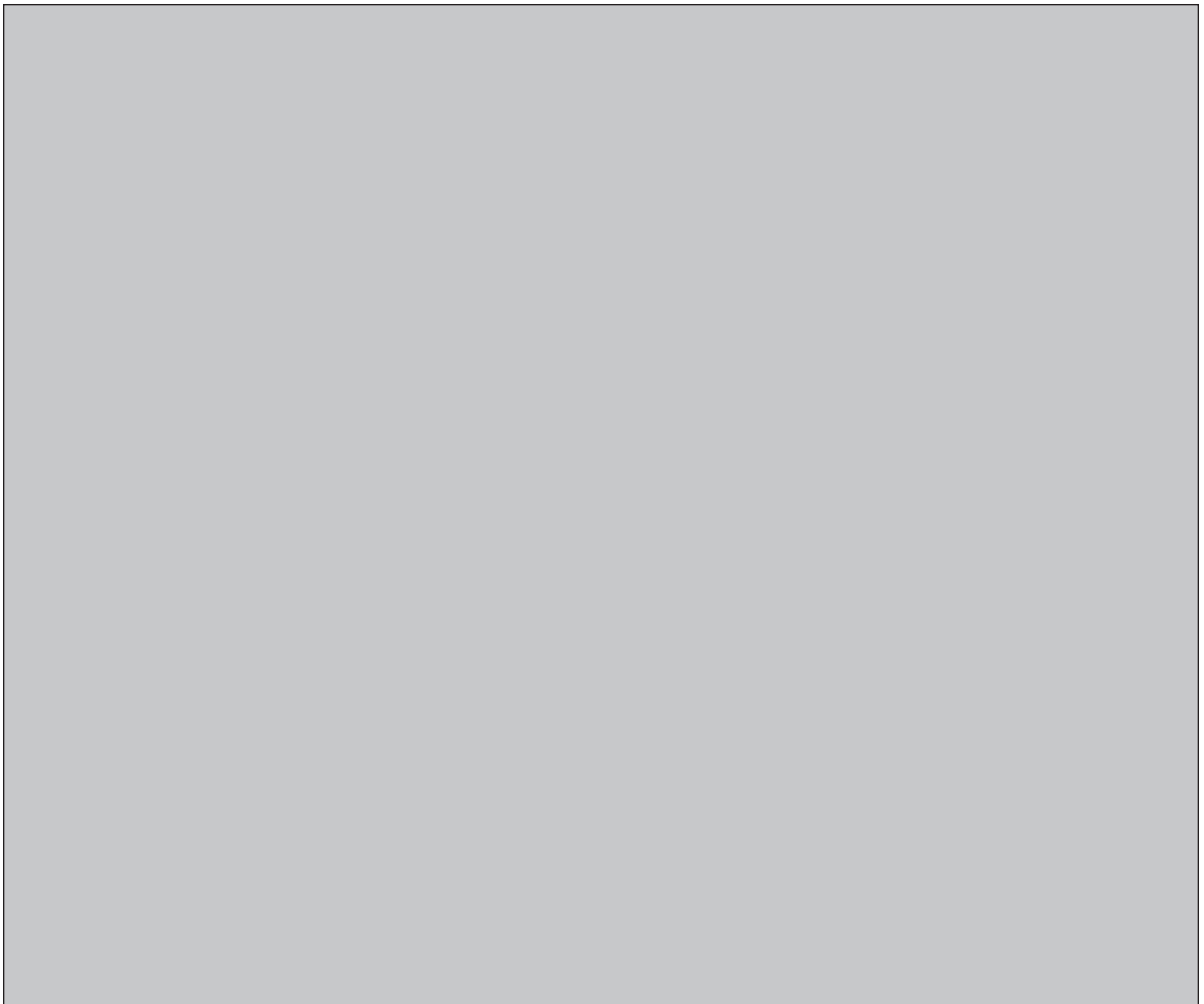


NWMO BACKGROUND PAPERS
6. TECHNICAL METHODS

**6-5 RANGE OF POTENTIAL OPTIONS FOR THE LONG-TERM MANAGEMENT
OF USED NUCLEAR FUEL**

EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

Methods for the long-term management of used nuclear fuel and other long-lived and highly active radioactive wastes have been under investigation in various countries for about the past forty years. A large number of methods have been suggested and there is sufficient information available to prioritize them for future work. This paper provides a summary of recent published assessments of management options for used fuel and, based on these assessments, suggests that they can be placed in three categories of differing levels of interest for further R&D.

Sixteen fuel management options are considered in the paper. These include underground disposal, storage above ground, storage underground, sub-seabed disposal, disposal in space, and partitioning and transmutation. For each option there is a brief description and a summary of published assessments. These summaries use environmental, technical, economic and social and ethical criteria taken from other reviews of options. The intention throughout is to give equal treatment to all the options and not to dismiss any of them out of hand.

It is suggested that there are only three long-term management options that are of '*considerable interest*' for future R&D. These are underground disposal in a deep repository, storage above ground and storage underground. These three options are being assessed in detail or implemented in many national programs worldwide.

Four options considered to be of '*some interest*' for future R&D are partitioning and transmutation, reprocessing, underground disposal in an international deep repository and storage in an international facility. The first two of these are not complete management options for used fuel because there would be residual wastes to store or dispose of, and neither could be implemented in the near future. International storage and international underground disposal are options that may become more practicable and desirable over the next few years than they seem now, at least for some countries.

Based on recent assessments, the other nine options are judged to be of '*very little interest*' now. They are still advocated by a few organizations and individuals but are not part of any national programs. Some are ruled out by international conventions.