DRILLING PROGRAMME

LOCATION 31/2-I

31/2-10

September 1982

A/S NORSKE SHELL
LICENCE 054

Kopi sendt
E. Lie LET
O. Dreyer BOR

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NORSKE SHELL E&P, FORUS.

DRILLING PROGRAMME

CONFIDENTIAL

LOCATION: 31/2-I

WELL: 31/2-10

RIG: Borgny Dolphin

PRODUCTION LICENCE No.: 054

ESTIMATED DAYS: 50 (incl. Prod.test)

CO-ORDINATES OF LOCATION

60 deg 47' 37.75" N

03 deg 29' 39.02" E

HOLE SIZE (INS)	HOLE DEPTH / CASING DEPTH (metres)	CASING SIZE/WT/GRAD/CPLG	CEMENT Req'd on Board (Tons)	CEMENT Type/Mixwater	CEMENT REMARKS	MUD S.G. (PSI/1000')	MUD REMARKS	LOGGING
36"	460/ 450	30"/1"WT/310/X-52 ATD-RB Squnch	150	Class"G" S'water	See Enclosure 2A	1.03 (445)	Seawater + Viscous Pills (+/- 100 MF)	None
26" See note 3	810/ 800	20"/129/X-52 Hunting SWIFT DW - LW Vetco LS - LH	220	Class"G" S'water	See Enclosure 2B	1.03 (445)	Gelled seawater + viscous pills	(In 14-3/4" pilot hole) ISF/SONIC/SP/GR LDT/CNL/CAL/GR
17½"	1530/ 1520	13-3/8"/72/N80/BTC	150	Class"G" F'water	See Enclosure 2C	1.26 (545) to 1.35 (585)	KCL/Polymer system KCL: +/- 35 ppb MF: 50-60 secs PV/YP 20-25/15-20 WL: Less than 10 ccs	ISF/SONIC/SP/GR LDT/CNL/CAL/GR SWS (as required)
12-1/4" See note	1800/ 1790	9-5/8"/43.5/N80/ BTC.	100	Class"G" F'water	See Enclosure 2D	1.14 (494)	KCL/Polymer system from 17½" section dispersed with Lignosulphonates. MF: 50-60 PV/YP: 20-25/15-20 WL: Less than 5 ccs	ISF/SONIC/SP/GR LTD/NGT/CNL/CAL/GR MSFL/DLL/CAL/SP/GR HDT RFT's (as required) Velocity Survey SWS (as required) CBL (on 13-3/8" and 9-5/8" casing)

DERRICK FLOOR ELEVATION: 355 M. ABOVE MSL / M. ABOVE SEA BED

FORMATION TOP	m. T.V. B.D.F
Seabed (Quarternary/Pliocene/ Miocene)	356+/- 3
Oligocene	730+/- 5
Eocene	1050+/- 5
Balder formation	1300+/- 5
Palaeocene	1355+/- 5
Cretaceous	1525+/- 5
Upper Jurassic Sandstone	
Top reservoir	1555+/- 5
Zone 1a U.J.S.*	1555+/- 5
Zone 1b U.J.S.	1590+/- 5
Zone 2 M.-U.J.S	1665+/-10
Zone 3 M.J.S.	1775+/-10
TD	1800

* Primary Target

NOTES:

1) All mud weights are to be adjusted in the light of hole problems (i.e. sloughing shales, high mud gas readings etc.)
2) Formation leak off tests are required below 20" and 13-3/8" casing shoes.
3) 14-3/4" pilot hole is to be drilled to 20" casing depth and logged for shallow gas prior to pulling the MR and opening the hole to 26".
4) Cutting Collection: Every 10m below the 30" casing shoe. Every 3m below 1275m BDF.
5) Estimate pore pressure is +/- 2280 psi at 1555m BDF.

NOTES:

6) Coring is to commence from top of the reservoir in the Upper Jurassic sandstone, and is to continue through the complete hydrocarbon-bearing sequence until just below top of zone 2 in the U.J.S. Approximate interval to be cored is 1555 - 1675 m BDF.
7) Testing is subject to confirmation upon receipt of logs.
8) 9 5/8" casing will be set only if testing is required.

SIGNED:

PRODUCTION MANAGER

CHIEF PETROLEUM ENGINEER | OPERATIONS SUPERINTENDENT | HEAD OF DRILLING

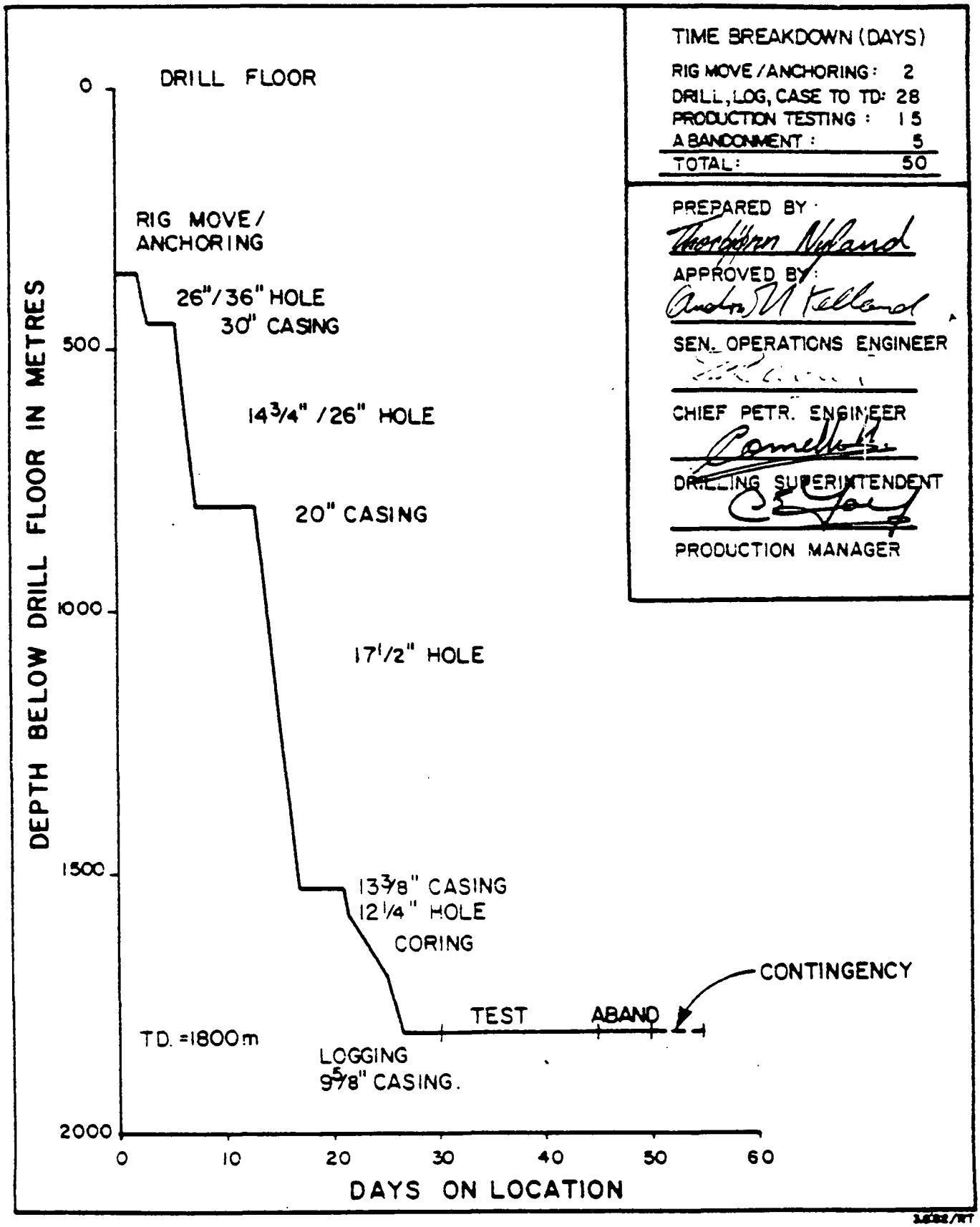
for

DATE:

NSEP FORUS.

G 566

DRILLING PROGRESS CURVE 31/2-1



TIME BREAKDOWN (DAYS)

RIG MOVE/ANCHORING:	2
DRILL, LOG, CASE TO TD:	28
PRODUCTION TESTING:	15
ABANDONMENT:	5
TOTAL:	50

PREPARED BY:
Thorbjørn Nyland

APPROVED BY:
Anders M Folland
SEN. OPERATIONS ENGINEER

CHIEF PETR. ENGINEER

DRILLING SUPERINTENDENT

PRODUCTION MANAGER

3602/RT

G 1175/11

CONTENTS:

ENCLOSURES

A/S NORSKE SHELL

DRILLING PROGRAMME - LOCATION 31/2-I

A. GENERAL

1. Location

a) A/S Norske Shell - Block 31/2 - Production Licence 054

b) Preliminary surface co-ordinates (centre of location) corresponding to SP 668 on seismic line 79-410 and SP 612 on seismic line 8007-328.

