Exploration & Production Division
Exploration Department
Stavanger District

statoil

Completion Report
Well 15/12-4
PL 038

Esso

PL 038

STATOIL/ESSO

COMPLETION REPORT

WELL 15/12-4

1 GENERAL INFORMATION

2 GEOLOGICAL REPORT

3 DRILLING REPORT

4 MARINE REPORT

5 PRESSURE AND LOG SUMMARY

6 APPENDIX

TABLE OF CONTENTS

1	GENERAL INFORMATION	1
1.1	Well data record	2
1.2	Rig data	2
1.3	Purpose of the well	2
1.4	Results of the well	2
1.5	Well history	4
1.5.1	General	4
1.5.2	Contractors	4
1.5.3	Casing	4
1.5.4	Conventional coring	5
1.5.5	Sidewall coring	5
1.5.6	Mud logging	5
1.5.7	Electrical logging	6
1.5.8	Velocity survey	6
2	GEOLOGICAL REPORT	7
2.1	Stratigraphy	8
2.1.1	Table of stratigraphy	8
2.1.2	Table of lithostratigraphy	10
2.2	Lithological description	11
2.2.1	General information	11
2.2.2.	Summary	11

3	DRILLING REPORT	20
3.1	Summary	21
3.2	Drilling operation in intervals	23
3.3	Extract of daily activities	27
3.4	Well and Subsea schematic	40
3.5	Formation integrity test	43
3.6	Total rig time distribution	48
3.7	Bit record and lithology column	53
3.8	Pressure profiles	57
3.9	Surveys	59
3.10	Equipment failure	63
4	MARINE REPORT	65
4.1	Weather and anchor tension	66
4.2	Navigation report	70
5	PRESSURE AND LOG SUMMARY	73
5.1	Petrophysical evaluation	74
5.2	FMT summary	77
6	APPENDIX	84
6.1	Wellsite Sample Description	
6.2	Conventional Core Description	
6.3	Sidewall Core Description	
6.4	Drilling Fluid Summary	
6.5	Composite log	
	Mud log	
	Drilling Parameter log	
	Pressure Evaluation log	
	Temperature log	

REPORT RESPONSIBILITY:

BOR: T. Sorsell

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1 GENERAL INFORMATION

1 GENERAL INFORMATION

1.1 Well data record

Well designation:	15/12-4
Well classification:	Wildcat
Well location:	Beta-west structure
i) Country:	Norway
ii) Licence:	PL 038
iii) Latitude:	58° 03' 09.16" N
iv) Longitude:	01° 54' 11.61" E
v) Seismic location:	Shotpoint no. 2105 Line no. ST 8315/106
vi) Water depth:	87 m

1.2 Rig data

Rig name:	Deepsea Bergen
KBE:	23 m

1.3 Purpose of the well

The well was designed to test possible hydrocarbon accumulations in different levels.

Primary objectives:	Heimdal Formation (stratigraphic trap) and sandstones of Jurassic/ Triassic age (structural trap).
Secondary objectives:	Frigg Formation sands and fractured limestones in Cretaceous.

1.4 Results of the well

Primary objectives:	No Heimdal Formation sands were found. An oil column of 1.5 m was proven in the sandstones of Jurassic/ Triassic age.

Secondary objectives: Frigg Formation sands were not found.

In the Cretaceous formation log interpretation indicates hydrocarbons over the interval 2496.5 - 2500 m RKB. This saturation seems to be unrealistic and might be a result of lithology effects.

1.5 Well history

1.5.1 General

i) Spud date:	13.09.84
ii) Rig released:	31.10.84.
iii) Status:	Plugged and abandoned

1.5.2 Contractors

Drilling platform:	Deepsea Bergen
Drilling Contractor:	Odfjell Drilling and Cons. Co.
Cementing:	Halliburton
Casing:	Stavanger Casing Crew
Electric logging:	Dresser Atlas
Mud logging:	Exlog
Mud contractor:	NPS
Supply boats:	Supply boat pool
Helicopters:	Helikopter Service A/S
Rig position contractor:	Decca/Geoteam
Diving:	Subsea Dolphin
Conventional coring:	Christensen Diamond
Core analysis:	Geco
Paleodating:	Robertson Research Intern. Ltd.

1.5.3 Casing

		Formation integrity test
30" at	171 m	
20" at	505 m	1.44 g/cc
13 3/8" at	1602 m	1.84 g/cc
9 5/8" at	2666 m	1.86 g/cc
TD at	3157 m	
		equiv. mud weight

1.5.4 Conventional coring (description attached)

CORE NO.	INTERVAL (m)	CORRECTED CORE DEPTHS, REC. INT.	RECOVERY m	%
1	2439 - 2450	2441 - 2452	10	91
2	2494½- 2499	2494½- 2499	4.2	92
3	2499 - 2513½	2499 - 2513½	14.6	100
4	2902 - 2920½	2903 - 2920½	17.7	96

Core depth is corrected from drillers depth to Dresser's log depth using "Core Gamma Surface Log" from Geco.

1.5.5 Sidewall cores (description attached)

Run	Interval (m)	Shot	Rec.	Lost	Misfired	Empty
1A	2225 - 2675	50	49	1	-	-
4B	2694½- 3154.9	50	41	1	2	6
Total		100	90	2	2	6

A total of 90 samples were accepted.

1.5.6 Mud Logging

Exlog's Gemdas unit recorded the following and approximately 20 other parameters:

i) Drilling rate (ROP)
ii) Lithology
iii) Cutting gas
iv) Mud gas
v) Chromatograph readings
vi) Shale density

1.5.7 Electrical Logging

Type of log	Run no.	Interval (m KB)
DIFL/BHC-acoustilog-GR-SP-CAL	1A	170 - 520
	2B	504 - 1622
	3C	1599 - 2682
	4D	2660 - 3157.5
CDL-GR-CAL CDL/CNL-GR-CAL	2A	504 - 1622
	3B	1599 - 2682
	4C	2660 - 3157.5
DLL/MLL-GR	3A	1599 - 2682
	4B	2660 - 3157.5
HR DIP	3A	1599 - 2682
	4B	2660 - 3157.5
FMT	3A	2438.5- 2482.5
	4B	2901 - 3146
	4C	2911.6- 2913.6

1.5.8 VSP

The velocity survey was conducted by SSL.

84 checkshots with levels from 3150 to 660 m RKB.

2 GEOLOGICAL REPORT

2 GEOLOGICAL REPORT

2.1 Stratigraphy

2.1.1 Table of stratigraphy, based on RRI's biostratigraphic report

Stratigraphic tops	Depth (m RKB)
QUATERNARY	
Pleistocene	180
TERTIARY	
Pliocene	640
Late Miocene	950
Middle Miocene	1050
Early Miocene	1200
Late Oligocene	1300
Early Oligocene	1630
Late - Middle ? Eocene	1860
Middle - Early Eocene	2110
Late Paleocene	2320
Early Paleocene	2482
CRETACEOUS	
Late Maastrichtian	2495
Early Maastrichtian	2499
Late Campanian	2514
Early Campanian	2550
? Santonian	2580
Santonian	2600
Coniacian - Turonian	2630
Middle Albian - Early Albian	2712
Barremian	2760
Early Barremian - Hauterivian	2775
LATE JURASSIC	
Early Volgian	2785
Kimmeridgian	2795
Early Kimmeridgian - Middle Oxfordian	2902

Earliest Oxfordian		3080
Early Oxfordian		3125
MIDDLE JURASSIC		3126.5
TRIASSIC		3154
	TD	3157

2.1.2 Table of Lithostratigraphy

LITHOSTRATIGRAPHIC TOPS	DEPTH (m RKB)	DEPTH (m MSL)	THICKNESS (m)
NORDLAND GROUP	180	89	1120
Utsira Fm	1200	1177	83
HORDALAND GROUP	1300	1277	1020
ROGALAND GROUP			
Balder Fm	2320	2297	15
Sele Fm	2335	2312	59
Lista Fm	2394	2371	70
Maureen Fm	2464	2441	18
CHALK GROUP			
Tor Fm	2482	2459	139
Hod Fm	2621	2598	91
CROMER KNOLL GROUP			
Rødby Fm	2712	2689	23
Sola Fm	2735	2712	25
Valhall Fm	2760	2737	24
VIKING GROUP			
Draupne Fm	2784	2761	108
Heather Fm	2892	2869	20
VESTLAND GROUP			
Oxfordian Sandstone	2912	2889	222
Sleipner Fm	3134	3111	6
TRIASSIC GROUP	3140	3117	
TD	3157		

2.2 Lithological description

2.2.1 General information

Period
Epoch
Age

are partly based on log interpretation/ correlation and partly on biostratigraphic report

Lithology: The description is based on the samples and core description from the wellsite geologist.

Depositional environment: Based partly on earlier regional interpretation and partly on biostratigraphical report and core analysis.

2.2.2 Summary

NORDLAND GROUP (180 m (top not seen) - 1283.5 m (log))

Age: Pleistocene to Early Miocene.

Unassigned Unit (180 m (top not seen) - 1200 m (log))

Age: Pleistocene to Middle Miocene.

This thick sequence is composed of silty clays and unconsolidated sands. The clays are soft to firm, light brownish grey, light olive grey and light grey, locally silty and sandy, locally micromicaceous, rarely calcareous, grading to claystones with depth. These clays are poorly represented in the ditch cuttings samples, especially between 530 m and 1020 m, and they have probably been lost during sample processing. The sands are very fine to fine, locally medium and coarse, with subangular to subrounded grains, poorly to moderately sorted and appear to be over represented in the ditch cuttings samples. Shell fragments, lithic clasts, pyrite and glauconite are present as accessories. Traces of light brownish grey dolomite are seen around 805 m.

Below 1030 m the lithologies comprise claystones which are firm, subfissile, medium light grey, medium dark grey and brownish grey, micromicaceous, locally silty, pyritic, rarely carbonaceous and non-calcareous, with trace amounts of brownish grey dolomite and minor sandstones. The sandstones are firm, medium light grey, very fine, with subangular grains, locally silty, micaceous, locally glauconitic and non-calcareous, present as thin stringers and beds within the claystones.

Depositional environment: marine, inner shelf.

Utsira Formation (1200 m (log) - 1283.5 m (log))

Age: Early Miocene.

The top of this formation has been taken on a wireline log break at 1200 m marking the top of the youngest of three "blocky" sandstone units. The sandstones are firm, friable, very light grey, very fine to medium with rounded to subrounded grains, glauconitic, non-calcareous, but poorly represented in the ditch cuttings samples. Dividing the sands into three are two beds of claystone which are firm, subfissile to blocky, brownish grey to dark grey, micromicaceous, locally pyritic and non-calcareous.

Depositional environment: marine, outer shelf.

HORDALAND GROUP (1300 m (log) - 2320 m (log))

Age: Early Miocene to Middle - Early Eocene.

This group is composed of claystones with thin stringers and lenses of brownish black and brownish grey dolomite and traces of glauconite, pyrite, siderite and calcite.

The claystones change in character down the interval, being locally slightly silty, rarely carbonaceous,

medium grey and light brownish grey in colour. Below 2065 m the claystones are firm, subfissile, locally waxy greenish grey to medium grey, medium light grey, brownish grey and rarely greyish red, slightly micro-micaceous, rarely pyritic and non-calcareous.

Depositional environment: marine, outer shelf to upper bathyal shallowing to outer shelf.

ROGALAND GROUP (2320 m (log) - 2482 m (log))

Age: Late Palaeocene.

This group has been divided into four formations as follows:

Balder Formation (2320 m (log) - 2335 m (log))

Age: Late Palaeocene.

The incoming of tuffaceous claystones and a decrease in gamma ray and interval transit time values at 2320 m defines the top of this group. Claystones comprise the major lithology and are firm, blocky, non-calcareous, medium grey, greenish grey and greyish red. The tuffaceous claystones are present in subordinate amounts and are firm, earthy, medium dark grey, medium grey and medium bluish grey, mottled white and non-calcareous.

Sele Formation (2335 m (log) - 2394 m (log))

Age: Late Palaeocene.

A wireline log break at 2335 m marks the top of this formation which is composed of subfissile to blocky, medium grey and medium dark grey, slightly micro-micaceous, pyritic and laminated claystones. Tuffaceous claystones are present in the upper part of this interval, perhaps caved from the Balder Formation above.

Lista Formation (2394 m (log) - 2464 m (log))

Age: Late Palaeocene.

This formation has a very stable wireline log response, the top of the unit being taken on a break at 2394 m. The lithologies are composed of claystones which are firm, blocky, locally waxy, dark greenish grey, greenish grey to dark grey and medium grey to light grey, non-calcareous, slightly micromicaceous, pyritic and carbonaceous.

Maureen Formation Equiv. (2464 m (log) - 2482 m (log))

Age: Late Palaeocene.

The top of this formation has been taken on a decrease in resistivity readings and slight increase in interval transit time values at 2464 m. This interval is characterised by moderately calcareous claystones which are firm, blocky, light grey with traces of pyrite and calcite, and claystones which are firm, subfissile, medium grey to greenish grey and greyish red, micromicaceous and non-calcareous.

Depositional environment, Rogaland Group: marine, outer shelf to upper bathyal.

CHALK GROUP (2482 m (log) - 2712 m (log)

Age: Early Palaeocene and Late Cretaceous, Late Maastrichtian to Coniacian - Turonian.

Tor Formation (2482 m (log) - 2621 m (log))

Age: Late Cretaceous, Late Maastrichtian to early Campanian - Santonian.

The top of the Tor Formation has been taken at 2482 m (log). The lithologies comprise firm to moderately hard, microcrystalline limestones with slightly chalky

textures, white, very pale orange and very light grey in colour, rarely argillaceous, glauconitic and stylolitic, with traces of pyrite and chert. Shale is seen in the cores and sidewall cores, but is present only in minor quantities within the predominantly limestone sequence. The shales are firm, fissile to subfissile, medium grey, greenish grey and brownish grey in colour, slightly waxy and moderately calcareous.

Depositional environment: marine, inner to outer shelf.

Hod Formation (2621 m (log) - 2712 m (log))

Age: Late Cretaceous, Santonian - Coniacian - Turonian.

The top of this formation has been taken at 2621 m, on a slightly increase in interval transit time values and a decrease in resistivity. Lithology comprises greyish pink, firm, platy, microcrystalline limestone. The limestones are variable in nature, but generally soft to firm, blocky, slightly to very chalky in texture, white to very light grey, rarely argillaceous and stylolitic. Calcareous, medium light grey to medium grey claystones are seen as traces, mainly in the sidewall cores. From 2665 m downwards, the limestones are locally moderately argillaceous, glauconitic and sandy.

Depositional environment: marine, outer shelf.

CROMER KNOLL GROUP (2712 m (log) - 2785 m (log))

Age: Early Cretaceous, Middle Albian - Early Aptian to Early Barremian - Hauterivian.

Rødby Formation (2712 m (log) - 2735 m (log))

Age: Lower Cretaceous, Middle Albian - Early Aptian.

A marked wireline log break at 2712 m, with a sudden increase in gamma ray and interval transit time values,

defines the top of the Cromer Knoll Group, which is separated from the Chalk Group by an unconformity. This formation is predominantly composed of calcareous claystones which are subfissile, greyish red, pale red, medium light grey and greenish grey, micromicaceous and locally silty.

Depositional environment: marine, inner - outer shelf.

Sole Formation (2735 m (log) - 2760 m (log))

Age: Lower Cretaceous, Middle Albian - Early Aptian.

The top of this formation has been taken at 2735 m, on a slightly increase in interval transit time values. The formation comprises calcareous claystones which are light grey, pink, red brown, silty, occasionally sandy, soft and subfissile.

Depositional environment: marine, inner to outer shelf.

Valhall Formation (2760 m (log) - 2784 m (log))

Age: Lower Cretaceous, Barremian - Hauterivian.

The top of this formation has been taken at 2760 m, on a sudden decrease in gamma ray and interval transit time values. The formation comprises calcareous claystone which are red brown, soft, subfissile, silty and occasionally sandy.

Depositional environment: marine, inner shelf.

VIKING GROUP (2784 m (log) - 2912 m (log)

Age: Late Jurassic, Early Volgian to Kimmeridgian - Middle Oxfordian.

Draupne Formation (2784 m (log) - 2892 m (log))

Age: Late Jurassic, Early Volgian to Kimmeridgian.

A very high gamma ray peak at 2784 m is taken at the top of this formation which is mainly composed of claystones. These are firm, subfissile, dark grey, greyish black to brownish black, very micromicaceous, locally silty and sandy, slightly carbonaceous, locally pyritic and slightly to non-calcareous. Trace amounts of brownish grey dolomite, very fine grained argillaceous sandstones and siltstones are present throughout the interval.

Depositional environment: marine, inner shelf with anaerobic/dysaerobic bottom conditions.

Heather Formation (2892 m (log) - 2912 m (log))

Age: Late Jurassic, Kimmeridgian to Early Kimmeridgian - Middle Oxfordian.

The Heather Formation is composed of an alternating sequence of argillaceous sandstones and silty claystones, the top being taken on a slight decrease in gamma ray and interval transit time values. The claystones are firm, dark grey, silty, micromicaceous and non-calcareous. The sandstones are firm, slightly to very friable, light grey to medium grey, very fine, subangular grained, locally silty, micaceous, non-calcareous, rarely glauconitic, pyritic and argillaceous. (The description is primarily taken from the core pieces, as the ditch cuttings samples mainly contained unconsolidated sand.)

Depositional environment: marine, inner shelf.

VESTLAND GROUP (2912 m (log) - 3140 m (SWC))

Age: Late Jurassic, Early Kimmeridgian - Middle Oxfordian to Middle Jurassic.

"Oxfordian Sandstone Unit" (2912 m (log)-3134 m (log))

Age: Late Jurassic, Early Kimmeridgian - Middle Oxfordian to Early Oxfordian.

A wireline log break at 2912 m marks the top of the Oxfordian Sandstone Unit which comprises this interval.

The sandstones in this well, which are fine to medium, rarely coarse grained with carbonaceous debris, are lithologically like those of the Hugin Formation, but are too young (i.e. post-Callovian). This interval, although equating more to the Ula Formation in age, does not contain sandstones with common glauconite and mica typical of Ula Formation sediments. These factors have resulted in the erection of an informal unit termed the "Oxfordian Sandstone Unit". Further exploration of this block should provide additional information to clarify the relationship of this sand unit to adjacent established lithostratigraphic units.

The lithologies comprise sandstones which are firm, friable, light grey to medium grey, very fine to fine, locally medium to coarse, with subangular to subrounded grains, poorly to unsorted and non-calcareous. Shales, which are firm, fissile, dark grey, micromicaceous and non-calcareous, are present in trace amounts below 2950 m. From 2980 m the sandstones are locally micaceous, carbonaceous, argillaceous and pyritic, occasionally being very poorly sorted with common, medium and coarse, subrounded to subangular grains.

Sleipner Formation (3134 m (log) - 3140 m (SWC))

Age: Middle Jurassic.

The incoming of a coal and shale bed, supported by a log increase in resistivity and interval transit time.

The lithologies consists of coal and shale.

The coal is black, occasionally dark brown, hard and brittle. The shale is medium to dark grey, firm, carbonaceous, occasionally sandy and silty, slightly pyritic and non-calcareous.

"TRIASSIC GROUP" (3140 m (SWC) - 3157 m (TD)

Age: Triassic.

The sediments of the "Triassic Group" comprises sandstones, which are firm, slightly friable, light greenish grey and very light grey, very fine grained to silty, well sorted, micaceous to micromicaceous, locally pyritic, non-calcareous and with minor red and green stained sand grains.

3. DRILLING REPORT

3.1 Summary

3.1 Summary

The drilling unit "Deepsea Bergen" was transferred from well 31/6-2 ph. II to well 15/12-4 at 2200 hours the 8th of September 1984.

The well was completed in 53 days and 5 hours v.s planned time which was 54 days plus 11 days for plugging and abandoning the well.

The primary objectives of this well was Paleocene and Jurassic sandstones. Secondary objectives was Frigg sandstone and fractured Cretaceons limestone.

Intermediate logs were run and the well was drilled to 3157 m (TD) and the final logs were run. The well was decided not to be tested.

The 8 1/2" hole was plugged with open hole cement plugs, and the rest of the well was permanently plugged and abandoned.

3.2 Drilling operations in intervals

3.2 Drilling operations in intervals.

The semisubmersible drilling unit "Deepsea Bergen" was towed from the TROLL-field down to Sleipner area. The average speed was 4.86 knop. The rig was anchored in 87 m water with 10 primary anchors.

36" hole: 110-171 m

The 36" hole was drilled using a 26" bit and 36" holeopener in 14 hours. Made one wiper trip to seabed prior to running casing. Ran 30" casing and cemented same. A leak on bullplug on running tool was observed prior to backing out. Cement was tagged 5 m above shoe. Drilled out cement shoe and made 2 m new 26" hole.

26" hole: 171-520 m

Ran pin connector and riser. Drilled 12 1/4" pilot hole to 520 m in 17.5 hours. Kept the mudweight as low as possible (1.08 S.G.). Dresser Atlas ran logs and it was decided to underream the 26" hole. Underreamed the hole to 26" using a 12 1/4" pilot bit, 17 1/2" holeopener and a 26" underreamer in 16.5 hours.
Displaced hole to 1.25 S.G. mud. POOH to wellhead and displaced riser to seawater. Observed the well. POOH and pulled pin connector and riser. Made a check trip with 26" bit. Tight spots between 300-400 m. Pumped 77 m^3 1.25 S.G. mud. Ran and cemented 20" casing at 505 m. Ran BOP and riser. Tested 20" casing to 60 bar.

17 1/2" hole: 520-1620 m

This section was drilled with Gypsum-Polymer mud. Drilled cement and 3 m new formation. Performed leak off equivalent to 1.44 S.G. Drilled to 1620 m using 3 bits. The first bit REED S11J balled up after drilling 29 m. The two following bits was SMITH SDTC making respectively 29.5 m/hr and 27.7 m/hr. Had maximum 25 tons overpull at 1575-1540 m and 1180-1176 m during wiper trip.

Dresser Atlas ran logs. Made a conditioning trip prior to running casing. Ran and cemented 13 3/8" casing. Set seal assembly and tested same to 242 bar.

12 1/4" hole: 1620-2680 m

Drilled cement and 3 m new formation. Performed leak off equivalent to 1.84 S.G. Drilled to 2439 m. Increased mudweight to 1.25 S.G. Top Heimdal formation was found at 2430 m.

Cut core no. 1 from 2439 m to 2450 m when core jammed (90 % recovery). The formation was shale. Drilled to 2494.5 m.

Cut core no. 2 in Cretaeous to 2499 m when core jammed (97 % recovery).

Cut core no. 3 form 2499 m to 2513.5 m when core jammed (100 % recovery).

Drilled to 2680 m using 2 bits. Average rate of penetration was 3.8 m/hr and 4.2 m/hr respectively. Dresser Atlas logged the hole and a conditioning trip was done prior to running casing. 9 5/8" casing was run and cemented at 2666 m. Seal assembly was tested to 241 bar. Casing was pressure tested to 385 bar.

8 1/2" hole: 2680-3157 m

This section with Lignite-Lignosulfonate mud system. Drilled cement and new formation to 2685 m. Performed leak off test equivalent to 1.86 S.G. Drilled further to 2692 m. Drilled with China bit XHP-2 to 2695 m. The bit was pulled due to slow penetration rate. Drilled to 2902 m using two JD4 and two J2 bits. Penetration rate was approimately 3 m/hr. Formation was Claystone/Shale and Marl.

Core no. 4 was cut from 2902-2920 m (96 % recovery).

Drilled to 3146 m using Smith F2. Average rate was 9.62 m/hr. Drilled to TD at 3157 m. Dresser Atlas ran 7 logs. A wiper trip was made prior to running FMT and Sidewall coregun. It was then decided to start abandoning the well.

Plug and Abandonment

5 balanced cement plugs were set from TD to 2560 m. Tagged cement at 2556 m. Dressed of plug to 2575 m. Set bridge plug at 2568 m.

Perforated at 1509 m and attempted to establish injection rate without success. Set bridge plug at 1497 m. Sement plug from 1494-1394 m.

Perforated 9 5/8" casing at 162 m and cut casing at 450 m. Set bridge plug at 436 m. Perforated at 407 m. It was not possible to establish injection rate.

Set 13 3/8" retainer at 397 m. Cut 13 3/8" casing at 255 m, 244 m, 213 m and 159 m without being able to pull casing loose. POOH with 13 3/8" casing after cutting at 118.5 m.

Attempted to establish injection rate below retainer at 397 m without obtaining leak off. Set cement plug from 395 m to 270 m. Tagged cement at 148 m. Dressed off to 155 m.

Pulled riser and BOP. Cut 20" and 30" casing at 115.4 m and attempted to pull loose with 200 tons overpull with no success. A second attempt to cut and pull loose also failed.

Cut 20" and 30" with Dyna cut on sandline at 115 m and pulled loose casing strings with 60 tons overpull.

Inspected the seabed with Mantis and pulled anchors.

3.3 Extract of daily activities

3.3 Extract of daily activities

Rig moved from 31/6-2 at 2220 hours 8th of September 1984.

84.09.08 Rig under tow to new location 15/12-4.

84.09.09 Under tow to new location.

84.09.10 Arrived location at 0720 hours. Started anchorhandling.

84.09.11 Continued anchorhandling. Ballasted rig. Made up bottom hole assembly while WOW to set anchor no. 6.

84.09.12 WOW. Finished anchorhandling. Picked up 30" casing. Inspected seabed with mantis. Tagged seabottom at 110m RKB.

84.09.13 Spudded in with 26" bit and 36" holeopener at 0000 hrs. Drilled 36" hole from 110-173 m.
Pumped high viscous mud at each connection. Circulated and displaced hole with $50m^3$ high viscous mud. Dropped survey. PO to 117m, retrieved survey and RIH. Displaced hole with $82m^3$ high viscous mud. POOH. Ran 30" casing and baseplate. Jumped mantis for inspection. Found leak on bullplug on runningtool. PO to cellar deck, checked and reran. Jumped mantis to guide casing. Cemented casing with shoe at 171 m. POOH with running tool. RIH with 26" bit to 105 m.

84.09.14 Anchor no. 6 was not holding while pretensioning. Piggybacked same. Pretensioned all anchors. Positioned rig. RIH and tagged cement at 166 m. Drilled cement and shoe to 173 m. Pumped $25m^3$ gel mud. POOH. Washed wellhead on way out. Ran riser and pin connector and pulltested same to 25 tons. Positioned rig. RIH and displaced hole with 1.05 S.G. mud. Function tested diverter. Drilled 12 1/4" hole from 173-240 m.

84.09.15 Continued drilling 12 1/4" hole to 342 m. Circulated and dropped survey. Pulled into shoe and retrieved survey. RIH and drilled 12 1/4" hole to 520 m. Circulated bottoms up. Dropped survey. Pumped slug. POOH to 164 m and retrieved survey. RIH to bottom and circulated hole clean. POOH. Rigged up Dresser Atlas. Run No. 1: DIFL-ACL-GR-SP-CAL.
Rigged down Dresser Atlas. Made up bottom hole assembly.

84.09.16 RIH and opened hole to 26" with underreamer from 173-516 m. Displaced hole to wellhead with 1.25 S.G. mud. POOH to wellhead and displaced riser with seawater. POOH.

84.09.17 Unlatched and pulled riser and pinconnector. Made up cement head and set back in derrick. Picked up 18 3/4" housing, installed wiperplug and set back in derrick. Made check trip to T.D. with 26" bit. Rigged up and ran 20" casing. Shoe at 505 m. Cemented casing. Plug did not bump. Backed out with running tool and washed wellhead area.

84.09.18 Rigged up and ran BOP and riser. Landed same. Pulltested BOP with 25 tons overpull and diverter with 10 tons. RIH with test plug and pressure tested BOP. Tested rams and failsafes to 341 bar and annulars to 241 bar. POOH with testplug. Closed shear ram with acoustic system, and tested casing to 60 bar. RIH and set wear bushing. RIH with 17 1/2" bit and tagged wiperplug at 490 m. Drilled plug and float. Tagged cement at 501 m. Drilled 3 m cement, shoe and 3 m new formation to 523 m. Circulated.

84.09.19 Performed leak off test, equivalent to 1.44 S.G. Drilled 17 1/2" hole from 523-549 m. Dropped survey. POOH and changed bit. RIH and drilled 17 1/2" hole from 549-647 m. Circulated and dropped survey.

POOH to shoe and retrieved survey. RIH. Drilled from 647-698 m. Observed 50 bar increase in pump pressure. Calculated pressure increase to be due to plugged centre nozzle. Drilled from 698-752 m. Circulated and dropped survey. POOH to 608 m and retrieved survey. RIH. Drilled from 752-772 m.

84.09.20 Continued drilling 17 1/2" hole from 772-868 m. Circulated and dropped survey. POOH to 737 m and retrieved survey. RIH. Drilled from 868-877 m. Installed circulation head and circulated. Set bent kelly in mousehole. POOH to shoe and laid down kelly. POOH. Picked up new kelly and waited for new kelly cock. Installed kelly cock and tested same to 345 bar. RIH to 877 m with new 17 1/2" bit. Drilled from 877-945 m.

84.09.21 Continued drilling 17 1/2" hole from 945-974 m. Circulated and dropped survey. POOH to 870 m and retrieved survey. RIH and drilled from 974-1079 m. Circulated and dropped survey. POOH to 725 m. Tight hole from 1023-840 m. Picked up circulation head and circulated out. Max overpull 20 tons. Retrieved survey. RIH and drilled from 1079-1184 m. Circulated and dropped survey. POOH to 1061 m. Tight hole from 1135-1110 m. Max overpull 20 tons. Retrieved survey. RIH and drilled from 1184-1213 m.

84.09.22 Continued drilling 17 1/2" hole from 1213-1300 m. Circulated and dropped survey. POOH to 1147 m. Tight hole from 1243-1230 m. Retrieved survey. RIH and drilled to 1405 m. Circulated and dropped survey. POOH to 879 m. Tight hole from 1300-990 m. Pumped out. Max overpull 25 tons. Retrieved survey. RIH and drilled from 1405-1491 m.

84.09.23 Drilled 17 1/2" hole from 1491-1511 m. Circulated and dropped survey. POOH to 1387 m. Tight hole from 1480-1399 m. Max overpull 15 tons. Retrieved survey.

RIH and drilled from 1511-1620 m. Circulated and dropped survey. POOH to shoe. Tight hole from 1575-1540 m and from 1180-1176 m. Max overpull 25 tons. Retrieved survey. RIH to bottom. Circulated hole clean and POOH. Rigged up Dresser Atlas. RIH but could not pass through 791 m. POOH.

84.09.24 Rigged down Dresser Atlas. RIH with pipe. Tight hole from 790-802 m. Worked pipe through. Circulated hole clean. Max gass 3.18 %. POOH. Rigged up Dresser Atlas.

Run No. 1: DIFL/BHC-ACOUSTIC-GR-SP-CAL-CDL-GR-CAL

Rigged down Dresser Atlas. Made up cement head and 13 3/8" hanger joint. RIH with 17 1/2" bit to 1620 m. Circulated hole clean.

84.09.25 POOH. Washed wellhead and retrived wear bushing. Rigged up and ran 13 3/8" casing. Circulated, and cemented casing. Shoe at 1601 m.

84.09.26 Did not bump top plug. Float held back pressure. Backed out running tool. Flushed wellhead area. Torqued up seal assembly and pressure tested same to 242 bar. RIH with test plug and tested BOP to 241 bar. Function tested on blue pod. Pulled out test plug and set wear bushing. Installed kelly spinner. Pressure tested kelly cocks to 241 bar. Made up and RIH with new bottom hole assembly. Tagged cement at 1562 m. Drilled cement and float to 1594 m.

84.09.27 Drilled out shoe and 3 m new formation to 1623 m. Circulated. Performed leak-off test equivalent to 1.84 S.G. Drilled 12 1/4" hole from 1623-1728 m. Dropped survey. POOH and retrieved survey. 1.5 deg. RIH with new bit and MWD-tool. Drilled 12 1/4" hole from 1728-1877 m.

84.09.28 Drilled 12 1/4" hole from 1877-2165 m. Pumped slug. Made wiper trip to 13 3/8" shoe. Tight hole from 2041-1830 m. Max overpull 18 tons. RIH and drilled from 2165-2174 m.

84.09.29 Continued drilling 12 1/4" hole from 2174-2374 m. Made 5 stands wiper trip. Tight hole from 2320-2252 m. Max overpull 18 tons. Washed from 2301-2328 m. RIH to 2374 m. Circulated bottoms up and increased mudweight from 1.14 to 1.20 S.G. Dropped survey. POOH to 2108 m. Pumped out from 2108-1994 m.

84.09.30 POOH and retrieved survey, mis-run. RIH with new bit. Reamed and washed from 2147 m to TD.
Circulated, worked junk basket,increased mudweight from 1.20 to 1.25 S.G. and took SPR. Drilled 12 1/4" hole from 2374-2439 m. Drilling break from 2437-2439 m. Flow check negative. Circulated bottoms up for sample. Worked junk basket. Dropped survey. Flow check negative. Pumped slug.

84.10.01 POOH. Tight hole from 2376-2368 m and from 2335-2315 m. Max overpull 18 tons. Retrieved survey. Made up corebarrel and RIH to 2298 m. Washed and reamed from 2298-2326 m and from 2423-2439 m. Circulated bottoms up and cut core no. 1 from 2439-2450 m. Corebarrel jammed. Pumped slug and POOH. Tight hole from 2415-2400 m. Max overpull 20 tons. Pumped out from 2400-2371 m due to swabbing.

