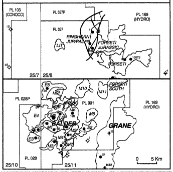
Esso Norge AS

25/11-23 (E5)

COMPOSITE LOG 1:500

REGIONAL MAP

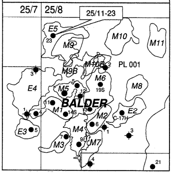


COUNTRY	: **Norway**
FIELD	: **Balder Mound 5**
BLOCK	: **25/11**
LICENSE	: **PI001**
OPERATOR	: **Esso Norge AS**
DRILLING PERMIT	: **P951**
RIG NAME / TYPE	: **Maersk Jutlander**
COMPLETION STATUS	: **Delineation**

OBJECTIVE

PRIMARY : **Eocene Zone III-2**

LOCATION MAP



RIG DATA

		RKB - MSL	: 22.8 m
SPUD DATE	: 13 May 1999	**RKB - SB**	: 149.8 m
TD reached	: 23 May 1999	**WATER DEPTH**	: 127.0 m
Off location	: 28 May 1999	**TD (DRILLER)**	: 2014.0 m MDRKB (1991.2m TVDSS)
TOTAL DAYS	: 11	**TD (LOGGER)**	: 2017.0 m MDRKB (1994.2m TVDSS)

LOCATION DATA

SURFACE LATITUDE	: 59° 14' 07.23" N (6 566 589.8 m N)
SURFACE LONGITUDE	: 02° 21'04.64" E (462 983.2 m E)
SEISMIC LOCATION	: inline 109 BS88-BALDER.
BOTTOM LATITUDE	: 59° 14'07.23" N (6 566 589.8 m N)
BOTTOM LONGITUDE	: 02° 21' 04.64" E (462 983.2 m E)

OPERATOR

Esso Norge AS	100%

CONTRACTORS

DRILLING CONTRACTOR	: **MAERSK**
MUD LOGGING	: **SPERRY SUN**
WIRELINE LOGGING	: **SCHLUMBERGER**
MWD	: **SPERRY SUN**
VSP	: **CGG**
CORE ANALYSIS	: **RESLAB**
BIOSTRATIGRAPHY	: **STRATLAB**
GEOCHEMISTRY	: **N / A**

GEOLOGISTS

OPERATIONS : T. Valheim

WELLSITE : D. Marmion, C. Bacchiana

LOG COMPILER

Wellsite Geologist : D. Marmion - C. Bacchiana
DATE : **August 1999**
Revised by : F. Mediavilla

LITHOSTRATIGRAPHIC TOPS

GROUP	FORMATION	MEMBER	SEQUENCE / CYCLE	DEPTH m MDRKB	DEPTH m TVDSS
Nordland				149,8	127,0
	UTSIRA			538,0	515,2
Hordaland				984,0	961,2
Rogaland		ZONE III-4		1686,3	1663,5
	BALDER	ZONE III-3		1698,5	1675,7
		ZONE III-2		1723,8	1701,0
		L ZONEIII-2MASSIVE SAND		1752,1	1729,3
		L ZONEIII-2 SHALE		1764,0	1741,2
		ZONE III-1		1768,2	1745,4
	SELE	ZONE II SHALE		1779,5	1756,7
	HERMOD	ZONE II MASSIVE SAND		1807,9	1785,1
		ZONE II SHALE		1863,5	1840,7
	LISTA	ZONE IB SHALE		1865,2	1842,4
	HEIMDAL	ZONE IB MASSIVE SAND		1899,9	1877,1
		ZONE IA2 SHALE		1911,8	1889,0
		ZONE IA2 MASSIVE SAND		1945,1	1922,3
Shetland	CHALK			1971,4	1948,6
Statfjord ?	Base Chalk / Jurassic			1975,0	1952,2

WIRELINE LOGGING

DATE	RUN	TOOL SUITE	INTERVAL (m MDRKB)
13/14.05.99	1	DIR - FE	149 - 970
16.05.99	2	DIR	213 - 970
18/20.05.99	3	DIR - FE* (MWD failure)	970 - 1339
20/21.05.99	4	DIR - FE	1339 - 1710
22.05.99	5	DIR - FE	1710 - 2015
23/24.05.99	1A	AITH-IPLT-DSI	930 - 2017
24.05.99	1B	MDT	1695 - 2017
24/25.05.99	1C	VSP (check shot)	538 - 2017

