WELL : 25/2-15 PL. 1

GEOLOGICAL COMPOSITE LOG

Elf Petroleum Norge A/S

Scale : 1/500

Month: Sept. 1993

Well Status: Exploration well, vertical
Water bearing. Brent reservoir, with
residual hydrocarbon shows
Plugged and abandoned

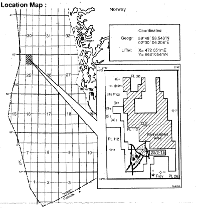
Well-site geologist: F.M. Bessesen, V.Wagner
V.H. Nygaard, N.Cottereau

Prepared by : J.M.Holmboe, J.C.Ennes
Approved by : H. Solomiac

Rig on location : 11/ 11/ 1992
Spud date : 14/ 11/ 1992
T.D. reached : 21/ 03/ 1993
Completion date : 12/ 04/ 1993

RKB : + 22m
Water : 120m
Total depth (driller) : 3942m
(logger): 3950m

Location Map :



Coordinates:
Geogr: 59°48' 53.543"N
02°30' 06.208"E
UTM: X= 472 051mE
Y= 6631054mN

Country : NORWAY
Licence : PL 026/ PL 112

Owners : Elf Petroleum Norge
Norsk Hydro
Statoil
Total

Rig: West Alpha/West Vanguard (reference level)
Contractors:
Drilling: Smedvig
Mud Logging: Geoservices
Wireline Logging: Schlumberger
MWD: Halliburton MWD

Surface location:

Latitude: 59° 48' 53.543" N

Longitude: 2° 30' 6.208" E
UTM **X =** 472051m E
Y = 6631054 mN

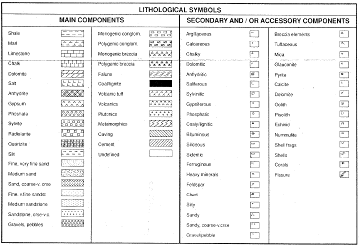
Location at Top Brent:
UTM **X =** 472066m E
Y = 6631059m N

Casing	**Driller depth**	**LOT**
30" :	201m	
20" :	1141.5m	1.60
13 3/8":	2111m	1.50(FIT)
9 5/8":	3498.5m	1.72(FIT)

