

U.S. Department of Energy

Oak Ridge Office

ORO O 420
Chapter XVI

DATE: 08/28/2006

SUBJECT: FIRE PROTECTION

1. **PURPOSE.** This Chapter correlates to DOE O 420.1B, FACILITY SAFETY, dated December 22, 2005, by assigning responsibility and accountability and providing administrative guidance to the Oak Ridge Office (ORO). This Chapter establishes the policy and process within ORO for facility safety requirements related to fire protection. This Chapter is intended to be used in conjunction with DOE O 420.1B. Nothing in this issuance changes any requirements contained in any Department of Energy (DOE) Directive. Therefore, if any conflicts arise between this ORO Directive and a DOE Directive, the requirements contained in the DOE Directive shall take precedence.
2. **CANCELLATION.** None.
3. **APPLICABILITY.** The provisions of this Chapter apply to ORO Principal Staff and contractors and subcontractors who perform work for the Department as provided by law and/or contract and as implemented by the Contracting Officer.
4. **RESPONSIBILITIES.** Many ORO contractors have developed Standards/Requirements Identification Documents or Work Smart Standards Sets that may not include requirements referenced or included in DOE O 420.1B, its attached Contractor Requirements Document (CRD), or this Chapter. Interpretation and performance of Federal responsibilities outlined below must take into account the approved standards set for each particular contract and must not be deemed to add any requirements to the approved standards set.
 - a. **Manager, ORO.**
 - (1) Fulfills the role and responsibilities for the Authority Having Jurisdiction (AHJ) for matters involving fire protection as defined by the National Fire Protection Association (NFPA) codes and standards unless otherwise delegated.
 - (2) Submit recommendation for approval of contractor's exemption requests to DOE Headquarters (HQ).
 - b. **Assistant Manager for Environment, Safety, and Health.**
 - (1) Disseminates requirements, incidents, lessons learned, and applicable information generated by DOE HQ, other agencies, organizations, and facilities among ORO line organizations.
 - (2) Provides ORO fire protection engineering support to the ORO line organizations for fire protection matters, as requested by ORO line management.

- c. Assistant Manager for Environmental Management; Assistant Manager for Science; Assistant Manager for Nuclear Fuel Supply; and Assistant Manager for Administration.
 - (1) Ensure that comprehensive assessments of the contractors' fire protection programs are conducted every 3 years.
 - (2) Ensure that contractors' fire department baseline needs assessments are reviewed and approved at least every 3 years.
 - (3) Submit contractor requests for exemptions and equivalencies to required Directives, codes, and standards to the Manager, ORO, for review and concurrence or approval, as appropriate.

- d. Director, Safety and Health Division.
 - (1) Provides fire protection subject matter expert support to the ORO line organizations for assessment, general technical support, review of proposed equivalencies and variances, and review of contractual provisions, as requested.
 - (2) Schedules and performs ORO Fire Protection Program self-assessments every 3 years.

- e. Fire Protection Engineer, ORO.
 - (1) Recommends the approval or rejection of contractor exemption requests related to noncompliant fire protection and life safety related configurations that are determined to be in direct violation of a national standard, code, or DOE requirements.
 - (2) Recommends approval or rejection of equivalency requests related to configurations for fire protection and life safety conditions that are determined to provide an acceptable level of protection, safety, and/or an equivalent level of performance of required systems, methods, or devices.
 - (3) Support assessments of contractors' fire protection programs, as requested by ORO line management.

5. REQUIREMENTS AND PROCEDURES. None.

6. REFERENCES.

- a. Title 29, Code of Federal Regulations, Part 1910.165, EMPLOYEE ALARMS SYSTEMS, Paragraph (d)(2).
- b. DOE O 231.1A, Change 1, ENVIRONMENTAL, SAFETY AND HEALTH REPORTING, dated June 3, 2004.
- c. DOE M 231.1-1A, Change 1, ENVIRONMENT, SAFETY AND HEALTH REPORTING MANUAL, dated September 9, 2004.

