

International Plutonium Management

There has been considerable concern expressed about the possibility of further proliferation of nuclear weapons that would arise if, as a result of the spread of reprocessing capacity or for other reasons, plutonium were to be stockpiled in a growing number of States, even if such stocks were subject to the current Agency safeguards procedures. These procedures require a meticulous accounting for nuclear material under safeguards but do not inhibit the production or acquisition of separated plutonium and do not constrain stockpiling of plutonium. Such stockpiles would make it far easier for the stockpiling State to acquire in a short time a nuclear explosive capacity and, therefore, might be a cause of concern to other States. Hence, unless effective steps are taken to prevent the propagation of national stockpiles of plutonium, the wider use of nuclear energy, which is in other respects beneficial and necessary, could become a significant cause of international insecurity and tension.

The national stockpiling of unprocessed spent fuel, which is now occurring increasingly as a result of delays in reprocessing programmes, presents a far smaller risk but it is, nevertheless, a potential source of very large and growing quantities of plutonium and in certain circumstances might also have undesirable international consequences.

The problem of growing worldwide stocks of plutonium was foreseen when the Statute of the Agency was negotiated in the mid-1950's. Accordingly, Article XII.A.5 of the Statute provides that the Agency shall have three sets of rights and responsibilities in this context, namely:

- (a) to approve the means to be used for the chemical processing of irradiated materials, solely to ensure that this chemical processing will not lend itself to diversion of materials for military purposes and will comply with applicable health and safety standards;
- (b) to require that special fissionable materials recovered or produced as a by-product be used for peaceful purposes, under continuing safeguards, for research or in reactors, existing or under construction, specified by the Member or Members concerned;
- (c) to require deposit with the Agency of any excess of any special fissionable materials recovered or produced as a by-product over what is needed for the above-stated uses in order to prevent stock-piling of these materials, provided that thereafter at the request of the Member or Members concerned special fissionable materials so deposited with the Agency shall be returned promptly to the Member or Members concerned for use under the same provisions as stated above.

Essentially, these rights empower the Agency to take steps to ensure that the reprocessing of spent fuel does not lead to diversion and to prevent the stock-piling of special fissionable materials by requiring that such materials be either used in specific research or reactor projects or be deposited with the Agency.

Articles IX.H and IX.I of the Statute are also relevant in that they foresee that the IAEA will be responsible for storing substantial quantities of special fissionable materials and require the Agency to ensure that these materials are geographically distributed in such a way as to prevent their concentration in large amounts in any single country or region.

Significant interest has developed in the possibility of the IAEA exercising some or all of the authority outlined above as a means of alleviating the problems which will be presented by growing stocks of plutonium in various countries around the world.

Until recently, reprocessing activities were confined to a small group of nuclear-weapon and non-nuclear-weapon States and none of the reprocessing facilities were under safeguards. There have been several indications that this situation will change. Many of the existing facilities have recently come under Agency safeguards or will shortly do so, while there has been a spreading interest in the acquisition of reprocessing capacity. In spite of the fact that most nuclear supplier countries have decided not to export reprocessing plants in the future, the number of countries engaged in reprocessing is bound to increase.

On the other hand, there are numerous uncertainties about the future plutonium picture. The two main sources of demand for separated plutonium will be (a) fast breeder reactor research and development and, later, operation, and (b) plutonium recycle. How great the demand for plutonium for these applications will be and when depends on a number of factors, most of which are difficult or impossible to assess at this time. Nevertheless, it seems likely that for the remainder of the century there will be a steadily growing surplus of separated plutonium and, in any case, substantial stocks of spent fuel. (Some 15 to 30 countries will be producing spent fuel during the next two decades).

IAEA Study

For its part, the Agency completed an internal study early in 1977 on the possibility of establishing regional fuel cycle centres which would include reprocessing facilities, and possibly storage facilities as well. The Agency has also been working on an internal study focussing specifically on the matter of the IAEA exercising the authority granted in its Statute to require the deposit of excess plutonium and other special fissionable materials. In June 1976 the Director General established a small Secretariat working group to identify the issues which would be involved in international plutonium management and which should be addressed in a study on the subject. The issues identified by the group included legal, organizational and institutional, safety, safeguards, physical security, financial, technical and timing questions. Another important factor identified by the group was supply and demand projections for plutonium.

Initially the Agency's international plutonium management study focussed on separated plutonium. However, the scope of the study was subsequently expanded to include the question of regional or international storage of spent fuel. It was recognized that many elements of an international plutonium management scheme would be relevant to the storage of spent fuel, although there would also be marked differences in the scale and nature of the problems involved.

It is expected that the Secretariat's study will be completed before the end of 1977. The major conclusions that may be tentatively drawn from the plutonium management part of the study are, in summary:

- (a) It may be timely to consider activating the Agency's authority under Article XII.A.5 of the Statute to limit stockpiling of plutonium, by requiring deposit with it of excess stocks and by enabling it to enter into such arrangements as may be necessary for this purpose;

- (b) Production of and demand for separated plutonium until the end of the next decade and beyond is likely to be concentrated in Western Europe. There will likely also be some production for peaceful purposes in Eastern Europe, Japan, India and, possibly, North America;
- (c) To prevent stockpiling of separated plutonium, it would be desirable to set up a system which would work on a non-discriminatory basis and be capable of universal application and which would regulate the release of plutonium both for export and for domestic use;
- (d) It is probable that the most practical arrangement would be for the interested States (reprocessors, consumers and suppliers) to work together under the IAEA auspices to set up such a system. IAEA Secretariat participation could be offered after authorization by the Board of Governors;
- (e) The problems of disposing of spent fuel (regional or international storage) involve a much wider group of countries than those concerned with separated plutonium;
- (f) While countries will wish to obtain compensation in one form or the other for the plutonium content of irradiated fuel and may wish to have the plutonium returned to them, many countries would be very eager to participate in an arrangement that would take spent fuel permanently off their hands, whether or not it was to be reprocessed;
- (g) One of the main problems involved in establishing either a regional plutonium or a regional spent fuel store will be that of public acceptance. The problem will be particularly difficult in the case of spent fuel if permanent storage without eventual reprocessing is proposed;
- (h) The costs of establishing an international plutonium storage facility would not be disproportionate to expenditures already incurred by the IAEA, but it, nevertheless, seems unlikely that the IAEA would proceed to establish such a facility from its own resources. The costs of a regional or international spent fuel storage facility are likely to be at least one order of magnitude higher than that of a plutonium store.

Next steps

It is understood that the question of spent fuel storage may be considered within the framework of the proposed international fuel cycle evaluation project. What further action, if any, would be taken on the question of international plutonium management will depend very largely upon the degree of interest in this matter evinced by the Member States of the Agency.