GEOGRAPHICAL	UTM (ZONE 31)
60 deg. 47' 37.75" N	NORTHING 6740100 M
03 deg. 29' 39.02" E	EASTING 526900 M

Tolerance: 25 meter radius from proposed location.

2. Base

Tananger Shore Base to Location 263 kms
Bergen Shore Base to Location 114 kms

3. Depth References

a) All depths are given with respect to the rotary table (derrick floor) of the drilling vessel at the specified drilling draught.

b) The drilling draught will be ca. 21.0 m.

c) Expected water depth at location is +/- 330 m (MSL-seabed)

d) Distance from rotary table to MSL is taken as +/- 25 m for this programme but will be measured on site. Distance from rotary table to seabed is taken as +/- 355 m for this programme but will be measured on site.

4. Type of well

Appraisal well.

5. Total Depth

TD in Middle Jurassic Sandstones is anticipated to be +/- 1775 m SS or +/- 1800 m BDF.

6. Drilling Installation

"Borgny Dolphin" - Aker H-3 semi-submersible.

7. Objectives

1) Define top reservoir and intra-reservoir markers downflank of the structure in an area where seismic interpretation is uncertain.

2) Determine the reserves potential in the structurally low area east and north-east of well 31/2-5 and south east of well 31/2-7.

3) Establish the extent of the 27.5 m oil province i.e. the area in which the GOC is at 1541 m.ss.

4) Increase understanding of lithological and petrophysical property variations in prospective zones.

8. Prognosis

Formation Tops	Lithology	Depth TVBDF (m)	Seismic Tolerance (m)
Seabed (Quarternary-Pliocene-Miocene)	Clay, Claystones, Sandstones.	355	+/- 3
Oligocene	Claystones	730	+/- 5
Eocene	Claystones	1050	+/- 5
Balder formation	Claystones, Tuffaceous claystone.	1300	+/- 5
Palaeocene	Claystones, silty claystones. Marls.	1355	+/- 5
Cretaceous	Mudstone, silty mudstone. Limestones.	1525	+/- 5
Top reservoir		1555	+/- 5
Upper Jurassic Sandstones			
Zone 1a	Fine to coarse unconsolidated sandstone. Fine micaceous sandstone. Occasional carbonate cemented bands.		
GOC	Expected in Zone 1a		

Zone 1b	Fine to coarse unconsolidated sandstones. Occasional carbonate cemented bands.	1590	+/- 5
OWC	Expected in Zone 1b		
Zone 2	Fine - silty, consolidated, micaceous sand-stones.	1665	+/- 10
Zone 3	Fine to medium, consolidated, micaceous sand-stones.	1775	+/- 10

TD +/- 1800 m BDF

9. Pressure Regime

Data gained from drilling, electric logging, RFT pressure measurements and production tests show that the wells drilled to-date in block 31/2 are hydrostatically pressured. (See enclosure 3)

The proposed location 31/2-I is some 4.2 km NE of 31/2-5 and 4 km NW of well 31/2-1 and is considered to be in the same hydrostatically pressured regime.

10. Mud Resumé

The 36" hole section is to be drilled with a seawater and viscous pill combination.

The 14-3/4" pilot hole for the 26" hole section is to be drilled with an unweighted gelled-seawater mud combined with the frequent spotting of viscous pills. The 14-3/4" pilot hole will be opened up to 26" using seawater and viscous pills, with the riser removed and returns to seabed.

Note:
Prior to pulling out of the 14-3/4" pilot hole and 26" hole for logging and the running of 20" casing respectively, mud of 1.35 SG is to be spotted in the open hole section, to ensure hole stability.

The 17½" hole section will be drilled with a KCL/Polymer mud system with a mud weight of 1.26 - 1.35 SG (.545 - .585 psi/ft)

Note:
From experience gained on other wells drilled in the block a mud weight of 1.35 SG was required to stabilize this hole section.

For the 12-1/4" hole section the addition of KCL will be stopped in the KCL/Polymer mud. A mud weight of 1.14 SG (.494 psi/ft) will be used in this section. The fluid loss is to be brought down to the lowest practical value but certainly below 5cc.

Note:

1) Mud weights mentioned are a guide only and are liable to change if hole conditions dictate.

2) The mud weight used in the 12-1/4" hole will exert +/- 140 psi overbalance on top of the reservoir in the event of the riser being disconnected.

11. Well Control

A diverter will be hooked up to the riser during the drilling of the 14-3/4" pilot hole for 20" casing. In addition, 1.4 SG mud (.606 psi/ft) should be available during this diverter drilling in case flows are encountered. Cement will also be available on the rig for use in an emergency. Pressure control will be maintained from the 20" casing point to TD in accordance with the well control policy manual EP 40806.

12. Deviation Control

Totcos are to be taken while drilling the 36" and 26" hole sections. Magnetic single shot (MSS) surveys will be taken just below the 20" casing point and thereafter every 90 meters, to coincide with bit trips where possible. The well path is to be calculated using the "Minimum Radius of Curvature" method.

13. Casing Summary

Size	Grade	Weight	Coupling	Interval BDF
30"	X-52,1" WT	310 lbs/ft	ATD-RB squnch	Seabed - 450 m
20"	X-52	129 lbs/ft	H.Swift DW-LH Vetco LS-LH	Seabed - 800 m
13-3/8"	N-80	72 lbs/ft	BTC	Seabed - 1520 m
9-5/8"	N-80	43.5 lbs/ft	BTC	Seabed - 1790 m

Note:

1) The 9-5/8" casing will only be set if the well is to be tested.

2) The 13-3/8", N-80, 72 lbs/ft, BTC casing has been specially drifted at the mill (during manufacturing) and will again be drifted on the pipe rack of the rig (before running) to ensure it will pass a 12-1/4" bit.

14. Wellhead Equipment

Vetco SG-5 18-3/4", 10,000 psi wellhead equipment.

15. Formation Leak-off Tests

Leak-off tests will be made after drilling 5 metres of new hole below 30", 20" and 13-3/8" casing shoes.

16. Casing Accessories

30" Float shoe.

20" Float shoe (automatic fill up). Two spring centralizers on the shoejoint and 3 on the next 6 joints (one per two joints). Two spring centralizers equally spaced inside 30" conductor.

13-3/8" Float shoe + float collar one joint above shoe. 10 spring centralizers - 2 on shoe joint, 6 on the next 12 joints (one every second joint) and 2 inside 20" shoe, spaced 1 joint apart.

9-5/8" Float shoe + float collar 2 joints above the shoe. Two spring centralizers on the shoe track, 1 centralizer per joint up to the base of the OWC, no centralizers across the oil zone, 1 centralizer per joint up to the 13-3/8" shoe and 1 centralizer per 3 joints over the first 100 m of 9-5/8" inside the 13-3/8" casing.

Casing test pressures will be as follows:

20"	1000 psi for 15 mins
13-3/8"	2500 psi for 15 mins
9-5/8"	3000 psi for 15 mins

Pressure tests on the 20", 13-3/8" and 9-5/8" casings to be done immediately after bumping the top plug. The casing may be retested using an RTTS packer set below the top of cement around the particular casing if there is concern over the casing being worn.

Cement calculations: See enclosure 2.

17. Contingency Plans - Stand-by vessel

The current A/S Norske Shell Exploration & Production Emergency Contingency Plan dated 4th of January 1982, and updated 23 July 1982, is valid for this drilling operation.

The name of the stand-by vessel which will be used is M/V "Nautik".

B. SUMMARY OF OPERATION

1. Pre-Spud Phase

Site Survey

A combined seafloor and high resolution seismic survey was carried out partly by Gardline Surveys in December 1981 (Ref. Gardline report 31/2/1255) and partly by A/S Geoteam in August 1982.

The seafloor survey covers an area of 4x4 km around the well location, and the area was surveyed with echo sounder, side scan sonar and mini sleeve Exploder. A deep towed boomer was also used in the section covered by A/S Geoteam. Except for numerous pockmarks in the area no other major features or obstructions which may cause any problems to anchoring/drilling were observed. At the location itself no pockmarks were seen.

The Quaternary sequence consists of 4 units. The top layer of seabed (unit I) consists of soft, slilty clays of about 40 m thickness. This overlies another 40 m thick unit (II) of consolidated clays with occasional sand or gravel lenses. Beneath this is a 50 m thick unit (III) of overconsolidated glacial clays with some boulders present in the eastern area. The 40 m thick unit IV consists of clays with sand layers in the lower half. The Tertiary bedrock (Oligocene-Pliocene) is mainly composed of claystones, with some siltstone layers.