CASING DATA

BIT SIZE	INTERVAL (m MDRKB)	CASING	SHOE DEPTH (m MDRKB)	MUD SYSTEM
9 7/8" pilot hole	149.8 - 970.0	30" 9 5/8"	211 951	SEAWATER
36"	149.8 - 211.5			SEAWATER
26"	149.8 - 213.0			SEAWATER
12 1/4"	211.5 - 970.0			SEAWATER
8 1/2"	970.0 - 2014.0			OBM

CONVENTIONAL CORES

CORE	INTERVAL (m MDRKB)	RECOVERY
core #1	1710 - 1747	37,15 m (100%)
core #2	1747 - 1767	18,45m (92,3%

BIOSTRATIGRAPHIC TOPS

SERIES	STAGE	ZONE	DEPTH (m MDRKB)	DEPTH (m TVDSS)

DRILLSTEM TESTS

DST N°	INTERVAL (m MDRKB)	FLOW	CHOKE	WHP	TEST N°	DEPTH (m MDRKB)	FORMATION PRESSURE	SAMPLE TYPE	TOP (m MDRKB)	BOTTOM (m MDRKB)	PLUG TYPE		
	No DST's performed												

SIDEWALL CORES

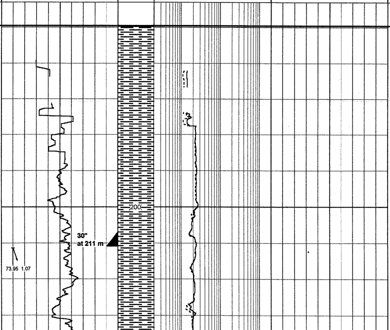
RUN	SHOT	DEPTH (m MDRKB)	RECOVERY (cm)	RUN	SHOT	DEPTH (m MDRKB)	RECOVERY (cm)
		No CST's performed					

MDT DATA

RUN	DEPTH (m MDRKB)	HYDROSTATIC PRESSURE (bar)	FORMATION PRESSURE (bar)	COMMENTS	FORMATION
1B	1695.5	226.11	172.06	Tight	ZIII-4
1B	1697.0	225.60	111.03	Tight	ZIII-4
1B	1697.1	226.07	113.74	Tight	ZIII-4
1B	1697.2	225.81	174.85	0.06	ZIII-4
1B	1705.8	226.90	105.29	Tight	BALDER
1B	1709.5	227.44	123.31	Tight	BALDER
1B	1709.6	227.28	109.73	Tight	BALDER
1B	1709.4	227.14	169.48	240.80	BALDER
1B	1713.9	227.90	137.39	Tight	BALDER
1B	1713.8	227.69	127.04	Tight	BALDER
1B	1753.0	233.42	172.52	289.09	LOWER ZIII-2SS
1B	1745.6	231.73	105.07	Tight	ZIII-2
1B	1754.0	233.27	172.59	358.31	LOWER ZIII-2SS
1B	1755.0	233.25	172.68	253.46	LOWER ZIII-2SS
1B	1756.0	233.28	172.78	476.45	LOWER ZIII-2SS
1B	1757.0	233.35	172.86	342.73	LOWER ZIII-2SS
1B	1758.0	233.44	172.95	453.13	LOWER ZIII-2SS
1B	1759.0	233.53	173.03	587.90	LOWER ZIII-2SS
1B	1760.0	233.61	173.11	460.67	LOWER ZIII-2SS
1B	1761.0	233.69	173.19	477.60	LOWER ZIII-2SS
1B	1762.0	233.80	173.27	472.30	LOWER ZIII-2SS
1B	1763.0	233.93	173.35	458.16	LOWER ZIII-2SS
1B	1765.2	234.25	85.34	Tight	LOWER ZIII-2SS
1B	1771.5	235.42	148.51	Tight	ZIII-1
1B	1775.0	235.92	117.77	Tight	ZIII-1
1B	1778.5	236.40	106.96	Tight	ZIII-1
1B	1788.5	237.86	107.71	Tight	ZIII-1
1B	1793.0	238.34	110.20	Tight	ZIII-1
1B	1797.0	238.76	176.24	418.23	ZIII-1
1B	1800.0	239.12	176.54	181.41	ZIII-1
1B	1803.0	239.47	176.83	514.59	ZIII-1
1B	1810.0	240.55	177.54	491.84	Massive ZII SS
1B	1814.0	241.00	177.93	532.67	Massive ZII SS
1B	1818.0	241.54	178.33	374.49	MAssive ZII SS
1B	1824.0	242.40	178.93	1045.77	Massive ZII SS
1B	1828.0	242.86	179.32	504.20	Massive ZII SS
1B	1830.5	243.00	179.56	108.85	Massive ZII SS
1B	1834.5	243.52	150.18	Tight	Massive ZII SS
1B	1837.0	243.81	180.21	1158.75	Massive ZII SS
1B	1842.0	244.57	180.72	1633.67	Massive ZII SS
1B	1848.0	245.45	181.52	1106.11	Massive ZII SS
1B	1854.0	246.15	181.91	357.70	Massive ZII SS
1B	1860.0	247.05	182.50	945.18	Massive ZII SS
1B	1901.5	252.65	186.52	46.56	ZIB SS
1B	1906.0	252.92	186.97	43.48	ZIB SS
1B	1909.2	253.21	122.20	Tight	ZIB SS
1B	1946.5	258.31	190.69	80.57	ZIA2 SS
1B	1952.0	258.80	191.15	934.72	ZIA2 SS
1B	1959.0	259.69	191.85	873.15	ZIA2 SS
1B	1964.0	260.32	192.35	1030.80	ZIA2 SS
1B	1970.0	261.13	192.96	73.12	ZIA2 SS
1B	1977.5	262.20	193.73	427.80	ZIA2 SS
1B	1988.0	263.49	194.79	224.61	JURASSIC
1B	1991.0	263.70	195.19	5.48	JURASSIC
1B	1994.0	263.82	195.39	222.05	JURASSIC
1B	1755.0	233.25	172.68	6 x 450cc + 1 GAL	LOWER ZIII-2SS

