Mobil

MOBIL EXPLORATION NORWAY INC.

FINAL GEOLOGICAL SUMMARY

33/12 - 5

MAY 1976

STAVANGER, NORWAY

MOBIL EXPLORATION NORWAY INC:

FINAL GEOLOGICAL SUMMARY

33/12-5

May, 1976

Stavanger, Norway

CONTENTS

	Page
Well Data	ii
Introduction	2
Results	1
Stratigraphy/Structure	3
Summary	5

Tables and Figures:

Table I .... Paleontological Summary

Table II .... Wireline Logging Summary

Figure 1 .... Comparison - Prognosis vs. Actual Depths

Enclosures:

Enclosure 1 Statfjord Field Generalized Structural Cross Section —

Enclosure 2 Summary Log ✓

Enclosure 3 Composite Log

Enclosure 4 Paleontological Summary Log (Robertson Research) ✓

NORWAY OFFSHORE

STATFJORD FIELD

WILDCAT WELL 33/12-5

WELL DATA

Well Name:	33/12-5
Location:	61° 11' 05.53" N
	01° 51' 53.39" E
Classification:	Wildcat
Drilling Period:	
Spudded:	9 October 1975
Completed Drilling:	4 February 1976
Rig Released:	21 February 1976
KB Elevation:	25.0 m
Water Depth:	143. m
Rig:	Norskald
Status:	Dry Hole Plugged and abandoned
Total Depth:	
Planned:	4575 m
Actual :	4574 m
Objective:	Deep test of Triassic sandstones and possible downfaulted Jurassic Reservoirs.
Cost: ($)	
Planned:	8,500,000
Actual :	* 11,413,141

* Charges as of 30 April 1976.

INTRODUCTION

The Statfjord wildcat well, 33/12-5, was spudded on 9 October 1975. This was the fifth of eight wildcats required in the Licence 037 area, and the second of three deep test obligations. The well was dry and abandoned at a total depth of 4574 meters (15,006') in probable Triassic sediments.

The well was programmed to test in a higher structural position, a Triassic sand, found water bearing in the 33/12-2 well, and to evaluate older, untested section beneath the sand. The Triassic sand in 33/12-2, defined seismically by the "R_2" horizon, had been tentatively identified as Lower Triassic.

33/12-5 is located on the southeast, downfaulted flank of the Statfjord structure, but on the upthrown block of the major, east-bounding Statfjord fault. The well was positioned near the highest point on the intra-Triassic "R_2" seismic horizon in the Statfjord area.

Secondary objectives were possible Jurassic reservoirs preserved within this downfaulted area east of the Statfjord Field. The 33/12-4 well was a similiar test on the east flank of the Statfjord feature. This well found a thin Jurassic/Upper Triassic ? sand with good porosity, which tested salt-water with minor amounts of oil.

RESULTS

The Top Triassic in 33/12-5 is at 2735 meters (8973'), 140 meters (459') high to prognosis. Log correlations with 33/12-2 suggest that as much as 185 meters (607') of Upper Triassic section may have been eroded in the 33/12-5 well. Depositional thinning may also be present within the uppermost Triassic section.

The main Triassic objective, previously interpreted as a Lower Triassic Bunter Sand in 33/12-2 and projected to 33/12-5, was encountered at 3741 meters (12,273'), 64 meters (210') high to prognosis.

The sand was 115 meters (377') thick and 307.5 meters (1009') high to the 12-2 well. Reinterpretation of palynology indicates that this sand is of Upper Triassic Carnian-Norian age in both wells.

The sand was found wet and exhibited marginal reservoir characteristics with an average log porosity of only 11 percent. Ditch samples indicated that this and other less well developed Triassic sands often have a carbonate cement and/or clay matrix, decreasing the effective porosity.

At the "J" unconformity the well enountered a 17 meter (56') thick sand, 25 meters (82') low to prognosis. It was barren of fauna or flora and was identified as reworked Jurassic on the basis of lithologic similarity to the Statfjord Formation.

The sand had a poor yellow fluorescence and only a trace of streaming crush cut after treatment with chloroform. Log analysis indicated average porosities of 20 to 23 percent with water saturations in the 61-100% range. The sand interval 2718 to 2724.1 meters (8917 to 8937') was drillstem tested and produced salt water at a rate of 2786 bbls. per day through a 28/64" choke with no trace of oil or gas. Remarks: Test failed acc. to test report. When?

