

REGULATORY ANALYSIS

REGULATORY GUIDE (RG)-1.91

EVALUATIONS OF EXPLOSIONS POSTULATED TO OCCUR AT NEARBY FACILITIES AND ON TRANSPORTATION ROUTES NEAR NUCLEAR POWER PLANTS

(Draft was issued as DG-1270, dated July 2011)

1. Statement of the Problem

The NRC issued Regulatory Guide 1.91, “Evaluations of Explosions Postulated to Occur on Transportation Routes Near Nuclear Power Plants,” Revision 1, in February 1978. Since 1978, approaches to evaluating explosion hazards to structures have benefitted from new research and revised methodologies. In a recent study—Rodriguez, E. A. and Schofield, W., “Comparison of Blast Pressures and Effects Methodologies with Application to South Texas Project Units 3 & 4,” February 2009—sponsored by the NRC, Energy Research, Inc. found that applicants for new nuclear power reactors are using updated information and methodologies to evaluate explosion hazards and recommended that the NRC update Regulatory Guide 1.91.

Revision of this regulatory guide is necessary to accomplish the following objectives:

1. Expand the scope of guidance to include fixed facilities and include any forms of hazardous explosive materials.
2. Bring this guidance into agreement with current industry practice and current NRC fire protection guidance (NUREG-1805, “Fire Dynamics Tools (FDT^s) Quantitative Fire Hazard Analysis Methods for the U.S. Nuclear Regulatory Commission Fire Inspection Program,” December 2004).
3. Clarify the methodology described in the regulatory guide.
4. Expand the scope of guidance in a consistent manner, to determine TNT equivalent based on energy equivalence value (yield) of the material under consideration (chemical/hydrocarbon), where energy equivalence ranges from 5-100%.

2. Objective

The objective of this revision is to provide clear and up-to-date guidance for protecting safety-related structures, systems, and components against postulated explosions.

3. Alternative Approaches

The NRC staff considered the following alternative approaches:

1. Do not revise RG 1.91.
2. Withdraw RG 1.91.
3. Revise RG 1.91.

Alternative 1: Do Not Revise RG 1.91

Under this alternative, the staff would not revise this regulatory guide, and the current regulatory guide would be retained. If the NRC does not take action, there would not be any changes in costs or benefits to the public, licensees, or the NRC. However, the “no-action” alternative would not address identified concerns with the current version of the regulatory guide, including bringing this regulatory guide into agreement with current methodologies. The NRC would continue to review each application on a case-by-case basis. This alternative provides a baseline condition from which any other alternatives will be assessed.

Alternative 2: Withdraw RG 1.91

Under this alternative the NRC would withdraw this regulatory guide. This would eliminate the current conflict that exists between the current regulatory guide and current NRC fire protection guidance (NUREG-1805, “Fire Dynamics Tools (FDT^s) Quantitative Fire Hazard Analysis Methods for the U.S. Nuclear Regulatory Commission Fire Inspection Program,” December 2004). It would also eliminate a readily available description of methods that the NRC staff considers acceptable for demonstrating compliance with 10 CFR Part 50.34(a). This regulation requires each applicant for a construction permit to build a production or utilization facility to describe in its preliminary safety analysis report the quality assurance program that will be applied to the design, fabrication, construction, and testing of the facility’s structures, systems, and components. Although this alternative would be less costly than revising RG 1.91, it would impede the public’s accessibility to guidance information.

Alternative 3: Revise RG 1.91

Under this alternative, the staff would revise Regulatory Guide 1.91, taking into consideration the recommendations in “Comparison of Blast Pressures and Effects Methodologies with Application to South Texas Project Units 3 & 4,” (ADAMS Accession No. ML090630278) including updated industry methodologies and other NRC guidance (NUREG-1805).

The impact to the NRC would be the costs associated with preparing and issuing the revised regulatory guide. The impact to the public would be the voluntary costs associated with reviewing and providing comments to the NRC during the public comment period. The value to the NRC staff and its applicants would be the benefits associated with enhanced efficiency and effectiveness in using a common guidance document as the technical basis for license applications and other interactions between the NRC and its regulated entities.

Conclusion

Based on this regulatory analysis, the NRC staff recommends revision of RG 1.91. The staff concludes that the proposed action will enhance this guidance by bringing it into agreement with current industry practice and current NRC fire protection guidance (NUREG-1805, “Fire Dynamics Tools (FDT^s) Quantitative Fire Hazard Analysis Methods for the U.S. Nuclear Regulatory Commission Fire Inspection Program,” December 2004).