- d. DOE O 440.1A, WORKER PROTECTION MANAGEMENT FOR DOE FEDERAL AND CONTRACTOR EMPLOYEES, dated March 27, 1998.
- e. DOE G 440.1-5, IMPLEMENTATION GUIDE FOR USE WITH DOE ORDERS 420.1 AND 440.1, FIRE SAFETY PROGRAM, dated September 30, 1995.
- f. DOE G 450.1-4, IMPLEMENTATION GUIDE, WILDLAND FIRE MANAGEMENT PROGRAM FOR USE WITH DOE O 450.1, *ENVIRONMENTAL PROTECTION PROGRAM*, dated February 11, 2004.
- g. DOE-STD-1066-99, FIRE PROTECTION DESIGN CRITERIA, dated July 1999.
- h. DOE-HDBK-1081-94, PRIMER ON SPONTANEOUS HEATING AND PYROPHORICITY, dated December 1994, Reaffirmed with memorandum January 2001.
- i. DOE-STD-1088-95, FIRE PROTECTION FOR RELOCATABLE STRUCTURES, dated June 1995, Reaffirmed with memorandum June 2000.
- j. DOE-STD-1137-2000, FIRE PROTECTION ENGINEERING FUNCTIONAL AREA QUALIFICATION STANDARD, dated July 2000.
- k. DOE HQ Memorandum, Joseph E. Fitzgerald, Jr., to John D. Rothrock, SE-30 “*Equivalency Request – Inspection, Testing, and Maintenance of Fire Protection and Fire Alarm Systems,*” dated June 8, 1994.
- l. ORO Memorandum, Gerald G. Boyd, M-1, to Dan Wilken, AD-40; George Malosh, LM-10; Larry Clark, AU-60; Stephen McCracken, EM-90; and Dale Jackson, NU-50, “*Oak Ridge Operations Policy Statement Regarding Protective Clothing Requirements During Hot Work Operations,*” dated August 21, 2003.
- m. National Fire Protection Association (NFPA) Codes and Standards, including:
 - NFPA 13, STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS;
 - NFPA 25 (1995 Edition), STANDARD FOR THE INSPECTION, TESTING, AND MAINTENANCE OF WATER-BASED FIRE PROTECTION SYSTEMS;
 - NFPA 72, NATIONAL FIRE ALARM CODE®;
 - NFPA 1404, STANDARD FOR FIRE SERVICE RESPIRATORY PROTECTION TRAINING; and
 - NFPA 1962, STANDARD FOR THE INSPECTION, CARE, AND USE OF FIRE HOSE, COUPLINGS, AND NOZZLES AND THE SERVICE TESTING OF FIRE HOSE.

7. DEFINITIONS.

- a. **AUTHORITY HAVING JURISDICTION.** Except as noted, decision making authority in the matters concerning fire protection rests with the manager of the DOE Field Office or designee.
- b. **EQUIVALENCY.** An approved alternative means of satisfying the technical provisions of an applicable code or standard.

- c. **EXEMPTION.** An approved deviation from a Directive, a nonstatutory code, or a standard.
- 8. CONTRACTOR REQUIREMENTS DOCUMENT. See the Contractor Requirements Document, Attachment 1 of this Chapter.
- 9. ATTACHMENTS.
 - a. Attachment 1 – Contractor Requirements Document.
 - b. Attachment 2 – ORO Fire Protection Inspection, Testing, and Maintenance Schedule.

CONTRACTOR REQUIREMENTS DOCUMENT

Contractors identified in Paragraph 3 of this Chapter will accomplish the following, to the extent as provided by law and/or contract and as implemented by the Contracting Officer.

DOE O 420.1B includes expectations for Field Elements to provide direction to contractors for specific elements of their fire protection programs. Sections of this Contractor Requirements Document (CRD) provide clarification and Oak Ridge Office (ORO)-specific expectations where the delegation to the Field Element is identified within the Directive. This CRD provides fire protection program requirements for ORO contractors responsible for design, construction, operation, management, decontamination, or decommissioning of Department of Energy (DOE) sites or facilities.

Contractors should refer to corresponding requirements in DOE O 420.1B and all applicable Rules, guidance, and standards when implementing the requirements of this CRD. Regardless of the performer of the work, the contractor is responsible for complying with requirements of this CRD. The contractor is responsible for flowing down the requirements to subcontractors at any tier to the extent necessary to ensure the contractor's compliance with the requirements and the safe performance of work. However, in doing so, the contractor must not flow down requirements to subcontractors unnecessarily or imprudently.

1. Fire Protection Facility Assessments.

- a. Annual fire protection assessments are to be completed for Category 1 and 2 nuclear facilities, facilities valued in excess of \$100 million, facilities considered to be high hazard by the contractor, or those that are considered to be of high importance to the contractor in the completion of their contracted scope of work.
- b. Triennial fire protection assessments are to be completed of radiological facilities not addressed above and facilities valued in excess of \$10 million up to \$100 million.
- c. Remaining facilities are to be assessed at least every 5 years.

2. Exemptions and Equivalencies.

- a. Approval of exemptions remains with the applicable DOE Headquarters (HQ) program office. Contractors requesting an exemption are to coordinate the submittal of such documents with the applicable ORO program office. All exemptions submitted to HQ for approval are required to have concurrence from the ORO Authority Having Jurisdiction (AHJ).
- b. Approval of equivalencies is the responsibility of ORO AHJ. Contractors requesting an equivalency are to coordinate the submittal of such documents with the applicable ORO program office. It is recommended the equivalency submittals be extensively coordinated prior to the contractor's submission of the equivalency request.
- c. The level of documentation necessary to support an exemption or equivalency will vary, depending on the issue. As a minimum, ORO expects that each analysis will identify the specific site location or condition at issue, the paragraph/section of the code or standard which

addresses the issue, a discussion as to why the literal requirements of the code or standard cannot be met, and a discussion which justifies the conclusion that the alternate configuration is acceptable or equivalent from a safety perspective to what is stipulated in the code or standard.

