SPEAKER / PRESENTATION INFORMATION

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Biography	John Wagner is the Radiation Transport & Criticality group leader at Oak Ridge National Laboratory (ORNL). He received a B.S. in nuclear engineering from the University of Missouri-Rolla in 1992 and a M.S. and Ph.D. degrees from Pennsylvania State University in 1994 and 1997. His dissertation research focused on development of a new hybrid radiation transport method and parallel processing for Monte Carlo shielding calculations. Wagner spent two years with Holtec International, primarily performing criticality safety analyses for storage and transport of commercial spent fuel. Wagner joined ORNL in 1999, where he continued work in hybrid transport methods development and burnup credit criticality safety. In late 2006, Wagner became technical lead for postclosure criticality in support of the proposed repository at Yucca Mountain.		
Title	***Postclosure Criticality: Basis for Exclusion and Role of Burnup Credit***		
Abstract	This presentation will describe the methodology and approach used to address the issue of criticality in the proposed repository at Yucca Mountain during the postclosure disposal time period. The United States Nuclear Regulatory Commission regulatory criteria will be reviewed relevant to postclosure criticality; the role of criticality will be explained within the overall repository performance assessment; the strategy will be described for preventing criticality via design features and waste form properties; and the numerous considerations will be reviewed relevant to criticality of spent fuel during disposal. The most significant and effective measures for prevention of criticality in the repository include: multiple, redundant barriers that act to isolate the fissionable material from water (which can act as a moderator, corrosive agent, and transporter of fissile material); inherent geometry of the waste package internals and waste forms; presence of fixed neutron absorbers in the waste package internals; and fuel burnup for commercial SNF. Within the probabilistic approach, criticality is considered an event, and the total probability of a criticality event during the disposal time period is calculated and compared against the regulatory criterion. The total probability of criticality includes contributions associated with both internal (within the waste package) and external (external to the waste package) criticality for each of the initiating events that could lead to waste package breach. Despite numerous and significant conservative analysis assumptions in the event sequences requisite to enabling criticality (i.e., analysis assumptions that increase the calculated probability of criticality), the probability of nuclear criticality during the postclosure performance period is determined to be below the regulatory threshold for inclusion in the repository performance assessment.		