Station Support Department

PECO ENERGY

10 CFR 50.54(f)

PECO Energy Company
Nuclear Group Headquarters
965 Chesterbrook Boulevard
Wayne, PA 19087-5691

February 4, 1994

Docket Nos. 50-277
50-278
50-352
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License Nos. DPR-44
DPR-56
NPF-39
NPF-85

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Subject: Peach Bottom Atomic Power Station, Units 2 and 3
Limerick Generating Station, Units 1 and 2,
Request for Additional Information Regarding
Generic Letter 92-08, "Thermo-Lag 330-1 Fire
Barriers,"

References: 1) Letter from G. A. Hunger, Jr. to USNRC
Document Control Desk dated April 16, 1993

2) Letter from G. A. Hunger, Jr. to USNRC
Document Control Desk dated December 29, 1993

Dear Sirs:

The subject request for additional information (RAI) regarding Generic Letter (GL) 92-08, "Thermo-Lag 330-1 Fire Barriers", dated December 22, 1993, requested Philadelphia Electric Company, now known as PECO Energy Company or PECO, to respond within 45 days with additional information regarding Thermo-Lag 330-1 fire barrier systems. PECO had previously responded on April 16, 1993 (reference letter 1) and December 29, 1993 (reference letter 2) to this GL. Attachment I to this letter includes our response to the RAI. This response is being submitted under oath or affirmation as requested in the RAI.

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If you have any questions please feel free to contact us.

Very truly yours,

G. A. Hunger, Jr.

G. A. Hunger, Jr., Director
Licensing Section

cc: T. T. Martin, Administrator, Region I, USNRC
W. L. Schmidt, USNRC Senior Resident Inspector, PBAPS
N. S. Perry, USNRC Senior Resident Inspector, LGS

COMMONWEALTH OF PENNSYLVANIA :

: ss.

COUNTY OF CHESTER :

D. M. Smith, being first duly sworn, deposes and says:

That he is Senior Vice President of PECO Energy Company; the Applicant herein; that he has read the attached response to the Request for Additional Information regarding Generic Letter 92-08 for Peach Bottom Facility Operating Licenses DPR-44 and DPR-56, and Limerick Facility Operating Licenses NPF-39 and NPF-85, and knows the contents thereof; and that the statements and matters set forth therein are true and correct to the best of his knowledge, information and belief.

D M Smith

Senior Vice President

Subscribed and sworn to before me this 24th day of February 1994.

Notary Public

Notarial Seal
Erica A. Santori, Notary Public
Tredyffrin Twp., Chester County
My Commission Expires July 10, 1995

Introduction

The request for additional information (RAI) regarding Generic Letter (GL) 92-08, "Thermo-Lag 330-1 Fire Barriers," dated December 22, 1993, requested that PECO respond within 45 days with additional information regarding Thermo-Lag 330-1 fire barrier systems. Each of the requested items is restated below along with our response.

PECO's fire protection programs at PBAPS and LGS are designed to prevent fires from starting, to detect rapidly, to control and to extinguish promptly those fires that do occur, and to provide protection for structures, systems, and components important to safety so that a fire that is not promptly extinguished by fire suppression activities will not prevent the safe shutdown of the plant. Thermo-Lag 330-1 fire barrier systems have been used at both PBAPS and LGS to protect electrical power and control cables for systems and components used for achieving and maintaining safe shutdown conditions.

NRC Bulletin 92-01 and its Supplement identified deficiencies in the performance of Thermo-Lag 330-1 fire barriers. Subsequently, PECO declared Thermo-Lag fire barriers at PBAPS and LGS to be inoperable and established compensatory actions. These compensatory actions will remain in effect until the Thermo-Lag deficiencies are resolved.

These fire barriers were installed to provide either 1 hour of protection in areas that have fire detection and suppression systems or 3 hours of protection in areas without suppression systems. Tests conducted to date by the Nuclear Management and Resource Council (NUMARC) have shown that Thermo-Lag 330-1 fire barrier performance is highly dependent on configuration and construction parameters and that some configurations do not provide protection for a full hour or a full 3 hours. NUMARC Phase II testing is currently scheduled to be completed by March, 1994 and the NUMARC Application Guide is scheduled for issuance in April 1994. We have requested that specific representative configurations be tested by NUMARC; however, further analysis is required before we can determine if the NUMARC test results are applicable to our configurations. Many of PECO's encapsulated raceways are comparable in size and type to the NUMARC test program; however, some of the configurations and construction parameters differ from the test program.

