

CORE LABORATORIES UK LTD.

Petroleum Reservoir Engineering

ABERDEEN, SCOTLAND

Supplementary Report

for

STATOIL

Well: 34/10-1

DST 2 Flow 3

North Sea, Norway

CORE LABORATORIES UK LTD.

Petroleum Reservoir Engineering

ABERDEEN, SCOTLAND

4 th December, 1978.

Statoil,
Lagardsveien 78
P.O. Box 300,
4001 Stavanger,
Norway.

Attention: Mr. Per Thomassan.

Subject: Supplementary Report
Well: 34/10-1 DST 2 Flow 3
North Sea, Norway.
Our File Number: RFLA-78059A

Gentlemen:

On August 24th 1978, a subsurface sample was collected from the subject well and forwarded to our Aberdeen laboratory. This report presents the results of analyses performed on this sample

A portion of the reservoir fluid was placed in a high pressure visual cell and thermally expanded to the reservoir temperature of 161° F. At this temperature a constant composition expansion was conducted during which a bubble point pressure of 3558 psig was observed. The results of the volumetric data is presented on page two.

A two-stage flash separation was conducted in the laboratory at the following conditions; 615 psia at 103° F., 15 psia at 60° F. The ratios and factors derived from this test are presented on page three. Also, gas samples evolved at each stage of separation were collected in the laboratory and analyzed for hydrocarbon composition. These compositions are listed on page four.

Additionally, the primary stage flash separation was repeated and the primary separator liquid was analyzed for hydrocarbon composition using low temperature fractional distillation apparatus. The results of this test are given on page five. Using the experimentally determined compositions of the primary separator gas and liquid a well stream composition was calculated and the results presented on page six.

In addition, the stock tank oil was collected and analyzed for hydrocarbon composition using low temperature fractional distillation apparatus. Using the experimentally determined compositions of the separator gas and stock tank oil, in conjunction with the factors and ratios derived from the flash separation, we were able to calculate a well stream composition. The resulting calculated well stream composition is given on page eight.

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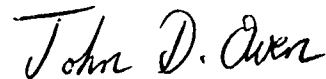
Statoil:
Well: 34/10-1 DST 2 Flow 3.

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Thank you for the opportunity to perform this fluid study. It is always a pleasure to be of service to Statoil, and should you have any questions or if we may be of further assistance, please do not hesitate to contact us.

Very truly yours

Core Laboratories U.K. Limited



JDO/rmb:
7cc/Addressee:

John D. Owen.
Supervisor.

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Company STATOIL Date Sampled 24th August, 1978.
 Well 34/10-1 DST 2 Flow 3 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 1839-1844 M
 Tubing Size and Depth In. to..... Ft.
 Productivity Index Bbl/D/PSI @ Bbl/Day
 Last Reservoir Pressure PSIG @ Ft.
 Date 19.....
 Reservoir Temperature ° 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 1530 M
 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 : Received cylinder 20475-74 Sample 2a upper.
 Ambient bubble point is 3167 psig at 67°F.

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Well 34/10-1 DST 2 Flow 3

VOLUMETRIC DATA OF Reservoir Fluid SAMPLE

1.	Saturation pressure (bubble-point pressure)	<u>3558</u> PSIG @ <u>161</u> °F.	
2.	Pressure-Volume Relations.	<u>Pressure</u>	<u>Relative</u>
		PSIG	Volume (1)
		5000	0.9886
		4700	0.9908
		4400	0.9931
		4000	0.9962
		3900	0.9971
		3800	0.9979
		3700	0.9988
		<u>3558</u>	1.0000

(1) Relative Volume is barrels of oil at indicated pressure and 161°F. per barrel of saturated oil at 3558 psig and 161°F.

2.9969

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

SEPARATOR PRESSURE PSIA	SEPARATOR TEMPERATURE ° F.	GAS/OIL RATIO (1)	GAS/OIL RATIO (2)	STOCK TANK GRAVITY ° API @ 60° F.	FORMATION VOLUME FACTOR (3)	SEPARATOR VOLUME FACTOR (4)	SPECIFIC GRAVITY OF FLASHED GAS
615	103	367	421			1.145	0.610 +
to							
150	60	127	127 348	28.9 0.882	1.246	1.000	0.786 +

gas held in separator 0.7692

* Flow 3 (cylinder 20475-74)
 + Gas and liquid collected for hydrocarbon analysis.

- (1) Gas/Oil Ratio in cubic feet of gas @ 60° F. and 14.73 PSI absolute per barrel of oil @ indicated pressure and temperature.
- (2) Gas/Oil Ratio in cubic feet of gas @ 60° F. and 14.73 PSI absolute per barrel of stock tank oil @ 60° F.
- (3) Formation Volume Factor is barrels of saturated oil @ 3558 PSI gauge and 161 ° F. per barrel of stock tank oil @ 60° F.
- (4) Separator Volume Factor is barrels of oil @ indicated pressure and temperature per barrel of stock tank oil @ 60° F.