Enclosure 1 is a generalized Jurassic/Triassic structural section illustrating our current interpretation of the relationship of 33/12-5 to the Statfjord Field.

The 33/12-5 well reached total depth of 4574 meters (15,006') in probable Triassic sediments of indeterminate age and was abandoned as a dry hole on 21 February 1976.

The well penetrated 1839 meters (6033') of Triassic sediments as compared to 1476 m (4843') of Triassic penetrated in 33/12-2. It evaluated 530 meters (1739') of stratigraphically older section than was seen in 33/12-2. Barring significant erosion of the Upper Triassic in other areas, 33/12-5 probably encountered the oldest Triassic section possible for a 15,000' well in License 037.

Sample collection and mud logging were performed by Exploration Logging. Paleontological samples were sent to Robertson Research and their paleontological summary is presented in Table I.

Wireline logging was done by Schlumberger. A detailed listing of specific services and log run intervals is shown on Table II and graphically illustrated on the enclosed Summary Log.

For detailes of lithology refer to the enclosed Final Composite Log.

STRATIGRAPHY/STRUCTURE

The stratigraphic section penetrated in the well was essentailly as predicted to the top of the Jurassic but variances to the original prognosis were encountered below this level. Figure 1 is a comparison of actual versus prognosed stratigraphy and tops.

The Tertiary and Upper Cretaceous sections were similar to other wells in the area, consisting predominantly of claystones and siltstones with minor sands. The Upper Cretaceous section, consisting of 795 meters (2608') of sediments, is the thickest found in the Statfjord area to date. The thickening could be a result of infilling on the Late Kimmerian and Lower Cretaceous unconformity paleotopography.

Younger Tertiary tops are based on paleontological data while the Paleocene and Cretaceous tops are based on wireline logs and lithologic markers. Paleo environments, reported by Robertson Research, are sublittoral in the Miocene and outer-sublittoral to bathyal in the Oligocene through the Cretaceous.

Based on electric log correlations the Lower Cretaceous is represented by 5.5 meters (18') of dark grey, calcareous claystone underlain by 5.5 meters (18') of tan to red-brown marl of Barremian age. As in other wells in the area, the contact between the Upper and Lower Cretaceous is unconformable. A sublittoral to inner-sublittoral environment is indicated by biostratigraphy.

Beneath the Lower Cretaceous, from 2718 to 3096 meters (8917 to 10,157'), the section is barren.

At 2718 meters (8917'), 17 meters (56') of clean, coarse grained sand with occasional kaolinitic matrix was penetrated. The Jurassic surface is at the top of this clastic unit, which is interpreted as a reworked Jurassic sand, unconformably overlain by the Lower Cretaceous and resting on an eroded Triassic surface. The sand is lithologically similiar to the Statfjord Formation and to the "Brent" sand in 33/12-4, which is also located on the east flank of the Statfjord structure.

In 33/12-4, faulting preserved a portion of the Jurassic section. In 33/12-5, erosion removed the entire Jurassic sequence and a portion of the Upper Triassic prior to deposition of a reworked Jurassic sand on the Triassic erosion surface. Enclosure 1 shows our present interpretation of the relationship of 33/12-5 to the Statfjord Field. The 33/12-5 well was correlated into the Field using electric logs and dipmeter data. Assuming an eroded and possibly thinning Upper Triassic section in the 33/12-5 well, the "B" Fault mapped seismically west of the well, is either not present or is of very minor significance.

The Upper Triassic was first identified by palynology at 3096 meters (10,157') by Norian palynomorphs. The top of the Triassic is picked higher, at 2735 meters (8973'), on the basis of lithologic similiarity with the underlying section and log correlations with the 33/12-2 well. Triassic lithology consists of red and brown shales and interbedded light red to white sands with calcareous cement and/or clay matrix, which are characteristic of the Upper Triassic in the region.

From 3708 meters (12,165') to 4254 meters (13,957') a Norian - Carnian age section was penetrated. Lithology is similar to the overlying section with increasingly argillaceous siltstones and finer grained sands.

