MARATHON PETROLEUM COMPANY (NORWAY)

COMPLETION LOG

24/9-7 B

LOCATION

WGS 84 (IN 31 TM): 350°37' 34.423"E
UTM: EN50, Zone 31, CM: PN
NKG 2011 NH4: E 3.000,000,000 N
[illegible]
WGS 84: 59.0938°N 003°37' 59.010"E
NKG.NN 2000: E 3.000,024.430 N

WATER DEPTH

124.3m

DRILL FLOOR ELEVATION

25m

CASING RECORD

30" Conductor
20" Casing shoe
13 3/8" Casing shoe, 17 1/2" hole
9 5/8" Casing shoe, 12 1/4" hole, 1.14sg

ENGINEERS

Drilling Rig	Saipem Neptune
Drilling Contractor	Saipem Norway

GEOLOGISTS

Geologist Onshore	Stefan Henderson
Geologist Offshore	

WELL CLASSIFICATION

Exploration

TOTAL DEPTH (TVD) 2100m	**PAD** Deepsea Delta
TOTAL DEPTH (MD) 2100m	**SPUD DATE** 11.30, 29 March 2004
COMPLETION DATE 19.30, 4 April 2004	**COMPLETION STATUS** P & A, Oil and Gas Shows

BOTTOM HOLE FORMATION

Lista/Vidar Formation - Rogaland Group
Hidra Formation

COMMENTS

All depths are measured from rotary on 1400m. Following depths are measured from the drill floor and are given in brackets: Water depth 124.3m, Rotary table 25m, and Kelly bushing 29.5m. [illegible]

LOCATION PLAT

COUNTRY

Norway

REGION

North Sea - West of Frømlandet

CONCESSION

PL 036

FIELD

Frøkenlaget

TESTING CONTRACTOR

MUD LOGGING

Baker Hughes INTEQ

MUD ENGINEERING

M-I SWACO

DRILLING CONTRACTOR

Seadrill Limited

WIRELINE LOGGING

Baker Atlas

CEMENTING

Halliburton

OPERATIONS

Drilling Operations	Schlumberger Sperry-Sun
Mud Logging	Baker Hughes INTEQ

OPENHOLE & EVALUATION

RUN	DATE	BIT SIZE	COMBINATION RUN	DIPOLE SONIC IMAGER	DRILLING DATA	REMARKS	Depth Range (m)		Hole Size (inches)	
							From	To	Min	Max
1A	31/03	26"	GR-MWD, DSL, FWD-VMSC	1400m - 1900m	1-2/10m	CR-1400m to 1400m	1400m	1900m	26"	26"
1A	31/03	26"	GR-MWD,PWD	1900m - 2100m	2/10m		1900m	2100m	17 1/2"	17 1/2"
									26"	30"

HOLE RECORD

HOLE SIZE (inches)	DEPTH (m) RKB/MSL	BIT SIZE (inches)	
30"	145.4m - 155m	Tetra water	
26"	155m - 1400m	Tetra water	
17 1/2"	1400m - 1900m	Versavert OBM	
26"*	1900m - 2100m	Versavert OBM	

