WELL SPECIFIC DOCUMENT

Licence	Project	Valid from	Doc. id
PL 144	1/5-4S	1/7/02	DR-024-AHN-02

Title

FINAL WELL REPORT

Objectives

To provide a summary of operations, data acquired and recommendations derived from the 1/5-4S drilling operation. In compliance with NPD reporting requirements and AHN end of well report procedure AWT-006

Distribution:

Electronic version is stored in IMS well file as "read only". Responsible person Information Centre Co-ordinator. AHN project personnel to have access.

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Authorisation

This Well Specific Document is authorised for distribution by the signatures below.

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1 INTRODUCTION AND SUMMARY

1.1 Well Objectives

Well 1/5-4S was drilled to test the K1 T1 prospect. The K1 prospect was a mapped four-way dip closure of the chalk over the salt intrusion. The chalk was thought to drape the entire salt diapir, or possibly exist as a rafted block. The T1 Palaeocene Prospect was believed to be a stratigraphic pinch-out prospect caused by the deposition of Forties and Andrews sandstones over a tectonically active diapiric dome feature.

The primary objective of the 1/5-4S well was to test the hydrocarbon bearing potential of the K1 Chalk prospect close to the crestal position on the NE side of the salt diapir. The wellpath was planned to penetrate the edge of a mapped Palaeocene fan system (T1 prospect). Hydrocarbon bearing Forties sandstones were targeted and treated as a secondary objective. Thicker and better quality sandstones were expected to be present down flank of the structure.

The overburden was known to contain charged fractures, as experienced by the Conoco well 1/5-3S. In order to avoid these fractures and the associated wellbore instability problems, a delineated wellpath using Oil Based Mud was planned from the 12.25” hole section to TD.

1.2 Results

The drilling of the well went very well and closely followed the plan. The top Palaeocene was encountered 55m higher than prognosis. Two thin sandstone beds were drilled, both within the Lista formation. This made them Andrew sandstones. The lower stringer was tight but contained some shows. The upper stringer had better reservoir properties however an FMT sample yielded water. Forties sandstones were absent.

The primary objective, the Chalk, was 118m higher than forecast, 49m thick, and 80m thinner than expected. The chalk was found to be water saturated with a maximum porosity of 25% and in pressure communication with the thin Palaeocene Andrews sand stringer. Minor shows were reported in the chalk and Palaeocene sandstone.

1.3 Well Information Summary

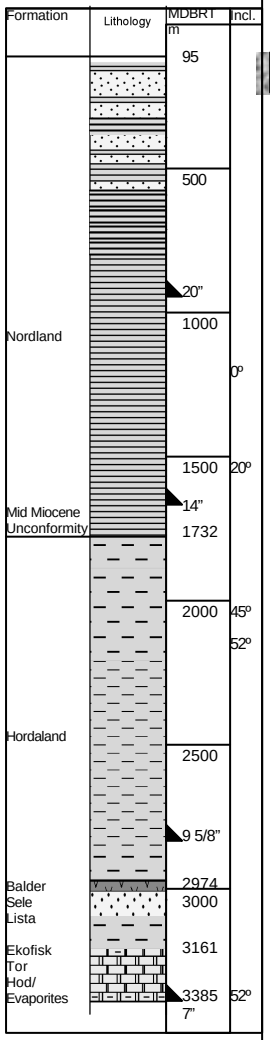
Block/Quadrant	1/5
Well Name	1/5-4S
Prospect	K1(Primary) T1 (Secondary)
Well Classification	Exploration
Rig	Deepsea Bergen
Drilling Contractor	Odfjell Drilling AS
Proposed Development Well Intent	Wildcat - Exlporation
Licence Number	PL 144
Rig Commencement Date	15/4/02
Spud Date	15/4/02
Well TD Date	15/5/02
P & A Complete	22/5/02
Rig Off Hire	24/5/02
Duration - Dry Hole	39 days
License Operator / Well Operator	Amerada Hess Norge AS
Well Partners	Statoil, Enterprise
Depth Measurement Units	Metres
Rig Floor Elevation	23m
Water Depth	70 MSL
Confirmed Surface Location UTM Zone 31 Rig Heading	Lat 56º 42' 32.04" N Long 02º 37' 41.06" E Co-ordinates: X 477299.01mE, Y 6285184.9mN 133.1º True North
Target Location	X 476382 E Y 6284324 N 2630m TVDSS
Target Tolerance from Target Co-ordinates	Elipsoid 25m low side, 100m high side, left and right on an inclined plane perpendicular to the planned wellbore.
Well Total Depth	3090m driller's depth. 3088.5m logger's depth

1/5-4S (K1/T1) Well Summary

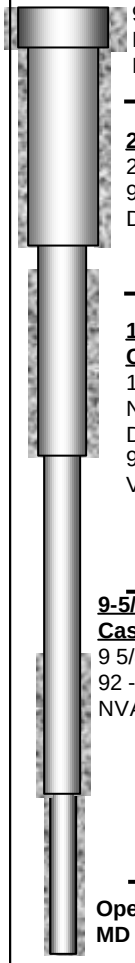
Location : 6285184 m N 477229 m E
UTM Zone 31, 3 Deg.East.

Well TD: 3090mdrkb
: 2539m tvdrkb

N.B. All depths given are Measured Depth Below Rotary Table unless stated otherwise.



Stratigraphic Column, based upon original prognosis not actual depths.



Casing	Cement	Mud	BHA	Evaluation	Hazards
30" Conductor: 30" x 1" WT, 92 - 167m Dril-Quip HD/HT90	300% excess. 1.56sg lead. 1.95sg tail.	Seawater and gel sweeps. Returns to seabed. (Weighted gel mud for anomalies in pilot hole).	Motor assy, 17 1/2" bit with 36" hole opener MWD	MWD:DIR/GR/EWR4 in 9-7/8" pilot hole).	
20" Casing 20", 131 ppf, X56 92 - 923m. Dril-Quip HD90	100% excess on lead. 1.50sg lead, 1.92sg tail. (Optional gas block slurry).	Sea water & gel sweeps. Returns to seabed.	26" motor assembly MWD	MWD: DIR. (GR/RES in 9-7/8" pilot hole).	Shallow gas anomalies- None encountered
14" Intermediate Casing: 14", 86 ppf, L80, Nom. ID 12.800" Drift 12.613" 92 - 1640m VAM TOP	TOC @ 1100m. 50% excess. 1.60sg lead. 1.92sg tail.	KCl/Glycol WBM system. 1.57sg. Returns to surface.	17 1/2" BHA Steerable motor MWD	MWD: DIR/GR/EWR4/PWD Wireline: Cancelled	Potential for kicks Potential for losses Reactive shales Steering difficulty in shales None encountered
9-5/8" Production Casing (K1) : 9 5/8", 47 ppf, P110, 92 - 2873m NVAM	TOC @ 2300m. 35% excess. 1.92sg. (Optional gas block slurry).	OBM. 1.76sg. Returns to surface. Cuttings collection.	12 1/4" rotary steer able assembly used down to 2660m then rotary assembly PWD/MWD	MWD: DIR/PWD/GR/EWR4 Wireline (K1): None	Borehole stability - Minor Increasing pore pressure Potential for kicks Large right hand walk tendancy TD Selection difficult
Openhole to 3090m MD 2593m tvdrkb		OBM. 1.80sg. Returns to surface. Cuttings collection.	8 1/2" rotary hold assembly. PWD/MWD Coring through chalk on shows	MWD: DIR/PWD/GR/EWR4 Wireline: 2 HDIL/MAC/GR/TTRM 2B ZDEN/CNC/GR/TTRM 2C FMT/GR 2D FMT 2D	Lack of reservoir minimised problems

2.1 Health, Safety and Environment (HSE) – Well Review

2.1.1 HSE Objectives

Amerada Hess Norge A/S' goals for Health, Safety & Environment performance have been "no accident, incidents, or serious potential near misses during the well operation", which means:

- No harm to people
- No damage to the environment
- No loss of material value

In order to achieve this the company has striven to:

- Promote and maintain safe working practices and conditions
- Systematically identify and mitigate all risks associated with the company activities to as low a level as practicable
- Attain a high level of operational quality by encouraging continual improvement
- Minimize environmental impact by organizing all activities with due regard to the environment.
- Encourage all employees to protect their own health and safety and that of others
- Ensure that sufficient resources are made available to meet performance criteria
- Conform to all appropriate governmental legislation

HSE statistics were maintained throughout the operational phase of the 1/5-4S well, and recorded manhours worked, injuries to personnel and incidents with environmental impacts.

2.1.2 HSE Management

The operation has been managed from the AHN office in Oslo by the 1/5-4S Drilling Operations Team working in close co-operation with Odfjell's onshore and offshore rig organisation. Additional well operations and HSE resources have been made available from the Amerada Hess federal organization as required.

AHN's Well Supervisor co-ordinated the offshore work onboard the Deepsea Bergen (DSB) in accordance with the Drilling Programme and relevant procedures. He chaired the daily communication meeting between the rig and AHN's and Odfjell's onshore organisations. Additional HSE meeting were held involving management team personnel from the respective organisations to follow up on actions raised and appraise HSE performance throughout the well operations period.

A Well Management System (document reference MN-002-AHN-02) was established during the well planning phase to ensure that the drilling activities would be executed in a safe, systematic and efficient manner. Quality/safety management principles were addressed, and improvements to the system were obtained by continuous activity assessment. Any non-conformance to regulatory requirements, company standards and procedures was followed up/corrected.

Prior to commencing operations with the DSB, AHN evaluated the drilling rig / Odfjell from a technical and management system stand-point to ensure that regulatory requirements were complied with and that the systems also met AHN's own QHSE requirements. Based on the documentation review and audits both offshore and onshore, AHN concluded that Odfjell's system documentation and management of the work was acceptable. This has been confirmed during a successful well operation.

The 1/5-4S well organization and management system was further developed throughout the life of the operation based on experience feedback.

Several meetings were held with the Authorities, before the application for consent to drill was submitted, and the close communication with NPD and SFT was kept during the well operation.

2.1.3 Non-Conformances

At the time of applying for consent to drill the 1/5-4S well a total of 32 regulatory non-conformances were attached to the application. The majority of these were related to the working environment, lack of automated systems resulting in manual handling, sizing of equipment, and non-conformance with more recent legislation. None of these were regarded as safety critical and likely to have a detrimental affect on 1/5-4S drilling operations and therefore accepted by AHN. Outstanding actions were followed up by AHN throughout the drilling operations period.

Subsequent to the technical evaluation carried out jointly by AHN, Phillips Petroleum Company Norway (PPCoN), and RWE-DEA, an additional 15 non-conformances to NPD regulations were identified, actioned and closed-out during the well operation period.

2.1.4 Occupational Health, Hygiene and Working Environment

After reviewing relevant documentation and meeting with Odfjell's designated medical provider, the AHN Company Doctor found the rig acceptable. It was recommended for operational use, and consent from the Norwegian National Health Board (FLIR) was obtained.

In general the cleaning and cleaning routines have been good in the galley as well as the rest of the accommodation areas during the operation, and produced water on board the rig has been of good quality.

Odfjell's manual for handling chemicals has been acceptable, and the chemical registers and datasheets have been according to the COSHH standard.

The hospital has served its purpose for treatment of ill or injured persons, and the nurse onboard has been reporting professionally to the Odfjell Company Doctor. The 24-hour medical stand-by duty provided by the Norwegian Air Ambulance in case of emergency was not mobilised throughout the drilling operation.

The Deepsea Bergen (DSB) was commissioned in 1983 according to NMD regulations, which in some areas have been modified since then. Non-conformances with new requirements have been subsequently identified and addressed by Odfjell and accepted by NPD/SFT.

Odfjell has been acting as Principle Enterprise for contractors and service companies during the AHN well operations. Working Environment Committee meetings have been held on a monthly basis, and safety delegates from all companies on the rig have been participating or given their input to the system.

2.1.5 Risk Analyses

A Hazard Identification process was conducted at an early stage of the well planning, to ensure that all potential risks were identified, such that they could be taken account of during the well design. Once identified the potential risks were assessed on the basis of frequency and severity, and recommended control measures were specified along with any actions required to further assess the hazard.

A Shipping Traffic Survey and Collision Frequency assessment (reference AHN-MR-02-001) revealed that one route in particular contributed significantly to the overall risk at the well location. This risk was later addressed quantitatively during the Area, Rig and Well Specific Risk

Assessment (see paragraph below). Adherence to good operational procedures was deemed appropriate to mitigate this risk to acceptable levels.

An Area, Rig and Well Specific Risk Analysis (reference AHN-SE-02-004) was carried out to assess potential hazards involved in the drilling operations. The analysis did not reveal any findings with a high risk potential or significant shortcomings regarding the area, rig and well specific risk aspects. A total of fifty-five (55) action points were identified during this exercise which was facilitated by external risk assessment consultants and involved operational and HSE personnel from AHN, Odfjell as well as the other significant contractors involved in the well. Recommendations/ actions resulting from the analysis, were fed into the AHN Action Plan – Deepsea Bergen (reference QA-011-AHN-02), and closed as necessary prior to operation.

2.1.6 Emergency Preparedness

In accordance with the Station Bill internal resources on the rig including personnel, procedures, communication control, lifesaving appliances and other equipment have been able to handle a level 1 emergency. Emergency drills have continuously been carried out on defined situations of hazards and accidents to ensure that the specific emergency preparedness requirements for the activity were met. A dedicated stand-by vessel with a qualified emergency team has also been included in this level of emergency.

DSB rig management has formed the offshore emergency team to cope with any critical situation during operations. The AHN Well Supervisor formed an integral part of this team with a direct communication link to the duty manager at the Oslo office. The AHN Emergency Response Team could mobilise to the Oslo ERC within 1 hour of receiving the initial call-out.

Prior to the starting rig-operations, tabletop exercises and accident simulations were conducted to test the AHN and Odfjell Emergency Response Teams.

The regional emergency resource pool containing SAR helicopter with nurse onboard, has been on stand-by in case of accidents requiring external assistance. The 24-hour duty doctor system ensured that any injured person would have had the best medical treatment when arriving at the onshore heliport. A hotel nearby was contracted to take care of offshore personnel brought ashore and the next of kin in case of an emergency situation.

No level three emergency (requiring the mobilisation of AHN's onshore emergency response team) was called during the K1T1 well operation, and the Joint Rescue Co-ordination Centre (JRCC) at Sola Airport was consequently never mobilized.

2.1.7 Environmental Emission Monitoring System Report

A separate report of environmental emissions to air and discharges to sea resulting from the K1T1 (1/5-4S) well is being prepared in accordance with SFT requirements. This report will be submitted to the SFT by the end of March 2003 as required by regulation.

2.1.8 Reported Undesired Incidents (RUI's)

As defined in section 2.1.1 above, AHN as well as Odfjell set some ambitious HSE objectives for the 1/5-4S well operation. Whilst the well was being drilled, some incidents did occur. However, from a safety point of view, it can be said that the operation was managed in a safe and professional way. RUI's are summarized as follows:

- No Fatalities
- No Lost Time Incident (LTI)
- One Medical Treatment Injury
- No Oil Spills
- One Near Miss Incident

The near miss incident occurred whilst rigging up for running 20" casing on the DSB, the rig-crew discovered that the elevator was too wide. The elevator was marked 20" ID, but when the actual elevator was measured, it turned out to be 21 1/8" ID. Odfjell Well Services (OWS) offshore personnel did not notice the non-conformity until the first casing joint was already latched to the elevator.

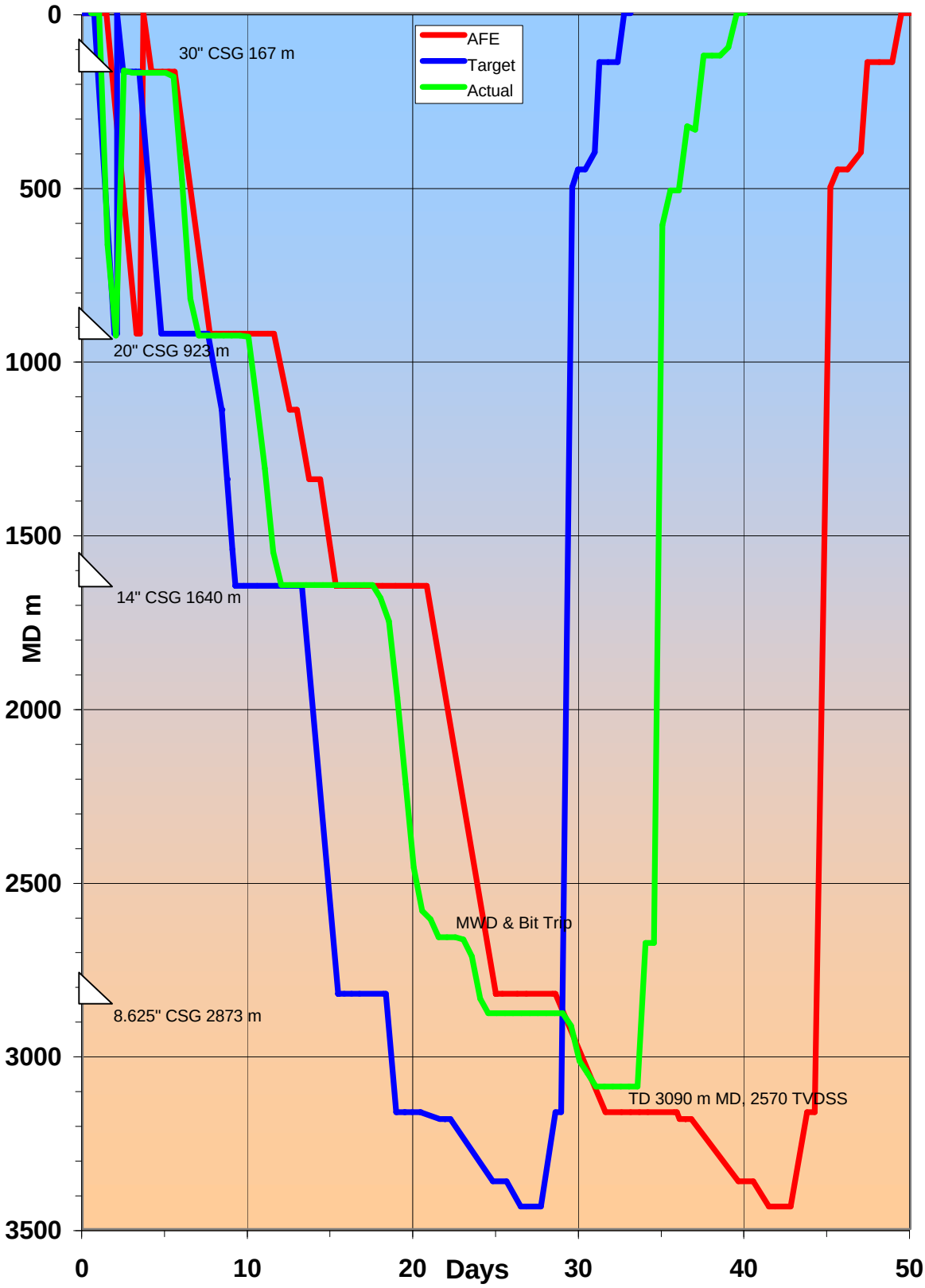
A minor injury occurred when the injured party (IP) was finishing lining up a mud pump on the standpipe. The IP stood up on the supercharge pump and went to step down. He stepped down from the flat top of the pump onto the edge of the base supporting the pump resulting in a twisted ankle.

All RUI's have been discussed/ followed up in the HSE meetings on board the rig and mentioned in the weekly HSE reports.

In addition, throughout 1/5-4S well operations, Odfjell's RUH (hazard reporting system) has been widely utilised with rig and external personnel encouraged to spot hazardous situations before they become a near miss or injury incident.

1/5-4S Time Depth Curve

Section 2.2



2.3 Operational Time Breakdown

Date of Operation (used in DCWR)	Starting Time of Operation	Finishing Time of Operation	Time in Hours For Operation	Depth m	Description of Currently Highlighted Operation	Class
15-04-2002	00:00	06:45	0.00	0	Complete deballast rig to initial 21m draft. Meanwhile : 1. X-tensioned anchors to 180T minimum. 1. Continued piggy backing Anchors 1 and 10. Delays running anchor 1 due to SIO engine water cooling problem - lost 1hr50. 2. Completed BHA handling and continued PU DP (27 jts). 3. Installed Sperry MWD pressure transducer spool. P/tested kelly hose to 345 bar (good)	P
15-04-2002	10:00	16:00	6.00	0	RIG ON CONTRACT FROM 10:00 HRS 15 APR 2002 Finalised preparations to drill: 1. Continued PU DP (total 46 stds in derrick). 2. 2. Offloaded equipt / bulks from boat (whole mud, barite, gel, cmt, PW, DW etc). 3. Completed mud mixing Final drilling draft 22 m	P
15-04-2002	16:00	17:30	1.50	0	Performed shallow gas drills and pull-off test with day shift crews (40 m to port in 2 mins)	P
15-04-2002	17:30	18:00	0.50	0	Ran 9.7/8" to 75 m. Uploaded MWD and flow tested same - pulsed at 2000 lpm. Jumped ROV.	P
15-04-2002	18:00	18:45	0.75	0	ROV observed while ran in from 75 to 88 m. LO single and MU drilling pup to accelerator.	P
15-04-2002	18:45	20:00	1.25	0	Held shallow gas TBT and performed drills for night shift crews (simulated pull-off location).	P
15-04-2002	20:00	20:15	0.25	0	Ran in and tagged seabed at 93 m (tide corrected). ROV performed final triangulation with reflector buoys to check well position (good).	P
15-04-2002	20:15	00:00	3.75	0	Spudded in well 1/5-4S with no rotary, minimal weight and 630 lpm (no pressure), increasing flow to 1000 lpm / 7 bars, 0 -2 MT WOB, introducing rotary at 30 RPM. Staged up parameters to 3000 lpm / 80 bar, 60 RPM / 1½ klbs torq, 0 - 2 MT WOB, by 118 m. Continued drilling 9.7/8" pilot hole to 229 m with seawater and gel sweeps, increasing rotary in stages to 100 RPM. Surveyed every ½ stand over first 4 stands, thereafter every stand. Pumped 3 m3 hivis sweeps every ½ stand. Returns to seabed. ROV observing with sonar from seabed 'garage'. Shallow gas procedures in place.	P
16-04-2002	00:00	16:00	16.00	0	Drilled 9.7/8" pilot hole from 229 to 928m (TD) 1. Returns to seabed with seawater and hivis sweeps (3 m3 pumped every ½ stand). 2. Drilled potential shallow gas anomalies at 365-375m, 430-440m, 818-830m and 860-870 m with 1.1 SG mud. 3 ROV observing with sonar from seabed 'garage' - no unusual signs observed. 4. Drilling parameters: WOB 0-3 MT, 100 RPM, 1-4 klbs.ft torque, 3000 lpm and 110 bar	P
16-04-2002	16:00	17:00	1.00	465	Pumped 5 m3 hivis pill and displaced OOH. Displaced hole with 60 m3 (150% theor) 1.2 SG mud.	P
16-04-2002	17:00	19:15	2.25	928	POOH - no problems, racked BHA in derrick.	P
16-04-2002	19:15	20:00	0.75	928	Switched off MWD (full data download performed later on deck, 'offline'). L/O 9.7/8" stabs, MWD collars and broke off bit (graded 1/1/WT/A/E/I/NO/TD)	P
16-04-2002	20:00	20:30	0.50	928	M/U and racked cement stand (Titus dart loaded above TIW).	P
16-04-2002	20:30	00:00	3.50	928	M/U 36" Hole Opener assy c/w 17½" bit to mud motor and tested same - rotation initiated at 500 lpm. Cont M/U HO BHA, uploaded and tested MWD.	P
17-04-2002	00:00	00:45	0.75	0	Completed M/U 36" Hole Opener BHA.	P
17-04-2002	00:45	01:00	0.25	928	Checked location with ROV. Tagged bottom of seabed crator at 96.8 m.	P
17-04-2002	01:00	11:00	10.00	928	Entered pilot hole without resistance. Drilled ahead with 36" hole opener from 112 to 171 m (36" hole depth 167.5 m). Swept hole with 10 m3 hivis every ½ stand. Notes: 1. Parameters: 4500 lpm / 100 bar, 190 RPM (50 surface + 140 motor) / 5-10 klbs.ft torque, 0-2 MT WOB Last survey: 123.4 m, 0.41 deg, 350.92 Azi 2. Motor stalled at 165 m. Worked back up to 155 m and ran back in - 3 m fill.	P

Date of Operation (used in DCWR)	Starting Time of Operation	Finishing Time of Operation	Time in Hours For Operation	Depth m	Description of Currently Highlighted Operation	Class
17-04-2002	11:00	12:00	1.00	928	Swept hole with 5 m3 hivis. Took check survey. Pumped 17 m3 SW w/4sx mica and chased with 20 m3 hivis, displacing OOH with SW. ROV unable to observe when returned to seabed due to poor visibility.	P
17-04-2002	12:00	12:30	0.50	171	Displaced hole to 1.32 SG (63 m3) due to boulder / hole fill.	P
17-04-2002	12:30	13:00	0.50	168	Performed wiper trip to 100 m - 0.5 m fill observed on returning to bottom.	P
17-04-2002	13:00	14:30	1.50	168	POOH (no hole problems), racking 36" HO BHA in derrick. 36" stab and HO balled up. Downloaded MWD data.	P
17-04-2002	14:30	15:15	0.75	168	R/U to run 30" Conductor.	P
17-04-2002	15:15	15:30	0.25	168	Held pre job Safety Meeting.	P
17-04-2002	15:30	17:30	2.00	168	While skidding guide frame / carrier to centre of moonpool, P/U 30" conductor shoe jt and tested float (OK). Cont RIHwith 30" conductor (total 6 jts inc shoe).	P
17-04-2002	17:30	18:00	0.50	168	CO 30" elevators for 5½" Bx type.	P
17-04-2002	18:00	18:15	0.25	168	Held pre job Safety Meeting for oncoming crews.	P
17-04-2002	18:15	20:30	2.25	168	M/U 30" RT w/5 LH turns. Ran in and landed conductor in PGB on carrier, latching same. Released CART and recovered to rig floor, racking back. M/U 3½" DP cement stinger, M/U to CART and ran down to engage CART in conductor / PGB assy. M/U Titus hose to top and btm, securing to conductor with 'bandits'. Removed safety chains from PGB and carrier.	P
17-04-2002	20:30	21:15	0.75	168	P/U conductor / PGB assy and removed carrier from beneath. Lowered conductor / PGB and installed guide wires / latches on guide posts. Ran conductor / PGB to seabed, entering 36" hole with ROV sonar assistance. Lowered PGB to sea level while filling conductor with rig pumps, observing flow through opened v/vs on top CART. Closed v/vs and continued pumping 200 stks to verify no leakage (OK). Checked bullseyes (0-½ deg to port, ½-1 deg fwd)	P
17-04-2002	21:15	21:45	0.50	168	RIH w/ 30" conductor on 5½" DP. Took weight at 123 m. P/U and ran back, attempting to work in with 10 - 15 T (20 max) set down - no go.	P
17-04-2002	21:45	22:30	0.75	168	M/U DDM and washed conductor down to 160 m with 1500 - 2000 lpm / 5 - 10 bar (pipe appeared to be 'free' from 137 m).	P
17-04-2002	22:30	23:00	0.50	168	M/U cement stand and RIH to conductor setting depth at 166 m (tide corrected). ROV checked PGB heading - 140 deg. Attempted to check bullseyes without success due to poor visibility.	P
17-04-2002	23:00	23:30	0.50	168	Untangled ROV umbilical from guide wires. 'Sea Owl' ROV suffered black out due to melted resistor.	S
17-04-2002	23:30	00:00	0.50	168	Launched Magnum ROV. Still unable to determine bullseye readings due to v. poor visibility.	S
18-04-2002	00:00	01:00	1.00	0	Waited for seabed visibility to clear. Checked PGB bullseyes with ROV - ½ and 3/4 deg. Meanwhile held TBT prior to 30" cement job.	P
18-04-2002	01:00	01:15	0.25	168	Cement unit tested surface lines to 150 bar / 5 mins.	P
18-04-2002	01:15	01:30	0.25	168	Pumped 20 m3 SW spacer with rig pumps via cement hose. Put 50 bar pressure above TIW on top cement stand, above side entry (Titus dart above TIW).	P
18-04-2002	01:30	03:30	2.00	168	Halliburton mixed and pumped 62 m3 1.95 SG Neat 'G' tail cement (83 MT) at 800 lpm / 45 bar. ROV on PGB monitoring returns. Displaced cement with 17 m3 SW to spot cement at 161 m (5m shoe track). Checked floats (OK).	P
18-04-2002	03:30	04:00	0.50	168	Opened TIW to drop Titus dart. ROV went to open ball v/v on top CART, in prep for shearing dart, and discovered one already open. Reran ROV video to check and confirmed v/v open for entire cement job.	P
18-04-2002	04:00	06:00	2.00	168	B/O and racked back cement stand. POOH with 30" conductor and PGB without problem (initial 50T drag, otherwise no resistance). Set down PGB on moonpool carrier - cement debris observed on PGB. Released / recovered CART and commenced recovery of Titus dart.	O

Date of Operation (used in DCWR)	Starting Time of Operation	Finishing Time of Operation	Time in Hours For Operation	Depth m	Description of Currently Highlighted Operation	Class
18-04-2002	06:00	16:30	10.50	168	Attempt to clean out 30" conductor without success. Solid cement tagged 6m inside shoe. Laid out cement filled 30" shoe and 2 joints 30". Piicked up backup shoe and spare joints. Re run conductor and hung off PGB on moonpool carrier.	O
18-04-2002	16:30	19:00	2.50	168	Pick up and RIH to 90m with 17 1/2" bit & 36" HO.	O
18-04-2002	19:00	20:00	1.00	168	Held general safety meeting to discuss recent incidents in NCS.	O
18-04-2002	20:00	00:00	4.00	168	Washed in hole from 90m to 125m, flow rate 600 lpm, 50 rpm with no resistance. Washed in hole from 125m to 128m, flow rate to 3000 lpm. Took weight at 128m, 0 - 2 MT. Washed in hole 128 m to 151m, flow rate 3800 lpm, 50 rpm. WOB 2 - 4 MT.	O
19-04-2002	00:00	04:00	4.00	0	Washed in hole from 151 to 171m (TD), flow rate 4500 lpm, 50 rpm, WOB 5 - 6 MT. Pumped 10m3 sweep @ 159m.	O
19-04-2002	04:00	06:00	2.00	168	Pumped 20 m3 sweep then displace hole to 60m3 1.32 Sg Mud. POOH to 131 m, (15MT O/P at 140m), RIH to TD, no resistance. No fill observed. POOH to 51m, (no O/P observed), download MWD data.	O
19-04-2002	06:00	06:30	0.50	168	POOH BHA & rack back. Clear rig floor.	O
19-04-2002	06:30	07:00	0.50	168	PU cement stand & drifted kelly cock to 2 7/8". Installed new titus dart and racked back.	O
19-04-2002	07:00	07:45	0.75	168	PU 3 1/2" DP stinger. RIH & made up to CART. MU CART to wellhead. Open CART valve. MU Titus hose.	O
19-04-2002	07:45	08:30	0.75	168	Burned off welded wellhead suport beams on trolly and removed carrier. Run PGB to seabed & entered 36" hole. Filled casing with sea water, closed valve.	O
19-04-2002	08:30	09:00	0.50	168	RIH 30" casing to 122m before taking weight.	O
19-04-2002	09:00	10:30	1.50	168	Washed down casing (3000lpm) from 122m to 162m. made up cement stand and washed in hole to 167.5m.	O
19-04-2002	10:30	11:45	1.25	168	Checked bullseyes whilst pressure testing surface lines. Starboard Bullseye 0.5 Deg Port Aft. Aft Bullseye 0.5 Deg Port Forward.	O
19-04-2002	11:45	12:00	0.25	168	Held pre cement job meeting.	O
19-04-2002	12:00	14:00	2.00	168	Circulated 45m3 SW @1500 lpm, 30 bar. Held 50 bar above TIW. Pumped 62m3 of 1.95Sg G slurry, (82MT Cement). Pumped cement at 0.8m3/min. Displaced with 17m3 SW to spot cement at 161m.	O
19-04-2002	14:00	15:15	1.25	168	Checked for backflow, float holding. Opened TIW and allowed Titus dart to fall. Pumped 40 strokes, observed dart shear at 97 bar. Continued to circulate 600 stks @ 800 lpm. ROV opened valve on CART.	O
19-04-2002	15:15	16:30	1.25	168	Pumped 4000 stks @ 960lpm, 15 bar whilst waiting on cement to gain compressive strength.	O
19-04-2002	16:30	17:30	1.00	168	Closed upper TIW & held 40 bar above. Commenced pumping 10m3 (13.3MT), 1.95Sg G cement through Titus Top up cementing system @ 0.8m3/min.	O
19-04-2002	17:30	19:30	2.00	168	WOC (ROV released Titus Hose and attempted to flush PGB clean.)	P
19-04-2002	19:30	21:00	1.50	168	POOH CART to surface & lay out. ('D' handle missing from PGB).	P
19-04-2002	21:00	21:15	0.25	168	Change out BX elevator hydraulic hoses.	P
19-04-2002	21:15	23:00	1.75	168	L/D 30" running tool. Rack back 3 1/2" cement stinger.	P
19-04-2002	23:00	00:00	1.00	168	PU 20" cement stand and drift to 2 15/16" below kelly cock. Drift cement stand with dart.	P
20-04-2002	00:00	00:45	0.75	0	Installed dart in cement stand & racked back.	P
20-04-2002	00:45	03:15	2.50	168	LD 36" BHA & MU 26" stab.	P
20-04-2002	03:15	03:30	0.25	168	Cleared rig floor.	P
20-04-2002	03:30	06:00	2.50	168	MU 26" bit. Test & download MWD data. Continue MU 26" BHA & RIH to 77m.	P
20-04-2002	06:00	07:00	1.00	168	Changed out BX elevator for periodic maintenance.	P
20-04-2002	07:00	11:00	4.00	77	Precautionary washed down (2800 lpm, 41 bar) - tagged hard cement @ 163m. Drilled out shoetrack then 26" hole from 163m to 184m - pulled BHA thru shoe to check clean. Params : 2900 lpm, 40 rpm, 5 kftlbs, WOB 8-10 T. Pumped 10m3 hivis sweeps every half stand.	P

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20-04-2002	11:00	00:00	13.00	400	Drilled 26" hole from 184m to 532m. Params : 3000-5000 lpm, 50 rpm,2-15kftlbs, WOB 0-5T. Pumped 10m3 hivis sweeps every half stand.	P
21-04-2002	00:00	14:00	14.00	928	Drilled 26" hole from 532m to 928m. Params : 5000lpm, 168Bar,120rpm, 6kftlbs, WOB 0-3T Pumped 10m3 hivis sweeps every half stand.	P
21-04-2002	14:00	15:15	1.25	928	Pump 15m3 sweep. Take survey and pump pressure parameters. Params: Flow rates 3000/3500/4000 lpm Pump pressures : 66 / 84 / 108 bar	P
21-04-2002	15:15	17:30	2.25	928	Racked back drilling stand. POOH for wiper trip to 164m (shoe). - 10T o/pull 234m to 230m, wiped clean.	P
21-04-2002	17:30	19:00	1.50	928	RIH from 164m to 903m - no OH problem, setdown 20Tat 903m.	P
21-04-2002	19:00	19:45	0.75	928	Washed down from 909 to 928m (TD). 903-909m : 3000 lpm, 50 rpm, 0T WOB 909-918m : 3000 lpm, 50 rpm, 25T WOB max. 918-928m : no drag / fill, 3000 lpm, 50 rpm, OT WOB.	P
21-04-2002	19:45	21:15	1.50	928	Pumped 14m3 hivis pill & circ 1/2 BU. Displaced 26" OH to 1.20Sg mud (274m3). Meanwhile commence rig up 20" remote power tong.	P
21-04-2002	21:15	00:00	2.75	928	POOH from 928m to 91m - no OH problems.	P
22-04-2002	00:00	00:15	0.25	928	Jet PGB / 30" housing @ 4300 lpm.	P
22-04-2002	00:15	02:00	1.75	928	POOH from 91m to surface. Rack back BHA in derrick. Note : low / no visibility with ROV, cannot confirm bullseyes.	P
22-04-2002	02:00	04:30	2.50	928	Clear rig floor. Rig up 20" csg handling equipt : 20" remote power tong, auto slips, lafluer circ tool.	P
22-04-2002	04:30	04:45	0.25	928	Held pre job safety meeting.	P
22-04-2002	04:45	05:15	0.50	928	Commenced PU 20" shoe joint - observed elevator ID too big. Laid down shoe joint. Measured ID of elevators = 21 1/8". Laid out 350T elevators. PU 250T elevators (20 1/8" ID).	S
22-04-2002	05:15	05:30	0.25	928	Pick up shoe joint. Unable to set power slips. Changed to manual slips.	S
22-04-2002	05:30	06:00	0.50	928	Test La Fleur. Lafleur jammed onto Elevators. RU winches to free same.	O
22-04-2002	06:00	07:00	1.00	928	PU Intermediate shoe joint & bakerlock to shoe. Installed centralisers and guide ropes in cellar deck.	P
22-04-2002	07:00	07:15	0.25	928	Help pre job safety meeting due to shift change.	P
22-04-2002	07:15	13:15	6.00	928	Ran shoetrack and 20 jts 20" casing to 260m. Notes: 1. Drift 3 stands 5 1/2" DP for landing string. 2. Adjust link-tilt assembly. 3. Test Lafleur at shoe (166.85m) prior to open hole.	P
22-04-2002	13:15	13:30	0.25	928	OWS electric power unit shutdown. False H2S alarm. Rig up power tong to rig hydraulic system.	O
22-04-2002	13:30	16:45	3.25	928	Continued run 20" casing to 809m. Notes: 1. Csg summary (131ppft, X56, E60MT) :shoe jt, int jt, float jt, 65jts csg. 2. MU to 20kftlbs, install anti-rot key every jt. 3. LO 1 jt - stuck protector. 4. Hole in good condition.	P
22-04-2002	16:45	17:45	1.00	928	L/D Lafleur & pick up hanger XO. Set casing in slips and changed to BX elevators.	P
22-04-2002	17:45	18:45	1.00	928	Pick up 18 3/4" WH hanger assy. Run 5 1/2" DP landing string. Landout WH hanger. (20T O/pull test). Setdown all 20" csg wt. Note : 1. low / no visibility with ROV, cannot confirm bullseyes. 2. Unable to observe hanger land.	P
22-04-2002	18:45	20:00	1.25	928	Check line and pump 20m3 SW to attempt to confirm returns with ROV (Zero Visibility). Pressure test line to 300 bar for 5 mins (good test after 3rd attempt).	P
22-04-2002	20:00	23:15	3.25	928	Completed cement job on 20" casing. Pump Schedule: 200m3 lead cmt. 1.50 Sg@1.4 m3/min, 70bar, 137T G cmt 20m3 tail cmt. 1.92 Sg@ 0.8 m3/m, 30bar, 27T G cmt	P
22-04-2002	23:15	00:00	0.75	928	Released dart, pumped total 1.9m3 SW. (observed top plug release @ 205bar & 1.5m3 pumped.) Commenced cement displacement w/ rig pumps	P
23-04-2002	00:00	00:15	0.25	0	Completed dislpacement of cement with rig pumps - bumped plug at 29 bar, (98.4%). Confirmed to 64 bar x 4 mins. Note: Cement in place @ 00:15 hrs, Apr 22.	P

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23-04-2002	00:15	00:45	0.50	928	Confirmed floats holding. Open CART tool valve. Rigged down cement line. PU 2T O/P, apply 5 turns RH rotation to disconnect CART from 18 3/4" WH & P/U 5m. (Plug launcher clear of wellhead.)	P
23-04-2002	00:45	01:00	0.25	928	Jetted PGB @ 4700 lpm.	P
23-04-2002	01:00	02:00	1.00	928	POOH CART & make service breaks. Note:Confirm, 18 3/4" WH 91.16m from RKB (MSL).	P
23-04-2002	02:00	03:00	1.00	928	L/D long bails & P/U 500T short bails. Adjust BX elevator for 500T bails.	P
23-04-2002	03:00	05:30	2.50	928	L/D 26" BHA, motor & MWD. Meanwhile, moved rig 20m forward.	P
23-04-2002	05:30	06:00	0.50	928	Build 5" landing stand for BOP.	P
23-04-2002	06:00	08:00	2.00	928	Cleared rig floor. Prepared to run BOP. Greased & inspected top drive, found 12mm loose bolt.	P
23-04-2002	08:00	11:30	3.50	928	MU riser double with floatation. Prepared then skidded BOP to well centre & MU same.	P
23-04-2002	11:30	15:45	4.25	928	PU BOP, retract carrier lower BOP into water (11:50hr). Ran additional riser joint (slick) and 15ft pup. RU and p/test C&K lines 20/465 bar. MU slip joint & 5" landing stand. MU riser support ring.	P
23-04-2002	15:45	18:00	2.25	928	Prepare then landout BOP onto WH (17:15hrs). Lock and o/pull test (25T) WH connector. Open slip joint.	P
23-04-2002	18:00	20:45	2.75	928	PU & install diverter. Take 5T O/pull test. Connect diverter hydraulics. l/d riser spider & BOP bails. Pressure test connector through C&K lines against shear rams to 130 bar/ 10mins. Note: completed 130 bar p/test on 20" casing x BOP connection x shear rams.	P
23-04-2002	20:45	21:30	0.75	928	Changed die in Top Drive torque wrench.	P
23-04-2002	21:30	23:15	1.75	928	Installed test sub in TD & P/test upper & lower kelly cock to 20 / 345bar.	P
23-04-2002	23:15	00:00	0.75	928	RU bails and BX elevators. Commence MU cement stand.	P
24-04-2002	00:00	01:30	1.50	0	Broke out old cement stand, drifted to 3 1/4". MU Halliburton cmt head for 14" csg w/ dart and ball loaded.	P
24-04-2002	01:30	03:00	1.50	928	MU emergency DP hang off tool.	P
24-04-2002	03:00	04:15	1.25	928	MU 14" hanger to DP double & rack back (drifted to 3 1/4"). Removed lock ring.	P
24-04-2002	04:15	06:00	1.75	928	PU 17 1/2" BHA, MU stabs, MWD, Motor & bit.	P
24-04-2002	06:00	08:30	2.50	928	Scribe motor, download MWD, & RIH to 279m.	P
24-04-2002	08:30	10:30	2.00	928	PU 30jts 5 1/2" DP & RIH f/ 279m to 569m.	P
24-04-2002	10:30	10:45	0.25	928	Installed diverter element & tested same.	P
24-04-2002	10:45	12:00	1.25	928	Function tested BOP f/ drillers panel (yellow pod), toolpushers panel (blue pod)	P
24-04-2002	12:00	12:15	0.25	928	RIH f/ 569m to 652m.	P
24-04-2002	12:15	12:45	0.50	928	Attempt to start top drive. (Low purge pressure).	R
24-04-2002	12:45	13:30	0.75	928	RIH f/ 652m to 859m.	P
24-04-2002	13:30	14:30	1.00	928	MU topdrive, & performed diverter drill. Flushed diverter lines overborad w/ SW. Close UAP & held kick drill. Opened UAP.	P
24-04-2002	14:30	16:45	2.25	928	Washed down f/ 859m. Tagged TOC @ 896m. (top of float 899m). Drilled shoe track to 920m. Pump 6m3 sweep every 1/2 stand.	P
24-04-2002	16:45	17:00	0.25	928	Commenced displacing well and C&K lines to 1.55Sg mud.	P
24-04-2002	17:00	18:45	1.75	928	Cont. drill shoetrack & displacing well to 1.55Sg mud. Drilled shoetrack from 920m to 928m. Drilled new formation from 928m to 931m.	P
24-04-2002	18:45	20:30	1.75	928	Circulated well clean until mud weight 1.55Sg in/out prior to LOT.	P
24-04-2002	20:30	21:30	1.00	928	Pull back into shoe, rack back stand. Closed UAP and lined up to pump down DP and kill line. Performed line test to 50 bar. Attempted to perform 20" csg LOT, results inconclusive, erratic pump rate & pressures. Bled off pressure from 20bar (no leak off observed).	O

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24-04-2002	21:30	00:00	2.50	928	Repeated LOT. Pressured up well in stages down DP and Kill line w/ 1.55Sg mud. Whilst increasing pressure, @ 42bar sudden drop in pressure. Investigate possible leak path - negative, reconfirmed line up, re-confirmed surface line pressure test to 50 bar. Repeated LOT to reconfirmed data. LOT = 1.91 Sg (33 bar, pumped 440 L , 160 L bled back.)	P
25-04-2002	00:00	02:30	2.50	0	Drilled 17 1/2" hole from 931m to 974m. Params: 5 - 10T, 7kftlbs Tq,55rpm, 3700lpm, 175 bar, 20-40m/hr.	P
25-04-2002	02:30	02:40	0.17	974	0.5m3 increase in active volume. Flow check - negative.	P
25-04-2002	02:40	06:00	3.33	974	Drilled 17 1/2" hole from 974m to 1033m. Params: 5 - 15T, 5kftlbs Tq, 55rpm, 4500lpm, 185 bar, 20-40m/hr.	P
25-04-2002	06:00	14:30	8.50	1,033	Drilled 17 1/2" hole from 1033m to 1200m. Params: 8 - 10T, 5-8 kftlbs Tq, 100rpm, 4500lpm, 230 bar, 20m/hr.	P
25-04-2002	14:30	18:00	3.50	1,151	Commenced KO @ 1200m md. Drilled & orientated hole to 1240m. Params: 8 T, 3250 lpm, 145 bar, 11 m/hr.	P
25-04-2002	18:00	00:00	6.00	1,240	Drilled 17 1/2" hole from 1240 m to 1346 m. Sliding as required. Built inclination to 8 deg, 256deg Az. Params: 5 - 15T, 5kftlbs Tq, 55rpm, 4500lpm, 185 bar, 20-40m/hr.	P
26-04-2002	00:00	06:00	6.00	0	Drill & orient (slide:rotate 60:40) 17 1/2" hole from 1346m to 1485 m. Sliding as required. Inclination 10 deg, 253 deg Azimuth. Params rotary: 10T, 6 kftlbs Tq, 55rpm, 4500lpm, 185 bar, 30-40m/hr. Params sliding: 15-20T 4000lpm, 175 bar, 30 - 40m/hr.	P
26-04-2002	06:00	12:00	6.00	1,485	Drilled & orient (slide:rotate 60:40) 17 1/2" hole from 1485 m to 1586 m. Built inclination to 20 deg, 223deg Az. Flow checked @ 1515, due to gain at 1560m - negative. Params: 10T, 6kftlbs Tq, 60rpm, 4100lpm, 185 bar, 17m/hr.	P
26-04-2002	12:00	14:30	2.50	1,586	Drill & orient (60/40) 17 1/2" hole from 1586 m to 1646 m. Params: 10T, 5 - 10kftlbs Tq, 100 rpm, 4100 lpm, 185 bar, 24 m/hr.	P
26-04-2002	14:30	18:15	3.75	1,646	Cirulated hole clean @ 4200 lpm, 230 bar, 100 rpm. Dropped carbide pill - hole ID = 17.47". Circulated 3 bottoms up - shakers improving.	P
26-04-2002	18:15	19:15	1.00	1,485	Pump 8m3 1.16 Sg pill, followed by 8m3 1.96 Sg sweep. Params: 4000lpm, 245bar, 100 rpm.	P
26-04-2002	19:15	21:00	1.75	1,646	Lost returns when pill entered casing. Bottom of pill at 750m (183m inside casing). Final PWD recorded = 1.96 SG. Flow checked well due to lost returns - well static. Restablished circulation, max flow 100 lpm without losses. Continued to work pipe whilst attempting to improve circulation.	H
26-04-2002	21:00	22:45	1.75	1,485	Flow checked well. Indications of well flowing. Shut in well on UAP. Monitored pressure build up. (DP = 10 bar, Choke 8 Bar). Suspected balloning shales Bled off pressure (300 L returned) Shut in, observed pressure build up, decreasing trend established. Time DP Choke 1 min 5 1 10 min 9 7 Bled off pressure, (330 L returned). Shut in, observed pressure build up, decreasing trend established. Time DP Choke 1 min 5 0 10 min 6 4 Moved pipe every 15m to maintain free pipe. Flow check well through open choke, flow check well for 20 mins. 400L returned in decreasing trend until well static.	H
26-04-2002	22:45	23:15	0.50	1,646	Open UAP & FC well for 30 mins. Well static.	H
26-04-2002	23:15	00:00	0.75	1,646	POOH 1 stand 15T o/p @ 1610m. Erratic torque 3 - 15kftlbs. Params 50 rpm, Max Tq 22kftlbs, 95 lpm, 5 bar SPP. Work string from 1615m to 1585m & attempt to circulate due to tight hole & high torque.	P
27-04-2002	00:00	01:00	1.00	0	Worked string from 1615m to 1585m & attempted to improve circulation due to tight hole & high torque. No loss flow rate = 100lpm.	P
27-04-2002	01:00	03:00	2.00	0	Continued to work string from 1615m to 1585m. Increased flow rate gradually from 100 lpm to 1900 lpm before losses occured. (Pill to surface @ 2:30am, Pill weight 1.62 - 1.74Sg).	P

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27-04-2002	03:00	07:00	4.00	1,646	Commenced pumping out from 1585 to 1370m. Wiped each stand clean prior to racking back stand. Params: 5 - 20 kftlbs tq, flow rate max 1200 lpm (no loss rate), 0 - 15 T O/P, rpm 45.	P
27-04-2002	07:00	08:30	1.50	1,370	Pumped 8m3 LCM Pill (No.1) @ 800lpm. Increased flow rate to 3800lpm in stages.	P
27-04-2002	08:30	11:00	2.50	1,646	Cont'd Pump OOH from 1370 to 1092m. LCM pill returned to surface - large volumes of gumbo returned. Params: 3500 lpm, 190 bar.	P
27-04-2002	11:00	11:30	0.50	1,646	Pumped 6m3 LCM pill (No.2).	P
27-04-2002	11:30	13:00	1.50	1,646	Cont Pump OOH from 1092m to 918m. No increase in ECD during circulation. ECD = 1.56Sg.	P
27-04-2002	13:00	16:00	3.00	1,646	Circulated casing clean @ 3000 lpm, (bit inside shoe). Losses occured over shakers due to large volumes of fines. Increased flow rate to 4600 lpm as shakers cleaned up.	P
27-04-2002	16:00	16:30	0.50	1,646	Flow checked well - well static. Pumped slug.	P
27-04-2002	16:30	17:30	1.00	1,646	POOH from 918m to 365m.	P
27-04-2002	17:30	22:00	4.50	1,646	Flow check w/ BHA below BOP - well static. POOH w/3 std & BHA. Download MWD data. Rack back Bit / motor assy.	P
27-04-2002	22:00	00:00	2.00	1,646	Cleared rig floor, changed BX elevators to 5" manual elevators. Held safety meeting. Rig up & run WL toolstring.	P
28-04-2002	00:00	01:30	1.50	0	Zero tool string & installed source. Commenced RIH @ 00:30. Unable to run below 374m. Hole sticky, 2500 lbs O/P when PU from 374m. 5 attempts to pass restriction - no go.	P
28-04-2002	01:30	03:00	1.50	1,646	POOH, rigged down WL tool string & cable. Note: Cable head & bottom WL tool string stabiliser covered in clay.	H
28-04-2002	03:00	06:00	3.00	1,646	Cleared rig floor. Broke out bit, L/D motor and 16 3/4" stab. PU 17 1/4" stab, 17 1/2" bit & commenced RIH with clean out string. Note: Whilst L/O motor, 16 3/4" stabilser RIH to 50m inside riser. Stab returned balled up.	P
28-04-2002	06:00	06:30	0.50	1,646	Download MWD tools.	H
28-04-2002	06:30	10:00	3.50	1,646	Cont. MU 17 1/2" BHA & RIH to 360m. Washed and worked string f/ 360 - 380 m, cleared restriction @374m (no drag or weight taken). Pumped 4m3 hivis pill (No.1) & circ BU at 3200lpm. No significant cuttings returned.	H
28-04-2002	10:00	13:00	3.00	1,646	Cont. RIH f/ 380m to 907m (bit inside shoe). Circ BU, pump 4m3 hivis pill (No.2) @ 3000 lpm & cont. circulate. No significant volumes of cuttings returned when pill returned or during circulation.	H
28-04-2002	13:00	14:30	1.50	1,646	Washed down f/ 907m to 1616m. 15T setdown observed @1616m. MU TD & washed thu restriction.	H
28-04-2002	14:30	15:00	0.50	1,646	Washed down f/ 1616m to 1646m (TD). No fill observed.	H
28-04-2002	15:00	17:00	2.00	1,646	Pumped 6m3 LCM hole cleaning pill (No.3), circulated hole clean. Increased cuttings observed from 1616m(TD) on BU, and on pill BU. Params: 4250 lpm, 231 bar, 120 rpm. Note: LCM pills pumped as hole cleaning pills.	H
28-04-2002	17:00	19:30	2.50	1,646	Pumped 5m3 hivis pill (No.4) and circulated hole clean. No significant cuttings returned in pill. Circulated until shakers clean. Dropped carbide pill, hole ID = 20.2".	H
28-04-2002	19:30	21:00	1.50	1,646	Flow checked well 10 mins - well static. Pulled 10 stands wet. Hole taking correct fluid. No drag.	H
28-04-2002	21:00	00:00	3.00	1,646	Pumped slug & POOH to 903m (bit inside shoe). No drag observed on trip out. Pumped 4m3 LCM hole cleaning pill (No.5) and circulated BU. No significant increase in cuttings when pill returned.	H
29-04-2002	00:00	01:15	1.25	0	POOH f/ 903m to 375m. Flow checked - well static.	H
29-04-2002	01:15	03:30	2.25	1,646	POOH BHA f/ 375m to surface & racked back BHA. Note: Upper and lower stab's balled up.	H
29-04-2002	03:30	05:00	1.50	1,646	Cleared rig floor & MU & bore protector pulling/jetting tool.	P
29-04-2002	05:00	06:30	1.50	1,646	RIH, jetted riser, BOP & Wellhead. Params: 2800 lpm, 12 bar boost riser @ 1400 lpm, 44 bar. Note: Increased cuttings returned at shakers.	P

Date of Operation (used in DCWR)	Starting Time of Operation	Finishing Time of Operation	Time in Hours For Operation	Depth m	Description of Currently Highlighted Operation	Class
29-04-2002	06:30	09:00	2.50	1,646	Landed Bore Protector running tool in WH. Set down 3T. Record steel line measurement. Recovered Bore Protector (10T O/P). Jetted WH / BOP / Riser on way out of hole. L/O Bore Prot & running tool (No visible wear).	P
29-04-2002	09:00	09:30	0.50	1,646	Cleared rig floor.	P
29-04-2002	09:30	12:00	2.50	1,646	Rig up to run 14" casing.	P
29-04-2002	12:00	12:45	0.75	1,646	Held pre job safety meeting.	P
29-04-2002	12:45	00:00	11.25	1,646	P/U shoe, checked float valves. Function tested Lafleur. P/U intermediate joint & float joint. Installed centralisers as per tally. (BakerLok 1st 4 joints). Ran casing to 825m. Note : Cum. total mud lost running casing = 3.5m3 Ave running speed - 5.5jts/hr No jts run 60jts, + shoe, int jt & Float jt	P
30-04-2002	00:00	06:00	6.00	0	Cont. run 14" casing from 825m to 1325m. Filled casing every 5 joints. Recorded up/down wts every 5jts. Params: 500 lpm SPP = 10 bar 1000 lpm SPP = 12 bar 1500 lpm SPP = 15 bar Up / Down weights (@ shoe) 134 T / 132 T Note : Cum. total mud lost running casing = 5.5m3 Ave running speed - 6 jts/hr No jts run = 37 jts Lafleur "lockring" leaking - tightened screw. Reduced leak to drip at 15 bar pressure.	P
30-04-2002	06:00	09:00	3.00	1,646	Cont RIH 14" casing f/ 1325m to 1639m. Recorded up / down weights every 5jts. Note: Up / down weights (@TD) 210T / 180T	P
30-04-2002	09:00	09:15	0.25	1,646	Changed to 5 1/2" DP equipment.	P
30-04-2002	09:15	09:45	0.50	1,646	Installed 14" hanger & removed FMS. Broke circulation.	P
30-04-2002	09:45	11:45	2.00	1,646	RIH & landed hanger (@11:00 hrs). MU cement head hoses & cement hose.	P
30-04-2002	11:45	12:15	0.50	1,646	Circulated and recorded circ pressures. Params:900lpm - 33bar, 1230lpm - 50 bar, 1580lpm - 71 bar	P
30-04-2002	12:15	13:00	0.75	1,646	Flushed lines with spacer. Tested surface lines to 250 bar - good test. Pumped 15m3 spacer & dropped ball.	P
30-04-2002	13:00	14:00	1.00	1,646	Completed 14" cement job Lead 25m3, 1.6Sg @ 1200lpm, 67 bar - no losses. Tail 15m3, 1.92 Sg @ 1100 lpm, 63 bar - no losses. Total cement 44 MT	P
30-04-2002	14:00	14:15	0.25	1,646	Released top dart & sheared top plug w/ cement unit.	P
30-04-2002	14:15	15:15	1.00	1,646	Displaced cement @2.5m3/min, 112 bar. Bumped plug (97.5%) with 35bar over circ pressure / 5mins. (Cement in place 15:15.)	P
30-04-2002	15:15	15:45	0.50	1,646	Checked floats - holding. 700l bled back.	P
30-04-2002	15:45	16:30	0.75	1,646	Disconnected cmt hoses, set down weight. Marked index line, released RT w/ 5 1/2 RH turns. Confirmed pipe drop 10" to set seal assembly.	P
30-04-2002	16:30	17:00	0.50	1,646	Pressured up against upper pipe rams to 172 bar. Set seal & packoff. Bled off pressure. Tested to 35 / 260 bar 5/10 mins - good test.	P
30-04-2002	17:00	17:30	0.50	1,646	Opened UPR & sheared RT off seal assembly (17T O/P). Flushed WH 1500 lpm 5 min. Set down again, closed UPR & pressure tested to 260 bar/5 mins - good test.	P
30-04-2002	17:30	19:15	1.75	1,646	POOH landing string. L/O & cleaned landing string.	P
30-04-2002	19:15	20:15	1.00	1,646	Rigged down 20' bails. Rigged up drilling bails & BX elevator.	P
30-04-2002	20:15	20:45	0.50	1,646	Cleared rig floor, serviced TD & checked for loose items.	P
30-04-2002	20:45	22:30	1.75	1,646	MU / run wearbushing. Landed & set down 5T. Sheared wearbushing running tool w/ 9T O/P. POOH & L/D Wearbushing running tool.	P
30-04-2002	22:30	00:00	1.50	1,646	RIH 2 stand 5 1/2" HWDP & MU BOP test tool.	P
01-05-2002	00:00	01:30	1.50	0	RIH BOP test tool & landed in WH.	P
01-05-2002	01:30	03:30	2.00	1,646	Pressure tested (f/ Blue Pod) UAP, LAP, inner & outer failsafes, MPR & UPR, inner & outer choke line valves and rig floor kill line valve to 35 / 260 bar for 5/10 mins. Function tested LPR. All tests good. Meanwhile cleared rig floor. Rigged down casing tong. Replaced hydraulic hose on BX elevators.	P
01-05-2002	03:30	04:15	0.75	1,646	Function tested valves on BOP from tool pushers panel and Yellow POD.	P

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01-05-2002	04:15	05:15	1.00	1,646	POOH with BOP test too l& LD same.	P
01-05-2002	05:15	09:00	3.75	1,646	Commenced L/D 17 1/2" BHA.PU 17 1/2" BHA from derrick / LD. Downloaded MWD data. LD rest of 17 1/2" BHA.	P
01-05-2002	09:00	10:15	1.25	1,646	MU 9 5/8" cement head & load dart & ball..	P
01-05-2002	10:15	10:45	0.50	1,646	Pressure tested 14" casing against shear rams to 260 bar - good test. Vol pumped 1300 L & returned 1300 L	P
01-05-2002	10:45	12:45	2.00	1,646	PU 12 1/4" BHA f/ deck.	P
01-05-2002	12:45	13:30	0.75	1,646	Loaded & tested MWD.	P
01-05-2002	13:30	14:00	0.50	1,646	Changed out cable due to communication problems.	S
01-05-2002	14:00	14:30	0.50	1,646	Completed testing of MWD.	P
01-05-2002	14:30	16:15	1.75	1,646	Cont. PU 12 1/4" BHA f/ deck.	P
01-05-2002	16:15	16:30	0.25	1,646	PU 5 1/2" DP f/ deck & RIH from 215m to 245m	P
01-05-2002	16:30	17:00	0.50	1,646	Shallow tested MWD & motor @ 2500 lpm & 10 rpm. Test OK.	P
01-05-2002	17:00	00:00	7.00	1,646	PU 5 1/2" DP f/ deck & RIH from 245m to 1213m.	P
02-05-2002	00:00	01:00	1.00	0	Re-adjusted kelly hose on topdrive. Hose twisted slightly since fitting MWD pressure detection sensor on top of goose neck.	P
02-05-2002	01:00	04:00	3.00	1,646	PU 5 1/2" DP f/ deck & RIH from 1213m to 1375m. RIH (DP f/ derrick) from 1375m to 1582m.	P
02-05-2002	04:00	05:00	1.00	1,646	Slip & Cut 100ft drilling line & adjusted crown o matic.	P
02-05-2002	05:00	06:00	1.00	1,646	MU drilling stand & broke circulation. Performed choke drill.	P
02-05-2002	06:00	06:30	0.50	1,646	Washed down with 1800 lpm / 73 bar and tagged cement plug at 1612 m	P
02-05-2002	06:30	11:00	4.50	1,646	Drilled plugs and cement from 1612 to 1635 m.	P
02-05-2002	11:00	11:30	0.50	1,646	Circ. 1½ x BU Meanwhile, held pre-job safety meeting prior to displacing well to OBM	P
02-05-2002	11:30	13:30	2.00	1,646	Pumped 15 m3 1.75 SG hivis OBM. Continued to displace well to to 1.75 SG OBM. Displaced kill, choke and booster lines. Meanwhile, continued to drill / wash down from 1635 to 1640 m.	P
02-05-2002	13:30	14:00	0.50	1,646	Performed choke drill	P
02-05-2002	14:00	15:30	1.50	1,646	Continued to drill out shoe track (shoe at 1640 m). Cleaned rathole and drilled 3m new fmtn. from 1646 to 1649 m.	P
02-05-2002	15:30	16:45	1.25	1,649	Circulated clean and conditioned mud prior to LOT.	P
02-05-2002	16:45	18:00	1.25	1,649	Performed LOT to 1.90 SG EMW	P
02-05-2002	18:00	00:00	6.00	1,649	Drilled 12¼" hole from 1649 to 1700 m. WOB 0 - 10 MT, RPM 220, TQ 4-7 daNm, Flow 3650 lpm, SPP 275 bar Note: Initial MPT problems experienced with Geo Pilot tool - resolved after surface troubleshooting and diagnostics performed.	P
03-05-2002	00:00	01:15	1.25	0	Continued drilling on hard limestone stringer at 1700 m. Worked bit - hole suddenly packed off and lost returns when attempting to lift string (able to move down). Slight indication on torque - max 20 klbs.ft 'flicker' at 20 RPM - suggested fallen cement block or unstable hole (NB. potential fracture at 1680 mTVD noted in programme). Shut down pumps and attempted to stage back up to re-establish circulation - observed positive flow show so closed Annular and monitored well. No shut in pressure recorded, so re-opened 'bag' and monitored well on trip tank - well gave back same volume of mud lost during pack off / lost circulation.	H
03-05-2002	01:15	02:30	1.25	1,700	Staged up pumps gradually to full drilling circulation rate. Continued to circ until btms up strokes achieved - cement seen in surface samples and 5% gas peak at btms up. Meanwhile, continued to work string with 50 RPM / 4 klbs.ft torque. Meanwhile, prepared 16 m3 LCM pill at 150 kg/m3 LCM conc. in Pit #6	H
03-05-2002	02:30	03:30	1.00	1,700	Resumed drilling at 1700 m - progress v difficult on hard limestone.	P
03-05-2002	03:30	04:30	1.00	1,700	Packed off and lost circulation once again. Worked string in attempt to free debris without success - continued to pack off and lost returns. Indications of further cement blocks falling into wellbore from shoe.	H

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03-05-2002	04:30	06:00	1.50	1,700	Backreamed to shoe with 50 RPM and 3000 lpm / 190 bar, and racked stand to get above 'obstruction.' Pulled back a further stand into casing. Worked / reamed back down to bottom and cleaned out rathole. Normal circulation established OK. Pulled back to shoe.	H
03-05-2002	06:00	07:45	1.75	1,700	Circulated clean at shoe (evidence of cement blocks again seen at shakers - additionally 'cavings' indicating some degree of wellbore instability). Washed back to bottom.	H
03-05-2002	07:45	08:00	0.25	1,700	Flowchecked slight increase in active - static.	H
03-05-2002	08:00	09:00	1.00	1,700	Resumed drilling from 1700 to 1702 m.	P
03-05-2002	09:00	10:00	1.00	1,702	Lost circulation (4.7 m3 mud lost to hole). Worked string free with 40 MT o/pull. Staged up pumps gradually and re-established circ. back at 3500 lpm.	H
03-05-2002	10:00	00:00	14.00	1,702	Continued drilling 12¼" hole from 1702 to 1971 m, using rotary steerable tool (Geo-pilot) in manual mode. WOB 0-5 MT, 120-150 RPM, 4-10 klbs.ft Torque, 3350 lpm, 235 bar	P
04-05-2002	00:00	00:00	24.00	0	Continued drilling 12¼" hole from 1971 to 2482 m, using rotary steerable tool (Geo-pilot) in manual mode. Tangent section from +/-2168 m. Pumped 4 m3 hole cleaning pill (LCM) - minimal increase in cuttings returns. Periodically boosted riser - again minimal improvement. Generally, hole cleaning appears good, however (no drag etc). WOB 0-5 MT, 120-180 RPM, 5-12 klbs.ft Torque, 3460 lpm, 250 bar	P
05-05-2002	00:00	07:00	7.00	0	Continued drilling 12¼" hole from 2482 to 2584 m, using rotary steerable tool (Geo-pilot) in manual mode. String torqued up at 2523 m - backreamed to 2516 m (max torque 25 klbs.ft). Hard stringer at 2565 m. WOB 0-5 MT, 120-180 RPM, 5-12 klbs.ft Torque, 3460 lpm, 250 bar	P
05-05-2002	07:00	07:30	0.50	2,569	Hole packed off at 2584 m. Picked up 10m and worked pipe free. Reamed back to 2583m - pipe packed off, worked pipe back to 2574 m. Worked pipe free, jarring down. Pick up wt. 115 MT	H
05-05-2002	07:30	07:40	0.17	2,584	Re-established rotation at 140 RPM and 10 klb.ft torque (bit at 2578 m). String free and able to work up and down over 2m distance.	H
05-05-2002	07:40	08:00	0.33	2,584	Attempted to re-establish circulation, but pressured up immediately to 45 bar (6 spm) - bled off slowly to 35 bar. Re-applied 40 bar pressure with 140 rpm rotation, 8 k torque. Pressure bled off slowly. Re-applied pressure to 44 bar. Continued to rotate at 140 RPM / 7 klbs.ft torque - pressure slowly bleeding off. Increased to 45 bar and worked string over 3.4 m. Circulation re-established with 25 spm and 35 bar.	H
05-05-2002	08:00	08:15	0.25	2,584	Staged pumps up slowly to full rate at 3400 lpm (211 spm) and 280 bar, whilst continuing to rotate at 140 RPM and 7k torque. Pick up wt 110 MT.	H
05-05-2002	08:15	09:30	1.25	2,584	Continued circulating at full rate while rotating and reciprocating full stand. Max gas recorded at 16.5% at bottom's up (fracture ? - dirty siltstone observed in cuttings samples).	H
05-05-2002	09:30	10:00	0.50	2,584	Flow checked for 25 mins - static.	H
05-05-2002	10:00	11:30	1.50	2,584	Performed 10 std wiper trip from 2584 to 2305 m. Worked through occasional sticky spots and tight spot at 2521 m (15 MT o/pull). Up / down wts reduced from 120 / 105 MT at start to 112 / 105 MT.	H
05-05-2002	11:30	12:15	0.75	2,584	Ran back in hole from 2305 to 2567 m (held up at 2524 m and worked through).	H
05-05-2002	12:15	13:00	0.75	2,584	Made up DDM and washed / reamed down from 2567 to TD at 2584 m, with 3200 lpm / 260 bar and 150 RPM / 8 klbs.ft torque. Trip gas 2.5 %.	H
05-05-2002	13:00	14:20	1.33	2,584	Pumped 4 m3 LCM pill and displaced to above BHA at 2000 lpm / 110 bar. Increased pump rate to 3200 lpm / 250 bar and swept pill out of hole - no increase in returns. Continued to rotate at 140 RPM / 8 k torque. Max gas recorded = 8.2%.	H
05-05-2002	14:20	16:10	1.83	2,584	Continued to circulate and reciprocated string whilst increasing mud wt from 1.75 to 1.78 SG.	H

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05-05-2002	16:10	16:15	0.08	2,584	Drilled 12¼" hole from 2584 to 2585 m.	P
05-05-2002	16:15	16:55	0.67	2,585	Worked stand while backreaming / reaming due to erratic torques between 2585m and 2573m.	H
05-05-2002	16:55	17:40	0.75	2,585	Continued drilling 12¼" hole from 2585 to 2598 m.	P
05-05-2002	17:40	21:45	4.08	2,598	Backreamed stand once at 2598 m and hole packed off once std back on bottom. Stopped pumps and worked string. Resumed rotation at 170 RPM and 8 - 12 klbs.ft torque. Re-started pumps and increased step-wise to 3200 lpm / 250 bar. Worked stand up and down to clear high torques and drags seen in both directions, esp. between 2595 and 2598 m. Torque reduced to 8-9 klbs.ft.	H
05-05-2002	21:45	22:00	0.25	2,598	Hole drag/torque clear, Broke off top drive and made up single from catwalk.	H
05-05-2002	22:00	00:00	2.00	2,598	Continued to drill a single 12¼" hole from 2598 to 2608 m to get BHA stabs past problem area at bottom of last std drilled.	P
06-05-2002	00:00	02:15	2.25	0	Continued drilling 12¼" hole from 2608m to 2660 m, using rotary steerable tool (Geo-pilot) in manual mode. WOB 0-5 MT, 120-170 RPM, 10-15 klbs.ft Torque, 3250 lpm, 255 bar	P
06-05-2002	02:15	03:30	1.25	2,660	String torqued up and pack-off at 2660 m. Quickly re-established circ. and maintained rotary. Backreamed to 2635 m and continued to work stand with 140 RPM / 7-8 klbs.ft torque. 15% gas recorded at bottom's up.	H
06-05-2002	03:30	04:30	1.00	2,660	String packed off again 5 - 10 m off bottom, and unable to re-gain circulation. Continued to rotate at 125 RPM and 10-15 k torque while working pipe over short distances.	H
06-05-2002	04:30	05:00	0.50	2,660	Re-established circulation at 3200 lpm / 250 bar. Worked full stand with 125 RPM and 7-8 k torque.	H
06-05-2002	05:00	05:30	0.50	2,660	String packed off, again on reaching bottom - able to maintain rotary at 125 RPM and 15-20 k torque. Circulation not possible. Worked pipe to regain same - no go (now +/-5m off bottom).	H
06-05-2002	05:30	06:30	1.00	2,660	String torqued up and became stuck. Worked same, slumping pipe and jarring down, and with torque locked into string. Eventually freed with and regained rotary after 20 mins, at 2657 m (3m off bottom). Established circulation.	H
06-05-2002	06:30	09:00	2.50	2,660	Reamed / backreamed with 3200 lpm / 250 bar, working string between 2650 and 2660 m. Packed off several times, each time working string and jars up to regain rotary and circulation. Attempted to drill ahead on a number of occasions - no go due to packing off each time. Re-established comms to MWD but not to Geo-pilot.	H
06-05-2002	09:00	10:00	1.00	2,660	Worked full stand with 3200 lpm / 255 bar and 160 RPM / 8-10 klbs.ft torque.	S
06-05-2002	10:00	10:30	0.50	2,660	Flowchecked - static	S
06-05-2002	10:30	10:45	0.25	2,660	Spotted 4 m3 LCM pill on bottom.	S
06-05-2002	10:45	12:30	1.75	2,660	POOH from 2660 to 2635 m. Backreamed OOH from 2635 to 2606 m due to tight spot. Cont to POOH wet from 2606 to 2431 m where tight spot encountered.	S
06-05-2002	12:30	13:00	0.50	2,660	Made up DDM and reamed with 80 RPM / 6-7 k torque and 1600 lpm / 75 bar to clear tight spot.	S
06-05-2002	13:00	17:15	4.25	2,660	Cont pump OOH from 2431 to 1883 m with 1600 lpm / 50 - 60 bar. Tight spot at 1883 m.	S
06-05-2002	17:15	18:15	1.00	2,660	Backreamed from 1883 to 1821 m with 150 RPM / 6 k torque and 2500 lpm / 95 bar. Took 30 MT o/ pull at 1821 m and lost returns. Installed single and worked string to free. Re-established circulation at 1600 lpm / 70 bar (4 m3 mud lost, 2.2 m3 returned - net loss to fmtn 1.8 m3).	S
06-05-2002	18:15	19:45	1.50	2,660	Circulated 2 x bottom's up at 1821 m at 3000 lpm / 200 bar, and 140 RPM / 5 -6 k torque. Small amount of cavings and fresh drill cuttings seen over shakers.	S
06-05-2002	19:45	21:00	1.25	2,660	Pumped OOH from 1821 to 1732 m with 650 lpm / 11 bar and 50 RPM / 5 k torque.	S
06-05-2002	21:00	21:45	0.75	2,660	POOH wet from 1732 to 14" casing shoe at 1640 m.	S
06-05-2002	21:45	22:00	0.25	2,660	Flowchecked - static.	S

