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WELL SUMMARY
Licence owners

License PL191

The Licensees' percentage share of PL191 is as follows:

Norsk Hydro Produksjon AS	40%
Gaz de France Norge AS	22,5%
Idemitsu Petroleum Norge AS	22,5%
Statoil ASA	15%

License PL054
The Licensees' percentage share of PL054 is as follows:

Norsk Hydro Produksjon AS	4,9 %
Statoil ASA	18 %
AS Norske Shell	25.9 %
Petoro AS	40,8 %
Total E&P Norge AS	5, 21 %
Norske ConocoPhillips AS	5,19 %

The well was drilled by Norsk Hydro ASA, on behalf of both Licenses during November-December 2002.

OBJECTIVES

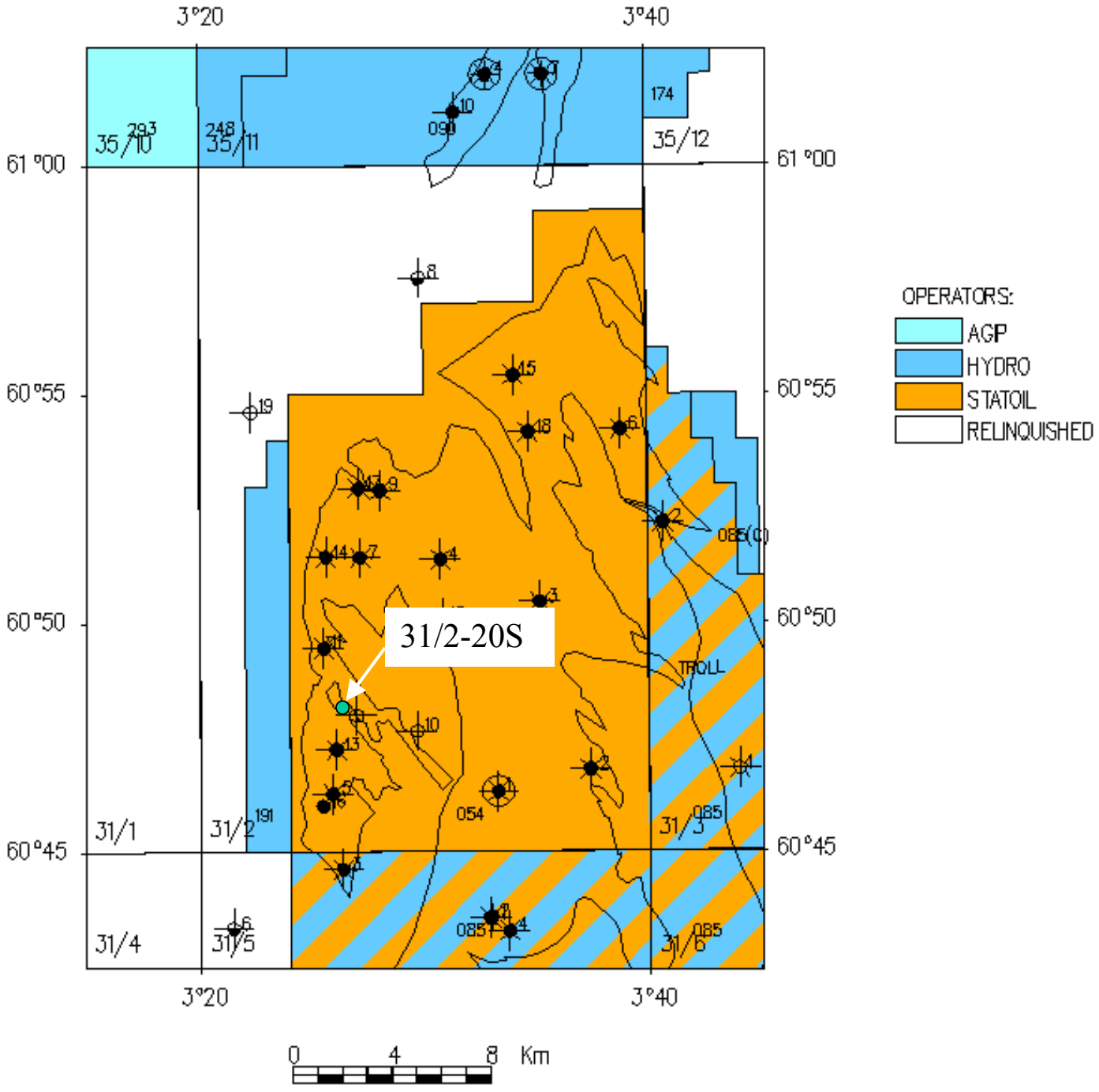
Well 31/2- 20 S is an exploration well drilled as a sidetrack in connection with the 31/2-E-3 H/AY1H/AY2H/AY3H production well located in the western part of the Troll West Oil Province. Drilling of well 31/2-10 S is a joint PL054 Exploration Group and PL191Group activity.

Well 31/2-20 S was drilled as an 8 1/2 " hole from the 13 3/8" casing to test the hydrocarbon potential of the P/Q-structure. The primary target was the Middle Jurassic Brent Group.

The main objectives of well 31/2-20 S were:

- test the hydrocarbon potential of the Brent group
- investigate a structural closure in the Fensfjord formation
- perform the operation in a safe manner within the approved time and cost estimates.

Location map.



SECTION A: GEOLOGY, GEOPHYSICS AND PETROPHYSICS.

Well 31/2-20 S was spudded on 27th of November 2002 and suspended on 8th of December at a depth of 3400/1928m MD/TVD in the Brent Group. The well was permanently plugged and abandoned as a dry well.

The main results were as follows:

- The P/Q prospect was found to be dry. No hydrocarbon shows were observed in the Brent Group.
- The Viking Group sandstones were encountered according to the prognosis.
- Top Brent Group were penetrated 39 m deeper than expected. This is mainly due to a higher than expected Jurassic interval velocity.

No cores were cut in this well.

After logging the Well was plugged back into the 13 3/8" casing.

31/2-20 S Formation Tops	TWT Prognosis (ms)	Depth Prognosis (m MD RKB)	Depth Prognosis (m TVD RKB)	Depth Prognosis (m TVD MSL)	Uncertainty (mTVD)	Actual (m MD RKB)	Actual (m TVD RKB)	Actual (m TVD MSL)
Base Quaternary	621.6	508.3	508.3	485.3	+/- 10	**510.0**	**510.0**	**487.0**
Base Pliocene	848.7	767.7	759.9	736.9	+/- 10	**765.0**	**755.5**	**732.5**
Top Green Clay	1239.2	1453.2	1136.4	1113.4	+/- 25	**1536.0**	**1153.0**	**1130.0**
Top Balder	1453.6	2203.0	1366.4	1343.4	+/- 15	**Not logged**		
Top Sele	1495.9	2333.6	1419.9	1396.9	+/- 15	**Not logged**		
Top Lista	----------	2385.4	1441.1	1418.1	+/- 15	**Not logged**		
Base Tertiary	1626.3	2695.5	1550.4	1527.4	+/- 10	**2669.0**	**1557.8**	**1534.8**
Top Sognefjord	1635.0	2706.2	1560.6	1537.6	+/- 10	**2673.0**	**1559.5**	**1536.5**
Top Fensfjord	1702.8	2910.0	1646.6	1623.6		**2887.5**	**1646.5**	**1623.5**
Top Krossfjord		3180.0	1768.0	1745.0		**3148.5**	**1756.0**	**1733.0**
Top Heather A		3210.0	1783.0	1760.0		**3252.2**	**1818.0**	**1795.0**
Top Brent	1872.9	3315.0	1863.0	1840.0	+/- 20	**3365.0**	**1901.5**	**1878.5**
TD		3414	1933	1910.0		**3400.0**	**1928.0**	**1905.0**
HWC Brent			1928	1905.0				**NP**

Table A.1: Formation Tops 31/2-20 S

1.1 Biostratigraphy

No biostratigraphical evaluation was performed in well 31/2-20S. Biostratigrapical analysis have been performed in a number of wells on the Troll field and was not considered important in well 31/2-20S.

1.2 Lithostratigraphy

All depths are in mMD RKB (RKB is 23 m). Formation tops are also given in mTVD RKB. This summary is compiled from ditch cuttings descriptions. MWD logs were used to aid lithological interpretation and the placement of formation boundaries. However, no LWD logs were run between 1981m and 13 3/8" casing @ 2447m

The well was drilled with returns to seabed from the seafloor at 355 m to 1151 m before setting 18 5/8" casing at 1146 m. Lithology interpretation through this interval is based on MWD logs and drilling parameters. The first drill cuttings spot samples were taken below 1240m.

1.2.1 Nordland Group; 355 - 765 m MD (355.0 - 755 m TVD) RKB

From MWD logs: Clays interbedded with Sands.

1.2.2 Hordaland Group; 765 – not logged MD (755 - not logged m TVD) RKB

Claystones, occasionally with limestone or dolomite stringers

Claystones: olv gry-brnsh gry, brnsh blk, dk gnsh gry, r mod brn, sft-frm, sbblky, occ. stky, slily slty, Tr Glauc, non calc - calc
Limestones: wh, sft-frm, blky, microxln, occ dolomitic.
Dolomites: lt olv gry, yelsh gry, pl yelsh brn, v pl or, sft-frm, brit, sbblky-blky,

1.2.3 Rogaland Group; Not logged- 2669 m MD

(Not Logged- 1557.8 m TVD) RKB

Rogaland Group was drilled without LWD, so no subdivisions into formations is done.
Descriptions down to 2447m are based on mudloggers work.

Claystones, tuffaceous in parts, occasionally with stringers of limestone and dolomite

Claystones: m dk gry, m gry, olv gry, m blsh gry, dk gnsh gry-gnsh gry, sft-frm, occ mod hd, sbblky, non calc-calc, Tr Micromic, r Glauc, Tr Pyr Nods, r Tf,
m gry-m dk gry, blk spk, sft, amor-sbblky, non-slily calc.
Limestones: v lt gry, lt brn-mod brn, sft-mod hd, occ hd when grad dol LS, sbblky-blky, shaily arg, r Glauc, r Pyr, sli blk spk, micro-crpxln.
Dolomites: grysh or, hd, blky, crpxln.

Lista Formation:

LWD logs from 2447m.

Claystones with minor Sandstones, Dolomites and Limestones. The claystones of Lista tended to dominate the samples through the major part of the rest of the well, thus complicating the descriptions.

Claystones: pred olv gry-lt olv gry, occ lt-dk gn gry, r lt bl gry, frm-mod hd, blky, slily ,slty I.P., r Glauc, r carb, non calc

Sandstones: lse Qtz Gr, clr-trnsl, vf-r crs, sbang-sbrndd
Dolomites: dk brnsh gry, grysh brn, hd, blky, brit, occ ang brk, microxln
Limestones: off wh-lt gry-m gry-lt brn gry, clr I.P., mod hd, blky, microxln, arg

1.2.4 Shetland Group 2669 - 2673m MD (1557.8 - 1559.5 m TVD) RKB

Hardråde Formation
Minor Limestone bed

Limestone: off wh, pt lt gry-m gry-lt brn gry, mod hd, blky, microxln, arg I.P.

1.2.5 Viking Group 2673 - 3400=TD m MD (1559.5 - 1928m TVD) RKB

Sognefjord Formation 2672.5 -2887m MD (1559.2 -1646 m TVD) RKB

Sandstone, occasionally with hard calcareous cemented parts and limestone stringers.

Sandstone::brnsh gry, clr-trnsl Qtz Gr, vf-f, dom vf, v wl srt, sbang-sbrndd, sbspher, mod hd-hd, pred seen as lse Gr, v wl calc cmt I.P., abd frm-sft dk brnsh, gry Cly/?org Mat Mtrx, loc abd Mica, Tr Pyr.
Limestone: dom wh,occ pl yelsh or, r trnsl pl yelsh, dom sft, occ hd, dom

Fensfjord Formation 2887.5 –3148.5m MD (1646.5 -1756 m TVD) RKB

Alternating clean and argillaceous Sandstone, occasionally with hard calcareous cemented parts and limestone stringers.

Sandstone:lt gry in aggregates, wh, clr-trnsl, v lt gry & op, occ mky & op, r rose trnsl , Qtz Gr, dom vf-f, occ m, Tr crs-v crs, mod srt, sbang-sbrndd, sbspher, frm-mod hd-hd, occ m gry Cly Mtrx, loc abd wh Calc cmt, abd Mica, (Musc), r Chlor, Tr Pyr Nods, r carb/C Fragm, no visible porosity in aggregates.
Limestone:wh, trnsl or, pl yelsh brn, sft-hd, sbblky-blky, occ dol, microxln-xln.

Krossfjord Formation 3148.5 -3252.2m MD (1756 - 1818 m TVD) RKB

Mainly clean sandstones, partly with calcareous stringers and silty layers.

Sandstone:dom as lse Sd Gr in samples, clr-trnsl, m gry & op, r rose & trnsl Qtz Gr, vf-crs, pred vf-m, pr srt, sbang-sbrndd, sbspher, occ ang when crs-v crs, r Mica, r Pyr Nods, occasionally as Sst, v lt gry-wh, clr-trnsl Qtz Gr, vf-m, dom vf-f, mod -wl srt, sbang-sbspher, frm, abd calc cmt, Tr Cly Min Mtrx, r Mica (Musc), r Chlor, n.v.p.
Limestone:dom wh, occ trnsl-clr, frm, occ sft, amor-blky, microxln-xln
Siltstone:dusky brn, fri-frm, sbblky, non calc occ assoc w/ wh Calc Lam
Shale:minor carb Sh, blk-brnsh blk, mod hd, blky, brit, ang brk, shny, micropyr Lam.

