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A/S Norske Shell
Aker Norsco Base

4056 TANANGER

TANANGER, 17 December 1984
Ref.no: DRNG/392/84/KE/ii

For the attention of: Mr. T. Nyland
CC : A. Kelland
J. Allen

Dear Sir,

Please find enclosed the Drilling Fluids Re-Cap for your 31/2-15 well.

We trust that your will find the information presented of interest and of use to your future operations. Should you or your colleagues have any queries or comments, please do not hesitate to contact us.

Regards

Ken Ellis
Area Engineer

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DRESSER NORWAY A.S.

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NORSCO OIL BASE
N-4056 TANANGER
PHONE:
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TELEX:
33 1 68 - «DRENO» N

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WELL SUMMARY

DATE:

COMPANY A/S NORSKE SHELL

ADDRESS EXPLORATION AND PRODUCTION

4056 TANANGER

WELL 31/2-15

LOCATION NORWEGIAN NORTH SEA - TROLL

PREPARED BY M. Silverstone
G. Finley
A. Wright

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I N D E X

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WELL SUMMARY BY INTERVAL

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WELL SUMMARY BY INTERVAL

36" Hole to 477m

The Borgny Dolphin arrived on location for Well 31/2-15 on 9 Sept 1984. After setting anchors and ballasting, the temporary guide base was run and on 10 Sept the well was spudded using a 26" bit with 36" hole opener. Viscous gel (150+ sec/qt) was pumped on connections to clean the hole. At TD 150 Bbls of viscous mud was circulated and after a wiper trip 550 Bbls was displaced. After running casing and pumping 200 Bbls seawater, 100 Bbls more viscous gel slurry was circulated. The 30" Casing was then cemented.

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WELL SUMMARY BY INTERVAL

26" Hole to 810m

The 30" casing cement and 3m of new hole were drilled with a 14-3/4" bit and a 26" hole opener. After the riser and pin connector were run and the diverter system tested, the hole and riser were displaced to a gel slurry with a viscosity of 45-50 sec/qt. 14-3/4" pilot hole was drilled to 810m. All solids control equipment was used to maintain the mud density well below the 1.15 S.G. maximum. Prior to pulling out to log, the open hole was displaced to 1.35 S.G. viscous mud.

After logging the riser was displaced to seawater and all possible mud was recovered for later use. The 30" casing and open hole were displaced to seawater in stages and the well was observed for flow. Prior to pulling out of the hole 250 Bbls of viscous mud was spotted in the open hole. The riser was then pulled. The hole was opened out to 26" using first a 14-3/4" bit with 26" hole opener and then, from 556m to 810m, a 26" bit.

Viscous mud was pumped after each connection. Following a wiper trip, 800 Bbls of viscous 1.35 S.G. mud was spotted in open hole. The 20" casing was set at 800.5m and cemented.

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WELL SUMMARY BY INTERVAL

17-1/2" Hole

810m - 1460m

Seawater was used to drill out the cement in the casing to the shoe at 800m. A KCL/Polymer mud of 1.26 s.g. was displaced at the shoe and 10m of cement and 5m of new hole were drilled before running a leak-off test at 815m. Formation integrity was set at 1.38 s.g. and drilling resumed.

High rates of penetration of 25 to 30m per hour were achieved in the predominantly soft clay formation throughout the interval with occasional slowing in dolomite and chert stringers at 1030m and 1200m respectively.

The KCl level was maintained at 5 ppb higher than programme by request at 40 ppb. A combined polymer level of 2-1/2 ppb was used to maintain a high yield point for hole cleaning and for encapsulating of reactive solids. The combined inhibitive effect of the KCl and the polymer was monitored by observing the clay cuttings on the returns which were firm, slick and undispersed. Due to the good inhibitive performance of the mud less solids were dispersed into the mud requiring a lower than projected dilution volume.

Wiper trips were done at 955m and 1307m with 75K to 125K maximum overpull. The mud weight was increased to 1.29 s.g. at 1307m. No drag was encountered on either trip when running back to bottom. After drilling to TD at 1460m a wiper trip was run with overpull and 20m fill on bottom.

Cont'd.....

Shell, 31/2-15

Cont.

No overpull was encountered while pulling out of the hole and logs were run. 36 Bbls of mud were lost to the formation while logging, and static losses were observed from the drill floor. The mud weight was subsequently lowered to 1.27 before the 13-3/8" casing was run at 1444m. The casing was then cemented with no cement observed at the surface.

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WELL SUMMARY BY INTERVAL

12-1/4" Hole

1460m - 1677m

A non damaging HEC/Chalk mud was built at this stage, and the surface system, now with 1465 Bbls of the new non-damaging chalk mud at 1.21 s.g. was circulated to displace the KCl mud. Five meters of formation was drilled at which point a leak-off test was performed giving an E.M.W. of 1.62 S.G. 12-1/4" hole was then drilled ahead to 1486m. Coring was begun after washing and reaming to bottom.

Cores were cut as follows:

	INTERVAL	RECOVERY		INTERVAL	RECOVERY
No. 1	1496 - 1493m	80%	No. 7	1520.5 - 1530m	88%
No. 2	1493 - 1501m	85%	No. 8	1530- 1533m	84%
No. 3	1501 - 1503m	45%	12-1/4" bit	1533 - 1533m	-
No. 4	1503 - 1510m	64%	No. 9	1533 - 1541m	90%
No. 5	1510 - 1516.5m	100%	No.10	1541 - 1559m	100%
No. 6	1516.5 - 1520.5m	100%	No.11	1559 - 1577m	86%
			No.12	1577 - 1595m	62%

Throughout the coring programme the mud density was maintained without problems at 1.21 s.g. and the funnel vis. at 68-72, using H.E.C. and giving a PV/YP reading averaging; 18/20 to provide suitable hole cleaning. Apart from a section immediately below the 13-3/8" shoe, some 30m in length, the hole was found from the logs to be in good condition.

Cont'd...

Shell, 31/2-15

Cont.

This upper section was found to be washed out and this correlated with a bed of mudstone.

Sand content was found to be consistently high while penetrating this section and screens on both shaker and mud cleaner were changed from 30/50 to 30/80 and 150 x 2 to 200 x 2 mesh respectively. This was helpful, and the level maintained at 1.0 to 1.5% without excessive wear to pump parts.

During the core run no. 7 the hole was tight at 1485m - 1475m and from this point on it was necessary to wash and ream from 5-10m of fill before cutting the core in each case. This problem may be related to the low gel strength characteristics of this particular mud type. The problem was tackled by extra circulation, also by increased flow in the riser, and by raising the Shellflo concentration by 1.0 ppb

On completion of the coring programme the well was drilled to TD with a 12-1/4" bit. At 1677m the hole was circulated throroughly and two short trips made before POOH w/no drag prior to a 4 day Schlumberger logging programme. A trip to bottom was made. While waiting on a replacement logging tool, where 8m fill was found. After finishing the logs, the hole was circulated clean prior to running the 9-5/8" csg, which was landed and cemented at 1665m.

