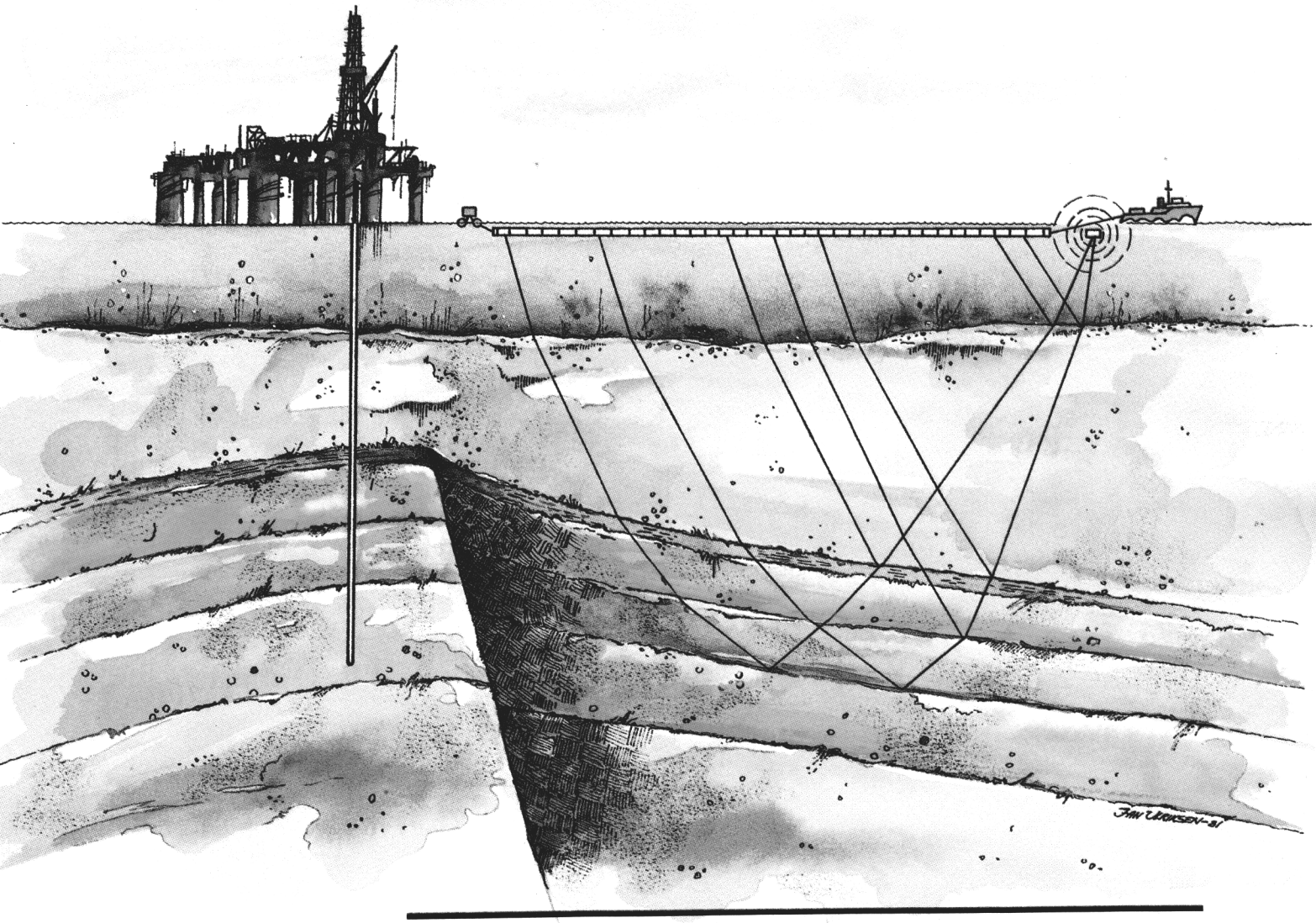
statoil



GULLFAKS-DIVISJONEN

SLUTTRAPPORT

BRØNN 34/10-29 PL 050

Statoil / Norsk Hydro / Saga Petroleum

statoil

Tittel/Undertittel

SLUTTRAPPORT BRØNN 34/10-29

Org.enhet	Kontraktnr./Prosjektnr.
RUV	
Rapportnr./Revisjon	Sted/Dato
0	Bergen 20.07.86

statoil

Gradering	Distribusjon
☒ FORTROLIG ☐ STRENGT FORTROLIG	☐ Fri distribusjon ☐ Kan distribueres fritt i Statoil ☒ Ingen distribusjon uten tillatelse fra ansvarlig avdeling

Tittel/Undertittel

SLUTTRAPPORT BRØNN 34/10-29

Fagområde/Emneord

GRUNN GASS BRØNN GULLFAKS A

Oppdragsgiver

PBR - Grunngass prosjekt

Org.enhet

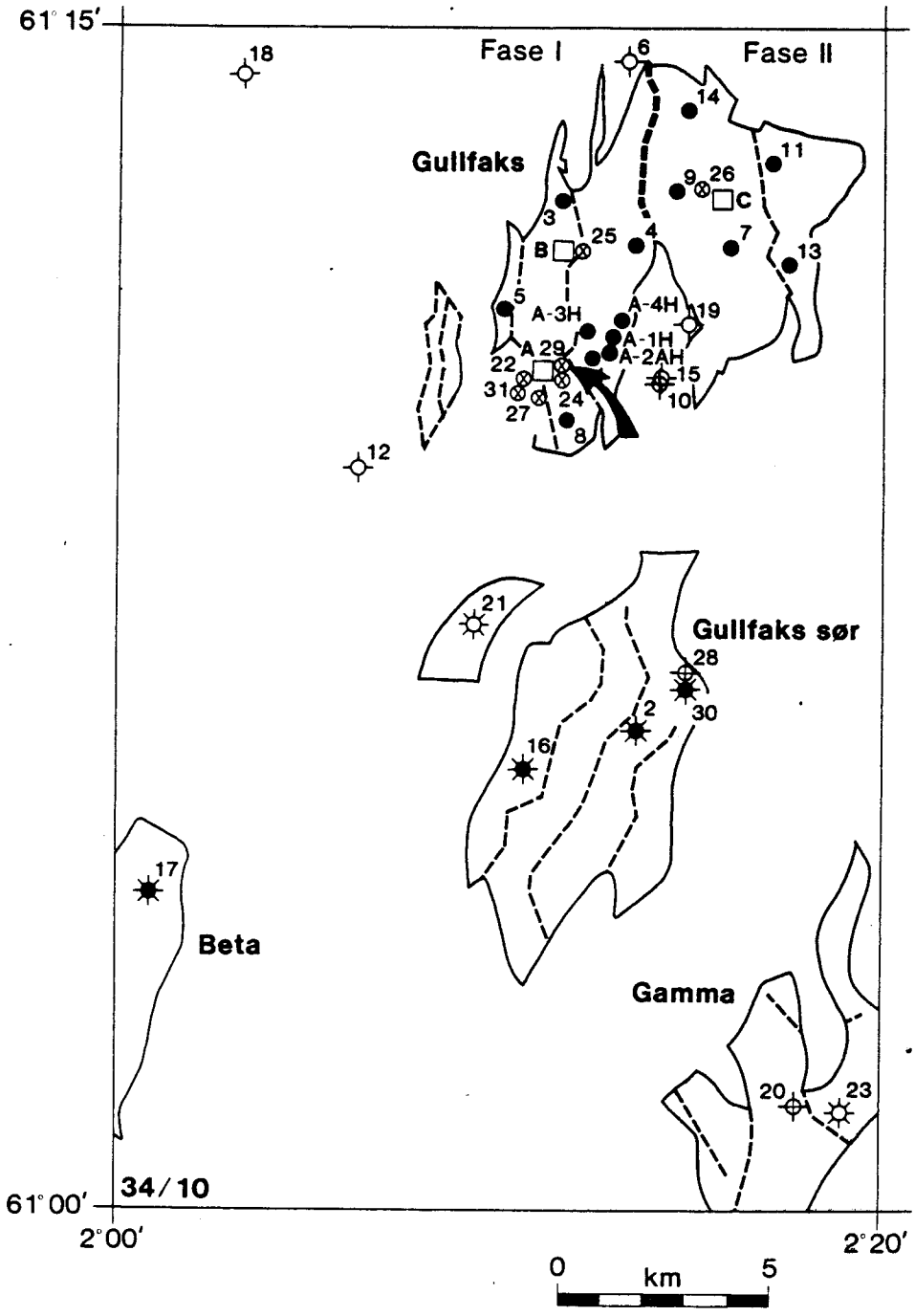
Kontraktnr./Prosjektnr.	Rapportnr./Revisjon

Utarbeidet av

Kari Janne Kornstad RUV
Russel McDowell RUV
Cheryl Lee-Berge RUV
Kjell Heggebø BOR-Dusavik

Antall sider	Antall vedl.	Antall kopier	Tekstoperatør
		20	50

Org. enhet	Sted/Dato
RUV - GULLFAKS DIVISJONEN	Bergen 20.07.86
Godkjent av	**Signatur**
RUV - GULLFAKS DIVISJONEN	4/8-86
Godkjent av	**Signatur**
BOR - DUSAVIK	
Godkjent av	**Signatur**



Sluttrapport

34/10-29

Statoil Bergen

Juni 1986

PL 050

STATOIL - NORSK HYDRO - SAGA PETROLEUM

SLUTTRAPPORT

BRØNN 34/10-29

FORORD:

Vi gjør oppmerksom på at kapittel IV og kapittel V er skrevet på engelsk. Disse delene har ikke blitt oversatt på grunn av kapasitetsmessige problemer.

Steinar Mæhle

INNHOLDSLISTE

I Generelle opplysninger

II Geologisk rapport

III Petrofysisk/reservoarteknisk evaluering

IV Borerapport

V Marin rapport

VI Div. vedlegg

			Side
I	GENERELLE OPPLYSNINGER		
	1.1	Brønnidentifikasjon	1.1
		a) Brønn nr.	1.1
		b) Brønn type	1.1
		c) Brønnlokasjon	1.1
		d) Rigg data	1.1
	1.2	Hensikten med brønnen	1.2
	1.3	Resultater av brønnen	1.2
	1.4	Brønnhistorie	1.2
		a) Generelt	1.2
		b) Kontraktorer	1.3
		c) Foringsrør	1.4
		d) Logging	1.4
		e) Kjernetaking	1.5
II	GEOLOGISK RAPPORT		
	2.1	Stratigrafi	2.1
	2.2	Litologisk beskrivelse	2.1
	Vedlegg 2.1: Borkaksbeskrivelse		
	Vedlegg 2.2: Kjernebeskrivelse		
III	PETROFYSISK/RESERVOARTEKNISK EVALUERING		
	3.1	Petrofysisk evaluering	3.1
	3.2	Reservoarteknisk evauering	3.3

IV	BORERAPPORT		Side
	4.1	Sammendrag	4.1
	4.2	Boreoperasjon i intervall	4.2
	4.3	Daglig aktivitet	4.5
	4.4	Brønn- og brønnhode skisse	4.18
	4.5	Rigg-tid fordeling	4.20
		Boretid mot dybde	
		Borekostnader mot dybde	
	4.6	Borkronedata	4.25
		Borkronedata mot litologi	
	4.7	Trykkprofil	4.27
	4.8	Retningsdata	4.28
	4.9	Utstyrsfeil	4.30
	4.10	Sammendrag av boreslamsdata	4.31
V	MARIN RAPPORT		
	5.1	Værdata og ankerstrekk	5.1
	5.2	Navigasjonsrapport	5.5
VI	DIV. VEDLEGG		
	2.3	Sluttlogg	
	2.4	MWD-logg	
	2.5	Formation evaluation logg	

I GENERELLE OPPLYSNINGER

RUV/GULLFAKS
K.J. Kornstad

I GENERELLE OPPLYSNINGER

1.1 Brønnidentifikasjon

a) Brønn nr : 34/10-29

b) Brønn type : Grunn gass brønn ved Gullfaks A posisjonen

c) Brønnlokasjon

i) Land : Norge

ii) Lisens : PL 050

iii) Koordinater

Geografiske : 61° 10' 33.06" N
02° 11' 28.76" Ø

UTM : N 6 782 805
Ø 456 503

iv) Vanndyp : 135 m

d) Rigg data

i) Riggens navn : West Venture

ii) Boredekk (BD) - Midlere havnivå (MHN) : 32 m

1.2 Hensikten med brønnen

Brønnen ble planlagt for å kartlegge og drenere mulige grunne gassforekomster mellom 310 m og 317 m (MHN) nær Gullfaks A plattformposisjonen.

1.3 Resultater av brønnen

I brønn 34/10-29 ble det boret gjennom en sand i intervallet 312 m - 316 m MHN (344 m - 348 m BD). De øverste 0.5 m av sanden inneholdt gass.

Det ble kuttet tre korte kjerner i intervallet 312 m - 315 m MHN. For beskrivelse se vedlegg 2.2

Boringen ble avsluttet ved 373 m MHN (405 m BD).

Brønnen ble perforert i intervallet 312 m - 316 m MHN. Strømningsegenskapene var svært dårlige, og etter innledende testperiode med produksjon opptil 24800 sm^3 pr. dag ble brønnen drept. Etter gjentatte mislykkede forsøk på å få produksjonen i gang igjen, ble det bestemt å oppgi brønnen.

1.4 Brønnhistorie

a) Generelt

i)	Borestart	: 27. desember 1985
ii)	Ferdig dato	: 26 januar 1986
iii)	Sluttstatus	: Plugget og forlatt, grunn gass brønn.

b) Kontraktorer

i)	Borerigg	: West Venture
ii)	Borekontraktor	: Smedvig
iii)	Boreslam	: Promud
iv)	Boreslamslogging	: Exploration Logging
v)	Elektrisk borehulls-logging	: Schlumberger
vi)	Sementering	: Dowell
vii)	Foringsrør	: TOS
viii)	Rigg posisjonering	: Geoteam
ix)	Bunnundersøkelser	: Geoteam Nor/Survey
x)	Logging under boring (LUB)	: Exploration Logging
xi)	Forsyningsfartøy	: Statoil's flåte
xii)	Overvåkingsfartøy	: Statoil's flåte
xiii)	Helikoptertransport	: Helikopter Service A/S
xiv)	Dykkertjeneste	: Stolt Nielsen

c) Foringsrør

30"	ved	209.5	m MHN	(241.5	m BD)
20"	ved	232	m MHN	(264	m BD)
13 3/8"	ved	279	m MHN	(311	m BD)
9 5/8"	ved	364	m MHN	(396	m BD)

d) Logging

i) Boreslamslogging

En Gemdas logge-enhet fra Exploration Logging stod for utførelsen av boreslamloggingen.

Følgende parametre ble registrert:

- Borehastighet
- Aktuelt boredyp
- Retur dyp
- Kraft på borekronen
- Vridning
- Rotasjonshastighet
- Pumpetrykk
- Boreslamsstrøm inn og ut
- Boreslams temperatur inn og ut
- Boreslams resistivitet ut
- Boreslams tetthet inn og ut
- Total gass
- Gass-kromatografi
- DXC-eksponenten
- Lengde- og tidsforbruk av gjeldende borekrone
- Litologi-beskrivelse
- "Shows"-beskrivelse

ii) LUB - logging under boring

Exlogs DLWD-utstyr ble brukt fra 270 m BD til 405 m BD i 17 1/2" og 8 1/2" hullseksjoner.

Utstyret registrerte gamma strålingen, resistiviteten i formasjonen, samt avviket på borehullet. Tilsammen ble instrumentene kjørt fire turer i borhullet.

Logging under boring ble ikke benyttet i forbindelse med boring av 36" og 26" hull, fra havbunnen til 270 m BD. I intervallet 316 - 319 m BD, som ble boret for å utføre en formasjonsstyrketest etter settingen av 13 3/8" foringsrør, ble heller ikke LUB-utstyr brukt

iii) Elektrisk borehullslogging

Den elektriske borehullsloggingen ble utført av Schlumberger.

Type logg	Logg nr.	Intervall (m BD)
ISF-BHC-MSFL-GR	1A	312-403.5
LDL-CNL-GR	1A	312-405
CBL-VDL-GR	2A	167-361

e) Kjernetaking

Det ble kuttet tre korte kjerner i intervallet 344.0 m BD-347.0 m BD. Angående beskrivelse, se vedlegg 2.2.

II GEOLOGISK RAPPORT

RUV/GULLFAKS
K.J. Kornstad

LITOLOGISK KOLONNE BRØNN 34/10-29

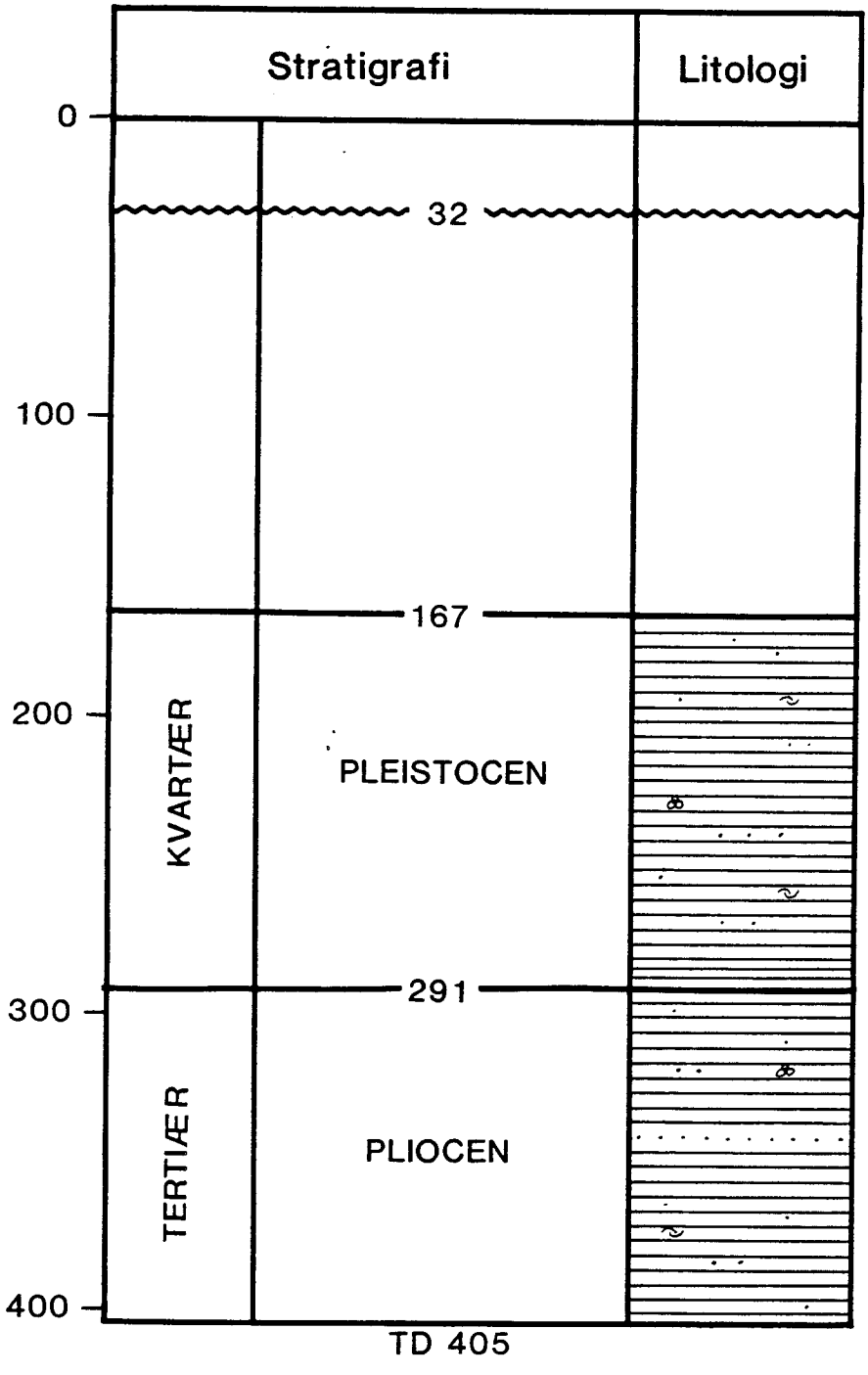


Fig. 2.1.1

2.1 Stratigrafi

Tabellen nedenfor viser de kronostratigrafiske toppene i brønnen.