COMMENTS
Logs used for this completion log:
See log foot

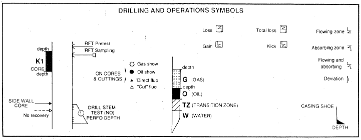
Test No test

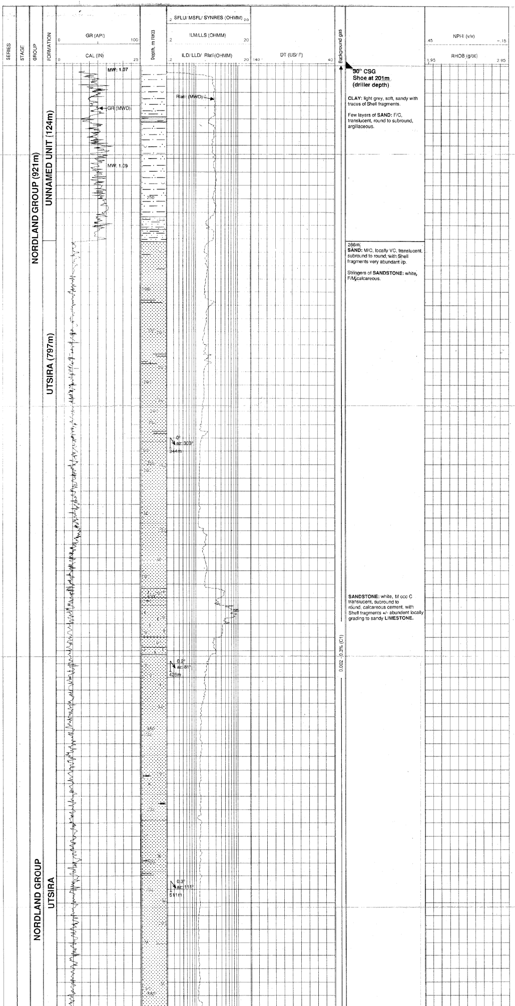
LITHOLOGICAL SYMBOLS



MAIN COMPONENTS		SECONDARY AND / OR ACCESSORY COMPONENTS	
Shale	Monogenic conglom.	Argillaceous	Breccia elements
Marl	Polygenic conglom.	Calcareous	Tuffaceous
Limestone	Monogenic breccia	Chalky	Mica
Chalk	Polygenic breccia	Dolomitic	Glauconite
Dolomite	Faluns	Anhydritic	Pyrite
Salt	Coal/lignite	Saliferous	Calcite
Anhydrite	Volcanic tuff	Sylvinitic	Dolomite
Gypsum	Volcanics	Gypsiferous	Oolith
Phoshate	Plutonics	Phosphatic	Pisolith
Sylvite	Metamorphics	Coaly/lignitic	Echinid
Radiolarite	Caving	Bituminous	Nummulite
Quartzite	Cement	Siliceous	Shell frags
Silt	Undefined	Sideritic	Shells
Fine, very fine sand		Ferruginous	Corals
Medium sand		Heavy minerals	Fissure
Sand, coarse-v. crse		Feldspar	
Fine. v.fine sandst		Chert	
Medium sandstone		Silty	
Sandstone, crse-v.c.		Sandy	
Gravels, pebbles		Sandy, coarse-v.crse	
		Gravel/pebble	

DRILLING AND OPERATIONS SYMBOLS





30" CSG
Shoe at 201m
(driller depth)

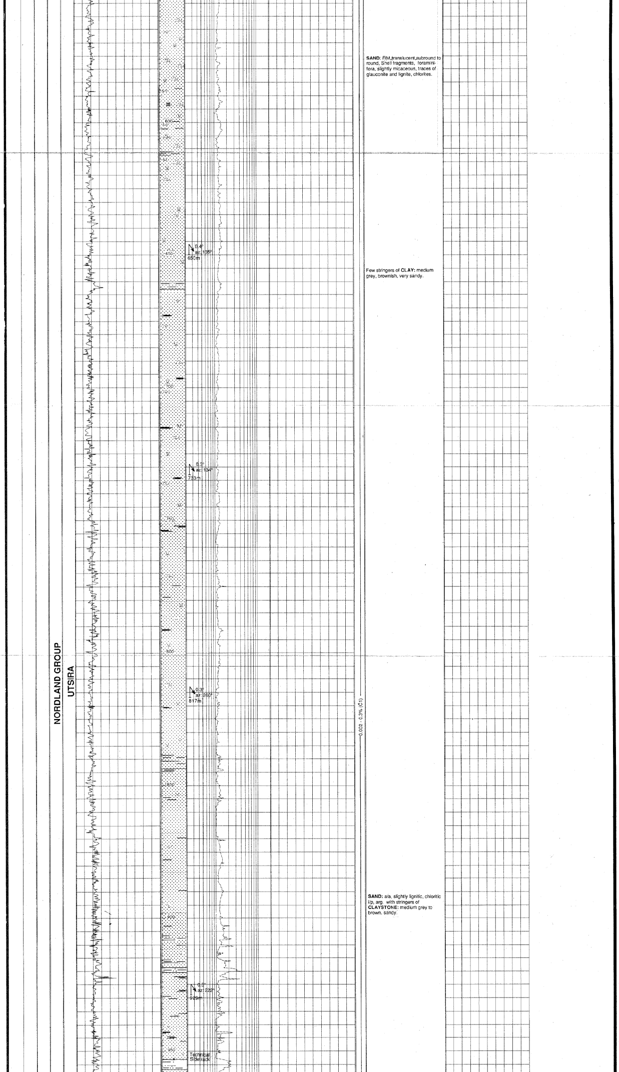
CLAY: light grey, soft, sandy with traces of Shell fragments.

Few layers of **SAND:** F/C, translucent, round to subround, argillaceous.

266m;
SAND: M/C, locally VC, translucent, subround to round, with Shell fragments very abundant i/p.

Stringers of **SANDSTONE:** white, F/M, calcareous.