At this point the weather turned, so a storm valve was set and the BOP/ riser pulled while on standby. W.O.W.

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WELL SUMMARY BY INTERVAL

Interval: Completion & Testing

A test plug was run and the hole displaced to seawater. An 8-1/2" scraper was run after circulating hi-vis, acid and caustic pills. The hole was then circulated with seawater before displacing to 1.2 s.g. Dowell brine, which was consequently filtered, before running logs, and a F packer.

During the test some 1100 Bbls of HEC/chalk mud was in storage and this monitored daily for contingency use. Testing was done according to Shell's specification. Bottom hole samples were run and chloride tests made for the Shell representatives.

After testing, a series of cement plugs were set and the well was plugged and abandoned.

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DAILY OPERATIONS LOG

9 September 1984

Report no. 1

Tow rig to new location. Set anchors. Ballast rig. Started mixing spud mud.

10 September

Report no. 2

Completed ballasting the rig. Picked up 8" drill collars and HWDP. Ran TGB. Jumped divers to inspect seabed. Unlatched running tool. POOH. Made up 36" TGB. Drilled 36" hole 367m. Stabbed into TGB. Drilled 36" hole 367m to 387m. Dropped survey at 384m. Retrieved same. Drilled to 396m. Dropped survey. Drilled to 414m. Dropped survey. Continued drilling 36" hole to 430m at 24:00 hrs.

11 September

Report no. 3

Drilled to 451m. Reamed tight hole. Drilled to 477m. Pumped 150 Bbls hi-vis mud, surveyed. POOH to TGB. Retrieved survey. RIH to 477m. Pumped 550 Bbls mud. POOH. Ran and cemented 30" csg. W.O.C.

12 September

Report no. 4

POOH. Washed wellhead. Made up BHA. RIH. Drilled cmt; pumped 50 Bbls mud. POOH. Ran riser, pin connector.

13 September

Report no. 5

Continued to run riser. Landed, latched same. Picked up 14-3/4" bit and BHA. RIH. Tested diverter system. Displaced to gel slurry mud. Drilled to 810m. Surveyed (1/4deg). POOH to 30" casing shoe. RIH. Circulated. Spotted 270 Bbls viscous 1.35 S.G. mud in open hole. POOH. Wireline logs.

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14 September — Report no. 6

Wireline logged. Slipped and cut drlg line. RIH to 466m. Displaced to seawater. RIH to displace to seawater in stages observing no flow. Spotted 250 Bbls viscous mud. POOH to 466m. Observed no flow. Flushed no flow. Flushed riser; no flow. Pulled riser. Weighted up 637 Bbls mud to 1.35 s.g.

15 September — Report no. 7

Pulled riser. RIH w/14-3/4" bit. 26" hole opener. Reamed to 556m. Sweeping with viscous gel slurry on connections. POOH due to torque. Low ROP. RIH with 26" bit. Continue to ream to 26" to 791m. Built additional 326 Bbls 1.35 s.g. viscous gel mud.

16 September — Report no. 8

Opened hole to 26" to 810m. Circulated 100 Bbls viscous gel pill. Surveyed (3/4 deg), wiper trip. RIH and reamed tight hole 794-810m. Circulated 50 Bbls 1.35 s.g. viscous gel. POOH. Ran, landed, circulated and cemented 20" Csg. Displaced cement. Held pressure and waited on cement due to backflow through float equipment. POOH.
Preparing 1400 Bbls KCl polymer mud, 1.26 s.g.

17 September — Report no. 9

RIH. Inspected wellhead. POOH. Ran, landed, tested B.O.P. riser. Weighted up pre-mix to 1.26 s.g.

18 September — Report no. 10

Tested B.O.P. Serviced test plug. Tested B.O.P. POOH with test plug. RIH with bore protector. Changed out running tool. Reran bore protector. Laid out DP. Tested B.O.P. Surface equipment. Made up hang-off tool. New BHA. RIH. Drilled cement shoe to 800.5m. Washed to bottom. Pumped 30 Bbls viscous gel. Displaced to KCl/polymer mud 1.26 s.g.

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19 September — Report no. 11

Drilled to 810-815m. Circulated bottoms up. Leak off test to 1.38 s.g. equivalent. RIH. Drilled to 815m-955m. Circulated. Wiper trip. 75K overpull maximum. RIH. No fill. Drilled 955m-1069m. Cutting firm. Not sticky. Maintained polymer. KCl concentration.

20 September — Report no. 12

Drilled 17-1/2" hole 1069m-1307m. Circulated hole clean. Wiper trip. Maximum overpull 125K lbs. RIH. No fill. Drilled 1307-1440m. Raised mw to 1.29. Maintained KCl = 40 ppb as per Shell specifications.

21 September — Report no. 13

Drilled to 1460m. Circulated bottoms up. Wiper trip to shoe. Washed and reamed 1440-1460m. Circulated 2-1/2 hrs. POOH - No overpull. Ran logs: loss of 6 Bbls per hour while logging: Total 36 Bbls.

22 September — Report no. 14

Ran in hole to 1424m. Washed and reamed 1424m-1460m. Reduced mud weight to 1.27. Ran 10 stand wiper trip. Washed and reamed 1446-1460m. Ran 5 stand wiper trip. Washed and reamed 1454-1460m. Circulated bottoms up. POOH. Ran 13-3/8" casing. Making 1400 Bbls HEC-chalk mud at 1.21 s.g.

23 September — Report no. 15

Continued running 13-3/8" casing. Landed and cemented casing at 1444m. Pressure tested choke + kill lines. BOP and acoustic system. Set wear bushing. Finished mixing 1465 Bbls HEC-chalk mud 1.21 s.g.

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24 September — Report no. 16

Broke down 17-1/2" BHA. RIH. Tagged cement at 1424m. Drilled out shoe to 1445m. Pumped 50 Bbls hi-vis mud. Displaced hole 1.21 chalk-Hec mud. Repaired drawworks. Slipped + cutted drill line. Drilled to 1465m. Circulated mud to even mud weight. Ran leak off test. Drilled to 1474m.

