INSPECTION PROCEDURE 64704

FIRE PROTECTION PROGRAM

PROGRAM APPLICABILITY: 2513, 2515

SALP FUNCTIONAL AREA: PLANT SUPPORT (PLTSUP)

64704-01 INSPECTION OBJECTIVES

01.01 Evaluate the overall adequacy and implementation of the licensee's approved Fire Protection Program with the exception of the requirements specified in 10 CFR 50, Appendix R, Sections III. G, J, L, and O.

01.02 Review the procedural incorporation and implementation of any changes permitted or required by the NRC in the Fire Protection Program.

01.03 Determine the adequacy of the licensee's system for conducting programmatic changes necessitated by quality assurance (QA) audit results, generic deficiencies, or licensee events.

64704-02 INSPECTION REQUIREMENTS

02.01 Obtain and review the documentation constituting the licensee's approved Fire Protection Program.

02.02 Verify that the licensee has developed technically adequate procedures to implement the entire Fire Protection Program. At a minimum, review the procedural guidance provided for the following items:

a. Combustible Material Control/Fire Hazard Reduction

1. Combustibles in safety-related and adjacent plant areas.

2. Bulk flammable and combustible liquids and gases storage.

3. Hydrogen lines in safety areas.

4. Plastics.

5. Anti-contamination clothing and shelving.

6. Wood.

b. Housekeeping

1. Control of combustible waste products.

2. Storage of radioactive materials.

3. Control of hazardous chemicals.

4. Control of smoking.

c. Administration/Fire Control Capabilities

1. Disarmed or inoperable fire detection or suppression systems.

2. Maintenance and surveillances on fire suppression, detection, and emergency communications equipment.

3. Site personnel fire fighting training.

4. Site personnel fire fighting qualifications.

5. Onsite fire protection staff responsibilities.

6. Fire emergency plans and actions.

7. Fire/emergency personnel designations.

d. Fire Risk Maintenance Evolutions

1. Welding, cutting and/or grinding.

2. Temporary heat processes.

3. Coating and roofing materials.

4. Leak testing.

02.03 Evaluate the implementation of the guidelines provided for the following items in the licensee's Fire Protection Program:

a. Items listed in 02.02 above.

b. Ventilation.

c. Emergency communications.

02.04 Verify the proper installation, operability, and maintenance of fire protection systems and equipment through performing the following actions:

a. Walk down the fire suppression water system to verify system operability as required by the Technical Specifications (TS).

b. Walk down at least two of the following fire suppression systems to ensure operability as defined in the TS:

   1. Any sprinkler/spray system.

   2. High/low pressure CO_2 system.

   3. Halon system.

c. Tour the plant to verify that the following fire protection requirements are being met:

   1. Standpipe and hose stations are operable in all areas important to safety.

   2. Adequate portable fire extinguishers are provided at designated places in each fire zone.

   3. Access to fire suppression devices is not being restricted by any materials or equipment.

   4. Inspections and maintenance on all fire suppression equipment or devices were satisfactorily performed.

   5. The general condition of all fire suppression devices is satisfactory (e.g., pressure gauges read in the acceptable range, water extinguishers are filled, nozzles are clear as indicated by visual inspection).

d. Evaluate the licensee's criteria for determining fire barrier functionality with respect to requirements and licensee commitments.

e. Visually inspect the fire barriers associated with two plant fire areas and ensure that the following fire barrier components are functional:

   1. Electrical and mechanical penetration seals and barriers.

   2. Fire doors.

   3. Fire dampers.

f. Inspect two safety-related cable trays and raceways to determine that the trays/raceways and enclosed cables meet fire prevention specifications.

g. Review the records for surveillances conducted since this inspection procedure was last performed to verify that:

   1. The fire detection and suppression systems currently meet the TS operability testing requirements.

   2. Operability for these systems has been satisfactorily demonstrated at the required frequencies.

h. Ensure that adequate emergency breathing apparatus is operable and available for control room personnel.

I. Verify that the fire alarm and supervisory signaling systems have been tested and are operable in compliance with licensee commitments.