TOPPER	DYP (M MHN)	DYP (m BD)
Kvartær (havbunn)	135	167
Pleistocen	135	167
Tertiær	259	291
Pliocen	259	291
TD	373	405

Overgangen Pleistocen - Pliocen er tatt fra LUB-loggen da det ikke er kjørt noen elektriske logger på dette dypet.

Fig 2.1.1 viser generell stratigrafi.

Sluttlogg, LUB-logg og "Formation Evaluation Log" for brønnen finnes som vedlegg bakerst i rapporten.

2.2 Litologisk beskrivelse

Brønnen er boret gjennom middels til mørk grå, noe kalk - og siltholdig bløt leire i veksling med enkelte sandlag. Sanden består hovedsakelig av gjennomskinnelig til melkehvit kvarts, og kornstørrelsen varierer fra fin til grov. Kornene er vanligvis angulære til subrundede og sorteringsgraden varierer fra dårlig til moderat. Det er rapportert spor av bergartsframenter, skallfragmenter og foraminiferer.

VEDLEGG 2.1: BORKAKSBESKRIVELSE

WELLSITE SAMPLE DESCRIPTION

WELL: 34/10-29
FIELD: GULLFAKS
AREA: NORTH SEA
COUNTRY: NORWAY
COMPANY: STATOIL
GEOLOGIST: DODSON/HERMANRUD

K.B.E.: 32 meters
HOLE SIZE: 17 1/2"
DATE: 31.12.1985

DEPTH	LITH.%	LITHOLOGIC DESCRIPTION	Shows&Remarks
275	90	CLAY; MED GRY, SFT, STKY, AMOR, I/P SOL SL CALC, TR CARB MAT, OCC OSTRACODS	CEMENT CONTAMINATION
	10	SLTST; BRN GRY - PURPLISH GRY, HD-V HD, NON CALC	
280	90	CLAY; MED-DK GRY, SFT-FRM, STKY, AMOR, I/P SOL, SL-MOD CALC,CARB MAT, SHELL FRAGS OSTRACODS, FORAMS:	SLIGHT CEMENT CONTAMINATION
	10	SLTST; BRN GRY-PURPLISH GRY, A/A	
	TR	ROCK FRAGS; CRS-V CRS, IGN & META, GRANITIC	
	TR	SD; TRNSL, MED, SUBRND, LSE	
285	90	CLAY; A/A	
	5	SLTST; A/A	
	5	SD; TRNSL, MED, SUBANG-SUBRND, OCC ANG. LSE	
290	100	CLAY; MED-DK GRY, SFT-FRM, STKY, AMOR, I/P SOL, MOD CALC, CARB SPKS, SHELL FRAGS	
	TR	SLTST; A/A	
	TR	SD; A/A	
295	90	CLAY; LT MED GRY - MED GRY, SFT, MOSTLY SOL, AMOR, MOD CALC, SL MICROMIC, TR SHELL FRAGS	
	10	SD; CLR-TRNSL, V FN-MED, PRED V FN, PR-MOD SRTD, ANG-SUBANG, LSE.	
	TR	SLTST; BRN GRY, FRM, FRI, ARG, calc	
300	70	CLAY; MED DK GRY, SFT, AMOR, SOL W/DISPERSED SD, ABUN SHELL/FOSS FRAGS, FORAMS & ECHINOID SPINES, CARB MAT, CALC.	DUE TO SOLUBILITY CLAY BEING WASHED OUT OF SAMPLES
	30	SD; CLR, TRNSL; ORNG/PK/WH, CRS, OCC FN, MED & V CRS, MOD SRTD, ANG-RND, PRED SUBRND, LSE, IGN & META ROCK FRAGS, CRS-V CRS MICA FLAKES	DULL YEL MIN FLUOR
305	70	CLAY; A/A	DULL YEL MIN FLUOR
	30	SD: A/A	

WELLSITE SAMPLE DESCRIPTION

WELL: 34/10-29
FIELD: GULLFAKS
AREA: NORTH SEA
COUNTRY: NORWAY
COMPANY: STATOIL
GEOLOGIST: DODSON/HERMANRUD

K.B.E.: 32 meters
HOLE SIZE: 17 1/2"
DATE: 31.12.1985

DEPTH	LITH.%	LITHOLOGIC DESCRIPTION	Shows&Remarks
310	80	CLAY; MED GRY, SFT, OCC FRM, AMOR, I/P SOL DISPERSED SD, SHELL & FOSS FRAGS, CARB SPKS, CALC, SL MICROMIC	DULL YEL MIN FLUOR
	20	SD; PRED TRNSL, OCC PK, ORNG, OFF WH, FN-CRS, PRED FN, PR-MOD SRTD, ANG-SUB RND, LSE, CRS META & IGN ROCK FRAGS.	
315	70	CLAY; MED DK GRY, ABUN SHELL & FOSS FRAGS, FORAMS	DULL YEL MIN FLUOR
	30	SD; FN-V CRS, P SRTD, ELSE A/A	

WELLSITE SAMPLE DESCRIPTION

WELL: 34/10-29
FIELD: GULLFAKS
AREA: NORTH SEA
COUNTRY: NORWAY
COMPANY: STATOIL
GEOLOGIST: DODSON/HERMANRUD

K.B.E.: 32 meters
HOLE SIZE: 8 1/2"
DATE: 31.12.1985

DEPTH	LITH.%	LITHOLOGIC DESCRIPTION	Shows&Remarks
320	70	CLAY, A/A	CEMENT CONTAM. IMPURITIES
	30	SD, DOM QZ, CLR-MLKY, VF-CRS, PRL SRT, SUBRND-ANG, LSE, AB LITH, ROCK FRAGM.	NO SHOWS
325	70	CLAY, MED-DK GRY, SFT, AMOR, CALC., FORAMS	
	30	SD, DOM QZ, MLKY-TRANSL, VF-CRS, PRL SRT SUBRND-SUBANG, LSE, LITHIC. ROCK FRAGM.	"
330	70	CLAY, A/A	
	30	SD, NO LITHIC FRAGM., ELSE A/A	"
335	70	CLAY, A/A	
	30	SD, OCC. LITH. FRAGM., ELSE A/A	
340	70	CLAY, A/A	
	30	SD, A/A	
344	60	CLAY, A/A	SPOT SAMPLE
	40	SD, CLR-OFF WH, VF-VCRS, PRED CRS, MOD SRT, ANG-SUBRND, LSE, AB. LITH FRAGM., CALC CMNT	
344-344,6		CLAYSTONE, MED-DK GRY, MAS-BLKY HD-VHD, NON CALC, OCC CARB SPKS	CORE 1 CA 70% RECOVERY
344,6-345		CLAYSTONE, MED-DK GRY, MAS-BLKY IN PTS SUBFISS, MOD HD, PLASTIC, NON CALC OCC SD GRNS	CORE 2 100% RECOVERY
346,5		SD, DOM QZ, CLR-TRANS, MLKY OCC GRY, PRED CRS, WELL SRT, SUBANG-ANG, LSE, AB LITH ROCK FRAGMTS, FORAMS, SHELL FRAGM.	

WELLSITE SAMPLE DESCRIPTION

WELL: 34/10-29
FIELD: GULLFAKS
AREA: NORTH SEA
COUNTRY: NORWAY
COMPANY: STATOIL
GEOLOGIST: DODSON/HERMANRUD

K.B.E.: 32 meters
HOLE SIZE: 8 1/2"
DATE: 31.12.1985

DEPTH	LITH.%	LITHOLOGIC DESCRIPTION	Shows&Remarks
350	70	SD, CRS-F, OCC V CRS, TRANSL-MLKY, MOD SRT SUBRND, LSE, AB LITHIC GRNS, SHELL FRAGS	
	30	CLAY: MED-DK GRY, SFT, SOLB, AMOR	$CaCO_3$ IN MUD
	TR	MICA	
355	90	CLAY: A/A	
	10	SD: VCRS-F, TRNSL-MLKY, MOD SRT, ANG-SUBRND LSE, AB LITHIC GRNS	
		FOSSILS: FORAMS, SHELL FRGS, ECHIN SPKLS	
360	90	CLAY; A/A	
	10	SD: A/A	
365	80	CLAY, A/A	
	20	SD, A/A	
370	90	CLAY, MED DK GRY, MAS, SFT, AMOR, I/P SOL OCC CRB SPKS, NON CALCS, FOSS A/A	
	10	SD; TRNSL, MILKY, FN-V CRS, PR SRTD, ANG, LSE	
375	90	CLAY; A/A, OCC W/FINELY DISPERSED SILT	
	10	SD; A/A	
380	95	CLAY; A/A	
	5	SD: A/A W/OCC LITHIC FRAGS	
	TR	SILT; BRN GRY, SFT, SOL, AMOR	
385	100	CLAY; A/A	
	TR	SD; A/A W/OCC LITHIC FRAGS	
390	90	CLAY; MED DK GRY, MAS, AMOR, SFT-FRM, STKY & PLASTIC I/P, NON CALC.	
	10	SD; TSL-GRY BRN, FN-CRS, PRED FN, PR-MOD SRTD, SBRND-ANG, ARG MTX, LSE-PR CONSOL-IDATED, OCC CRS LITHIC FRAGS, CALC	
395	100	CLAY; A/A	
	TR	SD; TRNSL, FN-CRS, ANG, LSE	
	TR	ROCK FRAGS	
400	75	CLAY; MED DK GRY, AMOR, SFT, I/P SOL, CARB SPKS, OCC SHELL FOSS FRAGS	
	25	SD; CLR-TRNSL; V FN-CRS, PRED FN, MOD SRTD, SUBRND-ANG, LSE	
405	90	CLAY; A/A	T.D. AT 405 M
	10	SD; A/A	

VEDLEGG 2.2.: KJERNEBESKRIVELSE

BRØNN 34/10-29

#1: 344.0 - 344.5 m BD
#2: 344.7 - 345.0 m BD
#3: 346.8 - 347.0 m BD
Totalt 1 m fordelt i plastposer

1. pose: =1 LEIRE; SILT,-SAND,-GRUS OG STEINHOLDIG
Ca. 20% > siltfraksjon. Blågrå, bløt
Sand av kvarts, feltspat, bergartsfragmenter
Observert svært fin - grov sand, subrundet til rundet
Grus og stein, 4 mm diam - 40-30 mm diam. subrundet til rundet. Av kalsittsementert kvartsand og konsolider hard siltstein.

2. pose: LEIRE; SILT,-SAND,-GRUS-og STEINHOLDIG
Ca. 40-50% > siltfraksjon
Sand: som i pose 1.
Grus og stein
eks. a) 45x10x20 mm skarpkantet granittisk med klar stripning på en flate.
b) 40x20 mm hard siltstein rundet
20x10x10 mm hard siltstein subrundet, stripning på en flate.
c) 20 x 20 mm primært rundet hard siltstein med skarpkantet bruddflate.

3. pose: 160x70x100 mm med hard siltstein, subrundet - rundet
#2 Fordelt i/på mange poser. Poser med Leire lik det som er beskrevet fra pose 2 i #1, men mer grusig.
En pose lik #1 pose 1. Bollematerialet som i #1.
eks. 70x30x50 mm granittisk subangulær
110x180x40 mm hard siltstein, subrundet. En pose med bare grus og stein (vasket ut på boredekk?).

#3 fordelt på flere poser.

En pose med kornbåret prøve, = "konglomeratisk" maksimalt 40x20x30 mm med bollemateriale som beskrevet over (= 20% leire). Ellers svært sandholdig leire/leirholdig sand som matriks med rundede og kantede boller i grus & steinfraksjon, d.v.s. svært dårlig sortert.

Skall-fragment funnet i en prøve i #3.

III PETROFYSISK/RESERVOARTEKNISK EVALUERING

RUV/GULLFAKS
R. McDowell/C. Lee-Berge

3.1 Petrofysisk evaluering

Loggene fra brønn 34/10-29 viser følgende resultater:

Sand intervall: 344.0 - 348.0 M(RKB)

Total tykkelse: 4.0 m

INTERVALL	344-344.5 MRKB	344.5-348 MRKB
Tykkelse:	0.5 m	3.5 m
Gjennomsnitts-porøsitet:	40%	25%
Gjennomsnitts-gassmetning:	25%	0%
Mineralogi:		
Kvarts:	25%	20-25%
Feltspat:	25%	15-75%
Glimmer:	5%	2%
Karbonater:	45%	10-35%
Leirmineraler:	0%	0%
Matriks Tetthett	2.68 g/cc	2.62-2.69 g/cc

Verdiene må betraktes om usikre på grunn av kompleks mineralogi i sonen.

Porøsitet er beregnet fra tetthetsloggen basert på ligningen:

$$\emptyset = \frac{(RHOMA-RHOB) + VSH\ (RHOSH-RHOMA)}{(RHOMA-RHOMF)}$$

Hvor:

Ø = Porøsitet
RHOMA = Matriks tetthet beregnet fra kjerne - XRD data
VSH = Leireinnhold
RHOSH = Leire tetthet
RHOMF = Væske tetthet

Kjernematerialet viser bare spor av leirmineraler

Indonesia ligningen ble benyttet til beregning av vannmetning:

$$\frac{1.0}{\sqrt{RT}} = \left[\frac{VSH^{(1.0-\frac{VSH}{2.0})}}{\sqrt{RSH}} + \frac{\emptyset^{\frac{M}{2.0}}}{\sqrt{a \cdot Rw}}\right] \cdot Sw^{\frac{N}{2}}$$

Hvor:

RT = Korrigert formasjonsresistivitet
RSH = Leireresistivitet
a = Litologi faktor = 0.62
Rw = Vann resistivitet = 0.4 ohm x m
(verdien fra tidligere analyser av 34/10-24, 34/10-31, 34/10-22)
Sw = Vannmetning
N = Metningseksponent = 2
M = Sementeringsfaktor = 2.15

3.2 Reservoarteknisk evaluering

Brønn 34/10-29 ble perforert 08.01.86 i intervallet 344-348 m RKB. Initiell strømnings-/innstengnings-periode ble utført med det samme:

1. strømningsperiode - 5 timer
1. innstengningsperiode - 10 timer

Det ble observert lekkasje i LPR-n ventilen ved 1. innstengningen og beslutningen ble derfor tatt for å utføre en ny innstengningsperiode. 2. strømnings-/innstengningsperiode ble utført 13.01.86:

2. strømningsperiode - 3½ time
2. innstengningsperiode - 7 timer

Maksimal strømningsrate ble målt ved 1. strømningsperiode ca. 25.000 sm^3/d.

P^2 Horner analyse indikerte:

K = 400 md (dersom bare høyde av gasskolonne settes lik = 0.75m. Total høyde av sand sonen = 4 m).

S = 30 (1. innstengningsperiode)
22 (2. innstengningsperiode)

Initielt trykk ($\bar{p}$) var ikke så enkelt å beregne, men er antatt å være i samme trykkregime som 34/10-24. (Mellom 3320-3370 kPa).

$\bar{p}$ = 3300 kPa $\pm$ 17 kPa* $\pm$ Kalibreringsjustering*

*17 kPa = trykkmålernes oppløsning.

Kalibreringsjustering: målerne ble ikke kalibrert før etter de ble brukt på brønn 34/10-31. Det er derfor vanskelig å si hvor mye trykket for brønn 34/10-29 må justeres.

Etter to initielle strømningsperioder ble det forsøkt å renske perforeringene. Dette ble avsluttet siden væske ble mistet inn i formasjonen. Deretter ble brønnen behandlet med saltlake som inneholdt gjensidig løse-middel og leir stabiliseringsmiddel. Forsøk på å få brønnen til å strømme etter behandling var mislykket.

I tiden etterpå ble brønnen syrebehandlet 3 ganger med 15% HCL. Det ble forsøkt å få brønnen til å strømme etter hver behandling, men alle forsøkene var mislykket.

IV DRILLING REPORT

BOR- DUSAVIK

K. Heggebø

4.1 Summary

4.1 Summary.

The drilling unit "West Venture" was transferred from well 34/10-27 to well 34/10-29 at 1200 hours the 14 th of December 1985. The drilling unit was transferred back to 34/10-27 at 14.55 hours the 26 th of January 1986.

The primary objective was to reduce the pressure in the shallow gas sand at 310 m MSL, below the planned Gullfaks 'A' location.

It was attempted to recover core samples from the "gas sand". Cores were recovered but no sand was recovered. The sand was drilled using MWD, and later logged with ISF-BHC-MSFL-GR and LDL-CNL-GR.

The well was perforated at 344 M to 348 M, with nitrogen cushion. Follows first flow a perforation wash was attempted. The test string was rerun and 20 % mutual solvent was injected into the well. The well did not flow. Coil tubing was used to lift out possible water production. Three acid jobs were conducted. After the last acid job high cocentrations of H_2S gas was detected. The well was killed and the string pulled.

The well was permanently plugged and abandoned.

