SECTION B

DRILLING

AND

WELL OPERATIONS

WELL

15/12-15

CONTENTS

FIGURES

1 GENERAL INFORMATION

Well 15/12-15 was drilled as a wildcat to test the Villmink Øst prospect. The main objective was to drill to Middle Jurrasic/Triassic strata with the aim to explore the hydrocarbon bearing potential of Oxfordian age (Upper Jurrasic) sandstones analogues to the Varg West. No permeable formations with hydrocarbons were found and therefore the well was permanently plugged and abandoned.

This report covers all operations from anchoring on 15/12-15 location until the anchors were pulled after drilling the well.

The operation was performed using the semi submersible rig Deepsea Trym.

The rig arrived at the location November 15th 2004 and the well spudded November 19th 2005. The operation on the well finished when last anchor was pulled December 26th 2004.

2 GENERAL WELL DATA

WELL LOCATION

Area	Norwegian North Sea	**Well Classification:**	Wildcat
Field	Villmink Øst	**Well design basis:**	Exploration
PL number	038 (Pertra 70%, Petoro 30%)	**Block**	15/12
H_2S, level of preparedness:			1

Well Identification:	15/12-15		Villmink Øst
Spud location		N 6 434 481 m E 433470 m	
Top Reservoir	15/12-15	N 6 434 489.01 m E 433 491.58 m	3141 m TVD, RKB 3142 m MD, RKB
TD	15/12-15	N 6 434 491.68 m E 433 493.51 m	3299.58 m TVD, RKB 3300.00 m MD, RKB

DRILLING RIG

Name:	Deepsea Trym	**Rig heading:**	150°
Type:	Semi Submersible		
RKB-MSL:	25 m	**Water depth :**	88 m

3 BOP SKETCH

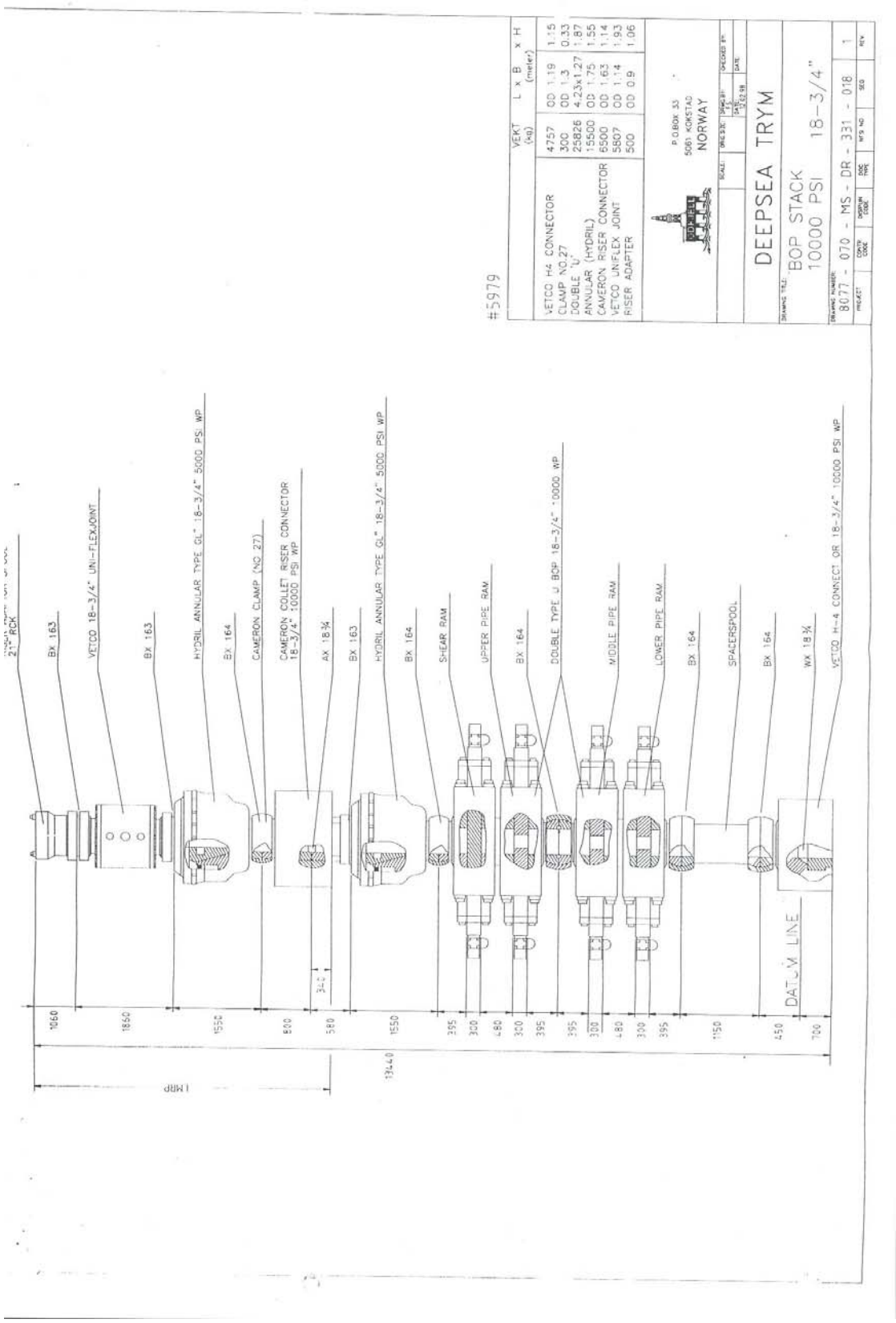


Figure 3-1 Deepsea Trym Pressure Control Equipment

4 LIST OF MAIN CONTRACTORS

Service	Company	Address	Contact	Phone	Fax
Rig*	Odfjell	Sandslimarka 63, P.O.Box 33, 5863 Bergen	Kjetil Forland	55998900 93240027	55998901
Multi-services**	Halliburton	Postboks 200, 4065 Stavanger	Jarl Hovden	51837000	51838383
Wireline	Smedvig	Finnestadgeilen 8, Box 338, 4001 Stavanger	Svein Bjelland	51839400	51839455
Liner Hanger (contingency)	PEAK	P.O.Box 162, 4098 Stavanger	Tore Todnem	51949000	51949001
Wellhead and conductor	Dril Quip	Lagerveien 31 4033 Stavanger	Torstein Lunder	51443700	51443701
Tubular services	Sumitomo	Bygg 92 North Sea Base 4056 Tananger	Håkon Håland	51652905	51652907
ROV	Subsea 7	Postboks 205, 4065 Stavanger	Geir Skåra	51838177	51837101
Base and supply boats	Statoil	Statoil Base Dusavik	Tor Sigve Gjerde	51995977 51990000	
Helicopter	Helicopter services		Personnel Duty	81033261	

*Includes rig positioning, anchoring, casing running and communication
**Includes Directional drilling, bits, MWD, mud , mud logging, wireline logging, cement, casing cutting and overall service planning.

5 OPERATIONS ORGANISATION CHART

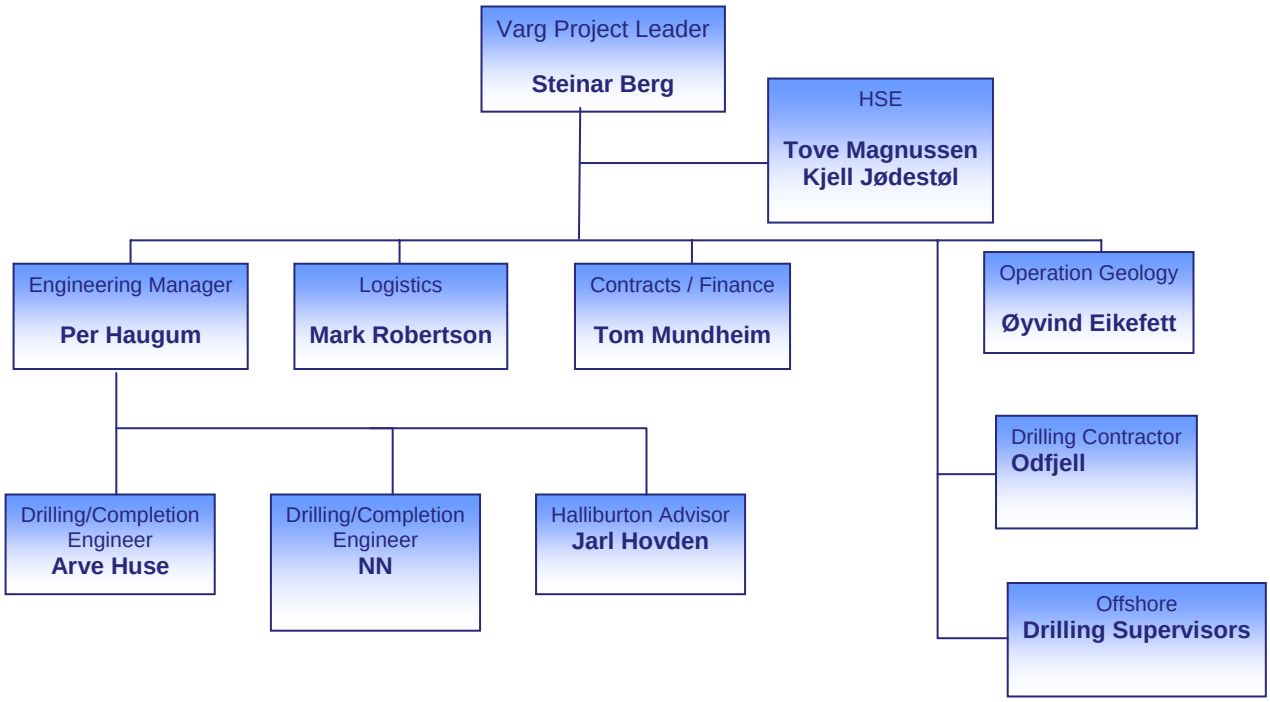


Figure 5-1 Project organization

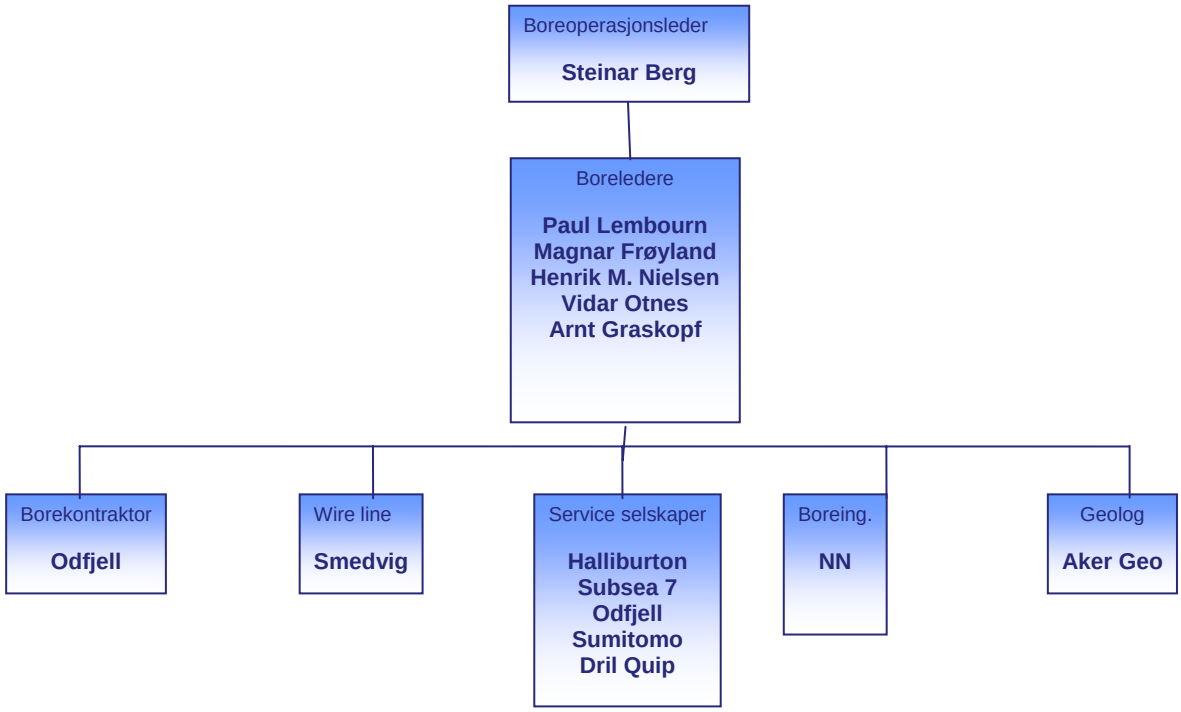


Figure 5-2 Offshore organization

6 LOCATION MAP

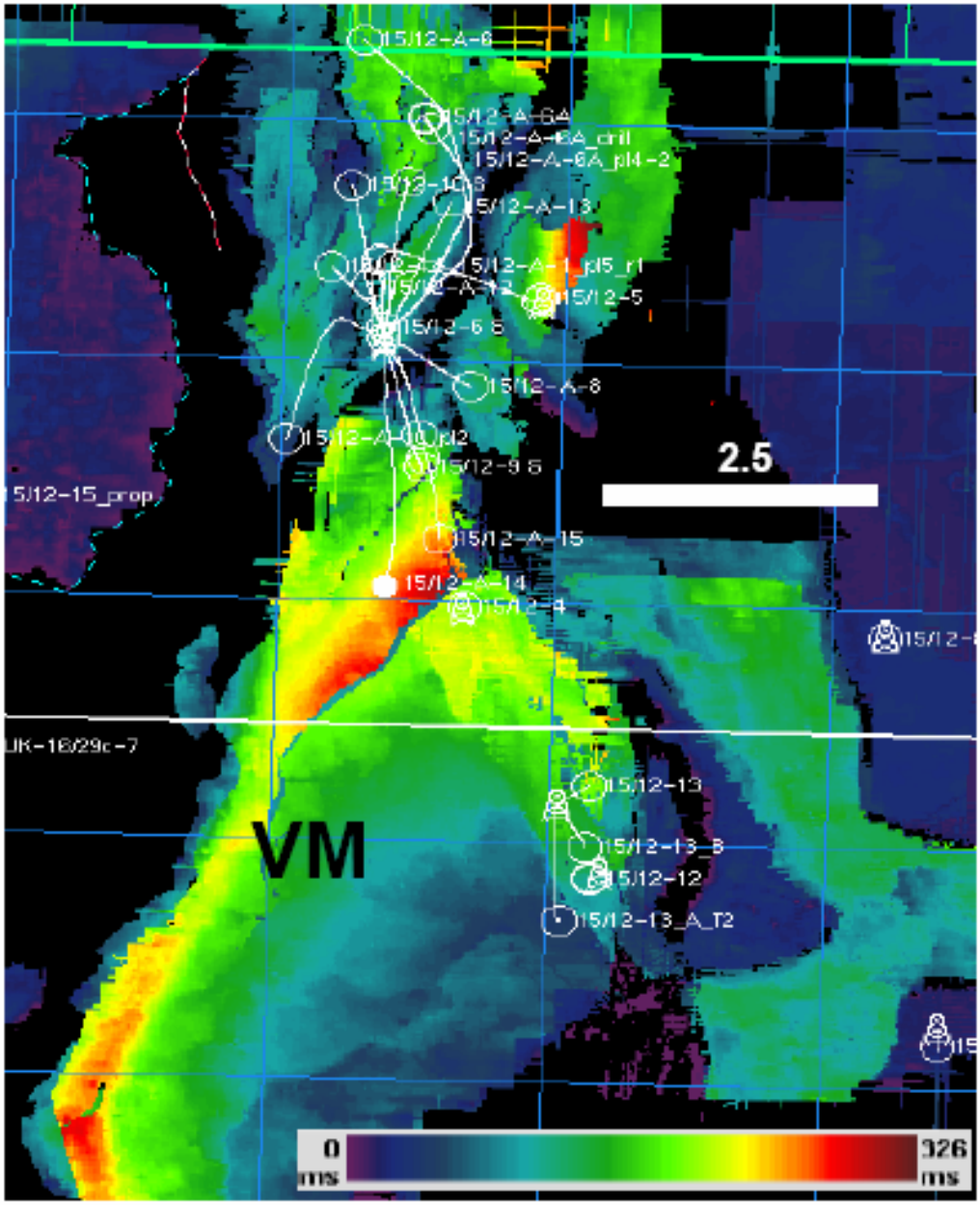


Figure 6-1 Well Location Map

7 WELL HISTORY

Well 15/12-15 was a new well on the Villmink Øst . The evaluation of the Upper Jurrasic prospect outside the Varg Field in 15/12 resulted in two potential targets named Villmink Øst and Villmink Vest. The main objective was to test the 15/12-15 Villmink Øst prospect for hydrocarbons. No hydrocarbons were found and therefore the well was permanently plugged and abandoned.

8 FINAL WELL STATUS/WELL SKETCH

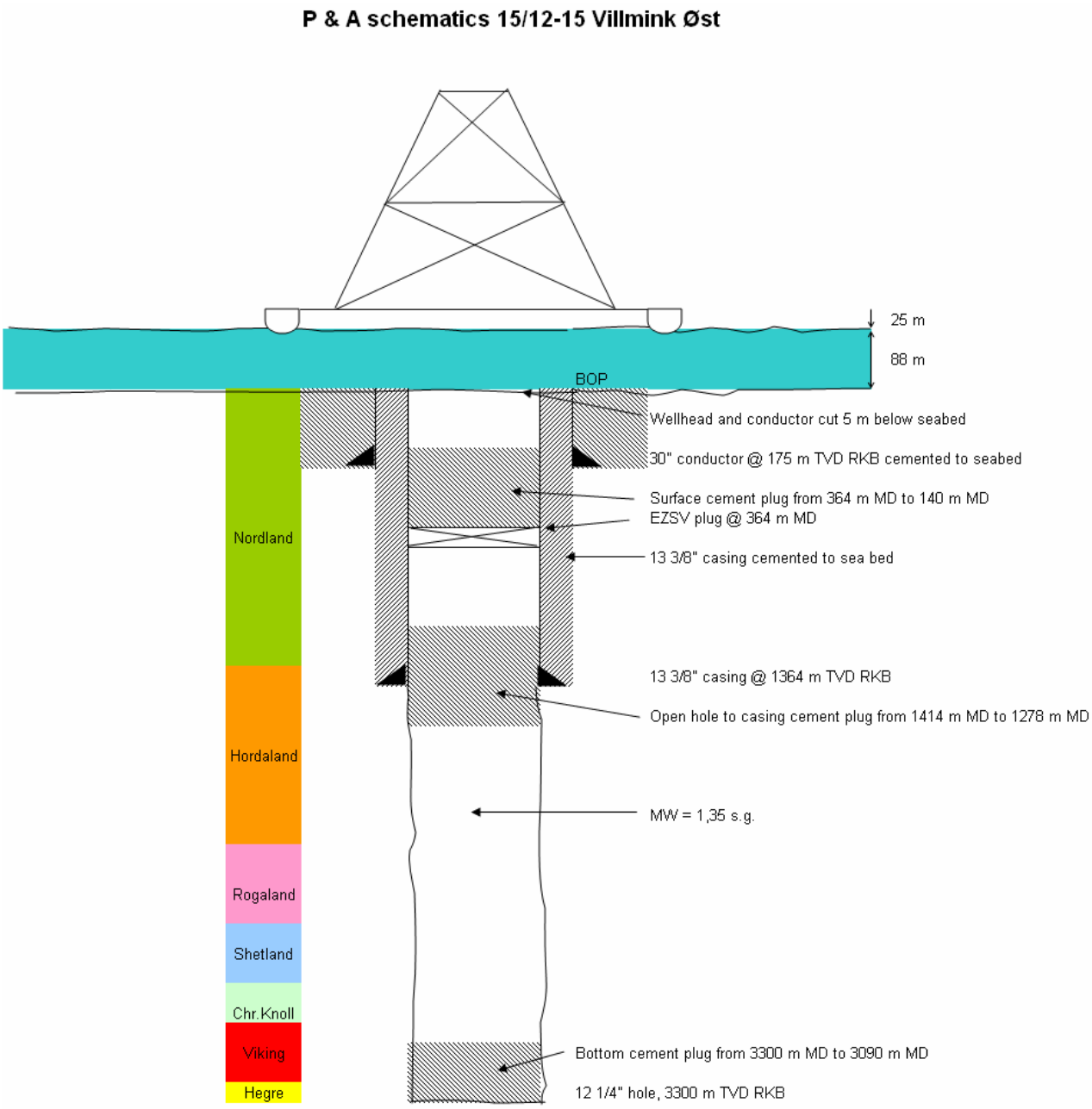


Figure 8-1 Final well status

9 WELLHEAD SKETCH

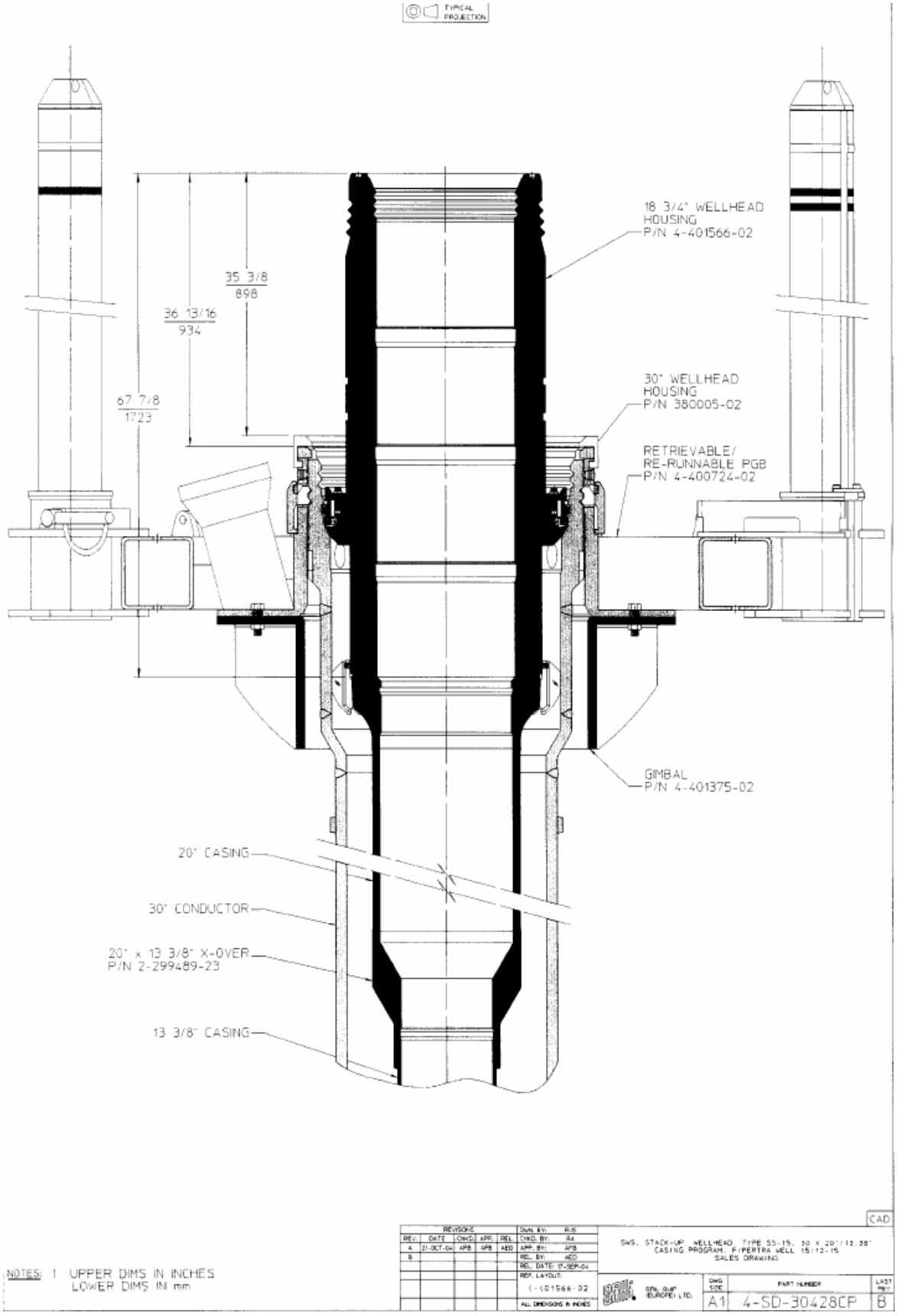


Figure 9-1 15/12-15 Wellhead

10 OPERATION SUMMARY

Operation commenced November 17th 2004 at 01:10 when first anchor was dropped , and finished December 26th 2004 at 11:30 when last anchor was pulled.

10.1 RIG MOVE

Total time used: 47.5 hrs.
Operational time: 42.5 hrs.
Downtime: 5.0 hrs.

Operation started November 17th 2004 at 01:10 when first anchor was run. The anchor handling and preparations for drilling operations were finished November 19th 00:30.

10.2 36" SECTION

Total time used: 80.5 hrs.
Operational time: 77.0 hrs.
Downtime: 3.5 hrs.

Spudded November 19th 2004.

Made up and ran in hole with a 36" BHA consisting of a 17 ½" pilot bit, a 36" hole opener, mud motor and an Anderdrift for inclination surveys. Drilled 36" hole from 113 m MD to TD at 176 m MD using seawater and hi-vis pills (10 m3 / 10 m drilled). Displaced hole to 1.25 sg mud and performed a wiper trip. Displaced hole to 1.50 sg mud and pulled out of hole.

Ran and cemented the 30" conductor with shoe at 175 m MD.

Ran in hole a 26" bit and drilled out cement and shoe inside 30" conductor. Cleaned the rat hole and pulled out of hole.

10.3 17 ½" HOLE

Total time used: 187.0 hrs.
Operational time: 169.5 hrs.
Downtime: 17.5 hrs.

The 17 ½" section was drilled using seawater and hi-vis sweeps (10 m3/10 m drilled)

Made up and ran in hole with a 17 ½" BHA consisting of a 17 ½" tri cone bit, mud motor and MWD.

Waited 5 hours on ROV (el. Failure)

Drilled 17 ½" hole from 176 m MD to 313 m MD.

Stopped drilling due to falling object, pulled to inside shoe. Inspected and repaired top drive.

Drilled 17 ½" hole from 313 m MD to TD at 1370 m MD. Pumped 3 x 20 m3 hi-vis pills. Displaced hole to 1.25 sg KCl mud.

Performed a wiper trip to 250 m MD, several tight spots (max overpull: 30 MT). Ran back to bottom, reamed several tight spots. Pumped 3 x 20 m3 hi-vis pills (all pills out before new pill) and displaced hole to 1.25 sg KCl mud. Pulled out of hole, several tight spots observed (max overpull: 30 MT).

Ran and landed the 13 3/8" casing at 1364 m MD. Worked tight spots, 30 MT weights at 810 m MD and 940 m MD. Got 40-45 MT weight while running in from 1280 m MD. Performed an over pull test (25 MT). Cemented 13 3/8" casing to sea bed.

Waited 5,5 hours on cement (float did not hold)

Cleaned sub sea well head with 13 3/8" running tool (guided by ROV).

Ran and landed BOP stack, Lower Marine Riser Package and Marine riser.

Tested BOP.

10.4 12 ¼" SECTION

Total time used: 359.5 hrs.
Operational time: 220.5 hrs.
Downtime: 139.0 hrs.

Made up and ran in hole with 12 ¼" BHA consisting of a 12 ¼" PDC bit on a mud motor, MWD, ALD/CTN and sonic. Displaced hole to 1,35 sg water based mud. Drilled the shoe track and 3 m new formation to 1373 m MD. Performed leak off test to 1.74 sg equivalent mud weight. Drilled and slide 12 ¼" hole from 1373 m MD to 1877 m MD. Circulated bottoms up due to pack off tendencies. Drilled and slide ¼" hole from 1877 m MD to 2173 m MD. Pulled out of hole due to MWD failure. Flow checked periodically while pulling out of hole.

Ran in hole with new 12 ¼" PDC bit on same BHA to 2173 m MD, washed down last 30 metres. Drilled and oriented 12 ¼" hole from 2173 m MD to 2454 m MD. Circulated hole clean.

Decided to secure well due to observed crater around conductor, ROV failure and increasing weather.

Pulled out of hole to 993 m MD and hanged off string on the RTTS packer. Ran in hole and sat RTTS packer at 363 m MD (bit at 1321 m MD), pulled out of hole with stinger. Pressure tested RTTS packer 291 bar/10 min.

Waited for new ROV for 23.5 hours.

Ran in hole with stinger, unset and pulled out of hole with RTTS packer.

Ran in hole with 12 ¼" BHA to 1346 m MD and broke circulation.

Launched new ROV, observed PGS bulls eye 1.5 to 2.5 deg off vertical, decided for grouting around conductor due to crater.

Pulled out of hole to 993 m MD and hanged off string on the RTTS packer. Ran in hole and sat RTTS packer at 363 m MD (bit at 1321 m MD), pulled out of hole with stinger. Pressure tested RTTS packer and storm valve, leak observed. Attempted several tests without success. Ran in hole with stinger, unset and pulled out of hole with RTTS packer and 12 ¼" BHA.

Ran in hole with 3 ½" stinger into crater, washed down from 127 m MD to 130 m MD. Pumped 51 m3 1.95 sg cement into crater, pulled out of hole with 3 ½" stinger.

Ran in hole with new 12 ¼" PDC bit on same BHA to 1335 m MD. Waited for cement to set up.

Observed no movement on PGB and bulls eye at 0.0-0.5 deg.

Continued to run in hole with 12 ¼" BHA to 2454 m MD. Tight spots from 2060 m MD to 2415 m MD, reamed tight spots. Circulated hole bottoms up at 2317 m MD, observed lots of cavings. Drilled 12 ¼" hole from 2454 m MD to 2458 m MD. Observed low ROP, spotted 5 m3 1.15 sg brine to treat potential bit balling, no effect. Drilled 12 ¼" hole from 2458 m MD to 2472 m MD with low ROP (2 m/h). Bumped BHA with moderate impact force on bottom to attempt removing the potential bit balling, no success. Soaked 4 m3 1.35 sg drill water around bit for 30 min, no effect on ROP. Pumped 10 m3 slug with walnut shells for removing potential bit balling, no effect. Drilled 12 ¼" hole from 2472 m MD to 2482 m MD. Set down 35 MT on bit without rotation and turned on pumps to attempt removing potential bit balling, no success. Pulled out of hole with 12 ¼" BHA.

Bit looked partly balled, changed out used bit with bit from run #2 and mud motor.

Ran in hole with changed 12 ¼" BHA to 2480 m MD, washed some areas, tight spot observed at 2480 m MD, reamed tight spot. Drilled 12 ¼" hole from 2480 m MD to 3026 m MD. Circulated bottoms up prior drilling into reservoir. Drilled 12 ¼" hole from 3026 m MD to 3300 m MD. Circulated hole clean and pulled out of hole, flow checked periodically while pulling out of hole, some tight spots.

Tested BOP

Rigged up electric wire line equipment and ran in hole with MDT tool string. Performed wire line MDT pressure points at 3148.5 m MD, 3151,0 m MD, 3161.5 m MD and 3172 m MD. Pulled out of hole with wire line MDT tool. Rigged down wire line equipment.

10.5 PERMANENT PLUG AND ABANDONMENT

Total time used: 271.5 hrs.
Operational time: 105.5 hrs.
Downtime: 166.0 hrs.

Ran in hole with 5 ½" drill pipe to 3300 m MD. Spotted a balanced cement plug from 3300 m MD to 3090 m MD. Pulled out of hole to 1477 m MD. Spotted a hi-vis pill from 1470 m MD to 1400 m MD. Pulled out of hole to 1420 m MD. Spotted a balanced cement plug from 1414 m MD to 1264 m MD. Pulled out of hole to 1035 m MD. Flow checked. Pulled out of hole.

Made up 12 ¼" bit on 5 ½" drill pipe and ran in hole to 1917 m MD. Tagged hard cement at 1278 m MD, set down 10 MT, ok. Displaced hole to 1.35 sg inhibited mud. Pulled out of hole. Pressure tested cement plug to 122 bar.

Ran in hole and sat EZSV plug at 364 m MD. Tagged EZSV plug with 10 MT, ok. Pressure tested EZSV plug to 122 bar, ok.

Spotted a balanced cement plug from 364 m MD to 140 m MD. Pulled out of hole and displaced riser to sea water. Made up and ran in hole with spring load tool to top of cement plug, set down 10 MT, ok.

Pulled wear bushing.

Waited on weather for 58 hours.

Pulled BOP

Made up and ran in hole with cutting tool to 118.7 m MD. Cut 20"/30" wellhead at 118.7 m MD (5 m below sea bed). Pulled out of hole with cut 20"/30" conductor (including guide base).

Performed seabed survey.

Waited on weather for 91.5 hours. (anchor handling limitations)

Pulled anchors.

The operation finished when last anchor was pulled December 26th 2004 kl 11:30.

11 DRILLING PROBLEMS AND RECOMMENDATIONS

#	Section	Problems	Recommendations
1	Mob	According to contract with Odfjell, a proper commissioning procedure should be made. No commissioning procedure was made from Odfjell, a simple one was used. Many errors was encountered during "company witness".	A good commissioning procedure should be made prior to "vitness tests".
2	17 1/2"	During start of drilling the 17 1/2" hole, extreme vibrations was experienced. This again resulted that a 3,9 kg piece of the top drive felt 27 m.	If possible, attempt to apply a less stiff BHA to reduce vibrations. Evaluate to use a shock sub to spare equipment.
3	17 1/2"	Had to run with hydraulic stroking tool on "La Fleur" fill and circulation tool. (during 13 3/8" casing run) Had to stop twice to repair leaks.	Run with mechanical stroking tool
4	17 1/2"	13 3/8" casing vas run and cemented. Plug was bumped and casing pressure tested according plan. It was checked for back flow and neither shoe nor float held the pressure.	Evaluate to change to another make or type of floats.
5	17 1/2"	Centralizers (13 3/8" csg) did not fit over the couplings. No stop rings had been sent to the rig.	Check that centralizers fit prior to shipment. Normally, centralizers should be fitted with a stop ring and not over the couplings.
6	17 1/2"	Found a big crater on the seabed after the BOP had been installed. This can possibly be due to water flowing from deeper strata.	If low visibility on seabed, evaluate to increase excess cement or put grouting into drilling programme. It is also recommended to have grouting system pre-installed on Conductor pipe with associated hose attached to the landing string.
7	12 1/4"	Found a big crater on the seabed after the BOP had been installed and 12 1/4" section started. The crater was cemented with 45 m3 conductor tail slurry. 3 1/2" drill pipe was run through the mouse hole, outside the BOP and into the crater. The cement solved the problem without having to pull the BOP.	Use same method for similar problem.
8	12 1/4"	After cement job on crater was done, the 12 1/4" hole had been left open for some time. Bit balling was experienced on first bit after crater cement job. The bit in question was a bit with 9 blades. The flushing areas between the blades are small and can easily be plugged/balled up.	Review the bit selection and and preferably bit with maximum 8 blades should be used.

9	12 1/4"	Many problems on ROV, not back up equipment on board. Limited support from shore.	Need to have back up equipment on rig, backup must be a part of the contract. Support from shore must be checked prior to signing contract.
10	12 1/4"	12 1/4" hole was drilled to 2173m . MWD tool stopped working. Had to POOH and change out Mwd tool.	Halliburton need to conduct an inspection of the tool and submit a report to DPT. Halliburton to make a plan how to improve their success rate.
11	12 1/4"	RTTS packer with storm valve was installed in the well due to observed a crater next to to 30 Conductor pipe. The storm valve failed to test.	Halliburton need to conduct an inspection of the storm valve and submit a report to DPT. Halliburton to come up with a plan how to avoid similar evidence in the future.

12 HSE SUMMARY

	Mål	Oppnådd
LTI (lost time incidents)	0	0
H2 verdi	< 8,5	7,6 *
Antall hendelser rapportert til PSA pr år	< 2	1
Akutte utslipp til ytre miljø	0	1

* The H2 is based on three MTI's and one LTI from previously operations.

13 SUMMARY OF INVESTIGATION REPORTS

During drilling of 17 ½" top hole, a 3.9 kg tilt guide felt 27 m from the top drive and down on deck. Due to strong vibrations during drilling, the area was sealed off, no persons was inside sealed area.

14 PRESSURE AND TEMPERATURE GRADIENTS

Reference is made to Section A.

15 DAILY REPORTING

Operations Summary Report

Legal Well Name: 15/12-15
Common Well Name: 15/12-15
Event Name: ORIG DRILLING
Contractor Name: Odfjell Drilling
Rig Name: Deepsea Trym

Start: 15.11.2004
Rig Release: 26.12.2004
Rig Number: 1

Spud Date: 19.11.2004
End: 26.12.2004

Date	From - To	Hours	Code	Sub Code	Phase	Description of Operations
						Rig arrived location at 06:00 hrs. Waited on weather for anchor handling meanwhile: Installed blue/yellow pod Changed valve on fill line Performed throubleshooting on signal from bulk tank 1-2 Changed pulsation dampener on mud pump no. 3 Repaired load cell for bulk day tank Hung up riser tension wires on safety support ring
16.11.2004	00:00 - 06:00	6,00	10	154	Prep	Waited on weather, meanwhile installed double yoke and coflex hoses to kill and choke lines at cellar deck.
	06:00 - 10:30	4,50	10	154	Prep	Waited on weather for anchor handling. Debalasted rig to prepare for anchor handling. Meanwhile: Greased compansation cylinders. Tested active compensator and checked piping on same.
	10:30 - 14:00	3,50	10	154	Prep	Waited on weather for anchor handling. Meanwhile: Built up 1 stand with 5 1/2" drill pipe and racked back same in derrick. Changed valves on suction line (pump room).
	14:00 - 00:00	10,00	10	4	Prep	Ran the anchors.Anchor #5 on bottom 14:40, anchor #10 on bottom 17:52, anchor #1 on bottom 20:00 and anchor #6 on bottom 20:41. Lost the chain for anchor #4 after 1263 m paid out. Retrieved the chain end to the rig. Anchor #9 on bottom 22:50. Parallel activities: Changed valve on fill line and bottle no 10. Tested kelly cocks and inside BOP to 20/345 bar, ok. Performed function test on both POD's. Function tested acoustic system. Repaired guide system for hydraulic hoses. Drilled holes in spinner roller. Checked finger board.
17.11.2004	00:00 - 05:30	5,50	10	4	Prep	Anchor handling: Anchor #2 on bottom 00:25, anchor #7 on bottom at 01:10, anchor #4 on bottom at 03:40, anchor #3 on bottom at 04:17 and anchor #8 at bottom at 05:02. Meanwhile: Pressure tested gray valves and kelly cocks to 20/345 bar
	05:30 - 06:30	1,00	10	4	Prep	Pre tensioned anchors to 110 MT. Meanwhile: Disconnected pop off valves on mud pumps, prepared and pressure tested same.
	06:30 - 12:00	5,50	10	4	Prep	Ballasted rig from transit to operational draft and ran piggy back on anchor #4 with the anchor on bottom 07:20. Meanwhile: Tested transponder. Calibrated trip tank. Calibrated Sperry Sun block height counter. Picked up 9 1/2" equipment from drill floor.
	12:00 - 14:00	2,00	10	4	Prep	Offloaded boat on operational time due to bad weather forecast.
	14:00 - 15:00	1,00	10	4	Prep	Pre-tensioned anchors to max 180 MT exept for anchors #5 and #10. This due to 3 bolts broken on motor shaft for anchor chain #5.
	15:00 - 15:30	0,50	11	97	Prep	Held tool box meeting prior to picking up drill collars and drill pipe.