02.05 Evaluate the readiness of the licensee's personnel to prevent and fight fires, including the following aspects:

a. Fire Brigade Readiness

1. Brigade composition.

2. Qualifications.

3. Training.

4. Manual firefighting equipment and turnout protective clothing availability and operability.

b. Fire Watches. Interview three people who stand fire watch and evaluate their knowledge of their duties, responsibilities, and required actions.

c. Other Personnel

1. Randomly interview at least five licensee personnel to evaluate their understanding and knowledge of the Fire Protection Program.

2. Assess the quality of fire protection/prevention training provided at the licensee's site indoctrination to verify compliance with requirements.

02.06 Review the adequacy and implementation of the QA program for fire protection with respect to the following:

a. Management inspections.

b. Fire prevention/protection audits.

c. Addressing and correcting all fire protection discrepancies.

d. Reviews for fire protection generic applicability.

e. Fire Protection Program changes.

f. System/equipment alterations.

g. Tests, surveillances, and maintenance reviews.

h. Records.

02.07 Effectiveness of Licensee Controls

a. Evaluate the effectiveness of the licensee's controls in identifying, resolving, and preventing problems by reviewing such areas as corrective action systems, root cause analysis, safety committees, and self assessment in the area of fire protection.

b. Determine whether there are strengths or weaknesses in the licensee's controls for the identification and resolution of the reviewed issues that could enhance or degrade plant operations or safety.

02.08 Use of risk insights

If a risk analysis specific to fire exists, consider risk significance as one input in the selection of a sample of inspection items.

64704-03 INSPECTION GUIDANCE

General Guidance

a. The Fire Protection Program is designed to give defense-in-depth against fires. This procedure is to be utilized to evaluate the following aspects of this defense:

   1. Preventing fires and their spread.

   2. Detection and suppression of fires.

   3. Mitigation of fire damage.

b. Evaluate the licensee's procedures for and implementation of the Fire Protection Program. An evaluation of the adequacy of the plan itself is not necessary as this has previously been performed by NRR during the licensing process and any further changes in the plan (e.g., plant modifications impacting fire protection or prevention) are subject to NRR approval.

c. Specific inspection requirements will vary depending upon the commitments made in the licensee's Fire Protection Program. This procedure has been written to incorporate the most recent guidance provided in 10 CFR 50, Appendix R; NFPA 803-1983; and BTP CMEB 9.5-1 to ensure satisfactory fire protection and prevention. A review of the licensee's program should indicate to the inspector which inspection requirements are applicable.

d. The initial performance of this procedure includes all of the aforementioned inspection requirements. All following inspections need not include inspection requirements 02.01 or 02.02, as it is not necessary to re-evaluate the Fire Protection Program and its procedures. Rather, an evaluation of all programmatic and procedural changes made since the last inspection should suffice.

Specific Guidance

03.01 Inspection Requirement 02.01. The licensee's Fire Protection Program consists of the Fire Hazard Analysis, the facility's Technical Specifications, and possibly, the NRR Fire Protection Safety Evaluation Report, if included as a license condition.

03.02.a.1 Inspection Requirement 02.02.a.1

1. Are safety-related systems isolated or separated from combustible materials? No combustibles are permanently permitted in safety areas unless they are an integral part of the system (e.g., cable insulation on exposed cables, reactor coolant pump lube oil or emergency diesel generator fuel oil) or are controlled in quantity to previously analyzed levels.

2. Are flammable and combustible liquids inside of structures limited in quantity to the minimum amounts necessary to meet the requirements of one shift's operations?

3. Are safety cans used to store and dispense flammable liquids used inside buildings or structures?

4. Is ventilation for operations involving the use of flammable or combustible liquids or of materials in solution with these liquids (e.g., paints) provided?

03.02.a.2 Inspection Requirement 02.02.a.2

1. Bulk gas storage is not permitted in areas associated with or structures housing safety-related equipment, except as analyzed and determined to be acceptable.

2. Bulk storage of flammable or combustible liquids or gases must be at least 50 feet from any permanent building or structure.

3. Closed containers shall be used for the storage and handling of flammable liquids.

03.02.a.3 Inspection Requirement 02.02.a.3. Hydrogen lines in safety areas shall be seismic Class I, sleeved to vent directly outside in case of a break, or equipped with excess flow valves so that hydrogen concentration will not exceed 2% in the affected area.

