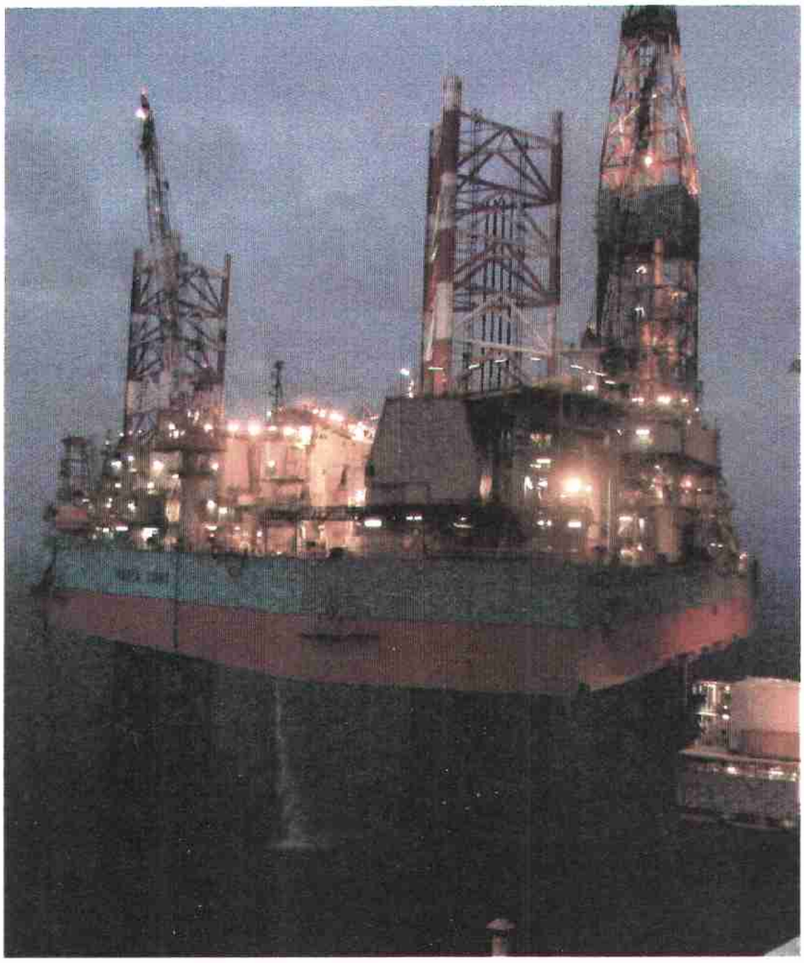
Well 1/9-7 T3
(incorporating 1/9-7 and 1/9-7 T2)

Tommeliten Alpha Exploration Well

Geological End of Well Report

February, 2004



ConocoPhillips STATOIL Eni GROUP Norsk Agip TOTAL

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(incorporating 1/9-7 and 1/9-7 T2)

Tommeliten Alpha Exploration Well

Geological End of Well Report

Prepared by:	Checked by:	Approved by:	Date:
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1 EXECUTIVE SUMMARY

1.1. WELL OBJECTIVES

The objective of well 1/9-7 was to explore the hydrocarbon potential of the Tommeliten Alpha prospect in Block 1/9 at the Jurassic level and to further appraise the 1976 Tommeliten Alpha Chalk discovery. The well was designed to test for the presence of hydrocarbons in the Upper Jurassic Oxfordian (J50) sand at a location that would provide adequate drilling margin in the HTHP environment without leaving untested commercial hydrocarbons updip. Consideration was also given to a suitable location for Chalk appraisal in the placement of the well. The well was prognosed to reach TD at 5045m MD or when sufficient rathole was drilled below the base of the Oxfordian sand interval to allow testing in the discovery case and full coverage logging in the wet case. In the case that sand was not encountered, the well would terminate in the Triassic section. The 1/9-7 well was discretionary in nature with no obligations to the state to penetrate a specific stratigraphic level.

1.2. WELL SUMMARY

The Drilling Operations Final Well Report is available as a seperate document. This contains a detailed drilling summary and time breakdown of the well.

The 1/9-7 Tommeliten well is located in the Southern North Sea – Norwegian Sector. The well location was approximately 25 kilometres (km) southwest of the Ekofisk complex in 75.75m of water.

The well was spudded at 1630 hrs on the 22nd March 2003 as 1/9-7. The well was drilled to the TD of the 17½" section at 3040m MD by the 21st April. Problems with losses at the 20" shoe at 1039m were remediated by spotting cement at the shoe. The well was inadvertently sidetracked as 1/9-T2 while drilling out the cement on the 27th April. Unable to re-enter the original borehole after drilling to 1215m MD, the 1/9-T2 sidetrack was cemented back to the 20" shoe.

The well was then deliberated and successfully sidetracked as 1/9-7 T3 on the 4th May 2003. The 17½" hole was redrilled to a TD of 3058m, 14" casing set, and the well drilled into the top of the Cromer Knoll at the TD of the 12¼" hole at 4328m MD. The well was drilled in HPHT mode from the start of the 8½" section. The rig was equipped with a Rotating Diverter (RD) and an Enhanced Circulation System (ECS). This equipment was designed and utilized to improve the safety of the operation, reduce personnel & equipment exposure to hydrocarbons and improve operational efficiency. The well was drilled in 8½" and 6½" hole to reach a final TD of 4986m MD (-4921m TVDSS) on the 13th July 2003.

The Chalk objective was proved to gas-condensate bearing, whilst Jurassic objective sands were found to be absent. The temperature and the mud weight at TD were 180°C and 17.0ppg (2.04 sg) respectively.

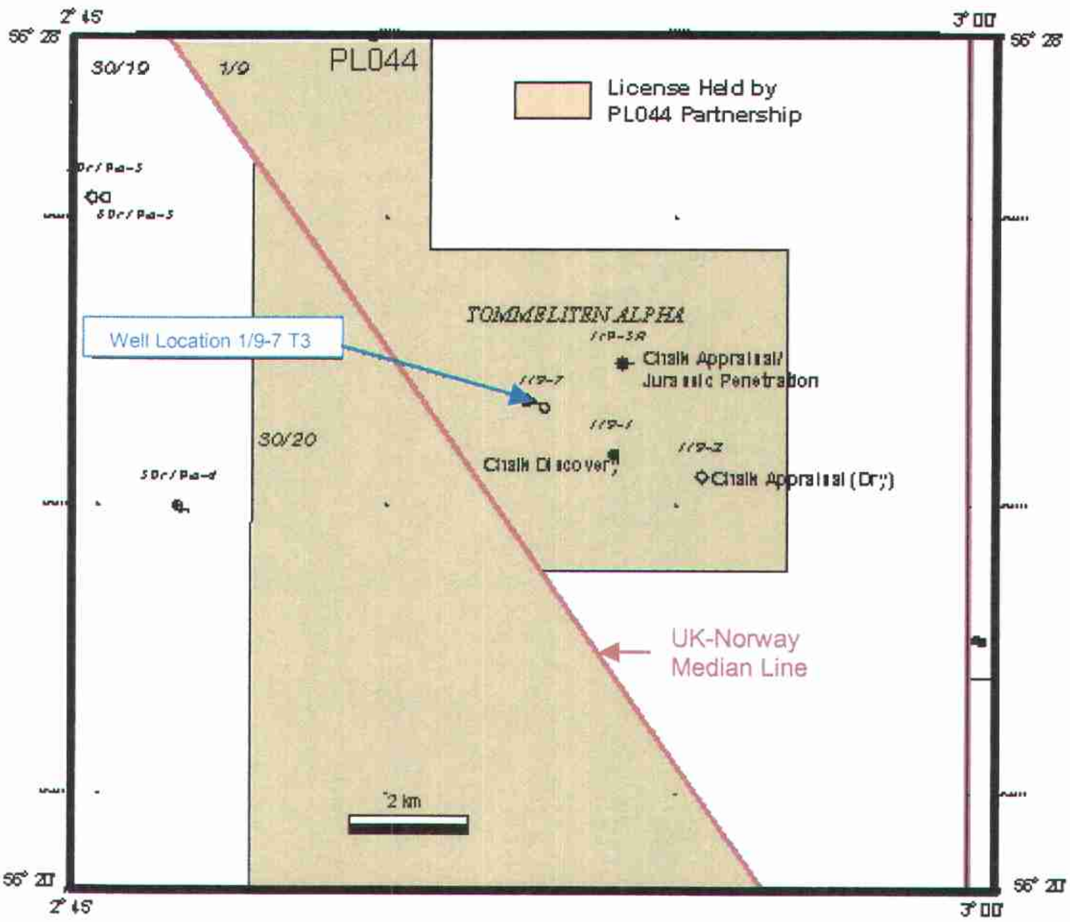
1.3. GENERAL INFORMATION

Final Well Name:	1/9–7 T3	
Permit:	PL044	
NPD Reference Number:	1048L	
Designation:	Exploration	
Operator:	ConocoPhillips Norge	
Drilling Contractor:	Maersk Contractors Norge	
Rig Name/Type:	Maersk Giant / Jack Up	
Water Depth:	75.75m MSL	
Rotary Table:	45m (above MSL)	
Total Depth 1/9-7 T3:	4986m MD (-4921m TVDSS) Drillers 4992m MD (-4927m TVDSS) Logger	
Maximum Temperature:	180°C	
Final Surface Location:	56° 24' 31.226" N 02° 52' 55.084" E	6 251 710.5m N 492 716.1 m E
1/9-7 Final TD Location:	56° 24' 31.717" N 02° 52' 55.053" E	6 251 725.69m N 492 715.60 m E
1/9-7 T3 Final TD Location:	56° 24' 34.940" N 02° 53' 02.694" E	6 251 825.12m N 492 846.75 m E
Location Reference Datum:	ED50, UTM Zone 31 (CM3°E)	
Rig on Contract: Rig on Location:	15th March 2003 16th March 2003	
Spud Date 1/9-7: TD Date 1/9-7:	22nd March 2003 21st April 2003	
Spud Date 1/9-7 T2: TD Date 1/9-7 T2:	27th April 2003 1st May 2003	
Spud Date 1/9-7 T3: TD Date: Rig Release Date:	4th May 2003 13th July 2003 3rd August 2003	

Total Well Duration:	140.7 days	
Completion Status (1/9-7 T3):	Plugged & Abandoned as a Gas Condenate Discovery	
PL 044 Partnership		
Operator:	Jurassic Level	Chalk Level
ConocoPhillips Norge	41.88%	28.26%
Coventures:		
Statoil	30.00%	42.38%
Total E-P Norge	15.00%	20.23%
Norsk Agip	13.12%	9.13%

1.4. LOCATION MAP

Figure1 : Well Location Map



2 GEOLOGY AND GEOPHYSICS

2.1. POST WELL RESULTS.

The 1/9-7 T3 satisfied the primary well objective which was to test the hydrocarbon potential of the Tommeliten Alpha Prospect and further appraise the 1976 Tommeltien Alpha Chalk Discovery. A post-drill depth structure map at the Top Oxfordian level showing the relative structural position of the well is shown in Figure 2.

Well 1/97-T3 was drilled to a TD of 4986m MD (-4921m TVDSS), 82 m beneath the top of the Hegre Group. The well was logged and a logger's TD of 4992m MD (-4927 m TVDSS) recorded.

Reservoir quality sands were not encountered at any level below the Base Cretaceous Unconformity, although an interval containing very fine sand and silt equivalent to the Oxfordian J50 Sand Unit in the 30/19a-5 well, 8 km to the WNW, was encountered without shows. The well did encounter probable hydrocarbon pay in the Ekofisk and Tor Formations with positive affirmation of hydrocarbons in the Ekofisk Formation via a dual-packer MDT.

The well was permanently plugged and abandoned.

2.2. GEOLOGICAL BACKGROUND

Well 1/9-7 was drilled on the Tommeliten Alpha prospect, located approximately 25 km from the Ekofisk Bravo Platform in the Central Graben portion of the Norwegian Continental Shelf.

The Tommeliten Alpha prospect lies in the Feda Graben just to the north of the Mid North Sea High. The primary objective of the prospect was Oxfordian J50 sand with a secondary objective in the Ekofisk and Tor Chalk Formations.

The Tommeliten Alpha structure is a very large structure (21 km^2) with 500 meters of 4-way dip closure (630 m high-side fault closure) at a paleotopographical position that appeared favourable to sand development in the Upper Jurassic Section. Containment was seen as the primary risk on the prospect as several Upper Jurassic Fields and discoveries in the Central Graben have small column heights relative to structural closure or fail to hold a hydrocarbon column. The presence of a potential protective structure at the nearby Affleck structure (8 km WNW) in the UK, which is at fracture pressure at the structural crest, indicated that the hydrocarbon column at Tommeliten Alpha could equal the structural spillpoint.

Reservoir quality was expected to be good due to relationships observed in other HTHP fields at similar depths in the Central Graben with porosity ranging from 12 to 20% and permeability ranging from 1 to 100 md. Gas condensate was the expected reservoir phase with a GOR of 1000 m^3/m^3 and a reservoir pressure at the well location of approximately 13500 psi (930.7 bars).

The probability of discovery was estimated at 41%. The primary risk for the prospect was containment (75%) with secondary risk of reservoir quality (84%). Reservoir presence was not envisaged to be high risk at the time of drilling due to the presence of apparent J50 shoreface sands in the nearby and analogous well 30/19a-5. 3D seismic indicated a thickening of the overall Jurassic section from the 30/19a-5 towards the Tommeliten Alpha structure.

Well 1/9-1 discovered hydrocarbons in the Ekofisk and Tor Formations of the Chalk Group in 1975. Subsequent wells 1/9-2 and 1/9-3 further delimited the field but no wells previous to the 1/9-7 had penetrated the western side of the structure. Chalk reserves from the Ekofisk and Tor Formations were not part of the primary justification for drilling and were considered only in sensitivity economics. Nonetheless, one of the primary objectives of Well 1/9-7 was to assay the western portion of the Tommeliten Alpha to provide further information regarding the commerciality of the Tommeliten Alpha Chalk Field.

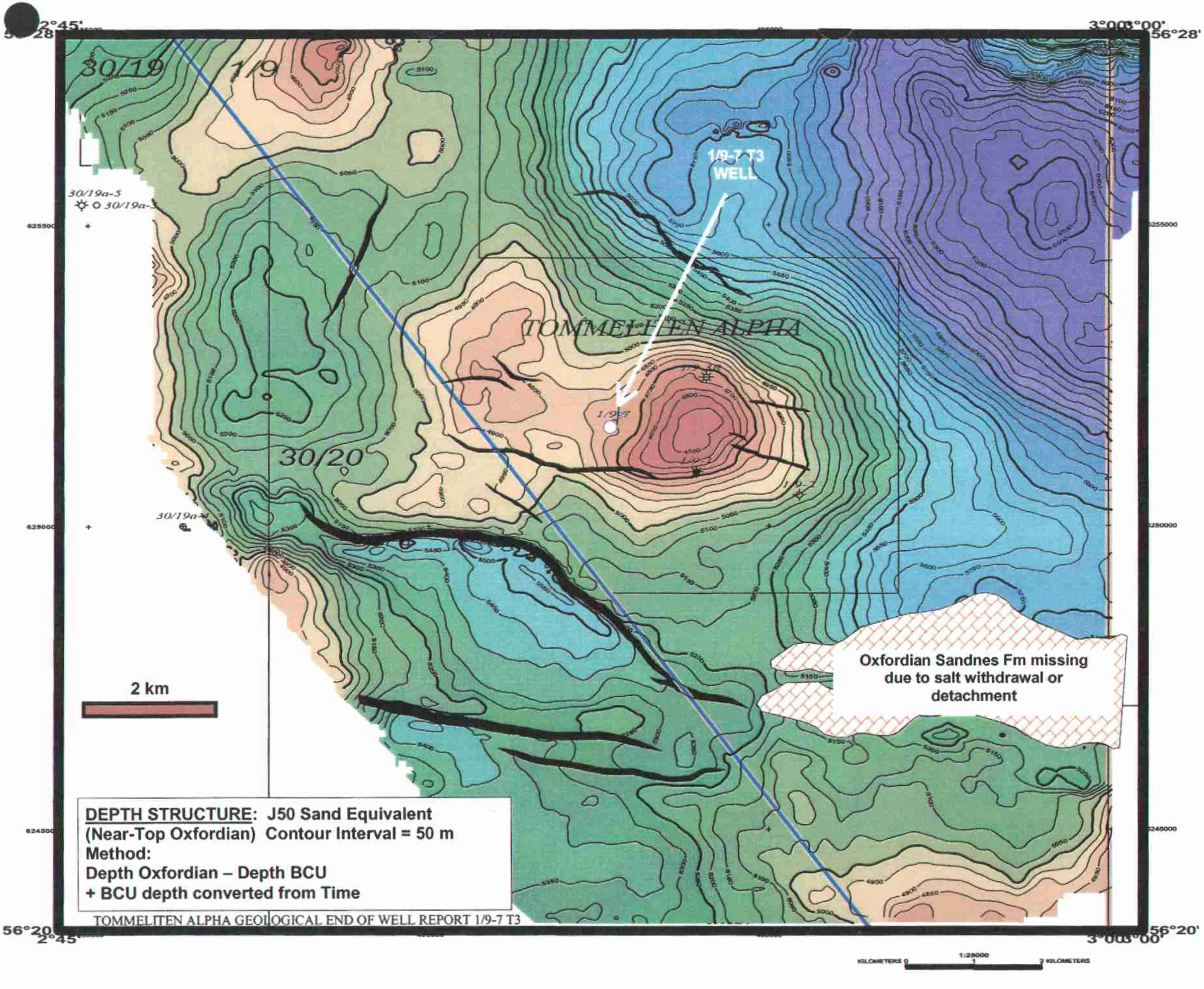


Figure 2: Post-drill Prospect Map – Top Oxfordian Depth Map

2.3. SAMPLING PROGRAM

2.3.1. Routine Cuttings Sampling

The 36" hole section was drilled riserless with returns taken to the seabed. Sampling began at the start of the 9⅞" pilot hole which was drilled from 310m – 1210m, before being opened to 26" down to a depth of 1042m. Drilling continued to the final TD of 1/9-7, in 17½" hole, of 3040m. The inadvertent 1/9-7 T2 sidetrack was drilled in 17½" hole from 1042m – 1215m. The 1/9-7 T3 sidetrack was drilled from 1042m (just below the 20" shoe at 1039m) to a final well TD of 4986m. A total of 3 sets of cuttings samples, 1 set of geochemical cans and 1 set of mud sample were collected at the rigsite, in the original well and the 2 sidetracks, as follows:

Table 1A: Wellsite Sample Collection.

TYPE	COMPANY	NO. OF SETS	WEIGHT
Mud sample	ConocoPhillips (COP)	1	0.25 litre
Washed and dried cuttings	COP	1	100 grams
Wet cuttings	COP Biostrat	1	100 grams
Wet cuttings	Split at Reslab Laboratory	1	5 kg bucket
Geochemical, unwashed cuttings, canned and sealed	COP	1	330 grams

The 5 kg buckets of wet samples were split onshore at Reslab's laboratories to provide, along with the separate sets collected on the rig, the following sets for distribution:

Table 1B: Cuttings and Sample distribution.

TYPE	COMPANY	NO. OF SETS	WEIGHT
Wet cuttings	NPD	1 (Set A)	1000 grams
Wet cuttings	COP Reference	1 (Set B)	500 grams
Wet cuttings	COP Biostrat	1 (Set C)	100 grams
Wet cuttings	Total	1 (Set D)	500 grams
Washed and dried cuttings	Total	1 (Set E)	100 grams
Washed and dried cuttings	Agip	1 (Set F)	100 grams
Washed and dried cuttings	COP Trade via OLF*	10 (Set G)	100 grams
Washed and dried cuttings	COP Reference	1 (Set H)	100 grams
Washed and dried cuttings	COP Studies Set	1 (Set I)	100 grams
Geochemical cans	COP Geochem	1 (Set J)	330 grams
Mud sample (Geochem)	COP	1 (Set K)	0.25 litre

* OLF are the trade operator and are based at the Reslab facility in Forus, Stavanger.

Table 2A: Sampling intervals in 1/9-7

TYPE	DEPTH m MD	SAMPLE INTERVAL

Wet cuttings (Sets A,B,D) Biostratigraphy samples (Set C) Washed and dried cuttings (Sets E, F, G, H, I)	315 – 1205 m 1205 – 2870 m 2870 – 3039 m	40 m 20 m 3 m
Geochem canned samples (Set J)	1500 – 1800 m 1800 – 2600 m 2600 – 3039 m	10 m 20 m 10 m
Mud samples (Set K)	1060 m, 1520 m	Single samples

Note no samples were retained for the short 1/9-7 T2 sidetrack (1042m – 1215m).

Table 2B: Sampling intervals in 1/9-7 T3

TYPE	DEPTH m MD	SAMPLE INTERVAL
Wet cuttings (Sets A,B,D) Biostratigraphy samples (Set C) Washed and dried cuttings (Sets E, F, G, H, I)	1070 – 2900 m 2900 – 3058 m (2970 – 2990m) 3058 – 3118 m 3118 – 3300 m 3300 – 4200 m 4200 – 4986 m	20 m 10 m 3 m 3 m 5 m 10 m 3 m
Geochem canned samples (Set J)	3062 - 3102 m 3135 - 4720 m 4720 – 4880 m	10 m 20 m 10 m
Mud samples (Set K)	3135 – 4650 m 4650 - 4980 m	100 m 10 m

*Additional mud samples taken over reservoir and cored intervals.

2.3.2. Sidewall cores

No sidewall cores were taken in the well.

2.3.3. Conventional cores

Two cores were taken in the Ekofisk Formation (see Table 3, overleaf). Despite being in the 12¼" hole section, coring was performed using an 8½" corehead and 27m-long barrel, as oriented core shoes were not available in the 12¼" size. The core diameter was 4". The first oriented core jammed off after only 2.6m and so the second core barrel was run without scribe knives. A full core cut and recovered. Core quality was good. The core was cut into 1m lengths at the wellsite, capped and shipped in special core containers and analysed at Reslab's laboratory in Stavanger.

