

# Fire Probabilistic Risk Assessment and National Fire Protection Association 805 Compliance

## Background

The Westinghouse Fire Risk Services Team is a one-stop shop for all aspects of nuclear power plant fire protection and fire risk assessment.

## Description

A fire probabilistic risk assessment (PRA) is required to meet U.S. Nuclear Regulatory Commission (NRC) Regulatory Guide 1.200 and for plant transition to National Fire Protection Association (NFPA) Standard 805. Regulatory Guide 1.200 defines the level of PRA technical adequacy required prior to plant implementation of risk-informed applications. NFPA 805 is a standard that provides a risk-informed, performance-based alternative to a plant's current fire-protection program.

The Westinghouse Fire Risk Services Team provides a broad range of services including fire PRAs, NFPA 805 transition, safe shutdown analysis, fire modeling and classic fire protection engineering.

## Benefits

Developing a fire PRA has several benefits, including:

- Regulatory Guide 1.200 compliance allows the plant to implement cost-beneficial risk-informed applications such as risk-informed surveillance frequencies, risk-informed license amendment requests, etc.
- The plant ranking under the NRC Reactor Oversight Program could improve by having a quantitative process for responding to NRC Significance Determination Process concerns before they become NRC findings that require considerable manpower and expense to resolve.

Benefits of NFPA 805 transition include:

- Safety improvement by focusing plant resources on risk-significant issues
- Burden reduction by spending fewer resources on low-risk issues
- Long-term fire protection program flexibility associated with a risk-informed process
- Reduced need for physical plant modifications to address NRC interpretations regarding post-fire operator manual actions and fire-induced spurious operations

Westinghouse offers these value propositions for fire-protection support:

- One-Stop Shop: Access to all fire protection and PRA disciplines eliminates the need to contract with multiple companies.

- Bench Strength: Very large PRA and fire-protection staff means resources will not be constrained.
- Experience: Broad fire-related experience base includes all pressurized water reactor (PWR) designs and the perspective gained from working under many global regulatory frameworks.

In addition, Westinghouse has relationships with preferred fire-protection vendor partners and can provide a utility with a team customized to meet its specific needs.

## Experience

The Westinghouse Fire Risk Services Team has a long history of providing fire risk services to the commercial nuclear power industry as well as nonpower nuclear facilities.

Selected experience includes:

- NUREG/CR-6850 fire PRA implementation
- Fire PRAs for existing PWRs as well as the AP1000®, AP600 and System 80+ advanced reactors
- Fire PRA peer review coordination for all U.S. PWRs
- Tools to automate various aspects of the fire PRA process, including generation of PRA model input files and calculation of fire parameters (e.g., nonsuppression probability, severity factor, frequency)
- Performance-based, post-fire safe-shutdown analyses at PWRs globally
- Fire PRA pilot plant support
- Extensive fire modeling at nuclear facilities both in the United States and globally (power generation and other nuclear applications)
- Thermal-hydraulic analyses for manual action feasibility studies and multiple spurious operation scenarios

- Compensatory measure reduction/optimization
- Fire-protection program and licensing consulting
- Support of Nuclear Energy Institute Task Forces on NFPA 805, fire PRA and fire-induced circuit failures, as well as the American Nuclear Society Risk-Informed Standards Consensus Committee
- In-house fire modeling code (FATE™ software) to model fire-induced spread of contamination at very large, multiroom facilities

In addition, Westinghouse has enhanced its breadth and depth of expertise by establishing working arrangements with recognized fire-protection consulting companies.

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