

# FLOPET

Denne rapport  
tilhører



L&U DOK. SENTER

L. NR. 200 88370031

KODE Well 31/2-8 nr 7

Returneres etter bruk

PS. 05. 15 31/2-8

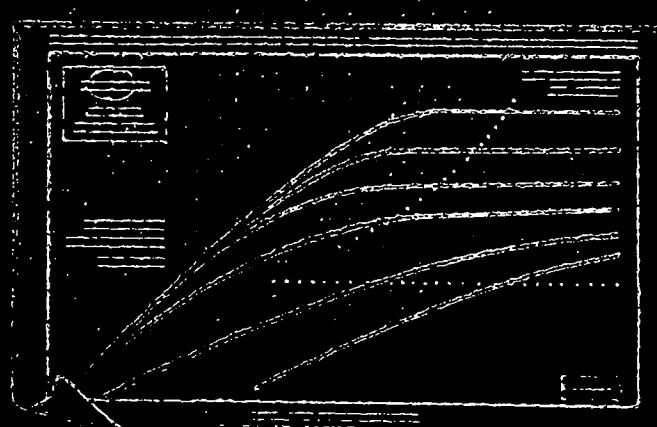
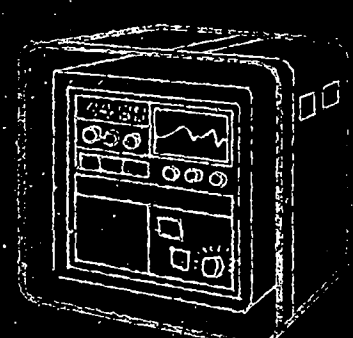
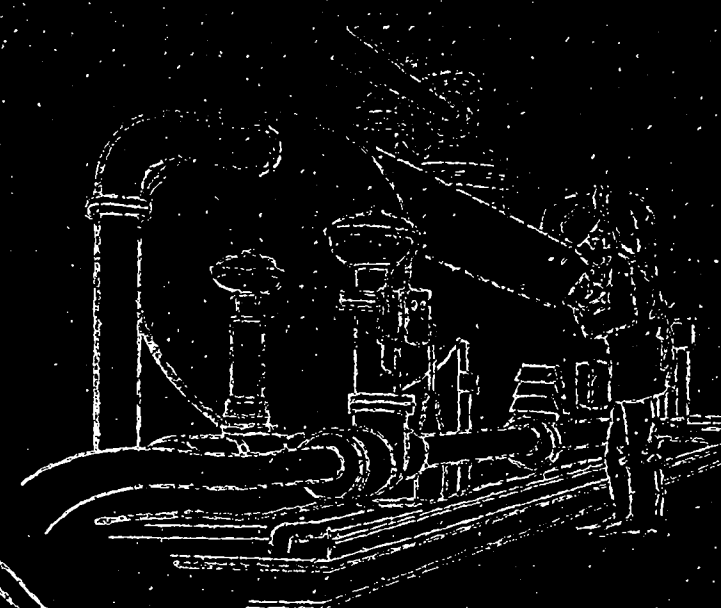
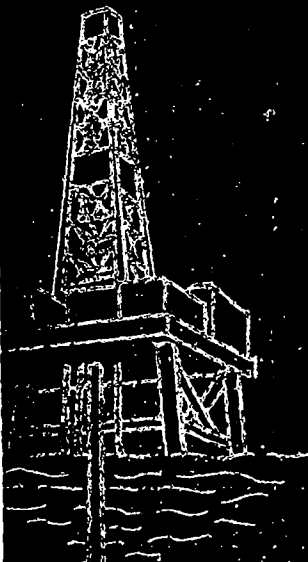
## Well Testing Report

NORSKE SHELL

TROLL

Well = 31/2-8

Date = 05.08.82 to 12.08.82



# FLOPETROL

DIVISION : NSD

BASE : NWB

REPORT N°: 82/2301/23

*PS. 05. 15 31/2-8*

## Well Testing Report

Client : NORSKE SHELL

Field : TROLL

Zone :

RIG: BORGNY DOLPHIN

Well : 31/2-8

Date : 05.08.82 to 12.08.82

# FLOPETROL

Client : NORSKE SHELLSection : INDEXBase : NWBField : TROLLPage : 1Well : 31/2-8Report N° : 82/2301/23

## INDEX

- 1 \_ TEST PROCEDURE \_
- 2 \_ MAIN RESULTS \_
- 3 \_ OPERATING AND MEASURING CONDITIONS \_
- 4 \_ SURFACE EQUIPMENT DATA \_
- 5 \_ WELL COMPLETION DATA \_
- 6 \_ SEQUENCE OF EVENTS \_
- 7 \_ WELL TESTING DATA \_

N° DOP 101

Flopetrol chief operator

Name : D. Bardin

Client representative

Name : P. Drent

# FLOPETROL

Client : NORSKE SHELL

Section :

1

Field : TROLL

Page : 2

Base : NWB

Well : 31/8-8

Report N° : 82/2301/23

## - TEST PROCEDURE -

The objective of this test was to collect a representative formation sample from the potential hydrocarbon bearing sand reservoir in the interval 1843 - 1848 m BDF.

To this end a Halliburton D.S.T. string will be run and a retrievable RTTS packer set.

The well was opened for an initial flow of 2 runs and then closed for an initial shut-in of one hour. The well was then reopened until it killed itself, during which period several runs were made with wire line to check the water level.

The well was then reversed out to the gauge tank by pumping through the APR-M safety reversing valve, different representative samples were then taken.

The packer was then unset.

# FLOPETROL

Client : NORSKE SHELL

Section :

**2**Base : NWBField : TROLLPage : 3Well : 31/2-8Report No: 82/2301/21

## — MAIN RESULTS —

Tested interval : D.S.T. No. 1 Perforations : 1843 - 1848 m

Operation	Duration	Bottom hole pressure	Well head pressure	Oil prod. rate	Gas prod. rate	G.O.R.
Units	Min.	Psig	Psig			
Initial flow	5	2875	0			
Initial shut in	60	2848				
Main flow	80	2852	0			
Main shut in	80	2843				

Depth of bottom hole measurements : 1829 m Reference : R.K.B.

