INSTITUTE OF GEOLOGICAL SCIENCES
MARINE GEOLOGY UNIT
Internal Report No. 82/14

CRUISE REPORT ON LEG 11 OF MV WHITETHORN CRUISE 82/WH/05

19-31 August 1982

by
N G T Fannin and J Chesher

82/14

3 September 1982

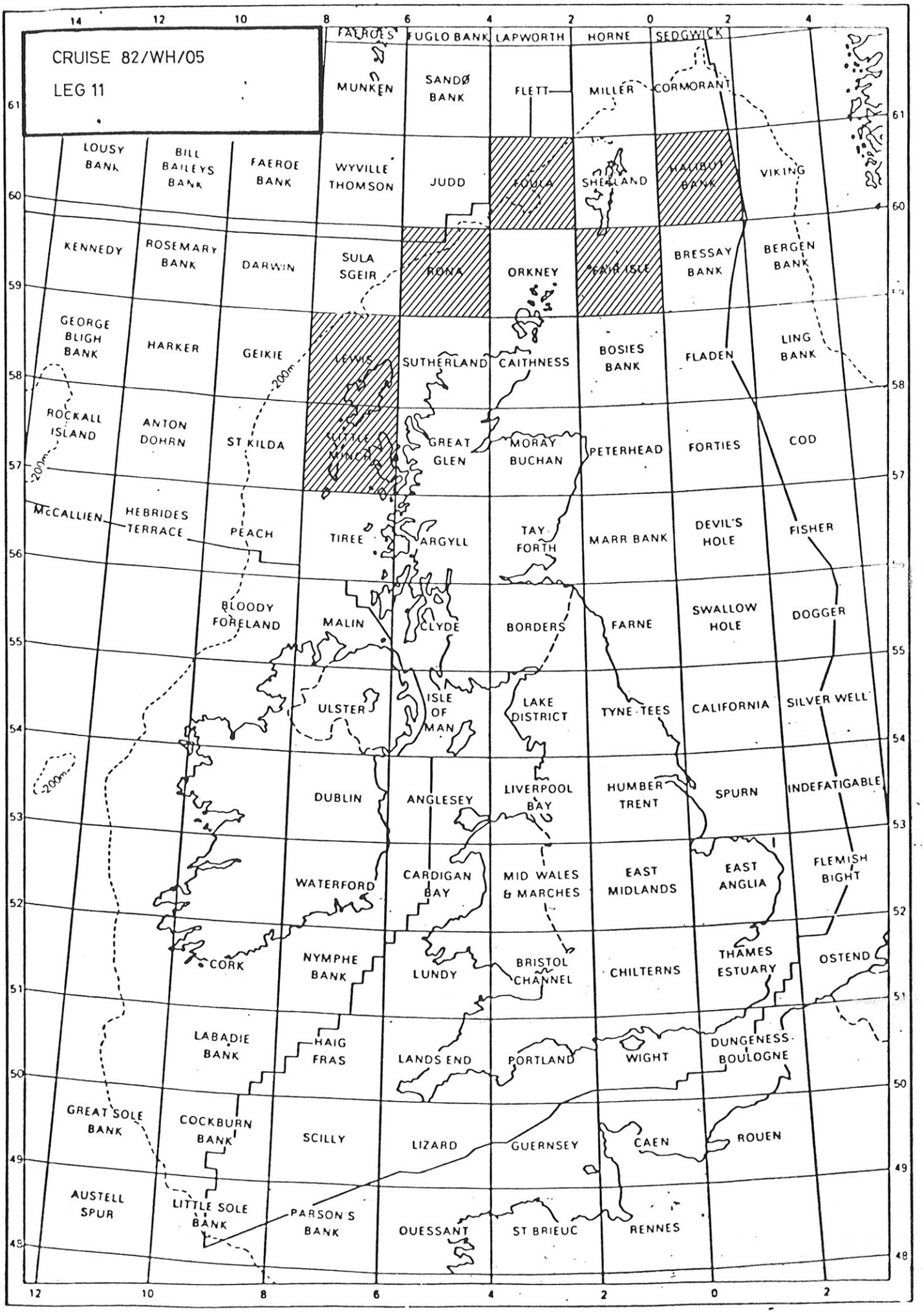
1. INTRODUCTION

This cruise was intended as an opportunity to rock drill in a number of areas west of Orkney and Shetland and to complete sampling coverage where necessary. Initial planning included sites for the new six metre rock drill but, in the event, this was not available and rock drilling was restricted to the use of the one metre drill. The working areas are shown in Figure 1.