Table 3: Core Recovery

Core	Bbl Length	Start	End	Cut	Rec	% Rec	Formation
1	27m	3104.4 m	3107.0 m	2.6 m	2.6 m	100	Ekofisk Chalk
2	27m	3107.0 m	3135.3 m	28.3 m	28.3 m	100	Ekofisk Chalk

A core gamma ray was acquired at the rigsite, with a core spectral gamma ray log taken at Reslab in Stavanger. The core to wireline depth shift is shown in the following table (note the +ve shift means a downward shift of core onto wireline):

Table 4: Core to Wireline Depth Shift

Core Depth	Log Depth	Shift
3104.700	3109.112	+4.412
3107.635	3111.856	+4.221
3110.879	3115.818	+4.939
3113.920	3118.104	+4.184
3115.513	3120.542	+5.029
3118.287	3122.066	+3.780
3122.216	3126.791	+4.574
3124.468	3128.924	+4.456
3129.534	3134.106	+4.572
3130.994	3135.782	+4.788
3133.649	3138.830	+5.182
3133.250	3140.432	+5.182

Core goniometry was performed by BHI. Schlumberger used the goniometry data combined with the dip information from the OBMI wireline tool to dip match and orient the core to logs., and produced a report with this information

Reslab performed a full suite of conventional core analyses and took core photographs, this information was compiled into the Core Analyses Report for 1/9-7 T3 Tommeliten. Note, a list of all the post-well reports is given in Section 2.12.

2.4. WIRELINE AND MWD LOGS

2.4.1. Wireline Logs

Wireline logging was performed by Schlumberger. All tools were fully heat tested at Schlumberger's Bergen facility prior to shipping. The same "Quadcombo" tool string was used for all the logging runs (1A, 2B, 3A and 4A). Run 1A logged the original 1/9-7 well to the TD of the 17½" section. The remaining logs were acquired in the 1/9-7 T3 sidetrack.

Table 5: Wireline Logging Summary

RUN NO.	HOLE SIZE	LOGS	LOGGED INTERVAL (m MDRT)	
			Start	Finish
1A	17½"	AIT/DSI/IPLT/HNGS	3040	1039
	17½"	DSI/GR (through casing)	1039	300
2A	12¼"	MDT/CMR/GR:	-	-
	12¼"	GR (downlog) – primary depth 1/9-7 T3	120.75	3049
	12¼"	CMR	3400	3090
	12¼"	MDT (sample at 3112m)	3098	3300
2B	12¼"	AIT/DSI/IPLT/HNGS	3566	3049.7
	12¼"	DSI/IPLT/HNGS (through casing)	3049.7	2900
2C	12¼"	UBI/OBMI (only OBMI recorded)	3350	3080
3A	8½"	AIT/GPIT/DSI/IPLT/HNGS	4609.7	3845.9
	8½"	DSI/IPLT/HNGS (through casing)	3845.9	2909.9
4A	6½"	AIT/DSI/IPLT/HNGS	4963.6	4613.2
	6½"	DSI/IPLT/HNGS (through casing)	4613.2	4312
	6½"	VSP-CSAT/GR	4610	2100

Run 1A: AIT/DSIIPLT/HNGS
The "Quadcombo" tool logged the 1/9-7 open hole without any problems. Whilst logging through casing at 300m however, the well suddenly started to lose mud. The tools were pulled out of the hole after a 6-hour delay during which the loses were controlled. In consequence of these well problems, the section from 300m to the seabed at 121.75m was not logged.

The 17 ½" hole section was redrilled as 1/9-7 T3. As this sidetrack was only 28m away from the original wellbore at section TD, the interval was not relogged with open hole wireline logs.

Run 2A: MDT/CMR/GR
Security Logging was initiated when it was decided to pull the bit at 3561m in the 12¼" hole. This was a planned activity written into the pre-drill wellplan. Logging of the chalk section was required prior to entering the pore pressure ramp in the Cromer Knoll as well as limiting the temperature to which the MDT dual packer (rated to only 110°C) was exposed.

For depth control purposes, GR was logged from surface, down through casing to the 14" shoe at 3049.7m. This was the primary depth curve for the 1/9-T3 well.

The objective of the CMR/MDT was to acquire high resolution CMR data with which to pick the MDT pressure points and the dual packer sampling intervals. It was intended to acquire 3 single phase gas condensate samples (SPMC) in both the Ekofisk and Tor chalk.

The tool was run into open hole and a bound fluid CMR uplog acquired. Due to the centralisation of the CMR tool within the relatively large 12¼" borehole, the tool read almost only mud signature, and as such could not be used to select MDT points. In addition, the tool would not re-enter the casing shoe despite several high-overpull attempts. As the MDT tool was working, the decision was made not to damage the tool trying to enter casing, rather to acquire the full MDT program, before again attempting to pull into casing.

Pressure points were selected to match high values on the LWD resistivity curve and then these stations depth-shifted to match wireline. A total of 11 tests were taken in the Ekofisk chalk between 3098m and 3121.5m. The best permeability (1.2mD) was identified at 3112m and the dual packer set and then reset following a unit powerdown when the packer deflated. A total of 5 rather than the planned 3 SPMC samples were taken. The rapid fill time of the bottles (30 seconds), and the lack of a positive fill indication at this the primary sampling objective, led to the acquistion of an additional 2 security samples. Post-well, it was discovered that a 100psi activated ball valve had obscured the indications that the sample chambers were filling. The 5 sample chambers were found to be full of gas condensate (see Section 2.10.2 for details).

A total of 11 tests were taken in the Tor chalk between 3159m and 3300m. The dual packer was set and the packer inflated at 3160m to acquire a Tor sample. Again the dual packer deflated following a second unit power down. The sampling was aborted due to the long sampling time in the very tight chalk (0.3mD) and the fact that it was unlikely to obtain a single phase sample under these conditions and/or positive fill indication. The tool was pulled out of the hole, into casing, without the sticking problems at the shoe seen at the start of the run. It is worth noting that the dual packer was exposed to a maximum temperature of 126°C (16°C higher than its rating). This was a record temperature for Schlumberger. The packer was cycled 4 times, and post–well examination revealed little to no sign of elastomer damage.

Run 2B: AIT/DSI/IPLT/HNGS
The quadcombo tool was RIH and tied in through casing (over the Balder) to the Run 2A GR downlog. The main uplog was acquired in 3 sections following firstly an overspeed data overload of the acquistion computer, and, secondly the tool being unable (like the previous run) to enter casing. A damaged casing shoe was suspected as the pull was seen on the wire and not on the tool. Eventually the tools were pulled into casing at high speed with the calipers closed. The log was then acquired through casing to just above top Balder at ca.2900m.

Run 2C: UBI/OBMI
The third and final run at security logging point in the 12¼" hole comprised dip imaging tools. Prior to the well, the UBI tool had been tested in 14.0 ppg mud to confirm that it would spin fast enough to acquire data. However, under real bore hole conditions, the tool could only spin at 4 revs/sec rather than the minimum 5 revs/second required for dip imaging. The OBMI worked well and was recorded over a 280m interval between 3350m and 3080m. The data quality was good enough to allow the whole core to be oriented to wireline.

Run 3A: AIT/GPIT/DSI/IPLT/HNGS
No logs were acquired at the 9⅞" casing point over the interval between the TD of the 12¼" hole (3845m) and the security logging point (3561m). A quadcombo tool was however logged at the TD of the 8½" hole prior to running the 7⅝" liner, and logging continued up through casing to acquire the missing data.

The standard temperature tool set was run in to the TD of the 8½" hole. The uplog was recorded with good data despite tight hole at 4245m, 4220m and 4113m where 11,600lbs was pulled. On the repeat section, the tool become stuck for 15 mins with the maximum permissible pull of 11,600lbs required to free it.

All curves, except resistivity, were recorded up through casing to above the top Balder at 2900m. This long through-casing run was performed for several reasons: to cover the unlogged lower part of the 12¼", to estimate the top of cement behind the 9⅞" shoe (in the event of a chalk DST) and to provide a continous GR log over the 12¼" security logging interval (where the log had originally been acquired in 3 sections due to tight hole at the 14" shoe).

Run 4A: AIT/DSI/IPLT/HNGS
The LWD real time logs indicated that the primary objective sands were absent, and so the decision was made to run the standard temperature tools (rated to 175°C) rather than the very expensive slim extreme tools (rated to 200°C). The BHT in Run 4A was recorded as180°C (3 thermometers) - slightly above the tool specification. The maximum internal tool was 186°C.

Several problems were encountered with this run. During the shallow hole tool test, the long space density tool appeared to be giving unstable values. The problem persited after rebooting the main computer and so the tool was changed out and the back-up run. The same unstable density values were observed with the back-up. The tool was run to the shoe where all curves functioned initially. Post-well both density tools checked out OK. It is believed that the shallow hole test of the tools occurred within the "mudcap" of 18.0 – 19.0ppg mud and that this had an adverse effect on the tool response.

The DSI and AIT failed at start of open hole logging. The failure was electrical and was not related to temperature which was only 164°C internal/159°C external at the shoe.

The tools were logged down to TD of the 6½" section with no significant hole problems. Sticking on cable began from initial pick up at TD. The string became stuck twice: firstly at 4910m for 100 mins during which time the internal tool temperature rose to 186°C and the APS (neutron) tool failed, and again at 4880m for 35 mins. The tools were logged to the shoe with more sticky hole recorded. The final presented curves consisted of the density downlog and the neutron and GR uplog. With the addition of the depth-shifted LWD resistivity, porosity and Sw calculation could be performed and so the quadcombo tool was not rerun.

Run 4B: VSP-CSAT/GR

The rig-sourced, zero-offset, VSP was only run in cased hole following the sticky hole experienced in the previous quadcombo run. The survey started without tie-in to minimize the time the tools were exposed to high temperature. Consequently, the whole survey was run off depth (survey depths 7.2m shallow to Run 4A at 4500m) and a depth correction of +7.2m was applied to all levels by Schlumberger computing centre, post-logging. The tool consisted of 2 geophones: CSAT-1 and CSAT-2. The former failed to retract properly from the 4tth level and was damaged by dragging it up while partially extended/anchored to 4310m . The remainder of the survey was taken using CSAT-2. Stations were taken at 15m intervals from 4610m to 2900m. Further details are provided in Section 2.5 – Geophysical Results.

Schlumberger Abbreviations

Mnemonic:	*Tool Name:*	*Type:*
ACTS	*Auxiliary Compression Tension Sub*	*Cable Head Tension*
AIT	*Array Induction Tool*	*Resisitivity*
CST	*Coring Sidewall Tool*	*Percussion Sidewall Cores*
CMR	*Compensated Magnetic Resonance Tool*	*Magentic Resonance*
DSI	*Dipole Shear Imager*	*Sonic*
GR	*Gamma Ray*	*Gamma Ray*
GPIT	*General Purpose Inclinometer Tool*	*Survey Tool*
HNGS	*Hostile Environment Natural Gamma Ray Sonde*	*Spectral Gamma Ray*
IPLT	*Integrated Porosity Lithology Tool*	*Density- Neutron*
MDT	*Modular Formation Dynamic Tester*	*Formation Tester and Sampler*
OBMI	*Oil-Based Multidip Imager*	*Resistivity Dip tool*
VSP	*Vertical Seismic Profile*	*Seismic*
UBI	*Ultrasonic Borehole Imager*	*Sonic Dip tool*

2.4.2. LWD/MWD Logs

Sperry Sun/ Halliburton/ provided the LWD/MWD service. A directional only MWD service was run in the top hole 36" and the 26" hole-opening section. This was augmented by LWD logging suites in 9⅞" pilot hole, 17½" hole, 12¼" hole, 8½" and 6½" hole sections, as tabulated in Tables 6A-6C.

Sperry Sun were selected for the well because of the high temperature tolerance (175°/347°F) of their hot "Solar" and slim "Solar" tools. The slim gamma ray-resistivity Solar tools functioned well in both real time and memory mode in the 6½" hole section. Here they were exposed to a maximum circulating temperature of 163°C (compared to the static BHT of 180°). Unfortunately, the pressure-while-drilling (PWD) sub failed after 175m of drilling at 4781m.

Tool reliability and data quality was good in all but the 8½ " hole section, where 2 failures occurred. In the initial run, the tool sent data while drilling out of the 9⅞" casing and while the MW was raised from 14ppg to 15.4ppg, but stopped pulsing after drilling 12m at 3852m. Drilling continued without real time data to 4328m (where the bit and LWD were changed). At surface, 100% of the data was recovered from the tool memory.

In the second run in the 8½ " hole section, the LWD tool functioned well within the agreed flow range rates of 140-180 gpm. Due to the low drill rates, the MW was reduced to 16.4ppg and the MWD engineers asked if the flow rate could be increased. The maximum flow rate of the tool was confirmed, by the engineers, as 180 gpm. Despite this, the flow rate was increased to 200 gpm at 4398m whereupon the tool stopped pulsing. At surface, 100% of the data was recovered from the tool memory.

Table 6A: 1/9-7 LWD/MWD Summary (all depths in MDRT)

CASING	HOLE SIZE	MAX HOLE ANGLE	MAX TEMP (°C)	MWD/LWD LOG RUNS
30" 307.8m	36" 310m	0.58	14	Directional Only
N/A	9⅞" Pilot Hole 1210m	0.4	35	DGR/EWR-P4/PWD (gamma ray/ resistivity/pressure while drilling)
20" 1039m	26" Hole Opener 1042m	1.84	30	Directional Only
N/A	17½" 3040m	0.74	78	DGR/EWR-P4/PWD (gamma ray/ resistivity/pressure while drilling)

Table 6B: 1/9-7 T2 LWD/MWD Summary (all depths in MDRT)

CASING	HOLE SIZE	MAX HOLE ANGLE	MAX TEMP (°C)	MWD/LWD LOG RUNS
N/A	17½" 1045m to 1215m	0.63	45	DGR/EWR-P4/PWD (gamma ray/ resistivity/pressure while drilling)

Table 6C: 1/9-7 T3 LWD/MWD (all depths in MDRT)

CASING	HOLE SIZE	MAX HOLE ANGLE	MAX TEMP (°C)	MWD/LWD LOG RUNS
14" 3049.7m	17½" 1045m to 3058m	7.81	74	DGR/EWR-P4/PWD (gamma ray/ resistivity/pressure while drilling)
9⅞" 3841.3m	12¼" 3845m	3.83	104 (at 3561m)	DGR/EWR-P4/PWD (gamma ray/ resistivity/pressure while drilling)
7⅝" Liner 4604 m	8½" 4605m	11.02	149	DGR/EWR-P4/PWD (gamma ray/ resistivity/pressure while drilling)
Open Hole	6½" TD 4986m (driller) TD 4992m (wireline)	16.12	163	Slim Solar PWD/EWR-P4/GR (gamma ray/ resistivity/pressure while drilling)

2.5. GEOPHYSICAL RESULTS

A normal incident zero offset VSP was acquired during the logging of the 6½" hole section and subsequently processed by Schlumberger. The offshore operation took place on the 15th July 2003.

The survey was acquired using a tuned array of 3 x 155 inch^3 Bolt 1900 LLX air guns operating at a pressure of 2000 psi. The down hole tool was the 3 component Combinable Seismic Imager (CSI) run in dual-level configuration with shuttle spacing set at 15m via stiff interconnects. VSP levels were recorded from 4617m to 2906m MD with a further 8 check shot settings recorded from 2807 m – 2107 m MD.

The VSP was acquired in cased hole only. The initial logging run which included basic petrophysical tools had experienced tight hole conditions and had become stuck on two occasions in the open-hole section (for a total of 3.33 hours). Due to the risk caused by these hole conditions and the relative size of the VSP tool, the decision was made to limit the VSP tool to the cased-hole interval and acquire data across the above-mentioned interval.

The VSP logging run took 30.25 hrs including 4.5 hrs lost time. After about 6.5 hrs of the logging run the lower CSAT tool failed. This was due to an electrical fault in the tool. The rest of the logging operation continued with the upper tool from the failure point to near top Balder at 2906 m. Despite the failure, results were better than expected due to the number and thickness of casing strings. Throughout the well, the ZVSP and check shots exhibited good quality results.

Full details of the acquisition and processing can be found in the final VSP report by Schlumberger.

2.6. BOTTOM HOLE TEMPERATURE FROM LOGS

Bottom hole temperatures were recorded on wireline log runs, the results of which are summarized in Table 5. A maximum corrected temperature of 180°C was recorded. Horner plots supporting these temperatures are shown in Figures 3A, 3B and 3C. A complete temperature profile of the well is provided in Figure 4. Temperature gradient for the well is 3.46°C per 100 m.

Table 7: Bottom Hole Temperature From Logs (Uncorrected)

DATE	LOG	DEPTH m MDRT	MAX TEMP	TIME SINCE LAST CIRCULATION
22/04/03	1A AIT-DSI-IPLT- HNGS	3040*	104°C	23 hrs 15 min
23/05/03	2A MDT-CMR-GR	3400[1]	124°C	18 hrs 15 min
25/05/03	2B AIT-DSI-IPLT- HNGS	3566	126°C	50 hrs 20 min
25/05/03	2C UBI-OBMI-GR	3350[1]	126°C	65 hrs 20 min
30/06/03	3A AIT-GPIT-DSI-IPLT-HNGS	4609	162°C	35 hrs 20 min
15/07/03	4A AIT-DSI-IPLT-HNGS	4963	180°C	41 hrs 00 min
15/07/03	4B VSP-CSAT	4610[1]	162°C	42 hrs 25 min

[1] Runs did not reach TD. *1/9-7 T1

Figure 3A: Horner Temperature Plot for Depth 3040m

Horner Plot for 3040 m (Based on 3350 m curve)

