Denne rapport tilhører **STATOIL**

L&U DOK. SENTER

L. NR. 20084280018

KODE Well 31/2-13 nr. 13

Returneres etter bruk

NOF

MAGCOBA

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A/S NORSKE SHELL
OPERATIONS BASE
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4056 TANANGER

TANANGER, 22.05.84

Ref.no. DRNG/177/84/KE/sgh

Attn: A. Kelland
CC : T. Nyland
J. Bysveen

Dear Sir,

Please find enclosed our Drilling Fluids Summary for Well 31/2-13 which was drilled using our low toxicity oil based mud system, Faxekleen.

We trust you will find the information contained within, our comments and recommendations of interest and of benefit to your drilling operations.

On behalf of Dresser Norway A/S, thank you for the opportunity to have serviced this well. Should you or your colleagues have any queries please do not hesitate to contact us.

Yours faithfully,

Ken E...s
Area Engineer
Dresser Norway A/S

DRESSER NORWAY A.S.
MAGCOBAR

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Ken Ellis

Ken Ellis
Area Engineer
Dresser Norway A/S

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I N D E X

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SUMMARY BY INTERVAL

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SUMMARY BY INTERVAL

36" Hole - 30" Casing

Mud Type: Spud Mud

RKB - 468m

After the temporary guide base was run three days were spent waiting on weather.

The 36" Hole was then drilled to 419m and displaced with 250 Bbls gel slurry.

Weather again delayed progress. While attempting to stab into the hole, the drill string parted. The fish was retrieved without problems and drilling resumed, at 431m a survey was taken (1° Deviation). T.D. was reached at 468m and a wiper trip made. After displacing the hole with gel slurry the 30" casing was run and cemented without problems.

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SUMMARY BY INTERVAL

26" Hole 20" Casing

Mud Type: Spud Mud

468m to 825m

The 30" casing shoe was drilled on and formation drilled to 473m. The bit was pulled to surface, and the B.O.P's and riser run. The 14 3/4" Pilot hole was then drilled to 500m while displacing mud. A trip was made and a directional drilling assembly run. Drilling resumed to 583m, building a 1½° deviation. Time was lost to waiting on weather.

Drilling resumed to 750m building a 12 1/4" angle. The hole was opened out to 26", 20" csg was run and cemented without problems, the hole having been displaced to a 1.3 s.g. slurry.

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SUMMARY BY INTERVAL

17 1/2" Hole - 13 3/8" Casing Mud Type: Fazekleen

825m - 1710m

Whilst running and testing the B.O.P. equipment and riser, 1900 Bbls Fazekleen were mixed and weighted up to 1.30 S.G. After waiting on weather a new bottom hole assembly was made up, cement was drilled to 806m and circulated out.

The hole wes reamed to 813m and displaced to Fazekleen with a 50 Bbl spacer ahead. After making up a new bottom hole assembly 17 1/2" hole was drilled to 819m and a 1.80 S.G. leak-off test was performed. New 17 1/2" hole was drilled to 1134m with wiper trips at 890m and a bit trip at 943m, afterwards, surveys were made at 30m intervals. When RIH after drilling to 1134m tight hole was experienced at 1117m and 1070m.

With the onset of bad weather conditions, the riser was displaced to seawater, the hang-off gear was picked up and the drill string was prepared to be hung off. After redisplacing to mud, RIH and washing 60m to bottom the mud weight was increased to 1.40 S.G. New hole was drilled to 1537m where the hole packed off after a survey.

After working pipe through a tight spot at 1381m, POOH to shoe, RIH and washing to bottom from 1489m new hole was drilled to 1631m. After a 10 stand wiper trip the hole was drilled to 1710m, circulated, surveyed and logged. During this time the mud properties were maintained by adding premixed mud with water to dilute solids, and maintaining the proper oil/water ratio as per the operator's request. 13 3/8" casing was then run and cemented without problems.

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SUMMARY BY INTERVAL

12 1/4" Hole - 9 5/8" Csg

Mud Type: Fazekleen

After drilling through the 13 3/8" casing shoe and rathole a leak-off test was performed to 1.61 S.G. Operations continued by drilling ahead to 1744m and working the junk basket incorporated in the string while circulating prior to POOH.

The mud weight was reduced to 1.25 S.G. whilst drilling out the cement and float shoe.

Coring operations were begun at this point with 8 cores being cut in all. Frequent tripping of pipe occured during coring operations and consequently a large amount of barite was being used for slugs and incorporated into the mud system. Coring data is as follows:

CORE	RECOVERY %	METERS DRILLED
1	4	10
2	20	18
3	90	12
4	100	11
5	94	12
6	100	6
7	94	12.5
8	82	18.5

Having cored to 1844m drilling operations were resumed. Some tight hole was experienced in reaching 1946m with a conventional assembly.

The weather deteriorated at this point and the string was hung-off. The riser was displaced to seawater and unlatched.

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When the weather improved again the riser was displaced back to O.B.M. and the string retrieved and POOH. After changing the bit, drilling continued to T.D. without incidents. The hole was logged and then 9 5/8" casing was run and set at 1999m.

The surface O.B.M. was backloaded at this point. A Dowell spacer was used to displace the O.B.M. inside the 9 5/8" csg and this volume was then backloaded. All pits and lines were then thoroughly cleaned in preparation for the brine system being used during the testing period.

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SECTION 2

MUD SYSTEM, PERFORMANCE, COMMENTS AND RECOMMENDATIONS

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36" and 26" Holes

These intervals were drilled with seawater and viscous pre-hydrated bentonite slurry. Hole conditions were good, logs and casings were run without problems.

17 1/2" Hole

This interval was drilled using Fazekleen, low toxicity invert oil emulsion mud, based on Shell Sol D70 oil.

(i) Mixing - The mud was mixed to the formulation proposed in Dressers tender and also in the mud programme for this well. The shear lines were used whilst mixing with approximatly 2000 psi on the mud pumps. This raised the temperature of the mud to +/- 120^{o}F. The oil and products went together well to form a stable emulsion giving the required mud properties.

As an experiment one batch of mud was mixed without the shear line being used. On checking the mud properties it was found that both emulsion stability and yield point were some 40% lower than when the shear line had been used, product concentrations were the same for all batches mixed. Once sheared, the mud properties were similar to those of the mud mixed with the shear gun.

(ii) Mud Properties - Mud properties were controlled within the required ranges without problems. The formulations used gave a stable mud system that required very little treatment to the active system other than small daily maintenance with primary emulsifier, oil wetting agent and lime.

The activity of the mud was run higher than what had been programmed, i.e. +/- 0.88 rather than 0.85. It was noted that on drilling ahead the

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activity increased as did the water content, this indicated that water was being drawn from the formation. Treatments of $CaCl_2$ to lower the activity to 0.85 achieved the desired result for a short period before it increased again along with the water content. The activity of the mud remained steady at +/- 0.88, as this was giving good firm cuttings, across the shale shakers it was allowed to stabilize and remain in this range.

Oil water ratio was maintained in the range of 80/20 as programmed. Tests performed by Dresser, prior to drilling this well, had indicated that O/W ratio, using Shell D70, gave a mud that had an acceptable increase in viscosities at low temperatures i.e. 20^{o}C and below. Higher O/W ratios than 80/20 did reduce the viscosity increase at low temperatures but only slightly and not enough to justify the increased cost from a higher oil content.

Due to the low flowline temperatures experienced on this location concern was expressed over flowline viscosity being very high when using an oil mud, resulting in problems at the shale shakers and mud cleaners. In fact this was not a problem, selection of Shell D70 which had a low viscosity and the correct O/W ratio contributed to minimising viscosities at the flowline as a result of low temperature.

Flowline temperature was actually +/- 32^{o}C, considerably higher than the 20^{o}C previously experienced with water based mud. Higher flowline temperatures with oil based have been experienced before on other wells where water based mud were used previously. It has also been noted that when low toxicity oil muds are used to replace diesel oil muds,flowline temperatures are generally higher than previously experienced.

As stated, very high viscosities at the flowline were not experienced, even after trips and logging. Viscosities were not excessive to the point where they caused problems, once circulation was established the viscosity dropped very quickly to normal levels. It was observed that viscosity returned to normal levels before the temperature reached the +/- 32^{o}C range, thus indicating that the quick reduction in viscosity to normal circulating

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levels after static periods, was more a function of shear than temperature.

When using an oil mud funnel viscosity will generally be higher than a water based mud for a given density, solids content, P.V. and Y.P. etc. Drilling personnel on the rig tended to compare mud viscosity to that of the KCl water based mud previously used rather than use the P.V. and Y.P., at the standard 115^{o}F, as a measure of mud performance. On several occasions discussions on the mud's funnel viscosity took place, generally that it was too high, when P.V. and Y.P. had not changed and were well within the required range.