25 September — Report no. 17

Drilled to 1479m. Circulated sample - negative. Drilled to 1486m. Circulated bottoms up 12 % gas. Turn on degasser. POOH. Made up 12-1/4" core assy. RIH. Washed and reamed 1470-1486m. Cut core no. 1 to 1493m. POOH. 80% recovery. Dress core barrel. RIH with core assembly no. 2.
Raised Shellflo content in active system to 0.3 ppb

26 September — Report no. 18

Ran in hole with core assembly no. 2. Cut core no. 2, 1493m-1501m. Circulated sample. Pulled out of hole. Ran in hole with core assembly no. 3. 1501-1503m. Circulated bottoms up. Pulled out of hole. Ran in hole with core assembly no. 4. Cut core no. 4. 1503-1510m.
Added HEC to maintain YP. $CaCo_3$ used for slugs. Ran mud cleaner to reduce sand content.

27 September — Report no. 19

Pumped slug and pulled out of hole. Laid down core no. 4. 64 % Recovery. Serviced core barrel. Ran in hole to cut core no. 5. 1510m-1516m. Pulled out to shoe. Flow checked. Pulled out of hole with core no. 5. Redressed core barrel. Ran in hole. Cut core no. 6. 1516m-1520m. Circulated bottoms up. Pulled out of hole. Recovered core no. 6. Redressed core barrel. Ran in hole with core assembly no.7. Raised YP with HEC. Dumped shaker box and Gumbo trap.

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28 September

Report no. 20

Circ during engine repair. RIH w/core Bbl no. 7. Washed and reamed 1515m - 1520m. Cut core no. 7 1520m - 1530m. POOH. Tight at 1485m - 1475m. 88 o/o recovery.

29 September

Report no. 21

RIH. Core assy no. 8. Cut core 1530m - 1533m. Retrieve. RIH w/12-1/4" bit. Reamed 1523m - 1533m. Circ riser clean (90 stks). POOH. RIH w/core assy. no. 9. Washed/ reamed 1528m - 1533m. Cut core to 1538m.

30 September

Report no. 22

Cut core no. 9 1538m - 1541m. (90 o/o) recovered. RIH w/core assy no. 10 to 1536m. Reamed to 1541m. Cut core no 10. 1541m - 1559m. Circ. POOH. Tight at 1530m. Recovered core (100 o/o). RIH w/core assy no. 11 to 1552m. 7m fill. Washed/reamed to 1559m. Cut core to 156 m.

1 October

Report no. 23

Cont'd cut core no. 11 156 m - 1577m. Circ hole clean. POOH. 86 o/o recovery. RIH w/core assy no. 12. Washed/ reamed 1565m - 1577m. Cut core no. 12 1577m - 1595m. POOH. Raised Shellflo conc by 1.0 ppb.

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2 October — Report no. 24

Retrieve core no. 12. RIH bit no RR9 to 1595m. 4m fill. Drilled 12-1/4" to 1677m. Circ B/up. 2 short trips w/100,000 lbs o/pull. Circ & clean hole twice. POOH. No drag. Schlumberger logs.

3 October — Report no. 25

Ran Schlumberger logs w/3m fill. Established 30m washout from 1460m. RIH 7m fill. Circ and clean hole. POOH. No drag. Ran Schlumberger logs.

4 October — Report no. 26

Ran Schlumberger logs.

5 October — Report no. 27

Ran Schlumberger logs; RFT and velocity survey.

6 October — Report no. 28

Wireline tool failure. RIH w/12-1/4" bit (found leak in upper jar) 8m fill. Washed and reamed to 1677m circ clean. POOH. Ran Schlumberger logs. RIH to 1671m. 6m fill. Washed and reamed - 1677m circ clean. POOH to run 9-5/8" csg.

7 October — Report no. 29

RIH. Washed wellhead. Recovered wearbushing. Ran + landed 9-5/8" csg. Circ and cmt. Press tested seal assy. Tested B.O.P.'s. Received displaced mud in no.2.

8 October — Report no. 30

POOH w/wear bushing. RIH. Set RTTS packer and top storm valve at 398m. Pulled riser and BOP. Worked on BOP.

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9 October	Report no. 31 W.O.W. Corrected mud volumes.
10 October	Report no. 32 W.O.W.
11 October	Report no. 33 W.O.W. Ran and landed B.O.P. Retrieved wearbushing.
12 October	Report no. 34 Ran test plug. Pressure tested BOP. Retrieved RTTS packer. Displaced riser with mud. Ran in hole with 8-1/2" bit and scraper. Washed down to cement at 1634m. Pumped 2 x 30 Bbls hi-vis pill. Displaced hole to seawater. Pumped 50 Bbls acid pill. Displaced with seawater. Pumped 50 Bbls Caustic pill. Dislaced with seawater.
13 October	Report no. 35 Circulated at 30 spm with seawater. Ran in hole to 16? m. Circulated with seawater 6 hours. Displaced surface lines to brine. Displaced hole with 1.20 s.g. Brine. Circulated and filtered brine 6 hours. POOH. Ran CBL-VDR.logs. Ran junk basket. Ran in with F-1 packer.
14 October	Report no. 36 Rig up to test.
15 October	Report no. 37 Rig up to test.
16 October	Report no. 38 Perforated - monitored flow.

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17 October — Report no. 39

Flowing well.

18 October — Report no. 40

Tested well.

19 October — Report no. 41

Tested well. W.O.W.

20 October — Report no. 42

W.O.W.

21 October — Report no. 43

W.O.W.

22 October — Report no. 44

Cont'd to W.O.W. Displaced to diesel. Opened well.

Rigged up Schlumberger PLT.

23 October — Report no. 45

Flowed well. Bullheaded tubing with hi-vis pill and brine well. Taking fluid. Pumped 25 Bbls hi-vis pill and observe - static. Pressure tested tubing. Circulated bottoms up through the choke. Closed pipe rams. Returned through choke - 3.5 Bbls. Pumped 25 Bbls hi-vis slug - 16 Bbls loss. Pumped 25 Bbls hi-vis mud slug. Observed well. POOH with test string.

24 October — Report no. 46

Ran 3-1/2" tubing on 5" DP to 1530m. Pumped 50 Bbls hi-vis mud - static. POOH. Laid out test assy. Made up mill assy. Ran in hole milled out packer. Ran in hole to 1607m. Pumped 45 Bbls hi-vis mud. Circulated bottoms up. Pumped 35 Bbls chalk mud. Added HEC to increase viscosity of slugs.

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25 October

Report no. 47

Observed well static. POOH. Made up 2-7/8" stinger. Ran in hole to 1600m. Cemented 1634-1517m. POOH. Ran in hole with 8-1/2" bit. Drilled cement 1517m-1568m. Pumped 45 Bbls hi-vis slug. POOH. Added HEC to increase viscosity of slugs.

