RINGHORNE EAST FIELD

GEOLOGICAL COMPLETION REPORT

WELL 25/8-15S
Drilling permit 1085 L

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1. GENERAL INFORMATION

1.0 Introduction

Well 25/8-15S was drilled as a dual target evaluation well from the Ringhorne platform. The objective was to first penetrate the Paleocene Zone II reservoir, and then to be an evaluation well for the Lower Jurassic Ringhorne East structure.

At the time of drilling the well was called 25/8-C-03, since it was drilled from the Ringhorne platform and had a production well target. After completion it was decided by the NPD that it would be called 25/8-15S, with Drilling permit L 1085.

Well 25/8-15S found good Jurassic Statfjord oil sands as prognosed.

The well found Zone II to be thin and below the Paleocene oil/water contact (OWC), so neither a multi-penetration pilot-hole nor producer was drilled for the Zone II in this area, as originally planned from this Ringhorne well slot.

The plan for this evaluation well was to take pressures in the Jurassic and to get a good seismic tie for Jurassic below the Statfjord S5. Drilling problems occurred and the full FE program could not be completed.

The well was drilled to 4804mmd when drilling problems started. The end result was that the total bottom hole assembly (BHA), with Gamma Ray, Resistivity, Density, Neutron, Sonic and Tes Trak, was left in hole at 2972m, before any pressure data or real time Sonic data was acquired. After nine days of working stuck BHA, the Pipeseis Chekshot was run to TD, before the well was plugged back.

Figure 1.1 shows Well location, figure 1.2 shows the well profiles and figure 1.3 Seismic line along well path.

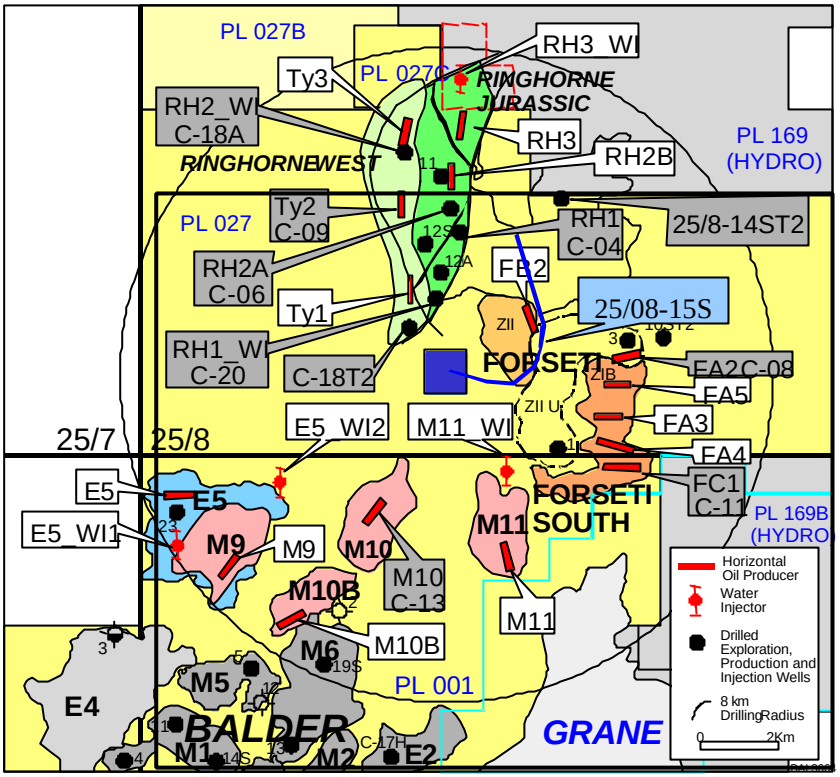


Figure 1.1 Well 25/8-15S Location

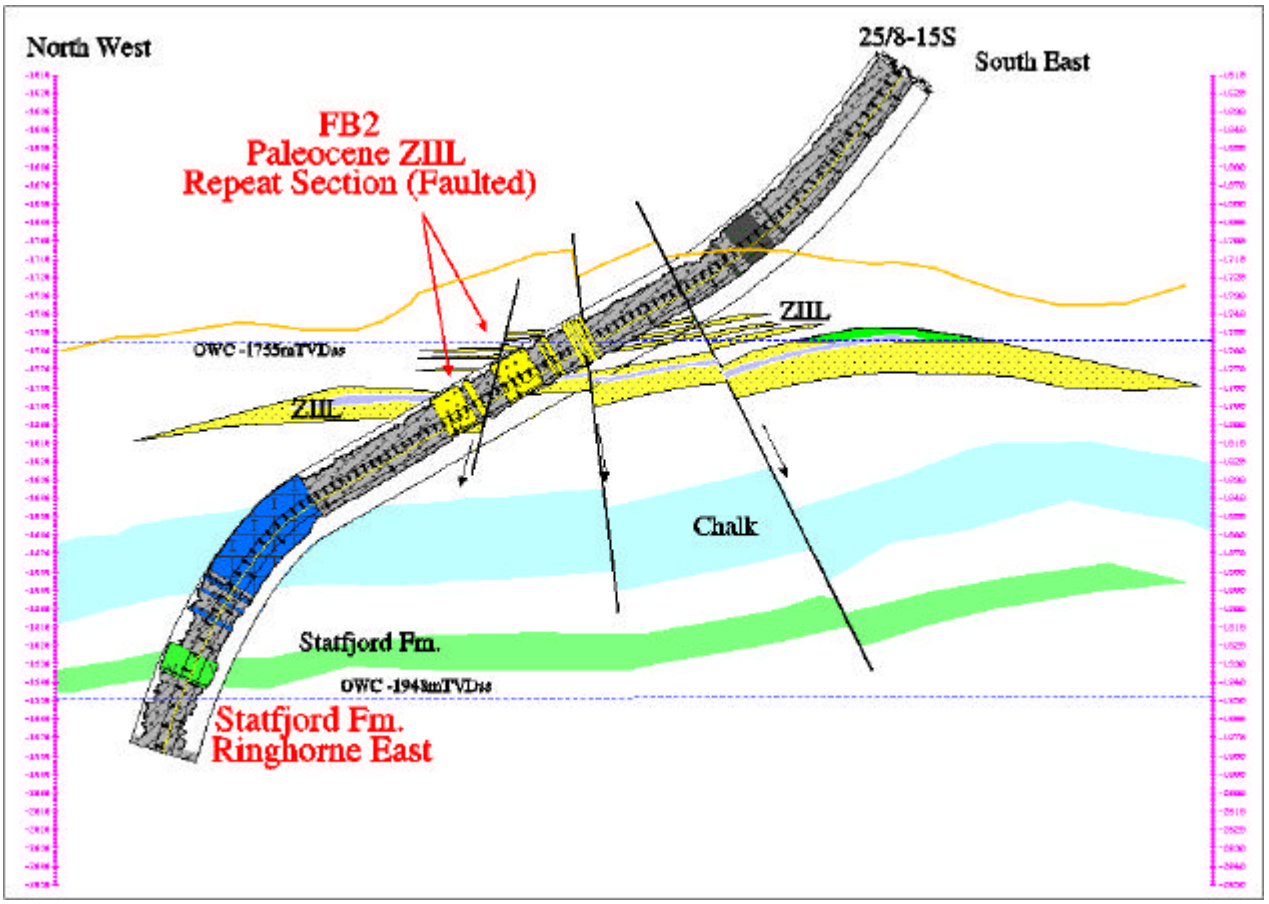


Figure 1.2 Well Profile 25/8-15S

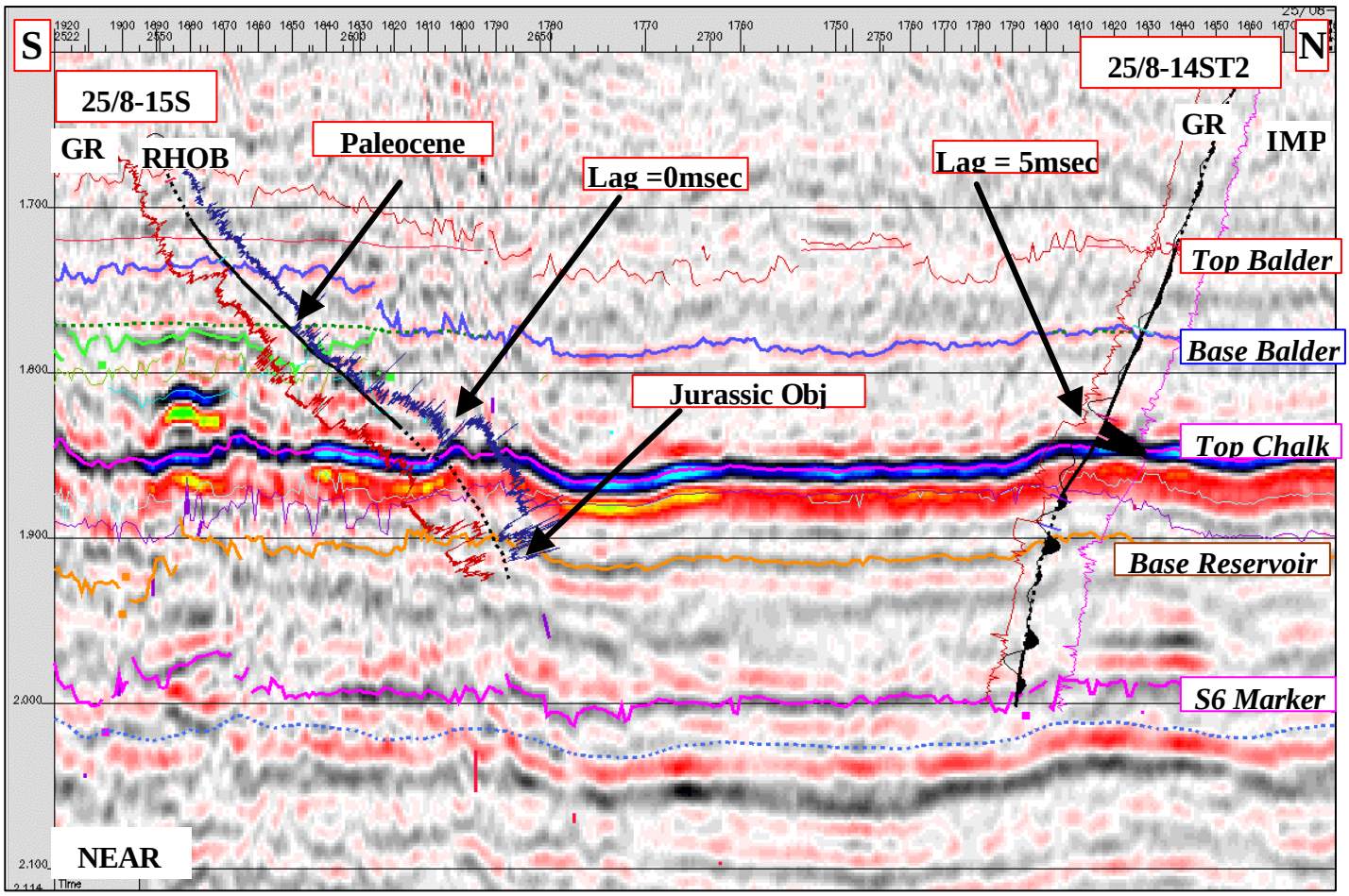


Figure 1.3 Seismic Line along the 25/8-15S Evaluation hole

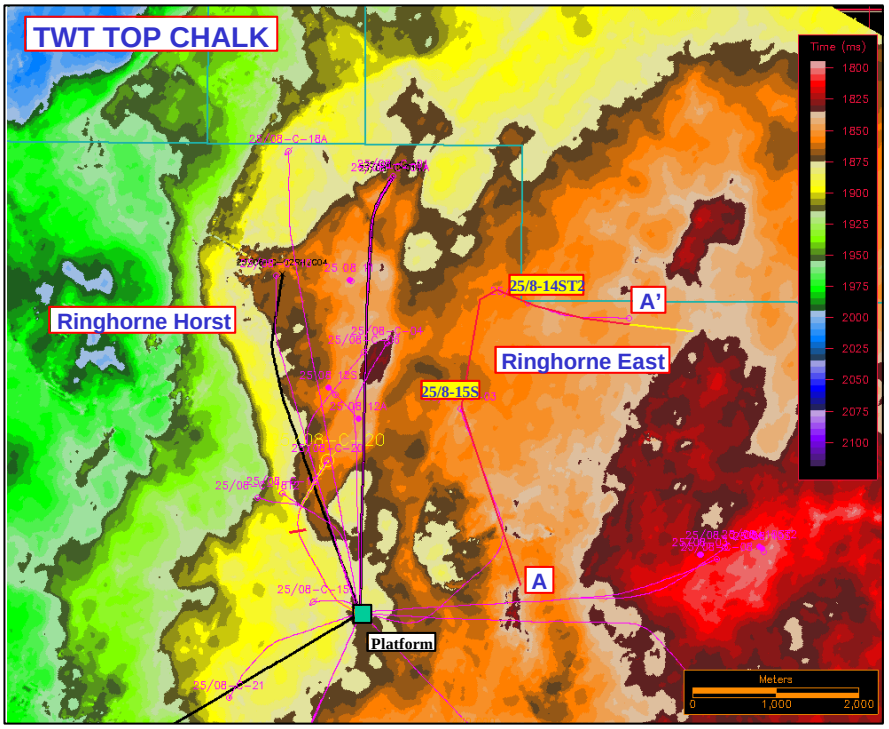


Figure 1.4 Map-view of seismic line above

1.1 Well Summary 25/8-15S

Table 1.1 Well 25/8-15S Summary

Field	Ringhorne East		
Production Licenses	PL027		
Operator	Esso Norge AS		
Well Name	**25/8-15S**		
Planning Well Name	RHE, Ringhorne East evaluation hole		
Well Type	Appraisal well for Ringhorne East and penetration point for Forseti Zone II		
Drilling Permit	**1085 L**		
Wellhead Location Slot C-03	X= 468 636.7 E Y=6 569 969.7m N	Longitude: 2° 26 min 59.535 sec E Latitude: 59° 15 min 58.129 sec N	
Drilling Rig	Ringhorne		
RKB to Sea level	60.3 m		
Water Depth	128.5 m		
Well objective	Heimdal, Zone II and Statfjord Formation		
Start 17 ½" hole	July 11, 2004		
Drilled to 4804 mMDRKB(not planned TD), lost return	July 22, 2004		
Got stuck with BHA	July 23, 2004		
At bottom , to run Checkshot	Aug 3, 2004		
Rig Released	Aug 7, 2004		
Total Depth	4804 mMDRKB (- 1978.1 mTVDSS)		
TD Location	X = 469840.35 m E Y = 6572413.98 m N	Longitude: 2°28min14.309sec E Latitude: 59°17min17.458sec N	
Hole size, Depth (inches mMDRKB)	**Casing , Depth (inches, mMDRKB)**	**Mud type/ Mudweight (SG)**	**Leak off / Formation Integrity (SG)**
32" 17 1/2" 1310 12 1/4" 4804	26" 304.7 13 3/8" 1305.7	Brine 1.04-1.20 NaCl mud 1.20 NAM 1.48	 FIT= 1.70
Well status:	Appraisal, Oil Discovery, plugged back to 13 3/8" shoe		

1.2 Well Operations Summary

For detailed drilling information, please see Drilling Final Well Report.

This well was originally drilled under well name designation 25/8-C-03 and later changed after the well was P&A'd to well name 25/8-15S as per Oljedirektoratet's request on August 9, 2004.

Well 25/8-15 S was drilled as evaluation well from the Ringhorne platform (slot AD, C-03) into the Jurrassic sands as well as it penetrated the Paleocene Zone II sands for the FB2 target. The well began operations on the AFE July 11, 2004 and FRR'd August 7, 2004.

The well was drilled and P&A'd in 26.9 days, 10.4 days ahead of the original AFE days and 2.9 days ahead of the target. The final cost for the well is estimated to be 90.3 M NOK.

The Non-Productive Time (NPT) for this well was 9.0 days (33.5%) and 47.4M NOK (includes LIH cost) Vs a budget of 7.4 days (20%) and 16.3M NOK. The major NPT drivers were; lost circulation problems after short trip and stuck pipe event while tripping out of hole.

Over the course of the well, there were no lost time incidents or restricted work incidents reported.

The following summarizes the drilling operations for the two hole sections in this well (Note: 26" conductor had been pre-set and cemented to 304.7m MD):

17-1/2" Hole Section

Interval: 304.7 m MD - 1310.0 m MD (304.7 m TVD - 1133.3 m TVD)
Mud system: NaCl/Polymer & KCL mud
Inclination: 61°
Direction: 103 °
Duration: 7.2 days
Formations: Utsira and Hordaland shale

A 17-1/2" mill tooth bit and motor with gyroMWD was used to drill to 513m MD to avoid magnetic interference from the offset conductors. The remaining 17-1/2" hole was drilled with an Autotrak assembly and PDC bit to TD in the Hordaland shale at 1310m MD (1133.3 m TVD).

After a short trip was made, the hole was circulated clean and the BHA was pulled out of hole. The hole appeared to be in good condition.

The 13-3/8" casing was run and cemented with no problems (100% returns during cementing and displacement). The casing shoe landed at 1305.7 m MD (1133.3 m TVD).

12-1/4" Evaluation Hole

Interval: 1305.7 m MD - 4804 m MD (1133.3 m TVD - 2038.6 m TVD)
Mud system: 1.48 - 1.50 sg Versaport NAF
Inclination: 61°- 83° - 55°
Direction: 103 °-340 ° - 338 °
Formations: Hordaland, Balder, Paleocene, Stratfjord

A 12-1/4" bit with an Autotrak assembly was used to drill the interval to total depth at 4804m MD. While drilling at depth of 4804m MD, the string stalled out. The pipe was worked free and hole conditioned while circulating with 4000 lpm. Lost signals to the AutoTrak tool while circulating hole in preparation for a short-trip. Performed short-trip to 4391m MD and ran back in the hole to 4770m MD with no excessive drag. While breaking circulation at 4770m MD and increasing flowrate to 3700 lpm, experienced lost returns. Racked back one stand and observed well on trip tank. Attempted to establish circulation without success. A decision was then made to pull of out the hole. Worked through tights spots from 3115 to 3025m MD when string became stuck at 3025m MD. Not able to circulate or rotate pipe. Attempted to jar down and up without success. Rigged up wireline and deployed severing tool inside drill pipe. Severed pipe in lower part of float sub with top of fish at 2971.5m MD. Ran in hole with fullbore 12-1/4" concave mill to dress top of fish. Reamed down to 2991m MD with no indication of milling on fish. Continued to run in hole with mill assembly to 4804m MD (TD), indicating the fish (53.5m) had not been pushed to bottom. Pull out of hole with mill assembly to 3106m MD. Mill hung up at 3106m MD, indicating that bottom of the fish may now be at 3028m MD (top of fish at 2974.5m MD, 53.5 meters of fish in hole). Worked mill assembly past fish and pulled assembly out of the hole. A decision was then made to permanently plug and abandon the well, due to inability to recover the fish.

P&A Operations

A 3-1/2" cement stinger was picked up and run in hole to 4804m MD. Ran in hole with wireline checkshot tool inside drillpipe to 4803m MD (tool string depth) and performed checkshot survey back to surface. The first cement plug was set from 4800m - 4550m MD. The second plug was set from 3830m - 3580m MD. The third cement plug containing Bayferrox (red dye) was set from 3075m - 2870m MD to isolate the bottomhole assembly lost in hole with radioactive source. The fourth cement plug was set from 1455m - 1234m MD, which covered the 13-3/8" casing shoe. After the cement was set, open ended drill pipe was tripped in hole to tag the top of cement with 10 ton. Attempted to pressure test plug to 94 bar. A fifth plug was set from 1222m - 1172m MD. Pressure tested cement plug to 94 bar successfully. A final cement plug was set from 400m - 211m MD. After the cement was set, drill pipe was run in the well to tag the cement with 10 ton.

2. STRATIGRAPHY

2.1 Lithostratigraphy

Table 2.1 Litostratigraphy

	Prognosed			Actual (Provisional)		
Formation Tops	**TVD SS**	**TVD RKB**	**MD RKB**	**TVD SS**	**TVD RKB**	**MD RKB**
Top Utsira Fm	558	618.3	618	557.8	618.1	622.5
Top Massive Utsira SS	736	796.3	819	731.6	791.9	810.5
Base Massive Utsira	921	981.3	1058	937.2	997.5	1069
Top Hordaland	985	1045.3	1116	971.1	1031.4	1121
Top Balder Fm	1647.5	1707.8	3023	1661.6	1721.9	3086
Base Balder Fm	1705	1765.3	3276	1713.6	1773.9	3347
Top Z11 sand	1724	1784.3	3402	1756.9	1817.2	3692
Base Zone II sand				1761.2	1821.5	3727.5
Top ZIB U sand				1772.5	1832.8	3822
Base IB U sand				1783.7	1844	3912
Top IB L sand				1789.7	1850	3963
Base IB L sand				1801.7	1862	4060
Top Chalk	1851	1911.3	4439	1842.7	1903	4393
Base Chalk	1871	1931.3	4528	1905.2	1965.5	4648
Top Burton-Amundsen				1908.1	1968.4	4656
Top Statfjord				1924.6	1985.1	4698
Top S-10 sand	1923	1983.3	4680	1924.6	1985.1	4698
Base S-10 sand				1932.2	1997.1	4730.5
Top S-9 sand				1955.8	2016.1	4764
Base S-9sand				1967.7	2028	4786
Top S6	2080	2140.3	4934		Not Penetrated	
TD	2100	2160.3	4958	1978.2	2038.4	4804

2.2 Chronostratigraphy

Robertson has performed the biostratigraphy study of this well, work was initiated Sept 3, 2004.
Table below prepared by Bob Dunay.

Table 2.2 Biostratigraphy 25/8-15S

DEPTH	BIOEVENTS	FOSSIL GROUP	SAMPLE TYPE	SAMPLE RANGE mMD
3400	B_Yp2MFS	MP	cu	3400
3760	B_Yp1MFS	P	cu	3510, 3620, 3760, 3790
3940	B_Th6MFS	P	cu	3940, 3950
3990	B_Th4MFS	P	cu	3990
4110	B_?Yp1MFS	MP	cu	4110, 4140
4240	B_Th4MFS	MP	cu	4240, 4250, 4270
4350	B_Th3MFS	P	cu	4350
4610	Indeterminate*			4610, 4620
4630	Indeterminate **	P	cu	4630, 4640, 4660, 4670, 4680, 4690
4700	B_?To6MFS	P	cu	4700
4730	B_Pl5MFS	P	cu	4730, 4740
4750	B_?Pl4MFS	P	cu	4750
4770	B_Si4MFS	P	cu	4760, 4770
4790	B_?Si3MFS	P	cu	4790
* Possible Draupne (Be5-Ki6) at 4610				
Possible Heather (Ox-Ca) at 4620				
**Possible Dunlin (Aa1-To) at 4630-4690				

Abbreviations: MFS- Maximum Flooding Surface, Yp-Ypresian, Th-Thanetian, To-Toarcian, Pl-Pliensbachian, Si- Sinemurian, Be- Berriasian, Ki- Kimmeridgian, Ox- Oxfordian, Ca-Callovian, Aa- Aalenian, cu- cuttings, MP- Micropalaentology, P- Palynology

3. FORMATION EVALUATION

3.1 Cuttings samples

One set of wet and two sets of dry cuttings were collected from 1700 mTVDRKB to TD.

3.2 MWD/LWD and Wireline Logging

The 12 ¼" hole was drilled with **AutoTrak and GR-RES-DEN-NEU-SON-TesTrak** to TD= 4804m. This entire BHA was left in hole at 2972m. The MWD tool stopped pulsing after we had been preliminary stuck and jarred free at 4804m. The BHA got stuck when pulling out of hole, and fishing was unsuccessful.

3.2.1 MWD/LWD Logging Program and Log Quality

Baker Hughes Inteq provided directional data and MWD, LWD gamma ray, propagation resistivity, density-neutron and sonic. (Table 3.1).

Table 3.1 MWD-LWD Logging Program Summary, Well 25/8-15S

Date run in hole	Run	Hole Size	Tool Suite (Baker Hughes Inteq)	Mud	Interval (mMD), and comments
July 16, 2004	1	12 ¼"	ATK_3.0/GR/MPR/ORD_1.50/CCN/APX/ Tes Trak	OBM	1310-4804m. No real-time sonic transmitted. TesTrak not used. Got stuck and lost tool string.

Abbreviations: ATK- AutoTrak directional, MPR- Multipole Resistivity - 2 MHz and 400 kHz long and short spaced measurements, ORD – Optimized Rotational Density with azimuthal data acquisition, CCN- Caliper-Corrected Neutron porosity, APX – Acoustic Properties Explorer, TesTrak – formation pressure test tool.

LWD Log Quality Comments:
LWD log quality is good for real-time transmitted data, but is not as good as memory data. Frequency of data points is poor in intervals drilled fast, such as in the shallow part of the hole. There are gaps where real-time transmission was interrupted, infrequently in the objective section of the well, but very frequently in the portion of the hole shallower than 3200mMD. Only up and down real-time azimuthal density curves were acquired, drastically limiting the usefulness of the azimuthal data.

3.2.2 WL Logging Program

Only Pipeseis Checkshots was run on wireline in the Well 25/8-15S, see section 4.

3.3 Composite Log Input Curves

Composite Log input curves were generated from the Baker Hughes Inteq LWD data. The following curves are included:

Table 3.2 Composite Input Data, Well 25/8-15S

Composite curve	LWD Curve	Description
CALI	CALX	Caliper
DEN	ABDCDX	Bulk Density
GR	GRAX	Gamma Ray
NEU	NPLX	Neutron Porosity
RDEP	RACLX	Deep Resistivity
RMED	RPCHX	Medium Resis.
PEF	None available	Photoelectric fact.
BS	BS	Bit Size

3.4 Petrophysical Interpretation

3.4.1 Standard Petrophysical Interpretation

A standard petrophysical evaluation was conducted on the 25/08-15S log data to understand the reservoir quality and fluid content of the reservoir intervals. Shale volume was calculated by both linear GR and density-neutron separation methods, total porosity was estimated with the bulk density measurement, and water saturation was calculated with the Archie equation and formation resistivity. The petrophysical parameters shown in Tables 3.3 were used. The RDEP (RACLX) was used for formation resistivity.

3.4.2 Shale Volume

Shale volume was calculated in two ways. One method was from the total gamma response using equation 1 below. GRclean and GRshale were defined from inspection of the log data and are shown in the input parameters table.

$$VSHGR = (GR - GRclean) / (GRshale - GRclean) \quad \text{eqn. 1}$$

The second method is based on the separation between the neutron and density porosity curves and equation 2.

$$VSHDN = (NEUSS-PHIT)/DNDELTA \quad \text{eqn. 2}$$

Where NEUSS is neutron porosity on a sand matrix (NEU + 0.044), PHIT is density porosity (as calculated with equation 3) and DNDELTA is the typical amount of neutron-density separation in shale zones (from the input parameters table).

3.4.3 Porosity

Total porosity has been determined from the density log:

$$PHIT = (RHOMA - DEN) / (RHOMA - RHOFL) \quad \text{eqn. 3}$$

RHOMA, matrix density, and RHOFL, fluid density, are from the input parameters tables.

3.4.4 Water Saturation

The Archie equation, equation 4, was used to calculate total water saturation.

$$Sw = ([Rw*a]/[(PHIT^m)*Rt])^(1/n) \quad \text{eqn. 4}$$

Where Rw is resistivity of the formation water, a = 1, PHIT is porosity from equation 3, 'm' and 'n' are from the parameter table, and Rt is resistivity. Water saturation was limited to fractional values between 0 and 1.

Table 3.3a Petrophysical Input Parameters, Well 25/08-15S

Parameter	Value Used							
	3600-3703.2 mMD	Tuff 3703.2-3708	3708-3710.5	Tuff 3710.5-3719.2	3719.2-3740	3740-3755	3755-4090	4090-4135
GR Clean (gAPI)	14	14	14	14	14	14	14	14
GR Shale (gAPI)	60	60	60	60	40	40	40	40
ND Delta in 100% shale (frac phi)	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Main Vsh source (GR or ND)	ND	GR	ND	GR	ND	GR	ND	GR
Matrix density (g/cm3)	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65
Fluid density (g/cm3)	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Vsh/Porosity cutoffs (to set Swt to 1.0 in shale intervals)	50/15	NA	50/15	NA	50/15	50/15	50/15	50/15
BHT (degC) at TD (mMD)	79@ 4450							
Surf. Temp (degC) at Mudline (m)	5 @ 100							
Formation Water Salinity (kppm NaCl equiv.)	46							
Archie Porosity Exponent 'm'	1.7							
Archie Saturation Exp. 'n'	2.0							

Table 3.3b Petrophysical Input Parameters, Well 25/08-15S

Parameter	Value Used						
	4135-4391.5 mMD	Chalk 4391.5-4656	4656-4731	4731-4747	Water 4747-4780	4780-4782	No Por 4782-4795.5
GR Clean (gAPI)	14	3	15	15	15	15	15
GR Shale (gAPI)	50	40	80	80	80	80	80
ND Delta in 100% shale (frac phi)	0.28	0.22	0.30	0.30	0.30	0.30	0.30
Main Vsh source (GR or ND)	GR	GR	GR	ND	ND	GR	GR
Matrix density (g/cm3)	2.65	2.71	2.65	2.65	2.65	2.65	2.65 Max Por 30pu
Fluid density (g/cm3)	0.9	0.9	0.82	0.82	0.9	0.9	0.9
Vsh/Porosity cutoffs (to set Swt to 1.0 in shale intervals)	50/15	NA	50/15	50/15	50/15	50/15	50/15
BHT (degC) at TD (mMD)	82 @ 4800						
Surf. Temp (degC) at Mudline (m)	5 @ 100						

Formation Water Salinity (kppm NaCl equiv.)	68		
Archie Porosity Exp.'m'	1.7	2.1	1.8
Archie Saturation Exp. 'n'	2.0	2.1	2.0

3.5 Azimuthal Density Interpretation

The standard azimuthal interpretation cannot be performed with the data from this well because there are only up and down curves available.

