

CORE LABORATORIES UK LTD.
Petroleum Reservoir Engineering
ABERDEEN, SCOTLAND

Special Study
For
Statoil A/S
Wells: 34/10-7 and 34/10-4
North Sea, Norway

CORE LABORATORIES UK LTD.
Petroleum Reservoir Engineering
ABERDEEN, SCOTLAND

15th December, 1980

Statoil A/S,
P.O. Box 300,
4001 Stavanger,
Norway.

Attention: Mr. Per Thomassen

Subject: Special Study
Wells: 34/10-4 and 34/10-7
North Sea, Norway
Our File Number: RFLA 80237

Gentlemen,

The following report details the results of analyses performed on samples from the subject wells as requested by a representative of Statoil A/S by telex on 1st December, 1980.

A small volume of the reservoir fluid from well 34/10-4 was blended with an equal volume of reservoir fluid from well 34/10-7 and the resulting fluid used for the entire study.

The sample was placed in a high pressure visual cell and thermally expanded to the operating temperature of 72°C. During a constant composition expansion at this temperature a saturation pressure of 233.2 Bar G was observed. The results of the pressure-volume relations and the associated compressibility data of the undersaturated reservoir fluid may be found on page two.

The fluid was then subjected to a multi-stage flash separation at conditions stipulated by a representative of Statoil A/S. The factors and data derived from this test may be found on page three.

At each separation stage the gas evolved was collected and analysed for hydrocarbon composition by routine gas chromatography. These compositions may be found on page four.

The hydrocarbon composition of the stock tank liquid was determined by low temperature fractional distillation, and this composition in terms of mol percent may be found on page five.

It has been a pleasure to be of service to Statoil A/S. Should any questions arise concerning the data presented in this report, please do not hesitate to contact us.

Very truly yours,
Core Laboratories U.K. Ltd.,



JDO/HG
10 cc addressee

John D. Owen,
Manager - RFL

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Company Statoil A/S Date Sampled
Well 34/10-7 and 34/10-4 County North Sea
Field State Norway

FORMATION CHARACTERISTICS

Formation Name
Date First Well Completed, 19.....
Original Reservoir Pressure PSIG @Ft.
Original Produced Gas-Liquid Ratio SCF/Bbl
Production Rate 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/PSI @Bbl/Day
Last Reservoir Pressure PSIG @Ft.
Date, 19.....
Reservoir Temperature 72°C @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 Ft.
Status of Well
Gas-Oil Ratio SCF/Bbl
Separator Pressure and Temperature PSIG.....° F.
Tubing Pressure PSIG
Casing Pressure PSIG
Sampled by Flopetrol
Type Sampler

REMARKS :

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Well34/10-7 & 34/10-4.....

VOLUMETRIC DATA OF RESERVOIR FLUID SAMPLE

1. Saturation pressure (bubble-point pressure) 233.2 BAR G @ 72.0°C
2. Thermal expansion of saturated oil @ 344.7 BAR = $\frac{V @ 72^{\circ}\text{C}}{V @ 20^{\circ}\text{C}} = 1.06167$
3. Compressibility of saturated oil @ reservoir temperature:
Vol/Vol/BAR G:
From 344.7 BAR G to 310.3 BAR G = 14.98×10^{-5}
From 310.3 BAR G to 275.8 BAR G = 16.80×10^{-5}
From 275.8 BAR G to 233.2 BAR G = 18.74×10^{-5}
4. Pressure-volume relations:

<u>Pressure</u> PSIG	<u>Relative</u> <u>Volume (1)</u>
344.7	0.9812
310.3	0.9863
275.8	0.9920
262.0	0.9944
255.1	0.9957
248.2	0.9970
241.3	0.9984
234.4	0.9997
233.2	1.0000

(1) Relative volume is V/V_{sat} .

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Well 34/10-7 & 34/10-4

SEPARATOR TESTS OF ...Reservoir Fluid..... SAMPLE

SEPARATOR PRESSURE BAR A	SEPARATOR TEMPERATURE °C	GAS/OIL RATIO (1)	GAS/OIL RATIO (2)	STOCK TANK Density at 15°C Kg/L	FORMATION VOLUME FACTOR (3)	SEPARATOR VOLUME FACTOR (4)	SPECIFIC GRAVITY OF FLASHED GAS
68.9	41.2	72.9	88.0			1.207	0.634*
to							
22.4	85.6	31.5	36.5			1.160	0.760*
to							
1.013	15.0	32.2	32.2	0.8453	1.466	1.000	1.130*

* Gas collected and analysed for hydrocarbon composition

- (1) Gas/Oil Ratio in cubic metres of gas @ 15°C and 1.013 Bar absolute per cubic metre of oil @ indicated pressure and temperature.
- (2) Gas/Oil Ratio in cubic metres of gas @ 15°C and 1.013 Bar absolute per cubic metre of stock tank oil @ 15°C.
- (3) Formation Volume Factor is cubic metres of saturated oil @ 233.2 Bar gauge and 72°C per cubic metre of stock tank oil @ 15°C.
- (4) Separator Volume Factor is cubic metres of oil @ indicated pressure and temperature per cubic metre of stock tank oil @ 15°C.

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Company Statoil A/S Date Sampled
 Well 34/10-7 and 34/10-4 County North Sea
 Field State Norway

HYDROCARBON ANALYSIS OF Stock Tank Oil SAMPLE *

COMPONENT	MOL PERCENT	WEIGHT PERCENT	DENSITY @ 60° F. GRAMS PER CUBIC CENTIMETER	° API @ 60° F.	MOLECULAR WEIGHT
Hydrogen Sulfide	NIL	NIL			
Carbon Dioxide	0.02	TRACE			
Nitrogen	0.01	TRACE			
Methane	0.33	0.03			
Ethane	0.76	0.11			
Propane	0.90	0.19			
iso-Butane	0.86	0.24			
n-Butane	2.34	0.64			
iso-Pentane	1.25	0.43			
n-Pentane	1.54	0.52			
Hexanes	3.85	1.56			
Heptanes plus	88.14	96.28	0.8637	32.2	231
	<u>100.00</u>	<u>100.00</u>			

* From multi-stage flash

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RFLA 80237

Core Laboratories U.K. Ltd.,
Reservoir Fluid Analysis,



John D. Owen,
Manager - RFL