The Broker Function of the IAEA

Market for Enriched Uranium

The market for enriched uranium has recently begun to look like that foreseen when the Agency was established: few but big suppliers of enriched uranium and many competing purchasers. This development is the result of two strong forces that in recent years have influenced the market for nuclear power plants. The first is the continued advances in nuclear power technology which have made nuclear power plants a practical and commercially acceptable source of electric energy. Allied to this is the fact that nuclear power plants using slightly enriched uranium have increased in number over those using natural uranium; in the latter case there would have been a far wider range of suppliers. The second is the steep rise in recent years in oil prices followed by upward movement in other fossil fuel prices, not to mention the present energy crises.

These two factors have considerably increased the capability of nuclear power plants to supply electricity as cheap or cheaper than plants fuelled by fossil fuel or hydro power plants. The combined effect of these two forces has been a series of years with record sales of nuclear power capacity.

This development has brought about a revival of the uranium market and a very tight supply situation for enriched uranium. While enrichment capacity was in oversupply, during the 1960's, exhaustion of present capacity can now be foreseen. Keen competition on the type and location of future enrichment plants is at present taking place[1]. A historical record of the prices of enrichment services is available only from the United States Atomic Energy Commission. Prices were reduced sharply in the 1960's but now have rapidly reverted to their previous level. The recent price rises result from several cost increases but are not unaffected by the present tight market situation.

Agency's Statutory Supply Function

This development in the market for enriched uranium has renewed the interest of Member States in the Agency's function as a broker or intermediary between its Member States, because this function applies particularly to the supply of enriched uranium, plutonium and reactors. It was a function of serious concern to the founders of the Agency. It is, in fact, the first of the Agency's functions in the order listed in its Statute.

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[1] See J.T. Roberts, "Supply Demand and Costs" in Bulletin 15/5.

Article III.A.1. on the Agency's functions authorizes it, "if requested to do so, to act as an intermediary for the purpose of securing the supply of materials, equipment or facilities by one Member of the Agency for another". The drafters of the Statute considered the supply of enriched uranium through the Agency so important that they devoted not less than seven of the Statute's 23 articles to it.

The most important articles in the Statute dealing with the Agency's supply function are Article IX (Supplying of materials), XI (Agency projects), XII (Agency safeguards) and XIII (Reimbursement of Members). Under Article IX, Members may make special fissionable materials available to the Agency and the Agency may receive and allocate them to other Members. The Agency may take and maintain physical possession of these materials, but in practice no material has been physically handed over to it. Articles XI, XII and XIII indicate the procedure, and outline the terms and conditions on which international transfers can take place through the Agency.

For reactors built to supply power, to assist research, to provide training or to produce radioactive isotopes, substantial quantities of uranium are needed. (The general term "reactors" includes critical or subcritical assemblies, usually for training or research).

The Agency can also, if required, undertake arrangements for the transfer of a reactor or assembly, as well as of the associated non-nuclear materials, equipment or services. In addition, nuclear materials can be supplied for research projects, such as the accurate determination of nuclear data or the development of fuel elements. These projects usually only call for minor quantities of material.

Availability of Materials through the Agency

At present four Member States of the Agency – France, the Union of Soviet Socialist Republics, the United Kingdom of Great Britain and Northern Ireland and the United States of America – have commercial plants for enriching uranium. All transfers of enriched uranium from these countries are arranged through governmental channels, either directly between the exporting and importing States, or through the Agency, acting as an intermediary between the two States concerned.

In 1957, when the Agency's Statute entered into force, the Soviet Union, the United Kingdom and the United States offered under Article IX.A of the Statute to make special fissionable material available to the Agency in the form of uranium-235 contained in enriched uranium. Later the United States also offered small quantities of uranium-233 and plutonium. The quantities were as follows:

Member		Quantity (kg)
Soviet Union	^{235}U contained in enriched uranium	50
United Kingdom	^{235}U contained in enriched uranium	20
United States	^{235}U contained in enriched uranium	5070
	^{233}U	0.5
	^{239}Pu	3.0

It should be noted that the enriched uranium offered is measured in quantities of the isotope uranium-235 only. Since this isotope is contained in uranium in various enrichments, the total quantity of material offered is undetermined but much larger. Approximately 160 transactions have taken place during the last six years. The quantities varied from a few milligrammes to several kilogrammes.

