



FORTROLIG
 i h.t. Beskyttelsesinstruksen,
 jfr. offentlighetslovens
 § nr.

FINAL WELL REPORT

GEOLOGICAL AND ENGINEERING

Journal no: **2/14180 - 1**
 date: **- 6 OKT. 1982**

SAGA PETROLEUM A.S./
 BP PETROLEUM DEVELOPMENT LTD. NORWAY/
 STATOIL

WELL 35/3-5
 LICENCE 041

- 6 OKT 1982
REGISTRERT
 OLJEDIREKTORATET

HØVIK, SEPTEMBER 1982

LICENCE INFORMATION

Licence 041 was awarded to Saga/Statoil/BP-group with Saga Petroleum a.s. as operator.

<u>Company</u>	<u>Working Interest</u>	<u>Net Interest</u>
Saga Petroleum a.s.	30 %	15 %
BP	70 %	35 %
Statoil	-	50 %

FINAL WELL REPORT WELL 35/3-5

<u>Parts</u>	<u>Contents</u>	<u>Page</u>
1.	SUMMARY	1
2.	GEOLOGY/GEOPHYSICS/PETROPHYSICS	3
	2.1. Key Data Summary	6
	2.2. Stratigraphy	20
	2.3. Sample Analyses	27
	2.4. Formation Evaluation	42
	2.5. Well Velocity Survey	57
3.	DRILLING AND ENGINEERING	
	3.1. Pertinent Information	61
	3.2. Highlights of Drilling Intervals	63
	3.3. Time Analysis	65
	3.4. Engineering Data	68
	3.5. Daily Activity Report	75
4.	ENCLOSURES	
	I Summary Log	
	II Conventional Core Description	
	III Formation Pressure Evaluation Sheet	
	IV Composite Well Log	
	V Seismic section SG 8130-413	

<u>Figures</u>	<u>Page</u>
2.1. Location of well 35/3-5	6
2.2. Formation temperature vs depth	17
2.3. Horizontal Permeability KL Core no. 1	48
2.4. " " KL " " 2	49
2.5. " " KL " " 3	50
2.6. " " KL " " 4	51
2.7. RFT gradients	54
2.8. RFT gradients	56
2.9. Time-depth curve	58
3.1. Time analysis	66
3.2. Time breakdown	67
3.3. Anchor pattern	69

<u>Tables</u>	
2.1. Sidewall cores shot and recovery	10
2.2. Open and cased hole logs	15
2.3. Temperature data	16
2.4. Conventional core porosities and permeabilities	43
2.5. Summary of results core no. 1	44
3.1. Bit hydraulic data	70
3.2. Cementing and casing details	73
3.3. Mud recap	74

PART 1

SUMMARY

1. SUMMARY

The well 35/3-5 was spudded on Dec. 22nd 1981 and completed on April 2nd 1982 by the rig "West Venture". The waterdepth was 261.5 m.

The well penetrated strata from Tertiary through Jurassic before reaching basement rocks of Pre-Cambrian or Caledonian age.

The well was plugged and abandoned as a dry well.

RFT measurements taken in the Lower Cretaceous gave a water gradient of 1-5 psi/m. Log evaluations indicate a total net sand of 106 m dispersed in the Lower Cretaceous. These sands have shales less than 40% and an average porosity of 17%. They are water bearing. Hardly any sands of significance are encountered in the Jurassic.

PART 2

GEOLOGY/GEOPHYSICS/PETROPHYSICS

2.	GEOLOGY/GEOPHYSICS/PETROPHYSICS	<u>Page</u>
2.1.	<u>Key Data Summary</u>	6
2.1.1.	Geographic Situation	6
2.1.2.	Purpose of Test	7
2.1.3.	Rock Sampling	7
2.1.4.	Special Analysis	13
2.1.5.	Wireline Logs	15
2.1.6.	Formation Temperatures	16
2.1.7.	Biostratigraphic Summary	18
2.1.8.	Lithostratigraphic Summary	19
2.2.	<u>Stratigraphy</u>	20
2.2.1.	General	20
2.2.2.	Nordland Group	20
2.2.3.	Hordaland Group	20
2.2.4.	Rogaland Group	21
	a) Balder Formation	
	b) Lista/Sele Formation	
2.2.5.	Shetland Group	22
	a) "Fm E"	
	b) "Fm D"	
	c) "Fm C"	
	d) "Fm B"	
	e) "Fm A"	
2.2.6.	"Cromer Knoll Group"	24
2.2.7.	Jurassic Sediments	25
2.2.8.	Basement	26
2.3.	<u>Sample Analysis</u>	27
2.3.1.	Sidewall Core Description	27
2.3.2.	Conventional Core Description	41

	<u>Page</u>
2.4. <u>Formation Evaluation</u>	42
2.4.1. Hydrocarbon Indication	42
2.4.2. Wireline Log Evaluation	42
2.4.3. Core Analysis	43
2.4.4. RFT Measurement	52
2.5. <u>Well velocity Survey</u>	57

2.1. Key Data Summary

2.1.1. Geographic Situation

The exploratory well 35/3-5 was drilled in the northern North Sea, approximately 50 km west of Måløy (fig. 2.1).

Final Location Coordinates :

Latitude : $61^{\circ} 47' 46,71''$ N

Longitude: $03^{\circ} 54' 44,01''$ E

Seismic Line : Line SG 8130-413, SP 484

Water Depth : 261.5 m

Rig : West Venture

RKB-MSL : 33 m

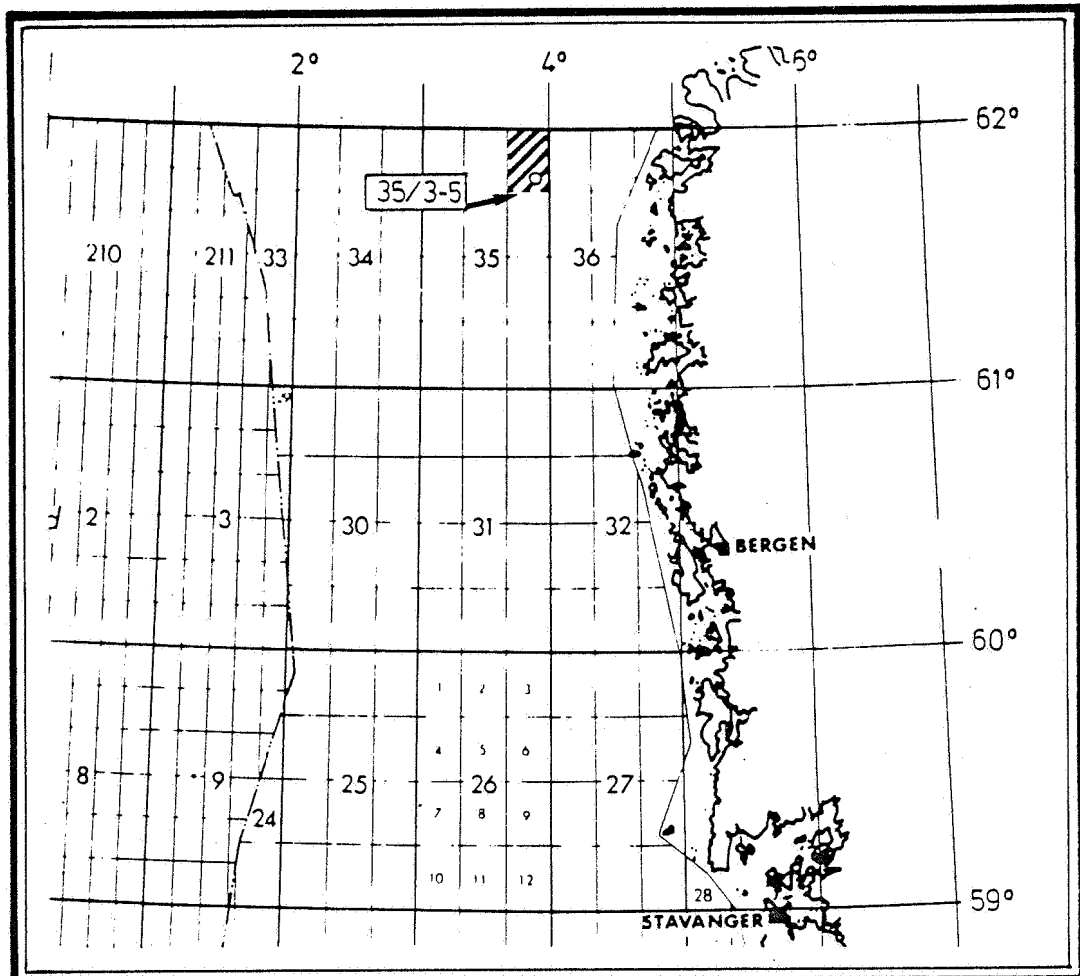


Fig. 2.1 Location of well 35/3-5

2.1.2. Purpose of test

The primary target of well 35/3-5 was sandstones of Lower Cretaceous age which have been found hydrocarbon bearing in the 35/3-2 and 4 wells. The correlation between sandbodies have proved uncertain in the area due to complicated tectonic and sedimentological pattern. For that reason the well was considered as a wildcat.

A secondary target was sandstones of Middle-Lower Jurassic age, which previously have been found to be hydrocarbon bearing (35/3-2), but with very poor reservoir characteristics.

2.1.3. Rock sampling

The following routine samples were collected :

- a) 2 sets of washed and dried cuttings

No returns : 294.5 mRKB (sea bed) - 410 m RKB
10 m intervals : 410 m RKB - 1400 m RKB
5 m intervals : 1400 m RKB - 2800 m RKB
3 m intervals : 2800 m RKB - 4110 m RKB

6 sets of wet ditch cuttings (1/2 kg)

- a) Saga
 - b) NPD
 - c) Statoil
 - d) Robertson Research (trades)
 - e) Robertson Research
 - f) Reserved paleo/palyno
- b) One set of canned samples was collected at 20 m composite interval from 410-1400 mRKB, at 10 m composite interval from 1400 mRKB to 2800 mRKB, and 9 m intervals from 2800 mRKB to T.D.

c) A total of 5 conventionally cores were cut

Core No. 1	Coring Depth	: 3227.6 - 3245.1 m
	Cored	: 17.5 m
	Recovered	: 17.4 m
	Recovery	: 99.4 %
	Depth correction	: + 3.8 m
	Corrected log depth	: 3231.4 - 3249.2
Core No. 2	Coring Depth	: 3245.1 - 3257.1 m
	Cored	: 12.0 m
	Recovered	: 12.0 m
	Recovery	: 100 %
	Depth correction	: + 4.1 m
	Corrected log depth	: 3249.2 - 3261.0 m
Core No. 3	Coring Depth	: 3257.1 - 3274.1 m
	Cored	: 17.0 m
	Recovered	: 17.0 m
	Recovery	: 100 %
	Depth correction	: + 3.9 m
	Corrected log depth	: 3261.0 - 3278.3 m
Core No. 4	Coring Depth	: 3274.1 - 3292.1 m
	Cored	: 18 m
	Recovered	: 18 m
	Recovery	: 100 %
	Depth correction	: + 4.2 m
	Corrected log depth	: 3278.3 - 3295.8 m
Core No. 5	Coring Depth	: 3740.0 - 3749.0 m
	Cored	: 9 m
	Recovered	: 0 m
	Recovery	: 0.0. %

d) 6 runs were made with the CST-tool. A total of 180 sidewall cores were shot, and 162 were recovered (90 %)

- In 12 1/4" hole : 2 runs consisting of 60 shots.
55 were recovered (91.7 %)
- In 8 1/2" hole : 4 runs consisting of 120 shots.
107 were recovered (89.2 %).

Table 2.1. Sidewall cores shot and recovery

a) SIDEWALL CORES IN 12 1/4" HOLE (2041-3406 m RKB)

Depth (m)	Recovered (cm)	Depth (m)	Recovered (cm)
2460	2.5	3314	2.6
2544	4.0	3317	2.9
2590	2.0	3319.5	3.0
2733.5	2.0	3326	1.3
2896	1.8	3329	1.6
2919	2.6	3332.5	1.4
3035	1.5	3338	2.0
3052	Lost	3341	1.3
3164	3.0	3344	1.9
3173	2.2	3347	1.2
3185	2.0	3352	1.5
3193	2.2	3357	2.0
3195	2.3	3363	Lost
3201.5	1.5	3363	4.0
3205	1.0	3366	Lost
3207.5	1.8	3368.5	2.9
3210.5	2.0	3372	3.9
3215	1.9	3374	2.0
3218	2.0	3376.5	3.1
3221.5	1.7	3378.5	2.8
3224	2.5	3381	2.6
3226	2.3	3383	2.5
3294	2.4	3385.5	1.0
3296	1.6	3388	2.0
3298	2.3	3392.5	1.5
3300.5	3.5	3400	Lost
3303	2.3	3400	3.6
3305	1.4	3405	2.0
3308	3.5	3410	Lost
3310.5	2.6	3410	2.4

b) SIDEWALL CORES IN 8 1/2" HOLE (3406-4114 m RKB)

Depth (m)	Recovered (cm)	Depth (m)	Recovered (cm)
3429.5	3.6	3606	1.2
3432.5	2.5	3612	2.1
3438.5	1.3	3617	4.9
3447.5	4.8	3620.5	4.6
3454	2.1	3630	3.8
3457.5	3.7	3634	4.1
3459.5	2.0	3637.5	2.6
3464	3.4	3643	2.3
3467	1.8	3652	1.5
3469.5	Misfire	3654.5	1.4
3475.5	1.7	3659.5	4.0
3483	3.6	3661.5	1.2
3486	Lost	3665	1.1
3488	3.1	3666.5	2.2
3491	1.0	3670.5	2.7
3493.5	Lost	3672.5	3.5
3498	4.0	3675.5	Lost
3500.5	1.0	3679	2.0
3505	1.2	3681.5	1.8
3512	Empty	3684	Lost
3517	1.6	3686	2.1
2521	3.9	3690	2.3
3530	5.0	3693.5	2.3
3531.5	3.0	3696	2.0
3533	3.0	3697	4.1
3543	4.0	3700	2.1
3547	4.0	3701.5	2.1
3550	1.4	3706.5	3.0
3556	2.9	3708	1.5
3560	2.0	3713	3.0
3561.5	4.0	3718.5	Lost
3570	1.0	3724	2.7
3577	4.8	3730.5	3.5
3584	Lost	3737	3.7
3593	4.0	3746.5	Lost

Depth (m)	Recovered (cm)	Depth (m)	Recovered (cm)
3754.5	4.5	4008.5	2.0
3760	2.4	4021	3.0
3764	1.1	4025	1.0
3770.5	5.0	4033	2.0
3777	3.5	4053.5	2.5
3783	2.1	4058	1.0
3787	Lost	4063.5	2.5
3793.5	5.0	4070	1.0
3798	3.0	4073.5	2.0
3802	4.8	4075.5	1.5
3806	3.1	4084	1.0
3809.5	2.1	4088	2.5
3814.5	2.0	4091	2.5
3818.5	2.6	4106	2.0
3821.5	3.2	4110	Empty
3828.5	2.2		
3833	2.1		
3835	1.0		
3841.5	1.2		
3849.5	2.3		
3854.5	4.0		
3861.5	1.0		
3867.5	3.0		
3875.5	2.0		
3885	1.0		
3891.5	Lost		
3900	3.0		
3912	1.5		
3930	1.0		
3942.5	1.5		
3956	3.0		
3975	2.5		
3985	2.0		
3995	3.5		
3998	Misfire		

2.1.4. Special Analysis

The following reports are completed and have been or will shortly be distributed to partners.

