

WATER ANALYSIS /RFT

for

STATOIL

Well: 6406/3-1

North Sea, Norway

CORE LAB

CORE LABORATORIES
Petroleum Reservoir Engineering
CCB, ÅGOTNES

WATER ANALYSIS /RFT

for

STATOIL

Well: 5406/3-1

North Sea, Norway

CORE LABORATORIES
Petroleum Reservoir Engineering
CCB, ÅGOTNES

20th July 1984

Statoil
Damsgaardsgaten 131
P.O. Box 1212
5001 Bergen

Attention: Mr. Per Seim

Subject: Analysis of Contents,
RFT Chamber RFS AB 1225
Well: 6406/3-1
North Sea, Norway
Our File Number: NCL 102/1

Dear Sirs,

On the 16th July 1984, a Schlumberger one gallon RFT chamber number RFS AB 1225, previously run in the subject well, was received in our Aagotnes laboratory. Presented in the following report are the results of analysis performed on the contents of this tool, as requested by a representative of Statoil.

Upon receipt in the laboratory the opening pressure of the tool was found to be 49.0 barg at 15°C, thereafter a sample of gas from the top of the chamber was collected in one of the containers provided by Statoil. The total contents of the tool were drained through a flash separation unit and the volumes of gas and water recovered were recorded. Whilst draining the tool a sample of the evolved gas was collected for chromatographic analysis, and a sample of gas collected in a container provided by Statoil. During draining one litre of water was collected, whilst minimising contact with air, in a container prepurged with nitrogen, the remaining water being collected for use in chemical analysis. The volumetric data and the hydrocarbon composition of the evolved gas are presented on page one of the following report.

Chemical analysis of the water collected from the RFT chamber revealed very little evidence to suggest the presence of formation water in the sample. Both the barium and strontium ion concentrations were low, whereas the sulphate ion concentration was found to be extremely high, suggesting the sample had been contaminated by the mud system. Indeed, analysis of samples of mud filtrate and the cushion water used, as provided by Statoil, showed that the water recovered from the chamber was probably a mixture of mud filtrate and cushion water. The results of the chemical analysis are presented on pages two through six.

Thank you for this opportunity of being of service to Statoil. If you have any questions concerning the data presented in this report, or if we may be of further service in any way please do not hesitate to contact us.

Yours faithfully
Core Laboratories Norsk
Chemistry Laboratory



Mike Orme
Laboratory Supervisor

CORE LABORATORIES
Petroleum Reservoir Engineering
CCB, ÅGOTNES

Page 1 of 6

File NCL 102/1

Well 6406/3-1

VOLUMETRIC AND RECOVERY DATA FROM RFT RFS 1225 AB

Opening Pressure at 15°C	49.0 barg
Volume of Gas Recovered at atmospheric pressure and 15°C	5.349 L
Volume of Water Recovered at atmospheric pressure and 15°C	3.298 L

HYDROCARBON ANALYSIS OF EVOLVED GAS SAMPLE

COMPONENT	MOL PERCENT	$\text{m}^3 / 10^6 \text{m}^3$
Hydrogen Sulphide	Nil	
Carbon Dioxide	0.11	
Nitrogen	0.76	
Methane	93.32	
Ethane	3.65	129.41
Propane	1.32	48.41
iso-Butane	0.18	7.84
n-Butane	0.34	14.27
iso-Pentane	0.13	6.34
n-Pentane	0.11	5.31
Hexanes	0.05	2.74
Heptanes plus	0.03	1.79
	<u>100.00</u>	<u>100.00</u>

Calculated gas gravity (air = 1.000) = 0.603

Calculated gross heating value = 39.89 MJ per cubic metre of dry gas at 1.01325 bara and 15°C

Collected at atmospheric pressure and laboratory temperature

CORE LABORATORIES
Petroleum Reservoir Engineering
CCB, ÅGOTNES
WATER ANALYSIS

COMPANY :	STATOIL	WELL NUMBER :	6406/3-1
SAMPLE NUMBER :	CUSHION WATER	FORMATION :	
DEPTH :		SAMPLED FROM :	1 GALLON RFT CHAMBER
LOCATION :	OFFSHORE	FIELD :	
COUNTY :	NORTH SEA	STATE :	NORWAY
DATE SAMPLED :		DATE ANALYSED :	16/7/84
ANALYST :	CC/NKH	OUR FILE NUMBER :	NCL 102/1