General Supply Agreements

In order to determine the terms and conditions for the international transfer through the Agency of the material thus offered, the Agency entered into a general supply agreement with each of the three Governments on 11 May 1959[2]. Each Government offered to make the uranium available in any enrichment up to 20%, but both the United Kingdom and the United States agreements further provide that the "parties may agree to a higher enrichment with respect to uranium to be used in research reactors, material testing reactors or for research purposes".

The provisions in the agreements regarding prices are as follows:

(a) Soviet Union: "The Government undertakes to base prices on a scale of charges corresponding to the lowest international prices in effect at the time of delivery for enriched uranium hexafluoride and for uranium compounds according to the percentage content of uranium-235";

(b) United Kingdom: "The material shall be supplied at a price and on conditions which are not less favourable than the most favourable price and conditions which the United Kingdom Atomic Energy Authority are offering or are prepared to offer, at the date of the contract in question, to any other customer outside the United Kingdom for the supply of similar material"; and

(c) United States: "The United States undertakes to make special nuclear material available to the Agency at the United States Atomic Energy Commission's published charges applicable to the domestic United States distribution of such material in effect at the time . . . . . ".

The duration of the general supply agreements differs. That with the Soviet Union "shall cease to have effect one year after the day of its denunciation by the Agency or the Government", and that with the United Kingdom will remain in force "until the end of any calendar year after 1960 in which notice of the withdrawal of the offer has been given". The agreement with the United States was concluded for a period of twenty years, which will end in 1979, but the United States has now proposed to extend the agreement until the year 2014 and for an increased amount of material.

Fund of Special Fissionable Materials

The Conference of Non-Nuclear-Weapon States had requested the General Conference at its session in September 1968 "to consider at its next meeting the establishment of a fund of special fissionable materials for the benefit of non-nuclear-weapon States and in particular of developing countries"[3]. The Board provided the General Conference with a

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[2] The texts of the agreements are reproduced in Agency document INFCIRC/5.

[3] United Nations document A/7277, Resolution J.II.

background paper for its discussion[4], and the Director General also brought to the notice of the Conference the replies he had received from France, the Union of Soviet Socialist Republics, the United Kingdom of Great Britain and Northern Ireland and the United States of America[5] to his inquiries concerning the possibility of increasing the supply of such materials through the Agency.

The general tenor of these replies indicates that special fissionable materials will be available through the Agency on the same terms and conditions as they are available through bilateral channels. Attention was also drawn to the fact that although numerous transactions of such materials for research purposes have taken place through the Agency, the special fissionable materials, available before 1960, were still very largely intact.

The General Conference took note of the Board's report and of the replies received from the producing countries, and requested the Director General to transmit them to the Secretary-General of the United Nations.

The General Assembly noted in November 1972 "with satisfaction that the International Atomic Energy Agency is continuing its efforts to ensure the supply to its Member States, when required, of special fissionable materials, including materials for power reactors"[6].

Procedure for Supply of Materials through the Agency

Under the general supply agreements the three Member States in question have undertaken to make materials available to the Agency on request. However, further steps have to be taken to enable the Agency to supply the materials to other Member States.

Requests

Any Member or group of Members desiring to set up a project for a peaceful use of nuclear energy may request the Agency's assistance in securing such materials. The request must be accompanied by an explanation of the project and must be considered by the Agency's Board of Governors. Article XI.E. lists certain matters to which the Board must give consideration before approving the project and the supply of the material; one of these matters is "the special needs of the under-developed areas of the world" (Article XI.E.6).

On the basis of the information provided, the Agency's Secretariat analyses the request. The request and the results of the Secretariat's analysis are presented as early as possible to the Board. The Board's considerations have usually been very brief, concluding with approval of the project and the supply of material.

In 1968 the Board approved a simplified procedure for the supply of small quantities of nuclear materials for research and development or for use in neutron sources. Under

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[4] GC(XIII)/409.