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06-05-2002	22:00	23:30	1.50	2,660	CBU x 2 at shoe with 3600 lpm / 125 bar. Boosted riser after first bottom's up. Shakers clean.	S
06-05-2002	23:30	23:45	0.25	2,660	Flowchecked - static	S
06-05-2002	23:45	00:00	0.25	2,660	Slugged pipe (5 m3) and POOH from 1640 to 1559 m.	S
07-05-2002	00:00	01:45	1.75	0	Cont POOH from 1559 to BHA at 215 m.	S
07-05-2002	01:45	02:00	0.25	2,660	Flowchecked at BHA - static.	S
07-05-2002	02:00	05:30	3.50	2,660	Handled BHA to surface. Downloaded MWD. L/O Geo-pilot - some wear noted on rotating stab immediately above sleeve, and on bit sub. Bit graded: 2 / 4 / BT / T / X / I / WT / DTF	S
07-05-2002	05:30	06:00	0.50	2,660	Cleaned and cleared rig floor.	S
07-05-2002	06:00	08:30	2.50	2,600	M/U new BHA (BB657XA Bit + AGS) c/w new MWD and Pulser.	S
07-05-2002	08:30	10:00	1.50	2,660	Plugged in and uploaded MWD. Performed surface tests. Tested AGS.	S
07-05-2002	10:00	12:00	2.00	2,660	Completed M/U BHA c/w new jars.	S
07-05-2002	12:00	16:00	4.00	2,660	X/O to 5½" HWDP and RIH from 105 to 215 m. Cont RIH with BHA on 5½" DP from 215 to 1609 m (filled string and broke circ. at 1000 and 1609 m).	S
07-05-2002	16:00	17:30	1.50	2,660	Whilst at shoe, replaced saver sub on DDM. Replaced DDM wash pipe.	S
07-05-2002	17:30	21:15	3.75	2,660	Cont RIH from 1609 to 2645 m (no hole problems - hole in v good condition)	S
07-05-2002	21:15	22:15	1.00	2,660	M/U DDM, filled pipe, broke circ and precautionary washed down last stand from 2645 to bottom at 2660 m. No fill encountered. Pulled back and staged up pumps to full circ rate at 3200 lpm / 287 bar. Cycled pumps and new readings recorded at 3200 lpm / 273 bar. 14 bar difference confirmed AGS in underguage (11½" position). Recycled pumps to re-set AGS at full guage (12¼") position.	S
07-05-2002	22:15	00:00	1.75	2,660	Drilled ahead 12¼" hole from 2660 to 2666 m - initially v slow as bit cut new profile on hard limestone stringer. WOB 1-4, RPM 60 - 130, TQ 10 - 12 klbs.ft, Flow 3200 lpm @ 290 bar. Assy locked with AGS @ 12¼". Trip Gas 6.5%.	P
08-05-2002	00:00	01:00	1.00	0	Cont drill 12¼" hole from 2666 to 2675 m. WOB 1-4, RPM 60 - 130, TQ 10 - 12 klbs.ft, Flow 3200 lpm @ 290 bar. AGS in 12¼" (full gauge) position.	P
08-05-2002	01:00	04:30	3.50	2,675	Attempted to wipe stand prior to making connection but unable to get back to bottom - limestone block fallen in below bit ? Hard reamed / worked bit from 2669 to bottom at 2675 m - v hard with frequent / continuous high torques. N.B. Resistivity data indicates hole washed out between 2650 and 2660 m.	H
08-05-2002	04:30	04:45	0.25	2,675	Switched DDM to low gear.	H
08-05-2002	04:45	07:30	2.75	2,675	Made connection and drilled ahead from 2675 to 2706 m. WOB 3 - 6, RPM 110, TQ 6 - 8 klbs.ft, Flow 3400 lpm @ 295 bar. AGS in 12¼" (full gauge) position from 2675 to 2690 m, 11½" (underguage) from 2690 to 2706 m.	P
08-05-2002	07:30	08:15	0.75	2,706	Attempted to take MWD survey without success. Recycled pumps and retook survey (OK). Problems with pulsation dampeners in pump room.	R
08-05-2002	08:15	08:45	0.50	2,706	Drilled 12¼" hole from 2706 to 2714 m. AGS in 11½" (underguage) position.	P
08-05-2002	08:45	09:30	0.75	2,714	Took survey, but difficulties experienced due to insufficient charge in pulsation dampener on pump #2.	P
08-05-2002	09:30	10:30	1.00	2,714	Circulated on 1 pump while changed out leaking supercharge vibration hose.	R
08-05-2002	10:30	13:30	3.00	2,714	Drilled 12¼" hole from 2714 to 2752 m. WOB 5 - 8, RPM 110-150, TQ 10 - 14 klbs.ft, Flow 3200 lpm @ 270 bar. AGS in 12¼" (full guage) position.	P
08-05-2002	13:30	14:30	1.00	2,752	Circulated for samples following shift in GR trace (3200 lpm / 269 bar and 150 RPM / 9 klbs.ft TQ)	P

Date of Operation (used in DCWR)	Starting Time of Operation	Finishing Time of Operation	Time in Hours For Operation	Depth m	Description of Currently Highlighted Operation	Class
08-05-2002	14:30	00:00	9.50	2,752	Drilled 12¼" hole from 2752 to 2837 m. WOB 5 - 10, RPM 150, TQ 10 - 15 klbs.ft, Flow 3350 lpm @ 270 - 283 bar. AGS: 12¼" (full gauge) 2752 - 2792 m 11½" (underguage) 2792 - 2821 m 12¼" (full gauge) 2821 - 2837 m Re-logged from 2738 to 2753 m with MWD to repeat / confirm GR (same) - no formation change indicated by circulated cuttings samples.	P
09-05-2002	00:00	03:30	3.50	2752	Drilled 12¼" hole from 2837 to 2855 m. WOB 5 - 10, RPM 150, TQ 10 - 15 klbs.ft, Flow 3350 lpm @ 270 - 283 bar. AGS in 12¼" (full gauge) position	P
09-05-2002	03:30	04:00	0.50	2,855	Following a connection, washout observed in stand above drill floor. Changed out stand and recycled pumps to reset AGS to full guage.	P
09-05-2002	04:00	07:30	3.50	2,855	Cont drilling 12¼" hole from 2855 m to section TD at 2879 m (AGS full guage - 12¼").	P
09-05-2002	07:30	10:45	3.25	2,879	Circulated 3 x bottom's up - shakers clean. Made 3 attempts at TD survey - no success. Boosted riser last 90 mins of circulation.	P
09-05-2002	10:45	11:00	0.25	2,879	Flowchecked - static.	P
09-05-2002	11:00	14:00	3.00	2,879	POOH wet 17 stands from 2879 to 2400 m. Pulled 15 MT o/pull at 2694m - top stab at 2672m. Had to backream through. Wiped 3 times - stab still dragging. Worked out to 2644m. No other hole problems.	P
09-05-2002	14:00	16:15	2.25	2,879	Pumped slug and cont POOH to shoe at 1640 m.	P
09-05-2002	16:15	16:30	0.25	2,879	Flowchecked - static	P
09-05-2002	16:30	18:00	1.50	2,879	Cont POOH from 1640 to BHA at 408 m.	P
09-05-2002	18:00	18:15	0.25	2,879	Flowchecked at BHA - static	P
09-05-2002	18:15	20:00	1.75	2,879	Handled BHA to surface, racking back in derrick. Bit graded 3 / 6 / BT / T / X / I / WT / TD	P
09-05-2002	20:00	21:00	1.00	2,879	Downloaded MWD.	P
09-05-2002	21:00	21:30	0.50	2,879	Racked stand and cleared drill floor.	P
09-05-2002	21:30	23:30	2.00	2,879	M/U MPT and ran in to BOP. Washed wellhead landing area and BOP cavities. Latched / recovered wear bushing with 6 MT o/pull and L/O same - minor key seating noted on aft side.	P
09-05-2002	23:30	00:00	0.50	2,879	Commenced M/U 9.5/8" casing hanger / RT assy.	P
10-05-2002	00:00	01:00	1.00	0	Completed M/U 9.5/8" Hanger assy and racked back in derrick.	P
10-05-2002	01:00	01:45	0.75	2,879	R/U to run 9.5/8" casing.	P
10-05-2002	01:45	02:00	0.25	2,879	Held pre-job safety meeting	P
10-05-2002	02:00	02:30	0.50	2,879	M/U Reamer Shoe joint to first intermediate joint casing in rotary table. Tested float - OK	P
10-05-2002	02:30	04:30	2.00	2,879	R/U 20 ft 350T bails. R/U La Fleur and tested same.	P
10-05-2002	04:30	06:00	1.50	2,879	M/U 9.5/8" shoe track and tested same. 1. shoe, 2 x inter, float collar, inter - all b/loked. 2. iInstalled RA pip tag (68.15 m above shoe).	P
10-05-2002	06:00	19:30	13.50	2,879	Ran 9.5/8" to 1610m (14" shoe). 1. Csg details : 53.5 ppf, NVam, VMSS95, 14300 ftlbs 2. 116jts / 13.5hrs = 8.6 jts/hr....no rejects.	P
10-05-2002	19:30	20:15	0.75	2,879	Inspected lip seals in Lafleur....originals ok condition BUT 10½" seal id vs 10.142" cplg od....BU "oval" due to transit damage.	S
10-05-2002	20:15	20:30	0.25	2,879	Test Lafluer tool....continuous leak at 1200 lpm / 22 bar.	P
10-05-2002	20:30	00:00	3.50	2,879	Ran 9.5/8" in OH from 1610 to 2022m. 1. Csg details : 53.5 ppf, NVam, VMSS95, 14300 ftlbs 2. 27 jts / 3.5hrs = 7.7 jts/hr....no rejects. 3. No OH problems.	P
11-05-2002	00:00	05:45	5.75	0	Ran 9.5/8" in OH from 2022 to 2749m 1. Csg details : 53.5 ppf, NVam, VMSS95, 14300 ftlbs 2. 54 jts / 5.8hrs = 9.3 jts/hr....no rejects. 3. No OH problems....nothing seen at 2660m.	P
11-05-2002	05:45	08:00	2.25	2,879	L/O LaFleur, ran last 2 casing joints and C/O long bails. P/U casing hanger, L/O FMS and re-installed master bushings and autoslips.	P

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11-05-2002	08:00	10:30	2.50	2,879	RIH 9.5/8" csg on 5½" landing string to 2840m - setdown 20T. Washed down to 2845m - no further progress, 40T setdown, 40T drag up, erratic SPP. Circulate BU to cleanup hole - 1300 lpm @ 50bar, 2834m - 2338m working window, large amount of "fines" over shakers.	H
11-05-2002	10:30	11:30	1.00	2,879	Washed down to 2845m - no further progress, 50T setdown, 60-80T drag up. Lost circulation - hole packed off. Worked pipe and regained circulation. Hole condition deteriorating - erratic SPP, increasing drag, no progress down (50T setdown).	H
11-05-2002	11:30	12:00	0.50	2,879	Pumped OOH to 2829m - no further progress, 20T overpull causing erratic SPP / returns.	H
11-05-2002	12:00	15:00	3.00	2,879	Worked 9.5/8" csg back to 2845m then used 80T setdown in further effort to make progress. No initial progress then worked / washed csg down and landed out same in wellhead (shoe setting depth 2873m)	H
11-05-2002	15:00	16:15	1.25	2,879	Circulated 60% BU - max gas peak 0.8% and decreasing.	P
11-05-2002	16:15	16:30	0.25	2,879	Held PJSM.	P
11-05-2002	16:30	19:00	2.50	2,879	Completed 9.5/8" csg cement job. Pump schedule : dropped ball - released btm plug (60bar), 3m3 baseoil, 10m3 spacer, 19m3 tail cmt (1.92sg@800lpm), dropped dart - pumped 1.6m3 water, released top plug (180 bar). Tail : 41.75lhk DW, 1.00lhk CFR-3L, 4.90lhk Gascon, 5.00lhk Halad-413L, 2.50lhk SCR-100L.	P
11-05-2002	19:00	21:00	2.00	2,879	Displace cement with rigpump - bumped plug at 33bar (97% eff), confirmed to 70bar x 3 mins. Checked floats - ok. Note : CIP at 2020hrs May 11. 9.5/8" Casing Losses Summary: RIH = 3.5 m3 Circ = 2 m3 Cmt = Full returns	P
11-05-2002	21:00	21:30	0.50	2,879	R/D cement hoses. Set 9.5/8" Seal Assy with 5RH turns (string dropped +/-0.25m to verify).	P
11-05-2002	21:30	23:00	1.50	2,879	P/tested LIKW to 465 bar from Cmt Unit. Opened v/v, closed UPR and pressure up to 465 bar to energise seal, holding pressure for 10 mins. Good test.	P
11-05-2002	23:00	00:00	1.00	2,879	Released CHSART with 25 MT o/pull and flushed through same. Relanded R/T and re-tested Seal Assy to 465 bar / 2 mins and 35 bar / 5 mins. Good tests.	P
12-05-2002	00:00	01:00	1.00	0	POOH with CHSART, service breaking connections on cmt stinger. L/D assy to deck.	P
12-05-2002	01:00	01:30	0.50	2,879	Ran Wearbushing c/w cup tester installed.	P
12-05-2002	01:30	05:30	4.00	0	Pressure tested BOPs on Yellow Pod (Drillers Panel) to 35 / 465 bar for 5 / 10 mins. Function tested same on Blue Pod (TP Panel). All tests good. Meanwhile, serviced BX Elevator, checked Topdrive Dolly and Block. Repaired 5½" auto slips.	P
12-05-2002	05:30	06:30	1.00	2,879	Set Wear Bushing and POOH with RT and cup tester (6MT to release). L/O same.	P
12-05-2002	06:30	10:30	4.00	2,879	L/D 12¼" BHA	P
12-05-2002	10:30	12:00	1.50	2,879	L/D washed out joints and cement head stand.	P
12-05-2002	12:00	12:30	0.50	2,879	Verified malfunction on upper IBOP and lower manual v/v on DDM.	P
12-05-2002	12:30	20:30	8.00	2,879	C/O Upper and Lower IBOPs R/D BX-Elevator and drilling bails. R/D Pipe Handler, safety v/v actuators, link tilt and torque arrestors on Topdrive. B/O and re-installed new IBOPs. Remount torque arrestors and link tilt. Re-mounted Pipe Handler. Meanwhile: 1) Pulled Yellow Pod, rerouted UPR open pilot line, then reran same. 2) Completed pressure testing on Mud Manifold. 3) Completed pressure testing on Choke Manifold.	R
12-05-2002	20:30	22:00	1.50	2,879	P/tested lower IBOP and Kelly Hose to 345 / 35 bar for 10 / 5 mins.	P
12-05-2002	22:00	00:00	2.00	2,879	Commenced M/U 8½" BHA. Function tested AGS. Meanwhile, P/tested casing to 430 bar / 15 mins against Shear Rams (vol. mud req'd = 2.7 m3 - 100% returned). Good Test.	P
13-05-2002	00:00	04:00	4.00	0	Continued M/U 8½" BHA. Uploaded MWD.	P
13-05-2002	04:00	07:00	3.00	2,879	P/U 60 joints (20 stands) DP from deck while RIH.	P

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13-05-2002	07:00	08:30	1.50	2,879	RIH from 750 to 1670m with stands from derrick.	P
13-05-2002	08:30	09:30	1.00	2,879	Filled pipe and tested MWD.	P
13-05-2002	09:30	11:30	2.00	2,879	Attempted function test on Yellow Pod - both Annulars not operational. Troubleshoot - identified problem associated with quick disconnect fitting on RBQ plate.	R
13-05-2002	11:30	12:00	0.50	2,879	Perforemed Choke Drill - mud response 60 seconds	P
13-05-2002	12:00	13:00	1.00	2,879	Performed Stripping Drill Installed Gray Valve and stripped in 3 stands. Upper Annular closing pressure 300 psi held 126 bar when stripping in with pipe. Down Wts: Bag Open 90MT; Bag Closed 80MT for pipe body, 60 MT for TJs Meanwhile, replaced four ¼" quick disconnect fittings on Yellow Pod Reel junction box.	P
13-05-2002	13:00	13:30	0.50	2,879	Function tested Yellow Pod - OK.	R
13-05-2002	13:30	16:00	2.50	2,879	Pulled back 3 stands and removed Gray Valve. Cont RIH from 1670 to 2775 m, filling pipe and precautionary washed down last 2 stands. Tagged Float Collar on depth at 2829 m.	P
13-05-2002	16:00	16:30	0.50	2,879	Attempted connection - Saver Sub backed off on topdrive. Remade same.	P
13-05-2002	16:30	18:00	1.50	2,879	Pressure tested casing to 100 bar to 'fingerprint' prior to LOT.	P
13-05-2002	18:00	20:30	2.50	2,879	Drill out plugs and float at 2829m (90 mins). Drilled 2m cement to 2831 m - ECD 2.00 SG with 2500 lpm.	P
13-05-2002	20:30	21:00	0.50	2,879	Established ECDs at various pump rates. 2000 lpm = 1.95 SG 1500 lpm = 1.90 SG 1000 lpm = 1.86 SG	P
13-05-2002	21:00	00:00	3.00	2,879	Cont drill cement from 2831 to 2872 m 2000 lpm, 190 bar, 67 RPM, 8½ kft.lbs TQ, 3.5 MT WOB	P
14-05-2002	00:00	01:00	1.00	0	Drill out casing shoe from 2872 to 2873 m. 1000 lpm, 190 bar, 67 RPM, 8½ kft.lbs TQ, 3.5 MT WOB	P
14-05-2002	01:00	03:00	2.00	2,879	Cleanout rathole from 2873 to 2879 m. Bit stalled in rathole 0.5 m below casing shoe. Hole partially packed off with erratic torque. Worked string free and re-established full circulation at 1000 lpm. Cont to clean shoe track and rathole, with string stalling several times and partial packing off. 1000 lpm, 68-98 bar, 60-120 RPM, 5-25 kft.lbs TQ, WOB 10 to -10 MT.	P
14-05-2002	03:00	03:30	0.50	2,879	Drilled 3 m new formation from 2879 to 2882 m.	P
14-05-2002	03:30	04:00	0.50	2,882	Circulated cuttings up hole away from BHA (50% BU).	P
14-05-2002	04:00	05:00	1.00	2,882	Flushed lines and pressure tested same to 100 bar / 5 mins. Performed LOT to 1.96 SG EMW (44.5 bar surface pressure with 1.78 SG mud). Note: PWD max pressure recorded during LOT also 1.96 SG	P
14-05-2002	05:00	00:00	19.00	2,882	Drilled ahead 8½" hole from 2882 to 3016 m. Varied parameters to maximise ROP within constraints of ECD (1.90 - 1.91 SG max). 1500 lpm, 115-125 bar, 60-90 RPM, 10-16 kft.lbs TQ, 5-9 MT WOB	P
15-05-2002	00:00	20:00	20.00	0	Drilled 8½" hole from 3016 to 3090 m (TD). Optimised parameters / ROP to limit ECD to 1.92 SG max. 1500 lpm, 120-130 bar, 60-100 RPM, 5-18 kft.lbs TQ, 8-11 MT WOB TD on entering Zechstein anhydrite.	P
15-05-2002	20:00	22:00	2.00	3,090	Circulated hole clean.	P
15-05-2002	22:00	22:15	0.25	3,090	Flowchecked (static)	P
15-05-2002	22:15	23:45	1.50	3,090	POOH from 3090 to 2800 m into casing at 3 mins/std (10 stands) - pipe pulled dry. No problems tripping out open hole.	P
15-05-2002	23:45	00:00	0.25	3,090	Flowchecked (static)	P
16-05-2002	00:00	04:45	4.75	0	Pumped slug. POOH from 2800 to 370 m (BHA at BOP).	P
16-05-2002	04:45	05:00	0.25	3,090	Flowchecked (static)	P
16-05-2002	05:00	05:30	0.50	3,090	POOH with BHA from 370 m - racked same.	P
16-05-2002	05:30	06:30	1.00	3,090	Downloaded MWD.	P
16-05-2002	06:30	07:30	1.00	3,090	Racked back MWD std - clear rigflooor.	P
16-05-2002	07:30	11:30	4.00	3,090	Held pre job safety meeting. RU WL sheaves arrangement. MU toolstring run 2a : GR/HDIL/MAC, complete cal checks.	P

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16-05-2002	11:30	18:15	6.75	3,090	Completed OH log run 2a : GR/HDIL/MA RIH setdown 2948m, o/pull 2942-2927m (1200lb max). RIH at higher speed (20m7min) - past problem area. Ran to TD and completed OH log out at 4m/min. O/pull at 2955m, 2934m, 2887m (600lb max) Completed MAC log to 2400m WL TD @ 3088.5m (corrected). Drillers TD = 3090m. Max BHT 107.2 DegC at 3070m (14:00hrs May 16). MAC gave 9.5/8" TOC approx 2490m.	P
16-05-2002	18:15	20:00	1.75	3,090	Completed toolstring handling : laid out 2a, PU 2b - ZDL/CN.	P
16-05-2002	20:00	00:00	4.00	3,090	Completed OH log run 2b : ZDL/CN. No problem getting to TD. Completed OH log out at 8m/min. Tool o/pull at 2939-2929m (700lb max). Caliper : Ave = 8.9" , no major washouts. Max BHT 118 DegC at 3070m (22:00hrs May 16).	P
17-05-2002	00:00	03:00	3.00	0	Completed post log calibration checks. Laid out toolstring 2b.	P
17-05-2002	03:00	04:00	1.00	3,090	MU toolstring run 2c : FMT / GR	P
17-05-2002	04:00	06:30	2.50	3,090	RIH to 2944m. Attempt pressure point - erratic signals. Troubleshoot - no success.	P
17-05-2002	06:30	14:00	7.50	3,090	POOH and troubleshoot - intermittent signal errors continued. CO toolstring. RIH to 1st point at 2944m.	S
17-05-2002	14:00	21:30	7.50	3,090	Completed run 2c : FMT. Points: Good - 4, Tight - 11, Lost Seal (?) - 1. Samples: filled 10l flush tank - 4l sample chamber. (2945.4m) Mud grad =1.78sg, Form Grad = 1.76sg max. Max Temp: 111.3 degC @ 3025m.	P
17-05-2002	21:30	22:00	0.50	3,090	RD WL - cleared rig floor.	P
17-05-2002	22:00	22:30	0.50	3,090	MU 5½" DP cement stand.	P
17-05-2002	22:30	00:00	1.50	3,090	MU diverting too. PU 27 singles 3½" DP (260m).	P
18-05-2002	00:00	01:00	1.00	0	PU total 45jts 3½" DP (431m).	P
18-05-2002	01:00	03:45	2.75	3,090	RIH 5 1/2" DP to 3090m (TD) - no fill.	P
18-05-2002	03:45	04:45	1.00	3,090	Fill string & circulated BU - 0.5% trip gas.	P
18-05-2002	04:45	06:00	1.25	3,090	Establish reverse circulating rates / pressures. P/tested cement stand - 200 bar / 5mins.	P
18-05-2002	06:00	07:15	1.25	3,090	Completed mix / pump / balanced cement plug 1. Plug interval : 3090m - 2890m (200m). Cmt recipe : 46.01lhk DW, 4.50lhk Halad-413L, 4.00lhk SCR-100L, Class G+35% silica. Pump schedule : 8m3 spacer, 8.2m3 cmt (1.92sg), 1.4m3 spacer, 28m3 mud. CIP : 07:00hrs May 18 - no losses.	P
18-05-2002	07:15	10:30	3.25	3,090	POOH to 2890m. RU cmt std and rev circulate 48m3 mud : 30spm @ 44bar - no losses, contaminated spacer / mud isolated.	P
18-05-2002	10:30	12:15	1.75	3,090	Completed mix / pump / balanced cement plug 2. Plug interval : 2890m - 2600m (290m). Cmt recipe : 50.43lhk DW, 2.50lhk Halad-413L, 1.20lhk SCR-100L, Class G+35% silica. Pump schedule : 7m3 spacer, 10.8m3 cmt (1.92sg), 1.5m3 spacer, 22m3 mud. CIP : 12:00hrs May 18 - no losses.	P
18-05-2002	12:15	15:30	3.25	3,090	POOH to 2540m. RU cmt std and rev circulate 45m3 mud : 30spm @ 44bar - no losses, contaminated spacer / mud isolated.	P
18-05-2002	15:30	22:15	6.75	3,090	POOH & LD 26 stands 5 1/2" DP. L/D 8 1/2" BHA f/ derrick.	P
18-05-2002	22:15	00:00	1.75	3,090	RIH f/1764m to 2500m. Washed down to 2577m.	P
19-05-2002	00:00	01:00	1.00	0	Washed down f/ 2577m & tagged cement plug 2 at 2676m w/ 10T.	P
19-05-2002	01:00	01:45	0.75	3,090	Pressure tested cement plug to 115 bar / 10 mins - good test.	P
19-05-2002	01:45	02:45	1.00	3,090	Pumped 68m3 POBM slops (1.78Sg) and spotted in well.	P
19-05-2002	02:45	07:00	4.25	3,090	Pumped slug and POOH l/d 121 jts 5 1/2" DP. Note: Circ down choke & kill to clean riser.	P
19-05-2002	07:00	09:30	2.50	3,090	POOH 5 1/2" DP & 3 1/2" cmt stinger & rack back.	P
19-05-2002	09:30	10:00	0.50	3,090	Cleared rig floor.	P
19-05-2002	10:00	12:00	2.00	3,090	MU EZSV packer to 4 std 5 1/2" HWDP & RIH to 610m	P
19-05-2002	12:00	13:30	1.50	3,090	Set EZSV & tested w/ 20T weight. Pump slug & POOH. L/d EZSV running tool.	P
19-05-2002	13:30	16:00	2.50	3,090	PU 9 5/8" csg cutter. MU wear bushing retreival tool & RIH. Landed in WH & pull 30T O/P. Set down 5T & closed UAP. Cut 9 5/8" csg. Params: 2500lpm, 221 bar, 3 mins.	P

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19-05-2002	16:00	18:00	2.00	3,090	Flow checked 10 mins - OK. POOH & l/d wear bushing (no wear) & casing cutter.	P
19-05-2002	18:00	19:00	1.00	3,090	MU spear assy w/ MPT tool.	P
19-05-2002	19:00	20:00	1.00	3,090	RIH w/ spear & MPT assy. Closed UAP (600psi).	P
19-05-2002	20:00	21:30	1.50	3,090	Took up/down weights (39T). Made 3 attempts to latch seal assy (w/ 5T, 10T & 15T set down). 5T over pull observed. Engaged spear & picked up 9 5/8" casing. Checked pressure for 15 mins - no pressure observed. Opened auto choke - no flow. Opened UAP & flow checked 15 mins on TT - OK. Pulled 9 5/8" hanger above BOP & pumped slug. POOH 9 5/8" casing f/ 510m to 410m.	P
19-05-2002	21:30	22:00	0.50	3,090	Rigged up casing tong and FMS. Released spear & racked back spear & MPT tool.	P
19-05-2002	22:00	22:15	0.25	3,090	Help pre job meeting.	P
19-05-2002	22:15	22:45	0.50	3,090	Unable to clamp back up tong onto casing. Repaired same.	S
19-05-2002	22:45	00:00	1.25	3,090	POOH w/ 9 5/8" casing f/ 410m to 100m.	P
20-05-2002	00:00	00:45	0.75	0	POOH 9 5/8" casing from 100m to surface.	P
20-05-2002	00:45	01:30	0.75	3,090	RD casing tong, FMS & 9 5/8" BX elevators. Cleared rig floor. Rigged up 3½" DP handling eqt.	P
20-05-2002	01:30	03:00	1.50	3,090	RIH 45jts 3½" DP cmt stinger on 5½" DP to 610m.	P
20-05-2002	03:00	05:15	2.25	3,090	Displaced well to sea water. Flow checked well 20mins = 0.45m3 gain.	P
20-05-2002	05:15	07:30	2.25	3,090	Shut UAP, monitored pressure BU, SIDPP = 22 bar, SICP = 12 bar, @ 6am. 06:15am - Closed MPR, bled off pressure bewteen MPR & UAP, open UAP : SIDPP 23 bar, SICP 114bar. 06:40 am - Bled down pressure - check for trapped press / thermal effects : SIDPP 10 bar, SICP 1 bar 07:30 am - Observed pressure build up. SIDPP 22 bar, SICP 14 bar	H
20-05-2002	07:30	08:30	1.00	3,090	Circulated BU thru choke. Params: 120 spm, 80 bar - no gas observed.	H
20-05-2002	08:30	09:00	0.50	3,090	Opened MPR & displaced well to 1.78Sg POBM. Params: 2800 lpm, 280 bar.	H
20-05-2002	09:00	14:00	5.00	3,090	Flowchecked well - static. Discuss options - prepare for cement plug 3 - mixed OBM spacer for cement plug. Held pre job meeting. Pressure tested lines to 100bar.	H
20-05-2002	14:00	15:00	1.00	3,090	Completed mix / pump / balanced cement plug 3. Plug interval : 610m - 360m. Cmt recipe : 40.14 lhk DW, 0.10 lhk NF6, 3.2 lhk CaCl2, Class G cmt. Pump schedule : 10m3 spacer, 15.4m3 cmt (1.95sg), 0.5 m3 SW. CIP : 14:40hrs.	P
20-05-2002	15:00	18:00	3.00	3,090	POOH to 200m - excess amounts of cement coated on 3½" DP stringer. Flushed 7std 3 1/2" DP (80bar req'd to clear DP). Cleaned cement from OD of DP as POOH. Note: Circulated down choke & kill lines to clean riser volume.	P
20-05-2002	18:00	20:15	2.25	3,090	RIH 3½" DP. Precautionary washed from 205m (1000lpm) - tagged TOC at 326m (10T tag)	P
20-05-2002	20:15	22:00	1.75	3,090	Circ hole clean. P/tested cement plug 3 to 88bar - good test.	P
20-05-2002	22:00	00:00	2.00	3,090	Displaced well to SW. Flowchecked - 30mins. POOH 3½" DP from 322m to 280m.	P
21-05-2002	00:00	00:30	0.50	0	POOH 3½" DP.	P
21-05-2002	00:30	02:30	2.00	0	MU 14" casing cutter. RIH to 123m - took wt (8T), no progress. POOH and rack back BHA.	P
21-05-2002	02:30	06:00	3.50	0	MU 12" mill BHA. RIH - setdown / cleaned out at 123m, 196m, 204m, 228 - 234m then clear to 341m final TD with 10T setdown (top cement plug 3). Params: 3000 lpm, 50 rpm.	H
21-05-2002	06:00	07:30	1.50	3,090	Pumped 5m3 hivis pill & displaced @ 4000lpm. POOH w/ junk mill from 341m.	H
21-05-2002	07:30	08:30	1.00	3,090	RIH 14" cutter assy.	P
21-05-2002	08:30	09:00	0.50	3,090	Cut 14" csg @ 335m in 10 mins. Flow check 15 mins - OK. Params: 2500lpm, 100 - 60 bar.	P
21-05-2002	09:00	10:00	1.00	3,090	POOH cutter assy & l/d.	P
21-05-2002	10:00	11:00	1.00	3,090	MU 14" spear & RIH. Pulled packoff - 12T O/P.	P
21-05-2002	11:00	12:00	1.00	3,090	Flowcheck 15 mins - OK. POOH spear & casing to surface.	P
21-05-2002	12:00	14:00	2.00	3,090	L/d spear assy & MPT tool. Rigged up csg tong, FMS	P
21-05-2002	14:00	14:30	0.50	3,090	L/d 14" hanger.	P
21-05-2002	14:30	15:00	0.50	3,090	CO from BX to manual sidedoor elevators - incompatability between BX frame and rig "swivel".	S

Date of Operation (used in DCWR)	Starting Time of Operation	Finishing Time of Operation	Time in Hours For Operation	Depth m	Description of Currently Highlighted Operation	Class
21-05-2002	15:00	16:30	1.50	3,090	Laid out 14" casing.	P
21-05-2002	16:30	17:30	1.00	3,090	RD 14" csg equipt - cleared rig floor.	P
21-05-2002	17:30	18:00	0.50	3,090	RIH 3½" cmt stinger. RIH to 341m.	P
21-05-2002	18:00	20:00	2.00	3,090	Pressure tested surface lines to 100bar Completed mix / pump / balanced cement plug 4. Plug interval : 341m - 120m. Cmt recipe : 40.62 lhk DW, 0.10 lhk NF6, 2.5 lhk CaCl2, Class G cmt. Pump schedule : 38.7m3 cmt (1.95sg), 0.5 m3 SW. CIP : 20:00hrs.	P
21-05-2002	20:00	21:00	1.00	3,090	POOH to 120m, circuled 60m3 SW. POOH & racked back 3 1/2" stinger.	P
21-05-2002	21:00	22:00	1.00	3,090	PU 1 std 5½" DP - break out MPT tool	P
21-05-2002	22:00	00:00	2.00	3,090	MU jetting sub. RIH on 5½" DP - jetted BOP/ riser. Pumped 10m3 soap pill & flushed BOP, riser, choke & kill lines, booster lines.	P
22-05-2002	00:00	01:00	1.00	0	Circulated soap pill - cleaned TT, choke manifold, PB degasser & all surface lines.	P
22-05-2002	01:00	03:00	2.00	3,090	L/O 42 jts 5 1/2" DP.	P
22-05-2002	03:00	03:45	0.75	3,090	Tested cmt plug 4 to 113 bar - no success 1. p/tested surface lines - good test. 2. rig up to recover BOP during p/test.	P
22-05-2002	03:45	06:00	2.25	3,090	RU elevators/slips. Cont L/D 5½" HWDP and 8" DCs.	P
22-05-2002	06:00	08:00	2.00	3,090	L/D 30jts 3½" DP. 1. Attempted p/test on cmt plug #4 - no success.	P
22-05-2002	08:00	10:00	2.00	3,090	RIH 5½" DP to 122m - tagged cmt plug #4 (5T). RU sfc lines - tested same (140 bar). Attempted p/test cmt plug #4 to 113 bar - no sucess.	U
22-05-2002	10:00	12:30	2.50	3,090	Complete preparations for cementing. Completed mix / pump / balanced cement plug 5. Plug interval : 122m - 107m. Cmt recipe 3.2lhk CaCl2, Class G cmt. Pump schedule : 2.6m3 cmt (2.15sg), 0.5 m3 SW. CIP : 12:30hrs.	U
22-05-2002	12:30	13:00	0.50	3,090	POOH to 105m. Circulated 3xBU (97m3 SW, 4128 lpm@12 bar)	U
22-05-2002	13:00	15:30	2.50	3,090	POOH to 102m. Closed BOP. Applied 85bar and squeezed 33ltr cmt. P/tested cmt plug #5 to 80 bar - good test. Open BOP and POOH.	U
22-05-2002	15:30	18:00	2.50	3,090	RU to pull riser & BOP. Released diverter.	P
22-05-2002	18:00	19:00	1.00	3,090	LD diverter. Closed slip jt. Unlatched BOP @ 18:50hrs.	P
22-05-2002	19:00	19:30	0.50	3,090	Removed pod saddles. Disconnected riser tensioners.	P
22-05-2002	19:30	00:00	4.50	3,090	Held pre job safety meeting. LD slip joint. Pull riser - BOP thru splash zone @ 21:35hrs. Landed & secured BOP on trolly. Removed guide lines. Released and LD riser joint. Setback BOP.	P
23-05-2002	00:00	01:30	1.50	0	RD BOP handling equipt. RU 5½" DP equipt.	P
23-05-2002	01:30	03:30	2.00	3,090	P/U casing cutter & MOST tool BHA - run same, spaced out to cut at 98m (5m below seabed).	P
23-05-2002	03:30	05:00	1.50	3,090	Landed MOST tool - setdown 5T. Commence cutting 20"x30" csg (3200 lpm, 165 bar).	P
23-05-2002	05:00	06:00	1.00	3,090	Completed cutting 20x30" - observed pressure drop. Latched WH - several attempts, latched @ 05:25 hrs. Attempt ¼ LH turn to engage lock - no success, ROV engaged back up locking bolts. Attempt pull WH - no success with 50T o/pull then MOST tool released. ROV backed off lockdown bolts in preparation for recutting 20x30" csg.	S
23-05-2002	06:00	07:00	1.00	3,090	Landed MOST tool, set down 5T, re-cut csg (3200 lpm, 165 bar).	S
23-05-2002	07:00	08:15	1.25	3,090	Engaged WH w/ MOST tool, attempt ¼ LH turn to lock - no success. ROV engaged backup locking bolts. Attempt pull WH @ 07:50hrs - no success, 30T O/P then MOST tool released. Attempt pull WH @ 08:05hrs - no success, 40T O/P then MOST tool released.	S
23-05-2002	08:15	08:45	0.50	3,090	Landed MOST tool on WH, set down 5T. Re-cut csg (3200 lpm, 207 bar).	P

Date of Operation (used in DCWR)	Starting Time of Operation	Finishing Time of Operation	Time in Hours For Operation	Depth m	Description of Currently Highlighted Operation	Class
23-05-2002	08:45	12:00	3.25	3,090	Engaged WH w/ MOST tool,. Pull WH, released guide base & 20" & 30" w/ 70T O/P & recovered to surface. Removed guide posts & Landed guide base on trolly.@ 10:40hrs. Disconnected MOST tool w/ csg cutter / L/D. Lay out guide base f/ cellar deck.	P
23-05-2002	12:00	18:45	6.75	3,090	Deballast rig to transit draft. Note: Meanwhile - L/D 3jts 8" DC, cleared rig floor.	P
23-05-2002	18:45	00:00	5.25	3,090	Commenced anchor handling. Anchor.....10.....1.....7.....4.....8 Vessel.....TH.....NC.....NC.....PB.....TH Anchor Up ..12:40....12:45...22:25....20:40 20:51 Com Rec.....12:40....12:45...22:30....20:40....20:55 Anch R'ked...n/a.....n/a....02:25.....23:00....00:02 PCP Passed....n/a.....n/a.....02:30....23:10....00:25 Tot time.....n/a. .. n/a....7h00... 2h50... .3h55 Lost Time.....Nil.....Nil.....2h Nil Nil	P
24-05-2002	00:00	06:00	6.00	3090	Cont. Anchor handling. Anchor..... 5.....3.....9 Vessel.....TH.....NC.....TH Anchor Up...01:05....03:20...03:45 Com Rec.....01:09....03:20...03:45 Anch R'ked...03:12....05:45..06:00 PCP Passed.03:18....05:50..06:05 Tot time.....2h48....3h05...2h40 Lost Time.....Nil.....Nil.....Nil Note: Towing bridle connected to the Pacific Banner, 120 T shackle 00:50 hrs	P
24-05-2002	06:00	08:00	2.00	3,090	Recovered Pendants from anchors 2, 9, 10, & 6. Pendant No.6 & 10 to T Heron, No9 to rig, No2 to N Corona. 300m chain transferred to T Heron	P
24-05-2002	08:00	09:45	1.75	3,090	Cut & removed tangled fibre rope from Forward / starboard thruster.	R
24-05-2002	09:45	14:00	4.25	3,090	Anchors 2 & 6 pulled & recovered f/ seabed. Twists removed f/ No6 chain.	P
24-05-2002	14:00	19:55	5.92	3,090	Backloaded remaining eqt to N.Corona. Port crane whipline damaged. Moved boat to Stb side to cont. backload while Port crane repaired. Note: Stilos SBV released. Rig off hire from AHN.	P

2.4 Operations Review by section

2.4.1 Move Rig

			Classification (Hours)						
AFE hrs	Actual	% of AFE	Productive	Weather	Rig	Service Co	Other	Hole	Unplanned
26.4	7.5	28	7.5	0	0	0	0	0	0

The Deepsea Bergen came on hire at 10:00 on 15th April 2002, upon completion of anchor handling at the 1/5-4S well location. Preparations for the spud, including picking up some drill pipe, had begun prior to completion of anchor handling hence the well was spudded only a short time after the rig went on contract. Due to the various shallow gas anomalies identified at the well location, a high degree of focus was placed on shallow gas procedures and drills were conducted prior to spud. Spud time was 20:15 on 15th April.

Recommendations / Conclusions

1. The rig was not positioned as accurately as intended because the rig was positioned by the rounded-off latitude and longitude figures. The definitive co-ordinate should be clearly stated
2. The Two additional anchors required piggy-backs these both had circa 250 m less chain than the 8 anchors regularly used. Although anchor handling conditions were expected to be good it is recommended for this location to ensure that all anchors have sufficient chain for anchor hold down on the seabed.
3. Mobilisation of pre-hydrated spud mud rather than mixing the spud mud on the rig saved rig time.

2.4.2 Drill 9 7/8" Pilot

			Classification (Hours)						
AFE hrs	Actual	% of AFE	Productive	Weather	Rig	Service Co	Other	Hole	Unplanned
57.6	26.5	46	26.5	0	0	0	0	0	0

The 9-7/8" pilot hole assembly included GR/Res/MWD. The 9-7/8" pilot hole was drilled to 928m without any shallow gas, nor boulders being noted. Most of the section was drilled with sea water plus viscous sweeps every half stand. 1.1sg mud was spotted into the hole before drilling each anomaly and the system returned to sea water after each high risk interval. No hole problems were observed and the hole inclination remained below 1º.

Recommendations / Conclusions

1. The choice of BHA was successful in maintaining a vertical hole.
2. Shallow gas hazards were succesfully drilled with mud without significant additional operational time.

2.4.3 Drill 36" hole

			Classification (Hours)						
AFE hrs	Actual	% of AFE	Productive	Weather	Rig	Service Co	Other	Hole	Unplanned
19.2	18.5	96	18.5	0	0	0	0	0	0

The 36" section was drilled with a 17½" mill-toothed bit plus 36" hole opener on a motor. The section was drilled to a depth of 171m. The motor had been run to improve the drilling performance and maintain a vertical hole but the motor did stall on one occasion. Due to suspected hole fill, a wiper trip was performed, the hole displaced to 1.32sg fluid and the assembly tripped out of the hole.

2.4.4 Run & cement 30" conductor

			Classification (Hours)						
AFE hrs	Actual	% of AFE	Productive	Weather	Rig	Service Co	Other	Hole	Unplanned
21.6	61.0	282	7.5	0	0	0	0	0	0

The 30" conductor was run and initially held up at 123m, and was washed down to 160m (pipe appeared to be free from 137m). The conductor was run in to setting depth at 166m. Initial attempts to check the bullseyes were unsuccessful due to poor visability, during this process the ROV became tangled in the guide wires.

The cement job appeared to go according to plan though there was very poor visibility at the seabed. Upon completion of the cement job, the ROV went to open the ball valve on top of the CART tool (in preparation for dropping the Titus dart), but found that the valve was already open. This valve had apparently been open throughout the job so there was no certainty as to where the cement had gone and a high probability that cement was inside the 30" conductor. Unfortunately the Titus dart had already been dropped before the open valve issue was communicated which removed the option of repeating the cement job. Therefore the 30" conductor was pulled back to surface. A check trip was conducted through the 30" which indicated cement 6m above the shoe and traces of cement in the next 2 joints. 2 joints plus the shoe joint were replaced and the 36" BHA was run in the hole to clean-out any potential cement. A small amount of resistance was observed but generally the hole was clean.

The 30" conductor was then re-run and took weight at 122m but washed down to TD without difficulty. The cement job was performed, pumping 300% excess. Rather than WOC and try to tag the TOC, a top up job was pumped immediately through the TITUS system. Based on offset well data it had been planned to use a lead and tail for this job and reduce the hydrostatic pressure on the formation. However the final projected thickening time (TT) was very long and the compressive strength of the lead was poor, hence the entire slurry pumped was tail cement at 1.95sg.

Recommendations / Conclusions

1. There appears to be no benefit to having two valves on the CART tool. Hence it is recommended to have only one valve. Manual valve operation should show resistance, i.e. not open easily. The ROV should also check that the valve is in the closed position before the primary cement job.
2. A good understanding of the operation to be performed is required by all personnel such that they are all in a position to conduct the necessary checks and communicate the results prior to, and during any activity
3. Post cement job checks should be conducted prior to dropping the Titus dart since this prevents further flow access via the 30" ID.
4. The definitive well position requirement should be stated in the drilling program as either UTM or Lat/Long to avoid the confusion between UTM and lat. & long. An imprecision of 9m in the required rig position occurred due to the use of rounded lat. & long. co-ordinates rather than using UTM co-ordinates.
5. The use of a UK wellhead system rather than a Norwegian system needs to take into account of all minor differences even down to the type of guide-line latches in use in Norway. The original latches sent out were not suitable.

2.4.5 Drill 26" hole

			Classification (Hours)						
AFE hrs	**Actual**	**% of AFE**	**Productive**	**Weather**	**Rig**	**Service Co**	**Other**	**Hole**	**Unplanned**
69.6	46.5	67	46.5	0	0	0	0	0	0

The 26 " motor assembly was run and drilled to 928m without incident. A high flowrate of 5100Lpm was maintained for most of the hole section, finally being reduced to 5000Lpm. A high ROP was maintained. The TFA of the bit was 1.42in^2.

Recommendations / Conclusions

1. The motor assembly was highly effective in achieving a vertical hole and maintained good ROP.
2. Sea water sweeps every half a stand were effective.

2.4.6 Run & cmt 20" casing. Run BOP

			Classification (Hours)						
AFE hrs	Actual	% of AFE	Productive	Weather	Rig	Service Co	Other	Hole	Unplanned
26.4	27.5	104	26	0	0	0.75	0.75	0	0

The hole was displaced to 1.20sg mud before tripping out with the drilling BHA. There was some concern that due to the amount of sand in the hole, differential sticking may occur. However offset wells had used 1.20sg successfully and in the event no problems of this nature occurred. Overall, running the casing proceeded well and the job was completed quicker than expected. However a number of brief equipment problems prevented an even more efficient operation. The most serious one of these issues was that the elevator i.d. was too large. Although the elevators were marked as being 20", the i.d. was in fact 21-1/8".

The cement job was conducted as programmed without incident.

Running and testing the BOP was done very efficiently without problems or lost time.

Recommendations / Conclusions

1. The use of 1.20sg mud in the hole for running casing should be continued. This density has proved to be effective and is satisfactory for a semi operation, even when extensive sand sections are present.
2. The supplier of casing running equipment should thoroughly confirm the suitability of all equipment (including circulating packer) before loadout. This should include compatibility of the equipment with the casing being run and with the rig's equipment. A further check of equipment should take place on the rig. A more detailed approach was required here to avoid the equipment problems that arose.

2.4.7 Drill 17½" hole

			Classification (Hours)						
AFE hrs	Actual	% of AFE	Productive	Weather	Rig	Service Co	Other	Hole	Unplanned
160.8	89.75	56	84.25	0	0.5	0	1.0	4.0	0

The LOT achieved at the 20" casing shoe was reported initially to be 1.91sg but later analysis of the result caused this to be reduced to 1.85sg. The LOT did not provide the typical straight line before curving over and so was repeated. Subsequent review of offset Leak-off tests at this depth indicates a local problem associated with plastic shales may have been responsible for the unclear result.. The 1.85sg value was higher than had been predicted but in line with offset LOT results. This increased fracture pressure meant that there was no problem drilling to the planned casing setting depth of 1646m

Drilling the section progressed without problem. The directional work was achieved with the inclination being only slightly behind the planned curve. By section TD the inclination had reached the planned 20.2º. There was no sign of any significant hole problems and the wellpath had avoided the fractures that could have potentially resulted in well control incidents, such as occurred on the 1/5-3S well. ROPs were reasonably good, even during the directional work after kicking off at 1200m the ROP was around 30m/hr.

A KCl/Glycol mud system was used in the 17 ½" hole section, this was selected to provide shale inhibition in this traditionally difficult section. Considerable focus was placed upon maintaining the required mud parameters throughout the section, this is often a difficult task given the high ROP and dilution requirements but was successfully achieved in this case. The entire section was drilled with the highest anticipated mud weight required, which was 1.50sg (this increased to 1.55sg by section TD).

At section TD there were indications that the hole was not cleaning up, hence a tandem low weight – high weight sweep was pumped to aid cleaning up the hole. This sweep brought back a lot of cuttings and cavings and resulted in causing a surge in pressure that was recorded by the PWD to be 1.96sg. Losses resulted followed by indications that the well was flowing. The well was closed in, the pressure bled off and the well was static. The subsequent trip out of the hole proved to be very difficult with numerous tight spots packing off around the BHA. A lot of fines were also circulated out of the hole.

Recommendations / Conclusions

1. Pills can be too effective and create more problems than they solve. If pills have not been regularly pumped, the first pill should be selected to give an indication of hole cleaning problems and avoid overloading the annulus.
2. The BHA performed well and this directional BHA is recommended for any similar applications for a similar build rate or less. If a higher build rate had been required a higher bend angle would have been necessary.
3. Although the hole conditions were not perfect, they were better than many of the offset wells proving that this section can be drilled with the KCl/glycol mud system. The method of keeping the mud weight high rather than starting low and increasing the mud weight maintained stability and made it easier to maintain stable mud parameters and concentrations.
4. Hole conditions were aided by the fact that this hole section was relatively short, this shale section commonly has a time dependent stability, hence careful review of the risks would be required before considering pushing the 17 ½" hole deeper.
5. The Derrick shakers worked extremely well. This is believed to be as a result of the work carried out between Odfjell and Swaco to optimise the shaker screen selection. XR flat screens were used. Losses at the shakers were controllable despite the high flowrate, this in-turn helped reduce maintenance requirements on the mud properties.
6. LOTs should be performed by the Dynamic pumping method when the casing seat is in a shale.

2.4.8 Run Wireline Logs

			Classification (Hours)						
AFE hrs	Actual	% of AFE	Productive	Weather	Rig	Service Co	Other	Hole	Unplanned
21.6	29.5	137	6.5	0	0	0	0	23	0

The wireline logging tools were run but were held up at 374m inside the 20" casing. As a result, the decision was taken to cancel the 17½" wireline logging run, which would have acquired sonic and density data. A bit run was made afterwards to clean-up the hole and after cleaning up inside the casing around the depth the logging tools hung up, the hole was found to be in good condition.

Recommendations / Conclusions

1. The debris inside the 20" casing is likely to be related to the highly effective but troublesome sweep that was pumped prior to pulling out of the hole with the drilling assembly. A further reason for care when selecting the correct pill type and volume.
2. Logging of the 17.5" section of the well was cancelled after the tools were unable to pass through a gumbo obstruction in the casing giving 2500lbs overpull. Fear of sticking a nuclear source was the key factor in this decision. The wiper trip confirmed that the openhole was in good condition and that logging could probably have been done. Perhaps a more detailed review of the necessity for top hole logs should be conducted in the planning phase.

2.4.9 Run & cement 14" casing

			Classification (Hours)						
AFE hrs	Actual	% of AFE	Productive	Weather	Rig	Service Co	Other	Hole	Unplanned
50.4	55.25	110	55.25	0	0	0	0	0	0

The 14" casing was run in the hole to 1646m, without notable problems though the casing running job progressed more slowly than expected. Note, 14" casing was used to provide the option of running an 11 ¾" contingency liner in the event of a problem in 12 ¼" hole. Filling every 5 joints appeared to be the main factor slowing the operation down. The La Fleur circulating packer was used, but could not fill while running in because of its location above the BX elevator.

The cement job was carried out, the seal assembly set and tested and the BOP tested without problems.

Recommendations / Conclusions

1. Need to consider the use of self-filling float equipment when using BX elevators, because of fill-up limitations.
2. Cement darts should be pre-installed in the cement head onshore for the first job with that cement head. For subsequent jobs the cement head will have been left racked in the derrick hence this only applies to the first job.

2.4.10 Drill 12¼" hole

			Classification (Hours)						
AFE hrs	**Actual**	**% of AFE**	**Productive**	**Weather**	**Rig**	**Service Co**	**Other**	**Hole**	**Unplanned**
153.6	202.75	132	130.58	0	1.75	37.75	0	32.67	0

Shortly before drilling this section Halliburton made an attractive commercial offer to run their Geopilot rotary steerable tool. The offer was accepted on the basis that cost should be the same as the slickbore BHA planned, a smoother wellbore should be produced and continuous rotation should provide better hole cleaning. On the downside the tool had relatively few runs, hence reliability was questionable and lost in hole costs could be high if problems were encountered.

The shoe track was drilled out slowly and the WBM displaced to 1.75sg XP-07 OBM. The LOT once again did not show a typical trend and this was attributed presence of plastic shales. The LOT value chosen was 1.90sg. Once again this was higher than had been prognosed and gave the potential for extending the 12¼" section to case off more of the overburden before drilling the reservoir section.

The Geopilot had problems at the beginning of the run, a tool software problem prevented communication with the surface pulsing system, which inturn prevented automatic orientation. Orientation of the tool was successfully achieved in manual mode (similar to a motor) this added approximately 6hrs of operational time at the start of the run when tool orientation was required each stand.

A short distance below the shoe, hard Limestone stringers held up progress significantly. These had not been identified to be a problem in the planning stages and it may be that at this inclination the stabilisers were hanging up on the ledges. Additional difficulties were experienced due to cement blocks falling in on the BHA. The earlier rat hole had been kept to as little as 6m specifically to try to avoid this problem. The cement blocks were cleared and the limestone stringers passed after some time and drilling continued to 2584m without difficulty. During this section hole cleaning appeared to be good and the directional work had been achieved with the inclination at 52º. ROP was slightly slower than expected.

At 2584m the hole packed-off and the assembly had to be jarred free. The hole problems continued for the next fifteen hours in which time a further 14m had been drilled and a ten-stand wiper trip performed. A gas peak of 16.5% at 2584m with associated oil on cuttings and a subsequent MWD resistivity log confirmed that a fracture had been encountered and was the cause of the problems. Drilling continued to 2660m whereupon the hole packed off again on encountering another fracture, and eventually stuck in a hard limestone. After twenty minutes the string was free and circulation re-established. Each time the BHA was reamed down the hole packed off just as the BHA tagged bottom. The Geopilot then failed due to parting of an electronic cable caused by the jarring. At this point six and three-quarter hours had been lost dealing with hole problems since reaching 2660m. The trip out of the hole to change the BHA required some back-reaming through tight spots particularly through high dogleg sections in the build interval 1700 – 1850m . At 1821m the string pulled tight and 4m^3 of mud were lost downhole. Circulation from that depth brought back cuttings a small volume of cavings which appeared to be from the fracture at 2560m but had accumulated in the high dogleg section. The trip out was completed without further problems. A large amount of wear was noted to some of the components of the Geopilot tool. The bit had broken teeth on the transition from nose to taper, indicating that it may have become damaged due to bit bounce through the limestone sections.

The replacement BHA consisted of an adjustable gauge stabiliser assembly on a rotary assembly. A rotary assembly had been selected because of the drilling problems encountered on the previous trip and the desire to keep maximum rotary speed to aid hole cleaning, ie there was concern that the Geopilot geometry may have been causing the packing off problems encountered. The trip in the hole was uneventful with the hole apparently in very good condition. Drilling resumed slowly due to hard limestone stringers to 2675m. High torque values were required when drilling through tight limestones, but notably packing off did not occur, indicating that the packing off problem observed on the previous run was likely to be related to the Long Guage bit or the BHA.

After making a connection at 2675m it took three and three-quarter hours to ream back to bottom due to high torque problems. It was thought that problem could have been due to limestone lumps falling in the hole. The hole was drilled to section TD of 2879m. TD was called at this point using well log correlation of the Eocene. The TD criteria was to get to 50m above top Balder ensuring that the 9 5/8" hole was set before encountering a Palaeocene sand. The trip out was clean, other than one small section at 2694m to 2644m. The PDC bit was graded 3/6 and showed similar wear to the previous bit with broken teeth on the shoulder.

Recommendations / Conclusions

1. The LOT at the 14" casing shoe was difficult to interpret so was repeated. The first LOT was performed using the static method ie. pumping a set volume and holding to monitor the pressure, where as the second attempt was performed using the dynamic method ie. pumping slowly but continuously and recording pressure build up.. The second method provides the clearest indication of the correct leak-off value and is the recommended method when attempting leak-off tests in a shale. However, subsequent analysis of the downloaded PWD

data indicated that a leak-off never actually occurred, ie. what appeared to be a leak-off on surface was a combination of the plastic shale inaccuracy of the measurement and possibly OBM compression.

2. The rat hole below the 14" casing had been kept as short as possible, at 6m. Despite that, problems may have occurred with cement blocks, indicating the importance of minimising the rat hole in inclined wells.
3. Running a rotary steerable tool in an exploration well is a risk balanced decision. The tool should provide better directional control, hole cleaning and drilling performance, however risks becoming damaged in the uncertain drilling conditions. The use of a rotary steerable in this application avoided and minimised hole cleaning and directional problems, but may have contributed to the packing off problem. The rotary steering tool finally failed when an electrical contact broke during jarring. Given the variable drilling conditions, it is unlikely that a motor assembly would have been able to achieve the section in one run and performance would almost certainly have been poorer given the amount of directional work required.
4. The pre drill wellbore stability and the fracture combat plan significantly contributed to the awareness of the risks and a good understanding of the situation when problems occurred. Because of this inappropriate actions, such as increasing mud weight, were avoided.
5. On occasions the drill string became stuck for short periods. The fact that the string was always freed without losing excessive time is an indication of the benefit of and experienced crew and the stuck pipe prevention training the rig crews had undertaken.
6. The 12 ¼" drilling performance could have been improved had the frequent limestone stringers been prognosed and planned for. A more detailed review of offset shallow formations should be conducted when planning exploration wells.
7. The PWD proved to be very useful for interpretation of the problems, e.g. indicating that the pack-offs were below the PWD sub & better understanding of the leak-off.
8. The section TD criteria, was developed during the hole section, ensuring that all those directly involved in the operation understood the issues and criteria. Well log correlation was more difficult in this location than had been expected. The use of a Biostratigrapher for 12 ¼" TD had not been considered necessary in the pre-well planning, if he had been present this may have helped reduce uncertainty but is unlikely to have changed the result. In the end the TD selected was proven to be at the optimum depth.
9. The Swaco / Clyde Blower cuttings collection system worked well and did not reach the limitations of its capacity. Its continued use is recommended.
10. LCM pills were pumped in an effort to seal potential fractures in the 12¼" section, in theory sealing potential fracture zones and avoiding invasion to limit instability. There was little evidence of losses or instability, hence the theory and effectiveness remains unproven from this well.
11. The mud system and weight selected maintained a good hole condition throughout, very few cavings were observed all of which were believed to have come from a hydrocarbon bearing fault at 2560m and 2660m.

2.4.11 Run & cmt 9-5/8”

			Classification (Hours)						
AFE hrs	Actual	% of AFE	Productive	Weather	Rig	Service Co	Other	Hole	Unplanned
50.4	72.5	144	56.75	0	8	0.75	7	0	0

The 9-5/8” casing was run in the hole much more slowly than had been expected. The speed of the operation was hampered by the inability to fill the casing on the fly with the LaFleur fill-up tool and the speed at which the fully automated handling system could be used.

At 2840m the casing took weight, it was washed to 2845m before progress stopped and fines were circulated out the hole. At this point the hole also packed-off and circulation was lost temporarily. It was not possible to make further progress in the hole with 50t slack-off or pull the casing out of the hole. After applying almost all of the casing weight as slack-off the casing started to move downwards. Slow but steady progress was made by reciprocating the pipe and by applying high slack-off loads. Approximately seven hours after taking weight and, the casing was eventually landed with the shoe at 2873m. The cement job was conducted with a Gascon slurry throughout (tail slurry only) to cement off the annulus above the point that any hydrocarbons had been seen in the returns during drilling and above the top of the chalk. Operator unfamiliarity with the remote control cement unit resulted in cement weight variance during the first part of the job. The last 30bbls was mixed in batches in the tub to ensure a consistent weight could be achieved over the shoe.

The BOP was tested in preparation for drilling the reservoir section. Prior to making up the 8½” BHA the IBOPs had to be replaced and the yellow BOP pod was pulled to re-route a pilot line.

Recommendations / Conclusions.

1. Consider the use of a auto fill shoe or examine alternative fillup options compatible with BX elevator equipment.
2. The 9-5/8” casing string include a reamer shoe. This shoe was utilised towards the end of the section. Without the shoe the casing may not have landed so it is recommended to continue the use of that type of equipment for sections where it is anticipated that it could be difficult to get the casing down.
3. It was difficult to give an accurate estimate of BHT at 12 ¼” TD due to the effects of the salt dome. The recipe was tested at a range of temperatures. Halliburton expected the MWD circ temp to be unrepresentative due to friction effects, however the MWD was proven to be quite accurate.
4. At least one cementer should have used the cement unit previously for mixing slurry. This is particularly important when using a remotely operated unit.

5. A stripping drill was performed whilst running in the hole to drill out the shoe track. The crew had not undertaken this type of drill before and it proved a useful education for them. Rigs new to AH should complete such drills as an assessment of their competence and of the rig equipment.

2.4.12 LOT, Drill 8½" hole

			Classification (Hours)						
AFE hrs	**Actual**	**% of AFE**	**Productive**	**Weather**	**Rig**	**Service Co**	**Other**	**Hole**	**Unplanned**
345.6	81.5	24	79	0	2.5	0	0	0	0

The 8½" BHA consisted of a PDC bit and a variable gauge stabiliser. A motor was not run as the intention was to keep the MWD tools as close to the bit as we could to help pick coring point. However the variable gauge stabiliser was necessary to be confident of hitting the target. The variable gauge stabiliser proved to be successful in building and dropping as required.

The mud weight was 1.78sg and a LOT value of 1.96sg was achieved. Drilling continued at a low ROP because the PWD sub showed that the ECD during drilling with 1500 LPM was as high as 1.91sg. The high ECD was primarily a result of continuing to utilise the 5 ½" drillpipe. The reduced flowrate was still capable of achieving high annular velocities and hence good hole cleaning. It did however compromise the bit hydraulics and was below the minimum specification of the MWD. Drilling continued until TD was called at 3090m, 190m TVD / 295m MD earlier than predicted having reached the geological TD criteria (presence of evaporites). No problems were experienced tripping out of the hole.

Recommendations / Conclusions

1. The use of the variable gauge stabiliser was successful in this application for controlling build and drop tendencies. For this application, a simple 2 stage stabiliser was sufficient to achieve the desired results.
2. The ECD was high as shown by the PWD sub. The use of the PWD sub allowed the operational parameters to be adjusted to minimise the effects.
3. The 7 1/4" tool joints on the 5½" drill pipe along with the relatively high mud weights. This should be taken into account, in the choice of 5½" versus 5" drill pipe for the 8½" hole section and assessed by reviewing hydraulic models.

2.4.13 Run Wireline Logs

			Classification (Hours)						
AFE hrs	Actual	% of AFE	Productive	Weather	Rig	Service Co	Other	Hole	Unplanned
24	38.5	160	31	0	0	7.5	0	0	0

The first logging run, GR/HDIL/MA, reached TD after a little difficulty passing 2948m. The second logging run, ZDL/CN experienced no problems. The HDIL was required because there was some doubt over the MWD resistivity results and the two wireline tool runs could not be combined because there was not sufficient rat hole. Some time was lost before running the log in trying to obtain the MWD memory data to determine whether or not the second wireline log would indeed be required.

7 ½ hours lost time were recorded due to intermittent problems with the FMT toolstring. Finally the replacement tool run was successful and gained four good pressure points. A sample was taken from the sandstone interval and the logging completed.

Recommendations / Conclusions

1. The smaller than typical rat hole of 6m in 12 ¼" hole, was successful in that the logging tools were able to pass the rat hole without problem even at 54 deg inclination.
2. The HDIL was essential for analysis of the water saturation of the Palaeocene Andrews sandstones.
3. Some time was lost preparing the FMT. This was partly due to lack of time for the Atlas crew to prepare their equipment before logging began. However this was a consequence of circumstances beyond our control, i.e. earlier than expected TD and lack of available helicopter seats due to strike action.
4. The wireline rig-up was not optimal, there was no line of site to the rig floor and rig-up took twice as long as expected.

2.4.14 Abandon well, pull anchors.

			Classification (Hours)						
AFE hrs	Actual	% of AFE	Productive	Weather	Rig	Service Co	Other	Hole	Unplanned
160.8	134	83	108.5	0	0	4.25	0	13.75	0

The entire open hole section was filled with a two-stage cement plug. No losses were recorded and the plug was tagged at 2676m, which was 76m below calculated depth but still high enough above the shoe to satisfy the requirements.
An EZSV packer was then set at 610m as a base for the next plug. The 9-5/8" casing was cut at 510m and was successfully pulled after three attempts to latch the casing spear.

The well was displaced to sea water, flow was detected and the well was displaced back to the 1.78sg mud. The third cement plug was spotted. The cement stringer was found to be caked in cement when it was pulled out of the hole indicating that the cement was setting sooner than had been expected. The TOC was tagged at 326m which was 34m high suggesting that perhaps it had been dragged up the hole a little. The 9 5/8" x 14" annulus was successfully pressure tested.

The 14" casing cutter was run but held up at 123m. Hence a clean-out run had to be performed and the 12" mill was run to 341m. The 14" casing cutter was re-run and the casing cut at 335m.
The final cement plug was then placed from 341m to 120m. However this plug failed to test. The reasons for this are unknown as all aspects of the job appeared to be according to plan and the plug was tagged at 122m. A final 2.6m3 of cement was squeezed on top of the last cement plug and a successful pressure test was performed 35bar (500psi) above the 20" LOT value.

The BOP was pulled and the MOST tool run to cut the 20", 30" and recover the wellhead. The cut progressed well, 5m below seabed, but it took some time to latch onto the wellhead, due to swarf affecting the Most tool mechanism. Eventually the wellhead was successfully pulled and laid down.
Anchor handling operations went well other than one major problem. When recovering some of the chain from one of the additional anchors the chain was allowed to go slack as the boat came around the rig. The slack should have been taken in by the rig winch. At the same time the rigs thrusters were in operation to keep the rig on station, since the other 2 anchors had been slackened to allow the boat to pass over them. As a result the soft line and wire connected to the chain became sucked into the thruster and wrapped itself around. It took several hours for the ROV to free the tangle, however only 2 hours of operational time were lost.

Finally at the end of the anchor handling operations back-loading needed to be completed before the rig went off hire. The worsening weather and a damaged whip line on the crane caused this to take six hours when only one to two hours were expected. The rig went off hire at 19:55 on the 24th May 2002, after 39.4 days on hire.

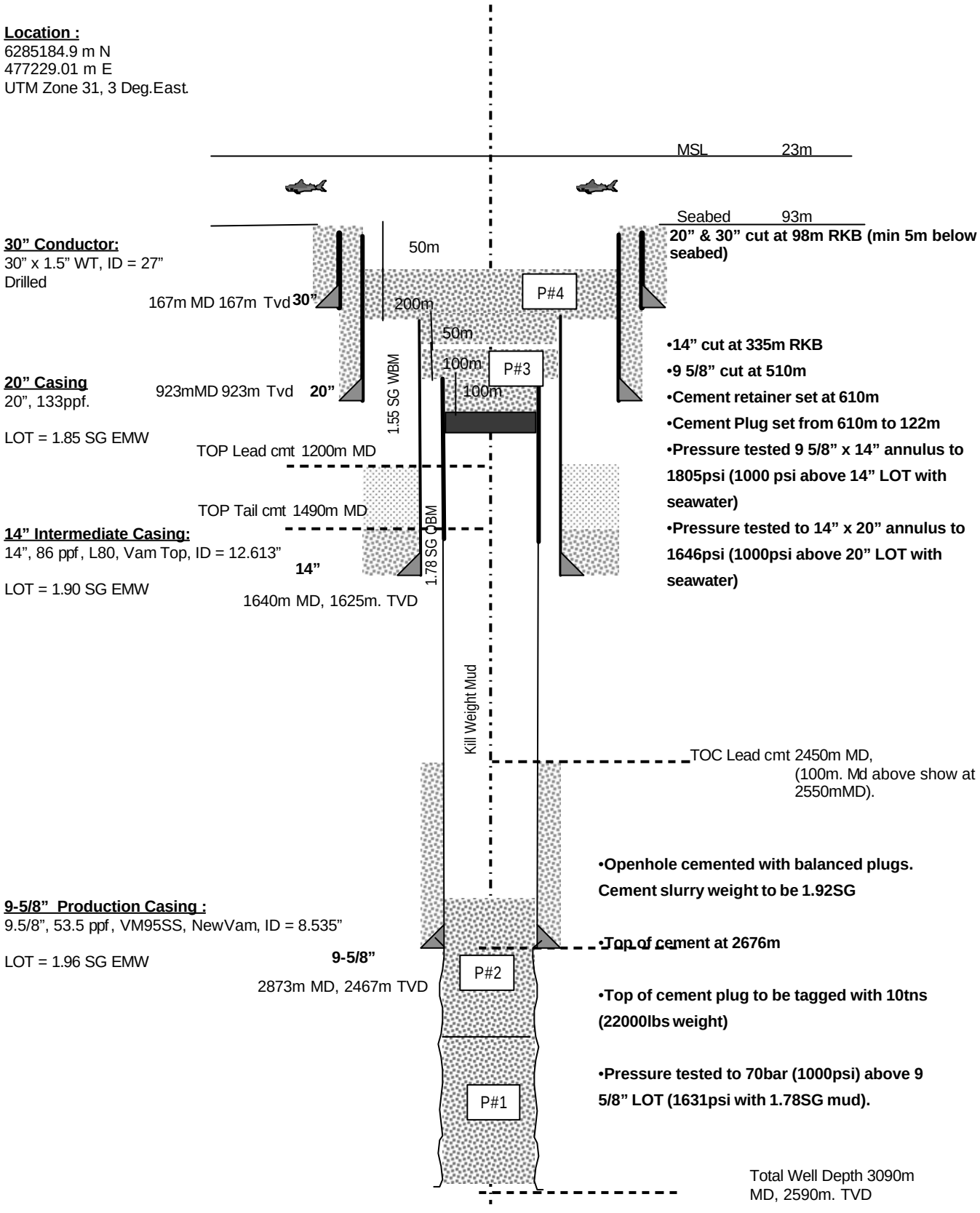
Recommendations / Conclusions

1. The flow observed from the 9 5/8" x 14" annulus was most likely due to relaxation of the plastic clays. A monitoring period could have been used to confirm a diminishing trend and avoid the need to displace back to OBM.
2. The displacement back to OBM resulted in a significant amount of oil contaminated fluid being accumulated and subsequently sent onshore for treatment. Displacement back to WBM or the use of an offshore treatment plan would have minimised the cost and handling requirement.
3. Combined fishing & wellhead tool BHAs were used. This successfully reduced the tripping time and this practice should be continued for future wells.

4. The second cement plug was dragged up the hole a little. Due to the thixotropic nature of this accelerated slurry, a little extra thickening time would have been better.
5. The casing cutting assembly should be run with a mill rather than bull nose in case cement has been dragged up the casing. Of course the mill could only be used at low flow rates to avoid activating the cutters.
6. Before mixing WBM in a pit that contained OBM, the cleanliness of the pit needs to be improved to avoid contamination and thereby prevent dumping of the WBM. Subsequent disposal of contaminated WBM is expensive.
7. The cement squeeze slurry was mixed at a density over 2sg and this proved to be effective.
8. The MOST tool had difficulty latching onto the casing due to swarf. Weatherford are looking into modifications to the MOST tool to further improve the system for this problem.

