

# **NRC INSPECTION MANUAL**

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INSPECTION MANUAL CHAPTER 1245, APPENDIX C7

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FIRE PROTECTION INSPECTOR TECHNICAL PROFICIENCY TRAINING AND  
QUALIFICATION JOURNAL

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## INTRODUCTION

This appendix establishes the program for initial qualification of fire protection inspectors through formal training courses, individual study activities (ISAs), and on-the-job training (OJT). Since the training described in this appendix supplements the training outlined in Appendices C-1, "Reactor Operations Inspector Technical Proficiency Training and Qualification Journal" and C2, "Reactor Engineer Training and Qualification Journal," this training program should not be commenced until either the reactor operations or reactor engineer training and qualification programs outlined in Appendices C1 or C2 have been completed. One member of the inspection team for all fire protection team inspections (FPTI) should be qualified to this standard.

Individual inspectors should be given credit for previous experience and training when completing the requirements outlined in this appendix. Section 05.02 of IMC1245 provides additional information on alternate methods for meeting a program requirement.

## REQUIRED TRAINING COURSES

1. Fire Protection for Power Plants (One of the Following)
  - a. The Hartford Steam Boiler (HSB) Professional Loss Control Division of Munich has offered this course. Check the company's website for details on the course and registration at <https://www.munichre.com/en.html>
  - b. Jensen Hughes has offered this course. Check the company's website for details on the course and registration at <https://www.jensenhughes.com/>.
  - c. **The Office of Research has developed and presented this course.** Check TMS for availability and course curriculum.
2. Fire Protection SDP Training (available in TMS as course P-108)
3. Post-Fire Safe-Shutdown Analysis (available in the HTRC Collaborative Learning Environment)

NOTE: IMC 1245, Appendix D3, "Fire Protection Advanced-Level Training," provides a list of additional courses and OJT that inspectors may wish to consider to gain more skills in specific areas of fire protection.

Fire Protection (FP) Inspector Individual Study Activities (ISA)

## (ISA-FP-1) Deterministic Fire Protection Regulations

### PURPOSE:

The purpose of this activity is to become familiar with the most important “deterministic” (non-risk-informed or “traditional”) fire protection regulations and the NRC generic communications that have been issued to help clarify regulatory expectations and positions on deterministic fire protection regulations.

COMPETENCY AREA: TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 24 hours

### REFERENCES:

Contact the fire protection contacts in the Division of Risk Assessment in NRR if the below references cannot be located:

1. 10 CFR Part 50, Appendix A, “General Design Criterion for Nuclear Power Plants,” Criterion 3, “Fire Protection”
2. 10 CFR 50.48, “Fire Protection”
3. 10 CFR Part 50 Appendix R, “Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979”
4. Branch Technical Position (BTP) Auxiliary and Power Conversion System Branch (APCSB) 9.5-1, “Guidelines for Fire Protection for Nuclear Power Plants,” May 1, 1976, ([Agencywide Documents Access and Management System \(ADAMS\)](#) Accession No. ML070660461)
5. Appendix A to BTP (APCSB) 9.5-1, “Guidelines for Fire Protection for Nuclear Power Plants Docketed Prior to July 1, 1976,” (August 23, 1976, [ML070660458](#))
6. BTP Auxiliary System Branch (ASB), “Guidelines for Fire Protection for Nuclear Power Plants,” Revision 1, (ML070660450)
7. BTP Chemical Engineering Branch (CMEB) 9.5-1, “Guidelines for Fire Protection for Nuclear Power Plants,” Revision 3, July 1981, (ML070660454)
8. Generic Letter (GL) 77-02, “Nuclear Plant Fire Protection Functional Responsibilities, Administrative Controls and Quality Assurance,” August 4, 1977, (ML031280293)
9. NUREG-0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, LWR Edition, Section 9.5.1.1, Fire Protection Program,” Revision 0, March 2009, (ML090510170)
10. GL 86-10 “Implementation of Fire Protection Requirements,” April 24, 1986, (ML031150322)

