NORWEGIAN EXPERIENCE WITH OIL SPILLS: SCIENTIFIC RESPONSE: by John Gray, Professor of Zoology, Oslo University and Senior Queen's Fellow in Marine Science

Norway has a rugged coastline of approximately 2000 km, similar in length to the Great Barrier Reef, with a population of some 4 million people. It does not have resources of the magnitude of the USA at its disposal in dealing with oil spills, although oil exploration and production are extremely important to the Norwegian economy.

Another important industry in the Arctic circle for Norway is the fishing industry. Because insufficient information was available about the effects of oil on the Arctic region, only the lower third of the country has been explored for oil. In 1984 exploration began within the Arctic circle and already promising finds of gas and oil have been made.

To obtain licences for oil exploration in Norway it is necessary for companies to show "willing", that is provide some finance for Norwegian research. Oil companies and researchers approach the Norwegian Research Council with a project to be funded by the company. Individual $1 million grants are not uncommon. This policy of the Norwegian Government has obviously been of great benefit to researchers and yet the Research Council can control the quality of the proposed research.

The Government also requires companies to collect meteorological and oceanographic data which is transmitted to central locations to improve oceanographic knowledge and provide input for modelling e.g. in the event of an oil spill. As a result current systems are now relatively well understood around Norway and these can be fed into the "Slick Forecast Model".

Four laboratories in Norway are fully equipped for oil analysis on a routine basis and can be mobilised for an oil spill.

Research on oil as a result of the increased funding has been in a number of areas. An early major concern regarding oil spills was biological. Would bacteria break down oil more slowly in the Artic? This led to a major research effort which found that oil bacteria can always be found on the Norwegian coast, but that they compete with phytoplankton for nutrients. The risk of a large spill in spring, therefore, is that the primary plankton bloom may not occur due to microbial utilisation of the available nutrients. This could have severe consequences for fish larvae.

Photoxidation was found to be very important as a releaser of toxic chemicals. This may have some relevance to Great Barrier Reef waters where illumination is high.

Effects of oil on many commercial species have also been examined, and a monitoring program for benthic populations and communities along the coast has been established using stereophotographic methods.

To enable a rapid scientific response, an Action Plan has been developed. Obviously with limited resources the entire coast cannot be covered simultaneously, but five 150' vessels are on full time standby (or on hydrographic survey work when not on oil spill work) to be mobilised in the event of a spill. "Lenses" are available to physically contain the oil and the plan is linked to the coastguard and airforce etc.

To enable a scientific response which is co-ordinated with the combat response, a Norwegian Ecological Action Plan has been developed. This plan co-ordinates the expertise in Norwegian Universities. Ecological response teams are "on call" to respond to spills at two hours notice. The teams consist of a zoologist, botanist, chemist and bacteriologist plus five or six students. Future teams will probably include ornithologists. Equipment is permanently packed in aluminium boxes and not used for any other purpose.

The team can be flown to sites using slick forecast model to take "before" samples over a 50 km stretch of coast in advance of the oil reaching the shore. Agreed predetermined samples and techniques are used. Once the oil has hit the shore, samples are taken daily for the first 14 days, twice per month for the next six months, then once every six months. Many more samples are taken than are analysed, due to the high cost of oil analyses. Choice of samples for analysis is made at a later date.

There is an annual training exercise for teams and formal contracts (including the important consideration of insurance) are drawn up between the government and team members.

Each team is able to give the Government advice on whether a large combat plan should be put into effect.

In two years they have responded to 7 spills - on six of those occasions the Government has been advised there was no need for any combat response.

This type of operation works well for a small nation over a large area.

The annual cost to maintain each team is approximately $A10,000 and includes equipment, equipment maintenance and training. Establishment cost varied between institutions, depending on the equipment they already had.

Reference: The Norwegian Marine Pollution Research and Monitoring Program FOH. Research Projects 1977-83.