December 24, 1996 SECY-96-267

FOR: The Commissioners

FROM: James M. Taylor /s/
Executive Director for Operations

SUBJECT: FIRE PROTECTION FUNCTIONAL INSPECTION PROGRAM

PURPOSE:

To inform the Commission of the objectives, scope, and status of the new fire protection functional inspection program and of the staff's plan to implement the program.

BACKGROUND:

In a memorandum of August 25, 1992, the staff of the U.S. Nuclear Regulatory Commission (NRC) submitted to the Commission its action plan for resolving the Thermo-Lag fire barriers issues. The staff stated that it would develop and implement a program to inspect the Thermo-Lag corrective actions at each plant. At that time, the staff believed that the licensees would simply replace or upgrade their existing Thermo-Lag fire barriers. However, since that time, the licensees have proposed a much broader range of corrective action options. For example, many licensees have initiated fire barrier reduction programs. The objective of these programs, which are based largely on reassessments and subsequent revisions of the plant post-fire safe shutdown analysis, is to eliminate as much as possible the need for fire barriers. Typical outcomes of barrier reduction programs include redefined fire area boundaries, new or relocated safe shutdown components, and new operator actions and procedures. Many licensees are also performing engineering

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evaluations to justify either eliminating certain Thermo-Lag barriers or keeping them as they are (i.e., without upgrades). In some cases, the licensees have used such evaluations to justify exemptions from the NRC fire protection regulations, and we anticipate the trend to continue in the future.
In the memorandum of August 25, 1992, the staff also informed the Commission that it would reassess the NRC reactor fire protection program to (1) determine if the program had appropriately addressed the safety issues, (2) determine if licensees are maintaining compliance with the NRC fire protection requirements, (3) identify the strengths and weaknesses of the program, and (4) make recommendations for improvement. The staff issued its "Report on the Reassessment of the NRC Fire Protection Program" on February 27, 1993. That report recommended, in part, that the staff (1) develop a coordinated approach for the fire protection and systems inspections and (2) reevaluate the scope of the fire protection inspection program. In SECY-93-143, "NRC Staff Actions To Address the Recommendations in the Report on the Reassessment of the NRC Fire Protection Program" dated May 21, 1993, the staff informed the Commission that it would implement these reassessment recommendations as part of the Fire Protection Task Action Plan. To do so, the staff considered fire events, licensee reports of deficiencies in the fire protection program, previous NRC inspection findings, the scope and adequacy of the existing NRC fire protection inspection program, and the need to inspect other plant fire protection features in response to ongoing NRC programs (e.g., self-induced station blackout, fire barrier penetration seals, turbine building assessments, and individual plant evaluations of external events (IPEEEs)).

On the basis of the wide range of Thermo-Lag corrective actions proposed by the licensees, the staff concluded that an inspection of broader scope than that proposed in the Thermo-Lag Action Plan was needed. In addition, in view of the preliminary results of its work under the reassessment recommendation, the staff concluded that additional fire protection inspection effort appeared to be warranted. In SECY-95-034, "Status of Recommendations Resulting from the Reassessment of the NRC Fire Protection Program," dated February 13, 1995, the staff informed the Commission that it was considering initiating a fire protection functional inspection (FPFI) program, which would cover all aspects of nuclear power plant fire safety (including Thermo-Lag fire barriers) and provide for more efficient, comprehensive and effective inspections. Revision and/or cancellation of some of the existing fire protection inspection procedures will be considered as part of the FPFI program.

In a memorandum to the Commission of September 20, 1995, the staff documented its conclusion that an inspection of broader scope than that originally specified in the Thermo-Lag Action Plan was needed. The staff also informed the Commission that

instead of the stand-alone Thermo-Lag fire barrier inspection program that it had proposed, it would develop and implement the FPFI program it had outlined in SECY-95-034. On February 8, 1996, the staff briefed the Chairman on its plans for the future direction of the NRC reactor fire protection program including the FPFI program. Later, in a memorandum to the Commission of April 3, 1996, the staff documented the framework for future direction of the NRC fire protection program with emphasis on the FPFI program, a plan for developing and implementing this program, and a plan for centralized management, by the Office of Nuclear Reactor Regulation (NRR), of the FPFI program and all other reactor fire protection work.

