

Fire Protection Program

Advanced Mixed Waste Treatment Project

Approved:

(Signature on file. See DCR-6827.)

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MP-ISIH-2.49, Rev. 1	Issued: 04/24/08	Effective: 04/25/08
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1.0 PURPOSE/SCOPE

The Advanced Mixed Waste Treatment Project (AMWTP) Fire Protection Program (FPP) ensures compliance with applicable fire protection requirements and establishes a level of fire protection sufficient to achieve the programmatic goals identified in DOE Order 420.1B, Facility Safety.

It is the policy of the company to operate and manage all organizational elements and facilities in a manner that will minimize the potential for the following:

- The occurrence of a *fire* (see def.) or related event that could threaten the health and safety of workers, the public, the environment, or U.S. Department of Energy Idaho Operations Office (DOE-ID) property
- An unacceptable release of hazardous or radiological materials as a result of fire or related hazards
- Unacceptable interruptions of vital DOE-ID programs as a result of fire or related hazards
- Property losses from a fire or related events
- Damage to critical process controls and safety-class systems as a result of fire or related events.

Company management is committed to meeting the goals of the AMWTP FPP and to supporting a level of fire protection and fire suppression capability sufficient to minimize losses from fire and related hazards consistent with the best class of protected property in private industry (i.e., *highly protected risks* [see def.]). Fire safety must be an integral part of all activities and facilities are designed with both active and passive fire protection features such that reliance is not placed on only one means to achieve defense in depth and ensure an acceptable level of fire safety.

Company management is committed to ensuring that AMWTP facilities are designed to and meet all applicable fire protection requirements, codes, and standards or exceed those requirements and standards when necessary to meet safety objectives, unless an exemption or equivalency has been granted.

The primary sources of requirements for the AMWTP Fire Protection Program are U.S. Department of Energy (DOE) Order 420.1B, 10 CFR 851, Worker Safety and health Program for DOE Federal and Contractor Employees; the *International Building Code*; the *International Fire Code*; and National Fire Protection Association (NFPA) codes and standards.

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Applicable fire protection requirements are interpreted by cognizant fire protection professionals and are published as controlled documents as well as facility specific documents. All managers are expected to implement the fire protection requirements within their areas of responsibility and to ensure that their personnel comply with the requirements.

The requirements apply to fire protection at the facilities operated by Bechtel BWXT Idaho, LLC (BBWI) at the Idaho National Laboratory (INL).

2.0 ROLES AND RESPONSIBILITIES

Performer	Responsibilities
President and General Manager	<ul style="list-style-type: none"> Enforces requirements Fire Protection Program throughout the company.
AMWTP Operations Manager	<ul style="list-style-type: none"> Provide resources for the Fire Protection Program.
ESS&H Manager	<ul style="list-style-type: none"> Provides direct oversight to the AMWTP Fire Marshal. Approves the Fire Protection Program.
AMWTP Fire Marshal	<ul style="list-style-type: none"> Performs Authority Having Jurisdiction (AHJ) (see def.) activities delegated by DOE-ID. Administers and enforces the AMWTP Fire Protection Program as described in this document.
IS/IH Manager	<ul style="list-style-type: none"> Provides day-to-day work assignments for programmatic fire protection issues.
System Engineering Manager	<ul style="list-style-type: none"> Provides day-to-day work assignments for fire protection systems.
<i>Fire Protection Engineer (FPE) (see def.)</i>	<ul style="list-style-type: none"> Performs work as assigned by the responsible manager
All employees	<ul style="list-style-type: none"> Comply with the provisions of the Fire Protection Program

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3.0 PROCEDURE

3.1 Implementing the Fire Protection Program

3.1.1 AMWTP President and General Manager: Ensure that the Fire Protection Program (FPP) requirements are enforced in all departments.

(DOE Order 420.1B)

3.1.2 AMWTP Operations Manager: Ensure that necessary resources are available and directed to conduct department operations in accordance with the FPP.

(DOE Order 420.1B)

3.1.3 Environmental, Security, Safety, and Health (ESS&H) Manager:
Perform the following:

3.1.3.1 Ensure that the AMWTP Fire Marshal's office is adequately staffed.

(AMWTP Letter RFF-003-2005)

3.1.3.2 Approve the FPP.

(DOE Order 420.1B)

3.1.3.3 Interface with facility management to ensure consistent implementation of the FPP.

(DOE Order 420.1B)

3.1.3.4 Assign responsibility for tracking and trending the fire protection performance indicators to appropriate organizations.

(DOE Order 420.1B)

3.1.3.5 Establish company fire protection policies, requirements, procedures, and goals and direct the company's fire protection initiatives.

(DOE Order 420.1B)

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3.1.3.6 Maintain the company-level fire protection procedure documents.

(DOE Order 420.1B)

3.1.3.7 Implement FPP requirements within the facilities.

3.1.3.8 Ensure adequate staffing with qualified FPEs and funding to provide for FPP implementation.

3.1.3.9 Assign the subject matter expert for fire protection topical areas.

(DOE Order 420.1B)

3.1.4 AMWTP Fire Marshal: Perform Authority Having Jurisdiction (AHJ) activities (using Form-1746, Authority Having Jurisdiction Record), as necessary) delegated by DOE-ID, including the following:

3.1.4.1 Administer and enforce the AMWTP Fire Protection Program (FPP). The FPP shall be based on nationally recognized codes and standards such as the UFC, UBC, National Fire Protection Association (NFPA) 1, and the Fire Prevention Code. Applicable DOE Orders, relating to fire protection, as directed by the DOE-ID, shall also be integrated into the FPP.

(DOE Order 420.1B)

3.1.4.2 Assist the DOE-ID FPE by making code interpretations and initial reviews of fire safety exemptions, equivalencies and deviations in the administration of the FPP. DOE will be the final AHJ to review and make final approval of fire safety exemption, equivalency and deviation requests.