Heather Formation 3252.2 - 3365 MD (1818 – 1901.5 m TVD) RKB

Mainly silty to sandy claystone partly with thin calcareous cemented sandstone stringers.

Claystone:brn blk-brn gry-olv gry, mod hd, blky, silty - v sdy I.P., micromic, micropyr I.P., occ microcarb, non-sli calc
Limestone:wh-off wh, hd, blky, v sdy I.P., grad to wl cmt Sst, clr Qtz, f-m, sbang, mod srt, n.v.p.
Siltstone:brnsh gry, com fri, occ frm, amor-sbfis, crumbly, micromica, Tr Mica, rChlor, r microcarb, non calc, arg

1.2.6 BRENT GROUP 3365 - 3400 MD (1901.5 - 1928 m TVD) RKB

Sandstone with minor Siltstone.

Sandstone:as lse Sd Gr in samples, dom clr & trnsl occ op, occ lt gry & op, r rose & trnsl Qtz Gr, vf-f, occ m, r crs, sbang-sbrndd, occ ang, sbspher, wl-wl srt, r mod srt, Tr Mica (dom Biot, occ Musc), r Chlor, pt as Calc Sst Agg.: wh-v lt gry, clr-trnsl Qtz

Gr, vf-f, v wl srt, sbang-sbrndd, sbspher, frm, abd calc cmt, Tr Mica (Musc& Biot), n.v.p.
Siltstone: brnsh gry, frm, sbblky, arg, sdy, v mica, r microcarb. Frag.

1.3 Standard and Special studies

Screening Analysis,
Hydrocarbon Fluid Inclusions,
Well 31/2-20S

PROCEDURES

Sample material:
Dried drill cuttings
Depth interval: 3360 – 3378mRBK (4 samples)
(Brent)

Sample preparation:
Epoxy impregnated cuttings
Polished thin sections (40□m thickness), 2 parallels from each depth.

Analysis
UV microscopy. Screening for fluorescent HCFIs trapped in diagenetic cement. Pre-test on bulk cuttings revealed possible HCFIs. Used drilling mud shows greenish fluorescence (figure A-1)

Result
No true inclusions observed. Some open micro fractures have partly green to yellow/green fluorescence, but these fractures are not hosting trapped petroleum inclusions.

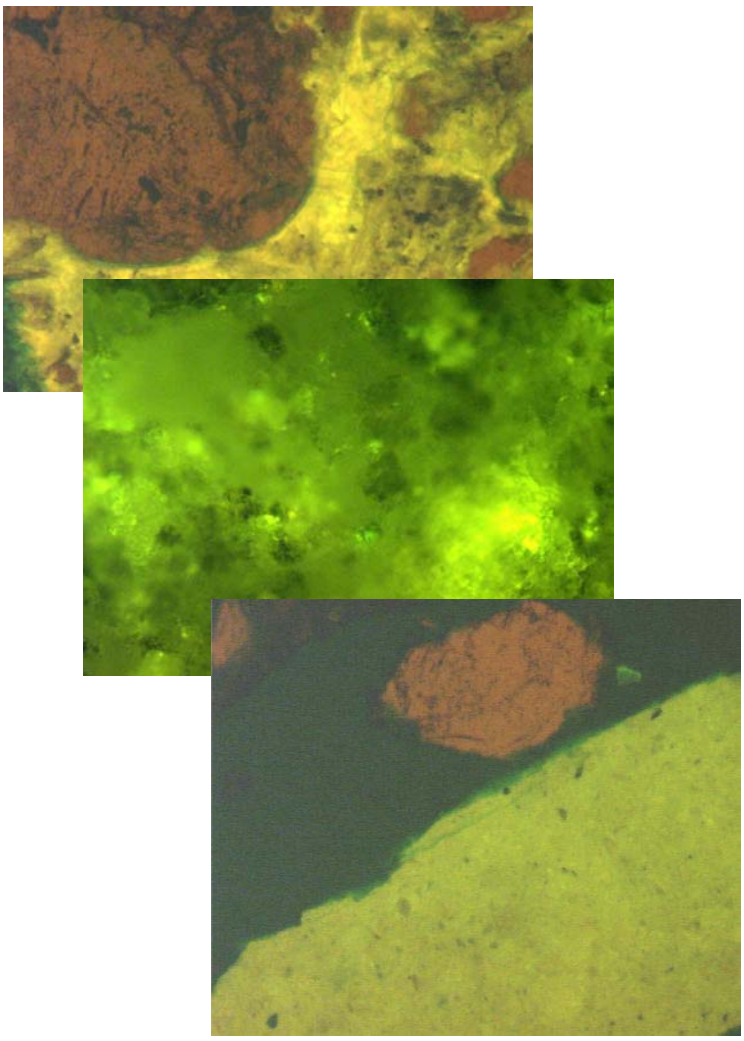
CONCLUSIONS

No fluorescent hydrocarbon fluid inclusions are observed, either in cemented fractures or in quartz overgrowths, which confirm low probability of any petroleum charging during geological time.

The observed yellow to greenish fluorescence seen in micro fractures and in matrix, originate most likely from the used drilling mud.

Yellowish fluorescence of fines can be related to “in situ” organic material.

Figure A-1: UV microscopy analysis.



1.4 PETROPHYSICAL EVALUATION

1.4.1 Petrophysical Results

Well 31/2-20 S was drilled as an 8 ½" hole from the 13 3/8" casing to TD, kicked off from the production well 31/2-E-3 Y1H. The well was drilled through the hydrocarbon bearing Sognefjord Formation, and continued through the Fensfjord, Krossfjord, Heather A Formations, and into the Brent Group. The Brent Group was the main target for the well, but hydrocarbons were only discovered in the Sognefjord Formation.

1.4.2 Discussion

A petrophysical evaluation of the Sognefjord, Fensfjord, Krossfjord and Heather A Formations, and the Brent Group, have been carried out.
The 13 3/8" casing shoe is located at 2447 m MD.

1.4.3 CPI input data

Only a limited logging program of Baker Hughes LWD logs was performed. No Cores were taken and no formation testing was executed.
The wellbore was logged with Baker Hughes Inteq (BHI) LWD logs. The log suite consisted of MPR resistivity, GR, density, neutron and sonic logs. These logs were used in the interpretation of the Sognefjord fm – Brent Group. No wireline surveys were run.

The following logs were recorded:

Well	LWD logs	Drilled / logged interval M MD RKB	Run no	Bit size In.	Date drilled
31/2-20 S	MPR-ORD-CCN-APX-MAP	2457 – 3400 / 2452 - 3395	6-7	8 ½"	28.11.02-02.12.02

MPR (Multiple Propagation Resistivity) is a 2MHz and 400KHz frequency electromagnetic wave resistivity tool. The 2 MHz phase difference (RPCH) is used as Rt for calculation of water saturation. Detailed log information is presented in the BHI "End of Well Report".

1.4.4 Log quality

The quality of the logs in this well is generally good.

1.4.5 Corrections

The 8 ½" well section was drilled with water based mud.

Log corrections are performed by the logging company. No other corrections are applied on the logs.

1.4.6 Evaluation Method

Figures A-2 and A-3 present the petrophysical interpretation results (averages and CPI) for the 31/2-20S 8 ½" pilot hole section.
Since the logging of the well did noe give any new information, the petrophysical interpretation is performed by using the Troll field parameters and methods.

True vertical depths and thicknesses are calculated in Recall. The petrophysical evaluation is done with the Recall program Recall 3, Sands. The calculation parameters including parameter sources are listed in Table A-2.
The formation temperature is estimated from the temperature gradient for the Troll Field.

Water saturation is calculated using the 2 MHz phase resistivity log and the Archie equation.

Porosity is calculated from the density log. As this log may be heavily affected by hydrocarbons present, a hydrocarbon correction is applied based on a computed pseude MSFL (microresistivity).

For detailed information and equations of porosity, water saturation and formation temperature, please refer to "Final Well Report, well 31/5-H-6 H", Norsk Hydro 1996.

1.4.7 Fluid System

1.4.7.1 Formation pressure analysis

No Formation pressure measurements were performed.

1.4.7.2 Fluid Contacts

Both the GOC and the OWC in the Sognefjord Formation were met, and interpreted by use of the LWD logs. No other contacts were discovered.

GOC : 1545.5 m TVD MSL / 2695 m MD in the Sognefjord Fm.
OWC: 1572.0 m TVD MSL / 2759.2 m MD in the Sognefjord Fm.
Oil column: 26.5 m TVD.

Parameter	Symbol	Unit	Sources	Actual well
Formation temperature	T	deg C	EQ. REF.1	70
Depth of form. temp.		mTVDMSL		1 550
Formation oil density	Rhooil	g/cm3	MDT 31/5-H-5H	0.8
Formation gas density	Rho gas	g/cc	"	0.116
Apparent gas density	Rhogapp	g/cc	REF. 1	- 0.0396
Formation water resistivity @ 70 deg. C	Rw	ohmm	REF.1	0.068
Mud filtrate Resistivity 12 1/4" BU sections @ reservoir temp.	Rmf	ohmm	CALC. FROM LOG HEADING/ MUD DATA	0.029
Mud filtrate Resistivity 9 1/2" horizontal hole sections @ reservoir temp.	Rmf	ohmm	CALC. FROM LOG HEADING/ MUD DATA	0.018
Mud filtrate density 12 1/4" BU sections @reservoir temp. and press	Rhofluid	g/cc	CALC. FROM LOG HEADING/ MUD DATA	1.08
Mud filtrate density 9 1/2" horizontal hole sections @reservoir temp. and press	Rhofluid	g/cc	CALC. FROM LOG HEADING/ MUD DATA	1.18
Shale GR	GRsh	API	LOG	100
Matrix density	RHOma	g/cm3	AVERAGE FROM CORE PLUG DATA	2.66
Matrix GR	GRgd	API	LOG	99
Archie factor	a		REF.3	0.412
Cementation exponent	m		REF.3	2.7
Saturation exponent	n		REF.3	2.0
K value gas zone	kgas		REF.2	3.0
K value oil zone	koil		REF.2	4.0

Ref. 1 : 'Troll west water saturation model for the oil zone.' Norsk Hydro, April 1995
Ref. 2 : 'Final well report, well 31/5-H-6H'
Ref. 3 : 'Plan of development and operation', December 1991

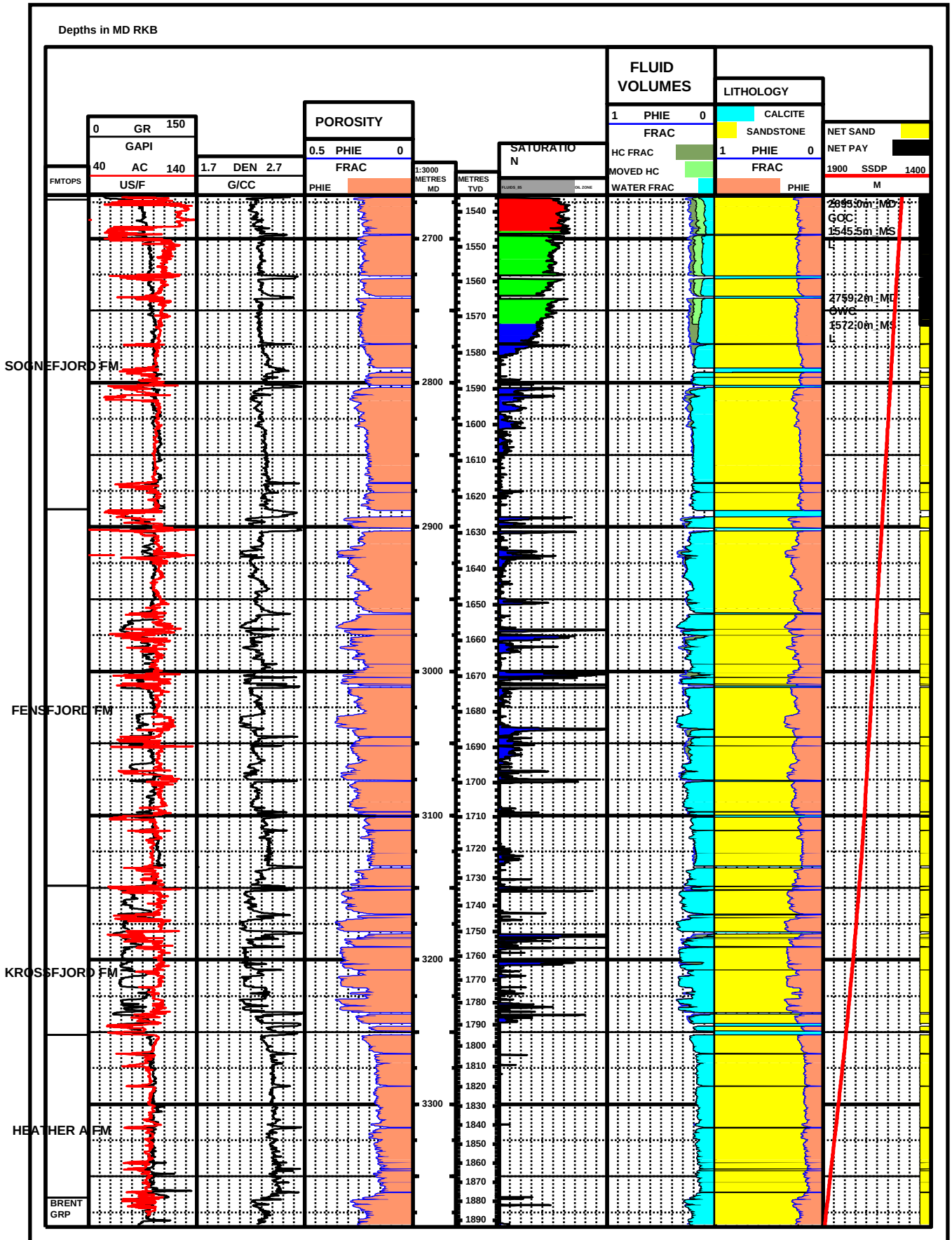
ZONE	TOP	BOTTOM	THICKN	NET	NTG	NETP	NPTG	VSH FRAC AR-TW NET	PHI FRAC AR-TW NET	SW FRAC AR-P&TW NET
SOGNEFJORD FM	2673.0	2887.5	214.5	199.7	0.93	95.7	0.45	0.00	0.22	0.72
FENSFJORD FM	2887.5	3148.5	261.0	239.2	0.92	20.8	0.08	0.00	0.25	0.91
KROSSFJORD FM	3148.5	3252.2	103.7	88.5	0.85	10.3	0.10	0.00	0.28	0.91
HEATHER A FM	3252.2	3365.0	112.8	106.7	0.95	0.1	0.00	0.00	0.16	1.00
BRENT GRP	3365.0	3400.0	35.0	18.4	0.53	0.3	0.01	0.00	0.23	0.98
TOTAL INTERVAL	2673.0	3400.0	727.0	652.5	0.90	127.2	0.18	0.00	0.23	0.87

