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PY-CEI/NRR-1750 L

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Perry Nuclear Power Plant
Docket No. 50-440
Response to 10CFR50.54(f) Request for
Additional Information Regarding
Generic Letter 92-08, Thermo-Lag
330-1 Fire Barriers

Gentlemen:

On December 29,1993, the Perry Nuclear Power Plant (PNPP) received the subject request for additional information regarding Generic Letter 92-08, Thermo-Lag 330-1 Fire Barriers. PNPP's response to your request is attached.

As noted in the submitted response to Generic Letter 92-08 (PY-CEI/NRR-1638L dated April 16, 1993), PNPP is participating in the Nuclear Management and Resources Council (NUMARC) Thermo-Lag 330-1 test program. The response also noted the suspension of activities required to restore affected cable raceways and conduits to operable status pending the results of the NUMARC test program. PNPP has initiated compensatory measures for plant areas protected by Thermo-Lag fire barriers. These compensatory measures will remain in effect until PNPP completes the evaluation of the NUMARC test results and implements applicable corrective actions.

As stated in the GL 92-08 response, PNPP will provide a schedule detailing any required corrective actions and their corresponding completion dates within 180 days after completing the evaluation of the NUMARC results.

If you have questions or require additional information, please contact Henry Hegrat, Regulatory Affairs, at (216) 280-5606.

Very truly yours,

RAS:DHL

Attachments

cc: NRC Project Manager
NRC Resident Inspector Office
NRC Region III

Operating Companies
Cleveland Electric Illuminating
Toledo Edison

A029
1/1

I, Robert A. Stratman, being duly sworn state that (1) I am Vice President, Nuclear - Perry of the Centerior Service Company, (2) I am duly authorized to execute and file this certification on behalf of The Cleveland Electric Illuminating Company and Toledo Edison Company, and as the duly authorized agent for Duquesne Light Company, Ohio Edison Company, and Pennsylvania Power Company, and (3) the statements set forth herein are true and correct to the best of my knowledge, information and belief.

Robert A. Stratman

Sworn to and subscribed before me, this 11th day of February, 1994.

JANE E. MOTT
Notary Public, State of Ohio
My Commission expires Feb. 20, 1995
(Recorded in Lake County)

FORM/3788/SS

NRC Request for Information Section I

I. Thermo-Lag Fire Barrier Configurations and Amounts

A. Discussion

Generic Letter (GL) 92-08, "Thermo-Lag 330-1 Fire Barriers," applied to all 1-hour and all 3-hour Thermo-Lag 330-1 materials and barrier systems constructed by any assembly method, such as by joining preformed panels and conduit preshapes, and trowel, spray, and brush-on applications. This includes all fire barriers, all barriers to achieve physical independence of electrical systems, radiant energy heat shields, and barriers installed to enclose intervening combustibles.

B. Required Information

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

a. meet 10CFR50.48 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 descriptions 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 shields; 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.

PNPP Response to Section I

B.1

a) Thermo-Lag fire rated barriers are installed on raceways and associated junction boxes to meet the requirements for separation of redundant trains of safe shutdown equipment and circuits as required by 10 CFR 50 Appendix R Section III G. Also Thermo-Lag was used to construct one 3 hour rated penetration seal in a fire barrier separating fire areas.

b) Thermo-Lag raceway wrap installations that do not extend throughout the fire area but terminate at a point that achieves the 20 ft. separation criteria from the redundant train of safe shutdown equipment are identified as supporting an exemption to Appendix R. Also a Thermo-Lag panel is installed as a radiant energy shield to support an exemption in one location. There is also an installation on a lighting conduit to support an exemption to 10 CFR 50 Appendix R Section L.

c) Independent walk downs and evaluations were conducted prior to commercial operations to determine the adequacy of separation and independence of safety related components (including raceways and cabling). These requirements are addressed as part of IEEE-384, Independence for Safety Related Systems. If existing trays and/or conduits were identified as having Appendix R Thermo-Lag, the compliance with IEEE-384 separation was found to be acceptable.

d) No Thermo-Lag was installed to meet a condition of the plant operating license other than compliance with Appendix R as a means of achieving and maintaining safe shutdown in the event of a fire.

e) No Thermo-Lag was installed to satisfy licensing commitments.

Attachment 2 summarizes the details for Thermo-Lag installations presently identified in the Fire Protection Programs providing a fire rated barrier.

B.2

a) Cable tray barriers: 1-hour rating 4 to 30 inch wide trays; approximately 1900 linear ft. and approximately 4000 square ft.