Because of the large extent of Thermo-Lag used at PECO (over 4,400 feet of protected cable at each station) an integrated analysis program was initiated in 1993 to reevaluate the extent of required protection. Conservative, bounding approaches have previously been employed in the application of this product. The integrated analysis program includes the following three elements. 1) a deterministic safe shutdown analysis will be performed to identify additional plant systems which can be relied upon to perform safe shutdown functions. This will allow us to identify the minimum set of cables requiring protection. 2) For those cables requiring protection, alternative means of compliance will be considered. 3) For those areas where cable protection is determined to be the most appropriate means of achieving compliance, each cable will be reviewed to determine the most cost effective means of providing protection. These means will be studied and dispositioned in priority order as determined by the Individual Plant Examination for External Events (IPEEE), Internal Fire Analysis utilizing the EPRI Fire Induced Vulnerability Evaluation (FIVE) methodology.

Itemized Response to Request for Additional Information

I. Thermo-Lag Fire Barrier Configurations and Amounts

B. Required Information

1. Describe the Thermo-Lag 330-1 barriers installed in the plant to:

   a. meet 10 CFR 50.48 or Appendix R to 10 CFR Part 50,
   b. support an exemption from Appendix R,
   c. achieve physical independence of electrical systems,
   d. meet a condition of the plant operating license,
   e. satisfy licensing commitments.

   The description should include the following information: the intended purpose and fire rating of the barrier (for example, 3-hour fire barrier, 1-hour fire barrier, radiant energy heat shield), and the type and dimension of the barrier (for example, 8-ft by 10-ft wall, 4-ft by 3-ft by 2-ft equipment enclosure, 36-inch-wide cable tray, or 3-inch diameter conduit)

2. For the total population of Thermo-Lag fire barriers described under Item I.B.1, submit an approximation of:

   a. For cable tray barriers: the total linear feet and square feet of 1-hour barriers and the total linear feet and square feet of 3-hour barriers.
   b. For conduit barriers: the total linear feet of 1 hour barriers and the total linear feet of 3-hour barriers.
   c. For all other fire barriers: the total square feet of 1-hour barriers and the total square feet of 3-hour barriers.

d. For all other barriers and radiant energy heat shield: the total linear or square feet of 1-hour barriers and the total linear or square feet of 3-hour barriers, as appropriate for the barrier configuration or type.

Response

1. The attached Appendix 1 provides the requested information for PBAPS and LGS.

1.a PBAPS must comply with the requirements of 10 CFR 50.48 and 10 CFR 50 Appendix R. The description of our use of Thermo-Lag 330-1 in order to comply with those requirements is provided in the PBAPS "Fire Protection Program" of the Updated Final Safety Analysis Report (UFSAR).

LGS must comply only with the requirements of 10 CFR 50.48. Our use of Thermo-Lag 330-1 in order to comply with 10 CFR 50.48 is described in our commitment to NRC Branch Technical Position (BTP) CMEB 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants," dated July 1981. The details are provided in Appendix 9A, "Fire Protection Evaluation Report," of the LGS UFSAR.

1.b For both PBAPS and LGS, Thermo-Lag fire barrier material was not installed to support an exemption from 10 CFR 50 Appendix R.

1.c For both PBAPS and LGS, Thermo-Lag fire barrier material was not specifically installed to achieve physical independence of electrical systems; however, at LGS, our cable tray installation specification allowed the use of installed Thermo-Lag in place of metal tray covers when minimum separation distances could not be maintained. This response clarifies our previous response to GL 92-08. We only recently recognized that Thermo-Lag installed to protect safe shutdown cables may be serving a dual purpose of maintaining electrical separation.

1.d For both LGS and PBAPS, Thermo-Lag fire barrier material was not installed to satisfy a condition of the plant operating licenses.

1.e. As discussed in response to 1.a, both LGS and PBAPS use installed Thermo-Lag fire barrier material to satisfy licensing commitments.

2. The attached Appendix 1 provides the requested information for PBAPS and LGS.

At both PBAPS and LGS, Thermo-Lag was not used as a radiant energy heat shield.

II. Important Barrier Parameters

B. Required Information

1. State whether or not you have obtained and verified each of the 24 parameters listed in the RAI for each Thermo-Lag barrier installed in the plant. If not, discuss the parameters you have not obtained or verified. Retain detailed information on site for NRC audit where the aforementioned parameters are known.

2. For any parameter that is not known or has not been verified describe how you will evaluate the in-plant barrier for acceptability.