Troll
Final Well Report
31/2-20 S

Figure
A-2

Reservoir Zonal Averages

HYDRO



Troll
Final Well Report
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Figure
A-3

CPI 8.5" observation hole

HYDRO

SECTION B: OPERATIONS

Prepared by: J. M. Hegreberg Verified by: J. M. Hegreberg Approved by: T. Skram

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Final Well Report for well 31/2-20 S

LIST OF CONTENT

OPERATION AND EXPERIENCES.

All depths referenced to RKB, 23 m above MSL. Seabed was located at 332 m below MSL.

The exploration well 31/2-S-20 was drilled as a pilot hole in well 31/2-E-3 Y1H on the Troll Oil Gas Province (TOGP). The semi submersible drilling rig "Polar Pioneer" started the drilling at 11:00 hours 26th of November 2002, the 36", the 24" and the 17 ½" sections were already drilled.
The well was drilled as an 8 ½" hole from the 13 3/8" casing to TD at 3400 mMD and plugged back. The operation on the well was finished at 05:30 hours the 8th of December 2002.

Total time used on the 31/2-20 S well was 8.96 days

8 1/2" section 31/2-20 S

TD	MD: 3400 m	TVD: 1928 m
Total time consumption	Hours: 215	
Operational time	Hours: 150	%: 70
Downtime	Hours: 65	%: 30

Drilling
The 13 3/8" casing shoe was drilled out with a 12 ¼" bit in a separate run. An FIT test was performed to 1.43 sg EMW using 1.25 sg mud. The 8 ½" section was drilled in three runs using two rollercone bits, AutoTrak and MWD Triple combo. There were no drilling on the first run due to an MWD failure. The first bit was pulled after a new MWD failure, having drilled with very high and erratic torque. The second bit were pulled at TD at 3400 mMD.

Logging
There were no logging performed in this well.

Plugging
The well was plugged back with a cement plug set in three steps and two Kick Off Plugs on top.
While setting the first Kick Off Plug there were a loss of mud to the formation of 5.1 m3, this might be the reason why the plug was found to deep kicking off the well 31/2-E-3 Y1H.
A new plug was set without losses to the formation and the plug was found on a correct depth for kicking off.

GENERAL INFORMATION ON WELL 31/2-20 S

Field	: TROLL	**Country**	: NORWAY
Licence	: 54	**Installation**	: POLAR PIONEER
UTM zone	: 31	**Central Median**	: 3' E **Horiz. Datum:** ED50

Location coordinates:		**Surface**	**Target**
UTM	**North [m]:**	6740732.201	
UTM	**East [m]:**	524457.973	
Geographical	**North :**	60 47'59.30"	
Geographical	**East :**	03 26'57.70"	

Water Depth: 332.0 **m** **Reference Point Height:** 23.0 **m**
Formation at TD: TARBERT at 3366 m MD

Operators:	NORSK HYDRO PRODUKSJON A/S	**Share:** 4.90 **%**
Partners:	PETORO	**Share:** 40.80 **%**
	A/S NORSKE SHELL	25.90 **%**
	DEN NORSKE STATS OLJESELSKAP A/S	18.00 **%**
	TOTALFINAELF	5.21 **%**
	CONOCO PETROLEUM NORGE A/S	5.19 **%**

Total depth (RKB) : 3400.0 **m MD** 1928.0 **m TVD**

TIME SUMMARY

Start Time	:	2002-11-26 18:30:00
Spudding date	:	2002-11-26
Abandonment date	:	2002-12-08

Main operation	**Hours**	**Days**	**%**
DRILLING	121.0	5.0	56.3
PLUG AND ABANDONMENT	29.0	1.2	13.5
DOWNTIME DRILLING	65.0	2.7	30.2
Sum:	**215.0**	**9.0**	

Hole and casing record

Well status: Permanently abandoned Exploration Well

CONTRACTORS:

Bit Supplier :	HUGHES CHRISTENSEN
Cement Contractor :	BJ SERVICES
Completion Eq. Contractor :	KVÆRNER OILFIELD PRODUCTS
Completion Equipment Supplier :	BAKER OIL TOOLS
Down Hole Motor Supplier :	BAKER HUGHES INTEQ
Fishing Tool Supplier :	SMITH RED BARON
Liner Hanger Supplier :	BAKER OIL TOOLS
Rig Contractor :	TRANSOCEAN OFFSHORE EUROPE LIMITED

	Current period	Year to date	AFE	Accum. cost
Employee relat. costs				575.949
Employee relat. costs				**575.949**
Rig costs		-10.562		8.330.818
Rig costs		**-10.562**		**8.330.818**
Rig support costs		218.925		264.553
Rig support costs		**218.925**		**264.553**
Fuel/luboil		531.600		531.600
Cement/cement addit.				110.260
Mud/mud chemicals				925.472
Consumable costs		**531.600**		**1.567.332**
Standby vessel				474.137
Helicopter transport		458.098		806.967
Supplyboat				463.653
Transportation costs		**458.098**		**1.744.757**
MWD-services				2.229.166
Mud logging		191.408		676.252
Cementing/press.test		96.269		241.188
El.logging	-1	4.472		827.929
Rov/diving				185.594
Misc.rental & op.costs		-13.611		1.324.780
Service contracts	**-1**	**278.538**		**5.484.908**
Warehouse costs				204.181
Warehouse costs				**204.181**
Total	**-1**	**1.476.600**		**18.172.498**

Norsk Hydro

2003-06-10

DOWNTIME REPORT POLAR PIONEER

Last 196 days

Inst.	Wellname	Startdate	#	Sum hrs	Downtime Type	Responsible Contractor	Manufacturer	Short description	Equipment Type	Activity	Service Type	NSFI Code	NSFI Type	Serial Number
PP	31/2-20 S	2002-11-27	7	0.5	Other	NORSK HYDRO A/S		Worked stuck drillstring after breaking through the reamer shoe		DRILLING				
PP	31/2-20 S	2002-11-28	1	13.0	Equipment failure	BAKER HUGHES INTEQ	BAKER HUGHES INTEQ	Failure in stearing unit.	SERVICE EQUIPMENT/SYSTE	DRILLING		370.00	Other Service Equipment/Sy	
PP	31/2-20 S	2002-11-30	2	0.5	Equipment failure	TRANSOCEAN SEDCO FOREX	TRANSOCEAN SEDCO FOREX	Loss of the rig air pressure.	MISCELLANEOUS EQUIPMENT/SYSTI	DRILLING	DRILLING CONTRACTOR	380.00	Miscellaneous equipment, systems and services	
PP	31/2-20 S	2002-12-01	3	18.5	Equipment failure	BAKER HUGHES INTEQ	BAKER HUGHES INTEQ	Failure in ontrak	SERVICE EQUIPMENT/SYSTE	DRILLING		370.00	Other Service Equipment/Sy	
PP	31/2-20 S	2002-12-01	4	1.0	Equipment failure	BAKER HUGHES INTEQ	BAKER HUGHES INTEQ	Reboot BHI computer	SERVICE EQUIPMENT/SYSTE	DRILLING		370.00	Other Service Equipment/Sy	
PP	31/2-20 S	2002-12-06	5	31.0	Other	NORSK HYDRO A/S		Setting of new cement plug due no cement to kick off with to perform 12 1/4" build up section on well 31/2-E- Y1H		DRILLING				
PP	31/2-20 S	2002-12-06	6	0.5	Equipment failure	TRANSOCEAN SEDCO FOREX	MARITIME HYDRAULICS A/S	Problems to open spear in the finger board	PIPE HANDLING EQUIPMENT/SYSTE	DRILLING	DRILLING CONTRACTOR	342.00	Drillfloor Tubular Handling	
			Sum:	65.0										
			Total Sum:	65.0										

DAILY REPORT ON WELL 31/2-20 S

Daily report no : 1 **Date:** 2002-11-26

Midnight depth : 2454 m MD **Estimated PP:** 1.15 sg **Mud weight:** 1.25 sg

Stop time	Description
18:30	No activity on this well.
20:30	Made up the 12 1/4" BHA.
21:00	Pressure tested the shear ram against the 13 3/8" casing to 35 / 235 bar for 5 / 10 min.
23:59	Ran in the hole to 1886 m.

Daily report no : 2 **Date:** 2002-11-27

Midnight depth : 2454 m MD **Estimated PP:** 1.15 sg **Mud weight:** 1.25 sg

Stop time	Description
01:00	Ran in the hole to 2378 m.
01:30	Installed the drilling pup and performed choke drill.
02:00	While waiting for mixing 1.25 sg mud, tested mud pump no 1 to 345 bar , OK.
02:30	Washed down to top of the cement at 2405 m.
04:00	Drilled through the plugs and the float collar.
05:30	Drilled the cement from 2408 m to 2446 m.
08:00	Drilled out the 13 3/8" casing shoe at 2447 m.
08:30	Worked the stuck drill string free after breaking through the casing shoe.
10:00	Reamed and worked the bit and the stabilizer in the shoe area.
13:00	Reamed the shoe and the rat hole area.
14:00	Drilled 12 1/4" hole from 2454 m to 2457 m. Reamed the hole several times.
14:30	Performed FIT to 1.43 sg.
15:00	Flow checked and pumped the slug.
18:30	Pulled out of the hole to 236 m.
21:30	Pulled out of the hole and laid down the jar,1x 8 1/4" DC, 2x 8" NMDC, string stab, near bit stab, float sub and the bit.
22:30	Made up the Autotrak, Tripple combo and the Sonic.
23:30	Programed and verified the AutoTrak, Tripple combo and the Sonic. Installed the radioactive sourses.
23:59	Picked up and ran in the hole with 2 joints of NM CS DP.

Daily report no : 3 **Date:** 2002-11-28

Midnight depth : 2501 m MD **Estimated PP:** 1.12 sg **Mud weight:** 1.25 sg

Stop time	Description
00:30	Continued to run in the hole with the BHA.
03:30	Ran in the hole with 5" DP. Strapped stands before running in the hole.
04:00	Changed over to 5 1/2" handling equipment. Filled the drillstring and tested the AutoTrak.
05:30	Ran in the hole to 2363 m.
06:00	Filled the drillstring. Ran in the hole to 2425 m. Made up the drilling stand. Washed down to the shoe at 2447 m.
06:30	Logged down from 2445 m to 2457 m.
07:00	Attemped to start the stearing unit, failed.
07:30	Flow checked and pumped slug.
11:00	Pulled out of the hole to 42 m.
12:00	Removed radioactive sources and prepared to dump the tool data.
12:30	Checked and found failure in communication in stearing unit.
13:00	Broke off the bit and laid out the Ontrak sensor sub and the steering unit.
14:00	Picked up and installed the stearing unit and the ontrak sensor sub. Made up the bit.
14:30	Verified the ontrak data, OK.
15:00	Installed the radioactive sources.
16:30	Ran in the hole to 1090 m.
17:00	Filled the drillstring and tested the ontrak.
18:30	Ran in the hole to 2450 m.
19:00	Installed the drilling stand and broke circulation.
19:30	Logged the casing shoe to 2447,5 m.
23:59	Drilled 8 1/2" hole from 2457 m to 4501 m.

