TEST PROGRAM

WELL 31/3-2

OIL TEST

TREASURE SEEKER

Operation Manager
Inge G. Myhre

Chief Drilling Engineer
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FIGURES

1. GENERAL

1.1 GENERAL DESCRIPITION

After completing drilling to TD and final logging of the 12 1/4" hole section a balanced cementplug will be set before setting 9 5/8" casing.

There will be performed one production test in the oil zone.

Test interval: 1577 m - 1567 m.

Testing objectives:

- Evaluate possible level of gas-oil contact.
- Evaluate the consequenses of possible waterproduction/coning.
- Evaluate reservoir properties and possible boundary effects.
- Fluid sampling.
- Gain experience with gravelpack completions.

1.2 SUMMARY OF TEST

1.2.1 Pretest preparations

Prepare the assemblies to be used in the test (2.1) and clean the casing as discribed in section 2.2

1.2.2 Production test no. 1

Pre gravelpack test

RIH with the perforating string (2.3, 2.4) and perforate the well underbalanced.

Flow well as discribed in 2.7 and 3.2.5.

Kill the well as discribed in section 2.10.

Post gravelpack test

RIH with the gravel pack string, inject acid and gravel pack as described in section 2.5.

RIH with the production string (2.6). Perform an acid job.

Flow well according section 2.7 and 3.2.8 and take 2 sets of 3 bottomhole samples (section 2.8, 2.9 and 3.2.9).

Kill the well as specified in section 2.10.

Isolate the testinterval as outlined in the plug and abandonment program.

1.3 SERVICE COMPANIES INVOLVED

Baker:	Surface test equipment, wireline and downhole gravel pack tools.
Dowell:	Downhole tools, surface gravel pack equipment, chemicals and brine.
Flopetrol:	Gauges, lubricator valve.
Sperry Sun:	Surface pressure monitoring (MR 6).
Schlumberger:	Logging, sand bailer.
Geo Vann:	Perforating gun, tools in production string.
Salvesen CC:	Tubing tongs and torque and turn system.
Oil Plus:	Fluid cleanliness measurements.
Wilh. Wilhelmsen:	Contractor

1.4 WEATHER LIMITATIONS

1.4.1 The test (flow period) is not to be initiated if a storm force 10 (48 - 55 knots) is forcasted within 2 days from planned start of test.

1.4.2 If the weather deteriorates during testing to force 9-10 or worse, the well is to be shut in at the tester valve. Choke in on surface simultaniously as closing the tester valve.

1.4.3 If the weather exceeds force 10, kill the well as described in 2.7.

1.4.4 Summary of weather limit criteria:

Operation condition	Max beaufort	(Knots)	Max heave m	Max anchor tension, kips
Perforating (positioning)			1.0	300
RIH w/gravel pack assembly and circulating the gravel in place	8	(34-40)	1.0	300
Initiate test/ flow well	8	(34-40)	1.5	300
Shut in down hole	9	(41-47)	2.0	300
Kill the well	10	(48-55)	2.5	350
Pull test string	8	(34-40)	1.5	300

Note: - Max heave is the most important parameter particularly when RIH w/the gravel pack assembly and circulating the gravel in place.
- These figures are guidelines only.

1.5 GENERAL NOTES

1.5.1 Test tubing data

	3 1/2" PH-6 12.95 lbs/ft P-105	5" TAC-1 18 lbs/ft L-80
Min torque ft. lb	-	-
Opt. torque "	7.000	5.800
Max torque "	8.750	7.250
Internal diam. (in)	2.750	4.267
Drift diam. (in)	2.625	4.151
Capacity (bbl/m)	0.0241	0.0583
Closed end displ. (bbl/m)	0.0391	0.0797
Open end displ. (bbl/m)	0.0150	0.0214

Annulus capasity between 9 5/8" 47 ppf casing and 5" TAC-1 tubing is 0.1605 bbl/m.

Annulus capasity between 9 5/8" 47 ppf casing and 3 1/2" PH-6 tubing is 0.2012 bbl/m.

1.5.2 Test tubing handling

Only API modified thread lubricant may be used on the tubing connections. The lubricant is to be applied to the pin ends only and put on with a small paint brush to minimize excessive dope inside made up couplings.

Notes:

- Always use stabbing guide for stabbing tubing.
- Secure lubricant brush to avoid loosing same into well or the tubing.

1.5.3 It is imperative to get a very clean system before introducing brine in the hole, and gravelpacking the well. Therefore mud pits, surface line etc. must be proper cleaned else the formation might be damaged or one might get a poor gavelpack job.

1.5.4 A pretest meeting is to be held with all involved companies. The job is to be discussed in detail to ensure everybody understand their tasks and responsibilities. The meeting is to be convened by the NH supervisor and the NH test engineer.

1.5.5 A Safety meeting with the whole crew is to be held prior to the test. Refer to appendix 4 for details.

A "Fire Alarm" and an "Abandon Ship Manouvre" is to be carried out in conjunction with the safety meeting.

2. WORK PROCEDURES

2.1 PRETEST PREPARATIONS

2.1.1 After having drilled the well to TD, the following operations will be performed prior to starting picking up the test tubing:

- Final logging of the open hole section.
- Setting balanced cementplug.
- Running and cementing the 9 5/8" Csg.
- Running the CBL/VDL log

Notes:

- A radioactive source will be run in the casing for later depth correlations.

- Note the exact depth of this when doing the final logging.

2.1.2 Ensure that all items in Appendix 8 (checklists) are available onboard.

2.1.3 Ensure that the items as given in Appendix 2 are pressure tested on deck at earliest convenience before commencing running the test string to the test pressures as specified.

2.1.4 All connections on the 6 1/2" drill collars to be used in the test string are to be cleaned and inspected prior to being run in the test string.

2.1.5 When off loading and racking tubing, separate each layer with minimum three evenly spaced wooden strips.

2.1.6 Number and measure each joint starting with the total number of joints onboard the boat pluss 10 (according to the checklist). Make an accurate tubing tally.

2.1.7 Brush each joint to remove scale and loose solids. If any joint has excessive scale it is to be rejected. All tubing has been waterblasted onshore prior to shipping.

2.1.8 Remove pin and box protectors and inspect threads for damage.

2.1.9 Drift each joint with a tubing drift.

2.1.10 Clean threads with solvent and steam all threads and protectors. Protectors should be slightly doped before putting on the joints.

2.1.11 Make sure that a reasonable amount of pup joints are available for proper space out.

2.1.12 Ensure that all down-hole components of the test string are of proper size OD, ID, thread type and that the items are clear of any debris, junk etc. All threads and collars are to be cleaned properly on the rack. Make sure all X-overs are properly bevelled.

Notes:

- A visual inspection should be made to verify the condition of packer rubbers, slips etc.

- Drift all accessories to ensure proper ID (min. 2.00").

2.1.13 Make a running list to ensure proper space out of the test string.

Note:

- Do not set packer across a collar.

- Stick up to be approximately 5 m above rig floor at MSL.

- Ensure enough room for wireline tools to be used between lubricator valve and stuffing box.

2.1.14 Make up and set the 5" TAC-1 and PH-6 tubing back in derrick. Clean the hole and displace the hole to brine. Refer section 2.2 for details.

2.1.15 Only API modified thread lubricant may be used on the down hole tool connections. The lubricant is to be applied to the pin ends only and put on with a paint brush to minimize excessive dope inside made up couplings.

Notes:

- Stabbing guide is always to be used.
- Secure brush to avoid loosing same into the well or the tubing.
- Install clean metal protectors before setting the tubing back in the derrick.
- Any additional single(s) picked up to make up a full stand or any single(s) laid down which is to be used in the test string is to be clearly marked.
- Reserve space in the derrick for the landing string.

2.1.16 Hang off one stand of 6 1/2" DC in the rotary. Pick up the SSTT w/pup joint on top, slick joint and fluted hanger. Make up all connections and paint the slick joint before RIH.

2.1.17 Make a dummy run with the SSTT on the landing string (Pick up and make up the landing string while RIH). With the correct amount of 5" TAC-1 joints to be run below the lubricator valve in the hole, make up a pup joint to the lubricator valve on the cat walk, using chain tong. Pick up the pup joint/lubricator valve and make up to the running string. Pick up additional single(s) to land the SSTT. Stick up to be approximately 5 m at MSL.

2.1.18 Close the Middle pipe ram to check the position of the slick joint relative to the ram. Check out the spacing of the landing string. POOH. Lay down the lubricator valve with one pup joint on top and rack the rest of the landing string in the derrick. Lay down the SSTT.

2.1.19 Place the STT (including the swivel) on the catwalk. Make up one single plus the X-over below to the STT using chain tongs. Pick up the STT and the single below to the rig floor and tighten up all connections. Lay down the STT.

2.1.20 Ensure that all meters, gauges on separator are checked and calibrated before test.

2.2. CASING CLEANING PROCEDURE

2.2.1 Pick up 6 1/2" Drill collars to be used in the test strings and 5" TAC-1 TBG to be run in order to reach bottom (tag bridge plug). RIH open ended.

2.2.2 Circulate the well to clean sea water at maximum rate, using a 50 bbl weighted "spacer 3001" between seawater and old mud at the interface (same weight as mud, to be mixed in the mud room). See appendix 5.

Note:

- Reciprocate the string while pumping.

2.2.3 POOH and Rach TAC-1 tubing in derrick.

2.2.4 RIH with 3 1/2" PH-6 tubing. Circulate seawater at maximum rate.

Note:

- Attach hose on top of tubing and circulate while reciprocating string when RIH.

- BOP-washing tool to be attached to PH-6 tubing.

2.2.5 Two mud pits, desilter suction and discharge and all shaker pits, degasser and the suction pit have to be completely cleaned for the brine system.

2.2.6 The pipes and fluid sluices to the mud pit which are to be used as a settling pit for the returned brines. Not to be forgotten, are all the gratings and equipment above the sluices and the mud pits, as any materials accidently washed or dropped into these fluids will contaminate the system. Also make sure the impellars on the agitators are clean - on both sides.

2.2.7 While the well is being changed over to seawater, ensure that all surface lines leading to and from the well and lines to or from the riser are systematically flushed thoroughly with sea water, to ensure that no mud exists throughout the system. This includes choke and stand pipe manifolds.

Note:

- Any mud left in any of these lines may contaminate the cleaned completion fluid, which might damage the formation and cause a poor gravel pack job. Filtering brine to reduce contaminations is costly and time consuming.

2.2.8 Having displaced the hole to clean sea water and with PH-6 in the hole, pump the following :

1. 40 bbl pill of viscosified sea water with 2 lb/bbl J164 (viscosifier) and 1/2 gal/bbl F40 (surfactant).

2. 20 bbl of viscosified sea water as in (a), but without sand. Circulate these pills around with sea water using the rig pumps, max. rate and dump the returns.

3. Seawater - approximately 1/2 hole volume

4. 40 bbl pill as (1).

5. Seawater.

Note:

- Use Dowell skid pump to introduce the pills into the well.

- Use rig pump when circulating.

2.2.9 Following this abrasive treatment, pump acid as follows:

2000 gal 15% HCl containing 5 gal A200 and 5 gal/1000 gal F40 (this is already included in the acid delivered to the rig).

Dump the acid return into the cleaned pit, and discharge same.

2.2.10 Start circulation with seawater and introduce a 20 bbl viscosified seawater pill after having displaced app. 50 bbl. Pump as fast as possible until the solids level has reached an irreducible minimum, as measured by the coulter counter and N.T.U. meter. Ideally this will be when the solids level into well are the same as those exiting the well.

2.2.11 Circulate out sea water with 20 bbl viscosified sea water, (refer app. 5) ahead of clean filtered $CaCl_2$ brine.

Discard the viscosified seawater. Clean brine is to be returned to the cleaned mud pit. As soon as the pit is full, load the brine tanks on deck with the remaining prefiltered brine.

