

Marine Geology  
Internal Report No. 84/

CRUISE REPORT  
BRITISH ENTERPRISE IV : Leg 6  
10-24 October 1984

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Report 84/BE/08 Leg 6. Wed-Wed October 10-24

General - (see further detailed summary log in Appendix 1)

The leg 6 personnel, see manning, joined in Scabster on 10 October. Sailing was delayed until 1330 on Saturday 10/13 due to pressure problems on the new RD computer pot. Trials at sea to 1230 10/14 proved a design fault in the hydraulics and a prolonged period from 1510 10/14 Sunday to 1340 10/17 Wednesday was spent at anchor in Loch Eriboll modifying the hydraulics and attending to further faults arising in the transformer and computer pots. The ship sailed again on Wednesday, already half way through the leg, and twice drilled a low priority site (RD5/Sutherland) on the second attempt obtaining 0.42 m of ?Durness Limestone. On the next site off Cape Wrath the whole electrical control system was down indicating further water penetration of the transformer pot and the ship returned to Loch Eriboll by 0100 Thursday 10/18. Thus in the first week of the leg only 37 hours had been spent at sea including passages.

Up to this time despite the lateness of the season the weather had been reasonable being only up to Force 6 and swell conditions acceptable. Thereafter conditions deteriorated drastically becoming extremely unstable and changeable with a series of secondary depressions travelling NE across Britain. In general the Minches established to a low situation allowing judicious work at sea with continuous monitoring of the changing situation. Hebrides and Fair Isle were to have almost continuous forecast gales though only four were experienced. More importantly, for future note, the initial storm passage of Thursday 10/18 produced a heavy northerly swell on the North Coast of Scotland and in the North Minch which would have precluded any safe operation northwards on North Sutherland, Rona, Foula, Fair Isle and Sula Sgeir, and also made the use of Loch Eriboll and Scabster untenable for visits or refuge anchorages.

On Thursday 10/18 from 1100 to 1835 the ship shifted from Loch Eriboll to Stornaway Bay due to severe gales. At the anchorages the transformer and computer pots of the RD were again drained, re-made, had the electrics potted, were tested, and were resealed and filled with oil. The ship sailed at 0615 10/19 and attempted an RD site in Broad Bay despite a heavy northerly swell. The electrics re-tripped several times to earth after a few moments running. Morale among even our

dedicated technicians, who had been working in excess of 18 hour days for the entire period, was by then getting low. Pending further extensive fault finding on the RD, the ship was taken gravity coring and grab sampling on RD sites in the North Minch and RC sites in the Little Minch from 1630 10/19, Friday to 1830 10/20 Saturday. A lot, ca 25, of CR barrels were smashed but several rock out-crops proved. We anchored for the night of Saturday-Sunday off North Harris to make up the RD again, though operations were slowed by heavy rain, and sailed 0600 10/21 Sunday to Minch due to a forecast SE Gale which would have created a lee shore. Some time was wasted since a return to Stornaway Bay was needed to refill the transformer pot oil out of the heavy swell from 1250 to 1500 10/21.

From 1630 to 2307 on 10/21 Sunday the RD performed well mechanically at 3 RD sites before anchoring in Enard Bay, Sutherland from a S-SE gale till 0730 10/22 Monday. From 0815 - 1650 the RD again performed well mechanically at three further sites off Assynt and another RD site was proved unsuitable for drilling with the gravity corer. At 1630 10/22 Monday the ship set off on passage for Leith but another RD site off Kyle of Tongue 20 nm west of the Pentland Firth was drilled from 2000 to 2300 10/22 Monday in marginal weather (wind SW 6-7), tide (E going 3 knots) and swell (2-3 metres northerly) conditions. Again the RD performed well mechanically.

At 0001 10/23 Tuesday the ship proceeded towards Leith passing the Pentland Firth in a waterly gale Force 8 at Slack Water (Springs) from 0450 to 0600 10/23.

Thus the RD (5 m) took almost continuous major trouble shooting for the first eleven days of the leg and only achieved reliable mechanical operations at 7 sites over a period of 20 hours operations (1500 - 2000 Sunday, 0800 - 2300 Monday) including three hours on passage. None of these 7 sites yielded rock cores due to geological problems (qv). As noted one RD site had yielded rock core previously.