A number of gravity core and vibrocorer stations were occupied in SW Halibut to complete coverage there, four rock drill sites were drilled on south east Foula in addition to a number of gravity and vibrocorer core sites. Gravity core samples were also collected around Rona and several Shipek samples were collected in the Minch in a co-operative programme with the Royal Scottish Museum in Edinburgh.

The cruise, however, was dominated by significant periods of bad weather which demanded considerable flexibility in the programme with the curtailment of work in the exposed areas and departure from the working area 12 hours earlier than planned. Useful data were, however, gathered, particularly at the rock drilling sites. A summary log is given in Appendix 1, a summary time utilisation analysis in Appendix II, and Cruise report sheet in Appendix III.

FIGURE 1


CRUISE 82/WH/05
LEG 11
FAEROES
FUGLO BANK
LAPWORTH
HORNE
SEDGWICK
MUNKEN
SANDØ BANK
FLETT
MILLER
CORMORANT
LOUSY BANK
BILL BAILEYS BANK
FAEROE BANK
WYVILLE THOMSON
JUDD
FOULA
SHETLAND
HALIBUT BANK
VIKING
KENNEDY
ROSEMARY BANK
DARWIN
SULA SGEIR
RONA
ORKNEY
FAIR ISLE
BRESSAY BANK
BERGEN BANK
GEORGE BLIGH BANK
HARKER
GEIKIE
LEWIS
SUTHERLAND
CAITHNESS
BOSIES BANK
FLADEN
LING BANK
ROCKALL ISLAND
ANTON DOHRN
ST KILDA
GREAT GLEN
MORAY BUCHAN
PETERHEAD
FORTIES
COD
McCALLIEN
HEBRIDES TERRACE
PEACH
TIREE
ARGYLL
TAY FORTH
MARR BANK
DEVIL'S HOLE
FISHER
BLOODY FORELAND
MALIN
CLYDE
BORDERS
FARNE
SWALLOW HOLE
DOGGER
ULSTER
ISLE OF MAN
LAKE DISTRICT
TYNE TEES
CALIFORNIA
SILVER WELL
DUBLIN
ANGLESEY
LIVERPOOL BAY
HUMBER TRENT
SPURN
INDEFATIGABLE
WATERFORD
CARDIGAN BAY
MID WALES & MARCHES
EAST MIDLANDS
EAST ANGLIA
FLEMISH BIGHT
CORK
NYMPHE BANK
LUNDY
BRISTOL CHANNEL
CHILTERNS
THAMES ESTUARY
OSTEND
LABADIE BANK
HAIG FRAS
LANDS END
PORTLAND
WIGHT
DUNGENESS BOULOGNE
GREAT SOLE BANK
COCKBURN BANK
SCILLY
LIZARD
GUERNSEY
CAEN
ROUEN
AUSTELL SPUR
LITTLE SOLE BANK
PARSON'S BANK
OUESSANT
ST BRIEUC
RENNES
200m
14
12
10
8
6
4
2
0
2
4
61
60
59
58
57
56
55
54
53
52
51
50
49
48

2. PERSONNEL

J A Chesher	IGS (MGLU)	Party Chief 19-24 August 1982
N G T Fannin	IGS (MGLU)	Party Chief 24 August 1982 - 1 September 1982
W Lonie	IGS (MGLU)	Technical Officer
S R Kirton	IGS (HCU)	Night Geologist
E McElvanney	IGS (MGLU)	Day Navigator
A Bell	IGS (MGLU)	Deck Officer
G Bradley	IGS (MGLU)	Night Laboratory
M Parkin	IGS (MGLU)	Day Laboratory
B Tait	IGS (ACU)	Geochemist

3. EQUIPMENT

Equipment aboard and used during the cruise included:-

6m vibrocorer system

Sediment and rock gravity coring systems

Shipek Grab

1m Rock drill with television camera

4. SHIP'S PERFORMANCE

No ship downtime was logged during this leg and the ship performed well under very rigorous weather conditions. The ship's roll, however, continues to be a problem and is very demanding of both equipment and personnel. For one period during severe storm conditions it was necessary to revert to hand steering in order to maintain the ship's head. Particular mention, however, should be made of the ship's cook who, at times under extremely difficult and trying conditions,

maintained a consistent standard of cuisine, to his credit and everyone's admiration.

