The Global Nuclear Energy Partnership (GNEP)

Minimize Nuclear Waste

The Global Nuclear Energy Partnership's (GNEP) plans to recycle spent nuclear fuel from commercial reactors have the potential to decrease the toxicity and volume of waste requiring disposal.

Under all strategies and scenarios for the future of nuclear power, the U.S. will need a permanent geologic repository to deal with radioactive wastes resulting from the operation of nuclear power plants. GNEP has important implications for the proposed repository at Yucca Mountain, Nevada.

Such increased efficiency would ensure that even with expanded use of nuclear energy,

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Aerial view of Yucca Mountain, Nevada (www.ocrwm.doe.gov/ymp)

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the U.S. would need only one geologic repository. GNEP is consistent with the Yucca Mountain Project and extends its benefits beyond the 21st century.

How recycling would work

The U.S. is pursuing the transition from a once-through fuel cycle to a new approach that includes recycling of spent nuclear fuel without separating out pure plutonium. Recycling would employ uranium extraction plus (UREX+).

Research has shown that UREX+ can separate uranium from the spent fuel at a very high level of purification that would allow it to be recycled for re-enrichment, stored in an unshielded facility, or simply buried as a low-level waste. In addition, to uranium, UREX+ recycling can separate out:

- Long-lived fission products, technetium and iodine, which could be immobilized for disposal in Yucca Mountain.
- Short-lived fission products, cesium and strontium, which could be prepared for decay storage until they meet the requirements for disposal as low-level waste.
- Transuranic elements (plutonium, neptunium, americium and curium), which could be fabricated into fuel for an Advanced Burner Reactor, or advanced fast reactor.

Fast reactors would consume or destroy the transuranics, reducing the need for disposal in Yucca Mountain. This approach would increase the effective capacity of the geologic repository by an estimated factor of 50 to 100. Residual waste fission products would be reconfigured for disposal at a single geologic repository.

With recycling and used fuel management, the planned geologic repository site at Yucca Mountain, Nevada, has the potential capability to accommodate all the used U.S. commercial nuclear fuel that has been or will be generated by U.S. nuclear power plants over their lifetimes.

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