DAILY REPORT ON WELL 31/2-20 S

Daily report no : 4 **Date:** 2002-11-29

Midnight depth : 2788 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.25 sg

Stop time	Description
08:30	Drilled 8 1/2" hole from 2501 m to 2626 m.
09:00	Performed weekly derrick inspection.
23:59	Drilled 8 1/2" hole from 2626 m to 2788 m.

Daily report no : 5 **Date:** 2002-11-30

Midnight depth : 3144 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.25 sg

Stop time	Description
04:30	Drilled 8 1/2" hole from 2788 m to 2850 m.
06:00	Drilled 8 1/2" hole from 2850 m to 2860 m.
06:30	Circulated due to loss off the rig air pressure.
23:59	Drilled 8 1/2" hole from 2860 m to 3144 m.

Daily report no : 6 **Date:** 2002-12-01

Midnight depth : 3214 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.25 sg

Stop time	Description
04:30	Drilled 8 1/2" hole from 3144 m to 3209 m.
05:00	Communication between BCPM (transmitter) and Ontrak failed. Ran two diagnostic tests. No results.
05:30	Flow checked and pumped the slug.
07:30	Pulled out of the hole to 2393 m. Hole good.
08:00	Flow checked the hole inside the 13 3/8" casing shoe. Performed kick drill.
10:30	Pulled out of the hole to 110 m.
11:00	Pulled out of the hole with the BHA and laid out the NMCSDP.
11:30	Removed the radioactive sources and laid out the 2nd NMCSDP.
12:30	Broke off the bit and attempted to dump the Ontrak data.
14:00	Laid out the AutoTrak assembly.
15:30	Pick up and ran in the hole with new ATK steerable stab, flex sub, Ontrak-MWD, BCPM and x-o sub. Made up a new bit.
17:00	Verified and surface tested the AutoTrak assembly, OK.
17:30	Installed the radioactive sources and ran in the hole to 110 m.
19:00	Ran in the hole to 1261 m.
19:30	Changed over to 5 1/2" handling equipment. Filled the drill string. Tested the AutoTrak, OK.
20:30	Ran in the hole to 2440 m.
21:00	Filled the drill string.
22:00	Ran in the hole to 3163. Hole good.
23:00	Made up the drilling stand and filled the drill string. Washed down to TD at 3209 m. Down linked the AutoTrak and took a check survey, OK
23:30	Drilled 8 1/2" hole from 3209 m to 3214 m.
23:59	Rebooted the BHI computer.

Daily report no : 7 **Date:** 2002-12-02

Midnight depth : 3400 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.25 sg

Stop time	Description
00:30	Rebooted the BHI computer.
21:00	Drilled 8 1/2" hole from 3214 m to 3400 m.
21:30	Circulated to clean the hole.
22:00	Flow checked, slugged the pipe. pulled out of hole with 1 stand of DP and laid down the drilling pup.
23:59	Pulled out of the hole to 2423 m. Hole in good condition. Performed kick drill and flow checked, OK.

DAILY REPORT ON WELL 31/2-20 S

Daily report no : 8 **Date:** 2002-12-03

Midnight depth : 2650 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.25 sg

Stop time	Description
02:30	Pulled out of the hole to 110 m.
03:00	Pulled out of the hole with the BHA. Racked back the Jar and 5" HWDP in the derrick.
03:30	Retrieved the radioactive sources.
05:00	Laid down BHA, cleaned the drill floor and held safety meeting.
06:00	Rigged up and picked up 3 1/2" DP to plug back the pilot hole.
07:30	Continued to pick up 3 1/2" DP and ran in the hole to 286 m.
08:00	Changed to 5" handling equipment.
10:30	Continued to run cement stinger in the hole from 286 m to 2447 m.
12:00	Ran the cement stinger to TD from 2447 m to 3377 m.
12:30	Attempted to start circulation, no go. Pulled back 22 m to 3355 m.
14:00	Established circulation and washed down to TD from 3355 m to 3400 m.
15:00	Mixed and pumped cement and set cement plug no.1 from 3400 m to 3150 m.
16:00	Pulled out of the hole to above cement plug no.1 at 3140 m.
17:30	Circulated bottoms up the long way.
18:30	Mixed and pumped cement and set cement plug no.2 from 3150 m to 2900 m.
19:30	Pulled out of the hole to above cement plug no. 2 at 2890 m.
21:00	Circulated bottoms up the long way.
22:00	Mixed and pumped cement and set cement plug no. 3 from 2900 m to 2650 m.
22:30	Displaced the cement with the rig pumps
23:00	Pulled out of the hole to above cement plug no.3 at 2640 m.
23:59	Circulated bottoms up the long way.

Daily report no : 9 **Date:** 2002-12-04

Midnight depth : 0 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.25 sg

Stop time	Description
00:30	Continued to circulate bottoms up the long way.
01:00	Mixed and pumped cement and set cement plug no. 4 from 2650 m to 2400 m.
01:30	Displaced the cement with 1347 strokes.
02:30	Pulled out to above cement plug no.4 at 2306 m.
04:30	Circulated 1.5 times bottoms up the long way.
06:00	Flow checked the well and slugged the pipe.Pulled out of the hole from 2306 m to 1614 m.
07:30	Continued to pull out of the hole.
08:30	Washed wellhead and BOP area several times and pulled out 3 stands of 5" DP.
09:00	Changed to 3 1/2" handling equipment.
10:00	Continued to pull out of hole with 3 1/2" DP and racked ame in the derrick.
23:59	No activity on this well.

Daily report no : 10 **Date:** 2002-12-06

Midnight depth : 0 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.25 sg

Stop time	Description
11:00	No activity on this well.
12:00	Filled the pipe and started washing down from 2310 m to 2337 m.
12:30	Problems opening the spear in the finger board.
13:30	Continued washing down from 2337 m to 2456 m. No cement plug was observed.
15:00	Pulled bit back into 13 3/8" shoe and circulated bottoms up.
15:30	Flow checked and slugged the pipe.
18:00	Pulled out of the hole from 2435 m to 427 m.
20:00	Continued to pull out of the hole with the BHA from 427 m to 24 m.
20:30	Retrieved radioactive sources and racked back the AutoTrak in the derrick.
21:00	Rigged up for running the 3 1/2" cement stinger.
23:59	Ran in the hole to 2020 m with the 3 1/2" cement stinger.

DAILY REPORT ON WELL 31/2-20 S

Daily report no : 11 **Date:** 2002-12-07

Midnight depth : 1006 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.25 sg

Stop time	Description
00:30	Continued running in the hole with 3 1/2" cement stinger from 2020 m to 2425 m.
02:00	Broke the circulation at 2425 m and washed down to 2510 m. Tagged the cement with 4 tons.
02:30	Prepared for the cement job and tested the cement line to 100 bar.
03:00	Pumped 7 m3 drillwater as spacer with the rig pumps.
03:30	Mixed and pumped 12 m3 of cement followed by 0.6 m3 of DW and displaced with 1400 lpm with the rig pumps.
04:30	Pulled out of the hole from 2510 m to 2350 m to circulate the hole clean.
06:00	Circulated 1.5 times bottoms up the long way.
06:30	Flow checked and slugged the pipe.
08:30	Pulled out of the hole from 2350 m to 1237 m.
09:00	Changed to 5" DP handling equipment.
09:30	Continued pulling out of the hole from 1237 m to 373 m.
10:30	Washed the BOP and the wellhead area and slugged the pipe.
11:00	Continued pulling out of the hole from 340 to 287 m. Changed to 3 1/2" DP handling equipment.
13:30	Continued pulling out of the hole with 3 1/2" DP while laying same out on the deck.
14:00	Rigged down the 3 1/2" handling equipment and cleaned the drill floor.
16:00	Made up the 12 1/4" BHA and ran in the hole to 427 m.
16:30	Continued running in the hole with 5 1/2" DP from 427 m to 1006 m.
23:59	No activity on this well.

Daily report no : 12 **Date:** 2002-12-08

Midnight depth : 1006 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.25 sg

Stop time	Description
03:30	No activity on this well.
05:30	Made up 5 1/2" handling equipment and continued running in the hole from 1006 m to 2310 m.
23:59	No activity on this well.

Norsk Hydro

2003-06-10

TIME DISTRIBUTION

Well: 31/2-20 S **PO:** 1 **Start date:** 1980-01-01 **Rig:** POLAR PIONEER **Depth:** 3400.0 **m MD**

All sections **Stop date:** 2003-06-10

Operations	Hours	%	Hours	%	Acc. total
DRILLING					
BHA HANDLING/TESTING	7.5	3.49			
MWD HANDLING/TESTING/SURVEYING	3.0	1.40			
TRIPPING IN CASED HOLE	17.0	7.91			
TRIPPING IN OPEN HOLE	2.5	1.16			
DRILLING	78.0	36.28			
OTHER	0.5	0.23			
CIRC. AND COND. MUD/HOLE	1.0	0.47			
DRILLING OUT OF CASING	10.0	4.65			
FORMATION STRENGTH TESTING	0.5	0.23			
BOP TESTING	0.5	0.23			
RIG MAINTENANCE	0.5	0.23			
Sum.			121.0	56.28	121.0
PLUG AND ABANDONMENT					
BHA HANDLING/TESTING	1.5	0.70			
CIRC. AND COND. MUD/HOLE	9.0	4.19			
TRIPPING FOR CEMENT JOB	14.5	6.74			
SET CEMENT PLUG	4.0	1.86			
Sum.			29.0	13.49	150.0
DOWNTIME DRILLING					
EQUIPMENT FAILURE AND REPAIR	33.5	15.58			
CEMENTING	31.0	14.42			
STICKING/GOING STUCK WITH EQUIPMENT	0.5	0.23			
Sum.			65.0	30.23	215.0
Reported time (100.0 % of well total 215.0 hours) :					215.0

Norsk Hydro

2003-06-10

HOLE DEVIATION

Well: 31/2-20 S **Reference point:** RKB ; 23.0 **m** ABOVE MSL

Waterdepth: 332.0 **m** **Vertical to:** 352.9 **m** **Total Depth:** 3400.0 **m MD**

Utm zone: 31 **Central Median:** 3° E **Horizontal datum:** ED50

Template Centre Coordinates, UTM: **North :** **m,** **East :** **m**

Wellhead Coordinates, UTM: **North :** 6740732.20 **m,** **East :** 524457.97 **m**

Official Surveys: Y **Track :**

Coordinates are measured from the wellhead centre.

Depth MD [m]	Incli-nation [Deg]	Direc-tion [Deg]	Tool Type	#	Depth TVD [m]	Coordinates North [m]	Coordinates East [m]	Vert. Sect [m]	Dogleg [D/30m]	Build [D/30m]	Turn [D/30m]
353.00	0.00	0.00	MWD	1	353.00	0.00	0.00	0.00	0.00	0.00	0.00
384.70	0.48	124.97	MWD	1	384.70	-0.08	0.11	0.13	0.45	0.45	118.27
412.80	0.37	162.70	MWD	1	412.80	-0.23	0.23	0.33	0.31	-0.12	40.28
440.60	0.48	354.70	MWD	1	440.60	-0.20	0.25	0.32	0.91	0.12	-181.29
469.40	2.35	355.94	MWD	1	469.39	0.51	0.20	0.55	1.95	1.95	1.29
497.70	3.97	1.31	MWD	1	497.64	2.07	0.18	2.07	1.74	1.72	5.69
526.90	5.57	357.33	MWD	1	526.74	4.49	0.13	4.50	1.68	1.64	-4.09
556.20	7.67	348.23	MWD	1	555.85	7.83	-0.33	7.84	2.40	2.15	-9.32
584.30	10.49	337.25	MWD	1	583.59	12.02	-1.70	12.14	3.52	3.01	-11.72
613.30	12.64	322.22	MWD	1	612.01	16.97	-4.67	17.60	3.81	2.22	-15.55
642.20	14.45	313.76	MWD	1	640.11	21.96	-9.21	23.82	2.78	1.88	-8.78
671.20	16.75	309.09	MWD	1	668.04	27.10	-15.07	31.01	2.71	2.38	-4.83
700.50	19.27	307.19	MWD	1	695.90	32.69	-22.20	39.51	2.65	2.58	-1.95
728.40	22.53	307.43	MWD	1	721.96	38.72	-30.11	49.05	3.51	3.51	0.26
757.40	25.21	307.53	MWD	1	748.48	45.86	-39.42	60.48	2.77	2.77	0.10
786.40	27.02	308.02	MWD	1	774.52	53.68	-49.51	73.03	1.89	1.87	0.51
814.70	30.15	307.78	MWD	1	799.36	62.00	-60.20	86.41	3.32	3.32	-0.25
842.80	33.13	305.65	MWD	1	823.29	70.80	-72.02	100.99	3.40	3.18	-2.27
871.10	35.40	303.17	MWD	1	846.67	79.79	-85.17	116.70	2.82	2.41	-2.63
899.60	37.71	301.94	MWD	1	869.57	88.92	-99.47	133.42	2.55	2.43	-1.29
927.90	41.05	301.21	MWD	1	891.44	98.32	-114.77	151.12	3.57	3.54	-0.77
956.70	42.82	303.31	MWD	1	912.86	108.59	-131.04	170.19	2.35	1.84	2.19
985.30	45.73	305.69	MWD	1	933.34	119.91	-147.48	190.08	3.51	3.05	2.50
1012.80	48.63	306.04	MWD	1	952.03	131.73	-163.83	210.22	3.18	3.16	0.38
1041.90	52.44	305.36	MWD	1	970.52	144.83	-182.07	232.65	3.96	3.93	-0.70
1069.30	54.62	304.65	MWD	1	986.81	157.47	-200.12	254.64	2.47	2.39	-0.78
1098.50	58.12	303.06	MWD	1	1002.98	171.00	-220.31	278.89	3.84	3.60	-1.63
1128.90	61.70	301.99	MWD	1	1018.22	185.14	-242.49	305.08	3.65	3.53	-1.06
1161.70	64.49	302.86	MWD	1	1033.06	200.82	-267.17	334.23	2.65	2.55	0.80
1175.30	65.46	301.42	MWD	1	1038.81	207.38	-277.60	346.51	3.59	2.14	-3.18
1204.80	67.58	299.17	MWD	1	1050.57	221.02	-300.97	373.41	3.01	2.16	-2.29
1233.80	70.15	297.41	MWD	1	1061.02	233.84	-324.78	400.20	3.15	2.66	-1.82
1262.80	72.45	296.20	MWD	1	1070.32	246.22	-349.30	427.36	2.66	2.38	-1.25
1291.80	72.42	295.10	MWD	1	1079.07	258.19	-374.22	454.65	1.09	-0.03	-1.14
1321.60	72.45	292.82	MWD	1	1088.07	269.73	-400.18	482.59	2.19	0.03	-2.30
1349.60	72.42	292.15	MWD	1	1096.52	279.93	-424.85	508.78	0.69	-0.03	-0.72