The staff presented its plans for the FPFI program to the Advisory Committee on Reactor Safeguards in March 1996. The staff also presented its plans to the nuclear industry at the Regulatory Information Conference of May 1996 and at the Nuclear Energy Institute fire protection forum of September 1996.

DISCUSSION:

Objectives of the FPFI Program

The FPFI program is a new headquarters-based inspection program. The program satisfies a number of objectives. The program satisfies staff plans to inspect Thermo-Lag fire barrier corrective actions. The program also responds to the reassessment recommendation that the staff reevaluate the scope of the reactor fire protection inspection program and develop a coordinated approach for the fire protection and post-fire safe shutdown systems inspections. In this regard, the FPFI program will provide a strong, broad-based, and coherent inspection program that is commensurate with the safety significance of the subject and that will help ensure licensee compliance with NRC fire protection regulations and commitments. Benefits of the FPFI program include focusing NRC fire protection and support staff resources on the fire protection issues of most importance, (such as licensee control of the fire protection design and licensing bases), providing clear guidance to the staff and the nuclear industry regarding NRC oversight of licensee reactor fire protection programs, and improving the consistency of internal NRC oversight of the program. The program will also provide an immediate safety benefit arising from renewed industry attention to nuclear power plant fire safety.

Scope of FPFI Program

The FPFIs will be announced inspections and will cover all aspects of plant fire safety. The staff will use risk insights to help focus the FPFIs on those areas most important to safety. The principal focus of the inspections will be on the plant fire

protection and post-fire safe shutdown design and licensing bases and those fire protection program elements that are covered by existing NRC regulations and guidelines. These include, for example, safe shutdown performance objectives, safe shutdown systems and equipment, fire protection systems and barriers, emergency lighting, reactor coolant pump oil collection systems, quality control and quality assurance, configuration control including change control process, administrative controls and procedures, and training. This aspect of the FPFI program will satisfy the program objective of ensuring continued licensee compliance with NRC fire protection regulations and commitments. In addition, the pilot inspections will include a review of fire safety considerations that are not expressly addressed by the fire protection regulation, but by other regulatory programs. This includes, principally, Generic Letter 88-20, Supplement 4, "Individual Plant Examinations of External Events (IPEEE) for Severe Accident Vulnerabilities, 10 CFR 50.54(f)," June 28, 1991. Such inspection areas include, for example, event initiated fires, fire induced reactor transients, and potential seismic fire interactions. This feature of the FPFI program will provide useful information regarding broader aspects of nuclear power plant fire safety. The staff will use this information to identify the strengths and weaknesses of the overall NRC reactor fire protection program and to develop and support recommendations for program improvement, where appropriate.

The FPFI program consists of a pilot program followed by a permanent program. The pilot program consists of four pilot inspections (one per region) conducted in series over a 1-year period. The permanent program, as currently envisioned, would consist of four to eight NRC team inspections (one to two per region) per year. Licensee self-assessments could also be an important element of the permanent FPFI program. The staff will consider the role of self-assessments after it completes the pilot program.

A typical FPFI team will consist of a qualified team leader and four qualified inspectors. The team leader will be a senior fire protection engineer or equivalent. The team will consist of a fire protection engineer, an electrical engineer, a plant systems engineer, and a regional inspector. A probabilistic risk assessment (PRA) specialist will help with inspection preparation by developing plant-specific risk-informed information for the inspection plan. The use of region-based inspectors will help maintain region office involvement in the program. The regional inspectors should have standard regional inspector qualifications. Experience in fire protection and plant systems inspections would be an advantage, but not required. The inspection activities that will be assigned to the regional inspectors will depend on their individual experience and qualifications. Specific inspection assignments will be made by

the team leader as part of inspection plan development. Examples include surveillance, testing, and repair activities and procedures; administrative controls; and quality assurance and quality controls.

