

R1/12

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FRV *Scotia*

Cruise 1301S, Part I

REPORT

22-31 August 2001

Start port: Aberdeen

End port: Aberdeen

Personnel

A McIntosh (In charge)

D Moore

P Hayes

S O'Neill

E Dalgarno

L Campbell

Fishing Gear

Granton 48' Trawl (BT101) (modified) - with tickler chains; 3 m beam trawl

Objectives

1. Offshore oil development and production effects on hydrocarbon loadings in fish, shellfish and sediments in the Fladen Ground.
2. To conduct a stratified sampling survey of the Fladen Ground to determine temporal changes in hydrocarbon loading in surficial sediment and depth profile sediment samples.

Out-turn days per project: 9 days AE08o; 1 day C668

Narrative

After all scientific gear and equipment had been loaded and secured, *Scotia* sailed from Aberdeen at 1300 hours on 22 August. Engineers carried out work on the bow thruster and then disembarked to the pilot boat at 1430 hours when passage was made to the Moray Firth. The centre of a single well drilling site was identified by grab sample and a number of unsuccessful attempts were made to sample sediment from the same location with a Sholkovitz corer. Passage was then made to the Fladen Grounds where sediment sampling commenced at 0130 hours on 23 August. Over the next three days, a sediment survey was conducted at locations previously sampled in 1989. Trawling was undertaken at seven locations within this sampling grid.

The second part of the survey commenced at 1400 hours on 25 August. Trawls were taken in 14 out of the 16 boxes surveyed. The survey was completed by 1400 hours on 30 August when passage was made for Aberdeen where docking was completed by 2200 hours on 30 August. All scientific gear and samples were transferred to the FRS Marine Laboratory on 31 August.

Results

The first part of the survey involved revisiting sampling locations occupied during a previous survey in 1989 which was conducted to investigate effects of the offshore oil and gas exploration and production activities in the Fladen Ground. Since that survey, changes in legislation over the years have led to a reduction in 'oily' discharges to the marine environment but the volume of activity in this area has increased substantially. The purpose of this survey was to investigate any temporal change in the hydrocarbon loading in the sediments and whether there was any detectable impact on fish and shellfish.

As a consequence of the proliferation of exploration and production activity in the Fladen Ground, the most accumulative area of the North Sea, and to inform the debate on the need to gain a better description of wider area contamination patterns, a further survey was undertaken in this area. As a potential model to advise future wider area monitoring surveys, a random stratified sampling regime was adopted. The criteria for selection of the sampling sites were those areas within a defined block that were greater than 2 km from known drilling activity.

The first part of the survey provided 148 sediment samples obtained by day grab. The multi-corer was deployed on five occasions and provided material for depth profile analysis. The second element of the survey generated 249 sediment samples by grab.

All sediment samples will be analysed initially for the presence of hydrocarbons by ultraviolet fluorescence (UVF) oil equivalent determination and based on this screening, further analysis will be conducted on selected samples to determine and quantify the polycyclic aromatic hydrocarbon (PAH) and *n*-alkane composition and concentration.