Mud rheology was easily maintained within the desired range by adding pre-mixed mud of known product concentrations and properties, small additions of organophillic clay were made occasionally to maintain the Y.P. Adding pre-mixed mud in this way is by far the best way of running an oil mud system as it ensures that all the properties remain within the required ranges, as was the case with fluid loss, and stability as well as the other properties previously mentioned.

Small daily maintenance treatments of D.F.L. (primary emulsifier), DV-33 (oil wetting agent) and lime were made to the active system to maintain a good emulsion, oil wet solids and the correct alkalinity respectivly.

The solids content of the mud was controlled at quite low levels, low gravity solids were generally in the range of 40-50 ppb. Oil muds tend to generate larger cuttings than water based muds, that do not disperse into the system. This can make primary removal of cuttings at the shale shakers much easier with oil based muds than with water based muds.

Drilling personnel on the rig suggested that the solids content of the mud was too high on several occasions, again the yardstick being a KCl/ polymer water based mud. It was pointed at that the liquied phase of a 35 ppb KCl/polymer mud has a density of approximately 1.06 S.G. where

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as the liquid phase of the oil mud (combined oil at 0.79 S.G. and $CaCl_2$ at 1.14, 80/20 ratio) has a density of approx. 0.86 S.G. For a given mud density e.g. the 1.4 S.G. used at T.D., the extra baryte required to achieve the required density, in this type of oil mud, would be approx. 3% by volume thus giving a much higher solids content than that of a KCl/polymer water based mud.

In summary, the Fazekleen low toxicity oil based mud provided a very stable mud system that required little treatment to maintain the required mud properties.

(iii) Oil muds will generally give a gauge hole and much larger cuttings which, due to their size, will settle very quickly. With directional well the cuttings have only a short distance to fall, depending upon hole angle (which was upto 45^{o} in this case) to the bottom side of the hole. On trips, connections and surveys accumulations of cuttings can easily result in stuck pipe and packing off.

The importance of circulating cannot be overemphasised when drilling directional wells with oil muds, especially in the 17 1/2" section. Circulating should not be considered as time lost, it will often save time by reducing tight hole on the way out and washing/reaming on the way back in.

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12 1/4" Hole

The mud density was reduced from 1.41 S.G. to 1.25 S.G. to drill this interval. As the centrifuge was not working this was done by dilution with new mud. Excess volume was taken off the rig for storage in Dresser's onshore liquid mud plant. Mud properties were maintained in the required range without problems, once the centrifuge was operational it was very effective in keeping down mud density thus reducing dilution requirements.

Solids Control Equipment

The finest screens possible were fitted to the shale shakers that would allow for minimum mud losses with cuttings yet still give good primary solids removal. The mud cleaners were also fitted with the finest screens possible with regard to the need for a relatively dry cutting discharge.

The centrifuge was installed for this oil mud job, not only to improve overall solids control efficiency but also to aid in cutting back mud density for the 12 1/4" hole thus reducing dilution requirements.

The installation was carried out by the drilling contractor and on first apperances all seemed to be in good order. However, when the centrifuge was switched on it was found that the solids discharge arrangement was inadequate. and that the solids were "backed up" into the centrifuge thus summing the machine making it inoperable.

The solids discharge was re-arranged and a centrifuge specialist flown to the rig, by the time the centrifuge was operational the 12 1/4" hole was being drilled and the mud density had been reduced by dilution. As stated, however, the centrifuge was very effective in keeping down mud density on the 12 1/4" interval.

Should the installation of a centrifuge be necessary for other wells in the future a specialised solids control equipment company should be considered.

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It would also be advisable to have a service engineer available for several days to oversee the start up and solve "teething troubles".

Logistics

The provision of extra base oil storage in the form of two deck tanks giving approx. 700 Bbls of extra storage proved invaluable. In fact, without them supply and storage of the base oil to meet drilling requirements would have been impossible. The tanks were also used to store unweighted pre-mixed mud, this being pumped back to the deck tanks after being mixed in the mud pits.

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DAILY OPERATIONS LOG

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DAILY OPERATIONS LOG

28 December 1983

Dresser Mud Engineer arrived on Borgny Dolphin at 1900 hrs. The rig was under tow and waiting on weather to proceed to the well location.

29 December

The rig was moved on to location; anchors were run.

30 December

The rig was ballasted down and anchor tested. Drill collars, heavy weight drill pipe and ordinary drill pipe was picked up. The temporary guide base was loaded with 150 sxs Barite and prepared for running. Mixed 350 Bbls 3.3 ppb CMC-EHV with 0.3ppb Soda Ash for use as spud mud while waiting on drill water.

31 December

The temporary guide base was run. Wait on weather to spud. Made up 795 Bbls gel slurry. Approx. 45 ppb to be diluted and flocculated with lime for use as spud mud.

1 January 1984

Wait on weather.

2 January

Wait on weather. RIH. Drill to 397m.
Drilled with CMC and then seawater. Pumped approx. 30 Bbls flocculated gel slurry after drilling each single.

3 January

Drilled to 419m. Displace hole with 260 Bbls gel slurry. POOH. Wait on weather.

4 January

Depth: 419m

Wait on weather. While attempting to stab into the temporary guid base the bottom hole assembly parted after hanging up in the funnel of the base. The 26" bit, 36" hole opener and two 9 1/2 Drill collars fell across the temporary guide base.
Worked on and completed shear device "skirt" in pit no.2.

5 January

Depth: 428m

The fish was recovered and a new bottom hole assembly was picked up and RIH. Drilled ahead to 428m.

6 January

Depth: 468m

Drilled to 431m. Survey 1^{o}. Drilled to 447m. Displaced the hole with 360 Bbls gel slurry. POOH due to excessive heave. RIH. Drilled to 468m. Pumped 450 Bbls gel slurry. POOH to temporary guide base and experienced no drag. RIH and pumped 450 Bbls gel slurry. Survey 1^{o}. POOH and rigged up to run 30" Csg.

Built 1400 Bbls gel slurry to be used in drilling 14 3/4" pilot hole. Mixed 150 Bbls $CaCl_2$ solution for 30" Csg cement.

7 January

Depth: 468m

The 30" Casing was prepared, run and landed. The hole was displaced from mud to seawater and the casing was set. Wait on cement 6 hours, while holding the casing in tension. POOH. RIH to wash wellhead. POOH. RIH with new bottom hole assembly to drill cement with 14 3/4" bit and a 26" hole opener.

Made up 350 Bbls gel slurry for 14 3/4" pilot hole.

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8 January

Depth: 473m

Drill cement and new hole to 473m. POOH. Set riser. Pin connector.

9 January

Depth: 500m

Complete running riser. Pin connector and installing diverter. Test diverter. Repair flow line valve. RIH. Drill 14 3/4" hole to 500m while displacing hole to mud. Circulate 30 min. after drlg. POOH. No drag experienced. Prepare to RIH with directional drilling equipment.

10 January

Depth: 583m

RIH with directional drilling equipment. Drill 14 3/4" deviated hole to 583m. Building 1 1/2^{o} deviation.

Built 350 Bbls gel slurry. Cutting became more sticky near bottom, indicating possible zone of reactive clays.

11 January

Depth: 750m

Wait on weather. RIH with directional equipment. Drill 14 3/4" hole 583m - 750m building 12 1/4^{o} angle. POOH to change to conventional drilling bottom hole assembly. Bit, drill collars "balled". Used mud cleaner as desilters to maintain weight 1.15 S.G. Desilter discharge = 1.26 S.G. Built 700 Bbls gel slurry.

12 January

Depth: 825m

Change BHA for rotary drilling. Drill to 825m (14^{o}N4IW). Wiper trip. Displace open hole with 300 Bbls 1.35 S.G. gel slurry. POOH. Log. Wait on weather.

