SAND2007-7845P

Summary and Conclusions

KHNP Training Program

Module 12: Interim Storage of Spent Fuel

December 19, 2007

Susan D. Carson, Ph.D.
Principal Member of the Technical Staff
Sandia National Laboratories

Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Conclusions: General

- There is an urgent need to provide increased interim storage capacity around the world.
- Interim storage is a key element of the fuel cycle - regardless of whether the planned permanent option is reprocessing or direct disposal.
- Interim storage is a complement, not an alternative, to permanent disposal, of SNF and wastes from reprocessing.

Sandia National Laboratories

Conclusions: Technology

- Technology is available to store spent nuclear fuel safely and securely until permanent management options are implemented.
- Spent fuel with burnups below ~45 GWd/MTU can be dry-stored for at least 100 years.
- To date, there have been no reported incidents of significant release of radioactive material during wet or dry SNF storage.
- Dry cask storage is the preferred option for long-term storage.

Sandia National Laboratories

Conclusions: Social Issues

- The most difficult and complex issues facing interim storage are not technological but political, legal, and institutional.
- An approach that emphasizes transparency, democracy, and fairness can help overcome the obstacles to gaining acceptance for siting interim storage facilities.
- The process for siting interim spent fuel storage facilities must give the host community high confidence that safety will be assured, that all potential facility negative impacts will be addressed, and that the host community will be better off, overall, once the facility is built.

Social Issues, continued

- Building confidence that interim storage facilities will not become de facto permanent repositories is essential to building public support for these facilities.

- The “Facility Siting Credo” offers useful guidance for efforts to implement interim storage approaches that can gain public support.

Sandia National Laboratories

The Facility Siting Credo

Procedural Steps

- Institute a broad-based participatory process.
- Seek consensus.
- Work to develop trust.
- Seek acceptable sites through a volunteer process.
- Consider competitive siting processes.
- Set realistic timetables ("go slowly in order to go fast").
- Keep multiple options open.

Desired Outcomes

- Agreement that a facility is needed.
- Storage approaches and sites that best address the problem are chosen.
- Stringent safety standards are met.
- Confidence that storage will be temporary.
- Negative aspects of the facility are fully addressed.
- The host community is better off.
- Agreements that specify what happens if something goes wrong are in place.
- Geographic fairness.

Conclusions: Safety, Security, and Economics

- If appropriately managed and regulated, interim SNF storage is very safe.
- If appropriately safeguarded, interim SNF storage is secure and proliferation-resistant.
- The cost of storing spent fuel for 40 years is <0.1 cents per kilowatt-hour of electricity generated. Once the initial capital costs of dry storage are paid, the costs of maintaining the fuel in storage are very low.

Sandia National Laboratories

Conclusions: Regional Storage

- Proposals for international sites for storage of SNF pose a complex mix of potential advantages and disadvantages, and face significant obstacles; however, such sites are essential, especially for countries with small nuclear programs and no suitable site for permanent disposal.

- Proposals for international sites in Russia pose especially complex issues. Such a facility could make a substantial contribution to international security and would deserve support if the appropriate criteria were met – but these will not be easy to meet.

Sandia National Laboratories