<u>AUTHOR</u>	<u>TITLE</u>
1. Geco	Conventional core analysis for 35/3-5
2. Geco	Core photoes, core 1-4
3. BP	Dipmeter interpretation of the Lower Cretaceous Reservoir in NOCS Block 35/3
4. Saga	Geology and well correlation of Jurassic and Pre-Jurassic in the Måløy Area, Norway
5. Saga	Stratigraphic well correlation of Tertiary and Upper Cretaceous in wells 35/3-3 & 4 and 35/3-5, Måløy Area, Norway
6. Saga	Paleo-correlation Lower Cretaceous 35/3-1, 2, 4, 5, 36/1-2
7. Saga	Special Core Description 35/3-5
8. Robertson Research	Biostratigraphy of the interval 900 m - 4114 m (TD), 35/3-5
9. Robertson Research	Sedimentological and Petrophysical study of Aptian and Albian in the Agat Field, Norwegian North Sea. Vol 1-3
10. IKU	Organic geochemistry well 35/3-5
11. Decca	Site survey 35/3-5
12. Geoteam	Resurvey 35/3-5

<u>AUTHOR</u>	<u>TITLE</u>
13. Geoteam	Rig position report
14. Exlog	Exploration logging well report 35/3-5

Casing Record	Hole size	Logged interval mRKB	Type of log	Run No	Date	
<p>30" at 410 m</p> <p>20" at 1032 m</p> <p>13 3/8" at 2041 m</p> <p>9 5/8" at 3406 m</p> <p>TD 4114 m</p>	36" hole to 420 m	410 - 1043.5	ISF-BHC-GR-CAL	1A	29.12.81	
	26" hole to 1046 m					
			292-1032	CBL-VDL-GR	1	5.1.82
			1032-2052	ISF-BHC-GR	2B	15.1.82
			1032-2052	FDC/CAL-GR	2A	15.1.82
		17 1/2" hole to 2052 m				
			2040.5-3411	ISF-BHC-MSFL/GR	3C	23.2.82
			2040.5-3412	LDL/CNL-GR	3B	"
			2040.0-3412	SHDT	3A	23.2 + 24.2.82
			3223.0-3397	RFT	3A	24.2.82
			2466.0-3410	CST	3A, 3B	"
			292.0-2041	CBL-VDL-GR	3B	25.2.82
	12 1/4" hole to 3413 m					
		Intermediate log run				
		3406-3719	ISF-BHC-MSFL-GR	4D	12.3.82	
		"	LDL-CNL-GR	4C	"	
		475-3718	VSP/vel. survey	4A	13.3.82	
		3700.0-4112.5	ISF-BHC-MSFL-GR	5E	22.3.82	
		3700.0-4100.0	NGS	5A	"	
		3700.0-4113.0	LDT-CNL-GR	5D	23.3.82	
		3406.0-4113.0	HDT	5B	24.3.82	
		3482.5-3598.5	RFT	5B	25.3.82	
		3429.5-4110.0	CST	5C, D, E, F	26.3.82	
		3467.0-4110.0	Vel. survey	5B	25.3.82	
		1680.0-3225.0	CBL-VDL-GR	5C	23.3.82	
	8 1/2" hole to 4114 m					

2.1.6. Formation Temperatures

Table 2.3.

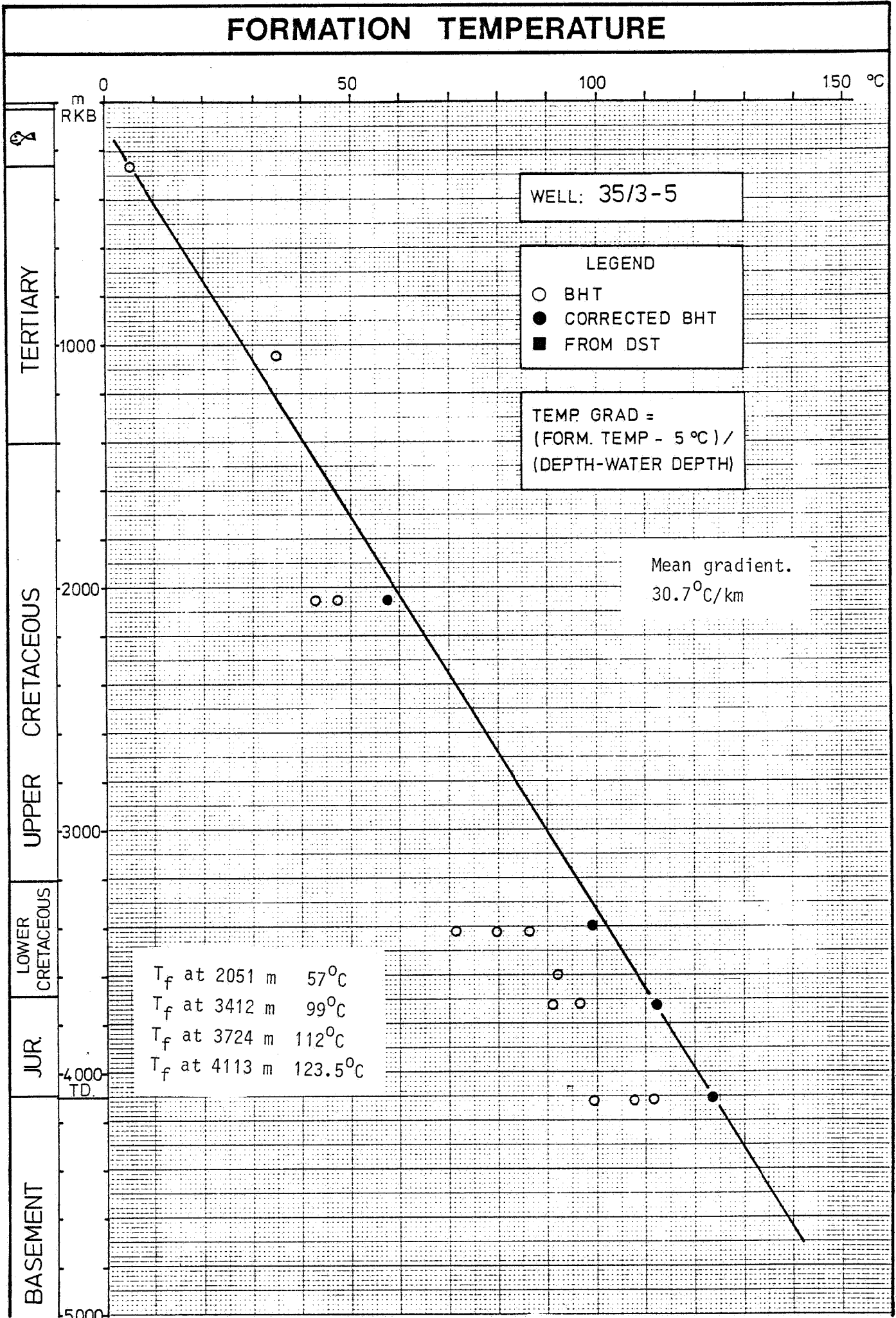
Saga
Petroleum a.s.



TEMPERATURE DATA

FIELD: WELL: 35/3-5 PAGE: 1						
LOG	DATE	RUN no.	Btm log interval	Max rec. temp. (BHT)	Time since circ. (Δt)	$\frac{\Delta t}{\Delta t + 10}$
ISF-BHC-GR-CAL	29/12-81	1A	1043.5	95 ⁰ F/35 ⁰ C	6hrs 20min	
ISF-BHC-GR	15/1-82	2B	2050.5	109 ⁰ F/42.8 ⁰ C	5hrs 45min	0.37
FDC-GR-CAL	15/1-82	2A	2051.5	117 ⁰ F/47.2 ⁰ C	9hrs 33min	0.49
ISF-BHC-MSFL-GR	23/2-82	3C	3411	160 ⁰ F/71.1 ⁰ C	7 hrs	0.41
LDL-CNL-GR	23/2-82	3B	3412	174 ⁰ F/78.9 ⁰ C	11hrs 45min	0.54
SHDT	24/2-82	3A	3412	187 ⁰ F/86.1 ⁰ C	18 hrs	0.64
RFT	24/2-82	3A	3397	201 ⁰ F/93.9 ⁰ C	27hrs 30min	Rem: Not used to corr.temp
CST	24/2-82	3A, 3B	3410	210 ⁰ F/98.8 ⁰ C Estimated	42hrs 30min	Rem: Not used to corr.temp
ISF-BHC-MSFL-GR	12/3-82	4D	3724	195 ⁰ F/90.6 ⁰ C	10hrs 30min	0.51
LDL-CNL-GR	12/3-82	4C	3719	204 ⁰ F/95.6 ⁰ C	15 hrs	0.60
ISF-BHC-MSFL-GR	22/3-82	5E	4113	211 ⁰ F/99.4 ⁰ C	7hrs 30min	0.43
NGS	22/3-82	5A	4100	211 ⁰ F/99.4 ⁰ C	7hrs 30min	0.43
RFT	25/3-82	5B	3599	197 ⁰ F/91.7 ⁰ C	13hrs 15min	
LDL-CNL-GR	23/3-82	5D	4113	225 ⁰ F/107 ⁰ C	13hrs 15min	0.57
HDT	24/3-82	5B	4113	232 ⁰ F/111 ⁰ C	19hrs 15min	0.66
CST	26/3-82	5C,D,E,F	4112	225 ⁰ F/107.2 ⁰ C	33hrs 15min	Remark: Not rel. data

Fig. 2.2.



2.1.7 Biostratigraphic Summary

(According to Robertson Research)

<u>Tops</u>	<u>Depth</u> (m RKB)	<u>Thickness</u> (m)
TERTIARY	Top not seen	
--Unconformity?--		
Late Palaeocene	990	370
Early Palaeocene (Danian)	1360	60
--Unconformity--		
LATE CRETACEOUS	1420	1773
Maastrichtian	1420	20
Early Maastrichtian -		
Late Campanian	1440	50
Early Campanian	? 1490	600
Santonian	2090	230
Coniacian-Turonian	2320	599
Cenomanian	2919	274
EARLY CRETACEOUS	3193	491
Albian	3193	384
Aptian	3577	93.5
Late-Middle Barremian	3670.5	8.5
Early Barremian -		
? Neocomian	3679	5
--Unconformity--		
JURASSIC	3684	408
Callovian	3684	129
--Unconformity--		
Middle Bajocian -		
Middle Toarcian	3813	279
--Unconformity--		
METAMAROPHIC BASEMENT	4092	

2.1.8 Lithostratigraphic Summary

<u>Tops</u>	<u>Depth (mRKB)</u>	<u>Thickness (m)</u>
NORDLAND GROUP	294.5	298.5
HORDALAND GROUP	593	382
ROGALAND GROUP	975	425
Balder Fm	975	51
Lista/Sele Fm	1026	374
SHETLAND GROUP	1400	1819
"Fm E"	1400	100
"Fm D"	1500	1069
"Fm C"	2569	248
"Fm B"	2817	95
"Fm A"	2912	307
"CROMER KNOLL GROUP"	3219	465
JURASSIC SEDIMENTS	3684	408
BASEMENT	4092	22
	T.D. 4114	

2.2 Stratigraphy

2.2.1 General

The interpretation is based upon electric logs, well cuttings, sidewall cores, conventional cores and biostratigraphic report prepared by Robertson Research. The lithostratigraphy is according to Deegan and Scull¹⁾.

2.2.2 Nordland Group (294.5 - 593 mRKB, 298.5 m)

Age: Quaternary - Pliocene. (Not dated)

Lithology: The group consists predominantly of a soft, light grey, slightly sticky and slightly silty clay which is moderately calcareous. There are occasional stringers of sand, which is loose, white to clear, medium to coarse, occasional fine grained, poor sorted, being subangular to subrounded and occasionally rounded. A white to grey limestone, which is soft to hard, is reported as trace in the group. Rock fragments of several lithologies are also observed throughout the group, schists, mica-schists, gneisses and two kind of siltstones. One is grading to sandstone, reddish-brown, firm and very calcareous. The other is grey green to light green, firm and slightly calcareous. Mineral traces of glauconite and pyrite are also observed. Fossil fragments like shell debris and sponge spicules are also reported as traces.

2.2.3 Hordaland Group (593 - 975 mRKB, 382 m)

Age: Pliocene ? - Oligocene - Eocene. (Not dated)

Lithology: The Hordaland Group consists mostly of a loose, clear to white, occasionally yellow sand/sandstone. It is grading from fine through coarse grained and is mostly poor sorted. The grains are grading from rounded to angular. The sandstone is sometimes

1) Deegan, C.E. & Scull, B.J. (1977): A Standard Lithostratigraphic Nomenclature for the Central and Northern North Sea. Institute of Geol. Sciences, Report 77/25, 36 p.

calcite cemented. The group also contains minor amounts of clay/claystone which often is slightly silty. It is light to brown and non calcareous. The claystone is mostly abundant in the interval 740-780 m and in the lowest part of the group. Stringers of limestone are also present. It is white to brown and firm to hard. Traces of mica, pyrite, glauconite, metamorphic rock fragments and shell debris.

Upper boundary: The upper boundary of the Hordaland Group is defined by a marked decrease in gamma ray readings and a slight decrease in the resistivity measurements.

2.2.4 Rogaland Group (975 - 1400 mRKB, 425 m)

Age: Paleocene.

The Rogaland Group is divided into two formations; The Balder Formation and the Lista/Sele Formation.

a) Balder Formation (975 - 1026 mRKB, 51 m)

Lithology: The Balder Formation consists of claystone with minor sandstone and tuff. The claystone is silty, light to medium grey, mottled, firm, and non- to slightly calcareous. The sandstone is clear-white, occasional yellow, medium to coarse, poor sorted, subangular to subrounded and loose grained. The tuffaceous material is dark grey to dark brown, occasional green to olive, white and black speckled. There are also observed traces of mica and glauconite.

Upper Boundary: The upper boundary is marked by a decrease in the gamma ray and a slight decrease in the resistivity readings. A more erratic pattern in sonic reading occurs.

b) Lista/Sele Formation (1026 - 1400 mRKB, 374 m)

Lithology: The formation consists mainly of claystone occasionally alternating with sandstone. The claystone is silty, light to dark grey, occasionally light green in the upper part, soft to firm and calcareous. The sandstone is best developed in the interval 1145-1175 mRKB, but does also

occur as thick beds else throughout the formation. It is clear to white, occasionally yellow, fine to very coarse, poorly sorted, subrounded to subangular and loose. Limestone occurs as traces throughout the formation. It is white to yellowish brown, occasionally brown to grey and firm to hard. There are also observed traces of mica, pyrite and glauconite.

Upper Boundary. The upper boundary is marked by an increase in the gamma ray curve and also a decrease in the sonic. A slight decrease in the resistivity measurements is also observed compared to the overlying Balder Formation.

2.2.5 Shetland Group (1400 - 3219 mRKB, 1819 m)

Age: Maastrichtian - Cenomanian

The Shetland Group is divided into five formations; "Fm A", "Fm B", "Fm C", "Fm D" and "Fm E".

a) Formation "E" (1400 - 1500 mRKB, 100 m)

Age: Maastrichtian - Campanian

Lithology: The formation consists mainly of claystone interbedded with limestone and minor sandstone. The claystone is silty, light to medium grey, occasionally brown and green, friable, and grades from very calcareous to non calcareous. The limestone is white, occasionally light brown, friable, occasionally hard and soft. It has some chalky appearance. The limestone is best developed in the middle and upper part of the formation. The sandstone is predominantly clear, occasionally yellow and light green, fine to coarse grained, poor sorted, subrounded to subangular, occasionally rounded and angular grains. In the formation it is observed traces of pyrite and glauconite.

Upper Boundary. The top of Formation "E" is marked by an increase in resistivity and a decrease in the interval transit time. It is a general increase in the gamma ray readings, but the curve has several "bottoms" due to the limestone beds of the formation.

b) Formation "D" (1500 -2569 mRKB, 1069 m)

Age: Campanian - Turonian

Lithology: Formation "D" consists predominantly of claystone with minor limestone and dolomite. The claystone is silty, light to medium grey, occasionally green, friable, occasionally firm, and slightly to non calcareous. In the lower part of the formation some of it has a shaly appearance. The limestone is white, crystalline to non-crystalline and grading from soft to hard. The dolomite is light brown, crystalline and hard. It is most abundant around 2500 m. The formation also contains traces of sandstone, pyrite, glauconite, siderite and microfossils (*Lenticula* sp.). The sandstone is medium grey to light brown, very fine to medium, well to moderately sorted, firm to hard, subangular to sub-rounded and predominantly calcareous cemented. The siderite is red brown, hard, translucent and crystalline.

Upper Boundary. The gamma ray readings increases slightly from Formation "E" to Formation "D". There is also observed a slight decrease in the resistivity readings.

c) Formation "C" (2569 - 2817 mRKB, 248 m)

Age: Turonian

Lithology: The main lithology of Formation "C" is claystone/shale with minor limestone and sandstone. The claystone/shale is silty, brownish grey, occasionally light grey, friable to firm, occasionally soft and hard and calcareous. The limestone is white, occasionally light brown, friable to firm, occasionally soft and crystalline. The sandstone is white to light grey, occasionally clear, fine to medium, poor porosity and calcareous. There also is traces of dolomite, pyrite and glauconite.

