INSTITUTE OF GEOLOGICAL SCIENCES
CONTINENTAL SHELF NORTHERN UNIT
Internal Report No. 80/6

Cruise Report on 4th Leg of Whitethorn, Cruise No 80/WH/04

17 - 30 July 1980

by

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CONTENTS

1. Introduction

The intention of the cruise was to continue CSNU sampling in the Central North Sea, the aim being to complete work in the area at the end of the subsequent leg (leg 5). In particular, it was considered important to complete work along the proposed route of the Gas Gathering Pipeline, which runs sub-parallel to the Median Line and close to it. It was hoped to complete the virtually unsampled Cod and Fisher sheets during this leg, as well as finishing the eastern half of the Devil's Hole sheet.

In the event these objectives were very largely if not wholly met, despite the loss of one day through bad weather and some downtime on the vibrocorer. The weather was very good other than the one day, while the equipment worked well, as did all the ship's equipment. Table I shows a Time Utilization Analysis for the leg.

2. Personnel

D Evans	IGS	CSNU	Party Chief
N A Ruckley	IGS	CSNU	Surveyor
C Graham	IGS	CSNU	Day Geologist
M A McMillan	IGS	CSNU	Day Lab
G Tulloch	IGS	CSNU	Night Lab
H S Robertson	IGS	CSNU	Technical officer
W G Lonie	IGS	CSNU	Technical officer
A Davis	IGS	ACU	Geochemist
D Gregory	IGS	Pal.Dept.	Lab Assistant, Palaeontologist

3. IGS Equipment

20 ft. Vibrocorer system with penetrometer and retraction system

Gravity corer system with Lebus winch

Shipek Grab system with Lebus winch

Suite of containers (workshop, stores, barrel store, lab and electrics/hydraulics).

4. Ship's Performance

The ship's performance was in general good, and the full cooperation of the ship's officers and crew was much appreciated. Anchoring was efficient, the average anchor time per station for the leg being 0.96 hrs/site compared with the 1979 average of 0.9 hrs/site. The deck layout was a significant improvement on last year.

Reservations must however be expressed on some points. The ability to hold station with the bow thrust in marginal conditions is very ..spect, a point which must be seriously considered in the context of anchor-free vibrocoring.

A final point concerns the speed of the vessel. Speeds greater than 8 knots were rarely produced by the ship during the leg, which inevitably reduced the rate of survey progress.

Doubts should also be expressed concerning the standards of cleanliness of parts of the ship, some of which must be considered health hazards.

5. IGS Equipment Performance

A full technicians report has been prepared in Appendix II dealing with this topic, to which very little need be added. All equipment worked well, the downtime on the vibrocorer being in the first place the result of an unlucky incident, although the filter 'design' fault w.s diagnosed later. Some comments are listed below:

1. A criticism of the penetrometer system print out is that it almost always gives a 'false start' and 'blimp' trace which should be eliminated.

2. The laboratory container requires more ventilation as it becomes very stuffy even in moderate conditions.

3. A number of improvements on last year are worthy of commendation, these include: the containers, shipek platform and winch, gravity core winch, "Hiab', the use of the hold and the laboratory.

6. Geological Results

The following stations were occupied:

1:100,000 Sheet No.	Total Stations	Shipek Grab	Sediment Corer	Vibrocorer
56/+01	31	31	23	8
56/+02	68	67	55	13
56/+03	11	11	9	2
56.5/+01	3	3	0	3
56.5/+02	36	36	25	11
57/+00	2	2	2	0
57/+01	6	6	1	5
57/+02	27	27	21	6
57.5/+02	7	7	7	0

In 1:250,000 sheet terms this represents:

	Total Stations	Vibrocorer
Forties	8	5
Cod	34	6
Devil's Hole	34	11
Fisher	115	26

The surface sediments of the area almost wholly proved to be the particularly monotonous fine slightly muddy dark olive grey sands typical of many parts of the North Sea. Initial reaction and comparison with other IGS work suggests that the cored material divides into two groups. Firstly, the compact medium gray sands which may relate to the Upper Channel Deposits. Secondly the clays, and clays with sand horizons, which belong to the Fisher Beds. The latter are very variable in their degree of compaction but rare samples were too hard to give readings from the equipment on board, while another was strongly fissured.

7. Conclusions

The leg was a considerable success, with the objectives very largely, if not wholly, met. Only one day was lost through poor weather, while the equipment worked well, although there was downtime on the vibrocorer following an unlucky accident.

The Time Analysis shows that much time (51% of working time) was spent traversing; this was due to the widely spaced stations and partly to the ship's slow speed. Anchoring times at 0.96 hrs per site were good, while mechanical downtime was almost negligible.