03.02.a.4 Inspection Requirement 02.02.a.4. Use of plastics is to be minimized. Polyvinyl chloride, neoprene, and any other halogenated plastics are to be used only when the use of non-combustible materials is not feasible and is at locations totally inaccessible to ignition or the effects of fire exposure.

03.02.a.5 Inspection Requirement 02.02.a.5. Anti-contamination clothing and shelving present the dual hazards of combustibles in safety-related areas and the potential

for low level radiological fires if the clothing is contaminated. These concerns shall be addressed in the licensee's Fire Protection Program.

03.02.a.6 Inspection Requirement 02.02.a.6. The use of combustible scaffolding, shoring, and forms within a structure greatly increase the fire hazard due to the nature of these materials and the construction or maintenance activities associated with their use. All combustible wood in any form is prohibited from use in safety-related areas. Only fire retardant treated wood (or non-combustible metals) may be used for scaffolding, shoring, or other forms required for maintenance or construction activities.

03.02.b.1 Inspection Requirement 02.02.b.1. Are transient fire loads associated with plant maintenance, modifications, or construction activities in safety-related buildings controlled by the licensee's Fire Protection Program?

03.02.b.2 Inspection Requirement 02.02.b.2. Are radioactive materials stored in closed metal tanks or containers and shall be in areas free from any ignition sources (including smoking) or combustibles?

03.02.b.3 Inspection Requirement 02.02.b.3. Chemicals pose the threat of an increased fire hazard due to the potentially flammable and explosive natures of these substances, as well as the potential for the release of toxic or noxious byproducts of combustion, and so, are they handled appropriately?

03.02.b.4 Inspection Requirement 02.02.b.4. Is smoking prohibited at or in the vicinity of hazardous operations or materials? Also, are "No Smoking" signs posted per the licensee's commitments in safety-related areas or in areas that would present a threat to safety-related areas?

03.02.c.1 Inspection Requirement 02.02.c.1. Inoperability of fire detection or suppression systems requires that TS action statements be performed. In addition, are alternate fire protection plans developed when any of these systems are removed from service?

03.02.c.2 Inspection Requirement 02.02.c.2. Are maintenance and surveillance programs and procedures established which meet the requirements of the TS, the vendor technical manuals, and any other applicable licensee commitments?

03.02.c.3 Inspection Requirement 02.02.c.3. Does site-wide training provide instruction on site and contractor personnel requirements upon discovering a fire or hearing the fire alarm, and when using combustibles, the requirements governing the use of materials and the actions necessary in the event of a combustible liquid spill or gas release/leaks?

03.02.c.4 Inspection Requirement 02.02.c.4

1. Do fire watch qualifications include hands-on training on a practice fire with the extinguishing equipment to be used while on fire watch?

2. Are control room personnel proficient in the use of the provided form of emergency air breathing apparatus?

3. Is the Fire Protection Program engineer qualified as a result of having a degree in an engineering curriculum of accepted standing with not less than 6 years of engineering attainment indicative of growth in engineering competency and achievement, 3 years of which shall have been in responsible charge of fire protection engineering work?

4. (a) Formulation and assurance of the Fire Protection Program's implementation may be delegated to a staff composed of personnel with knowledge of and experience in nuclear plant safety.

   (b) Are staff personnel assigned collateral duties or assignments that would significantly distract from their fire protection duties?

   (c) Is the staff responsible for the following:

      (1) Training of site and contractor personnel and fire drills implementation and critiques.

      (2) Reviewing all proposed maintenance, modifications, or construction activities to ensure that adequate fire protection considerations are included in the proposed work.

      (3) Implementing periodic inspections of the plant for compliance with all fire protection requirements, including combustible material control, fire detection and suppression equipment and barrier operability, and emergency lighting and safe shutdown capabilities.

03.02.c.5 Inspection Requirement 02.02.c.5

1. All personnel designated to take actions for fire emergencies should be trained in these actions and in the overall emergency plan.

2. Strategies for fire fighting in all safety-related areas and areas in which a fire would present a hazard to safety-related equipment should be developed and made available at the scene.

