R1/6

Not to be cited without prior reference to the Marine Laboratory, Aberdeen

FRV *Clupea*

Cruise 1895C

REPORT

13-24 November 1995

Ports

Loading:	Ardrossan
Unloading:	Fraserburgh
Working:	Belfast, 18/19 November

Personnel

D Saward	SSO	12-24 November (in charge)
J McKie	HSO	12-24 November
C Shand	HSO	12-24 November
L Goodwin	SO	12-24 November
E Armstrong	SO	12-24 November

Lord Lindsay visited the vessel on 13 November, accompanied by a Press Officer, a television cameraman and a photographer.

Fishing Gear

BT116 *Clupea* wing trawl

Objectives

1. To collect seabed sediment samples from the Beaufort's Dyke dredge spoil disposal site; from the Beaufort's Dyke explosives disposal site; and from the area adjacent to the explosives disposal site and the Premier Transco Scotland to Northern Ireland natural gas pipeline. The samples will be preserved for particle size and chemical analyses.

2. To undertake exploratory side-scan sonar and underwater television studies in the vicinity of the Beaufort's Dyke explosives disposal site, to confirm the suitability of selected areas for seabed trawling operations. To undertake a subsequent trawl survey in the selected areas, to collect samples of representative species for chemical analysis.

3. To map the seabed in the northern sector of the Beaufort's Dyke explosives disposal site, and in areas adjacent to the explosives disposal site and the Premier Transco natural gas pipeline, using RoxAnn©.

4. To undertake preliminary side-scan sonar and underwater television surveys in the northern sector of the Beaufort's Dyke site, and in areas adjacent to the disposal site and the Premier Transco natural gas pipeline.

5. To collect seabed sediment samples from the Sound of Mull, Loch Linnhe and Inner Sound munitions disposal sites, for particle size and chemical analyses.

Out-turn Days Per Project: 12 BEA1

Narrative

Scientific staff joined the vessel on 12 November, in preparation for Lord Lindsay's visit. During the morning of 13 November, a number of television, radio and newspaper reporters were shown around the vessel, and provided with a description of the survey objectives and scientific equipment. Lord Lindsay and his party then joined the vessel, accompanied by Mr G Foulkes MP. Following a series of discussions and interviews, Mr Foulkes and the reporters disembarked, and the vessel departed Ardrossan to demonstrate the survey equipment in the Firth of Clyde. Following that demonstration, the vessel returned to Ardrossan to allow Lord Lindsay and his party to disembark. During the afternoon of 13 November, the vessel departed Ardrossan to proceed to the survey area shown in Figure 1. Survey operations commenced on 14 November, to undertake the work programme outlined in Objectives 1-4. Weather conditions were poor throughout the survey period, and were a major determinant of daily activities. On 18/19 November, the vessel visited the Port of Belfast to repair and replace damaged equipment. The vessel departed the North Channel area on 21 November, to return to Fraserburgh. During passage to Fraserburgh, limited seabed sediment sampling programmes were completed at the Sound of Mull and Loch Linnhe munitions disposal site, and at control sampling locations in the Moray Firth. The vessel berthed at Fraserburgh on 23 November, and scientific staff disembarked on 24 November to return to Aberdeen.

Results

1. Grab sampling stations in the North Channel survey area are shown on Figure 2. A total of 58 grab sampling stations were occupied, and 113 grab deployments were undertaken. Forty eight duplicated seabed sediment samples were collected for inorganic chemical analysis; 39 samples were collected for organic chemical analysis; and 48 samples were collected for particle size analysis. All the samples were deep frozen. Heavy metal and particle size analyses will be undertaken at the Marine Laboratory, Aberdeen during November and December 1995. Munitions-related analyses will be undertaken at CBDE, Fort Halstead during December 1995 and January 1996.