APPEARANCE BEFORE FILTRATION : CLEAR COLOURLESS WATER

APPEARANCE AFTER FILTRATION : CLEAR COLOURLESS WATER

TOTAL DISSOLVED SOLIDS MG/L (CALCULATED) : 270

SPECIFIC GRAVITY AT 60/60°F : 1.000

RESISTIVITY, OHM-METRES AT 60°F (DETERMINED) : 23.560

HYDROGEN SULPHIDE : NONE DETECTED

pH : 6.2

CONSTITUENTS :	Mg/L :	Meq/L :
CATIONS :		
SODIUM	23	1.00
POTASSIUM	75	1.92
CALCIUM	0.3	0.01
MAGNESIUM	0.5	0.04
BARIUM	L 0.1	-
STRONTIUM	L 0.1	-
TOTAL IRON	0.2	-
DISSOLVED IRON	L 0.1	-
ANIONS :		
CHLORIDE	18	0.51
SULPHATE	L 1.0	L 0.02
BICARBONATE	2.4	0.04
CARBONATE	NIL	-
HYDROXIDE	NIL	-
NITRATE	150	2.42

L = LESS THAN

CORE LABORATORIES
Petroleum Reservoir Engineering
CCB, ÅGOTNES
WATER ANALYSIS

COMPANY :	STATOIL	WELL NUMBER :	6406/3-1
SAMPLE NUMBER :	MUD FILTRATE	FORMATION :	
DEPTH :	4498 METRES	SAMPLED FROM :	
LOCATION :	OFFSHORE	FIELD :	
COUNTY :	NORTH SEA	STATE :	NORWAY
DATE SAMPLED :		DATE ANALYSED :	16/7/84
ANALYST :	CC/NKH	OUR FILE NUMBER :	NCL 102/1

APPEARANCE BEFORE FILTRATION : BROWN/BLACK SOLUTION CONTAINING
 BROWN/BLACK SEDIMENT

APPEARANCE AFTER FILTRATION : DARK BROWN SOLUTION

TOTAL DISSOLVED SOLIDS MG/L (CALCULATED) : 52,080

SPECIFIC GRAVITY AT 60/60°F : 1.042

RESISTIVITY. OHM-METRES AT 60°F (DETERMINED) : 0.225

HYDROGEN SULPHIDE : NONE DETECTED

pH : 8.7

CONSTITUENTS :	Mg/L :	Meq/L :
CATIONS :		
SODIUM	18,370	799.10
POTASSIUM	580	14.84
CALCIUM	98	4.89
MAGNESIUM	13	1.07
BARIUM	18	0.26
STRONTIUM	0.8	0.02
TOTAL IRON	-	-
DISSOLVED IRON	35	1.25
ANIONS :		
CHLORIDE	19,850	559.77
SULPHATE	10,290	214.24
BICARBONATE	2,640	43.27
CARBONATE	120	4.00
HYDROXIDE	NIL	-