8. Recommendations

1. The laboratory container needs better ventilation.
2. If the hydraulics container is to be used solely for that purpose, then every effort should be made to keep it in a clean condition.
3. The experience of this leg strongly suggests that it is advisable to have two technicians on board. Our operation has now developed to such an extent that this has become inevitable.
4. It would be a retrograde step to cut out the surveyor from our manning. If our data are to be well ordered, one individual's attention must be very largely, but preferably wholly devoted to this work. Cutting out the 'night navigator's' work has been successfull, but further reduction of our surveyor post could well prove counter productive.
5. Aspects of the ship's performance (main winch, speed and cleanliness) should be investigated.

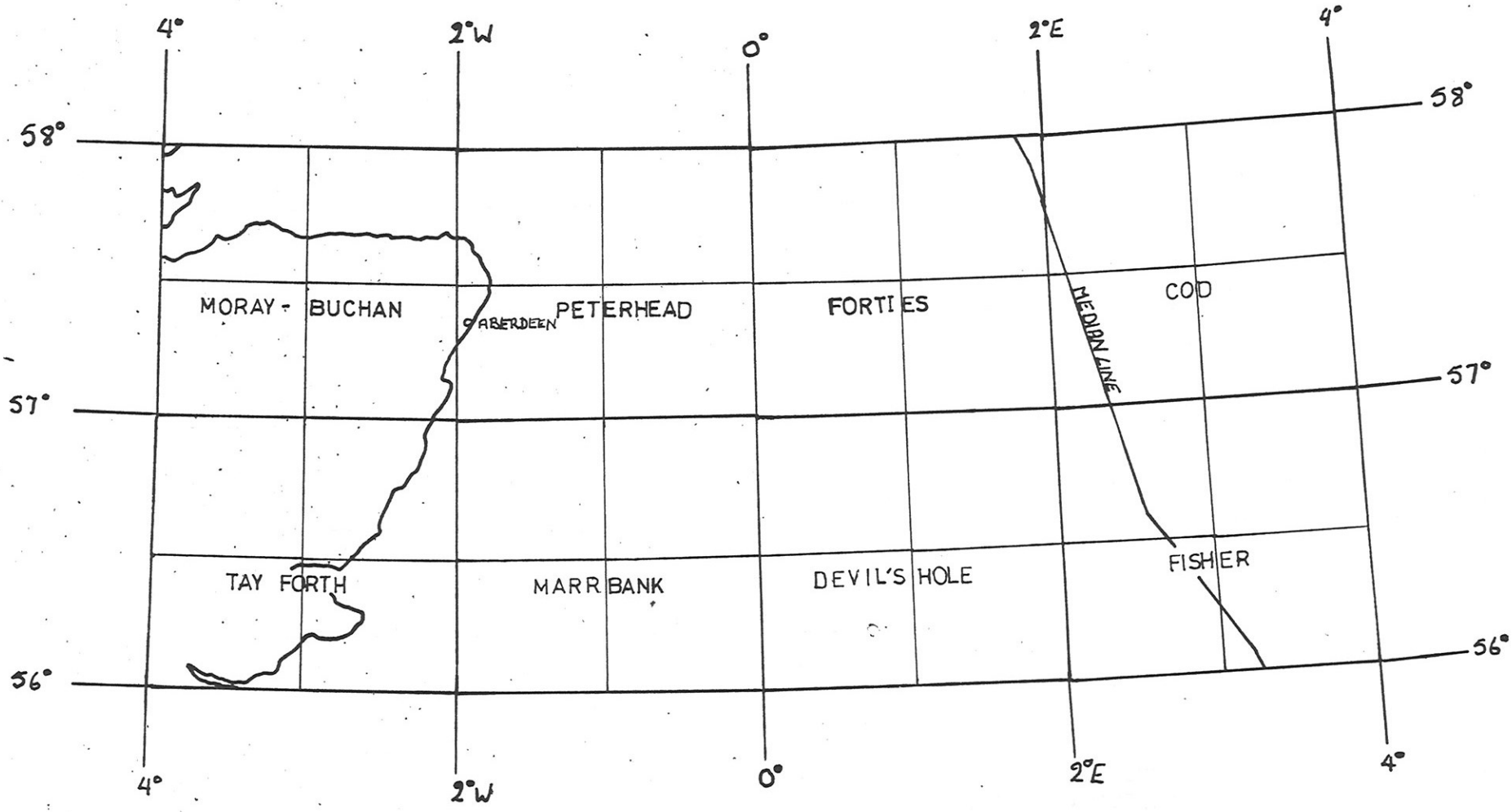

FIG 1. LOCATION MAP

TABLE I TIME UTILISATION ANALYSIS

DATE	IN PORT	ON PASSAGE	BETWEEN STATIONS	ANCHORING	ON STATION	DOWNTIME			NO.V/E STATIONS	NO.GS/CS STATIONS	REMARKS
						WEATHER	EQUIP'T	SHIP			
July 17	18.6	5.4							-	-	
18		5.7	8.7	4.9	4.7				5	4	
19			12.6	4.2	7.2				6	12	
20			11.6	6.5	3.3	2.6			4	13	
21			2.5	1.3	1.8	18.4			1	3	Rough seas
22			12.2	7.7	4.1				6	9	
23			13.2	4.1	6.1		0.6		5	11	
TOTAL %											

