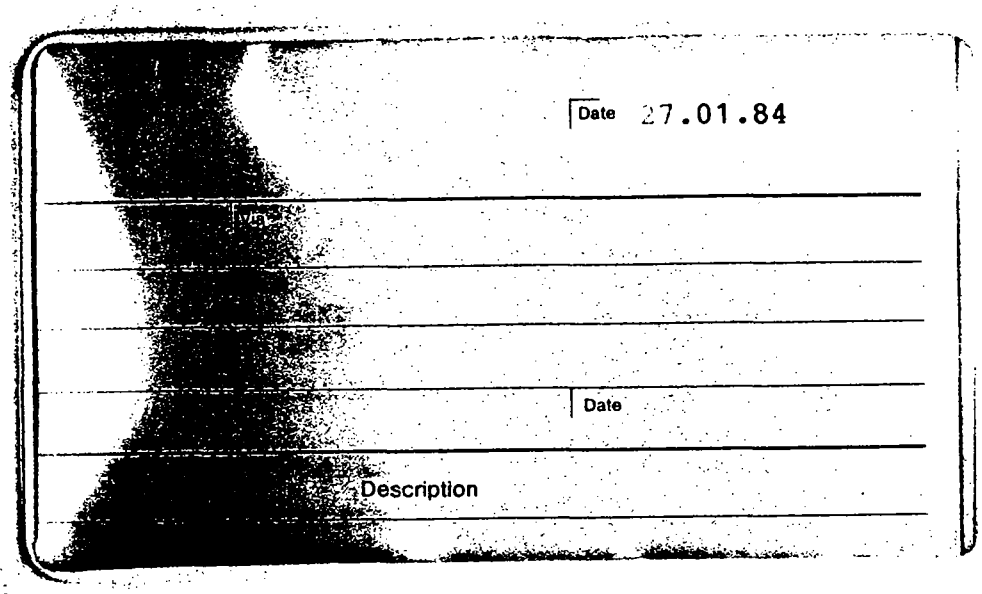


Norsk Hydro

Postadr.: Postboks 2594, Solli
N-Oslo 2
Kontoradr.: Kjørbokollen, Sandvika
Telefon: (02) 54 39 20
Telegram: norskhydro
Telex: 17327 hydro n

Data transmittal record

STATOIL
Stavanger
Att: P. Røise

Date 27.01.84

Via

☐ Under separate cover

☒ Enclosed

Subject: Norway well ~~31/3-2~~

Signed by Ø. Forsberg

Date

Quantity	Description
2 rep	Drilling program. "Treasure seeker"

O. Gorebo, RE
K.T. Skaar, LET
L.R Gossland, R
DTS Kron
PS.13
PR

Please sign and return yellow copy to acknowledge receipt of above data

Received by Randi Asheim

Date 31.01.84

1673 c HK 8 82 5000 W 4738

Norsk Hydro

Statoil
P.O. Box 300
4001 STAVANGER

Attn.: B. Rasmussen

Deres ref.	Deres brev av	Vår ref.	Dato
		O&G Grp. B. Lærkerød/SGa	26. januar 1984

Vedlagt oversendes "Drilling Program" for 31/3-2. Brønnen vil nå bli boret med Treasure Seeker, og de tidligere tilsendte boreprogrammer for Treasure Scout kan makuleres.

6 sider av "Prospect Description 31/3-2" er endret og ligger vedlagt. Vennligst makuler tilsvarende sider i tidligere tilsendte "Prospect Description".

Med hilsen
for Norsk Hydro a.s

Bjørn Lærkerød

B. Lærkerød

Vedlegg

cc: Saga, Høvik
Attn.: B. Rasmussen

Postadresse:
Postboks 2594 - Solli
N-Oslo 2

Kontoradresse:
Kjørbokollen, Sandvika

Telefon:
National (02) 54 39 20
Internat. + 47 2 54 39 20

Telegram:
norskhydro

Telex:
17327 hydro n

1. LOCATION

AREA	NORWEGIAN NORTH SEA	
LICENCE	PL 085	
BLOCK	31/3	
WELL NO	31/3-2	
GROUP	NORSK HYDRO PRODUKSJON A.S.,	
	STATOIL, SAGA PETROLEUM	
OPERATOR	NORSK HYDRO PRODUKSJON A.S.	
CLASSIFICATION	APPRAISAL	
GEOGRAPHICAL COORDINATES	60°52' 11.5"N	
	3°40'42.8"E	Sone 31
UTM COORDINATES	6,748,643m N	C. Meridian 3°E
	536,851m E	ED 50
SEISMIC LOCATION	ST 8007-338A, SP 204.5	
DRILLING RIG	TREASURE SEEKER	
WATER DEPTH	340 m	
RKB-MSL	25 m	
PROJECTED TOTAL DEPTH	2050m RKB (Alt.1)/2130 m RKB (Alt.2)	

TABLE

SEISMIC PROGNOSIS, WELL 31/3-2

Seismic Pick twt (ms)	Pick Uncertainty (ms)	Interval Velocity (ms^{-1})	Interval Thickness (m)	Expected Depths MSL (m)	Expected Depths RKB (m) 365	Total Seismic Uncertainty	Stratigraphy
460				340	365		Seabed
		1815 ±70	185				
665	±10			520	545	±15	Base NORDLAND GRP
		1855 ±90	55				
725	±10			575	600	±35	Intra OLIGOCENE seq. b.
		1860 ±70	230				
970	±10			805	830	±55	Top EOCENE seq. b.
		1955 ±55	230				
1205	±10			1025	1050	±80	Top BALDER FM
		2095 ±90	415				
1600	±10			1435	1460	±80	Top MAUREEN FM
		2690 ±45	95				
1670	+20 -10			1525	1550	+40 -25	Top DRAUPNE FM
		2390 ±90	25				
1690	±10			1550 (1575)	1575 (1600)[3]	±15	Top SOGNEFJORD FM
1690	±10			1550	1575	±10	G.O.C.
		3200 ±50	270[1] abs.[2]				
1860[1] abs.[2]	±20			1820[1] abs.[2]	1865[1] abs.[2]	±65	Fault plane
		3200 ±50	65[1] 415[2]				
1900[1] 1950[2]	±20			1885[1] 1965[2]	1910[1] 1990[2]	±65	Top NESS coal

Notes 1) Assuming well penetrates Top NESS coal on upthrown side of fault.

2) Assuming well penetrates Top NESS coal on downthrown side of fault.

3) Revised map and location.

G.I.B 27/10/83

TABLE 1b

ALTERNATIVE 2

STRATIGRAPHY	DEPTH (m MSL)	DEPTH (m RKB) (25m RKB)	THICKNESS (m)
Top UPPER HEATHER FM	1700	1725	15
Top FENSFJORD FM	1715	1740	130
Top FAULT PLANE	Absent		
Top KROSSFJORD FM	1845	1870	15
Top LOWER HEATHER FM	1860	1885	95
Top BRENT GRP	1955	1980	75
Top TARBERT/NESS FM	1955	1980	45
Top NESS COAL	1965	1990	
Top ETIVE FM	2000	2025	30
Top DUNLIN GRP	2030	2055	
Top DRAKE FM	2030	2055	

T.D. Alternative 2: 2130 m RKB.

TABLE 1a

EXPECTED TOPS AND THICKNESSES, 31/3-2

ALTERNATIVE 1

STRATIGRAPHY	DEPTH (m MSL)	DEPTH (m RKB) (25m RKB)	THICKNESS (m)
Sea Bottom	340	365	
Base NORDL.GRP (L.PLIO.unc.)	520	545	
Top OLIGOCENE SD	520	545	55
Intra OLIGOCENE seq. b.	575	600	
Top EOCENE seq. b.	805	830	220
Top ROGALAND GRP.	1025	1050	425
Top BALDER FM	1025	1050	145
Top SELE FM	1170	1195	175
Top LISTA FM	1345	1370	90
Top MAUREEN FM	1435	1460	15
Top SHETLAND GRP	1450	1475	55
Top CENOMAN seq.	1485	1510	20
Top CROMER KNOLL GRP	1505	1530	20
Top VIKING GRP	1525	1550	410
Top DRAUPNE FM	1525	1550	25
Top SOGNEFJORD FM	1550 (1575)	1575 (1600)*	150
G.O.C.	1550	1575	
Top UPPER HEATHER FM	1700	1725	15
Top FENSFJORD FM	1715	1740	125
FAULT PLANE	1820	1865	
Top KROSSFJORD FM	Absent		
Top LOWER HEATHER FM	1820	1865	35
Top BRENT GRP	1875	1900	75
Top TARBERT/NESS FM	1875	1900	45
Top NESS COAL	1885	1910	
Top ETIVE FM	1920	1945	30
Top DUNLIN GRP	1950	1975	
Top DRAKE FM	1950	1975	

*) Revised map and location

T.D. Alternative 1: 2050 m RKB.

GEOLOGICAL PROGNOSIS

ALT. 1

LOCATED ON LINE SP
ST 8007-338A 204.5

WELL **31/3-2**

WATER DEPTH 340m MSL

DEPTH m RKB | LITHO SECTION | SYSTEM | STAGE | GROUP | FORMATION | DESCRIPTIONS. | SHOWS

25 m MSL

365 m Sea bottom

390 m **Cly** gy, sft, lam

415 m **Cly**, *gy, sft, slty, tr* **Sd/Gvl**

425 m Pos Bldr

449 m 30"

460 m **Cly**, gy, overcons, v hd, w/crs fractions

475±15 m Pos Bldr

Cly, gy, overcons hd, w/strgs **Sd and Slt**

535m **Sd**, f-crs

545±15m

Sd, f-crs, slty

600 m 20"

600±35m

Cly, brn-brnish gy, sft, slty-v slty, sdy, mic, calc, plastic, poss swelling
Tr Microfoss
Tr Pyr

Tr Glau

830±55m

Cly/Clyst, lt-grnish gy, sft, slty, glau
Tr **Sd**, clr, m, ang
Tr **Lst** dusky yel brn-red brn

Clyst, bl gy-grnish gy, sft-firm, slty-v slty grdg **Slst**, sl micro-mic, glau, non-sl calc
Tr **Lst** wh-lt gy, sft-mod hd, in pt v arg grdg **Mrl**
Tr **Tuff**, gy-blk, spec Tr **Sd**

1050±80m

Clyst, m-dk brn, lt gy-grnish gy, sft-firm, slty, micro-mic, occ sl calc Tr **Slst**, m-dk gy, gy brn, sft-firm

Tr **Lst** lt gy-m brn, firm-hd, micro xln
Tr **Tuff** a/a

1195 $^{+80}_{-85}$

Clyst, olv gy-dk gy, sft-firm, micro-mic
Tr **Sst**, dk gy-dk gy brn, vf, sft-firm, arg mtx, loc calc

DEPTH m RKB	LITHO SECTION	SYSTEM	STAGE	GROUP	FORMATION	DESCRIPTIONS.	SHOWS
1300		TERTIARY	PALEOCENE	ROGALAND	SELE	**Clyst**, dk grn-grn blk, olv blk-gy blk-dusky yel brn, sft-firm occ slty, sl micro-mic, rr glau, rr *carb* Tr **Lst** a/a	
1350						1370 $\pm^{80}_{85}$ m	
1400					LISTA	**Clyst**, m-dk gy, dk gy brn, gy grn, sft-firm, occ slty, non calc	
1450						1460±80m **Lst** wh sft-firm, **Mrl**, lt gy-lt	
1500			U CRET		SHTL.	1475±70m brn, sft-firm, in pt slty **Mrl**, lt gy, occ dk bl gy, sft, occ slty **Lst**, wh, off wh, firm, micro-xln 13 3/8" 1500 m	
1550			L CRET			1510±50m **Mrl**, lt-m gy, occ slty **Lst** a/a 1530 $\pm^{45}_{30}$ m ^{40} **Lst**, wh, crm, yel brn, hd	
1600						1550±25 m **Clyst**, dk gy, brn blk, firm, carb, 1575±15m micro mic	
1650					SOGNEFJORD	**Sd/Sst**, m-dk gy, brn gy, vf-crs, pred m-crs, occ gran, lse-fri, hd when occ calc cmtd, mic, occ glau, pyr, carb, gd-poor por	
1700						1725±35m **Sst**, *m gy-m brn gy, vf-slty grdg* **Slst**, firm-mod hd, v mic, sl carb, sl calc	
1750					FENSFJORD	1740±40m **Sst** wh-lt gy, vf-f, occ crs, fri-mod hd, mic, pyr, carb, sl calc cmtd, loc intbd slty **Sst**, m-dk gy, vf-slt, mod hd, sl glau, mic, carb, sl calc	
1800						1865±65m **Fault** **Slst**, wh-lt gy, m brn, firm-mod hd, in pt grdg vf **Sst** mic, carb, sl calc	
1850						1900±65m **Sst**, clr, wh-lt gy, m-crs, 1910±65m firm-hd, calc cmt **Coal**, blk-brn blk, hd **Slst**, lt gy-gy brn	
1900					DRAKE	1945 $\pm^{60}_{80}$ sft-firm, occ carb, occ calc **Sst**, clr-wh, f-crs, mod hd, non calc, 1975 $\pm^{65}_{80}$ m mic	
1950						**Clyst**, lt-dk brn, dk gy, sft-firm, loc slty, micro-mic, non sl calc 9 5/8"	
2000						2050 $\pm^{80}_{85}$ m T.D. T.D	
2050							
2100							
2150							
2200							
2250							
2300							
2350							
2400							
2450							

~~ sequence boundaries

GEOLOGICAL PROGNOSIS

ALT. 2

LOCATED ON LINE SP
ST 8007-338A 204.5

WELL **31/3-2**

WATER DEPTH 340m MSL

DEPTH (feet) | LITHO SECTION | SYSTEM | STAGE | GROUP | FORMATION | DESCRIPTIONS | SHOWS

25 m MSL

365 m Sea bottom

I
390 m **Cly** gy, sft, lam

II
415 m **Cly**, gy, sft, slty, tr **Sd/Gvl**
425 m Pos Bldr
449m 30"

III
460 m **Cly**, gy, overcons, v hd, w/crs fractions
475±15 m Pos Bldr

IV
Cly, gy, overcons hd, w/strgs **Sd and Slt**

535m **Sd**, f-crs
545±15m

Sd, f-crs, slty
600 m 20"

600±35m
Cly, brn-brnish gy, sft, slty-v slty, sdy, mic, calc, plastic, poss swelling
Tr Microfoss
Tr Pyr

Tr Glau

830±55m
Cly/Clyst, lt-grnish gy, sft, slty, glau
Tr **Sd**, clr, m, ang
Tr **Lst** dusky yel brn-red brn

Clyst, bl gy-grnish gy, sft-firm, slty-v slty grdg **Slst**, sl micro-mic, glau, non-sl calc
Tr **Lst** wh-lt gy, sft-mod hd, in pt v arg grdg **Mrl**
Tr **Tuff**, gy-blk, spec. Tr **Sd**

1050±80/85 m
Clyst, m-dk brn, lt gy-grnish gy, sft-firm, slty, micro-mic, occ sl calc, Tr **Slst**, m-dk gy, gy brn, sft-firm

Tr **Lst** lt gy-m brn, firm-hd, micro xln
Tr **Tuff** a/a

1195±80/85 m
Clyst, olv gy-dk gy, sft-firm, micro-mic
Tr **Sst**, dk gy-dk gy brn, vf, sft-firm, arg mtx, loc calc

SYSTEM: TERTIARY | QUARTERNARY
STAGE: OLIGOCENE | EOCENE | PAL.
GROUP: NORDLAND | HORDALAND | ROGALAND
FORMATION: BALDER | SELE

SHOWS: ? ?

