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i h. t. Beskyttelsesinstruksen,
jfr. offentlighedslovens

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WELL 34/10-3

TEST PROGRAM

WELL 34/10-3. TEST PROGRAM.

The well 34/10-3 test program is based on the procedure given in Statoil Well Testing Manual.

Chapter 7, describing the test string running procedure, test intervals, well flowing program, and sampling program has been changed in accordance with the specific well tests and are valid for this well only.

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Attachments:

- Well 34/10-3 Upper Part of the Well Test String Assembly.
- Statoil Well 34/10-3 Halliburton Test String.

Section 7.1. Test Preparations and perforating.

1. The test preparations outlined in Chapter 6 p. in the Well Testing Manual are to be followed (drills etc.)
2. Prior to the running of the test assembly, the following tools/equipment are to be pressure - and function tested.
 - Data Header w/Sand Detector + Sampling Goosneck
 - OTIS Floor Choke Manifold and Halliburton Choke Manifold
 - OTIS Control Head
 - OTIS Lubricator Valve
 - OTIS Sub Sea Test Tree
 - HALLIBURTON Connection immediately above RTTS-packer against APR-valve.

NOTE: Above test pressure: 400 bar (5800 psi)

- OTIS Burners. Function test with diesel and water.
3. Plug well back. Increase mud weight to 1.70 g/cm^3 , Circulate and condition to low yield and filtrate losses. Use 150 mesh screen on the mud cleaner. Test casing/liner to 240 bar (3500 psi) before pulling out.
 4. If any lower zones have been drill stem tested, plug back. Run in, tag top of cement, and polish off cement as necessary. Condition mud and pressure test casing 240 bar (3500 psi) before pulling out.
 5. Run wireline gauge ring.
 6. Check weather conditions and forecasts. If good conditions are expected to continue, proceed with casing gun perforating. Turn off all radio transmitters after notifying the Operations Superintendant and other vessels in the area.

7. Rig up Schlumberger. Install the gun with CClocator.
 - a) Gun type: 4" casing gun HJ II, 4 spf.
 - b) Perforating interval: See section 7.3. Perforations are to be correlated to the GR/CCL run earlier.

8. Pull perforating gun. Lay down and check gun before turning on radio transmitters. Nipple down Schlumberger.

Section 7.2. Test String assembly and running procedure.

1. Make up the OTIS SSTT with fluted hanger and one joint of 3½" TDS tubing. Set back same.
2. Make up OTIS surface control head with one joint of 3½" TDS tubing. Lay down or set back same.
3. Make up the test assembly as per attached drawing. Run (10 ft 2 7/8" EUE Sand Screen, if necessary 254 microns below) Halliburton RTTS packer, OTIS XN-nipple (1.79" ID) and 2 joints 2 7/8" EUE tubing blanked off at bottom.
4. Hang 1 X 550 bar (8000 psi) Amerada pressure recorder, one Sperry Sun pressure recorder both w/72 hrs. clock and Amerada temperature recorder w/120 hrs clock, in the coupling between the two 2 7/8" EUE, 30 ft, tubing joints.
5. Precharge the nitrogen chamber in the Halliburton annulus pressure operated test valve to open approximately 70 bar annulus pressure. The valve is kept in open position by applying 100-120 bar (1500-1700 psi) on the annulus. The dump valve (causing the tool to close permanently) should be blanked off.
6. The annulus pressure operated reverse circulating valves should be set to shear and open at approximately 185 bar (2700 psi) annular pressure.
7. RIH with test assembly, having the upper RTTS reverse circulating valve in closed position and fill test string with mud.
8. When test assembly including 1 joint 3½" IF drill pipe is in the hole, pressure test against the APR-valve with 275 bar (4000 psi).

9. RIH, picking up 3½" IF drillpipe. Make up connections to 10000 ft-lbs. Fill string with water as RIH.
10. Space out the test string to locate the RTTS-packer desired distance above the perforations (30 m). Test the string (5000 psi) against APR-valve. Pick up the Sub Sea Test Tree with slick joint and fluted hanger, function test same.

