

Denne rapport
tilhører



L&U DOK. SENTER

L. NR. 20088370023

KODE Well 31/2-9 nr.3

Returneres etter bruk

PARTIAL FLUID STUDY

for

A/S Norske Shell Exploration & Production

Well: 31/2-9

CORE LABORATORIES UK LTD.
Petroleum Reservoir Engineering
ABERDEEN, SCOTLAND

PARTIAL FLUID STUDY

for

A/S Norske Shell Exploration & Production

Well: 31/2-9

North Sea, Norway.

CORE LABORATORIES UK LTD.

Petroleum Reservoir Engineering

ABERDEEN, SCOTLAND

25th August 1983

A/S Norske Shell Exploration & Production
Gamle Forusvei 43
P.O. Box 10
N-4033 Forus
NORWAY

Subject: Partial Fluid Study
Well: 31/2-9
Field: Troll
North Sea, Norway
Our File: RFLA 830015

Attention: Mr. B. Reinholdsten.

Gentlemen,

On the 25th September 1982 a sample of fluid was collected from an RFT chamber and subsequently forwarded to our Aberdeen laboratory for analysis. The results of these analyses as requested by telex ref FOR 010718 are presented in the following report.

The volume of fluid contained in the sample cylinder 9024-48 was checked and found to be 35cc's and hence only a partial study could be performed.

The fluid sample was placed in a high pressure cell 154°F and found to have a saturation pressure of 1089 psig. Gas from sample cylinder A3908 was added in order to bring the saturation pressure to the required 2280 psig at 154°F. This fluid was used for the remainder of the study.

The hydrocarbon composition of this gas previously reported under our file RFLA 820292 may be found on page two.

The recombined fluid was placed in a high pressure visual cell and thermally expanded to the quoted temperature of 154°F. During pressure volume relations at this temperature a saturation pressure of 2280 psig was observed. The results of the pressure-volume relations may be found on page five with the associated compressibility data on page four.

The hydrocarbon composition of this fluid was determined by low temperature fractional distillation. This composition in terms of both mol and weight percent may be found on page three.

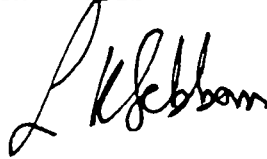
The above tests utilised all of the available fluid and hence no further analysis was possible.

Continued/Over.....

It has been a pleasure to be of service to A/S Norske Shell Exploration & Production. Should any questions arise concerning the data presented in this report, or if we may be of assistance in any further matter, please do not hesitate to contact us.

Very truly yours

Core Laboratories UK Limited
Reservoir Fluid Analysis

A handwritten signature in black ink, appearing to read 'L Sebborn', written in a cursive style.

Les K. Sebborn
Manager - RFL Aberdeen

LKS/slc
10cc/Addressee

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File RFLA 830015

Company A/S Norske Shell Expl. & Prod. Date Sampled 25th September 1982

Well 31/2-9 State North Sea

Field Troll Country Norway

FORMATION CHARACTERISTICS

Formation Name _____
 Date First Well Completed _____, 19____
 Original Reservoir Pressure _____ PSIG @ _____ Ft.
 Original Produced Gas-Oil Ratio _____ SCF/Bbl
 Production Ratio _____ Bbl/Day
 Separator Pressure and Temperature _____ PSIG _____ °F.
 Oil Gravity at 60°F. _____ °API
 Datum _____ Ft. Subsea
 Original Gas Cap _____

WELL CHARACTERISTICS

Elevation _____ Ft.
 Total Depth _____ Ft.
 Producing Interval _____ Ft.
 Tubing Size and Depth _____ In. to _____ Ft.
 Productivity Index _____ Bbl/D/PSIG @ _____ Bbl/Day
 Last Reservoir Pressure 2280 * PSIG @ _____ Ft.
 Date _____, 19____
 Reservoir Temperature 154 * °F. @ _____ Ft.
 Status of Well _____
 Pressure Gauge _____
 Normal Production Rate _____ Bbl/Day
 Gas-Oil Ratio _____ SCF/Bbl
 Separator Pressure and Temperature _____ PSIG, _____ °F.
 Base Pressure _____ PSIA
 Well Making Water _____ % Cut

