

Denne rapport  
tilhører



L&U DOK. SENTER

L. NR. 30287300008

KODE Well 31/2-6 OP 23

Returneres etter bruk

PARTIAL FLUID STUDY

for

A/S Norske Shell Exploration & Production

Well: 31/2-6 Gas Test

North Sea, Norway.

**CORE LABORATORIES UK LTD.**

*Petroleum Reservoir Engineering*

**ABERDEEN, SCOTLAND**

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*Petroleum Reservoir Engineering*

**ABERDEEN, SCOTLAND**

18th June 1982

A/S Norske Shell Exploration & Production  
Gamle Forusvei 43  
N-4033 Forus  
NORWAY

Subject: Partial Fluid Study  
Well: 31/2-6 GAS TEST  
North Sea, Norway.  
Our File: RFLA 820070

Attention: Mr. B. Rheinholdstein.

Gentlemen,

On the 7th October 1981 samples of gas and condensate were collected from the subject well and subsequently forwarded to our Aberdeen laboratory for analysis. The results of these analyses as requested in telex FOR 190208 are presented in the following report.

The hydrocarbon composition of the separator gas was determined by gas chromatography and that of the separator liquid by low temperature fractional distillation and chromatography.

The separator liquid sample was subjected to flash separation at 0 psig and 60°F in order to correct the gas-condensate ratio to separator conditions. The data derived from this separation may be found on page three.

Utilising the experimentally derived compositions of the separator products in conjunction with the separation test data and the quoted gas-condensate ratio of 3.7 Bbls/MMSCF a wellstream composition was calculated. These compositions through nonadecanes are to be found on page two.

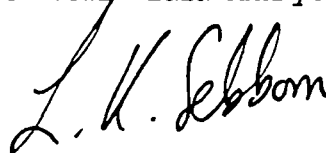
The separator products were physically recombined at this ratio and the resulting fluid utilised for the remainder of the study.

A portion of the the fluid was placed in a visual cell at 154°F and pressure-volume relations performed. The compressibility factor Z was used in conjunction with the pressure-volume relations to calculate the Z factor at each pressure. These data are presented on page four.

We thank you for this opportunity to be of service to A/S Norske Shell Exploration & Production. Should any questions arise concerning data presented in this report, or if we can be of further assistance, please do not hesitate to contact us.

Very truly yours

Core Laboratories UK Limited  
Reservoir Fluid Analysis



Les. K. Sebborn  
Laboratory Manager

LKS/stb  
10cc/Addressee

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Page 1 of 4

File RFLA 820070

Company A/S Norske Shell Expl. & Prod. Date Sampled 7th October 1981

Well 31/2-6 County North Sea

Field Block 31/2 State Norway

**FORMATION CHARACTERISTICS**

Formation Name	Clean Sands
Date First Well Completed	_____ , 19__
Original Reservoir Pressure	_____ PSIG @ _____ M.
Original Produced Gas-Liquid Ratio	_____ SCF/Bbl
Production Rate	_____ Bbls/Day
Separator Pressure and Temperature	_____ PSIG _____ °F.
Liquid Gravity at 60°F.	_____ °API
Datum	_____ M. Subsea

**WELL CHARACTERISTICS**

Elevation	25	M.
Total Depth		M.
Producing Interval	1518 to 1536	M.
Tubing Size and Depth	5/3½ In. to 1510.28	M.
Open Flow Potential		MMSCF/Day
Last Reservoir Pressure	2284.5 PSIG @ 1506.5	M.
Date	7th October	, 1981
Reservoir Temperature	154 * °F. @	M.
Status of Well		
Pressure Gauge		

**SAMPLING CONDITIONS**

Flowing Tubing Pressure	1795	PSIG
Flowing Bottom Hole Pressure	2169	PSIG
Primary Separator Pressure	450	PSIG
Primary Separator Temperature	60	°F.
Secondary Separator Pressure		PSIG
Secondary Separator Temperature		°F.
Field Stock Tank Liquid Gravity		°API @ 60°F.
Primary Separator Gas Production Rate		MSCF/Day
Pressure Base	14.73	PSIA
Temperature Base	60	°F.
Compressibility Factor (F <sub>pv</sub> )	1.0336	
Gas Gravity (Laboratory)	0.595	
Gas Gravity Factor (F <sub>g</sub> )	1.2964	
Liquid Production Rate @ 60°F.		Bbls/Day
Primary Separator Gas/ Stock Tank Liquid Ratio	270270 +	SCF/Bbl
	3.7 +	Bbls/MMSCF
Sampled by	Flopetrol	

REMARKS: \* Requested analysis temperature. + Data supplied by A/S Norske Shell.