## 2. Personnel

### Manning

#### BGS Personnel

1200-2400

No. 1 Robin Wingfield  
 Computing Sheila Alexander  
 Daylab Nigel Ruckley

#### BUE Personnel

Master	Iain Johnston
1st Officer	Glen Broughton
2nd Officer	Mark Yeoman
Chief	Danny Fegan
2nd Eng.	Alan Bulling

BGS (continued)

0001-1200

Geologist Dave Long  
Night Lab John McGuigan

Technicians

Jack Pheasant  
Peter Wiggins  
Alan Bell

(8)

BUE (continued)

3rd Eng.  
CPO (Bos'un)  
SG1A  
SG1A

SG1B  
Cook  
2nd Cook  
Steward  
Steward

Dave Graham  
Wille Fraser  
Robert Bruce  
Joe Doyle

Callum McLeod  
William Thomson  
Charles Miller  
Albert Teal  
Thomas Giraldas  
(14)

**3. Area of Operations**

North Coast of Scotland : Scabster - Loch Eriboll - Cape Wrath  
Minches : Stornaway - N. Uist - Skye - Assynt.

**4. Ship Equipment and Operation**

No problems. All operations were handled with speed and efficiency. The DP positioning was thoroughly understood by the ship's officers and worked well within tolerances in often marginal conditions such as winds to 30 knots (+) and a heavy cross swell. The captain was thoroughly in rapport with the requirements of BGS sampling operations.

Noise levels though high do not appear excessive though it is desirable to soundproof the electrical and sample treatment labs if this ship is used in the future.

**5. BGS equipment and its deployment**

a) Shipek grab

No problems.

b) Gravity Cover(g/c)

Used extensively giving quite useful results including proving rock at ca 6 stations and indicating very hard rock ?Tertiary sills, at several others by a series of smashed CRs. The one 3 m composite CS was broken and it seems desirable to make a routine safe deployment of 3 and 6 m barrels on the g/c . It is unfortunate that the lack of working space aft does not allow the g/c to be left rigged whilst deploying VE or RD. This is, however, not a serious problem.

c) Rock drill/5 m (nb not 6.0 m)

As related it took some 11 days of the twelve working days of the leg to bring this instrument to routine reliable operation mechanically

and electrically. As such for the period, hopefully, only of this leg it could be compared to the F15, Eagle, Fighter which has been described as the "Hanger Queen"; though it should be noted that much of the work was of necessity done, not in the hanger, but on the open, and was much restricted by rain - some temporary easily erected rainproof tent to enclose its innards is highly desirable. Problems encountered with the rock drill may be broken down into four 'fields':-

- 1) Running - mechanical, hydraulic, electrical - problems
- 2) Deployment
- 3) Geological sitings
- 4) Penetration and recovery abilities

Though these above fields are necessarily interrelated in every sense the enormous amount of work required on field 1 in the first eleven days concealed the other difficulties associated with fields 3-4, until the very last days of the trip. Furthermore, the necessary minimum 18 hour a day work schedule put in by the three technicians for the first 11 days meant that proper watches could not be set except for at most 48 hours in the whole trip.

#### Field 1 - Running

Problems have basically all stemmed from the improvements (?) made since 1983 to the working system used in 1982 and 1983. Both the new "pots" for the transformer and the computer control systems, supposedly pressure resistant to 500 m water depths (50 atmospheres), leaked in more than one occasion in less than 10 m of water (2A) and on other occasions in less than 100 m (11A). Furthermore, a design fault was found in the new hydraulics design which required major modification and this was only possible on board by a bit of inspired trouble shooting by J. Pheasant. To take off any one of these three "pots" requires many hours of work dismantling dozens of electrical connections and remaking which even with 99.9% accuracy will still allow new faults to be put into this highly complex system requiring the whole to be performed again. In the event the transformer pot had to be broken three times each time involving the entire removal and remaking of the computer "pot", and the hydraulic pot opened four times. Both the hydraulics and the computer "pot" moreover had to be refilled and repressurized on each make up taking several hours. It should be noted that though the T/F and C/P "pots", were both new and

expensive, the latter was found to be so unreliable that all the computer electrics were transferred to an older R/D pot used in 1983 and designed for use with the U/E umbilical - many hours - and the new "pot" gashed. In any event this dedicated labour finally yielded results though the technicians had certainly approached very near despair by the 10th day! Thereafter it appears that we have a workable system which works as it should despite minor remaining irritants such as an intermittent recording of water flow and recording of penetration only after the 0.9 m. These latter faults were quickly resolved in Leith on 24 October.