- d. Exemptions and equivalencies that are programmatic in nature (affect more than an individual component or design feature) are to be supported through the facility fire hazard analysis (FHA), if applicable. Where more than one exemption/equivalency request exists for a single facility/system, the contractor shall demonstrate that the cumulative affect of such conditions does not increase the level risk beyond an acceptable level.
 - e. Approved exemptions and equivalencies are to be reviewed annually by the contractor and internally documented as to their ongoing need and the continued implementation of applicable requirements.
 - f. Approved equivalencies and exemptions are applicable to the respective facilities and/or conditions to which they were requested. The transfer of facilities between contractor organizations is acknowledged. In the event that changes to the conditions of the approval document are made, the equivalency/exemption is no longer valid and conformance to the original requirements is required.
3. **Inspection, Testing and Maintenance of Fire Protection Equipment.** An ORO equivalency was approved by HQ in 1994 (see Reference k) pertaining to frequencies of inspection, testing, and maintenance of fire protection systems. Continued use of this equivalency is optional to ORO contractors (see Attachment 2 of this Chapter). Requirements associated with the use of the reduced inspection, testing, and maintenance frequencies remain the same as identified by HQ in 1994, specifically, *“Data on fire protection system performance should be continually collected and maintained so as to be able to provide sound technical basis for continuing to implement the revised frequencies. This data should be in an acceptable form.”* The inspection, testing, and maintenance of fire protection and life safety components not addressed in the equivalency are to be performed in accordance with applicable National Fire Protection Association (NFPA) standards. Contractors’ using the reduced frequency inspection, testing, and maintenance schedule are required to document a system performance report for the previous year by April 30 of the following year.
4. **Abandoned Facilities and Facilities Undergoing Decontamination and Decommissioning (D&D).**
- a. Alternate fire protection configurations shall be accomplished through equivalencies. A single equivalency may be processed for each facility. The equivalency shall be based on a graded FHA. The scope and depth of the analysis is to be commensurate with the complexity of the facility, the nature of the fire risks, and the type of D&D activities. FHAs associated with approved D&D equivalencies that are revised are to be submitted to ORO AHJ for information.
 - b. The FHA shall be revised, as appropriate, when significant changes in occupancy or hazard occur that affect fire safety. Fire safety features that have been required by DOE may be rendered inoperable or considered no longer needed if justified by the FHA. Such features may be abandoned in place until they are dismantled as part of planned demolition activities.

- c. The need for fire protection features in these facilities is governed by the fire risks to the public, the workers, and the firefighters and the potential release of hazardous and radiological materials to the environment. Property protection and program continuity are not normally factors to consider unless the facility possesses a definable value and/or mission.
- d. The decision to deactivate automatic fire suppression systems in facilities must reflect the possibility that emergency response forces may not be able to safely enter the facility to effect manual fire suppression. A "stand off and protect" tactical approach, which features exterior fire attack and protection of exposures, must be approved by ORO as part of the FHA or the fire department baseline needs assessment.

5. Protective Clothing Requirements During Hot Work Operations.

- a. ORO contractors and subcontractors activities involving hot work shall:
 - (1) Provide flame resistant clothing (outerwear) for all individual(s) directly performing the hot work.
 - (2) Positively determine the clothing requirements for all other personnel (e.g., fire watch personnel) using the Activity Hazards Analysis or Job Hazards Analysis.
 - (3) Evaluate clothing worn by personnel performing incidental tasks involving open flames, sparks, and other molten by-products and if warranted, require flame resistant clothing (outer wear).
 - (4) Ensure that these requirements are flowed down to all appropriate subcontracts and implementation verified.

ORO FIRE PROTECTION INSPECTION, TESTING, AND MAINTENANCE SCHEDULE

General Requirements

- a. The frequencies specified in National Fire Protection Association (NFPA) 25 should be followed for Hazard Category 1 nuclear and High Hazard facilities or facilities specifically open to the general public (i.e., museums and public auditoriums).
- b. Failure(s) occurring during surveillance testing shall be trended, reported in accordance with unusual occurrence reporting procedures and reporting requirements.
- c. It is not the intent to cover all aspects of inspection and testing. These testing frequencies are generic in nature, and specific applications, equipment, conditions, or facilities may warrant increased surveillance schedules.
- d. See Table 1 of this Attachment for inspection, testing, and maintenance frequencies. The frequency notations are defined as follows:

<u>Notation</u>	<u>Minimum Frequency</u>
Daily	At least once per 24 hours
Weekly	At least once per 7 days
Monthly	At least once per 31 days
Quarterly	At least once per 92 days
Semiannually	At least once per 184 days

The surveillances shall be performed within the specified interval, with a minimum extension of 25 percent of the interval between any two consecutive surveillances. This extension is intended to provide operational flexibility both for scheduling and for performing surveillances. It shall not be relied on as a routine extension of the specified interval. Failures to perform the surveillances within the required time intervals shall be documented.

