

February 26, 2001

MEMORANDUM TO: Loren R. Plisco, Director
Division of Reactor Projects
Region II

FROM: Suzanne C. Black, Deputy Director */RA/*
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

SUBJECT: SUPPLEMENTAL NRR RESPONSE TO TASK INTERFACE
AGREEMENT (TIA) 2000-16, SHEARON HARRIS NUCLEAR POWER
PLANT, UNIT 1 - REVIEW OF FIRE TEST REPORTS PROVIDED BY
LICENSEE FOR RESOLUTION OF FIRE PROTECTION INSPECTION
FIRE BARRIER QUALIFICATION ISSUES (TAC NO. MB0056)

By memorandum dated September 25, 2000 (TIA 2000-16), you requested technical assistance from the Office of Nuclear Reactor Regulation (NRR) to review a September 15, 2000, letter from Carolina Power & Light Company (CP&L) related to the adequacy of the fire barriers separating Switchgear Room A, Cable Room A, and Cable Room B at the Harris plant. In its letter, CP&L addressed some of the conclusions NRR made in its August 1, 2000, response to TIA 99-028. Specifically, the licensee provided additional information that it believed may alter NRR's conclusions.

By memorandum dated October 24, 2000, NRR provided a response to TIA 2000-16. In that response, the staff concluded that the licensee's September 15, 2000, letter did not provide any additional technical information to change the conclusions NRR made in its August 1, 2000, response to TIA 99-028. However, the staff noted that it had not reviewed the fire test reports that the licensee referenced in its letter, and stated that it would provide an update to the TIA response after reviewing the reports.

The staff has completed its review of the fire test reports that CP&L referenced in its September 15, 2000, letter and submitted to the NRC on October 20, 2000. As discussed in the attached evaluation, the staff concluded that:

1. the 1-hour wall assembly satisfied the acceptance criteria specified in Supplement 1 to Generic Letter (GL) 86-10 for a wall assembly to achieve a 1-hour fire resistive rating to meet NRC fire protection requirements; and

L. Plisco

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2. the 3-hour wall and ceiling assemblies fire tests did not satisfy the acceptance criteria specified in Supplement 1 to GL 86-10 to achieve a 3-hour fire resistive rating, and therefore should not be used as the basis for determining the adequacy of the fire barriers for satisfying NRC fire protection requirements.

This completes NRR's effort on TIA 2000-16 and closes TAC No. MB0056.

Docket No. 50-400

Attachment: As stated

cc w/att: A. R. Blough, Region I
G. E. Grant, Region III
K. E. Brockman, Region IV

CONTACT: R. Laufer, DLPM/PDII
301-415-1373

- 2. the 3-hour wall and ceiling assemblies fire tests did not satisfy the acceptance criteria specified in Supplement 1 to GL 86-10 to achieve a 3-hour fire resistive rating, and therefore should not be used as the basis for determining the adequacy of the fire barriers for satisfying NRC fire protection requirements.

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OFFICIAL RECORD

SUPPLEMENTAL RESPONSE TO REGION II

TASK INTERFACE AGREEMENT (TIA) 2000-16

REVIEW OF LICENSEE'S OCTOBER 20, 2000, SUBMITTAL OF FIRE TEST REPORTS

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1 (SHNPP)

1.0 INTRODUCTION

By memorandum dated September 25, 2000 (TIA 2000-16) (ref. 4), Region II requested technical assistance from the Office of Nuclear Reactor Regulation (NRR) to review a September 15, 2000, letter (ref. 3) from Carolina Power & Light Company (CP&L) related to the adequacy of the fire barriers separating Switchgear Room A, Cable Room A, and Cable Room B at the Harris plant. In its letter, CP&L addressed some of the conclusions NRR made in its August 1, 2000, response (ref. 2) to TIA 99-028 (ref. 1). Specifically, the licensee provided additional information that it believed may alter NRR's conclusions.

By memorandum dated October 24, 2000 (ref. 6), NRR provided a response to TIA 2000-16. In that response, the staff concluded that the licensee's September 15, 2000, letter (ref. 3) did not provide any additional technical information to change the conclusions NRR made in its August 1, 2000, response (ref. 2) to TIA 99-028 (ref. 1). However, the staff noted that it had not reviewed the fire test reports that the licensee referenced in its letter, and stated that it would provide an update to the TIA response after reviewing the reports.

