International Plutonium Storage Schemes

By R. Imai

There is no question that the idea of placing plutonium under international custody would greatly contribute to the cause of world-wide nuclear non-proliferation. Compared with the rather confused realities of existing bilateral arrangements and negotiations concerning either reprocessing or plutonium control, placing the International Atomic Energy Agency in the role of overseeing such a scheme is undoubtedly a very sound one.

The concept of international plutonium storage (IPS) has been extensively discussed during many of the International Nuclear Fuel Cycle Evaluation (INFCE) meetings and various proposals for the detailed technical, legal and institutional mechanisms are being evaluated in various forums by different national and international bodies, including the one established within IAEA. It is not the intention of this short essay to participate in such discussions of details. Rather I would like to take the position of an interested observer in considering the concept of international plutonium storage within a larger overall context: how best to control nuclear technology, a technology which promises great benefits but at the same time, as everyone is aware, threatens grave dangers to all humanity. I do so, obviously, in a purely personal capacity without purporting to present any institution's point of view.

Since last July, I have been taking part in the deliberations of the "Group of Experts on a Comprehensive Study on Nuclear Weapons" as established by the United Nations General Assembly resolution A/C 1/33/L.32 of November 1978. The group consists of twelve experts from twelve different countries. It has been looking into the following six major areas:

(a) The current status of the world's nuclear arsenals;
(b) Trends in the technological development of nuclear weapon systems;
(c) Effects of the use of nuclear weapons;
(d) Security implications of the doctrines of deterrence and other theories concerning nuclear weapons;
(e) Security implications of the continued quantitative increase and qualitative improvement of nuclear weapon systems; and
(f) Implications of the above for the process of nuclear disarmament.

Mr. Imai is affiliated with the Japan Atomic Power Company; he has prepared this contribution, however, in his personal capacity.

The group has not yet come to the end of its deliberations and the final report is still in the process of preparation. In mentioning this study, I do not intend, of course, that my comments should be interpreted as representing the contents of the group's deliberation. Nor do I intend to discuss what the group is saying concerning the effectiveness of international safeguards, or the role of plutonium or how this material should be controlled in the context of nuclear disarmament. That, after all, is not the major part of the group's mandate.

I refer to this work because the occasion of participating in what essentially is an updating of the similar UN study of 1967 has opened to me a different horizon. It has provided an opportunity to re-evaluate nuclear weapons non-proliferation against the background realities of today's nuclear weapon systems in the world and their various security implications to countries under different conditions. It has also allowed an understanding of these countries' perceptions regarding the possibilities of nuclear disarmament.

Without getting into the political aspects of the problem, it might be possible to consider this new horizon under the following three categories.

(i) Taking into account the size, scale, extent of sophistication, and the rapid pace of qualitative and quantitative expansion of the nuclear arsenals of today, issues of horizontal non-proliferation form a part but not the whole of the problem. Although this observation is almost a truism, there seems to be a trend for some individuals to forget the extent of the damage that nuclear weapons can inflict upon people as well as on social systems as a whole. A large and powerful arsenal can obviously cause larger-scale devastation. However, small and crude weapons can also cause very significant damage. Furthermore, they can lead to larger-scale nuclear exchanges. This is due to the complicated security networks that exist among states, as well as to the gamesmanship and brinkmanship psychology that has developed around various doctrines of nuclear deterrence and nuclear combat. In contemplating horizontal non-proliferation, and before concentrating on specific institutional or other details, one needs to be reminded of the entire spectrum of nuclear problems today. The complicated problems of the world energy future enters into this picture as one of the most important ingredients.

(ii) Compared with the late 1960s when the first UN nuclear weapons report was written and when the Non-Proliferation Treaty began to take form, conditions on the international scene today are different. There is no need to spell out here the details of alignment and non-alignment of states, energy and natural resources, the pace of economic growth, or political and military conflicts in the different regions of the world. What is worth noting is the ever-increasing role of that group of nations somewhat loosely referred to in common terminology as the Third World. For one thing the basic codes of international security, be they political, military or economic, as accepted among the industrialized countries some dozen years ago, may not necessarily coincide with those of the Third World in the present-day nuclear age. Issues of vertical nuclear proliferation, of the economics of energy and other resources, of international technology transfer are being seen in a somewhat different light today, to put it mildly.