Operations Summary Report

Legal Well Name: 15/12-15
Common Well Name: 15/12-15
Event Name: ORIG DRILLING
Contractor Name: Odfjell Drilling
Rig Name: Deepsea Trym

Start: 15.11.2004
Rig Release: 26.12.2004
Rig Number: 1

Spud Date: 19.11.2004
End: 26.12.2004

Date	From - To	Hours	Code	Sub Code	Phase	Description of Operations
17.11.2004	15:30 - 23:00	7,50	11	22	Prep	Picked up and racked in derrick 6 singles 9 1/2" and 12 singles 8" drill collars. Picked up and racked in derrick 9 singles 5 1/2" heavy weight drill pipe. Too bad weather conditions for spudding of well.
	23:00 - 00:00	1,00	11	154	Prep	Waited on weather.
18.11.2004	00:00 - 04:00	4,00	11	154	Prep	Waited on weather.
	04:00 - 18:00	14,00	11	22	Prep	Picked up and racked 5 1/2" DP. Too bad weather conditions for launching of ROV. Performed test tension to 180 Mt on anchors #5 and #10.
	18:00 - 19:00	1,00	11	58	Prep	Made up cement stand and racked back same in derrick.
	19:00 - 23:00	4,00	11	22	Prep	Picked up and racked 5 1/2" DP. Too bad weather conditions for launching of ROV. Total made up and racked tubulars: 6 ea 9 1/2" DC 12 ea 8" DC 9 ea 5 1/2" HWDP 225 ea 5 1/2" DP
	23:00 - 23:30	0,50	11	97	Prep	Held tool box meeting prior to picking and making up conductor running tool.
	23:30 - 00:00	0,50	11	152	Prep	Made up conductor running tool included 2 singles of 5 1/2" drill pipe above and 1 single of 5" drillp pipe below.
19.11.2004	00:00 - 00:30	0,50	11	152	Prep	Racked conductor running tool and secured same.
	00:30 - 05:00	4,50	11	26	Prep	Picked and made up the 36" bottom hole assembly. Ran in hole with same.
	05:00 - 05:30	0,50	11	97	Prep	Held tool box meeting for night shift prior to spudding.
	05:30 - 06:30	1,00	11	54	Prep	Checked top drive for loose parts prior to spudding. Ran in hole and tagged bottom at 113,7 m RKB (06:30, depth not corrected for tidewater). Logged spud loacation on bridge.
	06:30 - 08:30	2,00	11	97	Prep	ROV placed out SPUP markers (2 stk) and transponder (1 stk) on seabed, meanwhile held tool box meeting for day shift prior to spudding.
	08:30 - 10:00	1,50	11	64	DCon	Spudded in from seabed at 113 m to with 1500 ltr/min / 22 bar. Increased flowrate stepwise, at 128 m MD: 3000 ltr/min / 60 bar. Pumped 10 m3 hi-vis pill and performed survey. Survey at 128 m MD: 1,0 deg angle.
	10:00 - 17:00	7,00	11	14	DCon	Drilled 36" hole from 128 m MD to 148 m MD while increasing flow stepwise. At 148 m MD: 4500 ltr/min / 104 bar / 30 rpm and 5000 - 15000 ftlb. Pumped hi-vis sweeps every 10 m drilled. Survey at 136 m MD: 0,5 deg angle. Survey at 148 m MD: 1,5 deg angle.
	17:00 - 18:00	1,00	11	46	DCon	Reamed up and down several times to reduce hole inclination.
	18:00 - 21:30	3,50	11	14	DCon	Drilled 36" hole from 148 m MT to 153 m. Increased rotation from 30 to 50 rpm from 149 m to 153 m MD. At 153 m MD: 4500 ltr/min / 107 bar / 4000 -5000 ftlb Survey at 153 m MD: 2,0 deg angle
	21:30 - 00:00	2,50	11	46	DCon	Reamed stand up and down to reduce hole inclination, meanwhile checked rig position, ok 0,6 m off location. Fine tuned rig ballasting to horizontal position. Performed new survey at 153 m MD: 1,5 deg angle.
20.11.2004	00:00 - 03:30	3,50	11	14	DCon	Drilled 36" hole from 155 m MD to 157,5 m MD. Pumped 10 m3 hi-vis pill, performed survey: Survey at 157,5 m MD: 1,5 deg angle
	03:30 - 04:30	1,00	11	96	DCon	Elevator closed outside drill pipe string due to vibration. Trouble shoot

Operations Summary Report

Legal Well Name: 15/12-15
Common Well Name: 15/12-15
Event Name: ORIG DRILLING
Contractor Name: Odfjell Drilling
Rig Name: Deepsea Trym

Start: 15.11.2004
Rig Release: 26.12.2004
Rig Number: 1

Spud Date: 19.11.2004
End: 26.12.2004

Date	From - To	Hours	Code	Sub Code	Phase	Description of Operations
20.11.2004	03:30 - 04:30	1,00	11	96	DCon	open function
	04:30 - 11:00	6,50	11	14	DCon	Drilled 36" hole from 157 m to 176 m. Pumped 10 m3 hi-vis sweeps every 10 m drilled. Performed survey at 167 m MD: 1 deg angle.
	11:00 - 12:00	1,00	11	62	DCon	Performed survey at 176 m MD: 0 deg angle. Pumped 2 x 20 m3 hi-vis pills.
	12:00 - 12:30	0,50	11	62	DCon	Displaced hole to 1,25 sg mud by pumping 60 m3 with 4500 ltr/min /106 bar / 30 RPM / 5000 ftlb
	12:30 - 13:30	1,00	11	46	DCon	Reamed boulder area from 137 m to 150 m 6 times with 4000 ltr/min and 50 rpm. Slided same area without pumps and rotation. String took weight at 164 m MD. Reestablished circulation and worked area, ok. Pumped 10 m3 hi-vis pill. Worked string from 157 - 166 m MD.
	13:30 - 14:30	1,00	11	46	DCon	Reamed down to 176 m MD, tagged bottom, no fill. Reamed stand 3 times and pumped 2 x 10 m3 hi-vis sweeps. Displaced hole to 1,50 sg mud by pumping 60 m3 with 4000 ltr/min / 125 bar / 50 RPM / 6000 - 8000 ftlb.
	14:30 - 15:00	0,50	11	54	DCon	Pulled out of hole to 122 m MD and topped hole with 10 m3 1,50 sg mud.
	15:00 - 16:30	1,50	11	54	DCon	Pulled out of hole from 122 m MD to surface. Racked back bottom hole assembly in derrick. Cleared and cleaned rig floor.
	16:30 - 18:00	1,50	13	76	RCon	Held tool box meeting and rigged up prior to running 30" conductor.
	18:00 - 19:00	1,00	13	78	RCon	Picked up 30" shoe and joint nr 1 and 2 from deck, made up same.
	19:00 - 19:30	0,50	13	97	RCon	Held tool box for night shift prior to running 30" conductor.
	19:30 - 22:00	2,50	13	78	RCon	Moved guide base trolly into moon pool. Mounted guide wires. Checked float and ran in hole remaining conductor. Filled every joint with seawater.
	22:00 - 00:00	2,00	13	78	RCon	Changed handling equipment to 5 1/2" drill pipe. Laid down long bails. Rigged up for glass fibre inner string. Made up false rotary and work plattform.
21.11.2004	00:00 - 01:00	1,00	13	78	RCon	Picked up glass fibre inner string
	01:00 - 03:30	2,50	13	78	RCon	Picked up and made up running tool to conductor. Connected conductor to guide base. Ran guide base down on 5 1/2" drill pipe to 5 m above seal level. Pumped with 2000 ltr/min for 5 min, closed fill up fill vent valve. Ran in hole to 7 m above seabed .
	03:30 - 04:00	0,50	13	96	RCon	Power shot down on ROV unit due to gas sensor failure.
	04:00 - 05:30	1,50	13	78	RCon	Ran and entered 36" hole with 30" conductor on 5 1/2" drill pipe. Ran in hole to 175 m MD, rat hole 1,35 m, well head stick up from seabed: 1,85 m. Bulls eye readings on guide base: 0.75 deg port and 0,25 deg port.
	05:30 - 07:00	1,50	13	62	RCon	Rigged up cement hose and pressure tested same 5 min / 200 bar, ok. Filled string and ventilated out air.
	07:00 - 07:30	0,50	13	97	RCon	Held tool box meeting prior to cement job, meanwhile circulated 25 m3 seawater (1000 ltr/min / 5 bar)
	07:30 - 09:00	1,50	13	88	RCon	Cemented 30" conductor by pumping 5 m3 dye pill, followed by 18 m3 1,56 sg lead cmt slurry and 15 m3 1,95 sg. Displaced same with 4 m3 seawater.
	09:00 - 19:00	10,00	13	152	RCon	Waited for cement to set. At 18:15, ROV opened vent valve on running tool. Bulls eye readings on guide base at 19:00: 0,75 deg port and 0,25 deg port, same as prior to cement job.
	19:00 - 21:00	2,00	13	54	RCon	Released running tool and flushed through string. Pulled out of hole with landing string, racked back running tool and laid down inner glass fibre string.
	21:00 - 23:00	2,00	13	143	RCon	Performed tool box meeting prior to work in moon pool area. Changed Bonnet on BOP.
	23:00 - 00:00	1,00	13	26	RCon	Laid down conductor running tool.
22.11.2004	00:00 - 02:30	2,50	11	26	DCon	Laid down 36" bottom hole assembly and cement stand.
	02:30 - 05:30	3,00	11	26	D26	Made up 26" clean out bottom hole assembly. Laid out 1 jnt 8" drill collar

Operations Summary Report

Legal Well Name: 15/12-15
Common Well Name: 15/12-15 Spud Date: 19.11.2004
Event Name: ORIG DRILLING Start: 15.11.2004 End: 26.12.2004
Contractor Name: Odfjell Drilling Rig Release: 26.12.2004
Rig Name: Deepsea Trym Rig Number: 1

Date	From - To	Hours	Code	Sub Code	Phase	Description of Operations
22.11.2004	02:30 - 05:30	3,00	11	26	D26	due to space out top guide base.
	05:30 - 07:00	1,50	11	20	D26	Entered guide base and ran in hole to 157 m MD. Washed down with 4500 ltr/min / 30 RPM, tagged top of cement at 172 m MD. Drilled out cement and shoe from 172 m MD to 176 m MD with 4500 ltr/min / 50 RPM, WOB: 5-15 MT. Reamed rat hole and pumped 10 m3 hi-vis pill.
	07:00 - 08:30	1,50	11	26	D26	Pulled out of hole and laid out 26" bottom hole assembly. Cleaned rig floor.
	08:30 - 09:00	0,50	11	26	D171/2	Prepared for making up 17 1/2" bottom hole assembly. Checked top drive, LRA, URA and crown block
	09:00 - 09:30	0,50	11	97	D171/2	Held tool box meeting prior to making up 17 1/2" bottom hole assembly.
	09:30 - 12:00	2,50	11	26	D171/2	Made up 17 1/2" bottom hole assembly. Uploaded MWD.
	12:00 - 12:30	0,50	11	54	D171/2	Ran in hole with 17 1/2" bottom hole assembly to 105 m MD.
	12:30 - 17:30	5,00	11	142	D171/2	Waited on ROV due to failure on electrical motor on ROV, replaced same. Meanwhile: made up 5 1/2" pup on BOP test string, installed Pertra number plate on port wall on derrick.
	17:30 - 18:30	1,00	11	54	D171/2	Jumped ROV into the sea, ran in hole and entered guide base. Ran in hole to 176 m MD
	18:30 - 19:00	0,50	11	143	D171/2	Repaired stand pipe on top drive due to leakage.
	19:00 - 00:00	5,00	11	18	D171/2	Drilled 17 1/2" hole from 176 m MD to 250 m MD with 4300 ltr/min / 100 RPM / 150 bar. Pumped 10 m3 hi-vis pill every 10 m drilled.
23.11.2004	00:00 - 03:00	3,00	11	18	D171/2	Drilled 17 1/2" hole from 250 m MD to 313 m MD with 4300 ltr/min / 100 RPM / 150 bar. Pumped 10 m3 hi-vis pill every 10 m drilled.
	03:00 - 04:00	1,00	11	143	D171/2	Stopped drilling due to falling object from top drive (tilt guide). Racked back last stand and inspected top drive for loose parts.
	04:00 - 04:30	0,50	11	143	D171/2	Pulled out of hole to inside shoe at 168 m.
	04:30 - 06:30	2,00	11	143	D171/2	Changed all 4 tilt guides "cylinder supports" on top drive (modified with thread lock and locking wire). Inspected top drive.
	06:30 - 07:00	0,50	11	143	D171/2	Ran in hole from 168 m MD to 313 m MD.
	07:00 - 00:00	17,00	11	18	D171/2	Drilled 17 1/2" hole from 313 m MD to 643 m MD with 4300 ltr/min / 167 bar / 130 RPM / 4-8 kftlbs. Pumped 10 m3 hi-vis pill every 10 m drilled.
24.11.2004	00:00 - 00:00	24,00	11	18	D171/2	Drilled 17 1/2" hole from 643 m MD to 1149 m MD with 4300 ltr/min /170-183 bar / 130 RPM Pumped 10 m3 hi-vis pill every 10 m drilled. Some bubbles observed at 590 m MD, on ROV sonar. Drill break from 1070 m MD to 1078 m MD. Stringer at 1092 - 1096 m MD and 1139 m MD.
25.11.2004	00:00 - 14:30	14,50	11	18	D171/2	Drilled 17 1/2" hole from 1149 m MD to 1370 m MD with 4300 ltr/min / 185 bar / 130 RPM. Pumped 10 m3 hi-vis pill every 10 m drilled. Stringers at: 1151 m MD, 1155 m MD, 1163 m MD, 1168 m MD and 1196 m MD.
	14:30 - 19:00	4,50	11	62	D171/2	Pumped 3 x 20 m3 hi-vis pills with 4500 ltr/min / 150 RPM. Displaced hole to 1,25 sg KCl mud.
	19:00 - 00:00	5,00	11	44	D171/2	Pulled out of hole (wipertrip) from 1370 m MD to 250 m MD. Several tight spots observed from 1370 m MD to 850 m MD (max overpull: 30 MT)
26.11.2004	00:00 - 03:00	3,00	11	44	D171/2	Pulled out of hole with 17 1/2" bit from 250 m MD and into the shoe. Ran back in hole to 822 m MD, got 20 MT down weight.
	03:00 - 05:30	2,50	11	44	D171/2	Reamed down from 822 m MD to 1045 m MD with 4300 ltr/min / 185 bar / 130 RPM.
	05:30 - 06:00	0,50	11	44	D171/2	Ran in hole with 17 1/2" bit from 1045 m MD to 1265 m MD
	06:00 - 07:30	1,50	11	44	D171/2	Reamed down from 1265 m MD and tagged bottom at TD at 1370 m MD (no fill).
	07:30 - 11:30	4,00	11	62	D171/2	Pumped 3 x 20 m3 hi-viscous pills (all pills out before new pill). Displaced hole to 1,25 sg KCl mud.

Operations Summary Report

Legal Well Name: 15/12-15
Common Well Name: 15/12-15
Event Name: ORIG DRILLING
Contractor Name: Odfjell Drilling
Rig Name: Deepsea Trym

Start: 15.11.2004
Rig Release: 26.12.2004
Rig Number: 1

Spud Date: 19.11.2004
End: 26.12.2004

Date	From - To	Hours	Code	Sub Code	Phase	Description of Operations
26.11.2004	11:30 - 15:30	4,00	11	54	D171/2	Pulled out of hole with 17 1/2" bit from 1370 m MD to 168 m MD. Several tight spots observed from 1023 - 933 m MD, 842 - 818 m MD and 541 - 470 m MD (max overpull: 30 MT)
	15:30 - 19:30	4,00	11	26	D171/2	Pulled out of hole and laid down 17 1/2" bottom hole assembly.
	19:30 - 21:00	1,50	11	96	D171/2	Cleaned and cleared rig floor, checked top drive, lower racking arm and upper racking arm for loose items. Greased top drive.
	21:00 - 22:00	1,00	13	76	R133/8	Laid down top single on a 5 1/2" HWDP stand, picked up cementing head, low torque valve and ccementing hose. Connected cementing head on top of same HWDP stand. Secured and racked back in derrick.
	22:00 - 00:00	2,00	13	76	R133/8	Rigged up casing tong and remote panel. Laid down bails and rigged up hoses for BX-elevator.
27.11.2004	00:00 - 07:00	7,00	13	78	R133/8	Picked up 13 3/8" shoe from deck, checked shoe with seawater, ok. Ran in hole with 13 3/8" shoe, adjusted casing tong and casing slips. Picked up intermediate joint, bakerlocked same. Attempted to install centralizers on box end, no go. Ran in hole without centralizers to 48 m MD.
	07:00 - 07:30	0,50	13	97	R133/8	Held pre job meeting for day shift prior to running 13 3/8" casing.
	07:30 - 10:00	2,50	13	78	R133/8	Ran in hole/entered guide base with 13 3/8" casing (no centralizers) to 124 m MD. Filled every joint with 1,25 sg mud.
	10:00 - 10:30	0,50	13	96	R133/8	Changed hydraulic connection on elevator due to link trouble.
	10:30 - 16:00	5,50	13	78	R133/8	Ran in hole with 13 3/8" casing (no centralizers) from 124 m MD to 700 m MD. Filled every joint with 1,25 sg KCl mud while running in.
	16:00 - 16:30	0,50	13	96	R133/8	Changed hydraulic connection on "La Fleur" fill up tool stroke cylinder.
	16:30 - 00:00	7,50	13	78	R133/8	Ran in hole with 13 3/8" casing (no centralizers) from 700 m MD to 1240 m MD. Filled every joint with 1,25 sg KCl mud while running in. Took 30 tons weight at 810 and 940 m.
28.11.2004	00:00 - 01:00	1,00	13	76	R133/8	Laid down BX-elevator, bails and fill up tool. Disconnected hydraulic hoses.
	01:00 - 05:00	4,00	13	78	R133/8	Picked up casing hanger with 18 3/4" well head. Made up same and ran in hole with landing string (5 1/2" DP). Casing took 45 to 50 tons weight while running in hole from 1280 m. Made up cement stand and landed the 13 3/8" casing. Shoe at 1364 m MD. Performed overpull test (25 MT), ok.
	05:00 - 06:30	1,50	13	62	R133/8	Started pumping 1,25 sg KCl mud, increased slowly up to 1400 ltr/min. Suddenly, pump pressure increased from 95 bar to 155 bar, stopped pumps. Checked cement head and found all valves in right position. Connected air hoses to cement head for pressure support to valves. Restarted pumps and pumped slowly up to 900 ltr/min, suddenly pump pressure increased from 170 bar to 250 bar. Performed troubleshootng and found line from pump to drillfloor plugged. Changed line.
	06:30 - 09:00	2,50	13	62	R133/8	Circulated 35 m3 1,25 sg mud and 100 m3 seawater, meanwhile held tool box meeting prior to cement job.
	09:00 - 14:30	5,50	13	88	R133/8	Pumped 10 m3 dye spacer, dropped ball and pumped 108,5 m3 1,56 sg lead cement slurry followed by 20,5 m3 1.92 SG tail cement slurry. Had no returns during mixing and pumping of cement. Released dart and displaced cement with seawater at 2300 lpm. Pressure increased from 48 to 105 bar during displacement. Got returns when cement was displaced into annulus. Bumped plug after 5810 strokes with 35 bar over final circulation pressure. Pressure tested 13 3/8" casing to 291 bar/10 min, ok. Bled off pressure. Floats did not hold. Re bumped plug.

Operations Summary Report

Legal Well Name: 15/12-15
Common Well Name: 15/12-15
Event Name: ORIG DRILLING
Contractor Name: Odfjell Drilling
Rig Name: Deepsea Trym

Start: 15.11.2004
Rig Release: 26.12.2004
Rig Number: 1

Spud Date: 19.11.2004
End: 26.12.2004

Date	From - To	Hours	Code	Sub Code	Phase	Description of Operations
28.11.2004	09:00 - 14:30	5,50	13	88	R133/8	Bled off pressure again. Floats would still not hold. Re bumped plug with 85 bar.
	14:30 - 20:00	5,50	13	140	R133/8	Waited on cement with 85 bar pressure on the casing. Meanwhile: Pulled all guide wires from guide base up to moon pool. Performed inspection on drawwork, iron roughneck, derrick and cat walk. Repaired cat walk trolley and clamps on iron rough neck.
	20:00 - 21:00	1,00	13	86	R133/8	Bled off pressure. Disconnected cement hose to verify no return, ok. Disconnected wellhead running tool.
	21:00 - 22:00	1,00	13	76	R133/8	Cleaned wellhead with running tool (guided by ROV) by pumping seawater (4000 ltr/min.) Bullseye's same as before, 3/4 port and 1/2 port/slight aft.
	22:00 - 22:30	0,50	13	86	R133/8	Moved rig 30 m (240 deg)
	22:30 - 00:00	1,50	13	86	R133/8	Pulled out of hole with landing/runnig tool. Laid down wellhead running tool and cement head.
29.11.2004	00:00 - 01:30	1,50	13	86	R133/8	Picked up one single HWDP from deck and racked back. Changed to 5" elevator. Picked up 3 joints with 5" ITAG drillpipe and made up to slip joint running tool.
	01:30 - 02:00	0,50	13	28	BOP	Performed pre job meeting prior to running BOP stack, Lower Marine Riser Package and marine riser.
	02:00 - 03:00	1,00	13	28	BOP	Rigged up on drillfloor for running BOP. Laid down link tilt assembly and installed riser spider.
	03:00 - 05:00	2,00	13	28	BOP	Picked up 2 x riser joints and 1 riser pup joint. Connected hoses to kill & choke line.
	05:00 - 07:00	2,00	13	28	BOP	Skidded BOP from park position to moon pool center. Connected riser to BOP stack and installed guide lines. Meanwhile flushed and filled kill & choke line using cement unit.
	07:00 - 08:00	1,00	13	28	BOP	Continued to rig up for running BOP. Pressure tested choke & kill lines to 20 bar/5 min and 645 bar/10 min - test ok. ROV installed VX ring in wellhead.
	08:00 - 16:00	8,00	13	28	BOP	Prepared to release BOP from stump. Checked connector due to connctor dogs not able to release. Functioned connector several times. Ran BOP through splash zone down to 80 m and tested choke and kill lines to 20 bar/5 min and 645 bar/min - ok. Picked up slip joint and ran in hole with same. Connected support ring and hooked up choke & kill line in moon pool to BOP and tested same.
	16:00 - 19:00	3,00	13	28	BOP	Moved rig over location. Mounted POD sadels and guide wires in moon pool. Landed BOP with 155 ton. Closed connector. Performed 20 tons overpull on connector.
	19:00 - 22:00	3,00	13	28	BOP	Installed diverter with hydraulic hoses. Laid down diverter running tool and marine riser spider. Installed master bushing and tracks for iron roughneck. Laid down two stands with 9 1/2" DC from derrick and changed to 5 1/2" DP elevator. Installed link tilt assembly.
	22:00 - 00:00	2,00	13	28	BOP	Picked up hang off tool from deck and 2 x 5 1/2" DP + 1 x pup. Flushed down choke line and up riser. Closed shear ram with accoustic. Pressure tested wellhead connector to 35 bar/5 min and 291 bar/10 min - ok (pumped/bled back 1560 l).
30.11.2004	00:00 - 02:30	2,50	11	22	D121/4	Continued to lay down 6 x 9 1/2" DC. Tested choke & kill line to 645 bar - ok.
	02:30 - 04:30	2,00	11	22	D121/4	Made up 2" WECO x-over to 5 1/2" FH box to topdrive pin. Tested lower

Operations Summary Report

Legal Well Name: 15/12-15
Common Well Name: 15/12-15
Event Name: ORIG DRILLING
Contractor Name: Odfjell Drilling
Rig Name: Deepsea Trym

Start: 15.11.2004
Rig Release: 26.12.2004
Rig Number: 1

Spud Date: 19.11.2004
End: 26.12.2004

Date	From - To	Hours	Code	Sub Code	Phase	Description of Operations
30.11.2004	02:30 - 04:30	2,00	11	22	D121/4	Kelly Kock to 20 bar/5 min and 690 bar/10 min - ok. Tested upper Kelly Kock to 20 bar/5 min and 690 bar/10 min - ok. Tested Kelly hose to 20 bar/5 min and 345 bar/10 min.
	04:30 - 09:00	4,50	11	26	D121/4	Performed pre-job meeting prior to pick up 12 1/4" BHA. Picked up BHA according to BHA drawing (mud motor w/ bit, RLL, ALD/CTN, P4M). Uploaded and tested tools prior to RIH.
	09:00 - 12:00	3,00	11	26	D121/4	Installed radioactive sources. Made up 11 3/4" string stab with rig tong. Picked up 8" DC, jar, 2 x 8" DC, accelerator, x-o to 5 1/2" DP and HW DP. Ran compensated through BOP.
	12:00 - 15:00	3,00	11	22	D121/4	Picked up 6 x 5 1/2" HW DP from deck. Continued to pick up single joints of 5 1/2" DP from deck to 500 m.
	15:00 - 16:30	1,50	11	92	D121/4	Filled string with sea water. Started mud pumps 2800 l/min @ 78 bar and function tested MWD tools - ok. Function tested BOP - ok.
	16:30 - 23:00	6,50	11	22	D121/4	Continued to pick up single 5 1/2" DP from deck to 1258 m. Filled pipe with sea water.
	23:00 - 00:00	1,00	11	22	D121/4	Continued to run stands 4 x stands from derrick. Laid down 5 1/2" pup with 2 x saver subs from top drive. Installed diverter packer element.
01.12.2004	00:00 - 01:00	1,00	11	64	D121/4	Washed down at 1800 lpm. Upweight 97 ton, down weight 100 ton. Tagged top of cement at 1333 m (float @ 1335 m).
	01:00 - 02:00	1,00	11	97	D121/4	Performed choke drill with 30 bar shut in drill pipe pressure.
	02:00 - 02:30	0,50	11	97	D121/4	Performed pre job meeting prior to displacing well from 1.03 sg sea water to 1.35 WBM.
	02:30 - 05:30	3,00	11	20	D121/4	Drilled float collar with 2800 lpm, 100 bar SPP and 3-6 kft-lbs while displacing well to 1.35 sg WBM.
	05:30 - 07:30	2,00	11	20	D121/4	Drilled shoe track (cement) from 1335 m to 1350 m.
	07:30 - 09:00	1,50	11	97	D121/4	Performed choke drill with day crew.
	09:00 - 14:00	5,00	11	20	D121/4	Drilled remaining shoe track down to 1364 m. Reamed section due to tight hole. Cleaned rate hole from 1364 m to 1370 m and drilled 3 m new formation to 1373 m.
	14:00 - 15:00	1,00	11	62	D121/4	Conditioned mud and cleaned hole prior to LOT (mud weight 1.35 sg). Mean while tested cement line to 200 bar/5 min - ok.
	15:00 - 15:30	0,50	11	74	D121/4	Checked lines and performed LOT. Leak off observed @ 53.5 bar/ 1.74 sg equivalent mud density.
	15:30 - 00:00	8,50	11	18	D121/4	Rigged down cement line and continued to drill 12 1/4" hole from 1373 m to 1501 m (rpm=135, WOB=10-15 ton, 3300 - 3500 lpm, 3-5 kft-lbs, ECD=1.38 - 1.41). Sliding interval 1449 m to 1455 m.
02.12.2004	00:00 - 18:00	18,00	11	18	D121/4	Drilled 12 1/4" hole from 1501 m to 1877 m with drilling parameters: 135 rpm, WOB 5-10 ton, 3-5 kft-lbs and 3500 lpm.
	18:00 - 19:00	1,00	11	62	D121/4	Circulated bottoms up when back reaming a second time due to pack off tendencies when back reaming last stand. Pumped 3500 lpm/220 bar, 135 rpm, 3-5 kft-lbs.
	19:00 - 21:00	2,00	11	18	D121/4	Drilled 12 1/4" hole from 1877 m to 1938 m.
	21:00 - 21:30	0,50	11	18	D121/4	Drilled and oriented 12 1/4" hole from 1938 m to 1944 m. Slided to correct wellpath.
	21:30 - 00:00	2,50	11	18	D121/4	Drilled 12 1/4" hole from 1944 m to 1990 m. Parameters: 135 rpm, WOB 5 - 10 ton, 3 - 5 kft-lbs, 3500 lpm and 230 bar.
03.12.2004	00:00 - 07:00	7,00	11	18	D121/4	Drilled 12 1/4" hole from 1990 m to 2113 m. Got last directional survey at 2066 m bit depth.
	07:00 - 07:30	0,50	11	92	D121/4	Cycled mud pumps several times to obtain MWD survey readings without any success.
	07:30 - 10:00	2,50	11	18	D121/4	Drilled 12 1/4" hole from 2113 m to 2173 m.
	10:00 - 12:00	2,00	11	92	D121/4	Cycled mud pumps to obtain survey data without any success. Circulated bottom up with 3500 lpm/215 bar, 135 rpm and 2-3 kft-lbs

Operations Summary Report

Legal Well Name: 15/12-15
Common Well Name: 15/12-15 Spud Date: 19.11.2004
Event Name: ORIG DRILLING Start: 15.11.2004 End: 26.12.2004
Contractor Name: Odfjell Drilling Rig Release: 26.12.2004
Rig Name: Deepsea Trym Rig Number: 1

Date	From - To	Hours	Code	Sub Code	Phase	Description of Operations
03.12.2004	12:00 - 12:30	0,50	11	48	D121/4	Flow checked and laid down drilling pup.
	12:30 - 13:30	1,00	11	52	D121/4	Pulled out of hole from 2173 m to 1876 m.
	13:30 - 15:00	1,50	11	52	D121/4	Slugged pipe and pulled out from 1876 m to 1360 m (13 3/8" casing shoe).
	15:00 - 17:00	2,00	11	52	D121/4	Flow checked for 10 min. and pulled out from 1360 m to 357 m. Flow checked for 10 min.
	17:00 - 19:30	2,50	11	26	D121/4	Pulled out to 22 m and started to lay out BHA. Held pre job meeting prior to handling radioactive source.
	19:30 - 21:30	2,00	11	26	D121/4	Continued to lay down BHA. Checked screen sub. Connected MWD cable and turned off tool.
	21:30 - 22:00	0,50	11	26	D121/4	Inspected PDC bit and observed several broken cutters on nose and gauge. Decided to replace bit with backup bit. Installed new nozzles (7 x 14/32" => TFA = 1.05").
	22:00 - 22:30	0,50	11	26	D121/4	Ran in hole with bit and motor.
	22:30 - 00:00	1,50	11	143	D121/4	Cleaned drillfloor and checked DDM, intermediate- and upper racking arm. Changed broken bolt on DDM.
04.12.2004	00:00 - 02:30	2,50	11	26	D121/4	Continued to run in hole with bottom hole assembly (BHA)
	02:30 - 03:30	1,00	11	26	D121/4	Tested and uploaded logging while drilling tools.
	03:30 - 04:00	0,50	11	26	D121/4	Installed radioactive sources in the BHA.
	04:00 - 05:30	1,50	11	26	D121/4	Ran in hole with BHA to 232 m
	05:30 - 11:30	6,00	11	52	D121/4	Ran in hole with BHA on 5 1/2" drill pipe from 232 m to 2081 m. Filled string and broke circulation at 1346 m. Took 15 ton down weight at 2065 m - started mud pumps and rotation (2500 lpm/140 bar/90 rpm) and washed down to 2081 m
	11:30 - 12:00	0,50	11	52	D121/4	Ran in hole. Washed down from 2141 m to 2173 m (3500 lpm/238 bar/90 rpm/3000 ft-lbs).
	12:00 - 00:00	12,00	11	18	D121/4	Drilled 12 1/4" hole from 2173 m to 2454 m. Drilled and oriented hole a few 2.5 m intervals. Stabilizer (2.5 m behind bit) hung up on slightly undergauge hole.
05.12.2004	00:00 - 02:30	2,50	11	62	D121/4	Circulated hole clean at 3500 lpm/230 bar/150 rpm/3-5 kft-lbs prior to pull out to hang off drill string in RTTS packer . Uncertain conductor support due to observed crater around conductor, increasing wind and waves and a non functional ROV was the reason to hang of drill string and secure the well. Observed some cavings of various shapes while circulating hole clean.
	02:30 - 03:30	1,00	11	54	D121/4	Flow checked well and pulled five stands wet. Then pumped 4 m3 1.7 sg slug.
	03:30 - 05:30	2,00	11	54	D121/4	Pulled out of hole to 1346 m (no restrictions observed on the way out).
	05:30 - 06:30	1,00	11	54	D121/4	Flow checked at 1346 m (13 3/8" casing shoe) and removed diverter element. Pulled out of hole to 993 m
	06:30 - 07:30	1,00	11	54	D121/4	Changed elevator and made up RTTS packer and storm valve.
	07:30 - 09:00	1,50	11	54	D121/4	Ran in hole with RTTS and storm valve to 363 m (bit at 1321 m) and set RTTS packer.
	09:00 - 10:00	1,00	11	54	D121/4	Backed off above storm valve. Pulled out with stinger and laid down same.
	10:00 - 10:30	0,50	11	94	D121/4	Pressure tested RTTS packer to 35 bar/5 min and 291 bar/10 min - ok.
	10:30 - 12:00	1,50	11	22	D121/4	Picked up 15 singles 3 1/2" drill pipe, made up stands and racked in derrick.
	12:00 - 00:00	12,00	11	158	D121/4	Waited on ROV to start grouting of 30" conductor (ROV needed for guiding of 3 1/2" cementing string safely past BOP and land same in crater). Meanwhile performed maintenance work.
06.12.2004	00:00 - 11:30	11,50	11	158	D121/4	Waited on ROV meanwhile performing maintenance work.
	11:30 - 14:00	2,50	11	54	D121/4	Made up RTTS running tool and ran in hole to 363 m.
	14:00 - 16:00	2,00	11	54	D121/4	Stung into storm valve (21 turns) and unset RTTS packer according to

Operations Summary Report

Legal Well Name: 15/12-15
Common Well Name: 15/12-15
Event Name: ORIG DRILLING
Contractor Name: Odfjell Drilling
Rig Name: Deepsea Trym

Start: 15.11.2004
Rig Release: 26.12.2004
Rig Number: 1

Spud Date: 19.11.2004
End: 26.12.2004

Date	From - To	Hours	Code	Sub Code	Phase	Description of Operations
06.12.2004	14:00 - 16:00	2,00	11	54	D121/4	Halliburton procedure. POOH with RTTS and laid down same. Started to rig up back up ROV (Tiger 202) on trolly beside moon pool (arrived with Stril Supplier).
	16:00 - 17:00	1,00	11	54	D121/4	RIH with BHA to 1346 (above shoe) and broke circulation
	17:00 - 18:00	1,00	11	62	D121/4	Circulated and conditioned mud with 2000 lpm/85 bar.
	18:00 - 20:00	2,00	11	158	D121/4	Waited on ROV. Meanwhile function tested BOP.
	20:00 - 21:00	1,00	11	152	D121/4	Launched observation ROV in moon pool and dived down to BOP. Observed PGB bulls eye 1.5 to 2.5 deg off vertical. Increased tension on riser tesion wires from 100 ton to 120 ton. Observed BOP angle reduction to 0.5 - 1.5 deg. Decided not to continue with drilling operation but rather hang off BHA in RTTS packer.
	21:00 - 22:00	1,00	11	54	D121/4	Pumped slug and POOH to 963 m.
	22:00 - 23:00	1,00	11	54	D121/4	Changed to 5" handling equipment and made up RTTS and storm valve. RIH to 363 m
	23:00 - 00:00	1,00	11	54	D121/4	Set RTTS packer at 363 m.
07.12.2004	00:00 - 01:00	1,00	11	54	D121/4	Pulled ou of hole with RTTS running tool and laid down same
	01:00 - 02:30	1,50	11	94	D121/4	Pressure tested RTTS packer and storm valve and observed leak. Attemped several tests without any success. Only minor pressure exposed on the open hole below RTTS (30 bar - lost max 250 litre). Pressure dropped maxim um from 200 bar to 50 bar in 5 min.
	02:30 - 04:00	1,50	11	54	D121/4	Ran in hole with RTTS running tool to latch on and reset RTTS at 365 m. Disconnected RTTS running tool and pulled up 5 m.
	04:00 - 05:00	1,00	11	94	D121/4	Pressure tested RTTS and storm valve - still leaking.
	05:00 - 05:30	0,50	11	94	D121/4	Latched on to RTTS and pressure tested annulus (only RTTS packer and not storm valve) - test ok indicating leak in storm valve.
	05:30 - 06:00	0,50	11	94	D121/4	Disconnected RTTS to work storm valve. Pressure tested both RTTS and storm valve again - observed reduced leak rate but still outside acceptance criteria.
	06:00 - 06:30	0,50	11	94	D121/4	Latched on to RTTS and disconnected to work storm valve. Pressure tested both RTTS and storm valve - no test obtained.
	06:30 - 07:00	0,50	11	158	D121/4	Discussed further actions and decided to pull out of hole with RTTS and storm valve.
	07:00 - 09:30	2,50	11	54	D121/4	Latched on to RTTS and pulled out of hole and laid down RTTS and storm valve. No external damage observed on RTTS and storm valve.
	09:30 - 11:30	2,00	11	54	D121/4	Pulled out of hole with bottomhole assembly to 377 m and flow checked.
	11:30 - 14:30	3,00	11	26	D121/4	Pulled out of hole and laid down BHA on deck.
	14:30 - 15:00	0,50	11	26	D121/4	Dumped MWD memory.
	15:00 - 16:30	1,50	11	26	D121/4	Laid down remaining bottomhole assembly on deck
	16:30 - 19:00	2,50	11	150	D121/4	Performed pre job meeting prior to running 3 1/2" cementing string to cement crater at mudline. Ran cement stinger in mouse hole down to 127 m (14 m below mudline).
	19:00 - 19:30	0,50	11	97	D121/4	Performed pre job meeting with night crew prior to cementing crater.
	19:30 - 20:30	1,00	11	150	D121/4	Pumped at 300 lpm/3 bar increasing to 700 lpm/7 bar through 3 1/2" stinger to wash down and clean bottom of crater prior cement job. Washed down from 127 m to 130 m.
	20:30 - 22:00	1,50	11	152	D121/4	Moved rig on anchors to adjust wellhead to vertical (bullseye reading corrected from approx. 1.5 deg. to 0 deg.) Observed bullseye for 30 min. to verify correction and monitor min/max movements prior to cement job. Bullseye range from 0 - 1.0 deg with 90% time within 0.5 deg circle. Observed maximum 20-30 cm movement on PGB/Conductor.
	22:00 - 00:00	2,00	11	154	D121/4	Dicussed further action and decided to postpone cement job to 3 a.m. awaiting improved weather conditions

