Pros and Cons of Multinational Approach to the Back-End Fuel Cycle

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Abstract

In spite of Fukushima Daiichi disaster, enormous demands for nuclear energy especially in many emerging states are still existing and increasing. With steadily growing civilian nuclear power industry, needs for stable supply of nuclear fuels (front-end fuel cycle) and safe disposal of spent fuels (back-end fuel cycle) are further intensified with time. However, the related nuclear technologies such as uranium enrichment and spent fuel reprocessing have been the source of clandestine nuclear weapon materials and hence controlled duly by various national and international mechanisms in current non-proliferation regime. Multinational approaches could facilitate solutions for peaceful uses of nuclear while eliminating the risk of proliferation and terror. In this paper we have compared important proposals of multinational approaches to the nuclear fuel cycle and summarized pros and cons in implementing as a workable solution. In the case of front-end fuel cycle, bona fide efforts in implementing multinational approaches have yielded fruitful results with such as International Nuclear Fuel Bank and International Uranium Enrichment Centre. On the other hand, there is no such consensus for spent fuel recycling with continuing debates on the environment-friendliness as well as proliferation resistance. Analysis of debates on Direct Disposal or Partitioning and Transmutation (P&T) in key aspects including economy, environmental impact, and non-proliferation has led to a conclusion that advanced P&T has enough merits that warrants serious multinational approach toward demonstration and deployment. Such efforts can also provide a logical framework to maximize benefits and overcome obstacles in front. With the comparisons of outstanding options for back-end fuel cycle, practical multinational approaches have been formulated and recommended for international reviews.