2. Exploratory underwater television studies in the northwest sector of the Beaufort's Dyke explosives disposal site confirmed that significant quantities of munitions, and munitions-related materials, were present on the sea bed. The studies also revealed a large number of boulders on the sea bed. The majority of the larger dumped materials, and the larger boulders, were confined to the northern half of the area investigated. It was concluded that it would be acceptable to commence trawling operations in the southern half of the area. A single trawl of approximately one hour duration was undertaken in the area shown on Figure 3. The net was very badly damaged and the trawl survey was cancelled. Because of the net damage, very few fish were caught and it was not possible to obtain samples for chemical analysis. The Sea Fisheries Inspectorate have been requested to arrange a charter of a commercial fishing vessel, to collect samples of fish and shellfish from the Beaufort's Dyke area.

3. The locations of the RoxAnn© survey transects are shown in Figure 4. Bad weather prevented completion of all the survey transects, and it was not possible to obtain full coverage in the southeastern sector of the principal survey area. Effective coverage was obtained elsewhere, and a seabed sediment map was produced to support the grab sampling programme. The map will be refined at the Marine Laboratory, Aberdeen during December 1995, incorporating the particle size analysis data.

4. The locations of the side scan sonar survey transects are shown in Figure 4. Side-scan sonar operations were confined to water depths of less than 150 metres, to maintain acceptable resolution. Bad weather prevented completion of all the survey transects, and it was not possible to obtain any coverage in the southeastern sector of the principal survey area.

Acceptable coverage was obtained elsewhere. The side-scan sonar survey of the western sector of the principal survey area was undertaken using Marine Laboratory equipment, but the resolution was found to be unacceptable. The survey of the eastern sector was undertaken using hired equipment. The Marine Laboratory system was able to distinguish significant seabed features, but was unable to detect materials on the sea bed that could have been related to munitions disposal operations. The hired system had a greater resolution (approximately x5), and was able to detect dumped materials. Analysis of the side-scan sonar data will be undertaken at the Marine Laboratory, Aberdeen during November and December 1995. The locations of the underwater television survey transects are shown on Figure 5. The planned survey was not completed because of poor weather conditions, and it was necessary to target survey operations in selected areas. Underwater television studies were therefore concentrated in the western sector of the principal survey area, to supplement the side-scan sonar data obtained in that area. Six of the underwater television transects concentrated on areas outwith the boundary of the charted explosives disposal site, but one had to be abandoned because of very poor weather conditions. Three of the underwater television transects concentrated on areas within the boundary of the disposal site. One of the underwater television transects within the disposal site was undertaken in the vicinity of the Beaufort's Dyke dredge spoil ground, to investigate the possibility that dredging operations may have transferred dumped materials to that area. Underwater visibility throughout the survey area was extremely variable, depending upon the nature of the sea bed and the state of the tide. It was nevertheless possible to obtain acceptable quality video records. Analysis of the video records will be undertaken at the Marine Laboratory, Aberdeen during November and December 1995. Copies of the video records have also been submitted to 11 EOD Regiment, for identification of dumped materials observed on the sea bed.

5. A total of nine grab sampling stations were occupied at the Sound of Mull / Loch Linnhe munitions disposal site, and 11 grab deployments were undertaken. Nine seabed sediment samples were collected for heavy metal analysis; five samples were collected for organic chemical analysis; and nine samples were collected for particle size analysis. A total of four control grab sampling stations were occupied in the Moray Firth, and four grab deployments were undertaken. Four duplicated seabed sediment samples were collected for heavy metal analysis; four samples were collected for organic chemical analysis; and four samples were collected for particle size analysis. All the samples were deep frozen. Heavy metal and particle size analyses will be undertaken at the Marine Laboratory, Aberdeen during December 1995. Munitions-related analyses will be undertaken at CBDE, Fort Halstead during December 1995 and January 1996.

