DRILLING PROGRAM

MOBIL EXPLORATION NORWAY INC

BLOCK 33/12-~~6~~ 4

Location coordinates:	Latitude: 61° 14' 19.7" N
	Longitude: 01° 53' 24.2" E
	Shotpoint 380 Line MNG 28
KBE	82' (estimated)
WAter Depth	470'
Proposed Total Depth	12000'
Anticipated Starting Date	1 April, 1975

Contractors:

Rig:		"Norskald"
Electric Logging:		Schlumberger
Cementing & DST Service:		Ad Hoc
Mud Logging:		Exploration Logging Ltd.
Mud Service:		IMCO
Marine Service:		Grieg Offshore Marine
		M/V "Ibis I" and M/V "Ibis 2"/"Ibis 6"
Location Service:		Geoteam
Well Testing:		Otis
Diving Service:		Comex
Sub-sea System:		Cameron
Helicopter:		Helicopter Service A/S
Blow Out Preventers:	18 3/4"	4 Cameron Rams, API 10,000
		2 Hydril, API 5,000
	Diverter:	Regan Nom 20"
	30" Connector:	Cameron
	Manifolds:	Kill, API 10,000 Choke, API 10,000 above chokes API 5,000 below

Confidential Information

All Mobil and Contractor personnel are cautioned that any information about the activities and results of this operation are confidential and are not to be discussed with other parties. Release of data will be made only with the formal approval of the Mobil Exploration Norway Inc. Management and Petroleum Directorate.

Responsibility

The man immediately responsible for all operations on the rig, in accordance with this program and the drilling contract, will be the Mobil designated Drilling Supervisor, who will be aboard and in charge at all times. He will be advised by a Well Site Geologist and report to the Drilling Manager. The Manager will report to the Mobil Production Manager. Any change in this program will be approved by the Manager.

Well Objectives

As noted in the geological prognosis.

DRILLING AND CASING PROGRAM

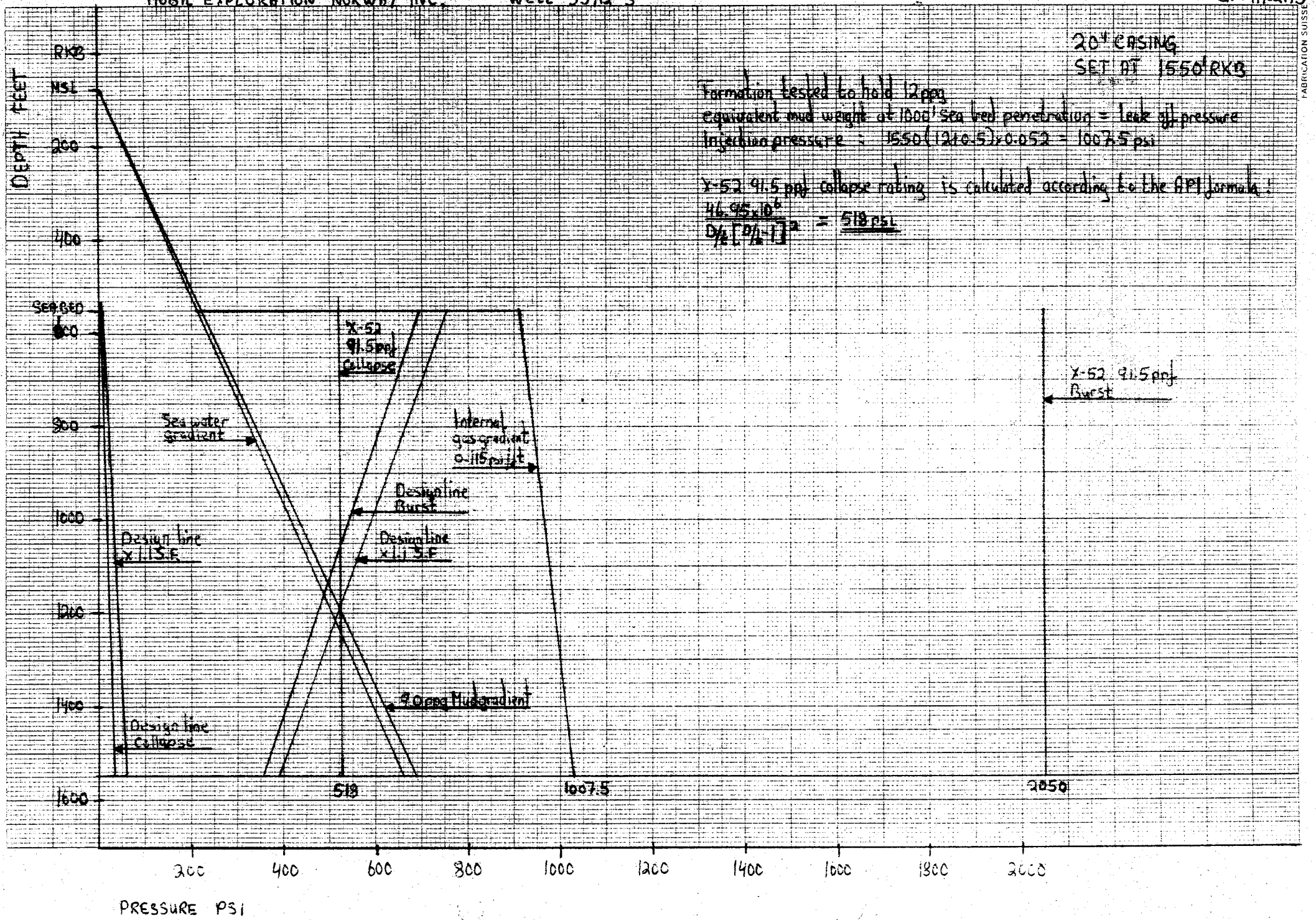
Hole Size	Casing Size	Depth RKB	Length ft.	Weight lbs/ft	Grade	Joint Type
36	30	± 550- 790	240	1" wall	-	Squnch
26	20	± 550-1550	1000	91.5	X-52	Vetco "L"
17 1/2	13 3/8	± 550-5600	2500	68	S-80	Buttress
			2550	72	N-80	Buttress
12 1/4	9 5/8	± 550-8750	3000	43.5	N-80	Buttress
			5750	47	N-80	Buttress
8 1/2	7xxx	±9100-12000	2900	29	N-80	x-Line

