Continental Shelf Unit North
CSU N Report Series No.77/8

Preliminary Report on the first leg of the 1977 Drilling Programme on MS Ferder

by

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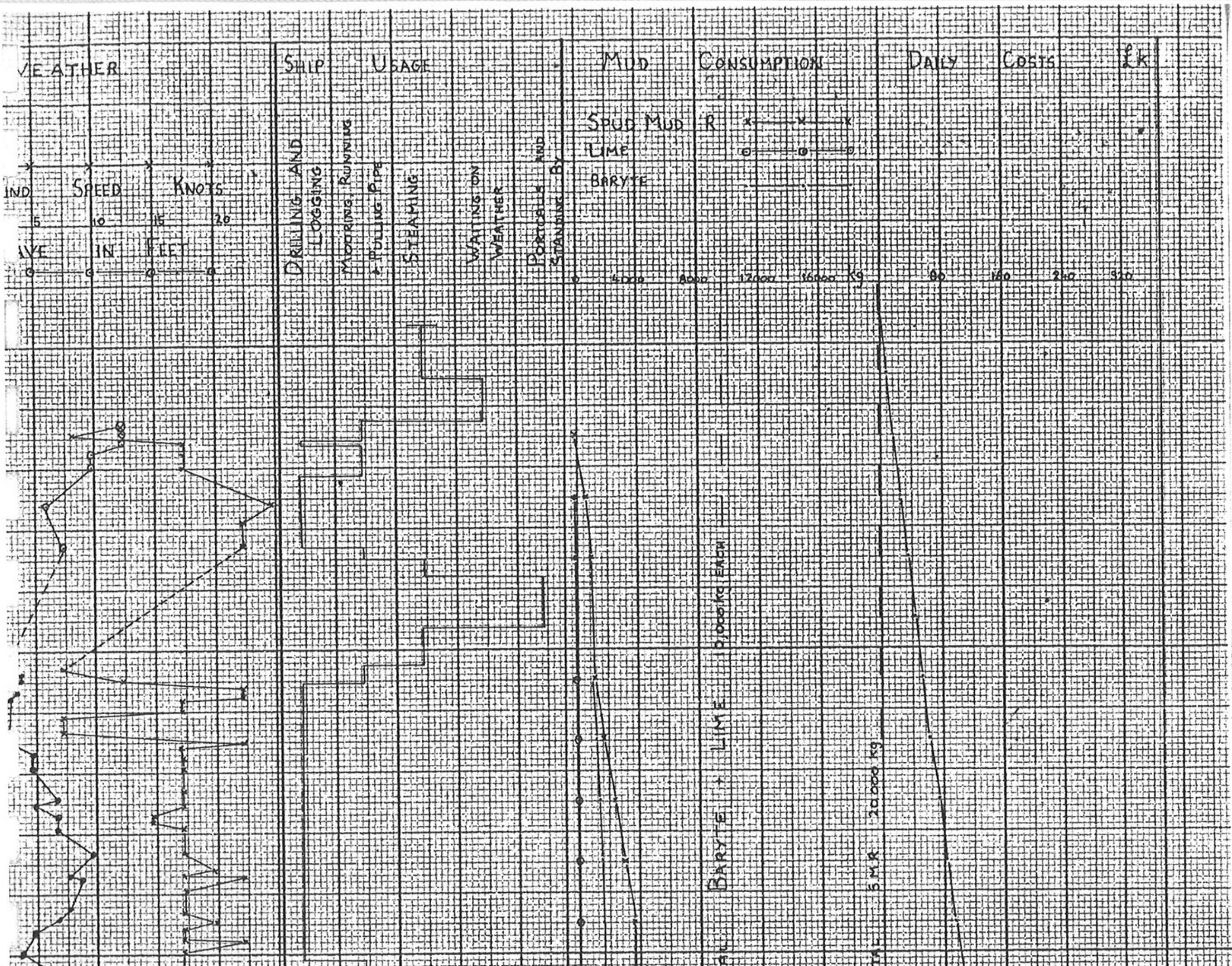


WEATHER
SHIP USAGE
MUD CONSUMPTION
DAILY COSTS £K
SPUD MUD R
LIME
BARYTE
WIND SPEED KNOTS
5 10 15 20
WAVE IN FEET
DRILLING AND LOGGING
MOORING, RUNNING + PULLING PIPE
STEAMING
WAITING ON WEATHER
PORTCALLS AND STANDING BY
4000 8000 12000 16000 KG
80 160 240 320
TOTAL BARYTE + LIME 10,000 KG EACH
TOTAL S.M.R. 20000 KG
SALT GEL
20 30 40 TONS
(TOTAL 130 MT)
LIME
BARYTE
S.M.R.
SALT GEL

