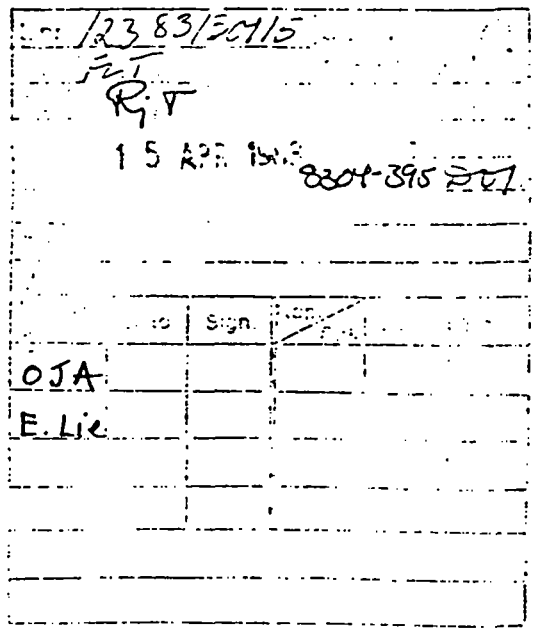
DRILLING PROGRAMME

LOCATION 31/2-N

(31/2-12)



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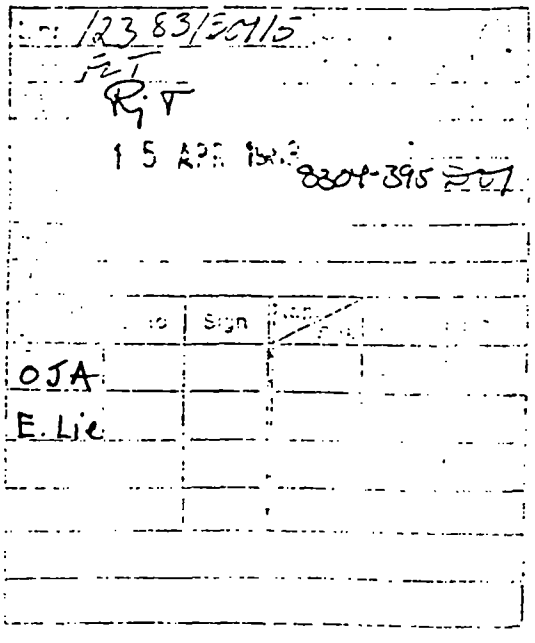
April 1983

A/S NORSKE SHELL
LICENCE 054

DRILLING PROGRAMME

LOCATION 31/2-N

(31/2-12)



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April 1983

A/S NORSKE SHELL
LICENCE 054

NORSKE SHELL E&P,FORUS.

DRILLING PROGRAMME

CONFIDENTIAL

LOCATION: 31/2-N

WELL: 31/2-12

RIG: BORGNY DOLPHIN

PRODUCTION LICENCE No.: 054

ESTIMATED DAYS: 63

CO-ORDINATES OF LOCATION

60 deg 50' 06.0" N

03 deg 30' 47.9" E

HOLE SIZE (INS)	HOLE DEPTH/ CASING DEPTH (metres)	CASING	CEMENT			MUD		LOGGING
		SIZE/WT/GRAD/CPLG	Read on Board (Tons)	Type/ Mixwater	REMARKS	S.G. (PSI/1000')	REMARKS	
36"	465/ 455	30"/1"WT/310/X52 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/X52 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"	1345/ 1335	13-3/8"/68/K55/BTC	150	Class"G" F'water	See Enclosure 2C	1.30 (563) to 1.35 (585)	KCL/Polymer system KCL: +/- 35 PPB MF : 50 - 60 secs. PV/YP: 20-25/15-20 WL : Less than 10 cc	ISF/SONIC/SP/GR LDT/CNL/CAL/GR SWS may be required.
12-1/4" See note 4	1405/ 1405	9-5/8"/43.5/NR0/ BTC	50	Class"G" F'water	See Enclosure 2D	1.32 (572)	Calcium Chloride/ calcium carborate non damaging mud.	GR (to confirm casing point) ISF/SONIC/SP/GR LDT/CNL/CAL/NGT MSFL/DLL/CAL/SP/GR RFT as required. CBL on 13-3/8" csg.
8½" See note 5	1610	No casing programmed.	-	-	-	1.27 (550)	Calcium Chloride/ calcium carbonate non damaging mud.	At Base Zone 1b LDT/GR (+/- 1405) MSFL/DLL/GR CNL (Gravel Pack evaluation to be advised) At TD (+/- 1610) ISF/SONIC/SP/GR LDT/CNL/CAL/NGT DLL/MSFL/CAL/GR HDT Velocity Survey CBL on 9-5/8" casing.

DERRICK FLOOR ELEVATION 25 M ABOVE MSL

360 M ABOVE SEA BED

FORMATION TOP	m TV BDF
Seabed (Quaternary/Pliocene/ Miocene)	360+/-1
Oligocene	735+/-5
Eocene	995+/-5
Balder Formation	1200+/-5
Paleocene	
Sele Formation	1235+/-5
Lista Formation	1255+/-10
Maureen Formation	1350+/-5
Upper Jurassic Sandstones	
* Top reservoir	1360+/-5
Sogn Formation Zone 1	1360+/-5
Middle Heather Fm. Zone 2	1450+/-10
Fens Formation Zone 3	1545+/-10
TD	+/- 1610

* Primary Target.

Note:

Top Middle Heather Fm./ Zone 2 could be 1450 or 1485 m BDF

NOTES

1) All mud weights are to be adjusted in the light of hole problems (ie sloughing shales, high mud gas readings etc.).
2) Formation leak off tests are required below the 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 M.R. and opening the hole to 26".
4) Coring will commence from top reservoir and continue to base zone 1a. Following logging the hole will then be opened to 12-1/4" and 9-5/8" casing set.
5) Coring will continue after setting the 9-5/8" csng. to testing depth (Base zone 1b) and the hole under-reamed to 18". An external gravel pack will be installed, and the well flow tested. If requisit flow rate is not achieved, an internal gravel pack will be carried out in zone 1a in addition. Following testing, the gravel pack equipment will be retrieved and the well drilled to TD.
6) Cutting collection: Every 10 m below the 30" casing shoe; every 5 m below 1160 m BDF and every 3 m below 1325 m.
7) All testing and the 9-5/8" setting depth, will be subject to confirmation upon receipt of logs.
8) Estimated reservoir pressure is
   +/- 2245 psi at 1360 m BDF and
   +/- 2253 psi at 1405 m BDF and
   +/- 2280 psi at 1572 m BDF (GOC)

