FLOPETROL JO

Well Testing Report

Client : STATOIL

Field : GULLFAKS SØR Well : 34/10-21

Zone : STATFJORD Date : 7-8 October 1984

FLOPETROL JOHNSTON
Schlumberger

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DIVISION : EMR

BASE : NWB-STAVANGER

REPORT N°: 84/2301/37

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Zone : STATFJORD Date : 7-8 October 1984

INDEX

- TEST PROCEDURE -

DST # 1

Objectives: To get a representative sample of reservoir contents, to survey well characteristics and to determine production limits.

Procedure: Perforation was performed by means of Geovann tubing conveyed guns, carried on 3 1/2 PHG tubing. Packer was set at 3871.4m. After several attempts, guns were fired by pressuring string to 400 BAR.

Due to no flow indication were several attempts made to ensure that guns were fired. A wireline run was made to perforate mechanically.

Flow was performed in 3 periods with total backflow of 1.4 m^3 - betwenn 1st. and 2nd. flow 15 BBL of water was injected.

Due to low flow to surface, it was decided not to do a final buildup.

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— MAIN RESULTS —

Tested interval : JURASSIC - STATFJORD Perforations : 3905.5m - 3923.5m

Operation	Duration	Bottom hole * pressure	Well head pressure	~~Oil prod.~~	Gas prod. rate	G.O.R.
Units	min	N/A	BAR	Water prod. 1)	N/A	N/A
1st. flow	19		1	14.85 M^3/D		
2nd. flow	230		1	0,291 M^3/D		
3rd. flow	81		2	3.96 M^3/D		
Total volume recovered				1.485 M^3		

Depth of bottom hole measurements : * Reference : RKB

Temperature : * at : depth

Separator gas gravity (air : 1) at choke size : N/A

STO gravity at choke size N/A :

BSW : N/A Water cut : N/A

REMARKS AND OTHER OPERATIONS

* Ref. sperry sun or Geoservices gauge report.

1) Flow data collected from tank and buckets flowed from bubble house.

N°: DOP 103

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Base : N.W.B.

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- OPERATING AND MEASURING CONDITIONS -

A - TYPE OF GAUGE -

BOTTOM HOLE :
Pressure : Geoservices
Temperature : Sperry sun

WELL HEAD :
Pressure : DWT - BAR
Temperature : Foxboro -

SEPARATOR :
Pressure : N/A
Temperature : N/A

B - PRODUCTION RATE CONDITIONS AND SOURCES -

OIL PRODUCTION RATE
- ☐ Tank
- ☐ Meter
- ☐ Dump
- ☐ Floco
- ☐ Rotron
- N/A
- ☐ _____

Reference conditions - N/A
- ☐ Separator
- ☐ Atmospheric pressure 60°F

Shrinkage measurement - N/A
- ☐ With tank
- ☐ With shrinkage tester

GAS PRODUCTION RATE
- ☐ Orifice meter N/A
- ☐ _____

Standard conditions - N/A

WATER PRODUCTION RATE
- ☒ Tank
- ☐ Meter
- ☒ Buckets

C - WELL DATA -

WELL STATE DURING SURVEY :