1300 | 1350 | 1400 | 1450 | 1500 | 1550 | 1600 | 1650 | 1700 | 1750 | 1800 | 1850 | 1900 | 1950 | 2000 | 2050 | 2100 | 2150 | 2200 | 2250 | 2300 | 2350 | 2400 | 2450

SYSTEM: TERTIARY | CRET | JURASSIC
STAGE: PALEOCENE | U.CRET | L.C | U.JUR | M.JUR | L.JUR.
GROUP: ROGALAND | SHTL. | VIKING | BRENT | DUNLIN
FORMATION: SELE | LISTA | M | D | TU-MA | CEN | C.K | U.P-BERA | DR. | SOGNEFJORD | U.H. | FENSFJORD | K.F. | HEATHER | NE-TA | ET-IVE | DRAKE

Clyst, dk grn-grn blk, olv blk-gy blk-dusky yel brn, sft-firm occ slty, sl micro-mic, rr glau, rr carb
Tr **Lst** a/a
1370 ± 80/85 m

Clyst, m-dk gy, dk gy brn, gy grn, sft-firm, occ slty, non calc

1460±80m
Lst wh sft-firm, **Mrl**, lt gy-lt
1475±70m brn, sft-firm, in pt slty
Mrl, lt gy, occ dk bl gy, sft, occ slty **Lst**, wh, off wh, firm, micro-xln
1510±50m
1530 ± 45/30 m **Mrl**, lt-m gy, occ slty **Lst** a/a
1550 ± 40/25 m **Lst**, wh, crm, yel brn, hd
Clyst, dk gy, brn blk, firm, carb,
1575±15m micro-mic

Sd/Sst, m-dk gy, brn gy, vf-crs, pred m-crs, occ gran, lse-fri, hd when occ calc cmtd, mic, occ glau, pyr, carb, gd-poor por

1725±35m
Sst, m gy-m brn gy, vf-slty grdg **Slst**, firm-mod hd, v mic, sl carb,
1740±40m sl calc
Sst, wh-lt gy, vf-f, occ crs, fri-mod hd, mic, pyr, carb, sl calc cmt, loc intbd slty **Sst**, m-dk gy, vf-slt, mod hd, sl glau, mic, carb sl calc

1870 ± 55/60 m
Sd/Sst, clr, vf-crs, lse-fri, mic, calc cmt
1885±60m
Slst, wh-lt gy, m brn firm-mod hd, in pt grdg vf **Sst**, mic, carb, sl calc

1980±65m
Sst, clr, wh-lt gy, m-crs, firm-hd, calc cmt,
1990±65m
Coal, blk-brn blk, hd
Slst, lt gy-gy brn, sft-firm, occ carb, occ calc
2025 ± 70/60 m
Sst, clr-vh, f-crs, mod
2055 ± 80/85 m non calc, mic
Clyst, lt-dk brn, dk gy, sft-firm, loc slty, micro-mic, non-sl calc
2130 ± 80/105 m T.D.

13 3/8" 1500m
9 5/8" TD.

~~~ sequence boundaries
~~~

4464S

DRILLING PROGRAM

WELL 31/3-2

"TREASURE SEEKER"

December 1983

This program supplemented by
Norsk Hydro's Operation Manuals
Part 1,2 and 3
constitute the drilling order for
31/3- 2

Drilling Manager

General Manager, Exploration

LIST OF CONTENTS

FIGURES

SECTION A

WELL DATA

1. GENERAL COMMENTS

Well 31/3-2 will be drilled with the H-3 drilling vessel Treasure Seeker. The main objectives of the well are to determine if hydrocarbons are present close to the "boundary fault" between Troll-West and Troll-East and to evaluate the degree of communication between the two structures.

The well may cross the "boundary fault". Therefore two alternative geological prognoses are presented. Total depth are 2050 m for Alt. 1 which represent the case were the well is crossing the fault and 2130 m for Alt. 2 which is not crossing the fault.

The pore pressure development is expected to be similar to what was experienced in the 31/6-1 and 31/2-6 wells (ref. section A-4). The 31/3-2 well will penetrate the reservoir in the oil/water zone, therefore no overpressure is expected in the reservoir or overlaying shales.

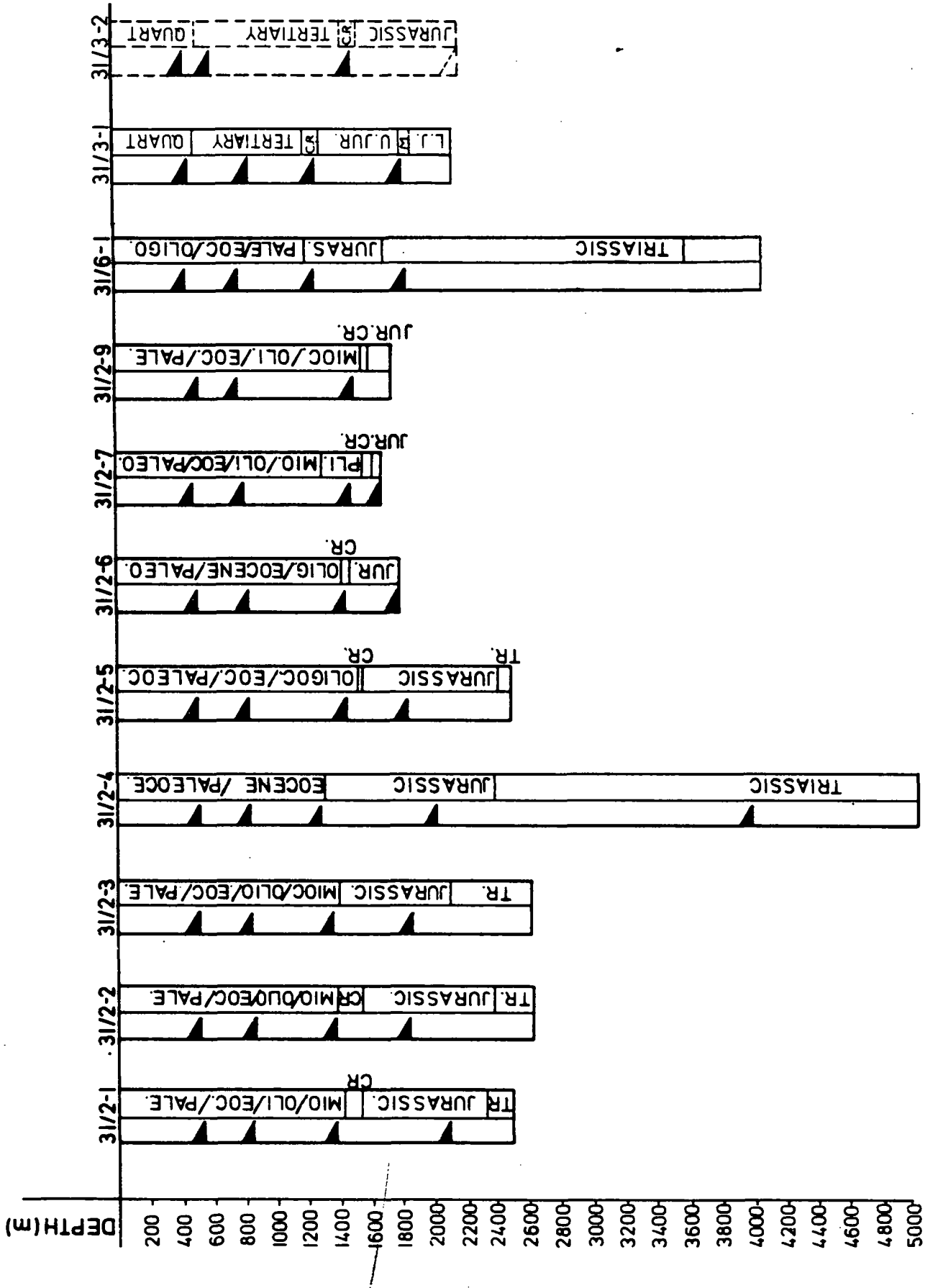
The preliminary interpretation of the sitesurvey does not show any high amplitude anomalies indicating possible shallow gas.

The 20" casing will be set just below the Oligocene sand to allow for maximum deviation if sidetrack is necessary.

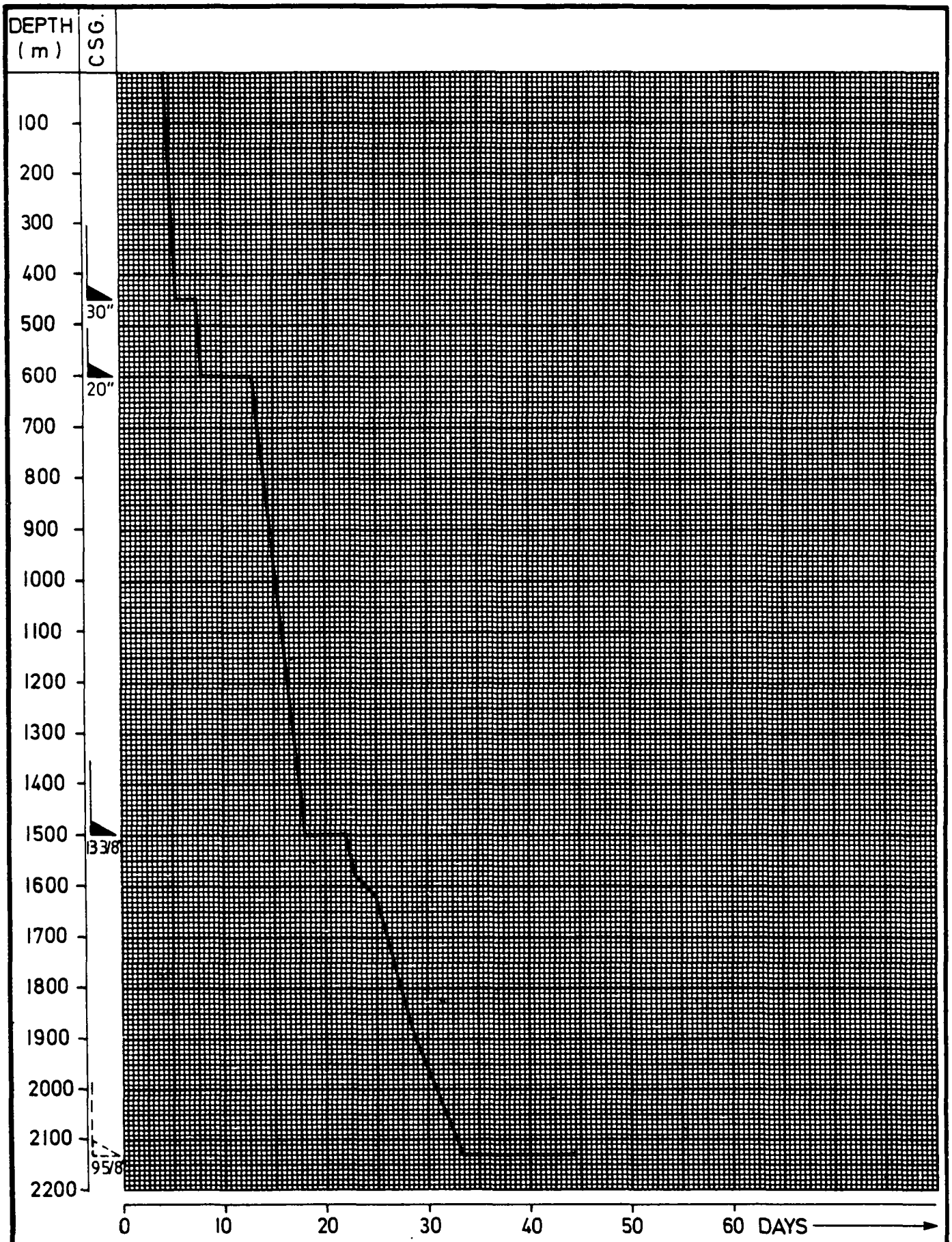
The 13 3/8" casing will be set into the Upper Cretaceous interval before entering the reservoir.

The well will be drilled to total depth with 12 1/4" hole and the 9 5/8" casing set for testing purpose.

A total of 44 days including 35% contingency is budgeted for this well (ref. fig. 2, page 3).



Norsk Hydro Drilling Department	CORRELATION WELLS FOR 31/3-2	Gr. no.: 7	Fig.: 1
		Date: 21.09.83. Sign: TH/SF	Dwg. no.: 06



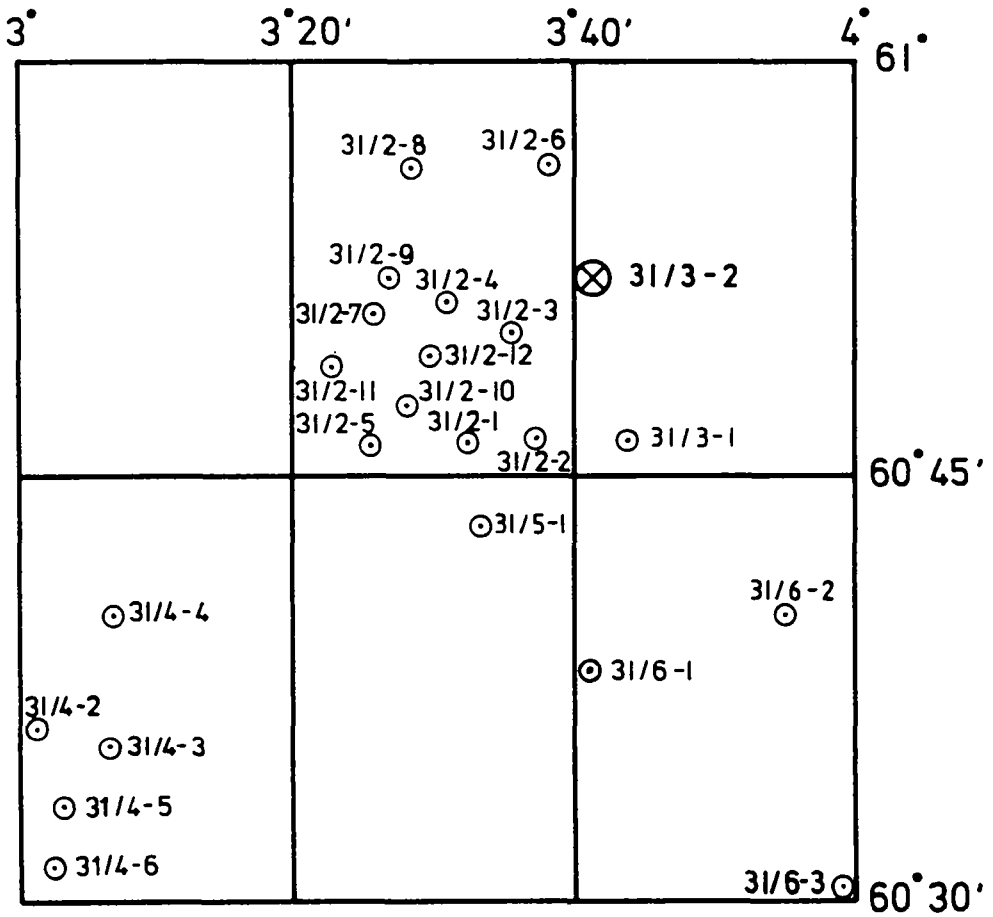
Norsk Hydro Drilling Department	DRILLING CURVE WELL 31/3-2 (Inncluding 35 % cont)	Gr. no.: 7	Fig.: 2
		Date: 27.12.83. Sign: JPL / SF	Dwg. no.: 51

2. LOCATION DATA

Well identification:	31/3-2
Location: Geographical	60°52'11,5"N 03°40'42,8"E
UTM coordinates::	6 748 643 mN 536 851 mE (Zone 3°, Central Meridian 3°E ED 1950)
Seismic line:	ST 8007-338A, S.P.: 204,5
Water Depth:	340 m (MSL)
KB devation:	25 m
Prognosed total depth:	2050 $\binom{+80}{-85}$ m or 2130 $\binom{+80}{(-105)}$ m

A site survey was performed by GECO during 1-29 November 1983.

General seabed slop at location:	Approximately flat.
Maximum water depth variation within anchorpattern (radius 1500 m):	3 metres. (339 m to 342 m).
Seabed condition:	Seabed is soft clay with pockmarks 3-7 metres deep and 25-40 metres in diameter.
Seabed hazards:	None.
Sub seabed condition:	Soft silty clay to 368 m MSL. Stiff clay to 390 m MSL, followed by overconsolidated material (till which may contain boulders) to 465 m MSL. Hard clay and silt to 530 m MSL. A layer interpreted as sand overlies the angular unconformity from 530-540 m MSL. A sand at this level in wells 31/3-1 and 31/6-1 has shown a gas content of just over 1%.
Drilling hazards	None.



Norsk Hydro Drilling Department	Location map 31/3-2	Gr. no.: 7	Fig.: 3
		Date: 21.09.83. Sign: JTA/SF	Dwg. no.: 00

3. OBJECTIVES, LITHO-STRATIGRAPHY AND GELOGICAL PROGNOSIS

3.1 Objectives

A large tilted fault block covering the major part of block 31/6, extends into block 31/3. The well is located very near the junction of the western master fault and the fault bounding the 31/2-6 block to the southeast.

A seismic anomaly representing the GOC is observed at the same TWT level as the top reservoir. This indicates that the well may penetrate an oil- (3-11 m thick) or water bearing SOGNEFJORD FM. Due to seismic uncertainty a small gas column may be present.

The well may record the "boundary fault" zone in the lower FENSFJORD FM (Alternative 1) or drill a complete UPPER-MIDDLE JURASSIC section (Alternative 2).

The objectives of 31/3-2 will be:

A: To determine if hydrocarbons are present on the downthrown side close to the "boundary fault" and determine the contacts.

B: To obtain data for evaluating the degree and capacity of communication between Troll-West and Troll-East.

C: To determine the depth to the reservoir in the area of unrealiable seismic mapping.

D: If moveable hydrocarbons are found, to perform testing for observation of "boundary effects" where the pay-zone is narrow and thin.

E: To obtain a new sedimentological datapoint between 31/2-6 and 31/3-1, with different evolution of the main reservoir sand.

