

Denne rapport
tilhører



L&U DOK.SENTER

L.NR. 30284290003

KODE Well 31/2-14 nr. 14

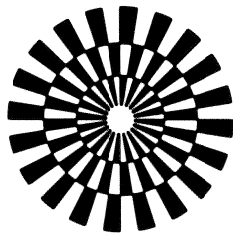
Returneres etter bruk

A/S NORSKE SHELL

ROUTINE CORE ANALYSIS

WELL: 31/2-14

DATE: JUNE 1984



GECO
GEOPHYSICAL COMPANY
OF NORWAY A-S

SH01

P5.12.04-01

31/2-14



ROUTINE CORE ANALYSIS

COMMENTS

GENERAL: Core analyses including horizontal and vertical permeability, porosity and grain density have been performed on samples from well 31/2-14 at the depths requested by A/S Norske Shell.

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 collected only 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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DATE: JUNE 1984

COMPANY : SHELL
WELL : 31/2-14
FIELD : 31/2
STATE : NORWAY

CORE NO.: 1



Plug No.	Depth (meter)	Permeability (mD),		Porosity (%)	Pore saturation	Grain dens. g/cc	Formation Description
		horizontal K _a	vertical K _a				
32	1535.00			38.1		2.67	
33	1535.10	15269	14996	37.0		2.69	
34	1535.40	1384	1323	38.1		2.69	
35	1535.70	5690	5542	38.1		2.66	
36	1536.00	7554	7378	36.6		2.67	
37	1536.30	1916	1841	36.5		2.67	
38	1536.60	2213	2130	35.6		2.66	
39	1536.90	3202	3099	36.8		2.68	
40	1537.20	1017	967	37.6		2.67	
41	1537.50	1072	1021	27.8		2.66	
42	1537.80	132	119	71.3	62.8		
43	1538.10	rmp		rmp		2.68	
44	1538.40	0.010	<0.01	1.2		2.69	
45	1538.70	0.024	0.017	4.4			
46	1539.00	rpp		37.8		2.50	
47	1539.30	595	559	36.8		2.67	
48	1539.60	506	473	35.6		2.68	
49	1539.90	440	410	35.4		2.67	
50	1540.20	290	267	38.1		2.68	
51	1540.50	512	480	38.1	300	2.67	
52	1540.80	594	558	38.0		2.67	
53	1541.10	273	251	36.2		2.67	
	1541.70	0.004	<0.01	0.5		2.70	
	1542.20						

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COMPANY : SHELL
 WELL : 31/2-14
 FIELD : 31/2
 STATE : NORWAY

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 CORE NO.: 2



Plug No.	Depth (meter)	Permeability (mD),		Porosity (%)	Pore saturation	Grain dens.	Formation Description
		horizontal Ka	vertical Kl				
1	1544.50						
2	1544.70	18.4	14.9	26.5		2.66	
3	1545.00	36.5	31.3	30.9		2.66	
4	1545.30	36.8	31.7	29.7		2.66	
5	1545.65	25.5	21.0	28.5		2.65	
6	1545.90	49.5	42.3	30.2		2.67	
7	1546.20	rmp		rmp			
8	1546.50	45.5	39.5	30.1		2.67	
9	1546.80	37.7	31.7	29.1		2.68	
10	1547.10	57.9	50.5	31.2		2.69	
11	1547.40	107	94.6	29.4		2.70	
12	1547.70	180	163	27.9		2.70	
13	1548.00	0.010	<0.01	0.4		2.66	
14	1548.30	0.014	0.010	2.4		2.70	
15	1548.60	0.010	<0.01	0.6		2.69	
16	1548.90	rmp		1.6		2.70	
17	1549.20	0.048	0.035	1.2		2.69	
18	1549.50	584	548	36.5		2.70	
19	1549.80	926	879	37.0		2.69	
20	1550.10	528	495	34.2		2.69	
21	1550.40	1112	1059	37.6		2.72	
22	1550.70	2131	2050	38.2	176	2.71	
23	1551.00	1177	1121	37.2		2.69	
24	1551.30	1291	1232	37.2		2.70	
25	1551.60	788	745	36.4		2.70	
26	1551.90	0.011	<0.01	0.4		2.69	
27	1552.20	0.009	<0.01	0.4		2.68	
28	1552.50	3897	3780	37.8		2.68	

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CORE NO.: 2 (cont.)