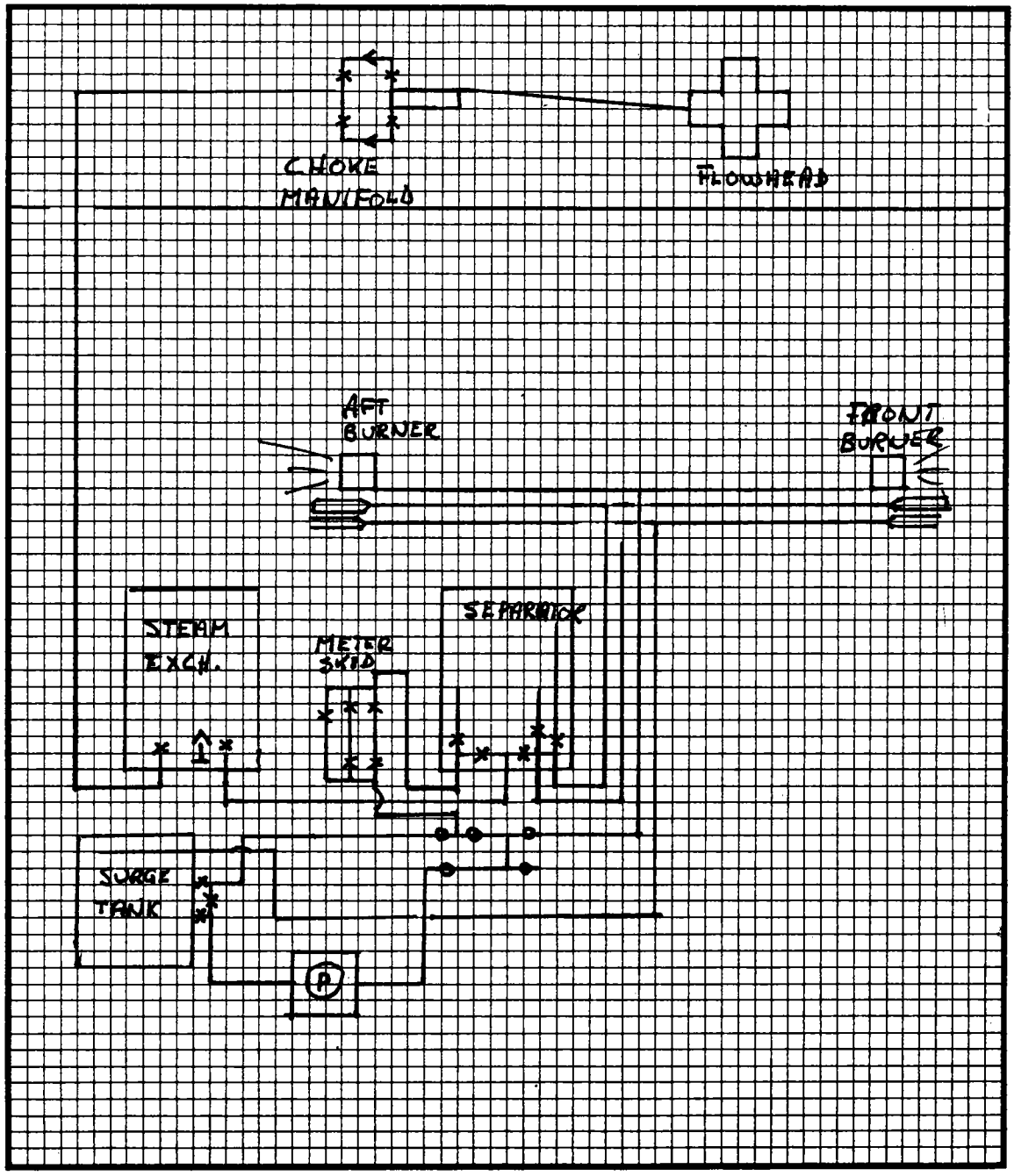
Well producing through : tubing ~~/drill pipe/casing~~
Main casing size 9 5/8 set at 3181m Total well depth 4005
Tubing size 3 1/2 PHG set at _____ Packer 7" RTTS set at 3871.4 m
Perforations :
- Zone Statfjord From 3905.5m to 3923.5m From _____ to _____
- Zone _____ From _____ to _____ From _____ to _____
-

WELL STATE BEFORE TEST : N/A New well

- ☐ Well closed since _____
- ☐ Well flowing since _____ Producing zone _____
  Choke size _____