F: To try to determine whether sands with different capillary pressure porperties are in contact across the "boundary fault".

The well is prognosed to be drilled into the LOWER JURASSIC DRAKE FM to a total depth of 2050 m RKB (Alternative 1)

In the case of the well being drilled entirely in the downthrown block (Alternative 2), the TD will be 2130 m RKB

3.2 Litho-Stratigraphy

Depth m RKB	System/Series	Rock unit	Lithology
365-545 (±15)	Quaternary	Nordland Gp.	Clay with intercalated sands, possible boulders at 415m and 460m RKB and sand at 535m RKB which might possibly contain gas.
545-1050 (±80)	Tertiary	Hordaland Gp.	55m of sand at top of Gp., underlain by clay silty and claystone, silty and tuffaceous at base Gp.
1050-1475 (±70)	Tertiary	Rogaland Gp.	Claystone, silty, tuffaceous and stringers of limestone (15m Danian limestone at base of Gp.).
1475-1530 (+45 -30)	Up. Cretaceous	Shetland Gp.	Claystone, marl and limestone.
1530-1550 (+40 -25)	Lwr. Cretaceous	Cromer Kn.Gp.	Marl and limestone
1550-1575 (±15)	U. Portl.-Berr.	Draupne Fm.	Claystone and limestone.

Depth m RKB	System/Series	Rock unit	Lithology
1575-1740 (± 40)	Oxf.-Kimmeridg.	Sognefjord & U. Heather Fm.	Sand/sandstone, very fine to coarse, siltstone, micaceous, argillaceous, carbonaceous.
Alternative 1:			
1740-1865 (±65)	Callovian	Fensfjord Fm.	Sandstone, very fine to coarse and sandstone, silty, very fine, micaceous, carbonaceous.
1865 (±65)	Fault		
1865-1900 (±65)	Bathonian	Lwr.Heather Fm.	Siltstone, micaceous, carbonaceous.
(+80) 1900-2050 (-85)	Bajocian-Toarc.	Brent & Dunlin Gps.	Sand/sandstone, fine to coarse. Coal at 1910m RKB. Siltstone carbonaceous. Claystone, silty, micromicareous.

Depth m RKB	System/Series	Rock unit	Lithology
Alternative 2:			
1740-1870 (+55) (-60)	Callovian	Fensfjord Fm.	Sandstone, very fine to coarse and sandstone, silty, very fine, micaceous, carbonaceous.
1870-1980 (±65)	Bathonian	Krossfjord & L. Heather Fms.	Sand/sandstone, very fine to coarse. Siltstone, micaceous, carbonaceous.
1980-2130 (+80) (-105)	Bajocian-Torac.	Brent & Dunlin Gps.	Sand/sandstone, fine to coarse. Coal at 1990m RKB. Siltstone, carbonaceous. Claystone, silty, micromicaceous.

GEOLOGICAL PROGNOSIS

ALT. 1

LOCATED ON LINE SP
ST 8007-338A 204,5

WELL **31/3-2**

WATER DEPTH 340m MSL

DEPTH m RKB | LITHO SECTION | SYSTEM | STAGE | GROUP | FORMATION | DESCRIPTIONS. | SHOWS

25 m MSL

365 m Sea bottom

I — 392 m **Cly** gy, sft, lam

II — 415 m **Cly**, gy, sft, slty, tr **Sd/Gvl** 30°

425m Pos Bldr

449m

III — **Cly**, gy, *overcons*, v hd, w/crs fractions

460 m

475±15 m Pos Bldr

IV — **Cly**, gy, overcons hd, w/strgs **Sd** and **Slt**

535m **Sd**, f-crs

545±15m

Sd, f-crs, slty

20°

600m

600±35m

Cly, brn-brnish gy, sft, slty-v slty, sdy, mic, calc, plastic, poss swelling
Tr Microfoss
Tr Pyr

Tr Glau

830±55m

Cly/Clyst, lt-grnish gy, sft, slty, glau
Tr **Sd**, clr, *m*, *ang*
Tr **Lst** dusky yel brn-red brn

Clyst, bl gy-grnish gy, sft-firm, slty-v slty grdg **Slst**, sl micro-mic, glau, non-sl calc
Tr **Lst** wh-lt gy, sft-mod hd, in pt v arg grdg **Mrl**
Tr **Tuff**, gy-blk, spec Tr **Sd**

1050±80m

Clyst, m-dk brn, lt gy-grnish gy, sft-firm, slty, micro-mic, occ sl calc Tr **Slst**, m-dk gy, gy brn, sft-firm

Tr **Lst** lt gy-m brn, firm-hd, micro xln
Tr **Tuff** a/a

1195±80/85

Clyst, olv gy-dk gy, sft-firm, micro-mic
Tr **Sst**, dk gy-dk gy brn, vf, sft-firm, arg mtx, loc calc

SYSTEM	STAGE	GROUP	FORMATION
QUARTERNARY			
TERTIARY	OLIGOCENE	NORDLAND	
TERTIARY	EOCENE	HORDALAND	
	PAL.	ROGALAND	BALDER
			SELE

SYSTEM	STAGE	GROUP	FORMATION
TERTIARY	PALEOCENE	ROGALAND	SELE
			LISTA
			SHTL.
			SOGNEFJORD
			FENSFJORD
			VIKING
			BRENT
			DUNLIN
			DRAKE
U.CRET	TU.-MA.		
	CEN		C.K.
	UP.V.-BERR.		DR.
			U.H.
			L.H.
			NE-TA-IVE
U.CRET	L.C		
UPPER JURASSIC	L.PORTLAND — CALLOV. — BATHON.		
M.JUR.	TOARC.-BAJOC.		
L.JUR.			

Clyst, dk grn-grn blk, olv blk-gy blk-dusky yel brn, sft-firm occ slty, sl micro-mic, rr glau, rr carb
Tr **Lst** a/a

1370 ± 80/85 m

Clyst, m-dk gy, dk gy brn, gy grn, sft-firm, occ slty, non calc

1460±80m

Lst wh sft- firm, **Mrl**, lt gy-lt

1475±70m brn, sft-firm, in pt slty **Mrl**, lt gy, occ dk bl gy, sft, occ slty **Lst**, wh, off wh, firm, micro-xln

1510±50m

1530 ± 45/30 m **Mrl**, lt-m gy, occ slty **Lst** a/a

Lst, wh, crm, yel brn, hd

1550 ± 25/40 m

Clyst, dk gy, brn blk, firm, carb,

1575±15m micro-mic

Sd/Sst, m-dk gy, brn gy, vf-crs, pred m-crs, occ gran, lse-fri, hd when occ calc cmtd, mic, occ glau, pyr, carb, gd-poor por

1725±35m

Sst, m gy-m brn gy, vf-slty grdg **Slst**, firm-mod hd, v mic, sl carb, sl calc

1740 ± 40m

Sst wh-lt gy, vf-f, occ crs, fri - mod hd, mic, pyr, carb, sl calc cmtd, *loc intbd* slty **Sst**, m-dk gy, vf - slt, mod hd, sl glau, mic, carb, sl calc

1865±65m **Fault**

Slst, wh-lt gy, m brn, firm-mod hd, in pt grdg vf **Sst** mic, carb, sl calc

1900 ± 65m

1910 ± 65m **Sst**, clr, wh-lt gy, m-crs, firm-hd, calc cmt **Coal**, blk-brn blk, hd **Slst**, lt gy-gy brn

1945 ± 60/80 sft-firm, occ carb, occ calc **Sst**, clr-wh, f-crs, mod hd, non calc,

1975 ± 65/80 m mic

Clyst, lt-dk brn, dk gy, sft-firm, loc slty, micro-mic, non sl calc

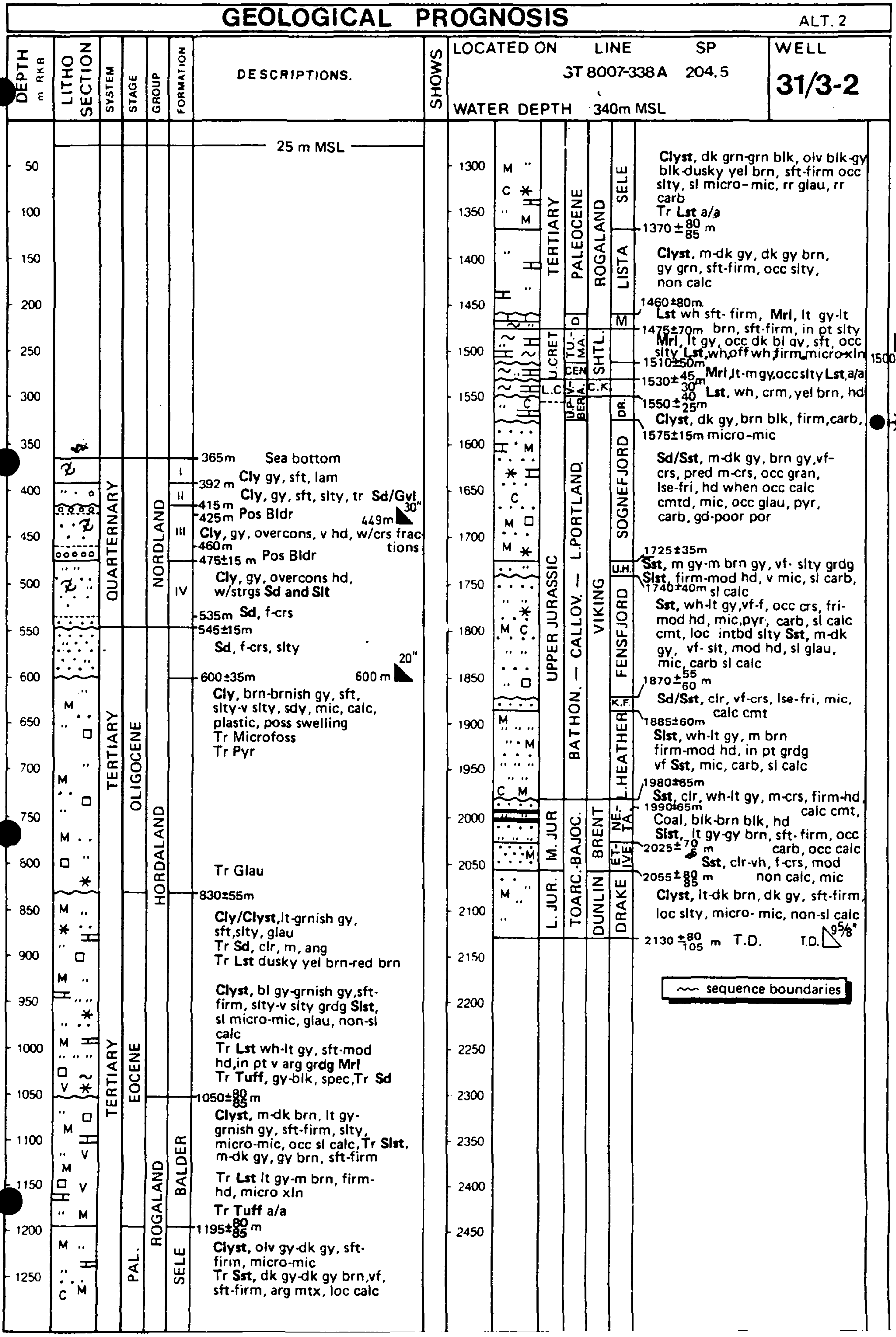
9 5/8"

2050 ± 80/85 m T.D. T.D.

13 3/8"

1500 m

~~~ sequence boundaries
~~~


GEOLOGICAL PROGNOSIS
ALT. 2
DEPTH m RKB
LITHO SECTION
SYSTEM
STAGE
GROUP
FORMATION
DESCRIPTIONS.
SHOWS
LOCATED ON LINE SP
ST 8007-338A 204.5
WATER DEPTH 340m MSL
WELL
31/3-2
25 m MSL
365m Sea bottom
392 m Cly gy, sft, lam
415 m Cly, gy, sft, slty, tr Sd/Gvl
425 m Pos Bldr
449m 30"
Cly, gy, overcons, v hd, w/crs fractions
460 m
475±15 m Pos Bldr
Cly, gy, overcons hd, w/strgs Sd and Slt
535m Sd, f-crs
545±15m
Sd, f-crs, slty
20"
600±35m
600 m
Cly, brn-brnish gy, sft, slty-v slty, sdy, mic, calc, plastic, poss swelling
Tr Microfoss
Tr Pyr
Tr Glau
830±55m
Cly/Clyst, lt-grnish gy, sft, slty, glau
Tr Sd, clr, m, ang
Tr Lst dusky yel brn-red brn
Clyst, bl gy-grnish gy, sft-firm, slty-v slty grdg Slst, sl micro-mic, glau, non-sl calc
Tr Lst wh-lt gy, sft-mod hd, in pt v arg grdg Mrl
Tr Tuff, gy-blk, spec, Tr Sd
1050±80/85 m
Clyst, m-dk brn, lt gy-grnish gy, sft-firm, slty, micro-mic, occ sl calc, Tr Slst, m-dk gy, gy brn, sft-firm
Tr Lst lt gy-m brn, firm-hd, micro xln
Tr Tuff a/a
1195±80/85 m
Clyst, olv gy-dk gy, sft-firm, micro-mic
Tr Sst, dk gy-dk gy brn, vf, sft-firm, arg mtx, loc calc
QUARTERNARY
TERTIARY
OLIGOCENE
EOCENE
PAL.
NORDLAND
HORDALAND
ROGALAND
BALDER
SELE
I
II
III
IV
Clyst, dk grn-grn blk, olv blk-gy blk-dusky yel brn, sft-firm occ slty, sl micro-mic, rr glau, rr carb
Tr Lst a/a
1370±80/85 m
Clyst, m-dk gy, dk gy brn, gy grn, sft-firm, occ slty, non calc
1460±80m
Lst wh sft-firm, Mrl, lt gy-lt brn, sft-firm, in pt slty
1475±70m
Mrl, lt gy, occ dk bl gy, sft, occ slty Lst, wh, off wh firm, micro xln
1510±50m
1530±45/30 m Mrl, lt-m gy, occ slty Lst a/a
1550±40/25 m Lst, wh, crm, yel brn, hd
Clyst, dk gy, brn blk, firm, carb, micro-mic
1575±15m
Sd/Sst, m-dk gy, brn gy, vf-crs, pred m-crs, occ gran, lse-fri, hd when occ calc cmtd, mic, occ glau, pyr, carb, gd-poor por
1725±35m
Sst, m gy-m brn gy, vf-slty grdg Slst, firm-mod hd, v mic, sl carb, sl calc
1740±40m
Sst, wh-lt gy, vf-f, occ crs, fri-mod hd, mic, pyr, carb, sl calc cmt, loc intbd slty Sst, m-dk gy, vf-slt, mod hd, sl glau, mic, carb sl calc
1870±55/60 m
Sd/Sst, clr, vf-crs, lse-fri, mic, calc cmt
1885±60m
Slst, wh-lt gy, m brn firm-mod hd, in pt grdg vf Sst, mic, carb, sl calc
1980±65m
Sst, clr, wh-lt gy, m-crs, firm-hd, calc cmt,
1990±65m
Coal, blk-brn blk, hd
Slst, lt gy-gy brn, sft-firm, occ carb, occ calc
2025±70/5 m
Sst, clr-vh, f-crs, mod non calc, mic
2055±80/85 m
Clyst, lt-dk brn, dk gy, sft-firm, loc slty, micro-mic, non-sl calc
2130±80/105 m T.D.
T.D. 9⅝"
13⅜"
1500m
?
TERTIARY
PALEOCENE
ROGALAND
SELE
LISTA
M
U.CRET
TU.-MA.
CEN
L.C
U.P.V.-BERA.
SHTL.
C.K.
DR.
UPPER JURASSIC
BATHON. — CALLOV. — L.PORTLAND
VIKING
SOGNEFJORD
U.H.
FENSFJORD
K.F.
HEATHER
M. JUR
TOARC.-BAJOC.
BRENT
NE-TA.
ET-IVE
L. JUR.
DUNLIN
DRAKE
sequence boundaries

4. PORE PRESSURE, FORMATION INTEGRITY AND TEMPERATUR PROGNOSES

The porepressure and formation integrity gradient prognoses for well 31/3-2 is shown in fig. 4. The temperature prognose is shown in fig. 5.

4.1 Pore pressure

The pore pressure in well 31/3-2 is expected to be normal hydrostatic from surface to TD. The 31/6-1 and 31/2-6 wells have been used as pressure correlation wells.

On some of the wells drilled on the Troll-field, a pore pressure gradient of up to 1,18 rd has been found on the top of the reservoar. The transition zone starts in lower Eocene and develops through Paleocene and Cretaceous.

Well 31/3-2 will penetrate the reservoar in the oil/water zone, therefore no overpressure is expected in the reservoar or in the overlaying shales.