84.10.02 POOH. Recovered core no. 1. 90 % recovery. Serviced corebarrel and set same back in derrick. RIH with new BHA and bit. Reamed and washed from 2425 m to T.D. Drilled 12 1/4" hole from 2450-2468 m. Flow checked negative. Drilling breaks at 2459 m and 2463 m. Circulated bottoms up. Drilled 12 1/4" hole from 2468-2492 m. Flow checked drilling breaks at 2478 m and 2490 m, negative. Circulated for sample. Drilled 12 1/4" hole from 2492-2494.5 m. Circulated bottoms up.

POOH. Tight hole from 2409-2390 m. Max overpull 18 tons. Pumped out from 2390-2361 m due to swabbing.

84.10.03 Made up corebarrel and RIH. Washed and reamed from 2481 m to T.D. Cut core no. 2 from 2494,5-2499 m. Corebarrel jammed. POOH. Recovered core no. 2. 97 % recovery. RIH. Reamed and washed from 2488 m to T.D. Cut core no. 3 from 2499-2511 m.

84.10.04 Continued cutting core no. 3 from 2511-2513,5 m. Corebarrel jammed. POOH. Recovered core no. 3. 100% recovery. Serviced corebarrel. Washed wellhead and retrived wear bushing. RIH with test plug and tested BOP to 241 bar. Function tested on yellow pod from acoustic unit. P.O. test plug. RIH and set wear bushing. RIH. Reamed and washed from 2481 m to T.D. Drilled 12 1/4" hole from 2513.5-2515 m. Flow checked. Circulated bottoms up through choke line due to un-explained pit gain. Max gas after poor boy degasser 2.04 %.

84.10.05 Drilled 12 1/4" hole from 2515-2576 m. Circulated, dropped survey and POOH with 10 stands. Retrieved survey and RIH. Increased mudweight from 1.25 to 1.30 S.G. Drilled from 2576-2584 m.

84.10.06 Continued drilling 12 1/4" hole from 2584-2612 m. Circulated, dropped survey and POOH. RIH with new bit and drilled 12 1/4" hole from 2612-2626 m.

84.10.07 Drilled 12 1/4" hole from 2626-2680 m. Had drilling breaks at 2630 m and 2634 m. Circulated bottoms up. Made wiper trip to 13 3/8" shoe. Circulated bottoms up. Dropped survey. POOH and retrieved survey. Rigged up Dresser Atlas.

84.10.08 Run no.1: DIFL/BHC-ACOUSTIC-GR-SP-CAL-ACBL
Run no.2: CNL-CDL-GR-CAL
Run no.3: DLL/MLL-GR

Run no.4: HR-DIP-CAL

84.10.09 Rigged down Dresser Atlas. RIH with bit. Washed and reamed from 2653 m to T.D. Circulated bottoms up. POOH. Rigged up Dresser Atlas.

Run no.5: FMT-GR
Run no.6: Core gun

Rigged down Dresser Atlas.

84.10.10 Made up cement head and casing hanger and set same back in derrick. RIH with junk basket. Washed and reamed from 2663 m to T.D. Worked junk basket and circulated bottoms up. POOH. Washed wellhead and retrieved wear bushing. Washed wellhead and BOP. Rigged up and ran 9 5/8" casing.

84.10.11 Continued running 9 5/8" casing. Shoe at 2666 m. Circulated and cemented casing. Top plug did not bump. Floats held OK. POOH with running tool and cement head. Torqued up seal assembly and tested same to 241 bar. RIH with test plug and tested BOP. Tested rams and failsafes to 385 bar, and annulars to 241 bar. Function test on blue pod from acoustic unit. POOH with test plug and set wear bushing. Laid down 9 1/2" and 8" DC. Made up new 8 1/2" BHA.

84.10.12 Tested 9 5/8" casing against shear ram to 385 bar. RIH with 8 1/2" bit and tagged wiper plug at 2628 m. Drilled plug,cement,float collar, shoe and 5 m new formation to 2685 m.
Circulated bottoms up. Performed leak off test equivalent to 1.86 S.G. Continued drilling 8 1/2" hole from 2685-2692 m. Circulated, worked junk sub, dropped survey and POOH.

84.10.13 Continued POOH. RIH with new BHA. Worked junk sub. Drilled 8 1/2" hole from 2692-2695 m. POOH. RIH with

new bit. Drilled 8 1/2" hole from 2695-2714 m. Drilling break at 2712 m. Flow check negative. Circulated bottoms up.

84.10.14 Drilled 8 1/2" hole from 2714-2744 m. Circulated, dropped survey and POOH. RIH with new bit to 2744 m. Increased mudweight from 1.30 to 1.35 S.G. Drilled 8 1/2" hole from 2744-2758 m.

84.10.15 Drilled 8 1/2" hole from 2758-2801 m. Circulated and dropped survey. POOH. RIH with new bit and MWD-tool. Washed and reamed from 2780m to T.D. Worked junk sub. Drilled 8 1/2" hole from 2801-2803 m.

84.10.16 Continued drilling 8 1/2" hole from 2803-2861 m. Circulated for samples. Worked junk sub. Dropped survey and POOH.

84.10.17 Continued POOH. RIH with new bit and MWD-tool. Reamed and washed from 2845-2861 m. Drilled 8 1/2" hole from 2845-2861 m. Calibrated MWD-tool and logged from 2842-2861 m. Drilled 8 1/2" hole from 2861-2902 m. Drilling break at 2900 m. Flow check negative. Circulated bottoms up for samples. Worked junk sub. POOH.

84.10.18 Continued POOH. RIH to cut core. Washed down from 2865 m to T.D. Cut core from 2902-2920 m. POOH. Recovered core. 96 % recovery. Serviced corebarrel and set same back in derrick. Retrived wear bushing and set test plug. Tested BOP. Piperams and failsafes to 385 bar.

84.10.19 Tested annulars to 241 bar. POOH with test plug and seat wear bushing. RIH with new bit and MWD-tool. Reamed and logged with MWD-tool from 2891 m to T.D. Drilled 8 1/2" hole from 2920-3034 m.

84.10.20 Continued drilling 8 1/2" hole from 3034-3146 m. Worked junk basket and circulated bottoms up. Dropped survey and POOH. Retrieved survey, misrun.

84.10.21 RIH with new bit and MWD-tool. Reamed and washed from 3132 m to T.D. Worked junk basket. Did not get any signals from MWD-tool. Drilled 8 1/2" hole from 3146-3157 m. Reamed section 3125-3157 m due to high torque.
Had high torque and 30-40 tons overpull on last 2 m of hole. Dropped survey and POOH to shoe. Retrieved survey 2 3/4 DEG. RIH to bottom and circulated bottoms up. POOH. Rigged up Dresser Atlas.
Run no 1: DIFL/BHC-ACOUSTIC-GR-SP-CAL-CBL
Failure on acoustic. POOH and changed acoustic. RIH.

84.10.22 Continued logging run no. 1.
Run no. 2: CDL/CNL-GR-CAL
Run no. 3: DLL/MLL-GR
Run no. 4: FMT 1st run
Run no. 5: FMT 2nd run

84.10.23 Continued logging run no. 5
Run no. 6: HR-DIP
Run no. 7: VSP
Rigged down Dresser Atlas.
RIH. Tight hole at 3152 m. Unable to get pass due to excessive torque and 30-40 tons overpull. Worked pipe and circulated bottoms up. POOH. Rigged up Dresser Atlas.

84.10.24 Run no.8: FMT 3rd run.
Misrun, could not get pressure seal in casing. POOH and changed tool. Electrical problem. Did not manage to get it work.
Run no. 9: Coregun
Run no.10: FMT
Rigged down Dresser Atlas. Laid down corebarrel and RIH with open ended DP to 3157 m. Circulated. Set cement

plug no. 1 from 3157-3038 m. Pulled out to 3038 m and reversed out. Set cement plug no 2 from 3038-2919 m. Pulled out to 2919 m and reversed out. Set cement plug no. 3 from 2919-2800 m. Pulled out to 2777 m and reversed out. POOH to shoe.

84.10.25 Continued POOH. RIH with 8 1/2" bit and tagged cement at 2794 m. Dressed cement to 2800 m. Weight tested plug to 7 tons. Circulated and POOH with 60 stands. RIH to 2800 m and drilled cement to 2830 m. Circulated POOH. RIH with open ended DP to 2830 m. Set cement plug no. 4 from 2830-2690 m. POOH to 2690 m and reversed out. Set cement plug no. 5 from 2690-2560 m. POOH to 2540 m and reversed out.

84.10.26 POOH. RIH with 8 1/2" bit and 9 5/8" casing scraper. Tagged cement at 2556 m. Drilled cement to 2575 m. Weight tested cement with 7 tons and pressure tested same to 172 bar. POOH. Rigged up Dresser Atlas. D.A. RIH with gauge ring and junk basket. CCL failed, POOH, changed tool, then OK. RIH and set bridge plug at 2568 m. RIH with gun and perforated with 4 shots at 1509 m. Did not manage to establish injection through perforations. Dresser Atlas RIH and set bridge plug at 1497 m.

84.10.27 Rigged down Dresser Atlas . RIH with open ended DP and tagged bridge plug at 1494 m. Set balanced cement plug from 1494-1394 m. POOH with 4 stands and reverse circulated. POOH. RIH with perforating string. Picked up kick joint and stuffing box and installed perforating gun. Pressure tested Dresser Atlas BOP to 242 bar and stuffing box to 171 bar. Perforated 9 5/8" casing at 162 m. Rigged down Dresser Atlas. POOH with perforating string. Retrieved wear bushing. RIH with cutting assembly and cut 9 5/8" casing at 450 m. POOH. RIH with spear assembly and pulled 9 5/8" casing loose with closed annular preventer. Circulated and POOH. RIH with 12 1/4" bit and scraper.

84.10.28 Tagged 9 5/8" casing at 450 m. Circulated and POOH. Rigged up Dresser Atlas. RIH and set bridge plug at 436 m. RIH with perforating gun and perforated at 407 m. RIH and set 13 3/8" EZSV retainer at 397 m. Rigged down Dresser Atlas. Made up and RIH with cutting assembly. Cut 13 3/8" casing at 255 m. POOH. RIH with spear and pack off. Stabbed into 13 3/8" casing and attempted to pull casing loose. No success with 100 tons overpull. POOH with spear. RIH and cut 13 3/8" casing at 244 m. POOH. Installed jar on spear assembly: RIH and stabbed in. Attempted to jar and pull casing loose. No movement with 80 tons overpull. POOH with spear. RIH and cut 13 3/8" casing at 213 m. POOH.

84.10.29 RIH with spear and pack off. Stabbed in and attempted to pull lose 13 3/8" casing. Jared with 25-30 tons. Max overpull 175 tons. Could not get casing loose. POOH with spear. RIH and cut 13 3/8" casing at 159 m. POOH. RIH with spear. Attempted to pull 13 3/8" casing loose. Jarred with 25-30 tons. Max overpull 168 tons. Casing did not move. POOH with spear. RIH and cut 13 3/8" casing at 118,5 m. POOH. RIH with spear and pulled casing loose. POOH. RIH with stinger to 397 m. Stung in and attempted to get injection. No leak off. POOH. RIH with open ended DP to 397 m. Displaced hole to seawater and set cement plug from 395-270 m. POOH to 270 m and ciculated bottoms up with seawater. Set cementplug from 270-130 m. POOH to 120 m and circulated. POOH. Laid down drill pipe.

84.10.30 Continued laying down drill pipe. Made up cutting assembly for 20" and 30" casing, and set back in derrick. RIH with 12 1/4" bit and tagged cement at 148 m. Drilled cement to 155 m. Weight tested with 7 tons. POOH. Disconnected BOP and nippled down kill and choke lines. Pulled riser and BOP. Moved BOP to store place. RIH and cut 20" and 30" casing at 115.4 m. POOH. RIH with wellhead running tool. Stabbed in and

attempted to pull 20" and 30" casing and permanent guide base. No success. POOH. RIH with cutting tool.

84.10.31 Cut casing at 115.4 m. POOH. Installed bumper sub and jar above well head running tool. RIH and connected to wellhead. Attempted to pull 20" and 30" casing. Jarred with 25 tons. Max overpull 180 tons. No success. POOH. RIH with Dyna cut on sand line, and blasted 20" and 30" casing at 115 m. POOH. RIH with well head running tool. Pulled loose 20" and 30" casing with 60 tons overpull. POOH. Inspected seafloor with mantis. Anchor handling. Last anchor on bolser at 23.00 hours.

The rig left location and moved to new location 6/3-1.

3.4 Well and subsea schematic

3.4 WELLBORE SCHEMATIC WELL 15/12-4

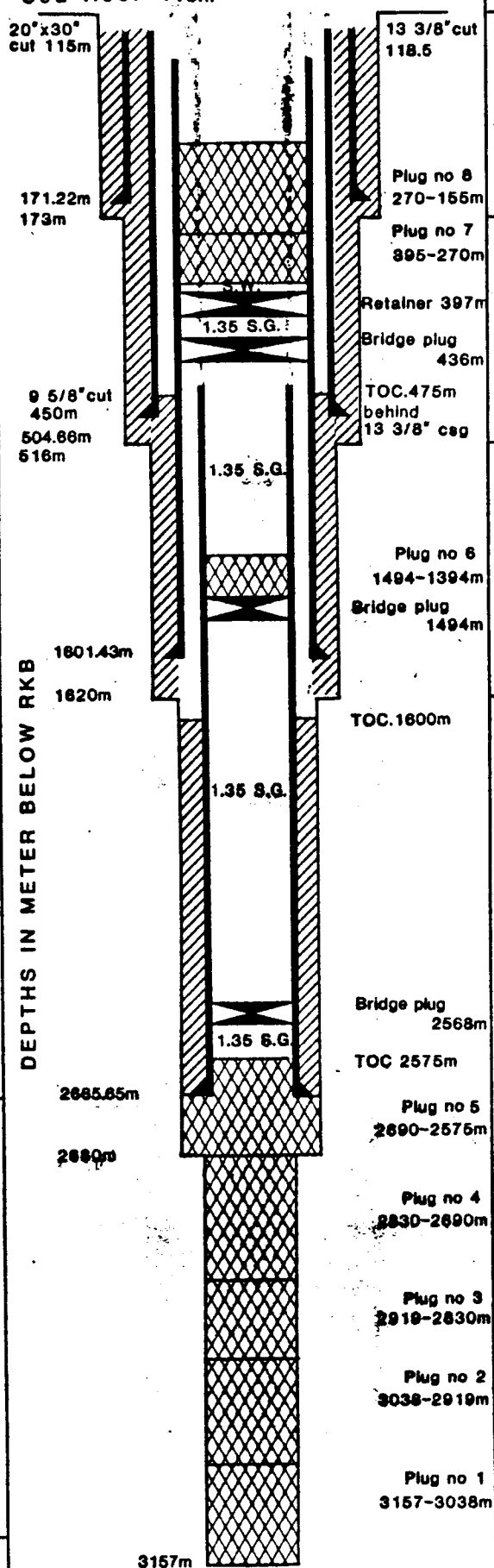
statoil
Den norske stats oljeselskap a.s

Original av : T.S
Tegnet av : Tei
Dato : 3/4-85

(NOT TO SCALE)

RKB - MSL: 23 m. WATER DEPTH: 87 m.

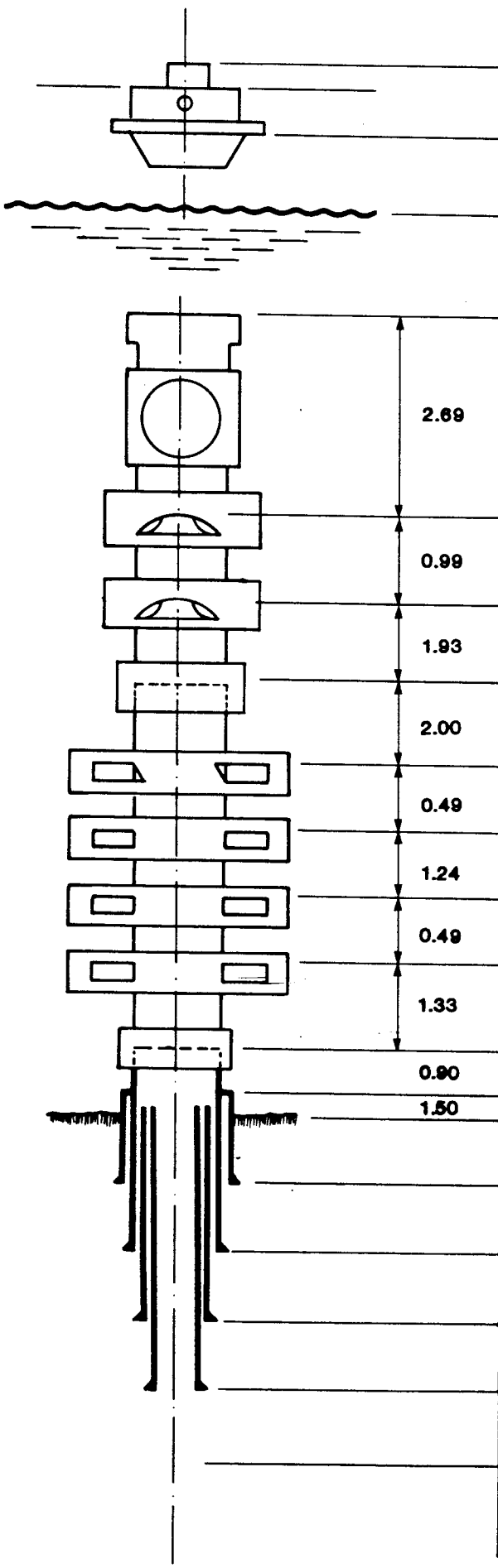
HOLE	CASING
36"	30" Grade B ATD.ST-2 5jts 63.22m
12 1/4" x 26"	20" 94lbs/ft X-56 VETCO LS 32jts 396.66m
17 1/2"	13 3/8" 72 lbs/ft N-80 BUTTRESS 126 jts 1493.43m
12 1/4"	9 5/8" 54 jts 47 lbs/ft P-110 BUTTRESS 672.87m 151jts 47 lbs/ft N-80 BUTTRESS 1884.71m Total 2557.58m
8 1/2"	



CASING CEMENT	PLUGS/SQUEEZE
Lead slurry: 18 tons "G" + 4.0 l Econolite + 92 l Seawater 1.56 S.G. Tail-in slurry: 13.2 tons "G" + 45.09 l Seawater 1.90 S.G.	Plug no. 8: 270-155 m 14.1 tons "G" + 45.09 l Seawater 1.90 S.G.
Lead slurry: 76.4 tons "G" + 4.0 l Econolite + 92 l Seawater 1.56 S.G. Tail-in slurry: 13.0 tons "G" + 45.2 l Seawater 1.90 S.G.	Plug no. 7: 395-270 m 12.1 tons "G" + 45.09 l Seawater 1.90 S.G.
Lead slurry: 65.2 tons "G" + 1.95 l CFR-2L + 0.18 l HR-6L + 2.25 Kg Prehyd. Bent. + 90.2 l Drillwater 1.56 S.G. Tail-in slurry: 13.2 tons "G" + 1.33 l CFR-2L + 0.27 l HR-6L + 42.81 l Drillwater 1.90 S.G.	Plug no. 6: 1494-1394 m 5.0 tons "G" + 0.71 l HR-6L + 43.52 l Drillwater 1.90 S.G.
Lead slurry: 38.4 tons "G" + 1.95 l CFR-2L + 0.27 l HR-6L + 2.25 kg Prehyd. Bent. + 90.27 l Fresh water 1.56 S.G. Tail-in slurry: 13.1 tons "G" + 1.95 l CFR-2L + 5.33 l HALAD-10L + 0.18 l HR-6L + 37.23 l Fresh water 1.90 S.G.	Plug no. 5: 2690-2575 m 7.9 tons "G" Same as plug no 1. Plug no. 4: 2830-2690 m 8.4 tons "G" Same as plug no. 1. Plug no. 3: 2919-2830 m 7.2 tons "G" Same as plug no. 1. Plug no. 2: 3038-2919 m 5.9 tons "G" Same as plug no. 1. Plug no. 1: 3157-3038 m 5.9 tons "G" + 1.33 l CFR-2L + 4.44 l HALAD-10L + 38.77 l Drillwater 1.90 S.G.

DEEPSEA BERGEN — SUBSEA ASSEMBLY — WELL 15/12-4

(NOT TO SCALE)



	M	
	0	RKB
		DIVERTER RISER CONN. FLANGE
	23.0	MEAN SEA LEVEL
	96.44	JOINT RISER CONNECTOR FLANGE
2.69		
	99.13	UPPER ANNULAR RUBBER TOP (CLOSED)
0.99		
	100.12	LOWER STACK ASSEMBLY TOP
1.93		
	102.05	LOWER ANNULAR RUBBER TOP (CLOSED)
2.00		
	104.05	SHEAR RAMS TOP
0.49		
	104.54	U.P. RAMS TOP
1.24		
	105.78	M.P. RAMS TOP
0.49		
	106.27	L.P. RAMS TOP
1.33		
	107.60	18 3/4" WELLHEAD TOP
0.90		
	108.50	30" HOUSING TOP
1.50		
	110.00	MUD LINE
	171.22	30" SHOE
	504.66	20" SHOE
	1601.43	13 3/8" SHOE
	2665.65	9 5/8" SHOE

Original:
Tegnet:
Dato:

3.5 Formation integrity tests

N O M E N C L A T U R E

Brønn no	=	Well no
Dybde	=	Depth, m
Foring	=	Casing
Fartøy	=	Rig name
Høyde	=	Hight, m
Over vannfl.	=	Above sea level
Over sjøb.	=	Above sea floor
Tyngde	=	Weight
Maks. trykk	=	Max. pressure
Boreslam	=	Mud
Tetthet	=	Density, S.G.
Vis	=	Funnel Viscosity, sec/gt.
P.V.	=	Plastic Viscosity, cps.
Y.P.	=	Yield Point, lbs/100-sq. ft.
Filt	=	Filtrate, cc's/30 min
Gel	=	Gel, lbs/100 sq. ft.
Kapasitet	=	Capacity
Vol/tidsenhet	=	Liters/min.
Tilb. str.	=	Returns, liters
Antatt styrke	=	Predicted formation strenght, S.G.
Obs. spr. strykk	=	Surface pressure at leak off, bar
Ekv. formasj. styrke	=	Formation integrity (Leak off) S.G.
Volum	=	Volume, liters
Trykk	=	Pressure, bar
Anmerkninger	=	Comments

statoil

FORMASJONSSTYRKETEST

Dato: 84.09.19

Brønn nr.: 15/12-4 **Dybde:** Brønn: 523 m Foring: 504 m Test: 504 m

Fartøy: Deepsea Bergen **Høyde R.K.B.:** Over vannfl.: 23 m Over sjøb.: 110 m

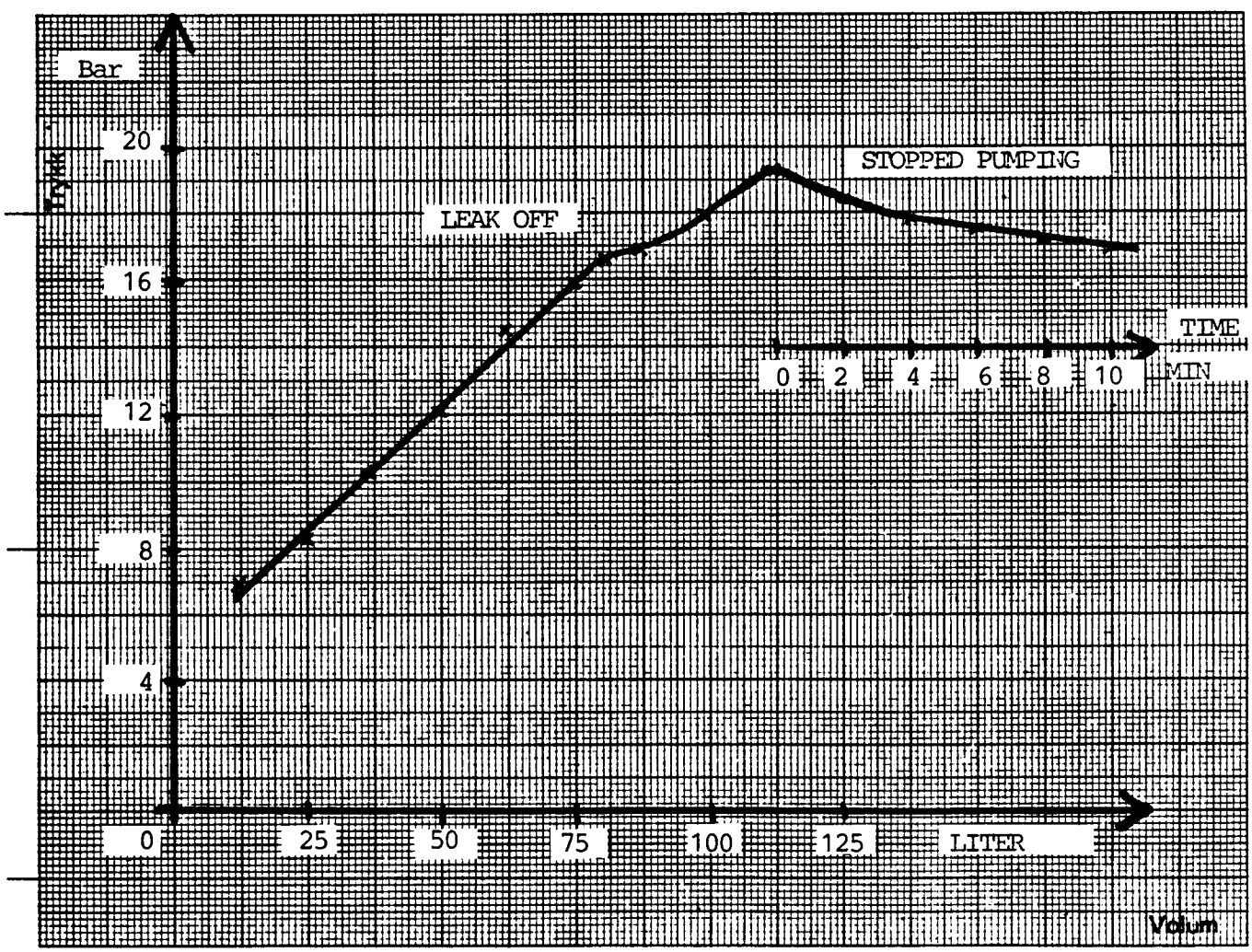
Foring: Diam.: 20" Tyngde: 94 lb/ft Grad: X-56 Maks. trykk: 60 bar

Boreslam: Tetthet: 1.11 S.G. Vis: 40 P.V.: 10 Y.P.: 20 Filt: 8.0 Gel.: 5/11

Pumpe: Type: HT 300 Kapasitet: 6.2 l/stk Vol./tidsenh.: 64 l/min Tilb.str.: 48 l

Antatt styrke: 1.44 S.G. Obs. spr. trykk: 16.6 bar Ekv. formasj. styrke: 1.45 S.G

Liter Volum	Bar Trykk	Liter Volum	Bar Trykk	Minutes tid	Bar Trykk	Anmerkninger
12.4	6.9	99.2	17.9	2	18.4	
24.8	8.3	111.6	19.3	4	17.8	
36.2	10.3			6	17.5	
49.6	12.1			8	17.2	
62.0	14.5			10	16.9	
74.4	15.9					
80.6	16.6					Sign.:
86.8	16.9					I. Gravdal



statoil

FORMASJONSSTYRKETEST

Dato: 84.09.27

Brønn nr.: 15/12-4 Dybde: Brønn: 1623 m Foring: 1602 m Test: 1602 m

Fartøy: Deepsea Bergen Høyde R.K.B.: Over vannfl.: 23 m Over sjøb.: 110 m

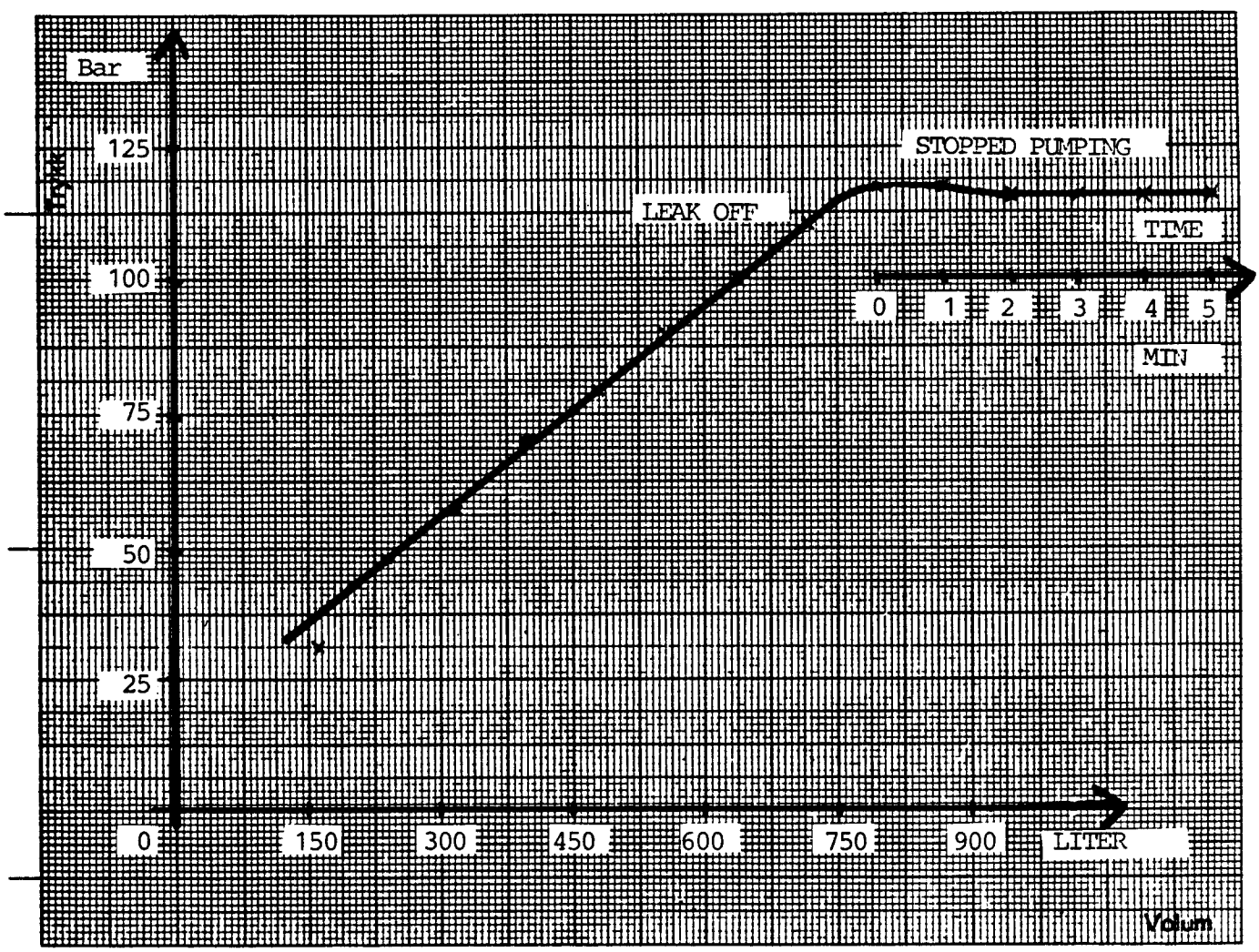
Foring: Diam.: 13 3/8" Tyngde: 72 lb/ft Grad: N-80 Maks. trykk: 241 bar

Boreslam: Tetthet: 1.14 Vis: 43 P.V.: 9 Y.P.: 16 Filt: 15.0 Gel.: 8/11

Pumpe: Type: HT 300 Kapasitet: 6.2 l/stk Vol./tidsenh.: 80 l/min Tilb.str.: 716 l

Antatt styrke: 1.65 Obs. spr. trykk: 112 bar Ekv. formasj. styrke: 1.85

Liter Volum	Bar Trykk	Liter Volum	Bar Trykk	Minutes tid	Bar Trykk	Anmerkninger
159	31	795	117	1	117	
238	48			2	116	
318	58.6			3	116	
398	68.9			4	116	
477	79.3			5	116	
557	89.6					
636	100					Sign.:
716	110.3					I. Gravdal



