD B (separator c	ond.) D
Stock fank BSW :	Femp. : <u>96</u> Atmosphere Tank temperature	_ °F Oil (separate : <u>14. 7.3 PS</u> / mmHg : LR :	1.790.4 1.60 F Oil at 1.60 F Oil at 1.60 F Oil at 0.16	BOPD B (separator c	:ond.)
Stock tank BSW : Transfering flu	Temp. : 96 Atmosphere Tank temperature	_ °F Oil (separate : <u>14. 7.3 PS</u> / mmHg : LR :	pricond.): 1790.4 1000 F Oil at Cil g 1000 F Cil g 1000 Cil g	BOPD B (separator c SOFF : <u>ISS8.S6</u> BOP Prav. S7 API	ond.) D
Stock tank BSW : Transfering flu Final condition Pressure : 25 Shipping bott	Temp. : 96 Atmosphere Tank temperature	C - IDENTIFICA	Pricond.) : <u>1790.4</u> Oil at Oil At	BOPD B (separator c SOFF : <u>ISS8.S6</u> BOP Prav. S7 API	cond.) D B B B Z Z
Stock tank BSW : Transfering flu Final condition Pressure : 25 Shipping bott	Temp. : 96 Atmosphere Tank temperature	C - IDENTIFICA	Pricond.) : <u>1790.4</u> Oil at Oil At	BOPD B (separator c 50°F : <u>1558.56</u> BOP prav. S7 API :15 min.	cond.) D B B B Z Z
Stock tank BSW : Transfering flu Final condition Pressure : _25 Shipping bott Addressee : Coupled with	Temp. : 96 Atmosphere Tank temperature	C - IDENTIFICA		BOPD B (separator of 50°F : 1558.56 BOP)	cond.) D B B B C C C C C C C C C C C C C C C C
Stock tank BSW : Transfering flu Final condition Pressure : _25 Shipping bott Addressee : Coupled with	Femp. : 96 Atmosphere Tank temperature	C - IDENTIFICA	0 1790.4 0 0 <	BOPD B (separator of 50°F : 1558.56 BOP)	cond.) D B B B B a
Stock tank BSW : Transfering flu Final condition Pressure : _2 Shipping bott Addressee : Coupled with Bottom h	Temp. : 96 Atmosphere Tank temperature 0% Will id : Mercus id : State ole samples No. State onditions. Mercus	C - IDENTIFICA	0 1790.4	BOPD B (separator of 50°F : 1558.56_BOP trav. S7_API :S7_API :Shipping order No GAS 	cond.) D B B B C C C C C C C C C C C C C C C C

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	FLOPETRO		STATOIL		n : ANNEX 42
	Base: Starranger	Field : Well :	5/9 - Gamma 5/9 - 11	Page Repor	
	DST#2		• •		
		SURFACE SA	<u></u>		
	Date of sampling : <u>Dec St</u> Sample nature : <u>Cendle</u>	an 1981 Service ora	ler :	<u>Sampling</u> :	No.: _1
	A-R Producing zone : <u>Paler</u>	ESERVOIR AND WELL		 Sampling inte	erval :
	Depth origin : <u>RKB</u> Surface elevation : <u>111m</u>	Tubing Dia. :	5" VAM 2426.42m	Casing Dia. Shoe	95/5" 2575m
	Bottom hole Intial pressure static Latest pressure conditions Temperature	measured : <u>3539</u>	SIA at depth : 20 SIA at depth : 20 F at depth : 20	106:36m	date : 9/12-51
\odot	B - A Time at which sample was taken	$\begin{array}{c} \text{MEASUREMENT AND SA}\\ \vdots \underline{O4.30} \end{array}$:
	Bottom hole Choke size : 32 dynamic Bottom hole pres conditions Bottom hole temp	$\begin{array}{r} \frac{1}{24^{n}} & \text{since} : \frac{03.35}{3434815} \\ \text{sure} : \frac{3434815}{5} \\ \text{sure} : \frac{209.1^{\circ}\text{F}}{5} \end{array}$	_ at depth :Q	1 An Blim di	ate : $\frac{5112 - 81}{2}$
- 1	Flow measurement of sampled	gas - Gravity (air: 1) : _	0.72 Fact	or $Fpv = 1$	=: 1.C183
	Values used for calculations :	See Otis report		· VZ	
		PSIG Rates - Gas	: <u>8.202 M</u> cond.) : <u>691.2</u>		GOR : 1277() (separator cond.)
