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April 17, 2001

50-400

Mr. Richard J. Laufer
NRR Lead Project Manager, Hemyc
U. S. Nuclear Regulatory Commission
NRR Mail Stop 08-G-09
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Rockville, MD 20852

Re: Shearon Harris Nuclear Power Plant Unit No. 1 – Docket No. 50-400: Licensing Basis of Promatec Hemyc Fire Barrier Systems

Dear Mr. Laufer:

The purpose of this letter is to describe the licensing basis for the use of Hemyc Fire Barrier Systems at the Shearon Harris Nuclear Plant Unit No. 1 ("Harris"). We have prepared this letter at the request of Carolina Power & Light Company ("CP&L") to respond to your letter dated March 19, 2001, to Mr. James Scarola, Vice President, Harris Plant, and to the August 1, 2000, Response to Task Interface Agreement (TIA) 99-028, referenced in your letter. As licensing counsel for CP&L during the operating license proceedings for Harris, we litigated the adequacy of the fire protection program at Harris – and specifically fire barriers -- before an Atomic Safety and Licensing Board. Consequently, the licensing basis for fire barriers at Harris is quite clear, as we believe it is for contemporaneous plants as well. We submit that the licensing basis has been ignored in the conclusions reached by NRR regarding the use of Hemyc Fire Barrier Systems at Harris.

Background

On August 1, 2000, NRR issued a Response to Task Interface Agreement (TIA) 99-028, which in part addresses the "adequacy of Hemyc 1-hour and Promatec "MT" 3-hour fire barrier systems." NRR evaluated the 1982 qualification testing for the Hemyc fire barrier systems, which was conducted pursuant to ANI/MAERP "Standard Fire Endurance Test Method to Qualify a Protective Envelope for Class 1E Electrical Circuits," and found it wanting as compared to the NRR's favored ASTM E 119 testing standards and criteria. Thus, NRR Staff concluded that the information in the 1982 test reports "is

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insufficient to qualify the Hemyc fire barrier system as a 1-hour-rated [Electrical Raceway Fire Barrier System]" and "insufficient to qualify "MT" fire barrier systems as 3-hour-rated conduit fire barrier systems."

NRR further stated that it was evaluating the potential generic implications of the Hemyc issue and thus "no action is required from the licensee at this time, based on this evaluation."

In a letter dated March 19, 2001, to Mr. James Scarola, Vice President, Harris Plant, you referred to the NRR Response to TIA 99-028 and stated that the NRR staff concluded that the fire rating of the installed fire wrap at Harris was "indeterminate." You also incorrectly suggested that Harris is licensed to 10 CFR Part 50, Appendix R, safe shutdown separation requirements. Finally, you have proposed that NRR meet with "affected licensees" – as listed in your letter -- as a group to discuss an approach for resolving the issue.

First, Harris is not licensed to Appendix R. Second, the Hemyc fire barrier systems were qualified to testing requirements specifically endorsed by the NRC Atomic Safety and Licensing Board and explicitly made part of the licensing basis of Harris. The fire rating of the installed fire wrap at Harris is demonstrated by the qualifications testing, as approved by the NRC at the time for a number of nuclear plants, and is not indeterminate simply because it does not meet the testing requirements favored by the NRC today. Third, before attempting to require the "affected licensees" to discuss an approach for resolving the issue, NRR must complete the analysis and justification as set forth in 10 C.F.R. § 50.109.

Qualification Testing of Hemyc

Hemyc was qualified for use as a fire barrier wrap system by testing. The tests are described in a letter dated July 27, 1993 from R. J. Block, President, PROMATEC to the NRC responding to NRC questions ("July 1993 PROMATEC letter"). The test used to qualify Hemyc as a fire wrap was the "ANI/MAERP Standard Fire Endurance Test Method to Qualify a Protective Envelope for Class IE Electrical Circuits," July 1979 ("ANI Test"). The test fire followed the standard time-temperature curve specified in American Society of Testing and Materials (ASTM) Standard E-119, "Standard Methods of Fire Tests of Building Construction and Materials." The cables are then subjected to a hose stream test. The fire barrier system is evaluated by monitoring the capability of the

cables inside the fire barrier to pass a low voltage circuit integrity test. During the fire and hose stream tests, if cable circuit integrity is maintained, the tests are considered successful.

The qualification testing of Hemyc was approved by the NRC at a number of plants prior to the licensing of Harris, including Waterford Unit No. 3[1] and Catawba Units 1 and 2.[2]

Harris Operating Licensing Proceeding and the Licensing Basis of the Fire Protection Barriers at Harris

The issue of fire barrier qualification testing was litigated at the Harris Operating License proceeding. Specifically, the admitted contention read in part: "In establishing fire resistance ratings of fire barriers with respect to fire in cable trays, Applicants have not established that qualification tests represent actual plant conditions or comparable conditions." At a hearing before the Atomic Safety and Licensing Board, the qualification testing for the fire barrier materials was described by Applicants' witness, an Ebasco fire protection engineer, Margareta Serbanescu. The actual materials had not yet been selected for wraps for cable trays and conduits at the time of the 1984 testimony. However, Ms. Serbanescu described the test methodology of the ANI Test. The NRC Staff presented the testimony of Randall Eberly and Robert Ferguson. The NRC Staff referred to the ASTM E-119 test. In addition, the Staff witnesses noted that "if a

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[1] The Waterford SER, Supplement 5, was issued in June 1983 and found the Waterford fire protection system acceptable and in compliance with regulatory requirements. Prior to issuance of Supplement 5 to the Waterford SER, Louisiana Power & light ("LP&L") provided detailed justification of the qualification tests for the Hemyc fire wrap. Letters from L. V. Martin, LP&L, to T. M. Novak, NRC, dated February 14, 1983 and March 15, 1983.