4.2 Drilling operations in intervals

4.2 Drilling operations in intervals.

The semi submersible drilling unit "West Venture" was moved 85 m from location 34/10-27. During anchor handling anchor chain no. 8 was jammed and could not be moved. Rig pulled all anchors and sailed to Ågotnes for repairs at 18.00 hours the 15 th of Desember 1985. Fairlead for anchor no 8 was repaired and locking plates was welded on all fairleads. Rig was back on location and anchor handeling started 17.00 hours the 24 th of December.

Final position:
N: 61 deg 10 min. 32.94 sec
E: 2 deg 11 min. 28.89 sec

36" hole: 167 - 241.5 M.

Spudded well, but due to low penetration rate rig was moved 2 m NE and well respudded. The 36" hole was drilled with a 26" bit and 36" holeopener in 20 hours. Ran 30" casing and cemented same without problems. Tagged cement 2 m above shoe.

26" hole: 241.5 - 270 M.

Drilled 26" hole with 26" bit from 241,5 m to 270 m in 1.5 hours. Made wiper trip. Ran and cemented 20" casing without problems. Bumped plug, no back flow. Ran BOP and riser and tested BOP without problems. Tested 20" casing to 100 bar.

17 1/2" hole: 270 - 316 M.

Drilled 17 1/2" hole with gel mud from 270 m to 316 m. Ran MWD in this section. Hole was drilled in 5 hrs. Made wiper trip, circulated hole clean and flow checked. Ran and cemented 13 3/8" casing without problems. Bumped plug, floats held ok. Set seal assembly and tested casing to 100 bar.

12 1/4" hole: 316 - 405 M.

Drilled out cement, float and shoe and 3 m new formation. Circulated hole clean and performed formation integrity test equivalent to 1.27 SG. mud weight.

Displaced hole to 1,27 SG KCL/POLYMER mud. Drilled 8 1/2" pilot hole with MWD tool to 344 m. Circulated for samples at 340 m, 342 m and 344 m, no gas. POOH and RIH with junk retriever. Had tight hole at 339 m. Circulated hole and cut core form 344 m to 344.5 m had problems shearing rupture disc. Recovered 0.5 m core, no sand. RIH with new junk cather cut core from 344.5 m to 345 m, recovered 0.5 m core, no sand.
RIH with 8 1/2" bit and drilled from 345 m to 346.5 m.
Circulated for sample had sand in bottoms up. POOH and RIH with junk catcher and cut core from 346.5 m to 347 m. Recovered 0.5 m, no sand. POOH and RIH with 8 1/2" bit and drilled to TD at 405 m.
Ran Schlumberger logs.
RIH with 8 1/2" bit and 12 1/4" hole opener and opened hole to 12 1/4" to 403 m. Ran and cemented 9 5/8" casing using silica cement. Bumped plug and pressure tested to 275 bar. Floats held ok. A radioactive marker was set at 280.3 m.

Production test: 344 m - 348 m.

Displaced riser to seawater. Washed riser and 9 5/8" casing with seawater using jetting tool. Displaced hole to 1.12 SG brine and filtered the hole clean. These operations took 32 hrs.
Sclumberger set packer at 335 m after one missrun.
Perforated 9 5/8" casing from 344 to 348 m using tubing conveyed gun using nitrogen as cushion. Flowed for 5 hrs. Shut in well for 12 hours, tester valve leaked. Ran pressure gauge on wire line, no indicatiotion of fluid in tubing.
Disconnected from Sub Sea Test Tree and later disconnected riser due to weather. During relatching of SSTT had problems with latch mechanism. Flowed well for 4 hours followed by a 7 hours shut in. Max production 24800 SM^3/DAY (48/64" choke). Killed the well and POOH with test string.
Ran Sclumberger gravel pack log. RIH with Baker MOD D circulation washer. Washed perforations from 347.3 m - 348 m lost brine for formation. POOH.
Ran sand bailer.
RIH with test string. Injected 20 % mutual solvent.
Overdisplaced with nitrogen. No flow. Ran coil tubing trying to lift out any water, no water was observed. Conducted three small

acid jobs without success. After final acid job H_2S was detected concentration up to 350 ppm. Killed well and pulled test string. Ran sand bailer and found sand at 358 m.

Plug and abandonment.

Ran and set a retainer at 336 m and squeezed off perforation.
Set a cement plug from 336 m and dressed it off to 250 m.
Perforated 9 5/8" casing at 222, a 3 bar drop was observed. Cut casing at 215.3 m. Pulled casing free with 34 tons overpull.
Set an EZ-SV at 212 m. Cut 13 3/8" casing at 198 m. Casing was pulled free with 14 tons overpull. Attempted to pressure test 13 3/8" x
20"annulus to 50 bar without success.
Set a balanced cement plug form 209 m to 180 m. Held 50 bar pressure against blind ram while WOC. Dressed off cement plug to 198 m with 17 1/2" bit. Attempted to pressure test to 50 bar, no success.
Set a Lynes packer at 192 m, tested packer to 50 bar, ok. Set a balanced cement plug from 192 m to 178 m.
Pulled BOP and riser.
RIH with 17 1/2" bit and tagged cementplug at 178 m.
Cut 20" and 30" casing at 192 m, attempted to pull 20" and 30", no success, had 225 tons overpull. Recut 20" and 30" casing and pulled loose with 204 tons overpull.

Rig moved to 34/10-27 for reentry.

4.3 Extract of daily activities

4.3 Extract of daily activities.

85.12.14 Moved rig 85 m to new location. Reset anchor no. 5. Picked up 36" BHA while moving rig. Not able to tension anchor no. 8. Inspected fairlead no. 8 with Scorpio. Inspection showed anchor was chain jammed between shieve and housing. Prepared to go to Agotnes for repair. Laid down 36" BHA started anchorhandling.

85.12.15 Anchorhandling. Waited on weather for three hours. Rig on tow to Agotnes. Left location at 1815 hours.

85.12.16 Rig on tow to Agotnes.

85.12.17 Rig on tow to Agotnes. Anchored up 1200 m east of CCB base. Backloaded drilling equipment and bulk due to deballasting of rig.

85.12.18 Deballasted rig to 14.5 m draft while backloading. Anchorhandling to move rig to shipyard. Moved rig and achored up. Started to repair fairlead no 8.

85.12.19 Rig repair.

85.12.20 Rig repair.

85.12.21 Rig repair.

85.12.22 Rig repair. Loaded bulk and drilling equipment. Anchorhandling. Last anchor bolstered at 2225 hours. On tow to location 34/10-29.

85.12.23 On tow to location 34/10-29.

85.12.24 On tow to location 34/10-29. Dropped anchor no 3 and 5 on bottom. Stopped anchorhandling due to bad weather.

85.12.25 Waited on weather for 18 hours. Continued anchorhandling.

85.12.26 Attempted to reset anchor no. 6. Not able to lift if from bottom. Slacked off on anchorchain no. 6. Lowered R.O.V. and found anchor chain no. 5 and no. 6 twisted together. Slacked off on chain no. 5 and attempted to pull anchor no. 6 and chain of anchor no. 5 on to deck on "Edda Star". Anchor no 5 and 6 was untwisted. Reset anchor no 6. Let anchors soak and pulltested to 160 tons.

85.12.27 Tested release of anchor no. 5 and no. 6. Waited on weather for 10 hours. Moved rig toward location. Tensioned up anchors. Tagged bottom and spaced out string. Pumped rig up 3 m. Spudded in at 1630 hours. Water depth: 135 m. Pulled of bottom and moved rig 2 m NE due to low penetration. Re-spudded well at 1730 hours.

85.12.28 Drilled 26" x 36" hole from 167 m to 241.5 m. Spotted gel pill each connection. Displaced hole with high viscous mud. Dropped survey. POOH to 176 m and retrieved survey. RIH to bottom, no fill. POOH. Rigged up to run 30" casing. Ran a total of 6 joints 30" casing, shoe at 241.5 m. Landed 30" casing with 0.5 m stick up.

85.12.29 Rigged up cement lines and pressure tested same. Held 30" casing shoe 2 m off bottom while mixing and pumping cement slurry. Landed 30" casing. Released running tool. POOH with cement stinger. RIH with jet sub. Washed inside 30" wellhead and POOH. Laid down 36" hole opener. Made up new 26" bit and RIH. Installed guide frame. Tagged cement at 239.5 m. Drilled cement and shoe. Drilled 26" hole from 241.5 m to 270 m. Displaced hole with high viscous mud. Dropped survey. POOH to 210 m and retrieved survey. RIH to bottom. No fill. POOH. Washed 30" wellhead. Rigged up to run 20"

casing. Ran 20" a total of 8 joints of 20" casing, shoe at 264 m.

85.12.30 Landed 20" casing with 18 3/4" wellhead 1 m above 30" wellhead. Pressure tested cement lines to 172 bar. Mixed and pumped 23 m^3 cement slurry. Bumped plug with 70 bar, no backflow. Released running tool and washed wellhead. POOH. Rigged up and ran BOP and riser. Installled diverter housing. Landed BOP and pulltested to 23 tons. Pressure tested BOP on blue pod. Rams and failsafe valves to 276 bar, annular preventer to 210 bar. Function tested on yellow pod. Pressure tested kelly, kelly cocks, spare cock, gray valve and stand pipe manifold to 276 bar. Closed blind shear ram on accoustic. Tested 20" casing against blind shear ram to 100 bar. Ran 18 3/4" wellhead seat protector.

85.12.31 Laid down 26" bit. Made up 17 1/2" BHA. Function tested MWD tool, and RIH. Tagged cement at 251.5 m. Drilled rubber plug, float, cement and cleaned rathole to 270 m. Displaced hole to 1.10 S.G. mud. Drilled 17 1/2" hole from 270 m to 316 m. Circulated bottoms up. Dropped survey. POOH to shoe, and retrieved survey. RIH, no fill. Pumped high viscous pill and circulated hole clean. Flow checked and POOH. Retrieved wear bushing. Ran 13 3/8" casing and landed same with shoe at 311 m. Dropped ball. Pressure tested cement lines to 210 bar. Mixed and pumped 12.3 m^3 cement slurry. Bumped plug with 70 bar. No backflow.

86.01.01 RIH with 13 3/8" seal assembly and set same. Tested seal assembly to 100 bar. Ran wear bushing. Laid down 17 1/2" BHA. Pressure tested casing against shear ram to 100 bar. RIH with 12 1/4" BHA and tagged cement at 282 m. Washed soft cement to 285 m. Drilled rubber plug, float, cement, shoe and 3 m new formation to 319 m. Circulated clean hole. Performed formation integrity test equal to 1.27 S.G. Displaced hole with 1.12 S.G. $KCl/CaCl_2$ polymer mud. POOH. Laid down 12 1/4" BHA. Made up 8 1/2" bit. Tested MWD tool and RIH.

86.01.02 Drilled 8 1/2" hole from 319-340 m. Circulated bottom up for samples. Drilled 8 1/2" hole from 340-344 m. Circulated bottoms up for samples. No gas. POOH with 8 1/2" BHA. Set back 8 1/2" bit and MWD tool. Made up junk catcher and RIH. Circulated bottom up. Dropped ball and cut core from 344 m to 344.5 m. Attempted to shear rupture disc. No success. Ran slick line, ball had hung up in jar. Worked ball down. Cut 0.2 m core and sheared rupture disc. Flow checked and POOH. Recovered 0.5 m core, no sand. Made up new junk catcher and RIH to 344.5 m. Dropped ball and cut 0.5 m core, sheared rupture disc. Had 5 tons overpull to break core. POOH and recovered core, 100% recovery, no sand. RIH with 8 1/2" BHA to 345 m. Logged from 342 m to 345 m with MWD-tool. Drilled 8 1/2" hole from 345 m to 346.5 m. Circulated for bottom up for sample, had sand in bottom up. POOH, RIH with junk catcher. Broke circulation and dropped ball. Cut core from 346.5 m to 347 m. Sheared rupture disc and broke core with 10 tons overpull. POOH, recovered 0.5 m core, no sand.

86.01.03 RIH with 8 1/2" BHA. Drilling line crossed on drawwork drum while tripping. Hung off travelling block and reinstalled drilling line. Continued RIH to 347 m, no fill. Drilled 8 1/2" hole from 347 m to 405 m. Circulated bottom up. Dropped survey. POOH to 13 3/8" shoe, RIH to TD, no fill. Circulated bottoms up and POOH. Retrieved survey. Rigged up Schlumberger.
Run no. 1: ISF-BHC-MSFL-GR
Run no. 2: LDL-CNL-GR.
Rigged down Schlumberger. Picked up 9 5/8" casing hanger, installed seal assembly and cement plugs and set back in derrick. Made up 8 1/2" bit and 12 1/4" holeopener and RIH.

86.01.04 Opened up 8 1/2" pilot hole to 12 1/4" from 319 m to 403m. Circulated bottom up. Made wiper trip to shoe Circulated hole clean. POOH. Washed wear bushing on way out. Ran 9 5/8" casing. Circulated bottom up.

Pressure tested cement line to 275 bar. Pumped spacer and 5.3 m^3 silicia cement slurry. Discplaced cement with mud. Landed hanger after having displaced 7.2 m^3. Bumped plug with 275 bar and held pressure for 15 min. Bled off pressure, no back flow. Released running tool and washed wellhead. POOH. RIH with seal assembly running tool and torqued up seal assembly. Pressure tested same to 275 bar. RIH with test tool and pressure tested BOP on yellow pod. Annular to 241 bar, pipe rams and failsafe valves to 275 bar. Function tested on blue pod. POOH with test tool.

86.01.05 Displaced riser with seawater. Made up jetting tool and 9 5/8" scraper. Jetted riser and 9 5/8" casing with seawater. POOH. Checked wearbushing and set same. Rigged up Schlumberger and ran: CBL-VDL-GR.

86.01.06 Rigged down Schlumberger. RIH with jetting tool, 9 5/8" scraper, DC's and fluted hanger to wellhead. Closed middle pipe ram on painted slick joint. POOH. Laid down fluted hanger. Picked up 3 1/2 PH-6 tubing when going in hole. Started to displace hole to seawater. Circulated with seawater until clean hole. Displaced hole with 1.12 S.G. brine. Continued circulate brine through pall filters until clean hole. Displaced kill/choke lines with brine. POOH. Laid down jet sub and 9 5/8" scraper. Rigged up Schlumberger.

86.01.07 Schlumberger set Baker F1 sump packer at 353 m. Had one misrun due to electrical short circuit in CCL. Rigged down Schlumberger. Picked up BHA for perforation test string. Tested BHA to 245 bar. RIH with 3 1/2" PH-6 tubing. Entered sump packer and put 3 tons tension on string. Closed middle pipe ram and opened same again. Pulled out of packer with 5 tons overpull. POOH and checked ram marks on painted joint. Corrected length of string below fluted hanger. Made up SSTT and function tested same. RIH with landing string and lubricater valve. Function tested lubricator valve. Landed fluted

hanger in wellhead. Schlumberger ran GR-CCL to check perforation depth. Perforations guns were 1 m too deep. POOH with landing string and corrected space out below fluted hanger. RIH with landing string. Function tested SSTT and lubricator valve. Pressure tested surface lines and entire string to 245 bar.

86.01.08 Tested SSTT and lubricator valve. Rigged up Nowsco frame on top of flowhead, coflexip hoses on kill and flow side on flowhead. Landed fluted hanger in wellhead. Picked up sand trap and connected kill and flow lines. Installed control lines to master valve and failsafe valve. Pressure tested surface equipment. Flushed surface system with brine. Pressure tested burner booms to 40 bar, chocke manifold upstream and downstream valves to 245 bar, and sandtrap valves to 245 bar. Rigged up wireline lubricator and tested same to 40 bar. Retrieved 2.188" check valve on wireline. Closed middle pipe ram and pumped nitrogen down tubing to 283 m with Nowsco. Set Baker plug in 2.125" HF nipple on wireline. Retrieved plug running tool and RIH with prong. Set Baker FH-packer with 242 bar nitrogen pressure. Equalized pressure over Baker plug. Retrieved prong. Tested packer with 100 bar on tubing. Retrieved Baker plug. Installed perforations bar and bled nitrogen pressure down to 10 bar on surface. Dropped bar and perforated from 344-348 m. Opened up well slowly. Flowed well through 32/64" choke. Flowrate 20190 scm gas, wellhead pressure 7.5 Bar. Flowed through 48/64" choke. Flowrate 24810 scm, wellhead pressure 3.4 bar. Shut in period. Shut in well on LPR-N valve and choke manifold.

86.01.09 Wellhead pressure increasing to 31 bar. LPR-N valve leaking. Final shut in pressure 31.1 bar. Rigged up to run Sperry Sun gauge on Otis slickline. Opened LPR-N with 103 bar. Ran Sperry Sun pressure gauge to 337 m. No indication of fluid in test string between surface and ported disc. at 332 m. Otis set HFH plug in

H-nipple at 318.6 m. Otis set prong in H Nipple at 318.6 m. Bleed of pressure on tubing from 31 bar to 7 bar. Pressured up teststring above HFH plug to 35 bar and closed SSTT. Bleed down above SSTT to 3.5 bar and closed in teststring. Waited on weather for 2.5 hours. Bleed off pressure above SSTT. Flushed surface lines out to burner boom, bypassing separator. Filled up tubing with 0.6 m^3 brine. Rigged down surface lines, flowhead and Nowsco frame. Disconnected from SSTT. Laid down lubricator valve, POOH teststring above SSTT. Closed shear ram.

86.01.10 W.O.W. Observing well. Opened shear ram and attempted to displace riser to seawater. Found chokeline plugged. Pressured up chokeline to 345 bar, pressure dropped. Displaced riser to seawater with rig pumps. Disconnected main riser and continued waiting on weather.

86.01.11 W.O.W. Landed and latched lower marine riser package, tested with 25 tons overpull. Landed and latched diverter, tested same with 10 tons overpull. Opened upper choke valves and checked for pressure below shear ram.

86.01.12 RIH with SSTT latch and landing string. Attempted to pressure test lubricator valve on surface. Would not hold pressure from below, changed out same with back up lubricator and pressure tested to 241 bar. Positioned rig. Picked up lubricator valve and surface equipment. Opened shear ram, flushed top of SSTT and displaced riser to brine. Displaced 140 m of landing string with nitrogen. Landed and relatched SSTT, tested same with 2,5 tons overpull. Equalized pressure over SSTT and opened same. Pressure up test string to 50 bar. Closed SSTT. Bled off pressure above to 10 bar, tested SSTT from below. Pressure up to equilize pressure over SSTT, pressure dropped to 12 bar. SSTT came unlatched, pulled latch above shear ram and closed same. Observed well

for pressure build up below shear ram. Rigged down surface test equipment and POOH with SSTT latch. Rigged up back up latch and RIH. Picked up lubricator valve, Nowsco frame, STT and nipple up surface lines. Opened shear ram and circulated down landing string with brine to flush top of SSTT latch assembly. Displaced 140 m of landing string with nitrogen. Landed and relatched SSTT, tested with 2.5 tons overpull. Equalized pressure across SSTT and opened same.