Temperature : \_\_\_\_\_ at : \_\_\_\_\_ depth

Separator gas gravity (air : 1) at choke size : \_\_\_\_\_

STO gravity at choke size : \_\_\_\_\_

BSW : \_\_\_\_\_ Water cut : \_\_\_\_\_

### REMARKS AND OTHER OPERATIONS

All shut in periods were done downhole with APR-N.  
All data at end of each period.

# FLOPETROL

Client : NORSKE SHELL

Section :

**2**Base : NWBField : TROLLPage : 4Well : 31/2-8Report N°: 82/2301/21

## — MAIN RESULTS —

Tested interval : D.S.T. No. 1a Perforations : 1843 - 1848 m

Operation	Duration	Bottom hole pressure	Well head pressure	Oil prod. rate	Gas prod. rate	G.O.R.
Units	Min.	Psig	Psig			
Initial flow	2	1945	0			
Initial shut in	62	2646				
Main flow	374	2648	0			

Depth of bottom hole measurements : 1828 m Reference : R. K. B.

Temperature : \_\_\_\_\_ at : \_\_\_\_\_ depth

Separator gas gravity (air : 1) at choke size : \_\_\_\_\_

STO gravity at choke size : \_\_\_\_\_

BSW : \_\_\_\_\_ Water cut : \_\_\_\_\_

### REMARKS AND OTHER OPERATIONS

All shut in periods were done downhole with APR-N.  
All data at end of each period.

### - OPERATING AND MEASURING CONDITIONS - D.S.T. No. 1

#### A - TYPE OF GAUGE -

##### BOTTOM HOLE :

Pressure : RPG 3 x 2

Temperature : \_\_\_\_\_

##### WELL HEAD :

Pressure : Foxboro 0-1000 psi D.W.T. 50-10000 psi

Temperature : \_\_\_\_\_

##### SEPARATOR :

Pressure : \_\_\_\_\_

Temperature : \_\_\_\_\_

#### B - PRODUCTION RATE CONDITIONS AND SOURCES -

##### OIL PRODUCTION RATE

- |                                |   |                                 |
|--------------------------------|---|---------------------------------|
| <input type="checkbox"/> Tank  | → | <input type="checkbox"/> Floco  |
| <input type="checkbox"/> Meter |   | <input type="checkbox"/> Rotron |
| <input type="checkbox"/> Dump  |   |                                 |
| <input type="checkbox"/>       |   |                                 |

##### Reference conditions.

- 
- Separator
- 
- 
- Atmospheric pressure 60 F

##### Shrinkage measurement.

- 
- With tank
- 
- 
- With shrinkage tester

##### GAS PRODUCTION RATE

- 
- Orifice meter
- 
- 
- \_\_\_\_\_

##### Standard conditions.

60°F - 14.73 Psi

##### WATER PRODUCTION RATE

- 
- Tank
- 
- 
- Meter
- 
- 
- \_\_\_\_\_

#### C - WELL DATA -

##### WELL STATE DURING SURVEY :

Well producing through : 4 1/2" tubing/drill pipe/casingMain casing size 9 5/8" set at \_\_\_\_\_ Total well depth 1870 mTubing size \_\_\_\_\_ set at \_\_\_\_\_ Packer RTTS set at 1824 m

##### Perforations :

-Zone \_\_\_\_\_ From 1843 m to 1843 m From \_\_\_\_\_ to \_\_\_\_\_

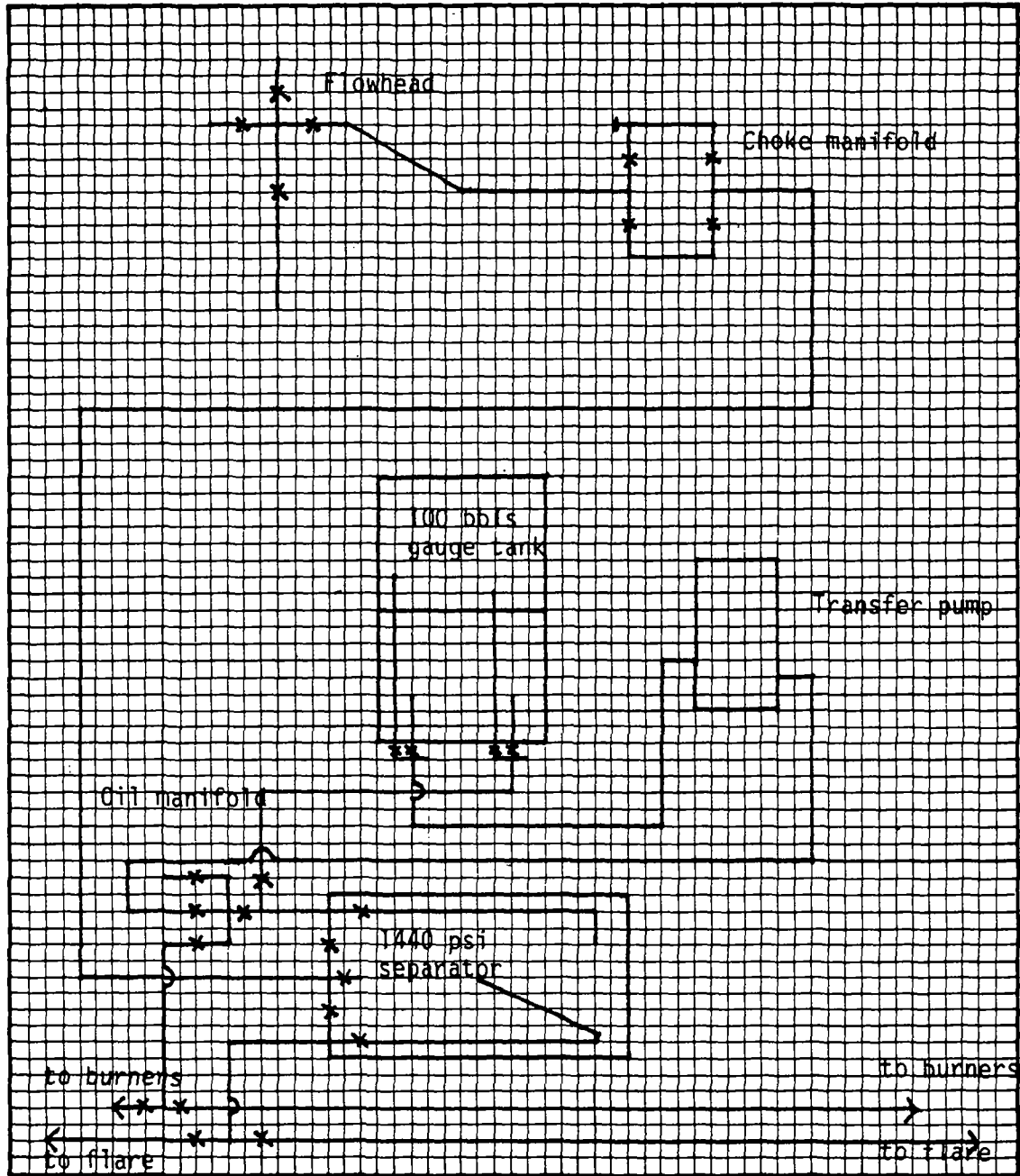
-Zone \_\_\_\_\_ From \_\_\_\_\_ to \_\_\_\_\_ From \_\_\_\_\_ to \_\_\_\_\_