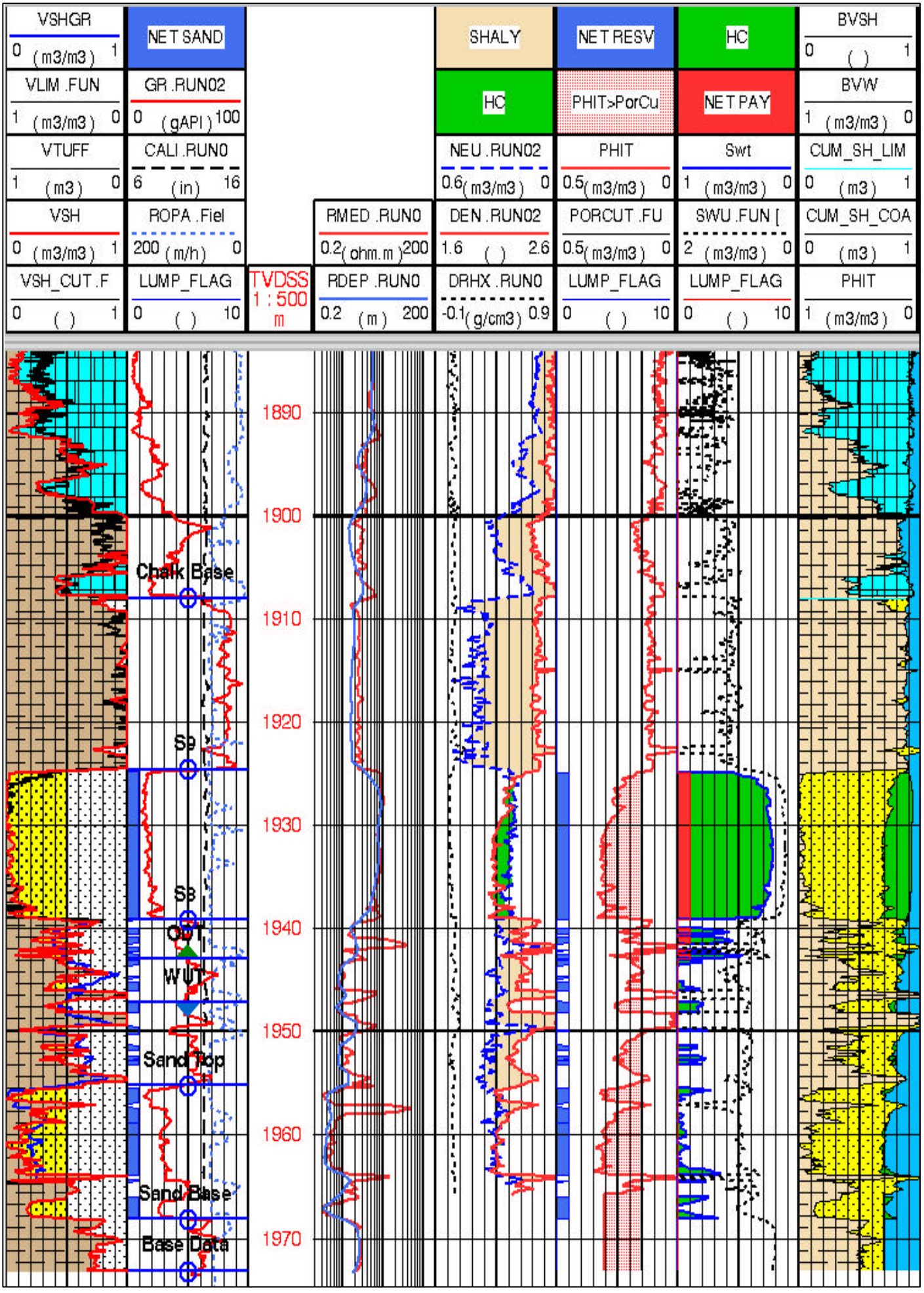
3.6 Results and Reservoir Summation By Zone

The results of this evaluation are shown with log plots (Figures 3.1 and 3.2) and a net summation table (Table 3.4). Also, a petrophysical interpretation plot is in the Appendix.

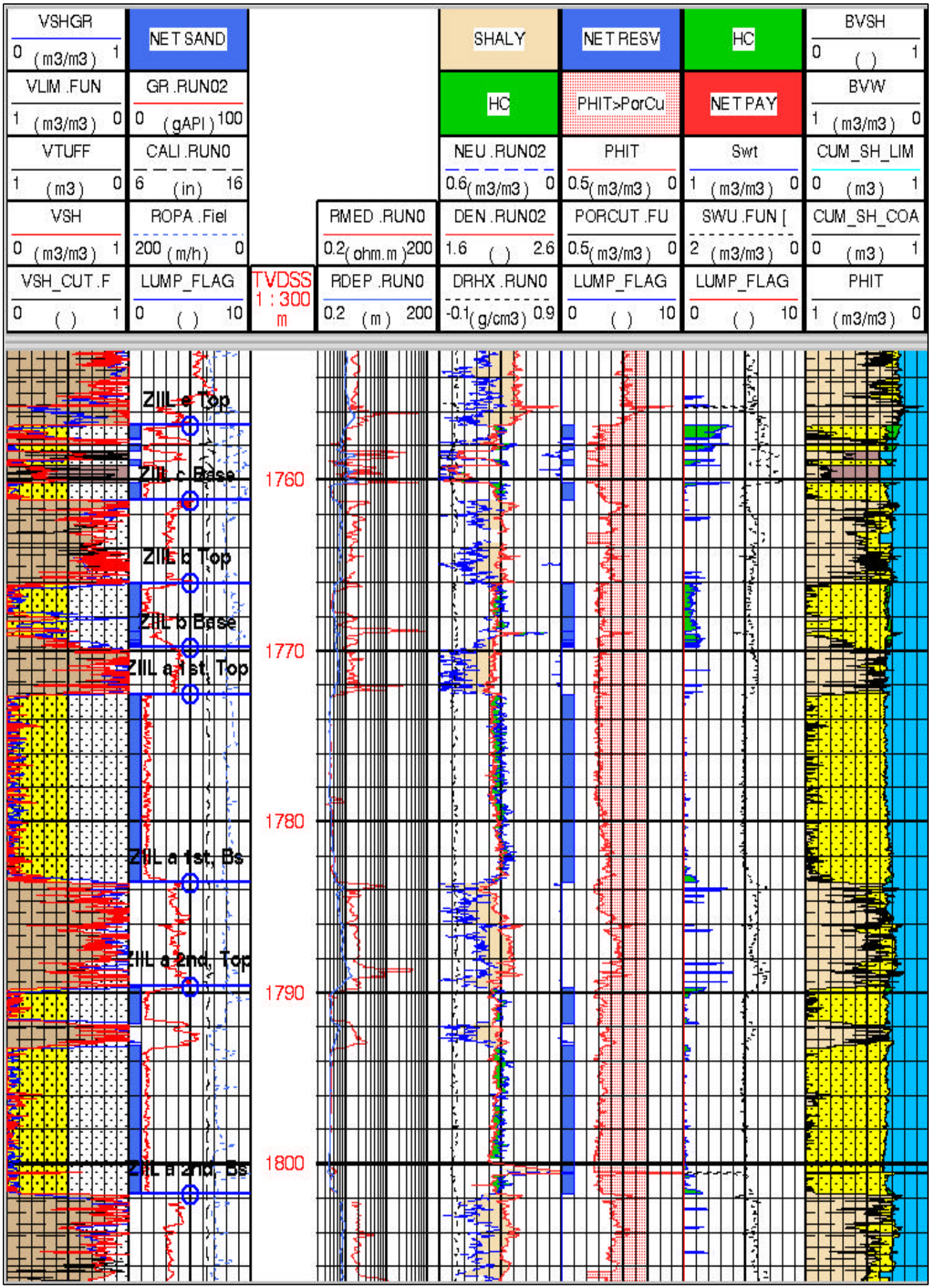
A massive, high net-to-gross Jurassic sand with 14.3m Net Pay was encountered about 17mTVD below the chalk. The entire sand is oil-bearing with porosity of 22-32 pu (avg. 27.8 pu) and average water saturation of 26 su. Formation water resistivity of 0.045 ohmm (68k ppm NaCl equiv. at 81.5degC) was used in the pay sand based on calculating Swt of 100% in the wet sand at 4770mMD. The exact position of the OWC is not known. Unfortunately, the planned formation pressure data were not acquired before the logging tools were lost. Oil Down To (ODT) is at least as deep as the base of the sand at 4730.6mMD or 1939.2mSS (see Figure 3.1). There is also some evidence that suggests there is oil in the thin sand down to 4738.5mMD or 1943.0mSS. Here there is an increase in resistivity in a thin, porous bed, assuming that the real-time logging curves are accurate. Water Up To (WUT) is at least as shallow as the top of the massive, wet sand at 4763mMD or 1955.3mSS. There also is a wet sand up to 4747mMD or 1947.2mSS. It is not know if these two thin sands are in communication with and should be used as evidence for the OWC interpretation of the pay interval.

ZII Lower is shown in Figure 3.2. The presence of the two intervals shown as Tuff, at 1760mSS, is unusual. In the cuttings description, up to 70% tuffaceous lithology is described at 3720mMD. The logging curves are neither reservoir nor shale in that the GR is slightly higher than sand, the beds are resistive, but have very low densities, and have high neutron porosity values. The caliper shows minor hole enlargement over the tuffaceous intervals but the up and down density curves give about the same values. These intervals are interpreted as non-reservoir. The sands in this interval, especially the top sand at 1757mSS calculate to have up to 20-30% oil saturation. It's possible that the log resistivity is higher than the true formation resistivity because the beds are thin and the curves are effected by the more resistive shale shoulder beds. Residual hydrocarbons could also explain the calculated oil saturation.

Ringhorne 25/8-15S: Jurassic Interval TVDSS



Ringhorne 25/8-15S: Paleocene Reservoirs



Ringhorne 25/8-15S Net Summary
Paleocene and Jurassic Reservoirs
Final Geological Report
January, 2005

TRUE VERTICAL DEPTH

Zone	Top MD	Base MD	Top TVDSS	Base TVDSS	Gross TVD Interval Thickness	Net Sand (TVD) (Vsh < 50%) Net Sand Thickness	Net Sand (TVD) (Vsh < 50%) Net to Gross Interval	Net Reservoir (TVD) (Vsh <50% and PHIT > 15%) Net Reservoir Thickness	Net Reservoir (TVD) (Vsh <50% and PHIT > 15%) Net to Gross Interval	Net Reservoir (TVD) (Vsh <50% and PHIT > 15%) Avg. Vsh	Net Reservoir (TVD) (Vsh <50% and PHIT > 15%) Avg. Porosity	Net Reservoir (TVD) (Vsh <50% and PHIT > 15%) Porosity Thickness	Net Pay (TVD) (Vsh < 50%, PHIT > 15%, Sw </= 0,100) * Net Pay Thickess	Net Pay (TVD) (Vsh < 50%, PHIT > 15%, Sw </= 0,100) * Net to Gross Interval	Net Pay (TVD) (Vsh < 50%, PHIT > 15%, Sw </= 0,100) * Avg. Vsh	Net Pay (TVD) (Vsh < 50%, PHIT > 15%, Sw </= 0,100) * Avg. Porosity	Net Pay (TVD) (Vsh < 50%, PHIT > 15%, Sw </= 0,100) * Avg. Sw	Net Pay (TVD) (Vsh < 50%, PHIT > 15%, Sw </= 0,100) * HCPV
	m	m	m	m	m	m	m	m	frac	frac	frac	m	m	frac	frac	frac	frac	m
ZIIL e	3690.8	3703.2	1756.8	1758.3	1.5	1.2	0.823	**1.2**	0.823	0.074	0.341	0.41	**0.0**	0.000	0.000	0.000	0.000	0.00
ZIIL d	3708.0	3710.5	1758.9	1759.2	0.3	0.3	0.980	**0.3**	0.980	0.019	0.339	0.10	**0.0**	0.000	0.000	0.000	0.000	0.00
ZIIL c	3719.2	3728.0	1760.2	1761.3	1.0	1.0	0.972	**1.0**	0.972	0.039	0.343	0.35	**0.0**	0.000	0.000	0.000	0.000	0.00
ZIIL b	3768.5	3799.5	1766.1	1769.9	3.8	3.5	0.935	**3.5**	0.935	0.117	0.338	1.19	**0.0**	0.000	0.000	0.000	0.000	0.00
ZIIL a 1st	3822.0	3912.5	1772.6	1783.6	11.0	11.0	1.000	**11.0**	1.000	0.036	0.340	3.74	**0.0**	0.000	0.000	0.000	0.000	0.00
ZIIL a 2nd	3962.0	4060.0	1789.7	1801.8	12.2	10.8	0.888	**10.7**	0.882	0.038	0.344	3.70	**0.0**	0.000	0.000	0.000	0.000	0.00
Paleocene Total	3690.8	4060.0	1756.8	1801.8	**45.0**	**27.9**	**0.620**	**27.8**	**0.618**	**0.049**	**0.341**	**9.49**	**0.0**	**0.000**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**0.000**
S9	4697.5	4730.6	1924.7	1939.2	14.6	14.4	0.987	**14.2**	0.977	0.053	0.278	3.96	**14.2**	0.977	0.053	0.278	0.257	2.94
BelowS9Oil	4730.6	4738.5	1939.2	1943.0	3.8	2.2	0.573	**1.8**	0.467	0.316	0.209	0.37	**1.8**	0.467	0.316	0.209	0.614	0.14
UnknownFluid	4738.5	4747.0	1943.0	1947.2	4.2	1.5	0.365	**1.5**	0.365	0.421	0.197	0.30	**0.0**	0.000	0.000	0.000	0.000	0.00
BelowS9Wtr	4747.0	4763.0	1947.2	1955.3	8.0	2.9	0.363	**2.3**	0.282	0.384	0.239	0.54	**0.0**	0.000	0.000	0.000	0.000	0.00
S8 Massive Sd	4763.0	4786.6	1955.3	1968.2	12.9	10.4	0.803	**10.2**	0.790	0.197	0.291	2.97	**0.0**	0.000	0.000	0.000	0.000	0.00
S8 Rathole	4786.6	4795.5	1968.2	1973.2	5.0	0.0	0.000	**0.0**	0.000	0.000	0.000	0.00	**0.0**	0.000	0.000	0.000	0.000	0.00
Jurassic Total	4697.5	4795.5	1924.7	1973.2	**48.6**	**31.4**	**0.646**	**30.0**	**0.618**	**0.161**	**0.271**	**8.14**	**16.0**	**0.330**	**0.082**	**0.270**	**0.297**	**3.081**

* Pay intervals have no Swt cutoff, so Net Pay equals Net Reservoir. In Water-bearing intervals, Net Pay is set to 0.

The position of the Jurassic OWC is uncertain. The massive S9 sand does not appear to have any free water.
A sand interval at 4747.0mMD appears to be water-bearing and is a WUT point.
A thin sand interval with a base of 4738.5mMD/1943.0mSS could be an ODT point.

cfp

Table 3.4. Net Summary page, well 25/8-15S.

4. GEOPHYSICS

4.1 25/8-15S, Check shot survey

A pipeseis checkshot survey was run from TD to surface before the well was plugged back.
Primary objectives of the survey were to reduce uncertainties associated with the seismic tie at the Jurassic reservoir and to evaluate the variation in velocities over the southern flank of Ringhorne East.
The checkshot survey was conducted by Baker Atlas,as a Vertical Incidence survey.
The source was one single 150cu.in airgun located 5 meter below sea level.
Post drill analyses indicate a zero lag between the recorded checkshots and the EM01 Near Angle 3D cube at the Top Chalk level which is consistent with a small lag observed at the 25/8-14ST2 discovery well.

Table 4.1. Post-Drill Velocity Table, Checkshot data

MDKB	TVD	1-Way Time	2-Way Time	V_{int}
(m)	(m)	(ms)	(ms)	(m/s)
				1760.6
622.5	557.8	316.8	633.6	
				2003.5
810.5	731.5	403.5	807.0	
				2117.4
1069.0	937.1	500.6	1001.2	
				2492.6
1121.0	971.0	514.2	1028.4	
				2085.8
1300.0	1068.2	560.8	1121.6	
				2072.5
1500.0	1162.5	606.3	1212.6	
				2101.2
1700.0	1247.6	646.8	1293.6	
				2199.3
1900.0	1312.7	676.4	1352.8	
				2090.9
2100.0	1372.5	705.0	1410.0	
				1923.3
2300.0	1432.7	736.3	1472.6	
				2082.8
2500.0	1493.1	765.3	1530.6	
				2192.7
2700.0	1553.4	792.8	1585.6	
				2094.2
2900.0	1611.2	820.4	1640.8	
				2255.6
3086.0	1661.5	842.7	1685.4	
				2186.6
3216.0	1690.8	856.1	1712.2	
				2410.5
3347.0	1713.7	865.6	1731.2	
				2035.7
3520.0	1736.5	876.8	1753.6	
				1980.6
3691.0	1756.9	887.1	1774.2	
				1925.9
3821.5	1772.5	895.2	1790.4	
				2982.8
3963.0	1789.8	901.0	1802.0	
				2000.0
4060.0	1801.8	907.0	1814.0	
				2175.8
4220.0	1821.6	916.1	1832.2	
				2175.3
4393.0	1842.7	925.8	1851.6	
				4615.4
4470.0	1854.7	928.4	1856.8	
				4076.3
4656.0	1908.1	941.5	1883.0	
				2666.7
4698.0	1924.9	947.8	1895.6	
				3525.0
4730.0	1939.0	951.8	1903.6	
				6222.2
4764.0	1955.8	954.5	1909.0	
				3545.5
4771.0	1959.7	955.6	1911.2	

APPENDIX I

SAMPLE DESCRIPTIONS 25/8-15S

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION												
WELL: 25/8-15	AREA: Ringhorne East		Spud Date:									Sheet No.			
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN DIST	STAIN COL	FLUOR DIST	FLUOR INTEN	FLUOR COL	CUT INTEN	CUT COL	CUT FLUOR INTEN	CUT FLUOR COL	RES COL	Rating
		PAGE ONE OF SAMPLE DESCRIPTIONS 25/8-15												
1313	95	Cement: olive grey, soft to firm												
	5	CLAYSTONE: brownish black, soft, friable in part, subblocky, moderate to very silty, micromicaceous, trace micropyrite, occasional glauconite, slightly calcareous.												
1350	100	CLAYSTONE: dark grey to greyish black, occasionally medium grey, firm to moderately hard, crumbly to sub blocky break, silty to very silty in part, common mica, glauconitic, occasional mcropyrite.												
	Tr	Limestone: yellowish grey with dark yellowish grey layers, hard, very hard in part, blocky to angular break, microcrystalline, mudstone texture.												
1383	90	CLAYSTONE: dark grey to greyish black, occasionally medium grey, firm to moderately hard, crumbly to sub blocky break, silty to very silty in part, common mica, glauconitic, occasional mcropyrite.												
	10	SANDSTONE: light yellowish brown, firm to friable, Bimodal, composed of clear occasionally opaque quartz grains, vf to silt sub angular to rounded, well sorted in argillaceous cement, and common coarse to very coarse colourless, clear quartz grains, well rounded, loose, slightly elongate, common micropyrite and micromica.												
	Tr	LIMESTONE: yellowish grey with dark yellowish grey layers, hard, very hard in part, blocky to angular break, microcrystalline, mudstone texture. Occasional sparry calcite.												
1400	100	CLAYSTONE: dark grey, to grey black, occasionally greenish black, firm to moderately hard, sub blocky, tabular to fissile break, common glauconite and mica, occasional micropyrite, silty in part, non to slightly calcareous.												
	Tr	LIMESTONE: light grey to medium light grey, common argillaceous streaks, firm to moderately hard, blocky to brittile break, cryptocrystalline.												
1450	100	CLAYSTONE: dark grey, to olive grey, occasionally greenish black, firm to moderately hard, sub blocky, tabular to fissile break, common glauconite and mica, occasional micropyrite, silty in part.												

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:										Sheet No.			
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
1500	100	CLAYSTONE: dark grey to brownish black, firm, subblocky, micromicaceous, micropyritic, occasional glauconite, silty in part, slight to moderately calcareous.												
1570	100	CLAYSTONE: olive black to brownish black, firm, subblock, micromicaceous, micropyritic, occasional glauconite, silty in part, slight to moderately calcareous.												
1600	100	CLAYSTONE: dark grey to brownish black, firm, subblocky, micromicaceous, micropyritic, local glauconite, silty in part, slight to moderately calcareous.												
	tr	SANDSTONE: light grey, locally hard, very fine to medium, subangular, poor to moderately sorted, local hard siliceous cement, slightly calcareous in places, common glauconite.												
1650	100	CLAYSTONE: dark grey to brownish black, firm, subblocky, micromicaceous, micropyritic, local glauconite, silty in part, slight to moderately calcareous.												
	tr	LIMESTONE: pale to moderately yellowish brown, firm, subblocky, microcrystalline, argillaceous in parts.												
1700	100	CLAYSTONE: dark grey to brownish black, firm, subblocky, silty micromicaceous, micropyritic, local glauconite, swelling in part, non to moderately calcareous.												
1750	80	CLAYSTONE: dark grey to brownish black, firm, subblocky, silty micromicaceous, micropyritic, local glauconite, swelling in part, non to moderately calcareous.												
	20	LIMESTONE: moderate to dark yellowish brown, firm to moderately hard, blocky to subangular, microcrystalline, locally cryptocrystalline, mudstone texture, argillaceous in parts, possibly slightly dolomitic.												
1800	100	CLAYSTONE: dark grey to brownish black, firm, subblocky, silty micromicaceous, micropyritic, local glauconite, swelling in part, non to slightly calcareous.												
	tr	LIMESTONE: pale to dark yellowish brown, firm to moderately hard, blocky to subangular, microcrystalline, locally cryptocrystalline, mudstone texture, argillaceous in parts.												

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:										Sheet No.			
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
1850	95	CLAYSTONE: dark grey to brownish black, rarely dark greenish grey to greenish black, firm, subblocky, silty, micromicaceous in part, micropyritic, local glauconite, swelling in part, non calcareous.												
	5	LIMESTONE: predominantly pale yellowish brown, firm to moderately hard, blocky to subangular, microcrystalline to locally cryptocrystalline, slightly dolomitic in parts, occasional black stylolitic laminae.												
1900	100	CLAYSTONE: dark grey to brownish black, locally greenish black, firm, subblocky, silty in part, trace micromica, micropyritic, local glauconite, swelling in part, non calcareous.												
	tr	LIMESTONE: pale to dark yellowish brown, firm to moderately hard, blocky, microcrystalline, locally microsucrosic, grades to Dolomite in parts.												
1950	100	CLAYSTONE: becoming greenish black in part, dark grey, olive black, occasionally brownish black, firm, subblocky, slightly silty, trace micropyritic, glauconite, non calcareous.												
	tr	DOLOMITE: pale to dark yellowish brown, firm to moderately hard, subblocky, crumbly in part, microcrystalline, microsucrosic, argillaceous in part.												
2000	100	CLAYSTONE: greenish black, dark grey, olive black, occasionally dark greenish grey, firm, subblocky, slightly silty, trace micropyritic, glauconite, non calcareous.												
	tr	LIMESTONE: pale to moderate yellowish brown, yellowish grey, firm to moderately hard, subblocky, brittle in part, micro-cryptocrystalline, grades to Dolomite in parts.												
2050	100	CLAYSTONE: greenish black, dark grey, olive black, locally dark greenish grey, firm, subblocky, slightly silty, trace micropyritic, glauconite, non calcareous.												
	tr	DOLOMITE: pale to dark yellowish brown, firm to moderately hard, subblocky, crumbly in part, microcrystalline, microsucrosic, argillaceous in part.												
	tr	LIMESTONE: pale to moderate yellowish brown, yellowish grey, firm to moderately hard, subblocky, brittle in part, micro-cryptocrystalline, grades to Dolomite in parts.												

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION												
WELL: 25/8-15	AREA: Ringhorne East		Spud Date:									Sheet No.			
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN DIST	STAIN COL	FLUOR DIST	FLUOR INTEN	FLUOR COL	CUT INTEN	CUT COL	CUT FLUOR INTEN	CUT FLUOR COL	RES COL	Rating
2100	90	CLAYSTONE: dark grey to olive grey, olive black, moderately hard, blocky to angular break, hackly break in part, glauconitic, pyritic, occasionaly micromicaceous.												
	10	LIMESTONE: pale to moderately yelowish grey, firm to moderately hard, blocky, microcrystalline to cryptocrystalline, silty in part, locally dolomitic.												
2150	100	CLAYSTONE: grey black to olive black, occasionally green black, hard, blocky to hackly break, generally micropyritic, occasionally micromicaceous, rare glauconite.												
	Tr	LIMESTONE: pale to moderately yelowish grey, firm to moderately hard, blocky, microcrystalline to cryptocrystalline, silty in part, locally dolomitic.												
2200	100	CLAYSTONE: grey black to olive black, occasionally green black, rare medium blue grey, hard, blocky to hackly break, generally micropyritic and glauconitic, occasionally micromicaceous.												
	Tr	LIMESTONE: pale to moderately yelowish grey, firm to moderately hard, blocky, microcrystalline to cryptocrystalline, silty in part, locally dolomitic.												
2250	100	CLAYSTONE: olive black, moderately hard, blocky to angular break, common fine disseminated pyrite, occasionallly micromicaceous, rare glauconite												
2300	100	CLAYSTONE: olive black, rarely green black, moderately hard, blocky to angular break, common fine disseminated pyrite, occasional very coarse nodular pyrite, occasionallly micromicaceous, rare glauconite												
	Tr	LIMESTONE: yelowish grey to white, firm, crumbly break, earthy texture, cryptocrystalline.												
2340	100	CLAYSTONE: dark grey black, to olive black, hard to brittle, blocky break, silty, micaceous, pyritic, occasionally glauconitic,												
	Tr	LIMESTONE: yelowish grey to white, firm, crumbly break, earthy texture, cryptocrystalline.												
2390	100	CLAYSTONE: dark grey black, to olive black, hard to brittle, blocky break, silty, micaceous, pyritic, occasionally glauconitic,												
	Tr	LIMESTONE: yelowish grey to white, firm, crumbly break, earthy texture, cryptocrystalline.												

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:									Sheet No.				
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating		
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL			
2450	100	CLAYSTONE: olive grey, to olive black, mod hard, blocky, common fine disseminated pyrite, occasional micro mica, rare glauconite.														
2500	90	CLAYSTONE: olive grey to olive black, occasionally medium blue grey, firm to hard, blocky occasionally flaky to hackly break, generally micropyritic, micromicaceous in part.														
	10	LIMESTONE: light grey, light olive grey, occasionally moderate yellowish brown translucent in part, firm to hard, blocky to crumbly break, crystalline to microcrystalline, mudstone texture.														
2550	90	CLAYSTONE: olive grey to olive black, occasionally medium blue grey, firm to hard, blocky occasionally flaky to hackly break, generally micropyritic, micromicaceous in part.														
	10	LIMESTONE: light grey, light olive grey, occasionally moderate yellowish brown, firm to hard, blocky to crumbly break, microcrystalline, mudstone texture.														
2600	100	CLAYSTONE: greenish black, olive black, firm to hard, blocky, common micropyritic in discrete patches, rare glauconite, occasional micro pyrite.														
	Tr	LIMESTONE: light grey, light olive grey, occasionally moderate yellowish brown, firm to hard, blocky to crumbly break, microcrystalline, mudstone texture.														
2650	100	CLAYSTONE: dark grey, greyish black, occasionally greenish grey, firm, crumbly to sub blocky micropyritic in discrete patches, micromicaceous, glauconitic in part.														
	Tr	LIMESTONE, yellowish grey, to grey orange, briefly white when fresh, moderately hard, blocky cryptocrystalline, chalky mudstone texture.														
2700	100	CLAYSTONE: dominantly dark grey, occasionally greenish black, locally olive black, firm, blocky, micropyritic, slightly micromicaceous, non calcareous.														
	Tr	LIMESTONE: pale to dark yellowish brown, greenish grey in places, firm to moderately hard, blocky to crumbly break, generally microcrystalline, rarely chalky texture, mudstone, slightly argillaceous in parts.														
2750	100	CLAYSTONE: dominantly dark grey, occasionally greenish black, locally olive black, firm, blocky, micropyritic, slightly micromicaceous, non calcareous.														
	Tr	LIMESTONE: pale to dark yellowish brown, firm to moderately hard, blocky to crumbly break, generally microcrystalline, mudstone texture, locally argillaceous.														
2800	100	CLAYSTONE: dark grey to greyish black, locally greenish black, also olive black, firm, blocky, micropyritic, slightly micromicaceous, rare glauconite, non calcareous.														

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:										Sheet No.			
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating		
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL			
	rtr	LIMESTONE: pale to dark yellowish brown, firm to moderately hard, blocky to crumbly break, microcrystalline, mudstone texture, locally argillaceous.														
2850	100	CLAYSTONE: olive black to greyish black, dark grey, rarely dark greenish grey, firm, blocky, locally silty, micropyritic, slightly micromicaceous, moderately swelling, non calcareous.														
	rtr	LIMESTONE: pale to dark yellowish brown, firm to moderately hard, blocky to crumbly break, microcrystalline, mudstone texture, locally argillaceous.														
2900	100	CLAYSTONE: olive black to greyish black, dark grey, rarely dark greenish grey, firm, blocky, locally silty, micropyritic, slightly micromicaceous, rare glauconite, moderately swelling, non calcareous.														
	gtr	DOLOMITE: pale to dark yellowish brown, firm to locally hard, blocky to crumbly break, microcrystalline, microsucrosic in part, locally argillaceous, occasionally grades to dolomitic Limestone.														
2950	100	CLAYSTONE: olive black to greyish black, occasionally brownish black and dark grey, firm, blocky, locally silty, micropyritic, slightly micromicaceous, rare glauconite, moderately swelling, non calcareous.														
	rtr	DOLOMITE: pale to dark yellowish brown, firm to locally hard, blocky to crumbly break, microcrystalline, microsucrosic in part.														
2973 (Spot)	100	CLAYSTONE: olive black, greyish black and brownish black, locally dark grey, slightly greenish in places, firm, blocky, slightly silty, micropyritic, slightly micromicaceous, rare glauconite, moderately swelling, non calcareous.														
2990 (Spot)	100	CLAYSTONE: olive black, greyish black and brownish black, locally dark grey, rarely dark greenish grey, firm, blocky, slightly silty, micropyritic, slightly micromicaceous, rare glauconite, moderately swelling, non calcareous.														
	rtr	DOLOMITE: dark yellowish brown, hard, subangular, microcrystalline, microsucrosic, argillaceous and pyritic.														
3000	100	CLAYSTONE: olive black to greyish black, brownish black, locally dark grey and dark greenish grey to greenish black, firm, blocky, slightly silty, micropyritic, slightly micromicaceous, rare glauconite, moderately swelling, non calcareous.														
	gtr	LIMESTONE: pale to moderate yellowish brown, occasionally yellowish grey and very light grey, firm to hard, blocky to crumbly break, generally microcrystalline, locally crystalline, locally argillaceous, occasionally dolomitic.														
3010	100	CLAYSTONE: predominantly olive black, also greyish black, locally brownish black and dark greenish grey to greenish black, occasionally dark to medium dark grey, firm, blocky, slightly silty, micropyritic, slightly micromicaceous, rare glauconite, non calcareous.														

