Feb '60

Memorandum on the US - EURATOM Joint Program

Before assessing the present state of the Program, it may be useful to recall the aims the authors of the Program had in mind when it was first conceived.

1. Objectives

The first aim was a political one, and one which seems to be even more valid now than in February 1958: it was to strengthen, by a combined effort, the unity of Europe and the ties between this new European Community and the US.

The second aim was an economic one; it was to add to the reactor experience already gained in the United States the experience of full-scale construction in Europe, where the cost of conventional fuel was, and still is, higher. This effort was to be accompanied by a major research and development program, in order to surmount rapidly the problems of first generation reactors and thus to approach the stage wherein atomic energy would be fully competitive with conventional energy.

But these two targets were to be reached only under certain conditions:

1) Neither the United States Government nor Euratom intended to get into the power-reactor business or become directly involved in the management decisions to proceed with this or that reactor.

2) Therefore, the Program had to create conditions which would lead to management decisions in favor of proceeding with the construction of reactors. The Program had to devise incentives sufficient to induce utilities to enter the field, but, at the same time leave them a fair share of the burden. These incentives were to be calculated on the basis of economic assumptions which, as explained below, proved to be inaccurate, because of changed circumstances.

3) It was to be a joint venture; meaning that both American and European industries would be involved in the Program.

4) Finally, it was thought that in view of the public money allocated to the Joint Research and Development Program, discoveries made within the framework of it had to fall in the public domain.

In short, it was always realized that utilities entering the atomic field would have to pay a price for it. The Joint Program was thus designed to bridge part of the gap between the cost of conventional and nuclear plants.

2. Status of the US - Euratom Joint Reactor Program

An invitation for proposals was issued on April 13, 1959. In response to this invitation, five utility groups submitted letters on May 29, expressing their intention to participate in the first phase of the Program. Each of these utilities, by October 20, had confirmed this intention. But only one out of the five fully met the requirements of the invitation.

SENN

This group is the Società Elettronucleare Nazionale (SENN) of Italy. The SENN proposal is for a boiling-water reactor of 150-megawatt capacity and will be located at Puntafiume between Rome and Naples. The prime contractor for its construction will be the International General Electric Company.

The study of this project has been completed and the Joint Reactor Board has submitted its report to the Euratom Commission and to the United States Atomic Energy Commission for their decision.

A.K.S.

The Joint Reactor Board has made a preliminary study of the proposal received from the "Arbeitsgemeinschaft Baden-Württemberg zum Studium der Errichtung eines Kernkraftwerkes"(A.K.S.) of Germany.

This plant would be located at a site as yet unspecified in Baden-Württemberg. Prime contractor for the nuclear portion of the plant would be Atomics International, which would work with its German affiliate, Interatom. Brown, Boveri would act as architect engineers and prime contractors for the conventional portion of the plant.

The German Federal Government has expressed its readiness to cover part of the difference between conventional and nuclear costs up to 100 million Deutsche Mark. Negotiations are taking place between the A.K.S. Group and the German Federal Government for further financial and economic assistance in connection with steps to be taken for the purchase of the site and the execution of the "Title I" design.

C.N.A.

Electricité de France, E.D.F., together with a Belgian Company, Centre-et-Sud, have submitted a proposal for a 200-MW plant to be located at Chooz, near the Franco-Belgian border, on the Meuse River. A Company has been founded, C.N.A., the site has already been surveyed, but the final choice of the type of reactor has not yet been made. The sponsors of this project wish to construct a more advanced type, rather than a "replica" of current reactors. The decision should be reached in March/April 1960.

S.E.P.

The S.E.P. which groups all the producers of electricity of the Netherlands, have expressed their continued interest in the Joint Program, but will not be participating in the 1963 phase of the program.

BEWAG

The West-Berlin utility BEWAG has expressed its desire to participate in the Joint Program with the construction of a 150-MW reactor. The construction of a nuclear reactor in West-Berlin would be of particular economic interest, but owing to the special juridical position of West-Berlin, legal problems are involved. Furthermore, the safety aspect must also be carefully studied in such a heavily populated area. At the end of October last year, the Mayor of Berlin, Mr. Willy Brandt, confirmed to Euratom in Brussels the importance his city attaches to such a construction. He indicated that, owing to the problems involved, completion should be expected before 1965, but not by 1963. Euratom will shortly be invited to make a preliminary study of the safety aspects of this project.

3. Changing economic conditions

Why did not more European utilities come into the Program in time with complete proposals?

One element of the answer is certainly the time factor. It is worth emphasizing that the only utility whose proposals fit the specifications of the invitation exactly is the SENN project, which had, so-to-speak, a longer incubation period than the others, thanks to the pioneering work done by the World Bank on this project.

All the utilities concerned, without exception, complained about the short time available for making such important management decisions involving entirely new technical factors.

But this is only part of the answer. The main reason for the caution shown by the European utilities is the changed energy picture in Europe. It is a striking fact that, with a mild recession in Europe, the European consumption of energy was two per cent less in 1958 than in 1957. In 1959 - according to the latest estimates - the energy consumption of Europe, estimated at some 415 millions of tons of coal equivalent, will still be slightly inferior to the corresponding 1956 figure. This drop in energy consumption was particularly striking for coal, whose use in 1958 was 10 per cent less than in 1957.

