NEWS AND VIEWS

Uranium in Plenty

THE United States Atomic Energy Commission has now made public the production capacity of the gaseous diffusion plants at which it manufactures enriched uranium, chiefly as a demonstration to industrial interests in the United States and elsewhere that nobody needs to worry about the availability of enriched uranium for power production, at least for some time to come. Inevitably, the AEC has had to provide information about its capacity to manufacture nuclear explosives which has only previously been guessed at. There is, however, at this stage no prospect that the technology of gaseous diffusion will become public knowledge, and the AEC has emphasized its intention that classification should persist.

The way in which the gaseous diffusion plants have been run down in the past six years is also apparent from the statement by the AEC. Electricity consumption at the three plants now operating is running at about 3,000 MW, compared with a peak consumption of nearly twice as much in the early sixties. In its statement, the AEC says that it is at present intended to reduce the operation still further until electricity consumption is running at roughly 2,000 MW by the end of 1968. Even then, when production will be roughly a third of full capacity, the AEC will be able to produce more than 3,500 metric tons of uranium metal enriched to 2 per cent in uranium-235. The corresponding production of uranium sufficiently enriched for the manufacture of weapons would be more than 30 metric tons a year.

The production capacity of the gaseous diffusion plants has been described in terms of the number of units of separative work performed on the isotopes of uranium by different quantities of electrical power (see Table 1). The non-linear character of this relationship no doubt reflects the way in which production is most efficient when the diffusion plants are working below their full capacity. The separative work done in separating isotopes is really a measure of the entropy of mixing of the two products, and in the operation of a diffusion plant the work done to produce a given quantity of enriched uranium will depend not merely on the degree of enrichment but also on the concentration of uranium-235 in the depleted uranium rejected from the plant as tailings. At present the AEC is operating its plants in such a way that tailings contain 0·2531 per cent of uranium-235, which implies that annual production (with electricity consumption running at 3,000 MW) would be equivalent to 2,615 metric tons of uranium enriched 3 per cent or 5,215 tons of uranium enriched 2 per cent.

Table 1. SEPARATIVE CAPACITY OF US GASEOUS DIFFUSION PLANTS AS A FUNCTION OF POWER CONSUMPTION

Megawatts	Annual production (millions of kilogram units of separative work)
2,000	6·9
3,000	9·9
6,000	17·0

In its statement the AEC says that the US government will need "only a small per cent" of the production of the gaseous diffusion plants during the seventies. Now that private operators of power stations in the United States may own their own uranium, the AEC is going to undertake to enrich this at its diffusion plants beginning in 1969.

British Diffusion

INTEREST in gaseous diffusion for the separation of uranium isotopes has also recently been awakened in Britain. For one thing, work is well in hand with the scheme to prepare the diffusion plant at Capenhurst for the more efficient production of enriched reactor fuel. This work will cost a total of £14 million, and is intended to put the UK Atomic Energy Authority in a position to supply fuel for the advanced gas cooled reactors now being built in Britain—but not yet elsewhere. But there is also talk of the further extension of the plant to provide enriched fuel for power reactors being built in Europe. These schemes raise a number of problems.

The chance that the United Kingdom might be able to sell enriched uranium cheaply enough to compete with fuel from the United States is clearly sufficiently real for meaningful discussions on the subject to be held, but there is also talk of how it would be even more advantageous if an enlarged diffusion plant could be coupled more or less directly to an AGR reactor so as to take the fullest advantage of the high load factors of both types of machines. But if Capenhurst is to be extended so as to produce enriched fuel for reactors in Europe, who is to pay the initial cost? Obviously the AEA would like to see some at least of the capital coming from Europe, although it is hard to see how that could happen without compromising the authority's right—even duty—to keep the technology of gaseous diffusion to itself. But it is also known that the Government as a whole is uneasy about some of the political implications of the scheme. The possibility that export sales of reactors may eventually be determined by the capacity of the potential vender to offer continuing supplies of enriched uranium is never far beneath the surface.

Computers in Concert

THE British computer industry will be permanently transformed by the proposed merger of two of the principal companies in the field—English Electric and Elliott Automation. On its own merits, the scheme is likely to appeal to shareholders of Elliott Automation, who have not done particularly well in recent years and who will be flattered to know that English Electric has valued their business at more than £41 million. Then everybody concerned will be cheered to know that the Industrial Reorganization Corporation has agreed to lend the joint enterprise £15 million in return for a modest rate of interest and the right to buy English Electric shares six or eight years hence. Evidently the marriage is well blessed, although it seems also to be an open secret that without this handsome dowry from public funds it would have been much less attractive to the proposed partners—both of them have found in recent years that good ideas