Within this interval a primary objective of the well (previously interpreted as Lower Triassic Bunter sand as found in 33/12-2) was encountered at 3741 meters (12,273'). Reinterpretation of palynology indicates that this unit is of Upper Triassic Carnian - Norian age in both wells. This sand is 115 meters (377') thick, light brown to rusty colored, very fine to medium grained, argillaceous and partially cemented with carbonate material. The sand contains interbeds of a white calcareous claystone. Average log porosity was 11 percent. Biostratigraphy indicates shallow water to continental environments of deposition.

From 4254 meters (13,957') to the total depth of 4574 meters (15,006)') an indeterminate (Triassic ?) section was encountered with a similar lithology as above. Deposition under arid, continental conditions is indicated for this interval.

Figure 1 illustrates that the Paleocene and Cretaceous tops were, structurally, essentially as prognosed. The top of the Jurassic was encountered only 25 meters (82') low to prognosis. The Triassic was found 140 meters (459') higher than prognosed, due primarily to the almost complete absence of an anticipated Jurassic section. The objective Triassic sand was encountered 64 meters (210') higher than prognosed.

SUMMARY

The 33/12-5 well accomplished its primary objective of evaluating the Triassic sand found in 33/12-2 in a higher structural position. The well also evaluated an extensive, older, previously untested Triassic section beneath this sand unit.

The well penetrated 1839 meters (6033') of Triassic sediments compared to 1476 meters (4843') of Triassic section drilled in 33/12-2. Some 530 meters (1739') of these sediments were stratigraphically older than in the 33/12-2 well. Barring significant erosion of the Top Triassic in other areas, the 33/12-5 well probably encountered the oldest Triassic section in reach of a 15,000' well in the 037 Area.

Along the southeast flank of the Statfjord feature, erosion appears to have removed Jurassic sediments and a portion of the Upper Triassic prior to draping of a younger reworked Jurassic sand on the eroded Triassic surface (See Enclosure 1). Faulting between the well and the Statfjord Field appears to be either absent or of minor significance.

Only minor shows were encountered in the reworked Jurassic sand, which tested saltwater on DST.

The 33/12-5 well reached a total depth of 4574 meters (15,006') in sediments of indeterminate (probably Triassic) age and was abandoned as a dry hole on 21 February, 1976.

TABLE I

PALEONTOLOGICAL SUMMARY 33/12-5

Interval (meters)	Stage/Substage	System/Subsystem
486 - 508		Pliocene
510		Upper Miocene
516 - 868		Middle Miocene
870 - 940		Lower Miocene
948 - 1316		Oligocene
1320 - 1452		Eocene
1458 - 1704		Lower Eocene-Paleocene
1710 - 1916		Paleocene
1920 - 2013	Maastrichtian	Upper Cretaceous
2016 - 2136	Early Maastrichtian	
2139 - 2193	Late Campanian	
2196 - 2550	Early Campanian	
2553 - 2625	Santonian	
2628 - 2664	Coniacian	
2670 - 2712	Lower Cretaceous ?	Lower Cretaceous
2715 - 2718	Barremian	
2724 - 3090	Indeterminate	(Jurassic ? - Triassic ?)
3096 - 3708	Norian	Upper Triassic
3708 - 4248	Norian - Carnian	
4254 - 4574	Indeterminate	(? Triassic)