Well: 1/5-4S

Actual Abandonment Schematic



Date: Rev. 00, 15/05/02, KSM

1/5-4S (K1T1) Bit Record Section 2.6

Date Bit was Put Into Hole	Manufacturer of Bit	Manufacturer's Name/Designation	Serial number	Nominal Size	Bit Number	Depth Bit was Put Into Hole	Depth Bit Was Pulled Out of hole	Depth Drilled m	ROP m/hr	Bit Inner Tooth Condition	Bit Outer Tooth Condition	Bit Gauge Condition	Bit Dullness Condition	Bit Bearing Condition	Location of Major Bit Wear	Other Areas of Bit Wear	Reason For Bit Being Pulled	(N) New or (U) Used	Bit Revsk	Total Flow Area	Comments
15-04-2002	Security DBS	XLC1	745506	251	1	93	928	835	61	1	1	I	WT	E	A	NO	TD	N	79	574	9 5/8" Pilot bit
16-04-2002	Security DBS	XT1C	739416	445	2	93	168	75	11	1	1	I	WT	E	A	NO	TD	N	72	557	17 1/2" pilot bit below hole opener
18-04-2002	Security DBS	XT1C	739416	445	2RR	168	168	0	0	1	1	I	WT	E	A	NO	TD	R	46	557	Wiper trip
20-04-2002	Security DBS	SS33SG	737297	660	3	168	928	760	33	1	1	I	WT	E	A	NO	TD	N	275	1,173	Motor Assembly
24-04-2002	Security DBS	XT3LC	745300	445	4	928	1,646	718	28	1	1	I	WT	E	A	NO	TD	N	271	1,132	Motor Assembly, build to 20deg
28-04-2002	Security DBS	XT3LC	745300	445	4RR1	1,646	1,646	0	0	1	1	I	WT	E	A	NO	TD	R	0	1,132	Wiper trip
01-05-2002	Security DBS	FM2743	5009442	311	5	1,646	2,660	1014	31	2	4	I	BT	X	T	WT	DTF	N	241	1,105	Long guage bit on geopilor assembly, build and control strong RH walk. ROP restricted by directional control requirements, packing off problems and hard limestone stringers.
07-05-2002	BBL	BB657XA	121903RR	311	6	2,660	2,879	219	12	3	6	I	BT	X	T	WT	TD	R	148	1,081	Rotary assembly, ROP restricted by TD selection investigation.
13-05-2002	Security DBS	FM2845	5011370	216	7	2,879	3,090	211	6	1	1	I	WT	X	S	NO	TD	N	152	689	Rotary assembly, ROP and flowrate controlled for ECD.

2.7 Service Companies

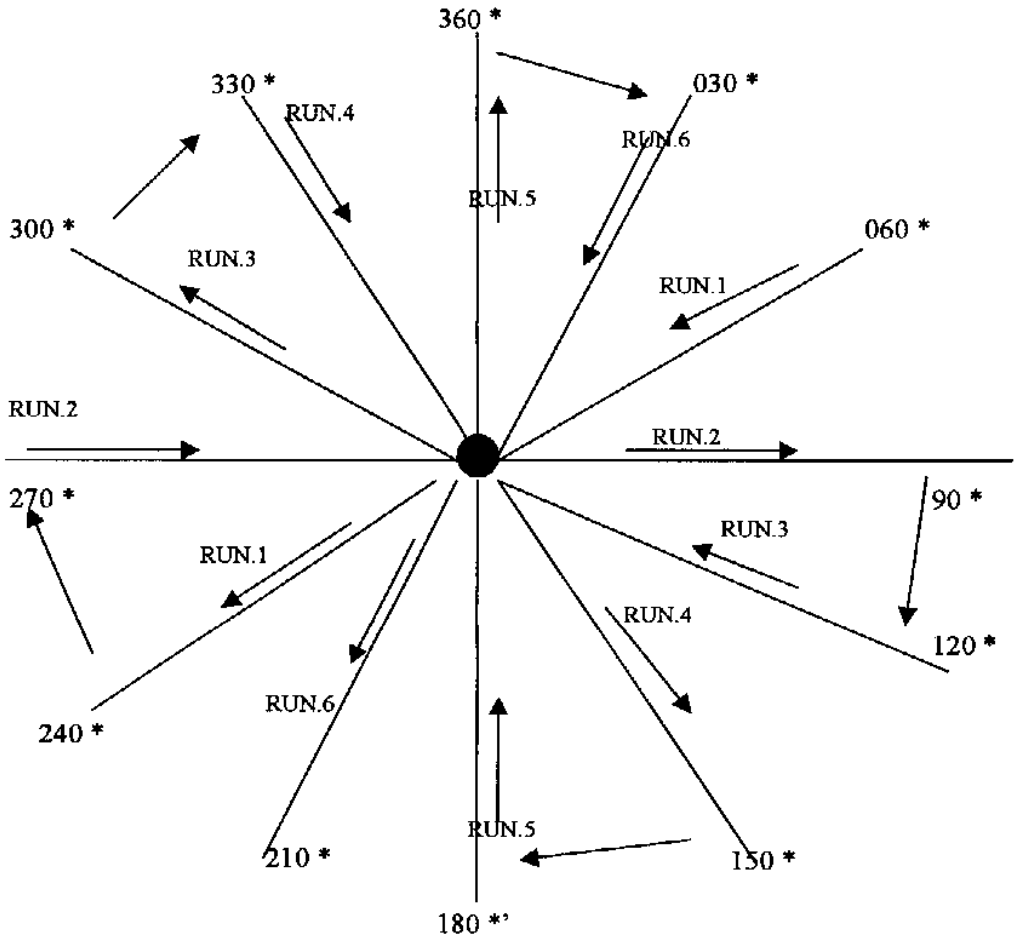
Service	Company	Office Location
Rig Contractor	Odfjell	Bergen / Oslo
Mud Logging	Halliburton (Sperry Sun)	Stavanger
Drilling Fluids	Halliburton (Baroid)	Stavanger / Oslo
MWD	Halliburton (Sperry Sun)	Stavanger
Directional Drilling	Halliburton (Sperry Sun)	Stavanger
Cement	Halliburton	Stavanger
Wellhead System	DrilQuip	UK
Liner Hanger System	Baker	UK/Stavanger
Conductor	Dril Quip	UK
Casing Running	Odfjell	Bergen
Fishing	Weatherford	Stavanger
Centifuge	Alfa Laval	Stavanger
OBM Cuttings Collection	Swaco / Clyde	Stavanger / Aberdeen UK
Coring	Corpro	Stavanger
Wireline	Baker Atlas	Stavanger
Shorebase	ASCO Tananger	Stavanger
Bits	Smith / SDBS/Hughes/BBL	Stavanger / UK
Weather	Ocean Routes	UK
Rig Move	Trident / Odfjell	UK / Stavanger

2.8 Summary of Non-Productive Time

					Classification (Hours)						
Operations	**Cum AFE Days**	**AFE hrs**	**Actual**	**% of AFE**	**Productive**	**Weather**	**Rig**	**Service Co**	**Other**	**Hole**	**Unplanned**
Move Rig on Location	1.10	26.40	7.50	28%	7.50	0.00	0.00	0.00	0.00	0.00	0.00
Drill Pilot Hole	3.50	57.60	26.50	46%	26.50	0.00	0.00	0.00	0.00	0.00	0.00
Drill 36" hole	4.30	19.20	18.50	96%	18.50	0.00	0.00	0.00	0.00	0.00	0.00
Run and Cement 30" Casing	5.20	21.60	61.00	282%	22.50	0.00	0.00	1.00	37.50	0.00	0.00
Drill 26" hole	8.10	69.60	46.50	67%	46.50	0.00	0.00	0.00	0.00	0.00	0.00
Run 20" Casing	9.20	26.40	27.50	104%	26.00	0.00	0.00	0.75	0.75	0.00	0.00
Run BOP	10.60	33.60	22.75	68%	22.75	0.00	0.00	0.00	0.00	0.00	0.00
Drill 17 1/2" hole	15.90	160.80	89.75	56%	84.25	0.00	0.50	0.00	1.00	4.00	0.00
Attempt wireline, cleanout 17 1/2" hole	16.80	21.60	29.50	137%	6.50	0.00	0.00	0.00	0.00	23.00	0.00
Run 14" Casing	18.90	50.40	55.25	110%	55.25	0.00	0.00	0.00	0.00	0.00	0.00
Drill 12 1/4" Hole	25.30	153.60	202.75	132%	130.58	0.00	1.75	37.75	0.00	32.67	0.00
Run 9 5/8" Casing	27.40	50.40	72.50	144%	56.75	0.00	8.00	0.75	0.00	7.00	0.00
Drill 8 1/2" hole	41.80	345.60	81.50	24%	79.00	0.00	2.50	0.00	0.00	0.00	0.00
Log 8 1/2" hole	42.80	24.00	38.50	160%	31.00	0.00	0.00	7.50	0.00	0.00	0.00
P&A	49.50	160.80	134.00	83%	108.50	0.00	0.00	4.25	0.00	13.75	7.50
P/U Anchors	50.00	12.00	31.92	266%	30.17	0.00	1.75	0.00	0.00	0.00	0.00
	Total		**945.92**		**722.08**	**0.00**	**14.50**	**52.00**	**39.25**	**80.42**	**7.50**

POST SEABED SURVEY.

23.05.02 **DEEPSEA BERGEN**
RIG HEADING.132'



Seabed survey of well 1/5 4S is carried out by sonar using on 75 m range.
No objects found.

Lars Tveito

ROV Supervisor

Section 3.0

FORMATION DATA

3.0 FORMATION DATA

3.1 Formation Temperature and Circulation Data

The following table shows maximum recorded temperatures during the wireline logging runs. Mud Temperatures from the flowline and the active mud pits were recorded by Sperry-Sun Drilling Services and results are presented on their Pressure Evaluation Log appended to their report "*End of Well Report- Surface Data Logging, Amerada-Hess 1/5-4S*".

	Run No		
	2A	**2B**	**2D**
TTRM (° C) Max	107.2	118	111.3
Depth	3088.5	3088.5	3035
Hours since circ. stopped	15.45	23.55	40.25
Circ stopped at time	22:05 hrs 15/05/02	22:05 hrs 15/05/02	22:05 hrs 15/05/02
Duration of last circ. (hrs)	01:55	01:55	01:55

FORMATION TEMPERATURE FROM LOGS

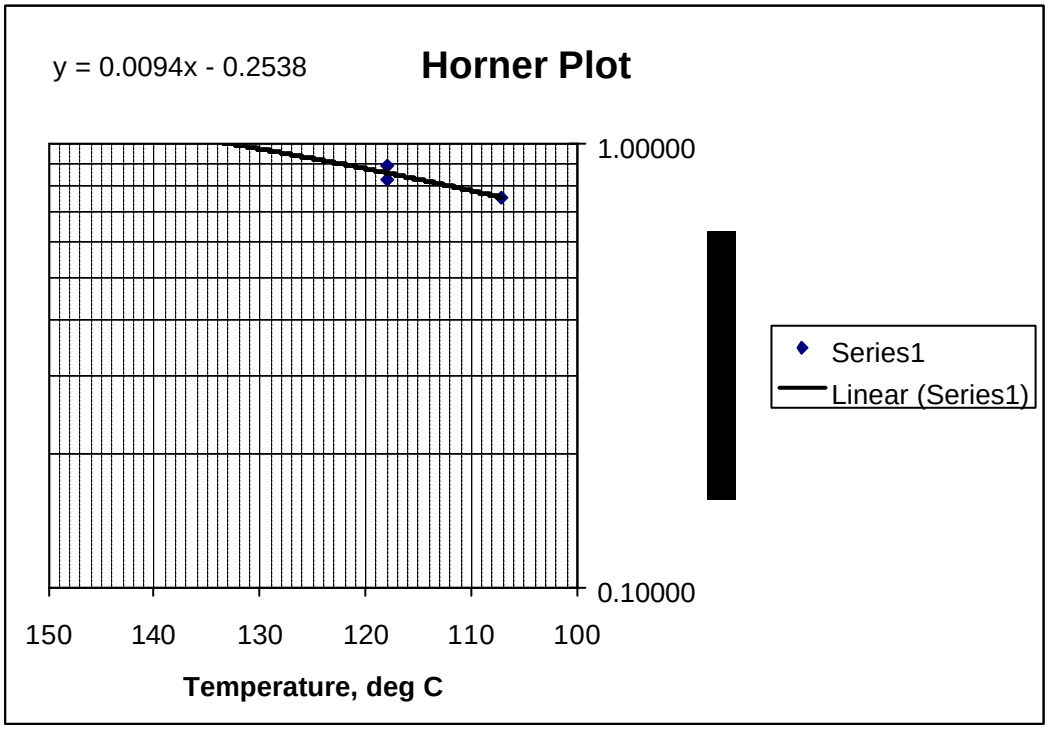
Amerada Hess Norway **WELL: 1/5-4S** **Geologist: _____**

LOG SUITE #2 **Depth 3088m** **Date: _____**

Horner-Fertl Method

Run #	Log	Max. Rec BHT, deg C	Duration of Last circ t, hrs	Time since Circ stopped dt, hrs	dt/(dt +t)
1	HDIL	107.2	5	15.45	0.75550
2	ZDEN	118	5	23.55	0.82487
3	FMT	118	5	40.25	0.88950
4					

Bottom Hole Temperature at 3088m (X-intercept from chart = 133,0 deg C'



3.2 Pore Pressure.

Overburden gradient estimates were generated utilising wellsite bulk density data and offset well information from 1/5-3 and 1/6-3. The cancellation of the 17 ½" logging programme due to wellbore instability problems resulted in a heavy reliance on offset wells for the overburden.

Pore pressure was estimated by the Amerada-Hess wellsite geologist in consultation with the mudlogging contractor (Sperry-Sun). Support, in the form of prognoses and offset analyses, and periodic analysis of the MWD resistivity was provided by AHN in Oslo.

The principal tool for real-time analysis was calculation from the modified drilling exponent (Dxc) using Eaton's Method:

$$P = S - (S - N) \times (Dxco / Dxcn)^{1.2}$$

Where:

P = Pore Pressure
S = Overburden Gradient
N = Reference Trend Gradient
Dxco = Observed Dxc
Dxcn = Normal Trend Dxc

Consideration was also given to mud/gas relationships and general hole conditions. Periodic reviews were conducted using the MWD deep phase resistivity data.

26" Hole section (1676-928m) drilled with water-based mud.

Pore pressure was identified at the wellsite using Drilling Exponent data, as being normal down to the TD for the 26" hole at 928m. Since the section was drilled riserless, no information was available with regard to cuttings character, cavings or gas.

17 ½" Hole section (928-1646m) drilled with WBM

A Leak-Off Test was conducted at 931m (20") shoe. Results were at first inconclusive due to plastic deformation of the sediments but formation strength was eventually calculated to be 1.85 SG (15.41 ppg) which was higher than expected.

On drilling out of the 20" shoe, parameters were controlled, such that Drilling Exponent Data were not usable until 1060m MDBRT. (MWD resistivity logs suggested that it was around this point where the onset of abnormal pore pressure began). Increasing pore pressure from the Dxc was seen from 1200m. Pressure appeared to increase steadily from that point to a maximum of 1.46 SG (12.16 ppg) at 1400m MDBRT, rising to 1.5 SG at 1646m MDBRT, (1632.5m TVD). There were no pressure indications from connection gasses or cuttings shape during the drilling of this section.

Subsequent analysis of the MWD Resistivity data indicated that pore pressure had reached 1.62 SG (13.51 ppg) at 1646m MDBRT, and was still increasing. The difference in the absolute pore pressure estimates between Dxc and analysis of MWD resistivity can be attributed to the placement of the normal compaction trend line. A comparison was made with offset well data and the resistivity logs were very similar.

Onset of abnormal pore pressure from 1080m as identified from MWD resistivity logs. Prior to analysis the resitivity logs were corrected for temperature using the folowing equation:

R2=R1[{T1+21.5}/{T2+21.5}] Celcius

12.25" (1646-2879m) hole section drilled with OBM

The 12.25" section of the well was drilled using PDC bits and a mud motor making the Dxc less reliable. The trend was shifted in order to carry on from 1.5 SG established from Dxc from the 17.5" section TD. The trend was seen to continue to increase to 1.65 SG at 2879m MD, (2470 TVD). By contrast the subsequent MWD resistivity analysis indicated

a pore pressure of 1.74 at this depth. Again the difference between Dxc and MWD log interpretation of pore pressure is attributable to the positioning of the normal compaction trend line.

Gas and cuttings shape did not indicate any pressure problems during drilling, with the notable exception of 3 interpreted fracture zones. These were identified from the resistivity log at 1711, 2585 and between 2655-2660 m. The breciated fractures were associated with minor packoff around the BHA. This had been expected and the situation was dealt with swiftly and efficiently.

8 ½" Hole Section. (3730 m to 4153 m) drilled with OBM

Most pore pressure analysis techniques apply to marine claystones. Other lithologies such as Tuffs and Limestones, as were common in this hole section, need to be filtered out from the data in order to determine good estimates of pore pressure. In addition to the issues of lithology, drilling was controlled in part making use of the Dxc difficult. In addition there were very few other pressure indicators (Gas and cuttings shape) to assist in establishing pore pressure whilst drilling. The wellsite team therefore assumed pore pressure remained between 1.66 - 1.65 SG. (Re Halliburton End of Well Report: Surface Logging Data, 1/5-5S).

By contrast, analysis from the MWD resistivity log suggested a maximum pore pressure of 1.75 at 2520 m TVD, cutting back with depth. FMT pressure measurements in the Andrews sandstone stringer at 2944 m (2507m TVDm) gave a direct pressure measurement of 1.75 SG, and in the chalk at 3029 m (2556 m TVD) of 1.74 SG. These points confirmed the resistivity analysis and confirmed the cutback in the pressure gradient. (Fig. 3.1)

Pressure Interpretation Sheet

Well	**1-5-4S**	*Permit*	**PL 144**
Type of well	**Deviated Exploration**	*Maximum Deviation*	**55.4 Degrees @ 2903 m**
Type of survey tool	**FMT 10lt Flush tank/4 lt sample chamber**	*Acquisition date*	**17/05/02**
Reference Datum	**MSL**	*Rotary Table Elevation,m*	**23.0**
Mud Weight	**1.78** *sg* **0.770** *psi/ft*		

Tool Set	MD mBDF	TVDRT mBDF	TVDSS m	Hydrostatic Press. bef. bar	Hydrostatic Press. after. bar	Fm Pr bar	DDMob mD/cP	T °C	Time	Fm Pr G. bar/m	Fm Pr G. sg	Mud G bar/m	Mud G sg	Comments, w/ pre-test vol
1	2944.8	2507.3	2484.3	433.30	433.00			102.6	14:00	0.000	0.000	0.147	1.762	Lost seal?
2	2944.3	2507.0	2484.0	432.80	432.50	431.50		103.7	14:07	0.147	1.758	0.147	1.760	Still building very slowly
3	2945.3	2507.6	2484.6	432.70	432.50	431.03	1.8	104.9	14:20	0.146	1.755	0.147	1.759	Good test?
4	2954.0	2512.6	2489.6	433.84	433.60			105.5	14:30	0.000	0.000	0.147	1.760	Tight
5	2953.4	2512.3	2489.3	433.40				105.9	14:33	0.000	0.000	0.147	1.759	Tight
6	2953.2	2512.2	2489.2	433.40	433.40			107.2	14:45	0.000	0.000	0.147	1.759	Tight
7	2973.5	2523.9	2500.9	436.30	436.00			107.6	14:57	0.000	0.000	0.147	1.762	Tight
8	2995.6	2536.7	2513.7	438.80	438.55			108.0	15:22	0.000	0.000	0.146	1.763	Tight
9	3019.0	2550.3	2527.3	441.70	441.10	427.00		108.9	15:44	0.141	1.710	0.146	1.765	Still building very slowly last pressure
10	3035.0	2559.7	2536.7	442.90	442.60			110.2	15:57	0.000	0.000	0.146	1.764	Tight
11	3029.5	2556.4	2533.4	441.75	441.75	435.98	13.1	111.1	16:02	0.144	1.742	0.146	1.761	Good test?
12	3025.0	2553.8	2530.8	441.10	441.10			111.1	16:10	0.000	0.000	0.146	1.761	Tight
13	3020.0	2550.3	2527.3	440.40	440.20	435.20	0.7	111.3	16:15	0.144	1.743	0.146	1.760	Good test?
14	3025.3	2554.0	2531.0	441.20	440.90	435.50	0.5	111.3	16:30	0.144	1.741	0.146	1.761	Still building slightly after 20 mins 0.1bar
15	2999.5	2538.7	2515.7	437.90	437.90			111.0	17:00	0.000	0.000	0.146	1.758	Tight
	Sampling													
16	2944.4	2507.0	2484.0	432.45	432.52			109.2	17:16	0.000	0.000	0.147	1.758	Tight
17	2944.9	2507.3	2484.3	432.80	432.50	431.00	0.7	109.3	17:20	0.146	1.756	0.147	1.760	Almost stable after 10 mins
18	2945.4	2507.6	2484.6	432.90	432.70	431.10	2.5	108.7	17:35	0.146	1.756	0.147	1.760	Opened 10 lt flush tank no indication of being filled after an hour, aborted, opene

3.3 Fracture Gradient

$$F = \sigma t + \sigma 1 [\nu / 1 - \nu] + P$$

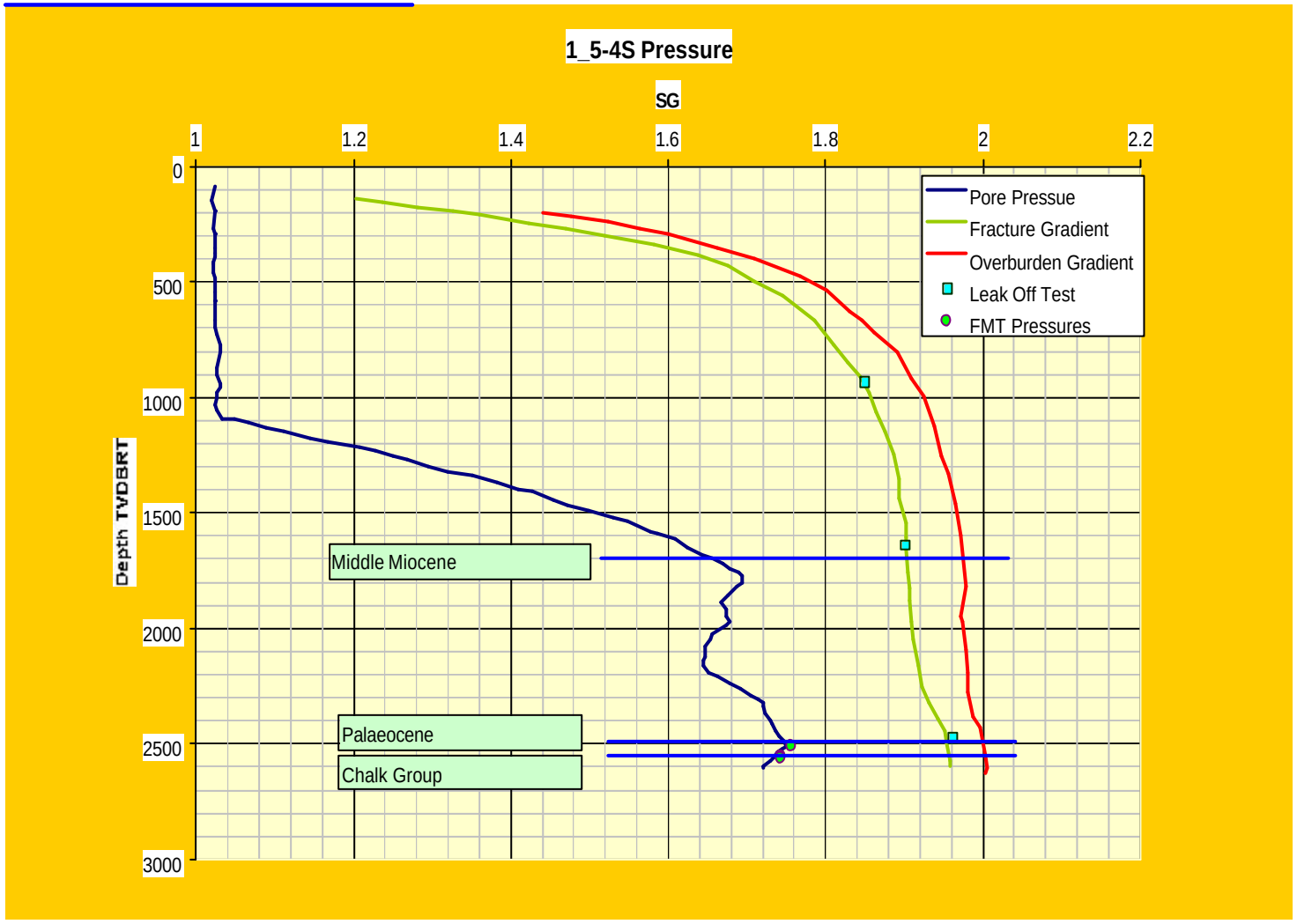
Where:

F = Fracture Pressure
σ**t** = Superimposed Tectonic Stress
σ**1** = Effective Stress (**S** – P)
ν = Poisson's Ratio
P = Pore Pressure
S = Overburden Pressure

A Poissons ratio of 0.42 was an assumed value based on prior experience. The Fracture Gradient curve is presented in Figure 3.1. along with the Overburden Gradient and Pore Pressure.

The fracture gradient is a function of the overburden gradient and the pore pressure. The latter was derived exclusively from the MWD resistivity analysis. However, the overburden requires density data. Density logs were acquired only between 2873 -3090m (2466 - 2593 m TVD). It is possible to use bulk density measurements on cuttings to give an estimate of overburden, however, since the resistivity profiles of 1/5-4S and offset wells (1/5-3 and 1/6-1) were similar then it seemed best to utilise the wireline density data available from these offset wells to infill where density data was unavailable in well 1/5-4S.

Figure 3.1 Pore Pressure, Fracture Gradient and Overburden Gradient of well 1/5-4S



Casing Report

Legal Well Name: 1 / 5 - 4S
Common Well Name: K1T1
Event Name: ORIG DRILLING

Report #: 2
Start: 15/04/2002

Spud Date: 15/04/2002
Report Date: 22/04/2002
End: 24/05/2002

General Information

String Type: SURFACE CASING
Hole TVD: 928.0 (m)
Ground Level: (m)
Circ Hours: 0.50 (hr)

Permanent Datum: SEA LEVEL
KB-Datum: 23.0 (m)
CF Elevation: (m)
Mud Lost: (bbl)

Hole Size: 26.000 (in)
Water TMD: 70.0 (m)
Liner Overlap: (ft)
KB to Cutoff: 299.08 (ft)

Hole TMD: 928.0 (m)
Str Wt on Slips: (lbs)
Max Hole Angle: 1.09 (°)
Days From Spud: 9.2 (days)

Casing Flange / Wellhead

Manufacturer: DRILQUIP
Hanger Model: SS15
Actual TMD Set: 923.420 (m)

Model: SS 15K
Packoff Model:

Top Hub/Flange: 18.750 (in) / 15,004 (psi)
BTM Hub/Flange: (in) / (psi)

Integral Casing Detail

Item	Size (in)	Weight (lb/ft)	Grade	Drift (in)	Threads	JTS	Length (m)	Top (m)	MU Torq. (ft-lbf)	THD	Manufacturer	Model	Cond.	Max OD (in)	Min ID (in)	Comp. Name
WELLHEAD HOUSING	18.625					1	11.140	91.16								
CROSS OVER (BIGGER	20.000					1	11.950	102.30						20.000		
CASING JOINT(S)	20.000					65	771.950	114.25						20.000		
FLOAT COLLAR	20.000					1	12.570	886.20						20.000		
CASING JOINT(S)	20.000					1	12.080	898.77						20.000		
FLOAT SHOE	20.000					1	12.570	910.85						20.000		

Non-Integral Casing Accessories

Accessory	Manufacturer	Number	Spacing (ft)	Interval Top (m)	Interval Bottom (m)	How Fixed
CENTRALIZER		2	13.1	910.9	923.4	BOLTED
CENTRALIZER		7	39.4	825.9	910.9	BOLTED

AMERADA HESS NORGE

Casing Report

Legal Well Name:	1 / 5 - 4S			Spud Date:	15/04/2002
Common Well Name:	K1T1	Report #:	3	Report Date:	30/04/2002
Event Name:	ORIG DRILLING	Start:	15/04/2002	End:	24/05/2002

General Information

String Type: INTERMEDIATE CASING		Permanent Datum:	SEA LEVEL	Hole Size:	17.500 (in)	Hole TMD:	1,646.0 (m)
Hole TVD:	(m)	KB-Datum:	23.0 (m)	Water TMD:	70.0 (m)	Str Wt on Slips:	(lbs)
Ground Level:	(m)	CF Elevation:	(m)	Liner Overlap:	(ft)	Max Hole Angle:	20.00 (°)
Circ Hours:	0.50 (hr)	Mud Lost:	37.7 (bbl)	KB to Cutoff:	299.08 (ft)	Days From Spud:	18.9 (days)

Casing Flange / Wellhead

Manufacturer:	DRILQUIP	Model:	SS15	Top Hub/Flange:	(in) / (psi)
Hanger Model:		Packoff Model:		BTM Hub/Flange:	(in) / (psi)

Actual TMD Set: 1,639.940 (m)

Integral Casing Detail

Item	Size (in)	Weight (lb/ft)	Grade	Drift (in)	Threads	JTS	Length (m)	Top (m)	MU Torq. (ft-lbf)	THD	Manufacturer	Model	Cond.	Max OD (in)	Min ID (in)	Comp. Name
WELLHEAD HOUSING	13.625	86.00	L-80	12.800	Vam Top	1	6.910	91.16						14.000	13.000	
CASING JOINT(S)	13.625	86.00	L-80	12.800	Vam Top	101	1,358.230	98.07						14.000	12.900	
CASING JOINT(S)	13.625	109.00	L-80	12.500	Vam Top	6	64.870	1,456.30						14.000	12.500	
CASING JOINT(S)	13.625	86.00	L-80	12.800	Vam Top	6	80.170	1,521.17						14.000	12.900	
FLOAT COLLAR	13.625	86.00	L-80	12.800	Vam Top	1	12.420	1,601.34						14.000	12.900	
CASING JOINT(S)	13.625	86.00	L-80	12.800	Vam Top	1	12.540	1,613.76						14.000	12.900	
FLOAT SHOE	13.625	86.00	L-80	12.800	Vam Top	1	13.840	1,626.30						14.000	12.900	

Non-Integral Casing Accessories

Accessory	Manufacturer	Number	Spacing (ft)	Interval Top (m)	Interval Bottom (m)	How Fixed
CENTRALIZER	Weatherford	23	42.7	1,389.0	1,639.0	X coupling

Casing Report

Legal Well Name: 1 / 5 - 4S
Common Well Name: K1T1
Event Name: ORIG DRILLING
Report #: 4
Start: 15/04/2002
Spud Date: 15/04/2002
Report Date: 11/05/2002
End: 24/05/2002

General Information

String Type: PRODUCTION (LONG STRING) C		Permanent Datum:	SEA LEVEL	Hole Size:	12.250 (in)	Hole TMD:	2,879.0 (m)
Hole TVD:	2,469.8 (m)	KB-Datum:	23.0 (m)	Water TMD:	70.0 (m)	Str Wt on Slips:	(lbs)
Ground Level:	(m)	CF Elevation:	(m)	Liner Overlap:	(ft)	Max Hole Angle:	55.29 (°)
Circ Hours:	(hr)	Mud Lost:	(bbl)	KB to Cutoff:	302.41 (ft)	Days From Spud:	26.8 (days)

Casing Flange / Wellhead

Manufacturer: DRILQUIP
Model: SS15
Top Hub/Flange: (in) / (psi)
Hanger Model:
Packoff Model:
BTM Hub/Flange: (in) / (psi)
Actual TMD Set: 2,873.400 (m)

Integral Casing Detail

Item	Size (in)	Weight (lb/ft)	Grade	Drift (in)	Threads	JTS	Length (m)	Top (m)	MU Torq. (ft-lbf)	THD	Manufacturer	Model	Cond.	Max OD (in)	Min ID (in)	Comp. Name
CASING HANGER	9.625					1	6.465	92.18						9.625	8.600	
CASING JOINT(S)	9.625					198	2,706.190	98.64						9.625	8.600	
CASING JOINT(S)	9.625					1	13.500	2,804.83		Y				9.625	8.600	
FLOAT COLLAR	9.625					1	12.980	2,818.33		Y				9.625	8.600	
CASING JOINT(S)	9.625					2	27.030	2,831.31		Y				9.625	8.600	
FLOAT SHOE	9.625					1	15.060	2,858.34		Y				9.625	8.600	

Non-Integral Casing Accessories

Accessory	Manufacturer	Number	Spacing (ft)	Interval Top (m)	Interval Bottom (m)	How Fixed
CENTRALIZER	WEATHERFORD	2	14.6	2,858.0	2,873.0	2 per Jnt
CENTRALIZER	WEATHERFORD	31	23.0	2,435.0	2,858.0	Mid Joint
RA TAG	BAKER ATLAS	1		2,805.1	2,805.1	Stop Coll.

Remarks

CENTRALISERS FITTED ACROSS SINGLE STOP COLLARS
(33 USED FOR PURPOSE + 1 FOR RA 'PIP' TAG = 34 IN TOTAL)

AMERADA HESS NORGE

Cementing Report

Legal Well Name:	1 / 5 - 4S			Spud Date:	15/04/2002
Common Well Name:	K1T1	Report #:	1	Report Date:	21/04/2002
Event Name:	ORIG DRILLING	Start:	15/04/2002	End:	24/05/2002

Cement Job Type: Primary

Primary	Squeeze Open Hole	Squeeze Casing	Plug
Hole Size: 36.000 (in)	Hole Size:	Hole Size:	Hole Size:
TMD Set: 166.9 (m)	SQ TMD: (m)	TMD Set:	Top Set: (m)
Date Set: 20/04/2002	SQ Date:	Date Set:	BTM set: (m)
Csg Type: CONDUCTOR	SQ Type:	Csg Type:	Plug Date:
Csg Size: 30.000 (in)		SQ TMD:	Plug Type:
		SQ Date:	Drilled Out:
Cmtd. Csg: CONDUCTOR	Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg:

Cement Co: HALIBURTON | Cementer: | Pipe Movement: NO MOVEMENT

Pipe Movement

Rot Time Start: :	Time End: :	RPM:	Init Torque: (ft-lbf)	Avg Torque: (ft lbf)	Max Torque: (ft-lbf)	
Rec Time Start: :	Time End: :	SPM:	Stroke Length: (ft)	Drag Up: (lbs)	Drag Down: (lbs)	

Stage No: 1 of 2

Type: SINGLE STAGE	Start Mix Cmt: :	Disp Avg Rate: 5.03 (bbl/min)	Returns:		
Volume Excess %: 300.00	Start Slurry Displ: 01:15	Disp Max Rate: 5.03 (bbl/min)	Total Mud Lost: (bbl)		
Meas. From:	Start Displ: 02:45	Bump Plug: N	Cmt Vol to Surf: (bbl)		
Time Circ Prior	End Pumping: 03:00	Press Prior: (psi)			
To Cementing:	End Pump Date: 18/04/2002	Press Bumped: (psi)	Ann Flow After: N		
Mud Circ Rate: (gpm)	Top Plug: N	Press Held: (min)	Mixing Method:		
Mud Circ Press: (psi)	Bottom Plug: N	Float Held: Y	Density Meas By: densitomet		

Mud Data

Type: SPUD MUD Density: (ppg) Visc: (s/qt) | PV/YP: (cp)/ (lb/100ft²) Gels 10 sec: (lb/100ft²) Gels 10 min: (lb/100ft²)
Bottom Hole Circulating Temperature: (°C) | Bottom Hole Static Temperature: (°C)
Displacement Fluid Type: SEAWATER | Density: 0.0 (ppg) | Volume: (bbl)

Stage No: 2 of 2

Type: SINGLE STAGE	Start Mix Cmt: :	Disp Avg Rate: (bbl/min)	Returns:		
Volume Excess %: 50.00	Start Slurry Displ: :	Disp Max Rate: (bbl/min)	Total Mud Lost: (bbl)		
Meas. From:	Start Displ: :	Bump Plug: N	Cmt Vol to Surf: (bbl)		
Time Circ Prior	End Pumping: :	Press Prior: (psi)			
To Cementing:	End Pump Date:	Press Bumped: (psi)	Ann Flow After: N		
Mud Circ Rate: 792,516 (gpm)	Top Plug: N	Press Held: (min)	Mixing Method:		
Mud Circ Press: (psi)	Bottom Plug: N	Float Held: N	Density Meas By:		

Mud Data

Type: Density: (ppg) Visc: (s/ql) | PV/YP: (cp)/ (lb/100ft²) Gels 10 sec: (lb/100ft²) Gels 10 min: (lb/100ft²)
Bottom Hole Circulating Temperature: (°C) | Bottom Hole Static Temperature: (°C)
Displacement Fluid Type: | Density: (ppg) | Volume: (bbl)

AMERADA HESS NORGE

Cementing Report

Legal Well Name:	1 / 5 - 4S			Spud Date:	15/04/2002
Common Well Name:	K1T1	Report #:	1	Report Date:	21/04/2002
Event Name:	ORIG DRILLING	Start:	15/04/2002	End:	24/05/2002

Casing Test

Test Press: (psi)
For: (min)
Cement Found between
Shoe and Collar:

Shoe Test

Pressure: (ppge)
Tool:
Open Hole: (m)
Hrs Before Test:

Liner Top Test

Liner Lap:
Pos Test: (ppge) Tool:
Neg Test: (ppge) Tool:
Hrs Before Test:
Cement Found on Tool:

Log/Survey Evaluation

CBL Run:
Under Pressure: (psi)
Bond Quality:
Cet Run:
Bond Quality:
Temp Survey:
Hrs Prior to Log:

Interpretation Summary

Cement Top: (m)
How Determined:
TOC Sufficient:
Job Rating:
If Unsuccessful Detection Indicator:
Remedial Cementing Required:
Number of Remedial Squeezes:

AMERADA HESS NORGE

Cementing Report

Legal Well Name:	1 / 5 - 4S			Spud Date:	15/04/2002
Common Well Name:	K1T1	Report #:	2	Report Date:	22/04/2002
Event Name:	ORIG DRILLING	Start:	15/04/2002	End:	24/05/2002

Cement Job Type: Primary

Primary	Squeeze Open Hole	Squeeze Casing	Plug
Hole Size: 26.000 (in)	Hole Size:	Hole Size:	Hole Size:
TMD Set: 923.4 (m)	SQ TMD: (m)	TMD Set:	Top Set: (m)
Date Set: 23/04/2002	SQ Date:	Date Set:	BTM set: (m)
Csg Type: SURFACE CASING	SQ Type:	Csg Type:	Plug Date:
Csg Size: 20.000 (in)		SQ TMD:	Plug Type:
		SQ Date:	Drilled Out:
Cmtd. Csg: SURFACE CASING	Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg:

Cement Co: HALIBURTON Cementer: Pipe Movement: NO MOVEMENT

Pipe Movement

Rot Time Start: :	Time End: :	RPM:	Init Torque:	(ft-lbf)	Avg Torque:	(ft-lbf)	Max Torque: (ft-lbf)
Rec Time Start: :	Time End: :	SPM:	Stroke Length:	(ft)	Drag Up:	(lbs)	Drag Down: (lbs)

Stage No: 1 of 1

Type:	SINGLE STAGE	Start Mix Cmt:	20:00	Disp Avg Rate:	8.81 (bbl/min)	Returns:	
Volume Excess %:	250.00	Start Slurry Displ:	20:10	Disp Max Rate:	9.12 (bbl/min)	Total Mud Lost:	(bbl)
Meas. From:		Start Displ:	00:00	Bump Plug:	Y	Cmt Vol to Surf:	(bbl)
Time Circ Prior		End Pumping:	23:15	Press Prior:	4 (psi)		
To Cementing:		End Pump Date:	22/04/2002	Press Bumped:	5 (psi)	Ann Flow After:	N
Mud Circ Rate:	1,056,688 (gpm)	Top Plug:	Y	Press Held:	65 (min)	Mixing Method:	FLY
Mud Circ Press:	(psi)	Bottom Plug:	N	Float Held:	Y	Density Meas By:	Densitomet

Mud Data

Type: SPUD MUD Density: (ppg) Visc: (s/qt) PV/YP: (cp)/ (lb/100ft²) Gels 10 sec: (lb/100ft²) Gels 10 min: (lb/100ft²)

Bottom Hole Circulating Temperature: (°C) Bottom Hole Static Temperature: (°C)

Displacement Fluid Type: SEAWATER Density: 0.0 (ppg) Volume: 893.15 (bbl)

Cementing Report

Legal Well Name:	1 / 5 - 4S			Spud Date:	15/04/2002
Common Well Name:	K1T1	Report #:	2	Report Date:	22/04/2002
Event Name:	ORIG DRILLING	Start:	15/04/2002	End:	24/05/2002

Casing Test

Test Press: (psi)
For: (min)
Cement Found between
Shoe and Collar: Y

Shoe Test

Pressure: (ppge)
Tool: N
Open Hole: (m)
Hrs Before Test:

Liner Top Test

Liner Lap:
Pos Test: (ppge) Tool: N
Neg Test: (ppge) Tool: N
Hrs Before Test:
Cement Found on Tool: N

Log/Survey Evaluation

CBL Run: N
Under Pressure: (psi)
Bond Quality:
Cet Run: N
Bond Quality:
Temp Survey: N
Hrs Prior to Log:

Interpretation Summary

Cement Top: (m)
How Determined:
TOC Sufficient: N
Job Rating:
If Unsuccessful Detection Indicator:
Remedial Cementing Required: N
Number of Remedial Squeezes:

AMERADA HESS NORGE

Cementing Report

Legal Well Name:	1 / 5 - 4S			Spud Date:	15/04/2002
Common Well Name:	K1T1	Report #:	3	Report Date:	11/05/2002
Event Name:	ORIG DRILLING	Start:	15/04/2002	End:	24/05/2002

Cement Job Type:

Primary	Squeeze Open Hole	Squeeze Casing	Plug
Hole Size:	Hole Size:	Hole Size:	Hole Size:
TMD Set: 2,873.3 (m)	SQ TMD: (m)	TMD Set:	Top Set: (m)
Date Set: 11/05/2002	SQ Date:	Date Set:	BTM set: (m)
Csg Type: PRODUCTION (LONG	SQ Type:	Csg Type:	Plug Date:
Csg Size:		SQ TMD:	Plug Type:
		SQ Date:	Drilled Out:
Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg:

Cement Co: HALIBURTON Cementer: Jarle / Kurt Pipe Movement: NO MOVEMENT

Pipe Movement

Rot Time Start: :	Time End: :	RPM:	Init Torque:	(ft-lbf)	Avg Torque: (ft-lbf)	Max Torque: (ft-lbf)	
Rec Time Start: :	Time End: :	SPM:	Stroke Length:	(ft)	Drag Up: (lbs)	Drag Down: (lbs)	

Stage No: 1 of 1

Type: SINGLE STAGE	Start Mix Cmt:	16:30	Disp Avg Rate:	7.55 (bbl/min)	Returns: FULL		
Volume Excess %: 25.00	Start Slurry Displ:	16:40	Disp Max Rate:	7.55 (bbl/min)	Total Mud Lost:	(bbl)	
Meas. From: Theor. Gauge OH	Start Displ:	19:00	Bump Plug:	Y	Cmt Vol to Surf:	(bbl)	
Time Circ Prior	End Pumping:	21:00	Press Prior:	5 (psi)			
To Cementing: 1.25	End Pump Date:	11/05/2002	Press Bumped:	10 (psi)	Ann Flow After:	N	
Mud Circ Rate: 317,006 (gpm)	Top Plug:	Y	Press Held:	10 (min)	Mixing Method:	RECIRC/FLY	
Mud Circ Press: (psi)	Bottom Plug:	Y	Float Held:	Y	Density Meas By:	DENSOMETER	

Mud Data

Type: Oil (ENVIRON) Density: 14.9 (ppg) Visc: 61 (s/qt) PV/YP: 37 (cp)/46 (lb/100ft²) Gels 10 sec: 27 (lb/100ft²) Gels 10 min: 36 (lb/100ft²)

Bottom Hole Circulating Temperature: (°C) Bottom Hole Static Temperature: (°C)

Displacement Fluid Type: MUD Density: 14.9 (ppg) Volume: 654.14 (bbl)

Stage No: 1 Slurry No: 1 of 1

Slurry Data

Fluid Type: TAIL Description: G + 35% SILICA BLEND Class: CLASS G Purpose: SHOE INTEG

Slurry Interval: 2,460.00 (m) To: 2,873.00 (m) Cmt Vol: 118.9 (bbl) Density: 0.0 (pp/1000gal) Yield: 3,194.38 (ft³/ton) Mix Water: (bbl/ton)

Water Source: DRILLWATER Slurry Vol: 118.9 (bbl) Water Vol: 66.0 (bbl) Other Vol: (bbl) Foam Job: N

Test Data			Time	Temp	Pressure
Thickening Time: 5.57	Temperature: 83 (°C)	Compressive Strength 1:	4.48	63 (°C)	15 (psi)
Free Water: (%)	Temperature: (°C)	Compressive Strength 2:	5.57	83 (°C)	15 (psi)
Fluid Loss: 36.0 (cc)	Temperature: (°C)				
Fluid Loss Pressure: (°C)					

AMERADA HESS NORGE

Cementing Report

Legal Well Name:	1 / 5 - 4S			Spud Date:	15/04/2002
Common Well Name:	K1T1	Report #:	3	Report Date:	11/05/2002
Event Name:	ORIG DRILLING	Start:	15/04/2002	End:	24/05/2002

Stage No: 1 Slurry No: 1 of 1 - Additives

Trade Name	Type	Concentration	Units	Liquid Conc.	Units
SILICA FLOUR	STRENGTHENER	35.00			% BWOC
CFR-3L	DISPERSANT	0.11			gal/Sack
SCR-100L	RETARDER	0.28			gal/Sack
GASCON	EXTENDER	0.55			gal/Sack
HALAD-413L	FLUID LOSS	0.56			gal/Sack
NF-6	DEFOAMER	0.01			gal/Sack

Casing Test

Test Press: 62 (psi)
For: 15 (min)
Cement Found between
Shoe and Collar: N

Shoe Test

Pressure: (ppge)
Tool: N
Open Hole: (m)
Hrs Before Test:

Liner Top Test

Liner Lap:
Pos Test: (ppge) Tool: N
Neg Test: (ppge) Tool: N
Hrs Before Test:
Cement Found on Tool: N

Log/Survey Evaluation

CBL Run: N
Under Pressure: (psi)
Bond Quality:
Cet Run: N
Bond Quality:
Temp Survey: N
Hrs Prior to Log:

Interpretation Summary

Cement Top: (m)
How Determined:
TOC Sufficient: N
Job Rating:
If Unsuccessful Detection Indicator:
Remedial Cementing Required: N
Number of Remedial Squeezes:

AMERADA HESS NORGE

Cementing Report

Legal Well Name:	1 / 5 - 4S			Spud Date:	15/04/2002
Common Well Name:	K1T1	Report #:	3	Report Date:	30/04/2002
Event Name:	ORIG DRILLING	Start:	15/04/2002	End:	24/05/2002

Cement Job Type: Primary

Primary	Squeeze Open Hole	Squeeze Casing	Plug
Hole Size: 17.500 (in)	Hole Size:	Hole Size:	Hole Size:
TMD Set: 1,648.0 (m)	SQ TMD: (m)	TMD Set:	Top Set: (m)
Date Set: 30/04/2002	SQ Date:	Date Set:	BTM set: (m)
Csg Type: INTERMEDIATE CASI	SQ Type:	Csg Type:	Plug Date:
Csg Size: 13.625 (in)		SQ TMD:	Plug Type:
		SQ Date:	Drilled Out:
Cmtd. Csg: INTERMEDIATE CASI	Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg:

Cement Co: HALIBURTON Cementer: Leigh Graham Pipe Movement: NO MOVEMENT

Pipe Movement

Rot Time Start: 12:15	Time End: 15:45	RPM:	Init Torque:	(ft-lbf)	Avg Torque: (ft-lbf)	Max Torque: (ft-lbf)
Rec Time Start: :	Time End: :	SPM:	Stroke Length:	(ft)	Drag Up: (lbs)	Drag Down: (lbs)

Stage No: 1 of 1

Type:	TWO STAGE	Start Mix Cmt:	13:00	Disp Avg Rate:	11.00 (bbl/min)	Returns:	
Volume Excess %:	50.00	Start Slurry Displ:	14:15	Disp Max Rate:	13.00 (bbl/min)	Total Mud Lost:	(bbl)
Meas. From:	Sweeps	Start Displ:	14:15	Bump Plug:	Y	Cmt Vol to Surf:	(bbl)
Time Circ Prior		End Pumping:	15:15	Press Prior:	300 (psi)		
To Cementing:	1.15	End Pump Date:	30/04/2002	Press Bumped:	800 (psi)	Ann Flow After:	N
Mud Circ Rate:	500 (gpm)	Top Plug:	Y	Press Held:	5 (min)	Mixing Method:	
Mud Circ Press:	(psi)	Bottom Plug:	N	Float Held:	Y	Density Meas By:	Balance

Mud Data

Type: KCL/GLYCOL Density: (ppg) Visc: (s/qt) PV/YP: (cp)/ (lb/100ft²) Gels 10 sec: (lb/100ft²) Gels 10 min: (lb/100ft²)

Bottom Hole Circulating Temperature: (°C) Bottom Hole Static Temperature: (°C)

Displacement Fluid Type: Density: (ppg) Volume: (bbl)

AMERADA HESS NORGE

Cementing Report

Legal Well Name:	1 / 5 - 4S			Spud Date:	15/04/2002
Common Well Name:	K1T1	Report #:	3	Report Date:	30/04/2002
Event Name:	ORIG DRILLING	Start:	15/04/2002	End:	24/05/2002

Casing Test

Test Press: (psi)
For: (min)
Cement Found between
Shoe and Collar:

Shoe Test

Pressure: (ppge)
Tool:
Open Hole: (m)
Hrs Before Test:

Liner Top Test

Liner Lap:
Pos Test: (ppge) Tool:
Neg Test: (ppge) Tool:
Hrs Before Test:
Cement Found on Tool:

Log/Survey Evaluation

CBL Run:
Under Pressure: (psi)
Bond Quality:
Cet Run:
Bond Quality:
Temp Survey:
Hrs Prior to Log:

Interpretation Summary

Cement Top: (m)
How Determined:
TOC Sufficient:
Job Rating:
If Unsuccessful Detection Indicator:
Remedial Cementing Required:
Number of Remedial Squeezes:

AMERADA HESS NORGE

Cementing Report

Legal Well Name:	1 / 5 - 4S			Spud Date:	15/04/2002
Common Well Name:	K1T1	Report #:	4	Report Date:	18/05/2002
Event Name:	ORIG DRILLING	Start:	15/04/2002	End:	24/05/2002

Cement Job Type: Plug

Primary	Squeeze Open Hole	Squeeze Casing	Plug
Hole Size:	Hole Size:	Hole Size:	Hole Size: 8.500 (in)
TMD Set: (m)	SQ TMD: (m)	TMD Set:	Top Set: 2,600.0 (m)
Date Set:	SQ Date:	Date Set:	BTM set: 3,090.0 (m)
Csg Type:	SQ Type:	Csg Type:	Plug Date: 18/05/2002
Csg Size:		SQ TMD:	Plug Type: ABANDONMENT
		SQ Date:	Drilled Out: N
Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg: OPEN HOLE

Cement Co: HALIBURTON Cementer: Jarle / Roy Pipe Movement:

Pipe Movement

Rot Time Start: :	Time End: :	RPM:	Init Torque: (ft-lbf)	Avg Torque: (ft-lbf)	Max Torque: (ft-lbf)	
Rec Time Start: :	Time End: :	SPM:	Stroke Length: (ft)	Drag Up: (lbs)	Drag Down: (lbs)	

Stage No: 1 of 1

Type: ABANDONMENT PLUG	Start Mix Cmt: :	Disp Avg Rate: 5.03 (bbl/min)	Returns:		
Volume Excess %:	Start Slurry Displ: 06:00	Disp Max Rate: (bbl/min)	Total Mud Lost: (bbl)		
Meas. From:	Start Displ: :	Bump Plug: N	Cmt Vol to Surf: (bbl)		
Time Circ Prior	End Pumping: 07:15	Press Prior: (psi)			
To Cementing:	End Pump Date: 18/05/2002	Press Bumped: (psi)	Ann Flow After:		
Mud Circ Rate: (gpm)	Top Plug: N	Press Held: (min)	Mixing Method: Fly		
Mud Circ Press: (psi)	Bottom Plug: N	Float Held:	Density Meas By: Densit		

Mud Data

Type: OIL (ENVIRON) Density: 14.9 (ppg) Visc: 79 (s/qt) PV/YP: 41 (cp)/40 (lb/100ft²) Gels 10 sec: 25 (lb/100ft²) Gels 10 min: 33 (lb/100ft²)

Bottom Hole Circulating Temperature: (°C) Bottom Hole Static Temperature: 111 (°C)

Displacement Fluid Type: MUD Density: 14.9 (ppg) Volume: 176.11 (bbl)

Stage No: 1 Slurry No: 1 of 1

Slurry Data

Fluid Type: PLUG	Description:		Class: CLASS G		Purpose: ABANDONME
Slurry Interval: 2,600.00 (m)	To: 3,090.00 (m)	Cmt Vol: 119.5 (bbl)	Density: 0.0 (pp/1000gal)	Yield: 38.44 (ft³/ton)	Mix Water: (bbl/ton)
Water Source:		Slurry Vol:119.5 (bbl)	Water Vol: (bbl)	Other Vol: (bbl)	Foam Job: N

Test Data			Time	Temp	Pressure
Thickening Time:	Temperature: (°C)	Compressive Strength 1:		(°C)	(psi)
Free Water: (%)	Temperature: (°C)	Compressive Strength 2:		(°C)	(psi)
Fluid Loss: (cc)	Temperature: (°C)				
Fluid Loss Pressure: (°C)					

Cementing Report

Legal Well Name:	1 / 5 - 4S			Spud Date:	15/04/2002
Common Well Name:	K1T1	Report #:	4	Report Date:	18/05/2002
Event Name:	ORIG DRILLING	Start:	15/04/2002	End:	24/05/2002

Casing Test

Test Press: 218 (psi)
For: 10 (min)
Cement Found between Shoe and Collar: N

Shoe Test

Pressure: (ppge)
Tool: N
Open Hole: (m)
Hrs Before Test:

Liner Top Test

Liner Lap:
Pos Test: (ppge) Tool: N
Neg Test: (ppge) Tool: N
Hrs Before Test:
Cement Found on Tool: N

Log/Survey Evaluation

CBL Run: N
Under Pressure: (psi)
Bond Quality:
Cet Run: N
Bond Quality:
Temp Survey: N
Hrs Prior to Log:

Interpretation Summary

Cement Top: (m)
How Determined:
TOC Sufficient: N
Job Rating:
If Unsuccessful Detection Indicator:
Remedial Cementing Required: N
Number of Remedial Squeezes:

Remarks

Plug from 2600 to 3090 was set as 2 separate balanced cement plugs.

AMERADA HESS NORGE

Cementing Report

Legal Well Name:	1 / 5 - 4S			Spud Date:	15/04/2002
Common Well Name:	K1T1	Report #:	5	Report Date:	20/05/2002
Event Name:	ORIG DRILLING	Start:	15/04/2002	End:	24/05/2002

Cement Job Type: Plug

Primary	Squeeze Open Hole	Squeeze Casing	Plug
Hole Size:	Hole Size:	Hole Size:	Hole Size: 8.500 (in)
TMD Set: (m)	SQ TMD: (m)	TMD Set:	Top Set: 360.0 (m)
Date Set:	SQ Date:	Date Set:	BTM set: 601.0 (m)
Csg Type: BRIDGE PLUG W/ CE	SQ Type:	Csg Type:	Plug Date: 20/05/2002
Csg Size:		SQ TMD:	Plug Type: ABANDONMENT
		SQ Date:	Drilled Out: N
Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg: OPEN HOLE

Cement Co: HALIBURTON Cementer: Jarlc / Roy Pipe Movement:

Pipe Movement

Rot Time Start: :	Time End: :	RPM:	Init Torque: (ft-lbf)	Avg Torque: (ft-lbf)	Max Torque: (ft-lbf)	
Rec Time Start: :	Time End: :	SPM:	Stroke Length: (ft)	Drag Up: (lbs)	Drag Down: (lbs)	

Stage No: 1 of 1

Type: ABANDONMENT PLUG	Start Mix Cmt: 14:00	Disp Avg Rate: 5.03 (bbl/min)	Returns:		
Volume Excess %:	Start Slurry Displ: 14:15	Disp Max Rate: (bbl/min)	Total Mud Lost: (bbl)		
Meas. From:	Start Displ: 14:45	Bump Plug: N	Cmt Vol to Surf: (bbl)		
Time Circ Prior	End Pumping: 15:00	Press Prior: (psi)			
To Cementing:	End Pump Date: 20/05/2002	Press Bumped: (psi)	Ann Flow After:		
Mud Circ Rate: (gpm)	Top Plug: N	Press Held: (min)	Mixing Method:		
Mud Circ Press: (psi)	Bottom Plug: N	Float Held:	Density Meas By: Densit		

Mud Data

Type: OIL (ENVIRON) Density: 14.9 (ppg) Visc: 85 (s/qt) PV/YP: 41 (cp)/40 (lb/100ft²) Gels 10 sec: (lb/100ft²) Gels 10 min: (lb/100ft²)
Bottom Hole Circulating Temperature: (°C) Bottom Hole Static Temperature: (°C)
Displacement Fluid Type: SEAWATER Density: 8.7 (ppg) Volume: 3.14 (bbl)

Stage No: 1 Slurry No: 1 of 1

Slurry Data

Fluid Type: PLUG	Description:		Class: CLASS G	Purpose: ABANDONME	
Slurry Interval: 360.00 (m) To: 610.00 (m)	Cmt Vol: 96.9 (bbl)	Density: 0.0 (pp/1000gal)	eld: (ft³/ton)	Mix Water: (bbl/ton)	
Water Source:	Slurry Vol:96.9 (bbl)	Water Vol: (bbl)	Other Vol: (bbl)	Foam Job: N	

Test Data

			Time	Temp	Pressure
Thickening Time:	Temperature: (°C)	Compressive Strength 1:		(°C)	(psi)
Free Water: (%)	Temperature: (°C)	Compressive Strength 2:		(°C)	(psi)
Fluid Loss: (cc)	Temperature: (°C)				
Fluid Loss Pressure: (°C)					

Cementing Report

Legal Well Name:	1 / 5 - 4S			Spud Date:	15/04/2002
Common Well Name:	K1T1	Report #:	5	Report Date:	20/05/2002
Event Name:	ORIG DRILLING	Start:	15/04/2002	End:	24/05/2002

Casing Test

Test Press: 1,276 (psi)
For: 10 (min)
Cement Found between Shoe and Collar: N

Shoe Test

Pressure: (ppge)
Tool: N
Open Hole: (m)
Hrs Before Test:

Liner Top Test

Liner Lap:
Pos Test: (ppge) Tool: N
Neg Test: (ppge) Tool: N
Hrs Before Test:
Cement Found on Tool: N

Log/Survey Evaluation

CBL Run: N
Under Pressure: (psi)
Bond Quality:
Cet Run: N
Bond Quality:
Temp Survey: N
Hrs Prior to Log:

Interpretation Summary

Cement Top: (m)
How Determined:
TOC Sufficient: N
Job Rating:
If Unsuccessful Detection Indicator:
Remedial Cementing Required: N
Number of Remedial Squeezes:

AMERADA HESS NORGE

Cementing Report

Legal Well Name:	1 / 5 - 4S			Spud Date:	15/04/2002
Common Well Name:	K1T1	Report #:	6	Report Date:	21/05/2002
Event Name:	ORIG DRILLING	Start:	15/04/2002	End:	24/05/2002

Cement Job Type: Plug

Primary	Squeeze Open Hole	Squeeze Casing	Plug
Hole Size:	Hole Size:	Hole Size:	Hole Size: 12.800 (in)
TMD Set: (m)	SQ TMD: (m)	TMD Set:	Top Set: 120.0 (m)
Date Set:	SQ Date:	Date Set:	BTM set: 341.0 (m)
Csg Type:	SQ Type:	Csg Type:	Plug Date: 21/05/2002
Csg Size:		SQ TMD:	Plug Type: ABANDONMENT
		SQ Date:	Drilled Out: N
Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg: SURFACE CASING

Cement Co: HALIBURTON Cementer: Jarle/ Roy Pipe Movement:

Pipe Movement

Rot Time Start: :	Time End: :	RPM:	Init Torque: (ft-lbf)	Avg Torque: (ft-lbf)	Max Torque: (ft-lbf)	
Rec Time Start: :	Time End: :	SPM:	Stroke Length: (ft)	Drag Up: (lbs)	Drag Down: (lbs)	

Stage No: 1 of 1

Type: ABANDONMENT PLUG	Start Mix Cmt: :	Disp Avg Rate: 3.77 (bbl/min)	Returns:		
Volume Excess %:	Start Slurry Displ: 18:00	Disp Max Rate: (bbl/min)	Total Mud Lost: (bbl)		
Meas. From:	Start Displ: 19:55	Bump Plug: N	Cmt Vol to Surf: (bbl)		
Time Circ Prior	End Pumping: 20:00	Press Prior: (psi)			
To Cementing:	End Pump Date: 21/05/2002	Press Bumped: (psi)	Ann Flow After:		
Mud Circ Rate: (gpm)	Top Plug: N	Press Held: (min)	Mixing Method:		
Mud Circ Press: (psi)	Bottom Plug: N	Float Held:	Density Meas By: densit		

Mud Data

Type: SALT MUD Density: (ppg) Visc: (s/qt) PV/YP: (cp)/ (lb/100ft²) Gels 10 sec: (lb/100ft²) Gels 10 min: (lb/100ft²)

Bottom Hole Circulating Temperature: (°C) Bottom Hole Static Temperature: (°C)

Displacement Fluid Type: SEAWATER Density: (ppg) Volume: (bbl)

Stage No: 1 Slurry No: 1 of 1

Slurry Data

Fluid Type: PLUG	Description:		Class: CLASS G	Purpose: ABANDONME	
Slurry Interval: 120.00 (m) To: 341.00 (m)	Cmt Vol: (bbl)	Density: 0.0 (pp/1000gal)	Yield: (ft³/ton)	Mix Water: (bbl/ton)	
Water Source:	Slurry Vol: (bbl)	Water Vol: (bbl)	Other Vol: (bbl)	Foam Job: N	

Test Data

			Time	Temp	Pressure
Thickening Time:	Temperature: (°C)	Compressive Strength 1:		(°C)	(psi)
Free Water: (%)	Temperature: (°C)	Compressive Strength 2:		(°C)	(psi)
Fluid Loss: (cc)	Temperature: (°C)				
Fluid Loss Pressure: (°C)					

AMERADA HESS NORGE

Cementing Report

Legal Well Name:	1 / 5 - 4S			Spud Date:	15/04/2002
Common Well Name:	K1T1	Report #:	6	Report Date:	21/05/2002
Event Name:	ORIG DRILLING	Start:	15/04/2002	End:	24/05/2002

Casing Test

Test Press: (psi)
For: (min)
Cement Found between
Shoe and Collar:

Shoe Test

Pressure: (ppge)
Tool:
Open Hole: (m)
Hrs Before Test:

Liner Top Test

Liner Lap:
Pos Test: (ppge) Tool:
Neg Test: (ppge) Tool:
Hrs Before Test:
Cement Found on Tool:

Log/Survey Evaluation

CBL Run:
Under Pressure: (psi)
Bond Quality:
Cet Run:
Bond Quality:
Temp Survey:
Hrs Prior to Log:

Interpretation Summary

Cement Top: (m)
How Determined:
TOC Sufficient:
Job Rating:
If Unsuccessful Detection Indicator:
Remedial Cementing Required:
Number of Remedial Squeezes:

Remarks

Plug failed to test. Planned to set a 5th abandonment plug and squeeze off the leak path in plug #4

AMERADA HESS NORGE

Cementing Report

Legal Well Name:	1 / 5 - 4S			Spud Date:	15/04/2002
Common Well Name:	K1T1	Report #:	7	Report Date:	22/05/2002
Event Name:	ORIG DRILLING	Start:	15/04/2002	End:	24/05/2002

Cement Job Type: Plug

Primary	Squeeze Open Hole	Squeeze Casing	Plug
Hole Size:	Hole Size:	Hole Size:	Hole Size: 8.500 (in)
TMD Set: (m)	SQ TMD: (m)	TMD Set:	Top Set: 107.0 (m)
Date Set:	SQ Date:	Date Set:	BTM set: 120.0 (m)
Csg Type:	SQ Type:	Csg Type:	Plug Date: 22/05/2002
Csg Size:		SQ TMD:	Plug Type: ABANDONMENT
		SQ Date:	Drilled Out: N
Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg: SURFACE CASING

Cement Co: HALIBURTON Cementer: Jarle / Roy Pipe Movement:

Pipe Movement

Rot Time Start: :	Time End: :	RPM:	Init Torque: (ft-lbf)	Avg Torque: (ft-lbf)	Max Torque: (ft-lbf)	
Rec Time Start: :	Time End: :	SPM:	Stroke Length: (ft)	Drag Up: (lbs)	Drag Down: (lbs)	

Stage No: 1 of 1

Type: ABANDONMENT PLUG	Start Mix Cmt: 12:00	Disp Avg Rate: 3.14 (bbl/min)	Returns:		
Volume Excess %:	Start Slurry Displ: 12:10	Disp Max Rate: (bbl/min)	Total Mud Lost: (bbl)		
Meas. From:	Start Displ: 12:20	Bump Plug: N	Cmt Vol to Surf: (bbl)		
Time Circ Prior	End Pumping: 12:30	Press Prior: (psi)			
To Cementing:	End Pump Date: 22/05/2002	Press Bumped: (psi)	Ann Flow After: N		
Mud Circ Rate: (gpm)	Top Plug: N	Press Held: (min)	Mixing Method:		
Mud Circ Press: (psi)	Bottom Plug: N	Float Held: N	Density Meas By: Densit		

Mud Data

Type: Density: 8.7 (ppg) Visc: (s/qt) PV/YP: (cp)/ (lb/100ft²) Gels 10 sec: (lb/100ft²) Gels 10 min: (lb/100ft²)

Bottom Hole Circulating Temperature: 2 (°C) Bottom Hole Static Temperature: 2 (°C)

Displacement Fluid Type: SEAWATER Density: 8.7 (ppg) Volume: (bbl)

Stage No: 1 Slurry No: 1 of 1

Slurry Data

Fluid Type: PLUG	Description:		Class: CLASS G	Purpose: ABANDONME	
Slurry Interval: 107.00 (m) To: 120.00 (m)	Cmt Vol: 16.4 (bbl)	Density: 0.0 (pp/1000gal)	Yield: (ft³/ton)	Mix Water: (bbl/ton)	
Water Source:	Slurry Vol:16.4 (bbl)	Water Vol: (bbl)	Other Vol: (bbl)	Foam Job: N	

Test Data

			Time	Temp	Pressure
Thickening Time:	Temperature: (°C)	Compressive Strength 1:		(°C)	(psi)
Free Water: (%)	Temperature: (°C)	Compressive Strength 2:		(°C)	(psi)
Fluid Loss: (cc)	Temperature: (°C)				
Fluid Loss Pressure: (°C)					

AMERADA HESS NORGE

Cementing Report

Legal Well Name:	1 / 5 - 4S			Spud Date:	15/04/2002
Common Well Name:	K1T1	Report #:	7	Report Date:	22/05/2002
Event Name:	ORIG DRILLING	Start:	15/04/2002	End:	24/05/2002

Casing Test

Test Press: (psi)
For: (min)
Cement Found between
Shoe and Collar:

Shoe Test

Pressure: (ppge)
Tool:
Open Hole: (m)
Hrs Before Test:

Liner Top Test

Liner Lap:
Pos Test: (ppge) Tool:
Neg Test: (ppge) Tool:
Hrs Before Test:
Cement Found on Tool:

Log/Survey Evaluation

CBL Run:
Under Pressure: (psi)
Bond Quality:
Cet Run:
Bond Quality:
Temp Survey:
Hrs Prior to Log:

Interpretation Summary

Cement Top: (m)
How Determined:
TOC Sufficient:
Job Rating:
If Unsuccessful Detection Indicator:
Remedial Cementing Required:
Number of Remedial Squeezes:

Casing Report

Legal Well Name: 1 / 5 - 4S
Common Well Name: K1T1
Event Name: ORIG DRILLING

Report #: 1
Start: 15/04/2002

Spud Date: 15/04/2002
Report Date: 19/04/2002
End: 24/05/2002

General Information

String Type: CONDUCTOR
Hole TVD: 166.9 (m)
Ground Level: (m)
Circ Hours: (hr)

Permanent Datum: SEA LEVEL
KB-Datum: 23.0 (m)
CF Elevation: (m)
Mud Lost: (bbl)

Hole Size: 36.000 (in)
Water TMD: 70.0 (m)
Liner Overlap: (ft)
KB to Cutoff: 302.33 (ft)

Hole TMD: 166.9 (m)
Str Wt on Slips: (lbs)
Max Hole Angle: 0.70 (°)
Days From Spud: 5.3 (days)

Casing Flange / Wellhead

Manufacturer: DRILQUIP
Hanger Model:

Model: SS15 Sub Sea
Packoff Model:

Top Hub/Flange: 30.000 (in) / (psi)
BTM Hub/Flange: (in) / (psi)

Actual TMD Set: 167.300 (m)

Integral Casing Detail

Item	Size (in)	Weight (lb/ft)	Grade	Drift (in)	Threads	JTS	Length (m)	Top (m)	MU Torq. THD (ft-lbf)	Manufacturer	Model	Cond.	Max OD (in)	Min ID (in)	Comp. Name
WELLHEAD HOUSING	30.000					1	13.300	92.15					30.000	28.000	
CASING JOINT(S)	30.000					1	12.190	105.45					30.000	28.000	
CASING JOINT(S)	30.000					3	36.770	117.64					30.000	28.000	
FLOAT SHOE	30.000					1	12.890	154.41					30.000	28.000	

AMERADA HESS
EXPLORATION
DEEPSEA BERGEN
WELL: 1/5-4S

POST WELL
CEMENTING REPORT
DATE: 6 JUNE 2002

Submitted to: **Kerry MacLean, Derek Charlton and Donnie Martin– AHESS Norway**

Prepared by:

Roger Sandanger –Technical Professional

HALLIBURTON

Halliburton Norway – Zonal Isolation
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INDEX

HEALTH SAFETY ENVIRONMENT

No undesired spills of chemicals have been reported on this well.

No serious accidents or incidents involving the Halliburton offshore staff have been reported.

One RUH has been issued on the cement head or handover/procedure. Halliburton has written a CPI report on the cement head.

For continuously improving our service, it is important for us to get feed back on our performance both positive and negative. As an example we would like to include one comment from on one of the End Of Job Customer Surveys (EJCS). We are taking seriously this kind of comments and it has been evaluated in our office with relevant personnel.

9 5/8" cement job was critical for the success of the well. A good shoe /LOT was required. The job was successfully completed by the cementer, but only after having to stop ½ way through the job and batch mix the last 10 m3. As this was the first time the cementer had operated the unit he did well.
However, Halliburton onshore should not have allowed this to occur. Due to this there was much exposure to both cementer and the well. Please ensure this does not occur on such critical jobs on future operations.

OPERATIONAL SUMMARY:

30" Conductor

Job date: 18-19 April 02
Operator: Vegar Wijnen, Egil Aunevik & Roy Middelton

Job objective:

Support the conductor after it is released.

Key facts:

1. 9 7/8" Pilot hole drilled to 928 mMD.
2. Hole displaced to 1. 32 SG mud.

30" Conductor			
Shoe Depth, MD (m)	± 164	B.H.S.T. (°C)	± 8
Shoe Depth, TVD (m)	± 164	B.H.C.T. (°C)	± 8
Hole Size (")	36	TOC (m)	ML @ 95
Open hole excess	300 %	Length shoetrack (m)	5
Volume preflush (m^3)	Min. 50 m^3	Volume cmt slurry (m^3)	62
Preflush type	Seawater	Top up job (m^3)	± 10

Changes to the Plan:

It was in the first place planned to pump a 1.56 SG lead slurry followed by a 1.95 SG Tail. Based on the Thickening test results it was decided to only pump the tail design.

Summary of events:

Run 1.

1. RIH w/30" conductor on 5 ½" DP.
2. Took weight at 123 m MD, circulated and washed the conductor down.
3. M/U cement stand and RIH to setting depth 166 m MD.
4. Tested surface lines to 150 bar with the cement unit.
5. Pumped 20 m3 SW preflush with the rig pumps.
6. Mixed and pumped 62 m3 1.95 SG tail slurry at 800 lpm.
7. Displaced cement with 17 m3 SW. Calculated 5 m^3 shoe track.
8. Checked float and found ok.
9. Opened TIW to drop Titus dart ok. ROV to open valve, which was found open. Investigation showed that the valve had been open for the entire job.
10. POOH with the entire conductor.

