Brent Spar: when science is not to blame

Munich. In some environmental situations, scientific uncertainty is the biggest problem faced by any attempt to conduct a rigorous risk analysis. In others, the scientific arguments for or against a particular line of action may be relatively clear-cut; in such instances, the task faced by decision-makers of persuading a sceptical or hostile public of the legitimacy of their conclusions can be equally difficult.

Such was the situation last summer, when the British/Dutch oil company Shell was forced by an astonishingly effective Greenpeace campaign to abandon its plans to dispose of the Brent Spar oil storage buoy in the Atlantic Ocean. It seemed at the time that Goliath had been justly felled by David. Soon afterwards, as it emerged that Greenpeace had mistakenly used false information about the buoy's contents to swing public opinion, it was less obvious which side held the moral high ground.

Risk analysis may help to provide an answer. But, even after the publication — expected shortly — of the report of a scientific advisory body set up last year by the British government (see box) on the likely impact of different forms of deep-sea disposal of the Brent Spar, such analysis is unlikely to resolve the conflict over its fate.

Shell believed — and still believes — that the environmental risk posed by dumping Brent Spar in the ocean is inconsequentially small. The oil company had even commissioned some research which supported that view. But the public agreed with Greenpeace that the risk was conspicuously large. Could an extensive, independent and thoroughly scientific risk assessment process have changed their minds?

The saga started last February, when the British government approved Shell's request to dispose of the Brent Spar 2,400 metres beneath the Atlantic, at a site on the UK continental shelf called the North Feni Ridge. Shell says it had identified the site as its Best Practicable Environmental Option (BPEO), after balancing scientific and environmental considerations with safety, health and economic criteria.

Initially, according to Shell, it considered thirteen different options for abandoning or re-using the Brent Spar. The oil company chose deep-sea disposal on the basis of three main criteria — safety, cost and environmental impact. The alternative seriously considered was horizontal dismantlement on land: the buoy would be turned on its side at sea, its two damaged storage tanks repaired, and after a rough clean-out it would be towed to shore for dismantling.

But, according to a risk analysis carried out by Aberdeen University Research and Industrial Services before the disposal option was chosen, dismantling was four times as expensive as deep-sea disposal. Furthermore, the risk of a fatal accident was six times higher, because of the labour-intensity and complexity of the process.

Shell's assessment of the environmental risk — which it thought would be negligibly small in both cases — was more controversial. Its assessment was presented in considerable scientific detail, including a full inventory of contents and analyses of the impact of leakage at different rates and depths, and of the physical and biological pathways of toxins. Nevertheless, some scientists still complained that the oil company had failed adequately to explain how it arrived at its conclusions.

Shell still stands by its initial assessment and subsequent choice, which it says was based on reports from three independent consultants, as well as input from UK government scientists. Eric Faulds, project manager for the decommissioning of the Brent ▶

Putting hazards under the microscope

London. Last October, the British government decided, in the wake of the public furore over the fate of the Brent Spar, to set up a group to reassess the various disposal options — and thus, hopefully, provide a firmer scientific basis for public discussion of its fate with possible implications for similar debates in the future.

The group, which is headed by John Shepherd, director of the Southampton Oceanography Institute, is now faced with the task of drawing together a diverse literature on the many scientific issues that bear on the environmental risk involved.

E.P.L./David Sims

Calmer waters: a detailed assessment is now being made of Brent Spar's future.

According to Shepherd, the group plans to draw as firm conclusions from current scientific knowledge as it can. But it also intends to indicate areas of uncertainty, while it is using a series of natural analogues and scientific models which could give some idea of the context and the scale of the environmental hazard posed by the Brent Spar disposal.

Armed with a new inventory commissioned by Shell last summer from the Norwegian certification authority, Det Norske Veritas, the group is making an assessment of the toxic materials contained in the Brent Spar that could have found their way into organic material in general — and the food chain in particular — so as to help to identify how each is likely to interact with the environment.

The natural analogues and models that will be used to help assess the potential impact include the results of studies of sites of sludge disposal in the sea, as well as the seepage of natural methane from sediments on the continental shelf, to assist the understanding of biodegradation and the cycling of hydrocarbons.

The potential fate of heavy metals from the Brent Spar will be assessed using studies of corrosion in shipwrecks, including the Titanic, which lies at about the same depth (more than 2,000 metres) as the originally planned disposal site for the Brent Spar. The analysis will also consider a photographic survey of containers holding low-level radioactive waste that have already been dumped in the north-east Atlantic, as well as natural hydrothermal vents — areas of the seabed on mid-ocean ridges which force metal-rich solutions into the environment.

Despite the relatively small amount of PCBs on the Brent Spar, the group will also draw on a study of PCB pollution of the Hudson River in Canada, where an electrical plant was found to have been releasing PCBs over a long period of time, extrapolating the results from shallow to deep waters.

Another assessment will be made of knowledge of the biota at the depths where Brent Spar was to have been dumped. At such depths, the amount of biomass found is between ten and 100 times lower than in shallow water. But, according to Shepherd, assessing biodiversity requires a "bold extrapolation" from known data; moreover, it is unclear whether a high or low biodiversity would best favour species survival.

The review group will issue its report this month. According to Shepherd, it is likely to conclude that, from the scientific point of view, there will be little environmental damage. The physical site of potential damage is small — the size of two football pitches. And fish stocks are unlikely to be affected, as some had claimed, as there are no biological or physical means by which toxic material can be carried up from such a depth to the layers closer to the surface that are fished commercially. **A. A.**