	Stock Atmosphere tank Tank temperature	: 14.73 R1 mmHg	0 E	$\frac{0}{10} F : -\frac{1}{10} \frac{1}{10}$	
	BSW : º/o W	LR : º/o	1	<u> </u>	
	Transfering fluid : <u>Marcu</u>	-ry	Transfer duration :	25m	n
	Final conditions of the shipping Pressure : <u>120 PS16</u> Ter	bottle : <u></u> np. : <u></u> 			tin and the second s
		C - IDENTIFICATI	ON OF THE SAMPLE	• • • • • • • • • • • • • •	
	Shipping bottle No. : <u>1709</u> Addressee :	100 sent on :	by:	Shippi	ng order No. :
	Coupled with	LIQUI	D	4	GAS
	Bottom hole samples No.	· •	······································		+
-	- 1	· •			<u> </u>
	Surface samipes No.			A - 10915	
	Measurment conditions. A Tank - a Corrcte	B Meter - d with shrinkage tester -		Dump Marine	ранан ^{ан са} лана 9 4 г.
	D - REMAR	RKS -	59.57		Visa Chief Operator
DOP 127		-			Fan Pyre

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	FLOF	PETRO	C	•	STAT		Secti	on : ANNEX	<u>42</u>
	Base :	taunger		Field : Well :	5/9-Gc 5/9-11	ummer	Page Rep	e :	
' [D	57#2		SURFACE SAN	PUNG				
		Dec St	h 1912				~ ··	. 9	
	Date of samp Sample natur	bling: <u>Dec 8rd</u> re: <u>Gcv</u> ろ		L Service ord	er : Sampl	ing point : $_$		gas antlet	
╹╎	Due duete e es			DIR AND WELL C					
		one :							
	Depth origin Surface eleve	ation : <u></u>		_ Tubing Dia. : – Shoe	<u>5"V</u> 4		ising Dia Ioe	a.: <u>43/8'</u> :	
	Bottom hole	Intial pressure		: 35 39 8	SIA at d	epth : <u>240</u> 6	; <u>36</u> m	date : <u>?//)</u>	-81
	static conditions	Latest pressure Temperature	measure	nd: <u>3539 </u>	<u>6 j.t)</u> at d at d	epth : <u> </u>	6, <u>36m</u> 6, <u>36i</u>	date : $\frac{9/11}{12}$	- <u>¥)</u> - <u>¥/</u>
୍ତି	Time at whic	B - A h sample was taker		EMENT AND SA			bilisatio	on :	
╏┠	Bottom hole	Choke size : 32/	<u></u>	since <u>03.35</u>	Well head	pressure : <u>}</u>	<u>9513</u> 141	Well head temp	.: <u>SL°F</u>
	dynamic	Bottom hole pres Bottom hole temp	sure :	160 1 °C	at depth :	2406-361V	<u> </u>	date: $\frac{8/12}{8/12}$	<u>s /</u>
╏┟	conditions	•							
	Flow measurement of sampled gas - Gravity (air: 1) : Factor Fpv = $\frac{1}{\sqrt{Z}}$: Factor Fpv = \frac{1}{\sqrt{Z}}							3	
╏┝		for calculations : Pressure : <u>144</u>	2 وو (Itis report	<u>.</u>	202 MM c		GOR :_12-	2 70
	Separator	Temp. $\frac{191}{5}$	°F	Oil (separator c	ond.) : <u>6</u>	<u>91,2</u> B		(separator co	ond.)