-

##### WELL STATE BEFORE TEST :

- 
- Well closed since \_\_\_\_\_
- 
- 
- Well flowing since \_\_\_\_\_ Producing zone \_\_\_\_\_
- 
- Choke size \_\_\_\_\_

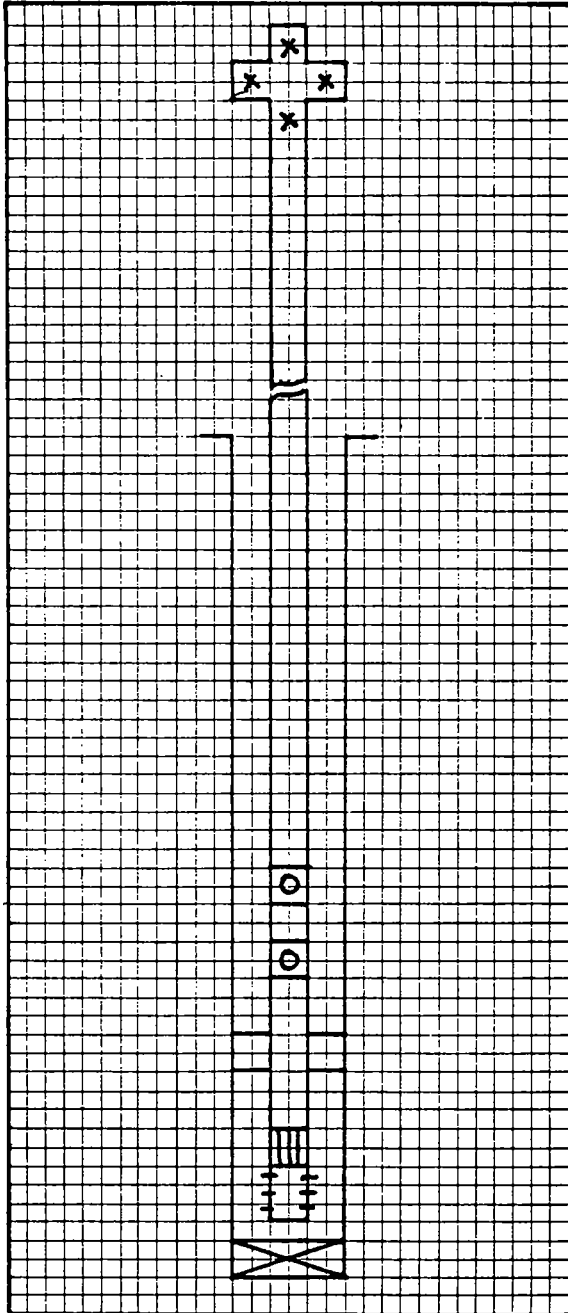
## - SURFACE EQUIPMENT LAYOUT -



**REMARKS:**



## -WELL COMPLETION DATA-



Flowhead

EZ tree 369 m

9 5/8" casing

APR-M 1787 m

APR-N 1818 m

RTTS Packer 1828 m

Bundler carrier 1829 m

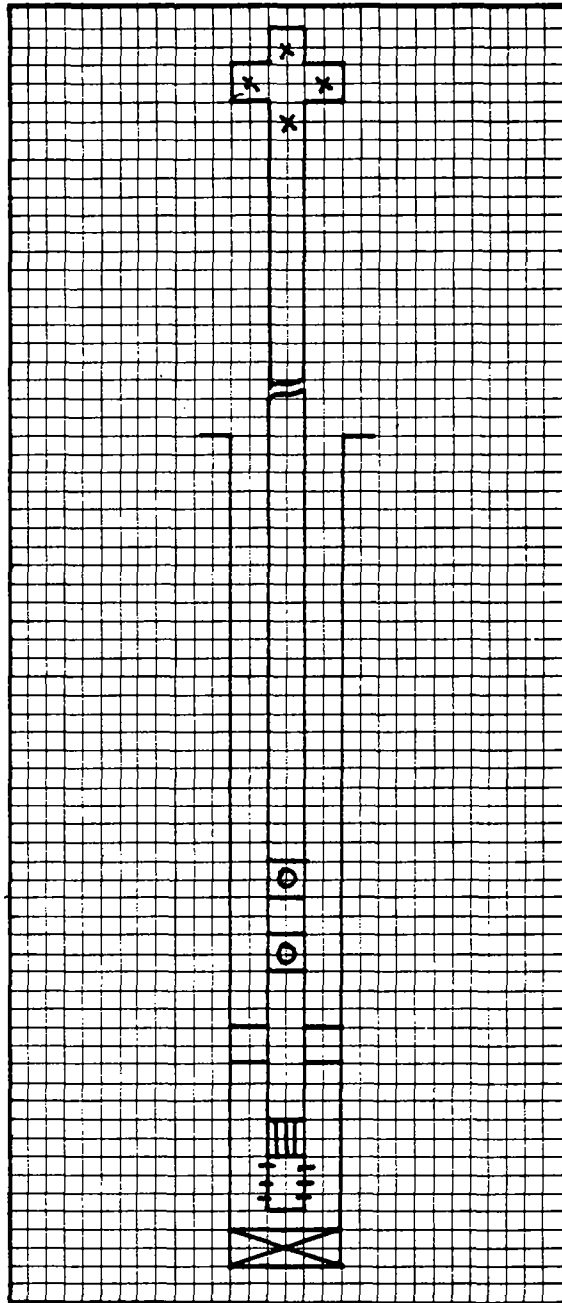
BT cases 1837 m

Birdge plug 1870 m

**REMARKS** D.S.T. No. 1

Not to scale.