N° : DOP 104

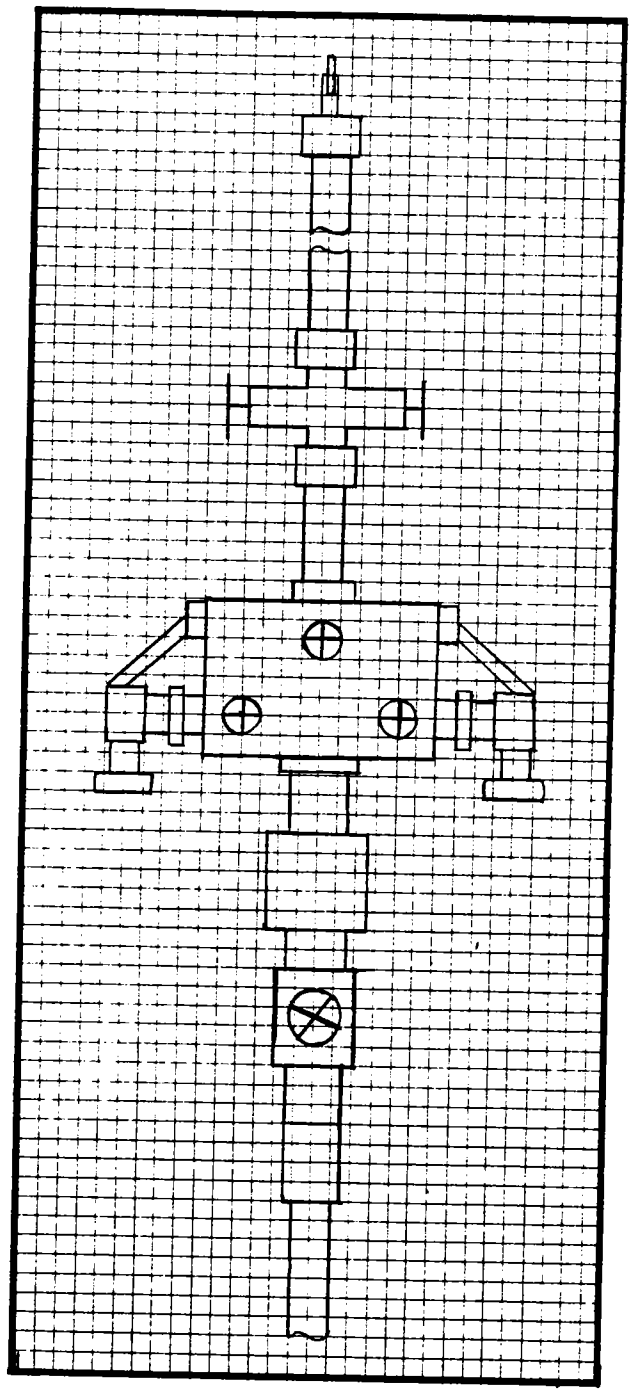
- SURFACE EQUIPMENT LAYOUT -



REMARKS :

Not to scale

- WELL COMPLETION DATA -

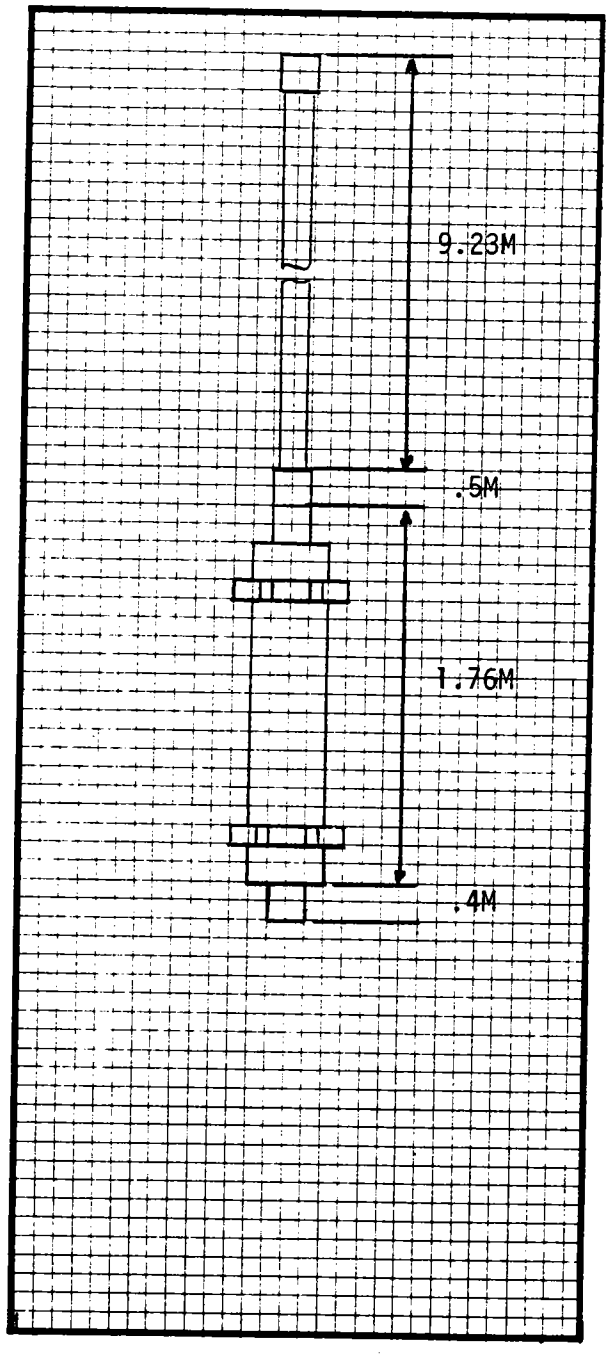


REMARKS :

Not to scale.

Min. ID-2.25"