CORING RECORD

CORE NO.	DEPTH (m) RKB/MSL	CUT	REC	DEPTH
1	1922.5m - 1979m	55.5m	55.5m	100

GENERAL DRILLING DATA AND SHOWS

DRILL STEM TEST
PRESSURE POINT
INSTRUMENTED DRILL PIPE

DEVIATION DATA — Continuous Survey

CASING (OR LINER) WITH SHOE BETTOM DEPTH

LINER HANGER

Oil Beared Mud
Gas Bearing Mud
Gas Cap Mud
Water Bearing Mud

Water Beared Mud
Dry Hole(s)
Dry Hole(s) Sidetrack
Abandoned Well

TRACE OIL SHOW
POOR OIL SHOW
GOOD OIL SHOW
EXCELLENT OIL SHOW

POOR GAS SHOW
GOOD GAS SHOW

CORE INTERVAL
CORE INTERVAL WITH NO LOSS
WITH RECOVERY IN BLACK

SEWRAGE CORE RECOVERED

SEWRAGE CORE NO RECOVERY

RFT PRETEST FAIL DIR DRY
RFT PRETEST GOOD
RFT PRETEST SAMPLE

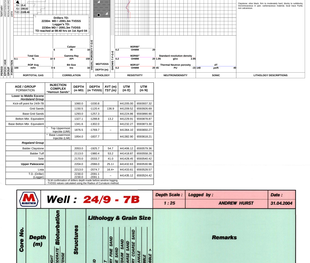
LITHOLOGIC SYMBOLS

SANDSTONE
LIMESTONE
GYPSUM
SILTSTONE
DOLOMITE
SALT
CLAYSTONE
MARL
COAL
SHALE
ANHYDRITE
VOLCANIC
SAND STRINGER
KAOLINITE/FULLERS'S EARTH
GYPSUM
DOLOMITE STRINGER
CALCAREOUS
TUFFACEOUS
MICACEOUS
CLASSICAL/TIC
MICROFOSSILS & FORAMS
COAST
PYRITE
CARBONACEOUS
FERROGINOUS
ARGILLACEOUS
DOLOMITIC

LITHOLOGY DESCRIPTIONS

Visual off from well 1900.7 m 2435.70 m (Hidra NS)

Siltstone, dark brown to dark greenish brown, fair fissility, fine-grained, sub-blocky, sub-fissile, sub-platy, occasionally sub-fissile, very fine micaceous, very fine-grained, occasionally micaceous, very fine-grained, sandy, carbonaceous, occasionally micaceous, very fine-grained, sandy, carbonaceous, occasionally micaceous, very fine-grained, sandy, carbonaceous



AGE / GROUP SUBGROUP	INJECTION PRESSURE (kPa)	DEPTH (m)	PIT (m)	LTM (m)	LTM (%)
Upper Mulga Beds Alluvium/Colluvium	1380.0	1380.0	1380.0	0.0	0.0
Mulga Beds	1380.0	1380.0	1380.0	0.0	0.0
Upper Paleozoic Devonian Group	1380.0	1380.0	1380.0	0.0	0.0
Devonian	1380.0	1380.0	1380.0	0.0	0.0
Silurian	1380.0	1380.0	1380.0	0.0	0.0
Ordovician	1380.0	1380.0	1380.0	0.0	0.0
Cambrian	1380.0	1380.0	1380.0	0.0	0.0
Proterozoic Proterozoic Group	1380.0	1380.0	1380.0	0.0	0.0
Proterozoic	1380.0	1380.0	1380.0	0.0	0.0
TD reached at 99.90 m on 1st April 94	1380.0	1380.0	1380.0	0.0	0.0