86.01.13 No indication of SSTT opening, bled off tubing pressure. Closed lubricator valve and rigged up Otis wireline lubricator and stuffing box. Opened lubricator valve and RIH with Otis wireline below SSTT ok. POOH and closed swab valve. Pressure tested test string, SSTT. lubricator valve, master valve, burner booms, chokes and Otis stuffing box and lubricator as per program. Circulated and filtered brine in riser. Pressure up test string to 28 bar and RIH with Otis to retrive HFH plug. Retrieved HFH plug after two missruns. Retrieved HFH seat. Rigged up and run Sperry Sun gauges, hung on Otis wireline at 330 m. Opened choke and flowed well for rates. Closed well on surface for build up. Retrieved Sperry Sun gauges. Closed LPR-N valve, bled off tubing to 6 bar and observed tubing for pressure build up. LPR-N valve leaking. Sheared upper APR-M valve with 186 bar and reverse circulated. Sheared lower APR-M with 255 bar and circulated long way.

86.01.14 Opened middle pip ram and checked for flow or losses. Unseated Baker packer with 29 ton overpull. Closed middle pipe ram circulated long way. Opened middle pipe ram and checked for flow or losses. Rigged down surface equipment and POOH with test string. Circulated and filtered brine in riser while rigging down surface equipment. Broke and layed down test tools. Rigged up Schlumberger and prepared to run log, rigged down Schlumberger due to rig heaving up to 6.0 m. Displaced riser with seawater. Waited on weather. RIH with test

plug. Pressure tested BOP on blue pod to 276 and 241 bar. Function tested yellow pod from minimum panel. POOH with test plug. Ran Schlumberger GR-CCL-GPPT log.

86.01.15 Rigged down Schlumberger. Flushed riser clean with seawater and diplaced to brine. Made up Baker washing tool. Circulated through washing tool and RIH to 330 m. Pressure tested same to 41 bar. RIH to 350 m, heave up to 1.0 m. Attempted to wash perforation 348 m to 347.5 m. Pumped 2.55 m^3, lost 1.8 m^3. Observed well. Sheared out ball seat with 90 bar. Circulated bottom up to wellhead. Flow checked. Continued circulated bottom up down choke line and up riser. POOH with Baker washing tool. Rigged up Otis and ran sandbailer. Rigged down Otis. Made up teststring. BHA no. 2 and RIH. Pressure tested same to
242 bar. Picked up SSTT with fluted hanger, lubricator and pressure tested test string as per test program. Picked up Nowsco frame, surface test tree and nippled up surface equipment.

86.01.16 Landed SSTT in wellhead. Pressure tested surface equipment. Rigged up Otis wireline equipment and retrieved check valve in H-nipple. Removed check valve in H-nipple with Otis wireline. Pumped 2.27 m^3 brine, 20% mutual solvent and 2% claystabilizer. Set Baker F.H. packer at 319 m with Baker plug on Otis wireline. Used 245 bar to set packer. Pressured up to 103 bar on annulus to test packer set. Pressure kept on annulus to keep LPR-N open. Injected brine with 20% mutual solvent and 2% clay stabilizer. Displaced solution with nitrogen. Closed kill valve and prepared to flow well. Attempted to flow well. Shut-in to see if tubing pressure built up. Tubing pressure was zero. RIH and retrieved the separation sleeve. When pulling out of hole it was noted that the tubing pressure began to slowly build-up. Attempted to check water level with wireline. Could not detect level. Attempted to flow well again, no success. Pressure went from 3.4 bar to

zero. Used a 12/164" choke. Rigged up coil tubing equipment.

86.01.17 Pressure tested coiled tubing and BOP, leaking. Retested ok. Ran Nowsco coil tubing and circulated nitrogen. Found no fluid and no restrictions down to 346 m. Rigged up Otis wireline equipment. Pressure tested wireline lubricator against master valve and failsafe valve to 50 bar.

86.01.18 RIH with pressure gauges on wireline. Tagged bottom at 357 m. Laid down pressure gauges. Picked up sand bailer. Pressure tested lubricator to 50 bar. RIH. Ran wireline with sand bailer to 358 m. Observed well for pressure build up. Rigged up wireline with pressure gauges. Pressure tested wireline lubricator to 50 bar. RIH and made gradient steps. POOH and rigged down wireline. Pumped 1.1. m3 acid. Rigged up coil tubing equipment. Pressure tested coil tubing and Nowsco BOP to 50 bar. Flushed coil tubing with nitrogen. Ran Nowsco coil tubing and circulated nitrogen.

86.01.19 Attempted to flow well, no success. Shut in well on surface and observed for pressure build up. Cleaned surface lines and pressure tested to 50 bar. Started pumping acid 15 % HCl and clay stabilizer. Stopped after pumping 1.17 m^3. Tubing pressure 17 bar. Bled off gas from tubing. Continued pumping 0.74 m^3. acid followed by brine. Bled off gas from tubing several times while displacing acid. Squeezed 0.41 m^3 acid. Opened up well on 12/64" choke. Ran in hole with coil tubing while pumping nitrogen. Stopped at 181 m, 270, 334, and 347 m while circulating nitrogen. Pulled out to 270 m with coil tubing. Stopped circulating nitrogen. Attempted to flow well on 20/64" choke. Had traces of H2S. Shut in well on choke manifold. Opened up well on 24/64". RIH to 346 m with coil tubing while circulating nitrogen. POOH with coil tubing. Attempted to flow well to burner on 34/64" choke.

86.01.20 Shut in well on choke manifold for pressure build up. Opened up well on 12/64" choke to burner. Shut in well at LPR-N valve. Opened up well to flare on 64/64" choke. Flushed surface lines. Closed kill side wing valve and pressure tested surface lines from BJ unit to 50 bar. Bled off annulus pressure to close LPR-N valve. Pumped 1.11 m^3 HCl acid. Opened LPR-N vlave. Pumped 1.27 m^3 HCl followed by brine. Squeezed 1.43 m^3 acid into formation in steps. Max squeeze pressure 6.9 bar. Opened well on choke manifold. RIH with coil tubing while pumping nitrogen. Stopped at 180 m, 275 m, 334 m and 347 m while circulating nitrogen. POOH coil tubing out of hole. Attempted to flow well on 14/64" choke.

86.01.21 Shut in well on choke manifold due to H2S readings. Flushed surface lines and equipment to burners. Bullheaded down test string. Observed well. Rigged down Nowsco coil tubing equipment. Checked pressure and fluid level in tubing. Sheared upper APR-M valve with 200 bar annulus pressure. Reverse circulate till no gas. Sheared lower APR-M valve with 269 bar annulus pressure. Bullheaded brine into formation. Reversed out till no gas. Circulated long way till no gas. Observed well. Circulated riser volume and unseated packer. No overpull. Bullheaded brine into formation. Observed well on trip tank. Had 0.6 m^3 gain. Shut in well and observed pressure for 15 min. Opened up and monitored trip tank, no gain. Circulated long way three times. Opened middle pipe ram. Rigged down surface equipment. POOH with test string no. 2. Ran Otis wireline with sandbailer. Found sand at 358 m. Rigged up Schlumberger. Ran Schlumberger. Run no. 1: Gauge ring and junk basket. Run no. 2: EZSV retainer. Set retainer at 336 m. Rigged down Schlumberger. RIH with cement stinger.

86.01.22 Stung into retainer and established injection rate. Mixed and pumped cement slurry. Squeezed cement slurry at a max pressure of 10 bar. Pulled out retainer and

reversed out. POOH with cement stinger. RIH with cement stinger. Set cement plug from 336 m to 228 m. Pulled out to 195 m and reversed out. Displaced riser with mud while making up 9 5/8" casing cutting assembly. RIH with 8 1/2" bit and tagged top of cement at 225 m. Drilling cement from 225 to 250 m. Pulled into riser. Closed blind ram and pressure tested casing and cement to 150 bar. RIH with open ended DP to 160 m. Rigged up Schlumberger. RIH with perforation guns to 222 m. Pressure up on string to 34.5 bar and fired perforations guns. Pressure dropped to 31 bar. Flow checked, negative. Circulated bottom up. Rigged down Schlumberger. POOH with open ended DP. Retrieved wear bushing.

86.01.23 RIH with casing cutting assembly and cut 9 5/8" casing at 215.3 m. Pressure dropped from 103 to 55 bar. Observed well. POOH with cutting assembly. RIH with 9 5/8" spear and pack off. Engaged spear and pulled casing free with 34 tons overpull. Closed annular and circulated bottoms up. POOH with 9 5/8" casing. RIH with 12 1/4" bit and 13 3/8" casing scraper. Tagged 9 5/8" casing at 215 m. Circulated bottoms up. POOH with bit and scraper. Rigged up Schlumberger. Set bridge plug at 210 m. Rigged down Schlumberger. RIH with casing cutting assembly and cut 13 3/8" at 198 m with upper annular preventer closed. Circulated bottoms up. POOH with casing cutting assembly. RIH with casing spear. Engaged spear and pulled 13 3/8" casing free with 14 tons overpull. POOH with casing. Attempted to pressure test 13 3/8" x 20" annulus to 50 bar, no success. RIH with cement stinger and tagged bridge plug at 212 m. POOH to 96 m. Attempted to pressure test 13 3/8" x 20" annulus to 50 bar, no success. Set a balanced cement plug from 209 to 180 m. POOH to 175 m. Closed annular and reversed out. No cement. POOH to wellhead. Washed wellhead and BOP. Had gas peak of 29.1 %.

86.01.24 Pulled into riser. Closed blind ram and pressure up to 50 bar on 20" casing. Held pressure while waiting on cement. Squeezed a total of 0.12 m^3. RIH with 17 1/2" bit. Tagged cement at 180 m. Drilled cement from 180 m to 190 m. Circulated bottom up and attempted to pressure test cement against shear ram, no success. Diplaced riser with seawater. RIH with 17 1/2" bit to 190 m. Drilled cement from 190 m to 198 m. Circulated hole clean. POOH. RIH to 198 m with cement stinger. Closed middle pipe ram and attempted to pressure test 20" casing to 50 bar, no success. POOH. Closed blind ram. Attempted to pressure test 20" casing to 50 bar, no success. Waited on tools.

86.01.25 Waited on tools for a total of 5.5 hours. RIH with 17 1/2" bit and underreamer to clean 20" casing. Circulated to clean hole. POOH with bit and underreamer. Set Lynes packer in 20" casing. Top of packer at 192 m. Closed lower pipe ram and pressure tested packer to 50 bar. Set balanced cement plug from 192 m to 178 m. Pulled riser and BOP. RIH with 17 1/2" bit using guide frame. Tagged cement at 178 m. Weight tested cement to 4.5 tons. POOH. RIH with 20" x 30" casing cutting assembly to 173 m. Cut 20" and 30" casing at 173 m.

86.01.26 POOH with casing cutting assembly one arm on cutter missing. RIH with 20" casing spear assembly. Engaged spear and attempted to retrieve 20" and 30" casing. Maximum 225 ton overpull. POOH with casing spear. Installed guide frame. RIH with 20" x 30" casing cutting assembly to 172 m. Cut 20" and 30" casing at 172 m. POOH with casing cutting assembly. Ran 20" casing spear. Engaged casing spear and pulled 20" and 30" casing free with 204 tons overpull. Lowered Scorpico and checked seabed. Started moving rig to location 34/10-27 at 14.55 hours.

4.4 Well and subsea schematic

III 4 WELLBORE SCHEMATIC

(NOT TO SCALE)

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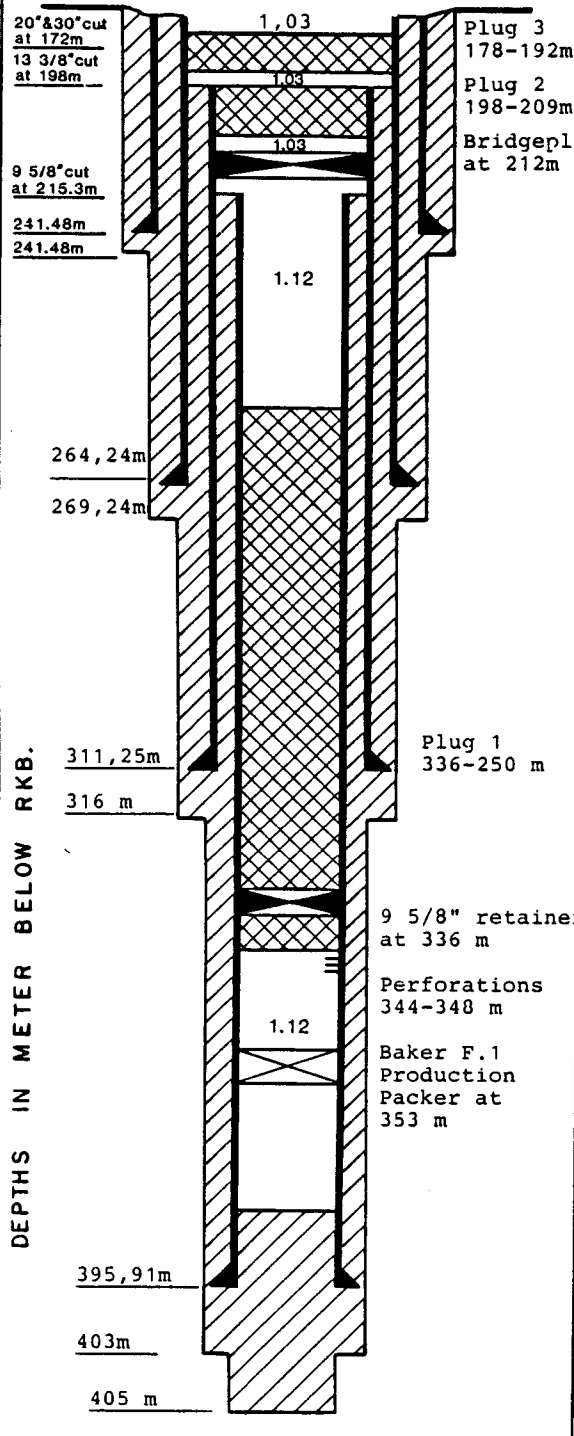
ORIGINAL AV:
TEGNET AV:
DATO:

RKB - MSL : 32 m. **WATER DEPTH : 135 m.**

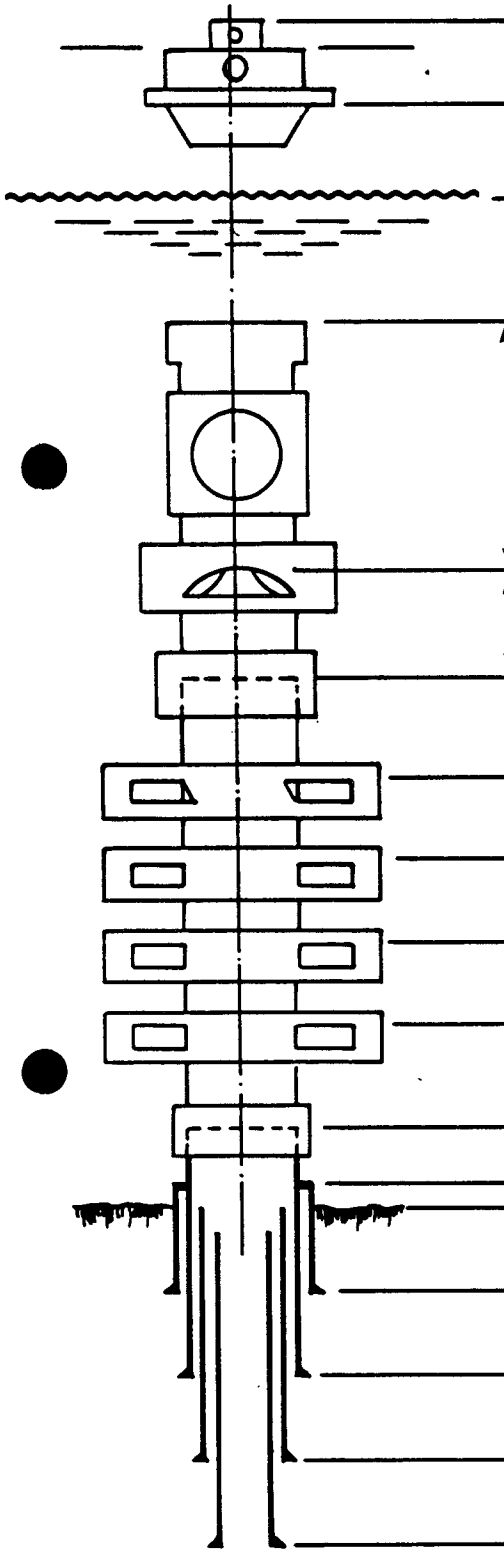
HOLE	CASING
36"	30" Grade B VETCO St-2RB 6 joints 74,98 m
26"	20" 133 lbs/ft X-56 VETCO LS 7 joints 98,74 m
17½"	13 3/8" 72 lbs/ft N-80 Buttress 12 joints 144,50 m
12 1/4"	9 5/8" 47 lbs/ft N-80 Buttress 18 joints 229,73 m
8 1/2"	



CASING CEMENT	PLUGS / SQUEEZ
LEAD SLURRY 21,5 TON 'G' + 3,2 l D-75 + 93,43 S/W 1,56 SG TAIL SLURRY 12,7 TON 'G' + 3,55 l D-77 + 43,411 S/W 1,9 SG	
LEAD SLURRY 10,25 TON 'G' + 3,2 L D-75 + 93,43 L S/W 1,56 SG TAIL SLURRY 12,8 TON 'G' + 3,55 L D-77 + 43,41 L S/W 1,9 SG	PLUG 3 2,72 TON 'G' + 3,55 L D-77 + 43,41 L S/W 1,9 SG
LEAD SLURRY 5,7 TON 'G' + 3,2 L D-75 + 93,43 L S/W 1,56 SG TAIL SLURRY 6,5 TON 'G' + 3,55 L D-77 + 43,41 L S/W 1,9 SG	PLUG 2 5,15 TON 'G' + 3 55 L D-77 + 43,41 L S/W 1,9 SG
SPACER SLURRY 0,55 TON 'G' + 20 % BWOC EMSAC + 2 % BWOC D-19 + 0,7 L D-31 LN + 243,58 L S/W 1,3 SG CEMENT SLURRY 4,8 TON 'G' + 15 % BWOC EMSAC + 1,25 % BWOC D-19 + 0.89 L D-31 LN + 0,24 L D-47 + 72,06 L S/W 1,7 SG	PLUG 1 5,35 TON 'G' + 3,55 L D-77 + 43.41 L S/W 1,9 SG PERFORATION SQUEEZE 344 - 348 m Squeezed 0,6 m^3 cement into formation 1,2 TON 'G' + 1,78 L D-603 + 42,69 L F/W 1,9 SG