(CONTINUED NEXT PAGE)

TABLE I TIME UTILISATION ANALYSIS (Cont'd)

DATE	IN PORT	ON PASSAGE	BETWEEN STATIONS	ANCHORING	ON STATION	DOWNTIME			NO.V/E STATIONS	NO.GS/CS STATIONS	REMARKS
						WEATHER	EQUIP'T	SHIP			
24			14.8	1.8	6.6		0.8		2	20	Large No. of CS sites due to VE repairs
25			15.5	1.0	5.3		2.2		1	24	" " "
26			13.5	5.8	4.7				6	8	
27			12.9	3.1	5.6	2.4			4	14	Fog
28			13.8	3.9	6.3				6	13	
29		7.7	9.1	2.5	3.9			0.8	3	8	
30	16.5	7.5							-	-	
TOTAL	3.5	15.2	140.4	46.8	59.6	23.4	3.6	0.8	49 +	139	= 188 Sample Stations
%			41.8	13.9	17.7	7.0	1.1	0.2	0.96 hrs/site average anchoring time		

Appendix I

SURVEY LOG

Wed. 16 July

1200 Takeover from previous crew at Aberdeen

1800 R. Cross arrives to check electrical equipment

Thurs. 17 July

0000 Alongside at Aberdeen, work continues on Coes deck hyraulics and generator

1700 Leave to take bunkers

1900 Off Aberdeen Harbour, steam for working area (Forties SW).

Fri. 18 July

0000 Steaming

0550 On CS (gravity corer) site

0915 On VE (vibrocorer) site

2100 Anchors lifted on 5th VE site begin night (CS) sampling.

Sat. 19 July

0000 Night sampling

0715 Night work complete, head for VE site

0735 On site, anchoring

2100 Final VE site complete, begin night sampling.

Sun. 20 July

0000 Night sampling

1000 On 1st VE site

2015 Leave 4th VE site and head for 5th, but in rapidly deteriorating weather conditions

2120 All work abandoned. Wind N8 with heavy swell. Hove to.

Mon. 21 July

0000 Hove to, waiting on weather

1845 Conditions improved rapidly, on VE site.

2035 Anchors aweigh on successful completion of site, begin night sampling

Tues. 22 July

0000 Night sampling

0710 On 1st VE site

2310 Anchors lifted on final station

Wed. 23 July

0000 Night sampling

0745 Anchoring on 1st VE site

1905 Anchoring on 5th VE site. Difficulty in retrieving vibrocorer due to main warp being snagged on hydraulic reservoir, so that VE surfaced upside down. When recovered breakages in hydraulics were discovered and filter was torn off with resultant leakage of fluid.

2125 Anchors aweigh. Begin night sampling and hydraulics repairs.

Thurs. 24 July

0000 Night sampling

1230 Anchoring on VE site after repairs. VE worked well.

1530 Anchoring on 2nd VE site. Failure in retraction and subsequent difficulty in pulling out with ships winch and 'A' frame. Retraction worked on recovery, but filter was crushed. Decided to modify system to eliminate filter.

1820 Anchors lifted, begin night sampling.

Fri. 25 July

0000 Night sampling, which continues through most of day while VE repairs are carried out.

1710 Anchor for final hydraulic oil fill up and testing. Test successful so take sample. Vibrocore operates perfectly.

2050 Anchors lifted, head for night sampling.

Sat. 26 July

0000 Night sampling

0750 Anchoring on 1st VE site.

1750 Anchors lifted on 5th site, take to sediment corer stations

1940 Anchoring on 5th site

2325 Anchors lifted on final site. Begin night sampling

Sun. 27 July

0000 Night sampling

0745 Anchoring on 1st VE site

1630 Standing by due to fog

2015 Anchoring on final VE station

2155 Vibrocoring completed. Night sampling

Mon. 28 July

0000 Night sampling

0740 Anchoring on 1st VE site

2120 Anchors aweigh on 6th and final site. Night sampling begins

Tues. 29 July

0000 Night sampling

0805 Anchoring on 1st VE site

1620 Anchors lifted on 3rd site, head for Aberdeen

Wed. 30 July

0000 Steaming for Aberdeen

0730 Alongside at Aberdeen

Appendix II

Technicians Report

1. Equipment

(a) Vibrocorer: During leg 4 the new vibrocorer worked with extreme reliability until on the last site on 23/7/80 the main hoist wire became looped around the hydraulic package during operation on the seabed. On recovery to the surface it was discovered that the external filter on this package had been wiped away. The hydraulic cylinder was replaced with the prepared spare package but, despite careful endeavour to evacuate all air from the system, on recovery from sampling at the next site, it was found that the external filter had collapsed. The filter was replaced and further efforts to free the system from pockets of air proved again to have been unsuccessful when the vibrocorer was recovered on the next site and it was seen the filter had once more collapsed.