26 October

Report no.48

POOH. Ran Schlumberger. RIH w/scraper, assy hung at 1556m. Washed to 1568m and drilled to 1572m. Spotted 25 Bbls hi-vis pill and circ 10 min. Scraped csg. 1571m-1500m. Pumped 150 Bbls pill and circ and cond brine. POOH. Ran Schlumberger. RIH w/scraper assy, washed to 1572m. Circ. POOH. Ran Schlumberger.

27 October

Report no.49

Ran 2 set bridge plug at 1571.5m. RIH w/RTTS. Tagged plug. Press test lines. Displ. string to diesel, set packer, bleed off. Rev. out diesel. Circ hi-vis pill and circ clean w/seawater. Displ. to brine (1.2 s.g.). Ran Schlumberger gauge ring/junk basket.

28 October

Report no. 50

Set packer at 1532.7m. Ret. w/bushing. RIH test plug. Tested BOP's bags and rams. Pulled test plug. RIH w/bushing and set same. RIH w/guns and SSD.

29 October

Report no. 51

Preform space out and pressure tests. Installed flowhead. W.O. daylight to open up well.

30 October

Report no. 52

Open morv. Displaced to diesel perforate. Well dead after 1.5 Bbls flow. Displaced back to diesel unable to close morv. POOH.

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31 October	Report no. 53 RIH with new PCT morv and SSARV in production string. No perforating guns. Test lines and string.
1 November	Report no. 54 Test lines and equipment. WOW to offload nitrogen. Prepared to displaced nitrogen cushion.
2 November	Report no. 55 Displaced tubing to nitrogen. Attempted to flow well.
3 November	Report no. 56 Attempted to take B.H. samples. Flow well. RIH w/gauges for gradient run.
4 November	Report no. 57 Flow well. Shut in well. RIH w/gauges for gradient run.
5 November	Report no. 58 Shut in well. RIH w/gauges and samplers. Opened well. Flowed well. Reverse out tubing contents. Circulated clean brine. Welldead.
6 November	Report no. 59 Formation fracture test. Circulate clean brine. Pull production string.

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7 November — Report no. 60

Ran in hole with tubing stinger on 5" D.P. Circulated bottoms up. Pumped cement plug no. 2. Ran baker bridge plug.

8 November — Report no. 61

Mud engineer off rig. P/A well.

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MATERIAL CONSUMPTION BY INTERVAL

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MATERIAL CONSUMPTION BY INTERVAL

Interval 36" hole - 368m to 477m

30" casing set at 466m

PRODUCT	UNITS	UNIT COST	TOTAL COST
Bentonite (m.t.)	42	$ 405.56/m.t.	$ 17 033.52
Caustic (25 kg)	11	$ 22.05/25 kg	$ 242.55
Lime (40 kg)	30	$ 10.30/40 kg	$ 309.00
Soda Ash (50 kg)	1	$ 22.81/50 kg	$ 22.81
*Calc.Chl.	33	$ 38.07/50 kg	$ 1 256.31
			$ 18 864.19

Cost per meter drilled $ 173.06

*Calc.Chl. used in cement for 30" Csg.

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MATERIAL CONSUMPTION BY INTERVAL

Interval: 26" Hole, 477m to 810m

20" Casing set at 800.5m

PRODUCT	UNITS	UNIT COST	TOTAL COST
Bentonite (m.t.)	25	$ 405.56	$ 10 139.00
Barite (m.t.)	114	$ 148.90	$ 16 974.60
Caustic (25 kg)	11	$ 22.05	$ 242.55
Soda Ash (50 kg)	3	$ 22.81	$ 68.43
Lime (40 kg)	9	$ 10.30	$ 92.70
Desco (25 lb)	3	$ 41.90	$ 125.70
			$ 27 642.98

Cost per meter drilled: $ 83.01

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MATERIAL CONSUMPTION BY INTERVAL

Interval 17-1/2" Hole, 810m to 1460m

13-3/8" Csg set at 1444m

PRODUCT	UNITS	UNIT COST	TOTAL COST
Barite, m.t.	172	$ 148.90	$ 25 610.80
Bentonite, m.t.	1	$ 405.56	$ 405.56
Caustic, 25 kg/sx	31	$ 22.05	$ 683.55
Lime, 40 kg/sx	3	$ 10.30	$ 30.90
SAPP, 50 lb/sx	3	$ 93.31	$ 279.93
Alcomer 110L, 25 kg/dr	52	$ 110.41	$ 5 741.32
Celpol Reg. 25 kg/sx	137	$ 198.50	$ 27 194.50
Celpol SL, 25 kg/sx	14	$ 205.00	$ 2 870.00
KCl, 50 kg/sx	637	$ 21.60	$ 13 759.20
KCl Brine, Bbls	1475	$ 21.60	$ 31 860.00
*$CaCl_2$, 50 kg/sx	28	$ 38.07	$ 1 065.96
	COST PER INTERVAL		$ 109 501.72
	COST PER METER		$ 168.16

*Calcium Chloride used for cementing.

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MATERIAL CONSUMPTION BY INTERVAL

Interval 12-1/4" Hole, 1460m to 1677m

9-5/8" Casing set at 1665m

PRODUCT	UNITS	UNIT COST	TOTAL COST
Caustic	19	$ 22.05	$ 418.95
Magconol	2	$ 1049.00	$ 2 098.00
H.E.C.	86	$ 246.38	$ 21 188.68
$CaCl_2$ Brine	1750	$ 22.40	$ 39 200.00
Shellflo	23	$ 282.75	$ 6 503.25
N5	141	$ 5.18	$ 730.38
N15, $CaCo_3$	706	$ 5.18	$ 3 657.08
N40	492	$ 5.18	$ 2 548.56
		TOTAL	$ 76 344.90

DRESSER

DRESSER NORWAY A.S.
MAGCOBAR

Shell, 31/2-15

MATERIAL CONSUMPTION BY INTERVAL

Interval: Completion & Testing

PRODUCT	QUANTITY	UNIT COST	TOTAL COST
H.E.C.	33	$ 246.38	$ 8 130.54
N 5	62	$ 5.18	$ 321.16
$CaCl_2$	137	$ 38.07	$ 5 215.59
N 15	20	$ 5.18	$ 103.60
			$ 13 770.73