Total cases recorded using Nylon 12 Lubricant 100%

Well : 24/9 - 7B

Depth Scale : 1 : 20 | Logged by : ANDREW HURST | Date : 31.04.2004

Core No.	Depth (m)	Accept Reject	Penetration Deformation	Structures	AUG	Lithology & Grain Size	Remarks
CORE 1	1921						
	1922						**Top Core 1 - 1922.00**
	1923						1923.07 - 1923.10 Brown, dark to pale green mudstone, laminated, ply appearance but appears to be fine sandstone. Contains numerous fine sand to silt size lenticular concretionary bodies. Appears to contain CHERTS (contains some dolomite and strong silica fracture).
	1924						1924.70 - 1924.90 Lime laminated (cm-scale), more green than brown and more disturbed
	1925						3cm thick fine grained micaceous sandstone with muddy laminae - approx. 12m above nearest injection and approx. 25m above the main sill.
	1926					Pyrite	1926.00 - 1926.15 Greyfirown laminated mudstone, occasional fenmas and local pyrite cement
	1927					Pyrite	Normal fault - approx. 3m throw.
	1928					Pyrite	cm-scale pyritised burrow.
	1929						
	1930						
	1931						Sinuous inclined sill (approx. 15deg) with small "pods" of injected sand above it.
	1932						Irregular, slightly discontinuous sill, approximately bedding parallel.
	1933						Band of irregular and discontinuous inclined sills (2 approx. 15deg inclination.
	1934						Discontinuous inclined sill @ approx. 15deg.
	1935						1cm thick inclined sill @ approx. 15deg.
	1936						
	1937						
	1938					Pyrite	Pair of sills, upper 7.8cm thick, lower 3.4cm thick - both have irregular shaped margins and both contain small (cm-scale) pyrite crystals - sills are inclined @ approx. 15deg to the mudstone lamination.
	1939						1939.00 - 1939.20 Brown mudstone with irregular cm-scale lamination - fossils common (CARB FOSSILS) - contains well developed Zoochabed - local calcite concretions.
	1940					Pyrite	1940.00 - 1940.20 Green mudstone with irregular cm-scale lamination - fossils common (CARB FOSSILS) - contains well developed Zoochabed - local calcite concretions.
	1941						Composite sill with a rounded, irregular lower boundary and an undulose, irregular cm-thick top unit - entire unit is 8cm thick - fine calcite veins emanate from the top surface.
	1942						Calcite veinlets.
	1943						Calcite nodules at the boundary between mudstone units.
	1944					Pyrite	1943.00 - 1943.20 Greenjrey mudstone, strongly laminated, intense green (possibly altered) mudstone with micaceous which are often quite calcareous - approx. 100deg inclination on lamination.
	1945					Pyrite	cm-thick dark grey mudstone - pyrite nodules.
	1946					Pyrite	A "swarm" of mm-scale pyrite nodules in burrows.
	1947					Pyrite	Large (half core width) calcite nodule with a veined, fractured base.
	1948					Pyrite	1947.40 - 1948.00 Green mudstone with dark grey laminae - where strongly laminated there is a slight increase in silt content - fossils common - fracture filled (micro-slickenlines occur - mudstone laminae dip @ approx. 100deg.
	1949						Pair of cm-scale inclined sills - approx.20deg inclination. Small filled micro-injections.
	1950						3cm-cm polygonal, discontinuous inclined sill - approx. 40deg inclination.
	1951						1949.50 - 1950.00 Greenjrey weakly laminated mudstone - laminae dip @ approx. 20deg.
	1952						Approx. bedding parallel sill with undulating margins, some calcite cement and ragg dead chips.
	1953						1950.10 - 1951.10 Green/brown mudstone, weakly laminated, (narrowly bioturbated with occasional fossils) - lamination inclined @ approx. 20deg.
	1954	GEAL PEEL NHLE - NHLE					Dyke with sub-horizontal flow laminae - flattens at top and base, probably part of a dropped feature - underlain by pinbeys of fine sand mechanites (mm-scale).
	1955						Inclined cm-scale sill - approx. 30deg inclination.
	1956						1951.10 - 1951.30 Brown/grey weakly laminated mudstone - intensity of lamination varies and sill zones relationship to the abundance of bioturbation (Chondrites and occasional large fossils - occasional fossils).
	1957					Pyrite	Approx. bedding parallel sill - abundant mud chips and mudstone clasts - base is irregular, top is undulose - sill is dissected by a 1cm thick shear with a slight offset - a small (cm-scale) polygonal dyke emanates at approx. 80deg from top surface.
	1958					Pyrite	Sill with mud chips.
	1959					Pyrite	Slightly inclined sill - top is stepped (cm-scale) and heavily cured (nucleiyed) with mudstone clasts and mud chips - base is irregular and undulose - some of the mud fragments are peeling from the overlying mudstone. The base 20cm in the core view is strongly inclined (approx. 35deg) with cm-scale steps the lowermost step is 2cm high - the top is less inclined (approx. 20deg) and the mudstone clasts appear are larger than the core width, have sparse fabrics and hummocky margins - a (cm-scale) fining-upwards of mudstone clasts is present - (cuts fine lamination is present in the uppermost approx. 20cm.
	1960						
	1961						
	1962						
	1963						
	1964						
	1965						
	1966						
	1967						
	1968						
	1969						
	1970						
	1971						
	1972						
	1973						
	1974						
	1975						
	1976						
	1977						
	1978						
	1979						
	1980						