Performed cleanout trip with 17 ½" bit and 36" hole opener to TD. Prepared to run the conductor.

11. PU cement stand and installed a new Titus dart.
12. RIH with 3 ½" stinger and made up CART to wellhead.
13. Ran PGB to seabed and entered the 36" hole.
14. RIH with conductor to 122 m MD before taking weight.
15. Circulated and washed the conductor down to TD.
16. Held pre job safety meeting.
17. Pumped 45 m3 SW pre-flush.
18. Pumped 62 m3 1.95 SG cement slurry at 800 lpm.
19. Displaced with 17 m3 SW, planned for 5 m shoe track.
20. Checked for back flow, the float was holding ok.
21. Opened TIW and let Titus dart fall. Pumped with 40 strokes and observed the shear pressure of 97 bar.
22. Circulated 2.5 hours while WOC.
23. Closed upper TIW and commenced with the top up cement job.
24. Mixed and pumped 10 m3 1.95 SG cement slurry at 800 lpm. through Titus Top Up Cementing System.
25. WOC 2 hours before POOH and L/D 30" running tool.

Experience and recommendations for future operations:

Foe future operations were the Titus system is used we recommend to plan for pumping only a tail slurry. Procedures concerning operations of the Titus system need to be improved to avoid incorrect operation.

20" Surface Casing

Job date: 14.04.01
Operator: Wegar Wijnen & Egil Aunevik

Job objective:

Isolate shoe for further drilling as well as isolate annulus, with planned TOC at 95 m MD.

Key facts:

Hole was drilled to 928 m MD with 1.05 SG sea water. Then displaced to 1.20 SG WBM.

20" Surface Casing					
Shoe Depth, MD	(m)	± 923	B.H.S.T.	(°C)	31
Shoe Depth, TVD	(m)	± 923	B.H.C.T.	(°C)	19
String Size	(")	20	Mud Type		WBM
String Weight	(lb/ft)	133	TOC, lead	(m)	ML @ 95
Hole Size	(")	26	TOC, tail	(m)	823
Open hole excess	(%)	100	Length shoetrack	(m)	2 joints
Volume preflush	(m^3)	1 B/U	Volume lead slurry	(m^3)	± 220
Preflush type		Seawater	Volume tail slurry	(m^3)	± 20

Changes to the Plan:

There were no changes to the plan.

Summary of events:

1. Ran casing to 809 m MD. The hole was in good condition.
2. Picked up 18 ¾" WH hanger assembly and ran in hole on 5 ½" landing string.
3. Pumped 20 m^3 sea water and tried to see return with no success at sea bead with the ROV.
4. Pressure tested cement lines to 300 bar, 5 min.
5. Mixed and pumped 20 m^3 1.50 SG lead cement at 1400 lpm.
6. Mixed and pumped 20 m^3 1.92 SG Tail cement at 800 lpm.
7. Released the 5 ½" dart and pumped 1.9 m^3. Top plug sheared out with 205 bar after 1.5 m^3 pumped.
8. Displaced cement in place and bumped plug with 29 bar, confirmed with 64 bar 5 minutes.
9. Checked for back flow, OK.
10. Rigged down cement line and prepared to POOH.

Experience and recommendations for future operations:

Ran and cemented the 20" surface casing without any problems.

14" Intermediate Casing

Job date: 30.04.02
Operator: Leigh Graham & Egil Aunevik

Job objective:

Isolate shoe for further drilling as well as isolate annulus, with planned TOC at 1200 m MD.

Key facts:

Hole was drilled to 1647 m MD with 1.55 SG KCl mud.

14" Intermediate casing			
Shoe Depth, MD (m)	1648	B.H.S.T. (°C)	58
Shoe Depth, TVD (m)	1633	B.H.C.T. (°C)	43
String Size (")	14	Mud Type	WBM
String Weight (lb/ft)	86	Mud weight (SG)	1,55
Hole Size (")	17 ½	TOC, lead (m)	1200
Open hole excess	50 %	TOC, tail (m)	1498
Volume spacer (m^3)	15	Length shoetrack	2 joints
Spacer type	Tuned Spacer E+	Volume lead slurry (m^3)	± 25
		Volume tail slurry (m^3)	± 15

Changes to the Plan:

There were no changes to the plan.

Summary of events:

1. Drilled hole to TD, circulated hole clean and lost returns. Re-established circulation and started to POOH.
2. Had tight spots and lost circulation while pulling out.
3. Riged up and ran WL log, but not able to pass 374 m MD.
4. Performed clean up run.
5. RU and RIH with 14" casing. Filled casing every 5 joint.
6. Changed to 5 ½" DP equipment, ran in hole and landed the casing.
7. MU cement head and connected cement hose.
8. Flushed lines with spacer.
9. Tested surface lines to 250 bar.
10. Pumped 15 m^3 tuned spacer.
11. Mixed and pumped 25 m^3 1.60 SG lead at 1200 lpm.
12. Mixed and pumped 15 1.92 SG tail at 1100 lpm.
13. Released top dart and sheared top plug with the cement unit.
14. Displaced cement at 2500 lpm with the rig pumps. Bumped the plug with 35 bar above final circulation pressure.
15. Checked float for back flow, OK.
16. Disconnected cement hose and set seal assembly.
17. POOH an L/O and cleaned the landing string.

Experience and recommendations for future operations:

Running and cementing the 14" intermediate casing was done without any problems.

The time used on making up the cement head and cement stand cement stand was long. Halliburton are working on a new that will be an improvement.
It can be evaluated to preload the cement head onshore. This will allow sending the cement head out with required X-Overs and handling subs that can make it easier to make it up on the rig.

While drilling new formation after the LOT, some hole problem was experienced while drilling on hard lime stone stringers. Hole suddenly packed off and circulation was lost. Cement was found in return and it was suspected that it had been falling inn from the shoe area and rat hole. This kind of problems have been experienced before in wells were the rat-hole has been relatively long. To avoid such kind of problem we recommend minimising the length of the rat hole if practically possible.

9 5/8" Production Casing

Job date: 11.05.01
Operator: Jarle Sandal & Kurt Haugvaldstad

Job objective:

Isolate shoe for further drilling as well as isolate gas zones at 2560 m MD, with planned TOC at 2450 m MD.

Key facts:

Hole was drilled to 2879 m MD with 1.78 SG OBM. Hydrocarbons were detected in a zone at 2560 m MD.

9 5/8" Production casing			
Shoe Depth, MD (m)	2873	B.H.S.T. (°C)	122
Shoe Depth, TVD (m)	2467	B.H.C.T. (°C)	63 - 83 (WellCat)
String Size (")	9 5/8	Mud Type	OBM
String Weight (lb/ft)	53.5	Mud Weight (SG)	1,78
Hole Size (")	12 ¼	Open Hole Excess	35 %
Volume Preflush (m^3)	3 + 10	TOC (m)	2450
Preflush Type	Base oil + Tuned Spacer E+	Length Shoetrack (m)	3 joints
		Single Tail Volume (m^3)	19

Changes to the Plan:

A gas tight design was chosen based upon a hydrocarbon zone at 2560 m MD. The excess was reduced from 35 to 25% based on evaluation of the hole condition. It was considered to be in good shape.

Summary of events:

1. R/U to run 9 5/8" casing.
2. Held pre job safety meeting.
3. M/U reamer shoe joint and tested the float.
4. M/U 9 5/8" shoe track and tested the same.
5. RIH with casing to 1610 m MD.
6. Inspected seals in Lafleur and tested the tool. Had continuous leak at 1200 lpm and 22 bar.
7. Ran 9 5/8" to 2749 m MD.
8. RIH the 9 5/8" on landing string to 2840 m MD, washed down to 2873 m MD.
9. Circulated 60 % of B/U.
10. Performed a pre job safety meeting.
11. Pumped 3 m^3 base oil and 10 m^3 1.85 SG tuned spacer.
12. Mixed and pumped 19 m^3 1.92 SG single cement slurry at 800 lpm.
13. Dropped dart and pumped 1.6 m^3 water behind. Top plug sheared out at 180 bar.
14. Displaced cement in place with 1200 lpm using rig pump, bumped plug with 70 bar above FCP.
15. Checked for back flow, OK.
16. R/D cement hose and set seal assembly.
17. POOH.

Experience and recommendations for future operations:

Lost 3.5 m3 while running in hole and additional 2 m^3 while circulating prior to the cement job.
Had full returns during the cement job.

While drilling the section the MWD temperature was found to be suspiciously high. Based on the temperature logged in the mudline and temperature prediction, WellCat simulations were run and the model was correlated to the temperatures measured in mud line. Based on this it was concluded that the Geomec temperature prediction seemed to be the closest estimate of the undisturbed temperature. Hence the Geomec gradient was used for this job and the remaining cement jobs.

Halliburton did a crew change a couple of day before the 9 5/8" casing job. The cementer that came out had not performed any cement jobs on this particular rig and unit before. We recognise that this is poor planning and it has been evaluated internally in Halliburton.

P & A Plug #1

Job date: 18.05.01
Operator: Jarle Sandal & Roy Middelthon

Job objective:

Permanent plug back the open hole section.

Key facts:

Hole was drilled to 3090 m MD with 1.78 SG OBM.

OH Plug # 1			
Mud Type	OBM	B.H.S.T. (°C)	137
Mud weight (SG)	1,78	B.H.C.T. (°C)	115 (WellCat)
Hole Size (")	8 ½	Open hole excess	25 %
Volume preflush (m^3)	8	Total depth, MD (m)	3090
Volume postflush	To balance	Total depth, TVD (m)	2600
Preflush type	Tuned Spacer E	TOC (m)	2923
		Single slurry volume (m^3)	± 8

Changes to the Plan:

The first P & A plan was based on drilling the 8 ½" to 3393 m MD and it was planned to set three cement plugs in the 8 ½" hole and into the 9 5/8" Casing. This was changed to two plugs due to the shallower TD

Summary of events:

1. P/U 431 m 3 ½" cement stinger and RIH.
2. RIH on 5 ½" DP to 3090 m MD.
3. Circulated BU.
4. Pressure tested cement lines to 200 bar.
5. Pumped 8 m^3 1.85 SG tuned spacer ahead.
6. Mixed and pumped 8.2 m^3 1.92 SG single cement slurry.
7. Pumped 1.5 m3 tuned spacer behind to balance and displaced the plug in place with 28 m^3 mud.
8. POOH to 2890 m MD. R/D cement stand and reverse circulated 48 m^3 mud.

P & A Plug #2

Job date: 18.05.01
Operator: Jarle Sandal & Roy Middelthon

Job objective:

Permanent plug and isolate the open hole section.

Key facts:

Plug #2 was set from 2890 m MD with TOC at 2600 m MD.

P & A Plug # 2			
Mud Type	OBM	B.H.S.T. (°C)	137
Mud Weight (SG)	1,78	B.H.C.T. (°C)	90 (WellCat)
Hole Size (")	8 ½	Open Hole Excess	25 %
Volume Preflush (m^3)	7	Total Depth, MD (m)	2890
Volume Postflush	To balance	Total Depth, TVD (m)	2600
Preflush Type	Tuned Spacer E	TOC (m)	2600
		Single Slurry Volume (m^3)	10.8

Changes to the Plan:

TOC has been moved from +/- 100 m above 9 5/8" shoe to +/-2600 m MD. After plug #1 was set, circulating B/U the long way was skipped and cement was reversed out.

Summary of events – casing run:

1. Pumped 7 m^3 tuned spacer ahead.
2. Mixed and pumped 10.8 m^3 1.92 SG single cement slurry.
3. Pumped 1.5 m^3 spacer behind and displaced the plug in place with 22 m^3 mud.
4. POOH to 2540 m MD. RU cement stand and reversed circulated 45 m^3 mud.
5. POOH and laid down 5 ½" DP.
6. RIH and tagged cement with 10 MT at 2676 m MD. WOC time at this stage was XX Hours
7. Pressure tested the cement plug to 115 bar.

Experience and recommendations for future operations:

Mixing and setting of P & A plug #1 and #2 went OK with no operational problems. Plug #2 was tagged and pressure tested 13 hours after placement with good results.

WellCat simulations were used to optimise the WOC on the plug setting. When doing this we generally simulate the whole operation by entering each step and timing in the operation. The purpose is to determine the temperature in the well during the operation, and thereby finding the absolutely lowest safe temperature that can be used for designing the job. Normally this will be somewhat lower than if using API tables. Changes in the operation like circulation volumes will affect this. It is therefore important to agree upon and follow the procedures that are

worked out. In future recommendations we feel it are important to make a note on the first page if any of the parameters are critical for the operation.

P & A Plug #3

Job date: 20.05.01
Operator: Jarle Sandal & Roy Middelthon

Job objective:

Permanent plug and isolate the cased hole 9 5/8" X 14" casing.

Key facts:

The EZSV was set at 610 m MD. The 9 5/8" casing was cut at 510 m MD and POOH. The well was then displaced to seawater.

Well data Surface Plug # 3			
Total Depth, MD Plug #1 (m)	610	B.H.S.T. (°C)	20
Plug Length (m)	200	B.H.C.T.) (°C)	15
Open Hole Excess	N/A	Mud Type	OBM
Volume Spacer (m^3)	10	Mud Weight (SG)	1,78
Spacer Type	Tuned Spacer	TOC, MD (m)	± 400
		Volume cmt. (m^3)	13

Summary of events:

1. Displaced the well to seawater and flow checked well for 20 minutes and gained 0.45 m^3.
2. Circulated B/U through choke manifold, no gas observed.
3. Displaced well back to OBM and prepared for setting cement plug #3.
4. Pumped 10 m^3 1.85 SG tuned spacer
5. Mixed and pumped 15.4 m^3 1.95 SG single cement slurry. Followed by 0.5 m^3sea water spacer behind.
6. POOH to 200 m MD. Had to clean cement from OD of DP while pulling out. At this stage 3 hours had elapsed since start mixing cement.
7. Circulated down choke and kill line to clean riser volume.
8. RIH with 3 ½" DP washed from 205 m MD, tagged TOC with 10 MT at 326 m MD.
9. Circulated hole clean and pressure tested cement plug to 88 bar.
10. Displaced hole to sea water and flow checked for 30 minutes.
11. POOH and made up the 14" casing cutter assembly.

Experience and recommendations for future operations:

The well started flowing after the 9 5/8" casing was cut and displaced to sea water. For future work if the margins not are high enough between the pore pressure and hydrostatic to ensure a stable well, it should be considered not to displace the well to sea water before the plug across the casing stamp is set and tested OK. Keeping OBM in the system will also make it easier to get a good pressure test on the last plug.

When pulling out of this plug it was found cement around the pipe. Due to the thixotropix properties of CaCl slurries, it is important to minimise the time to pull out of the plug.

The pump time was a bit on the short side considering time used to set plug. The CaCl2 concentration was lowered to increase the plug setting time slightly.

P & A Plug #4

Job date: 21.05.01
Operator: Jarle Sandal & Roy Middelthon

Job objective:

Permanent plug and isolate the cased hole 14" X 20" casing.

Key facts:

The 14"casing cutted at 335 m MD. The well displaced to seawater and flow checked OK.

Well data Surface Plug #4			
Total depth, MD (m)	341	B.H.S.T. (°C)	20
Plug length (m)	221	B.H.C.T.) (°C)	15
Open hole excess	N/A	Mud Type	Sea Water
Volume spacer (m^3)	10 and 20	Mud Weight (SG)	1,02
Spacer type	Sea Water + SEM-7	TOC, MD (m)	120
		Volume cmt. (m^3)	39

Summary of events:

1. MU 12" mill BHA cleaned out hole to 341 m MD. Load tested plug #3 with 8 MT.
2. Pumped Hi Vis pill and circulated hole clean with 4000 lpm. before POOH.
3. RIH with 14" casing cutter and cut casing.
4. Laid out 14" casing.
5. RIH with 3 ½" cement stinger to 314 m MD.
6. Pressure tested surface lines to 100 bar.
7. Mixed and pumped 38.7 m^3 1.95 SG single cement slurry.
8. POOH to 120m MD and circulated hole clean with 60 m^3 sea water.
9. POOH and racked back the cement stinger.
10. MU jetting sub and RIH, jetted BOP and riser pumped soap pill.
11. Pressure tested surface lines against failsafe and shear rams to 113 bar, good test.
12. Pressure tested cement plug to 113 bar, test failed. Leaked of at 58 bar.

Experience and recommendations for future operations:

To point out one single reason for the failure of the pressure test on the plug is not possible.

However the recommended preflush/spacer ahead of the plug setting was not pumped. This could have been the main cause of the p4roblem, due to inadequate displacement efficiency, leaving a channel or mud sheath at the casing wall. This practice is nor recommended.

P & A Plug #5 (Squeeze)

Job date: 22.05.01
Operator: Jarle Sandal & Roy Middelthon

Job objective:

Squeeze on top of plug #4.

Key facts:

Plug #4 did not hold the pressure test and an additional plug was needed..

Summary of events:

1. RIH with 5 ½" OE DP to 122 m MD. Tagged cement plug #4 with 5 MT.
2. R/U cement lines and pressure tested to 140 bar.
3. Mixed and pumped 2.6 m^3 single 2.15 SG cement slurry.
4. POOH to 105 m MD and circulated 3 x BU at 4128 lpm.
5. WOC 3 hours before pressure tested the plug to 80 bar, good test.
6. Opened BOP and POOH.

Experience and recommendations for future operations:

It was preferred to have as much solids as possible in the cement slurry as those could contribute to bridging off at the channel. It was therefore decided to mix the cement slightly heavier than designed.

CEMENT SLURRY DESIGNS PUMPED

CEMENT SLURRY DESIGN & DATA 30" CONDUCTOR					
Design	Dyckerhoff G-cement	**Tail**		**Units**	
	Econolite	--	--	lhk	gps
	Calcium chloride - liquid	4,35	0,49	lhk	gps
	NF-6	0,10	0,01	lhk	gps
	Sea Water	39,35	4,43	lhk	gps
	Density	**1,95**	**16,3**	**SG**	**ppg**
	Total Mix Fluid	43,80	4,93	lhk	gps
	Yield	74,96	1,13	lhk	ft^3/sk
	Thickening Time at BHCT				
	Time to 30 BC	1:25		hrs:min	
	Time to 70 BC	3:55		hrs:min	
	Time to 100 BC	4:18		hrs:min	
Test Results Lab reference no. NS02-Z-205	API Free Water, 0° deviation	0,4		%	
	Fann rheology at BHCT	82		300 rpm	
	The fann readings for Leads are based on results from lab DB	70		200 rpm	
		55		100 rpm	
		50		60 rpm	
		44		30 rpm	
		25		6 rpm	
		18		3 rpm	
	Plastic Viscosity	40.5		cP	
	Yield point	41.5		$lb/100\ ft2$	
Maximum static time allowable during mixing		15		minutes	
	Compressive strength at 8°C	200		psi 11 hrs	

CEMENT SLURRY DESIGN & DATA 20" SURFACE CASING

Design	Dyckerhoff G-cement	Lead		Tail		Units	
	Econolite	4,50	0,51	--	--	lhk	gps
	NF-6	0,10	0,01	0,10	0,01	lhk	gps
	Sea Water	110,73	12,47	44,79	5,05	lhk	gps
	Density	**1,50**	**12,5**	**1,92**	**16,0**	**SG**	**ppg**
	Total Mix Fluid	115,33	12,99	44,89	5,06	lhk	gps
	Yield	146,49	2,21	76,04	1,15	lhk	$^{ft3}/_{sk}$
	Thickening Time at BHCT						
	Time to 30 BC	6:42*		5:00		hrs:min	
	Time to 70 BC	7:52*		6:50		hrs:min	
	Time to 100 BC	10:01*		7:06		hrs:min	
Test Results Lab Reference no. NS02-Z-207	API Free Water, 0° deviation	0,6		1.5		%	
	Fann rheology at BHCT	27		84		300 rpm	
		23		67		200 rpm	
	* With Norcem cement	18		51		100 rpm	
		16		44		60 rpm	
		15		37		30 rpm	
		12		20		6 rpm	
		10		14		3 rpm	
	Plastic Viscosity	14		50		cP	
	Yield point	13		34		$^{lb}/_{100\ ft}2$	
Maximum static time allowable during mixing		45		45		minutes	
	Compressive strength at 31°C			50 psi		6:16 hrs	
		60 psi		500 psi		10:54 hrs	
		100 psi		1500 psi		19:00 hrs	

CEMENT SLURRY DESIGN & DATA 14" CASING

		Lead		Tail		Units	
Design	Dyckerhoff G-cement						
	Econolite	2,90	0,33	--	--	Lhk	gps
	HR-4L	3,00	0,34	0,50	0,06	Lhk	gps
	NF-6	0,10	0,01	0,10	0,01	Lhk	gps
	Sea Water	83,74	9,43	--	--	Lhk	gps
	Fresh Water	--	--	43,17	4,86	Lhk	gps
	Density	**1,60**	**13,4**	**1,92**	**16,0**	**SG**	**ppg**
	Total Mix Fluid	89,74	10,11	43,77	4,93	Lhk	gps
	Yield	120,89	1,82	74,93	1,13	Lhk	$ft^3/_{sk}$
	Thickening Time at BHCT						
	Time to 30 BC	6:23		3:12		hrs:min	
	Time to 70 BC	6:45		3:38		hrs:min	
	Time to 100 BC	7:00		3:55		hrs:min	
Test Results Lab Reference no. NS02-Z-225	API Free Water, 0° deviation	0		0,9		%	
	Fann rheology at BHCT	12		77		300 rpm	
		11		74		200 rpm	
		8		63		100 rpm	
		7		54		60 rpm	
		6		49		30 rpm	
		5		15		6 rpm	
		4		12		3 rpm	
	Gel Strength (10sec/10min)	7/13		19/20			
Maximum static time allowable during mixing		45		45		minutes	
	Compressive strength at predicted thermal recovery temperature schedule	220		500		Psi [11:22h]	

CEMENT SLURRY DESIGN & DATA 9 5/8"					
Design	Dyckerhoff G-cement	**Gas block**		**Units**	
	SSA-1, pre-blended	35	35	% BWOC	
	CFR-3L	1,00	0,11	lhk	gps
	Gascon	4,90	0,55	lhk	gps
	Halad-413L	5,00	0,56	lhk	gps
	SCR-100L	2,50	0,28	lhk	gps
	NF-6	0,10	0,01	lhk	gps
	Fresh Water	41,75	4,70	lhk	gps
	Density	**1,92**	**16,0**	**SG**	**ppg**
	Total Mix Fluid	55,25	6,22	lhk	gps
	Yield	99,71	1,50	lhk	$^{ft3}/_{sk}$
	Thickening Time at	**63 ^{0}C**	**83 ^{0}C**		
	Time to 30 BC	4:30	5:38	hrs:min	
	Time to 70 BC	4:44	5:54	hrs:min	
	Time to 100 BC	4:48	5:57	hrs:min	
Test results					
Lab Reference no.	API Free Water, 0° deviation	0		%	
NS02-Z-243	Fluid loss	36		$^{cm3}/_{30\ min}$	
	Fann rheology at BHCT	150		300 rpm	
		105		200 rpm	
		69		100 rpm	
		48		60 rpm	
		28		30 rpm	
		9		6 rpm	
		5		3 rpm	
Maximum static time allowable during mixing		45		minutes	
	Compressive strength	1000		psi [8:30 hrs]	

CEMENT SLURRY DESIGN & DATA P & A PLUG #1					
Design	Dyckerhoff G-cement	**Concentration**		**Units**	
	SSA-1, pre-blended	35	35	% BWOC	
	Halad-413L	4,50	0,51	lhk	gps
	SCR-100L	4,00	0,45	lhk	gps
	NF-6	0,10	0,01	lhk	gps
	Fresh Water	46,01	5,18	lhk	gps
	Density	**1,92**	**16,0**	**SG**	**ppg**
	Total Mix Fluid	54,61	6,14	lhk	gps
	Yield	99,07	1,49	lhk	$ft^3/_{sk}$
	Thickening Time at BHCT				
	Time to 30 BC	4:07		hrs:min	
	Time to 70 BC	4:09		hrs:min	
	Time to 100 BC	4:12		hrs:min	
Test results					
Lab reference	API Free Water, 0° deviation	0		%	
NS-02-272-9	SG top / bottom	1.90 / 1.92		SG / SG	
	Fann rheology at 90 °C	58		300 rpm	
		41		200 rpm	
		21		100 rpm	
		14		60 rpm	
		8		30 rpm	
		2		6 rpm	
		1		3 rpm	
	Static Gel Strenght (10 sec/10 min)	2/5		cp	
Maximum static time allowable during mixing		30		minutes	
	Drill water chloride content	600		ppm	
	Compressive strength	± 1500		psi [15 hrs]	

CEMENT SLURRY DESIGN & DATA P & A PLUG #2

Design	Dyckerhoff G-cement	**Concentration**		**Units**	
	SSA-1, pre-blended	35	35	% BWOC	
	Halad-413L	2,50	0,28	lhk	gps
	SCR-100L	1,20	0,14	lhk	gps
	NF-6	0,10	0,01	lhk	gps
	Fresh Water	50,43	5,68	lhk	gps
	Density	**1,92**	**16,0**	**SG**	**ppg**
	Total Mix Fluid	54,23	6,11	lhk	gps
	Yield	98,69	1,49	lhk	ft^3/sk
	Thickening Time at BHCT				
	Time to 30 BC	3:52		hrs:min	
	Time to 70 BC	4:01		hrs:min	
	Time to 100 BC	4:04		hrs:min	
	API Free Water, 0° deviation	0		%	
	SG top / bottom	1.92 / 1.92		SG / SG	
	Fann rheology at BHCT	71		300 rpm	
Test results		53		200 rpm	
Lab reference		34		100 rpm	
NS-02-273-6		25		60 rpm	
		20		30 rpm	
		19		6 rpm	
		16		3 rpm	
	Static Gel Strenght (10 sec/10 min)	4/53		cp	
Maximum static time allowable during mixing		30		minutes	
	Drill water chloride content	600		PPM	
	Compressive strength	1000		psi [8 hrs]	

CEMENT SLURRY DESIGN & DATA P & A PLUG #3 and #5

				Units	
Design	Dyckerhoff Class "G" Cement				
	Calcium Chloride	3,20	0,36	Lhk	gps
	NF-6	0,10	0,01	Lhk	gps
	Sea water	40,14	4,52	Lhk	gps
	Density	**1,95**	**16,3**	**SG**	**ppg**
	Total Mix Fluid	43,44	4,89	Lhk	gps
	Yield	74,59	1,12	Lhk	$ft^3/_{sk}$
Test results Lab reference NS-02-279-2	Thickening Time at BHCT				
	Time to 30 BC	4:05		hrs:min	
	Time to 70 BC	4:10		hrs:min	
	Time to 100 BC	4:20		hrs:min	
	API Free Water, 0° deviation	0		%	
	Maximum static time allowable during mixing	15		minutes	
	Compressive strength	300		psi [9 hrs]	

CEMENT SLURRY DESIGN & DATA P & A PLUG #4

				Units	
Design	Dyckerhoff Class "G" Cement				
	Calcium Chloride	2,50	0,28	Lhk	gps
	NF-6	0,10	0,01	Lhk	gps
	Sea water	40,62	4,57	Lhk	gps
	Density	**1,95**	**16,3**	**SG**	**ppg**
	Total Mix Fluid	43,22	4,87	Lhk	gps
	Yield	74,37	1,12	Lhk	$ft^3/_{sk}$
Test results Lab reference NS-02-279-3	Thickening Time at BHCT				
	Time to 30 BC (Estimate)	5:30		hrs:min	
	API Free Water, 0° deviation	0		%	

Maximum static time allowable during mixing	15	minutes
Compressive strength	300	psi [10:30 hrs]

SPACER DESIGNS PUMPED

Spacer design & data 14" Casing					
		Amount	**Unit**	**Order of addition**	**Function**
Spacer design per 1 m3:	Drill water	810	liter	1 Check Chlorides	Mix fluid
	NF-6	3	liter	2 Disperse in water	Defoamer
	Tuned Spacer E+	37	kg	3 Yield min. 1 hour	Viscosifier
	Barite	732	kg	4 Weigh up to final SG	Densifier
	Final density	**1,58**	SG	Final SG	

Spacer design & data 9 5/8" Casing					
		Amount	**Unit**	**Order of addition**	**Function**
Spacer design per 1 m3:	Drill water	700	liter	1 Check Chlorides	Mix fluid
	NF-6	3	liter	2 Disperse in water	Defoamer
	Tuned Spacer E+	31	kg	3 Yield min. 1 hour	Viscosifier
	Barite	1052	kg	4 Weigh up to final SG	Densifier
	Musol E	24	ltr	5 Just prior to job.	Solvent
	SEM-7	12	ltr	6 Just prior to job.	Surfactant
Density without Musol E & Sem-7		1,85	SG	Initial SG	
	Final density	**1,82**	SG	Final SG with surfactants	

Spacer design & data for P & A plug #1, #2 and #3					
		Amount	**Unit**	**Order of addition**	**Function**
Spacer design per 1 m3:	Drill water	691	liter	1 Check Chlorides	Mix fluid
	NF-6	3	liter	2 Disperse in water	Defoamer
	Tuned Spacer E+	31	kg	3 Yield min. 1 hour	Viscosifier
	Barite	1090	kg	4 Weigh up to final SG	Densifier
	Musol E	24	ltr	5 Just prior to job.	Solvent
	SEM-7	12	ltr	6 Just prior to job.	Surfactant
Density without Musol E & Sem-7		1,88	SG	Initial SG	
	Final density	**1,85**	SG	Final SG with surfactants	

APPENDIX

Usage Discharge Material Mass Balance

Field:	Exploration	Year:	2002
Rig:	DeepSea Bergen	Well:	1/5-4S

Product	SFT class	Unit	Density	Harmful subst.	Usage	Discharges				
			[SG]	[%]		Destruction	Left in well	Reinjected	To sea	Balance
CaCl2 liquid	1	ltr	1.318		9,810		9,810			OK
Cement cl. "G"	1	MT	3.220		464		462		2	OK
CFR-3L	13	ltr	1.178	45	222		222			OK
Econolite	2	ltr	1.363		6,800		6,800			OK
Gascon469	1	ltr	1.100		1,261		1,261			OK
Halad-413L	5	ltr	1.067	20	1,628		1,628			OK
HR-4L	4	ltr	1.182		723		723			OK
Musol E	16	ltr	0.950		1,206		1,206			OK
NF-6	7	ltr	0.940		615		605		10	OK
SCR-100L	2	ltr	1.078	45	1,060		1,060			OK
Sem-7	16	ltr	1.000	65	644		644			OK
SSA-1, blend	1	MT	3.043		57		57			OK
Tuned Spaer E+	5	kg	2.650		2,079		2,023		56	OK

Well Summary

Well : 1_5-4S (K1_T1)
Operator: Amerada Hess Norway

Well Data

Spud Date		Apr/15/02	Products/Fluids Drilling Cost		Kr4,708,044.83
TD Date		May/15/02	Products/Fluids Completion Cost		Kr0.00
Project			Solids Control/ Waste Management Cost		Kr0.00
Days on Well		37	Products/Fluids Cementing Cost		Kr22,165.42
From Date		Apr/15/02	Products Lost/Damaged Cost		Kr0.00
To Date		May/22/02	Engineering Services Cost		Kr568,217.00
Drilling Days		19	Equipment Cost		Kr0.00
Rotating Hours		291.00	Transport / Packaging		Kr0.00
Average ROP	m/hr	2.9	Other Cost		Kr84,120.98
Maximum Density	SG	1.790	Total Well Cost		Kr5,382,548.23
Total Measured Depth	m	91.7	Planned Cost		Kr0.00
True Vertical Depth	m	0.0	Cost per Fluid Volume	Kr / m3	2,484.36
Distance Drilled	m	3,834.3	Cost per m Drilled	Kr / m	1,404.47
Maximum Deviation	degrees	16.90	Cost / Volume of Hole Drilled	Kr / m3	6,643.13
Maximum Horiz. Displacement	m	1,116.4	Fluid Volume / Hole Volume	m3 / m3	2.674
Bottom Hole Temperature	Deg C	118.00	Fluid Volume / Length Drilled	m3/m	0.570

Casing Design

Interval #	Hole Size in	Top MD m	End MD m	Footage m	Casing Size in	Casing Top m	Casing End m	Casing Length m	Max Dev. Angle
01	36.000	91.70	927.80	836.1	30.000	92.0	166.9	74.9	0.00
01	26.000	91.70	927.80	836.1	20.000	92.0	923.4	831.4	0.00
01	17.500	91.70	927.80	836.1	14.000	92.0	1,640.0	1,548.0	0.00
01	12.250	91.70	927.80	836.1	9.630	92.0	2,873.0	2,781.0	0.00
02	36.000	91.70	167.30	75.6	30.000	92.0	166.9	74.9	0.70
02	26.000	91.70	167.30	75.6	20.000	92.0	923.4	831.4	0.70
02	17.500	91.70	167.30	75.6	14.000	92.0	1,640.0	1,548.0	0.70
02	12.250	91.70	167.30	75.6	9.630	92.0	2,873.0	2,781.0	0.70
03	26.000	167.30	927.80	760.5	20.000	92.0	923.4	831.4	1.09
03	17.500	167.30	927.80	760.5	14.000	92.0	1,640.0	1,548.0	1.09
03	12.250	167.30	927.80	760.5	9.630	92.0	2,873.0	2,781.0	1.09
04	17.500	927.80	1,645.90	718.1	14.000	92.0	1,640.0	1,548.0	20.20
04	12.250	927.80	1,645.90	718.1	9.630	92.0	2,873.0	2,781.0	20.20
05	12.250	1,645.90	2,878.80	1,232.9	9.630	92.0		2,781.0	55.29
06		2,878.80	3,089.80	210.9					55.42
07		3,089.80	91.70	0.2					0.00

Well Summary

Well : 1_5-4S (K1_T1)
Operator: Amerada Hess Norway

Mud Program

Interval #	Mud Type	Interval Days	BHT Deg C	Max. Dens SG	Planned Fluid Cost	Actual Fluids and Products Cost	Variance
01	Spud Mud	2		1.050	Kr 0.00	Kr 297,400.48	Kr 297,400.48
01	Seawater	2		1.050	Kr 0.00	Kr 0.00	Kr 0.00
02	Spud Mud	1		1.050	Kr 0.00	Kr 9,390.16	Kr 9,390.16
02	Seawater	1		1.050	Kr 0.00	Kr 0.00	Kr 0.00
03	Spud Mud	5		1.050	Kr 0.00	Kr 91,474.50	Kr 91,474.50
03	Seawater	5		1.050	Kr 0.00	Kr 0.00	Kr 0.00
04	Spud Mud	7	48	1.570	Kr 0.00	Kr 13,205.56	Kr 13,205.56
04	GEM	7	48	1.570	Kr 0.00	Kr 1,809,330.75	Kr 1,809,330.75
04	Seawater	7	48	1.570	Kr 0.00	Kr 0.00	Kr 0.00
05	XP-07	11	74	1.780	Kr 0.00	Kr 5,095,273.81	Kr 5,095,273.81
05	GEM	11	74	1.780	Kr 0.00	Kr 0.00	Kr 0.00
06	XP-07	5	79	1.790	Kr 0.00	Kr 997,250.48	Kr 997,250.48
07	Seawater P&A	7	118	1.780	Kr 0.00	Kr 80,724.80	Kr 80,724.80
07	XP-07	7	118	1.780	Kr 0.00	-Kr 3,686,005.71	-Kr 3,686,005.71

Conclusions & Recommendations

1. Pilot Hole, 36" and 26"

The pilot hole was drilled from 93 to 928 meters.
The pilot hole was opened up to 36" from 93 to 167.5 meters
The 30" casing was set at 167 meters
The 26" hole was drilled from 1267.5 to 928 meters
The 20" casing was set at 923 meters

The top-hole sections were drilled with seawater with returns to the seabed. High viscosity pills were pumped on a regular basis to clean the hole. The four seismic anomalies were drilled with 1.10 SG spud mud until the MWD could indicate that there was no shallow gas in the pilot hole. At TD of each section the open hole was displaced to weighted mud (pilot hole = 1.20SG, 36" hole = 1.32 SG and the 26" hole = 1.20 SG) prior to pulling out of the hole to run casing.

Prehydrated bentonite and kill mud were mixed up in the Tananger mud plant and were shipped out to the rig. This head start allowed the crews on the rig to start mixing prehydrated bentonite and then allow it time to hydrate.

The casing strings were run to the desired setting points with no problems. The 30" casing had to be pulled due to an open valve on the cart. The shoe joint and 2 intermediate joints had to be laid out. The second running of the casing was cemented successfully.

This procedure is recommended for drilling the riserless sections on future wells.

2. 17 ½" hole

The 17 ½" hole was drilled from 928 to 1646 meters
The 14" casing was set at 1640 meters

The section was drilled with a KCl/Polymer/GEM GP mud system in one bit run, with no problems during the drilling of the section. The mud properties were maintained using scheduled dilution and fine mesh shaker screen (140 to 210 mesh). A concentrated premix was mixed in the Tananger mud plant and was shipped to the rig prior to drilling this section. This allowed the mud for displacing into the casing for drilling to be made up quickly and then weighted up.

Tight hole was experienced when attempting to pull out with the motor assembly and bent sub BHA. A high viscosity sweep was used in an attempt to clean out the cuttings generated with the backreaming, but with no significant increase in cuttings. A second sweep with LCM was pumped, large increase in ECD was recorded before the hole packed off and returns were lost. Circulation was regained by working the pipe and the hole was circulated clean.

The 14" casing was run to 1640 meters and was cemented with no problems.

Conclusions & Recommendations

In future wells, the use of hole cleaning sweeps should be risk evaluated before pumping one. The mud system, dilution procedures and premix from town worked well in this section. It is recommended for future wells in this area.

3. 12 ¼" hole

The 12 ¼" hole was drilled from 1646 to 2878 meters
The 9 5/8" casing was set at 2873 meters

This section was drilled in two bit runs with the Sperry Sun Geo-Pilot and a rotary assembly using XP-07 NAP fluid. 1.68 SG treated XP-07 mud from the previous well was sent out from the Tananger mud plant for this interval. The cuttings were good and firm and the decision was made to allow the water phase salinity specification to drop and be maintained at a level determined by the condition of the cuttings.

Baroid's Drill Ahead Hydraulics were run in the Oslo office and confirmed that the ECDs from the PWD tool were accurate and that the re was little or no cuttings bed build up.

The 9 5/8" casing was run to 2840 meters where the casing string became stuck. After the casing was worked free, it was washed down to the required setting depth of 2873 meters.

A successful cement job was performed as per programme.

The XP-07 mud performed well in this interval and is recommended for other wells in this highly reactive shale interval.

4. 8 ½" hole

The 8 ½" hole was drilled from 2878 meters to the well TD at 3090 meters

The section was drilled in one bit run with XP-07 mud from the previous interval.

The well TD was reached higher than planned when the Hod evaporites were entered earlier than prognosed.

The use of 5 ½" drill pipe limited the pump output to 1500 liters per minute to maintain the ECD at or greater than the leak off test EMW of 1.96 SG. This was considerably less than the programmed 2000 2500 liters per minute pump output, but the Drill Ahead Hydraulics run in the Oslo office showed that hole cleaning was not affected by the lower pump rate. If the well had drilled to the programmed TD, this would have become a cause for concern.

Conclusions & Recommendations

Three suites of wire line logs were run to bottom in the 55-degree hole, which showed that the hole was in good shape.

The XP-07 mud performed well and is recommended for use in this area in future wells. In future wells the use of 5" drill pipe should be considered and the BHA tools such as the MWD must be risk assessed to ensure they can operate in the flow regime used.

5. Plug and Abandonment

The open hole and at least 100 meters of cased hole were cemented off with the first two cement plugs. Weighted slops and XP-07 mud were left between the two bottom cement plugs and the bridge plug below where the 9 5/8" casing was to be cut.

After cutting and pulling the 9 5/8" casing, the hole was displaced to seawater. The well began flowing and the hole was displaced back to XP-07 mud to kill it. The third cement plug was set in the XP-07 mud and the cement string had cement deposition of up to 1 ½" thick on it. The hole was displaced to seawater and the cement, spacer and water contaminated mud was designated as slops as the treatment cost was higher than the disposal cost.

A 1.55 SG water base mud was mixed for a contingency for cutting the 14" casing, but was used as a sweep for cleaning the hole when dressing off the third cement plug.

In future abandonment programs, a contingency waterbased mud could be used to displace the XP-07 mud after cutting and pulling the 9 5/8" casing. This could have recovered most of the XP-07 mud and would have reduced the amount of mud for disposal.

Interval Discussion

Interval No:	**1**	**Top of Interval:**	**91.7 m**
Bit Size:	**9.875 in**	**Bottom of Interval:**	**927.8 m**

Objective:

To drill a vertical 9 5/8" pilot hole from seabed (93m) to 927m checking for shallow gas presence, specific depths of interest being 365, 432 and 820m.

Rig abstract/Summary:

Spudded 15th April, 20:00hr, the pilot hole was drilled at a controlled rate, in 24hr, with no gas being detected. Drilled using seawater and prehydrated bentonite sweeps (3m3/15m) with returns to the sea floor, displacement of the hole to 1.10 SG bentonite mud was made prior to each potentially gas bearing anomaly, and 10m drilled thereafter, before, given no gas, reverting back to seawater. Three such displacements were made at 365, 432 and 820m respectively, with an unscheduled fourth being made at 862m. The hole was displaced to 1.20 SG bentonite mud prior to POOH.

A total of 672m3 mud was built, 296m3 (0.35m3/m) of which was used over the course of the section, 376m3 being carried forward to the next.

Issues discussion:

Drilling was uneventful, the only occurrence out with that programmed being the extra displacement required for the fourth anomaly.

Zero Defects tracking:

Nothing untoward to report.

Maintenance treatment:

None. Returns to sea floor.

Solids control evaluation:

No solids control equipment in use.

Interval Discussion

Concentrations:

Bentonite concentration maintained as per programme.

Logistics:

No problems.

HSE:

There were no safety or environmental issues.

Interval Discussion

Interval No:	**2**	**Top of Interval:**	**91.7 m**
Bit Size:	**36.000 in**	**Bottom of Interval:**	**167.3 m**

Objective:

To drill vertical 36.0" hole from seabed (93m) to 167.5m, thereafter to run and cement 30" conductor.

Rig abstract/Summary:

Commenced 17th April, a tandem 17 ½" bit/36" hole opening, mud motor assembly drilled the section in 10hrs, seawater and bentonite sweeps (5m3/10m) being employed, returns to the sea floor. Rubble was encountered over the last 10m of the hole, this prompting an increase in the weight of the displacement mud, 1.32sg being used instead of the intended 1.20sg. Hi-vis sweeps (20m3) x 2 were circulated out prior to displacement, the leading pill containing mica © x 4sx as an aid to identifying hole size. A wiper trip to 7m was conducted with the displacement mud in situ, 0.5m fill being encountered. The trip out was good, running of conductor, on the same day, saw its ready landing at 166m, light washing required over the final metre or so. Cementing and displacement were conducted as per programme, but on their completion it was noted that a valve on the cart was in an open position, probably the inadvertent result of ROV operations when inspecting the PGB bulls-eye.

The landing string and conductor were pulled. The cement stinger was plugged, the shoe and two intermediate joints of the latter required replacement. The 36" hole opening assembly was re-run to clean out the hole. Cement engaged from 120m. Sweep frequency on this occasion was less than before, a final 20 m3 high viscosity pill was pumped before displacing the hole to 1.32 SG mud. Successful re-running and cementing of the 30" conductor took place 19th April.

Total mud built during the section was 424m3, 282m3 (1.89m3/m) of which were used over the section, 516m3 being carried over to the 26" section.

Issues discussion:

Drilling of the section and running of the 30" conductor were uneventful, and only the incident with the cart valve extended the operational period.

Zero Defects tracking:

Nothing untoward to report.

Maintenance treatment:

Not a closed system. Returns to sea floor.

Interval Discussion

Solids control evaluation:

Not in use.

Concentrations:

Bentonite concentration maintained as per programme.

Logistics:

No problems.

HSE;

There

Interval Discussion

Interval No:	**3**	**Top of Interval:**	**167.3 m**
Bit Size:	**26.214 in**	**Bottom of Interval:**	**927.8 m**

Objective:

To drill vertical 26.0" hole from 167.5 - 928m, thereafter to run and cement 20" conductor.

Rig abstract/Summary:

Commenced 20th April, this section was drilled with a 26" bit and rotary assembly, in 34hrs, employing seawater and bentonite sweeps (10m3/15m), returns to the sea floor. A hi-vis sweep (30m3) was circulated out prior to a wiper trip to the 30" shoe, drag experienced across a sand body at 208m whilst POOH, and standing-up at 903m when RIH. Washing down ensued to 909m, reaming required thereafter to bottom. A final 20m3 high viscosity sweep preceded displacing the hole to viscous 1.20 SG mud (260m3 = o/h volume). The trip out was good. Casing was commenced 22nd, and landed at 923m without difficulty, cementing and displacement conducted as per programme.

Mud built during the section was 280m3, allied to the 516m3 carried over from the previous well. Mud usage over the section, encompassing both sweep and displacement volume, was 716m3 (0.94m3/m), 80m3 being dumped at section end.

Issues discussion:

None to report. Drilling of the section, and running/cementing of the 20" casing went as planned. The section was completed 1.5 days ahead of schedule.

Zero Defects tracking:

Nothing untoward to report.

Maintenance treatment:

Not a closed system. Returns to sea floor.

Solids control evaluation:

Not in use.

Interval Discussion

Concentrations:

Bentonite concentration maintained as per programme.

Logistics:

No problems.

HSE:

There were no safety or environmental issues.

Interval Discussion

Interval No:	**4**	**Top of Interval:**	**927.8 m**
Bit Size:	**18.160 in**	**Bottom of Interval:**	**1645.9 m**

Objective:

To drill a 20 deg. deviated 17 1/2" hole from 928m 1646 m, thereafter to run logs and cement 14" casing.

Rig abstract/Summary:

Commenced 24th April, this section was drilled with a 17 ½" bit and mud motor assembly, in 45hrs, Using a Kcl/GEM/ Polymer system. No problems were experienced while drilling to section TD at 1646 m. Casing was commenced 30th, and landed at 1640 m without difficulty, cementing and displacement conducted as per programme.

Issues discussion:

Tight hole was experienced when attempting to pull out. High viscosity sweeps were pumped without any significant increase in cuttings at the shaker. While Pumping the second sweep containing 150 kg/m3 BAROFIBRE and WALLNUT, the PWD tool indicated a big increase in the ECD, as a result of the hole packing off, with full loss of returns. Circulation was regained by working the pipe.

Zero Defects tracking:

Nothing untoward to report.

Maintenance treatment:

Nothing untoward to report. But it should be mentioned that the supply of pre mix was of great help for drilling this section.

Solids control evaluation:

The three Derrick Flo Line Cleaner was initially dressed with 140 mesh screens but was rapidly changed to 210 mesh and was used through out the section without any problems, an excellent performance.

Interval Discussion

Concentrations:

All concentrations were maintained as per programme.

Logistics:

No problems.

HSE;

There were no safety or environmental issues.

Interval Discussion

Interval No:	**5**	**Top of Interval:**	**1645.9 m**
Bit Size:	**14.901 in**	**Bottom of Interval:**	**2878.8 m**

Objective:

To drill a 12.25" hole from 1646 m. to 2823 m, and continue building angle from 20 deg. to 52.2 deg. down to 2117 m. from 2117 m to TD at 2823 m the angle will be held. A 9 5/8" casing will be run and cemented.

Rig abstract/Summary:

Commenced the 2nd May, 375 m3 XP-O7 drilling fluid at 1.68 SG was sent from town. While displacing the KCL/GEM/ Polymer out of the hole with the XP-07 mud, the displacement rate had to be reduced till it was past the GEO PILOT tool in the annulus, this caused some contamination and a 16-m3 interface was diverted to the slop tank. A high viscosity spacer was used between the KCl/ GEM fluid and the NAP fluid. A LOT was performed which gave an EMW of 1.88 SG.

Issues discussion:

The WPS was increased in accordance with the mud program. At 2500 m. this was stopped due to good firm cuttings. It was decided to let the well dictate the WPS according to the cuttings. According to the HESS computer program and Swaco skips filled with cuttings there was a bit of scepticism about hole cleaning and different hole cleaning sweeps was pumped with minor to no effect. At 2500 m. the sweep pumped came back to surface on the theoretical strokes with no conspicuous excess of cuttings. In the microscope it was detected around 50% small sharp cuttings with the sweep material. From 2482 m. down to 2605 m., there were some drilling difficulties, a ten-stand wiper trip was made and the string was worked through the problem areas. At 2660 m., there were again some problems to get the bit to drill; the bit was pulled to modify the B.H.A. A rotary assembly was then used to drill to T.D. at 2879 m.M.D. The trip out was uneventful. The mud weight by this point had been increased as per program to 1.78 SG from the initial 1.73 SG The 9 5/8" casing run was uneventful until 2840 m. where it became stuck, great effort was required to free it and pump it down to the required setting depth of 2873 m MD. After circulating and conditioning the mud, a successful cement job was performed as per programme.

Zero Defects tracking:

Nothing untoward to report.

Interval Discussion

Maintenance treatment:

Nothing untoward to report. But it should be mention that the supply of pre made drilling fluid was of great help for drilling this section.

Solids control evaluation:

The three Derrick Flo Line Cleaner were initially dressed with 210 mesh screens but was rapidly changed to two x 210 mesh and one, the middle shaker with 180 mesh, these were used through out the section without any problems.

Concentrations:

The concentrations were held to as near as possible to that programmed.

Logistics:

No problems.

HSE:

There were

Interval Discussion

Interval No:	**6**	**Top of Interval:**	**2878.8 m**
Bit Size:	**14.365 in**	**Bottom of Interval:**	**3089.8 m**

Objective:

To drill an 8,5" hole from 2879 m to 3385m. M.D. through the Lower Hordaland shales, the Rogaland group and into the Shetland, into the Hod evaporites.

Rig abstract/Summary:

The XP-07 mud from the previous section was transferred to this section, the same weight was used to start off, 1.78 S.G. After The floats, cement and shoe were drilled out, the rat-hole was cleaned out and 3 m. of new formation was drilled down to 2882 m. M.D. A L.O.T. was carried out to 1.97 S.G. E.M.W. Due to E.C.D. restrictions, the pump rate was limited to 1500 l/m., but this did not compromise the hole cleaning. The R.O.P. was restricted to a maximum of 10 m./hr. for sampling. Seepage losses of up to 1.5 m3/hr were experienced through the fractured limestones of the Ekofisk and Tor formations, no L.C.M. was added to the mud but the weight was reduced slightly by 0.1 S.G. using the centrifuge and unweighted premix. Great attention was focussed on the E.C.D. readout from the P.W.D. tool. No shows nor gas was encountered through the limestone sequences and at 3090 m. anhydrite was discovered in the samples, evidence that the evaporites had been entered, this was then T.D., the hole was surveyed and circulated clean and the bit pulled, the open hole section was in good shape. Three suites of wireline logs were then run all went to bottom, 1st run- GR-MAC-HDIL, 2nd run-GR-ZDEN-CN and the third run, which was repeated, - GR-FMT. The well was then plugged back and abandoned.

Issues discussion:

The use of 5 ½" drillpipe caused the E.C.D. readings while circulating to be near or even greater than the fracture gradient, therefore the pump output could not be raised much above 1500 l/min., while programmed was 2000-2500 l/min. But from the hydraulics programmes this still did not effect the hole cleaning, which was good throughout the section. If the well had be T.D. d as forecast, the E.C.D. would have become a cause for concern.

Zero Defects tracking:

Nothing untoward to report.

Maintenance treatment:

Nothing untoward to report. One mix of unweighted premix with a low water content was used to maintain weight and volume.

Interval Discussion

Solids control evaluation:

The three Derrick Flo Line Cleaner were initially dressed with 2 x 210 pyramid mesh screens and 1 x 180 pyramid mesh screens and this configuration was used throughout the section without any problems. At one stage it was decided to try 230 pyramid screens, with one shaker dressed with 230 mesh, mud was being lost as the third mud pump was used to boost the riser, the flow was too great for the 230 mesh screens, and they were changed back to the original set-up.

Concentrations:

The concentrations were held as programmed, calcium chloride was added to replace that lost by depletion.

Logistics:

No problems.

HSE;

There were no HSE problems.

Interval Discussion

Interval No:	**7**	**Top of Interval:**	**3089.8 m**
Bit Size:	**11.971 in**	**Bottom of Interval:**	**91.7 m**

Objective:

To plug and abandon the well in accordance with Amerada Hess abandonment programme: ref PoA 17 rev. 1 & subsequent PoA 17 addendum.

Rig abstract/Summary:

Commenced 21:00hr 17th May, the programme called for the setting of four cement plugs.
The first two were conducted in XP-07 mud, being set one on top of the other, covering at least TD 2773m, the second plug required to be a minimum of 100m inside the 9 5/8 casing shoe, this completed 8th. Cementing of each plug was preceded by 8m3 water wetting spacer (1.90sg), and chased by 1.4m3 of the same. After setting, each plug was tagged, at 2888 & 2545m respectively, and the cement spacer reversed out, cement possibly present on the first occasion. Mud contamination was looked for at the shakers, water-wet barite being the indicator, 27m3 being sent to slops pit on each occasion. Thereafter, 68m3 drilling slops (weighted up to 1.78sg) were spotted on top of the second plug, equivalent displaced XP-07 mud taken to reserve. An EZSV packer was then set at 610m, an ensuing casing cutting run severing the 9 5/8 casing at 510m. The subsequent spear/DQ MPT run successfully engaged and retrieved both the seal assembly and the casing.

Displacement of the well to seawater was conducted with the cement stinger at 610m prior to setting plug #3, a viscous 20 m3 wbm spacer (BARAZAN) at 2.0 SG pumped ahead. A good interface resulted, the XP-07 mud was taken to reserve and the wbm spacer diverted to slops pit. A flow check revealed the well to be flowing, the displacement having induced a 35 bar draw-down. The well was shut in, and an incremental pressure increase noted. The well was re-displaced to 55 m3 of 1.78 SG XP-07 mud at maximum rate, no further flow observed. Cement plug #3 was set 610-360m, 10 m3 water wetting spacer (1.90 SG) pumped ahead. The string was POOH to 230m, increasing external cement deposition observed on the 3 ½ stinger as the trip progressed, up to 1.5 thick towards the end. Circulating through the stinger to clean it took 85bar to break circulation, the returning mud being severely contaminated, to such an extent that the whole circulating system was designated as slops. This meant that only the most severely contaminated mud was diverted to slops pit, reasonably mobile mud being retained in the system to allow proceedings to continue. The string was staged in the hole, circulation conducted at 250m, before continuing to wash down, incorporating cement spacer into the XP-07 mud, tagging at 326m. A pressure test (88bar) was conducted before re-displacing the hole back to seawater, a 20-m3 wbm spacer at 2.0 SG preceding.

The next stage was to cut the 14 casing which had 1.55 SG KCl mud in the annulus. In case of a similar scenario to that previous, a 100m3 contingency wbm @ 1.55 SG was prepared using BARAZAN. In the event of a flow this would be pumped to kill it.

Interval Discussion

The 14" casing cutting run held up early (+/-120m) due to cement, an 8.5 milling run conducted, dressing to 400m, firm cement initially tagged at 340m. Considerable cement was brought to surface, overwhelming the shakers on one occasion, some of the 1.55 SG wbm contingency being used to sweep the hole. Casing cutting then proceeded, the 14 being cut at 350m, spearing and retrieval subsequently successfully achieved, the well was static throughout. The final cement plug was set on top of that previous, 400-143m. Pressure testing of the plug was indeterminate, further cement being spotted and squeezed to achieve integrity, completed 22nd May.

To ensure as clean seawater as possible in the riser prior to unlatch, a CONDET-E pill was circulated through it and the BOP.

P&A cost in mud chemical terms was NOK +/- 234,000.

Issues discussion:

The well flow encountered after displacing the well to seawater set back proceedings by 2 days, and incurred unscheduled extra mud costs, which included an extra cement spacer, extra 2.0 SG wbm spacers to displace the XP-07 from the hole and contingency 1.55 SG wbm kill mud. The above estimated P&A cost does not include for XP-07 SOBM consigned to slops because of contamination.

Solids control evaluation:

Good. Screened out cement and water wet barite effectively.

Logistics:

Disposal of slops and dirty seawater became slightly problematic towards the end of proceedings, further bunkering required on other boats after capacity of the Waveney Fortress was used up.

HSE;

A closed circulating system was adopted after displacing the well to seawater, limiting discharge.

Fluid Property Recap:Water-Based Fluid

Well : 1_5-4S (K1_T1)
Operator: Amerada Hess Norway

Date	Depth	FL Temp	Density	Fun Visc	Rheology @ 120F					Filtration					Filtrate Analysis						Sand	Retort Analysis				MBT	Rheometer Dial Reading					
					PV	YP	Gels lbs/100 ft2			API ml/30 min	HTHP ml/30 min	Cake API/HTHP 32nd in		Temp	pH	Pm ml	Pf ml	Mf ml	Cl mg/l	Total Hard mg/l	% by Vol	Corr Sol % by Vol	LGS % by Vol	Oil % by Vol	Water% by Vol							
	m	Deg C	SG	sec/qt	cP		10s	10m	30m					Deg C												ppb Eq.	600	300	200	100	6	3
04/15/02	92.0		1.100	94															0	0		0.0	0.0		95.0	0.0						
04/15/02	0.0		1.000	0	2	-1													0	0		0.0	0.0		100.0	0.0	3	1	1			
04/16/02	937.0		1.100	105															0	0		0.0	0.0		95.0	0.0						
04/16/02	927.0		1.000	28	2	-1													0	0		0.0	0.0		99.0	0.0	3	1	1			
04/17/02	168.0		1.100	97															0	0		0.0	0.0		95.0	0.0						
04/17/02	0.0		1.000	28	2	-1													0	0		0.0	0.0		99.0	0.0	3	1	1			
04/18/02	168.0		1.100	103															0	0		0.0	0.0		95.0	0.0						
04/18/02	168.0		1.000	0	2	-1													0	0		0.0	0.0		99.0	0.0	3	1	1			
04/19/02	168.0		1.000	28	2	-1													0	0		0.0	0.0		99.0	0.0	3	1	1			
04/20/02	532.0		1.000	29	2	-1													0	0		0.0	0.0		99.5	0.0	3	1	1			
04/21/02	928.0		1.100	100															0	0		0.0	0.0		97.0	0.0						
04/22/02	928.0		1.000	28	2	-1													0	0		0.0	0.0		99.5	0.0	3	1	1			
04/23/02	928.0		1.600	92	52	30	6	7		2.2		1			10.20	3.40	1.14	3.05	82,000	10	0.25	15.2	1.1	2.5	76.5	2.0	134	82	63	41	7	5
04/23/02	928.0		1.000	28	2	-1													0	0		0.0	0.0		99.5	0.0	3	1	1			
04/24/02	928.0		1.600	88	51	29	6	7		2.2		1			10.10	3.60	1.10	2.94	84,000	10	0.25	15.1	0.9	2.5	76.5	2.0	131	80	62	40	7	5
04/24/02	932.0		1.600	86	50	29	6	7		2.0		1			10.20	3.50	1.10	2.85	85,000	10	0.25	15.0	0.8	2.5	76.5	2.0	129	79	60	39	7	6
04/25/02	1,019.0	15	1.600	63	23	21	6	7		2.2		1			10.40	3.45	1.15	2.90	76,000	9	0.25	15.7	1.6	2.5	76.5	2.0	67	44	31	20	6	5
04/25/02	1,180.0	33	1.600	64	31	37	5	7		2.3		1			9.70	0.90	0.80	1.38	76,000	10	0.30	16.1	2.1	0.5	78.0	6.0	99	68	52	34	7	5
04/25/02	1,345.0	35	1.600	53	34	24	5	6	6	2.6		1			9.20	1.20	0.50	0.70	75,000	200		15.6	1.8		79.0	7.5	92	58	44	29	5	4
04/26/02	1,469.0	36	1.600	57	23	20	5	8	13	2.8		1			8.90	0.10		0.25	83,000	120		16.0	2.5		78.0	6.0	66	43	33	22	5	4
04/26/02	1,646.0	36	1.600	62	25	22	6	8		2.6		1			9.10	0.15	0.05	0.25	85,000	120	0.25	16.1	2.9	2.5	75.5	10.0	72	47	36	23	6	5
04/26/02	1,646.0		1.600	60	25	22	6	8	12	2.6		1			9.10	0.10	0.05	0.25	85,000	120		18.6	8.1		75.5	6.0	72	47	36	23	6	5
04/27/02	1,326.0	33	1.600	63	23	21	6	8		2.8		1			9.00	0.20	0.05	0.15	85,000	120	0.25	16.6	3.9	2.5	75.0	10.0	67	44	33	22	6	5
04/27/02	1,646.0		1.600	61	23	21	6	8	11	2.6		1			9.00	0.20	0.05	0.25	85,000	80		18.0	6.5		76.0	8.0	67	44	33	22	6	5
04/28/02	896.0	38	1.600	64	23	22	6	7		2.8		1			9.00				85,000	120	0.25	16.6	3.9	2.5	75.0	10.0	68	45	34	23	6	5
04/28/02	1,646.0	38	1.600	70	28	22	6	8		2.4		1			9.00		0.03	0.10	85,000	120	0.25	16.6	2.7	2.5	75.0	10.0	78	50	38	24	6	5
04/28/02	1,646.0	25	1.600	62	23	22	6	7	12	2.6		1			9.00	0.25	0.05	0.20	85,000	120		15.9	2.9		78.0	8.0	68	45	35	24	6	5
04/29/02	1,646.0		1.600	63	23	20	6	8	12	2.6		1			9.00	0.10	0.03	0.10	85,000	120		15.9	2.9		78.0	10.0	66	43	32	22	6	5
04/30/02	1,646.0		1.600	60	24	23	5	8	13	2.6		1			9.00	0.10	0.01	0.20	85,000	100		15.9	2.9		78.0	8.0	71	47	35	23	5	4
05/01/02	0.0		1.600	61	24	23	5	8		2.6		1			9.00	0.10			85,000	120		16.9	5.0		77.0	0.0	71	47	34	23	5	4
05/20/02	328.0	40	1.800	90	41	19								75					0	0		30.0	3.0	54.0	16.0	0.0	101	60	46	31	11	9
05/21/02	140.0		1.000	0	1														0	0		0.0	0.0		100.0	0.0	2	1				

Fluid Property Recap:NAP-Based Fluid (API Titrations)

Well : 1_5-4S (K1_T1)
Operator: Amerada Hess Norway

Date	Depth	FL Temp	Densit	Fun Vis	Rheology @ 120F					Elect Stab	Filtration			Whole Fluid Alk	Whole Fluid Cl	Whole Fluid Ca	Excess Lime	Sand % by Vol	Retort Analysis					Rheometer Dial Reading					
					PV	YP	Gels lbs/100 ft2				HTHP ml/30 min	Cake	Temp						Corr Sol % by Vol	LGS % by Vol	NAP % by Vol	Water % by Vol	NAP Water Ratio						
	m	Deg C	SG	sec/qt	cP		10s	10m	30m	Volts		32nd i	Deg C	ml	mg/l	mg/l	kg/m3							600	300	200	100	6	3
05/02/02	1,649.0	30	1.700	78	30	11	8	9	9	380	2.2	0/2	75	0.60	30,000	9,200	2.22	0.00	25.0	1.2	53.0	20.5	72.1/27.9	71	41	30	20	6	5
05/02/02	1,700.0	39	1.800	50	29	14	8	9	9	515	4.0	0/1	75	0.75	30,000	9,200	2.77	0.00	25.5	1.1	51.0	22.0	69.9/30.1	72	43	34	21	8	6
05/03/02	1,700.0	38	1.700	57	34	11	8	11	11	675	2.8	0/1	75	0.50	22,500	17,000	1.85	0.00	26.6	3.4	52.5	20.0	72.4/27.6	79	45	35	24	8	7
05/03/02	1,870.0	50	1.800	60	35	20	11	14	14	840	2.8	0/1	75	0.70	22,500	0	2.59	0.00	26.6	2.7	52.0	20.0	72.2/27.8	90	55	42	29	11	0
05/03/02	1,953.0	57	1.800	58	34	21	11	14	14	860	2.8	0/1	75	0.70	22,500	17,000	2.59	0.00	27.1	3.8	52.0	20.0	72.2/27.8	89	55	41	29	11	9
05/04/02	2,070.0	58	1.800	56	36	23	12	16	16	870	1.8	0/1	75	1.00	31,500	15,000	3.69	0.00	27.1	4.4	52.0	19.5	72.7/27.3	95	59	45	31	12	10
05/04/02	2,200.0	59	1.800	62	38	24	15	16	16	980	1.0	0/1	75	3.20	27,000	24,000	11.82	0.00	25.9	1.8	51.5	21.5	70.5/29.5	100	62	48	34	13	11
05/04/02	2,436.0	62	1.800	60	37	26	14	16	16	910	1.6	0/1	75	0.35	25,000	16,000	1.29	0.00	27.0	3.8	52.5	19.5	72.9/27.1	100	63	49	34	14	12
05/05/02	2,535.0	62	1.800	56	40	24	14	17	17	900	1.8	0/1	75	0.35	0	16,000	1.29	0.00	27.9	3.8	52.0	20.0	72.2/27.8	104	64	49	34	14	12
05/05/02	2,584.0	56	1.800	57	38	21	14	17	17	980	1.6	0/1	75	0.35	25,000	18,000	1.29	0.00	28.5	5.0	51.0	19.5	72.3/27.7	97	59	45	31	11	10
05/05/02	2,599.0	64	1.800	56	37	23	13	17	17	920	1.8	0/1	75	0.70	27,000	16,000	2.59	0.00	26.9	2.5	52.5	19.5	72.9/27.1	97	60	47	33	13	11
05/06/02	2,660.0	59	1.800	59	39	25	14	18	18	920	1.8	0/1	75	0.35	27,000	16,000	1.29	0.00	27.4	3.0	51.5	20.0	72.0/28.0	103	64	50	35	14	13
05/06/02	2,660.0	50	1.800	60	39	24	14	17	17	910	1.5	1/0	75	0.35	27,000	18,000	1.29	0.00	27.4	3.0	51.5	20.0	72.0/28.0	102	63	50	35	14	13
05/06/02	2,660.0	48	1.800	67	37	25	14	18	18	930	1.8	0/1	75	0.35	25,000	16,000	1.29	0.00	28.5	4.9	52.5	18.0	74.5/25.5	99	62	48	33	14	12
05/07/02	2,660.0	40	1.800	70	37	25	14	18	18	920	1.8	0/1	75	0.35	25,000	18,000	1.29	0.00	28.5	4.9	52.5	18.0	74.5/25.5	99	62	47	33	14	12
05/08/02	2,675.0	52	1.800	62	36	25	14	18	18	940	1.8	0/1	75	0.70	25,000	16,000	2.59	0.00	29.0	5.9	52.0	18.0	74.3/25.7	97	61	47	32	13	0
05/08/02	2,735.0	60	1.800	60	35	25	14	15	16	950	1.5	0/1	75	3.80	23,000	16,000	14.04	0.00	28.6	2.3	52.5	18.0	74.5/25.5	95	60	46	32	12	11
05/08/02	2,820.0	69	1.800	57	34	22	14	17	17	990	1.8	0/1	75	0.25	23,500	16,000	0.92	0.00	28.1	1.1	53.5	17.5	75.4/24.6	90	56	44	30	12	11
05/09/02	2,862.0	69	1.800	56	37	22	13	18	18	1,020	1.8	0/1	75	0.35	23,500	16,000	1.29	0.00	28.1	1.1	53.5	17.5	75.4/24.6	96	59	46	33	13	11
05/09/02	2,879.0		1.800	59	37	23	13	17	17	1,000	1.8	0/1	75	0.45	25,000	16,500	1.66	0.00	28.0	1.1	53.5	17.5	75.4/24.6	97	60	47	32	13	11
05/10/02	2,879.0		1.800	60	38	22	13	17	18	1,050	1.8	0/1	75	0.40	25,000	16,250	1.48	0.01	28.0	1.1	53.5	17.5	75.4/24.6	98	60	47	32	13	11
05/11/02	2,879.0	50	1.800	63	37	23	14	19	19	1,000	2.0	0/1	75	0.20	22,000	16,000	0.74	0.00	28.6	1.3	54.5	16.0	77.3/22.7	97	60	46	31	12	10
05/11/02	2,873.0	52	1.800	64	37	22	13	17	19	1,050	1.8	0/1	75	0.25	22,500	16,000	0.92	0.10	29.1	2.5	53.5	16.5	76.4/23.6	96	59	45	30	12	11
05/12/02	2,873.0		1.800	78	38	22	14	18	19	1,020	1.8	0/1	75	0.25	22,500	16,000	0.92	0.10	29.1	2.5	53.5	16.5	76.4/23.6	98	60	45	30	12	11
05/13/02	2,879.0	45	1.800	69	37	22	13	18	18	1,000	2.0	0/1	75	0.35	22,000	16,000	1.29	0.00	28.6	1.4	54.0	16.5	76.6/23.4	96	59	46	33	12	10
05/13/02	2,850.0	52	1.800	68	35	20	13	16	18	905	2.0	0/1	75	1.50	32,000	18,000	5.54	0.10	28.7	2.4	53.0	17.0	75.7/24.3	90	55	43	29	12	10
05/14/02	2,882.0	52	1.800	67	36	21	13	16	18	902	2.0	0/1	75	1.60	33,000	20,000	5.91	0.10	28.7	3.0	53.0	17.0	75.7/24.3	93	57	43	29	12	10
05/14/02	2,955.0	52	1.800	57	36	21	12	17	18	920	2.0	0/1	75	0.25	30,000	20,000	0.92	0.00	28.8	3.1	53.0	17.0	75.7/24.3	93	57	43	29	11	10
05/14/02	3,010.0	53	1.800	68	36	21	14	17	18	966	2.0	0/1	75	1.50	30,000	20,000	5.54	0.10	28.8	3.1	53.0	17.0	75.7/24.3	93	57	44	30	12	11
05/15/02	3,034.0	50	1.800	74	38	22	15	17	18	1,030	2.0	0/1	75	1.50	30,000	20,000	5.54	0.10	28.8	3.1	53.0	17.0	75.7/24.3	98	60	46	31	13	11
05/15/02	3,063.0	52	1.800	58	39	21	13	18	19	1,031	2.0	0/1	75	5.00	33,000	24,000	18.47	0.50	28.7	2.9	53.5	16.5	76.4/23.6	99	60	44	30	11	10
05/15/02	3,091.0	50	1.800	60	36	21	14	17	18	1,040	1.8	0/1	75	1.40	33,000	22,000	5.17	0.10	28.7	2.8	54.0	16.0	77.1/22.9	93	57	44	30	12	11
05/16/02	3,090.0		1.800	73	34	20	12	15	16	1,118	2.4	0/2	75	2.80	30,000	21,200	10.35	0.10	28.8	3.1	54.5	15.5	77.9/22.1	88	54	41	28	11	10

Fluid Property Recap:NAP-Based Fluid (API Titrations)

Well : 1_5-4S (K1_T1)
Operator: Amerada Hess Norway

Date	Depth	FL Temp	Densit	Fun Vis	Rheology @ 120F					Elect Stab	Filtration			Whole Fluid Alk	Whole Fluid Cl	Whole Fluid Ca	Excess Lime	Sand % by Vol	Retort Analysis					Rheometer Dial Reading					
					PV	YP	Gels lbs/100 ft2				HTHP ml/30 min	Cake	Temp						Corr Sol % by Vol	LGS % by Vol	NAP % by Vol	Water % by Vol	NAP Water Ratio						
	m	Deg C	SG	sec/qt	cP		10s	10m	30m	Volts		32nd i	Deg C	ml	mg/l	mg/l	kg/m3							600	300	200	100	6	3
05/17/02	3,090.0		1.800	75	34	20	12	15	16	1,100	2.4	0/1	75	2.50	30,000	22,000	9.24	0.10	28.8	2.8	54.5	15.5	77.9/22.1	88	54	41	28	11	10
05/18/02	3,090.0		1.800	83	41	19	12	16	0	997	2.8	0/2	75	2.20	32,800	20,000	8.13	0.10	28.7	3.2	54.0	16.0	77.1/22.9	101	60	46	31	11	9
05/19/02	610.0		1.800	83	41	19	12	16	17	997	2.8	0/2	75	2.20	32,800	20,000	8.13	0.10	28.7	2.8	54.0	16.0	77.1/22.9	101	60	46	31	11	9

GENERAL INFORMATION

Company	:	AMERADA HESS NORGE AS	
Rig / Platform	:	DEEPSEA BERGEN	
Well	:	1/5-4 S	
Field	:	1/5-4b	
Country	:	NORWAY	
Sperry-Sun Job Nr.	:	NR-DD-02018	
Job start date	:	11.04.2002	
Job end date	:	16.05.2002	
North reference	:	GRID	
Declination	:	-2.602°	
Mag-Grid correction	:	-2.292°	
Dip angle	:	70.421°	
Total magnetic field	:	49752.00 nT	
Date of magnetic data	:	11.04.2002	
Wellhead coordinates N	:	N 56° 42’ 32.044”	6285184.900 N
Wellhead coordinates E	:	E 02° 37’ 41.060”	477229.010 E
Vertical section direction	:	223.827°	
Vertical section reference	:	WELL HEAD	
DD supervisors	:	D.Miller (11/04-24/04) T.Z.Johansen (15/04-24/04) M.O’ Driscoll (24/04-08/05) A.Krisebom (25/04-08/05) Tor (24/04-16/05) B.de Boer (09/05-16/05)	
MWD Engineers	:	K.Ogden T.Kristoffersen Lasse Haarberg G.Peters	O.Lygre L.Haarberg Ø.Orvedal
Company Representatives	:	Keith Ormiston Steve Peters	Stephan Varga John Sinclair
Company Geologist	:	R.Saint	G.Weatley

Operational Overview

Sperry Sun was contracted to provide Measurement While Drilling services for Amerada Hess Norge AS on well 1/5-4S drilled from the Semi Submersible rig Deepsea Bergen.