4.2 Formation integrity

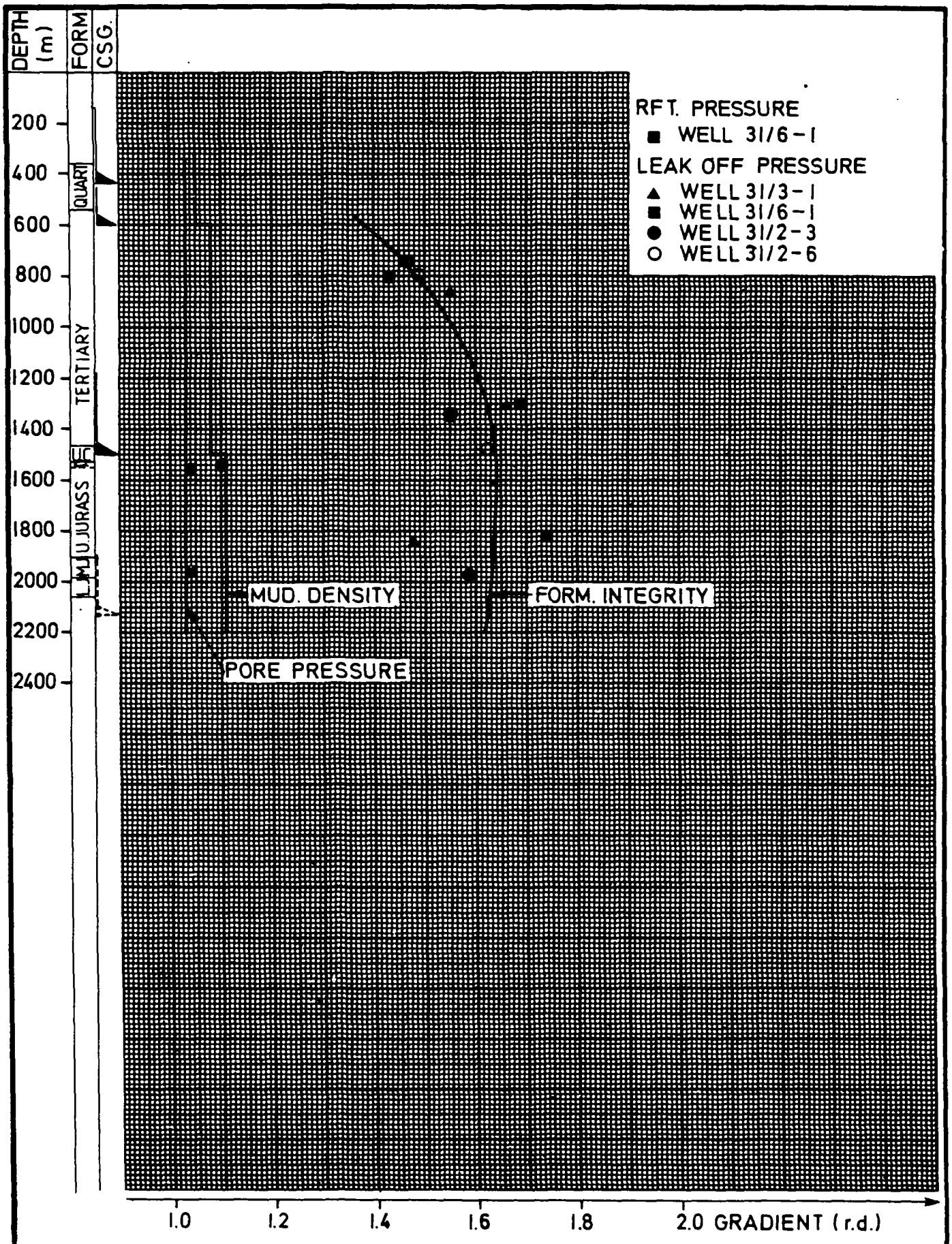
The fracture gradient prediction is based on leakoff data from correlation wells, 31/3-1, 31/2-3, 31/2-6 and 31/6-1.

It should be noted that the data are widely spread between 1800 m and 2000 m.

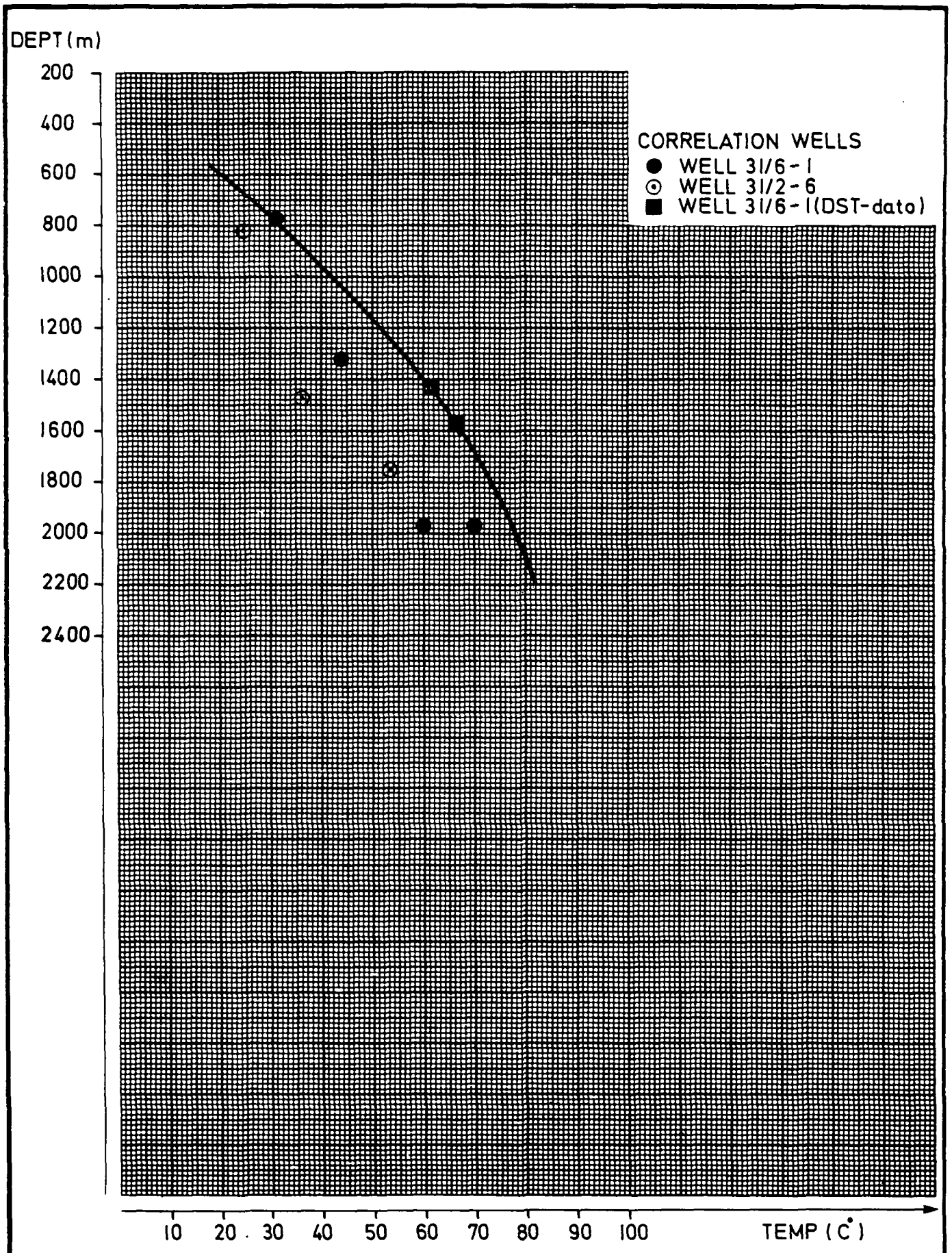
4.3 Temperatur prognosis

The prognosed temperature vs. depth is shown in fig. 5.

The temperature prognosis is based on data from correlation wells 31/6-1 and 31/2-6. The data is obtained from DST and termometers attached to the logging tools. The data from DST is regarded to be the most reliable and the prognosed temperature curve is drawn through these points.



Norsk Hydro Drilling Department	PREDICTED PORE PRESSURE FORMATION INTEGRITY AND MUD DENSITY GRADIENTS WELL 31/3-2	Gr. no.: 7	Fig.: 4
		Date: 23.12.83. Sign: Sho / SF	Dwg. no.: 52



Norsk Hydro Drilling Department	TEMPERATURE V.S. DEPTH WELL 31/3-2	Gr. no.: 7	Fig.: 5
		Date: 19.12.83 Sign: SHO/SF	Dwg. no.: 51

SECTION B
WELL SPECIFICATION

1.0 CASING/WELLHEAD PROGRAM

Wellhead, Vetco type SG-5, 690 bar WP.

30" Casing

Setting depth: 449 m
Run shoe joint, 5 joints, and housing joint.

20" Casing

Setting depth: 600 m (through the Oligocene sand). Run float shoe and float collar, with one intermediate joint.

Centralizers: Two on the bottom joint, one of them 3 m above the shoe, and then one each on the next two joints

13 3/8" Casing

Setting depth: 1500 m (into Upper Cretaceous). Run float shoe and float collar, with two intermediate joints.

Centralizers: Two on the bottom joint, one of them 3 m above the shoe, and then one each on the next four joints. Two inside the 20" shoe.

Across any hydrocarbon bearing zone run one centralizer on every joint plus three joints above and below.

9 5/8" Casing(Optional)

Setting depth: The exact setting depth will be decided after the well has been drilled to TD. However, TD at 2130 m has been used as a designe basis.
Run float shoe and float collar with three intermediate joints.

Centralizers: Two on the bottom joint, one of them 3 m above the shoe, and then one each on the next four joints. Two inside the 13 3/8" shoe.

Across any hydrocarbon bearing zone run one centralizer on every joint plus on three joints above and below.

CASING PROGRAM

Date :

WELL 31/3-2

Csg. Size	Setting Depth m	Frac. Grad. rd. (ppg)	Mud WT rd. (ppg)	Interval From m	Interval To m	Quant. m	Casing type WT kg/m (lbs/ft)	Casing type Grade	Casing type Thread	Min. Collapse bar (psi)	Min. Burst bar (psi)	Min. Tension kN (1000 lbs)	Required CP bar (psi)	Required BP bar (psi)	Required Tens. kN (1000 lbs)	Actual design factors Collapse	Actual design factors Burst	Actual design factors Tens.
30"	449			365	449	84	1 1/2" wt	B	ATD	HOUSING JOINT ONLY								
							1" WT	B	ATD	FOR THE OTHER 6 JOINTS								
20"	600	1.38	1.05	365	600	235	197.9 (133)	X-56	LS	101 (1465)	211 (3060)	9471 (2131)	37[1] (537)	67[2] (972)	1620[3] (364)	2.72	3.14	5.84
13 3/8"	1500	1.64	1.08	365	1500	1135	107.1 (72)	N-80	Butt	184 (2668)	371 (5380)	7388 (1661)	64[1] (928)	229[4] (3321)	2839[3] (638)	2.88	1.62	2.60
9 5/8"	2130	1.62	1.11	365	2130	1765	69.9 (47)	N-80	BUTT	328 (4756)	474 (6873)	4831 (1086)	96[5] (1400)	323[6] (4700)	2309[3] (519)	3.42	1.46	2.09

1. Calculated for casing 60% filled with mud.
2. Calculated for max gas kick.
3. Including testing load.
4. Calculated for gas filled casing.
5. Calculated for casing 60% filled with mud, checked for plugged perforations.
6. Calculated for gass filled casing, checked for leaking tubing.

2.0 CASING AND BOP TEST PROGRAM

2.1 Casing tests

The following casing string tests will be performed immediately after landing of the cement plug in the float collar.

Casing size	Surface test pressure	Test duration
20"	69 bar (1000 psi)	10 min.
13 3/8"	234 bar (3400 psi)	10 min.
9 5/8"	324 bar (4700 psi)	10 min.

NOTE: If the test is performed after the cement has set up, the test pressure has to be reevaluated. Test for maximum expected pressure, but do not exceed 85% of casing burst rating assuming pore pressure at the outside in open hole and mud pressure plus test pressure at the inside of the casing. Use fresh water gradient to calculate external pressure between casings.

2.2 BOP tests

The BOP stacks will be tested according to the Operation Manual. The following test pressures are to be used:

		Rams, C & K Valves	Annular preventers
i)	After landing 18 3/4" BOP stack and all following weekly tests	345 bar (5000 psi)	240 bar (3500 psi)

Note: Test blind-shear ram to above casing test pressures prior to drilling out of 13 3/8" and 9 5/8" casing. Do not exceed 85% of the casing burst rating. Ref. the above "note" for calculating the test pressure.

3. SURVEY PROGRAM

Run magnetic single shoot survey at casing depth before pulling out to run 30" casing.

Run magnetic multishot survey at TD of the 17 1/2" pilot hole to the 30" casing shoe. Survey internal: One shot every 30 m.

When drilling 17 1/2" hole section, run magnetic single shoot survey at bit change depth and in addition run a magnetic multishot survey from TD of the 17 1/2" hole to the 20" casing shoe when pulling out to log. Survey interval: One shot every 30 m.

While drilling below the 13 3/8" casing, run directional survey (magnetic single shot) every 100 m to TD.

MUD PROGRAM WELL 31/3-2

DEPTH RKB	FORMATION	MW RD	VIS SEC/L	API FL	PH	PV M PAS=CP	YP PA	HT/HP FL	o/o SOLIDS	CEC	REMARKS
	Water depth 340 m RKB-Seabed 365										
200	30" set at 449 m	1.03	100+	NC							Spud mud
600	20" set at 600	1.03	40-60	NC							Seawater/Bentorite
500		1.10	40-55	10-12	8.0-8.5	< 15	10-12		6-8	0	KCL/Polymer
800		↓	↓	↓	↓	↓	↓		↓	↓	
000											
200											
400	13 3/8" set at 1500										
600		1.11	45-50	6-8	10-10.5	< 20	6-8		7-9	↓	Coring Fluid
800		↓	↓	↓	↓	↓	↓		↓		
000											
200										Max .25	
400											Mud weights are based on pore pressure prognosis. 7.5 bar riser margin is included in the permeable section.
600											
800											
000											
200											
400											
600											
800											
000											
200											
400											
600											
800											

BIT AND HYDRAULIC PROGRAM WELL 31/3-2

SI-UNITS

INTERVAL (M)	HOLE SIZE	BIT TYPE IADC	FOB. RANGE KN	FOB. REC. KN	RPM. RANGE	RPM. REC.	PUMP PRESS BAR	FLOW M^3/HR	PUMP SPEED SPM	NOZZLES	ANNULAR VELOCITY M / MIN	JET VELOCITY M / SEC	LINER SIZE
365-449	36"	1-1-1	22/67	45	20/100	60	55-85	215-273	2x88	6x32	6	2	6 3/4"
449-600	17 1/2"	1-1-4	45/134	89	100/200	150	221	295	2x120	22x22x22	45	114	6 3/4"
449-600	17 1/2"-26"	1-1-1+UR	22/89	45	60/150	100	145	273	2x111	28x28x28	15	61	6 3/4"
600-1500	17 1/2"	1-1-4	89/205	156	100/200	150	221	273	2x111	22x22x22	41	101	6 3/4"
1500-1850	12 1/4"	1-3-5	178/267	222	100/150	120	269	156	2x80	13x13x14	59	169	6"
1850-2200	12 1/4"	2-1-5	178/267	245	100/120	100	269	149	2x76	13x13x13	56	168	6"

BIT AND HYDRAULIC PROGRAM WELL 31/3-2

OIL FIELD UNITS

INTERVAL (M)	HOLE SIZE	BIT TYPE IADC	FOB. RANGE 1000 LBS	FOB. REC. 1000 LBS	RPM. RANGE	RPM. REC.	PUMP PRESS PSI	FLOW GPM	PUMP SPEED SPM	NOZZLES	ANNULAR VELOCITY FT / MIN	JET VELOCITY FT / SEC	LINER SIZE
365-449	36"	1-1-1	5/15	10	20/100	60	800-1200	950-1200	2x88	6x32	20	65	6 3/4'
449-600	17 1/2"	I-1-4	10/30	20	100/200	150	3200	1300	2x120	22x22x22	146	375	6 3/4"
449-600	17 1/2" 26"	1-1-1+UR	5/20	10	60/150	100	2100	1200	2x111	28x28x28	50	200	6 3/4"
600-1500	17 1/2"	1-1-4	20/46	35	100/200	150	3200	1200	2x111	22x22x22	135	333	6 3/4"
1500-1850	12 1/4"	1-3-5	40/60	50	100/150	120	3900	685	2x80	13x13x14	193	554	6"
1850-2200	12 1/4"	2-1-5	40/60	55	100/120	100	3900	655	2x76	13x13x13	184	551	6"

6. FORMATION EVALUATION

6.1 Sampling program

Two (2) washed and dried and seven (7) wet ditch cutting samples shall be collected at each sampling interval.

