

FLOPE

Denne rapport
tilhører



L&U DOK. SENTER

L. NR. 302 84 05 0004

KODE Well 31/2-11 nr 12

Returneres etter bruk

Well Testing Report

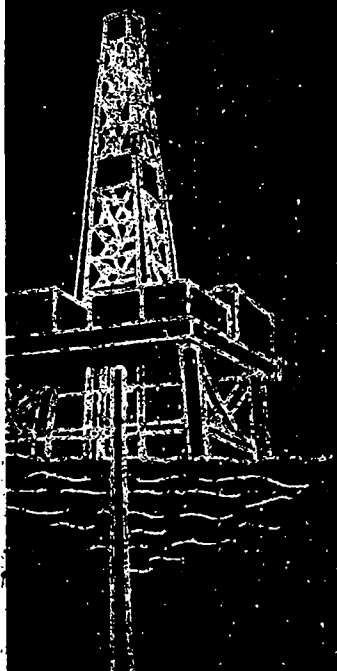
: NORSKE SHELL

: TROLL

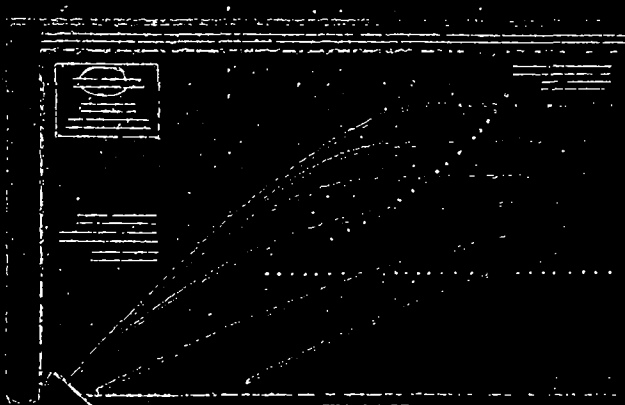
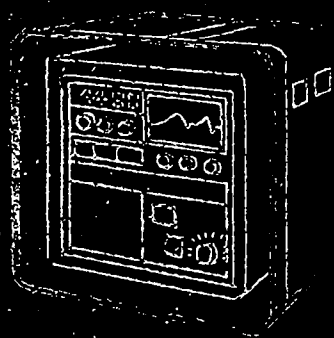
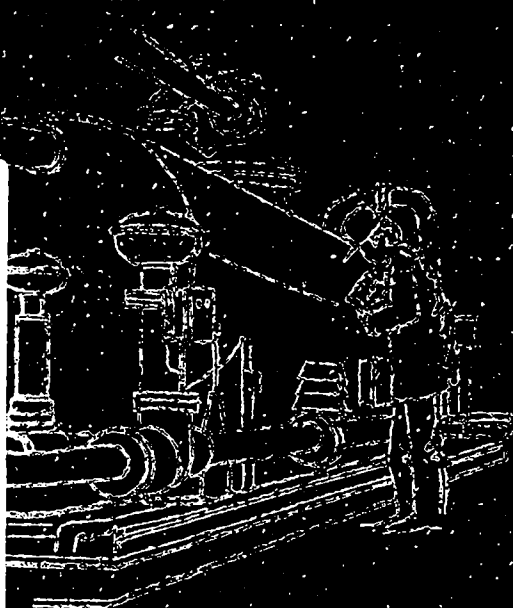
Well: 31/2-11

JURASSIC

Date: 13/5-83



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FLOPETROL

DIVISION : NSD
BASE : NWB
REPORT N°: 83/2301/23

Well Testing Report

Client : NORSKE SHELL

Field : TROLL

Well : 31/2-11

Zone : JURASSIC
SANDSTONE

Date : 13/5-83

WATER TEST

FLOPETROLClient : NORSKE SHELLSection : INDEXBase : NWBField : TROLLPage : 1Well : 31/2-11Report N° : 83/2301/23

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- 2 _ MAIN RESULTS _
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- 7 _ WELL TESTING DATA _

DOP 101

Flopetrol chief operator
Name : IAN COOPERClient representative
Name : GUSTAV RUNDGREN

TEST PROCEDURE

- WATER TEST

OBJECTIVE:

TO COLLECT A REPRESENTATIVE FORMATION WATER SAMPLE FROM THE WATER BEARING SAND.