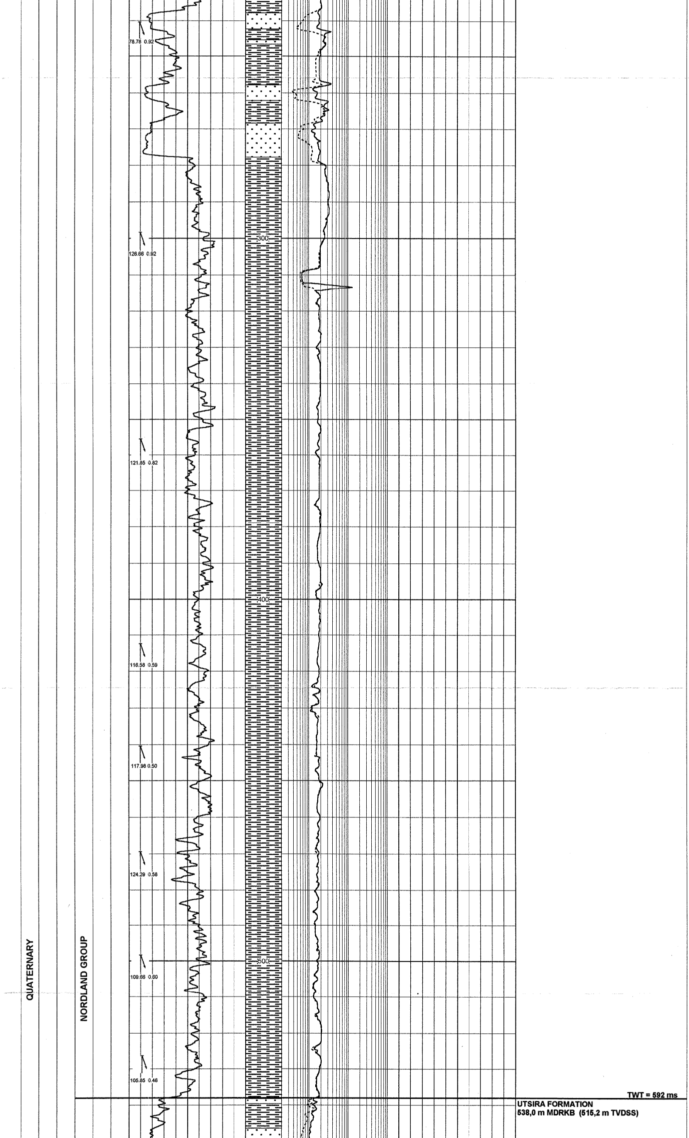
CHRONO / LITHO STRATIGRAPHY	GAMMA RAY CALIPER DEVIATION SURVEYS SWCs	DEPTH AND LITH	RESISTIVITY MDTs	POROSITY LOGS	LITHOLOGY DESCRIPTIONS TWT
SYSTEM SERIES STAGE GROUP FORMATION MEMBER	Gamma Ray 0 API 150 Caliper 8 INCH 18	1 M : 500 M MD in M	Resistivity Shallow 0.2 OHMM 200 Resistivity Deep 0.2 OHMM 200	Neutron Porosity (frac) 0.45 M3/M -0.15 1.05 0.45 Density 1.95 G/CM 2.95 0.95 1.95	