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13 January	Depth: 825m WOW. RIH to 455m and displace to seawater.at 825m. Observed well - No flow. Pumped 400 Bbls. Viscous mud. Pumped slug. POOH. Rig up to pull raiser. WOW.
14 January	Depth: 473m WOW. Pull riser assembly. Made up new BHA and rigged up guide frame. RIH and stabbed in. Rigged down guide frame and RIH. Open hole to 26" from 455 - 473m. Pumped 25 Bbl. Viscous sweep.
15 January	Depth: 782m Continued reaming 26" hole from 473 - 775m. Pumping 25 Bbl. Hi-Vis sweeps. Conducted surveys at 574, 650 and 764m. Started drilling new hole. Pumped 300 Bbls. Viscous mud and POOH. RIH with new BHA and drilled from 775 - 782m. Pumped 300 Bbls. Viscous mud and POOH.
16 January	Depth: 825m RIH to 763m.and wash to 783m. Reamed 26" hole from 782 - 813m, and conducted wiper trip to 30" shoe. Pumped 200 Bbls. viscous mud once back on bottom. Spotted 1.35 S.G. Viscous mud in open hole and POOH. Rigged up and ran and cemented 20" casing.
17 January	Depth: 825m Concluded cementing 20" casing. Backed out running tool and POOH. Rigged up to run B.O.P's - WOW. Continued mixing OBM. Weighted up one pit to 1.30 S.G. Properties as reported. Adjusting YP to 15. Activity to .85 and alkalinity to 2.0 prior to displacement.

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18 January	Depth: 825m WOW. Ran riser and B.O.P's. Pressure test and function test to Shell specs. Mixed all surface volume together. Adjusted properties to those of programme.
19 January	Depth: 825m Conclude B.O.P. test - OK. Run and set wear bushing. Made up new BHA and RIH. Drill out cement from 789 - 806m and ream to 813m. Circulate hole, pump 50 Bbl. Spacer and displace to OBM. Pumped slug and POOH. Run Gyro multi-shot. Toll malfunctioned. POOH.
20 January	Depth: 971m Made up new BHA. RIH. Drill 17 1/2" hole to 819m. Made leak off test. Breaking down at 1.80 s.g. equivalent. Drill ahead to 924m. Made wiper trip to 890m. Drill ahead to 943m. POOH. RIH. No fill. Drill ahead. Observing the trend on activity before adding $CaCl_2$ to alter.
21 January	Depth: 1134m Drilled to 1134m with surveys at 30m intervals. POOH to shoe. Worked tight hole 1117 to 1070m. Picked up hang off tool. Ran bit to shoe and prepared to hang off. Displaced riser to S.W. Cuttings firm across shakers, will lower activity with depth, or as dictated by quality of cuttings. Recommended circ. B.U. prior to surveys and control drilling to 30m per hour.

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22 January	Depth: 1134m WOW. RIH, washed and reamed 60m to bottom. Weighted up active system to 1.40 s.g.
23 January	Depth: 1300m RIH, washed and reamed from 1117m - 1134m. Drilled to 1153m. POOH. Change BHA. RIH washed last stand to bottom. Drilled ahead. Adding pre-mixed O.B.M. to maintain volume and properties. Shaker screens B60 over B80 x 2 B100 over B120 x 1
24 January	Depth: 1410m RIH with new BHA to 1220m. Washed and reamed 75m to bottom. Drilled to 1391m. Broke wire line during survey. POOH. Made up new BHA. RIH. Washed 60m to bottom. Continued adding premix. Changed mud cleaner screens to 150 mesh.
25 January	Depth: 1584m Drilled to 1537m. Hole packed off after survey. Worked pipe through tight hole to 1381m. Circ and POOH to csg shoe. RIH to 1489m. Circ. Washed to bottom. Drilled ahead. Pumped 100 Bbls mud into formation shale shakers tripped casing loss of a 150 Bbls. Diluting mud to control solids.

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26 January	Depth: 1710m Drilled to 1631m. Circulated. Made 10 stand wiper trip. RIH to 1560m. Washed to bottom. Drilled to 1710m. Circ. POOH to 20" shoe. RIH. Washed down last 60m. Circulated. Survey. POOH to log. Added pre-mixed mud without water to active to increase oil.water ratio. Mud properties stable.
27 January	Depth: 1710m Wireline logs. Made up casing hangar assembly. RIH to 1660m. Washed to bottom. Circulated hole clean. Slugged pipe. POOH. Rigged up to run 13 3/8" casing.
28 January	Depth: 1710m Ran and cemented 13 3/8" csg. Made up spacer for cement.
29 January	Depth: 1710m Pressure tested casing seal assembly. Laid down 17 1/2" bottom hole assembly. Ran B.O.P. test tool. Test B.O.P. Testing tool failed. Retest B.O.P. Set wear bushing. Tested kelly cocks. Made up new BHA. RIH. Built 615 Bbls unweighted mud to reduce mud weight in system to 1.25 S.G.

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30 January — Depth: 1749m

Drilled float collar. Cement 1688m - 1696m. Shoe and rathole to 1710m. Drilled to 1715m. POOH to shoe. Ran leak off test to 1.61 S.G. Drilled to 1733m. Circulated bottoms up. Drilled to 1744m. Circulated bottoms up. Worked junk basket. Took Gyro survey. Slugged pipe. POOH mud. Reduced mud weight to 1.25 S.G. While drilling float equipment and cement. Added Lime and Calcium Chloride to increase alkalinity and reduce activity. Used centrifuge to reduce solids and maintain mud weight. Allowed yield point to remain untreated as per operators instructions.

31 January — Depth: 1764m

Ran Gyro survey. Spaced out drill string. RIH to core no 1, 1744 - 1754. Core barrel jammed. Slugged pipe. POOH. Recover 4% core no. 1. Made up new core barrel. RIH to core no.2.

Maintained mud weight at 1.25 S.G. Yield point dropped to 9. Not treating as per operator's instructions.

1 February — Depth: 1784m

Cut core no. 2,1754m - 1772m. Slugged pipe. POOH. Recovered 20% core no.2. RIH for core no.3. RIH to core no. 4.

Adding VG-69 to active to increase yield point. Cuttings firm.

2 February — Depth: 1813m

Cut core no. 4 to 1795m. Recovered 100% core. Cut core no. 5 to 1807m. Recovered 99%. Cut core no. 6 to 1813m.

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Cont. 2 February	Core jammed. POOH. Treated with Lime and Calcium chloride to increase alkalinity. Decrease activity. Ran centrifuge 90 mins. to maintain weight at 1.25 S.G. because of the frequent, heavy slugs for tripping.
3 February	Depth: 1844m Recover 100% core no.6. RIh to cut core no. 7 to 1825m. Recover 94%. RIH to cut core no. 8 to 1844m. Recover 82%. Maintain weight at 1.25 S.G. with centrifuge. Other properties stable.
4 February	Depth: 1946m Made up new BHA. RIH. Drill to 1946m. Some tight hole. POOH 22 stands. Pick up and land hang off tool in wellhead. Displace riser to seawater. Wait on weather. Made up viscous spacer and ran ahead of seawater for riser displacement. While drilling maintained weight with centrifuge and stabilize emulsion with DFL.
5 February	Depth: 1946m Wait on weather. Made up spacer of redisplacement of riser to mud.

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6 February	Depth: 2010m T.D. Wait on weather. Relatch onto drill string. Displace riser to mud. POOH. Change bit. Drlg to 2010m. Circulate bottoms up. Survey 42°. POOH. Wireline log. Maintained weight with centrifuge. Added DFL to maintain emulsion stability.
7 February	Depth: 2010m Wireline logging. Transferred base oil to slug pit for use in cement spacer.
8 February	Depth: 2010m Wireline logging. Made up 9 5/8" casing hanger.
9 February	Depth: 2010m Wireline logging. Wiper trip. Run 13 3/8" casing. Made up cement spacer. Backloaded 300 Bbls mud.
10 February	Depth: 1968m (top of cement) Ran 9 5/8" Csg. String and land same at 1999m. Circulated and cleaned hole. Pumped spacer and cemented string. Ran Gyro survey. Made up test plug. Ran in hole and tested B.O.P's backloaded 600 Bbls oil base mud.
11 February	Depth: 1968m Concluded B.O.P. test. Ran and set wear bushing RIH with new BHA. Pumped 43 Bbls. Dowell spacer and displaced hole to seawater. Circulated hole clean. flushed all surface lines with seawater. POOH laying out 5" drill pipe. Picked up 3 1/2" drill pipe and RIH. Cleaning pits for brine water.

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12 February

Depth: 1968m

Continue to RIH with 3 1/2" drill pipe. Circulated. Pumping Dowell spacers to clean hole. POOH to 350m RIH. Continued to clean out pits and flow lines prior to brine displacement.

13 February

Depth: 1968m

RIH to 1968m. Circulated and cleaned hole. Displaced lines and well to brine. Circulated through. Dowell filtering system. POOH. Schlumberger made runs with CBL. Gauge ring and junk basket then set packer. Rig down Schlumberger.

14 February

Depth: 1968m

Function test E-Z tree and RIH with 4 1/2" tubing. Made up perforating and backflush assembly. Joint of 3 1/2" tubing damaged so made up new assembly and tested - OK. Picked up 5" tubing and RIH with perforating and backflush assembly.