THE DST STRING WAS RUN USING GEOVANN GUNS, BAKER PACKER, HALLIBURTON WEIGHT SET PACKER, TEST TOOLS AND PRESSURE GAUGES, FLOPETROL EZ TREE, FLOWHEAD AND SURFACE EQUIPMENT.

AFTER PRESSURE TESTING EQUIPMENT A BLIND BOX WAS RUN TO TAG DIESEL CUSHION. SEVERAL ATTEMPTS WERE MADE BEFORE THE HALLIBURTON LPRN VALVE WAS OPENED. THE GEOVANN FIRING BAR WAS RUN ON WIRELINE. AFTER SEVERAL ATTEMPTS THE GUNS WOULD NOT FIRE. RIGGED UP TO BAIL SCALE WHICH WAS LYING ON TOP OF GUN. 26 BAILING RUNS WERE MADE THEN THE GUNS WERE FIRED.

AT 09:43 ON 16/5/83 THE WELL WAS OPEN FLOWING ON FULL CHOKE TO GAUGE TANK 181/64.

AT 11:15 THE WELL STOPPED FLOWING.

AT 12:06 THE CHOKE MANIFOLD WAS CLOSED.

AT 12:13 THE APR-M WAS OPENED.

AT 12:14 OPENED CHOKE AND STARTED TO REVERSE OUT FLOWING TO GAUGE TANK. DURING THE REVERSING PERIOD 24 WATER SAMPLES WERE COLLECTED AND SOME SAND SAMPLES.

AT 13:16 REVERSING WAS COMPLETE. PREPARE TO ABANDON TEST.

WATER TEST COMPLETE.

FLOPETROL

Client : NORSKE SHELL

Section :

2

Base : NWB

Field : TROLL

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Well : 31/2-11

Report No: 83/2301/23

— MAIN RESULTS —

Tested interval : JURASSIC Perforations : 1681 - 1685 METERS

Operation	Duration	Bottom hole pressure	Well head pressure	Oil prod. rate	Gas prod. rate	G.O.R.
Units	MIN		PSIG	BBLs PRODUCED		
FLOW PERIOD	92		0	DIESEL CUSHION 90.66		