Operations Summary Report

Legal Well Name: 15/12-15
Common Well Name: 15/12-15
Event Name: ORIG DRILLING
Contractor Name: Odfjell Drilling
Rig Name: Deepsea Trym

Start: 15.11.2004
Rig Release: 26.12.2004
Rig Number: 1

Spud Date: 19.11.2004
End: 26.12.2004

Date	From - To	Hours	Code	Sub Code	Phase	Description of Operations
08.12.2004	00:00 - 03:00	3,00	11	154	D121/4	Waited on weather prior to perform cement job. Flushed cement stinger with seawater every hour to verify flow.
	03:00 - 04:00	1,00	11	152	D121/4	Launched remote operated vehicle (ROV) (repaired hydraulic leak in arm) and observed production guide base (PGB) bullseye for 30 min. prior to cement job. Bullseye reading 0 - 1 deg. Moved camera to monitor crater and observed PGB moving relative to mudline with 20-30 cm with bullseye as before.
	04:00 - 07:00	3,00	11	158	D121/4	Notified supervisor and tool pusher about conductor movement of 20-30 cm and started to discuss further course of action. Meanwhile bled of rucker tension from 50 000 lbs to 35 000 lbs and observed conductor movements with ROV - no reduction in movements observed. Increased tension to 40 000 lbs.
	07:00 - 07:30	0,50	11	158	D121/4	Called Odfjell and Pertra duty rep. and discussed the options.
	07:30 - 09:30	2,00	11	158	D121/4	Continued discussions with land in morning meeting. Agreed to grout conductor as previously planned. Contingency plans established if grouting job would be unsuccessful with regards to condutor movements.
	09:30 - 10:00	0,50	11	150	D121/4	Performed pre job meeting prior to cement job.
	10:00 - 12:00	2,00	11	150	D121/4	Mixed and pumped 51 m3 of 1.95 sg slurry at 400 l/min. Pulled out of hole with cement stinger above mudline and flushed 3 1/2" pipe with seawater.
	12:00 - 13:30	1,50	11	150	D121/4	Rigged down cement hose, pulled 3 1/2" stinger and changed to 5 1/2" drill pipe equipment.
	13:30 - 14:30	1,00	11	54	D121/4	Installed kelly cock and saver sub. Picked up storm valve in rotary and broke same. Inspected o-ring seals and found two seals damaged.
	14:30 - 15:00	0,50	11	54	D121/4	Prepared to run bottomhole assembly. Performed pre job meeting .
	15:00 - 21:30	6,50	11	26	D121/4	Made up bottomhole assembly with new bit (Total Flow Area - TFA=1.04). Programmed tools to last for 8 days, installed radioactive source and ran in hole to 232 m
	21:30 - 22:00	0,50	11	54	D121/4	Installed diverter element and ran in hole to 500 m. Observed bullseye after cement job. Contuctor PGB observed with 0 - 0,5 deg off vertical and no movements. Cement observed around 30" conductor with no gap between cement and 30" conductor - perfect cement job.
	22:00 - 22:30	0,50	11	26	D121/4	Tested bottomhole assembly with 2500 lpm/100 bar - ok.
	22:30 - 00:00	1,50	11	54	D121/4	ran in hole to 757 m with 12 1/4" BHA.
09.12.2004	00:00 - 02:00	2,00	11	54	D121/4	RIH with 12 1/4" BHA from 757 m to 1335 m
	02:00 - 05:00	3,00	11	150	D121/4	Waited on cement to set up (total 18 hours set up time). Observed no movement on PGB and bullseye at 0-0.5 deg.
	05:00 - 05:30	0,50	11	152	D121/4	Moved rig over well centre (approx. 4 m) using anchors. Slacked of riser tesion wires to 30 000 lbs (neutral point at LMRP) and observed no change in PGB movements or bullseye. Increased tension to 40 000 lbs. Concluded cement job completed.
	05:30 - 09:00	3,50	11	54	D121/4	RIH with 12 1/4" BHA from 1335 m to 2060 m.
	09:00 - 16:30	7,50	11	54	D121/4	Reamed and washed down from 2060 m to 2452 m. Met restrictions in intervals 2060 - 2082, 2265 - 2317, 2415. Reamed intervals. Circulated bottom up at 2317 and observed lot of cuttings over shakers (3020 lpm/191 bar/90 rpm/ECD down from 1.42 to 1.38/max gas 4.2 %)
	16:30 - 18:00	1,50	11	18	D121/4	Drilled 12 1/4" hole from 2452 m to 2458 m. Low ROP observed compared to last run (30 m/hr incl. connection and survey).
	18:00 - 19:00	1,00	11	62	D121/4	Pumped 5 m3 1.15 sg brine to treat possible bit balling problems - no effect observed.
	19:00 - 00:00	5,00	11	18	D121/4	Drilled 12 1/4" hole from 2458 m to 2468 m (ROP=2 m/hr). Attempted to optimized drilling parameters to improve ROP (WOB= 5 - 20 ton, RPM = 50 - 150, LPM = 2200 - 3500). Only minor changes in ROP observed with changing drilling parameters. Used WOB=20 ton, RPM=150 and

Operations Summary Report

Legal Well Name: 15/12-15
Common Well Name: 15/12-15
Event Name: ORIG DRILLING
Contractor Name: Odfjell Drilling
Rig Name: Deepsea Trym

Start: 15.11.2004
Rig Release: 26.12.2004
Rig Number: 1

Spud Date: 19.11.2004
End: 26.12.2004

Date	From - To	Hours	Code	Sub Code	Phase	Description of Operations
09.12.2004	19:00 - 00:00	5,00	11	18	D121/4	LPM=3500. No torque (3-4 kft-lbs) and motor differential pressure (5-8 bar, should be 13 - 35 bar) achieved. Observed change in formation hardness at 2450 - 2460 m (res.log approx. 14 m behind). Decided to drill past hard formation before concluding reason for low RPM (1) hard formation, 2) bit balling, 3) damaged bit, 4) junck in hole).
10.12.2004	00:00 - 03:00	3,00	11	18	D121/4	Drilled 12 1/4" hole from 2468 m to 2472m. Continued to optimize drilling parameters without any result on ROP. Increased WOB to 25 ton/5 min - no effect. Geologist reported shaker samples showing mainly firm hardness (past hard interval) without any change in ROP. Evaluated situation and decided to soak bit in drillwater based slug for 30 min. and then pump a second slug including 60 kg/m3 walnut shells to grind of any clay between bit blades.
	03:00 - 05:30	2,50	11	92	D121/4	Checked Sperry Drill (motor) shaft not broken. Set bit on bottom and turn off top drive. Started mud pumps and observed drill string rotating counter clockwise - motor ok. Bumped BHA with moderate/high impact force towards well bottom attempting to remove balled bit problem - no effect.
	05:30 - 07:30	2,00	11	62	D121/4	Pumped 4 m3 1.35 SG drillwater based slug down to bit. Soaked for 30 min. while moving bit up/down slowly. Observed high torque values when rotating pipe after soak period. Worked pipe up/down while pumping and cleaned hole. Then set bit on bottom (no rotation) and pumped 10 m3 slug including 60 kg/m3 walnut shells to grind of any clay between bit blades.
	07:30 - 10:00	2,50	11	18	D121/4	Drilled 12 1/4" hole from 2472 m to 2482 m. No soaking and walnut grinding effect observed. Attempted to clean bit further. Set down 30-35 ton on bit (no surface RPM) and turned pumpes on to clean bit. Observed increased stand pipe pressure from 250 bar to 310 bar @ 3500 lpm (60 bar diff. pressure over motor) - no effect. Decided to POOH.
	10:00 - 12:00	2,00	11	52	D121/4	Flow checked well and pulled 5 stands wet, pumped slug and POOH to 1850 m. No restrictions observed.
	12:00 - 13:00	1,00	11	52	D121/4	Continued to pull out of the hole with the 12 1/4" bit from 1850 m to 1346 m. Hole in good condition.
	13:00 - 14:30	1,50	11	52	D121/4	Flow checked the well and pulled out of the hole with the 12 1/4" bit from 1346 m to 377 m.
	14:30 - 16:00	1,50	11	52	D121/4	Flow checked with the bottom hole assembly below BOP. Pulled out of hole with 12 1/4" bit from 377 m to 46 m, removed diverter element.
	16:00 - 16:30	0,50	11	52	D121/4	Laid down screen sub. Found some debris inside.
	16:30 - 17:00	0,50	11	52	D121/4	Removed the radioactive sources.
	17:00 - 18:00	1,00	11	52	D121/4	Dumped data from LWD tool.
	18:00 - 18:30	0,50	11	52	D121/4	Racked MWD/LWD and pulled out with motor and bit.
	18:30 - 19:00	0,50	11	26	D121/4	Inspected bit and observed area between blades partly filled with clay and one nozzle plugged (bit looked only moderately balled up). No wear or broken teeth on bit - classed as 1-1. Desided to change bit and motor and rerun remaining BHA. Minimum memory life 8.5 days.
	19:00 - 20:00	1,00	11	52	D121/4	Held prejob meeting, broke out bit, float sub and motor. Laid equipment on deck.
	20:00 - 20:30	0,50	11	52	D121/4	Cleaned rig floor and greased and checked top drive and racking arms.
	20:30 - 21:00	0,50	11	52	D121/4	Picked up new motor and made up float sub.
	21:00 - 22:00	1,00	11	52	D121/4	Installed 12 1/8" sleeve on motor and made up new bit (rerun from run #2 on 12 1/4" section).
	22:00 - 22:30	0,50	11	52	D121/4	Made up MWD/LWD stand and screen sub.
	22:30 - 00:00	1,50	11	52	D121/4	Uploaded MWD/LWD.
11.12.2004	00:00 - 00:30	0,50	11	26	D121/4	Installed radioactive source in MWD tool.
	00:30 - 01:30	1,00	11	26	D121/4	Ran in hole with 12 1/4" BHA to 95 m.
	01:30 - 02:00	0,50	11	52	D121/4	Installed diverter assembly and remote operated slips.

Operations Summary Report

Legal Well Name: 15/12-15
Common Well Name: 15/12-15
Event Name: ORIG DRILLING
Contractor Name: Odfjell Drilling
Rig Name: Deepsea Trym

Start: 15.11.2004
Rig Release: 26.12.2004
Rig Number: 1

Spud Date: 19.11.2004
End: 26.12.2004

Date	From - To	Hours	Code	Sub Code	Phase	Description of Operations
11.12.2004	02:00 - 05:00	3,00	11	52	D121/4	Ran in hole with 12 1/4" BHA from 95 m to 1345 m.
	05:00 - 05:30	0,50	11	62	D121/4	Filled pipe with mud and performed a kick drill.
	05:30 - 07:00	1,50	11	96	D121/4	Cut and slipped 104 feet of drill line.
	07:00 - 07:30	0,50	11	96	D121/4	Removed hang off line and set new block alarms.
	07:30 - 09:00	1,50	11	52	D121/4	Ran in hole with 12 1/4" BHA from 1345 m to 2050 m (no restrictions observed).
	09:00 - 09:30	0,50	11	52	D121/4	Washed down from 2050 m to 2110 m with 2000 LPM/88 bar (no restrictions observed).
	09:30 - 10:30	1,00	11	52	D121/4	Ran in hole with 12 1/4" BHA from 2110 m to 2435 m
	10:30 - 11:00	0,50	11	52	D121/4	Washed down from 2435 m to 2480 m. Tight spot observed at 2480 m (10 ton) and reamed area.
	11:00 - 11:30	0,50	11	18	D121/4	Drilled in bit slowly from 2480 m to 2482 m.
	11:30 - 19:00	7,50	11	18	D121/4	Drilled 12 1/4" hole from 2482 m to 2605 m. Attempted to slide and orient interval from 2599 m to 2602 m - no results.
	19:00 - 00:00	5,00	11	18	D121/4	Drilled 12 1/4" hole from 2605 m to 2691 m. Optimized drilling parameters (WOB 15 ton, ROP=140). Drilled into Shetland formation at 2656 m MD RKB.
12.12.2004	00:00 - 01:30	1,50	11	18	D121/4	Drilled 12 1/4" hole from 2695 m to 2709 m with 5-10 ton/140 rpm . Experienced problems reading MWD pulses. Changed MWD to easy detection mode due to poor real time detection - pulse reading on surface improved. Decided to drill with optimized drilling parameters and aquire log data when reaming each stand (acceptable log data obtained).
	01:30 - 07:00	5,50	11	18	D121/4	Drilled 12 1/4" hole from 2709 m to 2797 m (ROP=16 m/hr) with WOB 10-15 ton and 140 rpm. Observed angle build up to 1.5 deg with a build rate of 0.2 deg per stand.
	07:00 - 19:00	12,00	11	18	D121/4	Drilled 12 1/4" hole from 2797 m to 2970 m (ROP=14.4 m/hr, WOB=10-15 ton, RPM=125-150). Angle stopped building - no problems to hit target without slide and orient.
	19:00 - 23:00	4,00	11	18	D121/4	Drilled 12 1/4" hole from 2970 m to 3026 m (ROP=14 m/hr, WOB=5 ton, RPM=125 - 150).
	23:00 - 00:00	1,00	11	62	D121/4	Circulated bottom up prior to drilling into reservoir.
13.12.2004	00:00 - 07:00	7,00	11	18	D121/4	Drilled 12 1/4" hole from 3026 m to 3130 m (ROP=14.9 m/hr, WOB=3-10 ton, RPM=80-140). Poor signal readings from MWD - logged while reaming back stand.
	07:00 - 19:00	12,00	11	18	D121/4	Drilled 12 1/4" hole from 3130 m to 3292 m (ROP=13.5 m/hr, WOB=3-15 ton, RPM=125). Reduced ROP from 3283 m due to mud motor problems. Top reservoir (RZ1) observed at 3142 m. Bottom reservoir (top Sleipner) observed at 3273 m.
	19:00 - 21:00	2,00	11	18	D121/4	Drilled 12 1/4" hole from 3292 m to 3300 m. Observed reduced ROP and no ROP from 3300 m. Decided to circulate hole clean and POOH. Found 10 x 3 cm rubber seal believed to belong to motor seal when circulated bottom up. Not able to drill down to 3330 m as planned to aquire sonic log down to top Sleipner formation.
	21:00 - 23:00	2,00	11	62	D121/4	Circulated bottom up twice prior to pull out of hole, only fines over the shaker at the end.
	23:00 - 00:00	1,00	11	48	D121/4	Flow checked for 15 min/10 rpm - ok. Pumped 4 m3 slug.
14.12.2004	00:00 - 04:30	4,50	11	54	D121/4	Pulled out of hole with 12 1/4" bottom hole assembly from 3300 m MD to 1345 m MD. Tight spots at 3090 m MD (20 MT overpull) and at 2110 m MD (10 ton overpull) Performed flowcheck for 15 min, ok, meanwhile inspected top drive and arms.
	04:30 - 06:00	1,50	11	54	D121/4	Pulled out of hole from 1345 m MD to 231 m MD. Performed flowcheck for 10 min, ok. Held tool box meeting prior handling bottom hole assembly.
	06:00 - 10:00	4,00	11	26	D121/4	Pulled out of hole to 50 m MD while laid down the 12 1/4" bottom hole

Operations Summary Report

Legal Well Name: 15/12-15
Common Well Name: 15/12-15
Event Name: ORIG DRILLING
Contractor Name: Odfjell Drilling
Rig Name: Deepsea Trym

Start: 15.11.2004
Rig Release: 26.12.2004
Rig Number: 1

Spud Date: 19.11.2004
End: 26.12.2004

Date	From - To	Hours	Code	Sub Code	Phase	Description of Operations
14.12.2004	06:00 - 10:00	4,00	11	26	D121/4	assembly. Held pre job meeting prior to handling radioacive sources. Removed radioactive sources, plugged in and turned off MWD tools. Laid down remaning 12 1/4" bottom hole assembly. Bit was 1 7/8" undergauged.
	10:00 - 11:00	1,00	11	152	D121/4	Checked out DDM and cleaned rig floor. Changed to 5 1/2" elevator and prepared for BOP test.
	11:00 - 12:00	1,00	11	64	D121/4	Made up jet sub tool, ran in hole and jetted BOP and well head area with 3000 ltr/min / 70 bar. Pulled out of hole with jetting tool
	12:00 - 17:00	5,00	11	96	D121/4	Made up BOP test tool, ran in hole and landed out on well head. Testet BOP to 242 / 345 bar (yellow pod) according to Odfjell procedyre. Pulled out of hole with BOP test tool. Broke and laid down test tool.
	17:00 - 18:30	1,50	11	64	D121/4	Ran in hole with jet sub to 98 m MD, washed riser (3000 ltr/min / 72 bar) while pulling out of hole. Laid down jet sub and cleaned drill floor.
	18:30 - 19:00	0,50	14	66	D121/4	Prepared to run wire line.
	19:00 - 19:30	0,50	14	97	D121/4	Held tool box meeting prior to rigging up wire line.
	19:30 - 21:00	1,50	14	66	D121/4	Rigged up electric wire line tool string and equipment.
	21:00 - 00:00	3,00	14	68	D121/4	Ran in hole with wire line MDT tool string to 3170 m MD.
15.12.2004	00:00 - 01:00	1,00	14	68	D121/4	Performed wire line MDT pressure points at 3148,5 m MD, EMW: 0,821 sg 3151,0 m MD, EMW: 0,821 sg 3161,5 m MD, EMW: 0,822 sg 3172,0 m MD, EMW: 0,823 sg
	01:00 - 03:30	2,50	14	68	D121/4	Pulled out of hole with wire line MDT tool
	03:30 - 04:00	0,50	14	66	D121/4	Laid down MDT tool and rigged down wire line equipment.
	04:00 - 05:00	1,00	15	58	P&A	Installed elevator and diverter element. Picked up 7 joints 5 1/2" drill pipe from deck and ran in hole with open ended 5 1/2" drill pipe to 94 m MD.
	05:00 - 12:00	7,00	15	54	P&A	Ran in hole with 5 1/2" drill pipe to 3300 m. Broke circulation with 1000 ltr/min / 20-30 bar every 500 m.
	12:00 - 13:30	1,50	15	62	P&A	Circulated bottoms up with 3500 ltr/min / 165 bar / 110 RPM / 4-5 k ftlbs (max gas 0,82 %). Meanwhile, held pre cement job meeting. Rigged up cement hose and tested same to 200 bar, ok.
	13:30 - 15:00	1,50	15	88	P&A	Pumped a balanced cement plug from 3300 m MD to 3090 m MD by pumping 8 m3 1,55 sg spacer followed by 20 m3 1,95 sg cement slurry. Pumped 1,5 m3 1,55 sg spacer behind cement. Displaced with 31,5 m3 1,35 sg mud.
	15:00 - 16:00	1,00	15	54	P&A	Pulled out of hole slowly from 3300 m MD to 2890 m MD.
	16:00 - 18:00	2,00	15	62	P&A	Inserted wiper ball and circulated 1,5 x bottoms up with 3000 ltr/min / 139 bar / 115 RPM, no cement observed in return. Held tool box meeting prior to laying down drill pipe on deck.
	18:00 - 00:00	6,00	15	54	P&A	Pulled out of hole with 5 1/2" drill pipe from 2770 m MD to 1477 m MD, laid out 93 ea 5 1/2" drill pipe singles on pipe deck.
16.12.2004	00:00 - 02:00	2,00	15	62	P&A	Circulated bottoms up. Meanwhile, held tool box meeting prior to cement job. Spotted a high viscous pill from 1470 m MD to 1400 m MD.
	02:00 - 02:30	0,50	15	62	P&A	Pulled out of hole with 5 1/2" drill pipe from 1470 m MD to 1420 m MD. Inserted and displaced CST (with dart) with 1000 ltr/min / 22 bar at 1420 m MD. Pulled out of hole from 1420 m MD to 1414 m MD. Pressure tested cement lines to 200 bar/10 min, ok.
	02:30 - 03:30	1,00	15	88	P&A	Set a balanced cement plug from 1414 m MD to 1264 m MD by pumping 8 m3 1,55 sg spacer followed by 13,5 m3 1,95 sg G-cement slurry. Pumped 1,5 m3 1,55 sg spacer after cement and displaced cement/spacer with 11 m3 1,35 sg mud.
	03:30 - 04:30	1,00	15	54	P&A	Pulled out of hole slowly with 5 1/2" drill pipe from 1414 m MD to 1035 m MD.

Operations Summary Report

Legal Well Name: 15/12-15
Common Well Name: 15/12-15
Event Name: ORIG DRILLING
Contractor Name: Odfjell Drilling
Rig Name: Deepsea Trym

Start: 15.11.2004
Rig Release: 26.12.2004
Rig Number: 1

Spud Date: 19.11.2004
End: 26.12.2004

Date	From - To	Hours	Code	Sub Code	Phase	Description of Operations
16.12.2004	04:30 - 06:00	1,50	15	62	P&A	Inserted wiper ball and pumped 1,5 x bottoms up with 3500 ltr/min / 65 bar. No cement or spacer observed on shakers. Flowchecked 10 min, ok.
	06:00 - 07:30	1,50	15	24	P&A	Pulled out of hole with 5 1/2" drill pipe from 1035 m MD to 610 m MD, laid down singles while pulling out of hole.
	07:30 - 08:00	0,50	15	128	P&A	Repaired hydraulic hose on roughneck.
	08:00 - 10:30	2,50	15	24	P&A	Pulled out of hole with remaining 5 1/2" drill pipe while laying out singels.
	10:30 - 16:00	5,50	15	24	P&A	Removed insert packer and laid down accellerator, jar, hang off tool and two stands 8" drill collars. Changed handling equipment to 3 1/2" and laid down 15 singles with 3 1/2" drill pipe. Changed back to 5 1/2" handling equipment.
	16:00 - 19:00	3,00	15	54	P&A	Made up 12 1/4" bit on 5 1/2" drill pipe, ran in hole to 1017 m MD.
	19:00 - 21:00	2,00	15	64	P&A	Washed down from 1017 m MD to 1278 m MD with 700 ltr/min / 17 bar. Tagged hard cement at 1278 m MD, set down 10 MT, ok.
	21:00 - 22:00	1,00	15	62	P&A	Displaced well to 1,35 sg corrosion inhibited mud with 3200 ltr/min / 70 bar / 40 RPM.
	22:00 - 22:30	0,50	15	54	P&A	Racked back 1 stand. Inspected top drive, DOLLY, IRA and URA prior to pull out of hole.
	22:30 - 23:00	0,50	15	54	P&A	Pulled out of hole with 5 1/2" drill pipe from 1250 m MD to 1077 m MD.
	23:00 - 00:00	1,00	15	24	P&A	Pulled out of hole and laid down singles of 5 1/2" drill pipe from 1077 m MD to 842 m MD.
17.12.2004	00:00 - 03:30	3,50	15	24	P&A	Pulled out of hole from 842 m MD , laid down singles while pulling out of hole. Held tool box meeting prior to breaking off 12 1/4" bit.
	03:30 - 04:00	0,50	15	26	P&A	Broke off 12 1/4" bit and x-overs on 5 1/2" drill pipe.
	04:00 - 04:30	0,50	15	94	P&A	Cleaned and cleared rig floor. Pressure tested cement plug against closed shear ram with 122 bar/10 min, ok.
	04:30 - 05:00	0,50	15	26	P&A	Made up EZSV plug and x-overs to string. Opened shear ram.
	05:00 - 07:30	2,50	15	54	P&A	Ran in hole and set EZSV-plug at 364 m MD according to Halliburton procedure. Tagged EZSV plug with 10 MT, ok.
	07:30 - 08:00	0,50	15	94	P&A	Pressure tested EZSV plug from below to 122 bar/10 min, ok.
	08:00 - 08:30	0,50	15	97	P&A	Held tool box meeting prior to cement job, meanwhile circulated bottoms up.
	08:30 - 09:30	1,00	15	88	P&A	Spotted a balanced cement plug from 364 m MD to 140 m MD by pumping 10 m3 spacer (seawater) followed by 18 m3 1,92 sg silica cement slurry. Displaced cement with 1 m3 seawater.
	09:30 - 10:30	1,00	15	54	P&A	Pulled out of hole slowly from 364 m MD to 140 m MD.
	10:30 - 11:30	1,00	15	62	P&A	Closed BOP and reversed circulated 3 x string volume, dumped cement contaminated mud. Displaced choke lines to seawater and reverse circulated with 3000 ltr/min / 110 bar.
	11:30 - 12:30	1,00	15	62	P&A	Opened BOP and pulled out of hole from 140 m MD to 120 m MD. Displaced riser to seawater with 3100 ltr/min / 50 RPM / 22 bar. Inserted wiper ball and pumped down same. Pulled out of hole from 120 m MD to 86 m MD.
	12:30 - 14:30	2,00	15	24	P&A	Pulled out of hole and laid down singles on pipe deck. Laid down cement stinger.
	14:30 - 16:00	1,50	15	54	P&A	Made up spring load tool and ran in hole same to 110 m MD. Set down 10 MT, washed down last 5 m with 1500 ltr/min.
	16:00 - 17:00	1,00	15	54	P&A	Pulled wear bushing with 30 MT, laid down same.
	17:00 - 18:00	1,00	15	152	P&A	Removed Sperry Sun sensors in derrick.
	18:00 - 20:00	2,00	15	24	P&A	Laid down rest of 5 1/2" drill pipe. Checked make up on collars stand.
	20:00 - 00:00	4,00	15	154	P&A	Waited on weather, meanwhile flushed chokes & trip tank, leak tested stand pipe and checked brake on drawork.
18.12.2004	00:00 - 00:00	24,00	15	154	P&A	Waited on weather, meanwhile greased and checked top drive, DOLLY,

Operations Summary Report

Legal Well Name: 15/12-15
Common Well Name: 15/12-15 Spud Date: 19.11.2004
Event Name: ORIG DRILLING Start: 15.11.2004 End: 26.12.2004
Contractor Name: Odfjell Drilling Rig Release: 26.12.2004
Rig Name: Deepsea Trym Rig Number: 1

Date	From - To	Hours	Code	Sub Code	Phase	Description of Operations
18.12.2004	00:00 - 00:00	24,00	15	154	P&A	trav block, IRA, manuell arm, drawork and iron roughneck. Performed weekly maintenance.
19.12.2004	00:00 - 10:30	10,50	15	154	P&A	Waited on weather, meanwhile performed general rig maintenance.
	10:30 - 11:00	0,50	15	97	P&A	Held tool box meeting prior pulling BOP.
	11:00 - 14:00	3,00	15	152	P&A	Disconnected air and water supply to slipjoint. Removed compensating wire on support ring. Pulled diverter and laid out same. Collapsed inner barrel.
	14:00 - 00:00	10,00	15	154	P&A	Waited on weather, meanwhile performed general rig maintenance.
20.12.2004	00:00 - 09:30	9,50	25	154	P&A	Waited on weather, unable to dive ROV. Meanhwhile performed general rig maintenance. Held tool box meeting prior to pulling BOP. ROV in water: 09:30
	09:30 - 10:30	1,00	25	30	P&A	Checked bullseye on riser:0,0 -2,0 deg forward, on BOP: 1,0 deg starboard.
	10:30 - 20:30	10,00	25	30	P&A	Unlatched BOP with 30 MT overpull. Pulled BOP above guide posts, released guide anchors, removed kill & choke hoses from slip joint and released support ring. Installed riser running tool. Pulled and laid down slip joint on deck. Pulled BOP and laid down riser joints. BOP out of water at 15:20. Secured BOP and removed guide wires. Skidded carrier into center. Set BOP on carrier, locked connector and installed turnbuckles. Disconnected riser from BOP and parked BOP. Laid down riser singles and riser pup. Rigged down BOP equipment.
	20:30 - 21:00	0,50	15	97	P&A	Held tool box meeting prior to cutting of wellhead.
	21:00 - 22:30	1,50	15	26	P&A	Picked up wellhead cutting and pulling tool. Build up spacer sub. Tested cutters. Established guidewires and attached guiderope to cutting tool.
	22:30 - 00:00	1,50	15	54	P&A	Ran in hole and stung into wellhead with cutting tool. Set down 5 MT.
21.12.2004	00:00 - 02:30	2,50	15	84	P&A	Cut 20"/30" wellhead at 118,7 m MD (5 m below seabed) according to Weatherford procedure.
	02:30 - 03:00	0,50	15	80	P&A	Engaged pulling tool and released cut 20"/30" wellhead with 60 MT overpull (no cement on conductor, clean cut). Pulled out one stand.
	03:00 - 04:00	1,00	15	96	P&A	Checked top drive for loose parts. (Found a small shim on the floor, that had fallen off the top drive due to shock during cutting of the wellhead)
	04:00 - 06:30	2,50	15	80	P&A	Pulled out of hole and landed guide base with cut 20"/30" conductor on trolley. Secured guide base to trolley. Released cutting and pulling tool and laid down same. Meanwhile, performed seabed survey, left two spud markers stuck in cement.
	06:30 - 08:00	1,50	15	34	P&A	Made up 18 3/4" wellhead housing running tool and connected same to wellhead housing. Pulled out cut wellhead from guide base and laid down same. Observed no cement between 20"/30" casing.
	08:00 - 09:00	1,00	15	152	P&A	Skidded trolley aft and removed guide base from trolley.
	09:00 - 00:00	15,00	10	154	Move	Waited on weather to pull anchors. Meanwhile dismanteled support ring. Laid down cutting string and BOP landing string. Performed general maintenance.
22.12.2004	00:00 - 00:00	24,00	10	154	Move	Waited on weather, meanwhile performed general maintenance.
23.12.2004	00:00 - 00:00	24,00	10	154	Move	Waited on weather. Meanwhile performed general maintenance: - Dismantled blue pod hose - Refreshed and painted equipment on drillfloor - Painted guide rails on guide/pod wires - Maintenance on rig pumps
24.12.2004	00:00 - 00:00	24,00	10	154	Move	Waited on weather. Meanwhile performed general maintenance: - Removed telescopic arm on IRA - Performed 6 months maintenance on mud pumps - Painted choke manifold

Operations Summary Report

Legal Well Name: 15/12-15
Common Well Name: 15/12-15
Spud Date: 19.11.2004
Event Name: ORIG DRILLING
Start: 15.11.2004
End: 26.12.2004
Contractor Name: Odfjell Drilling
Rig Release: 26.12.2004
Rig Name: Deepsea Trym
Rig Number: 1

Date	From - To	Hours	Code	Sub Code	Phase	Description of Operations
24.12.2004	00:00 - 00:00	24,00	10	154	Move	- Continued disconnecting service loop - Dismantled air cooler on DDM - Changed value on trip tank
25.12.2004	00:00 - 19:30	19,50	10	154	Move	Waited on weather. Meanwhile performed general maintenance: - Dismantled and backloaded gear-oil pump on DDM - Disconnected all electrical and hydraulic cables and hoses from service loop - Painted standpipe and choke manifold
	19:30 - 00:00	4,50	10	152	Move	Anchor handling: - At 19:21 Penet #10 to boat, on rig at 22:10 - At 19:41 Penet #1 to boat, on rig at 01:27 - At 22:29 Penet #4 to boat, on rig at 00:31
26.12.2004	00:00 - 11:30	11,50	10	152	Move	Anchor Handling. Last anchor to rig at 11:30

16 CASING AND LINER DATA

Size	Shoe (m TVD RKB)	Shoe (m MD RKB)	Top (m TVD RKB)	Top (m MD RKB)	Weight (lbs/ft)	Grade	Connection	Collapse rating (bar)	Burst rating (bar)	Tension minimum yield (kdaN)
30”	174.7	174.7	112.0	112.0	309.72	X-52	SL-60	109	230	2110
20” (top 13 3/8”)	119.4	119.4	113	113	202.92	X-65	Vam Top (pin)	272	392	1725
13 3/8”	353.4	353.4	119.4	119.4	72	P-110	Vam Top	199	510	1016
	464.3	464.3	353.4	353.4	72	P-110	New Vam	199	510	1016
	984.0	984.0	464.3	464.3	72	P-110	New Vam SC	199	510	1016
	1363.9	1363.9	984.0	984.0	72	L80	New Vam	184	371	739

17 CEMENTING DATA

OPERATIONAL SUMMARY:

On the following pages you will find a description of the cement jobs executed in this drilling operation. Each description will include a summary of events in addition to slurry and spacer recipes. In the table below all the jobs are listed in a chronological order:

Job description	Date
30” Conductor	21/11/2004
13 3/8” casing	28/11/2004
30” surface grouting	08/12/2004
P/A plug #1	15/12/2004
P/A plug #2	16/12/2004
P/A plug #3	17/12/2004

30" conductor

Key facts:

WELL DATA - 30" CONDUCTOR					
Casing Depth, MD	[m]	± 176	BHST	[°C]	7
Casing Depth, TVD	[m]	± 176	BHCT	[°C]	9
Conductor Size	["]	30	WOC Time	[hrs]	± 6
Conductor Thickness	["]	1	Mud Type		WBM
Slurry Volume (lead/tail)	[m^3]	± 18/15	Mud Weight	[SG]	1.5
Hole Size	["]	36	TOC, MD	[m]	Seabed @ 112
OH Excess (lead/tail)	[%]	100/100	TOC, TVD	[m]	Seabed @ 112

Spacer recipe:
The well was circulated with 25m^3 seawater in front of the cement job.

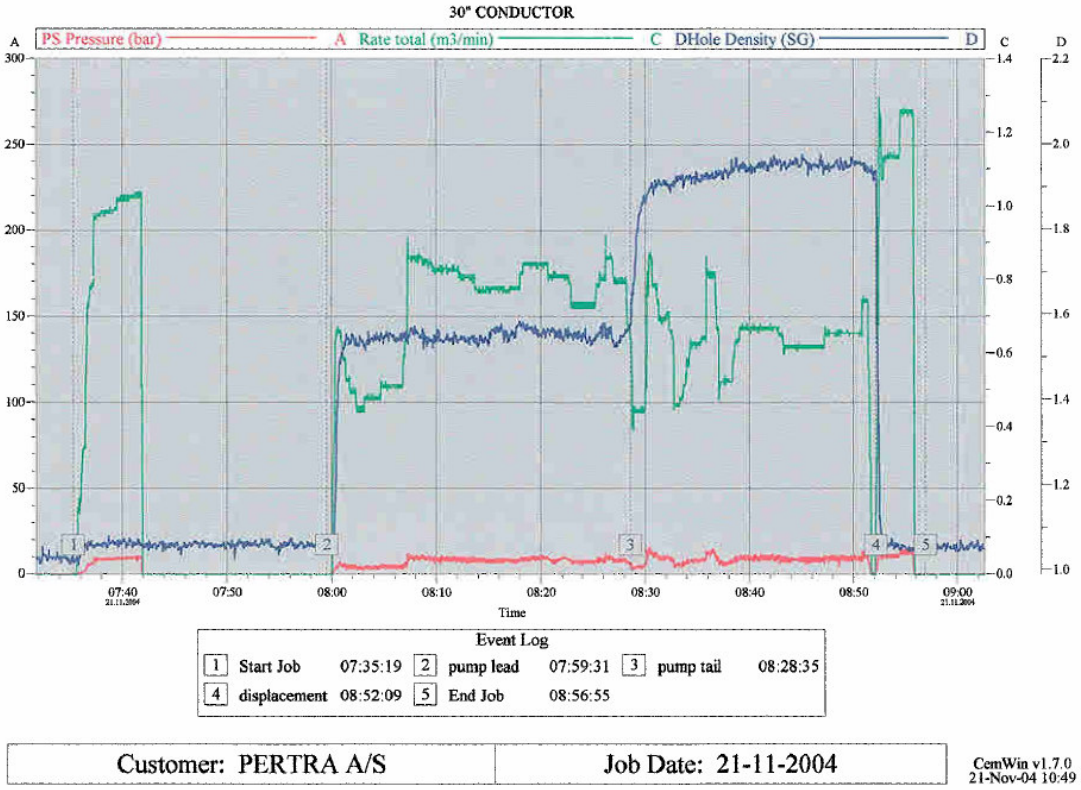
Summary of events:

- Picked up glass fibre inner string
- RIH with 30" conductor on5 ½" DP.
- The conductor was spaced out with the shoe at 175mMD.
- Rigged up the cement hose and held a pre job meeting.
- Pumped 5m^3 dye pill
- Pumped 18 m^3 1,56SG lead cement
- Pumped 15 m^3 1,95SG tail cement
- Displaced with 4m3 seawater
- Waited 10 hours on cement to set.
- Released running tool and flushed thought string.
- POOH and laid down glass fibre string

Slurry recipe:

CEMENT SLURRY DESIGN & DATA				
Slurry design	Dyckerhoff class "G" Cement w/ 0.1% EZ-FLO	**Amount:**		**Units**
		Lead	Tail	
	Econolite	3.20		Liter/100kg
	Liquid $CaCl_2$		2.50	Liter/100kg
	NF-6	0.10	0.10	Liter/100kg
	Sea Water	94.9	40.75	Liter/100kg
	Density	**1.56**	**1.95**	**SG**
	Total Mix Fluid	98.1	43.25	Liter/100kg
	Yield	129.3	74,4	Liter/100kg
	Thickening **Time at 9 °C:**			
	Time to 70 BC	>7	6:17	Hrs
	Required hang off strength	8 hrs		100 psi
	UCA Compressive strength	Ongoing		Psi

Job chart:


30" CONDUCTOR
PS Pressure (bar)
A Rate total (m3/min)
C DHole Density (SG)
D
Time
Event Log
1 Start Job 07:35:19
2 pump lead 07:59:31
3 pump tail 08:28:35
4 displacement 08:52:09
5 End Job 08:56:55
Customer: PERTRA A/S
Job Date: 21-11-2004
CemWin v1.7.0
21-Nov-04 10:49

13 3/8" surface casing

Key facts:

WELL DATA – 13 3/8" SURFACE CASING					
Casing Depth, MD	[m]	± 1370	BHST	[°C]	50
Casing Depth, TVD	[m]	± 1370	BHCT	[°C]	39
Casing Size	["]	13 3/8	WOC Time	[hrs]	± 12
Casign Weight	[kg/m]	107.15	Mud Type		WBM
Slurry Volume (lead/tail)	[m^3]	± 107/20	Mud Weight	[SG]	1.2
Hole Size	["]	17.5	TOC, MD	[m]	Seabed @ 113
OH Excess (lead/tail)	[%]	40/40	TOC, TVD	[m]	Seabed @ 113

Spacer recipe:

The 1.25sg water based mud was displaced out of the hole with seawater.