Norsk Hydro

2003-06-10

HOLE DEVIATION

Well: 31/2-20 S **Reference point:** RKB ; 23.0 **m** ABOVE MSL

Waterdepth: 332.0 **m** **Vertical to:** 352.9 **m** **Total Depth:** 3400.0 **m MD**

Utm zone: 31 **Central Median:** 3° E **Horizontal datum:** ED50

Template Centre Coordinates, UTM: **North :** **m,** **East :** **m**

Wellhead Coordinates, UTM: **North :** 6740732.20 **m,** **East :** 524457.97 **m**

Official Surveys: Y **Track :**

Coordinates are measured from the wellhead centre.

Depth MD [m]	Incli-nation [Deg]	Direc-tion [Deg]	Tool Type	#	Depth TVD [m]	Coordinates North [m]	Coordinates East [m]	Vert. Sect [m]	Dogleg [D/30m]	Build [D/30m]	Turn [D/30m]
1378.20	72.42	291.95	MWD	1	1105.15	290.17	-450.12	535.54	0.20	0.00	-0.21
1407.40	72.45	291.66	MWD	1	1113.97	300.51	-475.96	562.89	0.29	0.03	-0.30
1436.40	72.45	291.54	MWD	1	1122.71	310.69	-501.67	590.09	0.12	0.00	-0.12
1465.20	72.42	291.53	MWD	1	1131.40	320.77	-527.21	617.13	0.03	-0.03	-0.01
1494.20	72.46	291.61	MWD	1	1140.15	330.93	-552.93	644.39	0.09	0.04	0.08
1523.10	72.45	291.78	MWD	1	1148.86	341.12	-578.53	671.61	0.17	-0.01	0.18
1551.90	72.42	291.86	MWD	1	1157.56	351.32	-604.02	698.76	0.08	-0.03	0.08
1580.80	72.45	292.41	MWD	1	1166.28	361.71	-629.54	726.05	0.55	0.03	0.57
1609.80	72.55	292.97	MWD	1	1175.00	372.37	-655.06	753.50	0.56	0.10	0.58
1638.80	72.59	293.07	MWD	1	1183.68	383.19	-680.52	780.99	0.11	0.04	0.10
1667.70	72.55	293.17	MWD	1	1192.34	394.02	-705.88	808.41	0.11	-0.04	0.10
1695.80	72.62	292.93	MWD	1	1200.75	404.52	-730.55	835.07	0.26	0.07	-0.26
1725.60	72.64	293.17	MWD	1	1209.65	415.65	-756.72	863.37	0.23	0.02	0.24
1754.30	72.58	294.07	MWD	1	1218.23	426.63	-781.82	890.65	0.90	-0.06	0.94
1784.40	72.58	294.00	MWD	1	1227.24	438.33	-808.05	919.28	0.07	0.00	-0.07
1813.80	72.55	294.05	MWD	1	1236.05	449.75	-833.67	947.24	0.06	-0.03	0.05
1841.70	72.58	293.95	MWD	1	1244.40	460.57	-857.98	973.79	0.11	0.03	-0.11
1871.80	72.49	293.74	MWD	1	1253.44	472.18	-884.24	1002.42	0.22	-0.09	-0.21
1899.80	72.58	293.63	MWD	1	1261.84	482.91	-908.70	1029.05	0.15	0.10	-0.12
1929.70	72.59	293.12	MWD	1	1270.79	494.23	-934.89	1057.49	0.49	0.01	-0.51
1957.60	72.58	293.13	MWD	1	1279.14	504.68	-959.37	1084.02	0.01	-0.01	0.01
1985.30	71.70	290.59	MWD	1	1287.64	514.50	-983.84	1110.25	2.79	-0.95	-2.75
2013.30	70.60	286.53	MWD	1	1296.69	522.93	-1008.95	1136.42	4.28	-1.18	-4.35
2042.20	69.49	281.97	MWD	1	1306.55	529.62	-1035.27	1162.88	4.60	-1.15	-4.73
2071.10	68.80	278.54	MWD	1	1316.85	534.43	-1061.84	1188.75	3.40	-0.72	-3.56
2100.00	68.02	274.24	MWD	1	1327.48	537.42	-1088.54	1213.98	4.23	-0.81	-4.46
2129.10	67.40	271.20	MWD	1	1338.52	538.70	-1115.43	1238.70	2.97	-0.64	-3.13
2158.00	66.81	267.57	MWD	1	1349.77	538.42	-1142.05	1262.60	3.52	-0.61	-3.77
2186.80	66.34	264.21	MWD	1	1361.22	536.53	-1168.40	1285.70	3.25	-0.49	-3.50
2215.80	65.82	260.20	MWD	1	1372.98	532.93	-1194.66	1308.14	3.83	-0.54	-4.15
2244.70	65.82	256.23	MWD	1	1384.83	527.55	-1220.46	1329.60	3.76	0.00	-4.12
2273.60	65.86	252.11	MWD	1	1396.66	520.36	-1245.82	1350.13	3.90	0.04	-4.28
2302.70	65.83	247.82	MWD	1	1408.57	511.27	-1270.76	1369.75	4.04	-0.03	-4.42
2331.50	65.86	243.95	MWD	1	1420.36	500.53	-1294.74	1388.12	3.68	0.03	-4.03
2360.50	65.83	238.78	MWD	1	1432.23	487.86	-1317.95	1405.35	4.88	-0.03	-5.35
2389.40	66.06	234.85	MWD	1	1444.02	473.42	-1340.03	1421.20	3.73	0.24	-4.08

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HOLE DEVIATION

Well: 31/2-20 S **Reference point:** RKB ; 23.0 **m** ABOVE MSL
Waterdepth: 332.0 **m** **Vertical to:** 352.9 **m** **Total Depth:** 3400.0 **m MD**
Utm zone: 31 **Central Median:** 3° E **Horizontal datum:** ED50
Template Centre Coordinates, UTM: **North :** **m,** **East :** **m**
Wellhead Coordinates, UTM: **North :** 6740732.20 **m,** **East :** 524457.97 **m**
Official Surveys: Y **Track :**
Coordinates are measured from the wellhead centre.

Depth MD [m]	Incli-nation [Deg]	Direc-tion [Deg]	Tool Type	#	Depth TVD [m]	Coordinates North [m]	Coordinates East [m]	Vert. Sect [m]	Dogleg [D/30m]	Build [D/30m]	Turn [D/30m]
2418.30	66.06	231.32	MWD	1	1455.75	457.56	-1361.14	1435.99	3.35	0.00	-3.66
2438.00	66.26	228.53	MWD	1	1463.71	445.96	-1374.93	1445.44	3.90	0.30	-4.25
2471.40	66.34	228.49	MWD	1	1477.14	425.69	-1397.84	1461.22	0.08	0.07	-0.04
2500.30	66.18	229.12	MWD	1	1488.77	408.27	-1417.74	1475.36	0.62	-0.17	0.65
2529.20	65.97	226.55	MWD	1	1500.49	390.54	-1437.32	1489.44	2.45	-0.22	-2.67
2558.20	65.97	222.27	MWD	1	1512.31	371.63	-1455.85	1502.54	4.04	0.00	-4.43
2587.10	65.96	219.10	MWD	1	1524.08	351.61	-1473.06	1514.44	3.01	-0.01	-3.29
2615.40	65.95	215.21	MWD	1	1535.62	331.02	-1488.66	1525.02	3.77	-0.01	-4.12
2645.00	65.39	211.40	MWD	1	1547.81	308.49	-1503.47	1534.79	3.56	-0.57	-3.86
2673.00	65.52	209.11	MWD	1	1559.45	286.49	-1516.30	1543.13	2.24	0.14	-2.45
2702.20	65.54	209.59	MWD	1	1571.54	263.32	-1529.33	1551.83	0.45	0.02	0.49
2731.70	65.46	209.59	MWD	1	1583.78	239.98	-1542.58	1561.14	0.08	-0.08	0.00
2760.30	66.40	210.67	MWD	1	1595.44	217.40	-1555.69	1570.81	1.43	0.99	1.13
2789.60	66.46	209.29	MWD	1	1607.16	194.13	-1569.11	1581.07	1.30	0.06	-1.41
2818.50	66.38	208.88	MWD	1	1618.72	170.99	-1581.98	1591.20	0.40	-0.08	-0.43
2847.40	66.36	209.81	MWD	1	1630.30	147.91	-1594.96	1601.80	0.88	-0.02	0.97
2876.40	66.40	210.55	MWD	1	1641.92	124.94	-1608.32	1613.16	0.70	0.04	0.77
2905.30	66.47	211.40	MWD	1	1653.48	102.23	-1621.95	1625.17	0.81	0.07	0.88
2934.30	66.43	212.33	MWD	1	1665.06	79.65	-1635.99	1637.92	0.88	-0.04	0.96
2963.10	65.90	212.73	MWD	1	1676.70	57.44	-1650.15	1651.15	0.67	-0.55	0.42
2992.10	66.14	212.77	MWD	1	1688.49	35.15	-1664.49	1664.86	0.25	0.25	0.04
3021.00	66.09	213.11	MWD	1	1700.19	12.98	-1678.85	1678.90	0.33	-0.05	0.35
3049.90	66.05	213.11	MWD	1	1711.91	-9.15	-1693.28	1693.31	0.04	-0.04	0.00
3078.90	66.11	212.54	MWD	1	1723.67	-31.43	-1707.65	1707.94	0.54	0.06	-0.59
3107.80	63.40	213.42	MWD	1	1735.99	-53.35	-1721.88	1722.71	2.93	-2.81	0.91
3136.70	60.04	214.16	MWD	1	1749.68	-74.50	-1736.03	1737.63	3.55	-3.49	0.77
3165.60	56.90	214.95	MWD	1	1764.80	-94.79	-1750.00	1752.56	3.33	-3.26	0.82
3194.50	53.70	216.49	MWD	1	1781.25	-114.08	-1763.86	1767.55	3.57	-3.32	1.60
3224.30	50.61	215.49	MWD	1	1799.53	-133.11	-1777.69	1782.67	3.21	-3.11	-1.01
3253.30	47.07	216.51	MWD	1	1818.61	-150.78	-1790.52	1796.86	3.75	-3.66	1.06
3282.30	43.29	219.86	MWD	1	1839.05	-166.95	-1803.21	1810.93	4.62	-3.91	3.47
3311.30	40.93	221.92	MWD	1	1860.57	-181.65	-1815.93	1825.00	2.83	-2.44	2.13
3340.20	40.97	222.09	MWD	1	1882.39	-195.73	-1828.61	1839.05	0.12	0.04	0.18
3369.00	40.02	221.78	MWD	1	1904.29	-209.64	-1841.11	1853.01	1.01	-0.99	-0.32
3390.70	40.04	221.60	MWD	1	1920.91	-220.06	-1850.39	1863.43	0.16	0.03	-0.25
3400.00	40.04	221.60	MWD	1	1928.03	-224.54	-1854.36	1867.91	0.00	0.00	0.00

B I T R E C O R D F O R W E L L 31/2-20 S PO: 1

Bit No	RR	Type	Size (in)	Manu-fact-urer	Trade name	Serial no.	IADC code	Nozzles diameter (../32in)	Flow area (in2)	BHA no.	Depth out (m MD)	Bit meter (m)	Rot. hours (hrs)	ROP (m/hr)	Rotation min/max) (rpm)	Total bit revol.	Weight min/max (kN)	Flow min/max (l/min)	Pump min/max (bar)	Cutting Structure I - O -DC- L - B	Gauge 1/16 (in)	Other Remarks	Pull Cause
1		MITO	12.25	SMIT	MSDGHODC	LT6002	135	16,20,20,22	1.181	1	2457	3	0.30	10.0	0/90	880	0/85	0/3527.01	0/144	1 - 1 - WT - A - E	I	NO	TD
2		ISRT	8.50	SMIT	15GFDGPD	MJ7704	445	12,14,16	0.457	2	2457	0		0.0	0/0	0	0/0	0/0	0/0	0 - 0 - NO - A - E	I	NO	DTF
2	1	ISRT	8.50	SMIT	15GFDGPD	MJ7704	445	12,14,16	0.457	3	3209	752	46.60	16.1	79/137	326452	2/137	21.48/2267.	119/207	2 - 2 - WT - C - E	I	ER	DTF
3		ISRT	8.50	SMIT	15GFDGPD	MJ8183	445	12,14,16	0.457	4	3400	191	16.30	11.7	0/127	107100	0/131	0/2255.22	0/208.33	2 - 2 - WT - A - E	I	ER	TD

