Registry

MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
FISHERIES LABORATORY, LOWESTOFT, SUFFOLK, ENGLAND

1975 RESEARCH VESSEL PROGRAMME

REPORT: RV CORELLA: CRUISE 11

(PROVISIONAL: Not to be quoted without prior reference to the author)

STAFF

D F Jefferies
D E Tennant
R J Read
D Denoon
J Tipple

DURATION

Left Lowestoft 1000h 10 July
All times are Greenwich Mean Time
Arrived Lowestoft 0930h 24 July

LOCALITY

British Isles Coastal Waters

AIMS

1. To continue the examination of the distribution of radio caesium in coastal waters of the British Isles following increased rates of discharge from BNFL Windscale, Cumbria, in 1974.

2. To examine the distribution of plutonium and cerum-144 in seawater of the Irish Sea and its approaches for comparison with the distribution of radiocaesium.

3. To record the gamma count rate, in a selected energy range, from seawater of the Irish Sea.

4. To attempt to collect samples of suspended material close to the seabed in the vicinity of BNFL Windscale.

5. To collect samples of seabed in the North East Irish Sea.

6. To collect seawater samples from the Irish Sea for the analysis of total mercury.

NARRATIVE

RV CORELLA sailed from Lowestoft on the morning tide of 10 July and proceeded south about to the Irish Sea. 50 litre samples of seawater were collected, and processed on board for the analysis of ^{137}Cs and ^{134}Cs; at 16 stations between Lowestoft and the Smalls Lightvessel. One 50 litre sample was taken in the Straits of Dover for ^{238}Pu and ^{239}Pu determinations.

Sampling in the Irish Sea commenced on a line from Fishguard to Rosslare at 0350h 13 July and continued on a grid of 62 stations to the North Channel with completion at 2100h 17 July.

At all stations water was collected from the surface and at selected stations with depth for radiocaesum analysis. At selected stations 25 litre samples were also retained for the analysis of plutonium and cerium-144 for comparison with the distribution of ^{137}Cs in both the filtrate and particulate phases. A continual recording of the gamma count rate was made, with a print out every 1000 secs, from surface water flowing continuously over a 3" x 3" NaI crystal coupled to a gamma spectrometer and gated for the energy range 0.6-0.7 MeV. Samples of seabed were obtained at 10 stations using a Van Veen grab and retained for alpha and gamma spectrometry.

RV CORELLA anchored for a period of 7½ hours between 2230h 16 July and 0600h 17 July at a position 0.5 miles south of the Windscale pipeline outlet. Seawater samples were obtained at a height of 30 cms above the seabed using a 30 litre Niskin bottle mounted horizontally on the hydrographic wire. Sampling was hourly and 18 litre samples were filtered through large diameter membrane filters, the filter being retained for alpha and gamma spectrometry, and up to 3 litres were filtered through weighed, small diameter membrane filters. The weighed filters were washed with deionized water and retained for further weighing to establish the total suspended load in seawater close to the seabed and how that load varies over the tidal cycle.

2½ litre samples of seawater were obtained at 8 stations in the North Irish Sea for the examination of total mercury content.

Upon completion of work in the Irish Sea RV CORELLA proceeded to Stornoway for water and stores, sampling seawater for radiocaesum and plutonium en route. RV CORELLA departed from Stornoway at 1500h 19 July and worked a further grid of 37 stations between Cape Wrath - Fair Isle - Fraserburgh until 1230h 22 July when course was set for Lowestoft, where RV CORELLA docked at 0930h 24 July.

RESULTS

The original plan for the trip had to be modified when repairs to RV CORELLA's engines could not be completed before the start of the cruise. This meant the whole trip had to be run on one engine only with a subsequent increase in steaming time. Time was saved by reducing the number of stations at which depth sampling had been scheduled and the return north about was via the Minches and not West of the Hebrides on a grid of stations as planned. All but one of the modified station positions were worked. All sampling, on the original plan, for plutonium and cerum was completed.

The sensitivity of the measurement of the gamma count rate was considerably improved by the "gating" technique. Count rates in the English Channel were approximately 1 count/sec increasing to a maximum of approximately 50 counts/sec in the vicinity of the Windscale pipeline. During the period at anchor at the position 0.5 miles south of the discharge point count rates ranged from 16-41 counts/sec over the 8 hour period. The counter was run continuously back to Lowestoft from Windscale and provided much useful information on the variation of count rate from one area to another, with relatively high count rates being obtained at positions 30 miles north of Strathy Point, Sutherland off the North coast of Scotland and in an area

56°30'N 01°00W off the east coast of Scotland in the North Sea. These count rates will be compared with ^{137}Cs measurements made on water samples taken from these areas.

The modified 30 litre Niskin water bottle worked well and with no difficulty in operation. Seabed samples were obtained by use of the Van Veen grab only. The Reineck box corer was taken but found to be very difficult to use from the 2½ ton derrick on the port side and using the main winch. In order to manoeuvre the corer (weighing some 0.75 tons when all the lead weights are used) in any, other than calm sea conditions more open space is required than is available on RV CORELLA between the main winch and port side hatch. At the moment there is only a 6" clearance on either side of the cover frame. An attempt was made to lower the cover on two wires, at sea state 4, in order to try and minimise the swinging experienced on RV CIROLANA when the main frame came out of the water on hauling. This method, in the short time available for testing purposes, appeared to be unsatisfactory because the speed of lowering the two wires is very critical. If the stabilising wire is let out too slowly it takes the weight, the drop-link on the lowering wire falls out and the corer trips before reaching the sea bed. If the stabilising wire is let out too quickly the frame tips on its side and hits the sea bed end on. The use of the corer in this position on the ship also proves difficult because the winch men do not have a direct view of the wires which are hidden to view by the winch. A good lead to the winch from the derrick also proved difficult to obtain because of the lateral movement necessary to bring the corer inboard. It is suggested that future trials should be conducted in the use of the A frame for this equipment.

D F Jefferies
11 August 1975

SEEN IN DRAFT JEMB
EB

INITIALLED AJL

DISTRIBUTION

Basic list

H J Dunster NRPB Harwell
H Howells (UKAEA Windscale)
Dr E A Burse (SDD Edinburgh)
Dr J H Steele (DAFS Aberdeen)
D F Jefferies
D E Tennant
R J Read
D Denoon
J Tipple