

## Fusion research Where to next?

### Brussels

The European Economic Community and its partner countries, Sweden and Switzerland, should go ahead with research into thermonuclear fusion — according to the European fusion review panel. The road to commercial fusion will, however, “be long and costly” and it appears unlikely that commercial fusion power will be in general use within the next 50 years. These are the main conclusions in the review panel’s report published last week.

The European Commission has also released the proposed programme for the next five years (1982–86) which will now be discussed in the committee of the member states’ permanent representatives (Coreper). It says that a major landmark in fusion research has almost been reached. There is a good prospect that the full objectives of JET (Joint European Torus) may be achieved and that the results could go beyond the stated objectives and attain thermonuclear ignition.

The construction of the basic JET device is now expected to be completed by the end of 1982 and the first discharge could take place in April 1983. A problem in going further, the review panel’s report points out, is that the device will become radioactive and hence inaccessible after experiments with tritium take place. But unless this step is taken, JET cannot be used to answer the crucial question of how the plasma behaves when alpha particles from the deuterium–tritium reaction are produced in large quantities. This knowledge is essential for progress towards the stage after JET.

This next step is called, with refreshing logic, NET (Next European Torus) and would demonstrate the technical feasibility of a commercial tokamak. The concept of an international commercial demonstration tokamak (INTOR) is being studied under the auspices of the International Atomic Energy Authority (IAEA). The review panel recommends that the Europeans need to make preparations for studies of the new technologies.

“But the Community will only be able to contribute to and benefit from INTOR if it develops in parallel its own design of a next step device and the technological

know-how necessary to undertake its construction. Both the Japanese and Americans are planning their own next step devices” warns the report.

The panel also weighs up the pros and cons of fusion research apart from the tokamaks and, not surprisingly at this early stage in the art, feels that options should be kept as wide open as possible. The three new specialized tokamak projects (TORE SUPRA, FTU, ASKEX-UPGRADE), which are at various stages of design, are also considered well justified.

Both the European Commission and the review panel favour the Reverse Field Experiment (RFX) proposed by laboratories in Culham, Padua and Los Alamos. An agreement has been drawn up under which the United States contributes \$8 million out of the total cost of \$48 million, but this awaits approval from the member states. The United States is also likely to participate in the two-stage development of the Advanced Stellarator. This would mean rebuilding the existing device in Garching, West Germany, and a new and much bigger stellarator later on.

All this research is likely to cost around 1,500 million European Units of Account (£740 million) over the next five years, according to the report: 400 million for JET, 560 million for the running costs of the associated laboratories, 125 million for investments in new supporting tokamaks, 260 million for the technology programme and NET and about 40 million for investments in the new alternative devices. This agrees with what the Commission has outlined.

The review panel’s report highlights several issues likely to give rise to political problems. One of these is the future of Culham. Should it be the site of the next step project and what should be done to prevent the tokamak becoming useless once it is radioactive? Also questioned is the belief that fusion is as unpolluting as has been argued — the radioactive waste will have to be stored. Finally, there is a danger that the duration of nuclear fusion research will outstrip the mortality of its acolytes. The average age of Community staff is 45 and the increase of average age is very nearly one year per year. Thus in about 15 years time when these staff retire, most of the know-how acquired in 30 to 40 years of research “will disappear rather suddenly.”

**Jasper Becker**

## Clinch River reactor Start again folks

### Washington

After four years of delay caused largely by President Carter’s reluctance to make a full-scale commitment to the “plutonium economy”, plans for the construction of a liquid metal fast breeder reactor at Clinch River in Tennessee have been put squarely back on the rails by the US Congress.

Despite support from President Reagan, it was never a foregone conclusion. In May, the Science and Technology Committee of the House of Representatives voted against funds for the initial construction work on the 350 megawatt reactor, which has been on the drawing board since the early 1970s, and for which over \$500 million worth of components have already been delivered.

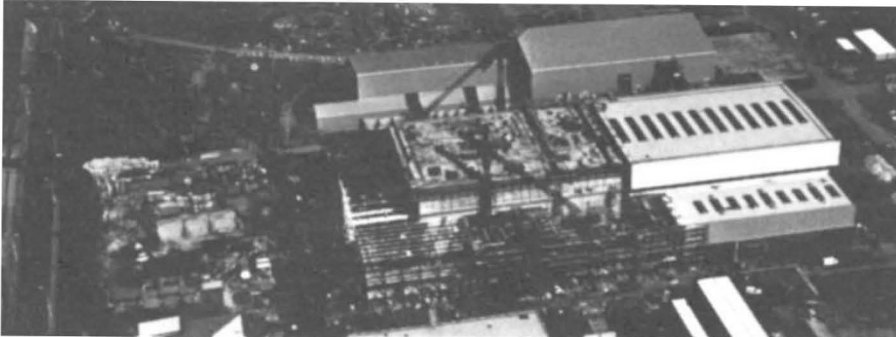
In previous years the same committee had spearheaded congressional efforts which succeeded in preventing President Carter from killing the project; this time, cost-conscious Republicans added their voices to the previous minority which had argued that no further federal funds should be committed.

But larger political forces were at work. In particular, strong support for the construction of the Clinch River reactor came from Senate Leader Howard Baker, who represents Tennessee, and for whom the reactor means both jobs and votes. Reflecting Mr Baker’s wishes, the House accepted a Republican amendment to the budget bill at the end of last month which overturned the recommendations of the Science and Technology Committee and inserted \$230 million for preliminary construction of the reactor as proposed by Mr Reagan.

Similar approval has already been given by the Senate (which, ironically, has in past years voted to terminate the project). And although the decision to go ahead with construction must now pass through the appropriations process, it seems that after the crucial House vote this will be little more than a formality.

Opponents of the fast breeder maintain their opposition on several grounds. One is that the declining price of uranium over the past three years has reduced the need for a rapid breeder programme. The pressure has also been eased by declining predictions of future demand for electricity. And even many of those who support fast breeders in principle feel that the Clinch River design is now out-of-date.

The critics appear to have a covert ally in the new director of the Office of Management and Budget, Mr David Stockman. Long opposed to heavy federal subsidies for energy demonstration projects, Mr Stockman wrote to fellow Congressmen in 1977 stating explicitly that the federal government’s 90 per cent support for the Clinch River reactor was “totally incompatible with our free-market approach to energy policy”.



JET nears completion