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FORMASJONSSTYRKETEST

Dato: 84.10.12

Brønn nr.: 15/12-4 Dybde: Brønn: 2680 m Foring: 2666 m Test: 2666 m

Fartøy: Deepsea Bergen Høyde R.K.B.: Over vannfl.: 23 m Over sjøb.: 110 m

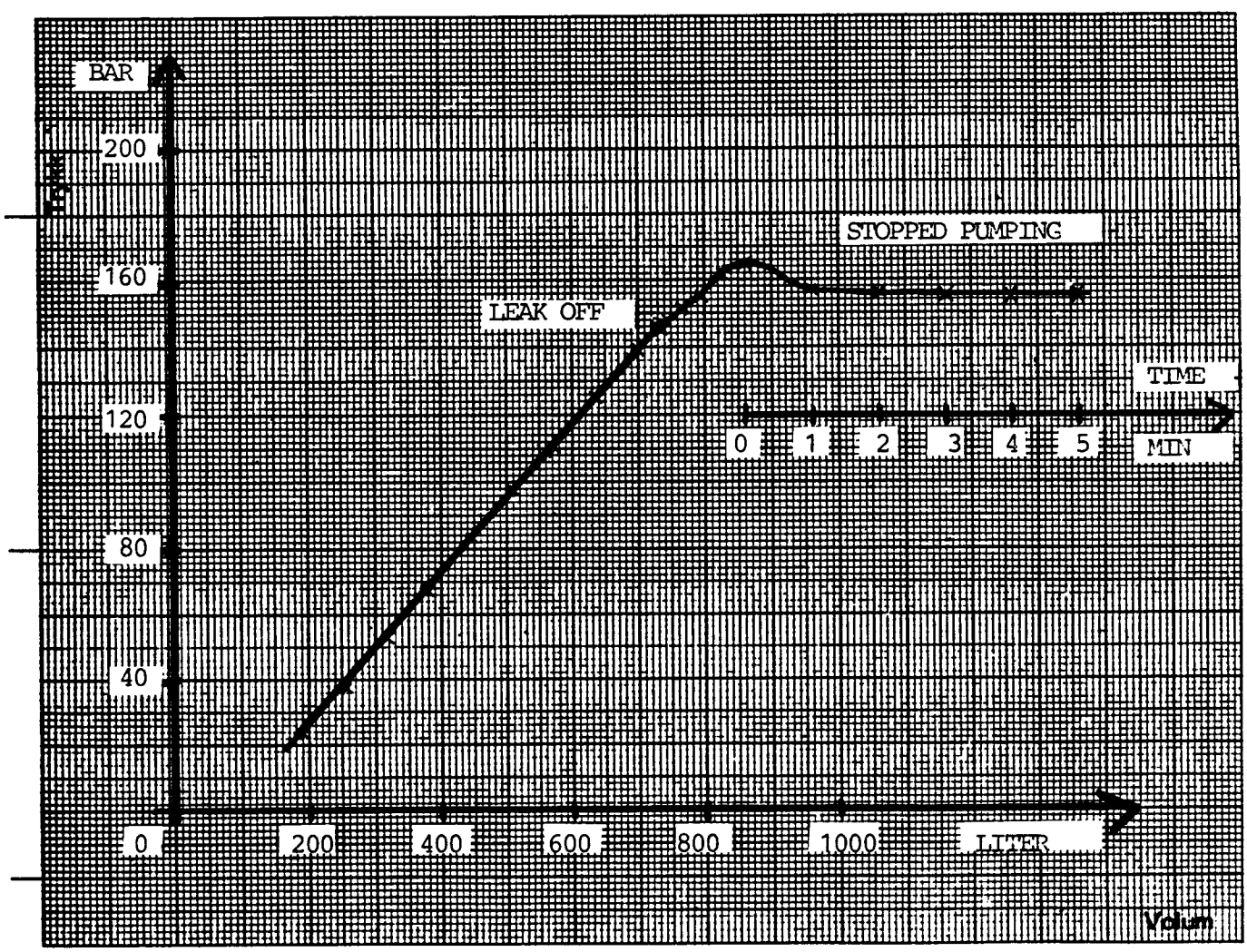
Foring: Diam.: 9 5/8" Tyngde: 47 lb/ft Grad: N-80, P110 Maks. trykk: 385 bar

Boreslam: Tetthet: 1.30 Vis: 42 P.V.: 12 Y.P.: 14 Filt: 9.4 Gel.: 12/30

Pumpe: Type: HT 300 Kapasitet: 6.2 l/stk Vol./tidsenh.: 64 l/min Tilb.str.: 716 l

Antatt styrke: 1.70 Obs. spr. trykk: 145 bar Ekv. formasj. styrke: 1.85

Liter Volum	Bar Trykk	Liter Volum	Bar Trykk	Minutes tid	Bar Trykk	Anmerkninger
191	24.1	700	138.6	1	157.2	
254	37.9	732	145.5	2	155.8	
318	53.1	764	151.0	3	155.1	
382	66.9	795	155.1	4	155.1	
445	82.7	827	162.0	5	155.1	
509	97.9	859	164.8			
573	110.3					Sign.:
636	124.8					K.A. Grini

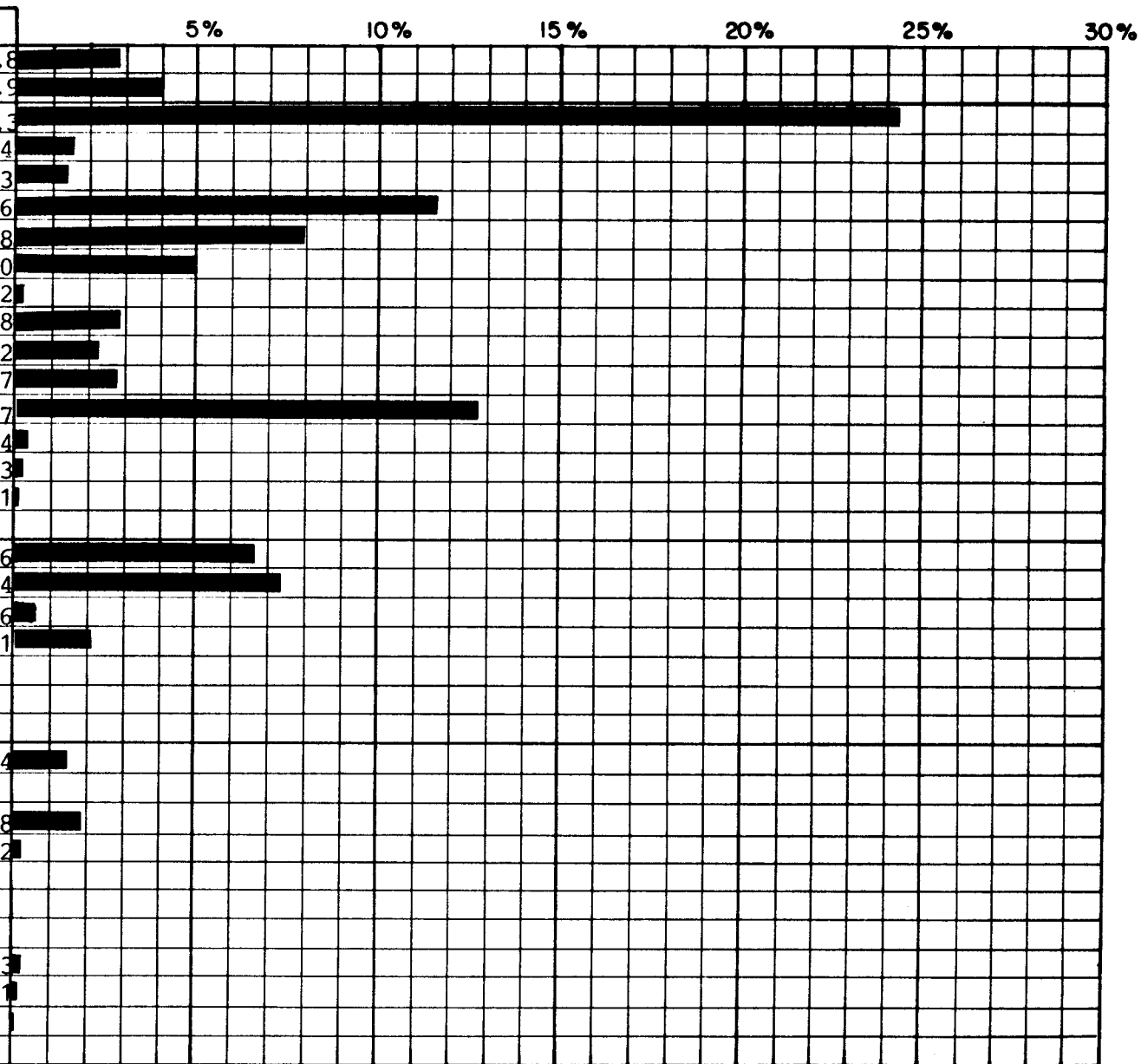


3.6 Total rig time distribution
Rig time distribution for plugging

Drilling time vs. depth
Drilling cost vs. depth

TOTAL RIG TIME DISTRIBUTION FOR WELL : 15/12-4

		HRS	%
	Moving	36.0	2.8
	Mooring	50.0	3.9
Drilling operation	Efficient drilling	310.5	24.3
	Other drilling	17.5	1.4
	Hole opening	16.5	1.3
	Regular tripping	147.5	11.6
	Casing and cementing	99.5	7.8
	Sub sea eq. and BOP	64.5	5.0
	Abnormal press. detection	3.0	0.2
	Cond. and circ.	35.5	2.8
	Reaming	28.0	2.2
	Directional survey	34.0	2.7
	Plugging	162.0	12.7
	Formation leak-off test	5.0	0.4
	Maintenance	3.5	0.3
	Other	1.0	0.1
Formation Evaluation	Coring	84.5	6.6
	El. logging	94.0	7.4
	Circ. for samples	8.0	0.6
	RFT	26.5	2.1
	Production testing		
	Other		
Downtime	Rig repairs	18.5	1.4
	Rig moving		
	Waiting on weather	23.0	1.8
	Sub sea eq. and BOP	3.0	0.2
	Fishing		
	Lost circulation		
	Well control		
	Hole problems	4.0	0.3
	Formation evaluation	1.0	0.1
	Diving	0.5	0.04
	Other		
TOTAL		1277.0	100.0



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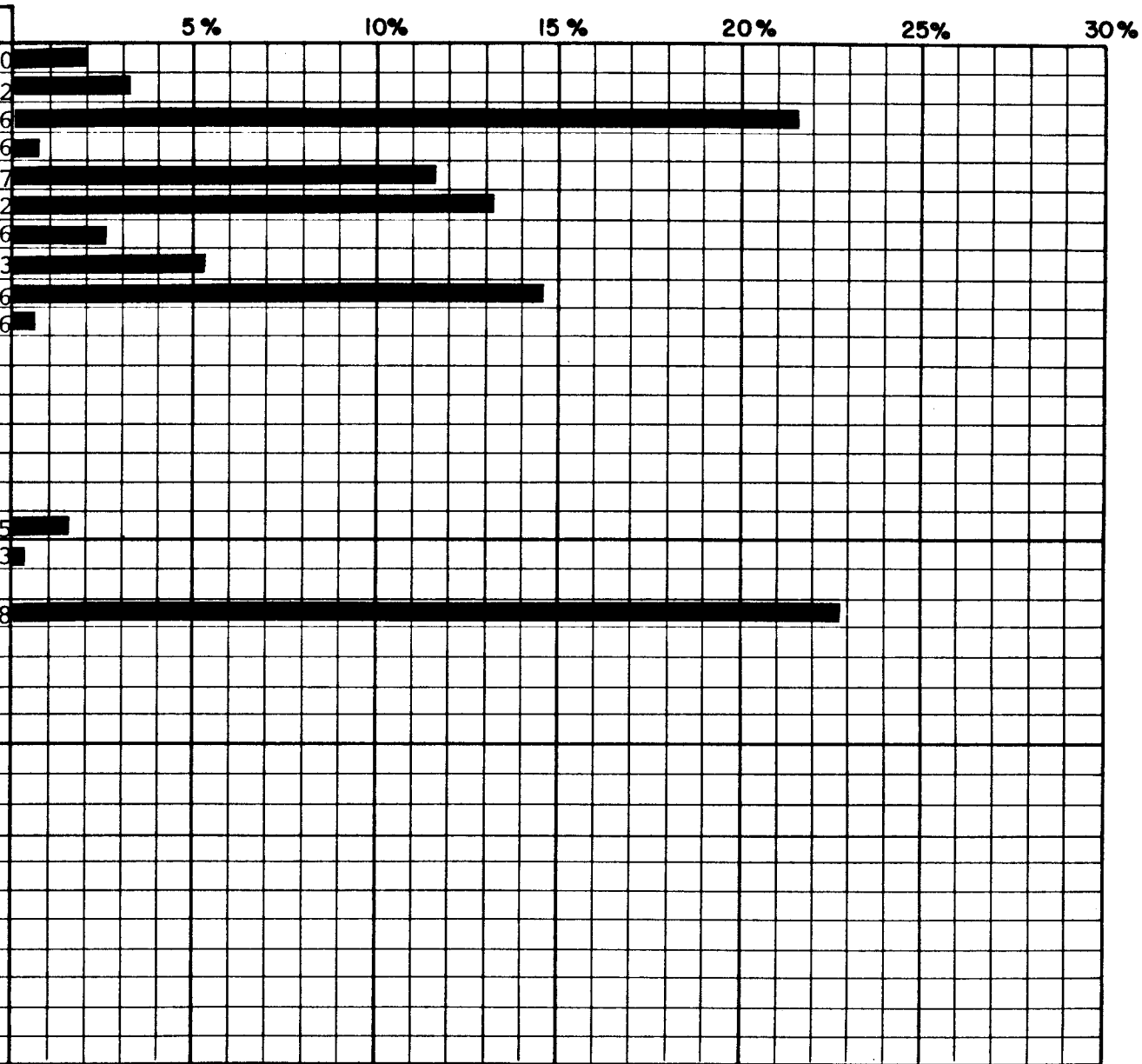
Den norske stats oljeselskap a.s

RIG TIME DISTRIBUTION FOR PLUGGING, INCL. IN TOTAL RIG TIME DISTRIBUTION. 15/12-4

		HRS	%
Plugging	Preparations	3.5	2.0
	Con. and circ.	5.5	3.2
	Cement / Squeeze	37.0	21.6
	Pressure testing	1.0	0.6
	Wire line ops.	20.0	11.7
	Tripping	22.5	13.2
	Other drilling	4.5	2.6
	Sub sea eq. and BOP	9.0	5.3
	Cutting casing	25.0	14.6
	Diving	1.0	0.6
	Other	2.5	1.5
Downtime	Waiting on weather	0.5	0.3
	Waiting on cement		
	Cutting casing	39.0	22.8
	Other		
TOTAL		171.0	100.0



3-4-1-61

WELL 15/12-4

DRILLING TIME V.S. DEPTH

RIG: DEEPSEA BERGEN

PLANNED DRILLING TIME

ACTUAL DRILLING TIME, TOTAL 53 DAYS, 5 HOURS

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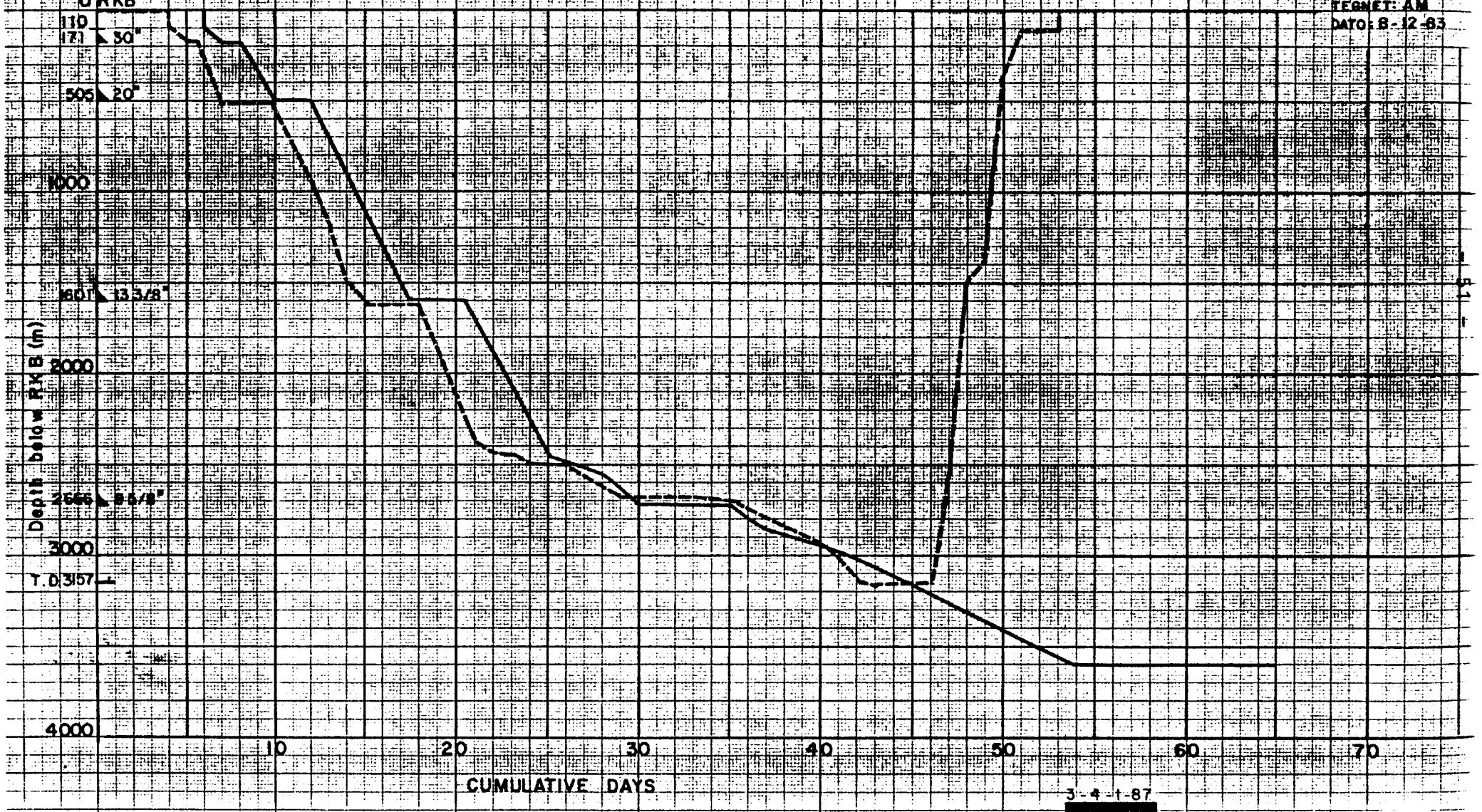
ORIGINAL: TS
TEGNET: AM
DATO: 8-12-83



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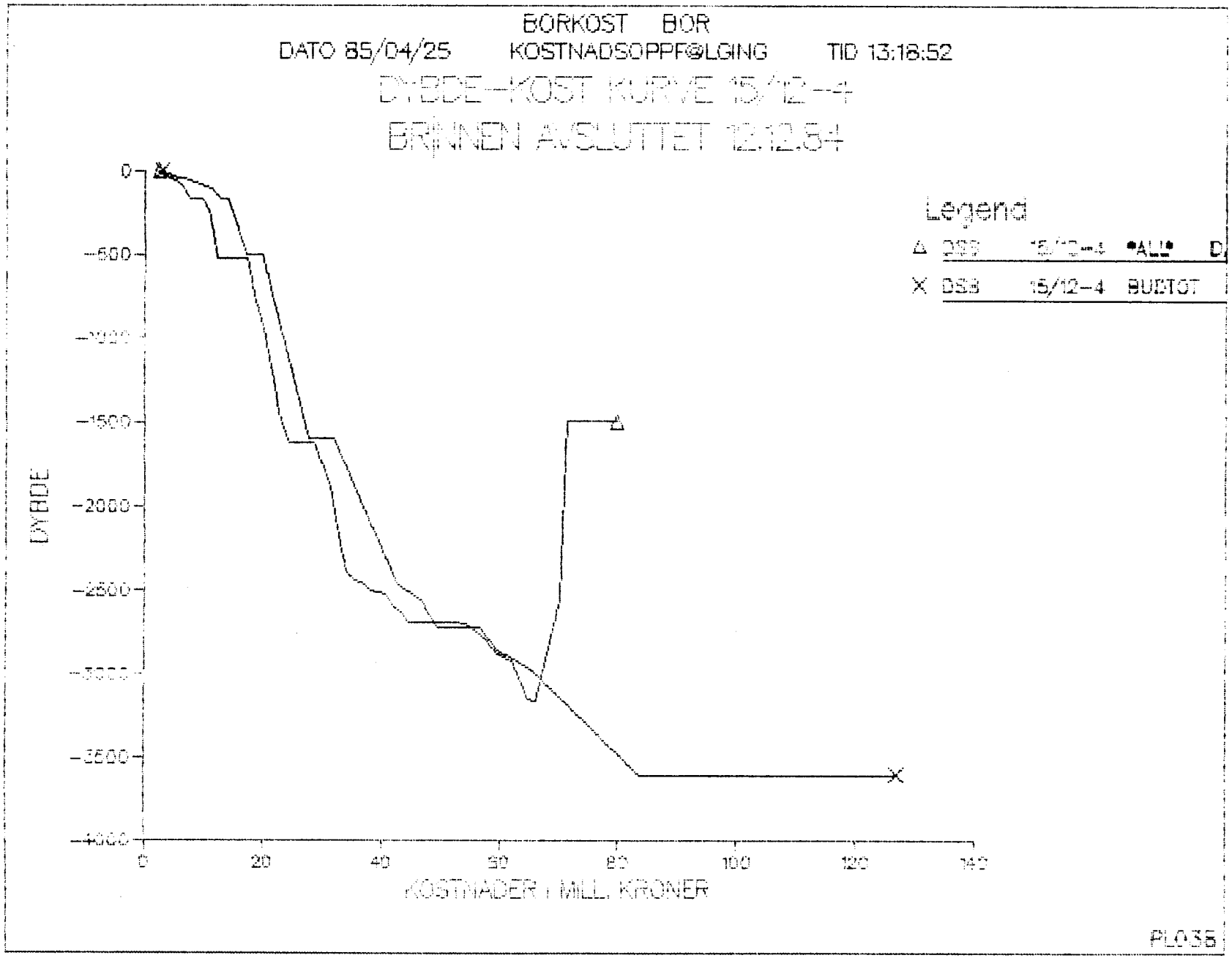
BORKOST BOR
DATO 85/04/25 KOSTNADSOPPFØLGING TID 13:18:52
DYBDE-KOST KURVE 15/12-4
BRØNNEN AVSLUTTET 12.12.84
Legend
DSS 15/12-4 *ALL* D
DSS 15/12-4 BUDTOT
DYBDE
0
-500
-1000
-1500
-2000
-2500
-3000
-3500
-4000
0
20
40
60
80
100
120
140
KOSTNADER I MILL. KRONER
PL035

3.7 Bit record and lithology column
Coring data

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BORKRONEDATA

Brønn nr.: 15/12-4

Nr.	B. k. Nr.	Diam.	Fabr.	Type	Serie no.	Dyser 1/32"	Dybde ut	Fremdrift	Rot. tid	Total rot.tid	Bore-hast.	V.p.b.	O.p.m.	Pumpe			Tilstand			Anmerkninger
														Trykk	V.grad	v/t	T	B	G	
1	1	26"	REED	Y 11	L35182	7 x 20	173	63	11.6	11.6	5.4	5-15	80-95	38	98%	3000-3300	1	1	I	
2	RR1	26"	"	"	"	3 x 20	173	DRLD CMT					50	17	"	2220	1	1	I	
3	2	12 1/4"	SEC	S33SF	920752	3 x 16	520	347	11.5	23.1	30.2	2-5	140	155	"	3250	2	2	I	
4	RR2	12 1/4"	SEC	S33SF	920754	3 x 12											2	2	I	
	171/2" HO		GRANT			6 x 14	UNDERREAM PILOT HOLE TO 26"							80	"	3450	1	3	I	
		26" UR	SERVCO			3 x 9											2	5	I	
5	RR1	26"	REED	Y 11	L35182	3 x 20	WIPER TRIP													
6	3	17 1/2"	"	S11J	B37006	3 x 18	549	29	3.1	26.2	9.4	8-16	120-150	144	"	3470	2	2	I	
7	4	"	SMITH	SDTC	XC7766	1 x 14 3 x 16	877	328	11.1	37.3	29.5	6-8	160	207	"	3360	1	1	I	Partly plugged nozzles
8	5	"	"	"	XD6090	1 x 14 3 x 16	1620	743	26.8	64.1	27.7	8-14	160-180	205	"	3550	3	3	I	
9	RR5	"	"	"	"	"	WIPER TRIP										3	3	I	
10	RR5	"	"	"	"	"	WIPER TRIP										3	3	I	
11	6	12 1/4"	SEC	S33SF	906349	3 x 14	1728	108	2.8	66.9	38.6	10	150	200	"	2590	4	3	I	
12	7	12 1/4"	HTC	JD 3	JA485	3 x 15	2374	646	26.1	93.0	24.7	6-8	140	200	"	2580	5	4	I	Brooken Teeth
13	8	12 1/4"	HTC	X 1G	083LF	3 x 15	2439	65	5.3	98.3	12.2	8-10	150	200	"	2560	2	2	I	Pulled To Core
14	9	12 1/4"	Christ. Dia.	C-22	19302	-	2450	11	6	104.3	1.8	8-10	100	125	"	1786				5% Worn
15	10	12 1/4"	HTC	JD 3	JA678	3 x 15	2494.5	44.5	5.5	109.8	8.0	6-8	135	204	"	2570	1	1	I	Pulled To Core
16	9RR	12 1/4"	Christ. Dia.	C-22	19302	-	2499	4.5	2.1	111.9	2.14	8-10	110	113	"	1825				10% Worn
17	9RR	12 1/4"	Christ.	C-22	19302	-	2513.5	13.5	10.2	122.1	1.32	8-10	110	112	"	1845				10-15% Worn
18	11	12 1/4"	Smith	F-2	WZ484	3 x 15	2612	98.5	26.1	148.2	3.8	15	120	202	"	2525	2	7	I	2 loose cones
19	12	12 1/4"	Smith	FVH	XA9293	3 x 15	2680	68	16.2	164.4	4.2	15	120	202	"	2520	2	3	I	Drld. to casing depth

4.01.08

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BORKRONEDATA

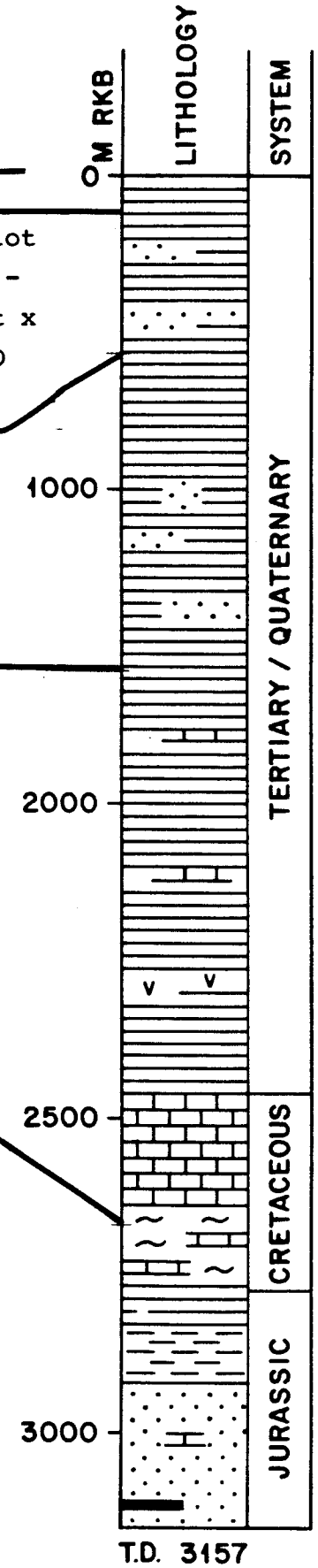
Brønn nr.: 15/12-4

Nr.	B. k. Nr.	Diam.	Fabr.	Type	Serie no.	Dyser 1/32"	Dybde ut	Fremdrift	Rot. tid	Total rot.tid	Bore-hast.	V.p.b.	O.p.m.	Pumpe			Tilstand			Anmerkninger
														Trykk	V.grad	v/t	T	B	G	
20	12RR	12 1/4"	Smith	FVH	XA9293	3 x 15			WIPER TRIP											
21	12RR	12 1/4"	Smith	FVH	XA9293	3 x 15			WIPER TRIP											
22	13	8 1/2"	Smith	SDT	CJ2373	3 x 13	2692	12	6.4	170.8	1.9	6-8	70-120	185	98%	1598	2	3	I	Cmt. shoe F/C Drld. out9 5/8'
23	14	8 1/2"	China	XHP-2	84-983	1 x 11 2 x 12	2695	3	2.4	173.2	1.25	6-11	40-60	200	"	1580	1	1	I	Low Penetration
24	15	8 1/2"	HTC	JD4	638 UK	1 x 11 2 x 12	2744	49	15.3	188.5	3.2	12-15	115	201	"	1575	3	6	I	
25	16	8 1/2"	HTC	J4	227 PK	3 x 12	2801	57	18.1	206.6	3.15	15	110	202	"	1570	4	6	I	
26	17	8 1/2"	HTC	J4	354 PK	3 x 12	2861	60	20.4	227.0	2.95	15	110	200	"	1565	6	5	1	
27	18	8 1/2"	HTC	JD4	236 DF	3 x 12	2902	41	12.2	239.2	3.36	15	110	202	"	1568	7	4	I	Pulled to core
28	19	8 1/2"	Christ.	C-22			2920	18	7.25	246.45	2.5	4-8	80-90	97	"	1150				10% Worn
29	20	8 1/2"	Smith	F2	XD6258	3 x 12	3146	226	23.5	269.95	9.62	15	83	211	"	1594	5	5	1/8	Broken teeth
30	21	8 1/2"	SMT	F3	WW698	3 x 12	3157	11	2.1	272.05	5.2	15	68	207	"	1550	1	1	I	
31	21RR	8 1/2"	SMT	F3	"	WIPER TRIP														
32	13RR	8 1/2"	SMT	SDT	CS-2373	OPEN	2830	36	2.5		14.4	8	80	120	"	1740	2	3	I	Drld. cmt.
33	13RR	8 1/2"	SMT	SDT	"	3 x 12	2575	19	0.7		27	3-5	32	67	"	940	2	3	I	" "
34	10RR	12 1/4'	HTC	JD 3	JA678	OPEN	SCRAPER RUN TO 450 M													

4.01.08

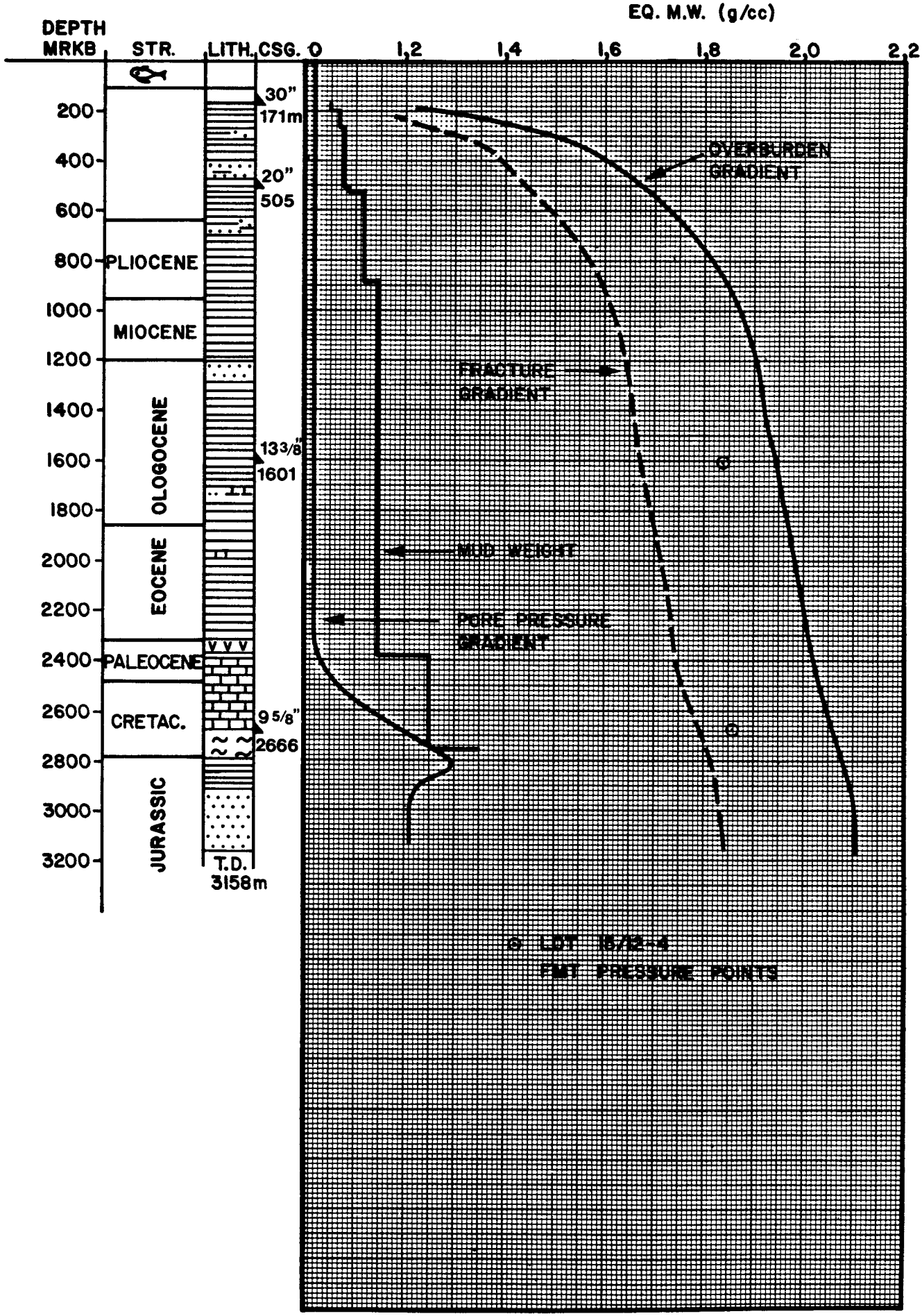
BIT SEQUENCE AND LITHOLOGY COLUMN 15/12-4