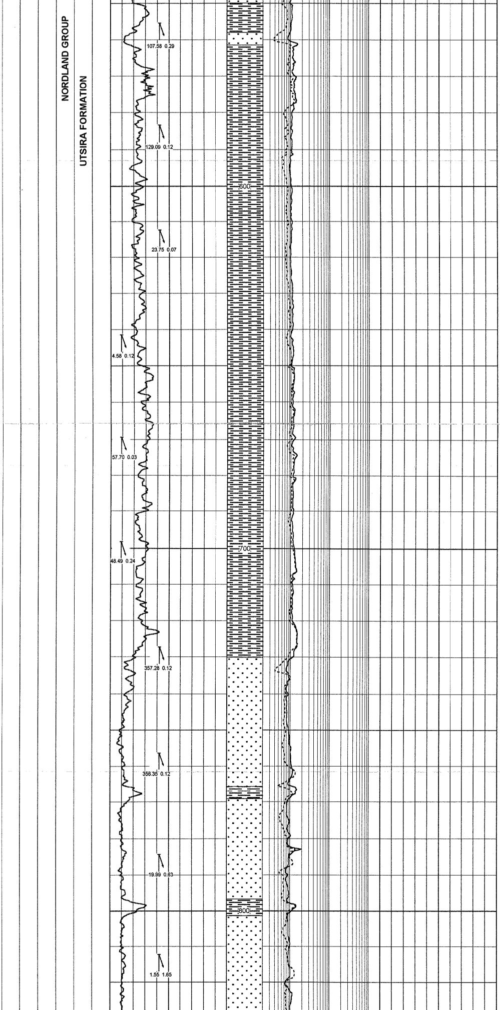
NORDLAND GROUP



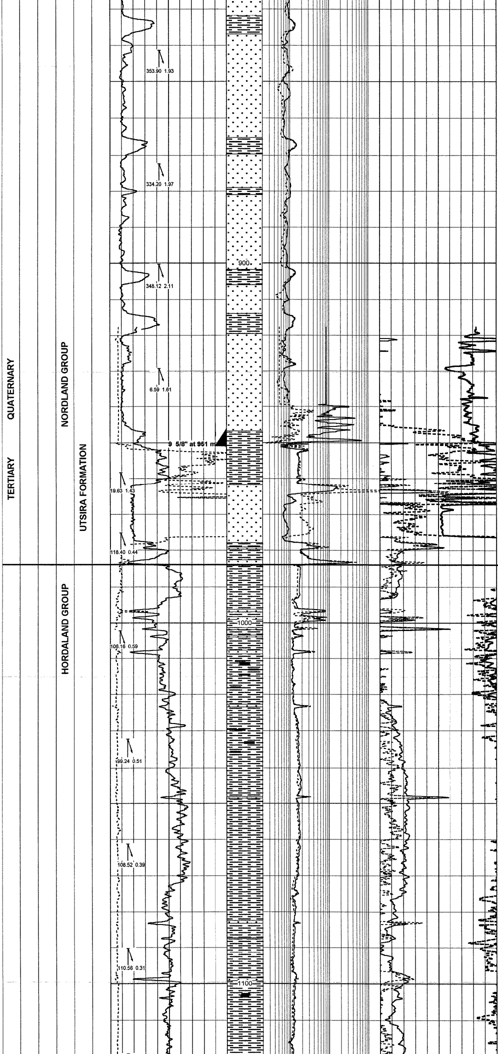
SEABED AT 149.8m MDRKB (127m TVDSS)

RETURNS TO SEABED
LITHOLOGY INTERPRETED FROM MWD LOGS





RETURNS TO SEABED NOT COLLECTED
LITHOLOGY INTERPRETED FROM MWD LOGS



8 1/2" to 973m, PIT = 13.0 ppg

TWT = 1028 ms

HORDALAND GROUP
984,0 m MDRKB (961,2 m TVDSS)

Clyst: olv blk to brnsh blk, frm, blky, sly slty.