2.2.12 Circulate clean brine from the pit through the filter unit and the tanks on deck.

Note:

- While filtering the $CaCl_2$ brine, use the 5 micron filters as pre-filters to the 2 micron filters, such that two (2) pods contain 5 micron elements and the other two pods contain 2 micron filters.

2.2.13 Circulate until the NTU readings out are in the range 5 NTU and 50% of the particles is less than 2 micron.

2.2.14 Before POOH spot a hight density (1.30 rd) pill from .... to .... m to prevent $CaCO_3$ pill to sink after the pregravelpack test.

2.3 TUBING CONVEYED PERFORATING SAFETY PROCEDURE

2.3.1 Tubing conveyed perforating guns are transported unloaded from shoe base, primerecord and detonators well separated from the perforation charges and in separate containers.

2.3.2 Primercords, detonators and perforation charges will also be kept well apart and protected from shock or impact when on board the rig.

2.3.3 After loading the guns with perforation charges and primercord the guns are to be stored in such a way that they are well protected from shock or impact (cranes).

2.3.4 The detonators should not be installed till the last convenient time.

2.3.5 Special precautions are to be taken when handling the guns with cranes to avid shock or impact. Allways use guideropes.

2.3.6 NO personnel not directly concerned with running the guns are to be present on the rig floor or in the derrick (could drop something) when assembling/installing the perforating guns. In addition areas below the rig floor should be cleared of personnel and warning signs installed. These regulations can be lifted when the gun is below the sealevel.

2.3.7 Allways use safety clamps when assembling on the rig floor.

2.3.8 When removing protectors, allways remove the top one first (could fall on top of unprotected detonator if done vice-versa).

2.3.9 When pulling the guns out of the hole, the same personnel restrictions apply as when RIH when the guns are above the sealevel. The restrictions can be lifted when the gun has been disarmed or when all shots have been confirmed fired.

2.3.10 No attemt should be made to pull an unfired drop bar actuated gun with gauges, drop bar or any other foreigh element in the test string.

2.4 PERFORATION STRING PROCEDURE

2.4.1 Rig up Schlumberger and set the Baker model "F", Sump packer so that the top of the packer is approx. 4 m below the interval to be perforated.

Note:

- Correlate with the CDL/CNL logs.
- Measure distance from gravelpack screen to stinger to get accurate setting depth.

2.4.2 Make up the bottom hole assembly for the perforating string (see fig. 4).

Notes:

- Fill the string with high viscosity polymer above the tester valve. (To be supervised by Dowell).
- Fill string with diesel.
- Jars should be "un-cocked" while RIH.
- Safety precautions in connection with handling/running the perforating gun are to be observed without exclutions. Ref. section 2.3.
- Use safety clamps while making up assemblies.
- Ensure that the tool joint threads are clean and that specified dope only is used.
- Drift every stand of drill collar with a 2" drift.

2.4.3 Pressure test the bottom hole assembly, including 1 stand of 3 1/2" PH 6 tubing for 10 minutes, against the PCT to 207 bar (3000 psi).

Notes:

- Every 7-8 stands that is RIH, pick up one stand slowly to make sure the HRT does not close.
- Set slips slowly to avoid compressing the perforating charges while RIH.
- Max. running speed 45 seconds per stand.
- A Geo Vann representative will be on the drill floor at all times when RIH.

2.4.4 Continue to RIH with the remaining of 3 1/2" PH-6 tubing. Pressure test the string against the tester valve to 207 bar (3000 psi).

Note:

- Paint the joint of PH-6 tubing that will be in the stack when the Baker indicating collet is in the sump packer and all slip joints are in open position (5-10 Klbs overpull).

2.4.5 X-over to 5" DP, RIH and sting into sump packer (approx. 10 Klbs to enter). Do not set down weight of drill collars on stinger.

2.4.6 Pick up and with 5-10 Klbs overpull, compensate to eliminate string movement.

2.4.7 Close middle pipe rams on painted single.

2.4.8 Open middle pipe rams and POOH to painted single and note mark from MPR.

2.4.9 Space out the string to install the fluted hanger below mark on pipe as follows:

Distance from sump packer to depth of lower perforation minus length of X-over below gun plus travel of 1 1/2 slip joints closed (7.5") plus distance from middle pipe rams to wear bushing. (Hang off point) Refer to figur 5 .

2.4.10 When the guns are correctly spaced out make up the Baker SSTT with slick joint and fluted hanger to the test string. Attach the control lines and function test the latch assembly and pressure test the lines. Relatch tree. Open the ball valves.

Note:

- Check all hydraulic hose connections for leaks.
- Cover the well while working on the SSTT/Lub-valve.

2.4.11 Hang off the string and SSTT on the pup joint. Pressure test the string against the tester valve to 207 bar (3000 psi) for 10 min.

2.4.12 Close the SSTT and bleed down the pressure above to 35 bar (500 psi). Check that SSTT holds the pressure from below. Equalize the pressure and open the ball valves.

Note:

- Secure hoses properly to the tubing and take care when setting down slips to avoid damaging the control lines.

2.4.13 Continue to RIH using the landing string tubing below the lubricator valve.

2.4.14 Pick up the lubricator valve pluss one pup joint on top (pick up the amount of singles to be run above the pup joint) and make it up to the string.

2.4.15 Attach the extra long bailes to the hook and to a 5" manual drill pipe elevator. Pick up the STT plus the single below and place it in the mouse hole and install the wireline equipment including the wireline BOP on top and make up the quick union. Attach the 5" drill pipe elevator to the lifting sub on top of the STT and lift the block so that the bails plus the STT with the single below is hanging free.

Note:

- Attach minimum one chicksan swing to the kill side and the flow side outlet prior to lifting the STT up from the rig floor.

2.4.16 Make up the STT and the single below to the test string. Land the SSTT in the well head. Rig up the surface equipment.

Notes:

- Land the SSTT with the compensator, keeping approximately 20 000 lbs. tension in the landing string.
- Ensure that all chicksan connections are properly cleaned prior to being made up.
- Fill up the string with cushion, keeping the swab and the master valve open.

2.4.17 Close the kill side wing valve on the STT and test the chicksans from the cementing unit to 207 bar (3000 psi) for 10 min.

Note:

- The swab valve and the master valve to be closed and the flowside valve to be open during this test.

2.4.18 Open the kill valve, the master valve and the swab valve and pressure test the entire string down to the tester valve to 207 bar (3000 psi) for 10 min. Close the master valve, bleed the pressure back to 35 bar (500 psi) check that the master valve holds pressure from below. Equalize the pressure and open the valve.

Note:

- The flow side wing valves to be closed during this test.

2.4.19 Close the lubricator valve. Bleed off the pressure above to 35 bar (500 psi). Check that the lubricator holds pressure from below for 10 min. Equalize the pressure and open the lubricator valve. Bleed down the pressure and close the swab valve.

2.4.20 Close the master valve and open the flowside wing valve. Flush all surface lines and equipment (heater, separator, and both burners) with water. Flush through both oil and gas lines on burners.

Note:

- The swab and the master valves to be closed during this test.

2.4.21 Close inlet and bypass on the heater, open all downstream valves and pressure test to 207 bar (3000 psi) for 10 minutes.

2.4.22 Before bleeding off pressure, close downstream valves on the choke manifold, bleed the pressure back to 35 bar (500 psi), check that the downstream valves hold pressure for 10 min. Test upstream valves to 207 bar (3000 psi) for 10 min.

2.4.23 Rig up one mud pump for cooling water to the burners and one mud pump to control the annulus pressure.

2.4.24 Set the test packer.

Note:

- Use the tubing make up tong to turn the string.

2.4.25 R/U Schlumberger and run a "slim hole" GR/CCL (1 11/16") inside the tubing. Locate the radioactive sub installed above the MIRV and correlate the log for correct positioning of the gun. Correlate the GR/CCL with the CDL/CNL reference log using the radioactive collar installed in casing.

2.4.26 If the perforating gun is out by more than the tolerable amount, pull the packer loose and reset using the slip joints. Recheck depths using the GR/CCL. Do not pull the wireline out during this operation, but leave in the hole till the guns are in position.

2.4.27 Flush the rig kill line with 10 bbl mud. Close the middle pipe ram.

2.4.28 Pressure up the annulus to the predetermined opening pressure of the PCT using one mud pump. The annulus pressure is to be monitored from this step and until the well has been killed. Log the annulus pressure every 15 min.

Note:

- Leave tubing OPEN to the surge tank/atmosphere when opening the PCT in order to avoid activiating the pressure controlled firing head in case of a packer leak.

2.4.29 Close the choke manifold and open the kill valve. Install the detonation listening device. Pressurize the test string to the predetermined pressure (adviced by Geo-Vann) to get 50 psi underblance using the cement pump. Close the kill valve and bleed off the pressure through the adjustable choke to the surge tank to create the desired underbalance.

Notes:

- The perforating gun should detonate approximately 5-7 minutes after having pressurized the string to the predetermined pressure. Therefore NO delays can be tolerated in the above operations. All involved parties must be briefed and understand their tasks.

- In case of a misfire, proceed as per section 2.3.31.

2.4.30 Open the choke manifold immediately after the gun detonates and flow the well according to pt. 3.2.1.

Notes:

- Due to heating of the test string the annulus pressure may have to be bled down to the opening pressure referred to above.
- Be aware that an increase in the annulus pressure also may be caused by a leak in the test string.
- The driller or the toolpusher must stay on the rigfloor at all times during testing.

2.4.31 In case of misfire, install drop bar on top of closed wireline BOP, pressure test lubricator etc. and make sure the swab, master, lubricator and SSTT valves are open. Repressureize test string if neccessary to desired underbalance. Close kill valve.

2.4.32 Drop detonating bar by opening the wireline BOP and proceed as per pt. 2.4.30.

2.4.33 Flow the well in accordance with the instructions given in the 2.7 and 3.2.1

- The well has to be closed in at the tester valve (bleeding off annular pressure) and at the floor choke manifold simultanously, as trapped tubing pressure will minimize the differential pressure across the downhole valve when this is to be reopened.

- During the flow, an Baker operator is to attend the burners to ensure proper combustion of the hydrocarbons.

- Standby boat with oil dispergent agent onboard to check for any slicks.

2.4.34 After the well has been backsurged (10-15 BBL) the well will be shut in at the choke manifold and two downhole pressure and temperature gauges are to be run and set in landing nipples, (ref. wireline procedure) before comencing the test.

2.5 GRAVEL PACK PROCEDURE

2.5.1 Rig Up Schlumberger and run a 3 3/8" GR/CNL and sandbailer. Run the Logging tool through the BAKER Sump-packer to record possible fill on top of bridgeplug. Record the hold up depth (HUD) and take sandsample.

Pull out of the hole w/Schlumberger and rig down same.

Note:

- Extreme care must be taken when running the tool through the Sump-packer. Make sure that the cable head is beveled.

- If sand fill is established above the top of the sump-packer, RIH with 2 7/8" stinger on DP and reverse out the fill. Set new fluid loss pill across the perforating zone before POOH.

2.5.2 Make up 3 joints of 5 1/2" LCT blank pipe (with weld-on centralizers) in the rotary table. Pick up and run through the blank pipe the following assembly from bottom upwards,

1) Wash pipe 2-7/8" CS as required.
2) Lower indicating collet 2-7/8" CS pin x box.
3) Pup joint 2-7/8" CS pin x box.
4) Upper indicating collet 2-7/8" CS pin x box.
5) Pup joint 2-7/8" CS pin x box.
6) Spacer pup 2-7/8" CS pin x box (for handling).

Item 2 - 6 is preassembled.
Clamp off the 2 7/8" CS sub on top of the 5 1/2" Blank pipe.