### Field 2 - Deployment

The major problems encountered on legs 1-3 in this field have been solved and the RD was launched and recovered with no snags apart from one recovery. The last station recovery in a heavy cross-swell allowed the whole RD to pirouette inboard forward of the side-leg restraints, but no damage resulted and it was lashed in position and later repositioned on passage south.

One problem remains, the off-loading kinks in the umbilical cable near the head of the rig. These almost certainly result from the removal of load on the wire on landing the RD or VE on the seabed - releasing ca 4 tonnes extension strain - and are possibly worsened by the slacking away to not permit snatch on the seabed rig in the swell or with ship movement. Some heave compensation system should be considered to give an approximately  $\frac{1}{2}$  tonne back-loading. One possibility would be to attach clusters of floats to the umbilical when lowering; another to fit an hydraulic heave compensator either on the A-frame or abaft the winch?

### Field 3 - Geological Siting

It is quite evident from the results achieved on Leg 6 84/08, that the majority of the RD sites attempted did not have rock head within the present capacity of the rig. Several factors intrude here: though the most glaringly obvious is that it cannot be adequate to use pre-1974 sparker with ca. 10 m seabed reverberation interval to predict rock head attainable with a maximum penetration of 5 m. Moreover even with high resolution boomer or sparker records, preferably with back up by sidescan indicating rock outcrops, a better maximum penetratable overburden of 3 m should be aimed at.

Further parameters desirable in siting RD sites must surely be records with horizontal along record distance and direction in °T shown and the depth scale lines in MSEC/TWT or metres identified. Additionally, in view of suspect early fixing the ability to move a site along line regarding the ship's E/S is desirable.

From the drill's performance - see field 4 - it is better to site an RD on an actual outcrop rather than on one with any overburden since the drill is stopped, or core will not enter the barrel, if pebbles, cobbles or boulders are penetrated. Apparently and impressively results indicate that the drill will penetrate rock at seabed even across a non-horizontal surface.

The geologists and engineers of Leg 6 were not impressed by many of the seismics proved for the sites attempted. In many cases study of the admittedly poor records suggested that as much as 10 m of overburden were present and up to 3 m of soft mud with to cobble-sized dropstones were proved with the gravity corer at 6 of the North Minch sites!

#### Field 4 - Penetration and Recovery

The RD was deployed at 14 sites on 7 of which it failed to perform due to running problems. On one at a second attempt it cored hard limestone well for 0.42 below rockhead with good recovery. On another: which had previously been proved by a CR as hard red quartz sandstone, ?Torridonian; it took an hour to penetrate about 0.5 m at a steady rate, but had no core retention on recovery - it is thought that the slow drilling rate caused undercut core that was not retained by the core spring. At the remaining 5 sites penetrations of up to 2.7 m were recorded generally at fast rates in steps. All these latter five sites, including the last when combined vibration and drilling increased penetration for 1.5 to 2.7 m; only gravel, large pebbles or cored pieces of small boulders or cobbles, were recovered. None of these latter 5 sites were thought to have penetrated the drift - even those two for which the seismic records, albeit poor, indicated extensive rock crops evidently with patchy gravel, the penetration was evidently stopped by pebbles rather than rockhead since the drill was still rotating at a satisfactory rate when penetration ceased.

It is suggested by these observations that the drill will penetrate to 2.5 m or more through overburden unless stopped/blocked by pebbles

or flints, though it will on occasion core through cobbles or boulders. Furthermore, it retains the ability to drill on after such passage unless clogged by soft mud with dropstones - as was proved to 3 m+ with the g/c at several of the projected N Minch RD sites. No doubt further insight to its abilities and limitations will be gathered on Farne on Leg 7 where at any rate high resolution boomer and pinger records are available together with modern sparker.

