

Denne rapport
tilhører



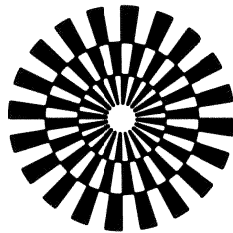
L&U DOK.SENTER

L.NR. 123 84 23 0004

KODE Well 31/3-2 nr.10

Returneres etter bruk

NORSK HYDRO A/S
 ROUTINE CORE ANALYSIS
 WELL: 31/3-2
 MAY 1984



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OF NORWAY A/S

Well	12384230004	Interval	
Well	ROLL	Depth	
Well		Anal. date	
Date	9 JUNI 1984	Time	
Well	31/3-2	Core	
Well		Core	
Well		Core	
Well		Core	
Well		Core	
Well		Core	



ROUTINE CORE ANALYSIS

COMMENTS

- GENERAL:** Core analyses including horizontal and vertical permeability, porosity and grain density have been performed on samples from well 31/3-2 at the depths requested by Norsk Hydro A/S. In addition, formation resistivity factor and grain size distribution were measured and have been reported under two separate covers.
- PREPARATION:** The samples for analyses were collected by gently drilling with a one inch bore in the horizontal and vertical planes using liquid nitrogen as a cooling agent. The sample plugs were then cut to lengths of one inch and mounted while still frozen in Hassler-type holders at a confining sleeve pressure of 15 bar. After thawing, the plugs were cleaned, dried and thus ready for petrophysical analyses.

MEASUREMENTS: AIR PERMEABILITY

Standard air permeability, k_a , was measured by injection of nitrogen gas at a net confining sleeve pressure of 15 bar and then converted empirically to liquid permeability, k_l , on all samples.

POROSITY AND GRAIN DENSITY

Porosity and grain density data were only collected from the horizontal sample plugs. Pore volume was determined by injection of helium gas at a net confining sleeve pressure of 15 bar. After dismounting, grain volume values were determined by using a Boyles law porosimeter and helium. Knowing also the weight of the sample, porosity and grain density were calculated.

FINAL REPORT

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COMPANY : HYDRO
 WELL : 31/3-2
 FIELD : 31/3
 STATE : NORWAY

CORE NO.: 1

Plug No.	Depth (meter)	Permeability (mD), vertical		Porosity (%) He	Pore saturation S _o	Grain dens. g/cc	Formation Description
		K _a	K _i				
1	1565.00			4.8		2.69	
2	1567.50	10.9	9.7	30.4		2.71	
3	1567.75	3484	3428	30.5		2.69	
4	1568.00	5282	5210	31.2		2.70	
5	1568.25	2594	2548	32.7		2.70	
6	1568.50	2918	2868	32.8		2.69	
7	1568.75	3893	3834	24.0		2.69	
8	1569.00	5.2	4.5	25.3		2.68	
9	1569.25	9.6	8.6	23.2		2.67	
10	1569.50	4.6	4.0	26.6		2.69	
11	1569.75	17.2	15.5	25.0		2.67	
12	1570.00	15.1	13.5	24.9		2.67	
13	1570.25	12.7	11.3	26.4		2.67	
14	1570.50	21.1	19.1	29.1		2.68	
15	1570.75	51.5	47.8	27.8		2.70	
16	1571.00	99.2	93.1	26.6		2.69	
17	1571.25	3453	3397	26.9		2.70	
18	1571.50	5783	5706	22.2		2.70	
19	1571.75	768	746	24.2		2.66	
20	1572.00	8944	8844	29.2		2.71	
21	1572.25	8467	8370	26.6		2.67	
22	1572.50	10969	10856	28.7		2.70	
23	1572.75	7338	7250	30.6		2.69	
24	1573.00	6122	6043	29.0		2.70	
25	1573.25	5184	5113	30.5		2.71	
26	1573.50	5091	5020	29.1		2.70	
27	1573.75	5276	5204	3.0		2.69	
	1574.25	0.053	0.039	0.057	0.042		

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COMPANY : HYDRO
WELL : 31/3-2
FIELD : 31/3
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CORE NO.: 1 (cont.)