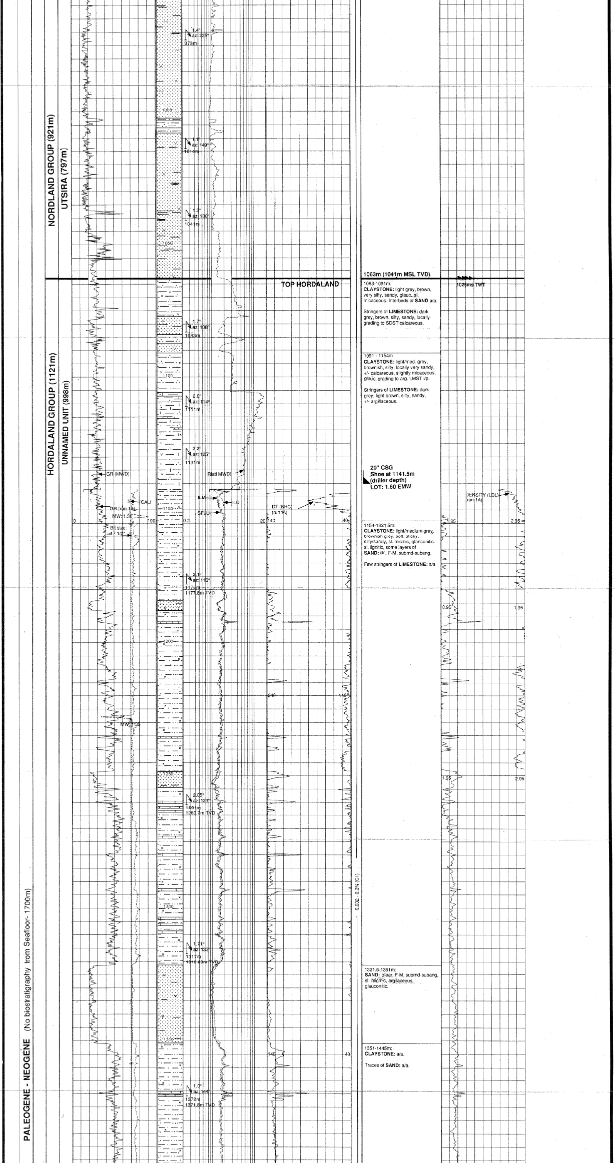
SANDSTONE: white, M occ C translucent, subround to round, calcareous cement, with Shell fragments +/- abundent locally grading to sandy **LIMESTONE.**



SAND: F/M,translucent,subround to round, Shell fragments, foraminifera, slightly micaceous, traces of glauconite and lignite, chlorites.

Few stringers of **CLAY:** medium grey, brownish, very sandy.

SAND: a/a, slightly lignitic, chloritic i/p, arg. with stringers of **CLAYSTONE:** medium grey to brown, sandy.



1063m (1041m MSL TVD)

1063-1091m:
CLAYSTONE: light grey, brown, very silty, sandy, glauc.,sl. micaceous. Interbeds of **SAND** a/a.

Stringers of **LIMESTONE:** dark grey, brown, silty, sandy, locally grading to SDST:calcareous.

1091 - 1154m
CLAYSTONE: light/med. grey, brownish, silty, locally very sandy, +/- calcareous, slightly micaceous, glauc, grading to arg. LMST i/p.

Stringers of **LIMESTONE:** dark grey, light brown, silty, sandy, +/- argillaceous.

20" CSG
Shoe at 1141.5m
(driller depth)
LOT: 1.60 EMW

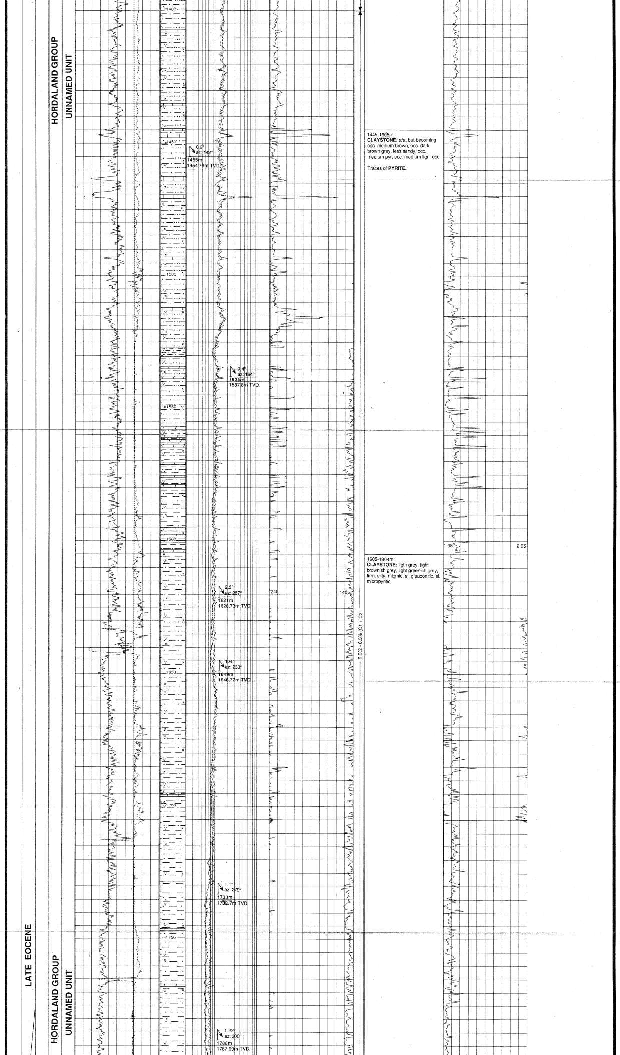
1154-1321.5m:
CLAYSTONE: light/medium grey, brownish grey, soft, sticky, silty/sandy, sl. micmic, glanconitic. sl. lignitic, some layers of **SAND:** clr, F-M, subrnd-subang.

