

**Final Well Report  
Well 16/2-2, Skuld  
PL265**

**02C94\*164**

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## 1 General well data

### 1.1 Well data record

Well name	:	16/2-2	
Type of well	:	Exploration Well	
Prospect	:	Skuld	
Country	:	Norway	
Area	:	North Sea	
Licence	:	PL 265	
Licensees	:	Statoil ASA (Operator)	30 %
		Petoro AS	30 %
		Esso Exploration and Production Norway A/S	25 %
		Enterprise Oil Norge AS	15 %
Drilling rig	:	Byford Dolphin	
Water depth	:	120 m MSL	
Air gap	:	25 m	
Total depth of well:		1880.0 mMD RKB/1854.5 mTVD MSL (Driller's depth)	
		1885.5 mMD RKB/1860.0 mTVD MSL (Logger's depth)	
On license	:	14.09.2001 at 18:00 hrs	
Rig release/off license:		04.10.2000 at 19:00 hrs	
Formation at TD:		Hidra - ?Rødby Formation	
Geographic coordinates:		58° 58' 07.79" N	
		02° 30' 07.79" E	
		Datum ED-1950, Spheroid Int.1924	
UTM :		UTM Zone 31, CM 3° E	
		6 536 839 N	
		471 371 E	

The position is 4 m in direction 249.0° from the intended location.

Seismic reference : Seismic 3D survey ST00M3  
Inline 2290, Crossline2948

All depths are in meters measured depth (MD) with drill floor (RKB) as datum unless otherwise stated.

PL265  
Well 16/2-2  
Location map

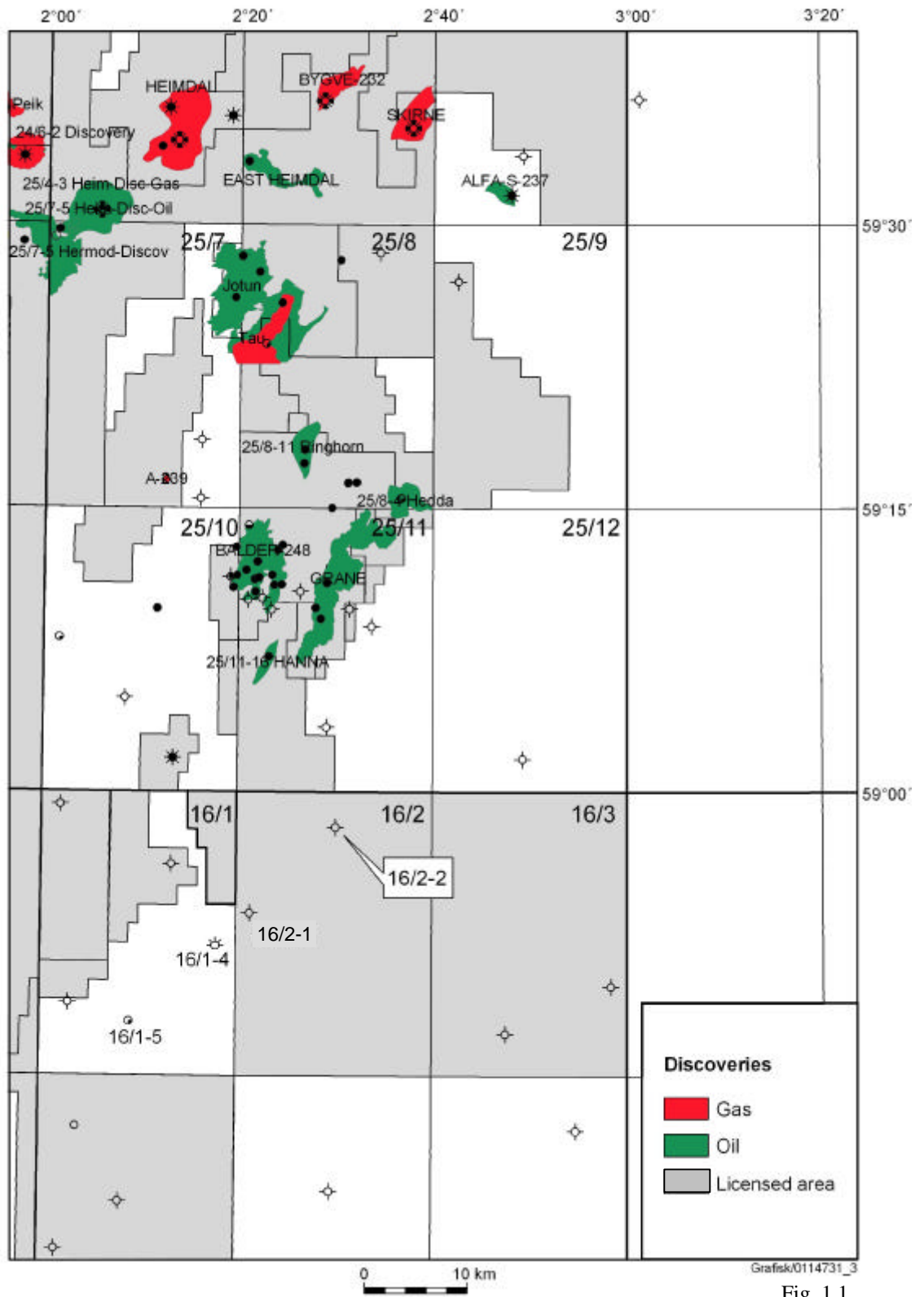


Fig. 1.1

## 1.2 Purpose of the well

The objectives of the well were to

- prove commercial volumes of hydrocarbons
- test the stratigraphic trap and the structural closure.

## 1.3 Results of the well

The water depth at the well location is 120 m MSL. The drilling was terminated at 1880 m (Driller's depth), which is 44 m below the top of the Shetland Group.

- No shallow gas was encountered neither in the Quaternary nor in the Tertiary sequences
- The well is classified as dry; no reservoir rock was developed in the Paleocene section. Only minor amounts of gas were recorded throughout the well.
- The Paleocene sequence is composed of claystones with only occasional traces of coarser clastics (siltstone and rarely sandstone).

Figure 4.1 shows a comparison between the predicted and the observed stratigraphy, including wireline logs (resistivity and gamma ray).

The well is permanently plugged and abandoned.

## 1.4 Well History

### 1.4.1 Casing

Casing	Shoe depth (m)	Leak off tests (Equivalent Mud Weight)
30"	205	
13 3/8"	1305	1.62 g/cm <sup>3</sup>

Table 1.1

### 1.4.2 Conventional Cores

No cores were cut in this well.

### 1.4.3 Sidewall Cores

No sidewall cores were taken in this well.



#### 1.4.4 *Mud logging*

A standard North Sea Mud logging unit, running Geoservices ALS level 5 software, was used for the well (details in the "End of Well Report," Geoservices).

#### 1.4.5 *Logging*

##### 1.4.5.1 *Electric logging*

Schlumberger performed the electric logging.

Run no.	Logged interval (m)	Tool combination	Comments
1A	1307.5 - 1885.5	DSI-PEX-AIT-GR	DSI in csg. to 205m. Reduced sonic data quality in csg.
1A	1880.5 - 498.5	CSI-GR	Four check shots at 500m, 1000m, 1250m and 1625m

Table 1.2

##### 1.4.5.2 *MWD logging*

Baker Hughes Inteq performed the MWD service.

Run no.	Interval (m)	Tool	Comments
1	205 - 1312	MPR; DIR-GR-RES	Logged in 17 1/2" pilot hole. Tool OK
2	1312 - 1634	MPR; DIR-GR-RES-DCP	The GR and RES sensors failed after drilling out of the 13 3/8" csg. shoe. Signal from DIR and DCP only.
3	1634 - 1880	MPR; DIR-GR-RES-DCP	Tool OK

Table 1.3

#### 1.4.6 *Velocity survey*

A zero-offset VSP was run in the 8 1/2" hole section. Altogether data from 52 levels were collected, excluding the 4 check shots at 500m, 1000m, 1250m and 1625m respectively. The tool was run on wireline with a retractable caliper. A summary of the VSP run with spacing and intervals is given in Table 1.4.

Run no.	Interval (m)	Spacing (m)	No. of levels
1A	1880.5 – 1385.5	15	34
	1344.5 – 498.5	50	18

Table 1.4

#### 1.4.7 *Wet Samples*

The uppermost part of the well, from 145m to 1312m, was drilled with returns to sea floor. Cuttings were sampled at every 10m from 1312m to 1640m and at every 3m from 1647m to final TD at 1880m. Only three samples were lost due to fast drilling.

Appendix L contains a detailed sample description.



## **2 Exemption and non-conformances**

None.

### **3 Health, safety, environment and quality (HSE&Q)**

#### **3.1 Synergy reporting**

Number of Synergy reports:	50
Number of lost time accidents:	0
Number of injuries without lost time:	2

### 3.2 Experience listing

System / event	D-time hrs	Experience	Immediate solution	Solution recommended	Ref.
<b>Anchor Handling / Ballasting of Rig</b>					
Waiting for piggy back anchors.		Had problems setting one of the anchors. Piggy back anchors were located at the base in Dusavik.	Used anchor handling vessel to transport new anchor from town.	Consider to have piggy back anchors on the anchor handling vessels, in case needed.	
<b>17 1/2" section</b>					
Preloaded Halliburton cement plugs.		The 20" x 13 3/8" casing hanger was preloaded with Halliburton plug set from shore. Thus saving rig time.		Preloaded plug set is recommended for future operations.	
<b>8 1/2" section</b>					
MPR sub failure.	13,5 hrs.	MPR sub started to transmit erratic status signals while drilling the shoe track. Cont. drill to 1633 m without GR/RES data. High lateral vibrations when drilling out cement may have caused tool failure.	POOH and changed MWD DC and MPR sub.	Consider drilling out shoetrack with full dimension bit/BHA i.e. 12 1/4" bit through 13 3/8" casing.	DBR #11 & 12.
<b>P &amp; A</b>					
HSE - Backloading equipment in containers		While preparing for backloading of equipment after completion of operations, service company forgot to secure the equipment in container	Discussed in the operational meetings together with the safety officer and the service companies.	Should be discussed onshore and offshore prior to future operations	

### 3.3 Time distribution

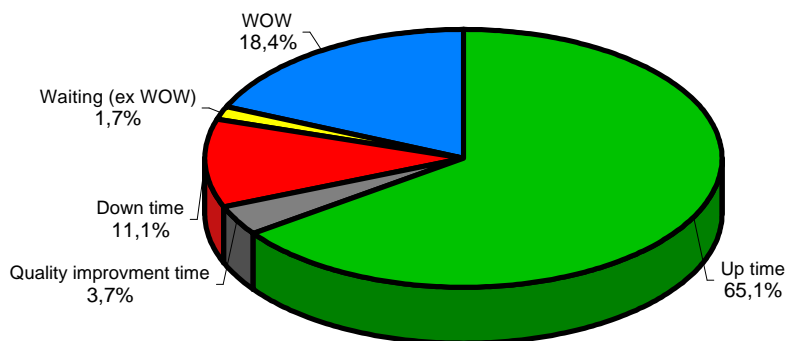
Distribution of down time	Hrs	Cause of waiting time	hrs
Statoil operations	29,25	WOW	88,5
Dolphin	1,5	Waiting (ex. WOW)	8
Schlumberger	3		
Baker Hughes MWD	19,5		
<b>TOTAL D-TIME</b>	<b>53,25</b>	<b>TOTAL W-TIME</b>	<b>96,5</b>

Activity parameters	Days	Hrs	%
Budget time	20,1		
Actual time	20		
Days ahead of Budget	0		
Total D+W-time		149,75	31,2
<b>Op. factor / Efficiency</b> = $\frac{\text{TotalTime} - \text{DownTime} - \text{WOW}}{\text{TotalTime} - \text{WOW}}$			<b>86,4</b>

### Ops. factor

86,4%

Updated: 05.10.01 (well completed)



Well 16/2-2, Skuld

## **4      Geology and formation data report**

### **4.1      Geological setting**

The Skuld prospect was located just to the south of the proven Balder/Grane oil province (Fig. 1.1). Four main prospective sandstones are present in the area: Ty, Lower Heimdal, Middle/Upper Heimdal and Hermod Formations. They form the main proven and potential reservoir intervals over the Greater Balder Area and were believed to be present in the Skuld prospect.

The prospect was interpreted to be a three-way stratigraphic trap, combined with a one-way dip closure, within a deep marine fan system of Heimdal age. The extension of the prospect was defined by a Paleocene thickness anomaly, attributed to the presence of sand, as well as a regional oil-water contact at 1760m MSL. The feeder was interpreted to be located towards the northwest and migration was believed to take place directly from the South Viking Graben, as well as from a fill-spill situation in the Balder-Grane area.

The objectives of the well were to

- prove commercial volumes of hydrocarbons
- test the stratigraphic trap and the structural closure

Criteria for the location of the well were:

- the presence of a thick Heimdal Formation
- the position to be above the regional oil-water contact
- the good seismic data quality (Heimdal definition in Amp. and AI cubes)
- the avoidance of overburden anomalies

### **4.2      Stratigraphy**

The stratigraphy is based on sample descriptions, the biostratigraphic report and correlations with adjacent wells.



#### 4.2.1 Table of chronostratigraphy

Stratigraphic succession		Depth interval	
		mMD	mTVD MSL
Tertiary	Lower Oligocene	1320 - 1450	1295 - 1425
	Upper Eocene	1450 - 1490	1425 - 1465
	Middle Eocene	1490 - 1570	1465 - 1545
	Lower Eocene	1570 - 1698	1545 - 1673
	Upper Paleocene	1698 - 1836	1673 - 1810.5
Cretaceous	Maastrichtian - Campanian	1836 - 1851	1810.5 - 1825.5
	Middle Campanian - Upper Santonian	1851 - 1863	1825.5 - 1837.5
	Santonian - Coniacian	1863 - 1872	1837.5 - 1846.5
	Cenomanian - ?Upper Albian	1872 - 1880	1846.5 - 1854.5

#### 4.2.2 Table of lithostratigraphy

Lithostratigraphic tops	Depth		TWT (msec.)	Difference from prognosis (mTVD)
	(mMD RKB)	(mTVD MSL)		
NORDLAND GROUP	145.0	120.0	162	0
Base Quaternary				
Utsira Formation	962.0	937.0	1015	+5
HORDALAND GROUP	1129.5	1104.5	1175	-97.5
Top Skade Formation	1267.0	1242.0	1304	-
Base Skade Formation	1298.5	1273.5	1332	-
ROGALAND GROUP	1630.0	1605.0	1653	-27
Balder Formation	1630.0	1605.0	1653	-27
Sele Formation	1649.0	1624.0	1671	-27
Lista Formation	1760.0	1735.0	1773	+44
Våle Formation	1815.0	1789.5	1820	-38.5
SHETLAND GROUP	1836.0	1810.5	1841	-49.5
Tor - ?Hod Formation	1836.0	1810.5	1841	-
Blødøks Formation	1872.0	1846.5	-	-
SHETLAND - ?CROMER KNOLL GROUP	1875.0	1849.5	-	-
Hidra - ? Rødby Formation	1875.0	1849.5	-	-
Total depth (Driller's depth)	1880.0	1854.5	-	
(Logger's depth)	1885.5	1860.0	-	

## 4.3 Lithological description

### 4.3.1 General information

**System, Series and Stage:** Based on log interpretation, the biostratigraphic report and correlation with nearby wells.

**Lithology:** The lithological description is based on the cuttings description; see Appendix L.

**Depositional environment:** Based on the biostratigraphic report and regional reports.

### 4.3.2 Geological summary

The well was drilled with returns to seabed down to 1312 m. This includes the Nordland Group and the upper part of the Hordaland Group, inclusive the Skade Formation. Throughout this interval the lithology was interpreted exclusively from the MWD logs. The lithology, prognosis versus results, is given in Figure 4.1a & b.

#### **NORDLAND GROUP      145.0 - 1129.5 m, (120.0 - 1104.5 mTVD MSL)**

**System:** Quaternary - Tertiary

**Series:** Pleistocene - Miocene

**Depositional environment:** N/A

The Nordland Group includes the Quaternary sediments and the Utsira Formation. The Quaternary is presumed to consist of mainly clay with some sand or silt stringers. There were no indications of boulders while drilling the Nordland Group.

#### **Utsira Formation      962.0 - 1129.5 m, (937.0 - 1104.5 mTVD MSL)**

**System:** Tertiary

**Series:** Miocene

**Depositional environment:** N/A

The top of the Utsira Formation is recognised on the logs by a sharp decrease in both the gamma ray and the resistivity readings. Three thick massive sandstone beds, separated by sequences of interbedded and interlaminated claystone and sandstone, characterize the formation in this well.

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**HORDALAND GROUP 1129.5 - 1630.0 m, (1104.5 - 1605.0 mTVD MSL)**

**System:** Tertiary

**Series:** Lower Oligocene (top not seen) – Lower Eocene

**Depositional environment:** Marine, bathyal

The boundary from the overlying Nordland Group/Utsira Formation is picked on the logs. Both the gamma ray and the resistivity readings shift to higher and more even levels going from the overlying sandy Utsira Formation into the Hordaland Group.

The Hordaland Group is dominated by claystone, apart from the sandy Skade Formation. Stringers of dolomitic limestone are common throughout, as well as fine grained sandstone and siltstone.

The following description is based on cuttings sampled below 1312m.

The dominating colours of the claystone varies from brown grey to dark grey and green grey to olive black. Below 1560 m moderate brown, pale red and pale green colours occur. The claystone is silty to very silty and locally grading to siltstone. The claystone is occasionally micromicaceous, micropyrritic and glauconitic in intervals. It appears as firm in the upper part and becomes gradually harder, up to moderately hard, with depth. The claystone is generally non calcareous, but becomes occasionally slightly calcareous. In the last few meters above the Rogaland Group traces of tuffaceous glass is seen as black specks in the claystone.

The limestone is partly dolomitic throughout the entire sequence, with colours varying from very light grey to light yellowish grey, moderately yellowish brown and yellowish grey. The limestone is soft to hard, occasionally brittle, and slightly argillaceous in parts.

The sandstone consists of clear to translucent loose quartz grains, which vary from very fine to medium size. The sand grains are moderately to well sorted and subangular to subrounded. Often the sandstone grades into light brown siltstone.

**Skade Formation 1267.0 – 1298.5 m, (1242.0 - 1273.5 mTVD MSL)**

**System:** Tertiary

**Series:** Lower Oligocene

**Depositional environment:** Marine, bathyal

The boundaries to the surrounding Hordaland Group are picked on the logs. Both the gamma ray and the resistivity readings shift to lower values going from the overlying clay dominated Hordaland Group, into the Skade Formation and back up again when re-entering the underlying claystone.

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**ROGALAND GROUP 1630.0 - 1836.0 m, (1605 - 1810.5 mTVD MSL)**

**System:** Tertiary

**Series:** Lower Eocene – Upper Paleocene

**Depositional environment:** Shelfal to deep marine, bathyal

The top of the Rogaland Group is defined by an increase in the resistivity, sonic velocity and density, and a corresponding drop in the gamma ray readings ("barrel shape").

The Rogaland Group consists of the Balder, Sele, Lista and Våle Formations.

**Balder Formation 1630.0 - 1649.0 m, (1605.0 - 1624.0 mTVD MSL)**

**System:** Tertiary

**Series:** Lower Eocene

**Depositional environment:** Shelfal, quiescent and dysaerobic conditions with hypohaline influences

The Balder Formation consists of interbedded claystone and tuffaceous claystone with minor stringers of sandstone and dolomitic limestone.

The claystone is multicoloured; medium dark grey, dark green grey, olive grey to olive black, moderate brown, pale red and medium blue grey. 30 to 50 percent of the claystone is tuffaceous with black specks of glassy material disseminated in the sediment, which gives the claystone a grainy texture in part very sandy and silty. The claystone is soft to firm, occasionally micropyrritic and generally non to occasionally calcareous.

The sandstone and dolomitic limestone in the Balder Formation are as described above in the Hordaland Group, but occur only in minor amounts.

**Sele Formation 1649.0 - 1760.0 m, (1624.0 - 1735.0 mTVD MSL)**

**System:** Tertiary

**Series:** Lower Eocene – Upper Paleocene

**Depositional environment:** Shelfal, quiescent and dysaerobic conditions with hypohaline influences.

The top of the Sele Formation is defined by a marked increase in the gamma ray readings and a corresponding shift in the resistivity to a lower and very uniform level.

The Sele Formation is dominated by non tuffaceous claystone. The claystone is olive black to occasionally olive grey, firm to moderately hard, blocky, massive with a waxy texture and non calcareous.

**Lista Formation**                      **1760.0 - 1815.0 m, (1735.0 - 1789.5 mTVD MSL)**

**System:** Tertiary

**Series:** Upper Paleocene

**Depositional environment:** Shelfal to deep marine, bathyal

The boundary between the Sele and the Lista Formations is picked at the maximum flooding surface called TPaMFS130, which corresponds with a high peak on the gamma ray log.

The Lista Formation is dominated by claystone with only minor sandstone, siltstone and trace amounts of dolomitic limestone.

The claystone is medium dark grey and olive black to dark green grey. In the lowermost part it is multicoloured with shades of greenish grey, bluish grey and minor medium dark grey. It is firm to moderately hard, blocky, slightly silty to silty, occasionally sandy, slightly micropyrritic/micromicaceous and non calcareous. Occasionally it has a waxy to soapy texture.

The sandstone consists of clear to translucent, occasionally milky white quartz grains. They are very fine to fine, well sorted, angular to subrounded, predominantly as loose grains, but occasionally in aggregates with rock fragments and glauconite.

The siltstone is light brownish grey to brownish grey, grading to very fine grained sandstone. It is firm to moderately hard and micromicaceous.

The limestone is partly dolomitic and is white to pale yellow grey, as well as light bluish grey. It is firm to moderately hard, microcrystalline, occasionally silty and slightly argillaceous.

**Våle Formation**                      **1815.0 -1836.0 m, (1789.5 - 1810.5 mTVD MSL)**

**System:** Tertiary

**Series:** Upper Paleocene

**Depositional environment:** Deep marine, bathyal

The top of the Våle Formation is picked at the onset of higher gamma ray readings and corresponding increasing resistivity readings. The general trend for the gamma ray is decending towards the underlying Shetland Group. The general trend for the resistivity readings is slightly increasing down through the formation.

The Våle Formation consists of claystone with increasing amount of limestone stringers towards the base and pyrite in trace amounts.

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The claystone is predominantly greenish black to olive black, and occasionally brown grey to brown black. It is firm to moderately hard and non calcareous.

The limestone is yellowish grey and off white, firm to moderately hard, brittle with a chalky texture and cryptocrystalline.

**SHETLAND GROUP 1836.0 – 1875.0, (1810.5 – 1849.5 mTVD MSL)**

**System:** Cretaceous

**Series:** Upper Cretaceous

**Stage:** Maastrichtian - Coniacian

**Depositional environment:** Open marine

The top of the Shetland Group is defined by an increase in the resistivity, sonic velocity and density readings, with a corresponding strong drop in the gamma ray readings.

The Shetland Group consists of the Tor-?Hod and Blodøks Formations in this well.

**Tor - ?Hod Formation 1836.0 – 1872, (1810.5 - 1846.5 mTVD MSL)**

**System:** Cretaceous

**Series:** Upper Cretaceous

**Stage:** Maastrichtian - Coniacian

**Depositional environment:** Open marine

There is no distinct boundary between the Tor Formation and a possibly Hod Formation in this well, and hence the naming 'Tor - ?Hod Formation'. The sequence consists of limestone with occasional stringers of claystone and chert. Pyrite occurs as traces in the upper parts of the formation.

The limestone is off white to yellowish grey with traces of pinkish grey. It is firm to moderately hard, brittle with a chalky texture. Below 1855 m the limestone becomes partly argillaceous with light to moderate brown and pale green to light greenish grey colours and partly glauconitic.

The claystone is predominantly green black to olive black and occasionally dark greenish grey. It is firm to moderately hard and generally non calcareous.

The chert is consisting of clear to translucent quartz that is angular and fine to coarse grained.

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**Blodøks Formation 1872.0 – 1875.0, (1846.5 - 1849.5 mTVD MSL)**

**System:** Cretaceous

**Series:** Upper Cretaceous

**Stage:** Cenomanian

**Depositional environment:** Open marine

The Blodøks Formation is picked at an increase in gamma ray intensity, a drop in resistivity readings and an increasing velocity. The lithology is more dominated by claystones than what was the case for the overlying Tor - ?Hod Formations, the descriptions of both the claystone and limestone do not, however, deviate significantly from the formations above.

**SHETLAND GROUP - ?CROMER KNOLL GROUP**

**1875.0 – 1880.0 (TD), (1849.5 – 1854.5 mTVD MSL)**

**System:** Cretaceous

**Series:** Upper - ?Lower Cretaceous

**Stage:** Cenomanian - ?Upper Albian

**Depositional environment:** Open marine

The lowermost part of the well comprises the Hydra Formation of the Shetland Group and possibly the upper part of the Rødby Formation of the Cromer Knoll Group. The top of this sequence is defined by dropping gamma ray values, increasing resistivity readings and a decreasing velocity.

**Hydra –?Rødby Formation 1875.0 – 1880.0 (TD), (1849.5 – 1854.5 mTVD MSL)**

**System:** Cretaceous

**Series:** Upper - ?Lower Cretaceous

**Stage:** Cenomanian - ?Upper Albian

**Depositional environment:** Open marine

This sequence including the Hydra Formation and a possible upper part of the Rødby Formation consists of limestone with occasionally traces of claystone.

The limestone is predominantly light olive grey to light brown grey and occasionally yellow grey, light grey, pale green and moderately brown. It is firm, blocky, non to slightly argillaceous and occasionally glauconitic.

The claystone is predominantly green black to olive black and occasionally dark greenish grey. It is firm to moderately hard and generally non calcareous.