(iii) Nuclear disarmament has been a very important and central theme within the United Nations structure for a very long time. Views regarding international achievements in this area may differ from country to country and from person to person. But all would agree that what has been achieved has not been enough. In spite of efforts and in spite of various proposals for the abolition or limitation of nuclear weapons or for the creation

of nuclear free zones, etc. the world has observed rapid escalation of nuclear arsenals. This may imply a number of different things. Probably, the efforts expended in this area have not been enough. Probably, moral stands regarding the abolition of nuclear weapons have not been strong enough. But, most probably, there are various different forces in the world which have made achievement of the desired ideal very difficult. This is the familiar problem of the gap between realities and ideals. There is no guarantee that idealism would win over realities this time. What one needs to strive for is the development of some workable scheme to reconcile the two.

I have mentioned the experience with the UN study group not for the purpose of advertising its works. The way I described the above-mentioned three items in rather general and non-specific terms is an expression of the desire on my part to reflect on these important, but sometimes forgotten elements of the nuclear age. I have no doubt that they have important bearings on the topic of this short essay, namely schemes for international storage of plutonium.

The primary importance of the IPS concept lies in the hope that it will serve as an important Confidence Building Measure, in addition to other practical benefits, as a non-proliferation step. Confidence building measures or CBM, as the term is often defined in the arms control community, is a very important ingredient in making any basic international concerted actions effective. IPS as a confidence building measure in this case would hopefully serve the purpose of re-creating confidence in the international nuclear market, in the impartiality of the international non-proliferation regimes, and thus in nuclear power as an important means to assure the world energy supply for the immediate and distant future.

If the impression is given that civil plutonium is the sole focus of non-proliferation attention, it must be stressed that many factors have changed even during the two years of INFCE. The world-wide capacity of nuclear generation in the coming decade will unfortunately be much less than was once thought would be the case. Not many large-scale reprocessing programmes are operating today, while the plants in existence are often running into operational difficulties. This means, actually, that there will not be as large a volume of civil plutonium as had been predicted earlier. Taking into consideration FBR programmes, one may argue that the supply and demand balance of plutonium may be such that the volume of plutonium to be stored could be less significant compared to the volume of material that dedicated military-oriented facilities may be producing. This, of course, is an arguable point. But it is not the central issue. As long as one believes in the role of nuclear energy and as long as one would like to regain a basic international confidence in the capabilities of the world market to function properly and re-establish the flow of nuclear material, technology and equipment, a credible IPS scheme could provide an example of one proliferation-free mechanism to serve such a purpose. This is of course bearing in mind the importance of FBRs and the use of plutonium as a major near-term energy option.

It is from such a point of view that I would like to mention some of the major problems that need resolution before one gets to a credible and feasible IPS scheme. Of course, I am not claiming that what follows has been newly discovered. I have already referred to a number of international bodies that are working on mechanisms for international custody of plutonium in one or several locations, with the IAEA or some fast-acting,

executive type of body under this international agency as a custodian. The major reason for mentioning these bodies is to note that the problems would not be resolved by committees. They are not issues of mechanism, but most probably of a political nature that require basic policy resolution by the countries involved.

(a) Usually what concerns people is not the countries who are willing to participate, but those who would stay out of the non-proliferation regimes. The same applies to the case of full-scope safeguards. What inducement there may be to make the latter category of countries willingly participate is the most important and serious problem. Unless IPS becomes as comprehensive as possible, its effectiveness would remain partial and confirmatory rather than a positive step toward the goal.

(b) The role of the nuclear weapon States is very important. From disarmament points of view, they should place their entire plutonium stock in IPS custody. That is a very unrealistic proposal today. Then, they should place excess civil plutonium into IPS. What criteria would be used to distinguish between civil and military, excess and non-excess is a very complicated issue. Something more than the safeguards gesture under NPT will be required in this case, considering the increased need to restructure and re-constitute a credible non-proliferating world nuclear market.

(c) Release mechanisms for stored plutonium and verification that its use is in conformity with declared ends are also complicated issues. There is undoubtedly a large area in which sensible and internationally agreed criteria can perform almost automatic fulfillment of these requirements. However, as in the case of international safeguards, problems always arise regarding uncommon, unusual and border-line cases. A country may want release of an unusually large amount of plutonium of particular isotopic content with the claim that it is for a new type of FBR fuel. This country may refuse to disclose actual fuel configurations beyond a certain limit on the grounds of proprietary technical information. Application of automatic criteria and verification measures have definite limits, and it would be very important to have prior agreement on how to handle such cases. The lesson from safeguards exercises is that the absence of early recognition of this problem has led to sometimes unproductive refinements of technology to deal with highly unlikely but not impossible diversion scenarios.