(DOE Order 420.1B)

3.1.4.3 Review and approve acceptance test procedures (ATPs) for fire alarm and suppression systems and equipment including new or modified installations at the AMWTP site. The AMWTP Fire Marshal's qualified technical representative shall witness the performance of ATPs.

(DOE Order 420.1B)

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3.1.4.4 Conduct inspection, testing and maintenance (IT&M) record audits on an unspecified number of facilities annually. The AMWTP Fire Marshal shall ensure site fire protection systems testing and maintenance programs meet minimum established requirements.

(DOE Order 420.1B)

3.1.4.5 Conduct self-assessments and management reviews, as necessary. Ensure the adequacy and consistent implementation of the FPP. The AMWTP Fire Marshal shall review FHAs, FSAs, and AFAs for completeness in accordance with applicable DOE orders and company procedures.

(DOE Order 420.1B)

3.1.4.6 Require that compensatory measures are conducted when conditions are deemed warranted.

(DOE Order 420.1B)

3.1.4.7 Review and approve construction documents and shop drawings for new construction modification or rehabilitation (see Appendix A, Fire Protection Design Criteria Development Process and Design Verification Process).

3.1.4.8 Define functional fire protection responsibilities.

(DOE Order 420.1B)

3.1.4.9 Issue advisory bulletins, as necessary, to assist with implementation of the FPP.

(DOE Order 420.1B)

3.1.4.10 Establish and issue permits, certificates, approvals, or orders pertaining to fire control and fire hazards. Revoke permits, certificates, or approvals issued if any violation of fire codes and standards is found upon inspection or any false statements or misrepresentations submitted on which the permit, certification, or approval was based.

(DOE Order 420.1B)

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3.1.4.11 Develop qualification, certification, and training requirements for fire protection professionals. Review and approve applicable fire protection training programs.

(DOE Order 420.1B)

3.1.4.12 Serve as the contractor point of contact with DOE-ID for programmatic fire protection issues.

(AMWTP Letter RFF-003-2005)

3.1.4.13 Ensure that the biannual programmatic fire protection assessments are conducted and corrective actions are developed for identified deficiencies.

(DOE Order 420.1B)

3.1.4.14 Prepare the annual Fire Protection Summary Report and submit it to DOE.

(DOE Order 420.1B)

3.1.4.15 Participate in all investigations of fire-related events.

(DOE Order 420.1B)

3.1.4.16 Serve as the AMWTP point of contact for external and programmatic fire protection audits.

(DOE Order 420.1B)

3.1.4.17 Review internal and external fire protection lesson-learned information for applicability at the AMWTP.

(DOE Order 420.1B)

3.1.5 IS/IH Manager: Perform the following:

3.1.5.1 Identify the required personnel to implement and maintain the FPP.

(DOE Order 420.1B)

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- 3.1.5.2 Identify and provide necessary resources for FPP implementation and FPE training requirements and professional development.
- 3.1.5.3 Provide FPE personnel day-to-day work assignments and schedules.
- 3.1.6 System Engineering Manager: Provide day-to-day work assignments for programmatic fire protection issues.
- 3.1.7 FPEs: Perform the following actions:
 - 3.1.7.1 Implement the FPP and monitor the implementation.

(DOE Order 420.1B)
 - 3.1.7.2 Manage professional, company, and facility training as required for position and assignments.
 - 3.1.7.3 Analyze facility operating and maintenance procedures for fire protection concerns and ensure that appropriate mitigation is incorporated to minimize the fire risk.

(DOE Order 420.1B)
 - 3.1.7.4 Review and approve fire protection system impairments and outages and establish compensatory measures.

(DOE Order 420.1B)
 - 3.1.7.5 Establish occupancy requirements and fire protection design criteria for designs of new and modified system, structures, and components (SSCs) (see Appendix A).

(DOE Order 420.1B)
 - 3.1.7.6 Review design packages to ensure that fire-protection design criteria have been satisfied (see Appendix A).

(DOE Order 420.1B)

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- 3.1.7.7 Communicate fire protection issues, concerns, and other pertinent information to management and the AMWTP Fire Marshal.

(DOE Order 420.1B)
- 3.1.7.8 Prepare required FHAs, FSAs, and AFAs in accordance with DOE orders and company policies and procedures.

(DOE Order 420.1B)
- 3.1.7.9 Provide technical support to all facility organizations in the interpretation and correlation of fire protection codes and standards.

(DOE Order 420.1B)
- 3.1.7.10 Provide technical guidance for the resolution of facility fire protection deficiencies.

(DOE Order 420.1B)
- 3.1.7.11 Review and approve facility fire protection-related procurements.

(DOE Order 420.1B)
- 3.1.7.12 Provide technical support to facility Emergency Response Organizations.
- 3.1.7.13 Serve as the facility point of contact with the INL Fire Department.

(DOE Order 420.1B)
- 3.1.7.14 Develop fire protection equivalency and exemption requests, as necessary.

(DOE Order 420.1B)
- 3.1.8 Employees: Perform the following:
 - 3.1.8.1 Follow established fire protection procedures.

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- 3.1.8.2 Practice good housekeeping in the work areas.
- 3.1.8.3 Conduct day-to-day operations in a manner that minimizes fire hazards.
- 3.1.8.4 Correct any condition posing a fire threat or report the condition to the immediate supervisor if it cannot be immediately corrected.
- 3.1.8.5 Report damaged, missing, or unauthorized use of fire protection equipment to the immediate supervisor.
- 3.1.8.6 Know the location of all exits and fire-fighting equipment in the assigned work areas.
- 3.1.9 All Managers and Employees: Conduct all operations in accordance with the principles of this FPP as follows:
 - 3.1.9.1 Conduct all operations in a manner that minimizes fire risk and complies with the mandatory requirements identified in Appendix C of this procedure.

(DOE Order 420.1B)
 - 3.1.9.2 Operations Manager: In consultation with the FPE, ensure that procedures relating to operations with inherent fire risks adequately identify and mitigate the associated fire hazards.