**TD of the well 1880.0 m (1854.5 mTVD MSL) (Driller's depth)  
1885.5 m (1860.0 mTVD MSL) (Logger's depth)**

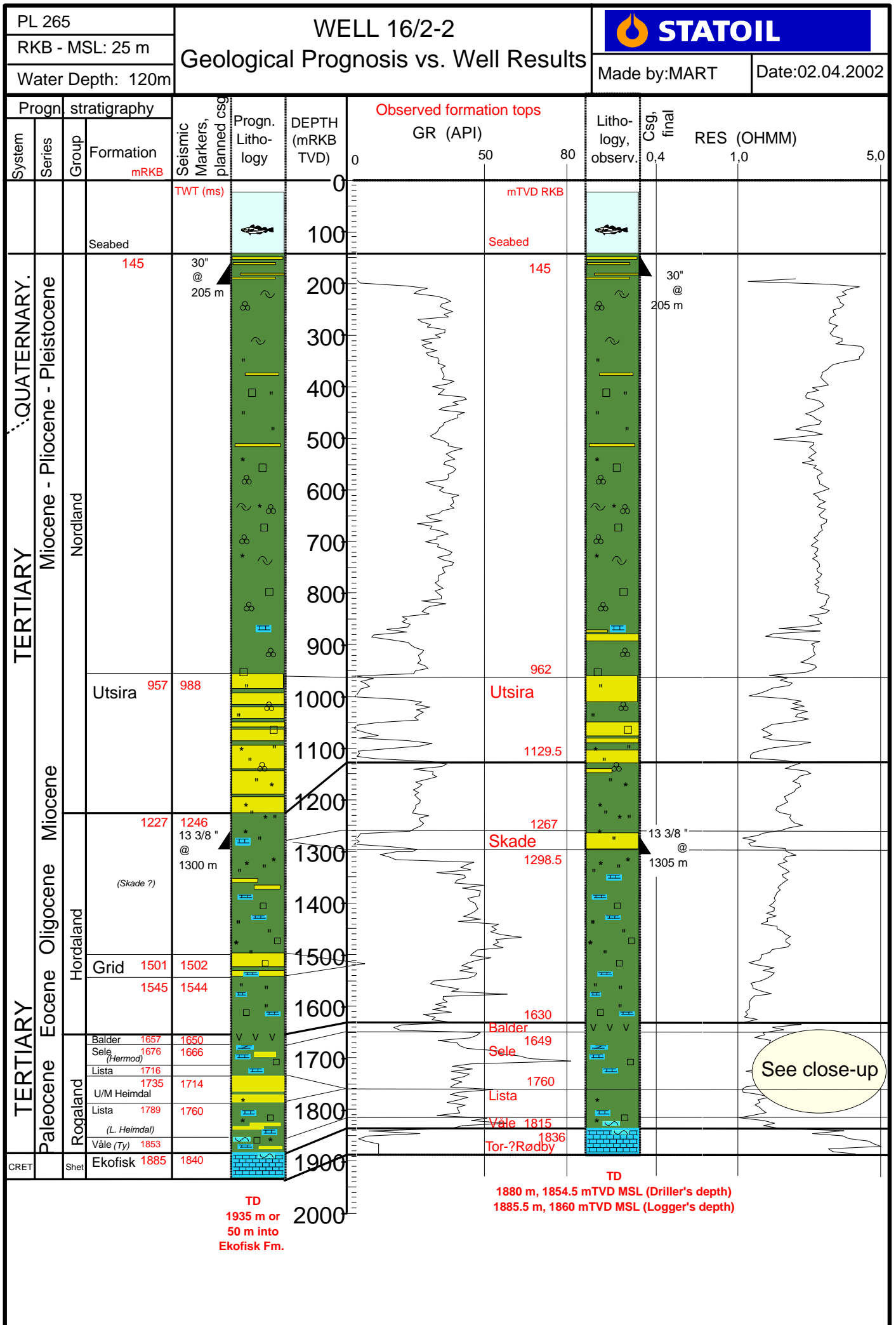


Fig. 4.1a



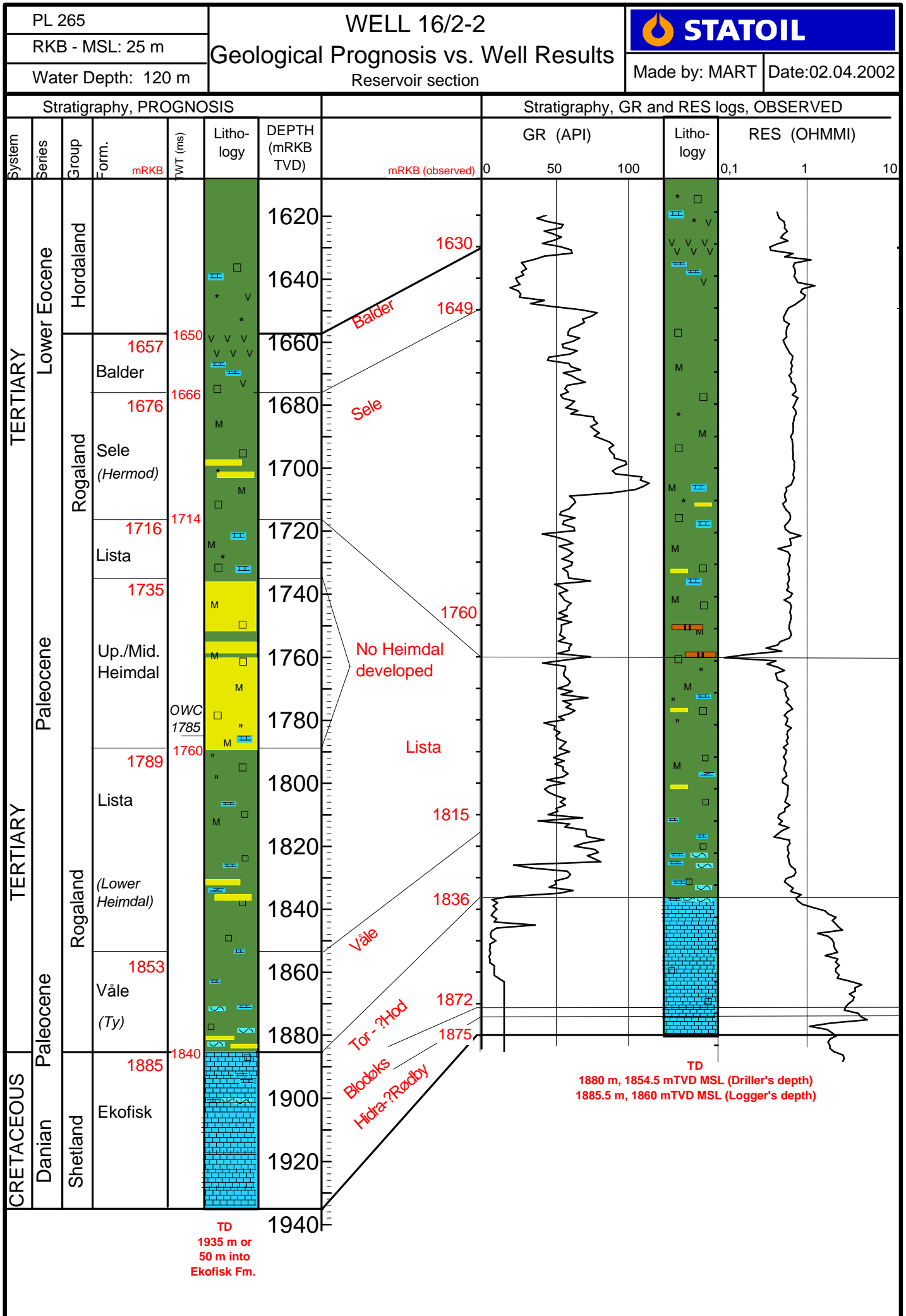


Fig. 4.1b

#### 4.4 Hydrocarbon indication

Shallow gas was neither predicted nor encountered in the Quaternary and Tertiary.

There were no indications of hydrocarbons in the well. No reservoir rock was developed throughout the Paleocene section.

Only small amounts of gas were recorded when drilling this well. See the gas table below (Table 4.1), which shows the maximum peaks recorded while drilling, all recorded in Tertiary sediments above the prognosed reservoir section.

The maximum formation gas recorded is 0.17% at 1697m. This is within a section of predominantly claystone and only traces of sand.

Depth (m)	Depth (mTVD MSL)	Total Gas (%)	Gas chromatograph breakdown (ppm)						Description	Background Gas (%)
			C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	iC <sub>4</sub>	nC <sub>4</sub>	iC <sub>5</sub>		
1635.0	1610.0	0.29	2 243	2		4	11	5	Trip gas	0.05
1697.0	1672.0	0.17	1 455	7	1				Formation gas	0.10

Table 4.1: Gas levels and chromatograph breakdown

#### 4.5 Geophysical results

##### Depth conversion

The pre-well interpreted time horizons were depth converted using a layer-cake technique. Migration velocities from the 3D seismic data were used to derive interval velocities within each of the layers. These velocities were then calibrated against regional wells to obtain a scalar correction factor for each layer.

This method was applied to the depth conversion of all the main time horizons from Sea Bed down to TEoMFS155. Below, in the interval from TEoMFS155 to Base Tertiary, an average interval velocity, derived from surrounding wells was applied for the time-to-depth conversion of the interpreted Paleocene time surfaces.

##### Result versus prognosis

The Heimdal Formation, which was the prognosed reservoir formation (Table 4.2), was not present in the well, the entire Paleocene sequence consisted of shale and mudstone.

The prognosed Grid sands were not encountered, the well drilled Skade sands instead.

Biostratigraphic analysis showed that the drilled chalk sequence of the Shetland Group belongs to the Tor Formation and not the expected Ekofisk Formation.

The well prognosis was based on seismic interpretation of the following maximum flooding surfaces (starvation surfaces) in the early Eocene/Paleocene sequence in the area:

Seismic Interpretation / Pick	Geological Prognosis
TEoMFS165	Top Balder
Near TEoMFS155	Top Sele
TPaMFS130	Top Lista and Top Heimdal
TPaMFS90	Top Våle

Table 4.2: Seismic interpretation and geological prognosis

The TEoMFS165 surface is represented in this area by a fairly continuous reflector on the seismic. In contrast the interval between TEoMFS165 and Base Tertiary is diffuse and mapping major flooding surfaces proved to be difficult. This is particularly true for TPaMFS 130, which came in 44m deeper than expected, whereas the majority of the tops below the Rogaland Group were encountered 30 - 50m shallower than prognosed. This discrepancy is due to the presence of an uncommon thick Sele shale, which has not been observed in any of the surrounding wells.

The pre-drill pick of TPaMFS130 was high, thus keeping the regional Sele thickness fairly constant. At the same time this allowed the interpretation of a Heimdal sequence within the Lista Formation. The first post-drill interpretations placed the TPaMFS130 at a prominent gamma break at 1708m, as has been done much over the North Sea Basin, where the mudstone unit beneath the prominent gamma peak is less than 10m thick and thus very often not recorded due to large cutting sample intervals. Later biostratigraphy analysis and literature studies, however, interpreted the prominent gamma peak to be MFS135 and moved the TPaMFS130 downwards to another gamma peak at 1760m. This implies that the thickness of the Lista Formation in well 16/2-2 corresponds roughly with the regional Lista thickness and that an uncommon thickness of the lower Sele Formation is observed.

The observed mismatch between the prognosis and the result for the horizons below Top Lista Formation is due to the absence of the predicted Heimdal sandstone, resulting in the use of a wrong velocity model. In addition, in the depth conversion model a constant velocity was used from TEoMFS155 downwards, which leads to an increasing error for the successive deeper horizons. The large error of the prognosed top Hordaland Group is probably due to picking a wrong reflector at a shallower level.

Figure 4.2 shows the interpretation of Top Balder and Top Chalk.

PL265  
Well 16/2-2  
Seismic line

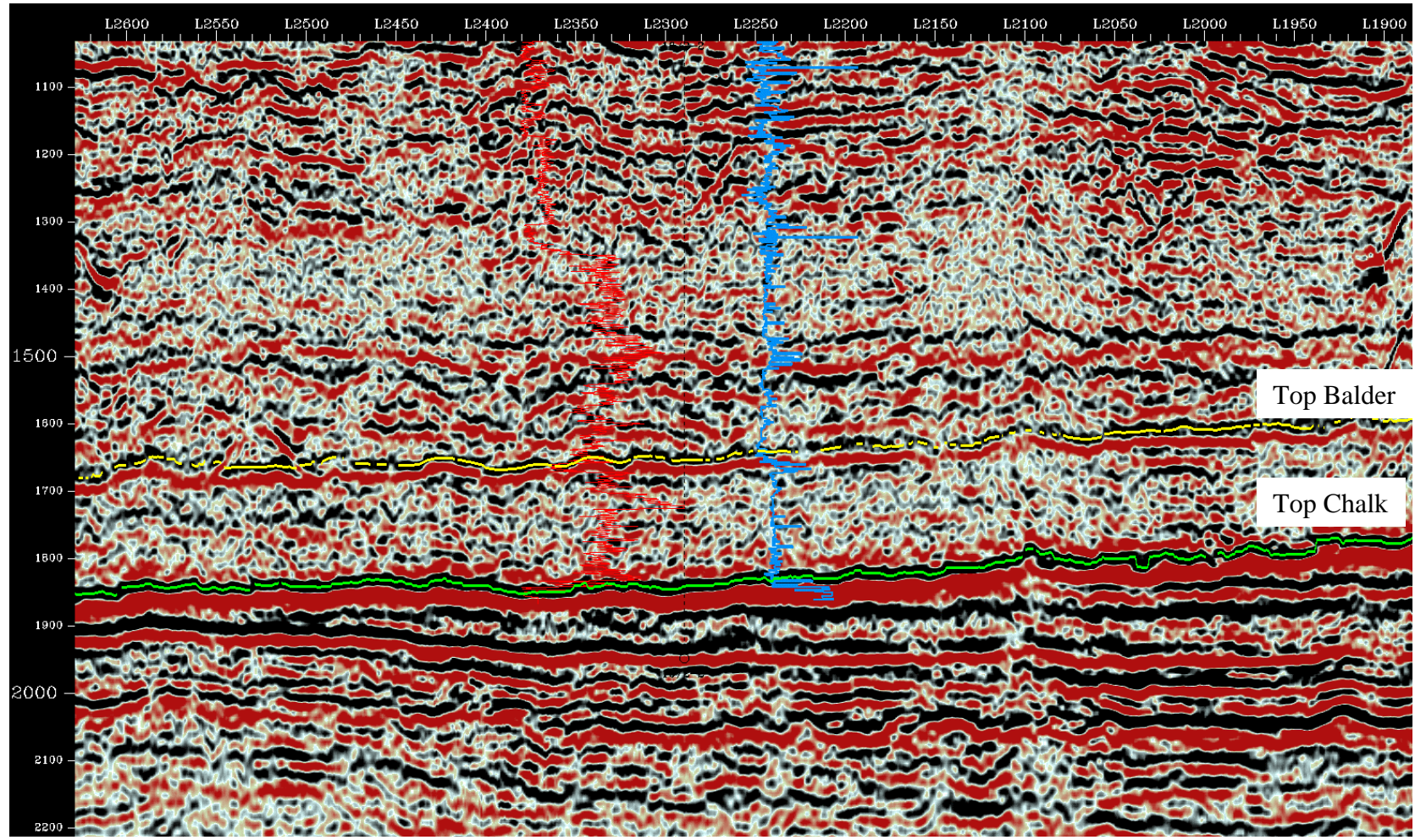


Fig. 4.2

#### 4.6 NPD standard form for reporting shallow gas

##### WELL DATA:

No.	Problems	Results
1	Distance from drill floor to sea level	25 m
2	Water depth (MSL)	120 m
3	a Setting depth for conductor (m RKB)	205 m
	b Leak Off/Formation Integrity Test (g/cc)	N/A
4	a Setting depth for casing on which BOP is installed	1305 m
	b Leak Off/Formation Integrity Test (g/cc)	1.62 g/cm <sup>3</sup>
5	Depth (mTVD RKB) and two-way time to formation/section/layer tops	Top Utsira Formation: 962 m Top Hordaland Group: 1129.5 m
6	Depth interval (m RKB & TWT) and age of sand layers shallower than 1000 m below seabed. State which layers if any contain gas	Quaternary sand layers 217-227 m; water wet Pliocene sand layers 871-893 m; water wet Miocene sand layers (Utsira Formation) 962-1129.5m; water wet
7	How was presence of gas proven:	No shallow gas observed
8	Composition and origin of gas	N/A
9	Describe all measurements performed in gas bearing layers	N/A
10	Indicate the depths (m RKB & TWT) of unconformities in the well bore	Top Hordaland Group at 1129.5 m
11	Indicate depth and extension of sand layers (communication, continuity, truncation etc.)	N/A
12	Indicate depth and extension of any gas blanking, seismic anomalies etc	N/A
13	State possible seismic indications that the gas originates from deeper levels. Description if gas originates from deeper levels	N/A
14	How does the interpretation of the site survey correspond with well data with respect to:	
	- shallow gas	No shallow gas prognosed and no shallow gas was observed
	- sand layers	Sand layers at 217 – 227 m according to prognosis Sand-rich sequence was prognosed from 811 – 884 m, and was observed from 871 – 893 m Utsira Formation was observed 5 m deeper than prognosed
	- unconformities	Top Hordaland Group observed 97.5m shallower than prognosed
	- correlation with adjacent wells	Good correlation to the nearest reference wells 25/11-17 and 16/2-1

#### 4.7 Formation pressure

The pore pressure gradient, mud weight, overburden gradient and relevant drilling- and log data are presented graphically in the Figures 4.3 and 4.4a & b. Gas readings have been listed in Chapter 4.4. Gradients are presented in  $\text{g/cm}^3$  equivalent mud weight (EMW).

The pore pressure evaluation is mainly based on sonic log data, but also resistivity logs and drilling parameters (D-exponent and gas readings) have been taken into consideration. The overburden pressure gradient is calculated based on the density logs from well 16/2-1 down to 1309 m and well 16/2-2 from 1309 m to TD.

The pore pressure indicators in the Tertiary are strongly influenced by changes in clay mineralogy and changes in lithology. The lithology variations complicate the establishing of normal compaction trend lines and hence lead to an uncertain quantitative estimation of the pore pressure in Tertiary shale's.

A normal pore pressure gradient of  $1.03 \text{ g/cm}^3$  is calculated in the Quaternary and Tertiary down to approximately 1350 m (below the Skade Fm. sandstone). The sonic log indicates slightly overpressured sediments in the shale-dominated intervals in the Hordaland Group, with a transition zone starting at approximately 1350 m. A maximum pore pressure gradient of  $1.25 \text{ g/cm}^3$  is calculated at approximately 1600 m. Towards the base of the Hordaland Group, a drop in the pore pressure gradient is calculated, giving a normal hydrostatic pore pressure gradient at the top of the Balder Formation at 1630 m. No indications of abnormal pore pressures are observed in the Rogaland Group.

No indications of abnormal pore pressures are, however, seen on the resistivity and D-exponent log trends in the Hordaland Group shale's, and the possibility of a normal pore pressure gradient throughout the entire Tertiary can not be entirely ruled out.

#### 4.8 Reservoir pressure summary

No reservoir sandstone layers were encountered in the 8 ½" hole (none of the prognosed Paleocene sandstone units were present) and therefore no formation pressure data were measured in this well.