NOTE: Make up the SSTT with one joint of ^{3½" DR} ~~tubing~~ prior to running in with test string. Do not set the SSTT down into the slips when making up above connection.

11. Pick up 3½" ^{DR} ~~TDS tubing~~. (Change elevator). ~~Make up TDS connections to 3000 ft lbs.~~

NOTE:

- Use API Modified RP 5A2 thread compound for connections.
- Spin the tubing carefully (slowly) to avoid crossthreading.
- Connection requiring higher torque values than the tubing (3000 ft-lbs) are to be made up with the backup tongue on the crossover, not on the tubing, in order to avoid overtorquing the tubing.

12. Run OTis lubricator valve two joints below Control head. Function test and secure hoses.

NOTE: Be careful not to damage the control lines when setting down into the slips.

13. Space out so that the control head is plus/minus 4 m above rotary and land the fluted hanger in the wear bushing.

14. Pull up the string, turn to the right to give 1/2 revolution at the packer and land the fluted hanger in the wear bushing, as the string is lowered, the packer starts taking weight (10000 kg). The lower two slip joints shall be in closed position and the upper two in middle position.
 15. Connect chocks to OTIS control head from the floor test manifold and from the cementing line/Ross Rig choke manifold.
 16. Close all valves on the OTIS control head and test chocks from the cementing unit to 275 bar (4000 psi).
 17. Open kill wing valve and pressure test the entire string down to the APR-valve to 275 bar (4000 psi).
 18. Refer to point 9.
 19. Pressure up to 415 bar (6000 psi) and test chocks from the cementing line and test string against the APR - ball valve. Bleed off pressure.
to 5000 psi
- NOTE:
- The SSTT and the lubricator valve cannot be tested from above - will cause valves to be pumped open.
 - 6000 psi surface test pressure is equal to approximate 4000 psi differential pressure across the APR - ball valve.
20. Close the lower master valve and open fail safe wing valve and pressure test the chocks down to the floor choke manifold to 415 bar (6000 psi).

21. Open the floor choke manifold and test line down to separator inlet and bypass valves to max. 2000 psi. Bleed off pressure and close floor choke manifold.
22. Secure OTIS surface control head and latch the tensioning device onto the string as per attached sketch. Rig up OTIS Stuffing box and wireline BOP above the 5" handling sub.
23. Open lower master valve, close wing valve on kill side (cementing unit), and open fail safe valve on production side, and close OTIS floor choke. Close middle pipe ram.
24. Pressure up the annulus slowly to predetermined opening working pressure of the APR valve using one mud pump. The annulus pressure is to be monitored from this step and till well has been killed. Due to the heating of the test string, the annulus pressure may have to be bled off.

NOTE: Excessive annulus pressure will cause the APR reverse circulating valve to shear open. Be aware of that an increase in annulus pressure also can be caused by a leak in the test string.

25. When the Halliburton APR-N valve opens, the surface pressure should increase to approximate 130 bar (\pm 1850 psi) indicating that the valve and perforations are open.
26. Close OTIS lubricator valve and bleed off pressure to 35 bar (500 psi). If the lubricator valve is tight, the pressure should stabilize at approx. 35 bar. Bleed off surface pressure and close OTIS choke manifold.
27. Insert 2 Sperry Sun pressure recorders and one Amerada pressure recorder, 48 hr, connected to OTIS XN-nipple running tool and wire line.

28. Open kill side wing valve to the cementing unit and pressure the lubricator to a pressure 10 bar (150 psi) below the pressure recorded before the lubricator was closed. Close kill side wing valve.
29. Open the OTIS lubricator valve, the pressure should increase 10 bar, run the pressure recorders, and land same in OTIS XN-nipple below the RTTS packer.
30. Pull out OTIS wire line and running tool. Close lubricator valve.
31. Open OTIS floor choke and bleed pressure back to approx. 35 bar (500 psi) and check that lubricator valve is holding pressure from below. Bleed off lubricator pressure.
32. Pull out OTIS wire line, close upper master valve. Open the kill side wing valve and repressure the lubricator to a pressure below the wellhead pressure recorded before the lubricator was closed.
33. Open the OTIS lubricator valve. The pressure should jump to static wellhead pressure indicating the lubricator valve has opened. Close kill side wing valve to the cementing unit.
34. Flow the well in accordance with the instructions given in section 7.3 for this well and in accordance with the following restrictions/recommendations.
 - The well is normally to be closed in at bottom hole (bleeding of annulus pressure) and also at the OTIS floor choke as soon as closure is indicated. Trapped surface pressure will minimize the differential over the downhole valve when this is to be reopened.
 - The downhole APR-N valve is only to operated when absolute necessary in order to minimize the chances for failure.

