ATTACHMENT 2

REGULATORY ANALYSIS

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REVISION TO 10 CFR 50.48, "FIRE PROTECTION"

1. Proposed Action

The U.S. Nuclear Regulatory Commission (NRC) is proposing to amend the fire protection requirements for nuclear power reactors in 10 CFR 50.48. The proposed rule would give light-water reactor licensees the option to voluntarily adopt the set of fire protection requirements contained in the national consensus standard promulgated by the National Fire Protection Association (NFPA) as Standard 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants, 2001 Edition" (NFPA 805), subject to the exceptions taken by the Commission in the wording of the rule change, as an alternative to the existing fire protection requirements of 10 CFR 50.48(b), or existing fire protection license conditions or technical specifications, and 10 CFR 50.48(f).

2. Statement of the Problem

Light water reactor licensees are currently required to comply with 10 CFR 50.48, which in turn requires licensees to comply with GDC 3 and either the fire protection requirements of Appendix R to 10 CFR Part 50, or licensing conditions or technical specifications developed for the given facility on the basis of similar requirements contained in the NRC's Standard Review Plan (NUREG-0800). All light water reactor licensees are currently required to comply with 10 CFR 50.48(f) when permanently ceasing operations. The current deterministic fire protection requirements are viewed by many as prescriptive in nature. Licensees have requested and received more than 900 exemptions to those requirements. The processing of these exemption requests has placed a significant burden on the resources of the NRC and the nuclear industry.

Instead of the prescriptive, deterministic requirements in Appendix R, or NRC staff reviews under NUREG-0800, there is now an opportunity to establish an alternative, less burdensome regulatory structure for fire protection. Permitting licensees to voluntarily adopt NFPA 805, as excepted, would give licensees the option to use a performance-based, risk-informed approach to change the fire protection configurations and procedures of their light water reactor electric generating plants. This alternative regulatory structure would potentially reduce the number and complexity of future licensee exemption or deviation requests related to fire protection changes in licensed reactor facilities, and would permit licensees to apply the full scope of NRC-approved analytical methods and approaches to establish and/or change reactor plant configurations and procedures.

3. Objectives

This proposed amendment has the following objectives:

(1) Provide licensees with an alternative set of performance-based, risk-informed fire protection requirements for changing the fire protection configurations of light water reactor electric generating plants.

(2) Leverage the involvement of industry in the development of NFPA 805, 2001 Edition, in the regulation of nuclear power reactors in accordance with the Commission's Direction Setting Issue (DSI) 13, "The Role of Industry."

(3) Leverage the involvement of the NRC staff in the development of NFPA 805, 2001 Edition in the regulation of nuclear power reactors.

(4) Achieve a main technology transfer goal of Public Law 104-113, "National Technology Advancement and Transfer Act of 1995."

4. Backfit Rule Considerations

The NRC assessed the proposed action for backfit considerations and determined that the proposed action does not include any backfits as defined in 10 CFR 50.109(a)(1). Licensees would be permitted, on a voluntary basis, to adopt NFPA 805, as excepted, as an alternative set of fire protection requirements. Alternatively, licensees could continue to comply with existing fire protection requirements. These licensees would not need to take any action as a result of the rule change.

5. Alternatives

Three alternatives are considered:

Alternative 1 - Make no change to 10 CFR 50.48.

This is the no-action option (the status quo). It results in licensees continuing to submit requests for exemptions or deviations, with the NRC conducting reviews of the exemption or deviation requests. It results in no incremental change in costs or benefits to licensees or the NRC. It is the base case used to compare costs and benefits of the other alternatives.

Alternative 2 - Approve NFPA 805, a national consensus standard, as an acceptable alternative to the requirements in 10 CFR 50.48 (b) and (f).

Licensees choosing to use the flexibilities provided by the proposed rulemaking could use risk-informed, performance-based approaches and methods contained in NFPA 805, rather than submitting an exemption or deviation request. Licensees could also submit requests to the Director of the NRC's Office of Nuclear Reactor Regulation (NRR) for approval of alternative fire protection analysis methodologies that meet the goals, objectives, and performance criteria in NFPA 805, rather than submitting an exemption or deviation request. A potential benefit would be that licensees could reduce costs over the lifetime of the plant, mainly through performance-based engineering flexibility involving building fire protection features, detection and suppression systems, and their associated maintenance costs.

It is difficult to estimate the cost benefits for licensees that implement alternative approaches because the benefits depend on the number of licensees implementing alternatives, the cost-benefit of the alternatives, and the number of years during which the licensees would derive benefits. Discussions with industry representatives indicate that the savings expected to result from implementing the proposed rule would be sufficient to induce a number of licensees

to adopt the NFPA 805 regulatory structure. Because the rule change applies to decommissioned plants as well as operating plants, the benefits derived from the rule change may also extend to reactor plants that permanently cease operations.