	Stock tank	Atmosphere Tank temperature		<u>3 PSI mmHg.</u>					BBBB
╏┟		└ º/₀ ₩			<u>+</u>	Oil gra	<u>v. 5</u>	7°AP1	
╹╽								<u></u>	<u> </u>
\mathbf{r}	Transfering f	luid: E venence	til (entainer	Transfer	duration :	<u>- 5 inn</u>	.n	
	Final conditi Pressure :	ons of the shipping 144 PSi G Ter	bottle : np. :	36°F Amb		<u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>			
		• • • • •	С	- IDENTIFICATIO	ON OF THE	SAMPLE			
	Shipping bo Addressee :	ttle No. : <u>A-169</u>	<u> 5</u> s	ent on :	by:		Ship	ping order No.	:
╸╽	Coupled wit	th		LIQUID)			GAS	
	Bottom	hole samples No.		······································					
╸╽					- <u></u>			<u> </u>	
			<u> </u>	69/103			987		
■	Surtace	samipes No.		<u> </u>					
	Measurment (A Tank -		ed with sl	B Meter - hrinkage tester -	Ь	Corrected wit	C Dun h tank -	np -	
		D - REMAI	RKS -	•••••••• <u>•</u>	<u></u>			Visa Chief C)perator
DOP 127								Jan P	yre
									4

						40
FLOP	ETRO		ent: ST		L	Section : ANNEX 42
Base : Sto	Wander	. Fie 	eld : <u>13/g -</u> ell : <u>15/g -</u>	<u>60mm</u>	<u>CA</u>	Page : Report N°:
Date of samplin	g: <u>Dec</u> 2-4		CE SAMPLING		Sa	mpling No.: <u>3</u>
Sample nature					```	
Producing zone	• :	Perfor	ations :	· · ·	Samplii	ng interval :
Depth origin	: RKB	Tubing Shoe	Dia. : 5	"VAM	_ Casin _ Shoe	g Dia. : 5/g ^{//}
static	Intial pressure Latest pressure Temperature	measured : <u>"3 5</u>	JARSIA	at depth : _	24065	$\frac{1}{2} \frac{1}{2} \frac{1}$
Time at which sa		AEASUREMENT A : <u>10.10</u>				isation :
dynamic Be conditions B	ottom hole pres ottom hole temp	sure : <u>3435</u> . : <u>100,</u>	PSIA_at dep Eat dep	oth : <u>- みり</u> oth : <u>- みり</u> で	16.36 m	$\frac{13}{2} \text{ Well head temp. : } \frac{84^{\circ}1}{12^{\circ}1}$ $\frac{13}{2} \text{ date : } \frac{8112^{\circ}11}{12^{\circ}21}$ $\frac{13}{2} \text{ date : } \frac{8112^{\circ}21}{12^{\circ}21}$
Flow measurem Values used for	ent of sampled g calculations :	gas-Gravity (air: See Otisr	1): _0.7 enert	<u> </u>	ictor Fpv =	$=\frac{1}{VZ}: \frac{1.0188}{1.0188}$
Separator Pr Te	essure : <u>146</u> mp. : <u>63</u>	_ PSIG Rates - (_ °F Oil (sep	Gas : arator cond.) :	5.272	MM SCFL BOP	$\begin{array}{c c} & GOR: \underline{1}, \underline{710} \\ \hline B \\ \hline B \\ \hline \end{array} (separator cond.) \end{array}$
	tmosphere ank temperature	:14,75PS1 m		_°F Oil at _°F OʻLα	60°F :_	<u>F 50,4</u> BOPD
BSW :	0/0 W	LR :	0/0			
Transfering fluic	H: E Vas cono	ted Contain	لر Tran	sfer duration	1:_25	mh
Final conditions Pressure :14	b PS I G Ten	bottle : np. :36°.F	Amla			
	No.: <u>A-498</u>	<u> </u>	FICATION OF	THE SAMPLE by :	: : :	Shipping order No. :
Coupled with			LIQUID			GAS
Bottom ho	le samples No.			.		