Borehole 77/80

30km NE of Unst, Shetland

Latitude ≃ 60°56.7'N Longitude 0°15.7'W Water Depth 141m

Decca Main Chain: OE Block No. 1/4 (unallocated)

Red I 4.39 Green E 44.21 Purple D 62.34

Drilled: 9.6.77 - 11.6.77 Hours on Site: 43.5

Depth	Cored	Recovered
Quaternary	33.6m	0.25m(0.74%)
Solid	45.35m	36.09m(79.6%)
Total	78.95m	36.34m(46%)

Mud Consumption

Spud Mud R	1300kg
Lime	122kg
Baryte	1350kg

Total cost: £5169

Bit usage: Tungsten Carbide (60% wear) - Bit subsequently rebuilt on board ship and ports bored out.

Comments

The drilling was carried out in poor weather conditions with a heavy swell.

The negligible recovery from the Quaternary was probably due to a combination of a dominantly sandy sediment and incorrectly supplied drilling equipment.

The hole was not logged because of fears concerning the stability of the hole in difficult terrain and poor weather.

Borehole 77/75

15km ENE of Piper Field

Latitude ≃58°29.55'N ≃ Longitude 00°30.4'E

Water Depth: 147m

Decca Main Chain: 6C Block No. 15/18 (Shell/Esso)

Red B 20.03 Green I 44.61 Purple B 61.23

Drilled: 13.6.77 - 17.6.77 Hours on site: 12.4

Depth	Open Hole	Cored	Recovered	(Cored Hole)
Quaternary	3.7m	214.05m	(43.67%)	93.47m
Solid	-	-	-	
Total	3.7m	214.05m	(42.9%)	93.47m

217.75m

Mud Consumption

Spud Mud R	2725kg
Lime	140kg
Baryte	550kg

Total cost: £9543

Bit usage: Tungsten Carbide (40% wear)

Comments

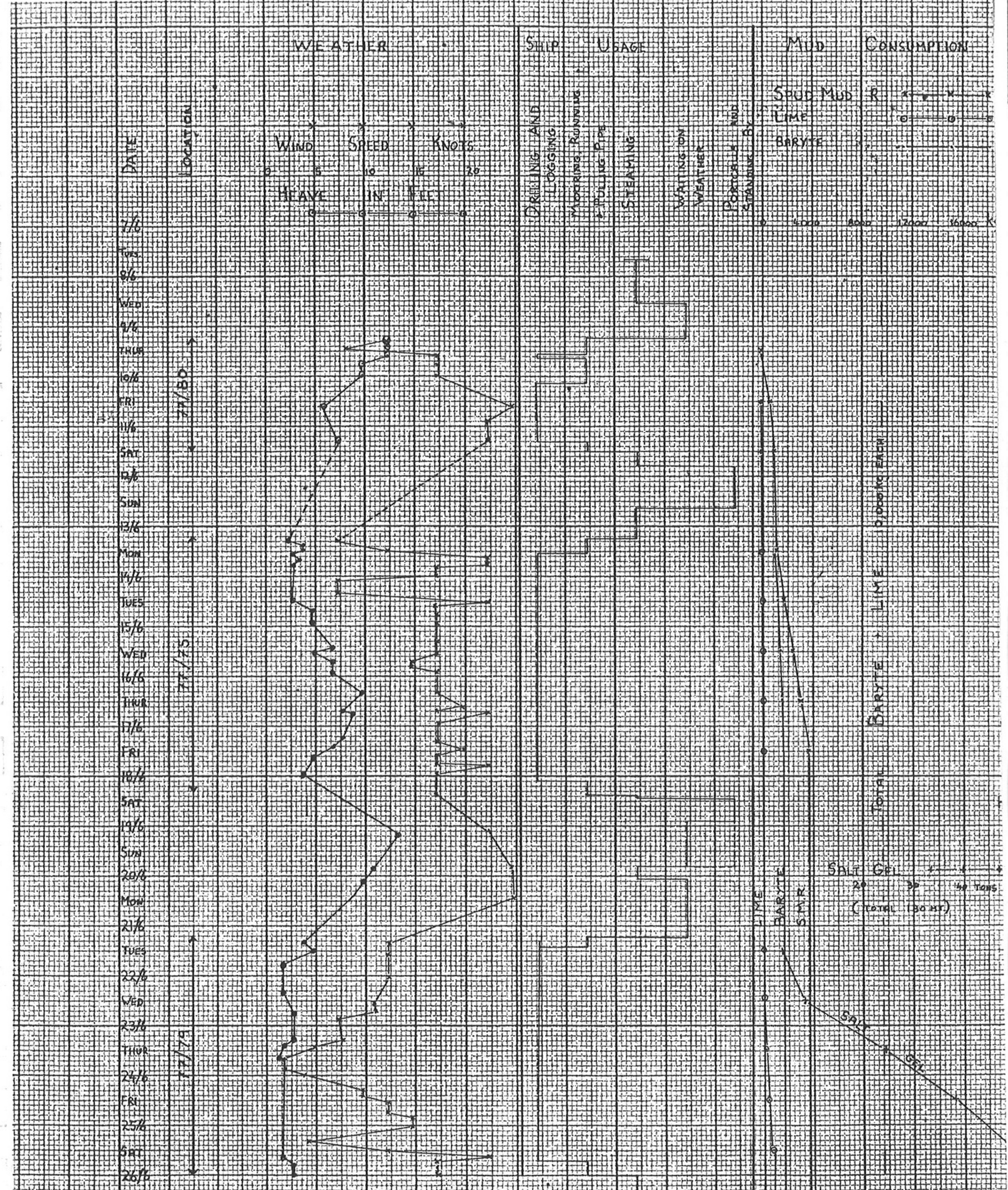
Push sample to 41.15m
Hammer sample 41.45-41.35m } Ferder equipment

