

SPECIAL CORE ANALYSIS STUDY

FOR

STATOIL

WELL: 34/10-11

Directors:

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**CORE LABORATORIES UK LTD.**  
Special Core Analysis



Statoil  
Forus  
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N-4001 Stavanger  
Norway

17th January 1984

Attention: Mr P. Read

Subject: Special Core Analysis Study  
Well: 34/10-11  
Area: North Sea, Norway  
File: UKSCAL 311-81159

Gentlemen,

In a letter dated 9th July 1981 from Statoil, Core Laboratories UK Limited was requested to perform special core analysis measurements on samples from the subject well.

The results of these measurements are presented herein as a final report and serves to confirm all data previously submitted in preliminary form.

Three, preserved, full diameter core pieces were received for use in this study. From each core piece, it was requested that one, one and a half inch diameter core plug sample be drilled, however it was only possible to drill a one and a half inch diameter sample from core piece 2. From core pieces 1 and 3, one inch diameter samples were therefore drilled. All samples were drilled using simulated formation brine as the bit lubricant. They were then cleaned in hot methanol followed by xylene and were dried in a controlled humidity oven.

In addition to the three full diameter core pieces, two one and a half inch diameter core plug samples were received for use in this study. Please note that sample number 5, depth 1899.20 metres was fractured and therefore unsuitable for analysis.

The four remaining core plug samples had permeability to air, helium injection porosity and grain density measured. Results are presented in tabular form on page 2.

The clean, dry samples were evacuated and saturated with simulated formation brine consisting of approximately 42,584 mg/l total dissolved solids which was synthesised according to information furnished for use in this study. A copy of this analysis is presented on page 3. They were each then mounted

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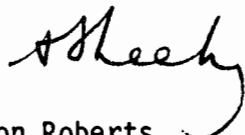
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in a hydraulic core holder and were flushed with this brine to ensure the removal of all trapped gas. Permeability to this brine was then measured and results are presented on page 4.

The samples were then flushed with a refined mineral oil having a viscosity of approximately 1.43 centipoise at room conditions which is the lowest viscosity oil used by Core Laboratories UK Limited. Water displaced was recorded and initial water saturations calculated. Please note that samples numbered 1 and 3 fractured during this flush and were unsuitable for further analysis. Effective permeability to the oil was then measured on the remaining two samples. Please note that the permeability to oil for these samples is less than 0.08 millidarcys, the recommended minimum for floods, and therefore no further analysis was possible. As it was not possible to drill replacement samples, it was requested by Statoil, that this study should be suspended pending further instructions. In a telephone conversation on the 9th June 1983 it was requested that all available data be telexed to Statoil. On the 19th December 1983, Mr Peter Read of Statoil requested that the final report should now be issued. In addition it was requested that a full SEM/XRD study be performed on these samples as a preliminary study indicated the presence of large quantities of kaolinite clay. This petrographic study will be forwarded to you, as an addendum, as soon as it is completed.

It has been a pleasure working with Statoil on this study. Should you have any questions, please do not hesitate to contact us.

Yours faithfully,  
CORE LABORATORIES UK LIMITED



PP • Jon Roberts  
Laboratory Manager - Special Core Analysis

JCR/MBL/hsb

10 cc - Addressee



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Identification And Description Of Samples

Company: STATOIL Well: 34/10-11  
Formation: \_\_\_\_\_ Field: \_\_\_\_\_  
Country: NORTH SEA, NORWAY

<u>Sample Number</u>	<u>Depth, Metres</u>	<u>Lithological Description</u>
1	1890.10	Sst, brn, m-crsgr, pcmt, msrt, fri.
2	1892.07	Sst, gry, vfgr, mod cmt, arg, mic.
3	1893.38	Sst, brn, m-crsgr, pcmt, msrt, fri.
4	1891.55	Sst, gry, vfgr, mod cmt, arg, mic.
5	1899.20	Sst, brn, mgr, mod cmt, wlsrt, fri, fract.

Permeability, Porosity And Grain Density

Company: STATOIL Well: 34/10-11  
 Formation: \_\_\_\_\_ Field: \_\_\_\_\_  
 Country: NORTH SEA, NORWAY

<u>Sample Number</u>	<u>Depth, Metres</u>	<u>Permeability to Air, Millidarcys</u>	<u>Porosity, percent</u>	<u>Grain Density, gm/cm<sup>3</sup></u>
1	1890.10	63	29.7	2.64
2	1892.07	9.6	22.1	2.63
3	1893.38	54	49.8	2.64
4	1891.55	25	27.9	2.64
5	1899.20	S A M P L E F R A C T U R E D		

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Water Analysis

Company: STATOIL Well: 34/10-11  
Formation: \_\_\_\_\_ Field: \_\_\_\_\_  
Country: NORTH SEA, NORWAY

Total Dissolved Solids, mg/l: 42,584.4  
Resistivity, Ohm-metres at 21.6°C: 0.168  
pH: 7.05

CONSTITUENTS: Mg/l:

CATIONS:

Sodium	14,000
Calcium	1,275
Magnesium	335
Barium	50
Lithium	7.6
Potassium	209

ANIONS:

Chloride	26,200
Bicarbonate	415
Sulphate	30.8
Bromide	62

Specific Permeability to Water

Company: STATOIL Well: 34/10-11  
 Formation: \_\_\_\_\_ Field: \_\_\_\_\_  
 Country NORTH SEA, NORWAY  
 Water Identification: Simulated Formation Brine

<u>Sample Number</u>	<u>Depth, Metres</u>	<u>Porosity, percent</u>	<u>Permeability to Air, millidarcys</u>	<u>Specific Permeability to Water, millidarcys</u>	<u>Permeability Ratio, water/air</u>
1	1890.10	29.7	63	16	0.254
2	1892.07	22.1	9.6	1.2	0.125
3	1893.38	49.8	54	11	0.204
4	1891.55	27.9	25	5.0	0.200

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Effective Permeability to Oil

Company: STATOIL Well: 34/10-11  
 Formation: \_\_\_\_\_ Field: \_\_\_\_\_  
 Country: NORTH SEA, NORWAY

<u>Sample Number</u>	<u>Depth, Metres</u>	<u>Porosity, percent</u>	<u>Permeability to Air, millidarcys</u>	<u>Water Saturation, percent pore space</u>	<u>Effective Permeability to Oil, millidarcys</u>	<u>Permeability Ratio, oil/air</u>
2	1892.07	22.1	9.6	21.0	0.01	0.001
4	1891.55	27.9	25	25.8	0.01	<0.001

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