254_m - 127_m ¹⁰⁾ 381 microns ~~431 microns~~

- The sand screen (254 microns) on the tailpipe is mainly used for protective purposes. Should there be operational problems, such as screen plugging up etc., contact drilling department immediately.
- If well produces sand, allowance to shut in well at bottom hole or at surface must be requested from Statoil Base, due to the possibility that settled out may cause plugging of the test string.

1
254
127
381

1
254
127
431

Section 7.3. Testing program 34/10-3.

Based on logs and available coredata in the zones of interest the following test intervals and- procedures are proposed:

Perforating: 4 in. casing gun, 4 sh/ft.

Test string: 3½ in DP with APR and RTTS tools.

Recorders: 1 temerature and 2 pressure recorders on string. 2 (3) pressure recorders on wireline to be hung in OTIS XN-nipple.

Shut in: All shut-in operations will be bottomhole. (If snad is believed to be present in test string, bottomhole shut-in will be avoided).

Cushion: Full string with drillwater.

Procedures.

DST no. 1: 1990-1995 m ISF/SONIC

Objectives: Obtain watersamples.
Reservoir pressure and temperature.
Estimates of productivity and sandstrength.

Procedures:

1. Initial flow: 2-5 bbls recovered or 5 mins flow.
2. Initial shut in: 1 hr.
3. Second flow: Flow to surface, clean up and flow at a stabilized rate until clean formation fluid is produced. Surface sampling. Increase rate in steps until sand is produced at surface.

- 4: If sand is produced, decrease flow rate in order to obtain sand-free production prior to bullheading.
- 4a: Build-up. If sand is not produced at maximum rate perform a bottom hole shut in.
- 5: End test.

DST no. 2: 1935-1940 m ISF/SONIC.

Objectives: Obtain fluid samples.
Reservoir pressure and temperature.
Estimation of productivity and sandstrength.

- Procedures:
1. Initial flow: As for DST no. 1.
 2. Initial shut in: As for DST no. 1.
 3. Second flow: Flow to surface, clean up and stabilize flow for surface sampling.
 - 4: Bottom hole sampling.
 - 5: Third flow: Increase rate in steps until sand is produced at surface.
 - 6: Optional bottomhole shut in with build-up: If sand is not produced at maximum rate perform a bottom hole shut in.
 - 7: Fourth flow: If sand is produced to surface during third flow reduce the rate until sand free production is obtained.
 - 8: Build-up. Bottom hole shut in.

9: Optional bottomhole sampling:
If samples taken earlier is thought not to be representative another run of bottomhole samples will be made.

10: End test.

DST no. 3: 1895-1990 m IFS/SONIC.

Objectives: Estimated of productivity and sand-strength. Obtain fluid samples. Reservoir pressure and temperature.

Procedures: As for DST no. 2.

Sand production: Possible sand production to surface will be monitored carefully during all tests.

Section 7.4.

Sampling:

- Separator oil and gas samples (2 sets) will be taken at each flow period.
- Stabilized oil and water production will be samples.
- Unless it violates the safety of the operations, two bottomhole samples (run in tandem) will be run if hydrocarbons in reasonable amount is produced.
- Draeger Multiges Detector tests for CO_2 and H_2S will be made during each flow period.

Section 7.5 Killing Well and Plugging Zone.