As discussed below, the staff has completed its review of the fire test reports that CP&L referenced in its September 15, 2000, letter (ref. 3) and submitted to the NRC on October 20, 2000 (ref. 5). This review did not alter the staff's previous conclusions made in response to TIA 99-028 (ref. 2) and TIA 2000-16 (ref. 6).

2.0 BACKGROUND

By letter dated October 20, 2000 (ref. 5), CP&L, the licensee for SHNPP, submitted three fire test reports for staff review. These fire test reports were used by the licensee to justify the Thermo-Lag 330-1 wall and ceiling assemblies installed in Switchgear Room B, Cable Spreading Room A and Cable Spreading Room B at SHNPP. The fire tests were conducted at Omega Point Laboratories (OPL) in Elmendorf, Texas between September 1994 and April 1995.

These fire barrier assemblies were the subject of two TIAs with Region II (TIA 99-028 (ref. 1) and TIA 2000-16 (ref. 4)) that resulted from a baseline fire protection inspection conducted at SHNPP during the week of November 1, 1999. NRR provided responses to these TIAs by memorandum dated August 1, 2000 (ref. 2) and October 24, 2000 (ref. 6). These responses concluded that the licensee had not clearly demonstrated that the as-installed Thermo-Lag fire barriers were adequate to withstand the fire hazards associated with the subject areas to protect important equipment from fire damage, and, therefore, that the licensee's technical evaluation was not adequate to conclude that the change from the current licensing basis (from

a 3-hour rating to a rating that is "adequate" for the hazard) would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire as required by the plant's fire protection license condition.

3.0 EVALUATION

The criteria specified in Supplement 1 to Generic Letter (GL) 86-10, "Fire Endurance Test Acceptance Criteria for Fire Barrier Systems Used to Separate Redundant Safe Shutdown Trains Within the Same Fire Area" dated March 25, 1994, was used to review and evaluate the adequacy of the fire endurance tests submitted by the licensee to satisfy existing NRC fire protection requirements. Supplement 1 to GL 86-10 allows licensees to propose alternative test methods and acceptance criteria to demonstrate an equivalent level of protection. Typically licensees submit their alternative methods and criteria to the staff prior to conducting the test(s). In this case, CP&L did not submit their test plan for the fire tests that are the subject of this review to the staff prior to the performance of the fire tests.

3.1 Test 1 - Fire Endurance Test to Qualify a Wall Design as a 60-Minute Fire Resistant Assembly (Project No. 14980-97261) dated November 7, 1994

This test assembly was constructed of two layers of 5/8-inch Thermo-Lag panels supported by 3"x3"x3/8" steel angle with a maximum spacing of approximately 26" on center (O.C.). A penetration for a 24"x24" steel duct was also included in this assembly. The steel supports were coated with trowel-grade Thermo-Lag and bolted to the Thermo-Lag panels with 1/4" diameter bolts spaced at 12" O.C. The non-symmetrical wall assembly was exposed on the structural steel side to the American Society for Testing and Materials (ASTM) E-119 standard time-temperature curve for a period of 1 hour at OPL. During the fire exposure, the average and maximum temperature increases recorded by thermocouples on the unexposed side of the barrier assembly were 102°F and 132°F respectively, which were well below the 250°F (maximum average temperature increase) and 325°F (maximum single point temperature increase) limits allowed by the ASTM standard and Supplement 1 to GL 86-10. Immediately following the fire exposure, the test assembly was subject to a hose stream test using an Underwriter's playpipe for 1 minute, which did not result in a projection of water on the unexposed side of the barrier.

Based on its review of the subject test report, the staff concludes that this assembly has satisfied the acceptance criteria specified in Supplement 1 to GL 86-10 for a wall assembly to achieve a 1-hour fire resistive rating to meet NRC fire protection requirements.

3.2 Test 2 - Fire Endurance Test to Qualify a Wall Design as a 180-Minute Fire Resistant Assembly (Project No. 14980-98207) dated May 23, 1995

This test assembly was constructed of two layers of 5/8-inch Thermo-Lag panels supported by 3"x3"x1/4" steel angle with a maximum spacing of approximately 31" O.C. Two penetrations for 24"x24" steel ducts were also included in the test assembly. The steel supports were coated with trowel-grade Thermo-Lag and bolted to the Thermo-Lag panels with 1/4" diameter bolts spaced at 12" O.C. The non-symmetrical wall assembly was exposed on the structural steel side to the ASTM E-119 standard time-temperature curve for a period of 3 hours at OPL. During the fire exposure, the maximum temperature increases recorded by thermocouples on the unexposed side of the barrier assembly exceeded the average temperature increase limit of 250°F at 108 minutes into the test, and the single point temperature increase limit of 325°F limit

at 123 minutes into the test. No hose stream test was performed on this assembly as specified in Supplement 1 to GL 86-10.