DATE: MAY 1984

Plug No.	Depth (meter)	Permeability (mD),		Porosity (%)	Pore saturation	Grain dens.	Formation Description
		horizontal	vertical				
		K _a	K _v				
28	1574.50	0.033	0.024	2.4		2.69	
29	1574.75	10.4	9.4	19.7		2.69	
30	1575.00		3.5	23.8		2.63	
31	1575.25	29.8	27.1	25.2		2.71	
	1575.50						



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COMPANY : HYDRO
 WELL : 31/3-2
 FIELD : 31/3
 STATE : NORWAY

DATE: MAY 1984

CORE NO.: 2

Plug No.	Depth (meter)	Permeability (mD), vertical		Porosity (%) He	Pore saturation S _o	Grain dens. g/cc	Formation Description
		K _a	K _l				
32	1581.00	8323	8227	31.5		2.68	
33	1581.00	4118	4056	28.4		2.69	
34	1581.50	2717	2669	30.8		2.67	
35	1581.75	4809	4741	30.9		2.66	
36	1582.00	2.3	1.8	9.2		2.72	
37	1582.25	0.078	0.058	6.6	0.015	2.72	
38	1582.50	0.22	0.17	10.3		2.71	
39	1583.00	327	314	33.2	3.4	2.68	
40	1583.25	68.9	64.1	28.4		2.69	
41	1583.50	145	137	29.1		2.64	
42	1583.75	13.7	12.1	23.4		2.65	
43	1584.00	13.3	11.7	23.7	rmp	2.66	
44	1584.25	143	135	29.8		2.67	
45	1584.50	5.0	4.3	23.3		2.66	
46	1584.75	10.0	8.7	23.5		2.67	
47	1585.00	32.5	29.6	26.5	3.6	2.67	
48	1585.25	29.7	27.0	25.2		2.66	
49	1585.50	8.9	7.8	22.9		2.66	
50	1585.75	3066	3014	35.0		2.72	
51	1586.00	1368	1337	31.5	989	2.75	
52	1586.25	952	926	33.1		2.71	
53	1586.50	4099	4037	33.1		2.66	
54	1586.75	3099	3047	33.7		2.67	
55	1587.00	49.8	45.9	27.9	rmp	2.67	
56	1587.25	174	165	28.8		2.66	
57	1587.50	140	133	33.3		2.68	
58	1587.75	68.5	63.8	28.5		2.67	

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COMPANY : HYDRO
WELL : 31/3-2
FIELD : 31/3
STATE : NORWAY

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CORE NO.: 2 (cont.)

Plug No.	Depth (meter)	Permeability (mD), vertical		Porosity (%) He	Pore saturation So	Grain dens. g/cc	Formation Description
		K _a	K _i				
59	1588.00	112	106	32.0		2.69	
60	1588.25	64.9	60.2	30.6		2.68	
61	1588.50	65.8	61.1	31.3		2.67	
62	1588.75	141	133	32.3		2.68	
63	1589.00	23.8	21.4	28.1		2.66	
64	1589.25	60.1	55.7	27.2		2.66	
65	1589.50	91.6	85.8	32.0		2.68	
66	1589.75	31.6	28.7	26.6		2.66	
67	1590.00	30.5	27.7	27.1	19.0	2.67	
68	1590.25	30.8	28.1	29.5		2.70	
	1590.70						



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COMPANY : HYDRO
 WELL : 31/3-2
 FIELD : 31/3
 STATE : NORWAY

CORE NO.: 3

Plug No.	Depth (meter)	Permeability (mD), vertical		Porosity (%) He	Pore saturation S _o	Grain dens. g/cc	Formation Description
		K _a	K _l				
69	1593.00	7.3	6.4	17.0	15.2	24.3	2.73
70	1593.00	27.9	25.6	26.8		26.8	2.69
71	1593.50	2095	2055	26.9		26.9	2.70
72	1593.75	12228	12108	27.8		27.8	2.67
73	1594.00	46.1	42.6	30.6	5.4	30.6	2.68
74	1594.25	80.8	75.6	22.0		22.0	2.68
75	1594.50	3719	3661	35.0		35.0	2.68
76	1594.75	2677	2629	33.0		33.0	2.68
77	1595.00	2980	2929	34.2	2180	34.2	2.68
78	1595.25	2899	2849	35.1		35.1	2.68
79	1595.50	2457	2412	33.6		33.6	2.68
80	1595.75	4206	4144	36.5		36.5	2.69
81	1596.00	48.9	45.2	29.1	32.8	29.1	2.67
82	1596.25	69.1	64.7	30.9		30.9	2.68
83	1596.50	71.9	67.3	30.4		30.4	2.68
84	1596.75	54.9	50.9	28.8		28.8	2.68
85	1597.25	134	127	32.2	36.6	32.2	2.67
86	1597.50	24.9	22.5	27.7		27.7	2.68
87	1597.75	0.015	0.010	0.5		0.5	2.78
88	1598.00	104	97.9	31.5	76.2	31.5	2.69
89	1598.25	42.8	39.5	29.1		29.1	2.69
90	1598.50	3463	2418	34.8		34.8	2.70
91	1598.75	153	145	29.8		29.8	2.68
92	1599.00	262	251	34.3	304	34.3	2.66
93	1599.25	1960	1921	34.8		34.8	2.66
94	1599.50	1067	1040	34.8		34.8	2.66
95	1599.75	148	140	33.3		33.3	2.66



