INDEXED

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

1989 RESEARCH VESSEL PROGRAMME

REPORT : RV CIROLANA : CRUISE 9

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

STAFF:

R J Law (SIC)	
C R Allchin	
D S Kirkwood	(to 12 November)
I Haslam (University of Liverpool)	(to 12 November)
T W Fileman	(from 12 November)
P M Hudson	(to 23 November)
Sorrel Bifield	(to 23 November)
J Overnell (SMBA)	(23 to 27 November)
M J Waldock	(from 23 November)
Angela Hopkins	(from 23 November)
Catherine Fileman	(to 27 November)
Jane Allen	(to 27 November)
S R Scott	(to 27 November)
P Mellor	(from 27 November)
Julia Finch	(from 27 November)
A Abarnou (IFREMER)	(from 27 November)
G Thoumelin (IFREMER)	(from 27 November)

DURATION:

Left Lowestoft 1530h 7 November 1989
Arrived Lowestoft 1230h 4 December 1989

(All times are Greenwich Mean Time)

LOCATION:

North Sea, English Channel and Irish Sea

AIMS:

1. To further investigate an area of anomalously high metals concentrations near to the Outer Well Bank, at the Southern edge of the Dogger Bank, previously identified during CLIONE cruises 13/86 and 3/87.

2. To carry out a survey of HCH (hexachlorocyclohexane) isomers, including lindane (gamma HCH), in the Southern Bight, English Channel and Irish Sea. This follows on from work carried out immediately after the sinking of MV PERINTIS earlier in the year.

3. To collect and analyse samples of seawter from coastal and offshore locations for Cd, Cu, Pb and Hg, with particular emphasis on Liverpool Bay. This will include an intensive survey of Cd in water and sediments

around Whitehaven - a hotspot identified on CIROLANA cruise 4b/87.

4. To collect samples of surface sediment from offshore locations in preparation for the JMG sediment monitoring programme to be undertaken in 1990.

5. To collect samples of seawater from offshore locations for analysis of tributyl tin, as part of the current monitoring programme.

6. To collect samples of seawater and surface sediment for analysis of various trace organic compounds. These will include coprostanol, nonyl phenols, chlorobenzenes and a range of industrial and Red List compounds.

7. To carry out a survey of hydrocarbons in coastal and offshore waters using a new HPLC technique, and to compare results obtained by this method with those derived from fluorescence spectrometry.

8. To collect a series of sediment cores in Liverpool Bay to be analysed at SMBA as part of a CSG-funded research project.

9. To collect samples of surface sediment along a transect in Liverpool Bay for analysis of methyl mercury.

10. To collect samples of surface sediment from stations in the vicinity of the Southern gas fields (off North Norfolk) for hydrocarbon analysis.

11. To collect seawater samples off the River Dee for phenol analysis.

12. To collect, and analyse by HPLC, seawater samples for linear alkylbenzene sulphonate surfactants in Liverpool Bay.

13. To collect samples of flatfish and surface sediment from the vicinity of the Rame Head disposal ground off Plymouth.

14. To collect samples of seawater from south of the Isle of Man for oxygen isotope analysis.

NARRATIVE:

CIROLANA left Lowestoft at 1530h on 7 November in fair weather and made for the Dogger Bank, with 2 sediment sampling stations being worked *en route*. Water sampling on the Dogger Bank began at 1041h on 8 November and 5 stations had been worked by 1700h, when rising winds prevented further work. CIROLANA then dodged in the area until 1400h on 9 November, when work was resumed. Four further stations were sampled on 9 November, and 5 on 10 November, the planned grid being completed by

1337h. Sampling off Bridlington, the River Humber and the Wash was undertaken on 10 and 11 November with 7 stations being worked. Samples were collected at 1 station at 0720h On 12 November and CIROLANA then proceeded to Lowestoft, where staff were exchanged at 1000h by means of the ship's Searider. Water and sediment samples were then taken at 4 further sites in the Southern Bight between 1240h and 1805h, with passage through the Straits of Dover being made during the night.

Work began again off Newhaven at 0730h on 13 November, with samples of water and sediment being collected at selected positions along the north coast of the English Channel. This section comprised 26 stations, and work was completed at 1642h on 14 November. CIROLANA then proceeded to anchor in Plymouth Sound, both in preparation for the next period of sampling and to allow repairs to be made to the engines. On the morning of 15 November the Searider was used to collect water samples at 3 sites close inshore, and 1 set of samples was collected from the ship. The repairs were completed by 1300h and CIROLANA left Plymouth in a stiff easterly gale to begin a grabbing survey of the Rame Head dumping ground. This comprised 15 stations, and was undertaken between 1345h and 1654h. An attempt was then made to obtain some fish samples for analysis by means of a 3m beam trawl, but this was unsuccessful as the ground proved to be too rough. Some damage was also sustained to the trawl, so no further attempts were made after the first 15 minute tow. Water and sediment samples were next taken as CIROLANA sailed south-west to the Western Approaches. Work at the most distant station at 48°30'N 8°00'W was begun at 1235h on 16 November and was completed by 1530h, after which CIROLANA made for the Bristol Channel. Two further stations were worked *en route*, south-west of the Scilly Isles.