Table 2 of this Attachment provides criteria for determining and trending component failures. Table 3 of this Attachment provides fire alarm system testing frequencies. Table 4 of this Attachment provides testing, inspection, and maintenance frequencies for miscellaneous equipment.

Table 1. Inspection, Testing, and Maintenance Frequencies

Item	NFPA 25 Section (1995 edition)	NFPA 25 Frequency	DOE Frequency	ORO Frequency	Justification
Sprinkler Systems					
Sprinkler Head, Inspection	2-2.1.1	Annually	Annually, not to exceed 3 years	At the same frequency as facility assessments, not to exceed 3 years	Sprinkler systems are reviewed by qualified engineers during scheduled self-assessments.
Spare Sprinkler Head, Inspection	2-2.1.3	Monthly	Annually	Annually	If a stock of spare sprinklers is kept at a central location, this is not needed.
Alarm Device, Inspection	2-2.6	Monthly	Quarterly	Quarterly	Consistent with NFPA 72.
Hydraulic Nameplate on Sprinkler Systems, Inspection	2-2.7	Quarterly	Annually, not to exceed 3 years	At the same frequency as the facility assessments, not to exceed 3 years	Contractors maintain a system of drawings, calculations, and other documentation that verifies the hydraulic design requirements.
Water Flow Alarms, Test	2-3.3	Quarterly	Quarterly	Semiannual	ORO failure rates over a period of approximately 50 years do not justify more frequent testing or the costs that would be incurred. Less frequent testing will also minimize discharges to the environment.
Guages, Test	2-3.2	5 Years	When abnormal	When abnormal	System gauges are not used to validate system operability.
Sprinkler System Piping, Inspection	2-2.2	Annually	Annually, not to exceed 3 years	At the same frequency as the facility assessments, not to exceed 3 years	Sprinkler systems are reviewed by qualified fire protection engineers during scheduled self-assessments.

Table 1. Inspection, Testing, and Maintenance Frequencies

Item	NFPA 25 Section (1995 edition)	NFPA 25 Frequency	DOE Frequency	ORO Frequency	Justification
Water Motor Gong, Test	2-3.3	Quarterly	Quarterly	Semiannual	Failure rates do not justify more frequent testing or the costs that would be incurred.
Compressor, Maintenance	2-4.2.2	Per manufacturer	Annually	Annually	Annual maintenance is reasonable.
Standpipe and Hose Systems					
Hose Cabinets, Inspection	Table 3-1	Annual	Annual, not to exceed 3 years	At the same frequency as the facility assessments, not to exceed 3 years	Hose cabinets are not subject to failure that would impair firefighting ability.
Alarm Devices, Test	Table 3-1	Quarterly	Quarterly	Semiannual	Failure rates do not justify more frequent testing or the costs that could be incurred.
Hose Nozzles, Inspection	Table 3-1 refers user to NFPA 1962	Annually by NFPA 1962. Monthly by para. 3-2.1 of NFPA 25	At the same frequency as the facility assessments, not to exceed 3 years	None	This requirement was removed from NFPA 25, 1994 edition. The nozzles are rugged devices and not subject to inordinate failure.
Hose Nozzles, Test	Table 3-1	Annually	When abnormal	When abnormal	Test when visual inspection reveals an abnormality or after nozzle maintenance.
Hose Storage Rack, Inspection	Table 3-1 refers the user to NFPA 1962	Annually	Annually, not to exceed 3 years	At the same frequency as the facility assessments, not to exceed 3 years	These are not subject to inordinate failure and will be reviewed during scheduled self-assessments.
Hose Storage Rack, Test	Table 3-1 refers the user to NFPA 1962	Annually	Annually, not to exceed 3 years	When abnormal	Test when visual inspection notes an abnormality or after maintenance. Storage racks are not subject to failure without apparent damage.

Table 1. Inspection, Testing, and Maintenance Frequencies

Item	NFPA 25 Section (1995 edition)	NFPA 25 Frequency	DOE Frequency	ORO Frequency	Justification
Standpipe, Flow, and Hydrostatic Test	Table 3-1	5 Years		5 Years	Flow tests and hydrostatic tests should be performed to ensure operability.
Standpipe Systems, Alarm Device, Test	Table 3-1	Quarterly	Quarterly	Semiannual	Failure rates and the costs incurred do not justify a greater frequency rate.
Private Fire Service Mains					
Mainline Strainers, Inspection	4-4.2	Annually	Per manufacturer or annually	Per manufacturer or annually	Inspect per the manufacturer's requirements if used in a portable water system. Annually if used in a nonportable water system or per the manufacturer's instructions.
Hydrants, Dry Wall and Wet, Inspection, Test, and Maintenance	4-4.3	Inspection – 6 months Test – 1 year Maintenance – 1 year	Annually	Annually	Combined Inspection, Test, and Maintenance. Ensure that the valve to the hydrant is fully open. Each hydrant shall be opened fully and water flowed for not less than 1 minute or until foreign material has cleared. Hydrant drainage shall be verified. (Tests shall be coordinated with environmental authorities.)