## -WELL COMPLETION DATA-



Flowhead

EZ tree 369 m

9 5/8" casing

APR-M 1786 m

APR-N 1817 m

RTTS Packer 1827 m

Bundler carrier 1828 m

BT cases 1836 m

Bridge plug 1870 m

### REMARKS

D.S.T. No. 1a

Not to scale.

# FLOPETROL

Client : Norske ShellSection : **6**Base : NWBField : TrollPage : 9Well : 31/2-8Report N° 82/2301/23

## - SEQUENCE OF EVENTS -

DATE	TIME	OPERATION
05.08.82	11300	D. Bardin, J. Bosworra, A. Ronne, S. Hoolum travelled from Bergen to Borgny Dolhin.
	1330	Started rigging up well testing equipment. Made up EZ tree assembly - checked wire line equipment, and made up wire line lubricator.
06.08.82		Finished to rig up well testing equipment. Pressure tested EZ tree assembly and valve to 5000 psi. Pressure tested Flowhead from kill line side to 5000 psi.
07.08.82		Rig up burners. Pressure tested Flowhead to bottom of master valve to 5000 psi. Prepared and maintained general equipment used for D.S.T. Prepared Amerada RPG3 - Draw base and mechanical lines.
08.08.82		Pressure tested wire line B.O.P. to 3000 psi.
	1845	Picked up EZ tree to drill floor.
	1910	Torqed up EZ tree to drill floor.
	1940	Function tested EZ tree.
	1955	Stood back EZ tree on derrick.
	2020	Picked up Flowhead.
	2040	Torqued Flowhead X over + single.
	2200	Schlumberger R.I.H with perforating guns.
	2230	Schlumberger perforated interval from 1843 m to 1848 m.
	2300	Schlumberger out of hole.
	2319	Engaged stylus on gauge No. 37701.
	2322	Engaged stylus on gauge No. 37703.
	2330	Gauges attached to bundle case.
	2345	Started R.I.H. with D.S.T. string.
09.08.82	1345	Picked up EZ tree.

N° DOP 107

# FLOPETROL

Section : **6**

## \_ SEQUENCE OF EVENTS \_ (Continuation)

Page : 10  
Report N°: 82/2301/23

DATE	TIME	OPERATION
09.08.82	1350	Function tested EZ tree.
	1355	R.I.H. with hole with EZ tree.
	1430	Due to shortage of EZ tree hose, made up and added special length.
	1530	Picked up Flowhead.
	1600	Rigged up Flowhead.
	1800	Rigged up wire line.
	1830	Started pressure testing wire lubricator, flowhead and flowlines.
	1900	Due to leak on flange on wing valve on Flowhead, undid flange to replace gasket.
	2200	End of pressure test.
	2235	Packer set at 1828 m.
	2300	Open swab valve R.I.H. with blind box to check water level.
	2344	P.O.H. Check blind box.
10.08.82	0000	R.I.H. with blind box.
	0015	Stuck at 371 m (X over from EZ tree) to drill pipe.
	0025	P.O.H. checked tool - changed blind box of 2.9" to sand boiler 2".
	0045	R.I.H. to 850 m. No sign of water.
	0140	P.O.H. - changed tool to blind box of 2.9" specially made to collect water.
	0145	R.I.H. with blind box. Tagged water at 64 m.
	0155	P.O.H. water in blind box. Water noted to be at 64 m.
	0245	Pressure up annulus to open APRN.
	0247	APR-N opened - no pressure indication, but bubbles at surface through bubble box.
	0250	Closed APR-N for initial shut-in.
	0350	Opened APR-N valve to choke manifold. Bubbles in water bucket through bubble hose.

# FLOPETROL

 Section : **6**

 Page : 11  
 Report N°: 82/2301/23

## - SEQUENCE OF EVENTS -( Continuation )

DATE	TIME	OPERATION
10.08.82	0435	Opened swab valve and R.I.H. with blind box.
	0443	Water tagged at 62 m. P.O.H.
	0450	Tool in lubricator. Close swab valve.
	0510	Close APR-N
	0517	Opened R.T.T.S. circulating valve to choke manifold.
	0520	Started reversing out to gauge tank collected water and mud
		sample.
	0548	Changed reverse circulation to mud pit.
	0615	Stopped reverse circulation.
	0630	Unset packer.
	0645	Flush through lines with water.
	0700	Rigged down wire line and flowhead.
	0800	Pumped up plug and observed annulus.
	0930	Started pulling out string.
	1145	EZ tree on surface.
	1155	Stood EZ tree on derrick. Gauges on surface.
		Took off stylus on gauge No.
		Took off stylus on gauge No.
	2130	Rigged up wire line.
	2155	R.I.H. with sand boiler 2".
	2235	Tagged bridge plug at 1867 m.
	2242	P.O.H.
	2305	Tool on surface.
	2330	Rig down wire line.
		End of D.S.T. No.1

**FLOPETROL**Client : NORSKE SHELLSection : **6**Base : NOBField : TROLLPage : 12Well : 31/2-8Report N°: 82/2301/23- SEQUENCE OF EVENTS -

DATE	TIME	OPERATION
11.08.82	0000	Engaged stylus on gauge No. 37703.
	0006	Engaged stylus on gauge No. 37701.
	0015	Gauges on bundle case.
	0030	Started running D.S.T. string.
	0640	Picked up EZ tree.
	0650	Function tested EZ tree.
	0652	Run in with EZ tree.
	0845	Picked up flowhead.
	1000	Rigged up wireline.
	1050	Started pressure testing.
	1115	End of pressure test.
	1120	Opened master valve, and swab valve. Run wire line with 2.75" blind box.
	1140	Stuck at 365 m - P.O.H.
	1153	R.I.H. with 2" boiler and passed EZ tree.
	1200	P.O.H.
	1210	Tool in lubricator. Closed swab valve.
	1218	R.I.H. with 2.9" blind box to 35 m.
	1225	P.O.H.
	1235	R.I.H. with 2.9" blind box to 201 m.
	1240	P.O.H.
	1245	Tool in lubricator.
	1247	R.I.H. with same tool to 362 m.
	1252	P.O.H.
	1257	Tool in lubricator. Close swab valve and changed to 2" sand boiler.
	1302	R.I.H. with sand boiler.