SIGNED BY

PRODUCTION MANAGER

CHIEF PETROLEUM ENGINEER

OPERATIONS SUPERINTENDENT

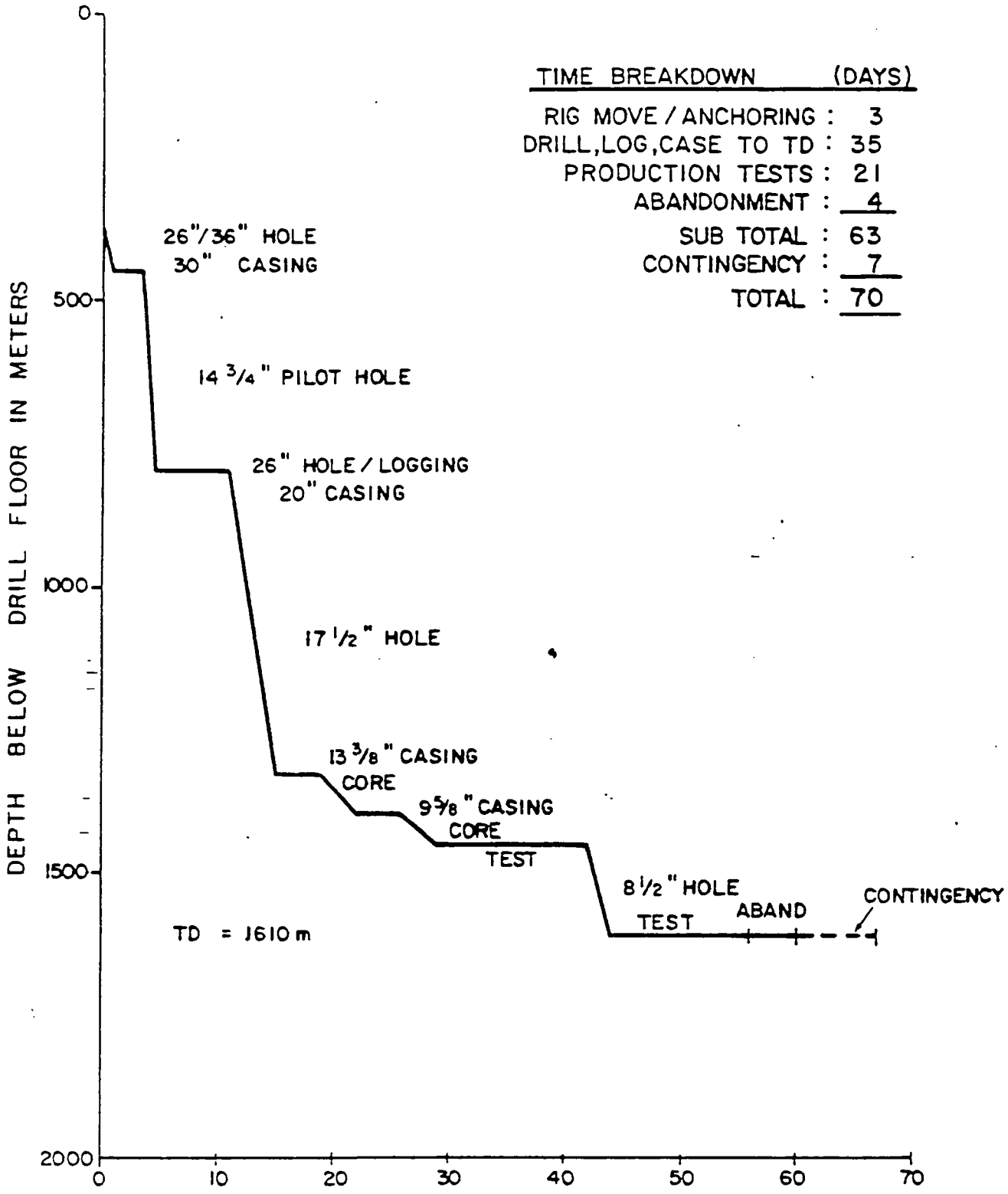
HEAD OF DRILLING

P.P.

DATE: 4/1/83

0566

DRILLING PROGRESS CURVE 31/2-N



TIME BREAKDOWN	(DAYS)
RIG MOVE / ANCHORING :	3
DRILL, LOG, CASE TO TD :	35
PRODUCTION TESTS :	21
ABANDONMENT :	4
SUB TOTAL :	63
CONTINGENCY :	7
TOTAL :	70

PREPARED BY:
Thorbjørn Nyland EPP/11

a-s Norske Shell
EXPLORATION & PRODUCTION NORWAY

APPRAISAL WELL 31/2-N
DRILLING PROGRESS CURVE

AUTHOR EPPP/11 | FIG. 1 | DATE APRIL 83
REPORT NO NSEP | DRAWING NO. 6 1361/7

MMJ

CONTENTS:

ENCLOSURES

FIGURE

A/S NORSKE SHELL

DRILLING PROGRAMME - LOCATION 31/2-N

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 778 on seismic line 8007-329.

GEOGRAPHICAL	UTM (ZONE 31)
60 deg. 50' 06.0" N	NORTHING 6744678 M
03 deg. 30' 47.9" E	EASTING 527907 M

Tolerance: 40 meter radius from proposed location based on Decca Pulse-8 co-ordinates.

2. Base

Tananger Shore Base to Location 266 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 rig at the specified drilling draught.

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

c) Expected water depth at location is +/- 335 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 +/- 360 m for this programme but will be measured on site.

4. Type of well

Appraisal well.

5. Total Depth

TD in Upper Jurassic Sandstones is anticipated to be +/- 1610 m BDF (+/- 1585 m SS).

6. Drilling Installation

"Borgny Dolphin" - Aker H-3 type semi-submersible with 18-3/4" 10.000 psi blowout preventer stack.

7. Objectives

1. To evaluate various techniques for the completion of gas production wells in the Troll field and thereby prove the required productivity for the development project.

2. To establish the reservoir quality in the central part of the Troll field gas accumulation in the neigbourhood of a possible platform location.

3. To provide an additional data point for the correlation and mapping of the depositional units.

8. Prognosis

Formation Tops	Lithology	Depth TVBDF (m) (Thickness m)	Seismic Tolerance (m)
Seabed (Quarternary-Pliocene-Miocene)	Clay, Claystones, Occasionally sandy.	360 (375)	+/- 1
Oligocene	Claystones.	735 (260)	+/- 5
Eocene	Claystones.	995 (205)	+/- 5
Balder formation	Claystones, Tuffaceous claystone.	1200 (35)	+/- 5
Paleocene			
Sele formation	Claystones,silty claystones.	1235 (20)	+/- 5
Lista formation	Claystones, silty. Marls.	1255 (95)	+/- 10
Maureen formation	Mudstone, Limestones	1350 (10)	+/- 5
Upper Jurassic Sandstones			
Top reservoir		1360	+/- 5
Sogn formation Zone 1	Fine to coarse unconsolidated sandstone. Fine micaceous sandstone. Occasional carbonate cemented bands.	1360 (125)	+/- 5

Middle Heather Fm. Zone 2	Fine - silty, consolidated, micaceous sand-stones.	1450/1485 (90)/(60)	+/- 10
Fens formation Zone 3	Fine to medium, consolidated, micaceous sand-stones.	1545	+/- 10
GOC	Expected in zone 3	1568-72	
OWC	Expected in zone 3	1584	-
TD +/- 1610 m BDF	Within zone 3.		

9. Pressure Regime

Data gained from drilling, 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-N is some 2.4 km South of well 31/2-4 and is considered to be in the same hydrostatically pressured regime.

10. Mud Resumé

36" Hole

The 36" hole section is to be drilled with a seawater and viscous pill combination. Some 350 bbls of viscous mud will be used to drill the first 10 - 20 m into seabed.

26" Hole

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. (See section B4).

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.

17½" Hole

The 17½" hole section will be drilled with a KCL/Polymer mud system with a mud weight of 1.30 - 1.35 SG (.563 - .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.

12-1/4" Hole

The KCL mud will be displaced with a non-damaging mud (brine-chalk mud) which will be used to drill to the 9-5/8" casing point. A mud weight of 1.32 SG (.572 psi/ft) will be required in this section.

8½" Hole

a) To testing depth in zone 1b.
After drilling out the 9-5/8" shoe track and coring to testing depth, the mud from the 12-1/4" hole section will be displaced with a new batch of non-damaging fluid before underreaming the hole . Mud weight of 1.27 SG (.550 psi/ft) will be required in this section.

b) The 8½" hole below the underreamed section to TD will be drilled with mud from previous section. Mud weight of 1.27 SG (.550 psi/ft) will be required in this section.