COMPANY : SHELL
 WELL : 31/2-14
 FIELD : 31/2
 STATE : NORWAY



Plug No.	Depth (meter)	Permeability (mD),		Porosity (%)	Pore saturation	Grain dens.	Formation Description
		horizontal	vertical				
		K _a	K _v				
28	1552.80	0.032	0.023	0.3		2.68	
29	1553.10	0.13	0.098	0.5		2.69	
30	1553.40	0.014	0.010	0.6		2.68	
31	1553.70	0.006	<0.01	0.5	<0.01	2.69	
	1553.75						

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COMPANY : SHELL
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 STATE : NORWAY

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CORE NO.: 3



Plug No.	Depth (meter)	Permeability (mD), vertical		Porosity (%) He	Pore saturation		Grain dens. g/cc	Formation Description
		K _a	K _i		S _o	S _w		
	1560.00							
54	1560.10	4836	4702	1421	1359	38.8	2.68	
55	1560.40	6204	6047			38.6	2.66	
56	1560.85	3233	3128			38.8	2.68	
57	1561.00	2953	2855			36.5	2.70	
58	1561.30	7901	7719			36.2	2.69	
59	1561.60	3322	3216			38.4	2.69	
60	1561.90	5737	5588	4259	4137	38.5	2.69	
61	1562.20	0.009	<0.01			2.2	2.69	
62	1562.50	0.014	0.010			1.4	2.70	
63	1562.80	0.012	<0.01			2.0	2.69	
	1562.90							



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COMPANY : SHELL
 WELL : 31/2-14
 FIELD : 31/2
 STATE : NORWAY

Plug No.	Depth (meter)	Permeability (mD),		Porosity (%)	Pore saturation	Grain dens.	Formation Description
		horizontal K_a	vertical K_v				
64	1564.00	0.005	0.005	2.4		2.69	
65	1564.30	8101	7917	37.6		2.68	
66	1565.20	5339	5196	35.8		2.66	
67	1565.50	12610	12367	36.9		2.66	
68	1565.80	2792	2697	37.3		2.67	
69	1566.10	3957	3839	36.7		2.66	
70	1566.40	5556	5410	36.4		2.66	
71	1567.00	2022	1945	36.7		2.68	
72	1567.30	495	1180	33.9	1124	2.66	
73	1567.60	1824	1752	37.1		2.68	
74	1567.90	0.009	<0.01	0.5		2.69	
75	1568.20	1842	1769	36.8		2.68	
76	1568.50	1345	1286	37.2		2.68	
77	1568.80	425	396	32.7		2.68	
78	1569.10	855	810	36.4		2.69	
	1570.10						

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COMPANY : SHELL
 WELL : 31/2-14
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CORE NO.: 5



Plug No.	Depth (meter)	Permeability (mD), vertical		Porosity (%) He	Pore saturation S _o	Grain dens. g/cc	Formation Description
		K _a	K _v				
	1571.00						
79	1571.20	194	177	32.5		2.68	
80	1571.50	393	366	34.6		2.70	
81	1571.80	331	307	33.8		2.70	
82	1572.10	316	292	35.5		2.68	
83	1572.40	61.1	53.5	31.8		2.64	
84	1572.70	74.3	65.5	28.7		2.67	
85	1573.00	281	259	30.8		2.69	
86	1573.30	12013	11778	34.5		2.73	
87	1573.60	2404	2318	32.5		2.72	
88	1573.90	2613	2522	37.3		2.70	
89	1574.20	839	795	35.6		2.69	
90	1574.50	1370	1310	36.1	201	2.69	
91	1574.80	517	484	35.1		2.68	
92	1575.10	919	872	35.9		2.69	
93	1575.40	304	281	34.4		2.69	
94	1575.70	693	653	35.8		2.68	
95	1576.00	440	410	34.7		2.68	
96	1576.30	275	253	33.7		2.69	
	1576.90						