N° DOP 107

# FLOPETROL

Section :

**6**

- SEQUENCE OF EVENTS - (Continuation)

Page : 13  
Report N°: 82/2301/23

DATE	TIME	OPERATION
11.08.82	1310	Tagged water at 623 m. P.O.H.
	1315	Tool in lubricator.
	1340	Pressure tested flowline to T manifold to 1500 psi.
	1400	Pressure tested flowline to choke manifold to 3000 psi.
	1415	Pressure tested kill line to 3000 psi.
	1445	End of pressure test.
	1447	Set RTTS packer at 1827 m.
	1458	Opened swab valve and run with sand boiler to check water level.
	1506	Found water level at 617 m. P.O.H.
	1516	Tool in lubricator. Closed swab valve.
	1521	Open APR-N to choke manifold for initial flow.
	1523	Closed in at APR-N for initial shut-in.
	1526	Opened choke to gauge tank.
	1545	R.I.H. with sand boiler.
	1553	Tagged water level at 172 m. P.O.H.
	1602	Tool in lubricator. Close swab valve.
	1615	R.I.H. with 2.9" blind box. Tagged water at 172 m.
	1623	Tool in lubricator. Closed swab valve.
	1625	Opened APR-N to choke manifold.
	1639	Well apparently dead.
	1737	Bubbles at bubble hose.
	1843	R.I.H. with 2.9" blind box.
	1846	Water depth checked at 39 m P.O.H.
	1851	Tool in lubricator.
	1917	R.I.H. with 2.9" blind box. Tagged water at 39 m. P.O.H.
	1922	Tool in lubricator.
	1947	R.I.H. with 2.9" blind box. Tag water at 35 m.
	1953	Tool in lubricator.
	2021	R.I.H. with 2.9" blind box. Water level found at 35 m.

# FLOPETROL

Section : **6**

## SEQUENCE OF EVENTS (Continuation)

Page : 14  
Report N°: 82/2301/23

DATE	TIME	OPERATION
11.08.82	2025	Tool in lubricator. Close swab valve.
	2152	Open swab valve and R.I.H. with 2.9" blind box. Water level found at 34 m.
	2202	Tool in lubricator.
	2223	R.I.H. with 2.9" blind box. Water level checked at 34 m.
	2227	Tool in lubricator. Close swab valve.
	2229	Open kill line valve on flowhead.
	2239	Closed APR-N and M.
	2245	Open choke manifold to gauge tank and start reversing out string content.
	2327	Flush flow lines with water.
12.08.82	0000	Unset packer.
	0016	Started reverse circulation to mud pit.
	0019	Rigged down wireline.
	0032	B.O.P. rigged down.
	0230	End of reverse circulation. Observed well behaviour.
	0255	Rigged down flowhead.
	0420	P.O.O.H.
	0525	EZ tree out of hole.
	0535	EZ tree in derrick.
	1020	Gauges on surface.
	1029	Stylus off on gauge No. 37701
	1032	Stylus off on gauge No. 37703.
	1105	Break down EZ tree.
	1230	Rig up wire line.
	1245	R.I.H. with sand boiler
	1305	Tagged bottom at 1848 m. P.O.O.H.
	1335	On surface. Rigged down wireline.



# FLOPETROL

Client : Norske Shell  
 Field : Troll  
 Well : 31/2-8

Section : 7  
 Page : 15  
 Report N°: 82/2301/23

Base : NWB

## - WELL TESTING DATA SHEET -

PRESSURE AND TEMPERATURE MEASUREMENTS				PROD. RATES AND FLUID PROPERTIES				GOR			
BOTTOM HOLE		WELL HEAD		OIL OR CONDENSATE		GAS					
DATE - TIME	Pressure	Tg temp	Ig press	Cg press	Temp	Press	Rate	Gravity	Rate	Gravity	Units
Time HR:MN			PSIG				Rate	BSW	Rate	Air = 1	
11.08.82 D.S.T. Nb. 1a											
1447											
1458											
1516											
1521											
1522											
1523											
1524											
1525											
1526											
1528											
1529											
1532											

LIQUID FLOW RATE MEASURING CONDITIONS :

TESTED INTERVAL : DST 1a  
 DEPTH REFERENCE : RKB  
 DEPTH OF B H MEASUREMENTS : 1828 m

Open swab valve and run wire line with sand boiler

Level of water found at 6/7 m. P.O.H.

Close swab valve. Tool in lubricator

Open A.P.R. to choke manifold

A.P.R. closed

Open choke manifold to gauge tank.



# FLOPETROL

## \_WELL TESTING DATA SHEET\_(Continuation)

Page Report N°: 82/2301/23

Section : **7**

DATE - TIME	PRESSURE AND TEMPERATURE MEASUREMENTS		SEPARATOR		OIL OR CONDENSATE		GAS		GOR
	BOTTOM HOLE Temp Pressure	WELL HEAD Tg temp Cg press. PSIG	Temp. Press	Rate	Gravity BSW	Rate	Gravity Air=1	Units	
11.08.82	D.S.T. No. 1a								
1629									
1630		22							
1631		18							
1632		13							
1633		6							
1634		2							
1639		1							
1737		No more bubbles.	Well apparently dead.	Keep on observing.					
2237		Bubbles at bubble hose							
12.08.82		Clared APR-N							
0000		Unset packer							

# FLOPETROL

DIVISION : NSD

BASE : NWB

REPORT N°: 82/2301/23

## Well Testing Report Annexes —

Client : NORSKE SHELL

Field : TROLL

Well : 31/2-8

Zone :

Date : 05.08.82 to 12.08.82

## INDEX of ANNEXES

- 1** - BOTTOM HOLE PRESSURE AND TEMPERATURE MEASUREMENT -
  - 1.1 - B. H. guge calibration -
  - 1.2 - B. H. pressure calculation -
  - 1.3 - B. H. temperature calculation -
  
- 2** - LIQUID PRODUCTION RATE MEASUREMENT -
  - 2.1 - Measurements with tank -
  - 2.2 - Measurements with meter -
  
- 3** - GAS PRODUCTION RATE MEASUREMENT -
  
- 4** - SAMPLING SHEETS -
  - 4.1 - Bottom hole sampling -
  - 4.2 - Surface sampling -
  
- 5** - CHARTS AND MISCELLANEOUS -

**\_ BOTTOM HOLE PRESSURE AND TEMPERATURE MEASUREMENTS \_****A \_ PRESSURE \_****a) READING USING CALIBRATED CHART :**

Chart is read using as reference line the base line drawn at atmospheric pressure.

$$P = KY + a + C$$

Y is the deflection for pressure P.