Let it not be forgotten that the RD is being required to perform the most difficult of all drilling operations: penetration through the surface clag and weathered zone to recover below rockhead. This zone is one that in full scale operations is cased and shelled into, and rock rolled through, to stabilise the hole before coring commences

#### 6. Sample Stations

Little Minch (E)      57/07/337 - 353

(17#)

GS 17, CR 11, CS 7, RD 0

6 stations proved rock  
 2 on rock no return  
 only smashed CRS.  
 1 proved till

Sutherland (E)      58/05/154 - 159 (6#)

GS 0, CS 4, CR 1, RD 14 deployment 2 drilled (!): 1 of limestone, 1 of gravels.

Sutherland (W)      58/06/280 - 288 (9#)

GS 9, CS 3, CR 1, RD 5 - all obtained pebbles, one in till(?)

Lewis (E)      58/07/144 - 149 (6#)

GS 5, CS 4, CR 3, RD 10 - 1 drilled, core lost at site CR proved rock.

<u>Totals</u>	Stations	38	
	GSs	35	successful 34
	CSs	14	successful 12
	CRs	16	successful 11
	RDs	29	actually drilled 8

#### 7. Conclusions

- a) Despite the lateness of the season the ship and her D/P is rugged enough to have worked successfully in NW Scotland well offshore for some half of the leg.



- b) The bad weather of the second half of the trip which is not abnormal at this time of year would have precluded far offshore operations due to swell even between the frequent gales.
- c) BEIV: her personnel equipment, systems, accommodation and facilities are well suited for our operations and initial problems of redeployment are now solved except.....
- d) ... problems of strain release kinking of the umbilical.
- e) The RD after a long gruelling shakedown involving virtually rebuilding the whole system can be used with reliability but major snags could reoccur. Minor irritants of instrumentation have been ironed out.

#### 8. Recommendations

- a) Sound proof the sample treatment lab and the electrical control cabin.
- b) Make a rain proof erectable tent to enclose the innards of the RD - to include winch off of heavy components and oil refilling of the pots.
- c) Institute a critical review of rock drill sites using much tighter parameters and only using good high resolution seismics and/or sidescan.
- d) Carry 4 technicians on RD deployment legs - this extremely sophisticated instrument when it has problems requires an inordinate amount of skilled work over periods well in excess of 24 hours at a stretch and such periods must be exceedingly expensive in terms of ship hire.
- e) Consider options for a heave compensator for the slack umbilical.
- f) Pressure pots, themselves expensive, should be pressure tested and proved before acceptance - a £1,500 pot on this trip may have cost us as much as £10k expenses in disproving!

#### Appendices

1. Summary Log
2. Map of ops area
3. Computer compatible cruise report sheet
4. Time analysis

## Appendix 1 : Summary Log

Wednesday, 10 October, SW 7-9	0800	BE IV alongside Scabster, Caithness.
	0900-1200	Handover from leg V
	0900-2000	Loaded RD and gear
Thursday, 11 October	0001-2400	In Scabster assembling RD. Weld failure proved in pressure casing of computer control on RD.
	0001-2400	Repairs to pressure plate.
Friday, 12 October	0730-2200	Reassemble.
	0001-1330	Alongside Scabster completed assembling and testing RD.
Saturday, 13 October WSW 5-7 mostly 6; 2 m swell	1330-1630	On passage
	1630-2000	Preparing RD
	2000-2400	Running drill at RDs 1 and 2 on Sutherland E. Rotation for up to 50 min ? no penetration. Various tests. GS + CS of sand at RD 1. Ship holding station well in 6(7) W-WSW/2 m swell little water on deck.
	0001	Stood down for remainder of night to rest technicians in marginal weather before resuming RD ops in daylight.
Sunday, 14 October WSW 6-5 Confused 2-3 m W swell	0800	Resumed ops at Site RD 10. 10 mm S of Stack Skerry. Still no penetration. Established that running rotation blocks payout of retraction winch.
	1230	Underway for Loch Eriboll.

