

International perspectives and implications of US decisions regarding the back-end of the nuclear fuel cycle

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US policies, decisions and actions in all matters concerned with the back end of the nuclear fuel cycle have had significant impacts, both positive and negative, on the programmes of many nations. The two activities that I wish to highlight here concern reprocessing and geological disposal.

The USA first attempted to influence national policies on reprocessing when it itself ceased working on commercial reprocessing, arguing that the proliferation risks outweighed potential benefits in uranium utilisation. In practice, this argument did not affect international activities in a very significant way. France, Russia and the UK continued with commercial reprocessing and most of their customer countries continued to send fuel for reprocessing until it became clear that the activity was uneconomic given the continuing low price of fresh uranium. The only countries that were really directly impacted by the US anti-reprocessing position were those whose fuel was US flagged, so that US permission would be needed to reprocess indigenously or at a service provider. Examples are South Korea and Taiwan.

When the Administration decided that nuclear power should be expanded, reprocessing again became a topical issue. Original ideas to build a French style plant in the USA and reprocess fuel using the PUREX method were quickly recognised to be nonsensical (no demand, no major advantages for disposal) and attention sensibly turned to developing advanced methods in the national labs. Meanwhile, for non-proliferation reasons, efforts were still being made to prevent or discourage other nations from reprocessing (and enrichment). In return for a commitment to forego the right to such technologies (if employed for peaceful purposes), the USA offered help with establishing nuclear power programs. It even proposed at one stage in the GNEP program that the USA might take back spent fuel from new nuclear countries – but this politically sensitive proposal was dropped even before GNEP as such met its end.

Today, an appropriate approach to enhancing the safe use of nuclear power without unduly increasing global security risks would indeed be for reprocessing to be concentrated in the few countries that have full fuel cycle facilities, for new reprocessing facilities to be built only when the need has been established (which means when the advent of fast reactors appears certain) and for them to use advanced, more proliferation resistant technologies. One incentive for other countries to desist from reprocessing might be that the major nuclear nations help them with the challenging task of geological disposal, i.e. by helping with “cradle to grave” support rather than focussing only on security of fuel supply.

Concerning geological disposal, the implications of developments in the USA over the past decades have been more often negative than positive. The positive aspects are mainly related to the large reservoir of US scientific and engineering skills that have been put to work on many aspects of geological disposal. Work on waste forms, engineered containers, contaminant transport, performance assessment modelling etc. has benefited many programs around the world. Examples of developments in the repository implementation program that have been negatively perceived by other nations include:

- A siting process that appeared - in its final stages - to have been strongly driven by political rather than scientific or societal criteria (The DOE sponsored NAS staging report had more impact outside the USA)
- An overly expansive site characterisation program that required funding far beyond the reach of most other countries – thus setting a dangerous signal
- An engineered barrier program in which new concepts kept appearing after previous assertions that a safe system was already proposed (e.g. the sudden appearance of the immensely expensive titanium drip-shield) – thus reducing the credibility of specialists in the disposal field
- Dropping the on-going Yucca Mountain project without awaiting an NRC judgement on the safety.

The most valuable services that the USA could do for the global nuclear community now are:

- Make clear that the Yucca Mountain decision is a policy choice and NOT a generic judgement on the feasibility, safety or ethical justifiability of geological repositories
- Acknowledge that, although safe surface storage of spent fuel can be carried out for many decades, it is not a final solution to the disposal of long-lived radioactive wastes.
- Start up a modern, adaptively staged siting program taking full account of societal issues.
- Continue to support the position that geological disposal will be a necessity for all nuclear countries and that small countries will need help to achieve this individually or in concert.