1/5-4S is an exploration well to test the hydrocarbon bearing potential of the K1 Chalk prospect on the North East side of the salt diapir. An initial 9 7/8" Pilot Hole was drilled to a depth of 928m to check for the presence of shallow gas.

Sperry Suns 8" Negative Pulse tools were used for this section which provided Realtime and Recorded Directional, Gamma Ray and Resistivity data. No shallow gas was found.

A 36" hole opener was then run to a depth of 171m using the 9.5" Negative Pulse Directional only tool and 30" casing was ran.
The same tool was used to drill a 26" hole to 928m and 20" casing was run.

The 17 1/2" holesection was drilled utilizing a Negative pulse tool with Directional, Gamma, Resistivity and Pressure while drilling equipment both realtime and recorded.

The 12¼" section was drilled in two runs utilizing a positive pulse tool (P4M) with Directional, Gamma, Resistivity, Pressure while drilling and Vibration sensor. For directional and angle the Geopilot was used in first run to build angle from 20degrees inclination, and up to 53 degrees and holedirection was keept between 220degrees and 240 degrees down to 2660mMD.

On the second run the same MWD sensors were used, but an adjustable stabillizer (AGS) was used to maintain angle and direction the same down to 2879mMD.ª«In the 8½" section the same MWD sensors as in 12¼" section were used, and an adjustable stabilizer were used to maintane same angle and direction throughout the whole run down to 3090mMD.

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DRILLING SERVICES

BHA Report

Customer : Amerada Hess Norge A/S
Well : 1/5-4S
Block : K1T1
Location : 1/5b
Rig : Deepsea Bergen
Job # : NR-DD-02018 **BHA# 1**

BHA# 1 : **Date In** :15-04-02 **MD In (m) :** 0 **TVD In (m) :** 0 **Date Out** 16-04-200; **MD Out (m):** 0 **TVD Out (m)** 0

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
1	9.875	Security/DBS	XLC1	745506	2x16, 2x18	0.890	1-1-WT-A -E-I-NO-TD

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Tricone	745506	9.875	3.000	9.875	236.92	P 6-5/8" Reg	0.32	
2	8" RLL w/DGR + EWR	NR03566	8.000	1.920		143.02	B 6-5/8" Reg	6.58	
3	8" MPT w/Dir	NR03569	8.000	1.920		139.83	B 6-5/8" Reg	6.24	
4	Float Sub w/Non-Ported Float	DD251	8.000	2.813		150.12	B 6-5/8" Reg	0.69	
5	9 7/8" Integral Blade Stabilizer	74421	8.000	2.813	9.875	150.12	B 6-5/8" Reg	1.99	14.85
6	1x 8" Drill collar		8.000	2.810		150.00	B 6-5/8" Reg	8.58	
7	9 7/8" Integral Blade Stabilizer	74422	8.000	2.810	9.875	150.17	B 6-5/8" Reg	1.87	25.31
8	4 x 8" Drill collar		8.000	2.810		150.00	B 6-5/8" Reg	36.21	
9	8" Drilling Jar	WHC2292	8.000	2.810		150.17	B 6-5/8" Reg	9.70	
10	2 x 8" Drill collar		8.000	2.810		150.00	B 6-5/8" Reg	17.47	
11	Accelerator	DACCH2021	8.000	2.810		150.17	B 6-5/8" Reg	9.95	
12	1 x 8" Drill collar		8.000	2.810		150.00	B 6-5/8" Reg	9.32	
13	Cross Over Sub		8.000	2.810		150.17	B 5-1/2" FH	0.84	
14	1x 5-1/2" HWDP		5.500	3.375		57.00	B 5-1/2" FH	8.98	
15	Dart Sub		7.000	2.575		113.41	B 5-1/2" FH	0.62	
16	10 x 5-1/2" HWDP		5.500	3.375		57.00	B 5-1/2" FH	90.49	
								209.85	

Parameter	Min	Max	Ave
WOB (t) :			
RPM (rpm) :			
Flow (L/min) :			
SPP (psi) :			

Activity	Hrs
Drilling :	0.00
Reaming :	0.00
Circ-Other :	20.75
Total :	20.75

BHA Weight	(lb)
in Air (Total) :	72594
in Mud (Total) :	63093
in Air (Bel Jars) :	30483
in Mud (Bel Jars) :	26493

Drill String	OD(in)	Len (m)
DP(S)-FH-21.90#	5.500	

PERFORMANCE

	In	Out
Inclination (deg)	0.00	0.00
Azimuth (deg)	0.00	0.00

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :					
Rotated :					
Total :		47			

COMMENTS

With the possibility of shallow gas, a 9-7/8" pilot hole is to be drilled while keeping the angle to as near vertical as possible.
Need to P/U 8" DC before drilling with drilling stand which will consist of Accelerator, 1x 8" DC, x/o sub and 1 joint 5 1/2" HWDP.

OBJECTIVES:

Spud 9-7/8" Pilot hole and drill down to 928m approx 5m below 20" shoe setting depth, keeping the well as near vertical as possible while monitoring for potential shallow gas.

RESULTS:

The well was successfully spudded and the 9-7/8" pilot hole drilled down to 928m MD. No boulders or shallow gas was encountered.

RECOMMENDATIONS:

Use same again.

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DRILLING SERVICES

BHA Report

Customer : Amerada Hess Norge A/S
Well : 1/5-4S
Block : 1/5-4
Location : K1T1
Rig : Deepsea Bergen
Job # : NR-DD-02018 **BHA# 2**

BHA# 2 : **Date In** :17-04-200 **MD In (m) :** 0 **TVD In (m) :** 0 **Date Out** 17-04-200 **MD Out (m):** 171 **TVD Out (m):** 171

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
2	17.500	Security/DBS	XTIC	739416	3x18, 1x14	0.896	1-1-WT-A -E-1-NO-TD

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
1	11.250	SSDS	SperryDrill	1125024	0.00°		5	11.50

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Tricone	739416	17.500	3.000	17.500	795.63	P 7-5/8" Reg	0.42	
2	17-1/2" x 36" Hole Opener (6x20)	21480	9.500	3.000	17.500	217.48	B 7-5/8" Reg	5.06	
3	11-1/4" SperryDrill Lobe 3/4 - 3.6 stg	1125024	11.250	6.219		235.24	B 7-5/8" Reg	9.37	
4	17-1/2" Welded Blade Stabilizer	74466	9.500	3.000	17.500	217.48	B 7-5/8" Reg	2.65	16.17
5	Non-Mag Pressure Drop Sub 1-3/8" nozzle	RN962	9.500	1.375		236.51	B 7-5/8" Reg	0.88	
6	9-1/2" CIM	NR03572	9.500	2.120		229.54	B 7-5/8" Reg	1.63	
7	9-1/2" MPT w/Dir	NR03564	9.500	2.120		229.54	B 7-5/8" Reg	6.32	
8	Float Sub w/Totco	DD150	9.500	3.000		217.48	B 7-5/8" Reg	0.69	
9	2 x 9-1/2" Non-Mag Drill collar	64743 / 70 004	9.500	2.810		220.00	B 7-5/8" Reg	17.64	
10	2 x 9-1/2" Drill collar		9.500	2.810		220.00	B 7-5/8" Reg	18.30	
11	Cross Over Sub		9.500	3.000		217.48	B 6-5/8" Reg	1.00	
12	5 x 8" Drill collar		8.000	2.810		150.00	B 6-5/8" Reg	44.70	
13	Cross Over Sub		8.000	2.810		150.17	B 5-1/2" FH	0.84	
14	1 x 5-1/2" HWDP		5.500	3.375		57.00	B 5-1/2" FH	8.98	
15	Dart Sub		6.500	3.000		89.00	B 5-1/2" FH	0.62	
16	6 x 5-1/2" HWDP		5.500	3.375		57.00	B 5-1/2" FH	54.70	
								173.80	

Parameter	Min	Max	Ave
WOB (t) :	1.00	5.00	2.31
RPM (rpm) :	0	50	39
Flow (L/min) :	800	5400	3917
SPP (psi) :	5	150	86

Activity	Hrs
Drilling :	10.00
Reaming :	0.00
Circ-Other :	1.50
Total :	11.50

BHA Weight	(lb)
in Air (Total) :	82147
in Mud (Total) :	71395
in Air (Bel Jars) :	0
in Mud (Bel Jars) :	0

Drill String	OD(in)	Len (m)
DP(S)-FH-21.90#	5.500	

PERFORMANCE

	In	Out
Inclination (deg)	0.00	0.30
Azimuth (deg)	0.00	208.90

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	0.00	0			
Rotated :	171.00	17			
Total :	171.00	17	0.05	0.00	0.05

COMMENTS

Drill and open the hole to 36" prior to running 30" conductor.

OBJECTIVES:

Open-hole up to 36" down to +/-167.5m (cutter depth) prior to running 30" conductor. An 11-1/4" motor will be used to drive the hole-opener which will help ensure a vertical spud - no surface rotation required until the motor has passed below the mud line.

RESULTS:

The pilot hole was successfully opened up down to 171m MD (167.5m Cutter Depth). The MWD surveys taken showed that the inclination had been kept below a maximum of 0.7 degrees.

RECOMMENDATIONS:

The use of the 11-1/4" motor to drive the hole-opener was once again very successful at ensuring a vertical spud.

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DRILLING SERVICES

BHA Report

Customer : Amerada Hess Norge A/S
Well : 1/5-4S
Block : K1T1
Location : 1/5b
Rig : Deepsea Bergen
Job # : NR-DD-02018

BHA# 3

BHA# 3 : **Date In** :18-04-200 **MD In (m) :** 171 **TVD In (m) :** 171 **Date Out** 19-04-200 **MD Out (m):** 171 **TVD Out (m):** 171

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
2rr1	36.000	Security/DBS	XT1C	739416	3x18, 1x14	0.896	1-1-WT-A -E-1-NO-TD

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
2	11.250	SSDS	SperryDrill	1125024				19.50

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Tricone	739416	36.000	3.000	36.000		P 7-5/8" Reg	0.42	
2	17-1/2" x 36" Hole Opener (6x20)	21480	9.500	3.000	36.000	217.48	B 7-5/8" Reg	5.06	
3	11-1/4" SperryDrill Lobe 3/4 - 3.6 stg	1125024	11.250	6.219		235.24	B 7-5/8" Reg	9.37	
4	36" Welded Blade Stabilizer	74466	9.500	3.000	36.000	217.48	B 7-5/8" Reg	2.65	16.17
5	Non-Mag Pressure Drop Sub 1-3/8" nozzle	RN962	9.500	1.375		236.51	B 7-5/8" Reg	0.88	
6	9-1/2" CIM	NR03572	9.500	2.120		229.54	B 7-5/8" Reg	1.63	
7	9-1/2" MPT w/Dir	NR03564	9.500	2.120		229.54	B 7-5/8" Reg	6.32	
8	Float Sub w/Totco	DD150	9.500	3.000		217.48	B 7-5/8" Reg	0.69	
9	1x 9-1/2" Drill collar		9.500	2.810		220.00	B 7-5/8" Reg	9.30	
10	Cross Over Sub		9.500	3.000		217.48	B 6-5/8" Reg	1.00	
11	2 x 8" Drill collar		8.000	2.810		150.00	B 6-5/8" Reg	18.00	
12	8" Drilling Jar		8.000	2.810		150.17	B 6-5/8" Reg	9.70	
13	4 x 8" Drill collar		8.000	2.810		150.00	B 6-5/8" Reg	36.00	
14	Cross Over Sub		8.000	2.810		150.17	B 5-1/2" FH	0.84	
15	1x 5-1/2" HWDP		5.500	3.375		57.00	B 5-1/2" FH	8.98	
16	Dart Sub		6.500	3.000		89.00	B 5-1/2" FH	0.62	
17	6 x 5-1/2" HWDP		5.500	3.375		57.00	B 5-1/2" FH	54.70	
								166.16	

Parameter	Min	Max	Ave
WOB (t) :			
RPM (rpm) :			
Flow (L/min) :			
SPP (psi) :			

Activity	Hrs
Drilling :	0.00
Reaming :	7.25
Circ-Other :	0.75
Total :	8.00

BHA Weight	(lb)
in Air (Total) :	75925
in Mud (Total) :	65988
in Air (Bel Jars) :	40926
in Mud (Bel Jars) :	35569

Drill String	OD(in)	Len (m)
DP(S)-FH-21.90#	5.500	5

PERFORMANCE

	In	Out
Inclination (deg)	0.30	0.30
Azimuth (deg)	208.90	208.90

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :					
Rotated :					
Total :					

COMMENTS

RIH and clean out after aborted cement job.

OBJECTIVES:

RIH and clean-out 36" after aborted cement run.

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DRILLING SERVICES

BHA Report

Customer : Amerada Hess Norge A/S
Well : 1/5-4S
Block : K1T1
Location : 1/5b
Rig : Deepsea Bergen
Job # : NR-DD-02018

BHA# 4

BHA# 4 : **Date In** :20-04-200 **MD In (m) :** 171 **TVD In (m) :** 171 **Date Out** 22-04-200 **MD Out (m):** 928 **TVD Out (m):** 928

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
3	26.000	Security/DBS	SS33SGJ4	737297	1x20, 3x22	1.420	1-1-WT-A -E-I-NO-TD

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
3	11.250	SSDS	SperryDrill	1125024	0.00°		5	55.75

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Tricone	737297	26.000	3.000	26.000		P 7-5/8" Reg	0.57	
2	11-1/4" SperryDrill Lobe 3/4 - 3.6 stg	1125024	11.250	6.219		235.24	B 7-5/8" Reg	9.37	
3	26" Welded Blade Stabilizer	74469	9.500	3.000	26.000	217.48	B 7-5/8" Reg	2.76	11.71
4	9-1/2" CIM	NR03572	9.500	2.120		229.54	B 7-5/8" Reg	1.63	
5	9-1/2" MPT w/Dir	NR03564	9.500	2.120		229.54	B 7-5/8" Reg	6.32	
6	Float Sub w/Totco	DD150	9.500	3.000		217.48	B 7-5/8" Reg	0.69	
7	26" Welded Blade Stabilizer w/Totco	74470	9.500	3.000	26.000	217.48	B 7-5/8" Reg	2.41	22.55
8	2 x 9-1/2" Non-Mag Drill collar	7004/64743	9.500	2.810		220.00	B 7-5/8" Reg	17.64	
9	2 x 9-1/2" Drill collar		9.500	2.810		220.00	B 7-5/8" Reg	18.30	
10	Cross Over Sub		9.500	3.000		217.48	B 6-5/8" Reg	1.00	
11	3 x 8" Drill collar		8.000	2.810		150.00	B 6-5/8" Reg	26.52	
12	Drilling Jar		8.000	2.810		150.17	B 6-5/8" Reg	9.70	
13	5 x 8" Drill collar		8.000	2.810		150.00	B 6-5/8" Reg	44.38	
14	8" Accelerator		8.000	2.810		150.17	B 6-5/8" Reg	9.95	
15	1x 8" Drill collar		8.000	2.810		150.00	B 6-5/8" Reg	9.32	
16	Cross Over Sub		8.000	2.810		150.17	B 5-1/2" FH	0.84	
17	1x 5-1/2" HWDP		5.500	3.375		57.00	B 5-1/2" FH	8.98	
18	Dart Sub		6.500	3.000		89.00	B 5-1/2" FH	0.62	
19	11x 5-1/2" HWDP		5.500	3.375		57.00	B 5-1/2" FH	99.56	
								270.56	

Parameter	Min	Max	Ave
WOB (t) :	2.00	5.00	2.99
RPM (rpm) :	50	120	102
Flow (L/min) :	3000	5100	4634
SPP (psi) :	58	175	141

Activity	Hrs
Drilling :	29.00
Reaming :	0.00
Circ-Other :	7.25
Total :	36.25

BHA Weight (lb)	
in Air (Total)	: 117445
in Mud (Total)	: 102073
in Air (Bel Jars)	: 60444
in Mud (Bel Jars)	: 52533

Drill String	OD(in)	Len (m)
DP(S)-FH-21.90#	5.500	657

PERFORMANCE

	In	Out
Inclination (deg)	0.30	0.72
Azimuth (deg)	208.90	148.39

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	0.00	0			
Rotated :	757.00	26			
Total :	757.00	26	0.02	0.00	0.02

COMMENTS

Drill 26" hole down to 928m MD prior to running 20" casing.

OBJECTIVES:

Drill 26" hole down to +/- 928m MD prior to running 20" casing. A pendulum assembly will be run for opening and drilling the 9-7/8" pilot hole with the objective of maintaining the well bore as near vertical as possible.

RESULTS:

All the objectives were met, and no problems were experienced. The assembly performed as expected, and the inclination was kept as near vertical as possible running light WOB 0-3T, while still optimising ROP, average ROP for the run was 40m/hr.

RECOMMENDATIONS:

Use same assembly for similar application.

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DRILLING SERVICES

BHA Report

Customer : Amerada Hess Norge A/S
Well : 1/5-4S
Block : K1T1
Location : 1/5b
Rig : Deepsea Bergen
Job # : NR-DD-02018

BHA# 5

BHA# 5 : **Date In** :24-04-200 **MD In (m) :** 928 **TVD In (m) :** 928 **Date Out** 28-04-200 **MD Out (m):** 1646 **TVD Out (m):** 1632

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
4	17.500	Security/DBS	XT3LC	745300	2x20, 2x22	1.356	1-1-WT-A -E-I-NO-TD

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
4	11.250	SSDS	SperryDrill	1125035	1.00°		8	68.50

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Tricone	745300	17.500	3.000	17.500	795.63	P 7-5/8" Reg	0.44	
2	11-1/4" SperryDrill Lobe 3/4 - 3.6 stg	1125035	11.250	6.219	17.250	235.24	B 7-5/8" Reg	9.32	1.29
3	Non-Mag Pony collar	N921	9.500	2.810		220.00	B 7-5/8" Reg	3.01	
4	16-3/4" NM Integral Blade Stabilizer	1379	9.500	3.000	16.750	217.48	B 7-5/8" Reg	2.24	13.95
5	9-1/2" RLL w/DGR + EWR+PWD	NR03574	9.500	2.120		197.68	B 7-5/8" Reg	8.66	
6	9-1/2" MPT w/Dir	NRO3564KM9	9.500	2.120		229.54	B 7-5/8" Reg	6.32	
7	Float Sub w/Ported valve	DD150	9.500	3.000		217.48	B 7-5/8" Reg	0.70	
8	17" NM Integral Blade Stabilizer w/Totco	35883	9.500	3.000	17.000	217.48	B 7-5/8" Reg	2.38	31.79
9	2 x 9-1/2" Non-Mag Drill collar		9.500	2.810		220.00	B 7-5/8" Reg	17.64	
10	2 x 9-1/2" Drill collar		9.500	2.810		220.00	B 7-5/8" Reg	18.30	
11	Cross Over Sub		9.500	3.000		217.48	B 6-5/8" Reg	1.00	
12	3 x 8" Drill collar		8.000	2.810		150.00	B 6-5/8" Reg	26.52	
13	Drilling Jar		8.000	2.810		150.17	B 6-5/8" Reg	9.70	
14	5 x 8" Drill collar		8.000	2.810		150.00	B 6-5/8" Reg	44.38	
15	8" Accelerator		8.000	2.810		150.17	B 6-5/8" Reg	9.95	
16	1x 8" Drill collar		8.000	2.810		150.00	B 6-5/8" Reg	9.32	
17	Cross Over Sub		8.000	2.810		150.17	B 5-1/2" FH	0.84	
18	1x 5-1/2" HWDP		5.500	3.375		57.00	B 5-1/2" FH	8.98	
19	Dart Sub		6.500	3.000		89.00	B 5-1/2" FH	0.62	
20	11x 5-1/2" HWDP		5.500	3.375		57.00	B 5-1/2" FH	99.56	
								279.88	

Parameter	Min	Max	Ave
WOB (t) :	5.00	15.00	8.61
RPM (rpm) :	60	100	81
Flow (L/min) :	3250	4500	4180
SPP (psi) :	138	242	221

Activity	Hrs
Drilling :	40.25
Reaming :	0.00
Circ-Other :	28.25
Total :	68.50

BHA Weight (lb)	
in Air (Total)	: 121393
in Mud (Total)	: 97483
in Air (Bel Jars)	: 64392
in Mud (Bel Jars)	: 51709

Drill String	OD(in)	Len (m)
DP(S)-FH-21.90#	5.500	1366

PERFORMANCE

	In	Out
Inclination (deg)	0.72	20.40
Azimuth (deg)	148.39	224.43

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	220.00	14			
Rotated :	498.00	20			
Total :	718.00	18	0.82	0.00	0.85

COMMENTS

Drill 17-1/2" hole down to KOP at +/-1200m, then build at 2 deg/30m up to a sail angle of 20 degs on an azimuth heading of 224.3 degrees. Hold this angle and direction down to the 14" casing point at +/-1648m MD.

OBJECTIVES:

Drill 17-1/2" hole down to KOP at +/-1200m, then build at 2 deg/30m up to a sail angle of 20 degs on an azimuth heading of 224.3 degrees. Hold this angle and direction down to the 14" casing point at +/-1648m MD.

RESULTS:

Tagged cement at 896m. Drilled shoetrack and rathole to 928m. Drilled 3m. new formation and took Leak off test.
Continued drilling rotary to 1200m maintaining angle less than 1 degree.
Commenced kick off at1200 using reduced flow for the first stand to avoid washing hole. Built angle to 6.5 degrees at azimuth 255 in order to correct path for misplacment of rig. Continued building and turning azimuth back towards 224.
Built to 20 degrees and azimuth 224 by TD at 1646 leaving wellpath 8.5 metres right of line.
Overall the dogleg capability of this assembly appeared to be 3.5-4 degrees /30m with 100% slide.
The effective toolface was about 25 degrees right of that set. this did not present a problem.

RECOMMENDATIONS:

this assembly would be recomended for future applications of this type bearing in mind that a consistent dogleg severity greater than 3 might be problematic.
It would also be necessary to ensure that there was sufficient flow capability on the rig to run the motor efficiently.
This motor/bit combination was not difficult to steer.

sperry-sun
DRILLING SERVICES

BHA Report

Customer : Amerada Hess Norge A/S
Well : 1/5-4S
Block : K1T1
Location : 1/5b
Rig : Deepsea Bergen
Job # : NR-DD-02018

BHA# 6

BHA# 6 : **Date In** :28-04-200 **MD In (m) :** 1646 **TVD In (m) :** 1632 **Date Out** 29-04-200 **MD Out (m):** 1646 **TVD Out (m):** 1632

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
4rr1	17.500	Security/DBS	XT3LC	745300	2x20, 2x22	1.356	1-1-WT-A -E-I-NO-TD

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	Tricone	745300	17.500	3.000	17.500	795.63	P 7-5/8" Reg	0.44	
2	Bit Sub		9.500	3.000		217.48	B 7-5/8" Reg	1.17	
3	17 1/4" Integral Blade Stabilizer	62999	9.500	3.000	17.250	217.48	B 7-5/8" Reg	2.51	2.86
4	9-1/2" RLL w/DGR + EWR+PWD	NR03574	9.500	2.120		197.68	B 7-5/8" Reg	8.66	
5	9-1/2" MPT w/Dir	NRO3564KM9	9.500	2.120		229.54	B 7-5/8" Reg	6.32	
6	Float Sub w/Ported valve	DD150	9.500	3.000		217.48	B 7-5/8" Reg	0.70	
7	17" NM Integral Blade Stabilizer w/Totco	35883	9.500	3.000	17.000	217.48	B 7-5/8" Reg	2.38	20.90
8	2 x 9-1/2" Non-Mag Drill collar		9.500	2.810		220.00	B 7-5/8" Reg	17.64	
9	2 x 9-1/2" Drill collar		9.500	2.810		220.00	B 7-5/8" Reg	18.30	
10	Cross Over Sub		9.500	3.000		217.48	B 6-5/8" Reg	1.00	
11	3 x 8" Drill collar		8.000	2.810		150.00	B 6-5/8" Reg	26.52	
12	Drilling Jar		8.000	2.810		150.17	B 6-5/8" Reg	9.70	
13	5 x 8" Drill Collar		8.000	2.810		150.00	B 6-5/8" Reg	44.38	
14	8" Accelerator		8.000	2.810		150.17	B 6-5/8" Reg	9.95	
15	1 x 8" Drill collar		8.000	2.810		150.00	B 6-5/8" Reg	9.32	
16	Cross Over Sub		8.000	2.810		150.17	B 5-1/2" FH	0.84	
17	1 x 5-1/2" HWDP		5.500	3.375		57.00	B 5-1/2" FH	8.98	
18	Dart Sub		6.500	3.000		89.00	B 5-1/2" FH	0.62	
19	11 x 5-1/2" HWDP		5.500	3.375		57.00	B 5-1/2" FH	99.56	
								268.99	

Parameter	Min	Max	Ave
WOB (t) :			
RPM (rpm) :			
Flow (L/min) :			
SPP (psi) :			

Activity	Hrs
Drilling :	0.00
Reaming :	0.00
Circ-Other :	10.00
Total :	10.00

BHA Weight	(lb)
in Air (Total)	: 113055
in Mud (Total)	: 90787
in Air (Bel Jars)	: 56053
in Mud (Bel Jars)	: 45013

Drill String	OD(in)	Len (m)
DP(S)-FH-21.90#	5.500	1377

PERFORMANCE

	In	Out
Inclination (deg)	20.40	20.40
Azimuth (deg)	224.43	224.43

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :					
Rotated :					
Total :					

COMMENTS

OBJECTIVES:

Clean out hole after wireline logs had stopped at 374m

RESULTS:

No restriction seen while tripping in. Circulating bottoms up and pooh.

RECOMMENDATIONS:

Use same bha again.

sperry-sun
DRILLING SERVICES

BHA Report

Customer : Amerada Hess Norge A/S
Well : 1/5-4S
Block : K1T1
Location : 1/5b
Rig : Deepsea Bergen
Job # : NR-DD-02018

BHA# 7

BHA# 7 : **Date In** :01-05-200 **MD In (m) :** 1646 **TVD In (m) :** 1632 **Date Out** 07-05-200 **MD Out (m):** 2660 **TVD Out (m):** 2344

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
5	12.250	Security/DBS	FM22743	5009442	4x15, 3x16	1.279	1-1-WT-A -E-I-NO-TD

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs
5	9.625	SSDS	Geopilot	GP1225TL001	0.00°		1	108.25

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	PDC FM2743DRX18F c/w ported float	5009442	12.250	3.000	12.250	377.57	P 6-5/8" Reg	0.62	
2	9-5/8" Geo-Pilot RST	GP1225TL00	9.625	1.625		240.90	B 6-5/8" Reg	6.61	5.25
	- top motor stabilizer	1							6.73
3	Non-Mag Flex Collar		6.750	3.000		97.86	B 6-5/8" Reg	2.80	
4	GP Stabilizer	673764	8.000	3.000	12.175	147.22	P 6-5/8" Reg	0.66	10.29
5	8" RLL w/DGR + EWR+PWD	NR03574	8.000	1.910		161.54	B 6-5/8" Reg	8.23	
6	Sleeve Type Stabilizer	729294	8.000	3.000	12.188	147.22	P 6-5/8" Reg	0.57	19.16
7	8" DWD HOC	11816	8.000	2.810		150.17	B 7-5/8" Reg	4.08	
8	1x Non-Mag 8" Drill collar	51265	8.000	2.810		150.00	B 6-5/8" Reg	8.85	
9	1x Non-Mag 8" Drill collar	45741	8.000	2.810		150.00	B 6-5/8" Reg	8.10	
10	Drilling Jar		8.000	2.810		150.17	B 6-5/8" Reg	9.70	
11	1x 8" Drill collar		8.000	2.810		150.00	B 6-5/8" Reg	9.00	
12	8" Accelerator		8.000	2.810		150.17	B 6-5/8" Reg	9.95	
13	1x 8" Drill collar		8.000	2.810		150.00	B 6-5/8" Reg	9.00	
14	Cross Over Sub		8.000	2.810		150.17	B 5-1/2" FH	0.84	
15	1x 5-1/2" HWDP		5.500	3.375		57.00	B 5-1/2" FH	8.98	
16	Dart Sub		6.500	3.000		89.00	B 5-1/2" FH	0.62	
17	11x 5-1/2" HWDP		5.500	3.375		57.00	B 5-1/2" FH	99.56	
								188.17	

Parameter	Min	Max	Ave
WOB (t) :	2.00	10.00	3.87
RPM (rpm) :	100	180	160
Flow (L/min) :	3000	4200	3473
SPP (psi) :	150	285	253

Activity	Hrs
Drilling :	65.50
Reaming :	2.50
Circ-Other :	40.25
Total :	108.25

BHA Weight	(lb)
in Air (Total) :	61631
in Mud (Total) :	47769
in Air (Bel Jars) :	22199
in Mud (Bel Jars) :	17206

Drill String	OD(in)	Len (m)
DP(S)-FH-21.90#	5.500	2472

PERFORMANCE

	In	Out
Inclination (deg)	20.40	53.73
Azimuth (deg)	224.43	220.50

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	321.00	14			
Rotated :	693.00	16			
Total :	1014.00	15	0.99	-0.12	0.99

COMMENTS

OBJECTIVES:

Drill plugs and cement
Displace to OBM and drill shoe rathole and 3 m of new formation before taking LOT
Continue drilling 12 1/4" hole to casing depth with Geopilot, building up to 53 degrees and holding to TD

RESULTS:

Tagged plugs at 1612m. Drilled plug and washed down to hard cement at 1627, drilled to 1636 and displaces to OBM using controlled flow rate (30spm) until heavy mud was well above the BHA. 1.55 to 1.75 sg.
No adverse effect to Geopilot
Continued drilling shoe rathole and formation to 1649 and took LOT.
Drilled to 1694 and commenced build up using manual control of Geopilot as Downlink communications were not recognised downhole. Drilling was problematic with the BHA appearing to hang up and be likely to pack off at 1710 circulation was briefly lost and 40T overpull was necessary to get free. Reamed the hole clean and continued.
Steering a full stand on highside from 1725 produced a 3.3/30 build rate but also a 7.8/30 turn to the right giving an overall dogleg severity of 4.65/30. This right hand trend continued throughout the build up but could easily be controlled once recognised, so that the wellpath turned to 241 Azimuth and was then brought round to point at the target. It was necessary to steer 70L in order to obtain turn and build and 120L for flat turn.
The buid up section was completed succesfully by 220m. according to plan and from there it was necessary to steer only to correct for build and right hand walk.
From 2500m MD onwards Hole problems were encountered with increasing frequency.
The string torqued up and packed off while on bottom becoming stuck on several occasions. Jarring was necessary to get free, both up and down. Eventually it was felt to be too risky to continue as every time the bit approached bottom problems occurred.
At 2660 the BHA was pulled.

RECOMMENDATIONS:

Although it has not yet been ascertained what the problems were due to, it is certain that unstable fractured fornmations were encountered.
The immediate recommendation is to run in with as simple a rotary assembly as possible so that if problems are encountered it will be easier to interpret the cause. However the following BHA encountered the same problems with high torque, but no packoffs were seen.

sperry-sun
DRILLING SERVICES

BHA Report

Customer : Amerada Hess Norge A/S
Well : 1/5-4S
Block : K1T1
Location : 1/5b
Rig : Deepsea Bergen
Job # : NR-DD-02018

BHA# 8

BHA# 8 : **Date In** :07-05-200 **MD In (m) :** 2660 **TVD In (m) :** 2344 **Date Out** 09-05-200 **MD Out (m):** 2879 **TVD Out (m):** 2470

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
6	12.250	BBL	BB657XA	121903RR	4x18, 2x14	1.295	3-6-BT-T -X-I-WT-TD

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	PDC BB 657 XA	121903RR	12.250		12.250	370.00	P 6-5/8" Reg	0.37	
2	NB Stabilizer (install ported float)	74471	8.000	3.000	12.250	147.22	B 6-5/8" Reg	2.19	1.33
3	Pony collar	64792	8.000	3.000		147.22	B 6-5/8" Reg	1.91	
4	Adjustable Gauge Stabilizer	512062	8.000	4.250	12.250	122.96	B 6-5/8" Reg	3.32	6.39
5	8" RLL w/DGR + EWR+PWD	NR03580	8.000	1.910		161.54	B 6-5/8" Reg	8.86	
6	8" DWD HOC	158234	8.000	2.810		150.17	B 7-5/8" Reg	4.79	
7	NM Integral Blade Stabilizer	44301	8.000	3.000	12.250	147.22	B 6-5/8" Reg	1.93	22.30
8	1x Non-Mag 8" Drill collar	51265	8.000	2.810		150.00	B 6-5/8" Reg	8.85	
9	1x Non-Mag 8" Drill collar	45741	8.000	2.810		150.00	B 6-5/8" Reg	8.10	
10	1x 8" Drill collar		8.000	2.810		150.00	B 6-5/8" Reg	9.05	
11	Drilling Jar		8.000	2.810		150.17	B 6-5/8" Reg	9.63	
12	2 x 8" Drill collar		8.000	2.810		150.00	B 6-5/8" Reg	17.97	
13	8" Accelerator		8.000	2.810		150.17	B 6-5/8" Reg	9.95	
14	2 x 8" Drill collar		8.000	2.810		150.00	B 6-5/8" Reg	17.90	
15	Cross Over Sub		8.000	2.810		150.17	B 5-1/2" FH	0.84	
16	1 x 5-1/2" HWDP		5.500	3.375		57.00	B 5-1/2" FH	8.98	
17	Dart Sub		6.500	3.000		89.00	B 5-1/2" FH	0.62	
18	11 x 5-1/2" HWDP		5.500	3.375		57.00	B 5-1/2" FH	99.56	
								214.82	

Parameter	Min	Max	Ave
WOB (t) :	2.00	11.00	6.96
RPM (rpm) :	120	150	142
Flow (L/min) :	3200	3339	3254
SPP (psi) :	260	285	272

Activity	Hrs
Drilling :	30.50
Reaming :	0.00
Circ-Other :	7.00
Total :	37.50

BHA Weight	(lb)
in Air (Total) :	72744
in Mud (Total) :	56290
in Air (Bel Jars) :	24552
in Mud (Bel Jars) :	18998

Drill String	OD(in)	Len (m)
DP(S)-FH-21.90#	5.500	2664

PERFORMANCE

	In	Out
Inclination (deg)	53.73	55.38
Azimuth (deg)	220.50	221.07

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	0.00	0			
Rotated :	219.00	7			
Total :	219.00	7	0.23	0.08	0.23

COMMENTS

OBJECTIVES:

Control angle by utilizing the Adjustable Gauge Stabiliser tool between 11 1/2" an 12 1/4"

RESULTS:

The bha builded 0.7deg/30m in 11 1/2" position and dropped 0.4deg/30m in 12 1/4" position. The angle was controlled to TD.

RECOMMENDATIONS:

Use same bha again

Sperry-Sun DRILLING SERVICES

BHA Report

Customer : Amerada Hess Norge A/S
Well : 1/5-4S
Block : 1/5-4
Location : K1T1
Rig : Deepsea Bergen
Job # : NR-DD-02018 **BHA# 9**

BHA# 9 : **Date In** :12-05-200 **MD In (m) :** 2879 **TVD In (m) :** 2470 **Date Out** 16-05-200 **MD Out (m):** 3090 **TVD Out (m):** 2593

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
7	8.500	Security/DBS	FM2845DRX3	5011370	3x16, 1x18	0.838	1-1-BT-S -X-I-NO-TD

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (psi)	Cum Circ Hrs

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (lbs/ft)	Top Con	Length (m)	Bit - Center Blade (m)
1	PDC FM2845DRX3	5011370	8.500		8.500	377.57	B 4-1/2" IF	0.44	
2	NM Integral Blade Stabilizer	24022	6.750	2.813	8.500	100.77	B 4-1/2" IF	2.03	1.45
3	0x Short Drill collar	70069	6.750	2.813		101.00	B 4-1/2" IF	1.76	
4	Adjustable Gauge Stabilizer	450098	6.750	3.000	8.500	97.86	B 4-1/2" IF	3.24	5.85
5	Cross Over Sub Pin	67137	6.750	3.000		97.86	P 4-1/2" IF	0.71	
6	EWR		6.750	1.840		112.89	B 4-1/2" IF	3.69	
7	DGR		6.750	1.840		112.89	B 4-1/2" IF	1.39	
8	CIM		6.750	1.840		112.89	B 4-1/2" IF	1.50	
9	Directional		6.750	1.840		112.89	B 4-1/2" IF	2.74	
10	Integral Blade Stabilizer		6.750	2.813	8.250	100.77	P 4-1/2" IF	0.43	17.71
11	Pulser		6.750	1.840		112.89	B 4-1/2" IF	2.87	
12	PWD		6.750	1.840		112.89	B 4-1/2" IF	1.35	
13	Float Sub w/ported float	112341	6.750	2.813		100.77	B 4-1/2" IF	0.97	
14	Integral Blade Stabilizer	62770	6.750	2.813	8.250	100.77	B 4-1/2" IF	1.89	24.07
15	2 x 6 3/4" NM Drill collar		6.750	2.813		101.00	B 4-1/2" IF	18.95	
16	1x 6 3/4" Drill collar		6.750	2.813		101.00	B 4-1/2" IF	9.35	
17	Drilling Jar		6.750	2.813		100.77	B 4-1/2" IF	9.61	
18	2 x 6 3/4" Drill collar		6.500	2.813		92.00	B 4-1/2" IF	18.77	
19	Accelerator		6.750	2.813		100.77	B 4-1/2" IF	9.90	
20	2 x 6 3/4" Drill collar		6.500	2.813		92.00	B 4-1/2" IF	18.80	
21	Cross Over Sub		6.500	2.813		91.91	B 5-1/2" FH	0.33	
22	1x HWDP		5.500	3.375		57.00	B 5-1/2" FH	8.89	
23	Dart sub		6.500	2.813		91.91	B 5-1/2" FH	0.62	
24	11x HWDP		5.500	3.375		57.00	B 5-1/2" FH	99.56	
								219.79	

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DRILLING SERVICES

BHA Report

Customer : Amerada Hess Norge A/S
Well : 1/5-4S
Block : 1/5-4
Location : K1T1
Rig : Deepsea Bergen
Job # : NR-DD-02018 **BHA# 9**

Parameter	Min	Max	Ave
WOB (t) :	3.00	8.00	3.26
RPM (rpm) :	80	100	91
Flow (L/min) :	1000	3200	2976
SPP (psi) :	75	258	240

Activity	Hrs
Drilling :	39.50
Reaming :	0.00
Circ-Other :	11.00
Total :	50.50

BHA Weight	(lb)
in Air (Total) :	56906
in Mud (Total) :	44035
in Air (Bel Jars) :	18548
in Mud (Bel Jars) :	14353

Drill String	OD(in)	Len(m)
DP(S)-FH-21.90#	5.500	2870

PERFORMANCE

	In	Out
Inclination (deg)	55.38	53.13
Azimuth (deg)	221.07	221.27

	Distance(m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	187.00	6			0.50
Rotated :	24.00	0	-0.40	0.40	
Total :	211.00	5	-0.32	0.03	0.32

COMMENTS

BHA Dropped 0.4 deg/30m with AGS in 8,5" position.

OBJECTIVES:

Control angle by utilizing the Adjustable Gauge Stabiliser tool between 8" and 8 1/2"

RESULTS:

The drillstring was configured with only 5 1/2" dp with 7 1/4" tooljoints. This resulted with an ECD reading of 2.0 EMW at 2500 lpm. This was far to high and the LOT later showed a fracture with 1.96 EMW. Drilling continued with 1500 lpm and an ECD of 1.90. Thus the rop and rpm was reduced to meat that goal. The assembly dropped 0.3 in 8 1/2" position.

Summary of MWD runs

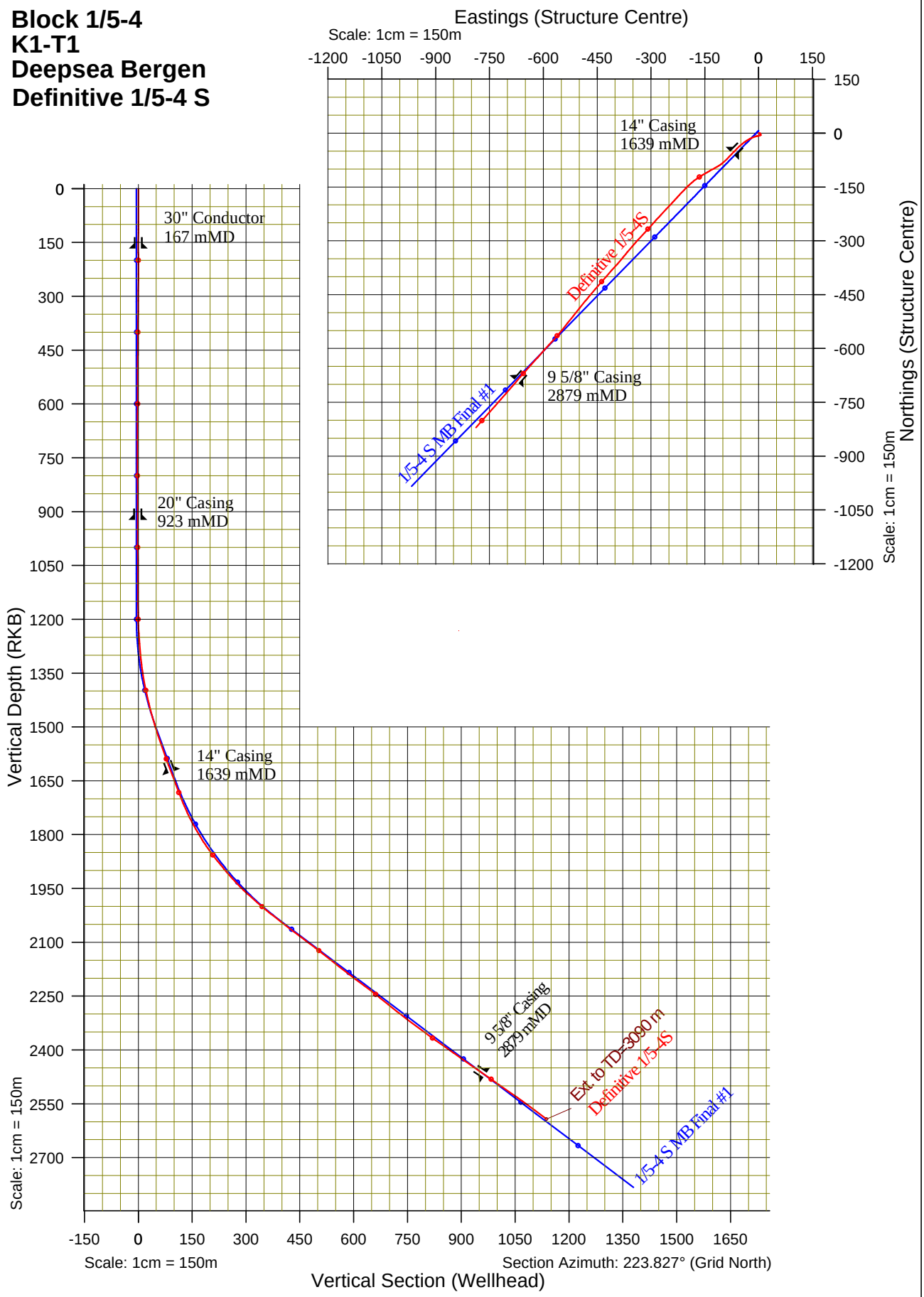
Run No.	Bit No.	Hole Size (in)	MWD Sensors	Start Depth (m)	End Depth (m)	Drill/Wipe Distance (m)	Run Start Date Time	Run End Date Time	BRT Hrs.	Oper. Hrs.	Circ. Hrs.	Max. Temp. (degC)	Serv. Int.	Trip for MWD	Failure Type
0100	1	9.88	DIR-FE	93.00	928.00	835.00	15-Apr-02 16:44	16-Apr-02 19:12	26.47	26.46	16.77	14.00	No	No	
0200	2	36.00	DIR	93.00	171.00	78.00	16-Apr-02 23:06	17-Apr-02 13:54	14.80	14.79	6.29	14.00	No	No	
0300	3	30.00	DIR	171.00	171.00	0.00	18-Apr-02 17:52	19-Apr-02 05:53	12.02	12.02	6.39	18.00	No	No	
0400	4	26.00	DIR	171.00	928.00	757.00	20-Apr-02 05:06	22-Apr-02 01:37	44.52	44.51	25.22	22.00	No	No	
0500	5	17.50	DIR-FE	928.00	1646.00	718.00	24-Apr-02 06:45	27-Apr-02 20:19	85.57	85.56	47.86	55.00	No	No	
0600	6	12.25	DIR-FE	1646.00	1646.00	0.00	28-Apr-02 06:41	29-Apr-02 03:22	20.68	20.90	8.27	47.00	No	No	
0700	7	12.50	DIR-FE-GP	1612.00	2660.00	1048.00	01-May-02 14:15	07-May-02 03:02	132.78	133.00	90.73	86.00	Yes	Yes	GP
0800	8	12.50	DIR-FE	2660.00	2879.00	219.00	07-May-02 09:40	09-May-02 20:30	58.83	59.10	36.56	96.00	No	No	
0900	9	8.50	DIR-FE	2829.00	3090.00	261.00	13-May-02 00:50	15-May-02 20:10	67.33	76.30	50.00	79.00	No	No	
				TOTALS	====>	3916.00			463.00	472.64	288.09		1	1	

HALLIBURTON Sperry-Sun

Amerada Hess Norge

DrillQuest

Block 1/5-4
K1-T1
Deepsea Bergen
Definitive 1/5-4 S



Prepared by:	Date/Time:	Checked:	Approved:
Lai Le Van	28 May, 2002 - 9:39		

Amerada Hess Norge
Block 1/5-4
K1-T1
Deepsea Bergen
1/5-4 S - Definitive 1/5-4S

Sperry-Sun

Survey Report

5 June, 2002

Surface Coordinates: 6285184.90 N, 477229.01 E (56° 42' 32.0440" N, 2° 37' 41.0603" E)
Grid Coordinate System: UTM Zone 31 on ED50 Datum, Meters

Surface Coordinates relative to Field Centre: 7.10 S, 0.01 E (Grid)
Surface Coordinates relative to Structure Centre: 0.00 N, 0.00 E (Grid)
Kelly Bushing: 23.00m above mean sea level

Survey Ref: svy3100

HALLIBURTON

Survey Report for Deepsea Bergen - 1/5-4 S

Measured Depth (m)	Incl. (Deg)	Azim. (Deg)	Station Coordinates TVD (m)	Northings (m)	Eastings (m)	Vertical Section (m)	Dogleg Rate (°/30m)	Comment
36" MWD								
0.00	0.000	0.000	0.00	0.00 N	0.00 E	0.00		
93.00	0.000	0.000	93.00	0.00 N	0.00 E	0.00	0.00	
105.00	0.700	255.920	105.00	0.02 S	0.07 W	0.06	1.75	
114.90	0.230	49.630	114.90	0.02 S	0.11 W	0.09	2.76	
123.40	0.410	350.920	123.40	0.02 N	0.11 W	0.06	1.24	
148.60	0.410	13.920	148.60	0.20 N	0.10 W	-0.07	0.19	
26" MWD								
167.00	0.178	215.003	167.00	0.24 N	0.10 W	-0.10	0.94	30" Conductor
183.40	0.690	204.020	183.40	0.13 N	0.15 W	0.01	0.94	
211.40	0.450	177.130	211.40	0.14 S	0.22 W	0.25	0.38	
238.80	0.110	137.110	238.80	0.26 S	0.19 W	0.32	0.41	
254.90	0.480	48.740	254.90	0.23 S	0.13 W	0.26	0.91	
312.70	0.700	57.240	312.69	0.12 N	0.35 E	-0.33	0.12	
341.70	0.860	117.470	341.69	0.12 N	0.69 E	-0.56	0.82	
371.00	1.090	89.130	370.99	0.02 N	1.16 E	-0.82	0.54	
399.20	0.480	86.680	399.18	0.03 N	1.55 E	-1.09	0.65	
432.70	0.990	142.500	432.68	0.19 S	1.86 E	-1.15	0.74	
468.40	0.950	92.000	468.38	0.45 S	2.35 E	-1.30	0.70	
484.80	0.720	75.830	484.78	0.43 S	2.58 E	-1.48	0.60	
515.70	0.170	18.020	515.67	0.33 S	2.79 E	-1.69	0.63	
558.10	0.530	142.580	558.07	0.43 S	2.92 E	-1.71	0.45	
573.40	0.760	138.110	573.37	0.56 S	3.04 E	-1.70	0.46	
602.10	0.570	55.750	602.07	0.62 S	3.28 E	-1.82	0.93	
629.00	0.310	74.890	628.97	0.53 S	3.46 E	-2.01	0.33	
661.80	0.110	167.420	661.77	0.54 S	3.55 E	-2.07	0.31	
692.00	0.760	164.380	691.97	0.76 S	3.61 E	-1.96	0.65	
717.90	0.510	107.790	717.87	0.96 S	3.77 E	-1.92	0.74	
746.40	0.400	58.300	746.37	0.95 S	3.98 E	-2.07	0.41	
775.20	0.330	267.140	775.17	0.90 S	3.98 E	-2.11	0.74	
803.80	0.460	169.050	803.77	1.01 S	3.92 E	-1.98	0.63	
863.00	0.240	279.320	862.97	1.23 S	3.84 E	-1.77	0.30	
890.50	0.520	200.740	890.47	1.33 S	3.74 E	-1.63	0.58	
911.00	0.610	161.160	910.96	1.52 S	3.74 E	-1.49	0.57	
17-1/2" MWD								
923.00	0.682	151.727	922.96	1.65 S	3.80 E	-1.44	0.32	20" Casing
948.80	0.880	137.590	948.76	1.93 S	4.00 E	-1.38	0.32	
977.00	0.940	140.310	976.96	2.27 S	4.30 E	-1.34	0.08	
1005.70	0.930	140.810	1005.65	2.63 S	4.59 E	-1.28	0.01	
1035.60	0.780	154.470	1035.55	3.00 S	4.83 E	-1.18	0.25	

Survey Report for Deepsea Bergen - 1/5-4 S

Measured Depth (m)	Incl. (Deg)	Azim. (Deg)	Station Coordinates TVD (m)	Northings (m)	Eastings (m)	Vertical Section (m)	Dogleg Rate (°/30m)	Comment
1064.90	0.950	143.560	1064.85	3.38 S	5.07 E	-1.07	0.24	
1095.20	0.760	147.570	1095.14	3.75 S	5.32 E	-0.98	0.20	
1124.20	0.950	155.810	1124.14	4.13 S	5.52 E	-0.85	0.23	
1153.30	0.830	156.120	1153.24	4.54 S	5.71 E	-0.68	0.12	
1181.30	0.900	158.410	1181.23	4.93 S	5.87 E	-0.51	0.08	
1210.30	1.650	239.170	1210.23	5.36 S	5.60 E	-0.01	1.81	
1239.30	4.010	245.400	1239.19	5.99 S	4.32 E	1.34	2.46	
1268.40	5.350	256.450	1268.19	6.74 S	2.07 E	3.42	1.66	
1298.40	6.500	259.790	1298.03	7.36 S	0.96 W	5.98	1.20	
1327.40	8.440	256.580	1326.79	8.15 S	4.65 W	9.10	2.05	
1356.20	10.720	252.990	1355.18	9.42 S	9.26 W	13.21	2.45	
1385.40	12.120	249.320	1383.80	11.30 S	14.73 W	18.35	1.62	
1414.40	13.180	244.790	1412.10	13.78 S	20.57 W	24.19	1.50	
1443.70	14.690	240.380	1440.54	17.04 S	26.82 W	30.87	1.89	
1473.20	16.370	238.760	1468.96	21.05 S	33.63 W	38.47	1.76	
1500.80	17.290	234.120	1495.38	25.47 S	40.28 W	46.27	1.77	
1529.90	18.040	229.890	1523.11	30.91 S	47.23 W	55.00	1.53	
1558.90	19.090	226.990	1550.60	37.04 S	54.13 W	64.20	1.45	
1588.00	20.000	223.780	1578.02	43.87 S	61.05 W	73.93	1.45	
1619.50	20.200	224.800	1607.60	51.62 S	68.61 W	84.75	0.38	

12-1/4" MWD-sag GP

1639.00	20.345	224.531	1625.90	56.43 S	73.36 W	91.51	0.27	14" Casing
1675.20	20.616	224.040	1659.81	65.50 S	82.20 W	104.18	0.27	
1703.50	21.316	225.350	1686.23	72.69 S	89.33 W	114.30	0.89	
1733.20	22.597	227.380	1713.78	80.35 S	97.37 W	125.39	1.50	
1761.10	25.720	234.630	1739.24	87.49 S	106.25 W	136.69	4.63	
1790.20	28.562	240.260	1765.14	94.60 S	117.45 W	149.57	3.95	
1819.70	31.404	241.460	1790.69	101.77 S	130.32 W	163.67	2.95	
1847.40	33.281	239.650	1814.09	109.06 S	143.22 W	177.86	2.29	
1876.30	36.065	238.670	1837.85	117.49 S	157.33 W	193.71	2.95	
1906.20	38.298	235.920	1861.68	127.26 S	172.53 W	211.28	2.79	
1936.00	39.555	229.020	1884.87	138.66 S	187.35 W	229.77	4.54	
1964.90	40.655	224.640	1906.98	151.40 S	200.91 W	248.35	3.14	
1994.60	42.864	222.800	1929.13	165.70 S	214.58 W	268.13	2.55	
2023.00	45.499	222.830	1949.50	180.21 S	228.03 W	287.92	2.78	
2052.60	47.615	223.050	1969.85	195.95 S	242.67 W	309.41	2.15	
2081.80	49.271	223.350	1989.22	211.87 S	257.63 W	331.25	1.72	
2109.90	50.201	222.630	2007.38	227.56 S	272.25 W	352.69	1.15	
2138.90	52.067	222.040	2025.58	244.25 S	287.45 W	375.26	1.99	
2168.20	52.315	222.150	2043.54	261.43 S	302.97 W	398.40	0.27	
2197.30	52.484	222.800	2061.30	278.43 S	318.54 W	421.45	0.56	
2225.50	52.674	223.240	2078.43	294.80 S	333.82 W	443.85	0.42	
2255.90	52.845	219.990	2096.83	312.89 S	349.89 W	468.02	2.56	
2287.90	53.430	220.180	2116.03	332.48 S	366.37 W	493.57	0.57	
2313.50	51.373	220.300	2131.65	347.96 S	379.47 W	513.81	2.41	
2342.20	51.566	221.150	2149.52	364.98 S	394.12 W	536.23	0.72	

Survey Report for Deepsea Bergen - 1/5-4 S

Measured Depth (m)	Incl. (Deg)	Azim. (Deg)	Station Coordinates TVD (m)	Northings (m)	Eastings (m)	Vertical Section (m)	Dogleg Rate (°/30m)	Comment
2371.80	52.096	221.350	2167.82	382.48 S	409.47 W	559.48	0.56	
2401.50	52.864	221.400	2185.91	400.15 S	425.04 W	583.01	0.78	
2430.20	52.614	221.400	2203.28	417.29 S	440.14 W	605.83	0.26	
2487.80	53.339	220.190	2237.97	452.10 S	470.18 W	651.76	0.63	
2514.90	50.854	218.630	2254.61	468.62 S	483.76 W	673.07	3.07	
2545.90	51.576	218.950	2274.03	487.45 S	498.90 W	697.14	0.74	
2584.30	51.946	218.490	2297.80	510.98 S	517.77 W	727.18	0.40	
2614.20	52.576	218.180	2316.10	529.53 S	532.43 W	750.72	0.68	
12-1/4" MWD-sag AGS								
2693.30	54.590	222.140	2363.07	578.14 S	573.49 W	814.22	1.43	
2712.10	55.166	222.230	2373.88	589.53 S	583.82 W	829.59	0.93	
2742.20	54.716	221.890	2391.17	607.83 S	600.32 W	854.22	0.53	
2773.10	54.398	221.940	2409.09	626.56 S	617.14 W	879.38	0.31	
2802.00	54.678	221.540	2425.86	644.12 S	632.81 W	902.90	0.45	
2830.00	55.287	221.560	2441.93	661.28 S	648.02 W	925.81	0.65	
8-1/2" MWD-sag AGS								
2879.00	55.378	221.070	2469.80	691.55 S	674.62 W	966.08	0.25	9 5/8" Casing
2903.00	55.423	220.830	2483.43	706.47 S	687.57 W	985.81	0.25	
2932.00	55.102	221.350	2499.95	724.44 S	703.24 W	1009.61	0.55	
2960.60	54.732	221.620	2516.39	741.97 S	718.74 W	1033.00	0.45	
2989.90	54.511	221.090	2533.35	759.90 S	734.52 W	1056.86	0.50	
3019.00	54.171	221.480	2550.32	777.67 S	750.12 W	1080.48	0.48	
3048.90	53.580	221.210	2567.94	795.80 S	766.08 W	1104.61	0.63	
3058.30	53.129	221.270	2573.56	801.47 S	771.05 W	1112.15	1.45	
Definitive 1/5-4S								
3090.00	53.129	221.270	2592.58	820.53 S	787.78 W	1137.48	0.00	

All data is in Metres unless otherwise stated. Directions and coordinates are relative to Grid North.
Vertical depths are relative to RKB. Northings and Eastings are relative to Structure Centre.

The Dogleg Severity is in Degrees per 30 metres.
Vertical Section is from Wellhead and calculated along an Azimuth of 223.827° (Grid).

Coordinate System is UTM Zone 31 on ED50 Datum, Meters.
Grid Convergence at Surface is -0.311°. Magnetic Convergence at Surface is 2.276° (23-May-02)

Based upon Minimum Curvature type calculations, at a Measured Depth of 3090.00m.,
The Bottom Hole Displacement is 1137.48m., in the Direction of 223.833° (Grid).

Survey Report for Deepsea Bergen - 1/5-4 S

Casing details

From		To		
Measured Depth (m)	Vertical Depth (m)	Measured Depth (m)	Vertical Depth (m)	Casing Detail
<Surface>	<Surface>	167.00	167.00	30" Conductor
<Surface>	<Surface>	923.00	922.96	20" Casing
<Surface>	<Surface>	1639.00	1625.90	14" Casing
<Surface>	<Surface>	2879.00	2469.80	9 5/8" Casing

Amerada Hess Norge

Block 1/5-4

K1-T1

Deepsea Bergen

1/5-4 S - Definitive 1/5-4S

Sperry-Sun

Survey Report

5 June, 2002

Surface Coordinates: 6285184.90 N, 477229.01 E (56° 42' 32.0440" N, 2° 37' 41.0603" E)
Grid Coordinate System: UTM Zone 31 on ED50 Datum, Meters

Surface Coordinates relative to Field Centre: 7.10 S, 0.01 E (Grid)
Surface Coordinates relative to Structure Centre: 0.00 N, 0.00 E (Grid)
Kelly Bushing: 23.00m above mean sea level

Survey Ref: svy3100

HALLIBURTON

Survey Report for Deepsea Bergen - 1/5-4 S

Measured Depth (m)	Incl.	Azim.	Vertical Depth (m)	Local Coordinates Northings (m)	Local Coordinates Eastings (m)	Geographic Coordinates Latitude	Geographic Coordinates Longitude	field ref point Northings (m)	field ref point Eastings (m)
36" MWD									
0.00	0.000	0.000	0.00	0.00 N	0.00 E	56° 42' 32.0440" N	2° 37' 41.0603" E	6285184.90 N	477229.01 E
93.00	0.000	0.000	93.00	0.00 N	0.00 E	56° 42' 32.0440" N	2° 37' 41.0603" E	6285184.90 N	477229.01 E
105.00	0.700	255.920	105.00	0.02 S	0.07 W	56° 42' 32.0435" N	2° 37' 41.0561" E	6285184.88 N	477228.94 E
114.90	0.230	49.630	114.90	0.02 S	0.11 W	56° 42' 32.0434" N	2° 37' 41.0536" E	6285184.88 N	477228.90 E
123.40	0.410	350.920	123.40	0.02 N	0.11 W	56° 42' 32.0447" N	2° 37' 41.0541" E	6285184.92 N	477228.90 E
148.60	0.410	13.920	148.60	0.20 N	0.10 W	56° 42' 32.0504" N	2° 37' 41.0544" E	6285185.10 N	477228.91 E
26" MWD									
183.40	0.690	204.020	183.40	0.13 N	0.15 W	56° 42' 32.0481" N	2° 37' 41.0512" E	6285185.03 N	477228.86 E
211.40	0.450	177.130	211.40	0.14 S	0.22 W	56° 42' 32.0396" N	2° 37' 41.0476" E	6285184.76 N	477228.79 E
238.80	0.110	137.110	238.80	0.26 S	0.19 W	56° 42' 32.0355" N	2° 37' 41.0490" E	6285184.64 N	477228.82 E
254.90	0.480	48.740	254.90	0.23 S	0.13 W	56° 42' 32.0366" N	2° 37' 41.0526" E	6285184.67 N	477228.88 E
312.70	0.700	57.240	312.69	0.12 N	0.35 E	56° 42' 32.0480" N	2° 37' 41.0806" E	6285185.02 N	477229.36 E
341.70	0.860	117.470	341.69	0.12 N	0.69 E	56° 42' 32.0479" N	2° 37' 41.1007" E	6285185.02 N	477229.70 E
371.00	1.090	89.130	370.99	0.02 N	1.16 E	56° 42' 32.0449" N	2° 37' 41.1286" E	6285184.92 N	477230.17 E
399.20	0.480	86.680	399.18	0.03 N	1.55 E	56° 42' 32.0453" N	2° 37' 41.1513" E	6285184.93 N	477230.56 E
432.70	0.990	142.500	432.68	0.19 S	1.86 E	56° 42' 32.0382" N	2° 37' 41.1700" E	6285184.71 N	477230.87 E
468.40	0.950	92.000	468.38	0.45 S	2.35 E	56° 42' 32.0300" N	2° 37' 41.1985" E	6285184.45 N	477231.36 E
484.80	0.720	75.830	484.78	0.43 S	2.58 E	56° 42' 32.0307" N	2° 37' 41.2124" E	6285184.47 N	477231.59 E
515.70	0.170	18.020	515.67	0.33 S	2.79 E	56° 42' 32.0337" N	2° 37' 41.2242" E	6285184.57 N	477231.80 E
558.10	0.530	142.580	558.07	0.43 S	2.92 E	56° 42' 32.0306" N	2° 37' 41.2324" E	6285184.47 N	477231.93 E
573.40	0.760	138.110	573.37	0.56 S	3.04 E	56° 42' 32.0264" N	2° 37' 41.2390" E	6285184.34 N	477232.05 E
602.10	0.570	55.750	602.07	0.62 S	3.28 E	56° 42' 32.0244" N	2° 37' 41.2534" E	6285184.28 N	477232.29 E

Survey Report for Deepsea Bergen - 1/5-4 S

Measured Depth (m)	Incl.	Azim.	Vertical Depth (m)	Local Coordinates Northings (m)	Local Coordinates Eastings (m)	Geographic Coordinates Latitude	Geographic Coordinates Longitude	field ref point Northings (m)	field ref point Eastings (m)
629.00	0.310	74.890	628.97	0.53 S	3.46 E	56° 42' 32.0275" N	2° 37' 41.2640" E	6285184.37 N	477232.47 E
661.80	0.110	167.420	661.77	0.54 S	3.55 E	56° 42' 32.0273" N	2° 37' 41.2694" E	6285184.36 N	477232.56 E
692.00	0.760	164.380	691.97	0.76 S	3.61 E	56° 42' 32.0201" N	2° 37' 41.2731" E	6285184.14 N	477232.62 E
717.90	0.510	107.790	717.87	0.96 S	3.77 E	56° 42' 32.0137" N	2° 37' 41.2823" E	6285183.94 N	477232.78 E
746.40	0.400	58.300	746.37	0.95 S	3.98 E	56° 42' 32.0142" N	2° 37' 41.2944" E	6285183.95 N	477232.99 E
775.20	0.330	267.140	775.17	0.90 S	3.98 E	56° 42' 32.0157" N	2° 37' 41.2945" E	6285184.00 N	477232.99 E
803.80	0.460	169.050	803.77	1.01 S	3.92 E	56° 42' 32.0119" N	2° 37' 41.2910" E	6285183.89 N	477232.93 E
863.00	0.240	279.320	862.97	1.23 S	3.84 E	56° 42' 32.0050" N	2° 37' 41.2865" E	6285183.67 N	477232.85 E
890.50	0.520	200.740	890.47	1.33 S	3.74 E	56° 42' 32.0015" N	2° 37' 41.2806" E	6285183.57 N	477232.75 E
911.00	0.610	161.160	910.96	1.52 S	3.74 E	56° 42' 31.9954" N	2° 37' 41.2808" E	6285183.38 N	477232.75 E

17-1/2" MWD

948.80	0.880	137.590	948.76	1.93 S	4.00 E	56° 42' 31.9823" N	2° 37' 41.2963" E	6285182.97 N	477233.01 E
977.00	0.940	140.310	976.96	2.27 S	4.30 E	56° 42' 31.9715" N	2° 37' 41.3137" E	6285182.63 N	477233.31 E
1005.70	0.930	140.810	1005.65	2.63 S	4.59 E	56° 42' 31.9598" N	2° 37' 41.3313" E	6285182.27 N	477233.60 E
1035.60	0.780	154.470	1035.55	3.00 S	4.83 E	56° 42' 31.9478" N	2° 37' 41.3456" E	6285181.90 N	477233.84 E
1064.90	0.950	143.560	1064.85	3.38 S	5.07 E	56° 42' 31.9357" N	2° 37' 41.3592" E	6285181.52 N	477234.08 E
1095.20	0.760	147.570	1095.14	3.75 S	5.32 E	56° 42' 31.9238" N	2° 37' 41.3744" E	6285181.15 N	477234.33 E
1124.20	0.950	155.810	1124.14	4.13 S	5.52 E	56° 42' 31.9115" N	2° 37' 41.3864" E	6285180.77 N	477234.53 E
1153.30	0.830	156.120	1153.24	4.54 S	5.71 E	56° 42' 31.8981" N	2° 37' 41.3974" E	6285180.36 N	477234.72 E
1181.30	0.900	158.410	1181.23	4.93 S	5.87 E	56° 42' 31.8856" N	2° 37' 41.4071" E	6285179.97 N	477234.88 E
1210.30	1.650	239.170	1210.23	5.36 S	5.60 E	56° 42' 31.8717" N	2° 37' 41.3911" E	6285179.54 N	477234.61 E
1239.30	4.010	245.400	1239.19	5.99 S	4.32 E	56° 42' 31.8509" N	2° 37' 41.3160" E	6285178.91 N	477233.33 E
1268.40	5.350	256.450	1268.19	6.74 S	2.07 E	56° 42' 31.8266" N	2° 37' 41.1843" E	6285178.16 N	477231.08 E
1298.40	6.500	259.790	1298.03	7.36 S	0.96 W	56° 42' 31.8057" N	2° 37' 41.0062" E	6285177.54 N	477228.05 E
1327.40	8.440	256.580	1326.79	8.15 S	4.65 W	56° 42' 31.7797" N	2° 37' 40.7898" E	6285176.75 N	477224.36 E
1356.20	10.720	252.990	1355.18	9.42 S	9.26 W	56° 42' 31.7377" N	2° 37' 40.5186" E	6285175.48 N	477219.75 E

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Measured Depth (m)	Incl.	Azim.	Vertical Depth (m)	Local Coordinates Northings (m)	Local Coordinates Eastings (m)	Geographic Coordinates Latitude	Geographic Coordinates Longitude	field ref point Northings (m)	field ref point Eastings (m)
1385.40	12.120	249.320	1383.80	11.30 S	14.73 W	56° 42' 31.6760" N	2° 37' 40.1979" E	6285173.60 N	477214.28 E
1414.40	13.180	244.790	1412.10	13.78 S	20.57 W	56° 42' 31.5947" N	2° 37' 39.8553" E	6285171.12 N	477208.44 E
1443.70	14.690	240.380	1440.54	17.04 S	26.82 W	56° 42' 31.4882" N	2° 37' 39.4887" E	6285167.86 N	477202.19 E
1473.20	16.370	238.760	1468.96	21.05 S	33.63 W	56° 42' 31.3574" N	2° 37' 39.0898" E	6285163.85 N	477195.38 E
1500.80	17.290	234.120	1495.38	25.47 S	40.28 W	56° 42' 31.2133" N	2° 37' 38.7003" E	6285159.43 N	477188.73 E
1529.90	18.040	229.890	1523.11	30.91 S	47.23 W	56° 42' 31.0362" N	2° 37' 38.2933" E	6285153.99 N	477181.78 E
1558.90	19.090	226.990	1550.60	37.04 S	54.13 W	56° 42' 30.8368" N	2° 37' 37.8894" E	6285147.86 N	477174.88 E
1588.00	20.000	223.780	1578.02	43.87 S	61.05 W	56° 42' 30.6144" N	2° 37' 37.4846" E	6285141.03 N	477167.96 E
1619.50	20.200	224.800	1607.60	51.62 S	68.61 W	56° 42' 30.3625" N	2° 37' 37.0426" E	6285133.28 N	477160.40 E

12-1/4" MWD-sag GP

1675.20	20.616	224.040	1659.81	65.50 S	82.20 W	56° 42' 29.9115" N	2° 37' 36.2478" E	6285119.40 N	477146.81 E
1703.50	21.316	225.350	1686.23	72.69 S	89.33 W	56° 42' 29.6775" N	2° 37' 35.8313" E	6285112.21 N	477139.68 E
1733.20	22.597	227.380	1713.78	80.35 S	97.37 W	56° 42' 29.4284" N	2° 37' 35.3610" E	6285104.55 N	477131.64 E
1761.10	25.720	234.630	1739.24	87.49 S	106.25 W	56° 42' 29.1960" N	2° 37' 34.8409" E	6285097.41 N	477122.76 E
1790.20	28.562	240.260	1765.14	94.60 S	117.45 W	56° 42' 28.9641" N	2° 37' 34.1850" E	6285090.30 N	477111.56 E
1819.70	31.404	241.460	1790.69	101.77 S	130.32 W	56° 42' 28.7299" N	2° 37' 33.4301" E	6285083.13 N	477098.69 E
1847.40	33.281	239.650	1814.09	109.06 S	143.22 W	56° 42' 28.4919" N	2° 37' 32.6740" E	6285075.84 N	477085.79 E
1876.30	36.065	238.670	1837.85	117.49 S	157.33 W	56° 42' 28.2168" N	2° 37' 31.8469" E	6285067.41 N	477071.68 E
1906.20	38.298	235.920	1861.68	127.26 S	172.53 W	56° 42' 27.8981" N	2° 37' 30.9567" E	6285057.64 N	477056.48 E
1936.00	39.555	229.020	1884.87	138.66 S	187.35 W	56° 42' 27.5267" N	2° 37' 30.0890" E	6285046.24 N	477041.66 E
1964.90	40.655	224.640	1906.98	151.40 S	200.91 W	56° 42' 27.1124" N	2° 37' 29.2955" E	6285033.50 N	477028.10 E
1994.60	42.864	222.800	1929.13	165.70 S	214.58 W	56° 42' 26.6476" N	2° 37' 28.4967" E	6285019.20 N	477014.43 E
2023.00	45.499	222.830	1949.50	180.21 S	228.03 W	56° 42' 26.1757" N	2° 37' 27.7106" E	6285004.69 N	477000.98 E
2052.60	47.615	223.050	1969.85	195.95 S	242.67 W	56° 42' 25.6643" N	2° 37' 26.8548" E	6284988.95 N	476986.34 E
2081.80	49.271	223.350	1989.22	211.87 S	257.63 W	56° 42' 25.1466" N	2° 37' 25.9805" E	6284973.03 N	476971.38 E

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Measured Depth (m)	Incl.	Azim.	Vertical Depth (m)	Local Coordinates Northings (m)	Local Coordinates Eastings (m)	Geographic Coordinates Latitude	Geographic Coordinates Longitude	field ref point Northings (m)	field ref point Eastings (m)
2109.90	50.201	222.630	2007.38	227.56 S	272.25 W	56° 42' 24.6368" N	2° 37' 25.1260" E	6284957.34 N	476956.76 E
2138.90	52.067	222.040	2025.58	244.25 S	287.45 W	56° 42' 24.0943" N	2° 37' 24.2374" E	6284940.65 N	476941.56 E
2168.20	52.315	222.150	2043.54	261.43 S	302.97 W	56° 42' 23.5360" N	2° 37' 23.3306" E	6284923.47 N	476926.04 E
2197.30	52.484	222.800	2061.30	278.43 S	318.54 W	56° 42' 22.9833" N	2° 37' 22.4207" E	6284906.47 N	476910.47 E
2225.50	52.674	223.240	2078.43	294.80 S	333.82 W	56° 42' 22.4510" N	2° 37' 21.5277" E	6284890.10 N	476895.19 E
2255.90	52.845	219.990	2096.83	312.89 S	349.89 W	56° 42' 21.8631" N	2° 37' 20.5888" E	6284872.01 N	476879.12 E
2287.90	53.430	220.180	2116.03	332.48 S	366.37 W	56° 42' 21.2267" N	2° 37' 19.6258" E	6284852.42 N	476862.64 E
2313.50	51.373	220.300	2131.65	347.96 S	379.47 W	56° 42' 20.7237" N	2° 37' 18.8606" E	6284836.94 N	476849.54 E
2342.20	51.566	221.150	2149.52	364.98 S	394.12 W	56° 42' 20.1708" N	2° 37' 18.0049" E	6284819.92 N	476834.89 E
2371.80	52.096	221.350	2167.82	382.48 S	409.47 W	56° 42' 19.6023" N	2° 37' 17.1084" E	6284802.42 N	476819.54 E
2401.50	52.864	221.400	2185.91	400.15 S	425.04 W	56° 42' 19.0278" N	2° 37' 16.1987" E	6284784.75 N	476803.97 E
2430.20	52.614	221.400	2203.28	417.29 S	440.14 W	56° 42' 18.4710" N	2° 37' 15.3162" E	6284767.61 N	476788.87 E
2487.80	53.339	220.190	2237.97	452.10 S	470.18 W	56° 42' 17.3397" N	2° 37' 13.5612" E	6284732.80 N	476758.83 E
2514.90	50.854	218.630	2254.61	468.62 S	483.76 W	56° 42' 16.8032" N	2° 37' 12.7684" E	6284716.28 N	476745.25 E
2545.90	51.576	218.950	2274.03	487.45 S	498.90 W	56° 42' 16.1913" N	2° 37' 11.8845" E	6284697.45 N	476730.11 E
2584.30	51.946	218.490	2297.80	510.98 S	517.77 W	56° 42' 15.4269" N	2° 37' 10.7830" E	6284673.92 N	476711.24 E
2614.20	52.576	218.180	2316.10	529.53 S	532.43 W	56° 42' 14.8245" N	2° 37' 09.9268" E	6284655.37 N	476696.58 E

12-1/4" MWD-sag AGS

2693.30	54.590	222.140	2363.07	578.14 S	573.49 W	56° 42' 13.2451" N	2° 37' 07.5289" E	6284606.76 N	476655.52 E
2712.10	55.166	222.230	2373.88	589.53 S	583.82 W	56° 42' 12.8747" N	2° 37' 06.9256" E	6284595.37 N	476645.19 E
2742.20	54.716	221.890	2391.17	607.83 S	600.32 W	56° 42' 12.2802" N	2° 37' 05.9612" E	6284577.07 N	476628.69 E
2773.10	54.398	221.940	2409.09	626.56 S	617.14 W	56° 42' 11.6713" N	2° 37' 04.9786" E	6284558.34 N	476611.87 E
2802.00	54.678	221.540	2425.86	644.12 S	632.81 W	56° 42' 11.1005" N	2° 37' 04.0631" E	6284540.78 N	476596.20 E

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2830.00	55.287	221.560	2441.93	661.28 S	648.02 W	56° 42' 10.5427" N	2° 37' 03.1746" E	6284523.62 N	476580.99 E
8-1/2" MWD-sag AGS									
2903.00	55.423	220.830	2483.43	706.47 S	687.57 W	56° 42' 09.0741" N	2° 37' 00.8641" E	6284478.43 N	476541.44 E
2932.00	55.102	221.350	2499.95	724.44 S	703.24 W	56° 42' 08.4904" N	2° 36' 59.9492" E	6284460.46 N	476525.77 E
2960.60	54.732	221.620	2516.39	741.97 S	718.74 W	56° 42' 07.9206" N	2° 36' 59.0435" E	6284442.93 N	476510.27 E
2989.90	54.511	221.090	2533.35	759.90 S	734.52 W	56° 42' 07.3378" N	2° 36' 58.1215" E	6284425.00 N	476494.49 E
3019.00	54.171	221.480	2550.32	777.67 S	750.12 W	56° 42' 06.7604" N	2° 36' 57.2102" E	6284407.23 N	476478.89 E
3048.90	53.580	221.210	2567.94	795.80 S	766.08 W	56° 42' 06.1712" N	2° 36' 56.2783" E	6284389.10 N	476462.93 E
3058.30	53.129	221.270	2573.56	801.47 S	771.05 W	56° 42' 05.9869" N	2° 36' 55.9879" E	6284383.43 N	476457.96 E
Definitive 1/5-4S									
3090.00	53.129	221.270	2592.58	820.53 S	787.78 W	56° 42' 05.3674" N	2° 36' 55.0108" E	6284364.37 N	476441.23 E

All data is in Metres unless otherwise stated. Directions and coordinates are relative to Grid North.
Vertical depths are relative to RKB. Northings and Eastings are relative to Structure Centre.
Global Northings and Eastings are relative to UTM Zone 31 on ED50 Datum, Meters.