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CORE NO.: 6

COMPANY : SHELL
 WELL : 31/2-14
 FIELD : 31/2
 STATE : NORWAY

Plug No.	Depth (meter)	Permeability (mD),		Porosity (%)	Pore saturation	Grain dens. g/cc	Formation Description
		horizontal K _a	vertical K _i				
97	1580.00	319	295	35.0		2.69	
98	1580.10	315	291	34.6		2.68	
99	1580.40	424	395	35.4		2.69	
100	1580.70	214	195	33.2		2.68	
101	1581.00	172	157	32.2		2.68	
102	1581.30	1461	1397	33.3		2.67	
103	1581.60	804	760	32.2		2.68	
104	1581.90	365	339	30.4		2.67	
105	1582.20	300	277	30.1		2.67	
106	1582.50	211	193	30.5		2.67	
107	1582.80	1256	1199	31.9		2.67	
108	1583.10	16977	16686	38.1		2.68	
109	1583.40	1582	1516	30.3		2.67	
110	1583.70	1806	1734	30.0		2.66	
111	1584.00	3477	3368	36.7		2.67	
112	1584.30	6327	6169	36.2		2.67	
113	1584.60	1441	1378	35.7		2.67	
114	1584.90	378	351	29.5		2.66	
	1585.20						
	1586.30						

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COMPANY : SHELL
 WELL : 31/2-14
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CORE NO.: 7

DATE: JUNE 1984

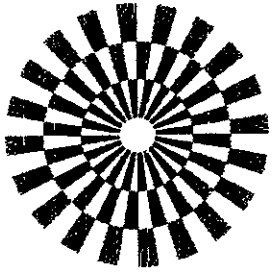


Plug No.	Depth (meter)	Permeability (mD),		Porosity (%)		Grain dens. g/cc	Formation Description
		horizontal K _a	K _l	He	Sum. So		
115	1589.50						
116	1589.80	22324	21979	11159	10934	38.9	2.65
117	1590.10	2814	2719			35.6	2.67
118	1590.40	3258	3153			36.6	2.66
119	1590.70	303	280			32.4	2.66
120	1591.00	306	283			32.6	2.66
121	1591.30	119	107			31.7	2.67
122	1591.60	115	103			31.4	2.66
123	1591.90	61.0	53.6			30.8	2.65
124	1592.20	59.6	52.3			29.8	2.65
125	1592.50	44.5	38.4			30.3	2.64
126	1592.80	54.1	47.3	30.1	25.7	29.6	2.66
127	1593.10	101	89.8			32.9	2.63
128	1593.40	8.6	6.7			24.9	2.65
129	1593.70	5.7	5.0			24.6	2.65
130	1594.00	0.043	0.031			1.4	2.69
131	1594.30	3.3	2.8			24.1	2.65
132	1594.60	3.2	2.7			24.5	2.63
133	1594.90	2.1	1.7			23.7	2.63
134	1595.20	6.7	5.2			25.5	2.66
135	1595.50	4.1	3.5			25.1	2.65
136	1595.80	2.9	2.4	4.6	3.8	26.6	2.63
137	1596.10	7.3	6.5			26.2	2.65
138	1596.40	6.0	4.6			25.0	2.63
139	1596.70	2.8	2.3			24.2	2.63
140	1597.00	5.1	4.4			25.1	2.63
141	1597.30	5.8	5.0			26.5	2.63
142	1597.60	5.7	4.9			26.4	2.62
143	1597.90	3.2	2.7			25.6	2.61
144	1598.10	6.7	5.9			27.0	2.64
145	1598.20						

COMPANY: SHELL
 WELL: 31/2-14
 LOCATION:

FIELD: 31/2
 COUNTY:
 STATE: NORWAY

FILE:
 DATE: JUNE 1984
 ELEV.:



CORE GRAPH

THESE ANALYSES, OPINIONS OR INTERPRETATIONS ARE BASED ON OBSERVATIONS AND MATERIAL SUPPLIED BY THE CLIENT TO GECO, 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.