2.5.3 Pick up blank pipe with wash pipe inside and stand same back in the derrick.

2.5.4 Pick up the gravel pack screen assembly and hang it off in the rotary table.

The assembly consist off, from bottom up:

1) 5 1/2", LTC box Model G-22 locator seal assembly size 192-47.
2) Bakerweld screen, 5 1/2" LTC pin x box 1.88 m long (tell-tale with weld-on centralizers).
3) GP seal bore receptacle 5 1/2" LTC pin x box

Note:

- Steam clean the screens on rigfloor prior to RIH.
- Utmost care must be exerciced when setting slips on screen body.
- Do not use exessive dope. Use a small paint brush and wipe of excessive dope from connections.

2.5.5 Install the wash pipe with the polished stinger into the gravel pack assembly. Make sure the polished stinger is stung into the sealbore receptable. Wash pipe assembly is as follows:

1) Polished stinger 2-7/8" OD with turned down locator and 2 7/8" CS.
2) Wash pipes, 2-7/8" CS pin x box.

2.5.6 Stab the 5 1/2" Reverse Flapper valve over the wash pipe and make it up to the assembly.

Note:

- Utmost care should be exercised when making pipe movements of the 2-7/8" wash pipe through this valve to avoid prematurely shattering the flapper valve or its seat.

2.5.7 Pick up the 3 joints off blank pipe with wash pipe and indicating collets inside stood back in the derrick and make the 2 7/8" wash pipe up to the 2 7/8" wash pipe protruding from the gravel-pack assembly in rotary.

2.5.8 Using an air tugger, pick up the 2 7/8" wash pipe so the 2 7/8" EU spacer pup can be removed. Then remove the clamp.

2.5.9 Make up the 5 1/2" blank pipe to the gravel pack screen assembly.

Note:

- Double check the wash pipe spacing to assure that the stinger is correctly positioned in the sealbore receptable.

2.5.10 Pick up the pre assembled gravel-pack assembly which consist of the following parts from bottom upwards:

1) Model "SC-1" gravel pack packer (OD = 8.440").
2) Model "S" gravel pack extension with sliding sleeve (extra long stroke).
3) Crossover sub - 6-5/8" box x 5 1/2" pin.
4) Indicating coupling 5 1/2" LTC box x box.
5) X-over 5 1/2" LTC pin x pin.
6) Model GP shear-out safety sub 5 1/2" LTC pin x box.

Preassembled and connected also will be:

1) Model "SC" crossover/model "B-1" setting tool (4 1/2" IF box up).
2) Pup oint 2-7/8" EU 8RD (4 ft long).
3) Model "S-1" shifting tool (extra long stroke).
4) Pup joints 2-7/8" CS.
5) Upper indicating collet 2-7/8" CS pin x box.

2.5.11 Make up above assembly to the string in the rotary and note the free hanging weight of the entire assembly. Check correct operation of crossover tool. Place tool in circulating position.

2.5.12 RIH with the complete GP assembly on 3 1/2" PH-6 workstring. Maximum RIH speed approximately 60 sec/stand and set slip gently to avoid shearing the safety sub.

Note:

- Use 3 stands of 6 1/2 drillcollars above gravelpack assembly.
- DO NOT USE EXCESSIVE DOPE. Use only a small paint brush and wipe off excessive dope squueezed out of the connections.

2.5.13 When on bottom gently locate the Baker Sump-pacer with 10.000 lbs weight using the heave compensator.

2.5.14 Space out the 3 1/2" PH-6 tubing so that the top of the tubing is about 4 m above drill floor when the stinger is landed in the sump-packer.

2.5.15 Break sirculation with approximately 10 bbls of brine. Note pump pressure.

Note:

Max pump rate 2.0BBL/min.

2.5.16 Drop the kirksite ball.

Note:

- Falling speed is about 60 m/min.
- Estimated falling time: 30 min.

2.5.17 Install kelly cock and circulating head on top off the tubing. Hook up chiksans to Dowell pump and pressure test the lines to 4000 psi for 10 minutes.

2.5.18 Circulate one hole volume with filtered brine. Monitor the return from the well for cleanness off the brine.

2.5.19 When packer setting ball is estimated to have landed in the seat, pressure up in 500 psi increment holding each increment for 1 minute.

The setting tool will shear at approximately 800-1000 psi. At 2000 psi hold the pressure for 3 minutes. Continue to pressurize the workstring until the ballseal shears at about 2.500 psi.

2.5.20 Pull 15 000 pounds over string weight to assure packer is set.

2.5.21 Slack off with 15 000 pounds weight on packer. Mark pipe at "mid heave". Close annular preventer. Pressure annulus to 700 psi/10 mins to check packer setting. Release pressure and open annular preventer.

2.5.22 When applying 700 psi on the annulus the SCH crossover tool should release from the packer. If not apply a slight upstrain on the workstring and rotate 10-15 turns to the right to release the crossover tool from the packer.

2.5.23 Lower Work string until Cross-Over Tool locates on top of the gravel pack pakcer and slack off 10.000 to 20.000 lbs. This indicates the squeeze position. Mark the pipe.

2.5.24 Close Upper Annular and pressure up the annulus to 300 psi. Pick up work string until pressure bleeds off. Set down approximately 10.000 lbs to verify ind. collet in place. This will be The Lower Circulating Position. (Through Tell Tale). Mark the pipe.

2.5.25 Open upper annular and pick up to reverse circulating position. Set down approximately 10.000 lbs to verify ind. collet in place. Mark the pipe. This will be the reverce circulating position.

2.5.26 Verify all positions by pumping. Then go to the lower circulating position.

2.5.27 At this point gravel pack operations are ready to begin.

Notes:

- All surface lines should be rigged for continuous operations.
- Reversing out lines should be rigged up through spesial manifold installed on choke manifold to possum belly tank so that gravel return can be monitored.
- Ensure that adequate length of chiksans pipe is installed to allow movement of workstring to all positions without operations shut down.
- All acidizing fluids and gravel pack fluids should be prepared and ready to be pumped.

2.5.28 With GP tool in circulating position, pump acid until 2 bbls acid has been pumped through the lower tell tale. Shut down and relocate GP tool in squeeze position. Allow acid to soak for 15 minutes to dissolve any fluid loss agent.

Note:

- Hydrostatic pressure of acid is less than formation pressure.

2.5.29 After soaking, squeeze acid into the formation at 2 to 3 bbls/min.

Note:

- Maximum allowable surface pressure is .... psi.

- Use a minimum of 75 gallons/foot perforation interval.

2.5.30 Following the acid treatment, pump 15 bbls filtered completion fluid spacer and 10 bbls waterpack pad.

Shift GP crossover tool to circulate position and pump as follows:

1) .... bbls gravel slurry
2) .... bbs pad.

3) Filtered brine until sand out occurs.

2.5.31 When the pump pressure starts to increase, slow down pump until the maximum pump pressure permissible is obtained. Check pack off 2-3 times at 0.2 bbls/min.

2.5.32 Switch surface lines to reverse position. Close upper annular. With 500 psi on annulus, pick up cross-over tool to reversing position while keeping same pump pressure. Start reversing immeately leaving lower crossover seals in packer bore. Reverse circulate 2 times tubing volume. Check for gravel returns.

2.5.33 After reversing out excess gravel POOH. However, if there is no excess gravel and if calculation indicates there is a possibility the screen may not be completely covered, do not POOH but shift GP tool back to circulate position.

Pressure up to maximum sand out pressure and attempt to circulate through production screen. If possible, circulate at 2 BPM, pump an additional 5 bbls of waterpack slurry followed by 10 bbls waterpack carrier fluid. Repeat item 2.5.31 and proceed.

2.5.34 Spot 20 bbl viscous calcium carbonate pill above packer. Observe well for 30 minutes.

Note:

- From this point, the well must be observed continuously until test string has been landed.

2.5.35 POOH and lay out GP-crossover tool.

Note:

- Pull slowly to avoid swabbing.

2.5.36 Rig up Schlumberger and run a 3-3/8" GR/CCL/CNL to check the height off the gravel on the outside off the blank pipe.

Note:

- ENSURE NOT TO TOUCH OR TO SET ANY WEIGHT DOWN ON THE REVERSED FLAPPER VALVE.

2.5.37 POOH and rig down Schlumberger.

2.6. PRODUCTION STRING PROCEDURE

2.6.1 Run the bottom hole assemblies with locked open PCT valve (modified PCT) as in Figure 3 with a 5" TAC-1 stand on top. Install a testplug in 2 7/8 RN nipple and pressuretest production string bottom hole assembly to 3000 psi for 10 min.

Note:

- Do not remove test plug.
- The 2 7/8" tubing below the seal assembly is to circulate debris off and to release the Reverse Flapper valve. It must be long enough to reach the flapper valve before the Floating Seal assembly enters the packer.

2.6.2 RIH with the remaining 5" TAC-1 test string.

2.6.3 Pressure test tubing to 3000 psi for 10 min.

2.6.4 Cross over to 5" DP to run the string on the dummy run before installing the landing string.

Note:

- Install one joint white painted 5" DP such that when the painted single is at the 5" rams the reverced indicating collet will be landed on the Baker packer.
- Do not set more than 10 000 lbs weight down on the reversed indicating collet. Circulate while RIH slowly.

2.6.5 Close middle pipe ram on white painted single. Open ram again and pick up approx. 1 m. Close upper annular preventer and reverse circulate slowly at least one tubing volume or until sand free.

Note:

- Max. circulation pressure 500 psi.

2.6.6 Pull back to the painted sub, make calculations necessary to space out with fluted hanger landed in the wellhead and the floating seal assembly in mid position of the packer. (See fig. 8).

2.6.7 Install space out subs if necessary, fluted hanger, 5" slick joint and SSTT with a pup joint on top.

2.6.8 Pressure test the tubingstring to 3000 psi for 10 minutes.

2.6.9 Close the SSTT and bleed back pressure to 500 psi to check the SSTT from below for 10 min. Equalize the pressure and open the valves and bleed off the pressure.

2.6.10 Continue to RIH using the landing string tubing below the lubricator valve.

2.6.11 Pick up the lubricator valve pluss one pup joint on top (pick up the amount of singles to be run above the pup joint) and make it up to the string.

Note:

- Make sure there is enough space between stuffing box and lubricator valve for wireline operation.

2.6.12 Attach the extra long bailes to the hook and to a 5" manual drill pipe elevator. Pick up the STT plus the single below and place it in the mouse hole and install the wireline equipment including the wireline BOP on top and make up the quick union. Attach the 5" drill pipe elevator to the lifting sub on top of the STT and lift the block so that the bails pluss the STT with the single below is hanging free.

Note:

- Attach minimum one chicksan swing to the kill side and the flow side outlet prior to lifting the STT up from the rig floor.

2.6.13 Make up the STT and the single below to the test string. Rig up the surface equipment.

Notes:

- DO NOT LAND SSTT IN WELLHEAD AT THIS POINT TO AVOID CRUSING THE REVECCED PLAPPER VALVE.

- Ensure that all chicksan connections are properly cleaned prior to being made up.

- Fill up the string with diesel cushion very slowly, keeping the swab and the master valve open.

2.6.14 Close the kill side wing valve on the STT and test the chicksans and the cementing unit to 207 bar (3000 psi) for 10 min.

Note:

- The swab valve and the master valve to be closed and the flowside valve to be open during this test.

2.6.15 Open the kill valve and the master valve, close the swab valve and pressure test the entire string down to the tester valve to 207 bar (3000 psi) for 10 min.

2.6.16 Close the master valve, bleed the pressure back to 35 bar (500 psi) check that the master valve holds pressure from below. Equalize the pressure and open the valve. The flow side wing valves to be closed during this test.

2.6.17 Close the lubricator valve. Bleed off the pressure above to 35 bar (500 psi). Check that the lubricator holds pressure from below for 10 min. Equalize the pressure and open the lubricator valve. Bleed down the pressure.

2.6.18 Close lubricator valve. Pressure test on top of lubricator valve to 3000 psi for 10 min. Bled of pressure. Open lubricator valve.

