STATOIL A/S

FORMATION RESISTIVITY FACTOR

WELL: 31/6-6

DATE: AUGUST 1984

GECO
GEOPHYSICAL COMPANY
OF NORWAY A.S

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FORMATION RESISTIVITY FACTOR

Approximately every third meter from well 31/6-6 a sample was saturated as near as possible to 100% with the requested formation water; 50 000 ppm NaCl. Formation resistivity factor was then measured using a frequency of 1 kHz. The parameters "a" and "m" in Archies formula were calculated both by least squares method forced through (FF=1.0, ϕ=1.0) and least squares method with free fit.

Archies formula: $$FF = \frac{r_o}{r_w} = a \cdot \phi^{-m}$$

where r_o = resistivity of sample (100 % saturated)

r_w = resistivity of saturating formation water

a = FF-value at fractional porosity of 1.0

ϕ = fractional porosity

m = cementation factor

The data sets and the calculated values are presented in tabular and graphical form.

Please note that all samples, except those listed below, were measured at ambient laboratory conditions outside the Hassler holder system.

Samples from depths: 1556.50 - 1633.50 m
1639.25 - 1642.00 m
1664.50 m

were measured at a confining pressure of 15 bar while the pore space remained at atmospheric pressure. All samples, however, have been included on the same plot and in the calculations of cementation factor.

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Plug no.	Depth (m)	Sample resistivity ohm-meters	Formation Factor	Porosity (%)
10	1527.25	-	nmp	-
20	1530.00	1.83	13.0	19.1
30	1532.75	-	nmp	-
40	1535.50	-	nmp	-
50	1538.25	2.51	17.8	14.4
60	1541.00	3.08	21.8	16.2
70	1543.75	2.35	16.7	20.3
80	1553.75	2.97	21.1	22.6
90	1556.50	1.12	7.98	34.5
100	1559.25	1.05	7.48	33.9
109	1561.75	1.18	8.44	32.9
121	1565.00	2.40	17.1	23.9
129	1567.25	2.95	21.1	22.2
139	1570.00	1.50	10.7	31.9
149	1572.75	1.93	13.8	26.9
161	1579.50	2.26	16.1	24.6
171	1582.25	1.08	7.68	35.5
180	1584.75	1.04	7.44	32.7
190	1587.50	1.17	8.40	34.5
200	1590.25	1.15	8.28	32.1

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Plug no.	Depth (m)	Sample resistivity ohm-meters	Formation Factor	Porosity (%)
210	1593.00	0.769	5.53	34.7
222	1597.00	1.81	13.0	28.9
231	1599.25	1.03	7.44	35.3
240	1602.75	1.22	8.65	34.5
250	1605.25	1.28	9.19	32.5
259	1607.50	2.84	20.3	22.1
269	1610.25	0.932	6.64	36.1
280	1613.00	1.20	8.53	35.7
290	1515.50	1.16	8.27	35.7
300	1618.00	1.30	9.31	33.1
310	1620.75	1.25	9.09	33.3
319	1623.00	2.37	17.3	24.4
332	1626.25	1.60	11.7	31.6
339	1628.00	1.92	13.7	26.7
350	1631.00	2.30	16.6	26.6
360	1633.50	2.81	20.8	23.4
370	1636.70	1.99	14.1	21.0
379	1639.25	1.62	12.0	30.2
390	1642.00	2.01	14.7	28.0
400	1644.50	1.84	13.1	25.0

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Plug no.	Depth (m)	Sample resistivity ohm-meters	Formation Factor	Porosity (%)
410	1647.25	1.30	9.19	26.3
420	1649.75	1.72	12.2	23.0
430	1652.25	13.3	94.4	6.1
440	1654.75	2.11	15.0	30.4
450	1657.50	-	nmp	-
460	1660.00	2.15	15.2	23.2
470	1662.25	2.18	15.5	22.3
479	1664.50	1.02	7.46	29.8
490	1667.20	8.08	57.3	11.5
500	1669.75	2.39	16.9	21.4
510	1672.50	2.01	14.2	22.7
520	1675.00	1.48	10.5	22.3
530	1677.50	2.07	14.7	20.1
540	1680.00	1.41	9.99	25.4
550	1682.75	31.6	224	9.3
560	1685.25	2.20	15.6	29.0
570	1687.75	1.53	10.8	24.0
580	1691.00	1.35	9.58	31.6
590	1693.50	1.88	13.3	26.0
599	1695.75	1.98	14.1	25.4

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Plug no.	Depth (m)	Sample resistivity ohm-meters	Formation Factor	Porosity (%)
610	1698.75	29.0	206	3.1
620	1701.25	1.83	13.0	28.4
630	1703.75	1.62	11.5	28.8
640	1706.50	2.54	18.0	18.5
650	1709.00	29.5	209	3.6
660	1711.50	2.10	14.9	22.5
670	1714.00	2.45	17.4	15.1
680	1716.50	2.48	17.6	17.8
690	1719.25	1.30	9.18	33.0
700	1721.75	1.33	9.40	32.8
710	1724.25	2.71	19.2	17.2
720	1727.00	2.78	19.7	17.4
730	1729.50	2.02	14.3	22.1
740	1732.00	1.40	9.90	29.2
750	1734.75	2.65	18.8	16.6
760	1737.25	1.73	12.3	22.0
770	1739.75	3.09	21.9	20.4
780	1742.25	1.28	9.08	32.3
790	1745.25	1.71	12.1	25.5
800	1747.75	1.46	10.4	28.2

