



# The Browns Ferry Nuclear Plant Fire of 1975 and the History of NRC Fire Regulations





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# Introduction

Fire events provide a unique source of historical data, but only when the lessons learned provide advancements in safety. When these lessons are learned but not preserved, they are often repeated.

The PURPOSE of this brochure and DVD is to preserve the history and impact of the fire at the Browns Ferry Nuclear (BFN) Power Plant on regulations and to educate future generations of safety professionals.

Fire protection in commercial nuclear power plants (NPPs) has been a long-standing challenge since operations began. In the 1960s and 1970s, when most of today's nuclear power reactors were being constructed, the U.S. Nuclear Regulatory Commission's (NRC's) predecessor—the Atomic Energy Commission—began adopting rules and regulations to ensure fire safety. The first adopted fire protection regulation was General Design Criterion (GDC) 3, “Fire Protection,” as Appendix A of 10 CFR Part 50 in February 1971. The GDC 3, in part, states that:

*Structures, systems, and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions. Noncombustible and heat-resistant materials shall be used wherever practical throughout the unit, particularly in such locations as the containment and control room.*



*Aerial View of Browns Ferry Nuclear Power Plant near Decatur, Alabama.*

During this time, the Institute of Electrical and Electronics Engineers (IEEE) also developed several standards for fire protection safety in the nuclear industry. These first standards were:

- IEEE 279-1971 “Criteria for Protection Systems for Nuclear Power Generating Stations.”
- IEEE 383-1974 “IEEE Standard for Type Test of Class 1E Electric Cables, Field Splices, and Connections for Nuclear Power Generating Stations.”
- IEEE 384-1974 “IEEE Standard Criteria for Independence of Class 1E Equipment and Circuits.”

NRC published Regulatory Guide 1.75 in February 1974 and provided the basis for complying with the IEEE 384-1974 standard.

## Facts About the Fire at BFN

NRC was established as a regulatory agency by the Energy Reorganization Act of 1974. The BFN fire occurred 3 months after NRC began operations in January 1975.



*Picture of Browns Ferry Fire Cable Spreading Room. Note the melted aluminum electrical cable conduit. (TVA File Photo)*

- FIRE started at the BFN on March 22, 1975, by a worker using a lit candle to check for air leaks. This risky action ignited a temporary polyurethane cable penetration seal.
- FIRE quickly spread into the polyurethane seal and cables, causing significant damage to the cable spreading room and Unit 1 Reactor Building.
- FIRE at BFN forever changed how NRC and industry view the threat of fire to safe NPP operations.

## Impact of the BFN Fire

The BFN fire prompted a new series of fire protection regulations. NRC published NUREG-0050, “Recommendations Related to Browns Ferry Fire,” in February 1976. In response to the recommendations, NRC developed the Branch Technical Position (BTP) Auxiliary Power Conversion Systems Branch (APCSB) 9.5-1 in May 1976 and its Appendix A, “Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976,” in February 1977. Appendix A uses

IEEE 383-1974 standard as a basis for flame spread, and to this date it is the electrical cable flame spread standard used in regulations. In November 1980, NRC published Section 50.48 and Appendix R of the 10 CFR Part 50 (effective February 1981).



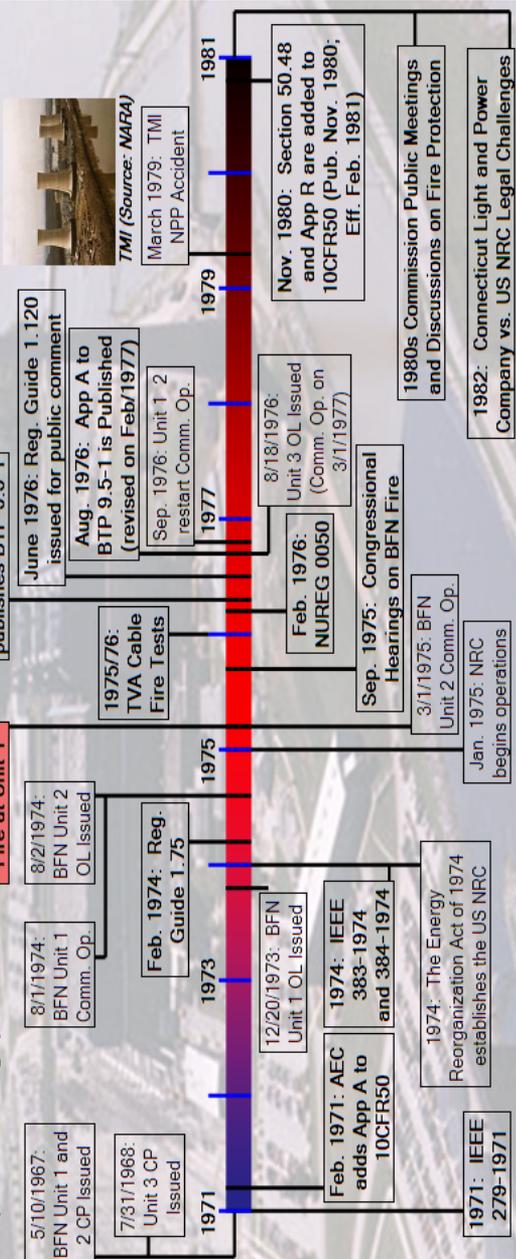
*Picture of TVA Browns Ferry Seal Penetration Tests. (TVA File Photo)*