Re-enter hole with Christensen W.I.C.B.

Core by push sampling and non-rotating inner barrel to base of hole.

Considerable problems encountered in recovering core.

Faults found with Christensen inner barrel catchers (too weak) and gap settings between inner barrel and bit throat.


WEATHER
SHIP USAGE
MUD CONSUMPTION
DATE
LOCATION
WIND SPEED KNOTS
0 5 10 15 20
HEAVE IN FEET
DRILLING AND LOGGING
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PORTCALLS AND STANDING BY
SPUD MUD
LIME
BARYTE
0 4000 8000 12000 16000
7/6
TUES
8/6
WED
9/6
THUR
10/6
FRI
11/6
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SUN
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23/6
THUR
24/6
FRI
25/6
SAT
26/6
SUN
77/80
77/75
77/79
TOTAL BARYTE + LIME
SALT GEL
20 30 40 TONS
LIME
BARYTE
SMR
SALT GEL

Borehole 77/79

33km ESE Forties Field.

Latitude ≃ 57°37.00'N Longitude ≃01°28.03'E

Water Depth: 95m

Decca Main Chain: 6C Block No. 22/13 (Sun)

Red C20.15 Green H45.95 Purple E72.88

Drilled: 21-25 June 1977 Hours on site: 113.5

Depth	Open Hole	Cored	Recovered
Quaternary	33.03m	202.97m	103.34m(50.9%)
Solid	-	-	-
Total	33.03m	202.97m	103.34m(43.8%)

236m

Mud Consumption

Salt Gel	50.6m.t.
Lime	480kg
Baryte	NIL

Total Cost: £7646 (This is low because 1/3 of hole was pushed)

Bit usage: 20% wear on built up T.C. Bit.

Comments

Push sample to 133m depth.

Actual thickness push sampled 101m, recovery 66.15m(66.5%)

Thickness cored with Christensen barrel 103m, recovery 37.19m(36.1%)

Note. Mud costs here are artifically low because so much of the hole was push sampled. If compared with 77/75 it is likely that costs would be similar or slightly higher per meter.

IGS SCOTTISH OFFSHORE DRILLING PROGRAMME 1977 - MS Ferder

The Norwegian ship MS Ferder has been chartered for approximately five weeks to continue the reconnaissance drilling programme on the Scottish Continental Shelf. From a total of over 80 proposed sites about a dozen priority sites and six alternative sheltered standby sites have been selected. Most of these are designed to explore Tertiary or Mesozoic sequences but two sites 77/75 and 77/79 have been specifically selected to core the thick North Sea Quaternary. It is expected that about six or seven sites will be drilled in the available time.

Leg I of the charter ended in Aberdeen on Sunday 26th June. During this period three sites (77/75, 77/79, 77/80) were drilled successfully to total depth though considerable problems were encountered with the Christensen drilling equipment. Two holes (77/75 and 77/79) were logged using a natural gamma probe adapted from use on land boreholes. A summary log is given below and basic information with some comments are provided for each site. Weather, ship and mud usage and costs are shown in graphic form.

SUMMARY LOG

Leg I: 7.6.77 - 26.6.77

Tuesday 7th June

15.45 Cast off from Bergen. Contract starts.

Wednesday 8th June

12.50 Standing by at site 80 (30km NE of Unst). Waiting for weather.

Thursday 9th June

06.00 Begin anchoring at site 80.

13.30 Spud in site 77/80A. String jamming in bottom re-entry cone in heavy swell. Pull string and modify core barrel.

22.10 Attempt to spud in again. Power slip guides damaged in heavy swell. Standing by for repairs.

Friday 10th June

03.40 Spud in site 77/80B. Negligible recovery in Quaternary.

09.00 Rockhead reached at 33m. Continue drilling in soft rock with tungsten carbide bit.

Saturday 11th June

07.00 Complete drilling at 78m. Abandon plans to log hole because of threatened instability and heavy swell. Pull string and raise anchor.