2.6.19 RIH with wireline retrieving tool and retrieve test plug, close the lubricator valve.

2.6.20 Close the master valve and open the flowside wing valve. Flush all surface lines and quipment (heater, separator, and both burners) with water. Flush through both oil and gas lines on burners.

2.6.21 Close inlet and bypass on the heater, open all downstream valves and pressure test to 207 bar (3000 psi) for 10 minutes.

2.6.22 Before bleeding off pressure, close downstream valves on the choke manifold, bleed the pressure back to 35 bar (500 psi), check that the downstream valves hold pressure for 10 min. Test upstream valves to 207 bar (3000 psi) for 10 min.

2.6.23 Land the Fluted Hanger in the wellhead and crush the Reverce Flapper valve with the mule shoe at the same time.

2.6.24 Close 5" pipe rams and pressure test annulus to 500 psi to check floating seal assembly.

2.6.25 Pressure up annulus to 3000 psi in 500 psi increment until rupturing the shear discs in the modified PCT at approx. 3000 psi. Bleed off pressure and close the PCT.

2.6.26 Open the MIRV and displace 1 000 gal of 15% HCL acid with diesel down to above the MIRV

2.6.27 Close the MIRV and open the PCT and squeeze the acid into the formation. Let the acid soak for approx. 15 min before opening the PCT and flowing the well back.

Note:

- Annulus pressure to be monitored from this point onwards

2.6.28 When gas at surface close the chokemanifold. Rig up W/L and run a sinkerbar to open the 2 7/8" Geo Vann Vent assembly.

2.6.29 POOH and run BHP/BHT gauges to be set in "AR" and "A" nipple.

2.6.30 Proceed according to the recommandation/regulations given in section 2.7 and 3.2.2.

2.7 FLOW/SHUT IN PERIODS

2.7.1 Open/close the well.

The NH Supervisor and captain shall be notified or present when the well is to be opened. The NH supervisor and the NH reservoir engineer are the only persons to give orders to open or close the well.

The well has to be closed in at the tester valve (bleeding off annulus pressure) and at the floor choke manifold simultanously, as trapped tubing pressure will minimize the differential pressure across the downhole valve when this is to be reopened.

2.7.2 Flow the well in accordance with the instructions given in the testing procedures for this well and in accordance with the following restrictions/- recommendations:

- During the flow, a Baker operator is to attend the burners to ensure proper combustion of the hydrocarbons.

Note:

- A check for the precence of H_2S is to be made immediately after hydrocarbons reaches the surface.
- H_2S and CO_2 is to be measured in the seperator gas and sniffers with H_2S inserts to be used at wellhead and separator during production test.

2.7.3 For hydrate prevention:

- Monoethylenglycol for preventing forming of hydrates.
- Mcthanol to dissolve ice.

These fluids will be injected at following points:

1) Below balls on SSTT.
2) On STT.
3) On dataheader on chockemanifold.

The injection pump set up have to be in such way that an extra pump fast can replace an injection pump if shutdown of this.

2.8 WIRELINE WORK PROCEDURES

Running in

2.8.1 Rig up wireline equipment on top of the STT. Note the surface pressure.

2.8.2 Close the lubricator valve, bleed off the pressure above to zero. Check that the lubricator is holding the pressure (10 min).

2.8.3 Open the swab valve and install the wireline tool. Make up the quick union.

2.8.4 Open the kill valve and flush from the cement unit through the choke manifold.

Note:

- *Use a 50/50 mixture of monoethylenglycol and seawater.*

2.8.5 Close the choke manifold and pump slowly until water is coming through the pack off.

2.8.6 Close the pack off and pressure test against lubricator valve/grease injection/pack off/choke manifold to 3000 psi for 10 min.

2.8.7 Close the kill valve. Bleed down the pressure through the choke manifold to the last recorded surface pressure.

2.8.8 Open the lubricator valve.

2.8.9 RIH w/wireline tool.

Pulling out

2.8.10 Note the surface pressure.

2.8.11 Close the lubricator valve when the wireline tool has been pulled above it. Bleed off the pressure above the lubricator valve and check that it is holding pressure for 10 min.

2.8.12 Retrieve the wire line tools.

2.8.13 Close the swab valve and wait until the samples have been checked.

Notes:

- If new or further samples are to be taken, proceede as from step 2.5.1.

- If the samples are OK and no further samples are required, follow the killing procedure.

2.9 BOTTOM HOLE SAMPLING

2.9.1 Run the bottom hole samplers on wireline to above the tester valve. When running in the hole, open the PCT when the samplers are well below the SSTT. Open the choke manifold and flow the well to the burner on a low rate .

2.9.2 Shut in the well at surface and close the sample chamber.

2.9.3 Close the PCT.

Note:

- Before closing PCT make sure that samplers are located above PCT.

2.9.4 Pull out with the bottom hole samplers.

2.9.5 While checking the bubble point and transferring the first sample, make a 2nd sample run as outlined above.

Notes:

- For procedures for inserting and retrieving the down hole samplers from the test string, refer to chapter 2.5.

- Any operation involving handling of Mercury must be approved and supervised by the Norsk Hydro test engineer/reservoir engineer, according to Norsk Hydro Mercury handling procedures, as approved by NPD. Refer to appendix 1.

2.10 KILLING PROCEDURE PERFORATING STRING

2.10.1 After completing the pregravelpack production open MIRV and reverse out the tubing content of gas through the Baker choke manifold.

2.10.2 Close MIRV and perform a leakoff test/pressure integrety test.

Note:

- Leak off pressure to be maximum pressure when gravelpacking well.

- If surface pressure exeeds .... psi do not frack the formation.

2.10.3 Open MIRV and pump a pill containing 20 lbs/bbl of N 15/N 40 made up with 4 lbs/bbl J 164 ahead of 1,12 rd brine. Displace the pill to 20 m above MIRV and close same.

2.10.4 Open PCT and bullhead gas below PCT valve back into the formation. Volume equal to volume from MIRV down to bottom of perforations. Do not exceed 1000 psi pump pressure.

2.10.5 Open SSARV and reverce circulate two tubing volumes through mud-gas separator.

2.10.6 Open the middle pipe ram and release the packer and land SSTT in wellhead using heave compensator.

2.10.7 Close middle piperam and circulate the long way through mud-gas separator until gas readings are low.

2.10.8 Open middle piperam and circulate through the riser.

2.10.9 Slug the pipe and POOH. Lay down the test tools and retrieve the gauges.

Note:

- Utmost care must be taken when POOH due to viscous pill placed round perforations may easy cause swabbing.

2.11 KILLING PROCEDURES

2.11.1 Rig down the wireline equipment above the wireline BOP.

2.11.2 Open the kill valve and the choke manifold and flush the lines with water to the burners.

2.11.3 Close the choke manifold and the flow-line valve (fail safe). Pressure up from the cement unit to psi (last recorded static surface pressure).

2.11.4 Open the lubricator valve.

2.11.5 Open the PCT tester valve.

2.11.6 Bullhead one tubing volume plus 1.25 volume of 9 5/8" casing from bottom of packer to bottom of perforations. Max. allowable pumping pressure after having filled the tubing with mud is bar (psi).

2.11.7 Bleed off the pumping pressure and record the bled back volume Observe that the well is stable for 1/2 hour, keeping the tester valve open.

2.11.8 Hook up the kill line to the reverse circulating outlet.

2.11.9 Pressure up the annulus to psi and open the reversing valve.

2.11.10 Reverse circulate 2 tubing volumes through the CIW choke/mud-gas separator.

2.11.11 Open the middle pipe ram, release the packer and land SSTT in wellhead using heave compensator.

2.11.12 Close middle pipe ram. Bullhead 3x volume of 9 5/8" casing from bottom of packer to bottom of perforations.

2.11.13 Close middle pipe ram and circulate the long way through the choke manifold and the mud-gas separator. Open the upper annular preventer and circulate through the riser when the gas readings are low.

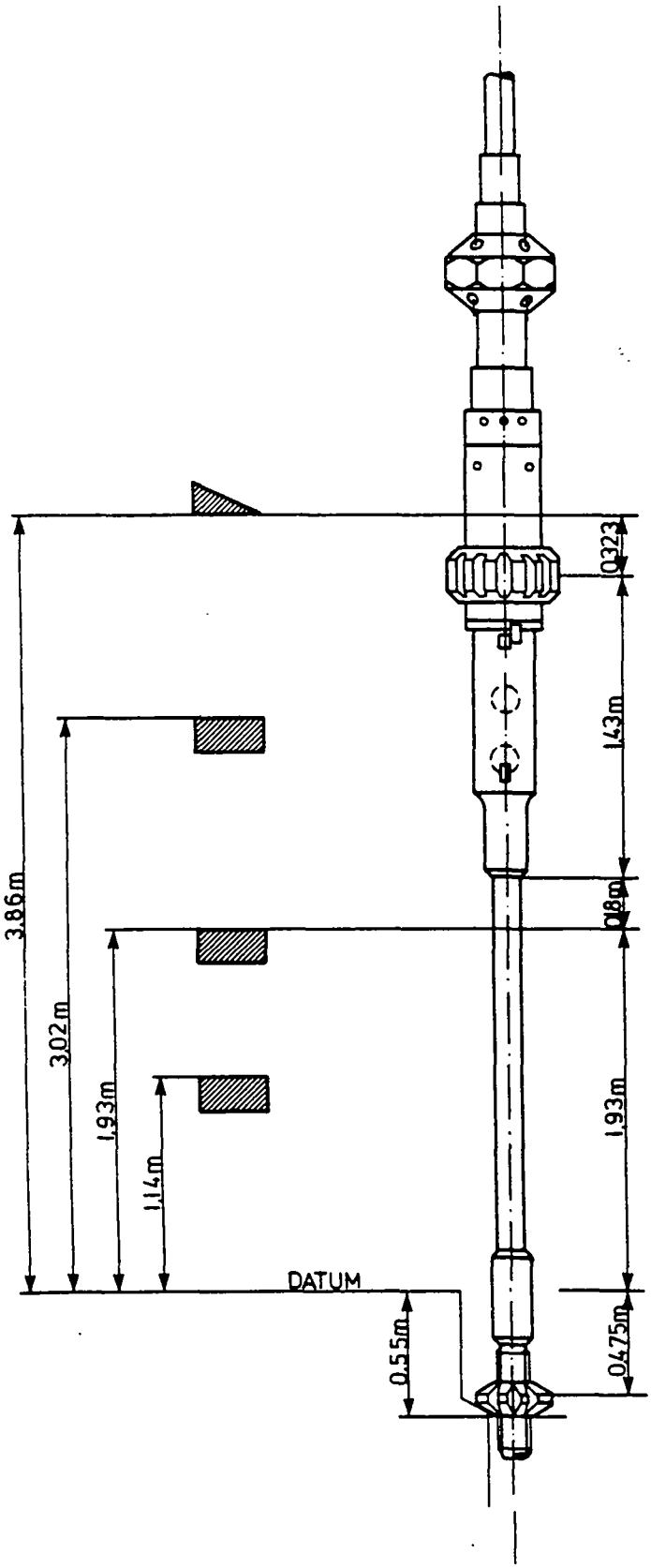
2.11.14 Slug the pipe and pull out of the hole. Lay down the test tools and retrieve the gauges.