(DOE Order 420.1B)

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3.2 Responding to a Fire

NOTE: *Operational fires in the box lines are responded to in accordance with applicable written work instructions rather than with this section.*

3.2.1 All Employees: Without incurring personal risk, respond to fires as follows:

3.2.1.1 Report all fires, regardless of size and whether they have been extinguished, to the following as a minimum:

(DOE Order 420.1B)

- Notify the appropriate Fire Department by activating the nearest manual fire alarm or by phone (AMWTP Site ext. 777 or 526-1515; Idaho Falls ext. 9-911).
- Immediate supervisor or manager.

3.2.1.2 Building Manager: Notify the following individuals:

- FPE
- AMWTP Fire Marshal
- DOE-ID FPE.

3.2.1.3 Immediately notify all affected personnel to evacuate in accordance with approved procedures.

3.2.1.4 Provide suppression on *incipient stage fires* (see def.) with the nearest fire extinguisher (within the individual's respective training and ability) until the arrival of the Fire Department.

3.2.1.5 Assist the Fire Department by providing, through the on scene commander, any available or crucial information regarding items such as:

- A. Trapped persons
- B. Radiation areas
- C. Contamination risks

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- D. Criticality concerns
- E. Involved chemicals or chemicals that could become involved
- F. Any unusual aspects of the fire area that might affect fire fighting operations
- G. Explosion risks
- H. Emergency actions taken before Fire Department arrival
- I. Energized electrical equipment in the fire area.

3.3 Inspection, Testing, and Maintenance

3.3.1 System Engineering Manager: Maintain all fire protection systems and equipment in accordance with MP-CMNT-10.18, Inspection, Testing, and Maintenance of Fire Protection Systems and Equipment, to ensure their operability as designed.

(DOE Order 420.1B)

3.3.2 FPE: Review and approve the maintenance procedures for fire protection systems and equipment.

(DOE Order 420.1B)

3.3.3 FPE: Monitor trends in system and equipment performance to determine if significant degradation of system performance is occurring over time. Identified degradation shall trigger the revision of the inspection, testing, and maintenance program to feature more conservative frequencies.

(DOE Order 420.1B)

3.4 Fire Protection System Impairments

3.4.1 FPE: Manage fire protection system impairments to ensure that fire protection systems and equipment are in a state of readiness or trigger appropriate compensatory measures when systems or equipment are unable to perform their intended function.

(DOE Order 420.1B)

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- 3.4.2 FPE: Return impaired systems or equipment to service in timely manner in accordance with INST-CMNT-10.6.2, Fire Protection System Impairments.

(DOE Order 420.1B)

3.5 Hazardous or Flammable Materials

- 3.5.1 Store, use, and handle flammable and combustible liquids in accordance with INST-CMNT-10.6.1, Flammable and Combustible Liquids.

(DOE Order 420.1B)

- 3.5.2 Store and handle radioactive and other hazardous materials in accordance with the mandatory requirements identified in Appendix C of this document and facility-specific authorization basis requirements.

- 3.5.2.1 Include qualified FPEs in the development and review of administrative controls for storage and handling of these materials to ensure that fire hazards are adequately identified and mitigated.

(DOE Order 420.1B; Company Practice)

3.6 Other Fire-Related Hazards

- 3.6.1 Perform welding, cutting, and other hot work activities in accordance with MP-ISIH-2.36, Welding, Cutting, and Other Hot Work, to ensure adequate mitigation of their associated hazards.

- 3.6.1.1 Include qualified FPEs in the review of work control documents involving hot work.

- 3.6.2 Protect AMWTP property, equipment, and personnel from the effects of wildland fire in accordance with INST-CMNT-10.7.1, Seasonal Facility Maintenance.

3.7 Equipment

- 3.7.1 Fire protection equipment must be UL listed or FM approved.
- 3.7.2 FPE: Provide configuration control for fire protection equipment in accordance with MP-CD&M-11.1, Change Control.

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(DOE Order 420.1B)

3.8 Fire Incident Investigation and Reporting

3.8.1 AMWTP Fire Marshal: Coordinate an investigation for cause, origin, or circumstance of any fire, explosion, deflagration, and fire related accidents, incidents, and occurrences in accordance with MP-Q&SI-5.1, Investigations and Root Cause Analysis.

(DOE Order 420.1B)

3.8.2 Use a graded approach to determine the qualifications of the investigator(s) and the investigation's level of effort. The AMWTP Fire Marshal shall concur with the level of rigor proposed for the investigation and qualifications of the investigator(s).

(DOE Order 420.1B)

3.8.3 Report all fires in accordance with MP-COPS-9.6, Occurrence Reporting. As a minimum, Form-1755, Report of Fire, shall be completed and kept on file for all fire occurrences.

(DOE Order 420.1B)

4.0 DEFINITIONS

Abbreviated Fire Assessment (AFA). The AFAs assess buildings, facilities, and areas that are valued at \$1 million, not considered high hazard, and not involved in any vital programs for compliance with DOE Order 420.1B, Fire Safety, and MP-ISIH-2.47, Developing Fire Hazards Analyses (FHA), Fire Safety Assessments (FSA), and Abbreviated Fire Assessments. Buildings, facilities, and areas considered low risk, low hazard, not involved in any vital programs, and adequately protected with a fire protection system can be evaluated by the FPE as requiring an AFA with concurrence of the AMWTP Fire Marshal. In addition, inactive facilities and DD&D buildings should be considered for an AFA.

Authority Having Jurisdiction. The decision-making authority for fire-protection systems, building features, and suitability for occupancy with respect to fire safety as described in this program. Final AHJ responsibilities rest with the cognizant DOE authority. The AMWTP Fire Marshal provides direction for fire protection, based upon contractual commitments and applicable standards and codes, and serves as the on-site AHJ.

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Fire. The state, process, or an instance of combustion in which ignited fuel or other material combines with oxygen, giving off light, heat, and flame.

Fire Hazards Analysis (FHA). A comprehensive assessment of the risks from fire within individual fire areas in a building or structure in relation to existing or proposed fire protection. The analysis is developed to ascertain whether applicable DOE fire protection criteria are met. An FHA is used as a management tool to identify the fire risks present in an area, building, or structure; identify fire protection systems; and to document if the fire protection provided is adequate to control the risks.