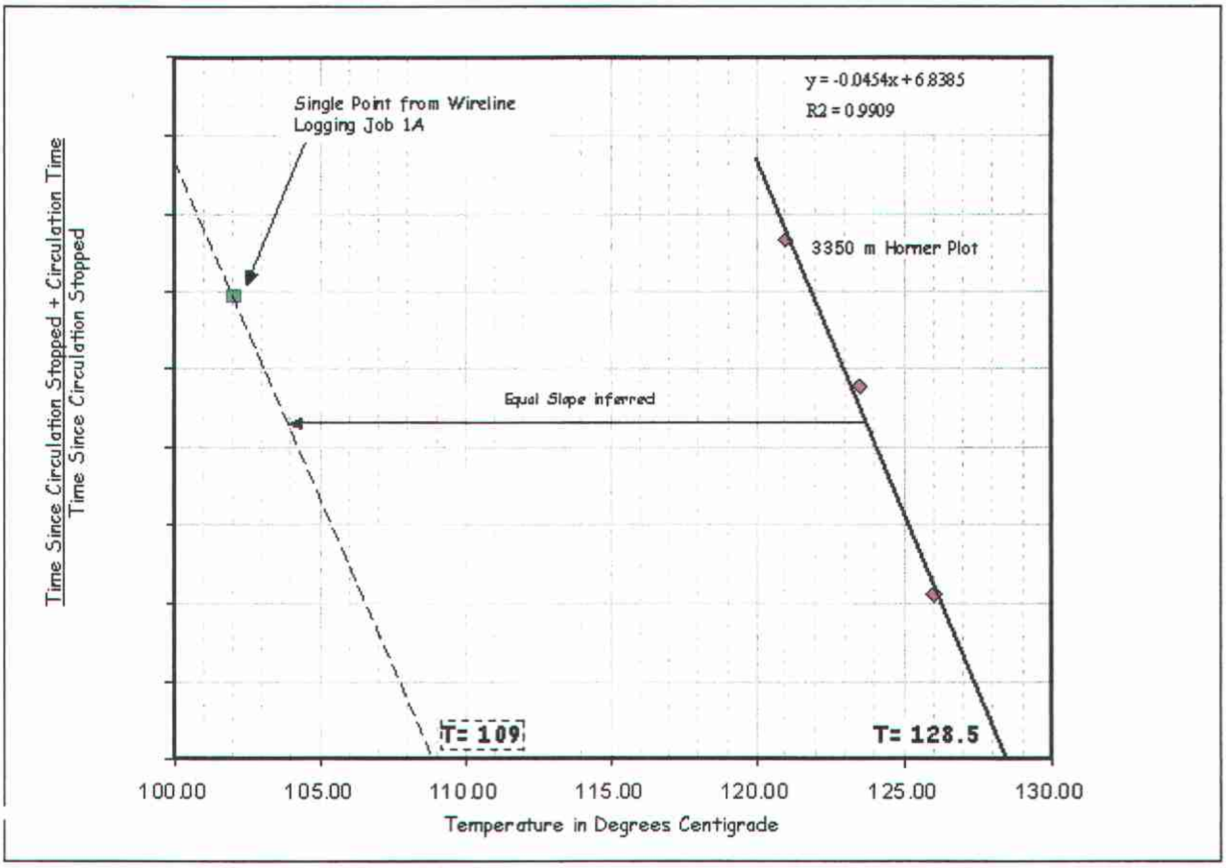


Figure 3B: Horner Temperature Plot for Depth 3350m

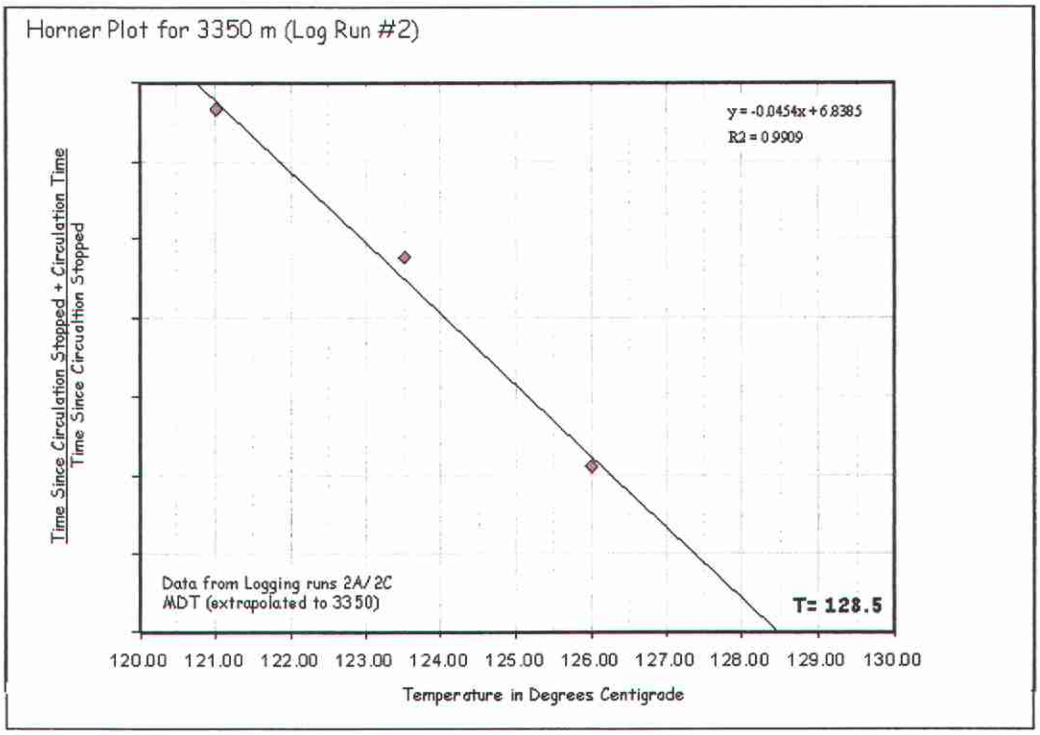


Figure 3C: Horner Temperature Plot for Depth 4609m

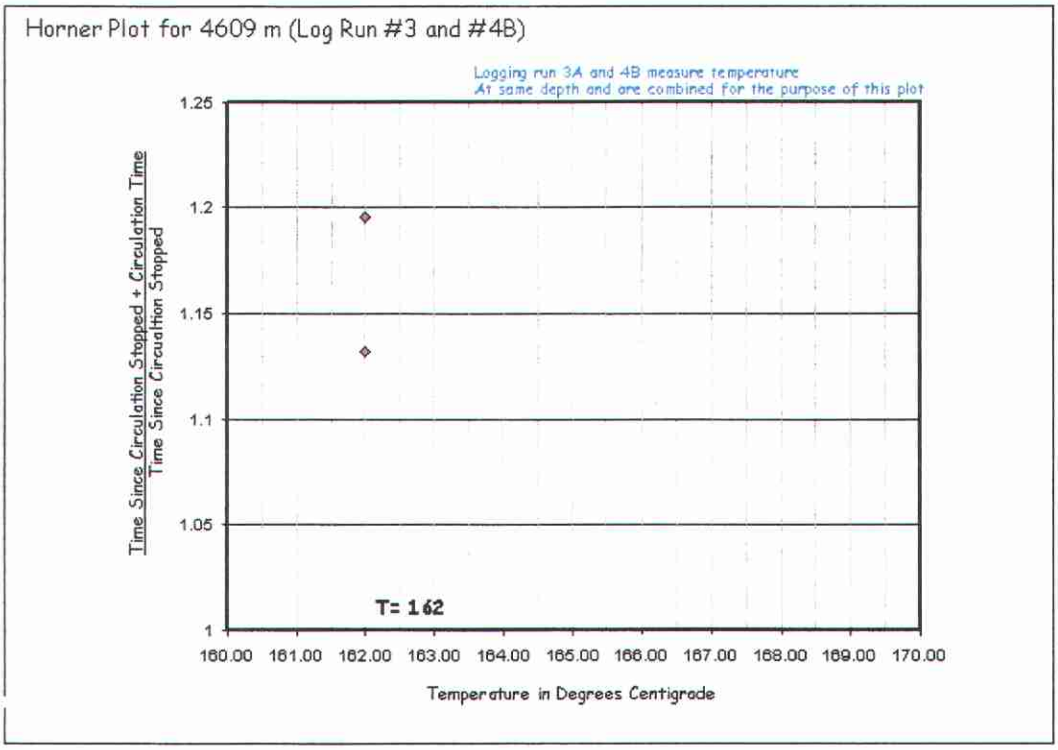
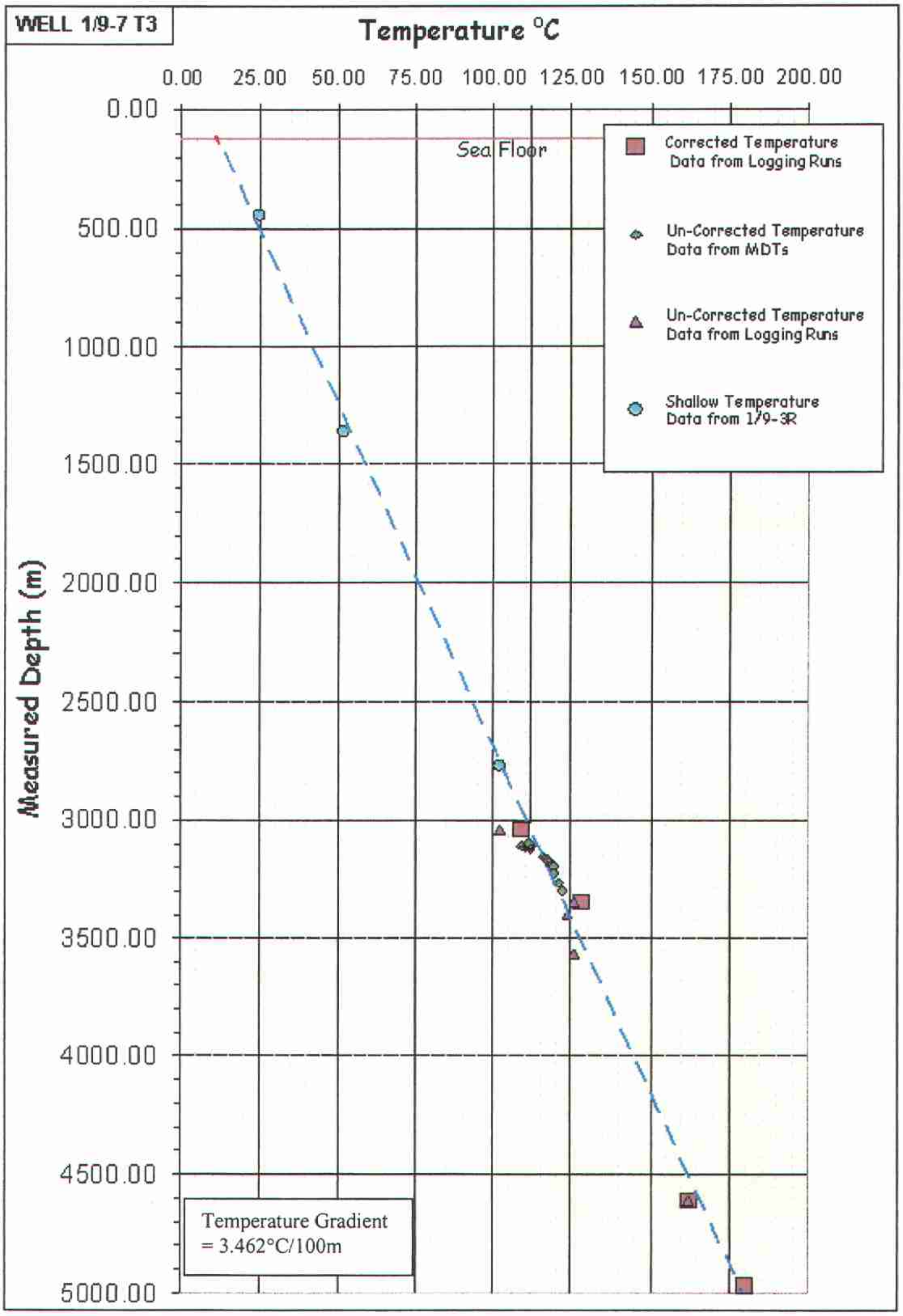


Figure 4: 1/9-7 T3 Final Corrected Temperature Plot



2.7. STRATIGRAPHY

2.7.1. Chronostratigraphical Summary

Table 8: Chronostratigraphic Table for 1/9-7 and 1/9-7 T3

Depths	Series	Stage
1/9-7		
320 m – 560 m	Pleistocene	Unassigned
560 m – 1000 m	Pliocene – ?Upper Miocene	Unassigned
1000 m – 1550 m	Upper Miocene	Unassigned
1550 m – 1770 m	Middle Miocene	Unassigned
1770 m – 2050 m	Lower Miocene	Unassigned
2050 m – 2510 m	Upper Oligocene	Unassigned
2510 m – 2690 m	Lower Oligocene	Unassigned
----------	Stratigraphic Break ----------	----------2692m (log)
2690 m – 2710 m	(?Upper) - Middle Eocene	Unassigned
2710 m – 2891 m	Middle Eocene	Unassigned
2891 m – 2948 m	Lower Eocene	Ypresian
2948 m – 3040* m	Upper Paleocene	Unassigned (*TD 1/9-7)
1/9-7 T3		
----------	Stratigraphic Break ----------	----------3065 m (log)
3065 m – 3159 m	Lower Paleocene	Danian
3159 m – 3310 m	Late Cretaceous	Upper Maastrichtian
----------	Stratigraphic Break ----------	----------3159 m (log)
3310 m – 3330 m	Late Cretaceous	Lower Maastrichtian
3330 m – 3400 m	Late Cretaceous	Upper Campanian
3400 m – 3440 m	Late Cretaceous	Lower Campanian-?Santonian
3440 m – 3460 m	Late Cretaceous	Lower Santonian
3460 m – 3490 m	Late Cretaceous	?Upper Coniacian
3490 m – 3580 m	Late Cretaceous	Coniacian
3580 m – 3700 m	Late Cretaceous	Turonian
3700 m – 3730 m	Late Cretaceous	Upper Cenomanian
3730 m – 3789 m	Late Cretaceous	Middle-?Lower Cenomanian
3789 m – 3840 m	Early Cretaceous	Upper Albian
3840 m – 3880 m	Early Cretaceous	Middle Albian - ?Upper Aptian
3880 m – 3920 m	Early Cretaceous	Upper Aptian
3920 m – 3940 m	Early Cretaceous	Lower Aptian
3940 m – 3960 m	Early Cretaceous	Upper Barremian
3960 m – 4000 m	Early Cretaceous	Lower Barremian
4000 m – 4030 m	Early Cretaceous	Upper Hauterivian
4030 m – 4190 m	Early Cretaceous	Lower Hauterivian-Valanginian
4190 m – 4281 m	Early Cretaceous	Lower Valanginian
4281 m – 4312.5 m	Early Cretaceous	?Ryazanian
4312.5 m – 4338 m	Late Jurassic	Ryazanian-Upper Volgian
4338 m – 4359 m	Late Jurassic	Upper-Middle Volgian
4359 m – 4473 m	Late Jurassic	Middle-?Lower Volgian
4473 m – 4734 m	Late Jurassic	Lower Volgian-Mid Kimmeridgian
4734 m – 4911 m	Late Jurassic	L Kimmeridgian - Upper Oxford
----------	Stratigraphic Break ----------	----------4911 m (log)
4911 m – 4992 m	Triassic	Indeterminate

2.7.2. Lithostratigraphical Summary

Based on wireline logs, LWD logs (depth shifted to match wireline), cuttings and biostratigraphic analyses, the following lithostratigraphical subdivision is suggested for well 1/9-7 and sidetrack 1/9-7 T3. Note no formation tops were penetrated by the short (1042m – 1215m MD) 1/9-T2 sidetrack. Please refer to Figures 5 and 6 for well diagrams showing prognosed versus actual depths.

Table 9a: Lithostratigraphical Summary well 1/9-7

Group	Formation	MD RT (m)	TVDSS (m)
Seabed		120.75	-75.75
Nordland Group[1]		320	-275.0
Hordaland Group	Lark Formation	1535	-1490.0
	Miocene Sand Unit	1666	-1621.0
	Horda Formation	2692	-2646.9
Rogaland Group	Balder Formation	2915.5	-2870.4
	Sele Formation	2926	-2880.9
	Lista Formation	2981.5	-2936.4
	Heimdal Formation - Top	2983.5	-2938.4
	Heimdal Formation - Base	2986.5	-2941.4
TD of 1/9-7	Driller	3040	-2994.4
	Logger	3044	-2998.4

1= Top Not Seen

Table 9b: Lithostratigraphical Summary well 1/9-7 T3

Group	Formation	MD RT (m)	TVDSS (m)
Seabed		120.75	-75.75
Nordland Group[1]		320	-275
Hordaland Group	Lark Formation	1537	-1490.0
	Miocene Sand Unit	1675.5	-1628.5
	Horda Formation	2701	-2654.0
Rogaland Group	Balder Formation	2920	-2873.0
	Sele Formation	2930.5	-2883.5
	Lista Formation	2986.5	-2939.5
	Heimdal Formation - Top	2989	-2942
	Heimdal Formation - Base	2992.5	-2945.5
	Våle Formation	3065	-3018.0
Chalk Group (Shetland Group)	Ekofisk Formation	3093	-3046.0
	Tor Formation	3159	-3112.0
	Hod Formation	3364	-3317.0
	Blodøks Formation	3692.5	-3645.0
	Hidra Formation	3704.5	-3657.0
Cromer Knoll Group	Rødby Formation	3789	-3741.5
	Sola Formation	3867	-3819.0
	Valhall Formation	3914.5	-3866.5
	Tuxen Member	3947.5	-3899.5
	Åsgard Member	4001	-3953.0
	Leek Member	4294.5	-4245.5
Humber Group	Mandal Formation	4312.5	-4263.5
	Farsund Formation	4400	-4350.5
	Haugesund Formation	4504	-4453.5
	J50 Sandstone Equivalent	4846	-4784.5
Hegre Group	?Smith Bank Formation	4911	-4848.0
TD of 1/9-7 T3	Driller	4986	-4921.4
	Logger	4992.2	-4927.6

1 = Top Not Seen

Figure 5: Prognosed vs Actual Diagram 1/9-7

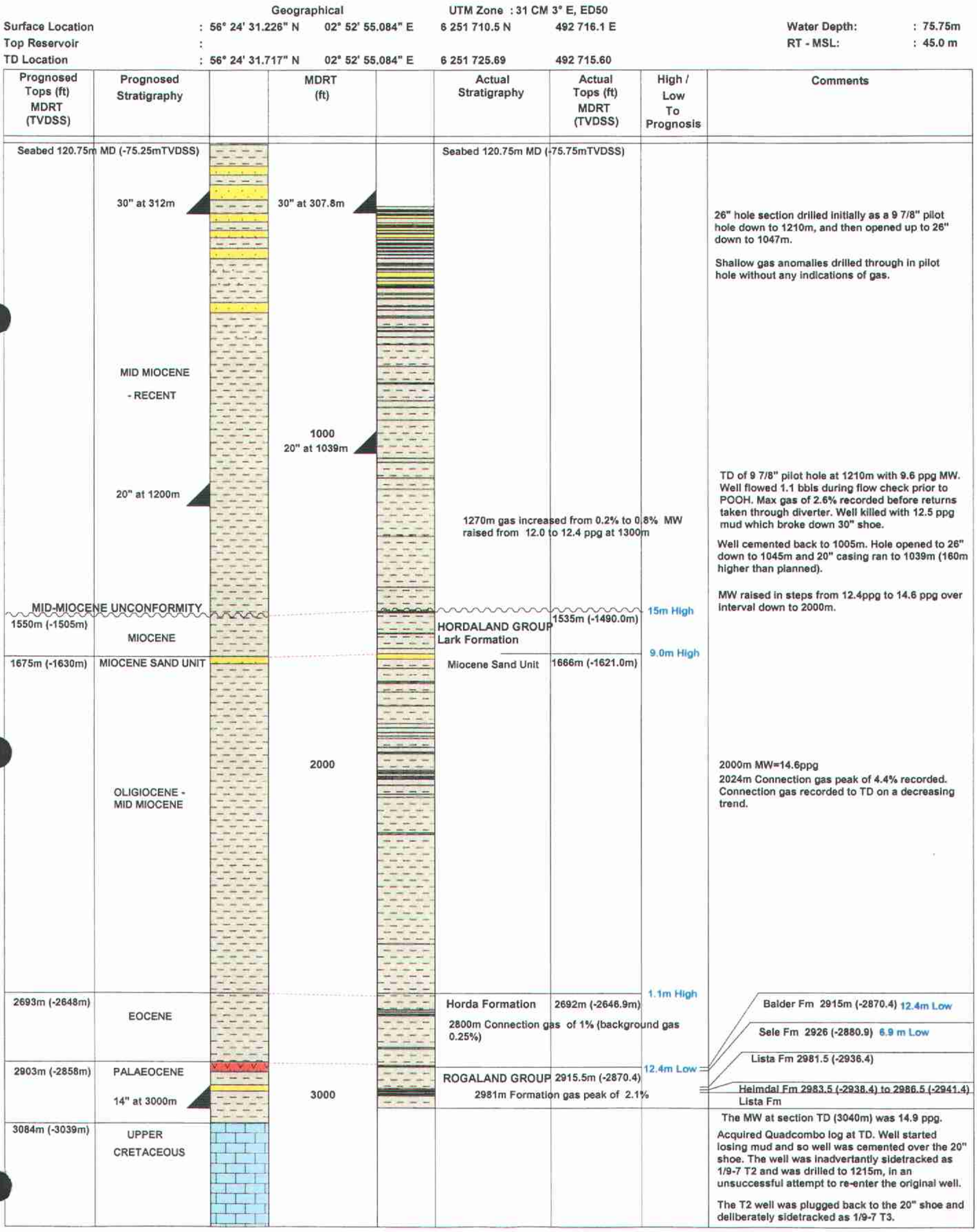
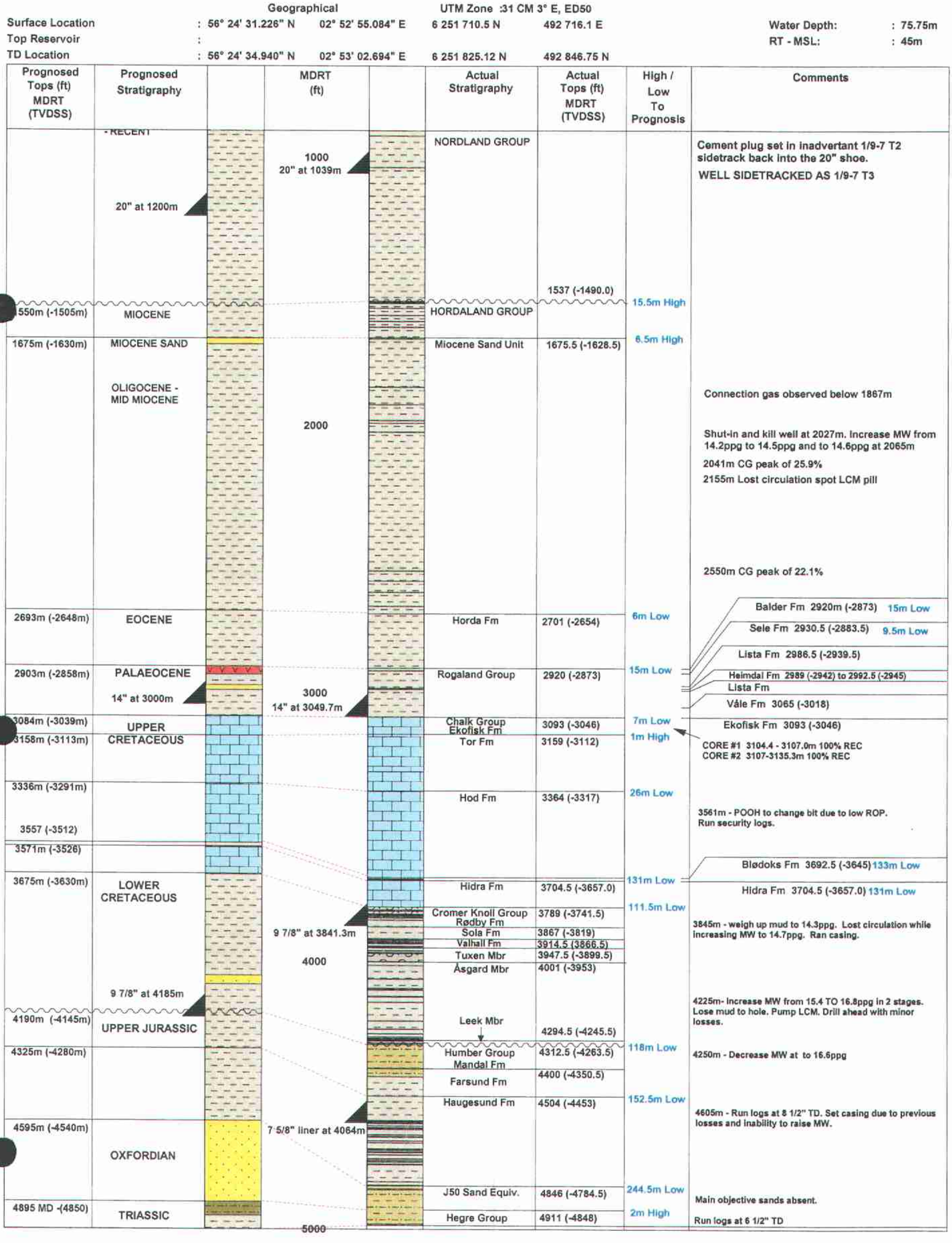


Figure 6: Prognosed vs Actual Diagram 1/9-7 T3



2.7.3. Lithological Description

First returns were taken at 310m MDRT (-265m TVDSS). The lithology above this depth has been left unassigned. The first sediments encountered were those of the Nordland Group, the top of which group was not seen.

2.7.3.1. Lithology Well 1/9-7

Nordland Group 310 to 1535m MDRT (-265m to -1490m TVDSS)

The Nordland Group comprises sandstones and claystones. The unit is dominated by sandstones near the top and becomes more argillaceous with depth.

The sands comprise loose quartz which is clear to translucent, fine to medium grained, and rounded to subrounded. The sands are unconsolidated with rare calcite cement and inferred argillaceous matrix. They are glauconitic and micaceous in part, with traces of shell fragments.

The claystones are medium dark grey to dark greenish grey, soft, very sticky, amorphous, rarely sub blocky, calcareous and very silty in parts, with occasional coarse quartz grains.

Hordaland Group 1535 to 2915.5m MDRT (-1490m to –2870.4 TVDSS)

The Hordaland Group comprises the Lark and Horda Formations. It is dominated by claystone with the minor sandstone of the "Miocene Sand Unit" developed within the Lark Formation.

The claystone is predominantly dark greenish grey to olive grey, greenish black to dark grey, moderately hard to hard, and blocky to subblocky. It is silty, and slightly to moderately calcareous with occasional micromica, rare disseminated micropyrite and microcarbonaceous material.

The "Miocene Sand Unit" at 1666m MDRT (-1621m TVDSS) is seen in the cuttings as loose quartz grains, within the predominant claystone lithology. The sand grains are clear to translucent, colourless to very pale grey, very fine grained, subrounded, subspherical and moderately sorted. Commonly, a greyish green argillaceous matrix and loose calcite cement is present, in addition to the abundant glauconite. There is no visible porosity or fluorescence. Traces of micropyrite were also noted.

Rogaland Group 2915.5m to 3044m MDRT (-2870.4 to –2998.9m TVDSS)

The Rogaland Group comprises claystones and tuffaceous claystones. A very thin sandstone is developed at Heimdal level.