11. Regulatory Guide 1.189, "Fire Protection for Nuclear Power Plants," Revision 3, February 2018, (ML17340A875)
12. Regulatory Guide 1.191, "Fire Protection Program for Nuclear Power Plants During Decommission and Permanent Shutdown," May 2001, (ML011500010)
13. "Fire Protection Toolkit," (ML16039A056)
14. Inspection Procedure 71111.05 "Fire Protection," January 1, 2020, (ML19170A368).
15. Inspection Procedure 71111.21 N.05, "Fire Protection Team Inspection (FPTI)," January 1, 2020, (ML19084A040)

#### EVALUATION CRITERIA:

At the completion of this activity, you should be able to describe the regulatory history of deterministic nuclear power plant fire protection as well as the relationship among the various key documents by which the NRC has clarified their deterministic expectations and positions. Specifically, you should be able to do the following:

1. Describe the concept of defense-in-depth (DID) as it relates to fire protection.
2. Describe what a licensee's fire protection program (FPP) is designed to accomplish.
3. Describe what a licensee's current licensing basis is.
4. Describe what "design basis" means with regards to a structure, system, or component (SSC) of a facility.
5. Determine which BTP/Regulation is used as a basis for a plant's fire protection program.

#### TASKS:

The activities listed below shall be performed under the guidance of a qualified Fire Protection Inspector (IMC 1245 C-7).

1. Review the references and develop an understanding sufficient to meet the evaluation criteria.
2. Discuss the evaluation criteria with a qualified Fire Protection Inspector (IMC 1245 C-7).
3. Obtain a licensee's Final Safety Analyses Report (FSAR) and determine which BTP/Regulation applies to the plant's fire protection program.

DOCUMENTATION: Fire Protection Inspector Technical Proficiency-Level Signature Card  
Item ISA-FP-1

## (ISA-FP-2) Fire Modeling

### PURPOSE:

The purpose of this activity is to become familiar with the fire modeling techniques used in industrial fire protection.

COMPETENCY AREA: TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 40 hours

### REFERENCES:

Contact the fire protection contacts in the Division of Risk Assessment in NRR if the below references cannot be located:

1. NUREG-1805, "Fire Dynamics Tools," December 2004 ([ML043290075](#))
2. NUREG-1805, Supplement 1, July 2013, ([ML13211A097](#) and [ML13211A098](#)) and Spreadsheets: <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1805/s1/>.
3. NUREG-1934 (EPRI 1023259), "Nuclear Power Plant Fire Modeling Analysis Guidelines (NPP FIRE MAG)," November 2012, ([ML12314A165](#))

### EVALUATION CRITERIA:

At the completion of this activity, you should be able to describe the fire modeling techniques used in fire protection. Specifically, you should be able to do the following:

1. Describe the difference between an algebraic zone and a computational fluid dynamics (CFD) or field fire model.
2. Describe the general limitations of the five fire models described in NUREG-1934, Section 4.1.
3. Describe how a fire model can be used in a fire hazard analysis (FHA).

### TASKS:

The activities listed below shall be performed under the guidance of a qualified Fire Protection Inspector (IMC 1245 C-7).

1. Review the references and develop an understanding sufficient to meet the evaluation criteria.
2. Discuss the evaluation criteria with a qualified Fire Protection Inspector (IMC 1245 C-7).

3. Develop a scenario on your own or use an example that is part of the fire model documentation, change the input parameters to see how these changes affect the output from the model. For example, changing the heat release rate (HRR) of the fire, the geometry or changing the ventilation from natural to forced ventilation.

DOCUMENTATION: Fire Protection Inspector Technical Proficiency-Level Signature Card  
Item ISA-FP-2

(ISA-FP-3) National Fire Protection Association (NFPA) 805 Fire Protection  
Risk-Informed, Performance-Based Regulations

PURPOSE:

The purpose of this activity is to become familiar with the risk-informed, performance-based (RIPB) regulation, NFPA 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition that licensees must meet to demonstrate if adopting or maintaining a risk-informed performance-based **fire protection program (FPP)** under 10 CFR 50.48(c), "National Fire Protection Association Standard NFPA 805."