Fire Protection Engineer (FPE). An individual possessing at least one of the following:

- Registered professional engineer in fire protection
- Graduate of an accredited engineering curriculum with no less than 4 years of engineering practice, at least 3 of these years being in responsible charge of fire protection engineering work
- Demonstrated knowledge of engineering principles (PD-ISIH-04, Fire Protection Training and Qualification) and who has completed no less than 6 years of engineering practice, being in responsible charge of fire protection engineering work for at least 3 of these years.

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Fire Safety Assessment (FSA). The principal objective of an FSA is to identify significant fire safety deficiencies that would prevent the achievement of DOE's fire-safety policy objectives. The FSA should encompass facility and programmatic elements, describe what was done during the effort, and feature a baseline description of the facility, hazards, and other occupancy considerations and fire protection features. In addition, list all noted deficiencies along with a recommendation for remediation and interim compensatory measures, if necessary, pending resolution.

Highly Protected Risk. This term characterizes the best-protected class of industrial facilities, as underwritten by Factory Mutual or Industrial Risk Insurers. This requires compliance with the fire protection and loss prevention standards detailed in applicable fire protection standards and codes. This term also implies that qualified fire protection engineering judgment has been used to obtain the highest economically justifiable level of industrial loss prevention. The most evident characteristic of an improved risk property is the existence of reliable, automatic fire-extinguishing systems. This applies to all buildings where the construction or content is vital to operational continuity or vulnerable to a large property loss from fire.

Incipient Stage Fire. A fire that is in the initial or beginning stage and can be controlled or extinguished by portable fire extinguishers, Class II standpipe, or small hose systems without the need for protective clothing or a breathing apparatus.

Maximum Possible Fire Loss (MPFL). The value of property within a fire area unless an FHA demonstrates a lesser (or greater) loss potential. This assumes the failure of both automatic fire-suppression systems and manual fire-fighting efforts.

Significant New or Modified Facility Design. A facility design, new or modified, that requires the preparation of detailed specifications, plans, acceptance test procedures, and vendor data requirements for the preparation of bid packages.

5.0 REFERENCES

- (1) 10 CFR 851, Worker Safety and Health, Code of Federal Regulations, Office of the Federal Register, March 2005
- (2) 29 CFR 1910, 2005, Occupational Safety and Health Standards, Code of Federal Regulations, Office of the Federal Register, March 2005
- (3) 29 CFR 1926, 2005, Safety and Health Regulations for Construction, Code of Federal Regulations, Office of the Federal Register, March 2005
- (4) DOE G-420.1/B-0, 1995, Implementation Guide for Use with DOE Orders 420.1 and 440.1 Fire Safety Program, U.S. Department of Energy, September 30, 1995

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- (5) DOE M 231.1-1A, Chg. 1, Environment, Safety and Health Reporting Manual, U.S. Department of Energy, March 19, 2004
- (6) DOE O 420.1B, 2002, Facility Safety, U.S. Department of Energy, May 20, 2002
- (7) DOE-HDBK-1062-96, 1996, DOE Fire Protection Handbook, U.S. Department of Energy
- (8) DOE-STD-1066-99, 1999, Fire Protection Design Criteria, U.S. Department of Energy, July 1999
- (9) DOE-STD-1088-95, 1995, Fire Protection for Relocatable Structures, U.S. Department of Energy, June 1995
- (10) Factory Mutual Approval Guide
- (11) French, R. R., BBWI, 2005, Letter entitled Contract No. DE-AC07-99ID13727 – Designation of Authority Having Jurisdiction for Fire Protection for the Advanced Mixed Waste Treatment Project, RFF-003-2005, September 21, 2005
- (12) International Building Code, IBC
- (13) International Fire Code, ICC
- (14) INST-CD&M-11.1.2, Facility Modification Proposal Preparation
- (15) INST-CMNT-10.6.1, Flammable and Combustible Liquids
- (16) INST-CMNT-10.6.2, Fire Protection System Impairments
- (17) INST-CMNT-10.6.3, Fire Prevention
- (18) INST-CMNT-10.7.1, Seasonal Facility Maintenance
- (19) MP-CD&M-11.1, Change Control
- (20) MP-CMNT-10.18, Inspection, Testing, and Maintenance of Fire Protection Systems and Equipment
- (21) MP-COPS-9.6, Occurrence Reporting
- (22) MP-DOCS-18.2, Records Management
- (23) MP-ISIH-2.32, Housekeeping
- (24) MP-ISIH-2.36, Welding, Cutting and Other Hot Work
- (25) MP-ISIH-2.43, Lessons Learned

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- (26) MP-ISIH-2.47, Developing Fire Hazards Analyses (FHA), Fire Safety Assessments (FSA), and Abbreviated Fire Assessments (AFA)
- (27) MP-ISIH-2.48, Fire Protection Exemptions and Equivalencies
- (28) MP-M&IA-17.1, Management Assessment
- (29) MP-Q&SI-5.1, Investigation and Root Cause Analysis
- (30) MP-Q&SI-5.3, Corrective Action
- (31) MP-Q&SI-5.6, Graded Approach
- (32) NFPA 70, 2005, National Electric Code, National Fire Protection Association
- (33) PD-ISIH-04, Fire Protection Training and Qualification
- (34) Product Directories of Underwriters Laboratories

6.0 RECORDS

Records generated by this procedure must be classified in accordance with the table below, and dispositioned in accordance with MP-DOCS-18.2, Records Management.

Record Description	Classification
MP-ISIH-2.49 Case File	Misc. Other Records/A16-1.2/Destroy 5 years after submittal.
Form-1746, Authority Having Jurisdiction Record	Facility Operating Record/ENV2-a-1-a/Destroy 5 years after Life of Facility.
Form-1755, Report of Fire	Facility Operating Record/ENV2-a-1-a/Destroy 5 years after Life of Facility.

