Chernobyl report

Drama of human perversity

Vienna

THE world's nuclear engineers gathered to hear the Soviet account of the Chernobyl accident on 26 April do not yet know whether they are at a wake for nuclear power or at a launching ceremony for a new generation of safe reactors. Nervously, they have crossed their fingers and praised the Soviets for their frankness.

The head of the Soviet delegation, Academician V.A. Lugasov, won over many critics with a gripping five-hour presentation of the authentic accident report, including personal asides hinting at disagreements on technical matters among Soviet officials. The highlight of the presentation was a video film, made under obviously hazardous conditions, showing the huge scale of the damage caused by the explosion of the No.4 reactor, with its contiguous neighbour miraculously undamaged. As in films of the *Titanic* at the bottom of the Atlantic, four of the eight reactor cooling pumps picked out through the gloom by a flickering spotlight seem as pristine as when they left the factory.

By Lugasov's account, the causes of the accident were not so much human error as human perversity. Plant operators in a hurry to complete a test of the reactor turbine's capacity to span a few seconds interruption of power supply, itself "poorly" designed, dealt with successive danger signals by disabling the safety systems meant to deal with them. In resignation, Lugasov said that when the RMBK-1000 reactor was designed 20 years ago, people had thought that human beings would be more reliable than automatic safety systems. Now he was not so sure.

The Soviet delegation has nevertheless acknowledged several technical defects of the reactor, whose merits are said to include simplicity and low cost. Lugasov pointed in particular to the disadvantage that, as excess steam forms in the water-cooled fuel channels, the reactivity of the reactor increases and also the complexity of the control system required to keep the power output stable.

Other RMBK reactors operating in the Soviet Union will be modified by 1987, chiefly by increasing the fuel enrichment from 2.0 to 2.4 per cent, with an estimated loss of 10 per cent of power output. Thereafter, there will be more radical modifications not yet decided.

The future of the Chernobyl site is much less clear. Two of the four reactors completed at Chernobyl have been decontaminated, but cannot yet be brought back into action for lack of housing for the operating staff now that the towns of Pripyat and Chernobyl are uninhabitable. Decisions remain to be made about reactor No.3 and the two other reactors whose construction was under way at the time of the accident.

Lugasov's statement has also cleared up some of the questions that have been puzzling the West since the end of April. Thus, he said, there was no undue delay before the plant operators told Moscow of the accident, which meant that a team of specialists could be despatched to Kiev by 8 p.m. on 26 April. But the plant operators subsequently transmitted misleading information about the state of the reactor, the effect of which was to underplay the damage to the reactor and the release of radioactivity.

Lugasov also stoutly defended the decision not to evacuate 49,000 people from Pripyat until 11 a.m. on 27 April, more than 30 hours after the accident. "Strange as it may seem", he said, there was no significant contamination until 9 p.m. on 26 April, when it was judged safer to keep people indoors overnight.

The second wave of radioactivity after a week's delay was explained this week by the heating of the damaged reactor core to an estimated 2,000°C because of the thermal insulation of the clay and sand which, with other materials, had by then been dumped on top of it. More could not be added for fear of making the reactor foundation collapse, but there seems to have been no danger of a fuel meltdown.

John Maddox

Private money for AIDS research

Washington

THE US Public Health Service (PHS) wants to encourage private sector involvement in its efforts to find a vaccine to prevent acquired immune deficiency syndrome (AIDS). To that end, PHS spelled out in the 23 August *Federal Register* a more formal framework for collaborative efforts between the government and private institutions. The hope is that such collaborations will speed up the search for an AIDS vaccine, but some wonder whether the government has a sufficiently succulent "carrot" to encourage industry to play along.

Under the framework, PHS will not provide any financial assistance to its collaborators. Instead, it will offer knowhow from its component agencies — the Alcohol, Drug Abuse and Mental Health Administration, the Centers for Disease Control, the Food and Drug Administration (FDA) and the National Institutes of Health (NIH). This assistance could include patent licences, research results, facilities, animal models and animal testing, and help in formulating clinical protocols and clinical trials. PHS is interested in finding collaborators who will be involved in all steps in vaccine development, from basic molecular biology to clinical trials to marketing and commercial production. Companies unable or unwilling to participate in such a large scale project are encouraged to find others in the private sector to join with them in collaborating with the government.

PHS identifies two basic approaches to vaccine development that it wants to pursue. One is the development of a synthetic vaccine, generating viral antigens from whole virus, or using recombinant DNA techniques, chemical synthesis or anti-idiotype antibodies. The other is development of a live, genetically altered viral vector or attenuated vaccine. PHS will also consider other approaches, such as passive immunization, if they show promise.

A special committee established by the assistant secretary for health of the Department of Health and Human Services will make final decisions on collaboration following a review by the applicable PHS agency. PHS decisions will be based on an applicant's experience and ability to achieve its stated goals.

In the past, some companies have been reluctant to enter into collaborations with the government for fear that their proprietary research could be made public under the Freedom of Information Act. Lowell Harmison, science adviser for PHS, says companies will be protected from unwarranted disclosures as far as the law allows, but otherwise will have to give careful thought to how they word their applications. George Galasso, assistant director for extramural research at NIH, does not think these caveats will be sufficient. Companies that really have a promising vaccine approach "will go it alone", leaving the "also-rans" to seek government help.

Galasso also wonders whether formal collaborations with the government will speed the development of a vaccine. Scientist-to-scientist relationships have worked well so far, says Galasso, and will continue to be available when the need arises. Dino Dina, director of virology for Chiron Corporation, says having FDA help in developing acceptable standards for animal trials and initial clinical trials would be useful. But he feels a more efficient approach would be to make such information available to all comers.

Dina also worries that previous offers of "collaboration" from the government have turned out to be more take than give. But Harmison says the PHS plan is a fresh approach to cooperative arrangements. He hopes that the offer of government facilities and expertise will encourage companies with interesting ideas about vaccine development to pursue them.

Joseph Palca