Depth of bottom hole measurements : _____ Reference : _____

Temperature : _____ at : _____ depth

Separator gas gravity (air : 1) at choke size : _____

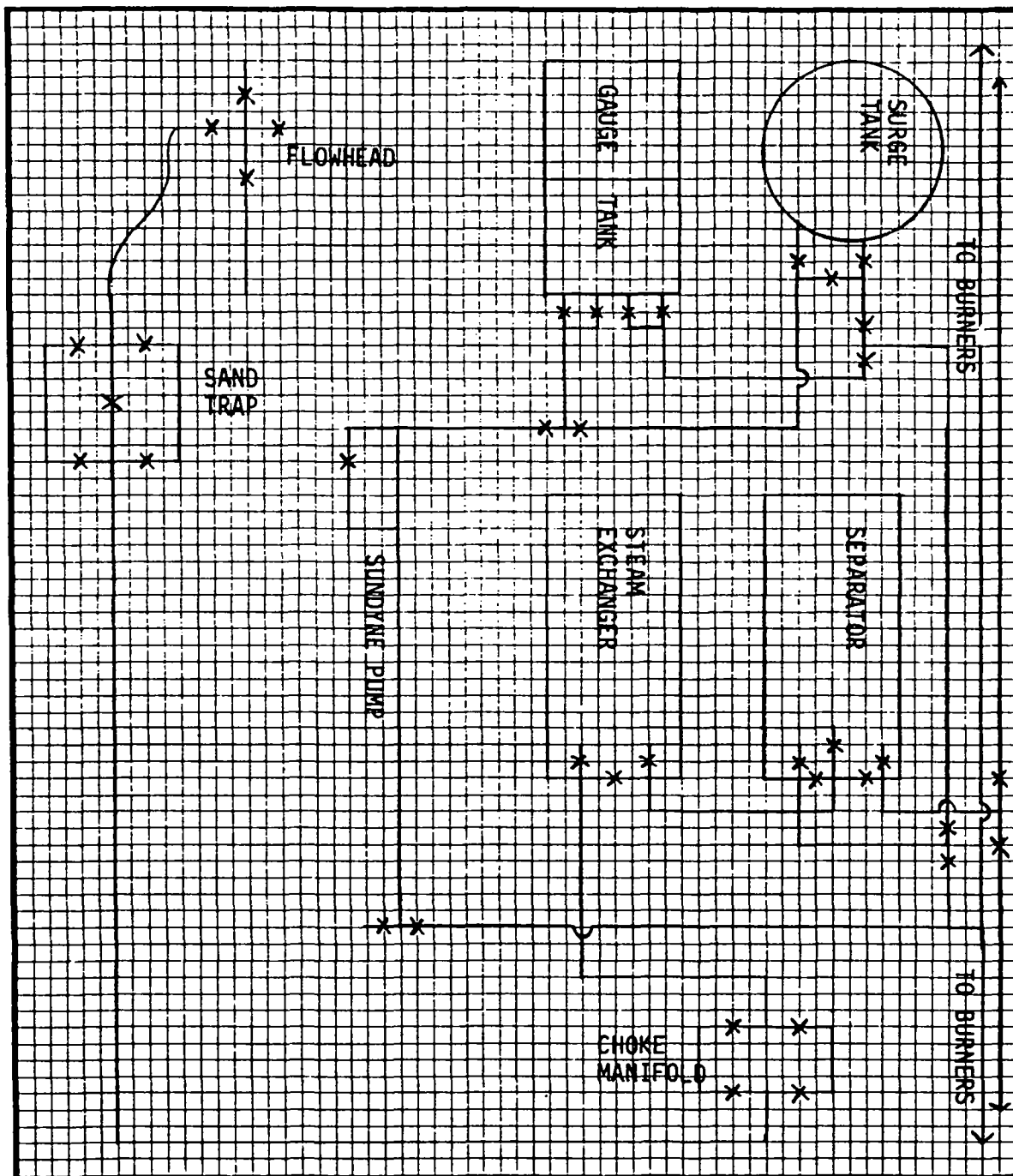
STO gravity at choke size : _____

BSW : APPROX 10% SAND Water cut : ALL WATER

REMARKS AND OTHER OPERATIONS

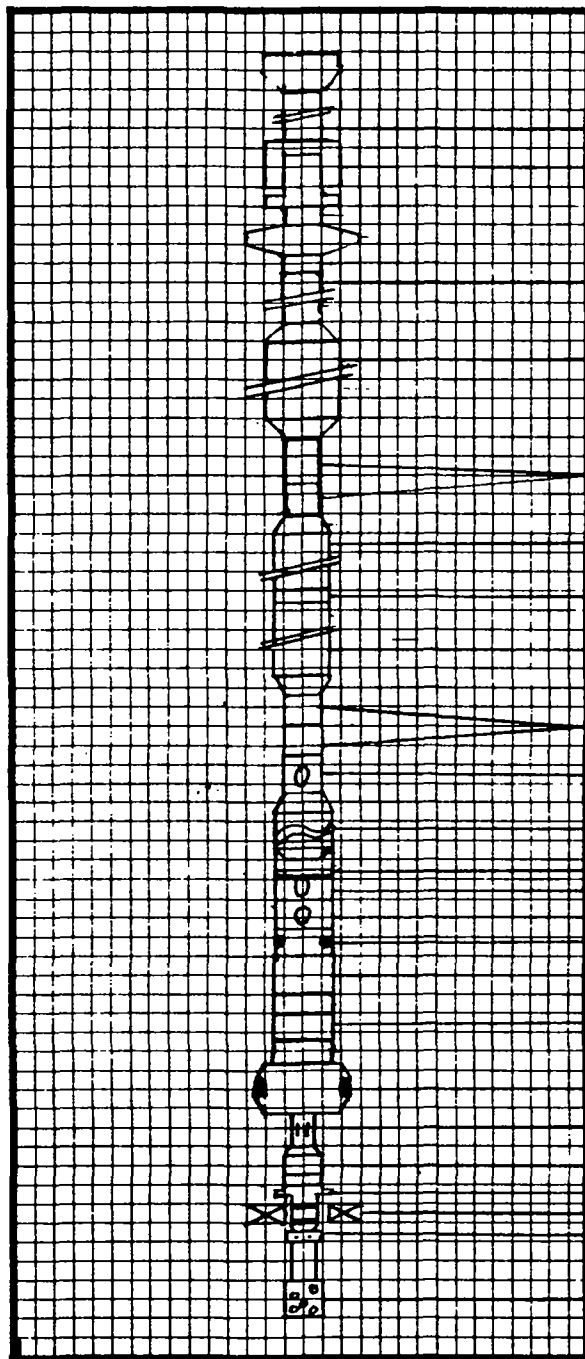
ALL MEASUREMENTS TAKEN ARE LAST IN OPERATIONS.

- SURFACE EQUIPMENT LAYOUT -



REMARKS :

- WELL COMPLETION DATA -



4 1/2" PH-6 TBG

FLOPETROL EZ-TREE

5" DRILL PIPE

7" BTC TBG 29 LB/FT

SLIP JOINT 5' STROKE 3 1/2" IF (BxP)

DRILL COLLARS

RTTS CIRCULATING VALVE

DRILL COLLARS

SLIP JOINT

APR-M SAFETY REV. VALVE

DRILL COLLARS

DRAIN VALVE

DRILL PIPE TESTER VALVE

LPR-N TESTER VALVE

HYDRAULIC BY-PASS

BIG JOHN JAR

RTTS SAFETY JOINT

NR EXPANDING SHOE BACKER ASSY

BUNDLE CARRIER

5" H.W. DP 4 1/2" IF (BxP)

BAKER SIZE 190-47, B-LOCATOR

BAKER SIZE 194-47, MUD 'DB' PACKER

PRESSURE EQUALIZING SUB

GEO VANN 3 3/8" GUN 4 SH/FT, 4M

REMARKS :

FLOPETROL

Client : NORSKE SHELLSection : **6**Base : NWBField : TROLLPage : 6Well : 31/2-11Report N° : 83/2301/23

- SEQUENCE OF EVENTS -

DATE	TIME	OPERATION