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" and 8½" holes will exert +/- 120 psi overbalance on top of the reservoir in case 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, 1.35 SG mud (.585 psi/ft) must be available during this diverter drilling in case flows are encountered. Cement (150 m/t) 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	Casing requirements
30"	X-52,1"WT	310 lbs/ft	ATD-RB squnch	Seabed - 455 m	(95 m)
20"	X-52	129 lbs/ft	Vetco LS-LH	Seabed - 800 m	(440 m)
13-3/8"	K-55	68 lbs/ft	BTC	Seabed - 1335 m	(975 m)
9-5/8"	N-80	43.5 lbs/ft	BTC	Seabed +/- 1405 m	(1045m)

Note:

1) The 9 5/8" casing setting depth is dependant on formation thickness encountered, but will most likely be set at base zone 1a in the Upper Jurassic Sandstone. No further casing is planned.

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 20" and 1 metre of new hole below 13-3/8" casing shoe.

16. Casing Accessories

30"	Float shoe.
20"	Guide shoe (B & W Trico) and baffle collar one joint above shoe. 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 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"	2300 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 carried out immediately after bumping the top plug. The casing may be retested using an RTTS packer set below the top of cement if required.

17. Cement Calculations: See enclosure 2.

18. 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) Objectives

A/S GEOTEAM was engaged by A/S NORSKE SHELL EXPLORATION AND PRODUCTION to prepare a site survey report for well location 31/2-N in the Norwegian Sector of the North Sea, based on data from a previous survey carried out by GARDLINE SURVEYS LTD., in December 1981, and data from a geotechnical survey carried out by A/S GEOTEAM from 22 July to 14 September 1982 (A/S GEOTEAM Report No. 8034).

In addition, A/S GEOTEAM data from previously performed surveys in the area were to be utilized. The survey was a combined seafloor investigation, bathymetric survey and a high resolution seismic survey. In order to map the sea floor topography and locate any debris or wrecks that might cause problems to drilling operations, profiles were run with an echo-sounder and side scan sonar. For observation of the uppermost zone of soft sediments, profiles were run with a deep towed boomer.

b) Interpretation

The interpreted area is a square of dimensions 4 km x 4 km centered at the planned well location aligned north/south. The Side Scan Sonar data shows the seabed in the area to be mostly flat and featureless with the exception of frequent depressions (pockmarks). These pockmarks vary in diameter from 15 to 120 meters and are in general between 1 and 3 meter in depth. An obsolete communication cable (OD=2 cm) runs through the area in the NW-SE direction with a distance of approximately 450 meters WSW of the location. Position and direction have been checked with the Norwegian Authorities, and it is stated that the feature most probably is caused by an obsolete pre-war communication cable which may be regarded as debris. Except for these pockmarks and the cable, no debris or obstructions which might cause problems for drilling operations or anchoring were evident. The seabed consists of soft silty clay with a water depth of +/- 333 m at the proposed location.

Unit I 358 - 388 m BDF (30m thick) soft, silty clays.

Unit II 388 - 425 m BDF (37m thick) Overconsolidated clays.

Unit III 425 - 430 m BDF (5m thick) Probably consisting of glacial till with boulders interbedded.

Unit IV 430 - 470 m BDF (40 m thick) Hard clay with isolated sandpockets

Unit Va 470 - 510 m BDF (40m thick) Layered sandy clay.

Unit Vb 510 - 545 m BDF (35 m thick) Consists of a series of erosion surfaces at the base of the Quaternary sediments. The sediments in this zone are thought to be sand and gravel. The possibility of gas in this unit can not be overlooked.

On the processed digital records below 545 m BDF a possibility of gas between 745 - 765 m BDF has also been observed.

However, in well 31/2-4 no shallow gas was encountered showing same features.

2. Rig Positioning

The rig will be brought on 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 290 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.

Satellite Navigation will be used to determine the final coordinates of the location; a 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) with Regan slope indicator installed. 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 (100 Sec 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). Ensure that the slope indicator is 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 2 degree or less, cement the casing using 150% excess cement. (For cement calculations see enclosure 2A.) See also note below.

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 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.

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 load of the BOP 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 if deemed necessary.

d) Ensure that the tension of the guide lines is optimum (6000 lbs) so that the TGB will not be lifted on one side or be tilted by excessive uneven guide line tension.

e) In previous wells, the guide bases have sunk into the soft sea bed when landing the 30" casing/PGB. In the case that this phenomena is observed, the 30" casing should be kept in tension whilst cementing and W.O.C. Care should be taken to maintain a constant load of the casing/ PGB on the TGB, adjusting the compensator for the weight of the cement when inside the casing (+/- 80 ton), and the buoyancy effect of the cement when in the annulus.

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. Run 30" hydraulic latch and dump valve complete with ball joint on 21" riser and latch on to the 30" housing. Fill up riser with seawater and observe fluid level.

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

4. 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.

5. 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/ft) stop drilling and circulate the hole clean. ROP must be controlled whilst drilling this section.

6. 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/ft) in the open hole section prior to pulling out of hole for logging.

7. 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.

8. Run in hole with open ended drill pipe to 30" shoe and displace the casing and riser to seawater. Continue to RIH 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 16.

   Note:

   The 1.35 SG mud spotted prior to logging, should be dumped via the dump valve to prevent losses to the formation due to the heavy mud entering the marine riser.

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

10. Make up the 18-3/4" housing with running tool, B.J. stinger and top plug and stand back in derrick. Also make up the cement head on a joint of H.W.DP.

11. Pick up 26" bit with two 26" stabilizers. Open the hole up to 26" using seawater and viscous pills as required.

12. 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/ft) in the open hole section prior to pulling out of hole for running casing.

13. Run and cement 20" casing as per programme.

    Note:

    a) Guide shoe and baffle collar with special profile will be used. The baffle collar will be installed between the first and second casing joints and 1 subsea plug (top plug) will be used for cement displacement and will subsequently latch into the baffle collar.

    b) If gas has been encountered in the pilot hole a regular float shoe will be used instead of the guide shoe.

    c) Casing to be run on H.W.D.P. only.

14. Unlatch the running tool and POH.

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

16. Install the 18-3/4" BOP stack and 21" Marine Riser. Test BOP stack. For stack test procedure see "Blowout Prevention Equipment Testing" item C. Make up drill pipe hang-off assembly and circulating head assembly. Install seat protector.

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 continue, open the dump valve 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) Make up the 18-3/4" housing with running tool, B.J. stinger and top plug and stand back in derrick.

xi) Run a BGT to check hole size.

xii) Rig up and run 20" casing.

Note:

- Regular float shoe will be used together with the baffle collar.
- 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 a minimum of 200 m/t of 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 1.30 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 maximum 10 m pocket below the 13-3/8" shoe.

5. Cement 13-3/8" casing as per programme. Test casing to 2300 psi after bumping the plug. Energize the seal assembly and test to 4250 psi as per "Blowout Prevention Equipment Testing" Section C. Clean out the stack area prior to pulling out with the running string.

6. Carry out stack test as per "Blowout Prevention Equipment Testing" Section C. Install wearbushing. Carry out a kickdrill.

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

1. Circulate the casing clean with sea water. Displace the sea water with the non-damaging fluid (brine-chalk mud) having a density of 1.32 SG.

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

3. Drill 12-1/4" hole to coring point and POH.

4. Commence coring, using fibreglass inner corebarrel and 8½" core head, from the top of the reservoir in the Upper Jurassic sandstone and continue down to the 9-5/8" casing point. Approximate interval to be cored is 1360 - 1405 m BDF.
   Note:
   Coring should stop at the base zone 1a, but will be confirmed on the well site, after examination of a GR log made prior to the main logging suit.

5. Carry out logging programme, including wire line tests if necessary.

6. Open up the cored interval to 12-1/4" after logging.

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

8. Make check trip and wash wellhead on the way out. Pull wearbushing and run 9-5/8" casing to landing point, leaving only 2 m pocket below the 9-5/8" shoe.

9. Cement the 9-5/8" casing as per programme. 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. Test casing to 3000 psi after bumping the plug. Energize the seal assembly and test to 4250 psi. Clean out the stack area prior to pulling out the running tool.