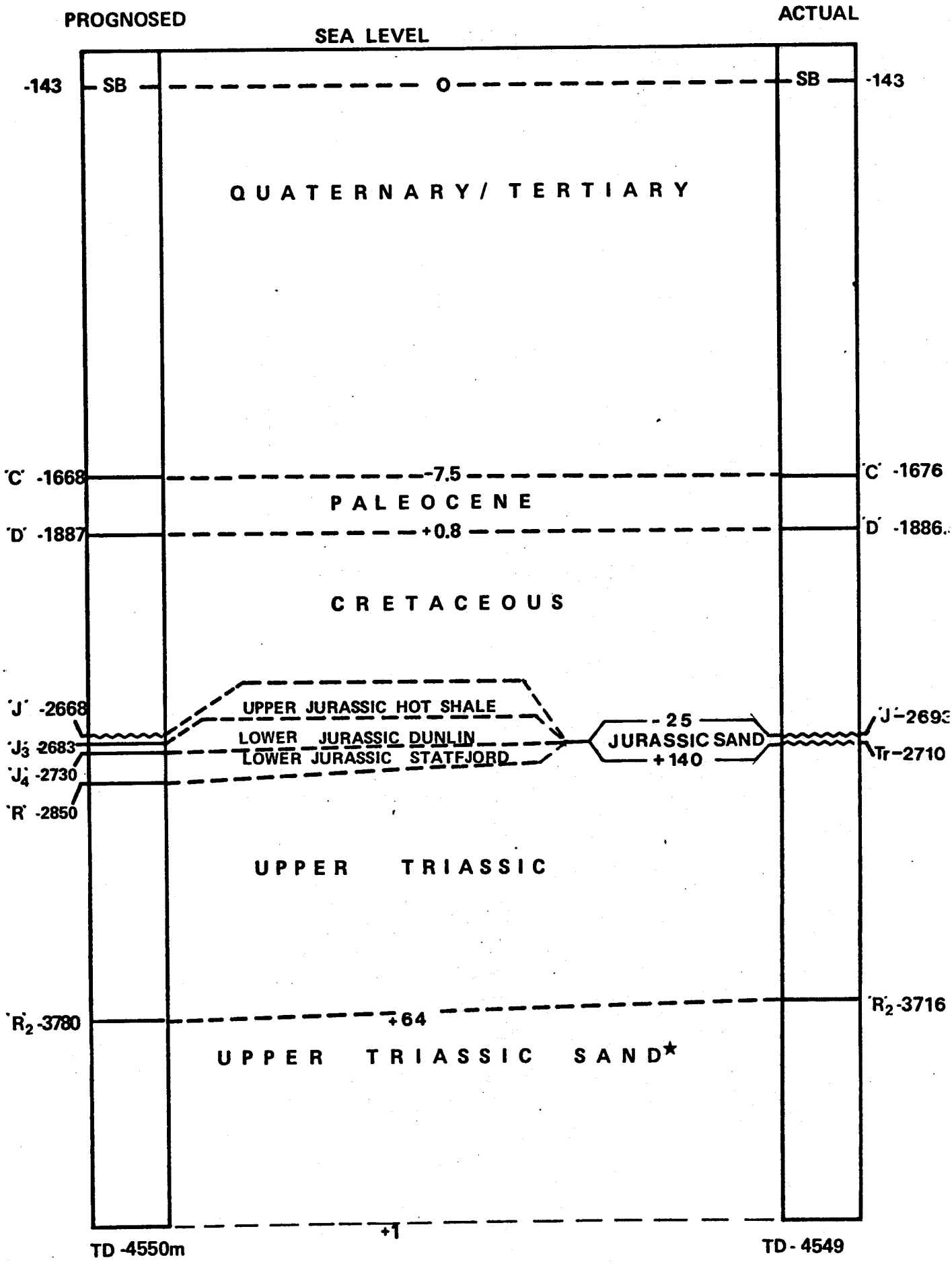
TABLE II

WIRELINE LOGGING SUMMARY

WELL 33/12-5

Log Type	Interval Logged, (m)	Date
First Log Run		
ISF/SONIC/GR	229.5 - 485.5	12 October 1975
Second Log Run		
IES	476.5 - 1999.5	23 October 1975
BHCS/GR	476.5 - 2000	23 October 1975
Third Log Run		
ISF/SONIC	1937 - 2870	15 November 1975
CNL/FDC/GR/Caliper	1936.5 - 2871	15 November 1975
HDT/Four Arm Caliper	1938 - 2850	15 November 1975
Temperature Log	160 - 2374	19 November 1975
Fourth Log Run		
ISF/SONIC	2861 - ca. 3850	11 January 1976
Tool malfunctioned and the entire interval was repeated in Run No. five.		
Fifth Log Run		
ISF/SONIC	2861 - 4573	4 February 1976
CNL/FDC/GR/Caliper	2861 - 4568	5 February 1976
HDT/Four Arm Caliper	2861 - 4517	6 February 1976
GR	3800 - 4564	6 February 1976
CBL	2600 - 2794.5	6 February 1976
CCL & Perf. Log	1925 - 2873	13 February 1976

WELL 33/12-5 PROGNOSIS VS. ACTUAL DEPTHS.