For planning purposes, each FPFI will take 7 to 10 weeks (2 to 3 weeks to prepare, 2 weeks on site with a 1 week break between 1-week site visits, and 2 to 4 weeks to write the report). The first week of the onsite inspection will consist of a broad-based inspection of the plant's overall fire protection and post-fire safe shutdown program. During the second week, the team will inspect areas of emphasis based on the results of the first week of the inspection. For example, if during the first week the team finds as part of the basic inspection program that the licensee has a weak configuration control program, the team could inspect this program in depth during the second week. The inspection team's findings will be sufficiently developed to support enforcement actions, as appropriate. Enforcement actions will be processed by the regional offices with the assistance of NRR and the Office of Enforcement (OE) in accordance with NUREG-1600, "General Statement of Policy and Procedures for NRC Enforcement Actions," and the "NRC Enforcement Manual." (Although the inspections will include review of fire safety considerations that are not expressly addressed by the fire protection regulation, as discussed above, information obtained from this aspect of the inspections should not lead to enforcement actions.) With respect to technical issues, decisions regarding responsibility for follow up activities will be made on a case-by-case basis after the FPFI. The staff expects that in most cases, the regional offices will perform the follow up activities. However, in some rare cases it may be more appropriate or more efficient for NRR to follow up.

The FPFI procedure will be "modular" in that sections of the procedure that address discrete inspection topics could be conducted by individual inspectors independent of a full-scale FPFI. For example, under the Thermo-Lag Action Plan, the staff prepared a draft Thermo-Lag fire barrier inspection procedure. This procedure will be converted into a fire barrier inspection procedure and integrated into the FPFI procedure. The staff could use this element of the FPFI program to inspect Thermo-Lag fire barriers independent of an FPFI, where appropriate. For example, it could be used at a plant that upgraded its Thermo-Lag fire barriers, but did not use the more complicated corrective action options discussed previously.

In general, the conduct of FPFIs will parallel that of other NRC team inspections. Before each inspection, the NRC team leader will assemble the inspection team, coordinate inspection preparation activities with the licensee and the individual team members, and prepare an inspection plan. During the inspection,

the team leader will manage the implementation of the inspection plan, manage the inspection team, and interface with the licensee. After the inspection, the team leader will integrate the team member inputs into a comprehensive NRC inspection report. In addition, after each pilot inspection, the inspection team and appropriate NRC staff and management will critique the inspection and assess lessons learned. The staff will apply the results of the critiques and the lessons learned in the development of the inspection plan for the following pilot inspection.

After the four pilot inspections, the staff will reassess the lessons learned and modify the draft FPFI procedure and guidance to reflect the lessons learned. The revisions will be the final draft of the FPFI procedure and guidance. The staff estimates that it could complete this effort no later than 4 months after it completes the final pilot inspection. After the staff prepares the final draft FPFI procedure and guidance, it will conduct a public workshop regarding the FPFI program. During the workshop, the staff will discuss the FPFI program, present the results of the pilot program, and seek public and industry input. At this time, the staff will also consider the value of retaining those inspection elements that cover fire safety considerations that are not expressly addressed by the fire protection regulation. The staff estimates that it will conduct the workshop about one month after it completes the final draft of the FPFI procedure and guidance.

After the public workshop, the staff will finalize the FPFI procedure and guidance. At that time, the staff will also consider the need for training for additional FPFI inspectors. Depending on the extent of the comments and input received during the workshop, the staff estimates that it will issue the final FPFI procedure and guidance 2 to 3 months after the workshop. In addition, as part of its overall efforts to improve the effectiveness of NRC reactor fire protection inspections, the staff will reassess the existing core fire protection inspection procedure (IP 64704, "Fire Protection Program") and develop recommendations regarding its future use or revision.

