

SNM-42

CHAPTER 7

FIRE SAFETY

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7.0 Introduction

The fire protection program at the site is based on a defense-in depth principle to provide a high degree of fire protection by preventing fires from starting, detecting fires quickly and suppressing those fires that occur, and by designing facilities with appropriate fire protection controls. The fire protection program is designed to ensure the radiological consequences of a fire are understood and that suitable fire safety controls are in place to protect workers, the public and the environment from the radiological consequences of a fire involving or threatening licensed materials.

7.1 Fire Safety Management

7.1.1 Organization

The program shall be administered by the Manager, Industrial Health & Safety. Oversight of the program shall be provided by the Safety Review Committee (SRC) and the Industrial Health and Safety (IH&S) Committee, both described in Chapter 2. The membership of the SRC includes the Chairman of the IH&S Committee (ref. Chapter 2). Day-to-day oversight of the program shall be provided by the Industrial Health and Safety Specialists.

7.1.2 Procedures

The program shall be implemented through the Industrial Health and Safety Manual and other systems described in Chapter 11. Procedures will be implemented which establish fire prevention requirements designed to prevent fires from occurring. Specifically, programs will be implemented for:

- Control of flammable liquids, pyrophoric materials, combustible metals and combustible gases
- Control of transient combustibles
- Periodic audits performed as part of the general safety audit program
- Housekeeping and storage and use of ordinary combustible materials
- Control and permitting of ignition sources

7.1.3 Engineering Review

All changes to the facility or processes that could affect fire safety or could affect Items Relied on For Safety (IROFS) are reviewed and approved according to the Change Control process described in Chapter 11. Change review shall be performed by the Industrial Health and Safety Specialist.

NFPA 801 shall be used during engineering reviews as guidance for design of new facilities containing processes involving licensed material.

7.1.4 Fire Prevention

Fire prevention is accomplished by maintaining the facility such that accumulation of combustibles is minimized, strictly controlling the use of ignition sources and other potential fire sources, and designing and controlling processes such that the possibility of a fire is minimized.

The facility is audited quarterly by members of the Industrial Health & Safety staff to monitor implementation of the administrative controls established. Findings from these audits are documented and a written response is required. Implementation of corrective actions are tracked via the Division-wide Commitment Tracking System.

As stated in section 7.1.2, procedures are in place to control potential ignition sources.

Controlling processes to assure an acceptable fire risk is accomplished through the ISA and the change control process described in Chapters 3 and 11, respectively.

7.1.5 Inspection, Testing, and Maintenance

The inspection, testing and maintenance of fire related IROFS is established during the ISA. The ISA Summary identifies inspection testing and maintenance as it applies to the specific IROFS.

A maintenance and inspection program has been developed for Fire Protection designated by the ISA Summary as IROFS (fire detection, fire suppression, the fire water distribution system, manual fire fighting equipment, and fire barriers). This program is described in written procedures contained in the Industrial Health & Safety Operating Manual. The inspection program is conducted by Industrial Health & Safety Technicians and Safety Engineers, and Emergency Team personnel. The maintenance program is conducted by Industrial Health & Safety Technicians and Safety Engineers, and Electrical and Mechanical Maintenance personnel.

The maintenance and inspection procedures are based on the requirements of the National Fire Protection Association (NFPA) standards.

7.1.6 Pre-Fire Plans

Procedures are established for initial response and reporting of fires. Employees are trained to report fires via the site emergency telephone number that is answered by personnel in the continuously manned security alarm station. The security alarm station is equipped with communications equipment and alarms that can be used to

activate the Emergency Organization. The notification and Emergency Organization response to fire are described in the Emergency Plan (Chapter 8.0).

The site also maintains a "Pre-fire Plan" which provides specific guidance to the site Emergency Team in responding to fires in all areas where radioactive material is stored or processed. The Pre-fire Plan includes drawings that identify the information necessary for fire fighting in those areas.

Copies of the Pre-Fire Plan are maintained in the site Emergency Operations Center (EOC), the Emergency Team Station, the Security Station located by the turnstile at Central Gate, and in the Emergency Team Radio Room. A copy is not provided to the local volunteer fire department (VFD), Concord VFD, because of the sensitive data in the plan. However, Concord VFD members receive training annually which includes a review of the plan and a site tour for the officers who hold DOE clearances. As a minimum, the Pre-Fire Plan is updated annually as a result of facility changes.

7.1.7 Personnel Qualification, Drills and Training

The site Emergency Team is equipped, trained and qualified to perform interior structural fire fighting as described in Chapter 8, Emergency Plan. The qualifications, drills, and training provided to the Emergency Team meets the requirements of NFPA 600, Standard on Industrial Fire Brigades.

