

NRC INSPECTION MANUAL

FCSS

ATTACHMENT 88135.05

RESIDENT INSPECTION PROGRAM
FIRE PROTECTION
(ANNUAL/QUARTERLY)

88135.05-01 INSPECTION OBJECTIVES

The objectives of this procedure are to provide requirements and guidance to independently assess the conditions and adequacy of the fire protection program.

88135.05-02 INSPECTION REQUIREMENTS AND INSPECTION GUIDANCE

02.01 Quarterly Inspections.

- a. **Inspection Requirement.** On a quarterly basis, perform a walkdown of plant areas important to safety and evaluate for fire protection requirements.
- b. **Inspection Guidance.** Do not attempt to address all plant areas during each inspection. It is expected that the residents perform the number of walkdowns necessary to assure themselves that fire protection requirements are being met. The main focus of the quarterly inspections is on the material condition and operational status of fire detection and suppression systems and equipment, and fire barriers used to prevent fire damage or fire propagation.

The areas selected should be areas in which licensed nuclear materials are either processed or stored.

1. Look for fire hazards that could increase risk and overall status of fire protection equipment.
2. Concentrate on areas where a fire, or its effects, would pose the greatest risks of loss of control or emission of nuclear material.
3. Look for potential fire hazards, especially in areas where high-enriched uranium (HEU) or process chemicals are stored or processed.
4. Ensure that water or other moderators would not be introduced into moderation controlled areas to fight fires unless nuclear criticality safety evaluations and appropriate management approvals have been established.
5. Emphasis should be placed on liquid HEU processing systems and components and potential fire hazards that could provide a driving force to spread a hypothetical release offsite.

Review the fire plan for the area selected against the fire protection program defined hazards and defense-in-depth features to verify that the fire plan is adequate.

The fire plan should define the hazards and fire protection defense-in-depth features to assist the inspector in determining whether the attributes of the fire area are within the limits of the licensing basis defined in the fire protection program. The required content of the fire plans will

be defined in the fire protection program and will include information such as fire hazards, locations of hose stations and extinguishers, locations of sprinkler isolation valves, important equipment in the area, etc. The plan can be a great help in distinguishing what combustibles are transient combustibles (if not on the plan, it is probably transient). The accuracy of the fire plan is important because it will be an important tool in providing information and guidance to the fire brigade team leader in determining the most likely locations of the fire in the fire area and the best strategy for approaching the fire.

While conducting the walkdown, evaluate the following elements where applicable:

1. Determine the status of on-site and off-site emergency response facilities.
2. Verify that for control of transient combustibles and ignition sources:
 - (a) Transient combustible materials are being controlled in accordance with the licensee's administrative control procedures; and
 - (b) Hot work, welding, or cutting is being done in accordance with the licensee's administrative control procedures.

Note: Transient combustibles and ignition sources and compare these with the limits provided in licensee administrative procedures. Also note the material condition and operational status (rather than the design) of fire detection and suppression systems, and fire barriers used to prevent fire damage or fire propagation.

3. Observe the fire detection systems, physical condition, in particular the fire detection devices, and note any that show physical damage, blockage or potential interference with functionality (see Compensatory Measures section below).
4. Verify that for water-based fire suppression systems:
 - (a) Sprinkler heads and nozzles are not obstructed by major overhead equipment (e.g., ventilation ducts);
 - (b) Water supply control valves to the system are open and the fire water supply and pumping capability is operable and capable of supplying the water supply demand of the system (Verify through visual observation or surveillance record; and
 - (c) Material conditions such as mechanical damage, painted sprinkler heads, corrosion, etc. will not affect performance of the system.
5. Verify that for gaseous fire suppression systems:
 - (a) Gaseous suppression system (e.g. Halon or CO₂) nozzles are not obstructed or blocked by plant equipment such that gas dispersal would be significantly impeded;

- (b) Suppression agent charge pressure is within the normal band, extinguishing agent supply valves are open, and the system is in the appropriate mode;
 - (c) Dampers/doors are unobstructed so that they will be permitted to close automatically upon actuation of the gaseous system;
 - (d) Room penetration seals are sealed and in good condition; and
 - (e) Material conditions such as mechanical damage, corrosion, damage to doors or dampers, open penetrations, or nozzles blocked by plant equipment that may affect performance of the system.
6. Verify that for manual firefighting equipment and capability:
- (a) Portable fire extinguishers are provided at their designated locations in or near the area being inspected, and access to the fire extinguishers is unobstructed by plant equipment or other work related activities;
 - (b) The general condition of fire extinguishers is satisfactory (e.g., pressure gauge reads in the acceptable range, nozzles are clear and unobstructed, charge test records indicate testing within the normal periodicity);
 - (c) Fire hoses are installed at their designated locations and the general condition of hoses and hose stations is satisfactory (e.g., no holes in or chafing of the hose, nozzle not mechanically damaged and not obstructed, valve hand wheels in place), and access to the hose stations is unobstructed;
 - (d) Water supply control valves to the standpipe system are open and the fire water supply and pumping capability is operable and capable of supplying the water flow and pressure demand; and
 - (e) Access to manual actuators for fixed suppression systems (e.g. gaseous systems, dry water systems) is unobstructed by plant equipment or work-related activities.
7. Verify that for passive fire protection features:
- (a) Electrical raceway fire barrier systems such as cable tray fire wraps, blanket material are in good condition with no cracks, gouges, or holes in the barrier material, and no gaps in the material at joints or seams, and that banding, wire tie, and other fastener pattern and spacing appears appropriate;
 - (b) Fire doors close without gapping (e.g. due to fire door damage from previous obstructions), and that the door latching hardware functions securely