★*PROGNOSED LOWER TRIASSIC SAND AGE LATER CHANGED TO UPPER TRIASSIC SAND (NORIAN - CARNIAN)*

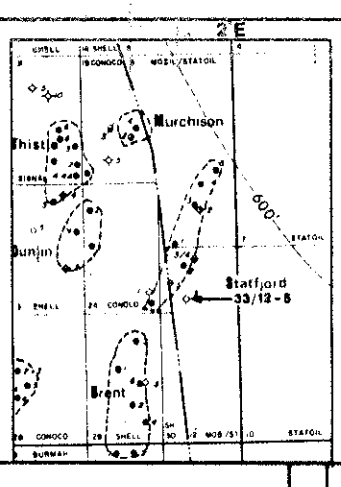
ALL DEPTHS IN METER SUBSEA

VERTICAL SCALE 1:20.000

A.L. APRIL 1976

FIGURE 1

ENCLOSURE 2



MOBIL EXPLORATION NORWAY INC.

MOBIL/STATOIL/CONOCO/ESSO/SHELL/AMOCO-SAGA

SUMMARY LOG 33/12-5

SCALE 1 10,000

COORDINATES LAT:	61°11' 05.53"	LONG:	01°51' 53.39"
ELEVATION KB/:	25m	RIG:	NORSKALD
WATER DEPTH:	143m	SPUDDED:	9 OCTOBER 1975
TOTAL DEPTH:	4574m (KB)	COMPLETED:	21 FEBRUARY 1976
		STATUS:	DRY HOLE, PLUGGED AND ABANDONED

METERS | STRATIGRAPHY | SHOWS | CASING TWOWAY CHECK SHOT TIME | LITHOLOGY-INDICATIONS-TEST RESULTS REMARKS | LOGS: ISF-SON, HDT, CNL/FDC, TES/BHCS, CCL/Perf., Temp.Log.

SHOWS: poor, fair, good

QUATERNARY

SEA BED 167.5 -142.5

(P) 486

TERTIARY

PLIOCENE 510 -461 (P)-485

MIOCENE

(P) 948 -923

OLIGOCENE

(P)1320 -1295

EOCENE

(P) 1458 -1433

LOWER EOCENE

(L) 1701 - 1676

PALEOCENE

(L) 1911.5 -1886.5

UPPER CRETACEOUS

UPPER CRETACEOUS

(L) 2707

L CRE JUR LOWER - 2682 CRETACEOUS (L) 2712.5

BAR. LS. - 2687.5 (L) 2718

REWORKED - 2693 JURASSIC SAND (L) 2735 -2710

UPPER TRIASSIC

INDETERMINATE SECTION

(P) 3096 -3071

NORIAN

(P) 3708 -3683

(L) 3741 -3716 U.TRIASSIC Sd

NORIAN-CARNIAN

(P) 4268 -4243

TRIASSIC?

INDETERMINATE SECTION

CASING: 30" (SEA BED), 20", 13 3/8", 9 5/8"

Depth	Lithology-Indications-Test Results / Remarks
	Clay, gy-grn, lse, calc Sand, clr, f-vf, prly srtd, SA-R
	Clay, sdy, gy-grn, lse, occ calc abd foss, occ pyr, tr glauc
	Sand, wh-clr, vf-m, SR-R, m srtd, lse, abd macro & micro foss
	Clay/Claystone, gy-grn-brn, sl calc, sft-firm
	Sand, wh-clr, vf-m, SR-R, m srtd, lse Claystone, grn, m hd
	Claystone, grn, m hd, occ tuf
	Claystone, grn-brn, m hd, occ tuf & mdy
	Claystone, tuf, slty, grn-brn, m hd, sl calc, minor calcilutite, wh-tan, hd
	Claystone, gy-grn, occ brn, sft-firm occ calc, tr pyr
2200m / 2082.8msec	Marl, gy-wh-rd brn, sft, stky Calcarenite, clr, m hd
	Sand, strgs, arg, clr, vf, m srtd, SA-SR, wh cly mtx, glauc, fri, no vis por, bri yel flor, tr streamy cut Claystone, lt-dk gy, sft-m hd, occ slty & calc Marl & Claystone, tan-gy-rd, sft firm, calc
2718m / 2448msec; 2735m / 2469msec	Sand/Sandstone, clr, m-c, SA m srtd, excellent por, yel flor, tr strmy wh cut
	Claystone, rd-brn-gy, sft-m hd, occ v slty, tr Calcilutite, chky, wh, sft Sandstone, wh-yel brn, vf-m, SA-SR, prly srtd, calc cmtd, lse, pr por
3400m / 2851msec	Mudstone, dk brn-rd, firm, occ calc
	Marl, rd-brn, sft-firm, blky
	Sandstone, arg, lt brn-rusty, vf-m, SA, m srtd, sl calc cmtd, mic, fri, pr por, intbdd Claystone, wh firm, lam Claystone, lt brn-tan, sft Marl, lt brn-tan, sft-firm
	Claystone, aa w/intbdd sandstone, lt gy-lt brn-brn, vf-m, m srtd, calc cmtd, mic, m hd, pr por
4400m / 3314.2msec	Claystone, dk rd, occ lt brn, sft-firm, stky, intbdd sandstone, dk rd, brn, occ wh-clr, m-prly srtd, SA-SR, m cmtd, hd, pr por
4555m / 3378.2msec	Sandstone, lt-m brn, f-m, SA-SR, prly srtd, sl calc, mic, sft-m hd, no vis por.
TD 4574 (-4549)	