No 3-hour fire rated barriers installed on trays.

b) Conduit barriers: 1-hour rating 0.75 to 3 inch diameter conduits; approximately 560 linear ft. Three-hour rating 4 inch diameter conduit; approximately 20 linear ft.

c) Penetration seal (in floor between 599' and 574' elevations of the Control Complex): 3-hour rated approximately 16 by 7 feet.
Boxed enclosure for cable drop: 1-hour rated approximately 18 by 24 by 6 inches.

d) Radiant energy heat shield: 3 by 8 feet, 1/2 inch thick (no fire rating).

NRC Request for Information Section II

II. Important Barrier Parameters

A. Discussion

In a letter of July 29, 1993, from A. Marion, NUMARC, to C. McCracken, NRC, NUMARC stated: "Relative to bounded configurations, ... [i]t will be the utilities' responsibility to verify their baseline installations are bounded." Furthermore, NUMARC stated that the parameters of importance for utility use of data from the industry Thermo-Lag fire barrier test program are:

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

Each NUMARC cable tray fire test specimen includes 15 percent cable fills (i.e., a single layer of cables uniformly distributed across the bottom of the cable tray). This approach requires consideration of plant-specific cable information during the assessments of tested configurations and test results in relation to plant-specific Thermo-Lag configurations; for example, cable trays with less thermal mass (cable fill) than the NUMARC test specimens, different cable types, and the proximity of the cables to the Thermo-Lag (e.g., cables may be installed in contact with the unexposed surface of the Thermo-Lag material sags). In its letter of July 29, 1993, NUMARC stated: "Utilities using the results of the NUMARC testing will need to evaluate their installed cable fill and ensure that it is bounded by the tested cable fill." NUMARC is not conducting any cable functionality tests or evaluations and stated that cable functionality evaluations will be performed by utilities using data

from the generic program.

The parameters of importance concerning cable protected by fire barriers are:

1. Cable size and type (power, control, or instrumentation).
2. Cable jacket type (thermoplastic, thermoset) and materials.
3. Cable conductor insulation type (thermpolastic, thermoset plastic) and materials.
4. Cable fill and distribution of cable within the protected conduit or cable tray.
5. Proximity of cables to the unexposed (inside) surfaces of the fire barrier.
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).
7. Cable operating temperature.
8. Temperatures at which the cables can no longer perform their intended function when energized at rated voltage and current.

Other parameters that are unique to particular barriers, such as interfaces between Thermo-Lag materials and other fire barrier materials or building features (walls, etc.) and internal supports, are also important. In addition, because of questions about the uniformity of the Thermo-Lag fire barrier materials produced over time, NUMARC stated in its letter of July 29, 1993, that "[c]hemical analysis of Thermo-Lag materials provided for the program, as well as samples from utility stock, will be performed, and a test report prepared comparing the chemical composition of the respective samples." The results of the chemical analyses may indicate that variations in the chemical properties of Thermo-Lag are significant and may require additional plant-specific information in the future.

B. Required Information

1. State whether or not you have obtained and verified each of the aforementioned parameters 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 parameters at your plant in this context.

PNPP Response to Section II

B.1

The information on the parameters is based on a review of the plant design documents, contractor installation drawings, instructions and documentation to determine the typical construction techniques and details used for installation of the fire rated Thermo-Lag barriers at PNPP. A representative sample of installations was examined to check the applicability of this information but did not include an itemized listing of each feature on every assembly. The examination of internal assembly details was limited to those areas where the material has been removed. Therefore, the information below is considered to be indicative of the typical construction of the majority of the installations at PNPP.

1. Raceway orientation (horizontal, vertical, radial bends);
Design drawings for the Thermo-Lag and the raceway layouts indicate raceway length and orientation and this information has been verified. Items will be accessible for future walkdowns to re-verify important parameters resulting from the NUMARC tests.

2. Conduit;
Rigid steel (schedule 40) conduit was used and is verifiable from electrical design and installation drawings and specifications as well as QA records.

3. Junction boxes and lateral bends;
The location and size of these items is verifiable from both the the Thermo-Lag and the raceway layout drawings.

4. Ladder-back cable tray with single layer cable fill;
Ladder back trays are used for all but designated instrumentation trays and the channel trays. Single layer fill is limited to the power trays and the channel trays. This is verifiable by specifications and electrical design and installation drawings for raceways. Instrumentation cable trays are solid bottom/ladder type with enclosed covers.