Note:

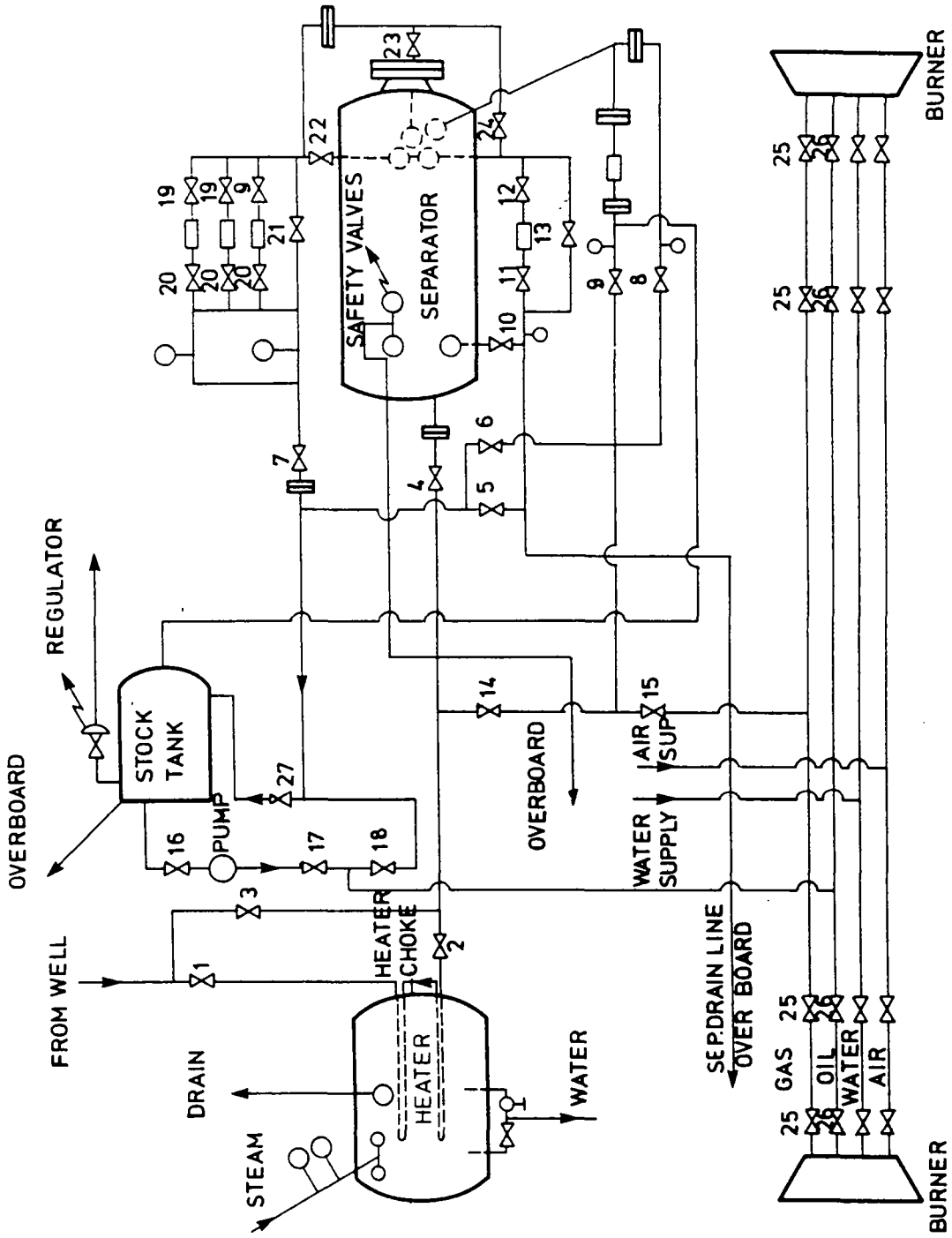
- Pull slowly to avoid swabbing.

- Use elevator/bails when laying out STT.

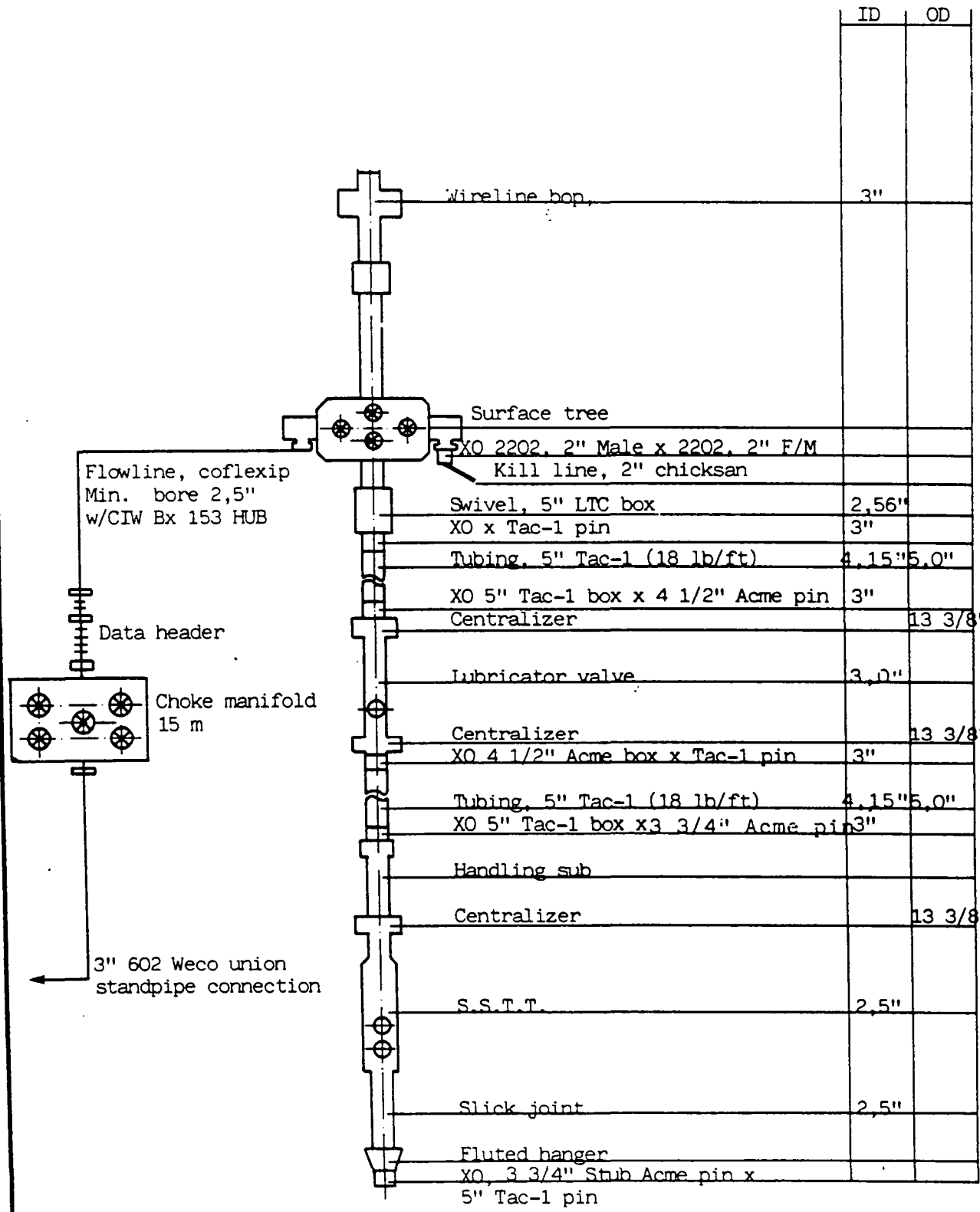
2.11.15 After having killed the well and POOH the test string, rig up Schlumberger and RIH w/sandbailer to establish the quantities of eventual sandfill on top of the bridgeplug, and if sand is present to take a sand sample.



Norsk Hydro Drilling Department	WELLHEAD / BOP / SSTT – SPACING TREASURE SEEKER 18 3/4 – 10 000 PSI	Gr. no.: 2	Fig.: 1
		Date: 11.04.83 Sign: MOI/SF	Dwg. no.: 92

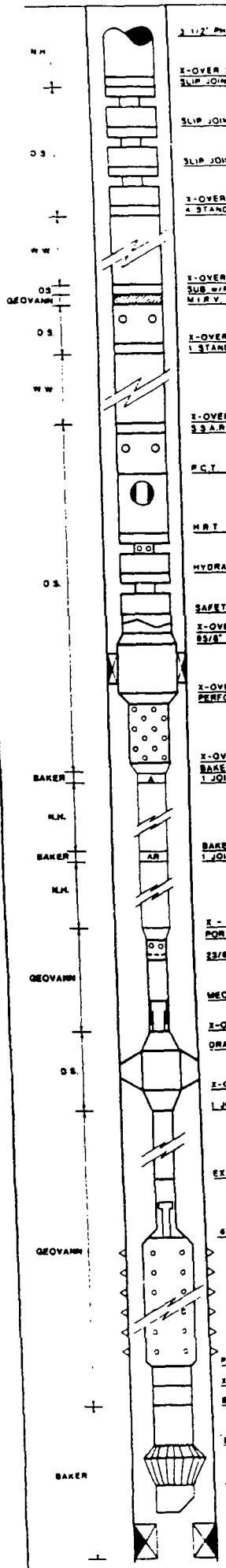


Norsk Hydro Drilling Department	DIAGRAM FOR PRESSURE TESTING OF SURFACE EQUIPMENT AND LINES TREASURE SEEKER	Gr. no.: I	Fig.: 2
		Date: 13.12.82. Sign: MOI/SF	Dwg. no.: 47



Norsk Hydro Drilling Department	SURFACE EQUIPMENT AND LANDING STRING, TREASURE SEEKER	Gr. no.: 4	Fig.: 3
		Date: 14.12.82 Sign: MoI/SF	Dwg. no.: 16