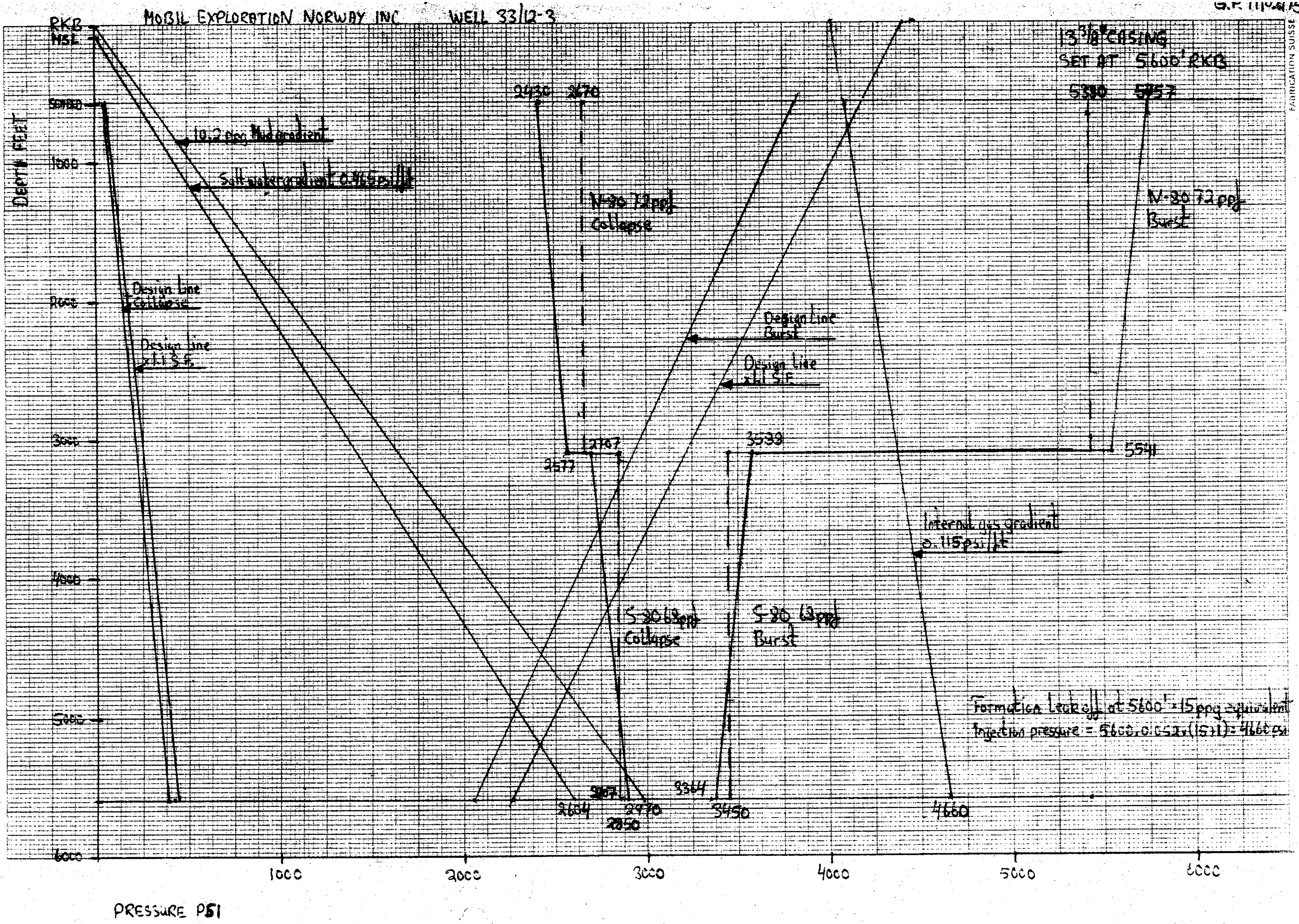
xxx 7" Liner set for evaluation purposes only