Sampling interval will be every 10 m from below the 30" casing down to 1200 m. From 1200 m and down to 1450 m samples will be taken every 5 m. Below 1450 m and down to TD samples will be taken every 2 and 3 m. The sampling interval may be further reduced at the wellsite geologist's request.

The washed and dried samples shall be of approx. 100 gm and packed in plastic bags.

The wet samples shall be of 500 gm mimimum, packed in plastic bags and placed inside cloth bags.

Two sets of unwashed wet ditch cuttings samples shall be collected for source rock analysis. These samples will be taken every 15 m from 1400 m down to TD. These samples which preferably shall be taken in shaley sequences, shall be canned.

Regular collection of canned mud samples for geochemistry shall be taken every 500 m from 1400 m and down to TD. Additional samples shall be taken whenever significant mud changes occur.

Detailed instructions on sampling, labeling and shipping procedures will be submitted to the parties concerned in due time before drilling starts.

6.2 Coring program

A minimum of 50 m of the Sognefjord formation will be cored for lithological/stratigraphical information. If hydrocarbons are encountered in the Upper Jurassic, the whole of the hydrocarbon bearing interval will be cored.

Additional cores will be taken if significant hydrocarbon shows are encountered or lighological/stratigraphical information is required.

A 60 ft or 90 ft 8 1/4" marine core barrel with a 12 1/4" core head will be used in the 12 1/4" hole. Due to the friable nature of the Upper Jurassic reservoir a fibre glass inner barrel will be used when coring that interval.

Sideweall cores will be taken from approximately 1400 m and down to TD. for micropaleontology/palynology/source rock/reservoir analysis or to check wire line log characters. The depths for the cores will be decided by the Exploration Department in cooperation with the wellsite geologist.

6.3 Wire line logging program

At 20" casing depth (17 1/2" pilot hole)

ISF/LSS/GR/SP (GR to sea floor, sensitivity adjusted for maximum correlation contrast through casing).

LDT/CNL/GR/CAL

At 13 3/8" casing depth (17 1/2" hole)

ISF/LSS/GR/SP
LDT/CNL/GR/CAL if required
HDT
SWC
Temp. log

In 12 1/4" hole

The following logs may be run for evaluation purposes:

ISF/LSS/GR/SP
LDT/CNL/NGT/GR/CAL
DLL/MLL/GR/CAL
RFT

At total depth (TD 12 1/4" hole)

ISF/LSS/GR/SP	
LDT/CNL/NGT/CAL/GR	
DLL/MLL/GR/CAL	If required
HDT	
RFT	
Velocity Survey	
SWC	
CBL/VDL	If required

LOGGING PROGRAM WELL : 31/3-2

SERIES	CASING	LOG RUNS
SEA BED 340m		
QUATERNARY	30" 449m	ISF / LSS / GR / SP, GR to sea bed LDT / CNL / GR / CAL
500m	20" 600m	
TERTIARY		ISF / LSS / GR / SP LDT / CNL / GR / CAL HDT SWC Temp. log or CBL / VDL
1000m		
	13 3/8" 1500m	
1500m CRETACEOUS		ISF / LSS / GR / SP 2) LDT / CNL / NGT / GR / SP 2) DLL / MLL / GR / CAL 1) 2) HDT RFT 1) 2) Velocity survey SWC CBL / VDL 1)
UPPER JURASSIC		
MIDDLE JURASSIC		
2000m LOWER JURASSIC	9 5/8 T.D.	1) If required 2) In intermediate runs if required
	T.D. = 2050 + 80/85 m or 2130 ± 80/105 m	
2500m		

Norsk Hydro

DISTRIBUTION CHART FOR SAMPLES AND LOGS · WELL: 31/3-2

		STATOIL	STAVANGER	SAGA	HÖVIK	OLJEDIREKTORATET STAVANGER	NORSK HYDRO, DRLG DEPT. FORUS	NORSK HYDRO, EXPLOR DEPT. · SANDVIKA	LABORATORIES FOR: - PALEO DATING	- GEOCHEMISTRY	- SPLIT, WASH & DRIED SAMPL	TOTAL	REMARKS
SAMPLES	WASHED AND DRIED	*15		1		1		1				18	* FOR TRADE
	WET	1	1			1		1	1		2	7	
	WET, CANNED							1		1		2	
	SWC							(x)	x	(x)			
	CONV CORE — CORE 1/4	1				1						2	
	CONV CORE — CORE 1/2							1				1	
	CONV CORE — CORE SAMPLES							x	x	(x)			
FLUID FROM TESTS	OIL / CONDENSATE												AS SPECIFIED IN TEST PROGRAM
	GAS												
	WATER												
LOGS	SEPIA SCHL., 1:500 + 1:200	1		1		1		1				4	
	PRINT " " "					1	1					2	
	TAPE + VERIFY. LIST	1		1		1		1				4	COMPOSITE AND EDITED TAPES AFTER WELL IS FINISHED
	SEPIA MUD LOG, 1:500	1		1		1		1				4	
	PRINT " " "					1	1					2	
	SEPIA LITHOLOG, 1:500	1		1		1		1				4	
	PRINT " "					1	1						
THERS													

NB! THIS CHART DEALS ONLY WITH THE DISTRIBUTION OF SAMPLES AND WILL THEREFORE DIFFER FROM THE WELLSITE SAMPLING PROGRAM

8. ABANDONMENT PROGRAM

The abandonment program will be prepared after the well has been drilled to TD and submitted to NPD for approval no later than 24 hours prior to start of the work.

SECTION C

OPERATIONS

1. POSITIONING

The determination of the final location in geographic and UTM coordinates will be carried out by a satellite navigation system.

For the positioning of the rig into the location, one of the following methods will be used:

- Pulse -8/Syledis on board the rig.

The well is planned to be located on seismic line ST 8007-338A SP no. 204,5. The spud in tolerance for the 31/3-2 location is shown on fig. 6, next page.

2. ANCHORING

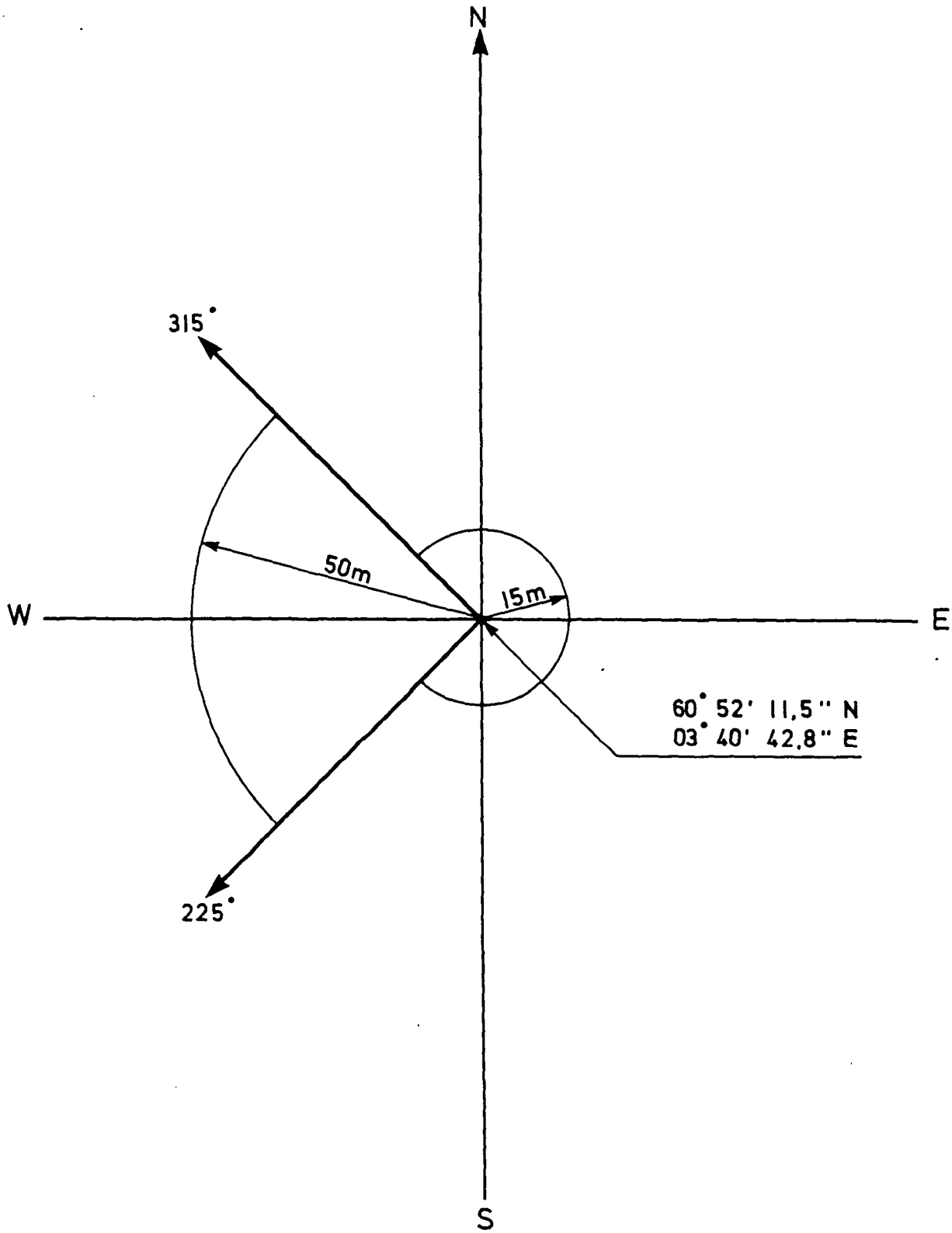
The rig will be anchored on northwestly (310^{o}) heading with eight anchors. A 45^{o} regular anchor pattern will be used according to the operation manual.

Prior to drilling out of the 30" casing all anchors are to be tension tested as shown below:

Pretension:	780 kN (175.000 lbs)
Test tension:	1557 kN (350.000 lbs)

If weather permits, make up 30" casing and hang off in the moonpool and make up the bottom hole assembly while anchoring. In any case make up the 30" casing and hang off in the moonpool prior to spudding.

If severe weather condition is forcasted, the anchor chains will be adjusted until a rig offset of 1-2% towards the expected wind direction is obtained.



Norsk Hydro Drilling Department	SPUD - IN TOLERANCE WELL 31/3-2	Gr. no.: 7	Fig.: 6
		Date: 27.12.83. Sign: RHL/SF	Dwg. no.: 52

3. DRILLING 36" HOLE

3.1 General

Drill the 36" hole to casing depth, approximately 449 m with return to sea bed. Spot 1.35 r.d mud in the 36" hole before running 30" casing. The 30" wellhead is to be 1,5 - 2 m above seabed. If the hole inclination at casing depth is found to exceed 1 1/2°, move the rig and respud. For further details refer to Operations Manual section 5.5 and page 34 in this program concerning grouting of the 30" casing. Ref. Drilling Bulletin no. 4 for stabbing the 30" casing into the 36" hole.

The 30" casing string is to be run on 5" Hevi Wate drill pipe. Before cementing the 30" casing, check the vertical alignment by TV inspection of the bull's eye installed on the permanent guidebase, to ensure that the inclination does not exceed 1 1/2°.

Slurry volumes and slurry compositions for the 30" cementing are specified in section E.

3.2 Bottom hole assembly

36" bit.
Bit sub.
1 x 9 1/2" non magnetic drill collar
1 x 9 1/2" drill collar
36" stabilizer
4 x 9 1/2" drill collars
X-over
9 x 8" drill collar
X-over
5" HW DP
Available force on bit 299 kN (67.000 lbs).

3.3 Bit and hydraulics

Bit wt. and RPM ref. Hydraulics and Bit Program.

4. DRILLING 26" HOLE

4.1 General

Run the 21" riser and latch on to the wellhead as specified in the Operation Manual.

183 m bouancy material are to be installed on the riser on the fourth joint below RKB and downwards.

Drill 17 1/2" pilot hole to casing depth at approx. 600 m (or at least 20 m below the Oligocene sand) plus a 15 m rat hole. The return mud density should not exceed 1,10 rd. After having flow checked the pilot hole (ref. 4,4 next page) displace the hole to seabed with 1,35 rd mud before running the required logs. Underream the 17 1/2" hole to 26" using same mud as for the pilot hole. On the wiper trip with 26" bit, displace the hole to seabed with 1,35 rd mud before running the 20" casing.

After having pulled the riser and before going in for the 26" wiper trip, run in the hole with 2 3/8" tubing stinger and stab into annulus between 30" casing and 36" hole and tag top of cement. If required, grout 30" casing to sea floor using 30" tail-in slurry and observe returns on TV.

Run the 20" casing string on 5" Hevi Wate drill pipe.

NOTE: If shallow gas is penetrated in this hole section and logging of the pilot hole confirms the presence of a shallow gas reservoir, the 17 1/2" pilot hole will be plugged back to above the reservoir. The remaining pilot hole will be opened to 26" and the 20" casing will be set above the shallow gas zone.

Cement slurry volume and composition for the 20" casing cementing is spesified in section E.

4.2 Bottom hole assembly

Pilot assembly:
17 1/2" bit
Bit sub
9 1/2" non magnetic drill collar
1 x 9 1/2" drill collar
17 1/2" stabilizer
4 x 9 1/2" drill collars
X-over
3 x 8" drill collars
x-over
15 x 5" HW drill pipe
5" drill pipe
Available force on bit: 156 kN (35.000 lbs)

Underreamer assembly:

Will be the same as above, except for using a 17 1/2" bit, 17 1/2" stabilizer, 26" underreamer and a bit sub below the 9 1/2" monel collar.

4.3 Bit and hydraulics

Ref.: Hydraulics and Bit Program.

4.4 Procedure to disconnect the riser

1. When drilling the 17 1/2" pilot hole flow check on drilling breaks and after high gas readings.

2. After completing the 17 1/2" pilot hole displace the hole with high viscosity mud, minimum yield point of 12 Pa. and a density equal to what was used when drilling the hole.

3. Then with bit on bottom displace riser with seawater using booster line and observe well for 15 min. to insure well is not flowing.

4. Open riser dump valve on sea floor lowering the water level in the riser to sea level.

5. Observe well with TV camera for 30 min. to ensure the well is stable.

6. Close dump valve and displace sea water with mud in riser, then circulate bottoms up while monitoring for gas.

7. If no hole problems are experienced pull out of the hole and log.

8. When 17 1/2" pilot hole is opened to 26", circulate bottoms up and displace high viscosity mud in the hole with a density equivalent to what was used in step 2.

9. Pull bit to sea floor and displace the mud in the riser with sea water and observe the well for 15 min.

10. Open the dump valve and observe well for 15 min. with TV.

11. Pull out of hole slowly leaving dump valve open and observe the well.

12. Disconnect and lay down riser.

5. DRILL 17 1/2" HOLE

5.1 General

Run the 21" riser and the 18 3/4" BOP stack and test the BOPs according to the Operation Manual.

Note: Make sure that pressure is not trapped behind the quick stab for emergency connector release prior to running the BOP. This can prevent the connector from closing when landing on the wellhead.

Drill out of the 20" casing plus 3 m of new formation and run a leak-off test. Squeeze and retest if the leak-off value is less than 1,38 rd. Drill 17 1/2" hole to casing depth plus 15 m rat hole.

The 13 3/8" casing will be set into Upper Cretaceous.

For details refer to the Operation Manual.
The 13 3/8" casing string is to be run on 5" Hevi Wate drill pipe.

Slurry volumes and slurry compositions for the 13 3/8" cementation are specified in section E.

Run a temperature log 10 - 12 hours after cementing the 13 3/8" casing or a CBL/VDL log in conjunction with the 12 1/4" section open hole logs to determine the cement top.

Samples of cement and water to be used shall be sent to shore for testing prior to the cement job.

5.2 Bottom hole assembly

17 1/2" bit
Bit sub
9 1/2" non magnetic drill collar
1 x 9 1/2" drill collar
17 1/2" stabilizer
4 x 9 1/2" drill collars
X-over
6 x 8" drill collars
Drilling jar
X-over
9 x 5" HW drill pipe
5" drill pipe
Available force on bit: 204 kN (46.000 lbs)

5.3 Bits and hydraulics

Ref.: Hydraulics and Bit Program for further details.

6. DRILLING 12 1/4" HOLE

6.1 General

Drill out of the casing and 3 m of new formation and run leak-off test. Squeeze and retest if the leak-off value is less than 1,58 rd. Drill 12 1/4" hole to TD.

The 9 5/8" casing will be set for testing purpose only, and will be run on 5" Hevi Wate drill pipe.

If required for geological evaluation purposes, intermediate log runs will be made in the 12 1/4" hole section.

For further details refer to the Operation Manual.

Slurry volumes and slurry compositions for the 9 5/8" cementation are specified in section E.