7.2 Fire Risk Identification

7.2.1 Fire Safety Analysis

A Fire Safety Analysis (FSA) shall be performed as part of the ISA described in Chapter 3. The FSA is performed to assess the potential for fire at any location in the facility and to evaluate the adequacy of controls implemented to prevent the fire or mitigate the consequences of a fire. As part of the FSA process, combustible loading and the potential for fire propagation are qualitatively assessed, administrative fire prevention controls are reviewed and the adequacy of fire suppression and detection systems are assessed. IROFS are identified where a fire could be of sufficient magnitude to cause a criticality, radiological or chemical consequence listed in 10CFR70.61.

7.2.2 Integrated Safety Analysis

Controlling the risk of fires which could produce high or intermediate consequences described in 10CFR70.61 is a key component of the ISA. Scenarios are identified which, if unmitigated, could result in these consequences. Items Relied on for Safety are then identified and implemented to assure an acceptable level of risk. The ISA process is described in detail in Chapter 3 and the results of the ISA are provided in the ISA Summary.

7.3 Facility Design

Facilities and processes on the site shall be specifically designed with fire safety consideration. Design features for fire safety shall include, as determined appropriate by a Fire Safety Analysis:

- Noncombustible and fire resistant building materials
- Fire barrier separations
- Ventilation controls and fire dampers
- Explosive gas detection systems
- Fire detection systems
- Fire suppression systems
- Electrical installations
- Egress and exit considerations

Facility design shall ensure that fire safety features do not significantly increase the probability of a nuclear criticality accident and releases of radiological materials to the environment during a fire event or due to an inadvertent actuation of a fire protection system. The geography of the site and the remoteness of the site to populated areas ensure that radioactive materials released in the fire plume or fire water runoff will not present a significant risk to the environment or public.

New construction of buildings and facilities/processes within existing structures will be designed to meet the requirements of (a) the baseline design criteria specified in 10CFR70.64; (b) the defense-in-depth requirements of 10CFR70.64(b); and (c) be consistent with the guidance provided in NFPA 801.

7.4 Process Fire Safety

Hazardous materials that are flammable, explosive, or which increase the potential for fire (strong oxidizers) are used in some processes on the site. The specific materials and their fire/explosion hazards are described for each process area in the ISA Summary. A Fire Safety Analysis has been performed to assess the potential fire consequences in areas where these materials are present. Specific fire safety controls, if necessary, are identified in the ISA Summary to prevent and mitigate the consequences of a fire involving these materials.

7.5 Fire Protection Systems

Fire protection systems are provided in facilities based on the results of the ISA. Specific equipment and systems that are required to protect against or mitigate the criticality, radiological and chemical consequences listed in 10CFR70.61 are identified in the ISA Summary as IROFS.

In addition to those specifically listed IROFS, the following fire protection systems are maintained at the site.

7.5.1 Detection, Alarm and Suppression

Fire/Gas Detection

Fire detectors will be installed and maintained in all controlled areas. These detectors will alarm in the continuously manned security alarm station. Fire detectors will be inspected and tested annually.

Gas detection will be installed and maintained in controlled areas where combustible process gases are used in volumes sufficient to produce explosive atmosphere greater than 10% of the lower explosive limit. The gas detection will be interlocked via process control to shutoff the gas supply.

Gas detection systems are maintained, calibrated, and tested in accordance with the manufacturer's recommendations. The gas detection system alarms locally at the gas detector control panel located in the area where this equipment is installed. The alarm is audible in the protected operations area.

Fire Suppression

Manual fire suppression capabilities will be provided for all facilities on the site where radioactive material is stored or processed.

Portable fire extinguishers will be provided for use by employees responding to incipient stage fires. Portable fire extinguishers provided in each area will be appropriate for the class of fire that could occur in the area. Large wheeled fire extinguishers will be available on site for fire fighting in moderation control areas where water is not permitted by Nuclear Criticality Safety.

The site has a service water system that also provides fire-fighting water for the facility. The system is composed of a large main loop connected to an elevated water supply. The site maintains a minimum capacity of 150,000 gallons for fire fighting. Sectional valves are provided at strategic locations to allow sections of the system to be isolated without cutting off the water supply to significant parts of the site. Sectional valves are inspected monthly to ensure they remain in the proper position.

Fire hydrants are installed along the service water loop and on legs off the main loop. Water from these hydrants is the primary means of fire suppression for the site. Fire hydrants are flushed and serviced annually to ensure their proper functions.

7.5.2 Emergency Response

The Emergency Plan contained in Chapter 8 describes the Emergency Organization and actions that will be taken to respond to and mitigate a fire. In addition the Emergency Plan specifies the emergency response capability. Potential accident scenarios are described in the ISA Summary and the Emergency Plan (Chapter 8). The ISA Summary describes the scenarios and Items Relied on for Safety that make the risk of the accident either unlikely or highly unlikely as required by 10CFR70.61.

The Emergency Plan also describes response to potential fires that are not within the scope of 10CFR70.61. This is consistent with the philosophy there be a single "all hazards" site Emergency Plan.