Risk assessment is more than numbers, Swedish seminar concludes

By Wendy Barnaby

"NEAR Santa Barbara, California, plans have been made to construct a large liquid natural gas terminal . . . A small group of American Indians is protesting the siting of the plant, contending that the chosen location is the most sacred spot of their culture, the Western Gate, where the Indians say the souls of their people must pass after they die to join the spirits of their ancestors . . . One can envision a Rasmussen-like report, examining the probability that a soul would be unable to migrate past a liquid gas terminal. The report would, no doubt, conclude that the risk was very small, perhaps 10^{-9} for each soul. To technical experts the risk seems negligible; to the Indians the risk is unthinkable . . ."*

How can risk impact assessment (RIA) deal with value judgements? This emerged as one of the main themes of a three-day long seminar entitled "Impacts and Risks of Energy Strategies: Their Analysis and Role in Management", held recently in Stockholm. The answer, simply stated, is that nobody knows.

Scientists evaluate the risks involved in a proposed course of action; policy-makers draw up policies after they have weighed the risks in a social context; organisations carry out the policies—so the theory goes. The trouble is that this cycle involves scientific, social, psychological, political and managerial processes and disputes, and it is very hard to say how or even by whom—they can all be brought together in some coherent whole.

According to Dr Baruch Fischhoff from Decision Research in Oregon, USA, RIA is limited by not having some inputs necessary for the analysis, by the analysts' inability to assess the validity of their work and incorporate that assessment into guidelines for action, and for its failure to address critical management issues. Some of the missing inputs are the preferences and values of the people who will be affected by whatever action is proposed: there is no adequate way of incorporating them into the numerical calculations that RIA demands. David Pearce, Professor of Political Economy from the University of Aberdeen, examined the issues that arose in the Windscale inquiry into whether or not to build an oxide fuel reprocessing plant in Cumbria, England, to see what—if anything—RIA could contribute. It is, he concluded, a valuable tool for ordering thoughts, but in considering issues like constraining the liberty of the individual or risking nuclear weapons proliferation and war, it has little or no role to play. RIA is, he inferred, unable to deal with ethical and political choices.

The problem of who should evaluate what in the RIA cycle was nicely illustrated by a difference of opinion between Dr Timothy O'Riordan from the University of East Anglia, and Mr Carl Tham, now Sweden's Minister for Energy. Arguing that the technically-sophisticated identification and estimation phases of RIA have been more fully developed than the evaluative and control phases, Dr O'Riordan said, "Ideally, the basis upon which key decisions are made in the evaluative and control aspects . . . should be made fully public and should be subject both to extra-parliamentary and parliamentary debate." Taking the academic's view, he saw this as a means of incorporating values into the cycle, to counter our present blind faith in scientific advice. Mr Tham, on the other hand, recommended quite a different procedure. "Politicians or decision-makers are best served with hardware facts about risks and their impacts on health and environment", he said. "Then it's our (ie the politicians') job to evaluate these facts as sensibly as possible and to make the necessary appreciation of costs and benefits." But can the politicians assume that they understand how the public perceives issues? There is "an immense gap between the views of technical experts and the views of a significant portion of the public", concluded Drs Paul Slovic, Sarah Lichtenstein and Baruch Fischhoff of Decision Research after studying opponents of a nuclear reactor to see how they perceived the threats it posed. Are the politicians informed and impartial enough to make their policies reflect these perceptions?

The RIA cycle does not end with the policy-makers, either: management, generally in the form of organisations, then takes over. But there is no guarantee that what is actually done will be even vaguely like what the policy-makers intended to have done: a gap demonstrated by Dr Shelagh Staynes fom London University's Monitoring and Assessment Research Centre, who talked about the administration of lead pollution ocntrol in the UK.

A more surprising difficulty with RIA is that there is so little communication between the different groups involved in it. The seminar—held jointly by the International Institute for Energy and Human Ecology (the Beijer Institute) and the Swedish Energy Research and Development Commission in association with UNEP—did at least get these groups talking to each other. Pointing out that natural scientists, politicians, psychologists and ecologists all contributed to the meeting, Professor Gordon Goodman, the Institute's Director, said, "There have been few occassions—it happens almost never—when people quantifying objective risk have talked to people trying to measure a democratic society's evaluation of risk perception. The policy-maker relates to the scientist and sometimes to the sociologist, but there has been no logical attempt to bring it all together." As far as Professor Goodman was concerned, however, the seminar summarised the state of RIA art and pointed to areas where more work could usefully be done to try to shed some light on the way many social policies are made. One of these, which the Institute hopes to take up, concerns threats of small probability but high significance: how could these be incorporated into RIA? How can the management process deal with them? Another area is "safety engineering": using RIA to identify technological systems' weak spots and cost-effective methods of improving them. Then there is a need for *post hoc* and comparative risk studies. The list is long, and illustrates how little we know about working out the greatest good for the greatest number. □

Reprocessing at Windscale: the risk may be high or low, but how to deal with ethical and political choices?

**From a paper presented at the seminar by Dr Raphael Kasper of the USA's National Academy of Science's Environmental Studies Board.*

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