Few stringers of **LIMESTONE:** a/a

1321.5-1351m:
SAND: clear, F-M, subrnd-subang, sl. micmic, argilaceous, glauconitic.

1351-1445m:
CLAYSTONE: a/a.

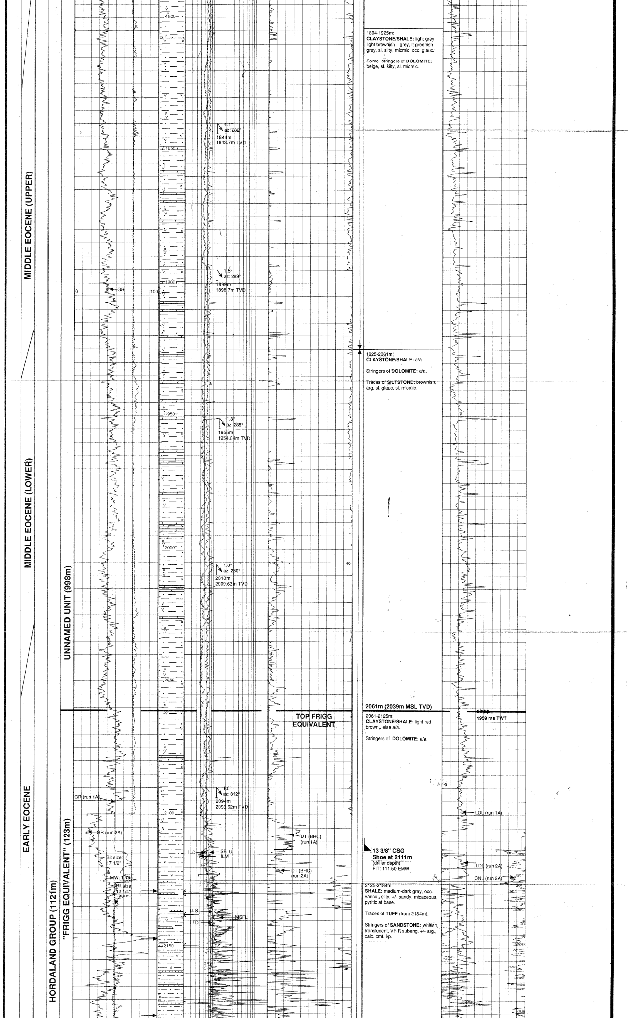
Traces of **SAND:** a/a.



1445-1605m:
CLAYSTONE: a/a, but becoming occ. medium brown, occ. dark brown grey, less sandy, occ. medium pyr, occ. medium lign. occ.

Traces of **PYRITE.**

1605-1804m:
CLAYSTONE: ligth grey, light brownish grey, light greenish grey, firm, silty, micmic, sl. glauconitic, sl. micropyritic.



1804-1925m:
CLAYSTONE/SHALE: light grey, light brownish grey, lt greenish grey, sl. silty, micmic, occ. glauc.

Some stringers of **DOLOMITE:** beige, sl. silty, sl. micmic.

1925-2061m:
CLAYSTONE/SHALE: a/a.

Stringers of **DOLOMITE:** a/a.

Traces of **SILTSTONE:** brownish, arg, sl. glauc, sl. micmic.

2061m (2039m MSL TVD)

2061-2125m:
CLAYSTONE/SHALE: light red brown,. else a/a.

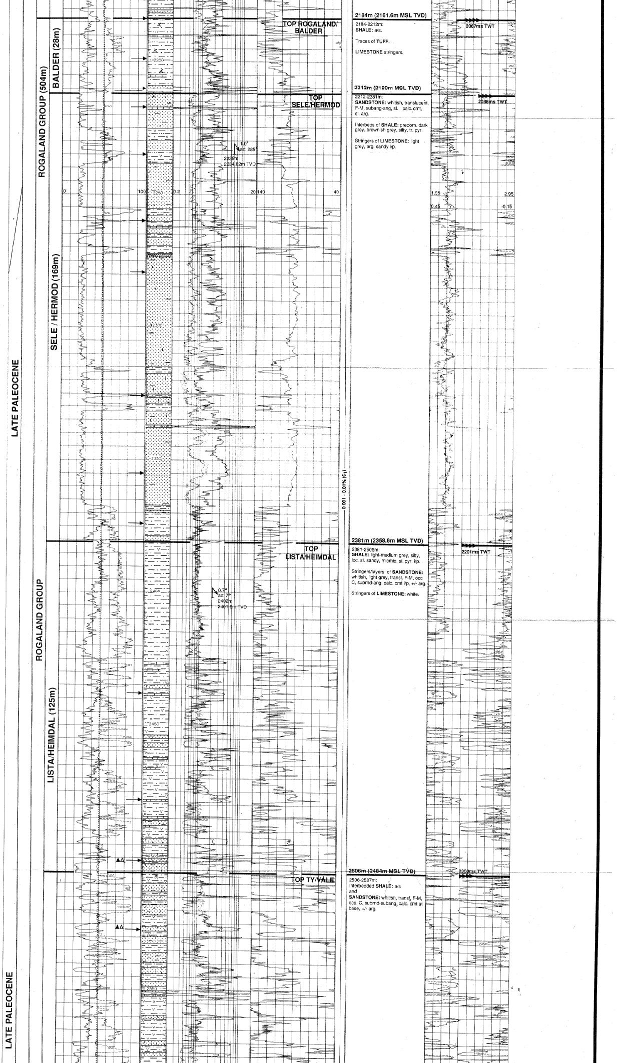
Stringers of **DOLOMITE:** a/a.

