

January 25, 2005

Mr. Frederick A. Emerson
Senior Project Manager
Engineering Department
Nuclear Generation Division
Nuclear Energy Institute
1776 I Street, NW, Suite 400
Washington, DC 20006-3708

SUBJECT: NRC'S PLAN FOR TESTING HEMYC ELECTRICAL RACEWAY FIRE BARRIER MATERIAL

Dear Mr. Emerson:

I am responding to your letter dated December 21, 2004, to Mr. Sunil Weerakkody, concerning the NRC's plan for testing the Hemyc electrical raceway fire barrier material. As you may know, in 2003, the responsibility for this testing was transferred from the Office of Nuclear Reactor Regulations (NRR) to the Office of Nuclear Regulatory Research (RES). Consequently, any questions regarding the conduct of this testing should now be addressed directly to RES.

In your letter, you requested the opportunity to review and comment on the detailed construction drawings of each test specimen. It is important to note that the objective of RES' tests is to provide sufficient information to NRR so that a reasonable determination can be made as to whether the Hemyc fire barrier material meets regulatory requirements. The objective of our testing is not to provide a technical basis for the qualification of Hemyc fire barrier material for different plant-specific applications. With this in mind, the extent of the documentation to date is our Hemyc fire barrier test plan, which can be found in the NRC's Agency-wide Documents Access and Management System (ML043210141). We plan to document test configurations in more detail in a report that will be provided to NRR after the completion of the tests. In conducting these tests, we will consider the information provided by the industry on plant installed configurations, and will provide oversight of the fire barrier testing. This testing will be conducted under the quality controls of testing facility and the national laboratory under RES contract. Furthermore, we have contracted the vendor of the Hemyc fire barrier material to manufacture and install the test material.

You also provided eight specific comments on the RES fire barrier test plan. Subsequent to the receipt of your letter, Mark Salley and Roy Woods of my staff contacted you for additional clarifications. We appreciate your interest and constructive comments on our test plan. Our responses to your eight comments are included as an attachment to this letter.

In your letter, you indicated a concern that we were not allowing the members of the industry to observe the actual fire testing. We do not preferentially allow any one industry or public group to observe research tests and experiments. However, in those cases in which we can gain efficiencies by leveraging resources, RES may enter an agreement through a memorandum of understanding to conduct collaborative research. In this case, members of the industry had not

previously expressed interest in conducting this testing. Furthermore, given that we have assumed the entire cost of the project to date and are nearing the actual conduct of the testing, such an agreement at this point of the project would not be justified. While we are not allowing members of the industry to observe this testing, we have made arrangements to ensure that the quality and conduct of the testing are well controlled and documented. RES will provide pertinent data to NRR after the testing is completed and the data are evaluated. This information will be made publically available.

Thank you for your comments and interest in this project. If you have any questions regarding this letter, please contact Mark Salley at 301-415-2840 or via e-mail mxs3@nrc.gov.

Sincerely,

/RA/

David C. Lew, Chief
Probabilistic Risk Analysis Branch
Division of Risk Analysis & Applications
Office of Nuclear Regulatory Research

Attachment: As stated

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RESPONSE TO NUCLEAR ENERGY INSTITUTE (NEI) COMMENTS ON NRC TESTING PLAN FOR THE HEMYC FIRE BARRIER MATERIAL

The following provides the NRC staff's response to the NEI comments described in the Enclosure of NEI letter dated December 21, 2004. We have formatted this response with each NEI comment in italicized text and our response directly below each comment. We have also numbered each comment for clarity.

NEI Comment 1

The NRC does not plan to test a 24" wide cable tray even though this size is the predominant one used in industry. If the 12" tray fails and the 36" tray passes, it would be difficult to apply the results to 24" tray. The failure to test the 24" tray is a serious flaw in the test plan and should be addressed.

NRC Response

The purpose of the test is to confirm the adequacy of the fire barrier and is limited to three tests. One test is dedicated to cable trays. The space on the test deck is fully utilized with the 4 cable trays (36" tray with and without 2" airgap and 12" tray with and without 2" airgap), junction box and 2 airdrops. We are not attempting to test all possible sizes and configurations. Rather, we will test appropriate bounding limits of parameters.