5. IGS EQUIPMENT PERFORMANCE

In the main, the IGS equipment worked satisfactorily. Problems were encountered with the penetrometer printout. These were traced to inboard cable faults and rectified.

The Shipek grabs worked efficiently. One grab was damaged during recovery and the slow starting of the Shipek Winch was noted as were intermittent faults in the start button of the winch.

The Gravity Corer also worked without difficulty. At the beginning of the cruise the nylon hoist line was respliced removing the tallurit clamp previously employed.

The 1m rock drill worked intermittently after an initial servicing period. (The drill was badly corroded after prolonged storage in the ship's hold.) The drill also appears to suffer from carriage travel problems and is likely to jam in conditions of even slight tilting. This emphasises the lack of power available when the BX barrel is in use when, for example, the drill cannot be restarted with the full carriage weight resting in the bit. The drill did, however, recover several useful short cores but it cannot yet be regarded as an operational tool.

6. GEOLOGICAL RESULTS

A total of 63 stations were occupied during the cruise, as follows:-

Sheet No	Total Stations	Shipek	Rock core	Sediment Core	Vibrocore	1m Drill
60/00 Halibut (West)	18	18	0	9	8	0
59/-02 Fair Isle (West)	1	1	0	0	0	0
60/-03 Foula (East)	27	24	3	0	2	4
60/-04 Foula (West)	1	1	0	1	0	0
57/-06 Rona (West)	9	9	4	0	0	0
58/-07 Lewis (East)	2	2	0	0	0	0
57/-07 Little Minch (East)	5	5	0	0	0	0
Total	63	60	7	10	10	4

The coring in the Halibut sheet completed coverage in the SW of the area where core had not been recovered before. The vibrocores in this area complemented evidence from elsewhere showing the seabed shelly sand with, in places, a concentrated shell layer at the base overlying normally consolidated reddish brown claysand pebbly sands, at times similar in character to red tills seen to the north, but, in this instance, clearly water sorted. These sediments overlie massive dark grey, clean and well sorted fine sands with no apparent shell content, at least a metre thick.

On the Foula sheet to the west an essentially similar sequence seems to be present where the surface sand (here with a much higher shell content at the seabed) passes down into pebbly and shelly sands which overlie reddish brown clays and poorly sorted clayey pebbly sands. These in turn overlie greyish pebbly and clayey sands, here less well sorted but again with no apparent shell content, and perhaps equivalent to the dark grey well sorted fine sands east of Shetland.

Rock Drill samples from the Vee Skerries, to the NE of Foula, recovered speciments of a quartz biotite schistose rock and a site to the south of Foula recovered a dark grey cross bedded fine sandstone with mudstone clasts, probably Devonian in age.

Rock coring around Rona failed to recover any in situ rock coring only coarse pebbly shelly sands overlying poorly sorted clayey pebbly sands.

In addition to these samples a total of eight grab samples were collected from the Shetland, Lewis and Little Minch areas and preserved in Formalin for biologists at the Royal Scottish Museum, Edinburgh.

7. CONCLUSIONS

A great deal of time was lost during the cruise due to almost continuous bad weather. Similar conditions affected the whole of northern Britain throughout this period and there was little option other than to remain in the area and make the best of such weather windows as arose.

Despite this, the Halibut Bank and Foula vibrocoring filled useful gaps in our coverage and underlined basic similarities in the sequence to the east and west of Shetland. The rock drilling to the north-east of Foula was also particularly rewarding in establishing the lithofacies of the crystalline basement rocks at the south western end of the Vee Skerries ridge and in identifying the rock type of the sedimentary sequence exposed as a large faulted seabed sub-cropping syncline observed in sidescan sonar to the south of Foula.

The sampling around Rona was less successful and the sub-cropping rocks in this area remain to be identified.

The collection of seabed samples appropriately treated for examination by biologists at the Royal Scottish Museum continues and develops a co-operative programme which has been in existence for a number of years.