Composite sill comprising three thickening-upward sills - the lowermost sill is approximately 3cm thick and the uppermost sill (top) is 7cm thick - contact occurs along the top surface of the upper sill - approx. bedding parallel. 3-5cm thick sill approx. bedding parallel - mud clasts are abundant - pyrite cement is abundant along the weights of the sill.

1957.47 - 1958.00 Green mudstone with weak lamination, pervasive bioturbation and secondary fracture.

Pyrite cemented in fractures - <1mm wide, up to approx. 25cm long.

1958.80 - 1960.00 Light green/brown mudstone, laminated (1-2mm scale), pervasively bioturbated.

Irregular accurred bases to mudstones at 1960.0 demonstrating a low density turbidite origin.

1960.00 - 1961.10 Dark green/brown mudstone, moderately laminated and bioturbated

Cuamnon arrings of micro-injections - decrease from (m- to mm-scale spread.

1961.10 - 1962.10 Rice dark grey mudstone, weakly laminated and pervasively bioturbated with cm-scale burrows which have a green mud fill

Very dark grey mudstone with browns and pyrite cemed along the base.

1962.10 - 1966.00 Well grey/greenjrey mudstone with weak irregular laminae, strongly bioturbated

mm-scale water-escape pipes.

mm-scale, discontinuous, micro-laminated sand lenses and pods - one upper surface is stepped and has ring pendent structures.

1964.80 - 1967.00 Dark green/brown mudstone, moderately laminated, common bioturbation, strongly bioturbated locally (excellent Zoochabe).

Graphs abundant in calcite cemented interval.

Interval of micro-injections (1967.8 - 1967.9) - includes a micro-injection complex with a dyke and sill - 3cm thick sill approx. circular cross-section, a possible a sole that intersects (@ 1967.95).
1967.50 - 1968.00 Medium green mudstone, occasional faint laminations, thoroughly bioturbated (excellent Zoochabe) - contains numerous calcite veinlets - pyrite, including nodules, Chondrites or abundance in top 25cm.

Approx. circular cross-section micro-injection, possibly tube-like (@ 1967.85).

1968.00 - 1970.00 Rich green/brown mudstone - moderately laminated, occasional mm-scale burrows, bioturbation is well developed (Zoochabe) - contains numerous calcite veinlets and nodules - pyrite.

Approx. 10cm thick interval of intensely bioturbated (predominantly horizontal burrows) very fine sand with calcite cement.
A composite of three low-angle (approx. 10-15deg) sills - the upper and lower sills are 3cm thick and the middle sill is 2cm thick - the upper and middle sills have calcite nodules and is quiceo. 3cm thick with irregular, dark laminae - part cemented by calcite

1970.80 - 1972.00 Medium green/grey mudstone, weakly laminated, intensely bioturbated including Zoochabe - cm-scale horizontal fractures - fossils common.

1972.70 - 1973.00 Dark green mudstone, laminated, bioturbated (Chondrites) - some calcite veins/fractures present.

1973.00 - 1978.90 Medium green mudstone, bioturbated with occasional (mm) fragments (some horizontal) fenmas with a dark mud fill.

Shelf (fossils) accumulation.

1978.90 - 1977.00 Light to medium green mudstone with occasional silty laminae - weak lamination, bioturbation is common (horizontal and occasional fragm - bioturbated mudmud at approx. 1m (dipping).

Approx. 3cm thick dark grey/green mudstone - calcite veins present.
1978.00 - 1978.20 Band of (cm)- LAM green mudstone, weakly laminated, clearly including fossils (CARB FOSSILS) - fossils common.

GEAL - BASE OF CORE

Base Core 1 - 1978.00