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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Well 34/10-1 DST 2 Flow 3

HYDROCARBON ANALYSIS OF MULTI-STAGE SEPARATOR GASES

<u>Separator Conditions:</u>	<u>615 PSIA @ 103°F.</u>		<u>15 PSIA @ 60°F.</u>	
<u>Component:</u>	<u>Mol Percent</u>	<u>GPM</u>	<u>Mol Percent</u>	<u>GPM</u>
Hydrogen Sulfide	NIL		NIL	
Carbon Dioxide	1.63		2.79	
Nitrogen	0.92		0.32	
Methane	91.70		72.34	
Ethane	4.74		15.67	
Propane	0.49	0.135	3.52	0.968
iso-Butane	0.18	0.059	1.70	0.556
n-Butane	0.12	0.038	1.45	0.457
iso-Pentane	0.09	0.033	0.96	0.351
n-Pentane	0.04	0.015	0.51	0.185
Hexanes	0.04	0.016	0.44	0.180
Heptanes plus	0.05	0.023	0.30	0.136
	<u>100.00</u>	<u>0.319</u>	<u>100.00</u>	<u>2.833</u>

Calculated gas gravity (air=1.000) 0.610

0.786

Calculated gross heating value = $\frac{1045}{14.73}$ BTU
per cubic foot of dry gas at psia @ 60°F.

$\frac{1299}{14.73}$ BTU
psia @ 60°F.

Collected in the laboratory.

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CompanySTATOIL..... Date Sampled24th August, 1978.....
 Well34/10-1 DST 2 Flow 3..... CountyNORTH SEA.....
 Field StateNORWAY.....

HYDROCARBON ANALYSIS OF ...Separator..Liquid... SAMPLE *

COMPONENT	MOL PERCENT	WEIGHT PERCENT	DENSITY @ 60° F. GRAMS PER CUBIC CENTIMETER	° API @ 60° F.	MOLECULAR WEIGHT
Hydrogen Sulfide	NIL	NIL			
Carbon Dioxide	0.49	0.12			
Nitrogen	0.06	0.01			
Methane	15.45	1.32			
Ethane	3.55	0.56			
Propane	1.04	0.24			
iso-Butane	0.76	0.23			
n-Butane	0.69	0.21			
iso-Pentane	1.03	0.39			
n-Pentane	0.43	0.16			
Hexanes	1.58	0.72			
Heptanes plus	74.92	96.04	0.8873	27.8	243
	<u>100.00</u>	<u>100.00</u>			

* Collected in the laboratory at 615 psia and 103° F.

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Company STATOIL Date Sampled 24th August, 1978
 Well 34/10-1 DST 2 Flow 3 County NORTH SEA
 Field State NORWAY

HYDROCARBON ANALYSIS OF Calculated Wellstream **SAMPLE ***

COMPONENTS:

MOL PER CENT

Hydrogen Sulfide	NIL
Carbon Dioxide	0.92
Nitrogen	0.39
Methane	44.48
Ethane	4.00
Propane	0.83
iso-Butane	0.54
n-Butane	0.47
iso-Pentane	0.67
n-Pentane	0.28
Hexanes	0.99
Heptanes plus	46.43
	100.00

Properties of Heptanes Plus:

API gravity at 60°F.	27.8
Specific Gravity at 60/60°F	0.8881
Molecular Weight	243

* Calculated from two-stage separator test data-based on primary stage separator ratios and compositions of primary liquid and primary gas.

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 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	Trace	Trace			
Nitrogen	Trace	Trace			
Methane	0.22	0.02			
Ethane	0.55	0.07			
Propane	0.44	0.08			
iso-Butane	0.55	0.14			
n-Butane	0.53	0.14			
iso-Pentane	1.03	0.33			
n-Pentane	0.58	0.18			
Hexanes	2.03	0.75			
Heptanes plus	94.07	98.29	0.8864	28.0	241
	<u>100.00</u>	<u>100.00</u>			

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Field State NORWAY.

HYDROCARBON ANALYSIS OF Calculated Wellstream.

COMPONENTS:

MOL PER CENT

Hydrogen Sulfide	NIL
Carbon Dioxide	0.95
Nitrogen	0.39
Methane	43.92
Ethane	4.01
Propane	0.84
iso-Butane	0.55
n-Butane	0.49
iso-Pentane	0.67
n-Pentane	0.37
Hexanes	1.07
Heptanes plus	46.74

100.00

Properties of Heptanes Plus:

API Gravity at 60°F.	28.0
Specific Gravity at 60/60°F.	0.8871
Molecular Weight.	241

* Calculated from two-stage separator test data - based on stock tank ratios and compositions of stock tank oil.

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STATOIL

Well: 34/10-1 DST 2 Flow 3

Core Laboratories U.K. Limited
Reservoir Fluid Analysis

John D. Owen

John D. Owen.
Supervisor.