Upper Boundary: A slight decrease in gamma ray readings and interval transit time marks the upper boundary of Formation "C".

d) Formation "B" (2817 - 2912 mRKB, 95 m)

Age: Turonian

Lithology: The formation consists of siltstone/claystone with trace of sandstone. The siltstone and claystone are medium-dark grey to brown-grey, predominantly firm, occasionally hard, slightly calcareous and micromicaceous. The sandstone is light grey, fine to medium, poor to medium sorted and calcareous cemented. There is also trace of dolomite and limestone. The dolomite is brown and crystalline and the limestone is white to light grey and light brown and firm.

Upper Boundary: The boundary is marked by slightly increased gamma ray readings and interval transit time.

e) Formation "A" (2912 - 3219 mRKB, 307 m)

Age: Cenomanian

Lithology: Siltstone and claystone are the dominant lithology with streaks of sandstone and trace of limestone, dolomite and glauconite. The siltstone and claystone are medium to dark grey, firm to hard, slightly to moderate calcareous. The sandstone are clear to white, very fine-coarse, poorly sorted, angular to subangular, occasionally subrounded, firm, often loose, partly calcareous cemented and glauconite. The limestone is light to moderately brownish, microcrystalline and hard. The dolomite is brownish and hard.

Upper Boundary. A slightly decrease in the gamma ray readings and decrease in interval transit time mark the upper boundary of the Formation "A".

2.2.6 "Cromer Knoll Group" (3219 - 3684 mRKB, 465 m)

Age: Albian - Barremian

No formal group or formation names have yet been suggested for Lower Cretaceous in the area.

Lithology: The "Cromer Knoll Group" of the well consists of sandstone alternating with shale. The sandstone is white to light grey, fine to medium, occasionally coarse, moderate to well sorted, subangular to subrounded, firm to friable, partly calcareous cemented, micromicaceous and shows poor to good porosity. The shale is partly silty, black to dark grey, hard, occasionally brittle, subfissile and occasionally calcareous. There are also traces of siltstone, limestone, dolomite, chert, glauconite and pyrite. The siltstone is grey to brown, soft to firm and calcareous. The limestone is white to yellow and hard. The dolomite is light grey, hard and blocky. The chert is yellow, non crystalline and very hard.

Upper Boundary. An irregular pattern occurs in the resistivity and sonic logs response.

2.2.7 Jurassic Sediments (3684 - 4092 mRKB, 408 m)

Age: Callovian - Toarcian

No formal groups and formation names have yet been suggested for the Jurassic sediments.

Lithology: The Jurassic sediments consist of shale alternating with sandstones and/or siltstones. The upper half of Jurassic probably is partly conglomeratic, as abundant metamorphic and igneous fragments are reported in the cuttings. The shale is partly silty, medium to dark grey, occasionally brownish, firm, subfissile, occasionally micromicaceous, calcareous and non calcareous. The sandstone is white to light grey, very fine to very coarse, well to poor sorted, angular, firm, partly micromicaceous and calcite cemented. The siltstone is partly sandy, light grey to medium grey, friable to firm, occasionally micromicaceous and calcareous. The metamorphic basement fragments in the upper part consist of greenschists, micaschists, gneisses and quartzites. There are also traces of limestone and dolomite, pyrite, glauconite and micas. The limestone is white to brown, occasionally clear and light red, soft to hard. The dolomite is light to dark brown and hard.

Upper Boundary: The upper boundary is marked by a decrease in the interval transit time.

2.2.8 Basement (4092 - T.D. 4114 mRKB, 22 m)

Age: Probably Caledonian or Precambrian

Lithology: The basement of the well consists of green mica schist/gneiss. It is foliated and friable. The mica is muscovite, biotite and chlorite. The quartz is mostly clear. There are some calcite.

2.3 Sample Analysis

2.3.1 Sidewall Core Description

<u>Depth</u> <u>(m_RKB)</u>	<u>Lithology</u>
2410.0	SILTSTONE, occ sandy, argillaceous, light grey, poor sorted, subang - subrounded, loose - friable, glauc /chlor, partly calcite cemented, poor visible porosity, no show.
2460.0	CLAY/CLAYSTONE, grey-dark grey, sticky, calcareous, glauc /chlor, micromicaceous.
2544.0	SANDSTONE, clear-white - greenish grey, fine - medium, mod - well sorted, subang - subrounded, loose, glauc / chlor, kaolinite cemented, micaceous, slightly calcareous, poor - fair porosity, no show.
2590.0	SANDSTONE/SILTSTONE, clear - light grey, very fine - silty, mod sorted, subangular - subrounded, friable - firm, calcite cemented, glauc /chlor, micaceous, poor porosity, no show.
2733.5	CLAYSTONE, dark grey, friable - firm, micromicaceous, very calcareous.
2896.0	CLAYSTONE, silty, dark grey, firm, very calcareous, micromicaceous, glauc /chlor, subfissile.
2919.0	CLAYSTONE/SILTSTONE, grey, friable, micromicaceous, very calcareous.
3035.0	CLAYSTONE, silty, dark grey, firm, very calcareous, micromicaceous, glauc /chlor.
3052.0	LOST
3164.0	CLAYSTONE/LIMESTONE, light grey - grey, loose - firm, subfissile, micromicaceous, glauc /chlor no show.

<u>Depth</u> <u>(m_RKB)</u>	<u>Lithology</u>
3173.0	CLAYSTONE, silty, grey - dark grey, firm, micromicaceous, glauc /chlor, very calcareous.
3185.0	CLAYSTONE, grey - dark grey, firm, micromicaceous, very calcareous.
3193.0	SILTSTONE, occ sandy, clear - light grey, calcite cemented, glauc /chlor, poor porosity, no show.
3195.0	CLAYSTONE/SILTSTONE, grey - brownish, firm, micromicaceous, glauc /chlor, very calcareous.
3201.5	CLAYSTONE, silty, dark grey, soft-firm, micromicaceous, glauc /chlor, very calcareous. 5-10% white - yellow fluorescence, with white streaming cut.
3205.0	CLAYSTONE/SILTSTONE, light - bluish grey, friable - firm, glauc /chlor, calcite cemented, micromicaceous, no show.
3207.0	CLAYSTONE, silty, dark grey, firm, micromicaceous, glauc /chlor, very calcareous.
3210.5	CLAYSTONE, silty, dark grey - brownish black, firm - hard, micromicaceous, very calcareous.
3215.0	CLAYSTONE, silty, dark grey, firm, micromicaceous, glauc /chlor, very calcareous.
3218.0	CLAYSTONE, silty, dark grey, sticky, micromicaceous, glauc /chlor, very calcareous.
3221.5	SHALE, silty, dark grey, firm, micromicaceous, glauc /chlor, very calcareous.
3224.0	SHALE, silty, dark grey, firm - hard, micromicaceous, glauc /chlor, very calcareous.

<u>Depth</u> <u>(m_RKB)</u>	<u>Lithology</u>
3226.0	SANDSTONE, clear - white, fine - medium, occ coarse, mod sorted, subrounded - rounded, loose - friable, partly calcite cemented, glauc/chlor, micaceous, poor porosity, no show.
3294.0	SHALE, interlaminated with SILTSTONE SHALE, silty, dark grey, firm - hard, very calcareous, micromicaceous, subfissile. SILTSTONE, light grey, occ sandy, calcite cemented, glauc/chlor, micromicaceous.
3296.0	SHALE/SILTSTONE, occ sandy, light grey - grey, firm - hard, very calcareous, glauc/chlor, micromicaceous, no show,
3298.0	SHALE, silty, dark grey - black, firm - hard, very calcareous, micromicaceous, subfissile.
3300.5	SHALE, silty, dark grey - black, firm, micromicaceous, slightly calcareous.
3303.0	SANDSTONE, argillaceous, light grey - grey, fine - medium, mod sorted, subang - subround, loose - friable, partly calcite cemented, glauc/chlor, tr of porosity, no show.
3305.0	SANDSTONE, silty, clear - white, very fine - fine, mod sorted, subang - subround, friable - firm, calcite cemented, glauc/chlor, micaceous, poor visible porosity, no show.
3308.0	SHALE interlaminated with SILTSTONE. SHALE, dark grey - black, firm, micromicaceous, calcareous. SILTSTONE, light grey, firm, calcareous, micaceous.
3310.5	SHALE, dark grey - black, firm, micromicaceous, occ silty, slightly calcareous.

<u>Depth</u> <u>(m RKB)</u>	<u>Lithology</u>
3314.0	SANDSTONE, clear - light grey, very fine - fine, occ medium, mod sorted, subang - subround, friable, calcite cemented, glauc /chlor, micaceous, poor visible porosity, no show.
3317.0	SANDSTONE, clear - white, fine - medium, occ coarse, mod sorted, subangular, firm, calcite cemented, glauc /chlor, micaceous, poor porosity, no show.
3319.5	SHALE, silty, dark grey - black, firm, subfissile, micromicaceous.
3326.0	SANDSTONE, clear - light grey, fine - medium, mod sorted, angular - subangular, loose, slightly calcareous, glauc /chlor, mica, poor - fair porosity. Trace to 5% white to yellow fluorescence with white streaming cut.
3329.0	SANDSTONE, clear - white, fine - medium, mod - well sorted, subang - subrounded, friable - firm, calcite and silica cemented, glauc /chlor, micaceous, no porosity, no show.
3332.5	SANDSTONE, clear - light grey, very fine - fine, occ silty, moderately sorted, subangular - subrounded, loose, slightly calcareous, glauc /chlor, mica, poor porosity, no show.
3338.0	SANDSTONE with SHALE fragments. Sandstone, clear - light grey, very fine - fine, mod sorted, friable - firm, very calcareous, mica, glauc /chlor, poor visible porosity, no show. SHALE, dark grey - black, firm, occ silty, micromicaceous.
3341.0	SANDSTONE, clear - white, very fine - fine, mod - well sorted, subang - subround, firm, calcite cemented, glauc /chlor, micaceous, poor porosity, no show.

<u>Depth</u> <u>(m RKB)</u>	<u>Lithology</u>
3344.0	SANDSTONE with SHALE fragments: SANDSTONE, clear - light grey, fine - medium, mod - well sorted, friable, very calcareous, micaceous, glauc /chlor, poor porosity, no show. SHALE, dark grey - black, firm - hard, occ silty.
3347.0	SANDSTONE, clear - light grey, very fine - fine, mod - well sorted, subang - subround, firm, calcite cemented, glauc /chlor, micaceous, poor porosity, no show.
3352.0	SANDSTONE, clear - light grey, fine - medium, mod - well sorted, subang, loose - friable, very calcareous, micaceous, glauc /chlor, poor - fair porosity, no show.
3357.0	SANDSTONE, clear - light grey, very fine - fine, mod - well sorted, subang - subrounded, loose, very calcareous, glauc /chlor, micaceous, kaolinitic, poor porosity, no shows.
3363.0	LOST.
3363.0	SHALE, dark grey - black, firm, micromicaceous, slightly calcareous.
3366.0	LOST
3368.5	SHALE, interlaminated with SANDSTONE/SILTSTONE: SHALE, dark grey - black, firm, subfissile, micromicaceous, calcareous. SANDSTONE/SILTSTONE, clear - light grey, very fine - fine, mod sorted, subang, glauc /chlor, no shows.
3372.0	SANDSTONE, clear - white, very fine - fine, occ medium, mod sorted, subround - round, friable - firm, calcite cemented, glauc /chlor, micaceous, poor visible porosity, no show.

<u>Depth</u> <u>(m_RKB)</u>	<u>Lithology</u>
3374.0	SHALE/SILTSTONE, dark grey - black, firm - hard, subfissile, micromicaceous, calcareous. No shows.
3376.5	SHALE/SILTSTONE, dark grey - black, firm, subfissile, micromicaceous, calcareous.
3378.5	SANDSTONE interbedded with SHALE. SANDSTONE, clear - light grey, very fine - fine, occ silty, moderately - well sorted, subangular, friable, slightly calcareous, glauc /chlor, micaceous, kaolinitic, poor visible porosity, no shows. CLAYSTONE, dark grey - black, sticky, micromicaceous, sl. calc.
3381.0	SHALE, dark grey - black, firm, micromicaceous, slightly calcareous.
3383.0	SANDSTONE, clear - white, very fine - medium, moderately sorted, angular - subangular, argillaceous, loose-friable, calcareous, glauc /chlor, micaceous, kaolinite cemented, poor visible porosity, no shows.
3385.5	SANDSTONE, clear - white, fine - medium, mod - well sorted, subrounded, loose - friable, partly calcite cemented, glauc /chlor, poor visible porosity, no show.
3388.0	SANDSTONE, clear - white, fine - medium, moderately - well sorted, angular - subangular, friable, slightly calcareous, glauc /chlor, micaceous, argillaceous, kaolinitic, poor visible porosity, no shows.
3392.5	SANDSTONE/SILTSTONE, clear - white, very fine - fine, moderately sorted, subangular - subrounded, loose - friable, calcareous, glauc /chlor, micaceous, poor visible porosity, no show.

<u>Depth</u> <u>(m RKB)</u>	<u>Lithology</u>
3400.0	LOST
3400.0	SANDSTONE, clear white - light grey, medium, well sorted, subangular - subrounded, firm - hard, calcite and silica cemented, glauc /chlor, trace of porosity, no show.
3405.0	SANDSTONE, clear - white, fine - medium, mod sorted, subangular, firm, calcite cemented, glauc /chlor, no porosity, no shows.
3410.0	LOST
3429.5	SHALE, silty, dark grey, calcareous.
3432.5	SHALE, silty, dark grey, subfissile, calcareous.
3438.5	SHALE, silty, dark grey, non calcareous.
3447.5	SHALE, silty, dark grey to black, calcareous.
3454.0	SANDSTONE, light grey, medium, well sorted, firm, calcite cemented, glauc.
3457.5	SHALE, silty, grey to dark grey, non calcareous.
3459.5	SANDSTONE, grey, medium, well sorted, subrounded, firm, calcite cemented, glauc.
3464.0	SANDSTONE, light grey, medium, well sorted, calcite cemented, glauc.
3467.0	SANDSTONE, a/a.
3475.5	SANDSTONE, glauc, light grey, pred medium, firm, calcite cemented. Interbedded with small shale layers.

<u>Depth</u> <u>(m_RKB)</u>	<u>Lithology</u>
3483.0	SANDSTONE, light grey, medium to coarse, moderate sorted, firm, glauc, slightly calcite cemented.
3488.0	SANDSTONE, a/a,
3491.0	SANDSTONE, light grey, micaceous, slight calcareous. Interbedded with dark shale.
3498.0	SANDSTONE, light grey, pred medium, subrd - subang, firm, calcite cemented, glauc.
3500.5	SHALE, silty, dark grey, calcareous. Grading to siltstone.
3505.0	SANDSTONE, light grey, calcite cemented.
3517.0	SHALE, silty, dark grey to black, subfissile, non calcareous.
3521.0	SHALE, silty, medium grey, micromicaceous, non calcareous. Interbedded with siltstone, lt grey, non calcareous.
3530.0	SANDSTONE, light grey, fine - coarse, poor sorted, subang- subrd, firm, calcite cemented.
3531.5	SHALE, silty dark grey to black, fissile, slight-non calcareous. Interbedded with laminaes of white sandstones.
3533.0	SHALE, silty, dark grey to black, subfissile, calcareous. Few quartz grains in band in the shale.
3543.0	SANDSTONE, light grey, medium - fine, moderate sorted, glauc, calcite cemented. Alternating with black shale.

<u>Depth</u> <u>(m RKB)</u>	<u>Lithology</u>
3547.0	SANDSTONE, light grey to grey, fine - coarse, poor sorted, subrd - subang, glauc, calcite cemented.
3550.0	SANDSTONE, white to light grey. Interbedded with black shale.
3556.0	SANDSTONE, white to light grey, fine - medium. Interbedded with small stringers of black shale.
3560.0	SANDSTONE, white to light grey, medium, well sorted, firm, slight calcite cemented.
3561.5	SANDSTONE, white to light grey, medium, well sorted, glauc, kaolinite? cemented. Interbedded with shale, silty, black, non calcareous.
3570.0	SHALE, silty, med - dark grey, non - slight calcareous.
3577.0	SHALE, silty, dark grey to black, subfissile, non calcareous.
3593.0	SANDSTONE, white to light grey, fine - medium, well sorted, calcite cemented, glauc.
3606.0	SHALE, silty, med - dark grey, non - slight calcareous.
3612.0	SHALE, a/a.
3617.0	SHALE, a/a.
3620.5	SHALE, silty, med - dark grey, subfissile, non calcareous.
3630.0	SHALE, silty, dark grey to black, subfissile, non calcareous.