Run a CBL/VDL after cementing the 9 5/8" casing.

Samples of cement and water to be used shall be sent to shore for testing prior to the cement job.

6.2 Bottom hole assembly

12 1/4" bit
12 1/4" near bit stabilizer with orifice float
1 x 8" non magnetic drill collar
12 1/4" stabilizer
1 x 8" drill collar
12 1/4" stabilizer
2 x 8" drill collars
12 1/4" stabilizer
14 x 8" drill collars
Drilling jar
3 x 8" drill collars

X-over
15 x 5" HW drill pipe
5" drill pipe
Available force on bit 267 kN (60.000 lbs)

6.3 Bit and hydraulics

Drill the cement and 45 m below the casing shoe with mill tooth bit and no stabilizers. If steel is left in the hole from sidewall coring, run a junk basket immediately above the bit. Pull out of the hole and install stabilizers. A junk sub is to be run on the last bit run prior to run in the hole with diamond bits. Ref. Hydraulics and bit program for further details.

SECTION D

CONTINGENCY PROGRAM

1. BLOWOUT

Ref. Contingency Manual

2. HYDROGEN SULFIDE GAS H_2S

The 31/3-2 well will be drilled into the Lower Jurassic sequence. These formations are penetrated in the correlation wells in the area without any sights of hydrogen sulfides.

All personel, permanently or temporarily assigned to the platform shall be instructed as to hazards of H_2S and SO_2 available safety equipment, H_2S detectors, alarms, ventilation procedures, briefing areas and platform evacuation procedures.

All the above information and instructions are to be given to all personnel on the rig during at least one safety meeting before drilling out of 13-3/8" csg.

Norsk Hydro will have available on the rig a container equipped with all necessary H_2S protection equipment. This container will be operational when drilling out of the 13 3/8" casing (Ref. Operation Manual, section 9).

Garret Gas Train will be available on board the rig during the drilling of the well and used on a routine basis to check the mud for H_2S.

Also chemicals for treating H_2S will be located on board the rig at all times. Ref. Operation Manual Section 9.

3. STAND BY VESSEL

Name:	Trønderhav
Class:	DNV IAI oil rec.
Marine Dimensions:	Lenght o.a.: 56.5 m
	Width: 9.05 m
	Dead weights: 1000 tons
Capasities:	Ballast: 970 m^3
	Freshwater: 24 tons
	Diesel fuel: 100 m^3
	Survivals: 150
Pump capacities:	Ballast pump: 200 m^3/h
Thrusters:	2 mos Liaaen
	1 mos Brunvoll
Machinery:	Main engine: Deutz 8M545 1000 Hp
	Auxiliary engine: MWM 232, 258 Hp
	Auxiliary engine: MWM 518, 125 Hp
Fuel consumption:	Full speed: 5 tons/24 hrs
	Stand by: 2 tons/24 hrs
Speed:	13 knots
Accomodation:	Cabins: 15
	Bed in hospital: 5
	Seats for survivals: 150
Navigation and communication aids:	Sailor MF 400 W SSB Dammar HF 1.200 W SSB
	2 VHF
	3 VHF portable
	VHF for pick up boat
	VHF for mob. boat
	VHF for helicopter
	VHF for Direction finder
	3 UHF portable
	1 Sat.nav. Magnarox
	1 Ben. logg
	1 Decca/Microteknica
	1 Decca/Arcas autopilot
	1 Emergency D.F. Pelcom DC22

	3 Emergency D.F. for lifeboats
	1 Coden color radar MDC 407
	1 Decca 10 cm radar
	1 Simrad Echosounder
	1 Offcourse alarm
	1 Tennfjord steering gear
Rescue equipment:	Rescue zone: 15 m
	Freeboard - rescue zone: 1.5 m
Pick up boat:	Holen Mek. Verksted
	Engine: Saab F6595 TI6
	Speed: 28 knots
MOB/Lifeboat:	Watercraft
	Engine: Saab 68
	Speed: 9 knots
	Cerificated for 22 persons
Dispersant system:	Boones and injectors
	Type: Skuteng A/S
Joistick:	Type: Liaaen, with cable

4. SEVERE WEATHER

Based on Norsk Hydro's experience with the H-3 drilling units the following list shows the limiting conditions for conducting various operations, with prime consideration being given to vessel heave.

Operating Limits:

Column	a)	b)	c)	d)	e)	f)
Operation	max. heave m	Knots Beaufort	Significant wave height m	Period rage in seconds	Response ratio	Period second
Handling of BOP	1.5	28-34 knots 7	5	6 - 9	0.14	8.5
Running the Riser	1.5	28-34 knots 7	5	6 - 9	0.14	8.5
Drilling and Tripping	4.5	41-48 knots 9	9	9 - 11	0.27	10.0
Logging	4.5	41-48 knots 9	9	9 - 11	0.27	10.0
Cementing	2.0	34-41 knots 8	7	7 - 11	0.16	9.0

Riser Angle Limitations

If the vessel offset results in a flex joint angle in excess of four (4) degrees, rotation and all other movement of the drill string that might cause flex joint wear is to be terminated.

When vessel offset results in a flex joint angle in excess of six (6) degrees, hang off and prepare to release the riser.

Release the riser before vessel offset results in a flex joint angle in excess of ten (10) degrees.

SECTION E

TECHNICAL INFORMATION

1. CASING DESIGN

1.1 General

The casing design is based on the prognosis of pore pressure and fracture pressure in the formations. The grade and weight of each casing string is based on the calculated burst and collapse pressure in addition to the maximum tension in the string. However, on the 20" and 13 3/8" casing Norsk Hydro has standardized on K-55 or X-52, 133 lb/ft for the 20" casing and N80, 72 lb/ft for the 13 3/8" casing in cases where higher strength casing is not required.

1.2 Collapse

Collapse is not considered for the 30" casing. The 20" casing and the 13 3/8" and 9 5/8" csg., are assumed 60% filled with mud when run in the hole.

1.3 Burst

20" Casing

High formation pressures are not anticipated when drilling the 17 1/2" hole. The internal pressure in the 20" casing will never cause a burst of the casing as the fracture pressure at the casing shoe is less than the casing burst pressure. The 20" casing is designed to have sufficient structural strength to support the subsequent casing strings and the BOP stack.

13 3/8" Casing

The required burst resistance is obtained from the gas filled casing criteria with maximum internal pressure beeing exerted when breaking down the formation at the 13 3/8" shoe.

In this case the 13 3/8" casing will withstand any high formation pressure which might ocur when drilling the 12 1/4" section.

9 5/8" casing

The 9 5/8" casing will most likely be set for testing purpose. In case a 8 3/8" hole will be drilled the 9 5/8" casing is designed for gas filled casing with maximum internal pressure beeing exerted when breaking down the formation at the 9 5/8" shoe.

In this case the 9 5/8" casing will withstand any high formation pressure which might occur if drilling a 8 3/8" hole.

In addition it is checked that the 9 5/8" casing can meet the strength requirements based on the leaking tubing criteria.

The pressure differential as function of depth will be:

1. For 13 3/8" and 9 5/8" casing (gas filled casing).

[Fracture pressure at casing shoe] - [Static pressure gas gradient inside casing] - [Pore pressure outside casing]

2. For 9 5/8" casing (leaking tubing)

[Reservoir pressure] - [Static pressure gas gradient to sea bed] + [Hydrostatic mud pressure inside the csg.] - [Pore Pressure outside casing, water gradient between casings]

1.4 Tension

All casing strings are designed to withstand the load of its own weight in the mud plus the testing load.

2. CEMENT SLURRIES AND CALCULATIONS

30" Casing cement data and calculations

General

The 30" casing will be cemented back to the sea bed with 200% excess volume. The cement slurry volume is calculated on the basis of theoretical hole volume.

A 5" drillpipe stinger is to be run to within 10 m of the shoe. Displace with sea water and leave 5 m cement plug inside the 30" casing. Observe cement returns to sea floor on TV. See page 34 conserning grouting of the 30" casing.

Well data

Depth from RKB to sea bed:	365 m
Casing setting depth:	449 m
Open hole diameter:	36"
Annulus capacity, open hole:	0.2007 m^3/m
Internal capacity, 30" casing:	0.3972 m^3/m
Mud weight:	1.05 rd
Bottom hole hydrostatic pressure:	46.25 bar (671 psi)
Est. bottom hole static temp. (BHST):	10°C (50°F)
Est. bottom hole circulating temp(BHCT)	10°C (50°F)

Slurry volume calculations

Annulus slurry volume:	0.2007 m^3/m	· 84 m	= 16.86 m^3
Plug slurry volume:	0.3972 m^3/m	· 5 m	= 1.99 m^3
200% excess of annulus volume:	16.86 m^3	· 2	= 33.72 m^3
Total slurry volume			= 52.57 m^3

Spacer slurry = 5.10 m^3

Lead slurry volume: Total slurry volume - net annulus volume - spacer volume - plug volume: 52.57 - 16.86 - 5.1 - 1.99 = 28.62 m^3

Tail in slurry volume: Net annulus volume + plug volume (16.86 + 1.99) = 18.85 m^3

Slurry compositions

1. Lead slurry

Norcem class G cement:	25.96 ton (610 sxs)
Yield:	110.24 L. slurry/100 kg. cement (1.66 cuft/sx)
Seawater:	63.39 L. sea water/100 kg. (7.14 gps)
Econolite:	15.8 L./100 kg. (1.78 gps)
Caustic:	0.95 kg/100 kg. (0.89 lb/sx)
Density:	1.68 rd (14.0 ppg)
Thickening time:	4:30 + hrs.:min. at 7°C (45°F)
Compressive strength:	8.6 bar (125 psi) in 24 hrs. at 10°C (50°F).

2. Spacer slurry:

Class G cement:	6.40 ton (150 sxs)
Yield:	79.70 L./100 kg. (1.20 cuft/sx)
Sea water	47.94 m^3/100 kg. (5.40 gal/sx)
Caustic:	0.072 kg/100 kg. (0.068 lbs/sx)
Density:	1.87 rd (15.6 ppg)
Thickening time:	4:30 + hrs.:min. at 10°C (45°F)
Compressive strength:	24 Bar (348 psi) in 24 hrs at 10°C (50°F).

3. Tail in slurry:

a. 4% $CaCl_2$

Class G cement:	22.71 ton (533 sxs)
Yield:	83.02 L./100 kg. (1.25 cuft/sx)
$CaCl_2$:	9.59 L./100 kg. (1.08 gal/sx)
Sea water:	41.81 L./100 kg. (4.71 gal/sx)
Density:	1.87 rd (15.6 ppg)
Thickening time:	2:35 hrs.:min at 10°C (50°F)
Compressive strength:	41 bar (600 psi) in 24 hrs at 10°C (50°F)

4. Grouting slurry:

The 4% $CaCl_2$ will be used for grouting the 30" casing.

Displacement volume

Surface capacity:	= 0.72 m^3
5" HWDP displacement volume: 0.00456 m^3/m · 365 m	= 1.66 m^3
5" drill pipe displacement volume: 0.0093 m^3/m · 74	= 0.69 m^3
30" casing capacity volume: 0.3972 m^3/m · 5 m	= 1.99 m^3
Total displacement volume:	= 5.06 m^3

Time estimate for the job

Mixing time for lead slurry:	
25.96 ton/0.72 ton/min.	= 36 min.
Mixing time for spacer slurry:	
6.40 ton/0.72 ton/min.	= 9 min.
Mixing time for first tail in slurry:	
22.71 ton/0.72 ton/min.	= 32 min.
	= 77 min.
Displacement time:	
5.06 m^3/1.27 m^3/min.	= 4 min.
Total time	= 81 min.
	1 hr 21 min.

20" Casing cement data and calculations

General

The 20" casing will be cemented back to the sea bed with 150% excess of open hole volume.

Well data

Depth from RKB to sea bed:	365 m
Casing setting depth:	600 m
Depth to last shoe:	449 m
Open hole diameter:	26"
Annulus capacity, cased hole:	0.1946 m^3/m
Annulus capacity, open hole:	0.1395 m^3/m
Internal capacity, 20" casing:	0.1778 m^3/m
Mud weight:	1.08 rd
Bottom hole hydrostatic pressure:	63.6 bar (922 psi)
Est. bottom hole static temp. (BHST):	21° C (70° F)
Est. bottom hole sirculating temp. (BHCT):	21° C (70° F)

Slurry volume calculations

Annulus slurry volume, open hole:	0.1395 m^3/m · 151 m =	21.06 m^3
Annulus slurry volume, cased hole:	0.1946 m^3/m · 84 m =	16.35 m^3
12 m plug slurry volume:	0.1778 m^3/m · 12 m =	2.13 m^3
150% excess of open hole:	21.06 m^3 · 1.5 =	31.59 m^3
Total slurry volume:	=	71.13 m^3

Tail in slurry volume = 40 m of open hole annulus + plug volume
= (0.1395 m^3/m · 40 m) + 2.13 m^3 = 7.73 m^3

Lead slurry volume = Total slurry volume - tail in slurry volume
= 71.13 m^3 - 7.73 m^3 = 63.40 m^3

Slurry composition

1. Lead slurry:

Norcem class G cement	62.00 ton (1455 sxs)
Yield:	102.28 L. slurry/100 kg. (1.54 cuft/s
Fresh water:	68.09 L./100 kg. (7.67 gps)
Econolite:	2.66 L./100 kg. (0.30 gps)
Density:	1.68 rd (14.0 ppg)
Thickening time:	5:00 + hrs.:min. at 21°C (70°F)
Compressive strength:	27,4 bar (398 psi) at 21°C (70°F) in 24 hrs.

2. Tail slurry:

Norcem class G cement:	9.83 ton cement (231 sxs)
Yield:	78.63 L. slurry/100 kg. cement (1.18 cuft/sx)
Sea water:	40.46 L./100 kg. (4.56 gps)
CFR-2L:	1.33 L/100 kg. (0.15 gps)
Econolite:	1.78 L/100 kg. (0.20 gps)
Halad 10L:	3.55 L/100 kg. (0.40 gps)
Density:	1.90 rd (15.8 ppg)
Thickening time:	4:00 hrs at 21°C (70°F)
Compressive strength:	88.3 bar (1281 psi) at 21°C (70°F) in 24 hrs.

20" Squeeze slurry

Norcem class G cement:	
Yield:	77.62 L. slurry/100 kg. cement (1.17 cuft/sx)
Sea water:	46.11 L./100 kg. (5.20 gps)
Density:	1.90 rd (15.8 ppg)
Thickening time:	4:00 hrs. min. at 21°C (75°F)
Compressive strength:	55 bar (800 psi) at 21°C (70°F) in 16 hrs.

Displacement volume

Surface capacity (Halliburton unit): = 0.72 m^3

5" HW drill pipe displacement volume: 0.00456 $m^3/m \cdot 365$ = 1.66 m^3

20 casing displacement volume: 0.1778 $m^3/m \cdot 437$ m = 77.70 m^3

Total displacement volume: = 80.08 m^3

Time estimate for the job

Mixing time for the lead slurry: $\frac{62 \text{ ton}}{0.72 \text{ ton/min.}}$ = 86 min.

Mixing time for the tail in slurry: $\frac{9.83 \text{ ton}}{0.72 \text{ ton/min.}}$ = 14 min.

Displacement time $\frac{80.08 \text{ m}^3}{1.27 \text{ m}^3/\text{min.}}$ = 63 min.

= 163 min.

2 hrs: 43 min.

13 3/8" casing cement data and calculations

General

The 13 3/8" casing string will be cemented from 1500 m to 500 m. The following slurry volume is calculated on the basis of theoretical hole volume. However, the final slurry volume shall be calculated based on caliper log.

Depth from RKB to seabed:	365 m
Casing setting depth:	1500 m
Depth to last casing:	600 m
Open hole diameter:	17 1/2"
Annulus capacity, open hole:	0,0646 m^3/m
Annulus capacity, cased hole:	0.0870 m^3/m
Internal capacity, 13 3/8" casing:	0,0773 m^3/m
Mud weight:	1,10
Bottom hole hydrostatic pressure:	162 bar (2347 psi)
Est. bottom hole static temp. (BHST)	64° C (147° F)
Est. bottom hole circ. temp. (BHCT)	42° C (108° F)

Slurry volume calculations

Annulus slurry volume, open hole:	0,0646 m^3/m x 900 m =	58,14 m^3
Annulus slurry volume, cased hole:	0,0870 m^3/m x 100 m =	8,70 m^3
24 m plug slurry volume:	0,0773 m^3/m x 24 m =	1,86 m^3
Total slurry volume:		68,70 m^3

Tail in slurry volume = 200 m of open hole annulus + plug volume
= 0,0646 m^3/m · 200 + 1,86 = 14,78 m^3

Lead slurry volume = Total slurry volume - tail in slurry volume
= 68,70 m^3 - 14,78 = 53,92 m^3

Slurry composition

1. Lead slurry:

Norcem class G cement:	47,93 ton cement (1121 sxs)
Yield:	112,49 L. slurry/100kg. cement (1,69 cuft/sx)
Prehydrated Bentonite:	80,97 L./100 kg. (9,12 gps)
Density:	1,62 rd (13,5 ppg)
Thickening time:	5:00 + hrs:min at 42° C BHCT (108° F)
Compressive strength:	52,5 bar (761 psi) in 24 hrs. at 64° C (147° F)

Note: To prepare the bentonite slurry add 22,83 kg of bentonite per 1000 liters of fresh water (8lb/bbl) and allow time for proper hydration (at least 1/2 hours).