	1510	Anchored Loch Eriboll. Assessed problems, found that new computer pot still leaking, can convert old pot and re-valve.
Monday, 15 October Sheltered waters Light winds	0001	Working on rewiring old pot and modifying hydraulics. RW NR and SA took dory to island and head of loch. On reassembly problems with transformer pot! Hydraulics and computer now apparently OK, but transformer down and pot has let in water.
	2400	
Tuesday, 16 October SW 3 to S6. in sheltered waters	0001	All day working on RD. First sorting out transformer then linear valve switching in hydraulic pots. Technicians on 0700-0100.
	2400	
Wednesday, 17 October S5 to light to W 2-3.	0001	Resumed work at 0800 filled hydraulics and transformer pots with oil. Seabed and tested on deck and overside. Raised anchor.
	1340-1510	On passage out of Loch Eriboll to RD5:9 nm.
	1510-1810	2 RD runs and several shipeks at 58/05/157. Core limestone good stick; ?Durness; fossils 44 cm. No penetration or water flow data.
	1810-2000	On passage to C. Wrath sites. Change card in computer pot.
	2000-2300	RD to bottom. Shipek. No control of RD ? Brought aboard and checked. No signal through transformer pot - water in again! Computer checked out OK. Took off computer to clear T/f pot for stripping and draining in shelter.
Thursday, 18 October W3 to S/SE5	2300-0100	On passage back to Loch Eriboll.

	0100-1045	At anchor. Drained and dismantled T/f pot from 0500-1030 cup full of water causing short?? leakage through un-tightened plug. Resin potted and shifted signal wires.
Forecast SE 7-9 NE, widespread storm warning with vigorous depression tracking Kerry - Fair Isle. 966 mb., rapid fall of glass		Checked resin settling in oil with shore by R/T. Gales and storms forecast. Closed down and secured for sea.
Thursday, 18 October (cont.) ExN8 to 3, to cyclonic variable, to NW9 decreasing 7-8	1100	On passage from Loch Eriboll for Minch, rounded C. Wrath 1300 into calmer seas and centre low. Headed for Stornaway Bay. Wide-spread storms. Anchored off Stornaway.
	1837	
Friday, 19 October Cycl. Var. 2-5 (GWs. N7-9) heavy N swell	0616 0800	Passage to Broad Bay.  Attempted RD ops, further problems tripping to earth. Stood down RD. Gravity cores and shipeks in in Minch. Port call arranged Leith.
<u>NORTH MINCH</u>	1630	
	0030	
Saturday, 20 October Cycl. Var/SW 5 (forecast NW 6 to 8) to NW 6(7) to N4	1630	Move to Little Minch and continue GS, CR and CS at a succession of RC sites.
<u>LITTLE MINCH SKYE-HARRIS</u>	1830-2140	Passage to anchorage off N. Harris. Working on RD for further trials drained hydraulic tank.
<del>Sunday</del> , 21 October N4 - Lt. var 1-2 heavy N swell	0001	Further gale warning SE 8 at 2310.
<u>HARRIS-N MINCH</u>	0600	On passage to N Shaint Bank.
	0930-1010	Gravity cores and shipeks.
S3 - 7 increasing SE 7-8	1010-1250	Steam for out of swell anchorage. Anchored in Stornaway Bay. Tests and hydraulics top up.