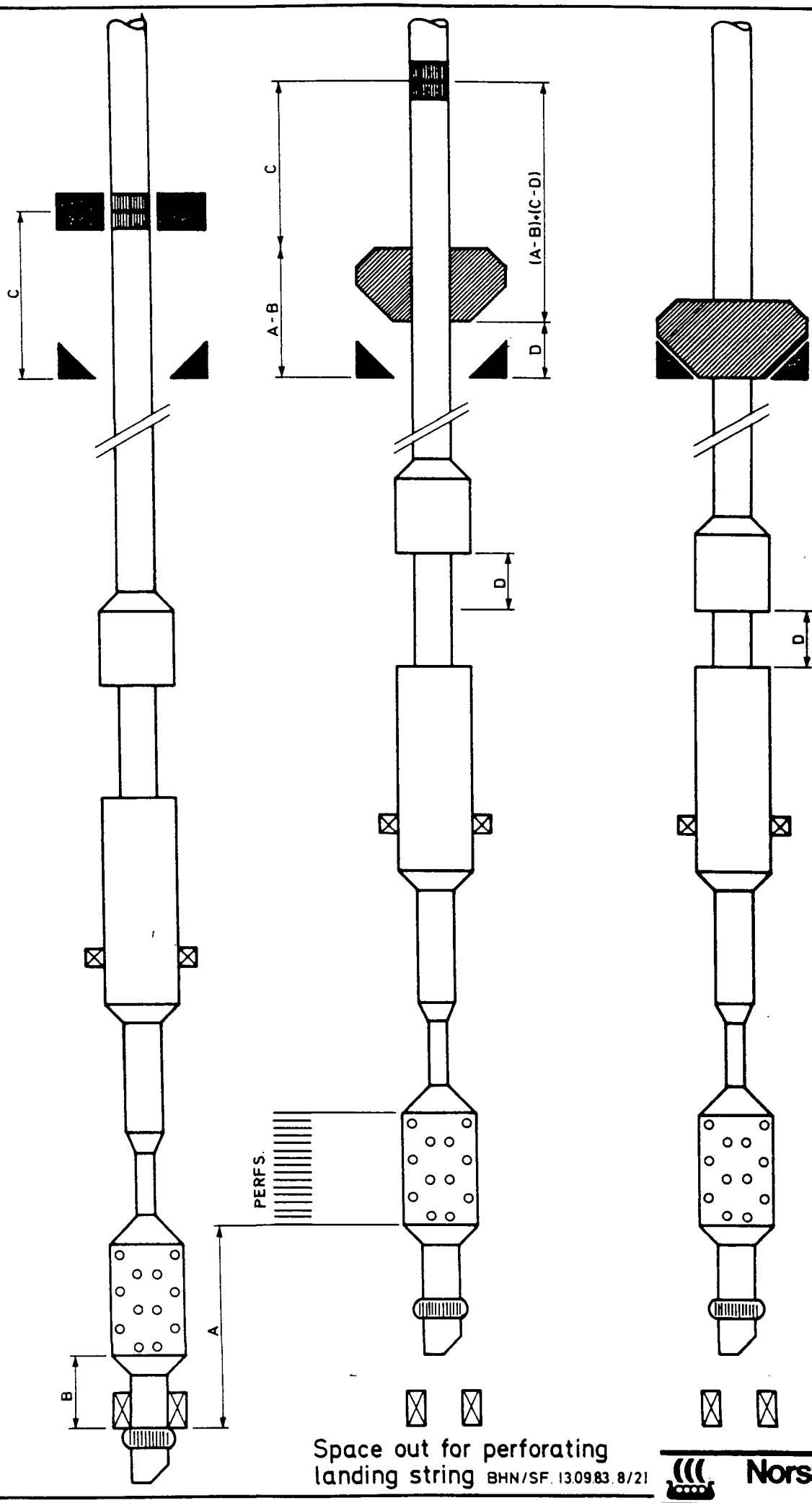
PERFORATING STRING



	ID INCH	OD INCH	LENGTH m	COM L m	HEIGHT RIH/POOH
3 1/2" PH - 6					
X-OVER 3 1/2" IF PIN x 3 1/2" PH - 6 BOX					
SLIP JOINT					
SLIP JOINT					
SLIP JOINT					
X-OVER 4" IF PIN x 3 1/2" IF BOX					
4 STANDS 8 1/2" DRILL COLLARS					
X-OVER 3 1/2" IF PIN x 4" IF BOX					
SUB w/RADIOACTIVE SOURCE					
M.R.V.					
X-OVER 4" IF PIN x 3 1/2" IF BOX					
1 STAND 8 1/2" DRILL COLLARS					
X-OVER 3 1/2" IF PIN x 4" IF BOX					
3 3 A.R.V					
P.C.T					
H.R.T					
HYDRAULIC JAR					
SAFETY JOINT					
X-OVER 3 1/2" EU PIN x 3 1/2" IF BOX					
85/8" POSITRIEVE PACKER					
X-OVER 3 1/2" IF PIN x 3 1/2" EU BOX					
PERFORATED "BIG HOLE" ANCHOR					
X-OVER 2 7/8" EU PIN x 3 1/2" IF BOX					
BAKER "A" NIPPLE					
1 JOINT 2 7/8" EUE TUBING					
BAKER "AR" NIPPLE					
1 JOINT 2 7/8" EUE TUBING					
X - OVER 2 3/8" EUE PIN x 2 7/8" EUE BOX					
PORTED EQUALIZING SUB					
23/8" EUE PUP JOINT					
MECHANICAL TUBING RELEASE					
X-OVER TO 2 3/8" EUE BOX UP					
DRAG BLOCK					
X-OVER TO 2 3/8" EUE PIN DOWN					
1 JOINT 23/8" EUE TUBING					
EXTENDED FIRING HEAD					
6" PERFORATING GUN 12 SPF 120° PHASING					
PRESSURE ACTIVATED FIRING HEAD (TCP)					
X-OVER GEOVANN GUN X 4" EUE PIN					
BAKER POLISHED STINGER W/O SEALS					
BAKER INDICATING COLLET (15-20 KLBS)					
BAKER HALF MULE SHOE					
TAIL					
BAKER 192-80 MODEL "F" SUMP PACKER					

Norsk Hydro TEST STRING 31/3-2

FIG. 4

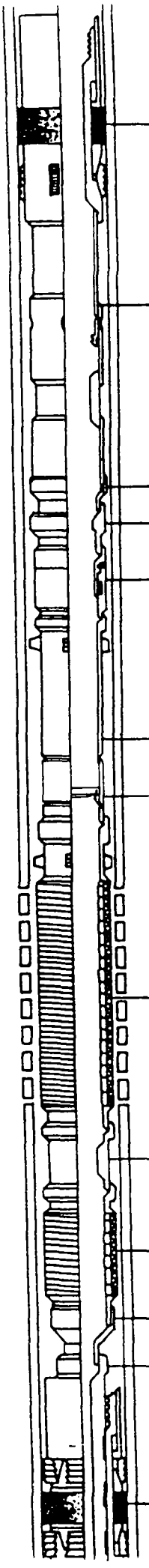


Space out for perforating landing string BHN/SF. 13.09.83. 8/21

FIG. 5

Norsk Hydro

PROD	OD	ID
488-02	8.440	6.00
487-06	8.125	6.00
299-69	7.66	4.95
445-35	6.05	4.50
485-41	6.05	4.95
845-07	6.05	4.95
487-29	6.05	4.75
486-05	6.10	4.95
485-34	6.05	3.25
486-05	6.10	4.95
299-69	6.05	4.00
444-20	6.500	4.875
413-06	8.218	6.000



ITEM 12 SIZE 190-60 MODEL 'SC-1L' PACKER WITH 7-5/8 8RD SHEET LONG BOX DOWN

ITEM 11 SIZE 90-60 MODEL 'S' GRAVEL PACK EXTENSION WITH SLIDING SLEEVE WITH 16' LOWER EXTENSION

ITEM 10 7" x 5-1/2" CASING SUB

ITEM 9 SIZE 4.50" MODEL 'A' INDICATOR SUB

ITEM 8 SIZE 5-1/2" SHEAR OUT SAFETY JOINT

ITEM 7 SIZE 5-1/2" x 90' BLANK TUBING

ITEM 7A KNOCK OUT ISOLATION VALVE

ITEM 6 SIZE 5-1/2" BAKERWELD ALL WELDED STAINLESS STEEL WIRE WRAPPED SCREEN

ITEM 5 3.25" SEAL BORE

ITEM 4 5-1/2" BAKERWELD TELL TALE SCREEN WITH 4' WRAP

ITEM 3 5-1/2" x 4-1/2 CASING SUB

ITEM 2 190-60 MODEL "B" INDICATING COLLET

ITEM 1 192-60 MODEL "F-1" PACKER

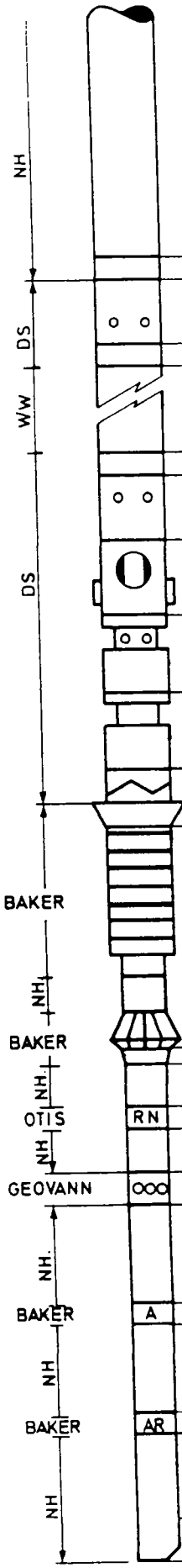
DWG. NO. 200-070
A.E.G. P-0622

REVISION
DRAWN. H.G.E.
APPROVED
DATE 04.04.84.

BAKER SAND CONTROL
A BAKER OIL TOOLS COMPANY

NAME: NORSK HYDRO
G.P. Completion

FIG. 6

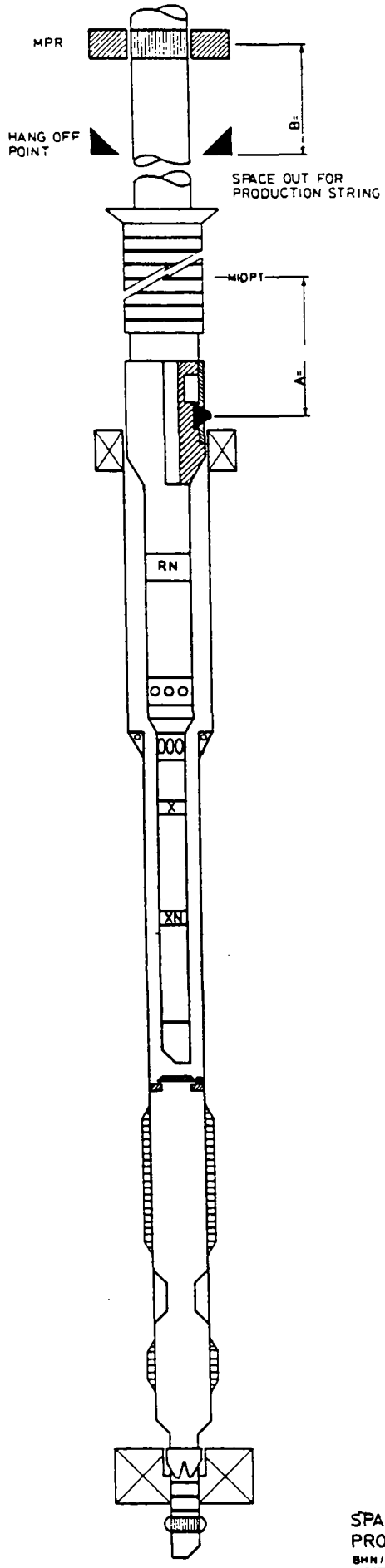


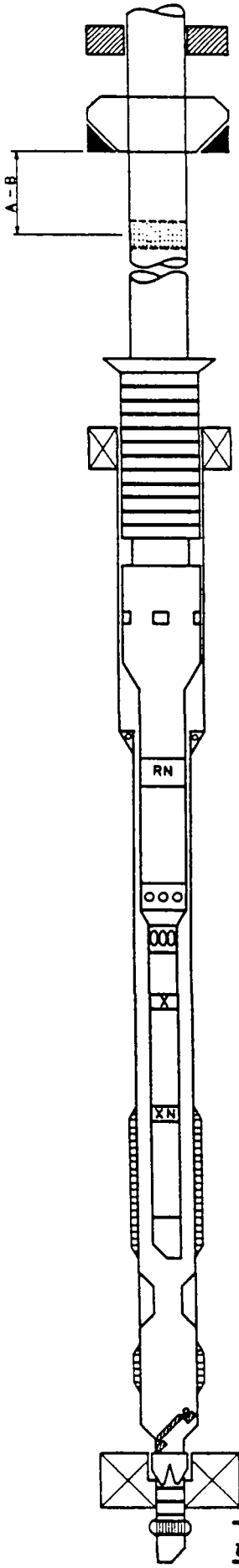
		ID"	OD"
	5" TAC - 1 TBG	4.196	5.000
	X - OVER 3 1/2" IF PIN x 5" TAC - 1 BOX		5.375
	M I R V	2.250	5.000
	X - OVER 4" IF PIN x 3 1/2" IF BOX		
	1 DRILL COLLAR STANDS	2.813	6.500
	X - OVER 3 1/2" IF PIN x 4" IF BOX		
	S S A R V	2.250	5.000
	MODIFIED PCT	2.250	5.500
	MODIFIED HRT	2.250	5.000
	JAR	2.250	5.000
	SAFETY JOINT	2.250	5.000
	X - OVER 4" EUE PIN x 3 1/2" IF BOX (LOCATOR SUB)		
	FLOATING SEAL ASSY		5.000
	X-OVER 2 7/8" EUE PUP JOINTS REVERSED INDICATING COLLET 15-20 klbs		5.125
	X-OVER 2 7/8" EUE PIN x 4" EUE BOX		
	2 7/8" EUE PUP JT. (4')		
RN	OTIS 2 7/8" "RN" NIPPLE 2.125 SEALBORE		
	2 7/8" EUE PUP JT.		
OOO	2 7/8" EUE VENT (MECH. OPENING) (AVA OR VANNTAGE)		3.880
	2 7/8" EUE PUP JT		
A	BAKER 2 7/8" "A" NIPPLE 1.875" SEAL BORE	1.875	
	1 JOINT 2 7/8" EUE TBG (GAUGE CARRIER)		
AR	BAKER 2 7/8" "AR" NIPPLE 1.875" SEAL BORE		
	1 JOINT 2 7/8" EUE TBG (GAUGE CARRIER)		
	2 7/8" EUE HALF MULE SHOE		

PRODUCTION STRING FIG 7

Norsk Hydro

8/19 709 83 BHN/SF





SPACEOUT FOR PRODUCTION STRING

BMN/SF 14 0983 8/22

Fig. 8

Norsk Hydro

3. RESERVOIR ASPECTS

3. RESERVOIR ASPECTS

3.1 Reservoir properties

Estimated reservoir pressure is 158 bar (2300 psi) at 1567 m. Estimated reservoir temperature is 70° C (158° F) at 1567 m. All lengths are referred to LDT/CNL log and are measured from RKB.

