

July 23, 2008

Mr. David Lochbaum
Union of Concerned Scientists
1707 H Street NW, Suite 600
Washington, D.C. 20006-3919

Dear Mr. Lochbaum:

On behalf of the U.S. Nuclear Regulatory Commission (NRC), I am responding to your letter to the Commission dated February 1, 2008, on the matter of the NRC Inspector General report on "NRC's Oversight of Hemyc Fire Barriers," dated January 18, 2008. The staff has carefully evaluated the findings of the Special Inquiry Report and concluded that while the Hemyc issue was not resolved immediately after the 1993 study, the NRC took appropriate actions commensurate with the significance of the safety concern represented by the reduced Hemyc fire barrier resistance.

In the wake of the Thermo-Lag fire barrier developments, the NRC examined licensees' use of other fire barrier materials. The staff performed a survey of fire barrier materials and systems that licensees used to meet NRC fire protection requirements and guidelines and identified a number of fire barrier systems including Promatec Hemyc. In 1993, the staff contacted the vendors of these fire barrier systems to obtain technical information concerning their systems, such as fire endurance characteristics, ampacity derating characteristics, and the technical bases for meeting NRC technical requirements. The staff's examination of this information led to the issuance of a number of Information Notices (INs) concerning the adequacy of particular non-Thermo-Lag fire barriers. At that time, the staff did not issue an IN addressing the adequacy of the Hemyc fire barrier system.

In March 1993, then Chairman Selin testified before a Congressional committee regarding Thermo-Lag and other fire barrier issues. The NRC completed the actions committed to by the Chairman and assessed fire barrier capabilities. Later in 1993, the NRC obtained and reviewed design and test information from all fire barrier vendors. The NRC also observed installed fire barrier configurations at selected nuclear plants. Finally, the NRC continued to develop updated guidance on fire barrier testing and acceptance criteria.

Also in 1993, the NRC staff worked with the National Institute of Standards and Technology to conduct a series of small scale fire tests of fire barrier materials. One of these tests, FR 3994, "Pilot-Scale Fire-Endurance Tests of Fire-Barrier Mats, Blankets, and Panels," included Hemyc. These pilot-scale tests were carried out to obtain fire endurance information and did not identify the Thermo-Lag failure mode (i.e., burnthrough and other physical failures) in Hemyc, and did not detect the later identified Hemyc shrinkage failure mode. Additionally, the pilot-scale test setup did not replicate the actual full-scale physical configuration of Hemyc installations. The test results were for screening purposes only. The significance of the results is discussed in the test report [source: "Report of Test FR 3994 on Pilot-Scale Fire-Endurance Tests of Fire-Barrier Mats, Blankets, and Panels," March 31, 1994; ADAMS Accession No. ML061140427; pp.8-9 (emphasis in original)]:

Significance of Pilot-Scale Fire-Endurance Test Results

It is important to note that pilot-scale fire-endurance tests on “planar” assemblies (e.g., walls, floor/ceilings), including those reported herein, generally produce longer fire-endurance periods than tests conducted on full-scale assemblies in a full-scale furnace. This is a consequence of factors such as large-scale mechanical moments, joints, expansion, and other three-dimensional effects not being duplicated in pilot-scale tests. Also, edge heat losses are a factor in pilot-scale fire-endurance tests that may affect the fire endurance period. For these reasons, pilot-scale fire-endurance testing is limited to assessing the thermal-transmission characteristics of fire-barrier materials, often under non-conservative edge-loss conditions.

Furthermore, since the tests in the current series were conducted on planar units (i.e., as “ceilings” forming the top of the furnace), exposed to the furnace on only one surface, the results cannot be used to assess the performance of a cable-tray fire-barrier enclosure exposed to the furnace on four sides, which is a more severe exposure.

Consequently, owing to the inability to reproduce full-scale three-dimensional effects in the current test series and the use of a one-sided exposure, the reader is cautioned against using the test results to assess the potential fire performance of full-scale cable-tray and electrical raceway fire barriers. Indeed, the test results are intended for NRC screening purposes only.

In March 1994, the NRC issued Generic Letter (GL) 1986-10, Supplement 1, “Fire Endurance Test Acceptance Criteria for Fire Barrier Systems Used to Separate Redundant Safe Shutdown Trains Within the Same Fire Area” (see ADAMS Accession No. ML031130661). This document refined and clarified the NRC’s fire endurance test acceptance criteria for fire barriers. In 1999, during the pilot fire protection inspections at Shearon Harris, inspectors discovered that the fire endurance tests the licensee used to qualify their Hemyc installations might not satisfy the GL. The NRC evaluation of this issue resulted in Task Interface Agreement (TIA) 99-028 (see ADAMS Accession No. ML003736721). As a result of TIA 99-028, the NRC determined that the fire resistance of the Hemyc fire barriers was indeterminate. The NRC publicized these conclusions, and started discussions with the industry for an industry-led resolution of this issue, which the industry declined.

The NRC initiated confirmatory fire tests in 2001. This test program was based on the NRC guidance in GL 86-10, Supplement 1 and concluded in 2005. The test results indicated that Hemyc did not achieve an appropriate fire endurance rating for the configurations tested. Immediately following the completion of the test program, the NRC issued IN 2005-07, “Results of Hemyc Electrical Raceway Fire Barrier System Full Scale Fire Testing,” (see ADAMS Accession No. ML050890089) which described the results of the NRC-sponsored confirmatory testing of Hemyc.

In 2006, the NRC issued GL 2006-03, "Potentially Nonconforming Hemyc and MT Fire Barrier Configurations," (see ADAMS Accession No. ML053620142) to aid in achieving final resolution of Hemyc issues. In GL 2006-03, the NRC required licensees to: (1) report the extent of their Hemyc installation; (2) report on any compensatory measures in effect; (3) describe corrective actions and their implementation schedules; and (4) describe how other fire barriers materials are capable of providing the appropriate fire resistance rating. To date, the compensatory measures and corrective actions have been inspected at a number of units through the routine fire protection inspection program.

In summary, the NRC has taken appropriate actions to address the Hemyc issue and continues to ensure that all operating reactors are safe. If you need additional information in this matter, please do not hesitate to call me.

Sincerely,

/RA/

R. W. Borchardt
Executive Director
for Operations

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