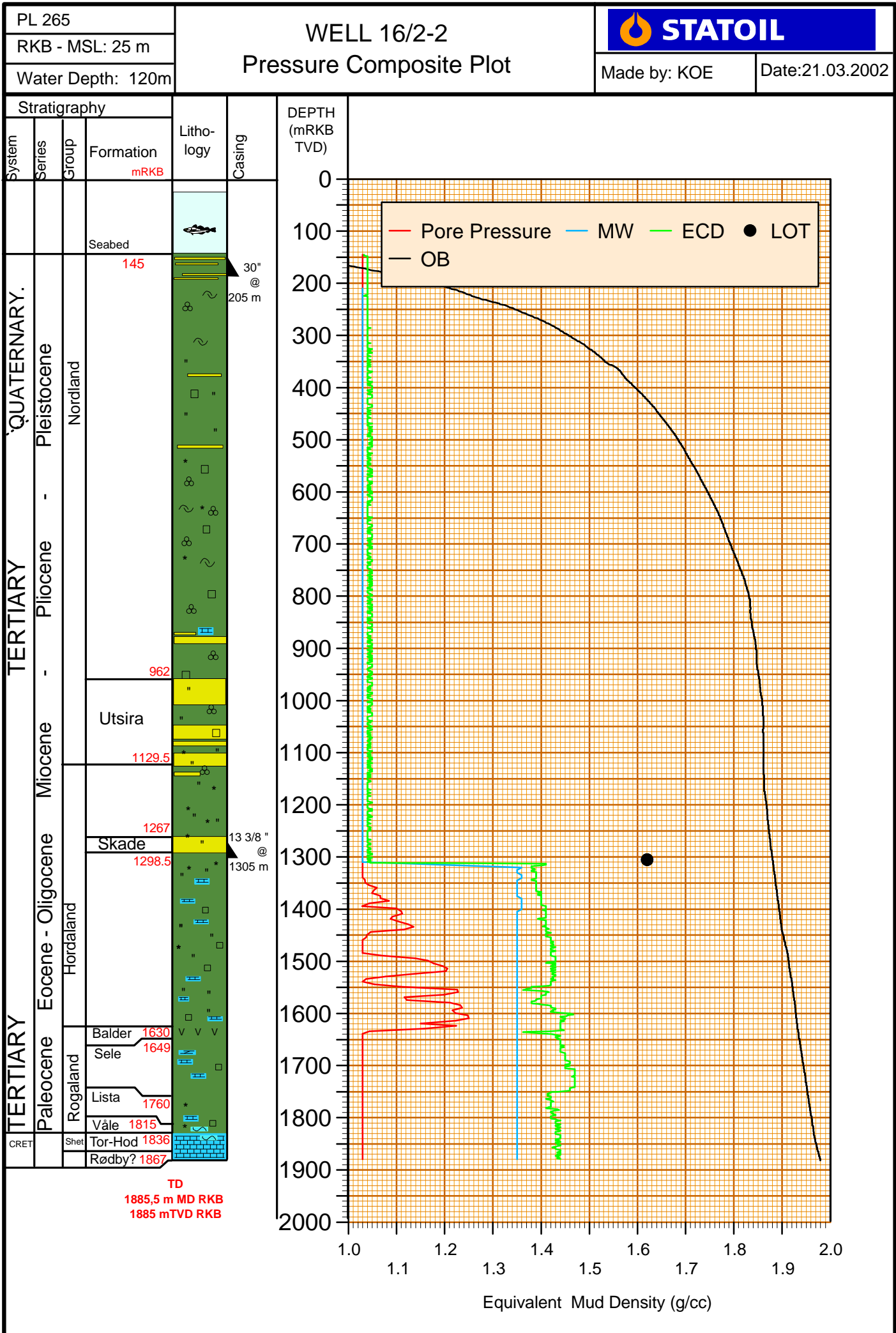


Figure 4.3

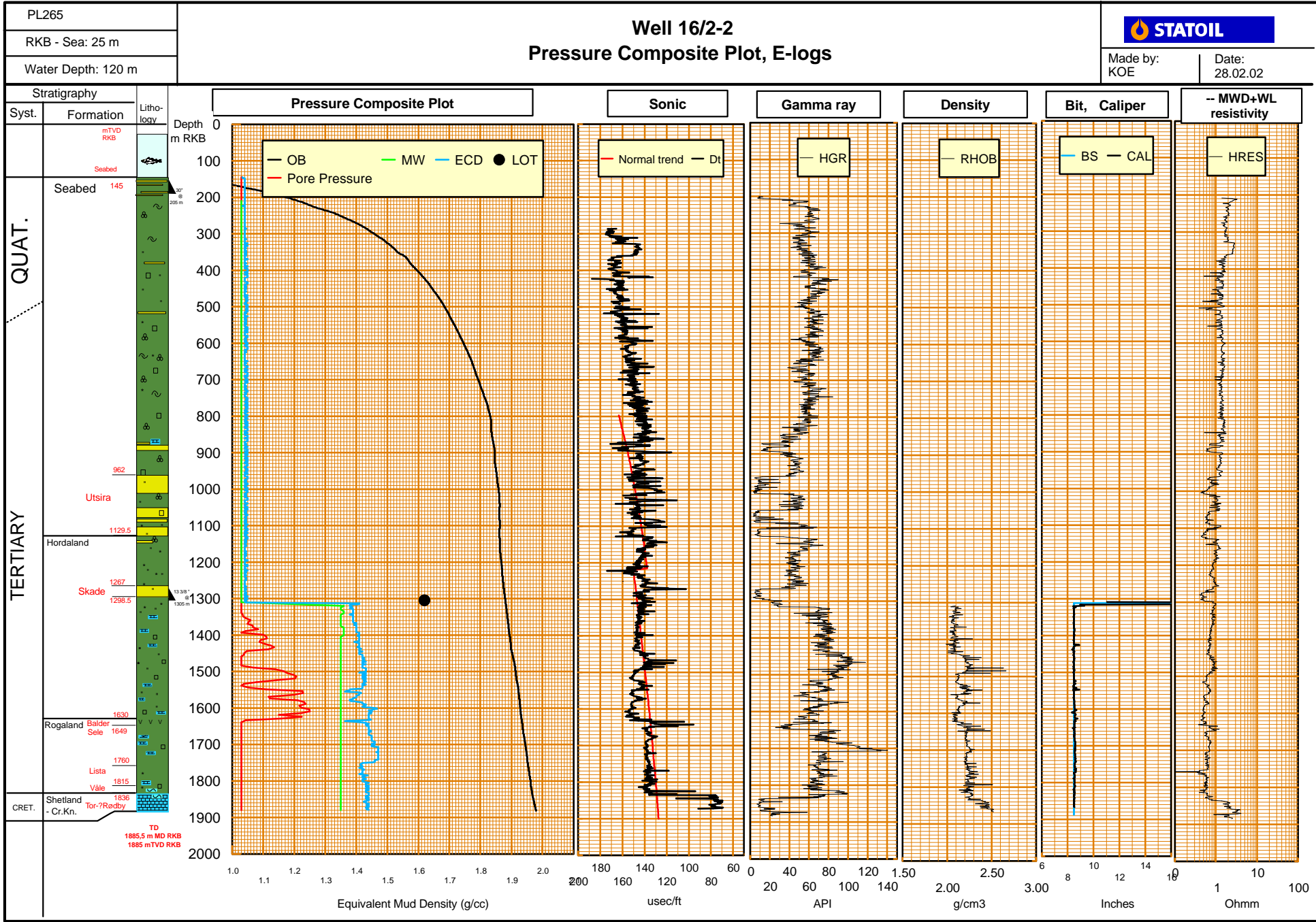


Figure 4.4 a



PL265  
 RKB - Sea: 25 m  
 Water Depth: 120 m

### Well 16/2-2 Pressure Composite Plot, Drilling Parameters



Made by:  
 KOE

Date:  
 12.03.02

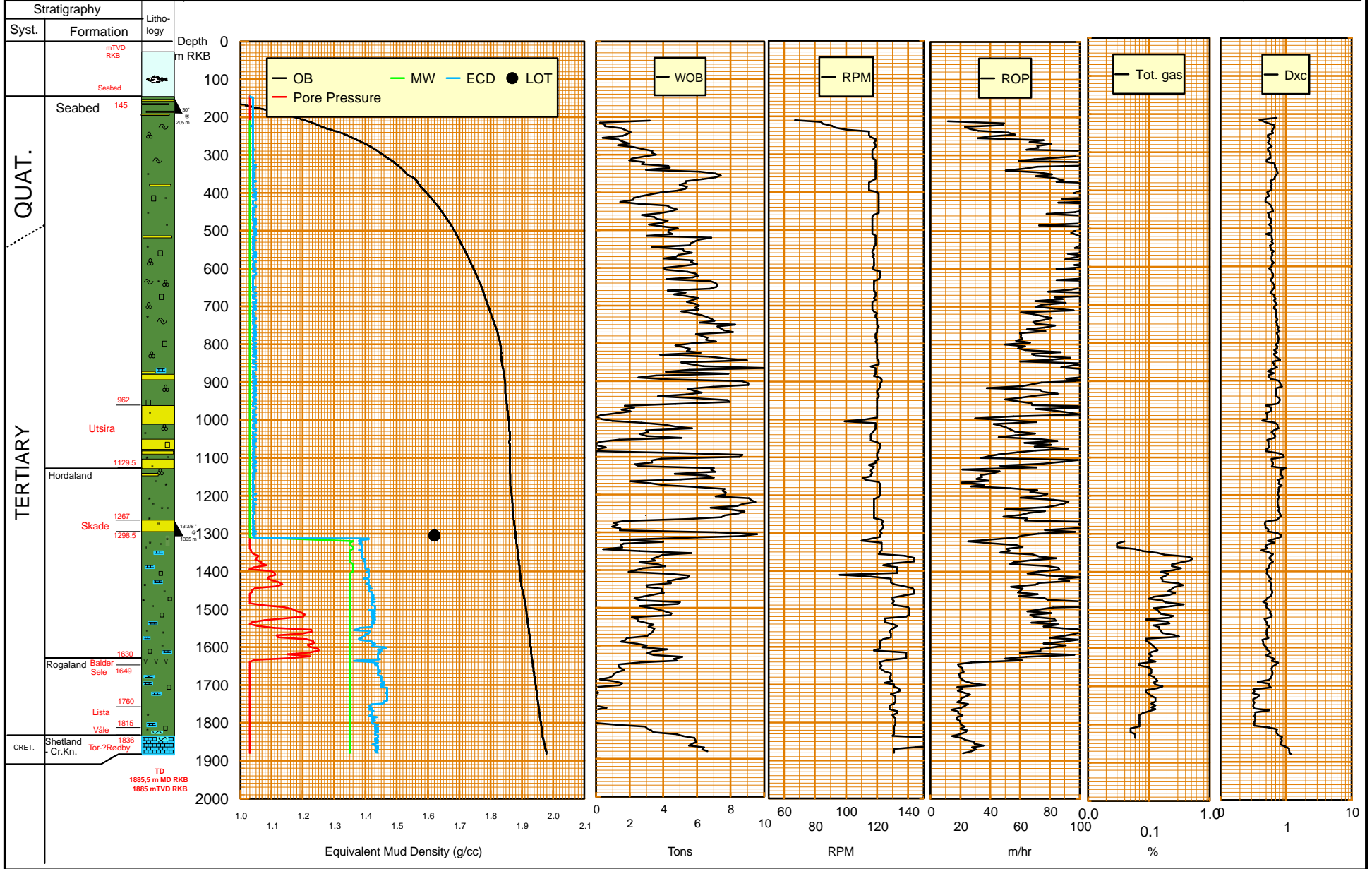


Figure 4.4 b

#### 4.9 Formation temperature

Temperature data are available from two wireline logging runs in the 8 ½” section (PEX-DSI-AIT, Run 1A and CSI-GR, Run 1A). Cable head temperatures of 85 °C at 1855.5m and 1874m, are respectively reported in the log headings for the PEX-DSI and the CSI logs. These temperatures are, however, not believed to be representative for the estimation of formation temperature in well 16/2-2. Internal tool temperatures from the PEX and AIT logging instruments are also available. These temperature readings are also uncertain due to the sensors location inside the logging tools (isolated from the well fluid) and they may also be affected by heat generated from tool electronics.

A geothermal temperature gradient of 44.5 °C/km has been estimated based on PEX and AIT internal tool measured temperatures from well 16/2-2 and extrapolated log temperatures and DST temperatures from nearby wells. For well 16/2-2 a maximum temperature of 82 °C is estimated at TD at 1880 m.

Figure 4.5 shows the estimated temperature gradient together with measured log temperatures from well 16/2-2. The measured temperatures are listed in Table 4.3.

Source	Run	Ref. depth (m)	Time since circulation (hours)	Circulation time (hours)	Temperature (°C)	Extrapolated temperature (°C)
PEX-AIT-DSI	1A	1855.5	11.0	2.0	85 <sup>(1)</sup>	-
CSI-GR	1A	1874.3	25.5	2.0	85 <sup>(1)</sup>	-
AIT (internal tool)		1887.6	11	2	76.7	-
PEX (internal tool)		1887.0	11	2	76.8	-

Table 4.3 Measured temperatures from well 16/2-2

(1) Only one out of three cable head thermometer readings is reported in the log heading. The value seems to be too high and are believed to be a number that was filled in prior to the logging job that has not been updated with correct readings after the logging tool came to surfaces after the logging job.

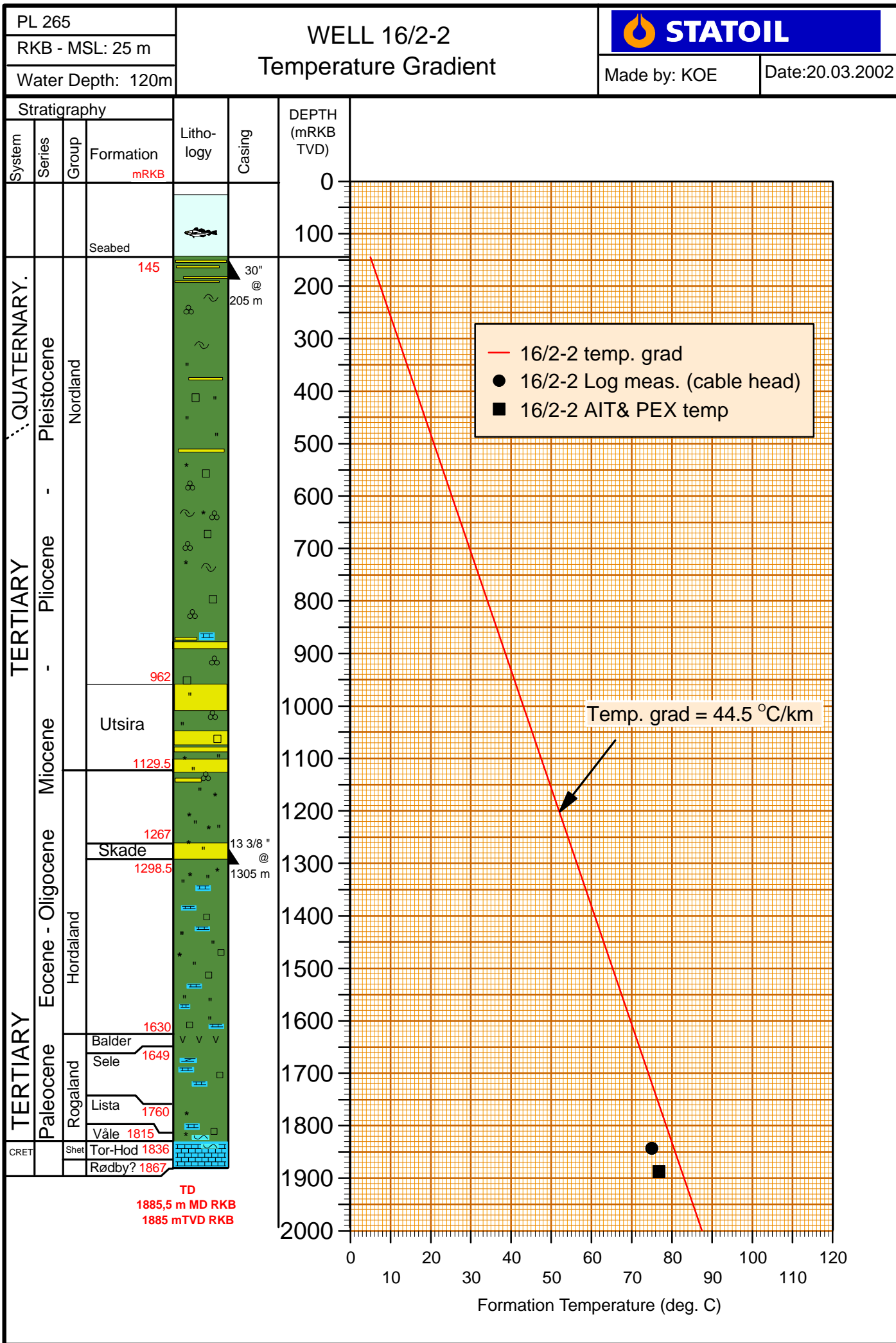


Figure 4.5

## 5 Drilling report

### 5.1 Rig move and positioning

#### 5.1.1 Summary

Byford Dolphin was moved from block 24/12 to location 16/2-2. Average speed 3,6 knots on 27,2 Nm sailed. Ran 11 anchors (anchor no. 11 was lost when pulled on previous well 24/12-4) and tension tested anchors to 160 ton. Anchor no. 10 slipped. Several attempts were made to reset and tension test anchor no. 10 without success. Anchor no. 10 and 11 were set with piggy back anchors. A total of 22,0 hrs was logged as "waiting on weather" during the anchor handling.

#### 5.1.2 Experiences / recommendations

Ref. Experience Listing Table.

### 5.2 36" hole section

#### 5.2.1 Summary

The 36" hole was drilled from seabed at 145 m to 205 m.

The section was drilled with seawater, and hi-vis pills were swepted every stand. At TD the hole was displaced to 1,30 g/cm<sup>3</sup> mud. No wiper trips were performed.

The 30" conductor was run as planned to 205m. Cementing was performed with 200% OH excess. Tension was held on conductor while WOC. Had returns to seabed during the cement job. Final stick up was 2,0 m with an angle of 0,5 degrees.

#### 5.2.2 Experiences / recommendations

- The primary 30" CART (Cam Actuated Running Tool) was not made up to the 30" Wellhead Housing onshore as planned, and the tool was not sent out in time to make up same. Made up backup 30" CART to 30" Wellhead Housing while ballasting rig.

### 5.3 17 1/2" section

#### 5.3.1 Summary

The 17 1/2" hole was drilled with seawater in combination with hi-vis sweeps from the 30" shoe at 205 m until a sudden pressure drop of 35 bar was noticed at 1151m. After trouble shooting on the surface system, the drilling continued down to 1158m. Signals from the MWD were lost, another pressure drop of 100 bar was observed and the string lost 12 ton weight. The hole was displaced to 1,20 sg mud and then POOH. Found bottom part of jar parted. RIH with overshot BHA and engaged fish at 1047m. Pulled fish free with 20 tons overpull and retrieved same to surface. Made up new jar to BHA, meanwhile the bit was checked with the ROV. RIH to 1158 m and displaced well back to SW. Drilled hole to TD at 1312 m. The hole was displaced to 1,25 g/cm<sup>3</sup> mud prior to POOH.

13 3/8" casing x 18 3/4" wellhead housing was run to 1305m. Cementing casing with 100 % OH excess, and observed returns to seabed with ROV.

After BOP was run and tested, an 8 1/2" BHA was RIH. MWD failed to work while testing at 1000 m. POOH, changed MWD DC and RIH. Drilled out the 13 3/8" shoe track and performed a LOT equal to 1,62 g/cm<sup>3</sup> at 1316 m with seawater in the well. A fluid-loss pill was spotted prior to the LOT.

#### 5.3.2 Experiences / recommendations

- Ref. Experience Listing Table
- Regarding incident with jar: The investigation report concludes that the incident was induced by fatigue cracking which in turn led to the fracture of the component. Ref. DBR #6 and investigation report from Weir-Houston.
- MWD tool failure when RIH and testing tool at 1000 m was caused by mud (SW) intrusion through a hatch cover on DCP-sub. Human failure onshore. Lost 6 hrs, ref DBR # 11.

### 5.4 8 1/2" hole section

#### 5.4.1 Summary

The well was displaced to 1,35 g/cm<sup>3</sup> Novatec POBM. In spite of MWD tool starting to transmit erratic status signals while drilling out of the 13 3/8" shoetrack, it was decided to continue drilling. Drilled to 1633m and circulated hole clean. POOH and changed MWD DC and MPR sub. RIH and drilled to TD at 1880m with controlled ROP to identify potential core point.

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The packed 8 ½" BHA gave good directional control, and inclination was steady between 1,3 and 1,9 degrees.

Open hole logging was performed with two runs on wireline.

#### 5.4.2 *Experiences / recommendations*

- Ref. Experience Listing Table
- No formation instability was experienced during drilling or tripping. Hole cleaning and cuttings handling were very satisfactory. For the entire section totally 35 skips (Swaco) were filled (16 skips cuttings/19 skips slop). Total weight 129,1 tons (63,3 tons cuttings/65,8 tons slop) after 564 m drilled.

### 5.5 **Permanent plug and abandonment**

#### 5.5.1 *Summary*

Reference is made to "Well Schematic and P&A".

The prognosed reservoir section included no permeable zones and therefore no cement plugs were set to isolate this section. A 1,60 g/cm<sup>3</sup> water based hi-vis pill was set from 1505m to 1355m as a base for cement plug in open hole/casing transition zone. The cement plug (# 1) extended from 50 m below to 150m above 13 3/8 casing shoe at 1305m.

Pressure tested cement plug to 105 bar/10 min with 1,35 g/cm<sup>3</sup> mud in well (70 bar above LOT at 13 3/8" casing shoe). Set a bridge plug at 385m, and pressure tested same to 105 bar. Displaced well to seawater and set a surface cement plug from 385m to 185m.

Pulled BOP and riser before the 20" x 30" casing/wellhead was cut and pulled to surface. A total of 54 hours was encountered for WOW during the plugging and abandonment, mainly due to strong winds restricting crane operations and rough sea causing problems for standby boat to come close to rig during work over open sea.

#### 5.5.2 *Experiences / recommendations*

- Ref. Experience Listing Table
- In the slurry recommendations, the time to 30 BC was set to only 2:30 hours in order to reduce waiting time on cement. However, testing in lab shows that by increasing the amount of CFR-5LE+ in this slurry, time to 30 BC could be increased to 3:25 hours with only half an hour extra waiting time on cement. Increased amount of CFR-5LE+ in slurry according to lab test. Hence, reducing the risk of getting stuck with stinger in

cement. Recommendation: Carefully consider the gain in waiting time on cement against the increased risk of getting stuck with stinger in cement.

- While pressure testing bridge plug at 385m, the pumped volume was similar to the pumped volume for the pressure test on cement plug #1 at 1155m. i.e. indicating that cement plug # 1 was holding the pressure and not the bridge plug. Good test was achieved by weight setting the bridge plug again and pump rate was increased on cement unit when pressurizing the system. Ref DBR # 16
- Due to lack of check and inventory lists on the rig, the plugging operations were done without backup 13 3/8" EZSV bridge plug. Keep more focus on use of checklists and inventory lists both in planning phase and offshore.
- During backloading of mud to supply boat from starboard side of rig, 50 m<sup>3</sup> of oil based mud was lost to sea due to a valve at the port loading station was left open. The valve is replaced with a valve fitted with visual indication of position. Further a back up valve is installed to have two barriers against open sea.

**Final Well Report  
Well 16/2-2, Skuld  
PL265**

Doc. no.  
**02C94\*164**  
Date  
**2002-04-12**



Rev. no.            39 of 51  
**0**

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**App A Directional data, survey listing**



**Wellbore**

Name	Created	Last Revised
16/2-2		

**Well**

Name	Government ID	Last Revised
16/2-2		

**Slot**

Name	Grid Northing	Grid Easting	Latitude	Longitude	North	East
Slot #1	6536839,0000	471371,0000	N58 58 7,8061	E2 30 7,7858	0,00N	0,00E

**Installation**

Name	Easting	Northing	Coord System Name	North Alignment
16/2-2 Exploration	471371,0000	6536839,0000	ED50-UTM-31N on EUROPEAN DATUM 1950 datum	Grid

**Field**

Name	Easting	Northing	Coord System Name	North Alignment
EXPLORATION ZONE 31	0,0000	0,0000	ED50-UTM-31N on EUROPEAN DATUM 1950 datum	Grid

**Created By**

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**Comments**

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All data is in Metres unless otherwise stated  
 Coordinates are from Installation MD's are from Rig and TVD's are from Rig ( Byford Dolphin (RT) 25.0m above Mean Sea Level )  
 Vertical Section is from 0,00N 0,00E on azimuth 236,37 degrees  
 Bottom hole distance is 22,40 Metres on azimuth 236,37 degrees from Wellhead  
 Calculation method uses Minimum Curvature method  
 Prepared by BHI

Wellpath (Grid) Report										
MD[m]	Inc[deg]	Dir[deg]	TVD[m]	North[m]	East[m]	Dogleg [deg/30m]	Vertical Section[m]	Easting	Northing	
145.00	0.00	0.00	145.00	0.00N	0.00E	0.00	0.00	471371.00	6536839.00	
232.00	0.30	224.40	232.00	0.16S	0.16W	0.10	0.22	471370.84	6536838.84	
321.00	0.20	213.10	321.00	0.46S	0.41W	0.04	0.59	471370.59	6536838.54	
404.00	0.10	248.30	404.00	0.61S	0.55W	0.05	0.80	471370.45	6536838.39	
492.00	0.30	164.70	492.00	0.86S	0.56W	0.10	0.94	471370.44	6536838.14	
579.00	0.40	178.90	579.00	1.38S	0.50W	0.05	1.18	471370.50	6536837.62	
663.00	0.20	198.00	663.00	1.81S	0.54W	0.08	1.45	471370.46	6536837.19	
751.00	0.30	185.10	750.99	2.19S	0.61W	0.04	1.72	471370.39	6536836.81	
837.00	0.30	158.40	836.99	2.62S	0.54W	0.05	1.90	471370.46	6536836.38	
924.00	0.50	178.90	923.99	3.21S	0.45W	0.08	2.16	471370.55	6536835.79	
1010.00	0.90	205.30	1009.99	4.20S	0.73W	0.18	2.94	471370.27	6536834.80	
1096.00	0.50	240.30	1095.98	5.00S	1.35W	0.20	3.89	471369.65	6536834.01	
1184.00	1.40	262.90	1183.97	5.32S	2.75W	0.33	5.23	471368.25	6536833.68	
1270.00	0.90	251.00	1269.95	5.67S	4.43W	0.19	6.83	471366.57	6536833.33	
1365.00	1.10	242.70	1364.93	6.33S	5.95W	0.08	8.46	471365.06	6536832.67	
1450.00	1.50	240.10	1449.91	7.26S	7.63W	0.14	10.38	471363.37	6536831.74	
1479.00	1.60	233.70	1478.90	7.69S	8.29W	0.21	11.16	471362.71	6536831.31	
1508.00	1.90	235.70	1507.89	8.20S	9.01W	0.32	12.05	471361.99	6536830.80	
1536.00	1.90	232.20	1535.87	8.74S	9.76W	0.12	12.97	471361.24	6536830.26	
1565.00	1.90	236.10	1564.86	9.31S	10.54W	0.13	13.93	471360.46	6536829.70	
1594.00	1.80	240.70	1593.84	9.80S	11.34W	0.19	14.87	471359.67	6536829.20	
1623.00	1.80	239.00	1622.83	10.26S	12.13W	0.06	15.78	471358.88	6536828.75	
1651.00	1.90	248.80	1650.81	10.65S	12.94W	0.35	16.67	471358.07	6536828.35	
1737.00	1.50	253.20	1736.77	11.49S	15.34W	0.15	19.14	471355.66	6536827.51	
1766.00	1.50	255.90	1765.76	11.69S	16.07W	0.07	19.86	471354.93	6536827.31	
1795.00	1.50	254.30	1794.75	11.89S	16.81W	0.04	20.58	471354.20	6536827.12	
1824.00	1.40	255.80	1823.74	12.08S	17.52W	0.11	21.27	471353.49	6536826.93	
1852.00	1.20	249.20	1851.74	12.27S	18.12W	0.27	21.88	471352.88	6536826.74	
1870.00	1.10	258.30	1869.73	12.37S	18.47W	0.35	22.23	471352.54	6536826.64	
1880.00	1.10	258.30	1879.73	12.41S	18.66W	0.00	22.40	471352.35	6536826.60	

All data is in Metres unless otherwise stated  
 Coordinates are from Installation MD's are from Rig and TVD's are from Rig ( Byford Dolphin (RT) 25.0m above Mean Sea Level )  
 Vertical Section is from 0,00N 0,00E on azimuth 236,37 degrees  
 Bottom hole distance is 22,40 Metres on azimuth 236,37 degrees from Wellhead  
 Calculation method uses Minimum Curvature method  
 Prepared by BHI

### Hole Sections

Diameter [in]	Start MD[m]	Start TVD[m]	Start North[m]	Start East[m]	End MD[m]	End TVD[m]	End North[m]	Start East[m]	Wellbore
36,000	145,00	145,00	0,00N	0,00E	206,00	206,00	0,08S	0,08W	16/2-2
17 1/2	205,00	205,00	0,08S	0,08W	1312,00	1311,94	5,92S	5,07W	16/2-2
8 1/2	1312,00	1311,94	5,92S	5,07W	1880,00	1879,73	12,41S	18,66W	16/2-2

### Casings

Name	Top MD[m]	Top TVD[m]	Top North[m]	Top East[m]	Shoe MD[m]	Shoe TVD[m]	Shoe North[m]	Shoe East[m]	Wellbore
30,000in Conductor	145,00	145,00	0,00N	0,00E	205,00	205,00	0,08S	0,08W	16/2-2
13 3/8in Casing	145,00	145,00	0,00N	0,00E	1305,00	1305,00	5,87S	4,96W	16/2-2

All data is in Metres unless otherwise stated  
 Coordinates are from Installation MD's are from Rig and TVD's are from Rig ( Byford Dolphin (RT) 25.0m above Mean Sea Level )  
 Vertical Section is from 0,00N 0,00E on azimuth 236,37 degrees  
 Bottom hole distance is 22,40 Metres on azimuth 236,37 degrees from Wellhead  
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 Prepared by BHI

**Final Well Report  
Well 16/2-2, Skuld  
PL265**

Doc. no.  
**02C94\*164**  
Date  
**2002-04-12**



Rev. no.            40 of 51  
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**App B Operational experience, operational listing**

# Operations

Wellbore: 0016/02-002

Time from	Time to	Time used	Depth mMD	Act code	---- Status ----		Description of activities
					During opr	End of opr	
14.09.2001.18:00	00:00	6,0		MNMU	OK	OK	Rig in transit from 24/12-4 location to 16/2-2 location
15.09.2001.00:00	02:00	2,0		MNMU	OK	OK	Rig in transit. Arrived location at 01:40 hrs. Distance sailed 27.2 nm, average speed 3.6 knots.
15.09.2001.02:00	06:00	4,0		MARU	OK	OK	Started anchor handling. Ran anchors #6 and #12
15.09.2001.06:00	11:30	5,5		MARU	OK	OK	Ran anchors.
15.09.2001.11:30	17:30	6,0		MNBU	OK	OK	Ballast rig to drilling draft. M/U cement stand and racked back same. Picked up and M/U CART tool to 30" wellhead housing. L/D same. Launched ROV and deployed ROV basket.
15.09.2001.17:30	21:00	3,5		MARU	OK	O FAIL	Tension tested anchors to 160 tonn. Anchor no 10 slipped.
15.09.2001.21:00	00:00	3,0		MARD	O FAIL	OK	Reset anchor no 10.
16.09.2001.00:00	06:00	6,0		MARD	O FAIL	OK	Made several attempts to reset and tension test anchor no 10 to 160 ton. Tension tests failed.
16.09.2001.06:00	11:00	5,0		MARD	O FAIL	OK	Continued reset and tension test anchor no 10. Tension test failed.
16.09.2001.11:00	00:00	13,0		MNWW	OK	OK	Waiting on weather to continue with anchor handling.
17.09.2001.00:00	06:00	6,0		MNWW	OK	OK	Continued waiting on weather.
17.09.2001.06:00	09:00	3,0		MNWW	OK	OK	Waited on weather.
17.09.2001.09:00	11:30	2,5		MARU	OK	OK	Set anchor #10 with piggy back. Tension tested to 160 tons.
17.09.2001.11:30	15:00	3,5		MARU	OK	OK	Set anchor #11 with piggy back. Tension tested to 160 tons.
17.09.2001.15:00	15:30	0,5	145,3	DDRU	OK	OK	Spudded well. Tagged sea bed at 145.3 m. Got 2 m penetration. Set 4 marker buoys with ROV.
17.09.2001.15:30	00:00	8,5	200,0	DDRU	OK	OK	Drilled/opened hole to 36" from 145.3 m to 200 m with sea water. Pumped 5-10 m3 high-vis pill every 15 m. Drilling parameters from 145.3 m to 190 m: 50-80 RPM, flow 3500 LPM, pump pressure 95 bar, 0-2 tons WOB, torque +/- 2 kNm. Drilling parameters below 190 m: 80-90 RPM, flow 4980 LPM, pump pressure 195 bar, 2 tons WOB, torque 2-4 kNm. Measured inclination: 160 m/ 2.0 deg, 175 m/ 1.25 deg, 190 m/ 0.5 deg.
18.09.2001.00:00	01:30	1,5	205,0	DDRU	OK	OK	Continued drilling/opening hole to 36" from 200 m to 208 m (HO depth: 205 m) with sea water. Pumped 5-10 m3 high-vis pill every 15 m. Drilling parameters: 80-90 RPM, flow 4980 LPM, pump pressure 195 bar, 2 tons WOB, torque 2-4 kNm. Measured inclination at TD: 206 m/ 1.25 deg (off bottom), 208 m/ 0.75 deg (on bottom).
18.09.2001.01:30	02:00	0,5	205,0	DDRU	OK	OK	Confirmed space out with ROV. Circulated 40 m3 high-vis pill. Displaced same with sea water. Displaced hole with 1.5 x hole volume with 1.30 sg mud.
18.09.2001.02:00	03:00	1,0	155,0	DTCU	OK	OK	POOH. No drag. Checked buoys/beacon position with ROV.
18.09.2001.03:00	04:30	1,5		DTCU	OK	OK	Continued POOH. L/out HO assembly.
18.09.2001.04:30	06:00	1,5		CERU	OK	OK	R/up to run conductor. Moved PGB onto beams in moonpool. Changed to 30 " handling equipment. Prepared to run casing.
18.09.2001.06:00	08:30	2,5		CARU	OK	OK	Held pre-job meeting. Ran 30" casing.
18.09.2001.08:30	09:30	1,0		CARU	OK	OK	Installed housing to PGB.
18.09.2001.09:30	10:30	1,0		CARU	OK	OK	Racked back CART tool. M/up cement stinger.
18.09.2001.10:30	12:30	2,0	205,0	CARU	OK	OK	M/up CART tool to PGB. Continued running 30" casing on 5" landing string. Filled casing with sea water. Stabbed in hole assisted by ROV. Ran 30" casing to 205 m.
18.09.2001.12:30	13:00	0,5		CSSU	OK	OK	Held pre-job meeting while circulating 30 m3 sea water at 1870 LPM.
18.09.2001.13:00	14:00	1,0		CSSU	OK	OK	Pressure tested surface lines to 100 bar/ 5 min. Mixed and pumped 17.7 m3 1.56 sg lead cement slurry and 20 m3 1.95 sg tail cement slurry. Displaced slurry with 5 m3 sea water. Checked bull's eye: FWD: 0 deg, STB: 0.5 deg. Stick-up: 2 m.
18.09.2001.14:00	22:00	8,0		CSCW	OK	OK	WOC. Checked bull's eye every 1/2 hr, showed marginal movements.
18.09.2001.22:00	00:00	2,0		CTTU	OK	OK	Released running tool. POOH with landing string. L/out running tool. POOH with cement stinger. L/out cement stand. Checked bull's eye, showed as before.
19.09.2001.00:00	02:30	2,5		DTPU	OK	OK	P/up and m/up 17 1/2" BHA. Checked MWD communication. Installed guide rope on BHA.

