



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, DC 20555 - 0001

June 10, 2005

Mr. Luis A. Reyes  
Executive Director for Operations  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

SUBJECT: DRAFT FINAL NUREG/CR-6850, "EPRI/NRC-RES FIRE PRA  
METHODOLOGY FOR NUCLEAR POWER FACILITIES"

Dear Mr. Reyes:

During the 523<sup>rd</sup> meeting of the Advisory Committee on Reactor Safeguards, June 1-3, 2005, we met with representatives of the NRC staff and Electric Power Research Institute (EPRI) to discuss the draft final NUREG/CR-6850, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities." Our Subcommittee on Fire Protection also reviewed this matter during its meeting on May 4, 2005. During our review, we had the benefit of the documents referenced.

#### CONCLUSIONS AND RECOMMENDATIONS

1. NUREG/CR-6850, "EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities," will be useful to both the industry and the staff and should be issued.
2. Full-scope pilot fire probabilistic risk assessments (PRAs) based on the procedures and methods in NUREG/CR-6850 should be completed, and the insights provided by these applications should be used to enhance the methodology.
3. Efforts should continue to further identify, quantify, and document remaining fire PRA uncertainties.

#### DISCUSSION

The NRC Office of Nuclear Regulatory Research (RES) and EPRI have completed a cooperative program to consolidate the fire PRA research and development activities, conducted over the past few years, into a single state-of-the-art methodology for fire PRA. The results, documented in NUREG/CR-6850, provide a structured framework for the overall analysis as well as specific recommended practices to address key aspects of the analysis. This work was conducted under the terms of an EPRI/RES memorandum of understanding and an accompanying fire research addendum.

While the primary objective of the project was to consolidate state-of-the-art methods, in many areas the newly documented methods represent a significant advancement over those previously documented. Several new methods and approaches were developed. These methods specifically address and resolve previously identified methodological issues. The participants should consider publication of some of the more innovative material in appropriate archival journals.

At some nuclear plants, risk from fire-initiated accidents is commensurate with risk from internal events. Despite the valuable contribution and advances in fire risk analysis described in NUREG/CR-6850, the body of knowledge and the tools supporting fire risk analysis are still not comparable with the state-of-the-art PRAs for internal events. Further development of fire PRA methods is needed. Ultimately, internal events and fire PRAs should be integrated.

Industry participants provided an extensive peer review of the project. A peer-review panel was formed from the six nonpilot utility participants. Two nuclear plants participated as pilot plants and supported demonstration studies conducted by the technical development teams. RES and EPRI intended that these demonstration studies would be complemented by full-scope fire PRAs at the pilot plants. Neither of the two pilot plants has completed its fire PRA. This represents a missed opportunity to gain experience with the procedures and new approaches in NUREG/CR-6850. Full-scope pilot fire PRAs based on the procedures and methods in NUREG/CR-6850 should be completed, and the insights provided by these applications should be used to enhance the methodology.

We have often emphasized the need for thorough uncertainty analyses to support licensee and regulatory decisionmaking. NUREG/CR-6850 prescribes methods for conducting these analyses as part of fire PRAs. Appendix V to Chapter 15 identifies uncertainty issues associated with each task in the methodology for conducting a fire PRA and suggests a strategy for addressing these uncertainties. While the uncertainties in fire ignition frequencies and post-fire human reliability will be quantified, many of the other uncertainties are to be relegated to a quality review rather than elucidated and made visible by estimation or analysis. Although a reasonable attempt has been made to require the identification of the key sources of uncertainty, efforts should continue to develop new approaches to further identify, quantify, and document the remaining uncertainties.

A formal issue resolution process was incorporated into the project to ensure that divergent technical views were fully considered. Although EPRI or RES could have maintained separate positions, no such cases were encountered, and consensus was reached. NUREG/CR-6850 will be useful to both the industry and the staff. We commend the organizations and the individuals involved in the preparation of this document.

Sincerely,

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Graham B. Wallis  
Chairman

#### REFERENCES

1. EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities: Vol I: Summary and Overview, Electric Power Research Institute(EPRI), Palo Alto, CA, and U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research (RES), Rockville, MD, EPRI-TR-1008239 and NUREG/CR-6850, Draft Final, April 2005.
2. EPRI/NRC-RES Fire PRA Methodology for Nuclear Power Facilities: Vol 2: Detailed Methodology, Electric Power Research Institute(EPRI), Palo Alto, CA, and U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research (RES), Rockville, MD, EPRI-TR-1008239 and NUREG/CR-6850, Draft Final. April 2005.