- WELL COMPLETION DATA -



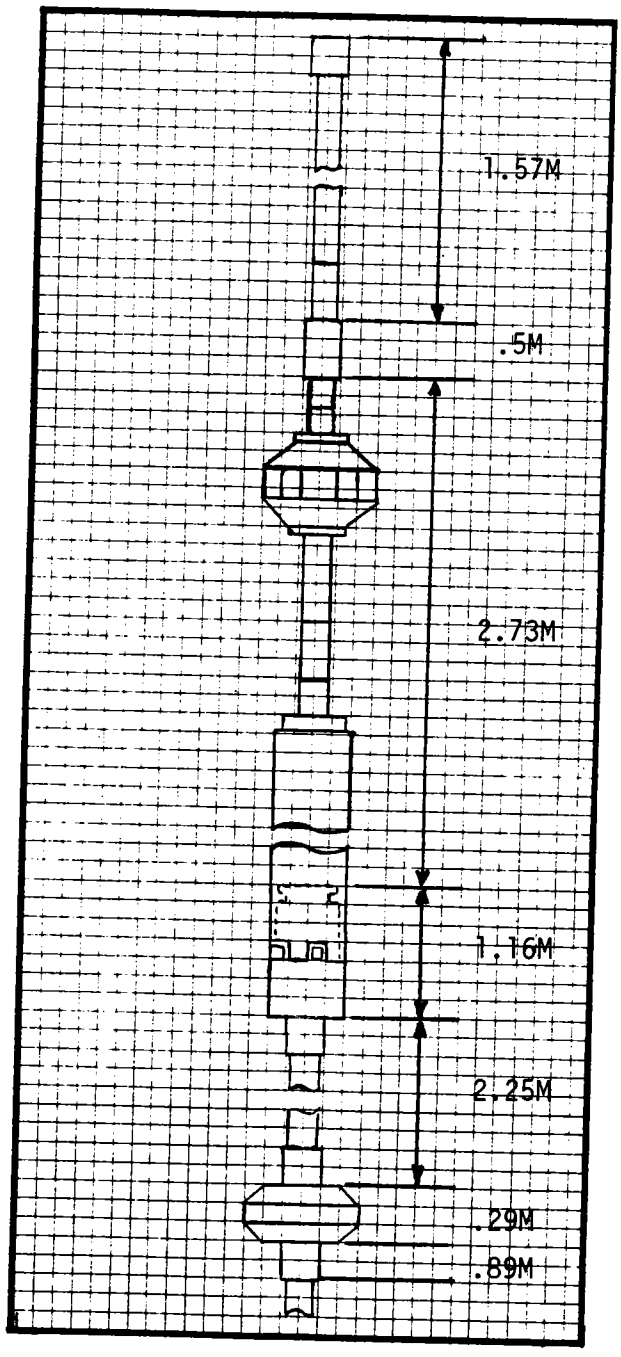
REMARKS :

Not to scale

Min. ID 3"

Max. OD 11"

- WELL COMPLETION DATA -



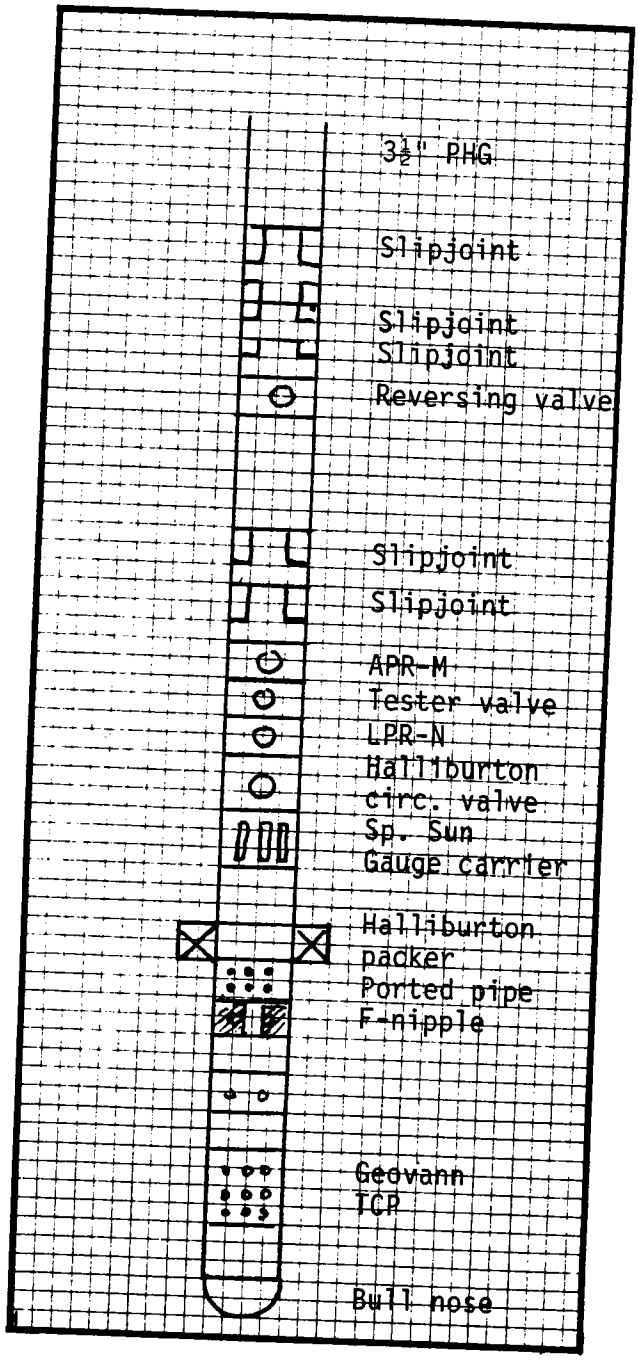
REMARKS :

Not to scale.

Min. ID - 2.25"

Max. OD - 17.5"

- WELL COMPLETION DATA -



REMARKS :

Not to scale.
Depths not included.

