



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

February 18, 1999

The Honorable Shirley Ann Jackson
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Chairman Jackson:

SUBJECT: NFPA 805, "PERFORMANCE-BASED STANDARD FOR FIRE PROTECTION FOR LIGHT WATER REACTOR ELECTRIC GENERATING PLANTS"

During the 459th meeting of the Advisory Committee on Reactor Safeguards, February 3-6, 1999, we reviewed a draft NFPA 805 Standard on fire protection developed by the National Fire Protection Association (NFPA). During our review, we had the benefit of discussions with representatives of the NRC staff, NFPA, and the Nuclear Energy Institute (NEI). We also had the benefit of the documents referenced.

CONCLUSIONS AND RECOMMENDATIONS

1. The draft version of the NFPA 805 Standard is intended to be an alternate method to meet the intent of existing fire protection requirements in 10 CFR 50.48, Appendix R, and General Design Criterion (GDC) 3. The draft Standard is not, however, a distinct, risk-informed, performance-based alternative to these existing fire protection requirements.
2. It may now be time for the NRC staff to revisit the strategy described in SECY-98-058 (Development of a Risk-Informed, Performance-Based Regulation for Fire Protection at Nuclear Power Plants) and initiate work on an alternate rule that makes good use of risk information and is distinctly performance based.

DISCUSSION

Existing fire protection requirements for nuclear power plants are quite prescriptive. Over the last several years, there has been interest on the parts of both the nuclear industry and the NRC in finding an alternative to these prescriptive requirements that would be more performance based. That is, outcomes, rather than methods and processes, would be specified in the performance-based requirements. More recently there also has been interest in using risk information to determine the performance standards for fire protection programs at nuclear power plants.

The NFPA has volunteered to help develop a performance-based fire protection standard for nuclear power plants. The draft version of the standard developed under the auspices of the NFPA was issued for public comment on November 25, 1998. Elements of the Standard are:

- basic, deterministic requirements imposed on all fire protection programs,
- additional requirement that the developers of fire protection programs must choose is either deterministic or performance-based, and
- a site-wide risk assessment to ascertain if more stringent or additional requirements are needed.

The risk assessment can be used to set performance criteria that are not yet defined. Risk assessment is not allowed by the standard to alter the basic fire protection requirements. Indeed, it is not readily apparent that risk analysis is considered as a means for justifying reductions in the additional performance-based fire protection requirements.

The objectives of the NFPA 805 Standard are to address nuclear safety, radiological release, life safety and property damage. The nuclear safety objectives include reactivity control and fuel cooling. These objectives are not the same as those set by the NRC, although the NRC is the only "agency having jurisdiction" over nuclear safety. Proliferation of goals and objectives does not contribute to the coherence and comprehension of safety regulation. Why should not fire safety objectives in the Standard be derived from NRC's safety objectives or from the cornerstones of safety adopted in revising the NRC inspection and assessment programs? The Standard could be a systematic, top-down derivation of fire protection objectives. This top-down process could be used to identify and even define performance criteria for individual pieces of equipment and elements of the fire protection program. Properly done, this process would make unnecessary a site-wide risk assessment to provide "additional assurance" of adequate fire protection. It would make possible the quantitative assessment of acceptable fire risk and acceptable levels of fire safety now called for in the Standard.

As formulated currently, it is difficult to distinguish some deterministic requirements and their performance counterparts. Consider, for example, the Standard's performance-based requirement: "Each fire pump and its driver and control shall be located in a room separated from the remaining fire pumps and from the remainder of the plant by barriers with fire resistance ratings as required by the Fire Hazards Analysis (FHA)."

This appears to be quite a deterministic requirement. We note that a performance requirement could be deterministic. We suspect that the concept of "performance" is interpreted differently by the NFPA and the nuclear safety community. The term as used by NFPA in the Standard should be clarified.

The NFPA 805 standard amounts to a rederivation of the fire protection requirements in Appendix R with minimal steps in the direction of using performance criteria and risk information. One could envision the NFPA 805 Standard, once completed, being endorsed in part in a regulatory guide as an acceptable, alternate way to meet the intent of existing fire protection requirements. The

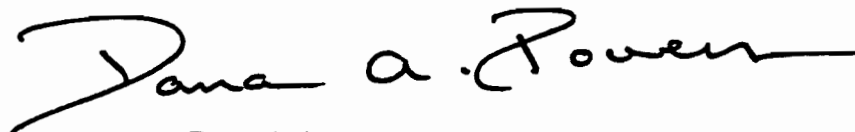
development of strategies for the NRC to inspect fire protection programs based on this new standard and to enforce requirements would require substantial effort.

It is clear that the draft NFPA 805 Standard is not a bold step in the direction of risk-informed, performance-based fire protection. It appears possible to make a far bolder step. There is an alignment of defense in depth for fire protection and risk analysis. Defense in depth for fire protection consists of steps to prevent fires from occurring, to detect and suppress fires, and to protect safety-related equipment from the effects of fires. Fire risk analyses attempt to quantify the effectiveness of these defense-in-depth steps. One can well imagine a rule calling for performance criteria based, perhaps, on risk analyses, for prevention of fires, detection and suppression of fires, and protection of equipment from the effects of fires. Performance indicators could be defined for each of these performance criteria.

Development of a risk-informed, performance-based alternative to existing fire protection rules should be done within the context of other ongoing activities within the NRC. The objectives and performance should be defined in a top-down fashion to yield results consistent with those of other elements of nuclear power plant safety strategies. There should be a systematic, transparent process that defines the pathway from the topmost objectives to individual performance criteria and performance indicators used for monitoring a plant fire protection program. Processes used to develop the NRC's improved plant inspection and assessment programs might well serve as a guide to develop a new fire protection rule.

We plan to follow the progress in the development of the NFPA 805 Fire Protection Standard, which is scheduled for completion in May 2000.

Sincerely,

A handwritten signature in black ink that reads "Dana A. Powers". The signature is fluid and cursive, with a long horizontal line extending from the end of the name.

Dana A. Powers
Chairman

References:

1. NFPA 805, Draft 6.3, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," dated November 25, 1998.
2. Memorandum dated March 26, 1998, from L. Joseph Callan, Executive Director for Operations, NRC, for The Commissioners, SECY-98-058, Subject: Development of a Risk-Informed, Performance-Based Regulation for Fire Protection at Nuclear Power Plants.
3. Letter dated November 7, 1997, from George D. Miller, National Fire Protection Association, to Shirley Ann Jackson, Chairman, NRC, regarding NFPA development of a standard covering fire protection.
4. Memorandum dated September 11, 1997, from John C. Hoyle, Secretary of NRC, to L. Joseph Callan, Executive Director for Operations, NRC, Subject: Staff Requirements - SECY-97-127, Development of a Risk-Informed, Performance-Based Regulation for Fire Protection at Nuclear Power Plants.

5. Memorandum dated October 2, 1998, from L. Joseph Callan, Executive Director for Operations, NRC, for The Commissioners, SECY-98-230, Subject: Insights from NRC Research on Fire Protection and Related Issues.
6. Memorandum dated October 27, 1998, from William D. Travers, Executive Director for Operations, NRC, for The Commissioners, SECY-98-247, Subject: Risk-Informed, Performance-Based Fire Protection at Nuclear Power Plants.