Current Status of FPFI Program Development

The Fire Protection Engineering Section of NRR will develop and implement the FPFI program. The staff is developing the FPFI procedure with technical assistance from Brookhaven National Laboratory and Scientech, Incorporated.

The staff has prepared a detailed outline of the FPFI program and procedures which have, in summary, the following major features:

- use of risk insights (PRA and IPEEE, when available)

- first week (core or basic inspection elements)

  - fire protection design and licensing bases
  - fire protection program
  - post-fire safe shutdown capability

- second week (in-depth inspection elements)

  - fire protection features, organization, controls, and practices
  - post-fire safe shutdown implementation
  - configuration control and management
  - event initiated fires
  - fire induced reactor transients
  - seismic fire interaction

- enforcement actions, as appropriate

- inspection follow up activities, as needed

Using this outline, the staff has prepared an initial draft of the FPFI procedure and guidance. NRR and the regions have selected four pilot plants (one per region) using criteria such as: the magnitude and character of licensee Thermo-Lag corrective action programs, whether licensees have been proactive in implementing their fire protection programs, reactor plant fire protection enforcement history, and the strength of licensee configuration management programs. The NRR staff is working with regional offices to schedule the four pilot FPFI inspections. As discussed below, the staff plans to begin the pilot inspections during the first quarter of calendar-year 1997.

Integration With Other NRC Programs

In SECY-96-134, "Options for Pursuing Regulatory Improvement in Fire Protection Regulations for Nuclear Power Plants," dated June 21, 1996, the staff asked the Commission to approve an option for improving the fire protection regulations. In a staff requirements memorandum of October 2, 1996, the Commission approved the staff recommendation to revise the current regulation. The Commission also stated that the staff should consider such issues as inspection and enforcement in a manner consistent with that stated in the Commission's preliminary views on Direction Setting Issue 12 regarding risk-informed, performance-based regulation. The staff will follow this direction. In addition, the staff will coordinate development of the FPFI program with the fire protection rulemaking effort. The staff will ensure that the FPFI procedure is appropriate for the current fire protection regulation and will update the procedure, as appropriate, when it revises the regulation.

Impact on Licensees

Licensee support for an FPFI will be equivalent to that needed for other comprehensive team inspections. During inspection preparation, the licensee site and engineering organizations will provide such information as results of licensee fire protection audits, reviews, and self-assessments; fire hazards analyses; post-fire safe shutdown analyses; design change control packages; procedures; and drawings. While the team is on-site, experienced and knowledgeable licensee personnel will be required to support the team's inspection activities. These personnel will coordinate answers to the inspectors' questions, and provide design drawings, plant procedures, and other documents as needed. The staff also expects that site engineering and licensing managers will participate in entrance and exit meetings.

NRC Staff Resource Implications

The staff will use headquarters and regional staff and technical assistance contractors to conduct the FPFIs. For planning purposes, the staff assumed that each FPFI will take up to 2,000 hours, about one full-time equivalent position. Additional staff time may be needed for inspection followup and enforcement activities depending on the inspection results. Resources are available to complete the pilot program described in this paper and to conduct up to four FPFIs per year as part of a permanent FPFI program. If, at some time, the staff determines that it should conduct more than four inspections per year, it will revisit the resource implications.

RECOMMENDATION:

The NRC staff will implement the FPFI pilot program described herein, unless directed otherwise by the Commission within 10 days from the date of this paper. (The staff needs to schedule the first pilot inspection shortly so that it can be conducted no later than the first quarter of calendar year 1997.) The staff estimates that it can complete the pilot program within a year without adversely affecting other high-priority fire protection work.

The staff will report to the Commission the results of the FPFI pilot program.

COORDINATION:

NRR is coordinating program development and inspection scheduling with the four regional offices and enforcement activities with OE.

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