

Denne rapport
tilhører



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L&U DOK. SENTER

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KODE Well 31/6-5 nr. 19

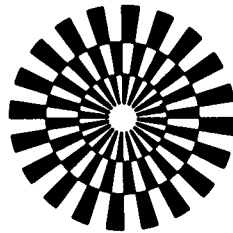
Returneres etter bruk

STATOIL A/S

FORMATION RESISTIVITY FACTOR

WELL: 31/6-5

DATE: JULY 1984



GECO
GEOPHYSICAL COMPANY
OF NORWAY A/S



STATOIL A/S
FORMATION RESISTIVITY FACTOR
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FORMATION RESISTIVITY FACTOR

Approximately every third meter 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, $\phi=1.0$) and least squares method with free fit.

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

- 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 a confining pressure of 15 bar while the pore space remained at atmospheric pressure.

Samples from depths:	1493.75	m
	1496.50	"
	1512.50	"
	1515.25	"
	1680.50	"
	1683.25	"
	1691.50	"
	1694.25	"

were measured at ambient laboratory conditions outside the Hassler holder system. All samples, however, have been included on the same plot and in the calculations of cementation factor. Previously reported data on sample from depth 1491.00 m has been deleted in this report because of unreliable data obtained in the laboratory. Unnoticed lateral cracks are suspected to have caused an uncharacteristic high conductivity at this depth.



FORMATION RESISTIVITY FACTOR

Plug no.	Depth (m)	Sample resistivity ohm-meters	Formation Factor	Porosity (%)
10	1485.50	rmp	-	-
20	1488.25	rmp	-	-
30	1491.00	rmp	-	-
40	1493.75	1.59	12.0	21.0
50	1496.50	2.14	16.2	17.8
60	1498.50	rmp	-	-
70	1501.25	rmp	-	-
80	1504.00	rmp	-	-
90	1507.00	rmp	-	-
100	1509.50	rmp	-	-
110	1512.50	2.54	19.3	16.9
120	1515.25	1.88	14.2	23.1



FORMATION RESISTIVITY FACTOR

Plug no.	Depth (m)	Sample resistivity ohm-meters	Formation Factor	Porosity (%)
130	1523.50	1.10	8.10	33.5
142	1527.00	0.926	6.81	32.3
151	1529.50	1.08	7.97	35.5
160	1532.00	1.08	7.97	35.0
170	1534.75	1.25	9.21	31.0
180	1537.50	1.17	8.62	34.0
189	1540.00	1.53	11.3	34.0
200	1543.00	1.17	8.59	35.3
210	1545.75	1.12	8.22	36.0
220	1548.75	1.15	8.49	34.5
230	1551.75	1.28	9.43	34.7
240	1554.50	1.48	10.9	34.0
254	1558.50	0.891	6.55	37.6
260	1560.25	0.796	5.85	37.5
270	1564.50	0.878	6.46	37.6
280	1567.25	0.954	7.02	34.0
290	1570.00	0.808	5.94	38.0
299	1572.50	0.818	6.02	37.7
310	1575.50	0.881	6.48	34.7
320	1578.25	1.16	8.54	33.8



FORMATION RESISTIVITY FACTOR

Plug no.	Depth (m)	Sample resistivity ohm-meters	Formation Factor	Porosity (%)
330	1581.00	1.06	7.76	35.8
340	1584.75	nmp		
351	1587.75	0.871	6.40	34.6
360	1590.25	0.968	7.12	38.2
370	1593.00	0.929	6.83	36.0
380	1595.75	1.56	11.5	31.1
391	1599.75	1.32	9.69	32.7
400	1603.00	1.91	14.0	27.1
411	1606.00	2.10	15.5	26.5
424	1609.75	2.04	15.0	26.3
431	1611.50	1.91	13.1	28.6
439	1613.75	2.06	14.1	27.7
450	1616.75	1.10	7.54	34.7
460	1619.50	1.45	9.93	29.8
472	1622.75	0.981	6.72	32.9
480	1625.25	1.25	8.55	29.6
490	1628.00	1.11	7.62	32.7
499	1630.75	1.47	10.1	30.3
510	1633.75	1.22	8.35	32.1
519	1636.25	1.33	9.12	29.0



FORMATION RESISTIVITY FACTOR

Plug no.	Depth (m)	Sample resistivity ohm-meters	Formation Factor	Porosity (%)
530	1639.25	1.11	7.59	32.8
540	1642.00	2.23	15.2	26.5
550	1644.75	1.43	11.1	29.3
560	1647.50	1.25	9.74	35.3
570	1650.25	1.17	9.14	35.6
580	1653.00	1.39	10.0	31.4
590	1655.75	2.00	15.6	25.9
601	1658.75	1.53	11.9	26.7
610	1661.25	1.11	8.70	34.6
620	1664.00	1.71	13.3	28.5
630	1666.50	2.32	18.1	24.5
640	1669.25	1.12	7.67	33.7
649	1671.75	1.06	7.28	34.7
660	1674.75	2.08	14.3	25.4
669	1677.50	1.78	13.9	24.6
680	1680.50	2.73	19.6	19.5
690	1683.25	2.79	19.9	17.3
700	1686.00	1.71	11.7	29.6
708	1688.25	2.83	19.4	23.3
720	1691.50	2.85	20.3	20.1
730	1694.25	2.56	18.3	17.3



FORMATION RESISTIVITY FACTOR

Plug no.	Depth (m)	Sample resistivity ohm-meters	Formation Factor	Porosity (%)
740	1697.00	5.48	37.5	16.9
751	1700.00	2.59	17.7	23.8
760	1702.50	0.901	6.17	34.4
770	1705.25	1.01	6.93	32.9
779	1707.75	1.30	8.92	30.9
792	1711.50	1.20	8.19	32.8
799	1713.50	0.947	6.49	33.2
809	1716.25	2.06	14.1	26.4
820	1719.25	1.92	13.1	28.2

Forced fit: $1.0 \cdot \phi^{-1.91}$

Free fit : $1.46 \cdot \phi^{-1.60}$

$R^2=0.7877$

FORMATION RESISTIVITY FACTOR VERSUS POROSITY



Company : STATOIL A/S
Well : 31/6-5

Forced fit : $FF = 1.00 * \phi^{-1.91}$

Free fit : $FF = 1.46 * \phi^{-1.60}$