13.05.83	12:00	CREW ARRIVE RIG. CHECK OVER EQUIPMENT. CHANGE OUT
		VALVES ON GAUGE TANK SPOOL OF 1240 METERS ON SLICK LINE.
		4000 METERS LEFT ON.
14.05.83		CHECK FOR LEAKS ON GAUGE TANK. REPAIR LEAKS. MAKE UP
		CONNECTIONS FOR SAMPLING ON RIG FLOOR. CHECK OVER
		EQUIPMENT.
15.05.83	09:50	RUN IN HOLE WITH EZ TREE
	10:54	RIG UP BAILER SLINGS
	11:00	PICK UP FLOWHEAD
	11:20	RIG UP FLOW AND KILL LINES TO FLOWHEAD
	11:27	FLOWHEAD MADE UP TO TEST STRING
	11:31	RIG UP CHOKE MANIFOLD
	12:15	SURFACE RECORDING EQUIPMENT RIGGED UP
	12:18	CLOSE PIPE RAMS
	12:20	PRESSURE UP ANNULUS TO 400 PSI TO CHECK PACKER
	12:35	OPEN MASTER VALVE. CHECK FOR LEAKS.
	13:20	CLOSE MASTER VALVE. OPEN KILL VALVE. FLUSH LINES.
		CLOSE KILL VALVE. PRESSURE TEST KILL VALVE TO 3000 PSI.
	13:50	CLOSE FAILSAFE VALVE. OPEN KILL VALVE. PRESSURE TEST
		FLOWHEAD.
	14:06	OPEN FAILSAFE. CLOSE CHOKE MANIFOLD.
	14:10	PRESSURE TEST CHOKE MANIFOLD TO 2000 PSI.
	14:25	CLOSE IN AT HEATER.
	14:27	PRESSURE TEST TO 2000 PSI.
	14:37	RIG UP WIRE LINE BOP AND LUBRICATOR.
	15:30	RUN IN HOLE TO TAG DIESEL CUSHION.
	15:36	TOOL DIAMETER TOO LARGE 2.9 BLIND BOX.
	15:38	PULL OUT OF HOLE.