Water sampling on a 24h basis then continued in the Bristol Channel, Cardigan Bay, Caernavon Bay and west of the Isle of Anglesey; with grab sampling at selected stations. The first sample was collected in the Bristol Channel off Land's End at 0341h on 17 November, and the last of the 18 stations worked at 1300h on 18 November off the Skerries.

Water samples were collected in the E. Irish Sea before CIROLANA anchored in Liverpool Bay. Two 13-hour anchor stations, over the old and new site Z disposal grounds, were worked on 19 and 20 November. A grid of water stations covering the NE Irish Sea, particularly the area off Whitehaven, was completed by 2040h on 22 November, after which CIROLANA went to anchor overnight prior to docking in Workington on 23 November.

CIROLANA left port at 1030h on 24 November, and work began off St. Bee's Head at 1135h. During the day, 5 coring sites were occupied as CIROLANA sailed south towards Liverpool Bay. Two further 13-hour anchor

stations, off the Queen's Channel and at the sewage sludge disposal ground, were worked on 25 and 26 November, before proceeding to Point Lynas (Anglesey) where the final changeover of staff was made by pilot boat on the morning of 27 November. At the first of the anchor stations sampling in the Mersey was undertaken using the ship's Searider.
On leaving Anglesey CIROLANA turned south and water samples were collected in St. Georges Channel, the Celtic Deep and off St. Mary's in the Isles of Scilly. Further water sampling was undertaken in the Channel, firstly off the Cornish coast and later off the French coast and around the Channel Islands. CIROLANA passed through the Dover Straits during the night of 30 November-1 December, and water samples were collected at 4 stations in the Barrow Deep in the morning of 1 December before steaming to the gas-field area off North Norfolk, where grabbing began at 1742h. Twenty sediment samples had been collected by 1625h on 2 December, after which CIROLANA made for the NE coast. Sampling off the River Wear took place at 0930h on 3 December, and further water samples were collected off the Tyne at 1008h and the Tees at 1245h. No sampling from the Searider was possible in the Tees because of thick fog. CIROLANA then returned to Lowestoft, docking at 1230h on 4 December.

RESULTS:

As the majority of this cruise was conducted in calm weather almost all the aims were met.

Aim 1 : Samples were collected from 14 stations on the Dogger Bank for analysis at Burnham and at Liverpool and Southampton Universities.

Aim 2 : Samples of seawater for analysis of HCH compounds were taken from 168 stations, incuding 1 13-hour anchor station off the River Mersey. Approximately 100 analyses were made during the cruise, with the highest concentration of lindane (2.4 ng dm^{-3}) being found in the Mersey itself.

Aim 3 : Analysis of Cd, Cu and Pb aboard ship proved impractical with the inexperienced staff available. Samples for Cd analysis were taken from 7 stations off Whitehaven. Samples for Hg analysis were taken from 120 stations, including 4 13-hour anchor stations in Liverpool Bay. All dissolved Hg analyses were carried out on board ship.

Aim 4 : Samples were collected from 24 offshore sites, and frozen for later analysis.

Aim 5 : Two large water samples (16 & 27l.) were taken at offshore sites in the Southern Bight and at the Leman Bank for TBT analysis.

Aim 6 : Chlorobenzenes were analysed in a few of the samples taken for HCH analysis, but only one compound (1,4-dichlorobenzene) was found at measureable concentrations. 23 samples were taken for analysis of coprostanol and nonyl phenols. A further 6 samples were taken (from the Tees, Thames and Mersey) for laboratory GC-MS analysis for a range of industrial organic chemicals including styrene, xylene and phthalate esters. In addition, 23 sets of triplicate water samples were collected for analysis of volatiles.

Aim 7 : Samples were collected from 35 stations, and analyses by both HPLC and fluorescence spectrometry were carried out during the cruise.

Aim 8 : Core samples were collected from 4 stations, but attempts to sample at a further 2 sites were unsuccessful as the proportion of sand in the sediment was too high for the corer to penetrate adequately.

Aim 9 : Samples of surface sediment were collected from 8 stations along a transect from Douglas Bay to the River Mersey.

Aim 10 : Samples were collected from 20 sites previously sampled on CLI 9/82, and frozen for analysis in the laboratory.

Aim 11 : This sampling was not carried out as staff would not be available to carry out the analyses on return to the laboratory.

Aim 12 : 19 samples were taken in all, 10 in Liverpool Bay, 4 in the Barrow Deep and 5 from the NE coast. Most analyses were carried out on board, concentrations found being in the range 1 to 10 $g\ dm^{-3}$.

Aim 13 : Sediment samples from 15 stations were collected and frozen for subsequent laboratory analysis. No fish were caught.

Aim 14 : Two samples were collected 10 miles south of the Calf of Man and returned to Peter Dare (Lowestoft).

(Note : Aims 13 and 14 were in addition to those listed on the original cruise programme.)