(d) The current thinking is to store plutonium in countries where reprocessing takes place. It is, however, also argued that in the cases of small reprocessing plants, it may be better to transport the product plutonium to other international storage locations. The problem in fact will be viewed by many as equivalent to determining "safe" and "un-safe" countries for plutonium storage from the point of view of possible forced seizure, physical protection and sometimes even technology of safe storage. Once this point is resolved, safeguarding stored plutonium would raise no difficult technical problems.

(e) In the given world atmosphere of today regarding reprocessing and plutonium fuel, and in spite of the general findings contained in the INFCE final report, there seems to be a danger that some countries with reprocessing capabilities may want to establish themselves as IPS locations and use this to commercial or political advantage. The reverse side of this is that some other countries might find IPS arrangements to commercial or political disadvantage to their nuclear industry. It may be possible to resolve this issue through monetary arrangements of IPS cost-

sharing and thus provide non-proliferation subsidy to non-reprocessing countries. The commercial negotiations regarding spent fuel reprocessing today, however, seem to indicate that the problem will not be that simple.

Regarding any constructive proposals, it is easier to criticize than to propose workable solutions. The five points mentioned above have been singled out, of course, not with the intention of criticizing IPS out of existence. These five, in my mind, are essential and primarily politically-oriented problems which have to be resolved somehow if international plutonium storage is to move a step ahead from just being "a good idea" to something that will work. The basic requirement to make it work is, as already mentioned, to create a system that countries of the world will find credible and one that they feel they can trust, both as regards the custody of their plutonium and the release of it for peaceful R&D or as fuel to generate electric power.

If there is any suspicion that a country or a group of countries will dominate the operation of IPS, or that somehow the rules of the game might change in mid-course, the necessary credibility cannot be established. In that case, the situation might turn from bad to worse. Quite apart from whether the international non-proliferation debate has contributed, over the past couple of years, to the erosion of confidence in the commercial functioning of the international nuclear market in its formative stage (and if so, to what extent), should yet another proposal to improve its credibility end up in some form of unproductive and half-hearted exercise, its contribution could very well be extremely negative. Although for very different reasons and from different points of view, one might be reminded of the fact that a good deal of the world energy crisis of today is due to the collapse of the once-robust international market mechanism for oil between producers, distributors and consumers. This again is a point quite apart from the arguments that what existed was good or bad. For the sound future of the nuclear industry, the credibility of the international market is an essential pre-condition and this point is worth stressing a number of times.

The two basic observations of this argument relate to the entirety of the proposed or existing international institutions for non-proliferation, be it safeguards, spent-fuel storage, supply assurance or technology transfer, and these two observations are worth reiterating.

In order to be credible and effective, these measures have to be as comprehensive as possible with the widest possible range of participation. As many of those countries outside of the NPT structure today should be induced to join. As many of the nuclear weapon States as possible should relinquish as much of their privileged positions as possible and show willingness to support the system. In order to resolve the five mainly politically-oriented points mentioned earlier, these objectives must be kept in mind and situations and conditions created in which countries of both categories would find it to their advantage to join.

Another very important aspect is realism, and the recognition that realism usually has two faces. One has to do with the sort of nuclear world we live in; that is, it must be recognized that vast, powerful and very sophisticated nuclear destructive capabilities exist and the fact that they are treated as essential ingredients of national security by many countries needs to be appreciated. Many countries also regard the availability of nuclear power as an alternative energy source as being an essential part of their economic security. Various proposals regarding the dangers of horizontal proliferation have to be evaluated against the background reality of many countries' equal if not greater concern

about where and how vertical proliferation will stop, while at the same time taking into account how to promote the peaceful uses of nuclear energy further.

Realism, however, has another face. It cautions against being too hasty in wishing the ideal world to materialize too soon. There are abundant examples of frustration from such an approach. After all, nuclear proliferation or non-proliferation does not represent the sole concern of the real world, and we are seeing enough evidences of that in the Middle East, Latin America, or South East Asia to mention a few.

In concluding on this general and somewhat moral note, I am very much aware that I have not made a single practical proposal about how to make International Plutonium Storage work. As stated at the outset, participating in detailed arguments was not the purpose of this essay. There are enough bodies today trying to resolve the details that will one day allow IPS to become a working entity. What I have attempted is to present a summary of the nature of the problems we are dealing with today.