COMPETENCY AREA: TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 16 hours

REFERENCES:

Contact the fire protection contacts in the Division of Risk Assessment in NRR if the below references cannot be located:

1. 10 CFR 50.48(c), "National Fire Protection Association Standard NFPA 805"
2. NFPA 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition, (ML010800360)
3. NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," Section 9.5.1.2, "Risk-Informed (RI), Performance-Based (PB) Fire Protection Program," Revision 0, December 2009, (ML092590527)
4. Regulatory Guide 1.205 "Risk-Informed, Performance-Based Fire Protection for Existing Light Water Nuclear Power Plants," Revision 2, December 2009, (ML092730314)
5. NEI 04-02 "Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program Under 10 CFR 50.48(c)," Revision 2, April 2008, (ML081130188)
6. NEI 00-01 "Guidance for Post-Fire Safe-Shutdown Analysis," Revision 2, June 2009, (ML091770265)
7. Shearon Harris Nuclear Power Plant, Unit 1—Issuance of Amendment Regarding Adoption of National Fire Protection Association Standard 805, Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating, (ML101130535- Un-Redacted Version, non-Public)
8. Inspection Procedure 71111.21N.05, "Fire Protection Team Inspection (FPTI)," January 1, 2020, (ML19084A040)

## EVALUATION CRITERIA:

At the completion of this activity, you should be able to describe the NRC's role in evaluating how well a licensee adopts and maintains compliance with 10 CFR 50.48(c) through adherence to NFPA 805.

## TASKS:

The activities listed below shall be performed under the guidance of a qualified Fire Protection Inspector (IMC 1245 C-7).

1. Review the references and develop an understanding sufficient to meet the evaluation criteria.
2. Discuss the evaluation criteria with a qualified Fire Protection Inspector (IMC 1245 C-7).
3. Outline the process by which a licensee converts their fire protection program from a traditional/deterministic program to one based on NFPA 805's risk informed performance-based program. Note: Additional insights into different fire protection programs can be gained by inspecting an NFPA 805 plant as well as a plant that was licensed prior to and after 1979.

DOCUMENTATION: Fire Protection Inspector Technical Proficiency-Level Signature Card  
Item ISA-FP-3.

Fire Protection Inspector On-the-Job (OJT) Activity

## (OJT-FP-1) Participate in a Regional Fire Protection Team Inspection

### PURPOSE:

The purpose of this activity is to acquaint you with the fire protection inspection process.

### COMPETENCY AREAS: TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 40 hours

### EVALUATION CRITERIA:

At the completion of this activity, you should understand the regional fire protection inspection process. Specifically, you should be able to do the following:

1. Discuss the objectives and implementation of the Fire Protection Team Inspection (FPTI) inspection procedure.
2. Discuss the criteria used to select risk informed inspection samples (fire protection systems, fire areas, or fire zones for the inspection).
3. Discuss the regulatory requirements and licensing basis against which post-fire safe-shutdown capability is assessed.

### TASKS:

The activities listed below shall be performed under the guidance of a qualified Fire Protection Inspector (IMC 1245 C-7) while accompanying a team of regional Inspectors during a fire protection team inspection

1. Discuss the evaluation criteria with a qualified Fire Protection Inspector (IMC 1245 C-7).
2. Prior to the inspection obtain any documents the team leader deems necessary.
3. Participate with the inspection team leader and the regional senior reactor analyst (SRA) in the selection process of the inspection samples (determining the minimum baseline sample completion requirements).
4. Any other task given by the inspection team leader.

DOCUMENTATION: Fire Protection Inspector Technical Proficiency-Level Signature Card  
Item OJT-FP-1.

Fire Protection Inspector Technical Proficiency-Level  
Signature Card and Certification

<u>Inspector Name:</u> _____	<u>Employee Initials/ Date</u>	<u>Supervisor's Signature/ Date</u>
<u>Training Courses for Fire Protection Inspector Qualification</u>		
Fire Protection for Power Plants		
Fire Protection SDP Training (P-108)		
Post-Fire Safe-Shutdown Analysis		
<u>Individual Study Activities</u>		
(ISA-1) Fire Protection Inspector: Deterministic Fire Protection Regulations		
(ISA-2) Fire Protection Inspector: Fire Modeling		
(ISA-3) Fire Protection Inspector: NFPA 805 Fire Protection Risk-Informed, Performance-Based Regulations		
<u>On-the-Job Training Activity</u>		
(OJT-1) Fire Protection Inspector: Participate in a Regional Fire Protection Team Inspection		

Supervisor's signature indicates successful completion of all required courses and activities listed in this training standard. Additionally, the supervisor's signature below indicates the individual's readiness to appear before the oral board, if the individual has not previously completed an oral board.