Maximum rate for plug flow in 13 3/8" to 17 1/2" annulus:
2,05 m^3/min. (12,88 BPM)

2. Tail slurry:

Norcem class G cement:	19,2 ton (450 sxs)
Yield:	77,06 L. slurry/100 kg. cement (1,16 cuft/sx)
Fresh Water:	40,93 L./100 kg. (4,61 gps)
CFR-2L:	1,95 L./100 kg. (0,22 gps)
Halad-10L:	2,66 L./100 kg. (0,30 gps)
Density:	1,90 rd (15,8 ppg)
Thickening time:	3:30 hrs. at 42° C (108° F)
Compressive strength:	188 bar (2730 psi) in 24 hrs. at 64° C (147° F)

Minimum rate for turbulent flow in 13 3/8" to 17 1/2" annulus:
1,38 m^3/min (8,68 BPM)

13 3/8" squeeze slurry

Norcem class G cement:	
Yield:	76.88 L. slurry/100 kg. cement (1.16 cuft/sx)
Fresh Water:	44.04 L./100 kg. (4.96 gps)
CFR-2L	1.33 L./100 kg. (0.15 gps)
Density:	1.90 rd (15.8 ppg)
Thickening time:	3:15 hrs. min. at 49°C (120°F)
Compressive strength:	214 bar (3100 psi) in 24 hrs at 64°C (147°F)

Displacement volume

Surface capacity (Halliburton unit)	= 0.72 m^3
5" HWDP displacement volume 0.00456 m^3/m.365 m	= 1.66 m^3
13-3/8" casing displacement volume:	
0.0773 m^3/m · 1099 m	= 84.95 m^3
Total displacement volume:	= 87.33 m^3

Time estimate for the job

Mixing time for the slurry: $\frac{47,93 \text{ ton}}{0.72 \text{ ton/min}}$ = 66 min

Mixing time for the tail in slurry: $\frac{19,2 \text{ ton}}{0,72 \text{ ton/min}}$ = 27 min

Displacement time: $\frac{87,33 \text{ m}^3}{1.27 \text{ m}^3/\text{min}}$ = 69 min

Total time: = 162 min

2 hrs. 42 min

9-5/8" casing cement data and calculations

General

The 9-5/8" casing will be cemented 100 m back into the 13-3/8" casing. The following slurry volumes are calculated on the basis of theoretical hole volume. However, the final slurry volume shall be calculated based on caliper log.

Well data

Depth from RKB to sea bed:	365 m
Casing setting depth:	2130 m
Depth to last casing:	1500 m
Open hole diameter:	12-1/4"
Annulus capacity, open hole:	0.0291 m^3/m
Annulus capacity, cased hole:	0.0303 m^3/m
Internal capacity, 9-5/8" casing	0.0382 m^3/m
Mud weight:	1.11 rd
Bottom hole hydrostatic pressure:	240 bar (3474 psi)
Est. bottom hole static. temp. (BHST):	82°C (180°F)
Est. bottom hole circ. temp. (BHCT):	54°C (129°F)

Slurry volume calculations

Annulus slurry volume, cased hole:	0,0303 m^3/m ·	100 m =	3,03 m^3
Annulus slurry volume, open hole:	0.0291 m^3/m ·	630 m =	18.33 m^3
36 m plug slurry volume:	0.0382 m^3/m ·	36 m =	1.40 m^3
Total slurry volume:			= 22.76 m^3

Slurry compositions

1.	Norcem class G cement:	32.15 ton (754 sxs)
	Yield:	77.15 L./100 kg. (1.16 cuft/sx)
	Fresh water:	40.84 L./100 kg. (4.60 gps)
	CFR-2L:	2.57 L./100 kg. (0.29 gps)
	Halad 10L	2.22 L./100 kg. (0.25 gps)
	Density:	1.90 rd (15.8 ppg)
	Thickening time:	4:22 hrs. min. at 54°C (129°F)
	Compressive strength	193 bar (2800 psi) at 82°C (180°F) in 16 hrs.

Minimum rate for turbulent flow in 9 5/8" to 12 1/4" annulus:
0.66 m^3/min. (4,15 BPM)

2. 9 5/8" casing squeeze slurry:

Norcem class G cement:	
Yield:	77.06 L./100 kg. (1.16 cuft/sx)
Fresh water:	40.04 L./100 kg. (4.51 gps)
CFR-2L:	1.95 L./100 kg. (0.22 gps)
Halad 10L:	3.55 L./100 kg. (0.40 gps)
Density:	1.90 rd (15.8 ppg)
Thickening time:	3:25 hrs. min. at 63°C (145°F)
Compressive strength:	158 bar (2297 psi) in 16 hrs. at 82°C (180°F)

Displacement volume

Surface capacity (Halliburton unit):	= 0.72 m^3
5" HWDP displacement volume 0.00456 m^3/m .365	= 1.66 m^3
9 5/8" Casing displacement volume:	
0.0382 m^3/m · 1729 m	= 66.05 m^3
Total displacement volume	= 68.43 m^3

Time estimate for the job

Mixing time for the slurry: $\frac{32.15 \text{ ton}}{0.72 \text{ ton/min.}}$ = 45 min.

Displacement time: $\frac{68.43 \text{ m}^3}{1.16 \text{ m}^3/\text{min.}}$ = 59 min.

= 104 min.

Total time 1 hrs 44 min.

3. KICK CONTROL CALCULATIONS

3.1 General

An influx of gas at the bottom of the open hole is circulated out without breaking down the formation at the weakest point, assumed to be at the casing shoe.

A computer program is used to perform the kick calculations. The program is based on the "Driller's Method" which assumes a constant drill pipe pressure when the kick is circulated out at a constant mud weight. The program calculates the following parameters:

- The pressure in the gas bubble v.s. depth.
- The pressure at the casing shoe v.s depth of gas bubble.
- Choke pressure v.s depth of gas bubble.
- Time elapsed from the start of circulating v.s depth of bubble.
- Volume of gas bubble v.s depth of gas bubble.

The influx fluid to the wellbore is assumed to be gas with specific gravity 0.6 (air = 1).

3.2 20" Casing

The gas bubble kick calculations are based on:

- Casing shoe at 600 m.
- Anticipated frac. gradient at 600 m = 0,135 bar/m
- Frac. gradient in equivalent mud weight = 1,38 rd
- T.D. of open hole = 1500 m
- Mud density at TD of open hole = 1,08 rd
- Bottom hole formation pressure = 1,08 rd
  (eqv. mud density).

The maximum acceptable pressure at the casing shoe is 81 bar.

The calculations show that a maximum influx volume of 12 m^3 can be circulated out without fracturing the formation below the 20" casing shoe.

The maximum pressure at the shoe will occur when the top of the bubble reaches the shoe.

3.3 13 3/8" casing

The kick calculations are based on:

- Casingshoe at 1500 m
- Anticipated frac. gradient at 1500 m = 0,161 bar/m
- Frac. gradient in equivalent mud weight = 1,64 rd
- TD of open hole = 2200 m
- Mud density at TD of open hole = 1,11 rd
- Bottom hole formation pressure (equ. mud density) = 1,11 rd

Maximum acceptable pressure at the 13 3/8" casing shoe is 241 bar. A maximum influx volume of 39,6 m^3 can be circulated out without fracturing the formation below the 13 3/8" casing shoe.

4. MARINE RISER OPERATION

4.1 Mounting of boyancy material

Boyancy material are to be mounted on the riser on the fourth joint from RKB and downwards. Minimum 183 m should be mounted which is also the base for the riser tension curve (fig. 7).

4.2 Limiting criteria for operations

4.2.1 The flex joint angle should not exceed 4 degrees and the top slope (slip joint angle) should be less than 2 degrees. Higher angles will significantly increase the wear to the riser, flex joint and wellhead. While running larger diameter tools through the riser, the flex joint angle must be minimized. (Usually obtained by keeping rig offset in the 1 - 2% range).

4.2.2 The flex joint must always be kept in tension.

4.2.3 Maximum tension setting is 1560 kN (350 kips) under normal operating conditions. If one tensioner should fail, the remaining five units are capable of keeping the required tension including 15% tolerance.

4.2.4 The maximum riser stress should never exceed 180 N/mm^2 (26.0 ksi or 1/2 of yield).

The working tension must never result in a streess variation exceeding 3.5 N/mm^2 (0.5 ksi) per 44 kN (10 kips) in the riser. This is given by the incline of the stress curve.

It is important to realize that tensioners will function within 15% tolerance of the counterbalance setting.

4.3 Limitations under stand-by conditions

Riser and flex joint angles will not have the same critical conditions under stand-by conditions, but high ball joint angles (7-10 degress) are undesirable as the maximum riser stress is very sensitve to changes in tension at these high angles. All other limitations are still applicable.

4.4 How to use the min. tension charts

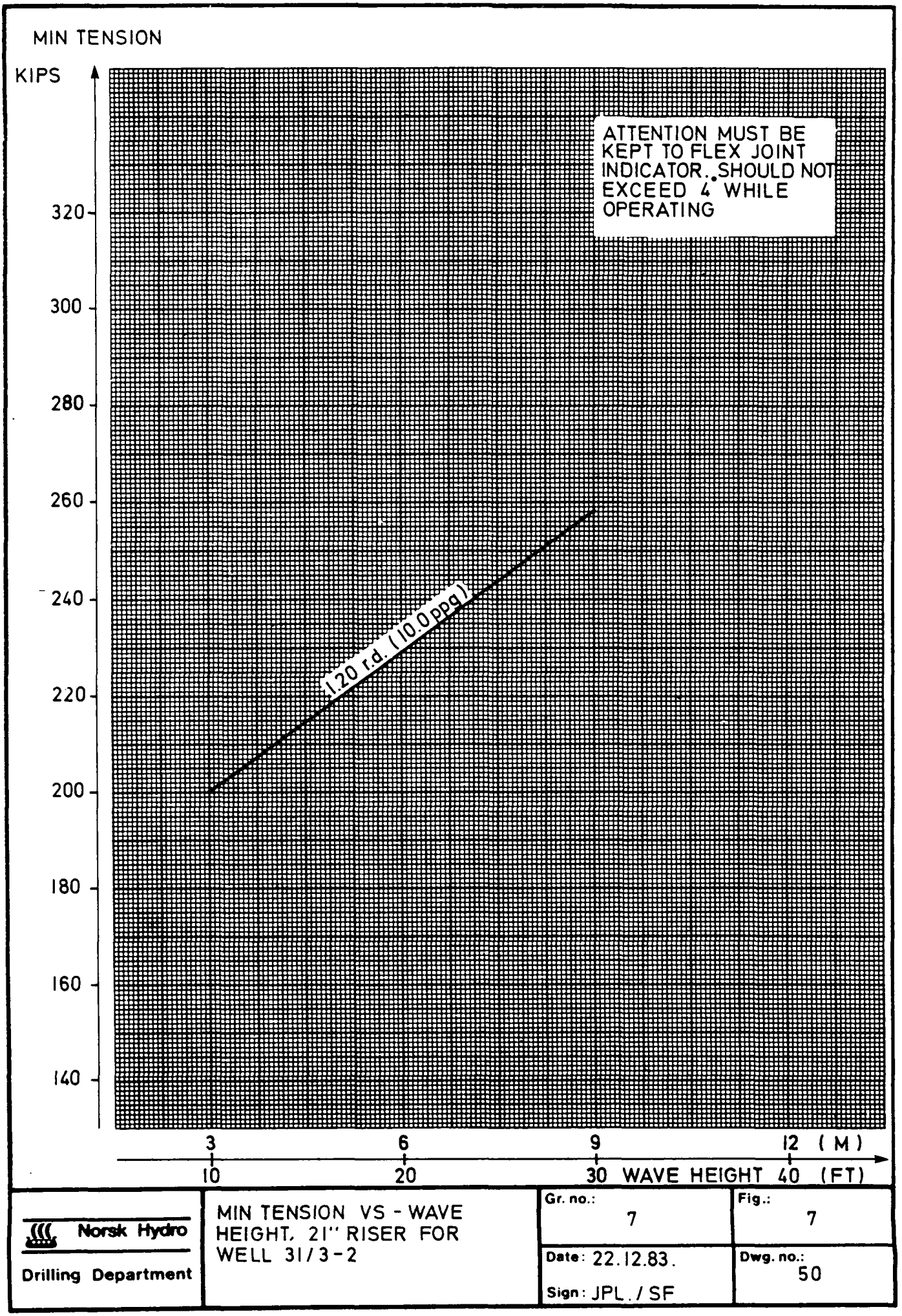
4.4.1 Estimate the wave height.

4.4.2 Read the minimum tension from the chart with the appropriate mud weight.

4.4.3 Divide this value by 6 and set the tensioners.

4.4.4 If weather conditions are unstable, the tensioners must be set for the worst conditions anticipated (hightest waves). If the limiting criteria cannot be met, the riser will have to be displaced with sea water and disconnected.

Riser stress calculations show the maximum stress to exceed 180 N/mm^2 (26 ksi or 1/2 of yield), when the wave height approaches 9 m.



Norsk Hydro Drilling Department	MIN TENSION VS - WAVE HEIGHT, 21" RISER FOR WELL 31/3-2	Gr. no.: 7	Fig.: 7
		Date: 22.12.83. Sign: JPL./SF	Dwg. no.: 50

SECTION F

GENERAL

1. SERVICE COMPANIES

TYPE OF SERVICE	SERVICE COMPANY
Drilling contractor:	Wilhelm Wilhelmsen
Mud logging:	Exploration Logging Ltd.
Eletric logging:	Schlumberger Inl.
Production testing:	Baker Prod. Services
Mud service:	Dresser Magcobar
Coring service:	Christensen Diamond Products GMBH
Cementing service:	Halliburton
Casing service:	Stavanger Casing Crew
Directional survey:	Eastman Whipstock
Drilling jars:	Eastman Whipstock
Helicopter service:	Helicopter Service A/S
Standby boat:	Maritim Manangement A/S
Supply boats:	Viking Supply, Wilh. Wilhelmsen

COMPANY TELEPHONE LIST

2. Area codes:

Stavanger,	Norway	04/
Bergen,	Norway	05/
Oslo,	Norway	02/
Hammerfest,	Norway	084/
Tromsø,	Norway	083/
Harstad,	Norway	082/
Windsor,	England	095/44/7535
Aberdeen,	Scotland	095/44/224
London,	England	095/44/1

COMPANY PERSONNEL AND TELEPHONE NUMBERS

COMPANY	TITLE	NAME	PRIV. PHONE
NORSK HYDRO			
Sandnes,	Manager	O. Tuxen	04/ 55 76 74
Forus			094/ 73 433
04) 67 80 66	Oper. Manager	I.G. Myhre	04/ 62 34 23
			094/ 72 205
	Oper. Superint.	D. Beard	04/ 57 66 13
			094/ 72 208
	Logistics	A. Solvoll	04/ 62 33 63
			094/ 73 272
	Engr. Mananger	H. Strand	04/ 61 87 38
			094/ 73 832
NORSK HYDRO			
Kjørbokollen	Gen. Mngr. Expl.	K.A Oppebøen	02/ 50 00 27
Sandvika,			094/ 16 274
Oslo	Chief Geologist	S.I. Leivestad	02/ 12 15 46
02) 54 39 20			094/ 16 272
	Chief Geophysicist	A.E. Nordberg	02/ 78 64 44
	Area Expl. Mananger	A. Sæbøe	02/ 53 53 27
	Oper. Geologist	A. Davies	02/ 56 34 41
			094/ 26 284
	Superv. Op. Geol.	B. Lærkerød	02/ 79 00 73
			094/ 26 284
NORSK HYDRO			
Bergen CCB,	N.H.Warehouseman	R. Olsen	05/ 22 75 44
05/ 33 40 00			
21 83 09			