13 3/8" CSG
Shoe at 2111m
(driller depth)
FIT: 111.50 EMW

2125-2184m:
SHALE: medium-dark grey, occ. varicol, silty, +/- sandy, micaceous, pyritic at base.

Traces of **TUFF** (from 2184m).

Stringers of **SANDSTONE:** whitish, translucent, VF-F, subang, +/- arg., calc. cmt. i/p.



2184m (2161.6m MSL TVD)

2184-2212m:
SHALE: a/a.

Traces of **TUFF.**

LIMESTONE stringers.

2212m (2190m MSL TVD)

2212-2381m:
SANDSTONE: whitish, translucent, F-M, subang-ang, sl. calc. cmt, sl. arg.

Interbeds of **SHALE:** predom. dark grey, brownish grey, silty, tr. pyr.

Stringers of **LIMESTONE:** light grey, arg. sandy i/p.

2381m (2358.6m MSL TVD)

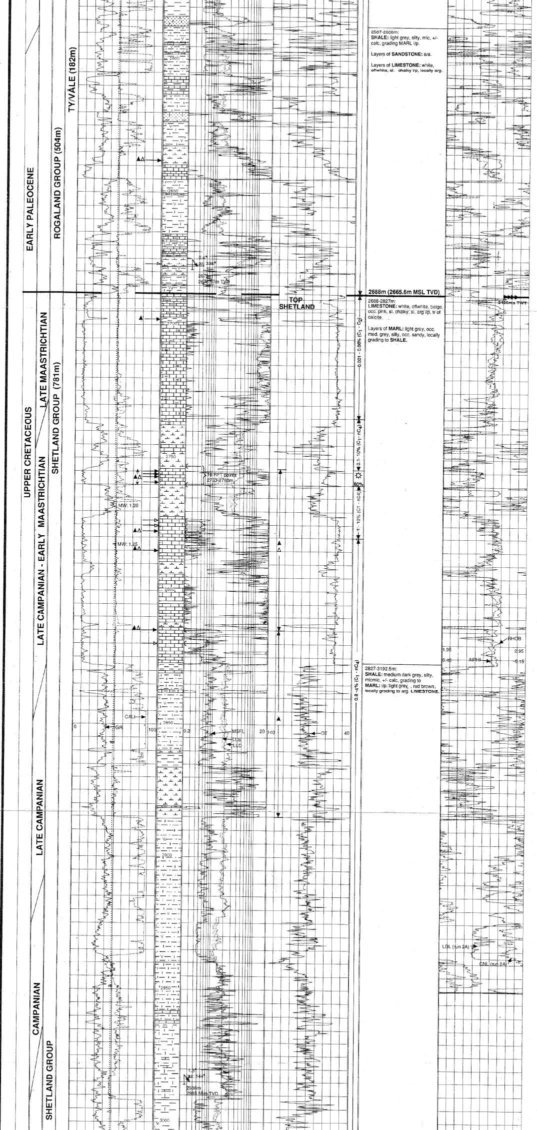
2381-2506m:
SHALE: light-medium grey, silty, loc. sl. sandy, micmic, sl. pyr. i/p.

Stringers/layers of **SANDSTONE:** whitish, light grey, transl, F-M, occ C, subrnd-ang, calc. cmt i/p, +/- arg.

Stringers of **LIMESTONE:** white.

2506m (2484m MSL TVD)

2506-2587m:
Interbedded **SHALE:** a/a
and
SANDSTONE: whitish, transl, F-M, occ. C, subrnd-subang, calc. cmt at base, +/- arg.