WEST VENTURE 18 3/4" SUBSEA ASSEMBLY — WELL 34/10-29

(NOT TO SCALE)



	M	
	0	RKB
		DIVERTER RISER CONN. FLANGE
	32	MEAN SEA LEVEL
	155.30	JOINT RISER CONNECTOR FLANGE
2.67	157.97	ANNULAR RUBBER TOP (CLOSED)
2.18	160.15	LOWER STACK ASSEMBLY TOP
1.31	161.46	SHEAR RAMS TOP
1.01	162.47	U.P.RAMS TOP
1.10	163.57	M.P.RAMS TOP
0.80	164.37	L.P.RAMS TOP
1.13	165.50	18 3/4"WELLHEAD TOP VETCO SG 6
1.00	166.50	30"HOUSING TOP
		MUD LINE
	241.48	30"SHOE
	264.24	20"SHOE
	311.25	13 3/8"SHOE
	395.91	9 5/8"SHOE

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4.5. Total rig time distribution

Rig time distribution for testing

Rig time distribution for plugging

Drilling time vs. depth

Drilling cost vs. depth

TOTALT 1035 HRS

TOTAL RIG TIME DISTRIBUTION FOR WELL

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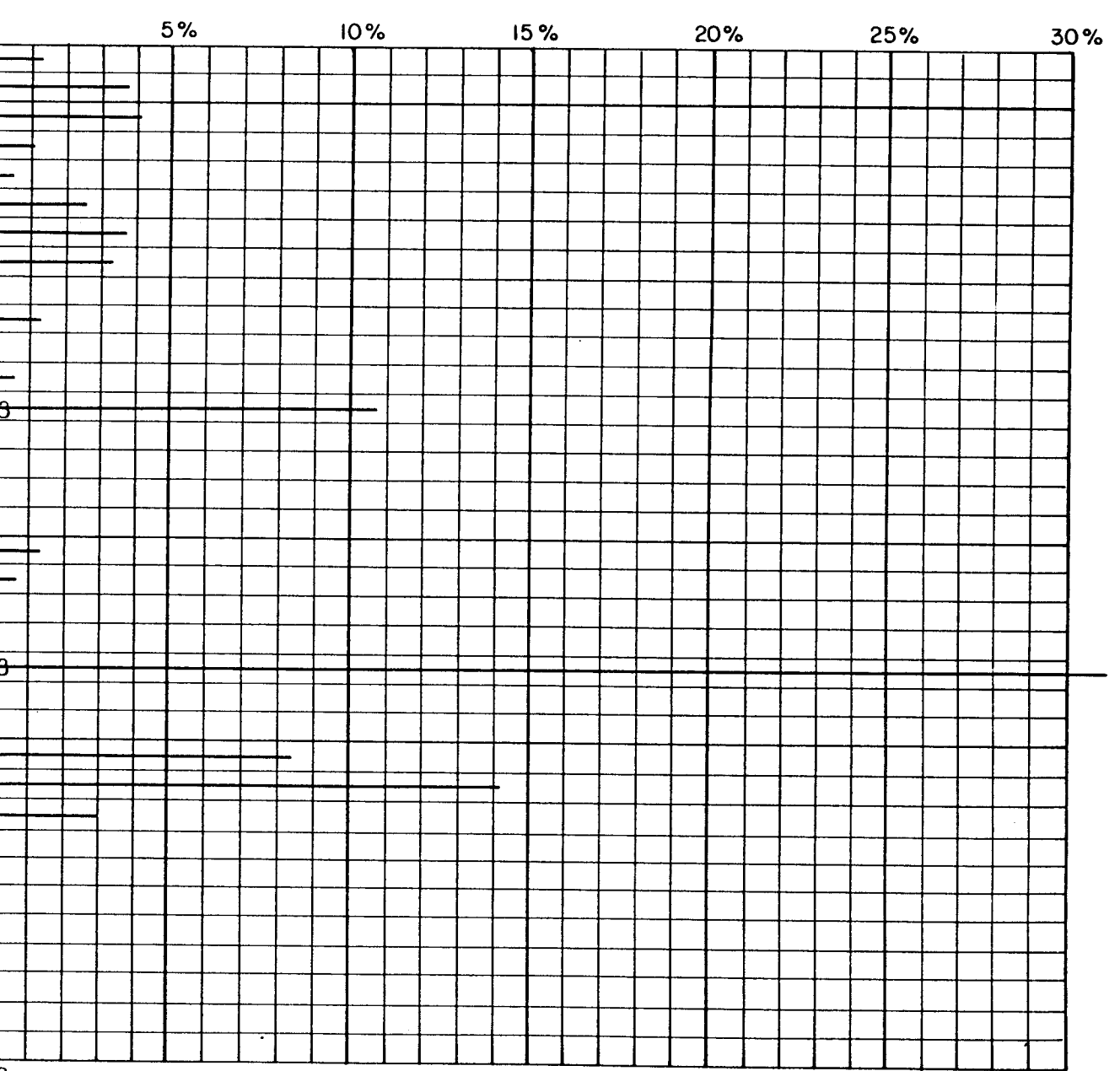
		HRS	%
	Moving	14,0	1,35
	Mooring	39,0	3,77
Drilling operation	Efficient drilling	42,0	4,06
	Other drilling	11,0	1,06
	Hole opening	5,5	0,53
	Regular tripping	26,0	2,51
	Casing and cementing	39,5	3,82
	Sub sea eq. and BOP	33,5	3,24
	Abnormal press. detection		
	Cond. and circ.	12,5	1,21
	Reaming		
	Directional survey	6,0	0,58
	Plugging	111,0	10,73
	Formation leak-off test		
	Maintenance		
	Other		
Formation Evaluation	Coring	13,0	1,26
	El. logging	8,0	0,77
	Circ. for samples	2,0	0,2
	RFT	1,0	0,1
	Production testing	404	39,03
	Other	1,0	0,1
Downtime	Rig repairs	86	8,31
	Rig moving	148,5	14,3
	Waiting on weather	30,5	2,95
	Sub sea eq. and BOP		
	Fishing		
	Lost circulation		
	Well control		
	Hole problems		
	Formation evaluation		
	Diving		
	Other		
	TOTAL	1035	99,88



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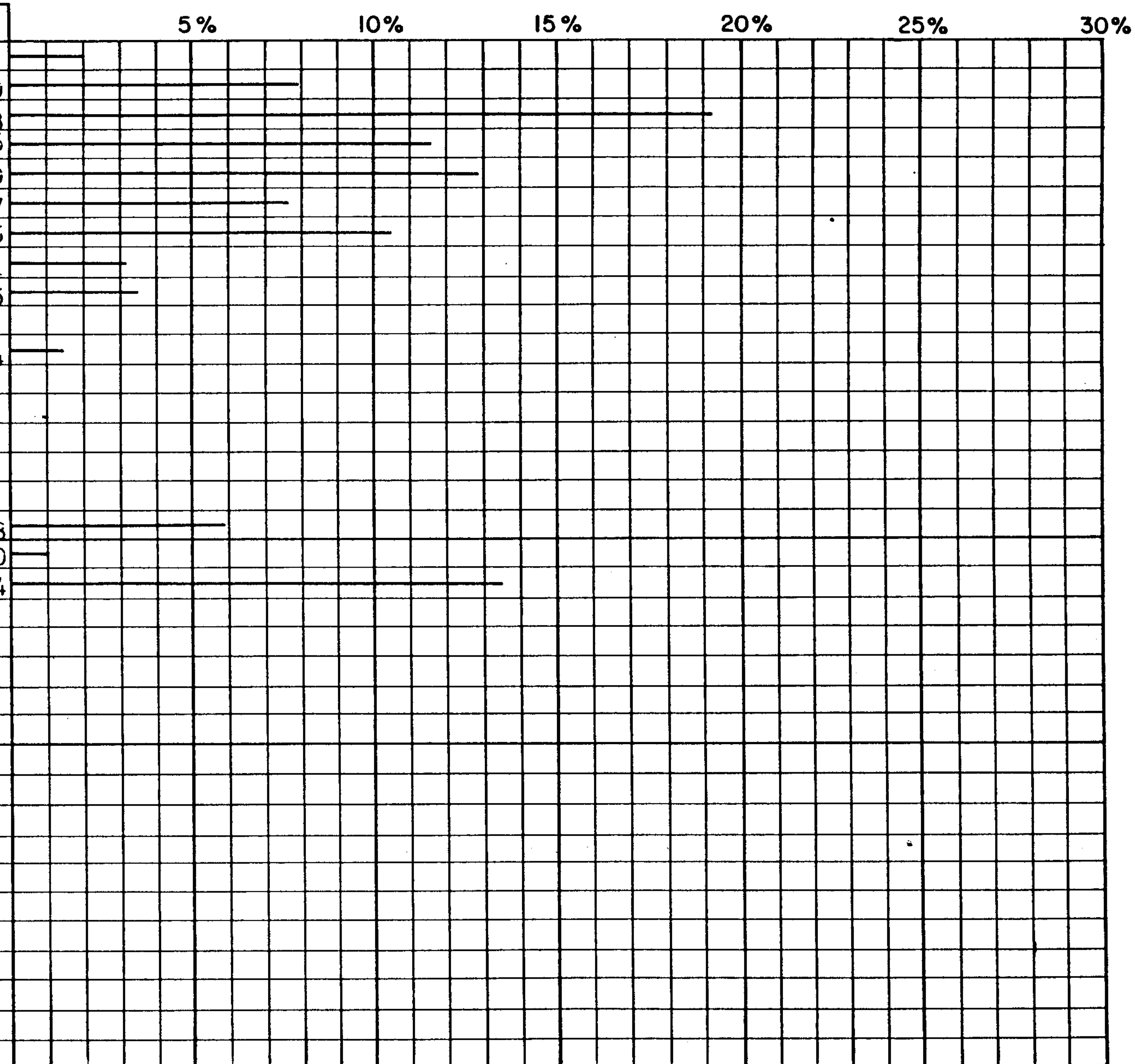
RIG TIME DISTRIBUTION FOR FORMATION EVALUATION, INCL. IN TOTAL RIG TIME DISTRIBUTION.

		HRS	%
Production testing	Preparations	8	2
	Pressure testing	32	7,9
	Teststring	78	19,3
	Cond. and circ.	47	11,6
	Wire line ops.	52	12,9
	Flow the well	31	7,7
	Build up	42,5	10,5
	Stimulation	12,5	3,1
	Killing well	14,0	3,5
	Cement / Squeeze		
	Sub sea eq. and BOP	5,5	1,4
	Other	23,5	5,8
Downtime	Rig repairs	4	1,0
	Waiting on weather	54,0	13,4
	Production testing		
	Other		
TOTAL		404	100,1



RIG TIME DISTRIBUTION FOR PLUGGING, INCL. IN TOTAL RIG TIME DISTRIBUTION.

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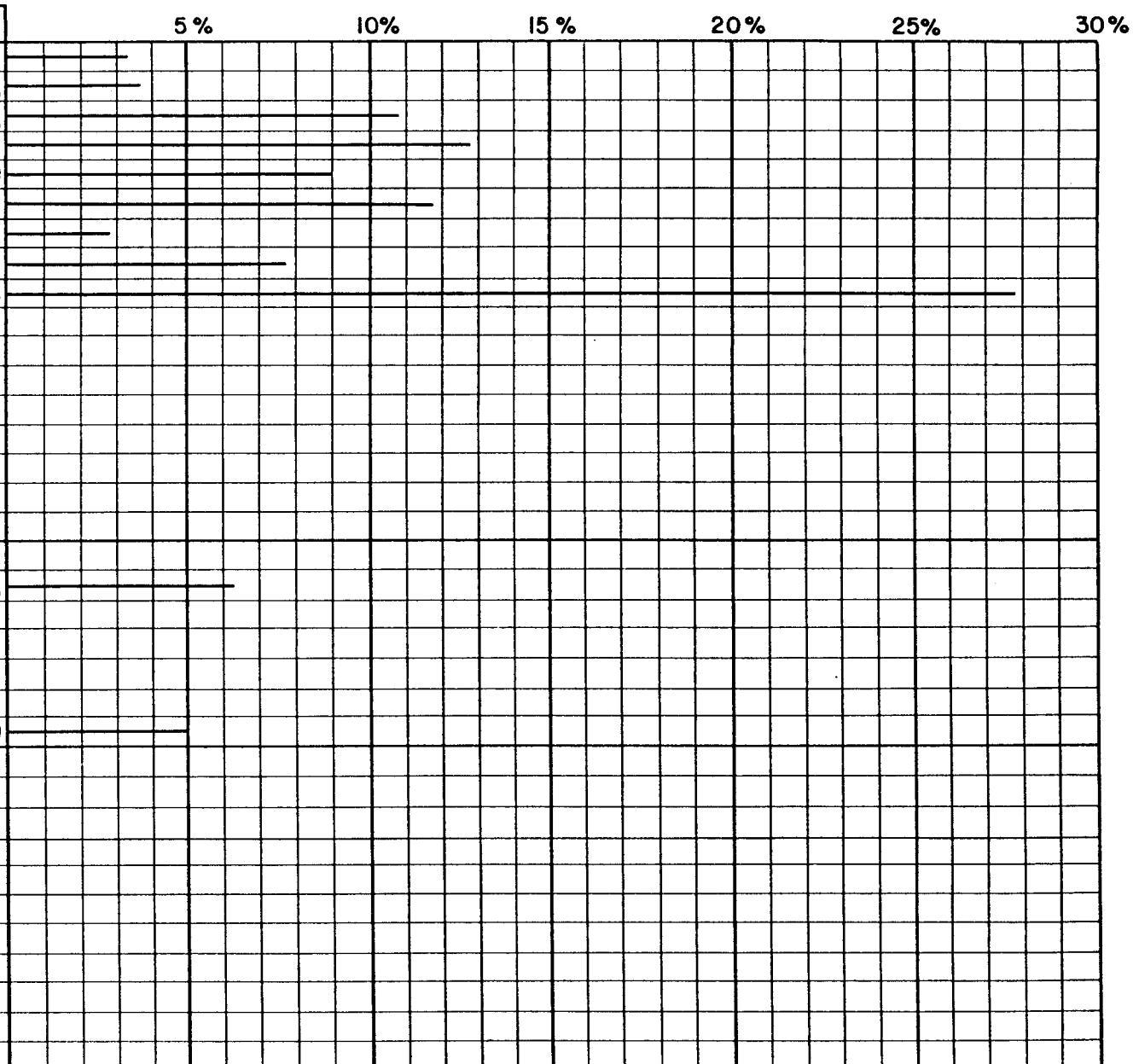
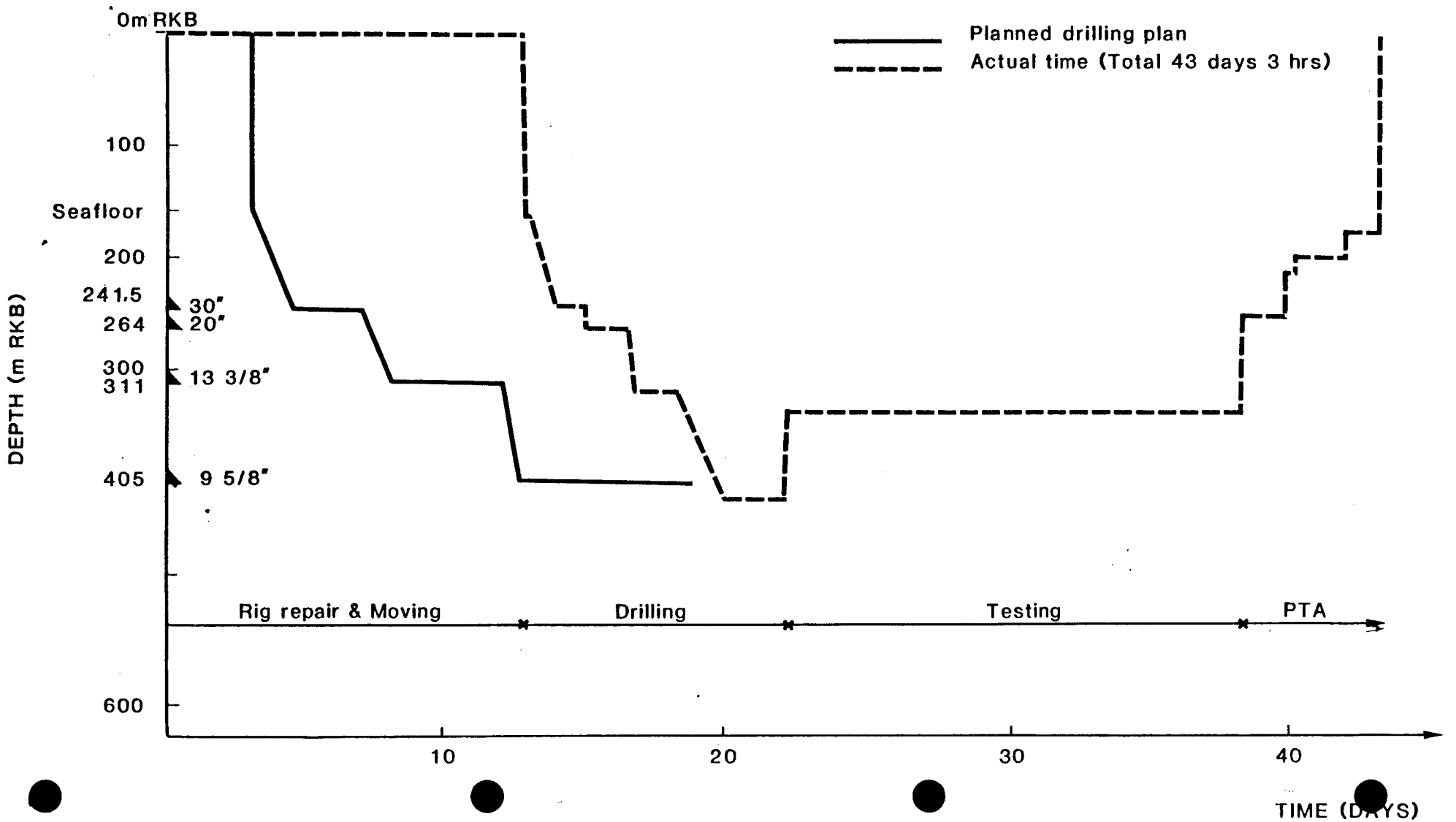
		HRS	%
Plugging	Preparations	3,5	3,2
	Con. and circ.	4	3,6
	Cement / Squeeze	12	10,8
	Pressure testing	13,5	12,2
	Wire line ops.	10	9,0
	Tripping	13	11,7
	Other drilling	3	2,7
	Sub sea eq. and BOP	8,5	7,7
	Cutting casing	31,0	27,9
	Diving		
	Other		
Downtime	Waiting on weather		
	Waiting on cement	7,0	6,3
	Cutting casing		
	Other	5,5	5,0
	TOTAL	111	100,1