RECOMMENDATIONS

8. A number of points have been highlighted during this cruise.

1. The overwhelming need for an operationally viable rock drill was again demonstrated. The failure to have such a tool, weather notwithstanding, considerably undermined the success of this cruise. Every priority should be placed on the development of a drill, preferably the 6m drill, to make it available in a routinely operational capacity. Such a tool is essential for the successful completion of most of the sheets to the west of Orkney, Shetland and particularly west of the Hebrides. It would also clearly be of great benefit in parts of the N Sea, the English Channel and the South-West Approaches.

Every effort should be made over the winter season to ensure that the drill is available early next season in an operational capacity and not simply still at a trials and development stage. Much valuable time was lost during this past summer season and this must not be allowed to happen in 1983.

2. More careful cruise planning will also be required in 1983 where sampling is intended for the north-west. Late May, June and July provide the best weather periods for the exposed areas northand west of Scotland. It is not good economic sense to consider working in these areas outside the optimum weather windows.

3. Attention is required to the switch controls in the Shipek winch and these should be overhauled and new switches installed during the lay-up period.

4.The 1m rock drill which was used with partial success during this cruise was stored on board in the ship's hold throughout the season. During this period parts of the drill became badly corroded, partly due to the apparently excessively corrosive atmosphere of the ship's hold. The lessons from this would appear to be that when the drill is required to be kept on board it should be stored on deck, adjacent to the workshop where it is convenient for regular maintenance. Otherwise it should be kept ashore when it is unlikely to be required for one or more legs.

5. The hard eye of the gravity core rope should be made fast with an appropriate splice and not a tallurit clamp as has been sometimes the practice in the past. The effects of such a clamp on the ultimate strength of the rope and the life of the joint is not sufficiently understood and until proper tests have been conducted the traditional splicing technique should be followed.

6. A comprehensive trial should be run on the actual buoyancy of the "buoyant" cable to ascertain its present condition.

7. Some of the Storno radio batteries will no longer hold their charge. During the winter period all the batteries should be checked and replaced as necessary.

8. The bitumen cover on the workshop roof is badly cracked and leaking in places. This should be checked and repaired; a process which may necessitate the removal of the old bitumen cover.

APPENDIX I

SUMMARY SHIP'S LOG

SUMMARY SHIP'S LOG

Thursday 19 August 1982

00.00-16.45	Alongside Aberdeen for routine port call
16.45-24.00	Steaming towards Halibut Bank

Friday 20 August 1982

00.00-14.30	On passage to Halibut Bank
14.30-24.00	Vibrocoring

Saturday 21 August 1982

00.00-06.00	Gravity coring
06.00-22.00	Vibrocoring
22.00-24.00	On passage to Foula area

Sunday 22 August 1982

00.00-07.00	On passage to Foula area
07.00-16.00	At anchor off Foula preparing rock drill
16.00-24.00	Rock drilling northof Foula

Monday 23 August 1982

00.00-08.00	Gravity coring
08.00-15.00	Vibrocoring while repairing rock drill
15.00-22.00	Rock drilling
22.00-24.00	Gravity coring

Tuesday 24 August 1982

00.00-07.00	Gravity coring
07.00-16.00	Rock drilling
16.00-19.00	Gravity coring in deteriorating weather
19.00-24.00	Abandon sampling and steam towards Shetland in deteriorating weather

Wednesday 25 August 1982

00.00-03.00	Steaming to Shetland in deteriorating weather
03.00-15.00	Hove-to in severe storm conditions
15.00-21.00	Steaming to shelter off Shetland
21.00-24.00	At anchor at Leven Wick in lee of Shetland

Thursday 26 August 1982

00.00-24.00	At anchor. Waiting on weather
11.30-12.00	Put J Chesher ashore to join MV Ferder
14.00-17.00	Midi drill tests

Friday 27 August 1982

00.00-14.00	At anchor waiting on weather
14.00-15.00	On passage to Sumburgh Head to check weather
15.00-16.30	Hove-to repairing ship's bow anchor
16.30-24.00	On passage for Rona in heavy seas

Saturday 28 August 1982

00.00-16.30	On passage for Rona in heavy seas
16.30-23.20	Gravity coring
23.20-24.00	Abandon gravity coring in deteriorating weather

Sunday 29 August 1982

00.00-10.00	On passage to Minch in heavy seas
10.00-20.00	Complete gravity coring in Minch
20.00-24.00	On passage to Liverpool