[5] GC(XIII)/419 and Add. 1.

[6] United Nations General Assembly Resolution 2931 (XXVII).

this procedure the Agency's Director General is authorized to arrange for the supply of these materials under appropriate agreements without referring the requests to the Board beforehand, and the Board is subsequently notified.

Choice of supplier

As the Agency does not keep its own stocks of nuclear materials, a supplier of the material has to be selected. In choosing the supplier, the wishes of the requesting Government are taken into consideration in accordance with Article XI.C of the Statute. If the requesting Government does not express a preference, enquiries are addressed to Member States likely to have the material available. However, the country supplying the material and the country where it is processed into the required chemical and physical form need not necessarily be the same, and there have been a number of such cases.

Agreements

Before the material can be supplied, two agreements have to be concluded. One of these is known as a Project Agreement, to which the recipient Government and the Agency are parties; it is that required by Article XI.F of the Statute, where most of the points to be covered are set forth. One of them is that "the project shall be subject to the safeguards provided for in Article XII, the relevant safeguards being specified in the agreement". Safeguards are usually required in connection with reactor projects, whereas the quantities of materials supplied for research projects are usually well below those that can be exempted from safeguards. The main provisions of Project Agreements are standardized, and vary only to meet particular circumstances.

The other agreement is known as a Supply Agreement, in which the exact type and quantity of material to be supplied, as well as the terms and conditions of supply, are specified.

Terms and conditions

The terms and conditions of supply to the recipient Government, including the price of the material, are normally the same as those offered by the supplying Government. The Agency's services are thus provided free of charge. In exceptional cases, the material itself has been provided free of charge by the supplying Government.

The main example of material provided free of charge is the annual gift of the United States Atomic Energy Commission to the Agency of US $50 000 worth of special fissionable materials to assist and encourage research on peaceful uses of atomic energy or for medical purposes. The United States has made these gifts to the Agency every year since 1960. The materials in question are not available for power reactors and have been used for Agency projects in Member States, mainly as fuel for research reactors, in plutonium-beryllium neutron sources and in fission counters for research projects. Small