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COMPANY : HYDRO
 WELL : 31/3-2
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CORE NO.: 3 (cont.)

Plug No.	Depth (meter)	Permeability (mD), vertical		Porosity (%) He	Pore saturation So	Grain dens. g/cc	Formation Description
		horizontal Ka	Ki				
96	1600.00	0.021	0.015	0.019	0.014	1.9	2.70
97	1600.25	36.9	33.9	19.9		19.9	2.66
98	1600.50	0.021	0.015	1.4		1.4	2.68
99	1600.75	179	171	32.1		32.1	2.68
100	1601.00	7578	7488	31.2	7415	31.2	2.71
101	1601.25	3728	3670	27.5		27.5	2.70
102	1601.50	7052	6966	32.0		32.0	2.68
103	1601.75	2798	2750	32.0		32.0	2.69
104	1602.00	6926	6841	31.1	3229	31.1	2.68
105	1602.25	2742	2694	30.1		30.1	2.68
106	1602.50	3769	3710	31.8		31.8	2.69
107	1602.75	1465	1432	30.6		30.6	2.67
108	1603.10	1662	1627	199	189	31.4	2.70
109	1603.25	3368	3313	32.3		32.3	2.67
110	1603.50	7378	7289	35.3		35.3	2.70
111	1603.75	1793	1756	32.8		32.8	2.69
112	1604.00	5210	5138	31.5	2354	31.5	2.69
113	1604.25	5040	4970	32.0		32.0	2.70
114	1604.50	5422	5349	31.1		31.1	2.68
115	1604.75	2978	2928	28.9		28.9	2.68
116	1605.00	4664	4597	31.6	2475	31.6	2.69
117	1605.25	5341	5268	30.7		30.7	2.67
118	1605.50	3532	3476	32.4		32.4	2.68
119	1605.75	4153	4091	34.1		34.1	2.69
120	1606.00	0.028	0.020	0.018	0.013	3.4	2.69
	1606.25						



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COMPANY : HYDRO
 WELL : 31/3-2
 FIELD : 31/3
 STATE : NORWAY

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CORE NO.: 4

Plug No.	Depth (meter)	Permeability (mD),		Porosity (%)	Pore saturation	Grain dens. g/cc	Formation Description
		horizontal K _a	vertical K _l				
121	1608.00					2.70	
122	1608.00	7446	7357	31.9		2.68	
123	1608.25	17978	17825	32.9		2.66	
124	1608.50	2842	2793	32.5		2.67	
125	1608.75	10087	9979	33.6		2.66	
126	1609.00	8581	8484	32.9		2.66	
127	1609.25	13305	13177	33.4		2.65	
128	1609.50	3855	3796	31.5		2.66	
129	1609.75	7334	7245	32.3		2.66	
130	1610.25	rmp	1616	rmp		2.67	
131	1610.50	3604	3547	31.4		2.65	
132	1610.75	2127	2086	31.6		2.65	
133	1611.00	1843	1805	33.9		2.66	
134	1611.25	6321	6240	34.2		2.64	
135	1612.00	2584	2537	29.6		2.66	
136	1612.25	9575	9471	35.6		2.66	
137	1612.50	7212	7125	35.6		2.66	
138	1612.75	357	344	29.2		2.64	
139	1613.00	41.9	38.5	24.6		2.63	
140	1613.25	2545	2499	36.3		2.68	
141	1613.50	0.18	0.14	3.5		2.68	
142	1613.75	0.073	0.054	4.6		2.68	
143	1614.00	0.043	0.031	2.2	0.093	2.69	
144	1614.25	0.036	0.026	2.5		2.66	
145	1614.50	23.9	21.5	24.0		2.68	
146	1614.75	12124	12004	32.3		2.66	
147	1615.00	78.1	72.9	29.9	14.6	2.66	
148	1615.25	53.7	49.6	27.9		2.66	



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COMPANY : HYDRO
 WELL : 31/3-2
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 STATE : NORWAY

DATE: MAY 1984

CORE NO.: 4 (cont.)