03.02.c.6 Inspection Requirement 02.02.c.6

1. Are personnel who are to react as either members of the fire brigade or as members of the emergency event teams for site fires designated in writing by the licensee?

2. Do fire brigade or emergency response team members have any duties that would conflict with their brigade or team responsibilities? Assignment to both the fire brigade and an emergency response team is prohibited. Do they remain mutually exclusive?

03.02.c.7 Inspection Requirement 02.02.c.7. No specific inspection guidance provided.

03.02.d.1 Inspection Requirement 02.02.d.1. Are cutting and welding operations in progress authorized by an appropriate permit? Ensure that combustibles have been moved at least 35 feet away from such operations or are properly covered. Is a fire watch with an extinguisher posted for the duration of the work and for 30 minutes thereafter to ensure that sparks or drops of hot metal do not start fires? If cutting or welding on a wall, floor, or ceiling, is a fire watch stationed at the opposite side of the partition? Additional fire watches may be required during cutting and welding operations where sparks or molten metal may drop several floors to areas containing significant quantities of combustible materials. NFPA-51B, Cutting and Welding Processes, includes provisions for safeguarding the hazards associated with welding and cutting operations.

03.02.d.2 Inspection Requirement 02.02.d.2. Are heating devices placed so as to avoid overturning and/or installed in accordance with their listing including clearance to combustible material, equipment, or construction?

03.02.d.3 Inspection Requirement 02.02.d.3. Are asphalt and tar kettles located in a safe place or on a fire resistive roof at a point where they avoid ignition of combustible material below. Is continuous supervision maintained while kettles are in operation and metal kettle covers and fire extinguishers should be provided?

03.02.d.4 Inspection Requirement 02.02.d.4. Are leak testing procedures utilizing airflow determinations or similar methods performed using one of the commercially available techniques? Open flame or combustion generated smoke tests should not be permitted.

03.03.a Inspection Requirement 02.03.a. No specific inspection guidance provided.

03.03.b Inspection Requirement 02.03.b

1. Separation of the smoke ventilation system from the normal ventilation system is the preferred configuration, but the normal system may be utilized if there exist

automatic or manually controlled dampers to isolate the normal ventilation in case of fire. However, separate smoke and heat vents are required in areas where the potential exists for heavy smoke conditions (e.g., cable spreading rooms or diesel fuel oil storage areas).

2. Is the fresh air supply intakes to areas containing safety-related equipment located remotely from smoke and heat vents?

3. Smoke ventilation from areas that may contain radioactive substances should not be ventilated outside the building, but rather, should be vented to gas treatment facilities.

4. Are enclosed stairwells designed to minimize smoke infiltration?

5. No plastic ventilation ducting is permitted.

6. Are fire areas separated in the ventilation system through sectioning off and through the use of fire dampers?

03.03.c Inspection Requirement 02.03.c. Are portable radio communications or fixed emergency communications systems available and operable?

03.04.a Inspection Requirement 02.04.a. At a minimum, during this walkdown include an evaluation of the operability and material condition of the fire suppression water supply system including a check that the system has two separate fire fighting water supplies, each including:

1. A water storage tank with a volume of water adequate to supply at maximum demand for 2 hours (separate redundant suctions in one or more intake structures from a large body of water are sufficient).

2. Controls to ensure the continuance of at least the minimum water volume required (administrative controls, including locks for tank outlet valves are unacceptable as the only method of control).

3. Fire pumps.

4. Supply valves aligned and controlled by locks or electrical supervision devices with audible signals to ensure the continuance of the water supply to all portions of the fire suppression system.

   (a) Fire suppression system sectional isolation valves (e.g., post indicator valves) shall be in their normally required positions except as needed for maintenance or repairs.

(b) Outside hydrants, water storage tanks, and indicator valves shall be adequately protected by isolation valves.

5. Adequate protection of suppression equipment to ensure that it would not be susceptible to freezing due to cold weather.

03.04.b Inspection Requirement 02.04.b. No specific inspection guidance provided.

03.04.c.1 Inspection Requirement 02.04.c.1

1. Are standpipes and hose stations placed such that at least one effective hose stream will be able to reach any location that contains or presents an exposure to fire hazard to structures, systems, or components important to safety?

