



HEALTH
PHYSICS
SOCIETY

MANAGING SPENT NUCLEAR FUEL

POSITION STATEMENT OF THE HEALTH PHYSICS SOCIETY*

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The Nuclear Waste Policy Act of 1982 legislates a system of managing spent nuclear fuel that results in its permanent disposal in appropriate geological repositories. Although a repository site has been identified, studied, and mostly developed as provided for by this law, the actual completion and use of the repository is still decades off with the potential for public and legal actions preventing it from ever being operational. In the meantime, nuclear reactor technology, energy use and demand, energy production effects on the environment, public-policy mechanisms, and medical knowledge have all evolved and can be seen to continue to evolve such that the assumptions and basis for the Nuclear Waste Policy Act may no longer be appropriate for the current inventory of spent nuclear fuel. In addition, the possibility of changing the nature of spent fuel management through the development of reprocessing techniques places new demands on managing possible spent fuel waste streams in the future.

In light of the current situation and prospect of future developments relevant to managing spent nuclear fuel, the Health Physics Society (HPS) takes the following **positions**:

1. The HPS believes the management of spent fuel from nuclear reactors should be conducted in a manner that (a) uses only scientifically valid and reasonable assumptions for setting protection standards, (b) adequately protects the public and environment from radiation exposure resulting from natural, accidental, or malevolent release of radioactive materials from the spent fuel, (c) accommodates evolving technologies, and (d) does not permanently dispose of potentially valuable material that is contained in a spent-fuel assembly.
2. The HPS believes that the development of new reactor technology that is intended for commercial production of electrical power must (a) integrate the characteristics of waste streams created by this new technology into the design of the new technology and process from the very beginning of its development, (b) design the framework to manage the new waste stream with equal importance to

designing the technology itself, and (c) incorporate input and involvement from the regulatory authority that will regulate the technology and resulting waste stream once it is producing commercial power.

3. Regarding position 1.(a) above, the HPS believes the radiation protection standards recommended in its position statement "Ionizing Radiation-Safety Standards for the General Public" (HPS 2003) are appropriate for application to potential public exposure associated with management of spent nuclear fuel.
4. Regarding position 1.(b) above, the HPS believes the scientific validity and reasonableness of assumptions regarding the estimation of cancer and genetic risk from radiation exposure only allows the risk estimates to be extrapolated out for a period on the order of several generations (that is, on the order of a hundred years) but no more than a few hundred years. The basis for this is that today's limited knowledge of radiation risk mechanisms results in the necessity of knowing the lifestyles and underlying cancer and genetic experience of the population for which the risk is being estimated, and it is unreasonable to think these can be known beyond a few generations. Of course, this limitation may be changed as our knowledge of the radiation risk mechanisms improves, which is an example of needing to have a spent nuclear fuel management system that accommodates evolving technologies (i.e., position 1.(c) above).

Regarding positions 1.(c) and 1.(d) above, the HPS makes the following **recommendations**:

1. Spent nuclear fuel should be designated for monitored interim retrievable storage for a period intended to be at least 100 years but with a possibility of being as long as 300 years.
2. An independent expert study should be performed to inform a risk-based decision on whether the location of the interim retrievable storage for up to 300 years should be on-site where the spent nuclear fuel is generated, should be centralized in the Yucca Mountain repository, or should be in some other configuration or location. This study should evaluate if any of these options present an unacceptable risk to the public and the environment from radiation exposure due to the presence of the spent nuclear fuel and due to the natural, accidental, or malevolent release of radioactive materials from the spent fuel.
3. Radiation protection standards should be developed for the interim storage facility or facilities based on a 300-year storage period. Radiation protection standards should not be developed for final permanent disposal/disposition of the spent nuclear fuel or wastes produced by processing the spent fuel until technologies and knowledge advance to the point of allowing a scientifically valid decision on final disposition.
4. The storage facility or facilities should be designed to have appropriate monitoring to ensure the integrity of the storage containers and facility or facilities remain intact throughout the storage period.

Reference

Health Physics Society. Position statement “Ionizing Radiation-Safety Standards for the General Public,” last revised June 2003.

*The Health Physics Society is a nonprofit scientific professional organization whose mission is excellence in the science and practice of radiation safety. Since its formation in 1956, the Society has represented the largest radiation safety society in the world, with a membership that includes scientists, safety professionals, physicists, engineers, attorneys, and other professionals from academia, industry, medical institutions, state and federal government, the national laboratories, the military, and other organizations. Society activities include encouraging research in radiation science, developing standards, and disseminating radiation safety information. Society members are involved in understanding, evaluating, and controlling the potential risks from radiation relative to the benefits. Official position statements are prepared and adopted in accordance with standard policies and procedures of the Society. The Society may be contacted at 1313 Dolley Madison Blvd., Suite 402, McLean, VA 22101; phone: 703-790-1745; fax: 703-790-2672; email: HPS@BurkInc.com.