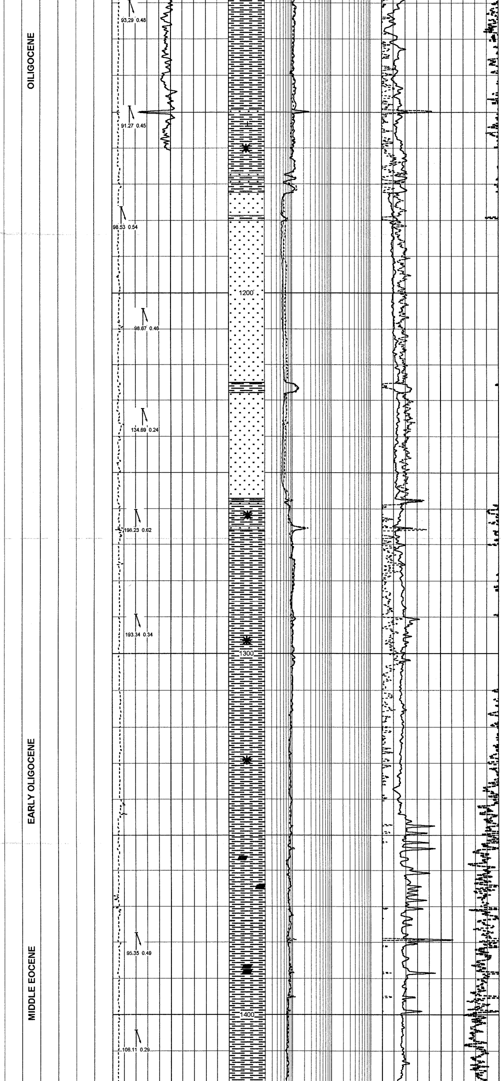
Sd: Qtz lse, trnsl - trnsp, m - crs, sbrnd, sbsph, mod srt, gd por, no shows.

Clyst: olv blk to brnsh blk, frm, blky, sly slty, no calc, mat carb.

Clyst: olv blk to brnsh blk, sft, blky, slty - v slty, no calc, mat carb.

Sd: Qtz lse, trnsl - trnsp, m -crs, sbrnd, sbsph, mod srt, vgd por, no shows.

Clyst: olv blk to brnsh blk occ brnsh gy, sft - frm, blky, slty to sltst, no calc, tr pyr.



1140 m : Early Oligocene Tm9

Clyst: olv blk to olv gy, sft - frm, blky, slty, sly calc, glauc.

Sd: Qtz lse trnsp - trnsl, m - Lcrs, sbrnd, sbsph, w srt, vgd por, no shows.

Sd: Qtz lse, trnsp - trnsl, f - m, r crs, sbrnd, sbang, sbsph, mod w srt, glauc, vgd por, no shows.

Clyst: olv blk to olv gy, sft - frm, blky, slty, no calc, glauc.

Sd: Qtz lse, trnsp - trnsl, f - m, r crs, sbrnd, sbang, sbsph, mod w srt, glauc, vgd por, no shows.

Clyst: olv blk to olv gy, sft - frm, blky, slty, no calc, glauc.

Clyst: olv blk to brnsh blk to olv gy, sft - frm, blky, no calc, glauc.

1340 m : Early Oligocene Tm9

Ls: dk yelsh brn, frm, blky, microxln, no por, no shows.

Clyst: olv blk, brnsh blk, sft - frm, blky, sly slty, no calc, pyr nod.

1390 m : Middle Eocene Tm7

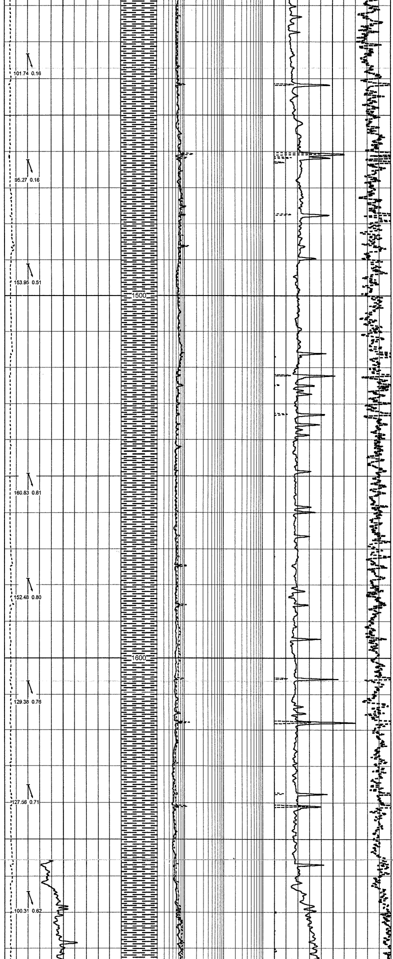
Clyst: olv blk, brnsh blk, sft, blky, sly slty, no calc.

TERTIARY

MIDDLE EOCENE

EARLY EOCENE

HORDALAND GROUP



Ls: dk yelsh brn, frm, blky, microxln, no por, no shows.

Clyst: gnsh blk, olv blk, sft - mod frm, blky, sly slty, no calc.

Ls: dk yelsh brn, sft - frm, blky, microxln, no por, no shows.