7.0 EXHIBITS

None

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Appendix A – Fire Protection Design Criteria Development Process and Design Verification Process

Appendix B – Fire Protection Programmatic Elements

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Appendix A

Fire Protection Design Criteria Development Process and Design Verification Process

The Advanced Mixed Waste Treatment Project (AMWTP) Fire Protection Program (FPP), in cooperation with the AMWTP Fire Marshal, is committed to ensuring that the designs for new and modified AMWTP facilities incorporate the necessary features to minimize fire risk to acceptable levels. It is the intent of the program to involve qualified fire protection personnel in the identification of required fire protection design criteria and the verification that designs incorporate and comply with the identified design criteria.

The fire protection engineer (FPE) will be included in the development of design criteria and design verification for all engineering changes involving compliance with the mandatory fire protection-related criteria identified in the main body of this document. Examples include, but are not limited to, the following:

- A. Fire suppression or fire alarm systems and equipment
- B. Passive fire barriers
- C. Proposed occupancy changes to include modifications in hazardous and combustible material inventory
- D. Floor plan modifications affecting means of egress and fire protection system coverage
- E. Building construction materials.

The AMWTP shall be included in the review and approval of new and significant changes presenting complex fire-protection challenges for regulatory compliance.

Technical and Functional Requirements

The FPEs shall be included on the Facility Change Group (FCG) as a required reviewer for all changes that involve fire protection criteria.

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The AMWTP Fire Marshal shall be included on the FCG team as a required reviewer for engineering changes of the following nature:

NOTE: *The AMWTP Fire Marshal may enforce the development of a fire hazards analysis in accordance with MP-ISIH-2.47 to support design considerations of nuclear facilities, facilities handling radioactive material, or other facilities that present significant fire protection challenges.*

- A. Construction of new and significant modifications to nuclear facilities
- B. Construction of new and significant modifications to structures, systems, and components (SSCs) involving storage, handling, or thermal treatment of radioactive or chemically hazardous materials
- C. Construction of new facilities greater than 5,000 ft² or \$1 million in property value
- D. Modifications of existing AMWTP structures affecting greater than 5,000 ft² or \$1 million in property value
- E. All new boiler installations
- F. All new or significant modifications to combustion fuel trains
- G. All new water storage and/or distribution system installations
- H. All new installations or modifications to gaseous fire-suppression systems
- I. The INL proprietary fire alarm center's receiving equipment.

Design Verification

The FPE shall be included on the design verification teams as a required reviewer for all changes involving fire protection criteria.

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NOTE: *The FPE is identified as a member of the FCG. The FPE also shall be included in the design verification team.*

The AMWTP Fire Marshal shall be included on the design verification team as a required reviewer for engineering changes of the following nature:

- A. When required for the FCG above.
- B. New or significant modifications to the following:
 - 1. Automatic suppression systems.
 - 2. Fire alarm systems.
 - 3. Fuel gas/liquefied petroleum gas storage and handling SSCs.
 - 4. Flammable/combustible liquid storage and handling SSCs.
 - 5. Compressed or liquefied gas storage and handling systems.
 - 6. Explosive storage or handling SSCs.
 - 7. Lightning protection systems.
- C. Decontamination, decommissioning, and demolition (DD&D) for nuclear facilities and facilities valued in excess of \$1 million.
- D. The AMWTP Fire Marshal shall be consulted for approval of the “National Electric Code” (NFPA 70) authority having jurisdiction (AHJ) issues to include the following:
 - 1. “National Electric Code” interpretations (NFPA 70)
 - 2. Disposition of nonconformance reports or other deficiencies related to compliance with the “National Electric Code” (NFPA 70).

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Vendor Data Review

The AMWTP Fire Marshal office shall be a required approver of vendor data as follows:

A. Shop drawings, calculations, and acceptance test procedures for the following:

1. Automatic suppression systems
2. Gaseous suppression systems
3. Fire alarm systems
4. Fire water distribution and supply systems

NOTE: *The AMWTP Fire Marshal must be notified before acceptance testing so a representative can be present for the required testing.*

5. All acceptance testing of fire protection systems required by the approved design documents.

B. Material submittals

1. Proprietary alarm receiving hardware
2. Fire water pumps, drivers, and controllers
3. All gaseous fire-suppression system components.

Final Project Acceptance Walk-downs

The AMWTP Fire Marshal shall be notified of final project acceptance walk-downs for projects involving new or significant modifications to SSCs identified in this procedure.

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Appendix B

Fire Protection Programmatic Elements

Fire Protection Programmatic Element Number 1

Fire Protection Programmatic Element Number 1 is a policy statement incorporating the requirements of DOE Order 420.1B, related DOE directives, and other applicable federal, state, and local fire protection requirements. Section 1.0 of this procedure includes the required policy statement.

(DOE Order 420.1B)

Fire Protection Programmatic Element Number 2

Fire Protection Programmatic Element Number 2 is the comprehensive written fire protection criteria and procedures reflecting additional site-specific aspects of the FPP. It addresses the following criteria.

(DOE Order 420.1B)

The AMWTP facilities and activities, including facility design and construction, are characterized by a level of fire protection that is equivalent to the best-protected class of industrial risks—highly protected risk (see def.). Fire safety must be an integral part of all activities. Facilities are designed with both active and passive fire protection features such that reliance is not placed on only one means to achieve defense in depth and ensure an acceptable level of fire safety. A graded approach shall be utilized to meet the minimum requirements for buildings that are not mission critical, aren't high value or don't have unique hazards associated with them.

(DOE Order 420.1B)

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NOTE: *The Implementation Guide for Use with DOE Orders 420.1 and 440.1 Fire Safety Program (DOE G-420.1/B-0) is incorporated, as appropriate, into the design and installation requirements. Fire Protection Engineers (FPEs) may request deviations, from the AMWTP Fire Marshal, regarding guidance requirements that are not required to meet the fire protection programmatic goals.*

Changes to fire protection designs are processed in accordance with INST-CD&M-11.1.2, Facility Modification Proposal Preparation. To minimize the loss from fire, all designs for new and modified DOE-owned facilities shall comply with the mandatory criteria and applicable guidance listed in Appendix C. This will include the following:

(DOE Order 420.1B)

- Reliable water supply of adequate capacity for fire suppression.