1. Empty separator contents to burners and flush lines from floor manifold to separator.
2. Pressure kill line to wellhead pressure. Open wing valve on kill side. Open bottom hole APR-N valve by applying annular pressure if this has been closed.
3. Bull head down water through the test string at minimum 500 litres/min. Overdisplace perforations by approx. 1500 litres. Static surface pressure approx. 125 bar (1800 psi).
4. In order to check the data points from the pressure gauges hung in the OTIS XN-nipple, retrieve the sampler and pressure gauges using the procedure outlined in section 7.2 step 26 to 32. Open lubricator valve after step 32.
5. Read sufficient data points on the pressure charts to confirm that good pressure data were obtained. If both pressure gauges failed, test will be repeated. If the pressure data are acceptable, proceed to kill the well.
6. Bull head down the test string and casing below the packer to the bottom perforation using 1.70 sp.gr. mud. Overdisplace perforations by 1500 litres. Kill mud should provide 20 bar overbalance at the perforation. Pressure up annulus to approximate 190 bar (2700 psi) to open the annulus pressure operated reverse circulating valve. The opening of the reverse circulating valve is accompanied by a drop in annulus pressure. Reverse circulating well till only fresh mud returns.
7. Open ^{Lower}(middle) pipe ram, latch elevator around the handling sub and pick up to release packer. Pull out test string slowly to avoid swabbing and check for flow. Well should take calculated mud volume when POOH.

8. RIH with drill pipe. Try to tag top of any produced sand. Circulate out produced sand if present (see section 7.4 sampling) and tag top of cement plug below the perforations. Record data.
9. Rig up Schlumberger and run gauge ring and squeeze packer on wireline. Set the packer approximately 5 m above top perforation.
10. Pick up stinger, drill pipe and cementing head. RIH and sting into packer. Break down formation and establish a sufficient pump in rate. Mix and bull head class G neat cement. Spot cement on top of packer.
11. Pull out to clear the cement plug. Proceed to next operation.