Summary of events:

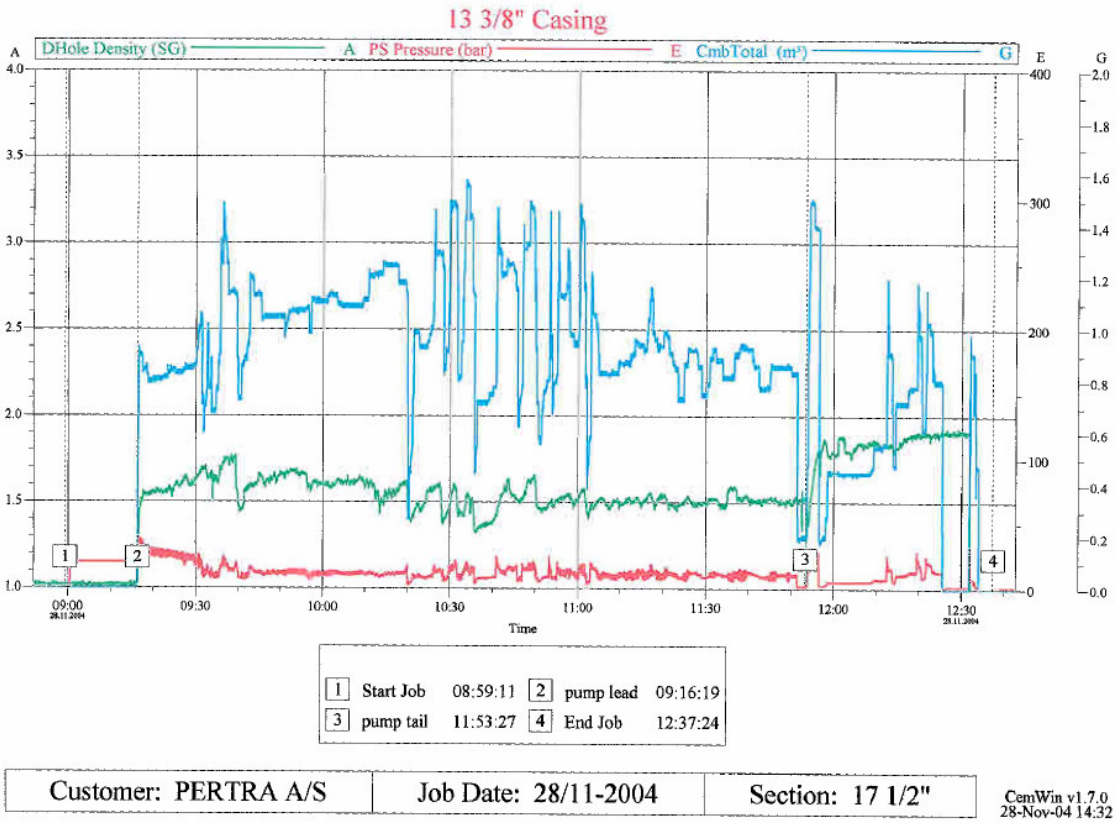
- Pumped 10 m3 dye pill
- Performed pre-job meeting while circulating.
- Launched ball.
- Mixed and pumped 108,5m3 1,56sg lead slurry.
- Mixed and pumped 20,5m3 1,92sg tail slurry.
- Launched dart and displaced out of cement head with drill water.
- Displaced cement with sea water with the mud pumps at 2300lpm.
- Bumped plug.
- Pressure tested plug and casing to 291bar.
- Bled off pressure. Checked for backflow – float did not hold.
- Re bumped plug – float still not hold.
- Re bumped plug with 85 bar – hold and waited 5,5 hours on cement to set.
- Rigged down cement head – no return.
- Good FIT achieved.

A possible reason for float to not hold can be dirt in the valves on the float equipment.

Slurry recipe:

CEMENT SLURRY DESIGN & DATA				
Slurry design	Dyckerhoff class "G" Cement w/ 0.1% EZ-FLO	**Amount:**		**Units**
		Lead	Tail	
	Econolite	3.20	-	Liter/100kg
	HR-4L	2.60	0.50	Liter/100kg
	NF-6	0.10	0.10	Liter/100kg
	Sea Water	92.95	-	Liter/100kg
	Fresh Water	-	43.17	Liter/100kg
	Density	**1.56**	**1.92**	**SG**
	Total Mix Fluid	98.85	43.93	Liter/100kg
	Yield	130.00	74.93	Liter/100kg
Lab results:				
Typical data	**Thickening Time at 30 °C:**			
	Time to 30 BC	6:13	4:30	Hrs
	Time to 70 BC	**8:02**	**5:13**	Hrs
	Time to 100 BC	8:18	5:30	Hrs
	Compressive strength at 55 ° C	7:40	7:19	50 psi
		13:59	8:52	500 psi
		670	2078	18/24 hours

Job chart:


13 3/8" Casing
DHole Density (SG)
PS Pressure (bar)
CmbTotal (m³)
Time
1 Start Job 08:59:11
2 pump lead 09:16:19
3 pump tail 11:53:27
4 End Job 12:37:24
Customer: PERTRA A/S
Job Date: 28/11-2004
Section: 17 1/2"
CemWin v1.7.0
28-Nov-04 14:32

30" surface grouting:

Key facts:

The ROV located an uncertain conductor support due to observed crater around conductor, increasing wind and waves and a non functional ROV was the reason to hang of drill string with an RTTS and secure the well. It was decided to grout inn the crater to get a proper conductor support.

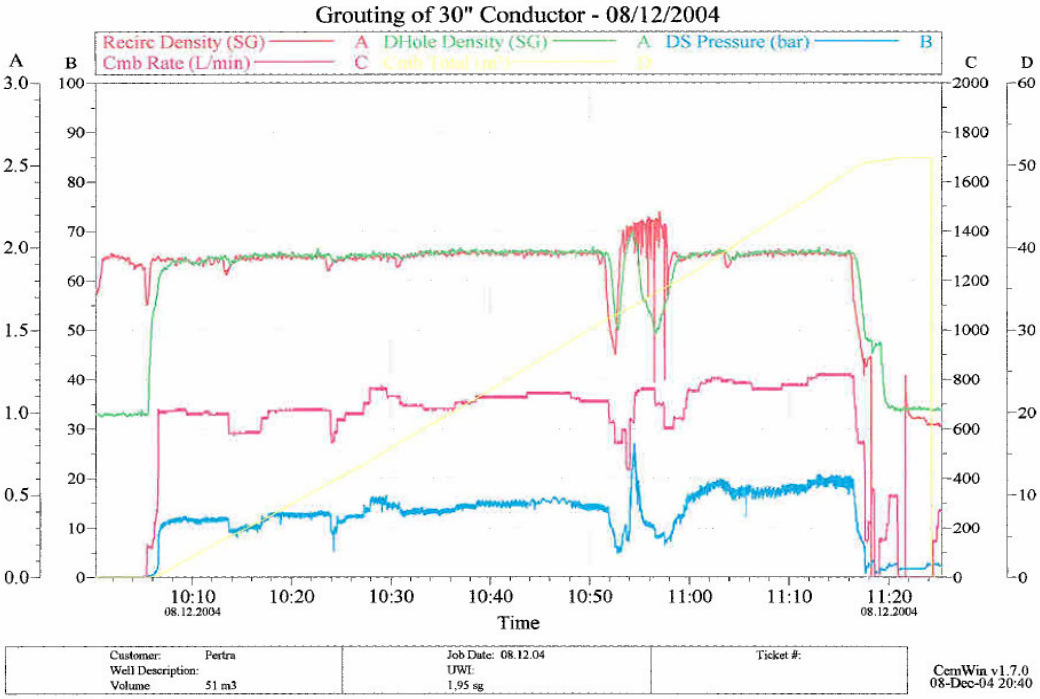
Slurry recipe:

We used the same slurry recipie as for the tail on 30" conductor for this job

Summary of events:

- Performed a pre job meeting prior to cement job.
- RIH with a stinger beside the BOP stack. Observed and directed with work ROV.
- Mixed and pumped 51 m3 of 1.95 sg slurry at 400 l/min
- Pulled out of hole with cement stinger above mudline and flushed 3 1/2" pipe with seawater.
- Rigged down cement hose, pulled 3 1/2" stinger and changed to 5 1/2" drill pipe equipment.
- Observed bullseye after cement job. Conductor PGB observed with 0 - 0,5 deg off vertical and no movements. Cement observed around 30" conductor with no gap between cement and 30" conductor - perfect cement job.

Job chart:



P&A plug #1

Key facts:

WELL DATA					
Plug Depth, MD	(m)	± 3300	BHST	(°C)	130
Plug Depth, TVD	(m)	± 3300	BHCT (API)	(°C)	108
String Size	(")	5 ½	Mud Type		VBM
String Weight	(lb/ft)	21,5	Mud Weight	(SG)	1,35
Hole Size	(")	12 ¼	TOC, MD	(m)	± 3000
Excess OH	(%)	20	Volume cement slurry	(m^3)	± 33
Spacer type		Tuned Spacer E+	Volume spacer ahead	(m^3)	8

Spacer recipe:

SPACER DESIGN & DATA				
Volume:	8 m^3 ahead + Volume to balance behind	**Amount**	**Unit**	**Order of addition**
Spacer design	Drill water	820,4	Liter	1 Check Chlorides
	NF-6	3	Liter	2 Disperse in water
	Tuned Spacer E+	30,8	Kg	3 Yield min. 1/2 hour
Per 1 m^3:	Barite	700,5	Kg	4 Weigh up to Final SG
	Final density	**1,55**	SG	
Rheology at 21°C:		25 20 14 11 8 5 4		300 200 100 60 30 6 3
Rheology at 82°C:		18 14 10 8 6 4 3		300 200 100 60 30 6 3

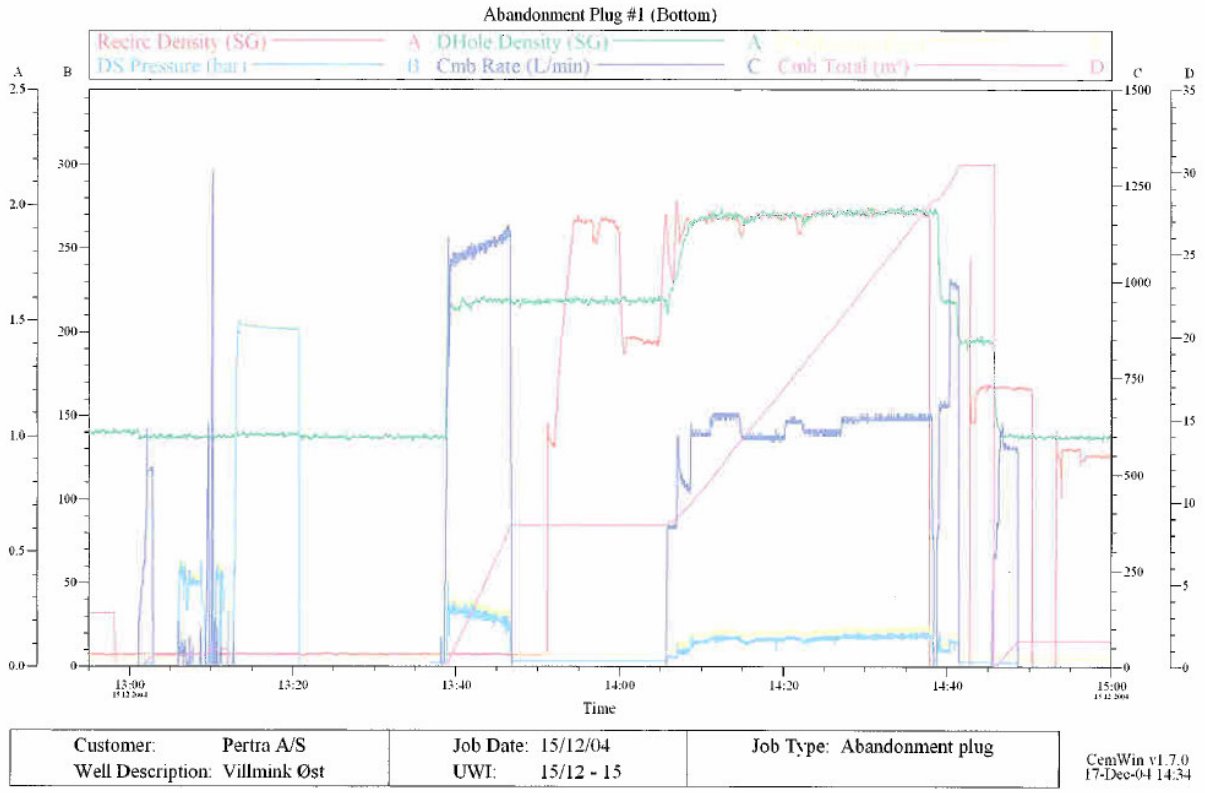
Slurry recipe:

CEMENT SLURRY DESIGN & TEST RESULTS			
Slurry design:	Dyckerhoff "G" + 35% SSA-1 + 0,1% Ez-Flo		**Units**
	Gascon	5,40	ltr/100 kg
	CFR-3L	1,60	ltr/100 kg
	Halad 413L	4,50	ltr/100 kg
	HR-5L	2,20	ltr/100 kg
	NF-6	0,10	ltr/100 kg
	Fresh water	38,59	ltr/100 kg
	Density	**1,95**	SG
	Total Mix Fluid	52,39	ltr/100 kg
	Yield	96,85	ltr/100 kg
	Thickening Time at BHCT		
Test results	Time to 30 BC	04:23	Hrs:Mins
	Time to 70 BC	**04:31**	Hrs:Mins
Lab reference NS04-824-3	Time to 100 BC	04:36	Hrs:Mins
	API Free Water, vertical	0	%
	SG top/bottom	1,95/1,95	SG / SG
	API fluid loss at BHCT	56	cc/30 min
	Fann readings at BHCT	205	300 RPM
		152	200 RPM
		88	100 RPM
		62	60 RPM
		39	30 RPM
		13	6 RPM
		8	3 RPM
	API gel strength, 10sec/min	7/45	CP
	UCA compressive strength	04:40	50 psi
		05:28	500 psi
		37:39	3543 psi

Summary of events:

- Ran the hole with open ended drillpipe to 3300mMD
- Circulated bottoms upwith 3500 lpm.
- Held pre job meeting
- Pressure tested cement line to 345 bar.
- Pumped 8 m3 1.55SG Tuned Spacer E+.
- Mixed and pumped 20m3 1.95 SG cement slurry.
    - Set a balanced plug from 3300 – 3090 mMD.
- Pumped 1.5 m3 1.55SG spacer behind cement
- Displaced cement with 31.5 m3 1.35SG mud for balancing the plug.
- Pulled slowly out of hole to 3090
- Insert DP wiper ball and circulated 1.5 x bottoms up with 3000 lpm
- No cement observed in return.

Job chart:



P&A plug #2

Key facts:

WELL DATA			
Depth to Plug Bottom MD:	1 414 m	Hole size	12,25 inch
Depth to Plug Bottom TVD:	1 414 m	OH Excess:	20 %
Depth to Plug Top MD:	1 035 m	Casing I D:	12,347 inch
Drilling Mud Type:	WBM	Drill Pipe Size:	5.5inch
Drilling Mud Weight:	1,35 S.G	BHST Temperature:	53 °C
Spacer fluid:	Tuned E+	BHCT Temperature:	43 °C
		Spacer volume:	8 m^3

Spacer recipe:

SPACER DESIGN & DATA				
Volume:	8 m^3 ahead + Volume to balance behind	**Amount**	**Unit**	**Order of addition**
Spacer design Per 1 m^3:	Drill water	820,4	Liter	1 Check Chlorides
	NF-6	3	Liter	2 Disperse in water
	Tuned Spacer E+	30,8	Kg	3 Yield min. 1/2 hour
	Barite	700,5	Kg	4 Weigh up to Final SG
	Final density	**1,55**	SG	
Rheology at 21°C:		25 20 14 11 8 5 4		300 200 100 60 30 6 3
Rheology at 82°C:		18 14 10 8 6 4 3		300 200 100 60 30 6 3

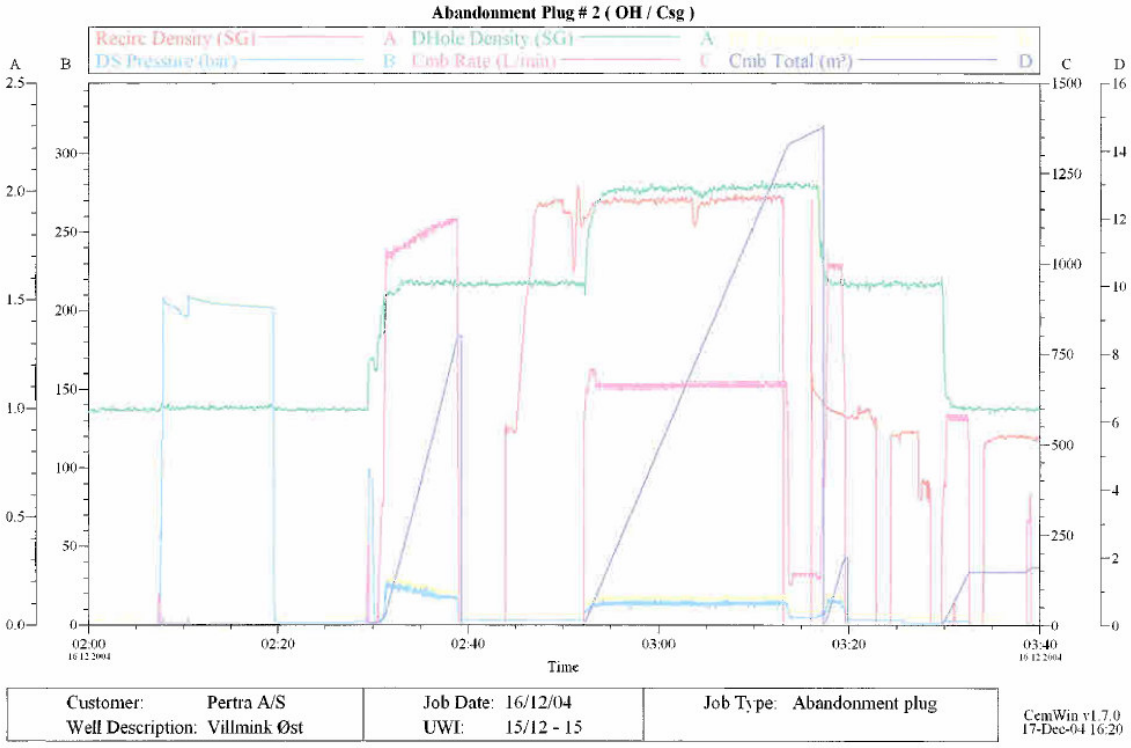
Slurry recipe:

CEMENT SLURRY DESIGN & DATA			
Design:	Dyckerhoff "G" + 0,1% Ez-Flo		**Units**
	HR-4L	0,50	lhk
	NF-6	0,10	lhk
	Freshwater	40,81	lhk
	Density	**1,95**	**SG**
	Total Mix Fluid	41,41	lhk
	Yield	72,56	lhk
NS04-850	Thickening Time at BHCT		
	Time to 30 BC	3:14	hrs:min
	Time to 70 BC	**4:07**	hrs:min
	Time to 100 BC	4:17	hrs:min
	Fann rheology at BHCT	92	300 rpm
		81	200 rpm
		69	100 rpm
		30	60 rpm
		24	30 rpm
	Plastic Viscosity	35	cP
	Yield point	57	$^{lb}/_{100\ ft^2}$
	Compressive strength at 7°C	6:18	50 Psi
		8:05	500 Psi
		2412	16 Hrs

Summary of events:

- Ran the hole with open ended drillpipe to 1470.
- Spotted a highvis pill from 1470 - 1400mMD
- POOH to 1420 and displaced down a CST.
- Pulled up to 1414mMD
- Pressure tested cement line to 200 bar.
- Pumped 8 m3 1.55SG Tuned Spacer E+.
- Mixed and pumped 13,5m3 1.95 SG cement slurry.
    - Set a balanced plug from 1414 – 1035 mMD.
- Pumped 1.5 m3 1.55SG spacer behind cement
- Displaced cement with 11 m3 1.35SG mud for balancing the plug.
- Pulled slowly out of hole to 1035
- Insert DP wiper ball and circulated 1.5 x bottoms up with 3000 lpm
- No cement observed in return.
- RIH to tag cement – tagged at 1278mMD with 10 tonne.

Job chart:



P&A plug #3

Key facts:

WELL DATA			
Depth to Plug Bottom MD:	363 m	Casing ID	12,347inch
Depth to Plug Bottom TVD:	363 m	Excess:	20 %
Depth to Plug Top MD:	143 m	Drill Pipe Size:	5.5 inch
Depth to Plug Top TVD:	143 m	BHST Temperature:	15 °C
Length Cement Plug:	220 m	BHCT Temperature:	13 °C
Drilling Mud Type:	Seawater	Drilling Mud Weight:	1,03 S.G
Spacer fluid:	Seawater	Spacer volume:	10 m^3

Spacer recipe:

Seawater

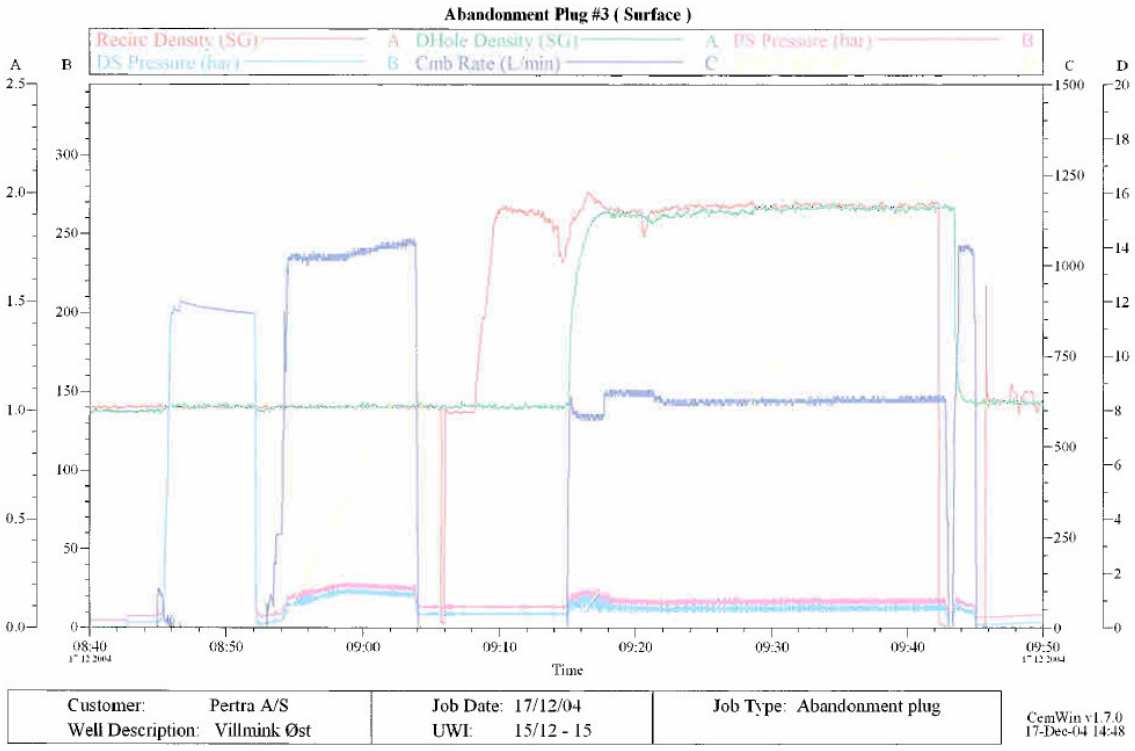
Slurry recipe:

CEMENT SLURRY DESIGN & DATA			
Design:	Dyckerhoff "G" w/35 SSA-1		**Units**
	NF-6	0,10	lhk
	Sea Water	55,35	lhk
	Density	**1,92**	**SG**
	Total Mix Fluid	55,45	lhk
	Yield	99,91	lhk
Typical Data	Thickening Time at BHCT		
	Time to 30 BC	4:30	hrs:min
	Time to 70 BC	5:20	hrs:min
	Time to 100 BC	5:38	hrs:min
	Fann rheology at BHCT	89	300 rpm
		78	200 rpm
		68	100 rpm
		34	6 rpm
		26	3 rpm
	Plastic Viscosity	32	cP
	Yield point	57	$^{lb}/_{100\ ft^2}$
	Compressive strength at 10°C	5:47	50 Psi
			500 Psi
		387	15:13 Hrs

Summary of events:

- Ran the hole with EZSV to 364 mMD.
- Pressure tested EZSV from below to 122bar.
- Hold pre job meeting meanwhile circulation bottoms up.
- Pumped 10 m3 seawater
- Pumped 18m3 1,92SG silica cement slurry
    - Balanced plug from 364 -140mMD
- Displaced cement with 1 m3 seawater to balance the plug.
- Pulled slowly out of hole to 140mMD
- Circulated 3 x string volume to clean the pipe.
- POOH

Job chart:



Material usage and discharge:

Total usage and discharge
Well 15/12-15

Product	Usage	Unit	Destruction	Left in well	Reinjected	To Sea
Dyckerhoff G	270	MT	0	229	0	41
SSA-1 (silica)	29	MT	0	24	0	5
EzFlo	245	kg	0	199	0	46
CaCl2 liquid	3900	ltr	0	2450	0	1450
Econolite	2930	ltr	0	2690	0	240
HR-4L	2500	ltr	0	2450	0	50
NF-6	302	ltr	0	263	0	39
CFR-3L	300	ltr	0	300	0	0
HR-5L	500	ltr	0	500	0	0
Gascon	1100	ltr	0	1100	0	0
Halad-413L	900	ltr	0	900	0	0
Tuned Spacer E+	810	kg	0	810	0	0

In the tables below the total usage and discharge are broken down into the belonging cement operations.

30" conductor

Product	Usage	Unit	Destruction	Left in well	Reinjected	To Sea
Dyckerhoff G	34	MT		20		14
EzFlo	34	kg		20		14
CaCl2 liquid	950	ltr		950		
Econolite	480	ltr		240		240
NF-6	32	ltr		28		4
Dye Marker E+	75	ltr		28		75

13 3/8" casing

Product	Usage	Unit	Destruction	Left in well	Reinjected	To Sea
Dyckerhoff G	122	MT		122		
EzFlo	122	kg		122		
HR-4L	2400	ltr		2350		50
Econolite	2450	ltr		2450		
NF-6	100	ltr		100		
Dye Marker E+	75	ltr				75

30" conductor surface grouting (not planned)

Product	Usage	Unit	Destruction	Left in well	Reinjected	To Sea
Dyckerhoff G	57	MT		30		27
SSA-1 (silica)	10	MT		5		5
EzFlo	67	kg		35		32
CaCl2 liquid	2950	ltr		1500		1450
NF-6	70	ltr		35		35

P&A plug reservoir

Product	Usage	Unit	Destruction	Left in well	Reinjected	To Sea
Dyckerhoff G	19	MT		19		
SSA-1 (silica)	10	MT		10		
CFR-3L	300	ltr		300		
Gascon	1100	ltr		1100		
Halad-413L	900	ltr		900		
HR-5L	500	ltr		500		
Tuned spacer E+	405	ltr		405		
NF-6	50	ltr		50		

P&A into 13 3/8" casing

Product	Usage	Unit	Destruction	Left in well	Reinjected	To Sea
Dyckerhoff G	22	MT		22		
EZ-flo	22	kg		22		
HR-4L	100	ltr		100		0
Tuned spacer E+	405	ltr		405		
NF-6	50	ltr		50		

P&A surface

Product	Usage	Unit	Destruction	Left in well	Reinjected	To Sea
Dyckerhoff G	16	MT		16		
SSA-1	9	MT		9		

18 DRILLING FLUIDS

Conclusions And Recommendations

CONCLUSIONS:

Hole Section	Depths	Casing / depth	Drilling fluid	Formations	Rop average	Time
29"	From113 m To 178 m	Set 30" Casing @ 175 m	Seawater with Hivis Sweeps	Pleistocene	2.7 m/hr	2 Day
171/2"	From 178m To 1370 m	Set 13 3/8"Csg @ 1364 m	Bentonite / seawater sweeps / KCL Polymer	Utsira Hordaland	16.1 m/hr	4 Days
12 ¼"	From 1370m To 3300 m,	Plugged back reservoir and casing shoe	PERFORMADRIL 1.55-1.58 sg @ 50 deg C	Hordaland, Rogaland, Shetland, BCU, Kimmeridge, RZ1, RZ2, Trias	14.3 m/hr	9 days

29" section:

- Drilling the 29" hole section were done in the same manner as have been done previously on the nearby Varg field, by pumping seawater and sweeping bentonite Hivis pills. No issues arose while drilling. The conductor was run and cemented without any problems.

- However, the conductor had to be grouted / cemented from the top later on as ROV surveys showed a big crater had occurred around the conductor. No good explanation of how this crater had occurred was found, other than that some kind of flow either of drilling mud or formation fluid had created it at some point of time. This crater led to too big movement of the wellhead and thereby had to be cemented. After the grouting the wellhead became stationary again.

17 ½" section:

- The section was drilled without any challenging drilling problems. The main challenge with regard to drilling fluids was related to logistics, meaning keeping up with the large volumes required. The supply of drillwater came at one point to a short, even though this had be stressed and ordered by the Baroid mudengineers well in advance. This challenge was resolved by sweeping Hivis pills made out of seawater and Pac regular / Barazan, which had been planned as a contingency instead of Bentonite sweeps.

- At Td of the section the hole was displaced to a 1.25 sg KCl / polymer fluid before POOH. Some tight spots were encountered on the way out and these were reamed and worked through. The string was run back to bottom again without any problems and the hole was once again displaced to a KCl / Polymer fluid. The string was pulled out of hole, and the 13 3/8" casing was run and cemented trouble free.

Conclusions And Recommendations

12 ¼" section:

- The reactive clays that are found in the Hordaland formation were of no challenge for the very inhibitive PERFORMADRIL mud system. Even though the hole was suspended for several days, no formation instability was seen.

- Even though the reservoir was drilled with high overbalance with regards to mudweight vs formation pressure, no signs of differential sticking was seen. This has to due to a combination of good drilling practices together with superior properties of the mud. Bridging materials as Baracarb and Steelseal was added to the mud prior to entering into the reservoir sand.

- One instance of bit balling occurred after a trip out of the hole. The reason for this is considered to be more a factor of bit choice and poor drilling practices when running in hole than to be a fluids problem. Bit balling will always be an issue when water based mud is used. When the bit was pulled only 3 out of 9 waterways were plugged with soft clay and nothing was seen on the BHA, this indicates that the fluid was doing the job it was set to do.

RECOMMENDATIONS:

- For similar wells it is recommended to use the same mud systems as on this well as this proved to be very successful. The reactive clays that are found in the Hordaland was of no challenge for the very inhibitive PERFORMADRIL mud system.
- When bit choice is evaluated, it is essential to keep in mind what kind of mud system is to be used. Oil based systems is different from water based systems, and this is an important factor for the choice of bit.
- The same attention that was given to avoid getting stuck in the possibly depleted reservoir sands on this well, is recommended for similar cases.
- More focus on drilling practices running in hole could in this case maybe have prevented bit balling.
- Adding Baracarb and Steelseal as bridging materials are recommended for similar operations.

Operator	**Pertra AS**
Well Name	**15/12-15**
Contractor	**Odfjell Drilling**
Rig No	**DEEPSEA TRYM**
Unit System	**Pertra**

Fluid Property Recap : Water-Based Fluid

Date	Depth	FL Temp	Density	Funn Visc	Rheology 50 Deg C					Filtration					Filtrate Analysis						MBT	Sand	Retort Analysis				Rheometer Dial Readings					
					PV	Pa				API	HTHP	Cake API	Cake HTHP	Temp	pH	Pm	Pf	Mf	Cl	Total Hardness	kg/m3 Eq.	% by vol	% by vol				600	300	200	100	6	3
	m	Deg C	SG	sec/qt	cP	YP	10S	10M	30M	ml/30 min	ml/30 min	32nd in		Deg C		ml	ml	ml	mg/l	mg/l			Corr Solid	LGS	NAP Base	Water						
Interval # 01										**From Date**				**19/11/04**						**Top of Interval**					**113.0**	**m**						
Max. Hole Size / Bit Size			**36.000 / 36.000 in**							**To Date**				**21/11/04**						**Bottom of Interval**					**178.0**	**m**						
19/11/04	150		1.500	100	30	33.5									9.00											80	130.0	100.0	81.0	58.0	18.0	16.0
19/11/04	150		1.250	80	21	15.8									9.00											85	75.0	54.0	42.0	24.0	13.0	12.0
19/11/04	0		1.070	120											9.00											95						
20/11/04	170		1.500	100	30	33.5									9.00											80	130.0	100.0	81.0	58.0	18.0	16.0
20/11/04	170		1.250	80	21	15.8									9.00											85	75.0	54.0	42.0	24.0	13.0	12.0
20/11/04	170		1.080	120											9.00											97						
Interval # 02										**From Date**				**22/11/04**						**Top of Interval**					**178.0**	**m**						
Max. Hole Size / Bit Size			**17.500 / 17.500 in**							**To Date**				**30/11/04**						**Bottom of Interval**					**1,370.0**	**m**						
22/11/04	0		1.090	150											9.20											94						
22/11/04	0		1.500	120											9.60											84						
23/11/04	0		1.090	120											9.50											94						
23/11/04	0		1.090	118											9.70											94						
23/11/04	0		1.500	120											9.60											84						
24/11/04	0		1.130	200	35	25.9	10.0	12.0		7.0		1			9.21											90	124.0	89.0	74.0	53.0	15.0	9.0
24/11/04	0		1.500	145	50	21.5	11.0	14.0				1			9.11											84	145.0	95.0	86.0	60.0	15.0	10.0
25/11/04	1,100		1.250	80	39	19.2	3.8	4.8		7.0													9.79	3.85		90	118.0	79.0	62.0	53.0	14.0	7.0
25/11/04	1,370		1.050	128											9.40								14.8	26.4		85						
25/11/04	0		1.250	80	27	13.4	5.0	6.0		5.0					9.30								9.79	3.85		90	82.0	55.0	44.0	29.0	7.0	5.0
26/11/04	1,370		1.250	83	30	11.5	3.8	4.8		6.5					9.70								9.79	3.85		90	84.0	54.0	43.0	28.0	8.0	6.0
26/11/04	1,370		1.050	160											9.80								9.79	16.3		90						
27/11/04	0		1.250	83	27	14.8	2.9	4.8		6.2					9.20								9.79	3.85		90	85.0	58.0	46.0	31.0	8.0	6.0
27/11/04	0		1.250	83	27	15.3	2.9	4.8		6.0					9.20								9.79	3.85		90	86.0	59.0	47.0	31.0	8.0	6.0
29/11/04	0		1.350	60	34	10.5	1.5	2.4		2.1		1			8.90			0.72	75,000							88	90.0	56.0	42.0	26.0	5.0	3.0
30/11/04	0	14	1.350	87	34	10.5	4.0	4.0	5.0	2.1		1			8.90				92,000	180			7.7	0.11		85	90.0	56.0	42.0	26.0	5.0	4.0
Interval # 03										**From Date**				**01/12/04**						**Top of Interval**					**1,370.0**	**m**						
Max. Hole Size / Bit Size			**13.300 / 12.250 in**							**To Date**				**18/12/04**						**Bottom of Interval**					**3,300.0**	**m**						
01/12/04	1,398	30	1.350	72	24	8.1	3.0	3.0	4.0	2.1		1			10.00	1.25	0.05	1.00	90,000	360	2.0		8.21	0.28	4	81	65.0	41.0	30.0	18.0	9.0	7.0
01/12/04	1,455	30	1.350	71	24	8.1	4.0	4.0	5.0	2.1		1			9.90	1.10	0.03	0.60	90,000	340	2.0		8.21	0.28	4	81	65.0	41.0	30.0	20.0	9.0	8.0

Operator	**Pertra AS**
Well Name	**15/12-15**
Contractor	**Odfjell Drilling**
Rig No	**DEEPSEA TRYM**
Unit System	**Pertra**