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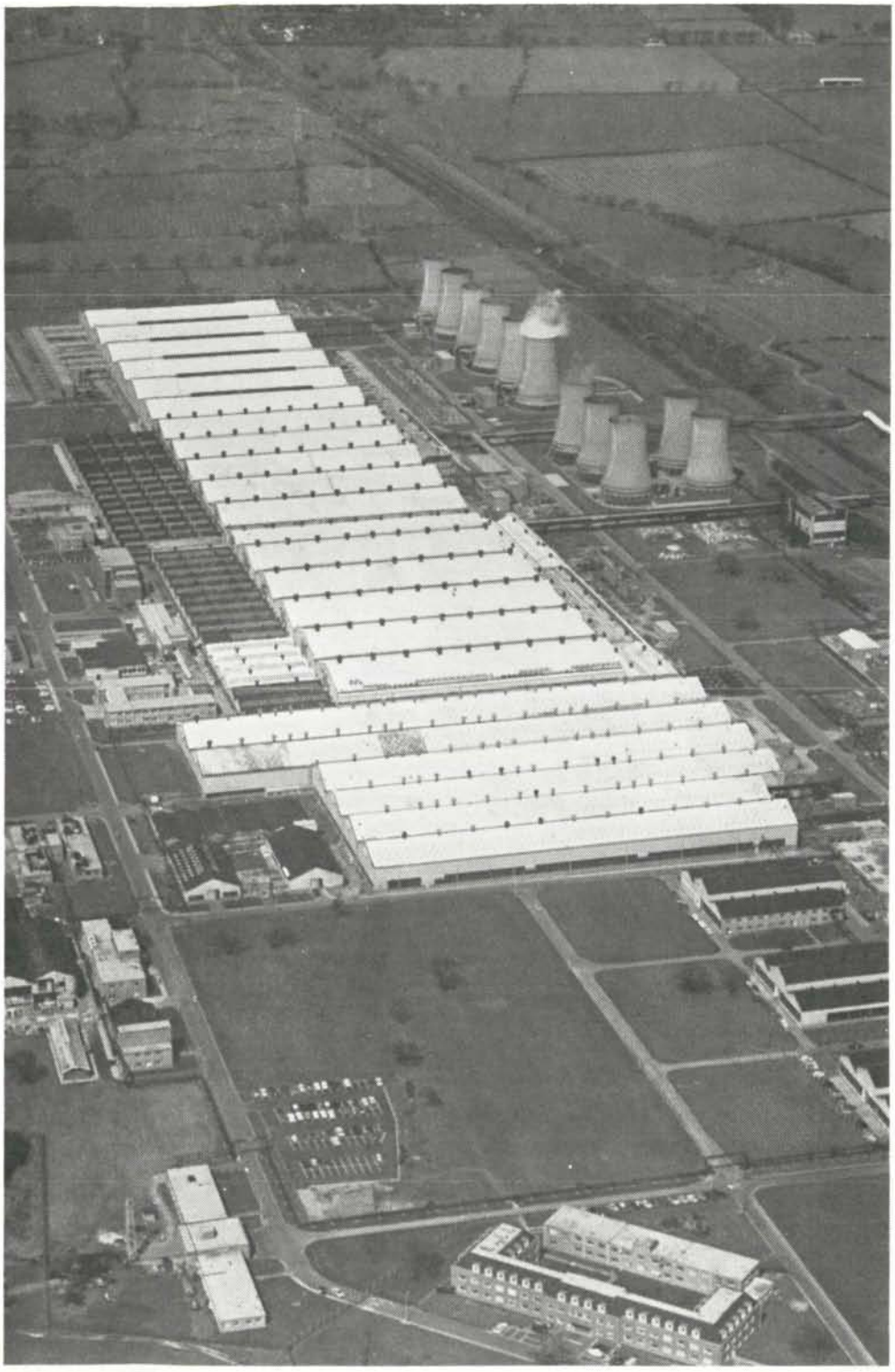
An aerial view of the U.K.A.E.A. Capenhurst Works, Cheshire, where enrichment of uranium is carried out in the gaseous diffusion plant. This plant can supply uranium at the enrichment levels required for power reactors . . . Photo: U.K.A.E.A. ▶



quantities have also been given for such research purposes as the determination of nuclear data. The charges for the fabrication of the material into the desired form and its transport to the place of use are paid by the recipient Government.

Another example of gifts from Member States in connection with Agency-approved projects is the donation by the Federal Republic of Germany of two training reactors to Argentina and Mexico.

Conclusion

The Agency's function as an intermediary or broker between Member States supplying and requesting materials, equipment or facilities depends entirely on requests for the Agency's services by Member States. It is therefore very elastic.

Contrary to the expectations of the founders of the Agency, Member States have so far generally preferred bilateral arrangements. Nevertheless, some Member States have found that the transfer arrangements the Agency is able to make offer them opportunities of obtaining materials which would not otherwise be open to them. Other Member States, wishing to obtain long-term supplies of enrichment services for their power reactors, prefer multilateral supply arrangements through the Agency to bilateral supply agreements with a single supplying state.

However, up to the present nearly all transactions have only been for research quantities of material. Now the first request for the Agency to act as intermediary in the supply of enrichment services for a full scale power reactor has come from Mexico. The changing supply situations and the expansion of nuclear power programmes in developing countries, as well as possible reluctance to depend overly on only one supplier, may mean that in future other countries could follow Mexico's example.

At the Agency's XVIIth General Conference in September 1973, the Director General pointed out that most States with nuclear programmes must concern themselves with future supplies of enriched uranium. He urgently appealed to suppliers to make sufficient quantities for power reactors for transfer to developing countries available through the Agency under less stringent conditions than at present.

In conclusion, it can be said that the nuclear material offered by the supplying Member States has so far been sufficient to meet demands, and there is every reason to believe that additional quantities would be available should they be required. A routine procedure for dealing with requests for nuclear material has been well established. Full account is taken of the fact that timely supply is of considerable importance for the efficient and economical operation of the installations for which the material is needed.