No indication of shallow gas is observed in the area

2. Rig Positioning

The rig will be brought on to location utilizing Decca Pulse-8 with HP minicomputer. All anchors will be run out plus/minus 1400 m. The rig will be positioned with a heading of 315 deg True North. After anchors have been set, each anchor will be tested to plus/minus 400,000 lbs for 1 hour. After a satisfactory mooring test, approximately 250,000 lbs tension will be maintained on all anchor chains.
Satnav. will be used to determine the final coordinates of the location, minimum of 40 satellite passes are required.

3. Spudding in, drilling 36" hole and running 30" Casing

1. Check the seabed condition by lowering underwater TV on the guide lines prior to setting the TGB on seabed.

2. Set TGB (with 5 m skirt). A Regan slope indicator is to be run on the TGB running tool to give an indication of the TGB angle. The TGB guide lines are to be marked at the spider deck level so that any subsequent sinking or tilting will be detected.
   Note:
   Calculate the DF - seabed distance and Mean Sea Level (MSL) after landing the TGB, taking into account the drilling draught and tidal variation.

3. Make up a 36" hole opener and 26" pilot bit assembly. Drill down to 30" casing setting depth, taking a survey (Totco) after the first kelly down. Additional surveys will be carried out as necessary, depending on hole angle. If hole angle is greater than 1½ degree then contact Base.

   Before POH to run 30" casing circulate high viscosity mud (60 MF) in the hole, using 100% excess.

4. Run 30" casing plus PGB equipped with a Regan slope indicator (to be installed in the middle of a side beam, as close to the beam as possible). Install a second Regan slope indicator on the 30" running tool. Ensure that the slope indicators are properly level and zeroed and will be visible on the subsea TV.

5. When the 30" casing is landed observe the angle with the subsea TV camera. If the angle is 1 degree or less, cement the casing using 200% excess cement. (For cement calculations see enclosure 2A.)

6. WOC. RIH with jetting sub and wash in and around the wellhead housing. Divers to check around the guide bases with an observation dive, if thought necessary.

7. If excessive cratering is observed, re-cementing around the guide base or seabed may be considered prior to drilling out of the 30" casing. Or if this problem is anticipated, consider using 300% excess cement instead of 200%.

   Note:

   a) For the single stack system the angle of the PGB and the BOP stack, and the base being level, are of utmost importance and good support is required to carry the heavy load of the stack.

   b) Observe operations such as placing of the TGB and PGB, spudding in, stabbing in, drilling with returns to seabed, cementing of the 30" and 20" casings, with the rig's underwater TV camera.

   c) Adjust anchor tension to facilitate stabbing, running and cementing of the 30" casing.

   d) Ensure that the tension of the guide lines is optimum so that the TGB will not be lifted on one side or be tilted by excessive uneven guide line tension.

4. Drilling 26" hole and running 20" casing

1. Drill out cement in 30" casing and 36" pocket with 26" hole opener and 14-3/4" pilot bit with a stabilizer at 20 m and start 14-3/4" pilot hole. POH and lay down 26" hole opener and stabilizer.

2. RIH with Lynes inflatable packer on drill pipe and sufficient drill collars and set same in the bottom of the 30" casing. Carry out a formation leak-off test. POH with packer.

3. Run 30" hydraulic latch and dump valve complete with ball joint on 21" riser. Use minimum required tension on ruckers. Fill up riser with seawater and observe fluid level.

4. Make up 14-3/4" pilot hole drilling assembly. Use a float sub, with the float installed, and run in hole.

5. Close diverter around drill pipe, and circulate through both diverter lines to check the diverter equipment, gradually building up to maximum circulating rate. Open diverter packing.

6. Drill 14-3/4" pilot hole to the 20" casing setting depth, allowing for a 10 m pocket and taking Totco surveys as required.

   Note:

   This section is to be drilled using an unweighted gelled mud and the weight of annular returns is to be continuously monitored. If the weight of annular returns causes losses or exceeds 1.15 SG (498 psi/1000 ft) stop drilling and circulate the hole clean. ROP must be controlled whilst drilling this section.

7. Perform a check trip to the 30" shoe and back to bottom, clean out any fill and spot viscous mud of 1.35 SG (585 psi/1000 ft) in the open hole section prior to pulling out of hole for logging.

8. Rig up Schlumberger and log as programmed.
   Note:
   Inspect the logs for indications of shallow gas prior to continuing with the programme. If any indications of shallow gas are observed then call Base and a revised programme will be issued.

9. Rig down Schlumberger and run in hole to TD. Circulate the hole volume to seawater and open the dump valve (close kelly cock). Observe well static for ½ hour and then spot viscous mud in the open hole section. If flow occurs, the 14-3/4" pilot hole will be under-reamed as described under "Notes on Diverter Drilling" item d page 15.
   Note:
   The 1.35 SG mud spotted prior to logging, should be circulated out in steps and dumped via the dumpvalve to prevent losses to the formation due to the heavy mud entering the marine riser.

10. Pull out of hole and retrieve the 30" hydraulic latch on riser.

11. RIH with Lynes inflatable packer on drill pipe and sufficient drill collars and set same in the bottom of the 30" casing. Repeat the formation leak-off test. POH with packer.
    Note:
    This leak-off test will only be carried out if no shallow gas has been detected.

12. Pick up a 14-3/4" pilot bit and 26" hole opener with a 26" stabilizer at 20 m above the bit. Open the hole up to 26" using seawater and viscous pills as required.

13. Perform a check trip to the 30" shoe and back to bottom, clean out any fill and spot viscous mud of 1.35 SG (585 psi/1000 ft) in the open hole section prior to pulling out of hole for running casing.

14. Run and cement 20" casing as per programme.
    Note:
    Baffle plate will be installed between first and second casing joint and 1 subsea plug (top plug) will be used for cement displacement.

15. Unlatch the running tool and POH.

16. RIH with a jetting sub and wash in and around the 18-3/4" wellhead housing. POH and lay down the jetting sub.

17. Install the 18-3/4" BOP stack and 21" Marine Riser. Test BOP stack, complete with casing. For stack test procedure see "Stack Testing" item C. Make up drill pipe hang off assembly and circulating head assembly. Install wearbushing.

Notes on Diverter Drilling/ Shallow gas drilling

a) A diverter system is fitted on the "Borgny Dolphin" to provide a means of controlling the flow should shallow pressures be encountered whilst drilling for the first casing string (20" surface casing).

b) The diverter system is not a blowout preventer. It is not designed to hold pressure, but instead, to direct the flow overboard. The controls of the flowline valves are manifolded in such a way that it is impossible to hold any pressure in the diverter. The downwind blow-off line must always be open.

c) Severe Losses

If severe losses are encountered while drilling with returns to surface, pull out and drill a 8½" pilot hole instead of 14-3/4" and restrict penetration rates to obtain the lightest possible annular returns. If severe losses are continuing, open the dumpvalve and drill a 8½" pilot hole with returns to seabed.

If gas is encountered whilst drilling 8½" pilot hole with seawater and returns to seabed, spot heavy mud and inform Base.

d) Gas Flow (No Losses)

If there are any signs of gas having been encountered whilst drilling the 14-3/4" pilot hole carry out the following programme: -

i) Drill to 20" casing setting depth with the mud weight required.

ii) Circulate the hole clean and make a wiper trip to the 30" shoe and back to bottom. Circulate bottoms-up and spot weighted viscous mud as required. POH.

iii) Run logs as programmed.

iv) RIH with 14-3/4" bit and displace hole to mud with required weight for under-reaming. Dump heavy mud via dump valve. POH.

v) RIH with 26" hydraulic under-reamer with a 14-3/4" pilot bit and 17½" stabilizer.

vi) Under-ream the 14-3/4" hole to 26". Check hole size with a BGT log.

vii) RIH and circulate the hole clean.

viii) Increase the weight of the mud in the interval TD - seabed, to give an overbalance to any potential gas zones and thus compensate for removing the riser.

ix) POH to seabed. Circulate the drillpipe and marine riser to seawater and close kelly cock. Open the dump valve and observe the well static for 30 mins. Unlatch the 30" hydraulic latch and pull the marine riser.

x) Run a BGT to check hole size.

xi) Rig up and run 20" casing.

Note:

- Differential fill shoe will be converted to regular float shoe prior to running casing.
- Casing will be filled with mud, weight as in step viii above, whilst RIH.
- If the casing has to be circulated down and when circulating prior to cementing, weighted mud (as used in step viii) above is to be used.

e) Gas Flow and Severe Losses

If any flow of gas is encountered whilst drilling the 14-3/4" pilot hole with returns to surface, and the required increased mud weight to counteract the gas flow causes severe losses, then inform Base and the various options will be considered.

Note:
There should be sufficient barytes and SAPP (1500) kg onboard the rig to allow for the setting of baryte plugs. Further programme will be advised in this case.

5. Drilling 17½" hole and running 13-3/8" casing

1. Drill out shoe track and shoe with a 17½" bit. Drill 5 m of new hole, and carry out a formation leak-off test.

2. Drill 17½" hole to programmed depth.
   Note:
   This hole section will be drilled with a KCL/Polymer mud starting off with a mud weight of 1.26 SG which will be increased to 1.35 SG before reaching casing setting depth.