N° DOP 107

FLOPETROL

Section : 6

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Report N°: 83/23017

_ SEQUENCE OF EVENTS _ (Continuation)

DATE	TIME	OPERATION
15.05.83	15:45	CHANGE TOOL TO 2.5 "
	16:00	RUN IN HOLE WITH BLIND BOX TO TAG DIESEL.
	16:04	TAG DIESEL AT 526 METERS RKB
	16:09	PULL OUT OF HOLE.
	16:20	TOOLS OUT. CHANGE TOOL TO DETONATING BAR.
	16:23	TOOLS LOADED.
	16:33	PRESSURE TEST LUBRICATOR TO 3000 PSI.
	16:58	OPEN MASTER VALVE. CLOSE KILL VALVE.
	17:02	PRESSURE UP ANNULUS TO 1500 PSI TO OPEN LPRN VALVE.
	17:05	RUN IN HOLE WITH DETONATING BAR TO FIRE GEOVANN GUNS.
	17:18	COULD NOT PASS THROUGH LPRN VALVE. VALVE STILL CLOSED.
	17:32	PRESSURE BLED OFF ANNULUS.
	17:34	PRESSURE BACK UP ANNULUS. TRY OPEN LPR N VALVE
	17:35	RUN IN HOLE WITH DETONATING BAR.
	17:42	LPRN VALVE STILL CLOSED. PULL OUT OF HOLE. FUNCTION
		TEST LPRN VALVE.
	17:52	RUN IN HOLE.
	17:56	LPRN VALVE STILL CLOSED.
	17:59	PULL OUT OF HOLE.
	18:07	TOOLS IN LUBRICATOR.
	18:13	CLOSE CHOKE MANIFOLD.
	18:15	OPEN PIPE RAMS. CHECK CIRCULATION ON KILL. OK.
	18:20	CLOSE PIPE RAMS.
	18:21	PRESSURE UP ANNULUS.
	18:30	PRESSURE BLED OFF.
	18:37	PRESSURE UP ANNULUS TO 1800 PSI.
	18:45	BLEED OFF.
	18:55	PRESSURE UP ANNULUS TO 1800 PSI.
	18:57	OPEN SWAB VALVE. RUN IN HOLE WITH DETONATING BAR.
	19:08	OPEN CHOKE MANIFOLD

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FLOPETROL

Section : **6**

SEQUENCE OF EVENTS (Continuation)