3. To evaluate NUMARC's application guidance, an understanding of the types and extent of the unknown parameters is needed. Describe the type and extent of the unknown parameter at your plant in this context.

Response

1. The attached Appendix 2 provides a listing of all of the requested parameters.

   At PBAPS the Thermo-Lag was installed as a modification that included design documentation, installation procedures and Quality Assurance verification. To confirm the accuracy of this documentation, a walkdown of accessible Thermo-Lag assemblies was completed and all observable parameters have been verified. The walkdown provided us with high confidence that parameters that are not directly observable are in accordance with the design details.

   At LGS, scoping walkdowns of accessible Thermo-Lag assemblies have been completed. The design documentation for LGS Thermo-Lag configurations is lacking sufficient detail to verify all of the required parameters; as such, some of the parameters can only be verified through destructive examinations. Further efforts to document and verify these parameters will be deferred until the integrated analysis program identifies those cables which require protection.

2. For those areas where encapsulation is determined to be the appropriate alternative, conservative analyses will be performed to ensure that acceptable encapsulations are installed.

3. Until the NUMARC application guide is issued and PECO has an opportunity to review it, we cannot determine the exact extent of configurations that are bounded by NUMARC testing.

III. Thermo-Lag Fire Barriers Outside the Scope of the NUMARC Program

B. Required Information

1. Describe the barriers discussed under Item I.B.1 that you have determined will not be bounded by the NUMARC test program.

2. Describe the plant-specific corrective action program or plan you expect to use to evaluate the fire barrier configurations particular to the plant. This description should include a discussion of the evaluations and tests being considered to resolve the fire barrier issues identified in GL 92-08 and to demonstrate the adequacy of existing in-plant barriers.

3. If a plant-specific fire endurance test program is anticipated, describe the following:

   a. anticipated test specimens.
   b. Test methodology and acceptance criteria including cable functionality.

Response

1. The majority of the assemblies at PBAPS are comparable to the NUMARC program; however, external V-rib orientations are not currently in the NUMARC test program although their inclusion has been requested.

   LGS used a significant amount of preshaped conduit forms and cable tray encapsulations which are comparable to the NUMARC test configuration; however, LGS cable gutters and unique boxes may not be covered by the NUMARC test program. Accordingly, our integrated analysis program has been developed to minimize reliance on encapsulation and consider many options for those areas where cable or raceway protection is required.

2. Our integrated analysis program will determine where cable protection is required. For those areas at either PBAPS or LGS where encapsulation is determined to be the preferred means of cable protection, a case by case analysis will be performed using the NUMARC application guide. If the NUMARC tests are not applicable, PECO will select the most appropriate means of achieving regulatory compliance after examining all available remedies.

3. Until our integrated analysis program is completed no plant specific fire test specimens can be identified; however, PECO has begun to investigate plant specific fire tests either on our own or in conjunction with other utilities or NUMARC to bound more Thermo-Lag configurations at either PBAPS or LGS.

IV. Ampacity Derating

B. Required Information

1. For the barriers described under Item I.B.1, describe those that you have determined will fall within the scope of the NUMARC program for ampacity derating, those that will not be bounded by the NUMARC program, and those for which ampacity derating does not apply.

2. For the barriers you have determined fall within the scope of the NUMARC program, describe what additional testing or evaluation you will need to perform to derive valid ampacity derating factors.

3. For the barrier configurations that you have determined will not be bounded by the NUMARC test program, describe your plan for evaluating whether or not the ampacity derating tests relied upon for the ampacity derating factors used for those electrical components protected by Thermo-Lag 330-1 (for protecting the safe-shutdown capability from fire or to achieve physical independence of electrical systems) are correct and applicable to the plant design. Describe all corrective actions needed and submit the schedule for completing such actions.

4. In the event that the NUMARC fire barrier tests indicate the need to upgrade existing in-plant barriers or to replace existing Thermo-Lag barriers with another fire barrier system, describe the alternative actions you will take (and the schedule for performing those actions) to confirm that the ampacity derating factors were derived by valid tests and are applicable to the modified plant design.

Response

1. Ampacity derating is not expected to vary significantly for the various configurations of Thermo-Lag barriers. Ampacity derating for 3-hour barriers have been documented by TSI and UL tests. PECO utilized deratings of 28 percent and 31 percent for cable trays requiring 1-hour and 3-hour fire barriers respectively. PECO utilized a derating of 10.9 percent for cable in conduit. We anticipate that these values will be validated to be appropriate by NUMARC testing.