10. Carry out stack test as per "Blowout Prevention Equipment Testing" Section C. Install wearbushing. Carry out a kickdrill.

7. Drilling 8½" Hole to Testing Depth in zone 1b

1. Drill out float collar, cement and shoe. Clean out the rathole. Circulate hole clean and POH.

   Note:

   Mud from the previous section will be used. However, mud weight will be reduced to 1.27 SG before drilling out the shoe. No leak-off test will be carried out due to the 9 5/8" casing shoe being in the reservoir.

2. Commence coring, using fiberglass inner corebarrel and 8½" core head, from end of last cored section until 20m of good sand is encountered or top zone 2 is reached. Approximate interval to be cored is 1405 - 1450 m BDF.

   Note: Cored interval is to be confirmed on the well site.

3. Make a check trip with 8½" bit and circulate hole clean. POH.

4. Carry out logging, including wireline tests if necessary.

5. RIH with 8½" bit and displace the old chalk mud with fresh chalk mud with weight 1.27 SG. POH.

6. Underream the 8½" hole to 18". Circulate a HIVIS brine pill to clean the underreamed section and then pull back into the casing and circulate a second HIVIS brine pill around to clean the annulus and riser.

   Note:

   Section to be underreamed will be decided after log interpretation.

7. Rig up Schlumberger and run BGT/GR log to check under-reamed section.

   Note:

   When the under-reamed section is satisfactorily the hole will be displaced to clean brine and the under-reamed section gravel packed. The well will then be production tested, and the gravel pack removed before continuing 8½" hole to TD. (See section D point 4 "Testing programme"). A separate test programme will be issued.

8. 8½" Hole to TD and plug back to 9 5/8" casing shoe

Note:
After having recovered the gravel pack assembly the well will be continued as follows:

1. RIH with 8½" bit and clean out the hole. Condition mud and POH.
   Note:
   Mud weight to be used is 1.27 SG.

2. Commence coring, using fiberglass inner corebarrel and 8½" core head, from end of last cored section and continue to complete coring of zone 1.
   Note:
   Cored interval is to be confirmed on the well site.

3. Drill 8½" hole to T.D.

4. Carry out logging, including wireline tests if necessary.

5. The hole will either be plugged back to the 9 5/8" casing shoe to allow for testing in the 9 5/8" casing or the well will be completely abandoned. Plug back/abandonment programmes and testing programme will be advised.

9. 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. BLOWOUT PREVENTION EQUIPMENT TESTING

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

18-3/4", 10.000 psi BOP Stack

1. First test after landing BOP stack on the 18-3/4" housing.

1.1	Pipe Rams	:	5000 psi
1.2	Variable Pipe Rams	:	5000 psi
1.3	Blind Rams	:	Function test only (Will be tested to 10,000 psi at surface).
1.4	Kill/Choke lines and valves	:	5000 psi
1.5	Annular preventers	:	2500 psi

2. Subsequent tests.

2.1	Pipe Rams	:	4000 psi
2.2	Variable pipe ram	:	4000 psi (Also see note c)
2.3	Blind Rams	:	Function test only (Also see note b).
2.4	Kill/choke lines and valves	:	4000 psi
2.5	Annular preventers	:	2500 psi around 5" DP 1500 psi around 3-1/2" DP

Note:

a) Test 1.1, 2.1, 1.2, 2.2, 1.4, 2.4 and 1.5, 2.5 to be carried out with a test tool run on DP and landed in the wellhead.

b) Blind/shear rams will be function tested only. During the BOP test before commencing production testing the blind rams will be tested to 4000 psi by backing off the test plug.

c) The 13-3/8" and 9-5/8" seal assemblies are to be tested to 4250 psi using the variable pipe rams. Note that the collapse pressure of the 13-3/8" and 9-5/8" casings are 1950 psi and 3810 psi respectively, thus an accurate check of the volume required to pressure up is required to ensure that any leak is observed, and a collapse situation is not created.

Accumulator Tests

The accumulators should 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 manufacturer's specifications.
Accumulator tests should be performed either on request of Base, or after repairs have been made to the accumulator system, i.e. bottles, bladders, pumps, etc.

Notes on Testing

1. The BOP stack must be tested on all functions using both pods and all rams tested to the full rated WP (10,000 psi) at surface prior to running the stack. After the surface tests all Cameron clamp connections and all studded connections must be checked for tightness.

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

3. All surface equipment (manifolds, pumps etc.) 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 approximately every five joints, firstly as soon as the stack is below sea level, and lastly, just before landing the stack.

5. When testing the BOP stack underwater with a test tool in the wellhead, use the vented blank test sub.

6. Pressure tests on seal assemblies should be done in 1000 psi stages up to the required test pressure. Pressure tests on the BOP should be carried out at a low pressure (1000 psi) for 5 minutes and to the required test pressure for 15 mins.

7. 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.

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

9. 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.

10. The testing of 10,000 psi BOP stack will be done to 5000 psi for the first test, and to 4000 psi only, at the subsequent 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 test tool, e.g. subjecting the seals of the seal assembly to the same pressure as the BOP stack.

D. EVALUATION REQUIREMENTS

1. Cutting Samples

Ditch cuttings to be collected every 10 m below 30" casing down to 1160 m BDF, every 5 m down to 1325 m, and every 3 m thereafter. The following samples will be required for partners/ government bodies:

a) 3 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. 2 x 2 kilogram samples should be sent ashore ASAP by boat, marked for attention of EPXA/1, Tananger. Biostratigraphy samples should be in cardboard boxes and sent in by the first available scheduled helicopter.

2. Coring

Coring will be carried out in three sequences as follows:

I From top of the reservoir in the Upper Jurassic sandstone to the 9-5/8" casing point at the base of zone 1a. Approximate interval to be cored is 1360 - 1405 m BDF (ie. 45 m section).

II From the 9-5/8" casing point until 20 m of good sand is encountered or top zone 2 is reached. Approximate interval to core is 1405 - 1450 m BDF (ie. 45 m section).

III Following the production test below the 9-5/8" casing the hole will be cleaned up with a conventional bit and the coring will commence from 1450 m BDF and continue to complete coring of zone 1.

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 zone 1a and zone 1b 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 might be required)
At 9-5/8" casing depth	:	GR (to confirm casing point). ISF/SONIC/SP/GR LDT/CNL/CAL/NGT MSFL/DLL/CAL/GR RFT's (as required) CBL (on 13-3/8" casing)
At base zone 1b	:	LDT/GR MSFL/DLL/GR CNL *
At TD	:	ISF/SONIC/SP/GR LDT/CNL/CAL/NGT DLL/MSFL/CAL/GR HDT or SHDT (to be advised) Velocity Survey CBL (on 9-5/8" casing)

* For gravel pack evaluation (to be advised).

4. Testing Programme.

The hole will be underreamed over a 20 m section below the 9-5/8" casing shoe and an external gravel pack set in the underreamed zone. A multi-rate gas flow test will be performed in step wise increasing rates to a maximum value of around 100 MMscf/d.

Evaluation of the test will lead to one of three possible conclusions:

either a) The inflow performance characteristics are sufficient to prove the necessary well potential for the development project.

or b) The inflow performance is dominated by severe skin and turbulence effects.

or c) An intermediate performance is obtained such that the well does not meet the minimum requirements for project development but does show substantial improvements over earlier well performances.

In the event of case c) it is proposed to additionally complete an internal gravel pack in zone 1a (behind the 9-5/8" casing) and test the IGP and EGP commingled. Following the test the completions will be retrieved and the well deepened to determine the levels of the GOC and OWC in zone 3.

In the event that test results shown either case a) or b), the EGP will be retrieved, the hole deepened to encounter the GOC and OWC and subsequently plugged back to allow testing of an IGP in zone 1A.

A test programme will be advised in separate programme.

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 of the string 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).