- SEQUENCE OF EVENTS -

DATE	TIME	OPERATION
04.10.84	08:00	EZ tree on drill floor.
	08:15	EZ tree through rotary table.
	09:15	Lubvalve on string.
	10:45	Flowhead on string.
	11:00	Rig up schlumberger for correlating before setting packer
	11:29	Lubvalve closed. Master valve and swab valve open.
	11:34	Open lubvalve RIH with schlumberger W.L. but toll stuck
		due to mixed control hoses on lubvalve.
	11:45	Close EZ tree.
	12:45	Rig down flowhead. Cut schlumberger wire.
	13:00	Lay down flowhead.
	13:29	Break out lubvalve.
	13:38	Schlumberger tool out of hole.
	13:40	Disconnect control hoses, connect hoses in correct order,
		pressure test from both sides. OK
	14:15	Lubvalve on string.
	15:40	Flowhead on string.
	15:50	Press test against kill valve; 10 min. OK.
	16:10	Press test against master- flow and swab valve.
	16:22	Test OK. Open master-lubvalve and EZ tree.
	16:25	Test string to 483 BAR - leak:
	16:40	Test against top of lubvalve 450 BAR. OK.
	17:00	test OK. Open lubvalve. Tubing pressure 1700 PSI indi-
		cating communication to annulus.
	19:16	Reverse out string content.
	21:25	Flowhead off string.
	22:00	Pumping slug.

_ SEQUENCE OF EVENTS _(Continuation)

DATE	TIME	OPERATION
	22:45	Lubvalve off string
	23:40	EZ tree off string.
06.10.84	17:35	EZ tree on string.
	17:44	Function test - RIH.
	18:55	Lubvalve on string.
	20:58	Flowhead on string.
	21:27	pressure test against kill valve 10 min. OK.
	21:45	Pressure test against failsafe swab and master valve 483
		BAR 10 min. OK.
	22:32	Open master test string against DP-tester valve to 483
		BAR 10 min. OK.
	22:54	With pressure on string. close EZ tree. Bleed off to 50
		BAR above; 10 min. OK.
	23:07	Equalize pressure and open EZ tree. Close lubvalve.
		Bleed off above to 50 BAR.
	23:21	Equalize pressure. Open lubvalve, close master. Bleed
		off above to 50 BAR; 10 min. OK.
	23:35	Open master, close lubvalve. Open swab.
	23:50	Close kill. Test to 483 BAR 10 min. OK
07.10.84	00:05	Rig up schlumberger.
	00:24	Open lubvalve.
	00:26	RIH with correlating tool.
	01:50	1st. attempt to set packer failed.
	03:05	Several attempts to set packer failed.
	03:19	POOH with W.L.
	03:50	Schlumberger out of hole.
	03:35	Close lubvalve, disconnect control lines
	03:57	Close EZ tree. Disconnect hoses at hose reel.
	04:15	Break of flowhead to undo twists on lines.
	04:25	Flowhead on string.

_ SEQUENCE OF EVENTS _(Continuation)

DATE	TIME	OPERATION
06.10.84	04:28	Open EZ tree. Open kill, close master and swab.
	05:30	Several attempts to set packer failed.
	06:10	Flowhead off string.
	07:15	Lubvalve off string.
	07:45	EZ tree off string.
	07:50	Rig up kelly and try to set packer. 3 successful set-
		tings of packer after 15 attempts.
	10:10	EZ tree on string.
	11:30	Lubvalve on string.
	12.25	Flowhead on string.
	12:46	Flush lines. Close kill; test 10 min. OK.
	13:17	Close EZ tree for leak off test. OK.
	13:20	Open EZ tree, close lubvalve. Test OK.
	13:25	Open lubvalve.
	13:30	Close master. Test OK.
	13:52	Packer set.
	14:16	RIH with schlumberger to correlate.
	16:10	Rig down schlumberger.
	16:15	Pressure test heater inlet and fixed side valves on choke
		manifold to 483 BAR 10 min. OK.
	16:30	Pressure test adj. side of manifold to same.
	17:02	Open LPR-N with 100 BAR annulus pressure.
	17:22	Pressure up string to perforate.
	17:25	Bleed off pressure in string to Halliburton unit, open
		choke to tank. 48/64" fixed choke.
	17:37	Close choke manifold, open kill valve.
	17:48	Pressure on string to perforate, 448 BAR.
	17:49	Pressure bled off. Kill valve closed, choke opened.
	17:57	LPR closed.
	18:08	LPR opened.