DRESSER

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MAGCOBAR

Shell; 31/2-15

TOTAL MATERIALS CONSUMPTION

DRESSER

DRESSER NORWAY A.S.
MAGCOBAR

Shell, 31/2-15

TOTAL MATERIALS CONSUMPTION

PRODUCT	UNITS	UNIT COST	TOTAL COST
Barite	286	$ 148.90/m.t.	$ 42 585.90
Bentonite	68	$ 405.56/m.t.	$ 27 578.08
Caustic	72	$ 22.05/sxs	$ 1 587.60
Lime	42	$ 10.30/sxs	$ 432.60
Soda Ash	4	$ 22.81/sxs	$ 91.24
*$CaCl_2$	61	$ 38.07/sxs	$ 2 322.27
Desco	3	$ 41.90/sxs	$ 125.70
SAPP	3	$ 93.31/sxs	$ 279.93
Alcomer 110	52	$ 110.41/dr	$ 5 741.32
Celpol Reg.	137	$ 198.50/sxs	$ 27 194.50
Celpol S/L	14	$ 205.00/sxs	$ 2 870.00
KCL	637	$ 21.60/sxs	$ 13 759.20
KCL (bbls)	1475	$ 21.60/bbl	$ 31 860.00
Magconol	2	$ 1049.00/dr	$ 2 098.00
H.E.C.	119	$ 246.38/sxs	$ 29 319.22
$CaCl_2$ (Brine,bbls)	1750	$ 22.40/bbl	$ 39 200.00
Shellflo	23	$ 282.75/dr	$ 6 503.25
$CaCl_2$,sxs	137	$ 38.07/sx	$ 5 215.59
$CaCO_3$, N 5	203	$ 5.18	$ 1 051.54
" , N15	726	$ 5.18	$ 3 760.68
" , N40	492	$ 5.18	$ 2 548.56
	TOTAL MATERIAL COST		$ 246 124.68

Cost per metre: $ 146.76

*Used for cmt jobs.

DRESSER

DRESSER NORWAY A.S.
MAGCOBAR

Shell, 31/2-15

DAILY MATERIALS CONSUMPTION

DRESSER

DAILY MATERIALS CONSUMPTION

WELL Shell, 31/2-15

DATE 1984	DEPTH m	BARITE	BENTONITE	CAUSTIC	LIME	SODA ASH	DESCO	SAPP	MAGCONOL	ALCOMER 110L	HEC	CELPOL REG	CELPOL SL	$CaCl_2$ sxs	$CaCl_2$ Brine	KCl sxs	KCl Brine	N5	N40	N15	SHELLFLO				DAILY MUD COST	REMARKS
09.09	-		5	1	4																				2091.05	Mix spud mud.
10.09	430		28	7	22									CEMENT JOB											11736.63	Drilled 36" Hole.
11.09	477		9	3	4	1								33											5036.51	Land&cement 30" csg.
12.09	480	8	3	2		1																			2474.79	Ran riser.
13.09	810	24	14	6			3																		9509.44	Drill 14-3/4" pilot hole.
14.09	810	45																							6700.50	
15.09	810	37	8	3	9	2								CEMENT JOB											8958.25	Opened to 26" hole.
16.09	810			1	3					2		22		28											5706.73	Set 20"csg;Prepared Kcl polymer mud.
17.09	810	68	1	3						21		28					800								35753.52	Ran BOP, riser.
18.09	815			3																					66.10	Displaced polymer mud.
19.09	1069	33		1				1		17		45	6			273	675								37545.33	Drilled 17-1/2" hole.
20.09	1440	45		17				2		7		42	8			364									25874.24	Drilled 17-1/2" hole.
21.09	1460	11		6						5															2322.25	36 Bbls loss while logging.
22.09	1460	15							1		12			450							1				16601.81	Made up HEC-chalk mud.
23.09	1460										15			550				17	171	171					17875.32	Cemented 13-3/8" casing.
24.09	1474								1		32			750				12	200	204					28488.04	Displaced to chalk-HEC.
25.09	1493										4								79		12				4787.74	Raised Shellflo content in mud.
26.09	1510			4							4							20	92	40	2				2426.58	Ran mud cleaner to reduce sand.
27.09	1520			2							9							6	64	4					2644.84	Raised YP with HEC.
28.09	1530			2							2							15		6					645.64	Cut core no.7.Maintain props.
29.09	1538			2							1							44		24					642.72	Recover core no.8. R.I. no.9.
30.09	1562										3							20	28	28	3				1981.07	Cut core no.9,10,11/7m fill.
01.10	1599			7							2							2	10	10	5				2174.82	" " no. 11,12.
02.10	1677										1							1	28	20					500.20	" " no.12.Drill 1177m/3m fill.
03.10	1677																	4	10	9					119.14	Logging- 7m fill.
04.10	1677		NO MATERIALS USED																							
05.10	1677		"	"	"	"																				
06.10	1677		"	"	"	"																				
07.10	1677			2							1														290.48	Cleaned hole/Ran 9-5/8".
08.10	1677		NO MATERIALS USED																							
09.10	1677		NO MATERIALS USED																							

DRESSER

DAILY MATERIALS CONSUMPTION

WELL Shell, 31/2-15

DATE	DEPTH	HEC	N-5	$CaCl_2$ sxs	N-15										DAILY MUD COST	REMARKS
10.10	1677															Set storm valve . BOP's.
11.10	1677														0.0	
12.10	1677														0.0	Displ. hole to seawater.
13.10	1677		NO MAETERIALS USED												0.0	Displ. to 1.20 brine.
14.10	1677														0.0	Rig up to test.
15.10	1677														0.0	Rig up to test.
16.10	1634														0.0	Perforate.Flow well.
17.10	1634														0.0	Flowing well.
18.10	1634														0.0	Test well.
19.10	1634														0.0	W.O.W.
20.10	1634														0.0	W.O.W.
21.10	1634														0.0	W.O.W.
22.10	1634														0.0	Flow well.
23.10	1634	7													1724.66	Rig down testing.
24.10	1634	3													739.14	Laid out test assy.
25.10	1568	2	34	137											5884.47	Cement plug to 1517m.
26.10	1568	17	28		20										4437.10	Hi-vis plug and slugs.
27.10	1568															
28.10	1568															
29.10	1568		NO MATERIALS USED													
30.10	1568															
31.10	1568	4													985.52	Dowell/pills.
1.11	1568															
2.11	1568															
3.11	1568															
4.11	1568															
5.11	1568															
6.11	1568															
7.11	1568															
8.11	1568															

DRESSER

DRESSER NORWAY A.S.