Supervisor's Signature \_\_\_\_\_ Date: \_\_\_\_\_

The appropriate Form 1, "Fire Protection Inspector Technical Proficiency

Level Equivalency Justification" must accompany this signature card and certification, if applicable. **Inspectors should consult IMC 1245 Appendix D-1 "Maintaining Qualifications" as applicable, for post qualification and refresher training requirements.**

(The electronic signature card, which is located on the Digital City and other internal NRC websites is also acceptable.) Record completion in TMS by sending a request to TrainingSupport.Resource@nrc.gov.

Copies to:     Inspector  
                  Supervisor

Form 1: Fire Protection Inspector Technical Proficiency  
Level Equivalency Justification

<u>Inspector Name:</u> _____	<u>Identify equivalent training and experience for which the inspector is to be given credit</u>
<u>Training Courses for Fire Protection Inspector Qualification</u>	
Fire Protection for Power Plants	
Fire Protection SDP Training (P-108)	
Post-Fire Safe-Shutdown Analysis	
<u>Individual Study Activities</u>	
(ISA-1) Fire Protection Inspector: Deterministic Fire Protection Regulations	
(ISA-2) Fire Protection Inspector: Fire Modeling	
(ISA-3) Fire Protection Inspector: NFPA 805 Fire Protection Risk-Informed, Performance-Based Regulations	
<u>On-the-Job Training Activity</u>	
(OJT-1) Fire Protection Inspector: Participate in a Regional Fire Protection Team Inspection	

Supervisor's Recommendation      Signature/Date \_\_\_\_\_

Division Director's Approval      Signature/Date \_\_\_\_\_

Copies to:      Inspector  
                         Supervisor

Attachment 1: Revision History for IMC 1245 Appendix C7

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment Resolution and Closed Feedback Form Accession Number (Pre-Decisional, Non-Public Information)
N/A	ML090360474 07/08/09 CN 09-017	Initial issuance. Completed 4-year historical CN search.	None	ML091590710
N/A	ML11105A143 12/29/11 CN 11-044	This revision updates required training and adds a new ISA (ISA-4) to familiarize inspectors with mitigation measures that licensees were required to develop and implement in response to the Section B.5.b of the Interim Countermeasures Order EA-02-026 of February 25, 2002, subsequently imposed License Conditions, and 10 CFR 50.54(hh)(2).	None	ML11339A061
N/A	ML12251A068 12/19//12 CN-12-029	This revision corrects the point of contact for B.5.b issues and adds several references to ISA-4.	None	ML12290A180 Closed FF: 1245C7-1758
N/A	ML15177A292 10/21/15 CN 15-020	This revision updates required training courses, references, and format; and clarifies that an oral qualification board is required, if not completed previously.	None	ML15195A178 Closed FF: 1245-1855 ML15054A211
N/A	ML18047A188 07/30/18 CN 18-023	This revision updates the point of contact for B.5.b issues from the Generic Communication Branch to the Beyond Design Basis Management Branch.		ML18065A656 Closed FF: 1245C7-2284 ML18186A548

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment Resolution and Closed Feedback Form Accession Number (Pre-Decisional, Non-Public Information)
	ML20077L271 06/26/20 CN 20-026	<p>This revision removed references to out of date applications, procedures, office titles and training courses. It also removed ISA-4, which referred to B.5.b related inspection activities that are no longer performed by Fire Protection Inspectors.</p> <p>This revision also added additional providers for the nuclear power plant fire protection course as recommended by feedback form 1245C7-2411.</p>	None	ML20079E418  Feedback form 1245C7-2411 ML20105A332
N/A	ML21166A346 09/24/21 CN 21-032	This revision updated expired websites, recognized the development of the Post Fire Safe Shutdown Analysis course, added the new names of NRC offices and updated the qualification card signoff sheet and distribution list. Minor format items were also corrected	None	ML21173A077
	ML23094A267 04/11/23 CN 23-011	This revision updated the required course catalog to reflect changes in curriculum.	None	