<u>Depth</u> <u>(m_RKB)</u>	<u>Lithology</u>
3634.0	SHALE, silty, dark grey to black, subfissile, non calcareous.
3637.5	SHALE, silty, med - dark grey, subfissile, slightly calcareous.
3643.0	SHALE, silty, med -dark grey, fissile, firm, non calcareous. Pebbles(boulders) of quartzite w/mica schists and calcite.
3654.5	SHALE, silty, medium - dark grey, subfissile, firm, non calcareous.
3659.5	SHALE, as above
3661.5	SHALE, silty, medium - dark grey, subfissile, non calcareous.
3665.0	SILTSTONE, light grey to grey, firm, calcite cemented.
3666.5	SANDSTONE, white, pred medium, well sorted, kaolinite? cemented.
3670.5	SHALE, silty, medium - dark grey, subfissile, non calcareous.
3672.5	SHALE, silty, medium - dark grey, firm, subfissile, non calcareous.
3679.0	LIMESTONE, white, friable, crystalline. DOLOMITE, light brown, firm, crystalline. Trace of micas (biotite, muscovite, phlogopite), some quartz grains and shale.
3681.5	SANDSTONE, white, pred. medium, well sorted, kaolinite cmtd? Interbedded with shale, silty, dark grey, subfissile, non calcareous.
3686.0	SHALE, silty, medium grey, calcareous. Pebbles of quartzite with mica. Foliated. Mica is muscovite, biotite, chlorite. Calcite.

<u>Depth</u> <u>(m_RKB)</u>	<u>Lithology</u>
3690.0	SANDSTONE, white, medium, well sorted, subang - subrd, calcite cemented.
3693.5	SANDSTONE, white to light grey, pred medium - fine grains, firm, calcite cemented. Interbedded with SHALE, silty, brownish to medium grey, non calcareous.
3697.0	SHALE, silty, med grey to brownish, non calcareous.
3700.0	METAMORPHIC FRAGMENT surrounded by SHALE. METAMORPHIC FRAGMENT, foliated quartzite and mica (white mica) layers. Calcite, Very hard. SHALE, silty, med grey, subfissile, friable, calcareous.
3701.5	SHALE, silty, medium grey to brownish, firm, subfissile. micaceous, slightly calcareous.
3706.5	SHALE, a/a.
3708.0	DOLOMITE/CALCITE, light brown, firm to hard, crystalline. Alternating with SHALE, silty, med grey, calcareous.
3713.0	SHALE, silty, med grey, subfissile, calcareous, micaceous. Alternating with SILTSTONE, light grey, calcite cemented.
3724.0	SHALE, silty, med grey to brownish, micaceous, calcareous.
3730.5	SHALE, silty, med grey, subfissile, firm, non calcareous, micaceous.
3737.0	SHALE, silty, med grey to brownish, pred firm, calcareous, micaceous.

<u>Depth</u> <u>(m RKB)</u>	<u>Lithology</u>
3754.5	SHALE, silty, medium grey, occ brownish, slight calcareous.
3760.0	SHALE, a/a.
3764.0	SHALE, silty, medium grey occ brownish, subfissile, firm, non calcareous.
3770.5	SHALE, a/a.
3777.0	SHALE, silty, medium - dark grey, subfissile, firm, calcareous.
3783.0	SHALE, a/a.
3793.5	SHALE, silty, medium - dark grey, subfissile, calcareous.
3798.0	SHALE, silty, medium to dark grey, calcareous, grading to SILTSTONE. Rock fragments, greenish (mica + qtz), very hard, (conglomerate?).
3802.0	SILTSTONE, light to medium grey, firm, micaceous, calcite cemented, grading to SHALE.
3806.0	SHALE, silty, medium to dark grey, subfissile, calcareous.
3809.5	SHALE, a/a.
3814.5	QUARTZITE/MICA SCHIST with calcite.
3818.5	SHALE, silty, medium grey, calcareous.
3821.5	SHALE, silty, medium to dark grey, friable, calcareous.
3828.5	SILTSTONE, sandy, light grey to medium grey, friable to firm, calcite cemented.

<u>Depth</u> <u>(m_RKB)</u>	<u>Lithology</u>
3833.0	SILTSTONE, light grey to medium grey, predominantly friable, calcite cemented.
3835.0	SILTSTONE/very fine SANDSTONE, light grey, friable, calcite cemented.
3841.5	SHALE, silty, medium grey, friable, calcareous, Alternating with small bands of SILTSTONE/SANDSTONE.
3849.5	SHALE, silty, dark grey, firm, subfissile, slight - non calcareous.
3854.5	SHALE, silty, dark grey, firm, non calcareous.
3861.5	SHALE, a/a.
3867.5	SANDSTONE, white to light grey, medium - very coarse, angular, poor sorted, firm, calcite cemented.
3875.5	SHALE, silty, dark grey, friable to firm, non calcareous.
3885.0	SHALE, a/a.
3900.0	SHALE, a/a.
3912.0	SHALE, a/a.
3930.0	SHALE, silty, dark grey, friable, non calcareous.
3942.5	SHALE, a/a.
3956.0	SHALE, silty, dark grey, friable, non calcareous.
3975.0	SHALE, medium grey, friable, non calcareous.
3985.0	SHALE, a/a.
3995.0	SHALE, a/a.
4008.5	SHALE, silty, moderate grey to brownish, friable, micaceous, non calcareous.

<u>Depth</u> <u>(m_RKB)</u>	<u>Lithology</u>
4021.0	SANDSTONE, white to light grey, fine - very fine, firm, moderate to well sorted, micaceous, calcite cemented.
4025.0	SILTSTONE, lt grey to medium grey, probably kaolinite cemented, micaceous.
4033.0	SILTSTONE, a/a. Interbedded with SHALE, silty, grey, soft to friable, micaceous, non calcareous.
4053.5	SILTSTONE, light grey, friable, calcite cemented, micromicaceous.
4058.0	SILTSTONE a/a.
4063.5	SILTSTONE, light grey, cemented with calcite, micromicaceous.
4070.0	SANDSTONE/SILTSTONE, white to light grey, micaceous, non calcareous, prob. kaolin.
4073.5	SANDSTONE/SILTSTONE a/a.
4075.5	SANDSTONE/SILTSTONE a/a.
4084.0	SILTSTONE, light grey, cemented with kaolinite?, micromicaceous.
4088.0	SANDSTONE, clear to white quartz grains, coarse to fine, poor sorted, angular, cemented with calcite, micaceous.
4091.0	SANDSTONE, clear quartz grains, coarse to very coarse, occ med, poor sorted, angular, cemented with calcite, micaceous (muscovite).
4106.0	MICA SCHIST/QTZ GNEISS. Greenish, foliated, but friable. Mica is muscovite, chlorite (biotite). Qtz is mostly clear. Some calcite.

Depth (m RKB)	Lithology
4110.0	MICA SCHIST/QTZ band. Foliated, greenish, calcite.
4112.0	MICA SCHIST/QTZ band, a/a.

2.3.2. Conventional Core Description

A total of 5 conventional cores were cut.
4 cores were cut in the Lower Cretaceous.
1 core was cut in the Jurassic, without recovery.

For corrected log depth, see 2.1.3.c.

Core description and pertinent information are attached on the well site Conventional Core Description Log (enclosure 1).

2.4 Formation Evaluation

2.4.1 Hydrocarbon Indication

Above lower Cretaceous the gas readings were noted to be less than 0.05% on average.

Lower Cretaceous

An average of 0.05% was read throughout the lower Cretaceous. A maximum gas reading of 0.25% was noted at a depth of 3350m. The gas consisted mostly of C₁.

Jurassic

Traces of gas not exceeding 0.05% C₁ was the main gas component.

2.4.2 Wireline Log Evaluation

A full suite of logs (ISF-BHC-MSFL-GR, LDT-CNL-GR) were run in the lower Cretaceous and Jurassic. An analysis was run over the zone 3190m RKB to 3725M RKB.

The key input parameters to the analysis are:

Rw (ohm-m)	=	0.19
Rmf (ohm-m)	=	0.148
RGh (ohm-m)	=	3
t _{ma} (mscf/ft)	=	53
Pcl (g/cc)	=	2.55
Rho _{ma} (g/cc)	=	2.68
Ønc1%	=	35
m	=	2
n	=	2
a	=	1

Cut off parameters:

Sw 65%

Vs1 40%

Ø 12%

The following table summarized the analysis.

Top Zone (mRKB)	3190	3685	(Lower Cretaceous)
Bottom Zone (mRKB)	3685	3710	(Jurassic) Low. Cret.
Gross Thickness (m)	495	15	
Net Thickness (m)	106	1	
Average Log Porosity (%)	17	17	
Average Water Sat. (%)	100	100	

All sands are shaly with values ranging from 0 to 40%

2.4.3 Core Analysis

Five cores were cut in this well. Cores 1 to 4 were taken in the Lower Cretaceous whereas core 5 was in the Jurassic. Apart from core 5 which had no recovery, all the other cores were sent to GECO for analysis. At GECO measurements of porosity (Helium), grain density, horizontal and vertical permeabilities were taken. Averages of the results for the respective cores are listed in tables 1-8.

Table 2.4 Conventional Core Porosities and Permeabilities

Core 1

Depth mRKB	Permeability (Horizontal)	Porosity (Helium %)
3227.65-75	0.13	6.6
3228.03-79	6.3	18.9
3229.09-75	5.5	17.5
3230.00-75	2.4	11.5
3231.00-42	10.8	17.8
3233.09-81	0.4	8.7
3234.12-81	3.1	12.0
3236.75-85	1.4	14.6

Depth (mRKB)	Permeability (Horizontal Air)	Porosity (Helium%)
3237.02-76	5.6	16
3238.00-96	27	16.9
3239.3-78	7.9	15.1
3240.00-79	12	12.8
3241.2-66	46	18.1
3242.00-97	17	16.7
3243.4-82	2	13.4
3244.1-85	4.2	15.3

Table 2.5 Summary of Results Core No. 1

Stratigraphy	:	Lower Cretaceous
Core interval (driller's depth:	:	3227.65-3245.1
Average Core Recovery	:	99.4%
Helium porosity, arithmetic	:	
Average	:	14.5%
Horizontal air permeability, md	:	
maximum value	:	82md
arithmetic average	:	9md
geometric average	:	4.48
Vertical air permeability, md	:	
maximum value	=	76
arithmetic average	=	6.9
geometric average	=	3.2

Core 2

	Horizontal Permeability Air	Vertical Permeability Air	Helium (Ø)
3245.18-3245.92	2.9	1.42	12
3246.15-3246.82	31.8	34	18.5
3247.07-3247.73	20	17.9	14.7
3248.0-3248.78	9.2	7.3	15.7
3249.0-3249.95	6	1.4	13.3
3250.25-3250.9	2.2	1.5	15.5
3251.26-3251.97	4.5	2.2	16.1
3252.2-3252.9	2.7	2.6	13.7
3253.37-3253.95	3.9	1.7	14.6
3254.48-3254.9	17	6.9	20.6
3255.1-3255.9	27.8	19.4	13.2
3256.26-3256.9	9.5	7.5	16.7
			16%

Stratigraphy	:	Lower Cretaceous
Average Recovery	:	100%
Net/Gross Cored Interval	:	
Helium Porosity, arithmetic average	:	16%
Horizontal permeability, md		
Maximum value	:	81
Arithmetic average	:	11.7
Geometric average	:	8.4
Vertical permeability, md		
Maximum value	:	60
Arithmetic average	:	8.9
Geometric average	:	5.2

Core 3

Depth	Horizontal Permeability Air	Vertical Permeability Air	Helium (Ø)
3257.29-3257.77	6.8	8.8	16.3
3258.07-3258.97	.82	0.37	10.4
3259.22-3259.97	.38	0.24	8.0
3200.25-3200.84	1.5	0.9	9.5
3261.13-3261.92	3.0	1.8	13.1
3262.22-3262.99	8.9	4.6	17.3
3263.29-3263.99	10.2	6.5	14.3
3264.23-3264.91	1.5	0.75	11.8
3265.25-3265.90	2.6	0.6	10.9
3266.25-3266.65	0.24	0.1	7.2
3267.09-3267.81	0.45	0.115	7.2
3268.05-3268.91	0.82	0.32	9.1
3269.52-3269.61	0.64	0.09	5.8
3270.76-3270.83	0.193	0.111	8.0
3271.12-3271.82	34.2	12.4	19.6
3272.14-3272.96	0.62	0.62	10.3
3273.25-3273.70	1.3	0.58	10.1
3274.01-3274.85	0.79	0.149	11.3

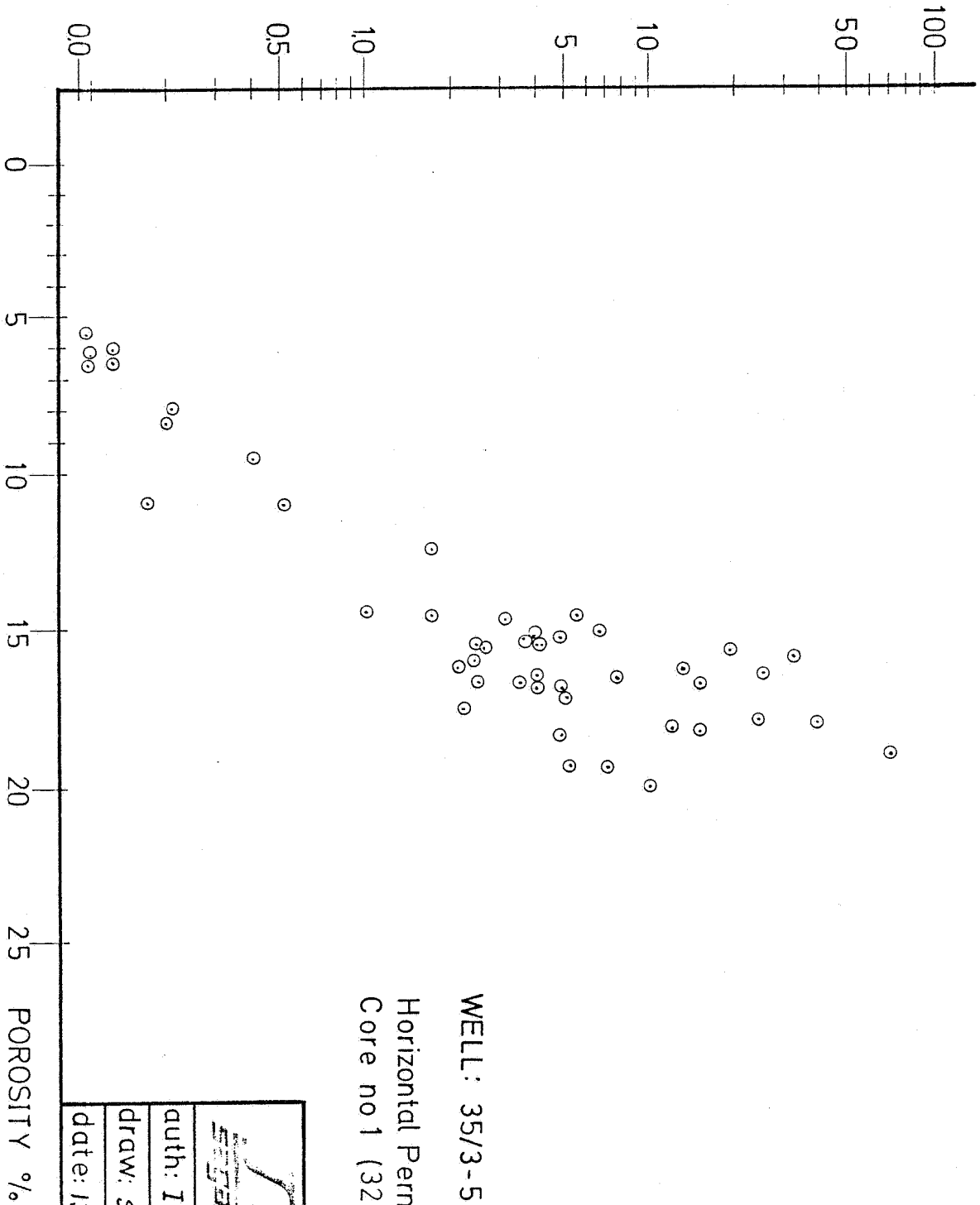
Stratigraphy	:	Lower Cretaceous
Average Recovery	:	100%
Net/Gross Cored Interval	:	
Helium Porosity, arithmetic average	:	11%
Horizontal permeability, md		
Maximum value	:	65
Arithmetic average	:	4.2
Geometric average	:	1.6
Vertical permeability, md		
Maximum value	:	31
Arithmetic average	:	2.2
Geometric average	:	0.64

Core No. 4

Depth	Horizontal Permeability Air	Vertical Permeability Air	Helium (∅)
3275.00-3275.99	0.18	0.74	5.5
3277.10-3277.92	0.098	0.047	5.7
3278.28-3278.94	0.24	0.18	8.6
3279.30-3279.95	0.18	0.88	5.2
3280.24-3280.95	2.4	0.102	6.0
3281.36-3281.97	0.44	0.24	10.2
3282.36-3282.90	1.8	1.2	15.2
3283.30-3283.90	1.4	1.2	13.7
3284.30-3284.99	0.4	0.34	7.1
3286.48-3286.93	0.102	0.052	3.9

Stratigraphy : Lower Cretaceous
 Average Recovery : 100%
 Net/Gross Cored Interval :
 Helium Porosity, arithmetic
 average : 8.1%
 Horizontal permeability, md
 Maximum value : 6.7
 Arithmetic average : 0.72
 Geometric average : 0.4
 Vertical permeability, md
 Maximum value : 1.6
 Arithmetic average : 0.35
 Geometric average : 0.18

HORIZONTAL
PERMEABILITY . KL.