Depth scale: 500, 1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 5500, 6000

Logs scale: 1000, 2000, 3000, 4000, 5000, 6000, 7000, 8000, 9000, 10000, 11000, 12000, 13000, 14000, 15000, 16000, 17000, 18000, 19000

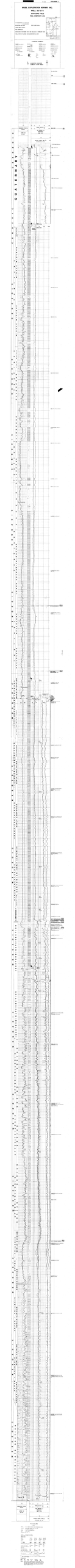
CBL

MINERAL EXPLORATION AUTHORITY (MTA)

DRILL: DD-15-8

LOCATION: Ayvacik

DATE: 2008/09/10 - 2008/09/11


MINERAL EXPLORATION AUTHORITY (MTA)
DRILL: DD-15-8
LOCATION: Ayvacik
DATE: 2008/09/10 - 2008/09/11
Q U A T E R N A R Y
Depth (m)
Lithology
Description
Sample No
Sample Interval
Core Recovery
Core Loss
Core Length
Core Recovery (%)
Core Loss (%)
Core Length (%)
Sample Interval (%)
Sample No (%)

ROBERTSON RESEARCH INTERNATIONAL LIMITED

SUMMARY LOG : 33/12-5

AREA NORWEGIAN NORTH SEA SPUD DATE 9th OCT 1973

COMPANY MOBIL EXPLORATION NORWAY INC. COMPLETION DATE 21st FEB 1976

INTERVAL STUDIED 486m-4574m T.D 4574m

Lat. 61° 26' 31.1" N / Long. 02° 01' 48.7" E SCALE 1:5000

Cored Interval

Casing Shoe

Log Analysis by Robertson Research International Limited

Log Plotted April 1976

SYSTEM	SUB-SYSTEM	STAGE / FORMATION	INTERVAL BOUNDARIES (approx.)
INDETERMINATE (?TRIASSIC)			
TRIASSIC	UPPER TRIASSIC	CARNIAN-NORIAN	425m
		NORIAN	1708m
INDETERMINATE (?TRIASSIC-?JURASSIC)	? UPPER TRIASSIC - ? JURASSIC		1989m
CRETACEOUS	UPPER CRETACEOUS	ALBIAN	2173m
		CENOMANIAN	2667m
		TURONIAN	2808.5m
		SANTONIAN	2951.5m
		EARLY CAMPANIAN	3194.5m
		LATE CAMPANIAN	3237m
		EARLY MAASTRICHTIAN	
		MAASTRICHTIAN	3504.5m
PALAEOCENE			3918m
PALAEOCENE-EOCENE	PALAEOCENE-LOWER EOCENE		4107m
EOCENE			4455m
OLIGOCENE			4518m
MIOCENE	LOWER MIOCENE		4944m
	MIDDLE MIOCENE		4965m
		PLIOCENE	4574m

CASING AND CORING DETAILS

DEPTH (FEET)

GENERALISED LITHOLOGY

ENVIRONMENT OF DEPOSITION: CONTINENTAL, FRESHWATER, BRACKISH/HYPERSALINE, LAGOONAL, LITTORAL, INNER SUBLITTORAL, OUTER SUBLITTORAL, BATHYAL

ENCLOSURE 4