Balder Formation 2915.5 to 2926m MDRT

The tuff and respective interbedded claystones are light to medium bluish grey to greenish grey in parts and are occasionally mottled. They are moderately to occasionally hard and predominantly non calcareous. Rare slightly calcareous horizons in claystone occur towards base and exhibit a generally an ashy texture. Occasional limestone stringers were noted. These are described as light bluish grey to light grey in colour, moderately hard with a microcrystalline texture, and no visible porosity or shows.

Sele Formation (2926m to 2981.5m MDRT)

This claystone is generally olive black to locally greenish black, moderately hard to hard and subblocky. The claystone is non calcareous and slightly silty, with rare carbonaceous specks and pyrite. It is locally tuffaceous with an ashy texture. A couple of limestone stringers were noted. These are described as moderate yellow brown to yellow grey, moderately hard, microcrystalline in texture, locally dolomitic, with no visible porosity or shows.

Lista Formation (2981.5m to 3044m MDRT)

The Lista Formation consists of claystone with a thin Heimdal Sandstone developed near the top. The claystone is generally olive black to locally greenish black in colour, subblocky and moderately hard to hard. It contains rare carbonaceous specks and rare pyrite. Passing down the claystone becomes interbedded with light green grey marl.

Heimdal Sandstone Formation 2983.5 to 2986.5m MDRT

This 3m-thick sandstone is light olive grey to yellowish grey in colour, partially consolidated, and consists of very fine to fine grained quartz. The grains are moderately sorted, subrounded and subspherical. The sandstone is calcareous cemented in parts with moderate to poor visible porosity. It contains rare carbonaceous and glauconitic specks and grades to siltstone in places towards the base of the unit. No visible shows above that of the oil-based mud were noted.

2.7.3.2. Lithology 1/9-7T2

The 1/9-7 well was inadvertently sidetracked AS 1/9-7 T2 between 1042 and 1215m MDRT (-997m to 1170m TVDSS).

Nordland Group 1042 to 1215m MDRT (-997m to 1170m TVDSS)

This short interval of the Nordland Group consists of claystone.

The claystones are medium to dark grey to greyish black, becoming olive black in part, soft to firm becoming moderately hard. They are locally sticky, silty in parts, calcareous to locally very calcareous, with traces of shell fragments, black carbonaceous specks and limestone.

2.7.3.3. Lithology1/9-7T3

The 1/9 T2 was cemented up and the well sidetracked at 1042m as 1/9-7 T3 and drilled to a TD of 4986m MDRT. The top of the Nordland Group was not seen in the initial 1/9-7 well, where it extends up to at least 310m MDRT (-265m TVDSS).

Nordland Group 1042m to 1537m MDRT (-997 to 1490m TVDSS)

The Nordland group consists of claystones with occasional limestone stringers.

The claystone is olive black to dark grey to rarely medium grey in colour. It is moderately hard to firm, subblocky to rarely crumbly and calcareous to very calcareous when lighter coloured. It is locally silty with traces of carbonaceous specks.

The limestones are generally light olive grey, moderately hard, brittle, subblocky, cryptocrystalline, slightly dolomitic and argillaceous in part.

Hordaland Group 1537 to 2920m MDRT (-1490m to –2873.0m TVDSS)

The Hordaland Group comprises the Lark and Horda Formations. It is dominated by claystone with the minor sandstone of the Miocene Sand Unit developed within the Lark Formation

The claystone is olive black to olive grey, moderately hard, brittle to friable, deformed to subblocky, non to occasionally slightly calcareous, slightly silty, occasionally carbonaceous, and rarely micromicaceous.

The Miocene sand unit at 1675.5m MDRT (-1628.5m TVDSS) is seen in the cuttings as loose quartz grains, within the dominant claystone lithology. The quartz grains are colourless, clear or translucent and rarely milky. They are generally fine to locally very fine grained, sub rounded to rounded with good sphericity. They are well sorted and unconsolidated.

The Horda Formation from 2701 to 2920m MDRT (-1654m to 2873m TVDSS) consists of claystone. This is olive black, also dark greenish grey to greenish black; becoming olive grey to light olive grey with depth. The claystone is moderately hard, deformed to subblocky to platy, slightly to predominantly non calcareous, slightly to occasionally moderately silty, and rarely carbonaceous and micromicaeous.

Rogaland Group 2920 to 3093m MDRT (-2873.0 to –3046.0m TVDSS)

The Rogaland Group comprises claystones, tuffaceous claystones and tuff.

Balder Formation (2920 to 2930.5m MDRT) (-2873.0m to –2883.5m TVDSS)

The tuff and respective interbedded claystones are light to medium bluish grey and in places greenish grey in colour. They are occasionally mottled, moderately to occasionally hard, and predominantly non calcareous with rare slightly calcareous horizons. They have a generally ashy texture. Traces of limestone were noted as stringers.

Sele Formation (2930.5 to 2986.5m MDRT) (-2883.5m to –2939.5m TVDSS)

The claystone is greyish black to olive black in colour. It is hard, deformed to blocky to platy, non to slightly calcareous, locally slightly silty, with trace carbonaceous material. Occasional limestone and dolomite stringers were noted. The limestone is olive black in colour, very hard, brittle, blocky, micro- to crypto-crystalline and argillaceous. The dolomite is pale to dark yellow brown or olive black in colour, hard to very hard, brittle, and crypto- to micro-crystalline.

Lista Formation (2986.5 to 3065m MDRT) (2939.5m to –3018.0m TVDSS)

The Lista Formation consists of claystone with a thin Heimdal Sandstone developed near the top. The claystone is generally olive black to locally greenish black in colour, subblocky and moderately hard to hard. It contains rare carbonaceous specks and rare pyrite. Passing down the claystone becomes interbedded with light green grey marl.

Heimdal Sandstone Formation 2989 to 2992.5m MDRT (-2942.0m to –2945.5m TVDSS)

This 3m-thick sandstone is light olive grey to yellowish grey in colour, partially consolidated, and consists of very fine to fine grained quartz. The grains are moderately sorted, subrounded and subspherical. The sandstone is calcareous cemented in parts with moderate to poor visible porosity. It contains rare carbonaceous and glauconitic specks and grades to siltstone in places towards the base of the unit. No visible shows above that of the oil-based mud were noted.

Våle Formation (3065 to 3093m MDRT) (-3018.0m to –3046.0m TVDSS)

The Våle Formation consists of claystone. This is medium dark grey becoming olive grey in colour. It is hard to very hard, blocky, occasionally brittle, splintery, calcareous to very calcareous and grades to marl with limestone stringers. The latter are olive grey, hard, occasionally very hard, blocky, brittle, and microcrystalline.

Chalk Group 3093 to 3789m MDRT (-3046.0m to –3741.5m TVDSS)

This Group ranges from the chalky clean limestones of the Ekofisk and Tor Formations to the more crystalline limestones and minor marls of the Hod Formation.

Ekofisk Formation (3093m to 3159m MDRT) (-3046.0m to –3112.0m TVDSS)

Two cores were taken in the Ekofisk Formation. Core No.1 was cut from 3104.4 to 3107.0m (2.6m) and core No.2 from 3107.0m to 3135.3m (28.3m). Depths are driller's depths.

The chalk of the Ekofisk Formation is light olive grey to yellowish grey to light greenish grey in colour. It is pale yellowish brown and oil-stained toward the top becoming light grey passing down. The chalk is firm to moderately hard, blocky, microcrystalline, with moderate visible porosity. It is slightly argillaceous in parts with occasional laminations towards the base. Initial good visible shows reduce downwards to trace very weak shows at the base of the unit.

Tor Formation (3159m to 3364m to MDRT) (-3112.0m to –3317.0m TVDSS)

The Tor chalk is yellowish grey to off white in colour, soft to firm and moderately hard in It is brittle to partly friable, with dark grey to greenish grey argillaceous lamina in parts. There is good visible porosity. The formation is generally fairly homogeneous in nature with a thin shale at 3297m which is olive black to greenish black in colour, hard to occasionally very hard, brittle, subblocky, moderately calcareous with rare carbonaceous specks.

Hod Formation (3364m to 3692.5m MDRT) (–3317.0m to –3645.0m TVDSS)

The upper part of the Hod Formation from 3364m to 3530m comprises limestones which are very light grey to yellowish grey (occasionally light bluish grey), becoming olive grey to light olive grey to medium light grey or occasionally medium dark grey in colour. The limestones are moderately hard to hard, occasionally very hard, brittle, blocky, homogenous and chalky. They are microcrystalline and in places slightly argillaceous rarely grading to marl with local very fine, dark grey, argillaceous laminae with traces of micropyrite.

The Limestones in the interval 3530m to 3640m are yellowish grey to yellowish brown, as well as off white and medium dark grey in colour. They are moderately hard to hard, brittle and chalky. The limestones are microcrystalline and locally very slightly argillaceous with fine argillaceous lamina and traces dark greenish grey claystone.

From 3640m to the base of the Hod Formation at 3692.5 m, the limestone becomes yellowish grey to light olive grey in colour. It is moderately hard, brittle, chalky and microcrystalline, with occasional laminae/interbeds of marl and/or argillaceous material. The marl is dark greenish grey to medium dark grey to olive black, and moderately hard. It has a crunchy texture and is blocky to locally crumbly, laminated, striated, and partly interbedded with limestone which is occasionally slightly silty and carbonaceous in parts.

Blodøks Formation (3692.5m to 3704.5m MDRT) (–3645.0m to –3657.0m TVDSS)

The Blodøks formation consists of olive black to black claystones which are moderately hard, very carbonaceous, slightly silty and generally non to locally moderately calcareous. The claystones are interbedded with marl.

Hidra Formation (3704.5m to 3789m MDRT) (–3657.0m to –3741.5m TVDSS)

The Hidra Formation limestones are brownish grey to light olive grey, yellow grey to light olive, olive grey to pale yellowish brown, grey to rarely off white, moderately hard, brittle to sub angular, chalky and microcrystalline. They are generally clean with occasional argillaceous laminae and rare traces of marl.

Cromer Knoll Group (3789m to 4312.5m MDRT) (-3741.5m to –4263.5m TVDSS)

The Cromer Knoll Group is dominated by calcareous claystones which locally grade into marls, most notably at the top of the section. They are locally silty, occasionally grading to siltstone. Infrequent limestone stringers occur throughout but are more prevalent at the top and base of the section.

Rødby Formation (3789m to 3867m MDRT) (–3741.5m to –3819.0m TVDSS)

The Rødby Formation comprises marls grading down into claystones and occasional limestones.

The marls are olive black to brownish black, locally medium dark grey to dark grey and brownish grey in colour. They are firm to moderately hard, blocky to locally crumbly, occasionally slightly silty and laminated in parts, with rare striations and local traces of carbonaceous material.

The claystones are red brown to yellow brown, moderately hard, blocky, earthy in texture, and slightly to locally calcareous. The limestones are olive grey to pale yellowish brown, off white in parts, moderately hard and brittle to subangular. They are chalky, microcrystalline, and slightly argillaceous in places rarely grading to marl.

Sola Formation (3867m to 3914.5m MDRT) (–3819.0m to –3866.5m TVDSS)

The Sola Formation consists of olive grey to brown grey and olive black to grey black calcareous claystones. These are moderately hard, brittle to friable, slightly to moderately calcareous to occasionally very calcareous. Occasional limestone stringers are pale to moderate yellow brown to light olive grey, hard, brittle, platy to blocky and cryptocrystalline. They can be either clean or slightly argillaceous.

Valhall Formation 3914.5m to 4312.5m MDRT (–3819.0 to –4263.5m TVDSS)

The Valhall Formation is sub-divided into the Tuxen, Åsgard and Leek Members.

The uppermost 33m of the Valhall Formation (above the Tuxen Member) consists interbedded calcerous claystones, siltsones and marls. The claystones are grey black to black, olive black, dark greenish grey and rarely medium bluish grey. They are moderately hard to hard, occasionally firm, subblocky and very calcareous grading to marl in parts. The claystones are also silty in places occasionally grading to siltstone which is brownish grey, firm to moderately hard and calcareous.

Tuxen Member 3947.5m to 4001m MDRT (–3899.5m to –3953.0m TVDSS)

The Tuxen Member consists of very calcareous claystones which pass down into marl. The claystones are: predominantly medium grey to olive grey or olive black, moderately hard to hard, subblocky occasionally brittle, very calcareous, occasionally silty with rare traces of pyrite.

The marl is medium grey or occasionally olive grey in colour. It is moderately hard, subblocky to occasionally blocky and angular with a waxy texture and rare carbonaceous specks. It grades to argillaceous limestone in parts.

Åsgard Member 4001m to 4294.5m MDRT (–3953.0m to –4245.5m TVDSS)

The Åsgard Member consists of calcareous claystones (which initially grade to marl) with occasional limestone stringers, which become thicker and more frequent in the lower part of the interval.

The claystones are olive black to brown black to olive grey, hard to rarely very hard, friable to brittle, deformed to blocky, occasionally slightly silty, moderately to locally very calcareous, grading to marl. The upper limestones are pale yellow brown, moderately hard to hard, brittle, cryptocrystalline and clean. Whilst the basal limestones are light olive grey to medium light grey, hard, brittle and partly argillaceous.

A poorly developed sand occurs between 4134m and 4138m. The loose quartz (or possibly barite) grains are very fine to fine, angular to occasionally subrounded, subspherical to elongate and well sorted. No visible shows were recorded.

Leek Member 4294.5m to 4312.5 MDRT (–4245.5m to –4263.5m TVDSS)

The basal member of the Valhall Formation consists of calcareous (slightly silty) claystones with occasional limestone stringers.

Humber Group (4312.5m to 4911m MDRT) (–4263.5m to –4848.0m TVDSS)

The Humber Group comprises largely homogeneous organic rich claystones with minor limestone stringers becoming more frequent in the lower part of Haugesund Formation. The basal unit of the Haugesund Formation – below 4846m MD - comprises siltstones, silty claystones and rare sand. This has been attributed as the "J50 Sandstone Equivalent" or equivalent of the well's primary objective.

Mandal Formation (4312.5m to 4400m MDRT) (–4263.5m to -4350.5m TVDSS)

The Mandal formation comprises silty claystones with occasional limestone stringers.

The claystones are generally black to brown black and locally grey black. They are moderately hard to hard, friable to brittle, deformed to blocky, non to occasionally slightly calcareous and silty to very silty. They have rare traces of micropyrite and are very carbonaceous with a very high organic content. There is a moderate to strong stale hydrocarbon odour from the kerogen within the claystones.

The generally argillaceous limestones are seen as rare stringers. These are olive black to olive grey in colour, very hard, brittle, deformed to platy with a cryptocrystalline texture.

Farsund Formation (4400m to 4504m MDRT) (-4350.5m to –4453.5 m TVDSS)

The Farsund Formation consists of claystones with rare limestone stringers.

The claystones are olive black to brown black to black, moderately hard to hard, friable to brittle, deformed, highly carbonaceous, slightly to occasionally moderately calcareous (locally non calcareous) and slightly to locally moderately silty.

The limestones are olive grey to olive black, hard to very hard, brittle, blocky, cryptocrystalline and argillaceous. They are also pale yellow brown, hard, brittle, deformed, cryptocrystalline and clean.

Haugesund Formation (4504m to 4846.m MDRT) (-4453.5m to –4784.5m TVDSS)

The upper part of the Haugesund Formation from 4504m to 4750m consists of claystones with occasional limestone stringers and very rare sandstones.

The claystones are olive black to black to brown black, and, at the base, occasionally dark grey to greyish black. They are moderately hard to hard, brittle to friable, deformed, and slightly to locally moderately calcareous (non calcareous in part). The claystones are slightly to locally moderately silty and occasionally very silty with rare very fine sand grains. They are highly carbonaceous with rare traces pyrite and micromica.

The limestones are light to medium olive grey to brown grey in colour. They are hard to very hard, locally moderately hard to firm, brittle, angular, rarely crumbly, deformed, and crypto- to occasionally microcrystalline. The limestones are slightly to moderately argillaceous with rare carbonaceous specks.

The sandstones are olive grey to olive black in colour and consist of fine-grained quartz, which is subangular, subspherical and well sorted. Sandstones are friable to loose, with a silty/argillaceous matrix without visible porosity or visible show. The sandstones are carbonaceous with trace micromica and grade to sandy claystone. Additionally, there are traces of loose quartz sand which is clear to colourless, translucent, rarely white, very fine to fine locally medium, rarely very course, well sorted, subangular to angular, and which exhibits no fluorescence.

The lower part of the Haugesund Formation from 4750m to 4846m comprises claystones with occasional limestones.

The claystones are dark grey to greyish black, olive black to black and brownish black in colour. They are moderately hard to hard (occasionally firm) and brittle to friable in texture. The claystones, which are very to moderately carbonaceous, are moderately to very calcareous and locally marly. They are also silty to locally very silty grading to siltstone.

The limestones are yellow grey, light olive grey to olive grey to light brown grey, moderately hard, brittle to friable, deformed, crypto- to microcrystalline,and clean to slightly argillaceous.

"J50 Sandstone Equivalent" 4846m to 4911m MDRT (-4784.5m to –4848.0m TVDSS)

The basal predominantly silty part of the Haugesund Formation is attributed as the "J50 Sandstone Equivalent". It consists of a distal silty claystone facies.

The silty claystones are olive black to black, green grey to brown grey, brownish black, moderately hard, brittle to friable, deformed, non to slightly calcareous (locally moderately calcareous) and moderately carbonaceous. The claystones are very silty and locally grade to siltstone with occasional floating very fine sand grains. They also grade to very fine sandstone which has no visible porosity and no show above the background oil-based mud.

Hegre Group (4911m to. 4986m MDRT) (–4848.0m to –4921.4m TVDSS)
?Smith Bank Formation (4911m to 4986m MDRT) (–4848.0m to –4921.4m TVDSS)

The Triassic rocks which occupy the TD of the well have been tentatively ascribed to the Smith Bank Formation of the Hegre Group. These red brown Triassic silty claystones are markedly different in colour from the overlying grey to black Jurassic silty claystones

In cuttings, the silty claystones are red brown, greyish brown, brown black to dusky yellow brown, locally dark green grey, moderately hard to firm, friable to brittle, deformed, non to slightly calcareous and silty to very silty grading to siltstone. Rare traces of anhydrite and of carbonaceous material were noted.

TD (Driller) 4986m MDRT (-4921.4m TVDSS)
TD (Logger) 4992.2m MDRT (-4927.6m TVDSS)

2.8. HYDROCARBON INDICATORS

2.8.1. Gas Shows

Gas analysis began at the start 9⅞" pilot hole beneath the 30" casing shoe at 310m MD. Peak gas data is listed in the following pages in Tables 10A (1/9-7)and 10B (1/9-7 T3). The following mnemonics have been used to describe the gas type:

BG	Background Gas
CBU	Circulate Bottoms Up Gas
CG	Connection Gas
DCG	Dummy Connection Gas

FC	Flow Check Gas
FG	Formation Gas Peak
TG	Trip Gas
WTG	Wiper Trip Gas

Background drilling gas was between 0% and 0.20% throughout the 9⅞" pilot hole section. At the TD of the pilot hole at 1210m, the well flowed during a flow check prior to POOH. A gas peak of 2.6% was recorded at surface before returns were taken through the diverter where gas measurement (including chromatographic breakdown) was not possible.

In the 17½" section, background gas levels increased from 0.2% to 0.8% at 1270m and the mud weight (MW) was, in consequence raised from 12.0 to 12.4 ppg at 1300m. Gas ranged from 0.5 – 1.5% down to 2040m with a couple of higher formation gas peaks related to limestone beds. The mud weight was raised in steps to 14.6 ppg over the corresponding interval in response to pore pressure. At 2024m, the first and highest connection gas peak of 4.4% was recorded. Connection gas was noted through the remainder of the section with a generally decreasing trend; by 2800m connection gas peaks of 1% and background gas of 0.25% were observed. A formation gas peak of 2.1% at 2981m (driller's depth) was derived from the 3m-thick Heimdal sand. The MW at section TD (3040m) was 14.9 ppg.

Table 10A: Gas Peak Data 1/9-7

Gas	Depth (m)	TG (%)	C1 ppm	C2 ppm	C3 ppm	iC4 ppm	nC4 ppm	iC5 ppm	nC5 ppm
FC	1210	2.6	-	-	-	-	-	-	-
FG	1391	2.0	14397	455	84	9	9	-	3
FG	1605	2.9	16598	1808	1687	319	384	-	123
FG	1674	2.3	14367	1434	971	185	261	-	113
FG	1868	2.8	14549	2502	1030	153	347	-	169
FG	2025	5.8	27924	6175	2995	430	902	-	435
CG	2040	4.1	19838	4270	1880	238	535	-	289
CG	2068	3.2	16376	2955	1364	192	428	-	256
CG	2126	4.4	25700	4157	1935	273	563	-	272
CG	2155	2.9	15485	2844	1067	133	336	-	202
CG	2184	2.3	10411	1842	718	93	228	-	144
FG	2201	2.5	17455	1934	576	76	166	-	100
CG	2270	1.9	7436	2531	521	35	180	-	100
CG	2384	1.2	7627	933	351	49	99	-	54
TG	2406	2.6	-	-	-	-	-	-	-
FG	2426	1.5	9495	667	405	83	119	-	64
CG	2441	1.1	8209	537	250	43	64	-	31
CG	2469	2.8	17830	1910	838	142	241	-	118
CG	2497	1.8	11338	1068	422	65	108	-	49
FG	2511	1.3	8134	840	294	53	109	-	66
CG	2526	1.4	8926	844	389	64	105	-	51
FG	2545	1.3	8263	883	379	63	113	-	56
FG	2566	0.6	3955	399	136	25	51	-	33
CG	2584	0.9	4296	611	210	34	73	-	47
CG	2757	1.4	8971	1130	364	47	90	-	40
CG	2785	0.6	3736	290	118	18	34	-	19
CG	2810	0.9	4939	515	184	26	51	-	27
CG	2839	1.1	7225	737	338	50	93	-	42
CG	2866	1.1	6585	806	291	36	78	-	39
CG	2896	1.1	6222	856	274	35	77	-	41
FC	2923	2.1	13192	1625	468	64	130	-	66
FG	2981	1.7	12200	870	510	80	131	-	56
FG	2996	0.9	6826	443	278	48	80	-	43
FG	3010	1.1	6691	980	352	47	107	-	55

The 17½" section was redrilled in the 1/9-7 T3 sidetrack. A slightly lower MW was used to guard against losses at the 20" shoe and in consequence higher gas levels were seen. A MW of 14.0ppg was used down to 1575m, where the density was increased to 14.2 ppg. At 1857m, a 9.5% formation gas peak was associated with a limestone stringer. Connection gas peaks of between 3% to 5% were observed starting at 1867m. At 2027m, the well flowed from a limestone stringer and a flow check gas peak of 28.8% was recorded. The well was killed and the MW increased to 14.6ppg at 2065m, and then lowered to 14.5ppg at 2165m and 14.4ppg at 2500m in response to losses. Connection gas ranged from 7% to 25% between 2027m and 2750m, and, from 2.5% to 10% between 2750m and section TD at 3058m.