2. Are standpipes and hose stations also appropriately placed inside PWR and non-inerted BWR containments.

03.04.c.2-3 Inspection Requirements 02.04.c.2-3. No specific inspection guidance provided.

03.04.c.4 Inspection Requirement 02.04.c.4. Are inspections conducted at least monthly and maintenance performed annually, or as specifically required as an inspection result. Detailed guidance for the required inspection and maintenance procedures for all equipment may be found in associated NFPA standards.

03.04.c.5 Inspection Requirement 02.04.c.5. No specific inspection guidance provided.

03.04.d Inspection Requirement 02.02.d. No specific inspection guidance provided.

03.04.e Inspection Requirement 02.04.e. The requirements for fire barriers are provided in 10 CFR 50, Appendix R. Does the licensee provide adequate methods of testing these to adequately demonstrate compliance?

03.04.f Inspection Requirement 02.04.f

1. Are cable trays constructed of metal with thick walled tubing used for conduits. Thin, flexible metallic tubing should be used only in short lengths to connect components to equipment. Thin walled metal tubing should not be used at all.

2. Do cables have automatic fire suppression wetting down systems or be accessible to manual hose standpipe systems?

3. Are cables designed and maintained to permit wetting down by fire suppression systems without electrical faulting?

4. Are cable raceways used only for cables?

03.04.g Inspection Requirement 02.04.g. No specific inspection guidance provided.

03.04.h Inspection Requirement 02.04.h

1. Control room emergency breathing apparatus can be in the form of either self-contained, full-face, positive-pressure masks approved by the National Institute for Occupational Safety and Health or of an air manifold piped in from a reservoir. If using self-contained units, the operating life should be at least one half an hour with two additional air bottles provided for each unit. In addition, on-site recharging facilities shall be available with a six hour reserve air supply.

2. Do air manifolds have an uninterrupted air supply with enough masks available to outfit all required control room personnel?

3. Are air bottles fully charged with their last inspections having been performed within the required time period?

03.04.I Inspection Requirement 02.04.i. No specific inspection guidance provided.

03.05.a.1 Inspection Requirement 02.05.a.1. Does each shift have a fire brigade of at least five members from the shift brigade? The brigade leader and two other members should have sufficient training or knowledge of plant safety-related systems to understand the effects of fire and fire suppressants on the safe shutdown capability. The shift supervisor cannot be a member of the brigade.

03.05.a.2 Inspection Requirement 02.05.a.2. Do all brigade personnel have annual physical examinations?

03.05.a.3 Inspection Requirement 02.05.a.3

1. Training shall consist of classroom instruction, fire fighting practice, and drills as described in Appendix R, Section I.

2. Attempt to schedule this inspection so as to be able to observe and evaluate either a fire drill or a practice session.

03.05.a.4 Inspection Requirement 02.05.a.4. Manual firefighting equipment and turnout clothing should meet the minimum specifications provided by NFPA 803-1983.

03.06.a Inspection Requirement 02.06.a

1. Does the plant manager or his designated fire protection manager periodically inspect the plant using prepared

checklists. Areas of primary containment or of high radiation normally inaccessible during plant operations should be inspected as conditions permit, but at a minimum, during each refueling outage.

2. Does the fire protection manager conduct weekly walk-through inspections to ensure implementation of required controls? During major maintenance periods the frequency of these walkthroughs should increase to daily.

03.06.b Inspection Requirement 02.06.b. The following are the three fire protection audits required by TS:

1. An annual audit to be conducted by an offsite fire protection specialist on the licensee's corporate staff or a consultant.

2. A 24 month audit by the licensee's QA organization.

3. A 3 year independent audit to be conducted by a consulting fire protection firm.

03.06.c Inspection Requirement 02.06.c. Does the onsite review committee address and recommend corrective action for all fire protection discrepancies. Are recommendations made reviewed by the offsite review committee, which either concurs with or disapproves the recommended procedural changes.

03.06.d Inspection Requirement 02.06.d. All events related to fire protection onsite (or those occurring at other facilities, if the information is made available to the utility) should be reviewed by the Fire Protection Program manager and the onsite review committee for generic applicability to the overall site Fire Protection Program.