_ SEQUENCE OF EVENTS _(Continuation)

DATE	TIME	OPERATION
17.10.84	18:10	Open kill valve, close choke.
	18:13	Pressure up to 483 BAR on string. Bleed off.
	18:19	Close kill valve, open choke manifold to tank.
	18:32	Close choke manifold.
	19:00	Rig up wireline to perforate mechanically.
	19:47	Open kill valve, close lubvalve, open swab. Pressure
		test lubricators to 483 BAR.
	20:25	Test OK. Open lubricator valve.
	20:28	RIH with chissel bar to set off guns mechanically.
	21:10	Close kill valve. Open choke manifold to surge tank.
	21:47	Start POOH with wire line. Close choke manifold.
	22:22	Wireline at surface. Close lubricator valve.
	22:45	close swab and failsafe valve.
	22:46	Open lubricator valve.
	22:50	Open kill valve.
	22:51	Open failsafe valve.
08.10.84	00:01	Pressure up string to 483 BAR for trigging perforating
		guns.
	00:05	Bleed off pressure through choke manifold to surge tank.
		Close kill valve.
	00:15	Close choke manifold.
	00:16	Open kill valve.
	00:17	Pressure up string to perforate. 483 BAR.
	00:29	Close kill valve.
	00:30	Open choke manifold at 48/64" fixed choke flow to surge
		tank.
	00:49	Close well in at choke manifold and LPR valve.
	01:50	Rig up wireline equipment to run gauges.
	02:06	Close lubricator valve.
	03:15	Gauges on wireline string.

_ SEQUENCE OF EVENTS _(Continuation)

DATE	TIME	OPERATION
08.10.84	03:20	Gauges in lubricator.
	03:25	Open kill valve. Flush lines.
	03:26	Pressure test lubricator to 483 BAR.
	03:40	Test OK
	03:42	Open lubricator valve.
	03:43	Start RIH with gauges.
		No. PHP 19. 1min sampling for 68 hrs. and
		No. PHP 59. 30sec sampling for 34 hrs.
	04:44	Open LPR by pressure up string to 100 BAR.
	04:45	RIH to set gauges.
	04:49	Close kill valve.
	04:50	Wireline at depth.
	05:32	Start POOH with wireline.
	05:58	Close lubricator valve.
	06:08	Open kill valve, close swab valve.
	06:10	Open lubricator valve.
	06:15	Open well on 48/64" fixed choke at choke manifold.
	06.23	Close choke manifold, open bubble hose. Flow to buckets
		á 15 liters.
	10:13	Close bubble hose. Flowed 45 liters.
	10:20	Open kill valve.
	10.22	Start injecting 1,5 m^3 water into the formation.
	10:37	Stop injecting. Close kill valve.
	10:40	Open well through 48/64" fixed choke.
	10:42	Close choke manifold. Open bubble hose.
	10:44	Open choke manifold on 48/64" fixed choke. Flowed two
		buckets á 15 liters = 30 liters.
	10:46	Close choke manifold, open bubble hose.
	10:55	Close bubble hose, 45 liters produced. Open choke mani-
		fold to surge tank.

SEQUENCE OF EVENTS (Continuation)

DATE	TIME	OPERATION
08.10.84	11:03	Close choke manifold, open bubble hose.
	11:09	Open choke manifold to surge tank, close bubble hose, 30
		liters produced.
	12:01	Close choke manifold, open bubble hose, flow well into
		buckets for rate measurement.
	12:21	Close failsafe wing valve. Produced 55 liters into
		buckets.
		END OF TEST
	12:30	Open APR-M. start reverse circulation.
	14:10	Unseat packer.
	14:25	Flowhead off string.
	15:15	Lubvalve off string.
	17:00	EZ tree off string.
	19:00	Start pressure testing EZ tree, lubvalve, flowhead and
		choke manifold.
		PREPARE FOR NEXT ZONE.

No.: DOP 109

FLOPETROL JOHNSTON
Schlumberger

Base : N.W.B.

Client : STATOIL
Field : GULLFAKS SØR
Well : 34/10-21

- WELL TESTING DATA SHEET -

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DATE - TIME		PRESSURE AND TEMPERATURE MEASUREMENTS							PROD. RATES AND FLUID PROPERTIES					GOR			
		BOTTOM HOLE		WELL HEAD			SEPARATOR		OIL OR CONDENSATE			GAS					
Time	Cumul	Temp.	Pressure	Tg.temp	Tg. press.	Cg. press.	Temp.	Press.	Rate	Gravity	BSW	Rate	Gravity				
HR/MIN	min			°C	BAR								Air = 1				Units
								7.10.84									
17:22	0			Pressure up string to perforate.													
17:25	3			Bleed off press. in string to Halliburton unit.													
17:26	4/0			Open choke manifold to tank.													
17:37	11			No flow indication - close choke. Open kill valve to press. up string.													
17:48	22/0			Pressure up string to 448 BAR													
17:49	1			Pressure bled off, closed kill valve. Opened choke to tank, no flow indication.													
17:57	8/0			Close LPR-N valve.													
18:08	11/0			Open LPR-N valve													
								8.10.84									
00:01	353/0			10	483	Pressure up string to 483 BAR for positive indication of perforating.											
00:05	4			10	1	Bleed off pressure. 0.795 m^3 were injected between 00.19 and 00.23.											
00:30	29/0					Open choke mannifold to tank.											
00:49	19/0			10	1	Close choke manifold.											
03:43						Start RIH with gauges.											