3. Log as per programme. Make up 13-3/8" casing hanger with seal assembly and subsea cementing assembly (use two plugs) and stand back in derrick.

4. Make checktrip to casing setting depth and wash wellhead area on the way out. Pull wearbushing and run 13-3/8" casing to landing point, leaving 10 m pocket below the 13-3/8" shoe.

5. Cement 13-3/8" casing as per programme. Energize the seal assembly. Clean out the stack area prior to pulling out with the running string.

6. Carry out stack and casing tests as per "Stack Testing" Item C. Install wearbushing. Make up drillpipe hang-off assembly and circulating head assembly. Carry out a kickdrill.

6. Drilling 12-1/4" hole and running 9-5/8" casing

1. Drill out float collar, cement and shoe. Drill 5 m of new hole, and carry out a formation leak-off test.

2. Drill 12-1/4" hole to programmed depth. Bit weight, RPM, bit selection and bottom hole assembly to be determined on site for optimum penetration rate.
   Note:
   Coring will commence, using fibreglass inner corebarrel and 8½" core head, from the top of the reservoir in the Upper Jurassic sandstone. Approximate interval to be cored is 1555 - 1675 m BDF. The cored interval will be opened up to 12-1/4" prior to logging.

3. Carry out logging programme, including wire line tests if necessary.
   Note:
   Dependent upon the results of the logs the well will either be abandoned or 9-5/8" casing will be run to allow for testing. If the well is to be tested, then proceed with step 4 below.

4. Make up 9-5/8" casing hanger with seal assembly and subsea cementing assembly (using two plugs) and stand back in derrick.

5. Make check trip and wash wellhead on the way out. Pull wearbushing and run 9-5/8" casing to landing point, leaving a 10 m pocket below the 9-5/8" shoe.

6. Cement the 9-5/8" casing as per programme. Energize the seal assembly. Clean cut the stack area prior to pulling out the running tool. Whilst displacing, (in turbulent flow at 250 ft/min or higher), returns are to be monitored closely. If losses are observed adjust pump rates until full returns are obtained.

7. Carry out stack and casing tests as per "Stack Testing" Item C. Install wearbushing. Carry out a kickdrill.
   Note: At this point the testing phase will commence and a separate testing programme will be advised.

7. Abandonment

A specific abandonment/suspension programme will be prepared and issued when the well reaches total depth, but the general points below will apply:

1. If there is open hole below the last casing then all porous zones in the open hole interval will be isolated with cement plugs extending 50 m above and below each zone. In addition a cement plug, extending 50 m above and below the casing shoe, shall be set. The top of the cement plug shall be located and load tested. A mechanical bridge plug may be set in the lower part of the casing but not more than 50 m above the shoe. A 20 m cement plug must be placed on top of the bridge plug. The plugs at the last casing shoe shall be tested to 1000 psi (70 bar) differential pressure.

2. Perforations shall be isolated by means of a mechanical bridge plug and squeeze cemented, or a cement plug shall be placed across the perforations extending 50 metres above and below the perforated interval or down to a casing plug whichever is less.

3. Cement plugs of at least 50 metres shall be placed in the smallest casing string extending to seabed. These plugs shall be placed at the level of the 13-3/8" casing shoe and the 20" casing shoe.

4. A cement plug of at least 200 metres, with the top of the plug not more than 50 metres below the sea floor, shall be placed in the smallest string of casing extending to the sea floor.

5. Casing strings and other installations extending above the sea floor will be removed to a depth of at least 5 metres below the ocean floor.

6. The sea floor in the vicinity of the borehole will be inspected by underwater TV/observation dive to ensure that no obstructions remain on the sea bed which may cause danger or impediment to fishing or shipping.

C. STACK TESTING

The regular tests of the BOP stack in service have to be limited to the following pressures, unless differently advised by the base.

18-3/4", 10.000 psi BOP Stack

1.	Pipe Rams (including variable ram)	: 4000 psi
2.	Blind Rams	: Casing test pressure, as specified in Item A-16
3.	Kill/choke lines and valves	: 4000 psi
4.	Annular preventers	: 2000 psi around 5" DP 1500 psi around 3-1/2" DP

a) Test 1,3 and 4 to be carried out with a boll weevil tester run on DP and landed in the wellhead.

b) Test 2 to be carried out only when the cement of the last casing is not yet drilled out.

c) The 13-3/8" and 9-5/8" seal assemblies are to be tested to 4250 psi.

Accumulator Tests

The accumulators must have sufficient capacity to be able to close, open and close all preventer with both air and electric charge pumps off, and then still have enough pressure left to provide working fluid for 25% of one closing function. Minimum recharge time from above condition with both air and electric pumps running should be in accordance with manufactorer's specifications. A note that this test has been carried out (and results) must be made in the Drilling Report and on weekly BOP test checklist. For frequency see item 10 of this section.

Notes on Testing

1. The BOP stack has to be tested on all functions and all rams tested to the full rated WP at surface prior to running the Stack. However, the blind/shear rams will be tested only on orders of Base, but at least once per month during a routine stack test. After the surface tests all Cameron clamp connections and all studded connections must be checked for tightness.

2. All presssure tests to be carried out with water, unless differently advised by Base.

3. All surface equipment has to be satisfactorily pressure tested prior to testing the BOP stack underwater.

4. When running the Marine Riser with integral kill and choke lines, the kill and choke lines can be tested while running in at various stages. This should be done at least twice, firstly as soon as the stack is below sea level, and secondly, just before landing the stack.

5. When testing the BOP stack underwater with a boll weevil test tool in the wellhead, use the vented red-painted test single.

6. All pressure tests should be done in 500 psi stages up to the required test pressure.

7. The test pressure should be kept on for 15 minutes, and the acceptable pressure drop over this 15 minutes period is 10% of the initial test pressure, provided that the pressure remains constant for the next 5 to 10 minutes.

8. All pressure tests to be recorded on pressure recorder charts. A record is to be kept of the volumes required to obtain the test pressure, and of the volumes returned when bleeding off.

9. For all pressure tests either the Shell TP or WSPE will be present at the pumping unit to monitor volumes/pumped and pressures.

10. The opening/closing times and the volumes of hydraulic operating fluid required for the operation of the various underwater stack components (such as: rams, kill and choke valves, annular preventers, hydraulic connectors, etc.) should be recorded during testing of the stack underwater. These results should be compared with the normal opening/closing times and volumes required of the hydraulic system. Any major differences are an indication that the system is not operating "normally" and may require further investigation and/ or repairs.

11. The testing of 10,000 psi BOP stack will be done to 4000 psi only, at the weekly routine BOP test underwater. If higher test pressures are required then, depending on the well programme, the test pressure will be increased to the value required and carried out with a boll weevil test tool, e.g. subjecting the seals of the seal assembly to the same pressure as the BOP stack, or by means of a weight set tester, subjecting only the stack to the required test pressure. Run 2 stands drill collars below the weight set tester to assist in shearing the pins with set down weight.

    See item 1 on blind/shear rams.

12. Accumulator tests (as described previously) should be performed either on request of Base, or after repairs have been made to the accumulator system, i.e. bottles, bladders, pumps, etc.

D. EVALUATION REQUIREMENTS

1. Cutting Samples

Ditch cuttings to be collected every 10 m below 30" casing down to 1275 m BDF, and every 3 m thereafter. The following samples will be required for partners/ government bodies:

a) 5 x full large bags (2 kg each) of wet cuttings.
b) 1 x medium large bag (1 kg) of wet cuttings for biostratigraphy.

1 x 2 kilogram large bag of wet samples from each interval should be kept on board until the well has reached TD when the complete set should be sent in. 4 wet (large bags) samples should be sent ashore ASAP by boat, marked for attention of EPXV/1, Tananger. Biostratigraphy samples should be in cardboard boxes and sent in by the first available helicopter.

2. Coring

Coring is to commence from top of the reservoir in the Upper Jurassic sandstone, and is to continue through the complete hydrocarbon-bearing sequence until just below top of zone 2 in the Upper Jurassic sandstone. Approximate interval to be cored is 1555 - 1675 m BDF, (i.e. 120 m section).

8-1/2" core-head and fiberglass innerbarrels are to be used.

Note: A 150 gram sand sample will be taken from each 90 cm length of core taken across the oil bearing sand and properly labelled. This sample will be used in sieve analysis to optimize sand size for a possible gravelpack completion.

3. Logging Programme

At 20" casing depth	ISF/SONIC/SP/GR (GR to seabed) LDT/CNL/CAL/GR
At 13-3/8" casing depth	ISF/SONIC/SP/GR LDT/CNL/CAL/GR SWS (as required)
At 9-5/8" casing depth (TD logging)	ISF/SONIC/SP/GR LDT/NGT/CNL/CAL/GR MSFL/DLL/CAL/SP/GR HDT RFT's (as required) Velocity Survey SWS (as required) CBL (on 13-3/8" casing and 9-5/8" casing).

