

Nuclear Plant Fire PRA Program Implementation



AREVA, the world's leading nuclear supplier, is recognized throughout the industry as a premier provider of fire protection engineering, design and analysis services.

Industry Issue

For utilities that have decided to retain their 10CFR 50, Appendix R licensing basis, NRC Regulatory Guide 1.189 has provided a path to use specific performance-based tools to evaluate and mitigate risks within the plant. Based on the NRC guidance, Fire Probabilistic Risk Assessment (Fire PRA) methodology can be used to mitigate circuit issues, such as Multiple Spurious Operations (MSOs).

AREVA Solution

AREVA is currently supporting our clients with the development of a new Fire PRA program with a proven track record. In addition, AREVA has supported clients in addressing the impacts of fire induced circuit MSOs, analyzing impacts on circuit routings, and updating component / cable selection data.

Involved and Engaged

AREVA has actively supported the development of fire protection NFPA standards, industry working groups, and industry forum presentations. Additionally, as part of a Nuclear Energy Institute (NEI) initiative, members of our team helped develop the advanced performance-based methods for circuit analysis described in NEI 00-01, "Guidance for Post-Fire Safe Shutdown Circuit Analysis." We were also selected by NEI to support pilot plant evaluations with the application of this methodology to demonstrate compliance with regulatory requirements.

Considering Developing a Fire PRA Program

Utilities often determine the implementation of risk-informed Fire PRA methodology is the most beneficial methodology by evaluating the risk impacts of fire induced circuit MSOs versus the potential for rerouting circuits or relocating components. AREVA has the knowledge and experience to supplement the plant engineering staff with fire protection (FPE) and safe shutdown (SSE) engineers for developing and implementing a Fire PRA program as allowed by Regulatory Guide 1.189, while maintaining the current plant licensing basis. This effort typically includes having AREVA project team resources available to support



initiation of revised and new procedures, and training of modification engineers for impacts on the program.

AREVA can provide the following services in developing a Fire PRA program:

- Review of impacted cables and components for updated routing location information or for missing cable routes / endpoints
- Develop component failure tag cable mapping data
- Perform the modeling and reports for identifying MSO risks
- Provide mentoring services for the plant engineering staff for maintaining the Fire PRA Program
- Update DATATRAK software to interface with the plant cable and raceway database to maintain configuration control

Features and Benefits

- Cost and man-hour savings for future modifications in identifying MSO risks
- Mentoring program for the plant engineering staff

Fire PRA Supporting Software (DATATRAK)

The Fire PRA supporting Data Tracking System (DATATRAK) software has been developed by AREVA as a tool for modeling, managing and reporting data related to a Fire PRA program. The application has been designed to integrate the data elements and relationships required to support Fire Safe Shutdown Analyses and Fire PRA related tasks. Data screens and reports have been designed to accommodate the data input and reporting requirements for Fire PRA tasks such as the following:

- The System and Component Selection
- Modeling Interlock, Power and Sub-component Dependencies
- Cable Selection – for Safe Shutdown, Probabilistic Risk Assessment and Non-Power Operations
- Cable Routing and Location
- Basic Event Mapping
- Fire PRA Impact Assessments
- Fire PRA Scenario Zone of Influence Calculations
- Evaluation / Analysis of Impact Due to Data Revisions

The use of DATATRAK involves modeling information associated with components, cables and raceways to determine the impact of fire damage on Core Damage Frequency (CDF) risks within each fire zone or fire area. The software also includes Basic Event mapping and Fire Scenario cable impacts. The database system is also designed to link to external data sources such as selected plant cable raceway data tables and selected PRA Computer Aided

Fault Tree Analysis CAFTA Basic Event data tables in support of the analysis. In addition, the software is also designed to identify the delta resulting from revisions to these external data sources used as design input in order to maintain data configuration control. This software solution has been developed from AREVA's expertise in supporting various NFPA 805 transition projects and has received favorable reviews from the NRC during Pilot Plant reviews. Furthermore, the design of the application supports customization to meet the needs of each plant-specific project by integrating all the elements required to support this analysis.

Mentoring of Plant Engineering Resources

AREVA understands that the plant engineering staff must ultimately implement the Fire PRA Program; therefore, we provide mentoring of the program so this responsibility can be transferred to the plant staff as quickly as possible. This transition typically is accomplished with the simultaneous mentoring and training of the plant staff in the process and tools used during the screening. To accomplish this, AREVA will provide our engineering personnel on site to work with the plant engineering for implementing the process of performing screenings and documentation updates.

Experience You Can Count On

AREVA offers the complete range of engineering services needed to help you successfully maintain your Fire PRA Program. Working in concert with your fire protection personnel, we will help map the maintenance process, develop the needed mentoring program and support the update to the required engineering analyses and supporting documentation.

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