12.30 Move off site and steam to Lerwick for crew change and to collect spares.

19.15 Alongside in Lerwick. Change crew. Spare bits en route from Germany. Expected Lerwick a.m. 12th June.

Sunday 12th June

15.00 Advised spares 'lost' at Gatwick Airport.

16.30 Cast off from Lerwick.

Monday 13th June

05.40 Begin anchoring at site 75 (15km ENE of Piper Field)

13.00 Spud in at site 77/75. Begin push sampling using Ferder's push sampling equipment.

Tuesday 14th June

14.20 Complete push sampling at 41m; begin hammer sampling.

15.20 Complete hammer sampling. Pull string to change to Christensen rotary wire line core barrel.

19.00 Re-enter hole with Christensen equipment and

tungsten carbide bit. Begin rotary coring with wire line equipment. Poor recovery.

Wednesday 15th June

00.00 - 24.00 Alternatively push sampling and rotary coring with Christensen wire line equipment. Recovery poor with rotary corer

Thursday 16th June

00.00 - 24.00 Continue rotary coring while experimenting with catcher design and drilling parameters. It is noted that bit/catcher clearance gap is not in accordance with recommended settings. Clarification requested from Christensen HQ.

18.00 Christensen engineer falls on deck stairway. Suspected damage to rib cage area.

Friday 17th June

00.00 - 23.00 Continue rotary coring and experimenting with catchers and drilling parameters. Christensen basket catchers are inadequate and have to be rebuilt by ship's engineers.

23.00 Complete hole at 217.75m. Prepare logging equipment.

Saturday 18th June

03.15 Complete logging of hole. Begin pulling string.

09.40 Move off site. Stingray re-entry cone tiltmeter stops working.

11.00 Transfer injured McClellands engineer to Piper Platform, standing by for spares in deteriorating weather.

22.00 Collect spare bits from M.V. Criscilla. Standing by Piper Platform waiting on weather and replacement catchers from Christensen.

Sunday 19th June

20.45 Spares transferred from Piper Platform by supply vessel Siddis Pilot. Proceed to site 79. Waiting on weather.

Monday 20th June

Waiting on weather.

Tuesday 21st June

06.30 Begin anchoring on site 79.

10.30 Spud in at site 77/79 (33km ESE of Forties). Begin push sampling with Christensen equipment.

19.30 At 24m try run with non-rotating inner barrel. Inner barrel jams in hole and cannot be recovered. Pull string to recover barrel.

22.00 Inner barrel found to be fractured at top thread at swivel. No apparent damage to outer barrel. For safety prepare new outer barrel.

Wednesday 22nd June

01.10 Re-enter hole and prepare to continue coring. Overshot tool damaged.

03.30 Overshot repaired. Continue push sampling.

Thursday 23rd June

00.00 - 16.00 Continue push sampling with variable success.

16.00 Begin coring in stiff clay.

Friday 24th June

00.00 - 24.00 Rotary coring with non-rotating inner barrel. Drilling in two meter runs. Recovery moderate but variable.

Saturday 25th June

16.00 Terminate hole at 236m.

18.00 Complete logging hole. Begin pulling string and raising stingray.

20.40 Begin raising moorings.

Sunday 26th June

00.10 Complete raising moorings. Steam for Aberdeen.

13.30 Alongside in Aberdeen. Standing by for repairs to stingray and Christensen equipment.

BOREHOLE SUMMARY

	77/80	77/75	77/79
Position	30km NE Unst, Shetland	15km ENE Piper Field	33km ESE Forties
Block No.	1/4 (unallocated)	15/18 (Shell/Esso)	22/13(Sun)
Water Depth	141m	147m	95m
Time on Site	9-11/6/77 (42.5hrs)	13-17/6/77 (124hrs)	21-25/6/77
Total Depth	78.95m	217.75m	236m
Thickness Cored	78.95m	214.05m	202.97m
Quaternary	33.6m	217.75m	236m
Solid	45.35m	NIL	NIL
Recovery Quat.	0.25 (0.74%)	93.47 (43.67%)	103.34 (50.9%)
Recovery Solid	36.09 (79.6%)	NIL	NIL
Recovery Total	36.34 (46%)	93.47 (43.67%)	103.34 (50.9%)
Mud (SMR)	1300kg	2725kg	Salt gel:50.6 M.T.
Mud (Lime)	122kg	140kg	480kg
Mud (Baryte)	1350kg	550kg	NIL
Mud Cost	£5169	£9543	£7646
Bit Usage	1 x T.C. (60%)	1 x T.C. (40%)	1 x T.C. (20%) built up