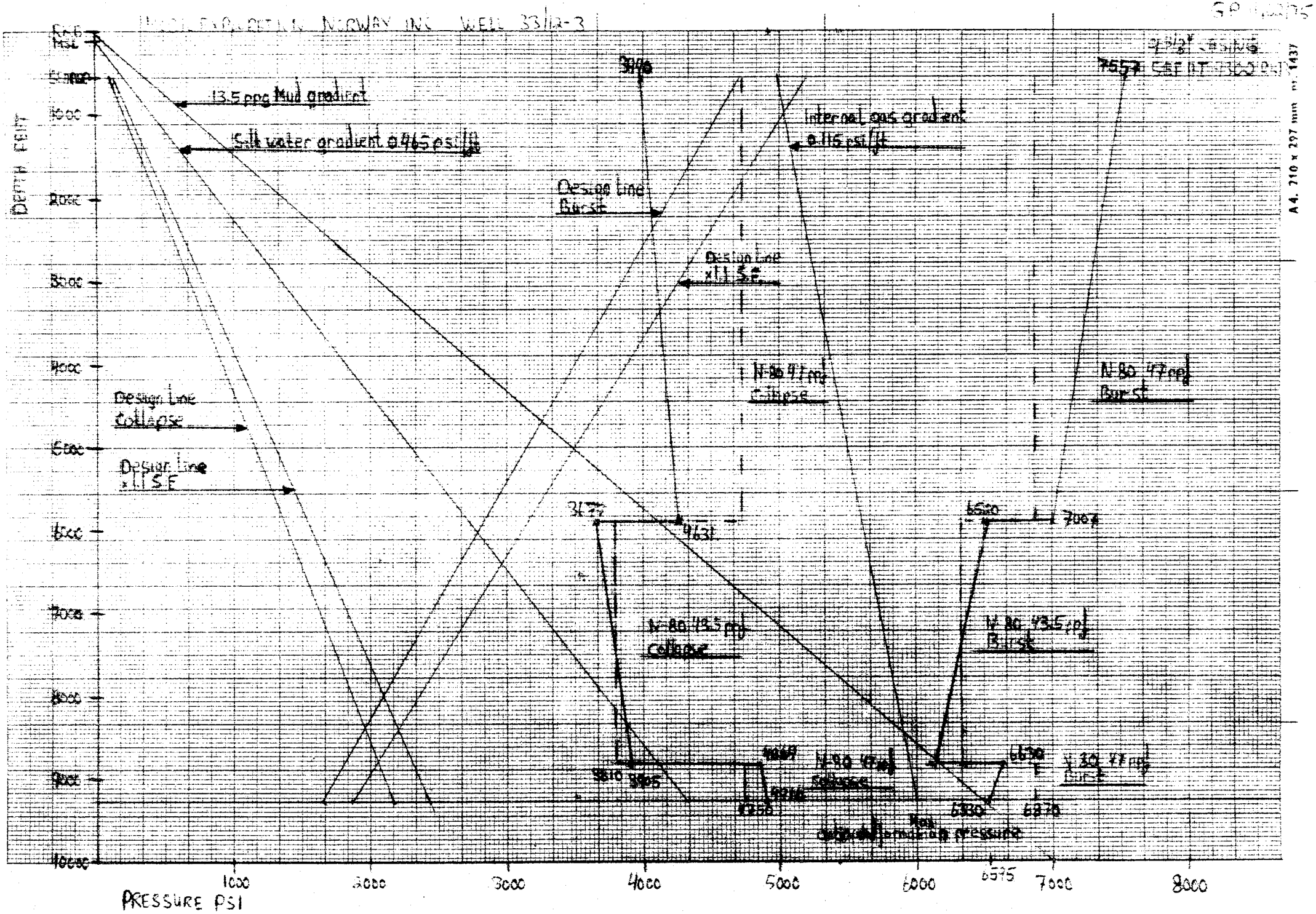
ALL CASING TO BE CHECKED BY INDEPENDENT INSPECTION SERVICE

