

The way forward to internationalize the Nuclear Fuel Cycle and Waste

Management

A Non-Paper by Dr. Mohamed I. Shaker *

We shall briefly trace the history of multilateral nuclear approaches to the nuclear fuel cycle to present-day ideas about future reactor systems and the results achieved by an expert group appointed by the Director General of the IAEA on multilateral nuclear approaches to the nuclear fuel cycle.

The first feasibility study on multilateral approaches to the nuclear fuel cycle was the Regional Nuclear Fuel Cycle Centre (RFCC) study of 1975-1977. The study put emphasis on the back end of the cycle, specifically reprocessing and plutonium containment. It was followed by the International Nuclear Fuel Cycle Evaluation (INFCE) study of 1977-1980, which among other things, touches upon the possibility of regional fuel-cycle facilities and prospects for multilateral cooperation on plutonium storage. However, due, in large part, to diminishing concerns over the likelihood of a “plutonium economy”, the disinclination of some countries to give up national control over reprocessing, and the general lack of political will, both studies did not result in any further pursuit of multilateral approaches.

The following initiative was the IAEA Expert Group on International Plutonium Storage (IPS). That initiative moved away from the discussion of regional fuel-cycle centres to examine instead the prospects for IAEA-supervised management, storage

* This is a part of a longer study on the evolving nuclear non-proliferation regime to be published by the International Law Academy at the Hague, the Netherlands, later in 2007

and disposition of spent nuclear fuel. Once again, no consensus was reached as States were unwilling to denounce sovereign control over nuclear technology and fuel. The same fate met the studies undertaken by the IAEA Committee on Assurances of Supply (CAS) in the 1980s, which went into abeyance in 1987. It failed to agree on a set of principles with regard to assurances of supply. In 1987, the UN Conference for the Promotion of International Cooperation in the Peaceful Uses of Nuclear Energy (UNPICPUNE), which I presided over, also failed to reach an agreement on such a set of principles because of the reluctance of the major supplier States to concede any advantages to the benefit of the recipient States. As president of this Conference, I tried hard to achieve a consensus on such principles to no avail.

The multilateral approach was revived and has gained new relevance amid serious challenges to the nuclear non-proliferation regime, including Iran's uranium-enrichment programme and the admission by Abdul Qadeer Khan, "father" of Pakistan's nuclear weapons programme, that he had organized a clandestine network to supply Iran, Libya and North Korea with uranium enrichment technology.

Today, several countries are collaborating on innovative nuclear R&D for the longer term. The IAEA's International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO) works to ensure that the future needs of all countries (including developing countries) are considered when innovative nuclear systems are evaluated. INPRO now includes 24 countries. Moreover, another consortium of 10 industrialized countries and the European Union called the Generation IV International Forum is focusing on exploring the technical and commercial liability of future reactor systems. The forum has selected six innovative nuclear systems for

collaborative R&D. For example, on reactor systems of the future, efforts are being made to incorporate proliferation resistance into the plant design. Certain design for example, would use modular core that would only need refueling every 30 years, greatly reducing the access to sensitive nuclear materials.

The aforementioned IAEA Experts Group's report on multilateral approaches to the nuclear fuel cycle had a three-fold mandate as indicated in its report:

- To identify and provide an analysis of issues and options relevant to the multilateral approaches to the front and back ends of the nuclear fuel cycle
- To provide an overview of the policy, legal, security, economic, institutional and technological incentives and disincentives for cooperation in multilateral arrangements for the front and back ends of the nuclear fuel cycle
- To provide a brief review of the historical and current experiences and analysis relating to multilateral nuclear fuel cycle arrangements relevant to the work of the IAEA Experts Group.

Two primary deciding factors dominate all assessments of multilateral nuclear approaches, namely, assurance of non-proliferation and assurance of supply and services. Multilateral approaches should in a way satisfy both objectives.

The multilateral option can follow three patterns:

Type I: Assurances of services not involving ownership of facilities:

- Suppliers provide additional assurances of supply
- International consortia of governments broaden the assurances
- IAEA-related arrangements provide even broader assurances

