

**Knowledge Management for Fire Protection and Fire Research
at the U.S. Nuclear Regulatory Commission**

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INTRODUCTION

Knowledge management is the process of capturing critical information and making the right information available to the right people at the right time. Faced with the loss of significant “corporate knowledge” as experienced workers leave, the Federal Government and other organizations have focused considerable attention on knowledge management. Within the U.S. Nuclear Regulatory Commission (NRC), the Fire Research Branch (FRB) in the Office of Nuclear Regulatory Research (RES) has initiated a number of knowledge management activities to address this issue.

NUREG/BR-0465: FIRE PROTECTION AND FIRE RESEARCH KNOWLEDGE MANAGEMENT DIGEST

The Fire Protection and Fire Research Knowledge Management Digest is a user-friendly database that provides information needed during activities such as inspections and reviews. The database includes publicly available documents including 10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities;” guidelines for fire protection in nuclear power plants (NPPs); fire inspection manuals; fire inspection procedures; generic letters; bulletins; information notices; circulars; administrative letters; regulatory issue summaries; and regulatory guides. The technical knowledge section contains NRC technical publications (i.e., NUREGs) that serve as background information to the regulatory documents. It includes reports of NRC-sponsored fire experiments, studies, and probabilistic risk assessments (PRAs). These documents often provide the technical bases and insights for fire protection requirements and guidelines.

NUREG/BR-0361: THE BROWNS FERRY NUCLEAR PLANT FIRE OF 1975 AND THE HISTORY OF NRC FIRE REGULATIONS

In 1975, a fire occurred at Browns Ferry Nuclear (BFN) Plant that challenged the operators’ ability to safely shut the plant down. The fire prompted a new series of fire protection regulations and is a formative event in the history of fire protection regulations for NPPs. This brochure and DVD (Fig. 1) comprise all major public documents, publications, regulations, and presentations pertaining to the BFN fire in a one-stop information resource with a user-friendly format to provide a well-informed perspective about the BFN fire. Combined, these sources create a well-rounded picture of the event for varied types and levels of users; individually, they paint a detailed picture of specific aspects of the event.



Fig. 1. Screen shot from NUREG/BR-0361 DVD.

*The views expressed herein are strictly the authors’ personal ones and do not necessarily represent any opinion or position by the U.S. Nuclear Regulatory Commission.

NUREG/BR-0364: A SHORT HISTORY OF FIRE SAFETY RESEARCH

This brochure covers four major phases of the NRC Fire Protection Research Program (FPRP). From 1975 to 1987, the program investigated the effectiveness of changes made to NRC's fire protection regulations after the 1975 BFN Plant fire. In 1983, the goals of the FPRP were changed to developing test data and analytical capabilities for evaluating NPP fire risk, determining fire effects on control room equipment and operations, and determining the effect of suppression system actuation on safety equipment. In the period from 1987 to 1993, the program conducted studies that assessed the importance of a set of topical issues raised as a result of the FPRP that had not been included in previous fire PRAs; the technical basis for resolving GI 57, "Effects of Fire Protection System Actuation on Safety-Related Equipment"; and the fire risk at three plants, using an improved method that determined fire risk as part of a broader analysis of non fire- and fire-related risk (i.e., the LaSalle fire PRA performed as part of the Risk Methods Integration and Evaluation Program (RMIEP), and the Peach Bottom Unit 2 and Surry Unit 1 fire PRAs reported in NUREG-1150). Incremental improvements were made to the RMIEP methods from 1993 to 1998. From 1998 to the present, the program developed methods to better apply PRA technology to fire risk assessment.

NUREG-1924: ELECTRIC RACEWAY FIRE BARRIER SYSTEMS IN U.S. NUCLEAR POWER PLANTS

In response to the 1975 BFN Plant fire, NRC issued Appendix R to Title 10 of the *Code of Federal Regulations* Part 50. One of the requirements that supports fire protection defense-in-depth was that 1- or 3-hour electric raceway fire barrier systems (ERFBS) should be used to protect electrical cables essential to fire protection safe shutdown capability. However, ERFBS were a new approach to fire barrier applications and, as the initial installation of the ERFBS began, uncertainty existed regarding the performance and definitive test standards required for ERFBS qualification. Following review and research efforts, NRC resolved all of the concerns with ERFBS. This report documents the history of various ERFBS and how U.S. commercial NPPs use ERFBS for regulatory compliance. This report also documents the current state of the use of ERFBS and evaluates the effectiveness of these barriers in achieving adequate fire protection for NPPs.

NUREG/CP-0194: METHODS FOR APPLYING RISK ANALYSIS TO FIRE SCENARIOS (MARIAFIRES) – 2008

Since 2005, NRC and the Electric Power Research Institute (EPRI) have jointly conducted training sessions in fire PRA. These sessions, hosted in alternate years by NRC and EPRI, are available at no charge to all interested stakeholders. These sessions provide detailed discussions and hands-on examples of fire PRA, fire models, fire circuit analysis, and human reliability analysis. In 2008, the training sessions were video recorded and documented along with their training materials in a three-volume NUREG/CP. This NUREG/CP-0194 is a useful self-study program for persons unable to attend the course or as a review for attendees.

RESULTS

These knowledge management activities have been extremely successful. Numerous copies of these documents have been distributed. Updates to NUREG/BR-0361, "The Browns Ferry Nuclear (BFN) Plant Fire of 1975 and the History of NRC Fire Regulations," and NUREG/BR0465, "Fire Protection and Fire Research Knowledge Management Digest," are in the planning stages.

REFERENCES

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