No connection gas was recorded in the 12¼" section. High background gas and formation gas peaks were recorded at the top of the Ekofisk (17.0% at 3120m) and Tor (10.6% at 3161m and 13.2% at 3169m) Chalk reservoirs. Gas levels dropped off sharply in the Tor Formation at 3215m from 5% to 0.5%. Below this background levels were low in the range 0.01 - 0.05% with occasional peaks noted in the Blodøks (1.3% at 3702m) and in the Hidra (1.5% to 2.0%). The top of the Cromer Knoll was marked by a 4.2% gas peak at 3797m at the end of the 12¼" section.

In the 8½" section, gas levels increased to a background average of 1% within the pressure transition zone of the Cromer Knoll Group. Over this interval, several higher gas peaks appeared to correspond to siltier lithologies, notably in the Valhall Formation: 3925m – 3970m (max 8.0%) and 4132m (max 7.0%).

Connection gas (5.7%) was recorded at 4264m with a 16.6 ppg MW at the base of the Cromer Knoll. The connection peaks continued into the silty Jurassic Mandal and Farsund Formations where the MW had to be lowered to 16.4 ppg because of seepage losses. With continuing connection gas and dummy connection gas of 2% - 5% in the Haugesund Formation, and the inability to raise the MW due to losses, a drilling liner was set at 4604m.

At the start of the 6½" section the MW was raised to 17.0ppg. Several marked formation gas peaks originated in limestone stringers in the Haugesund Formation: 19.4% at 4712m and 13.1% at 4724m. Connection gas and dummy connection gas was again recorded from 4815m and persisted at the 1.5% to 4.0% level in the Jurassic Haugesund and Triassic Hegre Group down to TD at 4986m where the final MW was 17.15ppg.

Table 10B: Gas Peak Data 1/9-7T3

Gas Type	Depth mMD	TG %	C1 ppm	C2 ppm	C3 ppm	IC4 ppm	NC4 ppm	IC5 ppm	NC5 ppm
FG	1264	0.8	5218	667	97	14	28	-	15
FG	1485	1.0	9260	686	237	31	35	-	12
FG	1597	0.8	5821	647	285	36	51	-	14
FG	1644	1.98	15892	821	768	158	90	-	33
FG	1674	3.1	23844	2327	1232	227	242	-	83
FG	1803	2.1	16592	2052	613	76	158	-	65
FG	1857	9.5	45111	9643	6457	1388	1358	-	641
CG	1868	5.5	35175	3341	1719	408	386	-	172

Gas Type	Depth mMD	TG %	C1 ppm	C2 ppm	C3 ppm	IC4 ppm	NC4 ppm	IC5 ppm	NC5 ppm
CG	1897	4.4	23081	2667	1765	592	559	-	317
CG	1925	3.52	21174	3524	1384	364	485	-	215
CG	1953	3.4	21570	3175	1229	232	444	-	228
CG	1982	3.3	22052	3371	1215	434	461	-	247
FC	2027	28.8	234936	28863	9749	1681	3192	-	2117
FC	2027	28.8	234936	28863	9749	1681	3192	-	2117
CG	2039	25.9	230601	7007	5323	2013	1116	-	1803
CG	2068	2.54	182648	20270	5542	852	1862	-	1696
CG	2097	14.2	97936	8333	2832	582	927	-	1124
CG	2126	9.0	53187	3432	932	238	362	-	812
FG	2144	16	116983	9892	2361	264	638	-	736
CBU	2155	14.4	105301	9708	3042	351	752	-	566
FG	2162	6.8	45274	5692	942	103	270	-	333
CG	2183	14.95	109549	11696	2593	239	531		366
CG	2212	17.0	144732	11754	2739	299	557	-	324
CG	2242	21.5	194424	14579	4126	485	833	-	385
CG	2270	15.1	105592	8471	3389	486	749	-	352
CG	2299	14.0	12509	10260	2227	237	509	-	297
FG	2223	11.6	94776	7555	2100	233	479	-	275
CG	2328	13.3	98016	11386	2674	303	692	-	347
CG	2357	17.3	149372	15248	3601	377	825	-	386
CG	2386	7.6	47617	4014	989	128	282	-	184
CG	2413	13.0	99087	8610	2392	243	563	-	278
FG	2435	15.8	138147	8806	1746	193	370	-	174
CG	2444	12.3	101726	7827	1802	233	446	-	200
CG	2473	9.9	68615	7059	1460	146	357	-	187
CG	2501	15.1	128512	14429	2074	190	413	-	192
FG	2514	14.0	114290	8383	1623	160	289	-	131
CG	2530	13.4	110391	8211	1936	215	450	-	202
CG	2558	22.1	192398	18007	3258	301	648	-	238
CG	2587	8.2	56609	13028	1807	180	502	-	220
CG	2617	11.8	102824	8895	2586	277	572	-	226
CG	2645	8.8	70385	7074	2001	219	528	-	219
CG	2674	8.2	71611	9969	1925	207	512	-	226
CG	2703	9.3	81446	7233	2015	254	538	-	213
CG	2732	7.5	61251	6963	1820	206	506	-	224
CG	2760	5.5	37784	3241	950	128	273	-	125
CG	2789	5.8	42867	3693	1157	135	312	-	144
CG	2818	8.0	66955	7159	1748	189	452	-	194
CG	2875	3.8	28118	2531	796	105	257	-	141
CG	2903	10.3	81908	6413	1821	227	454	-	199
CG	2930	8.2	71296	4633	1499	204	372	-	148

Gas Type	Depth mMD	TG %	C1 ppm	C2 ppm	C3 ppm	IC4 ppm	NC4 ppm	IC5 ppm	NC5 ppm
CG	2960	5.9	44646	4120	1209	136	325	-	147
CG	2987	9.9	73189	9407	2681	276	631	-	265
CG	3017	4.9	33749	3980	1078	124	320	-	171
CG	3046	2.4	16509	1123	566	85	187	-	122
FG	3102	17.0	131214	13872	3635	416	631	-	196
FG	3110	6.3	45669	4255	824	94	157	-	56
FG	3140	4.5	38687	3581	735	77	156	-	68
FG	3148	5.6	40742	3085	768	88	154	-	61
FG	3161	10.6	79274	10616	2071	206	425	-	165
FG	3169	13.2	104892	10582	2712	315	550	-	204
FG	3464	0.5	3341	218	58	11	25	-	23
TG	3556	24.9	224007	8027	2812	465	398	-	113
TG	3556	24.9	224007	8027	2812	465	398	-	113
TG	3561	24.6	224007	9286	2812	465	408	-	121
FG	3573	0.2	1311	114	112	48	44	-	35
FG	3591	0.4	4373	124	57	20	28	-	24
FG	3682	0.8	5408	163	112	32	36	-	20
FG	3716	2.2	15619	837	474	81	190	-	67
FG	3751	1.7	12609	639	255	51	124	-	43
FG	3756	2.3	17611	558	378	135	128	-	59
FG	3767	1.3	9131	728	217	36	113	-	40
FG	3798	4.6	32945	2146	953	165	348	-	114
FG	3811	2.9	20176	648	485	157	134	-	80
FG	3751	1.7	12609	639	255	51	124	-	43
FG	3756	2.3	17611	558	378	135	128	-	59
FG	3767	1.3	9131	728	217	36	113	-	40
FG	3798	4.6	32945	2146	953	165	348	-	114
FG	3811	2.9	20176	648	485	157	134	-	80
FG	3926	9.0	76340	6434	2154	464	234	-	20
FG	4045.3	1.5	12047	956	288	31	86	-	27
FG	4062.4	1.5	11963	1005	339	32	85	-	22
FG	4066	2.5	27732	1687	526	49	109	-	31
FG	4071	2.0	16877	1355	402	39	83	-	27
FG	4074.5	1.5	14558	1006	319	29	69	-	20
FG	4085.5	1.5	16454	1114	370	34	76	-	23
FG	4099	1.7	14226	1147	349	32	76	-	22
FG	4101	3.2	31075	2396	578	53	123	-	29
FG	4107.3	4.6	43608	3037	843	68	170	-	39
FG	4115	2.5	23212	1613	395	36	83	-	19
FG	4130	7.2	72100	4856	1261	101	239	-	50
FG	4141.5	3.3	24402	1737	498	45	101	-	29

Gas Type	Depth mMD	TG %	C1 ppm	C2 ppm	C3 ppm	IC4 ppm	NC4 ppm	IC5 ppm	NC5 ppm
FG	4147	3.1	24402	1737	482	45	94	-	26
FG	4152.5	3.6	41572	2417	641	57	112	-	35
FG	4167.2	2.8	20236	1989	576	51	123	-	33
FG	4169	1.6	12775	951	283	30	69	-	24
FG	4180	1.7	16439	902	244	28	63	-	21
FG	4182	1.35	12994	872	259	24	56	-	28
FG	4185	1.2	13467	811	276	29	66	-	29
FG	4201.5	1.5	13449	928	259	30	70	-	25
BG	4205.3	1.5	15181	956	293	28	68	-	23
FG	4205.6	1.6	17670	1141	344	33	79	-	28
FG	4206	1.4	11898	898	242	26	58	-	21
FG	4222	1.8	14671	999	297	30	60	-	31
FG	4232	1.2	10909	384	77	8	17	-	6
FG	4232.5	1.3	12665	495	76	6	14	-	5
FG	4233.8	1.8	17332	659	121	9	18	-	5
FG	4236.5	0.9	7319	278	46	4	8	-	5
FG	4245	1.1	10967	429	63	4	8	-	3
FG	2345	1.3	12561	511	92	6	12	-	4
FG	4253.5	1.8	16694	1061	228	21	36	-	16
FG	4257	2.6	29733	1235	215	14	29	-	8
DCG	4263.5	5.7	56171	2377	421	26	53	-	16
FG	4267	1.15	10730	665	139	10	23	-	11
FG	4270.5	1.2	11475	701	148	10	22	-	9
FG	4276.3	1.2	10408	784	173	13	33	-	10
FG	4276.7	1.3	10698	774	174	13	31	-	10
FG	4280.5	2.0	18145	1111	262	17	37	-	10
FG	4282.5	3.2	27193	2064	415	28	61	-	17
FG	4287	3.45	32063	2157	522	40	77	-	25
FG	4289	4.25	43884	3019	647	50	91	-	30
CG	4292	6.3	67120	4333	967	69	132	-	40
FG	4294	5.5	53972	4250	1020	79	128	-	40
FG	4295.5	4.8	47991	4538	967	74	120	-	51
FG	4298.2	4.3	40286	4094	1137	91	149	-	65
FG	4299	4.15	33162	3803	936	73	135	-	55
FG	4303	2.85	26003	1845	530	44	79	-	29
FG	4303.8	2.5	22335	1755	506	36	66	-	29
FG	4306.4	1.5	10662	1112	327	30	62	-	23
DCG	4306.8	1.95	17809	1383	343	32	62	-	20
FG	4311	2.0	15445	1270	338	33	72	-	27
FG	4311.2	1.8	14490	1036	322	32	62	-	23
FG	4316.2	2.8	26032	1862	476	41	82	-	27
FG	4320.4	4.0	43335	1946	458	36	70	-	20
FG	4327.5	3.3	33526	2284	541	41	95	-	20

Gas Type	Depth mMD	TG %	C1 ppm	C2 ppm	C3 ppm	IC4 ppm	NC4 ppm	IC5 ppm	NC5 ppm
TG	4292	4.1	-	-	-	-	-	-	-
CG	4350.5	2.5	22254	1430	267	34	41	-	12
FG	4354	3.0	29045	2168	424	44	75	-	23
CG	4379	4.3	36123	2044	361	47	69	-	43
FG	4391	3.9	28033	1714	350	48	66	-	29
DCG	4401	4.0	36335	1932	413	52	83	-	43
CG	4408	3.1	20513	1546	325	41	64	-	22
FG	4421	4.0	26627	2533	655	72	113	-	41
FG	4425	5.4	31560	3491	864	135	141	-	50
FG	4429	6.3	40498	4782	1060	128	167	-	60
FG	4433	5.6	41607	4281	1143	135	171	-	62
FG	4435	4.7	34498	2848	706	90	128	-	51
FG	4437	4.7	33151	2714	633	78	121	-	48
FG	4454	4.4	33971	4024	962	105	154	-	49
FG	4460	5.45	41876	5310	1239	133	185	-	51
CG	4465	10.6	9335	7895	1592	186	247	-	71
FG	4471	5.0	42649	3828	1125	126	166	-	55
FG	4484	5.8	46350	3921	947	116	165	-	36
CG	4494	2.6	18164	1611	394	63	90	-	42
FG	4497	4.4	28647	4352	1003	103	169	-	64
FG	4506	3.2	24487	2271	608	93	122	-	55
TG	3834*	0.7	5220	458	155	24	46	-	24
TG	4509	9.7	72226	8803	2220	277	445	-	95
CG	4522	2.2	19431	1492	365	45	72	-	34
FG	4545	3	23780	2135	470	63	75	-	40
DCG	4562	4.3	36824	2881	628	97	105	-	44
DCG	4572+	4.39	36942	2167	489	75	92	-	40
DCG	4573	5.11	44989	3064	703	99	109	-	43
CG	4580	3.7	31693	3616	407	50	69	-	20
CG	4580	3.6	27724	2553	411	51	74	-	20
DCG	4591	3.8	35106	2247	621	84	100	-	29
FG	4598	3.5	24161	2505	613	88	93	-	25
FG	4606	1.3	12739	687	150	17	24		10
DCG	4617	3	31963	1997	383	61	69	-	19
FG	4648	6.4	65665	4330	1062	137	161	-	31
FG	4712	19.4	145373	17898	5509	859	887		175
FG	4724	13.1	146325	12599	3436	488	499		87
FG	4744	4.5	44470	3302	952	145	157	-	34
FG	4763	5.6	54904	4899	1199	170	181	-	39
TG	4782	3.0	35343	1929	476	76	74	-	18
FG	4788	3.61	45106	3117	626	92	98	-	14
FG	4809	4.0	33805	2745	673	102	103	-	22
DCG	4813	2.36	26439	1725	482	71	85	-	25

Gas Type	Depth mMD	TG %	C1 ppm	C2 ppm	C3 ppm	IC4 ppm	NC4 ppm	IC5 ppm	NC5 ppm
CG	4824	3.73	39192	3140	679	95	24	-	24
FG	4839	3.78	33225	2520	657	104	104	-	27
DCG	4846	2.82	25435	1674	394	48	56	-	15
CG	4851	2.73	19375	1304	260	44	47	-	13
DCG	4867	2.69	23079	1397	333	52	50	-	14
FC	4880	3.16	28371	2220	477	71	80	-	13
DCG	4898	1.47	17051	1022	236	32	35	-	11
CG	4909	2.34	25216	1412	301	40	41	-	13
DCG	4924	1.77	19665	1320	316	36	44	-	9
CG	4938.5	1.56	17458	1129	274	34	42	-	11
DCG	4955	1.18	13243	756	217	33	35	-	12
DCG	4955	1.18	13243	756	217	33	35	-	12
CG	4967	2.2	22377	1574	353	50	63	-	13

* Gas from shoe, + early from 4190m

2.8.2. Oil Shows

Propanol was used as solvent for show description. Versavert oil-based mud was used as the drilling fluid for the entire well below the 20" shoe at 1039m, making show identication difficult.

The only significant hydrocarbons encountered were in the Ekofisk and Tor Formations in the upper portion of the Chalk Group where oil shows were observed. Whilst showing some petrophysical response, neither the thin Miocene Sand Unit (1666m MD and 1675.5m MD in 1/9-7 and 1/9-7 T3, respectively) nor the thin Heimdal sand (2983.5m MD and 2989m MD in 1/9-7 and 1/9-7 T3, respectively) showed any oil shows. No shows were described within the primary objective Jurassic section. A summary of observed shows is given below in Table 9.

Table 11: Observed Shows in 1/9-7 and 1/9-7T3

SOURCE	DEPTH (m MD)	LITHOLOGY	SHOWS DESCRIPTION
Core 1	3104 - 3107	Ekofisk Chalk	Core chips have a possible light oil staining and exhibit a bright yellowish white fluorescence, with a moderately fast, blooming yellowish white cut due in part to oil-based mud invasion.
Core 2	3107 - 3125	Ekofisk Chalk	Core chips have a possible light oil staining and a feint hydrocarbon odour. A good, bright yellowish white natural fluorescence was observed with a fast, streaming, yellowish white cut fluorescence.
Cuttings	3160 - 3170	Tor Chalk	Possible oil staining of the chalk cuttings was noted at the top of the Tor. However any fluorescence was masked by oil-based mud shows.
Cuttings	4315 - 4350	Mandal Shale	Black organic shales yielded a moderate stale hydrocarbon odour

2.9. PETROPHYSICAL REPORT

2.9.1. LWD and Wireline Data

LWD and wireline data were spliced and edited in accordance with HQLD specifications. Logtek in Stavanger performed the log editing and splicing.

In the 1/9-7 well, a single wireline run (1A) was performed. Due to the mud losses, logging was aborted at 281m MD, some 160m below the seabed. For this reason. the gamma ray downlog of Run 2A (MDT/CMR/GR), which was recorded from surface to the 14" shoe in well 1/9-7 T3, is considered the primary depth log for both 1/9-7 and 1/9-7 T3 wells. The 1/9-7 Run 1A data was shifted down onto depth with Run 2A, the approximate shift being +2m.

In 1/9-7, the LWD data from the 9⅞" pilot hole and 17½" hole were then depth matched to wireline. An average downwards depth shift of +3m from LWD onto wireline was noted in the lower half of the 17 ½" section, where the wireline TD was 3044m MD compared to 3040m MD (Driller's/LWD depth). The following depth pairs have been selected from Logtek's final report to illustrate the range of depth shifting required (all depths in metres):

Well 1/9-7

LWD GR	Wireline GR	Shift*
327.812	329.489	+1.7
464.82	466.496	+1.7
552.45	555.041	+2.6
729.996	733.196	+3.2
1003.706	1004.47	+0.8
1039.063	1039.06	+0.0
1707.947	1707.95	+0.0
1744.066	1744.98	+0.9
1764.487	1765.55	+1.1
1772.717	1774.55	+1.8
1823.771	1825.9	+2.1
1991.106	1993.09	+2.0
2333.549	2335.84	+2.3
2362.657	2365.71	+3.0
2526.487	2529.84	+3.4
2742.895	2746.25	+3.4
2914.041	2917.7	+3.7
3017.672	3021.48	+3.8

* Note "+" is downwards and "-" upwards

In well 1/9-7 T3, the Run 2A downlog was the primary depth log, with all subsequent wireline runs tied to this. Again, LWD logs were depth matched to wireline logs. An average depth shift of LWD downwards onto wireline of +4m was required in the 17½" section and +3.5m to +5m over the Ekofisk and Tor reservoir intervals. Within the 8½" and 6½" hole sections, the depth shift was +6m to +9m. The following depth pairs have to selected from Logtek's final report to illustrate the range of depth shifting required (all depths in metres):

Well 1/9-7 T3

LWD GR	Wireline GR	Shift*
1253.03	1257.3	+4.3
2296.21	2300.78	+4.6
3054.1	3057.45	+3.4
3095.85	3099.51	+3.7
3117.19	3122.22	+5.0
3142.49	3147.97	+5.5
3153	3158.34	+5.3
3217.93	3224.02	+6.1
3736.85	3743.25	+6.4
4222.4	4229.71	+7.3
4369	4376.78	+7.8
4452.21	4458.61	+6.4
4534.51	4543.2	+8.7
4547.62	4556.15	+8.5
4749.55	4756.25	+6.7
4883.35	4890.82	+7.5
4931.66	4940.35	+8.7

* Depth shift (+ = deeper) applied to LWD to match wireline.

Complete details of the log splicing and depth shifting can be found in the Logtek's HQLD documentation. The 'footer' of the composite logs also provides details on the composition and splice points of the final presented curves.

2.9.2. Petrophysical Interpretation

The petrophysical interpretation was performed in-house using GEOLOG software.

Shale volume was calculated from a combination of the following indicators:

Gamma-ray
Sonic-Density
Neutron-Density

All of these shale indicators were considered in the analysis, however, the Gamma-ray curve alone has been determined to be the best indicator of shaliness. The shale curve calculated from the gamma-ray is used in the CPI. Parameters used to calculate the Shale Curve throughout the well are shown below in Table 12.

Table 12: Petrophysical parameters used to construct CPI.