2507-2000m:
SHALE: light grey, silty, mic, +/- calc, grading MARL i/p.

Layers of **SANDSTONE:** a/a.

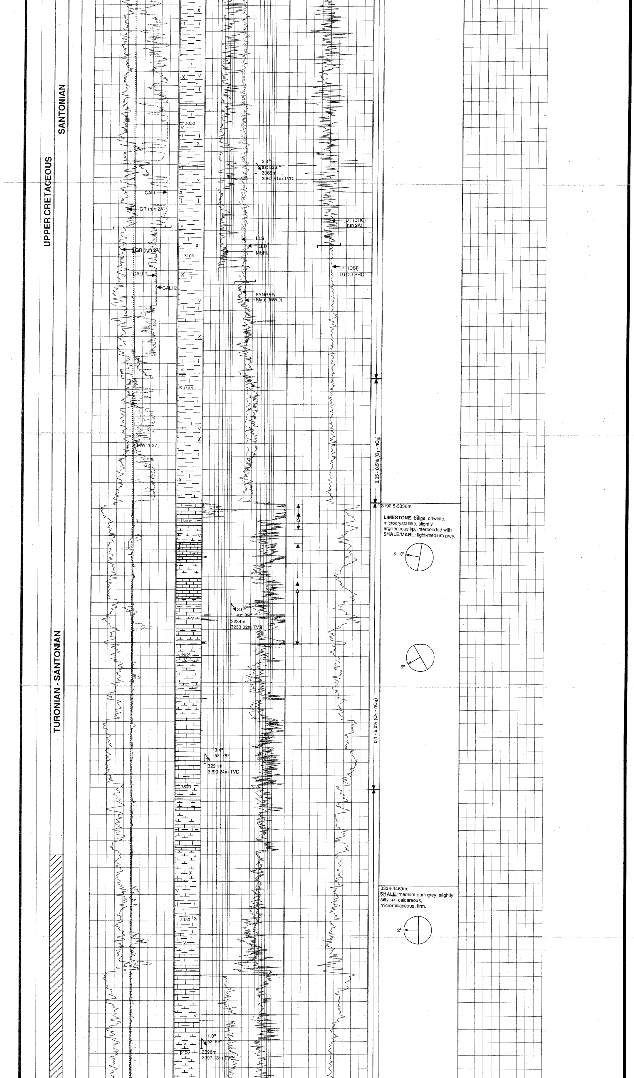
Layers of **LIMESTONE:** white, offwhite, sl. chalky i/p, locally arg.

2688m (2665.6m MSL TVD)

2688-2827m:
LIMESTONE: white, offwhite, beige, occ. pink, sl. chalky, sl. arg i/p, tr of calcite.

Layers of **MARL:** light grey, occ. med. grey, silty, occ. sandy, locally grading to **SHALE.**

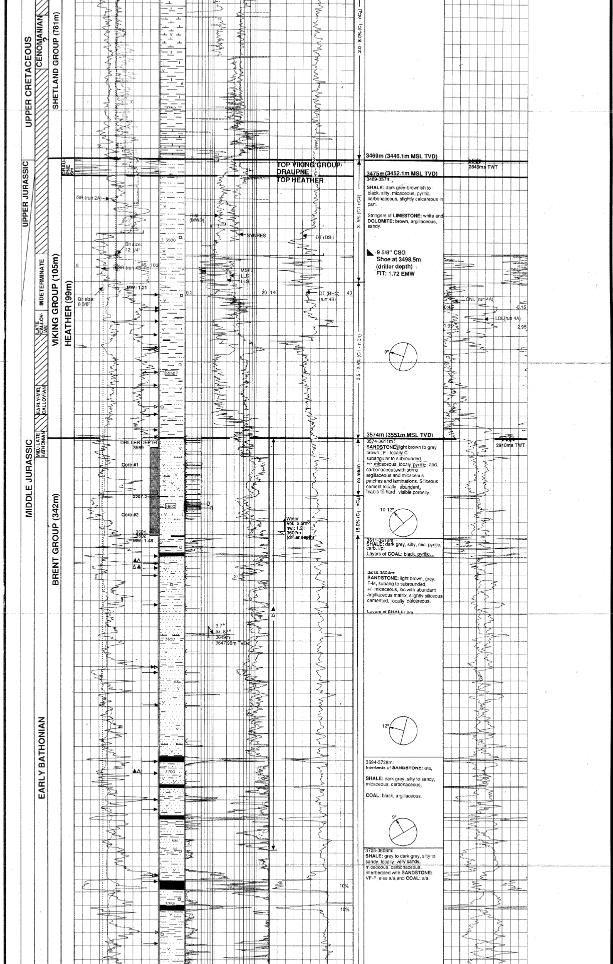
2827-3192.5m:
SHALE: medium dark grey, silty, micmic, +/- calc, grading to
MARL: i/p. light grey, , red brown, locally grading to arg. **LIMESTONE.**



3192.5-3336m:

LIMESTONE: beige, offwhite, microcrystalline, slightly argillaceous i/p, interbedded with **SHALE/MARL:** light-medium grey.