Derek Saward
1 May 1996

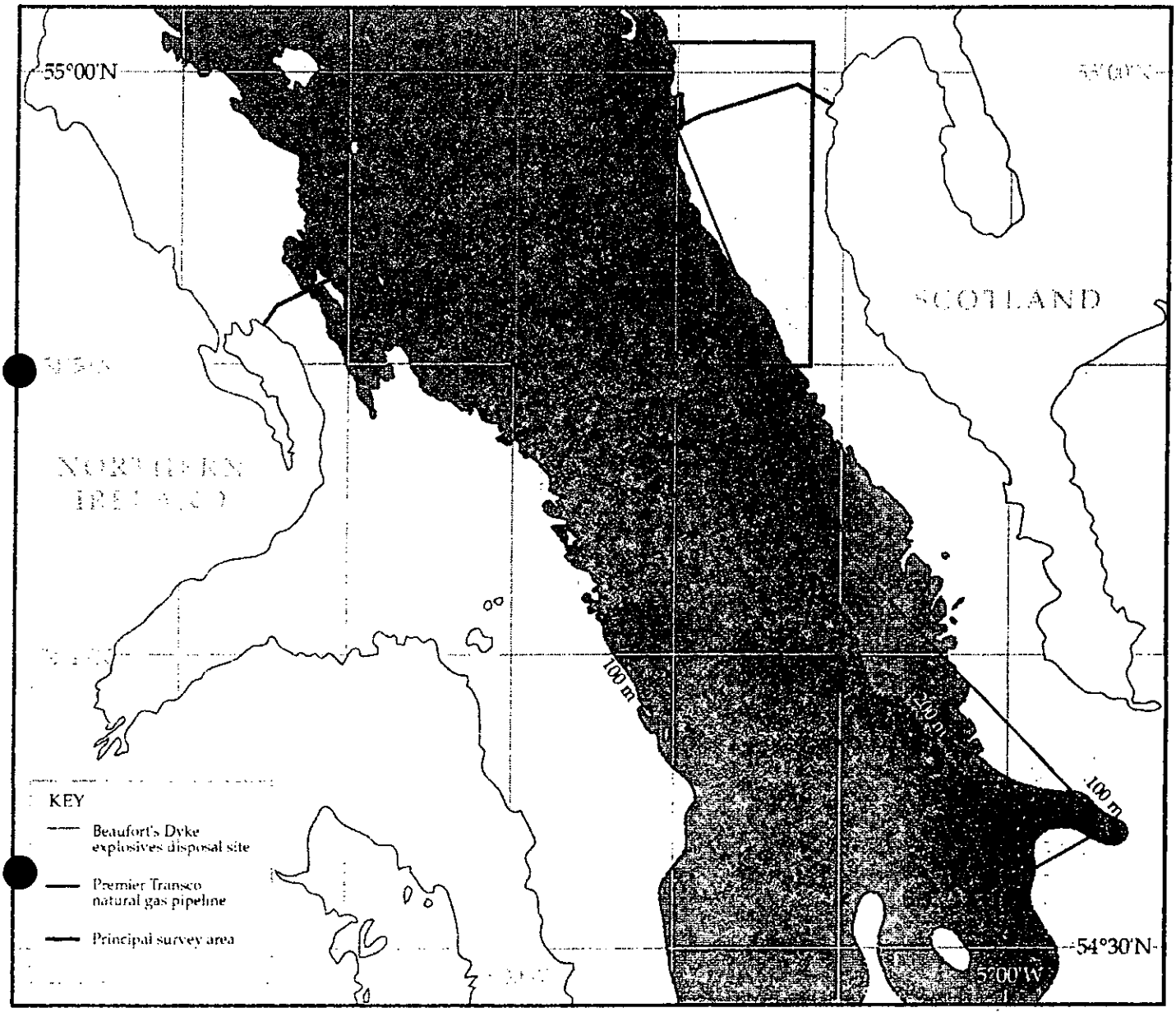

Figure 1 North Channel Survey Area (showing 100m and 200m depth contours).