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:									Sheet No.				
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
	rtr	LIMESTONE: pale to moderate yellowish brown, occasionally yellowish grey and very light grey, firm to hard, blocky to crumbly break, generally microcrystalline, locally crystalline, locally argillaceous, occasionally dolomitic												
3020	100	CLAYSTONE: becoming varicoloured, olive black, greyish black, dusky yellowish brown in part, also dark to medium dark grey, greenish black and rarely dusky green, firm, blocky, slightly silty, trace micropyritic, slightly micromicaceous, trace glauconite, occasional trace Tuff, non calcareous												
3030	100	CLAYSTONE: becoming dusky brown in part, dark olive grey to dark grey, dusky yellowish brown, olive black, occasionally greenish black and rarely dusky green, firm, blocky, slightly silty, trace micropyrite, trace glauconite, non calcareous.												
	tr	LIMESTONE: pale to moderate yellowish brown, firm to moderately hard, blocky to crumbly break, microcrystalline, occasionally crystalline, locally microsucrosic, dolomitic in part.												
3040	100	CLAYSTONE: dusky brown, dark grey to dark olive grey, dusky yellowish brown, olive black, occasionally greenish black and rarely dusky green, rare medum blueish grey to greenish grey, firm, blocky, slightly silty, trace micropyrite, trace glauconite, rarely tuffaceous, non calcareous.												
3050	100	CLAYSTONE: dusky brown, dark grey to dark olive grey, dusky yellowish brown, olive black, occasionally greenish black and rarely dusky green, rare medum blueish grey to greenish grey, firm, blocky, slightly silty, trace micropyrite, trace glauconite, rarely tuffaceous, non calcareous.												
	tr	SANDSTONE: olive grey, very fine to medium, dominantly fine to medium, silty, subangular to subrounded, poor to moderately sorted, argillaceous/silty matrix, weak silica cement in part, friable, rarely loose, trace mica and carbonaceous material, poor visible porosity, no visible Show.												
	rtr	LIMESTONE: pale to moderate yellowish brown, firm to moderately hard, blocky to crumbly break, microcrystalline, occasionally crystalline, locally microsucrosic, dolomitic in part.												
3060	100	CLAYSTONE: dusky brown (80%), locally dark grey to dark olive grey, rare olive black to brownish black and medium dark grey, occasionally medum blueish grey to greenish grey, firm, blocky, slightly silty, rare micropyrite, non calcareous.												
	tr	LIMESTONE: pale to dark yellowish brown, firm to moderately hard, occasionally hard, blocky to crumbly break, microcrystalline, locally microsucrosic and grades to Dolomite.												

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:									Sheet No.				
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating		
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL			
3070	100	CLAYSTONE: dusky brown (90%), locally dark grey to dark olive grey and medum blueish grey to greenish grey, firm, earthy texture, sublocky, slightly silty, rare micropyrite, slight to moderately swelling, non calcareous.														
3080	100	CLAYSTONE: dusky brown (90%), locally dark grey to dark olive grey and medum blueish grey to greenish grey, firm, earthy texture, sublocky, slightly silty, rare micropyrite, slight to moderately swelling, non calcareous.														
3090	100	CLAYSTONE: dark grey, dusky brown, medium blue grey, occasionally green grey, firm to moderately hard, sub bolcky, slightly silty, micropyritic, micromicaceous, common dark carbonaceous specks.														
	Tr	Tuff, yelowish grey, speckled, numerous very fine to fine angular glassy fragments, clear to dark green grey, occasional carbonaceous specks.														
3100	100	CLAYSTONE: dark grey, occasionally dusky brown, rare medium blue grey, firm to moderately hard, sub blocky, slightly silty, micropyritic, micromicaceous, common dark carbonaceous specks.														
3110	100	CLAYSTONE: dark grey, occasionally dusky brown, firm to moderately hard, sub bolcky, slightly silty, micropyritic, micromicaceous, common dark carbonaceous specks.														
	Tr	LIMESTONE: white to pale yellowish grey, moderately hard, crumbly to blocky break, microcrystalline, mudstone texture.														
3120	100	CLAYSTONE: dark grey occasionally dusky brown, hard, sub blocky occasionally slightly hackly break, slightly silty, micropyritic, micromicaceous, carbonaceous.														
	Tr	LIMESTONE: dark yellowish brown, hard, sub blocky to slightly hackly break, microcrystalline to cryptocrystalline, mudstone texture.														
3130	100	CLAYSTONE: dark grey occasionally dusky brown, hard, sub blocky occasionally slightly hackly break, slightly silty, micropyritic, micromicaceous, carbonaceous.														
	StTr	LIMESTONE: dark yelowish brown, hard, sub blocky to slightly hackly break, microcrystalline to cryptocrystalline, mudstone texture.														
3140	100	CLAYSTONE: dark grey to grey black, occasionally dusky brown, hard, sub blocky occasionally slightly hackly break, slightly silty, micropyritic, micromicaceous, carbonaceous.														
	StTr	LIMESTONE: dark yellowish brown, hard, sub blocky to slightly hackly break, microcrystalline to cryptocrystalline, mudstone texture.														
3150	100	CLAYSTONE: dark grey to grey black, occasionally dusky brown, rare medium blue grey, hard, sub blocky occasionally slightly hackly break, slightly silty, micropyritic, micromicaceous, carbonaceous.														
	StTr	LIMESTONE: dark yellowish brown, hard, sub blocky to slightly hackly break,														

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:									Sheet No.				
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
		microcrystalline to cryptocrystalline, mudstone texture.												
3160	100	CLAYSTONE: dark grey to grey black, occasionally dusky brown, rare medium blue grey, hard, sub blocky occasionally slightly hackly break, slightly silty, micropyritic, micromicaceous, carbonaceous.												
	Tr	LIMESTONE: dark yelowish brown, hard, sub blocky to slightly hackly break, microcrystalline to cryptocrystalline, mudstone texture. Occasionally dolomitic in part, dusky yellow brown, with yellow orange banding, hard, blocky slightly crumbly break, microcrystyalline.												
3170	100	CLAYSTONE: dark grey to dark grey black, occasionally brownish balck, rare dusky brown, hard, blocky to slightly hackly break, pyritic, common carbonaceous specks, micromicaceous in part.												
	Tr	LIMESTONE: dark yelowish brown, hard, sub blocky to slightly hackly break, microcrystalline to cryptocrystalline, mudstone texture. Occasionally dolomitic in part, dusky yellow brown, with yellow orange banding, hard, blocky slightly crumbly break, microcrystyalline.												
3180	100	CLAYSTONE: Dark grey to greyish black, occasionally brown black, rare dark greenish grey, , hard, blocky to slightly hackly break, pyritic, common carbonaceous specks, micromicaceous in part.												
	Tr	LIMESTONE: dark yelowish brown, hard, sub blocky to slightly hackly break, microcrystalline to cryptocrystalline, mudstone texture												
	rrTr	TUFF: medium blue grey, speckled, firm crumbly break, very common clear to dark greenish grey very fine to fine angular glassy fragments.												
3190	90	CLAYSTONE: Dark grey to blackish grey, occasionally brown black, rare dark greenish grey, , hard, blocky to slightly hackly break, pyritic, common carbonaceous specks, micromicaceous in part.												
	10	Tuff, medium blueish grey, occasionally very light grey, speckled, firm crumbly break, very common clear to dark greenish grey very fine to fine angular glassy fragments, calcareous in part, swelling.												
3200	80	CLAYSTONE: dark grey to greyish black, brownish black, rare dusky brown to moderate brown, firm to moderately hard, sub blocky to sub hackly micropyritic, occasional very coarse nodular pyrite. common carbonaceous fragments.												
	20	Tuff, medium blueish grey, occasionally very light grey, speckled, firm crumbly break, very common clear to dark greenish grey very fine to fine angular glassy fragments, calcareous in part, swelling.												
	Tr	LIMESTONE: white, firm to hard crumbly break, microcrystalline, mudstone texture.												

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:										Sheet No.			
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
3210	70	CLAYSTONE: dark grey to greyish black, brownish black, rare dusky brown to moderate brown, firm to moderately hard, sub blocky to sub hackly micropyritic, occasional very coarse nodular pyrite. common carbonaceous fragments.												
	30	Tuff, medium blueish grey, occasionally very light grey, speckled, firm crumbly break, very common clear to dark greenish grey very fine to fine angular glassy fragments, calcareous in part, swelling.												
3220	70	CLAYSTONE: dark grey to greyish black, brownish black, rare dusky brown to moderate brown, firm to moderately hard, sub blocky to sub hackly micropyritic, occasional very coarse nodular pyrite. common carbonaceous fragments.												
	30	TUFF, medium blueish grey, occasionally very light grey, speckled, firm crumbly break, very common clear to dark greenish grey very fine to fine angular glassy fragments, calcareous in part, swelling.												
3230	90	CLAYSTONE: dark grey to greyish black rare dusky brown, firm to moderately hard, sub blocky to sub hackly micropyritic, occasional very coarse nodular pyrite. common carbonaceous fragments.												
	10	TUFF, medium blueish grey, occasionally very light grey, speckled, firm crumbly break, very common clear to dark greenish grey very fine to fine angular glassy fragments, calcareous in part, swelling.												
	Tr	LIMESTONE: white to greyish orange, firm to hard, crumbly to blocky break, microcrystalline, mudstone texture.												
3240	60	CLAYSTONE: dark grey to greyish black rare dusky brown, firm to moderately hard, sub blocky to sub hackly micropyritic, occasional very coarse nodular pyrite. common carbonaceous fragments.												
	40	TUFF, light blueish grey to blueish white, specked , firm crumbly break, very common clear to dark greenish grey, very fine to fine, angular, glassy fragments, common carbonaceous fragments, calcareous in part, swelling.												
	Tr	LIMESTONE: yellowish grey with dark argillaceous streaks, hard, crumbly breaks, microcrystalline to cryptocrystalline, mudstone texture.												
3250	60	CLAYSTONE: dark grey to greyish black rare dusky brown, firm to moderately hard, sub blocky to sub hackly micropyritic, occasional very coarse nodular pyrite. common carbonaceous fragments.												
	40	TUFF, light blueish grey to blueish white, specked , firm crumbly break, very common clear to dark greenish grey, very fine to fine, angular, glassy fragments, common carbonaceous fragments, calcareous in part, swelling.												
	Tr	LIMESTONE: white to greyish orange, firm to hard, crumbly to blocky break, microcrystalline, mudstone texture.												

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:										Sheet No.			
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
3260	70	CLAYSTONE: dark grey to greyish black rare dusky brown, firm to moderately hard, sub blocky to sub hackly micropyritic, occasional very coarse nodular pyrite. common carbonaceous fragments.												
	30	TUFF, light blueish grey to blueish white, specked , firm crumbly break, very common clear to dark greenish grey, very fine to fine, angular, glassy fragments, common carbonaceous fragments, calcareous in part, swelling.												
	Tr	LIMESTONE: white to greyish orange, firm to hard, crumbly to blocky break, microcrystalline, mudstone texture.												
3270	60	CLAYSTONE: Dark grey, brownish black, occasionally tuffaceous medium blue grey, firm to hard, blocky, slightly hackly break, micropyritic, rare coarse nodular pyrite, micromicaceous, rare chloritic alterations.												
	40	TUFF, light blueish grey to blueish white, specked , firm crumbly break, very common clear to dark greenish grey, very fine to fine, angular, glassy fragments, common carbonaceous fragments, calcareous in part, swelling.												
3280	60	CLAYSTONE: dark grey, brownish black, occasional dusky yellow brown, moderate brown, firm to hard, blocky, slightly hackly break, micropyritic, rare coarse nodular pyrite, micromicaceous.												
	40	TUFF, light blueish grey to blueish white, specked , firm crumbly break, very common clear to dark greenish grey, very fine to fine, angular, glassy fragments, common carbonaceous fragments, very pyritic in part, nodular and finely disseminated, very calcareous in part, swelling.												
	Tr	LIMESTONE: white, firm to hard, blocky to crumbly break, microcrystalline, common glassy inclusions, wackestone texture.												
3290	70	CLAYSTONE: dark grey, brownish black, occasional moderate brown, rare dark greenish black, firm to hard, blocky, slightly hackly break, micropyritic, occasional coarse nodular pyrite, carbonaceous, rarely micromicaceous.												
	30	TUFF, light blueish grey to blueish white, specked , firm crumbly break, very common clear to dark greenish grey, very fine to fine, angular, glassy fragments, common carbonaceous fragments, very pyritic in part, nodular and finely disseminated, very calcareous in part, swelling.												
	Tr	LIMESTONE: white, firm to hard, blocky to crumbly break, microcrystalline, common glassy inclusions, wackestone texture.												
3300	70	CLAYSTONE: dark grey, greyish black, brownish black, rare dark greenish black, firm to hard, blocky, slightly hackly break, micropyritic, occasional coarse nodular pyrite, carbonaceous, rarely micromicaceous.												

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:									Sheet No.				
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
	30	TUFF, light blueish grey to blueish white, specked , firm crumbly break, very common clear to dark greenish grey, very fine to fine, angular, glassy fragments, common carbonaceous fragments, very pyritic in part, nodular and finely disseminated, very calcareous in part, swelling.												
	Tr	LIMESTONE: white, firm to hard, blocky to crumbly break, microcrystalline, common glassy inclusions, wackestone texture.												
3310	70	CLAYSTONE: olive grey to olive black, grey black, occasionally tuffaceous medium to light blueish grey, hard to blocky break, micropyrite, carbonaceous specks,												
	30	TUFF: medium to light blueish grey, common blue white inclusions, abundant dark green glassy inclusions, angular to assicular, firm, crumbly break, swelling.												
3320	60	CLAYSTONE: olive grey to olive black, grey black, rarely medium brown, occasionally tuffaceous medium to light blueish grey, hard to blocky break, very pyritic and carbonaceous in part.												
	40	TUFF: medium to light blueish grey, common blue white inclusions, abundant dark green glassy inclusions, angular to assicular, firm, crumbly break, swelling												
3330	70	CLAYSTONE: olive grey to olive black, grey black, rarely medium brown, occasionally tuffaceous medium to light blueish grey, hard to blocky break, very pyritic and carbonaceous in part.												
	30	TUFF: medium to light blueish grey, common blue white inclusions, abundant dark green glassy inclusions, angular to assicular, firm, crumbly break, swelling												
	Tr	LIMESTONE: white to yellowish grey, rare light orange grey, firm to hard, blocky to crumbly break, crystalline to microcrystalline generally mudstone texture, wackestone texture in part.												
3340		Missed Sample												
3350	70	CLAYSTONE: olive grey to olive black, grey black, rarely medium brown, occasionally tuffaceous medium to light blueish grey, hard to blocky break, very pyritic and carbonaceous in part.												
	30	TUFF: medium to light blueish grey, common blue white inclusions, abundant dark green glassy inclusions, angular to assicular, firm, crumbly break, swelling												
	Tr	LIMESTONE: white to yellowish grey, rare light orange grey, firm to hard, blocky to crumbly break, crystalline to microcrystalline generally mudstone texture, wackestone texture in part.												
3360		Missed Sample												

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:									Sheet No.				
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating		
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL			
3370	90	CLAYSTONE: olive black, moderately hard, , blocky to brittle break, very common micropyrite, occasional nodular pyrite, glauconitic in part.														
	10	TUFF: medium to light blueish grey, common blue white inclusions, abundant dark green glassy inclusions, angular to assicular, firm, crumbly break, swelling														
3380		Missed Sample														
3390		Missed Sample														
3400	100	CLAYSTONE: olive black to olive grey, moderately hard, blocky to britle break, Slightly hackly in part, common micro pyrite.														
	TR	TUFF: medium to light blueish grey, common blue white inclusions, abundant dark green glassy inclusions, angular to assicular, firm, crumbly break, swelling.														
3410	100	CLAYSTONE: olive black to olive grey, rare moderate brown, moderately hard, blocky to britle break, slightly hackly in part, common micro pyrite, rare glauconite and carbonaceous fragments.														
3420	100	CLAYSTONE: olive black to olive grey, rare moderate brown, moderately hard, blocky to britle break, slightly hackly in part, common micro pyrite and nodular pyrite, rare glauconite and carbonaceous fragments.														
	TR	TUFF: medium to light blueish grey, common blue white inclusions, abundant dark green glassy inclusions, angular to assicular, firm, crumbly break, swelling.														
3430	100	CLAYSTONE: olive black to olive grey, rare moderate brown, moderately hard, angular to hackly break, common micro pyrite and nodular pyrite, rare glauconite and carbonaceous fragments.														
	TR	TUFF: medium to light blueish grey, common blue white inclusions, abundant dark green glassy inclusions, angular to assicular, firm, crumbly break, swelling.														
3440	100	CLAYSTONE: olive black to olive grey, rare moderate brown, moderately hard, angular to hackly break, common micro pyrite and nodular pyrite, rare glauconite, common carbonaceous fragments, occasional intergrowths of sparry calcite.														
	Tr	LIMESTONE: light olive grey, firm to hard, blocky to crumbly break, microcrystalline, mudstone texture.														
3450	100	CLAYSTONE: olive black, dark olive grey, occasional medium brown, hard, blocky slightly hackly break, micropyritic.														
3460	100	CLAYSTONE: olive black, dark olive grey, occasional medium brown, hard, blocky, slightly hackly break, micropyritic.														
	Tr	LIMESTONE: light olive grey, firm to hard, blocky to crumbly break, microcrystalline, mudstone texture.														

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WELL: 25/8-15		AREA: Ringhorne East	Spud Date:									Sheet No.				
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
3470	100	CLAYSTONE: dark grey black to olive black, occasional medium brown to brown black, hard, blocky slightly hackly break, micropyritic carbonaceous in part.												
	Tr	LIMESTONE: light olive grey, firm to hard, blocky to crumbly break, microcrystalline, mudstone texture.												
3480	100	CLAYSTONE: dark grey black to olive black, occasional medium brown to brown black, hard, blocky slightly hackly break, micropyritic carbonaceous in part.												
	Tr	LIMESTONE: light olive grey, firm to hard, blocky to crumbly break, microcrystalline, mudstone texture.												
3490	100	CLAYSTONE: dark grey black to olive black, occasionally medium brown, rare dark greenish grey, hard to brittle, blocky to hackly break, very pyritic in part, carbonaceous, rare glauconite.												
	Tr	LIMESTONE: yellowish grey, light brownish orange, firm crumbly break, microcrystalline to cryptocrystalline.												
3500	100	CLAYSTONE: dark greyish black to olive black, occasionally dusky brown, rare dark greenish grey, hard to brittle, blocky to hackly break, very pyritic in part, carbonaceous, rare glauconite.												
	Tr	LIMESTONE: yellowish grey, light brownish orange, firm crumbly break, microcrystalline to cryptocrystalline.												
3510	100	CLAYSTONE: dark grey black to olive black, occasionally medium brown, rare dark greenish grey, hard to brittle, blocky to hackly break, very pyritic in part, common carbonaceous frags, rare glauconite.												
	Tr	LIMESTONE: yellowish grey, light brownish orange, firm crumbly break, microcrystalline to cryptocrystalline.												
	Tr	TUFF: medium to light bluish grey, common blue white inclusions, abundant dark green glassy inclusions, angular to assicular, firm, crumbly break, swelling.												
3520	100	CLAYSTONE: dark grey black to olive black, occasionally medium brown, rare dark greenish grey, hard to brittle, blocky to hackly break, very pyritic in part, carbonaceous, rare glauconite.												
	Tr	LIMESTONE: yellowish grey, light brownish orange, firm crumbly break, microcrystalline to cryptocrystalline.												
3530	100	CLAYSTONE: dark grey black to olive black, occasionally medium brown, rare dark greenish grey, hard to brittle, blocky to hackly break, common nodular pyritic part, carbonaceous, rare glauconite.												
	Tr	LIMESTONE: yellowish grey, light brownish orange, firm crumbly break, microcrystalline to cryptocrystalline.												

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:										Sheet No.			
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
3540	100	CLAYSTONE: predominantly olive black, greyish black to dark grey in part, occasionally dusky brown, rare greenish black, firm to moderately hard, blocky, slightly silty, common disseminated pyrite, also nodular pyritic in part, carbonaceous, slight to moderately swelling, non calcareous.												
3550	100	CLAYSTONE: predominantly olive black, greyish black to dark grey in part, occasionally dusky brown, rare greenish black, firm to moderately hard, blocky, slightly silty, common disseminated pyrite, also nodular pyritic in part, carbonaceous, slight to moderately swelling, non calcareous.												
3560	100	CLAYSTONE: predominantly olive black, greyish black to dark grey in part, occasionally dusky brown, rare greenish black, firm to moderately hard, blocky, slightly silty, common disseminated pyrite, also nodular pyritic in part, carbonaceous, slight to moderately swelling, non calcareous.												
3570	100	CLAYSTONE: predominantly olive black, greyish black to dark grey in part, occasionally dusky brown, rare greenish black, firm to moderately hard, blocky, slightly silty, common disseminated pyrite, also nodular pyritic in part, carbonaceous, slight to moderately swelling, non calcareous.												
3580	100	CLAYSTONE: predominantly olive black, greyish black to dark grey in part, occasionally dusky brown, rare greenish black, firm to moderately hard, blocky, slightly silty, common disseminated pyrite, also nodular pyritic in part, carbonaceous, slight to moderately swelling, non calcareous.												
	GTr	SANDSTONE: brownish grey, clear Quartz, very fine to medium, dominantly fine to medium, silty, subangular, poor to moderately sorted, abundant argillaceous/silty matrix, weak silica cement in places, friable, loose in part, poor estimated porosity, no visible Show above OBM.												
3590	100	CLAYSTONE: predominantly olive black, greyish black to dark grey in part, trace dusky brown and dark greenish grey, firm to moderately hard, blocky, slightly silty, common disseminated pyrite, carbonaceous, occasional grey tuffaceous streaks, rare thin sandy streaks, non calcareous.												
3600	100	CLAYSTONE: olive black, also greyish black to dark grey in part, trace dusky brown and dark greenish grey, firm to moderately hard, blocky, slightly silty, common disseminated pyrite, carbonaceous, occasional grey tuffaceous streaks, non calcareous.												
3610	100	CLAYSTONE: olive black, also greyish black to dark grey in part, trace dusky brown and dark greenish grey, firm to moderately hard, blocky, slightly silty, common disseminated pyrite, carbonaceous, occasional grey tuffaceous streaks, non calcareous.												

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:										Sheet No.			
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
3620	100	CLAYSTONE: greyish black to olive black in part, also dark grey, trace dusky brown and dark greenish grey, firm to moderately hard, blocky, slightly silty, slightly micromiceous, common disseminated pyrite, carbonaceous, occasional grey tuffaceous streaks, non calcareous.												
3630	100	CLAYSTONE: greyish black to olive black in part, also dark grey, trace dusky brown and dark greenish grey, firm to moderately hard, blocky, slightly silty, slightly micromiceous, common disseminated pyrite, carbonaceous, occasional grey tuffaceous streaks, non calcareous.												
3640	100	CLAYSTONE: greyish black to olive black in part, also dark grey, trace dusky brown and dark greenish grey, firm to moderately hard, blocky, slightly silty, slightly micromiceous, common disseminated pyrite, carbonaceous, occasional grey tuffaceous streaks, non calcareous.												
3650	100	CLAYSTONE: greyish black to olive black in part, also dark grey, trace dusky brown and dark greenish grey, firm to moderately hard, blocky, slightly silty, slightly micromiceous, common disseminated pyrite, carbonaceous, occasional grey tuffaceous streaks, non calcareous.												
3660	100	CLAYSTONE: greyish black to olive black in part, also dark grey, trace dusky brown, occasionally dark greenish grey to greenish black, firm to moderately hard, blocky, slightly silty, slightly micromiceous, common disseminated pyrite, carbonaceous, occasional grey tuffaceous streaks, trace glauconite, non calcareous												
	GTr	SANDSTONE: brownish grey, clear Quartz, very fine to medium, dominantly fine to medium, subangular, poor to moderately sorted, argillaceous/silty matrix in part, weak silica cement in places, friable, loose in part, poor estimated porosity, no visible Show above OBM.												
3670	100	CLAYSTONE: greyish black to olive black in part, also dark grey, trace dusky brown and dark greenish grey, firm to moderately hard, blocky, slightly silty, slightly micromiceous, common disseminated pyrite, carbonaceous, occasional grey tuffaceous streaks, non calcareous												
	Tr	SANDSTONE: brownish grey, clear Quartz, very fine to medium, dominantly fine to medium, subangular, poor to moderately sorted, argillaceous/silty matrix in part, weak silica cement in places, friable, loose in part, poor estimated porosity, no visible Show above OBM.												
	GTr	TUFF: medium bluish grey to medium grey in part, speckled, firm, crumbly break, silty texture, trace micropyrite, non calcareous, swelling.												
3680	80	CLAYSTONE: greyish black to olive black in part, also dark grey, trace dusky brown and dark greenish grey, firm to moderately hard, blocky, slightly silty, slightly micromiceous, common disseminated pyrite, carbonaceous, local bluish grey tuffaceous streaks, non calcareous.												

ESSO NORGE A/S				WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East		Spud Date:									Sheet No.				
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
	10	TUFF: medium bluish grey to medium grey in part, speckled, firm, crumbly break, silty texture, trace micropyrite, non calcareous, swelling.												
	10	SANDSTONE/SAND: light brownish grey, clear Quartz, very fine to coarse, dominantly fine to medium, subangular to subrounded, poor to moderately sorted, local argillaceous/silty matrix, weak silica cement in places, friable, predominantly loose, poor to moderate estimated porosity, no visible Show above OBM.												
3690	50	CLAYSTONE: greyish black to olive black in part, also dark grey, trace dusky brown and dark greenish grey, firm to moderately hard, blocky, slightly silty, slightly micromiceous, common disseminated pyrite, carbonaceous, local bluish grey tuffaceous streaks, non calcareous.												
	40	TUFF: medium bluish grey to medium grey in part, speckled, firm, crumbly break, silty texture, trace micropyrite, non calcareous, swelling.												
	10	SANDSTONE/SAND: very light grey, clear Quartz, very fine to coarse, dominantly fine to coarse, subangular to subrounded, poor to moderately sorted, common strong white calcite cement, local argillaceous matrix, friable to hard, loose in part, poor to moderate estimated porosity, no visible Show above OBM.												
3700	30	CLAYSTONE: olive black to greyish black, becoming dark grey to olive grey in part, trace dusky brown, firm to moderately hard, blocky, locally silty, slightly micromiceous, common disseminated pyrite, carbonaceous in part, tuffaceous in part, non calcareous.												
	40	SANDSTONE/SAND: very light grey, light brownish grey, clear Quartz, very fine to coarse, dominantly fine to medium, subangular to subrounded, poor to moderately sorted, common white calcite cement, trace argillaceous matrix, friable to hard, loose in part, poor to moderate estimated porosity, no visible Show above OBM.												
	30	TUFF: medium bluish grey to medium grey in part, speckled, firm, crumbly break, silty texture, trace micropyrite, non calcareous, swelling.												
3710	60	CLAYSTONE: olive black to greyish black, becoming dark grey to olive grey in part, trace dusky brown, firm to moderately hard, blocky, locally silty, slightly micromiceous, common disseminated pyrite, carbonaceous in part, tuffaceous in part, non calcareous.												
	10	TUFF: medium bluish grey to medium grey in part, speckled, firm, crumbly break, silty texture, trace micropyrite, non calcareous, swelling.												

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:										Sheet No.			
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
	30	SANDSTONE/SAND: light grey, light brownish grey, clear Quartz, very fine to coarse, dominantly fine to medium, subangular to subrounded, moderately sorted, rare white calcite cement, trace argillaceous matrix, friable to rarely hard, predominantly loose in part, poor to moderate estimated porosity, no visible Show above OBM.													
3710.7 (BU)	50	CLAYSTONE: olive black to greyish black, becoming dark grey to olive grey in part, trace dusky brown, firm to moderately hard, blocky, locally silty, slightly micromiceous, common disseminated pyrite, tuffaceous in part, non calcareous.													
	10	TUFF: medium bluish grey to medium grey in part, speckled, firm, crumbly break, silty texture, trace micropyrite, non calcareous, swelling.													
	40	SANDSTONE/SAND: light grey, light brownish grey, clear Quartz, very fine to coarse, dominantly fine to medium, subangular to subrounded, moderately sorted, rare white calcite cement, trace argillaceous matrix, friable to rarely hard, predominantly loose, poor to moderate estimated porosity, no visible Show above OBM.													
3720	70	TUFF: light to medium bluish grey, medium grey in part, speckled, firm, crumbly break, silty texture, rare micropyrite, occasionally slightly calcareous, swelling, argillaceous, locally arenaceous.													
	20	CLAYSTONE: olive black to greyish black, becoming dark grey to olive grey in part, trace dusky brown, firm to moderately hard, blocky, locally silty, slightly micromiceous, common disseminated pyrite, tuffaceous in part, non calcareous.													
	10	SANDSTONE/SAND: light grey, light brownish grey, clear Quartz, very fine to medium, dominantly fine to medium, rare coarse grains, subangular to subrounded, moderately sorted, local white calcite cement, common argillaceous/tuffaceous matrix, friable, occasionally moderately hard, loose in part, poor to moderate estimated porosity, no visible Show above OBM.													
3730	60	CLAYSTONE: olive black to greyish black, locally dusky brown to dusky yellowish brown and greenish black, also dark grey to olive grey in part, moderately hard, blocky to subangular, locally silty, trace micropyrite, trace glauconite, non calcareous.													
	10	TUFF: light to medium bluish grey, medium grey in part, speckled, firm, crumbly break, silty texture, rare micropyrite, occasionally slightly calcareous, swelling, argillaceous													
	30	SANDSTONE/SAND: light grey, light brownish grey, clear Quartz, very fine to coarse, dominantly fine to medium, rare coarse grains, subangular to subrounded, locally rounded, moderately sorted, rare calcite cement, local argillaceous/tuffaceous matrix, friable, generally loose, poor to good estimated porosity, no visible Show above OBM.													