[2] A June 1, 1984 NRC Inspection Report for Catawba indicates that "[t]he inspectors obtained copies of the test reports for both the cable wrap and penetration seal designs to permit a review and evaluation by members of the NRC Region II staff. In an April 30, 1984 telephone conversation with NRR/CMEB reviewers, the Region II inspectors were informed that these tests reports had been reviewed and found to be acceptable." Inspection Reports Nos. 50-413/84-46 and 50-414/84-22, at 13.

product is selected that has been previously reviewed by the Staff and found acceptable, no further documentation is usually required."[3]

In disposing of the fire protection contention in CP&L's favor, the Licensing Board referred both to the ASTM E-119 test and the ANI Test in noting that the fire barriers will be rated based on "standard fire tests." The Licensing Board found that the fire barrier would be tested under the "standard time-temperature conditions" by an independent laboratory. The Licensing Board found that "the qualification methods to be used by the Applicants represent equivalent or more rigorous tests of cable tray fire barriers than would be experienced under actual plant conditions."[4] On appeal, this finding of the Licensing Board was affirmed by the Atomic Safety and Licensing Appeal Board.[5]

The NRC Staff stated its final acceptance of the Harris fire protection program in its Safety Evaluation Report, Supplement No. 4, dated October 1986.

Subsequent Regulatory History

In GL 86-10, the NRC Staff discussed *inter alia* the fire test acceptance criteria for establishing the fire rating of a fire barrier. With respect to the cold-side temperature criterion used to establish that cables enclosed within a fire barrier will be free of fire damage, the NRC Staff stated:

> Conduit and cable tray enclosure materials accepted by the NRC as 1 hour barriers prior to Appendix R (e.g., some Kaowool and 3M materials) and already installed by the licensee need not be replaced even though they may not have met the 325°F criteria [cold–side temperature criterion].

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[3] The Staff required no further documentation of CP&L with respect to Hemyc reflecting that the Staff had previously reviewed and found Hemyc acceptable. See notes 1 and 2 supra.

[4] LBP-85-49, 22 N.R.C. 899, 1985 LEXIS 10, *40.

[5] ALAB-843, 24 N.R.C. 200, 1986 LEXIS 65, *16.

The guidance in GL 86-10 is silent on fire test acceptance criteria other than cold-side temperature.

On September 1984, Iowa Electric Light & Power ("Iowa") requested exemptions from certain requirements of Appendix R for its Duane Arnold Plant. Supplemental information was provided to the NRC by letters from Iowa dated October 31, 1984, October 21, 1986, and April 3, 1987. The requested exemptions were approved by the NRC on October 20, 1987.[6] The NRC Staff's Safety Evaluation was based in part on a Technical Evaluation Report prepared by the Franklin Research Center. Pertinent to this discussion, Iowa sought to avoid automatic suppression in certain fire areas by the use of 3-hour rated Hemyc fire wrap on conduit. The NRC Staff found:

> The "Hemyc" material has been tested and approved for a fire resistance rating of 1 hour based on a given thickness of the wrap. The "Hemyc" material is installed on the flexible conduits in excess of the 1-hour rating. The thickness installed was analyzed by the manufacturer as equivalent to a 3-hour barrier but no testing was performed.[7]

The NRC Staff found that Iowa had demonstrated the exemption from full zone detection and automatic suppression to be justified in light of the approved 3-hour Hemyc barrier.

GL 92-08 identified concerns with the use of Thermo-Lag 330-1 fire barrier. Licensees were required to take specific actions with respect to Thermo-Lag barrier systems at their plants. With respect to other fire barrier materials, the NRC Staff stated:

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[6] 52 Fed. Reg. 38978 (October 20, 1987).

[7] The quoted language in the NRC's Safety Evaluation is word-for-word from the Franklin Research Center Technical Report.

> This Generic Letter does not request actions for barrier materials and systems other than the Thermo-Lag 330-1 barrier system. However, the staff expects that the recipients of this Generic Letter will review the information to determine if it applies to other barrier materials and systems used at their facilities and consider actions, as appropriate, to avoid similar problems.