(DOE Order 420.1B)

- Noncombustible or fire-resistive construction, where appropriate. Complete fire-rated barriers that are commensurate with the fire hazard to isolate hazardous occupancies and minimize fire spread and loss potential consistent with the defined limits established by DOE G 420.1/B-0

(DOE Order 420.1B)

- Automatic fire-extinguishing systems are required throughout all facilities and in all areas subject to loss of safety-class systems, life safety hazards, unacceptable program interruption, or as a minimum, any building/facility in excess of 5,000 ft² or any building/facility with a *maximum possible fire loss (MPFL)* (see def.) of \$1 million or more.

(DOE Order 420.1B)

- Redundant fire protection systems in areas where safety class systems are vulnerable to fire damage and where no redundant safety capability exists outside the fire area. In new buildings/facilities, redundant safety-class systems will be in separate fire areas. Redundant fire protection systems also will be provided in areas where the MPFL exceeds \$50 million.

(DOE Order 420.1B)

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- Means to summon the Fire Department in the event of a fire.

(DOE Order 420.1B)

- Means to notify and evacuate building/facility occupants in the event of a fire (such as a fire detection or fire alarm system and illuminated, protected egress paths).

(DOE Order 420.1B)

- Means to prevent the accidental release of significant quantities of contaminated products of combustion and fire fighting water to the environment (such as ventilation control and filter systems, curbs, and dikes). Such features would only be necessary if required by the *fire hazards analysis (FHA)* (see def.), documented safety analysis (DSA), *fire safety assessment (FSA)* (see def.), or *abbreviated fire assessment (AFA)* (see def.) in conjunction with other building, facility, or site environmental protection measures.

(DOE Order 420.1B)

- Fire and related hazards that are unique to the operation and are not addressed by industry codes and standards shall be protected by isolation, segregation, or use of special fire control systems (such as inert gas or explosion suppression), as determined by the FHA.

(DOE Order 420.1B)

- Fire protection systems shall be designed such that their inadvertent operation, inactivation, or failure of structural stability will not result in the loss of vital safety functions or inoperability of safety-class systems, as determined by the DSA.

(DOE Order 420.1B)

Administrative controls shall be established and implemented to control the construction and placement of temporary facilities. The controls will provide for the type of construction, including materials and finishes, owner identification, occupancy limits, and limits on contents based on value and installed fire protection features in accordance with the guidance in DOE-STD-1088-95, Fire Protection for Relocatable Structures.

(DOE Order 420.1B)

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The codes and standards in effect when the design of new buildings/facilities begins shall be considered the code of record.

(DOE Order 420.1B)

NOTE: *When a building is significantly modified, the current edition of the code or standard shall apply to the modification.*

The FPP shall be effective in supporting the DOE-ID AHJ. The program shall be based on nationally recognized codes and standards to include the International Building Code, International Fire Code, National Fire Protection Association (NFPA) codes and standards, and applicable DOE orders relating to fire prevention.

INST-CMNT-10.6.3, Fire Prevention, shall include, but not be limited to, the following:

- Smoking shall be prohibited in all contractor-operated buildings and all government-owned vehicles. Smoking shall be permitted in designated areas only.

(DOE Order 420.1B)

- Good housekeeping shall be maintained in all areas to keep egress routes clear, fire protection equipment unobstructed, and combustible loading to a minimum. Combustible loading assessments shall be performed per the requirements of MP-ISIH-2.32, Housekeeping.

(DOE Order 420.1B)

- Transient combustibles shall be minimized to the extent practical in all buildings.

(DOE Order 420.1B)

Employees are encouraged to report fire protection concerns and may do so without fear of reprisal. No worker, foreman, supervisor, manager, or any other employee is allowed to take or threaten to take any act of reprisal, retribution, or discipline against any employee for having reported a fire safety concern.

The fire-protection performance indicators are established to effectively monitor the FPP. Baseline performance indicators include the following:

Quarterly evaluation report of inspection, testing, and maintenance of nuclear facilities' fire protection systems and equipment.

Quarterly evaluation and report of site area impairment logs.

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Annual Summary of Fire Loss (Calendar Year) reported per DOE M 231.1-1A, Chg. 1, Environment, Safety and Health Reporting Manual.

(DOE M 231.1-1A, Chg. 1)

Fire Safety Assessment/Abbreviated Fire Assessment Schedules

- Annual
- AFAs shall be completed within the mandatory schedule.

NOTE: *The schedule will be maintained in MP-ISIH-2.47, Developing Fire Hazards Analyses (FHA), Fire Safety Assessments (FSA), and Abbreviated Fire Assessments (AFA).*

Fire protection-related lessons learned generated from AMWTP operations and received from outside sources shall be reviewed to identify potential vulnerabilities and corrective actions initiated as necessary in accordance with MP-ISIH-2.43, Lessons Learned.

Fire Protection Programmatic Element Number 3

A system to ensure that FPP requirements are documented and incorporated in plans and specifications for new facilities and significant modifications to existing facilities.

(DOE Order 420.1B)

The FPEs shall provide fire-protection design criteria input for new building/facility designs and significant modifications and shall review designs for code compliance prior to approval

(DOE Order 420.1B)

Fire Protection Programmatic Element Number 4

Document review of plans, specifications, procedures and acceptance tests by a qualified fire protection engineer. Appendix A defines specific review and approval requirements of FPEs and the AMWTP Fire Marshal and as follows:

(DOE Order 420.1B)

The AMWTP Fire Marshal reviews and approves design criteria for new and modified buildings/facilities representing significant fire risk.

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All fire protection plans and specifications for significant new and *modified building/facility designs* (see def.) shall be performed by or under the responsible charge of a registered professional engineer

(DOE Order 420.1B)

The AMWTP Fire Marshal reviews and approves design documents presenting significant fire protection challenges or risk.