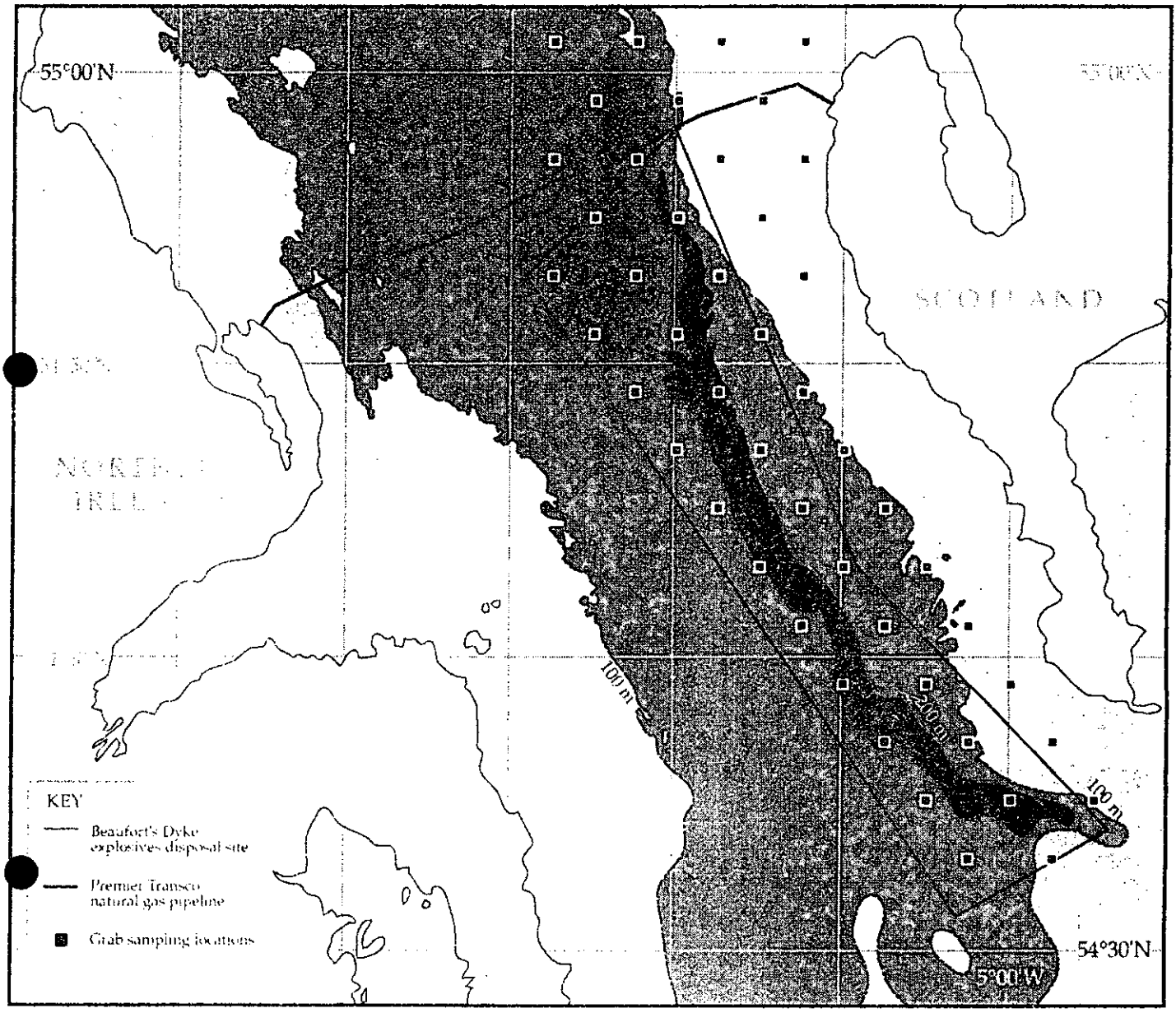

Figure 2 North Channel grab sampling stations.