MOBIL EXPLORATION NORWAY INC. WELL 33/12-3

G.P. 11/02/75




MOBIL EXPLORATION NORWAY INC
WELL 33/12-3
13 3/8" CASING
SET AT 5600' RKB
RKB
MSL
DEPTH FEET
PRESSURE PSI
1000
2000
3000
4000
5000
6000
10.2 ppg Mud gradient
Salt water gradient 0.465 psi/ft
Design Line Collapse
Design Line x1.1 SF
2430
2670
N-80 72 ppf Collapse
2577
2767
S-80 68 ppf Collapse
2604
2850
2970
3364
3450
S-80 68 ppf Burst
3533
Design Line Burst
Design Line x1.1 SF
5330
5757
N-80 72 ppf Burst
5541
Internal gas gradient 0.115 psi/ft
4660
Formation Leakoff at 5600' = 15 ppg equivalent
Injection pressure = 5600.0.052.(15+1) = 4660 psi


13.5 ppg Mud gradient
Salt water gradient @ 465 psi/ft
Internal gas gradient @ .115 psi/ft
Design Line Burst
Design Line x1.1 SF
Design Line Collapse
Design Line x1.1 SF
N-80 47 ppf Burst
N-80 47 ppf Collapse
N-80 43.5 ppf Collapse
N-80 43.5 ppf Burst
DEPTH FEET
PRESSURE PSI
1000
3000
4000
5000
6000
6515
7000
8000

13 3/8" Casing Biaxial Corrections

Weight string in air:

S-80	2500 x 68	=	170,000 lbs	(section 1)
N-80	2550 x 72	=	183,600 lbs	(section 2)
	Total	=	353,600 lbs	

Cross sectional areas:

S-80	68 ppf	19,445 sq.in.
N-80	72 ppf	20,768 sq.in.

Buoyancy of string in 10.2 ppg mud:

2500 x 10.2 x 0.052 x 19.445	=	25,784 lbs
2550 x 10.2 x 0.052 x 20,768	=	28,089 lbs
Total	=	53,873 lbs

Weight of string in mud 299,727 lbs

Buoyancy force at 5600 feet:

5600 x 10.2 x 0.052 x 19,445 = 57,756 lbs

Stress bottom section 1 57756/19.445 = 2970 psi (Compression)

Stress top section 1 (170,000-57756)/19.445 = 5772 psi (Tension)

Average yield strength section 1 65000 psi

(2979/65000) x 100% = 4.6 %

(5772/65000) x 100% = 8.9 %

Collapse rating corrections section 1:

Bottom	4.6%	compression	102%	= 2850 x 1.02 =	2907 psi
Top	8.9%	tension	95%	= 2850 x 0.95 =	2707 psi

Burst rating corrections section 1:

Bottom	4.6%	compression	97.5%	3450 x 0.975 =	3364 psi
Top	8.9%	tension	104%	3450 x 1.04 =	3588 psi

Buoyancy force at 3100 feet:

$3100 \times 10.2 \times 0.052\ (20{,}768\text{-}19{,}445) = \underline{2175\ \text{lbs}}$

Stress bottom section 2:

$$\frac{(170{,}000 - 57756 - 2175)}{20{,}768} = \frac{110069}{20{,}768} = \underline{5300\ \text{psi}}$$

Stress top section 2:

$$\frac{299727 + (550 \times 10.2 \times 0.052 \times 20{,}768)}{20{,}768} = \underline{14724\ \text{psi}}$$

Average yield strength section 2 90000 psi

(5300/90000) x 100% = 5.9%

(14724/90000)x 100% = 16.3%

Collapse rating correction section 2:

Bottom	5.9%	tension	96.5%	2670 x 0.965	= 2577 psi
Top	16.3%	tension	91%	2670 x 0.91	= 2430 psi

Burst rating correction section 2:

Bottom	5.9%	tension	103%	5380 x 1.03	= 5541 psi
Top	16.3%	tension	107%	5380 x 1.07	= 5757 psi

Safety factor tension: 1661000/299727 = 5.54

9 5/8" Casing

Weight of string in air

N-80 47 lbs/ft	400 x 47	= 18,800 lbs	(section 1)
N-80 43.5 lbs/ft	3000 x 43.5	=130,500 lbs	(section 2)
N-80 47 lbs/ft	5350 x 47	=251,450 lbs	(section 3)
	Total	400,750 lbs	

Cross sectional areas:

N-80 47 lbs/ft = 13,572 sq.in.