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BOTTOM HOLE ASSEMBLIES USED ON WELL 31/2-20 S PO: 1

BHA no. 1: No. / Element / OD(in) / Length(m) Depth In: 2454 m MD Out: 2457 m MD

1	MSDGHODC	12.25	0.31	2	BIT SUB	8.0	1.16
3	NON MAG. STAB	8.0	1.33	4	DRILL COLLAR STEEL	8.0	9.07
5	NON MAG. STAB	8.0	1.47	6	DRILL COLLAR STEEL	8.0	46.21
7	JAR	8.0	9.42	8	DRILL COLLAR STEEL	8.0	27.25
9	X-OVER	8.0	0.74	10	HWDP	5.5	139.64
11	DRILL PIPE	5.5	1994.10				

Reason pulled: TOTAL DEPTH/CASING DEPTH Total Length: 2230.70 m

BHA no. 2: No. / Element / OD(in) / Length(m) Depth In: 2457 m MD Out: 2457 m MD

1	15GFDGPD	8.5	0.25	2	AUTOTRAK	6.75	2.14
3	MWD	6.75	2.10	4	MWD	6.75	5.18
5	MWD	6.75	1.31	6	MWD	6.75	3.25
7	X-OVER	6.75	0.56	8	MWD	6.75	2.50
9	MWD	6.75	2.30	10	MWD	7.0	9.88
11	STOP SUB	6.75	0.41	12	NON MAG. STAB	6.37	1.36
13	NON MAGNETIC DRILL PIPE	5.0	11.47	14	NON MAGNETIC DRILL PIPE	5.0	10.74
15	FLOAT SUB	6.25	1.06	16	HWDP	5.0	28.18
17	JAR	6.5	9.50	18	HWDP	5.0	18.34
19	DRILL PIPE	5.0	950.02	20	X-OVER	6.75	0.76

Reason pulled: DOWNHOLE TOOL FAILURE Total Length: 1061.31 m

BHA no. 3: No. / Element / OD(in) / Length(m) Depth In: 2457 m MD Out: 3209 m MD

1	15GFDGPD	8.5	0.25	2	AUTOTRAK	6.75	2.17
3	MWD	6.75	2.10	4	MWD	6.75	5.15
5	MWD	6.75	1.31	6	MWD	6.75	3.25
7	X-OVER	6.75	0.56	8	MWD	6.75	2.50
9	MWD	6.75	2.30	10	MWD	7.0	9.88
11	STOP SUB	6.75	0.41	12	NON MAG. STAB	8.25	1.36
13	NON MAGNETIC DRILL PIPE	5.0	11.47	14	NON MAGNETIC DRILL PIPE	5.0	10.74
15	FLOAT SUB	6.25	1.06	16	HWDP	5.0	28.18
17	JAR	6.5	9.50	18	HWDP	5.0	18.34
19	DRILL PIPE	5.0	950.02	20	X-OVER	6.75	0.76
21	DRILL PIPE	5.5	2228.25				

Reason pulled: DOWNHOLE TOOL FAILURE Total Length: 3289.56 m

BHA no. 4: No. / Element / OD(in) / Length(m) Depth In: 3209 m MD Out: 3400 m MD

1	15GFDGPD	8.5	0.25	2	AUTOTRAK	6.75	2.17
3	FLEX SUB	6.75	2.04	4	MWD	6.75	5.16
5	FLEX SUB	6.75	1.31	6	MWD	6.75	3.24
7	X-OVER	6.75	0.59	8	MWD	6.75	2.50
9	MWD	6.75	2.30	10	MWD	7.0	9.88
11	STOP SUB	6.75	0.41	12	NON MAGNETIC DRILL PIPE	5.0	10.74
13	FLOAT SUB	6.25	1.06	14	HWDP	5.0	28.18
15	JAR	6.5	9.50	16	HWDP	5.0	18.34
17	DRILL PIPE	5.0	950.02	18	X-OVER	6.75	0.76
19	X-OVER	6.37	0.52	20	DRILL PIPE	5.0	202.86
21	X-OVER	6.37	0.52	22	DRILL PIPE	5.0	202.86

Reason pulled: TOTAL DEPTH/CASING DEPTH Total Length: 1455.21 m

TOTAL CONSUMPTION OF CEMENT ADDITIVES ON WELL 31/2-20 S PO: 1

Section	Cement/Additive	Unit	Total Amount Used
8 1/2"	FLUID-LOSS ADDITIVE: BETWEEN 38 AND 177 DEGC	l	2700.00
	FL-63L	l	588.00
	SPECIAL ADDITIVE: DEFOAMER FP-16LG	l	206.00
	API CLASS G	MT	84.00
	RETARDER: LIQUID LIGNOSULFONATE UP TO 93 DEGC	l	523.00
	BA-58L ANTI-GAS	l	9283.00
	DISPERSANT: CD-31L LIQUID	l	1189.00

CEMENT CONSUMPTION PER JOB ON WELL 31/2-20 S PO: 1

Date	CsgSize	Job Type	Cement/ Additive	Description	Unit	Actual Amount Used
2002-12-03	13 3/8"	PLUG IN OPEN HOLE	BA-58L	BA-58L ANTI-GAS	l	3776
			CD-31L	DISPERSANT: CD-31L LIQUID	l	221
			FP16LG	SPECIAL ADDITIVE: DEFOAMER FP-16LG	l	64
			G	API CLASS G	MT	16
			FL-45L	FLUID-LOSS ADDITIVE: BETWEEN 38 AND 177 DEGC	l	855
			R-12L	RETARDER: LIQUID LIGNOSULFONATE UP TO 93 DEG	l	221
2002-12-03	13 3/8"	PLUG IN OPEN HOLE	BA-58L	BA-58L ANTI-GAS	l	1384
			CD-31L	DISPERSANT: CD-31L LIQUID	l	81
			FL-45L	FLUID-LOSS ADDITIVE: BETWEEN 38 AND 177 DEGC	l	807
			R-12L	RETARDER: LIQUID LIGNOSULFONATE UP TO 93 DEG	l	81
			G	API CLASS G	MT	15
			FP16LG	SPECIAL ADDITIVE: DEFOAMER FP-16LG	l	23
2002-12-03	13 3/8"	PLUG IN OPEN HOLE	BA-58L	BA-58L ANTI-GAS	l	1770
			CD-31L	DISPERSANT: CD-31L LIQUID	l	103
			FL-45L	FLUID-LOSS ADDITIVE: BETWEEN 38 AND 177 DEGC	l	1038
			FP16LG	SPECIAL ADDITIVE: DEFOAMER FP-16LG	l	33
			G	API CLASS G	MT	16
			R-12L	RETARDER: LIQUID LIGNOSULFONATE UP TO 93 DEG	l	103
2002-12-04	13 3/8"	PLUG IN CASED TO OPEN HOLE	BA-58L	BA-58L ANTI-GAS	l	1200
			R-12L	RETARDER: LIQUID LIGNOSULFONATE UP TO 93 DEG	l	60
			G	API CLASS G	MT	21
			FP16LG	SPECIAL ADDITIVE: DEFOAMER FP-16LG	l	48
			FL-63L	FL-63L	l	300
			CD-31L	DISPERSANT: CD-31L LIQUID	l	400
2002-12-07	13 3/8"	PLUG IN CASED TO OPEN HOLE	BA-58L	BA-58L ANTI-GAS	l	1153
			CD-31L	DISPERSANT: CD-31L LIQUID	l	384
			FL-63L	FL-63L	l	288
			FP16LG	SPECIAL ADDITIVE: DEFOAMER FP-16LG	l	38
			G	API CLASS G	MT	16
			R-12L	RETARDER: LIQUID LIGNOSULFONATE UP TO 93 DEG	l	58

CEMENT SLURRY REPORT ON WELL 31/2-20 S PO: 1

Date	CsgSize	Jobtype	Slurry Type	Pumped Volume [m3]	Density [sg]	BHCT [DegC]	Yield [l/100 kg]	Additive	Unit	Additives [../100 kg Cement]	Additives [../m3 Slurry]
2002-12-03	13 3/8"	PLUG IN OPEN HOLE	DRILL WATER	4.00	1.00	72.00					
			TAIL SLURRY	10.20	1.90	72.00	82.39	FL-45L	l	7.00	
								CD-31L	l	0.70	
								FP16LG	l	0.20	
								BA-58L	l	12.00	
								R-12L	l	0.70	
			DRILL WATER	1.60	1.00	72.00					
			DISPLACEMENT	29.70	1.25	72.00					
			DISPLACEMENT			72.00					
2002-12-03	13 3/8"	PLUG IN OPEN HOLE	DRILL WATER	4.00	1.00	63.00					
			TAIL SLURRY	9.50	1.90	63.00	82.39	FP16LG	l	0.20	
								BA-58L	l	12.00	
								CD-31L	l	0.70	
								R-12L	l	0.70	
								FL-45L	l	7.00	
			DRILL WATER	1.60	1.00	63.00					
			DISPLACEMENT	26.90	1.25	63.00					
			DISPLACEMENT			63.00					
2002-12-03	13 3/8"	PLUG IN OPEN HOLE	DRILL WATER	4.00	1.00	59.00					
			TAIL SLURRY	10.10	1.90	59.00	82.39	BA-58L	l	12.00	
								CD-31L	l	0.70	
								FL-45L	l	7.00	
								FP16LG	l	0.20	
								R-12L	l	0.70	
			DRILL WATER	1.60	1.00	59.00					
			DISPLACEMENT	24.10	1.25	59.00					
			DISPLACEMENT			59.00					
2002-12-04	13 3/8"	PLUG IN CASED TO OPEN HOLE	DRILL WATER		1.00	54.00					
			DISPLACEMENT		1.25	54.00					
			DRILL WATER		1.00	54.00					

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CEMENT SLURRY REPORT ON WELL 31/2-20 S PO: 1

Date	CsgSize	Jobtype	Slurry Type	Pumped Volume [m3]	Density [sg]	BHCT [DegC]	Yield [l/100 kg]	Additive	Unit	Additives [../100 kg Cement]	Additives [../m3 Slurry]
2002-12-04	13 3/8"	PLUG IN CASED TO OPEN HOLE	TAIL SLURRY	13.40	2.05	54.00	68.50	CD-31L	l	2.00	
								FL-63L	l	1.50	
								FP16LG	l	0.20	
								R-12L	l	0.30	
								BA-58L	l	6.00	
2002-12-07	13 3/8"	PLUG IN CASED TO OPEN HOLE	DRILL WATER	7.00	1.00	54.00					
			TAIL SLURRY	12.00	2.05	54.00	68.50	BA-58L	l	6.00	
								CD-31L	l	2.00	
								FL-63L	l	1.50	
								FP16LG	l	0.20	
								R-12L	l	0.30	
			DRILL WATER	0.60	1.00	54.00					
			DISPLACEMENT	21.30	1.25	54.00					
			DISPLACEMENT			54.00					

DAILY MUD PROPERTIES:RHEOLOGY PARAMETERS FOR WELL 31/2-20 S PO: 1

Hole section : 8 1/2" **WATER BASED SYSTEM**

Date	Depth [m]		Mud Type	Funnel Visc	Dens	Mudtmp Out	Fann Readings								Rheo Test	PV	YP	Gel0	Gel10
	MD	TVD		[sec]	[sg]	[DegC]	600	300	200	100	60	30	6	3	[DegC]	[mPas]	[Pa]	[Pa]	[Pa]
2002-11-26	2430	1460	KCL/POLYMER	69.0	1.25		70	49	39	31	0	0	15	12	50.0	21.0	14.0	5.0	8.0
2002-11-27	2457	1471	KCL/POLYMER	61.0	1.25	25.0	60	45	38	30	0	0	12	10	50.0	15.0	15.0	5.0	10.0
2002-11-28	2501	1489	KCL/POLYMER	63.0	1.25	23.0	58	44	38	29	0	0	11	10	50.0	14.0	15.0	5.0	8.0
2002-11-29	2788	1607	KCL/POLYMER	63.0	1.25	28.0	70	54	47	37	0	0	16	13	50.0	16.0	19.0	8.0	12.0
2002-11-30	3144	1754	KCL/POLYMER	62.0	1.25	29.0	66	51	44	35	0	0	14	11	50.0	15.0	18.0	7.0	10.0
2002-12-01	3214	1793	KCL/POLYMER	65.0	1.25	18.0	66	50	44	35	0	0	14	11	50.0	16.0	17.0	7.5	9.0
2002-12-02	3400	1928	KCL/POLYMER	63.0	1.25	31.0	72	54	46	36	0	0	15	12	50.0	18.0	18.0	7.0	10.0