Clyst: gnsh blk, olv blk, sft - mod frm, blky, sly slty, no calc.

1510 m : Middle Eocene Tm7

Ls: dk yelsh brn, sft - frm, blky, microxln, no por, no shows.

Clyst: gnsh blk, olv blk, sft, blky, sly slty, no calc.

1590 m : Middle Early Eocene Tm7 - Tm6

Ls: dk yelsh brn, brnsh gy, frm, blky, microxln, no por, no shows.

Clyst: gysh blk, olc blk, gnsh blk, sft, blky, sly slty, no calc.

1620 m : Middle Early Eocene Tm7 - Tm6

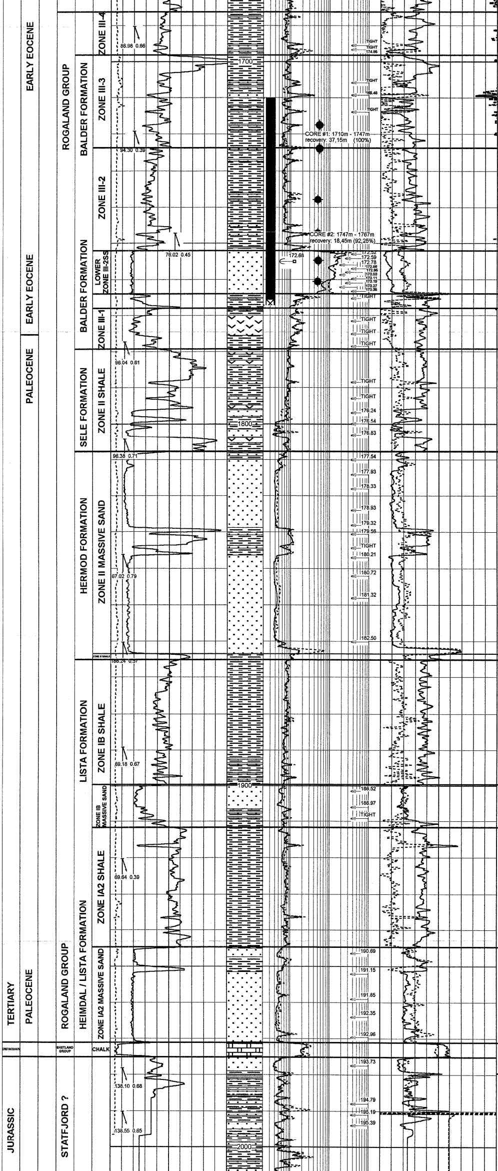
Clyst: gysh blk, olv blk, gnsh blk, frm - mod hd, blky, sly slty, to slty, no calc.

1650 m : Early Eocene Tm7 - Tm6, ET.10B.5-2

Clyst: brn - rdsh brn, brnsh blk, frm to mod hd, blky, slty, no calc.

1670 m Early Eocene : Tm6, ET.10B.5-2

1680 m : Early Eocene Tm6, ET.10B5-2



TWT = 1701 ms

TOP ZONE III-4
1686,3 m MDRKB (1663,5 m TVDSS)

Clyst: brn - rdsh brn, brnsh blk, frm to mod hd, blky, sly slty, no calc.

TWT = 1711 ms

T. BALDER FORMATION - T. ZONE ZIII-3
1698,5m MDRKB (1675,7m TVDSS)

Clyst: dk gy, frm - hd, blky, sly micaceous, carb mat, no calc.
1710,65 m : Early Eocene Tm4, ET.10B.2

1711,15 m, 1714,55 m, 1716 m, 1718,85 m : Early Eocene Tm4 ET.10B.1-10A.1

Sd: Qtz lse, trnsp, trnsl, m - Lcrs, sbrnd - rnd, v w srt, g por, od str oil, vis oil, stain: even brn, fluor: pchy brt yel-or, cut: dull yel brn, cut fluor: brt mky, res: yel mky.

1721,2 m : Early Eocene Tm4, ET.10A.1-9B
1722,2 m, 1722,98 m : Early Eocene Tm4, ET.9B

T. ZONE III-2 **TWT = 1733 ms**
1723,8 m MDRKB (1701,0 m TVDSS)

1730 m, 1732,68 m : Early Eocene Tm4, ET.9B
Clyst: dk gy, frm - hd, blky, sly micaceous, no calc, carb mat.

Ls: lt olv gy, hd, blky, microxln, sly dolic, no por, no shows.