K, a and C (non linearity correction) are obtained from calibration by least square calculation.

**b) READING USING REFERENCE LINE METHOD :**

Chart is read using as reference line a line drawn at pressure  $P_R$ .

$$P = KY + P_{RC} + C$$

Y is the deflection for pressure P read from the reference line.

$P_{RC} = KY_R + a$  : calculated pressure for reference line.

$P_{RC}$ , K and C are obtained from calibration data.

**B \_ TEMPERATURE \_**

Chart is read from zero at base line.

Bottom hole temperature is read from constructor's calibration tables at the point corresponding to the deflection

Base line is drawn with adjusting knob held against the stop.  
Therefore  $Y_0 = 0$

Base line is drawn at temperature  $T_0 =$  \_\_\_\_\_  
From calibration tables the corresponding deflection  $Y_0 =$  \_\_\_\_\_

**C \_ GENERAL INFORMATION \_**

Reference depth : R.K.B

Difference level between the two pressure elements : \_\_\_\_\_

# FLOPETROL

Client : Norske ShellSection : ANNEX 1.1Base : NWBField : TrollPage : 21Well : 31/2-8Report N : 82/2301/2

## - BOTTOM HOLE PRESSURE GAUGE CALIBRATION SHEET -

DATE : 5th July 1982

CALIBRATION No. : \_\_\_\_\_

### - EQUIPMENT DATA -

Calibration cell No. : 2147 Manufacturer : Flopetrol  
Dead weight tester No. : 1287 Manufacturer : Coleman Range : 50-10000 psig  
Recording element No. : 52099 Manufacturer : GRC  
Pressure element No. : 37703 Manufacturer : GRC Range : 5200 psi

### - MISCELLANEOUS INFORMATION -

Base line drawing temperature : Ambt  
Reference line data . temperature : Ambt . pressure  $P_R$  : \_\_\_\_\_ . reading  $Y_R$  : \_\_\_\_\_  
Calibration data . temperature : 150°F . step drawing :  with crank  
 with clock  
Equivalent pressure  $p$  of level difference between Dwt and bellows  
Level difference : 1.90 m  + in case of Dwt above  
Oil specific gravity : 874  $p = 2.36$  psig  - in case of Dwt beneath bellows

### - CALIBRATION READING AND CALCULATIONS -

P (Dwt)	Y	$\Delta Y$	$Y^2$	Y P	$P_c = KY + a$	$C = P - P_c$
			Units on this line -			
500	0.194	-			506.96	-6.37
1000	0.382	0.188			1003.21	-2.03
1500	0.572	0.190			1504.15	-2.37
2000	0.760	0.188			2000.50	1.86
2500	0.947	0.187			2494.26	8.69
3000	1.137	0.191			2998.00	5.55
3500	1.327	0.190			3499.87	4.27
4000	1.518	0.191			4003.19	1.54
4500	1.709	0.191			4508.39	-3.06
5000	1.901	0.191			5013.99	-0.08
	10.4467	$\Sigma$			$\Sigma + = 21.91$ $\Sigma - = 21.91$	

$$A = \frac{\Sigma P}{n} = \underline{2753} \quad B = \frac{\Sigma Y}{n} = \underline{1.0447}$$
$$D = \frac{\Sigma (Y P)}{\Sigma Y} = \underline{3502.7723} \quad C = \frac{\Sigma (Y^2)}{\Sigma Y} = \underline{1.3285} \quad K = \frac{D - A}{C - B} = \underline{2640.3126}$$
$$a' = A - B K = \underline{-4.9902} \quad a' = D - C K = \underline{-4.9902}$$

### - FINAL RESULTS -

$$K = \underline{2640.3126} \quad PRC = K Y_R + a = \underline{\quad\quad\quad}$$
$$a = a' + p = \underline{-2.6302}$$

# FLOPETROL

Client : Norske Shell

Section : ANNEX 1.1

Base : NWB

Field : Troll

Page : 22

Well : 31/2-8

Report N : 82/2301/23

## BOTTOM HOLE PRESSURE GAUGE CALIBRATION SHEET

DATE : 5th July 1982

CALIBRATION No. : \_\_\_\_\_

### EQUIPMENT DATA

Calibration cell No. : 2147 Manufacturer : Flopetrol  
 Dead weight tester No. : 1287 Manufacturer : Coleman Range : 50-10000 psig  
 Recording element No. : 10113 Manufacturer : GRC  
 Pressure element No. : 37701 Manufacturer : GRC Range : 5200 psi

### MISCELLANEOUS INFORMATION

Base line drawing temperature : Ambt  
 Reference line data - temperature : Ambt - pressure  $P_R$  : \_\_\_\_\_ - reading  $Y_R$  : \_\_\_\_\_  
 Calibration data . temperature : 150°F . step drawing :  with crank  
 with clock  
 Equivalent pressure  $p$  of level difference between Dwt and bellows  
 Level difference : 1.90 m  + in case of Dwt above  
 Oil specific gravity : .874  $p =$  2.36 psig  - in case of Dwt beneath bellows.