At the same time, structural factors came into play, chief among them the growing importance of oil. In the Suez days, it was feared that Europe would be more and more dependent upon Middle East oil with all the political dangers of such a dependence. But since that time, new oil deposits have been found in many places: Sahara, Libya, Canada. Not only did these new finds exceed expectations but new resources of natural gas were found in the Sahara and also on the Continent of Europe, namely in France and Italy. Those new findings have done much to lessen the fear of too exclusive a dependence on Middle East resources.

Some other elements also played in the same direction: the construction of new tankers continued unabated, productivity continued to rise in American coal mines. At the same time, a general slowing down of industrial activity occurred, and Atlantic freight rates dropped sharply. All those factors combined to make imported fossil fuels in Europe stronger competitors to nuclear energy for power than had been expected. It was forecast two years ago that the price of a ton of coal C.I.F. on the European cost would be around $18. Today, one can buy American steam coal in Rotterdam at about $14 a ton; the price of oil imported under the same conditions is even lower. With a four-dollar

difference in the cost of each imported ton, most modern thermal plants, with which atomic energy must compete, will be able to produce electricity for 1.5 mills less than was expected two years ago.

It is worth calculating the supplementary handicap which atomic energy has thus to face: for a 150-MW reactor with a load factor of 75 per cent, producing one billion kilowatt-hours per year, it is an added handicap of 1.5 million dollars per year. Over a 20-year period, that means 30 million dollars would be added to the handicap already forecast for a nuclear reactor when the Joint Program was launched.

Further, it appears from an early examination of the proposals received, that the installation cost for nuclear power plants tends to be higher than the 350 dollars_per-kilowatt-installed that was estimated when the Program was conceived.

This problem is by no means a Euratom problem or a European problem. In England, with a stockpile of 50 million tons of coal, it has been decided to postpone for about two years the deadline of their present ambitious nuclear program. In Russia, according to a recent study of Mr. Allen Dulles, the target for the production of nuclear power has been reduced to 30 % of the 2.000 MW which had been planned at first. There are similar difficulties and delays in the United States.

4. Long-term need for atomic energy

Although the commercial production of atomic energy meets everywhere with difficulties and unforeseen problems, the resolution of these problems is nonetheless just as essential as was thought two years ago.

The consumption of electricity in Western Europe keeps doubling every ten years. In 1958, the six member countries of Euratom produced 230 billion kw-hours. For a population nearly equal to the American population, that amounts to less than one third of United States' consumption. In 20 years' time, around 1980, the Community will need four times this amount, and estimates, based upon prospective energy resources, show that no less than a quarter of this will have to be electricity produced by nuclear power. If this assumption is correct, this means that in 1980, the Community will have to produce at least as much nuclear electricity as the total amount it is now producing in all its' thermal and hydro-electric power stations.

5. Success of US - Euratom Joint Research and Development Program

While the present energy picture in Western Europe explains the difficulties and delays met by the Joint Power Program, the foreseeable need for large quantities of atomic power in Europe explains the eagerness with which various European firms, and American firms as well, have put forward proposals to take part in the Joint US - Euratom Research and Development Program. The US - Euratom Agreement provides for the expenditure of 100 million dollars contributed equally by the two partners. This, by the way, is not, as has sometimes been said, a US contribution to Euratom research projects. The Program is to be elaborated and financed in common, each contributor spending his share on its own territory.

Almost 400 proposals have been received, out of which nearly 100 are joint American-European proposals. This demonstrates that industry on both sides of the Atlantic has faith in the ultimate success of atomic energy. Furthermore, the unique features of the Program, the direct association of many American and European firms, the joint financing, the selection of the proposals by a Joint Board made up of American and European experts, and the sharing of results and inventions, provide a working model of the kind of efficient and close relationship which should be developed between Europe and the United States.

6. Need for flexibility

What the Joint Program requires in the light of the above considerations is a certain measure of flexibility. First of all, flexibility concerning the time schedule. Instead of talking about a 1963 deadline with the possibility of two reactors being achieved for 1965, it would be more realistic to speak of a single program to be achieved by the end of 1965.

Secondly, the link established in the texts between the R & D Program and the power reactor proposals is far too rigid. Instead of limiting the R & D Program to research directly connected with reactors built under the Joint Program, the R & D Program should also include projects related to reactor concepts that are "eligible" for construction under the Joint Program. This will encourage the submission of further reactor proposals. Conversely, stopping the Joint R & D Program , until more reactor proposals come in is the surest way to stop them from comir

The third point is connected with the conditions under which fissile material will be supplied. The "Euratom Cooperation Act of 1958" gives the AEC the possibility either to sell or to lease the fuel. The present text of the US - Euratom Agreement is drafted on the basis of a sale with a deferred payment scheme. In keeping with the philosophy of the Agreement - which is to experiment US reactor concepts in Europe under conditions more or less similar to the conditions prevailing in the US - utilities planning to build those reactors ought to be able to lease the fuel under conditions similar to the contracts by which U 235 is leased to US utilities on the domestic market. The Agreement ought therefore to be amended in order to make it consonant with the "Euratom Cooperation Act". The USAEC has already marked its readiness to discuss this change with Euratom.

A fourth point is the question of plutonium. The proposals already made under the Joint R & D Program would require the supply of some 25 kilograms of plutonium. This would make necessary an amendment to the Act, which provides for a ceiling of one kilogram of plutonium. It ought to be emphasized in this connection that the question of plutonium recycling is of paramount importance if atomic energy is ever to become competitive, particularly if plutonium ceases to be used for the manufacture of weapons.