COMPANY PERSONNEL AND TELEPHONE NUMBERS

COMPANY	TITLE	NAME	PHONE
Statoil			
Stavanger	Expl. Mngr.	T. Sund	04/ 56 02 35
04/53 31 80	District Manager	O. Aga	04/ 53 47 39
	Area Supervisor	O. Kramer	04/ 62 00 39
	Oper. Geol. Coord.	S.E. Lie	04/ 66 74 11
			094/ 57 916
	Oper. Geologist	S.O. Syrestad	04/ 58 74 29
			094/ 57 910
Sata Petr.			
Oslo	Expl. Mananger	E. Nysæther	02/ 57 01 54
02/12 01 11	Group Leader	J. Olsen	032/ 66 409
	Area Geologist	A. Kleppe	02/ 26 64 50
	Area Geophy.	A.K. Hoff	02/ 46 88 89
	Oper. Geol.	B. Gustavsen	02/ 78 96 40
			094/ 15 412
	Reserv. Eng.	H. Høidalsvik	02/ 57 79 29
Stavanger			
04/57 66 55	Oper. Manager	J. Gorgas	04/ 66 47 70

COMPANY PERSONNEL AND TELEPHONE NUMBER

COMPANY	TITLE	NAME	HOME NO.
WILH. WILHELMSEN			
Stavanger	Mngr.	Ø. Jordanger	Priv. 04/ 56 08 31
04/ 53 45 40	Superint.	J. Polderman	Priv. 04/ 58 71 66
Bergen, CCB	Warehouseman		
04/33 40 00			
WILHELMSEN OFFSHORE SERVICE			
Oslo	Mngr.	P. Eitzen	Priv. 02/ 55 55 67
02/11 12 00	Representative	P. Watnaas	Priv. 02/ 13 49 23
Stavanger	Regional Mngr.	P. Pallesen	Priv. 04/ 59 08 43
04/53 45 43			

COMPANY PERSONNEL AND TELEPHONE LIST

COMPANY	TITLE	NAME	PHONE NO.
Halliburton	Distr. Mngr.	S.K. Karnes	04/ 65 12 22
04/69 67 33	Field Supervisor.	D.D. McGuire	04/ 58 79 18
Aker Norsco	Distr. Engr.	S. McDaniel	04/65 41 91
P.O. Box 67			
4056 TANANGER			
Dresser	Mngr.	S. Park	04/ 52 39 60
04/69 60 33	Sen. Engr.	R. Retz	04/ 55 83 52
Aker Norsco			
4056 TANANGER			
Schlumberger	Mngr.	C. Labbett	04/ 69 68 13
04/ 65 10 88	Field Serv. Mngr.	J.C. Pernot	04/ 65 44 04
P.O. Box 129			
4051 SOLA			
Bergen	Distr. Mngr.	~~P. Dowds~~	~~05/ 26 45 90~~
05/ 22 76 50	Logging Distr. Eng.	E. Riddell	05/ 16 41 24
Eastman Whipstock			
04/69 68 77	Distr. Mngr.	G. Beasley	04/ 65 08 70
c/o Aker Norsco Base			
4056 TANANGER			
Stolt Nilsen	V.Pres.Disv.Serv.	I. Gjesdahl	
047/28 824			
Haraldsgt. 125			
4400 HAUGESUND			
Hunting Oilfield Services			
87 74 87	Mngr. Director	Mitchell	
Blackness Rd	Turbodrlg. Mngr.	R. Powell	
Altens	Directional Mngr.	P. Scott	
Ind. Estate, Nigg			
Aberdeen ABI 4LT			

COMPANY	TITLE	NAME	PHONE
Baker Production			
04/69 68 36	Gen. Mngr.	I. Samuelsen	04/ 52 61 40
Aker Norsco			
4056 TANANGER			
Exlog	Area Mngr.	D. Wallis	73529/3827
7535 69 595			
Shirley Avenue			
Vale Road			
Windsor Berkshire			
England			
Stavanger Casing			
04/59 79 00	Gen. Mngr.	G. Gislason	04/ 52 24 76
P.O. Box 5019	Asst. Mngr.	T. Stenbro	04/ 59 12 55
Dusavik			
4001 STAVANGER			
Christensen Diamond Products GMBH			
04/53 00 74	Area Mngr.	P.H. Thornes	04/ 69 71 33
c/o Proserv A/S			
4000 STAVANGER			
Vetco	Distr. Mngr.	F. McGhie	097/ 63 935
04/54 23 11			
Dusavik			
4000 STAVANGER			
Maritim Manangement A/S			
071/ 21 176	Mananger	O. Huse	071/ 41 509
6000 ÅLESUND			

Norsea A/S
04) 54 10 33
Dusavik
4000 STAVANGER

Aker Contracting
04) 53 05 00
P.O.Box 650
Strømsteinen
4001 STAVANGER

Aker Norsco A/S
04) 69 66 11
Basen
4056 TANANGER

CCB
05) 33 40 00
5363 ÅGOTNES

VARSLINGSPLAN FOR OLJEDIREKTORATET I FORBINDELSE MED ULYKKES- OG FARESITUASJONER PÅ KONTINENTALSOKKELEN

TYPE INSTALLASJON	FASTE ANLEGG/BORE- OG DYKKEFARTØY/FLOTELL/LEKTERE M V				
TYPE AKTIVITET	DYKKING	BORING, KONSTRUKSJON, PRODUKSJON M V			
TYPE ULYKKE/ FARESITUASJON	ULYKKER/FARESITUASJONER I FORBINDELSE MED DYKKING	ALVORLIGE PERSON- OG DØDSSKADER	ULYKKES/FARESITUASJONER I FORBINDELSE MED BORING	BRANN, EKSPLOSJON, LEKKASJE OG UTSLIPP	STRUKTURELLE- OG RØRLEDNINGSBRUDD. DRIVENDE FARTØY O L
I KONTORTIDEN TLF 53 21 00	SEKSJON FOR DYKKING	SEKSJON FOR ARBEIDERVERN OG ARBEIDSMILJØ	SEKSJON FOR BORING	SEKSJON FOR SIKRINGSSYSTEM	SEKSJON FOR STRUKTURER OG RØRLEDNINGER
UTENFOR KONTORTID OG PÅ HELGEDAGER	1 SEKSJONSSJEF PER ROSENGREN REBAKKEN 28 TLF 54 28 28	1 SEKSJONSSJEF ODD B FINNESTAD NEDRE STOKKAVEI 1 TLF 53 57 23	1 SEKSJONSSJEF TOR STEIN ØLBERG ULABRANDSVN 45 TLF 54 85 65	1 SEKSJONSSJEF EINAR RAVNÅS OTERSTIEN 5 4033 FORUS TLF 57 68 71	1 SEKSJONSSJEF KJELL L NILSSON MOSTØLVN 34 TLF 54 21 83
	2 SPESIALLEGE BØRGE MINSAAS MÅLTROSTSTIEN 8 TLF 55 91 68	2 SPESIALRÅDGIVER EGIL TJELTA SELE, VOLL TLF 42 06 79	2 SPESIALRÅDGIVER ROLF MATHIESEN TVARABERGKROKEN 28 TLF 55 94 55	2 SJEFSINGENIØR NJÅL CORNELIUSSEN MIDTRE VÅGEN 4020 HUNDVÅG TLF 54 93 24	2 SEKSJONSSJEF KNUT GUTTORMSEN KONVALLSTIEN 29 TLF 56 00 57
	3 SPESIALRÅDGIVER ØYVIND MAGNUSSEN GATE 3243 HUS 31 4040 MADLA TLF 59 19 98	3 SJEFSINGENIØR ROLF RYDNING SELEMORKVN TLF 44 73 63	3 OVERINGENIØR RUNE N NAUSTDAL KLAPPMYSSVN 16 4020 HUNDVÅG TLF 54 90 48	3 SEKSJONSSJEF OTTO WIGDEL LILJEVN 10 TLF 53 49 58	3 SPESIALRÅDGIVER OLE J NÆSS KLØVERVN 26 i TLF 62 00 09
			4 OVERINGENIØR ØYVIND TUNTLAND ELGFARET 95 4033 FORUS TLF 57 03 20		4 OVERINGENIØR ALFRED ØIJORD ØVRE STOKKAVEI 8 TLF 53 49 58
			5 OVERINGENIØR HARALD BRATTHAMMAR ELGFARET 37 4033 FORUS		

AJOUR PER 28.10.83

UNOFFICIAL TRANSLATION

NOTIFICATION OF THE NORWEGIAN PETROLEUM DIRECTORATE IN CONNECTION WITH ACCIDENTS AND DANGEROUS SITUATIONS ON THE CONTINENTAL SHELF

TYPE OF INSTALLATION		PERMANENT INSTALLATIONS, DIVING- AND DRILLING VESSELS, FLOTELS, BARGES ETC			
TYPE OF ACTIVITY	DIVING	DRILLING, CONSTRUCTION, PRODUCTION ETC			
TYPE OF ACCIDENT/ DANGEROUS SITUATION	ACCIDENTS/DANGEROUS SITUATIONS IN CONNECTION WITH DIVING	SERIOUS INJURIES AND FATALITIES	ACCIDENTS/DANGEROUS SITUATIONS IN CONNECTION WITH DRILLING	FIRE, EXPLOSION LEAKAGE AND OIL SPILL	STRUCTURAL COLLAPSE PIPELINE RUPTURE DRIFTING VESSELS
DURING OFFICE HRS TEL. 53 21 00	DIVING SECTION	WORKERS PROTECTION & WORKING ENVIRONMENT	DRILLING SECTION	SAFETY SYSTEM SECTION	STRUCTURES AND PIPELINES SECTION
OUTSIDE OFFICE HOURS AND ON HOLIDAYS	1 SECTION MANAGER PER ROSENGREN REBAKKEN 7 TEL 54 28 28	1 SECTION MANAGER ODD B FINNESTAD NEDRE STOKKAVEI 1 TEL 53 57 23	1 SECTION MANAGER TOR STEIN ØLBERG ULABRANDSVN 45 TEL 54 85 65	1 SECTION MANAGER EINAR RAVNÅS OTERSTIEN 5 4033 FORUS TEL 57 68 71	1 SECTION MANAGER KJELL L NILSSON MOSTØLVN 34 TEL 54 21 83
	2 SPEC.MED.ADVISOR BØRGE MINSAAS MÅLTROSTSTIEN 8 TEL 55 91 68	2 ADVISOR EGIL TJELTA SELE, VOLL TEL 42 06 79	2 ADVISOR ROLF MATHIESEN TVARABERGKROKEN 28 TEL 55 94 55	2 PRINCIPAL ENGINEER NJÅL CORNELIUSSEN MIDTRE VÅGEN 4020 HUNDVÅG TEL 54 93 24	2 SECTION MANAGER KNUT GUTTORMSEN KONVALLSTIEN 29 TEL 56 00 57
	3 ADVISOR ØYVIND MAGNUSSEN GATE 3243 HUS 31 4040 MADLA TEL 59 19 98	3 PRINCIPAL ENGINEER ROLF RYDNING SELEMORKVN TEL 44 73 63	3 SENIOR ENGINEER RUNE N NAUSTDAL KLAPPMYSSVN 16 4020 HUNDVÅG TEL 54 90 48	3 SECTION MANAGER OTTO WIGDEL LILJEVN 10 TEL 53 49 58	3 ADVISOR OLE J NÆSS KLØVERVN 26 i TEL 62 00 09
			4 SENIOR ENGINEER ØYVIND TUNTLAND ELGFARET 95 4033 FORUS TEL 57 03 20		4 SENIOR ENGINEER ALFRED ØIJORD ØVRE STOKKAVEI 8 TEL 53 49 58
			5 SENIOR ENGINEER HARALD BRATTHAMMAR ELGFARET 37 4033 FORUS		

2693S

AJOUR PR 01.02.83

K A T A S T R O F E R

(STØRRE OMFATTENDE ULYKKER)

		I KONTORTIDEN	UTENFOR KONTORTIDEN/ HELGEDAGER
1	AVDELINGSINGENIØR MAGNE OGNEDAL	TLF 53 21 00	HAVGOLVEIEN 7 TLF 59 70 54
2	UNDERDIREKTØR SVEIN BYE	TLF 53 21 00	OLAV LILJEKRANSSTIEN 6 TLF 55 78 04
3	UNDERDIREKTØR ROLF G ANDRESEN	TLF 53 21 00	OTERSTIEN 14 4033 FORUS TLF 57 02 83
4	UNDERDIREKTØR ØYSTEIN BERG	TLF 53 21 00	PROF. HANSTEENSGT 94

KONTORTID:	15.9 - 15.5	KL 0800 - 1545	SVERDRUPSG 27, STAVANGER
	15.5 - 15.9	KL 0800 - 1500	TLF 53 21 00

3. ORGANIZATION PLANS

3.1 Project 31/3-2 Organization

Project organization plan is shown in the following charts.

The drilling supervisors is solely responsible for the drilling operation on the rig. He will report to, and immediately discuss any problems arising during the operation with the drilling superintendent or the operation manager.

3.2 Norsk Hydro Emergency Organization

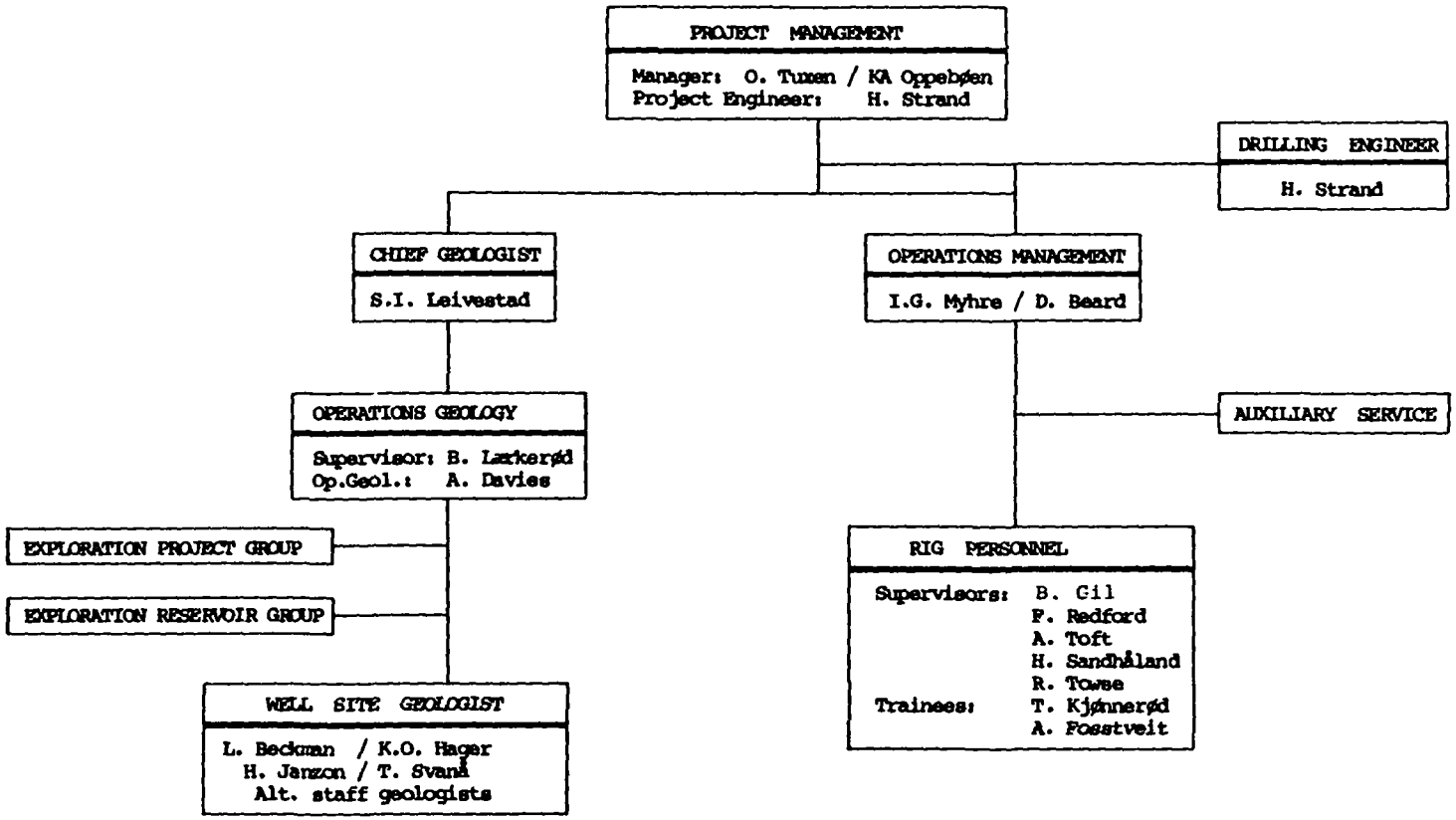
The company emergency organization is shown on page 82.

Normally all actions to mobilize this organization will be effected by the operation manager or his stand-in when an emergency situation is reported directly from the rig or through the rescue service.

For further information consult Operation manual Part III: Contingency Plan.

WELL 31/3-2 DRILLING PROJECT ORGANIZATION

Norsk Hydro



1001S/07.12.83/Hes

EMERGENCY ORGANIZATIONS PLAN

NORSK HYDRO a.s

See also
Contingency
Manual
Chap. 2