15 February

Depth: 1968m

Ran remaining 6" tbg. and hung off in well head using 5" D.P. Schlumberger ran GR. + CCL. - POOH with drill pipe and hanger tool. Space out 5" tbg. Flo-petrol RIH with test plug-press. Test - OK. Made up E-Z tree and RIH on 4 1/2" TBG. Landed fluted hanger in wellhead Schlumberger. Re-run GR + CCL - POOH. Made up flow head and lines. Circulate using Halliburton. Rig up wireline to test 3 1/2" TBG. No test due to leak in flo-petrol swivel. Wait for new flo-petrol swivel.

16 February

Depth: 1968m

Waiting on flo-petrol equipment. W.O.W.

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Shell, 31/2-13

2 March 1984 — WOW. Attempted to RIH with wireline. Too much heave so WOW. Rigged up again to run gauges. Open PCT valve and pressure test lubricator. O.K. Open master valve and RIH with gauges making gradient stops. POOH with wireline. Rig down and commence flowing well.

3 March — Flowing well.

4 March — Flowing well.

5 March — Continued to flow well. Shut well in then rigged up wireline. RIH with wireline to retrieve gauges making gradient stops when POOH. Made up new samplers and RIH. Energised samplers. Commenced flowing well.

6 March — Flowed well then retrieved samplers and SPD on wireline. Ran two bottom hole samplers and SPD on wireline. Flowed well then recovered samplers and SPD. WOW. Flushed surface lines. Dowell pumped 72 Bbls acid and let it soak. Flowed well through choke to clean up.

7 March — Flowed and continued to clean up well. Rig up wireline and RIH with gauges making gradient stops.POOH with wireline and flow well.

8 March — Continued to flow well. Shut in well on PCT for pressure build up. RIH and retrieve gauges then run sand bailer for sample. Dowell pumped viscous $CaCO_3$ pill and bullheaded tubing. Observed well. No flow. Closed PCT. Valve and opened morv. Reverse circulated well using brine. Made up and ran shifting tool to open SSD. Shear pin broke so POOH. Re-dress and rerun shifting tool.

DRESSER NORWAY A.S.
MAGCOBAR

Shell, 31/2-13

COST BY INTERVAL

DRESSER NORWAY A.S.
MAGCOBAR

Shell, 31/2-13

MATERIAL CONSUMPTION

Interval RKB - 468m

36" Hole - 30" Casing

Mud Type: Spud Mud

PRODUCT	UNIT SIZE	UNIT COST	COST
Magcobar	150 sxs (50 kg)	$ 7.10	$ 1065.00
Magcogel	52 M/T	$ 405.56	$ 21089.12
Caustic Soda	22 sxs (25 kg)	$ 22.05	$ 485.10
Soda Ash	9 sxs (50 kg)	$ 22.81	$ 205.29
Lime	28 sxs (40 kg)	$ 10.30	$ 288.40
CMC - EHV	22 sxs (25 kg)	$ 80.20	$ 1764.40
*$CaCl_2$	31 sxs (50 kg)	$ 38.07	$ 1180.17
*Mica (C)	1 sx (25 kg)	$ 21.40	$ 21.40
			$ 26098.88

$CaCl_2$ and Mica were used by Haliburton for cement operations.

Bbls mud utilized:	2866
Meters drilled:	110
Cost per meter:	$ 237.26
Cost per bbl:	$ 9.11

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Shell, 31/2-13

MATERIAL CONSUMPTION

Interval 468m - 825m

26" Hole - 20" Casing

Mud Type: Spud Mud

PRODUCT	UNIT SIZE	UNIT COST	COST
Magcobar	122 M/T	$ 148.90	$ 18165.80
Magcogel	35 M/T	$ 405.56	$ 14194.60
Caustic Soda	20 sxs (25 kg)	$ 22.05	$ 441.00
Soda Ash	10 sxs (50 kg)	$ 22.81	$ 228.10
Lime	21 sxs (40 kg)	$ 10.30	$ 216.30
			$ 33245.80

Bbls mud utilized:	2309 Bbls
Meters drilled:	357m
Cost per meter:	$ 93.12
Cost per Bbl:	$ 14.40

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Shell, 31/2-13

MATERIAL CONSUMPTION

Interval 825m - 1710m

17 1/2" Hole - 13 3/8" Csg

Mud Type: Fazekleen

PRODUCT	UNIT SIZE	UNITS	UNIT COST	COST
Magcobar	M/T	375	$ 148.90	$ 55837.50
Base oil (D-70)	Bbls	2745	$ 68.47	$ 187950.15
Bentone 38	25 kg/sx	230	$ 160.00	$ 36800.00
Vertoil	25 kg/sx	321	$ 61.50	$ 19741.50
DFL	55 gal/Dr	67	$ 1250.00	$ 83750.00
VG-69	25 kg/sx	467	$ 132.80	$ 62017.60
DV-33	55 gal/Dr	18	$ 1044.00	$ 18792.00
DV-22	25 kg/sx	321	$ 44.64	$ 14329.44
Lime	40 kg/sx	305	$ 10.30	$ 3141.50
$CaCl_2$	50 kg/sx	335	$ 38.07	$ 12753.45
				$ 495113.14

Bbls mud utilized: 3563

Less Bbls carried forward: 2511

= 1052 Bbls

Average cost/bbl =$ 138.08

Meters drilled = 885

Cost per meter $= \frac{138.08 \times 1052}{885}$

=$ 164.14

Shell, 31/2-13

MATERIAL CONSUMPTION

Interval 1710m - 2010m

12 1/4" Hole - 9 5/8" Csg

Mud Type: Fazekleen

PRODUCT	UNIT SIZE	UNITS	UNIT COST	COST
Magcobar	M/T	17	$ 148.90	$ 2531.30
Base oil (D-70)	Bbls	603	$ 68.47	$ 41287.41
Bentone-38	25 kg/sx	118	$ 160.00	$ 18880.00
DFL	55 gl/Dr	15	$ 1250.00	$ 18750.00
VG-69	25 kg/sx	56	$ 132.80	$ 7436.80
Vertoil	25 kg/sx	58	$ 61.50	$ 3567.00
DV-22	25 kg/sx	54	$ 44.64	$ 2410.56
DV-33	55 gl/Dr	2	$ 1044.00	$ 2088.00
Lime	40 kg/sx	67	$ 10.30	$ 690.10
$CaCl_2$	50 kg/sx	96	$ 38.07	$ 3654.72
				$ 101295.89

Bbls mud utilized: 3165

Less Bbls backloaded to boat 2688

477 Bbls

Average cost/bbl = $ 32.01

Meters drilled = 300m

$$\text{Cost per meter} = \frac{32.01 \times 477}{300}$$

$$= \$\ 50.90$$

DRESSER

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MAGCOBAR

Shell, 31/2-13

MATERIAL CONSUMPTION

Interval: Testing and completion

9 5/8" Csg, Top of cement 1968m

Mud Type: Brine

PRODUCT	UNIT SIZE	UNITS	UNIT COST	COST
HEC	25 kg/sx	12	$ 107.00	$ 1284.00
$CaCO_3$	25 kg/sx	218	$ 5.60	$ 1220.80
Caustic	25 kg/sx	2	$ 22.05	$ 44.10
			TOTAL	$ 2548.90

DRESSER

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MAGCOBAR

Shell, 31/2-13

Interval: Testing and Abandonment

PRODUCT	UNIT SIZE	UNITS	UNIT COST $	TOTAL COST$
HEC	25 kg/sx	6	$ 127.00	$ 762.00
$CaCO_3$	50 kg/sx	27	$ 5.60	$ 151.20
$CaCl_2$	50 kg/sx	24	$ 38.07	$ 913.68
			Total	$ 1826.88

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Shell, 31/2-13

TOTAL COST AND PRODUCT % OF TOTAL COST

DRESSER

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MAGCOBAR

Shell, 31/2-13

TOTAL MATERIAL CONSUMPTION + PRODUCT % OF TOTAL COST

PRODUCT	UNIT SIZE	UNITS	UNIT COST	COST	% OF TOTAL COST
Magcobar	50 kg/sx	150	$ 7.10	$ 1065.00	0.1624
Magcobar	M/T	514	$ 148.90	$ 76534.60	11.6712
Magcogel	M/T	87	$ 405.56	$ 35283.72	5.3806
Base oil (D-70)	Bbls	3348	$ 68.47	$229237.56	34.9579
Bentone-38	25 kg/sx	348	$ 160.00	$ 55680.00	8.4909
DFL	55 kg/sx	82	$1250.00	$102500.00	15.6309
Vertoil	25 kg/sx	379	$ 61.50	$ 23308.50	3.5545
VG-69	25 kg/sx	523	$ 132.80	$ 69454.40	10.5915
DV-22	25 kg/sx	375	$ 44.64	$ 16740.00	2.5528
DV-33	55 gl/Dr	20	$1044.00	$ 20880.00	3.1841
Lime	40 kg/sx	421	$ 10.30	$ 4336.30	0.6613
Caustic Soda	25 kg/sx	42	$ 22.05	$ 926.10	0.1412
Soda Ash	50 kg/sx	19	$ 22.81	$ 433.39	0.0661
$CaCl_2$	50 kg/sx	469	$ 38.07	$ 17588.34	2.6822
CMC - EHV	25 kg/sx	22	$ 80.20	$ 1764.40	0.2691
Mica	25 kg/sx	1	$ 21.40	$ 21.40	0.0033
			TOTAL	$655753.71	100%