5. Cable tray with T-Section;
This configuration exists in one fire area. It is shown on design drawings and has been verified by walkdown.

6. Raceway material (aluminum, steel);
Raceways protected with Thermo-Lag are steel. This is verified from electrical design and installation drawings and specifications as well as QA records. No aluminum tray materials are used at PNPP.

7. Support protection, thermal shorts (penetrating elements);
Contractor installation drawings show the location of the heat transfer items and the standard protection applications. The thickness is not in accordance with current requirements or the vendor recommended protection

for heat transfer. Previous walkdowns have identified problems with installation in several areas (LER 91-020-01).

8. Air drops;
The location of air drops, including flex conduit, containing protected cables has been verified on contractor installation drawings and walkdowns. The method of application of the fire barrier protection is verified by contractor installation instruction and QA records.

9. Baseline fire barrier panel thickness;
Thickness is specified on design drawings. Material receipt records and/or field verification by examination of samples in installation assemblies can be used to verify this information.

10. Preformed conduit panels;
Preformed sections have been used in the majority of the installations. The material is documented in contractor installation packages and can be readily verified by walkdown.

11. Panel rib orientation (parallel or perpendicular to the raceway);
Design drawings indicate panel rib orientation for stress skin with trowelable grade applied, is perpendicular to the tray run, but information is not shown for prefabricated panels. Typical installation practice was to have the ribs perpendicular to the tray run. This will be verified by installation records and/or examination.

12. Unsupported spans;
This is observable from the exterior of the assembly and can be readily verified by walkdown.

13. Stress skin orientation (inside or outside);
Stress skin is inside 1-hour rating preformed and tray assemblies. The annular pumping installation and the 3-hour rating perform have stress skin inside and outside. This is verified by installation documentation and examination. This information can be confirmed by examination during walkdown.

14. Stress skin over joints or no stress skin over joints;
Stress skin was not applied over joints. This has been verified by design drawings and examination of several assemblies.

15. Stress skin ties or no stress skin ties;
Stress skin ties were not applied over joints. This has been verified by installation instructions and examination of several assemblies.

16. Dry-fit, post-buttered joints or prebuttered joints;
The vendor typical installation indicates that joints are prebuttered. This has also been observed in the walkdowns.

17. Joint gap width;
This is not documented as part of the design drawings or installation instructions and will be verified by walkdown or sample inspection if deemed a critical factor for assemblies with prebuttered joints.

18. Butt joints or grooved and scored joints;
With the exception of curves, butt joints were typically used. This will be verified by walkdown if deemed a critical factor for assemblies with prebuttered joints.

19. Steel bands or tie wires;
Steel bands were used for assembly of preformed and trays. This is verified by material documentation, QA records and walkdowns.

20. Band/wire spacing;
Band spacing is verified by design documents and installation documentation. The spacing for the tray assemblies is not in accordance with TSI requirements. Previous walkdowns have identified this problem (LER 91-020-01).

21. Band/wire distance to joints;
The location and spacing is specified on design and installation documents and can be verified by walkdown.

22. No internal bands in trays;
Internal bands are not used in tray assemblies. Assembly support bands are exposed on three sides to provide for removal of the top panel for access. The location and spacing is specified on design and installation documents and can be verified by walkdown.

23. No additional trowel material over sections and joints or additional trowel material applied;
The typical installation technique applies a cover of material over joints. This is verified by walkdown of typical installations.

24. No edge guards or edge guards;
Edge guards are not installed. The standard installation technique builds up the edges to the original thickness over the bands. This is verified by walkdown of typical installations.

The parameters of importance concerning cable protected by fire barriers are:

1. Cable size and type (power, control, or instrumentation);
The cable parameters associated with electrical systems at Perry are bounded by and may be verified from Design Documents. Circuits as designed at Perry are uniquely identified and tracked by specific "Pull Slips" and "Termination Cards". These cards clearly denote the cable type, cable composition, safety classification, voltage classification and function, raceway routing, and similar attributes which clearly reflect the as installed as-built conditions.

2. Cable jacket type (thermoplastic, thermoset) and materials;
Cable jacket type - Hypalon, Chlorosulphonated Polyethylene (CSP)
Information in regards to cable design data can be readily verified from the original Cable Design Specifications and their attached data sheets for each cable type, along with the respective Environmental Qualification reports and supporting IEEE-383 documentation.