Table 1. Inspection, Testing, and Maintenance Frequencies

Item	NFPA 25 Section (1995 edition)	NFPA 25 Frequency	DOE Frequency	ORO Frequency	Justification
Underground Piping Flow Tests	4-3.1	Minimum 5-year intervals		Annual (Adequate water supplies are a vital fire protection element.)	Flow tests representative of those expected during a fire should be performed annually at selected plant areas and compared to previous years. Different areas of a facility should be tested on a 5-year cycle to ensure that all areas are capable of achieving the required flow demands.
Hose/Hydrant Houses, Inspection	Table 4-2.1	Quarterly	Annually	Annually	Hydrant/hose houses are not subject to frequent failure.
Fire Pumps					
Fire Pumps Heating System, Inspection	Table 5-1.1	Weekly during heating season	Weekly or Monthly	Weekly or Monthly	Weekly unless the pump room is constantly monitored for low temperature conditions.
Fire Pumps, Vent Louvers, Inspection	Table 5-1.1	Weekly during heating season	Weekly or Monthly	Weekly or Monthly	Weekly unless the pump room is constantly monitored for low temperature conditions.
Water Storage Tanks					
Water Storage Tanks, Water Condition (Check for Ice Buildup), Inspection	6-2.9	Daily/Weekly during the heating season	Daily during the heating season	Daily when the temperature is <30°F unless monitored	Daily when the temperature is below freezing unless the water temperature is constantly monitored.
Water Level	6-2.1	Monthly/Quarterly if monitored		Quarterly	Fire water storage tanks should be inspected quarterly by overflowing, except where tank levels can be visually verified.

Table 1. Inspection, Testing, and Maintenance Frequencies

Item	NFPA 25 Section (1995 edition)	NFPA 25 Frequency	DOE Frequency	ORO Frequency	Justification
Interior Inspection	6-2.4	5 Years		5 Years	Tank interiors and corrosion protection should be inspected every 5 years.
Water Storage Tanks, Heating System, Inspection	6-2.8	Daily/Weekly during the heating season	Daily during the heating season	Daily when the temperature is <30°F unless monitored	Daily when the temperature drops below freezing unless the water temperature is constantly monitored.
Water Spray Fixed Systems					
Mainline Strainers, Inspection and Maintenance, If Required	7-3.9	Inspection –Per manufacturer Maintenance – 5 Years	5 Years Combined Inspection and Maintenance	5 Years Combined Inspection and Maintenance	Use engineering judgment to set an inspection frequency if the water is contaminated.
Valve Enclosures, Cold Weather, Inspection	7-3.1.2	Daily/Weekly	See the frequencies for Chapters 2, 5, and 9	Weekly or Monthly if monitored	Inspect monthly if valve enclosures are monitored by a supervised low temperature alarm device.
Pipe and Hangers, Inspection	7-3.4.1 and 7-3.4.2	Quarterly Monthly by para. 3-2.1 of NFPA 25	Annually	Annually	Inspect during the annual flow test.
Spray Nozzles, Inspection	7-3.5	Annually	Annually	Annually	Inspect during the annual flow test.
Individual Nozzle Strainers, Water Spray and Foam Systems, Inspection and Maintenance	7-3.5	Annually	Annually	Annually	Inspect during the annual flow test.
Drainage, Inspection	7-3.10	Quarterly	Annually	Annually	Inspect during the annual flow test.

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Table 1. Inspection, Testing, and Maintenance Frequencies

Item	NFPA 25 Section (1995 edition)	NFPA 25 Frequency	DOE Frequency	ORO Frequency	Justification
Foam-Water Sprinkler Systems					
Foam-Water Systems Discharge Device Location, Position, and Check for Obstruction, Inspection	Table 8-2	Monthly/Annually	Annually	Annually	Inspect during the annual test.
Foam-Water Systems, Foam Concentrate Strainer, Inspection	8-2.9	After each flow test or operation	Annually	Annually	Inspect during the annual test.
Foam-Water Systems Drainage, Inspection	Table 8-2	Quarterly	Annually	Annually	Inspect during the annual test.
Foam-Water Systems, Proportioning Systems, Inspection	Table 8-2	Monthly	Monthly or Annually	Monthly or Annually	Configuration: a. Annual for fixed proportioners. b. Monthly for adjustable proportioners. c. Fluid Level – Monthly Power Systems. d. Power Systems’ Strainers – Monthly.
Foam-Water Systems, Foam Concentrate Pump Power, Inspection	Table 8-2	See Section 5. Weekly/Annually	Monthly	Monthly	Power failures are a common failure mode.
Foam-Water Systems, Foam Concentrate Pump Running, Maintenance	Table 8-2	See Section 5. Weekly/Annually	Monthly	Monthly	Power failures are a common foam system failure mode.