DRESSER NORWAY A.S.
MAGCOBAR

Shell, 31/2-13

DAILY MATERIAL CONSUMPTION

DAILY MATERIALS CONSUMPTION

WELL Shell, 31/2-13

PAGE 1

DATE	DEPTH	MAGCOLUBE 50 kg sx	MAGCOBAR M.T.	LIME	CAUSTIC	BENTONITE	CMC EHV	MICA (C)	SODA ASH	DAILY MUD COST	REMARKS
30.12							21		1	1707.01	Ballast.Anchors.Build 33 ppb CMC.
31.12		150			6	20			2	9354.12	Run TGB. 795 Bbls gel slurry.
01.01										-	W.O.W.
02.01	419			11						113.30	36" hole to 419m.
03.01	419			2	2	3			1	1304.19	W.O.W.
04.01	419			4						41.20	W.O.W. Parted BHA.
05.01	428			5	4	5			1	2190.31	Recover BHA. Drlg.
06.01	468			6	8	18	1		3	8867.08	Drlg.Survey.W.O.W.
07.01	468				2	6		1	1	2521.67	Set 30" Csg.
08.01	473									-	Drlg. cement. Run riser.
09.01	500		32	7	2	6			1	7337.27	Set riser.Drlg 14 3/4" pilot hole.
10.01	583				2	6			1	2560.27	RIH for dev. drlg.
11.01	750				6	3			3	1417.41	Drlg dev. hole 12 1/4".
12.01	825		9	3		4				3953.24	Drlg. dev.hole. 14°.Rotary drlg. Log.
13.01	825		2	1	2	6			1	2808.37	Displace riser spot vis.mud.
14.01	825		57	4						8528.50	Opening hole to 26".
15.01	825			6	8	10			4	4385.64	" " "
16.01	825		22							3275.80	Run & Cement csg.
											Prepare to change to Fazekleen mud.

DAILY MATERIALS CONSUMPTION

WELL Shell, 31/2-13

DATE	DEPTH		MAGCOBAR M.T.	VERTOIL	VG-69	DFL 55 gal/dr	DV-33 55 gal/dr	DV-22	LIME	$CaCl_2$	BENTONITE 38	FRESH WATER	OIL		DAILY MUD COST	REMARKS
17.01	825		14	146	70	25	5	146	91	122	190				99328.88	Mixing Fazekleen OBM.
18.01	825		121	30	65	5	1	30	25	26			1300			Mixing Fazekleen OBM.
19.01	825			60	132	12	3	60	57	59			1620		114702.63	Displaced TD OBM.
20.01	971		10						12		20				4812.60	Drilled ahead.
21.01	1134		10			1	1		12						3906.60	WOW.
22.01	1134		74	20	48	5	1	20	17						26984.90	Displaced riser to mud.
23.01	1300		60	25	52	5	1	25	29	62					28446.71	Drilled ahead.
24.01	1410		6			1	1		15	15	10				5512.95	Drilled ahead.
25.01	1584		25	20	50	7	3	20	30	26	10		250		44383.80	Made 300 Bbls mud.
26.01	1710		48	20	50	6	2	20	17	25			150		36895.50	Drilled to TD.
27.01	1710														0.00	Log.Wiper trip. Rig csg.
28.01	1710		7										25		2754.05	Ran cmt 13 3/8" csg.
29.01	1710			63		12	2	60		61	94		575		1	Built pre-mix to reduce M.W. Test BOP's
																M/up new BHA.
30.01	1744								50	20					1246.40	Leak off to 1.60s.g.Drill.Survey.
31.01	1764														0.00	Core no.1 Jammed. Core no. 2.
01.02	1784				33										4383.40	Core no.3.
02.02	1813		2						17	15					1043.95	Core no.4,5,6.
03.02	1844														0.00	Core no.7, no.8.
04.02	1946				4	1					2				2101.20	Drlg. WOW. Unlatch.
05.02	1946				4										531.20	WOW.
06.02	2010		6			4									5893.40	Drill to 2010. TD.
07.02	2010					-2(credit)							28		-582.84	Wireline.logging.
08.02	2010														0.00	Wireline logging.
09.02	2010		2												257.80	Wireline log.Wiper trip. Csg.
10.02	2010		7	-5cr	+15			-6cr			-22					Oil base inventory adjustment.

DAILY MATERIALS CONSUMPTION

WELL 31/2-13

DATE	DEPTH	MAGCOBAR	HEC.	N-40 $CaCO_3$	N-15 $CaCO_3$	N-5 $CaCO_3$	CAUSTIC								DAILY MUD COST	REMARKS
11.02	1968														0.00	Displaced OBM-Seawater.
12.02	1968														0.00	Cleaning hole (Circ.)
13.02	1968														0.00	Displaced to brine.
14.02	1968		12	104	104	10	1								2766.85	Run 5" TBG.
15.02	1968						1								22.05	Run 4½" TBG. Rig for flo-petrol
16.02	1968															

DRESSER NORWAY A.S.
MAGCOBAR

Shell, 31/2-13

DAILY MUD PROPERTIES

DAILY MUD PROPERTIES

DRESSER

OPERATOR: A/S NORSKE SHELL

CONTRACTOR: DOLPHIN SERVICES

WELL: 31/2-13

PAGE: 1

REPORT No.	DATE	DEPTH m	WT.	VISCOSITY SEC.	VISCOSITY CPS.	CORR. 115°F PV	CORR. 115°F YP	GELS 0	GELS 10	STAB. VOLTS	FLUID LOSS Temp___ PSI___	PF	CL Mg/L	SALT % BY WT.	ACTIVITY Am MUD	ACTIVITY As SHALE	RETORT % OIL	RETORT % WATER	RETORT % SOLIDS	OIL/WATER RATIO	REMARKS
1	30.12		1.03	50						SPUD MUD AND NATIVE CLAYS											WOW Runanchor
2	31.12		1.08	100							"		"								WOW.
3	01.01		1.08	100																	WOW.
4	02.01	397	1.05	100																	WOW.Spud.
5	03.01	419	1.05	100																	Drill. WOW.
6	04.01	419	1.05	100																	WOW.Fish.
7	05.01	428	1.05	100																	Fish.Drlg.
8	06.01	468	1.05	100																	Drlg.36"TD.
9	07.01	468	1.05	100																	Set cement
																					36" csg.
10	08.01	473	1.05	84																	Set riser.
11	09.01	500	1.06	42		5	15														Drlg.
12	10.01	583	1.09	43		5	24	17	22												Drlg dev hol
13	11.01	750	1.11	47		8	40	25	38												" " "
14	12.01	825	1.12	42		6	24	19	25												Rotary drlg.
15	13.01	825	1.10	100																	Displace to
																					S/W.Spot
																					viscous mud.
16	14.01	825	1.10	100																	Opening 26"
17	15.01	825	1.10	100																	Opening hol
18	16.01	MIXING OBM.																			