TIME VS DEPTH 34/10-29



34/10-29

KOST / DYBDE - KURVE

4.6. Bit record and lithology column

statoil

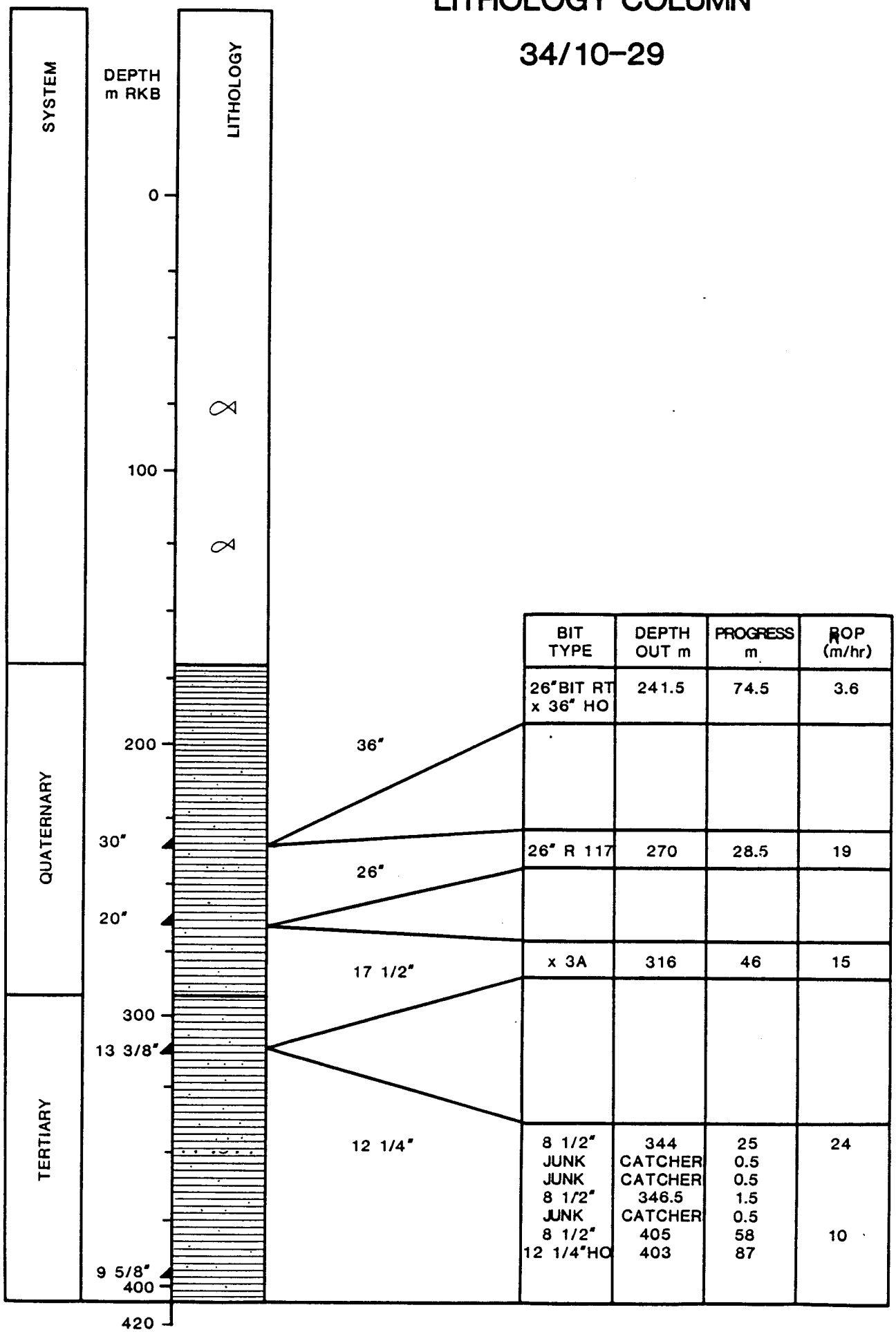
BORKRONEDATA

Brønn nr.: _____

Nr.	B. k. Nr.	Diam.	Fabr.	Type	Serie no.	Dyser 1/32"	Dybde ut	Fremdrift	Rot. tid	Total rot.tid	Bore-hast.	V.p.b.	O.p.m.	Pumpe			Tilstand			Anmerkninger
														Trykk	V.grad	v/t	T	B	G	
A	B			C		D	J	K	I		L	E	F	H		G	N			
1	1	26" Bit 36" HO		R1		3 x 20	241,5	74,5	20,5	20.5	3,6	2-5	65	72		4000				Drilled 26"and opened to 36"
2	2	26"	REED	117	2-35456	7 x 20	270	28,5	1,5	22	19	2-5	70	86		4000	1	2	I	Drilled 30"shoe and 26"
3	3	17 1/2"	HTC	X3A	790 WL	2 x 18 1 x 20	316	46	3,1	25.1	15	1-8 1-3	50 140	164 210		4000	1	1	I	Drilled cmt + 17 1/2" hole
4	4	12 1/4"	SEC	S33SF	859570	3 x 16	319	3		31.1		4-14	60/70	200		4000/ 3600				Drilled FC, cmt +3m new formation
5	5	8 1/2"	HTC	J2	KK983	2 x 11 1 x 13	344	25	3,4	34.5	24	2-9	100	62		900/ 1000	1	1	I	
			JUNK CATCHER.				345	0,5												Recovered 0,5m no sand
			JUNK CATCHER				345	0,5												Recovered 0,5m no sand
6	RR5	8 1/2"	HTC	J2	KK983	2 x 11 1 x 13	346,5	1,5	3 min	34.5	30	1	95	68		1000	1	1	I	
			JUNK CATCHER				347	0,5												Recovered 0,5m no sand
7	RR5	8 1/2"	HTC	J2	KK983	2 x 11 1 x 13	405	58	5,4	39.9	10	3/7	90/120	68		1000	4	3	I	Skid marks
8	6RR	8 1/2"	SEC	S33SF	843133	2 x 11 1 x 13	405		4	43.9		1/2	120	25		1600	2	2	I	From 34/10-27 open up
		12 1/4"HO	HTC	XIG		3 x 16	403										2	2	I	Pilot hole
9	6RR	8 1/2"	SEC	S33SF	843133	NONE											2	2	I	Tagged cement.
10	RR8	12 1/4"	HTC	XIG		NONE											2	2	I	Clean up trip
11	RR3	17 1/4"	HTC	X3A	790 WL	2 x 18 1 x 20	190	10	1	44.9										Drilled cement
12	RR3	17 1/4"	HTC	X3A	790 WL	2 x 18 1 x 20	198	8	1	45.9										Drilled cement
13	RR3	17 1/4"	HTC	X3A	790 WL	2 x 18 1 x 20														Cleaned out
		26" UR																		20" casing

LITHOLOGY COLUMN

34/10-29



BIT TYPE	DEPTH OUT m	PROGRESS m	ROP (m/hr)
26"BIT RT x 36" HO	241.5	74.5	3.6
26" R 117	270	28.5	19
x 3A	316	46	15
8 1/2"	344	25	24
JUNK	CATCHER	0.5	
JUNK	CATCHER	0.5	
8 1/2"	346.5	1.5	
JUNK	CATCHER	0.5	
8 1/2"	405	58	10
12 1/4"HO	403	87	

4.7. Pressure profiles

BRØNN: 34/10-29

RIGG: West Venture

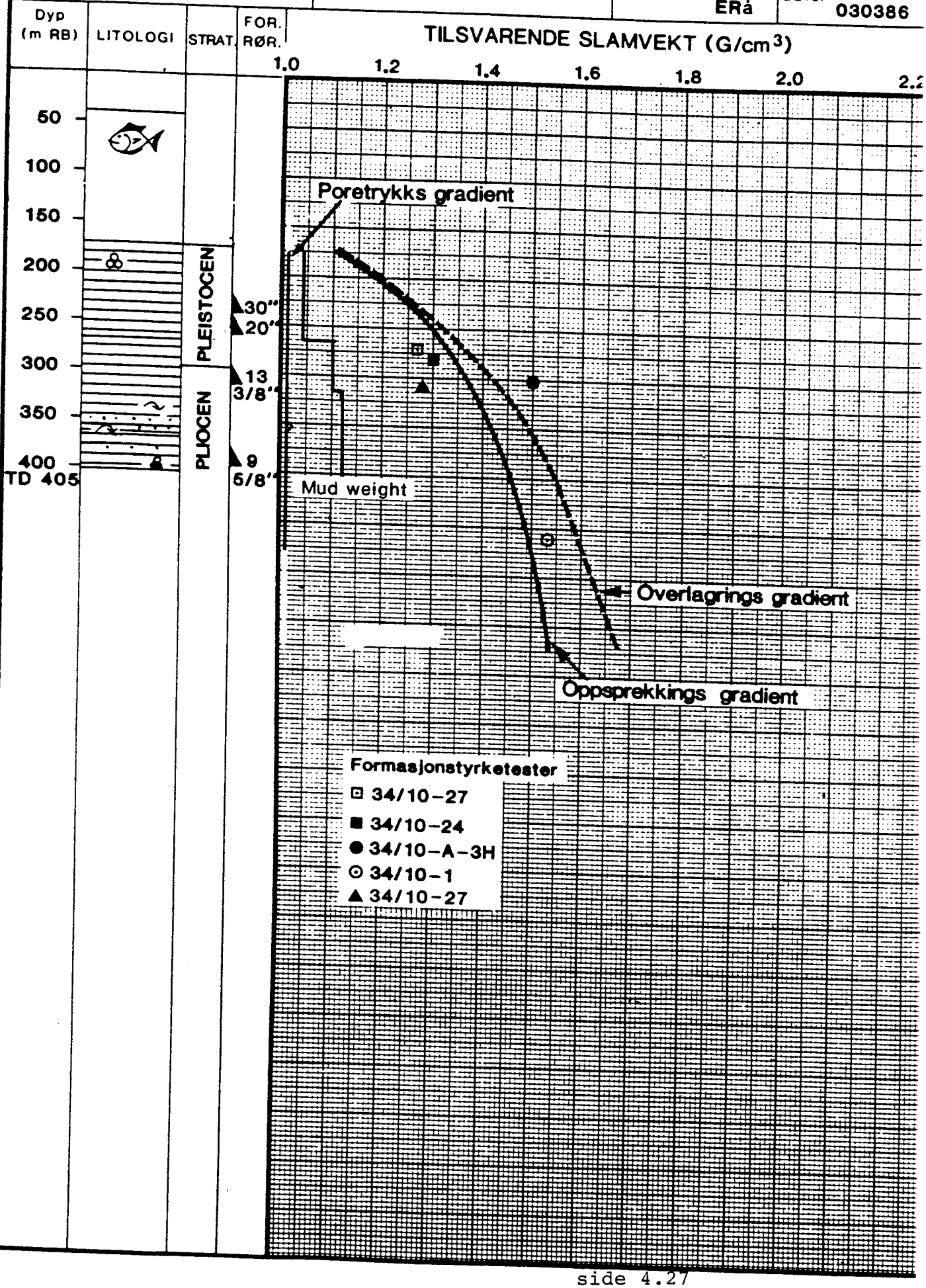
RB: 32m

TRYKKGRADIENTER

Statoil
Bergen

Tegnet av: ERå

Dato: 030386



4.8. Surveys

Measured Depth	Drift Angle	Drift Direction	Course Length	Vertical Depth	Vertical Section	RECTANGULAR COORDINATES	Dogleg Severity
70.00	0.00	0.00	0.00	70.00	0.00	0.00 N 0.00 E	0.00
99.00	0.75	16.00	29.00	99.00	0.18	0.18 N 0.05 E	0.78
108.00	0.75	41.00	9.00	108.00	0.28	0.28 N 0.11 E	1.08
117.00	0.61	37.00	9.00	117.00	0.37	0.37 N 0.17 E	0.49
127.00	0.62	346.00	10.00	127.00	0.46	0.46 N 0.19 E	1.59
133.00	0.25	270.00	6.00	133.00	0.49	0.49 N 0.17 E	3.05
136.00	0.38	31.00	3.00	136.00	0.50	0.50 N 0.17 E	5.52
145.00	0.06	222.00	9.00	145.00	0.52	0.52 N 0.18 E	1.46
166.00	0.74	288.00	21.00	166.00	0.56	0.56 N 0.05 E	1.03
177.00	0.46	280.00	11.00	177.00	0.59	0.59 N 0.06 W	0.80
185.00	0.62	247.00	8.00	185.00	0.58	0.58 N 0.14 W	1.29
205.00	0.31	304.00	20.00	204.99	0.56	0.56 N 0.28 W	0.78
223.00	0.25	320.00	18.00	222.99	0.62	0.62 N 0.35 W	0.16
236.00	0.40	274.00	13.00	235.99	0.65	0.65 N 0.41 W	0.67

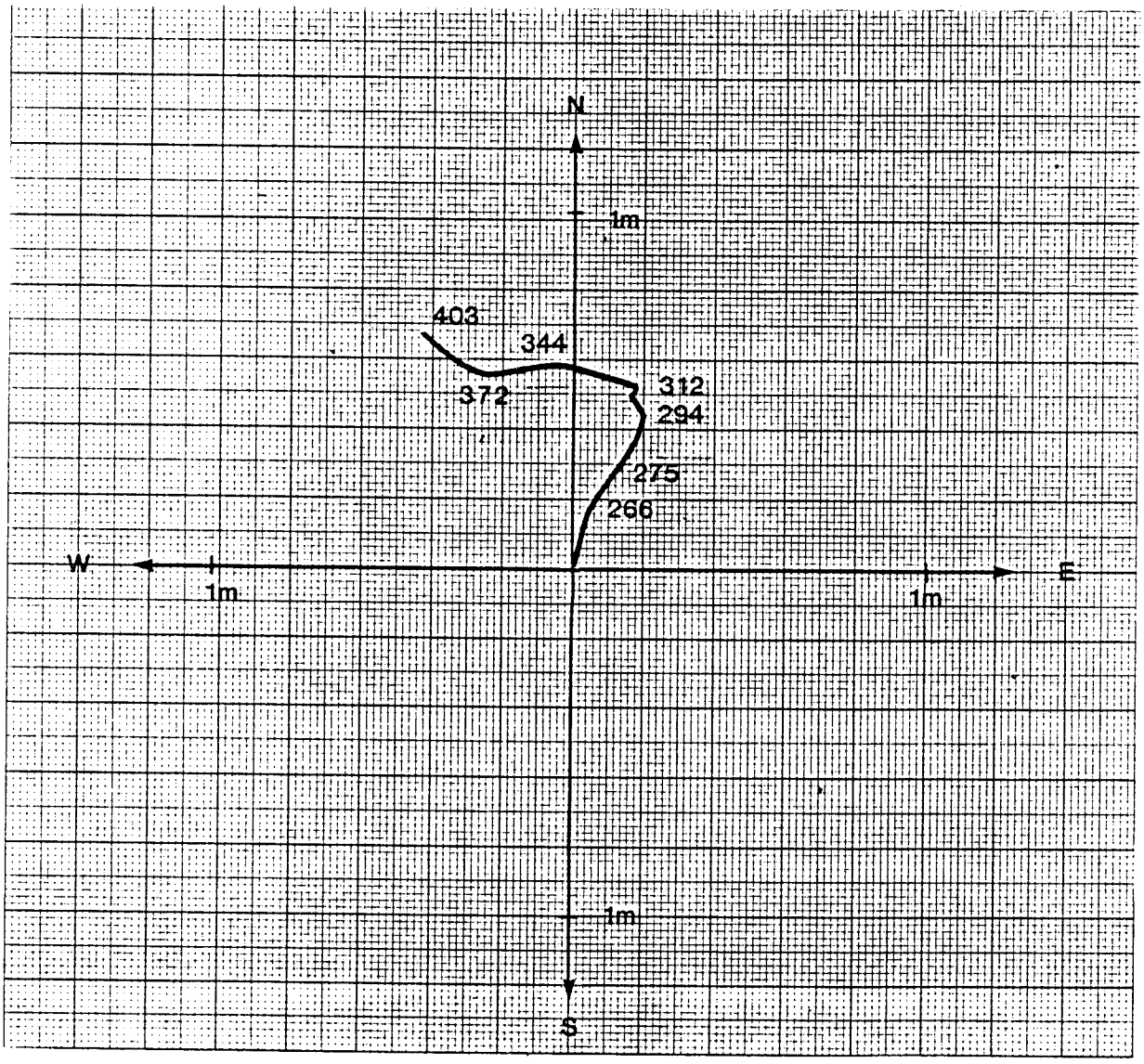
CALCULATION METHOD : Minimum curvature
SLOT COORDINATES : 0.00 N 0.00 E
BOTTOM HOLE LOCATION : Referenced to SLOT
DISTANCE : 0.76
DIRECTION : 327.65

Report Units : Meters

SURVEY RUN INFORMATION

MAG. SINGLESHOTS 99 - 236 MT. MD. (FROM SEA-BED)
ASSUMED VERTICAL TO 70 MT. MD.
(RKB = 167 MT., WATER-DEPTH = 135 MT.)

WELL 34/10-29
HORIZONTAL SECTION
DEPTHS RKB



4.9. Equipment failures

4.9. Equipment failure

1. Due to damaged fairlead for anchor nr 8 rig had to be towed to CCB for repair. Lost 9 days.

2. Expro Easy Tree. Due to weather Expro Easy Tree (SSTT) was unlatched. During relatching and subsequent testing with nitrogen in landing string the SSTT unlatched. Pulled landing string and reran same with back up latch section. Time lost 11 hrs.

3. Halliburton 7" LPR-N. The valve did not close completely for bottom hole shut-in. This was caused by a design failure.