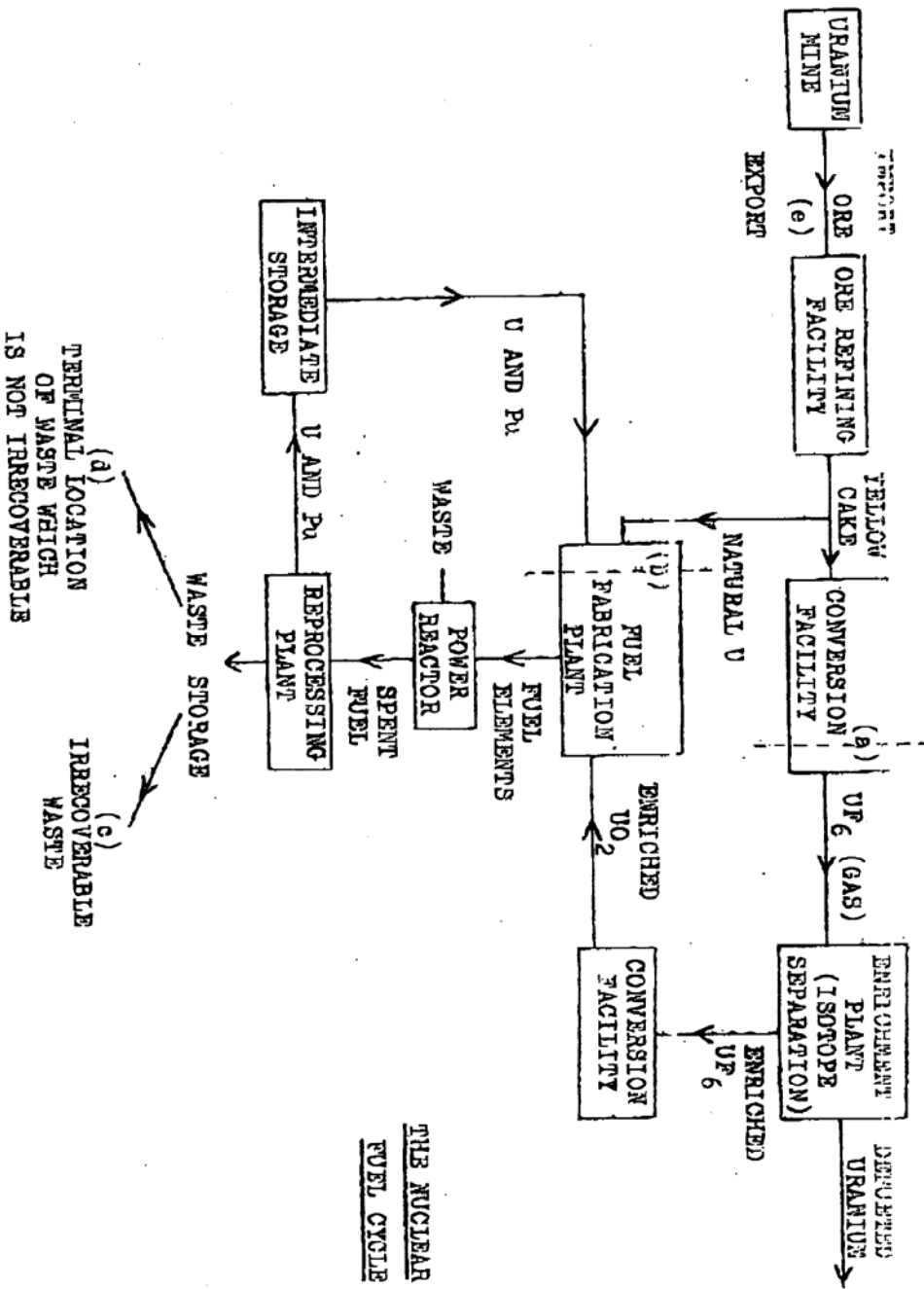
Type II: Conversion of existing national facilities to multinational facilities:

Type III: Construction of new joint facilities

The Expert Group considers that the multilateral nuclear approaches for the non-proliferation regime can provide, as confidence-building measures, enhanced reassurances to the partners and to the international community that the more sensitive parts of the civilian parts of the nuclear fuel cycle are less vulnerable to misuse for weapon purposes. Multilateral approaches could also provide the benefits of cost-effectiveness and economies of scale for whole regions or smaller countries or for those with limited resources.

In all of these discussions, the IAEA was looked upon as a guarantor of supply. The 2004 report of the UN Secretary-General's High Level Panel on Threats, Challenges and Change supported this idea.

The advantages of introducing multilateral nuclear approaches would overcome the denial attitudes of the cartel-based export control mechanisms existing today. Developing a multilateral treaty-based, universal export control system would involve the participation of all States relying on the rules of international law and accountability, and would provide both the assurances of non-proliferation and assurances of smooth access to civilian uses of nuclear technology. The IAEA is playing an active role in developing such multilateral nuclear approaches. It is believed that we have reached a stage that necessitates a great leap forward in this direction. The ideas put forward by the IAEA Director General, Mohamed ElBaradei, first in The Economist and later developed in a great number of his statements, whether within or outside the IAEA, have been a great source of inspiration in pursuing this new scheme.



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