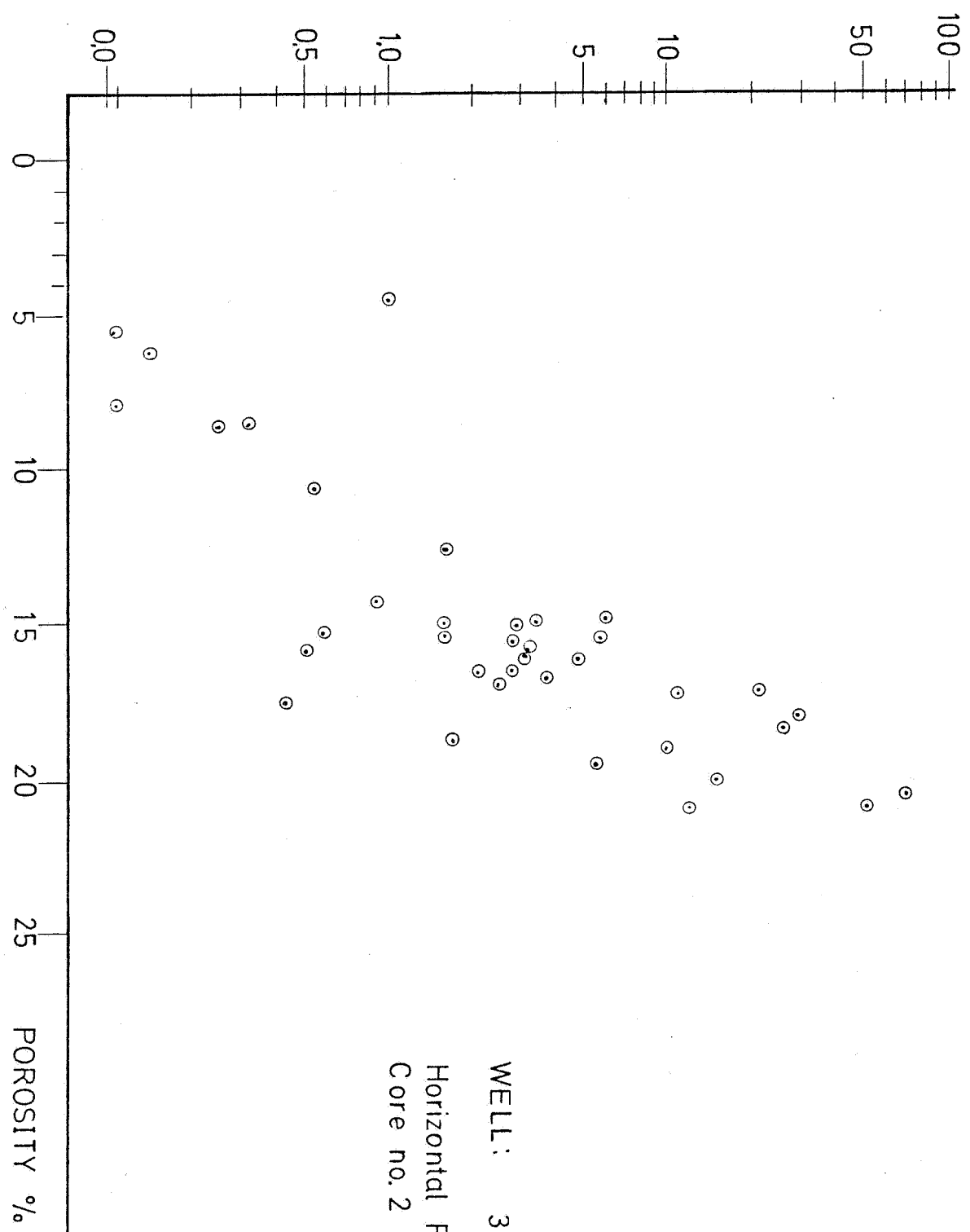
WELL: 35/3-5

Horizontal Permeability KL
Core no 1 (3227-3244 MRKB)

auth: I.M.H.
draw: S.B.N.
date: 13.09.82.

Fig. 2.3

HORIZONTAL
PERMEABILITY



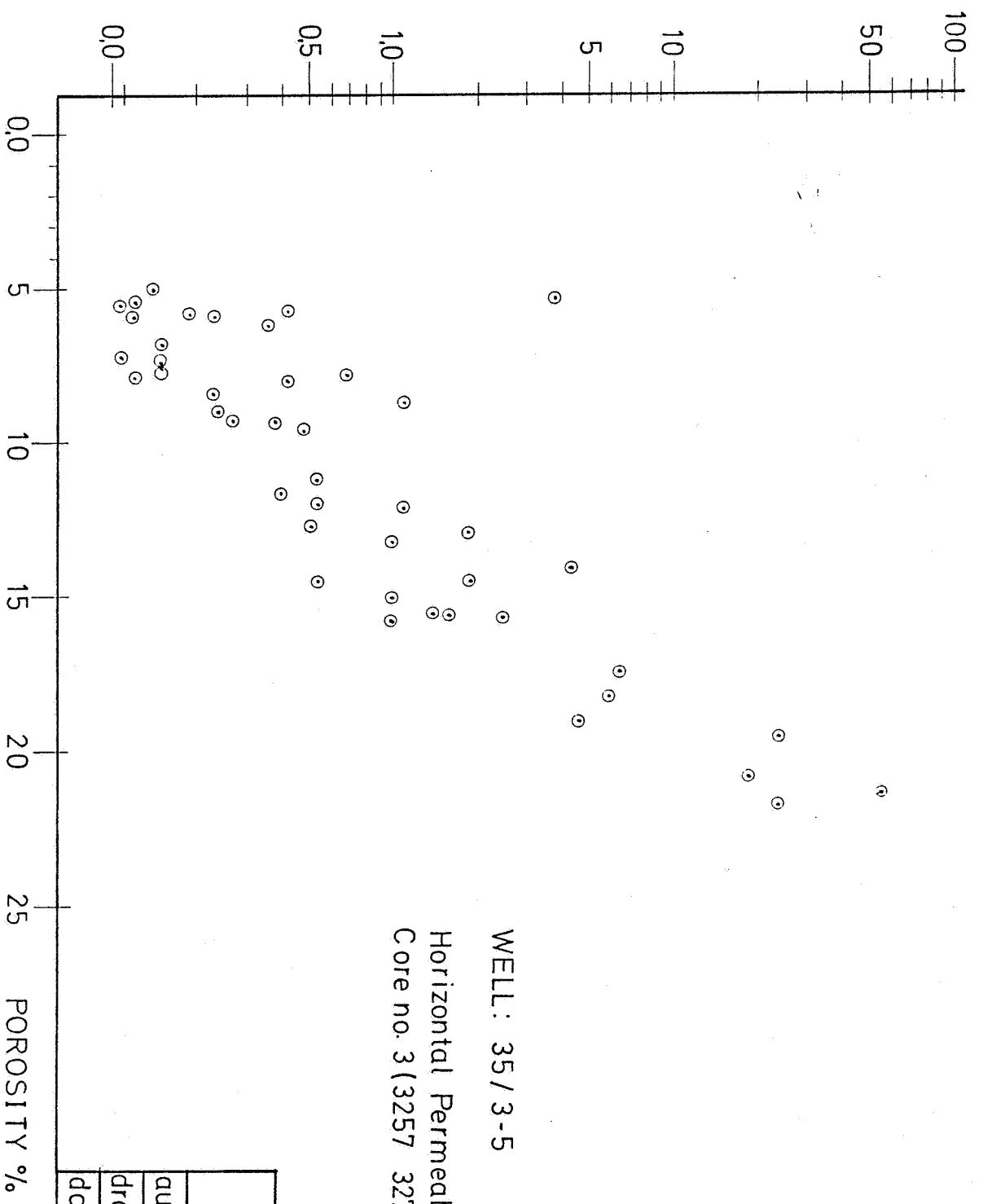
WELL: 35/3-5

Horizontal Permeability KL
Core no. 2 (3245, - 3257 MRKB)

auth: SMH
draw: SBW
date: 10.09.1982

Fig. 2.4.

HORIZONTAL
PERMEABILITY KL



WELL: 35/3-5
Horizontal Permeability
Core no. 3 (3257 3274 MRKB)


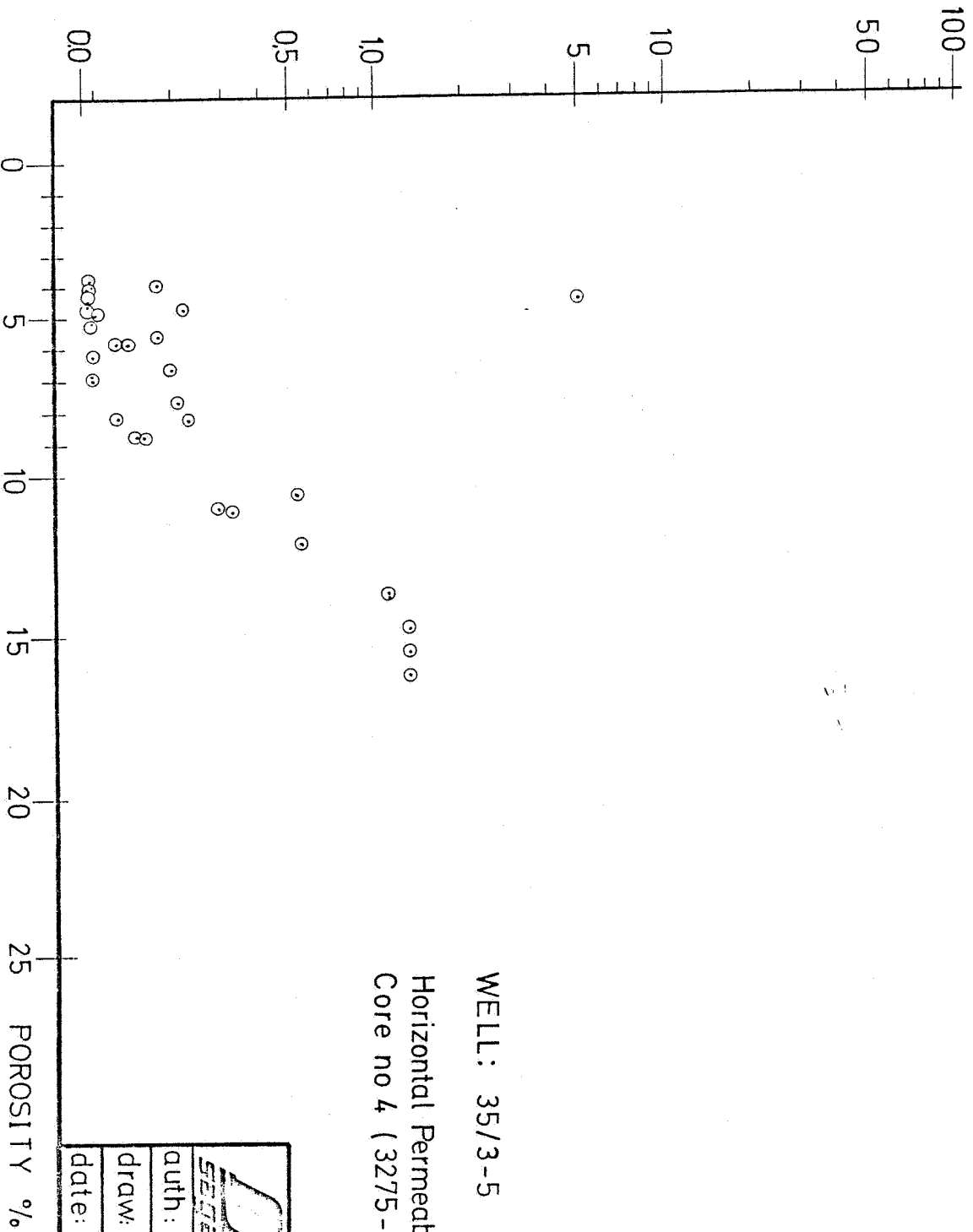

auth: JMH
draw: SBN
date: 10.09.82.

Fig. 2.5.

HORIZONTAL
PERMEABILITY KL



auth: 1MH
draw: SBN
date: 13.09.82

WELL: 35/3-5
Horizontal Permeability KL
Core no 4 (3275-3286 MRKB)

Fig. 2.6.

2.4.4 RFT Measurement

The Repeat Formation Tester was run twice to measure formation pressures and take samples in the event of presence of hydrocarbons. Run 3A which is in the lower Cretaceous comprises 15 tests of which six were not representative. A plot of pressure versus depth (figure) gave a gradient of 1.5 psi/m which is clearly indicating water. A sample taken at 3243 mRK contained a mixture of water and filtrate.

In run 5B which is in the Lower Cretaceous a total of 6 pressure tests were measured. A plot of pressure versus depth gives a gradient of (1.57 psi/m).