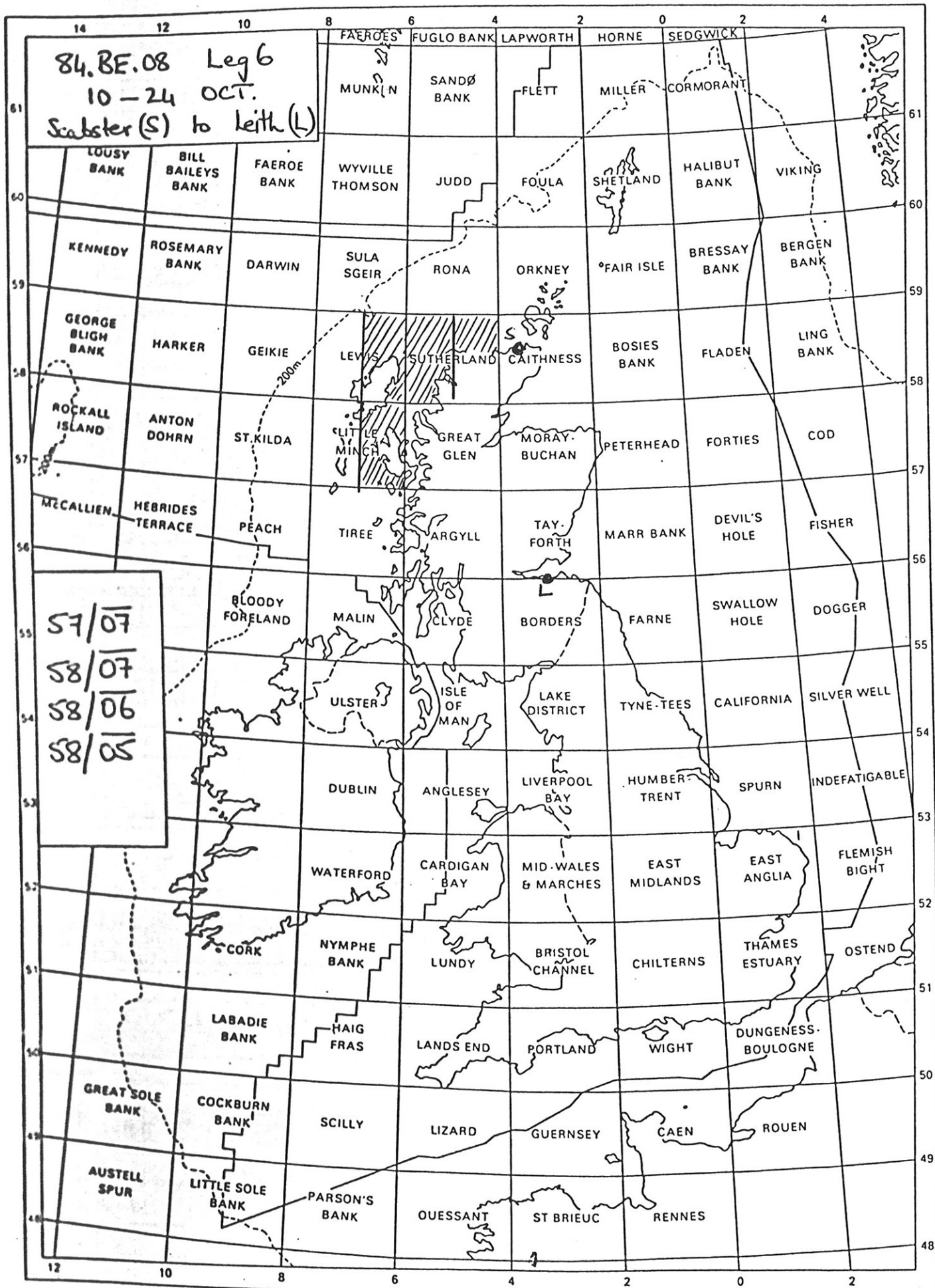
Monday, 22 October  
S7 to var. 2 increasing  
SW6(7)

Tuesday, 23 October  
WG(8), NW6-7

Wednesday, 24 October

1500-1630	Departed Stornaway Bay. Talked to Dr Whittington of UCW Aberystwyth in RRV Challenger on VHF concerning Celtic Sea Quaternary.
1630-2307	Used RD at 3 sites in SE 6-7 worked well but only penetrated rock 0.9 m with no recovery and 2.1 and 3.5 m into drift.
2307-2400	Anchored Enard Bay in SE gales.
0100-0730	Sheltering Enard Bay
0730-0815	Passage
0815-0915	RD34 Mud, sandy GS and CS only not worth drilling.
0815-1650	RDs at 3 sites W of Sutherland all on P-C ?Lewisian but all got only pebbles after short penetrations.
1650-2000	Steam round C. Wrath.
2000-2300	Operations at P-T site RD3 off Kyle of Tongue. Gravel and cobbles to 2.71 m.
2300-2330	Secured RD which had come inboard brought in G/C trough.
2330	Underway for Pentlands and Leith.
0430-0600	Passage of Pentland Firth on spring tide in rising W. gale at slack water.
1600	Brought RD to secure position off Aberdeen.
0130	In Leith
0130-2400	Port call Leith
1600-1630	Handover to Leg 7

Appendix 2.