BIT	DEPTH OUT m	ROP m/hr	PROGRESS		PHASE
Y 11	173	5.4	63		36"
Sec S33SF	520	30.2	347		12 1/4" pilot
Grant H.O.					12 1/4" bit x 17 1/2" H.O
Servco U.R.	520	21.0	347		x 26" U.R.
Reed S11J	549	9.4	29		
Smith SDTC	877	29.5	328		
Smith SDTC	1620	27.7	743		17 1/2"
Sec S33SF	1728	38.6	108		
HTC JD3	2374	24.7	646		
HTC x 1G	2439	12.2	65		
Crist C-22	2450	1.8	11	1 core	
HTC JD3	2494.5	8.0	44.5		12 1/4"
Crist C-22	2513	1.46	18	2 cores	
Smith F-2	2612	3.8	98.5		
Smith FVH	2680	4.2	68		
Smith SDT	2692	1.9	12		
China XHP-2	2695	1.25	3		
HTC JD4	2744	3.2	49		
HTC J4	2801	3.15	57		8 1/2"
HTC JD4	2861	2.95	41		
Crist C-22	2920	2.5	18	1 core	
Smith F2	3146	9.62	226		
Smith F3	3157	5.2	11		



3.8 Pressure profiles

15/12-4 PRESSURE GRADIENT COMPOSITE PLOT



3.9 Surveys

WELL DEFLECTION SURVEY

STATOIL
15/12-4
NORTH SEA, NORWEGIAN SECTOR

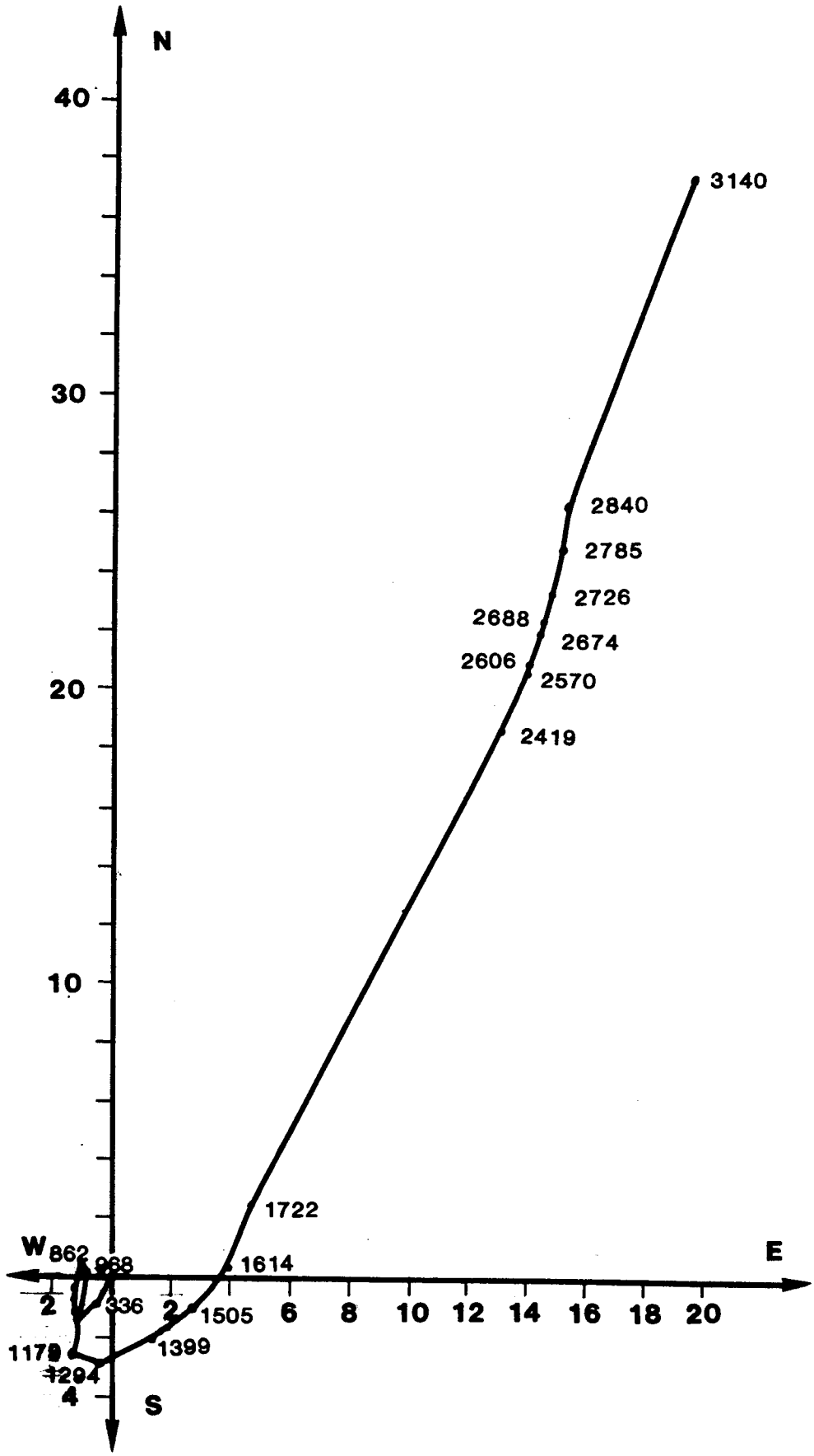
Slot : 1
Well : 15/12-4
PBHL : N 0 0 E

Our ref : S05774.0ST
Date printed : 28-FEB-85

Measured Depth	Drift Angle D M	Drift Direction D M	Course Length	Vertical Depth	Vertical Section	RECTANGULAR COORDINATES		Dogleg Severity
110.00	0 0	N 0 0 E	0.00	110.00	0.00	0.00 N	0.00 E	0.00
336.00	0 30	S 28 0 W	226.00	336.00	-0.87	0.87 S	0.46 W	0.07
514.00	0 15	N 71 0 W	178.00	513.99	-1.43	1.43 S	1.19 W	0.09
543.00	0 30	N 9 0 E	29.00	542.99	-1.28	1.28 S	1.23 W	0.54
641.00	0 15	N 65 0 W	98.00	640.99	-0.77	0.77 S	1.36 W	0.15
746.00	0 30	N 29 0 E	105.00	745.99	-0.27	0.27 S	1.35 W	0.16
862.00	0 15	N 26 0 E	116.00	861.99	0.40	0.40 N	0.99 W	0.06
968.00	0 30	S 9 0 W	106.00	967.99	0.15	0.15 N	0.96 W	0.21
1073.00	1 0	S 10 0 W	105.00	1072.98	-1.21	1.21 S	1.19 W	0.14
1179.00	0 30	S 0 0 W	106.00	1178.97	-2.58	2.58 S	1.35 W	0.15
1294.00	1 0	N 79 0 E	115.00	1293.96	-2.89	2.89 S	0.37 W	0.31
1399.00	1 0	N 49 0 E	105.00	1398.95	-2.12	2.12 S	1.22 E	0.15
1505.00	1 0	N 60 0 E	106.00	1504.93	-1.05	1.05 S	2.72 E	0.05
1614.00	1 0	N 20 0 E	109.00	1613.91	0.32	0.32 N	3.87 E	0.19
1722.00	1 30	N 21 0 E	108.00	1721.89	2.53	2.53 N	4.70 E	0.14
2419.00	1 30	N 34 0 E	697.00	2418.65	18.61	18.61 N	13.07 E	0.01
2570.00	0 15	N 37 0 W	151.00	2569.63	20.51	20.51 N	13.98 E	0.29
2606.00	0 30	N 40 0 E	36.00	2605.63	20.69	20.69 N	14.03 E	0.42
2674.00	1 45	N 10 0 E	68.00	2673.62	21.94	21.94 N	14.40 E	0.59
2688.00	1 45	N 19 0 E	14.00	2687.61	22.36	22.36 N	14.51 E	0.59
2726.00	1 30	N 10 0 E	38.00	2725.60	23.39	23.39 N	14.78 E	0.28
2785.00	1 15	N 16 0 E	59.00	2784.58	24.77	24.77 N	15.10 E	0.15
2840.00	2 0	N 0 0 E	55.00	2839.56	26.31	26.31 N	15.26 E	0.47
3140.00	2 45	N 36 0 E	300.00	3139.31	37.37	37.37 N	19.49 E	0.16

Calculation Method : Minimum curvature
Report Units : Metres
Slot Coordinates : 0.00 N 0.00 E
Bottom hole Location : Referenced to Centre
Distance : 42.15
Direction : N 27 33 E

WELL 15/12-4
HORIZONTAL SECTION,MAGNETIC SINGLE SHOT



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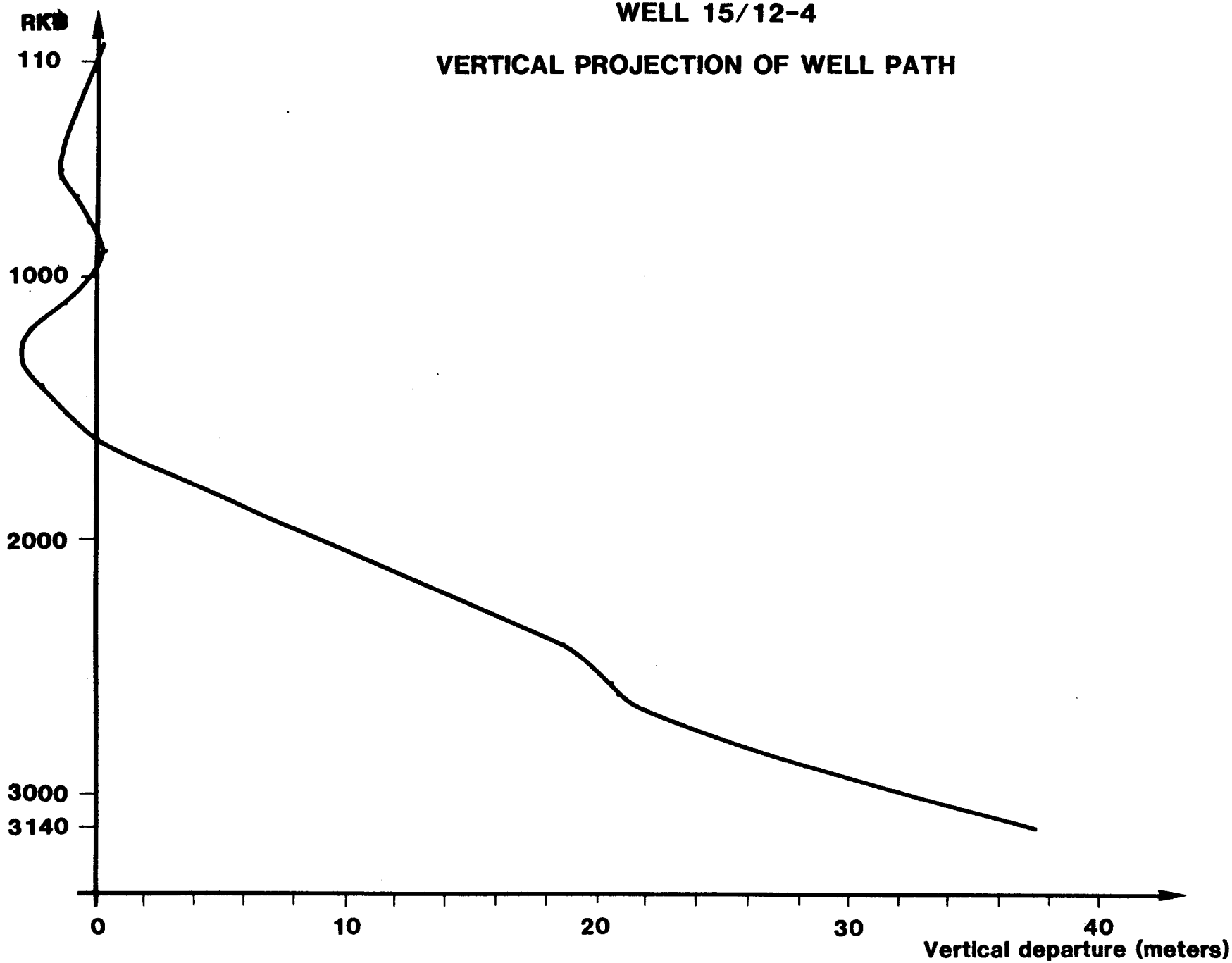

WELL 15/12-4
VERTICAL PROJECTION OF WELL PATH
RKB
110
1000
2000
3000
3140
0
10
20
30
40
Vertical departure (meters)

3.10 Equipment failure

3.10 Equipment failure

1. After connection at 870 m driller set bit on bottom, closed compensator 30 % and turn around to adjust mudpumps and rotary. The brake was not chained causing the block to come down and bent kelly, kelly spinner and upper kelly cock. 13 hours rig time was lost.

2. Analyst MWD tool failed just after starting drilling on bottom the sections 2695-2744 m and 2801-2861 m. The fault was found in the power supply. No rig time was lost.

4. MARINE REPORT

4.1 Weather and anchor tension
Location weather data summary

4.1 Weather and anchor tension, Well: 15/12-4

Deepsea Bergen drilled this well from 8th of September 1984 to 31th of October 1984.
There was 23 hours downtime due to bad weather (1.8 % of total time).

Maximum anchorstretch values was reported on anchor no. 4. (064 deg) and no. 5 (113 deg). The 19th of October we had 150 and 148 tons pull on no. 4 and 5. At the same time the windspeed was reported to be 31 m/s from SW. Wave hight was reported to be 11.5 m coming from the same direction.

The most severe weather conditiones occured 19th and 20th of October 1984 with wind speed up to 25-31 m/s from SW and 11.5 m waves from SW. At that time the rig heave was 4.1 m.

In the periode from September to November 1984 the wind and waves was mainly coming from all directions except from ENE to NNE. The strongest winds and waves came from WNW to SSW.

LOCATION WEATHER DATA SUMMARY

statoil
Den norske stats oljeselskap a.s

WELL: 15/12-4 RIG: Deepsea Bergen

TIME PERIOD: FROM 8./9 TO 30/9 -1984

READINGS PR. MONTH: 22 readings in September 1984

WIND

dir. \ m/sec.	0 – 5	5 – 10	10 – 15	15 – 20	20 – 25	25 – 30	> 30	total
N			1					1
NNE		1		1				2
NE								
ENE								
E			1					1
ESE				2				2
SE		1		2	1			4
SSE			1	4				5
S								
SSW								
SW			1					1
WSW			1	1				2
W								
WNW				1				1
NW					2			2
NNW			1					1
total		2	6	11	3			22 / 22

WAVE

dir. \ height (m)	0 – 1	1 – 2	2 – 3	3 – 5	5 – 7	7 – 10	> 10	total
N				2				2
NNE				1				1
NE								
ENE								
E			2	1				3
ESE								
SE					2			2
SSE				4				4
S			1		1			2
SSW			1					1
SW								
WSW								
W			1	1		1		3
WNW						2		2
NW					1			1
NNW				1				1
total			5	10	4	3		22 / 22

4.00.23

LOCATION WEATHER DATA SUMMARY

statoil
Den norske stats oljeselskap a.s

WELL: 15/12-4 RIG: Deepsea Bergen

TIME PERIOD: FROM 1/10 TO 31/10 -1984

READINGS PR. MONTH: 32 readings in October and November 1984

WIND

dir. \ m/sec.	0 – 5	5 – 10	10 – 15	15 – 20	20 – 25	25 – 30	> 30	total
N				1				1
NNE								
NE				1				1
ENE								
E								
ESE								
SE				1				1
SSE				1				1
S			1	2				3
SSW				2				2
SW		1	2			1	1	5
WSW				3	1			4
W			1	3	2			6
WNW				3	1	1		5
NW					1			1
NNW					1			1
total		1	4	17	6	2	1	31 / 31

WAVE

dir. \ height (m)	0 – 1	1 – 2	2 – 3	3 – 5	5 – 7	7 – 10	> 10	total
N						1		1
NNE			1					1
NE								
ENE								
E			1					1
ESE								
SE								
SSE				4				4
S					1			1
SSW				2				2
SW				1		1	1	3
WSW			1	2	1			4
W				3	3	1		7
WNW				1	2	2		5
NW					1			1
NNW						1		1
total			3	13	8	6	1	31 / 31

4.00.23

4.2 Navigation report

4.2 Navigation report

RIG MOVE OF "DEEPSEA BERGEN" TO WELL 15/12-4

Final position ED 1950)

58° 03' 09.16"N, 01° 54' 11.61"E
Accuracy: 10 meters
Rig heading: 314°
Deviation from intended position: 34 m - 313°

2. Computed Decca Main Chain readings

Chain :	Vestlandet OE		Nord Skotske 6C	
Red :	1A	23,25	1B	2,95
Green :	2H	43,28	1I	34,45
Purple:	2C	71,33	2D	58,35

3. Navigation/positioning method.

a) Navigation

Pulse/8 navigation system with HP computer and plotter. (Q-6 package).
Contractor: Racal-Decca Survey Norway A/S, Bergen.
Personnel : Kuttner.

b) Positioning

JMR-4 satellite positioning system.
Contractor: Racal-Decca Survey Norway A/S, Bergen.
Personell : Indrebø.

4. Duration of the rig move

Personell and equipment onboard	: 8 Sept. 1984 at 09.45 hours
Rig left 31/6-2	: 8 Sept. 1984 at 22.20 hours
Start run in, turning point 5 km from location	: 10 Sept. 1984 at 05.00 hours
Dropped first anchor (no. 5)	: 10 Sept. 1984 at 06.50 hours
Dropped last anchor (no.10, reset)	: 12 Sept. 1984 at 19.15 hours
All anchors pretensioned to 120 t.	
Ready for drilling	: 12 Sept. 1984 at 20.00 hours

5. Techniques/problems

The operations was performed according to Statoil's procedures without navigational problems.

The anchorhandling was delayed due to bad weather. Anchor no. 6 and 10 had to be reset.

Discreapency between Pulse/8 position and Sat.nav. position was 11 m - 10° (Pulse/8 position E.N.E. of Sat.nav. position).

5 PRESSURE AND LOG SUMMARY

5 PRESSURE AND LOG SUMMARY

5.1 Petrophysical evaluation 15/12-4

Cretaceous Fm

The Cretaceous formation was logged with the following tools:

1. DIFL/BHC ACOUSTIC-SP-GR-CAL
2. CDL/CNL-GR
3. DLL/MLL-GR
4. FMT
5. HR DIPLOG
6. COREGUN

A petrophysical evaluation has been done with the following input parameters:

Interval, m RKB:	2475 - 2676
Formation temp. ^{o}C:	99
R fm at 99°C, ohm m:	0.078
R_w, ohm m:	0.040
R_{sh}, ohm m:	1.80
$PHIN_{ma}$, fraction:	0.00
$PHIN_{sh}$, fraction:	0.23
$RHOB_{ma}$, g/cc:	2.71
RHOBsh, g/cc:	2.50
$RHOB_{fl}$, g/cc:	1.01
GR_{max}:	68
GR_{min}:	4
m:	2
n:	2
a:	1
Shale exp:	1.6

Hydrocarbon corr. factor: 0.1

A shaly sand model with the GR log as shale indicator was used in the evaluation. The porosities are determined from the CDL and CNL logs corrected for shale and hydrocarbons.

Water saturation was calculated using the North Sea equation.

From logs and cores hydrocarbons were seen in the uppermost part of the Cretaceous chalk. Core analysis and log analysis indicates very poor reservoir properties in this chalk. The water saturation is high (60 - 80 %) and the permeability is extremely low (0.01 - 0.5 md).

The results from the log analysis are listed below:

Interval evaluated, m RKB:	2475 - 2675
Top oil zone, m RKB:	2491.5
High oil zone, m*:	9.5
Av. porosity*:	0.15
Av. water saturation*:	0.74
Av. shale content*:	0.11

* The results are taken from the hydrocarbon interval 2491.5 - 2501 m RKB with not cut off values for Fw and Ø.

Jurassic Fm

The Jurassic formation was logged with the following tools:

1. DIFL/BHC-GR-SP-CAL
2. CDL/CNL-GR
3. DLL/MLL-GR
4. FMT
5. HR DIPLOG
6. COREGUN
7. VSP

A petrophysical evaluation has been done with the following input parameters:

Interval, m RKB	2875-2911	2911-2951	2951-3075
Formation temp. °C:	120	120	120
Rmf at 99°C, ohm m:	0.047	0.047	0.047

R_w, ohm m:	0.0145	0.0145	0.0145
R_{sh}, ohm m:	2.0	2.0	2.0
$PHIN_{ma}$, fraction:	0.035	0.035	0.035
$PHIN_{sh}$, fraction:	0.23	0.23	0.23
$RHOB_{ma}$, g/cc:	2.68	2.65	2.65
$RHOB_{sh}$, g/cc:	2.50	2.50	2.50
$RHOB_{fl}$, g/cc:	1.01	1.01	1.01
GR_{max}:	100	100	100
GR_{min}:	35	32	12
m:	2	2	2
n:	2	2	2
a:	1	1	1
Shale exp:	1.6	1.6	1.6

Hydrocarbon corr. factor: 0.1

A shaly sand model with the GR log as shale indicator was used in the evaluation. The porosities are determined from the CDL and CNL logs corrected for shale and hydrocarbons.

Water saturation was calculated using the North Sea equation.

A 1.5 meter oil leg was seen in the Jurassic sandstone. The calculated water saturation is probably too high because the thinness of the oil and bed effects are affecting the resistivity logs. No water was produced back when taking a segregated oil sample at 2912 m RKB.

On the logs and oil/water contact is seen at 2913 m RKB with a transition zone down to 2915.5 m RKB. This is confirmed by the FMT log were an oil sample were taken at 2912 m RKB and a water sample, containing some small amounts of oil, at 2913.5 m RKB.

The results from the log evaluation are listed below:

Top reservoir:	2911.5	
Oil/water contact, m RKB:	2913	
Interval evaluated:	2875-2911.5	2911.5-3075

Net pay, m:	0	1.50
Net sand, m:	3.75	160.5
Av. porosity, net pay:	-	0.25
Av. porosity, net sand:	0.13	0.23
Av. shale content, net pay:	-	0.04
Av. shale content, net sand:	0.25	0.10
Av. water saturation, net pay:	-	0.56

Cut off values applied: $V_{sh} > 0.40$
$\emptyset < 0.10$
$Sw > 0.70$

5.2 FMT summary

Cretaceous Fm

One FMT run was made in the Cretaceous formation. No pressure points out of 19 attempts were successful due to seal failure and very low permeability in the formation. One attempt to get sample at 2439.5 m RKB failed due to tight formation. The sample chamber showed to be empty.

Uncorrected pressure readings are listed below:

Test no.	Depth (m RKB)	Formation pressure (KPa)	Remarks
1	2482.5	-	Tight formation
2	2484.5	-	No seal
3	2483	-	No seal
4	2489	-	No seal
5	2494.5	-	No seal
6	2498	-	No seal
7	2324.5	29619	Supercharge
8	2483	-	No seal
9	2505	1315	Low permeability, press. incr. very slow.
10	2538	32819	Supercharge

11	2560	-	No seal
12	2570.5	-	No seal
13	2604.9	791	Very low perm., press. increasing very slow
14	2633	977	Very low perm., press. increasing very slow
15	2653.5	1660	Very low perm., press. increasing very slow
16	2666	-	No seal
17	2488.5	998	Very low perm., press. increasing very slow
18	2483	32350	Supercharge, attempt to get sample
19	2438.5	2860	Very low perm., press. increasing very slow

Jurassic Fm

Four FMT runs were made in the Jurassic formation.

Run no. 1:

17 out of 23 attempts to get pressure points were successful. One segregated oil sample was taken at 2912 m RKB. Some pressure was lost on the 2 3/4 gallon chamber due to a leaking o-ring.

The 2 3/4 gallon chamber was drained offshore:

Opening pressure:	1480 KPa
H_2S:	0 %

Recovery,	Gas:	0.06 Sm^3
	Oil:	5800 cc (SG = 0.847 g/cc)
	Water	0 cc

The one gallon chamber was sent to Statoil PVT lab. for analysis.

Opening pressure offshore:	12860 KPa
Opening pressure onshore:	11136 KPa at 13°C

Run no. 2:

3 out of 5 attempts to get pressure points were successful. An attempt to get a sample at 2913.6 m RKB failed due to a shorted conductor. This conductor is used to operate tool valves for sample chambers.

Run no. 3:

It was not possible to get pressure points during this run due to seal failures (misrun).

Run no. 4:

1 out of 2 attempts to get pressure points were successful. One segregated sample was taken at 2113.5 m RKB.

2 3/4 gallon chamber was drained offshore:

Opening pressure:		6998 KPa
Recovery:	Gas:	0.33 Sm^3
	Oil:	500 cc
	Mudfiltrate/water:	9000 cc

1 gallon chamber was drained onshore:

Opening pressure offshore:	5274 KPa
Opening pressure onshore:	3205 KPa at 13°C
Recovery: Water with traces of oil	

Data summary from PVT report:

Bubble point at res. temp. (120°C): 356 bar

Single flash GOR:	150 Sm^3/Sm^3
Flash volume factor:	1.445 m/Sm^3 STO
Viscosity at bubble point:	0.368 cp
Viscosity at res. press:	0.400 cp
Density at bubble point:	0.700 g/cm^3
Density of STO:	0.0854 g/cm^3

Composition of reservoir fluid:

	Mol %
Nitrogen	0.65
Carbondioxide	2.11
Methane	43.18
Ethane	7.30
Propane	4.78
i-Butane	0.74
n-Butane	2.10
i-Pentane	0.76
n-Pentane	1.22
Hexanes	1.78
Heptanes	3.56
Octanes	3.96
Nonanes	2.80
Decan plus	25.06

Corrected pressure readings from the various runs are listed below and plotted in Fig. 5.1.

Run no.	Depth (m RKB)	Formation press (KPa)	Comments
1	2901	3894	Supercharge
	2902.5	38522	Supercharge
	2904	-	Tight formation
	2906	-	Tight formation
	2908.4	-	Tight formation
	2910	35329	Very low perm.
	2912	34788	Very good perm., sample
	2914	34788	Very good perm.
	2916	34829	Very good perm.
	2918	34850	Very good perm.
	2924	34915	Very good perm.
	2935	35088	Very good perm.
	2946	35215	Very good perm.
	2955	35263	Very good perm.
	2971	35481	Very good perm.
	2986	35584	Very good perm.

	2994	35681	Very good perm.
	3003	35774	Very good perm.
	3023.5	35998	Very good perm.
	3043.5	36212	Very good perm.
	3097	36770	Very good perm.
	3119.5	37001	Very good perm.
	3146	37843	Very good perm.
2	2911.5	-	Tight formation
	2911.9	-	Tight formation
	2912	34936	Very good perm.
	2912.6	34915	Very good perm.
	2913.6	34936	Very good perm.
4	2913.4	-	Lost seal
	2913.5	34812	Very good perm., sample

The pressure points indicate a water gradient of 10.73 KPa/m (SG = 1.10 g/cc).

It was not possible to establish any oil gradient because the thinness of the oil zone (1.5 m).

From the sampling results it is proved that the oil/water contact must be between 2912 and 2913.5 m RKB.

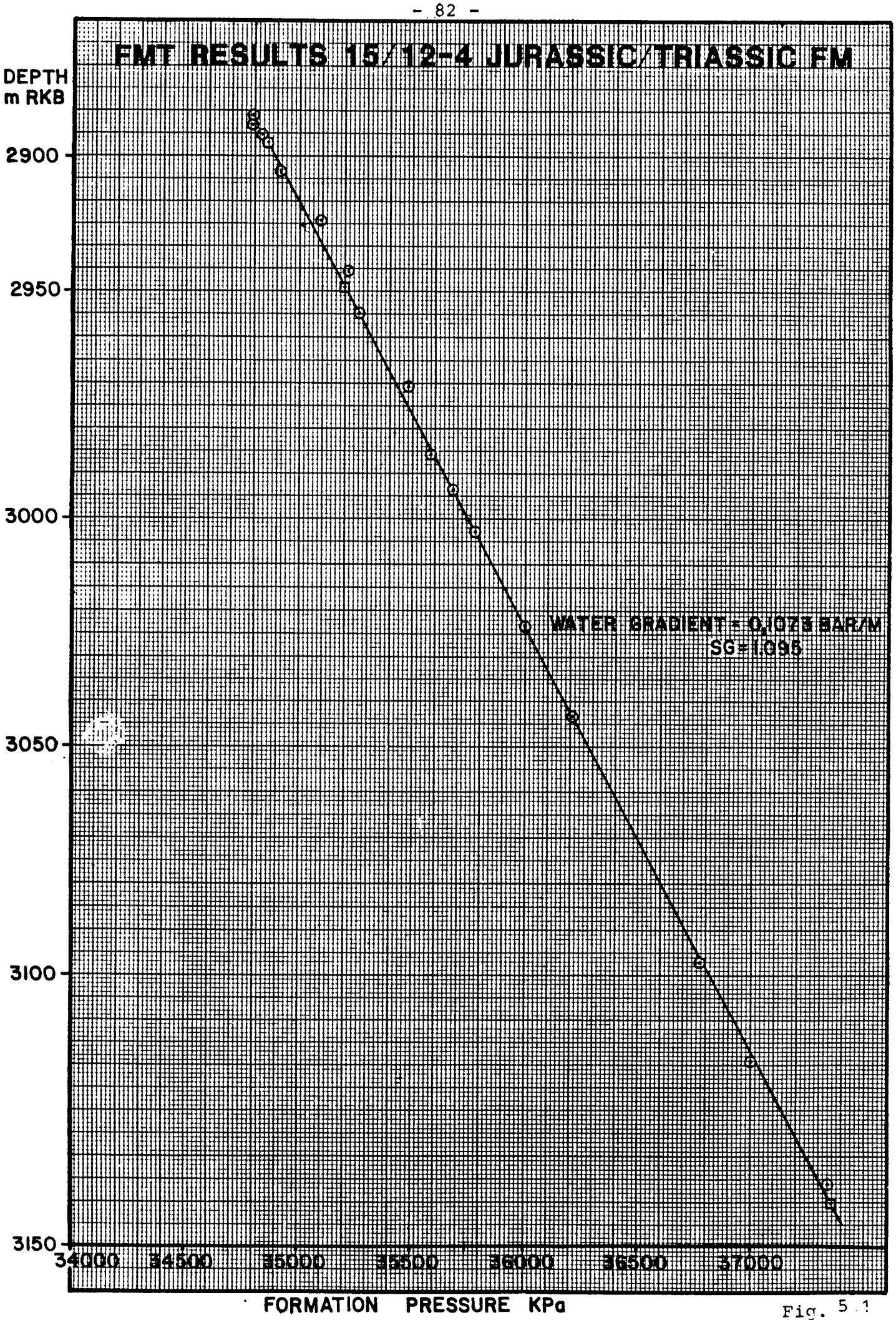
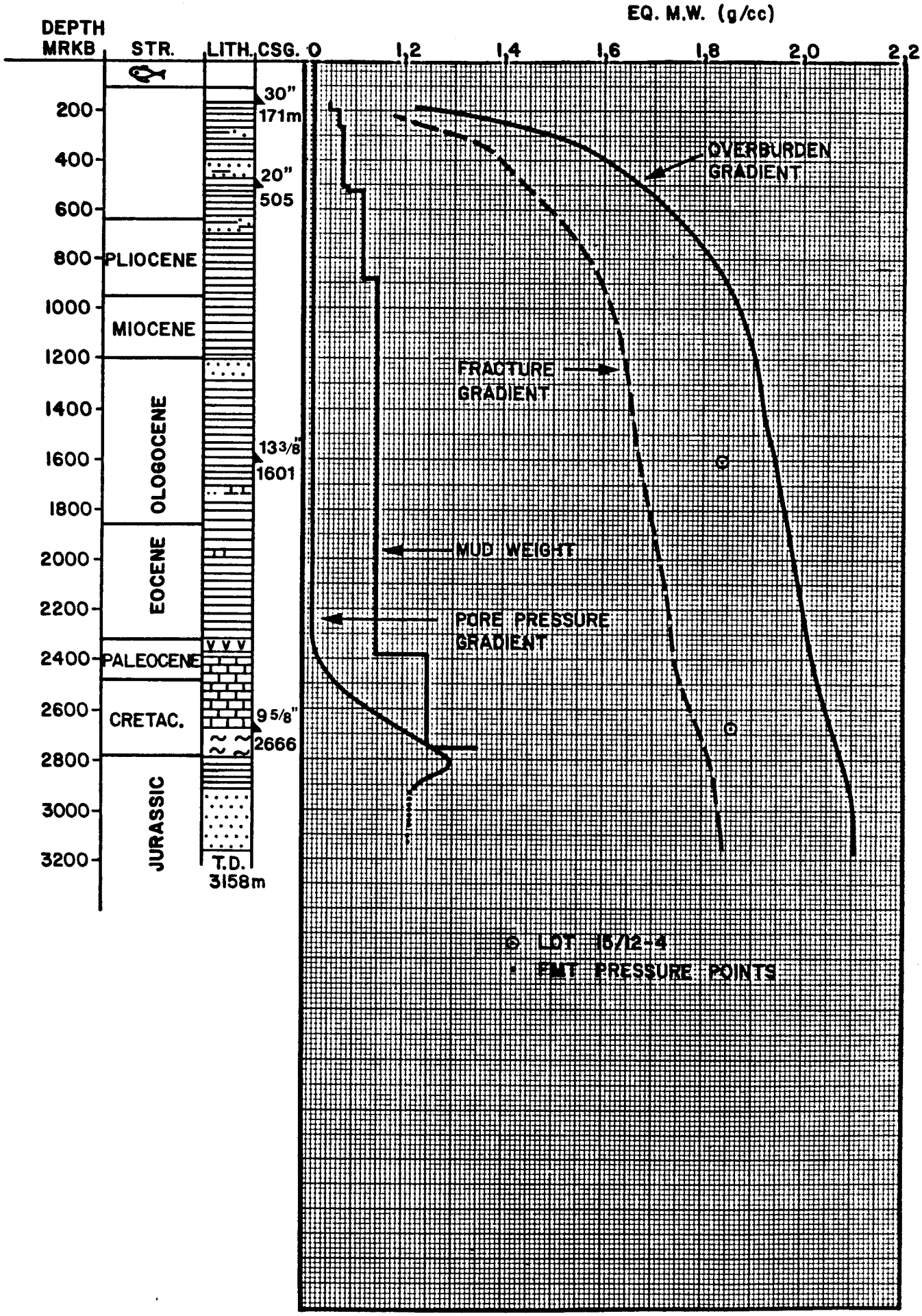