Hole section : P&A **WATER BASED SYSTEM**

Date	Depth [m]		Mud Type	Funnel Visc	Dens	Mudtmp Out	Fann Readings								Rheo Test	PV	YP	Gel0	Gel10
	MD	TVD		[sec]	[sg]	[DegC]	600	300	200	100	60	30	6	3	[DegC]	[mPas]	[Pa]	[Pa]	[Pa]
2002-12-03	2400	1448	KCL/POLYMER		1.25		72	54	46	36	0	0	15	12	50.0	18.0	18.0	7.0	14.0
2002-12-04	2400	1448	KCL/POLYMER	61.0	1.25	15.0	67	50	42	33	0	0	13	10	50.0	17.0	16.5	7.0	11.0

DAILY MUD PROPERTIES : OTHER PARAMETERS FOR WELL 31/2-20 S PO: 1

Hole section : 8 1/2" **WATER BASED SYSTEM**

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Dens [sg]	Filtrate API [ml]	Filtrate HPHT [ml]	Filtcake API [mm]	Filtcake HPHT [mm]	HPHT Press/Temp [bar/DegC]	pH	Alcalinity Pm [ml]	Alcalinity Pf [ml]	Alcalinity Mf [ml]	Inhib Chem [Kg/m3]	K+ [mg/l]	CL- [mg/l]	Ca++ [mg/l]	Mg++ [mg/l]	Tot hard [mg/l]	Percentage Solid [%]	Percentage Oil [%]	Percentage Sand [%]	CEC [Kg/m3]	ASG [sg]	LGS [Kg/m3]
2002-11-26	2430	1460	KCL/POLYMER	1.25	3.2	13.5	1	1	500 / 70	8.1	0.0	0.0	1.2		97026	92000	860		860	14.8		0.6	55	2.9	169
2002-11-27	2457	1471	KCL/POLYMER	1.25	3.2	13.0	1	1	500 / 70	8.6	0.0	0.0	1.2		100275	98000	480	480	480	14.8		0.4	51	2.9	160
2002-11-28	2501	1489	KCL/POLYMER	1.25	3.6	13.1	1	1	/ 70	9.0	0.4	0.1	1.0		88400	92000	560	560	560	14.6		0.4	42	2.9	174
2002-11-29	2788	1607	KCL/POLYMER	1.25	3.6	13.0	1	1	/ 70	8.4	0.1	0.0	1.0		83200	100000	600		600	14.5		0.3	35	2.8	172
2002-11-30	3144	1754	KCL/POLYMER	1.25	3.6	13.0	1	1	/ 70	8.2	0.0	0.0	0.6		86840	98000	440		440	14.9		0.4	28	2.9	173
2002-12-01	3214	1793	KCL/POLYMER	1.25	3.2	12.8	1	1	/ 70	8.1	0.0	0.0	0.6		87360	100000	480		480	14.9		0.4	28	2.9	170
2002-12-02	3400	1928	KCL/POLYMER	1.25	3.4	13.2	1	1	/ 70	8.0	0.0	0.0	0.7		88400	104000	400		400	15.0		0.2	28	2.9	171

Hole section : P&A **WATER BASED SYSTEM**

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Dens [sg]	Filtrate API [ml]	Filtrate HPHT [ml]	Filtcake API [mm]	Filtcake HPHT [mm]	HPHT Press/Temp [bar/DegC]	pH	Alcalinity Pm [ml]	Alcalinity Pf [ml]	Alcalinity Mf [ml]	Inhib Chem [Kg/m3]	K+ [mg/l]	CL- [mg/l]	Ca++ [mg/l]	Mg++ [mg/l]	Tot hard [mg/l]	Percentage Solid [%]	Percentage Oil [%]	Percentage Sand [%]	CEC [Kg/m3]	ASG [sg]	LGS [Kg/m3]
2002-12-03	2400	1448	KCL/POLYMER	1.25	4.6		1		/	10.4		0.0	0.6		88400	99000	320		320	15.0			28	2.8	191
2002-12-04	2400	1448	KCL/POLYMER	1.25	3.6		1		/	8.8	0.6	0.6	2.1		88400	94000	840		840	14.0		0.2	28	3.0	140

Norsk Hydro

2003-06-11

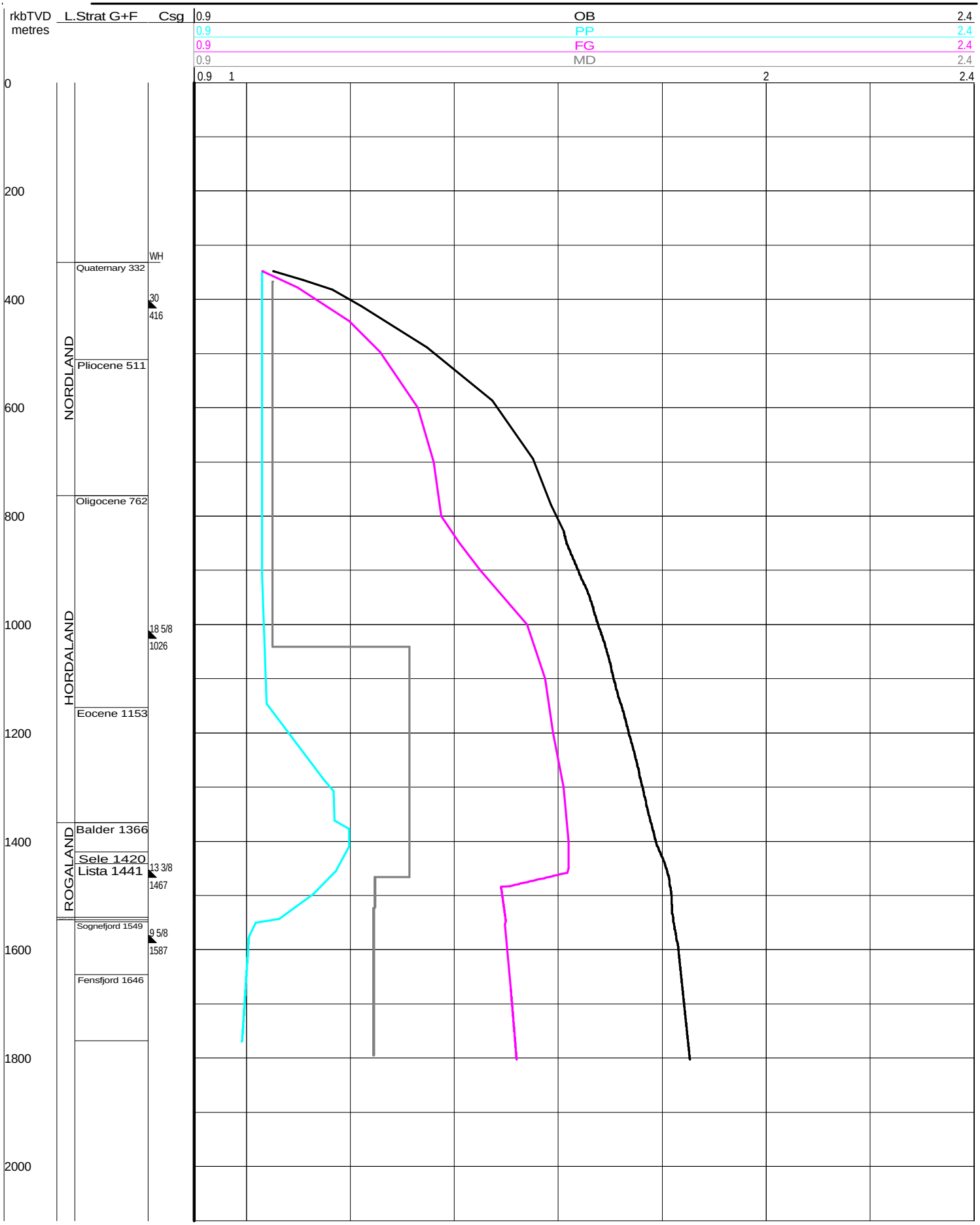
TOTAL CONSUMPTION OF MUD ADDITIVES ON WELL 31/2-20 S PO: 1

Section	Product/ Additive	Unit	Total Amount Used
8 1/2"	ANTISOL FL10	kg	3206.00
	CITRIC ACID	kg	2725.00
	DUOTEC NS	kg	2488.00
	KCL BRINE	l	245000.00
	KCL POWDER	kg	10000.00
	M-I BAR	kg	10000.00
	POTASSIUM CARBONATE	kg	50.00
	SODA ASH	kg	100.00
	SODIUM BICARBONATE	kg	4818.00

HYDRO

Well: 31/2-20-S

Fig.B-1



Final Pore Pressure-, Fracture and Overburdon Gradients

2003-06-05

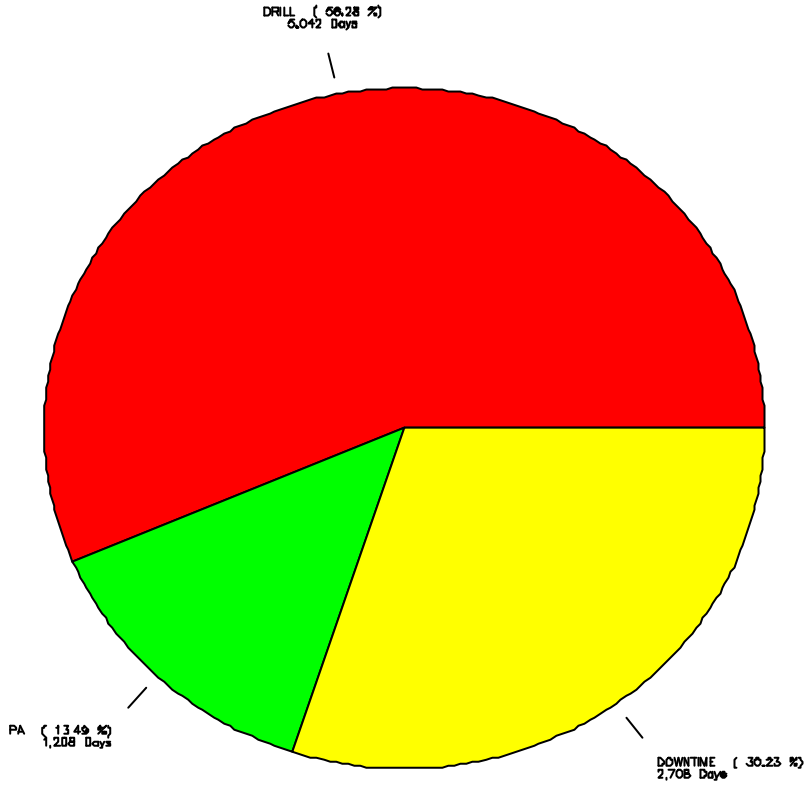
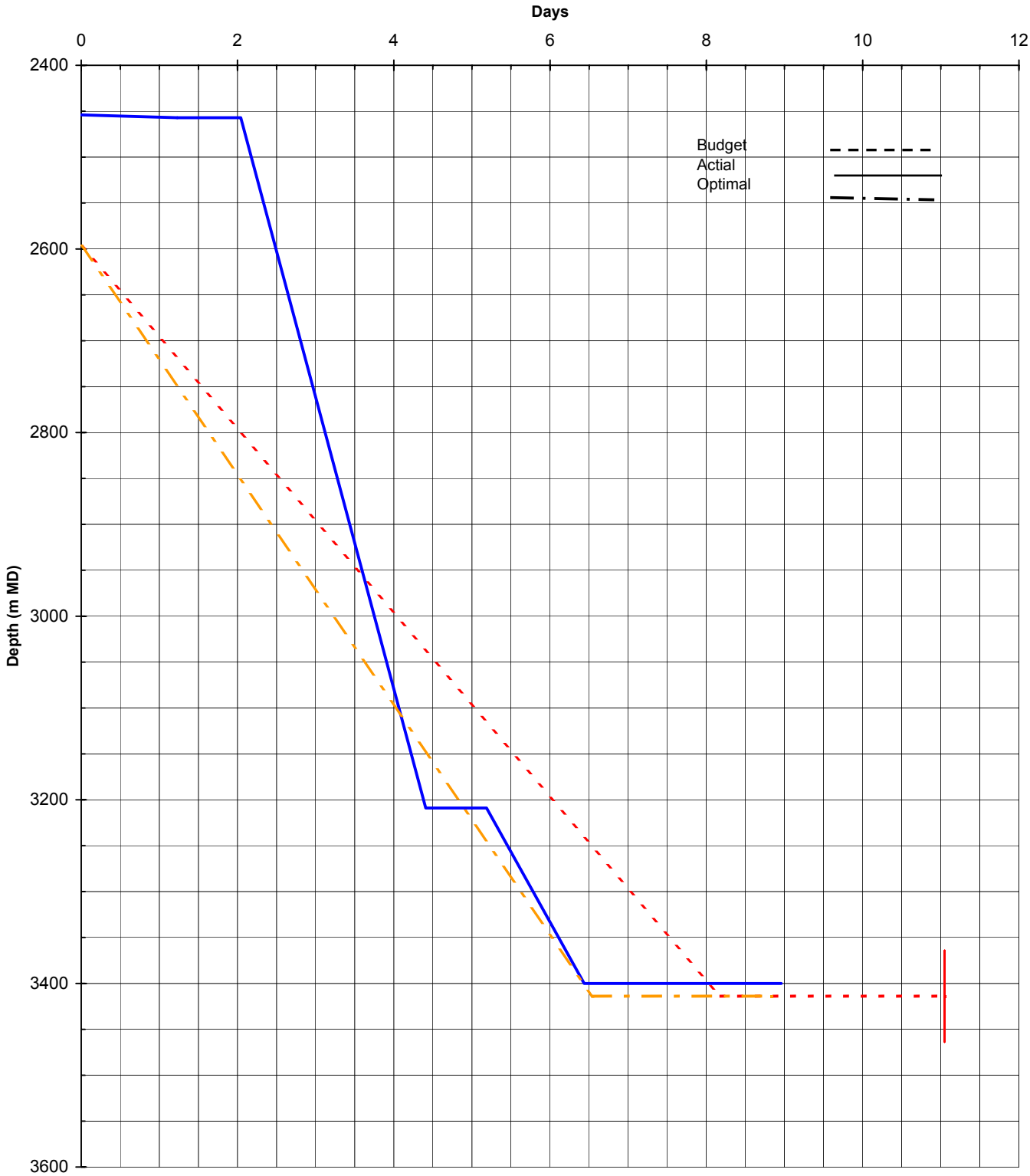