MAGCOBAR

Shell, 31/2-15

D A I L Y M U D P R O P E R T I E S

DRESSER

DAILY MUD PROPERTIES

Well: Shell, 31/2-15

84 DATE	DEPTH	WT.	VIS SEC.	CORR. 115°F PV	YP	GELS 0 10	pH BECK ☐ STRIP ☐	FLUID LOSS 100 PSI API	500 PSI 300 °F HT-HP	CL ☐ CACL ☐ NACL ☐	ALKALINITY PF	PM	MF	CA ppm	RETORT % OIL	% SOL	% WATER	V.G. METER READING @ 115° 600 R.P.M.	300 R.P.M.	200 R.P.M.	100 R.P.M.	6 R.P.M.	3 R.P.M.	Bbl CEC		TOTAL MUD COST
09.09	-	1.03	MIXING SPUD MUD																							2091.05
10.09	430	1.03	93	9	34	11	23	9.5	N/C	N/D	21,900	0.3			140	0	2	98	52	43						13827.68
11.09	477	1.05	150	15	60			11.0			<1000	.4			400	0	3	97	90	75						18864.19
12.09	480	1.05	150	15	60			11.0			<1000	.4			400	0	3	97	90	75						21338.98
13.09	810	1.09	48	6	31			9.0				.05				0	5	95	43	37						30848.42
14.09	810	1.09	52	4	38			9.0				.05				0	5	95	46	42						37548.92
15.09	810	1.09	150																							46507.17
16.09	810	PREPARING KCL/POLYMER MUD.																								52213.90
17.09	810	1.26	52	16	16	2	2	9.0	9.2		57,000	.05			320	0	9	91	48	32					NIL	87967.42
18.09	815	1.26	66	20	19	2	2	9.5	5.0		59,000	.15	.5		120	0	12	88	59	39					7.5	88033.57
19.09	1069	1.26	57	17	18	2	2	8.5	5.0		59,000	.05	.1		400	0	12	88	52	35					12	125578.50
20.09	1440	1.29	56	18	18	2	3	9.0	5.6		59,000	.1	.5		600	0	12	88	54	36					20	151453.14
21.09	1460	1.29	52	16	16	2	2	9.3	5.6		59,000	.2	.6		480	0	12	88	48	32					20	153223.34
22.09	1460	1.27	50	14	16	2	2	9.0	5.8		59,000	.15	.5		520	0	12	88	44	30					18	170377.20
23.09	1460	1.21	57	13	17	2	2	9.2	72		107000	.1	.4		2000	0	11	89	43	30					0	188252.52
24.09	1474	1.21	55	14	18	2	2	8.5	58		98,000	TR	.15		2000	0	12	88	44	30					0	216740.56
25.09	1493	1.21	60	15	19	3	4	8.0	11		97,000	0	.05		2000	0	12	88	49	34					3.5	221528.30
26.09	1510	1.21	60	15	19	2	3	8.0	12		99,000	TR	.25		2000	0	11	89	49	34					5.0	223954.88
27.09	1520	1.21	67	16	25	3	4	8.0	12		98,000	0	.2		2000	0	12	89	57	41					3.0	226599.72
28.09	1530	1.21	72	17	22	3	4	8.0	9		101000	TR	.15		8000	0	12	88	54	39					3.5	227244.08
29.09	1538	1.21	72	17	21	3	4	8.5	11		96K	.05	.30		8000	0	12	88	56	38					3.5	227888.98
30.09	1562	1.21	70	18	19	3	4	7.9	6		96K	TR	.15		8000	0	12.5	87.5	55	32					5.0	229869.15
01.10	1599	1.21	72	17	20	3	4	8.5	6		97K	.10	.30		8000	0	13	87	54	33					5.0	232043.97
02.10	1677	1.23	70	19	21	3	4	7.9	5.8		98K	TR	.15		8000	0	13	87	51	40					6.0	232544.77
03.10	1677	1.24	70	20	21	3	4	8.0	5.8		98K	TR	.15		8000	0	12.5	87.5	61	41					6.0	232663.91
04.10	1677	1.24	70	19	21	3	4	8.0	6.0		97K	TR	.15		8000	0	12.5	87.5	59	40					6.0	232663.91
05.10	1677	1.23	70	19	20	3	4	8.0	6.0		98K	TR	.15		8000	0	13	87	59	39					6.0	232663.91
06.10	1677	1.23	71	18	21	3	4	7.8	5.8		98K	TR	.10		8000	0	13	87	62	42					6.0	232954.39

DATE SPUD: DATE T.D.: COST:

DRESSER

DAILY MUD PROPERTIES

Well: Shell, 31/2-15

DATE	DEPTH	WT.	VIS SEC.	CORR. 115°F PV	CORR. 115°F YP	GELS 0	GELS 10	pH BECK ☒ STRIP ☐	FLUID LOSS 100 PSI API	FLUID LOSS 500 PSI 300 °F HT-HP	CL ☒ CACL ☐ NACL ☐	ALKALINITY PF	ALKALINITY PM	ALKALINITY MF	CA ppm	RETORT % OIL	RETORT % SOL	RETORT % WATER	V.G. METER READING @ 115° 600 R.P.M.	300 R.P.M.	200 R.P.M.	100 R.P.M.	6 R.P.M.	3 R.P.M.	Bbl CEC		TOTAL MUD COST
07.10	1677	1.23	70	18	20	3	4	7.8	6.0		98K	TR	.15		8000		13	87							6		232954.39
08.10	1677	1.23	70	18	20	3	4	7.8	6.0		98K	TR	.15		8000		13	87							6		232956.39
09.10	1677	1.23	69	18	19	3	4	7.8	6.0		97K	TR	.15		8000		13	87							6		232956.39
10.10	1677	1.23	69	18	19	3	4	7.8	6.0		97K	TR	.15		8000		13	87							6		232956.39
11.10	1677	1.23	69	18	19	3	4	7.8	6.0		97K	TR	.15		8000		13	87							6		232353.79
12.10	1677	1.22	55	17	18	3	4	8.0	6.0		97K	0	.15		8000		13	87							6		232353.79
13.10	1677	1.22	51	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		232535.79
14.10	1677	1.22	50	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		232353.79
15.10	1677	1.22	50	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		232353.79
16.10	1677	1.22	50	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		232353.79
17.10	1677	1.22	50	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		232353.79
18.10	1634	1.22	50	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		232353.79
19.10	1634	1.22	50	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		232353.79
20.10	1634	1.22	50	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		232353.79
21.10	1634	1.22	50	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		232353.79
22.10	1634	1.22	50	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		232353.79
23.10	1634	1.22	50	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		234078.45
24.10	1634	1.22	50	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		234817.59
25.10	1568	1.22	50	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		240702.06
26.10	1568	1.22	50	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		245139.16
27.10	1568	1.22	50	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		245139.16
28.10	1568	1.22	50	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		245139.16
30.10	1568	1.22	50	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		245139.16
31.10	1568	1.22	50	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		246122.68
01.11	1568	1.22	50	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		246122.68
02.11	1568	1.22	50	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		246122.68
03.11	1568	1.22	50	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		246122.68
04.11	1568	1.22	50	16	16	2	3	8.0	6.5		97K	0	.10		8000		13	87							6		246122.68

DATE SPUD: Completion fluid: $CaCl_2$ brine 1.20 S.G. DATE T.D.: COST:

DRESSER

DAILY MUD PROPERTIES

Well : Shell, 31/2-15

PAGE 3

DATE	DEPTH	WT.	VIS SEC.	CORR. 115°F PV	CORR. 115°F YP	GELS 0	GELS 10	pH BECK ☐ STRIP ☐	FLUID LOSS 100 PSI API	FLUID LOSS 500 PSI 300 °F HT-HP	CL ☐ CACL ☐ NACL ☐	ALKALINITY PF	ALKALINITY PM	ALKALINITY MF	CA ppm	RETORT % OIL	RETORT % SOL	RETORT % WATER	V.G. METER READING @ 115° 600 R.P.M.	300 R.P.M.	200 R.P.M.	100 R.P.M.	6 R.P.M.	3 R.P.M.	Bbl CEC		TOTAL MUD COST
03.11	1568	1.22	50	16	16	2	3	8.0	6.5		97K		.10		8000		13	87							6		246122.68
04.11	1568	1.22	50	16	16	2	3	8.0	6.5		97K		.10		8000		13	87							6		246122.68
05.11	1568	1.22	50	16	16	2	3	8.0	6.5		97K		.10		8000		13	87							6		246122.68
06.11	1568	1.22	50	16	16	2	3	8.0	6.5		97K		.10		8000		13	87							6		246122.68
07.11	1568	1.22	50	16	16	2	3	8.0	6.5		97K		.10		8000		13	87							6		246122.68

DATE SPUD: DATE T.D.: COST:

DRESSER

DRESSER NORWAY A.S.

MAGCOBAR

Shell, 31/2-15

BIT AND HYDRAULIC RECORD

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 Gelslurry		SUMMARY BITS								
CONTRACTOR DOLPHIN SERVICES																		DAYS								
WELL NAME 31/2-15					No. 1 EMSCO FA1600								S" 19.50 lb					HOURS								
LOCATION TROLL					No. 2 EMSCO FA1600																						
DATE	RUN No.	SIZE	MAKE	TYPE	JETS - 32nds Reg. R or RO			DEPTH OUT	FEET DRILLED	HOURS RUN	FEET PER HOUR	WT. 1000 LBS.	RPM	PUMP PRESS	PUMP No. 1		PUMP No. 2		Dull. Cond.			VER. DEV.	"d" EXPONENT				
					1	2	3								Liner	SPM	Liner	SPM	T	B	G						
11.09	1	26+36"H.	HTC	O5C3A	20	20	20	477	109	12.9	8.72	10 / 20	80	2200	6½	105	6½	105				1/4					
12.09	2	14-3/4" 26"	HTC	OSC3A	16	16	16	480	21	2.5	8.4	10 / 20	60	2100	6½	100	6½	100	1	3	I						
13.09	3	14-3/4"	SMITH	DSJ	18	18	18	810	330	11.0	30.0	20 / 25	125	3000	6½	100	6½	100	3	5	I	1/4					
14.09	2RR	14-3/4" 26"	HTC	OSC3A	16	16	16	556	76	3.5	21.7	5 / 10	80	2000	6½	100	6½	100	2	4	I						
15.09	4	26"	HTC	OSC3A	24	20	20	810	254	12	21.2	10 / 15	100	2200	6½	100	6½	100	2	2	I	3/4					
16.09	5	17½	HTC	OSC3A	18	18	18	1460	650	25½	25	20 / 30	105	2600	6½	98	6½	96	3	5	1/8						
	5RR	17½	HTC	OSC3A	18	0	0	1460	650	25½	25	10 / 15	100	1800	6½	100	6½	100	3	5	1/8	3½					
	6	12-1/4"	SMITH	FDT	0	0	0	1486	26	7	3.7	30 / 40	90	1100	6½	60	6½	600	5	5	1/8	3½					
	7	12-1/4 5-1/4	WEASEL	ACC				1493	7	3.5	2	14	130	330	6½	60					1/16	3½	80%REC				
	8	" "	"	ACC				1501	8	1.5	5.3	14	130	350	6½	60							85% "				
	8RR	" "	"	ACC				1503	2	1.5	1.3	12	125	350	6½	60							45% "				
	8	" "	"	ACC				1510	7	5	1.4	20 / 24	125	350	"	68							64% "				
	8	" "	"	ACC				1516.5	6.5	5	1.3	19	110	348	"	68							100% "				
	8	" "	"	ACC				1520.5	4.5	1	4	10	90	310	"	65							100% "				
	8	" "	"	ACC				1530	9.5	6.5	1.8		110	400	"	66							88% "				
	8	" "	"	ACC				1533	3.0	4	1.3		100	420	"	68							90% "				
	9	12-1/4"	HTC	X1G				1533																			
	RR8	" 51/4	WEASEL	ACC				1541	8						"								90% "				
	8	"	"	"				1559	18						"								100% "				
	8	"	"	"				1577	18						"								86% "				
	10	12-1/4"	"	"				1595	18						"								95% "				
	RR9	12-1/4"	HTC	X1G				1677	82						"								95% "				
	11	12-1/4"	SMITH	SDS				1677																			

REMARKS

DRESSER

DRESSER NORWAY A.S.