2. PECO's derating calculations have been reviewed and determined to be conservative. Any non-conservative changes from the design values obtained from either Texas Utilities (TU) testing or NUMARC testing will be incorporated into our calculations. Any ampacity concerns identified as a result of a calculation will be evaluated on a case-by-case basis, and appropriate action will be taken.

   Ampacity derating applies only to cable raceways containing power cables. Ampacity derating factors determined for upgraded configurations can be conservatively applied to baseline configurations. For upgraded one hour cable trays and conduits, we intend to employ the derating factors derived by TU using the methodology of IEEE P848 Draft 11, "Procedure for the Determination of the Ampacity Derating of Fire Protected Cables," with some modifications. This test methodology has been reviewed by the NRC through NUMARC and TU. NRC acceptance of the methodology is still pending. NRC has informed NUMARC that they will issue a request for further information to TU regarding the submitted ampacity test report.

3. The IEEE P848 approach provides for testing of a single cable tray, and small and large conduits. The limiting conduit derating factor (of the two sizes tested) is applied to the range of conduit sizes, cable fills, etc. For cable trays, the single cable tray derating factor is applied to all sizes of cable trays, cable fills, etc. Thus, ampacity testing can be performed generically with broad applicability, unlike fire testing where many performance parameters must be considered. The NUMARC program is expected to provide ampacity derating factors for 1- and 3-hour barriers, for cable trays and conduit. Few if any installations are anticipated to be outside the generic scope.

4. NUMARC will be conducting ampacity testing of upgraded 3-hour fire barriers to the requirements of IEEE P848, following determination of appropriate barrier upgrades for 3-hour installations and agreement with the NRC on test methodology. It is expected that this testing will be conducted in the second quarter of 1994, at the earliest. To the extent that successful upgrades using alternative materials are identified, ampacity testing of these upgrades would be considered as well.

V. Alternatives

B. Required Information

Describe the specific alternatives available to you for achieving compliance with NRC fire protection requirements in plant areas that contain Thermo-Lag fire barriers. Examples of possible alternatives to Thermo-Lag based upgrades include the following:

1. Upgrade existing in-plant barriers using other materials.

2. Replace Thermo-Lag barriers with other fire barrier materials or systems.

3. Reroute cables or relocate other protected components.

4. Qualify 3-hour barriers as 1-hour barriers and install detection and suppression systems to satisfy NRC fire protection requirements.

Response

The goal of our integrated analysis program is to resolve the Thermo-Lag issue, while maintaining regulatory compliance and minimizing costs. To achieve this goal, PECO will reduce its reliance on Thermo-Lag. PECO will consider all alternatives that maintain safety and select on a case-by-case basis the most cost beneficial alternative. We will consider all alternatives, including: reevaluating the post-fire safe shutdown analysis, re-routing cable, installing suppression, requesting exemptions from regulations and, as required, upgrading or replacing some Thermo-Lag assemblies.

VI. Schedules

B. Required information

Submit an integrated schedule that addresses the overall corrective action schedule for the plant. At a minimum, the schedule should address the following aspects for the plant:

1. implementation and completion of corrective actions and fire barrier upgrades for fire barrier configurations within the scope of the NUMARC program,

2. implementation and completion of plant-specific analyses, testing, or alternative actions for fire barriers outside the scope of the NUMARC program.

Response

The integrated analysis program will be completed for LGS by June 1995 and by November 1995 for PBAPS. An update on this schedule will be submitted by September 30, 1994, which will provide the preliminary findings of the integrated analysis program, including the cable raceways which may not require protection and a discussion on the applicability of the industry testing on PECO Thermo-Lag assemblies.

VII. Sources and Correctness of Information

Describe the source of the information provided in response to this request for information (for example, from plant drawings, quality assurance documentation, walk downs or inspections) and how the accuracy and validity of the information was verified.

Response

At PBAPS, a physical walkdown of the accessible Thermo-Lag assemblies was recently completed. The walkdown verified that externally visible parameters matched design documentation.

At LGS, scoping walkdowns of accessible Thermo-Lag assemblies have been completed. The information supplied in this response was gathered from design documentation and the scoping walkdown.