An NEI Fire Barrier Review Ad Hoc Advisory Committee was convened to address the adequacy of fire barrier enclosure materials other than Thermo-Lag in August 1993. In May 1994, results of the additional testing and analysis was documented in an NEI Report.[8] Hemyc is the first material discussed. Specifically, the material is described as not affected physically (i.e. material properties remain unchanged) when subjected to E-119 time temperature test conditions, nor is it consumed. Joint failures observed in Thermo-Lag applications do not apply to PROMATEC materials because of their greater flexibility and differences in the design envelopes. Thus, the generic review undertaken by the Ad Hoc Advisory Committee would appear responsive to the directive in GL 92-08. No similar problems were identified with Hemyc that had caused failures with Thermo-Lag.

Furthermore the NRC specifically requested information from PROMATEC regarding its fire barrier systems, by letter dated May 12, 1993. The detailed response in the July 1993 PROMATEC Letter included copies of qualification test reports and installation procedures. The NRC Staff did not raise any concerns or issues as a result of its review of the materials provided by PROMATEC. This can be contrasted with the NRC Staff's response to its review of fire testing results for another material, Kaowool. In 1993, the NRC Staff issued two

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[8] "Documentation of the Adequacy of Fire Barrier Materials in Raceway Applications Vis-à-vis Failure Characteristics Inherent to the Thermo-Lag 330-1."

information notices regarding potential problems with the methods and results of fire tests of Kaowool fire barriers.[9]

GL 86-10, Supplement 1, issued March 25, 1994, provides guidance to be used by the NRC Staff "to review and evaluate the adequacy of fire endurance tests and fire barrier systems proposed by licensees or applicants in the future to satisfy existing NRC fire protection rules and regulations." (Emphasis added.) GL 86-10, Supplement 1, states its preference for the ASTM E-119 test over the ANI Test due to two additional test criteria, including the cold-side temperature criterion.

However, GL 86-10, Supplement 1, (written by the present Region II Administrator, Luis Reyes) notes consistently that the guidance is to be applied to future evaluations. No action is requested by existing licensees. In the "Backfit Discussion," the GL makes clear that no "generic or plant-specific backfitting is intended or approved at this time in connection with issuance of this review guidance." Further, "if plant-specific backfits are proposed by the NRC staff consistent with this review guidance, the proposed backfits would be justified on a case-by-case basis in accordance with the criteria of 10 CFR § 50.109 and existing NRC backfit procedures." The NRC Staff has stated to the Commissioners that GL 86-10 effectively "grandfathered" fire wrap materials previously approved by the NRC Staff based on earlier testing.[10]

Conclusions Regarding Harris Licensing Basis For Hemyc Fire Barrier Material

As a result of our review of the Harris specific licensing basis and the NRC's approval of the use of Hemyc Fire Barrier Material, we can summarize our conclusions as follows:

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[9] IN 93-40, "Fire Endurance Test Results for Thermal Ceramics FP-60 Fire Barrier Material," (May 26, 1993); IN 93-41, "One-Hour Fire Endurance Test Results for Thermal Ceramics Kaowool, 3M Company FS-195 and 3M Company Interam E-50 Fire Barrier Systems, (May 28, 1993).

[10] See Memorandum from W. D Travers, EDO, to NRC Commissioners dated August 4, 1999 (SECY-99-204) at 2.

- The Harris fire protection program is described in the FSAR and approved by the NRC Staff in the Harris SER without any commitment to testing fire barrier materials to ASTM E-119.

- The very issue of the adequacy of qualification testing for fire barriers for cable trays was litigated before the Atomic Safety and Licensing Board. The Licensing Board found that the testing program, and specifically the ANI Test, was acceptable. This finding was approved by the Atomic Safety Licensing Appeal Board and is binding on the NRC Staff.

- Hemyc has been repeatedly approved by the NRC Staff as an acceptable one-hour rated fire barrier, both before Harris was licensed and after; the approval has been based on a review of qualification tests – including review by an outside, independent consultant.

- Indeed, Hemyc has been recognized as an approved one-hour rated fire barrier as recently as October 1999, when the NRC Staff approved an exemption request for Arkansas Nuclear One, Unit 2.[11]

- CP&L complied with the "expectation" in GL 92-08 that licensees review the information regarding Thermo-Lag to determine if it applied to other barrier materials; the NEI Ad Hoc Task Group Report found that Hemyc did not have the same material properties or structural design properties that had resulted in failures in Thermo-Lag.

- The NRC Staff did not identify technical issues with the test reports submitted to the NRC in 1993 by PROMATEC, as the NRC Staff apparently had with Kaowool.

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[11] See 64 Fed. Reg. 54651, 54652 (October 7, 1999).

- Any attempt to find a fire protection material indeterminate at Harris because there is no evidence that it could pass the "cold side temperature criterion" would be a clear backfit, as acknowledged in GL 86-10, Supplement 1, and would require the analysis and justification as set forth in 10 C.F.R. § 50.109.

I would be pleased to meet with you and with representatives from the NRC's Office of General Counsel to discuss these conclusions. We submit that these issues should be addressed before any meeting to discuss an approach for "resolving" the issues identified in the Response to TIA-99-028.

Sincerely,

John H. O'Neill, Jr.

cc: Joseph B. Brady, NRC Resident Inspector/Harris Plant
Brian R. Bonser, NRC Region II
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