# Operations

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Time from	Time to	Time used	Depth mMD	Act code	---- Status ----		Description of activities
					During opr	End of opr	
19.09.2001.02:30	04:00	1,5	201,0	DTDU	OK	OK	RIH. Stabbed into 30" housing at 143 m assisted by ROV. Tagged cement at 201 m.
19.09.2001.04:00	05:30	1,5	205,0	CDDU	OK	OK	Drilled firm cement from 201 m. Drilled shoe. Cleaned rat hole. Drilling parameters: 45 RPM, flow 3030 LPM, pump pressure 110 bar, 1 tons WOB, torque +/- 2 kNm.
19.09.2001.05:30	06:00	0,5	220,0	DDRU	OK	OK	Drilled 17 1/2" hole from 205 m to 220 m, using SW. Pumped 5-10 m3 high-vis pill every 15 m. Drilling parameters: 85 RPM, flow 4000 LPM, pump pressure 188 bar, 1 ton WOB, torque 1-3 kNm.
19.09.2001.06:00	07:00	1,0	248,0	DDRU	OK	OK	Drilled and surveyed 17 1/2" hole from 220 m to 248 m with reduced parameters, using SW. Pumped 5-10 m3 high-vis pill every 15 m. Drilling parameters: 85 RPM, flow 4000 LPM, pump pressure 188 bar, 1 ton WOB, torque 1-3 kNm.
19.09.2001.07:00	00:00	17,0	1120,0	DDRU	OK	OK	Drilled and surveyed 17 1/2" hole from 248 m to 1120 m, using SW. Pumped 5-10 m3 high-vis pill every 15 m. Drilling parameters: 120 RPM, flow 4100-4500 LPM, pump pressure 240 bar, 1-8 ton WOB, torque 5-8 kNm.
20.09.2001.00:00	01:15	1,3	1151,0	DDRU	OK	E FAIL	Continued drilling and surveying 17 1/2" hole from 1120 m to 1151 m. Got a sudden pressure drop of 35 bar from 235 bar to 200 bar.
20.09.2001.01:15	01:30	0,3	1158,0	DEOD	E FAIL	OK	Picked off bottom. Suspected problem with mud pump #1. Isolated same and trouble shooted, while continued drilling from 1151 m to 1158 m using mud pumps #2 and #3. Pump pressure remained constant at 200 bar. Lost signals from MWD tool. Cycled pumps to regain MWD signals, when another sudden pressure drop of approx. 100 bar and 12 ton lost string weight were observed.
20.09.2001.01:30	03:30	2,0	1158,0	DEOD	E FAIL	OK	Circulated while preparing displacement fluid. Displaced hole to 1.20 sg mud.
20.09.2001.03:30	06:00	2,5		DTWD	E FAIL	OK	POOH. Found jar parted.
20.09.2001.06:00	12:30	6,5		FTFD	E FAIL	OK	Prepared 11 1/4" overshot dressed with 7 7/8" basket grapple and m/up fishing BHA.
20.09.2001.12:30	18:00	5,5	1036,0	FTTD	E FAIL	OK	RIH. Stabbed into 30" housing assisted by ROV. Washed down from 30" shoe at 205 m to 1036 m, due to tight hole. Parameters: 30-50 RPM, flow 500 LPM, pump pressure 0-5 bar, torque 5-35 kNm.
20.09.2001.18:00	19:30	1,5	1047,0	FCFD	E FAIL	OK	Recorded up/down weight and off-bottom torque. Washed down from 1036 m to 1046 m. Parameters: 10-15 RPM, flow 500 LPM, pump pressure 5 bar. Stopped pumping at 1046 m when 4 bar pressure increase to approx. 9 bar was observed. Engaged fish at 1047 m. Lowered +/- 20 cm over fish. Pulled fish free with 20 tons overpull.
20.09.2001.19:30	00:00	4,5		FTTD	E FAIL	OK	POOH with fish. No signs of tight hole.
21.09.2001.00:00	01:00	1,0		FTFD	E FAIL	OK	Retrieved fish to surface. Attempted to release fish from grapple, no success. L/out fish (lower part of twisted jar), overshot and bumper sub in one piece.
21.09.2001.01:00	02:00	1,0		DTWD	E FAIL	OK	Flow tested MWD tool. P/up new drilling jar while checking bit with ROV, all teeth OK. RIH. Stabbed into 30" housing assisted by ROV.
21.09.2001.02:00	04:30	2,5	1137,0	DTWD	E FAIL	OK	Continued RIH. No signs of tight hole from 30" shoe at 205 m down to 1137 m.
21.09.2001.04:30	06:00	1,5	1158,0	DTWD	E FAIL	OK	Took weight at 1137 m, 7 tons. Pumped 10 m3 high-vis pill. Reamed down to bottom at 1158 m. Parameters: 85 RPM, flow 3600 LPM, pump pressure 210 bar, torque +/- 3 kNm. Circulated 40 m3 high-vis pill at TD. Started to displace same with sea water.
21.09.2001.06:00	06:30	0,5	1158,0	DTWD	E FAIL	OK	Continued displacing 40 m3 his-vis pill with sea water.
21.09.2001.06:30	10:00	3,5	1312,0	DDRU	OK	OK	Drilled and surveyed 17 1/2" hole from 1158 m to 1312 m, using sea water. Pumped 5-10 m3 high-vis pill every 15 m. Drilling parameters: 120 RPM, flow 4050 LPM, pump pressure 240 bar, 1-4 ton WOB, torque 2-4 kNm.
21.09.2001.10:00	14:00	4,0	1312,0	DCWK	OK	OK	Performed short trip from 1312 m to 1115 m. Sticky hole on connections. Backreamed from 1284 m to 1143 m, due to tight hole. Max. 30 tons overpull. Reamed from 1115 m to 1312 m.
21.09.2001.14:00	17:00	3,0	1312,0	DCAU	OK	OK	Pumped 40 m3 high-vis pill and displaced same with sea water. Displaced hole to 1.25 sg mud.

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Time from	Time to	Time used	Depth mMD	Act code	---- Status ----		Description of activities
					During opr	End of opr	
21.09.2001.17:00	21:30	4,5	205,0	DTCU	OK	OK	PO to 30" shoe. Several tight spots. Worked pipe free. Max. 35 tons overpull.
21.09.2001.21:30	22:00	0,5	205,0	DCAU	OK	OK	Pumped 1.25 sg mud to top up hole to 30" housing.
21.09.2001.22:00	00:00	2,0		DTCU	OK	OK	Cont. POOH. Washed PGB assisted by ROV. Racked BHA in derrick.
22.09.2001.00:00	01:00	1,0		CERU	OK	OK	M/up cement head. Racked back same on stand in derrick.
22.09.2001.01:00	03:00	2,0		CERU	OK	OK	Cleared rig floor. R/up to run 13 3/8" casing. Used 500 tons bails with 350 tons elevator (350 tons bails not compatible with 350 tons casing elevator). Held pre-job meeting.
22.09.2001.03:00	06:00	3,0	100,0	CARU	OK	OK	Ran 13 3/8" casing shoe, intermediate - and float joint. Baker locked first 3 connections. Installed guide ropes. Continued running 13 3/8" casing to 100 m. Filled each 5th joint with sea water.
22.09.2001.06:00	18:00	12,0	1149,0	CARU	OK	OK	Continued running 13 3/8" casing from 100 m to 1149 m. Filled each 5th joint with sea water. Took weight at 652 m, 30 tons. Worked casing down from 652 m to 664 m.
22.09.2001.18:00	21:00	3,0	1285,0	CARU	OK	OK	P/up WH housing and continued running casing on 5" DP landing string. Took weight at 1221 m. Worked string down from 1221 m to 1237 m. Max. 60 tons down weight / 50 tons overpull. Worked string and circulated from 1237 m to 1285 m with sea water at 300 LPM / 70 bar. Observed returns with ROV.
22.09.2001.21:00	22:00	1,0	1305,0	CARU	OK	OK	Installed cement head and landed 18 3/4" WH housing while circulating with sea water at 200 LPM / 30 bar. Casing shoe at 1305 m. Took 25 tons overpull test, OK.
22.09.2001.22:00	23:30	1,5	1305,0	CCCU	OK	OK	Circulated 25 m3 1.25 sg mud followed by sea water at 2300 LPM / 90 bar 1.5 x bottoms up while preparing for cement job. Held pre-job meeting.
22.09.2001.23:30	00:00	0,5	1305,0	CSSU	OK	OK	Pressure tested surface lines to 200 bar/ 10 min. Dropped ball for bottom wiper plug.
23.09.2001.00:00	04:00	4,0	1305,0	CSSU	OK	OK	Mixed and pumped 146.3 m3 1.56 sg lead slurry and 15 m3 1.92 sg tail slurry. Dropped dart for top wiper plug. Displaced same with 1.5 m3 sea water at 1000 LPM, using cement unit. Sheared plug at 150 bar. Continued displacing cement with 88.2 m3 sea water, using rig pumps. Observed returns with ROV. Final circulating pressure: 140 bar. Plug bumped at 94.8 % pump efficiency. Checked for backflow, OK.
23.09.2001.04:00	04:30	0,5	142,0	CTTU	OK	OK	Released CART tool. Flushed wellhead and PGB. Checked bull's eye: FWD = STB = 0.5 deg.
23.09.2001.04:30	06:00	1,5		CTTU	OK	OK	POOH with landing string. L/out running tool (CART) and cement head.
23.09.2001.06:00	06:30	0,5		DTPU	OK	OK	Downloaded MWD memory.
23.09.2001.06:30	08:00	1,5		DTPU	OK	OK	L/out 17 1/2" BHA.
23.09.2001.08:00	09:00	1,0		DEOU	OK	OK	Slipped and cut drilling line.
23.09.2001.09:00	10:00	1,0		BBRU	OK	OK	Moved rig 30 m off location prior to BOP running while repairing leakage on cooling system for drawwork drum and performing maintenance on TDS. Started to prepare for running BOP. Held pre-job safety meeting.
23.09.2001.10:00	12:00	2,0		BBRU	OK	OK	Moved BOP and LMRP into moonpool on spider beams while r/up BOP handling gear.
23.09.2001.12:00	13:00	1,0		BBRU	OK	OK	Installed riser spider and picked up 1st riser joint.
23.09.2001.13:00	14:00	1,0		BBWW	OK	OK	Waited on weather due to fogg. Too poor visibility for stand-by boat.
23.09.2001.14:00	14:30	0,5		BBRU	OK	OK	Prepared to run BOP.
23.09.2001.14:30	15:00	0,5		BBWW	OK	OK	Waited on weather due to fogg. Too poor visibility for stand-by boat.
23.09.2001.15:00	17:00	2,0		BBRU	OK	OK	Continued preparing to run BOP. M/up 1st riser joint to LMRP. Mounted beacon and bull's eye.
23.09.2001.17:00	22:30	5,5		BBRU	OK	OK	Lifted BOP off beams. Ran BOP/riser. Tested K/C lines every 3rd riser joint to 35 bar/ 5 min 220 bar/ 10 min.
23.09.2001.22:30	00:00	1,5		BBRU	OK	OK	P/up slip joint and landing joint.
24.09.2001.00:00	02:30	2,5		BBRU	OK	OK	Installed goosenecks and tension ring.

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Time from	Time to	Time used	Depth mMD	Act code	---- Status ----		Description of activities
					During opr	End of opr	
24.09.2001.02:30	03:30	1,0		BBRU	OK	OK	Moved rig back to location.
24.09.2001.03:30	05:30	2,0		BBRU	OK	OK	Landed BOP while observing with ROV. Performed 25 tons overpull test, OK. Released slip joint inner barrel. L/down landing joint. Installed diverter. L/out handling tools.
24.09.2001.05:30	06:00	0,5		BBDU	OK	OK	Pressure tested WH connector and 13 3/8" casing to 220 bar / 15 min. Observed WH connector with ROV during pressure testing. Function tested BOP on both PODs.
24.09.2001.06:00	06:30	0,5		BBDU	OK	OK	Completed function testing BOP on both POD's. Continued l/down riser handling gear.
24.09.2001.06:30	11:00	4,5	197,5	DTPU	OK	OK	P/up and m/up 8 1/2" BHA. Communicated with MWD tool, sensors OK.
24.09.2001.11:00	12:00	1,0	430,0	BBDU	OK	OK	RIH on 5" DP. Tested LMRP to 220 bar.
24.09.2001.12:00	13:00	1,0	1000,0	DTDU	OK	E FAIL	Continued RIH 8 1/2" BHA on 5" DP to 1000 m. Filled pipe with SW and flow tested MWD tool, negative.
24.09.2001.13:00	15:30	2,5		DTMD	E FAIL	OK	POOH to change MWD tool.
24.09.2001.15:30	16:30	1,0		DTMD	E FAIL	OK	L/down MWD DC module. P/up new MWD DC and tested same, OK.
24.09.2001.16:30	19:00	2,5	1000,0	DTMD	E FAIL	OK	Continued RIH 8 1/2" BHA on 5" DP to 1000 m. Filled pipe with SW and flow tested MWD, OK.
24.09.2001.19:00	20:30	1,5	1279,0	DTDU	OK	OK	Continued RIH with 8 1/2" assembly to 1233 m. Washed in last stand with 750 LPM and tagged float at 1279 m.
24.09.2001.20:30	21:00	0,5	1279,0	DCAU	OK	OK	Performed kick drill.
24.09.2001.21:00	00:00	3,0	1312,0	CDDU	OK	OK	Drilled wiper plug/float/shoe track (soft cement only). Worked through shoe several times. Cleaned rat hole. Drilling parameters: 70 RPM, flow 2000 LPM, pump pressure 76 bar, 0-2 tons WOB, torque 0-4 kNm.
25.09.2001.00:00	01:00	1,0	1316,0	DDRU	OK	OK	Drilled 4 m new formation to 1316 m. Took check survey with MWD, OK.
25.09.2001.01:00	03:30	2,5	1316,0	ECFU	OK	OK	Circulated 15 m3 hi-vis pill around. Spotted 10 m3 unweighted fluid loss polymer pill while having pre-job meeting prior to displacing to OBM. Pulled inside casing shoe. Performed LOT to 1.62 sg EMW.
25.09.2001.03:30	06:00	2,5	1316,0	DCAU	OK	OK	Displaced kill/choke - and booster lines to OBM. Ran back to bottom. Started to displace hole to 1.35 sg OBM.
25.09.2001.06:00	06:30	0,5	1316,0	DCAU	OK	E FAIL	Continued displacing hole to 1.35 sg OBM.
25.09.2001.06:30	07:00	0,5	1316,0	DERD	E FAIL	OK	Trouble shooted SCR failure on drawwork and mud pumps #1 and #2. Replaced burned coil in SCR system for drawwork motor.
25.09.2001.07:00	14:00	7,0	1634,0	DDRU	OK	E FAIL	Drilled and surveyed 8 1/2" hole from 1316 m to 1634 m, using 1.35 sg OBM. Drilling parameters: 130 RPM, flow 2500 LPM, pump pressure 235 bar, WOB 0-5 tons, torque 3-8 kNm. Decided to POOH due to MWD failure.
25.09.2001.14:00	16:00	2,0	1634,0	DTMD	E FAIL	OK	Circulated bottoms up at 2500 LPM and 130 RPM. Flow checked 10 min. Pumped slug prior to POOH.
25.09.2001.16:00	19:30	3,5		DTMD	E FAIL	OK	POOH. Flow checked 10 min. at 13 3/8" shoe and before pulling BHA through BOP.
25.09.2001.19:30	23:00	3,5		DTMD	E FAIL	OK	Held pre-job meeting. L/down MWD DC. Broke off MWD modular stab and l/down remaining part of MPR module. P/up new MWD DC and MPR sub. M/up same, incorporating MWD modular stab. Communicated with MWD tool, sensors OK.
25.09.2001.23:00	00:00	1,0	197,0	DTMD	E FAIL	OK	RIH with 8 1/2" BHA to 197 m.
26.09.2001.00:00	03:30	3,5	1634,0	DTMD	E FAIL	OK	Continued RIH with 8 1/2" BHA on 5" DP to 1634 m. Filled pipe every 500 m. Flow tested MWD tool at 1000 m, OK. Took weight at 1490 m, 10 tons. Worked string through tight spot. Washed/reamed in last stand from 1604 m to 1634 m with 2000 LPM, relogged interval with MWD.
26.09.2001.03:30	06:00	2,5	1682,0	DDRU	OK	OK	Drilled and surveyed 8 1/2" hole from 1634 m to 1682 m, with controlled ROP (max. 20 m/hr) looking for coring point. Drilling parameters: 120 RPM, pump pressure 210 bar, flow 2300 LPM, WOB 0-5 tons, torque 2-8 kNm.



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Time from	Time to	Time used	Depth mMD	Act code	---- Status ----		Description of activities
					During opr	End of opr	
26.09.2001.06:00	06:30	0,5	1684,5	DDRU	OK	OK	Continued drilling with controlled ROP from 1682 m to 1684.5 m (max. 20 m/hr), looking for coring point (sand). Observed drilling break at 1684.5 m. Flow checked 10 min, negative. Continued drilling 5 m and evaluated MWD GR and RES log responses, no sand.
26.09.2001.06:30	07:00	0,5	1690,0	DDRU	OK	OK	Observed a sudden pressure drop of approx. 20 bar. P/off bottom and investigated pressure drop (corresponded with an unplugged nozzle). Resumed drilling from 1684.5 m to 1690 m (max. 20 m/hr), looking for sand. Drilling parameters: 135 RPM, pump pressure 220 bar, flow 2530 LPM, WOB 0-2 tons, torque 2-8 kNm.
26.09.2001.07:00	08:00	1,0	1706,0	DDRU	OK	OK	Continued drilling with controlled ROP from 1690 m to 1706 m. Drilling parameters remained constant. Flow checked 10 min at 1703 m, negative.
26.09.2001.08:00	09:00	1,0	1706,0	ECSU	OK	OK	Circulated bottoms up for samples at 2540 LPM and 130 RPM.
26.09.2001.09:00	12:30	3,5	1764,0	DDRU	OK	OK	Continued drilling and surveying 8 1/2" hole from 1706 m to 1764 m with controlled ROP (max. 20 m/hr), looking for sand. Drilling parameters: 130 RPM, pump pressure 220 bar, flow 2540 LPM, WOB 0-2 tons, torque 2-8 kNm.
26.09.2001.12:30	13:30	1,0	1764,0	ECSU	OK	OK	Circulated bottoms up for samples at 2540 LPM and 130 RPM.
26.09.2001.13:30	19:30	6,0	1880,0	DDRU	OK	OK	Continued drilling and surveying 8 1/2" hole from 1764 m to TD at 1880 m with controlled ROP (max. 20 m/hr), no sand. Drilling parameters: 130 RPM, pump pressure 235 bar, flow 2530 LPM, WOB 3-7 tons, torque 4-10 kNm.
26.09.2001.19:30	21:30	2,0	1880,0	DCAU	OK	OK	Circulated bottoms up x 2 at 2530 LPM and 130 RPM.
26.09.2001.21:30	00:00	2,5	1305,0	DTLU	OK	OK	Flow checked 10 min, negative. Pumped slug and started POOH. Performed kick-drill with crew. Flow checked 10 min at 13 3/8" shoe, negative. Hole in good condition, only minor drag (1-2 tons) from 1479 m to 1440 m.
27.09.2001.00:00	01:00	1,0	197,5	DTLU	OK	OK	Continued POOH. Flow checked 10 min prior to pulling BHA through BOP, negative.
27.09.2001.01:00	03:00	2,0		DTPU	OK	OK	Pulled and l/down 8 1/2" BHA.
27.09.2001.03:00	06:00	3,0		ELWU	OK	OK	R/up wireline equipment and tools. Held pre-job meeting. Checked tools and loaded radioactive sources.
27.09.2001.06:00	12:00	6,0		ELWU	OK	OK	RIH with wireline log #1 (PEX-AIT-DSI-GR,). Started logging operation at 07:30.
27.09.2001.12:00	13:30	1,5		ELWU	OK	OK	POOH. Layed down tools on deck.
27.09.2001.13:30	15:30	2,0		ELWU	OK	E FAIL	Rigged up for wireline log #2 (ZVSP-GR).
27.09.2001.15:30	17:30	2,0		ELOD	E FAIL	OK	Changed retractable caliper on VSP tool due to stiff caliper.
27.09.2001.17:30	18:00	0,5		ELWU	OK	E FAIL	RIH with VSP tool to 500 m.
27.09.2001.18:00	19:00	1,0		ELOD	E FAIL	OK	Discovered leakage in VSP guns. Repaired same.
27.09.2001.19:00	23:00	4,0		ELWU	OK	OK	Continued RIH with VSP tool to 1880 m. Performed check shots at 500 m, 1000 m, 1250 m and 1625 m.
27.09.2001.23:00	00:00	1,0		ELWU	OK	OK	Performed VSP logging from 1880 m to 1807 m.
28.09.2001.00:00	06:00	6,0		ELWU	OK	OK	Continued with VSP logging from 1807 m to 1200 m.
28.09.2001.06:00	09:00	3,0		ELWU	OK	OK	Continued with VSP logging (Logging run #2). OOH with VSP tool at 08:45. L/D VSP tool on deck.
28.09.2001.09:00	09:30	0,5		ELWU	OK	OK	Rigged down logging equipment. Cleared drill floor.
28.09.2001.09:30	12:00	2,5	307,0	PTTU	OK	OK	Rigged up to run cement stinger. M/U 3 1/2" mule shoe and RIH with 3 1/2" sement stinger to 307 m.
28.09.2001.12:00	15:30	3,5	1557,0	PTTU	OK	OK	M/U casing scraper and RIH on 5" DP to 1557 m (Csg scraper at 1240 m).
28.09.2001.15:30	16:30	1,0	1557,0	PCCU	OK	OK	Circulated bottoms up with 3000 lpm.
28.09.2001.16:30	17:30	1,0	1355,0	PTTU	OK	OK	POOH to 1505 m. Pumped 8,2 m3 1,60 sg water based hi-vis pill (from 1505 m to 1355 m). Displaced same with 10,5 m3 OBM. POOH to 1355 m.