4. Testing Programme

Testing of the well is subject to confirmation upon receipt of logs.

The intention is to production test the oil zone if sufficient thickness of oil column is found to be present. The completion technique to be applied, either internal gravel pack (IGP) or a milled casing under-reamed gravel pack (MCURGP), will depend on the evaluation of the production test results of well 31/2-9 currently being drilled.

E. CASING DESIGN

Casing designs are presented for the 20", 13-3/8" and 9-5/8" casings (See Encl. 1.0.)

The following assumptions apply:

1. For tension, a design safety factor of 1.6 is used, neglecting buoyancy in the drilling fluid.

2. Bi-axial effects have been neglected except in the case of the lowering of collapse resistance caused by tension. No allowance is given for the increase of burst resistance caused by tension.

3. For burst, a design safety factor of 1.1 is employed. The pressure distribution for the burst loading assumes a 40% evacuation of mud from the well by a kick. (This is equivalent to a kick volume in excess of 100 bbls).

4. For collapse, a design safety factor of 1.0 is employed. For the 20" and 9-5/8" casings total evacuation has been assumed for the design. For the 13-3/8" casing, evacuation of 85 % has been assumed for the design.

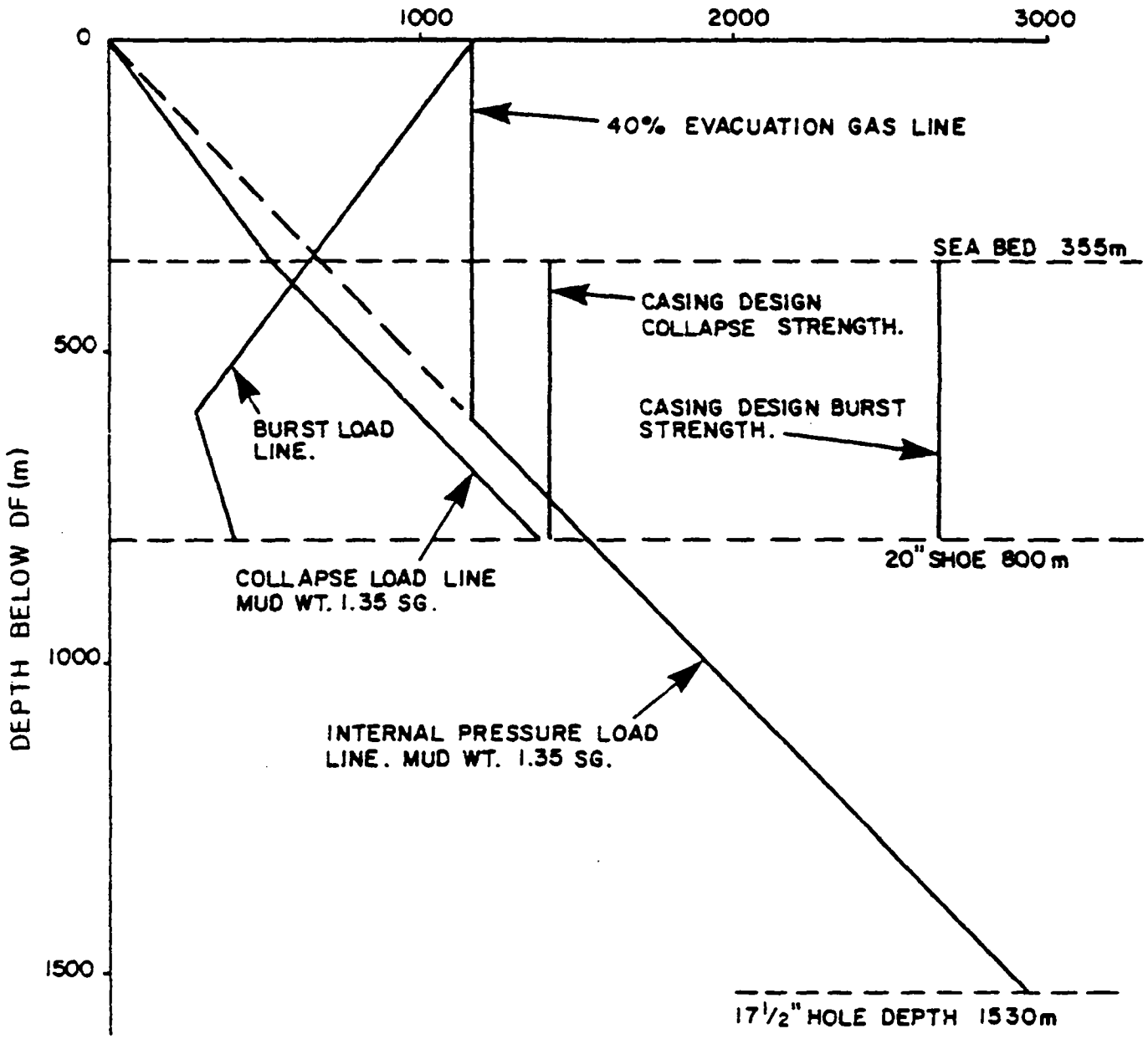
5. In the production test design for casing burst, a tubing leak is assumed putting full THP on the tubing/casing annulus, filled with 1.15 S.G. fluid.

F. GLOSSARY OF ABREVIATIONS

BDF	:	below derrick floor
BGT	:	borehole geometry tool
BOP	:	blow out preventer
FS	:	fail safe (as in FS valve)
GOC	:	gas oil contact
ID	:	internal diameter
MF	:	Marsh funnel (mud viscosity)
MR	:	Marine riser
MSL	:	mean sea level
MSS	:	magnetic single shot
OD	:	outside diameter
OWC	:	oil water contact
PGB	:	permanent guide base
PPG	:	pounds per US gallon
PV	:	plastic viscosity
ROP	:	rate of penetration
SS	:	sub sea
TD	:	total depth
TGB	:	temporary guide base
THP	:	tubing head pressure
TMCM	:	Transverse Mercator Central Meridian
UGF	:	universal guide frame
YP	:	yield point
WHP	:	wellhead pressure
WP	:	working pressure
WOC	:	wait on cement
UTM	:	Universal Transverse Mercator

ENCL. IA

20" CASING DESIGN 31/2-I



FOR 20", 129.3 LB/FT, X-52, HUNTINGSWIFT DW-LH/VETCO LS-LH CASING.

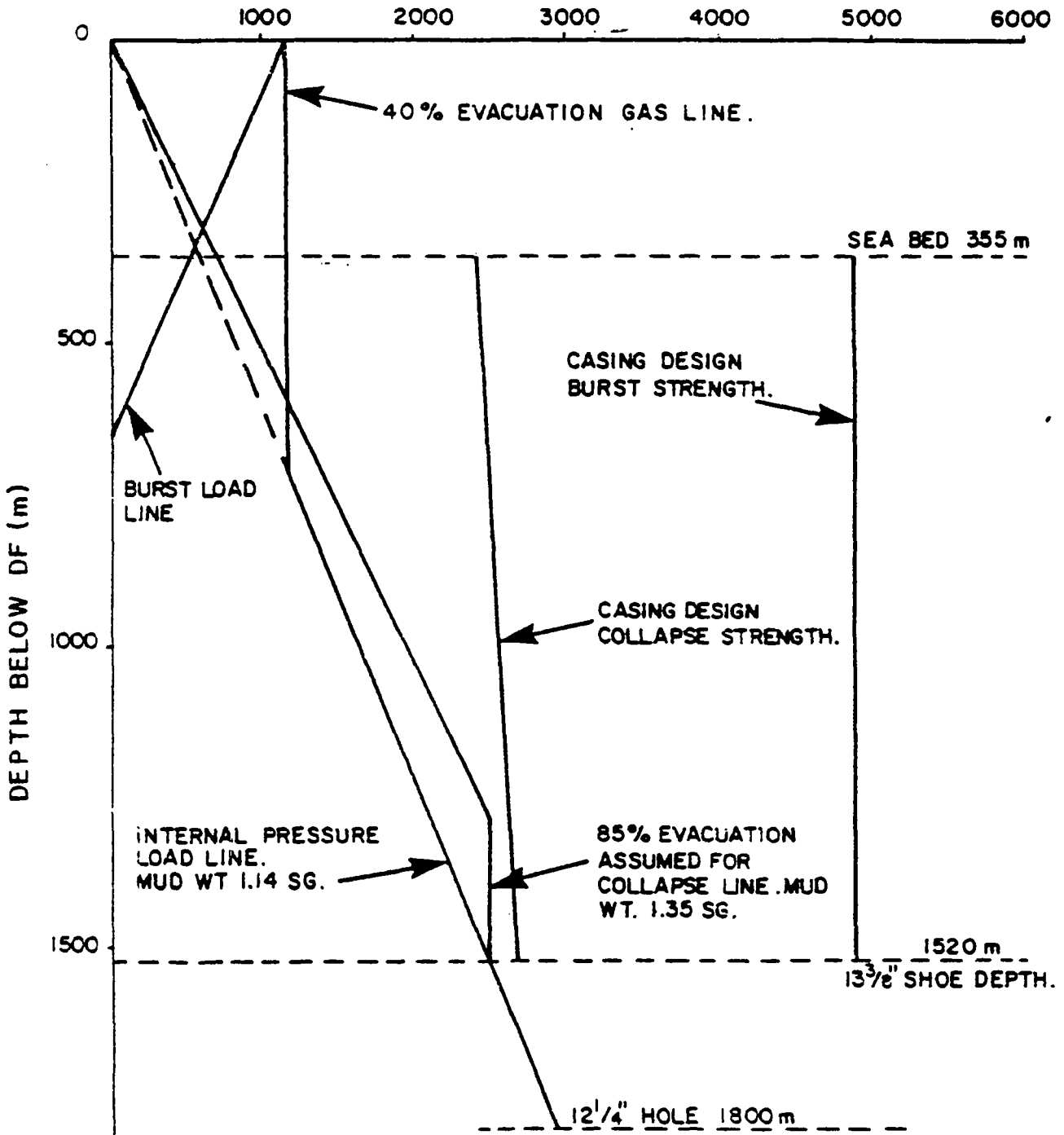
	COLLAPSE	BURST	TENSION
API RATING	1410	2930	1.978.000
SAFETY FACTOR	1.0	1.1	1.6
DESIGN STRENGTH	1410	2663	1.236.250