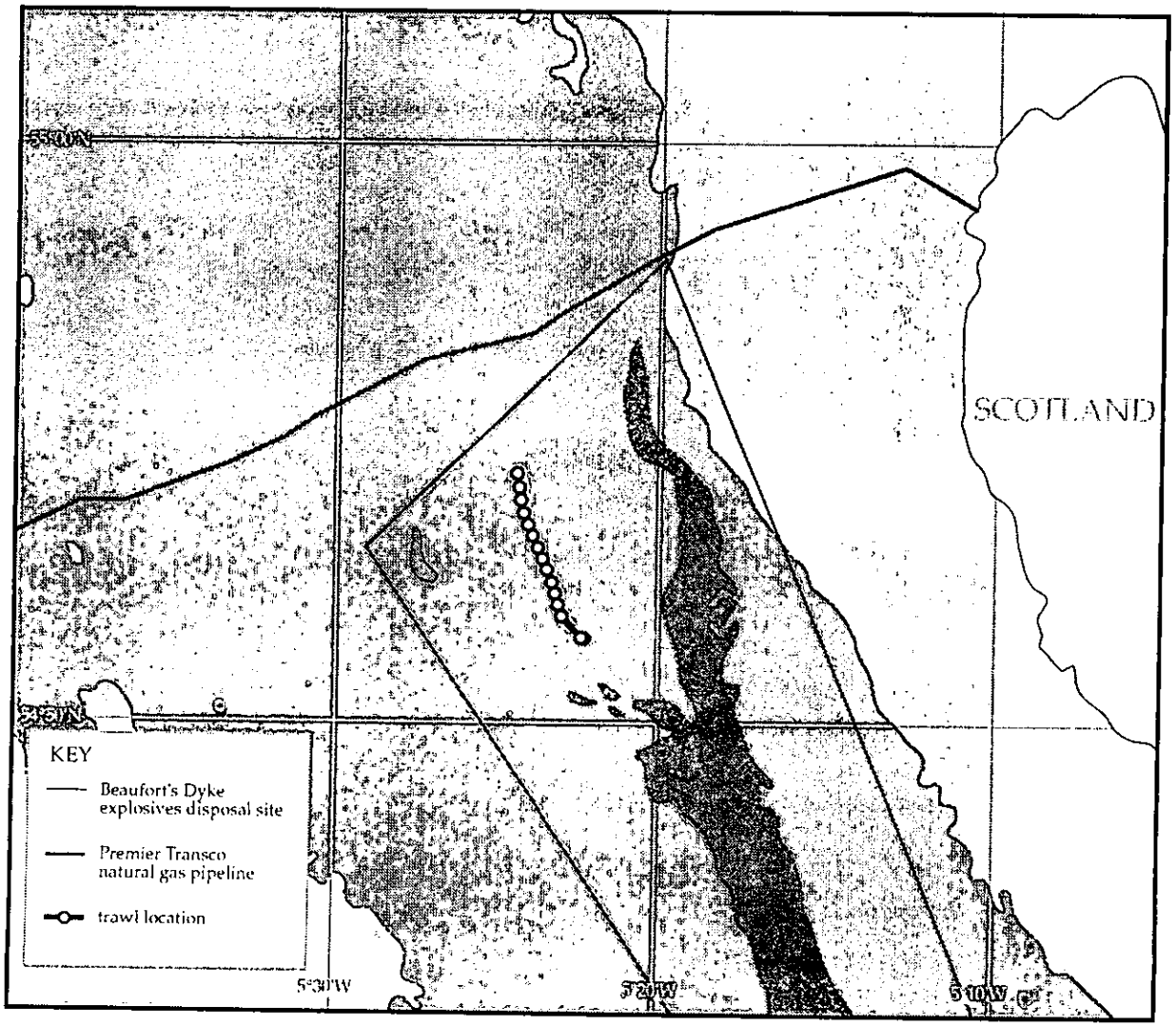

Figure 3 North Channel trawl location.