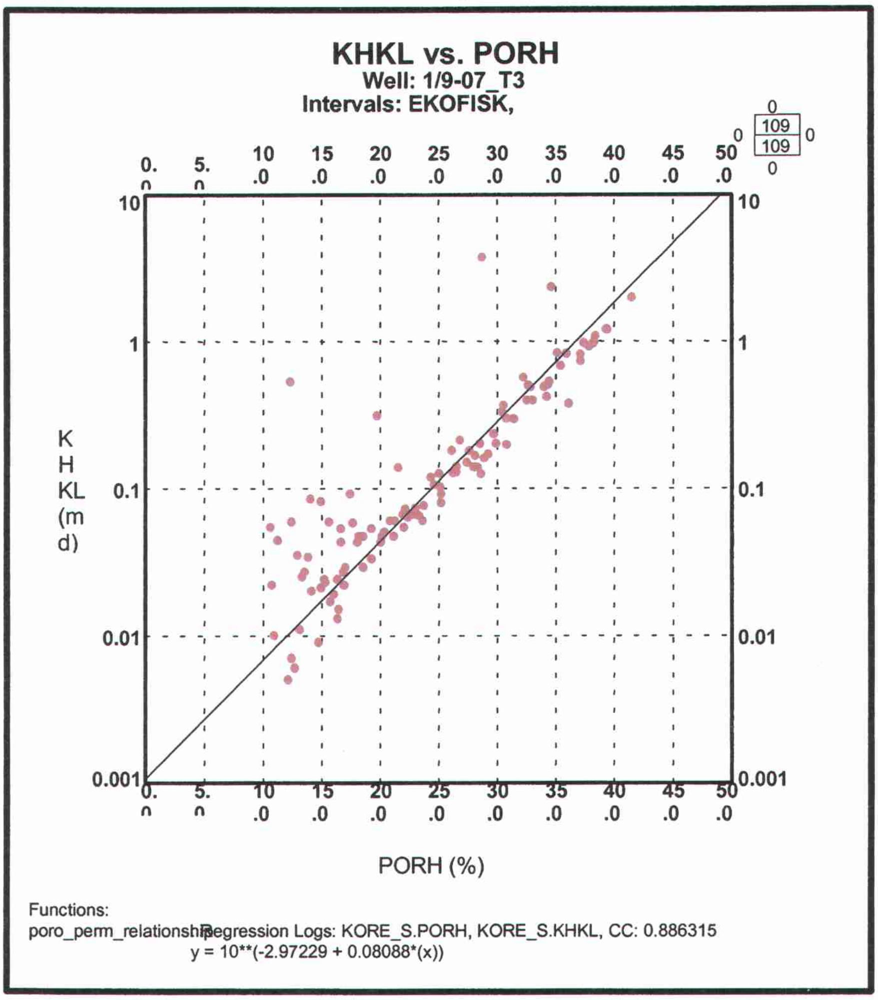
START Depth	STOP Depth	a	m	n	RWS	RWT	GR MA	GR SH	RHO FL	RHO MA	RHO SH	NPHI SH	RT SH	PHIE MAX
312.0	417.3	1	1.9	1.9	0.12	75	30	100	1.0	2.65	2.30	0.40	2.0	0.5
417.3	507.9	1	1.9	1.9	0.12	75	30	100	1.0	2.65	2.30	0.40	1.5	0.5
507.9	618.1	1	1.9	1.9	0.12	75	30	100	1.0	2.65	2.30	0.40	1.5	0.5
618.1	682.0	1	1.9	1.9	0.12	75	30	100	1.0	2.65	2.30	0.40	1.5	0.5
682.0	796.7	1	1.9	1.9	0.12	75	10	85	1.0	2.65	2.30	0.40	1.5	0.5
796.7	888.4	1	1.9	1.9	0.12	75	10	65	1.0	2.65	2.30	0.40	1.5	0.5
888.4	1219.8	1	1.9	1.9	0.12	75	10	65	1.0	2.65	2.14	0.60	1.0	0.5
1219.8	1540.5	1	1.9	1.9	0.12	75	10	68	1.0	2.65	2.13	0.58	0.7	0.5
1540.5	1567.3	1	1.9	1.9	0.12	75	10	80	1.0	2.65	2.13	0.57	0.6	0.5
1567.3	1639.0	1	1.9	1.9	0.12	75	10	70	1.0	2.65	2.50	0.60	0.6	0.5
1639.0	1696.4	1	1.9	1.9	0.12	75	10	80	1.0	2.65	1.90	0.60	0.6	0.5
1696.4	1794.2	1	1.9	1.9	0.12	75	10	60	1.0	2.65	1.93	0.60	0.5	0.5
1794.2	1885.1	1	1.9	1.9	0.12	75	10	57	1.0	2.65	1.98	0.58	0.5	0.5
1885.1	2093.9	1	1.9	1.9	0.12	75	10	65	1.0	2.65	2.20	0.58	0.5	0.5
2093.9	2220.0	1	1.9	1.9	0.12	75	10	65	1.0	2.65	2.50	0.54	0.5	0.5
2220.0	2580.1	1	1.9	1.9	0.12	75	10	60	1.0	2.65	2.15	0.50	0.3	0.5
2580.1	2809.8	1	1.9	1.9	0.12	75	10	47	1.0	2.65	2.25	0.48	0.3	0.5
2809.8	2915.2	1	1.9	1.9	0.12	75	10	40	1.0	2.65	2.27	0.44	0.3	0.5
2915.2	2983.0	1	1.9	1.9	0.12	75	30	58	1.0	2.65	2.35	0.36	0.4	0.5
2983.0	3063.7	1	1.9	1.9	0.12	75	20	50	1.0	2.65	2.35	0.33	0.4	0.5
3063.7	3127.9	1	2.0	2.0	0.12	75	12	90	.95	2.71	2.35	0.35	0.6	0.5
3127.9	3703.9	1	2.0	2.0	0.12	75	12	100	.95	2.71	2.35	0.35	0.6	0.5
3703.9	3850.5	1	2.0	2.0	0.12	75	25	100	1.0	2.71	2.55	0.35	0.6	0.5
3850.5	3934.7	1	1.9	1.9	0.12	75	20	80	1.0	2.71	2.50	0.30	0.6	0.5
3934.7	4144.6	1	1.9	1.9	0.12	75	10	75	1.0	2.65	2.50	0.28	1.0	0.5
4144.6	4313.3	1	1.9	1.9	0.12	75	10	95	1.0	2.65	2.55	0.30	0.6	0.5
4313.3	4399.4	1	1.9	1.9	0.12	75	20	190	1.0	2.65	2.40	0.30	2.0	0.5
4399.4	4499.0	1	1.9	1.9	0.12	75	10	130	1.0	2.65	2.40	0.30	1.0	0.5
4999.0	4564.8	1	1.9	1.9	0.12	75	30	110	1.0	2.65	2.40	0.30	1.0	0.5
4564.8	4765.2	1	1.9	1.9	0.12	75	30	95	1.0	2.65	2.40	0.30	1.0	0.5
4765.2	4844.6	1	1.9	1.9	0.12	75	30	110	1.0	2.65	2.40	0.30	0.7	0.5
4844.6	4911.2	1	1.9	1.9	0.12	75	30	105	1.0	2.65	2.50	0.24	0.7	0.5
4911.2	4983.2	1	1.9	1.9	0.12	75	30	110	1.0	2.65	2.60	0.20	1.0	0.5

All depths evaluated assuming NPHI fluid = 1/NPHI Matrix = 0

The porosity from the LWD logs, acoustic, neutron, and density were analysed and compared. Where core data were available (e.g. Ekofisk Formation), it was used to correct the log-based porosity. The Density Log has been utilized for the porosity calculations throughout the well. For the Ekofisk interval, core porosity to CPI porosities are shown in Figure 7. Matrix densities from core data from the existing Tommeliten Alpha wells, which show an average grain density of 2.71 gm/cc^3, were used for calibration in the Chalk Group. The matrix densities for the Ekofisk and other reservoir zones were estimated for well 1/9-7 as follows: (see also Table 12):

Ekofisk Formation	3063 m – 3159 m = 2.71 g/cc
Tor Formation	3159 m – 3364 m = 2.71 g/cc
Jurassic Oxford Sand/siltstone	4846 m – 4911 m = 2.65 g/cc

Figure 7: Core Porosity vs. CPI Porosity (Ekofisk Zone).



Rw (at reservoir temperature) and a, m, & n for Tor and Ekofisk Formations was determined by analogue data from existing wells on the Tommeliten Alpha structure. A water sample was not recovered in the 1/9-7 well and no special core analysis to determine a, m, & n has been performed to date. Water Saturation was calculated using a modified version of the Poupon equation, which takes into account the effect of clay on the resistivity measurement. Wireline and LWD resisitivities were compared and the most representative data was used for calculations of Water Saturation. A temperature gradient of 3.46° C per 100 m was utilized in the algorithm. The following parameters were used in the initial water saturation determination (see also Table 12):

Ekofisk Formation	Rw = 0.031 at 112 °C; a = 1, m = 2.0, n = 2.0
Tor Formation	Rw = 0.029 at 115 °C; a = 1, m = 2.0, n = 2.0

The only significant accumulation of hydrocarbons encountered by well 1/9-7 T3 occurs in the Ekofisk and Tor Formations in the upper portion of the Chalk Group (Figures 8 and 9). The reservoir summary for this interval is shown in Table 11.

Water Saturation versus height above free water level curves have been evaluated for the well as part of a greater assessment of the Tommeliten Alpha Chalk discovery. These curves were created using two free water levels of (-3160m TVDSS (blue curve)) and (-3197m TVDSS (black curve)) and are shown in Figure 9. The curves are based on Leveritt J-functions and utilised permeability calculated from known porosity-permeability crossplots from the 1/9-7 T3 and adjacent Tommeliten Alpha Chalk wells. Calculated permeability is plotted against core permeability (Ekofisk only) in Figure 7. The red curve in Figure 9 represents water saturation calculated using the modified version of the Poupon equation.

Table 13: Petrophysical Reservoir Summary

ZONE	GROSS M	NET M	N/G M/M	PHIEH (V/V)M	BVWH (V/V)M	HVOLH (V/V)M	PHIE_AV V/V	SWE_AV V/V	VSH_AM V/V
EKOFISK	75.3	28.0	0.372	8.800	3.074	5.726	0.314	0.349	0.031
TOR	60.1	14.9	0.249	4.079	2.140	1.939	0.273	0.525	0.001
TOTALS	**135.4**	**43.0**	**0.317**	**12.879**	**5.214**	**7.665**	**0.300**	**0.405**	**0.020**

Cutoff details: PHIE >= 0.15 V/V SWE <= 0.6 V/V VSH <= 0.30 V/V

Two additional potential reservoir zones, drilled by both the 1/9-7 and 1/9-7 T3 wells, encountered significant hydrocarbon shows. These included the Miocene Sand Unit at 1675m (1/9-7 depth) and a thin sand in the Paleocene (Figures 10 and 11) from 2989m to 2992.5m (1/9-7 T3 depth).

The Miocene sand unit appears to be very shaly and unconsolidated. Porosity calculations derived from the various log measurements indicate over 30 percent porosity and water saturations of about 50 percent. The interval appears to be 10m in thickness. The unit, however, appears much better in the 1/9-7 relative to the 1/9-7 T3 indicating some lateral variability.

The Palaeocene Heimdal Sand is also very shaly and is only 2-4 metres in thickness. Porosity in this sand is difficult to determine accurately due to the logs being dramatically affected by the shaliness. The water saturation calculations indicated 50 percent Sw.

The objective sands in the Jurassic were represented by a poorly developed coarsening-upwards sequence which did not yield hydrocarbon shows while drilling (at 4846m). Petrophysically, these sands (Figure 12) appeared to be very thin with poor porosity (maximum 9-10%) and high water saturation.

Figure 8: CPI Log Chalk Section

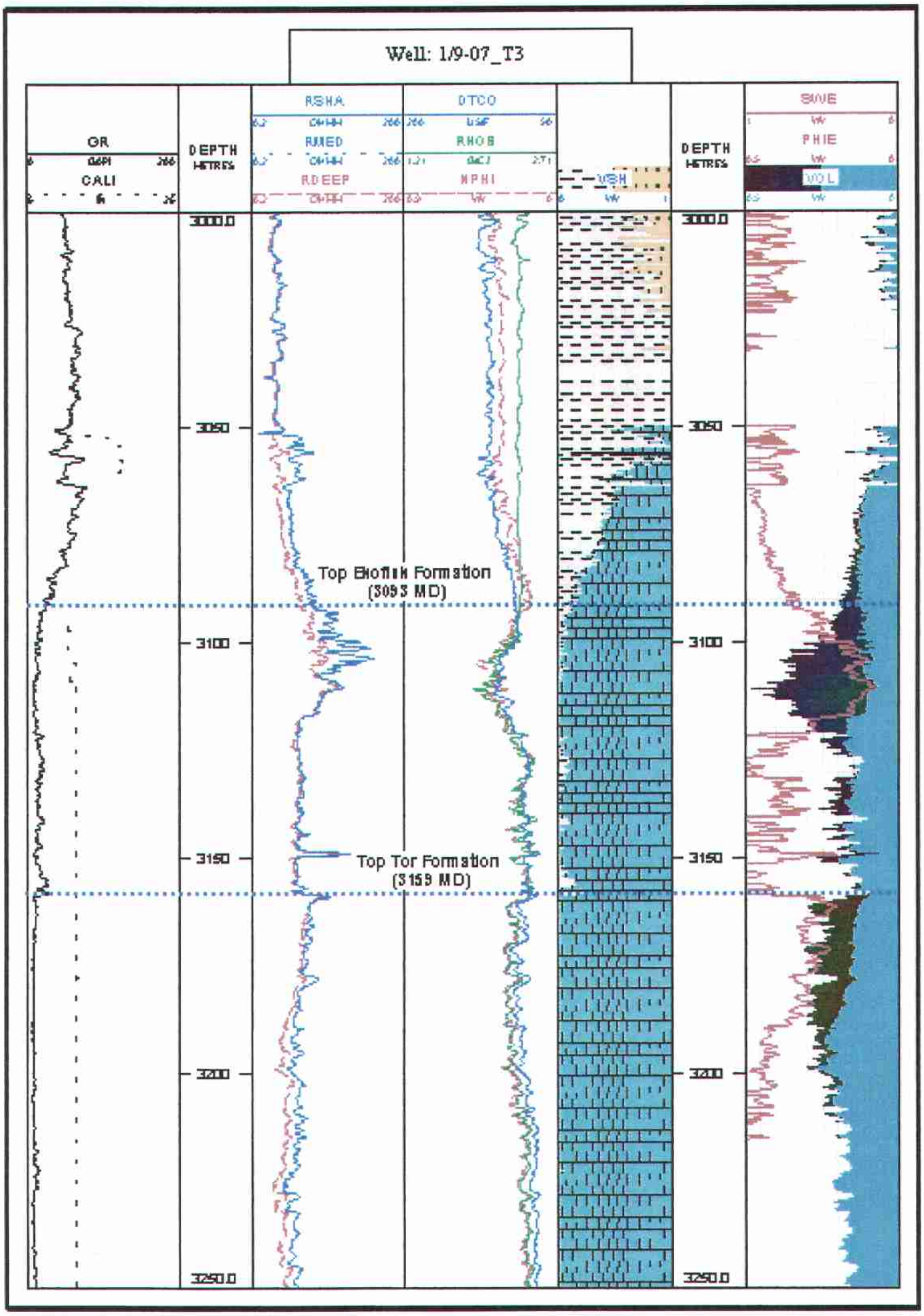


Figure 9: Chalk Section Water Saturation Models

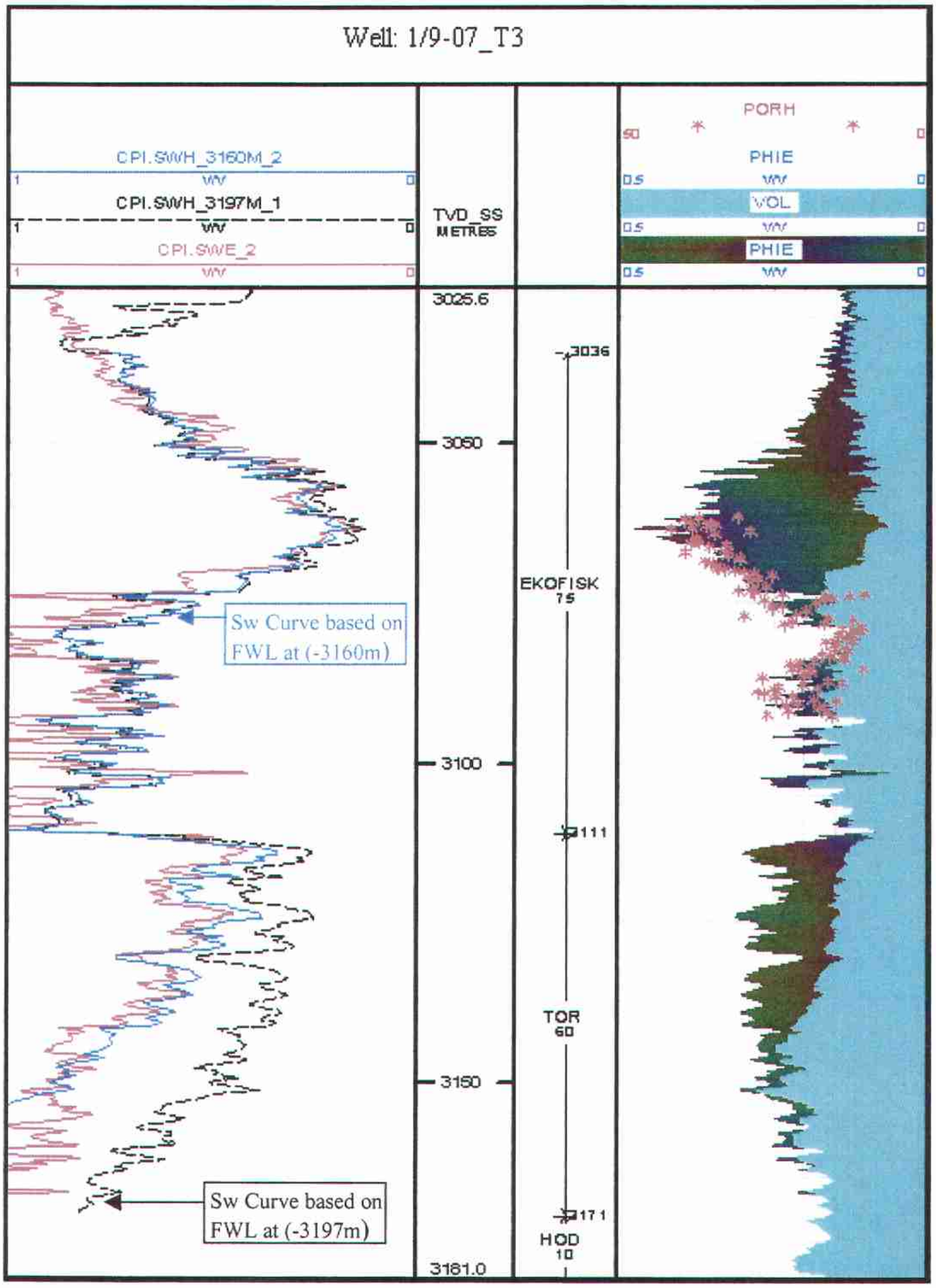


Figure 10: CPI Log for Miocene Section (1/9-7)

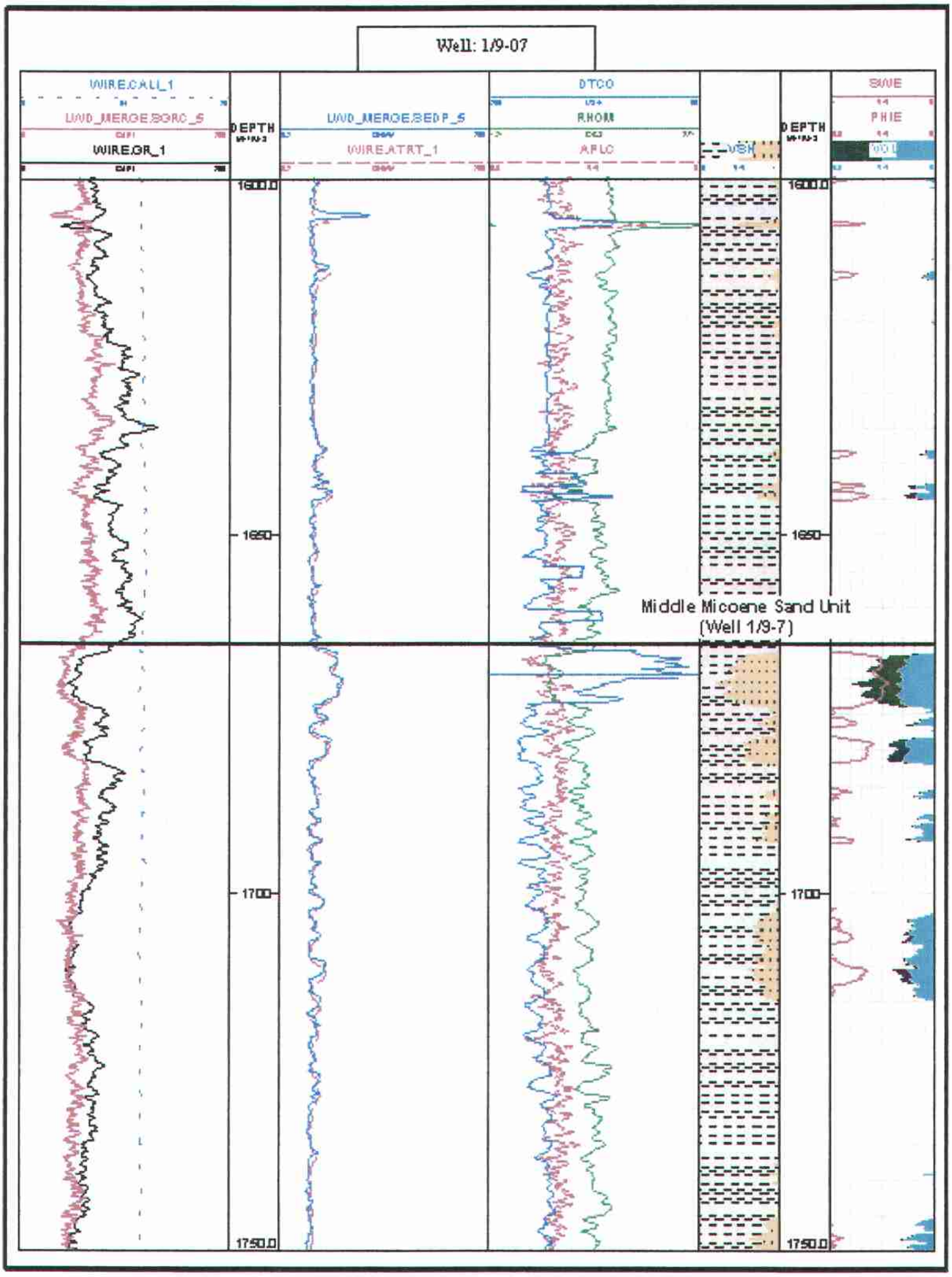


Figure 11: CPI Log for Palaeocene Heimdal Section (1/9-7 T3)