3336-3469m:
SHALE: medium-dark grey, slightly silty, +/- calcareous, micromicaceous, firm.



3469m (3446.1m MSL TVD)

3475m (3452.1m MSL TVD)

3469-3574:

SHALE: dark grey-brownish to black, silty, micaceous, pyritic, carbonaceous, slightly calcareous in part.

Stringers of **LIMESTONE:** white and **DOLOMITE:** brown, argillaceous, sandy.

9 5/8" CSG
Shoe at 3498.5m
(driller depth)
FIT: 1.72 EMW

3574m (3551m MSL TVD)

3574-3611m:

SANDSTONE: light brown to grey brown, F - locally C subangular to subrounded. +/- micaceous, localy pyritic and carbonaceous, with some argillaceous and micaceous patches and laminations. Siliceous cement locally abundant, friable to hard, visible porosity.

3611-3618m:

SHALE: dark grey, silty, mic. pyritic, carb. i/p.

Layers of **COAL:** black, pyritic.

3618-3694m:

SANDSTONE: light brown, grey, F-M, subang to subrounded, +/- micaceous, loc with abundant argillaceous matrix, slightly siliceous cemented, locally calcareous.

Layers of **SHALE:** a/a.

3694-3728m:

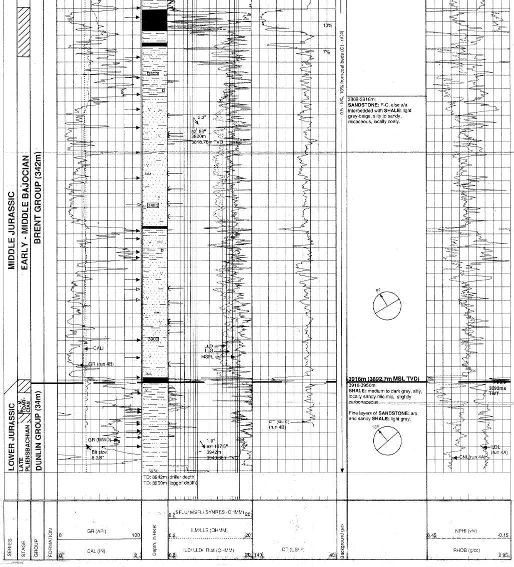
Interbeds of **SANDSTONE:** a/a,

SHALE: dark grey, silty to sandy, micaceous, carbonaceous,

COAL: black, argillaceous.

3728-3808m:

SHALE: grey to dark grey, silty to sandy, locally very sandy, micaceous, carbonaceous, interbedded with **SANDSTONE:** VF-F, else a/a, and **COAL:** a/a.



WIRELINE LOGGING

Drilling Phase	Date	Run nb.	Type of Log	Logged Interval	Recorded BHT (°C)	Extrap. BHT (°C)	Comments
17 1/2"	11.12.92	1A	DIL, BHC, LDL, GR, AMS	2117-1000m (RKB=18m)	49		
12 1/4"	14.02.93 to 20.02.93	2A	DLL, MSFL, BHC, GR, AMS	3109-2050m	67	106	Hang up at 3115m, probably due to wash out.
			DIL, SGR, LDL, CNL, AMS	2962-2050m	70		Unable to pass 2964m
			HP, RPQS, RFT, GR	2820-2129.5m	82		Three good pressure points
			FMS, SHDT, GR	3505-2113m	79		First run: SHDT made from 3505-2113m. Second run: Unable to pass 3160m, logged in FMS - mode from 2882-2700m
			SWC, GR	2820-2129m	79		1 lost, 3 empty, 26 rec.
			CBL, VDL, GR	2105-987m	62		
8 3/8"	14.03.93 to 15.03.93	3A	DLL, MSFL, GR	3595-3457m	102	118	
		3B	HP, RPQS, RFT, GR	3599-3574.5m	109		15 attempted pressure points, 1 good formation pressure
8 3/8"	22.03.93 to 29.03.93	4B	DLL, MSFL, BHC, GR, AMS	3945-3445m	108	125	
		4A	LDL, CNL, NGL, AMS	3949-3505m	115		
			FMI, GR	3950-3508m	117		FMI was used to log the interval from 3508-3629m and 3675-3950m. No data was recorded between 3629 and 3675m due to tool problem.
			GRA, LDS, APS, HNGS	3932-3505m	111		
			DIL, DSI, GR, AMS	3948-3030m	122		From 3505-3030m: Logged behind 95/8" casing Data from this section have been processed
		4B	CBL, VDL, GR, CCL	3500-2000m	117		
		4C	HP, RPQS, RFT,GR	3909-3598m			
			1st. run	3909-3580m	124		
			2nd. run	3600.1-3598m	113		Tool stuck at 3600.1m
			VSP	3940-2540m			
		4B	CST, GR	3935-3526m	124		1 lost, 3 empty, 26 rec.
		4C	CST, GR	3940-3520m	124		3 lost, 2 empty, 25 rec.