DRESSER

DAILY MUD PROPERTIES

OPERATOR: A/S NORSKE SHELL

WELL: 31/2-13

CONTRACTOR: DOLPHIN SERVICES

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REPORT No.	DATE	DEPTH m	WT. SG	VISCOSITY SEC.	VISCOSITY CPS.	CORR. 115°F PV	CORR. 115°F YP	GELS 0	GELS 10	STAB. VOLTS	FLUID LOSS Temp 300 PSI 500	PF	CL Mg/L	SALT % BY WT.	ACTIVITY Am MUD	ACTIVITY As SHALE	RETORT % OIL	RETORT % WATER	RETORT % SOLIDS	OIL/WATER RATIO	TOTAL MUD COST
19	17.01	825	1.30	50		14	11	6	9	2000+	4.2	0.7	117200	16	.888		75	12	13	86/14	159633.56
20	18.01	825	1.30	49		17	15	7	10	2000+	4.4	2.1	143000	19	.850		74	14	12	84/16	287018.98
21	19.01	825	1.30	57		17	15	5	9	1550	4.6	1.8	143000	19	.850		75	12	13	86/14	401721.61
22	20.01	971	1.32	62		22	16	7	11	1200	4.0	1.6	113100	15.5	.890		69	17	14	80/20	406534.00
23	21.01	1134	1.33	60		26	17	8	16	920	4.0	1.7	117500	16	.880		67	17	16	80/20	410440.00
24	22.01	1134	1.40	71		24	15	6	11	1000	4.0	1.3	126500	17.3	.870		67	15	18	82/18	437425.00
25	23.01	1300	1.40	68		29	17	7	14	900	4.0	1.8	129900	17.5	.870		62	18	20	78/22	465871.00
26	24.01	1410	1.40	70		28	15	6	12	960	4.0	1.8	121440	16.5	.880		65	15	20	81/19	471384.00
27	25.01	1584	1.40	71		32	16	8	14	820	4.0	1.8	108936	15	.890		66	16	18	80/20	515768.00
28	26.01	1710	1.40	60		28	13	6	11	880	4.0	1.2	121440	16.5	.880		67	15	18	82/18	552663.00
29	27.01	1710	1.41	64		27	11	5	11	700	3.4	1.1	113100	15.8	.890		67.5	15	17.5	82/18	552663.00
30	28.01	1710	1.41	76		28	11	5	12	700	3.7	1.0	113100	15.5	.890		67	15	18	82/18	555417.90
31	29.01	1710	1.40	75		26	10	4	11	684	3.5	1.0	113100	15.5	.890		67	15	18	82/18	635791.24
32	30.01	1744	1.25	51		20	10	4	9	700	3.0	.9	142885	19.0	.850		70	13	17	84/16	637067.64
33	31.01	1754	1.25	57		18	9	4	10	920	3.0	1.4	131000	17.7	.860		72.5	12	15.5	86/14	637067.64
34	01.02	1784	1.25	56		19	11	4	10	912	3.0	1.3	124000	16.7	.870		72.5	12.5	15	85/15	641450.04
35	02.02	1813	1.25	67		19	12	4	10	880	3.0	1.3	134200	18.2	.860		73	12	15	86/14	642493.99
36	03.02	1844	1.25	68		19	11	4	10	800	3.0	1.5	132000	17.8	.866		72	13	15	85/15	642493.99
37	04.02	1946	1.25	66		22	13	4	12	610	3.0	1.7	121440	16.5	.886		70	14	16	83/17	644595.19
38	05.02	1946	1.25	73		22	12	4	10	680	3.2	1.2	103000	14.3	.904		70	15	15	82/18	645126.39
39	06.02	2010	1.25	62		23	12	5	11	710	3.2	1.3	106000	14.8	.901		71	13.5	15.5	84/16	651019.79
40	07.02	2010	1.25	95		23	12	5	12	710	3.0	1.3	106000	14.8	.901		71	13.5	15.5	84/16	650436.95
41	08.02	2010	1.25	102		23	13	5	11	690	3.0	1.3	106000	14.8	.901		71	13.5	15.5	84/16	650436.95
42	09.02	2010	1.25	100		25	14	5	14	660	3.0	1.0	106000	14.8	.901		71	13.5	15.5	84/16	650734.75
43	10.02	1948	1.25	87		24	13	6	12	670	3.2	1.4	106000	14.8	.901		71	13.5	15.5	84/16	656713.71

DRESSER NORWAY A.S.
MAGCOBAR

Shell, 31/2-13

DAILY MUD VOLUMES

DRESSER NORWAY A.S.

MUD VOLUME DATA

COMP: SHELL

CONTR: DO[illegible]HIN

WELL: 31/2-13

RIG: BORGNY DOLPHIN

Page 2 O.B.M.

DATE	HOLE SIZE	DEPTH	MUD WT.	VISC.	BBL'S HOLE DRLD.	HOLE VOLUME	ACTIVE PIT VOL.	RES. VOL.	TOTAL VOL.	VOLUME BUILT: MUD	WATER	OIL	BARITE	DAILY	CUMM.	VOLUME LOST: DUMP	SHAKER	D.SAND.	D.SILT.	HOLE	MISC.	DAILY	CUMM.	REMARKS
17/01	17½	806	1.3	42	0	0	0	1283	1283	7639	68	1100	0	1283	1283							0	0	Built O.B.M.
18/1	17½	806	1.3	49	0	0	0	1685	1685	17 6	25	200	154	402	1685									Built & wt up O.B.M.
19/1	17½	813	1.3	57	0	910	411	986	2307	3315	40	600		688	2373	46					20	66	66	Displace to O.B.M.
20/1	17½	971	1.32	60	93	1003	357	878	2238	3 -	20		7	30	2403		24				75	99	165	Drilled ahead.
21/1	17½	1134	1.33	60	134	780	480	925	2185	1 2	-		14	17	2420		53					53	218	Displace riser to SW.
22/1	17½	1134	1.40	71	177	1180	400	758	2338	4 2	-	200	59	269	2689		60				56	116	334	Displace riser to mud.
23/1	17½	1300	1.40	68	155	1335	380	855	2570	7 6	-	220	66	299	2988		67					67	401	Drilled ahead.
24/1	17½	1410	1.40	70	86	1421	396	705	2522	4 2	-		10	16	3004		40				24	64	465	Drilled ahead.
25/1	17½	1584	1.40	71	142	1563	400	505	2468	1510	-	250	40	315	3319		37			100	94	231	696	See daily log.
26/1	17½	1710	1.40	60	123	1726	396	491	2613	1210	-	150	72	244	3563					99		99	795	Drilled ahead.
27/1	17½	1710	1.41	64	-	1726	396	434	2556	- -	-				3563					138	57	195	990	Log.Wiper trip.
28/1	17½	1710	1.41	76	-	1109	420	982	2511	- -	-				3563		10			52		62	1052	Set Cmt 13 3/8" Csg.

DRESSER NORWAY A.S.

MUD VOLUME DATA

WELL: 31/2-13 RIG: BORGNY DOLPHIN

DATE	HOLE SIZE	DEPTH	MUD WT.	VISC.	BBL'S HOLE DRLD.	HOLE VOLUME	ACTIVE PIT VOL.	RES. VOL.	TOTAL VOL.	VOLUME BUILT: MUD	WATER	OIL	BARITE	DAILY	CUMM.	VOLUME LOST: DUMP	SHAKER	D.SAND.	D.SILT	HOLE	MISC.	DAILY	CUMM.	REMARKS
29/1	17½	1710	1.40	75		1109	420	615	2144	40		575		615	4178						982		2034	982Bbls backload not lost,
30/1	12 1/4	1744	1.25	51	16	1095	452	567	2114	9					4187		9			30		39	2073	
31/1	12 1/4	1754	1.25	57	7	1102	370	632	2104						4187		10					10	2083	
1/2	12 1/4	1784	1.25	56	14	1116	430	544	2090	3					4190		17					17	2100	
2/2	12 1/4	1813	1.25	67	14	1130	413	530	2073	6			3		4199		20 6					26	2126	Ran cmt 90min/ 50 gpm.
3/2	12 1/4	1844	1.25	70	15	1178	362	529	2069						4199		4					4	2130	
4/2	12 1/4	1946	1.25	66	49	719	975	349	2043		10				4209	25	6 5					30	2166	Riser displaced SW. Dumped spacer
5/2	12 1/4	1946	1.25	73		719	975	352	2046		3				4212								2166	Make spacer WOW.
6/2	12 1/4	2010	1.25	68	31	1257	289	453	1999	5					4217	34	14 4					52	2218	Dumped spacer in displacement.
7/2	12 1/4	2010	1.25	95		1257	393	349	1999						4217								2218	Wireline logging
8/2	12 1/4	2010	1.25	102		1257	393	349	1999						4217								2218	Wireline logging
9/2	12 1/4	2010	1.25	100		1257	391		1648						4217						351	351	2569	
10/2	9 5/8 csg	1968	1.25	87		855	42	39	934						4217	44				70	600	114	2683	75Bbl Behind casing.
11/2	csg	1968							NII							179					755		2862	Displaced+cleaned out pits.
12/2		SEAWATER IN HOLE																						

DRESSER

DRESSER NORWAY A.S.
MAGCOBAR

Shell, 31/2-13

VOLUMES SUMMARY O.B.M.