N-80 43 lbs/ft = 12.559 sq.in.

Buoyancy of string in 13.5 ppg mud

3000 x 13.5 x 0.052 x 12,559	=	26,449 lbs
5750 x 13.5 x 0.052 x 13,572	=	54,783 lbs
Total		81,232 lbs
Weight and string in mud	=	319,518 lbs

Buoyancy force at 9300 feet = 9300 x 13.5 x 0.052 x 13,572 = - 88,606 lbs

Stress bottom section 1 = 88606/13,572 = 6529 psi (compression)

Stress top of section 1 = (88606-18800)/13,572 = 5143 psi (compression)

Average yield strength = 90000 psi

(6529/90000) x 100% = 7.3%

(5143/90000) x 100% = 5.7%

Collapse rating corrections Section 1:

Bottom	7.3%	compression	103.5%	4750 x 1.035	= 4916 psi
Top	5.7%	compression	102.5%	4750 x 1.025	= 4869 psi

Burst rating corrections Section 1:

Bottom	7.3%	compression	96%	6870 x 0.96	= 6595 psi
Top	5.7%	compression	96.5%	6870 x 0.965	= 6630 psi

Buoyancy force at 8900 ft:

- 88606 + 18800 + 8900 x 13.5 x 0.52 (13,572 - 12,559) = - 63477 lbs

Stress bottom section 2:

63477/12,559 = 5054 psi (compression)

Stress top section 2:

(-63477 + 3000 x 47)/12,559 = 5336 psi (tension)

(5054/90000) x 100% = 5.6%

(5336/90000) x 100% = 5.9%

Collapse rating corrections Section 2:

Bottom	5.6% compression	102.5%	3810 x 1.025	= 3905 psi
Top	5.9% tension	96.5%	3810 x 0.965	= 3677 psi

Burst rating corrections Section 2:

Bottom	5.6% compression	96.5%	6330 x 0.965	= 6108 psi
Top	5.9% tension	103%	6330 x 1.03	= 6520 psi

Buoyancy force at 5900 feet

- 63477 + 130500 - 5900 x 13.5 x 0.052 (13572 -12559)= + 62827 psi

Stress bottom Section 3: 62827/13572 = 4629 (tension)

Stress Top Section 3:

$$\frac{62827 + 5350 \times 47 + (550 \times 13.5 \times 0.052 \times 13572)}{13.572} \quad - 23542 \text{ psi}$$

(4629/9000) x 100% = 5.1%

(23542/90000) x 100% =26.1%

Collapse rating corrections Section 3:

Bottom	5.1% tension	97.5%	4750 x 0.975	= 4631 psi
Top	26.1% tension	84%	4750 x 0.84	= 3990 psi

Burst rating corrections Section 3:

Bottom	5.1% tension	102%	6870 x 1.02	= 7007 psi
Top	26.1% tension	110%	6870 x 1.1	= 7557 psi

Safety factor tension: 1036000/[illegible]

Mud Program

Depth Interval	Hole Size	Mud Type	Weight	Funnel VIS/SEC	API Fluid Loss, CC
550 - 790	36"	Sea Water Spot gel mud before running pipe			
790 -1500	26"	Sea Water Spot gel mud before running pipe			
1550-5600	17 1/2"	Fresh Water Gel-FCL CMC	10-11	40-50	10-15 at 5000
5600-9300	12 1/4"	Fresh Water Gel-FCL CMC	10-11/ 13.5	40-50	3- 5 by 7000
9300-12000	8 1/2"	Fresh Water Gel-FCL CMC	13.5	40-50	3- 5

Water Loss figures may be lowered if hole conditions warrant

Mud weight to be 13.5 ppg below 7500 feet

Hole Deviation

The hole will be kept as straight as practical through the use of stabilizers. No deviation problems are anticipated. Deviation checks will be made at each bit change or at 500 ft. intervals, whichever is less. Additional or fewer surveys may be made at the discretion of the Drilling Supervisor.
Dog leg severity should be limited to 1^{o} per 100 ft.

Well Control Procedure

The Drilling Supervisor will be responsible for well control procedures. Mobil's Blow-Out Prevention Rig Guide for Floating Rigs will be followed.