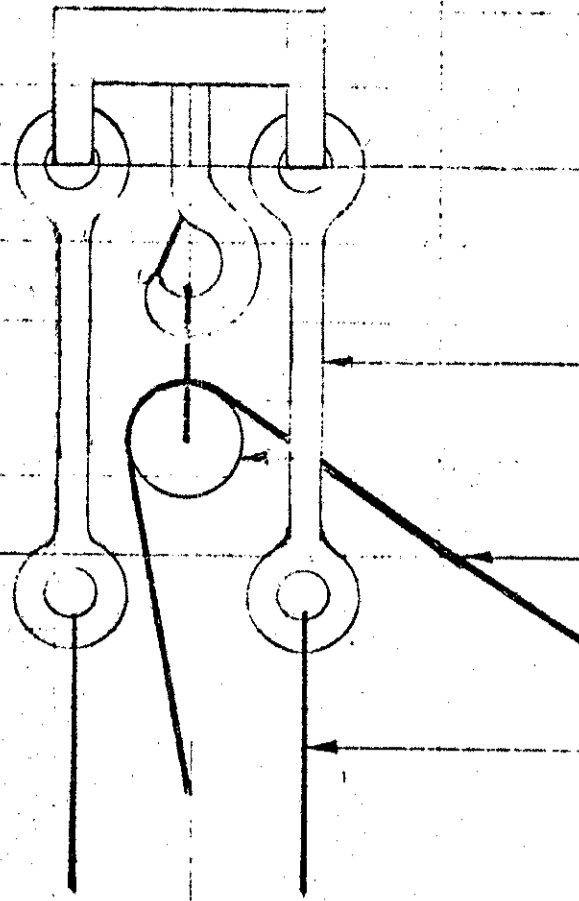
STATOIL WELL NO. 34/10-3

HALLIBURTON TEST STRING

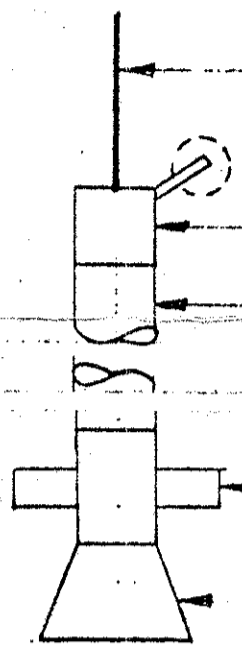


	TD	OD	Length
Drill Pipe	2.76	3.50	
Slip Joint	2.25	5.00	218" Open 60" Stroke
Slip Joint	2.25	5.00	218" Open 60" Stroke
Crossover 3" TE Box - 2 7/8 EUE Pin			
BPMs Circulating Valve	2.44	4.87	32.89
Crossover 2 7/8 EUE Box - 3 1/2 TE Pin			
Slip Joint	2.25	5.00	218" Open 60" Stroke
Slip Joint	2.25	5.00	218" Open 60" Stroke
Crossover-3" TE Box-Drill Collar Connections			
Drill Collar -			
BPMs Reversing Valve	2.25	5.00	36.00
BPMs Master Valve	2.25	5.00	153.30
Big John Jars	2.37	4.63	60.00"
BPMs Circulating Valve	2.44	4.87	32.16"
BPMs Safety Joint	2.44	5.00	38.56"
BPMs Pecker	2.185	5.75	52.28"
Crossover 2 3/8 EUE Box- 2 3/8 EUE Pin			
Perforated Drill Pipe 2 7/8 EUE Tubing		2.875	
Crossover			
4 1/2" XE Nipple	1.81		
Crossover			
2 Joints 2 7/8 EUE Tubing		2.875	
Bull Plug			

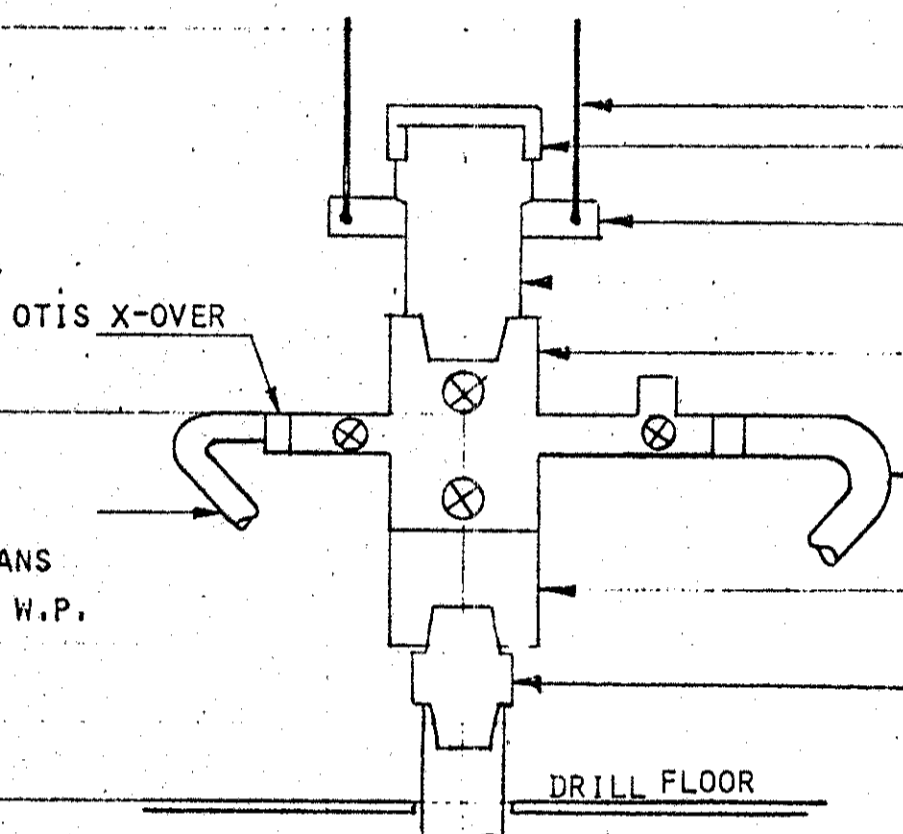
WELL 54/10-3 UPPER PART OF THE WELL TEST STRING ASSEMBLY.