1741,5 m, 1744,05 m, 1745 m, 1749,9 m, 1763,93 m, 1765,2 m 1765,45 m, 1775 m Early Eocene - Late Paleocene Tm4, ET.9A

TWT = 1758 ms

T. LOWER ZIII-2SS
1752,1 m MDRKB (1729,3 m TVDSS)

Sd: trnsl, trnsp, Um to crs, sbrnd, w srt, uncons, vg por, v oil, od str oil, stain: even brn, fluor: even brt yel-or, cut: dull yel brn, cut fluor: brt mky, res: yel mky.

BASE ZONE III-2 LOWER MASSIVE SAND
1764,0 m MDRKB (1741,2 m TVDSS) **TWT = 1772 ms**

ZONE III-1
1768,2m MDRKB (1745,4m TVDSS)

Clyst: dk gy, frm, blky,no calc
Tuff: m l gy, m gy, fri, crmbly, qtz gr, arg cmt, glauc, heavy min.

TWT = 1781 ms

TOP SELE FORMATION / BASE BALDER FM.
1779,5m MDRKB (1756,7 m TVDSS)

Clyst: olv blk, blk brn, dk gy, frm - mod hd, blky, no calc.

1785 m, 1795 m : Early Eocene - Late Paleocene Tm4, ET.9A - ET.8C

Sd: Qtz lse, trnsp, trnsl, f - Um, sbrnd, sbsph, sbang, w srt, vg por, no shows.

1800 m : Late Paleocene Tm4, ET.8C

TWT = 1804 ms

T. HERMOD FORMATION
T. ZONE II SS MASSIVE SAND
1807,9 m MDRKB (1785,1m TVDSS)

Sd: Qtz lse, trnsp, trnsl, f - Um, sbrnd, sbsph, sbang, w srt, vg por, no shows.

1830 m : Late Paleocene Tm4, ET.8

Clyst: olv blk, blk brn, dk gy, sft to frm, occ mod hd, blky, no calc.

Sd: Qtz lse, trnsp, trnsl, f - Um, sbrnd, sbsph, sbang, w srt, vg por, no shows.

1860 m : Late Paleocene Tm3, ET.7 - ET.6

BASE ZONE II MASSIVE SS
1863,5m MDRKB (1840,7m TVDSS)

TWT = 1845 ms

LISTA FORMATION ZONE IB SHALE
1865,5 m MDRKB (1842,4 m TVDSS)

Clyst: brn blk, dk gy, dk gn gy, sft to frm, occ mod hd, blky, sly calc.

1890 m : Late Paleocene Tm3, ET.6

Clyst: brn blk, dk gy, dk gn gy, sft to frm, occ mod hd, blky, sly calc.

1890 m : Late Paleocene Tm3, ET.6

TWT = 1874 ms

ZONE IB SS/LISTA FM.
1899,9 m MDRKB (1877.7 m TVDSS)

Sd: Qtz lse, trnsp, trnsl, f to crs, sbrnd, sbang, m srt, loc cmt arg, g por, no shows.
1910 m : Late Paleocene Tm3, ET.4 **TWT = 1883 m**

ZONE IA2 Sh
1911,8 m MDRKB (1889,0 m TVDSS)

Clyst: gn gy, brn blk, dk gy, sft to frm, occ mod hd, blky, sly slty, glauc.

1940 m :Late Paleocene Tm3, ET.4

TWT = 1912 ms

ZONE IA2 SS
1945.1m MDRKB (1922.3m TVDSS)

1950 m : Late Paleocene Tm3, ET.4

Sd: Qtz lse, trnsp, trnsl, f - m, sbrnd, sbang, m srt, cmt arg, g por, no shows.

1970 m : Late Paleocene Tm3, ET.4

TWT = 1927 ms

SHETLAND (CHALK)
1971.4m MDRKB (1948.6m TVDSS)

Chk: mky wh to wh, bf, frm to mod hd, blky, microxln, no por, no shows.

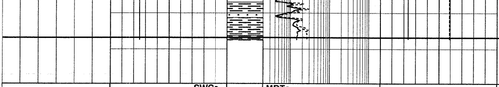
TWT = 1929 ms

JURASSIC
1975m MDRKB (1952.2m TVDSS)

Sst: m lty gy, f, sbrnd, w srt, sly arg cmt, tr heavy oil.

Clyst: m dk gy, blk gy, gn gy, brn blk, sft to frm, blky, slty to v slty.

Sst: m lt gy, f, sbrnd, w srt, sly arg, calc cmt, coal i/p blk, glossy, hd.