Coordinate System is UTM Zone 31 on ED50 Datum, Meters.
Grid Convergence at Surface is -0.311°. Magnetic Convergence at Surface is 2.276° (23-May-02)

Based upon Minimum Curvature type calculations, at a Measured Depth of 3090.00m.,
The Bottom Hole Displacement is 1137.48m., in the Direction of 223.833° (Grid).

Section 7.0

GEOLOGICAL RESULTS

7.0 GEOLOGICAL RESULTS

7.1 INTRODUCTION.

The primary objective of drilling Well 1/5-4S (K1T1) was to test the hydrocarbon potential of the K1 Chalk prospect close to the crest of a salt diapir. The T1 Palaeocene prospect lay on the north east flank of the diapir. The structure was situated in the northern eastern part of Block 1/5 of the Norwegian Central Graben, close to the Norway/U.K. median line.

The primary K1 Prospect was a mapped 4-way dip closure of the Chalk over a Permian salt diapir and developed during the Cretaceous period. Palaeocene shales onlap the structure. Chalk Limestones of the Upper Cretaceous and Lower Palaeocene were prognosed to provide the potential reservoir. These were subsequently found to be water saturated.

The forecast secondary T1 Palaeocene prospect was mapped as a stratigraphic pinchout containing Forties and Andrew sandstone. Forties sandstones were notably absent in the well. Poor shows were recorded from thin Andrews sandstones in the Lista Formation.

Wellsite lithological descriptions of carbonate rocks were made with reference to Dunham's Classification. The Wentworth scale has been used in evaluating sandstone lithologies.

7.2 STRATIGRAPHY.

7.2.1 Lithostratigraphy

Table 7.2 and Figure 7.1 summarise the lithostratigraphy based on cuttings descriptions made at the wellsite. A complete listing of wellsite sample descriptions are included in Attachment 11.3. No sidewall or conventional cores were cut. Wireline and FEMWD logs were used as an aid in

lithological interpretation and the placing of formation boundaries, supported by the biostratigraphic analyses provided by Microstrat Ltd.

A 9 7/8" pilot-hole, was drilled riserless (returns to seabed), down to 928 m and later opened-up to 26" to enable the 20" casing to be run and set at 923m. First returns were from 928m within the Nordland Group Claystones.

NORDLAND GROUP (Undifferentiated)

Nordland group formation from 93 m to 928 m was not collected as that section was drilled riserless and all returns were to the seabed. Note: Bed thicknesses are not reported as the well was inclined and the dip of the beds was not known.

Interval**:** 93.0 m to 571.0 m MD BRT (93 – 571 m TVD)
Age: Recent - Pleistocene
Thick glacial deposited sands with interbedded clays characterised this section, as identified from MWD logs.

Interval**:** 571.0 m to 1718.0 m MD BRT (571 – 1699.7 m TVD)
Age: Late Miocene - Pliocene

This interval consisted of massive Claystones with minor Sand and Limestone stringers. The claystone was variably medium greenish grey to greenish black, olive grey to olive black, light to medium grey & occasionally medium bluish grey. It was very soft & sticky in the topmost part of the hole, becoming more indurated with depth, although there were localised zones of soft, sticky, hydrophilic clay. It was generally not calcareous, (locally moderately - very calcareous and grading to Marl), was silty, often with matrix supported fine quartz sand grains. Traces of very fine mica were present along with very fine glauconite grains, finely crystalline to disseminated pyrite, common very fine dark brown laths of organic material, fragments of bivalve shells and microfossils (foraminifera). There was evidence of bioturbation in the form of pyritised burrow infills.

The Limestone stringers were soft to firm, very pale orange brown, pale orange or off-white to pale orange grey cryptocrystalline to microcrystalline lime mudstones with a porcelainous or pasty texture. They were often slightly argillaceous and rarely dolomitic towards the base of the interval.

Dolomite stringers were moderate yellowish brown colour microcrystalline lime mudstones, were very hard, brittle and slightly argillaceous.

Rare Sand flasers comprised loose, clear to translucent, colourless to pale yellow & pale pink quartz and sparse moderate orange-pink K-feldspars. These were very fine to fine grained, subangular & subspherical in shape.

HORDALAND GROUP (undifferentiated).

Interval: 1718.0 - 2903.0 m MD BRT (1699.7 – 2483.4 m TVD)

Age: Mid Eocene - Mid Miocene

This was massive Claystone with minor Limestone and rare Dolomite stringers.

The Claystones were a series of interbedded brownish grey to locally brownish black, olive grey to greenish grey, light to medium grey, light bluish grey. The formations were firm to moderately hard producing subfissile, blocky (locally splintery or platey), bit cuttings that were commonly silty and graded to Siltstone. They were often micromicaceous, generally non to slightly calcareous (locally moderately calcareous), locally had a waxy texture and contained traces of very finely crystalline to disseminated pyrite. Traces of very fine quartz sand were also present and the claystone locally graded to Argillaceous Sandstone. In the lower section of the Hordaland (from 2840m-2864m) there were traces of reddish brown sediments considered to represent volcanic ashfall tuffs.

A silty sandy interval was seen between 2560-2598m and was considered to be of Oligocene age. The rare Argillaceous Sandstone horizons were firm, moderately consolidated and

comprised clear to translucent, colourless to dark brown quartz grains that were very fine to fine, rounded and spherical in shape and well sorted with a non calcareous, argillaceous matrix. There was no visible porosity.

Thin limestone stringers occurred throughout the sequence. The Limestone stringers were either greyish orange to dark yellowish orange, off white to pale yellowish orange, off-white to light grey or light bluish grey microcrystalline – cryptocrystalline lime mudstones. Crystalline, wackestone or packstone textures were occasionally observed. They were often slightly argillaceous, locally contained very fine clear quartz sand and graded to Calcareous Sandstone. They were firm to moderately hard and locally very hard and brittle, when dolomitic.

Dolomite stringers were dark yellowish orange to moderate yellowish brown microcrystalline mudstones and were very hard to hard, producing blocky to angular, brittle bit cuttings.

ROGALAND GROUP

Balder Formation

Interval: 2903.0 - 2935.0 m MD BRT (2483.4 -2501.7 m TVD)

Age: Early Eocene - Late Palaeocene

This formation comprised massive Claystones with minor Limestone Stringers and Tuffaceous beds.

The Claystone was variably moderate grey to moderate brownish grey, occasionally light bluish grey or mottled greyish blue green in colour. It was micromicaceous, commonly silty and locally grading to siltstone. Other horizons were sandy and graded to very fine sandstone containing traces of glauconite. It was commonly tuffaceous and contained nodules of very finely crystalline pyrite and was non to slightly calcareous.

The Limestone stringers were predominantly off-white to very light grey, very pale orange, occasionally very light brownish grey or white in colour. They were hard to very hard

cryptocrystalline - microcrystalline lime mudstones, occasionally with wackestone textures. Drilled cuttings were generally blocky to sub-blocky or angular, were occasionally chalky & crumbly and sometimes brittle. In places they contained very fine quartz sand grains or were variably argillaceous, locally grading to argillaceous limestones. Nodular masses of microcrystalline pyrite were present and some stringers were dolomitic.

The Tuffs were varicoloured, predominantly moderate grey to moderate brownish grey, off-white to very light grey, greyish blue-green, pale purple, purplish grey, commonly mottled. They contained traces of microcrystalline pyrite nodules, traces of glauconite and were moderately calcareous. They commonly graded to, and were interbedded with claystone.

Sele Formation

Interval: 2935.0 – 2942.0 m MD BRT (2501.7 – 2505.7 m TVD)

Age: Late Palaeocene

The Sele formation consisted of Claystone and Tuffaceous Claystone with minor stringers of Limestone.

Claystone was moderate brownish grey to olive grey or moderate grey, locally micromicaceous and contained very finely crystalline or disseminated pyrite and traces of glauconite. Some beds were silty (grading to Siltstone) or sandy (locally grading to Sandstone which comprised very fine to fine, moderately well sorted, colourless, clear to translucent quartz grains). It was generally not calcareous and only locally slightly calcareous. Tuffaceous beds were mottled off-white to light grey, slightly to moderately calcareous and occasionally contained traces of glauconite.

Limestones were off-white to very pale orange, firm to moderately hard cryptocrystallline lime mudstones. Some were argillaceous and others contained traces of very fine clear quartz sand.

Lista Formation

Interval: 2942.0 - 2978.0 m MD BRT (2505.7 – 2526.4 m TVD)

Age: Late Palaeocene

This consisted of Claystone with minor Sandstone and Limestone Stringers.

The Claystone was moderate dark grey, moderately dark olive grey, brownish grey and occasionally light bluish grey, micromicaceous, silty in part and rarely graded to Siltstone. It was firm to moderately hard and produced blocky to sub-blocky (occasionally splintery) drilled cuttings. Some beds were dusky yellowish green or light grey and contained traces of very finely crystalline & disseminated pyrite. The formation was non-slightly calcareous.

Sandstone stringers were off-white and greyish orange to dark yellowish orange, soft to firm, friable and poorly consolidated with only a weak calcareous cement and an argillaceous matrix. They comprised colourless to very pale orange, clear to translucent quartz grains that were very fine to fine, moderately sorted, subrounded and subspherical in shape. Locally the sandstone was moderately hard to hard and well cemented with no visible porosity.

Limestone stringers were firm to moderately hard, off-white to very pale orange, occasionally pale yellowish orange cryptocrystalline lime mudstones, locally slightly crumbly with a chalky texture and in places argillaceous or containing very fine quartz grains. Other stringers were hard to very hard, greyish orange or dark yellowish orange cryptocrystalline to microcrystalline lime mudstones that were locally dolomitic and produced sub-blocky to angular, slightly brittle drilled cuttings.

Våle Formation

Interval: 2978.0 – 2993.5 m MD BRT (2526.4 – 2535.4 m TVD)

Age: Early - Late Palaeocene

This consisted of Claystone with minor Limestone and Sandstone Stringers.

The Claystone was medium grey to medium olive grey, occasionally dusky bluish green, light grey, locally bluish grey or grey blue-green in colour. It was micromicaeous, silty in part (locally grading

to Siltstone) and was slightly to moderately calcareous, becoming increasingly calcareous towards the base. It was firm to moderately hard and produced blocky to sub-blocky, locally platey drilled cuttings.

Limestone stringers were generally cryptocrystalline to microcrystalline mudstones, locally with a wackestone or chalky texture. They were pale yellowish orange to greyish orange, locally off-white and occasionally dark yellowish orange in colour, were locally slightly argillaceous and hard to moderately hard, (occasionally very hard) producing drilled cuttings that were sub-blocky to blocky, locally crumbly and slightly brittle.

The Sandstone stringers were light to medium grey, comprising colourless, transparent-translucent quartz. The grains were very fine to fine, subrounded, subspherical and moderately well sorted. They were generally poorly consolidated and returned to surface as loose grains or were weakly cemented with calcite and a slightly argillaceous matrix.

Shetland Group

Ekofisk Formation

Interval:	2993.5 - 3013.0 m MD BRT (2535.4 – 2546.8)
Age:	Early Palaeocene (Danian)

This comprised Limestone with thin Claystone interlaminations.

The Limestone was an off-white to white, cryptocrystalline to microcrystalline lime mudstone. It was hard to moderately hard and produced sub-blocky to blocky drilled cuttings that were occasionally crumbly and locally brittle, with a chalky texture. It was rarely argillaceous.

The Claystone laminations were olive grey, brownish grey, dark grey and rarely greenish grey, were micromicaeous, non to slightly calcareous and rarely moderately calcareous, containing

traces of very fine disseminated Pyrite. Occasional cuttings showed interlamination with the clean limestone.

Tor Formation

Interval: 3013.0 - 3063.0 m MD BRT (2546.8 – 2576.4 m TVD)

Age: Late Cretaceous (Maastrichtian).

This was massive Limestone with minor disseminated Claystone.

The Limestone was a white, occasionally off-white to pale bluish white cryptocrystalline to locally microcrystalline mudstone, locally with a chalky texture and rare dark grey to olive black argillaceous laminations. It was firm to moderately hard and produced blocky to sub-blocky, moderately brittle or slightly crumbly drilled cuttings. There was no visible porosity.

The Claystone laminations were dark grey to olive black and rarely greenish grey, were micromicaeous, non to slightly calcareous and locally contained finely disseminated pyrite.

Hod Formation

Interval: 3063.0 – 3076.5 m MD BRT (2576.4 – 2584.2 m TVD)

Age: Late Cretaceous (Late Campanian - Santonian).

This was massive Limestone containing thin Claystone laminations and grading to Calcareous Claystone at the base.

The Limestone was white, locally off-white to pale blue, very pale orange or light grey to off white and was a firm to moderately hard cryptocrystalline to microcrystalline mudstone, rarely with a chalky texture. It was locally brittle and occasionally crumbly, argillaceous in part grading to Argillaceous Limestone and Calcareous Claystone and contained argillaceous laminations. Traces of disseminated Pyrite were evident. There was no visible porosity.

The Claystone laminations were dark grey to olive black and locally medium to dark green and greenish grey. They were micromicaeous, non to slightly calcareous, locally were moderately to very calcareous and graded Calcareous Claystone. They were firm to moderately hard and produced subblocky drilled cuttings.

Zechstein Group

Interval: 3076.5 – 3090.0 m MD BRT (2584.2 – 2592.6 m TVD)

Age: Permian

This was massive Anhydrite with thin Limestone & Claystone interbeds.

The Anhydrite was white in colour, microcrystalline (locally with a sucrosic texture) and produced soft to moderately firm, subblocky to friable cuttings.

Limestone stringers were very pale orange to off white, occasionally very light grey to white in colour and were firm to moderately hard. They produced sub-blocky to blocky (locally brittle or crumbly) cuttings. They were occasionally argillaceous and only rarely exhibited a chalky texture.

Thin Claystone stringers were dark grey to olive black and occasionally medium to dark greenish grey in colour, were firm to moderately hard, micromicaeous and were non to slightly calcareous.

7.2.2 Biostratigraphy

The biostratigraphy evaluation of Well 1/5-4S was carried out by Microstrat Ltd.

Biostratigraphy was undertaken offshore to assist in differentiating the Palaeocene formations and the chalk formations. After the well infill analysis was done from 2580 m to TD. In addition to Micropalaeontology, palynology was undertaken between 2870 – 2981 m and Nannofossil analysis was undertaken between 2978m (top Våle) to 3081m.

Full details of the analysis are available in the Microstart report for 1/5-4S. The following tops are based on biostratigraphic analysis, (Micropalaeontolgy), of the cuttings samples.

The following listing are biostratigraphic age dating of cuttings samples. Table 7.1 utilises these datings and combined with well logs gives the probable definitive depths for the biostratigraphic tops.

Depth (mBRT)	**Age**
2580 – 2620	Late Oligocene (top not seen)
2630 – 2690	Early Oligocene
2700 – 2740	Late Eocene
2750 – 2800	Middle? - Late Eocene
2810 – 2897	Middle Eocene
2903	Early Eocene
2909 – 2984	Late Palaeocene
2987 – 3014	Early Palaeocene
3017 – 3065	Late Maastrichtian
3068	Late Campanian
3071 – 3077	Early Campanian
3080 – 3086	Indeterminate

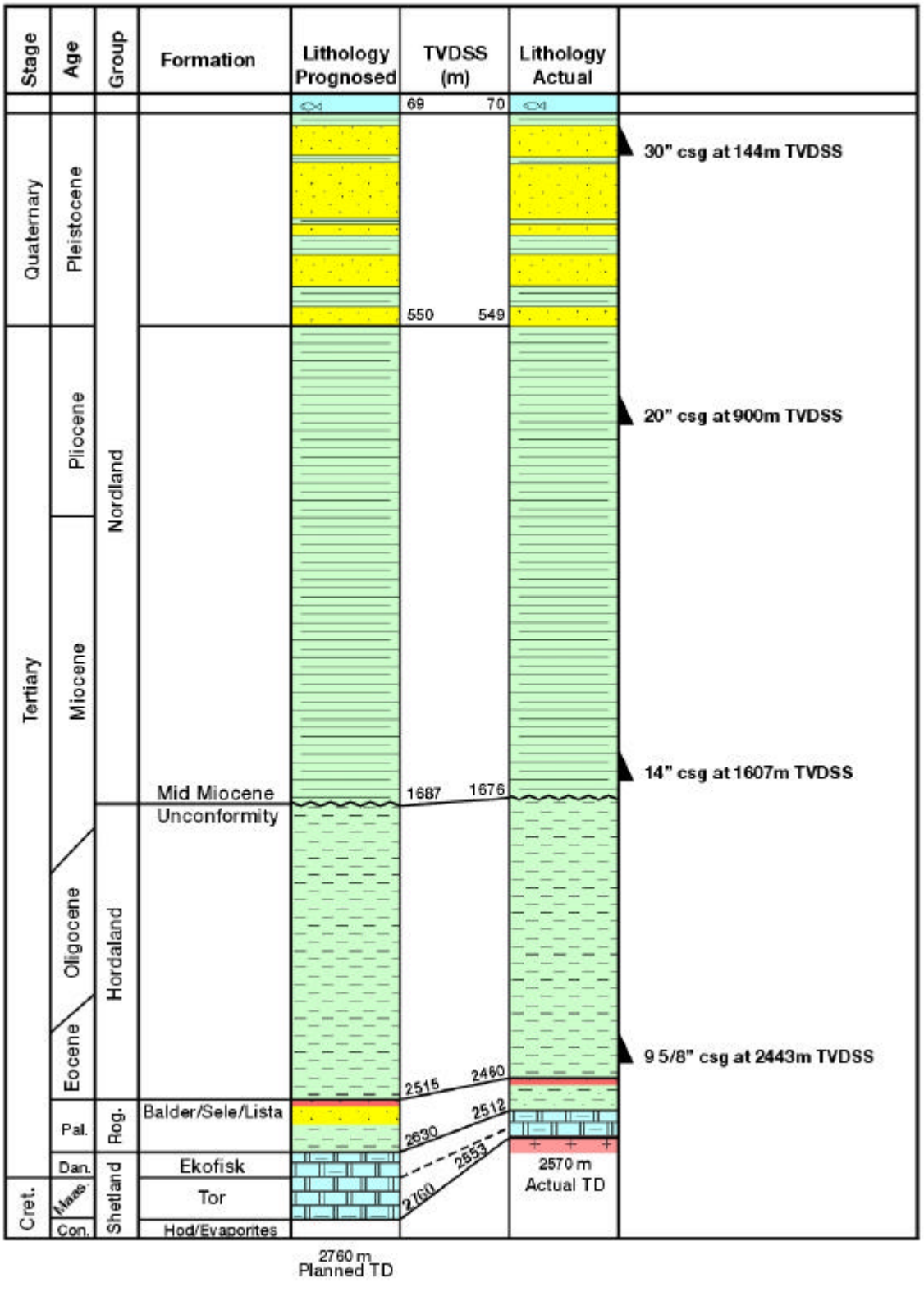
Table 7.1

Series	Stage	Zone	MDBRT	TVDBRT	TVDSS
RKB-MSL					-23
Late Eocene		PM9c	2693-2809	2363-2429.9	2340-2406.10
Middle Eocene		PM6b-9a	2809-2903	2429.9-2483.4	2406.9-2460,4
Late Palaeocene - E Eocene		PM 4a-d	2903-2935	2483.4-2501.7	2460.4-2478,7
Late Palaeocene		PM2a-4a	2935-2990	2501.7-2533.3	2478.7-2510,3
Early Palaeocene		Pm1b-e	2990-3013	2533.3-2546.8	2510.3-2523,8
Cretaceous	Late Maastichtian	LKM11-12	3013-3065	2546.8-2577.6	2523.8-2554,6
Cretaceous	Santonian - Campanian	LKM 6-9c	3065-3078	2577.6-2585.4	2554.6-2562,4

GROUP	FORMATION	MD BRT (m)	TVD BRT (m)	TVD SS (m)
NORDLAND	Forth	93.0	93	70.0
	Fisher	102.0	102	79.0
	Ling Bank	171.0	171	148.0
	Aberdeen Ground	194.0	194	171.0
	(Undiff.)	571.0	571	549.0
HORDALAND	(Undiff.)	1718	1699.7	1676.7
ROGALAND	Balder	2903	2483.4	2460.4
	Sele	2935	2501.7	2478.7
	Lista	2942	2505.7	2482.7
	Våle	2978	2526.4	2503.4
SHETLAND	Ekofisk	2993.5	2535.4	2512.4
	Tor	3013	2546.8	2523.8
	Hod	3063	2576.4	2553.4
ZECHSTEIN	“Anhydrite”	3076.5	2584.5	2561.5
	TD (Drillers)	3090.0	2592.6	2569.6
	TD (Loggers)	3088.5	2591.7	2568.7

Table 7.2 Lithostratigraphic Summary

Figure 7.1 Proposed Vs Actual Well results - General stratigraphy



7.4 CORING

No conventional or sidewall cores were taken.

7.5 HYDROCARBON SHOWS

The evaluation of hydrocarbon shows was carried out in a conventional manner. Constant analysis by Total Hydrocarbon and Chromatograph detectors was conducted on ditch gas from first returns at 928 m MDBRT to T.D. of 3090 m MDBRT.

Weak hydrocarbon shows were seen from bit cuttings of Hordaland formation Claystone between 2460 - 2660 m, and thinly developed Lista formation (Andrews sandstone). These were evaluated according to procedures described in the Amerada Hess Norge "Descriptive Wellsite Geology Work Instructions" (QMS-4-E4-126).

The Hordaland claystone between 2490m to 2560m had no natural hydrocarbon odour but traces of visible free oil and a medium brown oil stain on cuttings was recorded. This had a bright white fluorescence, no natural cut colour, slow diffuse bluish white cut fluorescence which left a very weak pale straw residual ring which had a moderate yellowish white fluorescence. Show rating was poor. (Fresh ***cavings*** of the claystone at 2560m had a moderate odour, visible free (dark brown) oil on the samples, bright white fluorescence, no natural cut colour, slow to moderate bimodal streaming bluish white cut fluorescence, no visible residual ring, moderate yellowish white residual fluorescence. Show rating was moderate).

The Andrews sandstone at 2957m had a slight light brown oil stain, a moderate bright yellowish white direct fluorescence and produced a slow streaming moderately bright bluish white fluorescent cut which left a moderate bright bluish white flluorescent residue. This sandstone stringer was tight.

Våle Formation limestone at 2981m had a slight light brown stain, poor dull bluish white direct fluorescence and a slow streaming dull bluish white fluorescent cut, which left a faint residue.

The chalk of the Tor and Hod Formations displayed a trace of bright blue white fluorescence giving a slow streaming milky blue white cut. There was no visible oil staining present.

7.5.1 Geochemistry.

Geolab Nor was requested to propose an analytical program in order to investigate possible shows occurring in two intervals of K1T1well NOCS 1/5-4S, this well being drilled with organic mud additives (mud XP07) causing strong masking of any free hydrocarbons. The two intervals of interest comprise an upper interval (spls 2480 – 2590 m) representing Oligocene lithologies; and a lower interval (spls 2942 – 2954 m) representing the Andrew Fm. Shows were suspected in the Oligocene at 2480 – 2590 m by fluorescence, including possible fault-associated hydrocarbons at 2560 m. An FMT in the Andrew Fm. at 2945 m was reported to have an oily film.

Analyses of cuttings, mud and FMT samples from the Oligocene and Andrew Fm. sections of well NOCS 1/5-4S were performed in order to assess the possibility for the presence of migrated hydrocarbons. The well samples were heavily impregnated with contaminant additives from the XP07 mud system used.

All samples were analysed by thermal extraction GC (GHM). This included the FMT samples, which were analysed by injecting the (mainly water) samples onto a pre-cleaned sand substrate which was then gently dried sufficiently for analysis. This allowed a more direct comparison between all samples.

Traces of migrated hydrocarbon staining are considered to occur around 2560 and 2590 m in the Oligocene section. These support the report of shows in the 2480 – 2590 m section, including hydrocarbons associated with faulting around 2560 m. Traces of hydrocarbons are also considered to occur around 2942 and 2945 m in the Andrew Fm., although the FMT from 2945 m was only of water with mud additive components, this also being evident from visual inspection of the FMT samples. Full details of the analysis are available in the Geolab Nor report of well 1/5-4S.

7.6 SAMPLING

7.6.1 Cuttings Samples

Cuttings samples were taken throughout the well from first returns at 928 m MDBRT. Table 7.3 outlines the sampling programme.

Table 7.3

Interval (m SS)	Sample Frequency (m)	Number of samples
928m - 2850m	10	5L tin* (partner/NPD splits onshore) 1 washed and dried
2850m - 3090m	3	5L tin* (partner/NPD splits onshore) 1 washed and dried
1700m - 3090m	50	1 x Can of Composite Geochemical,
Spud – 3090 m	BU each hole section; prior to coring; every 20m in reservoirs	1 litre bottle mud sample

Section 8

WELL EVALUATION

8.0 WELL EVALUATION

8.1 INTRODUCTION

MWD Gamma and resistivity logs were acquired throughout the well. Wireline logs, density, sonic, neutron, gamma ray, resistivity, pressures and samples were run at TD in 8.5" hole between, 2879 - 3090 m MD.

8.2 MWD/LWD LOGGING

The MWD/LWD services for well 1/5-4S was provided by Sperry-Sun Drilling Services.

Table 8.1 shows the various MWD/LWD log runs related to hole size, interval logged, MWD sensors and run number.

Directional data were recorded throughout the well. Resistivity (EWR-4) and Gamma Ray were recorded from the 9 7/8" pilot hole from 174 m MD BRT to T.D. Additionally, a PWD tool was included in the drilling assemblies in the 17 ½", 12 ¼" and 8 ½" hole sections.

8.2.1 LOG QUALITY

MWD GR

A good quality GR log was acquired throughout the well. Hole size and mud type have an effect on the absolute GR value. Throughout the 17 ½" section of the well a KCL mud was used. The GR was edited to remove the effect of the washout below the 14" casing shoe.

- Bulk shift of +52 API added between 1625.9 - 1642.7 m
- Bulk shift of +15 API added between 1644 - 1647 m
- Data between 1642.7 and 1644 deleted and a straight linear Interpolation made.

MWD EWR4 RESISTIVITY

A good quality resistivity log was obtained over most of the well.
Throughout the 17.5" hole section separation was seen between the resistivity curves despite all the lithologies being shale. This section was drilled with a water based mud and the separation indicated reactivity between the formation and the mud system.

The 12.25" section of the well was drilled with OBM. Between 1690 - 1715 low GR and separation on the resistivity logs indicated a siltstone to fine sandstone. Between 2575 - 2600m, an invasion profile was seen through a siltsone - very fine sandstone interval. Fault zones were identified from the resistivity log at 1711, 2585 and between 2655-2660 m.

In the 8.5" section, drilled with OBM, questionable spikes were seen on different channels over the Andrews sandstones in the Palaeocene. Because these spikes were not readily explainable, a wireline resistivity log was run.

Further details are found in the Sperry-Sun report entitled *"END OF WELL REPORT - Measurement While Drilling, Amerada-Hess AS K1T1 1/5-4S"*.

8.2.2 NON PRODUCTIVE TIME

A total of 0.5 hours non productive time resulted through surface hardware problems

8.2.3 LEASONS LEARNED

Using several services from one company was a major benefit. Sperry Sun provided the Mudlogging, INSITE, MWD and Directional services. Communication between Hess and each of these interrelated services was excellent. The onsite presence of a Halliburton representative at the Hess Oslo office aided this significantly.

Detailed planning involving the MWD operator at an early stage paid dividends. The service company were fully aware of the operators needs throughout, and were made aware of the difficult conditions to be experienced. Their knowledge and suggestions were utilised throughout the planning phase. All the decisions relating to MWD were captured in the Data Acquisition Procedures Manual. The final plans were worked by the field operators and minor modification made on their suggestions.

The inclusion of the PWD proved invaluable and assisted decision making relating to mud weight and circulation rates, tripping speeds, drilling parameters and hole cleaning activities.

Hole Size	**Tool O.D.**	**MWD sensors**	**Interval (m)**	**Problems / Issues**
9 7/8”	8”	DIR-DGR-EWR4	174 – 928	-
36”	9 ½”	DIR	93 – 167.5	Some decoding problems
26”	9 ½”	DIR	167.5 – 928	-
17 ½”	9 ½”	DIR-DGR-EWR4-PWD	928 - 1646	-
12 ¼”	8”	DIR-DGR-EWR4-PWD Geopilot	1646-2660	MPT probs initially. Software error configured incorrectly for client needs
12 ¼”	8”	DIR-DGR-EWR4-PWD-AGS	32660-2879	-
8 ½”	6 ¾”	DIR-DGR-EWR4-PWD-DDR	2879-3090	Some questionable resistivity spikes

Table 8.1 MWD logs

8.3 WIRELINE FORMATION EVALUATION

The wireline logging of well 1/5-4S was conducted by Baker-Atlas Wireline Services. Table 8.2 is a summary of wireline logs ran.

Date	Logs	Hole size (")	Logged interval	Run No.	Notes
28th Apr 2002	TTRM/GR/ZDEN/MAC	17 ½	-	1A	Hung up at 374 m, Gumbo in casing. Cancel job due to adverse hole conditions
16th May 2002	TTRM/GR/HDIL/MAC	8.5	2513 - 3088 m	2A	Good resistivity log, sonic DT24 field data incorrectly picked requiring reprocessing. MAC logged to top cement inside 9 5/8" casing
16th May 2002	TTRM/GR/ZDEN/CN	8.5	2873 - 3088 m	2B	Good log
17th May 2002	TTRM/FMT/GR	8.5	2945	2C	Tool pressure guages failed on first pre test.
27rd May 2002	TTRM/FMT/GR	8.5	2944 - 3035 m	2D	Good logpressure data, water sample from Andrews sst.

Table 8.2 Wireline logs

8.3.1 LOG QUALITY

Wirline Run 1A (TTRM/GR/ZDEN/MAC) 17.5" hole hung up at 374 m inside the casing. All attempts to get deeper failed, and 2,500 lbs overpull was experienced. On pulling the tool from the hole it was covered in sticky gumbo. A wiper trip was run to remove the obstruction but given the reactivity of the claystone a decision was made to skip the logging on the basis that to run a nuclear tool in such a sticky environment was too high a risk outweighing the benefits of the log. Such a decision point had been considered in the planning phase.

Wireline Run 2A (TTRM/GR/HDIL/MAC) was run from TD (3090 m) in 8.5" hole. Logging of the MAC continued up through the casing to top of cement (2873 -2513 m).
The HDIL was run because of the spurious nature of the MWD EWR4 over a number of thin potentially hydrocarbon bearing stringers. The HDIL provided a very good quality resistivity log over the 8.5" open hole. The MAC DT24Q1 log appears to be skipping between Shear and compressional arrivals from 3090 to 3039 m and is unreliable over this interval. Reprocessing of the MAC data was essential. Note: Only the processed DTCB and DTS values should be used.
The wireline logging engineer logged the MAC through the casing in CBL mode despite full waveform data being requested. Fortunately the computer center were able to back out a reliable DTC from the data set thus meeting the primary objective of the log run. The secondary objective of a DTS was not possible over the cased interval due to the mode of log data acquisition.

Wireline Run 2B (TTRM/GR/CN/ZDEN) was run from TD (3090 m) in 8.5" hole.
The log run went smoothly and good quality neutron, density and photo electron logs were acquired. The calliper showed the hole to be in gauge

Wireline Run 2C (GR/FMT) was run to 2945 m. The quartz gauge became erratic prior to taking the first pretest, which was eventually attempted using the strain gauge. This too became erratic during the first pre test so the run was aborted. See tool Failure report in Attachment 11.4.

Wireline Run 2D (GR/FMT) was run between 2944 - 3035 m. Despite generally poor reservoir quality rocks some good pressure measurements were achieved and a quality formation fluid sample acquired from the Andrews sandstone at 2945 m

8.3.2 NON PRODUCTIVE TIME

The attempt to log the 12.25" hole section was cut short as a blockage was encountered in the wellbore resulting in an unplanned round trip. This was not the fault of the wireline logging company. The logging of the 12.25" section was subsequently cancelled.

A total of 7 hours and fifty minutes downtime are attributable to the wireline operations.
See Attachment 11.4 "Logging Witness report" for details

8.3.3 LEASONS LEARNED

- Logging the Tertiary section in the Central Graben of the North Sea is often problematical and difficult particularly when the hole has been drilled using water based mud. The density and sonic logs over this section have a dual purpose. Firstly they are used for accurate pore pressure, fracture pressure and overburden gradient modelling, an essential requirement for safe drilling, optimum casing design and wellbore stability modelling. Secondly the sonic log data (DTC and DTS) are needed for rock mechanic studies which are essential for optimum bit selection, wellbore stability and waste injection. It is not essential to collect this data on the first exploration well over a prospect, consequently the option to drop these logs under tough conditions is often exercised. However the data will be required in the event of appraisal and development of a prospect. Consequently detailed planning regarding mud type and chemistry, drilling and tripping practices and logging combinations will need to be done for the Tertiary when acquiring the data becomes essential.
- Detailed planning involving the wireline contractor ensured operators expectations were in line with the service providers deliverable. The wireline company were given daily operational updates to ensure they were ready with their tools as required. It is fully understood that it pays to have wireline personnel offshore a couple of days prior to logging in order to minimise tool failure in the hole. However it is also important to ensure that tools being sent to the rig are fully checked out and ready to go into the hole as it is not always possible to ensure the wireline crew have that

couple of days to run through the tools check. Chopper availability and industrial action by helicopter pilots can and do have a negative impact on such planned operations.

- Despite involving the logging personnel and the wellsite witnesses in the planning of the data acquisition program, (which was typed up into the Data Acquisition Procedures Manual and distributed to all data service providers), an unrequited CBL log was run inside the 9 5/8" casing. Full waveform acquisition should have been gathered. It is essential that the wireline witness satisfies himself that the engineers are fully conversant with the data acquisition plan in depth prior to commencing the job.

8.4 CPI

The primary objective of the well was the chalk, with a secondary objective being Palaeocene sandstones. The well discovered 2 very thin Andrews sandstone stringers and a thin chalk sequence. The Palaeocene came in 75m TVD high and the top chalk was 118 m TVD high, with TD 190m TVD earlier than expected.

8.4.1 Results

The Andrews sandstone stringers were described as argillaceous with minor shows. The top stringer had up to 18% porosity and a FMT pressure and fluid sample were acquired from it. The sample was formation water of 100,000 PPM chlorides content. An oil sheen was reported on the surface of the fluid sample. Subsequent analysis proved this to be attributable to invasion of OBM filtrate. The Indonesia equation suggests the top Andrews sandstone stringer has a SW of 70-80%..

The chalk porosity was significantly less than expected, with a maximum of 25%, commonly averaging around 15%. The highest porosity zone was found in the Tor formation and was water saturated. Some parts of the Ekofisk suggest SW as low as 70%, but this is probably a cementation exponent error (m). The Pe curve suggests quite a bit of variability.

8.4.2 Rwa and Rw

The Rwa for sandstone at 2947 suggests .3 -0.4 ie not all water

The Rwa for sandstone at 2952 suggests 0.04 - 0.05 ie water

Rwa top chalk 0.06

Rwa in Tor 0.02

Water analysis at rig suggested chlorides of 100,000 ppm = Rw of 0.025 at 110 C

Table 8.3 : 12 ion analysis data from FMT sample 2945.4 m

Parameter	Result	Unit	LL	Method/standard	Uncertainty
Sodium, Na	49800	mg/	0,1	I-1-22 / ICP AES	±15% / ±0,1
Calcium, Ca	11300	mg/l	0,1	I-1-22 / ICP AES	±10%
Magnesium, Mg	1100	mg/l	0,1	I-1-22 / ICP AES	±15% / ±0,1
Barium, Ba	7,9	mg/l	0,05	I-1-22 / ICP AES	±10% /±0,1
Iron, Fe	10,9	mg/l	0,1	I-1-22 / ICP AES	±10%
Strontium, Sr	1380	mg/l	0,05	I-1-22 / ICP AES	±10% /±0,1
Potassium K	717	mg/l	0,1	I-1-22 / ICP AES	±15% el. ±0,1
Chloride, Cl-,	102000	mg/l	5,0	K-064 / NS4756 1.utg	±10%
Sulphate, SO42-	190	mg/l	2,0	K-009 / ISO 10304-2	±10%
Bicarbonate, HCO3-	153	mg/l		K-003 / NS 4754	±15%
Ion Balance cat/an	-0,5	%		/	
Total dissolved salt	167000	mg/l		/	
pH v/20°C	5,7	pH		K-001 / NS4720 2.utg	±0,1
* Suspended Material	226	mg/l	5,0	K-002 / NACE TM01-73	±10%
Spesif. density 15°C	1,117			K-005 / mASTM D4052	±0.0005
Resistivity v/25°C	0,055	ohmm		K-004 / NS-ISO 7888	±5%

* = Not a recognised analysis LL= Lower Detection Limit

8.4.3 Curve splicing for Completion Log

Depth shifting between logs was not deemed required.

GR = MWD GR used to 2870m, WL GR to 2870 - TD

Rd = SEDP to 2870m, WL M2RX to TD

Rm = SEMP to 2870, WL M2R3 to TD

Rs = DESP to 2879, WL N2R1 to TD

8.4.4 Editing

GR Surprisingly no lateral shift was required between logs from the 9 7/8" pilot hole and 17.5" hole section.

- Bulk shift of +52 API added between 1625.9 - 1642.7 m
- Bulk shift of +15 API added between 1644 - 1647 m
- Data between 1642.7 and 1644 deleted and a straight line interpolation made.

DT Spliced at 2839m from processed sonic DTCB open hole and DTCB in casing. Gaps in data were filled in as a straight line fill between the two data points.

ZDEN Data logged inside casing (above 2873m) has been removed.

CNC Data logged inside casing (above 2873m) has been removed.

Rd Composed of MWD log SEDP from 93m to 2875 m, and wireline M2RX from 2875 to 3078m
1627-1646m Data removed and infilled with straight line
2870-2875m Log despiked

Rm Composed of MWD log SEMP from 93m to 2875 m, and wireline M2R6 from 2875 to 3078m
1627-1646m Data removed and infilled with straight line
1710-1713m Log despiked
2727m Log despiked

Rs Composed of MWD log SESP from 93m to 2875 m, and wireline M2R1 from 2875 to 3078m
1627-1646 Data removed and infilled with straight line
2870-2875 Log despiked

8.4.5 Environmental Corrections

Not undertaken.

8.4.6 CPI models and constants

CPI undertaken for 8.5" section of the well only

8.4.7 Vsh

Linear method
GR cln 10
GR Sh 65

8.4.8 Porosity

Dtf 200
Dtma (Palaeocene) 55
Dtma (Chalk) 49
Dtma (Zechstein) 50
Rhof 1.03
Rhoma (Palaeocene) 2.65
Rhoma (Chalk) 2.71
Rhoma (Zechstein) 2.9
Cn sh 0.3
Rt sh 0.4
Dtsh 115
Rhosh 2.4

8.4.9 Sw

Palaeocene - Indonesia
Chalk - Archie
a 1
m Pal 1.8, Eko 2.3, Tor 2.1, Hod 2.2
n 2

8.4.10 Equations

Vsh = (log - clean) / (shale-clean)

PHIT = (PHIRhob + PHIcn) / 2

PHIE = (1 - Vsh) * PHIT

$F = a / PHIE^{m}$

$SWARCH = (F * Rw / Rt)^{(-n)}$

$SWINDO = (Vsh^{(0.5*(2-Vsh))} / (Rsh / Rt)^{0.5} + (Rt / Ro)^{0.5})^{(-2/n)}$

$Ro = aRw / PHIE^{m}$

8.4.11 Reservoir communication

The FMT pressure plot (Fig. 8.2) shows that the Palaeocene Andrews sandstone and the chalk appear to be on a common water gradient. Pressure communication between the two reservoirs was forecast as a consequence of fracturing over a growing diapiric structure.

Figure 8.1 CPI Analysis 1/5-4S

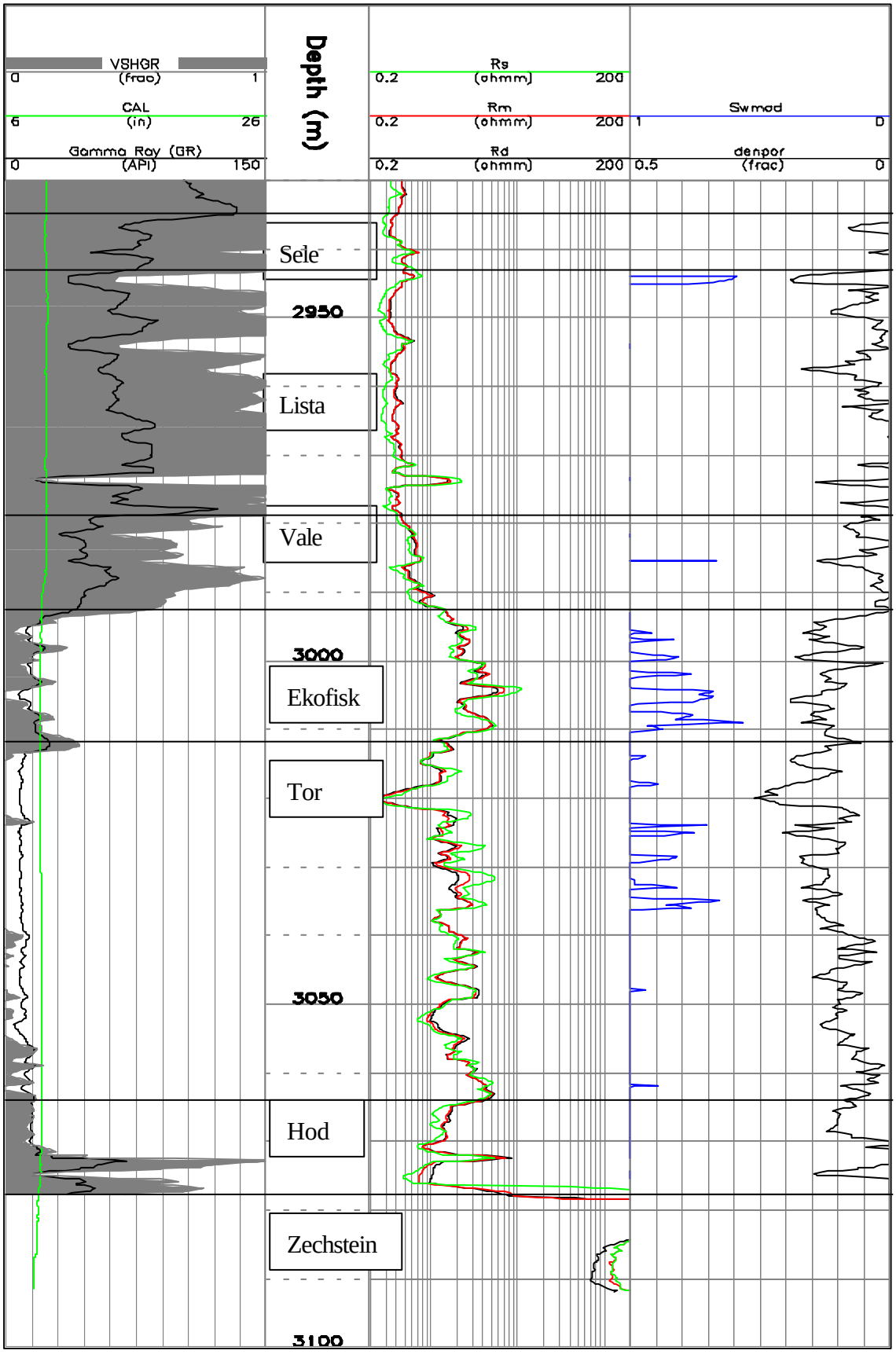


Table 8.1: CPI Parameters files

```
RMC      .ohmm          10.00000   : TLOG Constant - 5 - RMC
TRMC     .degF          40.00000   : TLOG Constant - 6 - TRMC
RM       .ohmm          10.00000   : TLOG Constant - 7 - RM
TRM      .degF          40.00000   : TLOG Constant - 8 - TRM
RMF      .ohmm          10.00000   : TLOG Constant - 9 - RMF
TRMF     .degF          40.00000   : TLOG Constant - 10 - TRMF
RW       .ohmm           0.04000   : TLOG Constant - 11 - RW
TRW      .degF         230.00000   : TLOG Constant - 12 - TRW
BHT      .degF         230.00000   : TLOG Constant - 13 - BHT
MEAN_SUR.degF           5.00000   : TLOG Constant - 14 - MEAN_SURF_TEMP
ARCHIE_A.UNKN           1.00000   : TLOG Constant - 16 - ARCHIE_A
ARCHIE_M.UNKN           2.10000   : TLOG Constant - 17 - ARCHIE_M
SAT_EXP_.UNKN           2.00000   : TLOG Constant - 18 - SAT_EXP_(N)
R_SHALE .ohmm           0.40000   : TLOG Constant - 19 - R_SHALE
TD_OF_RE.m           3090.00000   : TLOG Constant - 20 - TD_OF_REC__BHT
CALIPER_.por%          18.00000   : TLOG Constant - 23 - CALIPER_CHANNEL
BIT_SIZE.in             8.50000   : TLOG Constant - 24 - BIT_SIZE
MUD_WEIG.lb/g          14.80000   : TLOG Constant - 25 - MUD_WEIGHT
STANDOFF.in             1.50000   : TLOG Constant - 28 - STANDOFF_(IL)
STANDOFF.in             1.50000   : TLOG Constant - 29 - STANDOFF_(NEUT)
O_D__CAS.in             9.62500   : TLOG Constant - 30 - O_D__CASING
SURF_TEM.m              0.00000   : TLOG Constant - 34 - SURF_TEMP_MD
GR_MATRI.GAPI          15.00000   : TLOG Constant - 61 - GR_MATRIX
RHO_MATR.g/cc           2.71000   : TLOG Constant - 62 - RHO_MATRIX
DT_MATRI.us/f          47.50000   : TLOG Constant - 63 - DT_MATRIX
CNL_MATR.pu             0.00000   : TLOG Constant - 64 - CNL_MATRIX
GR_SHALE.GAPI          65.00000   : TLOG Constant - 65 - GR_SHALE
RHO_SHAL.g/cc           2.40000   : TLOG Constant - 66 - RHO_SHALE
DT_SHALE.us/f         115.00000   : TLOG Constant - 67 - DT_SHALE
CNL_SHAL.pu             0.30000   : TLOG Constant - 68 - CNL_SHALE
RHO_FLUI.g/cc           1.03000   : TLOG Constant - 70 - RHO_FLUID
DT_FLUID.us/f         189.00000   : TLOG Constant - 71 - DT_FLUID
CNL_FLUI.pu             1.00000   : TLOG Constant - 72 - CNL_FLUID
DT_MATRI.us/f          70.00000   : TLOG Constant - 73 -
DT_MATRIX_SHALE
```

Table 8.2: CPI Zonation and Parameters

Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	Name	Description
1 1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	prm1	a
2 1.7000	1.7000	1.7000	1.8000	2.1000	2.3000	2.1000	2.2000	2.0000	prm2	m
3 2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	prm3	n
4 0.040000	0.040000	0.025000	0.025000	0.025000	0.025000	0.025000	0.025000	0.015000	prm4	rw
5 2.6500	2.6500	2.6500	2.6500	2.7100	2.7100	2.7100	2.7100	2.9000	prm5	Rhom
6 55.000	55.000	55.000	55.000	49.000	49.000	49.000	49.000	58.000	prm6	Dtm
7 200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000	prm7	Dtf
8 15.000	15.000	15.000	15.000	10.000	10.000	10.000	10.000	10.000	prm8	gr_cln
9 65.000	65.000	65.000	65.000	65.000	65.000	65.000	65.000	65.000	prm9	gr_sh
10 115.000	115.000	115.000	115.000	115.000	115.000	115.000	116.000	115.000	prm10	dt_sh
11 0.40000	0.40000	0.40000	0.40000	0.40000	0.40000	0.40000	0.40000	0.40000	prm11	rsh

Geologic Parameters			
	Zone1	2828.00	2903.00	Eocene
	Zone2	2903.00	2935.00	Balder
	Zone3	2935.00	2940.00	Sele
	Zone4	2940.00	2960.00	Lista
	Zone5	2960.00	2993.00	Vaale
	Zone6	2993.00	3013.00	Ekofisk
	Zone7	3013.00	3063.00	Tor
	Zone8	3063.00	3076.00	Hod
	Zone9	3076.00	3090.00	Zechstein

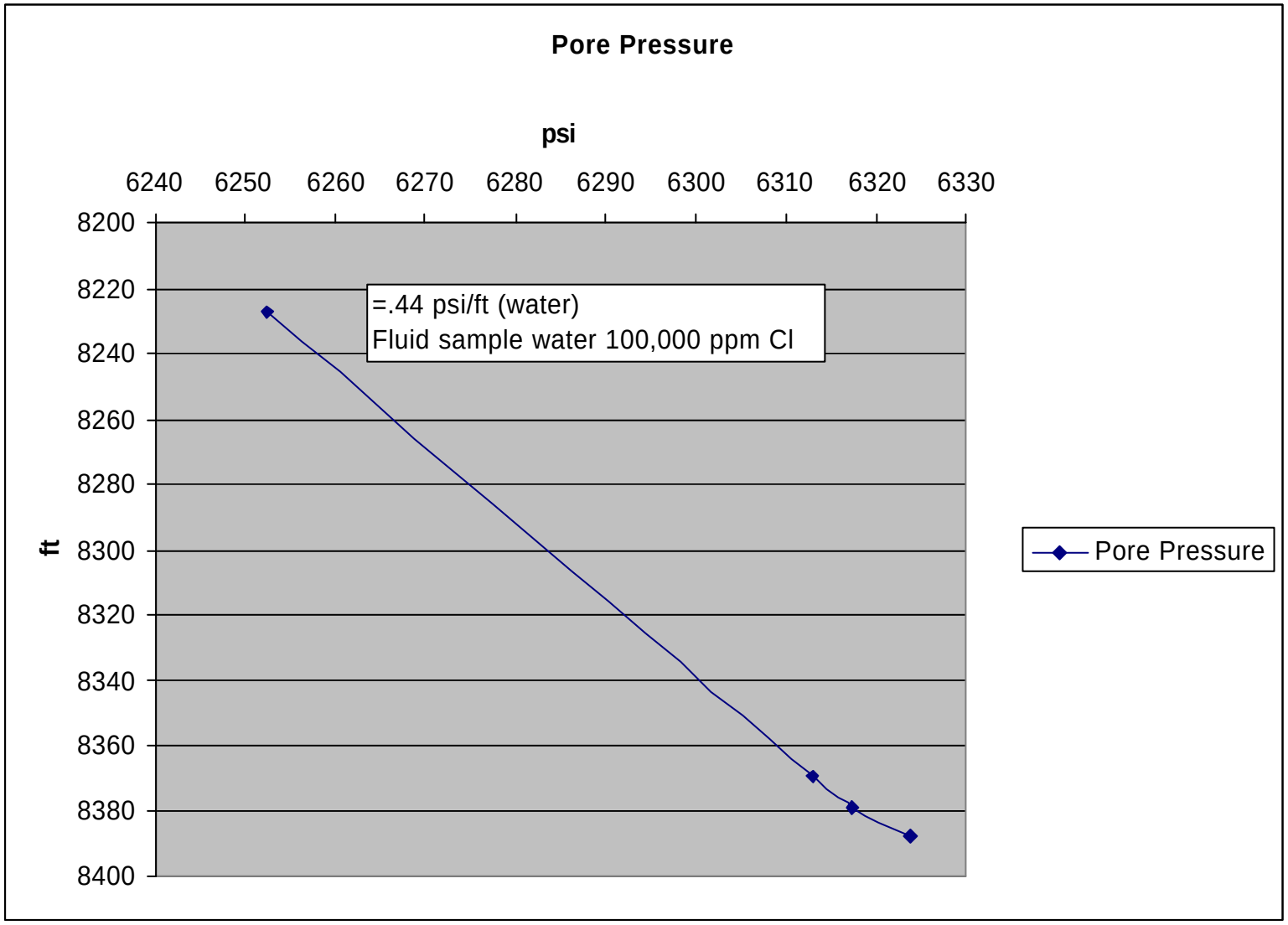
Table 8.3: FMT Pressures

Pressure Interpretation Sheet

Well	**1-5-4S**	*Permit*	**PL 144**
Type of well	**Deviated Exploration**	*Maximum Deviation*	**55.4 Degrees @ 2903 m**
Type of survey tool	**FMT 10lt Flush tank/4 lt sample chamber**	*Acquisition date*	**17/05/02**
Reference Datum	**MSL**	*Rotary Table Elevation,m*	**23.0**
Mud Weight	**1.78** *sg* **0.770** *psi/ft*		

Tool Set	MD mBDF	TVDRT mBDF	TVDSS m	Hydrostatic Press. bef, bar	Hydrostatic Press. after, bar	Fm Pr bar	DDMob mD/cP	T °C	Time	Fm Pr G, bar/m	Fm Pr G, sg	Mud G bar/m	Mud G sg	Comments, w/ pre-test vol
1	2944.8	2507.3	2484.3	433.30	433.00			102.6	14:00	0.000	0.000	0.147	1.762	Lost seal?
2	2944.3	2507.0	2484.0	432.80	432.50	431.50		103.7	14:07	0.147	1.758	0.147	1.760	Still building very slowly
3	2945.3	2507.6	2484.6	432.70	432.50	431.03	1.8	104.9	14:20	0.146	1.755	0.147	1.759	Good test?
4	2954.0	2512.6	2489.6	433.84	433.60			105.5	14:30	0.000	0.000	0.147	1.760	Tight
5	2953.4	2512.3	2489.3	433.40				105.9	14:33	0.000	0.000	0.147	1.759	Tight
6	2953.2	2512.2	2489.2	433.40	433.40			107.2	14:45	0.000	0.000	0.147	1.759	Tight
7	2973.5	2523.9	2500.9	436.30	436.00			107.6	14:57	0.000	0.000	0.147	1.762	Tight
8	2995.6	2536.7	2513.7	438.80	438.55			108.0	15:22	0.000	0.000	0.146	1.763	Tight
9	3019.0	2550.3	2527.3	441.70	441.10	427.00		108.9	15:44	0.141	1.710	0.146	1.765	Still building very slowly last pressure
10	3035.0	2559.7	2536.7	442.90	442.60			110.2	15:57	0.000	0.000	0.146	1.764	Tight
11	3029.5	2556.4	2533.4	441.75	441.75	435.98	13.1	111.1	16:02	0.144	1.742	0.146	1.761	Good test?
12	3025.0	2553.8	2530.8	441.10	441.10			111.1	16:10	0.000	0.000	0.146	1.761	Tight
13	3020.0	2550.3	2527.3	440.40	440.20	435.20	0.7	111.3	16:15	0.144	1.743	0.146	1.760	Good test?
14	3025.3	2554.0	2531.0	441.20	440.90	435.50	0.5	111.3	16:30	0.144	1.741	0.146	1.761	Still building slightly after 20 mins 0.1bar/min
15	2999.5	2538.7	2515.7	437.90	437.90			111.0	17:00	0.000	0.000	0.146	1.758	Tight
Sampling														
16	2944.4	2507.0	2484.0	432.45	432.52			109.2	17:16	0.000	0.000	0.147	1.758	Tight
17	2944.9	2507.3	2484.3	432.80	432.50	431.00	0.7	109.3	17:20	0.146	1.756	0.147	1.760	Almost stable after 10 mins
18	2945.4	2507.6	2484.6	432.90	432.70	431.10	2.5	108.7	17:35	0.146	1.756	0.147	1.760	Opened 10 lt flush tank no indication of being filled after an hour, aborted, opened 4

Figure 8.2 FMT Pressure Plot



9.1 K1T1 Well Test Planning

9.1.1 CONTRACTOR SELECTION

CONTRACTOR	SERVICE
SCHLUMBERGER	WELL TEST EQUIPMENT DATA ACQUISTION SUBSEA TREE
OILPHASE	FLUID SAMPLING (BOTTOMHOLE AND SURFACE SAMPLING) PVT FLUID ANALYSIS
DOWELL	ACID STIMULATION AND N2
HALLIBURTON	DST TOOLS MEMORY GAUGES TCP PERFORATING
BAKER	PERMANENT PACKER
BAKER ATLAS	WIRELINE PERFORATING
MARITIME WELL SERVICES	PLT LOGGING BOTTOMHOLE SAMPLERS SLICKLINE (CONTINGENCY)

9.1.2 PLANNING

Overall the planning and preparation for 1/5-4S was well advanced, a HAZID analysis had been conducted some small issues only to be resolved. A rig visit by the testing contractor had also been made and preparations were advanced with all equipment and major items available to mobilise. This was due in part to the considerable testing information from this area made available early on in the programme preparations.

Though not classified as an HP/HT well, pressure prognoses warranted careful consideration when it came to equipment selection and downhole equipment.

The key drivers were….

The objectives are clear

Selecting the test criteria and equipment carefully

Keep things simple as possible

Due to the well angle (52 deg) and the estimated time expected to test both zones, consideration of the annular fluid and packer were an early challenge. After discussions of alternatives seawater as the annular fluid and a permanent packer was agreed. It was felt that this was an exploration well and as such if there was doubt we would not want to use a retrievable packer in an underbalanced situation.

	COST REPORT FOR WELL AFE 1/5-4S L002D OF 24:00 HRS 24-May-02		Estimate To Date DEPTH: 3090 DAYS: 39.42	Estimate To Complete 0 0.00	Estimated Final Cost 3090 39.42	AFE 3435 49.98	Increase/ (Decrease) (345) -10.56
CODE	ITEM AND DESCRIPTION		USD	USD	USD	USD	USD
300	DRILLING CONTRACT		4,275,208	0	4,275,208	5,387,000	(1,111,792)
179	SHOREBASE SUPPORT		248,837	0	248,837	315,662	(66,825)
159	AIR TRANSPORT		256,179	0	256,179	293,250	(37,071)
169	WORKBOATS		894,235	0	894,235	982,300	(88,065)
350	TOWBOATS		429,000	0	429,000	330,000	99,000
248	STANDBY VESSEL		220,000	0	220,000	239,250	(19,250)
201	FUEL		228,617	0	228,617	290,000	(61,383)
350	RIG POSITIONING		60,000	0	60,000	60,000	0
310	PRE WELL STUDIES		78,474	0	78,474	78,474	0
354	FLUID ANALYSIS		50,000	0	50,000	50,000	0
353	WELLSITE GEOLOGY		107,450	0	107,450	107,450	0
302	MUD LOGGING		137,958	0	137,958	190,559	(52,601)
303	DIRECTIONAL DRILLING		500,000	0	500,000	407,407	92,593
303	MWD		325,000	0	325,000	662,501	(337,501)
303	LWD		0	0	0	0	0
310	DRILLING TOOLS		0	0	0	0	0
305	MUD ENGINEER		73,315	0	73,315	72,000	1,315
305	MUD PROCESS EQUIPMENT		75,000	0	75,000	92,600	(17,600)
365	DRILL BITS & COREHEADS		115,000	0	115,000	259,259	(144,259)
310	WELLHEAD RENTAL & SERVICE		72,000	0	72,000	71,279	721
310	CASING SERVICES		150,000	0	150,000	158,584	(8,584)
306	CEMENTING SERVICE		102,483	0	102,483	118,081	(15,598)
310	FISHING TOOLS		14,308	0	14,308	18,125	(3,817)
310	MILLING SERVICE		28,774	0	28,774	36,498	(7,724)
304	ROV		190,800	0	190,800	123,772	67,028
355	CUTTINGS DISPOSAL		400,000	0	400,000	400,000	0
352	CORING		6,000	0	6,000	16,000	(10,000)
340	ELECTRIC LOGGING		275,000	0	275,000	722,046	(447,046)
310	OTHER TOOLS & SERVICES		132,992	0	132,992	168,683	(35,691)
343	TANK CLEANING / MUD PROCESSING / DISPOSAL		280,000	0	280,000	0	280,000
307	CREW CHANGE & OVERTIME		0	0	0	0	0
310	RIG INPSPECTION/REPAIRS		51,681	0	51,681	51,681	0
310	SAFETY		11,000	0	11,000	10,983	17
310	MISC RIG SUPPLIES		27,500	0	27,500	27,500	0
308	COMMUNICATIONS & WEATHER FORECASTING		47,221	0	47,221	59,915	(12,694)
351	LOCATION COSTS		0	0	0	0	0
366	MUD CHEMICALS & ADDITIVES		670,000	0	670,000	887,876	(217,876)
367	CEMENT & ADDITIVES		500,000	0	500,000	277,006	222,994
347	WELL TESTING EQP/SERVICE		70,566	0	70,566	57,803	12,762
347	DST TOOLS/SERVICE		0	0	0	0	0
348	PERFORATION EQP/SERVICE		0	0	0	0	0
342	EQUIPMENT LOST/ABANDONDED		0	0	0	0	0
309	DRILLING SUPERVISION		49,271	0	49,271	196,800	(147,529)
330	DRILLING MANAGEMENT		1,400,000	0	1,400,000	1,599,625	(199,625)
330	EMERGENCY RESPONSE		61,963	0	61,963	78,600	(16,637)
A)	TOTAL INTANGIBLE COSTS						
360	30" CONDUCTOR CASING		65,000	0	65,000	80,582	(15,582)
360	20" CONDUCTOR CASING		170,000	0	170,000	206,521	(36,521)
360	14" CASING		290,000	0	290,000	293,630	(3,630)
360	11.3/4" CASING		0	0	0	136,850	(136,850)
360	9.5/8" CASING		310,000	0	310,000	693,172	(383,172)
360	7" LINER		0	0	0	178,890	(178,890)
360	5" CASING		0	0	0	0	0
360	WELLHEAD EQIPMENT		33,563	0	33,563	18,563	15,000
360	LINER HANGER EQUIPMENT		0	0	0	249,832	(249,832)
360	CASING JEWELLERY		45,000	0	45,000	74,000	(29,000)
B)	TOTAL TANGIBLE COSTS		913,563	0	913,563	1,932,040	(1,018,477)
	CONTINGENCY						
C)	TOTAL WELL COST ESTIMATE		13,529,396	0	13,529,396	16,830,610	(3,301,214)
	CONTINGENCY		0	0	0	0	0
2.1	**TOTAL DRILLING COST**	**USD**	**13,529,396**	**0**	**13,529,396**	**16,830,610**	**(3,301,214)**
2.3	**TOTAL SITE SURVEY COST**	**USD**	**178,986**	**0**	**178,986**	**242,775**	**(63,789)**
2.4	**TOTAL PLANNING COST**	**USD**	**1,238,162**	**0**	**1,238,162**	**1,156,069**	**82,092**
	TOTAL WELL COST	**USD**	**14,946,543**	**0**	**14,946,543**	**18,229,453**	**(3,282,910)**
2.1	**TOTAL DRILLING COST**	**NOK**	**117,029,272**	**0**	**117,029,272**	**145,584,773**	**(28,555,501)**
2.3	**TOTAL SITE SURVEY COST**	**NOK**	**1,548,225**	**0**	**1,548,225**	**2,100,000**	**(551,775)**
2.4	**TOTAL PLANNING COST**	**NOK**	**10,710,100**	**0**	**10,710,100**	**10,000,000**	**710,100**
	TOTAL WELL COST	**NOK**	**129,287,597**	**0**	**129,287,597**	**157,684,773**	**(28,397,176)**

DATE PREPARED:	26-Aug-02	PERCENTAGE COMPLETED:	DAYS	DEPTH	$	
PREPARED BY :	Duncan Wallace	DRYHOLE	100%	100%	100%	-19.61%
FILENAME		TOTAL	100%	100%	100%	
		PERCENTAGE OF AFE	79%	90%	82%	
EX RATE - AFE		8.65				
EX RATE - FORECAST		8.65				

ORIGINAL AFE				145,584,773	
SUPPLEMENT AFE				-	0.00%
WELL COST against TOTAL AFE	117,029,272	-	117,029,272	145,584,773	- 28,555,501
					-19.61%

Activity	Depth	AFE Days	Actual / Forecast Days	+/- AFE	AFE Cost $	Estimated Cost $	+/- AFE $
Planning						130,155	
Location Costs						-	
Drilling Operations							
Move Rig on Location		1.10	0.31	-0.79		586,795	
Drill Pilot Hole		2.40	1.10	-1.30		273,976	
Drill 36" hole		0.80	0.77	-0.03		220,795	
Run and Cement 30" Casing		0.90	2.54	1.64		800,197	
Drill 26" hole		2.90	1.94	-0.96		579,930	
Run 20" Casing		1.10	1.15	0.05		443,749	
Run BOP		1.40	0.95	-0.45		222,329	
Drill 17 1/2" hole		6.70	3.74	-2.96		1,140,349	
Attempt wireline, cleanout 17 1/2" hole		0.90	1.23	0.33		425,544	
Run 14" Casing		2.10	2.30	0.20		991,036	
Drill 12 1/4" Hole		6.40	8.45	2.05		2,531,404	
Run 9 5/8" Casing		2.10	3.02	0.92		1,199,041	
Drill 8 1/2" hole		14.40	3.40	-11.00		964,818	
Log 8 1/2" hole		1.00	1.60	0.60		571,215	
P&A		6.70	5.58	-1.12		1,922,020	
P/U Anchors		0.50	1.33	0.83		526,042	
		51.40	39.41	- 11.99	-	13,529,396	
		-	-	-	-	-	
		-	-	-	-	-	
Total Well 1/5-4S		**51.40**	**39.41**	**-11.99**	**16,830,610**	**13,529,396**	

ATTACHMENT 11.1

LESSONS LEARNED REVIEW

11.1 Lessons Learned Review / Feedback from the 1/5-4S Well Review Meeting Conducted on 6th June 2002

Attendees

Name	Company	Position
Robert Ward	AHC	Knowledge Mgmt Advisor
Kerry MacLean	AHN	Drilling Engineer
Donnie Martin	AHN	Drill Superintendent
Derek Charlton	AHN	Drilling Engineer
Ray Pratt	AHN	Operation Geologist
Niall Sinclair	AHN	HSE Advisor
Thor Henning Olsen	AHN	Logistics
Keith Ormston	AHN	Well Supervisor
Peter Kristiansen	Baroid	Mud Engineer
Tom Pogue	Baroid	Fluids Coordinator
	Dril-Quip	Norway Service Manager
Rodger Hartill	Halliburton	Co-ordinator
Jarb Sandal	Halliburton	Cementer
Rodger Sandanger	Halliburton	Cement Engineer
Henning Hassel	Odfjell	Driller
John Skeggs	Odfjell	Director QHSE
Rune Mesel	Odfjell	Assistant Rig Manager
Odd Granheim	Odfjell	OIM
	Odfjell	Casing Rental Supervisor
Arve Grasdal	Odfjell	Rig Manager
Jøran Austbø	SDBS/Halliburton	Bit Applications Engineer
Jon Morgan-Smith	Sperry Sun/Halliburton	DD Co-ordinator
Stephen Reeks	Sperry Sun/Halliburton	Geopilot Service Co-ordinator
Tore Zahl Johansen	Sperry Sun/Halliburton	Directional Driller Trainee
Orjan Orvedal	Sperry Sun/Halliburton	MWD Eng
Svein Magne Osnes	Sperry Sun/Halliburton	MWD/Mudlogging Coordinator
Peter Macintosh	Swaco	Project Leader
Torres Joa	Weatherford	Operations Supervisor

Introduction

An end of well review for the 1/5-4S well drilled with the Deepsea Bergen was conducted on the 6th of July 2002. Each section of the well was presented and discussed; key issues both positive and negative were noted. The following document lists the issues raised at the review; appropriate comments and suggestions have been noted beside each issue. It is hoped that future operations may benefit from the experience gained on the 1/5-4S salt dome operation. Opportunities for experience transfer and outstanding actions have been noted in the last column of the table.