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Table 1. Inspection, Testing, and Maintenance Frequencies

Item	NFPA 25 Section (1995 edition)	NFPA 25 Frequency	DOE Frequency	ORO Frequency	Justification
Foam-Water Systems, Foam Concentrate Strainer, Inspection and Maintenance	8-2.9	Annually	Annually	Annually	Annually after each flow test.
Pipe Corrosion, Inspection	Table 8-2	Quarterly	Annually	Annually	Inspect during the annual test.
Pipe Damage, Inspection	Table 8-2	Quarterly	Annually	Annually	Inspect during the annual test.
Fittings Corrosion, Inspection	Table 8-2	Quarterly	Annually	Annually	Inspect during the annual test.
Fittings Damage, Inspection	Table 8-2	Quarterly	Annually	Annually	Inspect during the annual test.
Hangers and Supports, Inspection	Table 8-2	Quarterly	Annually	Annually	Inspect during the annual test.
Discharge Device Location, Position, and Obstruction, Test	Table 8-2	Annually	5 Years	Annually	Inspect during the annual test.
Foam Concentrate Strainers, Test	8-2.9	Annually	5 Years	Annually	Verify during the annual test.
Proportioning Systems, All, Test	8-2.11	Annually	5 Years	Annually	Foam systems are subject to corrosion and should be tested annually. All foam discharges should be minimized.
Complete Foam-Water Systems, Operational Test	8-3.3	Annually	5 Years	Annually	Foam systems should be tested annually to verify operability.

Table 1. Inspection, Testing, and Maintenance Frequencies

Item	NFPA 25 Section (1995 edition)	NFPA 25 Frequency	DOE Frequency	ORO Frequency	Justification
Valves and FD Connections					
Alarm Valves, Exterior Inspection	9-4.1.1	Monthly	Quarterly	Monthly or Quarterly	Inspect all unsupervised shutoff valves that are installed before the alarm pressure device monthly.
Hose Connection, Inspection	9-5.2	Quarterly	Quarterly	Quarterly	The facilities are not accessible to the public, and tampering is not experienced.
Fire Department, Connections, Inspection	9-7	Quarterly	Quarterly	Quarterly	The facilities are not accessible to the public, and tampering is not experienced.
Main Drain, Test	9-2.6	Quarterly	Quarterly	Semiannual	ORO failure rates over a period of 50 years do not justify more frequent testing or the costs that will be incurred. Less frequent testing will minimize discharges to the environment.
Dry Pipe Valves, Quick Opening Devices, Test	9-4.4	Quarterly	6 Months	Annually	Quick-opening devices are relatively simple, and annual testing is adequate to detect and repair mechanical problems.
Preaction/Deluge Dry Pipe Valve, Inspection of Exterior	9-4.3.1.3	Monthly	Quarterly	Annually	Annually after each flow test.

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Table 1. Inspection, Testing, and Maintenance Frequencies

Item	NFPA 25 Section (1995 edition)	NFPA 25 Frequency	DOE Frequency	ORO Frequency	Justification
Valve Enclosure, Inspection	9-4.3.1	During cold weather; daily/weekly if temperature is constantly monitored	Daily, if no temperature monitoring Monthly, if monitored	Daily at temperatures <32°F Monthly if low temperature alarm	Daily when temperatures are expected below freezing and valves are subject to freezing (i.e., not located in a heated building). Monthly if a supervised low temperature alarm is constantly monitored.
Dry Pipe Valve Enclosure, Inspection	9-4.3.1	During cold weather; daily/weekly if temperature is constantly monitored	Annually	Daily at temperatures <32°F Monthly if low temperature alarm	Daily when temperatures are expected below freezing. Monthly if a supervised low temperature alarm is constantly monitored.
Dry Pipe Valve's Interior, Inspection	9-4.4.1.1	Annually	Annually	Every 3 Years at Full Flow Test	There is no evidence that annual interior inspection of valves is needed to ensure operability. Water supplies are relatively clean for ORO.
Orifices, Filters, and Strainers, Inspection	9-4.4.1.5	5 Years	5 Years	5 Years	Operability of this equipment is verified during other testing.
Water Flow Alarm, Test	9-2.7	Quarterly	Quarterly	Semiannual	ORO failure rates over a period of 50 years do not justify more frequent testing or the costs that will be incurred. Less frequent testing will minimize discharges to the environment.