Plug No.	Depth (meter)	Permeability (mD), vertical		Porosity (%) He	Pore saturation S _o S _w	Grain dens. g/cc	Formation Description
		K _a	K _i				
148	1615.50	19.3	17.3	24.1		2.66	
149	1615.75	36.0	32.9	26.0		2.65	
150	1616.00	1.7	1.4	21.0	1.2	2.65	
151	1616.25	1.1	0.83	19.7		2.72	
152	1616.50	1.6	1.2	21.3		2.67	
153	1616.75	3.0	2.5	22.2		2.67	
154	1617.25	2.8	2.3	20.7	11.2	2.66	
155	1617.50	4.9	4.2	23.4		2.68	
156	1617.75	2.8	2.4	22.3		2.66	
157	1618.00	8.6	7.5	23.8	2.6	2.68	
158	1618.25	8.4	7.3	24.0		2.69	
159	1618.50	1.3	0.99	21.6		2.66	
160	1618.75	0.89	0.69	16.3		2.66	
161	1619.00	1.1	0.83	19.8	0.73	2.66	
162	1619.25	13.0	11.5	25.7		2.68	
163	1619.50	9.8	8.6	24.5		2.69	
164	1619.75	4.0	3.4	22.5		2.68	
165	1620.00	1.6	1.3	20.6	0.53	2.68	
166	1621.00	19.0	17.0	17.5	19.8	2.70	
167	1621.25	13.2	11.7	14.3		2.70	
168	1621.50	0.043	0.031	1.1		2.69	
169	1622.00	0.039	0.029	0.9	0.029	2.67	
170	1622.25	173	164	31.0		2.67	
171	1622.50	791	768	31.8		2.68	
172	1622.75	5777	5701	31.0		2.68	
173	1623.00	3107	3055	29.8	2828 2779	2.71	
174	1623.25	4013	3952	34.4		2.68	

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COMPANY : HMDRO
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FIELD : 31/3
STATE : NORWAY

DATE: MAY 1984

CORE NO.: 4 (cont.)

Plug No.	Depth (meter)	Permeability (mD),		Porosity (%)	Pore saturation	Grain dens.	Formation Description
		horizontal K _a	vertical K _v				
175	1623.50	2741	2693	33.5		2.68	
176	1623.75	1948	1909	32.3		2.69	
177	1624.00	1862	1823	32.1	1871	2.69	
178	1624.25	2628	2581	31.3		2.68	
179	1624.50	1610	1575	33.3		2.67	
180	1624.75	4622	4556	34.7		2.65	
181	1625.00	4063	4002	35.2	2921	2.66	
182	1625.25	4121	4059	34.7		2.66	
183	1625.50	1940	1900	34.9		2.66	
	1626.00						



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COMPANY : HYDRO
WELL : 31/3-2
FIELD : 31/3
STATE : NORWAY