17 1/2" Hole - 13 3/8" Csg

825-1710m

VOLUME BUILT

BASE OIL	2720 Bbls
CHEMICAL ADDITIONS (EXC. BARITE)	268 Bbls
WATER ADDITIONS	153 Bbls
BARITE ADDITIONS	422 Bbls
TOTAL=	3563 Bbls

LOSSES

DISCARDED	46 Bbls
SOLIDS EQUIPMENT	291 Bbls
SUB SURFACE	389 Bbls
MISCELLANEOUS	239 Bbls
TOTAL=	1052 Bbls

2511 Bbls CARRIED TO 12 1/4" HOLE SECTION

DRESSER

DRESSER NORWAY A.S.
MAGCOBAR

Shell, 31/2-13

12 1/4" HOLE - 9 5/8" CSG

1710-2010m

VOLUME BUILT

BASE OILS	575 Bbls
CHEMICAL ADDITIONS (EXC. BARITE)	63 Bbls
WATER ADDITIONS	13 Bbls
BARITE ADDITIONS	3 Bbls
TOTAL=	654 Bbls

LOSSES

DISCARDED	282 Bbls
SOLIDS EQUIPMENT	95 Bbls
SUB-SURFACE	100 Bbls
MISCELLANEOUS	NIL
TOTAL=	477 Bbls

2688 Bbls OFF LOADED TO BOATS

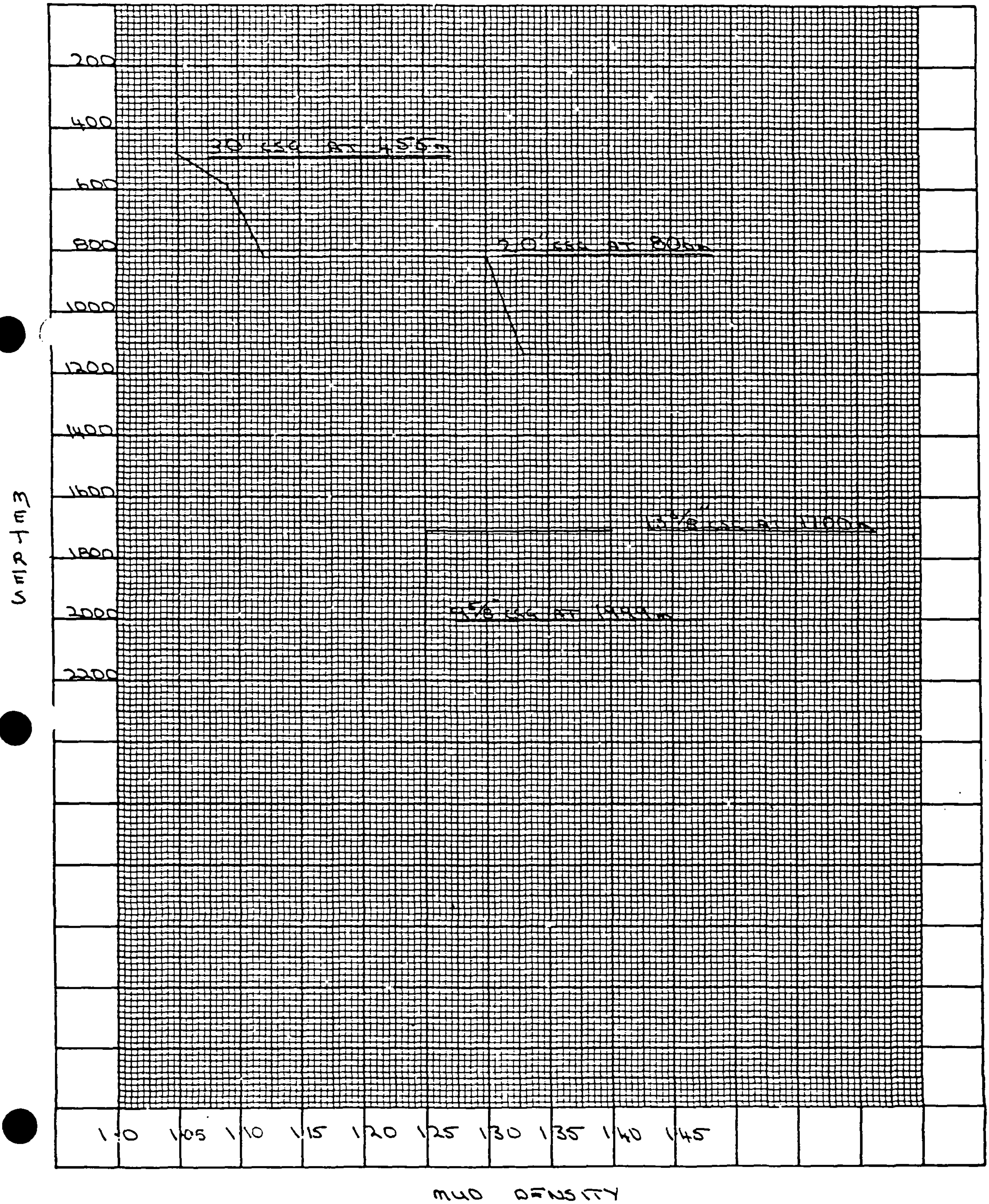
DRESSER NORWAY A.S.
MAGCOBAR

Shell, 31/2-13

GRAPHS

DRESSER

Plot Title: DEPTH VS. MUD DENSITY
Well Name: 31/2-13
Location: NORWAY N. SEA
Legal Description: A/S NORSKE SHELL



DRESSER NORWAY A.S.
MAGCOBAR

Shell, 31/2-13

BIT RECORD

DRESSER

BIT AND HYDRAULIC RECORD

OPERATOR	A/S NORSKE SHELL	PUMP MAKE	DRILL COLLARS O.D. x I.D. x LENGTH	DRILL PIPE	TOOL JOINT	MUD TYPE/S	SUMMARY
CONTRACTOR	DOLPHIN SERVICES					SPUD	BITS
WELL NAME	31/2-13	No. 1 EMSCO FA-1600	9½ x 3			FAZEKLEEN	DAYS
LOCATION	TROLL NOR. NORTH SEA	No. 2 EMSCO FA-1600					HOURS

84 DATE	RUN No.	SIZE	MAKE	TYPE	JETS - 32nds Reg. R or RO 1	2	3	DEPTH OUT	m DRILLED	HOURS RUN	m PER HOUR	WT. 1000 LBS.	RPM	PUMP PRESS	PUMP No. 1 Liner	PUMP No. 1 SPM	PUMP No. 2 Liner	PUMP No. 2 SPM	Dull. Cond. T	B	G	VER. DEV.	Direction EXPONENT
2/1	1	26+36"	HTC	OCS/3AJ	20	20	20	419	61	6½	9.4	0-5	30/40	300	6½	50	6½	-	1	1	I	2°	
5/1	2	26+36"	SMITH	DSJ	20	20	20	447	19	5	3.8	5-15	50/80	400/1000	6½	60	6½	60	1	1	I	1°	
6/1	2RR	26+36"	SMITH	DSJ	20	20	20	468	21	5	4.2	10-20	65	1000	6½	70	6½	70	1	1	I	1°	
8/1	3	14 3/4 26	SEC	S4J	18	18	18	473	5	3	1.7	20	60	650	6½	100	6½		1	1	I		
9/1	3RR	14 3/4	SEC	S4J	18	18	18	500	27	4½	6	17	70	1800	6½	75	6½	75	1	3	I		
10/1	4	14 3/4	HTC	OSC				583	83	5	16.6	10		1500	6½	60	6½	60				1½°	N53W
11/1	3RR	14 3/4	HTC	OSC 3AJ				750	167	12	13.9	10		1400	6½	60	6½	69	6	6	1/4	2¼	NAOW
12/1	3RR	14 3/4	SEC	S4J	18	18	18	825	75	4	18.75	35	120	2200	6½	75	6½	75				14°	NAIW
15/1	3RR	14 3/4	SEC	S4J	18	18	18	782	7	1½	2	5-10	60	2500	6½	100	6½	100					
16/1	3RR	14 3/4 26"	SEC	S4J	18	18	18	813	31	3	10	10 20	65	1600	6½	80	6½	80		USED W/HOLE OPENER			
19/1	5	17½	HTC	OSC1G	20	20	20	813	24			5 30	60 70	1850	6½	80	6½	80		DRILLED OUT CEMENT			
20/1	5RR	17½	HTC	OSC1G	20	20	20	943	130	5½	25	10 45	60 125	3200	6½	95	6½	95	4	1	I	25	
22/1	6	17½	HTC	OSC1G	20	20	20	1153	210	9½	25	45 53	100 125	3400	6½	90	6½	90	2	2	0	40	
23/1	6RR	17½	HTC	OSC1G	20	20	20	1295	142	7	20	45 55	110 80	3400	6½	85	6½	85	3	2	0	37	
24/1	6RR	17½	HTC	OSC1G	20	20	20	1391	96	4½	25	55 30	90 125	3400	6½	80	6½	80	3	3	0	40	
25/1	6RR	17½	HTC	OSC1G	20	20	20	1710	319	42	18	30 60	110	3600	6½	75	6½	75	5	4	0	45	
29/1	7	12 1/4	HTC	X1G	16	16	16	1744	34	8	4.2	20 45	80 110	3300	6½	65	6½	65	7	2	1/8	47	
31/1	8	12 1/4	ACC	WEASEL3	COREHEAD			1754	10	2	5	10	100	1200	6½	82	6½		5%	WORN			4%RECOVERY
31/1	8RR	12 1/4	ACC	WEASEL3	COREHEAD			1772	18	4½	4	10	130	1100	6½	82	6½		10%	WORN			20%RECOVERY
1/2	8RR	12 1/4	ACC	WEASEL3	COREHEAD			1784	12	2	6	10 15	120	750	6½	58	6½		25%	WORN			90%RECOVERY
1/2	8RR	12 1/4	ACC	WEASEL3	COREHEAD			1795	11	3½	3.1	10 13	100 130	750	6½	58	6½		40%	WORN			100%RECOVERY
2/2	9	12 1/4	ACC	WEASEL3	COREHEAD			1807	12	2½	4.8	10 12	100 130	750	6½	58	6½		15%	WORN			94%RECOVERY
3/2	9RR	12 1/4	ACC	WEASEL3	COREHEAD			1813	6	2	3	10 15	100 130	750	6½	58	6½		25%	WORN			100%RECOVERY
3/2	9RR	12 1/4	ACC	WEASEL3	COREHEAD			1825.5	12.5	2.5	5	10 12	100 120	800	6½	60	6½		40%	WORN			94%RECOVERY
3/2	9RR	12 1/4	ACC	WEASEL3	COREHEAD			1844	18.5	3	6.7	12 15	100 120	1050	6½	66	6½		4	1	0		82%RECOVERY
4/2	10	12 1/4	HTC	X1G	16	16	16	1946	102	10	10.2	45	95	3200	6½	66	6½	66	4	1	1/8	44½	
6/2	11	12 1/4	HTC	X1G	16	16	16	2010	64	5½	11.6	30 45	110	3200	6½	66	6½	66	3	1	I	42	