Section	Issue (Can be improved / Successful)	Comments / Discussion	Transfer to / Action
Well Planning			
Rig Move and Preparations for spud	Planning rig move – good; good contract	Barytes taken off for rig move. Able to do jobs during rig move. Well planned, efficient use of time prior to rig move, Confusion on rig relating to location because of lat. Long. v UTM. Use UTMs as definitive	All Mobile Drilling Ops
	Boats	1 boat crew inexperienced. Needed to re-run 2 anchors. Anchors 1& 10 had too short a chain length Plan for unusual mooring plan, i.e. 10 lines. Good planing to have piggy-backs available. Need navigation people when moving rig. Trident skippers very useful as liaison for Odfjell & boats.	AH logistics. Mooring Plan
	BHA pre prepared	Equipment sent out early enabled work to commence early. Had contingency BHA available too.	
	Offline Operations during mooring	DP picked up during mooring.	
	Bulks transferred to rig	Mobilising prehydrated spud mud good. Saved rig time. Could have done better on a pre made BHA, too many options / contingents were available.	All Wells
	Equipment on Rig prior to spud	Busy time in Dusavik but managed to get the key equipment on board. Good planning. Excellent co-operation between rig contractor and service companies. Swaco hook-up at Dusavik showed excellent co-operation with Odfjell. All service providers should attend the pre-spud meeting.	New Rig Start-ups
	Communications	Hand-over between crews could be better (all companies). Swaco equipment placement was discussed with one Odfjell crew but that was not	

Section	Issue (Can be improved / Successful)	Comments / Discussion	Transfer to / Action
		passed on to crews who were onboard for the rig up. Some good examples, e.g. cementing where Halliburton took over from BJ.	
9-7/8" Pilot Hole	Good job	Good work done prior to spudding enabled a flying start. Deep Sea Bergen good choice of rig with good pit storage space. Pit management helped by having column tanks. Bit BHA, mud hydraulics all good for the job. Hole remained vertical.	Rig Contracting All AH drilling engineers.
	ROV	Spare ROV on the rig. Back-up sonar (or Sea Owl) for ROV also needed.	All AH drilling operations.
36" Hole	36" BHA with HO, Motor and Bit	Assembly made up in advance enabled flying start.	All Wells
	Hole opener hydraulics.	Bit BHA, mud hydraulics all good for the job. Though location of the nozzles on the hole-opener was questioned – balling observed PMN – Nozzle location reviewed and found to be correct – larger HO nozzles suggested by weatherford, 6 x 20/32 fitted to give 40% to bit 60% to HO.	Well Planning
30" Casing	2 Valves on CART tool	Make sure there is only one valve and that it is not loose to open. Drill Quip check this valve in future both onshore and offshore. Check position prior to run and prior to cementing.	All Subsea Wells Dril-Quip.
	Titus System	Having dropped the Titus dart it was not possible to circulate the cement out and repeat the cement job. CART tool valve check needs to be conducted prior to dropping the Titus Dart	All Subsea Wells Dril-Quip.

Section	Issue (Can be improved / Successful)	Comments / Discussion	Transfer to / Action
26” Hole	Good Drilling Performance	SW sweeps good job. Standard BHA pendulum pre planned to minimise rig handling from 36” assembly to 26” assembly. Running 11.25” motor very efficient minimises BHA problems and potential twist-offs reduced. Always get vertical wells. Recommend for all top hole particularly on a floater	All Subsea Wells
	MWD Tools –(good Job)	Do not need to test single collar MWD tools in hole. Tools to be fit for purpose - accountability Continuity tests.	All Wells
20” Casing	Problems with Auto-slips	Adjustment of chain link on rig fixed the problem. Could have been done prior to the job on the deck	AHN operations.
	Lafleur	Had to modify the Lafleur. E60 connections are short. Needs to be checked prior to the job by Weatherford.	All AH operations. Weatherford & OWS.
	BOP – good job	Test BOPs off line. Ran efficiently on this rig – criterion in rig choice.	
	Rig up to run casing prior to POOH – installation of remote handling and casing make-up equipment.	A meeting was conducted the day before rig up to discuss plans for casing job and equipment. This allowed most of the equipment to be installed off critical path during the trip out of the hole. Co-man and tool pusher to take responsibility. 20” Power tongs big job – not suitable for most rigs.	AHN operations.
17½” Hole	LOT	Plastic Shales a problem for LOT interpretation (similar in offset well). 2 LOT performed neither likely to be correct due to the presence of Plastic shale. Confirmed later when performing 12 ¼” lot. Evidence in offset wells of similar problems.	All AH Wells
	Gas Trap	Still not in an optimum location. Requires working on by Odfjell as this is a safety issue. Gas trap only operational if a particular shaker is in use. Problem caused by small header box design.	Deepsea Bergen. Rig Inspection issue
	Tandem Pill Sweep	Hole was not cleaning. Supervisor decided to pump pill against advice of mud engineer and against plans.	All AH operations.

Section	Issue (Can be improved / Successful)	Comments / Discussion	Transfer to / Action
		Too much latitude given in plan on volume of pill allowable. Need to be clearer and more specific to rig. Do we need a procedure or a guideline? The latter can be better and give support to the supervisor.	
	Directional Drilling	Keep bend to a minimum. Ship motors pre set offshore. Correct choice of bend enabled good ROPs. Had contingency BHA available.	Any wells with similar directional requirements.
	Shaker Performance	Derrick shakers performed well. Good performance attributed to well maintained condition and design. Shaker screen choices were excellent. XR Flat worked well in WBM, (pyramid screens) used in OBM.	All AH operations.
	Mud System	KCl levels about correct (higher than typical). Dilution levels normal, MBT maximum was 12. Separation in resistivity curves seen suggesting reaction. If we drill in this area again we need to do more work on these clays to get ideal mud chemistry Starting with high mud weight worked well. Pit room cleanliness was excellent.	Tertiary Drilling
	Tripping out Practice	POOH dry is best practice. Only pump out if required.	
	Well Ballooning	Picked up quickly due to good Hess procedures and good alertness by rig crew	
	Pore Pressure	Good, just slightly higher than prognosed	
	Wireline Logging Unit	Time to rig-up excessive, 3 times normal. Unit location not optimal Could it be rigged up above the accommodation?	Deepsea Bergen. Rig Selection
	Gas Trap	The placement of the gas trap is a problem on this rig. It was not ideal in this section and Odfjell should consider modifying the position.	Deepsea Bergen.
14” Casing	Casing running speed	6 joints per hour. Odfjell Drilling and Odfjell Well Services casing need to discuss this to improve significantly. Expect to get 12-15 joints per hour. No hole problems so casing went into ground okay. Gap between top casing and Lafleur but not possible to	Odfjell Drilling & Odfjell Well Services. Rig Selection – automated casing running

Section	Issue (Can be improved / Successful)	Comments / Discussion	Transfer to / Action
		put hose in casing to fill whilst RIH. Need to fill sequentially due to elevators and fact stabbers are not used with the automated equipment Need to explore the self-fill casing shoe. If using automated equipment need to plan in detail to improve this.	
	Lafleur	Takes up a long time to rig up Lafleur as need to change the bails. Number of issues with Lafleur system. Never had a smooth job with this system. Seal ring leaked. La Fleur had to be used with the BX elevators – only fill up tool with height adjustment.	AHN operations.
	Cementing	Pre-install darts onshore Darts should be compatible with the launch system and plug. Was not supplied with crossovers and pup joints installed.	All AH operations.
	Slurries	Final slurries were fine. Jobs went according to plan	
	Plugs	Supposed to be Shark bite, but not convinced it was. 4 ½ hrs to drillout shoe	
	Patches	If have a casing patch contingency for an odd size casing need to have it planned as a contingency, as not easy to secure. Not felt necessary to have available due to low chance of using one.	Well Planning
12¼" Hole	Pack-off below 14" shoe	Cement blocks were occurring. Minimised rat hole.	All AH operations.
	Static LOT inconclusive	Again plastic shales prevented an acceptable LOT being achieved using a static method. A dynamic test provided a higher value, but still looked inconclusive. PWD data later confirmed that no leak-off had occurred. Recommend using dynamic method only in shale and always check PWD if available.	Well Planning / all wells

Section	Issue (Can be improved / Successful)	Comments / Discussion	Transfer to / Action
	Geopilot software	New procedure adopted to send to rig. (Used to be sent as an email attachment using Hotmail).	Halliburton.
	Limestones	Caused damage to bit and to the Geopilot. Would have used a different bit if stringers were in the pre-job plan. They were not anticipated to be hard to drill. Configuration of Geopilot. Only used because of a commercial deal making it not overly expensive compared to the alternative. If we drill in this area again we need to address this in more detail	AH drilling engineers & geologists.
	Hole cleaning	Geopilot provided clean, gauge hole conditions.	
	Right Hand Walk	Significant right hand walk during build section, believed to be caused by the strike angle to the dip, which pushed the BHA right. Evidence of max walk during max build. Trend reduced to a small effect in the hold section at 54deg. Geopilot capable of correcting once tendancy was noticed.	Well Planning
	Stuck in places	Experienced crew made the difference and avoided long periods of lost time. No logs were planned for this section which was a prudent decision.	Drill crew training & experience.
	Mud	Difficulty keeping chlorides to planned level. Allowed to find its own level. Used cuttings quality as a guide.	All AH operations. Baroid.
	Fractures	High gas on rig handled well. Good awareness level of issues by rig crew – good job. Good planning.	
	Cuttings Handling	Limiting factor was the ditch being a shallow angle, steeper angle would be better. Swaco to be consulted. Worked fine for us but could be better. But CCB system worked well and is recommended for future use. Did not have any difficulty even with brief periods of 76m/hr it was not at full capacity.	Swaco.
	TD	Possible use of biostratigraphist may have assisted. However there was excellent communication between exploration and drilling groups in agreeing TD.	

Section	Issue (Can be improved / Successful)	Comments / Discussion	Transfer to / Action
	Gas Readings	Odfjell crew showed alertness and picked up any traces of potential influx.	
9-5/8" Casing	Temperature – Salt Dome effects make temp prediction difficult.	Halliburton used Geomec temperature gradient as it fit best at this depth and were suspicious of MWD value. MWD more accurate than expected and fitted in with the Geomec forecast. Fortunately temp was not over critical on this well. PMN: Prognosed temperature at logged depth of 3035m was 125ºC by Geomec and 119ºC by AHN. The log temperature was 111ºC.	Well Planning
	Cement Job	2 green cementers (for that rig). Best efforts were made at rig and finally successful. Should have had a rig experienced cementer on board on this critical job. Personnel changes in critical phases of the well need to be monitored closer. This had been stressed in the planning phase.	Halliburton
	Running Casing	Ran in slow speed 8.6 jts per hour. La fleur leaked. 10.5" seal. Vam Top box. Special clearance coupling was used. Weatherford need to know the OD of the couplings. Last 30m of RIH with pipe very difficult. Had 25-30 centralisers. Could reduce that amount but uncertain whether that would help or hinder. Tortuosity did not help. Use of the BBL reciprocating shoe proved to be worthwhile. Did a good job getting the casing to bottom.	AH, Weatherford, Odfjell Well Services. Any future supplier of casing circulating packers.
	Drilling Shoe Track	Very slow progress.	
8½" Hole	LOT	Good, no issues. This confirmed that the previous problem in 12 ¼" was not due to OBM.	
	High ECD	Limited the flow rate with issues of hole cleaning and restricted ROP.	Well Planning.

Section	Issue (Can be improved / Successful)	Comments / Discussion	Transfer to / Action
		Should have done analysis pre-drill. PWD showed we had a problem – highlighted the issue. Probably not normally considered a concern unless losses are experienced Focused too much on fishing aspects and not enough on the hydraulics aspects. 5.5" DP possibly to large. Do hydraulics then plan pipe size to use. Also use a low flow MWD tool.	
	BHA	Very good performance. The use the adjustable stabiliser was a good decision and it performed as predicted in both this section and the 12¼" section. Good choice of bit.	Well Planning
	Mud	No problems. Gauge hole.	. Baroid.
	Drilling performance	Good bit choice. Good mud. Good ROPs.	
	Casing Shoe	Small rat hole enabled the wireline logs to pass through the rat hole – slight difficulty on the first run but got in by running faster. Rat hole not washed out – good drilling practice. Enabled good wireline logging runs.	
	Logging	Erroneous MWD data meant that an extra wireline run was required. Good contingency planning had the HDIL wireline tool available.	AH petrophysicists/ operations geologists.
	Drills	Stripping drill proved useful to the rig crew. Odfjell should have procedures for this.	Odfjell Drilling
P&A	Large volume of contaminated mud	Costs a lot of money to dispose of, may have been better to spend time lessening the slops. 4-500 cubes of slops. Separate and treat on surface. Should dispose of stuff over the side as long as not in excess of regulations – good reason for separator.	All OBM wells
	Cement coating on 3.5" DP	Took long time to pooh. Needed to get out of plug quickly due to thixotropic nature of slurry. Need a	Halliburton. Well Planning

Section	Issue (Can be improved / Successful)	Comments / Discussion	Transfer to / Action
		longer set time but will add to waiting time.	
	Adding Mill to 14" cutter	Could have avoided an additional run if the 14" cutter had been run with a pilot mill rather than a bullnose.	Weatherford. Well Abandonment
	Cement weight	Very high density achieved on the squeeze job – over 2sg.	
	MOST tool	Tool locked up by swarf. Has already been modified to lessen this problem. And looking at further modification. Awaiting approval from Aberdeen. The Weatherford crews commended the rig.	Weatherford.
	Cement barrier	Down rated the test to 500psi over leak-off value which was still within the AH guidelines. Within NPD guidelines as there was no permeable formation exposed.	AHN drilling engineers.
Logistics	ASCo	Time to get equipment returned from ASCo slow. Equipment from rig not manifested well e.g. split loads.	ASCo. / Materials
	Tool Rentals	Rental equipment turnaround was very efficient – much better than on Tyr. But still mobilising equipment too soon. Much equipment (MWD & BHA) on the rig for due to having many contingencies. Distances involved with boat turnarounds contributed to this.	Materials
	Boats & choppers	Boats and helicopters running light in comparison to other operators.	AH operations.
	Chopper strikes	Thor Henning good example of accountability and made sure rig not shut down.	
	Training	For rig crews – well control and stuck pipe. Customised for 1/5-4S – received well. No issues on rig. Potential stuck pipe issues dealt with professionally. Training may have contributed to this success.	All AH operations.
	Back-loading	Could have been more efficient at the end of the well. Sending the boat in prior to end of well was a mistake.	Rig Supervision

Section	Issue	Can be improved / Successful	Comments / Discussion	Transfer to / Action
			Slop not fully back-loaded due to weather deterioration.	
Other Issues				

ATTACHMENT 11.2

WEATHERFORD POST WELL P&A REPORT

Weatherford	Post job report for P&A on well 1/5-4S Amerada Hess

Weatherford Norge A.S	Department: **Downhole Fishing, milling & cutting**

The P&A job on well 1/5-4S for Amerada Hess was planned and executed with the modified running procedure to save trips recover the wear bushing and seal assembly. All tools were pre made in BHA assemblies.

The 9 5/8" casing was cut in 3 minutes at 500 meter using 6 ¾" OD mud motor. The wear bushing was retrieved with the Dril-quip MPT tool that was installed in the cutting BHA.
The seal assembly and the 9 5/8" casing was retrieved using the Dril-quip MPT tool and 9 5/8" spear grapple.

The 14" cutting BHA was RIH but hit hard cement at 123 m. The BHA was pulled and a 12" junk mill was run to clean out the well. The 14" cutting BHA with 6 ¾" mud motor was then run to cut casing at 350 meter. Cutting time was 10 minutes. POOH with cutting assembly. Pick up 14"casing retrieving tools and Dril-quip MPT tool. RIH and pull seal assembly free, engage grapple / spear and pull 14"casing free.

After POB / riser was removed. RIH with the 20" x 30" cutting and retrieving assembly. Stab in to well head. Cut for 1 hrs 25 minutes. Engage MOST tool and lock the T bar to secure the tool to the well head. Pull with 50 ton over pull. MOST tool slipped from the well head. The Tool was reset and cutting was started for 1hrs and 30 minutes to break up cement.

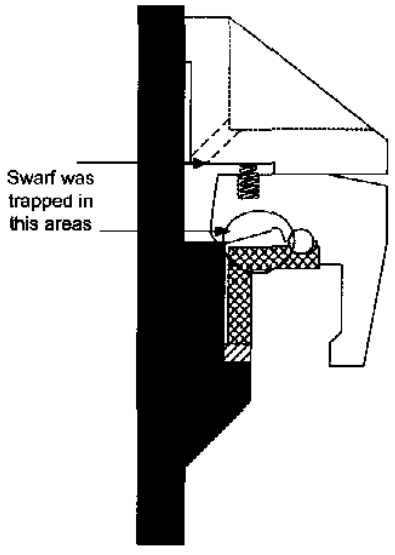
Problems to latch MOST tool. Worked tool to knock of swarf. Engaged tool and pull wellhead free with 140 ton.

Casing size:	Cutting time:
9 5/8" 53,5#	3 min
14"	10 min
20 x 30 well head	2 hrs 55 min

Regarding the problems encountered when the MOST tool released; this was caused by swarf created during the cutting of the casings.

Upon return of the MOST tool, the tool was taken completely apart and inspected. Swarf was found packed under and over the "arm" (see drawing) that would not allow the arm into the proper lock or release position. This piece was approximately 14-cm long, 7-cm wide and approximately 1,8 cm high (see photo).

Due to the failure to set the MOST Tool on this job we have now elected to carry out a new modification to the tool. This includes a well bore wiper on the motor below the MOST tool that collects the long pieces of swarf that create bird nests inside the MOST tool during cutting operations. This together with smoothing the corners on the modified vent hole in the MOST tool should eliminate this from happening again.



ATTACHMENT 11.3

CUTTINGS LITHOLOGY DESCRIPTION SHEETS

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 1		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
930	90	**SD:** qtz, clr-trnsl, clss, pa orng-pa pnk, mod orng, feldsp, vf, occ m, ang-sbang, occ sbrndd, lse, com m-c musc flakes, occ wood frags, occ grnsh gy lithic frags	10	**CLYST:** dk grnsh gy-grnsh blk, sft, stky, hydrtd, non calc	
940	100	**CLYST:** dk grnsh gy-grnsh blk, sft-frm, loc stky, hydrtd, n calc, tr vvf musc, com vf carb spks, occ slty burrow infils	Tr	**SD:** qtz, clr-trnsl, clss, pa orng-pa pnk, mod orng, feldsp, vf, occ m, ang-sbang, occ sbrndd, lse, fltng in clyst mtx	
950	100	**CLYST:** dk grnsh gy-grnsh blk, sft-frm, loc stky, hydrtd, n calc, tr vvf musc, com vf carb spks, occ slty burrow infils, tr biv shl frags, tr lith grs, loc slty lam, tr dk brn carb mat	Tr	**SD:** qtz, clr-trnsl, clss, pa orng-pa pnk, mod orng, feldsp, vf, occ m, ang-sbang, occ sbrndd, lse, fltng in clyste mtx	
960	100	**CLYST:** dk grnsh gy-grnsh blk, sft-frm, loc stky, hydrtd, n calc, tr vvf musc, com vf carb spks, occ slty burrow infils, tr biv shl frags, tr lith grs, loc slty lam, tr dk brn carb mat	Tr	**SD:** qtz, clr-trnsl, clss, pa orng-pa pnk, mod orng, feldsp, vf, occ m, ang-sbang, occ sbrndd, lse, fltng in clyste mtx	
970	100	**CLYST:** dk grnsh gy-grnsh blk, sft-frm, loc stky, hydrtd, n calc, tr vvf musc, com vf carb spks, occ slty burrow infils, tr biv shl frags, tr lith grs, loc slty lam, tr dk brn carb mat	Tr	**SD:** qtz, clr-trnsl, clss, pa orng-pa pnk, mod orng, feldsp, vf, occ m, ang-sbang, occ sbrndd, lse, fltng in clyste mtx	
980	100	**CLYST:** dk grnsh gy-grnsh blk, sft-frm, loc stky, hydrtd, non calc, rr sl calc, tr vf musc, com vf carb spks, occ slty burrow infills, tr shl frags, tr lith grs, loc slty lam, tr dk brn carb mat	Tr	**SD:** sft-frm, loc stky, hydated, non calc, rr sl calc, tr vvf musc, com vf carb spks, occ slty burrow infils, tr biv shl frags, tr lith grs, loc slty lam, tr dk brn carb mat	
990	100	**CLYST:** pred dk grnsh gy,-dk olv gy, sft-frm, loc stky, hydrtd, non calc, rr sl calc, tr vvf musc, com vf carb spks, occ slty burrow infils, tr biv shl frags, tr lith grs, loc slty lam, tr dk brn carb mat, tr vf dk grn glauc	Tr	**SD:** sft-frm, loc stky, hydated, non calc, rr sl calc, tr vvf musc, com vf carb spks, occ slty burrow infils, tr biv shl frags, tr lith grs, loc slty lam, tr dk brn carb mat	
1000	100	**CLYST:** dk grnsh gy-dk olv gy, frm-loc sft, subblky, occ amor, stky, occ hkly brk, non calc, tr vf-f dk brn carb/wood frags, tr shl frag, loc qtz, vf-f clr, occ glauc, loc slty-v slty	Tr	**SD: qtz**, clr-trnsl, clss, pa yel , vf-f, sbang, claystone mtx	
1010	100	**CLYST:** dk grn gy-dk olv gy, sft-loc frm, amor, stky, hydrtd, non-sli calc, tr glauc, tr wood frags, tr biv frags, sl slty, tr sd.	Tr	**SD: qtz**, clr-trnsl, clss, pa yel , vf-f, sbang, claystone mtx	
1020	100	**CLYST:** dk grn gy-dk olv gy, sft-loc frm, amor, stky, hydrtd, non-sli calc, tr glauc, tr wood frags, tr biv frags, sl slty, tr sd.	Tr	**SD: qtz**, clr-trnsl, clss, pa yel , vf-f, sbang, claystone mtx	
1030	100	**CLYST:** med dk-dk gy, olv gy, sft, loc mod frm, amor, subblky, swlg, v sl calc, tr shl frags, v pr tr glauc, tr wood frags, tr biv frags, mmic, sl slty, tr **SD:** grs a/a	Tr	**SD: qtz**, clr-trnsl, clss, pa yel , vf-f, sbang, claystone mtx	
1040	100	**CLYST:** med dk-dk gy, olv gy, sft, loc mod frm, amor, subblky, swlg, non calc, tr shl frags, v pr tr glauc, tr wood frags, tr biv frags, mmic, sl slty, tr **SD:** grs a/a	Tr	**SD: qtz**, clr-trnsl, clss, vf-f, sbang-sbang, claystone mtx	

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 2		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
1050	100	**CLYST:** med dk-dk gy, olv gy, sft, loc mod frm, amor, rr subblky, swlg, non calc, tr shl frags, v pr tr glauc, tr wood frags, tr biv frags, mmic, sl slty, tr **SD:** grs a/a	Tr	**SD:** qtz, clr-trnsl, clss, vf-f, sbang-sbang, claystone mtx	
1060	100	**CLYST:** med dk-dk gy, olv gy, sft, loc mod frm, amor, rr sub blky, swlg, inc calc, tr shl frags, v pr tr glauc, tr wood frags, tr biv frags, mmic, tr vf dissem pvr, sl slty, tr **SD:** grs a/a	Tr	**SD:** qtz, clr-trnsl, clss, vf-f, sbang-sbang, claystone mtx	
1070	100	**CLYST:** med dk-dk gy, olv gy, sft-mod frm, amor, pred sub blky, loc amor, sl stkv, swlg, loc calc, mmic, tr vf dissem pvr	Tr	**SD:** qtz, clr-trnsl, clss, vf-f, sbang-sbang, claystone mtx	
1080	100	**CLYST:** med dk-dk gy, occ olv gy, sft mod frm, inc frm, amor, predom subblky, loc amor, sl stkv, swlg, loc calc, mmic, tr vf dissem pvr	Tr	**SD:** qtz, clr-trnsl, clss, vf-f, sbang-sbang, claystone mtx	
1090	100	**CLYST:** med dk-dk gy, occ olv gy, sft, amor, loc subblky, loc stkv, mod calc, mmic, tr vf dissem pyr	Tr	**SD:** Tr qtz, clr-trnsl, clss, vf-f, sbang-sbang, cl mtx, Tr sh frags, wood frags	
1100	100	**CLYST:** med dk-dk gy, occ olv gy, sft, amor, loc subblky, loc stkv, mod calc, mmic, tr vf dissem pvr	Tr	**SD:** qtz, clr-trnsl, clss, vf-f, sbang-sbang, claystone mtx, Tr sh frags, wood frags	
1110	100	**CLYST:** pred m gy, loc m dk gy-olv gy, rr blu gy, sft, stky, pred amor, loc subblky, mmic, calc	Pr Tr	**SD:** qtz, trnsp, vf-occ f, subang, in arg mtx, Sh frgs, nod pyr, mic foss, bioturb,	
1120	100	**CLYST:** pred m gy, loc m dk gy-olv gy, rr blu gy, sft, stky, pred amor, loc subblky, mmic, calc	Tr	**SD:** Tr qtz, trnsp, vf-occ f, subang, in arg mtx, V pr tr sh frgs	
1130	100	**CLYST:** pred m gy, loc m dk gy-olv gy, rr blu gy, sft, stky, pred amor, loc subblky, mmic, calc	Tr	**SD:** Tr qtz, trnsp, vf-occ f, subang, in arg mtx, V pr tr sh frgs, forams	
1140	100	**CLYST:** pred m gy, loc m dk gy-olv gy, rr blu gy, sft, stky, pred amor, loc subblky, mmic, calc	Tr	**SD:** Tr qtz, trnsp, vf-occ f, subang, in arg mtx, V pr tr sh frgs,	
1150	100	**CLYST:** dk gy-dk olv gy, rr m gy, sft-mod frm, subblky, calc, mmic, sl slty	v pr Tr	**SD:** qtz, trnsp, vf-occ f, subang, in arg mtx	
1160	100	**CLYST:** dk gy-dk olv gy, rr m gy, sft-mod frm, subblky, calc, mmic, sl slty	Tr	**SD:** qtz, trnsp, vf-occ f, subang, in arg mtx	
1170	100	**CLYST:** dk olv gy-dk olv blk, sft-frm, com stky, amor, v calc, occ grdg-MRL, tr forams, tr shl frags, mmic, sl slty	Pr tr	**SD:** qtz, trnsp, vf-occ f, subang, in arg mtx	
1180	100	**CLYST:**dk olv gy-dk olv blk, bec dkr, sft-frm, com stky,amor v calc, occ grdg-MRL, tr forams, tr shl frags, mmic, sl slty	Tr	**SD:** qtz, trnsp, vf-occ f, subang, in arg mtx	
1190	100	**CLYST:**dk olv gy-dk olv blk, bec dkr, sft-frm, com stky,amor v calc, occ grdg-MRL, tr forams, tr shl frags, mmic, rr vsl slty			

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 3		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
1200	100	**CLYST:** dk olv gy-dk olv blk, bec dkr, loc sft-frm, com stky, amor- subblky, com v calc, rr dk grn glau, mmic, sl slty	Tr	**SD:** qtz, trnsp, vf-occ f, subang, in arg mtx	
1210	100	**CLYST:** dk olv gy-dk olv blk, bec dkr, loc sft-frm, com stky, amor com v calc, rr dk grn glau, mmic, occ dissem pyr, sl slty	Tr	**SD:** qtz, trnsp, vf-occ f, subang, in arg mtx	
1220	100	**CLYST:** dk olv gy-dk olv blk, bec dkr, loc sft-frm, com stky, amor, com v calc, rr dk grn glau, mmic, occ dissem pyr, sl slty	Tr	**SD:** qtz, trnsp, vf-occ f, subang, in arg mtx	
1230	100	**CLYST:** dk olv gy-dk olv blk, bec dkr, loc sft-frm, com stky, amor-subblky, com v calc, rr dk grn glau, mmic, occ dissem pyr, bec v slty	Tr	**SD:** qtz, trnsp, vf-occ f, subang, in arg mtx	
1240	100	**CLYST:** dk olv gy-dk olv blk, bec dkr, loc sft-frm, com stky, amor-subblky, com v calc, rr dk grn glau, mmic, occ dissem pyr, bec v slty .	Tr	**SD:** qtz, trnsp, vf-occ f, subang, in arg mtx	
1250	100	**CLYST:** dk olv gy-dk olv blk, bec dkr, loc sft-frm, com stky, amor-subblky, com v calc, rr dk grn glau, mmic, occ dissem pyr, bec v slty	Tr	**SD:** qtz, trnsp, vf-occ f, subang, in arg mtx	
1260	95	**CLYST:** dk olv gy-dk olv blk, frm, loc mod hd, loc sft, amor, stky, mod-v calc, occ grd-MRL, tr micfos/forams, rr sh frags, loc dissem pyr, mmic, loc slty, occ vf sst lam/lens	5 Tr	**SD:** qtz, clr-trnsl, clss, pa yel-pa pnk, occ pa orng feldspar, vf-f, sbang, sbsphr, occ claystone mtx **LST:**: V pa orng brn-v pa orng, aft, amor, crmbly, mdst text, arg	
1270	100	**CLYST:** dk olv gy-dk olv blk, frm, loc mod hd, loc sft, amor, stky, mod-v calc, occ grd-MRL, tr micfos/forams, rr sh frags, loc dissem pyr, mmic, loc slty, occ vf sst lam/lens.	Tr Tr	**SD:** qtz, clr-trnsl, clss, pa yel-pa pnk, occ pa orng feldspar, vf-f, sbang, sbsphr, occ clyst mtx **LST:** pa org brn-v pa org, sft, amor, crmbly, mdst text, arg	
1280	100	**CLYST:** dk olv gy-dk olv blk, frm, loc mod hd, loc sft, amor, stky, sl-mod calc, occ grd-MRL, tr micfos/forams, rr sh frags, loc dissem pyr, mmic, loc slty, occ vf sst lam/lens	Tr	**SD:** qtz, clr-trnsl, clss, pa yel-pa pnk, occ pa orng feldspar, vf-f, sbang, sbsphr, occ clyst mtx	
1290	100	**CLYST:** pred olv blk, com dk olv gy, frm, loc mod hd, subblky, sl-mod calc, tr dissem pyr, slty, occ sd lens	Tr	**SD:** qtz, clr-trnsl, clss, pa yel-pa pnk, occ pa orng feldspar, vf-f, sbang, sbsphr, occ clyst mtx	
1300	100	**CLYST:** dk olv gy-dk olv blk, com mod grnsh gy-mod olv gy, sft-frm, loc mod hd, loc sft, amor, stky, v calc, tr micfos/forams, rr sh frags, loc dissem pyr, mmic, sl-mod slty, occ vf sst lam/lens	Tr	**SD:** qtz, clr-trnsl, clss, pa yel-pa pnk, occ pa orng feldspar, vf-f, sbang, sbsphr, occ clyst mtx	

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 4		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
1310	100	**CLYST:** dk olv gy-dk olv blk, com mod grnsh gy-mod olv gy, sft-frm, loc mod hd, loc sft, amor, stky, v calc, rr sh frags, tr micfos/forams, loc dissem pyr, mmic, sl-mod slty, occ vf sst lam/lens	Tr Tr	**SD:** qtz, clr-trnsl, clss, pa yel-pa pnk, occ pa orng feldspar, vf-f, sbang, sbsphr, occ clyst mtx **LST:** pa org brn-v pa org, aft, amor, crmbly, mdst text, arg	
1320	100	**CLYST:** dk olv gy-dk olv blk, com mod grnsh gy-mod olv gy, sft-frm, loc mod hd, loc sft, amor, stky, v calc, rr sh frags, tr micfos/forams, loc dissem pyr, mmic, sl-mod slty, occ vf sst lam/lens	Tr Tr	**SD:** qtz, clr-trnsl, clss, pa yel-pa pnk, occ pa orng feldspar, vf-f, sbang, sbsphr, occ clyst mtx **LST:** pa org brn-v pa org, aft, amor, crmbly, mdst text, arg	
1330	100	**CLYST:**Mod grnsh gy, frm-mod hd, blky, stky, mod calc, ethy-wxy text, mmic, sl slty			
1340	100	**CLYST:** lt-mod grnsh gy, frm-mod hd, blky, stky, mod calc, ethy-wxy text, mmic, rr tr biv frag, sl slty	Tr	**LST:** lt yelsh wh, sft, amor-subblky, mdst text	
1350	100	**CLYST:** lt-mod grnsh gy, frm-mod hd, blky, stky, mod calc, ethy-wxy text, mmic, rr tr biv frag, sl slty			
1360	100	**CLYST:** m gy-m gysh grn, sft-frm, blky, rr fiss, v sl calc, stky in pt, ethy-wxy text, rr glau, sl slty in pt	Rr tr	**LST:** lt yelsh wh, sft, amor-subblky, mdst text	
1370	100	**CLYST:** m gy-m gysh grn, sft-frm, blky, rr fiss, v sl calc, stky in pt, ethy-wxy text, rr glau, rr lith frags, sl slty in pt	-		
1380	100	**CLYST:** lt grnsh gy, sft, blky, non calc, ethy text, com slty.	-		
1390	100	**CLYST:** lt grnsh gy, sft, blky, non calc, ethy text, com slty	-		
1400	100	**CLYST:** lt-m grnsh gy, sft, blky, v sl calc, non swlg, ethy text, rr **SD:** gr,rr lith gr	-		
1410	100	**CLYST:** m dk grnsh gy, sft-frm, blky-subblky, n-v sl calc, non swlg, wxy text, rr micropyr, mmic, occ varicol lith frags	Tr	**LST:** lt yelsh wh, sft, amor-subblky, mdst text	
1420	100	**CLYST:** m dk grnsh gy, sft-frm, blky-subblky, n-v sl calc, non swlg, wxy text, rr micropyr, mmic, occ varicol lith frags	Tr	**LST:** m yelsh orng, mod hd-hd, blky, brit in pt, mdst text	
1430	100	**CLYST:** lt-m grnsh gy, sft-frm, blky-subblky, non-v sl calc, non swlg, wxy text, rr micropyr, mmic, occ varicol lith frags	-		
1440	100	**CLYST:** lt-m grnsh gy, sft-frm, blky-subblky, non-v sl calc, non swlg, wxy text, rr micropyr, mmic, occ varicol lith frags	-		
1450	100	**CLYST:** lt-m grnsh gy, grdg-blush gy in pt, occ lt gy, sft-frm, blky, n calc, n swlg, ethy text, tr mmic, tr biv frag, v sl slty	Tr	**LST:** m yelsh orng, mod hd-hd, blky, brit in pt, mdst text	

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 5		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
1460	100	**CLYST:** dk grnsh gy, com grnsh blk, frm-mod h, subblky-blky, loc sbfiss, tr mmic, rr vf blk spks, rr tr micxln pyr, tr calc burrow infils, sl-rr v slty	Tr Tr	**SD:** qtz, trnsp-trnsl, clss, pa yel, vf-f, sbang, sbspher, lse, tr feldsp **LST:** mod yel org, frm-mod hd, subblky-amor, loc sl brit, sl arg	
1470	100	**CLYST:** dk grnsh gy, com grnsh blk, frm-mod h, subblky-blky, loc sbfiss, tr mmic, rr vf blk spks, rr tr micxln pyr, tr calc burrow infils, sl-rr v slty	Tr Tr Tr	**SD:** qtz, trnsp-trnsl, clss, pa yel, vf-f, sbang, sbspher, lse, tr feldsp **LST:**Mod yel orng, frm-mod hd, subblky-amor, loc sl brit, sl arg **DOL:** mod yel brn, v hd, blky, brit, micxln	
1480	100	**CLYST:** dk grnsh gy, com grnsh blk, occ mod grnsh gy, frm - mod h, subblky-blky, loc sbfiss, tr mmic, rr vf blk spks, rr tr micxln pyr, tr calc burrow infils, sl-rr v slty	Tr Tr	**SD:** qtz, trnsp-trnsl, clss, pa yel, vf-f, sbang, sbspher, lse, tr feldsp **LST:** mod yel orng, frm-mod hd, subblky-amor, loc sl brit, sl arg	
1490	100	**CLYST:** dk grnsh gy, com grnsh blk, occ mod grnsh gy, frm - mod h, subblky-blky, loc sbfiss, occ sl wxy text, tr mmic, rr vf blk spks, rr tr micxln pyr, tr calc burrow infils, sl-rr v slty	Tr Pr tr	**SD:** qtz, trnsp-trnsl, clss, pa yel, vf-f, sbang, sbspher, lse, tr feldsp **LST:** mod yel orng, frm-mod hd, subblky-amor, loc sl brit, sl arg	
1500	100	**CLYST:** pred dk grnsh, com grnsh blk, mod hd-frm, subblky - occ sbfis, com amor, non-sl calc, loc sl wxy text, mmic, tr vf blk spks, occ dk brnsh gy-brnsh blk, slty, non calc	Tr Tr	**SD:** qtz, clr-trnsl, clss, pa yel, vf-f, sbang, sbspher, lse, com as fltg gr in clyst **LST:** mod yel brn, brn, frm occ mod hd, blky-amor, ethy, sl-mod arg	
1510	100	**CLYST:** dk grnsh gy, com grnsh blk, occ mod grnsh gy, frm - mod h, subblky-blky, loc sbfiss, occ sl wxy text, tr mmic, rr vf blk spks, rr tr micxln pyr, tr calc burrow infils, sl-rr v slty	Tr Tr	**SD:** qtz, clr-trnsl, clss, pa yel, vf-f, sbang, sbspher, lse, com as fltg gr in clyst **LST / DOL:** mod yel brn, brn, frm occ mod hd, blky-amor, ethy, sl-mod arg; occ v hd, blky, brit, micxln, sl arg	
1520	100	**CLYST:** dk grnsh gy, com grnsh blk, occ mod grnsh gy, frm - mod h, subblky-blky, loc sbfiss, occ sl wxy text, tr mmic, rr vf blk spks, rr tr micxln pyr, tr calc burrow infils, sl-rr v slty	Tr Tr Tr	**SD:** qtz, clr-trnsl, clss, pa yel, vf-f, sbang, sbspher, lse, com as fltg gr in clyst **LST:** pa yel brn, sft, amor, ethy, mod arg, occ dolic **DOL:** mod-occ pa yel brn, vhd, blky, brit, micxln, sl arg	
1530	100	**CLYST:** dk grnsh gy, com grnsh blk, occ mod grnsh gy, frm - mod h, subblky-blky, loc sbfiss, occ sl wxy text, tr mmic, rr vf blk spks, rr tr micxln pyr, tr calc burrow infils, sl-rr v slty	Tr 5%	**SD:** qtz, clr-trnsl, clss, pa yel, vf-f, sbang, sbspher, lse, com as fltg gr in clyst. **LST:** pa yel brn, sft, amor, ethy, mod arg, loc dolic.	

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 6		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
1540	100	**CLYST:** dk grnsh gy, com grnsh blk, occ mod grnsh gy, frm - mod h, subblky-blky, loc sbfiss, occ sl wxy text, tr mmic, rr vf blk spks, rr tr micxln pyr, tr calc burrow infils, sl-rr v slty	Tr 5%	**SD:** qtz, clr-trnsl, clss, pa yel, vf-f, sbang, sbspher, lse, com as fltg gr in clyst. **LST:** pa yel brn, sft, amor, ethy, mod arg, loc dolic.	
1550	100	**CLYST:** dk grn gy-dk olv gy, sft-frm, stky, amor, occ subblky hydphillic, n-loc sl calc, sli slty, mmica, bioturb, tr vf xln pyr	Tr Tr	**SD:** qtz, clr-trnsl, clss, pa yel, vf-f, sbang, sbspher, lse, com as fltg gr in clyst. **LST:** pa yel brn, sft, amor, ethy, mod arg, loc dolic.	
1560	100	**CLYST:** stky, amor, occ subblky, hydrophyllic, non-loc sl calc, sli slty, mmica, bioturb, tr vf xln pyr	Prtr Prtr	**SD:** qtz, clr-trnsl, clss, pa yel, vf-f, sbang, sbspher, lse, com as fltg gr in clyst. **LST:** pa yel brn, sft, amor, ethy, mod arg, loc dolic.	
1570	100	**CLYST:** dk grnsh gy,-dk olv gy, frm, loc sft, stky, amor, subblky, non-loc sl calc, loc sl wxy, mmic, rr tr xln pyr, slty	Tr Tr	**LST:** pa org gy, sft, amor, crmbly, ethy,mod arg, com DOL **DOL:** pa orng gy, occ mod yel brn, vhd, blky, brit, micxln, mod arg.	
1580	100	**CLYST:** dk grnsh gy,-dk olv gy, frm, loc sft, stky, amor, subblky, non-loc sl calc, loc sl wxy, mmic, rr tr xln pyr, slty w/ occ wh silic burrows	Tr	**LST:** pa orng gy, sft, amor, crmbly, ethy, mod arg, com DOL.	
1590	100	**CLYST:** dk grnsh gy,-dk olv gy, frm, loc sft, stky, amor, sub blky, non-loc sl calc, loc sl wxy, mmic, rr tr xln pyr, slty w/ occ wh silic burrows, occ off wh-pa gy, sft, amor, stky, kaol	Tr	**LST/DOL:** pa orng gy, sft, amor, crmbly, ethy, mod arg, com DOL	
1600	100	**CLYST:** dk grnsh gy,-dk olv gy, frm, loc sft, stky, amor, sb blky, loc sl-mod calc, loc sl wxy, mmic, rr tr xln pyr, slty w/ occ wh silic burrows, occ off wh-pa gy, sft, amor, stky, kaol	Tr	**LST/DOL:** pa orng gy, sft, amor, crmbly, ethy, mod arg, com DOL	
1610	100	**CLYST:** med grnsh gy, com dk grnsh gy, frm-mod hd, subblky-amor, non-sl calc, tr mmic, tr vf dissem pyr, sl slty, occ lt-mod grn gy, sft-fm, amor-rndd, mod-v calc grdg-mrl	Gd tr	**LST:** pa orng gy, sft, amor, crmbly, ethy, mod arg, mod-v arg, grdg-MRL	
1620	100	**CLYST:** med grnsh gy, com dk grnsh gy, frm-mod hd, subblky-amor, non-sl calc, tr mmic, tr vf dissem pyr, sl slty, occ lt-mod grn gy, sft-fm, amor-rndd, mod-v calc grdg-mrl	Gd tr	**LST:** pa orng gy, sft, amor, crmbly, ethy, mod arg, mod-v arg, grdg- MRL	
1627 SPOT	100	**CLYST:** med grnsh gy, com dk grnsh gy, frm-mod hd, subblky-amor, non-sl calc, tr mmic, tr vf dissem pyr, sl slty, occ lt-mod grn gy, sft-fm, amor-rndd, mod-v calc grdg-mrl	Gd tr	**LST:** pa orng gy, sft, amor, crmbly, ethy, mod arg, mod-v arg, grdg- MRL, occ off wh, sft, micxln, cmpct mdst text	
1630	100	**CLYST:** med grnsh gy, com dk grnsh gy, frm-mod hd, subblky-amor, non-sl calc, tr mmic, tr vf dissem pyr, sl slty, occ lt-mod grn gy, sft-fm, amor-rndd, mod-v calc grdg-MRL	Gd tr	**LST/DOL:** pa orng gy, sft, amor, crmbly, ethy, mod arg, mod-v arg, grdg-MRL, occ off wh, sft, micxln, cmpct mdst text	

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 7		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
1640	100	**CLYST:** pred m-dk grnsh gy, loc lt-m gy, frm-mod hd, subblky-oc rndd, loc sbfiss, sl calc, sl slty	Tr	**LST:** pa orng gy, occ wh-off wh, sft, amor, micxln, mdst text, sl arg	
1646	100	**CLYST:** pred m-dk grnsh gy, loc lt-m gy, frm-mod hd, subblky-oc rndd, loc sbfiss, non-sl calc, rr mod calc, sl slty	Gd tr	**LST:** pa orng gy, occ wh-off wh, sft, amor, micxln, mdst text, sl arg	
1650	90	**CLYST:** lt-m grnsh gy-lt m blush gy, frm-mod hd, blky, slty ip, sl-mod calc.	10	**LST:**Off wh-v lt gy, mod hd-hd, blky, occ brit, arg.	
1660	80	**CLYST:** lt-m grnsh gy-lt m blush gy, frm-mod hd, blky, slty ip, sl-mod calc.	20	**LST:**Off wh-v lt gy, mod hd-hd, blky, occ brit, arg.	
1670	90	**CLYST:** lt-m grnsh gy-lt m blush gy, frm-mod hd, blky, slty ip, sl-mod calc	10	**LST:** off wh-v lt gy, mod hd-hd, blky, occ brit, arg.	
1680	100	**CLYST:** lt-m grnsh gy-lt m blush gy, frm-mod hd, blky, slty ip, sl-mod calc	Gd tr	**LST:** off wh-v lt gy, mod hd-hd, blky, occ brit, arg.	
1690	100	**CLYST:** lt-m blush gy-grnsh gy, mod hd, blky, wxy text, sl swlg, micrmic, sl calc.			
1700	80	**CLYST:** lt-m gy, occ m blush-grnsh gy, frm-mod hd, blky, occ plty, sl wxy text, micrmic, non-sl calc.	20	**LST:** off wh-v pa orng, occ pa yelsh orng, sft-frm, rare v hd, amor-subblky, occ splnty, conc frac ip, sl arg ip, occ porcel text, cryptoxln, occ micrxln, mdst text.	
1710	90	**CLYST:** lt-m gy, occ m blush-grnsh gy, occ m brnsh gy, frm-mod hd, blky, occ plty, sl wxy text, micrmic, mod calc.	10	**LST:** off wh, v pa gy, transl, v hd, slnty, con frac, porcel text, micrxln.	
1720	80	**CLYST:** lt-m gy, occ m blush-grnsh gy, occ m brnsh gy, frm-mod hd, blky, occ plty, sl wxy text, micrmic, mod calc.	20		
1730	100	**CLYST:** lt brnsh gy, occ lt-m grnsh gy-olv gy, mod hd, blky, micrmic, non calc.	Tr	**LST:** v pa gy, v hd, splnty, conc frac, porcol text, micrxln.	
1740	-	**Missed**	-	**-**	
1750	100	**CLYST:** lt brnsh gy, occ lt-m grnsh gy-olv gy, mod hd, blky, micrmic, non calc.	Rr tr	**LST:** v pa gy, v hd, splnty, conc frac, porcel text, micrxln.	
1760	100	**CLYST:** lt-m grnsh gy, com olv gy, mod hd, blky, micrmic, sl calc.			
1770	100	**CLYST:** lt-m grnsh gy, com olv gy, occ grdg-lt gy, mod hd, blky, micrmic, loc slty, sl calc, occ v calc, grdg-MARL	Pr tr	**MARL:** lt gy, mod hd, blky, occ loc slty, micrmic.	
1780	100	**CLYST:** lt-m grnsh gy, com olv gy, occ grdg-lt gy, mod hd, blky, micrmic, loc slty, sl calc, occ v calc, grdg-MARL			

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 8		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
1790	100	**CLYST:** lt-m grnsh gy, com olv gy, occ grdg-lt gy, occ m brnsh gy ip, mod hd, blky, micrmic, loc slty, sl calc, occ v calc, grdg-MARL			
1800	100	**CLYST:** lt-m grnsh gy, com olv gy, occ grdg-lt gy, occ m brnsh gy ip, mod hd, blky, micrmic, loc slty, sl calc, occ v calc, grdg-MARL	Tr	**LST:** off wh, frm, blky, crmbly, v sl srg, mdst text.	
1810	100	**CLYST:**m brnsh gy, rr grnsh gy, occ olv gy, mod hd, blky, micrmic, v sl slty ip, non-v sl calc.			
1820	100	**CLYST:**m brnsh gy, rr grnsh gy, occ olv gy, mod hd, blky-occ fiss, micrmic, v sl slty ip, non-v sl calc.	Tr	**LST:** off wh, frm, blky, crmbly, v sl srg, mdst text.	
1830	100	**CLYST:**m brnsh gy, rr grnsh gy, occ olv gy, mod hd, blky-occ fiss, micrmic, v sl slty ip, non-v sl calc, rr v calc, rr grdg-MARL	tr tr	**MARL:** v lt gy, frm, blky-crmbly. **LST:** Off wh, frm, blky, crmbly, mdst text.	
1840	100	**CLYST:** lt-m olv gy, m brnsh gy, frm-mod hd, blky, occ fiss, micrmic, sl slty ip, sl-mod calc.	Gd tr	**LST:** Off wh, frm, blky, crmbly, mdst text.	
1850	100	**CLYST:** lt-m olv gy, m brnsh gy, frm-mod hd, blky, occ fiss, micrmic, sl slty ip, sl-mod calc.	Pr tr	**LST:** Off wh, frm, blky, crmbly, mdst text.	
1860	100	**CLYST:** lt-m olv gy-m gysh brn, occ brnsh gy, occ m blush gy, frm-mod hd, blky, loc plty, occ subfiss, micrmic, sl slty ip, sl calc.	Tr Sl tr	**LST:** pa yelsh orng-gysh orng, frm blky-crmbly, v sl arg, cryptoxln, occ dolic, mdst text. **DOL:** dk yelsh orng-mod yelsh brn, hd-v hd, blky-ang, micrxln.	
1870	100	**CLYST:** m olv gy-brnsh gy, occ m blush gy, frm-mod hd, blky, loc plty, occ subfiss, micrmic, sl slty ip, sl calc.	Tr	**LST:** pa yelsh orng-gysh orng, frm blky-crmbly, v sl arg, cryptoxln, occ dolic, mdst text.	
1880	100	**CLYST:** pred brnsh gy, occ lt-m olv gy, occ m blush gy, frm-mod hd, blky, loc plty, occ subfiss, micrmic, sl slty ip, sl calc.	Tr	**LST:** pa yelsh orng-gysh orng, frm blky-crmbly, v sl arg, cryptoxln, occ dolic, mdst text.	
1890	100	**CLYST:** pred m brnsh gy-brnsh gy, occ lt-m olv gy, occ m blush gy, frm-mod hd, blky, loc plty, occ subfiss, micrmic, sl slty ip, sl calc.	Tr	**LST:** pa yelsh orng-gysh orng, frm blky-crmbly, v sl arg, cryptoxln, occ dolic, mdst text.	
1900	95	**CLYST:** m gy-m olv gy, occ m dk gy, occ brnsh gy, frm-mod hd, blky, loc plty, occ subfiss, micrmic, rr slty ip, sl calc.	5	**LST:** pa yelsh orng-gysh orng, frm blky-crmbly, v sl arg, cryptoxln, occ dolic, mdst text.	
1910	95	**CLYST:** pred m brnsh gy-brnsh gy, occ lt-m olv gy, occ m blush gy, frm-mod hd, blky, loc plty, occ subfiss, micrmic, sl slty ip, sl calc.	5	**LST:** pa yelsh orng-gysh orng, frm blky-crmbly, v sl arg, cryptoxln, occ dolic, mdst text.	

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 9		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
1920	100	**CLYST:** pred m brnsh gy-brnsh gy, occ lt-m olv gy, occ m blush gy, frm-mod hd, blky, loc plty, occ subfiss, micrmic, sl slty ip, sl calc.	Tr	**LST:** pa yelsh orng-gysh orng, frm blky-crmbly, v sl arg, cryptoxln, occ dolic, mdst text.	
1930	85	**CLYST:** pred m brnsh-brnsh gy, occ brnsh blk, comm olv gy-dk grnsh gy, frm, blky, occ plty, rr subfiss, micrmic, occ sl slty, non-sl calc.	15	**LST:** gysh orng-dk yelsh orng, frm-mod hd, blky, dolic ip, rr sl arg, micrxln-cryptxln, mdst text.	
1940	95	**CLYST:** pred m brnsh-brnsh gy, occ brnsh blk, comm olv gy-dk grnsh gy, frm, blky, occ plty, rr subfiss, micrmic, occ sl slty, non-sl calc.	5	**LST:** gysh orng-dk yelsh orng, frm-mod hd, blky, dolic ip, rr sl arg, micrxln-cryptxln, mdst text.	
1950	100	**CLYST:** pred m brnsh-brnsh gy, occ brnsh blk, occ lt-m olv gy, occ m blush gy, frm, blky, occ plty, rr subfiss, micrmic, occ sl slty, non-sl calc.	Gd tr Tr	**LST:** gysh orng-dk yelsh orng, frm-mod hd, blky, dolic ip, rr sl arg, micrxln-cryptxln, mdst text, occ grdg-DOL. **DOL:** dk yelsh orng-mod yelsh brn, hd-v hd, blky-ang, micrxln.	
1960	100	**CLYST:** pred m brnsh-brnsh gy, occ brnsh blk, com lm olv gy- m blush gy, frm, blky, occ plty, rr subfiss, micrmic, occ sl slty, non-sl calc.	Gd tr Tr	**LST:** gysh orng-dk yelsh orng, frm-mod hd, blky, dolic ip, rr sl arg, micrxln-cryptxln, mdst text, occ grdg-DOL. **DOL:** dk yelsh orng-mod yelsh brn, hd-v hd, blky-ang, micrxln.	
1970	100	**CLYST:** pred m brnsh-brnsh gy, occ brnsh blk, com lm olv gy- m blush gy, frm, blky, occ plty, rr subfiss, micrmic, occ sl slty, non-sl calc.	Tr	**LST:** gysh orng-dk yelsh orng, frm-mod hd, blky, dolic ip, rr sl arg, micrxln-cryptxln, mdst text, occ grdg-DOL.	
1980	100	**CLYST:** m brnsh gy-brnsh gy, com olv gy-grnsh gy, frm-mod hd, blky, plty ip, rr subfiss, micrmic, occ slty, sl calc ip.	Tr	**LST:** gysh orng-dk yelsh orng, frm-mod hd, blky, dolic ip, rr sl arg, micrxln-cryptxln, mdst text, occ grdg-DOL.	
1990	100	**CLYST:** pred m brn gy, occ brn gy, com olv gy-grn gy, frm-mod hd, blky, plty ip, rr subfiss, micrmic, occ slty, sl calc ip.	Tr	**LST:** gysh orng-dk yelsh orng, frm-mod hd, blky, dolic ip, rr sl arg, micrxln-cryptxln, mdst text, occ grdg-DOL.	
2000	100	**CLYST:** pred m brn gy, occ brn gy, com olv gy-grn gy, frm-mod hd, blky, plty ip, rr subfiss, micrmic, occ slty, sl calc ip.	Tr	**LST:** gysh orng-dk yelsh orng, frm-mod hd, blky, dolic ip, rr sl arg, micrxln-cryptxln, mdst text, occ grdg-DOL.	
2010	100	**CLYST:** pred m brn gy, occ brn gy, com olv gy-grn gy, frm-mod hd, blky, plty ip, rr subfiss, micrmic, occ slty, sl calc ip.	Gd tr	**LST:** gysh orng-dk yelsh orng, frm-mod hd, blky, dolic ip, rr sl arg, micrxln-cryptxln, mdst text, occ grdg-DOL.	
2020	100	**CLYST:** m brnsh-brnsh gy, com olv gy, frm-mod hd, blky, rr plty, micrmic, occ slty, non-sl calc.	Tr	**LST:** gysh orng-dk yelsh orng, frm-mod hd, blky, dolic ip, rr sl arg, micrxln-cryptxln, mdst text, occ grdg-DOL.	
2030	100	**CLYST:** m brnsh-brnsh gy, com olv gy, frm-mod hd, blky, rr plty, micrmic, occ slty, non-sl calc.	Tr	**LST:** gysh orng-dk yelsh orng, frm-mod hd, blky, dolic ip, rr sl arg, micrxln-cryptxln, mdst text, occ grdg-DOL.	
2040	95	**CLYST:** m brnsh-brnsh gy, com olv gy, frm-mod hd, blky, rr plty, micrmic, occ slty, non-sl calc.	5	**LST:** pa yelsh orng, frm-mod hd, blky, chlky ip, cryptoxln-micrxln, mdst text.	

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 10		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
2050	95	**CLYST:** m brnsh-brnsh gy, com olv gy, occ lt olv gy, frm-mod hd, blky, rr plty, micrmic, occ slty, non-sl calc.	5	**LST:** pa yelsh orng, occ v pa orng, frm-mod hd, blky, chlky ip, cryptoxln-micrxln, mdst text.	
2060	100	**CLYST:** m brnsh-brnsh gy, com olv gy, occ lt olv gy, frm-mod hd, blky, rr plty, micrmic, occ slty, non-sl calc.	Tr	**LST:** v pa orng, frm-mod hd, blky, chlky ip, cryptoxln-micrxln, mdst text.	
2070	100	**CLYST:** m brnsh-brn gy, com olv gy, occ lt olv gy, occ dk brn gy, frm-mod hd, blky, rr plty, micrmic, occ slty, n-sl calc.	Tr	**LST:** v pa orng, frm-mod hd, blky, chlky ip, cryptoxln-micrxln, mdst text.	
2080	100	**CLYST:** m brnsh-brnsh gy, com olv gy, occ lt olv gy, occ dk brnsh gy, frm-mod hd, blky, rr plty, occ splnty, rr subfiss, micrmic, occ slty, non-sl calc.	Tr	**LST:** v pa orng, frm-mod hd, blky, chlky ip, cryptoxln-micrxln, mdst text.	
2090	85	**CLYST:** m brnsh-brnsh gy, com olv gy, occ lt olv gy, occ dk brnsh gy, frm-mod hd, blky, rr plty, occ splnty, rr subfiss, micrmic, occ slty, non-sl calc.	15	**LST:** pa yelsh orng-gysh orng, frm-mod hd, blky, rr arg, dolic, occ grdg-DOL, crytoxln-microxln, mdst text.	
2100	90	**CLYST:**M-mdk brnsh gy, mod hd, blky, micrmic, v sl slty, sl-mod calc.	10	**LST:** pa orng, frm, occ v hd, blky-crmbly, occ brit, dolic ip, grdg-DOL, mdst text.	
2110	90	**CLYST:**M-mdk brnsh gy, mod hd, blky, micrmic, v sl slty, sl-mod calc.	10	**LST:** pa orng, frm, occ v hd, blky-crmbly, occ brit, dolic ip, grdg-DOL, mdst text.	
2120	85	**CLYST:**M-mdk brnsh gy, mod hd, blky, micrmic, v sl slty, rr grdg-SLTST sl.mod calc.	15	**LST:** pa orng, frm, occ v hd, blky-crmbly, occ brit, dolic ip, grdg-DOL, mdst text.	
2130	90	**CLYST:**M-mdk brnsh gy, mod hd, blky, micrmic, v sl slty, rr grdg-SLTST sl.mod calc.	10	**LST:** pa orng, frm, occ v hd, blky-crmbly, occ brit, dolic ip, grdg-DOL, mdst text.	
2140	90	**CLYST:**M-mdk brnsh gy, mod hd, blky, micrmic, v sl slty, rr grdg-SLTST sl.mod calc.	10	**LST:** pa orng, frm, occ v hd, blky-crmbly, occ brit, dolic ip, bcmg-DOL LST, mdst text.	
2150	70	**CLYST:** m brnsh gy, mod hd-hd, blky, fiss ip, rthy text, micrmic, sl calc.	30	**DOL LST:** yelsh orng, mod hd, blky, crmbly, grdg-DOL, mdst text.	
2160	85	**CLYST:** m brnsh gy, mod hd-hd, blky, fiss ip, rthy text, micrmic, sl calc.	15	**DOL LST:** yelsh orng, mod hd, blky, crmbly, grdg-DOL, mdst text.	
2170	100	**CLYST:** m brnsh gy, mod hd-hd, blky, fiss ip, rthy text, micrmic, sl calc.	Gd tr	**DOL LST:** yelsh orng, mod hd, blky, crmbly, grdg-DOL, mdst text.	
2180	100	**CLYST:**M-m dk brnsh gy, mod hd-hd, blky, rr fiss, rthy text, micmic, rr tr slt, non calc.	Tr	**DOL LST:** yelsh orng, mod hd, blky, crmbly, grdg-DOL, mdst text.	
2190	90	**CLYST:** m brnsh gy-brnsh blk, mod hd-hd, blky, rr fiss, rthy text, micmic, rr tr slt, non calc.	10	**DOL LST:** yelsh orng, mod hd, blky, crmbly, grdg-DOL, mdst text.	
2200	-	**MISSED**	-	**-**	

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 11		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
2210	100	**CLYST:** m brnsh gy-brnsh blk, mod hd-hd, blky, rr fiss, rthy text, micmic, rr tr slt, non calc.	Gd tr	**DOL LST:** yelsh orng, mod hd, blky, crmbly, grdg-DOL, mdst text.	
2220	100	**CLYST:** m brnsh gy-brnsh blk, mod hd-hd, blky, rr fiss, rthy text, micmic, rr tr slt, non calc.	Gd tr	**DOL LST:** yelsh orng, mod hd, blky, crmbly, grdg-DOL, mdst text.	
2230	100	**CLYST:** m brnsh gy-m gysh brn, mod hd, blky-occ fiss, rthy text, micrmic, slty ip, grdg-SLTST ip, non calc.	Gd tr	**DOL LST:** yelsh orng, frm, blky, crmbly, cryptxln-micrxln, mdst-pkst text.	
2240	100	**CLYST:** m brnsh gy-m gysh brn, rr purplsh gy, rr rdsh brn, mod hd, blky-occ fiss, rthy text, micrmic, slty ip, grdg-SLTST ip, sl-mod calc.	Tr	**DOL LST:** yelsh orng, frm, blky, crmbly, cryptxln-micrxln, mdst-pkst text.	
2250	100	**CLYST:** m brnsh gy-m gysh brn, rr purplsh gy, rr rdsh brn, mod hd, blky-occ fiss, rthy text, micrmic, rr tr micrpyr, slty ip, grdg-SLTST ip, sl-mod calc.	Gd tr	**DOL LST:** yelsh orng, frm, blky, crmbly, cryptxln-micrxln, mdst-pkst text.	
2260	100	**CLYST:** m brnsh gy-m gysh brn, rr purplsh gy, rr rdsh brn, occ purplsh brn, rr grnsh gy, frm, blky, rthy text, micrmic, rr tr micrpyr, slty ip, grdg-SLTST ip, mod calc.	Gd tr	**DOL LST:** yelsh orng, frm, blky, crmbly, cryptxln-micrxln, mdst-pkst text.	
2270	100	**CLYST:** m brnsh gy-m gysh brn, rr purplsh gy, rr rdsh brn, occ purplsh brn, rr grnsh gy, frm, blky, rthy text, micrmic, rr tr micrpyr, slty ip, grdg-SLTST ip, mod calc.	Gd tr	**DOL LST:** yelsh orng, frm, blky, crmbly, cryptxln-micrxln, mdst-pkst text.	
2280	100	**CLYST:**Rdsh brn-dk brn gy, occ m brn gy, mod hd-frm, blky occ fiss, v sl slty ip, n-sl calc, occ mod calc. Rr tr shell frags	Tr	**DOL LST:** yelsh orng, frm, occ v hd, blky crmbly, mdst text.	
2290	100	**CLYST:** dk brnsh gy-m dk gy, occ purp gy, mod hd-occ hd, blky-occ fiss, sl slty ip, non-sl calc.		**DOL LST:** yelsh orng, frm, occ v hd, blky crmbly, mdst text.	
2300	90	**CLYST:** dk brnsh gy-m dk gy, occ purp gy, mod hd-occ hd, blky-occ fiss, sl slty ip, non-sl calc.	10	**DOL LST:** yelsh orng, frm, occ v hd, blky crmbly, mdst text.	
2310	100	**CLYST:** dk brnsh gy-dk gy, occ purp gy, mod hd-occ hd, blky-occ fiss, sl slty ip, tr micrpyr, non-sl calc.	Tr	**DOL LST:** dk yelsh orng, frm, bcmg hd, blky, crmbly, wkst text.	
2320	100	**CLYST:** dk brnsh gy-dk gy, occ purp gy, mod hd-occ hd, blky-occ fiss, sl slty ip, tr micrpyr, non-sl calc.	Gd tr	**DOL LST:** dk yelsh orng, frm, bcmg hd, blky, crmbly, wkst text.	
2330	100	**CLYST:** dk brnsh gy-dk gy, occ purp gy, mod hd-occ hd, blky-occ fiss, sl slty ip, tr micrpyr, non-sl calc.	Gd tr	**DOL LST:** dk yelsh orng, frm, bcmg hd, blky, crmbly, wkst text.	
2340	100	**CLYST:** dk gy, occ dk brnsh gy, frm-mod hd, blky, occ plty, occ subfiss, micrmic, sl slty ip, non-sl calc.	Tr	**DOL LST:** dk yelsh orng, frm, bcmg hd, blky, crmbly, wkst text.	

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 12		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
2350	100	**CLYST:** dk gy, occ dk brnsh gy, frm-mod hd, blky, occ plty, occ subfiss, micrmic, sl slty ip, non-sl calc.	Tr	**DOL LST:** dk yelsh orng, frm, bcmg hd, blky, crmbly, wkst text.	**LST SHOWS:,** Rr dk brn stn, tr ptchy wh-pa yel, mod bri, dir fluor,inst bri wh cut fluor, ?B/O fluor
2360	100	**CLYST:** dk gy, occ dk brnsh gy, frm-mod hd, blky, occ plty, occ subfiss, micrmic, sl slty ip, non-sl calc.	Tr	**DOL LST:** dk yelsh orng, frm, bcmg hd, blky, crmbly, wkst text.	**LST SHOWS:,** Rr dk brn stn, tr ptchy wh-pa yel, mod bri, dir fluor,inst bri wh cut fluor, ?B/O fluor
2370	100	**CLYST:** dk gy-dk brn gy, frm-mod hd, blky, plty ip, occ sub fiss, micrmic, tr micrpyr, rr micrfoss?, sl slty ip, non-sl calc.	Tr	**DOL LST:** dk yelsh orng, frm, bcmg hd, blky, crmbly, wkst text.	
2380	100	**CLYST:** dk gy-dk brnsh gy, frm-mod hd, blky, plty ip, occ subfiss, micrmic, tr micrpyr, sl slty ip, non-sl calc.	Tr	**LST:** gysh orng, frm-mod hd, blky-crmbly, chlky ip, rr arg, occ dolic, cryptxln, occ grdg-DOL LST, mdst text.	
2390	90	**CLYST:** dk gy-dk brnsh gy, frm-mod hd, blky, plty ip, occ subfiss, micrmic, tr micrpyr, sl slty ip, non-sl calc.	10 Tr	**LST:** gysh org, frm-mod hd,blky-crmbly,chlky ip,rr arg, occ dolic, cryptxln, occ micrxln, occ grdg-DOL LST, mdst text. **DOL:**Mod yelsh brn, v hd-hd, blky-ang, micrxln.	
2400	90	**CLYST:** dk gy-dk brnsh gy, frm-mod hd, blky, plty ip, occ subfiss, micrmic, sl slty ip, non-sl calc.	10 Tr	**LST:**Gysh org, frm-mod hd,blky-crmbly,chlky ip, rr arg,occ dolic, cryptxln, occ micrxln, occ grdg-DOL LST, mdst text. **DOL:**Mod yelsh brn, v hd-hd, blky-ang, micrxln.	
2410	100	**CLYST:** dk gy-dk brnsh gy, frm-mod hd, blky, plty ip, occ subfiss, micrmic, occ v f dissem micrpyr, sl slty ip, non-sl calc.	Tr	**LST:**Gysh orng, dk yelsh brn-mod yelsh brn, frm-mod hd, blky-crmbly, chlky ip, rr arg, occ dolic, cryptxln, occ micrxln, occ grdg-DOL, mdst text.	
2420	95	**CLYST:** dk gy-dk brnsh gy, frm-mod hd, blky, plty ip, occ subfiss, micrmic, occ v f dissem micrpyr, sl slty ip, non-sl calc.	5	**LST:**Gysh orng, dk yelsh brn-mod yelsh brn, frm-mod hd, blky-crmbly, chlky ip, rr arg, occ dolic, cryptxln, occ micrxln, occ grdg-DOL, mdst text.	
2430	95	**CLYST:** dk gy-dk brnsh gy, frm-mod hd, blky, plty ip, occ subfiss, micrmic, occ v f dissem micrpyr, sl slty ip, non-sl calc.	5 Tr	**LST:**Gysh orng, dk yelsh brn-mod yelsh brn, frm-mod hd, blky-crmbly, chlky ip, rr arg, occ dolic, cryptxln, occ micrxln, occ grdg-DOL, mdst text. **DOL:**Mod-dk yelsh brn, v hd-hd, blky-ang, micrxln.	
2440	100	**CLYST:** dk gy-dkbrnsh gy, frm-mod hd, blky. Occ plty, occ subfiss, micrmic, slty ip, non-sl calc.	Tr	**DOL:**Mod-dk yelsh brn, hd-v hd, blky-ang, occ splntymicrxln, occ grdg-DOL LST.	
2450	100	**CLYST:** dk gy-dkbrnsh gy, frm-mod hd, blky. Occ plty, occ subfiss, micrmic, slty ip, non-sl calc.	Tr	**LST:**Gysh orng-dk yelsh orng, frm-mod hd, blky, occ crmby, chlky ip, dolic ip, cryptxln, mdst text.	
2460	100	**CLYST:** dk gy-dkbrnsh gy, frm-mod hd, blky. Occ plty, occ subfiss, micrmic, slty ip, non-sl calc.	Tr	**LST:**Gysh orng-dk yelsh orng, frm-mod hd, blky, occ crmby, chlky ip, dolic ip, grdg-DOL ip, cryptxln, mdst text.	