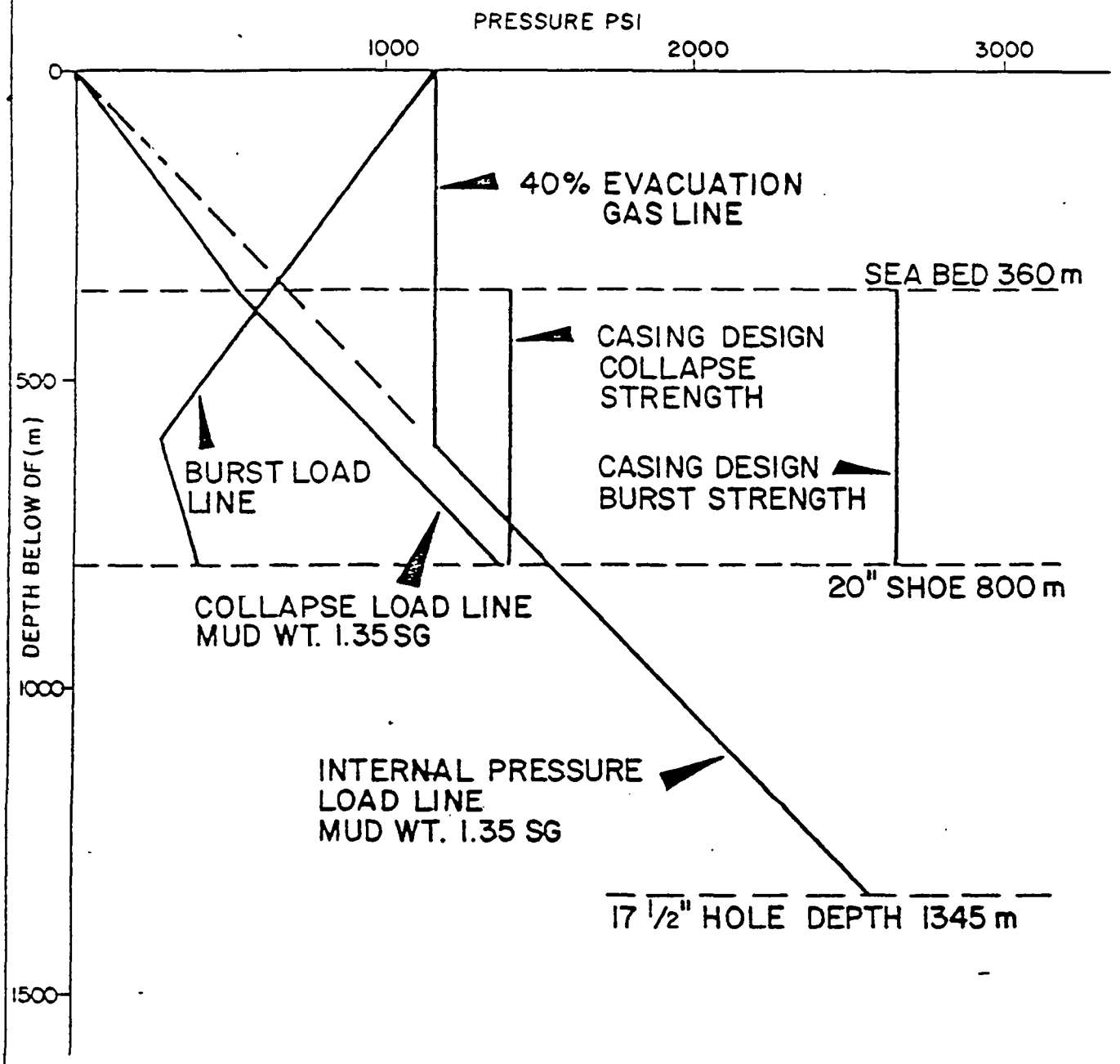
   In the production test design for casing burst, a tubing leak is assumed putting full THP on the tubing/casing annulus, filled with 1.27 S.G. compeletion fluid.

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 75 % has been assumed for the design.

F. GLOSSARY OF ABREVIATIONS

BDF	:	below derrick floor
BGT	:	borehole geometry tool
BOP	:	blow out preventer
DF	:	Derrick Floor
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

20" CASING DESIGN 31/2-N



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

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

MAXIMUM TENSILE LOAD = 129.3 x 3.281 x (800 - 360) = 186.663 LBS

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

a/s Norske Shell

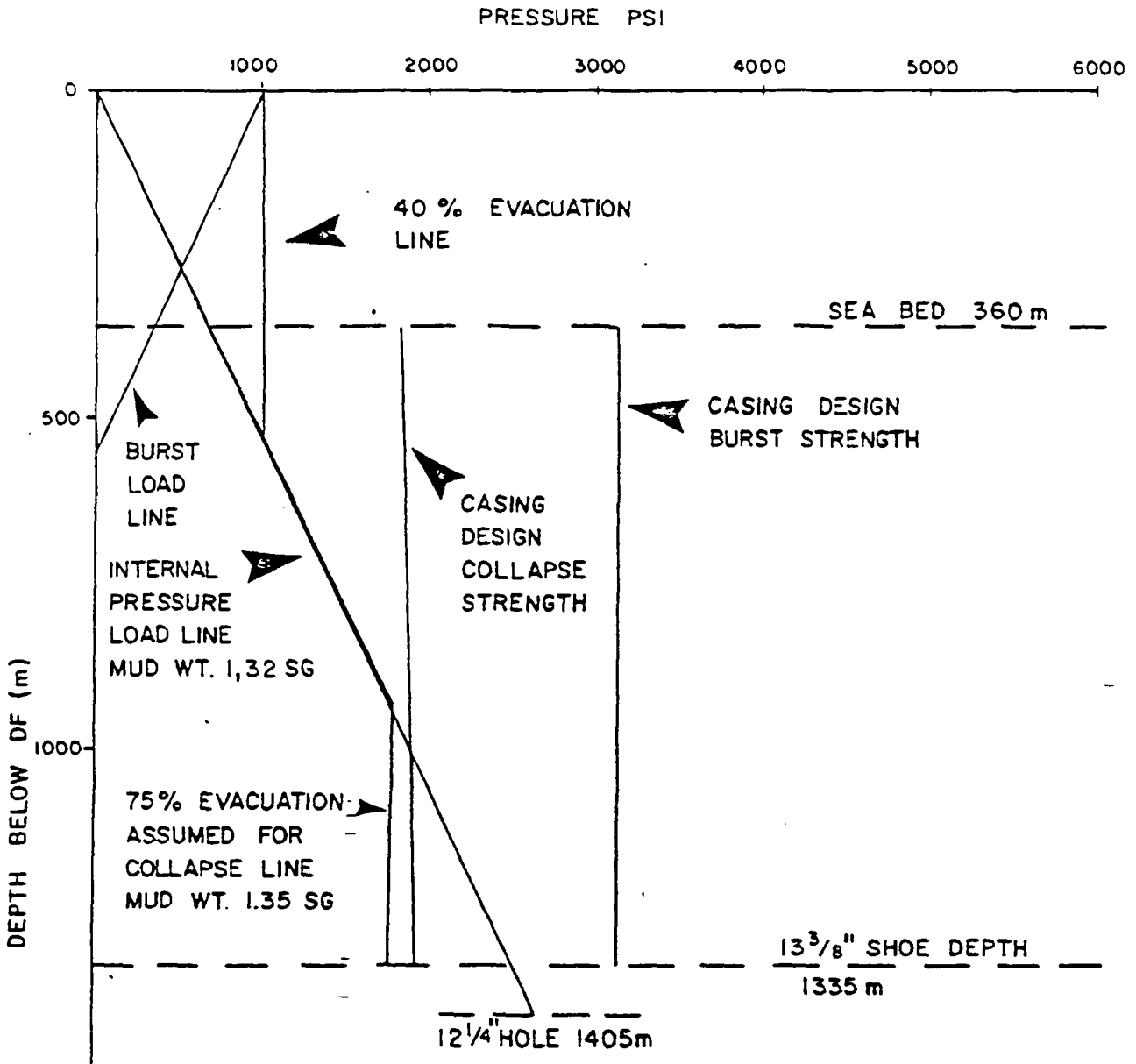
20"CASING DESIGN 31/2-N

AUTHOR EPPP/II — DATE APRIL 83

REPORT NO — IA — DRAWING NO G 1361/1

SIV

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



FOR 13 3/8", 68 LB/FT, K55, BTC CASING

	COLLAPSE	BURST	TENSION
API RATING	1950	3450	1.069.000
SAFETY FACTOR	1.0	1.1	1.6
DESIGN STRENGTH	1950	3136	668.130

MAXIMUM TENSILE LOAD = 68 x 3.281 x (1335 - 360) = 217.530 lbs

13 3/8", 68 LB/FT, K55, BTC CASING IS THEREFORE SATISFACTORY IN BURST, COLLAPSE AND TENSION FOR THIS WELL.