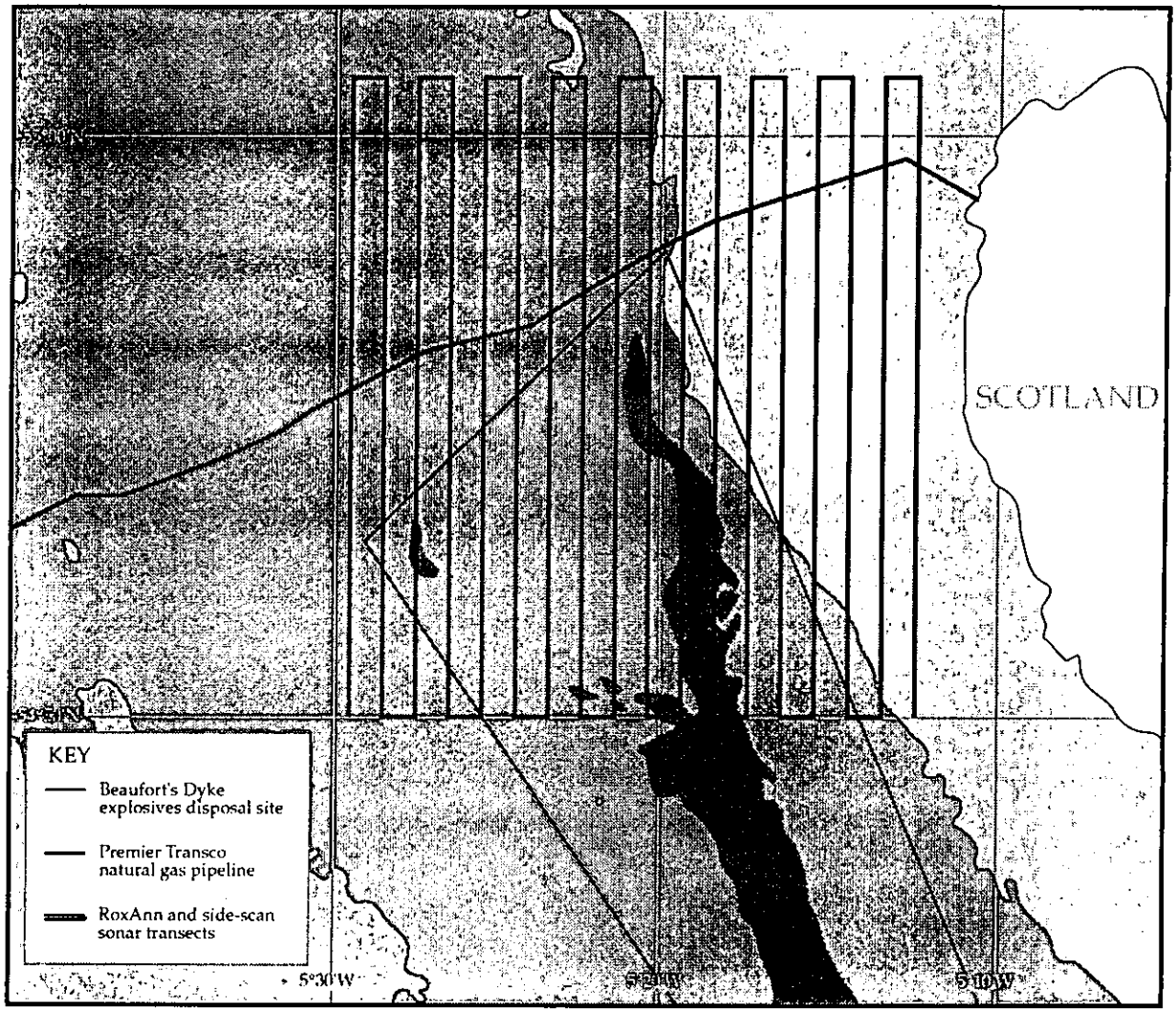

Figure 4 North Channel RoxAnn© and side-scan sonar survey transects.