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:										Sheet No.			
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
3740	100	CLAYSTONE: predominantly dark grey to dark olive grey, also olive black to greyish black, occasionally dusky brown and greenish black, firm to moderately hard, blocky to subangular, locally silty, trace micropyrite, non calcareous.												
	10	TUFF: light to medium bluish grey, medium grey in part, speckled, firm, crumbly break, silty texture, rare micropyrite, occasionally slightly calcareous, swelling, argillaceous												
	Tr	SANDSTONE/SAND: light grey, light brownish grey, clear Quartz, very fine to coarse, dominantly fine to medium, rare coarse grains, subangular to subrounded, locally rounded, moderately sorted, rare calcite cement, local argillaceous/tuffaceous matrix, friable, generally loose, poor to good estimated porosity, no visible Show above OBM.												
3750	100	CLAYSTONE: predominantly dark grey to dark olive grey, also olive black to greyish black, occasionally dusky brown and greenish black, firm to moderately hard, blocky to subangular, locally silty, trace micropyrite, rare glauconite, non calcareous.												
	GTr	TUFF: light to medium bluish grey, medium grey in part, speckled, firm, crumbly break, silty texture, rare micropyrite, occasionally slightly calcareous, swelling, argillaceous.												
3760	100	CLAYSTONE: predominantly dark grey to dark olive grey, also olive black to greyish black, occasionally dusky brown and greenish black, firm to moderately hard, blocky to subangular, locally silty, trace micropyrite, rare glauconite, non calcareous.												
	Tr	TUFF: light to medium bluish grey, medium grey in part, speckled, firm, crumbly break, silty texture, rare micropyrite, occasionally slightly calcareous, swelling, argillaceous												
	RTr	LIMESTONE: white to very light grey, firm, brittle in part, microcrystalline to crystalline, locally arenaceous.												
3770	100	CLAYSTONE: predominantly dark grey to dark olive grey, also olive black to greyish black, occasionally dusky brown, firm to moderately hard, blocky to sub blocky angular, locally silty, trace micropyrite, rare chlorite .												
	Tr	SANDSTONE: loose quartz grains colourless, clear, occasionally opaque, fine to medium grained, mode fine, sub angular, generally spherical,well sorted, occasionally dark grey argilaceous cement with carbonaceous fragments, good visual porosity, no show.												
	Tr	TUFF: light to medium bluish grey, medium grey in part, speckled, firm, crumbly break, silty texture, rare micropyrite, occasionally slightly calcareous, swelling, argillaceous												

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:									Sheet No.				
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating		
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL			
	Tr	LIMESTONE: white to very light grey, firm, brittle in part, microcrystalline to crystalline, locally arenaceous.														
3780	60	CLAYSTONE: predominantly dark grey to dark olive grey, also olive black to greyish black, occasionally dusky brown, firm to moderately hard, blocky to sub blocky angular, locally silty, trace micropyrite, carbonaceus in part. .														
	40	SANDSTONE: loose quartz grains colourless, clear, occasionally opaque, fine to medium grained, mode medium, sub angular, generally spherical,well sorted, common light grey argilaceous cement, good inferred porosity, no show.														
	Tr	LIMESTONE: white to very light grey, firm, brittle in part, microcrystalline to crystalline, locally arenaceous.														
3790	100	CLAYSTONE: Dark grey to olive black , occasionally moderate brown, rare dark green grey, hard, blocky to hackly break, micropyritic, very carbonaceous in part, rare glauconite.														
	TR	SANDSTONE: loose quartz grains colourless, clear, occasionally opaque, fine to medium grained, mode medium, sub angular, generally spherical,well sorted, common light grey argilaceous cement, good inferred porosity, no show.														
	Tr	TUFF: light to medium bluish grey, medium grey in part, speckled, firm, crumbly break, silty texture, rare micropyrite, occasionally slightly calcareous, swelling, argillaceous														
3800	60	CLAYSTONE: Dark grey to olive black , occasionally moderate brown, rare dark green grey, hard, blocky to hackly break, micropyritic, very carbonaceous in part, rare glauconite.														
	40	TUFF: light blue grey, speckled, firm angular to splintery break, occasional dark green glassy angular inclusions, common white inclusions, rare fine nodular pyritic inclusions, swelling, argillaceous.														
	Tr	LIMESTONE: white to very light grey, firm, brittle in part, microcrystalline to crystalline, locally arenaceous.														
3810	70	TUFF: light blue grey, speckled, firm angular to splintery break, occasional dark green glassy angular inclusions, common white inclusions, rare fine nodular pyritic inclusions, swelling, argillaceous.														
	30	CLAYSTONE: Dark grey to olive black , occasionally moderate brown, rare dark green grey, hard, blocky to hackly break, micropyritic, very carbonaceous in part, rare glauconite.														
	Tr	LIMESTONE: white to very light grey, firm, brittle in part, microcrystalline to crystalline, locally arenaceous.														
3820	80	TUFF: light blue grey, speckled, firm angular to splintery break, occasional dark green glassy angular inclusions, common white inclusions, rare fine nodular pyritic inclusions, swelling														

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:										Sheet No.			
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
	20	CLAYSTONE: Dark grey to olive black , occasionally moderate brown, rare dark green grey, hard, blocky to hackly break, micropyritic, very carbonaceous in part, rare glauconite.												
	Tr	LIMESTONE: white, firm to hard, crumbly, cryptocrystalline, arenaceous in places, wackestone texture.												
3830	70	TUFF: light blue grey, speckled, firm angular to hackly occasionally splintery break, occasional dark green glassy angular inclusions, common white inclusions, rare fine nodular pyritic inclusions, swelling, argillaceous.												
	30	CLAYSTONE: Dark grey to olive black , occasionally moderate brown, rare dark green grey, hard, blocky to hackly break, micropyritic, very carbonaceous in part, rare glauconite.												
	Tr	LIMESTONE: white firm to hard, crumbly, cryptocrystalline, arenaceous in places, wackestone texture.												
3840	80	SANDSTONE: loose quartz grains, colourless, clear occasionally cloudy, very fine to medium grained rare coarse grained, mode medium, sub round, generally spherical , coarse grains sub elongated, moderate sorting, good inferred porosity, common carbonaceous fragments and fine pyrite nodules. No show.												
	10	TUFF: light blue grey, speckled, firm angular to hackly occasionally splintery break, occasional dark green glassy angular inclusions, common white inclusions, rare fine nodular pyritic inclusions, swelling, argillaceous.												
	10	CLAYSTONE: Dark grey to olive black , occasionally moderate brown, rare dark green grey, hard, blocky to hackly break, micropyritic, very carbonaceous in part, rare glauconite.												
3850	40	CLAYSTONE: as above												
	30	TUFF : as above												
		Both the above lithologies are over represented in this sample due to sand escaping from the collecting plate !												
	30	SANDSTONE: loose quartz grains, colourless, clear occasionally cloudy, very fine to medium grained rare coarse grained, mode medium, sub round, generally spherical , coarse grains sub elongated, moderate sorting, good inferred porosity, common carbonaceous fragments and fine pyrite nodules. No show.												

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:										Sheet No.			
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
3860	80	SANDSTONE: loose quartz grains, colourless, clear occsionally opaque, fine to medium grained occasionally coarse mode medium, generally sub rounded, sherical, moderatedly sorted, good inferred porosity, common carbonaceous fragments and fine pyrite nodules. No show.												
	10	TUFF: light blue grey, speckled, firm angular to hackly occasionally splintery break, occasional dark green glassy angular inclusions, common white inclusions, rare fine nodular pyritic inclusions, swelling, argillaceous.												
	10	CLAYSTONE: Dark grey to olive black , occasionally moderate brown, rare dark green grey, hard, blocky to hackly break, micropyritic, very carbonaceous in part, rare glauconite.												
3870	80	SANDSTONE: loose quartz grains, colourless, clear occsionally opaque, fine to medium grained occasionally coarse mode medium, generally sub rounded, sherical, moderatedly sorted, good inferred porosity, common carbonaceous fragments and fine pyrite nodules. No show.												
	10	TUFF: light blue grey, speckled, firm angular to hackly occasionally splintery break, occasional dark green glassy angular inclusions, common white inclusions, rare fine nodular pyritic inclusions, swelling, argillaceous.												
	10	CLAYSTONE: Dark grey to olive black , occasionally moderate brown, rare dark green grey, hard, blocky to hackly break, micropyritic, very carbonaceous in part, rare glauconite.												
3880	90	SANDSTONE: loose quartz grains, colourless, occasionally light grey, clear rarely cloudy slightly frosted in part, fine to medium grained occasionally coarse, mode medium, sub round, occasionally sub angular, generally equant, rare sub elongated, moderately sorted, occasional mica flakes and mycropyritic carbonaceous fragments, good inferred porosity, no show.												
	10	CLAYSTONE: Dark grey to olive black , occasionally moderate brown, rare dark green grey, hard, blocky to hackly break, micropyritic, very carbonaceous in part, rare glauconite.												
3890	90	SANDSTONE: loose quartz grains, colourless, occasionally light grey, clear rarely cloudy slightly frosted in part, fine to medium grained occasionally coarse, mode medium, sub round, occasionally sub angular, generally equant, rare sub elongated, moderately sorted, occasional mica flakes and mycropyritic carbonaceous fragments, good inferred porosity, no show.												
	10	CLAYSTONE: Dark grey to olive black , occasionally moderate brown, rare dark green grey, hard, blocky to hackly break, micropyritic, very carbonaceous in part, rare glauconite.												

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:										Sheet No.			
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating		
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL			
3900	90	SANDSTONE: loose quartz grains, colourless occasionally light grey or stained green, clear rarely cloudy slightly frosted in part, fine to medium grained occasionally coarse, mode medium, sub round, occasionally sub angular, generally equant, rare sub elongated, moderately sorted, occasional mica flakes and mycropyritic carbonaceous fragments,rare white argillaceous cement, good inferred porosity, no show.														
	10	CLAYSTONE: Dark grey to olive black , occasionally moderate brown, rare dark green grey, hard, blocky to hackly break, micropyritic, very carbonaceous in part.														
3910	90	SANDSTONE: loose quartz grains, colourless occasionally light grey or stained green, clear rarely cloudy slightly frosted in part, fine to medium grained occasionally coarse, mode medium, sub round, occasionally sub angular, generally equant, rare sub elongated, moderately sorted, occasional mica flakes and mycropyritic carbonaceous fragments, occasional soft white argillaceous cement, good inferred porosity, no show.														
	10	CLAYSTONE: olive grey to medium dark grey, occasionally medium grey, rare moderate brown hard, blocky to hackly break, micropyritic, very carbonaceous in part.														
3920	70	CLAYSTONE: olive grey to medium dark grey, occasionally medium grey, rare moderate brown,hard, blocky to hackly break, micropyritic, very carbonaceous in part.														
	20	SANDSTONE: loose quartz grains, colourless occasionally light grey or stained green, clear rarely cloudy slightly frosted in part, fine to medium grained occasionally coarse, mode medium, sub round, occasionally sub angular, generally equant, rare sub elongated, moderately sorted, occasional mica flakes and mycropyritic carbonaceous fragments, occasional soft white argillaceous cement, good inferred porosity, no show.														
	10	TUFF: light blue grey, speckled, firm angular to hackly occasionally splintery break, occasional dark green glassy angular inclusions, common white inclusions, rare fine nodular pyritic inclusions, swelling, argillaceous.														
3930	60	CLAYSTONE: olive grey to medium dark grey, occasionally medium grey, rare moderate brown,hard, blocky to hackly break, increasingly pyritic, very carbonaceous in part.														

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:										Sheet No.			
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
	20	SANDSTONE: loose quartz grains, colourless occasionally light grey or stained green, clear rarely cloudy slightly frosted in part, fine to medium grained occasionally coarse, mode medium, sub round, occasionally sub angular, generally equant, rare sub elongated, moderately sorted, occasional mica flakes and mycropyritic carbonaceous fragments, occasional soft white argillaceous cement, good inferred porosity, no show.													
	20	TUFF: light blue grey, speckled, firm angular to hackly occasionally splintery break, occasional dark green glassy angular inclusions, common white inclusions, rare fine nodular pyritic inclusions, swelling, argillaceous.													
3940	90	CLAYSTONE: olive grey, rare moderate brown, to dusky brown, hard, blocky break, micropyritic, carbonaceous, rare glauconite.													
	10	SANDSTONE: loose quartz grains, colourless occasionally light grey or stained green, clear rarely cloudy slightly frosted in part, fine to medium grained occasionally coarse, mode medium, sub round, occasionally sub angular, generally equant, rare sub elongated, moderately sorted, occasional mica flakes and mycropyritic carbonaceous fragments, occasional soft white argillaceous cement, good inferred porosity, no show.													
	St Tr	TUFF: light blue grey, speckled, firm angular to hackly occasionally splintery break, occasional dark green glassy angular inclusions, common white inclusions, rare fine nodular pyritic inclusions, swelling, argillaceous.													
3950	100	CLAYSTONE: olive grey, rare moderate brown, to dusky brown, rare dark greenish grey, hard, blocky break, micropyritic, carbonaceous, rare glauconite.													
	Tr	SANDSTONE: loose quartz grains, colourless occasionally light grey or stained green, clear rarely cloudy slightly frosted in part, fine to medium grained occasionally coarse, mode medium, sub round, occasionally sub angular, generally equant, rare sub elongated, moderately sorted, occasional mica flakes and mycropyritic carbonaceous fragments, occasional soft white argillaceous cement, good inferred porosity, no show.													
	Tr	TUFF: light blue grey, speckled, firm angular to hackly occasionally splintery break, occasional dark green glassy angular inclusions, common white inclusions, rare fine nodular pyritic inclusions, swelling, argillaceous.													
3960	100	CLAYSTONE: olive grey, rare moderate brown, to dusky brown, rare dark greenish grey, hard, blocky break, micropyritic, carbonaceous, rare glauconite.													
	Tr	TUFF: light blue grey, speckled, firm angular to hackly occasionally splintery break, occasional dark green glassy angular inclusions, common white inclusions, rare fine nodular pyritic inclusions, swelling, argillaceous.													
3970	90	CLAYSTONE: olive grey to olive black, rare moderate brown, to dark greenish black, firm to hard, blocky to sub blocky break, nodular pyrite, carbonaceous.													

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:										Sheet No.			
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
	10	SANDSTONE: loose quartz grains, colourless occasionally light grey or stained green, clear rarely cloudy slightly frosted in part, fine to medium grained, mode fine,occasionally coarse, sub round, occasionally sub angular, generally equant, rare sub elongated, moderately sorted, occasional mica flakes and mycropyritic carbonaceous fragments, occasional soft white argillaceous cement, good inferred porosity, no show.													
3980	60	CLAYSTONE: olive grey to olive black, rare moderate brown, to dark greenish black, firm to hard, blocky to sub blocky break, nodular pyrite, carbonaceous													
	40	SANDSTONE: loose quartz grains, colourless, clear occasionally cloudy to translucent, fine to coarse grained, mode medium, sub round, occasionally sub angular, spherical, moderately sorted, occasional soft white argillaceous cement, good inferred porosity, no show.													
3990	90	CLAYSTONE: dark grey to olive grey, occasionally moderate brown, firm to hard, blocky to hackly break, micropyritic and carbonaceous in part.													
	10	TUFF: light blue grey, firm to moderately hard, crumbly to sub blocky, slightly speckled, with white and dark glassy inlclusions, argillaceous, in part.													
	Tr	SANDSTONE: loose quartz grains, colourless occasionally light grey or stained green, clear rarely cloudy slightly frosted in part, fine to medium grained, mode fine,occasionally coarse, sub round, occasionally sub angular, generally equant, rare sub elongated, moderately sorted, occasional mica flakes and mycropyritic carbonaceous fragments, occasional soft white argillaceous cement, good inferred porosity, no show.													
4000	50	SANDSTONE: loose quartz grains, colourless, clear, occasionally cloudy, fine to medium grained, rare corese grained, mode medium, sub angular to sub rounded, spherical, moderately sorted, good inferred porosity, fine nodular pyrite, no show.													
	40	CLAYSTONE: dark grey to olive grey, occasionally moderate brown, firm to hard, blocky to hackly break, micropyritic and carbonaceous in part.													
	10	TUFF: light blue grey, firm to moderately hard, crumbly to sub blocky, slightly speckled, with white and dark glassy inlclusions, argillaceous, in part.													
4010		Missed sample													
4020	70	CLAYSTONE: dark grey occasionally moderate brown, dusky brown, rare dark green, firm to hard, blocky to hackly break, micropyritic and carbonaceous in part.													
	30	TUFF: light blue grey, firm to moderately hard, crumbly to sub blocky, slightly speckled, with white and dark glassy inlclusions, very argillaceous.													

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:									Sheet No.				
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
	Tr	SANDSTONE: loose quartz grains, colourless, clear, occasionally cloudy, fine to medium grained, rare corese grained, mode medium, sub angular to sub rounded, spherical, moderately sorted, good inferred porosity, fine nodular pyrite, no show.												
4030	70	CLAYSTONE: dark grey occasionally moderate brown, dusky brown, rare dark green, firm to hard, blocky to hackly break, very coarse carbonaceous fragments with discrete micropyrite bands.												
	30	TUFF: light blue grey, firm to moderately hard, crumbly to sub blocky, slightly speckled, with white and dark glassy inlclusions, very argillaceous.												
4040	90	SANDSTONE: loose quartz grains, colourless to light grey clear to cloudy, medium to coarse grained, mode medium, rounded to sub rounded, spherical, good inferred porosity no show, occasional white argillaceous cement.												
	10	CLAYSTONE: dark grey occasionally moderate brown, dusky brown, rare dark green, firm to hard, blocky to hackly break, very coarse carbonaceous fragments with discrete micropyrite bands.												
	Tr	TUFF: light blue grey, firm to moderately hard, crumbly to sub blocky, slightly speckled, with white and dark glassy inlclusions, very argillaceous.												
		NB suspect 4030 & 4020 not representational sand (spilling from collecting plate.)												
4050	80	SANDSTONE: very light to light grey, quartz grains, colourless, light grey, clear to cloudy, fine to coarse grained, dominantly fine to medium, subangular to rounded, spherical, moderate to well sorted, common white calcite cement, trace very light grey argillaceous cement/matrix, friable to moderately hard, dominantly loose, trace pyrite, good estimated porosity. No Show.												
	20	CLAYSTONE: dark grey occasionally moderate brown, dusky brown, rare dark green, firm to hard, blocky to hackly break, very coarse carbonaceous fragments with discrete micropyrite bands.												
	rtr	TUFF: light blue grey, firm to moderately hard, crumbly to sub blocky, slightly speckled, with white and dark glassy inlclusions, very argillaceous.												
4060	50	CLAYSTONE: dark grey occasionally moderate brown, dusky brown, rare dark green, firm to hard, blocky to hackly break, very coarse carbonaceous fragments with discrete micropyrite bands.												
	40	SANDSTONE: very light to light grey, quartz grains, colourless, clear to cloudy, fine to coarse grained, dominantly fine to medium, subangular to rounded, spherical, moderate to well sorted, local white calcite cement, friable to moderately hard, dominantly loose, trace pyrite, good estimated porosity. No Show.												

ESSO NORGE A/S				WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East		Spud Date:									Sheet No.				
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating			
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL				
4070	80	CLAYSTONE: dark grey to olive black, brownish black in part, locally medium dark grey, occasionally dusky brown, firm to moderately hard, subblocky break, trace micropyrite, locally finely carbonaceous, non calcareous.															
	10	SANDSTONE: very light to light grey, quartz grains, colourless, clear to cloudy, fine to coarse grained, dominantly fine to medium, subangular to rounded, spherical, moderately sorted, local white calcite cement, friable to moderately hard, dominantly loose, trace pyrite, poor to good estimated porosity. No Show.															
	10	TUFF: medium grey to medium bluish grey, firm, crumbly to sub blocky, slightly speckled, with white and dark glassy inclusions, silty texture, rare fine pyrite, argillaceous, non calcareous.															
4080	80	CLAYSTONE: dark grey to olive black, brownish black in part, locally medium dark grey, occasionally dusky brown, firm to moderately hard, subblocky break, trace micropyrite, locally finely carbonaceous, non calcareous.															
	10	SANDSTONE: very light grey, quartz grains, colourless, clear to cloudy, fine to coarse grained, dominantly fine to medium, subangular to rounded, spherical, moderately sorted, local white calcite cement, friable to mderately hard, dominantly loose, trace pyrite. No Show.															
	10	TUFF: medium grey to medium bluish grey, firm, crumbly to sub blocky, slightly speckled, with white and dark glassy inclusions, silty texture, rare fine pyrite, argillaceous, non calcareous.															
4090	100	CLAYSTONE: dark grey to olive black, brownish black in part, locally medium dark grey, occasionally dusky brown, firm to moderately hard, subblocky break, trace micropyrite, locally finely carbonaceous, non calcareous.															
	gtr	SANDSTONE: very light grey, very fine to coarse grained, dominantly fine to coarse, subangular to rounded, spherical, moderately sorted, local white calcite cement, friable to moderately hard, dominantly loose, trace pyrite. No Show.															
	gtr	TUFF: medium grey to medium bluish grey, firm, crumbly to sub blocky, slightly speckled, with white and dark glassy inclusions, silty texture, rare fine pyrite, argillaceous, non calcareous.															
4100	70	CLAYSTONE: dark grey to olive black, brownish black in part, locally medium dark grey, occasionally dusky brown, firm to moderately hard, subblocky break, trace micropyrite, locally finely carbonaceous, non calcareous.															
	30	SANDSTONE: very light grey, very fine to coarse grained, dominantly fine to coarse, subangular to rounded, spherical, moderate to well sorted, rare white calcite cement, friable to moderately hard, dominantly loose, trace pyrite, poor to moderate inferred porosity. No Show. ,															

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:										Sheet No.			
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
	tr	TUFF: medium grey to medium bluish grey, firm, crumbly to sub blocky, slightly speckled, with white and dark glassy inclusions, silty texture, rare fine pyrite, argillaceous, non calcareous.												
4110	90	CLAYSTONE: dark grey to olive black, dark olive grey to olive grey, rarely dusky brown, firm to moderately hard, subblocky, slightly silty in part, trace micropyrite, locally tuffaceous, non calcareous.												
	10	SANDSTONE: very light grey, very fine to coarse grained, dominantly fine to medium, subangular to rounded, spherical, moderate to well sorted, rare white calcite cement, friable to moderately hard, dominantly loose, trace pyrite, poor to moderate inferred porosity, No Show.												
	rtr	LIMESTONE: white to very light grey, firm to moderately hard, blocky, argillaceous and arenaceous in part.												
4120	100	CLAYSTONE: dark grey to olive black, dark olive grey to olive grey, rarely dusky brown, firm to moderately hard, subblocky, slightly silty in part, trace micropyrite, locally tuffaceous, non calcareous.												
	gtr	SANDSTONE: very light grey, very fine to coarse grained, dominantly fine to medium, subangular to rounded, spherical, moderate to well sorted, rare white calcite cement, friable to moderately hard, dominantly loose, trace pyrite, poor to moderate inferred porosity. No Shows.												
	gtr	TUFF: medium grey to medium bluish grey, firm, crumbly to sub blocky, slightly speckled, with white and dark glassy inclusions, silty texture, rare fine pyrite, argillaceous, non calcareous.												
	tr	LIMESTONE: white to very light grey, firm to moderately hard, blocky, argillaceous and arenaceous in part.												
4130	90	CLAYSTONE: dark grey to olive black, dark olive grey to olive grey, rarely dusky brown, firm to moderately hard, subblocky, slightly silty in part, trace micropyrite, locally tuffaceous, non calcareous.												
	10	SANDSTONE: very light grey, fine to coarse grained, dominantly fine to medium, subangular to rounded, spherical, moderate to well sorted, local white calcite cement, friable to moderately hard, dominantly loose, trace pyrite, poor to moderate inferred porosity. No Show.												
	10	TUFF: medium grey to medium bluish grey, firm, crumbly to sub blocky, slightly speckled, with white and dark glassy inclusions, silty texture, rare fine pyrite, argillaceous, non calcareous.												
4140	90	CLAYSTONE: dark olive grey to dark grey, olive black to brownish black, rarely dusky brown amd medium dark grey, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, non calcareous.												

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:									Sheet No.				
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating		
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL			
	10	TUFF: medium grey to medium bluish grey, firm, crumbly to sub blocky, slightly speckled, with white and dark glassy inclusions, silty texture, rare fine pyrite, argillaceous, non calcareous.														
	tr	SANDSTONE: fine to coarse grained, dominantly fine to medium, subangular to rounded, spherical, moderately sorted, rare white calcite cement, dominantly loose. No Show.														
4150	80	CLAYSTONE: dark olive grey to dark grey, olive black to brownish black, rarely dusky brown amd medium dark grey, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, non calcareous.														
	20	TUFF: medium grey to medium bluish grey, firm, crumbly to sub blocky, slightly speckled, with white and dark inclusions, silty texture, rare fine pyrite, argillaceous, locally calcareous.														
	tr	SANDSTONE: very light grey, very fine to coarse grained, dominantly fine to medium, subangular to rounded, spherical, moderately sorted, rare white calcite cement, dominantly loose. No Show.														
4160	70	CLAYSTONE: olive black to brownish black, becoming dark greenish grey to greenish black in part, rarely dusky brown amd medium dark grey, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, non calcareous.														
	30	TUFF: medium grey to medium bluish grey, firm, crumbly to sub blocky, slightly speckled, with white and dark inclusions, silty texture, rare fine pyrite, argillaceous, slight to moderately calcareous.														
	tr	SANDSTONE: predominantly loose, dominantly fine to medium, subangular to rounded, spherical, moderately sorted, rare white calcite cement, No Show.														
4170	80	CLAYSTONE: becoming predominantly dark greenish grey to greenish black, olive black to brownish black, rarely dusky brown, subwaxy in part, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, non calcareous.														
	20	TUFF: medium grey to medium bluish grey, firm, crumbly to sub blocky, slightly speckled, with white and dark inclusions, silty texture, rare fine pyrite, argillaceous, locally calcareous.														
	tr	SANDSTONE: predominantly loose, dominantly fine to medium, subangular to rounded, spherical, moderately sorted, rare white calcite cement, No Show.														
4180	90	CLAYSTONE: predominantly dark greenish grey to greenish black, olive black to dark grey, rarely dusky brown, subwaxy in part, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, non calcareous.														

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DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
	10	TUFF: medium grey to medium bluish grey, firm, crumbly to sub blocky, slightly speckled, with white and dark inclusions, silty texture, rare fine pyrite, argillaceous, locally calcareous												
	rtr	SANDSTONE: predominantly loose, dominantly fine to medium, subangular to rounded, spherical, moderately sorted, rare white calcite cement, No Show.												
4190	100	CLAYSTONE: predominantly dark greenish grey, locally greenish black, locally brownish black and dark to medium dark grey, rarely dusky brown, subwaxy in part, firm to moderately hard, subblocky, locally silty, trace micropyrite, occasionally tuffaceous, non calcareous.												
	tr	TUFF: medium grey to medium bluish grey, firm, crumbly to sub blocky, slightly speckled, with white and dark inclusions, silty texture, rare fine pyrite, argillaceous, locally calcareous.												
	rtr	SANDSTONE: white to very light grey, very fine to fine, rarely medium, good calcareous cement, firm. No Show.												
4200	100	CLAYSTONE: predominantly dark greenish grey, locally greenish black, locally brownish black to olive black, also dark to medium dark grey, rarely dusky brown, subwaxy in part, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, non calcareous.												
	tr	LIMESTONE: light grey to greenish grey, firm, crumbly, microcrystalline, argillaceous in part, locally sandy.												
	tr	SANDSTONE: white to very light grey, very fine to fine, rarely medium, good calcareous cement, firm, argillaceous in places. No Show.												
4210		Missed Sample												
4220		Missed Sample												
4230		Missed Sample												
4240	100	CLAYSTONE: predominantly dark greenish grey, locally greenish black, locally brownish black to olive black, also dark to medium dark grey, rarely dusky brown and medium bluish grey (tuff), subwaxy in part, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, non calcareous.												
	tr	SANDSTONE: white to very light grey, very fine to fine, rarely medium, good calcareous cement, firm, also occurs as loose medium to coarse grains. No Show.												
	tr	LIMESTONE: very light grey, moderate yellowish brown, firm, crumbly, microcrystalline, argillaceous in part, rarely sandy.												
	rtr	TUFF: medium grey to medium bluish grey, firm, crumbly to sub blocky, slightly speckled, silty texture, argillaceous, locally calcareous.												

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DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
4250	100	CLAYSTONE: predominantly dark greenish grey, locally greenish black and greenish grey, brownish black, dark to medium dark grey, subwaxy in part, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, non calcareous.												
	rtr	SAND: occurs as loose medium to coarse grains, subangular to subrounded. No Show.												
	rtr	TUFF: medium grey to medium bluish grey, firm, crumbly to sub blocky, slightly speckled, silty texture, rare fine pyrite, argillaceous, locally calcareous.												
4260	100	CLAYSTONE: predominantly dark greenish grey to greenish black, locally dark to medium dark grey, occasionally brownish black, rarely dusky brown and light bluish grey (tuff), subwaxy in part, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, rare trace glauconite, non calcareous.												
	rtr	LIMESTONE: very light grey, moderate yellowish brown, firm, crumbly, microcrystalline, argillaceous in part, rarely sandy.												
4270	100	CLAYSTONE: predominantly dark greenish grey to greenish black, locally dark to medium dark grey, occasionally brownish black, rarely dusky brown and light bluish grey (tuff), subwaxy in part, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, rare trace glauconite, non calcareous												
	rtr	LIMESTONE: very light grey, moderate yellowish brown, pale yellowish orange, firm, crumbly, microcrystalline, argillaceous in part, rarely sandy.												
4280	100	CLAYSTONE: predominantly dark greenish grey, rarely greenish black, locally dark to medium dark grey and brownish black, rarely dusky brown and light bluish grey (tuff), subwaxy in part, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, trace glauconite & chlorite, non calcareous.												
	tr	LIMESTONE: light olive grey, light grey, pale yellowish brown, firm, crumbly, microcrystalline, trace glauconite, argillaceous in part, rarely sandy, occasionally microsucrosic and grades to Dolomite.												
4290	100	CLAYSTONE: predominantly dark greenish grey, rarely greenish black, locally dark to medium dark grey and brownish black, rarely dusky brown and light bluish grey (tuff), subwaxy in part, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, trace glauconite & chlorite, non calcareous.												
	tr	LIMESTONE: pale yellowish orange, pale yellowish brown, white to very light grey, firm to hard, crumbly, microcrystalline, locally crystalline, argillaceous in part.												

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DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating		
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL			
4300	100	CLAYSTONE: predominantly dark greenish grey, dark to medium dark grey , occasionally brownish black, rarely dusky brown and greenish black, subwaxy in part, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, trace glauconite & chlorite, non calcareous.														
	tr	LIMESTONE: pale yellowish orange, pale yellowish brown, white to very light grey, firm to hard, crumbly, microcrystalline, locally crystalline, argillaceous in part.														
4310	100	CLAYSTONE: predominantly dark greenish grey, locally dusky yellowish brown, dark to medium dark grey & dusky brown, occasionally olive black and brownish black, subwaxy in part, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, trace glauconite & chlorite, non calcareous.														
	rtr	LIMESTONE: pale yellowish orange, pale yellowish brown, white to very light grey, firm, crumbly, microcrystalline, argillaceous in part.														
4320	100	CLAYSTONE: predominantly dark greenish grey, locally dusky yellowish brown, dark to medium dark grey & dusky brown, occasionally olive black and brownish black, subwaxy in part, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, trace glauconite & chlorite, non calcareous.														
	tr	LIMESTONE: greenish grey, yellowish grey to pale yellowish brown, white to very light grey, firm to hard, crumbly, microcrystalline, locally chalky texture, argillaceous in part.														
4330	100	CLAYSTONE: predominantly dark greenish grey, locally dusky yellowish brown, dark to medium dark grey & dusky brown, occasionally olive black and brownish black, subwaxy in part, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, trace glauconite & chlorite, non calcareous.														
	rtr	LIMESTONE: greenish grey, yellowish grey to pale yellowish brown, white to very light grey, firm to hard, crumbly, microcrystalline, locally chalky texture, argillaceous in part.														
4340	100	CLAYSTONE: predominantly dark greenish grey, dusky yellowish brown, locally olive black, occasionally dark to medium dark grey and brownish black, rarely bluish grey and dusky brown, locally subwaxy, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, trace chlorite, non calcareous.														
	tr	LIMESTONE: light grey to greenish grey, pale yellowish brown in part, firm to moderately hard, crumbly, rarely brittle, microcrystalline, chalky in part, locally argillaceous, rare pyrite.														