Repeat Formation Tester

Depth	Hydrostatic Pressure	Formation Pressure
3235.5	5896	4766
3243.0	5911	4744
3252.0	5933	4772
3267.0	5959	-
3267.5	5954	4801
3286.5	5992	-
3287.5	5987	-
3287.5	5988	-
3303.0	6018	-
3317.0	6041	4851
3330.0	6169	-
3324.0	6167	4888
3347.0	6100	4909
3347.0	6144	4937
3397.0	6201	4954

Well: 35/3-5

(Lower Cretaceous)

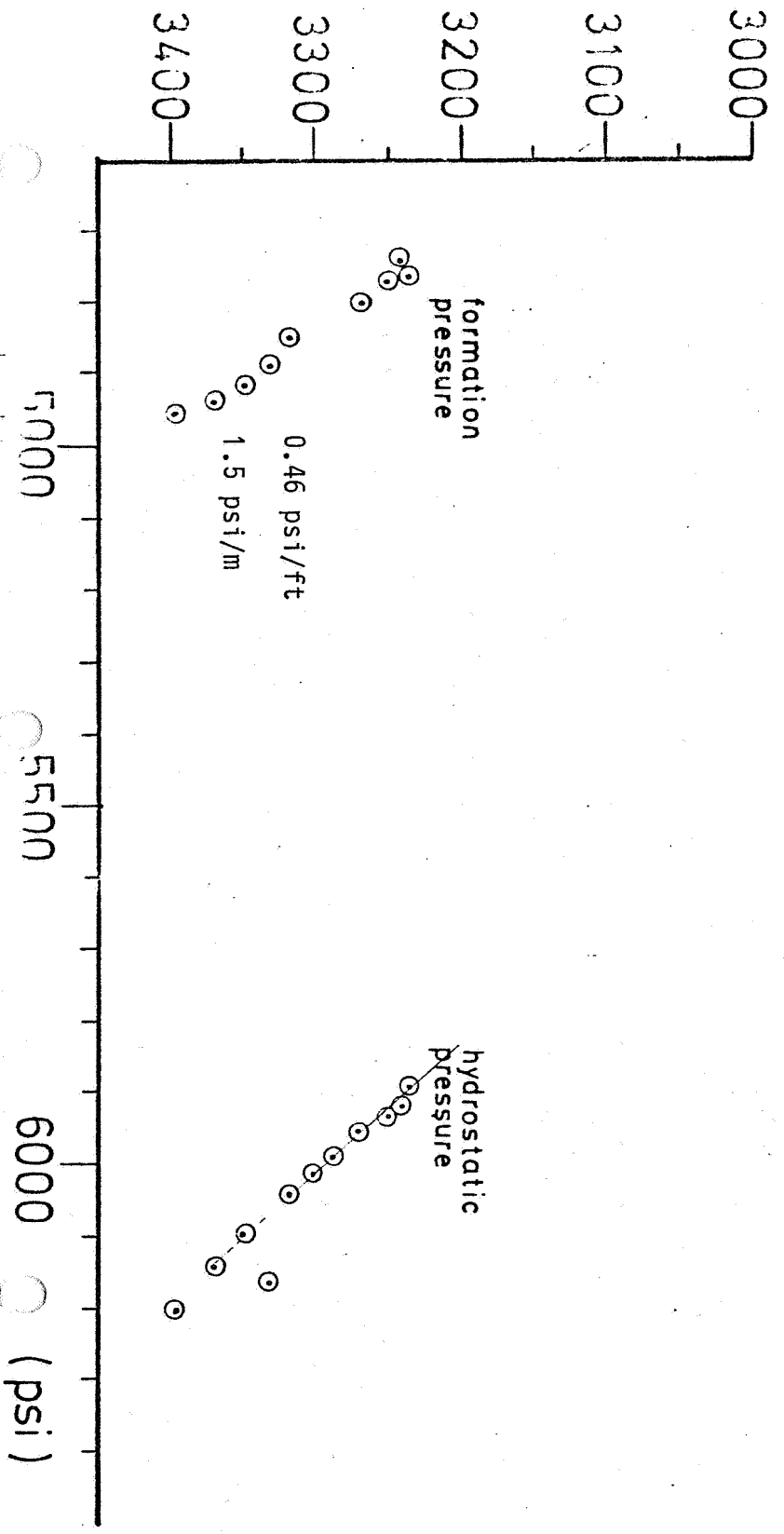
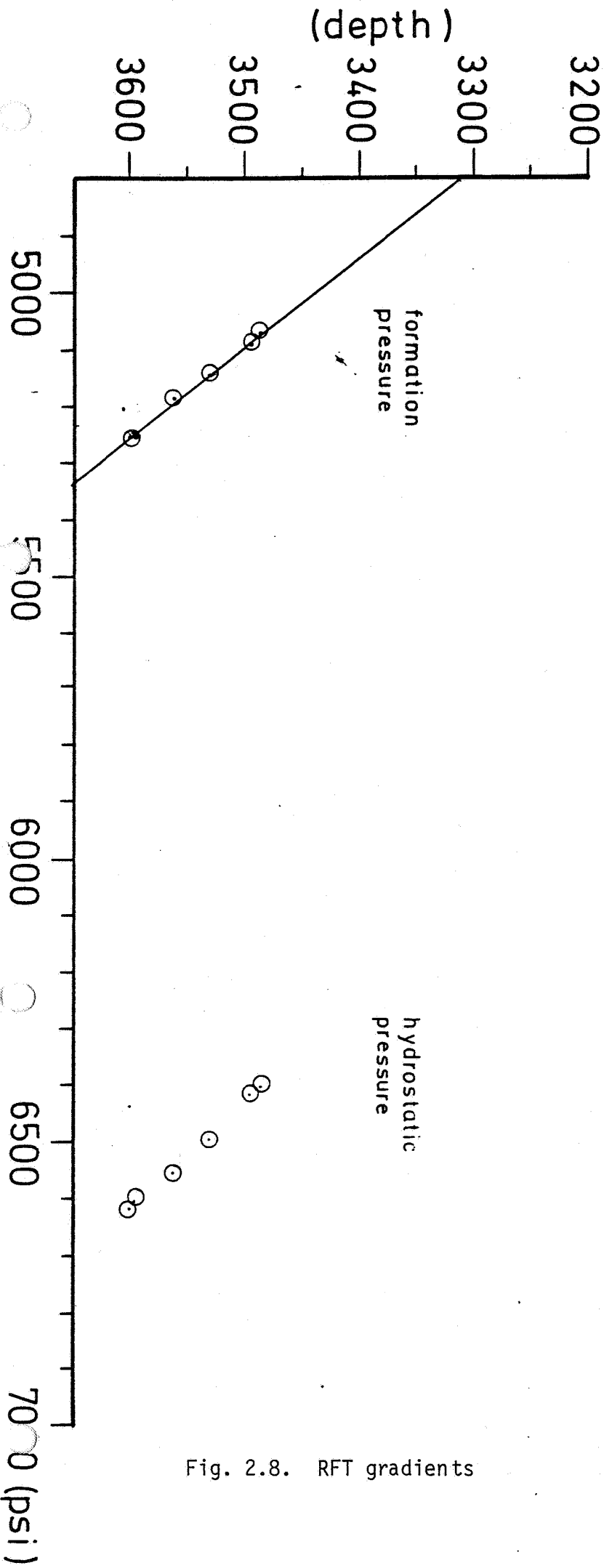


Fig. 2.7. RFT gradients

Repeat Formation Tester

Depth	Hydrostatic Pressure	Formation Pressure
3482.5	6401	5069
3442.5	6414	5086
3529.5	6494	5144
3561.0	6552	5187
3592.0	6608	5253
3598.0	6617	5253



Well : 35 / 3-5
(Lower Cretaceous)

Fig. 2.8. RFT gradients

2.5. Well Velocity Survey

2.5. Well Velocity Survey

The well velocity survey was carried out by SSL in two steps. The first survey was shot at 3718 m RKB covering 103 levels, and the second at TD (4114 m RKB) covering 24 levels. The results from the two surveys have been combined for the final report. The direct arrivals on the well geophone signals for the check levels above 1540 m RKB and between 1570 and 1630 m RKB are distorted and have been omitted. Totally 88 levels, with some overlap, have been used. Both surveys included check shots and vertical seismic profiling (VSP), and only the shots taken as the well geophone ascended, have been included in the VSP-processing.

The recorded data was processed by SSL together with the sonic and density logs.

The seismic section, line SG 8130-413 through the well is attached with the interval velocity curve inserted at sp.484 (Enclosure V). A time-depth curve based on check-shots is also attached (fig. 2.9).

Synthetic Seismograms

The velocity and density data was used for processing of synthetic seismograms. A 30 Hz zero and minimum phase wavelet was used in the convolution. The synthetic seismogram was band pass filtered with the same filter as used in processing of the seismic lines SG 8130 (airgun data shot in 1981 by Horizon Exploration Ltd).

VSP

The records of each level were stacked. The band pass filter (8-60 Hz) and a special VSP deconvolution of 1300 ms derivation was used in the processing. In addition a tracking filter was applied.

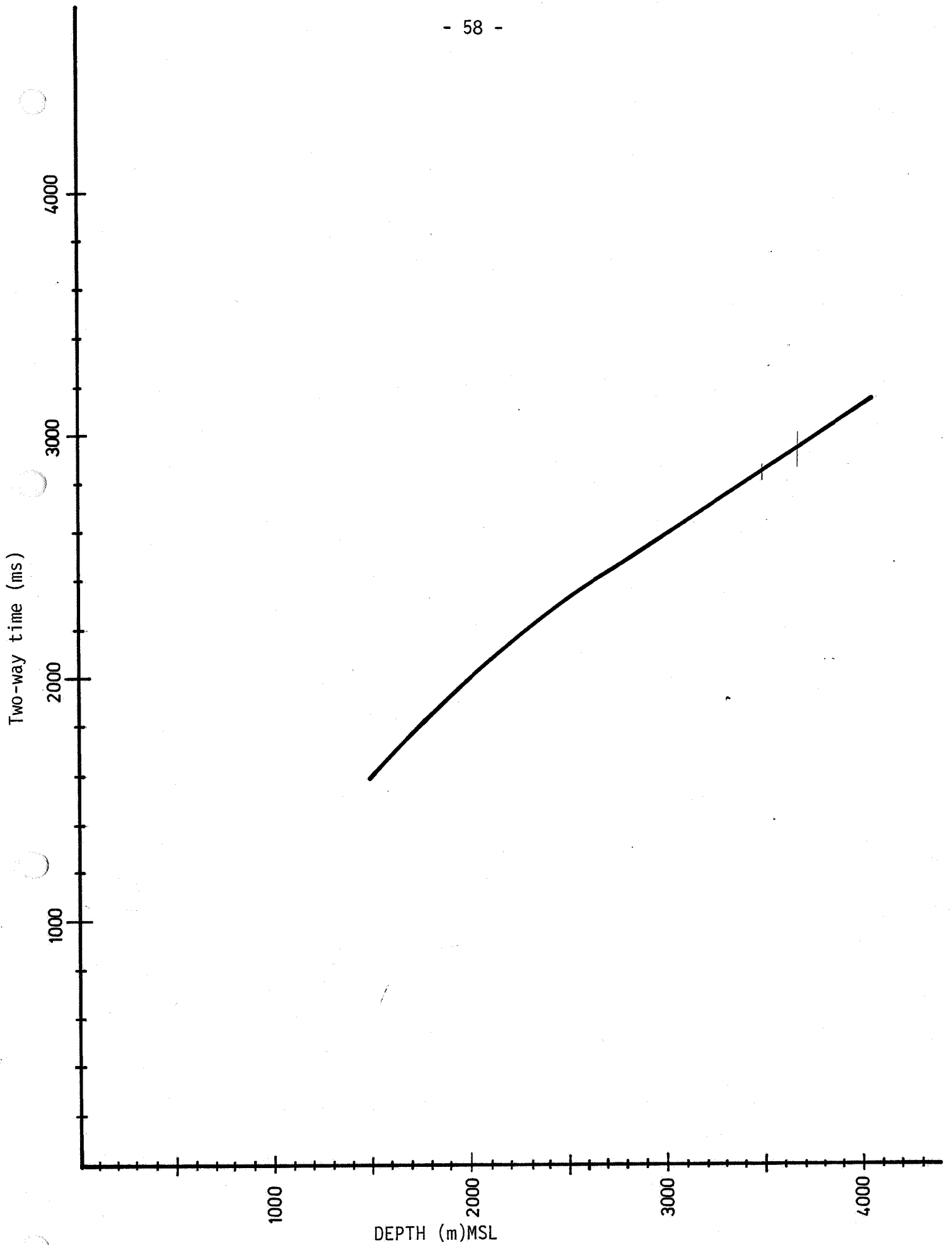


Fig. 2.9. Time-depth curve
Well 35/3-5

PART 3

DRILLING AND ENGINEERING

	<u>Page</u>
3. DRILLING END ENGINEERING	59
3.1. <u>Pertinent Information</u>	61
3.2. <u>Highlights of Drilling Intervals</u>	63
3.3. <u>Time Analysis</u>	65
3.4. <u>Engineering Data</u>	68
3.4.1. Anchor Pattern	69
3.4.2. Bit Hydraulic Well Data	70
3.4.3. Cement and Casing Details	73
3.4.4. Mud Recap	74
3.5. <u>Daily Activity Report</u>	75

3.1. Pertinent Information

WELL DATA

Well	:	35/3-5
Classification	:	Wildcat
Rig	:	West Venture
Rig heading	:	315 ^o
Rotary Kelly Bushing elevation	:	33
Rotary Kelly Bushing to seabed	:	295 m
Water Depth	:	262 m
Total Depth Drilled	:	4110 m
Date rig on location	:	15/12 1981
Spud date	:	22/12 1981
Date abandoned	:	30/3 1982
Date released	:	3/4 1982
Total days from mobilization to release of rig	:	114
Present status	:	Well final plugged and abandoned

3.2. Highlights of Drilling Intervals

Highlights of drilling intervals.

The following is a short summary of the drilling activities for each hole interval in well 35/3-5. For more detailed information, see Daily Activity Report.

- 36" inch hole: Spudded well at 23.30 hrs. December 22. 1981. Drilled to 420 m using 26" bit and 36" hole opener. Drilled with seawater, and displaced with high viscous mud. Landed and cemented 30" casing at 410 m.
- 26" inch hole: Drilled 26" hole from 420 m to 1046 m using a 17 1/2" bit and 26" underreamer. Drilled with mud. Landed and cemented 20" casing at 1032 m. Ran 18 3/4" BOP-stack and 21" riser. Drilled 5 m of new hole and tested formation to 12,4 ppg. equivalent mud weight.
- 17 1/2" inch hole: Drilled 17 1/2" hole from 1046 m to 2052 m and logged. Landed and cemented 13 3/8" casing at 2041 m. Tested BOP. Tested formation to 13,9 eq. mud weight.
- 12 1/4" inch hole: Drilled and cored 12 1/4" hole from 2052 m to 3425 m and logged. Landed and cemented 9 5/8" casing at 3406 m. Drilled to 3423 m and performed leak off test. Eq. mudweight: 14,5 ppg.
- 8 1/2" inch hole: Drilled and cored 8 1/2" hole from 3415 m to 4110 m and ran different logs. Plugged back at 9 5/8" casing shoe. Perforated and squeezed cement around 13 3/8" casing shoe. Plugged well near seabed and final abandoned well.