- (c) Ventilation system fire damper material conditions including fusible links, where applicable, to ensure unobstructed operability. For those dampers which **cannot** be readily observed in the selected plant areas, review the licensee's surveillance efforts directed towards verifying the continuing operability of ventilation fire dampers;
- (d) Structural steel fire proofing, such as fibrous or concrete encapsulation, is installed in such a way that the structural steel is uniformly covered (no bare areas); and
- (e) Fire barrier and fire area/room/zone electrical and piping penetration seals are not missing from locations where they are needed to complete a fire barrier wall, and determine that seals appear to be properly installed and in good condition.

8. Verify that for compensatory measures:

- (a) Compensatory measures are put in place by the licensee for out-of-service, degraded or inoperable fire protection equipment, systems or features (e.g. detection and suppression systems and equipment, passive fire barrier features, or safe shutdown functions or capabilities). A fire watch is often the compensatory measure of choice for a large variety of fire protection malfunctions and deficiencies. Assure that the fire watch or other compensatory measure is commensurate with the significance of the deficiency;
- (b) The licensee's plans for permanent corrective actions including effectiveness in returning the equipment to service in a reasonable period of time.

Note: For those fire protection structures, systems, and components installed to satisfy **U.S. Nuclear Regulatory Commission (NRC) requirements** designed to **National Fire Protection Association (NFPA)** codes and standards, the code edition in force at the time of the design and installation is the code of record to which the design is evaluated.

Deviations from the codes should be identified and justified in the license or **Integrated Safety Analysis (ISA)**. A licensee may apply the equivalency concept in meeting the provisions of the NFPA codes and standards. When the licensee states that its design "meets the NFPA code(s)" or "meets the intent of the NFPA code(s)" and does not identify any deviations from such codes, the NRC expects that the design conforms to the codes and the design is subject to inspection against the NFPA codes.

The "Authority Having Jurisdiction" as described in NFPA documents refers to the Director, Office of Nuclear Reactor Regulation, **NRC**, or designee, consistent with the authority specified in **Title 10 of the Code of Federal Regulations (10 CFR) 1.43**.

02.02 Annual Inspection.

- a. Inspection Requirement. Evaluate the licensee performance of a fire brigade drill and verify that the licensee is in compliance with regulatory requirements.
- b. Inspection Guidance. Observe and evaluate the licensee's fire brigade drill. The minimum recommended sample size is one drill per year. Verify that:
 1. The specified number of individuals is assigned to the fire brigade response including the fire brigade leader.
 2. Each member sets out his/her designated protective clothing and turnout gear and properly dons the gear. (Identify the required gear and verify availability of correct sizes.).
 3. Self-contained breathing apparatus (SCBA) are available and are properly worn and used. Evaluate the SCBA program including storage, training, expectations for use, and maintenance.
 4. Personnel follow procedures for verification of the fire and initiation of response, including identification of fire location, dispatching fire brigade, and sounding alarms.
 5. Emergency action levels are declared and notifications are made in accordance with the license and applicable emergency plan requirements.
 6. Fire brigade leader exhibits command of the fire brigade and has a copy of the pre-fire plans or strategy. Manager in charge of the response, for example, the plant shift **superintendent** (not the fire brigade leader), has access to pre-fire plans or strategy and applicable procedures.
 7. Starting at the dress-out area, the fire brigade leader maintains control. Members are briefed, discuss plan of attack, receive individual assignments, complete communications checks, and generally get ready to combat the fire. Plan of attack discussion should be consistent with the pre-fire plans or strategies and include potential **hazards** in the fire area.
 8. Fire brigade arrives at the fire scene in a timely manner, taking the appropriate access route specified in the strategies and procedures. (For fire drills conducted in the radiation control areas, the specified most direct route may not be followed by the brigade.).
 9. Control/command is set up near the location of the fire after assessing the fire, and communications are established with the incident commander and fire brigade members.
 10. Radio communications between the command post, plant operators, and among fire brigade members remain efficient and effective for the duration of the drill.