### CALIBRATION READING AND CALCULATIONS

P (Dwt)	Y	$\Delta Y$	$Y^2$	Y P	$P_c = KY + a$	$C = P - P_c$
Units on this line -						
500	0.182	-			506.10	-5.51
1000	0.369	0.187			1000.39	0.79
1500	0.558	0.189			1500.61	1.16
2000	0.748	0.190			2002.70	-0.34
2500	0.936	0.188			2500.53	2.43
3000	1.124	0.188			2997.73	5.82
3500	1.815	0.191			3502.22	1.92
4000	1.506	0.190			4005.67	-0.93
4500	1.696	0.190			4507.66	-2.33
5000	1.885	0.190			5008.92	-3.00
		$\Sigma$				$\Sigma + = 12.12$ $\Sigma - = 12.12$

$$A = \frac{\Sigma P}{n} = \frac{2753}{10} = 275.3 \quad B = \frac{\Sigma Y}{n} = \frac{1.0319}{10} = 0.10319$$

$$D = \frac{\Sigma (YP)}{\Sigma Y} = \frac{3511.2276}{1.0319} = 3399.8 \quad C = \frac{\Sigma (Y^2)}{\Sigma Y} = \frac{1.3187}{1.0319} = 1.277$$

$$K = \frac{D - A}{C - B} = \frac{3399.8 - 275.3}{1.277 - 0.10319} = 2643.1444$$

$$a' = A - BK = 275.3 - 2643.1444 \times 0.10319 = 25.7568 \quad a' = D - CK = 3399.8 - 2643.1444 \times 1.277 = 25.7568$$

### FINAL RESULTS

$$K = \frac{2643.1444}{1} \quad PRC = KY_R + a =$$

$$a = a' + p = 28.1168$$



# FLOPETROL

Client : NORSKE SHELL

Section : **ANNEX 1.2**

Base : NWB

Field : TROLL  
Well : 31/2-8

Page : 23  
Report N° : 82/2301/23

## BOTTOM HOLE PRESSURE CALCULATIONS

Well producing through casing / tubing / drill pipe  
Bottom hole temperature : \_\_\_\_\_ at depth \_\_\_\_\_ with \_\_\_\_\_

INSTRUMENT DATA	LOWER GAUGE	UPPER GAUGE
Instrument type :	R.P.C.-3	
Press. element. No. and range:	37701	
Recording element. No.:		
Clock. No. and capacity:	10442 - 72 hrs.	
<b>CALIBRATION DATA</b>		
Calibration. No. and date :		
Calibration temperature :	150°F	
Calibration range :	500-5000 psi	
K :	2643.1444 psi/inch.	
a, (calibrated chart) :	28.1168	
P <sub>RC</sub> , (non calibrated chart) :		

DATE-TIME		Choke size	W.H. pressure	Depth	Y	C *	P	Y	C *	P
Time	Cumul									
Hrs	Min	Mins		Meters	Inch		Psig			
08.08.	82	D.S.T. No. 1								
2319		Stylus on gauge	37701							
09.08.	82									
				1829	1.2230		3261	Hydrostatic		
2239	0			1829				Set packer		
2245	6				1.1955		3188			
2250	11				1.1939		3184			
2255	16				1.1876		3167			
2300	21				1.1844		3159			
2305	26				1.1806		3149			
2310	31				1.1728		3128			
2315	36				1.1689		3118			
2320	41				1.1657		3109			
2325	45				1.1617		3099			
2330	51				1.1568		3086			
2335	56			1829	1.1562		3084			

REMARKS :

\* Only used if its value is significant compared to the accuracy of the gauge.

No. : DOP 115 Litografen 8175

# FLOPETROL

Section: ANNEX 1.2

- B.H. PRESSURE CALCULATIONS (Continuation) -

Page : 24  
Report N°: 82/2301/23

DATE - TIME			Choke size	W.H. pressure	LOWER GAUGE			UPPER GAUGE		
Time	Cumul				Depth	Y	C *	P	Y	C *
Hrs	Min	Mins		Meter	Inch		Psig			
09.	to	10.08.82								
2340		61		1829	1.1538		3078			
2345		66			1.1509		3070			
2350		71			1.1501		3068			
2355		76			1.1482		3063			
10.08.82										
0000		81			1.1449		3054			
0005		86			1.1440		3052			
0010		91			1.1440		3052			
0015		96			1.1419		3046			
0020		101			1.1372		3034			
0025		106			1.1372		3034			
0030		111			1.1363		3031			
0035		116			1.1347		3028			
0040		121			1.1326		3022			
0045		126			1.1307		3017			
0050		131			1.1892		3171			
0055		136			1.1281		3010			
0100		141			1.1258		3004			
0110		151			1.1237		2998			
0120		161			1.1211		2991			
0130		171			1.1192		2986			
0140		181			1.116		2978			
0150		191			1.1139		2972			
0200		201			1.1119		2967			
0210		211			1.1089		2959			
0220		221			1.1082		2957			
0230		231			1.1060		2951			
0240		241			1.1051		2949			

No. DOP 116 Litografen 8175

# FLOPETROL

Section: ANNEX 1.2

\_ B. H. PRESSURE CALCULATIONS (Continuation) \_

Page : 25  
Report N°: 82/2301/23

DATE - TIME			Choke size	W. H. pressure	LOWER GAUGE			UPPER GAUGE		
Time	Cumul	Mins			Depth	Y	C *	P	Y	C *
Hrs	Min			Meter	Inch		Psig			
0245		246		1829	1.1042		2947			
0245		0		Pressure up annulus to open APR-N						
0247		2		1829	1.0788		2879			
0248		3			1.0784		2878			
0249		4			1.0775		2876			
0250		5			1.0770		2875			
0250		0		Close APR-N for initial shut in.						
0300		10			1.0675		2850			
0310		20			1.0660		2846			
0320		30			1.0668		2848			
0330		40			1.0665		2847			
0340		50			1.0668		2848			
0350		60			1.0668		2848			
0350		0		Open APR-N						
0400		10			1.0680		2851			
0400		20			1.0680		2851			
0420		30			1.0680		2851			
0430		40			1.0680		2851			
0440		50			1.0681		2851			
0450		60			1.0682		2852			
0500		70			1.0682		2852			
0500		80			1.0682		2852			
0500		0		Close APR-N						
0520		10			1.0680		2851			
0530		20			1.0665		2847			
0540		30			1.0681		2851			
0550		40			1.0682		2852			
0600		50			1.0682		2852			

No DOP 116 Litografen 8175

# FLOPETROL

Section: ANNEX **1.2**

## \_ B.H. PRESSURE CALCULATIONS (Continuation) \_

Page : 26  
Report N°: 82/2301/23

				LOWER GAUGE			UPPER GAUGE			
DATE - TIME		Choke size	W H pressure	Depth	Y	C *	P	Y	C *	P
Time	Cumul			Meter	Inch		Psig			
Hrs	Min	Mins								
0610	60				1.0630		2672			
0620	70				1.0625		2836			
0630	80			1829	1.0650		2843			
End of survey/unset packer.										