4.10. Drilling Fluid Summary

DRILLING MUD RECAP

DATE: 21-Jan-86

OPERATOR: Statoil WELL NO.: 34/10-29 RIG NAME: West Venture

SPUD DATE: 27-Des-85 No.drlg days to TD: : 10 TOTAL DEPTH: 405 m

CONTRACTOR: Smedvig WAREHOUSE: CCB TOTAL COST: $ 67.300,336

Date	Depth	Time	W.T.	FV API @	PV cp @	YP API @	GELS 0/10	pH	FILTRATE API	FILTRATE HT-HP	F	Cake	ALKALINITY Pm	ALKALINITY Pf/Mf	Cl- mg/l	Ca- mg/l	Sand %	Solids %	Water %	MBT
26-Dec	0	2400	1.04	100+																
27-Dec	183	2400	1.04	100+																
28-Dec	243	2400	1.04	100+																
29-Dec	270	2400	1.04	100+																
30-Dec	270	2400	1.10	80				10.0	15.0											
31-Dec	316	2400	1.11	55				10.3	15.0											
01-Jan	327	2400	1.12	59	12	24	7/10	10.1	8.5			1	0.51	0/0.28	46500	220	tr	5.00	95.00	
02-Jan	347	2400	1.12	58	12	26	9/10	10.0	8.9			1	0.41	0/0.22	44500	220	tr	6.00	94.00	
03-Jan	405	2400	1.12	57	12	27	9/10	10.0	8.0			1	0.40	0/0.22	43500	220	tr	6.00	94.00	

side 4.31

WELL 34/10-29

RIG	West Venture
DRILLING CONTRACTOR	Smedvig
WATER DEPTH FROM RKB	167 m
36" HOLE TO	243 m
30" CASING TO	243 m
26" HOLE TO	270 m
20" CASING TO	264 m
17 1/2" HOLE TO	316 m
13 3/8" CASING TO	311 m
12 1/2" HOLE TO	405 m

CASING SIZE:	30"
HOLE SIZE:	36"
CASING SET AT:	243 m
DRILLED FROM:	167 m

The 36" hole was drilled with seawater and viscous slugs. The section was drilled without problems whatsoever. After drilling the hole was displaced to gel mud and casing was set and cemented without problems.

CASING SIZE:	20"
HOLE SIZE:	26"
CASING SET AT:	264 m
DRILLED FROM:	243 m

The 26" hole was drilled to 270 m with seawater and viscous slugs. No problems was encountered while drilling this section. 20" casing were run and cemented.

CASING SIZE:	13 3/8"
HOLE SIZE:	17 1/2"
CASING SET AT:	311 m
DRILLED FROM:	264 m

The remaining mud from the previous section was diluted with 20 % seawater and weighted up to 1.10 as per spesifications. The funnel viscosity was lowered to 55 sec/qt by addition of 5 sx Desco.. Cement and shoe was drilled with sea-water and the hole was then displaced to gel mud. The mud became very viscous after a few circulations, but addition of 4 sx Desco brought viscosity back in line. The section was drilled without any other problems.
Casing was run and cemented without any problems.

CASING SIZE: open hole

HOLE SIZE: 12 1/4"

CASING SET AT:

DRILLED FROM: 311 m

The KCl-$CaCO_3$ polymer system was mixed up using one of the rig pumps for shearing the fluid. Each pit was sheared at a pressure drop of 1100 psi for aprox. 4 hours. Afther the fluid was sheared, the system was weighted up to 1.12 using calsiumcarbonate.
The cement was drilled with the existing gel mud. Then the hole was displaced to KCl-polymer mud dumping all returns. The 8 1/2" pilot hole was drilled with a yield point of 30 which seemed enough to clean the hole. KCL concentration was kept at 40 ppb througout the section. When reaching TD the hole was logged and then opened to 12 1/4". The mudweight was kept in line by running the mudcleaner from time to time. Clay cuttings went over the shakers without probles. Although the clay was soft it did not blind the shaker screens.
Using the rig pump for shearing the fluid gave some operational problems, because we had to stop shearing every time the trip tank needed to be filled up. The lines had thereafter to be flushed using some of the existing polymer mud. Except for this using the rig pump for shearing gave good and uniform mixing of polymers in the system.

TOTAL MUD MATERIALS USED FOR WELL

COMPANY STATOIL WELL NO. 34/10-29 PAGE 1 of 1

Quantity	Material	Unit/Weight	Unit Cost	Total Cost
38	Bentonite	MT	403,60	15.336,80
5	Soda Ash	50 kg	22,79	113,95
20	NaOH	25 kg	22,47	449,40
30	Barite	MT	151,20	4.536,00
3	Bicarbonate	50 kg	26,47	79,41
9	Desco	50 lbs	41,88	376,92
5	Prodefoam	25 l	72,19	360,95
360	KCl	50 kg	22,68	8.164,80
60	XCD- Polymer	25 kg	393,80	23.628,00
457	Prowate	50 kg	19,64	8.975,48
1	Probio	200 l	750,00	750,00
6	Drispac S/L	50 lb	208,00	1.248,00
12	WO 21	25 kg	273,36	3.280,32

TOTAL COST FOR WELL $ 67.300,03

DEPTH AT T.D. 405

AVERAGE COST per METER for WELL $ 282,77

side 4.37

COMPLETION INTERVAL

COMPANY STATOIL Well No. 34/10-29 Page 1 of 4

Casing Size	Meters		(Bit Size)	Meters	
30 "	from 167	to 243	36 "	hole from 167	to 243

Material Consumption for Interval:

Product	Units	Size	Cost/Unit	Total Cost
Bentonite	31	MT	403,60	12.511,60
Soda Ash	5	50 kg	22,79	113,95
NAOH	14	25 kg	22,47	314,58

Material Cost for Interval $ 12.940,13 Average Cost per meter $ 170,26

Number of Days 2 Average Cost per Day $ 6.470,07

Comments

COMPLETION INTERVAL

COMPANY STATOIL Well No. 34/10-29 Page 2 of 4

Casing Size 20 " from Meters 167 to 264 (Bit Size) 26 " hole from Meters 243 to 270

Material Consumption for Interval:

Product	Units	Size	Cost/Unit	Total Cost
Bentonite	7	MT	403,60	2.825,20
NAOH	4	25 kg	22,47	89,88

Material Cost for Interval $ 2.915,08 Average Cost per meter $ 107,96

Number of Days 1 Average Cost per Day $ 2.915,08

Comments

COMPLETION INTERVAL

COMPANY STATOIL Well No. 34/10-29 Page 3 of 4

Casing Size 13 3/8 " from 167 Meters to 311 Meters (Bit Size) 17 1/2 " hole from 270 to 316

Material Consumption for Interval:

Product	Units	Size	Cost/Unit	Total Cost
Barite	30	MT	151,20	4.536,00
Bicarbonate	3	50 kg	26,57	67,71
Desco	9	50 lbs	41,88	376,92

Material Cost for Interval $ 4.980,63 Average Cost per meter $ 108,27

Number of Days 1 Average Cost per Day $ 4.536,00

Comments

COMPLETION INTERVAL

COMPANY STATOIL Well No. 34/10-29 Page 4 of 4

Casing Size		Meters		(Bit Size)		Meters	
9 5/8	" from	167	to 405	12 1/2	" hole from	311	to 405

Material Consumption for Interval:

Product	Units	Size	Cost/Unit	Total Cost
NAOH	2	25 kg	22,47	44,94
Prodefoam	5	25 l	72,19	360,95
KCl	360	50 kg	22,68	8.164,80
XCD- Polymer	60	25 kg	393,80	23.628,00
WO 21	12	25 kg	273,36	3.280,32
Prowate	457	50 kg	19,64	8.975,48
Probio	1	200 l	750,00	750,00
Drispac SL	6	50 lb	208,00	1.248,00

Material Cost for Interval $ 46.452,49 Average Cost per meter $ 494,18

Number of Days 4 Average Cost per Day $ 11.613,12

Comments

DAILY ACTIVITY REPORT

COMPANY Statoil WELL NO. 34/10-29 PAGE 1 OF 3

DATE 14/12-85 DEPTH - TIME 24:00 ENGINEER Mather/Sirevåg

Pulled rig to near location and prepared to spud in. One ancor system broke down. Prepared rig to go onshore for repair. 111 m^3 spud mud were dumped.

DATE 15/12-85 DEPTH - TIME 24:00 ENGINEER Mather/Sirevåg

Rig under tow for repairs.

DATE 26/12-85 DEPTH - TIME 24:00 ENGINEER Mather/Nøklebye

Buildt 254 m spud mud and prepaired to spud well.

DATE 27/12-85 DEPTH 183 m TIME 24:00 ENGINEER Mather/Nøklebye

Spud in at 17:00 hrs. and drilled 36" hole from seabed to 183 m using sea water and high viscosity pills.

DAILY ACTIVITY REPORT

COMPANY STATOIL WELL NO. 34/10-29 PAGE 2 OF 3

DATE 28/12-85 DEPTH 243m TIME 24:00 ENGINEER Mather/Nøklebye

Drilled 36" hole to 243 m. Displaced hole to spud mud. Ran 30" casing.

DATE 29/12-85 DEPTH 270m TIME 24:00 ENGINEER Mather/Nøklebye

Cemented 30" casing. Drilled 26" hole to 270 m using seawater and high viscosity pills. Displaced hole to spud mud and set 20" casing.

DATE 30/12-85 DEPTH 270m TIME 24:00 ENGINEER Mather/Nøklebye

Cemented 20" casing. Set BOP and marine riser. Tested BOP and prepared to drill 17 1/2" hole. Existing spud mud was diluted with 20% seawater and weighted up to 1.10 SG with barite. Added 0,25 ppb Desco to lower FV to 55-60 sec/qt.

DATE 31/12-85 DEPTH 316m TIME 24:00 ENGINEER Mather/Nøklebye

The cement was drilled out with seawater. The hole was then displaced to gel mud and 17 1/2" hole was drilled to 316 m. The 13 3/8" casing was set and cemented without any problems. Started mixing KCl-system.

DAILY ACTIVITY REPORT

COMPANY Statoil WELL NO. 34/10-29 PAGE 3 OF 3

DATE 1/1-86 DEPTH 327m TIME 24:00 ENGINEER Mather/Nøklebye

Continued mixing KCl-system. The fluid was sheared at 1100 psi using one of the rig pumps. The hole was displaced to KCl mud dumping all returns. Started drilling 8 1/2" pilot hole.

DATE 2/1-86 DEPTH 347m TIME 24:00 ENGINEER Mather/Nøklebye

Drilled 8 1/2# pilot hole to 344 m. Cut 3 short cores to 347 m. Mixed 50 m^3 polymer premix for maintenance of active mud.

DATE 3/1-86 DEPTH 405m TIME 24:00 ENGINEER Pennance

Drilled 8 1/2" pilot hole to 405 m. Circulated and pulled out of hole for logging. Finished logging. Opened 8 1/2" hole to 12 1/4".

DATE _____ DEPTH _____ TIME _____ ENGINEER _____

DAILY DRILLING MUD ADDITIONS

DATE: 21-Jan-86

OPERATOR: Statoil | WELL NO : 34/10-29 | RIG NAME: West Venture

SPUD DATE: 2-Des-85 | No.drlg days to TD: 10 | TOTAL DEPTH: 405 m

CONTRACTOR: Smedvig | WAREHOUSE: CCB | TOTAL COST: 67.300,33

Product :	Bento-nite	Caus. soda	Soda ash	Barite	KCl	W.O.21	XCD polymer	Dris. S/L.	Desco	Pro-defoam	Prowate N40	N 15	Fine	Probio	Bicarb		
Price	403.60	22.47	22.79	151.20	22.68	273.36	393.80	208.00	41.88	72.19	19.64	19.64	19.64	750.00	26.57		
Unit	mt	25 kg	50 kg	mt	50 kg	25 kg	25 kg	50 lb	25 lb	25 l	50 kg	50 kg	50 kg	200 l	50 kg	C O S T	
Date	Depth															Daily	Cumulative
14-Dec	0	2	4	2												942.66	942.66
26-Dec	0	20	8	2												8,297.34	9,240.00
27-Dec	183															0.00	9,240.00
28-Dec	243	9	2	1												3,700.13	12,940.13
29-Dec	270	7	4													2,915.08	15,855.21
30-Dec	270				4											604.80	16,460.01
31-Dec	316				26	143				9	1				3	7,703.26	24,163.27
01-Jan	327		2			217	12	53			4	143	53			33,256.42	57,419.69
02-Jan	347							4				164	37		1	6,272.84	63,692.53
03-Jan	405							3	6			10		50		3,607.80	67,300.33

side 4.45

V MARINE REPORT

5.1. Weather data and anchor tension

Location weather data summary

5.1.Weather data and anchor tension.

Maximum anchor tension values were reported on anchors no. 1 (288 deg) and anchor no. 2 (324 deg). The 28th of December 1985 134 and 130 tons were reported on no. 1 and no. 2. The wind was from the north blowing 21-23 m/s with a wave hight of 8-12 m from the same direction. During the periode from the 2nd through the 8th of January 124 tons were reported on anchor no. 1, with wind and waves from NE to SE.

The strongest wind occured the 10th of January 1986 with a wind speed of 36-42 m/s from the SEE, waves reached 16 m the same day coming from the south. This was the most severe condition.

During the periode on location the wind and waves were mainly comming from the N to NE and S to SE.

LOCATION WEATHER DATA SUMMARY

statoil
Den norske stats oljeselskap a.s

WELL: 34/10-29 RIG: West Venture

TIME PERIOD: FROM 15/12 TO 31/12 -1985

READINGS PR. MONTH: One reading per day

WIND

dir. \ m/sec.	0 – 5	5 – 10	10 – 15	15 – 20	20 – 25	25 – 30	> 30	total
N					2			2
NNE			1					1
NE					2			2
ENE								
E								
ESE								
SE					2			2
SSE								
S			3		2			5
SSW								
SW								
WSW								
W	1		2					3
WNW								
NW			1	1				2
NNW								
total	1		7	1	8			17 / 17

WAVE

dir. \ height (m)	0 – 1	1 – 2	2 – 3	3 – 5	5 – 7	7 – 10	> 10	total
N	6			1	1	2		10
NNE								
NE					1	1		2
ENE								
E								
ESE								
SE				3				3
SSE								
S			1					1
SSW								
SW								
WSW								
W								
WNW								
NW			1					1
NNW								
total	6		2	4	2	3		17 / 17

LOCATION WEATHER DATA SUMMARY

statoil
Den norske stats oljeselskap a.s

WELL: 34/10-29 RIG: West Venture

TIME PERIOD: FROM 1/1 TO 26/1 -1986

READINGS PR. MONTH: One reading per day

WIND

m/sec. / dir.	0 – 5	5 – 10	10 – 15	15 – 20	20 – 25	25 – 30	> 30	total
N				1	1	1		3
NNE			1					1
NE		1	2	2		1		6
ENE								
E			?					1
SE								
SE		1						1
SSE				1	2		1	4
S				1	1	1	1	4
SSW								
SW						1		1
WSW								
W		1						1
WNW								
NW		1						1
NNW					2	1		3
total		4	4	5	6	5	2	28 / 26

WAVE

height (m) / dir.	0 – 1	1 – 2	2 – 3	3 – 5	5 – 7	7 – 10	> 10	total
N						2	2	4
NNE						1		
NE			2	4				6
ENE								
E								
ESE								
SE			2					2
SSE								
S			1		1	2	1	5
SSW					1			1
SW				1		1	1	3
WSW								
W				1	1	1		3
WNW								
NW					1			1
NNW								
total			5	6	4	7	4	26 / 26

LOCATION WEATHER DATA SUMMARY

statoil
Den norske stats oljeselskap a.s

WELL: 34/10-29 RIG: West Venture

TIME PERIOD: FROM 15/12-85 TO 26/1 -19 86

READINGS PR. MONTH:

WIND

m/sec. / dir.	0 – 5	5 – 10	10 – 15	15 – 20	20 – 25	25 – 30	> 30	total
N				1	3	1		5
NNE			2					2
NE		1	2	2	2	1		8
ENE								
E			1					1
ESE								
SE		1			2			3
SSE				1	2		1	4
S			3	1	3	1	1	9
SSW								
SW						1		1
WSW								
W	1	1	2					4
WNW								
NW		1	1	1				3
NNW					2	1		3
total	1	4	11	6	14	5	2	43 / 43

WAVE

height (m) / dir.	0 – 1	1 – 2	2 – 3	3 – 5	5 – 7	7 – 10	> 10	total
N	6			1	1	4	2	14
NNE						1		1
NE			2	4	1	1		8
ENE								
E								
ESE								
SE			2	3				5
SSE								
S			2		1	2	1	6
SSW					1			1
SW				1		1	1	3
WSW								
W				1	1	1		
WNW								
NW			1		1			2
NNW								
total	6		7	10	6	10	4	43 / 43

PRO

5.2. Navigation report

5.2. Navigation report.

RIG MOVE OF "WEST VENTURE" TO WELL 34/10-29

1. Final position (Datum ED50)

Georaphical coordinates:

Lat. 61° 10' 33.06" N Lon. 02° 11' 28.76" E

UTM coordinates (UTM-zone 31, cm 3°E):

Northing 6 782 805 Esting 456 503

Accuracy: +/- 5 meter

Rig heading: 89°

Deviation from intended position: 5 m - 29°

2. Observed Decca Main Chain Readings:

Chain : Vestlandet

Red : 1I 12.89
Green : 2D 47.49
Purple : 1B 66.92

3. Navigation/Position Metod

a) Navigation

Micro-fix positioning system interfaced to a HP 9845 computer.

Contractor : A/S Geoteam, Oslo
Personnel : Geir Østby (Geoteam) and Eivind Jacobsen (Racal)

b) Positioning

MX 1502 satellite positioning system.
Translocation against fixed point at Eigerberg near Stavanger.

Contractor : A/S Geoteam, Oslo
Personnel : Geir Østby

4. Duration of Rig Move

Personell and equipment onboard	:	21 Dec. at 12.00 hours
Rig leaving CCB (approx.)	:	22 Dec. at 18.00 hours
Start circling to location	:	24 Dec. at 13.55 hours
2 km from location	:	24 Dec. at 14.45 hours
On location, but problems with		24 Dec. at 16.00 hours
windlass no. 2 caused delay until	:	24 Dec. at 17.30 hours
First anchor (no. 3) on bottom	:	24 Dec. at 18.00 hours
(this anchor lengthened and reset later)		
Standby due to bad weather	:	24 Dec. at 21.45 hours
until	:	24 Dec. at 15.45 hours
Anchor no. 6 hooked up in something at the bottom	:	25 Dec. at 20.30 hours
The ROV discovered that anchors no. 5 and 6 have get tangled up	:	26 Dec. at 03.30 hours
Last anchor (no. 6) on bottom	:	26 Dec. at 13.08 hours
Started to tension up to 60 tons	:	26 Dec. at 13.35 hours
Tension test from	:	26 Dec. at 19.00 hours
until	:	27 Dec. at 00.30 hours
(the rig is stable 80 m south og location)		
Standby due to bad weather	:	27 Dec. at 00.30 hours
until	:	27 Dec. at 10.30 hours
On location	:	27 Dec. at 13.30 hours

5. Techniques/Problems

The operation was performed according to Statoil's procedures without any navigational problems.

