D.S. 6/3/84

R1/12
In Confidence: Not to be quoted without reference to the Laboratory

1SR84

FRV Scotia
Cruise 1/84
Cruise Report
9-16 January 1984

Personnel

D Saward	SSO (in charge)
D C Moore	HSO
J C McKie	SO
M R Robertson	SO
C W Shand	SO

Objectives

1 To undertake a water sampling survey, a Smith McIntyre grab survey, an Agassiz trawl survey, and an underwater closed circuit television survey of the Guillam Bank dump site and surrounding area.

2 To undertake a grab survey, an Agassiz trawl survey and an underwater television survey at Jonsis line stations A-E inclusive. A water sample will be taken at station E for background cyanide determination.

3 To collect water samples for radiocaesium analysis at locations off Buckie, Fair Isle and Aberdeen.

4 If the above objectives are achieved ahead of schedule, or if bad weather prevents completion of the Guillam Bank survey, a contingency sampling programme will be undertaken in the Moray and Cromarty Firths (see cruise programme 1SP84).

Narrative

'Scotia' left Aberdeen at 15.45 hrs on 9 January 1984. A water sample was collected off Aberdeen for radiocaesium analysis, and the vessel then headed for the Moray Firth. Upon arrival in the Moray Firth, a further water sample was collected off Buckie for radiocaesium analysis, and the vessel then proceeded to the Guillam Bank survey area, arriving on station at 02.00 hrs on 10 January. Grab sampling commenced immediately, and was continued until the vessel experienced power pack failure at 10.00 hrs. Grab sampling recommenced at 14.00 hrs and was completed at 02.45 hrs on 11 January. The water sampling was then commenced, and was completed at 10.15 hrs on 11 January. The Agassiz trawl survey was then started, and completed at 07.30 hrs on 12 January. A trial run with the underwater television was undertaken in daylight on the afternoon of 11 January, during the Agassiz trawl survey.

At 09.30 hrs on 12 January, water and grab sampling were commenced at Masspec sampling stations in the Moray Firth. At 13.00 hrs on 12 January the Guillam Bank underwater television survey was recommenced. This work continued until it became necessary to recharge the Hasselblad batteries at 02.30 hrs on 13 January. Water and grab sampling were then resumed at Masspec sampling stations. In view of the extremely poor weather conditions, it was decided that it would not be feasible to undertake extensive sampling outwith the relatively calm waters of the Moray Firth. It was therefore decided that cruise objective 2 should be abandoned, and sampling undertaken at the contingency sampling stations in the Moray and Cromarty Firths. The Marine Laboratory, Aberdeen was informed and it was agreed that cruise objective 4 would be undertaken.

During the remainder of 13 January sampling was undertaken at Masspec sampling stations, and a number of underwater television transects were completed at Guillam Bank. Power pack maintenance, and subsequently power pack failure, made it necessary to integrate these sampling programmes to avoid loss of sampling time. At 16.00 hrs on 13 January it was agreed that because of the extremely poor weather conditions, and the onset of darkness, we should postpone further sampling in the Sutors and Cromarty Firth areas, and return to Guillam Bank. The plankton winch wire was rewound onto the starboard fishing winch, and the underwater television survey was resumed at 20.00 hrs on 13 January. Underwater visibility proved to be unacceptable, and sampling was abandoned until daylight. 'Scotia' remained in the area and the underwater television survey was resumed at 06.00 hrs on 14 January. It was agreed with Captain Gillon that sampling within the Cromarty Firth should be confined to hours of daylight. Therefore during the afternoon of 14 January, and during the daylight hours of 15 January, sampling was confined to stations within the Cromarty Firth. During hours of darkness, further underwater television transects were undertaken at Guillam Bank, and a series of Agassiz trawls were undertaken due north of Burghead Bay to obtain experimental animals for Miss S Aitchison. During one of these Agassiz hauls, a shell carriage was recovered.

At 16.30 hrs on 15 January sampling was effectively completed in the Cromarty and Moray Firths, and 'Scotia' departed for Aberdeen, arriving at 08.30 hrs on 16 January. The ship was unloaded and scientific staff left the vessel during the morning of 16 January.

Results

1 Cruise objective 1 was achieved. Water samples were collected at 9 sampling stations for cyanide analysis. Water samples were collected from surface to seabed at 5 metre depth intervals. A total of 61 samples were collected, and processed on board the vessel prior to analysis in the Aberdeen Marine Laboratory. In addition, full hydrographic sampling was undertaken at the centre of the dump site and samples retained for oxygen, phosphate, nitrate, silicate and salinity analysis. A surface sample was collected at the centre of the dump site for hydrocarbon analysis. Samples were processed as appropriate, prior to analysis in the Aberdeen Marine Laboratory.

Grab samples were collected from 57 of the 65 sampling stations. The remaining 8 stations were on 'hard ground'. Samples were deep frozen for subsequent analysis for cyanide, carbon, and heavy metals. In addition a separate sample was collected at the centre of the dump site for hydrocarbon analysis. This sample was also deep frozen for subsequent analysis in the Aberdeen Marine Laboratory.

A series of 28 Agassiz trawls was completed in the survey area. Smelter waste was recovered from 8 of the trawls. Waste was recovered from locations both on and off the dump site. Waste recovered outwith the boundaries of the designated dump site was located to the south and west of the dump site. Waste recovered included large pieces of anode waste. Fauna were collected from areas both on and off the dump site. Representative species were identified, and deep frozen prior to analysis in the Aberdeen Marine Laboratory.

A series of 16 transects was completed using the underwater closed circuit television camera. Smelter waste was observed during 6 of the transects. The location of the transects was logged using the vessels Decca plotter, and the majority of the waste observed outwith the boundaries of the dump site was located to the south and west of the dump site.

2 Cruise objective 2 was abandoned because of adverse weather conditions. The vessel remained in the Moray Firth area and cruise objective 4 was undertaken.

3 Cruise objective 3 was partially completed. Water samples were collected for radiocaesium analysis at locations off Aberdeen and Buckie. Sampling off Fair Isle was abandoned because of adverse weather conditions.

4 Cruise objective 4 was partially completed. Water and grab samples were collected at 14 sampling stations within the Cromarty and Moray Firths. Water samples were collected from surface to seabed at 5 metre depth intervals. Samples were retained,and processed as appropriate prior to analysis in the Marine Laboratory. Grab samples were deep frozen prior to analysis. Water samples will be analysed to determine cyanide, oxygen, phosphate, nitrate, silicate, salinity and surface hydrocarbon levels; grab samples will be analysed to determine cyanide, carbon, heavy metal and hydrocarbon concentrations. It was not possible to undertake sampling at other locations in the Cromarty Firth because of adverse weather conditions, and insufficient water depth for 'Scotia' to maneouvre satisfactorily.

Derek Saward
06 March 1984

Seen in draft: J W Gillon