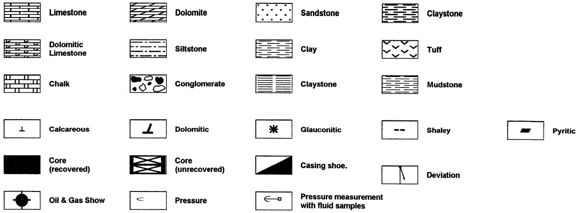
Clyst: gn gy, dk gy, brn blk, sft to frm, blky, sly slty.

TWT = 1967 ms

TD DRILLER 2014.0m MDRKB (1991.2m TVDSS)

TD LOGGER 2017.0m MDRKB (1994.2m TVDSS)

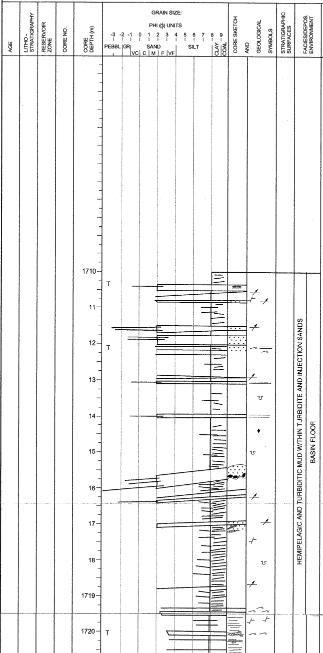
CHRONO / LITHO STRATIGRAPHY	SWCs DEVIATION SURVEYS GAMMA RAY	DEPTH AND LITH	MDTs RESISTIVITY	POROSITY LOGS	LITHOLOGY DESCRIPTIONS	TWT



LEGEND

CORE DESCRIPTION DATA SHEET

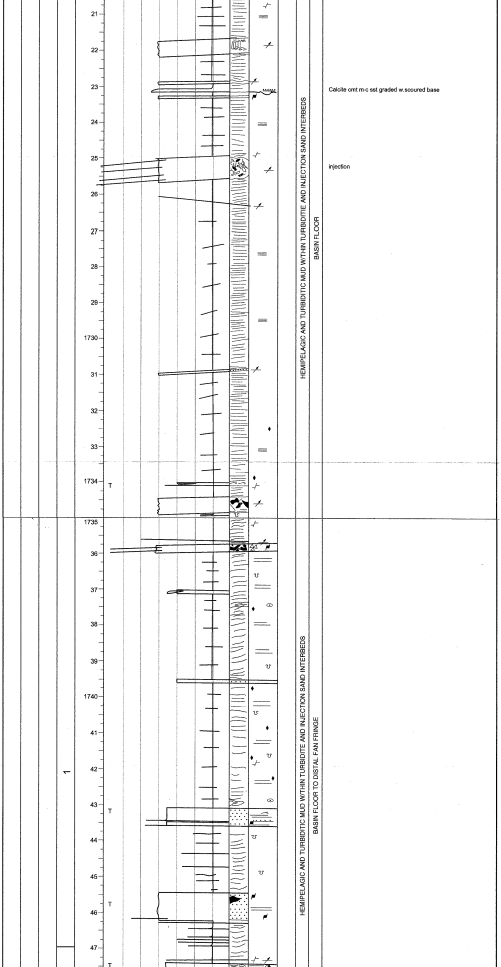
FIELD/AREA: E5 WELL NO.: 25/11-23 SCALE: 1 : 50 DATE: 3/6-99 GEOLOGIST: D.Bergslien PAGE 1 OF 4



COMMENTS

Thin beds of fine to medium grained quarts sst. with irregular but most commonly by plan paraleil laminations. Shale clasts concentrate at laminations and are imbricated.

Injection with clasts and slickenside.
1710 - 1748.80 m MD
Medium to black dark grey laminated claystone w. common sandinjections of fine to medium sand. Lamina and thin beds of silt and very fine sand. Occasional ripples in sand.
Cacite cemented bands common (1 - 10cm). Small burrows common throughout, but seem to be of higher concentration i cemented areas. Pyrite nodules and aggregates common throughout the section. Silt content decrease from 1716 and up.
Content of sand and silt interbeds increase downwards
and occasional tuff beds are also present
in lower part (below 1743 m MD)


21
22
23
24
25
26
27
28
29
1730
31
32
33
1734
T
1735
36
37
38
39
1740
41
42
43
T
44
45
T
46
47
T
1
Calcite cmt m-c sst graded w.scoured base
injection
HEMIPELAGIC AND TURBIDITIC MUD W/THIN TURBIDITIE AND INJECTION SAND INTERBEDS
BASIN FLOOR
HEMIPELAGIC AND TURBIDITIC MUD W/THIN TURBIDITE AND INJECTION SAND INTERBEDS
BASIN FLOOR TO DISTAL FAN FRINGE