3.3. Time Analysis

Depth
(m) 0

transp.
anchor hand.
WOW

ng,

1000

2000

3000

4000

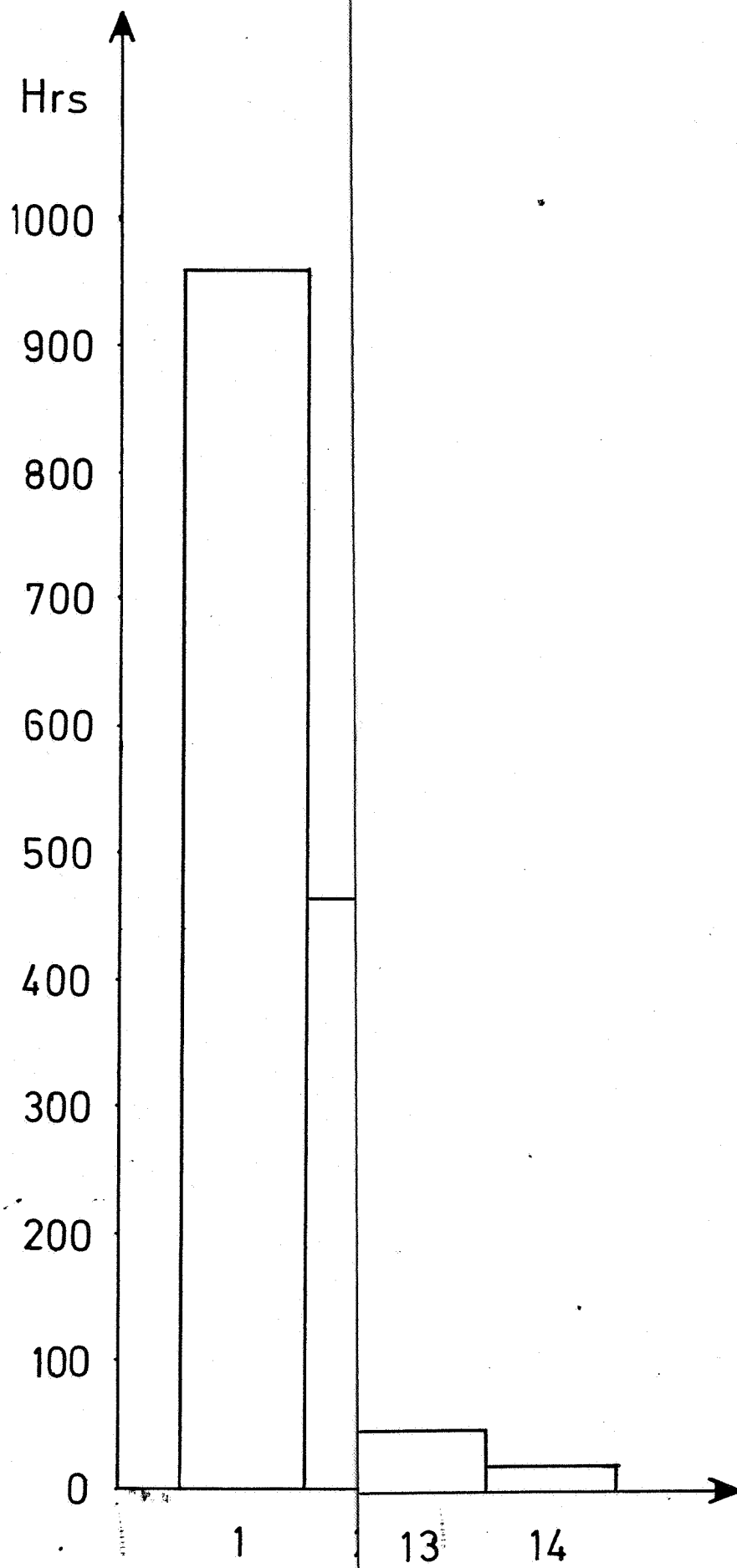
5000

Last anchor bolstered at 1930 hrs.
April 3, 1981

125

Days





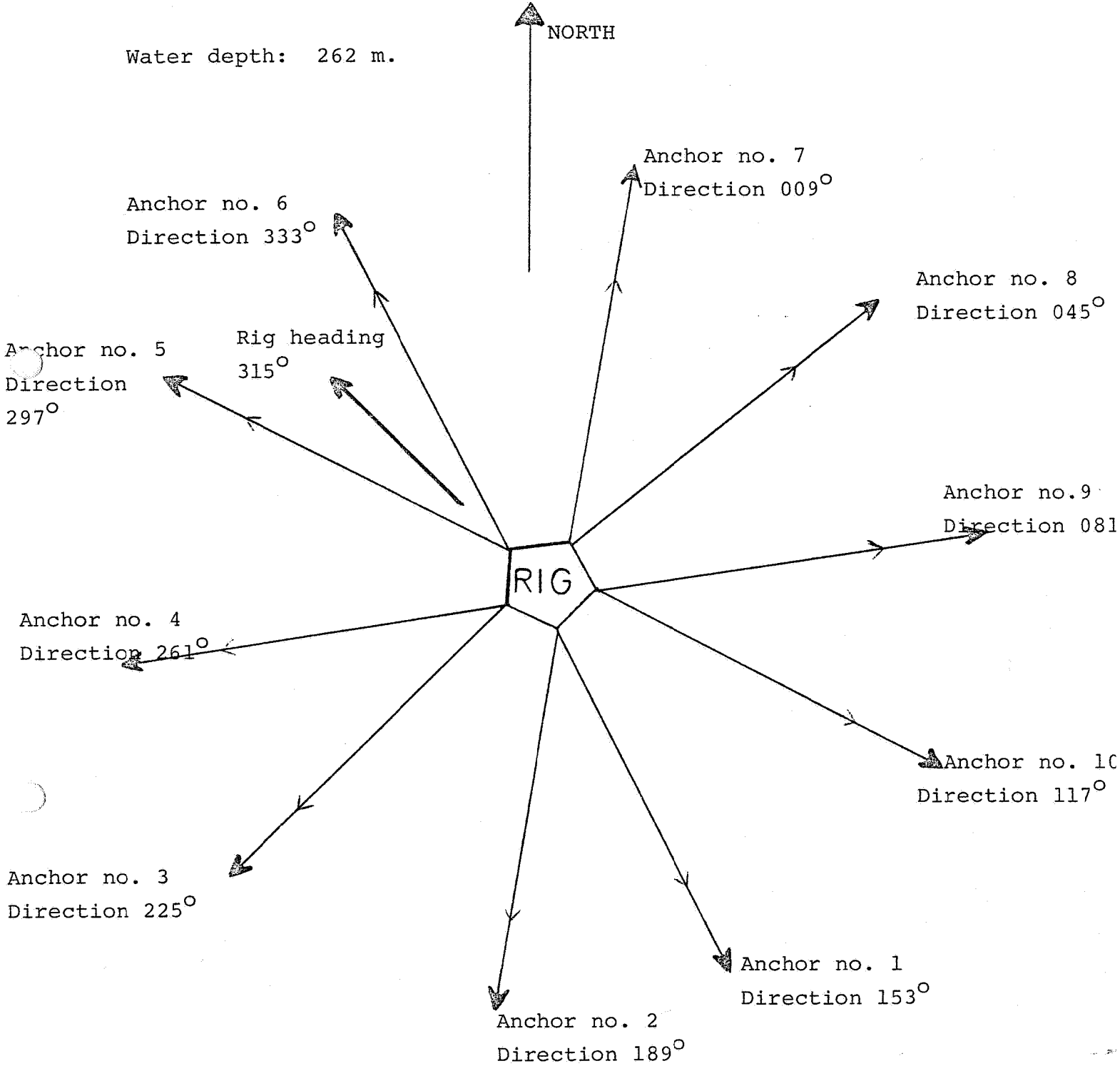
3.4. Engineering Data

ANCHOR PATTERN WELL 35/3-5

Fig. 3.3.

Final position: 61°47' 46.71"N
03°54' 44.01"E

Water depth: 262 m.



BIT HYDRAULIC, WELL DATA
WELL 35/3-5

Table 3.1.

Bit No.	Size	Make	Type	Jets	Depth out (m)	Drilled (m)	Hours	m/hr	accum. drlg. hrs.	WOB (1000 lbs)	RPM	Vertical Dev.	Pump Press. (Psi)	Pump Spm.		Mud			Dull. Cond.		
														No. 1.	No. 2.	WT. Visc	F.L.	F	B	G	
1	26	HTC	OSC-3AJ	3x22	302	11	2	5,5	2	5	20-50		50			SEAWATER			36"	HO	
2	17½	HTC	OSC-3AJ	3x24	308	6	1	6	3	2/10	160	250/600	50	50		SEAWATER			2	2	I
RR2	17½	HTC	OSC-3AJ	3x24	353	58,5	7,5	7,8	10,5	2/10	60/100		75	75		SEAWATER			3	2	I
RR1	26	HTC	OSC-3AJ	3x22	420	125,5	18,5	6,8	29	2/25	70/100	2300	120	120		SEAWATER			3	3	I
RR2	17½	HTC	OSC-3AJ	3x24	817	397	23	17,3	52	5/25	160	1150		120	120	9,3	42	0	6	5	1/8
3	17½	HTC	OSC-3AJ	2x20	1046	229	15,5	14,8	67,5	5/20	160	1150		120	120	9,3	43	0	2	2	I
RR3	17½	HTC	OSC-3AJ	2x20	867														3	5	I
4	17½	HTC	OSC-3AJ	2x20	1046														1	1	I
RR4	17½	HTC	OSC-3AJ	2x20	1051	5	1,5	3,3	69,5	15/30	100	2000		90	90	9,3	38	20	2	2	I
5	17½	HTC	X3A	16,18,20	1771	666	32	20,8	101,5	30/4+	110			85	85	9,6	40	15	3	4	I
6	17½	HTC	X3A	3x20	1985	268	30	8,9	131,5	35/50	80/110			86	86	10,5	52	9,8	3	4	I
7	17½	Smith	MSDT	3x24	2052	67	17,5	3,8	149	40/50	140			84	84	11,1	58	9,1	3	3	I
8	121/4	HTC	X3A	3x16	2112	60	10,5	5,7	159,5	25/50	125			67	67	10,7	60	7,9	3	2	I
9	121/4	Smith	SDT	3x16	2289	177	33,5	5,3	193	45/50	115			63	63	10,7	70	9,4	2	2	I
10	121/4	Smith	SDS	2x16	2481	192	43	4,5	236	15/50	120			69	69	9,8	42	6,5	4	5	1/8
11	121/4	Secur.	S33S	3x16	2515	34	12,5	2,7	248,5	30/60	50/120			69	69	9,8	46	8,3	5	5	1/16
12	121/4	Smith	A1	2x18	2336	21	12	1,8	260,5	15/55	40/60			69	69	9,8	50	8	1	1	I
13	121/4	Diaboa	LX-13	Out	2634	98	36	2,7	296,5	5/50	825			92	92	10,2	42	9			25% WORKN

BIT HYDRAULIC, WELL DATA

WELL 35/3-5.

BIT NO.	SIZE	MAKE	TYPE	JETS	DEPTH OUT (M)	DRILLED (M)	HOURS	M/HR.	ACCUM DRLG. HRS.	WOB (1000 LBS)	RPM	VERTICAL DEV.	PUMP PRESS. (PSI)	PUMP SEM		MUD			DULL. COND			
														NO 1.	NO 2.	WT.	VISC	F.L	W	B	G	
14	12 1/4	Diabo.	IX-13	OUT	2827	240	72,5	3,3	369	40/55	735	2 1/2	3650	82	82	10,2	43	9	50%	WORN		
15	12 1/4	HTC	J3	3x15	2954	80	44,5	1,8	413,5	50/60	50/55	2 1/2	3000	87	87	10,2	42	9,5	4	2	I	
16	12 1/4	SMITH	FDGH	3x15	3050	96	54	1,8	467,5	40/60	55/65	1 3/4	3000	86	86	10,2	44	9	5	2	1/8	
17	12 1/4	SMITH	FDGH	2x15	3098	48	27,5	1,75	495	60/80	50/70	2	3000	86	86	10,2	45	7	5	8	1/4	
18	12 1/4	SMITH	F-2	2x15	3143	45	23,5	1,9	518,5	50/60	80	2	3000	59	59	10,5	45	7,0	5	8	I	
19	12 1/4	HTC	XDG	3x16	3170	27	15,5	1,7	534	40	100	1 1/2	3000/2700	65	65	10,5	48	7,0	3	3	I	
20	12 1/4	SMITH	F-2	3x15	3195	25	18	1,4	552	40/50	50/80	1 1/2	3000	60	60	10,5	45	7,2	1	8	I	
21	12 1/4	HTC	J-22	3x15	3227	32	21	1,5	573	45/50	50/55	1 1/2	3000	60	60	10,5	50	6,4	1	2	I	
CH1	12 1/4	X-L	CB403	OUT	3245	17,45	8	2,2	581	8/25	60/100	1	950	60	60	10,5	54	6	5%	WEAR		
CHRR1	12 1/4	X-L	CB403	OUT	3257,1	12,0	4,5	2,7	585,5	20/35	85/100	1	950	60	60	10,5	51	6,6	10-15%	WEAR		
CHRR2	12 1/4	X-L	CB403	OUT	3274,0	16,9	11,5	1,5	597	20/35	85/100	1	950	60	60	10,5	51	6,6	15-20%	WEAR		
CHRR3	12 1/4	X-L	CB403	OUT	3291,8	17,8	14,5	1,2	611,5	30/40	85/110	1	950/1000	60	60	10,5	51	6,4	35/40%	WEAR		
22	12 1/4	HTC	J22	3x15	3413	122	28	4,4	639,5	40/50	45/55	3/4	3000	58	58	10,5	48	6,6	4	2	I	
19RR	12 1/4	HTC	XDG	3x16	3420	7	3,5	2	643	5/50	40/60	3/4	2900	60	60	10,5	45	6,8	4	3	I	
23	8 1/2	HTC	XR3J	OUT	3423		8,5		651,5	20/35	60	3/4	2400	66	66	10,5	45	8,2	3	3	I	
24	8 1/2	HTC	J22	3x13	3425	2	1,5	1,3	653	10/35	40/60	1	2500	42	42	10,5	46	6,8	1	1	I	
25	8 1/2	HTC	XDV	3x13	3473	48	23	2,1	676	30/40	60	1	2500	43	43	10,5	52	6,2	7	3	I	
24RR	8 1/2	HTC	J22	3x13	3579	106	31,5	3,4	707,5	20/50	60	1 1/4	2500	43	43	10,5	50	6	8	3	1/8	
26	8 1/2	SMITH	SVH	3x13	3622	43	17,5	2,5	725	35/45	75	1 1/2	2500	43	43	10,5	51	7,2	6	3	I	

Bit No.	Size	Make	Type	Jets	Depth out (m)	Drilled (m)	Hours	m/hr.	Accum. drlg. hrs.	WOB (1000 lbs)	RPM	Vertical Dev.	Pump Press. (psi)	Pump Spm		Mud			Dull. Cond.		
														No. 1.	No. 2.	WT.	VISC.	F.L.	T	B	G
27	8 1/4	HTC	XDV	1x13	3676	54	27,5	1,9	752,5	35/45	50/60	1	1/22500	86		10,5	51	7,2	6	3	1
28	8 1/4	Smith	F2	3x12	3740	64	20,5	3,1	773	30	80	1	1/42900			10,4	47	7,4	3	3	1
CH28	8 1/4	X-L	CB-403	OUT	3749	9	3,5	2,6	776,5	20/25	110	1	1/41650		70	10,3	53	7,4	good	For	reru
29	8 1/4	HTC	XDV	3x12	3789	40	18,5	2,2	795	40/50	60/80	1	1/43000	90		10,4	50	7,4	6	6	1
30	8 1/4	Smith	F2	2x11	3884	95	41	2,3	836	30/35	70/80	2	3000	83		10,4	53	6,9	2	3	1/8
31	8 1/4	Smith	F2	3x12	4026	142	49	2,9	885	30/35	70/75	7	3000	83		10,4	50	6,6	2	2	1
32	8 1/4	ACC	PowerPak	5x12	4039	13	6,5	2,0	891,5	10/15	200	7	3000	108		10,4	50	6,6	80%	Wear	
33	8 1/4	HTC	J-22	3x12	4110	71	19	3,7	910,5	30/40	60/80	6	1/23000	88		10,5	56	6,5	8	8	0

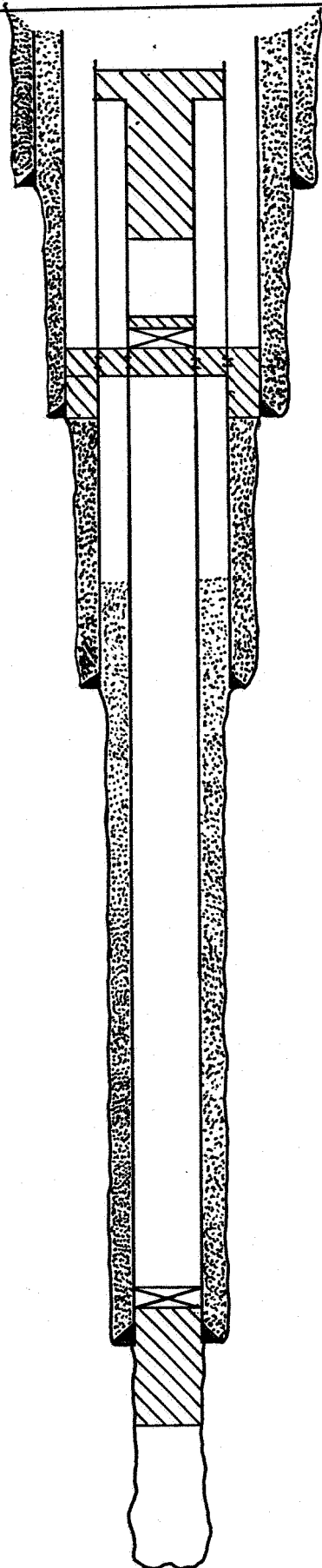
Tab. 3.2.



PRIMARY CEMENT



SECONDARY CEMENT



	Primary Cement		
	Shoe M-RKB	Sacks	Type Addi- tives
	410	2222	Class "G" 0,27gps CaCl ₂
LS'	1032	3345	Class "G" 8,5lbs/bbl bentonite 0,54 gps CaCl ₂
		500	Class "G" 0,81 gps CaCl ₂
SS	2041	2200	Class "G" 0,36gps Enconolite 0,15gps CFR-2L
		500	Class "G" 0,29gps CFR-2L
ess	3406	2130	Class "G" 0,2gps FL-1, 0,29gps CFR-2L

Table 3.3.