FMT RESULTS 15/12-4 JURASSIC/TRIASSIC FM
DEPTH
m RKB
2900
2950
3000
3050
3100
3150
WATER GRADIENT = 0.1073 BAR/M
SG = 1.095
34000
34500
35000
35500
36000
36500
37000
FORMATION PRESSURE KPa

Fig. 5.1

15/12-4 PRESSURE GRADIENT COMPOSITE PLOT



6 APPENDIX

6.1 WELLSITE SAMPLE DESCRIPTION

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 12 1/4" Geologist: Kristensen/Olsen Date: 14/9-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
180	50	Cly: med gry, sft, stky, soluble, calc	80 % cmt
	50	Sd: clr-mlky qtz, occ pink, med-v crs, occ gran, poor srtd, subang-rnd, lse	
	Tr	Shell frags, Rock frags	
190	80	Sd: clr-transluc qtz, occ mlky qtz, occ pink-red qtz, med-v crs, occ gran, poor srtd, subang-rnd, lse	20 % cmt
	20	Cly: med gry, sft, stky, soluble, calc	
	Tr	a/a	
200	70	Sd: a/a	
	30	Cly: a/a	
	Tr	Shell frags, Rock frags, Microfoss	20 % cmt
	Tr	Lign: dk brn-blk, predom sft-frm, occ mod hd, fibreous i p	
210	60	Sd: clr-transluc qtz, occ mlky, occ pink-yel pink, occ red, med-v crs, occ fn, occ gran, poor srtd, subang-rnd, lse	10 % cmt
	40	Cly: lt gry-med gry, sft, stky, soluble, occ slty, sl calc-calc	
	Tr	Carb material: brn, dk brn-blk, sft-firm,occ mod hd, fibreous, wood, texture i/p	
	Tr	Shell frags, Microfoss, Rock frags	
220	70	Sd: med-v crs, mod srtd, subrnd-rnd, else a/a	
	30	Cly: a/a	
	Tr	Rock frags, Shell frags	
	Tr	Carb material: a/a	
230	90	Sd: a/a	
	10	Cly: a/a	
	Tr	Lst: wh, mod hd, micritic, chalky texture	
	Tr	Rock frags, Shell frags, Glau	
	Tr	Carb material: a/a	
240	90	Sd: a/a	
	10	Cly: a/a	
	Tr	Rock frags, Shell frags, Glau	
	Tr	Lst: a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 12 1/4" Geologist: Kristensen/Olsen Date: 15/9-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
250	80	Sd: clr-transluc qtz, occ mlky, occ pink-yel pink, occ red qtz, fn-v crs, poor srtd, subrnd-rnd, lse	
	20	Cly: med gry-lt gry, sft, stky, soluble, occ slty, sl calc-calc	
	Tr	Glau, Rock frags	
260	60	Cly: med gry-lt gry, sft, stky, soluble, sl slty, calc	
	40	Sd: predom fn-med, else a/a	
	Tr	Rockfrags, Shell frags	
	Tr	Glau	
270	100	Cly: lt gry-med gry, sft, stky, soluble, occ sl slty, calc	
	Tr	Sd: clr-transluc qtz, fn, occ med, mod srtd, subang-subrnd, lse	
	Tr	Microfoss	
280	90	Cly: a/a	
	10	Sd: clr-transluc qtz, occ mlky, occ pink, occ yel, fn-crs, poor srtd, subang-rnd, lse	
	Tr	Rock frags, Shell frags	
290	100	Cly: lt gry-med gry, sft, stky, soluble, slty i p, calc	
	Tr	Sd: clr-transluc qtz, fn, occ med, mod srtd, subang-subrnd, lse	
300	100	Cly: med gry-med brn gry, sft, stky, soluble, occ sl slty, calc	
	Tr	Sd: a/a	
310		a/a	
320		a/a	
330	100	Cly: med gry-med brn gry, dk blue gry, sft, stky, soluble, slty i p, sl calc-calc	
	Tr	Sd: a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 12 1/4" Geologist: Kristensen/Olsen Date: 15/9-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
340	100	Cly: dk bl gry, sft, stky, soluble, slty, sl calc, sl micromic, sl micropyr (H_2S w/acid)	
	Tr	Sd: clr-transluc qtz, vfn-fn, mod srtd, subang-subrnd, lse	
350		a/a	
360	95	Cly: a/a	
	5	Sd: clr-transluc qtz, vfn-fn, occ med, mod srtd, subang-subrnd, lse	
370	100	Cly: a/a	
	Tr	Sd: a/a	
380	100	Cly: dk bl gry, sft, stky, soluble, slty i p, non calc-sl calc, sl micromic, sl micropyr	
	Tr	Sd: a/a	
390		a/a	
400		a/a	
410		a/a	
420	90	Cly: non calc, else a/a	
	10	Sd: clr-transluc qtz, vfn-fn, mod srtd, subang-subrnd, lse	
430	100	Cly: a/a	
	Tr	Sd: a/a	
	Tr	Microfoss	
440		a/a	
450		a/a	
460	100	Cly: a/a	
	Tr	Sd: occ med, else a/a	
470	100	Cly: a/a	
	Tr	Sd: a/a	
	Tr	Shell frags	
480	100	Cly: dk bl gry, sft, stky, soluble, slty, micromic, sl micropyr-pyr, non calc-sl calc	
	Tr	Sd: a/a, shell frags	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 12 1/4" Geologist: Kristensen/ Date:15/9,18/9,19/9-8
17 1/2" Olsen

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
490	100	Cly:dk bl gry, sft, stky, soluble, slty, micromic, sl micropyr-pyr, non calc-sl calc	
	Tr	Sd: clr-transluc qtz, vfn-fn, occ med,mod srtd, subang-subrnd, lse	
	Tr	Shell frags	
500	100	Cly: dk bl gry, med brn gry, sft, stky, soluble, slty i p, micromic, sl micropyr-pyr, calc, when med brn gry	
	Tr	Sd: a/a	
510	100	Cly: predom med brn gry, occ dk bl, else a/a	
	Tr	Sd: a/a	
520	100	Cly: med brn gry-lt gry, sft, stky, soluble, sl slty, micromic, calc	
	Tr	Sd: a/a	
530	100	Cly: med gry-dk grn gry, sft, stky, soluble, amorf, sl-mod calc, v sl micropyr	
540		a/a	
550	100	Cly: sl slty i p, else a/a	
560		a/a	
570		a/a	
580		a/a	
590		a/a	
600		a/a	
610		a/a	
620	100	Cly: med gry-dk grn gry-med bl gry, sft, stky, soluble, sl slty i p, occ sl micropyr, mod calc	
	Tr	Microfoss	
630		a/a	
640		a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 17 1/2" Geologist: Kristensen/Olsen Date: 19/9, 20/9-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
650	100	Cly: lt gry-med gry-dk bl gry, sft, stky, soluble, slty i p, micropyr i p, occ sdy, mod calc	
	Tr	Microfoss	
660	100	Cly: a/a	
	Tr	Microfoss, Shell frags	
670	100	Cly: a/a	
	Tr	Microfoss	
680	100	Cly: lt gry-med gry-dk bl gry, sft, stky, soluble, slty i p, sdy, mod calc	
	Tr	Microfoss, Shell frags	
690	100	Cly: a/a, sl sdy	
	Tr	Microfoss	
700		a/a	
710		a/a	
720		a/a	
730		a/a	
740		a/a	
750		a/a	
760	100	Cly: a/a	
770	100	Cly: gry grn gry, sft, stky, soluble, sl calc	
	Tr	Sltst, Microfoss	
780		a/a	
790	100	Cly: gry, sl bl, sft stky, soluble, non-sl calc, sl micropyr, sl micromica	
	Tr	Sd: transluc qtz, fn, rnd-ang	
800		a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 17/12" Geologist: Kristensen/Olsen/ Aslagsen Date: 20/9-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
810	100	Cly: med-dk gry, sl bl, sft, stky, soluble, non-sl calc	
	Tr	Sd: transluc qtz, fn, rnd-ang	
	Tr	Microfoss, Shell frags	
820	100	Cly: a/a	
	Tr	Sd: a/a	
	Tr	Microfoss	
830		a/a	
840	100	Cly: med-dk gry, med-dk grn, sft, stky, soluble, non-sl calc	
	Tr	Sd: a/a	
	Tr	Microfoss, Pyr	
850		a/a	
860	100	Cly: med-dk gry, sft, stky, calc	
	Tr	Sd: clr qtz, v fn-crs, sub rnd-rnd	
	Tr	Slt, Pyr	
870	100	Cly: a/a	
	Tr	Slt	
880		a/a	
890	100	Cly: med-dk grn gry, sft, stky, soluble, non calc,	
	Tr	Sd: clr, qtz, vfn, subrnd-rnd	
	Tr	Microfoss, Pyr	
900	100	Cly: a/a	
	Tr	Sd: a/a	
910	100	Cly: a/a	
	Tr	Sd: a/a	
	Tr	Pyr	
920	100	Cly: a/a	
	Tr	Sd: a/a	
	Tr	Pyr, Microfoss	
930	100	Cly: a/a	
	Tr	Sd: a/a	
	Tr	Pyr	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 17 1/2" Geologist: Aslagsen/Olsen Date: 20/9-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
940	100	Cly: med-dk grn gry, sft, stky, soluble, non calc	
	Tr	Sd: clr, qtz, vfn, subrnd-rnd	
950	100	Cly: dk-med gry, stky, soluble, non calc	
	Tr	Sd: clr qtz, fn, subrnd-rnd	
	Tr	Pyr, Microfoss, Sltst: vf	
960	100	Cly: a/a	
	Tr	Sd: a/a, Sltst: a/a, Lst	
	Tr	Pyr	
970	100	Cly: med-dk gry, sft, stky, soluble, sl-non calc	
	Tr	Sd: clr qtz, fn, subrnd-rnd	
	Tr	Microfoss	
980	90	Cly: a/a	
	10	Sltst: dk grn, gry	
	Tr	Sd: a/a	
	Tr	Pyr, Microfoss	
990	95	Cly/Clyst: med-dk grnsh gry, sft, stky, soluble, sl calc	
	5	Sltst: med gry, frm, non calc	
	Tr	Sd: a/a	
	Tr	Pyr	
1000		a/a	
1010	100	Cly/Clyst: a/a	
	Tr	Sltst: a/a	
	Tr	Pyr	
1020	95	Cly/Clyst: med-dk gry, else a/a	
	5	Sltst: a/a	
	Tr	Pyr	
1030	95	Clyst: dk gry, occ med gry, frm, occ sft, occ stky, occ blky, non-sl calc	
	5	Sltst: a/a	
	Tr	Pyr	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 17 1/2" Geologist: Aslagsen/Lervik Olsen Date: 21/9-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
1040	95	Clyst: dk gry, occ med gry, frm, occ sft, occ stky, occ blky, non-sl calc	
	5	Sltst: med gry, frm, non calc	
	Tr	Pyr	
1050	100	Clyst: a/a, but prtly fiss	
	Tr	Lst: med gry, wh, frm-vhd, microxln	
	Tr	Sltst: a/a	
	Tr	Pyr, Glau	
1060	100	Clyst: a/a, but non calc	
	Tr	a/a	
1070		a/a	
1080	100	Clyst: med-dk grnsh gry, frm, blky, stky, occ sl calc	
	Tr	Sltst: a/a	
	Tr	Sd: clr, qtz, fn	
	Tr	Glau	
1090	100	Clyst: a/a	
	Tr	Sltst: a/a, Sd: a/a	
	Tr	Glau, Pyr	
1100	100	Clyst: med-dk grnsh gry, sft-frm, blky, prtly stky, sl calc	
	Tr	a/a	
1110		a/a	
1120	100	Clyst: a/a	
	Tr	Lst: wh, frm	
	Tr	Sltst: a/a, Sd: a/a	
	Tr	Glau, Pyr	
1130	100	a/a	
1140	100	Clyst: med-dk grnsh gry, occ med brn gry, sft-frm, blky, prtly stky, sl calc	
	Tr	Sd: a/a, Sltst: a/a	
	Tr	Glau	
1150	100	Clyst: med-dk grnsh gry, med brn gry, frm-hd, blky, sl calc	
	Tr	Sltst: a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 17 1/2" Geologist: Aslagsen/Lervik Date: 21/9, 22/9-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
1160	100	Clyst: med-dk grnsh gry, med brn gry, frm-hd, blky, occ sl calc	
	Tr	Sltst: med gry, frm	
	Tr	Sd: clr qtz, fri	
	Tr	Glau	
1170	100	Clyst: med-dk brn, med-dk grnsh gry, frm-hd, blky, occ sl calc	
	Tr	Sltst: a/a	
1180	100	Clyst: a/a	
1190	100	Clyst: a/a	
1200	100	Clyst: a/a	
1210	90	Clyst: a/a	
	10	Sd: transluc qtz, vf	
1220	100	Clyst: lt-med grnsh gry, med brn gry, frm-hd, blky, sl calc	
	Tr	Sd: a/a	
	Tr	Glau	
1230	100	Clyst: lt-dk grnsh gry, med brn gry, frm-hd, blky, sl calc	
	Tr	Sd: a/a	
	Tr	Glau, Pyr	
1240		a/a	
1250	100	Clyst: a/a	
	Tr	Sd: a/a	
	Tr	Glau	
1260	100	Clyst: a/a	
	Tr	Sd: a/a	
	Tr	Glau, Forams	
1270	100	Clyst: a/a	
	Tr	Sd: a/a	
	Tr	Glau, Pyr, Forams	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 17 1/2" Geologist: Aslagsen/Lervik Date: 22/9-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
1280	100	Clyst: med-dk brn, occ med grnsh gry, sft-frm, occ hd, brit, blky, occ sl calc	
	Tr	Lst: clr, wh, hd	
	Tr	Sd: transl qtz, vf	
	Tr	Glau, Forams	
1290	95	Clyst: a/a	
	5	Sd: med-crs qtz, subang-subrnd	
	Tr	Lst: a/a	
	Tr	Glau, Forams	
1300	100	Clyst: a/a	
	Tr	Sd: a/a	
	Tr	Lst: a/a	
	Tr	Glau, Forams	
1310	100	Clyst: med-dk brn, sft-frm, blky, none calc	
	Tr	Sd: a/a	
	Tr	Glau, Forams, Pyr, slt	
1320	100	Clyst: a/a	
	Tr	Sd: clr qtz, med-crs, subang-subrnd	
	Tr	Lst: grysh-wh, hd	
	Tr	Slt	
	Tr	Glau, Forams	
1330		a/a	
1340	95	Clyst: med-dk brn, sft-frm, blky, non calc	
	5	Sd: clr-transl qtz, med, occ crs, subrnd-rnd	
	Tr	Lst: buff, wh, transl, hd	
	Tr	Slt	
	Tr	Glau, Pyr, Forams	
1350	100	Clyst: a/a	
	Tr	Sd/Lst: a/a	
	Tr	Slt	
	Tr	Glau, Forams	
1360		a/a	
1370		a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 17 1/2" Geologist: Aslagsen/Lervik Date: 22/9, 23/9-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
1380	100	Clyst: med-dk brn, sft-frm, blky, occ sl calc	
	Tr	Sd/Lst: clr-transl qtz, med, occ crs, subrnd-rnd, buff, wh, transl, hd	
	Tr	Slt	
	Tr	Glau, Forams	
1390	100	Clyst: a/a	
	Tr	Lst: a/a	
	Tr	Slt	
	Tr	Pyr, Forams	
1400	100	Clyst: a/a	
	Tr	Pyr	
1410	100	Clyst: med-dk brn, sft-frm, blky, non calc	
		Clyst: grn, med hd, blky, occ calc	
	Tr	Pyr	
1420	100	Clyst: grn, med hd, blky, occ calc	
		Clyst: dk gry-blk, med hd-hd, blky, non calc	
	Tr	Lst: a/a	
1430	100	Clyst: a/a	
1440	100	Clyst: a/a	
	Tr	Sltst: yel-brn, hd, blky, non calc	
	Tr	Pyr	
1450	100	Clyst: a/a	
	Tr	Pyr, Glau	
1460	100	Clyst: a/a	
	Tr	Pyr	
1470	100	Clyst: dk gry-blk, med hd-hd, blky, non calc	
		Clyst: grn, med hd, blky, occ calc	
	Tr	Pyr	
1480	100	Clyst: a/a	
	Tr	Pyr	
1490	95	Clyst: lt-dk gry, med hd, blky, occ calc	
		Clyst: grn, med hd, blky, occ calc	
	5	Lst: buff, lt gry-wh, hd	
1500	100	Clyst: a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 15/12-4 Geologist: Aslagsen/Lervik/ Opstad Date: 23/9-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
1510	100	Clyst: grn, med hd, blky, occ calc	
	Tr	Forams	
1520	95	Clyst: med-dk grysh brn, occ grysh grn, frm, blky, soluble, sl calc	
	5	Lst: buff, lt-med gry, frm-hd	
	Tr	Slt	
	Tr	Glau, Forams	
1530		a/a	
1540	100	Clyst: a/a	
	Tr	Lst: a/a	
	Tr	Slt	
	Tr	Glau, Forams	
1550	95	Clyst: a/a	
	5	Lst: a/a	
	Tr	Slt	
	Tr	Glau, Forams	
1560	95	Clyst: a/a	
	5	Lst: a/a	
	Tr	Sd: clr-transl qtz, med, occ crs	
	Tr	Slt	
	Tr	Glau, Forams	
1570	95	Clyst: a/a	
	5	Lst: a/a	
	Tr	Slt	
	Tr	Glau, Forams	
1580		a/a	
1590	90	Clyst: a/a	
	10	Lst: a/a	
	Tr	a/a	
1600	90	Clyst: med-dk grysh brn, occ grysh grn, frm, blky, non calc	
	10	Lst: a/a	
	Tr	a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 12 1/4" Geologist: Aslagsen/Lervik Date: 23/9, 27/9-84
Opstad