03.06.e Inspection Requirement 02.06.e

1. Are all Fire Protection Plan changes or recommended changes evaluated for their impact on fire safety and submitted to NRR for approval?

2. Are systems established to permit programmatic changes and to implement them once approved?

03.06.f Inspection Requirement 02.06.f. Have adequate methods to evaluate system/equipment alterations been established to ensure that these changes do not circumvent the fire prevention or suppression systems or create a greater chance of fire damage to safety or safety-related areas?

03.06.g Inspection Requirement 02.06.g. Are guidelines provided to ensure a proper management review of all tests, surveillances, and maintenance conducted on the fire protection systems?

03.06.h Inspection Requirement 02.06.h. Are records prepared and maintained to provide evidence that the Fire Protection Plan criteria are being met? Are these being retained for a minimum of 5 years as required by TS?

03.07.a Inspection Requirement 02.07.a. When safety issues, events, or problems are reviewed, the adequacy of the results of licensee controls may be assessed by determining how effective the licensee was in performing the following:

1. Initial identification of the problem.

2. Elevation of problems to the proper level of management for resolution (internal communications and procedures).

3. Root cause analysis.

4. Disposition of any operability issues.

5. Implementation of corrective actions.

6. Expansion of the scope of corrective actions to include applicable related systems, equipment, procedures, and personnel actions.

03.07.b Inspection Requirement 02.07.b. The determination of whether there are strengths or weaknesses in the licensee's controls will be limited to those issues, events, or problems reviewed in detail. The evaluation will not draw sweeping conclusions about the licensee's overall control programs, but will be very specific in identifying any licensee strengths or weaknesses encountered with the individual items reviewed.

Note: For additional guidance on licensee controls, please refer to IP 40500, "Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems."

03.08 Use of risk insights

A risk analysis specific to fire may be available in the IPEEE or other PRA. If so, consider risk significance as one input in the selection of a sample of inspection items by gaining an understanding of 1) the impact on safety functions of failures of systems, structures, or components (SSCs) occurring within the more likely core damage accident sequences identified in the PRA, and 2) the assumptions regarding plant and operator responses associated with these sequences. Obtain these insights through discussion with the regional Senior Reactor Analyst, resident inspector staff, licensee PRA group, or by review of PRA documentation (if available in usable form). Compare these insights to your own knowledge of plant design and operation in order to ensure that they are reasonable. As a subset of inspection items, select a sample of items which are related to the safety

functions depended upon to mitigate the above core damage sequences (as much as possible given the available items). Include the rationale for risk significance of any adverse findings in the inspection report as appropriate. Refer to IMC 2515 Appendix C for further guidance.

64704-04 INSPECTION RESOURCES

Completion of this inspection procedure is expected to take, on the average, 25 hours of direct inspection effort at a site.

64704-05 REFERENCES

10 CFR 50.48.

10 CFR 50, Appendix A, Criterion 3.

10 CFR 50, Appendix R.

Facility Fire Hazard Analysis Report.

Facility Technical Specifications.

NRC Appendix A to Branch Technical Position BTP 9.5-1, "Fire Protection Program."

NRC Branch Technical Position BTP CMEB 9.5.-1, "Fire Protection Program."

NRR Fire Protection Safety Evaluation Report.

NUREG-0800, Section 9.5.1, Rev. 3, "Standard Review Plan - Fire Protection Program," July 1981.

Regulatory Guide 1.39, "Housekeeping Requirements for Water-Cooled Nuclear Power Plants."

Regulatory Guide 1.120, "Fire Protection Guidelines for Nuclear Power Plants."

SAR, Chapters 3, 9, and 17.

The following National Fire Protection Association (NFPA) Standards:

NFPA 10-1984, "Standard for Portable Fire Extinguishers."

NFPA 14-1983, "Standard for the Installation of Standpipe and Hose Systems."

NFPA 51B-1984, "Standard for Fire Prevention in Use of Cutting and Welding Processes."

NFPA 72D-1979, "Standard for the Installation, Maintenance and Use of Proprietary Protective Signaling Systems."

NFPA 803-1983, "Standard for Fire Protection for Light Water Nuclear Power Plants."

END