# Operations

Wellbore: 0016/02-002

Time from	Time to	Time used	Depth mMD	Act code	---- Status ----		Description of activities
					During opr	End of opr	
28.09.2001.17:30	19:00	1,5	1355,0	PSSU	OK	OK	M/U cement stdnd and cement hose. Pressure tested cement hose to 150 bar/5 min, ok. Pumped 7 m3 1,60 sg spacer, 13,9 m3 1,92 sg cement and 0,35 m3 1,60 sg spacer. Displaced cement with 8,2 m3 1,35 sg OBM.
28.09.2001.19:00	20:30	1,5	950,0	PTTU	OK	OK	POOH from 1355 m to 950 m. Pulled 5 first stand dry.
28.09.2001.20:30	21:00	0,5	950,0	PCCU	OK	OK	Circulated string volume with 3200 lpm. Pumped slug.
28.09.2001.21:00	00:00	3,0	436,0	PTTU	OK	OK	POOH from 950 m to 436 m. L/D 5" drill pipe while POOH. Worked casing scraper from 395 m to 375 m with 20 rpm and 2000 lpm.
29.09.2001.00:00	01:30	1,5	307,0	PTTU	OK	OK	Continued POOH and L/D 5" drill pipe.
29.09.2001.01:30	03:00	1,5		PTTU	OK	OK	Broke off and L/D casing scraper. POOH with 3 1/2" stinger and racked back in derrick. Washed wellhead and BOP on way out.
29.09.2001.03:00	06:00	3,0		PTPU	OK	OK	Laid down excess 5" DP from derrick.
29.09.2001.06:00	07:30	1,5		PTPU	OK	OK	Laid out 3 jnts 5" HWDP, jar and 8 jnts 6 1/2" DC from derrick. Meanwhile closed shear ram and pressure tested cement plug to 105 bar/10 min, ok.
29.09.2001.07:30	08:30	1,0	142,0	BHRU	OK	OK	Changed elevator. M/U wear bushing retrieving tool and RIH with same on 5" DP.
29.09.2001.08:30	10:30	2,0		BHRU	OK	OK	Engaged wear bushing and pulled free with 17 tons over pull. POOH. Laid down 5" DP, wear bushing and wear bushing retrieving tool.
29.09.2001.10:30	13:00	2,5	385,0	PSMU	OK	OK	M/U 13 3/8" EZSV bridge plug and RIH with 5" DP to 385 m. Set bridge plug at 385 m. Pulled free with 20 ton overpull and set down 7,5 ton to verify plug set, ok.
29.09.2001.13:00	14:30	1,5	385,0	PSMU	OK	OK	Closed UPR and pressure tested bridge plug, pumped volume to obtain 105 bar indicate negative test. Opened UPR and set down 16 tons to fully collapse bridge plug packer elements. Closed UPR and IBOP and pressure tested bridge plug to 105 bar/10 min, ok.
29.09.2001.14:30	15:00	0,5	385,0	PCCU	OK	O FAIL	Displaced kill/choke line to seawater. Started to displace well to seawater from 385 m. Lost suction on mud pumps after pumping 3 m3 baseoil.
29.09.2001.15:00	16:00	1,0	385,0	PAOD	O FAIL	OK	Troubleshoot and sorted out problem with suction on mud pumps.
29.09.2001.16:00	18:00	2,0	385,0	PCCU	OK	OK	Continued to displace well to seawater from 385 m. Pumped 3 m3 baseoil and 17 m3 safesurf hi-vis pill. Pumped pill around with 2000 lpm.
29.09.2001.18:00	19:00	1,0	385,0	PSSU	OK	OK	Racked back one stand and M/U cement stand. RIH to 385 m. Connected cement hose and pressure tested surface lines to 100 bar/5 min. Set surface cement plug from 385 m to 185 m. Pumped 15,6 m3 1,90 sg cement and displaced with 1,60 m3 seawater at 1200 lpm.
29.09.2001.19:00	19:30	0,5	175,0	PTTU	OK	OK	Racked back cement stand. Pulled back to 175 m.
29.09.2001.19:30	20:30	1,0	175,0		OK	OK	Circulated bottoms up with 2000 lpm. No cement in return. Operated BOP rams and annulars. Flushed BOP.
29.09.2001.20:30	21:30	1,0		PTTU	OK	OK	POOH. Laid down 17 jnts 5" DP while POOH. Broke off and laid down EZSV running tool.
29.09.2001.21:30	00:00	2,5		PTPU	OK	OK	Rearranged pipe in derrick. Laid down 30 jnts 5" DP from derrick.
30.09.2001.00:00	02:00	2,0		PTPU	OK	OK	Laid down 8" jar and 11 jnts 8" DC from derrick. Cleaned rig floor.
30.09.2001.02:00	06:00	4,0		BBWW	OK	OK	Waited on weather to disconnect BOP. Not possible to have standby boat in near standby.
30.09.2001.06:00	11:00	5,0		BBWW	OK	OK	Waited on weather to disconnect BOP. Not possible to have standby boat in near standby. Meanwhile P/U 6 jnts 8" DC and racked back in derrick. Rigged up on drill floor to pull riser and BOP.
30.09.2001.11:00	13:30	2,5		BBRU	OK	OK	Laid out diverter. M/U landing joint and collapsed slip joint. Disconnected BOP from wellhead. Pulled BOP above guide posts.
30.09.2001.13:30	15:00	1,5		BBRU	OK	OK	Removed pod real saddles. Disconnected load ring. Removed control hoses and goose necks on kill, choke and booster line.
30.09.2001.15:00	20:00	5,0		BBRU	OK	OK	Laid out landing joint and slip joint. Continued to pull riser/BOP.
30.09.2001.20:00	00:00	4,0		BBRU	OK	OK	Landed BOP on spider beams. Disconnected riser. Split and moved BOP to setback area.

# Operations

Wellbore: 0016/02-002

Time from	Time to	Time used	Depth mMD	Act code	---- Status ----		Description of activities
					During opr	End of opr	
01.10.2001.00:00	02:30	2,5		BBRU	OK	OK	L/D riser joints. Rigged down riser handling equipment.
01.10.2001.02:30	04:30	2,0		PAHU	OK	OK	Picked up 20" x 30" cutting assembly with MOST tool and RIH with same.
01.10.2001.04:30	06:00	1,5		PAHU	OK	OK	Landed MOST tool in wellhead. Started to cut 20" and 30" casing at 148,8 m.
01.10.2001.06:00	08:30	2,5		PAHU	OK	OK	Continued to cut 20" x 30" casing at 148,8 m.
01.10.2001.08:30	09:00	0,5		PAHU	OK	OK	String stalled out. Picked up and engaged MOST tool. Locked MOST tool to wellhead with ROV. Pulled 30" conductor free, no overpull. POOH with PGB and wellhead to 75 m.
01.10.2001.09:00	20:00	11,0		BBWW	OK	OK	Waited on weather. Not possible to have standby boat in near standby.
01.10.2001.20:00	21:00	1,0		PAHU	OK	OK	POOH with wellhead and PGB. Secured PGB on spider beams. Released MOST tool and L/D cutter assembly. L/D wellhead.
01.10.2001.21:00	00:00	3,0		MNWW	OK	OK	Waited on weather to start anchor handling.
02.10.2001.00:00	06:00	6,0		MNWW	OK	OK	Waited on weather to start anchor handling.
02.10.2001.06:00	00:00	18,0		MNWW	OK	OK	Waiting on weather to pull anchors.
03.10.2001.00:00	06:00	6,0		MNWW	OK	OK	Waiting on weather to pull anchors.
03.10.2001.06:00	18:00	12,0		MNWW	OK	OK	Waited on weather to start anchor handling.
03.10.2001.18:00	00:00	6,0		MNBU	OK	OK	De-ballasted rig
04.10.2001.00:00	02:30	2,5		MNBU	OK	OK	Continued to de-ballast rig.
04.10.2001.02:30	06:00	3,5		MARU	OK	OK	Pulled anchors. Anchor no 3 on bolster at 04:58 hrs, anchor no. 6 on bolster at 05:30 hrs.

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## **App C Wellbore schematic and P&A**

Well: 16/2-2  
 Field: Skuld  
 Rig: Byford Dolphin

## WELL SCHEMATIC

HOLE		CASING				LOT	TOC		CSG. SHOE			WL LOGS	LWD LOGS	SURV CSG/OH	
SIZE	TVD MD	SIZE	TYPE / RAD. MARKERS	CENTRALIZERS	TEST PRESS [BAR]	g/cm3	TVD	MD	TVD	MD	RKB				
SB	145														
36"	205	30"	X-52, 309 lb/ft, ST-2 4 jnts 30" # 309.7, X-52, ST-2 + Housing jnt. Total length: approx. 60 m incl. Housing jnt				Surface	Surface	205	205					
17 1/2"	1312	20"x 13 3/8"	P110, 72 lb/ft, New Vam (Housing ext. joint: 20", X-65, 166.2 lb/ft)	1 cent. pr. jnt on first 3 jnts. from shoe. None on the rest of casing Type: NW-ST A4	220 1.03 g/cm3	1.62	Surface	Surface	1305	1305			MPR	OH MWD	
8 1/2"	1880												3R-Density- Neutron-res. Sonic	MPR lite	OH MWD

Well: 16/2-2  
 Field: Skuld  
 Rig: Byford Dolphin

**WELL SCHEMATIC - PLUGGED WELL**

Purpose of plugging: Permanent  
 Date of abandonment: October, 2001

HOLE		CASING and FORMATION				LOT / FIT	TOC		CSG. and PLUGS		RT	TESTS				
SIZE	TVD MD	SIZE	CASING TYPE	PERMEABLE HC BEARING ZONES	Mud [g/cm3]	g/cm3	TVD	MD	TVD	MD						
Sea Bed	145								Cut at	148.8						
36"	205	30"	X-52, 309 lb/ft. ST-2 4 jnts 30" # 309,7, X-52, ST-2 + Housing jnt.	None			185	185								
									205	205						
17 1/2"	1312	20"x 13 3/8"	P110, 72 lb/ft. New Vam (Housing ext. joint: 20", X-65, 166 lb/ft)	None	1.03				385	385		70 bar above LOT				
											1155	1155				70 bar above LOT
8 1/2"	1880			None	1,35						1305	1305				
											1360	1360				
											1510	1510				
													1880	1880		

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## **App D Timeplanner**





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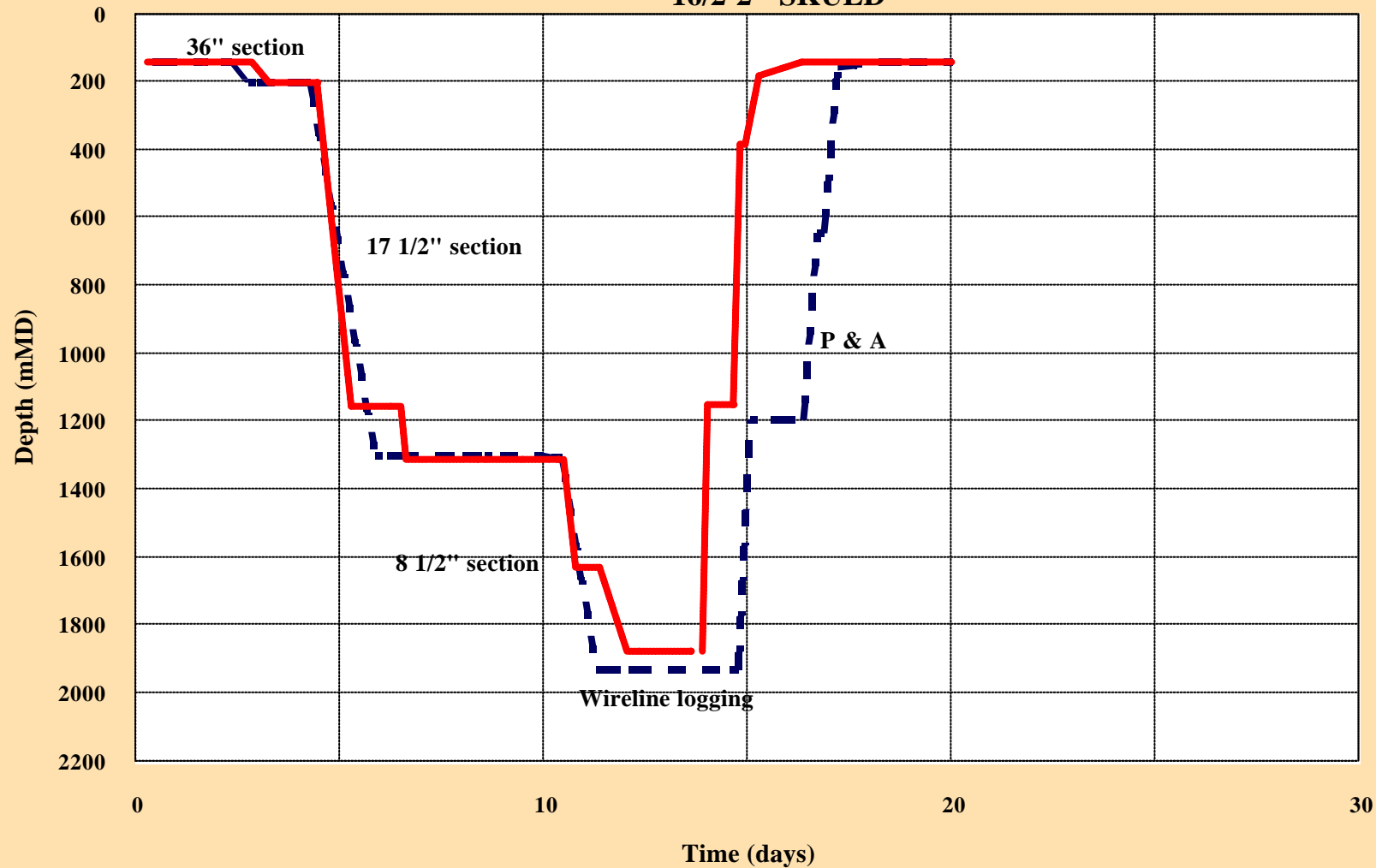
**App E Time/depth curve**

# Time - Depth Plot

## Byford Dolphin

### 16/2-2 - SKULD

- - - Budget time (days)  
— Actual time (days)



**Updated date/time:**  
 Date: 04.01.02  
 Time: 12:18  
  
**Start date/time:**  
 Date: 14.09.01  
 Time: 18:00  
  
**Finish date/time:**  
 Date: 04.10.01  
 Time: 19:00  
  
**Total budget time:**  
 20,1 days  
  
**Time used:**  
 20,0 days  
  
**Time behind budget:**  
 0,0 days  
  
Comments:

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## **App F Bit record**

# Bit record

Wellbore: 0016/02-002

Run No	Bit Size	Bit No	BHA No	Bit Type	IADC code	Bit manufacturer	Serial No	Nozzles (n/32")				Flow Area in2
								no x n	no x n	no x n	no x n	
1	17 1/2"	1	1	MXT1	115	Hughes Christensen	K90DE	3 x 12	1 x 14	x	x	,482
	26"/36"	HO	1	HO2STAGE	135	IPE		6 x 12	x	x	x	,663
2	17 1/2"	2	2	MXT1	115	Hughes Christensen	ma56li	1 x 16	2 x 20	1 x 14	x	,961
3	17 1/2"	2R	4	MXT1	115	Hughes Christensen	ma56li	1 x 16	2 x 20	1 x 14	x	,961
4	8 1/2"	3	5	SD944	S423	Diamond Products Internation	1964094	9 x 10	x	x	x	,691
5	8 1/2"	3R	6	SD944	S423	Diamond Products Internation	1964096	9 x 10	x	x	x	,691

Run No	Bit Size	Pump Rate l/min	Pump Press bar	Depth in mMD	Depth out mMD	Drilled length m	Hours Drilled	ROP	Min WOB ton	Max WOB ton	Min RPM	Max RPM	Torque		Conn drag	
													Min Nm	Max Nm	Min 1000 daN	Max 1000 daN
1	26"/36"	4980	195	145,3	205	59,7	7,2	8,3	0	2	50	90	1	4		
1	17 1/2"	4980	195	145,3	208	62,7	7,2	8,7	0	2	50	90	1	4		
2	17 1/2"	4000	188	205	1158	953	13,5	70,6	1	8	45	120	1000	8000		
3	17 1/2"	4050	238	1158	1312	154	2,5	61,6	0	4	115	120	2	4		
4	8 1/2"	2500	230	1312	1634	322	7	46,0	0	5	80	130	3	8		
5	8 1/2"	2300	210	1634	1880	246	11,3	21,8	1	5	90	130	2	10		

Run No	Bit Size	----- IADC dull grading -----										Remarks
		I	O	DC	L	B	G	OC	RP			
1	26"/36"	1	1	WT	A	E	I	NO	TD	One locked cone on 36" HO		
	17 1/2"	1	1	WT	A	E	I	NO	TD			
2	17 1/2"									Not graded as bit was not pulled to surface when recovering fish. Only laid out jar, and ran back in hole.		
3	17 1/2"	2	1	CT	A	E	I	NO	TD			
4	8 1/2"	1	2	CT	G	X	I	PN	DTF	Additional other dull: one broken cutter on the nose		
5	8 1/2"	1	3	CT	G	X	I	PN	TD	Drilled with controlled ROP for core point.		

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## **App G Bottom Hole Assemblies (BHA)**

# BHA report

Wellbore: 0016/02-002

**BHA seq: 1**      **BHA category: Drilling**      **BHA description: 36" Assembly**

**BHA no: 1**

String component	OD in	ID in	Length m	Acc length m
BIT	17,500		0,43	0,43
FLOAT SUB	9,500		0,64	1,07
HOLE OPENER	36,000		3,85	4,92
BIT SUB	9,500		0,87	5,79
ANDERDRIFT	9,500		2,98	8,77
X-OVER	8,000		0,76	9,53
DRILL COL	8,000	3,000	111,63	121,16
X-OVER	7,750	3,375	0,43	121,59
HW DRILL PIPE	5,000			121,59

**BHA seq: 2**      **BHA category: Drilling**      **BHA description: 17 1/2" Rot. assembly**

**BHA no: 2**

String component	OD in	ID in	Length m	Acc length m
BIT			0,40	0,40
NB STAB W/FL	17,500	3,000	2,41	2,81
PONY COLLAR	9,440	3,000	3,25	6,06
STAB STRING	17,500	3,000	2,29	8,35
X-OVER	9,500	3,000	0,86	9,21
MWD, MPR	8,250	2,813	5,02	14,23
MWD, DCP	8,250	2,813	11,22	25,45
SAVER SUB	8,000	3,000	0,55	26,00
STAB. W/TOTCO	8,000	3,000	1,47	27,47
DRILL COLLAR	8,000	2,813	74,78	102,25
JAR	8,000	2,750	9,77	112,02
DRILL COLLAR	8,000	3,000	27,65	139,67
X-OVER	7,750	3,375	0,43	140,10
HW DRILL PIPE	5,000	3,000	83,15	223,25
DRILL PIPE	5,000			223,25

**BHA seq: 3**      **BHA category:**      **BHA description: Fishing assembly**

**BHA no: 3**

String component	OD in	ID in	Length m	Acc length m
OVERSHOT	11,250	3,500	2,16	2,16
BUMPER SUB	8,000	3,000	5,23	7,39
X-OVER	9,500	3,000	0,78	8,17
STAB STRING	17,500	3,000	2,27	10,44
X-OVER	8,000	3,000	0,95	11,39
DRILL COLLAR	8,000	3,500	27,65	39,04
JAR	7,750	3,000	9,57	48,61
X-OVER	6,500	3,000	1,29	49,90
DRILL COLLAR	6,500	3,000	27,40	77,30
HW DRILL PIPE	5,000	3,000	83,15	160,45
DRILL PIPE	5,000			160,45

**BHA seq: 4**      **BHA category: Drilling**      **BHA description: 17 1/2" Rot. assembly**

**BHA no: 4**

String component	OD in	ID in	Length m	Acc length m
BIT			0,40	0,40
NB STAB W/FL	17,500	3,000	2,41	2,81
PONY COLLAR	9,440	3,000	3,25	6,06
STAB STRING	17,500	3,000	2,29	8,35
X-OVER	9,500	3,000	0,86	9,21
MWD, MPR	8,250	2,813	5,02	14,23
MWD, DCP	8,250	2,813	11,22	25,45
SAVER SUB	8,000	3,000	0,55	26,00

# BHA report

Wellbore: 0016/02-002

**BHA seq: 4**      **BHA category: Drilling**      **BHA description: 17 1/2" Rot. assembly**

**BHA no: 4**

String component	OD in	ID in	Length m	Acc length m
STAB. W/TOTCO	8,000	3,000	1,47	27,47
DRILL COLLAR	8,000	2,813	74,78	102,25
JAR	8,000	2,750	9,57	111,82
DRILL COLLAR	8,000	3,000	27,65	139,47
X-OVER	7,750	3,375	0,93	140,40
HW DRILL PIPE	5,000	3,000	83,15	223,55
DRIFT SUB	6,400	2,300	1,00	224,55
DRILL PIPE	5,000			224,55

**BHA seq: 5**      **BHA category: Drilling**      **BHA description: 8 1/2" Rot. assembly**

**BHA no: 5**

String component	OD in	ID in	Length m	Acc length m
BIT	8,500		0,48	0,48
SRIG NB STAB	8,500	2,813	1,20	1,68
MWD, MPR	6,750	2,813	3,65	5,33
MOD STAB	8,500	2,813	1,12	6,45
MWD, DCP	6,750	2,813	11,67	18,12
STAB STRING	8,500	3,000	1,50	19,62
FLOAT SUB	6,500	3,000	1,07	20,69
DRILL COLLAR	6,500	3,000	54,42	75,11
JAR	6,500	2,750	9,86	84,97
DRILL COLLAR	6,500	3,000	28,38	113,35
HW DRILL PIPE	5,000	3,000	83,15	196,50
DRIFT SUB	6,400	2,300	1,00	197,50
DRILL PIPE	5,000			197,50

**BHA seq: 6**      **BHA category: Drilling**      **BHA description: 8 1/2" Rot. assembly**

**BHA no: 6**

String component	OD in	ID in	Length m	Acc length m
BIT	8,500		0,48	0,48
SRIG NB STAB	8,500	2,813	1,19	1,67
MWD, MPR	6,750	2,813	3,78	5,45
MOD STAB	8,500	2,813	1,10	6,55
MWD, DCP	6,750	2,813	11,66	18,21
STAB STRING	8,500	3,000	1,50	19,71
FLOAT SUB	6,500	3,000	1,07	20,78
DRILL COLLAR	6,500	3,000	54,42	75,20
JAR	6,500	2,750	9,86	85,06
DRILL COLLAR	6,500	3,000	28,38	113,44
HW DRILL PIPE	5,000	3,000	83,15	196,59
DRIFT SUB	6,400	2,300	1,00	197,59
DRILL PIPE	5,000			197,59

**BHA seq: 7**      **BHA category: Drilling**      **BHA description: Wellhead cutting assy w/MOST tool**

**BHA no: 7**

String component	OD in	ID in	Length m	Acc length m
BULL NOSE	8,000	1,500	0,38	0,38
CASING CUTTER	12,000		1,82	2,20
SUB	10,000	3,500	0,38	2,58
STABILIZER NON.ROT	17,500	2,813	1,50	4,08
SPACE OUT SUB	8,000	3,000	0,89	4,97
MOST TOOL	39,000	2,500	2,45	7,42
MARINE SWIVEL	14,375	2,250	2,11	9,53
DRIL COL	8,000	3,000	56,71	66,24

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## **App H Drilling fluids summary**



Well: 16/2-2  
 Field: Skuld  
 Rig: Byford Dolphin

## DRILLING FLUIDS SUMMARY

HOLE		CASING		MUD TYPE	MW [g/cm3]	FV (Sec.)	10 sec. [Pa]	10 min. [Pa]	Fann 100 rpm	Fann 3 rpm	O/W ratio	PV [mPa]	API FL [ml]	HTHP FL [ml]	MBT [KG/m³]	pH	Ex lime [KG/m³]	Stab [V]	WPA	DFE [%]	Total Volume Old Volume New Volume Usage [m³]					
SIZE	TVD MD	SIZE	TVD MD																							
36"	205	30"	205	HiVis pills	1,03-1,05	>150										8						480				
				Seawater/ polymer	1,30 (displ)	>150												8						0		
				Comments:	Prior to drilling had 70 m3 1.60 g/cm3 kill fluid ready.																					
				Spec 6	This section was drilled using SW and pumping 10 m3 high viscosity sweeps as required. At TD pumped a 40 m3 havis pill and displaced the well to 1.30 g/cm3 muc																					
17 1/2"	1312	13 3/8"	1312	Bentonite	1,03-1,05	>150										8						956				
				HiVis pills														-						291		
				Seawater w/bentonite	1,25 (displ.)	>150										8						665				
																9							956			
				Comments:	Prior to drilling had 70 m3 1.60 g/cm3 kill fluid ready.																					
				Spec 6	This section was drilled using SW and pumping 10 m3 high viscosity sweeps as required. At TD pumped a 40 m3 havis pill and displaced the well to 1.25 g/cm3 muc The kill mud were diluted back to 1,25 g/cm3 and used as displacement mud.																					
8 1/2"	1880			Novatec	1,35		8	9	28	12	62/38	21					7.7		670				341			
							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	245
							9	10	34	13	70/30	26				1.5				9.6		890				
				Comments:	This section was drilled with POBM. The start volume was premixed onshore.																					
				Spec 59	NOTE: Novatec POBM used on previous well /24/12-4 came out heavily water contaminated - therefore the high O/W ratio. Included in the mud usage are 50 m3 accidental spillage to the sea while backloading to boat.																					