MAXIMUM TENSILE LOAD = 129.3 x 3.281 x (800-355) = 188.783 LBS

20" 129.3 LB/FT, X-52 CASING IS THEREFORE SATISFACTORY IN BURST, COLLAPSE AND TENSION FOR THIS WELL.

ENCL. 1B

13 3/8" CASING DESIGN 31/2-I



FOR 13 3/8", 72 LB/FT, N80, BTC CASING.

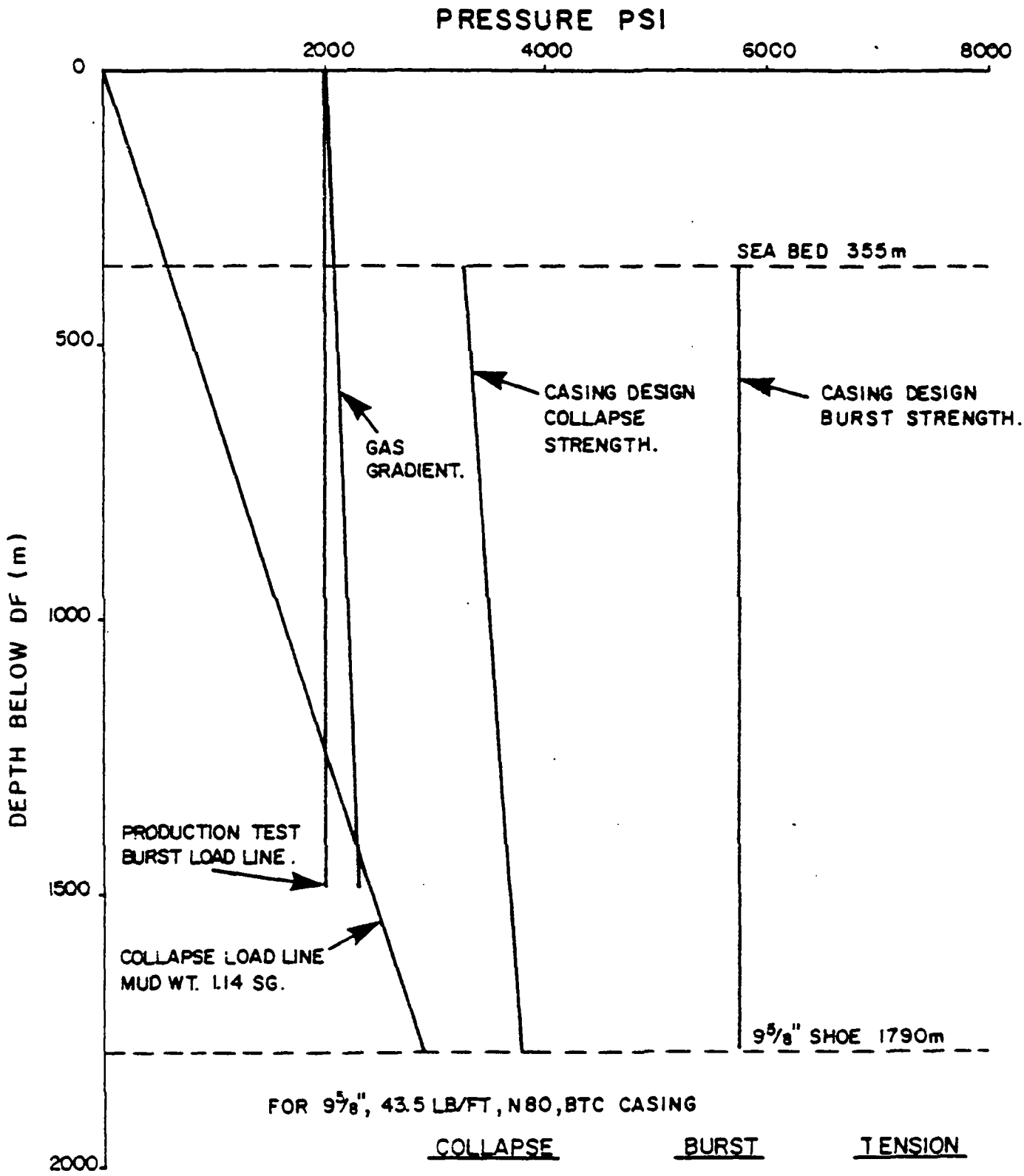
	COLLAPSE	BURST	TENSION
API RATING	2670	5380	1661000
SAFETY FACTOR	1.0	1.1	1.6
DESIGN STRENGTH	2670	4891	1038125

MAXIMUM TENSILE LOAD = 72 x 3.281(1520-355) = 275.210 LBS

13 3/8", 72 LB/FT, N80, BTC CASING IS THEREFORE SATISFACTORY IN BURST, COLLAPSE AND TENSION FOR THIS WELL.

9⅝" CASING DESIGN 31/2-I

ENCL. IC



FOR 9⅝", 43.5 LB/FT, N80, BTC CASING

	COLLAPSE	BURST	TENSION
API RATING	3810	6330	1005000
SAFTY FACTOR	1.0	1.1	1.6
DESIGN STRENGTH	3810	5754	628125

MAXIMUM TENSILE LOAD 43.5 x 3.281 x (1790 - 355) = 204.808 LBS

9⅝" 43.5LB/FT, N80, BTC CASING IS THEREFORE SATISFACTORY IN BURST, COLLAPSE AND TENSION FOR THIS WELL.

THE DESIGN SHOWS THAT THE CASING CAN WITHSTAND A PRODUCTION TEST ON THE MAIN GAS RESERVOIR.

CEMENT CALCULATIONS

30" Cementation

Extended Norcem Class "G" cement of lead slurry weight 13.2 ppg(1.58 SG) and 10 m of 15.8 ppg(1.90 SG) tail slurry above the shoe are to be used. The casing is to be cemented back to seabed, and an excess of 200% is to be used over open hole intervals. Cement displaced to 10 m above shoe.

Data: Casing 30" 1" WT/VETCO "ATD-RB"
30" shoe 450 m BDF
36" hole 460 m BDF

13.2 ppg Lead Slurry Volumes

i)	36" x 30" annulus	= (440-355)x3.281x2.1598x3	=	1807.0 cu.ft.
	Cement required	= 1807.0/1.89	=	956.1 sxs
			=	40.8 m/t
	Seawater required	= 956.1 x 10/42	=	227.6 bbls
	Econolite required	= 956.1 x 0.36	=	344.2 gals.

15.8 ppg Tail Slurry Volume

i)	36" x 30" annulus	= (450-440)x3.281x2.1598x3	=	212.6 cu.ft.
ii)	36" pocket	= (460-450)x3.281x7.0686x3	=	695.8 cu.ft.
iii)	30" casing fill	= 10 x 3.281 x 4.2761	=	140.3 cu.ft
		Total slurry	=	1048.7 cu.ft.
	Cement required	= 1048.7/1.17	=	896.3 sxs
			=	38.2 m/t
	Seawater required	= 896.3 x 5.15/42	=	109.9 bbls
	$CaCl_2$ required 3%(BWOC)	= 896.3 x 94 x 0.03/2205	=	1.15 m/t

20" Cementation

Extended Norcem Class "G" cement of lead slurry weight 13.2 ppg(1.58 SG), and 60 m of tail slurry above the shoe, of weight 15.8 ppg(1.90 SG) are to be used. The casing is to be cemented back to seabed and an excess of 100% is to be used over open hole intervals. Cement to be displaced to the baffle plate approximatly 12 m above the float shoe using 1 subsea cement plug.