a.s Norske Shell
EXPLORATION & PRODUCTION FORUS

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

EPPP/II — APRIL 82
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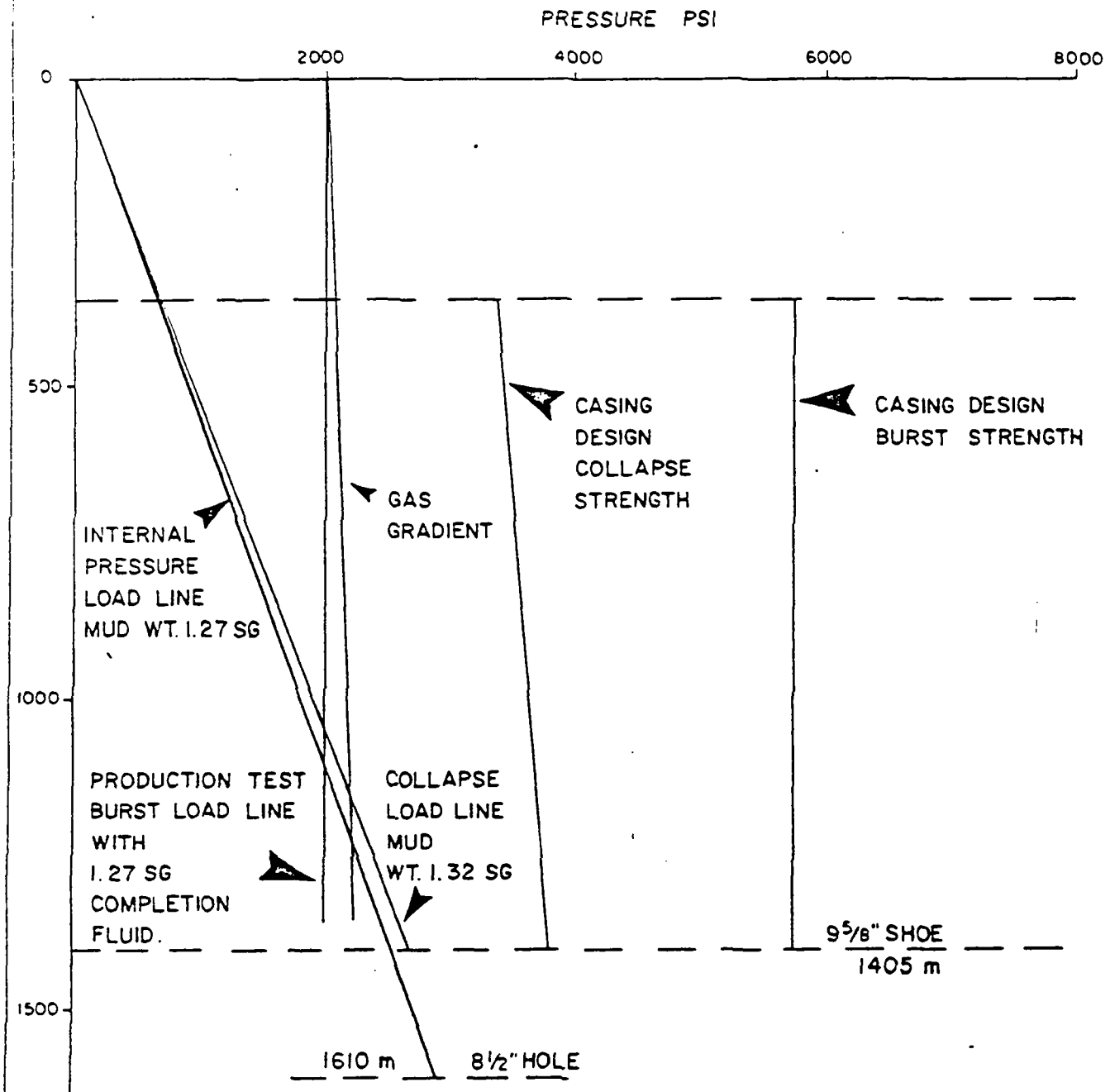
R.H.

9 5/8" CASING DESIGN 31/2-N



FOR 95/8", 43.5 LB/FT, N80, BTC CASING

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

MAXIMUM TENSILE LOAD = 43.5 x 3.281 x (1405 - 360) = 149.146 LBS

9 5/8", 43.5 LB/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.

a/s Norske Shell
EXPLORATION & PRODUCTION FORUS

31/2-N

9 5/8" CASING DESIGN

EPPP/11 | 1C | APRIL '83 | G 1361/2

P.H.

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 150 % is to be used over open hole intervals. Cement displaced to 10 m above shoe.

Data: Casing 30" 1" WT/VETCO "ATD-RB"
Seabed 360 m BDF
30" shoe 455 m BDF
36" hole 465 m BDF

13.2 ppg Lead Slurry Volumes

i)	36" x 30" annulus	= (445-360)x3.281x2.1598x2.5	=	1505.8 cu.ft.
	Cement required	= 1505.8/1.89	=	796.7 sxs
			=	34.0 m/t
	Seawater required	= 796.7 x 10/42	=	189.7 bbls
	Econolite required	= 796.7 x 0.36	=	286.8 gals.

15.8 ppg Tail Slurry Volume

i)	36" x 30" annulus	= (455-445)x3.281x2.1598x2.5	=	177.2 cu.ft.
ii)	36" pocket	= (465-455)x3.281x7.0686x2.5	=	579.8 cu.ft.
iii)	30" casing fill	= 10 x 3.281 x 4.2761	=	140.3 cu.ft
		Total slurry	=	897.3 cu.ft.
	Cement required	= 897.3/1.17	=	766.9 sxs
			=	32.7 m/t
	Seawater required	= 766.9 x 5.15/42	=	94.0 bbls
	$CaCl_2$ required 3%(BWOC)	= 766.9 x 94 x 0.03/2205	=	1.00 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 collar approximatly 12 m above the guide shoe using 1 subsea cement plug.

Data: Casing 20"/129 lbs/ft/X-52/Vetco LS-LH
30" shoe at 455 m BDF
36" hole at 465 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	= (455-360)x3.281x2.0944	=	652.8 cu.ft.
ii)	36" x 20" annulus	= (465-455)x3.281x4.8869x2	=	320.7 cu.ft.
iii)	26" x 20" annulus	= (740-465)x3.281x1.5053x2	=	2716.4 cu.ft.
		Total slurry volume	=	3689.9 cu.ft.
	Cement required	= 3689.9/1.89	=	1952.3 sxs
			=	83.3 mt
	Seawater required	= 1952.3 x 10/42	=	464.8 bbls
	Econolite required	= 1952.3 x 0.36	=	702.8 gals

15.8 ppg Tail Slurry Volumes

i)	26" x 20" annulus	= (800-740)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	= 12 x 3.281 x 1.9174	=	75.5 cu.ft.
		Total slurry volume	=	910.1 cu.ft.
	Cement required	= 910.1/1.17	=	777.9 sxs
			=	33.2 mt
	Seawater required	= 777.9 x 5.15/42	=	95.4 bbls
	$CaCl_2$ required 2% (BWOC)	= 777.9 x 94 x 0.02/2205	=	0.66 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 20 % excess on open hole volumes. If caliper is available, use 10 % excess over and above the estimated caliper volume. Cement will be displaced to a float collar c. 13 m above the shoe. Sea water will be used to displace the cement.