- NORSKALD ELEVATOR LINKS
- OTIS "HAY PULLI"
- OTIS WIRE LINE
- NORSKALD WIRE SLINGS



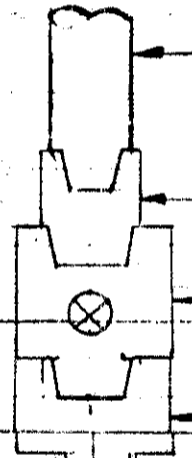
- OTIS WIRE LINE
- OTIS STUFFING BOX
- OTIS LUBRICATOR (OPTIONAL)
- OTIS WIRELINE BOP
- OTIS X-OVER 3 1/2" x 6 1/2" Q.U.



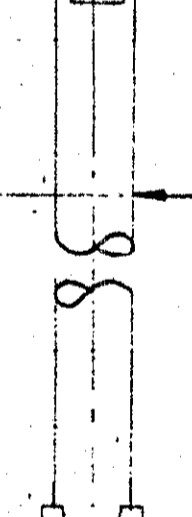
- NORSKALD WIRE SLINGS/ELEVATOR LINKS
- OTIS BLANK OFF, 6 1/2" QUICK UNION
- NORSKALD, 5" DE ELEVATOR
- OTIS HANDLING SUB, 5", 5 FT LONG
- OTIS CONTROL HEAD, 4 3/8" ACME BOX X BOX
- HALLIBURTON 2" CHICKSANS 10000 PSI WORKING PRES.
- OTIS LT 20 SWIVEL
- STATOIL X-OVER, 4 3/8", 6 STUB HALL. ACME PIN X 3 1/2" TDS PIN

KILL LINE
2" CHICKSANS
10000 PSI W.P.

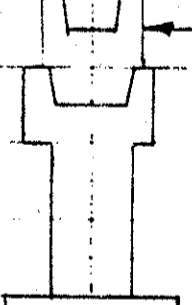
DRILL FLOOR



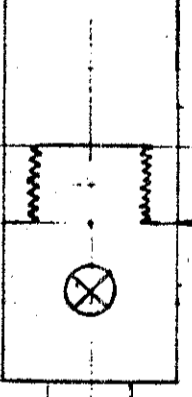
- STATOIL TUBING, 3 1/2", 12.70 LB/FT, N 80MOD. MANNESMANN TDS, 2 JOINTS
- STATOIL X-OVER, 3 1/2" TDS BOX X 4 1/2" OTIS ACME PIN
- OTIS LUBRICATOR VALVE, 4 1/2" OTIS ACME BOX X PIN
- STATOIL X-OVER, 1 1/2" OTIS ACME BOX X 3 1/2" TDS PIN



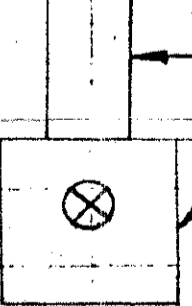
STATOIL 3 1/2" TDS TUBING



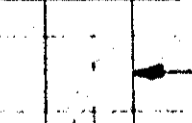
STATOIL X-OVER, 3 1/2" TDS BOX X 4 1/2" ACME PIN



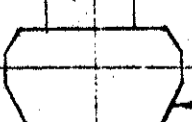
OTIS SUB SEA TEST THREE



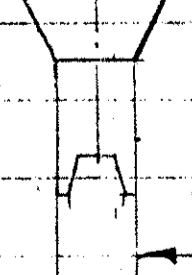
3 1/2" OD RAM LOCK, 18" LONG FOR LPR



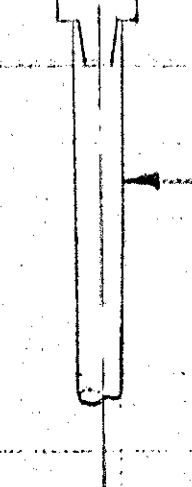
OTIS SLICK JOINT



OTIS FLUTED HANGER



OTIS X-OVER 4 1/2" OTIS ACME PIN X 3 1/2" IF PIN



STATOIL 3 1/2" OD, 13.3 LB/FT, 3 1/2" IF DRILL PIPE