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 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

POROSITY %

PERMEABILITY mD

x HORIZONTAL
 o VERTICAL

% 42 39 36 33 30 27 24 21 18 15 12 9 6 3 %

1000mD 100mD 10mD 0

FLUID SATURATION

OTHER OIL WATER

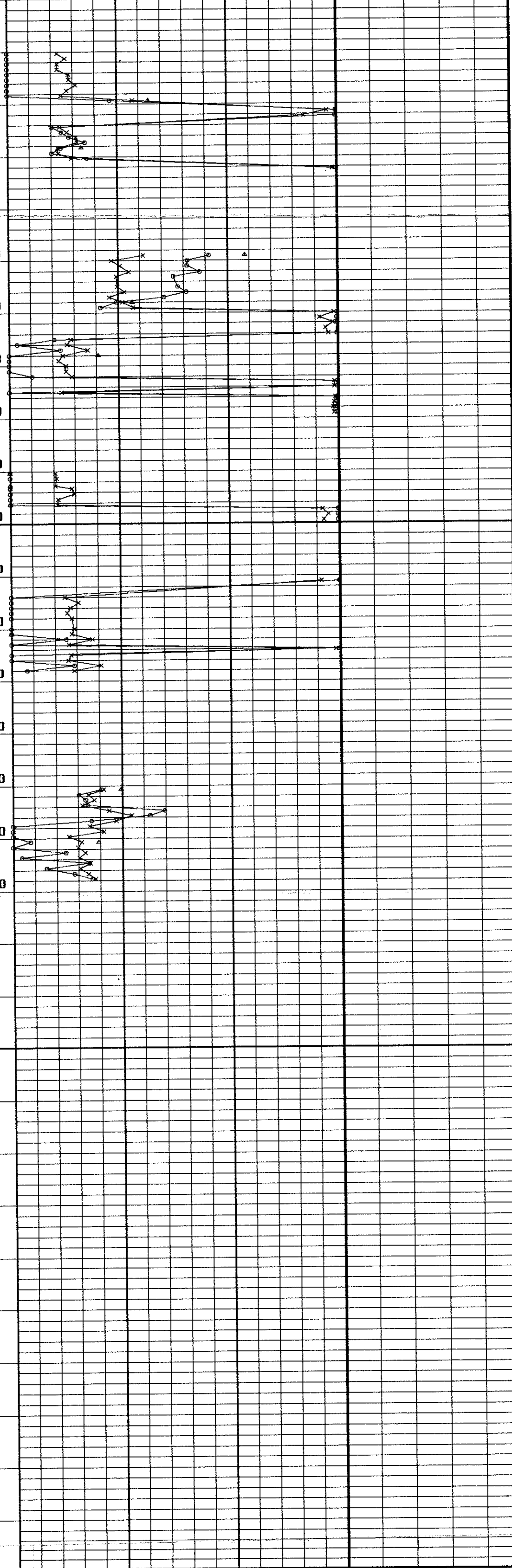
80 60 40 20 %

DEPTH METER
 1535.00
 1538.00
 1541.00
 1544.00
 1545.00
 1548.00
 1551.00
 1554.00
 1560.00
 1563.00
 1564.00
 1567.00
 1570.00
 1573.00
 1571.00
 1574.00
 1577.00

