

## Fast breeder reactors

# Europeans sign joint development programme

THE United States may have abandoned Clinch River, but Europe last week confirmed its commitment to the fast breeder reactor. At least, that is one interpretation of an agreement signed on Wednesday by five European states — the United Kingdom, France, West Germany, Italy and Belgium — to open the way to cooperation on fast breeder research and development and commercialization. A more sanguine view is that the agreement is largely a way to reduce the embarrassing £300-million a year cost of European work on fast breeders.

Britain, for example has already announced a cut in its fast breeder programme. Britain's present spending of £108 million a year (1983-84) will fall by a third by 1986-87, according to a spokesman for the UK Atomic Energy Authority, notwithstanding the new agreement (which does not mention cash figures).

Moreover, Peter Walker, Britain's Secretary of State for Energy, said in announcing the agreement that the fast breeder potential (for energy supplies next century) "can be developed only if Europe . . . is assured that it would provide an economic supply of energy". The memorandum is directed towards this end, he said, and to assuring safety. At the moment, fast breeder electricity is not economic, the costs being estimated to be about double those of a thermal pressurized water reactor.

Nevertheless, the other major partners are pushing ahead rapidly with their own fast breeder construction programmes. In the south of France near Avignon, the 1,200 MWe Superphénix reactor, cooled by a great basin of liquid sodium, nears

connection to the grid, and at Kalkar in West Germany the SNR 300, cooled by a sodium loop, should be completed in 1985, and connected to the grid in 1987. The German Federal Government claims to have solved the problem of financing Kalkar by transferring the bulk of construction costs to industry — but it is still financing the fast breeder research and development team at Karlsruhe. This team should also be supported by industry, the government argues, and it hopes that the companies will agree.

Meanwhile the international agreement signed last week will enable the transfer of know-how, technologies and people among the partners. "It would be absurd", said Mr Walker, "for various countries in the European Community to duplicate the research and development work that is needed. The work can be done more effectively and more economically by working together."

Exactly what economies will follow is not clear, but the agreement signed last week is to be followed at an early date by other more detailed agreements covering research and development, industrial cooperation, patenting and industrial property, fuel cycle arrangements (including transport and processing of plutonium) and an inter-utility agreement "to provide for the joint realization of fast reactor power stations and the exchange of operational experience".

It is not thought likely that Britain, at least, would consider building a successor to Superphénix for upwards of 10-15 years. France, too, may find it difficult to support, with the national utility EDF currently facing international debts of FF150,000 million (£12,500 million) and a surplus of electricity. **Robert Walgate**

## French fast breeder reactors

# Military doubts in France

COULD the new European agreement on fast breeders help France to make more nuclear weapons? On the face of it, such a military interpretation would fly in the face of the agreement, a "memorandum of understanding" which announced that signatories "confirm that activities taking place as a part of this collaboration will be directed to the peaceful development of nuclear energy".

Nevertheless, simply to maintain the security and future of the French fast breeder programme — the main component of European work — is also to maintain the French weapons programme, a vociferous group of French scientists is claiming.

Jean-Pierre Pharabod of the Ecole Polytechnique, for example, claims that the 40 MWth Phénix reactor — a prototype fast breeder power station now to be succeeded by Superphénix — has been used for military plutonium production. Pharabod also says that this fact has been communicated by France to the director of Euratom, the European treaty organization for nuclear research, based in Brussels.

Certainly, France has not submitted inspection of Phénix to the International Atomic Energy Agency (IAEA) — unlike the UK Atomic Energy Authority's Dounreay fast breeder, the PFR, to which IAEA inspectors have been admitted. According to Pharabod, the French military actually need Superphénix (a 1,200 MWe station due on line next year) to fulfil their planned (and announced) expansion of the French deterrent. The number of submarines, now five, each equipped with 16 missiles each with a single warhead, is to increase to seven submarines with the same number of missiles but each with six warheads; and there will be some 200-400 new tactical weapons with yields of some 100-300 tonnes of TNT. (For example, 120 Hades missiles will replace the present 40 Pluton ground-to-ground weapons.)

These developments will need new plutonium, and the arithmetic shows that only Superphénix can provide it, says Pharabod. Thus it is impossible in France to disentangle peaceful from military uses of plutonium, however much the new memorandum of understanding might appear to do so.

Indeed, according to a statement to the French Parliament by a socialist deputy, M. Georges Benedetti, who represents the nuclear area of Marcoule, "the fast breeder is the best choice for assuring both national energy independence and military independence . . . The fast breeder is the only means now of making plutonium of more than 95 per cent Pu-239 in sufficient quantities to feed the development of our nuclear forces". **Robert Walgate**

# Asian academy established

## New Delhi

A FEDERATION of Asian Scientific Academies and Societies has formally been established with the long-term aim of "solving regional problems without disturbing the natural ecosystem". The idea of such a federation was formulated at a meeting sponsored by the Indian National Science Academy (INSA) two months ago. Appropriately, the formalities setting up the 10-member federation were completed on 15 January, the day before the golden jubilee celebrations of INSA.

INSA, the oldest of India's science academies, though not of its learned institutions (the Calcutta-based Asiatic Society has just celebrated its bicentenary), is the organization responsible for India's

international scientific cooperation programme. Guests at the celebration therefore included representatives from many national academies as well as the American Association for the Advancement of Science and the Royal Society of London, all of whom were to address the two-day symposium following the jubilee session.

The main issue at present facing Indian science — the balancing of the pursuit of excellence against the immediate needs of the country — was, however, the keynote of the jubilee session. Professor A. K. Sharma, president of INSA, stressed the need to ensure the academy's autonomy by guaranteeing it an annual budget that would be stable in real terms.

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