Monday 30 August 1982

00.00-24.00	On passage to Liverpool in heavy seas and westerly gale

Tuesday 31 August 1982

00.00-01.30	On passage to Liverpool
01.30-07.00	Sheltering in the lee of the Isle of Man
07.00-15.00	On passage to Liverpool
15.00-24.00	Alongside for routine port call

APPENDIX II

SHIP: WHITETHORN DATES: 19.8.8.2-31.8.82 LEG NO: 11

	DATE	19	20	21	22	23	24	25	26	27	28	29	30	31	TOTALS	%
Working Hours	In port	17												9.0	26.0	8.3
	On Passage	7	15.2									5.0	24.0	9.5	60.7	19.5
	Traversing		3.2	13.4	10.2	11.3	7.0			8.0	22.1	9.2			84.4	27.0
	Anchoring		3.0	5.3	2.2	4.6	0.9								16.0	5.1
	On Station		2.6	5.3	3.6	7.5	9.9				1.4	1.1			31.4	10.0
Downtime Hours	Weather						5.5	24.0	24.0	16.0	0.5	8.0		5.5	83.5	26.8
	Grab						0.6	0.7							1.3	0.4
	Rock Corer															
	Sediment Corer															
	Vibrocorer															
	Rock Drill				8.0										8.0	2.6
No.of Stations	No. of VE Stations		3	5		2									10	
	No. of GS Stations		4	14	1	17	7	1			9	7			60	
	Grab		1	8		1									10	
	Rock Corer					2	1				4				7	
	Rock Drill				3	1									4	

APPENDIX III

INSTITUTE OF GEOLOGICAL SCIENCES MARINE GEOLOGY UNIT

CRUISE REPORT ON LEG 11 OF WHITETHORN

CRUISE NO 82/WH/ 5 19- 8-1982 TO 30- 8-1982

SENIOR SCIENTIST: N G T FANNIN AREA OF STUDY: HALIBUT FAIR ISLE FOULA RONA MINCHES

PERSONNEL:

SENIOR SCIENTIST:	N G T FANNIN
DAY GEOLOGIST:	J CHESHER
DAY LABORATORY:	M PARKIN
SURVEYOR:	E MCELVANNEY
DECK ENGINEER:	A BELL
MAINTENANCE ENG:	W LONIE
NIGHT GEOLOGIST:	G BRADLEY
NIGHT LABORATORY:	S KIRTEN
GEOCHEMIST:	B TAIT
OTHER:	

SUMMARY ACCOUNT OF LEG 11:

POOR WEATHER DOMINATED THE LEG. SEVERAL AREAS WERE SAMPLED TO COMPLETE COVER

TIME ANALYSIS (PERCENTAGES):

		IN PORT:	8%
WORKING TIME:		ON PASSAGE:	20%
		TRAVERSING:	27%
		ANCHORING:	5%
		ON STATION:	10%
DOWN TIME:		WEATHER:	27%
	SHIP:	PROPULSION:	0%
		POWER:	0%
		ANCHORS:	0%
		DECK:	0%
	IGS:	SHIPEK GRAB:	0%
		CAMERA GRAB:	0%
		GRAV CORER:	0%
		VIBROCORER:	0%
		ROCK DRILL:	3%
		WINCHES:	0%

RESULTS (NUMBER OF STATIONS):

SHIPEK GRAB:	60	
CAMERA GRAB:	0	
SED CORER:	10	
ROCK CORER:	7	
VIBROCORER:	10	ANCHORED
	0	UNANCHORED
ROCK DRILL:	4	

AVERAGE ANCHORING TIME PER STATION: 1.1HRS

EQUIPMENT PERFORMANCE:

SHIPEK GRAB: SATISFACTORY
CAMERA GRAB:
GRAVITY CORER:SATISFACTORY
VIBROCORER: OK PENETROMETER RECORDER NEEDS CHECKING
DRILLS: NOT YET FULLY OPERATIONAL
WINCHES:
SHIP:

GEOLOGICAL SUMMARY:

SEQUENCE OF SANDS WITH SHELLS ON REDDISH CLAYS AND SANDS OVER DARK GREY CLEAN QUARTZ SANDS PROVED IN SW HALIBUT AND GENERALLY SIMILAR TO SUCCESSION WEST OF SHETLAND. QUARTZ BIOTITE SCHIST DRILLED OFF NW FOULA, X-BEDDED SST OFF S FOULA

ADDITIONAL REMARKS: