

## Spent Fuel Transportation Fire Safety Analyses

To better understand how spent fuel transportation packages would perform in severe and/or long-duration fires, the NRC has conducted a number of studies of real-world roadway and railway accidents. These studies have been focused on railway and roadway accidents that have involved long-duration and/or severe fires and have analyzed the impacts of these fires on spent nuclear fuel (SNF) transportation packages. Specifically, the NRC's objective has been to understand: (a) the frequency of long-duration fires, (b) the amount of fuel needed to cause these kinds of fires, (c) the duration of these fires, (d) the potential effects on SNF packages, (e) the behavior of important-to-safety components during these fires, and (f) the additional actions, if needed, to address the real-world fire accidents.\

To date, the NRC staff has completed and documented the following studies:

- Analysis of Severe Railway Accidents Involving Long Duration Fires, NUREG/CR-7034, February 2011;  
Analysis of Severe Roadway Accidents Involving Long Duration Fires, NUREG/CR-7035, February 2011;
- Analysis of Structural Materials Exposed to a Severe Fire Environment, NUREG/CR-6987, February 2009;
- Spent Fuel Transportation Package Response to the Caldecott Tunnel Fire Scenario, NUREG/CR-6894, January 2007;
- Spent Fuel Transportation Package Response to the Baltimore Tunnel Fire Scenario, NUREG/CR-6886, February 2009;
- Structural Materials Analyses of the Newhall Pass Tunnel Fire, NUREG/CR-7101, June 2011; and
- Numerical Simulation of the Howard Street Tunnel Fire, Baltimore, Maryland, NUREG/CR-6793, January 2003.

The overall project is planned to cover the issues of (a) examination and explanation of current regulations, (b) screening of real life accidents, (c) case studies of most severe accidents, and (d) consequence, conclusion, and recommendation. The current results of these studies indicate that:

- 1) the SNF transportation packages are robust and provide reasonable assurance of safety, even in severe fire accidents;
- 2) the frequency of severe fires is very low;
- 3) the consequences of severe fires analyzed are not significant; and
- 4) the current regulatory framework is adequate.

In addition, the NRC staff is currently analyzing the fire at Newhall Pass Tunnel and the accident and fire at MacArthur Maze Interchange. These studies and analyses will be integrated into an overall evaluation of the risks of SNF transportation by railway and by roadway due to severe fire accidents. The NRC will use the results of this evaluation to determine the adequacy of its current SNF transportation packaging standards and what, if any, additional actions may be

needed to address the real-world severe fire accidents. The results of this evaluation will be documented in two NUREGs