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
1610	95	Clyst: med-dk grysh brn, occ grysh grn, frm, blky, non calc	
	5	Lst: buff, lt-med gry, frm-hd	
	Tr	Slt	
	Tr	Glau, Forams	
1620		a/a	
1630	100	Clyst: lt-med gry, frm, blky, calc, slty, micromica	
1640	100	Clyst: a/a	
	Tr	Glau, Pyr, Forams	
1650		a/a	
1660		a/a	
1670		a/a	
1680		a/a	
1690		a/a	
1700		a/a	
1710		a/a	
1720	100	Clyst: a/a	
1730	100	Clyst: a/a	
	Tr	Slt	
1740		a/a	
1750	100	Clyst: a/a	
	Tr	Pyr	
1760	100	Slty Clyst: lt-med gry, med-dk grysh brn, frm, blky, micromic, occ calc	
	Tr	Forams	
1770	100	Slty Clyst: a/a	
1780	100	Slty Clyst: a/a	
	Tr	Forams	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 12 1/4" Geologist: Opstad/Lervik Date: 27/9, 28/9-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
1790	100	Slty Clyst: lt-med gry, med-dk grysh brn, frm, blky, micromic, occ calc	
1800	100	Slty Clyst: a/a	
	Tr	Sd: wh-mlky wh qtz, vf, non calc	
1810	100	Slty Clyst: a/a	
1820	100	Slty Clyst: a/a	
	Tr	Forams	
1830		a/a	
1840	95	Slty Clyst: a/a	
	5	Sd: a/a	
	Tr	Forams	
1850	100	Slty Clyst: a/a	
	Tr	Pyr, Forams	
1860	100	Slty Clyst: a/a	
1870	90	Slty Clyst: a/a	
	10	Lst: yel-lt brn, hd, microxln	
	Tr	Sd: a/a	
1880	90	Slty Clyst: a/a	
	10	Lst: a/a	
	Tr	Sd: a/a	
	Tr	Pyr	
1890	100	Slty Clyst: a/a	
1900	100	Slty Clyst: a/a	
	Tr	Pyr, Forams	
1910	100	Slty Clyst: a/a	
	Tr	Lst: a/a	
	Tr	Pyr	
1920	100	Slty Clyst: a/a	
1930		a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 12 1/4" Geologist: Opstad/Lervik Date: 28/9-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
1940	100	Slty Clyst: lt-med gry, med-dk grysh brn, frm, blky, micromic, occ calc	
	Tr	Pyr	
1950	100	Clyst: a/a	
	Tr	Dol/Lst: yel-lt brn, hd, microxln	
1960		a/a	
1970		a/a	
1980		a/a	
1990	100	Clyst: a/a also tr of lt grn, frm, blky, non calc	
	Tr	a/a	
2000		a/a	
2005	100	Clyst/Sh: a/a clyst but also subfiss	
	Tr	a/a	
2010	100	Clyst/Sh: a/a	
	Tr	a/a	
2015	100	Clyst/Sh: a/a also tr of lt grn, frm, blky, non calc	
	Tr	Lst/Dol: a/a	
2020	95	Clyst/Sh: a/a	
	5	Lst/Dol: a/a	
2025	100	Clyst/Sh: a/a	
	Tr	a/a	
2030	100	Clyst/Sh: a/a	
	Tr	a/a	
2035	100	Sh: med gry, brn gry, frm, subfiss, sl slty, non calc	
	Tr	Lst/Dol: tan, hd, xln	
	Tr	Foss	
2040		a/a	
2045	100	Sh: a/a	
	Tr	a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 12 1/4" Geologist: Opstad Date: 28/9-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2050	100	Sh: brn gry, occ med gry, subfiss, sl slty, non calc	
	Tr	a/a	
2055		a/a	
2060		a/a	
2065	100	Sh/Clyst: med gry, grn gry, brn gry, frm, blky, sl slty, partly subfiss, non calc	
	Tr	Lst/Dol: tan, hd, xln	
2070		a/a	
2075		a/a	
2080		a/a	
2085	100	Sh/Clyst: dom grn gry, med gry, brn gry frm, blky, sl slty, partly subfiss, non calc	
	Tr	a/a	
2090		a/a	
2095	100	Sh/Clyst: a/a also brick red	
	Tr	a/a	
	Tr	Pyr	
2100	100	Sh/Clyst: a/a, but also rd brn	
	Tr	a/a	
2105	100	Sh: dom grn gry, med gry, brn gry, brick rd, frm, blky-subfiss, sl slty	
	Tr	Lst/Dol: wh-buff, hd, xln	
	Tr	Forams and Pyr	
2110	100	Sh/Clyst: as 2100	
	Tr	a/a	
2115	100	Sh: a/a	
	Tr	Lst/Dol: a/a	
	Tr	Pyr, Glau, Foss	
2120		a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 12 1/4" Geologist: Opstad Date: 29/9-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2125	100	Sh: dom grn gry, med gry, brn gry, brick rd, frm, blky-subfiss, sl slty,	
	Tr	Lst/Dol: wh-buff, hd, xln	
	Tr	Pyr, Glau, Foss	
2130	100	Sh: a/a	
	Tr	Lst/Dol: a/a	
	Tr	Pyr	
2135		a/a	
2140	100	Sh/Clyst: dom grn gry, med gry, brn gry, rd brn, frm, blky, sl slty, partly subfiss, non calc,	
	Tr	a/a	
2145	100	Sh/Clyst: a/a	
	Tr	Lst/Dol: a/a	
2150		a/a	
2155		a/a	
2160		a/a	
2165		a/a	
2170		a/a	
2175		a/a	
2180		a/a	
2185	100	Sh/Clyst: a/a	
	Tr	Dol/Lst: a/a	
	Tr	Pyr, Glau	
2190		a/a	
2195		a/a	
2200		a/a	
2205		a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 12 1/4" Geologist: Opstad Date: 29/9-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2210	100	Sh/Clyst: dom grn gry, med gry, brn gry, frm, blky-subfiss, sl slty	
	Tr	Dol/Lst: wh-buff, hd, xln	
	Tr	Pyr, Glau	
2215		a/a	
2220		a/a	
2225		a/a	
2230		a/a	
2235		a/a	
2240		a/a	
2245	100	Sh/Clyst: a/a but also brick red	
	Tr	a/a	
2250		a/a	
2255		a/a	
2260		a/a	
2265	100	Sh/Clyst: a/a	
	Tr	Lst/Dol: a/a	
	Tr	Pyr, Glau, Forams	
2270		a/a	
2275		a/a	
2280		a/a	
2285		a/a	
2290		a/a	
2292.5		a/a	
2295		a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 12 1/4" Geologist: Opstad Date: 29/9-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2297.5	100	Sh/Clyst: dom grn gry, med gry, brn gry, frm, blky-subfiss, sl slty	
	Tr	Lst/Dol: wh-buff, hd, xln	
	Tr	Pyr, Glau, Forams	
2300		a/a	
2302.5	100	Sh/Clyst: a/a, more brn sh	
	Tr	a/a	
2305		a/a	
2307.5	100	Sh/Clyst: dom brn gry, med brn, grn gry, brn clyst is carb, slty, micromica, calc	
	Tr	a/a	
2310	100	Clyst: a/a also rd brn	
	Tr	a/a	
2312.5	100	Clyst: brn gry, brick rd, med gry, partly sl calc, sl slty, micromica, frm, blky	
	Tr	a/a	
2315	100	Clyst: rd brn, med gry, brn gry, frm, blky, micromica, sl slty, carb	
	Tr	Lst/Dol: a/a	
2317.5	100	Clyst: a/a	
	Tr	Lst/Dol: a/a	
	Tr	Tuff: lt gry, wh and blk specks, hd-frm, blky	
2320	95	Clyst: a/a	
	5	Tuff: a/a	
	Tr	Lst/Dol: a/a	
2322.5	90	Clyst: a/a	
	10	Tuff: a/a	
	Tr	Lst/Dol: a/a	
2325	90	Clyst: mostly med gry, grn gry, brn gry, brick rd, frm, blky, micromica, sl slty	
	10	Tuff: a/a	
	Tr	a/a	
	Tr	Pyr	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 12 1/4" Geologist: Opstad Date: 29/9-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2327.5	90	Clyst: mostly med gry, grn gry, brn gry, brick rd, frm, blky, micromica, sl slty	
	10	Tuff: lt gry, wh and blk specks, hd-frm, blky	
	Tr	Pyr	
	Tr	Lst/Dol: wh-buff, hd, xln	
2332.5	100	Clyst: a/a	
	Tr	Tuff: a/a	
	Tr	Lst/Dol: a/a	
2335		a/a	
2337.5		a/a	
2340		a/a	
2342.5		a/a	
2345	100	Clyst: a/a	
	Tr	Dol/Lst: a/a	
2347.5	100	Clyst: med gry, brn gry, brick red, frm, blky, partly micromica and slty, non calc	
	Tr	Lst/Dol: hd, xln, blky	
	Tr	Tuff: a/a	
2350		a/a	
2352.5		a/a	
2355		a/a	
2357.5		a/a	
2360	100	Clyst: a/a	
	Tr	Lst/Dol: a/a	
2362.5		a/a	
2365		a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 12 1/4" Geologist: Opstad Date: 29/9, 30/9-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2367.5	100	Clyst: med gry, brn gry, brick red, frm, blky, partly micromica and slty, non calc	
	Tr	Lst/Dol: hd, xln, blky	
	Tr	Pyr	
2370		a/a	
2372.5		a/a	
2375		a/a	
2377.5	100	Clyst: a/a	
	Tr	a/a	
	Tr	Tuff	
2380		a/a	
2382.5	100	Clyst: a/a	
	Tr	Lst/Dol: a/a	
	Tr	Tuff: a/a	
	Tr	Sltst: lt rd, brn, carb, micromica	
2385	100	Clyst: med gry, brn gry, rd brn, grn gry, frm, non calc, micromica, blky, partly v slty	
	Tr	Lst/Dol: wh-buff, xln, hd	
	Tr	Pyr	
2387.5	100	a/a	
2390	100	Clyst: a/a	
	Tr	Lst/Dol: a/a	
	Tr	Sd: clr, lse, fn	
2392.5		a/a	
2395		a/a	
2397.5	100	Clyst: a/a	
	Tr	Lst/Dol: a/a	
	Tr	Glau	
2400		a/a	
2402.5		a/a	
2405		a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 12 1/4" Geologist: Opstad Date: 30/9, 2/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2407.5	100	med gry, brn gry, rd brn, grn gry, frm, non calc, micromica, blky, partly v slty	
	Tr	Lst/Dol: wh-buff, xln, hd	
	Tr	Glau	
2410		a/a	
2412.5		a/a	
2415		a/a	
2417.5		a/a	
2420		a/a	
2422.5	100	Clyst: med gry, brn gry, grn gry, frm, blky, non calc, partly slty, micromica	
	Tr	Lst: wh, xln, hd	
	Tr	Glau, Pyr	
2425		a/a	
2427.5	100	Clyst: a/a	
	Tr	a/a	
	Tr	Sd: clr, lse, fn	
2430		a/a	
2432.5		a/a	
2435		a/a	
2437.5		a/a	lt yel fluor
2440	95	Clyst: a/a	
	5	Sd: a/a	
	Tr	Lst: a/a	
	Tr	Glau	
	CORE NO 1		
2452.5	100	Clyst: lt gry, grn, brn, sft, blky, calc (not rd brn), micromica, sl-v slty	
	Tr	Lst: wh, xln, hd	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 12 1/4" Geologist: Opstad Date: 2/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2455	100	Clyst:lt gry, grn, brn, sft, blky, calc (not rd brn), micromica, sl-v slty	
	Tr	Lst: wh, xln, hd	
2457.5		a/a	
2460		a/a	
2462.5		a/a	
2465	100	Clyst: mostly brn, else a/a	
	Tr	Lst: a/a	
2467.5	100	Clyst: mostly rd brn, lt gry, sft, blky, lt gry calc, slty, micromica	
	Tr	Lst: a/a	
2470	100	Clyst: mostly rd brn, gry brn, lt gry, mostly non calc, sl slty, mica	
	Tr	Lst: wh, xln	
2472.5		a/a	
2475		a/a	
2477.5		a/a	
2480	85	Clyst: a/a	
	15	Lst: wh, chalc, frm	
	Tr	Pyr	
2482.5	50	Lst: a/a	
	50	Clyst: a/a	
	Tr	Pyr	
2485	80	Lst: a/a	
	20	Clyst: a/a	
	Tr	Pyr	
2487.5	90	Lst: a/a	
	10	Clyst: a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 12 1/4" Geologist: Opstad Date: 2/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2490	90	Lst: chalk, wh, frm	wh-lt yel fluor, lt yel crush cut stronger and brighter than earlier, also more yel grains
	10	Clyst: rd brn, med gry, grn gry, non-sl calc, sl slty, blky, micromica	
2492.5		a/a	
2495		a/a	
	CORE NO. 2 and 3		
2515	95	Sh: med gry, brn gry, frm, subfiss, v calc	weak wh yel min fluor, no cut
	5	Lst: a/a	
2517.5	90	Sh: a/a	
	10	Lst: a/a	
2520	85	Lst: a/a	
	15	Sh: a/a	
2522.5	90	Lst: a/a	
	10	Sh: a/a	
2525	95	Lst: a/a	
	5	Sh: a/a	
2527,5	90	Lst: a/a	
	10	Sh: a/a	
2530	95	Lst: a/a	
	5	Sh: a/a	
2532.5	100	Lst: a/a	
	Tr	Sh: a/a	
2535		a/a	
2537.5	95	Lst: a/a	
	5	Sh: a/a	
	Tr	Clyst: a/a	
2540		a/a	
2542.5	90	Lst: chalk, wh, frm	
	10	Sh: med gry, brn gry, frm, subfiss	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 12 1/4" Geologist: Opstad Date: 2/10-7/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2545	95	Lst: chalk, wh, frm	
	5	Sh: med gry, brn gry, frm, subfiss	
2547.5		a/a	
2550	95	Lst: chalk, lt gry-lt pk, blky-frm	
	5	Sh: a/a	
2552.5	90	Lst: a/a	
	10	Sh: a/a	
2555	95	Lst: a/a	
	5	Sh: a/a	
	Tr	Pyr	
2557.5	95	Lst: a/a	
	5	Sh: a/a	
2560		a/a	
2562.5		a/a	
2565		a/a	
2567.4	100	Lst: chalk, wh-lt pk, frm	
	Tr	Sh: a/a	
2570	90	Lst: chalk, wh, frm	
	10	Sh: a/a	
2572.5		a/a	
2575		a/a	
2577.5	70	Lst/Chalk: wh, frm	
	30	Sh: a/a	
2580	90	Lst/Chalk: a/a	
	10	Sh: a/a	
2582.5	90	Lst/Chalk: off wh, firm, occ sft	
	10	Sh: a/a, slight increase in red brn	
2585	100	Lst/Chalk: a/a	
	Tr	Sh: a/a, occ slty	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 12 1/4" Geologist: Opstad Date: 2/10-7/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2587.5	100	Lst/Chalk: off wh, firm, occ sft	
	Tr	Sh: med gry, brn gry, frm, subfiss, slight increase in red brn, occ slty	
2590		a/a	
2592.5	95	Lst/Chalk: a/a	
	5	Sh: a/a	
2595		a/a	
2597.5	95	Chalk/Lst: a/a becoming sl darker	
	5	Sh: a/a	
2600	90	Lst: a/a	
	5	Sh: a/a	
	5	Clyst: rd brn, sl slty, blky, micromica	
2602.5	95	Lst: a/a	
	5	Clyst: a/a, gry gn	
	Tr	Sh: a/a	
2605	70	Lst: a/a	
	30	Clyst: a/a	
	Tr	Sh: a/a	
2607.5	75	Lst: a/a	
	25	Clyst: a/a	
	Tr	Sh: a/a	
2610	90	Lst: a/a	
	10	Clyst: a/a	
	Tr	Sh: a/a	
2612.5	90	Lst: chalk, wh, frm	
	5	Sh: med gry, brn gry, frm, subfiss	
	5	Clyst: rd brn, sl slty, blky, micromica	
2615	70	Lst/Chalk: a/a	cavings?
	30	Sh/Clyst: a/a	
2617.5	80	Lst/Chalk: a/a	cavings?
	20	Sh/Clyst: a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 12 1/4" Geologist: Kristensen/Opstad Larsen Date: 7/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2620	100	Lst/Chalk: wh, frm	
	Tr	Sh/Clyst: rd brn, sl slty, blky, micromica	
2622.5		a/a	
2625		a/a	
2627.5	100	Chalk/Lst: a/a	
	Tr	Sh/Clayst: a/a	
	Tr	Clyst: red brn, frm, sft, calc, occ grd to marl	
2630		a/a	
2632.5	100	Chalk/Lst: a/a	
	Tr	Sh/Clyst: non calc, else a/a	
2635	100	Chalk/Lst: off wh, frm, occ soft, occ Lst: microxln, v hd	
	Tr	Clyst/Sh: red brn, med-dk gry, frm, subfiss, occ sl slty	
2637.5		a/a	
2640		a/a	
2642.5	100	Chalk/Lst: a/a, bec more arg	
	Tr	a/a	
2645		a/a	
2647.5		a/a	
2650	100	Chalk/Lst: a/a bec sl darker	yel fluor
	Tr	a/a	bright
2652.5		a/a	a/a
2655		a/a	yel fluor yel cloudy crush cut
2657.4		a/a	a/a
2660	100	Mrl/Lst: buff, lt gry, arg lst, mrl stky	a/a
	Tr	Clyst/Sh: a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 12 1/4" Geologist: Opstad/Kristensen Larsen Date: 9/10-12/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2662.5	100	Mrl/Lst: buff, lt gry, arg lst, mrl stky	
	Tr	Clyst/Sh: red brn, med-dk gry, frm, subfiss, occ sl slty	
2665	60	Chalk: off wh, soft, frm w/Lst: hd, microxln	Dull yell
	40	Mrl: lt brnish gry, occ lt gry, soft, frm, stky when lt gry	
2667.5	60	Chalk/Lst: a/a bec sl gry	
	40	Mrl: a/a	
	Tr	Clyst/Sh: a/a	
2670	55	Chalk/Lst: a/a	
	45	Mrl: a/a	
	Tr	Clyst/Sh: a/a	
2672.5		a/a	
2675	50	Chalk/Lst: a/a	
	50	Mrl: more stky, else a/a	
2677.5		a/a	
2680		a/a	
2685	100	Chalk/Lst: off wh, v lt gry, frm-hd, microxln-sucrosic	Min fluor no cut heavily contam with cmt
	Tr	Mrl: lt gry, a/a	
2687.5		a/a	a/a
2690	50	Chalk/Lst: a/a	a/a
	50	Mrl: a/a	
	Tr	Sh: dk brnish gry, hd	
2692.5	50	Lst: wh-off wh, sft-hd, microxln-sucrosic, occ arg and mrly, occ glauc	
	50	Sh: bluish gry, lt-med gry, med brn, frm-med hd, non-sl calc	
	Tr	Pyr, Glau	
2695	70	Lst: a/a	
	30	Sh: occ micromic, else a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 8 1/2" Geologist: Østby/Eide Date: 13/10-14/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2697.5	100	Mrl: v lt gry-gryish wh, sft, occ slty and glauc	
	Tr	Sh: bluish gry, lt-med gry, med brn, frm-med hd, non-sl calc, occ micromic	
2700		a/a	
2702.5	100	Mrl: occ pnk else a/a	
	Tr	Sh: a/a	
2705	100	Mrl: lt gry-pnk, sft, occ slty and glauc	
	Tr	Sh: a/a	
2707.5	100	Mrl: v lt gry, sft, occ slty and glauc	
	Tr	Sh: a/a	
2710		a/a	
2712.5		a/a	
2715	100	Mrl: lt gry-pnk, sft, v slty, occ glauc	
	Tr	Sh: a/a	
2717.5		a/a	
2720	100	Mrl: v slty and sdy else a/a	
	Tr	Sh: a/a	
2722.5	100	Mrl: lt gry occ pnk else a/a	
	Tr	Sh: a/a	
2725		a/a	
2727.5		a/a	
2730	100	Mrl: lt gry occ pnk, sft, slty, occ glauc	
2732.5	100	Mrl: pnk-rd brn, occ lt gry, else a/a	
2735	100	Mrl: partly lt gry-grnish gry, sft, slty, grdg sltst, else a/a	
2737.5	100	Mrl: slty-v slty, occ sl sdy, else a/a	
	Tr	Sh: lt-med gry, mod hd, micromic, non calc	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 8 1/2" Geologist: Østby/Eide Date: 14/10-15/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2740	100	Mrl: lt gry, pnk-rd brn slty-v slty, occ sl sdy, sft,	
	Tr	Sh: lt-med gry, mod hd, micromic, non calc	
2742.5		a/a	
2745	100	Mrl: incr shly, else a/a	
2747.5	100	Mrl: mostly rd-brn-pnk, else a/a	
2750	100	Mrl: mostly lt gry, else a/a	
2752.5		a/a	
2755		a/a	
2757.5		a/a	
2760	100	Mrl: mostly rd brn, else a/a	
2762.5		a/a	
2765		a/a	
2767.5		a/a	
2770		a/a	
2772.5		a/a	
2775	50	Mrl: a/a	
	50	Sh: rust brown, lt-med gry occ dk gry, bluish gry, mod hd, micromic, sl calc	
	Tr	Pyr	
2777.5	95	Mrl: off wh-v lt gry, sft, stky, occ sl slty	
	5	Sh: dk gry, occ rust brn, mod hd, micromic, sl calc	
2780	90	Mrl: off wh-v lt gry, rd brn	
	10	Sh: med-dk gry, rust-rd brn, calc, mod hd, micromic	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 8 1/2" Geologist: Østby/Eide Date:15/10, 16/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2782.5	100	Mrl: off wh-v lt gry, rd-rust brn, sft, stky, occ sl slty	
	Tr	Lst: cream, hd, microxln	
	Tr	Sh: med-dk gry, bluish-grnish gry, mod hd, calc, micromic	
2785	95	Mrl: mostly off wh-v lt gry, else a/a	
	5	Sh: occ slty else a/a	
	Tr	Lst: a/a	
	Tr	Pyr	
2787.5	100	Clyst/Sh: med dk gry-brnish dk gry, frm-mod hd, subfiss, occ sl fiss, non-sl calc, micromic	
	Tr	Pyr	
2790		a/a	
2792.5		a/a	
2795		a/a	
2797.5		a/a	
2800		a/a	
2802.5	100	Clyst/Sh: dk-brnish gry, frm-mod hd, subfiss occ fiss, non-sl calc, occ v calc, micromic, carb, occ slty	
	Tr	Lst: a/a	
	Tr	Pyr	
2805		a/a	clyst/sh becomes more silty and calc downwards
2807.5		a/a	
2810		a/a	
2812.5		a/a	
2815	100	Clyst/Sh: med-dk gry, frm-mod hd, subfiss, calc occ v calc, slty, carb, micromic	
	Tr	Lst: wh-buff, frm-hd, microxln	
	Tr	Pyr	
2817.5		a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 8 1/2" Geologist: Østby/Eide Date: 16/10, 17/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2820	95	Clyst/Sh: med-dk gry, frm-mod hd, subfiss, calc occ v calc, slty, carb, micromic	
	5	Sltst: lt gry-wh, fri-sft, v arg	
	Tr	Lst: wh-buff, frm-hd, microxln	
	Tr	Pyr	
2822.5	90	Clyst/Sh: v calc, else a/a	
	10	Sltst: a/a	
	Tr	Pyr	
2825		a/a	
2827.5		a/a	
2830		a/a	
2832.5		a/a	
2835	100	Clyst/Sh: a/a	
	Tr	Lst: pyritic, occ xln, else a/a	
2837.5		a/a	
2840	100	Clyst/Sh: a/a	
2842.5		a/a	
2845		a/a	
2847.5		a/a	
2850		a/a	
2852.5		a/a	
2855		a/a	
2857.5	100	Clyst/Sh: occ glau, else a/a	
2860		a/a	
2862.5		a/a	
2865	100	Clyst/Sh: sdy i/p; sd: slt-vf, subang else a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 8 1/2" Geologist: Østby/Eide Date: 16/10, 17/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2867.5	90	Clyst/Sh: med-dk gry, frm-mod hd, subfiss, v calc, slty, carb, micromic, occ glau, sdy i/p	
	10	Sst: clr qtz, vf-f occ med, subang, lse-fri	
	Tr	Pyr	
2870	95	Clyst/Sh: a/a	
	5	Sst: a/a	
	Tr	Pyr	
2872.5	90	Clyst/Sh: grdg to sltst i/p, else a/a	
	10	Sst: a/a	
	Tr	Lst: cream, hd, xln	
	Tr	Pyr	
2875	95	Clyst/Sh: sdy and slty i/p, else a/a	
	5	Sst: a/a	
	Tr	Pyr, incr amount	
2877.5	100	Clyst/Sh: slty i/p, glauc i/p, else a/a	
	Tr	Sst: a/a	
	Tr	Pyr	
2880	100	Clyst/Sh: a/a	
2882.5		a/a	
2885		a/a	
2887.5	100	Clyst/Sh: a/a	
	Tr	Sltst: wh-clr qtz, fri-mod hd	
	Tr	Sst: clr qtz, ang-subang, v hd, lt brn, matrix cmt	
	Tr	Lst: wh, xln, hd	
	Tr	Pyr	
2890	100	Clyst/Sh: a/a	
	Tr	Lst: med brn, hd	
	Tr	Pyr	
2892.5	100	Clyst/Sh: a/a	
	Tr	Sst: a/a, also clr qtz, vf-f, lse, subang	
	Tr	Pyr	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY
Area: NORTH SEA
Field:
Well no: 15/12-4
K.B.E.:
Company : STATOIL/ESSO
Hole size: 8 1/2"
Geologist: Kristensen/Eide Østby
Date: 17/10-19/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2895	100	Clayst/Sh: med-dk gry, frm, occ subfiss, non-sl calc, slty, carb, micromic	
	Tr	Sst: clr qtz, vf-f occ crs grains, subang-ang, fri, glauc	
	Tr	Pyr	
2897.5		a/a	
2900	95	Clyst/Sh: a/a	weak dull yel fluor in sst and slty prts of clyst
	5	Sst: a/a	
	Tr	Pyr	
2902.5	90	Clyst/Sh: a/a	
	10	Sst: a/a	dull yel fluor
	CORE NO 4		
	Start coring 2902 m, hence poor samples		
2922.5	100	Sst: clr-transluc qtz, vfn-med, poor srtd, subang-subrnd, lse-fri	No shows 80 % of samples cavings MWS-log showing 100 % Sst
2925	100	Sst: clr-transluc qtz, med, occ crs, well srtd, subang-subrnd, appears lse, v good vis por	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 8 1/2" Geologist: Kristensen/Eide Date: 19/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2927.5	100	Sst: clr-transluc qtz, med-crs, mod-well srtd, subang-subrnd, appears lse, occ kaol cmt, v good vis por	
	Tr	Pyr	
2930	100	Sst: clr-transluc qtz, fn-crs, poor-mod srtd, subang-subrnd, lse-mod hd, kaol cmt i p, dol cmt i p, occ sl mic, mod-good vis por	
	Tr	Kaol: wh-off wh, sft, amorf, non calc	
	Tr	Pyr (cavings?)	
2932.5	95	Sst: predom med, else a/a	
	5	Kaolin: a/a	
2935	100	Sst: lt gry, clr-transluc qtz, med-crs, mod srtd, subang-subrnd, lse-mod hd, kaol cmtd i p, occ dol cmtd, mod-good vis por	
	Tr	Kaol: a/a	
2937.5	100	Sst: clr-transluc qtz, fn-crs, poor-mod srtd, subang-subrnd, lse-fri, kaol cmtd i p, mod-good vis por	
	Tr	Kaol: a/a	
2940	95	Sst: a/a	
	5	Kaol: a/a	
2942.5	100	Sst: clr-transluc qtz, predom med, occ fn, occ crs, mod srtd, subang-subrnd, appears lse, occ kaol cmt, good vis por	
2945	100	Sst: a/a	
	Tr	Kaol: off wh, sft, amorf, non calc, sl sdy	
2947.5	95	Sst: clr-transluc qtz, fn-crs, poor srtd, subang-subrnd, appears lse, occ kaol cmt, good vis por	
	5	Kaol: a/a	
2950	95	Sst: clr-transluc qtz, vfn-med, mod srtd, subang-subrnd, appears lse, good vis por	
	5	Kaol: a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 8 1/2" Geologist: Kristensen/Eide Date: 19/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2952.5	100	Sst: lt gry, clr-transluc qtz, fn-med, occ crs, mod srtd, subang-subrnd, lse-mod hd, dol cmtd i p, occ kaol cmt, sl arg i p, mod-good vis por	
	Tr	Kaol: off wh, sft, amorf-chalky texture, non calc, sdy i p	
2955	90	Sst: a/a	
	10	Kaol: a/a	
2957.5	100	Sst: a/a	
	Tr	Kaol: a/a	
2960	100	Sst: lt gry, clr-transluc qtz, med-crs, mod srtd, subang-subrnd, lse-mod hd, good vis por	
	Tr	Kaol: a/a	
2962.5	100	Sst: med-crs occ fn, else a/a	
	Tr	Kaol: a/a	
2965		a/a	
2967.5	100	Sst: lt gry, clr-transluc qtz, med-crs occ fn, mod srtd, subang-subrnd, lse-mod hd, occ kaol cmt, good vis por	
	Tr	Kaol: a/a	
2970		a/a	
2972.5	100	Sst: med-fn occ crs, else a/a	
	Tr	Kaol: a/a	
2975		a/a	
2977.5	100	Sst: med-crs occ fn, else a/a	
2980	90	Sst: lt gry, clr-transluc qtz, med-crs occ fn, mod srtd, occ calc cmtd	
	10	Kaol: a/a	
2982.5	90	Sst: lt gry, clr-transluc qtz, med-crs occ fn, mod srtd, occ calc cmt, good vis por	
	10	Kaol: a/a	
2985		a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 8 1/2" Geologist: Kristensen/Svindland Date: 19/10-20/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
2987.5	90	Sst: lt gry, clr-transluc qtz, med-crs occ fn, mod srtd, occ calc cmt, good vis por	
	10	Kaol: off wh, sft, amorf-chalky texture, non calc, sdy i p	
2990	100	Sst: med-fn occ crs, else a/a	
	Tr	Kaol: a/a	
2992.5		a/a	
2995	100	Sst: med-crs occ fn, else a/a	
	Tr	Kaol: a/a	
2997.5		a/a	
3000	90	Sst: a/a	
	10	Kaol: a/a	
3002.5		a/a	
3005	100	Sst: lt gry, clr-transluc qtz, med-fn occ crs, mod srtd, calc cmt, good vis por	
	Tr	Kaol: a/a	
3007.5	70	Sst: med-fn, else a/a	
	30	Kaol: off wh, sft, amorf, non calc	
	Tr	Clyst/Sltst: grn-gry, frm, occ calc	
3010		a/a	
3012.5		a/a	
3015	50	Sst: lt gry, clr-transluc qtz, med-fn, mod srtd, occ calcit cmt	
	50	Kaol: off wh, sft, amorf non calc	
	Tr	Clyst/Sltst: gry occ grn, frm, occ calc	
3017.5	30	Sst: a/a	
	40	Kaol: a/a	
	30	Clyst/Sltst: a/a	
3020	20	Sst: a/a	
	30	Kaol: a/a	
	50	Clyst/Sltst: a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 8 1/2" Geologist: Kristensen/Svindland Date: 20/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
3022.5	30	Sst: lt gry, clr-transluc qtz, med-fn, mod srt, occ calc cmt	
	50	Kaol: off wh, sft, amorf, non calc	
	20	Clyst/Sltst: gry occ grn, frm, occ calc	
3025	40	Sst: a/a	
	50	Kaol: a/a	
	10	Clyst/Sltst: a/a	
3027.5		a/a	
3030		a/a	
3032.5	40	Sst: fn-vfn, occ med-crs, else a/a	
	50	Kaol: a/a	
	10	Clyst/Sltst: a/a	
3035	70	Sst: lt gry, clr-transluc qtz, med-fn, occ crs, mod srt, occ calc cmt	
	30	Kaol: a/a	
	Tr	Clyst/Sltst: a/a	
3037.5	50	Sst: a/a	
	50	Kaol: a/a	
	Tr	Clyst/Sltst: a/a	
3040	80	Sst: lt gry, clr-transluc qtz, med-fn, mod srtd, occ calcit cmt, good vis por	
	20	Kaol: off wh, sft, amorf, non calc	
	Tr	Clyst	
3042.5		a/a	
3045	80	Sst: lt gry, clr-transluc qtz, fn-med, occ crs, mod srtd, subang-subrnd, lse-fri, occ dol cmt, kaol cmt i p, mod-good vis por	
	20	Kaol: wh-off wh, sft, amorf, non calc	
3047.5	90	Sst: a/a	
	10	Kaol: a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 8 1/2" Geologist: Kristensen/Svindland Date: 20/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
3050	100	Sst: lt gry-med gry, clr-transluc qtz, fn, well srtd, subang-subrnd, fri-mod hd, dol cmt, kaol cmt, sl arg, v sl glauc, sl mic, poor-mod vis por	
	Tr	Kaol: a/a	
3052.5		a/a	
3055	100	Sst: lt gry-med gry, clr-transluc qtz, vfn, well srtd, subang-subrnd, fri-mod hd, dol cmt, kaol cmt, sl mic, sl arg, v sl glauc, v sl pyr, poor-mod vis por	
	Tr	Kaol: a/a	
3057.5	100	Sst: occ sl carb, else a/a	
3060		a/a	
3062.5	100	Sst: clr-transluc qtz, predom med, well srtd, subang-subrnd, lse-mod hd, i/p cmtd a/a, mod-good vis por	
	Tr	Kaol: wh-off wh, sft, amorf, non calc	
3065	100	Sst: clr-transluc qtz, med-crs, well srtd, subang-subrnd, lse, good vis por	
	Tr	Kaol: a/a	
3067.5	100	Sst: fn-crs, poor srtd, else a/a	
	Tr	Kaol: a/a	
3070	90	Sst: clr-transluc qtz, med-crs, well srtd, subang-subrnd, lse, good vis por	
	10	Kaol: wh-off wh, sft, amorf, non calc, sdy i/p	
3072.5	100	Sst: clr-transluc qtz, fn-crs, occ c crs, mod srtd, subang-rnd, lse, good vis por	
	Tr	Kaol: a/a	
3075		a/a	
3077.5	90	Sst: lt gry, clr-transluc qtz, fn-crs, poor-mod srtd, subang-subrnd, lse-mod hd, dol and kaol cmt i p, occ sl arg, occ sl mic, good-mod vis por	
	10	Kaol: wh-off wh, sft, amorf-chalky texture, non calc, sdy i p	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 8 1/2" Geologist: Kristensen/Svindland Date: 20/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
3080	90	Sst: lt gry, clr-transluc qtz, fn-crs, poor-mod srtd, subang-subrnd, lse-mod hd, dol and kaol cmt i p, occ sl arg, occ sl mic, good-mod vis por	
	10	Kaol: wh-off wh, sft, amorf-chalky texture, non calc, sdy i p	
3082.5		a/a	
3085		a/a	
3087.5	90	Sst: occ sl pyr, else a/a	
	10	Kaol: a/a	
3090	60	Sst: lt gry-med gry, clr-transluc qtz, fn, mod srtd, subang-subrnd, fri-mod hd, dol and kaol cmt, sl arg, sl mic, occ sl pyr, poor-mod vis por	
	30	Sst: clr-transluc qtz, med-v crs, occ gran, mod srtd, subrnd-rnd, lse, good vis por	
	10	Kaol: a/a	
3092.5	80	Sst: cmtd a/a	
	20	Sst: clr-transluc qtz, occ pink, lse a/a	
	Tr	Kaol: a/a	
3095	100	Sst: clr-transluc qtz, occ mlky-lt gry, fn-v crs, poor srtd, subang-subrnd, lse, good vis por	
	Tr	Kaol: a/a	
3097.5	80	Sst: lt gry, clr-transluc qtz, vfn-fn, occ crs rnd grns, well srtd, subang-subrnd, lse-mod hd, dol cmtd i p, kaol i p, sl mic i p, sl pyr i p, sl arg i p, poor-good vis por	
	20	Kaol: wh-off wh, occ dk bands, sft, amorf-chalky texture, sdy i p, non calc	
	Tr	Pyr	
3100	90	Sst: clr-transluc qtz, fn-v crs, occ gran, poor srtd, subang-rnd, predom lse, occ hd w/dol and kaol cmt, sl mic, sl pyr, sl arg, predom good vis por	
	10	Kaol: a/a	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 8 1/2" Geologist: Kristensen/Svindland Date: 20/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
3102.5	80	Sst: clr-transluc qtz, fn-v crs, occ gran, poor srtd, subang-rnd, predom lse, occ hd w/dol and kaol cmt, sl mic, sl pyr, sl arg, predom good vis por	
	20	Kaol: wh-off wh, occ dk bands, sft, amorf-chalky texture, sdy i p, non calc	
	Tr	Pyr	
3105	60	Sst: lt gry-med gry, clr-transluc qtz, vfn-fn, mod srtd, subang-subrnd, fri-mod hd, dol cmt i p, occ clr non calc cmt, sl pyr, sl mic, sl arg, poor-mod vis por	
	20	Sst: clr-transluc qtz, vfn-v crs, poor srtd, subang-rnd, lse, occ massi, good vis por	
	20	Kaol: a/a	
	Tr	Pyr	
3107.5	70	Sst: lse a/a	
	30	Sst: cmtd a/a	
	Tr	Kaol: a/a	
	Tr	Pyr	
3110	90	Sst: lt gry, clr-transluc qtz, vfn-crs, occ gran, poor srtd, subang-rnd, predom lse, fri-mod hd i p, arg, sl mic, sl pyr, kaol, sl dol cmt, good-mod vis por	
	10	Kaol: a/a	
	Tr	Pyr	
3112.5		a/a	
3115		a/a	
3117.5	80	Sst: lt gry-med gry, brn gry, clr-transluc qtz, fn-med, mod srtd, subang-subrnd, fri-mod hd, dol cmt, sl pyr-pyr, kaol i p, sl mic, sl arg, poor vis por	
	10	Sst: clr-transluc qtz, crs-v crs, well srtd, subrnd-rnd, lse, good vis por	
	10	Kaol: off wh-wh, sft, amorf, sdy i p, non calc	
	Tr	Pyr	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 8 1/2" Geologist: Kristensen/Svindland Date: 20/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
3120	70	Sst: clr-transluc qtz, fn-crs, poor srtd, subang-subrnd, lse, good vis por	
	20	Sst: dol cmtd clr-transluc qtz, crs-v crs, well srtd, subrnd-rnd, lse, good vis por	
	10	Kaol: off wh-wh, sft, amorf, sdy i p, non calc	
	Tr	Pyr	
3122.5	60	Sst: lse a/a	
	20	Sst: cmtd a/a	
	20	Kaol: often associated w pyr, else a/a	
	Tr	Pyr	
3125	70	Sst: lse a/a	
	20	Sst: dol cmtd, occ v pyr, else a/a	
	10	Kaol: a/a	
	Tr	Pyr, abund	
3127.5	90	Sst: clr-transluc qtz, predom med, occ fn, well srtd, subang-subrnd, lse, good vis por	
	10	Sst: cmtd a/a	
	Tr	Kaol: a/a	
	Tr	Pyr	
3130	100	Sst: brn gry-med gry, vfn-fn, well srtd, subang-subrnd, fri-mod hd, dol cmtd, sl arg-arg, poor vis por	
	Tr	Kaol: a/a	
3132.5	70	Sst: a/a	
	30	Clyst: med gry, frm, slty, sl sdy, pyr, carb, non calc	
3135	90	Coal: blk, occ dk brn, hd, brittle, shiny	
	10	Clyst: med gry-dk gry, frm, slty i p, carb, occ sdy, sl pyr, non calc	
	Tr	Sst: a/a	
	Tr	Pyr	
3137.5	60	Coal; blk-dk brn, hd, brittle i p, pyr i p	
	40	Clyst: pale brn-dk brn, frm, sl slty-v slty, occ sdy, carb-v carb, pyr i p, non calc	
	Tr	Pyr, abund	

WELLSITE SAMPLE DESCRIPTION

Country: NORWAY Area: NORTH SEA Field:
Well no: 15/12-4
K.B.E.: Company : STATOIL/ESSO
Hole size: 8 1/2" Geologist: Krist4nsen/Svindland Date: 20/10-21/10-84

DEPT	LITH.%	LITHOLOGIC DESCRIPTION	SHOWS & REMARKS
3140	90	Sst: pale brn, clr-transluc qtz, fn, well srtd, subang-subrnd, hd, silica cmtd, sl kaol, poor vis por	
	10	Clyst: med brn-dk brn-blk, frm, sl slty, v carb, pyr i p, non calc	
	Tr	Pyr	
	Tr	Kaol: off wh, frm, chalky texture, non calc	
3142.5	40	Sst: pale brn, clr-transluc qtz, fn-vfn, well srtd, subang-subrnd, silica cmtd, poor vis por	
	10	Clyst: med brn-dk brn, frm, sl slty, non calc	
	50	Kaol: off wh, frm, chalky texture, non calc	
	Tr	Pyr	
3145	50	Sst: a/a	
	50	Kaol: a/a	
	Tr	Pyr, Coal	
3147.5		a/a	
3150	40	Sst: clr-transluc qtz, med-fn occ crs, mod good srtd, subang-subrnd, lse, good vis por	
	50	Kaol: off wh, frm, chalky texture, non calc	
	10	Clyst: pale brn-brn, frm, slty, non calc	
	Tr	Pyr	
3152.5	100	Kaol: off wh, frm, chalky texture	
	Tr	Clyst: a/a	
	Tr	Pyr abund	
3155	70	Clyst: off wh-lt gry, sft, stky, soluble, dol, calc i p, sdy, kaol?	
	30	Sst: clr-transluc qtz, vfn-fn, subang-subrnd, appears lse	
	Tr	Pyr	
3157		a/a	

6.2 CONVENTIONAL CORE DESCRIPTION

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CONVENTIONAL CORE DESCRIPTION

Country: NORWAY	Area: NORTH SEA		Field:		
Well no.: 15/12-4	Formation: LISTA FM				
Core no.: 1	Interval: 2439-2450	Cored: 11 m	Rec: 10 m 91 %		
Core size: 5 1/4"	Geologist: A. OPSTAD		Date: 2/10-84		

DEPTH (mKB)	LITHOLOGY/ GRAIN SIZE (cly slt vf f m c vc)	Dip (apparent)	SHOWS STAIN	FLUOR	CUT	Φ POOR	FAIR	GOOD	Lithological Description (Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed structures, accessories, fossils, porosity, contamination)	Remarks (Shows, etc.)
2439	M, □, C, M, □, C								Sh: med gry, gn, frm-med hd, sl-v slty, mostly non calc, occ v calc, sl mica, sl carb, micromica, blky-fiss	No fluor No cut
2440										
2441										
2442										
2443										
2444										

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CONVENTIONAL CORE DESCRIPTION

Country:	NORWAY	Area:	NORTH SEA	Field:	
Well no.:	15/12-4	Formation:	LISTA FM		
Core no.:	1	Interval:	2439-2450	Cored: 11 m	Rec: 10 m 91 %
Core size:	5 1/4"	Geologist:	A. OPSTAD	Date:	2/10-84

DEPTH (mKB)	LITHOLOGY/ GRAIN SIZE (cly slt vf f m c vc)	DIP (apparent)	SHOWS: STAIN	FLUOR	CUT	Φ: POOR	FAIR	GOOD	Lithological Description (Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cemer ation, hardness, sed. structures, accessories, fossils, porosity, contamination)	Remarks (Shows, etc.)
2444	M								Sh: med gry, gn, frm-med hd, sl-v slty, mostly non calc, sl mica, sl carb, micrimica, blky-fiss	No fluor No cut
2445	M									
2446										
2447	M									
2448	C C									
2449										
2450										

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CONVENTIONAL CORE DESCRIPTION

Country: NORWAY	Area: NORTH SEA		Field:		
Well no.: 15/12-4	Formation: TOR FM				
Core no.: 2	Interval: 2494.5-2499	Cored: 4.5 m	Rec: 4.16 m 92 %		
Core size: 5 1/4"	Geologist: A. OPSTAD		Date: 3/10-84		

DEPTH (mKB)	LITHOLOGY/ GRAIN SIZE (cly slt vf f m c vc)	DIP (apparent)	SHOWS: STAIN	FLUOR	CUT	Φ: POOR	FAIR	GOOD	Lithological Description (Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cemer ation, hardness, sed. structures, accessories, fossils, porosity, contamination)	Remarks (Shows, etc.)
2494,5									Lst: buff, chk, occ calcite, crystal nodls, prtly sl xln, hd	Pale yel bright fluor, slow-fast strm pale yel cut
2495										
2496										
2497									Clyst: med gry, v calc, frm, foss	
2498										
2498 .65										

cly slt vf f m c vc

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CONVENTIONAL CORE DESCRIPTION

Country: NORWAY	Area: NORTH SEA	Field:	
Well no.: 15/12-4	Formation: TOR		
Core no.: 3	Interval: 2499-2513.5	Cored: 14.6 m	Rec: 14.6 m 100 %
Core size: 5¼''	Geologist: OPSTAD / LARSEN	Date: 4/10 - 84	

DEPTH (mKB)	LITHOLOGY/ GRAIN SIZE (cly slt vf f m c vc)	Chip (apparent)	SHOWS STAIN	FLUOR	CUT	Φ POOR	FAIR	GOOD	Lithological Description (Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cemer ation, hardness, sed. structures, accessories, fossils, porosity, contamination)	Remarks (Shows, etc.)
2499									Lst: lt gry, chk, frm-hd, prtly arg, occ fractures w/calc crystals	Weak wh-yel fluor (mineral)
2500										
									Sh: lt olv gry, frm, fissile, v calc	
2501										
2502										
2503										
2504										

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CONVENTIONAL CORE DESCRIPTION

Country: NORWAY	Area: NORTH SEA	Field:	
Well no.: 15/12-4	Formation: TOR		
Core no.: 3	Interval: 2499-2513.5	Cored: 14.6 m	Rec: 14.6 m 100 %
Core size: 5¼''	Geologist: OPSTAD / LARSEN	Date: 4/10 - 84	

DEPTH (mKB)	LITHOLOGY/ GRAIN SIZE (cly slt vf f m c vc)	Dip (apparent)	SHOWS: STAIN	FLUOR	CUT	Φ: POOR	FAIR	GOOD	Lithological Description (Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cemer ation, hardness, sed. structures, accessories, fossils, porosity, contamination)	Remarks (Shows, etc.)
2505									Lst: lt gry, chk, frm-hd, prtly arg, occ fractures w/calc crystals	Weak wh-yel fluor (mineral)
				I		I			Sh: lt olv gry, frm, fissile, v calc	
2506										
				I		I				
2507										
				I		I				
2508										
				I		I				
						I				
2509										

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CONVENTIONAL CORE DESCRIPTION

Country: NORWAY	Area: NORTH SEA	Field:	
Well no.: 15/12-4	Formation: TOR		
Core no.: 3	Interval: 2499-2513.5	Cored: 14.6 m	Rec: 14.6 m 100 %
Core size: 5¼''	Geologist: OPSTAD / LARSEN	Date: 4/10 - 84	

DEPTH (mKB)	LITHOLOGY/ GRAIN SIZE (cly slt vf f m c vc)	DIP (apparent)	SHOWS: STAIN	FLUOR	CUT	Φ: POOR	FAIR	GOOD	Lithological Description (Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination)	Remarks (Shows, etc.)
									Lst: lt gry, chk, frm-hd, prtly arg, occ fractures w/calc crystals	Weak wh-yel fluor (mineral)
									Sh: lt olv gry, frm, fissile, v calc	
2510										
2511										
2512										
2513										

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CONVENTIONAL CORE DESCRIPTION

Country:	NORWAY	Area:	NORTH SEA	Field:	
Well no.:	15/12-4	Formation:	OXFORDIAN SST		
Core no.:	4	Interval:	2902-2920.5m	Cored: 18.5 m	Rec: 17.7 m 96 %
Core size:	4 1/2"	Geologist:	S.I.EIDE/T.F.KRISTENSEN	Date:	19/10-84