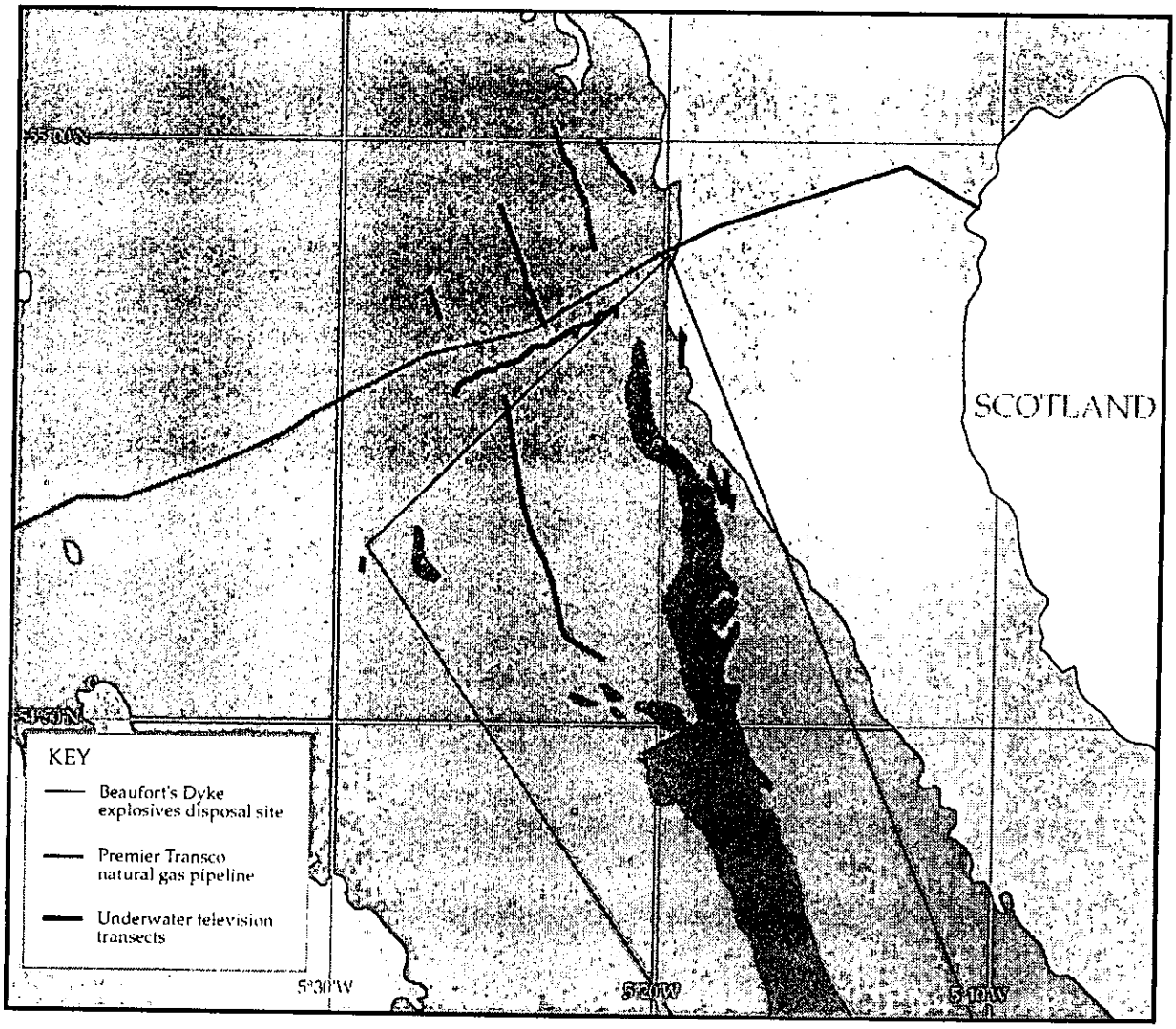

Figure 5 North Channel underwater television survey transects.