3.2 *DST No. 1 (Oil sone)*

Objectives

- Evaluate possible level of gas-oil contact.
- Evaluate the consequences of possible water-production/coning.
- Evaluate reservoir properties and possible boundary effects.
- Fluid sampling.
- Gain experience with gravel pack completions.

3.2.1 Pregravelpack test

Perforating

Interval: 1577 - 1567 m (ref. LDT/CNL)
Depth tolerance: + 0.5 m, - 0.5 m.

Type of perforating guns: Tubing conveyed Hollow carrier, 6" gun, 12 spf, 120° phasing.

Underbance when perforating: 50 psi.

Cushion

Diesel

Pressure gauges to be used for the test

To be run down on wire line after back surging.

- 2 (two) Flopetrol SDP/CRG

To be attached to data header:

- 1 (one) Baker Pressure/Temperature Sensor.
- 1 (one) Baker DWT.
- 1 (one) Sperry Sun Mr. Six.

Surface Sand monitoring

Sandec and gooseneck to be installed at surface.

Sandsampling

Run sand bailer on wireline after killing pregravelpack test and take sand sample on brigde plug below sumppacker.

Flow/shut in up periods

Backsurging

Open the well to the stock tank and flow approximately 10-15 bbl of cushion or 5 minutes to clean perforations (then RIH with gauges).

Main flow

Duration : Approximately 4 hrs.

Main build-up

Shut in the well at the tester valve and at the choke manifold simultaniously. Pressure build up duration approximately equal to the duration of the main flow period.

3.2.2 Post gravel pack test

Cushion:

Diesel.

Pressure gauges to be used in the test

To be run down on wireline and hung off in Baker "A" nipple during main flow and build up after acid job.

- 2 (two) Flopetrol SDP/CRG

To be run down on wireline and hung off in Baker "AR" nipple during main flow and build up after acid job.

- 2 (two) Flopetrol SDP/CRG

To be attached to the data header:

- 1 (one) Baker Pressure/Temperature Sensor.
- 1 (one) Baker DWT.
- 1 (one) Sperry Sun Mr. Six.

Surface sand monitoring

Sandec and goosenedc to be installed at surface.

Flow/shutin periods

Flow periode 1

Flow well at approximately same rate as on pregravel pack production. Length of flow decided by analysis of pregravel pack test (surface sampling).

Shutin periode 1

Lenght of shutin dictated by analysis of pregravel test.

Flow for bottomhole sampling

Two run with 3 each bottomhole samples. For representative samples to be obtained.

Multiratetest

Start on test obtained flowrate and increase the rates with approximately 1500 - 2000 BOP/D steps. The duration of each flowperiode will depend on the results from the pregravel pack test.

Final buildup

The duration will depend upon the results from the pregravel pack test.

Bottom hole sampling

Two sets of each 3 bottomhole samples are to be taken.
At least four representative samplers must be obtained.

Surface sampling

During 1. flow 5 sets of recombinating samples are to be taken.

Each set consisting of

2 x 20 litres gas bottles
1 x 600 cc oil bottle

In addition

5 x 20 litres gas bottles with oil
10 x 20 litres jerry cans to be filled with oil.

4. CONTINGENCIES

4. CONTINGENCIES

4.1 FIRE ON BOARD

In the case of fire commencing either in or outside of the well testing system the following steps are to be followd:

i) No wireline in the hole

1. Bleed off annulus pressure to close the tester valve.
2. Close the flowline valve.
3. Close the master valve.
4. Close the SSTT.
5. Proceed to extinguish fire.

ii) Wireline in the hole

1.1 Pull the Bottom hole samplers above the tester valve.

1.2 Bleed off annulus pressure to close the tester valve.

1.3 Close the flowline valve (fail safe close).

1.4 Proceed to extinguish the fire. If unsuccessful to extinguish fire proceed from B ii) 3.

4.2 MOORING SYSTEM FAILURE

Failure in this system can range in serverity from total immediate failure to a slowly deteriorating situation.

If the failure requires immediate action, the following steps are to be taken:

i) No wireline in the hole

1. Bleed off annulus pressure to close the tester valve.
2. Close SSTT.
3. Bleed off tubing string above SSTT.
4. Disconnect from SSTT.
5. Close the shear rams.
6. Disconnect upper marine riser package from BOP.

If the mooring system failure is of such a nature that corrective measures may be taken, then follow the normal killing procedures.

ii) Wireline in the hole

1. Pull the corelimetool above the tester valve.
2. Bleed off the annulus pressure to close the tester valve.
3. Close the SSTT and cut the wire with the ball.
4. Bleed off the tubing pressure above the SSTT through the choke manifold.

5. Disconnect from the SSTT.

6. Close the shear rams.

7. Disconnect lower marine riser package from the BOP.

If the mooring system failure is slowly deteriorating pull out of the hole with the Bottom hole samples and follow the normal killing procedures.

4.3 LINE LEAK OR RUPTURE

Leaks or ruptures in the testing system can be isolated into three (3) general areas, which are as follows:

1. Test string leak or rupture below or inside the SSTT.

   i) No wireline in the hole

      a. If the well is flowing, close the choke manifold.

      b. Equalize the pressure across the kill valve by pressuring up from the Dowell unit.

      c. Close the flow valve and open the kill valve and bullhead the tubing volume + 1.25 the volume below the packer down to the bottom of the perforation back into the formation.

      d. Proceed according to normal killing procedure.

   ii) Wireline in the hole

      a. Close the choke manifold if the well is flowing.

      b. Equalize the pressure across the kill valve by pressuring up crom the cementing unit.

      c. Close the flow valve and open the kill valve and bull head tubing volume + 1,25 x the volume below the packer down to the bottom of the perforations, back into the formation.

      d. Pull the wirelinetool to the surface.

      e. Proceed according to normal killing procedure.

f. Keep the annulus pressure between operating pressures of the Tester and the circulating valve.

2. Test string leak or rupture between the SSTT and STT.

i) No wire in the hole

a. Reduce annulus pressure to close tester valve.

b. Close valve in SSTT.

c. Bleed off pressure in test string above SSTT. Observe well.

d. Disconnect SSTT.

e. Close blind-shear rams.

f. Pull string above SSTT and repair same as required.

ii) Wireline in the hole

a. Pull the wireline tools above the tester valve.

b. Reduce annulus pressure to close tester valve.

c. Bleed off pressure in the test string above the tester valve. Observe the well.

d. Pull out of the hole with the wirelinetool.

e. Close valves in SSTT.

f. Disconnect the SSTT.

g. Close blind shear rams.

h. Pull string above SSTT and repair same as required.

3. Surface lines failures (downstream of the STT).

i) No wire in the hole

a. Reduce annulus pressure to close tester valve.

b. Close flowline valve.

c. Close master valve.

d. Bleed off surface system lines.

e. Repair lines and retest same.

ii) Wireline in the hole

a. Pull wirelinetool to above the tester valve.

b. Reduce annulus pressure to close the tester valve.

c. Close flowline valve (fail safe close).

d. Bleed off surface system lines.

e. Repair lines and retest same.

f. Resume test

4.4 PLUGGING

Components of the testing system are also subject to plugging conditions. Correction of these possible conditions should be executed in the same manner as in leaking or rupture situations.

4.5 DETERIORATING WEATHER

Weather forecast should provide enough time to make the following basic decisions:

1. Complete test and kill well in accordance with normal testing procedures.

2. Abort test.

If the decision is made to abort the test, follow the normal killing procedures.

5. APPENDIXES

APPENDIX 1

NORSK HYDRO'S WORK PROCEDURE FOR MERCURY TESTING IN BOTTOM HOLE AND SEPARATOR SAMPLING (WELL TESTING)

AIM:

1. To establish a control system to ensure that mercury is responsibly handled with regard to safety and health by all personnel, especially test personnel directly involved in the test.

2. To establish a work procedure which takes account of the official and Norsk Hydro requirements for safe working of such a control system.

PERSON RESPONSIBLE:

1. The Drilling Section in Sandnes, Norsk Hydro a.s, will be responsible for seeing that the Norwegian Petroleum Directorate, Section for Worker Protection and Working Environment, are informed as early as possible when testing with a risk of mercury exposure is to take place.

2.a. Norsk Hydro's test engineer and reservoir engineer have the delegated authority of responsible persons for the sampling of bottom hole and test separator, including transfers operations for the assembly and disassembly of test equipment and health risk monitoring. They will receive the necessary safety training.

b. They will also be delegated the necessary authority to correct or stop transfer operation in the event of divergence from the work procedure.

c. The test engineer is also responsible for preparing a report at the end of testing. This report is to be sent to the Norwegian Petroleum Directorate, Section for Worker Protection and Working Environment as soon as possible, at the latest within three weeks of the end of testing.

PROCEDURE:

A. CONTRACTOR

1. Norsk Hydro a.s, Drilling Section in Sandnes, will at all times be responsible for the ensure that the contractor undertaking the well test uses test equipment which has been evaluated with regard to safety. The equipment shall satisfy the official and Norsk Hydro requirements and guidelines for responsible handling of mercury.

2. The contractor firm itself shall obtain the necessary personal safety equipment.

Norsk Hydro will provide an additional Safety Kit for Mercury Spillage. See appendix.

3. The contractor's test operator shall at all times have the necessary occupational hygiene safety training and competence required for sampling.

4. The contractor must be in a position to document by urine testing that their personnel have not been overexposed to mercury when they are sent an a well test mission. The concentration of mercury in the urine should not exceed 200 nmol/l.

The most recent urine check should not be more than a month old, and it shall be available for Norsk Hydro before the test operator arrives at the drilling rig.

B. MEDICAL HEALTH CONTROL

1. The contractor's test operators shall submit a urine sample each to the nurse as soon as they arrive on the rig.

In addition, the urine tests shall be taken every day as long as test operations with mercury exposure risk take place.

A final urine test shall also be taken when the test operators leave the drilling rig. All urine samples shall be morning samples.

2. The responsible persons in Norsk Hydro shall ensure that:

i) the rig nurse receives the necessary urine samples,

ii) the necessary urine samples are sent by the nurse for analysis to:

The Institute of Occupational Health
(Yrkeshygienisk Institutt)
P.O.Box 8149 Dep.
OSLO 1
Tel. 02-46 68 60

3. The nurse shall ensure that the necessary number of urine bottles are available onboard.

C. TRANSFER

1. The transfer of bottom hole samples and separator samples from the sampler to transportable containers shall take place in a well ventilated area. The area is to be closed with a warning notice, and only necessary personnel have admittance to this restricted area.

2. The test engineer or reservoir engineer shall be present and have their test equipment available in the event of spillage of mercury.

   In addition they shall ensure that the necessary safety equipment is used.

3. Sufficient time shall be allowed for assembling and taking down equipment, and for cleaning it.

4. Smoking, eating and drinking are not allowed during work with mercury.

   Before doing any of the above, wash properly.