The BFN fire was the first major challenge the newly formed NRC had to face. Today, with a renewed interest in building new nuclear power plants and the development of new materials and technology, fire protection continues to face challenges ahead.

# Timeline of the Regulatory Changes in Fire Protection due to Browns Ferry Nuclear (BFN) Fire



BFN (Source: [www.tva.gov](http://www.tva.gov))



TMI (Source: NARA)  
March 1979: TMI NPP Accident

Note:  
Event boxes in bold are reference points critical of fire protection regulations.  
Other event boxes are provided as reference points of important events in BFN.

Abbreviations:  
 CP - Construction Permit  
 OL - Operating License  
 Comm. Op - Commercial Operation  
 BTP - Branch Technical Position  
 CFR - Code of Federal Regulations  
 IEEE - Institute of Electrical and Electronics Engineers  
 TVA - Tennessee Valley Authority

# DVD Topics

To help navigate through the DVD, the outline below provides topics and headings that can be accessed directly. The user may also click the boxes on the Timeline for the related documents.

1. Introduction
2. Historical Documents:
  - a. 10 CFR Part 50.48 and Appendix R History of Changes
    - i. Current versions of 10 CFR 50.48 and Appendix R
    - ii. History of Changes
    - iii. Federal Register Notices
  - b. Secretary of the Commission (SECY) Papers, Legal Challenges, and Congressional Documents
    - i. SECY Papers
    - ii. Court and Congressional Documents
  - c. NRC NUREG (Technical Reports by NRC Staff)
    - i. U.S. NRC NUREG on BFN
  - d. Reports and Other Related Documents
    - i. Non-NRC Reports on BFN
    - ii. Journal Articles by the Society of Fire Protection Engineers (SFPE)
  - e. Presentations and Multimedia
    - i. Video and Photographs of BFN and Seal Penetration Fire Tests
    - ii. Office of Nuclear Regulatory Research (RES) Seminar Presentation of BFN Fire; invited speakers David Notley and Robert Ferguson (former NRC Engineers who worked with NRC during the BFN Fire)
    - iii. Technical Training Center (TTC) Interview with Jack Lewis (former NRC's TTC Instructor)
    - iv. Presentations about BFN Fire
  - f. NRC Bulletins, Amendments, and Commission Meeting Transcripts
    - i. NRC Bulletins
    - ii. Amendments to BFN
    - iii. Commission Meeting Transcripts

# Questions and Answers

This DVD provides a compilation of information to gain perspective about the BFN fire. Document types each serve a different purpose and answer a different question. 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 certain aspects of the event. The following table asks some questions related to the BFN fire and provides examples of where the user should go in the DVD to find the answers.

QUESTION:	Where to go in the DVD:	Subcategories to go to:
What happened in the BFN fire and what did we learn?	Reports and Other Related Documents	All
	NRC NUREGs	NUREGs
	NRC Bulletins, Amendments and Commission Meeting Transcripts	Commission Meeting Transcripts
How is this information reported to the public?	Reports and Other Related Documents	Journal Articles
	NRC NUREGs	NUREGs
How did NRC communicate what actions needed to be taken after this event?	NRC NUREGs	All
	NRC Bulletins, Amendments and Commission Meeting Transcripts	All
What were the rules and regulations before the BFN fire and how has this fire changed them?	10 CFR 50.48 and Appendix R History of Changes	All
	NRC Bulletins, Amendments and Commission Meeting Transcripts	Amendments
How does NRC staff inform the Commission of policy and rulemaking matters?	SECY Papers, Legal Challenges and Congressional Documents	SECY Documents

*(continued)*

QUESTION:	Where to go in the DVD:	Subcategories to go to:
How does the court uphold or challenge rules set forth by NRC?	SECY Papers, Legal Challenges and Congressional Documents	Legal Challenges
How does Congress obtain information, conduct investigations, or oversee NRC?	SECY Papers, Legal Challenges and Congressional Documents	Congressional Documents
What do the experts think, and what does a fire like this look like?	Presentations and Multimedia	All

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