GS MARINE GEOLOGY UNIT

CRUISE NO. 84 BE 08 LEG 06 DATES: FROM 10/08/84 TO 24/10/84

CRUISE AREA SUTHERLAND, NORTH AND LITTLE MINCHES

PERSONNEL			
Scientist	<u>WINGFIELD, R</u>	Maint. Techn.	<u>BELL, A</u>
Geologist	<u>RUCKLEY, N</u>	Night Deck	<u>MCGUIGAN, J</u>
Laboratory		Night Lab.	<u>LONG, D</u>
Deck	<u>ALEXANDER, S</u>	Geochemist	
Technician	<u>WIGGINS, P</u>	Senior Technician	<u>PHEASANT, J</u>

SUMMARY COUNT  
 SPENT ELEVEN DAYS TROUBLE SHOOTING SM RD  
 THUS LEAVING ONLY 24 HRS TO RUN RD BEFORE  
 THE PASSAGE TO KEITH. SKIP COULD WORK WITH  
 TITLE WEATHER LOSS DESPITE GALES.

ANALYSIS (PERCENTAGES)

WORKING TIME										DOWN TIME											
IN	ON	TRAN	ANCH	ON	WEA-	SHIP					IGS					OTHER EQUIPMENT TYPE					
PORT	PASSAGE	ERRING	DRING	STATION	THER	PROPUL	POWER	ANCHOR	DECK	GS	TAM G	TRAV C	VF	DRILL	WINCH	OTHER					
1	16	9	0	1	7									46							

RESULTS

EQUIPMENT	SHIPEK G	CAMERA G	CS	CR	VE ANCHOR	UNANCHOR	DRILL	OTHER	OTHER EQUIPMENT (or A/A)
	35		13	15			15		

Enter 'A' if 'OTHER' is anchored

EQUIPMENT PERFORMANCE

Ship grab: GOOD, SPARSE REC ON SEVERAL OUTCROPS

Camera grab: NO TECHNICIANS AVAILABLE TO ATTEMPT

Gravity corer: GOOD - MANY CR BARRELS SMASHED BY VOLCS?

Vibrocorer: \_\_\_\_\_

Drills: 11 DAYS TO TROUBLE SHOOT, THEN SITE PROBS

Wireless: \_\_\_\_\_

Other: \_\_\_\_\_

Ship: EXCELLENT

GEOLOGICAL SUMMARY

LACK OF HIGH RESOLUTION GPS MADE MANY DRILL SITES INAPPROPRIATE IN HARD TERT VOLC

ANIGS OR PRE-CAMBRIAN PROVED AT SEVERAL RD AND RC SITES ONLY ONCE WITH RD

\_\_\_\_\_

\_\_\_\_\_

OTHER COMMENTS

LEG G SHOULD BE CONSIDERED AS A FURTHER TRIALS PERIOD OF THE RD.

Appendix 4

SHIP: BE IV DATES: 10-24 OCTOBER LEG NO. 6 SHEET NOS. 57/07  
58/05, 06, 07

	DATE	1200 10/10	11/10	12/10	13/10	14/10	15/10	16/10	17/10	18/10	19/10	20/10	21/10	22/10	23/10	1200 24/10	TOTALS	
																	HRS	%
Working Time	In Port	12			13.5											10.5	36	10.7
	On Passage				2.5	3.0			1.8	8.7	3.9	1.4	2.8	2.7	2.4	1.5	52.3	15.6
	Traversing				1.3				1.2		3.4	11.0	7.2	7.2			31.3	9.3
	Anchoring				0.2												0.2	0.0
	On Station				2.0	8.5				3.7		7.1	6.1	4.0	6.6		38.0	11.3
Down Time	Weather					4.0				5.3	6.0	0.5		7.5			23.3	6.9
	SHIP																	
	Propulsion																	
	Power Supply																	
	Anchoring																	
	Handling Systems																	
	IGS																	
	Camera																	
	Grab																	
	Gravity Corer																	
	Vibrocorer																	
	Rock Drill		24	24	4.5	8.5	24	24	17.3	10	3.6	5.5	9.5				154.9	46.1
	Other																	
Winches																		
Power Cables																		
No. of Stations	Grab				1				2		6	17	3	6			35	
	Rock Corer				1						4	9	1				15	
	Sediment Corer										3	8		2			13	
	Vibrocorer																	
	Drill				2	1			2		3		3	4			15	

Complete to nearest 0.1 hour (6 min)

REMARKS

From 1200, 10/10, to 1200, 21/10, all technical time inclusive of that shown for passages and on station was spent hoisting the Smetre Rock Drill.