SAMPLING CONDITIONS

Sampled at 1575.5 _____ M.
 Status of Well _____
 Gas-Oil Ratio _____ SCF/Bbl
 Separator Pressure and Temperature _____ PSIG, _____ °F.
 Tubing Pressure _____ PSIG
 Casing Pressure _____ PSIG
 Sampled by Schlumberger
 Type Sampler RFT Number 4

REMARKS: * Data supplied by Norske Shell

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Well 31/2-9

HYDROCARBON ANALYSIS OF SEPARATOR GAS SAMPLE *

COMPONENT	MOL PERCENT	GPM
Hydrogen Sulphide	NIL	
Carbon Dioxide	1.22	
Nitrogen	0.80	
Methane	88.06	
Ethane	7.40	
Propane	1.23	0.338
iso-Butane	0.72	0.236
n-Butane	0.13	0.041
iso-Pentane	0.12	0.044
n-Pentane	0.02	0.007
Hexanes	0.15	0.061
Heptanes plus	0.15	0.068
	<u>100.00</u>	<u>0.795</u>

Calculated gas gravity (air = 1.000) = 0.640

Calculated gross heating value = 1103 BTU per cubic foot of dry gas at 14.73 psia and 60°F.

Collected at 92 psig and 71°F.

* Cylinder Number : A3908

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 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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Well 31/2-9

HYDROCARBON ANALYSIS OF RESERVOIR FLUID SAMPLE

COMPONENT	MOL PERCENT	WEIGHT PERCENT	DENSITY	API	MOL WEIGHT
Hydrogen Sulphide	NIL	NIL			
Carbon Dioxide	0.44	0.12			
Nitrogen	0.75	0.13			
Methane	30.03	3.01			
Ethane	3.67	0.69			
Propane	0.76	0.21			
iso-Butane	1.06	0.38			
n-Butane	0.21	0.08			
iso-Pentane	0.43	0.19			
n-Pentane	0.11	0.05			
Hexanes	0.50	0.27			
Heptanes plus	62.04	94.87	0.8835	28.5	245
	<u>100.00</u>	<u>100.00</u>			

* After addition of gas to give saturation pressure of 2280 psig at 154°F.

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VOLUMETRIC DATA OF RESERVOIR FLUID SAMPLE

1. Saturation pressure (bubble-point pressure) $\frac{2280}{V @ 154} \text{ PSIG @ } 154 \text{ }^\circ\text{F.}$
2. Thermal expansion of saturated oil @ 5000 PSIG = $\frac{V @ 71}{V @ 154} \text{ }^\circ\text{F.} = \underline{1.03312}$
3. Compressibility of saturated oil @ reservoir temperature: Vol/Vol/PSI:
From 5000 PSIG to 4000 PSIG = 6.12 x 10⁻⁶
From 4000 PSIG to 3000 PSIG = 7.14 x 10⁻⁶
From 3000 PSIG to 2280 PSIG = 8.06 x 10⁻⁶

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PRESSURE-VOLUME RELATIONS AT 154°F.

<u>Pressure PSIG</u>	<u>Relative Volume(1)</u>	<u>Y Function(2)</u>
5000	0.9811	
4000	0.9871	
3000	0.9942	
2600	0.9976	
2500	0.9983	
2400	0.9990	
2300	0.9998	
<u>2280</u> Saturation pressure	1.0000	
2215	1.0065	4.518
2141	1.0145	4.456
1957	1.0381	4.302
1765	1.0699	4.141
1490	1.1349	3.890
1224	1.2332	3.655
999	1.3687	3.427
786	1.5731	3.255
622	1.8410	3.095
514	2.1235	2.971
426	2.4492	2.901
353	2.8471	2.835
288	3.3682	2.776
232	4.0606	2.709

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

(2) Y Function = $\frac{(P_{sat}-P)}{(P_{abs}) (V/V_{sat}-1)}$

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Les. K. Sebborn
Manager - RFL Aberdeen