LOGS USED TO MAKE THIS COMPLETION LOG

Type of log	Interval,m RKB Reference Level: West Vanguard, RKB = 22m	Log Run No	Log Combination	Depth Shift	Comments
Gamma ray	201-1142m	—	MWD: 9 1/2" RGDM tool (Dual Resistivity,Gamma Ray, Directional)	+5m	This section was logged from West Alpha (RKB=18m) Depth shift: 4m for RKB shift, pluss 1m
	1142-2100m	1A	DIL - BHC - LDL - GR - AMS	+6m	This section was logged from West Alpha (RKB=18m) Depth shift: 4m for RKB shift, pluss 2m
	2100-3089m	2A	DLL - MSFL - BHC - GR - AMS		
	3089-3497m	2A	FMS - SHDT - GR		

	3497-3925m	4B	DLL - MSFL - BHC - GR - AMS		
	3925-3947m	—	MWD: 6 3/4" RGDM tool	+8m	
Resistivity/ induction	201-1142m	—	MWD: 9 1/2" RGDM tool	+5m	Same as for GR
	1142-2123m	1A	DIL - BHC - LDL - GR - AMS	+6m	Same as for GR, run 1A
	2123-3109m	2A	DLL - MSFL - BHC - GR - AMS		
	3109-3500m	(2A)	SYNRES (SHDT)		SYNTHETIC RESISTIVITY FROM SHDT DATA
	3109-3500m	—	MWD: 8" RGDM tool	+6m	
	3500-3945m	4B	DLL - MSFL - BHC - GR - AMS		
Sonic	1142-2113m	1A	DIL - BHC - LDL - GR - AMS	+6m	Same as for GR, run 1A
	2113-3095m	2A	DLL - MSFL - BHC - GR - AMS		
	3095-3505m	4A	DSI - GR - AMS		DTCO BHC: Compressional DT, obtained by processing of data from the monopole and dipole source in the DSI
	3505-3933.5m	4B	DLL - MSFL - BHC - GR - AMS		
Density	1142-2113m	1A	DIL - BHC - LDL - GR - AMS	+6m	Same as for GR, run 1A
	2113-2950m	2A	DIL - SGR - LDL - GR - AMS		
	2950-3505m	—	No density log		
	3505-3949m	4A	LDL - CNL - NGL		
Neutron	2113-2950m	2A	DIL - SGR - LDL - CNL - AMS		
	2950-3505m	—	No neutron log		
	3505-3949m	4A	LDL - CNL - NGL		

CORING

Core No.	Depth, m RKB		Recovery		Time to cut
	Driller	Logger	m	%	
1	3569-3587.5	3577.5-3596	18.5	100	0.9hr (20.6m/hr)
2	3587.5-3602	3596-3610.5	13.5	93.1	0.6hr (24.2m/hr)

SIDEWALL - CORES

Run	Depth (m RKB)	Hole Size	Bullets	Recov. Samples	Lost	Misfired	Empty
1	2820-2129.5	12 1/4"	30	26	1		3
2	3935-3526	8 3/8"	30	26	1		3
3	3940-3520	8 3/8"	30	25	3		2
	Total:		90	77	5		8

RFT: PRESSURE MEASUREMENTS / SAMPLING

Run No.	Interval, m RKB	Comments
1 (2A)	2820-2129.5	3 good pressure points in "Frigg Equivalent" Formation. No pressure points achieved in Shetland Group
2 (3B)	3599-3574.5	15 pressure point attempted in Brent, after a water kick at 3602m(driller depth)while coring. Only one pretest gave good formation pressure.
3 (4C)		A total of 37 pressure points were attempted. 11 points provided valid formation pressure. Sampling was performed in both runs, however, filtrate filled both chambers in the first run (at 3598m), and as the seal was lost half way though the sampling in the second run (at 3600.1m), a mixture of filtrate and well fluid was obtained.
1'st run	3909-3580	
2'nd run	3600.1-3598	