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Table 1. Inspection, Testing, and Maintenance Frequencies

Item	NFPA 25 Section (1995 edition)	NFPA 25 Frequency	DOE Frequency	ORO Frequency	Justification
Post Indicator Valves, Position, Test	9-3.4.1	Quarterly	Semiannual	Semiannual	Test valve position during the semiannual alarm test. Valve supervisory switches shall be tested.
Dry Pipe Valves, Priming Water, Test	9-4.4.2.1	Quarterly	Semiannual	Semiannual	Test the priming water prior to cold weather. Loss of priming water may cause valves to trip but would not cause failure of the valve.
Dry Pipe Valves, Low Air Pressure Alarms, Test	9-4.4.2.6	Quarterly	6 Months	Semiannual	Test during the alarm flow test.
Deluge/Preaction Valves, Priming Water, Test	9-4.3.2.1	Quarterly	6 Months	Annual	Test the priming water prior to cold weather. Loss of priming water may cause valves to trip but would not cause failure of the valve.
Preaction/Deluge Fire Cycle, Full Trip Test	9-4.3.2.2	Annually		Annually	<p>Trip tests of the system shall be tested with the control valve fully open, not partially closed.</p> <p>Tests shall be conducted in accordance with the manufacturer's instructions.</p>
Dry Pipe, Full Trip Test	9-4.3.2.2	Every 3 Years		Every 3 Years	<p>Trip tests of the systems shall be tested with the control valve fully open, not partially closed.</p> <p>Tests shall be conducted in accordance with the manufacturer's instructions.</p>

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Table 2. Criteria for Determining and Trending Component Failures

Component	Reference	Failure Criteria
Water Flow Alarm-Initiating Device	NFPA 72, Section 5-7	Alarms shall be received at the constantly attended location within 180 seconds after the inspector's test valve is fully opened.
Wet Pipe/Dry Pipe/Preaction/Deluge Valves		Operation of the valve shall be considered unsatisfactory if: a. The valve fails to open. b. A mechanical or operating failure of parts occurs. c. Water does not reach the test connection within 1 minute, measured from the time the inspector's test valve is fully open.
Local Alarm (i.e., Electric Bell or Water Motor Gong)	NFPA 13, Section 8-2.4	Water flow detecting devices shall result in an alarm within 5 minutes after the inspector's test valve is fully open.
Firewater Control Valves	NFPA 13, Section 8-2.4	Valves that are found more than 5 turns closed shall be considered a failure and reported as an improper impairment.

Table 3. Fire Alarm System Testing Frequencies – Table 7-3.2 of NFPA 72 and ORO Guidance

Devices	Frequency	ORO Guidance on Frequency
Alarm Notification Appliances:		See NOTE.
a. Audible Devices	Annual	Annual
b. Speakers	Annual	Annual
c. Visible Devices	Annual	Annual
Batteries – Central Station:		
a. <u>Lead Acid Type</u>		
1. Charger Test	Annual	Annual
2. Discharge Test (30 Minutes)	Monthly	Monthly
3. Load Voltage Test	Monthly	Monthly
4. Specific Gravity	Semiannual	Semiannual
b. <u>Nickel-Cadmium Type</u>		
1. Charger Test	Quarterly	Quarterly
2. Discharge Test (30 Minutes)	Annual	Annual
3. Load Voltage Test	Annual	Annual
c. <u>Sealed Lead Acid</u>		
1. Charger Test	Monthly	Monthly
2. Discharge Test (30 Minutes)	Monthly	Monthly
3. Load Voltage Test	Monthly	Monthly
Batteries – Fire Alarm Systems:		
a. <u>Lead Acid Type</u>		
1. Charger Test	Annual	Annual
2. Discharge Test	Semiannual	Semiannual
3. Load Voltage Test	Semiannual	Semiannual
4. Specific Gravity	Semiannual	Semiannual
b. <u>Nickel-Cadmium Type</u>		
1. Charger Test	Annual	Annual
2. Discharge Test	Annual	Annual
3. Load Voltage Test	Semiannual	Semiannual
c. <u>Primary Type (Dry Cell)</u>		
1. Load Voltage Test	Monthly	Monthly
d. <u>Sealed Lead Acid Type</u>		
1. Charger Test	Annual	Annual
2. Discharge Test	Annual	Annual
3. Load Voltage Test	Semiannual	Semiannual
Batteries – Public Fire Alarm Reporting System:	Daily	N/A for ORO Sites
(NOTE: Voltage test in accordance with NFPA 72.)		
a. <u>Lead Acid Type</u>		
1. Charger Test	Annual	
2. Discharge Test (2 Hours)	Quarterly	
3. Load Voltage Test	Quarterly	
4. Specific Gravity	Semiannual	

Table 3. Fire Alarm System Testing Frequencies – Table 7-3.2 of NFPA 72 and ORO Guidance