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DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
	rtr	SAND: fine to medium grains, subangular to subrounded, subspherical to spherical, loose and uncemented												
4350	100	CLAYSTONE: predominantly dark greenish grey, locally dusky yellowish brown, dusky brown in parts, occasionally dark to medium dark grey, brownish black, rarely bluish grey, locally subwaxy, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, non calcareous.												
	rtr	LIMESTONE: dark yellowish brown, white, light grey, firm, crumbly, microcrystalline, locally argillaceous.												
4360	100	CLAYSTONE: dark greenish grey, dusky brown, locally dusky yellowish brown, occasionally dark to medium dark grey, also dark greenish grey, rarely bluish grey, locally subwaxy, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, non calcareous.												
	tr	LIMESTONE: greenish grey, rarely pinkish grey, yellowish grey, firm, crumbly, microcrystalline, locally chalky, argillaceous in part.												
4370	100	CLAYSTONE: dark green grey, moderate brown, dusky yellowish brownm occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, sub blocky, micropyritic, occasional nodular pyrite, rare glauconite.												
	100	CLAYSTONE: dark green grey, moderate brown, dusky yellowish brown, occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, sub blocky, micropyritic, occasional nodular pyrite, rare sparry calcite, rare glauconite.												
4380	100	CLAYSTONE: dark green grey, moderate brown, dusky yellowish brownm occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, sub blocky, micropyritic, occasional nodular pyrite, rare sparry calcite, rare glauconite.												
	TR	TUFF: light blueish grey, patchy dark bluish grey to blueish white, with occasional dark glassy fragments, firm crumbly break, swelling.												
4390	100	CLAYSTONE: dark green grey, moderate brown, dusky yellowish brownm occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, sub blocky to slightly hackly break, micropyritic, occasional reworked white limestone, rare glauconite.												
	Tr	TUFF: light blueish grey, patchy dark bluish grey to blueish white, with occasional dark glassy fragments, firm crumbly break, swelling.												
4400	90	CLAYSTONE: dark green grey, moderate brown, dusky yellowish brownm occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, sub blocky to slightly hackly break, micropyritic, occasional reworked white limestone, rare glauconite.												

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DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
	10	LIMESTONE: white, soft to firm, crumbly to sub blocky break, cryptocrystalline, mudstone texture, chalky.												
	Tr	TUFF: light blueish grey, patchy dark bluish grey to blueish white, with occasional dark glassy fragments, firm crumbly break, swelling.												
4410	60	CLAYSTONE: dark green grey, moderate brown, dusky yellowish brownm occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, sub blocky to slightly hackly break, micropyritic, rare glauconite.												
	40	LIMESTONE: white, soft to firm, crumbly to sub blocky break, cryptocrystalline, mudstone texture, chalky.												
	Tr	TUFF: light blueish grey, patchy dark bluish grey to blueish white, with occasional dark glassy fragments, firm crumbly break, swelling.												
4420	50	LIMESTONE: white, soft to firm, crumbly to sub blocky break, with thin moderate brown argillaceous laminae, cryptocrystalline, mudstone texture chalky.												
	50	CLAYSTONE: dark green grey, moderate brown, dusky yellowish brownm occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, sub blocky to slightly hackly break, micropyritic, rare glauconite.												
	Tr	TUFF: light blueish grey, patchy dark bluish grey to bluish white, with occasional dark glassy fragments, firm crumbly break, swelling.												
4430	50	LIMESTONE: white, firm to hard, crumbly to slightly brittle break, occasional dark argillaceous streaks, microcrystalline, mudstone texture.												
	50	CLAYSTONE: dark green grey, moderate brown, dusky yellowish brownm occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, sub blocky to slightly hackly break, micropyritic, rare glauconite.												
4440	50	LIMESTONE: white, firm to hard, crumbly to slightly brittle break, occasional dark argillaceous streaks, microcrystalline, mudstone texture.												
	50	CLAYSTONE: dark green grey, moderate brown, dusky yellowish brownm occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, sub blocky to slightly hackly break, micropyritic, rare glauconite.												
4450	60	LIMESTONE: white, hard, angular to brittle break, microcrystalline, mudstone texture.												
	40	CLAYSTONE: dark green grey, moderate brown, dusky yellowish brownm occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, sub blocky to slightly hackly break, micropyritic, rare glauconite.												
4460	70	LIMESTONE: white, hard, angular to brittle break splintery in part, microcrystalline, mudstone texture.												

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DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
	30	CLAYSTONE: dark green grey, moderate brown, dusky yellowish brownm occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, sub blocky to slightly hackly break, micropyritic, rare glauconite.												
4470	60	LIMESTONE: white, hard, angular to brittle break splintery in part, microcrystalline, mudstone texture.												
	40	CLAYSTONE: dark green grey, moderate brown, dusky yellowish brownm occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, sub blocky to slightly hackly break, micropyritic, rare glauconite.												
4480	60	LIMESTONE: white, hard, angular to brittle break splintery in part, microcrystalline, mudstone texture.												
	40	CLAYSTONE: dark green grey, moderate brown, dusky yellowish brownm occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, sub blocky to slightly hackly break, micropyritic, rare glauconite.												
4490	60	LIMESTONE: white, hard, angular to brittle break splintery in part, microcrystalline, mudstone texture.												
	40	CLAYSTONE: dark green grey, moderate brown, dusky yellowish brownm occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, sub blocky to slightly hackly break, micropyritic, rare glauconite.												
4500	60	LIMESTONE: white, firm to moderately hard, crumbly to blocky in part, commonly subangular and brittle break, also splintery in places, porcellaneous in part, microcrystalline, mudstone, chalky to compact, occasional dark argillaceous streaks (stylolites), very poor chalky porosity. No Shows.												
	40	CLAYSTONE: comprising cuttings and 'knockoffs' from above formations, dark green grey, olive black to brown black, dark grey, trace moderate brown & dusky yellowish brown, occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, blocky, micropyritic, non calcareous.												
4510	70	LIMESTONE: white, firm to moderately hard, crumbly to blocky in part, commonly subangular and brittle break, also splintery in places, porcellaneous in part, microcrystalline, mudstone, chalky to compact, occasional dark argillaceous streaks (stylolites), very poor chalky porosity. No Shows.												
	30	CLAYSTONE: comprising cuttings and 'knockoffs' from above formations, dark olive black to brown black, dark grey, dark green grey, trace moderate brown & dusky yellowish brown, occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, blocky, micropyritic, non calcareous.												
4520	60	LIMESTONE: white, firm to moderately hard, crumbly to blocky in part, commonly subangular and brittle break, also splintery in places, porcellaneous in part, microcrystalline, mudstone, chalky to compact, occasional dark argillaceous streaks (stylolites), very poor chalky porosity. No Shows.												

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				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
	40	CLAYSTONE: comprising cuttings and 'knockoffs' from above formations, dark olive black to brown black, dark grey, dark green grey, trace moderate brown & dusky yellowish brown, occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, blocky, micropyritic, non calcareous.												
4530	60	LIMESTONE: white, firm to moderately hard, crumbly to blocky in part, commonly subangular and brittle break, also splintery in places, porcellaneous in part, microcrystalline, mudstone, chalky to compact, occasional dark argillaceous streaks (stylolites), very poor chalky porosity. No Shows.												
	40	CLAYSTONE: comprising cuttings and 'knockoffs' from above formations, dark olive black to brown black, dark grey, dark green grey, trace moderate brown & dusky yellowish brown, occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, blocky, micropyritic, non calcareous.												
4540	60	LIMESTONE: white, occasionally very light grey, firm to moderately hard, crumbly to blocky in part, commonly subangular and brittle break, also splintery in places, porcellaneous in part, microcrystalline, mudstone, chalky to compact, occasional dark argillaceous streaks (stylolites), very poor chalky porosity. No Shows.												
	40	CLAYSTONE: comprising cuttings and 'knockoffs' from above formations, dark olive black to brown black, dark grey, dark green grey, trace moderate brown & dusky yellowish brown, occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, blocky, micropyritic, non calcareous.												
4550	50	LIMESTONE: white, occasionally very light grey, firm to moderately hard, crumbly to blocky in part, commonly subangular and brittle break, also splintery in places, porcellaneous in part, microcrystalline, mudstone, chalky to compact, occasional dark argillaceous streaks (stylolites), very poor chalky porosity. No Shows.												
	50	CLAYSTONE: comprising cuttings and 'knockoffs' from above formations, dark olive black to brown black, dark green grey, dark grey, trace moderate brown & dusky yellowish brown, occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, blocky, micropyritic, non calcareous.												
4560	50	LIMESTONE: white, firm to moderately hard, locally hard, crumbly to blocky in part, commonly subangular and brittle break, also splintery in places, porcellaneous in part, microcrystalline, mudstone, chalky to compact, occasional dark argillaceous streaks (stylolites), very poor chalky porosity. No Shows.												
	50	CLAYSTONE: comprising cuttings and 'knockoffs' from above formations, dark olive black to brown black, dark green grey, dark grey, trace moderate brown & dusky yellowish brown, occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, blocky, micropyritic, non calcareous.												

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				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
4570	50	LIMESTONE: white, locally light grey, firm to moderately hard, locally hard, crumbly to blocky in part, commonly subangular and brittle break, also splintery in places, porcellaneous in part, microcrystalline, mudstone, chalky to compact, occasionally argillaceous, very poor chalky porosity. No Shows.												
	50	CLAYSTONE: comprising cuttings and 'knockoffs' from above formations, dark olive black to brown black, dark green grey, dark grey, trace moderate brown & dusky yellowish brown, occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, blocky, micropyritic, non calcareous.												
4580	50	LIMESTONE: white, locally pinkisk grey to light brownish grey, rarely light greenish grey, also light grey in places, firm to moderately hard, crumbly to blocky, slightly break in part, microcrystalline, mudstone, chalky to locally compact, slightly argillaceous in places. No Shows.												
	50	CLAYSTONE: comprising cuttings and 'knockoffs' from above formations, dark olive black to brown black, dark green grey, dark grey, trace moderate brown & dusky yellowish brown, occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, blocky, micropyritic, non calcareous.												
4590	50	LIMESTONE: white, pale brown, pinkisk grey to light brownish grey, firm to moderately hard, crumbly to blocky, slightly break in part, microcrystalline, mudstone, chalky, marly in part, slightly argillaceous, local greyish brown Claystone streaks.												
	50	CLAYSTONE: comprising cuttings and 'knockoffs' from above formations, dark olive black to brown black, dark green grey, dark grey, trace moderate brown & dusky yellowish brown, occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, blocky, micropyritic, non calcareous.												
4600	60	LIMESTONE: light brownish grey to pale brown, pinkish grey, locally white, generally soft to firm, locally moderately hard, crumbly to blocky, microcrystalline, mudstone, chalky, slight to moderately argillaceous, marly local greyish brown Claystone streaks.												
	tr	CLAYSTONE: greyish brown, soft to firm, subblocky, crumbly, calcareous, marly.												
	40	CLAYSTONE: comprising cuttings and 'knockoffs' from above formations, dark olive black to brown black, dark green grey, dark grey, trace moderate brown & dusky yellowish brown, occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, blocky, micropyritic, non calcareous.												
4610	60	LIMESTONE: grey orange pink, occasionally white, rare light brown mottled in places, moderately hard, blocky to slightly brittle break, microcrystalline, marly in part, common dark argillaceous streaks, rare glauconite inclusions,												

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WELL: 25/8-15		AREA: Ringhorne East	Spud Date:									Sheet No.				
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
	40	CLAYSTONE: comprising cuttings and 'knockoffs' from above formations, dark olive black to brown black, dark green grey, dark grey, trace moderate brown & dusky yellowish brown, occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, blocky, micropyritic, non calcareous.												
4620	60	LIMESTONE: white with glauconite inclusions, grey orange pink, moderately hard, firm in part, blocky to brittle break, slightly crumbly in part, microcrystalline marly in part.												
	40	CLAYSTONE: comprising cuttings and 'knockoffs' from above formations, dark olive black to brown black, dark green grey, dark grey, trace moderate brown & dusky yellowish brown, occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, blocky, micropyritic, non calcareous.												
4630	60	LIMESTONE: white, grey orange pink, moderate brown, firm to slightly hard, crumbly to slightly brittle break, cryptocrystalline, very argillaceous, marly in parts.												
	40	CLAYSTONE: comprising cuttings and 'knockoffs' from above formations, dark olive black to brown black, dark green grey, dark grey, occasionally moderate brown & dusky yellowish brown, occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, blocky, micropyritic, non calcareous.												
4640	50	LIMESTONE: moderate brown, to grey orange pink, white, firm to slightly hard, crumbly break with the white limestone fragments hard brittle and microcrystalline												
	50	CLAYSTONE: comprising cuttings and 'knockoffs' from above formations, dark olive black to brown black, dark green grey, dark grey, occasionally moderate brown & dusky yellowish brown, occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, blocky, micropyritic, non calcareous.												
4650	50	LIMESTONE: greyish brown, moderate brown, grey orange pink, locally white, firm to crumbly break, (white fragments generally hard to microcrystalline) marly to very argillaceous, cryptocrystalline, occasionally mottled appearance, slightly silty in part with small glauconite inclusions.												
	50	CLAYSTONE: comprising cuttings and 'knockoffs' from above formations, dark olive black to brown black, dark green grey, dark grey, occasionally moderate brown & dusky yellowish brown, occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, blocky, micropyritic, non calcareous.												
4660	40	LIMESTONE: greyish brown, moderate brown, grey orange pink, locally white, firm to crumbly break, (white fragments generally hard to microcrystalline) marly to very argillaceous, cryptocrystalline, occasionally mottled appearance, slightly silty in part with small glauconite inclusions.												

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:										Sheet No.			
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
	50	CLAYSTONE: comprising cuttings and 'knockoffs' from above formations, dark olive black to brown black, dark green grey, dark grey, occasionally moderate brown & dusky yellowish brown, occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, blocky, micropyritic, non calcareous.												
	10	CLAYSTONE: (fresh cuttings showing marks of bit action) dark grey to grey black firm to hard, blocky break, slightly silty, trace of very fine glauconite, calcareous slightly swelling.												
4670	40	LIMESTONE: white to pale greenish white, moderate to light brown, grey orange pink, clean hard microcrystalline to argillaceous crumbly and cryptocrystalline, mod brown limestone marly in part occaisonal glauconite inclusions.												
	50	CLAYSTONE: comprising cuttings and fragments knocked off previous formations, greenish grey to dark grey, olive black, occasionally tuffaceous medium to light bluish grey, firm to moderately hard, blocky, micropyritic.												
	10	CLAYSTONE: (fresh cuttings showing marks of bit action) dark grey to grey black, firm to hard, blocky break, slightly silty, trace of very fine glauconite, calcareous, slightly swelling. Also rare dark yellowish brown CLAYSTONE: firm, crumbly, non calcareous, silty in part.												
4680	30	CLAYSTONE: dark grey (rare dark yellowish brown as above), hard, blocky to brittle break, common dark (glauconite?) mineral specks, non calcareous, slightly swelling.												
	40	CLAYSTONE: comprising cuttings and fragments knocked off previous formations, greenish grey to dark grey, olive black, occasionally tuffaceous, medium to light bluish grey, firm to moderately hard, blocky, micropyritic.												
	30	LIMESTONE: white to pale greenish white, moderate to light brown, grey orange pink, clean hard microcrystalline to argillaceous crumbly and cryptocrystalline, mod brown Limestone marly in part occaisonal glauconite inclusions.												
4690	50	CLAYSTONE: dark grey, hard, blocky to brittle break, common dark (glauconite?) mineral specks, non calcareous, slightly swelling. Trace light brownish grey to pale red purple claystone, hard, sub blocky calcareous.												
	30	LIMESTONE, moderate to light brown, grey orange pink, white to pale greenish white, clean hard microcrystalline to argillaceous crumbly and cryptocrystalline, moderate brown Limestone very marly becoming argillaceous.												
	20	CLAYSTONE: comprising cuttings and fragments knocked off previous formations, greenish grey to dark grey, olive black, occasionally tuffaceous medium to light bluish grey, firm to moderately hard, blocky, micropyritic.												

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:									Sheet No.				
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating		
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL			
4700	60	CLAYSTONE: dark grey, hard, blocky, brittle, slightly silty, glauconitic, micropyritic. Occasionally dark yellowish brown, firm sub blocky to crumbly silty.														
	30	CLAYSTONE: comprising cuttings and fragments knocked off previous formations, moderate brown, dark grey, olive black, occasionally tuffaceous medium to light bluish grey, firm to moderately hard, blocky, micropyritic.														
	10	LIMESTONE: moderate to light brown, grey orange pink, white to pale greenish white, clean hard microcrystalline to argillaceous crumbly and cryptocrystalline, moderate brown Limestone, very marly, becoming argillaceous.														
4710	20	SANDSTONE: predominantly loose quartz grains, colourless, clear occasionally slightly cloudy to opaque, medium to coarse grained, occasionally fine, mode medium, subangular, generally equant occasionally sub elongated, moderate sorting, occasional soft white kaolin cement, good inferred porosity. No visible show above OBM.														
	40	CLAYSTONE: dark grey, hard, blocky, brittle, slightly silty, glauconitic, micropyritic. Occasionally dark yelowish brown, firm, sub blocky to crumbly silty.														
	10	CLAYSTONE: comprising cuttings and fragments knocked off previous formations, moderate brown, dark grey, olive black, occasionally tuffaceous medium to light bluish grey, firm to moderately hard, blocky, micropyritic.														
	30	LIMESTONE: moderate to light brown, grey orange pink, white to pale greenish white, lean hard microcrystalline to argillaceous crumbly and cryptocrystalline, moderate brown limestone very marly, becoming argillaceous.														
4720		**Emphasised lower shaker screens during sample collection**														
	50	SANDSTONE: predominantly loose quartz grains, colourless, clear, occasionally slightly clouded, rarely opaque, medium to coarse grained, occasionally very coarse, mode medium, subangular to to angular, generally equant, coarse to very coarse grains generally elongate. Poor sorting, very good inferred porosity, no show.														
	40	CLAYSTONE: dark grey to greyish black, firm to hard, blocky to crumbly break, micropyritic, carbonaceous fragments. Trace tuffaceous blue grey claystone														
	10	LIMESTONE, moderate to light brown, grey orange pink, white to pale greenish white, clean hard microcrystalline to argillaceous crumbly and cryptocrystalline, moderate brown limestone very marly, becoming argillaceous.														
4730	40	SANDSTONE: loose quartz, colourless, clear, occasionally cloudy to opaque, fine to coarse grained, occasionally very coarse, mode coarse, angular to sub angular, equant to sub elongate, poor sorting, very good visual porosity, no cement no show.														

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:										Sheet No.			
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
	50	CLAYSTONE: comprised of cuttings and knockoffs of previously drilled formation, dark grey to greyish black, moderate brown, dark greenish grey, occasionally medium bluish grey, firm to hard, blocky to crumbly break, micropyritic, carbonaceous fragments.												
	10	LIMESTONE, comprised of cuttings and knockoffs, moderate to light brown, grey orange pink, white to pale greenish white, clean hard microcrystalline to argillaceous crumbly and cryptocrystalline, moderate brown limestone very marly, becoming argillaceous.												
4740	40	SANDSTONE: loose quartz colourless, clear, occasionally cloudy to opaque, fine to coarse grained, occasionally very coarse, mode medium, angular to sub angular, coarse grains generall subround, generally equant, poor sorting, very good visual porosity, no cement, no visible show.												
	50	CLAYSTONE: comprised of cuttings and knockoffs of previously drilled formation, dark grey to greyish black, moderate brown, dark greenish grey, occasionally medium bluish grey, firm to hard, blocky to crumbly break, micropyritic, carbonaceous fragments.												
	10	LIMESTONE: comprised of cuttings and knockoffs, moderate to light brown, grey orange pink, white to pale greenish white, clean hard microcrystalline to argillaceous crumbly and cryptocrystalline, moderate brown limestone very marly, becoming argillaceous.												
4750	50	SANDSTONE: predominantly loose quartz, colourless, clear, occasionally loudy, rarely slightly frosted, fine to coarse, mode fine, sub angular to sub round, generally spherical, poor sorting, good inferred porosity, no show.												
	40	CLAYSTONE: comprised of cuttings and knockoffs of previously drilled formation, dark grey to greyish black, moderate brown, dark greenish grey, occasionally medium bluish grey, firm to hard, blocky to crumbly break, micropyritic, carbonaceous fragments, occasional chlorite reduction spots.												
	10	LIMESTONE: comprised of cuttings and knockoffs, moderate to light brown, grey orange pink, white to pale greenish white, clean hard microcrystalline to argillaceous crumbly and cryptocrystalline, moderate brown limestone, very marly, becoming argillaceous.												
4760	90	CLAYSTONE: dark grey, occasionally moderate brown, firm to moderately hard, blocky, silty, carbonaeous, micropyritic.												
	10	SANDSTONE: loose quartz grains, colourless, clear, occasionally loudy, rarely slightly frosted, very fine to coarse, mode fine, sub angular to sub round, generally spherical, poor sorting, good inferred porosity, no show.												

ESSO NORGE A/S			WELLSITE SAMPLE DESCRIPTION													
WELL: 25/8-15		AREA: Ringhorne East	Spud Date:										Sheet No.			
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
	10	LIMESTONE: comprised of cuttings and knockoffs, moderate to light brown, grey orange pink, white to pale greenish white, clean hard microcrystalline to argillaceous crumbly and cryptocrystalline, moderate brown limestone very marly, becoming argillaceous.												
	Tr	CLAYSTONE: cuttings and knockoffs as above.												
4770	90	CLAYSTONE: grey black, firm to moderately hard, subblocky to fissile break, hackly in part, carbonaceous, micropyritic, micaceous in part, non calcareous, slightly swelling.												
	10	SANDSTONE: white to light grey, crumbly with calcic cement, comprised of quartz grains, colourless, cloudy to clear, very fine to fine grained, angular to sub angular, generally equant, moderate to poor sorting, poor inferred porosity, no visible show.												
	Tr	LIMESTONE: comprised of cuttings and knockoffs, moderate to light brown, grey orange pink, white to pale greenish white, clean hard microcrystalline to argillaceous crumbly and cryptocrystalline, moderate brown limestone: very marly, becoming argillaceous.												
4780	70	CLAYSTONE: grey black, firm to moderately hard, sub blocky to fissile break, hackly in part, carbonaceous, common micropyrite in discrete bands, micaceous in part, non calcareous, slightly swelling.												
	30	SANDSTONE: predominantly loose quartz, colourless, clear, opaque, occasionally cloudy, very fine to fine, coarse occasionally very coarse, bimodal, sub rounded to angular grains (occasional broken grains) poor sorting, occasional firm, white calcite cement and hard light grey silica cement, poor inferred porosity. No show.												
4790	90	CLAYSTONE: frequent 4cm flaky cavings, dark grey to blackish grey, firm to moderately hard, sub blocky to fissile break, hackly in part, occasional carbonaceous fragments with micropyrite in discrete bands, micaceous in part, non calcareous, slightly swelling.												
	10	SANDSTONE: predominantly loose quartz, colourless, clear, opaque, occasionally cloudy, very fine to fine, coarse occasionally very coarse, bimodal, sub rounded to angular grains (occasional broken grains) poor sorting, occasional firm white calcite cement and hard light grey silica cement, poor inferred porosity. No visible show.												

ESSO NORGE A/S		WELLSITE SAMPLE DESCRIPTION														
WELL: 25/8-15	AREA: Ringhorne East	Spud Date:											Sheet No.			
DEPTH (m)	%	LITHOLOGY DESCRIPTION and COMMENTS Colour, hardness, texture, mineralogy, modifiers, cement	POR	STAIN		FLUOR			CUT		CUT FLUOR		RES	Rating
				DIST	COL	DIST	INTEN	COL	INTEN	COL	INTEN	COL	COL	
4800	60	CLAYSTONE: frequent 4cm flaky cavings, dark grey to blackish grey, firm to moderately hard, sub blocky to fissile break, hackly in part, occasional carbonaceous fragments with micropyrite in discrete bands, micaceous in part, non calcareous, slightly swelling.												
	30	SANDSTONE: light grey, firm, crumbly break, comprised of carbonaceous fragments, mica flakes and colourless, very fine, angular quartz grains, cemented together in a firm white kaolin or hard grey silica cement.												
	10	COALY CARBONACEOUS FRAGMENTS: black, hard to brittle break, conchoidal fracture, occasional micropyrite banding.												
4804	70	CLAYSTONE: dark grey to brownish black, medium to dark blue grey, dark greenish grey, firm to blocky break, very silty in parts, micropyrite, very carbonaceous.												
	30	SANDSTONE: light grey, firm, crumbly break, comprised of carbonaceous fragments, mica flakes and colourless, very fine, angular quartz grains, cemented together in a firm white kaolin or hard grey silica cement.												
	Sl Tr	COALY CARBONACEOUS FRAGMENTS: black, hard to brittle break, conchoidal fracture, occasional micropyrite banding.												

APPENDIX II

DEVIATION SURVEY 25/8-15S

Report Date:
Report Type: Openworks Directional Data Transfer Report
Report Version: Sysdrill Ltd., v2.0
IDEAS Version: Director v2.2.2 2003/06/19 09:55:04
Ellipse Version: Sysdrill v2
Location Name: North sea, Norwegian sector.
Field Name: Ringhorne 25/8
Structure Name: Ringhorne Platform
Slot Name: AD (C-3)
Well Name: 25/08-15 (RHE)
Wellpath Name: Definitive 25/08-15 (RHE) (TD@4804m Md) (Preliminary)
Unique Well Identifier: 25/08-15 (RHE)
Wellpath Reference: s98966
Wellpath Date Created:
Wellpath Last Revised:
Co-ordinate System Name: European Datum 1950 / UTM Zone 31 N
Co-ordinate System Datum: Europe - west - Spain; France - offshore; United Kingdom - UKCS; Netherlands - offshore;\nGermany - offshore North Sea; Denmark; Norway; Turkey.\nMean Values
Co-ordinate System Projection: Transverse Mercator or Gauss Kruger Projection
Co-ordinate System Units: METER
Co-ordinate System Origin: N0 0 0.0000,E3 0 0.0000
Co-ordinate System False Origin: 500000.00,0.00
Co-ordinate System Central Meridian: E3 0 0.0000
Co-ordinate System LSF at CM: 0.999600
Well Surface Location X Co-ordinate: 468636.7193
Well Surface Location Y Co-ordinate: 6569969.6831
KB Elevation: 60.30
KB Elevation Units: Metres
Wellhead Elevation Type: Top of DPHH (+26.8m) to Mean Sea Level (0.00m)
Local Grid Orientation: Grid North
Grid Convergence: -0.47 Degrees
Local Grid Units: Metres
True Vertical Depth Reference: Installation Centre
Position Uncertainty Confidence: 99.48 (1D)

MD	Inc	Dir	TVD-RKB	Grid E Offset	Grid N Offset	East-West Semi-Major	North-South Semi-Minor	Minor Vertical Rotn

33.50	0.00	0.00	33.50	468636.72	6569969.68	1.22	7.19	0.00	0.00	N/A	0.00
188.80	0.00	0.00	188.80	468636.72	6569969.68	1.22	7.19	0.09	0.09	N/A	0.33
190.00	0.01	227.89	190.00	468636.72	6569969.68	1.22	7.19	0.09	0.09	N/A	0.33
200.00	0.11	227.89	200.00	468636.71	6569969.68	1.21	7.18	0.09	0.09	N/A	0.35
210.00	0.25	206.21	210.00	468636.69	6569969.65	1.20	7.15	0.10	0.10	N/A	0.37
220.00	0.46	212.78	220.00	468636.66	6569969.60	1.16	7.10	0.11	0.11	N/A	0.39
230.00	0.56	215.01	230.00	468636.61	6569969.52	1.11	7.03	0.11	0.11	N/A	0.41
240.00	0.67	220.78	240.00	468636.55	6569969.44	1.05	6.94	0.12	0.12	N/A	0.43
250.00	0.78	213.37	250.00	468636.47	6569969.34	0.97	6.84	0.12	0.12	N/A	0.45
260.00	0.88	213.00	260.00	468636.39	6569969.22	0.89	6.72	0.13	0.13	N/A	0.47
270.00	0.80	217.63	270.00	468636.31	6569969.10	0.81	6.60	0.13	0.13	N/A	0.50
280.00	0.88	216.55	280.00	468636.22	6569968.98	0.72	6.48	0.14	0.14	N/A	0.52
290.00	0.54	224.32	289.99	468636.14	6569968.88	0.64	6.39	0.15	0.15	N/A	0.54
292.90	0.52	225.33	292.89	468636.12	6569968.87	0.62	6.37	0.15	0.15	N/A	0.54
308.50	1.41	224.94	308.49	468635.94	6569968.68	0.44	6.18	0.15	0.15	N/A	0.58
335.50	1.32	81.15	335.49	468636.01	6569968.49	0.51	6.00	0.16	0.16	N/A	0.63
350.50	1.93	84.32	350.48	468636.43	6569968.54	0.93	6.05	0.18	0.18	N/A	0.66
362.80	2.02	88.62	362.77	468636.85	6569968.57	1.35	6.07	0.19	0.19	N/A	0.69
390.20	3.34	86.08	390.14	468638.13	6569968.64	2.63	6.14	0.22	0.22	N/A	0.75
417.60	4.95	93.90	417.47	468640.11	6569968.61	4.61	6.11	0.27	0.26	N/A	0.81
445.00	6.62	99.87	444.73	468642.84	6569968.26	7.34	5.76	0.31	0.30	N/A	0.86
472.10	8.81	101.10	471.58	468646.42	6569967.59	10.92	5.09	0.36	0.34	95.81	0.92
499.50	9.85	104.18	498.62	468650.75	6569966.61	15.25	4.12	0.42	0.39	97.95	0.98
525.60	11.39	100.88	524.27	468655.44	6569965.58	19.95	3.08	0.43	0.40	97.37	1.05
552.50	13.31	101.88	550.55	468661.08	6569964.44	25.59	1.94	0.45	0.43	95.93	1.12
580.20	14.99	102.23	577.41	468667.70	6569963.03	32.21	0.53	0.49	0.48	94.47	1.20
607.40	16.06	102.66	603.62	468674.80	6569961.46	39.32	-1.04	0.55	0.54	96.04	1.27
634.80	16.23	104.32	629.94	468682.21	6569959.68	46.73	-2.82	0.62	0.60	98.74	1.35
662.30	18.08	105.46	656.21	468690.04	6569957.59	54.56	-4.91	0.71	0.68	101.33	1.42
689.60	20.04	106.47	682.01	468698.61	6569955.14	63.13	-7.36	0.82	0.75	103.13	1.50
716.80	22.10	106.46	707.39	468707.98	6569952.37	72.51	-10.13	0.86	0.76	104.00	1.57
744.20	24.18	105.38	732.59	468718.33	6569949.42	82.86	-13.08	0.93	0.78	104.51	1.64
771.70	26.22	105.09	757.47	468729.62	6569946.35	94.16	-16.16	1.03	0.80	104.74	1.71
798.80	28.11	104.49	781.58	468741.58	6569943.19	106.12	-19.32	1.16	0.83	104.78	1.78
826.00	29.73	103.89	805.39	468754.33	6569939.97	118.88	-22.54	1.31	0.87	104.68	1.85
853.30	31.14	103.53	828.92	468767.76	6569936.70	132.31	-25.82	1.48	0.91	104.53	1.92
880.70	32.45	102.51	852.21	468781.82	6569933.45	146.38	-29.07	1.67	0.96	104.29	1.99