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 13		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
2470	90	**CLYST:** dk gy-dkbrnsh gy, frm-mod hd, blky. Occ plty, occ subfiss, micrmic, slty ip, non-sl calc.	10	**LST:**Gysh orng-dk yelsh orng, frm-mod hd, blky, occ crmby, chlky ip, dolic ip, grdg-DOL ip, cryptxln, mdst text.	
2480	90	**CLYST:** dk gy-dkbrnsh gy, frm-mod hd, blky. Occ plty, occ subfiss, micrmic, slty ip, non-sl calc.	10	**LST:**Gysh orng-dk yelsh orng, frm-mod hd, blky, occ crmby, chlky ip, dolic ip, grdg-DOL ip, cryptxln, mdst text.	
2490	100	**CLYST:** dk gy-dkbrnsh gy, frm-mod hd, blky. Occ plty, occ subfiss, micrmic, slty ip, non-sl calc.	Tr	**LST:**Gysh orng-dk yelsh orng, frm-mod hd, blky, occ crmby, chlky ip, dolic ip, grdg-DOL ip, cryptxln, mdst text.	**CLYST:** rr tr vis free oil,stn on ctg surf, br wh fluor, nil nat cut col, sl diff bl wh cut fluor, no vis resid ring, v wk yel wh cut fluor. **PR SHOW**
2500	100	**CLYST:** dk gy-dkbrnsh gy, frm-mod hd, blky. Occ plty, occ subfiss, micrmic, slty ip, non-sl calc.	Tr	**LST:**Gysh orng-dk yelsh orng, frm-mod hd, blky, occ crmby, chlky ip, dolic ip, grdg-DOL ip, cryptxln, mdst text.	**CLYST:** rr tr vis free oil,stn on ctg surf, br wh fluor, nil nat cut col, sl diff bl wh cut fluor, no vis resid ring, v wk yel wh cut fluor. **PR SHOW**
2510	80	**CLYST:**M-dk gy, occ dk gy brn, frm-mod hd, blky. Occ plty, occ subfiss, micrmic, slty ip, non-sl calc.	20	**LST:**gysh orng-dk yelsh orng,sft, amor, mdst text	**CLYST:** rr tr vis free oil,stn on ctg surf, br wh fluor, nil nat cut col, sl diff bl wh cut fluor, no vis resid ring, v wk yel wh cut fluor. **PR SHOW**
2520	85	**CLYST:**M-dk gy-m blush gy, occ dk gy brn, frm-mod hd, blky. Occ plty, occ subfiss, micrmic, slty ip, non-sl calc.	15 Tr	**LST:**gysh orng-dk yelsh orng,sft, amor, mdst text **DOL:**Mod-dk yelsh brn, hd-v hd, blky-ang, occ splntymicrxln, occ grdg-DOL LST.	**CLYST:** rr tr vis free oil,stn on ctg surf, br wh fluor, nil nat cut col, sl diff bl wh cut fluor, no vis resid ring, v wk yel wh cut fluor. **PR SHOW**
2530	100	**CLYST:**M-dk gy-m blush gy, occ dk gy brn, frm-mod hd, blky. Occ plty, occ subfiss, micrmic, slty ip, non-sl calc.	Gd tr	**LST:**gysh orng-dk yelsh orng,sft, amor, mdst text	**CLYST:** rr tr vis free oil,stn on ctg surf, br wh fluor, nil nat cut col, sl diff bl wh cut fluor, no vis resid ring, v wk yel wh cut fluor. **PR SHOW**
2540	100	**CLYST:**M-dk gy-m blush gy, occ dk gy brn, frm-mod hd, blky. Occ plty, occ subfiss, micrmic, slty ip, non-sl calc.	Gd tr	**LST:**Off wh, occ lt gy, gysh orng-dk yelsh orng,sft, amor, mdst text	**CLYST:** rr tr vis free oil,stn on ctg surf, br wh fluor, nil nat cut col, sl diff bl wh cut fluor, no vis resid ring, v wk yel wh cut fluor. **PR SHOW**

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 14		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
2550	100	**CLYST:** predom m gy-mod blsh gy, occ brnsh gy, frm-mod hd, blky, occ plty, sbfiss in pt, non-sl calc, ethy text, micrmic	Tr	**LST:**Off wh, occ lt gy, gysh orng-dk yelsh orng,sft, amor, mdst text	**CLYST:** rr tr vis free oil,stn on ctg surf, br wh fluor, nil nat cut col, sl diff bl wh cut fluor, no vis resid ring, v wk yel wh cut fluor. **PR SHOW**
2560	100	**CLYST:** predom m gy-mod blsh gy, occ brnsh gy, frm-mod hd, blky, occ plty, sbfiss in pt, non-sl calc, ethy text, micrmic	Tr	**LST:**Off wh, occ lt gy, gysh orng-dk yelsh orng,sft, amor, mdst text	Free oil on sample tray, dk brn vis oil stn on **CLYST** surf, no vis cut, bri whi fluor stn, sl-mod fst bimod strmg bl wh cut fluor, no vis resid ring, mod yelsh wh resid resid fing fluor. **MOD SHOW**
2570	100	**CLYST:** predom m gy-mod blsh gy, occ brnsh gy, frm-mod hd, blky, occ plty, sbfiss in pt, non-sl calc, ethy text, micrmic	Tr	**LST:**Off wh, occ lt gy, gysh orng-dk yelsh orng,sft, amor, mdst text	
2580	100	**CLYST:** m-m dk gy, mod hd-hd, blky, mod calc, wxy text, micrmic	Tr	**LST:**Off wh, occ lt gy, gysh orng-dk yelsh orng,sft, amor, mdst text	
2584 SPOT	100	**CLYST:** m-m dk gy, mod hd-hd, blky, mod calc, wxy text, micrmic, very slty in pt	Tr Tr	**LST:**Off wh, occ lt gy, gysh orng-dk yelsh orng,sft, amor, mdst text **ARG SST:** qtz, dk brn, clr, clss grs, frm, vf-f, rnd, spher, w srt, non calc arg mtx, no vis por	**ARG SST:** no HC od or stn v wk dl brn fluor stn, no vis cut, v wk unimod dull wh cut, no vis resid ring, OBM?
2590	95	**CLYST:** lt olv gy-m olv gy, occ m gy brn, bec grnsh gy-m blsh gy, frm-mod hd, blky, occ splnty, non-sl calc, micrmic, slty in pt-loc v slty, grdg-SLTST	5	**LST:**Off wh, occ lt gy, gysh orng-dk yelsh orng,sft, amor, mdst text	
2600	100	**CLYST:** lt olv gy-m olv gy, occ m gy brn, bec grnsh gy-m blsh gy, frm-mod hd, blky, occ splnty, non-sl calc, micrmic, slty in pt-loc v slty, grdg-SLTST	Tr	**LST:**Off wh, occ lt gy, gysh orng-dk yelsh orng,sft, amor, mdst text	
2610	100	**CLYST:** lt olv gy-m olv gy, occ m gy brn, bec grnsh gy-m blsh gy, occ m-dk yelsh brn, frm-mod hd, blky, occ splnty, non-sl calc, micrmic, slty in pt-loc v slty, grdg-SLTST	Tr	**LST:**Off wh, occ lt gy, gysh orng-dk yelsh orng, sft, amor, mdst text, also occ ly gy-lt blsh gy, splnty, xln-micxln	
2620	100	**CLYST:** lt olv gy-m olv gy, occ m gy brn, bec grnsh gy-m blsh gy, occ m-dk yelsh brn, frm-mod hd, blky, occ splnty, non-sl calc, micrmic, vf dissem micropyr, slty in pt-loc v slty, grdg-SLTST, sdy in pt, grdg- vf **ARG SST**, occ brnsh blk	Tr	**LST:**Off wh- v pa orng, frm-mod hd, blky, mdst text, cryptoxln	

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 15		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
2630	100	**CLYST:** lt olv gy-grnsh gy, rr m brnsh gy, frm-mod hd, blky-subblky, n-sl calc, slty in pt, micrmic, occ vf dissem micrpyr	Tr	**LST:** off wh-v pa orng, pa yelsh orng, frm-mod hd, blky, crmbly, micr-crypxln, mdst text	**LST:** tr bri wh-yel wh smpl fluor, fst mod bri blu wh cut fluor, OBM?
2640	100	**CLYST:** lt olv gy-grnsh gy,, rr m brnsh gy, frm-mod hd, blky-subblky, non-sl calc, slty in pt, micrmic,	Tr	**LST:** off wh-v pa orng, pa yelsh orng, frm-mod hd, blky, crmbly, micr-crypxln, mdst text	**LST:** tr bri wh-yel wh smpl fluor, fst mod bri blu wh cut fluor, OBM?
2650	100	**CLYST:** lt olv gy-grnsh gy, rr m brnsh gy, frm-mod hd, blky-subblky, occ crmbly, non-sl calc, slty in pt, micrmic, occ vf dissem micrpyr	Tr	**LST:** off wh-v pa orng, pa yelsh orng, frm-mod hd, blky, crmbly, micr-crypxln, mdst text	**LST:** tr bri wh-yel wh smpl fluor, fst mod bri blu wh cut fluor, OBM?
2660	100	**CLYST:** lt olv gy-grnsh gy, rr m brnsh gy, frm-mod hd, blky-subblky, non-sl calc, slty in pt, micrmic, occ dissem pyr.	Tr	**LST:** off wh-v pa orng, pa yelsh orng, frm-mod hd, blky, crmbly, micr-crypxln, mdst text	**LST:** patchy bri wh-yel wh smpl fluor, fst mod bri blu wh cut fluor, OBM?
2670	70	**CLYST:** lt olv gy, grnsh gy, m brnsh gy, frm-mod hd, blky, slty, occ grdg-SLTST, micrmic, sl-non calc, occ mod calc.	30	**LST:**Off wh-lt gy, lt blush gy, com gysh org, mod hd-v hd, rr sft, blky-ang, occ conc frac, occ crmby, occ arg, occ sdy, grdg-CALC SST (v f gr), micrxln-cryptxln, dolic ip, occ grdg-DOL, mdst-wkst text.	
2675 SPOT	85	**CLYST:** lt olv gy, grnsh gy, m brnsh gy, occ brnsh gy-brnsh blk, frm-mod hd, blky, slty, occ grdg-SLTST, micrmic, sl-non calc, occ mod calc.	15	**LST:**Off wh-lt gy, lt blush gy, com gysh org, mod hd-v hd, rr sft, blky-ang, occ conc frac, occ crmby, occ arg, occ sdy, grdg-CALC SST (v f gr), micrxln-cryptxln, dolic ip, occ grdg-DOL, mdst-wkst text.	
2680	95	**CLYST:** lt-m gy, frm-mod hd, occ hd, blky-fiss, rthy text, com slty, rr grdg-SLTST, sl-mod calc.	5	**LST:** lt gy, frm-mod hd, occ v hd, blky, sl arg, grdg-ARG LST ip, mdst-wkst, rr xln pkst text.	
2690	90	**CLYST:** lt-m gy, rr m dk brn, frm-mod hd, occ hd, blky-fiss, rthy text, com slty, rr grdg-SLTST, sl-mod calc.	10	**LST:** lt gy, frm-mod hd, occ v hd, blky, sl arg, grdg-ARG LST ip, mdst-wkst, rr xln pkst text.	
2700	100	**CLYST:** lt-m gy, rr m dk brn, frm-mod hd, occ hd, blky-fiss, rthy text, com slty, rr grdg-SLTST, sl-mod calc.	Tr	**LST:** lt gy, frm-mod hd, occ v hd, blky, sl arg, grdg-ARG LST ip, mdst-wkst, rr xln pkst text.	
2710	100	**CLYST:** lt-m gy, rr m dk brn, frm-mod hd, occ hd, blky-fiss, rthy text, com slty, rr grdg-SLTST, sl-mod calc.	Tr	**LST:** lt gy, frm-mod hd, occ v hd, blky, sl arg, grdg-ARG LST ip, mdst-wkst, rr xln pkst text.	
2720	100	**CLYST:** m brnsh gy-m gysh brn, frm-mod hd, blky-fiss, sl slty ip, rr micropyr, non-sl calc.	Tr	**LST:** m org yel, mod hd-hd, blky, mdst text, & rr lt gy, v hd, blky, grnst text ip.	
2730	100	**CLYST:** m brn gy-m gysh brn, rdsh brnsh gy, frm-mod hd, rr v hd, blky-fiss, sl slty ip, rr dissem micrxln pyr, non-sl calc.	Rr tr	**LST:** m org yel, mod hd-hd, blky, mdst text, & rr lt gy, v hd, blky, grnst text ip.	
2735	100	**CLYST:** m gy-lt m gy, occ rdsh brn, frm-mod hd, rr v hd, blky-fiss, sl slty ip, rr dissem micrxln pyr, non-sl calc.			

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 16		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
2740	100	**CLYST:** m gy, mod hd, blky, non calc.	Rr tr	**LST:** m org yel, mod hd-hd, blky, mdst text, & rr lt gy, v hd, blky, grnst text ip.	
2750	100	**CLYST:** m gy, mod hd, blky, non calc.	Rr tr	**LST:** m org yel, mod hd-hd, blky, mdst text, & rr lt gy, v hd, blky, grnst text ip.	
2752.5	100	**CLYST:** m gy, mod hd, blky, non calc.			
2760	95	**CLYST:** m gy-olv gy, occ m brnsh gy, frm-mod hd, blky, micrmic, slty, loc grdg-SLTST, non-sl calc.	5	**LST:** pa yelsh brn-dk yelsh org, occ off wh-lt gy, frm-mod hd, occ v hd, blky, cryptxln-microxln, occ arg, mdst text	
2770	95	**CLYST:** pred m brnsh gy, com m gy-olv gy, frm-mod hd, blky, micrmic, slty, loc grdg-SLTST, non-sl calc.	5	**LST:** pa yelsh brn-dk yelsh org, occ off wh-lt gy, frm-mod hd, occ v hd, blky, cryptxln-microxln, occ arg, dolic ip, occ grdg-DOL, sl surc text, mdst text, occ pkst text.	
2780	100	**CLYST:** m gy-olv gy, com m brnsh gy, frm-mod hd, blky, micrmic, slty, loc grdg-SLTST, non-sl calc.	Tr	**LST:** pa yelsh brn-dk yelsh org, occ off wh-lt gy, frm-mod hd, occ v hd, blky, cryptxln-microxln, occ arg, dolic ip, occ grdg-DOL, sl surc text, mdst text, occ pkst text.	
2790	100	**CLYST:** m gy-olv gy, com m brnsh gy, frm-mod hd, blky, micrmic, slty, loc grdg-SLTST, non-sl calc.	Tr	**LST:** pa yelsh brn-dk yelsh org, occ off wh-lt gy, frm-mod hd, occ v hd, blky, cryptxln-microxln, occ arg, dolic ip, occ grdg-DOL, sl surc text, mdst text, occ pkst text.	
2800	100	**CLYST:** m gy-olv gy, com m brnsh gy, occ brn gy-brnsh blk, frm-mod hd, blky, micrmic, slty, loc grdg-SLTST, n-sl calc.	Gd tr	**LST:** pa yelsh brn-dk yelsh org, occ off wh-lt gy, frm-mod hd, occ v hd, blky, cryptxln-microxln, occ arg, dolic ip, occ grdg-DOL, sl surc text, mdst text, occ pkst text.	
2810	100	**CLYST:** m gy-olv gy, com m brnsh gy, occ brnsh gy-brnsh blk, frm-mod hd, blky, micrmic, slty, loc grdg-SLTST, occ v f dissem micrpyr, non-sl calc.	Gd tr	**LST:** pa yelsh brn-dk yelsh org, occ off wh-lt gy, frm-mod hd, occ v hd, blky, cryptxln-microxln, occ arg, dolic ip, occ grdg-DOL, sl surc text, mdst text, occ pkst text.	
2820	100	**CLYST:** m gy-olv gy, com m brnsh gy, occ brnsh gy-brnsh blk, frm-mod hd, blky, micrmic, slty, loc grdg-SLTST, sdy ip (vv f qtz gr), occ v f dissem micrpyr, non-sl calc.	Gd tr	**LST:** pa yelsh brn-dk yelsh org, occ off wh-lt gy, frm-mod hd, occ v hd, blky, cryptxln-microxln, occ arg, dolic ip, occ grdg-DOL, sl sucr text, mdst text, occ pkst text.	
2830	80	**CLYST:** m gy-olv gy, com m brnsh gy, occ brnsh gy-brnsh blk, frm-mod hd, blky, micrmic, slty, loc grdg-SLTST, sdy ip (vv f qtz gr), occ v f dissem micrpyr, non-sl calc.	20	**LST:** pred off wh-lt gy, occ gysh org, frm-mod hd, blky, crmbly, arg ip, cryptxln-micrxln, mdst text.	
2840	80	**CLYST:** pred m brnsh gy-olv gy, occ grnsh gy-lt blush gy, rr brnsh blk, rr rdsh brn, frm-mod hd, blky, slty, loc grdg-SLTST, occ sdy, micrmic, non-sl calc	20	**LST:** pred off wh-lt gy, com v pa org-gysh org, frm-mod hd, blky, crmby, occ chlky, arg ip, occ dolic, crypxln, occ micrxln, mdst text, occ wkst text.	

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 17		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
2850	90	**CLYST:** pred m brnsh gy-olv gy, occ grnsh gy-lt blush gy, rr brnsh blk, rr rdsh brn,frm-mod hd, blky, slty, loc grdg-SLTST occ sdy, micrmic, rr-loc abun v f dissem micrpyr, non-sl calc	10	**LST:** pred off wh-lt gy, com v pa org-gysh org, frm-mod hd, blky, crmby, occ chlky, arg ip, occ dolic, crypxln, occ micrxln, mdst text, occ wkst text.	
2852	95	**CLYST:** pred m brnsh gy-olv gy, occ grnsh gy-lt blush gy, rr brnsh blk, rr rdsh brn, frm-mod hd,blky, slty, loc grdg-SLTST occ sdy, micrmic, rr-loc abun v f dissem micrpyr, non-sl calc	5	**LST:** pred off wh-lt gy, com v pa org-gysh org, frm-mod hd, blky, crmby, occ chlky, arg ip, occ dolic, crypxln, occ micrxln, mdst text, occ wkst text.	
2855	100	**CLYST:** pred m brnsh gy-olv gy, occ grnsh gy-lt blush gy, rr brnsh blk, rr rdsh brn,frm-mod hd, blky, slty, loc grdg-SLTST occ sdy, micrmic, rr-loc abun v f dissem micrpyr, non-sl calc	Tr	**LST:** pred off wh-lt gy, com v pa org-gysh org, frm-mod hd, blky, crmby, occ chlky, arg ip, occ dolic, crypxln, occ micrxln, mdst text, occ wkst text.	
2858	100	**CLYST:** pred m brnsh gy-olv gy, occ grnsh gy-lt blush gy, rr brnsh blk, rr rdsh brn, frm-mod hd, blky, slty,loc grdg-SLTST occ sdy, micrmic, rr-loc abun v f dissem micrpyr, non-sl calc	Gd tr	**LST:** pred off wh-lt gy, com v pa org-gysh org, frm-mod hd, blky, crmby, occ chlky, arg ip, occ dolic, crypxln, occ micrxln, mdst text, occ wkst text.	
2861	100	**CLYST:** pred m brnsh gy-olv gy, occ grnsh gy-lt blush gy, rr brnsh blk, rr rdsh brn, frm-mod hd, blky, slty,loc grdg-SLTST occ sdy, micrmic, rr-loc abun v f dissem micrpyr, non-sl calc	Gd tr	**LST:** pred off wh-lt gy, com v pa org-gysh org, frm-mod hd, blky, crmby, occ chlky, arg ip, occ dolic, crypxln, occ micrxln, mdst text, occ wkst text.	
2864	100	**CLYST:** pred m brnsh gy-olv gy, occ grnsh gy-lt blush gy, rr brnsh blk, rr rdsh brn, frm-mod hd, blky,slty, loc grdg-SLTST occ sdy, micrmic, rr-loc abun v f dissem micrpyr, non-sl calc	Gd tr	**LST:** pred off wh-lt gy, com v pa org-gysh org, frm-mod hd, blky, crmby, occ chlky, arg ip, occ dolic, crypxln, occ micrxln, mdst text, occ wkst text.	
2867	100	**CLYST:** m gy-m blush gy, rr dk brnsh gy, frm-mod hd, blky, slty, com grdg-SLTST, non-sl calc.	Gd tr	**LST:**Off wh-lt gy, pa yelsh org, frm-occ mod hd, blky, crmbly, com srg, mdst text, occ wkst text.	
2870	100	**CLYST:** m gy-m blush gy, rr dk brnsh gy, frm-mod hd, blky, slty, com grdg-SLTST, non-sl calc.	Gd tr	**LST:**Off wh-lt gy, pa yelsh org, frm-occ mod hd, blky, crmbly, com srg, mdst text, occ wkst text.	
2873	100	**CLYST:** m gy-m gysh brn, rr dk brnsh gy, frm-mod hd, blky, slty, com grdg-SLTST, non-sl calc.			
2876	100	**CLYST:** lt-m gysh brn-brnsh gy, lt-m blush gy, frm-mod hd, blky, slty, com grdg-SLTST, non-sl calc.	Gd tr	**LST:**Off wh-lt gy, pa yelsh org, frm-occ mod hd, blky, crmbly, com srg, mdst text, occ wkst text.	
2879	100	**CLYST:** lt-m gysh brn-brnsh gy, lt-m blush gy, frm-mod hd, blky, slty, com grdg-SLTST, non-sl calc.	Tr	**LST:**Off wh-lt gy, pa yelsh org, frm-occ mod hd, blky, crmbly, com srg, mdst text, occ wkst text.	
2879.5 SPOT	60	**LST:** m gy-v lt gy, occ v pa org gy, frm-hd, occ v hd, blky, ang, brit, occ crmby, sl arg, cryptxln, occ micrxln, dolic ip, mdst- occ wkst text.	40	**CLYST:** lt-m brnsh gy, lt-m gy, lt blush gy, mod soft-mod hd, blky-subblky, micrmic ip, loc slty grdg-SLTST, non-sl calc.	

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 18		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
2882	70	**CLYST:** lt-m brnsh gy, lt-m gy, lt blush gy, mod soft-mod hd, blky-subblky, micrmic ip, loc slty grdg-SLTST, non-sl calc.	30 rr tr	**LST:** m gy-v lt gy, occ v pa org gy, incr off wh, rr org brn, mod hd-hd, occ v hd, blky, ang, brit, occ crmby, sl arg, cryptxln, occ micrxln, dolic ip, mdst- occ wkst text. **SD:**Lse coll, transp-pa org, v f-f gr, subrnd, w srtd.	
2885	-	**MISSED**	-	**-**	
2888	90	**CLYST:**lt-m gy, occ m brnsh gy, occ lt blush gy, frm-mod hd, blky, occ splnty, micrmic, com v f dissem micrpyr, occ slty, grdg-SLTST, rr sdy, non-sl calc	10	**LST:**Off w-v lt gy, occ v lt brnsh gy, rr pa org, frm.mod hd, occ v hd, blky, ang, occ brit, crmbly, sl arg, cryptxln-micrxln, mdst-occ wkst text.	
2891	85	**CLYST:**lt-m gy, occ m brnsh gy, occ lt blush gy, frm-mod hd, blky, occ splnty, micrmic, com v f dissem micrpyr, occ slty, grdg-SLTST, rr sdy, non-sl calc	15	**LST:**Off w-v lt gy, occ v lt brnsh gy, rr pa org, frm.mod hd, occ v hd, blky, ang, occ brit, crmbly, sl arg, cryptxln-micrxln, mdst-occ wkst text.	
2894	95	**CLYST:** pred m gy-m brnsh gy, occ lt blush gy, rr gysh grn, frm-mod hd, blky, occ splnty, micrmic, com v f dissem micrpyr, occ slty, grdg-SLTST, rr sdy, non-sl calc	5 Tr	**LST:**Off w-v lt gy, occ v lt brnsh gy, rr pa org, frm.mod hd, occ v hd, blky, ang, occ brit, crmbly, sl arg, loc v arg, grdg-ARG LST, cryptxln-micrxln, mdst-occ wkst text. **SD:**Lse coll, transp-clr, v f-f gr, subrnd, mod w srtd.	
2897	90	**CLYST:** pred m gy-m brnsh gy, occ lt blush gy, rr gysh grn, frm-mod hd, blky, occ splnty, micrmic, com v f dissem, rr micrpyr nod, occ slty, grdg-SLTST, rr sdy, non-sl calc	10	**LST:**Off w-v lt gy, occ v lt brnsh gy, occ pa org, frm.mod hd, occ v hd, blky, ang, occ brit, crmbly, sl arg, loc v arg, grdg-ARG LST, cryptxln-micrxln, mdst-occ wkst text.	
2900	-	**MISSED**	-	**-**	
2903	95	**CLYST:**lt-m gy, occ m brnsh gy, occ lt blush gy, occ gysh bl grn mott, frm-mod hd, blky, occ splnty, micrmic, com v f dissem micrpyr, com micrpyr nod, occ slty, grdg-SLTST, rr sdy, v rr tuff, non-sl calc	5	**LST:**Off w-v lt gy, occ v lt brnsh gy, occ pa org, frm.mod hd, occ v hd, blky, ang, occ brit, crmbly, sl arg, loc v arg, grdg-ARG LST, cryptxln-micrxln, mdst-occ wkst text.	
2906	-	**MISSED**	-	**-**	
2909	90	**CLYST:** m gy-m brnsh gy, occ lt blush gy, blky-subblky, frm-mod hd, micrmic, slty, loc grdg-SLTST, com micrpyr nod/v f dissem micrpyr, occ tuff, rr sdy, non-sl calc.	10 Gd tr	**LST:**Off wh- v lt gy, v pa org, frm-mod hd, occ v hd, blky-subblky, ang, crmby ip, arg, loc v arg grdg-ARG LST, dolic ip, cryptxln-occ micrxln, mdst, occ wkst text **TUFF:** off wh-v lt gy, gysh bl grn, pa purp, purp gy, mott, frm-mod hd, blky-subblky, com micrpyr nod, mod calc	
2912	-	**MISSED**	-	**-**	

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 19		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
2915	100	**CLYST:** m gy-m brnsh gy, occ lt blush gy, blky-subblky, frm-mod hd, micrmic, slty, loc grdg-SLTST, com micrpyr nod/v f dissem micrpyr, com tuff, com grdg-TUFF CLYST, rr sdy, tr glauc, non-sl calc.	Gd tr Gd tr	**LST:**Off wh- v lt gy, v pa org, frm-mod hd, occ v hd, blky-subblky, ang, crmby ip, arg, loc v arg grdg-ARG LST, dolic ip, cryptxln-occ micrxln, mdst, occ wkst text **TUFF:** off wh-v lt gy, gysh bl grn, pa purp, purp gy, m gy-m brnsh gy, mott, frm-mod hd, blky-subblky, com micrpyr nod, tr glauc, mod calc	
2918	100	**CLYST:** m gy-m brnsh gy, occ lt blush gy, blky-subblky, frm-mod hd, micrmic, slty, loc grdg-SLTST, com micrpyr nod/v f dissem micrpyr, com tuff, com grdg-TUFF CLYST, occ sdy, loc grdg-vv f SST, tr glauc, non-sl calc.	Gd tr Tr	**LST:**Off wh- v lt gy, v pa org, frm-mod hd, occ v hd, blky-subblky, ang, crmby ip, arg, loc v arg grdg-ARG LST, dolic ip, cryptxln-occ micrxln, mdst, occ wkst text **TUFF:** off wh-v lt gy, gysh bl grn, pa purp, purp gy, m gy-m brnsh gy, mott, frm-mod hd, blky-subblky, com micrpyr nod, tr glauc, mod calc	
2921	80	**CLYST:** m gy-m brnsh gy, occ lt blush gy, blky-subblky, frm-mod hd, micrmic, slty, loc grdg-SLTST, com micrpyr nod/v f dissem micrpyr, com tuff, com grdg-TUFF CLYST, occ sdy, loc grdg-vv f SST, tr glauc, non-sl calc.	20 Tr	**TUFF:** pred m gy-m brnsh gy, off wh-v lt gy, gysh bl grn, pa purp, purp gy, , mott, frm-mod hd, blky-subblky, com micrpyr nod, tr glauc, mod calc **LST:**Off wh- v lt gy, v pa org, frm-mod hd, occ v hd, blky-subblky, ang, crmby ip, arg, loc v arg grdg-ARG LST, dolic ip, cryptxln-occ micrxln, mdst, occ wkst text	
2924	100	**CLYST:** m brnsh gy-olv gy-m gy, frm-mod hd, blky-subblky, occ crmby, slty, loc grdg-SLTST, occ tuff, micrmic, ip, com v f dissem micrpyr, rr tr glauc, non-sl calc	Tr Tr	**TUFF:** pred m gy-m brnsh gy, off wh-v lt gy, gysh bl grn, pa purp, purp gy, , mott, frm-mod hd, blky-subblky, com micrpyr nod, tr glauc, mod calc, grdg-TUFF CLYST. **LST:**Off wh- v lt gy, v pa org, frm-mod hd, occ v hd, blky-subblky, ang, crmby ip, arg, loc v arg grdg-ARG LST, dolic ip, cryptxln-occ micrxln, mdst, occ wkst text	
2927	100	**CLYST:** m brnsh gy-olv gy-m gy, frm-mod hd, blky-subblky, occ crmby, slty, com grdg-SLTST, occ tuff, micrmic, ip, com v f dissem micrpyr, occ tr glauc, sdy ip, occ grdg-v f SST, non-sl calc	Tr Rr Tr	**LST:**Off wh, lt gy, gysh org, mod hd-hd, blky-subblky, ang ip, occ crmby, arg-occ v arg, loc grdg-ARG, cryptxln, rr micrxln, mdst text. **TUFF:** off wh-v lt gy, gysh bl grn, pa purp, purp gy, mott, frm-mod hd, blky-subblky, com micrpyr nod, occ tr glauc, mod calc	

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 20		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
2930	100	**CLYST:** m brnsh gy-olv gy-m gy, rr lt blush gy, frm-mod hd, blky-subblky, occ crmby, slty, com grdg-SLTST, occ tuff, micrmic, ip, com v f dissem micrpyr, occ tr glauc, sdy ip, occ grdg-v f SST, non-sl calc	Tr Rr Tr	**LST:**Off wh, lt gy, gysh org, occ wh-off wh, mod hd-hd, blky-subblky, ang ip, occ crmby, occ chlky, arg-occ v arg, loc grdg-ARG, occ nod micrpyr, cryptxln, rr micrxln, mdst text. **TUFF:** off wh-v lt gy, gysh bl grn, pa purp, purp gy, mott, frm-mod hd, blky-subblky, com micrpyr nod, occ tr glauc, mod calc	
2933	100	**CLYST:** m brnsh gy-olv gy-m gy, frm-mod hd, blky-subblky, micrmic ip, occ v f dissem micrpyr, slty, loc grdg-SLTST, occ sdy, loc grdg-v f SST, tr glauc, occ tuff, non-sl calc.	Tr Rr tr	**LST:**Off wh-v pa org, frm-mod hd, blky-subblky, crmbly ip, arg ip, occ sdy, (v f qtz gr), cryptxln, mdst text. **TUFF:** Off wh-lt gy mott, frm-mod hd, subblky-blky, occ tr glauc, sl mod calc.	
2936	-	**MISSED**	-	**-**	
2939	100	**CLYST:** m brnsh gy-olv gy-m gy, frm-mod hd, blky-subblky, micrmic ip, occ v f dissem micrpyr, slty, loc grdg-SLTST, occ sdy, loc grdg-v f SST, tr glauc, occ tuff, non-sl calc.	Tr Rr tr	**LST:**Off wh-v pa org, frm-mod hd, blky-subblky, crmbly ip, arg ip, occ sdy, (v f qtz gr), cryptxln, mdst text. **TUFF:** Off wh-lt gy mott, frm-mod hd, subblky-blky, occ tr glauc, sl mod calc.	
2942	100	**CLYST:** m brnsh gy-olv gy-m gy, frm-mod hd, blky-subblky, micrmic ip, occ v f dissem micrpyr, slty, loc grdg-SLTST, occ sdy, loc grdg-v f SST, tr glauc, occ tuff, non-sl calc.	Tr Tr	**LST:**Off wh-v pa org, frm-mod hd, blky-subblky, crmbly ip, arg ip, occ sdy, (v f qtz gr), cryptxln, mdst text. **SD:**Clss, clr-transp, vf-f gr, subrnd, subsph, mod srtd.	
2945	90	**CLYST:**m-m dk gy, brnsh gy, occ dk gy, rr lt blush gy, frm-mod hd, blky-subblky, occ splnty, slty ip, loc grdg-SLTST, sdy ip, loc grdg-v f ARG SST, occ micrmic, non-sl calc.	10 Tr	**SD/SST:** pred lse, clr-transp, clss, vf-f gr, subrnd, subsph, pr-mod srtd, occ consol w/ mod calc cmt, slty/arg mtx, no vis por. **LST:**Off wh-v pa org, frm-mod hd, blky-subblky, crmbly ip, arg ip, occ sdy, (v f qtz gr), cryptxln, mdst text.	
2948	-	**MISSED**	-	**-**	
2951	100	**CLYST:**m-m dk gy, brnsh gy, occ dk gy, occ lt blush gy, frm-mod hd, blky-subblky, occ splnty, slty ip, loc grdg-SLTST, sdy ip, loc grdg-v f ARG SST, occ micrmic, non-sl calc.	Tr Tr	**SD/SST:** pred lse, clr-transp, clss, vf-f gr, subrnd, subsph, pr-mod srtd, occ consol w/ mod calc cmt, slty/arg mtx, no vis por. **LST:**Off wh-v pa org, frm-mod hd, blky-subblky, crmbly ip, arg ip, occ sdy, (v f qtz gr), cryptxln, mdst text.	

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 21		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
2954	100	**CLYST:** pred brnsh gy-m brnsh gy, m-m dk gy, occ dk gy, occ lt blush gy, frm-mod hd, blky-subblky, occ splnty, slty ip, loc grdg-SLTST, sdy ip, loc grdg-v f ARG SST, occ micrmic, non-sl calc.	Tr Tr	**SD/SST:** pred lse, clr-transp, clss, vf-f gr, subrnd, subsph, pr-mod srtd, occ consol w/ mod calc cmt, slty/arg mtx, no vis por. **LST:**Off wh-v pa org, frm-mod hd, blky-subblky, crmbly ip, arg ip, occ sdy, (v f qtz gr), cryptxln, mdst text.	
2957	95	**CLYST:** m gy-m olv gy, occ lt blush gy, frm-mod hd, blky-subblky, micrmic, slty ip, loc grdg-SLTST, occ sdy, tr micrpyr lams, non- sl calc.	5 Tr	**SST:**Off wh, gysh org-dk yelsh org, sft-frm, blky-subblky, crmbly, v f-f gr, clss-v pa org, clr-transp, subrnd, subsph, pr srtd, mod-wk calc cmt, arg/slt mtx, no vis por. **LST:**Off wh-v pa org, occ pa yesh org, frm-mod hd, blky-subblky, arg ip, occ sdy (v f gr), cryptxln, mdst text.	**SHOWS:** lt brn oil stn, mod bri yel wh nat fluor, slw strmg mod bri bl wh cut fluor, mod bri bl wh resid rng.
2960	-	**MISSED**	-	**-**	
2963	100	**CLYST:** m gy-m olv gy, occ lt blush gy, rr mod yelsh grn, frm-mod hd, blky-subblky, micrmic, slty ip, loc grdg-SLTST, occ sdy, tr micrpyr lams, non- sl calc.	Sl tr Tr	**SST:**Off wh, gysh org-dk yelsh org, sft-frm, blky-subblky, crmbly, v f-f gr, clss-v pa org, clr-transp, subrnd, subsph, pr srtd, mod-wk calc cmt, arg/slt mtx, no vis por. **LST:**Off wh-v pa org, occ pa yesh org, frm-mod hd, blky-subblky, arg ip, occ sdy (v f gr), cryptxln, mdst text.	
2966	-	**MISSED**	-	**-**	
2969	100	**CLYST:** m gy-m olv gy, occ lt blush gy, occ lt gy, frm-mod hd, blky-subblky, micrmic, slty ip, loc grdg-SLTST, occ sdy, occ v f dissem micrpyr, non- sl calc.	Sl tr Tr	**SST:** off wh, gysh org-dk yelsh org, sft-frm, blky-subblky, crmbly, v f-f gr, clss-v pa org, clr-transp,subrnd, subsph, pr srtd, mod-wk calc cmt, arg/slt mtx, occ lse qtz, no vis por. **LST:**Off wh-v pa org, occ pa yesh org, frm-mod hd, blky-subblky, arg ip, occ sdy (v f gr), cryptxln, mdst text.	
2972	90	**CLYST:** m gy-m olv gy, occ lt blush gy, occ lt gy, rr dusky yelsh grn, frm-mod hd, blky-subblky, micrmic, slty ip, loc grdg-SLTST, occ sdy, occ v f dissem micrpyr, non- sl calc.	10	**LST:**Off wh-v pa org, frm-mod hd, blky-subblky, sl arg ip, chlky ip, cryptxln, mdst text.	
2975	50	**CLYST:** m gy-m olv gy, com lt blush gy-gysh blu grn, occ lt gy, occ dusky blu grn, frm-mod hd, blky-subblky, micrmic, slty ip, loc grdg-SLTST, occ sdy, occ v f dissem micrpyr, non- sl calc.	50	**LST:**Gysh org, occ dk yelsh org, mod hd-hd, occ v hd, subblky, ang, occ brit, sl arg ip, occ dolic, cryptxln-micrxln, mdst-wkst text.	**LST SHOW:**sl lt brn stn, tr dull bl wh nat fluor, sl strmg dull bl wh cut fluor, bl wh faint resid rng, B/O?
2978	70	**CLYST:** m gy-m olv gy, com lt blush gy-gysh blu grn, occ lt gy, occ dusky blu grn, frm-mod hd, blky-subblky, micrmic, slty ip, loc grdg-SLTST, occ sdy, occ v f dissem micrpyr, non- sl calc.	30	**LST:**Gysh org, occ dk yelsh org, occ wh-off wh, mod hd-hd, occ v hd, subblky, ang, occ brit, sl arg ip, occ dolic, chlky, cryptxln-micrxln, mdst-wkst text.	

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 22		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
2981	80	**CLYST:** m gy-m olv gy,com lt blush gy-gysh blu gn,occ dsky blu grn, occ lt gy, frm-mod hd, blky-subblky, occ plty, micmic ip, slty ip, loc grdg-SLTST, non-sl calc, occ mod calc.	20 Tr	**LST:** pa yelsh org-gysh org, occ off wh, occ dk yelsh org, hd-mod hd, occ v hd, subblky-blky, ang, crmbly, occ brit, arg ip, crypt-micrxln, mdst-wkst text. **SD:**Clss, clr-transp, vf-f gr, subrnd, subsph, mod srtd.	**LST SHOW:**sl lt brn stn, tr dull bl wh nat fluor, sl strmg dull bl wh cut fluor, bl wh faint resid rng, B/O?
2984	50	**LST:** pa yelsh org-gysh org, occ off wh, occ dk yelsh org, hd-mod hd, occ v hd, subblky-blky, ang, crmbly, occ brit, arg ip, crypt-micrxln, mdst-wkst text.	40 10	**CLYST:** m gy-m olv gy, com lt blush gy-gysh blu grn, occ dsky blu grn, occ lt gy, frm-mod hd, blky-subblky, occ plty, micrmic ip, slty ip, loc grdg-SLTST, n-sl calc, occ mod calc **SD/SST:**Clss, clr-transp, vf-f gr, subrnd, subsph, mod srtd, occ consol w/ wk calc cmt, arg/slt mtx ip, no vis por.	**SST SHOW:**No stn, rr yel wh mod br dir fluor, v sl dull mlky bl wh cut fluor, no resd rng.
2987	60	**CLYST:** m gy-m olv gy, occ lt gy-lt blu gy, rr dusky blu grn, frm-mod hd, blky-sub blky, micrmic ip, slty ip, sli-mod calc.	30 10	**SST:**Clss, transp.transl, vf-f gr, subrnd, subsph, mod srtd, wk calc cmt, arg ip, no vis por **LST:**Off wh-v pa gy, rr pa yelsh org, mod hd-occ hd, blky, brit, crmbly, occ sl arg, cryptxln-micrxln, mdst text.	**SST SHOWS:**No stn, no dir fluor, mod slw mlky blu wh diff cut fluor, no nat cut, no resd rng, B/O?
2990	90	**CLYST:** pred m-dk m gy, dk grn gy, m olv gy, occ dk olv gy, blu gy, frm-mod hd, blky-sub blky, micrmic ip, slty ip, sli-mod calc, inc calc.	10 Gd tr	**SST:**Clss, transp.transl, vf-f gr, subrnd, subsph, mod srtd, wk calc cmt, arg ip, no vis por **LST:**Off wh-v pa gy, rr pa yelsh org, mod hd-occ hd, blky, brit, crmbly, occ sl arg, cryptxln-micrxln, mdst text.	
2993	100	**CLYST:** pred m-dk m gy, dk grn gy, m olv gy, occ dk olv gy, blu gy, frm-mod hd, blky-sub blky, micrmic ip, slty ip, sli-mod calc, inc calc.	Gd tr Gd tr	**SST:**Clss, transp.transl, vf-f gr, subrnd, subsph, mod srtd, wk calc cmt, arg ip, no vis por **LST:**Off wh-v pa gy, rr pa yelsh org, mod hd-occ hd, blky, brit, crmbly, occ sl arg, cryptxln-micrxln, mdst text.	
2996	60	**LST:**Wh-off wh, loc v pa gy, mod frm-loc mod hd, blky, crmbly ip, loc brit, crytpxln-micrxln, loc chlky, tr stylolites, mdst text.	40	**CLYST:** pred m-dk m gy, dk grn gy, m olv gy, occ dk olv gy, blu gy, frm-mod hd, blky-sub blky, micrmic ip, slty ip, sli-mod calc, inc calc.	**LST SHOW:**No nat fluor, no nat stn, v slw mly blu wh diff cut fluor. B/O
2999	70	**LST:** Wh-off wh, loc v pa gy, mod frm-loc mod hd, blky, crmbly ip, loc brit, crytpxln-micrxln, inc chlky, inc stylolites w/ dk gy-blk arg/carb infill, mdst text.	30	**CLYST:** pred m-dk m gy, dk grn gy, m olv gy, occ dk olv gy, blu gy, frm-mod hd, blky-sub blky, micrmic ip, slty ip, gd tr v f dissem pyr, sli-mod calc, inc calc.	**LST SHOW:**No nat fluor, no nat stn, v slw mly blu wh diff cut fluor. B/O
3002	90	**LST:** Wh-off wh, loc v pa gy, mod frm-loc mod hd, blky, crmbly ip, loc brit, crytpxln-micrxln, sl arg ip, inc chlky, inc stylolites w/ dk gy-blk arg/carb infill, mdst text.	10	**CLYST:** pred m-dk m gy, dk grn gy, m olv gy, occ dk olv gy, blu gy, frm-mod hd, blky-sub blky, micrmic ip, slty ip, gd tr v f dissem pyr, tr v f blb carb incl, rr pa grn glauc, rr vf LST lams, sli-mod calc, inc calc.	**LST SHOW:**No HC od, no vis fluor, nat min fluor, mod diff mlky blu wh cut fluor. B/O

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 23		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
3005	90	**LST:**Wh-off wh, rr v pa gy, mod frm-mod hd, occ hd, blky, brit, occ crmbly, occ chlky, occ arg, tr stylolite dk gy-blk 'carb mat' w/ dense dissem pyr, occ ARG LST intlam w/clay, cryptxln-micrxln, mdst text.	10	**CLYST:**Brn gy, olv gy, dk gy, rr grn gy, mod frm, subblky, micrmic, loc dissem pyr, loc intlams w/ LST, non-sl calc, rr mod calc.	**LST SHOW:**Nat min fluor, no stn, no HC od, mod diff mlky blu wh cut fluor, no nat cut-B/O
3008	90	**LST:**Wh-off wh, rr v pa gy, mod frm-mod hd, occ hd, blky, brit, occ crmbly, occ chlky, inc arg, tr stylolite dk gy-blk 'carb mat' w/ dense dissem pyr, tr pyr nod, occ ARG LST intlam w/clay, cryptxln-micrxln, mdst text.	10	**CLYST:**Brn gy, olv gy, dk gy, rr grn gy, mod frm, subblky, micrmic, loc dissem pyr, loc intlams w/ LST, non-sl calc, rr mod calc.	Mineral & B/O fluor
3011	100	**LST:** pred wh, loc off wh, rr v pa gy, frm-mod hd, blky, brit, crmbly, loc chlky, rr tr stylolites dk gy-blk 'carb mat' w/ dense rr dissem pyr, occ ARG LST intlam w/clay, cryptxln-micrxln, mdst text.	Gd tr	**CLYST:**Brn gy, olv gy, dk gy, rr grn gy, mod frm, subblky, micrmic, loc dissem pyr, loc intlams w/ LST, non-sl calc, rr mod calc.	Mineral & B/O fluor
3014	90	**LST:** pred wh-off wh, occ v pr gy, rr pa grn wh, mod frm-mod hd, subblky-blky, occ chlky, gd tr dissem pyr, occ arg, tr stylolites, sli glauc ip, micrxln-cryptxln, mdst-wkst text.	10	**CLYST:** brn gy, olv gy, inc dk gy, rr grn gy, frm, subblky-blky,micrmic,loc dissem pyr,loc intlam w/ LST, sl-mod calc	Mineral & B/O fluor
3017	100	**LST:**Wh-off wh, mod frm-mod hd, subblky-blky, brit, occ crmbly, micrxln-cryptxln, mdst text.	Gd tr	**CLYST:** brn gy, olv gy, inc dk gy, rr grn gy, frm, subblky-blky,micmic, loc dissem pyr, loc intlam w/ LST, sl-mod calc	Mineral & B/O fluor
3020	90	**LST:** pred wh, occ off wh, frm-mod hd, occ hd, blky-subblky, brit, occ crmbly, loc chlky, sl srg ip, micrxln-cryptxln, mdst text, loc styliolites w/ carb/arg mat, dk gy-blk, dissem pyr.	10	**CLYST:** brn gy, olv gy, inc dk gy, rr grn gy, frm, subblky -blky,micmic,loc dissem pyr,loc intlams w/ LST, sl-mod calc	**LST SHOW:**No HC od, no min fluor, mod diff mlky blu wh cut. B/O
3023	100	**LST:** pred wh, occ off wh, rr pa grn gy, frm-mod hd, occ hd, blky-subblky, brit, occ crmbly, loc chlky, sl srg ip, micrxln-cryptxln, mdst text, loc styliolites w/ carb/arg mat, dk gy-blk, dissem pyr.	Gd tr	**CLYST:** Brn gy, olv gy, inc dk gy, rr grn gy, mod frm, subblky-blky, micrmic, loc dissem pyr, loc intlams w/ LST, sl- mod calc.	Mineral & B/O fluor
3026	100	**LST:** pred wh, occ off wh, rr pa grn gy, frm-mod hd, occ hd, blky-subblky, incr brit, occ crmbly, loc chlky,sl srg ip, micrxln -cryptxln, mdst text, gd tr carb/arg intlams, dk gy-blk, w/ v f dissem pyr.	Gd tr	**CLYST:** dk gy, mod frm, subblky-blky, micrmic, loc dissem pyr, loc intlams w/ LST, sl- mod calc.	Mineral & B/O fluor
3029	100	**LST:** pred wh, occ off wh, rr pa grn gy, frm-mod hd, occ hd, blky-subblky, incr brit, occ crmbly, loc chlky, sl srg ip, micrxln-cryptxln, mdst text, gd tr carb/arg intlams, dk gy-blk, w/ v f dissem pyr.	Pr tr	**CLYST:** dk gy, mod frm, subblky-blky, micrmic, loc dissem pyr, loc intlams w/ LST, sl- mod calc.	Mineral & B/O fluor

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 24		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
3032	100	**LST:** pred wh, occ off wh, rr pa grn gy, mod frm-mod hd, rr mod sft, blky-subblky, incr brit, occ crmbly, loc chlky, sl srg ip, micrxln-cryptxln, mdst text, gd tr carb/arg intlams, dk gy-blk, w/ v f dissem pyr.	Pr tr	**CLYST:** dk gy, mod frm, subblky-blky, micrmic, loc dissem pyr, loc intlams w/ LST, sl- mod calc.	Mineral & B/O fluor
3035	100	**LST:**Wh, rr off wh, mod frm-mod hd, subblky-blky, mod brit, loc crmbly, rr chlk text, cryptxln-micrxln, mdst text, w/ rr dk gy-olv blk carb/arg intlams, v f dissem pyr.	Pr tr	**CLYST:**dk gy- olv blk, rr m dk gy, frm subblky-blky, micrmic, non-sli calc.	Mineral & B/O fluor
3038	100	**LST:**Wh, rr off wh, v rr tr wh-v pa grn, mod frm-mod hd, sub blky-blky, mod brit,loc crmbly, rr chlky,cryptxln-micrxln, mdst text, w/ rr dk gy-olv blk carb/arg intlams, v f dissem pyr.	Pr tr	**CLYST:**dk gy- olv blk, rr m dk gy, frm subblky-blky, micrmic, non-sli calc.	Mineral & B/O fluor
3041	100	**LST:**wh-pa blu, occ off wh, frm-mod hd, blky-subblky, mod brit, crmbly ip, chlky text ip, rr dk gy-olv blk arg lams, cryptxln, loc micrxln, mdst text, no vis por.	Rr tr	**CLYST:**dk gy- olv blk, rr m dk gy, rr grnsh gy, frm subblky-blky, micrmic, non-sli calc.	Mineral & B/O fluor
3044	100	**LST:**wh-pa blu, occ off wh, rr v lt gy, frm-mod hd, blky-sub blky, mod brit, crmbly ip,occ splnty. chlky text ip, rr dk gy-olv blk arg lams, cryptxln, loc micrxln, mdst text, no vis por.	Rr tr	**CLYST:**dk gy- olv blk, rr m dk gy, rr grnsh gy, frm subblky-blky, micrmic, non-sli calc.	Mineral & B/O fluor
3047	100	**LST:**wh-pa blu wh, occ off wh, rr v lt gy, rr v pa org, frm-mod hd, blky-subblky, mod brit, crmbly ip, occ splnty. chlky text ip, rr dk gy-olv blk arg lams, cryptxln, loc micrxln, mdst text, no vis por.	Rr tr	**CLYST:**dk gy- olv blk, rr m dk gy, rr grnsh gy, frm subblky-blky, micrmic, non-sli calc.	Mineral & B/O fluor
3050	100	**LST:**wh-pa blu, occ off wh, rr v lt gy, frm-mod hd, blky-sub blky, mod brit, crmbly ip,occ splnty. chlky text ip, rr dk gy-olv blk arg lams, cryptxln, loc micrxln, mdst text, no vis por.	Rr tr	**CLYST:**dk gy- olv blk, occ gysh blu grn, rr m dk gy, rr grnsh gy, frm subblky-blky, micrmic, non-sli calc.	Mineral & B/O fluor
3053	100	**LST:**wh-pa blu, occ off wh, rr v lt gy, frm-mod hd, blky-sub blky, mod brit, crmbly ip,occ splnty. chlky text ip, rr dk gy-olv blk arg lams, cryptxln, loc micrxln, mdst text, no vis por.	Rr tr	**CLYST:**dk gy- olv blk, occ gysh blu grn, rr m dk gy, rr grnsh gy, frm subblky-blky, micrmic, non-sli calc.	Mineral & B/O fluor
3056	100	**LST:**wh-pa blu, occ off wh, rr v lt gy, frm-mod hd, blky-sub blky, mod brit, crmbly ip,occ splnty. chlky text ip, rr dk gy-olv blk arg lams, cryptxln, loc micrxln, mdst text, no vis por.	Rr tr	**CLYST:**dk gy- olv blk, occ gysh blu grn, rr m dk gy, rr grnsh gy, frm subblky-blky, micrmic, non-sli calc.	Mineral & B/O fluor
3059	100	**LST:**wh, occ off wh-pa blu, rr v lt gy, frm-mod hd, blky-sub blky, mod brit, crmbly ip,occ splnty. chlky text ip, rr dk gy-olv blk arg lams, cryptxln, loc micrxln, mdst text, no vis por.	Rr tr	**CLYST:**dk gy- olv blk, occ gysh blu grn, rr m dk gy, rr grnsh gy, frm subblky-blky, micrmic, non-sli calc.	Mineral & B/O fluor

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 25		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
3062	100	**LST:**wh, occ off wh-v pa gy wh, occ v pa org, frm-mod hd, blky-subblky, loc brit, crmbly ip, occ splnty. chlky text ip, rr dk gy-olv blk arg lams, cryptxln, occ micrxln, mdst text, occ dissem pyr, no vis por.	Rr tr	**CLYST:**dk gy- olv blk, occ med-dk grn gy, frm-mod hd, subblky, occ blky, micrmic, sli calc, occ vf dissem pyr.	Mineral & B/O fluor
3065	100	**LST:**wh, occ off wh-v pa gy wh, frm-mod hd, blky-subblky, crmbly ip, loc brit, chlky text ip, occ sli arg, cryptxln, occ micrxln, mdst text.	Rr tr	**CLYST:**dk gy- olv blk, occ med-dk grn gy, frm-mod hd, subblky, micrmic, sli calc.	Mineral & B/O fluor
3068	100	**LST:** pred off wh-wh, com off wh-v pa gy, occ v pa orng-gy orng, frm-mod hd, blky-subblky, crmbly ip, loc brit, chlky ip, occ sli arg, cryptxln, occ micrxln, mdst text, occ dissem pyr.	Rr tr	**CLYST:**dk gy- olv blk, occ med-dk grn gy, frm-mod hd, subblky, micrmic, sli calc.	Pred mineral & B/O fluor,rr tr brit blu wh, nat fluor, slw strmg mlky blu wh cut fluor.
3071	100	**LST:** pred v pa org, off wh-wh, com off wh-v lt gy, occ dk yel org, frm-mod hd, blky-subblky, crmbly ip, loc brit, chlky text ip, loc arg, occ grdg Arg Lst, cryptxln, occ micrxln, mdst text, rr dk gy-med grn gy argil intlams, occ vf dissem pyr.	Rr tr	**CLYST:**dk gy- olv blk, occ med grn gy, frm-mod hd, subblky-blky, micrmic, mod-v calc, loc grdg Calc Clyst, tr dissem micropyr.	Pred mineral & B/O fluor,rr tr brit blu wh, nat fluor, slw strmg mlky blu wh cut fluor.
3074	90	**LST:** pred v pa org, off wh-wh, com off wh-v lt gy, occ dk yel org, frm-mod hd, blky-subblky, crmbly ip, loc brit, chlky text ip, loc arg, occ grdg Arg Lst, cryptxln, occ micrxln, mdst text, rr dk gy-med grn gy argil intlams, occ vf dissem pyr.	10	**CLYST:**dk gy- olv blk, occ med grn gy, frm-mod hd, subblky-blky, micrmic, mod-v calc, loc grdg Calc Clyst, tr dissem micropyr.	Pred mineral & B/O fluor,rr trbrit blu wh, nat fluor, slw strmg mlky blu wh cut fluor.
3077	70	**LST:** pred v pa org, off wh-wh, com off wh-v lt gy, occ dk yel org, frm-mod hd, blky-subblky, crmbly ip, loc brit, chlky text ip, loc arg, occ grdg Arg Lst, cryptxln, occ micrxln, mdst text, rr dk gy-med grn gy argil intlams, occ vf dissem pyr.	30	**CLYST:**dk gy- olv blk, occ med grn gy, frm-mod hd, subblky-blky, micrmic, mod-v calc, loc grdg Calc Clyst, tr dissem micropyr.	Pred mineral & B/O fluor,rr tr brit blu wh, nat fluor, slw strmg mlky blu wh cut fluor.
3080	70	**ANHY:**wh, sft-mod frm, subbkly, fri, crmbly, microxln, loc suc.	30 Rr tr	**LST:** pred v pa org, off wh-wh, com off wh-v lt gy, occ dk yel org, frm-mod hd, blky-subblky, crmbly ip, loc brit, chlky ip, loc arg, occ grdg Arg Lst, cryptxln, occ micrxln, mdst text, rr dk gy-med grn gy argil intlams. **CLYST:** dk gy-olv blk,occ med grn gy,frm-mod hd, subblky -blky, micmic, mod-v calc, loc grdg calc clyst, tr dissem pyr	Pred mineral & B/O fluor,rr tr brit blu wh, nat fluor, slw strmg mlky blu wh cut fluor.

WELL: 1/5-4S (K1T1)		AMERADA HESS NORGE A/S			
Sheet No: 26		SAMPLE DESCRIPTION DOCUMENT			
DEPTH	**%**	**DOMINANT LITHOLOGY**	**%**	**MINOR LITHOLOGY**	**Accessory, Show**
3083	90	**ANHY:**wh, sft-mod frm, subbkly, fri, crmbly, microxln, loc suc.	10 Rr tr	**LST:** pred v pa org, off wh-wh, com off wh-v lt gy, occ dk yel org, frm-mod hd, blky-subblky, crmbly ip, loc brit, chlky ip, loc arg, occ grdg Arg Lst, cryptxln, occ micrxln, mdst text, rr dk gy-med grn gy argil intlams. **CLYST:** dk gy-olv blk,occ med grn gy,frm-mod hd, subblky -blky, micmic, mod-v calc, loc grdg calc clyst, tr dissem pyr	Pred mineral & B/O fluor,rr tr brit blu wh, nat fluor, slw strmg mlky blu wh cut fluor.
3086	100	**ANHY:**wh, sft-mod frm, subbkly, fri, crmbly, microxln, loc suc.	Rr tr	**LST:**pred v pa org, off wh-wh, com off wh-v lt gy wh, occ dk yel org, frm-mod hd, blky-subblky, crmbly ip, loc brit, chlky text ip, loc arg, occ grdg Arg Lst, cryptxln, occ micrxln, mdst text, rr dk gy-med grn gy argil intlams.	Pred mineral & B/O fluor,rr tr brit blu wh, nat fluor, slw strmg mlky blu wh cut fluor.
3089	100	**ANHY:**wh, sft-mod frm, subbkly, fri, crmbly, microxln, loc suc.	Rr tr	**LST:**pred v pa org, off wh-wh, com off wh-v lt gy wh, occ dk yel org, frm-mod hd, blky-subblky, crmbly ip, loc brit, chlky text ip, loc arg, occ grdg Arg Lst, cryptxln, occ micrxln, mdst text, rr dk gy-med grn gy argil intlams.	Pred mineral & B/O fluor,rr trbrit blu wh, nat fluor, slw strmg mlky blu wh cut fluor.
3090	100	**ANHY:**wh, sft-mod frm, subbkly, fri, crmbly, microxln, loc suc.	Rr tr	**LST:**pred v pa org, off wh-wh, com off wh-v lt gy wh, occ dk yel org, frm-mod hd, blky-subblky, crmbly ip, loc brit, chlky text ip, loc arg, occ grdg Arg Lst, cryptxln, occ micrxln, mdst text, rr dk gy-med grn gy argil intlams.	Pred mineral & B/O fluor,rr trbrit blu wh, nat fluor, slw strmg mlky blu wh cut fluor.

ATTACHMENT 11.4

WIRELINE LOGGING WITNESS REPORTS

AND WIRELINE TOOL FAILURE REPORT

Logging Report
Well 1/5-4S K1T1
17.5” Hole Section

TABLE OF CONTENTS

Name: Ian Prothero
Job: Wellsite Geologist
Date: 28 April 02

1. Well Data

Well No.	1/5-4S
Prospect	K1T1
Licence	PL 144
Well Classification	Exploration
Location co-ordinates	56° , 42 min, 32.044 sec N 02° , 37 min, 41.060 sec E
RTE Elevation	23.00 m amsl
Water depth	70.00 m
RTE to seabed	93.0m
TD	N/A (Baker Atlas depth)
Max. deviation.	20.0 deg.
Casing depths **(Drillers depth)**	30" @ 167.3 mMD brt 20" @ 923m MD brt

2. Logs Run

Run No.	**Date**	**Log**	**Interval (m)**	
			Top	**Bottom**
1A	27/4/02	GR//MAC/ZDEN/TTRM	N/A	N/A

3. Operation Activity Summary

27-04-02

22:30	Safety meeting with drill, Maritime and Atlas crew
22:40	Start rigging up
23:45	Check tool

28-04-02

00:00	Zero tool string at ttrm 24.48m
00:05	install ZDEN source
00:30	turn on compensator on drill floor
01:00	problems RIH. Can't get below 374m attempt 5 times w/ max o'pull of 2,500lbs
01:30	POOH w/ Run 1A, sticky clay/mud ob centralisers
02:30	Sources removed
03:00	R/D complete.

4. Temperature and Circulating History

Run No.	Date	Logs run	Hole Size (in)	Logged interval (m BRT ld)		Max Temp (°C)	Time since circ. (hrs)
				Top	Bottom		
1A	27/4/02	GR//MAC/ZDEN/TTRM	17.5	N/A			

5. Comments

Run 1A unable to pass 374m due to sticky obstruction. String pulled, centralisers coated with sticky clay/mud.

Baker Atlas rigged down. RIH w/ 17 .5" assembly with mud motor removed for wiper trip.

17 ½" logging abandoned due to poor hole conditions.

6. Time Breakdown

Run No.	Date	Log	Interval (m) Top	Bottom	Opr. Time (Productive) (Hr:min)					Non-productive Time (Hr:min)		Total Time (Hr:Min)	Max temp (°C)
					Rig-up	RIH	Log	POOH	Rig-down	Hole Conditions	Baker Atlas		
1A	27/4/02	GR//MAC/ZDEN/ TTRM	N/A		1:20	00:30	N/A	0:30	1:00	00:30	0.00	4:20	N/A

Logging Report
Well 1/5-4S K1T1
8½" Hole Section

TABLE OF CONTENTS

Name: Roger Saint/Ed Linaker
Job: Wellsite Geologist
Date: 17 May 02

1. Well Data

Well No.	1/5-4S
Prospect	K1T1
Licence	PL 144
Well Classification	Exploration
Location co-ordinates	56° , 42 min, 32.044 sec N 02° , 37 min, 41.060 sec E
RTE Elevation	23.00 m amsl
Water depth	70.00 m
RTE to seabed	93.0m
TD	3088.5 (Baker Atlas depth)
Max. deviation.	55.4 deg. @ 2903m MD brt
Casing depths **(Drillers depth)**	30" @ 167.3 mMD brt 20" @ 923m MD brt 14" @ 1640 m MD brt 9 5/8" @ 2873 m MD brt

2. Logs Run

Run No.	**Date**	**Log**	**Interval (m)**	
			Top	**Bottom**
2A	16/5/02	GR//MAC/HDIL	2873*	3088.5
2B	16/5/02	GR/ZDL/CN	2873	3088.5
2C	17/5/02	GR/FMT	2944.8	2944.8
2D	17/5/02	GR/FMT	2944.3	3035

* MAC (sonic) run until top of cement at 2440m.

3. Operation Activity Summary

<u>16-05-02</u>

07:30	Safety meeting with drill, Maritime and Atlas crew, started rigging up sheaves.
08:00	Waiting on decision regarding running HDIL.
08:45	HDIL required. Agreed changed toolstring.
09:20	Started picking tools for run 2A GR/MAC/HDIL.
11:15	Tools rigged up.
11:30	Tools checked and calibrated, started RIH.
11:40	At 84.4m put compensator on.
11:55	At 92.2m adjusted depth back to 84.4m.
12:00	Continued RIH (running speed 40 m/min).
13:00	At 2850, recorded up for last MMR in casing and casing pip tag. (up logging tension 4200 lbs)
13:05	Last mark in casing 2827m, pip tag 2802.5m (2.5m shallow).
13:10	At shoe, no problems passing through rathole. Started logging down at 10 m/min. Logging tension 1800lbs
13:15	Stood up at 2948m uncorrected, sticky. Picked up to restart downlog taking overpull (1000lbs) at 2942m. continued POOH. (looks like it correlates to the lower of the Paleocene sands)
13:20	Hung up again at 2927m (1000-1200lbs overpull), free but unable to push tool downhole.

13:25	POOH inside casing.
13:30	At 2840m, started RIH at 20 m/min. (log down tension 1800 lbs).
13:35	Started downlog at 20 m/min (faster to hopefully keep enough momentum to get past Paleocene sands), too fast to record both HDIL and MAC data, switched of MAC downlog and swapped to logging down with MAC approximately 50m from bottom to check wave forms.
13:50	At TD 3086m uncorrected. Picked up slowly and started main up log at 4 m/min.
14:30	500-600 lbs overpull at 2955m (lower Paleocene sand).
14:35	500 lbs overpull at 2943m (Upper Paleocene sand).
14:50	200-300 lbs overpull at 2887m.
14:55	Inside 9 5/8" casing shoe 2870.5m uncorrected 2.5m shallow, continued logging up at 10 m/min to log casing pip tag again logged at 2802.5m uncorrected, 2.5m shallow (+2.5 depth correction – corrected wireline TD 3088.5m).
15:00	RIH for repeat section.
15:15	At 3006m corrected depth. Start repeat section logging up at 4-5m/min.
15:20	1000lbs overpull at 2996m.
15:35	Finished repeat log.
15:45	Inside shoe, POOH to 2400m to calibrate MAC over section with no cement behind casing.
16:15	Finished calibration position, RIH to shoe.
16:30	Start up log for MAC.
17:10	Finished HDIL/MAC, POOH.
18:10	At surface.
18:45	Rig down complete, started rigging up run 2B GR/ZDL/CN
19:30	Toolstring checked.
19:40	Meeting on drill floor, before installing sources into logging string.
19:55	Going down to 60m, driller putting on compensator.
20:00	Preset depth from 64.5m to 60m. RIH.
21:00	Pick up weight at 2800m, 3700lbs.
21:10	Perform log verification of caliper at2801m, preset caliper from 8.665 to 8.606
21:15	Recording file 11, from 2825m to 2780m, to check depth of gamma peak. Many peaks due to source activation, going down to tie in with casing.
21:30	Recording file 12, start repeat section at 8m/min, from 3005m to 2900m, repeat section 1.5m shallow, adjust depth correction +1.5m.
21:45	Repeat section completed. Preset depth from 2894.173m to 2895.573m
22:00	Recording file 13, main log, from 3095m, cable tension taken up at 3088.5m, to 2823m, 700lbs overpull at 2939m, and 400lbs overpull at 2929.6m (logging speed 8.5 m/min)
22:30	Main log completed, after verification of caliper at 2820m. POOH.
23:30	At 50m, take off compensator.
23:45	Out of hole.
23:55	Remove sources from tool.

<u>17-05-02</u>

00:30	Completeed after calibrations and started rigging down run 2B GR/ZDL/CN.
01:15	Rig down completed.
01:20	Radio active survey on drill floor after sources removed
01:30	Started making up run 2C FMT/GR (unchecked prior to job due to late arrival on rig).
03:00	checking tools.
03:55	Tools checked and calibrated. RIH.
04:00	At 130.35m, put on compensator, reset depth and continued to RIH.
05:00	At 2825m, started GR correlation (+1.5 depth correction).
05:15	Quartz gauge starts to drift, very unstable signal. Changed out FMT panel, and powered down tool, quartz gauge signal still erratic, strain gauge still OK.
05:50	Continued to RIH to 2930m to do correlation, quartz guage signal stabilised, powered down string and up again, still OK.
06:00	Correlation pass from 2930m to 2887m – on depth. Quartz gauge signal again erratic while correlatng.

06:10	Go to 1st Pretest point at 2944.8m using strain gauge, (hyd. Press. – 1.78sg, Form Press. – 1.6 sg although pressure not completely stable before stain guage signal became erratic.
06:30	POOH to troubleshoot.
07:30	At surface, still seeing the problem, although intermittant. Removed SWL/CHT (tool head swivel/cable head tension), monitored signals for 20 mins. Stable. Put SWL/CHT back on and problem occurred again. Swapped to Daps B, still bad. Put on back up GR and FMT electronics and picked up rest of backup FMT, set for 15 cc drawdown.
12:00	Back up FMT tool connected and checked – OK.
12:10	Tool zerod and RIH to 50m
12:20	Put compensator on, adjust depth back to 50m and continued to RIH
13:15	At 2850m, acclimatise tool.
13:25	Started correlation check with casing pip tag at 2805m, 4m deep, depth correction – 0.4m made and recheck.
13:40	RIH to 2930m for correlation pass, 0.4m deep, -0.4m depth correction, stopped correlation at 2883m
13:55	At first pretest point 2944.8m (Lost seal?, 102.6°C)
14:05	Move up 0.5m to 2944.3m (still building slowly, 103.7°C).
14:18	At 2945.3m (Good test?, 104.9°C).
14:29	At 2954m (Tight, 105.5°C).
14:33	At 2953.4m (Tight, 105.9°C).
14:40	RIH to 2990m and log up with GR to check correlation , 0.5m deep.(–0.5m depth correction).
14:45	At 2953.2m (Tight, 107.2°C).
14:55	At 2973.5m (Tight, 107.6°C).
15:20	At 2995.6m (Tight, 108.0°C). Problems sticky around 3005m.
15:25	Recorrelation, with +1.5m correction.
15:40	RIH to next pretest depth.
15:43	At 3019m (still building slowly, 108.9°C).
15.57	At 3035m (Tight, 110.2°C).
16:02	At 3029.5m (Good test, 111.1°C).
16:10	At 3025m (Tight, 111.1°C).
16:15	At 3020m (Good test, 111.3°C).
16:30	At 3025.3m (Still building slowly 0.1bar/min after 20 mins, 111.3°C).
16:53	Pulling up slowly to 2999.5m, whilst checking permiability.
17:00	At 2999.5m (Tight, 111.0°C).
17:05	Pull to 2944.4m, correlating with GR, 0.5m shallow (+0.5m depth correction).
17:15	At 2944.4m (Tight, 111.0°C).
17:20	At 2944.9m (Almost stable at 10 mins, 109.3°C).
17:35	At 2945.4m (Good test 108.7°C).
17:45	Stay on last sample depth, filling 10 ltr. flush tank, fluctuating pressure between 150-200psi, no increase in pressure noted over time.
18:50	Open 4 ltr. sample chamber.
19:00	Shut 4 ltr. sample chamber, initial hydrostatic pressure 432.7, final pressure 431.1.
19:05	POOH
20:00	On surface extracting samples.
21:00	Finished extraction, preflush = 9 ltrs fluid and 0.6 cuft gas, PVT had no gas and 0.75 ltr fliud. None of the tanks had any overpressure.
22:00	Rig down atlas wireline complete. Rig floor to Odfjell.

4. Temperature and Circulating History

Run No.	Date	Logs run	Hole Size (in)	Logged interval (m BRT ld)		Max Temp (°C)	Time since circ. (hrs)
				Top	Bottom		
2A	16/5/02	GR//MAC/HDIL	8½	2873*	3088.5	107.2	15:45
2B	16/5/02	GR/ZDL/CN	8½	2873	3088.5	118	23:55
2C	17/5/02	GR/FMT	8½	2944.8	2944.8	N/A	31:25
2D	17/5/02	GR/FMT	8½	2944.3	3035	111.3	40:25

* MAC (sonic) run until top of cement at 2440m.
Last circulation 22:05 on 15/05/02, length of last circulation – 1hr 55mins.

5. Comments

Run 2D GR/FMT:-
No. Pretest pressure samples – 15.
No. Tests to locate fluid sample point – 3.
No. Fluid samples taken – 1.

Volume of sample in 10 ltr Flush tank – 9 ltr. No observed pressure.
Volume of sample in 4 ltr Sample tank – 0.75 ltr. No observed pressure.

Down time, 7hrs, 50 mins.

6. Time Breakdown

Run No.	Date	Log	Interval (m) Top	Bottom	Opr. Time (Productive) (Hr:min)					Non-productive Time (Hr:min)		Total Time (Hr:Min)	Max temp (°C)
					Rig-up	RIH	Log	POOH	Rig-down	Hole Conditions	Baker Atlas		
2A	16/5/02	GR//MAC/HDIL	2873*	3088.5	4:00	1:30	4:10	1:00	0:35	0:20	-	11::15	107.2
2B	16/5/02	GR/ZDL/CN	2873	3088.5	1:10	1:05	1:30	1:15	1:45	-	-	6:45	118
2C	17/5/02	GR/FMT	2944.8	2944.8	2:25	1:05	0:25	-	-	-	2:05	6:00	N/A
2D	17/5/02	GR/FMT	2944.3	3035	-	-	5:50	0:55	2:00	-	5:45	14:30	111.3
										0:20	**7:50**	**38:30**	

* MAC (sonic) run until top of cement at 2440m.

Problem Report

Problem Description

On 17th May 2002, rig Deep Sea Bergen, Baker Atlas had a failure with the first run FMT. Problem was the Hewlett Packard (HP) Pressure signal being intermittent. Surface panels were exchanged and problem still appeared to be tool related. Trouble-shooting indicated the problem to be with the tool and the tool was pulled to surface and signal was still intermittent.

Fix :

Complete tool string was replaced with the back-up and run in hole to complete pressure survey and sample taking.

Problem investigation and follow-up:

Back in the base, the engineers stringed up the intermittent sting, and checked it out.
Had the string running for 4 hours, with and without the pump attached to the snorkel to simulate formation pressure. Could not reproduce the problem.

The tools were returned to Aberdeen, and the mandrel was completely serviced, new wiring installed in tool.

Tool prepared for HTHP well (including heat test to 150 degrees C). After re-build and heat-test the tools were again checked-out and found to be in working order.
Tool has not been in a well after the failure on Deep Sea Bergen, but with all new wiring in the tool and several hours of checking it does indicate that the problem could have been located elsewhere than in the tool or that the fault was in the wiring of the tool even if not found during post-job checking.

ATTACHMENT 11.5

GEOLOGICAL REFERENCES

11.5 GEOLOGICAL REFERENCE DATA BASE

The following documents were consulted in preparing this report, or exist as supplementary information to Well 1/5-4S

1. Drilling Programme for Well 1/5-4S, AHN document No. DR-020-AHN-02, 2002.
2. Amerada-Hess 1/5-4S K1T1 Prospect – Data Acquisition Procedures Manual, AHN document No. WT-042-AHN-02, 2002.
3. Geomec, 1/5-4S Wellbore Stability Analysis, Project G-AH-2002-01, 18/6/02
4. Sperry-Sun Drilling Services “End of Well Report - Surface Data Logging, Amerada-Hess 1/5-4S”.
5. Microstratigraphy report"Biostratigraphy of Amerada Hess Well 1/5-4S, interval 2580m - 3086m
6. Geolab Nor report " Geochemical Report on NOCS Well 1/5-4S
7. Sperry-Sun "END OF WELL REPORT - Measurement While Drilling, Amerada-Hess AS 1/5-4S”.
8. Baker Atlas Wireline Services , Log Interpretation Charts, 1996.
9. NPD Bulletin No.5 “A Revised Cretaceous and Tertiary Lithostratigraphic Nomenclature for the Norwegian North Sea” (1989)
10. NPD Bulletin No.3 “A Revised Triassic and Jurassic Lithostratigraphic Nomenclature for the Norwegian North Sea” (1984).
11. Isaksen, D. & Tonstad, K. (eds.). 1989. A revised Cretaceous and Tertiary lithostratigraphic nomenclature for the Norwegian North Sea. NPD Publn

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ATTACHMENT 11.6

COMPLETION LOG