3. Cable conductor insulation type (thermpolastic, thermoset plastic) and materials;
Cable conductor insulation type - EPR and/or cross linked polyolefin (XLP). Information in regards to cable design data can be readily verified from the original Cable Design Specifications and their attached data sheets for each cable type, along with the respective Environmental Qualification reports and supporting IEEE-383 documentation.

4. Cable fill and distribution of cable within the protected conduit or cable tray;
This information is verifiable from design documents. By design, cable tray fill corresponds to 50% fill for 3 or 5 inch usable depth for control and instrumentation trays, whereas power trays are based on single layer only. Conduit fills are limited to 40% fill.

5. Proximity of cables to the unexposed (inside) surfaces of the fire barrier;
This information can be verified by field walkdown.

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);
PNPP design did not use any types of material such as Sealtemp cloth, etc. between the cables and the unexposed side of the fire barrier material. This may be verified by the design drawings and/or documentation, or as otherwise determined by visual field inspection, if required.

7. Cable operating temperature;
90 degrees Celsius, based on 40 degree ambient with a 50 degree rate of rise.

8. Temperatures at which the cables can no longer perform their intended function when energized at rated voltage and current;
This information is available from environmental qualification reports for each specific voltage rating of cable at PNPP.

B.2

Based on the results of the NUMARC testing and the application guide, it is planned that acceptable installation configurations will be developed to upgrade and/or replace the existing Thermo-Lag installations which are required to achieve compliance with Appendix R. In conjunction with the correction of known problems with band spacing and support protection, the barriers will be examined against the acceptable installation criteria. This may include a review of the detailed installation documentation for each assembly to determine any improvements needed or destructive examination of the barrier on a sample basis to obtain information on construction techniques. Where they exist, the presently unknown parameters, if determined to impact the function of the barriers, will be corrected to establish an acceptable barrier performance.

B.3

The Industry Application Guideline that NUMARC is developing, along with the results of the testing, will be referenced in the evaluation of the fire barriers at Perry Nuclear Power Plant. Since this Guideline and the Phase 2 testing, which can impact the significance of the parameters, is not yet complete it is not yet possible to describe the type and extent of these unknown parameters in context of the Guideline.

NRC Request for Information Section III

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

A. Discussion
In your response to GL 92-08, you indicated that actions necessary to restore the operability of these barriers would be based on the results of the NUMARC test program. During recent meetings with the NRC staff, the Executive Director for Operations and the Commission, NUMARC described the scope of its Thermo-Lag fire barrier program, the results of the Phase 1 fire tests, and planned Phase 2 tests. The program is limited to certain 1-hour and 3-hour conduit and cable tray fire barrier configurations and the development of guidance for applying the test results to plant-specific fire barrier configurations. However, NUMARC's program is not intended to bound all in-plant Thermo-Lag fire barrier issues identified in GL 92-08. Therefore, licensees may need to take additional actions to address fire endurance and ampacity derating concerns with in-plant Thermo-Lag barriers.

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.

PNPP Response to Section III

B.1

HORIZONTAL BENDS - The NUMARC test assemblies all have a vertical bend. There are several areas in the plant where the bend is on the horizontal plane.

T BENDS - There are a few locations with a T type bend. T type bends are not included in NUMARC phase 2 testing.

BOXES - There is one location where several circuits are enclosed in a box of Thermo-Lag rather than wrapped individually.

AIR DROP - This is a configuration where the cables are not enclosed inside a rigid conduit or tray, but are wrapped in the barrier. The PNPP design uses a ceramic blanket around the cables with a layer of stress skin and trowelable grade over, per the TSI Installation Manual. There is also a limited use of the annular pumping method, which consists of trowelable grade pumped between two layers of stress skin spaced 1/2 inch apart. These configurations are not within the scope of NUMARC testing.

INTERFERENCES - In a few areas the conduit is partially buried in pyrocrete. There is also a location where a sprinkler head is installed inside the tray barrier.

BARRIERS - A large penetration in the floor between Control Complex 574 and 599 has been sealed using a 3-hr. (1" thick) Thermo-Lag panel. This design was based on ASTM barrier tests done by TSI. Since all previous testing conducted by TSI is considered unacceptable, the seal is being treated as inoperable. The radiant energy heat shield is not included in the NUMARC test program.

B.2

HORIZONTAL BENDS - It is felt that this can be bounded by the proposed test configurations and previous tests.

T BENDS - Although this is not being tested by NUMARC, Texas Utilities has done testing of a horizontal T assembly. This may be used for justification of our configuration. Additional testing proposed by NUMARC and required upgrades may also be used.