CORE LABORATORIES NORSK

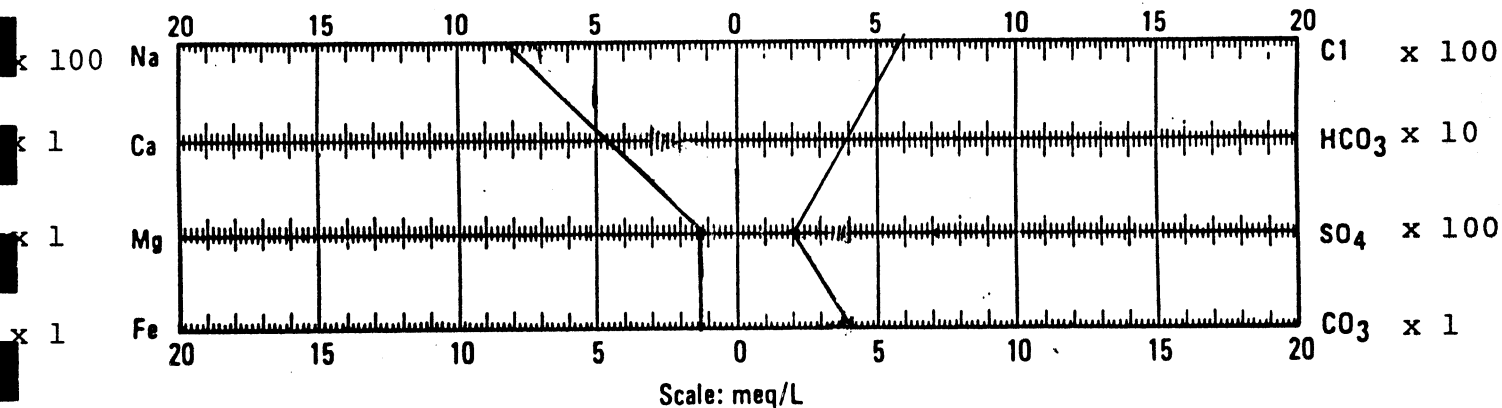
WATER ANALYSIS

STIFF DIAGRAM

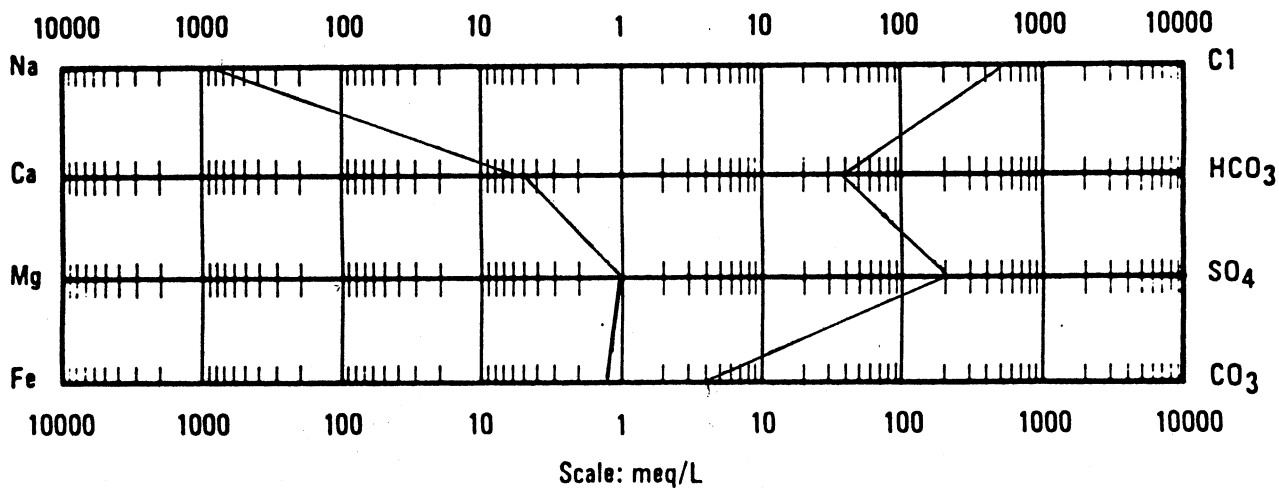
COMPANY: STATOIL
 SAMPLE NO: MUD FILTRATE
 DEPTH: 4498 METRES
 LOCATION: OFFSHORE
 COUNTY: NORTH SEA
 DATE SAMPLED:
 ANALYST: CC/NKH

WELL NAME: 6406/3-1
 FORMATION:
 SAMPLED FROM:
 FIELD:
 STATE: NORWAY
 DATE ANALYSED: 16/7/84
 FILE: NCL 102/1

LINEAR PLOT



LOGARITHMIC PLOT



ALL ANALYSES PERFORMED ON A FILTERED SAMPLE

CORE LABORATORIES
Petroleum Reservoir Engineering
CCB, ÅGOTNES
WATER ANALYSIS

COMPANY:	STATOIL	WELL NUMBER:	6406/3-1
SAMPLE NUMBER:	RFT, 1225 RFS	FORMATION:	
DEPTH:		SAMPLED FROM:	
LOCATION:	OFFSHORE	FIELD:	
COUNTY:	NORTH SEA	STATE:	NORWAY
DATE SAMPLED:		DATE ANALYSED:	16/7/84
ANALYST:	CC/NKH	OUR FILE NUMBER:	NCL 102/1

APPEARANCE BEFORE FILTRATION: HAZY BROWN WATER CONTAINING SOME FINE BROWN SEDIMENT.

APPEARANCE AFTER FILTRATION: CLEAR BROWN WATER

TOTAL DISSOLVED SOLIDS MG/L (CALCULATED): 32,700

SPECIFIC GRAVITY AT 60/60°F: 1.028

RESISTIVITY. OHM-METRES AT 60°F (DETERMINED): 0.284

HYDROGEN SULPHIDE: NONE DETECTED

pH: 8.7

CONSTITUENTS:	Mg/L:	Meq/L:
CATIONS:		
SODIUM	11,630	505.91
POTASSIUM	630	16.12
CALCIUM	28	1.40
MAGNESIUM	0,5	0.04
BARIUM	L 0,1	-
STRONTIUM	1.4	0,03
TOTAL IRON	2.0	-
DISSOLVED IRON	0.5	0.02
ANIONS:		
CHLORIDE	13,520	381.26
SULPHATE	6,270	130.54
BICARBONATE	595	9,75
CARBONATE	26	0,87
HYDROXIDE	NIL	-
NITRATE	66	1.06