APPENDIX 1

Peach Bottom Atomic Power Station - Thermo-Lag			
Description		1 Hour Fire Barrier	3 Hour Fire Barrier
Size	Type	Raceway Length	Raceway Length
1"	Conduit	None	165′
1½"	Conduit	None	278′
2"	Conduit	None	390′
2½"	Conduit	None	147′
3"	Conduit	None	2,046′
3½"	Conduit	None	263′
4"	Conduit	None	156′
5"	Conduit	None	650′
6"	Conduit	None	335′

Notes:

- At PBAPS, no cable trays were encapsulated. All PBAPS Thermo-Lag fire barriers protecting conduit are constructed with prefabricated panels forming a box design.
- PBAPS Thermo-Lag fire barriers protecting junction boxes are bolted to the junction box. There are 52 junction boxes encapsulated. The largest assembly measures approximately 62" by 50" by 14" and the smallest assembly measures approximately 14" by 14" by 10".
- PBAPS Thermo-Lag fire barriers protect two manhole covers measuring approximately 6′x4′each.
- 3 Thermo-Lag Fire barriers protect safety related cable(s) in conduit in stairwells in lieu of smoke detectors.
- Several Thermo-Lag fire barriers protect multiple conduits. The total length of conduit protected is approximately 4,430 feet while the total linear feet of prefabricated panels protecting conduit is approximately 2,665 feet.
- The approximate total square footage of Thermo-Lag protecting conduits and junction boxes at PBAPS is 8,766 ft^2 with 8,063 ft^2 protecting conduits and 703 ft^2 protecting junction boxes.

APPENDIX 1

Limerick Generating Station - Thermo-Lag			
Description		1 Hour Fire Barrier	3 Hour Fire Barrier
Size	Type	Barrier Length	Barrier Length
6" x 6"	Gutter	48'	225'
8" x 8"	Gutter	323'	357'
24"	Tray	822'	219'
30"	Tray	150'	None
2"	Flex	None	12'
3/4"	Conduit	None	17'
1"	Conduit	7'	13'
1-1/2"	Conduit	87'	211'
2"	Conduit	250'	317'
3"	Conduit	192'	622'
4"	Conduit	168'	172'
5"	Conduit	113'	402'
6"	Conduit	13'	17'

Notes:

- The square footage of Thermo-Lag in box assemblies on gutters is approximately 1,200 ft^2 on 1 hour barriers and approximately 1,800 ft^2 on 3 hour barriers
- The square footage of Thermo-Lag in box assemblies on trays is approximately 5,500 ft^2 on 1 hour barriers and approximately 1,200 ft^2 on 3 hour barriers.

APPENDIX 2

Peach Bottom Atomic Power Station - Verified Barrier Parameters	
1. Raceway orientation (horizontal, vertical, radial bends)	Y
2. Conduit	Y
3. Junction boxes and lateral bends	Y
4. Ladder-back cable tray with single layer cable fill	N/A See Note
5. Cable tray with T-Section	N/A See Note
6. Raceway material (aluminum, steel)	Y
7. Support protection, thermal shorts (penetrating elements)	Y
8. Air drops	N/A See Note
9. Baseline fire barrier panel thickness	Y
10. Preformed conduit panels (shapes)	N/A See Note
11. Panel rib orientation (parallel or perpendicular to the raceway)	Y
12. Unsupported spans	Y
13. Stress skin orientation (inside or outside)	Y
14. Stress skin over joints or no stress skin over joints.	Y
15. Stress skin ties or no stress skin ties	N/A See Note
16. Dry-fit, post-buttered joints or prebuttered joints	Y-Pre-Buttered
17. Joint gap width	N
18. Butt joints or grooved and scored joints	Y
19. Steel bands or tie wires	Y-Bands
20. Band/wire spacing	Y
21. Band/wire distance to joints	Y
22. No internal bands in trays	N/A See Note
23. No additional trowel material over sections and joints or additional trowel material applied	Y
24. No edge guards or edge guards	N/A See Note

Note: These parameters are not applicable to the PBAPS Thermo-Lag Encapsulations.

APPENDIX 2

Peach Bottom Atomic Power Station - Verified Cable Parameters	
1. Cable size and type (power, control, or instrumentation).	Y
2. Cable jacket type (thermoplastic, thermoset) and materials.	Y
3. Cable conductor insulation type (thermoplastic, thermoset plastic) and materials.	Y
4. Cable fill and distribution of cables within the protected conduit or cable tray.	Y
5. Proximity of cables to the unexposed (inside) surfaces of the fire barrier.	N/A
6. Presence of materials between the cables and the unexposed side of the fire barrier material (for example, Sealtemp cloth, which is used in the NUMARC test specimens).	N/A
7. Cable operating temperature.	Y
8. Temperatures at which the cables can no longer perform their intended function when energized at rated voltage and current.	See Note