Alternative 3 - Develop a separate NRC fire protection standard.

In this case, the expected outcome would be similar to or the same as allowing licensees to adopt NFPA 805 (Alternative 2). This is because (1) the basic principles that the NRC would use to develop a separate standard are the same as those principles used to develop NFPA 805, and (2) the NRC staff participated in the development of NFPA 805, and the logical processes and technical considerations used in the development of an NRC-developed approach would, therefore, likely result in a standard with requirements similar to those in NFPA 805. This approach would not take advantage of the involvement of industry in the development of a standard as directed by DSI 13, and would not comply with the technology transfer goal of the National Technology Advancement and Transfer Act of 1995. This approach would also require an additional expenditure of NRC resources, as well as an additional amount of time to develop the NRC standard.

6. Estimated Consequences

Alternative 1 - Make no change to 10 CFR 50.48.

This is the status quo, for which there are no incremental costs or benefits.

Alternative 2 - Approve NFPA 805, a national consensus standard, as an acceptable alternative to the requirements in 10 CFR 50.48(b) and (f).

Each licensee choosing to implement the alternative fire protection requirements would have to conduct a one-time, plant-wide re-analysis of its fire protection systems, fire barriers, equipment, features, and procedures to establish that they meet the newly adopted standard. The costs of this analysis are estimated to be about $1M for each facility that adopts the new standard.

For fire protection systems, equipment, features, and procedures identified as no longer required, there will be a plant-specific, one-time cost for their removal, less any salvage value. A key benefit would be an elimination of recurring operating, training, and maintenance costs related to the existence of fire protection-related systems, equipment, features, and procedures that are no longer required.

For new, performance-based and risk-informed systems, equipment, features, and procedures, there will be a plant-specific, one-time cost for their establishment (which can not be estimated with any certainty), in addition to recurring operating, training, and maintenance costs.

A benefit of the proposed rule change to both licensees and the NRC would be the elimination of most fire protection-related exemption requests.

Although some of the costs and benefits discussed above cannot be estimated with any certainty, the proposed rulemaking, overall, is cost-beneficial because licensees will volunteer

to adopt the new standard only when they determine that the benefits (in terms of ongoing savings) outweigh the one-time implementation costs.

Alternative 3 - Develop a separate NRC fire protection standard.

In addition to the costs and benefits discussed for Alternative 2 (above), the NRC would incur an extra cost for developing a new standard to use in lieu of NFPA 805. Further, it would take extra time to develop the separate standard.

7. Decision Rationale

Of the alternatives considered, Alternative 2 is preferable. Alternative 2 would change the rule to allow licensees, to voluntarily adopt NFPA 805, as excepted, as an alternative to the fire protection requirements of Sections 50.48 (b) or existing license conditions or technical specifications, and 10 CFR 50.48(f). This proposed change is considered to be a relaxation of requirements, to the extent that it would allow licensees to use risk-informed, performance-based methodologies that meet the goals, objectives, and performance criteria of NFPA 805, in lieu of meeting the arguably more prescriptive, deterministic requirements contained in Appendix R to 10 CFR Part 50, or the similar requirements that resulted from the licensing review process for reactor plants licensed after January 1, 1979. Alternative 2 would, therefore, represent a reduction in regulatory burden.

Because it is certain that only licensees will only adopt the alternative standard for fire protection changes if they determine that they will realize a net benefit, Alternative 2 has no potential to result in a net cost to licensees, and could have the potential to add net benefits. This would clearly be superior to the no-action alternative (Alternative 1). Alternative 2 would result in the same future state of fire protection regulation as the higher-cost Alternative 3, which adds burden without adding benefits.

The proposed action would be final if approved.

Section 7.1 through 7.4 discuss the decision criteria and goals that the NRC considered in making this determination.

7.1 Maintain Public Health and Safety

The NRC staff has determined that public health and safety and the common defense and security would continue to be adequately protected under NFPA 805. This determination is based, in part, on the goals, objectives, and performance criteria specified in Chapter 1 of NFPA 805. Those goals, objectives, and performance criteria provide for defense-in-depth to control fires; prevention of radioactive releases that adversely affect the public; and control of plant reactivity, inventory, and pressure, as well as decay heat removal, vital auxiliaries, and process monitoring.