NOTE: *Review and approval by the AMWTP Fire Marshal shall not relieve the applicant of compliance with established codes and standards.*

The AMWTP Fire Marshal reviews and approves calculations, shop drawings, and acceptance test procedures for fire alarm and suppression systems and equipment

The AMWTP Fire Marshal's qualified technical representative witnesses the performance of the acceptance test procedures.

The AMWTP Fire Marshal reviews and signs all exemption and equivalency requests.

Fire Protection Programmatic Element Number 5

Fire hazard analyses (FHAs) using a graded approach conducted for hazard category 1, 2, and 3 nuclear facilities, significant new facilities, and facilities that represent unique fire safety risks. The FHA must be completed under the following requirements:

(DOE Order 420.1B)

A qualified FPE writes, reviews, and maintains FHAs. The AMWTP Fire Marshal must be consulted for a determination of whether an FHA is required for significant new facilities and facilities that present a unique or significant fire safety risk.

(DOE Order 420.1B)

The AMWTP Fire Marshal shall review the FHA for completeness in accordance with applicable DOE orders and directives and company policies and procedures.

(DOE Order 420.1B)

The FPEs shall be included in the review of DSAs to ensure that vital fire protection systems are identified and applicable portions of the FHA are integrated. [DOE Order 420.1B]

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Developing Fire Hazards Analyses (FHA), Fire Safety Assessments (SA), and Abbreviated Fire Assessments (AFA) (MP-ISIH-2.47) implements the requirements to complete fire hazards analyses and the cycle for review.

(DOE Order 420.1B)

Fire Protection Programmatic Element Number 6

FHA conclusions shall be incorporated into the DSA and integrated into design basis and beyond design basis accident conditions.

The conclusion of the FHA shall be used to validate the design basis and beyond design basis accident scenarios in applicable DSAs.

(DOE Order 420.1B)

Fire Protection Programmatic Element Number 7

Access to qualified, trained fire protection staff that includes fire protection engineers, technicians, and fire fighting personnel to implement the requirements of DOE Order 420.1B.

(DOE Order 420.1B)

A qualified fire protection engineer shall be an individual possessing at least one of the following:

- Registered professional engineer in fire protection

(DOE Order 420.1B)

- Graduate of an accredited engineering curriculum with no less than 4 years of engineering practice, at least 3 of these years being in responsible charge of fire protection engineering work

(DOE Order 420.1B)

- Demonstrated knowledge of engineering principles (PD-ISIH-04, Fire Protection Training and Qualification) and who has completed no less than 6 years of engineering practice, being in responsible charge of fire protection engineering work for at least 3 of these years.

(DOE Order 420.1B)

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Prospective candidates for new fire protection engineering and fire protection technical positions shall be reviewed by the AMWTP Fire Marshal and approved by the ESS&H Manager.

(DOE Order 420.1B)

The FPEs shall be trained and qualified in accordance with PD-ISIH-04, Fire Protection Training and Qualification.

(DOE Order 420.1B)

The FPEs shall be provided professional development and/or continuing education opportunities as required for maintaining competence in the field of fire protection.

(DOE Order 420.1B)

The FPEs shall be provided access to the necessary materials to perform their job requirements.

(DOE Order 420.1B)

Personnel assigned to perform inspection, testing, or maintenance functions on fire protection systems or equipment shall be trained for the assigned tasks. Training shall be repeated as necessary to maintain proficiency.

(DOE Order 420.1B)

All employees shall be trained annually as to the appropriate response in the event of a fire, including the recognition of fire alarm notification devices and the immediate evacuation of the facility.

All employees shall receive awareness training on the principles of fire extinguisher use and the hazards involved in incipient stage fire suppression annually.

(29 CFR 1910.157(g))

Employees designated by management as expected by job function to use a fire extinguisher to suppress incipient fires (i.e., personnel performing a hot work fire watch) shall receive hands-on fire extinguisher training annually.

(29 CFR 1910.157(g))

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Fire Protection Programmatic Element Number 8

A Fire Department baseline needs assessment (BNA) that establishes the minimum required capabilities of the Site fire-fighting forces. This includes minimum staffing, apparatus, facilities, equipment training, fire pre incident plans, and off Site assistance requirements and procedures. Information from the assessment shall be incorporated into the Site Emergency Plan and as follows:

(DOE Order 420.1B)

The company shall maintain access to an adequate Fire Department and interface agreement with off-Site emergency service organizations based on the required needs as determined by the assessment

(DOE Order 420.1B)

Emergency drills and exercises structured to emphasize realistic scenarios and standard Fire Department tactical evolutions shall be performed as a minimum annually.

(DOE Order 420.1B)

Fire Protection Programmatic Element Number 9

BNA information from the assessment shall be incorporated into the Site Emergency Plan and applicable FHA, FSA, DSA, AFA, and other required government documentation

(DOE Order 420.1B)

Fire Protection Programmatic Element Number 10

Pre-fire strategies, plans, and standard operating procedures to enhance the effectiveness of site fire fighting personnel.

The INL Fire Department shall complete written pre-incident strategies, plans, and standard operating procedures to enhance the effectiveness of site fire fighting forces. Pre-incident plans shall address as a minimum the use of fire fighting water or other neutron-moderating materials within or adjacent to moderation-controlled areas.

(DOE Order 420.1B)

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Fire Protection Programmatic Element Number 11

Procedures governing the use of fire fighting water or other neutron moderating materials to suppress fire within or adjacent to moderation controlled areas.

Pre-incident plans, written by the INL Fire Department, identify restrictions on the use of fire fighting water or other neutron moderating materials to suppress fire within or adjacent to moderation controlled areas.

Fire Protection Programmatic Element Number 12

Where no alternative exists to criticality safety restrictions on the use of water for fire suppression, the need for such restrictions is fully documented with written technical justification.