DEPTH (mKB)	LITHOLOGY/ GRAIN SIZE (cly slt vf f m c vc)	Dip (apparent)	SHOWS STAIN	FLUOR	CUT	Φ POOR	FAIR	GOOD	Lithological Description (Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cemer ation, hardness, sed. structures, accessories, fossils, porosity, contamination)	Remarks (Shows, etc.)
2902	M, M, *								Sst: clr qtz, f, w srtd, subang-subrnd, slty matrix, fri, v glau, mica, fair por	Mod strong pale yel fluor, mod fast stn mlky wh cut fluor
	M								Sltst: v sndy, lt-med gry, hd, v mica, glau, non-sl calc	Non-v weak pale yel fluor
2903	*, M, *									Patchy, slow str mlky wh cut fluor
	M									
	2903.87m SEAL PEAL 2904.22m									
2904	*, M, *									
	M									
2905	*, *								Sltst: a/a	
	M									
2906	*, M, *									Large wood fragment
	M									
2907	*									

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CONVENTIONAL CORE DESCRIPTION

Country:	NORWAY	Area:	NORTH SEA	Field:	
Well no.:	15/12-4	Formation:	OXFORDIAN SST		
Core no.:	4	Interval:	2902-2920.5	Cored: 18.5 m	Rec: 17.7 m 96 %
Core size:	4 1/2"	Geologist:	S.I.EIDE/T.F.KRISTENSEN	Date:	19/10-84

DEPTH (mKB)	LITHOLOGY/ GRAIN SIZE (cly slt vf f m c vc)	Dip (apparent)	SHOWS STAIN	FLUOR	CUT	Φ POOR	FAIR	GOOD	Lithological Description (Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cemer ation, hardness, sed. structures, accessories, fossils, porosity, contamination)	Remarks (Shows, etc.)
2907									Sltst: v sndy, lt-med gry, hd, v mica, glau, non-sl calc	Non-v weak pale yel fluor, patchy slow strm mlky wh cut fluor
2908										
2909									Sltst: a/a	
2910										
2911									Sst: clr qtz, f-med, w srtd, subang-subrnd, fri, massive, glau, occ calc concr, v gd por	Oily smell, lt brn stain strong pale yel fluor, fast-inst strm mlky wh cut fluor
2912	2911 .94m									

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CONVENTIONAL CORE DESCRIPTION

Country:	NORWAY	Area:	NORTH SEA	Field:	
Well no.:	15/12-4	Formation:	OXFORDIAN SST		
Core no.:	4	Interval:	2902-2920.5m	Cored: 18.5 m	Rec: 17.7 m 96 %
Core size:	4 1/2"	Geologist:	S.I.EIDE/T.F.KRISTENSEN	Date: 19/10-84	

DEPTH (mKB)	LITHOLOGY/ GRAIN SIZE (cly slt vf f m c vc)		DIP (apparent)	SHOWS STAIN	FLUOR	CUT	Φ POOR	FAIR	GOOD	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cemer ation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, etc.
2912		SEAL PEAL 2912 .22m								Sst: clr qtz, f-med, w srtd, subang-subrnd, fri, mass, glau, occ calc concr, gd por	Large shell frags 6x2 cm
											Oily smell, lt brn stain, strong pale yel fluor, fast-inst str mlky wh cut fluor
2913											
2914											Oil-water contact 2914.4 m
2915										Sst: no stain, else a/a	No fluor or cut fluor
2916											
2917											

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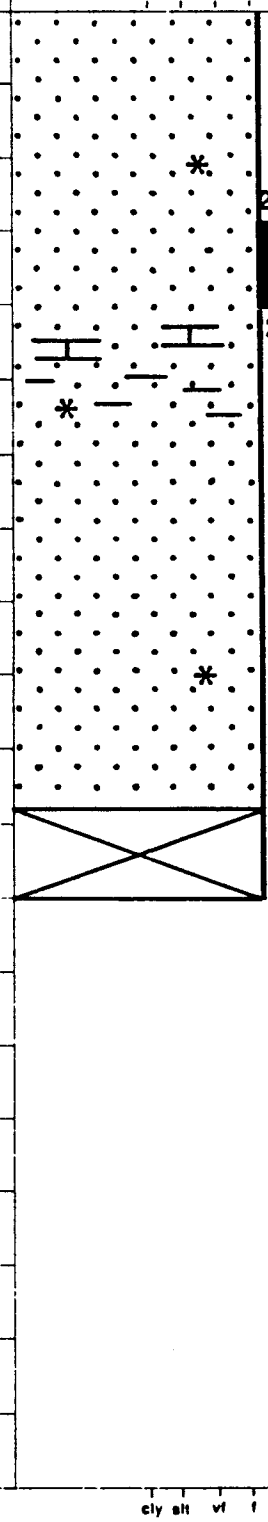
CONVENTIONAL CORE DESCRIPTION

Country: NORWAY	Area: NORTH SEA	Field:	
Well no.: 15/12-4	Formation: OXFORDIAN SST		
Core no.: 4	Interval: 2902-2920.5	Cored: 18.5 m	Rec: 17.7 m 96 %
Core size: 4 1/2"	Geologist: S.I.EIDE/T.F.KRISTENSEN	Date: 19/10-84	

DEPTH (mKB)	LITHOLOGY/ GRAIN SIZE (cly silt vf f m c vc)	DIP (apparent)	SHOWS: STAIN	FLUOR	CUT	Φ: POOR	FAIR	GOOD	Lithological Description (Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cemer ation, hardness, sed. structures, accessories, fossils, porosity, contamination)	Remarks (Shows, etc.)
2917									Sst: clr qtz, f-med, w srtd, subang-subrnd, fri, mass, glau, occ calc concr, gd por	No fluor or cut fluor
	2917.7m SEAL PEAL									
2918	2918 m									Calc cmtd shale lam
2919										
2920										



6.3 SIDEWALL CORE DESCRIPTION

SIDEWALL CORE DESCRIPTION

Country: NORWAY Area: North Sea Field:
Well no: 15/12-4 Run no.: 1 Interval: 2675 - 2225 m
K.B.E.: 23 Company : Statoil/Esso
Hole size: 12 1/4" Geologist: Opstad/Larsen Date: 10/10-84

SHOT NO	DEPTH (mRKB)	REC (min)	LITHOLOGICAL DESCRIPTION	REMARKS
50	2225	32	Clyst: med gry, frm, sl calc, subfiss	
49	2250	30	Clyst: a/a, also slty	
48	2275	30	Clyst: a/a	
47	2298	35	Clyst: med gry, frm, fis, non calc	
46	2301	30	Sltst: med gry, micromica, non calc, arg	
45	2304	27	Sltst: a/a	
44	2328	27	Sltst: lt-med gry, micromica, calc, arg	
43	2331	25	Clyst: med gry, frm, subfiss, non calc, slty, micromica	
42	2333.5	30	Clyst: a/a, but sl calc	
41	2392	30	Clyst: lt gry, stcky, blky, sl slty, v calc	
40	2394	32	Clyst: a/a	
39	2396.5	33	Clyst: a/a	
38	2437.5	24	Clyst: a/a	
37	2437.7	27	Clyst: lt gry, blky, non calc, frm, sl slty, micromica	
36	2438	20	Clyst: a/a	
35	2455.5	32	Clyst: a/a, but sl calc	
34	2466	30	Clyst: dk gry-red brn, micromica, frm, sl calc	
33	2475	33	Clyst: a/a, but slty	
32	2477.5	29	Clyst: grn gry, non calc, blky, sl slty	
31	2478.5	30	Clyst: med gry, sl calc, v slty, micromica, fis	
30	2480	35	Clyst: a/a	

SIDEWALL CORE DESCRIPTION

Country: NORWAY Area: North Sea Field:
Well no: 15/12-4 Run no.: 1 Interval: 2675 - 2225 m
K.B.E.: 23 Company : Statoil/Esso
Hole size: 12 1/4" Geologist: Opstad/Larsen Date: 10/10-84

SHOT NO	DEPTH (mRKB)	REC (min)	LITHOLOGICAL DESCRIPTION	REMARKS
28	2483	28	Lst: wh, chalk, sl arg, frm	wh cloudy cut
27	2484	25	Lst: wh, chalk, frm	a/a
26	2485.5	28	Lst: a/a, sl arg	a/a
25	2486.5	25	Lst: wh, frm, hd, sl arg	
24	2487.5	22	Lst: a/a	
23	2488.5	25	Lst: a/a	
22	2489.5	20	Lst: a/a	
21	2490.5	20	Lst: a/a	yel cloudy cut
20	2491.5	20	Lst: a/a	a/a
19	2492.5	20	Lst: a/a	a/a
18	2493.5	20	Lst: a/a	
17	2525	20	Lst: a/a	
16	2539	20	Lst: a/a, also clyst lamenaes	
15	2550	20	Lst: lt pink, hd, sl arg	
14	2565	18	Lst: wh, sl xln, hd	
13	2580	18	Lst: a/a	
12	2595	18	Lst: a/a, but arg	
11	2600	15	Lst: wh, chalk, sl xln, hd, sl arg	yel cloudy cut
10	2605	15	Lst: a/a	a/a
9	2620	15	Lst: a/a	
8	2625	20	Lst: a/a	
7	2645	20	Lst: a/a, sl more arg	yel cloudy cut
6	2650	15	Lst: a/a	

SIDEWALL CORE DESCRIPTION

Country: NORWAY Area: North Sea Field:
Well no: 15/12-4 Run no.: 1 Interval: 2675 - 2225 m
K.B.E.: 23 Company : Statoil/Esso
Hole size: 12 1/4" Geologist: Opstad/Larsen Date: 10/10-84

SHOT NO	DEPTH (mRKB)	REC (min)	LITHOLOGICAL DESCRIPTION	REMARKS
5	2655	15	Mrl: lt gry, frm, blky	
4	2660	15	Mrl: lt brn gry, frm, blky	yel cloudy cut
3	2665	25	Mrl: a/a, also sl slty	
2	2670	15	Mrl: lt brn gry, frm, blky	
1	2675	15	Mrl: a/a	

SIDEWALL CORE DESCRIPTION

Country: NORWAY Area: North Sea Field:
Well no: 15/12-4 Run no.: 4B Interval: 3154.9 - 2694.5 m
K.B.E.: 23 Company : Statoil/Esso
Hole size: 8 1/2" Geologist: Kristensen/Svindland Date: 24/10-84

SHOT NO	DEPTH (mRKB)	REC (min)	LITHOLOGICAL DESCRIPTION	REMARKS
25	2694.5	15	Clyst: med gry, frm, massive, v calc, micromic, sl glauc	
24	2713	22	Sst: qtz, lt gry, v f, fri, v calc, glauc, arg, micromic, slty	
23	2747.3	25	a/a	
22	2755	30	Sst/Sltst: qtz, lt gry, fri, v calc, arg, micromic	
21	2758	27	Clyst: brn red, frm, massiv, v calc, micromic	
20	2775.2	30	Clyst: blk, frm, massive, waxy, sl micromic, sl pyr, carb, v calc	
19	2780.3	20	Clyst: brn red, frm, massive, v calc, micromic	
18	2785.2	35	Clyst: dk gry, frm, massive-subfiss, non calc, carb, sl pyr	no fluor, slo stream blue w cut fluor
17	2791.5	30	Clyst: dk gry-dk brn gry, frm, massive, non calc, carb, sl pyr, sl slty	a/a
16	2800	23	a/a	a/a
15	2830	22	Clyst: sdy, dk gry, frm, massive, v calc, sl glauc, sl micromic	no fluor, v weak slow stream blue w cut fluor
14	2860.5	30	Clyst: v sdy, dk gry, frm, massive, v calc, sl micromic	a/a
13	2870		Lost	a/a
12	2880	25	a/a	a/a
11	2885	25	Clyst: v sdy, dk gry, frm, massive, sl calc, sl micromic, sl pyr, glauc	
10	2890	35	Clyst: v sdy, dk gry, frm, massive, sl micromic	No fluor, v weak slow stream blue, wh cut fluor

SIDEWALL CORE DESCRIPTION

Country: NORWAY Area: North Sea Field:
Well no: 15/12-4 Run no.: 4B Interval: 3154.9 - 2694.5 m
K.B.E.: 23 Company : Statoil/Esso
Hole size: 8 1/2" Geologist: Kristensen/Svindland Date: 24/10-84

SHOT NO	DEPTH (mRKB)	REC (min)	LITHOLOGICAL DESCRIPTION	REMARKS
9	2895	25	Clyst: v sdy, dk gry, frm massive, sl micromic, sl dol	no fluor, wea slow stream blue wh cut fluor
8	2897		Sst: v arg, dk gry, frm, massive sl micromic, sl glauc, sl dol	
7	2901		Misfire	
6	2983.2	30	Sst: lt gry, clr-transluc qtz, vfn, good srtd, subang-subrnd, fri, sl arg, sl pyr, good vis por	
5	3017.3	27	Sst: lt gry, clr-transluc, qtz, vfn-fn, good srtd, subang-subrnd, fri, sl arg, sl pyr, good vis por, sl-non calc cmt, silica cmt?	
4	3017.5	27	Sst: lt gry, clr-transluc qtz, vfn-fn, good srtd, subang-subrnd, fri, sl calc, sl arg, sl pyr mod vis por,	
3	3055	29	Sst: off wh-lt gry, clr-transluc qtz, fn-vfn, good srtd, subang-subrnd, fri, kaol cmtd, sl pyr, mod vis por	
2	3058.5	25	a/a	
1	3065.0	25	Sst: off wh-lt gry, clr-transluc qtz, fn-vfn, good srtd, subang-subrnd, fri, sl kaol cmtd, sl pyr, good vis por	
25	3107.5	28	Sst: lt gry, clr-transluc qtz, vfn, occ crs grns, subang-subrnd, fri, kaol, sl pyr and carb in streaks, sl mic, poor vis por	
24	3116.0	20	Sst: off wh-lt gry, clr-transluc qtz, vfn-fn, subang-subrnd, kaol, arg, pyr, sl mic, appears fri (possibly crushed by bullet impact)	
23	3130.5		Misfire	
22	3131.5	20	Sst/Sltst: brn, frm-mod hd, blky, non calc, v arg, carb, mic, non vis por	

SIDEWALL CORE DESCRIPTION

Country: NORWAY Area: North Sea Field:
Well no: 15/12-4 Run no.: 4B Interval: 3154.9 - 2694.5 m
K.B.E.: 23 Company : Statoil/Esso
Hole size: 8 1/2" Geologist: Kristensen/Svindland Date: 24/10-84

SHOT NO	DEPTH (mRKB)	REC (min)	LITHOLOGICAL DESCRIPTION	REMARKS
21	3134.0	23	Sst: w/laminaes of Pyr/Carb Sst: lt gry, vfn-fn, subang-subrnd, fri, arg, pyr, carb, poor-mod vis por	
20	3134.5	20	Sst: v arg and pyr, med gry, vfn-fn, subang-subrnd, fri, carb, mic, non calc	
19	3135	25	Coal: blk, hd, brittle, shiny, antracite	
18	3136.0	20	Clyst: brn, mod hd, subfiss, v carb, non calc	
17	3137.1	25	Clyst: dk gry-red brn, frm, massiv, carb, slty, sdy, mic, red brn, i p v calc, dk gry, non calc	
16	3145.9		Empty	
15	3149	15	Sst: off wh, clr-transluc qtz, fn, subang-subrnd, appears fri, v kaol, non calc, poor vis por	
14	3150	10	Sst: gry wh, clr-transluc qtz, vfn, subang-subrnd, fri, v kaol, streaks of pyr, sl mic, non calc, poor vis por	
13	3150.3	6	Sst: gry wh, clr-transluc qtz, fn- v fn, occ med, mod srtd, subang-subrnd, fri, v kaol, sl pyr, poor-mod vis por	
12	3150.7	15	Sst: streaks of pyr, else a/a	
11	3150.9	18	a/a	
10	3151.5	20	Sst: lt gry, clr-transluc qtz, vfn, mod srtd, subang-subrnd, fri, pyr, sl kaol, sl arg, mod vis por	
9	3152.1	24	Sst: lt gry, clr-transluc qtz, vfn-fn, mod srtd, subang-subrnd, fri, sl kaol, sl mic, good vis por	
8	3152.6	22	Sst: lt gry, clr-transluc qtz, vfn-fn, subang-subrnd, fri, v pyr, sl kaol, mic, mod vis por	

SIDEWALL CORE DESCRIPTION

Country: NORWAY Area: North Sea Field:
Well no: 15/12-4 Run no.: 4B Interval: 3154.9 - 2694.5 m
K.B.E.: 23 Company : Statoil/Esso
Hole size: 8 1/2" Geologist: Kristensen/Svindland Date: 24/10-84

SHOT NO	DEPTH (mRKB)	REC (min)	LITHOLOGICAL DESCRIPTION	REMARKS
7	3152.9	15	Sst: lt gry, clr-transluc qtz, vfn-fn, subang-subrnd, fri, v pyr, sl kaol, mic, less pyr mod vis por	
6	3153.4	20	Sst: v pyr, else a/a	
5	3153.8	19	Sst: a/a tr of dk brn arg/carb material	
4	3154.1	25	Clyst: w/Sst lenses Clyst: dk gry, red brn spks, frm, massiv, mic, carb, pyr, v calc Sst: lt gry, clr-transluc qtz, vfn, subang-subrnd, fri, sl mic, sl pyr	
3	3154.3	6	Sst: lt gry, clr-transluc qtz, vfn-fn, subrnd-subang, kaol, pyr, arg, poor vis por	
2	3154.9	26	Clyst: w/Sst lenses and Lst nodules Clyst: dk gry-blk, red brn in spks, frm-hd, massiv, slty, mic, carb, pyr, sdy, v calc Sst: a/a Lst: lt gry, hd, microxln	

6.4 DRILLING FLUID SUMMARY

DRILLING MUD RECAP

WELL NAME: 15/12-4

NORSK PETROLEUM nps SERVICES!

MUD PROPERTY RECAP

DATE	DEPTH	DENSITY	VISC-OSITY	FILTRATE		HT/HP filt		pH	RHEOLOGY				FILTRATE ANALYSIS					RETORT ANALYSIS			CEC	OTHER		
	feet	PPG/ Spcf/ SG			Cake	°500psi			PV	YP	10"	10'	Cl	Ca	Pf	Mf	Pm	Oil	Water	Corr. Solids	PPB			
	metres		secs	ccs	1"/32/mm	ccs	1"/32/mm		cp	lbs/100ft²-gms/100cm²			mg/litre	ppm			YS CYP	%	%	%	Bent. Eq.			
12/9	-	1.03	58	-	-			11.6	11	40	15	40												
13/9	111	1.03	112	-	-			10.5	14	69	40	44												
14/9	173	1.03	55	-	-			9.5	11	27	16	24	8,000	200										
15/9	275	1.07	49	36	3			10.2	6	41	22	27	11,000	320				0	96	4				
16/9	193	1.08	45	46	3			10.1	5	31	18	24	12,000	280				0	96	4				
17/9	520	1.10	40	56	3			9.7	5	25	18	20	13,000	320				0	96	4				
18/9								NO		MUD			IN	PITS										
19/9	535	1.11	40	8.0	2			10.4	10	20	5	11	16,000	2240	.1	.4	4.8	0	97	3				
20/9	772	1.14	42	12.3	2			10.0	8	21	6	9	19,000	2800	.1	.3	4.0	0	95	5	10			
21/9	946	1.14	47	13.4	2			10.4	12	24	10	13	18,000	2200	.1	.3	3.5	0	94	6	11			
22/9	1271	1.14	45	12.1	2			10.1	12	22	9	13	17,000	2200	.1	.3	3.9	0	94	6	14			
23/9	1491	1.14	49	10.8	2			9.5	12	27	7	12	18,000	1900	.1	.3	3.8	0	94	6	15			
24/9	1620	1.14	44	12.8	2			9.6	9	24	9	15	18,000	1700	.1	.3	3.1	0	94	6	15			

WELL NAME 15/12-4 12 1/4 HOLE SECTION

NORSK PETROLEUM nps SERVICES

MUD PROPERTY RECAP

DATE	DEPTH	DENSITY	VISC-OSITY	FILTRATE		HT/HP filt		pH	RHEOLOGY				FILTRATE ANALYSIS					RETORT ANALYSIS			CEC	OTHER		
	feet	PPG/ Spgt/ SG			Cake	°500psi			PV	YP	10"	10'	Cl	Ca	Pf	Mf	Pm	Oil	Water	Corr. Solids	PPB			
	metres		secs	ccs	1"/32/mm	ccs	1"/32/mm		cp	lbs/100ft²-gms/100 cm²			mg/litre	ppm				%	%	%	Bent. Eq.	EXS GYP		SAND
25/9	1620	1.15	46	13.8	2			9.7	10	22	13	15	18,000	1840	0.1	0.3		0	94	6	18	3.5		TRACE
26/9	1594	1.14	43	15.0	3			10.8	9	16	8	11	18,000	2160	0.15	0.3		0	94	6	18	4.2		TRACE
27/9	1841	1.14	45	9.4	2			10.1	9	18	12	19	18,000	2200	0.1	0.3		0	94	6	17	4.0		.25
28/9	2194	1.15	46	9.8	2			9.7	11	19	12	16	18,000	2200	1.01	0.3		0	94	6	19	3.8		.3
29/9	2374	1.20+	44	9.3	2			9.4	11	18	13	21	18,000	1800	0.1	0.3		0	91	9	19	4.1		<.25
30/9	2439	1.25	45	9.3	2			9.7	12	19	12	17	18,000	2100	0.1	0.3		0	89	11	20	3.9		.3
1/10	2450	1.25	42	9.7	2			9.3	10	18	14	19	18,000	1750	0.1	0.3		0	90	10	20	4.0		TRACE
2/10	2494	1.25	45	8.6	2			9.7	12	21	18	24	18,500	1500	0.1	0.4		0	89	11	22	3.7		TRACE
3/10	2510	1.25	43	8.0	2			9.7	11	19	15	23	19,000	1600	0.1	0.4		0	90	10	21	3.5		TRACE
4/10	2527	1.25	46	8.0	2			9.5	12	20	17	29	20,000	1860	0.1	0.4		0	99	12	20	4.1		TRACE
5/10	2592	1.30	42	6.8	2			9.6	11	19	17	30	20,000	1760	0.1	0.4		0	88	12	18	4.1		TRACE
6/10	2636	1.30	45	6.6	2			9.5	10	20	18	32	20,000	1840	0.1	0.4		0	87	13	10	4.0		TRACE
7/10	2681	1.30	47	7.0	2			9.6	11	21	23	39	20,500	1840	0.1	0.35		0	85	15	10	4.2		TRACE
8/10	2681	1.30	46	7.2	2			9.5	12	19	17	34	21,000	1680	0.1	0.4		0	85	15	10	4.2		TRACE
9/10	2681	1.30	47	7.2	2			9.7	11	18	15	31	21,000	1640	0.1	0.4		0	85	15	10	4.1		TRACE
10/10	2681	1.30	42	8.0	2			9.4	13	13	11	23	20,000	1640	0.1	0.25		0	85	15	10	3.8		TRACE

WELL NAME 15/12-4 8 1/2" HOLE SECTION

NORSK PETROLEUM nps SERVICES

MUD PROPERTY RECAP

DATE	DEPTH	DENSITY	VISC-OSITY	FILTRATE		HT/HP filt		pH	RHEOLOGY				FILTRATE ANALYSIS					RETORT ANALYSIS			CEC	OTHER		
	feet	PPG/ Spgf/ SG			Cake	°500psi			PV	YP	10"	10'	Cl	Ca	Pf	Mf	Pm	Oil	Water	Corr. Solids	PPB			
	metres		secs	ccs	1"/32/mm	ccs	1"/32/mm		cp	lbs/100ft²-gms/100cm²			mg/litre	ppm				%	%	%	Bent. Eq.	EXS GYP		SAND
12/10	2681	1.30	42	9.4	2			9.8	12	14	12	30	21,000	1440	.2	.4		0	87	13	18	3.8		TRACE
13/10	2692	1.30	44	11.2	2			10.3	12	12	4	23	21,000	1680	.2	.8		0	86	14	16	3.5		TRACE
14/10	2718	1.30	54	7.0	2			10.7	17	13	3	22	20,000	1640	.2	1.3		0	86	14	20	3.2		TRACE
15/10	2760	1.35	55	5.4	2			10.3	24	15	4	24	20,000	1720	.2	1.4		0	85	15	22	3.0		TRACE
16/10	2804	1.35	55	5.0	2			10.6	23	13	3	17	21,000	7120	.2	1.6		0	85	15	22	3.0		TRACE
17/10	2861	1.35	51	4.4	2			10.3	22	13	3	13	21,000	1720	.15	1.6		0	85	15	22	2.8		TRACE
18/10	2901	1.35	53	4.4	2			10.4	22	14	3	11	22,000	1720	.2	1.8		0	85	15	25	2.3		TRACE
19/10	2920	1.35	54.60	4.3	1	15	3	10.2	22	12	3	12	21,500	1680	.2	1.4		0	85	15	23	1.9		.25
20/10	3044	1.35	56	4.2	1	14.8	3	10.7	22	15	3	18	21,000	1640	.2	1.6		0	84	16	24	1.2		.25
21/10	3146	1.35	62	4.3	1	14.0	3	10.6	25	14	3	15	21,500	1640	.2	1.6		0	84	16	25	0.7		0.30
22/10	3157	1.35	61	4.0	1	14.0	3	10.2	23	13	3	13	24,000	1500	.1	1.4		0	83	17	23	0.5		0.30
23/10	3157	1.35	76	3.9	1	14.0	3	10.3	25	14	3	18	21,000	1520	.2	1.3		0	83	17	22	0.7		.25
24/10	2777	1.35	71	4.3	1	18	3	11.3	25	14	3	18	21,000	1800	.3			0	82	18	22			TRACE
25/10	2560	1.36	66	4.8	1	20	3	11.6	26	18	4	22	21,000	1840	.6	1.9		0	82	18	22			TRACE
26/10	1397	1.36	76	4.8	1	22	3	11.7	26	16	3	19	21,500	1900	.7	2.0		0	83	17	22			.25
27/10	1394	1.34+	75	5.2	1			11.8	26	15	3	20	21,000		.8	2.0		0	83	17				TRACE

DAILY OPERATIONS LOG

OPERATING AREA

DAILY OPERATIONS LOG

11 Sept.:	Mix spud mud
12 Sept.:	Mixed 300m^3 spud mud
13 Sept.:	Drilled to 173 m. wiper trip. Displace hole with mud. Run and cement 30" casing.
14 Sept.:	Drill cement and shoe. Displace hole to mud. Drill to 240 m.
15 Sept.:	Drill 12 1/4" pilot hole to 520 m. Survey. Run "E"-Logs. Make up 26" under-reamer.
16 Sept.:	Under ream 12 1/4" hole to 26". Displace hole to wellhead with 150 m^3 1.25 S.G. mud. Displace riser with seawater.
17 Sept.:	Mixing 250m^3 GYP/POLYMER mud. Run and cement 20" casing.
18 Sept.:	Finish mixing 337 m^3 GYP/POLYMER mud. Displace hole to 1.10 S.G. GYP/POLYMER mud.

OPERATING AREA

DAILY OPERATIONS LOG

19 Sept.: Perform leak-off test to 1.44 EMW. Drill from 523 to 549 m. Drop survey trip for bit. Drill to 647 m. Survey, wiper trip. No drag, 8 meters fill. Stand pipe probe washed out. Survey and wiper trip at 752 m. No drag, no fill. Drill to 772 m. Dilution - 172 m^3.

20 Sept.: Drill to 867 m. Survey; no drag, no fill. P.O.O.H, make up new bit and Kelly. RIH, no fill. Dilution - 140 m^3.

21 Sept.: Drill 17 1/2" hole to 974 m. Survey, no fill. Drill to 1079 m. Survey, tight hole from 1023 max up 20 tone. Circulate out. RIH, no fill. Drill to 1213 m.
Dilution - 230 m^3, raise yield point with XC POLYMER.

22 Sept.: Drill to 1300 m. Survey. P.O.O.H. to 1147. Hole tight 1243 - 1230 m. RIH, no fill. Drill to 1405 m. Survey and wiper trip to 879 m. Tight hole 1300 to 990 m. Circulate out. RIH, no fill. Drill to 1491 m.

Dilution - 175 m^3

OPERATING AREA

DAILY OPERATIONS LOG

23 Sept.: Drill to 1511 m. Survey. P.O.O.H. to 1387 m. Tight hole 1446 - 1399 m. RIH, no fill. Drill to 1620 m. Circulate hole clean. Survey. Wiper trip to shoe. Tight 1120 - 1126 m. RIH, to T.D. no fill. Circulate hole clean P.O.O.H., no drag. Rig up dresser atlas. Unable to run logging tool past 791 m.

24 Sept.: Run in hole and work tight spot a 790 m. Continue to run in, no fill. Circulate for 3 hours pull out of hole and log, no problems. Run in with bit to T.D. Circulate and pull out.

25 Sept.: Run and cement 13 3/8 casing with no mud loss.

26 Sept.: Test stack drill cement from 1562 to 1594 m. Mix 50 m^3 of unweighted mud in reserve. Reduced fluid loss on circulating mud with DEXTRID. Running all solids control equipment including mud cleaner as desilter. Change no. 2 shaker to 60x60 on bottom screen.

27 Sept.: Drill cement to 1623 m and perform leak off to 1.87 equivalent mud weight. Drill to 1728 m., survey, pull out of hole and run in with MWD tool, drill to 1880 m.

OPERATING AREA

DAILY OPERATIONS LOG

Reduce fluid loss with DEXTRID and STAFLO Mix 23 m^3 Q mix in reserve. Continual dilution and chemical addition to maintain weight and volume. Change nol bottom screen to 40x40.

28th Sept.: Drill to 2165 m. and perform wiper to shoe. Tight spots 2041 - 2032 - 1830. Run in to 2165 with no fill. Drill to 2174 m. Screen sizes now S 20 S20 S20
S 80 S60 S100
Run all solids control equipment with continual dilution and chemical addition.

29 Sept.: Drill to 2374 m pullout to 2,214m. Tight spots 2320 - 2310 and 2272 to 2252. Wash 2301 -2328. Continue to run in, no fill. Circulate bottoms up and increase mud weight from 1.15 to 1.20. Drop survey and pull out of hole pump out 2108 to 2079.

OPERATING AREA

STATOIL 15/12-4

12 1/4 HOLE SECTION

DAILY OPERATIONS LOG

30 Sept.: Run in with new bit to 2147m. Ream and wash 2147 - 2174, 2220 - 2235 and 2299 - 2374. Circulate and increase mud weight from 1.20 to 1.25. Drill to 2439. Circulate bottoms up for sample prior to pulling out of hole. Control viscosity while weighting up with the addition of premix heavily treated with lo vis CMC. Change to 2 shaker bottom screen from S60 to S100.

1 Oct.: Continue to pull out with tight spots 2369 - 2368, 2335 - 2315. Run in with core barrel, ream and wash 2298 - 2326, 2423 - 2439m. Cut core nol from 2439 to 2450. Pull out of hole tight 2415 - 2400. Pump out 2400 - 2372 due to hole swabbing.

2 Oct.: Recover core nol. Run in with bit, ream and wash 2425 - 2450 m. Drill to 2494 m. Circulate bottoms up for sample. Pull out to hole Tight spot 2409 - 2390m. Run in hole with coring assembly. Run mud cleaner while circulating and other solids control as necessary 9.5 m^3.of seawater for dilution.

3 Oct.: Run in with core assembly, ream 2481 - 2494.5. Cut core no. 2 to 2499, pull out of hole. Run in ream and wash 2488 - 2499. Cut core no. 3 to 2511.
Run mud cleaner while circulating other solids equipment as necessary start to reduce filtrate with addition of CMC lo vis.

OPERATING AREA

DAILY OPERATIONS LOG

4 Oct.:	P.O.O.H and recover core 3 (100% rec). Lay down barrel. Press test B.O.P.'s. P/U BHA and RIH. Wash cored section and circulate B.U. through choke and degasser. Drill ahead. Treat / dilute and max solids control to maintain properties.
5 Oct.:	Drill to 2576 - Circulate B.U. survey and wiper trip - 1.5 m. fill. Circulate B.U. Wt. up to 1.30 and drill ahead.
6 Oct.:	Drill to 2612 - Trip for bit - R.I.H. Drill ahead. Max solids control and treat to maintain mud.
7 Oct.:	Drill to 2681 - Circulate B.U. - Wiper trip and circulate B.U. P.O.O.H. - Rig up and run electric logs.
8 Oct.:	Run electric logs.
9 Oct.:	R.I.H. Circulate and Cond. mud and circ. P.O.O.H. continue with electric logs.
10 Oct.:	R.I.H. Circ. and cond. mud and circ. B.U.- P.O.O.H. Rig up and run 9 5/8 casing.
11 Oct.:	Finish running 9 5/8" casing. Cement 9 5/8" casing. Lost 20 m^3 mud on cement job. Test BOP's. Make up new BHA.
12 Oct.:	RIH. Tag cement at 2628 m. Drill shoe and new hole to 2680m. Leak-off test to 1.86 S.G. EQ. Drill to 2692 m. POH.