CORE NO: 1
 CORE NO: 2
 CORE NO: 3
 CORE NO: 4
 CORE NO: 5

LOGGED INTERVAL:

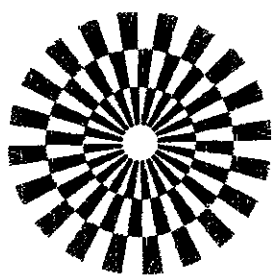
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1535.00 - 1542.20
- CORE NO.2 :
1544.50 - 1553.75
- CORE NO.3 :
1560.00 - 1562.90
- CORE NO.4 :
1564.00 - 1570.10
- CORE NO.5 :
1571.00 - 1576.90



COMPANY: SHELL
 WELL: 31/2-14
 LOCATION:

FIELD: 31/2
 COUNTY:
 STATE: NORWAY

FILE:
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 ELEV.:



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CORE GRAPH

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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
 Z
 nD
 HORIZONTAL
 VERTICAL

FLUID SATURATION

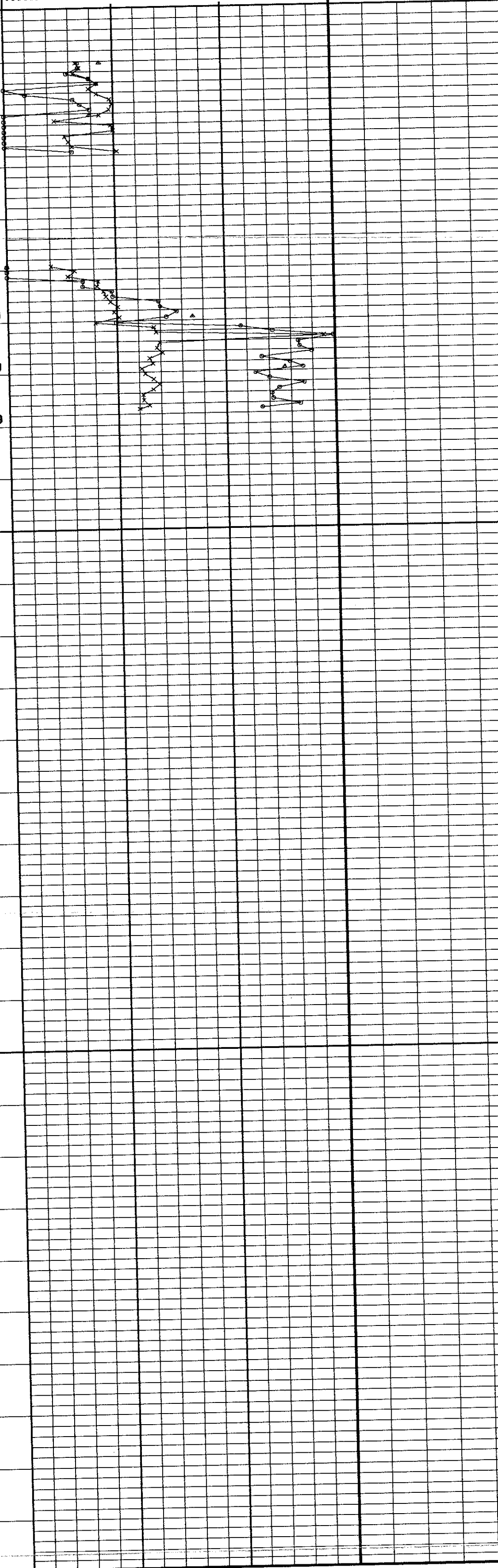
OTHER OIL WATER
 % 80 60 40 20 %

1000nD 100nD 10nD 0

CORE NO: 6

CORE NO: 7

1580.00
 1583.00
 1586.00
 1589.00
 1590.00
 1593.00
 1596.00
 1599.00



LOGGED INTERVAL:

CORE NO. 6 :
 1580.00 - 1586.30
 CORE NO. 7 :
 1589.50 - 1598.20