LIQUID FLOW RATE MEASURING CONDITIONS : Atmospheric

TESTED INTERVAL : STATFJORD SAND
DEPTH REFERENCE : RKB
DEPTH OF B.H. MEASUREMENTS :

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FLOPETROL JOHNSTON Schlumberger

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8.10.84		BOTTOM HOLE		WELL HEAD			SEPARATOR		OIL OR CONDENSATE			GAS					
Time	Cumul	Temp.	Pressure	Tg. temp.	Tg. press.	Cg. press.	Temp.	Press.	Rate	Gravity	BSW	Rate	Gravity				
HR/MIN	min			°C	BAR								Air=1				Units
03:43								8.10.84									
04:44				10	106	Open LPR.											
04:50				10	106	Wireline at depth.											
04:55					109												
05:00					111												
05:05					113												
05:10					115												
05:15					116												
05:20					118												
05:25					119												
05:30				10	120.5												
05:32					120.5	Unlatch gauges in hanger. Pull out of hole.											
05:35					120.5												
05:40					118												
05:45					115												
05:50					111												
05:55					108												
05:58				10	108	Close lubricator valve. Rig down wireline.											

TRIO TYPOGRAFER OG TRYKKERE A/S

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DATE – TIME		PRESSURE AND TEMPERATURE MEASUREMENTS							PROD. RATES AND FLUID PROPERTIES					GOR			
8.10.84		BOTTOM HOLE		WELL HEAD			SEPARATOR		OIL OR CONDENSATE			GAS					
Time HR/MIN	Cumul min	Temp.	Pressure	Tg. temp. °C	Tg. press. BAR	Cg. press.	Temp.	Press.	Rate	Gravity	BSW	Rate	Gravity Air=1				Units
05:58								8.10.84									
06:10				10	111	Open lubricator valve.											
06:15	0			10	111	Open well on 48/64" fixed choke:											
06:16	1				1												
06:17	2				1												
06.18	3				1												
06:19	4				1												
06:20	5			10	1												
06:23	8				1	Close choke manifold. Flow well through bubble hose.											
06:23					1												
06:25	10				1												
10.13	230/0				1	Close bubble hose. 45 liters flowed.											
10.22	9/0			10	180	Start injecting 10 bbl water into formation.											
10.23	1				400												
10.24	2				425												
10.25	3				425												
10.26	4				425												
10.27	5/0				365	Stop injecting.											

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DATE – TIME		PRESSURE AND TEMPERATURE MEASUREMENTS							PROD. RATES AND FLUID PROPERTIES					GOR			
8.10.84		BOTTOM HOLE		WELL HEAD			SEPARATOR		OIL OR CONDENSATE			GAS					
Time	Cumul	Temp.	Pressure	Tg. temp.	Tg. press.	Cg. press.	Temp.	Press.	Rate	Gravity	BSW	Rate	Gravity				
HR/MIN	min			°C	BAR								Air=1				Units
10:27								8.10.84									
10.28	1			10	365												
10:29	2				363												
10:30	3				363												
10:31	4/0				270	160 l water bleed off to Halliburton unit.											
10:32	1				305												
10:33	2				320												
10:34	3				325												
10:35	4				335												
10:36	5				336												
10:37	6			10	340	Close kill valve.											
10:38	7				345												
10:39	8				346												
10:40	9/0				347	Open choke manifold on 48/64" fixed choke.											
10:41	1				1												
10:42	2				20	Close choke manifold. Open bubble hose to flow into buckets á 15 liters.											
10:42	3			10	20												
10:44					30	Flowed 30 liters into buckets.											