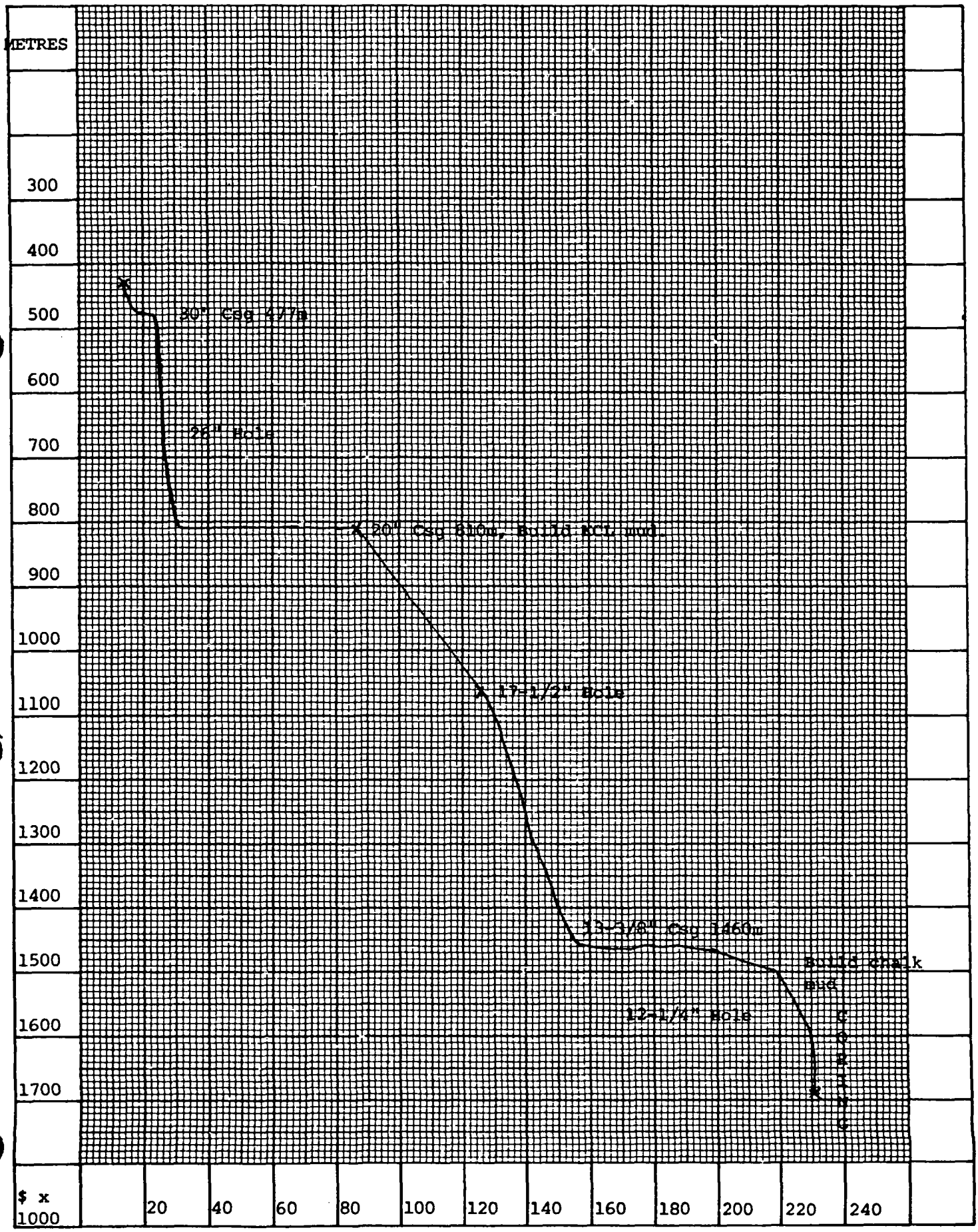
MAGCOBAR

Shell, 31/2-15

G R A P H S

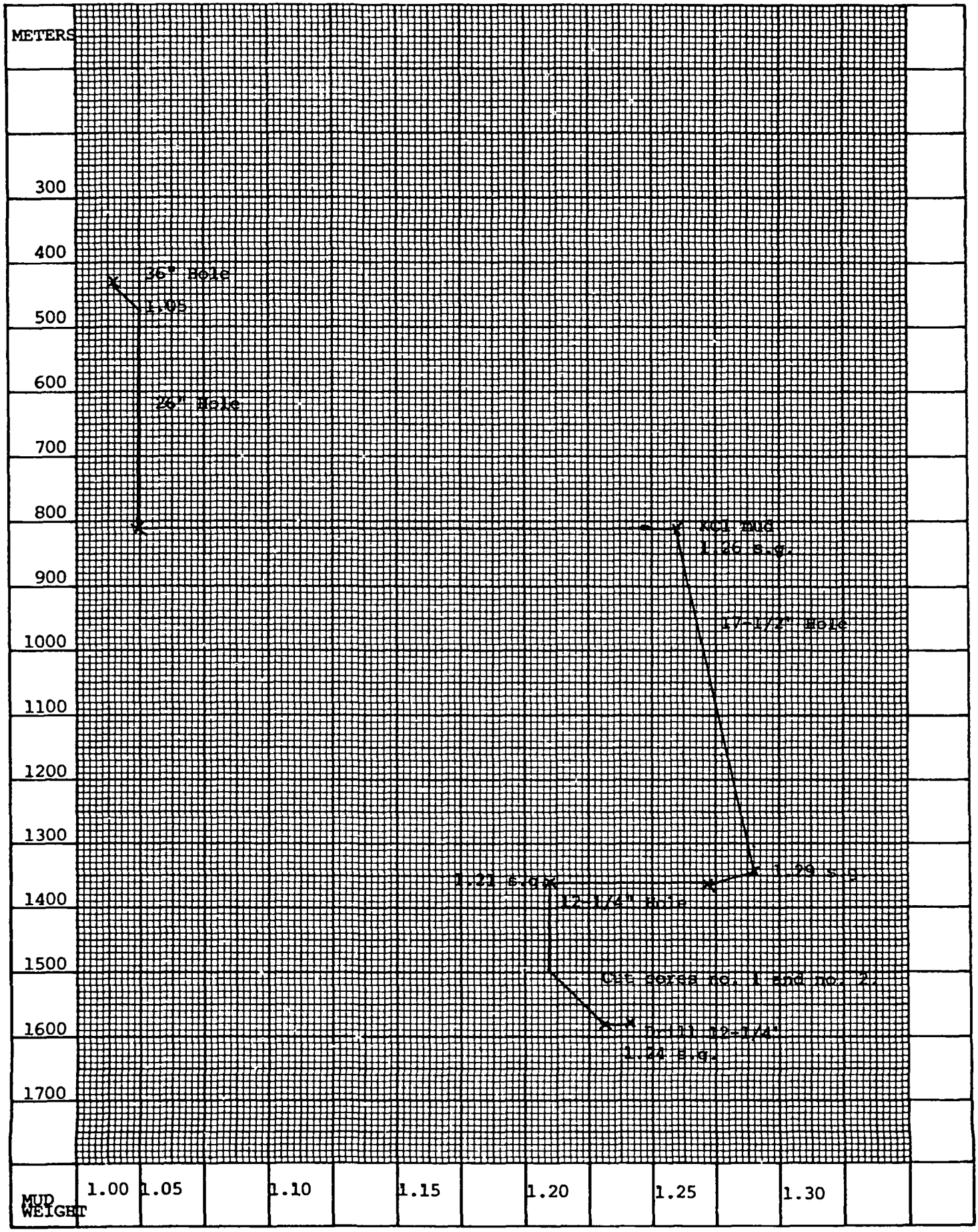
DRESSER

Plot Title: DEPTH VS COST
Well Name: 31/2-15
Location: TROLL
Legal Description: A/S NORSKE SHELL



DRESSER

Plot Title: DEPTH VS MUD WEIGHT
Well Name: 31/2-15
Location: TROLL
Legal Description: A/S NORSKE SHELL



DRESSER

Plot Title: DAYS VS DEPTH
Well Name: 31/2-15
Location: TROLL
Legal Description: A/S NORSKE SHELL