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DATE	TIME	OPERATION
15.05.83	19:11	HIT AT GEOVANN GUNS. NOTHING.
	19:13	HIT AGAIN.
	19:28	JARRING. NOTHING.
	19:45	PULL OUT OF HOLE.
	19:55	CLOSED SWAB VALVE. TOOLS OUT.
	20:08	RUN IN HOLE WITH SAND BAILER.
	20:22	REACHED DEPTH.
	20:26	PULL OUT OF HOLE.
	20:35	TOOLS AT SURFACE. SCALE IN SAND BAILER.
	20:49	RUN IN HOLE SAND BAILER 2ND RUN.
	21:09	OUT OF HOLE.
	21:24	3RD BAILER RUN.
	21:46	OUT OF HOLE.
	21:58	4TH BAILER RUN.
	22:14	OUT OF HOLE.
	22:28	5TH BAILER RUN.
	22:48	OUT OF HOLE.
	22:58	6TH BAILER RUN.
	23:20	OUT OF HOLE.
	23:32	7TH BAILER RUN.
16.05.83	00:06	OUT OF HOLE.
	00:16	8TH BAILER RUN.
	00:40	OUT OF HOLE
	00:49	9TH BAILER RUN
	01:10	OUT OF HOLE
	01:20	10TH BAILER RUN
	01:40	OUT OF HOLE
	01:50	11TH BAILER RUN
	02:11	OUT OF HOLE
	02:27	12TH BAILER RUN

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FLOPETROL

Section : **6**

- SEQUENCE OF EVENTS - (Continuation)

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DATE	TIME	OPERATION
16.05.83	02:43	OUT OF HOLE
	02:53	13TH BAILER RUN
	03:13	OUT OF HOLE
	03:25	14TH BAILER RUN
	03:45	OUT OF HOLE
	03:54	15TH BAILER RUN
	04:12	OUT OF HOLE
	04:21	16TH BAILER RUN
	04:38	OUT OF HOLE
	04:46	17TH BAILER RUN
	05:05	OUT OF HOLE
	05:16	18TH BAILER RUN
	05:30	OUT OF HOLE
	05:40	19TH BAILER RUN
	06:01	OUT OF HOLE
	06:08	20TH BAILER RUN
	06:26	OUT OF HOLE
	06:34	21TH BAILER RUN
	07:03	OUT OF HOLE
	07:10	22ND BAILER RUN
	07:36	OUT OF HOLE
	07:44	23RD BAILER RUN
	08:04	OUT OF HOLE
	08:10	24TH BAILER RUN
	08:38	OUT OF HOLE
	08:47	25TH BAILER RUN
	09:11	OUT OF HOLE
	09:20	CHANGE TO GEOVANN BAILER. RUN IN HOLE. 26TH RUN.
	09:43	FIRE GEOVANN GUNS. WELL OPEN. FULL CHOKE. FLOW
		DIRECTED TO GAUGE TANK.

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FLOPETROL

Section : 6

SEQUENCE OF EVENTS (Continuation)

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DATE	TIME	OPERATION
16.05.83	09:46	DIESEL CUSHION AT SURFACE
	11:15	WELL STOP FLOWING
	11:53	RIGGED DOWN WIRELINE. CLOSE SWAB VALVE.
	12:06	CLOSED CHOKE MANIFOLD
	12:13	PRESSURE UP ANNULUS. SHEAR APRM CIRCULATING VALVE.
	12:14	OPEN CHOKE. REVERSE OUT TO GAUGE TANK. 32/64.
	12:16	CHANGE TO 20/64" ADJUSTABLE CHOKE.
	12:23	CHANGE TO 24/64" ADJUSTABLE CHOKE. START TAKING 1ST OF 24
		SAMPLES.
	12:25	CHANGE TO 28/64" ADJUSTABLE CHOKE.
	12:34	CHANGE TO 40/64" ADJUSTABLE CHOKE.
	13:16	STOP REVERSING.
	13:28	CLOSE KILL VALVE. DISCONNECTED CHOKE MANIFOLD.
	13:29	OPEN KILL VALVE.
	13:30	CONTINUE REVERSE CIRCULATING HOLE TO BALANCE BRINE.
	13:35	CHOKE MANIFOLD LAID DOWN.
	13:52	FLOWLINE RIGGED DOWN FROM FLOWHEAD.
	14:00	UNSEAT PACKER. LOSING BRINE TO HOLE. STING BACK INTO
		PACKER. START PUMPING.
	15:30	UNSEAT PACKER. OBSERVE WELL LOSING TO HOLE. HOLE STABLE.
	16:30	RIG DOWN FLOWHEAD. LAND STRING IN WELLHEAD.
	16:55	FLOWHEAD LAID DOWN. REVERSE CIRCULATE.
	18:00	PULL OUT OF PACKER.
	18:30	START TO PULL OUT OF HOLE WITH TEST STRING.
	19:25	SEVEN STANDS OUT OF HOLE. TUBING BREAK. TEST STRING
		LAND BACK INTO WELLHEAD.
	23:20	FISHED TEST STRING.
	23:30	CONTINUE TO PULL OUT OF HOLE.
17.05.83	01:04	EZ TREE TO SURFACE.
	01:40	UNLATCH EZ TREE.