907.90	34.14	102.48	874.95	468796.39	6569930.22	160.95	-32.30	1.89	1.00	104.04	2.05
934.90	36.16	102.64	897.02	468811.56	6569926.84	176.13	-35.67	2.12	1.06	103.86	2.12
962.30	38.21	103.10	918.85	468827.69	6569923.15	192.27	-39.37	2.37	1.11	103.74	2.19
989.40	40.26	103.63	939.84	468844.36	6569919.19	208.94	-43.33	2.65	1.17	103.71	2.25
1016.80	42.52	104.39	960.39	468861.93	6569914.80	226.52	-47.72	2.96	1.23	103.76	2.32
1044.20	44.62	104.48	980.25	468880.21	6569910.10	244.81	-52.42	3.29	1.29	103.84	2.38
1071.30	47.75	105.01	999.01	468899.11	6569905.12	263.71	-57.40	3.65	1.35	103.95	2.45
1098.80	49.53	104.67	1017.18	468919.06	6569899.84	283.67	-62.69	4.05	1.41	104.04	2.51
1126.00	51.25	104.21	1034.52	468939.34	6569894.61	303.96	-67.91	4.48	1.48	104.07	2.57
1153.10	53.83	104.22	1051.00	468960.18	6569889.33	324.81	-73.19	4.93	1.54	104.08	2.63
1180.50	55.94	103.78	1066.76	468981.92	6569883.91	346.56	-78.62	5.43	1.61	104.07	2.69
1207.80	57.11	103.60	1081.82	469004.04	6569878.53	368.68	-84.00	5.96	1.68	104.03	2.75
1234.90	58.71	103.12	1096.21	469026.37	6569873.23	391.02	-89.31	6.52	1.74	103.96	2.81
1262.20	60.28	103.60	1110.07	469049.24	6569867.79	413.90	-94.75	7.10	1.81	103.92	2.87
1289.50	61.12	103.48	1123.43	469072.38	6569862.22	437.05	-100.32	7.72	1.88	103.89	2.93
1299.10	61.19	103.87	1128.06	469080.54	6569860.23	445.22	-102.31	7.93	1.90	103.88	2.95
1325.60	61.75	102.44	1140.72	469103.21	6569854.94	467.89	-107.60	8.23	1.95	103.85	2.98
1352.90	61.92	99.98	1153.61	469126.80	6569850.26	491.49	-112.28	8.60	2.00	103.70	3.02
1407.50	61.97	94.74	1179.30	469174.55	6569844.09	539.26	-118.45	9.47	2.10	102.96	3.09
1434.60	61.97	91.59	1192.04	469198.42	6569842.77	563.14	-119.77	9.96	2.16	102.34	3.13
1462.00	61.96	88.66	1204.92	469222.59	6569842.72	587.32	-119.82	10.49	2.24	101.57	3.17
1489.20	62.05	85.08	1217.69	469246.56	6569844.03	611.29	-118.51	11.03	2.32	100.65	3.21
1516.40	62.00	81.57	1230.45	469270.40	6569846.82	635.15	-115.72	11.57	2.41	99.63	3.26
1543.70	63.17	78.16	1243.02	469294.24	6569851.09	659.00	-111.45	12.11	2.52	98.49	3.30
1570.90	64.04	75.06	1255.12	469317.93	6569856.73	682.69	-105.81	12.68	2.64	97.24	3.34
1598.10	64.00	71.84	1267.04	469341.35	6569863.69	706.13	-98.85	13.24	2.76	95.97	3.39
1625.60	64.93	68.47	1278.89	469364.68	6569872.11	729.46	-90.42	13.78	2.89	94.69	3.43
1652.80	66.80	65.90	1290.02	469387.55	6569881.74	752.34	-80.80	14.31	3.01	93.41	3.48
1680.00	68.10	63.18	1300.45	469410.21	6569892.53	775.01	-70.00	14.83	3.13	92.16	3.52
1707.20	68.31	60.06	1310.55	469432.42	6569904.53	797.23	-57.99	15.30	3.25	90.96	3.56
1734.20	69.99	57.42	1320.16	469453.98	6569917.62	818.79	-44.90	15.75	3.36	89.82	3.61
1761.80	70.00	54.84	1329.60	469475.50	6569932.07	840.33	-30.45	16.17	3.47	88.71	3.65
1789.10	70.47	52.45	1338.84	469496.18	6569947.29	861.01	-15.22	16.56	3.57	87.66	3.70
1816.50	72.09	49.82	1347.63	469516.37	6569963.57	881.22	1.07	16.92	3.68	86.66	3.74
1843.80	72.34	48.71	1355.97	469536.06	6569980.52	900.91	18.03	17.27	3.78	85.69	3.79
1870.80	72.19	49.23	1364.19	469555.46	6569997.40	920.31	34.91	17.62	3.88	84.77	3.83
1898.10	72.57	49.22	1372.46	469575.15	6570014.38	940.02	51.91	17.98	3.99	83.87	3.88

1925.50	72.67	49.09	1380.64	469594.93	6570031.48	959.80	69.01	18.35	4.09	82.99	3.93
1952.70	72.63	48.50	1388.76	469614.45	6570048.58	979.33	86.11	18.72	4.19	82.15	3.97
1979.90	72.61	48.27	1396.88	469633.85	6570065.81	998.74	103.35	19.08	4.29	81.34	4.02
2007.20	72.65	48.08	1405.03	469653.26	6570083.18	1018.15	120.72	19.45	4.39	80.55	4.07
2034.40	72.75	47.58	1413.12	469672.50	6570100.60	1037.40	138.16	19.82	4.49	79.79	4.12
2061.90	72.45	47.02	1421.34	469691.78	6570118.39	1056.69	155.95	20.19	4.59	79.04	4.17
2089.10	72.43	46.67	1429.55	469710.69	6570136.12	1075.60	173.69	20.55	4.68	78.33	4.22
2116.10	72.53	46.62	1437.68	469729.40	6570153.79	1094.33	191.37	20.91	4.78	77.65	4.27
2143.40	72.41	46.71	1445.90	469748.33	6570171.65	1113.26	209.23	21.29	4.87	76.98	4.33
2170.90	72.48	46.68	1454.19	469767.40	6570189.63	1132.34	227.22	21.67	4.96	76.33	4.38
2198.00	72.50	47.06	1462.35	469786.25	6570207.29	1151.20	244.88	22.05	5.05	75.70	4.44
2225.40	72.52	46.78	1470.58	469805.34	6570225.13	1170.29	262.73	22.43	5.14	75.10	4.49
2252.70	72.50	46.88	1478.79	469824.32	6570242.94	1189.28	280.55	22.82	5.23	74.51	4.54
2279.80	72.49	46.96	1486.94	469843.19	6570260.58	1208.16	298.20	23.21	5.32	73.95	4.60
2307.10	72.38	47.17	1495.18	469862.24	6570278.31	1227.21	315.93	23.61	5.41	73.40	4.66
2334.40	72.41	47.70	1503.43	469881.39	6570295.90	1246.38	333.53	24.02	5.49	72.87	4.71
2361.80	72.57	48.33	1511.68	469900.81	6570313.37	1265.80	351.01	24.44	5.58	72.36	4.77
2388.90	72.44	48.33	1519.83	469920.11	6570330.55	1285.11	368.19	24.86	5.66	71.88	4.83
2416.20	72.31	48.15	1528.09	469939.51	6570347.87	1304.52	385.52	25.28	5.74	71.40	4.89
2443.60	72.39	48.79	1536.40	469959.05	6570365.18	1324.06	402.83	25.71	5.82	70.95	4.94
2470.70	72.45	48.83	1544.58	469978.48	6570382.18	1343.50	419.85	26.14	5.90	70.52	5.00
2498.20	72.53	49.25	1552.86	469998.28	6570399.37	1363.31	437.04	26.59	5.98	70.09	5.06
2525.30	72.38	50.04	1561.03	470017.96	6570416.09	1383.00	453.77	27.04	6.05	69.70	5.12
2552.60	72.27	51.14	1569.32	470038.05	6570432.60	1403.09	470.28	27.51	6.13	69.32	5.18
2579.80	72.53	51.58	1577.54	470058.29	6570448.78	1423.35	486.47	27.98	6.20	68.96	5.24
2607.30	72.53	51.16	1585.80	470078.78	6570465.15	1443.84	502.85	28.46	6.28	68.61	5.30
2634.50	72.47	50.08	1593.98	470098.82	6570481.61	1463.89	519.31	28.93	6.35	68.27	5.36
2661.70	72.59	48.43	1602.14	470118.47	6570498.53	1483.54	536.24	29.38	6.42	67.93	5.42
2688.90	72.44	46.75	1610.32	470137.62	6570516.02	1502.70	553.74	29.80	6.50	67.59	5.48
2716.20	72.47	46.46	1618.55	470156.52	6570533.90	1521.61	571.62	30.22	6.57	67.24	5.55
2743.50	72.28	46.05	1626.81	470175.31	6570551.88	1540.41	589.61	30.64	6.65	66.91	5.61
2770.80	73.57	44.79	1634.83	470193.89	6570570.19	1558.99	607.93	31.05	6.72	66.58	5.67
2798.00	73.72	41.29	1642.49	470211.69	6570589.26	1576.81	627.00	31.43	6.80	66.24	5.73
2826.20	73.33	40.64	1650.49	470229.41	6570609.67	1594.53	647.42	31.80	6.88	65.89	5.80
2853.40	73.54	39.76	1658.24	470246.24	6570629.57	1611.36	667.33	32.16	6.96	65.56	5.86
2880.50	73.46	36.68	1665.94	470262.30	6570649.98	1627.43	687.74	32.49	7.04	65.23	5.92
2907.70	73.62	33.12	1673.65	470277.22	6570671.36	1642.36	709.13	32.79	7.12	64.89	5.98

2935.10	73.71	29.91	1681.36	470290.96	6570693.76	1656.10	731.55	33.06	7.20	64.54	6.05
2962.40	73.52	26.74	1689.06	470303.38	6570716.80	1668.52	754.60	33.31	7.29	64.20	6.11
2989.70	74.60	23.77	1696.56	470314.57	6570740.53	1679.72	778.34	33.54	7.38	63.86	6.17
3017.00	74.58	20.89	1703.82	470324.56	6570764.87	1689.72	802.68	33.75	7.47	63.52	6.24
3044.10	74.61	17.31	1711.02	470333.11	6570789.54	1698.27	827.36	33.93	7.56	63.19	6.30
3098.50	75.58	10.90	1725.02	470345.90	6570840.48	1711.06	878.32	34.25	7.76	62.54	6.43
3125.70	76.68	7.72	1731.54	470350.17	6570866.52	1715.33	904.37	34.38	7.87	62.23	6.49
3153.20	76.69	4.58	1737.88	470353.03	6570893.11	1718.20	930.98	34.49	7.99	61.93	6.55
3180.30	77.70	1.40	1743.89	470354.41	6570919.49	1719.58	957.36	34.59	8.11	61.64	6.62
3207.70	78.35	358.62	1749.57	470354.41	6570946.28	1719.58	984.16	34.68	8.23	61.35	6.68
3234.80	80.00	355.67	1754.66	470353.09	6570972.85	1718.25	1010.74	34.77	8.36	61.04	6.74
3262.10	80.09	353.36	1759.38	470350.52	6570999.60	1715.68	1037.51	34.86	8.49	60.70	6.80
3289.50	80.06	350.72	1764.11	470346.78	6571026.32	1711.94	1064.23	34.94	8.62	60.34	6.86
3316.80	80.00	347.64	1768.83	470341.74	6571052.72	1706.90	1090.64	35.02	8.76	59.96	6.93
3344.20	80.06	345.36	1773.58	470335.44	6571078.95	1700.60	1116.88	35.09	8.89	59.55	6.99
3371.50	81.21	342.69	1778.02	470328.03	6571104.83	1693.18	1142.77	35.16	9.02	59.12	7.05
3398.90	82.18	340.54	1781.98	470319.48	6571130.55	1684.63	1168.50	35.22	9.16	58.66	7.11
3426.10	82.66	338.54	1785.57	470310.06	6571155.80	1675.21	1193.76	35.28	9.29	58.20	7.17
3453.50	83.15	338.95	1788.95	470300.21	6571181.13	1665.35	1219.10	35.33	9.43	57.72	7.24
3480.60	83.19	338.69	1792.18	470290.49	6571206.21	1655.63	1244.19	35.39	9.56	57.25	7.30
3507.40	83.20	338.18	1795.35	470280.71	6571230.95	1645.85	1268.94	35.45	9.69	56.78	7.36
3535.00	83.16	338.62	1798.63	470270.63	6571256.42	1635.76	1294.42	35.52	9.83	56.30	7.42
3562.20	83.20	338.75	1801.86	470260.81	6571281.57	1625.94	1319.58	35.58	9.97	55.82	7.48
3589.50	83.15	338.62	1805.10	470250.96	6571306.81	1616.09	1344.83	35.65	10.11	55.34	7.54
3616.60	83.18	339.15	1808.33	470241.28	6571331.90	1606.40	1369.93	35.72	10.25	54.87	7.61
3643.90	83.17	339.46	1811.57	470231.70	6571357.25	1596.82	1395.29	35.80	10.40	54.40	7.67
3671.10	83.19	339.63	1814.80	470222.26	6571382.54	1587.38	1420.59	35.88	10.54	53.93	7.73
3698.50	83.15	339.89	1818.06	470212.86	6571408.06	1577.97	1446.12	35.96	10.69	53.45	7.80
3725.40	83.21	339.87	1821.26	470203.67	6571433.13	1568.78	1471.20	36.05	10.83	52.99	7.86
3752.80	83.18	340.11	1824.50	470194.37	6571458.68	1559.47	1496.76	36.13	10.98	52.52	7.92
3780.00	83.00	339.95	1827.77	470185.15	6571484.05	1550.25	1522.14	36.22	11.12	52.05	7.98
3807.10	83.00	340.45	1831.08	470176.04	6571509.35	1541.14	1547.45	36.32	11.27	51.59	8.05
3834.70	82.99	340.22	1834.44	470166.82	6571535.14	1531.92	1573.25	36.42	11.42	51.11	8.11
3862.00	82.98	340.09	1837.78	470157.63	6571560.61	1522.72	1598.73	36.51	11.56	50.64	8.18
3889.20	83.03	340.06	1841.09	470148.43	6571585.98	1513.52	1624.11	36.61	11.71	50.17	8.24
3916.60	83.02	340.46	1844.42	470139.25	6571611.57	1504.33	1649.71	36.72	11.86	49.70	8.31
3943.90	83.06	340.17	1847.72	470130.13	6571637.08	1495.21	1675.23	36.82	12.00	49.23	8.37

3971.10	82.80	340.81	1851.07	470121.11	6571662.51	1486.19	1700.67	36.93	12.15	48.77	8.44
3998.50	82.89	340.33	1854.48	470112.07	6571688.14	1477.15	1726.31	37.04	12.30	48.30	8.50
4025.60	82.82	340.17	1857.86	470102.99	6571713.44	1468.06	1751.62	37.16	12.44	47.83	8.57
4052.90	82.85	341.00	1861.26	470093.99	6571738.97	1459.06	1777.16	37.27	12.59	47.37	8.63
4080.20	82.86	340.58	1864.66	470085.08	6571764.54	1450.15	1802.74	37.39	12.73	46.90	8.70
4107.20	82.82	338.75	1868.02	470075.78	6571789.65	1440.84	1827.86	37.51	12.88	46.43	8.76
4134.40	82.79	338.52	1871.43	470065.95	6571814.77	1431.00	1852.99	37.63	13.02	45.95	8.83
4162.10	83.05	338.60	1874.84	470055.91	6571840.35	1420.96	1878.58	37.75	13.16	45.46	8.89
4189.30	83.02	338.76	1878.14	470046.09	6571865.49	1411.14	1903.73	37.87	13.30	44.98	8.96
4216.50	82.99	338.95	1881.45	470036.36	6571890.66	1401.40	1928.91	38.00	13.44	44.50	9.02
4243.60	83.08	339.46	1884.74	470026.81	6571915.80	1391.85	1954.06	38.13	13.58	44.03	9.09
4270.70	82.99	339.32	1888.03	470017.35	6571940.97	1382.38	1979.24	38.26	13.71	43.56	9.16
4297.70	82.99	339.84	1891.32	470008.00	6571966.07	1373.03	2004.35	38.40	13.85	43.10	9.22
4325.10	83.00	339.24	1894.66	469998.50	6571991.54	1363.53	2029.83	38.53	13.99	42.63	9.29
4352.70	82.97	339.42	1898.03	469988.83	6572017.16	1353.86	2055.46	38.68	14.13	42.15	9.35
4379.50	83.00	339.05	1901.31	469979.40	6572042.03	1344.43	2080.33	38.82	14.26	41.69	9.42
4406.90	83.01	339.25	1904.64	469969.73	6572067.43	1334.75	2105.75	38.96	14.39	41.22	9.49
4434.50	80.94	339.28	1908.50	469960.06	6572092.98	1325.07	2131.31	39.11	14.53	40.75	9.55
4461.80	78.92	338.95	1913.27	469950.48	6572118.08	1315.49	2156.42	39.26	14.65	40.28	9.62
4489.10	77.27	339.40	1918.90	469940.99	6572143.04	1305.99	2181.38	39.41	14.78	39.82	9.69
4516.50	75.96	340.06	1925.24	469931.75	6572168.03	1296.76	2206.39	39.57	14.90	39.37	9.76
4543.40	74.25	339.70	1932.16	469922.82	6572192.43	1287.82	2230.80	39.73	15.02	38.92	9.83
4570.10	72.95	339.41	1939.70	469913.87	6572216.42	1278.87	2254.80	39.88	15.14	38.49	9.90
4597.20	71.32	339.32	1948.01	469904.79	6572240.55	1269.78	2278.93	40.04	15.25	38.05	9.97
4625.30	70.00	340.69	1957.32	469895.72	6572265.46	1260.71	2303.85	40.21	15.37	37.60	10.05
4654.60	67.92	340.78	1967.84	469886.71	6572291.26	1251.69	2329.66	40.38	15.48	37.15	10.12
4679.90	66.40	339.81	1977.66	469878.85	6572313.20	1243.83	2351.61	40.54	15.58	36.77	10.19
4707.50	64.60	338.86	1989.10	469869.99	6572336.69	1234.97	2375.11	40.70	15.69	36.35	10.27
4734.30	61.69	340.55	2001.21	469861.70	6572359.10	1226.67	2397.53	40.86	15.79	35.96	10.34
4761.60	58.49	338.61	2014.82	469853.45	6572381.27	1218.42	2419.71	41.01	15.89	35.57	10.41
4788.70	55.24	337.93	2029.63	469845.06	6572402.34	1210.03	2440.78	41.16	15.98	35.20	10.49
4804.00	55.24	337.93	2038.35	469840.34	6572413.98	1205.30	2452.43	41.24	16.04	34.99	10.50

MD TVD Grid E Grid N Target Name

APPENDIX III

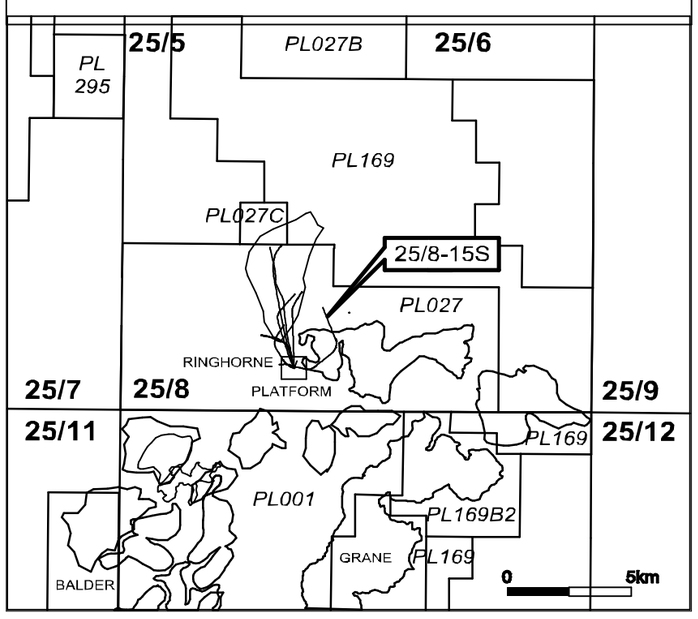
COMPOSITE LOG 25/8-15S

ESSO NORGE AS

COMPOSITE LOG 1:500

WELL : 25/8-15S

REGIONAL MAP



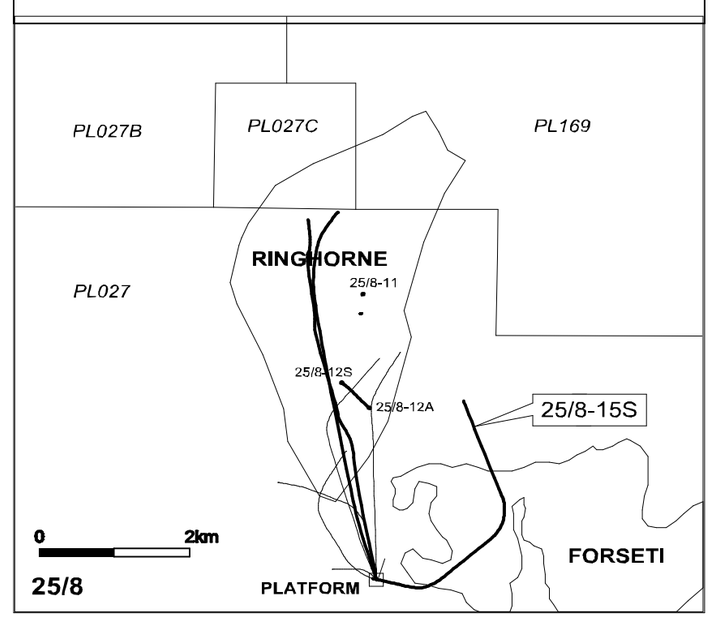
COUNTRY :	NORWAY
FIELD :	RINGHORNE EAST
BLOCK :	25/8,25/10 & 25/11
LICENCE :	PL027
DRILLING PERMIT NO :	1085L
OPERATOR :	ESSO NORGE AS
RIG NAME :	RINGHORNE PLATFORM
STATUS :	APPRAISAL, OIL

DISCOVERY, PLUGGED BACK TO 13 3/8"SHOE

OBJECTIVES

PRIMARY : STATFJORD SANDS

LOCATION MAP



RIG DATA

RTE	: 60.3m	WATER DEPTH	: 128.5m
SPUD DATE	: 18th November 2003	REENTERED	: 12th JULY 2004
TD DATE	: 23rd JULY 2004	P & A	: 7th AUGUST 2004
TD DRILLER	: 4804.0m MDBRT	TVDSS	: 1978.2m TVDSS

LOCATION DATA

SURFACE LATITUDE	:	6 569 969.7m N 59° 15min 58.129sec N
SURFACE LONGITUDE	:	468 636.7m E02° 26min 59.535sec E
TD LATITUDE	:	6 572 413.97m N 59° 17min 17.458sec N
TD LONGITUDE	:	469 840.35m E 2° 28min 14.309sec E

ZONE UTM 31N ED 50

DRILLED FROM THE RINGHORNE PLATFORM

OPERATOR

ESSO NORGE AS

PARTNERS

CONTRACTORS

DRILLING	:	PROSAFE
WELLSITE GEOLOGY	:	CAMBRIAN
MUDLOGGING	:	SPERRY SUN
DIRECTIONAL	:	BAKER HUGHES INTEQ
MWD/LWD	:	BAKER HUGHES INTEQ
WIRELINE	:	BAKER ATLAS
DRILLING FLUID	:	MI/ANCHOR
CASING	:	WEATHERFORD
CEMENT	:	HALLIBURTON

GEOLOGISTS

OPERATIONS	:	ODD TANGEN
		TORUNN VALHEIM
PROJECT	:	ODD TANGEN
WELLSITE	:	RICHARD HOWES
		JAMES WATSON

LOG COMPILER(S)

RICHARD HOWES, JAMES WATSON

DATE : JULY 2004

LITHOSTRATIGRAPHIC TOPS

GROUP	FORMATION	MEMBER	TWT (sec)	DEPTH (MDRKB)	DEPTH (TVDSS)
NORDLAND					
	Top Utsira Fm		633.6	622.5	557.8
		Top Utsira Massive SS	807.0	810.5	731.6
		Base Utsira Massive SS	1001.2	1069.0	937.2
HORDALAND	Undifferentiated		1028.4	1121.0	971.1
ROGALAND					
	Top Balder Fm		1685.4	3086.0	1661.6
	Base Balder Fm		1731.2	3347.0	1713.6
		Top Zone II Sst	1774.2	3692.0	1756.9
		Base Zone II Sst	1785.9	3727.5	1761.2
		Top Zone IB U Sst	1790.4	3822.0	1772.5
		Base Zone IB U Sst	1797.9	3912.0	1783.7
		Top Zone IB L Sst	1802.0	3963.0	1789.7
		Base Zone IB L Sst	1814.0	4060.0	1801.7
SHETLAND	Undifferentiated		1851.6	4393.0	1842.7
LOWER JURASSIC					
	Burton-Amundsen		1883.0	4656.0	1908.1
	Statfjord Fm		1895.6	4698.0	1924.6
		Top S10 sand	1895.6	4698.0	1924.6
		Base S10 sand	1899,8	4730.5	1932.2
		Top S9 sand	1909.0	4764.0	1955.8
		Base S9 sand	1915.8	4786.0	1967.7

LWD LOGGING

DATE	RUN No.	TOOL SUITE	INTERVAL
13/07/04	1	AUTOTRACK - GR/RES	513.0m - 1310.0m
17/07/04	2	AUTOTRAK - GR/RES/NEUTRON/DENSITY/APX/ /Testrak (LOST IN HOLE)	1310.0m - 4806.0m

WIRELINE LOGGING

DATE	RUN No.	TOOL SUITE	INTERVAL
2/08/04	1A	VSP/GR	622.5m - 4771.0m

CASING DATA

BIT SIZE	INTERVAL	CASING	SHOE DEPTH	MUD SYSTEM
32"	189.0 - 312.0m	26"	305.0	Seawater
17 1/2"	312.0 - 1310.0m	13 3/8"	1305.7	NaCl/KCL Polymer
12 1/4"	4804.0 - 5039.0m			VERSAVERT - OBM

CONVENTIONAL CORES

CORE	INTERVAL	RECOVERY
1	2222-2285	95%
2	2285-2346	83%

BIOSTRATIGRAPHIC TOPS

SERIES	STAGE	ZONE	DEPTH (MDRKB)	DEPTH (TVDSS)
Series 1	Stage 1	Zone 1	1111	(-1080)

DRILLSTEM TESTS

DST No	INTERVAL	FLOW	CHOKE	WHP

MISCELLANEOUS

MISCELLANEOUS

1	2222-2275	2098 bopd	28/64"	2103										

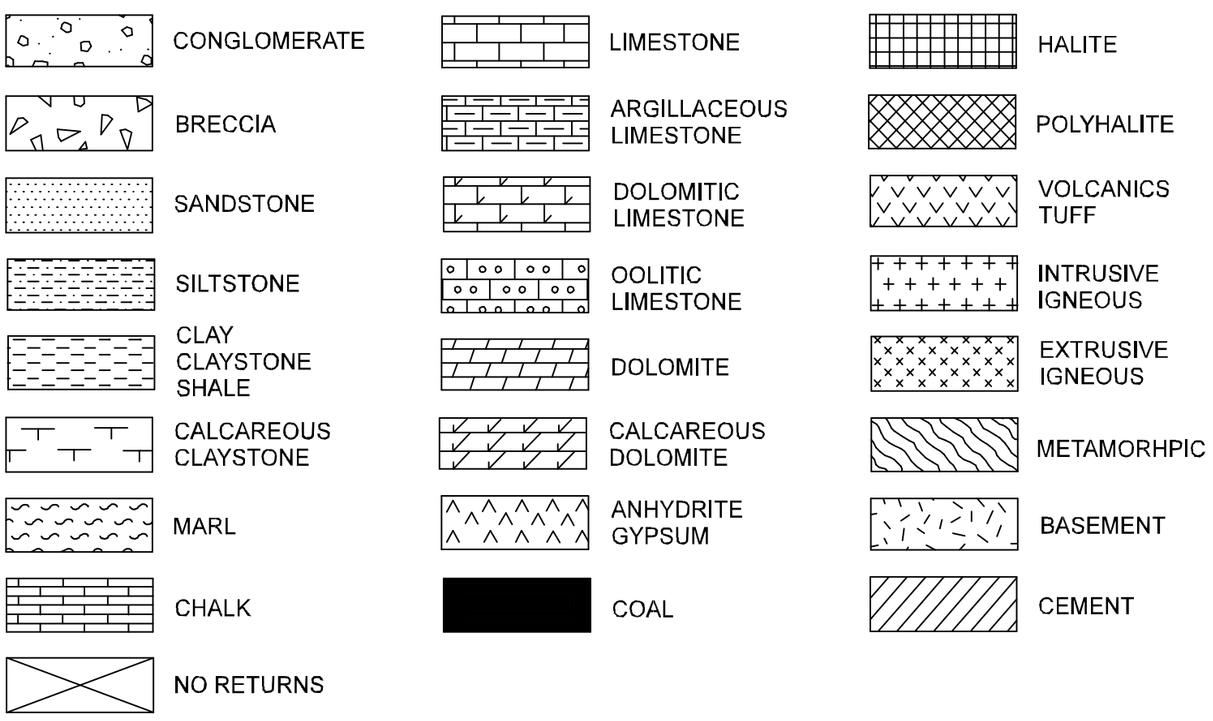
SIDEWALL CORES

RUN	SHOT	DEPTH	RECOVERY	RUN	SHOT	DEPTH	RECOVERY
				1	2	2111	25mm

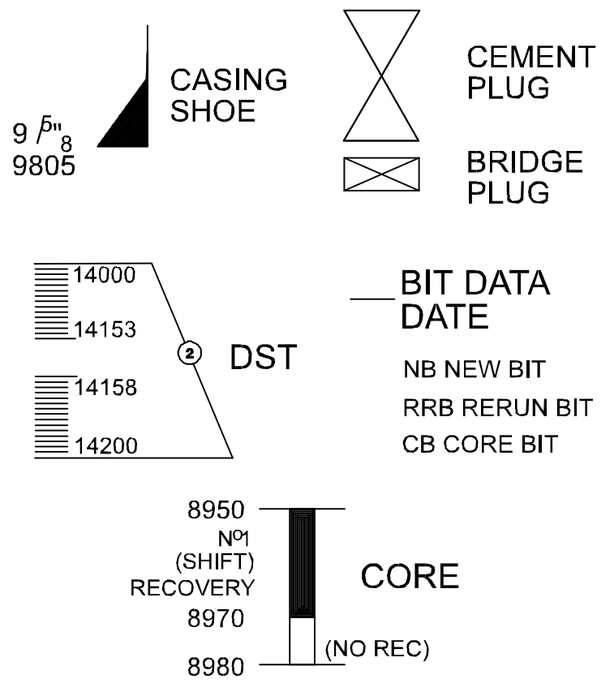
PRESSURE DATA

TEST No.	DEPTH (mMDBRT)	DEPTH (mTVDSS)	HYDROSTATIC PRESSURE INITIAL (Bar)	HYDROSTATIC PRESSURE FINAL (Bar)	FORMATION PRESS (Bar)	MOBILITY (cp)	COMMENT	FORMATION