**Final Well Report  
Well 16/2-2, Skuld  
PL265**

Doc. no.  
**02C94\*164**  
Date  
**2002-04-12**



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## **App I Cementing summary**

Well: 16/2-2  
 Field: Skuld  
 Rig: Byford Dolphin

## CEMENT SUMMARY

HOLE		CASING SHOE		TOC	VOLUME/ EXCESS	CEMENT SLURRY DESIGN										SPACER	DISPLACEMENT
SIZE	TVD MD	SIZE	TVD MD	TVD MD		Components	Lead [ltr/100kg]	Tail [ltr/100kg]	Density [ g/cm3 ]	Yield [ltr/100kg]	Stat. / Circ. Temp [°C]	Thickening time [hrs to 30 Bc]	API Free Water [ % ]	API Fluid loss [ cc/30min ]	24 hrs C. S. [ psi ]	Fluids and Rates	
36"	205	30"	205	Sea bed	Lead: 17,7 m3 Tail: 20 m3 200%	Norcem "G" Cmt. (100 kg) Econolite CaCl2 liquid NF-6 Sea water	3.20 - 0.10 95.07	- 4.35 0.10 39.56	L: 1,56 T: 1,95	L: 129,42 Code STL10 T: 75,06 Code STT10	6-8	L: > 6 T: 3-4	n/a n/a	n/a n/a	L: +/- 200 T: +/- 500	Min. 30 m3 Sea water	Sea water 1000 - 2000 lpm
17 1/2"	1312	20"x 13 3/8"	1305	Sea bed	Lead: 146,m3 Tail: 15 m3 100% (Lead)	Norcem "G" Cmt. (100 kg) Econolite HR-4L NF-6 Sea water	3.20 1.30 0.10 94.15	- - 0.10 45.00	L: 1,56 T: 1,92	L: 129,80 Code STL40 T: 76,16 Code STTNT	52/27	L: 5:00 T: 3:06	L: n/a T: < 1,4	n/a n/a	L: +/- 300 T: 1500	Casing volume Sea water	Sea water 2200 lpm
8 1/2"	1880	PTA #1 into 13 3/8" csg	1355	1155	14 m3 Excess: csg ID in OH	Norcem "G" Cmt.(100 kg) Halad-99 LE+ CFR-5LE+ NF-6 Fresh water		1.00 1.00 0.10 41.95	1.92	75.11 Code MPT14	52/36	03:25	0.5	n/a	2000	7 m3 1,60 SG Spacer 4A	OBM 2500 lpm
		PTA#2 surface plug	385	185	15,6 m3 0%	Norcem "G" Cmt.(100 kg) NF-6 Seawater		0.10 46.74	1.90	77.9 Code STTNT	12/10	+/- 4	n/a	n/a	+/- 400	Seawater	Seawater 2000 lpm

**Final Well Report  
Well 16/2-2, Skuld  
PL265**

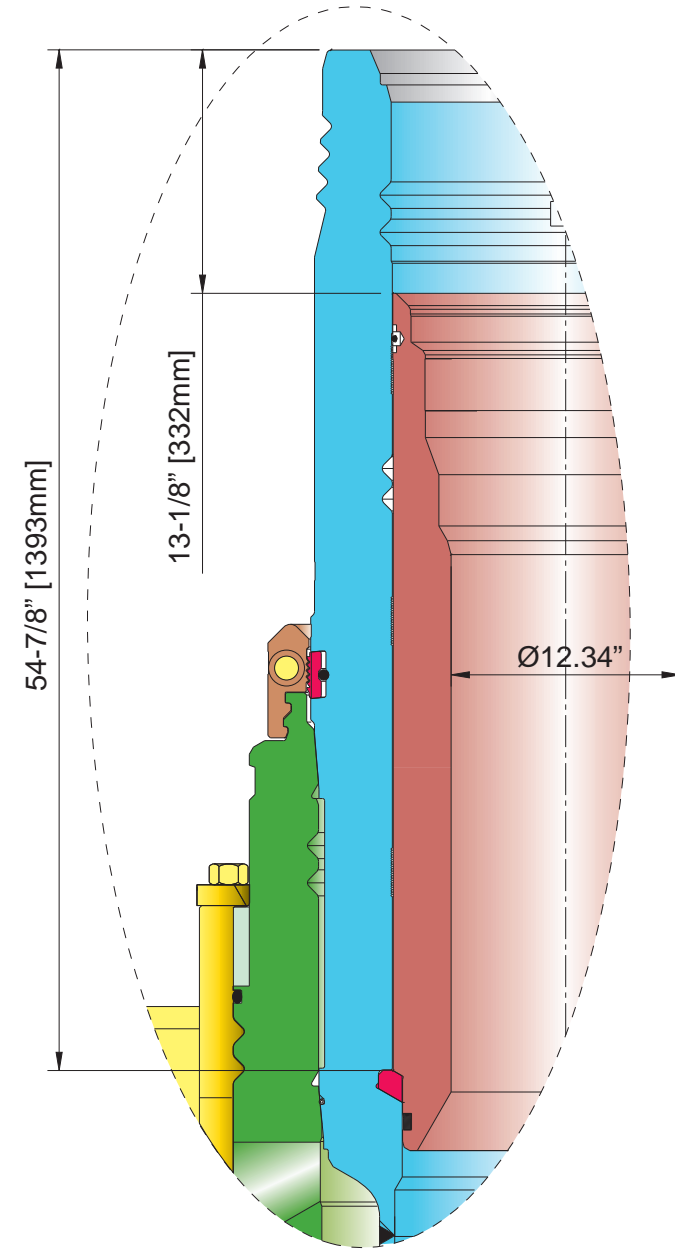
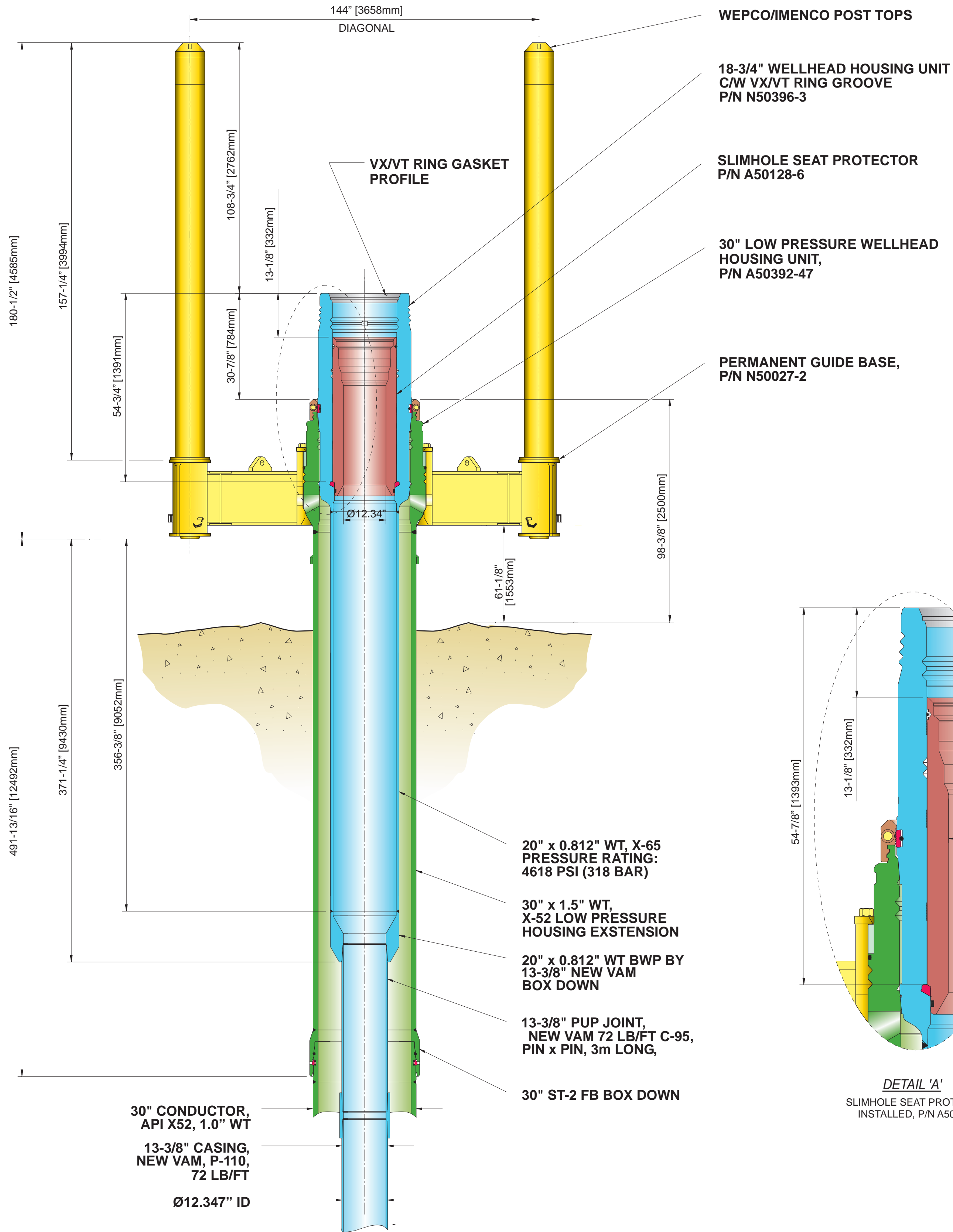
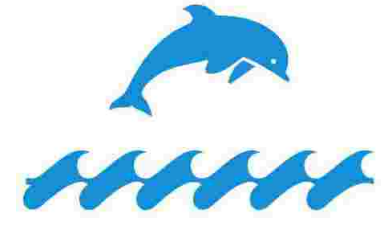
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## **App J Wellhead system**



**MS-700 Wellhead System**  
**18-3/4" x 15,000 PSI**

Drawing Number: N600992-2

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## App K List of Contractors

<b>SERVICE</b>	<b>COMPANY</b>
Casing/Liner hanger	Weatherford
Cementing	Halliburton
Coring	Security DBS
Directional Drilling	Baker Hughes INTEQ
Diving	Oceaneering AS
Drilling Contractor	Dolphin
Electric Logging	Schlumberger Offshore Service NV
Helicopter	Norsk helikopter
Helicopter Booking	Lufttransport (Statoil)
Mud	M-I Norge AS
Mud Logging	Geoservices
MWD	Baker Hughes INTEQ
Production Testing	Halliburton
Rig Positioning	Racal Survey Norge AS
Site Survey	Fugro-Geoteam AS
Wellhead System	ABB Offshore System AS

**Final Well Report  
Well 16/2-2, Skuld  
PL265**

Doc. no.  
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## **App L Wellsite sample description**

**WELLSITE SAMPLE DESCRIPTION**

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Country: Norway		Area: North Sea		Field: Skuld	
Well no: 16/2-2					
RKB: 25 meters		Company: Statoil ASA, Petoro AS, Esso E&P Norway A/S, Enterprise Oil Norge AS			
Hole size: 8 1/2 "		Geologist: Lars Rasmussen, Vivian Hommel, Per Furmyr		Date: 25.09.2001	
Depth (m RKB)	Lithology (%)	Lithological Description			Remarks
		Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination			Shows, cavings, mud additives, etc.
1320	95 5	Clst: brn gry-dk gry, frm, sbbly, non-slily calc, occ microglau Sst: lt brn gry, v f-sly, wl srt, frm, sbbly, grad Slst, slily arg, slily calc			No shows
1330	95 5	Clst: occ olv gry, else a.a. Sst: a.a.			a.a.
1340	95 5 Tr	Clst: a.a. Sst/Slst: a.a. Dol Ls: v lt gry-lt yel gry, frm, sbbly, slily arg			a.a.
1350	100 Gd Tr Tr	Clst: a.a. Slst/sst: a.a. Dol Ls: a.a.			a.a.
1360	100 Tr	Clst: a.a. Dol Ls: a.a.			a.a.
1370	100 Gd Tr	Clst: a.a. Dol Ls: frm-brit, else a.a			a.a.
1380	100 Gd Tr	Clst: a.a. Dol Ls: frm-brit, else a.a			a.a.
1390	100 Tr	Clst: slty, occ lt gn gry, else a.a Dol Ls: a.a.			a.a.
1400	100 Tr	Clst: a.a. Dol Ls: a.a			a.a.
1410	a.a.				a.a.
1420	a.a.				a.a.
1430	100 Tr Tr	Clst: a.a. Dol Ls: a.a Slst: a.a.			a.a.
1440	100 Tr Tr	Clst: brn gry-dk gry, occ olv gry-lt gn gry, slty-occ sdy (v f), frm, sbbly, non – slily calc, occ microglau, occ micromic, occ micropyr Dol Ls: v lt gry-lt yel gry, frm-briy, sbbly, slily arg Slst: lt brn gry-lt yel gry, occ v f sdy, frm, sbbly, slily arg, non calc			a.a.
1450	95 5 Tr	Clst: a.a. Dol Ls: a.a. Slst: a.a.			a.a.
1460	90 10 Tr	Clst: a.a. Dol Ls: a.a. Slst: a.a.			a.a.



**WELLSITE SAMPLE DESCRIPTION**

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Country: Norway		Area: North Sea		Field: Skuld	
Well no: 16/2-2					
RKB: 25 meters		Company: Statoil ASA, Petoro AS, Esso E&P Norway A/S, Enterprise Oil Norge AS			
Hole size: 8 1/2 "		Geologist: Lars Rasmussen, Vivian Hommel, Per Furmyr		Date: 25.09.2001	
Depth (m RKB)	Lithology (%)	Lithological Description			Remarks
		Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination			Shows, cavings, mud additives, etc.
1470	90	Clst: brn gry-dk gry, occ olv gry-lt gn gry, slty-occ sdy (v f), frm, sbbkly, non – slily calc, occ microglauc, occ micromic, occ micropyr			No Shows
	10	Dol Ls: v lt gry-lt yel gry, frm-briy, sbbkly, slily arg			
1480	95	Clst: a.a.			a.a.
	5	Dol Ls: a.a.			
1490	90	Clst: a.a.			a.a.
	10	Dol Ls: a.a.			
	Tr	Pyr			
1500	Lost Sample				
1510	90	Clst: dk gn gry-grysh gn, olv blk, blkly, frm-mod hd, slty, slily calc			a.a.
	10	Dol Ls: mod yel brn-yel gry, microxln-cryptoxln, blkly, sft-hd			
	Tr	Sst: clr-transl Qtz, v f, sbang-sbrnd, mod-wl srt, lse			
1520	95	Clst: a.a.			a.a.
	5	Dol Ls: a.a.			
	Tr	Pyr			
	Tr	mafic rck frags/pyr/Sst			
1530	95	Clst: a.a.			a.a.
	5	Ls: a.a.			
	Tr	Pyr, Sst			
1540	100	Clst: a.a.			a.a.
	Tr	Dol Ls: a.a.			
	Tr	Sst: clr-mky wh, else a.a.			
	Tr	Pyr, rck frags			
1550	100	Clst: a.a.			a.a.
	Tr	Dol Ls: a.a.			
	Tr	Sst, Pyr			
1560	100	Clst: mod brn, slty-v slty, else a.a.			a.a.
	Tr	Sst: clr-transl Qtz, v f-f, sbang, mod srt, rck frags, lse			
	Tr	Ls: pl yel gry, microxln, else a.a.			
1570	100	Clst: a.a.			a.a.
	Tr	Dol Ls: a.a.			
	Tr	Sst, Pyr: a.a.			
1580	100	Clst: a.a.			a.a.
	Tr	Dol Ls: a.a.			
	Tr	Sst, Pyr: a.a.			
1590	100	Clst: a.a.			a.a.
	Tr	Dol Ls: a.a.			
	Tr	Sst, Pyr: cmt-lse, else a.a.			

**WELLSITE SAMPLE DESCRIPTION**

Page 3 of 8

Country: Norway		Area: North Sea		Field: Skuld	
Well no: 16/2-2					
RKB: 25 meters		Company: Statoil ASA, Petoro AS, Esso E&P Norway A/S, Enterprise Oil Norge AS			
Hole size: 8 1/2 "		Geologist: Lars Rasmussen, Vivian Hommel, Per Furmyr		Date: 25.09.2001	
Depth (m RKB)	Lithology (%)	Lithological Description			Remarks
		Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination			Shows, cavings, mud additives, etc.
1600	100	Clst: dk gn gry-olv blk, mod brn, blk, frm-mod hd, slty-v slty, slily calc Tr Dol Ls: mod yel brn-yel gry, pl yel gry, microxln-cryptoxln, blk, sft-hd Tr Sst: clr-transl-mky Qtz, f-m, sbang-sbrnndd, mod-wl srt, lse, rck frags			No shows
1610	100	Clst: a.a. Tr Dol Ls: a.a. Tr Sst: a.a.			a.a.
1620	100	Clst: pl gn, mod brn, pl red, else a.a. Gd Tr Sst: vf-m, clr-mlky, sbrnndd-sbang Tr Glauc, Pyr, Dol Ls			a.a.
1630	95	Clst: multicol, med dk gry, dk gn ry, olv gry-olv blk, mod brn, pl rd, med bl gry, 30% tf w/spk of blk glass, frm-sft, i.p. v sdy-slty, occ micropyr i.p., gen non calc-occ calc 5 Sst: a.a. Tr Glauc, Pyr, Dol Ls			a.a.
1640	95	Clst: pred med bl gry, med gry, olv gry-olv blk, 50% tf, else a.a. 5 Sst: a.a. Tr Dol Ls: a.a.			a.a.
1647	100	Clst: pred olv gry-olv blk, dk gn gry, frm, 20% tf a.a. Tr Dol Ls: a.a.			a.a.
1650	100	Clst: pred olv blk, non tf, frm-mod hd, blk, wxy, non calc, mas, tr med blu gry, med gry and tf a.a. Tr Sst, Dol Ls			a.a.
1653	a.a.				a.a.
1656	a.a.				a.a.
1659	100	Clst: a.a. Tr Sst: a.a.			a.a.
1662	95	Clst: a.a. 5 Sst: mky, else a.a. Tr Ls			
1665	75	Clst: a.a. 25 Sst: a.a.			a.a.
1668	70	Clst: a.a. 30 Sst: ang-sbrnndd, v f-f, clr-mky, rock frags, glauc			a.a. a.a.
1671	95	Clst: a.a. 5 Sst: a.a.			a.a.

**WELLSITE SAMPLE DESCRIPTION**

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Country: Norway		Area: North Sea		Field: Skuld	
Well no: 16/2-2					
RKB: 25 meters		Company: Statoil ASA, Petoro AS, Esso E&P Norway A/S, Enterprise Oil Norge AS			
Hole size: 8 1/2 "		Geologist: Lars Rasmussen, Vivian Hommel, Per Furmyr		Date: 26.09.2001	
Depth (m RKB)	Lithology (%)	Lithological Description			Remarks
		Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination			Shows, cavings, mud additives, etc.
1674	80	Clst: pred olv blk, non tf, frm-mod hd, blk, wxy, non calc, mas, tr med bl gry, med gry and tf a.a.			No shows
	20	Sst: ang-sbrnndd, v f-f, clr-transl, rock frags, glauc			
1677	100	Clst: a.a.			a.a.
	Tr	Sst: a.a.			
	Tr	Pyr			
1680	100	Clst: pred med dk gry, also tr brn gry-olv blk and med bl gry, frm-mod hd, sbbkly-blky, non calc			a.a.
	Tr	Sst, Dol Ls			
1683	100	Clst: pred med dk gry, tr olv gry-med bl gry, else a.a.			a.a.
	Tr	Dol Ls			
1686	100	Clst: a.a.			a.a.
	Tr	Dol Ls: wh-pl yel gry, sbbkly-blky, frm-mod hd, cryptoxln, slily arg			
1689	Lost sample				
1692	100	Clst: slily micromic, else a.a.			a.a.
	Tr	Sst: clr-transl Qtz, vf-f, sbang-sbrnndd, mod-wl srt, lse			
	Tr	Dol Ls: a.a.			
1695	a.a.				
1698	a.a.				
1701	100	Clst: pred med dk gry, tr med bl gry, else a.a.			a.a.
	Tr	Sst: a.a.			
	Tr	Dol Ls: a.a.			
1704	a.a.				
1707	100	Clst: a.a.			a.a.
	Tr	Slst: lt brn gry-brn gry, occ v f sdy, sbbkly, frm-mod hd, micromic			
	Tr	Dol Ls: a.a.			
1710	a.a.				
1713	100	Clst: a.a.			a.a.
	Gd Tr	Dol Ls: also lt bl gry, slty-occ sdy, else a.a			
	Tr	Slst: a.a.			
1716	95	Clst: a.a.			a.a.
	5	Slst: a.a.			
	Tr	Dol Ls: a.a.			
1719	100	Clst: a.a.			a.a.
	Gd Tr	Slst: a.a.			

**WELLSITE SAMPLE DESCRIPTION**

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Country: Norway		Area: North Sea		Field: Skuld	
Well no: 16/2-2					
RKB: 25 meters		Company: Statoil ASA, Petoro AS, Esso E&P Norway A/S, Enterprise Oil Norge AS			
Hole size: 8 1/2 "		Geologist: Lars Rasmussen, Vivian Hommel, Per Furmyr		Date: 26.09.2001	
Depth (m RKB)	Lithology (%)	Lithological Description			Remarks
		Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination			Shows, cavings, mud additives, etc.
1722	100	Clst: pred med dk gry, also tr brn gry-olv blk and med bl gry, frm-mod hd, sbblky-blky, non-slily calc			No shows
	Tr	Slst, Dol Ls			
1725	100	Clst: a.a.			a.a.
	Tr	Slst: lt brn gry-brn gry, occ v f sdy, sbblky, frm-mod hd, micromic			
1728	a.a.				
1731	95	Clst: a.a.			a.a.
	5	Slst: a.a.			
	Tr	Dol Ls			
1734	a.a.				
1737	100	Clst: a.a.			a.a.
	Tr	Dol Ls, Slst, a.a.			
1740	Lost sample				
1743	100	Clst: a.a.			a.a.
	Tr	Slst: a.a.			
1746	100	Clst: a.a.			a.a.
	Gd Tr	Slst: a.a.			
1749	100	Clst: occ pyr, else a.a.			a.a.
	Gd Tr	Slst: a.a.			
1752	95	Clst: occ pyr, else a.a.			a.a.
	5	Slst: a.a.			
	Tr	Dol Ls: wh-pl yel gry, also lt bl gry, slty-occ sdy sbblky-blky, frm-mod hd, cryptoxln, slily arg			
1755	100	Clst: a.a.			a.a.
	Gd Tr	Slst: a.a.			
1758	a.a.				a.a.
1761	a.a.				a.a.
1764	a.a.				a.a.
1767	a.a.				
1770	100	Clst: pred med dk gr- dk gn gry, else a.a.			a.a.
	Tr	Dol Ls: a.a.			
	Tr	Sst: v f, qz gr, rock frags, py			
1773	100	Clst: incr med dk gry, else a.a.			a.a.
	Gd Tr	Dol Ls: xln-microxln-cryptoxln, a.a.			
	Tr	Sst: v f, qz gr, rock frags, pyr, else a.a.			

**WELLSITE SAMPLE DESCRIPTION**

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Country: Norway		Area: North Sea		Field: Skuld	
Well no: 16/2-2					
RKB: 25 meters		Company: Statoil ASA, Petoro AS, Esso E&P Norway A/S, Enterprise Oil Norge AS			
Hole size: 8 1/2 "		Geologist: Lars Rasmussen, Vivian Hommel, Per Furmyr		Date: 26.09.2001	
Depth (m RKB)	Lithology (%)	Lithological Description			Remarks
		Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination			Shows, cavings, mud additives, etc.
1776	100	Clst: pred med dk gry-dk gn gry, also tr brn gry-olv blk, frm-mod hd, sbblky-blky, non-slily calc, occ pyr			No shows
	Gd Tr	Dol Ls: wh-pl yel gry, also lt bl gry, slty-occ sdy sbblky-blky, frm-mod hd, cryptoxln, also xln-microxln, slily arg,			
	Tr	Sst: clr-transl Qtz, vf-f, sbang-sbrndd, mod-wl srt, lse, rock frags, pyr			
1779	100	Clst: incr dk gn gry, also bl gry, glauc, else a.a.			a.a.
	Tr	Dol Ls: a.a., also gry brn, no sand			
1782	100	Clst: incr in glauc, else a.a.			a.a.
	Gd Tr	Dol Ls: a.a.			
	Tr	Sst: a.a.			
1785	a.a.				a.a.
1788	a.a.				
1791	95	Clst: dom med dk gry, else a.a.			a.a.
	5	Dol Ls: a.a.			
	Gd Tr	Sst, incr glauc, else a.a.			
1794	100	Clst: a.a.			a.a.
	Tr	Dol Ls: a.a.			
1797	100	Clst: pred dk gn gry, also olv gry, occ gry gn-dsky gn, frm-mod hd, wxy-soapy tex, blk, non calc,			a.a.
	Tr	Dol Ls: pl yel gry, brn gry, occ yel gry, frm, blk			
1800	100	Clst: also brn gry, else a.a.			a.a.
	Tr	Dol Ls: a.a.			
1803	100	Clst: multicol, mod brn-dk rd brn, med bl gry, brn gry-brn blk, dk gn gry, gn blk, olv gry, frm-mod hd, blk, non calc			a.a.
	Tr	Dol Ls: a.a.			
	R Tr	Slst: yel gry, sft-frm, non calc			
1806	a.a.				a.a.
1809	a.a.				a.a.
1812	100	Clst: pred shades of gn gry, olv gry and brn gry, less mod brn, else a.a.			a.a.
	Tr	Dol Ls: a.a.			
	R Tr	Slst: a.a.			
1815	a.a.				a.a.
1818	100	Clst: pred gn blk, olv blk, occ brn gry-brn blk, frm-mod hd, blk, non calc			a.a.
	Tr	Dol Ls: a.a.			
	Tr	Ls: wh, frm, blk, cryptoxln			

**WELLSITE SAMPLE DESCRIPTION**

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Country: Norway		Area: North Sea		Field: Skuld	
Well no: 16/2-2					
RKB: 25 meters		Company: Statoil ASA, Petoro AS, Esso E&P Norway A/S, Enterprise Oil Norge AS			
Hole size: 8 1/2 "		Geologist: Lars Rasmussen, Vivian Hommel, Per Furmyr		Date: 26.09.2001	
Depth (m RKB)	Lithology (%)	Lithological Description			Remarks
		Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination			Shows, cavings, mud additives, etc.
1821	90	Clst: pred gn blk, olv blk, occ brn gry-brn blk, frm-mod hd, blk, non calc			No shows
	10	Ls: yel gry, off wh, frm-mod hd, brit, blk, chky tex, cryptoxln			
	Tr	Dol Ls: : pl yel gry, brn gry, occ yel gry, frm, blk			
	Tr	Pyr			
1824	95	Clst: a.a.			a.a.
	5	Ls: a.a.			
1827	90	Clst: a.a.			a.a.
	10	Ls: a.a.			
1830	70	Clst: a.a.			a.a.
	30	Ls: a.a.			
1833	60	Ls: off wh, yel gry, tr pk gry, frm-mod hd, blk, chky tex, cryptoxln			a.a.
	30	Clst: occ slily calc-calc, else a.a.			
	10	Cht: clr-trnsluc, qtz, f-crs, ang, lse			
	Tr	Pyr			
1836	75	Ls: a.a.			a.a.
	20	Clst: a.a.			
	5	Cht: a.a.			
	Tr	Pyr			
1842	85	Ls: a.a.			a.a.
	15	Clst: pred gn blk-olv blk, occ dk gn gry, frm-mod hd, blk, occ slily calc-calc, else non calc			
	Gd Tr	Cht: a.a.			
1845	a.a.				a.a.
1848	90	Ls: a.a.			a.a.
	10	Clst: a.a.			
	Tr	Cht: a.a.			
1851	90	Ls: a.a.			a.a.
	10	Clst: a.a.			
	Tr	Cht			
1854	90	Ls: slily incr arg, occ lt-mod brn, sft and slily arg, else a.a.			a.a.
	10	Clst: a.a.			
	Tr	Cht: a.a.			
1857	90	Ls: 70% off wh, yel gry a.a., 30% arg, lt-mod brn, pl-gry or, pl gn, sft-frm, occ glauc-v glauc			a.a.
	10	Clst: a.a.			
	Tr	Cht: a.a.			
1860	a.a.				a.a.
1863	a.a.				a.a.