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Plug no.	Depth (m)	Sample resistivity ohm-meters	Formation Factor	Porosity (%)
810	1754.00	2.40	17.0	19.2
820	1756.50	1.79	12.7	25.1
830	1763.00	3.92	27.8	12.0
840	1766.25	1.53	10.8	28.9
850	1768.75	2.93	20.8	15.7
860	1771.25	1.45	10.3	29.1

Forced fit: $FF = 1.0 \cdot \phi^{-1.80}$

Free fit : $FF = 1.85 \cdot \phi^{-1.42}$

Regression Coefficient = $R^2 = 0.859$

FORMATION RESISTIVITY FACTOR VERSUS POROSITY

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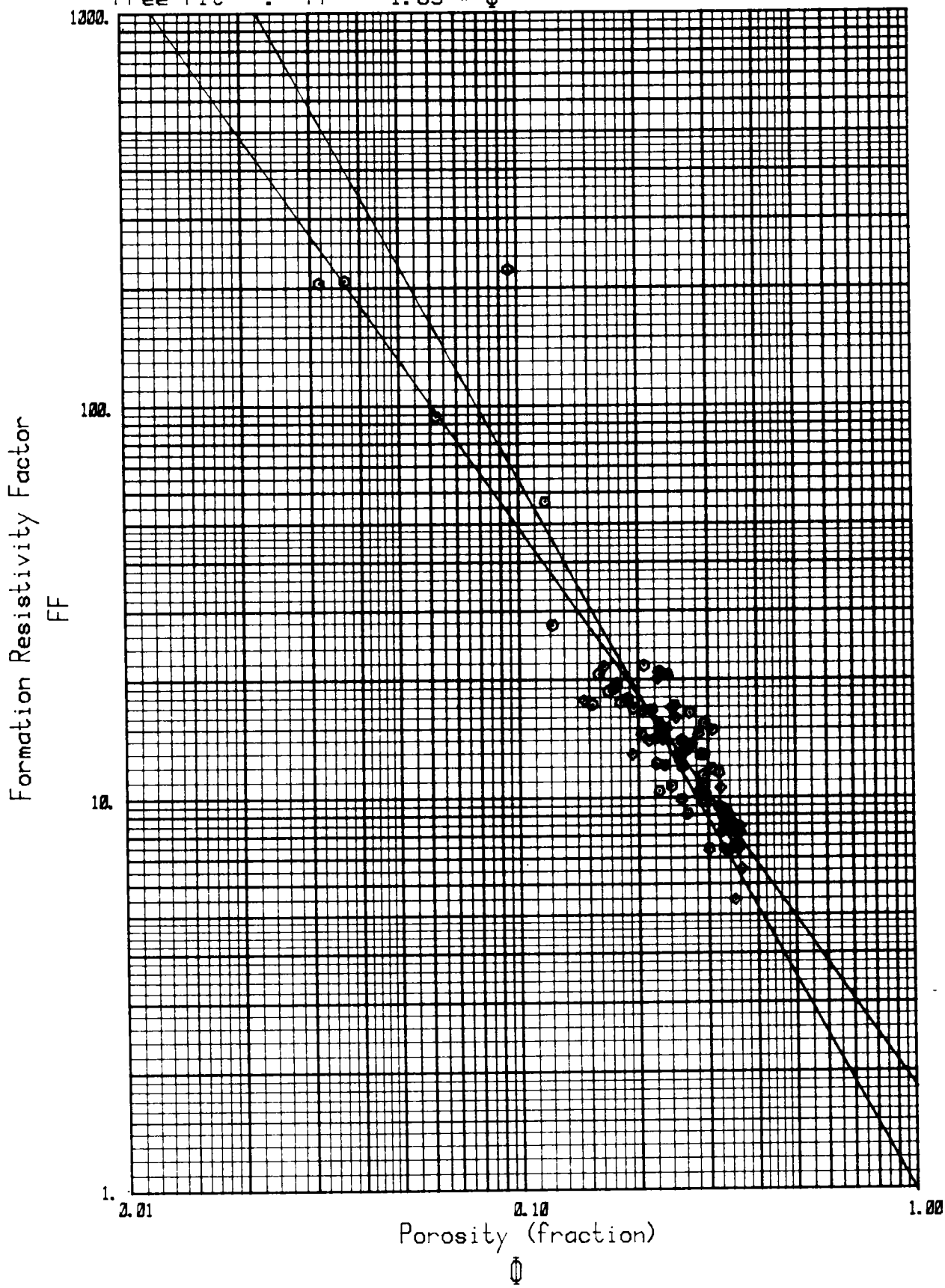
GEOPHYSICAL COMPANY OF NORWAY A.S
Petroleum laboratory

Company : STATOIL A/S
Well : 31/6-6

Forced fit : $FF = 1.00 * \phi^{-1.80}$
Free fit : $FF = 1.85 * \phi^{-1.42}$



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