

Regulatory Guide Periodic Review

Regulatory Guide Number: 1.189
Revision 2

Title: Fire Protection for Nuclear Power Plants

Office/division/branch: NRR/DRA/APLB
Technical Lead: Daniel M. Frumkin

Staff Action Decided: Revise

1. What are the known technical or regulatory issues with the current version of the Regulatory Guide (RG)?

Regulatory Guide 1.189, Revision 2 (Rev. 2), "Fire Protection for Nuclear Power Plants," most recently published in October 2009, provides fire protection guidance that identifies the scope and depth of fire protection that the staff would consider as one acceptable way for nuclear power plants to meet fire protection regulations.

>>>>>> For 2017 Administrative Update >>>>>>

During the course of interactions with applicants and licensees, the staff identified a minor typographic error on page 52 in which four paragraphs were incorrectly indented, resulting in these paragraphs being incorrectly labeled as sub-bullets. Paragraphs labeled as: iii, iv, v, and vi, were inadvertently indented, and should read as paragraphs: g, h, i, and j, respectively. A correct version of this page is attached at the end of this evaluation for clarity.

>>>>>> For Future Update – Technical Information Is Not Yet Finalized >>>>>>

The staff has identified the following related activities that should be considered for inclusion the next time this RG is revised:

- Since 2009 licensees have used the information in RG 1.189 extensively and have identified a number of enhancements.
- Information released as part of NUREG/CR-7150, "Joint Assessment of Cable Damage and Quantification of Effects from Fire (JACQUE-FIRE)," is considered applicable to this RG.
- Nuclear Energy Institute (NEI) has published revision 4 of NEI 00-01, "Guidance for Post-Fire Safe Shutdown Circuit Analysis."
- Based on discussions with NEI staff, the next revision of NEI 00-01 will include information from NUREG/CR-7150, Volume 3.

Following this administrative update, during the next revision of RG 1.189, the staff should consider making changes to ensure consistency with any changes in NUREG/CR-7150, and should consider endorsing applicable elements of NEI 00-01, when the next revision is made available.

2. **What is the impact on internal and external stakeholders of not updating the RG for the known issues, in terms of anticipated numbers of licensing and inspection activities over the next several years?**

>>>>> For 2017 Administrative Update >>>>>>

The staff recognizes that this minor typographic error may cause confusion and possible misinterpretation of when these certain paragraphs apply.

>>>>>> For Future Update – Technical Information Is Not Yet Finalized >>>>>>

Other than the identified typographic error, the staff finds RG 1.189 has a number of technical issues that have resolutions under development. The use of the current version of RG 1.189 has no known impact on internal or external stakeholders. Notwithstanding areas for improvement when technical information is finalized, there is no immediate impact on ongoing and anticipated licensing activities.

3. **What is an estimate of the level of effort needed to address identified issues in terms of full-time equivalent (FTE) and contractor resources?**

The staff estimates 0.1 FTE to process an administrative change to RG 1.189 to correct this typographic error. No action or FTE is needed at this time for the more substantive changes – since they will occur during a later review.

4. **Based on the answers to the questions above, what is the staff action for this guide (Reviewed with no issues identified, Reviewed with issues identified for future consideration, Revise, or Withdraw)?**

Revise. The staff plans on processing an administrative change to RG 1.189 to correct this typographic error,

5. **Provide a conceptual plan and timeframe to address the issues identified during the review.**

The staff will process an administrative change to correct the typographic error.

Once the administrative change is complete, the staff will monitor the related industry related activities mentioned above in Question 1 and consider incorporating them during the next revision of RG 1.189.

NOTE: This review was conducted in November 2017 and reflects the staff's plans as of that date. These plans are tentative and are subject to change.

- f. When a common water supply is permitted for fire protection and the ultimate heat sink, the following conditions should also be satisfied:
 - i. The additional fire protection water requirements are designed into the total storage capacity.
 - ii. Failure of the fire protection system should not degrade the function of the ultimate heat sink.
- g. Other water systems that may be used as one of the two fire-water supplies should be permanently connected to the fire main system and should be capable of automatic alignment to the fire main system. Pumps, controls, and power supplies in these systems should satisfy the requirements for the main fire pumps. The use of other water systems for fire protection should be compatible with their safe-shutdown functions. Failure of the other system should not degrade the fire main system.
- h. For multiunit nuclear power plant sites with a common yard fire main loop, common water supplies may be used.
- i. Fire-water supplies should be filtered and treated as necessary to prevent or control biofouling or microbiologically induced corrosion of fire-water systems. If the supply is raw service water, fire-water piping runs should be periodically flushed and flow-tested.
- j. Provisions should be made to supply water to at least two standpipes and hose connections for manual firefighting in areas containing equipment required for safe plant shutdown in the event of a safe-shutdown earthquake. The piping system serving such hose stations should be analyzed for safe-shutdown earthquake loading and should be provided with supports to ensure system pressure integrity. The piping and valves for the portion of the hose standpipe system affected by this functional requirement should, at a minimum, satisfy ASME B31.1, "Power Piping" (Ref. 87). The water supply for this condition may be obtained by manual operator actuation of valves in a connection to the hose standpipe header from a normal seismic Category I water system, such as the essential service water system. The cross-connection should be (1) capable of providing flow to at least two hose stations (approximately 284 L/min (75 gal/min) per hose station), and (2) designed to the same standards as the seismic Category I water system (i.e., it should not degrade the performance of the seismic Category I water system).

3.2.2 Fire Pumps

Fire pump installations should conform to NFPA 20, "Standard for the Installation of Stationary Pumps for Fire Protection" (Ref. 88), and should meet the following criteria:

- a. If fire pumps are required to meet system pressure or flow requirements, a sufficient number of pumps is provided to ensure that 100-percent capacity will be available, assuming failure of the largest pump or loss of offsite power (e.g., three 50-percent pumps or two 100-percent pumps). This can be accomplished, for example, by providing either electric-motor-driven fire pumps and diesel-driven fire pumps or two or more seismic Category I Class 1E electric-motor-driven fire pumps connected to redundant Class 1E emergency power buses. (See Regulatory Guide 1.6 (Ref. 80), Regulatory Guide 1.32 (Ref. 81), and Regulatory Guide 1.75 (Ref. 82))