No DOP 116 Litografen 8175

# FLOPETROL

Client : NORSKE SHELL

Section : ANNEX 1.2

Base : NWB

Field : TROLL

Page : 27

Well : 31/2-8

Report N° : 82/2301/23

## - BOTTOM HOLE PRESSURE CALCULATIONS -

Well producing through . casing / tubing / drill pipe

Bottom hole temperature : \_\_\_\_\_ at depth \_\_\_\_\_ with \_\_\_\_\_

INSTRUMENT DATA		LOWER GAUGE		UPPER GAUGE	
Instrument type :		R.P.C.-3			
Press. element. No. and range:		37703			
Recording element. No.:		52099			
Clock. No. and capacity:		10442 - 72 hr.			
<b>CALIBRATION DATA</b>					
Calibration. No. and date:		150°F			
Calibration temperature:		500-5000 psi			
Calibration range:		2640.3126 psi/inch			
K :		-2.6302 inch			
a, (calibrated chart) :					
PRC, (non calibrated chart) :					

DATE-TIME		Choke size	W.H. pressure	Depth Meter	Y Inch	C*	P Psig	Y	C*	P
Time	Cumul									
Hrs	Min									
11.08	82									
		D.S.T. No.	1 A							
0005		Stylus on gauge	37701							
				1828	1.1856		3128	Initial	hydrostatic	
1447	0				Set RTTS packer at 1827 m					
1450	3				1.1850		3126			
1500	13				1.1795		3112			
1510	23				1.1725		3093			
1521	34				1.1662		3076			
1521	0				Open APR-N for initial flow					
1522	1				0.7376		1945			
1523	2				0.7376		1945			
1523	0				Close APR-N for initial shut-in					
1525	2				0.9561		2522			
1535	12				1.0029		2645			
1545	22				1.0031		2646			
1555	32				1.0031		2646			
1605	42			1828	1.0031		2646			

REMARKS :

\* Only used if its value is significant compared to the accuracy of the gauge.

# FLOPETROL

Section: ANNEX 1.2

- B H. PRESSURE CALCULATIONS (Continuation) -

Page : 28  
Report N°: 82/2301/23

DATE - TIME			Choke size	W H pressure	LOWER GAUGE			UPPER GAUGE		
Time	Cumul				Depth	Y	C *	P	Y	C *
Hrs	Min	Mins		Meter	Inch		Psig			
11.08	82									
1615	52			1828	1.0031		2646			
1625	62				1.0031		2646			
1625	0				Open APR-N					
1630	5				1.0032		2646			
1640	15				1.0042		2649			
1650	25				1.0042		2649			
1700	35				1.0042		2649			
1720	55				1.0042		2649			
1740	75				1.0042		2649			
1800	95				1.0042		2649			
1820	115				1.0042		2649			
1840	135				1.0041		2648			
1900	155				1.0041		2648			
1920	175				1.0041		2648			
1940	195				1.0041		2648			
2000	215				1.0041		2648			
2020	235				1.0041		2648			
2040	255				1.0041		2648			
2100	275				1.0041		2648			
2120	295				1.0041		2648			
2140	315				1.0041		2648			
2200	335				1.0041		2648			
2220	355				1.0041		2648			
2239	374				1.0041		2648			
2239	0				Close APR-N and APR-M					
2240	1				1.0117		2668			
2250	11				1.0117		2668			
2300	21				1.0117		2668			

No DOP 116 Litografen 8175

# FLOPETROL

Section: ANNEX 1.2

- B. H. PRESSURE CALCULATIONS (Continuation) -

Page : 29  
Report N°: 82/2301/23

				LOWER GAUGE			UPPER GAUGE				
DATE - TIME		Choke size	W H pressure	Depth	Y	C *	P	Y	C *	P	
Time	Cumul			Meter	Inch			Psig			
Hrs	Min										
2310		31		1828	1.0117		2668				
2320		41			1.0117		2668				
2330		51			1.0117		2668				
2340		61			1.0117		2668				
2350		71			1.0117		2668				
2400		81		1828	1.0117		2668				
2400					Unset packer - end of survey						

No DOP 116 Litografen 8175

Division: NSD - NWE

**FLOPETROL**  
**Schlumberger**

Centre: Stavanger

Service order:

## AMERADA CHART

Customer: NORSE SHELL

Field:

Well: 31/2-8

Date: 11 to 12.08.82

Remarks:

DST No. 1a

Pressure element No. 37701 Range 1

Clock No. 72 Range 10442

Division: NSD - NWE

**FLOPETROL**  
**Schlumberger**

Centre: Stavanger

Service order:

## AMERADA CHART

Customer: NORSE SHELL

Field:

Well: 31/2-8

Date: 11 to 12.08.82

Remarks:

DST No. 1A

Pressure element No. 37703 Range

Clock No. 72 Range 10441



Division: NSD - NWB .....

**FLOPETROL**  
**Schlumberger**

Centre: .....Stavanger.....  
Service order: .....

## AMERADA CHART

Customer: NORSKE SHELL .....

Field: .....

Well: .....31/2-8.....

Date: .....08.08.82 to 10.08.82.....

Remarks:

.....DST No. 1.....

.....

Pressure element No. 37701..... Range .....

Clock No. 72..... Range 10442.....

Division: NSD - NWB .....

**FLOPETROL**  
**Schlumberger**

Centre: .....Stavanger.....  
Service order: .....

## AMERADA CHART

Customer: NORSKE SHELL .....

Field: .....

Well: .....31/2-8.....

Date: .....08.08.82 - 10.08.82.....

Remarks:

.....DST No. 1.....

.....

Pressure element No. 37703..... Range .....

Clock No. 72..... Range 10441.....