TRIO TYPOGRAFER OG TRYKKERE A/S

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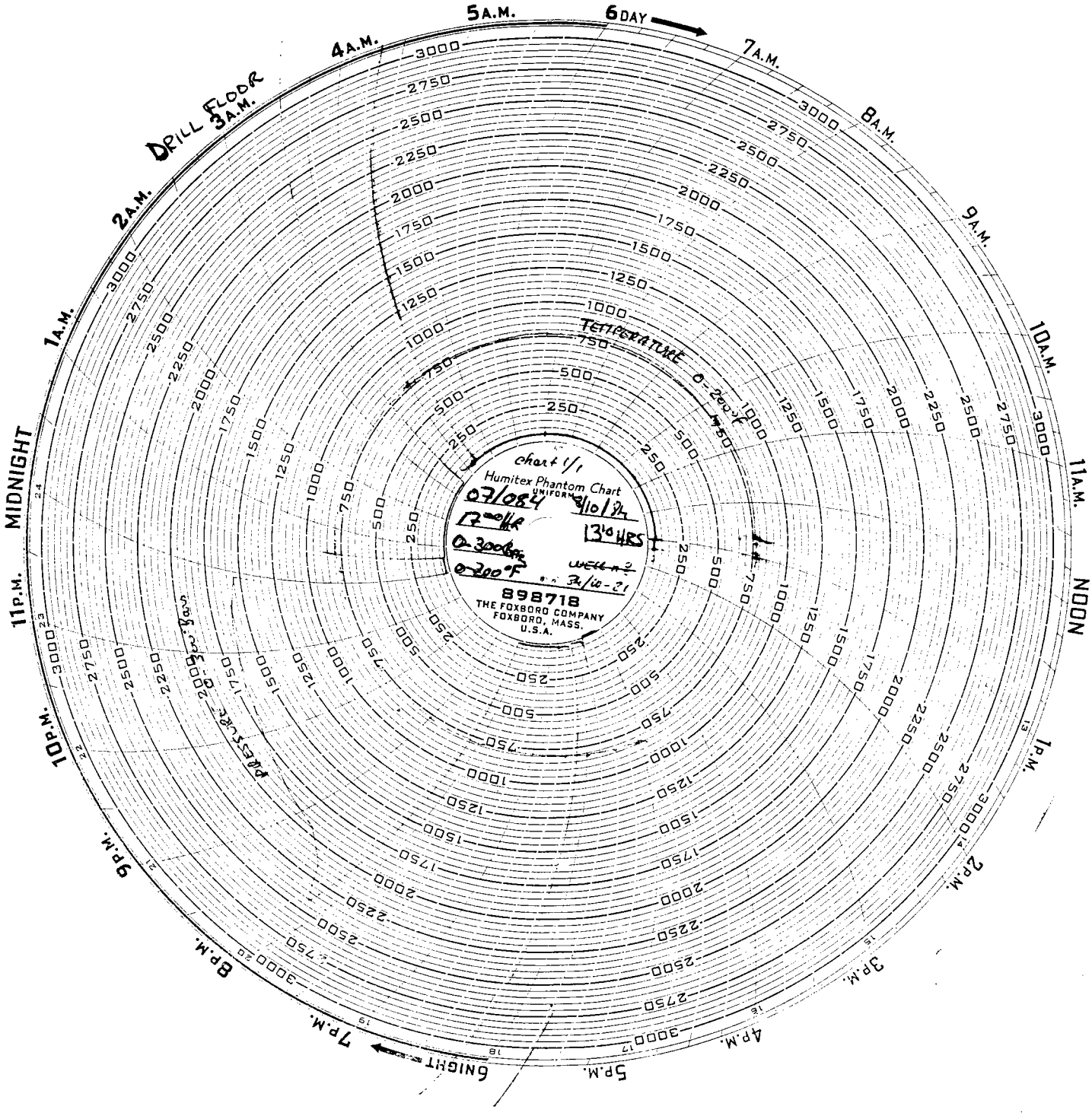
DATE – TIME		PRESSURE AND TEMPERATURE MEASUREMENTS							PROD. RATES AND FLUID PROPERTIES					GOR			
8.10.84		BOTTOM HOLE		WELL HEAD			SEPARATOR		OIL OR CONDENSATE			GAS					
Time	Cumul	Temp.	Pressure	Tg. temp.	Tg. press.	Cg. press.	Temp.	Press.	Rate	Gravity	BSW	Rate	Gravity				
HR/MIN	min			°C	BAR								Air=1				Units
10:44								8.10.84									
10:44	4				30	Open choke manifold to tank.											
10:45	5			10	1												
10:46	6					Close choke manifold, open bubble hose.											
10:46				10	1												
10:55	15			10	1	Production 45 liters to buckets.											
10:55				10	1	Switch flow from bubble hose to surge tank.											
11:03	23					Close choke manifold, open bubble hose.											
11:03				10	1												
11:06	26				5												
11:07	27				7												
11:08	28				9												
11:09	29			10	9	Produced 30 liters into buckets.											
11:09				10	9	Open choke manifold to surge tank, close bubble hose.											
12:01	81			10	1	Close choke manfold, open bubble hose. 924 liters produced to tank											
12:21	101/0			10	2	Close failsafe valve. 5 liters produced into buckets.											
					Total	production after injection is estimated to 1.084 m^3 + .160 m^3 bled back to Halliburton unit.											
					Total	production 1.485 m^3.											

TRIO TYPOGRAFER OG TRYKKERE A/S


5A.M.
6 DAY
7A.M.
8A.M.
9A.M.
10A.M.
11A.M.
NOON
1P.M.
2P.M.
3P.M.
4P.M.
5P.M.
6NIGHT
7P.M.
8P.M.
9P.M.
10P.M.
11P.M.
MIDNIGHT
1A.M.
2A.M.
3A.M.
4A.M.
DRILL FLOOR
3000
2750
2500
2250
2000
1750
1500
1250
1000
750
500
250
TEMPERATURE 0-200°F
PRESSURE 0-3000 psig
chart 1/1
Humitex Phantom Chart
UNIFORM
07/084
4/10/84
12 HR
13 1/2 HRS
0-3000psig
0-200°F
WELL # 2
3/12-21
898718
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U.S.A.