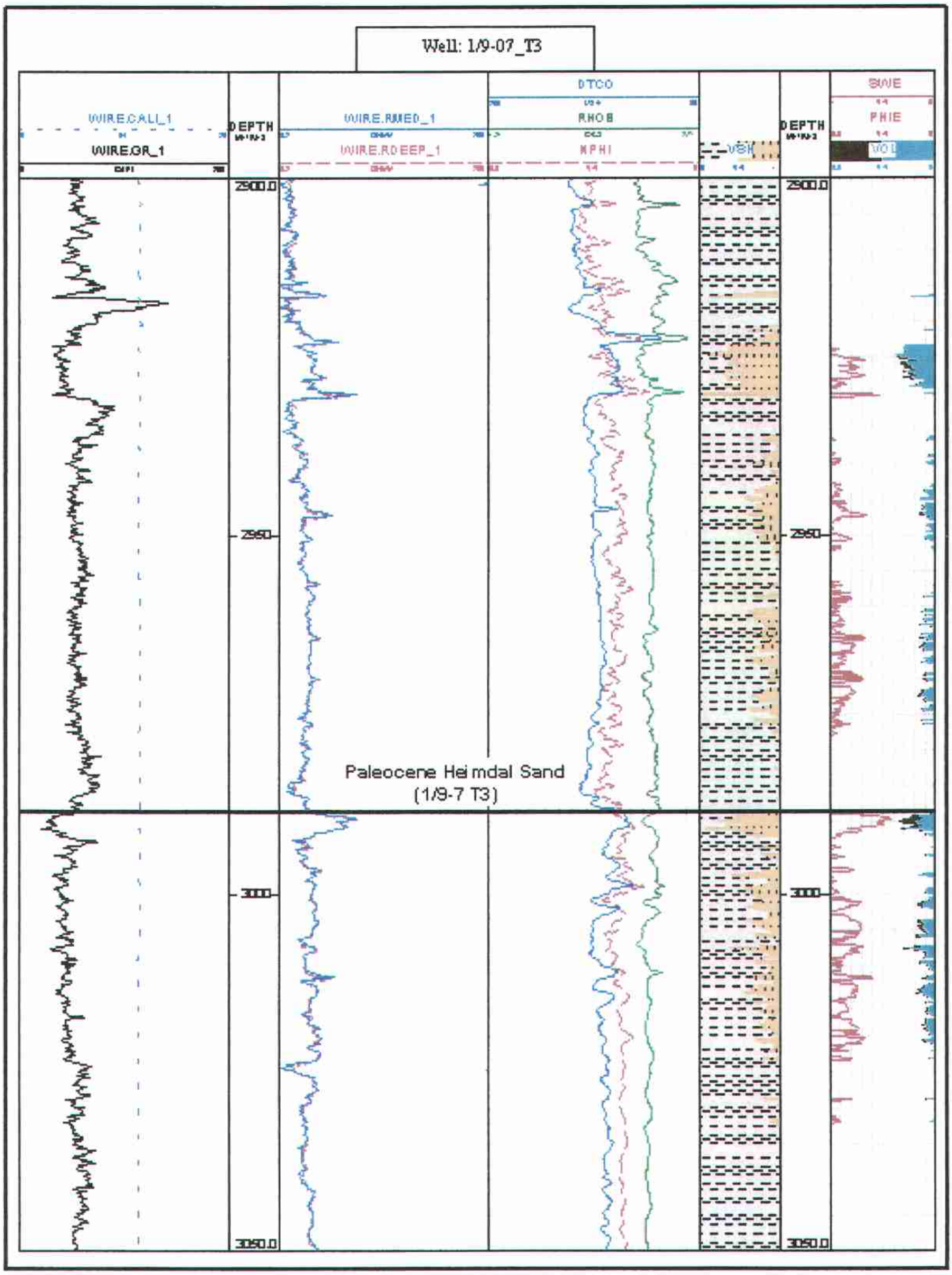
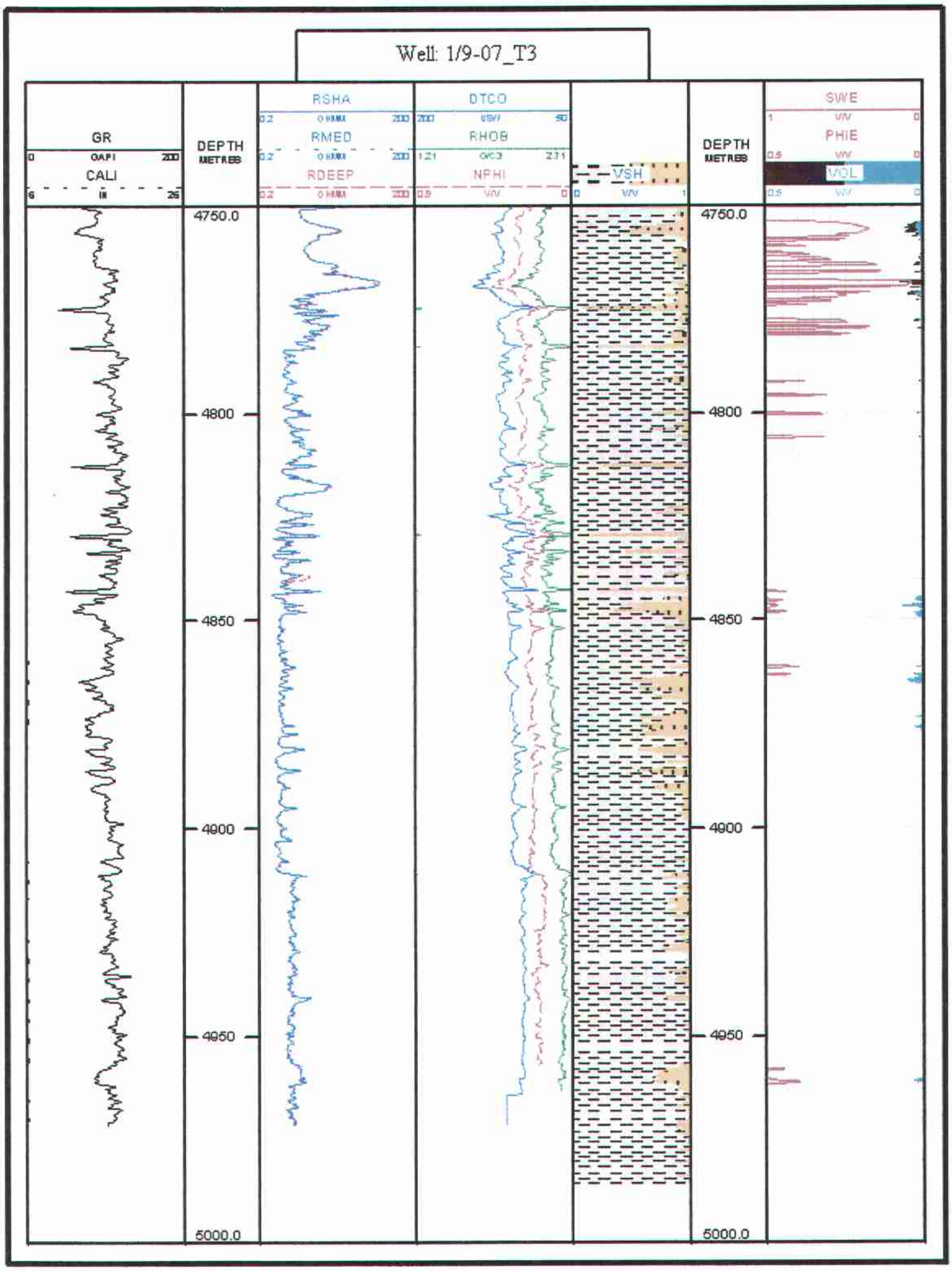


Figure 12: CPI Log Jurassic Section



2.10. MDT RESULTS

2.10.1. Pressure Data

One MDT run was performed over the Ekofisk and Tor Chalk Formations as part of run 2A at the security logging point (3561m) in 12¼" hole. An additional planned MDT run at TD was aborted due to lack of sand in the objective interval. Acquisition of pressure points was complicated by failure of the CMR tool which was serving as the primary porosity/permeability indicator. A total of 22 pressure tests were taken: tests 1 – 11 were within the Ekofisk Formation and tests 12 – 12 were in the Tor Formation. Of the 22 tests: 12 were successful, 7 were tight, 2 were seal failures and 1 was supercharged.

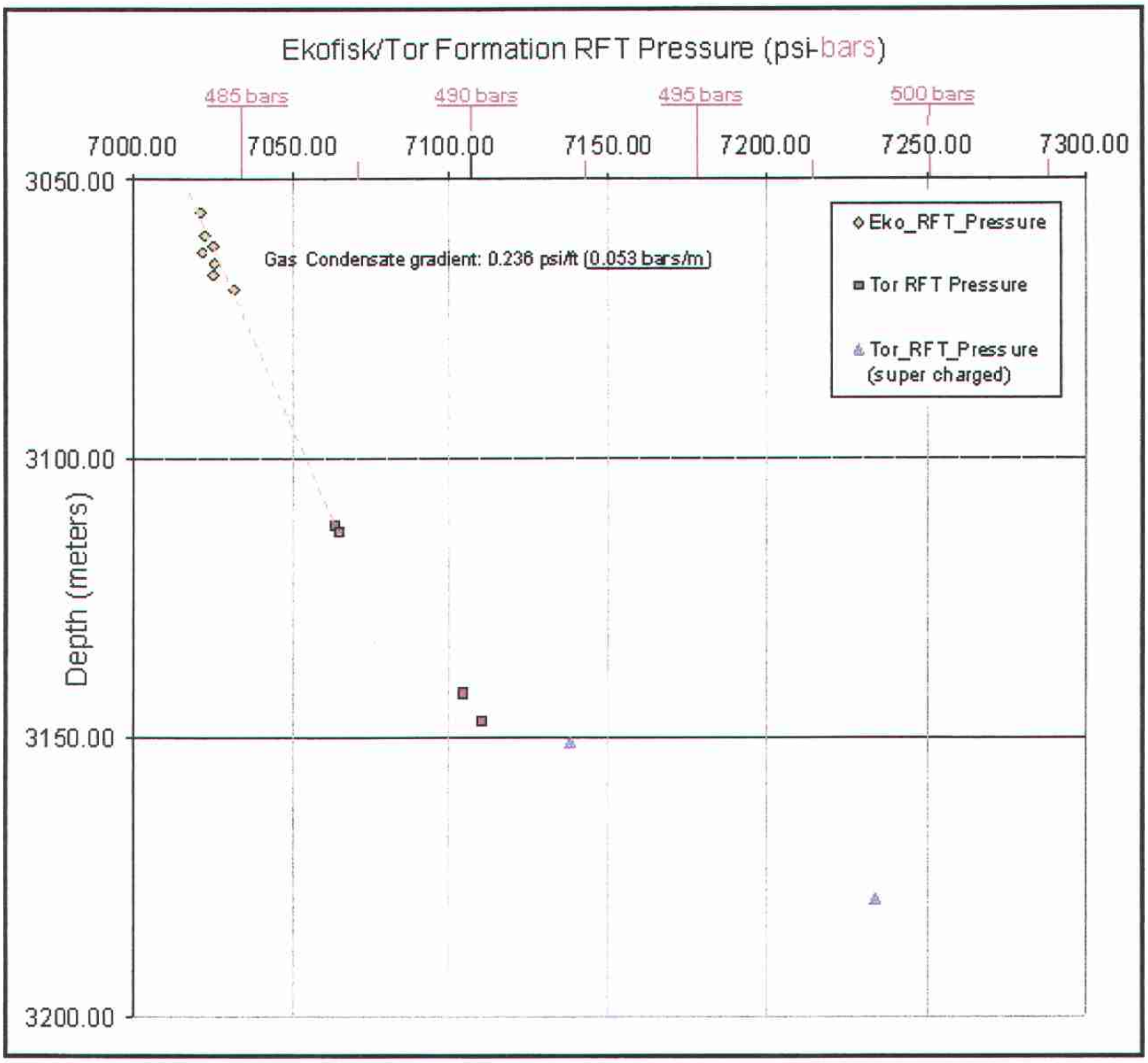
The pressures are plotted in Figure 13. The results are presented in Table 14. A reliable water gradient was not obtained due to the low permeability of the Tor below the gas/water contact. A gradient of 0.236 psi/ft (0.053 bars/m) provides the best fit to the Ekofisk pressures (1-4 and 8-10). The 2 vaild tests at the top of the Tor (12 and 13) also plot on this gradient of 0.236 psi/ft 0.053 bars/m). Consequently, the gas/water contact cannot be confirmed by use of static pressure data.

Table 14: MDT pressures (all pressures are measured in bars, using quartz gauges)

1/9-7 T3 MDT Pressure Test Results (Run 2A)

Test No	MDRT (m)	TVDRT (m)	Initial Hydro-Static (psia)	QTZ Form Press (psia)	Strain Form Press (psia)	Final Hydro-Static (psia)	Temp (°C)	Mobil (mD /cp)	Pore Press (sg)	Comments
1	3 110.0	3 063.0	7 431.0	7 021.8	7 015.7	7 428.0	109.0	1.1	1.614	Good Test
2	3 112.0	3 065.0	7 435.0	7 025.8	7 020.3	7 431.5	109.4	1.2	1.614	Good Test – Fluid sample
3	3 114.0	3 067.0	7 439.7	7 025.1	7 018.9	7 437.0	110.0	0.5	1.613	Good Test
4	3 116.5	3 069.5	7 443.5	7 031.5	7 025.4	7 441.1	111.2	0.1	1.613	Good Test
5	3 118.5	3 071.5	7 450.3	-	-	7 447.9	111.3	-	-	Formation tight. Test abandoned
6	3 119.0	3 072.0	7 447.7	-	-	7 446.2	111.7	-	-	Formation tight. Test abandoned
7	3 121.5	3 074.5	7 456.9	-	-	7 454.6	112.1	-	-	Formation tight. Test abandoned
8	3 109.0	3 062.0	7 424.2	7 025.2	7 019.2	7 423.4	112.2	0.2	1.616	Good Test
9	3 107.0	3 060.0	7 418.2	7 023.1	7 017.8	7 418.6	111.9	0.2	1.616	Good Test
10	3 103.0	3 056.0	7 408.4	7 021.3	7 016.0	7 408.8	111.7	0.1	1.618	Good Test
11	3 098.0	3 051.0	7 397.3	-	-	7 397.4	111.2	-	-	Formation tight. Test abandoned
12	3 159.0	3 112.0	7 570.5	7 063.4	7 056.5	7 561.1	116.0	0.1	1.598	Good Test (2 drawdowns)
13	3 160.0	3 113.0	7 564.4	7 064.9	7 058.1	7 560.6	116.4	0.3	1.598	Good Test
14	3 165.0	3 118.0	7 573.5	-	-	7 569.5	116.8	-	-	Formation tight. Test abandoned
15	3 171.5	3 124.5	7 586.7	-	-	7583.7	117.4	-	-	No seal
16	3 175.5	3 128.5	7595.0			7592.4	118.0	-	-	Tight Seal failed.
17	3 189.0	3 142.0	7 630.9	7 104.1	7 111.7	7 624.7	118.4	0.2	1.592	Good Test (2 drawdowns)
18	3 194.0	3 147.0	7 640.1	7 110.4	7 118.2	7637.0	119.0		1.591	Good Test (2 drawdowns)
19	3 198.0	3 151.0	7 648.6	7 138.3	7 145.0	7 646.6	119.3		1.595	Not fully stable (rising slowly)
20	3 226.0	3 179.0	7 724.5	7 233.8	7 226.7	7 719.7	119.7	0.1	1.602	Supercharged?
21	3 268.0	3 221.0	7 830.0	-	-	7 820.9	120.9	-	-	Tight – building to hydrostatic
22	3 300.0	3 253.0	7 905.1	-	-	7 896.0	122.0	-	-	Tight – built to hydrostatic

Figure 13: MDT Pressures plotted against depth (metres) for Ekofisk & Tor Formations.



2.10.2. Formation Fluid Samples

During MDT operations across the Chalk Group, 5 downhole samples were retrieved from the Ekofisk Formation with an MDT dual-packer tool. The MDT dual packer module was used to minimize drawdown and condensate banking, and thus provide a more accurate representation of *in situ* formation fluid and phase. Upon examination at surface, it was concluded that these samples contained what appeared to be single-phase retrograde gas condensate. After PVT studies were performed on the samples, it was concluded that they are 12-16 wt% contaminated with base-oil drilling mud. The fluid, however, is currently being characterised as a near-critical retrograde gas condensate. Maximum drawdown was 2 bar (30psi) during sample capture.

Subsequent attempts to obtain fluid samples from the Tor Formation were abandoned due to power outages in the logging unit. Additionally, because of the very low permeability/mobility, it was believed that fluid retrieval would be difficult and at best lead to misleading results.

A full discussion of Ekofisk Formation Fluid Samples can be found in PVT REPORT, Tommeliten Chalk Well 1/9-7 prepared by Oilphase DBR (Schlumberger).

2.11. FLUID PRESSURE AND FRACTURE GRADIENT PROFILES

2.11.1. Fluid Pressure Gradient

The interpreted fluid pressure gradient in the 1/9-7 T3 well is shown in Figure 14 (KSI, 2003). Figure 14 displays the interpreted pore pressure (red), KSI pre-drill pore pressure (green), fracture gradient (blue) and overburden gradient (pink). The drilling mud weight and ECD are also represented on the graph by black and blue lines respectively. Depth is in true vertical depth subsea. All pressure data (PP, FG, OBG, LOT, gains and losses) are shown in PPG rather than SG due to the default output of KSI's DrillWorks Software. All measurements of pressure given below are in SG with (PPG) stated parenthetically for easy comparison to the chart in Figure 14. See Drilling End of Well Report for complete KSI report: *Tommeliten Alpha 1/9-7, Report from Pore Pressure Analysis While Drilling.*

36" Hole Section, to 310m MD
This interval was drilled with seawater with returns to the sea bed. No data is available to interpret fluid pressure; a hydrostatic gradient is assumed.

9⅞" Pilot Hole, 310 to 1210m and 26" Hole Opening 310 to 1047m
The pilot hole was drilled to 1210m with 1.15 sg (9.56 ppg) spud mud. The hole was drilled without incident according to plan but at TD, the well began to flow. The influx occurred when the well bore was completely clean of cuttings dropping effective mud weight to 1.16 (9.7 ppg). This influx indicates that a maximum pressure of 1.16 sg (9.7 ppg) was encountered at some point in the well bore. The source of the overpressure cannot be easily identified from logs. The deepest interval containing apparent porosity/permeabilty was at 1075m MD which was above the estimated regional onset of overpressure. The onset of

overpressure was re-interpreted post-drill for Figure 14 at 1150m MD using the sonic log and a careful review of trend lines.

Subsequent opening of the hole to 26" progressed to 1047m MD with a mud weight of 1.16 sg (9.7 ppg). Lack of incident indicated that maximum pore pressure in this portion of the hole was no greater than this.

Two seismic anomalies noted in the pre-drill site survey evaluation at 741 and 843meters were drilled without indications of gas. Pre-drill conclusions that these anomalies would not be overpressured proved correct.

17½" Hole Section, 1039 to 3040m MD (1/9-7). 1042 to 3058m MD (1/9-7 T3)
This interval was drilled with oil-base mud. An LOT at 1039m MD casing shoe yielded 2.02 sg (16.8 ppg). The shoe was subsequently broken down when the LOT was continued to 2.18 sg (18.19 ppg). After the test, the integrity of the shoe was 1.71 sg (14.26 ppg) but was increased to 1.82 sg (15.18 ppg) after an LCM plug was placed at the shoe and squeezed into place.

Real-time pore prediction utilised LWD resistivity, D-exponent data, and offset wells. TD of the hole section was reached with an estimated pore pressure of 1.78 sg (14.85 ppg) by KSI. Mud weight was increased to 1.8 sg (15.0 ppg) under static conditions prior to tripping out of the hole for logging. At the end of the logging job, the well went on total losses. Subsequent pore pressure analysis using the sonic data indicate that a pressure regression occurs as the Chalk Group is approached and that the maximum pore pressure for the interval is 1.75 ppg at 2500m MD. This reduction in pore pressure is present in most area wells and was noted on in-house and KSI pre-drill pore pressure estimates. The regression results from the more porous Chalk Group, while itself overpressured, relieving the development of hard overpressure in the overlying Tertiary shales. A substantial increase in gas readings did occur below 2400m MD. As stated in the Drilling End of Well Report, at no time did the gas readings comporomise the safety of the drilling operations and, furthermore, over-reaction to connection gas at these depths could lead to losses as the well is drilled deeper.

The total losses experienced in 1/9-7 with the well at TD of the 17½" hole section resulted in the eventual loss of this hole section. The sidetrack (1/9-7 T3) was commenced at 1042m MD. At 2027m MD, an influx was noted with 1.70 sg (14.1 ppg). This influx provides a calibration point for the final pore pressure curve shown in Figure 14. Drilling continued with 1.75 sg mud (14.6 ppg) to 2155m where losses occurred. Mud weight was then reduced to 1.74 sg (14.52 ppg) further constraining pore pressure estimates for the interval. Drilling was continued to the TD of the hole section at 3058m MD with a mud weight of 1.73 sg (14.43 ppg) without further incident.

12¼" Hole Section, 3058 – 3845m MD
This interval is largely comprised of Chalk and was drilled with oil-based mud. Data for fluid pressure interpretation through the chalk included well-established MDT data from Chalk offset wells on the Tommeliten Alpha structure (traditional trend line approaches do not work well in carbonates as they are typically calibrated to shale). Additionally, the security logging run at 3561m MD included several MDT points in the Chalk that affirmed the pore pressure of the interval. These data are incorporated into Figure 14 and shown also in the grapnical presntation of the MDT Results in Figure 13.

In the short section of Cromer Knoll drilled below the Chalk in this hole section, the LWD resistivity was the primary pore real-time pore pressure evaluation tool. That section was subsequently reviewed with the aid of the sonic log (through casing) after the TD and logging of the 8½" hole section.

An FIT of 1.97 sg (16.43 ppg) had been achieved at the 14" shoe prior to drilling the 12¼" section. This was deemed sufficient to progress the 12¼" section into the Cromer Knoll Formation and through the initial stages of the pressure transition towards hard overpressure. The Chalk was drilled with a constant mud weight of 1.65 sg (13.8 ppg). The well was drilled 100m into the Cromer Knoll with 1.65 sg mud where an acceptable shallow 9⅞" casing point presented itself in the event that the Chalk could not hold a 1.80 sg (15.0 ppg) mud weight. The mud weight was increased to 1.76 in two stages and full returns were lost. Post-drill pressure analysis indicates a rapid pore pressure transition from this section into the underlying Cromer Knoll from 1.65 sg (13.76 ppg) to 1.83 sg (15.3 ppg) over a vertical distance of only 50-75meters. Because the Chalk could not hold the mud weight required to safely drill the Cromer Knoll section, TD for the 12¼" hole was called at this point.