It was then decided to strip and rebuild the original hydraulic package removing the filter and blanking off the tapped holes in the housing. The oil in this package was found to have emulsified owing to considerable ingress of sea water. Further, on opening up, it was discovered that one of the mounting studs retaining the Sumo motor had sheared, no doubt due to the hammering encountered by the vibrocorer during the previous 7 weeks unfailing operation. New motor mountings were fabricated and welded into the housing. The motor, pump, valves and all ancillary fittings were stripped, cleaned and the package reassembled.

After testing in the hydraulic laboratory, using a pressure guage installed between the pressure line and tank return line, and solenoid

valve switching to indicate a distinct pressure change, the package was then mounted on the vibrocorer frame, run, and the Staffa motor topped up by raising one leg of the frame to position the Staffa horizontally. It was found that almost 3 pints of oil could be added with the frame in this position. The equipment was then tested on the next site and performed satisfactorily. The second hydraulic package was then modified to comply with the first.

No further difficulty was experienced with the system during the remainder of the cruise and it appears that all the problems encountered this year have been attributable directly to the external filter. Consequently it is now suggested that this filter is superfluous in this clean, sealed hydraulic system.

The penetrometer system operated reliably and the Elcomatic chart recorder had a steady paper feed rate of between 46mm and 48mm per minute (nominal 50mm per minute), despite an imprecision in the mechanical drive which fed out about 3mm of paper quickly each minute followed by a short stationary period. Time marks were recorded on all records as were traces monitoring operational current.

(b) Camera Grab: The Shipek grab camera system which was brought back into operational condition towards the end of Leg 3 had started to be used on a routine basis at all vibrocore sites. However, after a short period the contacts for the electronic flash synchronisation on the Cannonmatic camera failed. The camera was replaced and operated briefly before the same fault developed in the second Cannonmatic.

Both cameras will come ashore for repair at the end of leg 4 and should be available to return to sea at the start of the Leeds portion of the charter.

(c) Gravity Coring System: The gravity coring system using the new Lebus winch in conjunction with nylon line operated smoothly and efficiently throughout the cruise.

(d) Shipek Grab: The Shipek grab also worked well. However, some lack of attentiveness in the grab operation frequently resulted in the grab shackle being pulled into the block despite the face that the new Lebus winch could be controlled to raise the grab with extremely fine control - one inch at a time if necessary.

2. Suggested Equipment Development

A proposal on equipment development discussed at length by the technicians on leg 4 was one of utilising the reliability of the present vibrocore/penetration indication/retraction system to incorporate a rotary drill head. It is suggested that an electric motor, such as that used on the failed Midi Drill, could be mounted on an adaptor plate which can bolt to the barrel mounting of the vibrator pot. This motor could use a chain drive to the drill barrel which in turn would drive the pump for the water packer. Advantages of this system would be simple adoption of the 3 phase power cabling to the existing vibrocorer pot and the negation of television cameras and the extra handling required to deploy the television cable.

3. Recommendations

(a) Crewing of MGLU Cruises: As a consequence of the manning structure

on leg 4 it was essential at all vibrocore sites for both members of the technical staff as well as the senior scientist to be involved in barrel removal, core extraction, core cutting and barrel reloading. This meant late working for technicians, even to carry out enforced repairs, and reduced the time available for routine maintenance though a considerable amount of this was nevertheless carried out. In future particular attention should be paid to the manning of cruises and the present situation of using two female staff on day deck operations, "... should be carefully scrutinised at the end of this season. The present arrangement may not be efficient".

(b) Technical Staffing of MGLU Cruises: With regard to remarks in the cruise report prepared by Dr. R. Owens for leg 2 concerning the efficiency of utilising two technicians on board at the same time, the amount of technical input required on leg 4 indicates that it is imperative to pursue this policy.

(c) Electrical/Hydraulic Laboratory Usage: The electrical and hydraulic laboratories must be maintained as clean working areas. This entails personnel abstaining from placing gritty gloves, lifejackets, etc. on benches.

H.S. Robertson
W.G. Lonie