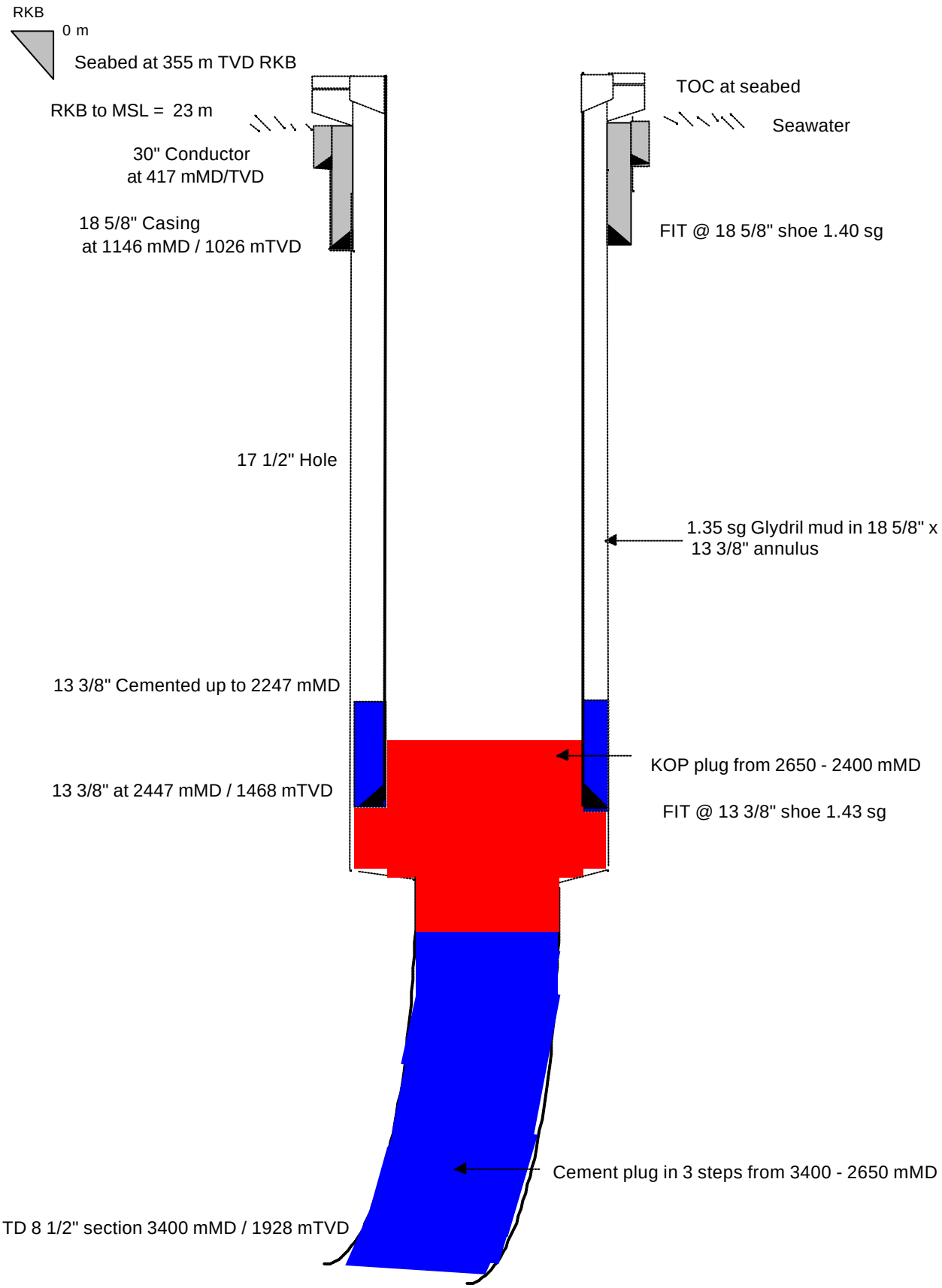
Figure 2		Time Distribution 31/2-20 S	**HYDRO**



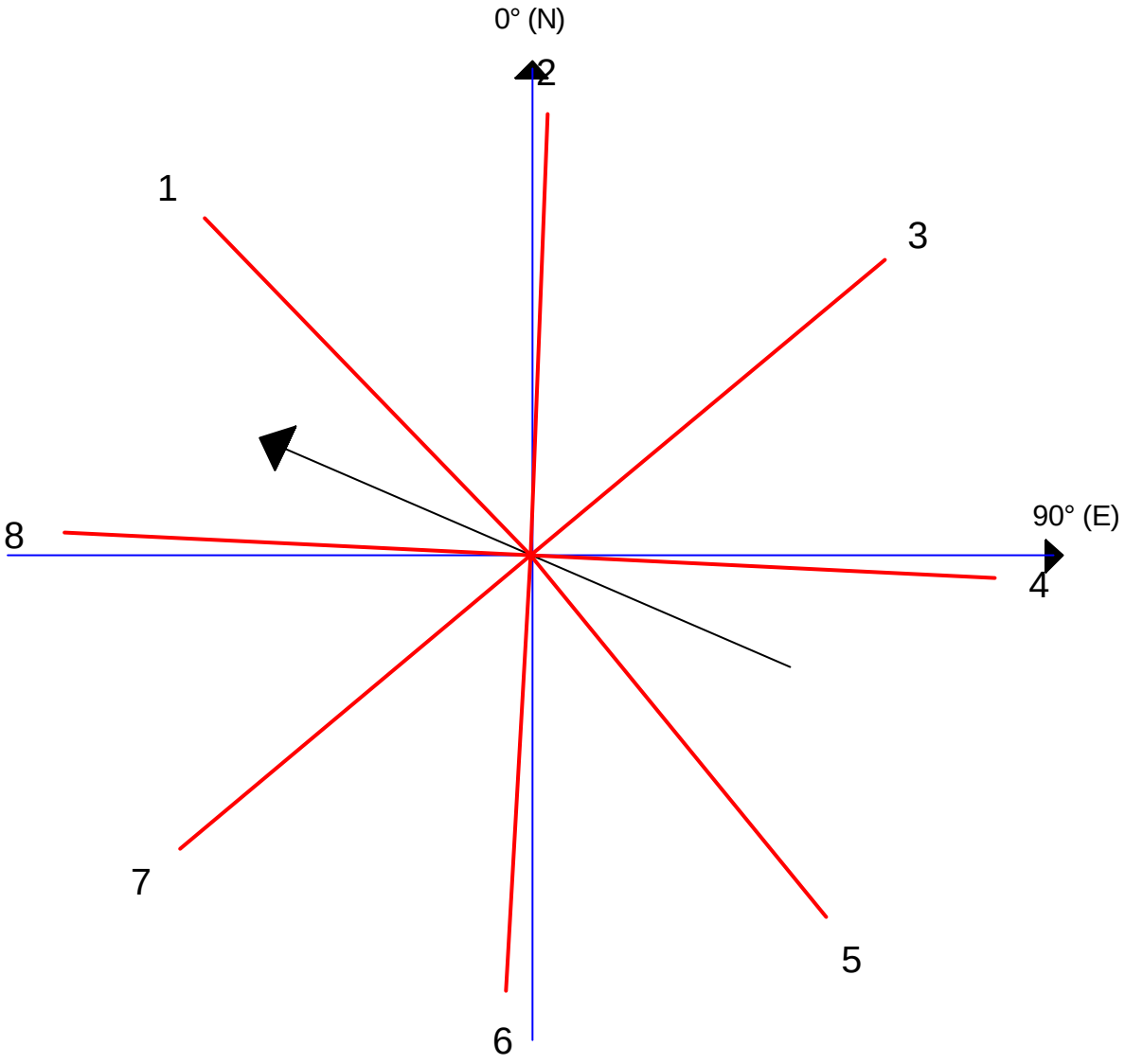
B-25

Prognosed and Actual Drilling Curves
Well 31/2-20 S

HYDRO



Plug & Abandonment	**B-26**	
Well 31/2-20 S	**Revision: 0**	**Permanent Abandonment**



RIGHEADING 295 DEG.

ANCHOR NO	DIRECTION (DEG.)	LENGTH (m)
1	318	1800
2	2	1751
3	48	1745
4	93	1706
5	143	1801
6	183	1734
7	228	1737
8	273	1719

Figure 4		RIG ANCHORS POLAR PIONEER 31/2-20 S	**HYDRO**

Appendix 1

1 Correction and Evaluation Methods

1.1 Log Corrections

The logs used in the computation have been corrected for environmental effects by BHI. The natural gamma ray was calibrated to MWD-API units and corrected for mud radiation. The resistivity was corrected for tool size, nominal hole size, mud resistivity (Rm) and formation dielectric properties by use of CRIM.

The Neutron Porosity was corrected for tool size, nominal hole size and mud weight presented in limestone units. The Density was corrected to take account of hole size. The correction curve was derived through the use of dual spaced detectors on the tool. The tool computes density by applying a Patented Weighting algorithm, a technique that minimizes the errors caused by tool standoff and errors due to statistical uncertainty from count rates.

The curves are used in the interpretation without any further editing.

Large errors can be introduced into the porosity calculation because of

1. The hydrocarbon effect on the RHOB log, and
2. The use of water-based mud and consequent lack of a microresistivity log to correct for the hydrocarbon effect.

To overcome this problem a correction for the hydrocarbon effect is made using the method described in the section below.

1.2 Evaluation Method

True vertical depths and thicknesses are calculated in Recall. The petrophysical evaluation is done with the Recall program Prototype. The calculation parameters including parameter sources are listed in Table 1.

The formation temperature is estimated from the temperature gradient for the Troll Field.

Water saturation is calculated using the 2 MHz phase resistivity log and the Archie equation.

Porosity is calculated from the density log. As this log may be heavily affected by hydrocarbons present, a hydrocarbon correction is applied based on a computed pseudo MSFL (microresistivity).

For detailed information and equations of porosity, water saturation and formation temperature, please refer to 'Final well report, well 31/5-H-6 H', Norsk Hydro 1996.

The procedure for calculation of synthetic permeability K_FZI is presented in: 'Troll Field, Sognefjord Formation: FZI synthetic permeability model', Hydro U&P Bergen 21/03-2000

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1.3 Definition of Net Reservoir

To obtain the best values for net sand in the well the calcites have been manually picked on the density log (BDCM) and by applying cut off on the density log.

Parameter	Symbol	Unit	Sources	Actual well
Formation temperature	T	deg C	EQ. REF.1	70
Depth of form. temp.		mTVDMSL		1 550
Formation oil density	Rhooil	g/cm3	MDT 31/5-H-5H	0.8
Formation gas density	Rho gas	g/cc	"	0.116
Apparent gas density	Rhogapp	g/cc	REF. 1	- 0.0396
Formation water resistivity @ 70 deg. C	Rw	ohmm	REF.1	0.068
Mud filtrate Resistivity 12 1/4" BU sections @ reservoir temp.	Rmf	ohmm	CALC. FROM LOG HEADING/ MUD DATA	0.029
Mud filtrate Resistivity 9 1/2" horizontal hole sections @ reservoir temp.	Rmf	ohmm	CALC. FROM LOG HEADING/ MUD DATA	0.018
Mud filtrate density 12 1/4" BU sections @reservoir temp. and press	Rhofluid	g/cc	CALC. FROM LOG HEADING/ MUD DATA	1.08
Mud filtrate density 9 1/2" horizontal hole sections @reservoir temp. and press	Rhofluid	g/cc	CALC. FROM LOG HEADING/ MUD DATA	1.18
Shale GR	GRsh	API	LOG	100
Matrix density	RHOma	g/cm3	AVERAGE FROM CORE PLUG DATA	2.66
Matrix GR	GRgd	API	LOG	99
Archie factor	a		REF.3	0.412
Cementation exponent	m		REF.3	2.7
Saturation exponent	n		REF.3	2.0
K value gas zone	kgas		REF.2	3.0
K value oil zone	koil		REF.2	4.0

Ref. 1 : 'Troll west water saturation model for the oil zone.' Norsk Hydro, April 1995
Ref. 2 : 'Final well report, well 31/5-H-6H'
Ref. 3 : 'Plan of development and operation', December 1991