Material	Unit weight	Total Quantity	30" Quantity	20" Quantity	13 3/8" Quantity	9 5/8" Quantity	8 1/2" hole Quantity
Barite	mt	773,5	56	195	197	252	73,5
Wyoming Bentonite	mt	85	31	47	2	5	
Wyoming Bentonite	kg	705		80		434	191
Milgel	kg	386	69	317			
Caustic Soda	kg	531	13	57	78	310	76
Bicarbonated Soda	kg	26		5		14	7
Gypsum	kg	219		142	73	4	
Milpolymer 302	kg	261		66	142	53	
Drispac Superlo	lb	128			85	43	
Drispac Regular	lb	54				54	
CMC hi vis	kg	119			32	56	
CMC lo vis	kg	222			24	168	30
Unical	kg	282				231	51
Liqcon	lb	273				198	75
Drillaid	kg	21	4			17	
LD-8	gal	26				11	15
Anconol deformer	ltr	13					13
DM detergent	gal	6			4	2	
Milplug	kg	23		23			
Milmica	kg	64		64			
Kwickseal	lb	78		78			
Lubrisal	gal	4			4		

3.5. Daily Activity Report

- Dec. 11 Under way to location.
- Dec. 12 Under way to location.
- Dec. 13 Under way to location.
- Dec. 14 Under way to location.
- Dec. 15 Under way to location. Prepared running anchors. Positioned rig.
- Dec. 16 Ran anchors and piggybacks.
- Dec. 17 Ran anchors and piggybacks. WOW.
- Dec. 18 WOW. Ran piggybacks.
- Dec. 19 Made up 36" BHA, Ran TGB and landed same at 291 m, RIH w/36" BHA and drilled from 291 - 293 m.
- Dec. 20 Drilled from 292 - 302 m, Made up 17 1/2" BHA, WOW.
- Dec. 21 WOW. RIH w/17 1/2" BHA. Drilled from 302 - 308 m. Guide lines 1 and 4 tangled around DP while reaming, and parted.
- Dec. 22 Retrieved TGB and renewed the parted guidelines. Repositioned rig. Ran TGB, reached seabed at 294,5 m. RIH w/17 1/2" BHA and spudded to 298 m.
- Dec. 23 Drilled to 346 m. Reamed to 328 m. SSS at 339 m (2 3/4^o N85E). POOH. RIH w/26" bit and 36" hole opener. Opened hole to 36" to 327 m. Pumped high visc. pills.
- Dec. 24 Reamed several times to 327 m due to tight spot. Opened hole to 353 m. Drilled to 420m. Circ. w/seawater. Displaced hole w/950 bbl high visc. mud. POOH. Ran 30" csg. Total length 118 m, 309 lbs/ft, API B csg. Made up PGB on 30" Vetco wellhead.
- Dec. 25 Landed PGB in TGB. Mixed and pumped 110 bbl mica mix. Cemented csg. w/222 sxs class G cement. Casing shoe at 430 m. Ran 21 1/4" BOP and riser. Tested choke and kill lines to 500 psi. Tested BOP. RIH w/17 1/2" BHA.

- Dec. 26 Drilled cement and 17 1/2" hole from 401 - 730 m, Flow check negative. SSS at 598 m (1°S38W).
- Dec. 27 Drilled from 730 - 931 m. Reamed and washed section 806 - 817 m due to high torque on DP. SSS at 896 m (1/2° N20E). Hole seeped mud.
- Dec. 28 Drilled to 1046 m. Added mica to mud due to seeped mud. POOH to 313m. Circulated bottoms up w/seawater. No influx. RIH to 443 m, observed well, well flowing. Displaced well w/9,2 ppg mud.
- Dec. 29 RIH to bottom. Flowchecked 15 min, 1/2 m drop. POOH to shoe. F/C negative. Rigged up Schlumberger. Ran ISF-Sonic, GR-CAL. Rigged down Schlumberger, RIH w/26" underreamer.
- Dec. 30 Reamed cement to 420 m. Opened hole to 26" to 856 m.
- Dec. 31 Opened hole to 1042m. Flow checked. Changed bit and arms on underreamer. Circulated and conditioned mud. Opened hole to 1046 m.

- Jan. 1 Leak off test, 50 psi w/9,2 ppg mud. Circ. and cond. mud. Displaced hole with 10,9 ppg mud. Flow checked. Pulled BOP and riser. Prepared to run 20" csg.
- Jan. 2 Ran 20" casing and stinger. Landed at 1032 m. Cemented same as per program. Displaced cement with 95 bbl water and mud. Observed small flow beside PGB.
- Jan. 3 Ran 18 3/4" BOP stack w/21" riser. Tested BOP. Rigged up Schlumberger and ran HDT (temperature log).
- Jan. 4 RIH to 996 m. Tested csg. Leak at 900 psi. Drilled and reamed cement and hole to 1046 m. Leak off test (eqv. MW. 12,4 ppg) Circulated and displaced hole to MW 9,3 ppg
- Jan. 5 POOH. Rigged up Schlumberger and ran CBL-VDL. Rigged down. Made up new BHA and rubber packer. Icing problems. Set packer at 1019 m. Tested csg. to 1000 psi. Sudden pressure drop. Flowchecked and registered backflow due to water in DP. POOH. Packer broken.
- Jan. 6 Made up BHA, RIH and tag fish at 1041 m. Waited on Tri-State fishing tools. Made up fishing tool assembly. RIH w/overshot to fish packer.
- Jan. 7 Attempted to retrieve fish. Failed. POOH. Waited for fishing tools.
- Jan. 8 Changed fishing tools and RIH. Caught fish and POOH. Made up 17 1/2" BHA and RIH. Drilled to 1230 m.
- Jan. 9 SSS at 1224 m (1 1/4^oN). Reamed and washed to 1345 m. Drilled to 1369 m.
- Jan. 10 Drilled to 1660 m. Circulated bottoms up. SSS at 1613 m (1/2^o N15E).
- Jan. 11 Drilled to 1717 m. POOH. Retrieved worn wear-bushing. Tested BOP. Changed wear-bushing. Made up new 17 1/2" bit and RIH to 1224. Hole bridged. Washed and reamed to 1482 m.

- Jan. 12 Washed and reamed to 1717 m. Drilled to 1903 m.
- Jan. 13 Drilled to 1985 m. Flow check negative. POOH.
Changed bit. RIH to 1367m. Washed and reamed to 1430 m.
- Jan. 14 RIH. Drilled and reamed to 2052 m. Wiper trip to casing shoe. RIH and reamed from 1692 - 1720 m.
- Jan. 15 Reamed to 1855 m. Circulated hole clean. Rigged up Schlumberger. Ran ISF Sonic, FDC. Rigged down. RIH and reamed from 1765 m - 1780 m.
- Jan. 16 RIH and tag fill at 2048 m. Circ. hole clean to bottom. Increased M.W. to 11.0 ppg. POOH. Ran 13 3/8" casing.
- Jan. 17 Ran 13 3/8" csg. Landed csg., shoe at 2041m. RIH w/HWDP and circulated to bottom. Pumped 20 bbl's water as pre-flush and cemented casing and checked float. Made up and tested seal assembly to 4400 psi. Washed seal assembly and displaced riser.
POOH w/running tool.
- Jan. 18 RIH w/test plug and tested BOP. POOH.
Rigged up Schlumberger. Ran temperature log. Rigged down. Tested casing and shear ram. Made up 12 1/4" BHA and RIH. Drilled cement and new hole from 2018 m - 2055 m.
- Jan. 19 Leak off test, eq. M.W. 13,9 ppg. Drilled to 2133 m. Dropped survey at 2112 m.
- Jan. 20 Drilled to 2266 m. Dropped survey at 2212 m. Checked for flow.
- Jan. 21 Drilled to 2333 m.
- Jan. 22 Drilled to 2439 m. Survey dropped at 2394 m.
- Jan. 23 Drilled to 2494 m. Balled bit.
- Jan. 24 Unballed bit. Drilled to 2529 m. Hit hard formation at 2495 m.

- Jan. 25 Drilled to 2536 m. POOH. Retrieved wear-bushing after having flushed well-head area. Tested BOP. Attempted to test shear rams, but failed due to damaged o-rings in test plug.
- Jan. 26 Pressure tested shear rams. Made up turbodrill and BHA. RIH. Turbodrilled from 2536 m to 2540 m.
- Jan. 27 Turbodrilled to 2619 m.
- Jan. 28 Turbodrilled to 2634 m. POOH due to bearing failure. Made up and tested new bearing section and BHA. RIH. Turbodrilled to 2637 m.
- Jan. 29 Turbodrilled to 2718 m.
- Jan. 30 Turbodrilled to 2763 m.
- Jan. 31 Turbodrilled to 2830 m.

- 81 -

Feb. 1 Turbodrilled to 2874 m. POOH.

Feb. 2 Pressure tested BOP. Made up new bit and BHA. RIH. Drilled to 2894 m.

Feb. 3 Drilled to 2937 m.

Feb. 4 Drilled to 2954 m. Flow checked. POOH. RIH w/new bit. Drilled to 2983 m.

Feb. 5 Drilled to 3020 m.

Feb. 6 Drilled to 3050 m.

Feb. 7 Flowchecked and dropped survey. POOH. Made up new bit and RIH. Washed and reamed from 3030 m - 3050 m. Drilled to 3080 m.

Feb. 8 Drilled to 3098 m. POOH. Tested BOP.

Feb. 9 RIH with new bit. Backed of landing string and POOH. WOW. Displaced mud in riser with seawater.

Feb. 10 WOW. Displaced riser with mud. RIH and retrieved string. POOH. RIH w/BHA. Reamed from 3030 m to 3098 m. Drilled to 3120 m. Increased M.W. to 10.5 ppg.

Feb. 11 Drilled to 3143m. Circulated bottoms up. POOH and changed bit RIH.

Feb. 12 Drilled to 3170 m. POOH. Changed bit and RIH while checking for washout.

Feb. 13 Backed of landing string and POOH. Found washout. WOW. RIH.

Feb. 14 Drilled to 3195 m. POOH.

Feb. 15 Tested BOP. RIH w/new bit. Drilled to 3200 m.

Feb. 16 Drilled to 3227 m. Circ. btms. up. Dropped survey.

Feb. 17 POOH. Made up core barrel and RIH. Circulated btms. up.

Feb. 18 Cut core no. 1 from 3227 m - 3245 m. POOH. RIH. Reamed from 3240 m - 3245 m. Cut core no. 2 from 3245 m - 3257 m. POOH

- Feb. 19 RIH. Washed and reamed from 3254 m to 3257 m. Cut core no. 3 from 3257 m - 3274 m. Flow check negative. POOH.
- Feb. 20 RIH. Washed and reamed from 3271 m - 3274 m. Cut core no. 4 from 3274 m - 3292 m. POOH.
- Feb. 21 Made up new BHA and RIH. Drilled to 3330 m.
- Feb. 22 Drilled to 3413 m. F/C negative. Dropped multishot. POOH.
- Feb. 23 RIH, washed and reamed 2 1/2m fill to 3413 m. Circulated bottom up. POOH. Rigged up Schlumberger. Ran MSFL, ISF Sonic, G. Ray, LDT-CNL-GR and SHDT.
- Feb. 24 Ran RFT, and SWC twice.
- Feb. 25 Ran CBL, Rigged down Schlumberger. Made up new BHA and RIH to 3399 m. Washed and reamed 14 m fill. Drilled to 3420 m. POOH.
- Feb. 26 Rigged up for and ran 9 5/8" csg. Stabbing board broke down when csg. shoe at 2678m. Circulated and worked pipe while repairing stabbing board.
- Feb. 27 Continued to run 9 5/8" csg. Broke 10 3/4" x 9 5/8" X-over, due to change in csg. program. Threads damaged. Circulated and worked pipe, while waiting for 9 5/8" csg. hanger. Landed casing, with shoe at 3406 m.
- Feb. 28 Mixed and pumped cement and cemented casing. Pressure tested cement. POOH. Tested BOP. RIH to set bore protector. POOH.

- March 1 Made up 8 1/2" BHA and RIH to 260 m. Tested casing against shear ram. RIH and tag cement at 3332 m. Drilled cement and new hole to 3423 m. Leak off test. (M.W. eqv. 14,8 ppg.) POOH.
- March 2 Made up new BHA and RIH. Drilled to 3425 m. Pressure dropped 1100 psi. POOH. Made up BHA with new bit and junk basket and RIH. Drilled to 3434 m. Circ. and cond. mud due to aerated mud. Drilled to 3437 m.
- March 3 Drilled to 3473 m. SSS dropped. POOH. Made up new bit and RIH. Drilled to 3479 m.
- March 4 Drilled to 3563 m.
- March 5 Drilled to 3579 m. POOH due to broke bit. RIH w/new bit and junk sub. Drilled to 3601 m. Circulated btm. up for samples.
- March 6 Drilled to 3622 m. Dropped SSS. Hung off DP. WOW. POOH for bit change.
- March 7 RIH w/new bit. Performed drill off test. Drilled from 3622 m - 3653 m.
- March 8 Drilled to 3676 m. POOH. Pressure tested BOP and choke manifold.
- March 9 RIH w/new bit. Drilled to 3715 m. Circulated btms up for samples. Dropped SSS.
- March 10 Flowchecked. Hung off DP, WOW. RIH. Drilled to 3719 m.
- March 11 Drilled to 3740 m. POOH. RIH w/4 3/8" corebarrel. Cut 4 3/8" core from 3740 m - 3745 m.
- March 12 Cut 4 3/8" core from 3745 m - 3749 m. POOH. Rigged up Schlumberger. Ran ISF-Sonic-GR-MSFL, LDT-CNL-GR, and velocity survey.
- March 13 Ran velocity survey, and rigged down. Made up new bit and RIH. Drilled to 3758 m.

- March 14 Drilled to 3789 m. Flowchecked, POOH. Made up new bit and junk basket. RIH.
- March 15 Drilled to 3838 m.
- March 16. Drilled to 3884 m. Circulated btms. up for geological samples at 3865 m. POOH.
- March 17 Tested BOP stack. RIH w/new bit. Drilled to 3904 m.
- March 18 Drilled to 3971 m.
- March 19 Drilled to 4026 m. Ran survey at 3981 m. Flowcheck. POOH.
- March 20 RIH w/new bit. Drilled to 4038 m. Pressure dropped 300 psi. POOH to check for washout. RIH and drilled to 4039 m. POOH.
- March 21 RIH w/new bit. Drilled to 4102 m.
- March 22 Drilled to 4110 m. Dropped survey. POOH. Rigged up Schlumberger. Ran ISF-BHC-MSFL-NGS, and LDL-CNL-GR.
- March 23 Ran HDT. Schlumberger line parted. RIH w/fishing spear for cable. Tagged at 527 m and POOH w/fish. Ran CBL log from 3240 m - 1675 m. Rigged down Schlumberger. RIH.
- March 24 Washed down from 4095 m - 4108 m. Circulated and conditioned mud. POOH. Rigged up Schlumberger. Ran H.D.T. dipmeter.
- March 25 Ran RFT, SSL, and CST-C three times.
- March 26 Ran one more run of CST-C. Rigged down Schlumberger. RIH w/open ended DP to 3650 m. Circulated and conditioned mud. Set cement plug as pr. program. POOH.
- March 27 Rigged up Schlumberger. RIH and set bridging plug at 3336 m, and tested same, Ran perforation gun w/8 shots. Perforated 9 5/8" and 13 3/8" csg. at 832 m. POOH. RIH w/stinger to 922 m and squeezed cement through perforations. POOH. Perforated w/4 shots at 325 m, and rigged down Schlumberger.

- March 28 Cut 9 5/8" csg. at 348 m. Flowchecked. POOH. RIH and retrieved 9 5/8" csg. POOH. RIH and cut 13 3/8" at 313 m and retrieved same. Set cement plug at 530 m.
- March 29 Unlatched BOP and POOH with same. Cut 20" and 30" casing at 299,5 m and retrieved same + PGB. Made up assy. to retrieve TGB.
- March 30 Attempted to get "J"-tool into slots on TGB. Failed. Washed with seawater and got "J" into slots. TGB retrieving tool broke off. Pulled TGB with guidelines. Pulled piggybacks and anchors.
- March 31 Pulled anchors.
- April 1 Pulled anchors
- April 2 Pulled anchors. WOW.
- April 3 WOW. Pulled anchors. Last anchor bolstered at 19:30 hrs.