Surface sa	mlpes No.	92.09/10	2 <u>0</u>		H - 10 °	<u>115</u>
Measurment con A Tank -		B Me d with shrinkage		b Correct		Dump - nk -
	D - REMA	RKS -				Visa Chief Operator
			•			Jem Gyre

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	PETRO		Clinate	TAT	<u></u>		. 12
-LUI						Section : ANNE	× ••• ∠
Base : 5	tavunger		Field : <u>13</u> Well : <u>15</u>	19-60 19-11	<u></u>	Page : Report N°:	
	ST #3		SURFACE SAM	PLING	• P	VT set=	I
Date of sam Sample natu	pling: <u>Des 14</u> th re: <u>Conclus</u>	1981 mite	_ Service orde		ng point	iampling No. :	1 t
Producing z	one : faller		IR AND WELL C			, ling interval :	
Depth origir Surface elev	n : <u>RXR</u> ration: <u>111</u> m)	Tubing Dia. : Shoe :	5"V / 2341	M Cas	ing Dia. : $\frac{95/3}{57}$	11 5m
Bottom hole static conditions		measured	: <u>3521PS</u> 1: <u>3520 PS</u> : <u>136°</u> F	IA at de	epth : <u>2370</u>	9 m date : 22 9 m date : 22 9 m date : 23 9 m date : 20	c 14th - 81
Time at whic	B - A h sample was taken		MENT AND SA			ilisation ;	·•
Bottom hole dynamic conditions	Choke size : <u>43//</u> Bottom hole pres Bottom hole temp	sure :	5433PS1A	at depth :_	2370,9 .	z date : Dec	. 14th_81
Flow measur Values used	rement of sampled g	gas-Grav	vity (air: 1):	134	Factor Fpv	$v = \frac{1}{\sqrt{Z}}: -\frac{1}{\sqrt{Z}}$	0536
Separator	Pressure : <u>785</u> Temp. : <u>90</u>	PSIG	Rates - Gas	: <u>~~</u> ; ond.) : <u>/ 3</u>	<u>657_20</u> SC 598BO	FD GOR : _/ PD B (separator	
Stock tank	Atmosphere Tank temperature			۶ <u>۲</u> ۴۴		вс вс вс	
BSW :	0/0 W	LR :	0/0	¹	<u> </u>		
Transfering	fluid : <u>Merry</u>	ry		Transfer o	duration : 🐴 🕄	o min.	
Final condit Pressure : _	ions of the shipping うるち PSIE Ter	bottle : np. : <u>3 5</u>	JBCC FAME				······
Shipping bo Addressee	ottle No. : <u>9314</u> /	- C کلا se	IDENTIFICATIO	N OF THE S	SAMPLE	_ Shipping order t	No. :
Coupled wi	ith		LIQUID	· · · · · · · · · · · · · · · · · · ·		GAS	
- Bottom	hole samples No.						
Surface	ə samlpes No.					051	
Measurment A Tank -		ed with sh	B Meter – rinkage tester –			C] Dump - tank -	· · · · · · · · · · · · · · · · · · ·
	D - REMAN	RKS -	·			Visa Chi	ef Operator
				• • •		Gan	gyre
I			·				

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FLOPETROL	Client : S	Enfoil	Sect	ion : ANNEX	42
Base : Stavanger	Field : Well :	5/9- GA14,14:	7 Pag Rep	e : oort N°:	
DST #3			127	Sett 1.	
	SURFACE SAM	PLING	-		
Date of sampling : <u>Des 1944 19</u> Sample nature : <u>9</u> 23	<u>Sí</u> Service orde	er :Sampling po	Sampli مرحد : Sampli	ng No.: <u>3</u>	
	VOIR AND WELL C				
Producing zone : <u>Paleocene</u>					, <u> </u>
Depth origin : <u>RKB</u> Surface elevation : <u>i// m</u>	Tubing Dia. : . Shoe :	<u>5 1/4M</u> 2391 m	Casing Di Shoe	$a.: \frac{95/8}{2575n}$?
Bottom hole Intial pressure static Latest pressure measure conditions Temperature	ured : 3520 P	$\frac{51A}{51A}$ at depth : at depth : at depth :	23.709m	_ date : <u></u>	17tr -81
Time at which sample was taken: _		Time elapsed	since stabilisati		
Bottom holeChoke size : $\frac{\sqrt{3}/64}{64}$ dynamicBottom hole pressure :conditionsBottom hole temp. :	3433 PSIA	at depth : $-\frac{23}{3}$	70.9 m	date : Esc 14th	1.81
Flow measurement of sampled gas -	Gravity (air: 1):	0.734	Factor Fpv = $\frac{1}{\sqrt{2}}$		ić.
Values used for calculations :SceSeparatorPressure :2785PSI				-	· ·
Separator Pressure : <u>2785</u> PSM Temp. : <u>90</u> °F	G Rates - Gas Oil (separator c	: <u>20039.</u> ond.) : <u>1598</u>	BOPD	GOR : <u>12.5</u> (separator co	<u>3 8</u> nd.)
StockAtmosphere: 14tankTank temperature :		<u>50</u> ۴ Oil ۴ Oil	at 60°F :	BOPD	B 🚱 a
BSW : % WLR :	º/ ₀		J		<u>-</u>
Transfering fluid :		Transfer durati	on :2	Omin.	