Data: Casing 13-3/8"/68 lb/ft/K55/BTC
20" shoe at 800 m BDF
26" hole at 810 m BDF
13-3/8" shoe at 1335 m BDF
17-1/2" hole at 1345 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)x3.281x2.7113x1.2	=	106.7 cu.ft
iii) 17½"x 13-3/8" annulus	=(1235-810)x3.281x0.6946x1.2	=	1162.3 cu.ft
	Total slurry volume	=	1730.5 cu.ft
Cement required	= 1730.5/1.79	=	967.0sxs
		=	41.2 mt
Mixwater required	= 967.0 x 9.47/42	=	218.0 bbls

Additives to be advised.

15.8 ppg Tail Slurry Volumes

i) 17½"x 13-3/8" annulus	=(1335-1235)x3.281x0.6946x1.2	=	273.5 cu.ft.
ii) 17½" pocket	= 10 x 3.281 x 1.6703 x 1.2	=	65.7 cu.ft.
iii) 13-3/8" shoe track	= 13 x 3.281 x .8406	=	35.9 cu.ft.
	Total slurry volume	=	375.1cu.ft
Cement required	= 375.1/1.17	=	320.6 sxs
		=	13.7 mt
Mixwater required	= 320.6 x 5.07/42	=	38.7 bbls

Additives to be advised.

9 5/8" Cementation

Norcem Class "G" cement at 15.8 ppg(1.90 SG) slurry weight will be used as the main slurry up to 1160 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 15.8 ppg slurry. A 10% 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 1335 m BDF
17-1/2" hole at 1345 m BDF
9-5/8" shoe at 1405 m BDF
12-1/4" hole at 1407 m BDF

15.8 ppg Slurry Volume

i)	13-3/8"x9-5/8" annulus (1335-1160)3.281x.3262	=	187.3 cu.ft.
ii)	17-1/2"x9-5/8" annulus (1345-1335)3.281x1.1651x1.1	=	42.1 cu.ft.
iii)	12-1/4"x9-5/8" annulus (1405-1345)3.281x.3132x1.1	=	67.8 cu.ft.
iv)	12-1/4" pocket 2x3.281x0.8185x1.1	=	5.9 cu.ft.
v)	9-5/8" shoe track 24 x 3.281 x 0.4180	=	16.5 cu.ft.
	Total slurry volume	=	319.6 cu.ft.

Cement required	= 319.6/1.17	=	273.2 sxs
		=	11.7 mt
Mixwater required	= 273.2 x 4.29/42	=	27.9 bbls

Additives to be advised.

13.5 ppg Scavenger Slurry Volumes

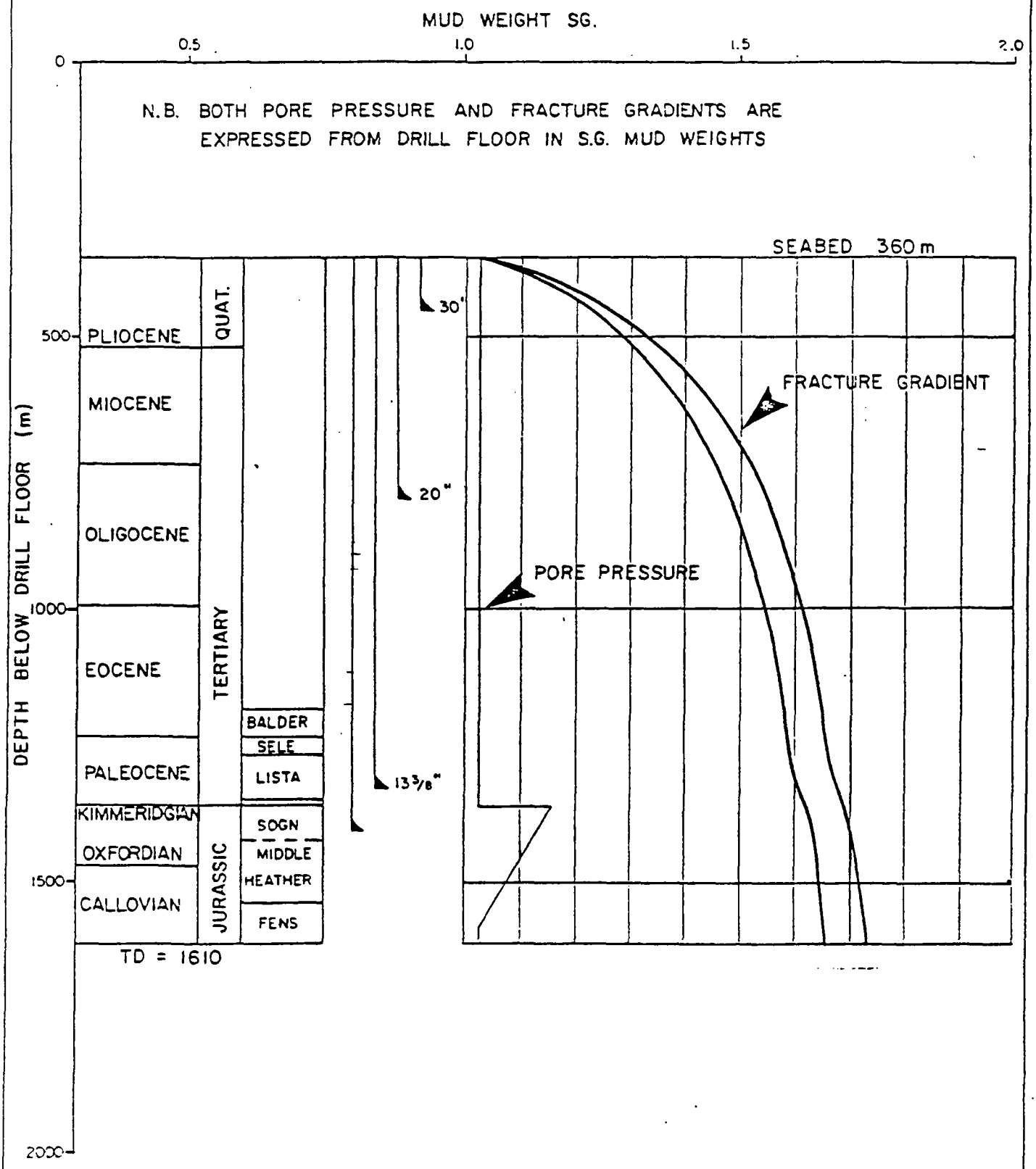
i)	13-3/8" x 9-5/8" annulus (1160-898)3.281x.3262	=	280.4 cu.ft.

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.