11. Fire hose lines are capable of reaching all necessary fire hazard locations, the lines are laid out without flow constrictions and the hose is simulated as being charged with water.
12. The fire area of concern is entered in a controlled manner following the two-person rule; two fire brigade members enter while two remain outside the area of concern. Additionally, the fire brigade members stay low to the floor and feel the door for heat prior to entry into the fire area of concern.
13. The fire brigade brings sufficient fire-fighting equipment to the scene to properly perform its fire-fighting duties.
14. Members of the fire brigade check for fire victims and propagation into other plant areas.
15. Effective smoke removal operations are simulated in accordance with pre-fire plans and strategies by aligning ventilation in the fire area or by placing smoke removal units at the proper doors. Areas protected by gaseous suppression systems should not be ventilated before the brigade confirms that the fire is extinguished. If the simulation of smoke removal is not part of the drill, verify availability and condition of such equipment (e.g. fans, hoses, etc.).
16. The fire-fighting pre-fire plan strategies were utilized.
17. The licensee's drill scenario was followed, and the acceptance criteria for the drill objectives were met.
18. The licensee performs a post-drill critique to discuss any failures and weaknesses associated with the fire drill performance. Training and other improvement needs are identified.
19. At the conclusion of the drill, all fire-fighting equipment is returned to a condition of readiness to respond to an actual fire.

Note: The annual inspection evaluates the licensees' fire brigade performance. While the evaluation is an annual process, observation and evaluation of all the important drill activities as part of a single drill may not be effectively accomplished. Therefore, inspectors should consider the observation of several fire brigade drill segments (announced and unannounced) through the year to be able to formulate an appropriate assessment for the period. In addition, elements such as licensee fire brigade capability, training, dedicated size and membership, equipment, etc., can be verified independent of drills. This review is conducted to verify the capability of the fire brigade members, the leadership ability of the brigade leader, the use of turnout gear and fire-fighting equipment, and the effectiveness of the team operation.

02.03 Identification and Resolution of Problems.

- a. Inspection Requirement. During quarterly and annual resident inspection, verify that the licensee is identifying issues related to fire protection at an appropriate threshold and entering them in the corrective action program.

For a sample of selected issues documented in the corrective action program, verify that the corrective actions are appropriate.

- b. Inspection Guidance. The inspector should use the guidance in Attachment 02, "Plant Status," Section 02.05, "Identification and Resolution of Problems," when verifying the effectiveness of corrective actions.

88135.05-03 RESOURCE ESTIMATE

The total hours to complete this inspection is estimated to be 25 hours per year for the quarterly and annual inspections, including time allocated for the observation of the fire drill. For sites with only one resident inspector, the annual total estimated hours is expected to be 15 hours per year. Time spent conducting plant status activities should be charged to IP 88135. Completion of the quarterly walkdowns and the annual fire brigade observation should be documented in the quarterly inspection report for the quarter in which they were performed.

88135.05-04 REFERENCES

10 CFR 70.61, "Domestic Licensing of Special Nuclear Material," Subpart H, "Performance Requirements"

Regulatory Guide 3.7, "Monitoring of Combustible Gases and Vapors in Plutonium Processing and Fuel Fabrication Plants," March 1973

Regulatory Guide 3.12, "General Design Guide for Ventilation Systems of Plutonium Processing and Fuel Fabrication Plants," August 1973

Regulatory Guide 3.16, "General Fire Protection Guide for Plutonium Processing and Fuel Fabrication Plants," January 1974

NFPA 25, "Inspection, Testing, and Maintenance of Water-based Fire Protection Systems"

NFPA 30, "Flammable Liquids"

NFPA 600, "Industrial Fire Brigades"

NFPA 801, "Fire Protection for Facilities Handling Radioactive Materials"

88135.05-05 PROCEDURE COMPLETION

Inspection of the minimum sample size will constitute completion of this procedure. The minimum sample size will consist of one sample representing observation of a selected fire drill and the recommended number of quarterly fire area walkdowns. For fire area walkdowns, the recommended minimum sample size for a facility with 1 resident inspector is 1 walkdown per quarter and 2 walkdowns per quarter for a facility with two resident inspectors.

END

Attachment:

Revision History for IP 88135.05

Attachment 1 - Revision History for IP 88135.05

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment and Feedback Resolution Accession Number
N/A	ML13233A174 01/31/14 CN 14-004	IP 88135 was revised in its entirety. ¹ The Attachment 88135.05 is new.	N/A	ML13354B918

¹ Specific changes include:

- Breakout of inspection requirements into attachments.
- Incorporated specific language requiring that inspection planning be risk-informed.
- Incorporated specific language requiring inspectors to address corrective action program effectiveness when performing inspections.
- Revised format to comply with the requirements of IMC 0040.