Research reactors

NRC rule may backfire

Washington

THE only consequence of a worthy attempt by the Nuclear Regulatory Commission (NRC) to promote the cause of nuclear non-proliferation may be to damage research and training in universities. That is the fear of many of the 25 universities in the United States which operate research reactors and which expect to be asked, in a draft NRC rule this month, to convert them from high to low enriched uranium fuel.

The new rule is ostensibly intended to reduce the risks that terrorists might steal enough weapons-grade uranium to make an atomic bomb, but the universities believe the threat of terrorism is already minimal and that the NRC action is politically motivated.

The 25 reactors are widely used. One of the largest, the 10-MW reactor operated by the Massachusetts Institute of Technology (MIT), generates several million dollars a year of sponsored research for the institute. In addition to training nuclear engineers, MIT uses the facility for neutron analysis of trace elements, for the production of medical isotopes and for research on power reactor safety.

Dr Otto Harling, director of MIT's nuclear reactor laboratory, said last week that the danger of terrorism had been exagerated. He claimed that none of the university reactors was allowed to store more than 5 kilograms of unirradiated fuel, and that at least 15 kilograms of uranium was necessary to produce a crude nuclear weapon. To steal enough uranium for a bomb, terrorists would have to attack several reactors at once or — a complex and hazardous undertaking — remove burned fuel from the reactor core.

Although the Department of Energy (DoE) is spending some $5 million a year on development of new kinds of low-enriched uranium for research reactors, it appears to agree with the universities' assessment. Testifying in the Senate last month, Dr Alvin Trivelpiece, director of research at DoE, said he did not believe there was much risk of sabotage or theft at the university facilities. NRC, however, is expected to press ahead with the rule as a gesture designed to impress foreign countries with the United States' concern about the dangers of nuclear proliferation.

Many of the 25 university reactors use uranium that is more than 90 per cent enriched. A university study group set up by NRC last year concluded that several of them could be converted to use a new 20 per cent enriched fuel developed by the Argonne National Laboratory, but Mr Lincoln Clark, director of reactor operations at MIT and a member of the panel, said the universities doubted whether the exercise would be useful, since universities accounted for only 10 per cent of the weapons-grade uranium used in research reactors. The bulk, used by DoE's research reactors, would not be affected by the rule.

The universities also fear that the measure could backfire. One worry is the estimated $15 million cost of conversion. Unless DoE foots the bill, several financially hard-pressed universities are likely to close their reactors rather than convert them. And according to Dr Harling, it is all too probable that anti-nuclear groups would take advantage of the public hearings that would be required when relicensing converted reactors to try to close university reactors altogether.

NRC has told the universities that it will try to make any relicensing hearings as smooth as possible, but the universities doubt whether any short cuts are legally possible. Meanwhile, there are knotty technical obstacles to be overcome. Several of the reactors were designed with a lifetime fuel core, and conversion will therefore be difficult. And the two biggest reactors — at MIT and Missouri — cannot be modified because there is not enough room in their cores to accommodate the larger volume of low-enriched uranium.

Peter David

IAEA steps in

THE International Atomic Energy Agency is to prepare a safety guide laying down principals for decommissioning research reactors. The agency points out that 100 of the 270 research and test reactors in operation worldwide are more than 20 years old and so approaching the end of their useful lives. Although there are no special difficulties in decommissioning research reactors that have not been met in power reactors, experience so far is limited to industrialised counties. And the reactors are very varied in their construction.

Most of the new research reactors being built are in developing countries, and the agency wants clear criteria for decommissioning to be established and incorporated into reactor designs. In both Britain and the United States the shrinking nuclear power industries have resulted in a lower demand for nuclear engineers, and financial pressures on higher education institutions have made reactors seem very expensive training tools.

A teaching reactor at Queen Mary's College in London was decommissioned a few years ago because the college could not afford to run it. Others are facing a 15 per cent down-grading of their thermal flux ratings because of the need to convert to low enriched fuel; for some applications this could mean a real loss of capability. The pressure to change to low enriched fuel is blamed on US restrictions on the export of very highly enriched fuel. Tim Beardsley

Aachen hospital

High hopes — higher costs

THE Gross-Klinikum of the Technische Hochschule at Aachen in West Germany (see *Nature* **297**, 267; 1982) is more bedevilled by financial problems than ever before in its 15-year gestation. Estimated completion costs have risen to more than DM 2,400 million (£635 million) and on the advice of a still secret report of the *Bundesrechnungshof*, the West German Ministry of Education and Science is refusing to pay more than its 50 per cent share of a previously agreed limit of DM 1,700 million. Eventual running costs of DM 500–600 million a year will be borne entirely by the *Land*.

The eight-storey building — the so-called *Bettenberg* — covers the area of five football pitches and contains 52 operating theatres and 1,500 beds. It will be devoted 44 per cent to research and teaching and 66 per cent to hospital functions, replacing the ageing medical facilities of the border city of Aachen. It is unique in Europe in providing integrated health care, research and educational facilities under one roof.

Medical focus will be particularly on kidney disease, heart disease, paediatric cardiology, burns and plastic surgery. The clinic will have a yearly intake of 450 medical students, 80 dental students and 500 students in ancillary professions.

Clinical research, will emphasize biomedical technology, driving mechanisms for artificial hearts, synthetic valves, vibration techniques for removal of kidney stones and neuroradiology.

Conceived by the *Wissenschaftsrat* in the 1960s in a mistaken estimate of the health care needs of the Aachen area, and on an erroneous assumption that it would draw patients from outside Germany, many of the massive costs can be laid at the door of the concept of *Synchronplanung*, meaning planning while you build. Inflation, changes in building regulations and the needs of progress in medical and pharmaceutical knowledge, added to a large measure of error, omission and general incompetence and mechanical subsidence, have produced an unparalleled financial situation. There is litigation between the *Land* and the builders *Neue Heimat Stadtebau*, the *Land* does not accept the report to the federal ministry, which is refusing to raise its contribution partly on the grounds that this could curtail its contribution to other institutions in North Rhine-Westphalia, and there are fears that, having siphoned off 230 academic jobs from universities in the *Land*, the clinic may have a continued unhealthy influence. The general secretary of the Free Democratic Party, Frau Adam-Schwätzer, this week called for closure of one-third of the clinic to stem mounting costs.

Sarah Tooze