WELL 31/2 - N

ESTIMATED PORE PRESSURE AND FRACTURE GRADIENTS SHOWING THE DEGREE OF UNCERTAINTY



a/s Norske Shell

31/2 - N

ESTIMATED PORE PRESSURE AND FRACTURE GRADIENTS SHOWING THE DEGREE OF UNCERTAINTY

AUTHOR EPPP/11 | DATE APRIL '83 | DRAWING NO. G1361/4

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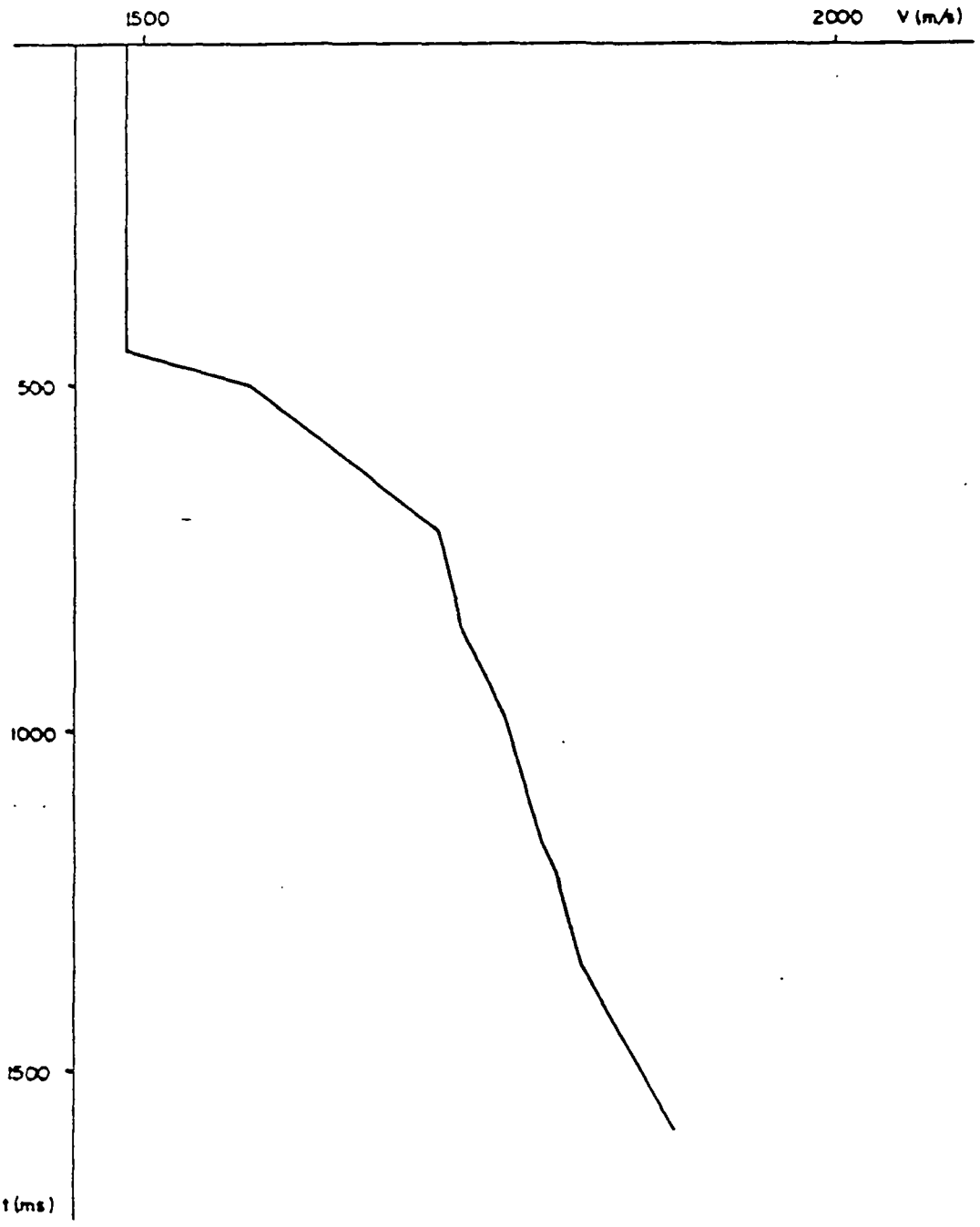
AVERAGE VELOCITY VS SEISMIC TIME



a·s Norske Shell
EXPLORATION & PRODUCTION FORUS

DRILLING PROGRAMME
LOCATION 31/2-N

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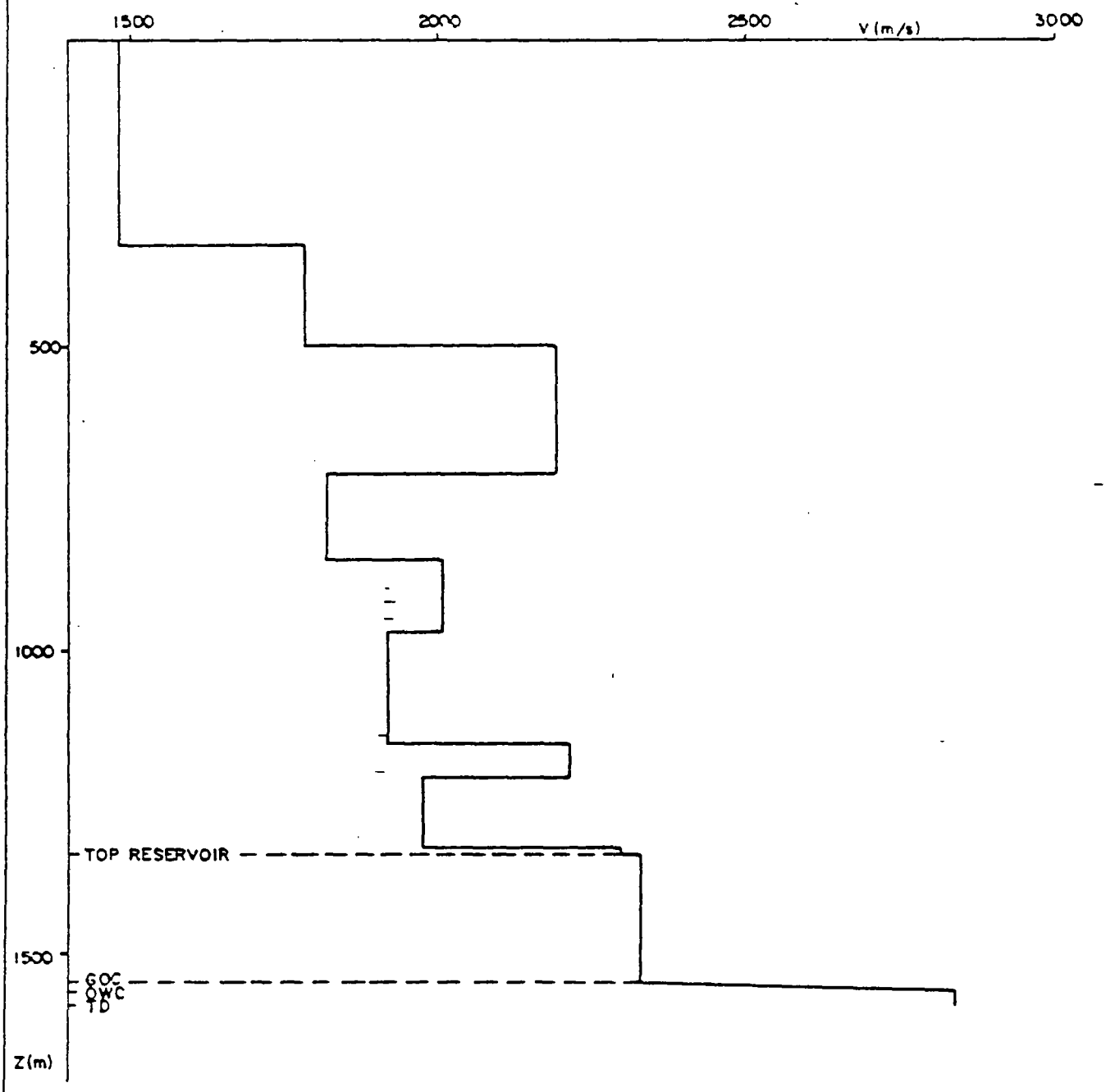
ADV

INTERVAL VELOCITY VS DEPTH



a.s Norske Shell
EXPLORATION & PRODUCTION NORWAY

DRILLING PROGRAMME
LOCATION 31/2-N

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