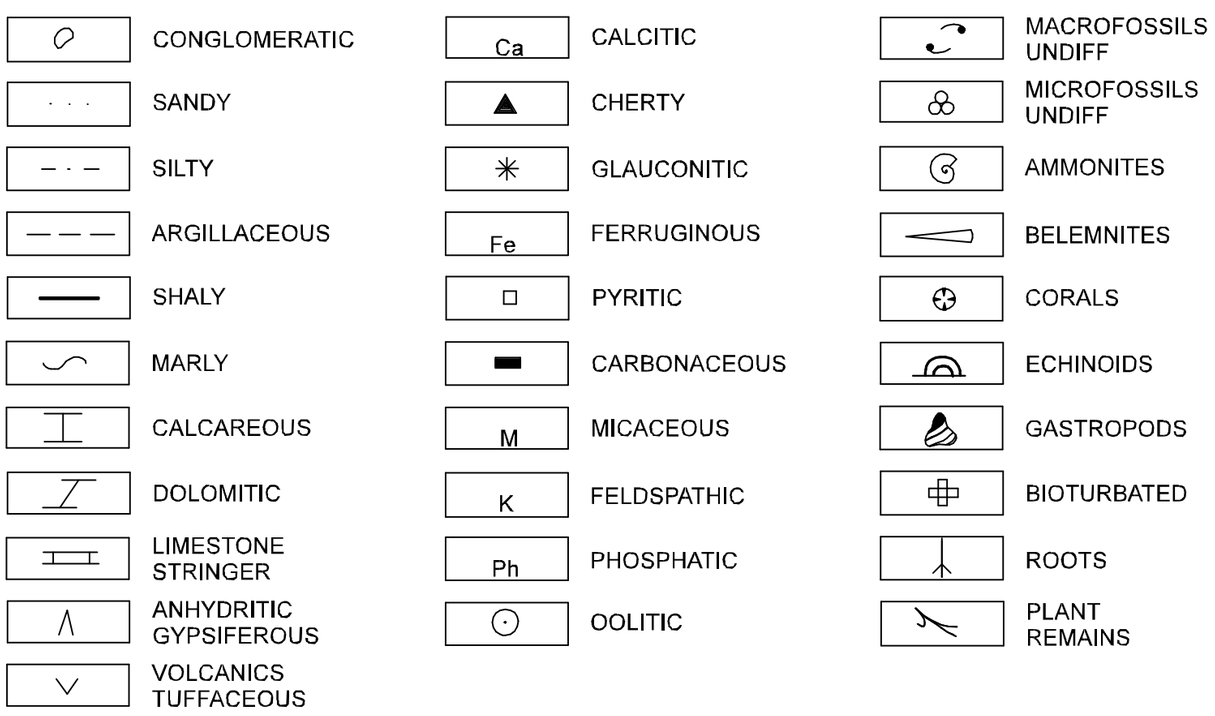
LITHOLOGY SYMBOLS

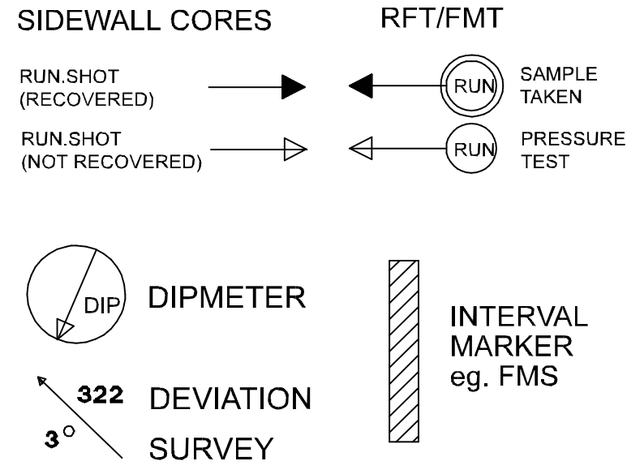


OPERATIONAL SYMBOLS



ACCESSORY SYMBOLS





CHRONO/LITHO STRATIGRAPHY						GAMMA RAY	DEPTH AND LITH	RESISTIVITY	POROSITY	LITHOLOGY DESCRIPTION
SYSTEM	SERIES	STAGE	GROUP	FORMATION	MEMBER	0 GRAFM(api) 150		0.20 RPCHX(Ohm.m) 200 0.20 RACLX(Ohm.m) 200 0.20 RPCLM(ohm.m) 200 0.20 RACLM(ohm.m) 200 0.20 RPCHM(Ohm.m) 200 0.20 RACHM(Ohm.m) 200	45 NPLFM(pu) -15 1.95 BDCFM(g/cc) 2.95	

100

200

0.0
227.9
0.1
227.9
0.3
206.2
0.5
212.8
0.6
215.0
0.7
220.8
0.8
213.4
0.9
213.0
0.8
217.6
0.9
216.6
0.5
0.5
224.3
225.3

300

26 ”
305m

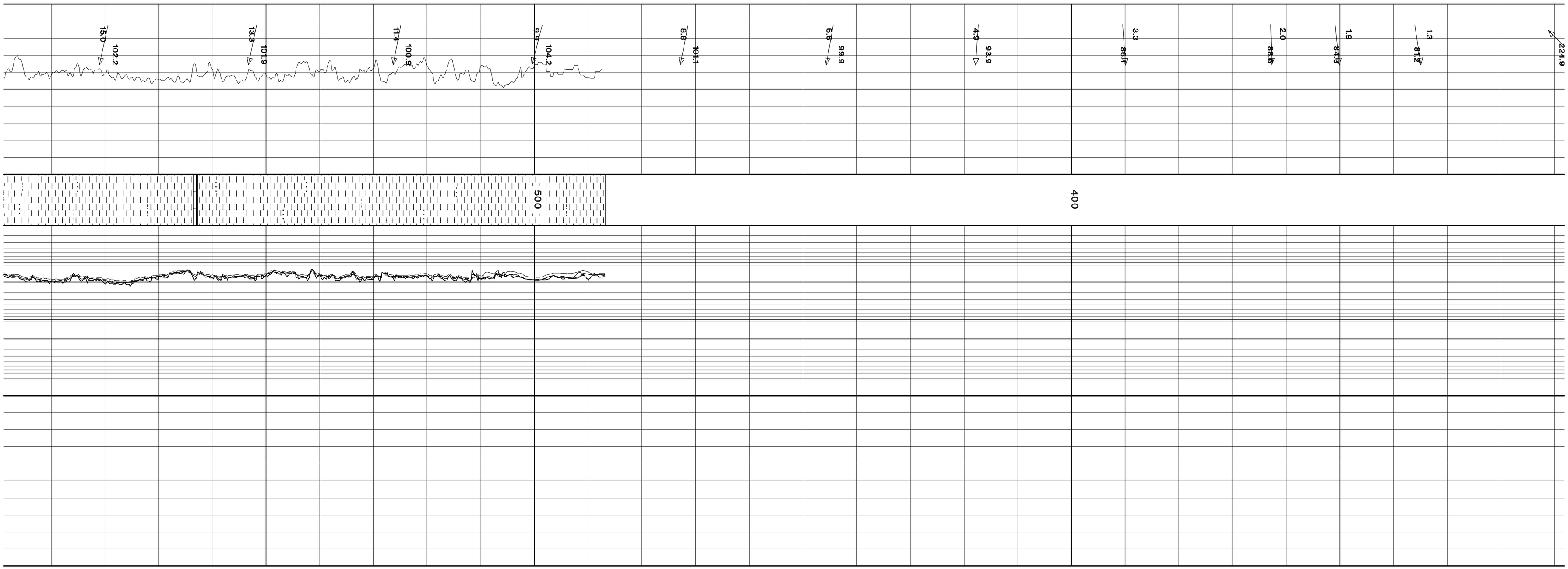
1.4

SEABED @ 188.8m MDRKB

No Cuttings collected
down to 1310m MDRKB

TERTIARY

NORDLAND



Lithology from 487m to 1310m MDRKB interpreted from GR/Res MWD logs only.

TERTIARY

NORDLAND

UTSIRA

600

102.7
16.1

104.3
16.2

105.5
18.1

106.5
20.0

700

106.5
22.1

105.4
24.2

105.1
26.2

104.5
28.1

800

103.9
29.7

103.5
31.1

102.5
32.5

633.6ms TWT

UTSIRA FORMATION
622.5m MDRKB (557.8m TVDSS)

807.0ms TWT

UTSIRA MASSIVE SAND
810.5m MDRKB (731.6m TVDSS)

UTSIRA MASSIVE SAND

TERTIARY

TERTIARY

HORDALAND

UNDIFFERENTIATED

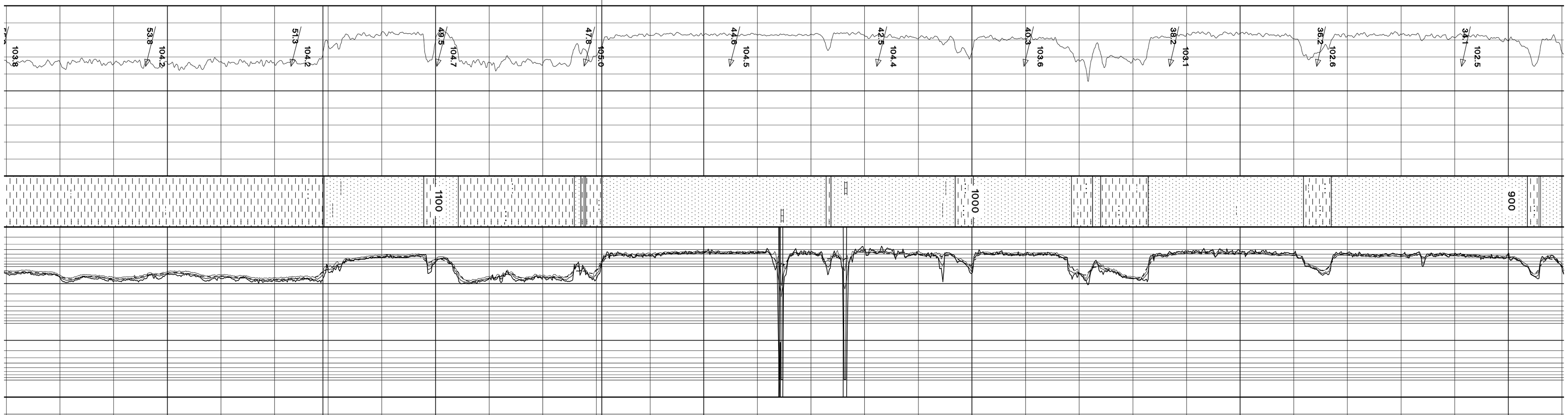
NORDLAND

UTSIRA

NORDLAND

UTSIRA MASSIVE SAND

UTSIRA MASSIVE



1001.2ms TWT
Base UTSIRA MASSIVE SAND
1069.0m MDRKB (937.2m TVDSS)

1028.4ms TWT
HORDALAND GROUP
1121.0m MDRKB (971.1m TVDSS)

TERTIARY

HORDALAND

UNDIFFERENTIATED

55.9

1200

103.6
57.1

103.1
58.7

103.6
60.3

103.5
61.1

103.9
61.2

1300

13⅜"
1306m

102.4
61.8

100.0
61.9

1400

94.7
62.0

91.6
62.0

62.0
88.7

BEGIN TAKING SPOT SAMPLES AT 50m INTERVALS

CLAYSTONE: brownish black, soft, friable in part, subblocky, moderate to very silty, micromicaceous, trace micropyrite, occasional glauconite, slightly calcareous.

PIT @ 1313.0 m MDBRT
1.70 SG EMW

CLAYSTONE: dark grey to greyish black, also brownish black, occasionally medium grey, firm to moderately hard, crumbly to sub blocky break, silty to very silty in part, common mica, glauconitic, occasional mcropyrite.

CLAYSTONE: dark grey to greyish black, occasionally medium grey, firm to moderately hard, crumbly to sub blocky break, silty to very silty in part, common mica, glauconitic, occasional mcropyrite.

SANDSTONE: light yellowish brown, firm to friable, Bimodal, composed of clear occasionally opaque quartz grains, vf to silt sub angular to rounded, well sorted in argillaceous cement, and common coarse to very coarse colourless, clear quartz grains, well rounded, loose, slightly elongate, common micropyrite and micromica.

CLAYSTONE: dark grey to greyish black, occasionally green black, firm to moderately hard, sub blocky, tabular to fissile break, common glauconite and mica, occasional micropyrite, silty in part.

TERTIARY

HORDALAND

UNDIFFERENTIATED

62.0
85.1

62.0
81.6

1500

63.2
78.2

64.0
75.1

64.0
71.8

1600

64.9
68.5

66.8
65.9

68.1
63.2

1700

68.3
60.1

70.0
57.4

70.0

CLAYSTONE: dark grey to brownish black, firm to moderately hard, blocky break, micromicaceous, micropyritic, occasional glauconite, silty in part.

CLAYSTONE: olive black to brown black, firm, blocky break, micromicaceous, micropyritic, occasional glauconite, silty in part, slight to moderately calcareous.

Trace SANDSTONE: light grey, locally hard, very fine to medium, subangular, poor to moderately sorted, local hard siliceous cement, slightly calcareous in places, common glauconite.

Trace LIMESTONE: pale to moderately yellowish brown, firm, subblocky, microcrystalline, argillaceous in parts.

CLAYSTONE: dark grey to brownish black, firm, subblocky, silty micromicaceous, micropyritic, local glauconite, swelling in part, non to moderately calcareous.

LIMESTONE: moderate to dark yellowish brown, firm to moderately hard, blocky to subangular, microcrystalline, locally cryptocrystalline, mudstone texture, argillaceous in parts, possibly slightly dolomitic.

RTIARY

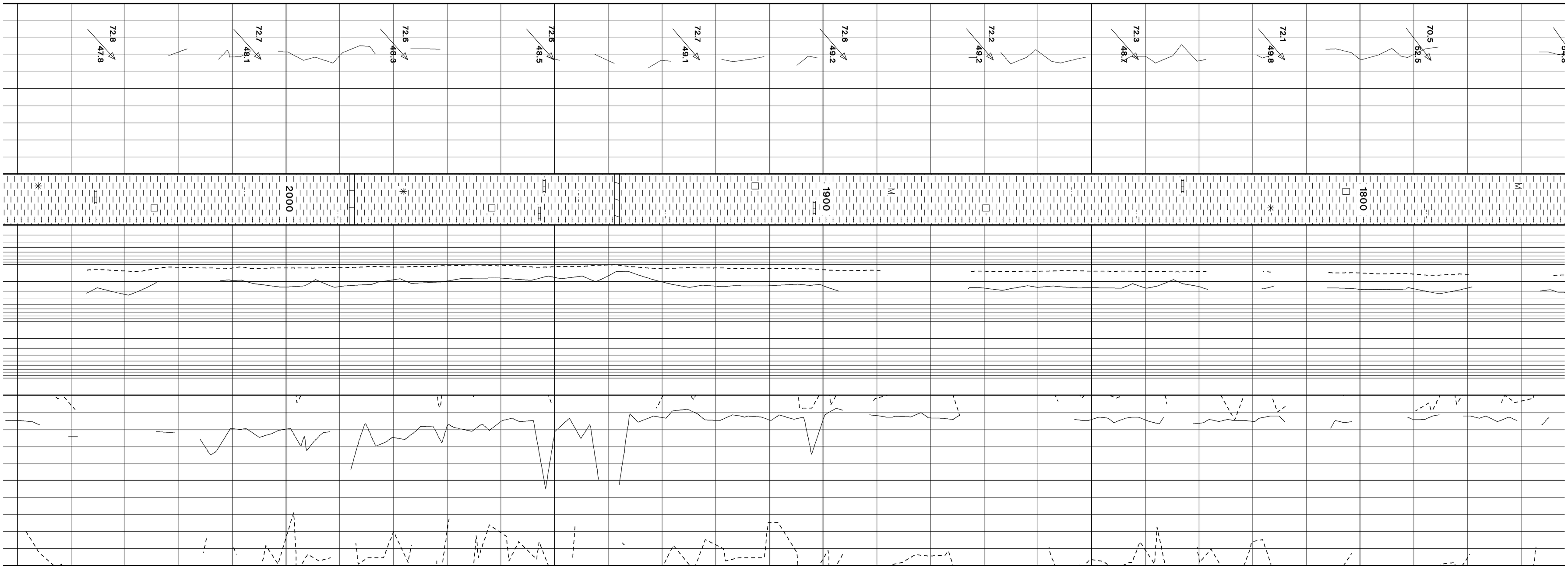
TERTIARY

DALAND

HORDALAND

ERENTIATED

UNDIFFERENTIATED



CLAYSTONE: dark grey to brownish black, firm, subblocky, silty micaceous, microcrystalline, local glauconite, swelling in part, non to slightly calcareous.

Trace LIMESTONE: predominantly pale yellowish brown, firm to moderately hard, blocky to subangular, microcrystalline to locally cryptocrystalline, slightly dolomitic in parts, occasional black stylolitic laminae.

CLAYSTONE: dark grey to brownish black, occasionally greenish black, firm, subblocky, silty in part, trace micromica, micropyritic, local glauconite, swelling in part, non calcareous.

CLAYSTONE: becoming greenish black in part, dark grey, olive black occasionally brownish black, firm, subblocky, slightly silty, trace micropyritic, glauconite, non calcareous.

DOLOMITE: pale to dark yellowish brown, firm to moderately hard, subblocky, crumbly in part, microcrystalline, microsucrosic, argillaceous in part.

LIMESTONE: pale to moderate yellowish brown, yellowish grey, firm to moderately hard, subblocky, brittle in part, micro-cryptocrystaline, grades to Dolomite in parts.

CLAYSTONE: greenish black, dark grey, olive black, locally dark greenish grey, firm, subblocky, slightly silty, trace micropyritic, glauconite, non calcareous.

CLAYSTONE: greenish black, dark grey, olive black, locally dark greenish grey, firm, subblocky, slightly

TERTIARY

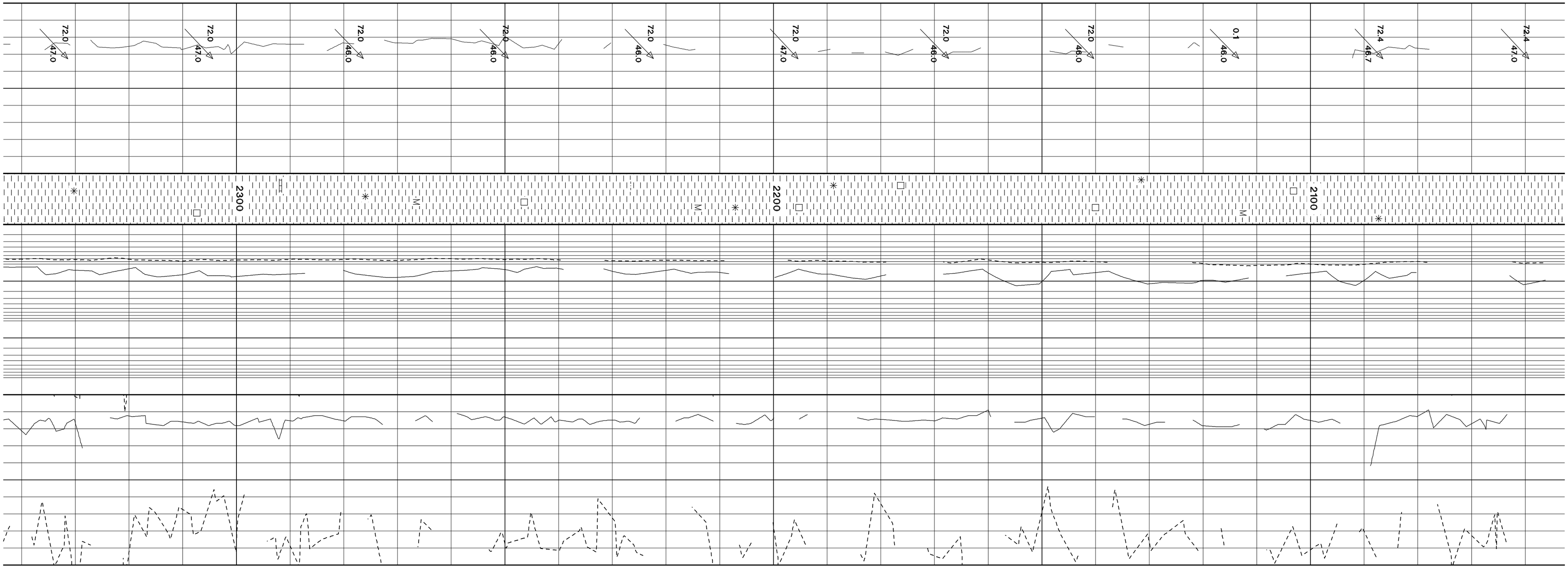
TEI

HORDALAND

HOR

UNDIFFERENTIATED

UNDIFFE



silty, trace micropyritic, glauconite, non calcareous.

CLAYSTONE: dark grey to olive grey, olive black, moderately hard, blocky to angular break, hackly break in part, glauconitic, pyritic, locally micromicaceous.

CLAYSTONE: greyish black to olive black, occasionally greenish black, hard, blocky to hackly break, generally micropyritic, locally micromicaceous, rare glauconite.

CLAYSTONE: greyish black to olive black, occasionally greenish black, rare medium bluish grey, hard, blocky to hackly break, generally micropyritic and glauconitic, locally micromicaceous.

CLAYSTONE: olive black, moderately hard, blocky to angular break, common fine disseminated pyrite, slightly micromicaceous, rare glauconite.

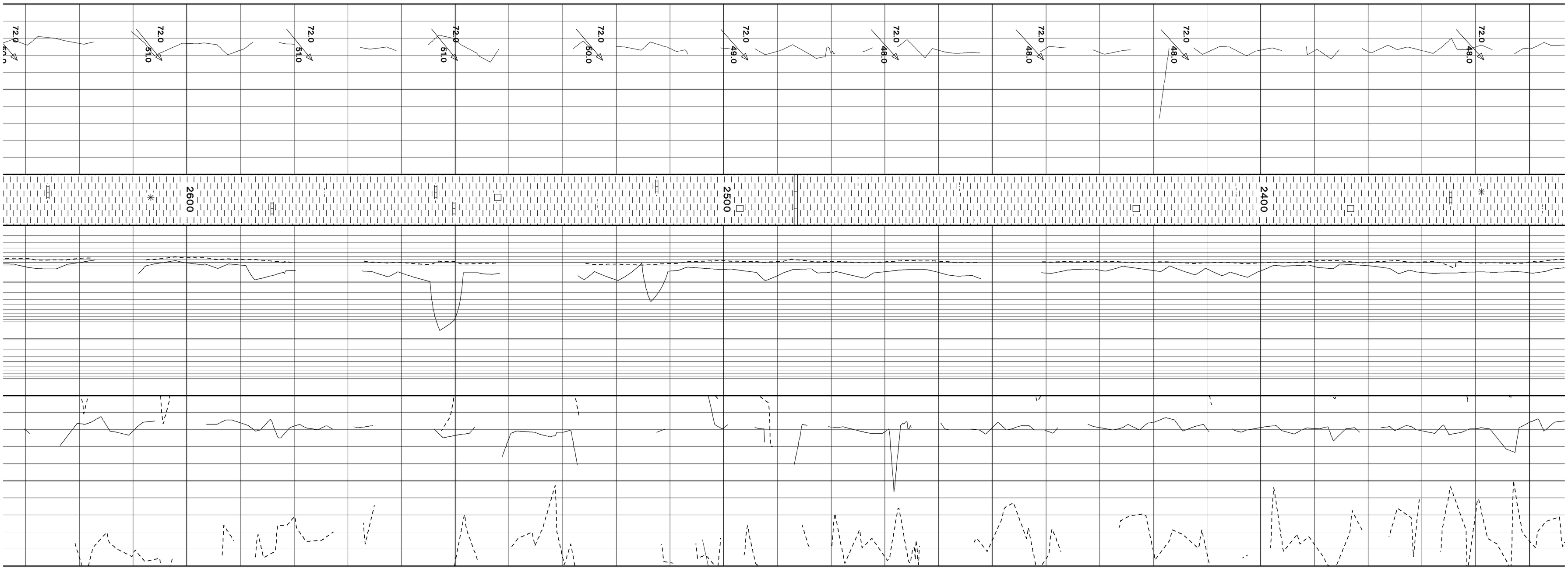
CLAYSTONE: olive black, rarely greenish black, moderately hard, blocky to angular break, common fine disseminated pyrite, occasional very coarse nodular pyrite, locally micromicaceous, rare glauconite.

CLAYSTONE: dark grey to olive black, hard to brittle, blocky break, silty, micaceous, pyritic, locally

TERTIARY

HORDALAND

UNDIFFERENTIATED



glauconitic.

CLAYSTONE: dark grey to olive black, hard to brittle, blocky break, silty, micaceous, pyritic, occasionally glauconitic.

CLAYSTONE: olive grey, to olive black, hard, blocky, common fine disseminated pyrite, occasional micro mica, rare glauconite.

CLAYSTONE: olive grey to olive black, occasionally medium blue grey, firm to hard, blocky, locally flaky to hackly break, generally micropyritic, micromicaceous in part.

LIMESTONE: light grey, light olive grey, occasionally moderate yellowish brown translucent in part, firm to hard, blocky to crumbly break, crystalline to microcrystalline, mudstone texture.

CLAYSTONE: olive grey to olive black, rarely medium bluish grey, firm to hard, blocky, occasionally flaky to hackly break, generally micropyritic, micromicaceous in part.

CLAYSTONE: greenish black, olive black, firm to hard, blocky, common micropyritic in discrete patches, rare glauconite, trace micropyrite.

TERTIARY

HORDALAND

UNDIFFERENTIATED

CLAYSTONE: dark grey, greyish black, occasionally greenish black, firm, crumbly, to subblocky, micropyritic, discrete patches, micromiaceous, glauconitic in part.

LIMESTONE: pale to dark yellowish brown, greenish grey in places, firm to moderately hard, blocky to crumbly, break, generally microcrystalline, rarely chalky texture, mudstone, slightly argillaceous in parts.

CLAYSTONE: dark grey to greyish black, locally greenish black, also olive black, firm, blocky, micropyritic, slightly micromiaceous, rare glauconite, non calcareous.

CLAYSTONE: olive black to greyish black, dark grey, rarely dark greenish grey, firm, blocky, locally silty, micropyritic, slightly micromiaceous, rare glauconite, moderately swelling, non calcareous.

DOLOMITE, pale to dark yellowish brown, firm to locally hard, blocky to crumbly break, microcrystalline, microsucrosic in part, locally argillaceous, occasionally grades to dolomitic Limestone.

TERTIARY

ROGALAND HORDALAND UNDIFFERENTIATED

BALDER

73.7 29.9

73.5 26.7

74.6 23.8

74.6 20.9

74.6 17.3

75.7 14.4

75.6 10.9

76.0 7.0

76.0 4.0

77.0 1.0

78.0 358.0

3000

3100

3200

M

CLAYSTONE: olive black to greyish black, dark grey, rarely dark greenish grey, firm, blocky, locally silty, micropyritic, slightly micromicaceous, rare glauconite, moderately swelling, non calcareous.

Trace LIMESTONE: pale to moderate yellowish brown, occasionally yellowish grey and very light grey, firm to hard, blocky to crumbly break, generally microcrystalline, locally crystalline, locally argillaceous, occasionally dolomitic.

CLAYSTONE: becoming varicoloured, olive black, greyish black, dusky yellowish brown in part, also dark to medium dark grey, greenish black and rarely dusky green, firm, blocky, slightly silty, trace micropyritic, slightly micromicaceous, trace glauconite, occasional trace Tuff, non calcareous

CLAYSTONE: dusky brown, dark grey to dark olive grey, dusky yellowish brown, olive black, occasionally greenish black and rarely dusky green, rare medum blueish grey to greenish grey, firm, blocky, slightly silty, trace micropyrite, trace glauconite, rarely tuffaceous, non calcareous.

SANDSTONE: olive grey, very fine to medium, dominantly fine to medium, silty, subangular to subrounded, poor to moderately sorted, argillceous/silty matrix, weak silica cement in part, friable, rarely loose, trace mica and carbonaceous material, poor visible porosity, no visible Show.

CLAYSTONE: dusky brown (90%), locally dark grey to dark olive grey and medum bluelsh grey to greenish grey, firm, earthy texture, sublocky, slightly silty, rare micropyrite, slight to moderately swelling, non calcareous.

1685.4ms TWT

BALDER FORMATION
3086m MDRKB (1661.6 mTVDSS)

CLAYSTONE: dark grey, dusky brown, medium blue grey, occasionally green grey, firm to moderately hard, sub bolcky, slightly silty, micropyritic, micromicaceous, common dark carbonaceous specks, rare trace tuff.

CLAYSTONE: dark grey occasionally dusky brown, hard, subblocky occasionally slightly hackly break, slightly silty, micropyritic, micromicaceous, carbonaceous.

LIMESTONE: dark yellowish brown, hard, subblocky to slightly hackly break, microcrystalline to cryptocrystalline, mudstone texture.

CLAYSTONE: dark grey to grey black, occasionally dusky brown, rare medium blue grey, hard, subblocky occasionally slightly hackly break, slightly silty, micropyritic, micromicaceous, carbonaceous.

LIMESTONE: dark yellowish brown, hard, subblocky to slightly hackly break, microcrystalline to cryptocrystalline, mudstone texture. Occasionally dolomitic in part, dusky yellowish brown, with yellow orange banding, hard, blocky slightly crumbly break, microcrystalline.

CLAYSTONE: dark grey to greyish black, occasionally brownish black, rare dark greenish grey, hard, blocky to slightly hackly break, pyritic, common carbonaceous specks, micromicaceous in part, occasional Tuff.

TUFF: medium blueish grey, occasionally very light grey, speckled, firm crumbly break, very common clear to dark greenish grey, very fine to fine, angular glassy fragments, calcareous in part, swelling.