Devices	Frequency	ORO Guidance on Frequency
b. <u>Nickel-Cadmium Type</u> 1. Charger Test 2. Discharge Test (2 Hours) 3. Load Voltage Test	Annual Annual Quarterly	
c. <u>Sealed Acid Type</u> 1. Charger Test 2. Discharge Test (2 Hours) 3. Load Voltage Test	Annual Annual Quarterly	
Conductors/Metallic	Init/Recept	Init/Recept
Conductors/Nonmetallic	Init/Recept	Init/Recept
Control Equipment: Fire Alarm Systems Monitored for Alarm, Trouble Signals: a. Functions b. Fuses c. Interfaced Equipment d. Lamps and LEDs e. Primary (Main) Power Supply f. Transponders	Annual Annual Annual Annual Annual Annual	Annual Annual Annual Annual Annual Annual
Control Equipment: Fire Alarm Systems Not Monitored for Alarm, Trouble Signals: a. Functions b. Fuses c. Interfaced Equipment d. Lamps and LEDs e. Primary (Main) Power Supply f. Transponders	Quarterly Quarterly Quarterly Quarterly Quarterly Quarterly	Annual Annual Annual Annual Annual Annual
Control Unit Trouble Signals	Annual	Annual
Emergency Voice/Alarm Communications Equipment	Annual	Annual
Engine-Driven	Weekly	Weekly
Fiber Optic Cable Power	Annual	Annual
Guard's Tour Equipment	Annual	N/A
Initiating Devices: a. Duct Detectors b. Electromechanical Releasing Device c. Extinguishing System Switches d. Fire-Gas and Other Detectors e. Heat Detectors f. Fire Alarm Boxes g. Radiant Energy Fire Detectors	Annual Annual Annual Annual Annual Annual Annual	Annual Annual Annual Annual Annual Annual (20%) Annual

Table 3. Fire Alarm System Testing Frequencies – Table 7-3.2 of NFPA 72 and ORO Guidance

Devices	Frequency	ORO Guidance on Frequency
h. Smoke Detectors – Functional	Annual	Annual
i. Smoke Detectors - Sensitivity	Annual	Annual (20%)
j. Supervisory Signal Devices	See NFPA 72	Annual (20%)
k. Water Flow Devices	Quarterly	Semiannual
Interface Equipment	Annual	Annual
Off-Premises Transmission Equipment	Quarterly	Semiannual
Remote Annunciators	Annual	Annual
Retransmission Equipment	See NFPA 72	N/A
Special Hazard Equipment	Annual	Annual
Special Procedures	Annual	Annual
System and Receiving Equipment – Off Premises:		
a. <u>Operational</u>		
1. Functional – All	Annual	Annual
2. Transmitters – WF and Supervisory	Quarterly	Semiannual
3. Transmitters – All Others	Annual	Annual
4. Receivers	Monthly	Semiannual
b. <u>Standby Loading – All Receivers</u>	Monthly	Semiannual
c. <u>Standby Power</u>		
1. Receivers – All	Monthly	Semiannual
2. Transmitters – All	Annual	Semiannual
d. <u>Telephone Line – All Receivers</u>	Monthly	Semiannual
e. <u>Telephone Line – All Transmitters</u>	Monthly	Semiannual

NOTE: Unsupervised alarm notification appliances are to be tested bimonthly in accordance with Title 29 CFR Part 1910.165(d)(2).

Table 4. Inspection, Testing, and Maintenance Frequencies for Miscellaneous Equipment

Equipment	Frequency
<p>Emergency Lighting and Internally Illuminated Exit Signs:</p> <ul style="list-style-type: none"> a. Visual during building inspections b. Activate lights for a minimum of 30 seconds – Batteries or Generators c. Activate batteries for a minimum of 60 minutes d. Ensure transfer of power to lights - generators 	<p>Monthly Semiannual Annual Annual</p>
<p>Fire Doors:</p> <ul style="list-style-type: none"> a. Visual during monthly inspections b. Operability tests 	<p>Monthly Annual</p>
<p>Fire Dampers:</p> <ul style="list-style-type: none"> a. Test and inspection (20%) on a 5-year cycle 	<p>20% Annual</p>
<p>Dry Chemical Fire Extinguisher Systems:</p> <ul style="list-style-type: none"> a. Visual inspection b. Remote alarm test c. Maintenance and testing 	<p>Monthly Semiannual Annual</p>
<p>Mobile Fire Apparatus:</p> <ul style="list-style-type: none"> a. Visual inspection and tests b. Road Test c. Pump Test d. Flow Capacity 	<p>Each Shift Monthly Weekly Annual</p>
<p>Self-Contained Breathing Apparatus:</p> <ul style="list-style-type: none"> a. <u>Service Checks</u> <ul style="list-style-type: none"> 1. Visual Inspection 2. Detailed Inspection 3. After Each Use b. <u>Maintenance</u> – According to the manufacturer’s instructions and NFPA 1404 c. <u>Cylinder Test and Maintenance</u> <ul style="list-style-type: none"> 1. Hydrostatic Test 2. Internal Inspection 3. External Inspection d. <u>Breathing Air</u> – Air quality check by a qualified laboratory e. <u>Program Review</u> – Review respiratory protection policies and procedures 	<p>Weekly Monthly See NFPA 1404 Annual According to the manufacturer’s instructions According to the manufacturer’s instructions According to the manufacturer’s instructions Every 3 months Annual</p>