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 judgement 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 profitability 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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Page 2 of 4

File RFLA 820070

Well 31/2-6 GAS TEST

HYDROCARBON ANALYSES OF SEPARATOR PRODUCTS AND CALCULATED WELL STREAM

<u>Component</u>	<u>Separator Liquid</u>		<u>Separator Gas</u>		<u>Well Stream</u>
	<u>Mol Percent</u>	<u>Mol Percent</u>	<u>Mol Percent</u>	<u>GPM</u>	<u>Mol Percent</u>
Hydrogen Sulfide	NIL	NIL	NIL		NIL
Carbon Dioxide	0.30	0.63	0.63		0.63
Nitrogen	TRACE	1.45	1.45		1.44
Methane	13.43	93.74	93.74		93.43
Ethane	3.36	3.34	3.34		3.34
Propane	0.98	0.28	0.28		0.28
iso-Butane	2.53	0.34	0.35		0.35
n-Butane	0.26	0.02	0.02		0.02
iso-Pentane	1.42	0.05	0.06		0.06
n-Pentane	0.39	0.01	0.01		0.01
Hexanes	4.84	0.05	0.07		0.07
Methylcyclopentane	1.00	0.02	0.02		0.02
Benzene	NIL	NIL	NIL		NIL
Cyclohexane	3.64	0.02	0.03		0.03
Heptanes	5.89	0.02	0.04		0.04
Methylcyclohexane	11.12	0.02	0.06		0.06
Toluene	0.96	TRACE	0.01		0.01
Octanes	10.84	0.01	0.05		0.05
Ethylbenzene	1.25	TRACE	0.01		0.01
Meta & Para Xylene	2.78	TRACE	0.01		0.01
Ortho Xylene	2.08	TRACE	0.01		0.01
Nonanes	8.16	TRACE	0.03		0.03
1,2,4, Trimethylbenzene	1.23	NIL	0.01		0.01
Decanes	9.33	TRACE	0.04		0.04
Undecanes	5.11	NIL	0.02		0.02
Dodecanes	2.28	NIL	0.01		0.01
Tridecanes	2.00	NIL	0.01		0.01
Tetradecanes	1.59	NIL	0.01		0.01
Pentadecanes	0.84	NIL	TRACE		TRACE
Hexadecanes	0.75	NIL	TRACE		TRACE
Heptadecanes	0.60	NIL	TRACE		TRACE
Octadecanes	0.35	NIL	TRACE		TRACE
Nonadecanes	0.25	NIL	TRACE		TRACE
Eicosanes plus	0.44	NIL	TRACE		TRACE
	<u>100.00</u>	<u>100.00</u>	<u>100.00</u>		<u>100.00</u>

Properties of Heptanes plus

Specific gravity @ 60/60°F.	<u>0.7954</u>		<u>0.773</u>
Molecular weight	<u>128</u>	<u>103 (assumed)</u>	<u>122</u>

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Page 3 of 4

File RFLA 820070

Well 31/2-6

SEPARATOR TESTS OF SEPARATOR LIQUID SAMPLE

Separator Pressure, PSI Gauge	Separator Temperature °F.	Separator Gas/Oil Ratio(1)	Stock Tank Gas/Oil Ratio(1)	Stock Tank Oil Density gm/cc	Shrinkage Factor, Vr/Vsat(2)	Formation Volume Factor Vsat/Vr(3)	Specific Gravity of Flashed Gas
0	60	144		0.7830	0.9326	1.0722	0.840

- (1) Separator and Stock Tank Gas/Oil Ratio in cubic feet of gas at 14.73 psia and 60°F per barrel of stock tank oil at 60°F.
- (2) Shrinkage Factor: Vr/Vsat is barrels of stock tank oil at 60°F per barrel of saturated oil at 450 psig and 60°F.
- (3) Formation Volume Factor: Vsat/Vr is barrels of saturated oil at 450 psig and 60°F per barrel of stock tank oil at 60°F.

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**CORE LABORATORIES UK LTD.***Petroleum Reservoir Engineering***ABERDEEN, SCOTLAND**Page 4 of 4File RFLA 820070Well 31/2-6PRESSURE-VOLUME RELATIONS AT 154°F.

<u>Pressure</u> <u>PSIG</u>	<u>Relative</u> <u>Volume</u>	<u>Compressibility</u> <u>Factor Z</u>
2500	0.9116	0.801
2400	0.9479	0.800
<u>2275</u> Reservoir Pressure	1.0000	0.800
2200	1.0350	0.801
2100	1.0865	0.803
2000	1.1435	0.805
1900	1.2094	0.809
1800	1.2839	0.814
1600	1.4716	0.830
1400	1.7148	0.848
1200	2.0542	0.872
1000	2.5363	0.899
800	3.2548	0.927
600	4.4538	0.957

(1) Relative Volume:  $V/V_{sat}$  is barrels at indicated pressure per barrel at saturation pressure.

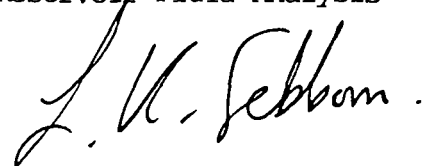
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A/S NORSKE SHELL EXPLORATION & PRODUCTION  
Well: 31/2-6 GAS TEST

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Reservoir Fluid Analysis



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