8½" Hole Section, 3845 to – 4605m MD

This interval was drilled with oil-based mud. Before drilling the hole section, an ECS system was installed on the Maersk Giant. The purpose of this system is fully described in the Drilling End of Well Report in Section 1. It was intended that real-time pore pressure could be estimated from the MWD resistivity tool at least until penetration of the Mandal Formation where rich source rock adversely affects the magnitude of the resistivity response. Unfortunately, the MWD tools failed immediately after drilling out of the casing shoe. Consequently, real-time pore pressure analysis had to rely on the drilling exponent and well dynamics. The acquisition of a sonic log at TD of the hole section allowed for a more precise final pressure estimate over this hole section.

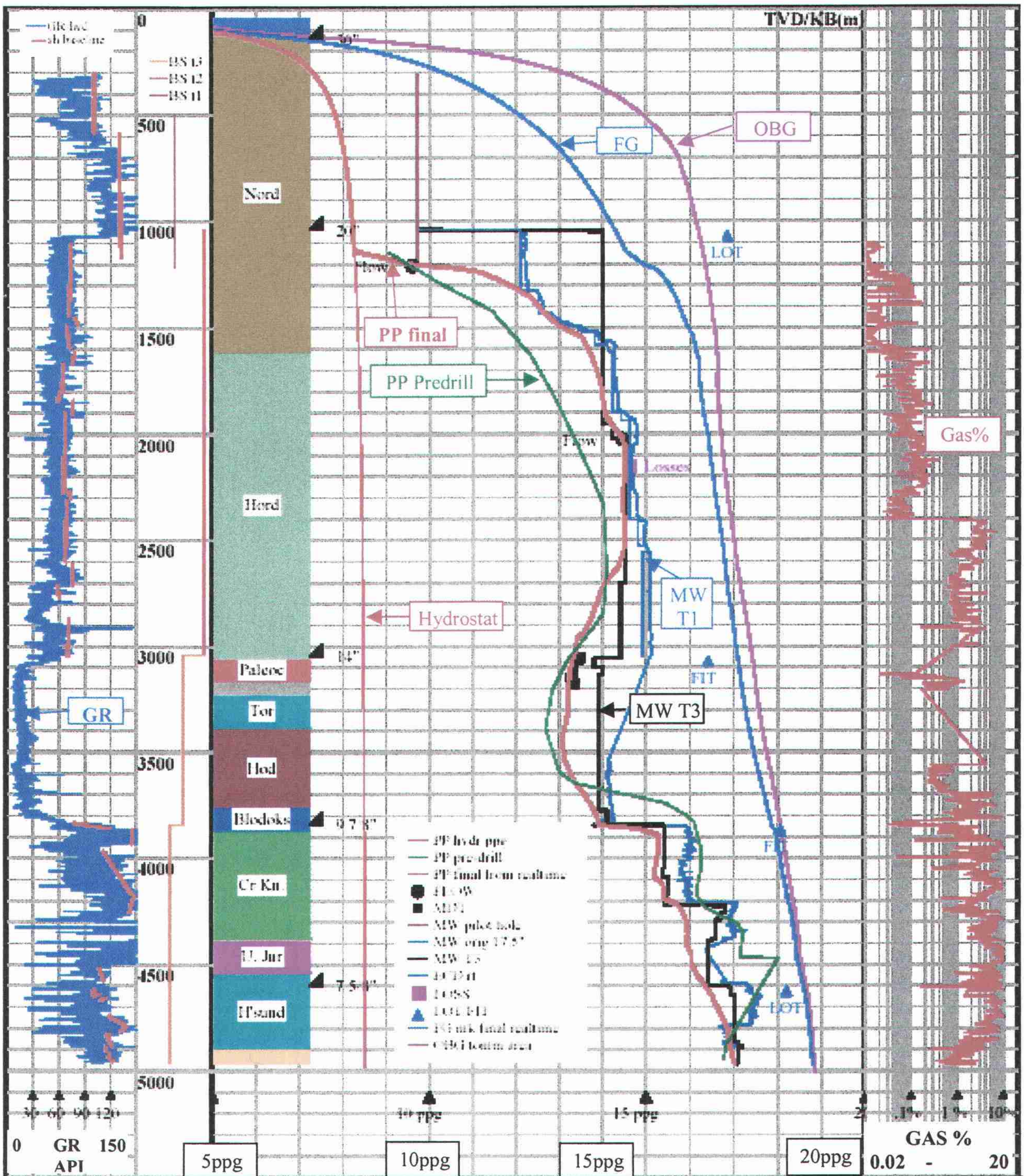
Once cement at the 9⅞" shoe was drilled out, an FIT to 2.16 sg EMW (18.02 ppg) was achieved. A mud weight of 1.85 sg (15.43 ppg) was used to drill the hole initially and then increased to 2.01 sg (16.77 ppg) at 4225m MD based on events in the offset 1/9-3R well. Post-drill pressure analysis using the sonic log calibrated to well dynamics and events indicate that a steep pressure ramp was encountered just below the 9⅞" casing shoe increasing from from 1.65 sg (13.76 ppg) to 1.83 sg EMW (15.3 ppg) over a vertical distance of only 50–75m. Below the steep pressure transition, pressure stabilized at a fairly constant weight of 1.83 sg EMW for 300m to just below 4200m MD.

Once the mud weight was raised to 2.01 sg EMW (16.77 ppg), ECD induced mud losses began to occur. Below 4225m MD, a second but much less severe pressure transiton was encountered (per post well analysis). Formation pressure rose from 1.83 sg (15.3 ppg) to 1.91 sg (16.0 ppg) at 4500m MD before levelling off slightly. A trip was made to change out the bit in this interval and the MWD was changed out. The resulting MWD benefited stratigraphic correlation but did not aid real-time pressure analysis due to problems associated with the resistivity tool in high resistivity shale. The interval between 4500m and the liner point at 4605m MD, has a formation pressure increase from 1.91 sg EMW (16 ppg) to 1.95 sg EMW (16.30 ppg) per the post well analysis using the sonic log. Bottom hole mud weight was 1.96 sg EMW (16.35 ppg).

6½" Hole Section, 4605 to 4986m MD (4992m Loggers TD)
This interval was drilled with oil-based mud. A LOT of 2.18 sg EMW (18.19 ppg) was obtained after drilling out the 7⅝" shoe. Drilling commenced with a 2.04 sg. Mud weight at TD was 2.05 sg (17.14 ppg). Post-well pore pressure estimates were hampered by failure of the sonic tool in the 6½" section. Analysis was carried out using Drilling exponent, well dynamics, wireline resistivity and Gardner sonic from density. Results indicate a continued but subdued transition in formation pressure from 1.95 sg EMW (16.30 ppg) at the top of the hole section to 2.03 sg EMW (17.0 ppg) at the TD of the well. The absence of sand alleviated any potential pressure steps due to lateral transfer of pressure and /or hydrocarbon buoyancy.

For more detail please refer to **Section 1** of the **Tommeliten Alpha Exploration Well, Drilling End of Well Report** and **Tommeliten 1/9-7: Report from Pore Pressure Analysis While Drilling** by KSI.

Figure 14: Final Pore Pressure Plot (by KSI)



OBG = Overburden Gradient, FG=Fracture Gradient,
PP Final= Final interpreted Pore Pressure (using all data sources)
PP Predrill=Prognosed Pore Pressure prior to well, MW T1=Mud Weight used to drill 1/9-7,
MW T3 = Mud Weight used to drill 1/9-7 T3.

2.12. SPECIAL STUDIES AND ASSOCIATED REPORTS

1/9-7 and 1/9-7 T3 Wells, Biostratigraphy of the Interval 320m to 4986m MD.	: Robertson Research (Aberdeen)
Geochemistry	: Geolab Nor
Zero offset VSP	: Schlumberger
Pore Pressure	: KSI (Knowledge Systems Inc.)
End of Well Report, Surface Logging Data	: Halliburton – Sperry Sun (Mudlogging)
End of Well Report, LWD	: Halliburton – Sperry Sun
1/9 7 T3 REW-Wireline End of Well Report	: Schlumberger
1/9 7 T3 Core Analyses Report	: Reslab
Dip Image Analysis (including Core Orientation)	: Schlumberger
PVT Report Tommeliten Chalk Well 1/9-7	: Oilphase DBR (Schlumberger).

3 POST WELL – SITE SURVEY REPORT / SHALLOW GAS REPORT

The site survey for the 1/9-7 well was acquired, processed and interpreted by Gardline Surveys in 1997. The survey number is ST9793. It was originally designed to investigate a different well location from 1/9-7 by using single beam echo sounder, multi-beam echo sounder, sidescan sonar, pinger, mini airgun and high resolution seismic equipment. Nonetheless, the area of coverage incorporated the 2003 well location and no new seismic was acquired. The scope of the seismic survey was to identify hazards and constraints for siting and drilling of well 1/9-7. The survey consists of a 11 X 11 2D line grid with 200 meters line spacing around the location and a spacing of 500 outside the immediate vicinity of the well location. Subsequent seafloor sampling at the drilling location was performed by Fugro Geoteam between 8th – 14th March, 2003.

Four primary stratigraphic levels were identified that contained acoustic anomalies of which three were present beneath the drilling location (Figures 15 and 16). These anomalies were studied in detail by an in-house investigation to determine the relative drilling hazard they presented. Most attention was given to the two shallower hazards at 760 and 870 milliseconds as the well plan called for these to be drilled in the 20" section (30" casing shoe set at 308 meters). These upper two anomalies represented a low risk for gas according to the Gardline classification system. Although gas was a possible model for these anomalies, correlation to offset wells on the Tommeliten Alpha structure indicated the lack of a permeable media in the area at these intervals. Furthermore, review of pressure data from Tommeliten Alpha and nearby wells, indicated that these intervals, which were depth converted to 741 and 843 meters respectively, occur well above the regional onset of overpressure (approximately 1200 meters pre-drill interpretation) and were not likely to be overpressured. No significant dip was observed on these features indicating that anomalous overpressure would not be provided by lateral transfer. It was concluded that these shallow events could be safely drilled using the mud weights specified in the drilling program. A pilot hole was included in the drilling program to provide an extra margin of safety.

The third and fourth anomalies located at 1050 and 1600 ms were aerially more widespread than the shallow events discussed above. Only the 1600 ms anomaly was present beneath the well location. This anomaly would be encountered approximately 400 meters deeper than the planned 20" shoe and, hence, did not represent a significant drilling hazard, as higher mud weights would mitigate any risk of posed by the presence of slightly overpressured gas.

The pilot hole was drilled to 1210 meters through the shallow gas anomalies with 1.15 sg mud as planned without incidence. At TD, however, a flow check indicated that the well was flowing and gains were observed. The incident is believed to be a result of encountering pressure transition away from hydrostatic conditions at the base of the hole section and unrelated to the shallow gas anomalies. This interpretation is well supported by the subsequent uneventful opening of the 20" hole to a depth of 1047 meters with no gas influx from the anomalies at 741 and 843 meters. As expected, the deeper anomaly at 1600 meters yielded gas shows but was drilled in both the 1/9-7 and 1/9-7 T3 without incidence.

Figure 15:Pre-Drilling Site Survey Shallow Hazards Map

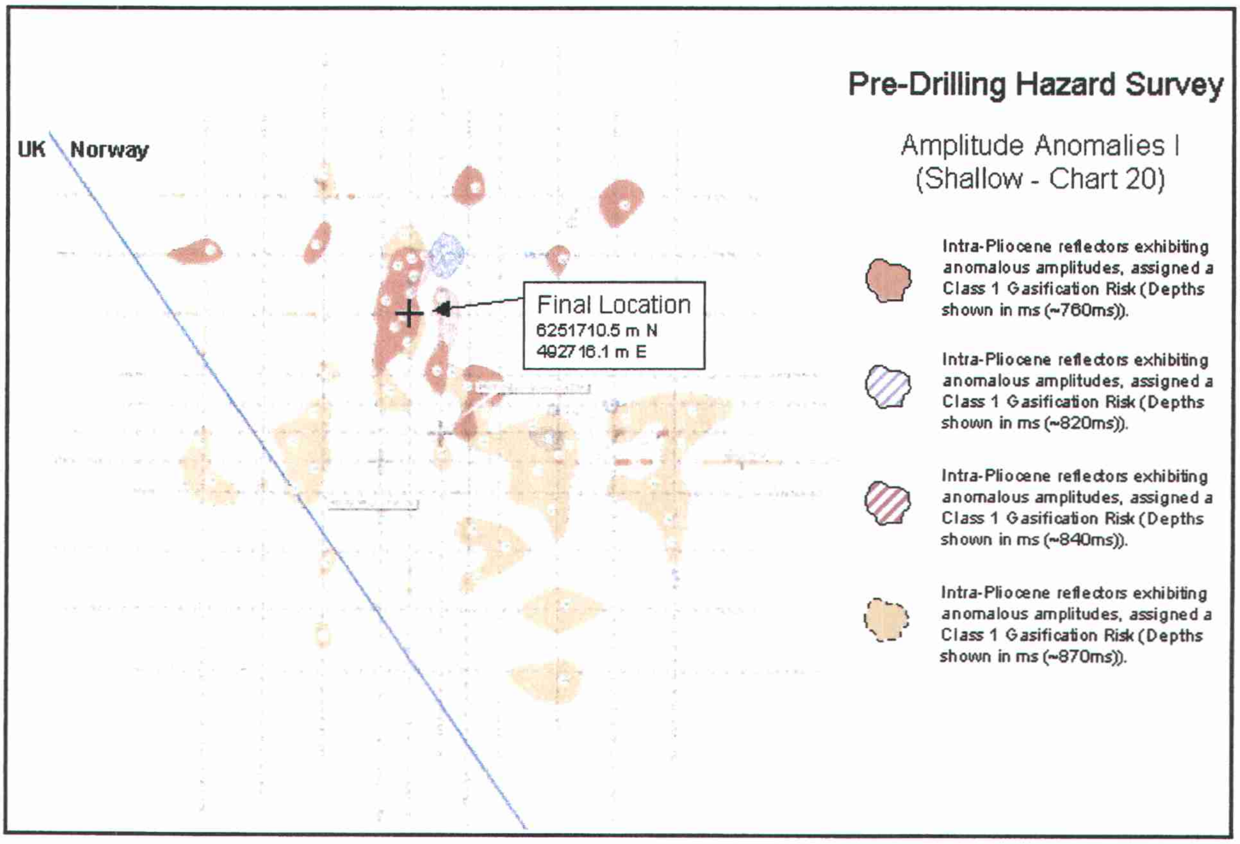
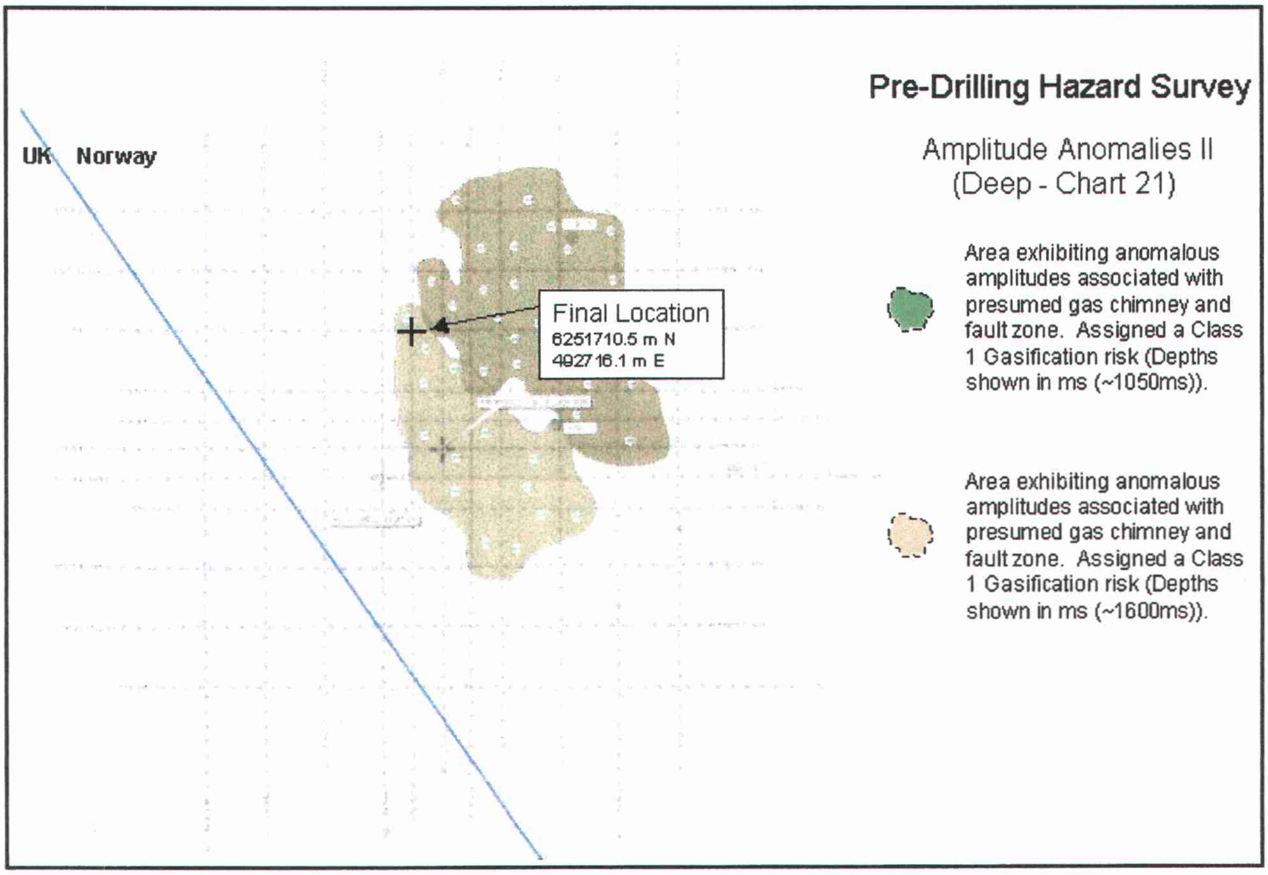


Figure 16: Pre-Drilling Site Survey Deeper Hazards Map



ConocoPhillips	FINAL WELL REPORT WELL 1/9- T3
Section: 3	POST WELL–SITE SURVEY REPORT/SHALLOW GAS REPORT

WELL DATA:

1	**Distance from rotary table to sea level:**	45 meters
2	**Water depth (MSL):**	75.75 meters
3a	**Setting depth for conductor (m RKB):**	308 metres
3b	**Leak Off / Formation Integrity Test (g/cc):**	n/a
4a	**Setting depth for casing on which BOP is mounted (m RKB):** (initially drilled pilot hole to 1210 m)	1039 meters
4b	**LOT / FIT (g/cc):**	2.02

5 Depth (m RKB) & two way time to anomalies:

The anomalies are located at approximately 758 and 881 ms at the well location (per Site Survey). These anomalies do not correspond to sand or a porous media on the wireline logs (see composite at 741 and 843 m). The anomalies are probably Upper Pliocene in age. No show was noted whle drilling the 9⅞" pilot hole although the well did flow when the pilot hole TD was reached at 1210 m. This flow, however, is not believed to be related to the subject anomalies due to lack of sand in the anaomaly interval and the fact that the hole was opened to 26" through these intervals without incident.

6 Depth interval (m RKB) and age of sand bodies shallower than 1000 m under the seabed. Note, which layers if any contain gas:

Several thick clean sands were encountered in the interval between the conductor pipe at 308 meters and the TD of the pilot hole at 1047 meters (1210 meters for 9⅞" hole). These sands are generally Pleistocene in age and thin dramatically at the Base Qauternary Unconformity at 563 meters (MD). Below this unconformity the sands tend to become progressively thinner and shalier down section before disappearing altogether at approximately 700 meters (MD). None of these sands are present below the transition to overpressure and there is no evidence that they contain gas.

7 By what means is the presence of gas proven:

No gas seen while drilling the pilot hole section but gas was encountered at TD where a flow incident occurred. Due to the relatively high mud weights used to drill this portion of the hole, and for reasons stated above, the origin of the gas is believed to have been near the 1210 meter TD of the hole section. Nonetheless, no sand is noted in that vicinity by either mudloggers or wireline loggers.

8 Composition and origin of gas: n/a

9 **Description of all measurements carried out on the gas containing strata:** n/a

SEISMIC DATA:

10 **Give depth and extent of sand layers (communication, continuity, truncation etc.):**

Sand layers were prognosed to occur within the Pleistocene section and degrade downhole into silts as the section becomes more shale prone. The upper 2 anomalies were located in this shale prone Pliocene/Miocene section. Plesitocene sands are widespread across the structure are reasonably correlatable but do not contain gas or overpressure. The anomalies at 1050 ms (this anomaly not present at drilling location) and 1600 ms are more likely to be associated with the occorrence of sand. This observation is particularly true for the 1600 ms anomaly which is associated with a hydrocarbon-bearing sand elsewhere on the structure. The presence of this sand (Mid-Miocene Sand Unit) was prognosed for the well location. The disconintuous nature of the sand, however, is illustrated in the dramatic difference in sand development between the 1/9-7 and the 1/9-7 T3 just a few feet apart.

11 **Given depth and extent of any gas blanking ("gass-skygging"), seismic anomalies etc.:**

No gas blanking.
Seismic anomalies identified in the site survey report are discrete and scattered. The uppermost anomalies at the location were based on amplitude alone. The lowermost anomaly was more widespread with higher amplitude but was below the 20" casing shoe (BOP stack).

12 **Note any indication of gas originating from deeper levels. Give description in cases where gas comes from deeper layers:**

High amplitude areas concentrated adjacent to faults emenating from the Lower Paleocene and Cretaceous sections. Shape and distribution of anomalies (particularly deeper anomaly at app. 1600 ms and 1050 ms - 1050 ms anomaly not at well location) governed by fault location and orientation. Since feature relatively flat at these levels, there is no evidence, however, of lateral transfer of basinal pressures to crestal area of strucure.

13 **How does the interpretation of the site survey correspond to the well data with respect to:**

- shallow gas: Fair correspondence - site survey indicated of possible gas at two shallow anomalies at 758 and 881 ms and no gas was noted in either the pilot hole or the 26" opened hole. Anomaly at 1600 ms contained both gas and sand as predicted.

- sand bodies: na.

- unconformities: na.

- correlation to nearby wells: Excellent ties between anomaly zones and wells.

References:

Gardline Survey, NOCS 1/9-B Site Pre-Drilling Hazards Survey; October 1997.
DOCS number NR01611782

4 COMPOSITE WELL LOG 1/9-7 & 1/9-7 T3

5 PETROPHYSICAL CPI LOG 1/9-7 T3