Data: Casing 20"/129 lbs/ft/X-52/Hunting SWIFT DW - LH/Vetco LS-LH
30" shoe at 450 m BDF
36" hole at 460 m BDF
20" shoe at 800 m BDF
26" hole at 810 m BDF

13.2 ppg Lead Slurry Volumes

i)	30" x 20" annulus	= (450-355)x3.281x2.0944	=	652.8 cu.ft.
ii)	36" x 20" annulus	= (460-450)x3.281x4.8869x2	=	320.7 cu.ft.
iii)	26" x 20" annulus	= (740-460)x3.281x1.5053x2	=	2765.8 cu.ft.
		Total slurry volume	=	3739.3 cu.ft.
	Cement required	= 3739.3/1.89	=	1978.5 sxs
			=	84.3 mt
	Seawater required	= 1978.5 x 10/42	=	471.1 bbls
	Econolite required	= 1978.5 x 0.36	=	712.3 gals

15.8 ppg Tail Slurry Volumes

i)	26" x 20" annulus	= (800-760)x3.281x1.5053x2	=	592.7 cu.ft.
ii)	26" pocket	= 10 x 3.281 x 3.6870 x 2	=	241.9 cu.ft.
iii)	20" casing fill	= 10 x 3.281 x 1.9133	=	62.8 cu.ft.
		Total slurry volume	=	897.4 cu.ft.
	Cement required	= 897.4/1.17	=	767.0 sxs
			=	32.7 mt
	Seawater required	= 767.0 x 5.15/42	=	94.0 bbls
	$CaCl_2$ required 2% (BWOC)	= 767.0 x 94 x 0.02/2205	=	0.65 mt

13-3/8" Cementation

Extended Norcem Class "G" cement of lead slurry weight 13.2 ppg(1.58 SG), and 100 m of tail slurry above the shoe, of weight 15.8 ppg(1.90 SG) to be used. The casing is to be cemented back to 150 m inside the 20" casing using 30% excess on open hole volumes. If caliper is available, use 20 % excess over and above the estimated caliper volume. Cement will be displaced to a float collar c. 13 m above the shoe.

Data: Casing 13-3/8"/72 lb/ft/N80/BTC
20" shoe at 800 m BDF
26" hole at 810 m BDF
13-3/8" shoe at 1520 m BDF
17-1/2" hole at 1530 m BDF

13.2 ppg Lead Slurry Volumes

i)	20" x 13-3/8" annulus	= (800-650)x3.281x0.9377	=	461.5 cu.ft
ii)	26" x 13-3/8" annulus	= (810-800)x3.281x2.7113x1.3	=	115.6 cu.ft
iii)	17½"x 13-3/8" annulus	=(1420-810)x3.281x0.6946x1.3	=	1807.2 cu.ft
		Total slurry volume	=	2384.3 cu.ft
	Cement required	= 2384.3/1.79	=	1332.0 sxs
			=	56.8 mt
	Mixwater required	= 1332.0 x 9.47/42	=	300.3 bbls

Additives to be advised.

15.8 ppgTail Slurry Volumes

i)	17½"x 13-3/8" annulus	=(1520-1420)x3.281x0.6946x1.3	=	296.3 cu.ft.
ii)	17½" pocket	= 10 x 3.281 x 1.6703 x 1.3	=	71.2 cu.ft.
iii)	13-3/8" shoe track	= 13 x 3.281 x .8314	=	35.5 cu.ft.
		Total slurry volume	=	403.0 cu.ft
	Cement required	= 403.0/1.15	=	350.4 sxs
			=	14.9 mt
	Mixwater required	= 350.4 x 5.07/42	=	42.3 bbls

Additives to be advised.

9 5/8" Cementation

Norcem Class "G" cement at 15.4 ppg(1.85 SG) slurry weight will be used as the main slurry up to 1345 m BDF. 50 bbls (262 m) of 13.5 ppg(1.62 SG) scavenger slurry (Class "G") is to be pumped ahead of the main 15.4 ppg slurry. A 20% excess is to be used over and above estimated caliper volume over open hole intervals, and cement is to be displaced to a float collar c.24 m above the shoe.

Data: Casing 9-5/8"/43.5 lb/ft/N80/BTC
13-3/8" shoe at 1520m BDF
17-1/2" hole at 1530m BDF
9-5/8" shoe at 1790m BDF
12-1/4" hole at 1800m BDF

15.4 ppg Slurry Volume

i)	13-3/8"x9-5/8" annulus (1520-1345)3.281x.3262	=	187.3 cu.ft.
ii)	17-1/2"x9-5/8" annulus (1520-1510)3.281x1.1651x1.2	=	45.9 cu.ft.
iii)	12-1/4"x9-5/8" annulus (1790-1530)3.281x.3132x1.2	=	320.6 cu.ft.
iv)	12-1/4" pocket 10x3.281x0.8185x1.2	=	32.2 cu.ft.
v)	9-5/8" shoe track 24 x 3.281 x 0.4180	=	32.1 cu.ft.
	Total slurry volume	=	618.1 cu.ft.

Cement required	= 618.1/1.23	=	502.5 sxs
		=	21.4 mt
Mixwater required	= 502.5 x 5.67/42	=	67.8 bbls

Additives to be advised.

13.5 ppg Scavenger Slurry Volumes

i)	13-3/8" x 9-5/8" annulus (1345-1083)3.281x.3262	=	280.4 cu.ft.

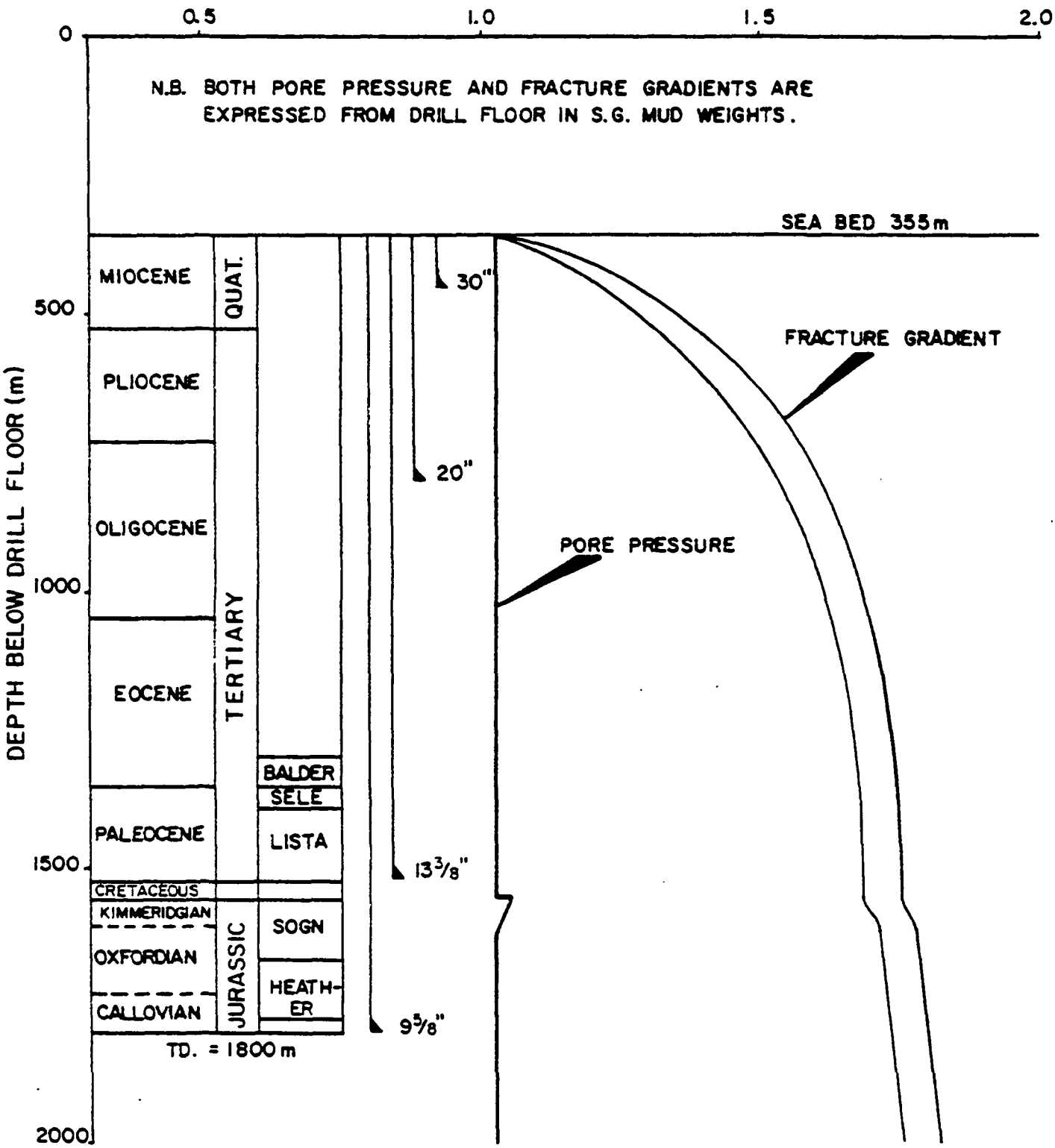
Cement required	= 280.4/1.71	=	164.0 sxs
		=	7.0 mt
Mixwater required	= 164.0 x 9.27/42	=	36.2 bbls

Additives to be advised.