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FLOPETROL

WELL TESTING DATA SHEET(Continuation)

Page Report N°: 83/2301/23

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DATE - TIME	PRESSURE AND TEMPERATURE MEASUREMENTS		WELL HEAD		SEPARATOR		PROD. RATES AND FLUID PROPERTIES			GOR		CUSHION DIESEL		CUMULA-TIVE Units
	BOTTOM HOLE Pressure	Temp.	Ig temp	Cg press.	Temp.	Press.	OIL OR CONDENSATE Rate	GRAVITY	CONDENSATE Rate	GAS Rate	GRAVITY	BBL/DAY	BBL/DAY	
16.05.83 Time Cumul														
HRS/min 10:06														
10:08 25			50											
10:10 27			50									23.50	3383	83.16
10:12 29			50											
10:14 31			50											
10:16 33			50											
10:20 37			50									3.036	437	86.2
10:25 42			50											
10:30 47			50									3.432	494	89.6
10:35 52			50											
10:40 57			50											
10:45 62			50									.792	76.03	90.4
10:50 67			50											
10:55 72			50											
11:00 77			50									.264	25.3	90.66
11:15 92			50									0	0	90.66
11:53														
12:06														

STOPPED FLOWING
RIGGED DOWN WIRELINE.
CLOSED CHOKE MANIFOLD.

CLOSE SWAB VALVE.

FLOPETROL

WELL TESTING DATA SHEET(Continuation)

Page Report N°: 83/2301/23

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Section : 7

DATE - TIME	PRESSURE AND TEMPERATURE MEASUREMENTS			SEPARATOR			PROD. RATES AND FLUID PROPERTIES			GOR			WATER CUSHION		
	BOTTOM HOLE	WELL HEAD	TEMP.	TEMP.	PRESS.	RATE	GRAVITY	BSW	RATE	GRAVITY	GOR	RRLS	RRLS/DAY	CL	
Time	Pressure	Tg temp	Ig temp	Cg press.	Temp.	Rate	SG	Rate	Rate	Air=1		RRLS	RRLS/DAY	PH	
HRS/min	PSIG													Units	
16:05.83															
12:06															
12:13				PRESSURE UP ANNULUS.	SHEAR APRM VALVE.										
12:14	0			CHROKE OPEN ON 32/64"	ADJUSTABLE CHROKE. REVERSE OUT TO GAUGE TANK								90.66		
12:16	2			CHANGE TO 20/64"	ADJUSTABLE CHROKE.							4.884	95.54		
12:20	6											9.24	104.78		
12:21	7			990					10% SAND						
12:23	9			770	CHANGE TO 24/64"	ADJUSTABLE CHROKE.									
12:25	11			460	CHANGE TO 28/64"	ADJUSTABLE CHROKE.						11.35	116.14		31000 5-5
12:26	12			450					10% SAND						
12:30	16			900						1.034		12.94	129.1		33000 5-5
12:34	20			800	CHANGE TO 40/64"	ADJUSTABLE CHROKE.									
12:35	21			200											28000 5-5
12:40	26			188						1.033		28.51	157.6		35000 5-5
12:55	41			178					5% SAND			39.6	197.2		30000 5-5
13:00	46			167					4% SAND			14.92	212.1		30000 5-5
13:05	51			161					4% SAND			7.39	219.5		80000 5-5
13:10	56			138					3% SAND			14.52	234.0		115000 5-5
13:15	61			150								19.54	253.5		105000 5-5