Fluid Property Recap : Water-Based Fluid

Date	Depth	FL Temp	Density	Funn Visc	Rheology 50 Deg C					Filtration					Filtrate Analysis						MBT	Sand	Retort Analysis				Rheometer Dial Readings					
					PV	Pa				API	HTHP	Cake API	Cake HTHP	Temp	pH	Pm	Pf	Mf	Cl	Total Hardness	kg/m3 Eq.	% by vol	% by vol				600	300	200	100	6	3
	m	Deg C	SG	sec/qt	cP	YP	10S	10M	30M	ml/30 min	ml/30 min	32nd in		Deg C		ml	ml	ml	mg/l	mg/l			Corr Solid	LGS	NAP Base	Water						
02/12/04	1,590	36	1.350	70	30	9.6	4.0	4.0	5.0	2.1		1			9.90	0.05	0.16	0.66	95,000	300	7.0	0.01	7.98	0.21	3.8	81	80.0	50.0	40.0	27.0	11.0	8.0
02/12/04	1,630	37	1.350	70	30	9.6	5.0	5.0	5.0	2.1		1			9.80	0.05	0.10	0.70	95,000	300	6.0	0.01	8.33	0.84	4	80.5	80.0	50.0	40.0	27.0	11.0	8.0
02/12/04	1,784	39	1.350	72	32	11.5	4.3	4.3	4.3	2.2		1			9.80		0.08	0.50	91,000	430	9.0	0.01	8.67	1.23	4	80.5	88.0	56.0	42.0	28.0	12.0	9.0
02/12/04	1,938	43	1.350	80	36	13.4	5.0	5.0	5.0	2.2		1			9.80		0.05	0.71	89,000	530	11.0	0.01	8.84	1.43	4	80.5	100.0	64.0	50.0	35.0	14.0	10.0
03/12/04	2,083	46	1.350	83	42	12.9	5.0	6.0	6.0	2.1					8.50			0.71	95,000	780	16.0	0.06	8.33	0.84	4	80.5	111.0	69.0	52.0	38.0	15.0	11.0
03/12/04	2,173	46	1.350	76	37	12.4	5.0	6.0	6.0	2.8		1			8.20			0.50	95,000	790	11.2	0.06	8.33	0.84	4	80.5	100.0	63.0	48.0	32.0	13.0	10.0
03/12/04	2,173		1.350	83	37	12.9	5.0	6.0	6.0	2.8		1			8.30			0.50	95,000	770	11.0	0.06	8.33	0.84	4	80.5	101.0	64.0	49.0	33.0	13.0	10.0
04/12/04	2,202	35	1.350	85	36	12.4	5.0	5.0	6.0	2.1		1			8.20			0.71	98,000	600	11.2	0.10	8.62	1.6	4	80	98.0	62.0	48.0	32.0	12.0	10.0
04/12/04	2,417	46	1.350	75	36	12.9	5.0	5.0	6.0	2.3		1			8.10			0.72	98,000	760	16.0	0.10	9.16	2.65	4	79.5	99.0	63.0	49.0	33.0	12.0	10.0
05/12/04	2,454		1.350	103	36	12.9	5.0	5.0	6.0	2.3		1			8.10			0.71	98,000	760	16.3	0.10	9.16	2.65	4	79.5	99.0	63.0	49.0	33.0	12.0	10.0
06/12/04	2,454	35	1.350	96	33	13.9	6.0	6.0	6.0	2.1		1			8.50	0.10			95,000	320	19.8	0.10	8.87	1.89	4	80	95.0	62.0	50.0	33.0	12.0	11.0
07/12/04	2,454	35	1.350	96	31	13.4	6.0	7.0	8.0	2.0		1			8.50	0.10			95,000		19.8	0.10	8.87	1.89	4	80	90.0	59.0	48.0	33.0	13.0	10.0
08/12/04	2,454		1.350	80	31	13.4	6.0	7.0	8.0	2.0		1			8.50	0.10			95,000	300	20.0	0.10	8.87	1.89	4	80	90.0	59.0	48.0	33.0	13.0	10.0
09/12/04	2,060	20	1.370	73	28	12.9	5.0	6.0	6.0	2.2		1			8.40				89,000	890	19.6	0.01	10.5	3.31	4	79	83.0	55.0	43.0	28.0	11.0	10.0
09/12/04	2,300	30	1.350	71	28	12.9	5.0	5.0	5.0	2.1		1			8.40				97,000	900	23.0	0.01	8.7	1.7	4	80	83.0	55.0	43.0	28.0	11.0	10.0
09/12/04	2,457	40	1.350	83	26	10.1	4.0	5.0	5.0	2.6		1			8.30				97,000	340	11.2	0.10	8.7	1.7	4	80	73.0	47.0	37.0	24.0	10.0	8.0
09/12/04	2,464	43	1.350	73	26	12.9	5.0	5.0	6.0	2.2		1			8.30				96,000	320	21.0	0.10	8.79	1.79	4	80	79.0	53.0	41.0	28.0	11.0	9.0
10/12/04	2,473	45	1.350		33	9.1	4.0	4.0		2.4		1			8.20	0.10			88,000	320	15.0	0.10	9.46	2.57	4	80	85.0	52.0	43.0	29.0	10.0	8.0
10/12/04	2,482	45	1.350	85	36	8.6	4.0	4.0	5.0	2.8		1			8.10				82,000	320	14.0	0.10	9.96	3.13	4	80	90.0	54.0	40.0	23.0	10.0	8.0
10/12/04	2,482		1.350	90	35	8.6	4.0	4.0	5.0	2.6		1			8.10	0.10		0.10	85,000	360	15.0	0.10	9.71	2.85	4	80	88.0	53.0	40.0	23.0	10.0	8.0
11/12/04	2,428		1.350	87	22	10.1	5.0	5.0	5.0	2.2		1			8.10			0.10	96,000	320	18.0	0.10	8.79	1.79	4	80	65.0	43.0	33.0	22.0	11.0	10.0
11/12/04	2,522	43	1.350	65	25	11.0	5.0	5.0	5.0	2.2		1			8.40				90,000	300	17.5	0.10	9.29	2.38	4	80	73.0	48.0	38.0	25.0	11.0	10.0
11/12/04	2,650	49	1.350	70	24	12.0	5.0	6.0	6.0	2.2		1			8.15				86,000	480	17.0	0.10	9.63	2.76	4	80	73.0	49.0	40.0	28.0	10.0	9.0
12/12/04	2,730	52	1.350	70	24	13.4	5.0	6.0	6.0	2.4		1			8.00				94,000	360	18.0	0.01	8.96	1.99	4	80	76.0	52.0	41.0	28.0	11.0	10.0
12/12/04	2,815	56	1.350	60	33	16.3	5.0	5.0	6.0	2.5		1			8.00				96,000	300	19.0	0.01	8.79	1.79	4	80	100.0	67.0	54.0	37.0	12.0	10.0
12/12/04	3,000	60	1.350	65	32	18.2	5.0	6.0	7.0	2.5		1			7.90				96,000	320	17.0	0.01	8.79	1.79	4	80	102.0	70.0	58.0	41.0	12.0	10.0
12/12/04	2,915	57	1.350	65	33	15.8	5.0	6.0	7.0	2.4		1			7.90				98,000	300	19.0	0.01	8.62	1.6	4	80	99.0	66.0	54.0	37.0	12.0	10.0
13/12/04	3,070	60	1.350	65	28	21.1	5.0	6.0	7.0	2.5	11.0	1	2	130	7.90				93,000	300	18.0	0.10	9.04	2.09	4	80	100.0	72.0	60.0	42.0	13.0	10.0
13/12/04	3,193	61	1.350	66	34	21.1	6.0	6.0	7.0	2.8		1		130	8.30				97,000	240	25.0	0.25	9.79	3.8	4	79	112.0	78.0	64.0	46.0	14.0	11.0
13/12/04	3,280	59	1.345	73	37	22.0	5.5	7.5	8.0	2.4	12.2	1	2	130	8.60	0.05			95,000	200	21.0	0.20	8.87	2.2	4	80	120.0	83.0	68.0	48.0	14.0	11.0

Operator	**Pertra AS**
Well Name	**15/12-15**
Contractor	**Odfjell Drilling**
Rig No	**DEEPSEA TRYM**
Unit System	**Pertra**

Fluid Property Recap : Water-Based Fluid

Date	Depth	FL Temp	Density	Funn Visc	Rheology 50 Deg C					Filtration					Filtrate Analysis						MBT	Sand	Retort Analysis				Rheometer Dial Readings					
					PV	Pa				API	HTHP	Cake API	Cake HTHP	Temp	pH	Pm	Pf	Mf	Cl	Total Hardness	kg/m3 Eq.	% by vol	% by vol				600	300	200	100	6	3
	m	Deg C	SG	sec/qt	cP	YP	10S	10M	30M	ml/30 min	ml/30 min	32nd in		Deg C		ml	ml	ml	mg/l	mg/l			Corr Solid	LGS	NAP Base	Water						
13/12/04	3,298	60	1.350	70	34	22.0	5.0	7.0	8.0	3.0	8.4	1	2	130	8.30				93,000	240	21.0	0.20	9.67	3.13	5	78.5	114.0	80.0	65.0	46.0	13.0	10.0
14/12/04	3,300	56	1.350	75	34	22.0	5.0	7.0	8.0	3.0	8.4	1	2	130	8.30	0.05			93,000	240	21.0	0.20	9.67	3.13	5	78.5	114.0	80.0	65.0	46.0	13.0	10.0
15/12/04	3,300	40	1.350	80	34	22.0	5.0	7.0	8.0	3.0	8.4	1	2	120	8.30	0.05			93,000	240	21.0	0.20	9.67	3.13	5	78.5	114.0	80.0	65.0	46.0	13.0	10.0
16/12/04	0		1.370	80	34	22.0	5.0	7.0	8.0	3.0	8.4	1	2	120	10.60	0.20			93,000	500	21.0	0.20	9.67	1.88	5	78.5	114.0	80.0	65.0	46.0	13.0	10.0

HALLIBURTON

Baroid

Pertra AS

Rapporteringsperiode: Fra 18/Nov/04 Til 18/Dec/04 Boreoperasjon Boring Total Well

Borevaeske (m3):

Seksjon: Alle in

Borevaesketype WBM Egenvekt: 0 kg/l

Volum bygget:	Tap til formasjon:	Dumpet	Til Sjo Sammen med kaks	Injeksjon	Til neste seksjon	Til Land
3,016 m3	217	0	2,419	0	0	380

Borekaks:

Lengde bo	Teoretisk hullvolum	Estimert hullvolum	Kakstetthet	Kaksmengde
3187 m	374 m3	432 m3	2.60 kg/l	1123 tonn

Borekaks til sjo (tonn)	Borekaks til land (tonn)	Borekaks reinjisert (tonn)
1,123	0	0

Borekjemikalier:

Handelsnavn	Funksjons gruppe	Forbruk tonn	Etterlatt i hullet tonn	Utslip til sjo tonn	Injeksjon tonn	Til neste seksjon tonn	Til land tonn
BARACARB	16	2.575	0.690	1.380			0.505
BARAKLEAN NS	27						
BARASCAV L	5						
DEXTRIDE E	18	5.901	1.581	3.162			1.158
BARAZAN	18	4.981	0.477	4.155			0.350
Barite	16	478.699	56.259	342.509			79.931
Calcium Chloride	16						
Caustic Soda	11						
PERFORMATROL	21	50.103	13.423	26.845			9.835
DURATONE E	21						
EZ MUL 2F	22						
GELTONE II	18						
GEM GP	21	40.471	10.842	21.684			7.944
Lime	11	1.868		1.778			0.090
PAC R/L	18	8.677	1.742	5.558			1.377
BARAZAN L	18						
OMC 3	18						
STEELSEAL	17	1.125	0.301	0.603			0.221
BAROFIBRE	17						
MICA F/M/C	17						
Soda Ash	11	4.911	0.851	3.300			0.759
OCMA Bentonite	18	110.201		93.997			16.204
CITRIC ACID	11	0.250	0.054	0.157			0.039
Driltreat	18						
Wall-Nut F/M/C	17	0.450	0.121	0.241			0.088
KCl-powder	16	152.470	40.847	81.694			29.929
Sugar	22						
Soltex	21						
NaCl powder	16						

19 BIT AND HYDRAULIC DATA

Company	**Pertra AS**
Well Name	**15/12-15**
Contractor	**Odfjell Drilling**
Rig No	**DEEPSEA TRYM**
Unit System	**Pertra**

Bit Record Report

Run No	Bit No	Bit Size in	Bit Manufacturer	Bit Type	Bit Style	IADC Code	Serial Number	Jet or TFA sq-in	Depth Out m	Run Length m	ROP m/hr	WOB kg	Bit RPM	Pump Press bar	Pump OutPut l/min	Fluid Type	Fluid Weight SG	Hole Angle	Bit Grading	Reason Pulled
1	1	17.500	DBS	XTD12DSC	MT		755358	3x11|1x12|7x11	178.0	65.0	3.2	499.0	153	107.0	4,500	Seawater	1.030	0.01	1-1-WT-A-E-1-NO-TD	TD - Total/Casing Depth
3	2	26.000	DBS	XTD08DS	FC	.	376107	4x20	178.0		4.0	6,803.9	50	50.0	4,500	Seawater	1.030		1-1-WT-A-E-I-NO-TD	BHA - Change BHA
4	3	17.500	DBS	XTD08DS	FC	.	10380524	4x20	1,370.0	1,192.0	27.3	3,628.7	130	180.0	4,300	Seawater	1.030	0.5	1-1-WT-A-E-I-NO-TD	TD - Total/Casing Depth
6	4	12.250	DBS	FM3843	FC		10685300	8x16	2,173.0	803.0	28.0	6,803.9	236	180.0	3,500	PerformaDril	1.350	0.5	1-2-BT-S-X-T-PN-DLF	BHA - Change BHA
7	5	12.250	DBS	FM2843	FC		509954	7x14	2,454.0	281.0	40.4	6,803.9	221	240.0	3,500	PerformaDril	1.350	0.2	1-3-BT-S-X-1-CT-HP	HP - Hole Problems
8	6	12.250	DBS	FM3943	FC		10561003	3x14|3x16	2,482.0	28.0	3.5	14,061.4	223	233.0	3,527	PerformaDril	1.350	0.5	1-1-BU-N-X-I.NO-PR	HP - Hole Problems
9	9	12.250	DBS	FM2843	FC		5009954	7x14	3,300.0	818.0	15.0	9,071.8	255	260.0	3,527	PerformaDril	1.350	1	8-8-RO-A-X-9-PB-RR	TD - Total/Casing Depth

Drill bits Performance summary

Well **15/12--15**

Section **17 1/2"**

System	Group	Formation	MD (M)	Bit run	Comments
Quarternary	**Pleistocene**	**Oxf. Sst**	176	**XTD08DSLC** **sn: 10380524** **1370 m** **43.9 hrs** **27.2 m/hr** **Bit run 1** **1-1-WT-A-E-I-NO-TD**	After drilling to TD at 1370m the hole was circulated clean with HiVis pills and well displaced to 1.25SG KCl before wiper trip Some tight spots that required reaming from 822m to 1045m and from 1265m to 1370m. When POOH some overpull (39T) was observed in the Utsira fm
Tertiary	**Pliocene**	**Nordland**			
	Miocene		1370	**TD**	
	Oligocene	Hordaland			

SDBS recommendation: Recommendation is to run same BHA and soft insert bit for the next well

Drill bits Performance summary

Well 15/12-15

Section 12 1/4"

System	Group	Formation	MD (M)	Bit run		Comments
Tertiary	Hordaland		1333			Tagged cmt at 1333. Drilled cmt to 1335 followed by the float collar and shoe track to 1364. Reamed several times to 1370m. Succesful leak off test.
			1370	**FM3843Z** **803 m** **41.5 hrs** **19 m/hr** **Bit run 1** **1-1-CT-A-X-I-NO-DTF**	**sn: 10685300**	Drilled to 2173 and pulled for MWD failure
			2173	**FM2843DR** **281 m** **12 hrs** **23 m/hr** **Bit run 1** **1-3-BT-S-X-1-CT-HP**	**sn: 5009954**	Reamed one tight spot at 2065m. Tried to steer to vertical but assembly was hanging up after 2.5m slide Later decided to POOH to read MWD data and doing a grout/cement job around the conductor.
	Rogaland	Balder/Sele/Lista	2350			
			2453	**FM3943C** **28 m** **14 hrs** **2 m/hr** **Bit run 1** **0-0-NO-A-X-I-NO-PR**	**sn: 10561003**	POOH due to low ROP. Bit found to be partially balled. However very soft and easy to remove by hand
Cretaceous	Shetland		2700			
		Hod / Blodøks		**FM2843DR** **818 m** **57 hrs** **14 m/hr**	**sn: 5009954**	Good ROP but still unable to steer. 15 m/hr through Shetland
		Hidra		**Bit run 2** **1-8-RO-A-X-9-PN-PR**		2 nozzles blocked and bit ringed out.
	Cr. Kn		2850			
Jurass	Viking		3300	**TD**		

SDBS recommendation:Keep the 5 1/2" DP. Be more focused on hydraulics and improve communication when change of bit.

Well Name	**15/12-15**
Operator	**Pertra AS**
Contractor	**Odfjell Drilling**
Rig No	**DEEPSEA TRYM**
Unit System	**Pertra**

Hydraulics Summary Report

Rpt No	Rpt Date	Hole MD	Max. Hole Size	ECD @ Csg Shoe	ECD @ Bit	Flow Rate	Btms Up Time	Total Circ Time	Press Drop DP	Press Drop @ Bit	Press Drop An	Total Press Drop	Hyd Meth	Circ Press	Ann Vel Riser	AV min DP	AV max DC	Bit HHSI	Bit Jet Vel	Bit Imp Force
		m	in	SG	SG	l/min	Min	Min	bar	bar	bar	bar		bar	m/min	m/min	m/min	hhp/in2	m/sec	N
001	19/11/04	154.0	36.000																	
002	20/11/04	178.0	36.000																	
003	21/11/04	178.0	36.000																	
4	22/11/04	255.0	17.500																	
005	23/11/04	640.0	17.500			4,304	20	21								11.3	35.1		90.4	
006	24/11/04	1,150.0	17.500	1.130	1.130	4,239	37	40		49.5		49.5	HB	188.0		11.1	34.5	1.95	89.0	7,101.27
007	25/11/04	1,370.0	17.500																	
008	26/11/04	1,370.0	17.500																	
009	27/11/04	1,370.0	17.500																	
010	28/11/04	1,370.0	17.500																	
011	29/11/04	1,370.0	17.500																	
012	30/11/04	1,370.0	17.500	1.625	1.628	3,640	26	40	81.4	26.6	36.8	204.9	HB	290.0	20.5	58.8	81.2	1.84	59.7	4,886.77
013	01/12/04	1,503.0	12.250	1.368	2.502	3,284	31	61	72.0	21.7	169.4	320.6	HB	180.0	18.5	53.0	75.3	1.35	53.9	3,977.86
014	02/12/04	1,995.0	12.250	1.379	2.269	3,511	38	53	104.6	24.8	179.1	370.2	HB	237.0	19.8	56.7	80.5	1.65	57.6	4,545.45
015	03/12/04	2,173.0	12.250		1.363	3,511	0	20		24.8	0.0	88.7	HB	235.0	24.1			1.65	57.6	4,545.45
016	04/12/04	2,454.0	12.250	1.378	2.198	3,543	45	75	126.1	56.2	204.1	448.8	HB	240.0	20.0	57.2	81.3	3.78	86.8	6,913.62
017	05/12/04	2,454.0	12.250		1.781	3,527	20	46	63.8	55.7	40.9	222.4	HB	240.0	19.9	57.0	78.7	3.73	86.4	6,850.63
018	06/12/04	2,454.0	12.250	1.637	1.640	3,511	27	30	75.3	55.2	38.4	227.9	HB	240.0	19.8	56.7	78.3	3.68	86.0	6,787.92
019	07/12/04	2,454.0	12.250																	
020	08/12/04	2,454.0	12.250																	
021	09/12/04	2,464.0	13.300	1.375	1.380	3,462	50	84	113.3	54.9	7.1	233.0	HB	237.0	19.5	46.6	60.5	3.61	85.8	6,677.71
022	10/12/04	2,482.0	13.300																	
023	11/12/04	2,692.0	12.250	1.375	1.956	3,527	54	88	125.1	55.7	160.1	419.8	HB	260.0	19.9	47.5	80.9	3.73	86.4	6,850.63
024	12/12/04	3,026.0	12.250	1.375	1.928	3,495	60	94	139.9	54.7	171.5	446.3	HB	264.0	19.7	47.0	80.1	3.63	85.6	6,725.51
025	13/12/04	3,300.0	12.250	1.388	1.785	3,349	66	103	137.4	50.2	136.8	399.1	HB	290.0	18.9	45.1	76.8	3.19	82.0	6,176.72
026	14/12/04	3,300.0	12.250																	
027	15/12/04	3,300.0	12.250	1.389	1.389	3,511	29	59	54.4	0.2	5.6	92.3	HB	100.0	19.8	56.7		0.07	5.2	413.77
028	16/12/04	3,300.0	12.250																	
029	17/12/04	160.0	28.000																	
029	18/12/04	160.0	28.000																	

20 BOTTOM-HOLE ASSEMBLIES

sperry-sun
DRILLING SERVICES

BHA Schematic

Pertra as

15/12-15

BHA ID #: 1

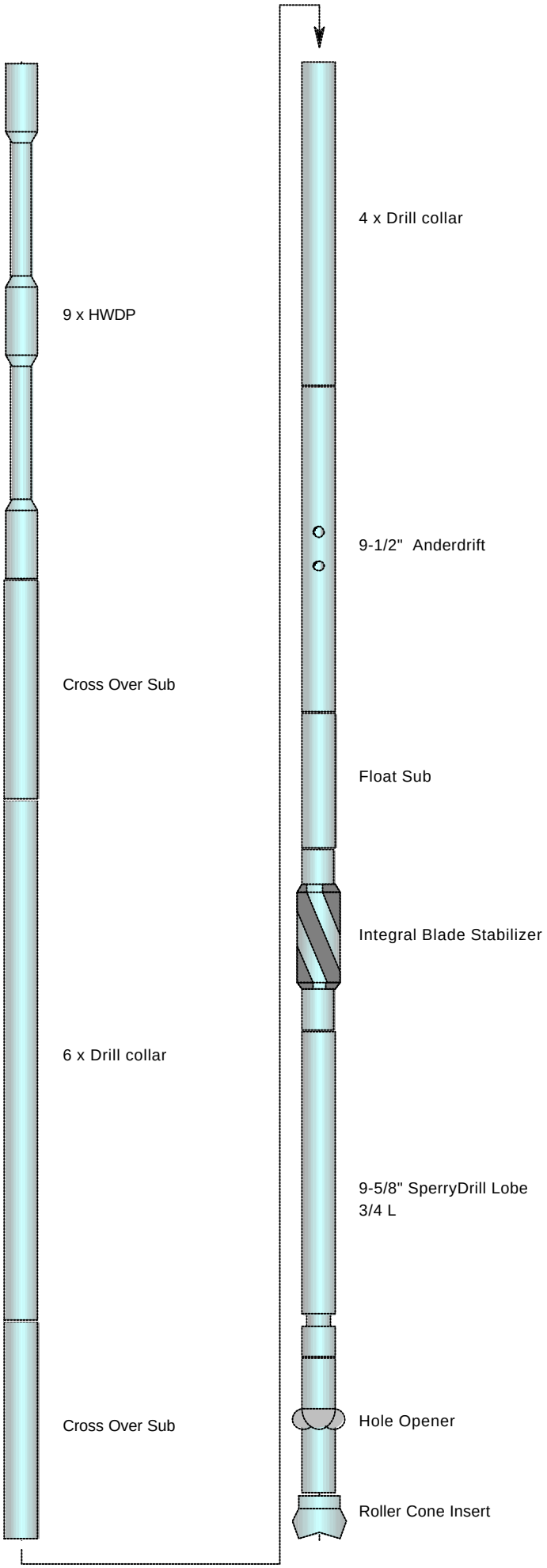
36" Spud Assy

BHA Configuration

O.D.	Length	Description
36"	0.43m	Roller Cone Insert
9.5"	3.94m	Hole Opener
11.25"	9.23m	9-5/8" SperryDrill Lobe 3/4 L
9.5"	2.2m	Integral Blade Stabilizer
9.5"	0.83m	Float Sub
9.5"	3.07m	9-1/2" Anderdrift
9.5"	36.57m	4 x Drill collar
8"	0.93m	Cross Over Sub
8"	54.71m	6 x Drill collar
7.625"	0.61m	Cross Over Sub
5.5"	81.48m	9 x HWDP

BHA Discussion

Spud well at 113m and drill to 176m



sperry-sun DRILLING SERVICES

BHA Report

Customer : Pertra as
Well : 15/12-15
Field : Varg 15/12
Location : Villmink East
Rig : Deep Sea Trym
Job # : NR-DD-0003354768

BHA# 1

BHA# 1 : **Date In** :19-11-200 **MD In (m) :** 113 **TVD In (m) :** 113 **Date Out** 20-11-200 **MD Out (m):** 176 **TVD Out (m):** 176

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
1	36.000	Security DBS	XTD12DSCL	755558	3x14, 1x12	0.561	1-1-WT-A -E-I-NO-TD

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (bar)	Cum Circ Hrs
1	11.250	SSDS	SperryDrill	1125026	0.00°		0.0	30.00

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (kg/m)	Top Con	Length (m)	Bit - Center Blade (m)
1	Roller Cone Insert	755558	36.000		36.000		P 7-5/8" Reg	0.43	
2	Hole Opener	ODT 3608	9.500	3.000	36.000	323.58	P 7-5/8" Reg	3.94	
3	9-5/8" SperryDrill Lobe 3/4 L	1125026	11.250	5.943		363.38	B 7-5/8" Reg	9.23	
4	Integral Blade Stabilizer		9.500	3.000	35.000	323.58	B 7-5/8" Reg	2.20	14.70
5	Float Sub	ODT-FS-013	9.500	3.000		323.58	B 7-5/8" Reg	0.83	
6	9-1/2" Anderdrift	ADB-923	9.500	3.000		323.58	B 7-5/8" Reg	3.07	
7	4 x Drill collar		9.500	3.500		309.48	B 7-5/8" Reg	36.57	
8	Cross Over Sub	114918	8.000	3.000		219.04	B 6-5/8" Reg	0.93	
9	6 x Drill collar		8.000	3.000		218.72	B 6-5/8" Reg	54.71	
10	Cross Over Sub	SLA30	7.625	3.000		195.70	B 6-5/8" Reg	0.61	
11	9 x HWDP		5.500	3.375		84.81	B 5-1/2" FH	81.48	
								194.00	

Parameter	Min	Max	Ave
WOB (t) :	0.50	0.50	0.50
RPM (rpm) :	50	50	50
Flow (L/min) :	2000	4500	3886
SPP (bar) :	40.0	106.0	89.8

Activity	Hrs
Drilling :	23.00
Reaming :	4.50
Circ-Other :	2.50
Total :	30.00

BHA Weight	(kg)
in Air (Total) :	39311
in Mud (Total) :	
in Air (Bel Jars) :	0
in Mud (Bel Jars) :	

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

PERFORMANCE

	In	Out
Inclination (deg)	0.00	0.05
Azimuth (deg)	160.19	160.19

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	15.30	3			
Rotated :	47.70	3			
Total :	63.00	3	0.02	0.00	0.02

COMMENTS

Spud well at 113m and drill to 176m

BHA Schematic

Pertra as

15/12-15

BHA ID #: 2

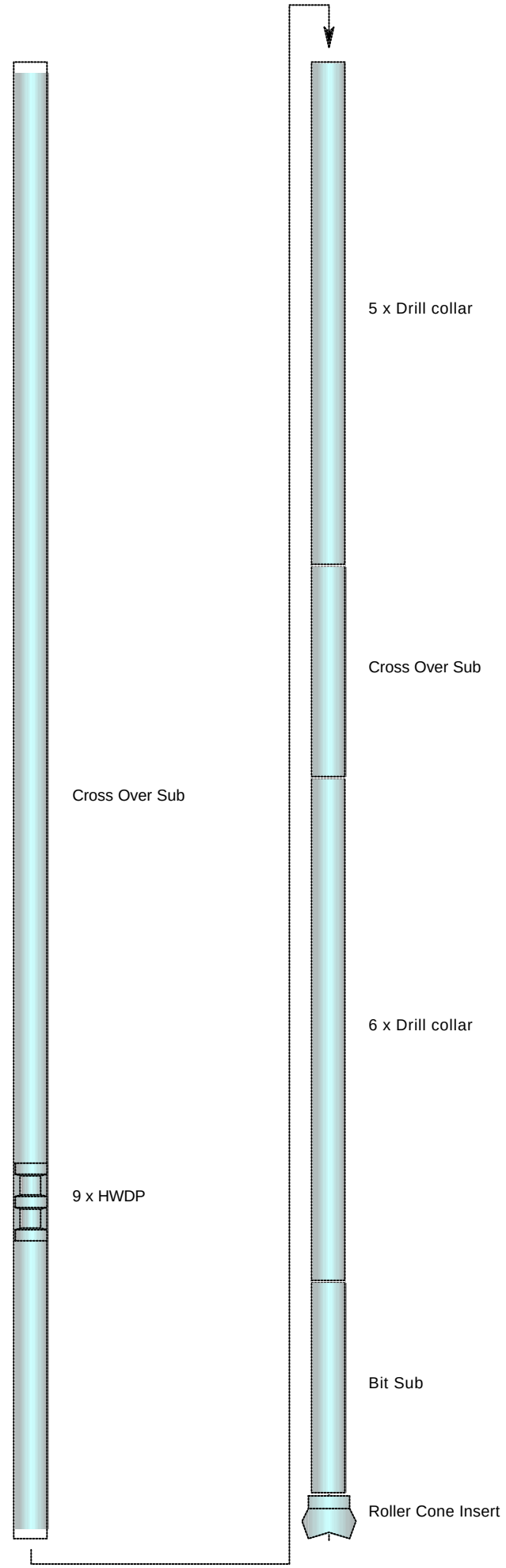
26" Clean Out

BHA Configuration

O.D.	Length	Description
26"	0.56m	Roller Cone Insert
9.437"	0.92m	Bit Sub
9.5"	54.96m	6 x Drill collar
8"	0.93m	Cross Over Sub
8"	45.55m	5 x Drill collar
7.625"	0.61m	Cross Over Sub
5.5"	81.48m	9 x HWDP

BHA Discussion

Drillout cement and shoe.



sperry-sun DRILLING SERVICES

BHA Report

Customer : Pertra as
Well : 15/12-15
Field : Varg 15/12
Location : Villmink East
Rig : Deep Sea Trym
Job # : NR-DD-0003354768

BHA# 2

BHA# 2 : **Date In** :22-11-200 **MD In (m) :** 176 **TVD In (m) :** 176 **Date Out** 22-11-200 **MD Out (m):** 176 **TVD Out (m):** 176

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
2	26.000	Security DBS	XT1DLSC	10376107	3x20, 1x20	1.227	1-1-NO-A -E-I-NO-DP

MOTOR DATA

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

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (kg/m)	Top Con	Length (m)	Bit - Center Blade (m)
1	Roller Cone Insert	376107	26.000		26.000		P 7-5/8" Reg	0.56	
2	Bit Sub	ODT-BS-013	9.437	2.812		323.18	B 7-5/8" Reg	0.92	
3	6 x Drill collar		9.500	3.500		309.48	B 7-5/8" Reg	54.96	
4	Cross Over Sub	114918	8.000	3.000		219.04	B 6-5/8" Reg	0.93	
5	5 x Drill collar		8.000	3.000		218.72	B 6-5/8" Reg	45.55	
6	Cross Over Sub	SLA30	7.625	3.000		195.70	B 6-5/8" Reg	0.61	
7	9 x HWDP		5.500	3.375		84.81	B 5-1/2" FH	81.48	
								185.01	

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

Activity	Hrs
Drilling :	0.00
Reaming :	0.00
Circ-Other :	1.00
Total :	1.00

BHA Weight	(kg)
in Air (Total) :	
in Mud (Total) :	
in Air (Bel Jars) :	0
in Mud (Bel Jars) :	

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

PERFORMANCE

	In	Out
Inclination (deg)	0.05	0.05
Azimuth (deg)	160.19	160.19

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

COMMENTS

Drillout cement and shoe.

sperry-sun
DRILLING SERVICES

BHA Schematic

Pertra as

15/12-15

BHA ID #: 3

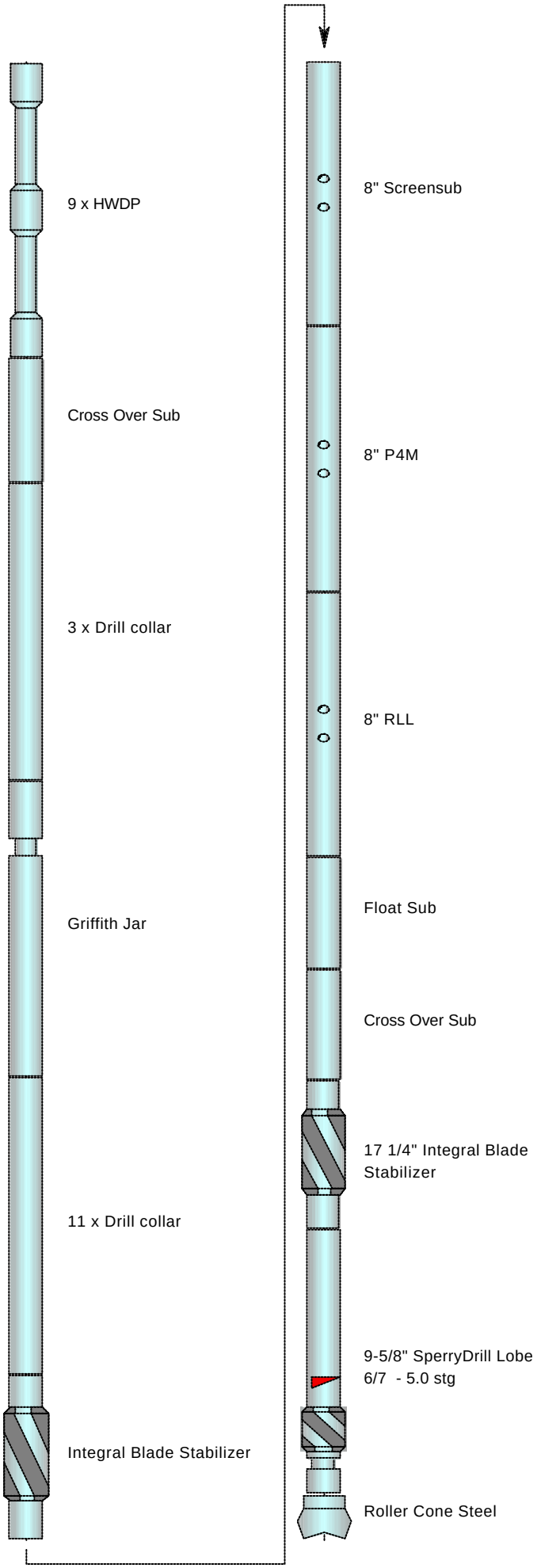
17½" Motor Assy

BHA Configuration

O.D.	Length	Description
17.5"	0.42m	Roller Cone Steel
9.625"	8.52m	9-5/8" SperryDrill Lobe 6/7 - 5.0 stg
9.5"	2.49m	17 1/4" Integral Blade Stabilizer
9.5"	1.32m	Cross Over Sub
8"	1.19m	Float Sub
8"	8.82m	8" RLL
8"	4.75m	8" P4M
8"	2.48m	8" Screensub
8"	2.29m	Integral Blade Stabilizer
8"	99.87m	11 x Drill collar
8.125"	9.72m	Griffith Jar
8"	26.84m	3 x Drill collar
7.625"	0.61m	Cross Over Sub
5.5"	81.48m	9 x HWDP

BHA Discussion

Performance drill 17 ½" hole to section TD at 1370m



sperry-sun DRILLING SERVICES

BHA Report

Customer : Pertra as
Well : 15/12-15
Field : Varg 15/12
Location : Villmink East
Rig : Deep Sea Trym
Job # : NR-DD-0003354768

BHA# 3

BHA# 3 : **Date In** :22-11-200 **MD In (m) :** 176 **TVD In (m) :** 176 **Date Out** 26-11-200 **MD Out (m):** 1370 **TVD Out (m):** 1370

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
3	17.500	Security DBS	XTD08DS	10380524	4x20	1.227	1-1-WT-A -E-I-NO-TD

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (bar)	Cum Circ Hrs
2	9.625	SSDS	SperryDrill	963167	1.15°		3.3	75.50

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (kg/m)	Top Con	Length (m)	Bit - Center Blade (m)
1	Roller Cone Steel	10380524	17.500	3.000	17.500		P 7-5/8" Reg	0.42	
2	9-5/8" SperryDrill Lobe 6/7 - 5.0 stg	963167	9.625	6.135	17.250	219.03	B 7-5/8" Reg	8.52	1.32
3	17 1/4" Integral Blade Stabilizer	71212	9.500	3.000	17.250	323.58	B 7-5/8" Reg	2.49	10.09
4	Cross Over Sub	110412	9.500	3.000		323.58	B 6-5/8" Reg	1.32	
5	Float Sub	149154	8.000	3.000		219.04	B 6-5/8" Reg	1.19	
6	8" RLL	9006400HWGRU8	8.000	3.000		219.04	B 6-5/8" Reg	8.82	
7	8" P4M	162070	8.000	3.000		219.04	B 6-5/8" Reg	4.75	
8	8" Screensub	174916	8.000	2.375		232.42	B 6-5/8" Reg	2.48	
9	Integral Blade Stabilizer	124979	8.000	3.000	17.250	219.04	B 6-5/8" Reg	2.29	30.99
10	11 x Drill collar		8.000	3.000		218.72	B 6-5/8" Reg	99.87	
11	Griffith Jar	4118061400	8.125	2.750		232.79	B 6-5/8" Reg	9.72	
12	3 x Drill collar		8.000	3.000		218.72	B 6-5/8" Reg	26.84	
13	Cross Over Sub	SLA30	7.625	3.000		195.70	B 5-1/2" FH	0.61	
14	9 x HWDP		5.500	3.375		84.81	B 5-1/2" FH	81.48	
								250.80	

Parameter	Min	Max	Ave
WOB (t) :	2.00	6.00	4.66
RPM (rpm) :	50	130	124
Flow (L/min) :	3500	4300	4250
SPP (bar) :	106.0	194.0	172.5

Activity	Hrs
Drilling :	66.50
Reaming :	4.00
Circ-Other :	5.00
Total :	75.50

BHA Weight	(kg)
in Air (Total) :	44913
in Mud (Total) :	
in Air (Bel Jars) :	29750
in Mud (Bel Jars) :	

Drill String	OD(in)	Len (m)
DP(S)-FH-21.90#	5.500	1119

PERFORMANCE

	In	Out
Inclination (deg)	0.05	0.57
Azimuth (deg)	160.19	243.99

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	0.00	0			
Rotated :	1194.00	18			
Total :	1194.00	18	0.01	0.00	0.01