CORE NO.: 5

Plug No.	Depth (meter)	Permeability (mD),		Porosity (%)	Grain dens. g/cc	Formation Description
		horizontal K _a	vertical K _i			
184	1626.00	0.060	0.044	2.6	2.69	
185	1626.00	0.063	0.046	3.1	2.69	
186	1626.25	4.5	3.9	8.3	2.63	
187	1626.50	532	514	34.3	2.66	
188	1626.75	1354	1323	35.4	2.67	
189	1627.00	1834	1796	34.4	2.67	
190	1627.25	21326	21156	37.7	2.66	
191	1627.50	5266	5194	33.9	2.66	
192	1628.00	5513	5439	34.3	2.66	
193	1628.25	6640	6557	34.7	2.66	
194	1628.50	5963	5886	34.0	2.67	
195	1628.75	10418	10309	32.7	2.65	
196	1629.00	10572	10402	32.6	2.66	
197	1629.25	4760	4693	31.5	2.67	
198	1629.50	4706	4639	32.4	2.66	
199	1629.75	9668	9564	32.8	2.67	
200	1630.00	4563	4497	34.9	2.66	
201	1630.25	5441	5367	30.4	2.66	
202	1630.50	6473	6391	31.3	2.69	
203	1630.75	14827	14691	34.1	2.69	
204	1631.00	5862	5785	33.8	2.68	
205	1631.25	4296	4232	33.0	2.70	
206	1631.50	2444	2399	34.0	2.69	
207	1631.75	1218	1189	26.2	2.73	
208	1632.00	11528	11411	34.7	2.69	
209	1632.25	5210	5138	30.2	2.72	
210	1632.50	15970	15827	34.6	2.68	
211	1632.75	10418	10308	30.5	2.73	



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COMPANY : HYDRO
 WELL : 31/3-2
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CORE NO.: 5 (cont.)

DATE: MAY 1984

Plug No.	Depth (meter)	Permeability (mD),		Porosity (%)	Pore saturation	Grain dens. g/cc	Formation Description
		horizontal K _a	vertical K _l				
212	1633.00	2881	2831	31.5		2.73	
213	1633.25	4193	4130	30.0		2.73	
214	1633.50	rmp	rmp	rmp			
215	1633.75	3158	3106	31.2		2.72	
216	1634.00	3203	3150	30.4		2.68	
217	1634.25	3686	3628	30.8		2.71	
218	1634.50	1956	1917	32.8		2.68	
219	1634.75	6091	6012	31.4		2.66	
220	1635.00	4914	4845	28.6		2.70	
221	1635.25	5348	5275	32.2		2.65	
222	1635.50	6596	6513	34.3		2.66	
223	1635.75	3973	3912	31.8		2.65	
224	1636.00	3637	3580	33.3		2.65	
225	1636.25	3193	3140	33.9		2.65	
226	1636.50	4321	4257	28.9		2.65	
227	1636.75	10828	10716	31.5		2.64	
228	1637.00	3106	3054	31.9		2.64	
229	1637.25	4888	4819	31.0		2.64	
230	1637.50	6198	6118	33.6		2.66	
231	1637.75	4967	4897	31.5		2.63	
232	1638.00	3497	3441	33.3		2.64	
233	1638.25	5749	5672	33.2		2.64	
234	1638.50	11950	11831	33.0		2.64	
235	1638.75	0.029	0.021	0.5		2.66	
236	1639.00	0.75	0.58	5.4		2.69	
237	1639.25	1710	1674	34.1		2.68	
238	1639.50	1310	1280	33.1		2.69	
239	1639.75	2372	2327	33.7		2.67	
	1639.85						

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COMPANY: HYDRO

FIELD: 31/3

FILE:

WELL: 31/3-2

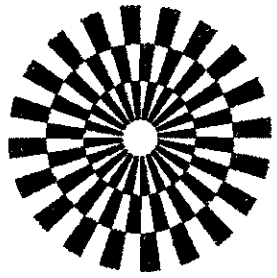
COUNTY:

DATE: MAY 1984

LOCATION:

STATE: NORWAY

ELEV.:



CORE GRAPH

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 GECO LABORATORIES AND ITS OFFICERS AND EMPLOYEES.

GECO
GEOPHYSICAL COMPANY
OF NORWAY A.S

VERTICAL SCALE: 1:200

LABORATORY

CORE-GAMMA SURFACE-LOG

(PATENT APPLIED FOR)
GAMMA RAY RADIATION INCREASE ----->
VOLTAGE: 985 VOLT
INTEGRATING TIME: 11 SEC
COUNTS PER MINUTE: 10 K