R J Law
4 December 1989

SEEN IN DRAFT :

G Sinclair (Master)

J Harper (Fishing Skipper)

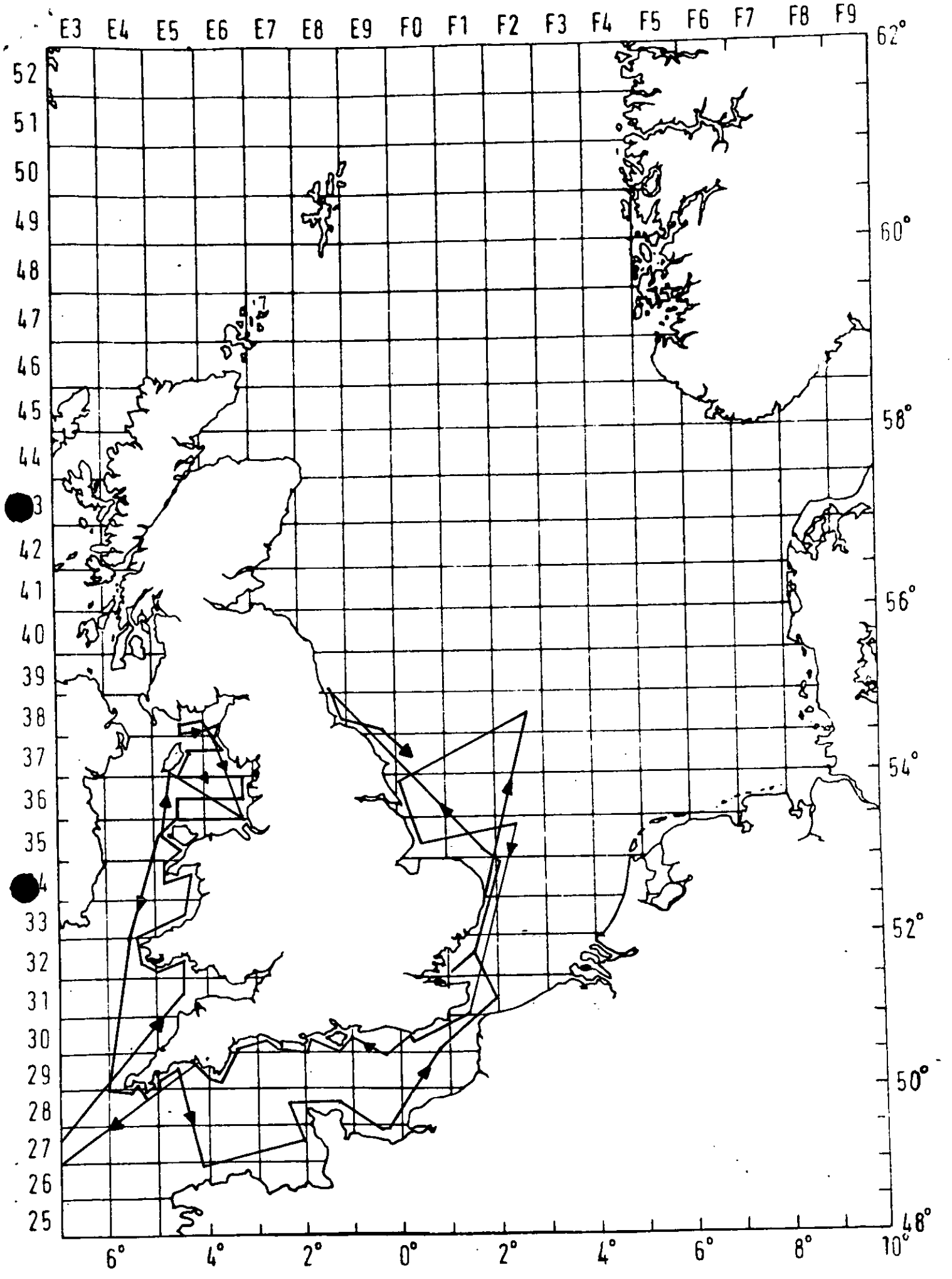
INITIALLED :

CEP

DISTRIBUTION :

Basic List +

R J Law
C R Allchin
D S Kirkwood
I Haslam (University of Liverpool)
P Statham (University of Southampton)
T W Fileman
P M Hudson
Sorrel Bifield
A Abarnou (IFREMER) [2 copies]
PED5, Department of Energy
Capitaine de Vaisseau Besson (Cherbourg)
Captain W H McLeod (MPCU)
M J Waldock
Catherine Fileman
Jane Allen
S R Scott
Angela Hopkins
P Mellor
R A A Blackman
J M Davies (DAFS)
J Overnell (SMBA)
J E Portmann
Julia Finch


E3 E4 E5 E6 E7 E8 E9 F0 F1 F2 F3 F4 F5 F6 F7 F8 F9
62°
60°
58°
56°
54°
52°
50°
48°
52 51 50 49 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25
6° 4° 2° 0° 2° 4° 6° 8° 10°