

### *Water Quality Monitoring Instrumentation*

- towed platforms
- sensors
- data management

### *Instrumentation For Measurement and Control of Discharges of Possible Pollutants*

- oil platforms
- ships
- industrial discharges
- coastal outfalls

### *Clean-Up*

- booms
- skimmers
- filters/shakers for drill cuttings
- dispersants

### *Clean Technologies*

- water-based muds

These markets, especially those related to monitoring of water quality or prevention of pollution, are in an early stage of development. The development of these markets is closely associated with the introduction of national/European legislation.

### **United Kingdom and General**

The U.K. Coordinating Committee on Marine Science and Technology (CCMST) estimated a \$600 million per year market in the marine environmental protection industry, including oil pollution clean-up. Total current U.K. expenditure on R&D is approximately \$140 million per year, of which one-third is private sector expenditure, responding either to environmental protection requirements or exploiting near-market opportunities for goods and services. The majority is spent by the hydrocarbon and construction industries.

The balance, approximately \$90 million per year, is spent by government departments, statutory authorities, research councils and the E.C. This includes monitoring and other mandatory activities to meet statutory responsibilities, which are not strictly R&D.

It is extremely difficult to obtain market statistics in the ocean industry area because official statistics, such as the SIC classification, do not usually distinguish between marine- and land-based equipment/instrumentation or services. However, the CCMST attempted to make some estimations, based on these statistics, and was able to calculate the following specific U.K. sales in the ocean sciences and marine environmental sectors:

**Table 7**

### **U.K. Sales in the Ocean Sciences and Marine Environmental Sectors**

	Sales/\$M
Environmental Protection	
• oil pollution control	38
• non-oil pollution control	578
• environmental data services	11
• disposal of waste, including coastal outfalls	875
Consulting engineering	114
Diving, including equipment	13
Metocean surveys	18

The CCMST report showed that the main areas of increasing interest and likely development, in the ocean sciences and environmental areas, were:

- engineered waste disposal on continental shelf and in deep ocean
- modelling of flows and dispersal of pollutants on shelf, coasts and in estuaries
- sediment transport-retention of nuclides and other contaminants in sediments
- chemical sampling and measurement at very low concentrations
- autonomous ROVs for chemical and environmental monitoring

In the area of discharge of sewage into the marine environment, the likely cost to the U.K. of achieving 100 percent compliance with the E.C. Directive on the Quality of Bathing Beaches was estimated in 1990 as \$2,500 million. The estimated cost to