FLOPETROL

DIVISION : NSD
BASE : NWB
REPORT N° : 83/2301/23

Well Testing Report Annexes —

Client = NORSKE SHELL
Field = TROLL Well = 31.02.11
Zone = JURASSIC Date = 13.05.83
 SANDSTONE

WATER TEST

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 -

-LIQUID PRODUCTION RATE MEASUREMENT -**2.1 - MEASUREMENT WITH TANK -**

$$V_o = V \times K \times (1 - BSW)$$

V_o : Net oil volume at 60°F and atmospheric pressure.

V : Gross oil volume measured by tank gauging.

K : Volume correction factor to be applied between the tank temperature during gauging and 60°F.

BSW : Basic sediments and water.

2.2 - MEASUREMENT WITH METER -

a) Shrinkage factor is measured by shrinkage tester.

$$V_o = V_s \times f \times (1 - Shr) \times K \times (1 - BSW)$$

V_o : Net oil volume at 60°F and atmospheric pressure.

V_s : Gross oil volume measured by meter under separator conditions.

f : Meter correction factor = $\frac{\text{Volume measured in tank}}{\text{Volume measured by meter}}$

Shr : Percentage of oil volume reduction between separator and tank conditions, reported to oil volume at separator conditions.

K : Volume correction factor to be applied between the finale temperature during shrinkage measurement and 60°F.

BSW : Basic sediments and water.

b) Shrinkage factor is measured with tank.

$$V_o = V_s \times (1 - Shr') \times K \times (1 - BSW)$$

V_o , V_s , K and BSW : Same meaning as in a).

$(1 - Shr')$: Shrinkage factor including meter correction factor.

FLOPETROL MEASUREMENT WITH TANK - (Continuation)

DATE - TIME Time	Interval	Gauge graduation CM	TANK VOLUME		STO GRAVITY		K	BSW %	Net volume of STO V _o	Net STO product. rate /day	Cumulative production	Units
			Volume V	Temp.	Gravity	Temp. (Grav. 60°F)						
12:13					SHEAR APRM. REVERSE OUT.							
12:14		15.5			OPEN CHOKE 32/64". FLOW TO GAUGE TANK.						90.66	
12:16					CHANGE CHOKE TO 20/64"							
12:16		34	4.884					4.884			95.54	
12:20		69	9.24					9.24			104.78	
12:23					CHANGE CHOKE TO 24/64"							
12:25		112	11.35					11.35			116.14	
12:25		8			CHANGE CHOKE TO 28/64" CHANGE TO FRONT TANK.							
12:30		57	12.94					12.94			129.1	
12:34					CHANGE CHOKE TO 40/64".							
12:40		165	28.51					28.51			157.6	
12:40		30			CHANGE TO BACK TANK.							
12:55		180	39.60					39.6			197.2	
12:55		80.5			CHANGE TO FRONT TANK.							
13:00		137.0	14.92					14.92			212.1	
13:05		165.0	7.39					7.39			219.5	
13:05		42.0			CHANGE TO BACK TANK.							

FLOPETROL

Client : NORSKE SHELL

Section :

1Field : TROLLPage : 23Base : NWBWell : 31/2-11Report N° : 83/2301/23

WATER SAMPLES

SAMPLE NO.	SALINITY *		PH **
	CL	PPM	
8	48000		5.5
9	41000		5.5
10	39000		5.5
11	35000		5.5
12	35000		5.5
13	34000		5.5
14	34000		5.5
15	32000		5.5
16	31000		5.5
17	33000		5.5
18	28000		5.5
19	35000		5.5
20	30000		5.5
21	30000		5.5
22	80000		5.5
23	115000		5.5
24	105000		5.5

* USING 0.282 SILVER NITRATE
POS: CHROMATE DISTILLED
WATER AND SAMPLE

** USING PH-PAPER