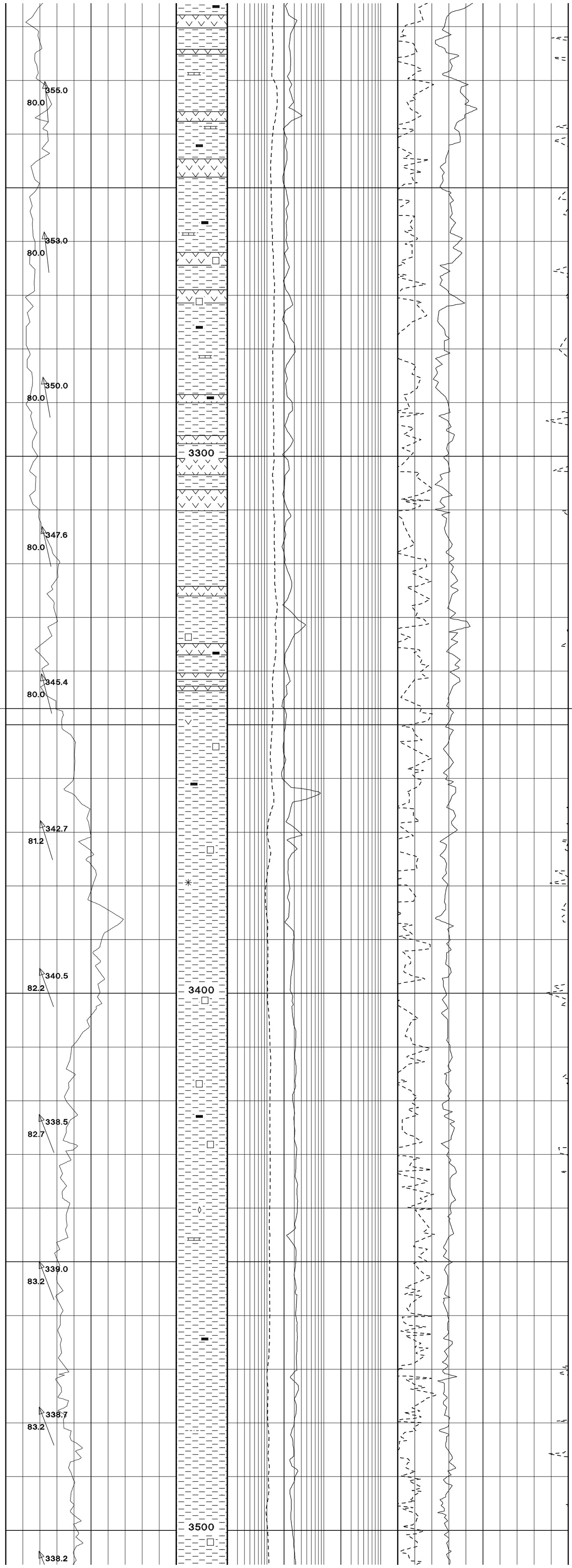
CLAYSTONE: dark grey to greyish black, brownish black, rare dusky brown to moderate brown, firm to moderately hard, subblocky to subhackly micropyritic

TERTIARY

ROGALAND

SELE | BALDER

YPRESIAN 1 | YPRESIAN 2



moderately hard, subblocky to subhackly micropyritic, occasional very coarse nodular pyrite, common carbonaceous fragments.

LIMESTONE: yellowish grey with dark argillaceous streaks, hard, crumbly breaks, microcrystalline to cryptocrystalline, mudstone texture.

TUFF, light blueish grey to blueish white, specked , firm crumbly break, very common clear to dark greenish grey, very fine to fine, angular, glassy fragments, common carbonaceous fragments, calcareous in part, swelling.

CLAYSTONE: dark grey to greyish black rare dusky brown, firm to moderately hard, sub blocky to sub hackly micropyritic, occasional very coarse nodular pyrite. common carbonaceous fragments.

TUFF, light blueish grey to blueish white, specked , firm crumbly break, very common clear to dark greenish grey, very fine to fine, angular, glassy fragments, common carbonaceous fragments, calcareous in part, swelling.

TUFF, light blueish grey to blueish white, specked , firm crumbly break, very common clear to dark greenish grey, very fine to fine, angular, glassy fragments, common carbonaceous fragments, very pyritic in part, nodular and finely disseminated, very calcareous in part, swelling.

CLAYSTONE: dark grey, brownish black, occasional moderate brown, rare dark greenish black, firm to hard, blocky, slightly hackly break, micropyritic, occasional coarse nodular pyrite, carbonaceous, rarely micromicaceous.

TUFF, light blueish grey to blueish white, specked , firm crumbly break, very common clear to dark greenish grey, very fine to fine, angular, glassy fragments, common carbonaceous fragments, very pyritic in part, nodular and finely disseminated, very calcareous in part, swelling.

LIMESTONE: white, firm to hard, blocky to crumbly break, microcrystalline, common glassy inclusions, wackestone texture.

TUFF: medium to light blueish grey, common blue white inclusions, abundant dark green glassy inclusions, angular to assicular, firm, crumbly break, swelling.

CLAYSTONE: olive grey to olive black, grey black, rarely medium brown, occasionally tuffaceous medium to light blueish grey, hard to blocky break, very pyritic and carbonaceous in part.

1731.2ms TWT

SELE FORMATION (BASE BALDER)
3347.0m MDRKB (1713.6m TVDSS)

CLAYSTONE: olive grey to olive black, grey black, rarely medium brown, occasionally tuffaceous medium to light blueish grey, hard to blocky break, very pyritic and carbonaceous in part.

CLAYSTONE: olive black, moderately hard, , blocky to brittle break, very common micropyrite, occasional nodular pyrite, glauconitic in part.

CLAYSTONE: olive black to olive grey, moderately hard, blocky to britle break, slightly hackly in part, common micro pyrite.

CLAYSTONE: olive black to olive grey, rare moderate brown, moderately hard, blocky to britle break, slightly hackly in part, common micro pyrite and nodular pyrite, rare glauconite and carbonaceous fragments.

CLAYSTONE: olive black to olive grey, rare moderate brown, moderately hard, angular to hackly break, common micro pyrite and nodular pyrite, rare glauconite, common carbonaceous fragments, occasional intergrowths of sparry calcite.

LIMESTONE: light olive grey, firm to hard, blocky to crumbly break, microcrystalline, mudstone texture.

CLAYSTONE: dark grey black to olive black, occasional medium brown to brown black, hard, blocky slightly hackly break, micropyritic carbonaceous in part.

CLAYSTONE: dark greyish black to olive black, occasionally dusky brown, rare dark greenish grey, hard to brittle, blocky to hackly break, very pyritic in part, carbonaceous, rare glauconite.
Trace LIMESTONE: yellowish grey, light brownish

TERTIARY

ROGALAND

SELE

ZONE II SAND

YPRESIAN 1

YPRESIAN 6

83.2

338.6
83.2

338.8
83.2

338.6
83.2

3600

339.1
83.2

339.5
83.2

339.6
83.2

3700

339.9
83.2

340.1
83.2

340.0
83.0

orange, firm crumbly break, microcrystalline to cryptocrystalline.

CLAYSTONE: predominantly olive black, greyish black to dark grey in part, occasionally dusky brown, rare greenish black, firm to moderately hard, blocky, slightly silty, common disseminated pyrite, also nodular pyritic in part, carbonaceous, slight to moderately swelling, non calcareous.

SANDSTONE: brownish grey, clear Quartz, very fine to medium, dominantly fine to medium, silty, subangular, poor to moderately sorted, abundant argillaceous/silty matrix, weak silica cement in places, friable, loose in part, poor estimated porosity, no visible Show above OBM.

CLAYSTONE: olive black, also greyish black to dark grey in part, trace dusky brown and dark greenish grey, firm to moderately hard, blocky, slightly silty, common disseminated pyrite, carbonaceous, occasional grey tuffaceous streaks, non calcareous

CLAYSTONE: greyish black to olive black in part, also dark grey, trace dusky brown, occasionally dark greenish grey to greenish black, firm to moderately hard, blocky, slightly silty, slightly micromiceous common disseminated pyrite, carbonaceous, occasional grey tuffaceous streaks, trace glauconite, non calcareous

SANDSTONE: brownish grey, clear Quartz, very fine to medium, dominantly fine to medium, subangular, poor to moderately sorted, argillaceous/silty matrix in part, weak silica cement in places, friable, loose in part, poor estimated porosity, no visible Show above OBM.

TUFF: medium bluish grey to medium grey in part, speckled, firm, crumbly break, silty texture, trace micropyrite, non calcareous, swelling.

SANDSTONE/SAND: very light grey, clear Quartz, very fine to coarse, dominantly fine to coarse, subangular to subrounded, poor to moderately sorted, common strong white calcite cement, local argillaceous matrix, friable to hard, loose in part, poor to moderate estimated porosity, no visible Show above OBM.

1774.2ms TWT

ZONE II SAND
3692m MDRKB (1756.9m TVDSS)

SANDSTONE/SAND: light grey, light brownish grey, clear Quartz, very fine to coarse, dominantly fine to medium, subangular to subrounded, moderately sorted, rare white calcite cement, trace argillaceous matrix, friable to rarely hard, predominantly loose in part, poor to moderate estimated porosity, no visible Show above OBM.

TUFF: light to medium bluish grey, medium grey in part, speckled, firm, crumbly break, silty texture, rare micropyrite, occasionally slightly calcareous, swelling, argillaceous, locally arenaceous.

SANDSTONE/SAND: light grey, light brownish grey, clear Quartz, very fine to coarse, dominantly fine to medium, rare coarse grains, subangular to subrounded, locally rounded, moderately sorted, rare calcite cement, local argillaceous/tuffaceous matrix, friable, generally loose, poor to good estimated porosity, no visible Show above OBM.

1785.9ms TWT

BASE ZONE II SAND
3727.5m MDBRT (1761.2m TVDSS)

CLAYSTONE: predominantly dark grey to dark olive grey, also olive black to greyish black, occasionally dusky brown and greenish black, firm to moderately hard, blocky to subangular, locally silty, trace micropyrite, rare glauconite, trace Tuff, non calcareous.

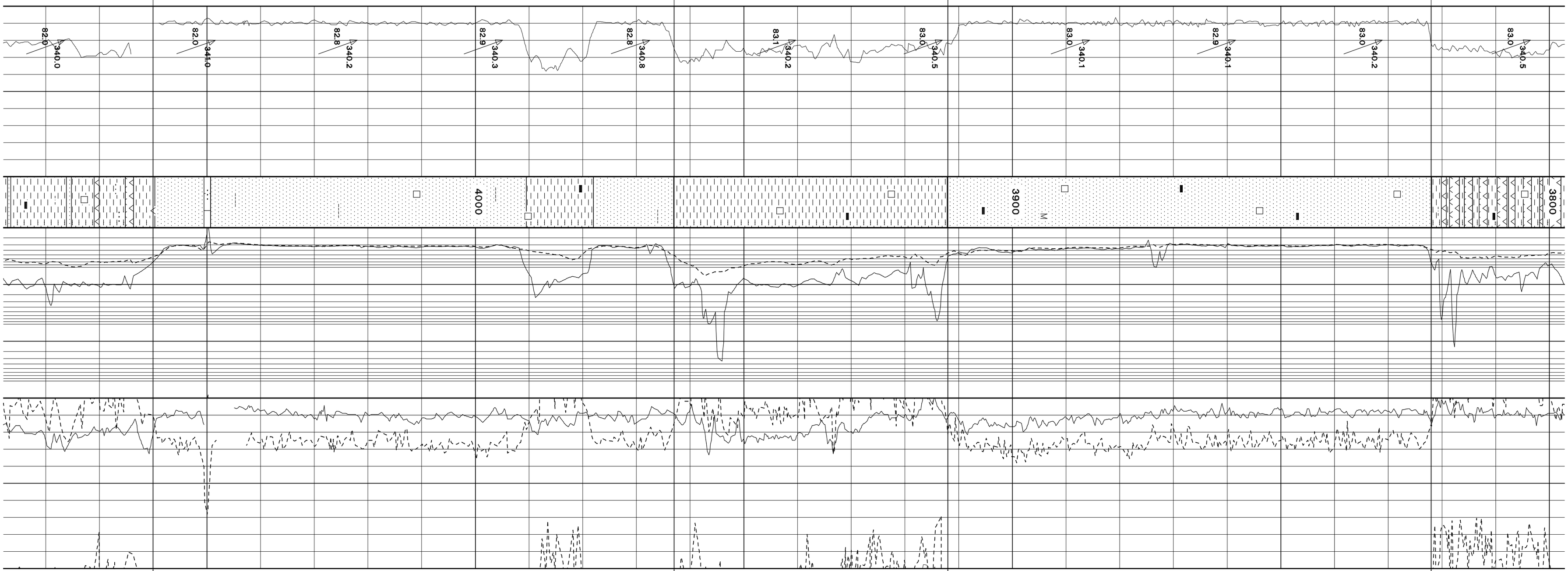
CLAYSTONE: predominantly dark grey to dark olive grey, also olive black to greyish black, occasionally dusky brown, firm to moderately hard, blocky to sub blocky angular, locally silty, trace micropyrite, rare chlorite.

SANDSTONE: loose quartz grains colourless, clear, occasionally opaque, fine to medium grained, mode medium, sub angular, generally spherical,well sorted, common light grey argilaceous cement, good inferred porosity, no show.

CLAYSTONE: Dark grey to olive black , occasionally moderate brown, rare dark green grey, hard, blocky to hackly break, micropyritic, very carbonaceous in part, rare glauconite.

LIMESTONE: white to very light grey, firm, brittle in

TERTIARY	TERTIARY	TERTIARY	TERTIARY
YPRESIAN 1? / YPRESIAN 1?	THANETIAN 4	THANETIAN 6	THANETIAN 6 / THANETIA
ROGALAND	ROGALAND	ROGALAND	ROGALAND
LISTA	LISTA	LISTA	LISTA / SELE



TUFF: light blue grey, speckled, firm angular to splintery break, occasional dark green glassy angular inclusions, common white pyritic inclusions, swelling, argillaceous.

1790.4ms TWT
ZONE IB UPPER SAND
3822.0m MDBRT (1772.5m TVDSS)

SANDSTONE: loose quartz grains colourless, clear occasionally cloudy, very fine to medium grained rare coarse grained, mode medium, sub round, generally spherical , coarse grains sub elongated, moderate sorting, good inferred porosity, common carbonaceous fragments and fine pyrite nodules. No show.

SANDSTONE: loose quartz grains, colourless, clear occsionally opaque, fine to medium grained occasionally coarse mode medium, generally sub rounded, spherical, moderatedly sorted, good inferred porosity, occasional carbonaceous fragments and fine pyrite nodules. No show.

SANDSTONE: loose quartz grains, colourless occasionally light grey, clear rarely cloudy slightly frosted in part, fine to medium grained occasionally coarse, mode medium, sub round, occasionally sub angular, generally equant, rare sub elongated, moderately sorted, occasional mica flakes throughout, occasional carbonaceous fragments, rare argillaceous cement, good inferred porosity, no show.

1797.9ms TWT
BASE ZONE IB UPPER SAND
3912m MDRKB (1783.7m TVDSS)

CLAYSTONE: olive grey to medium dark grey, occasionally medium grey, rare moderate brown, hard, blocky to hackly break, micropyritic, very carbonaceous in part.

TUFF: light blue grey speckled, firm angular to hackly occasionally splintery break, occasional dark green glassy angular inclusions, common white inclusions, rare fine nodular pyritic inclusions, swelling, argillaceous.

1802.0ms TWT
ZONE IB LOWER SAND
3963m MDRKB (1789.7m TVDSS)

SANDSTONE: loose quartz grains, colourless, clear occasionally, cloudy to translucent, fine to coarse grained, mode medium, sub round, occasionally sub rounded, occasionally sub angular, moderately sorted, soft white argillaceous cement, good inferred porosity, no show.

CLAYSTONE: dark grey to olive grey occasionally moderate brown, firm to hard, blocky to hackly break, micropyritic and carbonaceous in part.

SANDSTONE: loose quartz grains, colourless, clear, occasionally cloudy, fine to medium, sub angular to rounded, spherical, moderate to well sorted, common white argillaceous cement/matrix, friable to moderately hard, dominantly loose, trace pyrite, good estimated porosity. No Show.

SANDSTONE: loose quartz grains, colourless, clear, occasionally cloudy, fine to coarse grained, mode medium, sub angular to rounded, spherical, moderately sorted, good inferred porosity, fine nodular pyrite, no show.

SANDSTONE: loose quartz grains, colourless to light grey, clear to cloudy, fine to coarse grained, mode medium, rounded to sub rounded, spherical, good inferred porosity no show, occasional white argillaceous cement.

SANDSTONE: very light to light grey, quartz grains, colourless, light grey, clear to cloudy, fine to coarse grained, dominantly fine to medium, subangular to rounded, spherical, moderate to well sorted, common white argillaceous cement/matrix, friable to moderately hard, dominantly loose, trace pyrite, good estimated porosity. No Show.

1814.0ms TWT
BASE IB LOWER SAND
4060m MDRKB (1801.7m TVDSS)

CLAYSTONE: dark grey to olive black, brownish black in part, locally medium dark grey, occasionally dusky brown, firm to moderately hard, subblocky to blocky, micropyrite, locally finely carbonaceous, non calcareous.

SANDSTONE: very light grey, quartz grains, colourless, clear to cloudy, fine to coarse grained, dominantly fine to medium, subangular to rounded, spherical, moderately sorted, local white calcite cement, friable to moderately hard, dominantly loose, trace pyrite. good estimated porosity. No Show.

TERTIARY

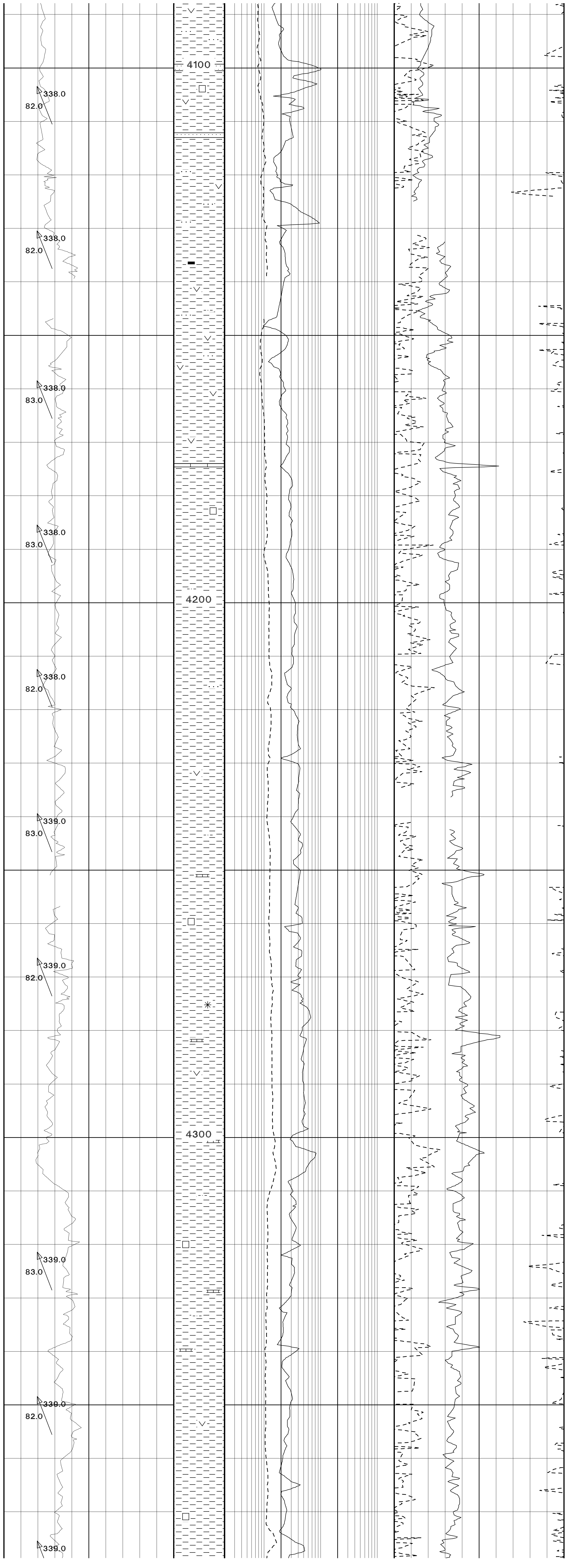
ROGALAND

LISTA

YPRESIAN 1?

THANETIAN 4

THANETIAN 3



TUFF: medium grey to medium bluish grey, firm, crumbly to sub blocky, slightly speckled, with white and dark glassy inclusions, silty texture, rare fine pyrite, argillaceous, non calcareous.

CLAYSTONE: dark grey to olive black, dark olive grey to olive grey, occasionally, rarely dusky brown, firm to moderately hard, subblocky, slightly silty in part, trace micropyrite, locally tuffaceous, non calcareous

CLAYSTONE: becoming predominantly dark greenish grey to greenish black, olive black to brownish black, rarely dusky brown, subwaxy in part, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, non calcareous.

TUFF: medium grey to medium bluish grey, firm, crumbly to sub blocky, slightly speckled, with white and dark inclusions, silty texture, rare fine pyrite, argillaceous, locally calcareous

CLAYSTONE: predominantly dark greenish grey, locally greenish black, locally brownish black to olive black, also dark to medium dark grey, rarely dusky brown, subwaxy in part, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, non calcareous.
Trace SANDSTONE: white to very light grey, very fine to fine, rarely medium, good calcareous cement, firm, argillaceous in places. No Show.

CLAYSTONE: predominantly dark greenish grey, locally greenish black and greenish grey, brownish black, dark to medium dark grey, subwaxy in part, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, non calcareous.

Trace LIMESTONE: very light grey, moderate yellowish brown, pale yellowish orange, firm, crumbly, microcrystalline, argillaceous in part, rarely sandy.

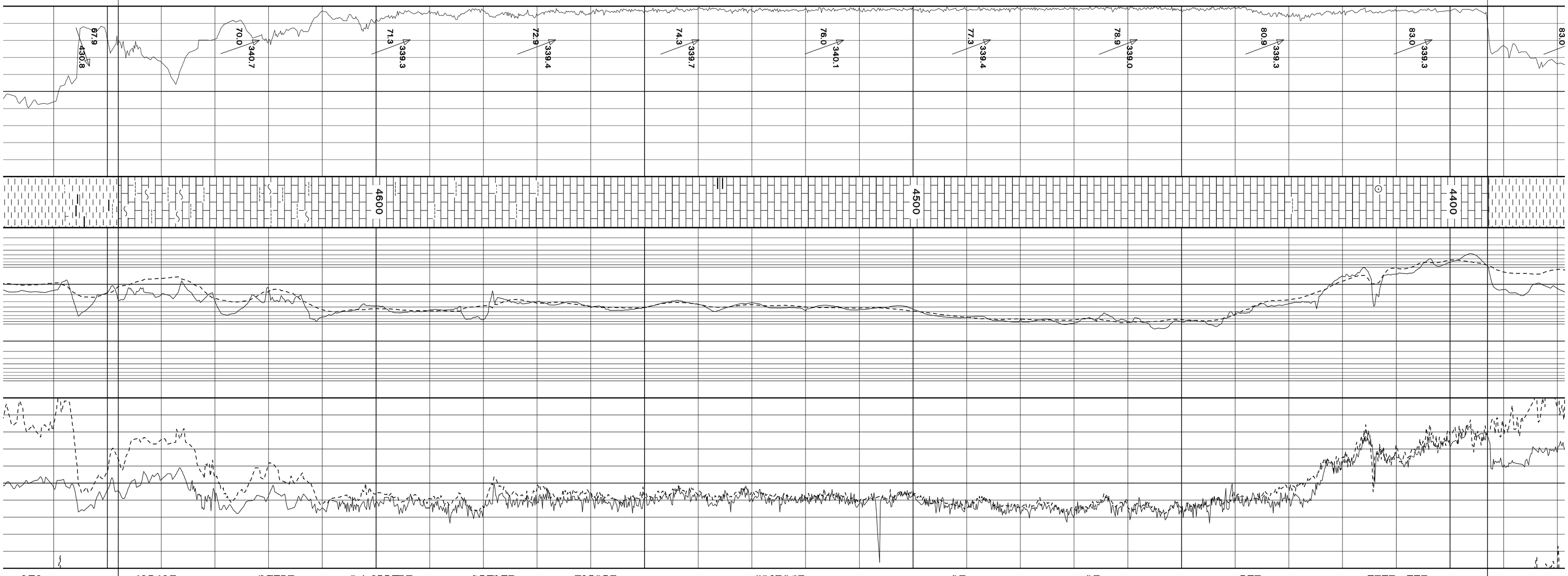
CLAYSTONE: predominantly dark greenish grey, locally dusky yellowish brown, dark to medium dark grey & dusky brown, occasionally olive black and brownish black, subwaxy in part, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, rare trace glauconite & chlorite, non calcareous.

Trace LIMESTONE: light grey to greenish grey, pale yellowish brown in part, firm to moderately hard, crumbly, rarely brittle, microcrystalline, chalky in part, locally argillaceous, rare pyrite.

CLAYSTONE: dark greenish grey, dusky brown, locally dusky yellowish brown, occasionally dark to medium dark grey, also dark greenish grey, rarely bluish grey, locally subwaxy, firm to moderately hard, subblocky, locally silty, trace micropyrite, tuffaceous in part, non calcareous.

CLAYSTONE: dark green grey, moderate brown, dusky yellowish brownm occasional tuffaceous medium blue grey, rare green black, firm to moderately hard, sub blocky, micropyritic, occasional nodular pyrite, rare sparry calcite, rare glauconite.

JURASSIC		CRETACEOUS		CRETACEOUS	TERTIARY
ER JURASSIC		UPPER CRETACEOUS		UPPER CRETACEOUS	
J 6					
NLIN GP.	VIKING	CROMER KNOLL GP.	SHETLAND GP.	SHETLAND	ROGALAN
SEN FM.	HEATHER?	UNDIFFERENTIATED	UNDIFFERENTIATED		LISTA



1851.6ms TWT
SHETLAND GROUP
4393m MDRKB (1842.7m TVDSS)

LIMESTONE: white, soft to firm, crumbly to sub blocky, locally moderately argillaceous laminae, cryptocrystalline, mudstone texture chalky.

LIMESTONE: white, soft to firm, crumbly to subblocky break, cryptocrystalline, mudstone texture, chalky. Rare trace Ooilitic limestone light olive grey, hard, blocky to angular break, grain supported ooiths.

LIMESTONE: white, firm to hard, crumbly to slightly brittle break, occasional dark argillaceous streaks, microcrystalline, mudstone texture.

LIMESTONE: white, hard, angular to brittle break splintery in part, microcrystalline, mudstone texture.

LIMESTONE: white, occasionally very light grey, firm to moderately hard, crumbly to blocky in part, subangular and splintery in places, commonly brittle, porcellaneous in part, microcrystalline, mudstone, chalky to compact, occasional dark argillaceous streaks (stylolites), very poor chalky porosity. No Shows.

LIMESTONE: white, hard, angular to brittle break, splintery in part, microcrystalline, mudstone texture.

LIMESTONE: white, locally light grey, firm to moderately hard, locally hard, crumbly to blocky, also subangular to locally splintery, brittle in part, microcrystalline, mudstone, chalky to compact, occasionally argillaceous, very poor chalky porosity. No Shows.

LIMESTONE: white, locally pinkish grey to light brownish grey, rarely light greenish grey, also light grey in places, firm to moderately hard, crumbly to blocky in places, brittle in part, microcrystalline, mudstone chalky to locally compact, slightly argillaceous in places. No Shows.

LIMESTONE: light brownish grey to pale brown, locally pinkish grey, locally white, generally soft to firm, locally moderately hard, crumbly to blocky, microcrystalline, mudstone, chalky, slight to moderately argillaceous, marly local greyish brown Claystone streaks.

Trace CLAYSTONE: greyish brown, soft to firm, subblocky, crumbly, calcareous, marly.

LIMESTONE: grey orange pink, occasionally white, rare light brown mottled in places, moderately hard, blocky to slightly brittle break, microcrystalline, marly in part, common dark argillaceous streaks, rare glauconite inclusions.

LIMESTONE: greyish brown, moderate brown, grey orange pink, locally white, firm to crumbly break, (white fragments generally hard to microcrystalline) microcrystalline, argillaceous, chalky in part, occasionally mottled appearance, slightly silty in part with small glauconite inclusions

1883.0ms TWT
BURTON AMUNDSEN FORMATION
4656m MDRKB (1908.1m TVDSS)

CLAYSTONE: dark grey to grey black firm to hard, blocky break, slightly silty, trace very fine glauconite, calcareous, slightly swelling.

JURASSIC

LOWER JURASSIC

PLIENSBACHIAN 4-5

SINEMURIAN 4

SINEMURIAN 3

TOARCIAN

DU

BURTON-AMUNDS

STATFJORD FM.

S10 SAND

S9 SAND

339.8
66.4

338.9
64.6

340.5
61.7

338.6
58.5

337.9
55.2

4700

M

4800

4900

CLAYSTONE: dark grey to greyish black, firm to hard, blocky break, slightly silty, trace of very fine glauconite, calcareous, slightly swelling. Also rare dark yellowish brown CLAYSTONE: firm, crumbly, non calcareous, silty in part.

CLAYSTONE: dark grey, hard, blocky to brittle break, common dark (glauconite?) mineral specks, non calcareous, slightly swelling. Also trace light brownish grey to pale red purple CLAYSTONE: hard, subblocky calcareous.

1895.6ms TWT

TOP STATFJORD S10 SAND (TOP RESERV.)
4698m MDRKB (1924.6m TVDSS)

SANDSTONE: predominantly loose quartz grains, colourless, clear, occasionally slightly cloudy to opaque, medium to coarse grained, occasionally fine, mode medium, subangular, generally equant, locally subelongated, moderate sorting, occasional soft white kaolin cement, good inferred porosity. No visible show above OBM.

SANDSTONE: loose quartz, colourless, clear, occasionally cloudy to opaque, fine to coarse grained, occasionally very coarse, mode coarse, angular to sub angular, equant to sub elongate, poor sorting, very good visual porosity, no cement no show.

1899.8ms TWT

BASE S10 SAND
4730.5m MDRKB (1932.2m TVDSS)

CLAYSTONE: dark grey, occasionally moderate brown, firm to moderately hard, blocky, silty, carbonaeous, micropyritic.

SANDSTONE: predominantly loose quartz, colourless, clear, locally cloudy, rarely slightly frosted, fine to coarse, mode fine, subangular to subround, generally spherical, poor sorting, good inferred porosity. No visible Show above OBM.

1909.0ms TWT

TOP S9 SAND
4764m MDRKB (1955.8m TVDSS)

SANDSTONE: dominantly loose quartz, colourless, clear, opaque, occasionally cloudy, very fine to fine, coarse, occasionally very coarse, bimodal, subrounded to angular grains, poor sorting, occasional firm, white calcite cement and hard light grey silica cement, poor to moderate inferred porosity. No visible Show above OBM.

SANDSTONE: light grey, colourless quartz, very fine, angular quartz grains, white kaolin or strong grey silica cement, friable in part, carbonaceous fragments, mica flakes, poor inferred porosity. No visible Show.

1915.8ms TWT

BASE S9 SAND
4786m MDRKB (1967.7m TVDSS)

CLAYSTONE: dark grey to brownish black, medium to dark blue grey, dark greenish grey, firm to blocky break, very silty in parts, micropyrite, very carbonaceous, common coaly fragments.

TD 4804m MDBRT (1978.2m TVDSS)

5200

5100

5000

5300

5400

SYSTEM

SERIES

STAGE

GROUP

FORMATION

MEMBER

0 GRAFM(api) 150

0.20 RACHM(Ohm.m) 200

0.20 RPCHM(Ohm.m) 200

0.20 RACLM(ohm.m) 200

0.20 RPCLM(ohm.m) 200

0.20 RACLX(Ohm.m) 200

0.20 RPCHX(Ohm.m) 200

1.95 BDCFM(g/cc) 2.95

45 NPLFM(pu) -15

CHRONO/LITHO STRATIGRAPHY	GAMMA RAY	DEPTH AND LITH	RESISTIVITY	POROSITY	LITHOLOGY DESCRIPTION

APPENDIX IV

LOG ANALYSIS 25/8-15S