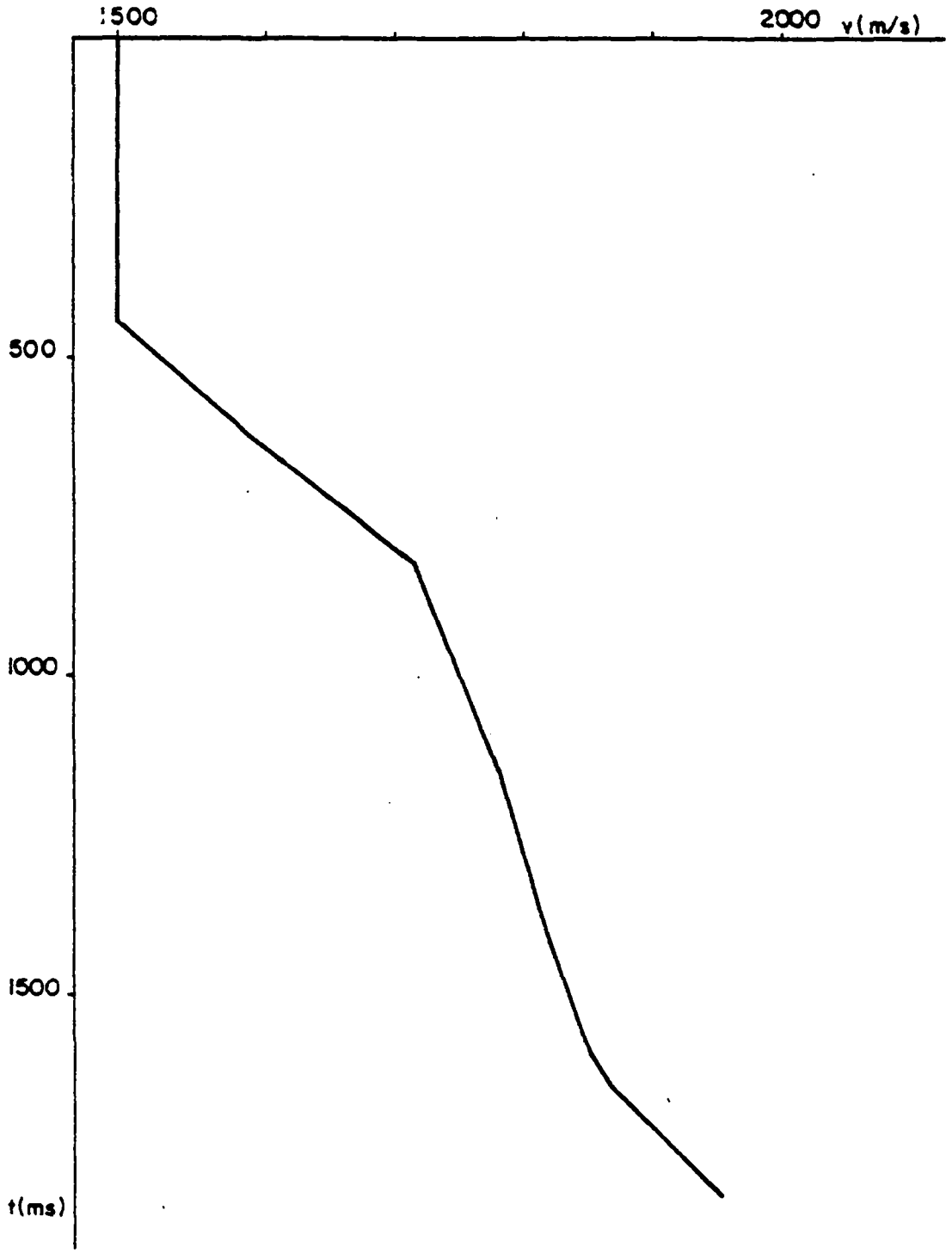
ENCL. 3

WELL 31/2-I

ESTIMATED PORE PRESSURE AND FRACTURE GRADIENTS SHOWING THE DEGREE OF UNCERTAINTY



AVERAGE VELOCITY VS. SEISMIC TIME

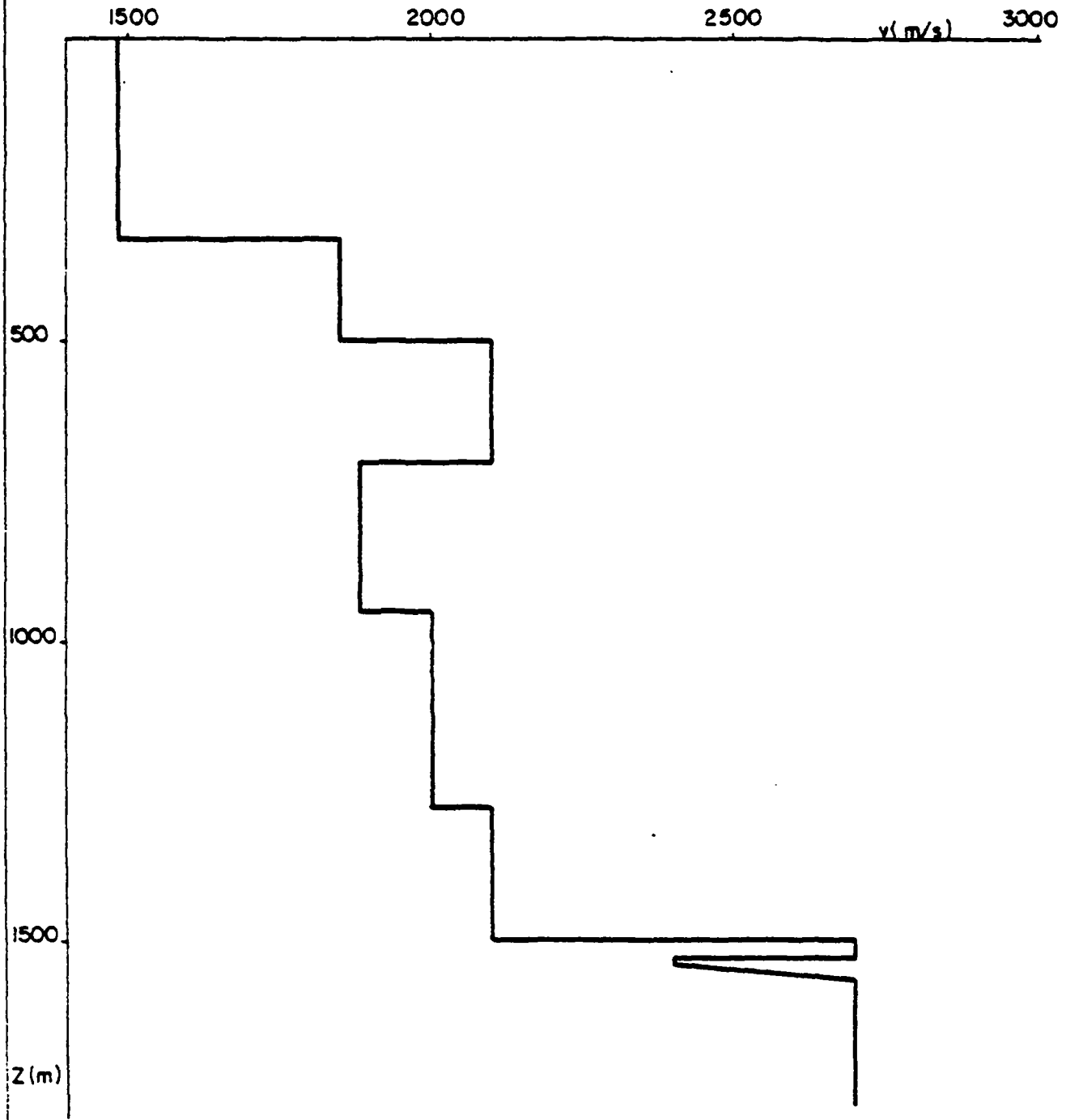


a.s Norske Shell
EXPLORATION & PRODUCTION FORUS

DRILLING PROGRAMME
LOCATION 31/2-1

AUTHOR EPPP/33 ENC. 4 DATE SEP. 1982
REPORT NO NSEP183 DRAW NO 61220

INTERVAL VELOCITY VS DEPTH



a.s Norske Shell
EXPLORATION & PRODUCTION FORUS

DRILLING PROGRAMME

LOCATION 31/2-1

AUTHOR EPFR/33 | ENCL | DATE SEP 1982
REPORT NO NSEP 183 | 5 | DRAW NO 61220