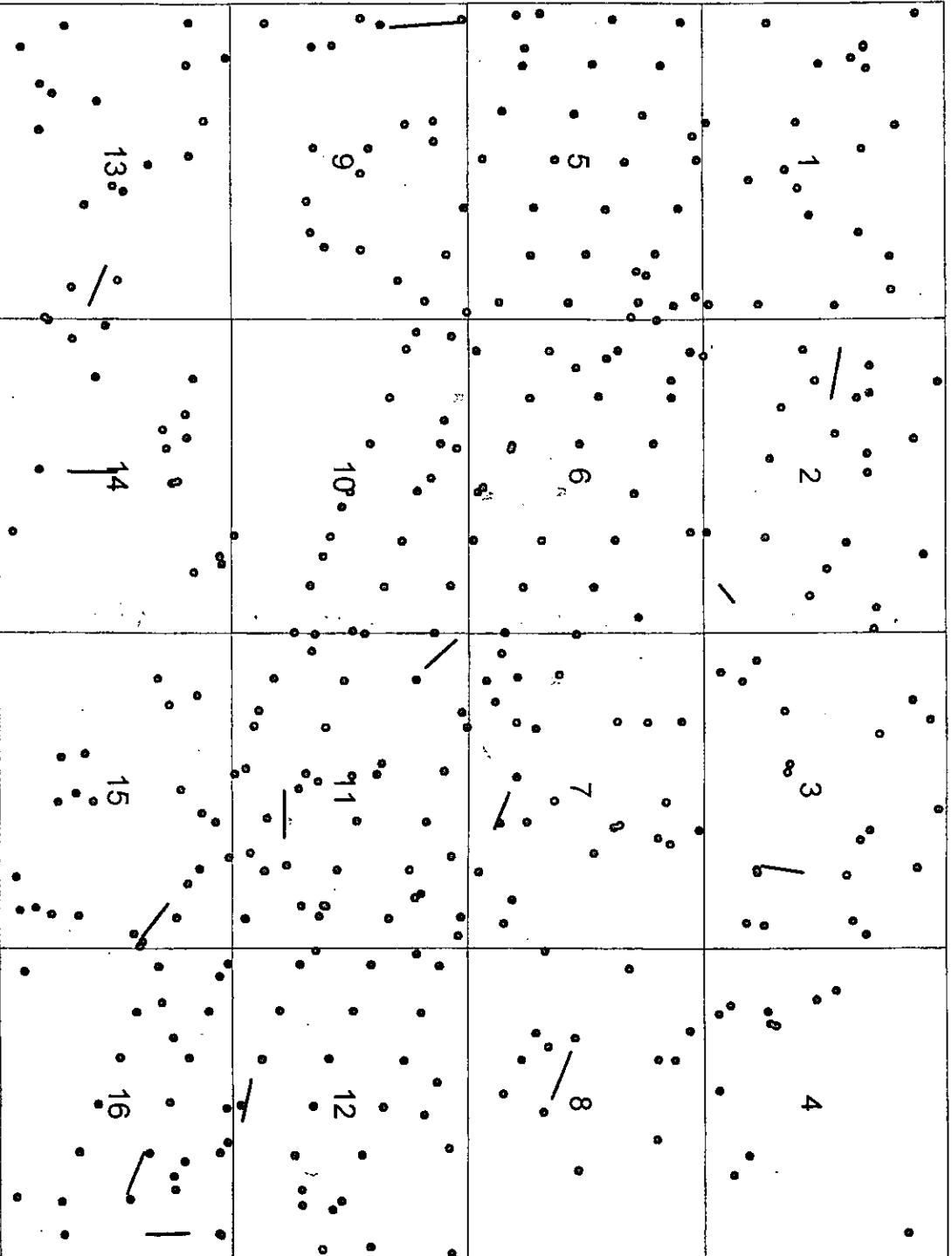
An aliquot of sediment from every sample was taken for subsequent particle size analysis (PSA). On board PSA by laser granulometry was carried out on every tenth sediment sample. This is the first time that this instrument has been used at sea and the samples will be re-analysed in the laboratory for comparison to advise a decision as to whether it would be valid to use the instrument at sea in the future.

Fish and shellfish were sampled by trawl at 14 locations within the sampling grid and provided 28 pools of (five) fish muscle tissue for sensory assessment and 28 pools each of (five) muscle and liver tissue for PAH analysis. *Nephrops* and *Pandalus* were sampled where available and divided into pools for sensory assessment and chemical analyses.

A McIntosh
31 August 2001

Seen in draft: P Ramsay, OIC/Captain

1301 Scotia - sediment sampling and trawl locations in the Fladen Grounds August 2001



- ▲ Trawls ship
- 1301 sediment/15 ft
- 1989 Comparison Grabs
- 1989 Comparison Multiple Grabs
- 1989 Comparison Multi Core
- 2001 Stratified Sampling
- Odd Sod
- 4x4 ship

1301 Scotia cruise track and sampling area