As stated in Section 2.4.4 of NFPA 805, the Standard's general methodology requires that the plant change evaluation process must consist of an integrated assessment of the acceptability of change in risk, defense-in-depth, and safety margins. This approach requires engineering evaluations to assess the adequacy of the fire protection elements (e.g., combustible and

ignition control, fire detection and suppression, and fire confinement) and the nuclear safety element (e.g., post-fire safe shutdown capability), to ensure that defense-in-depth philosophy is maintained. The NFPA 805 approach also includes requirements for the application of acceptable codes and standards to assess the calculated margin between designed and qualified fire protection features versus specified nuclear safety and radioactive release performance criteria, as well as provisions for evaluating acceptable change in risk in terms of small increases in Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) based on risk acceptance guidelines, as presented in NRC Regulatory Guide 1.174. (For example, when the calculated risk increase is in the range of 10^{-6} per reactor year to 10^{-5} per reactor year, the increase is acceptable if it can be reasonably shown that the total CDF is less than 10^{-4} per reactor year.)

Chapters 1 and 2 of NFPA 805 specify measurable or calculable parameters and objective nuclear safety and radioactive release performance criteria; provide flexibility for the program, processes, and analytical approach; and ensure that a performance failure will not result in an immediate safety concern (through application of the fire protection defense-in-depth philosophy and the assurance of adequate safety margins). Potential performance failures are assessed in advance to ensure that the licensee is capable of detecting the performance failure, and that adequate time is available to take the needed corrective actions upon detection.

In summary, the overall approach of NFPA 805 is consistent with the key principles for evaluating licensing basis changes, as described in NRC Regulatory Guide 1.174. Namely, the proposed change is consistent with defense-in-depth philosophy, maintains sufficient safety margins, and when the proposed change results in an increase in CDF or risk, the increase is small and consistent with the intent of the Commission's Safety Goal Policy Statement. Therefore, the concepts and processes in NFPA 805 comprise a risk-informed, integrated, performance-based decision making process for evaluating plant changes related to fire protection systems and features.

7.2 Reduce Unnecessary Burden

The proposed change would reduce the need for licensees to develop exemption requests targeted at obtaining relief from the existing deterministic, prescriptive fire protection requirements. Additionally, the proposed change is expected to result in a net reduction in operating, training, and maintenance costs over the remaining life and decommissioning of the plants.

7.3 Increase Public Confidence

NFPA 805 reflects the most recent fire protection recommendations of the National Fire Protection Association for existing light water electric generating plants. The proposed rule allows licensees to use risk-informed, performance-based approaches to more appropriately allocate a plant's fire protection resources on the bases of risk information, while maintaining NRC oversight of reactor fire protection configurations and licensees' fire protection activities (see Section 8 below).

7.4 Increase NRC Efficiency and Effectiveness

The proposed change would leverage the involvement of the NRC staff in the development of NFPA 805, 2001 Edition, and would reduce the resources that the NRC staff needs to process exemption requests related to the existing deterministic, prescriptive fire protection requirements.

8. Implementation

The NRC proposes to implement this change by completing a rule change to 10 CFR 50.48 to allow licensees to voluntarily adopt NFPA 805. The rule change would become effective when published. The rule change is considered necessary to allow NFPA 805 to be accepted as an alternative to the fire protection requirements in 10 CFR 50.48(b) or existing license conditions or technical specifications, and 10 CFR 50.48(f), for changes to a licensee's existing fire protection configuration and procedures.

A Licensee may undertake the implementation of NFPA 805 by performing an assessment of its facility for compliance with NFPA 805, as excepted, identifying changes and completing actions necessary to bring the facility into compliance. The rule language states that an adopting licensee must complete its implementation of the methodology in Chapter 2 of NFPA 805 (including all required evaluations and analyses), and modify the fire protection plan required by paragraph (a) of 10 CFR 50.48 to reflect the licensee's decision to comply with NFPA 805.

The NRC will inspect a licensee's compliance with NFPA 805, as excepted, as part of its normal oversight processes.

9. References

SECY-98-058, "Development of a Risk-Informed, Performance-Based Regulation for Fire Protection at Nuclear Power Plants," dated March 26, 1998.

U.S. Code of Federal Regulations (CFR), Title 10, Section 50.48, "Fire protection," 65 FR 38190, June 20, 2000.

U.S. Code of Federal Regulations (CFR), Title 10, Section 50.90, "Application for Amendment of License or Construction Permit."

U.S. Code of Federal Regulations (CFR), Title 10, Part 50, Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979."

U.S. Nuclear Regulatory Commission, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," NUREG-0800, 1987.

U.S. Nuclear Regulatory Commission,"Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission, NUREG/BR-0058, Revision 3, June 2000,

U.S. Nuclear Regulatory Commission,"Regulatory Analysis Technical Evaluation Handbook," NUREG/BR-0184, Final Report, January 1997.

Office of Management and Budget, “Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities,” OMB Circular NO. A-119, Revised, February 10, 1998.

National Fire Protection Association (NFPA), Standard 805, “Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants, 2001 Edition,” NFPA, Quincy, MA.