5. If mercury is spilt, notify the Norsk Hydro Drilling Supervisor immediately.

   He/she is the person responsible (together with the test engineer or reservoir engineer or both) for coordinating and controlling any cleaning operation.

6. Materials and equipment polluted with mercury shall be responsibly packaged, sealed and labelled, and sent onshore by ship as soon as possible.

7. The Norsk Hydro test engineer will ensure that the necessary details in the report are completed at the end of the test operation. See appendix.

SAFETY KIT FOR MERCURY SPILLAGE

1.	Tight coveralls without pockets or turn ups	4 items
2.	Apron	4 "
3.	Operation gloves of rubber	10 "
4.	Fresh air equipment	2 "
5.	Safety masks with Hg brown-red filter	4 "
6.	Drager pump	1 "
7.	Drager tubes for mercury vapour	100 items
	Drager tubes for hydrogen sulphide vapour (H_2S)	100 "
8.	Mercury Kit with special cleaning agent for use with mercury spillage (calcium polysulphide or sulphur powder)	1 "
9.	Urine test bottles	20 "
10.	Norsk Hydro Mercury Exposure Control Form	10 "
11.	Copy of Norsk Hydro work procedures for control of mercury when well testing	10 "

APPENDIX 2

PRESSURE TESTING OF TEST EQUIPMENT

1. Testing of movable test equipment.

The following equipment is to be tested upon arrival on the rig as specified below:

ITEM	TEST PRESS./ TIME PSI/MIN.	APPROVED	DATE
- Choke manifold, upstream	3 000/10		
- Choke manifold, downstream	3 000/10		
- Choke manifold, body	3 000/10		
- Lubricator valve, body test, from above and below ball	3 000/10		
- SSTT, bodytest and from below balls	3 000/10		
- STT & swivel, from below and against closed master valve	3 000/10		
- STT, from below against closed kill, swab and flow line valves	3 000/10		
- STT including wireline pressure control equipment against closed master, fail safe and BOP (Pressure up from kill side wing valve)	3 000/10		
- STT including wireline pressure control equipment against closed master, fail safe and BOP open	3 000/10		
- Kill valve from outside	3 000/10		
- MIRV, body test	3 000/10		
- SSARV circ. valve, body	3 000/10		
- Slip joints	3 000/10		
- PCT tester valve body above and below ball	3 000/10		
- Modified PCT testervalve as above	3 000/10		

APPENDIX 3

The organization chart for personnel is shown in Fig. 9.

The Drilling Supervisor has the overall (complete) authority on the rig and shall be held responsible for operations conducted at the well site. The Assistant Drilling Supervisor will assist the Drilling Supervisor in executing the well testing operation.

The following is an outline of the personnel required to conduct a test and their duties and responsibilities.

a) Drilling Supervisor - Responsible for the execution of the testing operation and for safety measures. The Drilling Supervisor will normally delegate the execution of the testing operation to the Testing and Reservoir eng.

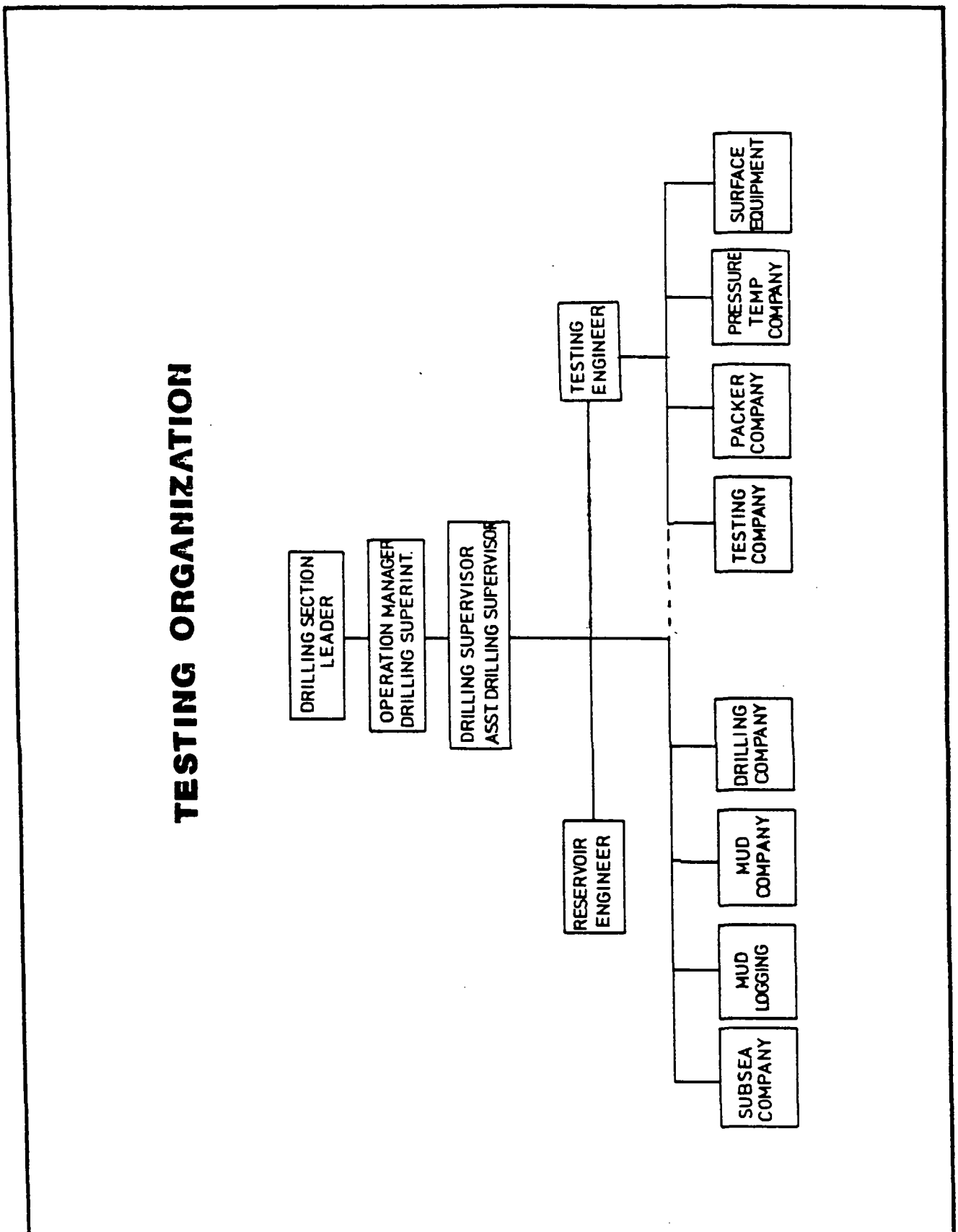
b) Assistant Drilling Supervisor - Assist Drilling Supervisor.

c) Testing Engineer - will in cooperation with the Drilling Supervisor coordinate service company personnel before and during the test. He will supervise pressure testing and pre-operational checks on all test equipment, including sampling and metering equipment.

d) Assistant Testing Engineer - Assist testing engineer.

e) The reservoir Engineer will in cooperation with Drilling Supervisor - Supervise and coordinate service personnel during flowing and build up periods activities. Further he will observe the progress of the test and note necessary data for further interpretation of the test. In cooperation with the reservoir department and after consultation with Drilling Supervisor he may modify and adapt the remainder of the test program in accordance with the obtained results.

f) Assistant Reservoir Engineer - Assist Reservoir Engineer.



Norsk Hydro Drilling Department	TESTING ORGANISATION	Gr. no.: 1	Fig.: 9
		Date: 14.12.82. Sign: MOI/SF	Dwg. no.: 52

APPENDIX 4

SAFETY MEETING

One production test will be performed in the water zone.

Expected reservoir pressure is psi, expected wellhead pressure when flowing is psi. Estimated flowrate is BPD.

All decisions to be taken by NH Supervisor/Reservoir engineer. Supervisor/test engineer to be informed before any action related to test are taken.

Supervisor/test engineer to be informed of any abnormalties.

During testing the following restrictions are to be observed: (Test means from preparations for perforating zone No. 1 to end of killing the well in the last test).

1. Smoking is prohibited outside living quarters.

2. Welding, grinding and any use of open fire without written hot work permit from Drilling Supervisor and Rig Manager/toolpusher are prohibited.

3. Fireguards with suitable fire fighting equipment are to be placed at the drillfloor and at the separatorarea during all flow periods.

4. The wellhead area, the flowline down to the separator, the separator area and the lines to the burners will be checked for gas leakage by using gas sniffers.

5. No admittance to rig floor during test for personnel not directly involved with test operations. This also applies when pressure testing prior to the test.

6. The separator area will be closed off, no admittance to separator area for unauthorized personnel.

7. No doors to the living quarters to be open during test.

8. When using wireline run perforating guns, Radio silence to be obtained before arming perforating guns.

During the radio silence no use of walkie talkies, no radio contacts with helicopters and supply boats, no use of platform radio station and no welding and use of heavy electric motors close to the guns are to take place.

The radio silence can be lifted when the perforating gun has been lowered below the seabed.

Radio silence is also to be enforced pulling the fired gun above seabed and until the gun has been disarmed or all shots have been confirmed fired.

9. When using tubing conveyed perforating guns, refer to water hoses are to be laid out and connected to a rig pump to protect rig from heat during flow periods.

- Emergency shutdown device locations:

  For STT at separator and in doghouse.

  For SSTT located away from the rigfloor near the toolpusher's office.

- Take care handling test-equipment.

  Expensive mechanics.

  Equipment preloaded with nitrogen on deck.

- Brine, clanness and safety aspects.

- Questions.

APPENDIX 5

PREPARATION OF VISCOSIFIED FLUID SPACERS

It is strongly recommended that the gelled spacers are mixed in the paddle blender.

Mixing procedure.

1. Check pH. This should then be reduced to pH 5-6 using J286 or HCl.

2. Add the required amount of J164, and ensure J164 is disperced. I.e. 40 lbs per 20 bbl.

3. Using caustic soda solution, adjust the pH upwards to pH + -8.

4. Add surfactant and D30 as required.

Note: Ensure that the caustic soda is fully dispersed in the seawater before adding more, as a pH avove 10 will cause local precipitations to occur.
These ppts will dissolve as the pH drops after dispersion.

The J164 rate of hydration is dependent on pH and temperature, and can be expected to take 5-20 minutes for full hydration.

Do not exceed pH 10

APPENDIX 6

FLUID LOSS CONTROL PILL

Because of the very nature of clean clear completion fluids, loss of these fluids to the formation might be experienced after the well has been perforated.

For 20 bbl of graded Calcium Carbonate Pill

20 bbl brine
80 lbs J164 (4 lbs/bbl)
200 lbs N-15 (10 lbs/bbl)
200 lbs N-40 (10 lbs/bbl)

Note:

- In all cases ensure that NO FISH EYES have formed by following the recommended mixing procedure, as FISH EYES are likely to impair the gravel pack at the most critical stage.

- Ensure that the caustic soda is fully dispersed in the sea water before adding more, as a pH above 10 local precipitations will occur.

Dowell Schlumberger will supply a transfer pump with the tanks, to ensure they are clean when received onboard the rig. The fluid will again be filtered before going into the clean storage tanks.

APPENDIX 7

ACID TREATMENT

Pregravel pack acid treatment

Small acid treatment prior to test program would consist of:

1. Fill test string with inhibited 15% HCl containing 3 lbs/bbl L41 and 10% U66.

2. Inject below frac. pressure, at low rate using diesel.

3. Wait 10/15 minutes to bring well in.

Post gravel pack treatment

Experience in the Troll field has shown that a post gravel pack acid job has proved to be beneficial. The reason for the effectivness has yet to be determined.

The post treatment can be effected

a) after flowing the well

b) using a small treatment of ± 50 gal/ft prior to flowing the well

c) complete acid treatment prior to well test program.

SMALL ACID TREEATMENT

APPENDIX 8

Checklists