L = LESS THAN

CORE LABORATORIES NORSK

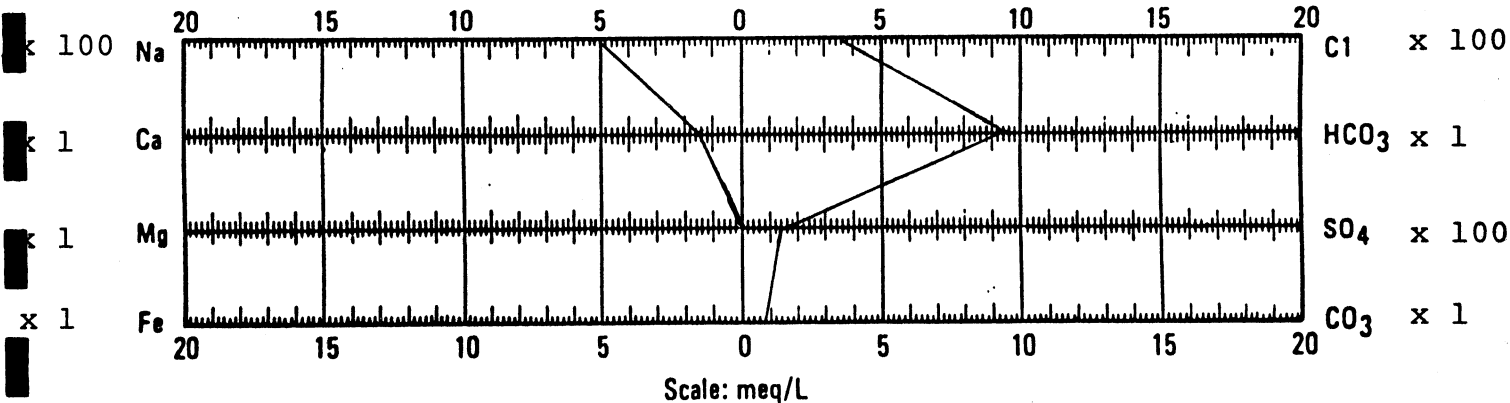
WATER ANALYSIS

STIFF DIAGRAM

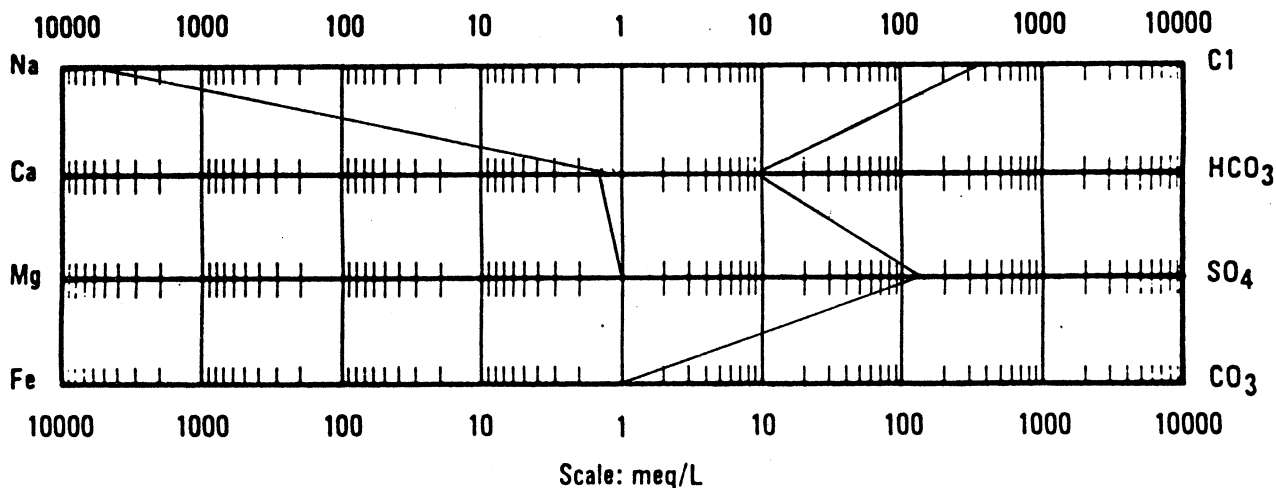
COMPANY: STATOIL
 SAMPLE NO: RFT 1225 RFS
 DEPTH:
 LOCATION: OFFSHORE
 COUNTY: NORTH SEA
 DATE SAMPLED:
 ANALYST: CC/NKH

WELL NAME: 6406/3-1
 FORMATION:
 SAMPLED FROM:
 FIELD:
 STATE: NORWAY
 DATE ANALYSED: 16/7/84
 FILE: NCL 102/1

LINEAR PLOT



LOGARITHMIC PLOT



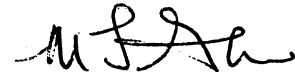
ALL ANALYSES PERFORMED ON A FILTERED SAMPLE

CORE LABORATORIES
Petroleum Reservoir Engineering
CCB, ÅGOTNES

STATOIL
Well: 6406/3-1

NCL 102/1

Core Laboratories Norsk
Chemistry Laboratory



Micheal Orme
Laboratory Supervisor