COMMENTS

Performance drill 17 ½" hole to section TD at 1370m

sperry-sun
DRILLING SERVICES

BHA Schematic

Pertra as

15/12-15

BHA ID #: 4

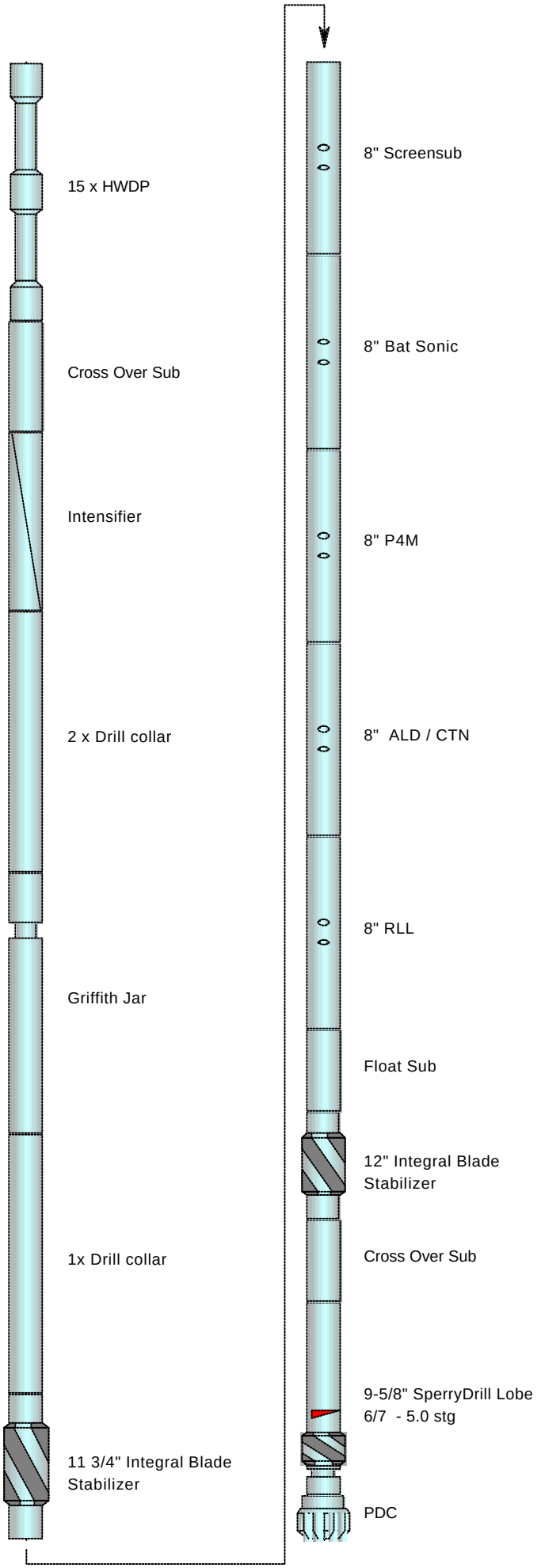
12¼" Motor Assy#1

BHA Configuration

O.D.	Length	Description
12.25"	0.28m	PDC
9.625"	8.44m	9-5/8" SperryDrill Lobe 6/7 - 5.0 stg
9.5"	1.05m	Cross Over Sub
9.5"	2.1m	12" Integral Blade Stabilizer
8"	0.5m	Float Sub
8"	8.82m	8" RLL
8"	11.57m	8" ALD / CTN
8"	4.63m	8" P4M
8"	6.66m	8" Bat Sonic
8"	2.48m	8" Screensub
8"	2.11m	11 3/4" Integral Blade Stabilizer
8"	8.88m	1x Drill collar
8.125"	9.37m	Griffith Jar
8"	18.27m	2 x Drill collar
8"	8.92m	Intensifier
7.625"	0.61m	Cross Over Sub
5.5"	137.36m	15 x HWDP

BHA Discussion

Drill 12 1/4" to section TD at 3238m.



sperry-sun DRILLING SERVICES

BHA Report

Customer : Pertra as
Well : 15/12-15
Field : Varg 15/12
Location : Villmink East
Rig : Deep Sea Trym
Job # : NR-DD-0003354768

BHA# 4

BHA# 4 : **Date In** :30-11-200 **MD In (m) :** 1370 **TVD In (m) :** 1370 **Date Out** 03-12-200 **MD Out (m):** 2173 **TVD Out (m):** 2173

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
4	12.250	Security DBS	FM3843	10685300	8x16	1.571	1-2-BT-S -X-1-PN-DTF

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (bar)	Cum Circ Hrs
3	9.625	SSDS	SperryDrill	963328	1.15°		8.2	58.00

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (kg/m)	Top Con	Length (m)	Bit - Center Blade (m)
1	PDC	10685300	12.250	3.000	12.250	561.78	P 7-5/8" Reg	0.28	
2	9-5/8" SperryDrill Lobe 6/7 - 5.0 stg	963328	9.625	6.135	12.125	219.03	B 7-5/8" Reg	8.44	1.18
3	Cross Over Sub	113513	9.500	3.000		323.58	B 6-5/8" Reg	1.05	
4	12" Integral Blade Stabilizer	64762	9.500	3.000	12.000	323.58	B 6-5/8" Reg	2.10	10.67
5	Float Sub	74437	8.000	3.000		219.04	B 6-5/8" Reg	0.50	
6	8" RLL		8.000	3.000		219.04	B 6-5/8" Reg	8.82	
7	8" ALD / CTN	90066058N1 L1a/c8U	8.000	3.000	12.000	219.04	B 6-5/8" Reg	11.57	
8	8" P4M	162073	8.000	3.000		219.04	B 6-5/8" Reg	4.63	
9	8" Bat Sonic	90059257UO 8	8.000	3.000	11.750	219.04	B 6-5/8" Reg	6.66	
10	8" Screensub	174916	8.000	2.375		232.42	B 6-5/8" Reg	2.48	
11	11 3/4" Integral Blade Stabilizer	71319	8.000	3.000	11.750	219.04	B 6-5/8" Reg	2.11	47.40
12	1x Drill collar		8.000	3.000		218.72	B 6-5/8" Reg	8.88	
13	Griffith Jar	4118031500	8.125	2.750		232.79	B 6-5/8" Reg	9.37	
14	2 x Drill collar		8.000	3.000		218.72	B 6-5/8" Reg	18.27	
15	Intensifier	3908001600	8.000	3.000		219.04	B 6-5/8" Reg	8.92	
16	Cross Over Sub	SLA30	7.625	3.000		195.70	B 5-1/2" FH	0.61	
17	15 x HWDP		5.500	3.375		84.81	B 5-1/2" FH	137.36	
								232.05	

Parameter	Min	Max	Ave
WOB (t) :	6.00	12.00	6.84
RPM (rpm) :	135	135	135
Flow (L/min) :	3400	3550	3504
SPP (bar) :	180.0	224.0	209.0

Activity	Hrs
Drilling :	41.50
Reaming :	0.00
Circ-Other :	16.50
Total :	58.00

BHA Weight (kg)	
in Air (Total) :	32954
in Mud (Total) :	27301
in Air (Bel Jars) :	13054
in Mud (Bel Jars) :	10815

Drill String	OD(in)	Len (m)
DP(S)-FH-21.90#	5.500	1941

PERFORMANCE

	In	Out
Inclination (deg)	0.57	1.14
Azimuth (deg)	243.99	21.11

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	12.00	7			
Rotated :	791.00	20			
Total :	803.00	19	0.02	0.00	0.06

COMMENTS

Drill 12 1/4" to section TD at 3238m.

sperry-sun
DRILLING SERVICES

BHA Schematic

Pertra as

15/12-15

BHA ID #: 5

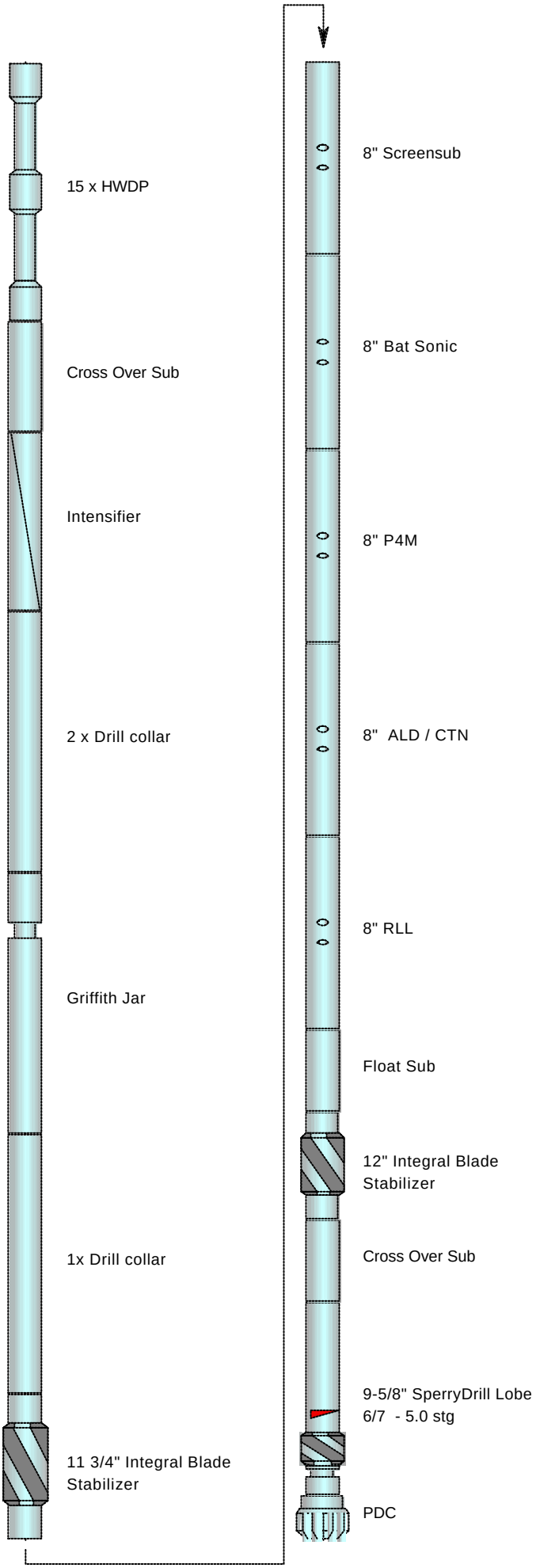
12¼" Motor Assy#2

BHA Configuration

O.D.	Length	Description
12.25"	0.28m	PDC
9.625"	8.44m	9-5/8" SperryDrill Lobe 6/7 - 5.0 stg
9.5"	1.05m	Cross Over Sub
9.5"	2.1m	12" Integral Blade Stabilizer
8"	0.5m	Float Sub
8"	8.82m	8" RLL
8"	11.5m	8" ALD / CTN
8"	4.75m	8" P4M
8"	6.84m	8" Bat Sonic
8"	2.48m	8" Screensub
8"	2.11m	11 3/4" Integral Blade Stabilizer
8"	8.88m	1x Drill collar
8.125"	9.37m	Griffith Jar
8"	18.27m	2 x Drill collar
8"	8.92m	Intensifier
7.625"	0.61m	Cross Over Sub
5.5"	137.36m	15 x HWDP

BHA Discussion

Drill 2173 - 2454m, hang off due to bad weather. POOH to do grout job around 30" conductor.



sperry-sun DRILLING SERVICES

BHA Report

Customer : Pertra as
Well : 15/12-15
Field : Varg 15/12
Location : Villmink East
Rig : Deep Sea Trym
Job # : NR-DD-0003354768

BHA# 5

BHA# 5 : **Date In** :03-12-200 **MD In (m) :** 2173 **TVD In (m) :** 2173 **Date Out** 08-12-200 **MD Out (m):** 2454 **TVD Out (m):** 2454

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
5	12.250	Security DBS	FM2843	5009954	7x14	1.052	1-3-BT-S -X-1-CT-HP

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (bar)	Cum Circ Hrs
4	9.625	SSDS	SperryDrill	963328			8.2	73.50

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (kg/m)	Top Con	Length (m)	Bit - Center Blade (m)
1	PDC	5009954	12.250	3.000	12.250	561.78	P 7-5/8" Reg	0.28	
2	9-5/8" SperryDrill Lobe 6/7 - 5.0 stg	963328	9.625	6.135	12.125	219.03	B 7-5/8" Reg	8.44	1.18
3	Cross Over Sub	113513	9.500	3.000		323.58	B 6-5/8" Reg	1.05	
4	12" Integral Blade Stabilizer	64762	9.500	3.000	12.000	323.58	B 6-5/8" Reg	2.10	10.67
5	Float Sub	74437	8.000	3.000		219.04	B 6-5/8" Reg	0.50	
6	8" RLL	90064005HW JRVU8	8.000	3.000		219.04	B 6-5/8" Reg	8.82	
7	8" ALD / CTN	90066059N1 L1a/c8U	8.000	3.000	12.000	219.04	B 6-5/8" Reg	11.50	
8	8" P4M	162070	8.000	3.000		219.04	B 6-5/8" Reg	4.75	
9	8" Bat Sonic	9006576O8U	8.000	3.000	11.000	219.04	B 6-5/8" Reg	6.84	
10	8" Screensub	174916	8.000	2.375		232.42	B 6-5/8" Reg	2.48	
11	11 3/4" Integral Blade Stabilizer	71319	8.000	3.000	11.750	219.04	B 6-5/8" Reg	2.11	47.63
12	1x Drill collar		8.000	3.000		218.72	B 6-5/8" Reg	8.88	
13	Griffith Jar	4118031500	8.125	2.750		232.79	B 6-5/8" Reg	9.37	
14	2 x Drill collar		8.000	3.000		218.72	B 6-5/8" Reg	18.27	
15	Intensifier	3908001600	8.000	3.000		219.04	B 6-5/8" Reg	8.92	
16	Cross Over Sub	SLA30	7.625	3.000		195.70	B 5-1/2" FH	0.61	
17	15 x HWDP		5.500	3.375		84.81	B 5-1/2" FH	137.36	
								232.28	

Parameter	Min	Max	Ave
WOB (t) :	5.00	10.00	8.09
RPM (rpm) :	100	125	114
Flow (L/min) :	3550	3550	3550
SPP (bar) :	224.0	240.0	232.1

Activity	Hrs
Drilling :	12.00
Reaming :	0.00
Circ-Other :	3.50
Total :	15.50

BHA Weight	(kg)
in Air (Total) :	33004
in Mud (Total) :	27343
in Air (Bel Jars) :	13105
in Mud (Bel Jars) :	10857

Drill String	OD(in)	Len (m)
DP(S)-FH-21.90#	5.500	2222

PERFORMANCE

	In	Out
Inclination (deg)	1.14	0.65
Azimuth (deg)	21.11	56.14

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	120.00	11			
Rotated :	161.00	33			
Total :	281.00	23	-0.05	0.00	0.08

COMMENTS

Drill 2173 - 2454m, hang off due to bad weather. POOH to do grout job around 30" conductor.

sperry-sun
DRILLING SERVICES

BHA Schematic

Pertra as

15/12-15

BHA ID #: 6

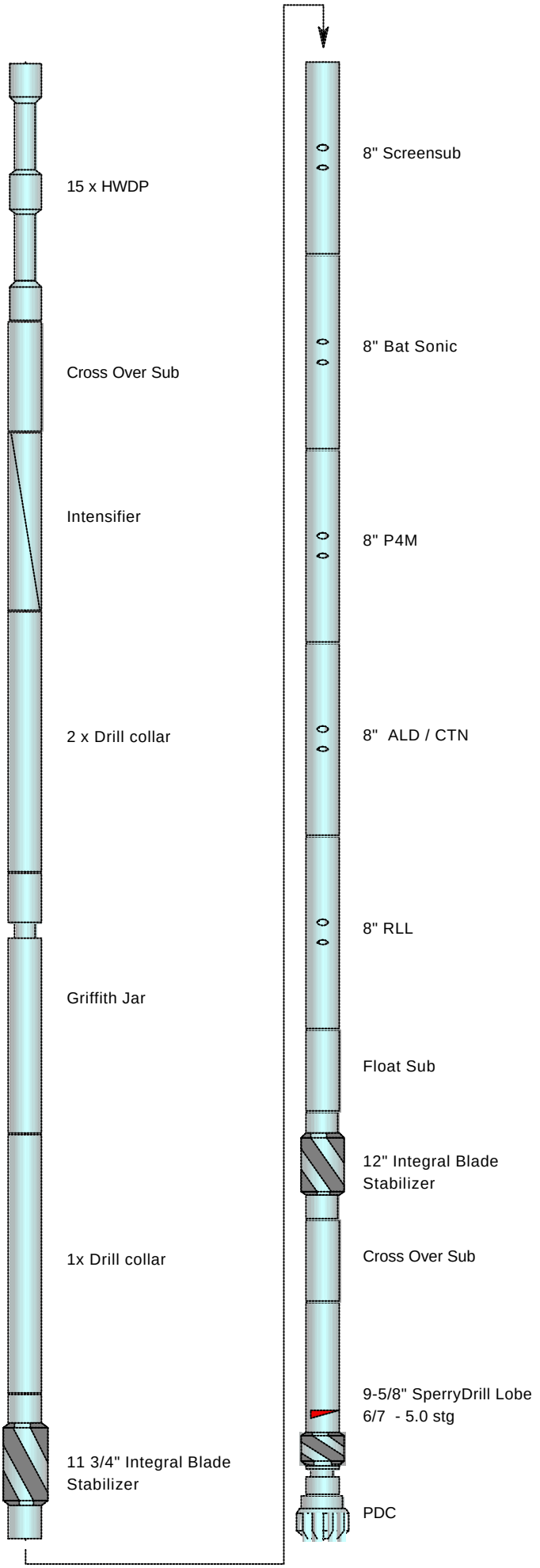
12¼" Motor Assy#3

BHA Configuration

O.D.	Length	Description
12.25"	0.37m	PDC
9.625"	8.44m	9-5/8" SperryDrill Lobe 6/7 - 5.0 stg
9.5"	1.05m	Cross Over Sub
9.5"	2.1m	12" Integral Blade Stabilizer
8"	0.5m	Float Sub
8"	8.82m	8" RLL
8"	11.5m	8" ALD / CTN
8"	4.75m	8" P4M
8"	6.66m	8" Bat Sonic
8"	2.48m	8" Screensub
8"	2.11m	11 3/4" Integral Blade Stabilizer
8"	8.88m	1x Drill collar
8.125"	9.37m	Griffith Jar
8"	18.27m	2 x Drill collar
8"	8.92m	Intensifier
7.625"	0.61m	Cross Over Sub
5.5"	137.36m	15 x HWDP

BHA Discussion

Drill 2454m - 2482m.
POOH due to low ROP from the start of the run possibly due to balled bit.
Bit seen to be partially balled on surface with unconsolidated cuttings.
One plugged nozzle.



sperry-sun DRILLING SERVICES

BHA Report

Customer : Pertra as
Well : 15/12-15
Field : Varg 15/12
Location : Villmink East
Rig : Deep Sea Trym
Job # : NR-DD-0003354768

BHA# 6

BHA# 6 : **Date In** :08-12-200 **MD In (m) :** 2454 **TVD In (m) :** 2454 **Date Out** 10-12-200 **MD Out (m):** 2482 **TVD Out (m):** 2482

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
6	12.250	Security DBS	FM3943	10561003	3x14, 3x16	1.040	1-1-BU-N -X-I-NO-PR

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (bar)	Cum Circ Hrs
5	9.625	SSDS	SperryDrill	963328	1.15°		5.0	99.00

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (kg/m)	Top Con	Length (m)	Bit - Center Blade (m)
1	PDC	10561003	12.250	3.000	12.250	561.78	P 7-5/8" Reg	0.37	
2	9-5/8" SperryDrill Lobe 6/7 - 5.0 stg	963328	9.625	6.135	12.125	219.03	B 7-5/8" Reg	8.44	1.27
3	Cross Over Sub	113513	9.500	3.000		323.58	B 6-5/8" Reg	1.05	
4	12" Integral Blade Stabilizer	64762	9.500	3.000	12.000	323.58	B 6-5/8" Reg	2.10	10.76
5	Float Sub	74437	8.000	3.000		219.04	B 6-5/8" Reg	0.50	
6	8" RLL	90064005HW JRVU8	8.000	3.000		219.04	B 6-5/8" Reg	8.82	
7	8" ALD / CTN	90066059N1 L1a/c8U	8.000	3.000	12.000	219.04	B 6-5/8" Reg	11.50	
8	8" P4M	162070	8.000	3.000		219.04	B 6-5/8" Reg	4.75	
9	8" Bat Sonic	90059257-U 08	8.000	3.000	11.000	219.04	B 6-5/8" Reg	6.66	
10	8" Screensub	174916	8.000	2.375		232.42	B 6-5/8" Reg	2.48	
11	11 3/4" Integral Blade Stabilizer	71319	8.000	3.000	11.750	219.04	B 6-5/8" Reg	2.11	47.54
12	1x Drill collar		8.000	3.000		218.72	B 6-5/8" Reg	8.88	
13	Griffith Jar	4118031500	8.125	2.750		232.79	B 6-5/8" Reg	9.37	
14	2 x Drill collar		8.000	3.000		218.72	B 6-5/8" Reg	18.27	
15	Intensifier	3908001600	8.000	3.000		219.04	B 6-5/8" Reg	8.92	
16	Cross Over Sub	SLA30	7.625	3.000		195.70	B 5-1/2" FH	0.61	
17	15 x HWDP		5.500	3.375		84.81	B 5-1/2" FH	137.36	
								232.19	

Parameter	Min	Max	Ave
WOB (t) :	10.00	10.00	10.00
RPM (rpm) :			
Flow (L/min) :	3550	3550	3550
SPP (bar) :	235.0	235.0	235.0

Activity	Hrs
Drilling :	14.50
Reaming :	6.50
Circ-Other :	4.50
Total :	25.50

BHA Weight (kg)	
in Air (Total) :	33016
in Mud (Total) :	27352
in Air (Bel Jars) :	13116
in Mud (Bel Jars) :	10866

Drill String	OD(in)	Len (m)
DP(S)-FH-21.90#	5.500	2250

PERFORMANCE

	In	Out
Inclination (deg)	0.65	0.49
Azimuth (deg)	56.14	60.19

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	28.00	2			
Rotated :	0.00	0			
Total :	28.00	2	-0.17	0.00	0.18

COMMENTS

Drill 2454m - 2482m.
POOH due to low ROP from the start of the run possibly due to balled bit.
Bit seen to be partially balled on surface with unconsolidated cuttings.
One plugged nozzle.

sperry-sun
DRILLING SERVICES

BHA Schematic

Pertra as

15/12-15

BHA ID #: 7

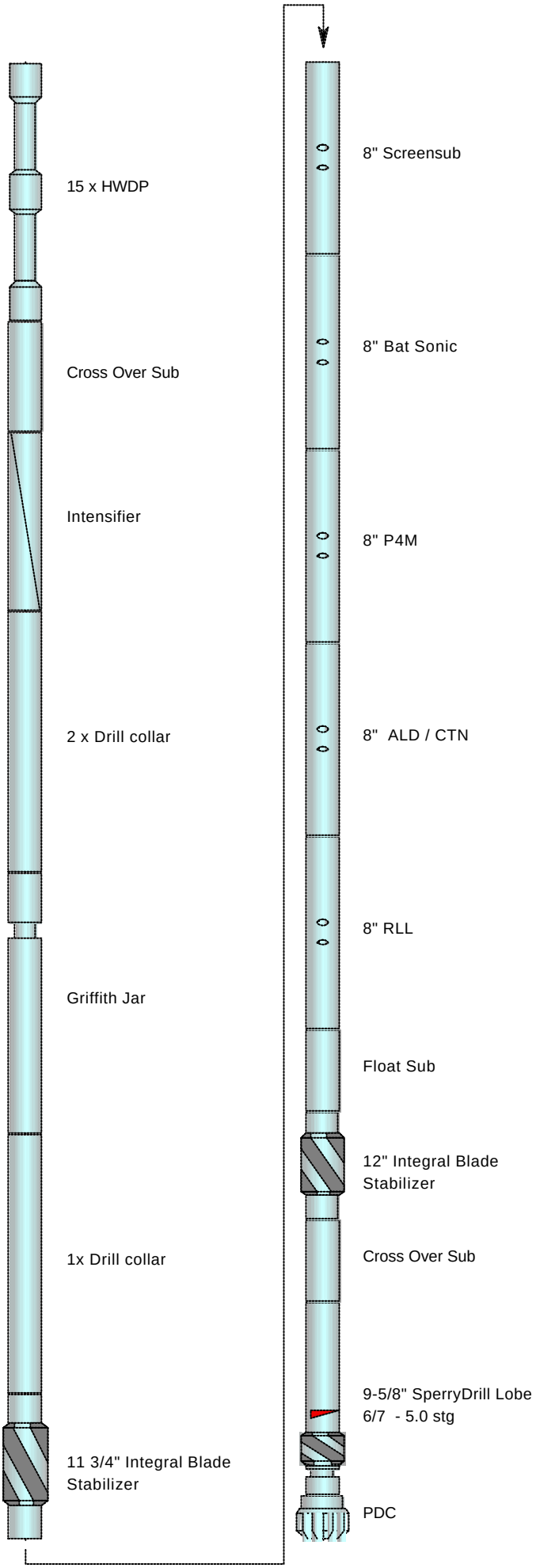
12¼" Motor Assy#4

BHA Configuration

O.D.	Length	Description
12.25"	0.28m	PDC
9.625"	8.13m	9-5/8" SperryDrill Lobe 6/7 - 5.0 stg
9.5"	1.05m	Cross Over Sub
9.5"	2.1m	12" Integral Blade Stabilizer
8"	0.5m	Float Sub
8"	8.82m	8" RLL
8"	11.5m	8" ALD / CTN
8"	4.75m	8" P4M
8"	6.66m	8" Bat Sonic
8"	2.48m	8" Screensub
8"	2.11m	11 3/4" Integral Blade Stabilizer
8"	8.88m	1x Drill collar
8.125"	9.37m	Griffith Jar
8"	18.27m	2 x Drill collar
8"	8.92m	Intensifier
7.625"	0.61m	Cross Over Sub
5.5"	137.36m	15 x HWDP

BHA Discussion

Pick up new motor and rerun bit 5.
Drill from 2482m - 3300m
POOH due to no ROP. Bit 1 7/8" undergauge.



sperry-sun DRILLING SERVICES

BHA Report

Customer : Pertra as
Well : 15/12-15
Field : Varg 15/12
Location : Villmink East
Rig : Deep Sea Trym
Job # : NR-DD-0003354768

BHA# 7

BHA# 7 : **Date In** :10-12-200 **MD In (m) :** 2482 **TVD In (m) :** 2482 **Date Cur**: 14-12-200 **MD Cur (m):** 3300 **TVD Cur (m):** 3300

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (in²)	Dull Condition
5rr1	12.250	Security DBS	FM2843	5009954	7x14	1.052	1-8-RO-A -X-9-PN-PR

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (bar)	Cum Circ Hrs
6	9.625	SSDS	SperryDrill	963197			10.4	61.00

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (kg/m)	Top Con	Length (m)	Bit - Center Blade (m)
1	PDC	5009954	12.250	3.000	12.250	561.78	P 7-5/8" Reg	0.28	
2	9-5/8" SperryDrill Lobe 6/7 - 5.0 stg	963197	9.625	6.135	12.125	219.03	B 7-5/8" Reg	8.13	1.18
3	Cross Over Sub	113513	9.500	3.000		323.58	B 6-5/8" Reg	1.05	
4	12" Integral Blade Stabilizer	64762	9.500	3.000	12.000	323.58	B 6-5/8" Reg	2.10	10.36
5	Float Sub	74437	8.000	3.000		219.04	B 6-5/8" Reg	0.50	
6	8" RLL	90064005HW JRVU8	8.000	3.000		219.04	B 6-5/8" Reg	8.82	
7	8" ALD / CTN	90066059N1 L1a/c8U	8.000	3.000	12.000	219.04	B 6-5/8" Reg	11.50	
8	8" P4M	162070	8.000	3.000		219.04	B 6-5/8" Reg	4.75	
9	8" Bat Sonic	90059257-U 08	8.000	3.000	11.000	219.04	B 6-5/8" Reg	6.66	
10	8" Screensub	174916	8.000	2.375		232.42	B 6-5/8" Reg	2.48	
11	11 3/4" Integral Blade Stabilizer	71319	8.000	3.000	11.750	219.04	B 6-5/8" Reg	2.11	47.14
12	1x Drill collar		8.000	3.000		218.72	B 6-5/8" Reg	8.88	
13	Griffith Jar	4118031500	8.125	2.750		232.79	B 6-5/8" Reg	9.37	
14	2 x Drill collar		8.000	3.000		218.72	B 6-5/8" Reg	18.27	
15	Intensifier	3908001600	8.000	3.000		219.04	B 6-5/8" Reg	8.92	
16	Cross Over Sub	SLA30	7.625	3.000		195.70	B 5-1/2" FH	0.61	
17	15 x HWDP		5.500	3.375		84.81	B 5-1/2" FH	137.36	
								231.79	

Parameter	Min	Max	Ave
WOB (t) :	7.00	20.00	10.23
RPM (rpm) :	130	150	135
Flow (L/min) :	3500	3550	3503
SPP (bar) :	240.0	290.0	266.0

Activity	Hrs
Drilling :	57.00
Reaming :	1.00
Circ-Other :	3.00
Total :	61.00

BHA Weight	(kg)
in Air (Total) :	32897
in Mud (Total) :	27254
in Air (Bel Jars) :	12998
in Mud (Bel Jars) :	10768

Drill String	OD(in)	Len (m)
DP(S)-FH-21.90#	5.500	3068

PERFORMANCE

	In	Out
Inclination (deg)	0.49	1.14
Azimuth (deg)	60.19	23.13

	Distance (m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	0.00	0			
Rotated :	818.00	14			
Total :	818.00	14	0.02	0.00	0.03

COMMENTS

Pick up new motor and rerun bit 5.
Drill from 2482m - 3300m
POOH due to no ROP. Bit 1 7/8" undergauge.

21 DIRECTIONAL DRILLING, DRILLING PARAMETERS AND DEVIATION DATA

GENERAL INFORMATION

Company	:	PERTRA AS	
Field	:	VARG 15/12 VILLMINK EAST	
Rig / Platform	:	DEEP SEA TRYM	
Well	:	15/12-15	
Country	:	NORWAY	
Sperry-Sun Job Nr.	:	NR-DD- 0003354768	
Job start date	:	18-11-2004	
Job end date	:	14-12-2004	
North reference	:	GRID	
Declination	:	-2.831° (8½" Hole)	
Mag-Grid correction	:	-1.875°	
Dip angle	:	71.385°	
Total magnetic field	:	50019.00 nT	
Date of magnetic data	:	10-11-2004	
Wellhead coordinates N	:	N 58° 02' 43.919"	6434481.00 N
Wellhead coordinates E	:	E 01° 52' 22.977"	433470.00 E
Vertical section direction	:	00.00°	
Vertical section reference	:	WELL HEAD	
DD Coordinator	:	Jarl Hovden	
Wellplanner	:	Lai Le Van	
DD Supervisors	:	O. Heggland D. Miller	
MWD Engineers	:	C. Meijvogel A. Aakre G. Hjelvik I. Summers	R. Puddipatt G. Lemin G. Helkjivick
Company Representatives	:	M Frøyland A. Graskopf	P. Lembourn V. Otnes
Company Geologist	:	Ø. Eikefet	

sperry-sun DRILLING SERVICES

Survey and Drilling Parameters

Customer : Pertra as
Well : 15/12-15
Rig : Deep Sea Trym

Field : Varg 15/12
Location : Villmink East
Job # : NR-DD-0003354768

North Ref : Mag **Declination :** -2.83° **VS Dir :** 65.57° (from Wellhead)

WELLBORE SURVEY										DRILLING PARAMETERS								
Measured Depth (m)	Incl Angle (deg)	Azi Dir (deg)	Vertical Depth (m)	Vertical Section (m)	Coordinates N/S (m)	Coordinates E/W (m)	DLS (°/30m)	Build Rate (°/30m)	Turn Rate (°/30m)	WOB (t)	RPM	Flow Rate (L/min)	Stand Pipe (bar)	Orientation From (m)	Orientation To (m)	Tool Face (deg)	BHA No. (#)	Comment
112.00	0.00	0.00	112.0	0.0	0.0	0.0	0.00	0.00	0.00									Tieon
175.00	0.05	160.19	175.0	0.0	0.0	0.0	0.02	0.02	0.00	0.50	50	4500	106.0	114	129	HS	1	
195.50	0.06	160.19	195.5	0.0	0.0	0.0	0.00	0.01	0.00	5.00	50	3500	109.0				3	
225.70	0.88	247.31	225.7	-0.2	-0.1	-0.2	0.87	0.81	0.00	3.00	50	3500	106.0				3	
282.90	0.84	241.73	282.9	-1.1	-0.5	-1.0	0.05	-0.02	0.00	5.00	100	4300	160.0				3	
311.00	0.94	240.65	311.0	-1.5	-0.7	-1.3	0.11	0.11	0.00	6.00	130	4300	160.0				3	
342.40	0.58	242.36	342.4	-1.9	-0.9	-1.7	0.34	-0.34	0.00	4.00	130	4300	162.0				3	
370.90	0.64	261.11	370.9	-2.2	-1.0	-2.0	0.22	0.06	0.00	4.00	130	4300	162.0				3	
399.70	0.50	230.00	399.7	-2.5	-1.1	-2.3	0.35	-0.15	0.00	3.00	130	4300	164.0				3	
428.50	0.25	221.00	428.5	-2.7	-1.3	-2.4	0.27	-0.26	0.00	3.00	130	4300	164.0				3	
457.10	0.22	235.50	457.1	-2.8	-1.3	-2.5	0.07	-0.03	0.00	3.00	130	4300	164.0				3	
486.20	0.28	226.90	486.2	-2.9	-1.4	-2.6	0.07	0.06	0.00	3.00	130	4300	164.0				3	
515.10	0.22	164.60	515.1	-3.0	-1.5	-2.6	0.27	-0.06	0.00	2.00	130	4300	165.0				3	
548.30	0.06	82.27	548.3	-3.0	-1.6	-2.6	0.20	-0.14	0.00	4.00	130	4300	167.0				3	
575.20	0.28	144.25	575.2	-3.0	-1.6	-2.5	0.29	0.25	0.00	4.00	130	4300	167.0				3	
604.80	0.45	149.75	604.8	-2.9	-1.8	-2.4	0.18	0.17	0.00	4.00	130	4300	167.0				3	
636.80	0.53	154.47	636.8	-2.9	-2.0	-2.3	0.08	0.08	0.00	4.00	130	4300	167.0				3	
666.30	0.62	153.18	666.3	-2.9	-2.3	-2.2	0.09	0.09	0.00	5.00	130	4300	174.0				3	
696.40	0.51	144.79	696.4	-2.9	-2.5	-2.0	0.14	-0.11	0.00	5.00	130	4300	174.0				3	
724.10	0.57	149.95	724.1	-2.9	-2.8	-1.9	0.08	0.06	0.00	5.00	130	4300	174.0				3	
755.90	0.50	144.16	755.9	-2.8	-3.0	-1.7	0.08	-0.07	0.00	5.00	130	4300	174.0				3	
784.00	0.56	152.05	784.0	-2.8	-3.2	-1.6	0.10	0.06	0.00	5.00	130	4300	174.0				3	
813.00	0.50	154.30	813.0	-2.8	-3.5	-1.5	0.07	-0.06	0.00	5.00	130	4300	174.0				3	
842.00	0.53	155.93	842.0	-2.8	-3.7	-1.3	0.03	0.03	0.00	5.00	130	4300	174.0				3	
871.90	0.53	157.21	871.9	-2.8	-4.0	-1.2	0.00	0.00	0.00	6.00	130	4300	183.0				3	
900.70	0.44	149.25	900.7	-2.8	-4.2	-1.1	0.12	-0.09	0.00	6.00	130	4300	183.0				3	
929.90	0.48	155.25	929.9	-2.7	-4.4	-1.0	0.06	0.04	0.00	6.00	130	4300	183.0				3	
958.30	0.33	149.73	958.3	-2.7	-4.6	-0.9	0.16	-0.16	0.00	4.00	130	4300	186.0				3	
988.10	0.48	160.66	988.1	-2.7	-4.8	-0.8	0.17	0.15	0.00	4.00	130	4300	186.0				3	

sperry-sun DRILLING SERVICES

Survey and Drilling Parameters

Customer : Pertra as
Well : 15/12-15
Rig : Deep Sea Trym

Field : Varg 15/12
Location : Villmink East
Job # : NR-DD-0003354768

North Ref : Mag **Declination :** -2.83° **VS Dir :** 65.57° (from Wellhead)