NEI Comment 2

The listing of materials shows the use of Klevers 600/6 fiberglass mat as being optional. If it is not tested, NRC should state the criteria for accepting its use on the unexposed side.

NRC Response

Prometec, the material's manufacturer, is formally contracted to perform the material's installation for these tests. The test assemblies will be consistent with their published installation manual. It is RES's understanding that the predominant practice in industry was to use siltemp for both internal and external covers. This is how the barriers will be tested.

NEI Comment 3

Banding materials have not been identified in the Hemyc List of Materials but do appear on the MT Wrap List of Materials. Please address the use of banding materials in the Hemyc test plan as well.

NRC Response

It is RES's understanding that the predominant practice in the industry was to use stainless steel banding on cable trays, conduits and junction boxes to attach the fire barrier material. This is how the barriers will be tested.

NEI Comment 4

The sizes of the Unistrut support members to be tested are not detailed. Prior industry comments identified the use of 1-5/8" x 1-5/8" P-1000 Unistrut, 2" x 2" x 1/4" steel angle iron, 4" x 4" x 3/8" angle iron, and 4" x 6" x 3/8" angle iron. The test plan should provide additional information about the sizes of the Unistrut support members to be tested.

NRC Response

Unistrut has been ordered for the tests in the 1-5/8" x 1-5/8" size with 1/8" thick walls because it was commercially available. Note that it's used only to support the junction box. We're separately testing the effects of supports to conduct heat into the protected envelop. We will test 1-5/8" unistrut and 2" x 2" steel to investigate the conduction of heat into the protected envelope.

NEI Comment 5

The NRC should justify the provision of raceway fill using bare conductors. The use of insulated cable for raceway fill is far more consistent with actual field configurations.

NRC Response

We plan to use bare conductors for raceway fill as a means of adding mass to the conduits. Use of bare wire should produce a more robust result, as it will quickly absorb heat due to its uniform high conductivity (insulated cable would absorb heat more slowly due to lower thermal conductivity of the insulation, and might introduce more variability due to a somewhat greater tendency to be influenced by exact placement of the fill, etc.). Experience with other Electrical Raceway Fire Barrier Systems (ERFBS) indicate that raceways with greater mass have greater fire resistance.

NEI Comment 6

The test plan shows a metal deck with the tested items penetrating the metal deck. Industry representatives are more familiar with using a concrete slab on the test furnace. The use of a metal deck precludes testing of the concrete/wrap interface, and thus a key piece of qualification information would be missing.

NRC Response

Note that the majority of Thermo-Lag testing was performed using a steel deck. We are not testing the deck, nor its interface with the test assembly. Also, we are not trying to qualify all possible configurations with this series of tests, and thus do not intend to test/qualify the various designs of the interface. In the event the interface portion of the test were to fail, all useful data for the test assembly itself would be lost. Most importantly, it should be noted that we are doing representative testing, not plant-specific detailed design qualification.

NEI Comment 7

The size of the junction box to be tested has increased from 12" x 24" x 10" to 18" x 24" x 10". Since this is the only box size tested, the bounding of smaller boxes using the principles of larger mass and larger surface area would not appear to be possible. The industry provided the NRC with a range of box sizes, and a smaller box size should be used to bound as many installations as possible.

NRC Response

Our intent is simply to test a junction box of a reasonable size, and to observe items such as whether or not the fire barrier fails where it is folded over the corners, etc. We will look into substituting a more standard size assuming it's commercially available and will not delay the tests. Keep in mind we are not trying to qualify all designs and sizes etc., as previously discussed. Also, we believe it will be possible to reasonably infer the performance of other sizes based upon the size box that will be used in the test.

NEI Comment 8

NRC should provide in advance of the testing the evaluation criteria for the configurations not tested. These criteria should include guidelines for bounding qualifications, thermal mass issues, grouped cable trays, and conduits within the same wrap enclosure, varying box sizes, varying support member sizes, etc. The "separate more complete report" that will be issued six months after the completion of the testing should also include this information. Without this information it will be difficult to close issues related to Hemyc and MT materials.

NRC Response

We do not intend to address all Hemyc and M.T. issues with these limited number of tests. Instead, we intend to determine if the materials are capable of protecting raceways as detailed in a few typical vendor approved configurations.