All restrictions on the use of water for fire suppression shall be formally documented by way of engineering design file (EDF), equivalency, or other means acceptable to the AMWTP Fire Marshal.

Fire Protection Programmatic Element Number 13

A comprehensive, documented fire protection self-assessment program—which includes all aspects (program and facility)—of the FPP shall be performed on a regular basis at a frequency established by the company.

(DOE Order 420.1B)

Facility, building, and area fire protection assessments shall be performed in accordance with MP-ISIH-2.47.

(DOE Order 420.1B)

A comprehensive FPP assessment shall be performed in accordance with DOE Order 420.1B. This assessment shall be completed every 2 years.

(DOE Order 420.1B)

Critical FPP elements shall be periodically assessed to identify opportunities for improvement in accordance with MP-M&IA-17.1, Management Assessments.

(DOE Order 420.1B)

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Fire Protection Programmatic Element Number 14

Fire protection-related appraisal findings, recommendation, and other deficiencies shall be identified, prioritized, and monitored in accordance with MP-Q&SI-5.3, Corrective Action and as follows:

(DOE Order 420.1B)

All validated fire protection appraisal findings, recommendations, and deficiencies shall be reported through the Trackwise System.

(DOE Order 420.1B)

Responsible management shall prioritize the findings, recommendations, and other deficiencies with input from the FPEs and ensure that a timely resolution is achieved. The FPEs shall provide periodic feedback to the AMWTP Fire Marshal on the status of significant fire protection issues.

(DOE Order 420.1B)

The AMWTP Fire Marshal shall intervene in the review and approval of FPP programmatic issues as needed for concurrence with corrective action plans and interim compensatory measures, as required.

(DOE Order 420.1B)

Fire Protection Programmatic Element Number 15

Identify fire protection areas of noncompliance that require an equivalency or exemption as follows:

(DOE Order 420.1B)

- Where strict compliance with fire protection requirements is not possible, exemptions or equivalencies shall be prepared and approved in accordance with MP-ISIH-2.48, Fire Protection Exemptions and Equivalencies.

(DOE Order 420.1B)

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- The AMWTP Fire Marshal shall assist the DOE-ID AHJ by making code interpretations and initial reviews of fire safety exemptions and equivalencies in the administration of the FPP. The AMWTP Fire Marshal's concurrence is required prior to submittal to DOE ID. The DOE maintains final AHJ review and approval authority for fire safety exemptions and equivalencies.

(AMWTP Letter RFF-003-2005)

Fire Protection Programmatic Element Number 16

Develop procedures governing firefighting techniques to be used during deactivation, decontamination, and demolition phases, when applicable.

(DOE Order 420.1B)

All FPP requirements may not be appropriate for facilities undergoing decontamination, decommissioning, and demolition (DD&D) and safe shutdown. Decisions relating to fire safety of such building/facilities shall be made upon completion of an FHA, FSA, or AFA on the basis of the guidance contained in DOE G 420.1/B 0.

(DOE Order 420.1B)

The replacement cost plus content cost for the building/facility must be reduced to less than \$1 million prior to inactivation of automatic fire suppression or fire alarm systems. The FSA or AFA shall reflect a MPFL damage potential of less than \$1 million.

(DOE Order 420.1B)

The isolation of fire protection systems will be conducted in accordance with INST-CMNT-10.6.2, Fire Protection System Impairments and the conditions of the approved FSA or AFA. Systems will not be isolated prior to the removal of all design modifications necessary to ensure the continued operability of interconnected fire protection systems. In addition, an out-of-service or out of-commission impairment will be completed.

(DOE Order 420.1B)

The INL Fire Department will be notified to ensure that affected pre incident plans are updated to reflect the revised occupancy of DD&D, or inactivated facilities.

(DOE Order 420.1B)

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Affected fire protection system drawings and inspection, testing, and maintenance procedures will be identified during the planning phase of the inactivation project and revisions/deletions will be completed prior to project closeout. Affected documents and procedures will be managed in accordance with MP-CD&M-11.1, Change Control.

(DOE Order 420.1B)

At least every 3 years, fire protection inspections of inactivated facilities will be performed to ensure that inactivation conditions specified in the FSA or AFA are maintained. An updated FSA or AFA will be prepared and issued following the inspection, if required. Fire protection inspections should be coordinated with other required inspections to maximize inspection efficiency.

(DOE Order 420.1B)

Administrative controls shall be documented, shall include as a minimum proper signage with the point of contact and phone number, and shall state the current status of the building/facility (such as "INACTIVE FACILITY," entry requirements, and proper personal protective equipment requirements for entry).

(DOE Order 420.1B)

The appropriate FPE will be contacted to review all procedures, work orders, job safety analyses, hot work permits, and other documents that pertain to fire protection and the requirements for inactivating the building/facility.

(DOE Order 420.1B)

The building/facility will be cleared of all combustibles and flammables at all times. There shall be NO storage allowed in the building.

(DOE Order 420.1B)

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Appendix C

Requirements Applicable to the AMWTP Fire Protection Program

Mandatory requirements for the FPP are derived from the following sources:

(DOE Order 420.1B)

- NFPA codes and standards
- 29 Code of Federal Regulations (CFR) 1910, Occupational Safety and Health Standards
- 29 CFR 1926, Safety and Health Regulations for Construction
- U.S. Department of Energy (DOE) Order 420.1B, Facility Safety
- International Building Code
- International Fire Code
- Other DOE orders and statutory requirements not listed above that contain requirements of a more limited extent relating to the DOE Fire Protection Program.
- Product Directories of Underwriters Laboratories
- Factory Mutual Approval Guide
- DOE-STD-1088-95, Fire Protection for Relocatable Structures

Information from the following documents is incorporated into the FPP as non-mandatory guidance:

- DOE G-420.1/B-0, Implementation Guide for Use with DOE Orders 420.1 and 440.1 Fire Safety Program
- DOE-STD-1066-99, Fire Protection Design Criteria
- DOE-HDBK-1062-96, DOE Fire Protection Handbook
- Factory Mutual data sheets.