REMARKS

DRESSER NORWAY A.S.
MAGCOBAR

Shell, 31/2-13

CUTTINGS ANALYSIS

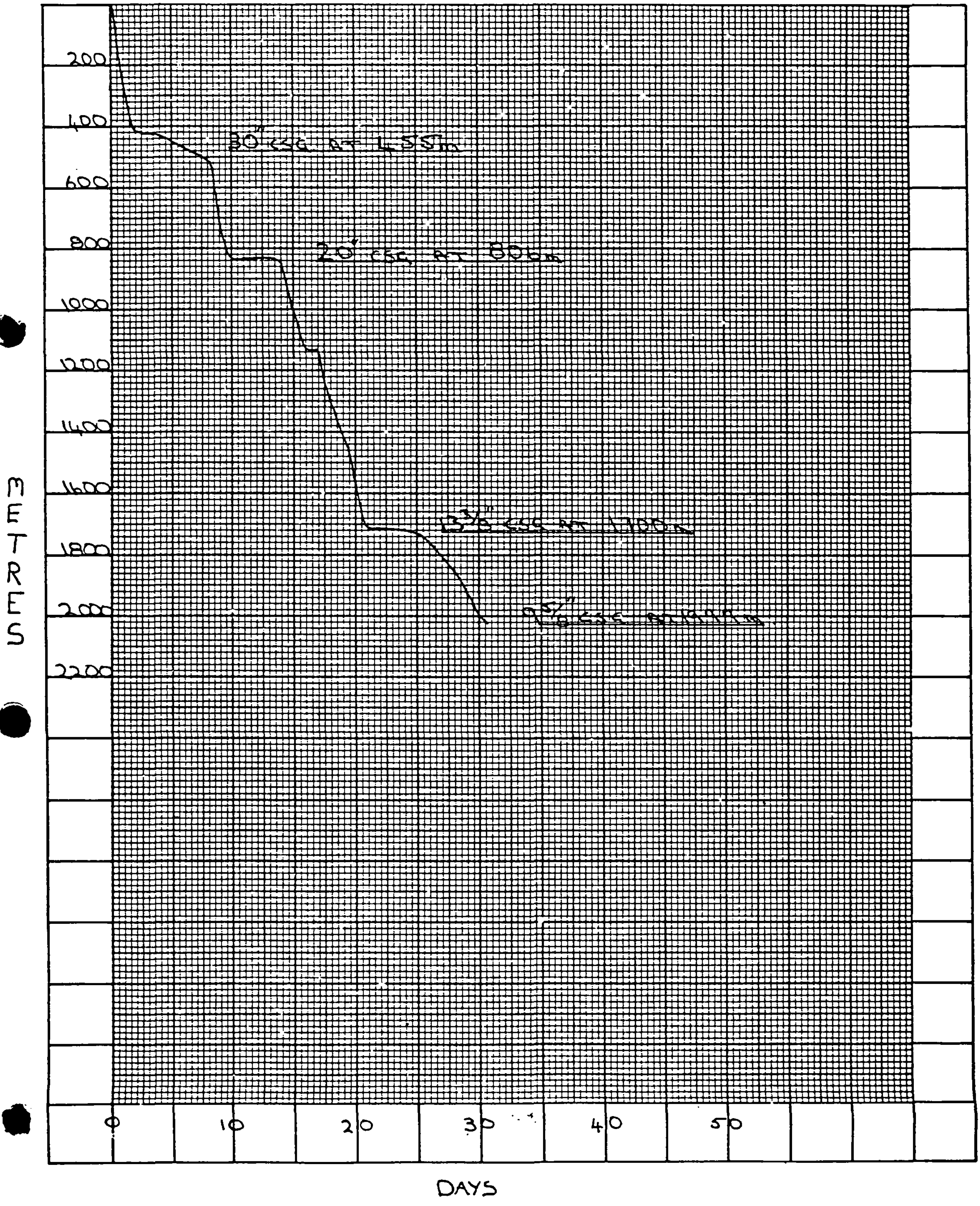
RETO. - RESULTS FROM CUTTINGS DISCHARGED

DATE	WEIGHT OF WET SAMPLE (Grams)	WEIGHT OF DRY SAMPLE (Grams)	VOL OF OIL RETORTED (ML)	VOL OF WATER RETORTED (ML)	SPECIFIC GRAVITY OF SAMPLE	REMARKS (such as cuttings size, LCM No. of samples)	OIL CONTENT ON CUTTINGS (l/m^3)
20.12.83	62	28	13	15	2.3		325
21.01.84	80	55	12.5	16	2.3		238.50
22.01.84	NO DRILLING						
22.01.84	93	69	11	16	2.3		193
23.01.84	84	60	11	15	2.3		212
24.01.84	81	57	10	16.5	2.3		195
25.01.84	87	58	15	14	2.3		277
26.01.84	NO DRILLING						
27.01.84	NO DRILLING						
28.01.84	NO DRILLING						
29.01.84	86	60	22	11.5	2.3	SOME CEMENT	369
30.01.84	88	63	16.50	9	2.3		312 l/m^3
31.01.84	88	63	19.50	8.5	2.3	CORING	352 l/m^3

RETORT RESULTS FROM CUTTINGS DISCHARGED

DATE	WEIGHT OF WET SAMPLE (Grams)	WEIGHT OF DRY SAMPLE (Grams)	VOL OF OIL RETORTED (ML)	VOL OF WATER RETORTED (ML)	SPECIFIC GRAVITY OF SAMPLE	REMARKS (such as cuttings size, LCM No. of samples)	OIL CONTENT ON CUTTINGS (l/m^3)
01.02.84	96 gr.	64 gr.	18 ml.	7 ml.	2.3	CORING	341 l/m^3
02.02.84	91 gr.	68	18	5	2.3	"	342 l/m^3
03.02.84	89 gr.	67	19.5	4.5	2.3	"	367 l/m^3
04.02.84	89	68	14.5	11	2.3	DRLG	263 l/m^3
07.02.84	50	41	10.5	5	2.3	"	315 l/m^3

Plot Title: DEPTH VS. DAYS
Well Name: 31/2-13
Location: NORWAY N SEA
Legal Description: A/S NORSKE SHELL



DRESSER

Plot Title: DEPTH VS. MUD COST
Well Name: 31/2-13
Location: NORWAY N. SEA
Legal Description: A/S NORSKE SHELL