Based on its review of the subject test report, the staff concludes that: (1) the test assembly did not qualify as a 180-minute barrier as the temperature limit was exceeded at 108 minutes into the test; and (2) the fire testing criteria specified in Supplement 1 to GL 86-10 was not followed for this test assembly as no hose stream test was performed and no basis for this deviation was provided by the licensee. Therefore, this test should not be used as the basis for qualifying a fire barrier used to satisfy NRC fire protection requirements.

3.3 Test 3 - Fire Endurance Test to Qualify a CP&L Ceiling Design as a 180-Minute Fire Resistant Assembly (Project No. 14980-97668) dated May 18, 1995

This test assembly was constructed of field-fabricated ½-inch thick Thermo-Lag panels and Thermo-Lag trowel-grade material supported by an expanded metal lattice welded to 3"x3"x1/4" steel angle with a maximum spacing of approximately 30" O.C. The steel supports were coated with trowel-grade Thermo-Lag and bolted to the Thermo-Lag panels with 1/4" diameter bolts spaced at maximum of approximately 23" O.C. The ceiling assembly was exposed on the structural steel side to the ASTM E-119 standard time-temperature curve for a period of 3 hours at OPL. At approximately 2 hours into the fire test, a chain was installed on the assembly to counter excessive sagging along an unsupported edge. To the knowledge of the staff, the installation of this additional support is not representative of the as-installed configuration, and therefore, the test was not conducted in accordance with the criteria specified in Supplement 1 to GL 86-10. During the fire exposure, the average and maximum temperature increases recorded by thermocouples on the unexposed side of the barrier assembly were 157°F and 291°F respectively, which are well below the 250°F (maximum average temperature increase) and 325°F (maximum single point temperature increase). No hose stream test was performed on this assembly as specified in Supplement 1 to GL 86-10.

Based on its review of the subject test report, the staff concludes that the fire testing criteria specified in Supplement 1 to GL 86-10 was not followed for this test assembly because: (1) no hose stream test was performed; and (2) an additional support was added during the fire test. Since the licensee did not provide a basis for these deviations, this test should not be used as the basis for qualifying a fire barrier used to satisfy NRC fire protection requirements.

4.0 REFERENCES

1. Memorandum to J. Zwolinski from L. Plisco, dated November 23, 1999, "Task Interface Agreement (TIA 99-028) Resolution of Harris Pilot Fire Protection Inspection Fire Barrier Qualification Issues." (ADAMS Accession No. ML003671052)
2. Memorandum to L. Plisco from S. Black, dated August 1, 2000, "NRR Response to Task Interface Agreement (TIA) 99-028, Shearon Harris Nuclear Power Plant, Unit 1, - Resolution of Pilot Fire Protection Inspection Fire Barrier Qualification Issues (TAC NO. MA7235)." (ADAMS Accession No. ML003736721)
3. Letter to NRC from CP&L, dated September 15, 2000, "Response to Task Interface Agreement (TIA) 99-028 Resolution of Fire Protection Inspection Fire Barrier Qualification Issues (TAC No. MA7235)." HNP-00-141 (ADAMS Accession No. ML003753144)

4. Memorandum to J. Zwolinski from L. Plisco, dated September 25, 2000, "Task Interface Agreement (TIA 2000-16) Shearon Harris Nuclear Power Plant, Unit 1 - Review of Additional Information provided by Licensee for Resolution of Fire Protection Inspection Fire Barrier Qualification Issues." (ADAMS Accession No. ML003754169)
5. Letter to NRC from CP&L, dated October 20, 2000, "Response to Task Interface Agreement (TIA) 99-028 Resolution of Fire Protection Inspection Fire Barrier Qualification Issues." HNP-00-0153 (ADAMS Accession No. ML003764336)
6. Memorandum to L. Plisco from S. Black, dated October 24, 2000, "NRR Response to Task Interface Agreement (TIA) 2000-16, Shearon Harris Nuclear Power Plant, Unit 1 - Review of Additional Information provided by Licensee for Resolution of Fire Protection Inspection Fire Barrier Qualification Issues (TAC NO. MB0056)." (ADAMS Accession No. ML003763138)

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