SWEDEN

● Less than a week after the formation of Sweden's new three-party government, Prime Minister Thorbjörn Fälldin's election promise to stop the insertion of fuel into the Barsebäck 2 nuclear reactor fell victim to the compromises said to be necessary for the survival of the coalition and insertion was allowed to go ahead. In a declaration of the government's programme, Fälldin said in effect that the government would stop the reactor going into operation unless its owners produce acceptable plans for the reprocessing of spent fuel and proof that radioactive waste will be stored in complete isolation from all life for eternity. The deadline for the presentation of these plans is October 1, 1977.

Politicians opposed to nuclear energy assert that the reactor's owners will not be able to come up with any proposals acceptable to the government. The nuclear industry is confident that it can. The effect is to throw open the entire question of whether the country's reactor plans are to be stopped, or even greatly slowed down: Sweden's construction workers are already seeking assurances about nuclear power stations now being built.

Fälldin also announced the formation of a commission which will evaluate the research done so far on the security and environmental aspects of nuclear power as well as the storage of highly radioactive waste. The commission is also to make suggestions for a new energy policy to be presented to parliament in 1978, until which time it seems that the futures of other reactors under construction will hang fire. It has at least been made clear that the twelfth in the planned series of thirteen reactors will not now be built at all, and this would presumably also apply to the thirteenth.

Meanwhile, in what has been dubbed as Operation Striptease, the findings of the Committee on Radioactive Waste have been attacked by academics and politicians who want to reveal its unwarranted optimism about the long-term storage of spent fuel. Action to endorse the committee's conclusions has come from only one source, a local government council which, amidst lively public debate, has voted to allow reprocessing and storage plants to be built near the Forsmark reactors already in operation.

● The hullabaloo over Barsebäck 2 has overshadowed a surprisingly favourable legal decision recently won

by one anti-nuclear power group. The Supreme Water Court has ordered the State Power Board to lower the level of radioactivity in the cooling water to be discharged from the third and fourth Ringhals reactors. In addition, the Court has directed the Board to pay about US\$22,000 in legal

costs to those who pressed the case, the environmentalist Björn Gillberg and Gunnar Michelson, a lawyer.

Following the Court's decision, the release of tritium must be lowered from 10,000 to 3,700 curies per reactor per year; of isotopes emitting beta and gamma rays, from 100 to 2–24 curies per reactor per year; and of isotopes emitting alpha rays, from 50 to zero curies per reactor per year. As the case of beta and gamma rays suggests, the new figures are not so much absolute limits as indications of what the Court thinks should be feasible, according to what is technically possible and economically reasonable. Its decision allows the Power Board to make very occasional releases of much greater amounts of radioactivity—but only when it may be technically impossible to avoid doing so. Any repeatedly greater releases would be investigated by the National Institute for Radiation Protection and could put the Board back in court for another trial.

Gillberg and Michelson lost that part of their case in which they had argued for a reduction in the volume of cooling water which is to be released into the sea. According to Gillberg, they are thinking of appealing on this issue to the Supreme Court. If they do, they will shore up the Prime Minister's creaking campaign to stop Sweden's nuclear power programme. The reactors' debut (planned for December 1977 and July 1979) would have to be postponed until the appeal had been heard and a judgment made, a process which would probably take two or three years.

● With nuclear fission such a controversial issue, the case for fusion could grow. Bo Lehnert, professor of plasma physics and fusion research at Stockholm's Royal Institute of Technology, says fusion would not involve the two problems normally associated with fission, namely radioactive waste products and reactor accidents; the radioactivity which neutrons would induce in the material surrounding the reaction could be diminished by using vanadium and its alloys in the wall material. He says that even if materials less suitable than these were used, the level of radioactivity and the corresponding biological hazards would be many orders of magnitude smaller than with a corresponding amount of energy produced by fission. Reactor accidents would also be less severe with fusion than with fission, says Lehnert, partly because no runaway nuclear reactions would be possible in an incident involving a fusion reactor.

Fusion power, then, is extremely attractive to the Swedes, as it is in many developed countries, and they have not been idle in their research. Their interest dates from the mid-1950s, Lehnert's group being financed mainly by the Swedish Atomic Research Council and the Bank of Sweden Tercentenary Fund. From 1976, however, it has joined with the team working under Hans Wilhelmsson, professor of electromagnetic field theory at Chalmers Institute of Technology, near Gothenburg, to form a fusion research unit associated with Euratom, which now shares the support of the unit with the Atomic Research Council. The immediate result of this has been a doubling of research funds, which amount this financial year to Skr4 million (about US\$900,000).

Lehnert is, however, dissatisfied with what he considers to be the narrowness of present fusion research. His general, and personal feeling—"controlled optimism for controlled fusion"—cannot give immediate comfort to anyone involved in the debate over fission reactors. Given a frontal attack on a wide variety of problems, including basic research, new ideas and modified old ideas, he believes that commercial fusion reactors may be "not quite unimaginable" before the year 2000. But with research going in current directions at its present level of finance, he forecasts a longer wait.

Wendy Barnaby