Oil Spill Pollution Control

The Drilling Supervisor is responsible for Oil Spill Pollution Control procedures and drills aboard the rig. The primary control measure for small oil spills will be the use of dispersants. Mobil's Manual on Oil Spill Control and API publication No. 4024, Systems Study of Oil Spill Clean-Up Procedures, will be used as guides and expert advice will be immediately solicited in case of a disaster situation.

Well Evaluation Program

Sample Logging

A mud logging unit will be aboard the rig. Exploration Logging (U.K.) Ltd. will install a new computerized logging unit that will yield more drilling information in addition to the conventional logging service.

Coring

Coring will be limited to the evaluation of significant reservoir/oil shows. Sidewall cores may be taken.

Testing

A detailed testing program will be prepared when the well reaches proposed depth.

Electric Logging

As noted in geological program.

Operational Sequence

1. The rig will be towed to location and the anchors run. All anchors will be run out 3,000 feet or more. The rig will be positioned with a heading of 315° true. After anchors out, moorings will be tested to 400,000 lbs. After satisfactory mooring test, approximately 200,000 lbs tension will be held on all moorings.

2. Run 26" bit on 36" hole opener to sea bed, drill 36" hole with sea water to 240 feet, sea bed penetration. Wipehole, spot viscous mud in hole, POH. Bit weight while drilling 36" hole should be kept to minimum. Totcos should be taken after 20', 50', and 100' sea bed penetration and at total depth. (240 feet penetration).

3. Run 30" conductor with permanent guide base and 30" housing and stab into hole. Leave bottom of guide base ± 5 feet above sea bed. Cement with 780 sacks Class "G", followed by 500 sacks Class "G" with 2 per cent Calcium Chloride. Regan Level Indicator will be installed on camera side of guide structure. Level Indicator to be checked before and after cementing.

4. Run 30" pin connector, marine riser and diverter and latch on to the 30" well head. Test the 30" casing, pin connector and diverter to 400 psi.

5. Drill out 30" casing with water with 17 1/2" bit. Displace with gel mud and drill 5 feet of formation. Establish formation bleed off pressure.

6. Drill 17 1/2" hole with water to 1550 feet RKB (1000 feet sea bed penetration). Slug hole with gel mud if necessary. Spot gel in hole before pulling out.

7. Disconnect the 30" pin connector from 30" housing and pull the riser.

8. Run in the hole with a 26" hole opener and open up to 26". Spot gel mud as required and before pulling out to run 20" casing. No welding or open flares will be permitted while operating with open hole unprotected by BOP's.

9. Run 20" casing on 18 3/4", API 10,000 housing, latch into 30" housing, cement with 1000 sacks 8 per cent gel Class "G" cement, followed by 1000 sacks neat Class "G".

10. Nipple-up 18 3/4" API 10,000 BOP stack and 21" riser. Test rams and wing valves to 7,500 psi, Hydrils to 2500 psi. Test all surface manifold valves to 10,000 psi. All tests to be made with water.

11. Drill out 20" float and shoe with 17 1/2" bit and 5 feet of formation. Establish formation bleed-off pressure.

12. Drill 17 1/2" hole to 5,600 feet. Log as directed by geologist. Conduct weekly pressure test of BOPs as in 10. above using test plug. Conduct frequent pit drills, and "hang-off" drills. "Hang-off" drills to be conducted without closing Hydril.

13. Condition hole for 13 3/8" casing, run 13 3/8" casing on 13 3/8" x 18 3/4" API 10,000 Hanger. Cement 13 3/8" to 150 feet above 20" casing shoe with 1000 sacks Class "G" + 8% gel followed by 1600 sacks Class "G" neat cement. Activate Hanger seals and test.

14. Drill out with 12 1/4" bit, make 5 feet of hole. Establish formation bleed-off pressure.

15. Drill 12 1/4" hole to 9,300 feet. Log as directed by geologist. Conduct weekly pressure test of BOPs as in 10 above using test plug. Conduct frequent pit drills, and "hang-off" drills. "Hang-off" drills to be conducted without closing Hydril.

16. Condition hole for 9 5/8" casing, position blade stabilizer immediately above bit during conditioning trip or trips. Run 9 5/8" casing on 9 5/8" x 18 3/4" API 10,000 Hanger. Cement 9 5/8" to 150 feet above 13 3/8" casing shoe with 1300 sacks Class "G" with 0.2 per cent HR-4 retarder. Activate Hanger seals and test.

17. Test BOPs as in 10 above. Conduct weekly pressure tests thereafter.

18. Drill out with 8 1/2" bit, make 5 feet of hole. Establish formation bleed-off pressure.

19. Drill to approximately 12,000 feet or as dictated by geologist with 8 1/2" bit. Conduct frequent pit drills and "hang-off" drills. Check drilling breaks for flow. Log as directed by geologist.