WELLBORE SURVEY										DRILLING PARAMETERS								
Measured Depth (m)	Incl Angle (deg)	Azi Dir (deg)	Vertical Depth (m)	Vertical Section (m)	Coordinates N/S (m)	Coordinates E/W (m)	DLS (°/30m)	Build Rate (°/30m)	Turn Rate (°/30m)	WOB (t)	RPM	Flow Rate (L/min)	Stand Pipe (bar)	Orientation From (m)	Orientation To (m)	Tool Face (deg)	BHA No. (#)	Comment
1018.00	0.45	168.63	1018.0	-2.8	-5.0	-0.8	0.07	-0.03	0.00	4.00	130	4300	186.0				3	
1050.00	0.45	167.63	1050.0	-2.8	-5.2	-0.7	0.00	0.00	0.00	5.00	130	4300	188.0				3	
1080.10	0.81	179.37	1080.1	-2.9	-5.6	-0.7	0.38	0.36	0.00	5.00	130	4300	188.0				3	
1107.70	0.76	175.30	1107.7	-3.1	-5.9	-0.7	0.08	-0.05	0.00	5.00	130	4300	188.0				3	
1139.40	0.75	171.65	1139.4	-3.2	-6.4	-0.6	0.05	-0.01	0.00	5.00	130	4300	188.0				3	
1169.20	0.69	157.84	1169.2	-3.3	-6.7	-0.5	0.18	-0.06	0.00	6.00	130	4300	189.0				3	
1198.10	0.68	157.05	1198.1	-3.3	-7.0	-0.4	0.00	-0.01	0.00	6.00	130	4300	189.0				3	
1227.60	0.70	156.99	1227.6	-3.3	-7.4	-0.3	0.00	0.02	0.00	6.00	130	4300	189.0				3	
1256.80	0.43	170.50	1256.7	-3.3	-7.6	-0.2	0.31	-0.28	0.00	6.00	130	4300	194.0				3	
1314.60	0.43	268.90	1314.5	-3.6	-7.9	-0.4	0.34	0.00	0.00	6.00	130	4300	194.0				3	
1371.20	0.57	243.60	1371.1	-4.1	-8.0	-0.8	0.14	0.07	0.00								4	
1406.00	0.59	251.53	1405.9	-4.4	-8.1	-1.2	0.07	0.02	0.00	6.00	135	3400	180.0				4	
1430.00	0.45	254.26	1429.9	-4.6	-8.2	-1.4	0.18	-0.17	0.00	6.00	135	3400	180.0				4	
1459.50	0.69	29.42	1459.4	-4.6	-8.1	-1.4	1.08	0.24	0.00	6.00	135	3400	180.0	1449	1455	45m	4	
1462.00	0.75	29.09	1461.9	-4.6	-8.0	-1.4	0.72	0.72	0.00	6.00	135	3400	180.0				4	
1493.00	0.78	28.97	1492.9	-4.2	-7.7	-1.2	0.03	0.03	0.00	6.00	135	3400	180.0				4	
1515.00	0.64	30.17	1514.9	-4.0	-7.4	-1.0	0.19	-0.19	0.00	6.00	135	3400	180.0				4	
1545.00	0.88	27.53	1544.9	-3.7	-7.1	-0.8	0.24	0.24	0.00	6.00	135	3400	180.0				4	
1575.00	0.79	30.07	1574.9	-3.4	-6.7	-0.6	0.10	-0.09	0.00	7.00	135	3500	205.0				4	
1603.80	0.83	32.90	1603.7	-3.0	-6.4	-0.4	0.06	0.04	0.00	7.00	135	3500	205.0				4	
1633.10	1.02	40.92	1633.0	-2.6	-6.0	-0.1	0.23	0.19	0.00	7.00	135	3500	205.0				4	
1662.90	0.94	45.50	1662.8	-2.1	-5.6	0.2	0.11	-0.08	0.00	7.00	135	3500	209.0				4	
1692.60	0.89	44.69	1692.5	-1.7	-5.3	0.5	0.05	-0.05	0.00	7.00	135	3500	209.0				4	
1722.30	0.99	45.61	1722.2	-1.2	-4.9	0.9	0.10	0.10	0.00	7.00	135	3500	209.0				4	
1810.30	1.13	44.18	1810.2	0.3	-3.8	2.0	0.05	0.05	0.00	7.00	135	3550	222.0				4	
1840.00	1.02	46.11	1839.9	0.8	-3.4	2.4	0.12	-0.11	1.95	7.00	135	3550	222.0				4	
1868.40	1.05	37.11	1868.3	1.3	-3.0	2.8	0.17	0.03	-9.51	7.00	135	3550	222.0				4	
1898.90	1.05	49.55	1898.8	1.8	-2.6	3.2	0.22	0.00	12.24	7.00	135	3550	222.0				4	
1927.80	1.19	47.00	1927.7	2.3	-2.2	3.6	0.15	0.15	-2.65	7.00	135	3550	222.0				4	

sperry-sun DRILLING SERVICES

Survey and Drilling Parameters

Customer : Pertra as
Well : 15/12-15
Rig : Deep Sea Trym

Field : Varg 15/12
Location : Villmink East
Job # : NR-DD-0003354768

North Ref : Mag **Declination :** -2.83° **VS Dir :** 65.57° (from Wellhead)

WELLBORE SURVEY										DRILLING PARAMETERS								
Measured Depth (m)	Incl Angle (deg)	Azi Dir (deg)	Vertical Depth (m)	Vertical Section (m)	Coordinates N/S (m)	Coordinates E/W (m)	DLS (°/30m)	Build Rate (°/30m)	Turn Rate (°/30m)	WOB (t)	RPM	Flow Rate (L/min)	Stand Pipe (bar)	Orientation From (m)	Orientation To (m)	Tool Face (deg)	BHA No. (#)	Comment
1957.00	0.93	17.27	1956.9	2.8	-1.8	3.9	0.62	-0.27	0.00	7.00	135	3550	222.0	1938	1944	270m	4	
1987.00	1.05	14.35	1986.9	3.1	-1.3	4.0	0.13	0.12	0.00	7.00	135	3550	222.0				4	
2046.00	0.69	326.77	2045.9	3.4	-0.5	3.9	0.39	-0.18	0.00	7.00	135	3550	222.0				4	
2135.60	1.20	24.15	2135.5	4.0	0.8	4.0	0.34	0.17	0.00	7.00	135	3550	222.0				4	
2164.10	1.17	19.17	2163.9	4.4	1.4	4.3	0.11	-0.03	-5.24	7.00	135	3550	222.0				4	
2193.90	1.09	26.02	2193.7	4.9	1.9	4.5	0.16	-0.08	6.90								5	
2223.00	1.08	31.97	2222.8	5.3	2.4	4.7	0.12	-0.01	6.13								5	
2252.90	0.98	29.57	2252.7	5.8	2.9	5.0	0.11	-0.10	0.00	10.00		3550	224.0	2232	2253	200m	5	
2282.20	0.80	28.17	2282.0	6.1	3.3	5.2	0.19	-0.18	0.00	10.00		3550	224.0	2253	2282	200m	5	
2370.20	0.84	42.43	2370.0	7.2	4.3	6.0	0.07	0.01	0.00	7.00	100	3550	240.0	2282	2336	200m	5	
2399.80	0.76	46.25	2399.6	7.6	4.6	6.3	0.10	-0.08	0.00	5.00	125	3550	240.0	2379	2383	200m	5	
2430.00	0.70	50.61	2429.8	8.0	4.8	6.5	0.08	-0.06	0.00	5.00	125	3550	240.0	2409	2413	200m	5	
2459.03	0.64	57.40	2458.8	8.3	5.0	6.8	0.10	-0.06	0.00	10.00		3550	235.0	2439	2443	200m	6	
														2446	2450	200m	6	
														2454	2459	200m	6	
2491.42	0.43	61.90	2491.2	8.6	5.2	7.1	0.20	-0.19	0.00	20.00	135	3550	240.0	2459	2482	200m	7	
2520.20	0.48	72.93	2520.0	8.8	5.3	7.3	0.10	0.05	0.00	20.00	135	3550	240.0				7	
2549.04	0.64	62.22	2548.8	9.1	5.4	7.5	0.20	0.17	0.00	7.00	135	3500	245.0				7	
2578.40	0.68	61.86	2578.2	9.4	5.6	7.8	0.04	0.04	0.00	7.00	135	3500	245.0				7	
2607.40	0.80	79.67	2607.2	9.8	5.7	8.2	0.27	0.12	0.00	7.00	135	3500	245.0				7	
2636.87	0.88	69.63	2636.7	10.2	5.8	8.6	0.17	0.08	0.00	8.00	135	3500	252.0				7	
2666.30	0.99	77.91	2666.1	10.7	5.9	9.1	0.18	0.11	0.00	8.00	135	3500	252.0				7	
2695.72	1.26	85.34	2695.5	11.3	6.0	9.6	0.31	0.28	0.00	8.00	135	3500	252.0				7	
2725.11	1.53	83.23	2724.9	11.9	6.1	10.4	0.28	0.28	-2.15	8.00	135	3500	252.0				7	
2754.54	1.60	86.36	2754.3	12.7	6.1	11.2	0.11	0.07	3.19	8.00	135	3500	252.0				7	
2784.03	1.62	91.38	2783.8	13.5	6.2	12.0	0.14	0.02	5.11	8.00	135	3500	252.0				7	
2813.46	1.66	89.64	2813.2	14.2	6.1	12.8	0.07	0.04	-1.77	8.00	135	3500	252.0				7	
2842.90	1.91	89.82	2842.6	15.1	6.2	13.7	0.25	0.25	0.18	10.00	150	3500	260.0				7	
2872.50	1.80	88.42	2872.2	15.9	6.2	14.7	0.12	-0.11	-1.42	15.00	135	3500	260.0				7	

sperry-sun DRILLING SERVICES

Survey and Drilling Parameters

Customer : Pertra as
Well : 15/12-15
Rig : Deep Sea Trym

Field : Varg 15/12
Location : Villmink East
Job # : NR-DD-0003354768

North Ref : Mag **Declination :** -2.83° **VS Dir :** 65.57° (from Wellhead)

WELLBORE SURVEY										DRILLING PARAMETERS								
Measured Depth (m)	Incl Angle (deg)	Azi Dir (deg)	Vertical Depth (m)	Vertical Section (m)	Coordinates N/S (m)	Coordinates E/W (m)	DLS (°/30m)	Build Rate (°/30m)	Turn Rate (°/30m)	WOB (t)	RPM	Flow Rate (L/min)	Stand Pipe (bar)	Orientation From (m)	Orientation To (m)	Tool Face (deg)	BHA No. (#)	Comment
2901.37	1.86	91.95	2901.1	16.8	6.2	15.6	0.13	0.06	3.67	15.00	135	3500	260.0				7	
2930.77	1.87	88.67	2930.5	17.6	6.2	16.6	0.11	0.01	-3.35	15.00	135	3500	260.0				7	
2960.24	1.77	82.28	2959.9	18.5	6.2	17.5	0.23	-0.10	-6.50	15.00	135	3500	260.0				7	
3049.21	1.44	62.75	3048.8	20.9	6.9	19.9	0.21	-0.11	-6.59	10.00	130	3500	285.0				7	
3078.50	1.31	58.37	3078.1	21.6	7.3	20.5	0.17	-0.13	-4.49	8.00	135	3500	285.0				7	
3107.86	1.27	55.81	3107.5	22.3	7.6	21.0	0.07	-0.04	-2.62	8.00	135	3500	285.0				7	
3137.50	1.35	55.78	3137.1	23.0	8.0	21.6	0.08	0.08	-0.03	8.00	135	3500	285.0				7	
3166.97	1.20	46.56	3166.6	23.6	8.4	22.1	0.26	-0.15	-9.39	8.00	135	3500	285.0				7	
3196.41	1.24	42.77	3196.0	24.2	8.9	22.5	0.09	0.04	-3.86	8.00	135	3500	285.0				7	
3225.87	1.13	31.61	3225.5	24.7	9.3	22.9	0.26	-0.11	-11.36	8.00	135	3500	285.0				7	
3255.25	1.14	23.13	3254.8	25.2	9.9	23.2	0.17	0.01	-8.66	13.00	130	3500	290.0				7	
3300.00	1.14	23.13	3299.6	25.8	10.7	23.5	0.00	0.00	0.00								7	

HALLIBURTON
Sperry-Sun

Compass

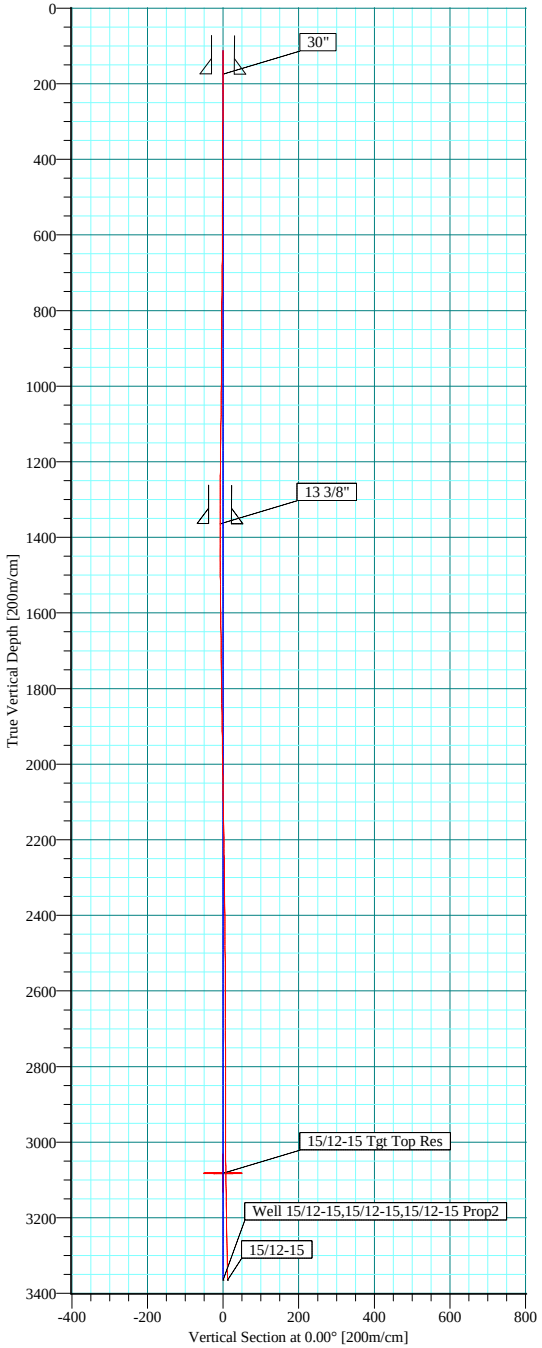
Field: Varg 15/12
Site: 15/12-15 (Villmink East)
Well: Well 15/12-15
Wellpath: 15/12-15

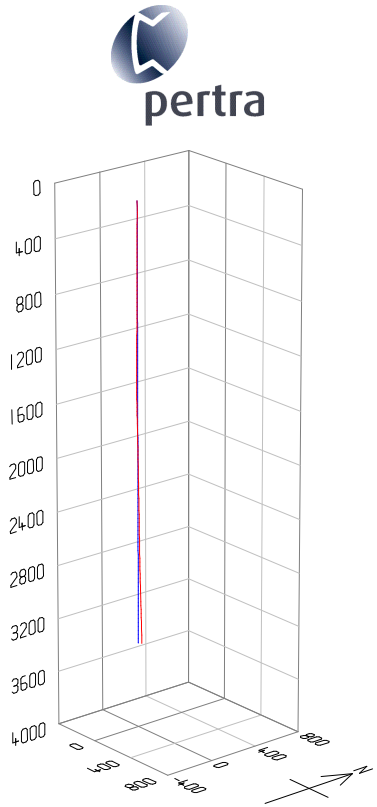
SITE DETAILS

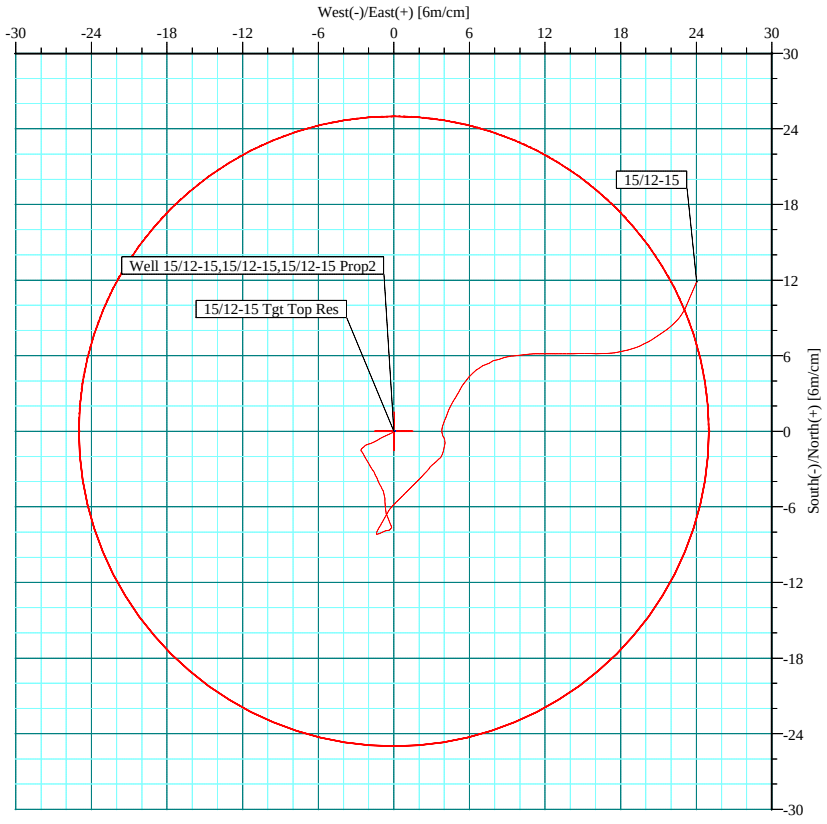
15/12-15 (Villmink East)

Site Centre Northing: 6434481.00
Easting: 433470.00

Water Depth: 87.00
Positional Uncertainty: 0.00
Convergence: -0.956







CASING DETAILS

No.	TVD	MD	Name	Size
1	175.00	175.00	30"	30.00
2	1363.95	1364.00	13 3/8"	13.38

LEGEND

Well 15/12-15,15/12-15,15/12-15 Prop2
15/12-15

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Site Centre 15/12-15 (Villmink East), Grid North
Vertical (TVD) Reference: Dee Sea Trym 25.00
Section (VS) Reference: Slot - (0.00N,0.00E)
Measured Depth Reference: Dee Sea Trym 25.00
Calculation Method: Minimum Curvature

TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
15/12-15 Tgt Top Res	3082.00	0.00	0.00	6434481.00	433470.00	Circle (Radius: 25)

WELL DETAILS

Name	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
Well 15/12-15	0.00	0.00	6434481.00	433470.00	58°02'43.919N	001°52'22.977E	N/A

Halliburton
Survey Report

HALLIBURTON Sperry-Sun

Company:	Pertra as	**Date:** 06-01-2005	**Time:** 10:25:44	**Page:**	1
Field:	Varg 15/12	**Co-ordinate(NE) Reference:**	Site: 15/12-15 (Villmink East)		
Site:	15/12-15 (Villmink East)	**Vertical (TVD) Reference:**	Dee Sea Trym 25.0		
Well:	Well 15/12-15	**Section (VS) Reference:**	Well (0.00N,0.00E,0.00Azi)		
Wellpath:	15/12-15	**Survey Calculation Method:**	Minimum Curvature	**Db:**	Sybase

Field: Varg 15/12
Norwegian Sea
Norway

Map System:	Universal Transverse Mercator	**Map Zone:**	UTM Zone 31, North 0 to 6E
Geo Datum:	ED50 (International 1924)	**Coordinate System:**	Site Centre
Sys Datum:	Mean Sea Level	**Geomagnetic Model:**	bggm2004

Site: 15/12-15 (Villmink East)

Site Position:			**Northing:**	6434481.00	m	**Latitude:**	58 2 43.919	N
From:	Map		**Easting:**	433470.00	m	**Longitude:**	1 52 22.977	E
Position Uncertainty:		0.00 m				**North Reference:**	Grid	
Water Depth:		87.00 m				**Grid Convergence:**	-0.956	deg

Well: Well 15/12-15 **Slot Name:**

Surface Position:	**+N/-S**	0.00 m	**Northing:**	6434481.00	m	**Latitude:**	58 2 43.919	N
	+E/-W	0.00 m	**Easting :**	433470.00	m	**Longitude:**	1 52 22.977	E
Position Uncertainty:		0.00 m						
Reference Point:	**+N/-S**	0.00 m	**Northing:**	6434481.00	m	**Latitude:**	58 2 43.919	N
	+E/-W	0.00 m	**Easting :**	433470.00	m	**Longitude:**	1 52 22.977	E
			Measured Depth:	112.00	m	**Inclination:**	0.000	deg
			Vertical Depth:	112.00	m	**Azimuth :**	0.000	deg

Wellpath: 15/12-15

			Drilled From:	Well Ref. Point	
			Tie-on Depth:	112.00	m
Current Datum:	Dee Sea Trym	**Height** 25.00 m	**Above System Datum:**	Mean Sea Level	
Magnetic Data:	09-07-2004		**Declination:**	-2.787	deg
Field Strength:	50166 **nT**		**Mag Dip Angle:**	71.344	deg

Vertical Section:	**Depth From (TVD)**	**+N/-S**	**+E/-W**	**Direction**
	m	m	m	deg
	112.00	0.00	0.00	0.000

Survey Program for Definitive Wellpath
Date: 03-01-2005 **Validated:** No **Version:** 3

Actual From m	**To** m	**Survey**	**Toolcode**	**Tool Name**
195.50	1314.60	15/12-15_MWD 17-1/2" (195.50-1	IFR Norway Standard	MWD+IFR+MS+SAG
1371.20	3255.25	15/12-15_MWD 12-1/4" (1371.20-	IFR Norway Standard	MWD+IFR+MS+SAG
3300.00	3300.00	15/12-15_Extrapolation (3300.0	BLIND	Blind drilling

Survey

MD m	**Incl** deg	**Azim** deg	**TVD** m	**+N/-S** m	**+E/-W** m	**VS** m	**DLS** deg/30m	**Build** deg/30m	**Turn** deg/30m	**Tool/Comment**
112.00	0.000	0.000	112.00	0.00	0.00	0.00	0.00	0.00	0.00	TIE LINE
175.00	0.045	160.190	175.00	-0.02	0.01	-0.02	0.02	0.02	0.00	30"
195.50	0.060	160.190	195.50	-0.04	0.01	-0.04	0.02	0.02	0.00	IFR Norway Standard
225.70	0.880	247.310	225.70	-0.15	-0.19	-0.15	0.87	0.81	86.54	IFR Norway Standard
282.90	0.840	241.730	282.89	-0.51	-0.97	-0.51	0.05	-0.02	-2.93	IFR Norway Standard
311.00	0.940	240.650	310.99	-0.72	-1.35	-0.72	0.11	0.11	-1.15	IFR Norway Standard
342.40	0.580	242.360	342.39	-0.92	-1.72	-0.92	0.34	-0.34	1.63	IFR Norway Standard
370.90	0.640	261.110	370.88	-1.02	-2.00	-1.02	0.22	0.06	19.74	IFR Norway Standard
399.70	0.500	230.000	399.68	-1.12	-2.26	-1.12	0.35	-0.15	-32.41	IFR Norway Standard
428.50	0.250	221.000	428.48	-1.25	-2.39	-1.25	0.27	-0.26	-9.37	IFR Norway Standard
457.10	0.220	235.500	457.08	-1.33	-2.48	-1.33	0.07	-0.03	15.21	IFR Norway Standard
486.20	0.280	226.900	486.18	-1.41	-2.58	-1.41	0.07	0.06	-8.87	IFR Norway Standard
515.10	0.220	164.600	515.08	-1.51	-2.61	-1.51	0.27	-0.06	-64.67	IFR Norway Standard
548.30	0.060	82.270	548.28	-1.57	-2.58	-1.57	0.20	-0.14	-74.39	IFR Norway Standard
575.20	0.280	144.250	575.18	-1.62	-2.53	-1.62	0.29	0.25	69.12	IFR Norway Standard
604.80	0.450	149.750	604.78	-1.78	-2.43	-1.78	0.18	0.17	5.57	IFR Norway Standard
636.80	0.530	154.470	636.78	-2.02	-2.30	-2.02	0.08	0.07	4.42	IFR Norway Standard
666.30	0.620	153.180	666.28	-2.29	-2.17	-2.29	0.09	0.09	-1.31	IFR Norway Standard
696.40	0.510	144.790	696.38	-2.54	-2.02	-2.54	0.14	-0.11	-8.36	IFR Norway Standard
724.10	0.570	149.950	724.08	-2.76	-1.88	-2.76	0.08	0.06	5.59	IFR Norway Standard
755.90	0.500	144.160	755.87	-3.01	-1.72	-3.01	0.08	-0.07	-5.46	IFR Norway Standard
784.00	0.560	152.050	783.97	-3.23	-1.58	-3.23	0.10	0.06	8.42	IFR Norway Standard
813.00	0.500	154.300	812.97	-3.47	-1.46	-3.47	0.07	-0.06	2.33	IFR Norway Standard

Company:	Pertra as	**Date:** 06-01-2005	**Time:** 10:25:44	**Page:**	2
Field:	Varg 15/12	**Co-ordinate(NE) Reference:**	Site: 15/12-15 (Villmink East)		
Site:	15/12-15 (Villmink East)	**Vertical (TVD) Reference:**	Dee Sea Trym 25.0		
Well:	Well 15/12-15	**Section (VS) Reference:**	Well (0.00N,0.00E,0.00Azi)		
Wellpath:	15/12-15	**Survey Calculation Method:**	Minimum Curvature	**Db:**	Sybase

Survey

MD m	Incl deg	Azim deg	TVD m	+N/-S m	+E/-W m	VS m	DLS deg/30m	Build deg/30m	Turn deg/30m	Tool/Comment
842.00	0.530	155.930	841.97	-3.71	-1.35	-3.71	0.03	0.03	1.69	IFR Norway Standard
871.90	0.530	157.210	871.87	-3.96	-1.24	-3.96	0.01	0.00	1.28	IFR Norway Standard
900.70	0.440	149.250	900.67	-4.18	-1.13	-4.18	0.12	-0.09	-8.29	IFR Norway Standard
929.90	0.480	155.250	929.87	-4.39	-1.02	-4.39	0.06	0.04	6.16	IFR Norway Standard
958.30	0.330	149.730	958.27	-4.57	-0.93	-4.57	0.16	-0.16	-5.83	IFR Norway Standard
988.10	0.480	160.660	988.07	-4.76	-0.85	-4.76	0.17	0.15	11.00	IFR Norway Standard
1018.00	0.450	168.630	1017.96	-4.99	-0.78	-4.99	0.07	-0.03	8.00	IFR Norway Standard
1050.00	0.450	167.630	1049.96	-5.24	-0.73	-5.24	0.01	0.00	-0.94	IFR Norway Standard
1080.10	0.810	179.370	1080.06	-5.56	-0.70	-5.56	0.38	0.36	11.70	IFR Norway Standard
1107.70	0.760	175.300	1107.66	-5.94	-0.69	-5.94	0.08	-0.05	-4.42	IFR Norway Standard
1139.40	0.750	171.650	1139.36	-6.36	-0.64	-6.36	0.05	-0.01	-3.45	IFR Norway Standard
1169.20	0.690	157.840	1169.15	-6.72	-0.54	-6.72	0.18	-0.06	-13.90	IFR Norway Standard
1198.10	0.680	157.050	1198.05	-7.03	-0.41	-7.03	0.01	-0.01	-0.82	IFR Norway Standard
1227.60	0.700	156.990	1227.55	-7.36	-0.27	-7.36	0.02	0.02	-0.06	IFR Norway Standard
1256.80	0.430	170.500	1256.75	-7.63	-0.19	-7.63	0.31	-0.28	13.88	IFR Norway Standard
1314.60	0.430	268.900	1314.55	-7.85	-0.37	-7.85	0.34	0.00	51.07	IFR Norway Standard
1364.00	0.547	246.047	1363.95	-7.95	-0.77	-7.95	0.14	0.07	-13.88	13 3/8"
1371.20	0.570	243.600	1371.15	-7.98	-0.83	-7.98	0.14	0.09	-10.20	IFR Norway Standard
1406.00	0.590	251.530	1405.94	-8.12	-1.16	-8.12	0.07	0.02	6.84	IFR Norway Standard
1430.00	0.450	254.260	1429.94	-8.18	-1.36	-8.18	0.18	-0.17	3.41	IFR Norway Standard
1462.00	0.750	29.090	1461.94	-8.03	-1.38	-8.03	1.04	0.28	126.40	IFR Norway Standard
1493.00	0.780	28.970	1492.94	-7.67	-1.18	-7.67	0.03	0.03	-0.12	IFR Norway Standard
1515.00	0.640	30.170	1514.94	-7.43	-1.05	-7.43	0.19	-0.19	1.64	IFR Norway Standard
1546.00	0.880	27.530	1545.93	-7.07	-0.85	-7.07	0.23	0.23	-2.55	IFR Norway Standard
1575.00	0.790	30.070	1574.93	-6.70	-0.65	-6.70	0.10	-0.09	2.63	IFR Norway Standard
1603.80	0.830	32.900	1603.73	-6.35	-0.43	-6.35	0.06	0.04	2.95	IFR Norway Standard
1633.10	1.020	40.920	1633.03	-5.98	-0.15	-5.98	0.23	0.19	8.21	IFR Norway Standard
1662.90	0.940	45.500	1662.82	-5.61	0.20	-5.61	0.11	-0.08	4.61	IFR Norway Standard
1692.60	0.890	44.690	1692.52	-5.27	0.54	-5.27	0.05	-0.05	-0.82	IFR Norway Standard
1722.30	0.990	45.610	1722.21	-4.93	0.88	-4.93	0.10	0.10	0.93	IFR Norway Standard
1810.30	1.130	44.180	1810.20	-3.77	2.03	-3.77	0.05	0.05	-0.49	IFR Norway Standard
1840.00	1.020	46.110	1839.89	-3.38	2.42	-3.38	0.12	-0.11	1.95	IFR Norway Standard
1868.40	1.050	37.110	1868.29	-3.00	2.76	-3.00	0.17	0.03	-9.51	IFR Norway Standard
1898.90	1.050	49.550	1898.78	-2.59	3.14	-2.59	0.22	0.00	12.24	IFR Norway Standard
1927.80	1.190	47.000	1927.68	-2.22	3.56	-2.22	0.15	0.15	-2.65	IFR Norway Standard
1957.00	0.930	17.270	1956.87	-1.78	3.86	-1.78	0.62	-0.27	-30.54	IFR Norway Standard
1987.00	1.050	14.350	1986.87	-1.29	4.00	-1.29	0.13	0.12	-2.92	IFR Norway Standard
2046.00	0.690	326.770	2045.86	-0.46	3.94	-0.46	0.39	-0.18	-24.19	IFR Norway Standard
2135.60	1.200	24.150	2135.45	0.84	4.02	0.84	0.34	0.17	19.21	IFR Norway Standard
2164.10	1.170	19.170	2163.95	1.39	4.24	1.39	0.11	-0.03	-5.24	IFR Norway Standard
2193.90	1.090	26.020	2193.74	1.93	4.47	1.93	0.16	-0.08	6.90	IFR Norway Standard
2223.00	1.080	31.970	2222.83	2.41	4.73	2.41	0.12	-0.01	6.13	IFR Norway Standard
2252.90	0.980	29.570	2252.73	2.87	5.01	2.87	0.11	-0.10	-2.41	IFR Norway Standard
2282.20	0.800	28.170	2282.03	3.27	5.23	3.27	0.19	-0.18	-1.43	IFR Norway Standard
2370.20	0.840	42.430	2370.02	4.29	5.95	4.29	0.07	0.01	4.86	IFR Norway Standard
2399.80	0.760	46.250	2399.61	4.59	6.24	4.59	0.10	-0.08	3.87	IFR Norway Standard
2430.00	0.700	50.610	2429.81	4.84	6.53	4.84	0.08	-0.06	4.33	IFR Norway Standard
2459.03	0.640	57.400	2458.84	5.04	6.80	5.04	0.10	-0.06	7.02	IFR Norway Standard
2491.42	0.430	61.900	2491.23	5.20	7.06	5.20	0.20	-0.19	4.17	IFR Norway Standard
2520.20	0.480	72.930	2520.01	5.28	7.27	5.28	0.10	0.05	11.50	IFR Norway Standard
2549.04	0.640	62.220	2548.85	5.39	7.53	5.39	0.20	0.17	-11.14	IFR Norway Standard
2578.40	0.680	61.860	2578.20	5.55	7.83	5.55	0.04	0.04	-0.37	IFR Norway Standard
2607.40	0.800	79.670	2607.20	5.67	8.18	5.67	0.27	0.12	18.42	IFR Norway Standard
2636.87	0.880	69.630	2636.67	5.78	8.60	5.78	0.17	0.08	-10.22	IFR Norway Standard
2666.30	0.990	77.910	2666.09	5.92	9.06	5.92	0.18	0.11	8.44	IFR Norway Standard
2695.72	1.260	85.340	2695.51	6.00	9.63	6.00	0.31	0.28	7.58	IFR Norway Standard
2725.11	1.530	83.230	2724.89	6.07	10.34	6.07	0.28	0.28	-2.15	IFR Norway Standard
2754.54	1.600	86.360	2754.31	6.14	11.14	6.14	0.11	0.07	3.19	IFR Norway Standard

Halliburton
Survey Report

Company:	Pertra as	**Date:** 06-01-2005	**Time:** 10:25:44	**Page:**	3
Field:	Varg 15/12	**Co-ordinate(NE) Reference:**	Site: 15/12-15 (Villmink East)		
Site:	15/12-15 (Villmink East)	**Vertical (TVD) Reference:**	Dee Sea Trym 25.0		
Well:	Well 15/12-15	**Section (VS) Reference:**	Well (0.00N,0.00E,0.00Azi)		
Wellpath:	15/12-15	**Survey Calculation Method:**	Minimum Curvature	**Db:**	Sybase

Survey

MD m	Incl deg	Azim deg	TVD m	+N/-S m	+E/-W m	VS m	DLS deg/30m	Build deg/30m	Turn deg/30m	Tool/Comment
2784.03	1.620	91.380	2783.79	6.16	11.97	6.16	0.14	0.02	5.11	IFR Norway Standard
2813.46	1.660	89.640	2813.21	6.15	12.81	6.15	0.07	0.04	-1.77	IFR Norway Standard
2842.90	1.910	89.820	2842.63	6.15	13.73	6.15	0.25	0.25	0.18	IFR Norway Standard
2872.50	1.800	88.420	2872.22	6.17	14.68	6.17	0.12	-0.11	-1.42	IFR Norway Standard
2901.37	1.860	91.950	2901.07	6.17	15.61	6.17	0.13	0.06	3.67	IFR Norway Standard
2930.77	1.870	88.670	2930.46	6.16	16.56	6.16	0.11	0.01	-3.35	IFR Norway Standard
2960.24	1.770	82.280	2959.91	6.23	17.49	6.23	0.23	-0.10	-6.50	IFR Norway Standard
3049.21	1.440	62.750	3048.85	6.93	19.85	6.93	0.21	-0.11	-6.59	IFR Norway Standard
3078.50	1.310	58.370	3078.13	7.27	20.46	7.27	0.17	-0.13	-4.49	IFR Norway Standard
3107.86	1.270	55.810	3107.48	7.63	21.02	7.63	0.07	-0.04	-2.62	IFR Norway Standard
3137.50	1.350	55.780	3137.11	8.01	21.58	8.01	0.08	0.08	-0.03	IFR Norway Standard
3166.97	1.200	46.560	3166.58	8.42	22.09	8.42	0.26	-0.15	-9.39	IFR Norway Standard
3196.41	1.240	42.770	3196.01	8.87	22.53	8.87	0.09	0.04	-3.86	IFR Norway Standard
3225.87	1.130	31.610	3225.46	9.35	22.90	9.35	0.26	-0.11	-11.36	IFR Norway Standard
3255.25	1.140	23.130	3254.84	9.86	23.16	9.86	0.17	0.01	-8.66	IFR Norway Standard
3300.00	1.140	23.130	3299.58	10.68	23.51	10.68	0.00	0.00	0.00	PROJECTED to TD

Casing Points

MD m	TVD m	Diameter in	Hole Size in	Name
175.00	175.00	30.00	36.00	30"
1364.00	1363.95	13.38	17.50	13 3/8"

Halliburton
Survey Report - Geographic

HALLIBURTON Sperry-Sun

Company:	Pertra as	**Date:** 06-01-2005	**Time:** 10:26:35	**Page:**	1
Field:	Varg 15/12	**Co-ordinate(NE) Reference:**	Site: 15/12-15 (Villmink East)		
Site:	15/12-15 (Villmink East)	**Vertical (TVD) Reference:**	Dee Sea Trym 25.0		
Well:	Well 15/12-15	**Section (VS) Reference:**	Well (0.00N,0.00E,0.00Azi)		
Wellpath:	15/12-15	**Survey Calculation Method:**	Minimum Curvature	**Db:**	Sybase

Field: Varg 15/12
Norwegian Sea
Norway

Map System:	Universal Transverse Mercator	**Map Zone:**	UTM Zone 31, North 0 to 6E
Geo Datum:	ED50 (International 1924)	**Coordinate System:**	Site Centre
Sys Datum:	Mean Sea Level	**Geomagnetic Model:**	bggm2004

Site: 15/12-15 (Villmink East)

Site Position:			**Northing:**	6434481.00	m	**Latitude:**	58 2 43.919	N
From:	Map		**Easting:**	433470.00	m	**Longitude:**	1 52 22.977	E
Position Uncertainty:		0.00 m				**North Reference:**	Grid	
Water Depth:		87.00 m				**Grid Convergence:**	-0.956	deg

Well: Well 15/12-15 **Slot Name:**

Surface Position:	**+N/-S**	0.00 m	**Northing:**	6434481.00	m	**Latitude:**	58 2 43.919	N
	+E/-W	0.00 m	**Easting :**	433470.00	m	**Longitude:**	1 52 22.977	E
Position Uncertainty:		0.00 m						
Reference Point:	**+N/-S**	0.00 m	**Northing:**	6434481.00	m	**Latitude:**	58 2 43.919	N
	+E/-W	0.00 m	**Easting :**	433470.00	m	**Longitude:**	1 52 22.977	E
			Measured Depth:	112.00	m	**Inclination:**	0.000	deg
			Vertical Depth:	112.00	m	**Azimuth :**	0.000	deg

Wellpath: 15/12-15 **Drilled From:** Well Ref. Point
Tie-on Depth: 112.00 m

Current Datum:	Dee Sea Trym	**Height** 25.00 m	**Above System Datum:** Mean Sea Level
Magnetic Data:	09-07-2004		**Declination:** -2.787 deg
Field Strength:	50166 **nT**		**Mag Dip Angle:** 71.344 deg

Vertical Section:	**Depth From (TVD)** m	**+N/-S** m	**+E/-W** m	**Direction** deg
	112.00	0.00	0.00	0.000

Survey Program for Definitive Wellpath
Date: 03-01-2005 **Validated:** No **Version:** 3

Actual From m	**To** m	**Survey**	**Toolcode**	**Tool Name**
195.50	1314.60	15/12-15_MWD 17-1/2" (195.50-1	IFR Norway Standard	MWD+IFR+MS+SAG
1371.20	3255.25	15/12-15_MWD 12-1/4" (1371.20-	IFR Norway Standard	MWD+IFR+MS+SAG
3300.00	3300.00	15/12-15_Extrapolation (3300.0	BLIND	Blind drilling