Final conditions of the shipping bottl Pressure : <u>485 PSi</u> Temp. : .	8: 35°17 Amb.				
Shipping bottle No. : <u>A-Robæ</u> Addressee :		DN OF THE SAMP	LE Ship	ping order No.	:
Coupled with	LIQUID)		GAS	
Bottom hole samples No.		· · · · · · · · · · · · · · · · · · ·			
Surface samipes No.	9214/368		A - 120	52	
Measurment conditions. A Tank - a Corrcted wit	B Meter - h shrinkage tester -	b Corre	C Dur acted with tank -		
D - REMARKS -				Visa Chief O	perator

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FLOPETR	OL		TATOIL		Section : ANN	VEX 42
Base : Stavance.		Field : Well :	19-60, mm		Page : Report N°:	
Base: Stavanger DST #13	l				PUT Set	21.
,	S		PLING			
Date of sampling : Des 19	141 1981	Service orde		-	Sampling No. : _	â
Date of sampling : <u>Des 19</u> Sample nature : <u>Gaz</u>	5		Sampling	point :	p gas out	'Cer-
					-	
Producing zone : Paleo	cent	Perforations :	2395-24/5	Samı	oling interval : _	<u> </u>
Depth origin : <u></u>	B	Tubing Dia. : _	5" UA	~ <u>/</u> Ca:	sing Dia. : pe :	5/5 "
Surface elevation :///	m	Shoe :_	2391 m	She	e : <u>25</u>	7547
Bottom hole Intial pressu	re	: 3521 PS	1 <u>A</u> at dept	h: <u>2370</u> :	<u>7 m</u> date : . <u>9 m</u> date : .	Des 14 ** 88
T - - - - - - - - - -	ure measured	: 3520 ,25	<u>IA</u> at dept	h: <u>2370 °</u>	<u>, m</u> date : =	Des 14th 81
conditions [Temperature	e	:	at dept	h: <u>~370</u>	<u>9 m</u> date : _	<u>U2877 5</u>
		MENT AND SAM				
Time at which sample was ta			-		bilisation :	
Bottom hole Choke size :	48/64 sir	$\frac{15-55}{12705}$	Well head pre	ssure : <u>×cc</u>	Well head	temp. : <u>//o</u>
dynamic Bottom hole p conditions Bottom hole t	pressure : $-\frac{50}{14}$	IF°F	at depth :	370,9m	2 date : 🖉	oc 14th-91
Flow measurement of sampl Values used for calculations				Factor Fp	$v = \frac{1}{\sqrt{z}}: -\frac{1}{\sqrt{z}}$.0336
		ates - Gas	-	5- <u>7.2</u> SC		12558
Separator Pressure : $\frac{478}{7}$	<u> </u>	ates - Gas Dil (separator co	i <u>~೭೦೯</u> nd.) : <u>-/೨</u> ೯	<u>ه جنمی</u> SC کBC	OPD B (separa	
Stock Atmosphere		² 51 mmHg. 60				BOPD
tank Tank tempera						ALD DO THE
BSW : º/o	WIR	- 0/0		- il gra	w. kg 57,2.4	12/
					-2	
Transfering fluid : <u><i>Liac</i></u>	6.111		Transfer dur	ation :	20 min	<u> </u>
Final conditions of the shipp	ing bottle :					
Pressure : $485PSi$	<u>رر_</u> : Temp.	CK Amb				
	12 AST C-1	DENTIFICATIO	N OF THE SA	MPLE	<u>.</u>	
Shipping bottle No. : <u>4</u> - Addressee :		nt on :	by:		_ Shipping orde	⊰r No. :
		LIQUID			CAS.	
Coupled with				· · · · · · · · · · · · · · · · · · ·	GAS	
Bottom hole samples N	lo.			<u> </u>	·	
			· · · · · · · · · · · · · · · · · · ·			
Surface samlpes No.		14/368		A	12060	
		<u></u>	· · · · · · · · · · · · · · · · · · ·			· · · · ·
Measurment conditions.		B Meter -		I I I I I I I I I I I I I I I I I I I	C Dump -	
		inkage tester -	Ъ Co	ر prrected with		
D - RE/	ARKS -				Visa C	Chief Operator
					· · · · · · · · · · · · · · · · · · ·	1
					Jan	. WYR
1						V

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