R1/12

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FRV *Scotia*

Cruise 1398S

REPORT

29 July - 6 August 1998

Loading:	28 July, Aberdeen
Unloading:	6 August, Aberdeen

Personnel

Alistair McIntosh	HSO (B2) (in charge)
Derek Moore	SSO (B3)
Rodney Payne	HSO (B2)
Steve Grigson	Visitor - Heriot Watt University
Ed Stutt	Visitor - University of Plymouth
Gang Pan	Visitor - University of Plymouth
Bob Milne	Visitor - Robert Gordon University
Jörg Bergmann	Visitor - Robert Gordon University

Fishing Gear

Granton 48' Trawl (BT101) with monk gear and tickler chains.

Objectives

1. To recover caged mussels from moorings in the vicinity of the Thistle "A" platform.
2. To sample sediments around the Thistle "A" and Magnus platforms for determination of speciality chemicals and hydrocarbon concentrations.
3. To obtain samples of produced water from the Thistle "A" and Magnus platforms.
4. To sample water from the oiled water discharge plume for determination of speciality chemicals and hydrocarbon concentrations.
5. To conduct radiochemical experiments aboard the vessel.
6. To deploy caged mussels at the Magnus field.
7. To monitor and sample the water column in the oiled water discharge plume by specialised monitoring equipment.
8. To sample *Nephrops* from the Burra Haaf and Little Halibut Bank for sensory assessment and PAH concentration

Out-turn days per project

AE10n; 9 days

Narrative

After loading all necessary sampling and scientific equipment, *Scotia* departed from Aberdeen at 1000 hours on 29 July and made passage for the Thistle oilfield, collecting en route, 40 x 25 l carboys of sea water for QUASIMEME over position 58°00N 00°30E between 1800 and 1830 hours.

Scotia arrived at the mussel mooring reference site, some 2 km west from the platform, at 1200 hours on 30 July, to find that there were no surface markers visible. A search by sonar was instigated but no signal from the mooring was received either on the position or in the immediate area. The vessel then moved into the 500 m zone and as previously reported to the Laboratory by BP, no surface markers were visible. A sonar search was commenced and three mussel cage moorings were located at 250 m, 350 m and 500 m. These were consequently recovered by passing a wire to the subsurface buoy and hauling the moorings aboard over the stern. The mooring at 150 m had been moved outside the 500 m zone by the platform and without accurate knowledge of the position where the standby vessel had relaid the mooring it proved impossible to locate by sonar. There had been a change of standby vessel so no position data was available. The three recovered moorings showed in all cases that the strength member of the 5 m cage had chafed through against the lid of the cage, leading to the loss of the surface markers. With the loss of the flotation at the surface, the 5 m cage relocated at 45 m, while the 20 m cage remained in position. It is known that a long-liner was operating in the area of the lost moorings which may account for the inability to locate them. The mussels were removed from the cages and transferred to storage containers and frozen.

Earlier in the day, samples of produced water were transferred from the platform to *Scotia* by the standby vessel's FRC. This allowed the staff from Plymouth to proceed with their experiments. At 1738 hours a fire broke out in the container where the staff from Plymouth had set up their experiments caused by overheating of a fan associated with their apparatus. The incident was dealt with immediately and all the fire emergency procedures worked faultlessly. The fire was extinguished using dry powder and the area was then ventilated.

Sediment sampling for macrobenthos, offshore speciality chemicals and polycyclic aromatic hydrocarbons commenced at 1900 hours, working on a transect 2-6 km down the residual current direction from the Thistle platform. This transect was completed by 0500 hours on 1 August. The sampling at 500 m and 1,000 m, from the four sides of the platform, commenced at 0800 hours and was completed by 1900 hours when *Scotia* made passage for the Magnus field, stopping mid way between the platforms to obtain a sediment sample as a reference site.

Sediment sampling for macrobenthos, offshore speciality chemicals and polycyclic aromatic hydrocarbons commenced at 2300 hours, working on a transect 2-6 km along the residual current direction from the Magnus platform. This transect was completed by 0400 hrs on the 2nd. The sampling at 500 m and 1,000 m, from the four sides of the platform, commenced at 0800 hours and was completed by 1700 hours. Earlier in the day, samples of produced water were transferred from the Magnus platform to *Scotia* by the standby vessel's FRC. This allowed the staff from Plymouth to continue with their experiments.

After the sediment sampling programme was completed, *Scotia* moved to a position 750 m from the platform in the predicted direction of the produced water plume where the RGU staff deployed a optical fibre fluorosensor to verify the presence of hydrocarbons in the plume.

Worsening weather overnight precluded further sampling attempts. The wind by 0800 hours on the 3rd was gale force and as the forecast indicated moderating conditions later in the day, *Scotia* spent the next eight hours dodging head to wind. With no visible improvement in the weather, and little prospect of moderation, a decision was taken at 1600 hours to move to the north end of Shetland, where, in the lea of the westerly gales, a control site could be taken for sediment. This position proved to be unsuitable in terms of the sediment type and the sampling position was moved to south of Fetlar where the station was successfully occupied between 1000 and 1130 hours. The USNEL box corer was prepared for deployment but there appeared to be a problem maintaining tension on

the plankton crane wire which resulted in the deployment being aborted. The ETO suspected a problem with the software associated with the winch control and this was reported to the Laboratory.

Scotia then made passage to the south of the Shetland mainland in the lea of the westerly force 6/7. The EM950 was calibrated over three transects in Mousa Sound and after sheltering for a few hours, south of Mousa, *Scotia* made passage for the Burra Haaf in the early morning of 5 August, and was on the trawling site for 0700 hours where two trawls were taken but no *Nephrops* was caught. On completion of this exercise, *Scotia* made passage for Aberdeen where docking was completed by 0400 hours on 6 August.

Results

This has been a successful and positive cruise where all the objectives that were possible were met. Three out of the five moorings holding caged mussels were recovered. The reasons for those that were not were outwith our control. The mussels will be analysed for speciality production chemicals, heavy metals and polycyclic hydrocarbons in the MLA and elsewhere and the results will be made available in due course.

The sediment sampling programme was successfully completed and these will be analysed for speciality production chemicals, particle size, total organic carbon, heavy metals and polycyclic hydrocarbons in the MLA and elsewhere and the results will be made available in due course. The macrobenthos samples will be analysed by a contact Laboratory on behalf of BP and the results will be made available in due course.

Samples of produced water were obtained from the platforms and Plymouth University staff measured particle/water partition coefficients and the partitioning behaviour of zinc and cadmium. Samples of the produced water and aliquots of sediment samples were taken by Plymouth for further analysis and all relevant results will be made available in due course.

Caged mussels were not deployed at the Magnus field due to information received prior to sailing that there was to be a seismic survey in progress in the area and that permission for such a deployment would not be granted.

Severe adverse weather precluded the water column plume sampling programme from being undertaken. However, RGU staff deployed some measuring instrumentation. Fluorescence signals were observed verifying that oil may be present that may be the produced water plume. The OFAF has shown that it is capable of detecting oil fluorescence from the limited sampling time available.

Two trawls were taken in the Burra Haaf area off Shetland but were unsuccessful in obtaining a sample of *Nephrops*. Other means of obtaining such a sample will be investigated later.

A McIntosh
19 August 1998

Seen in draft: Captain John B Nichols, Master

Track Chart and Sampling Locations - 13985