WELLSITE SAMPLE DESCRIPTION			Page 8 of 8	
Country: Norway		Area: North Sea		
Well no: 16/2-2		Field: Skuld		
RKB: 25 meters	Company: Statoil ASA, Petoro AS, Esso E&P Norway A/S, Enterprise Oil Norge AS			
Hole size: 8 1/2 "	Geologist: Lars Rasmussen, Vivian Hommel, Per Furmyr		Date: 26.09.2001	
Depth (m RKB)	Lithology (%)	Lithological Description		Remarks
		Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination		Shows, cavings, mud additives, etc.

1866	90	Ls: 50% off wh, yel gry, frm-mod hd, chky, 50% pl gn and lt-mod brn, glauc-v glauc when pl gn	No shows
	10	Clst: pred gn blk-olv blk, occ dk gn gry, frm-mod hd, blk, occ slily calc-calc, else non calc	
	Tr	Cht: clr-trnsl, qtz, f-crs, ang, lse	
1869	a.a.		a.a.
1872	100	Ls: lt brn gry-lt olv gry, yel gry, lt gry, occ pl gn, occ mod brn, frm, gen non-slily arg, occ arg, occ glauc	a.a.
	Gd Tr	Clst: a.a.	
1875	100	Ls: incr lt brn gry-lt olv gry, else a.a.	a.a.
	Gd Tr	Clst: a.a.	
	Tr	Cht: a.a.	
1878	a.a.		a.a.
1880	100	Ls: pred lt olv-lt brn gry, also yel gry and off wh, occ pl gn-lt gn gry and glauc, tr mod brn, frm, blk, non-slily arg	a.a.

TD OF WELL AT 1880 m MD RKB, 1854.5 m TVD MSL

## **App M Other reports**

<b>COMPANY</b>	<b>REPORTS</b>
Baker Hughes Inteq	Definitive Survey
Baker Hughes Inteq	End of well Report, MWD
Fugro	Site Survey + CD-rom
Geoservices	Final Well Report, Mudlogging
Ichron	A Biostratigraphical Evaluation of the Oligocene to Cretaceous interval
Statoil	Samtykkesøknad Byford Dolphin
Statoil	Well Programme
Statoil	Lithology of cuttings samples from 1749-1761mRKB
Thales	Navigation and Position



# FORMATION EVALUATION LOG

MA32\_N1 Q.PR1

Well name : 16/2-2  
Client name : STATOIL

Rig Name : BYFORD DOLPHIN Country : NORWAY Spud Date : 17-09-2001  
Rig Type : SEMI SUBMERSIBLE Field : SKULD TD reached : 26-09-2001  
Contractor : DOLPHIN DOC AS Block : 16/2

Geoservices crew: Location lat : 58 deg 58' 7.79"N Total Depth (m) : 1880m  
J.E. Eriksen T. Hansen Location long : 02 deg 30' 7.79"E TVD (m) : 1879.7m  
M. Morley R. Hatlebakk UTM loc [N] (m) : 6536839 RT - MSL (m) : 25  
P. Wright O.M. Kinn UTM loc [E] (m) : 471371 MSL - Wellhead (m) : 120.3  
R. Tyndall Depth Reference : ROTARY TABLE  
S. Vassstveit Plot Scale : 1/ 500

Generated by ALX Package

	CLAYSTONE		SHALE		CLST sandy		CLST silty		CLST silic		CLST calc		CLST dol		CLST sandy & calc		CLST sandy & dol
	CLST anhydr		CLST pyritic		MARL		MARL silty		MARL sandy		MARL dol		COAL				
	SILT		SILTSTONE		SAND		SANDSTONE		SST coarse		CONGLOMERATE		SST calc		SST dol		SAND arg
	LIMESTONE		LST argil		LST sandy		LST silty		LST arg & sandy		LST dol		LST arg & dol		LST pyritic		LST oolitic
	DOLOMITE		DOL calc		DOL arg		CHALK		CHALK chert		GYPSUM		ANHYDRITE		HALITE		
	Fossils unspec		Fossil frags		Forams		Spicules		Plant frags		Wood frags		Corals		Shell frags		
	Tuff		Mica		Pyrite		Glauconite		Carbonaceous		Silty		CEMENT				
	Test		Mud loss		Mud gain		Deviation survey		Core		Sidewall Core		DST		FIT/LOT		RFT/FMT
	Casing Shoe		Bit Change		Wiper Trip		Oil		Gas		TG Trip Gas		CG Pipe connection gas		POG Gas from pumps off		

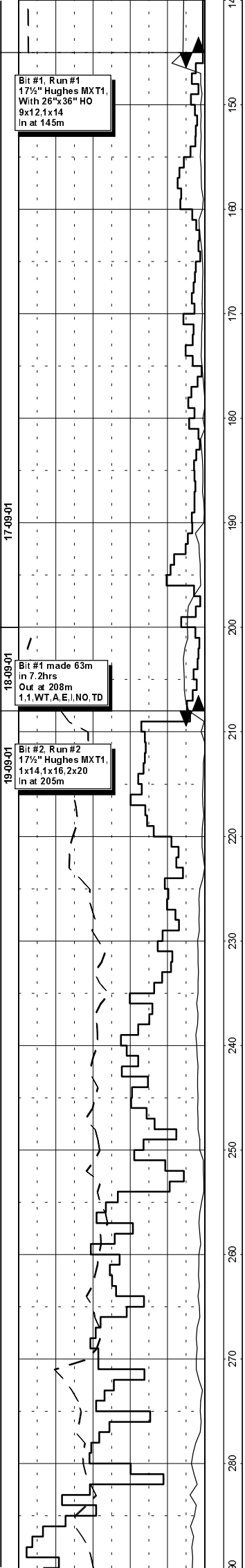
DATE	GAMMA RAY	BIT WEIGHT (tons)	ROP (m/hr)	CORES	DEPTH (m)	CUTTINGS (%)	RESISTIVITY (ohm.m)					GAS ANALYSIS (ppm)					FLUOR	CUT	LITHOLOGY	GEOLOGICAL DESCRIPTION
							.1	1	10	100	1K	TOTAL GAS (%)	C1	nC4	C2	iC5				
					100															
					110															
					120															
					130															
					140															

Geoservices

Bit #1, Run #1  
1 7/8" Hughes MXT1,  
With 26"x36" HO  
9x12,1x14  
In at 145m

Bit #1 made 63m  
in 7.2hrs  
Out at 208m  
1,1,WT,A,E,I,NO,TD

Bit #2, Run #2  
1 7/8" Hughes MXT1,  
1x14,1x16,2x20  
In at 205m

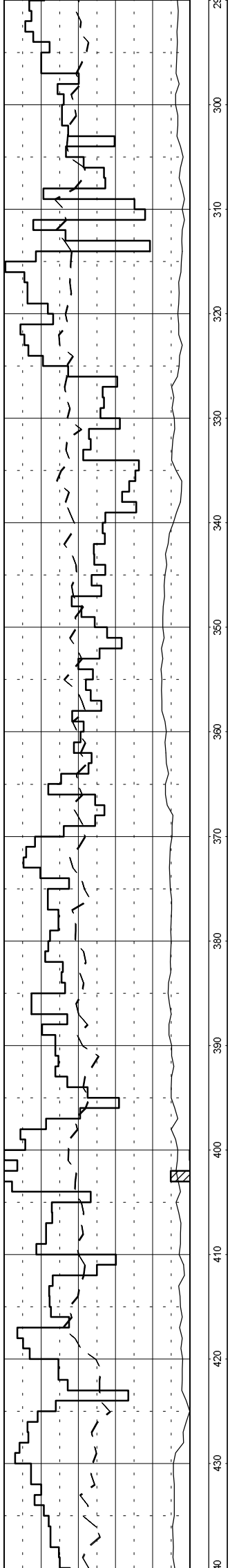


STATOIL 16/2-2  
SPUDED 17-09-01

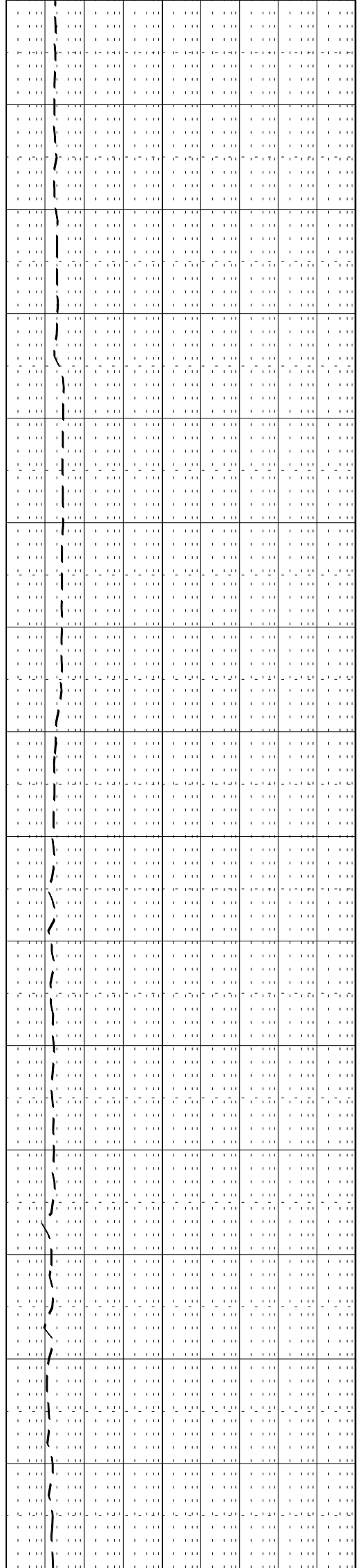
NO SURFACE RETURNS  
NO SHALLOW GAS

30" CASING SHOE at  
205mMD

SVY: 232.0mMD : 232.0mTVD  
Inc 0.3 : Az 224.4



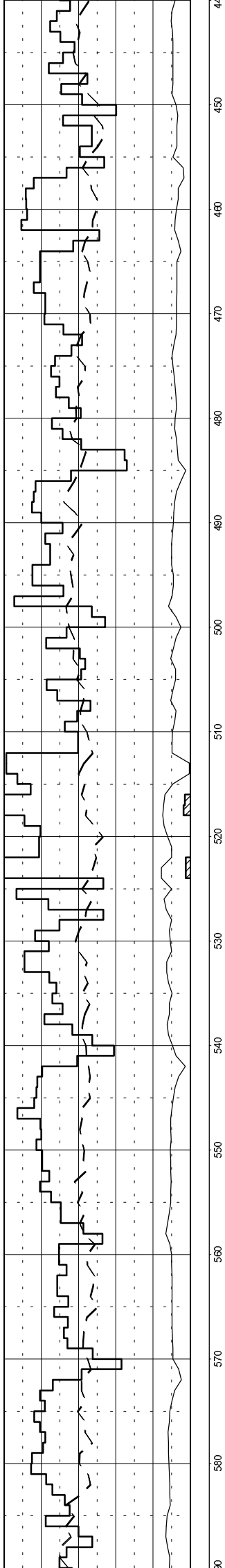
280 300 310 320 330 340 350 360 370 380 390 400 410 420 430 40



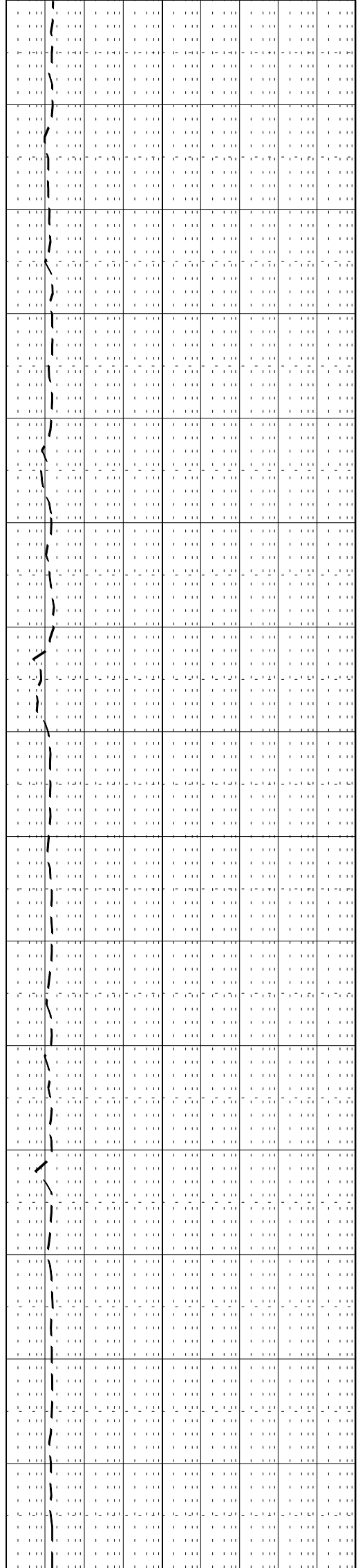
SVY: 321.0mMD : 321.0mTVD  
Inc 0.2 : Az 213.1

NO SURFACE RETURNS  
NO SHALLOW GAS

SVY: 404.0mMD : 404.0mTVD  
Inc 0.1 : Az 248.3



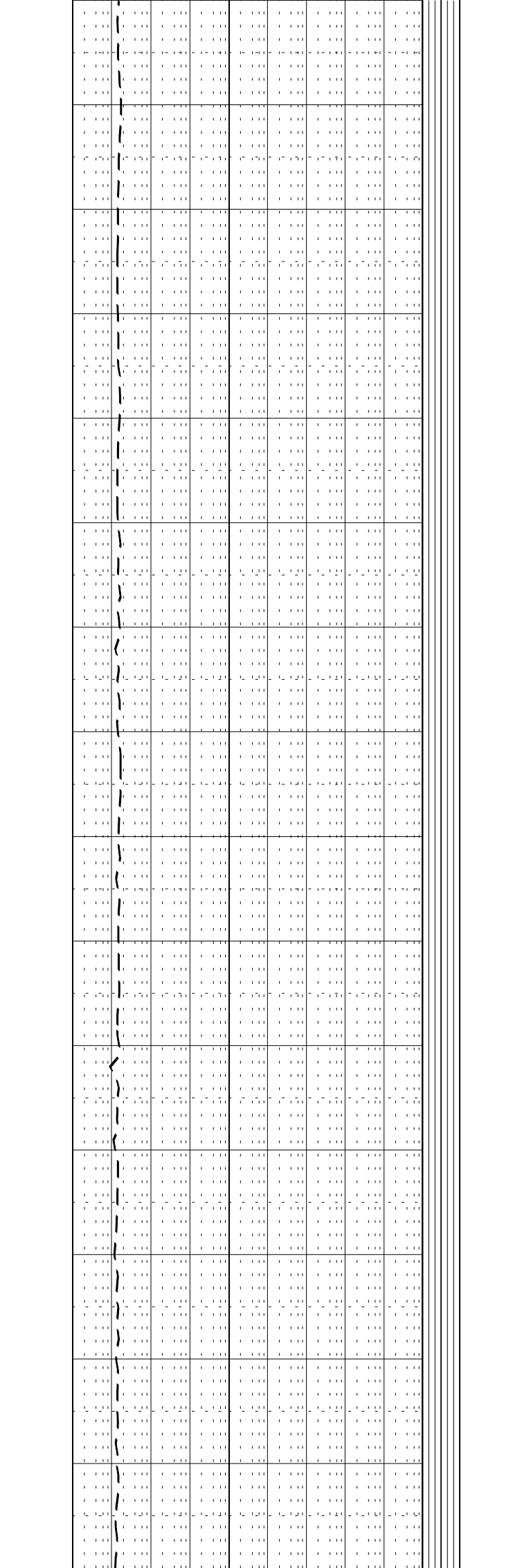
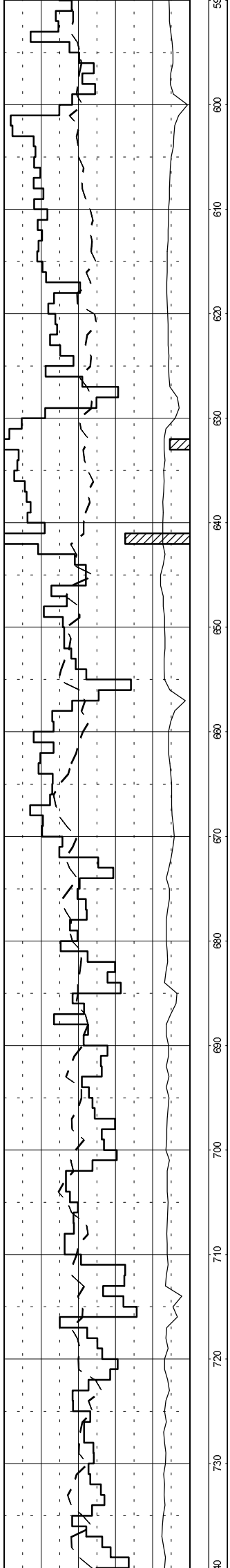
440 450 460 470 480 490 500 510 520 530 540 550 560 570 580



SVY: 492.0mMD : 492.0mTVD  
Inc 0.3 : Az 164.7

NO SURFACE RETURNS  
NO SHALLOW GAS

SVY: 579.0mMD : 579.0mTVD  
Inc 0.4 : Az 178.9



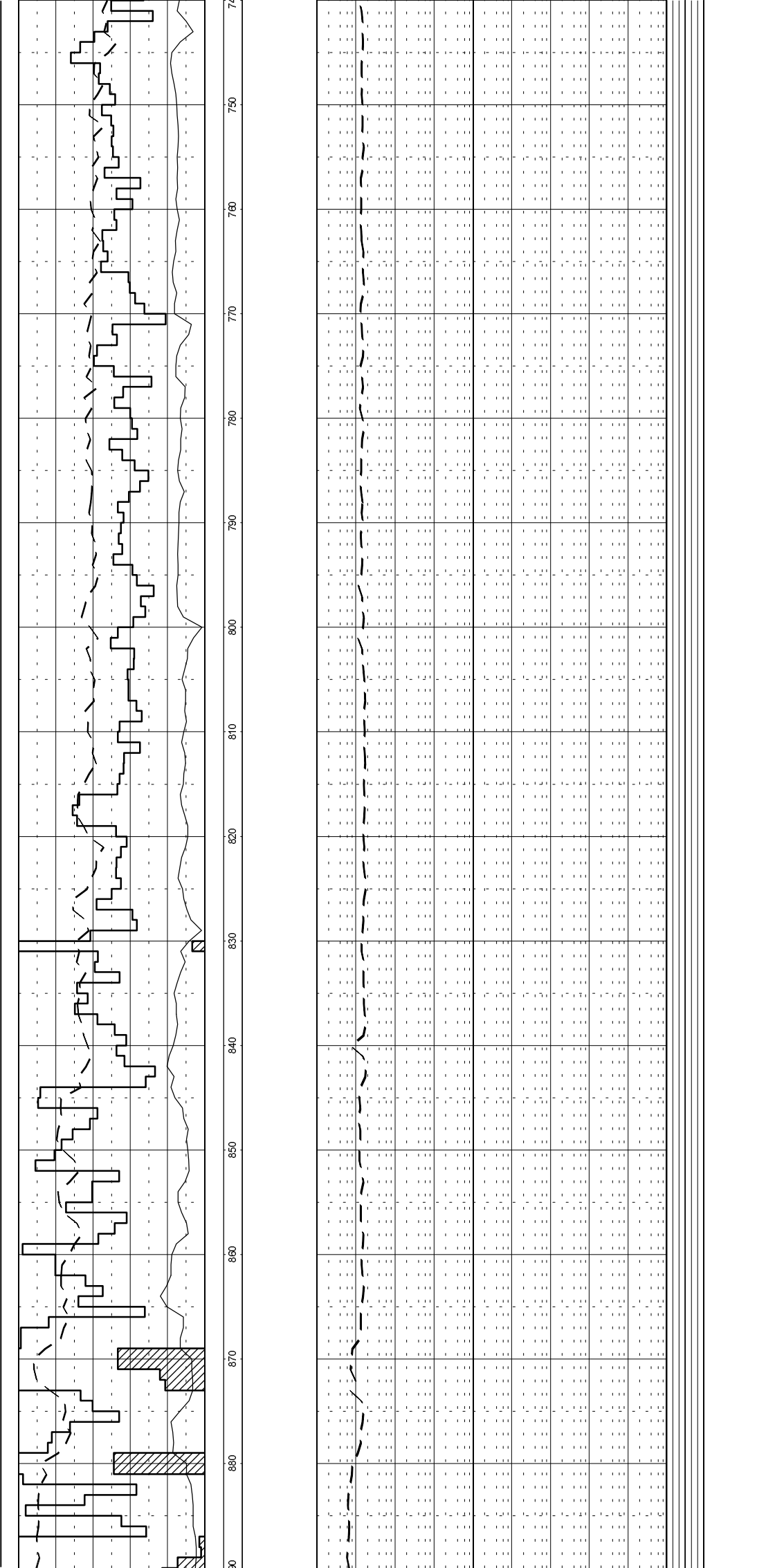
SVY: 663.0mMD : 663.0mTVD  
Inc 0.2 : Az 198.0

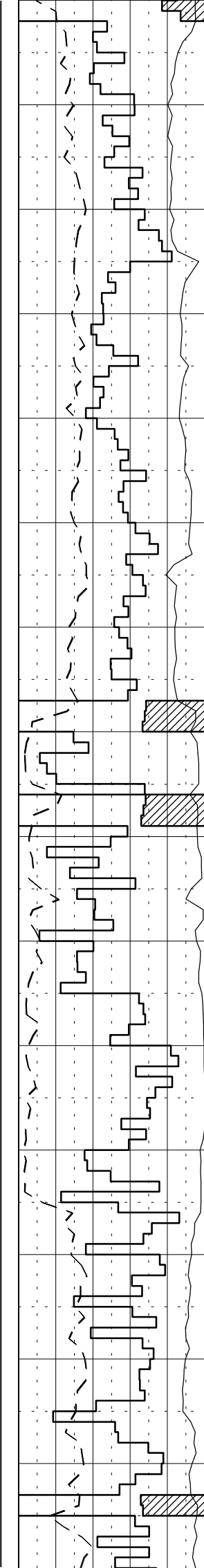
NO SURFACE RETURNS  
NO SHALLOW GAS

SVY: 751.0mMD : 751.0mTVD  
Inc 0.3 : Az 158.4

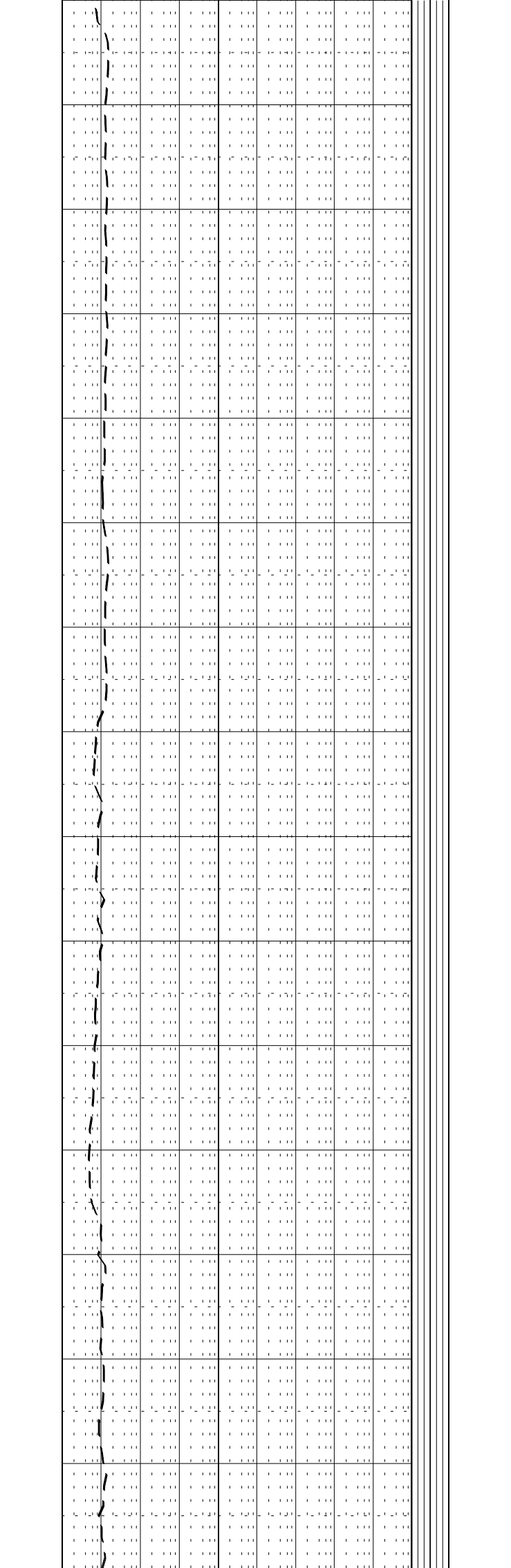
SVY: 837.0mMD : 837.0mTVD  
Inc 0.3 : Az 158.4

