



Electric Power Research Institute
(EPRI)

Sandia National Laboratories (SNL)

Scientech

Information Sheet: Fire Human Reliability Analysis Methods Development, Susan Cooper, Kendra Hill (NRC/RES/DRA)

The Risk

The Individual Plant Examination of External Events (IPEEE) program and the experience from actual fire events identified that fire, depending on design and operational conditions, can be a significant or dominant contributor to nuclear power plant risk. Human actions, and subsequently, human error, have also been shown to be a significant contributor to overall plant risk, including the risk from fires, due to the significant role that operators play in the fire protection defense-in-depth strategy on safety. Human reliability analysis (HRA) is the tool used to assess the implications of various aspects of human performance on risk. Currently existing HRA methods are being expanded to provide an approach to evaluate the impact of human failures in the fire protection defense-in-depth safety strategy.

The Needs

In 2004, the NRC amended its fire protection requirements to allow existing reactor licensees to voluntarily adopt the risk-informed, performance-based rule, 10CFR50.48c, which endorses NFPA 805 "Performance Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants", as an alternative to the existing prescriptive fire protection requirements. In order to realize the full benefits of transitioning to the Risk Informed/Performance Based standard, plants will need to perform a fire PRA which should include quantitative human reliability analysis for post-fire mitigative human actions modeled in a fire PRA.

In 2001, Electric Power Research Institute (EPRI) and US NRC Office of Nuclear Regulatory Research (RES) embarked on a cooperative project to improve the state-of-the-art in fire risk assessment to support this new risk-informed environment in fire protection. This project produced a consensus document, NUREG/CR-6850 (EPRI 1011989), entitled "Fire PRA Methodology for Nuclear Power Facilities" which addresses fire risk for at-power operations.

This report provides high level qualitative guidance and quantitative screening guidance for conducting a fire HRA. However, this document does not provide a detailed quantitative methodology to develop best-estimate Human Error Probabilities (HEPs). To fulfill this need, NRC-RES is working collaboratively with EPRI to develop a methodology and associated guidance for performing quantitative human reliability analysis for

post-fire mitigative human actions modeled in a fire PRA. This guidance will build upon NUREG/CR-6850 (EPRI1011989) and is expected to be published in 2009.

The Applications

The Fire HRA guidance is intended to support plants transitioning to 10CFR50.48c, as well as NRC reviewers evaluating the adequacy of submittals from licensees in the process of transitioning to this rule.



Program Management

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