20. If required condition hole and run 7" casing liner on 9 5/8" x 7" liner hanger with tie back sleeve. Cement full length of liner with 250 sacks Class "G" cement + 0.3% HR 4 + 0.5% CFR 2. Re-test BOPs as in 10 above.

21. Test 9 5/8" casing to 4,000 psi. Drill out cement in 9 5/8" casing and 7" liner.

22. Plug back open hole with neat Class "G" cement to such depth as dictated by the testing program.

23. Test as directed by Management.

24. Plug and abandon or plug and suspend, as directed by Management.

CASING CEMENT CALCULATIONS

1. 30" conductor in 36" hole (no allowance for washout)

	Bbls/ft	Cu. Ft/ft
30" x 36" annular volume	0.38467	2.15988
30" x 1½" wall casing volume	0.7082	3.9761
30" x 1 " wall casing volume	0.7616	4.2761

Cement Data	Neat	Class "G"
Using freshwater	Class "G"	+ 2% $CaCl_2$
Gallons water per sack	5.2	5.2
Slurry weight, ppg	15.6	15.6
Yield, cu. ft. per sack	1.18	1.18
Thickening time, hr: min	4:30+	1:30+
Compressive strength psi, 8 hrs & 60°F	NS	375
12 hrs & 60°F	75	695

Casing cemented full length to sea bed

Annular volume	= 0.38467 x 240	= 92.32 bbls
20' plug in shoe joint	= 0.7616 x 20	= 15.23 bbls
		107.55 bbls
107.55 bbls x 5.62 ft^3/bbl - 1.18 ft^3/sack		=512.22 sacks
Excess of 150%		= 1280 sacks

Use

780 sacks neat Class "G" tailed in with 500 sacks Class "G" + 2% Calcium Chloride

Displacement = 220 x 0.7616 = 167.55 bbls + D.P. volume

2. 20" casing in 26" hole (no allowance for washout)

	Bbls/ft	Cu.Ft/ft
20" x 26" annular volume	0.2681	1.5053
20" x 91.5 ppf casing volume	0.3714	1.9947

Cement Data	Neat	Class "G"
Using fresh water	Class "G"	+ 8% Gel
Gallons water per sack	5.2	10.4
Slurry weight, ppg	15.6	13.1

	Neat Class "G"	Class "G" + 8% Gel
Yield, cu. ft. per sack	1.18	1.92
Thickening time, hr:min	4:30+	4:00+
Compressive strength, psi, 12 hrs & 60°F	75	
24 hrs & 60°F	495	45

Casing cemented full length to sea bed

Annular volume	0.2681 x 1000	= 268.1 bbls
100' plug in casing	0.3714 x 100	= 37.1 bbls
		305.2 bbls
(305.2 bbls x 5.62 ft^3/bbl) + 80% excess		3087.4 cu.ft.

Use

(Lead)	1000 sx Class G + 8% gel	1920 cu.ft.
(Tail in)	1000 sx Class G neat	1180 cu.ft.
	Total	3100 cu.ft.

Displacement: 900 x 0.3714 = 334.26 bbls + D.P. volume

3. 13 3/8" casing in 17 1/2" hole (no allowance for washout)

	Bbls/ft.	Cu.ft/ft
13 3/8" x 17 1/2" annular volume	0.1237	0.6946
13 3/8" x 68 ppf casing volume	0.1497	0.8406
13 3/8" x 72 ppf casing volume	0.1480	0.8313

Cement Data Using fresh water	Neat Class "G"	Class "G" + 8% Gel
Gallons water per sack	5.2	10.4
Slurry weight, ppg	15.6	13.1
Yield, cu.ft. per sack	1.18	1.92
Thickening time, hr:min	2:35	4:00+
Compressive strength, psi 12 hrs & 140° F	2470	
24 hrs & 140° F	4875	595

Casing cemented to 150 feet above 20" casing shoe

150 feet between 20" and 13 3/8"	= 150 x 0.281	42.23 bbls
Annular volume	= 0.1237 x 4050	500.98 bbls
100' plug in casing	0.1480 x 100	14.80 bbls
	Total volume	558.01 bbls

(558.01 bbls x 5.62 cu.ft/bbls) + 20% excess = 3763.22 cu.ft.

Displacement = 0.148 x 2400 + 0.1497 x 2550 = 737 bbls + D.P. volume

Use

Lead	1000 sx Class G + 8% gel	1920 cu.ft.
Tail in	1600 sx Class G Neat	1888 cu.ft.
	Total	3808 cu.ft.