OPERATING AREA

DAILY OPERATIONS LOG

13 Oct.:	Drill 8 1/2" hole to 2592m. Trip. Drill to 2695. Trip. Drilling break at 2712. Flow check negative. Added 20 m^3 Prehydrated Gel to maintain YP and reduce filtrate.
14 Oct.:	Drill 8 1/2" hole to 2744 m. Trip for bit No. 16. No fill. Circulate and Raise mud weight to 1.3. Drill to 2758m. Adding 1 - 2 m^3 seawater.
15 Oct.:	Drill 8 1/2" hole to 2801m. Trip for bit No.17. 1 m. fill. Drill to 2803m. Add 8 m^3 seawater to maintain volume and Plastic viscosity.
16 Oct.:	Drill 8 1/2" hole to 2861 m. Trip for bit No. 18.
17 Oct.:	Finish trip for bit No. 18. Drill 8 1/2" hole to 2902. Flow check. Circulate Bottoms up. P.O.O.H. for core barrel.
18 Oct.:	Pull out of hole and lay down MWD tool, run in with coring assembly. Cut core from 2902m. to 2920.5. Pull out, retrieve core. Test stack.
19 Oct.:	Test stack, run in hole, ream and wash from 2891 to 2920 m. Drill 8 1/2" hole to 3036m. Slow addition of prehydrated gel to raise yield point. Mix 15 m^3 Q mix in reserve.

OPERATING AREA

DAILY OPERATIONS LOG

20 Oct.:	Drilling 8 1/2" hole to 3146. Circulate bottoms up and pull out. No drag. Run Garret gas train at 3142m. Check inventory and materials received 210 CMC lo vis 200 CClb. Change broken screens on shakers 2 & 3 also mud cleaner.
21 Oct.:	Runn in hole, ream and was 3120 to 3146m. Dril 3156 work pipe due to high torque when on bottom. Perform wiper trip to hsoe, no drag, run in to T.D. no fill. circulate bottoms up and pull out. Rig up and run logs. Mud properties stable with the exception of slight increase 2000 ppm. in chlorides.
22 Oct.:	Logging
23 Oct.:	Logging, run in hole for wiper trip, circulate bottoms up. Pull out and continue logging. Test 6 samples while circulating. All showed 20-21000 ppm. chlorides.
24 Oct.:	Logging. Run in with drill pipe and set cement plugs 1 2 and 3. Reverse circulate after each plug and dump contaminated returns.
25 Oct.:	Run in with bit and dress cement from 2794 m. Pull out set cement plugs 4 and 5 back to 2650 m. Reverse circulate after each plug.
26 Oct.:	Run in with bit and tag cement at 2556 m. Drill to 2575 m. Pressure test and pull out. Set bridge plugs at 2568 m. and 1497 m.

OPERATING AREA

DAILY OPERATIONS LOG

27 Oct.:	Run in and tag plug at 1497 m. set cement plug back to 1394 reverse circulate and pull out Cut and retrieve 9 5/8 casing. at 450 m. Run in with 12 1/4 bit and scraper. Finish inventory and re-organizing sack room.
28 Oct.:	Set bridge plug at 436 m. Cut and attempt to retrieve 13 3/8 casing.
29 Oct.:	Cut and retrieve 13 3/8 casing. Set cement plug, lay down drill pipe dump and clean pits.
30 Oct.:	Pull riser and stack, cut and attempt to retrieve 20" casing.
31 Oct.:	Pull anchors move rig. Wait on weather.

OPERATING AREA

INTERVAL DISCUSSION

36" HOLE

Section drilled with seawater and high Vis Pills with return to seabed.

6-8 m^3 Hi Vis Mud 100+ Vis pumped on each connection.

Holed filled with mud prior to running 30" casing.

14 hours to drill

Cost per m^3	$ 18.86
Cost per m	$ 27.80
Interval cost	$ 8,658.13
Vol.	495 m^3

OPERATING AREA 15/12-4 SLEIPNER

NORSK PETROLEUM nps SERVICES

INTERVAL DISCUSSION

26" HOLE 20" CASING

This section was drilled in two passes - the 12 1/4" pilot hole was drilled to 520m and 26" with a 17 1/2" hole opener and 26" under-reamer to 516m. Electric logs were run in the 12 1/4" pilot hole.

Dilution rate through this section was $7m^3$ per cubic meter of open hole volume - weight was held at or below 1.10 S.G. while drilling.

The hole was displaced to well-head with 1.25 S.G. mud and the riser displaced with a 26" bit run to bottom. Tight spots were encountered at 280 and 520 meters with no overpull on trip out.

Twenty inch casing was run and cemented without problems. Enough 1.25 S.G. mud was made available to fill the casing and circulate the casing volume prior to cementing.

Solids control equipment was operated continuously thoughout this interval. The three brandt shakers were fitted with 20 mesh and 40 mesh screens respectively on top and bottom. The mud cleaner was operated as a desilter and the centrifuge and desander were also operated continuously.

INTERVAL DISCUSSION

17 1/2" HOLE 13 3/8" CASING

This section was drilled with gyp/polymer mud. All mud remaining from the previous section was dumped and 340 cubic meters of gyp mud was mixed - cement and shoe were drilled with this mud. Formation leak-off below the shoe was tested at 1.44 S.G. equivalent.

Mud losses over shakers were relatively high as extremely soft and sticky clays blinded the shaker screens. Losses were reduced to a minimum as the clays became progressively firmer below the utsira sand. All mud volume built throughout this section was made in order to maintain mud weight at 1.14 S.G. while drilling. At no time was mud prepared in order to replace fluid lost over the shakers.

Wiper trips were made each 100 meters. Most instances of excess overpull occurred on the first wiper trip through the newly drilled hole. Most occurrences of excess overpull were between 1100 and 1450 meters. The logging tool was unable to go past 790 meters. The hole was logged to T.O. after a wiper trip to bottom. No fill or overpull on trip out were noted.

A total of 1220 cubic meters of gyp/polymer mud was mixed over this interval. Dilution rate in order to maintain mud weight at 1.14 S.G. was approximately 4 cubic meters per cubic meter of opem hole volume.

Continued

OPERATING AREA 15/12-4 SLEIPNER

NORSK PETROLEUM nps SERVICES!

INTERVAL DISCUSSION

17 1/2" HOLE 13 3/8" CASING

All solids control equipment was operated constantly while drilling. Rig shakers were fitted with 20 mesh and 40 mesh screens on top and bottom respectively. The mud cleaner was operated as a disilter and the centrifuge and desander were also operated while drilling.

Thirteen and three-eighths casing was run and cemented without problem.

INTERVAL DISCUSSION

12 1/4" HOLE 95/8" CASING

The 9 5/8 casing interval took 16 days to complete. The interval was drilled in 98.9 rotating hours using six rock bits and one diamond core bit.

After drilling cement from 1562 m. to 1620 m. a leak off test was performed to 1.87 S.G. equivalent mud weight. The hole was then drilled to 1728 m. before pulling out to pick up the M.W.D. tool. Drilling continued to 2374 m. with a wiper trip at 2165 m. At 2374 a short trip was performed prior coming out of the hole, tight hole and a high short trip gas reading were experienced and it was decided to raise the mud weight from 1.15 to 1.20 before pulling out. After running in with a new bit the mud weight was increased to 1.25 in a further effort to stabalize the hole.

At 2439 m. the bit was pulled in order to run in with a coring assembly, again the hole was tight while pulling out. Core no. 1 was cut from 2439 m. to 2450 m., the hole was then drilled before cutting cores 2 and 3 to 2513.5 m. After drilling to 2576 m. the mud weight was raised from 1.25 S.G. to 1.30 after a wiper trip. Drilling continued to 2681 m. with a change of bit at 2612 m.

The hole was logged and the mud circulated before running and cementing 9 5/8 casing. While displacing cement 22 m^3 of mud were lost to the formation, 319 m^3 were transferred to the next section.

Continued

INTERVAL DISCUSSION

12 1/4" HOLE 9 5/8" CASING

While drilling the mud was maintained according to programme specifications with continual seawater dilution and chemical addition this maintained mud properties and volume. The mud cleaner was run continuously while circulating using 200 x 200 mesh screens. The desander and centrifuge, in fluid recovery mode, were run when necessary to control mud weight and solids content. At the start of the section the rig shakers were fitted with 20 x 20 mesh screens on the top deck and 20 x 40 and 40 x 40 on the bottom. The bottom screens were progressively change to 80 x 80, 100 x 100 and 100 x 100 in order to maintain as low a solids content as possible.

There were no problems keeping the mud to specification and this is reflected in the interval cost of $ 39,480.90 being considerably lower than the programme estimate of $ 69,380.26.

This was also due to carrying more mud over from the previous section (328 cubic meters) than had been anticipated (219m^3). The section cost was further reduced by transferring 319 cubic meters ($ 22,859.54) to the next section. In addition the speed with which the hole was drilled and the fact that no serious problems were encountered helped to reduce the cost of mud treatment and maintainance.

OPERATING AREA STATOIL Well No. 15/12-4

CONCLUSIONS AND RECOMMENDATIONS

12 1/4" HOLE 9 5/8" CASING

The Gyp Polymer mud used in this section performed well and was maintained within specification at below the estimated cost, in this respect no significant changes would seem necessary.

While drilling this section there was considerable tight hole on wiper trips though no problems while drilling. Prior to raising the mud weight to 1.30 S.G. there were some cavings evident on the shakers. Indicating unstable hole conditions.

The addition of 4.6 pounds per barrel of *SOLTEX if these problems are anticipated as well as increasing mud weight would help.

* This has been written into the mud programme for Well No. 6/3-1.

INTERVAL DISCUSSION

8 1/2" HOLE

The 8 1/2 hole was drilled with a LIGNITE LIGNOSULFONATE mud. The section took 18 days using 8 rock bits, 1 diamond core bit in 137.9 rotating hours.

After drilling 3 m. of new formation to 2680 m. a leak off test to 1.86 equivalent mud weight was performed.

At 2744 m. the mud weight was raised from 1.30 to 1.35, drilling continued to 2902 m. when the hole was cored to 2920.5 m. After coring the hole was drilled to 3146 when the bit was pulled due to high torque. Drilling continued with new bit no. to 3157 but there was an increase in the torque and overpull when pulling off bottom. After logging the hole it was decided that 3157 m. should be T.D. and the hole was plugged back.

During this section there were no hole problems other than the high torque evident in the last 10 meters. There was never significant drag or fill on trips and no signs of unstable hole at the shakers.

The mud system utilized the mud from the previous section with no further addition of GYPSUM, and the system maintained as a LIGNITE- LIGNOSULFONATE system using prehydrated gel and lignosulfonate for rheological control and CC16 and CMC lo vis to control filtrate loss. Continual seawater dilution and chemical addition maintained volume and mud properties.

Continued

INTERVAL DISCUSSION

The mud cleaner was run continuously while circulating and the rig shakers used 20 x 20 mesh screens over 60 x 60 and 50 x50 mesh.

The interval cost of $ 46,365. 73 was 96% of the programme estimate.

OPERATING AREA

MATERIALS USED PER CASING INTERVAL

36" HOLE 30" CONDUCTOR

MATERIAL	UNIT	QTY	COST	ESTIMATED USE	TOTAL COST $
BARITE	-	-	-	35	3,500.00
BENTONITE	MT	30	7,500.00	23	5,750.00
CAUSTIC		33	371.25		
CMC Extra Hi vis	25 KG.	14	612.50		
SODA ASH	50 KG.	11	223.52		
TOTAL MATERIAL COST			8707.27		9,250.00

COST PER METER DRILLED	61.43	ESTIMATED	142.31
COST PER CUBIC METER	18.97	ESTIMATED	30.53
COST PER BARREL	3.02	ESTIMATED	4.87

OPERATING AREA STATOIL Well No. 15/12-4.

MATERIALS USED PER CASING INTERVAL

26" HOLE 20" CASING

MATERIAL	UNIT	QTY	COST	ESTIMATED USE	TOTAL COST $
BARITE	MT	82	8,2000.00	152	15,200.00
BENTONITE	MT	18	4,500.00	50	12,500.00
CAUSTIC	25 KG.	37	416.25		
CMC Extra Hi vis	25 KG.	12	525.00		
LIGNOSULFONATE	25 KG.	12	159.00		
STAFLO	25 KG.	3	322.35		
SODA ASH	50 KG.	9	182.88		
XCD POLYMER	25 KG.	1	359.60		
TOTAL MATERIAL COST			14,665.08		27,700.00

COST PER METER DRILLED (345)	56.53	ESTIMATED (340)	81.47
COST PER CUBIC METER (1,147	17.00	ESTIMATED (779)	35.56
COST PER BARREL (7,213)	2.70	ESTIMATED (4900)	5.56

OPERATING AREA STATOIL Well No. 15/12-4.

MATERIALS USED PER CASING INTERVAL

17 1/2 HOLE 13 3/8 CASING

MATERIAL	UNIT	QTY	COST	ESTIMATED USE	TOTAL COST $
BARITE	MT	43	4,300.00	61	6,100.00
BENTONITE	MT	4	1,000.00	81	20,250.00
CAUSTIC	25 KG.	170	1,912.50	217	2,441.25
CMC Lo vis	25 KG.	118	4,336.50	248	9,114.00
CMC Hi vis	25 KG.	12	441.00		
CMC Extra Hi vis	25 KG.	3	131.25		
DEXTRID	50 LB.	293	17,392.48	344	20,419.84
GYPSUM	40 KG.	740	5,505.60	707(50KG.)	6,575.10
LIME	25 KG.	13	79.30		
LIGNOSULFONATE	25 KG.	-	-	155	2,053.75
SODA ASH	50 KG.	-	-	24	487.68
XCD POLYMER	25 KG.	85	30,566.00	144	51,782.40
TOTAL MATERIAL COST			65,664.63		119,224.02

COST PER METER DRILLED (1,100)	43.67	ESTIMATED (1100)	108.38
COST PER CUBIC METER (1,222)	53.74	ESTIMATED (1086)	109.78
COST PER BARREL (7,685)	8.55	ESTIMATED (6830)	17.47

OPERATING AREA STATOIL Well No. 15/12-4.

MATERIALS USED PER CASING INTERVAL

12 1/4 HOLE 9 5/8 CASING

MATERIAL	UNIT	QTY	COST	ESTIMATED USE	TOTAL COST $
BARITE	MT	112	11,200.00	283	28,300.00
BENTONITE	MT	2	500.00	18	4,500.00
CAUSTIC	25 KG.	103	1,158.75	131	1,473.75
CMC Lo vis	25 KG.	89	3,270.75	154	5,659.50
DEXDRID	50 LB.	247	14,661.92	216	12,821.76
DRISPAC (reg)	50 LB.	6	585.00	-	-
GYPSUM	40 KG.	345	2,566.80	327 (50KG)	3,041.10
LIGNOSULFONATE	25 KG.	40	530.00	27	357.75
SODA ASH	50 KG.	1	20.32	-	-
SODIUM BICARB	50 KG.	12	259.20	13	280.80
STAFLO	-	12	1,289.40	-	-
XCD POLYMER	-	24	8,630.40	36	12,945.60
TOTAL MATERIAL COST			44,715.24		69,380.26

COST PER METER DRILLED (1,060)	37.25	ESTIMATED (1,120)	61.95
COST PER CUBIC METER (870)	71.66	ESTIMATED (573)	121.08
COST PER BARREL (5,471)	11.39	ESTIMATED (3,600)	19.27

OPERATING AREA

STATOIL Well No. 15/12-4.

MATERIALS USED PER CASING INTERVAL

8 1/2 HOLE

MATERIAL	UNIT	QTY	COST	ESTIMATED USE	TOTAL COST $
BARITE	MT	56	5,600.00	216	21,600.00
BENTONITE	MT	11	2,750.00	25	6,250.00
CAUSTIC SODA	25 KG.	73	821.25	132	1,485.00
CC1b	50 LB.	265	4,505.00	362	5,592.90
CMC Lo vis	25 KG.	203	7,460.25	185	6,798.75
CMC Hi vis	25 KG.	3	110.25	-	-
DEXTRID	50 LB.	18	1,068.48	-	-
LIGNOSULFONATE	25 KG.	110	1,457.50	444	5,883.00
SODA ASH	50 KG.	9	182.88	9	182.88
SODIUM BICARB	50 KG.	5	108.00	12	258.20
TOTAL MATERIAL COST			24,179.51		48,051.73

COST PER METER DRILLED	(529)	87.65	ESTIMATED	(1,120)	61.95
COST PER CUBIC METER	(432)	107.33	ESTIMATED	(318)	151.11
COST PER BARREL	(2,717)	17.07	ESTIMATED	(2,000)	24.03

NORSK PETROLEUM nps SERVICES!

OPERATOR STATOIL

WELL NAME/No. 15/12-4.

CONTRACTOR O.D.C.C.

RIG DEEP SEA BERGEN

BAROID ENGINEERS CHRIS MADLEY - HOLLIS CLUCK

T.D. 3157 m.

HOLE SIZE	CASING SIZE	CASING SET AT	MUD TYPE	MUD COST	DRILLING DAYS
36"	30"	171	GEL-SEAWATER	3,869.92	0.6
26"	20"	505	GEL-SEAWATER	19,502.43	2.1
17 1/2	13 3/8	1601	GYP-POLYMER	48,039.43	2.9
12 1/4	9 5/8	2666	GYP-POLYMER	39,480.90	4.5
8 1/2	-	3157	LIGNITE-LIGNOSULFONATE	46,365.73	5.3

6.5 ENCLOSURES

statoil ASEBO

31/2T-4
COMPLETION LOG
Scale 1:500

AREA:	NORTH SEA
LICENCE:	036
COORDINATES:	59° 22' 24.04" N 02° 25' 00.00" E
RIG:	Ocean Vanguard
WATER DEPTH:	70m
TOTAL DEPTH:	5217m MSL
COMPLETION DATE:	1st Oct 1996
SPUD DATE:	7th Sep 1996
DRILLING TIME:	25 days
WELL STATUS:	A & A
TYPE:	Exploration Sidetrack
CONTRACTOR:	Smedvig
MUD TYPE:	Water based polymer

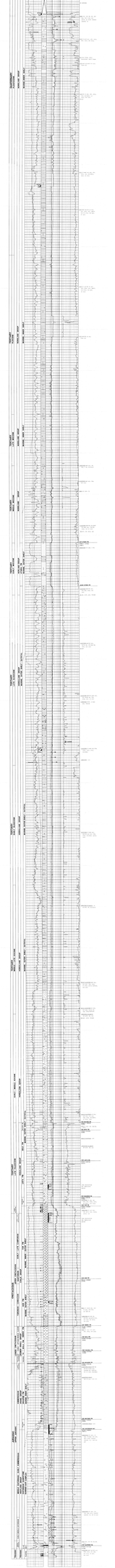
LOCATION MAP

PREPARED BY & DRAWN:		DATE: 30.10.96	
CONTACTS:		COMPLETION TIMES & VELOCITY SURVEY:	
Tel:	+47 51 72	TVD, completion: 5m. Est.	
Fax:	+47 51 72	All measurements are from RKB.	
Tel:	+44 1224		
Fax:	+44 1224		

CASING REAL				CONTRACTOR			
30" x 1"	1.0	1.0	1.0	Drilling Contractor	Smedvig	Drilling Contractor	Smedvig
20" x 1"	1.0	1.0	1.0	Drilling Rig	Ocean Vanguard	Drilling Rig	Ocean Vanguard
13 3/8" x 1"	1.0	1.0	1.0	Drilling Rig Type	Semi-Sub	Drilling Rig Type	Semi-Sub
9 5/8" x 1"	1.0	1.0	1.0				
7" x 1"	1.0	1.0	1.0				

COMMENTS
FOR INTERPRETATION, EVALUATION - SEE COMPLETION REPORT

LITHOLOGICAL SYMBOLS


Drilling Time (min/m)
Total Gas (%)
Chromatograph (ppm)
Lithology
Casing
Mud Weight (SG)
Formation Pressure (SG)
Fracture Pressure (SG)
Hole Deviation (deg)
Chloride (mg/l)
Resistivity (ohmm)
Porosity (%)
Water Saturation (%)
Permeability (mD)
Shale Density (SG)
Shale Resistivity (ohmm)
Shale Porosity (%)
Sonic Porosity (%)
Sonic Velocity (km/s)
Sonic Shale Porosity (%)
Sonic Shale Velocity (km/s)
Sonic Shale Resistivity (ohmm)
Sonic Shale Density (SG

EXLOG

Company:	
Well:	
Field:	
County:	
State:	
Elevation:	
Location:	
Spud Date:	
Comp. Date:	
Type Well:	
Depth Reached:	
Hole Size:	
Casing:	
Mud Type:	
Max. Gas:	
Max. Flow:	
Max. Pit Gain:	
Max. Trip Gas:	
Max. Connection Gas:	
Max. Background Gas:	
Max. Chlorides:	
Max. Temp. Out:	
Max. Temp. In:	
Max. Temp. Bottom:	
Max. Temp. Date:	
Max. Temp. Depth:	
Max. Temp. Time:	
Max. Temp. Type:	
Max. Temp. Method:	
Max. Temp. Source:	
Max. Temp. Remarks:	
Max. Temp. Remarks:	
Max. Temp. Remarks

EXLOG

COMPANY STATOIL
WELL 15/12-4
FIELD WILDCAT
REGION NORWEGIAN NORTH SEA
COORDINATES 58° 03' 09.2" N
01° 54' 12.5" E
API WELL INDEX NO.
SPUD DATE 13/9/1984
ELEVATION RKB TO MSL = 23m
RKB TO SB = 110m
TOTAL DEPTH 3157m
CONTRACTOR ODCC
RIG / TYPE DEEPSEA BERGEN/SEMI-SUB

LOG INTERVAL
DEPTH FROM 110m TO 2157m
DATE FROM 13/9/84 TO 23/10/84
SCALE 1:5000 UNIT 251
LOG PREPARED BY CRUTCHLEY/PICKUP
CURRY / PROTHERO / THORN

HOLE SIZE

36"	TO	173m	12 1/4"	TO	2680m
26"	TO	516m	8 1/2"	TO	3157m
17 1/2"	TO	1680m		TO	

CASING RECORD

30"	AT	171m	9 5/8"	AT	2665m
20"	AT	505m		AT	
13 3/8"	AT	1601m		AT	

MUD TYPES

SEAWATER GEL	TO	173m
GYPSUM POLYMER	TO	2680m
LIGNOSULPHONATE	TO	3157m

LITHOLOGY SYMBOLS

LIMESTONE, DOLOMITE, ANHYDRITE AND GYPSUM, HALITE, COAL AND LIGNITE, CLAY, SHALE, SILT AND SILTSTONE, SILTY SANDSTONE, SAND AND SANDSTONE, CONGLOMERATE, CHERT, IGNEOUS UNDIFFERENTIATED, TUFF, MARL

EXLOG SUITE

FORMATION EVALUATION LOG
PRESSURE EVALUATION LOG
DRILLING DATA PRESSURE LOG
WIRELINE DATA PRESSURE LOG
TEMPERATURE DATA LOG
GEMDAS COMPUTER LOGS

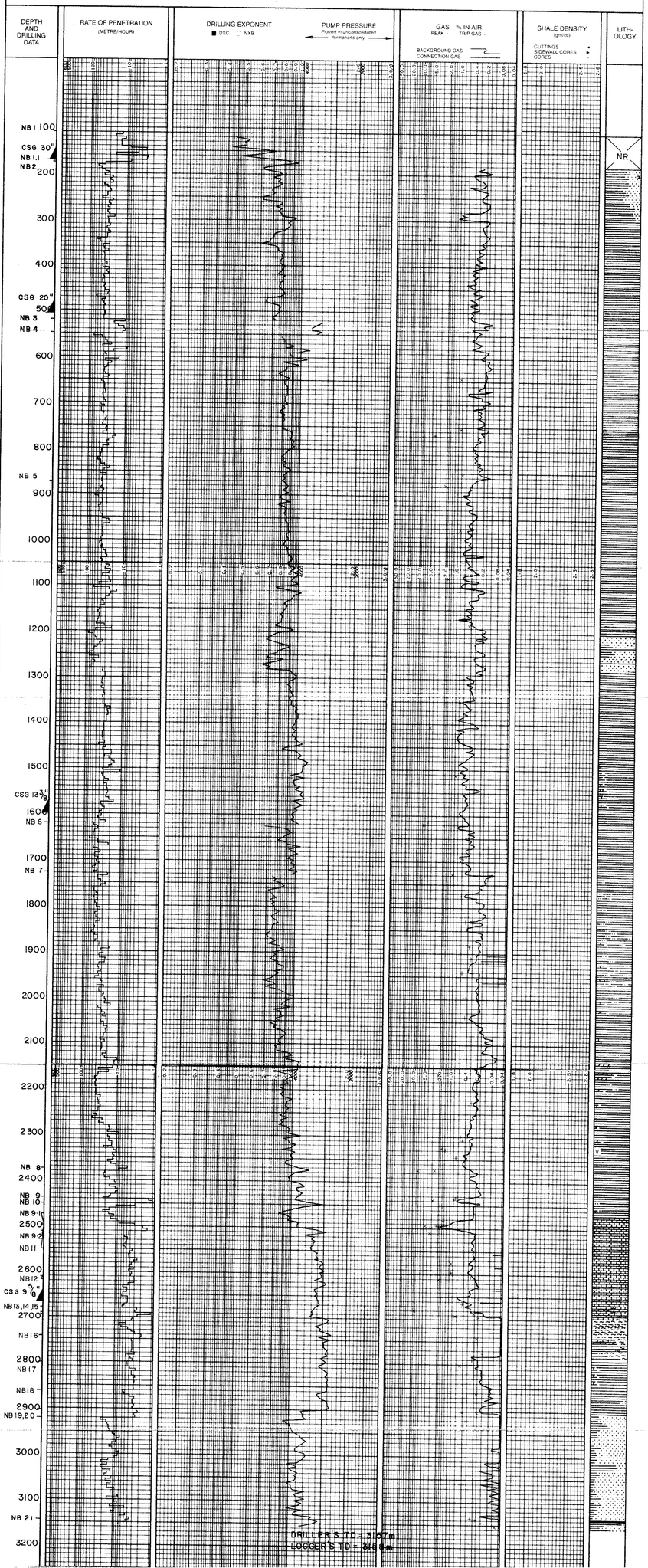
ABBREVIATIONS

NB NEW BIT
RRB RERUN BIT
CB CORE BIT
WOB WEIGHT ON BIT
RPM REVS PER MINUTE
FLC FLOW CHECK
CR CIRCULATE RETURNS
PR POOR RETURNS
NR NO RETURNS
LAT LOGGED AFTER TRIP
BG BACKGROUND GAS
TG TRIP GAS
STG SHORT TRIP GAS
CG CONNECTION GAS
SWG SWAB GAS
SVG SURVEY GAS
C CARBIDE TEST
W MUD DENSITY g/cc
V FUNNEL VISCOSITY
F FILTRATE – API
FC FILTER CAKE
PV PLASTIC VISCOSITY
YP YIELD POINT
SOL SOLIDS — %
SD SAND — %
S SALINITY — PPM Cl
RM MUD RESISTIVITY
RMF FILTRATE RESISTIVITY

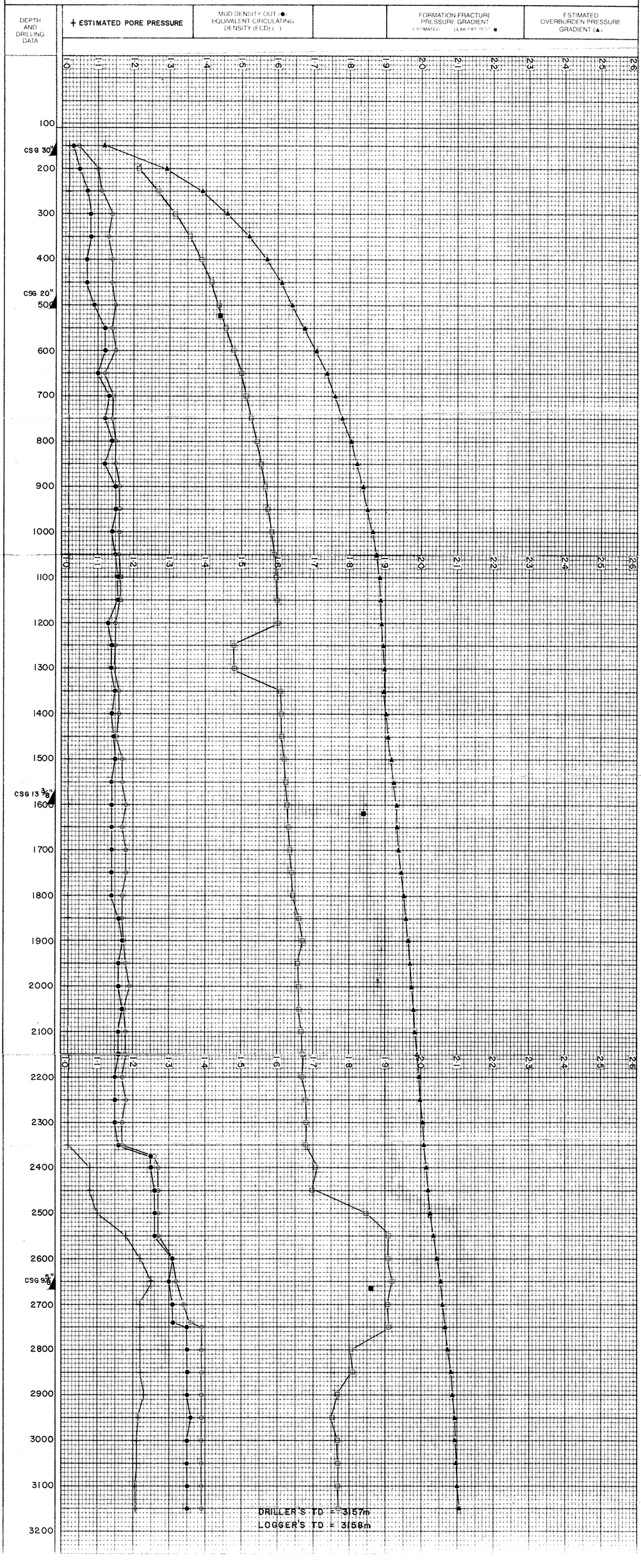
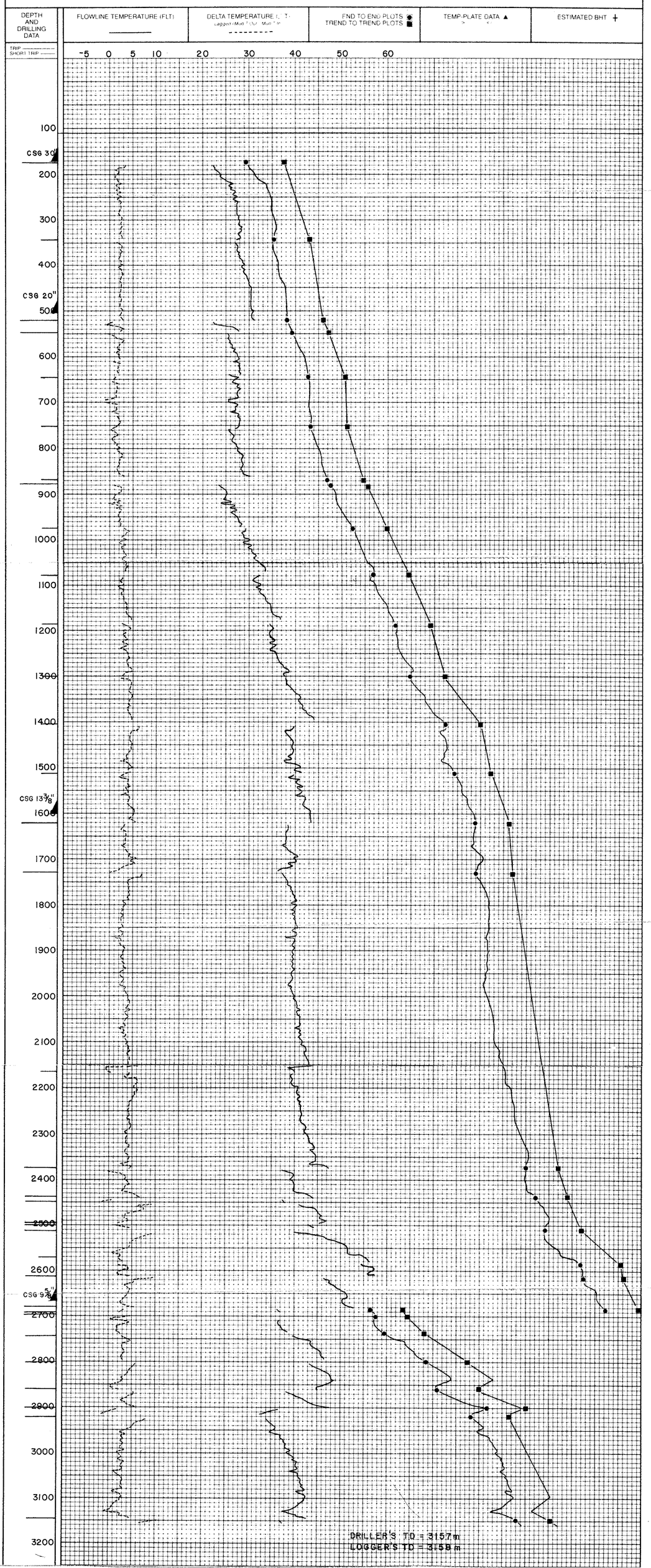
CASING SEAT
CORED INTERVAL
NO RECOVERY
SIDEWALL CORE
WIRELINE LOG RUN
TEST INTERVAL
WIRELINE TEST

GAS – 100 Total gas units is equivalent to 2% methane-in-air
LITH. – Based on several unwashed cuttings and percentage washing of washed cuttings

DRILLING DATA PRESSURE LOG



PRESSURE EVALUATION LOG



TEMPERATURE DATA LOG