Survey

MD m	**Incl** deg	**Azim** deg	**TVD** m	**+N/-S** m	**+E/-W** m	**Map Northing** m	**Map Easting** m	**<---- Latitude ----> Deg Min Sec**	**<--- Longitude ---> Deg Min Sec**
112.00	0.000	0.000	112.00	0.00	0.00	6434481.00	433470.00	58 2 43.919 N	1 52 22.977 E
175.00	0.045	160.190	175.00	-0.02	0.01	6434480.98	433470.01	58 2 43.918 N	1 52 22.978 E
195.50	0.060	160.190	195.50	-0.04	0.01	6434480.96	433470.01	58 2 43.917 N	1 52 22.978 E
225.70	0.880	247.310	225.70	-0.15	-0.19	6434480.85	433469.81	58 2 43.914 N	1 52 22.966 E
282.90	0.840	241.730	282.89	-0.51	-0.97	6434480.49	433469.03	58 2 43.901 N	1 52 22.919 E
311.00	0.940	240.650	310.99	-0.72	-1.35	6434480.28	433468.65	58 2 43.894 N	1 52 22.896 E
342.40	0.580	242.360	342.39	-0.92	-1.72	6434480.08	433468.28	58 2 43.888 N	1 52 22.874 E
370.90	0.640	261.110	370.88	-1.02	-2.00	6434479.98	433468.00	58 2 43.885 N	1 52 22.856 E
399.70	0.500	230.000	399.68	-1.12	-2.26	6434479.88	433467.74	58 2 43.881 N	1 52 22.841 E
428.50	0.250	221.000	428.48	-1.25	-2.39	6434479.75	433467.61	58 2 43.877 N	1 52 22.833 E
457.10	0.220	235.500	457.08	-1.33	-2.48	6434479.67	433467.52	58 2 43.874 N	1 52 22.828 E
486.20	0.280	226.900	486.18	-1.41	-2.58	6434479.59	433467.42	58 2 43.872 N	1 52 22.822 E
515.10	0.220	164.600	515.08	-1.51	-2.61	6434479.49	433467.39	58 2 43.868 N	1 52 22.820 E
548.30	0.060	82.270	548.28	-1.57	-2.58	6434479.43	433467.42	58 2 43.867 N	1 52 22.822 E
575.20	0.280	144.250	575.18	-1.62	-2.53	6434479.38	433467.47	58 2 43.865 N	1 52 22.825 E
604.80	0.450	149.750	604.78	-1.78	-2.43	6434479.22	433467.57	58 2 43.860 N	1 52 22.831 E
636.80	0.530	154.470	636.78	-2.02	-2.30	6434478.98	433467.70	58 2 43.852 N	1 52 22.839 E
666.30	0.620	153.180	666.28	-2.29	-2.17	6434478.71	433467.83	58 2 43.844 N	1 52 22.848 E
696.40	0.510	144.790	696.38	-2.54	-2.02	6434478.46	433467.98	58 2 43.835 N	1 52 22.857 E
724.10	0.570	149.950	724.08	-2.76	-1.88	6434478.24	433468.12	58 2 43.828 N	1 52 22.866 E
755.90	0.500	144.160	755.87	-3.01	-1.72	6434477.99	433468.28	58 2 43.820 N	1 52 22.876 E
784.00	0.560	152.050	783.97	-3.23	-1.58	6434477.77	433468.42	58 2 43.813 N	1 52 22.884 E

Halliburton
Survey Report - Geographic

HALLIBURTON Sperry-Sun

Company:	Pertra as	**Date:** 06-01-2005	**Time:** 10:26:35	**Page:**	2
Field:	Varg 15/12	**Co-ordinate(NE) Reference:**	Site: 15/12-15 (Villmink East)		
Site:	15/12-15 (Villmink East)	**Vertical (TVD) Reference:**	Dee Sea Trym 25.0		
Well:	Well 15/12-15	**Section (VS) Reference:**	Well (0.00N,0.00E,0.00Azi)		
Wellpath:	15/12-15	**Survey Calculation Method:**	Minimum Curvature	**Db:**	Sybase

Survey

MD m	Incl deg	Azim deg	TVD m	+N/-S m	+E/-W m	Map Northing m	Map Easting m	<---- Latitude ----> Deg Min Sec	<--- Longitude ---> Deg Min Sec
813.00	0.500	154.300	812.97	-3.47	-1.46	6434477.53	433468.54	58 2 43.806 N	1 52 22.892 E
842.00	0.530	155.930	841.97	-3.71	-1.35	6434477.29	433468.65	58 2 43.798 N	1 52 22.899 E
871.90	0.530	157.210	871.87	-3.96	-1.24	6434477.04	433468.76	58 2 43.790 N	1 52 22.906 E
900.70	0.440	149.250	900.67	-4.18	-1.13	6434476.82	433468.87	58 2 43.783 N	1 52 22.913 E
929.90	0.480	155.250	929.87	-4.39	-1.02	6434476.61	433468.98	58 2 43.776 N	1 52 22.919 E
958.30	0.330	149.730	958.27	-4.57	-0.93	6434476.43	433469.07	58 2 43.771 N	1 52 22.925 E
988.10	0.480	160.660	988.07	-4.76	-0.85	6434476.24	433469.15	58 2 43.764 N	1 52 22.931 E
1018.00	0.450	168.630	1017.96	-4.99	-0.78	6434476.01	433469.22	58 2 43.757 N	1 52 22.935 E
1050.00	0.450	167.630	1049.96	-5.24	-0.73	6434475.76	433469.27	58 2 43.749 N	1 52 22.938 E
1080.10	0.810	179.370	1080.06	-5.56	-0.70	6434475.44	433469.30	58 2 43.738 N	1 52 22.940 E
1107.70	0.760	175.300	1107.66	-5.94	-0.69	6434475.06	433469.31	58 2 43.726 N	1 52 22.942 E
1139.40	0.750	171.650	1139.36	-6.36	-0.64	6434474.64	433469.36	58 2 43.713 N	1 52 22.945 E
1169.20	0.690	157.840	1169.15	-6.72	-0.54	6434474.28	433469.46	58 2 43.701 N	1 52 22.951 E
1198.10	0.680	157.050	1198.05	-7.03	-0.41	6434473.97	433469.59	58 2 43.691 N	1 52 22.960 E
1227.60	0.700	156.990	1227.55	-7.36	-0.27	6434473.64	433469.73	58 2 43.680 N	1 52 22.968 E
1256.80	0.430	170.500	1256.75	-7.63	-0.19	6434473.37	433469.81	58 2 43.672 N	1 52 22.974 E
1314.60	0.430	268.900	1314.55	-7.85	-0.37	6434473.15	433469.63	58 2 43.665 N	1 52 22.963 E
1364.00	0.547	246.047	1363.95	-7.95	-0.77	6434473.05	433469.23	58 2 43.661 N	1 52 22.939 E
1371.20	0.570	243.600	1371.15	-7.98	-0.83	6434473.02	433469.17	58 2 43.660 N	1 52 22.935 E
1406.00	0.590	251.530	1405.94	-8.12	-1.16	6434472.88	433468.84	58 2 43.656 N	1 52 22.915 E
1430.00	0.450	254.260	1429.94	-8.18	-1.36	6434472.82	433468.64	58 2 43.653 N	1 52 22.903 E
1462.00	0.750	29.090	1461.94	-8.03	-1.38	6434472.97	433468.62	58 2 43.658 N	1 52 22.901 E
1493.00	0.780	28.970	1492.94	-7.67	-1.18	6434473.33	433468.82	58 2 43.670 N	1 52 22.913 E
1515.00	0.640	30.170	1514.94	-7.43	-1.05	6434473.57	433468.95	58 2 43.678 N	1 52 22.921 E
1546.00	0.880	27.530	1545.93	-7.07	-0.85	6434473.93	433469.15	58 2 43.690 N	1 52 22.933 E
1575.00	0.790	30.070	1574.93	-6.70	-0.65	6434474.30	433469.35	58 2 43.702 N	1 52 22.945 E
1603.80	0.830	32.900	1603.73	-6.35	-0.43	6434474.65	433469.57	58 2 43.713 N	1 52 22.957 E
1633.10	1.020	40.920	1633.03	-5.98	-0.15	6434475.02	433469.85	58 2 43.725 N	1 52 22.974 E
1662.90	0.940	45.500	1662.82	-5.61	0.20	6434475.39	433470.20	58 2 43.737 N	1 52 22.995 E
1692.60	0.890	44.690	1692.52	-5.27	0.54	6434475.73	433470.54	58 2 43.748 N	1 52 23.015 E
1722.30	0.990	45.610	1722.21	-4.93	0.88	6434476.07	433470.88	58 2 43.760 N	1 52 23.036 E
1810.30	1.130	44.180	1810.20	-3.77	2.03	6434477.23	433472.03	58 2 43.798 N	1 52 23.105 E
1840.00	1.020	46.110	1839.89	-3.38	2.42	6434477.62	433472.42	58 2 43.811 N	1 52 23.129 E
1868.40	1.050	37.110	1868.29	-3.00	2.76	6434478.00	433472.76	58 2 43.823 N	1 52 23.149 E
1898.90	1.050	49.550	1898.78	-2.59	3.14	6434478.41	433473.14	58 2 43.836 N	1 52 23.172 E
1927.80	1.190	47.000	1927.68	-2.22	3.56	6434478.78	433473.56	58 2 43.849 N	1 52 23.197 E
1957.00	0.930	17.270	1956.87	-1.78	3.86	6434479.22	433473.86	58 2 43.863 N	1 52 23.214 E
1987.00	1.050	14.350	1986.87	-1.29	4.00	6434479.71	433474.00	58 2 43.879 N	1 52 23.222 E
2046.00	0.690	326.770	2045.86	-0.46	3.94	6434480.54	433473.94	58 2 43.906 N	1 52 23.218 E
2135.60	1.200	24.150	2135.45	0.84	4.02	6434481.84	433474.02	58 2 43.948 N	1 52 23.222 E
2164.10	1.170	19.170	2163.95	1.39	4.24	6434482.39	433474.24	58 2 43.966 N	1 52 23.235 E
2193.90	1.090	26.020	2193.74	1.93	4.47	6434482.93	433474.47	58 2 43.983 N	1 52 23.248 E
2223.00	1.080	31.970	2222.83	2.41	4.73	6434483.41	433474.73	58 2 43.999 N	1 52 23.264 E
2252.90	0.980	29.570	2252.73	2.87	5.01	6434483.87	433475.01	58 2 44.014 N	1 52 23.280 E
2282.20	0.800	28.170	2282.03	3.27	5.23	6434484.27	433475.23	58 2 44.027 N	1 52 23.293 E
2370.20	0.840	42.430	2370.02	4.29	5.95	6434485.29	433475.95	58 2 44.061 N	1 52 23.336 E
2399.80	0.760	46.250	2399.61	4.59	6.24	6434485.59	433476.24	58 2 44.070 N	1 52 23.353 E
2430.00	0.700	50.610	2429.81	4.84	6.53	6434485.84	433476.53	58 2 44.079 N	1 52 23.371 E
2459.03	0.640	57.400	2458.84	5.04	6.80	6434486.04	433476.80	58 2 44.085 N	1 52 23.387 E
2491.42	0.430	61.900	2491.23	5.20	7.06	6434486.20	433477.06	58 2 44.090 N	1 52 23.403 E
2520.20	0.480	72.930	2520.01	5.28	7.27	6434486.28	433477.27	58 2 44.093 N	1 52 23.416 E
2549.04	0.640	62.220	2548.85	5.39	7.53	6434486.39	433477.53	58 2 44.097 N	1 52 23.431 E
2578.40	0.680	61.860	2578.20	5.55	7.83	6434486.55	433477.83	58 2 44.102 N	1 52 23.449 E
2607.40	0.800	79.670	2607.20	5.67	8.18	6434486.67	433478.18	58 2 44.106 N	1 52 23.470 E
2636.87	0.880	69.630	2636.67	5.78	8.60	6434486.78	433478.60	58 2 44.110 N	1 52 23.496 E
2666.30	0.990	77.910	2666.09	5.92	9.06	6434486.92	433479.06	58 2 44.115 N	1 52 23.524 E
2695.72	1.260	85.340	2695.51	6.00	9.63	6434487.00	433479.63	58 2 44.118 N	1 52 23.558 E
2725.11	1.530	83.230	2724.89	6.07	10.34	6434487.07	433480.34	58 2 44.120 N	1 52 23.602 E

Halliburton
Survey Report - Geographic

Company:	Pertra as	**Date:** 06-01-2005	**Time:** 10:26:35	**Page:**	3
Field:	Varg 15/12	**Co-ordinate(NE) Reference:**	Site: 15/12-15 (Villmink East)		
Site:	15/12-15 (Villmink East)	**Vertical (TVD) Reference:**	Dee Sea Trym 25.0		
Well:	Well 15/12-15	**Section (VS) Reference:**	Well (0.00N,0.00E,0.00Azi)		
Wellpath:	15/12-15	**Survey Calculation Method:**	Minimum Curvature	**Db:**	Sybase

Survey

MD m	Incl deg	Azim deg	TVD m	+N/-S m	+E/-W m	Map Northing m	Map Easting m	<---- Latitude ----> Deg	Min	Sec		<--- Longitude ---> Deg	Min	Sec	
2754.54	1.600	86.360	2754.31	6.14	11.14	6434487.14	433481.14	58	2	44.123	N	1	52	23.650	E
2784.03	1.620	91.380	2783.79	6.16	11.97	6434487.16	433481.97	58	2	44.124	N	1	52	23.701	E
2813.46	1.660	89.640	2813.21	6.15	12.81	6434487.15	433482.81	58	2	44.124	N	1	52	23.752	E
2842.90	1.910	89.820	2842.63	6.15	13.73	6434487.15	433483.73	58	2	44.125	N	1	52	23.808	E
2872.50	1.800	88.420	2872.22	6.17	14.68	6434487.17	433484.68	58	2	44.126	N	1	52	23.866	E
2901.37	1.860	91.950	2901.07	6.17	15.61	6434487.17	433485.61	58	2	44.126	N	1	52	23.923	E
2930.77	1.870	88.670	2930.46	6.16	16.56	6434487.16	433486.56	58	2	44.127	N	1	52	23.981	E
2960.24	1.770	82.280	2959.91	6.23	17.49	6434487.23	433487.49	58	2	44.130	N	1	52	24.038	E
3049.21	1.440	62.750	3048.85	6.93	19.85	6434487.93	433489.85	58	2	44.153	N	1	52	24.181	E
3078.50	1.310	58.370	3078.13	7.27	20.46	6434488.27	433490.46	58	2	44.165	N	1	52	24.217	E
3107.86	1.270	55.810	3107.48	7.63	21.02	6434488.63	433491.02	58	2	44.177	N	1	52	24.251	E
3137.50	1.350	55.780	3137.11	8.01	21.58	6434489.01	433491.58	58	2	44.189	N	1	52	24.285	E
3166.97	1.200	46.560	3166.58	8.42	22.09	6434489.42	433492.09	58	2	44.203	N	1	52	24.315	E
3196.41	1.240	42.770	3196.01	8.87	22.53	6434489.87	433492.53	58	2	44.217	N	1	52	24.342	E
3225.87	1.130	31.610	3225.46	9.35	22.90	6434490.35	433492.90	58	2	44.233	N	1	52	24.364	E
3255.25	1.140	23.130	3254.84	9.86	23.16	6434490.86	433493.16	58	2	44.250	N	1	52	24.380	E
3300.00	1.140	23.130	3299.58	10.68	23.51	6434491.68	433493.51	58	2	44.277	N	1	52	24.400	E

Casing Points

MD m	TVD m	Diameter in	Hole Size in	Name
175.00	175.00	30.00	36.00	30"
1364.00	1363.95	13.38	17.50	13 3/8"

Directional Survey Data

Measured Depth (metres)	Inclination (degrees)	Direction (degrees)	Vertical Depth (metres)	Latitude (metres)	Departure (metres)	Vertical Section (metres)	Dogleg (deg/30m)
195.50	0.06	160.19	195.50	0.10 S	0.04 E	-0.10	TIE-IN
225.70	0.88	247.31	225.70	0.20 S	0.17 W	-0.20	0.87
282.90	0.84	241.73	282.89	0.57 S	0.95 W	-0.57	0.05
311.00	0.94	240.65	310.99	0.78 S	1.33 W	-0.78	0.10
342.40	0.58	242.36	342.39	0.98 S	1.69 W	-0.98	0.34
370.90	0.64	261.11	370.88	1.07 S	1.98 W	-1.07	0.22
399.70	0.50	230.00	399.68	1.18 S	2.24 W	-1.18	0.35
428.50	0.25	221.00	428.48	1.31 S	2.37 W	-1.31	0.26
457.10	0.22	235.50	457.08	1.39 S	2.46 W	-1.39	0.07
486.20	0.28	226.90	486.18	1.47 S	2.56 W	-1.47	0.07
515.10	0.22	164.60	515.08	1.57 S	2.59 W	-1.57	0.27
548.30	0.06	82.27	548.28	1.63 S	2.56 W	-1.63	0.20
575.20	0.28	144.25	575.18	1.68 S	2.51 W	-1.68	0.28
604.80	0.45	149.75	604.78	1.83 S	2.41 W	-1.83	0.18
636.80	0.53	154.47	636.78	2.08 S	2.28 W	-2.08	0.09
666.30	0.62	153.18	666.28	2.34 S	2.15 W	-2.34	0.09
696.40	0.51	144.79	696.38	2.60 S	2.00 W	-2.60	0.14
724.10	0.57	149.95	724.08	2.82 S	1.86 W	-2.82	0.08
755.90	0.50	144.16	755.87	3.07 S	1.70 W	-3.07	0.08
784.00	0.56	152.05	783.97	3.29 S	1.56 W	-3.29	0.10
813.10	0.50	154.30	813.07	3.53 S	1.44 W	-3.53	0.07
842.00	0.53	155.93	841.97	3.76 S	1.33 W	-3.76	0.03
871.90	0.53	157.21	871.87	4.02 S	1.22 W	-4.02	0.01
900.70	0.44	149.25	900.67	4.24 S	1.11 W	-4.24	0.12
929.90	0.48	155.25	929.87	4.44 S	1.00 W	-4.44	0.06
958.30	0.33	149.73	958.27	4.62 S	0.91 W	-4.62	0.16
988.10	0.48	160.66	988.07	4.81 S	0.83 W	-4.81	0.17
1018.00	0.45	168.63	1017.96	5.05 S	0.76 W	-5.05	0.07
1050.00	0.45	167.63	1049.96	5.29 S	0.71 W	-5.29	0.01
1080.10	0.81	179.37	1080.06	5.62 S	0.68 W	-5.62	0.39
1107.70	0.76	175.30	1107.66	6.00 S	0.67 W	-6.00	0.08
1139.40	0.75	171.65	1139.36	6.41 S	0.62 W	-6.41	0.05
1169.20	0.69	157.84	1169.15	6.77 S	0.52 W	-6.77	0.18
1198.10	0.68	157.05	1198.05	7.09 S	0.39 W	-7.09	0.02
1227.60	0.70	156.99	1227.55	7.41 S	0.25 W	-7.41	0.02
1256.80	0.43	170.50	1256.75	7.69 S	0.16 W	-7.69	0.31
1314.60	0.43	268.90	1314.55	7.91 S	0.34 W	-7.91	0.34
1371.20	0.57	243.60	1371.15	8.04 S	0.81 W	-8.04	0.14
1406.00	0.59	251.53	1405.94	8.17 S	1.13 W	-8.17	0.07
1430.00	0.45	254.26	1429.94	8.23 S	1.34 W	-8.23	0.18

Directional Survey Data

Measured Depth (metres)	Inclination (degrees)	Direction (degrees)	Vertical Depth (metres)	Latitude (metres)	Departure (metres)	Vertical Section (metres)	Dogleg (deg/30m)
1462.00	0.75	29.09	1461.94	8.09 S	1.36 W	-8.09	1.04
1493.00	0.78	28.97	1492.94	7.72 S	1.16 W	-7.72	0.03
1515.00	0.64	30.17	1514.94	7.49 S	1.02 W	-7.49	0.19
1546.00	0.88	27.53	1545.93	7.12 S	0.82 W	-7.12	0.23
1575.00	0.79	30.07	1574.93	6.75 S	0.62 W	-6.75	0.10
1603.80	0.83	32.98	1603.73	6.41 S	0.41 W	-6.41	0.06
1633.10	1.02	40.92	1633.02	6.03 S	0.12 W	-6.03	0.23
1662.90	0.94	45.50	1662.82	5.66 S	0.23 E	-5.66	0.11
1692.60	0.89	44.69	1692.52	5.32 S	0.56 E	-5.32	0.06
1722.30	0.99	45.61	1722.21	4.98 S	0.91 E	-4.98	0.10
1780.40	0.90	44.27	1780.31	4.31 S	1.58 E	-4.31	0.05
1810.30	1.13	44.18	1810.20	3.93 S	1.95 E	-3.93	0.23
1840.00	1.02	46.11	1839.90	3.53 S	2.35 E	-3.53	0.11
1868.40	1.05	37.11	1868.29	3.15 S	2.68 E	-3.15	0.17
1898.90	1.05	49.55	1898.79	2.75 S	3.07 E	-2.75	0.22
1927.80	1.19	47.00	1927.68	2.37 S	3.49 E	-2.37	0.16
1957.00	0.93	17.27	1956.88	1.94 S	3.78 E	-1.94	0.62
1987.00	1.05	14.35	1986.87	1.44 S	3.92 E	-1.44	0.13
2046.00	0.69	326.77	2045.86	0.62 S	3.86 E	-0.62	0.39
2135.60	1.20	24.15	2135.45	0.69 N	3.95 E	0.69	0.34
2164.10	1.17	19.17	2163.95	1.24 N	4.16 E	1.24	0.11
2193.90	1.09	26.02	2193.74	1.78 N	4.39 E	1.78	0.15
2223.00	1.08	31.97	2222.84	2.26 N	4.66 E	2.26	0.12
2252.90	0.98	29.57	2252.73	2.72 N	4.93 E	2.72	0.12
2282.20	0.80	28.17	2282.03	3.12 N	5.15 E	3.12	0.18
2311.50	0.81	27.02	2311.33	3.49 N	5.34 E	3.49	0.02
2370.20	0.84	42.43	2370.02	4.18 N	5.82 E	4.18	0.11
2399.80	0.76	46.25	2399.62	4.47 N	6.11 E	4.47	0.09
2430.00	0.70	50.61	2429.81	4.73 N	6.40 E	4.73	0.08
2459.03	0.64	57.40	2458.84	4.93 N	6.68 E	4.93	0.10
2491.42	0.43	61.90	2491.23	5.09 N	6.94 E	5.09	0.20
2520.20	0.48	72.93	2520.01	5.17 N	7.15 E	5.17	0.11
2549.04	0.64	62.22	2548.85	5.28 N	7.41 E	5.28	0.20
2578.40	0.68	61.86	2578.21	5.44 N	7.71 E	5.44	0.04
2607.40	0.80	79.67	2607.20	5.56 N	8.06 E	5.56	0.27
2636.87	0.88	69.63	2636.67	5.68 N	8.48 E	5.68	0.17
2666.30	0.99	77.91	2666.10	5.81 N	8.94 E	5.81	0.17
2695.72	1.26	85.34	2695.51	5.89 N	9.51 E	5.89	0.31
2725.11	1.53	83.23	2724.89	5.96 N	10.22 E	5.96	0.28
2754.54	1.60	86.36	2754.31	6.03 N	11.02 E	6.03	0.11

Directional Survey Data

Measured Depth (metres)	Inclination (degrees)	Direction (degrees)	Vertical Depth (metres)	Latitude (metres)	Departure (metres)	Vertical Section (metres)	Dogleg (deg/30m)
2784.03	1.62	91.38	2783.79	6.05 N	11.84 E	6.05	0.14
2813.46	1.66	89.64	2813.21	6.04 N	12.69 E	6.04	0.07
2842.90	1.91	89.82	2842.63	6.05 N	13.60 E	6.05	0.25
2872.50	1.80	88.42	2872.22	6.06 N	14.56 E	6.06	0.12
2901.37	1.86	91.95	2901.07	6.06 N	15.48 E	6.06	0.13
2930.77	1.87	88.67	2930.46	6.05 N	16.44 E	6.05	0.11
2960.24	1.77	82.28	2959.91	6.12 N	17.37 E	6.12	0.23
3049.21	1.41	62.75	3048.85	6.81 N	19.70 E	6.81	0.22
3078.50	1.31	58.37	3078.13	7.15 N	20.31 E	7.15	0.15
3107.86	1.27	55.81	3107.48	7.51 N	20.86 E	7.51	0.07
3137.50	1.35	55.78	3137.12	7.89 N	21.42 E	7.89	0.09
3166.97	1.20	46.56	3166.58	8.30 N	21.93 E	8.30	0.26
3196.41	1.24	42.77	3196.01	8.74 N	22.37 E	8.74	0.09
3225.87	1.13	31.61	3225.47	9.22 N	22.74 E	9.22	0.26
3255.25	1.14	23.13	3254.84	9.74 N	23.01 E	9.74	0.17

22 COMPLETION DETAILS

N/A

23 DRILLING CURVE

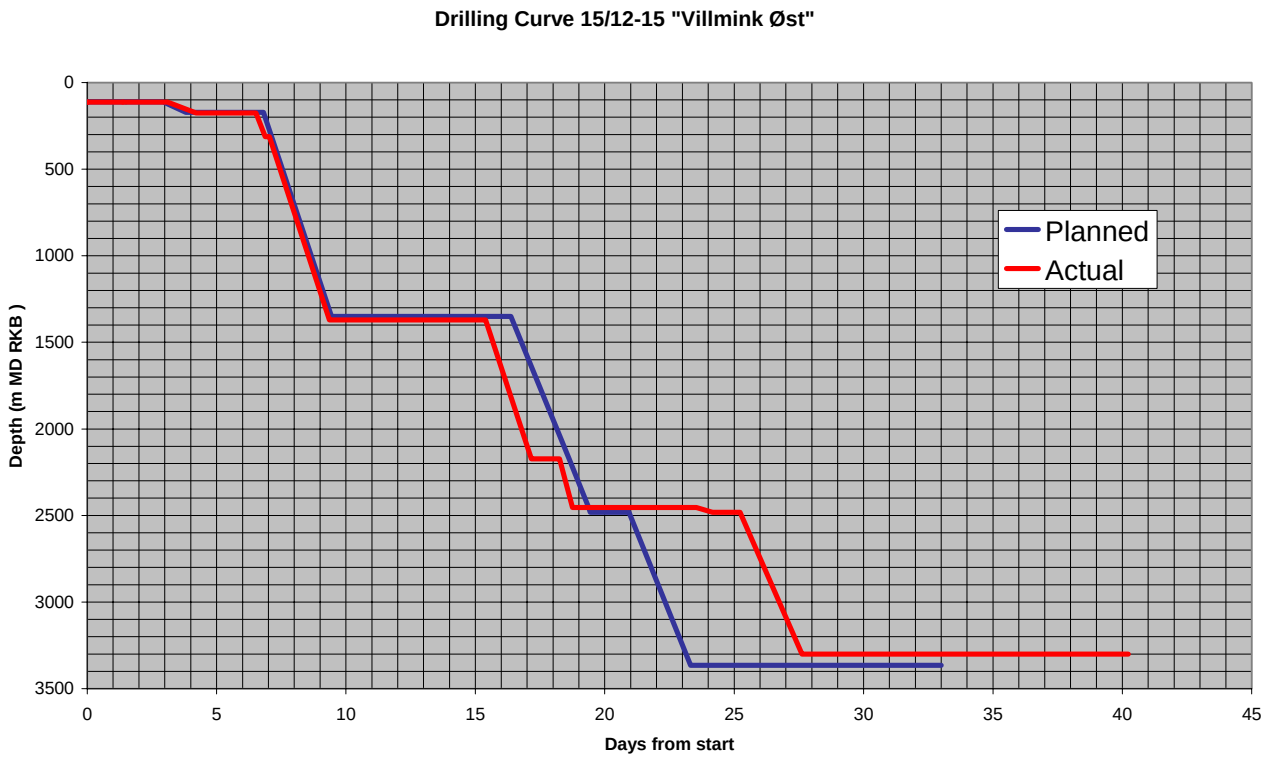


Figure 23-1 Drilling Curve

24 TIME SUMMARY

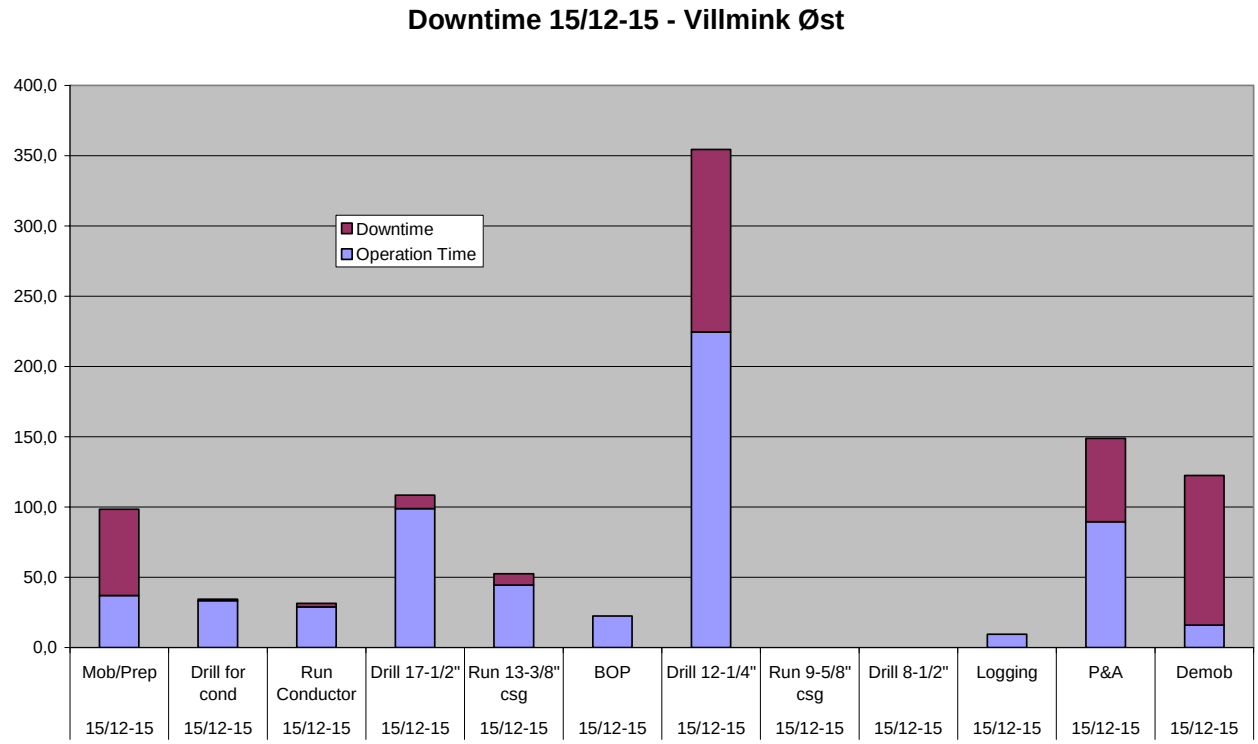


Figure 24-1 Time Breakdown

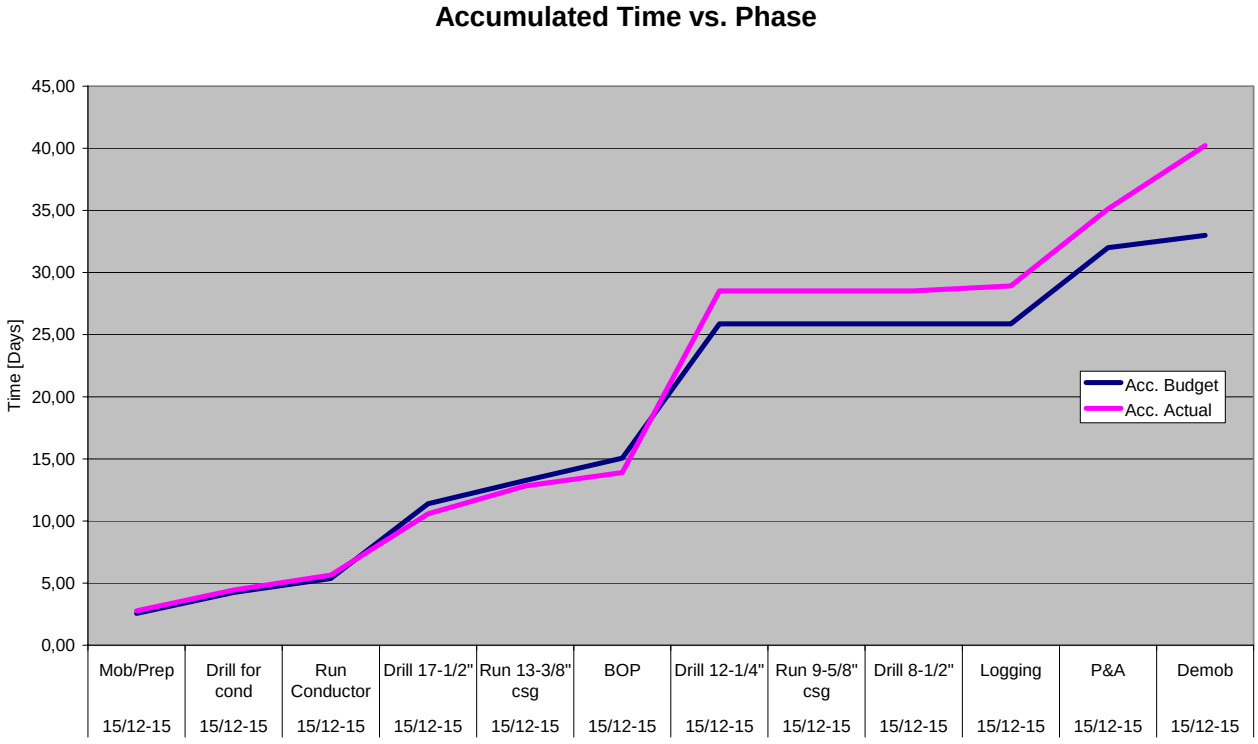


Figure 24-2 Accumulated Time

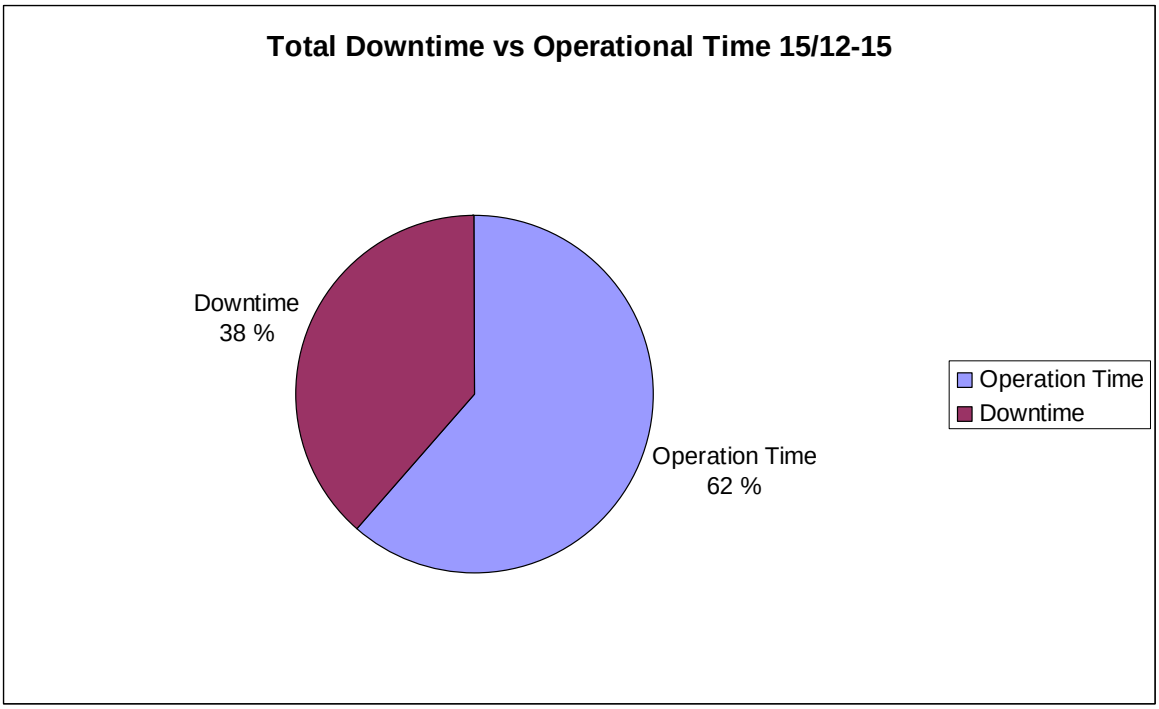


Figure 24-3 Downtime pie-chart

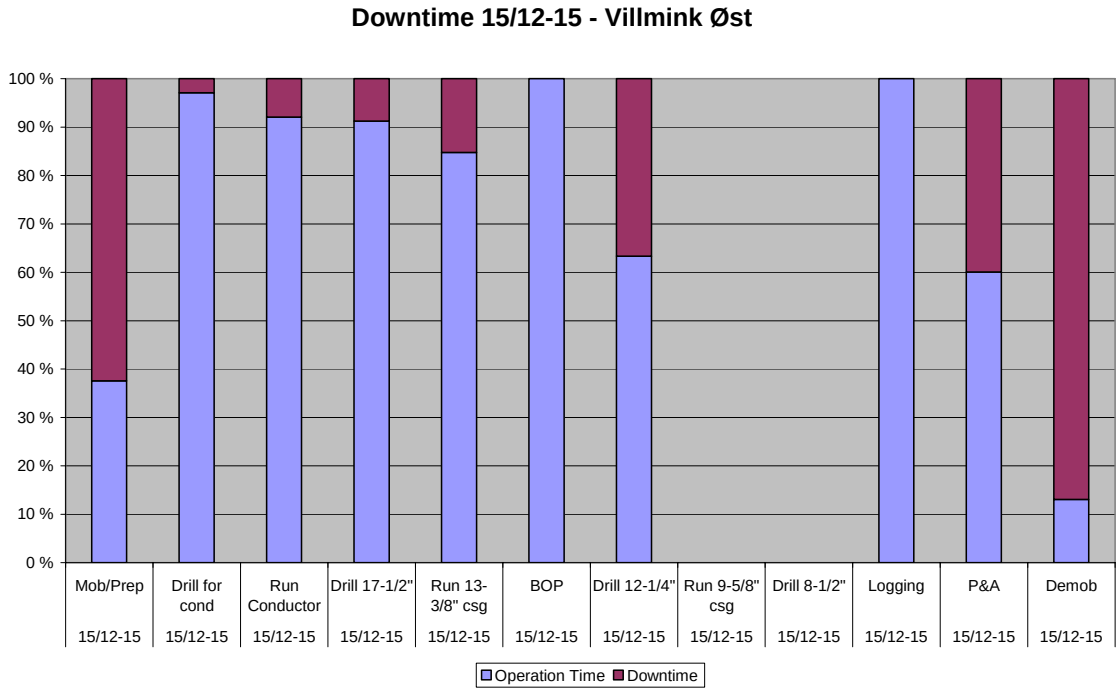


Figure 24-4 Percent Downtime