4. 9 5/8" casing in 12 1/4" hole (no allowance for wash out)

	Bbls/ft.	Cu.ft/ft.
9 5/8" x 12 1/4" annular volume	0.0558	0.3132
9 5/8" x 47 ppf casing volume	0.0732	0.4110
9 5/8" x 43.5 ppf casing volume	0.0744	0.4180

Cement Data — Using fresh water

	Neat Class "G"	HR-4 Retarded Class "G" 0.2%	0.3%
Gallons water per sack	5.2	5.2	5.2
Slurry weight, ppg	15.6	15.6	15.6
Yield, cu. ft. per sack	1.18	1.18	1.18
Thickening time, hr:min	1:54	3:09	4:00+
Compressive strength, psi 8 hrs & 160° F	2185		
12 hrs & 160° F	3055		
24 hrs & 160° F	5925	5185	5200

Casing cemented to 150' above 13 3/8" casing shoe

Annular volume	0.0558 x 3850	214.83 bbls
100' plug in casing	0.0732 x 100	7.72 bbls
	Total volume	222.15 bbls

(222.15 bbls x 5.62 cu.ft/ft) + 20% excess 1498.18 cu.ft.

Displacement: 3000 x 0.0744 + 5650 x 0.0732 =
219.6 + 413.58 = 633.2 bbls + D.P. volume

Use: 1300 sacks class G + 0.2% HR-4 retarder = 1534 cu.ft.

5. 7" Liner in 8 1/2" hole (no allowance for wash out)

	Bbls/ft	Cu.ft/ft
7" x 8 1/2" annular volume	0.0226	0.1268
7" x 29 ppf casing volume	0.0371	0.2085
7" x 9 5/8" annular volume	0.0424	0.2380

Annular volume = 0.0226 x 2700 = 61.02
+ 0.0424 x 200 + 8.48 = 69.5 bbls
100' plug in casing: 0.0371 x 100 = 3.7 bbls
73.2 bbls

(73.2 bbls x 5.62) + 10% excess = 452.52 cu.ft.

Displacement = 2800 x 0.0371 = 103.9 bbls
D.P. volume = 0.0173 x 9100 = 157.4 bbls
261.3 bbls

Cement Data

Using fresh water	Neat Class "G"	HR-4 Retarded Class "G" 0.2%	0.3%
Gallons water per sack	5.2	5.2	5.2
Slurry weight ppg	15.6	15.6	15.6
Yield cu.ft. per sack	1.18	1.18	1.18
Thickening time, hr:min	1:11	1:57	2:21
Compressive strength psi, 12 hrs 230° F			3630
24 hrs 230° F			6190

Use
400 s x Class "G" + 0.3% HR-4 retarded + 0.5% CFR-2 = 472 cu.ft.

GP/sb
19/02/75

Mobil Exploration Norway Inc.

Norwegian Sector North Sea

Well 33/12-3

Casing Program

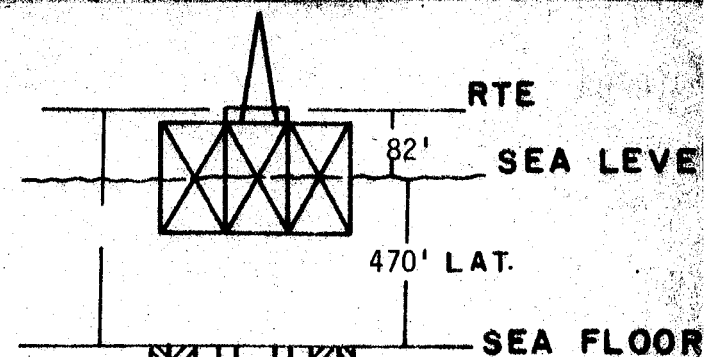
NOT TO SCALE

ORIGINAL CEMENT

CEMENT

ABANDONMENT CEMENT PLUG

PERFORATED INTERVALS



30" x 1 1/2" & 1"wall
Cement to seabed

790'

20" X-52 91.5 ppf
Cement to seabed

1550'

13 3/8" 72 ppf N-80 2550'
13 3/8" 68 ppf S-80 2500'
Cement to 150' above 20" shoe

5600'

9 5/8" 47 ppf N-80 5350'
9 5/8" 43.5 ppf S-80 3000'
9 5/8" 47 ppf N-80 400'
Cement to 150' above 13 3/8" shoe

9300'

7" x 29 ppf N-80

12000'

T.D.

36"HOLE
30"CSG.
26"HOLE
20"CSG.
17 ½"HOLE
13 3/8"CSG.
12 ¼"HOLE
9 5/8"CSG.
8 ½"HOLE

GP
19/02/75