The final position of the rig were fixed by satellite using the translocation method. A geodetic point onshore at Eigerberg near Stavanger was used for the fixed point satellite receiver.

Micro-fix position is 5 m in direction 160° from final position.

VI DIVERSE VEDLEGG

VEDLEGG 2.3: SLUTTLOGG

statoil / NORSK HYDRO / SAGA PETROLEUM

Den norske stats oljeselskap a.s
Operator for Gullfaks

34/10 - 29 GULLFAKS FASE 1

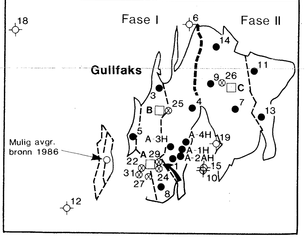
SLUTT - LOGG

Målestokk 1 : 500

Lisens : PL 050
Koordinater : 61° 10' 33.06"N 02° 11' 28.76"Ø
Brønntype : GRUNN GASS
R.B.: 32m
Vann dybde : 135m
Total dybde : 405m BD
Avvik på TD/retning : VERTIKAL BRØNN
Dypeste formasjon : NORDLAND GRUPPEN
Borestart : 27.12.85
Ferdig dato : 26.01.86
Brønn status : PLUGGET OG FORLATT
Rigg : WEST VENTURE
Geologer : DODSON, HERMANRUD

Utarbeidet av : KORNSTAD Dato : 15.07.86

LOKASJONSKART



FORINGSRØR:			FORM.STYRK.-TEST.	HASTIGHETSUNDERSØKELSE:
30"	ved	241.5m BD		
20"	ved	264m BD		
16"	ved	–		
13 3/8"	ved	311m BD	1.27 SG (F.I.T)	
9 5/8"	ved	396m BD		
7"	ved	–		

LOGGER , KONTRAKTOR : SCHLUMBERGER

ISF-BHC-MSFL-GR	LDL-CNL-GR	CBL-VDL-GR				
1A: 312 - 403.5m	1A: 312 - 405m	1A: 167 - 361m				

KOMMENTARER:

TRE SMÅ KJERNER BLE KUTTET.
KJERNE # 1: 344 - 344.5m BD
KJERNE # 2: 344.7 - 345m BD
KJERNE # 3: 346.8 - 347m BD

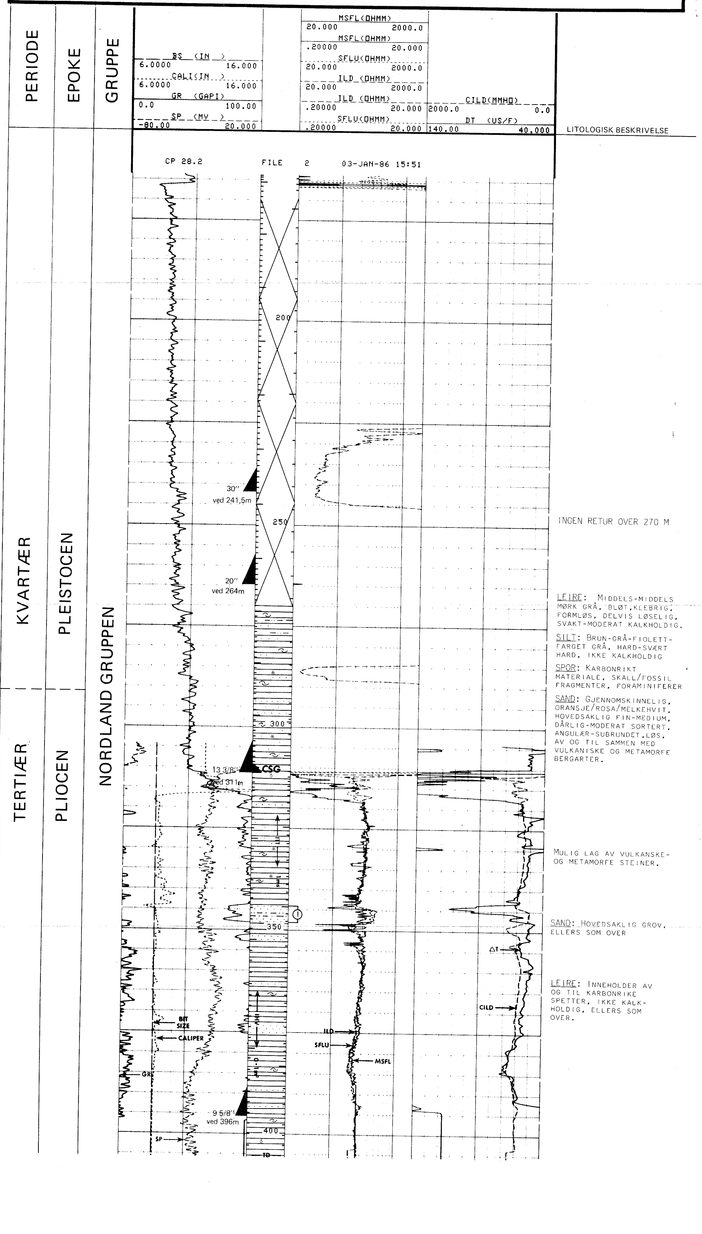
LITOLOGISKE SYMBOLER

KONGLOMERAT, SKIFER, MERGEL, KULL LIGNITT, FORAMINIFERER, GLIMMER
SAND SANDSTEIN, KALKSTEIN, TUFF, TRE – FRAGMENTER, GRAVESPOR, KAOLIN
SILT SILTSTEIN, KRITT, SALT, FOSSILER GENERELT, PYRITT, KISEL
LEIRE LEIRSTEIN, DOLOMITT, ANHYDRITT, SKALL-FRAGMENTER, GLAUKONITT, SIDERITT

OLJEDEKKET, FLUORESCENS, STRØMNINGS FLUORESCENS, INDIKASJONER PÅ GASS

SIDEVEGGSKJERNER
GJENVINNING
GJENVINNING M/HYDROKARBONER
INGEN GJENVINNING

PRODUKSJONSTEST (DST): KJERNER, KJERNE NR.
TRYKKTEST (RFT/FMT/SFT): MISLYKKET
FORINGSRØR SKO/FORINGSRØR FORLENGELSE



VEDLEGG 2.4; MWD-LOGG

EXLOG MWD

MEASUREMENT WHILE DRILLING

COMPANY STATOIL

WELL 34/10-29

FIELD GULLFAKS

REGION OFFSHORE NORWAY

COORDINATES N 61 DEG 10' 32.94"
E 02 DEG 11' 28.89"

API WELL INDEX NO. ----

CONTRACTOR SMEDVIG DRILLING

RIG/TYPE WEST VENTURE / SEMI-SUBMERSIBLE

HOLE SIZE		CASING RECORD	
36"	TO 243M	30"	AT 241.5M
26"	TO 270M	20"	AT 264.3M
8-1/2"	TO 405M	13-3/8"	AT 311M
12-1/4"	TO 405M		AT
	TO		AT
	TO		AT

PERMANENT DATUM MSL ELEVATION 0M

LOG MEASURED FROM RKB : 32M ABOVE PERMANENT DATUM

ELEVATION KB 32M DF 30M GL ---

RUN DATA :

RUN NUMBER	1	2	3	4
START DATE	123185	010186	010286	010386
END DATE	123185	010286	010286	010386
TOP LOG INT.	270M	319M	345M	347M
BTM LOG INT.	316M	344M	347M	405M
BIT NUMBER	3	5	5	5
BIT SIZE	17-1/2	8-1/2"	8-1/2"	8-1/2"
CLR SIZE	9-1/2	6-1/4"	6-1/4"	6-1/4"
CLR SER. NO.	52881	51325	51325	51325

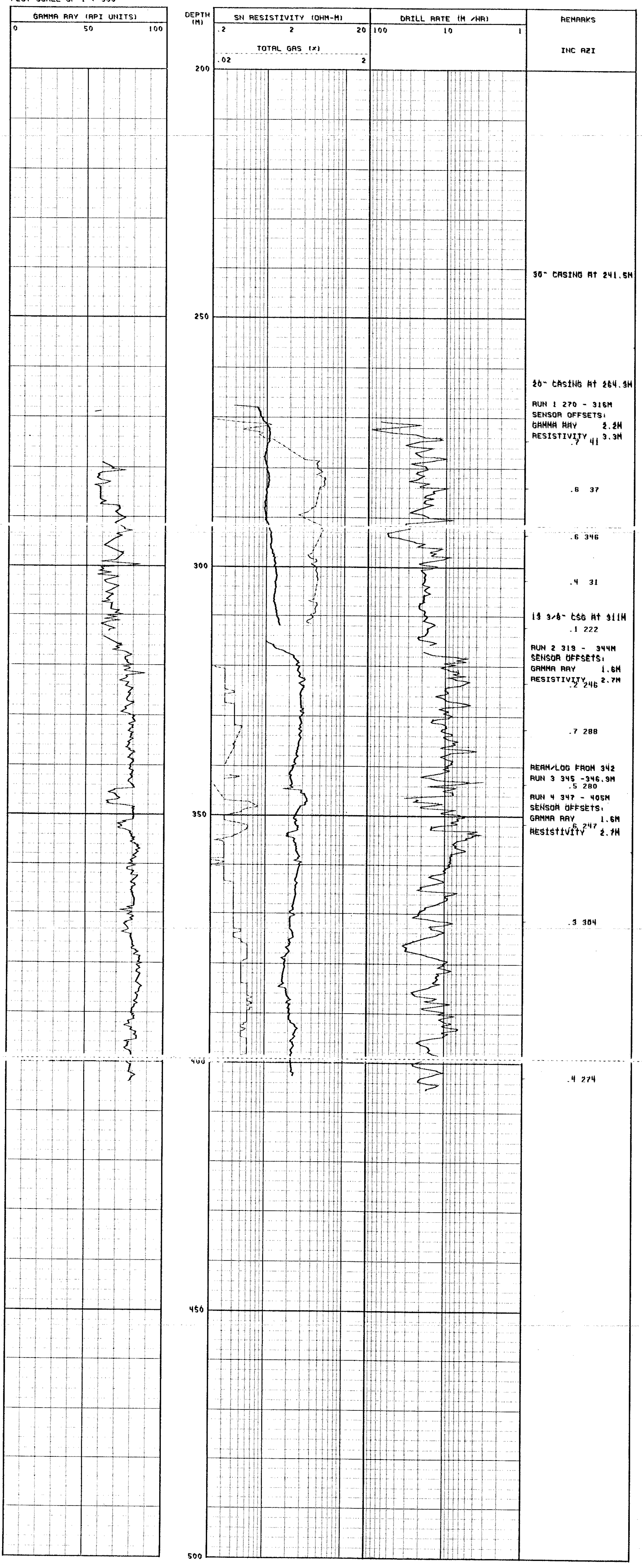
MUD DATA :

FLUID TYPE	SW/GEL	KCL/POLYM	KCL/POLYM	KCL/POLYM
DENSITY	9.2	9.4	9.4	9.4
VISCOSITY	55	49	59	59
PH	10.3	10.1	10.0	10.0
FLUID LOSS	N/A	8.5	8.2	8.0
RM AT TEMP.	0.67 25	0.08 25	0.08 25	0.09 25
RMF AT TEMP.				
RM AT BHT				

REMARKS :

656.1681 300 0000487

PLOT SCALE OF 1 : 500



VEDLEGG 2.5: FORMATION EVALUATION LOG

1985

EXLOG

COMPANY STATOIL

WELL 34/10-29

FIELD GULLFAKS

REGION NORWEGIAN NORTH SEA

COORDINATES 61° 10' 32·94" NORTH
02° 11' 28·89" EAST

API WELL INDEX NO.

SPUD DATE 27 DECEMBER 1985

ELEVATION RKB - MSL 32 m
RKB - SEABED 167 m

TOTAL DEPTH 405 m

CONTRACTOR SMEDVIG DRILLING

RIG / TYPE WEST VENTURE / SEMI-SUB

LOG INTERVAL

DEPTH FROM 167 m TO 405 m

DATE FROM 27/12/85 TO 3/1/86

SCALE 1:500 UNIT 272

LOG PREPARED BY CHEW, HALLIGAN, HERRIES, LUMPTON

HOLE SIZE

36" TO 241·5m		12¼" TO 405 m	
26" TO 270 m		____ TO ____	
17½" TO 316 m		____ TO ____	

CASING RECORD

30" AT 241 m		9⅝" AT 396 m	
20" AT 264 m		____ AT ____	
13⅜" AT 311 m		____ AT ____	

MUD TYPES

SEAWATER / SPUD MUD TO 270 m

SEAWATER-BENTONITE TO 316 m

KCL-POLYMER TO 405 m

LITHOLOGY SYMBOLS

LIMESTONE; DOLOMITE; ANHYDRITE AND GYPSUM; HALITE; COAL AND LIGNITE; CLAY; SHALE; SILT AND SILTSTONE; SILTY SANDSTONE; SAND AND SANDSTONE; CONGLOMERATE; CHERT; IGNEOUS UNDIFFERENTIATED

EXLOG SUITE

FORMATION EVALUATION LOG ☒ WIRELINE DATA PRESSURE LOG ☐
PRESSURE EVALUATION LOG ☒ TEMPERATURE DATA LOG ☒
DRILLING DATA PRESSURE LOG ☒ GEMDAS COMPUTER LOGS ☐

ABBREVIATIONS

NB	NEW BIT	SVG	SURVEY GAS
RRB	RERUN BIT	C	CARBIDE TEST
CB	CORE BIT	W	MUD DENSITY SG
WOB	WEIGHT ON BIT	V	FUNNEL VISCOSITY
RPM	REVS PER MINUTE	F	FILTRATE -- API
FLC	FLOW CHECK	FC	FILTER CAKE
CR	CIRCULATE RETURNS	PV	PLASTIC VISCOSITY
PR	POOR RETURNS	YP	YIELD POINT
NR	NO RETURNS	SOL	SOLIDS — %
LAT	LOGGED AFTER TRIP	SD	SAND --- %
BG	BACKGROUND GAS	S	SALINITY --- PPM Cl
TG	TRIP GAS	RM	MUD RESISTIVITY
STG	SHORT TRIP GAS	RMF	FILTRATE RESISTIVITY
CG	CONNECTION GAS		
SWG	SWAB GAS		

CASING SEAT; WIRELINE LOG RUN; CORED INTERVAL; TEST INTERVAL; NO RECOVERY; WIRELINE TEST; SIDEWALL CORE

GAS — 100 Total gas units is equivalent to 2% methane in air

(%) Based on average cuttings and percentage staining of washed cuttings

FORMATION EVALUATION LOG

RATE OF PENETRATION — METRE/HR — VISUAL POROSITY

CUTTINGS LITHOLOGY

HYDROCARBON ANALYSIS — CONTINUOUS TOTAL GAS — CUTTINGS GAS — CHROMATOGRAPH — METHANE; ETHANE; PROPANE; BUTANES; PENTANES; GAS UNITS; GAS PERCENT

DEPTH HRS

SCALE 5 10 15 20

NB#1 HTC R1 26" 27/12 W/ 36" HOLE OPENER

26/12

NR

NR

NR

SET 30" CASING SHOE AT 241m

NB#2 REED Y11J 26" 29/12/85

NOTE SCALE CHANGE 10 20 30 40

NR

SET 20" CASING SHOE AT 264m

NB#3 HTC-X3A 17½" 31/12

TG 0·15%

SET 13⅜" CASING SHOE AT 311m

NB#4 SEC S33SF 12¼

NB#5 HTC J2 8½ 1/1/2

2/1/2

TG 2·61%

3/1/2

NR8#5 HTC J2 8½

NR8#6 HTC J2 8½

TG 0·07%

SET 9⅝ CASING SHOE AT 396m

DRILLERS DEPTH 405m
SCHLUMBERGERS DEPTH 405·5m

WELL 34/10-29 SPUDDED 27/12/85

ALL DEPTHS FROM RKB IN METRES
RKB - MSL 32m
MSL - SEABED 135m

SURFACE HOLE FROM 167m - 270m DRILLED USING SEAWATER WITH RETURNS TO SEABED

DEVIATION AT 237m
0°

W	V	PV	YP	F
1·1	75	16	25	15
pH	CL	SD	SOL	FC
10	21k	-	4	3·5

DEVIATION AT 266m
0·75° N 16°E

CLY; LT-M GRY, SFT-V SFT, OCC FRM, PLAS, SOL, AMOR, SL CALC, TR CARB MAT, TR SHELL FRAGS, TR LITHIC FRAGS

SD; WH-TRANSLU, OCC CLR, VF-F, V OCC M, RNDD-SUBRNDD, WELL SRTD, TR CARB MAT, TR LITHIC FRAGS, TR SHELL FRAGS

DEVIATION AT 294m
0·62° N 14° W

CLY; M-DK GRY, V SFT, PLAS, SOL, AMOR, SL-MOD CALC, TR SHELL FRAGS, TR LITHIC FRAGS

SD; TRANSP-MLKY, OCC ORNG, VF-C, SUBANG-RNDD, PRLY SRTD, TR SHELL FRAGS, TR LITHIC FRAGS

W	V	PV	YP	F
1·12	58	12	26	8·9
pH	CL	SD	SOL	FC
10	46k	TR	6	1

SD; TRANSP, OCC W/ BLK INCLSNS, C-VF, SUBRNDD-ANG, PRLY SRTD, TR SHELL FRAGS, TR LITHIC FRAGS

ADT JUNK BASKET USED AS CORE BIT
CORE #1, 344·0m - 344·5m
CORE #2, 344·5m - 345·0m
CORE #3, 346·8m - 347·0m

CLY; M-DK GRY, SFT, SOL, AMOR, CARB SPKS, TR SHELL FRAGS, TR LITHIC FRAGS

SD; CLR-TRANSLU, VF-C, PRED F, MOD WELL SRTD, ANG-SUBRNDD

DEVIATION AT 372m
0·31° N 56° W

NB#6 SEC S33SF 8½ w/ 12¼ HOLE OPENER USED TO OPEN OUT 8½ PILOT HOLE

RAN E-LOGS TO 405m
ISF-SONIC, MSF, CAL
GR-LDL-CNL, CAL, GR