Note: If temperature criteria are exceeded during fire tests, one optional approach to resolution, as provided in the NRC draft test and acceptance criteria, would be to evaluate cable functionality at the elevated temperatures. In this case, determination of cable performance at elevated temperature (requested item 8) would be necessary, using cable performance test data or information for specific installed cable types (items 1, 2, 3, and 7). However, the NRC has yet to finalize requirements for cable functionality evaluation, and test results which clearly indicate the scope of such evaluations are not yet available. The degree and conservatism of cable functionality evaluation requirements implied by the NRC listing of cable parameters, and discussed in proposed Supplement 1 to GL 86-10, significantly exceed the original requirements of GL 86-10.

APPENDIX 2

Limerick Generating Station - Verified Barrier Parameters		
1.	Raceway orientation (horizontal, vertical, radial bends)	Y
2.	Conduit	Y
3.	Junction boxes and lateral bends	Y
4.	Ladder-back cable tray with single layer cable fill	Y
5.	Cable tray with T-Section	N
6.	Raceway material (aluminum, steel)	Y
7.	Support protection, thermal shorts (penetrating elements)	N
8.	Air drops	N
9.	Baseline fire barrier panel thickness	N
10.	Preformed conduit panels (shapes)	Y
11.	Panel rib orientation (parallel or perpendicular to the raceway)	N
12.	Unsupported spans	N
13.	Stress skin orientation (inside or outside)	N
14.	Stress skin over joints or no stress skin over joints.	N
15.	Stress skin ties or no stress skin ties	N
16.	Dry-fit, post-buttered joints or prebuttered joints	N
17.	Joint gap width	N
18.	Butt joints or grooved and scored joints	N
19.	Steel bands or tie wires	Y - See Note
20.	Band/wire spacing	N
21.	Band/wire distance to joints	N
22.	No internal bands in trays	N
23.	No additional trowel material over sections and joints or additional trowel material applied	Y
24.	No edge guards or edge guards	N

Note: Not all bands or wires observable because of Trowel Grade Material.

APPENDIX 2

Limerick Generating Station - Verified Cable Parameters	
1. Cable size and type (power, control, or instrumentation).	Y
2. Cable jacket type (thermoplastic, thermoset) and materials.	Y
3. Cable conductor insulation type (thermoplastic, thermoset plastic) and materials.	Y
4. Cable fill and distribution of cables within the protected conduit or cable tray.	Y - See Note
5. Proximity of cables to the unexposed (inside) surfaces of the fire barrier.	See Note
6. Presence of materials between the cables and the unexposed side of the fire barrier material (for example, Sealtemp cloth, which is used in the NUMARC test specimens).	See Note
7. Cable operating temperature.	Y
8. Temperatures at which the cables can no longer perform their intended function when energized at rated voltage and current.	See Note

Note: The parameters proximity of the cables to the inside surface of the fire barrier, and the presence of material between the cables and the inside of the fire barrier material, (items 5, and 6) will not be gathered until the scope of functionality verification becomes clear.

If temperature criteria are exceeded during fire tests, one optional approach to resolution, as provided in the NRC draft test and acceptance criteria, would be to evaluate cable functionality at the elevated temperatures. In this case, determination of cable performance at elevated temperature (requested item 8) would be necessary, using cable performance test data or information for specific installed cable types (items 1, 2, 3, and 7). However, the NRC has yet to finalize requirements for cable functionality evaluation, and test results which clearly indicate the scope of such evaluations are not yet available. The degree and conservatism of cable functionality evaluation requirements implied by the NRC listing of cable parameters, and discussed in proposed Supplement 1 to GL 86-10, significantly exceed the original requirements of GL 86-10.

For cable trays parameters 4, 5, and 6 address issues relative to potential cable/barrier contact. This is an unresolved issue at this time, and barrier inspection in this regard would be difficult or impossible. Cable contact with the barrier is most likely to occur in situations of large cable fills. However, the large cable fills also provide significant thermal mass that could improve the barrier system performance and mitigate the effect of cables in contact with the barrier. NUMARC has agreed to provide additional thermocouples below the cable tray rungs in the Phase 2 cable tray tests to provide information to address the NRC concerns relative to potential contact of cables with the cold side of the fire barriers. Further, note that a small piece of Sealtemp cloth (item 6) was used only in NUMARC test number 1-4 (24" steel cable tray with air drop, three hour test) and did not impact the performance or useability of the test.