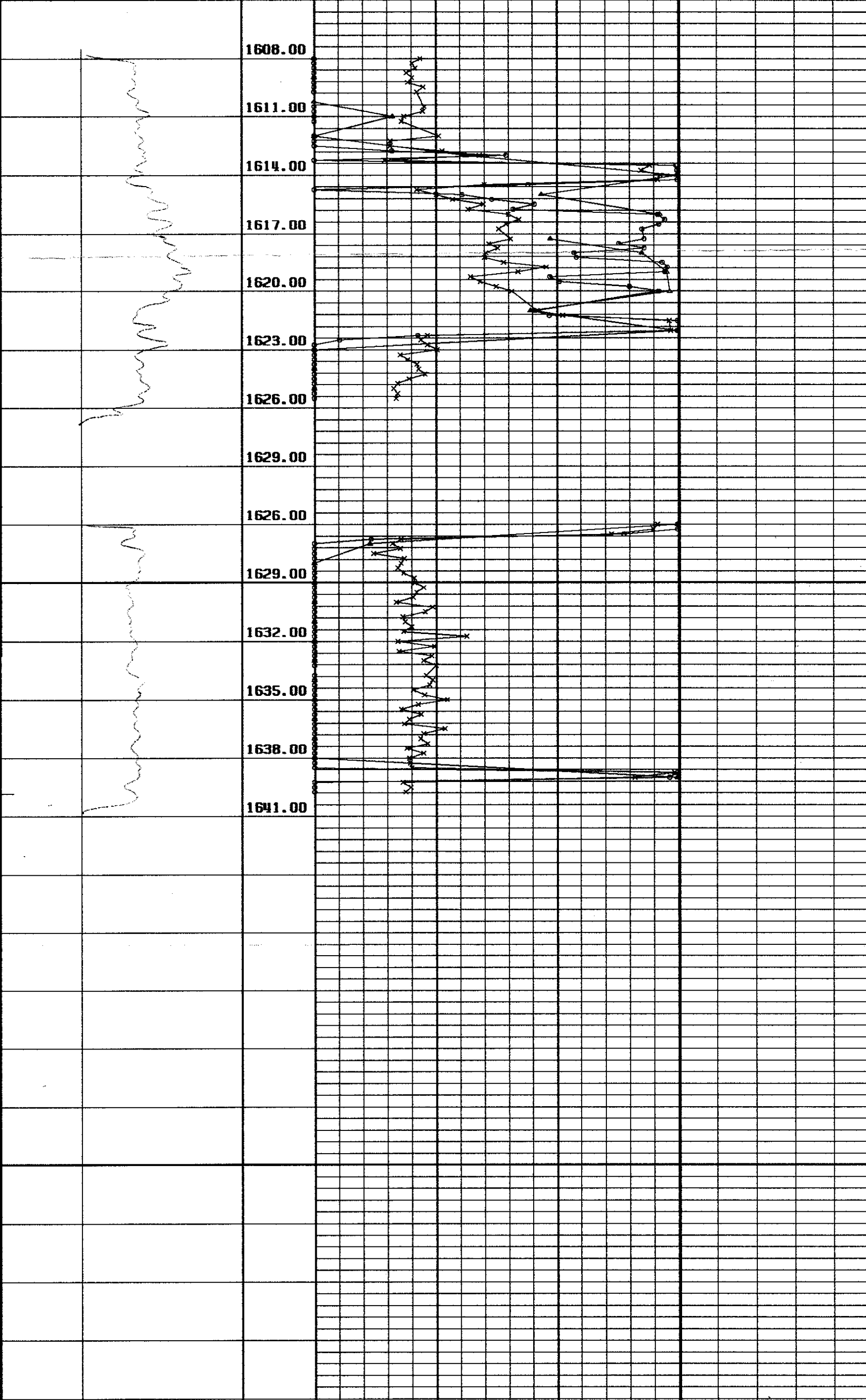
DEPTH
METER

POROSITY %
PERMEABILITY mD
HORIZONTAL
VERTICAL

FLUID SATURATION
OTHER OIL WATER

CORE NO: 4

CORE NO: 5



LOGGED INTERVAL:

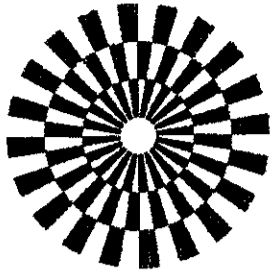
CORE NO.4 :
1608.00 - 1626.00

CORE NO.5 :
1626.00 - 1639.85

COMPANY: HYDRØ
 WELL: 31/3-2
 LOCATION:

FIELD: 31/3
 COUNTY:
 STATE: NORWAY

FILE:
 DATE: MAY 1984
 ELEV.:



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 GEOPHYSICAL COMPANY
 OF NORWAY A.S.

CORE GRAPH

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VERTICAL SCALE: 1:200

LABORATORY