NO SURFACE RETURNS





880 900 910 920 930 940 950 960 970 980 990 1000 1010 1020 1030 1040

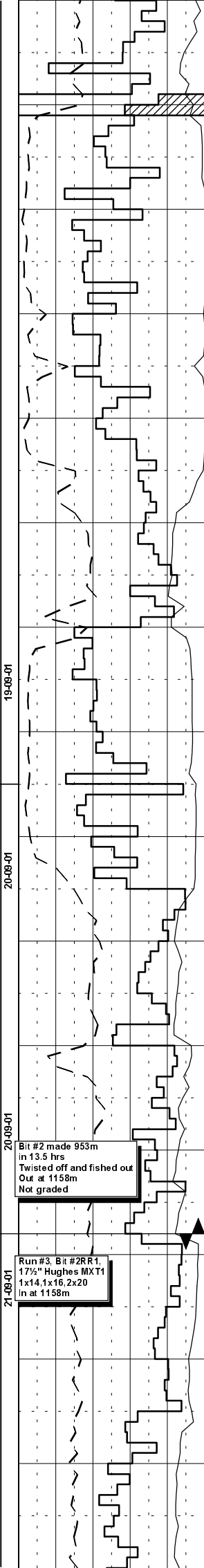


NO SHALLOW GAS

SVY 924mMD : 924mTVD  
Inc 0.5 : Az 178.9

NO SURFACE RETURNS  
NO SHALLOW GAS

SVY 1010mMD : 1010mTVD  
Inc 0.9 : Az 205.3



10  
1050  
1060  
1070  
1080  
1090  
1100  
1110  
1120  
1130  
1140  
1150  
1160  
1170  
1180  
90

19-09-01

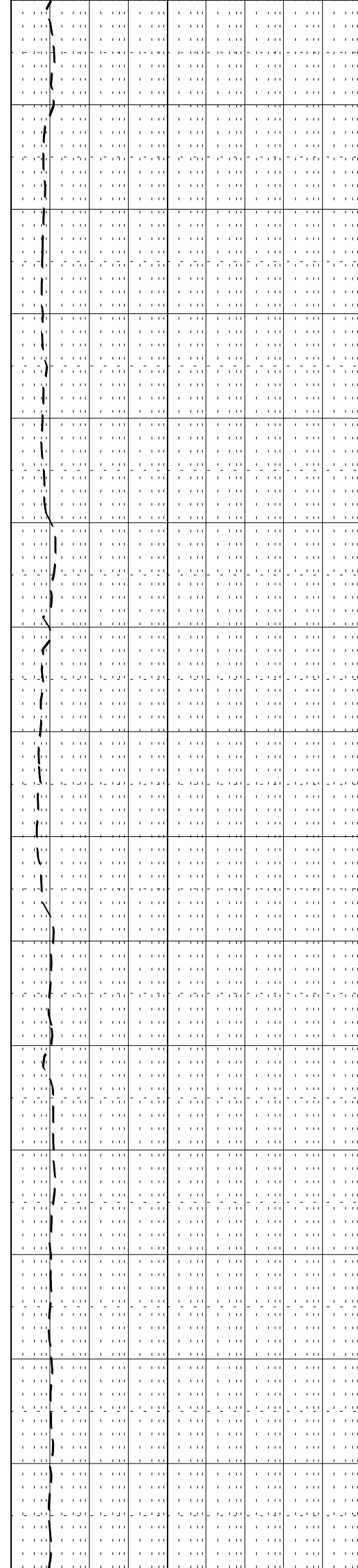
20-09-01

20-09-01

21-09-01

Bit #2 made 953m  
in 13.5 hrs  
Twisted off and fished out.  
Out at 1158m  
Not graded

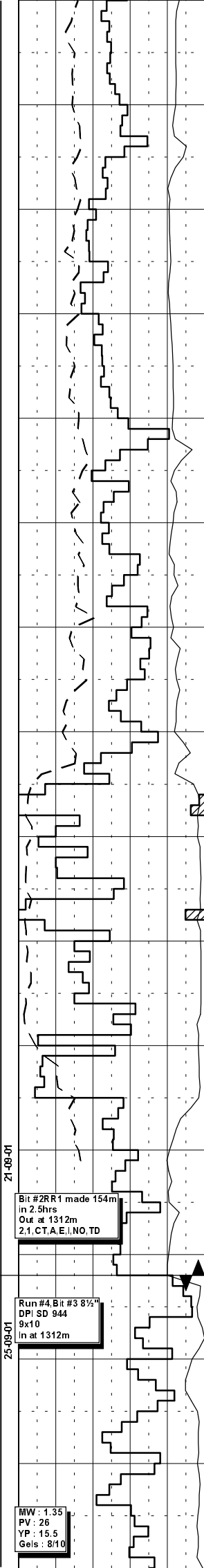
Run #3, Bit #2RR 1,  
1 7/8" Hughes MX T1  
1x14, 1x16, 2x20  
In at 1158m



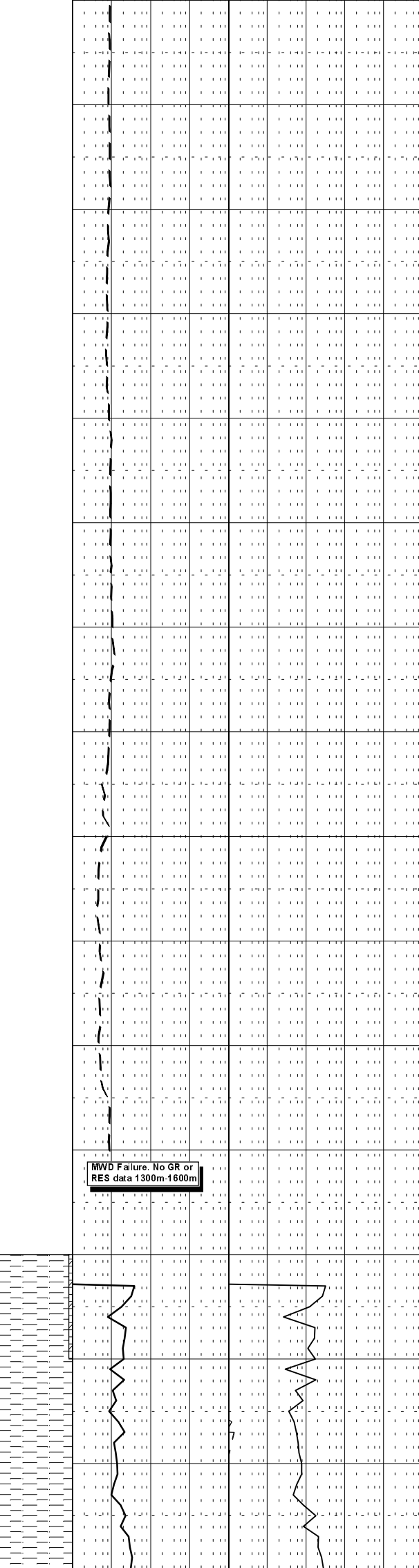
SVY 1096mMD : 1096mTVD  
Inc 0.5 : Az 240.3

SVY 1184mMD : 1184mTVD  
Inc 1.4 : Az 262.9





1200  
1210  
1220  
1230  
1240  
1250  
1260  
1270  
1280  
1290  
1300  
1310  
1320  
1330  
40



NO SURFACE RETURNS  
NO SHALLOW GAS

SVY 1270mMD : 1270mTVD  
Inc 0.9 : Az 251.0

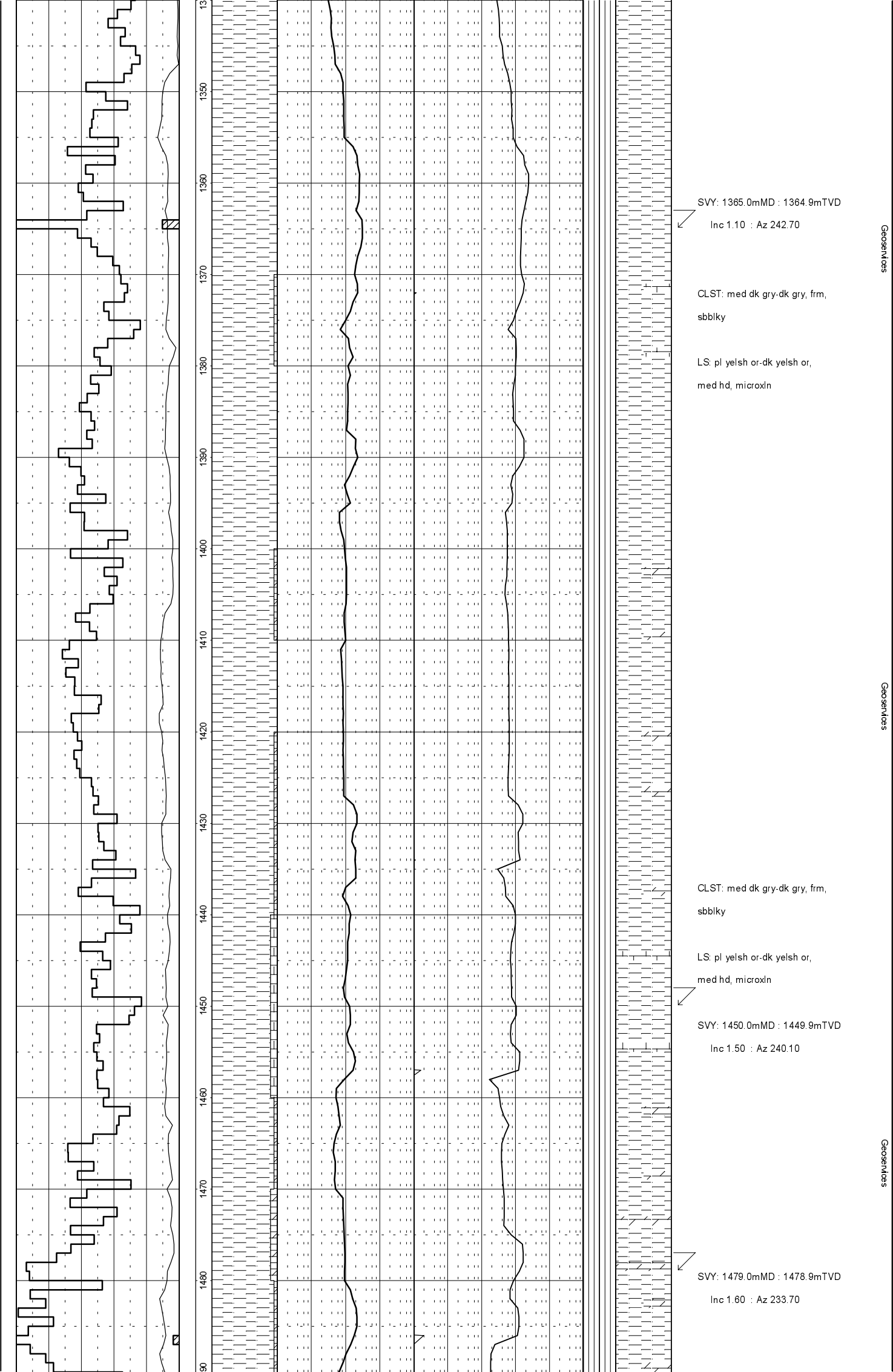
NO SURFACE RETURNS  
NO SHALLOW GAS

13 3/8" CASING SHOE at  
1305mMD, 1304.9mTVD

LOT TO 1.62sg EMW

CLST: med dk gry-dk gry, frm, sbblky

DOL: lt brnsh-pl yelsh or, frm-med hd



1350  
1360  
1370  
1380  
1390  
1400  
1410  
1420  
1430  
1440  
1450  
1460  
1470  
1480  
90

SVY: 1365.0mMD : 1364.9mTVD  
Inc 1.10 : Az 242.70

CLST: med dk gry-dk gry, frm,  
sbblky

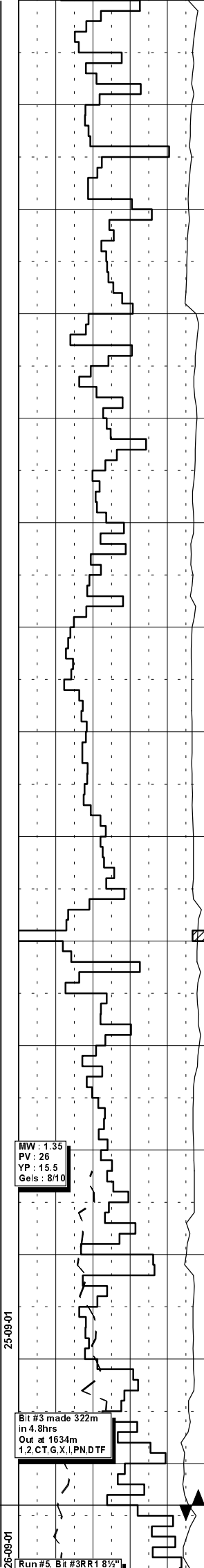
LS: pl yelsh or-dk yelsh or,  
med hd, microxln

CLST: med dk gry-dk gry, frm,  
sbblky

LS: pl yelsh or-dk yelsh or,  
med hd, microxln

SVY: 1450.0mMD : 1449.9mTVD  
Inc 1.50 : Az 240.10

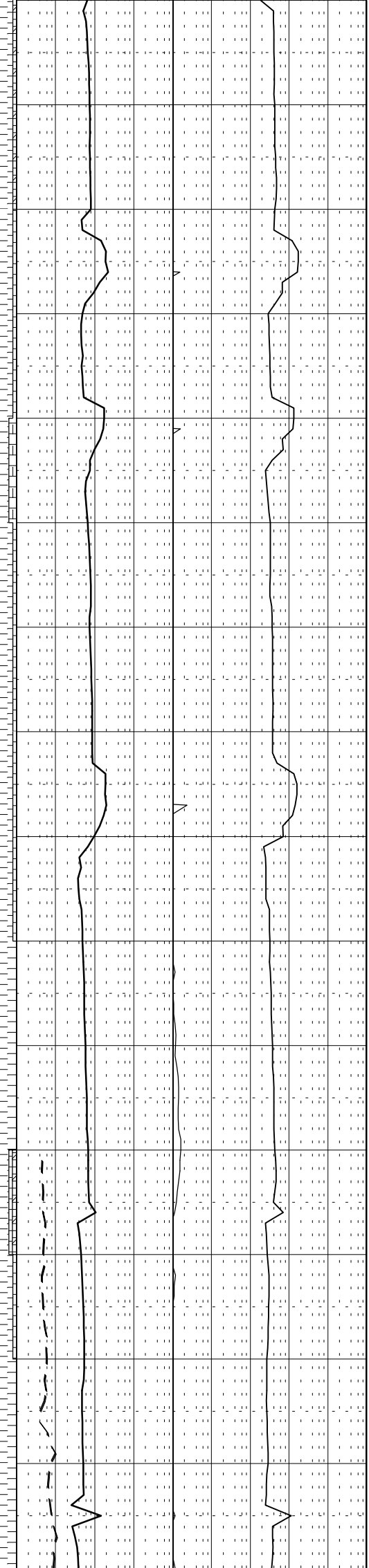
SVY: 1479.0mMD : 1478.9mTVD  
Inc 1.60 : Az 233.70



MW : 1.35  
 PV : 26  
 YP : 15.5  
 Gels : 8/10

Bit #3 made 322m  
 in 4.8hrs  
 Out at 1634m  
 1.2.CT.G.X.I.P.N.D.TF

14  
 1500  
 1510  
 1520  
 1530  
 1540  
 1550  
 1560  
 1570  
 1580  
 1590  
 1600  
 1610  
 1620  
 1630  
 1640



CLST: med dk gry-dk gry, frm, sbblky

DOL: lt brnsh-pl yelsh or, frm-med hd

SVY: 1508.0mMD : 1507.9mTVD  
 Inc 1.90 : Az 235.70

SVY: 1536.0mMD : 1535.9mTVD  
 Inc 1.90 : Az 232.70

CLST: med dk gry-dk gry, pl grn-grysh grn, frm, sbblky, glauc

LS: pl yelsh or-dk yelsh or, med hd, microxln

SVY: 1565.0mMD : 1564.9mTVD  
 Inc 1.90 : Az 236.10

SVY: 1594.0mMD : 1593.8mTVD  
 Inc 1.80 : Az 240.70

CLST(1): med dk gry-dk gry, pl grn-grysh grn, frm, sbblky, glauc

CLST(2): pl rdsh-dk rdsh brn, frm, sbblky

LS: pl yelsh or-dk yelsh or, med hd, microxln

TR: SST: trnsl Qtz gr, vf-f, sbrndd-mdd, wl srl, hd

SVY: 1623.0mMD : 1622.8mTVD  
 Inc 1.80 : Az 239.00

Geoservices

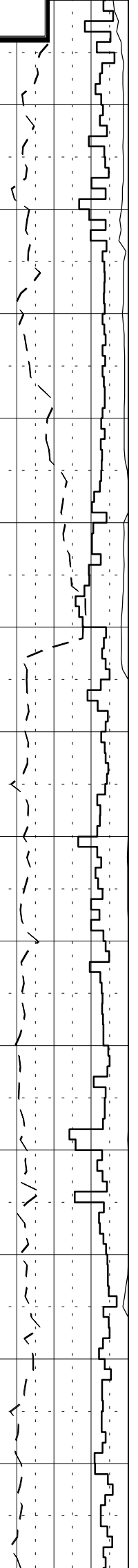
Geoservices

Geoservices

MW : 1.35  
PV : 23  
YP : 15.5  
Gels : 8/10

MW : 1.35  
PV : 22  
YP : 14  
Gels : 7/9

1630  
1650  
1660  
1670  
1680  
1690  
1700  
1710  
1720  
1730  
1740  
1750  
1760  
1770  
1780  
1800



CLST: blk-grnsh blk, grysh blk-  
med dk gry, sft-frn, tuff, blk,  
occ calc

SVY: 1651.0mMD : 1650.8mTVD  
Inc 1.90 : Az 248.80

CLST: grnsh blk, dk grnsh gry-  
med dk gry, sft-med sft,  
sbbiky

SST: mky, wh, cl, blk, Qtz gr,  
sb rndd-rnnd, vf gr, occ f gr,  
w-mod srt

CLST: pred med dk gry, also tr  
brn gry/olv blk and med bl gry,  
frm/mod hd, sbbiky-blky, non  
calc

TR: SST, DOL LS

CLST: pred med dk gry, also tr  
brn gry-olv blk and med bl gry,  
frm-mod hd, sbbiky-blky,  
non-sliily calc

TR: SLST, DOL LS

SVY: 1737.0mMD : 1736.8mTVD  
Inc 1.50 : Az 253.20

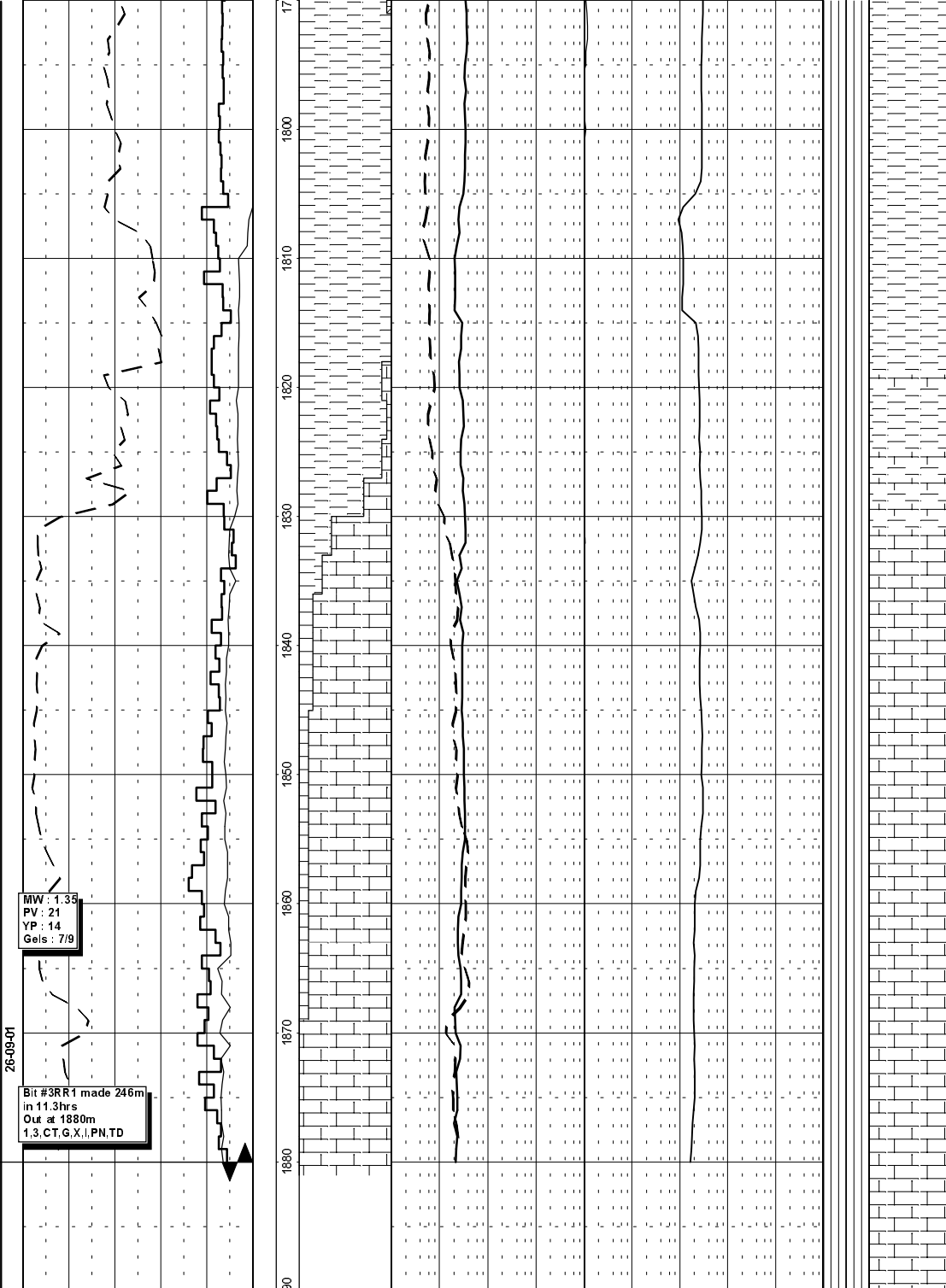
CLST: occ pyr  
SLTST: lt brn gry-brn gry, occ  
vf sdy, sbbiky, frm-mod hd,  
micromic

TR: DOL LS: wh-pa yel gry, also  
GD TR: SLTST: lt brn gry-brn  
gry, slty-occ sdy, sbbiky-blky,  
frm-mod hd, micromica

SVY: 1766.0mMD : 1765.8mTVD  
Inc 1.50 : Az 255.20

CLST: incr med dk gry  
TR: DOL LS: xln-microxln-  
cryptoxln  
TR: SST: vf, qz gr, rock frags,  
py

CLST: incr in glauc  
GD TR: DOL LS



TR: SST  
SVY: 1795.0mMD : 1794.8mTVD  
Inc 1.50 : Az 254.30  
CLST: multicol, mod brn-dk rd  
brn, med blu gry, brn gry-brn bl  
k, dk gn gry, gn blk, olv gry,  
frm-mod hd, blk, non calc  
TR: DOL LS  
TR: SLTST: yel gry, sft-frm,  
non calc

SVY: 1834.0mMD : 1833.7mTVD  
Inc 1.40 : Az 255.80

LS: off wh, yel gry, tr pk gry,  
frm-mod hd, blk, chky tex,  
cryptoxln

SVY: 1852.0mMD : 1851.7mTVD  
Inc 1.20 : Az 249.20

TR: pyr  
LS: 50% off wh, yel gry, frm-mod  
hd, chky, 50% pa gn and lt-mod  
brn, glauc-v glauc when pa gn

SVY: 1870.0mMD : 1869.7mTVD  
Inc 1.10 : Az 258.30

# PRESSURE EVALUATION LOG

FROM : (m) 100      TO : (m) 1880      SCALE : 1/ 5000

PEL1\_N1 Q.PR1

Well name : 16/2-2	Location : 58 deg 58' 7.79"N 02 deg 30' 7.79"E	Rig Name : BYFORD DOLPHIN
Company name : STATOIL	Field : SKULD	Rig Type : SEMI SUBMERSIBLE
Reference depth : Rotary table (RKB)	Final TD (m) : 1880m	UTM coordinate N (m) : 6536839
Water depth (m) : 120.3	Final TVD (m) : 1879.7m	UTM coordinate E (m) : 471371
Rot table - MSL (m) : 25	Spud date : 17-09-2001	Well type : WILDCAT
Rot table - seabed (m) : 145	Reached TD : 26-09-2001	Country : NORWAY

Generated by ALX Package

CLAYSTONE	SHALE	CLST sandy	CLST silty	CLST silic	CLST calc	CLST dol	CLST sandy & calc	CLST sandy & dol
CLST anhydr	CLST pyritic	MARL	MARL silty	MARL sandy	MARL dol	COAL		
SILT	SILTSTONE	SAND	SANDSTONE	SST coarse	CONGLOMERATE	SST calc	SST dol	SAND arg
LIMESTONE	LST argil	LST sandy	LST silty	LST arg & sandy	LST dol	LST arg & dol	LST pyritic	LST oolitic
DOLOMITE	DOL calc	DOL arg	CHALK	CHALK chert	GYPSUM	ANHYDRITE	HALITE	
Fossils unspec	Fossil frags	Forams	Spicules	Plant frags	Wood frags	Corals	Shell frags	
Tuff	Mica	Pyrite	Glauconite	Carbonaceous	Silty			CEMENT
TEST Test	Mud loss	Mud gain	Deviation surge	Core	Sidewall Core	DST	FIT/LOT	RFT/FMT
Casing Shoe	Bit Change	Wiper Trip	TG Trip Gas	CG Pipe connection gas				