BOXES - These circuits will be evaluated to determine the need for protection based on the current plant analysis. This enclosure can be replaced by an acceptable design based on the results and evaluation of phase 2 testing.

AIR DROP - This configuration is not within the scope of NUMARC Phase 2 testing but additional testing has been proposed by NUMARC. If this program does not support our correction schedule, site specific testing will be considered when review and approval of 1-hour barrier acceptance criteria is finalized. The limited use of the annular pumping installations can be replaced with a tested configuration.

INTERFERENCES - This can be solved by removal of enough pyrocrete to provide required Thermo-Lag coverage. The sprinkler head will be removed.

BARRIERS - An alternate seal may be utilized. Testing is being considered based on the review and approval of the acceptance criteria. Based on the current shutdown analysis the radiant energy heat shield is not required.

B.3

a) Testing of the 3-hour barrier and the 1-hour air drop configuration may be required. Testing of possible upgrades based on outcome of the Phase 2 testing may be required.

b) The testing may be done in conjunction with other utilities. The test methodology and specimen configuration is dependent on the outcome of the NUMARC acceptance criteria.

NRC Request for Information Section IV

IV. Ampacity Derating

A. Discussion
NUMARC has informed the staff that it intends to use the Texas Utilities (TU) Electric Company and Tennessee Valley Authority (TVA) ampacity derating test results to develop an electrical raceway component model for the industry. Additional information is needed to determine whether or not your Thermo-Lag barrier configurations (to protect the safe-shutdown capability from fire or to achieve physical independence of electrical systems) are within the scope of the NUMARC program and, if not, how the in-plant barriers will be evaluated for the ampacity derating concerns identified in GL 92-08.

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.

Your response to Section IV.B may depend on unknown specifics of the NUMARC ampacity derating test program (for example, the final barrier upgrades). However, your response should be as complete as possible. In addition, your response should be updated as additional information becomes available on the NUMARC program.

PNPP response to Section IV

Separate design verification and calculations have been prepared to document and verify the maximum ampere loading for each power cable(s) which is associated with those tray systems that have been protected via the installation of Thermo-Lag 330-1 materials. These calculations determine the actual conductor load based on equipment FULL LOAD AMPERE (FLA) ratings, as compared to the standard ICEA cable ampacity rating. In some cases specific plant cable ampacities have been adjusted based on the variation of cable diameters as otherwise shown in the standard tables.

Preliminary calculations, based on conservative assumptions, suggest that all of the power circuits protected via Thermo-Lag 330-1 material and required to be operational as defined in the Safe Shutdown Capabilities Report, Revision 4, dated 10/93 (Reference 3.12-4, Table of Safe Shutdown Circuits), provide a load versus ampacity margin equal to or greater than 29%.

The NUMARC ampacity derating program is not yet complete. The TU/TVA data has not been released for industry use. After PNPP has received and evaluated this information this letter will be updated.

NRC Request for Information Section V

V. Alternatives

A. Discussion

On the basis of testing of Thermo-Lag fire barriers to date, it is not clear that generic upgrades (using additional Thermo-Lag materials) can be developed for 3-hour barrier configurations or for some 1-hour barriers (for example, 1-hour barriers on wide cable trays, with post-buttered joints and no internal supports). Moreover, some upgrades that rely on additional thicknesses of Thermo-Lag material (or other fire barrier materials) may not be practical due to the effects of ampacity derating or clearance problems.

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.

PNPP Response to Section V

Perry Nuclear Power Plant is considering:

1. Re-evaluation of the need of the fire rated barrier for protection of redundant trains of safe shutdown circuits based on the function of the circuits protected and the availability of another means of achieving safe shutdown in the event of fire.

2. Engineering evaluation of the risk to safe shutdown equipment and circuits and possible exemption requests.

Due to the extent of the installations, replacement of the Thermo-Lag with another material is not considered practical. The use of another fire rated material as an upgrade would require testing of the combination on a site specific or utility group. Rerouting of the cables in trays and conduit would be impractical.

NRC Request for Information Section VI

VI. Schedules

A. Discussion

The staff expects the licensees to resolve the Thermo-Lag fire barrier issues identified in GL 92-08 or to propose alternative fire protection measures to be implemented to bring plants into compliance with NRC fire protection requirements. Specifically, as test data becomes available, licensees should begin upgrades for Thermo-Lag barrier configurations bounded by the test results.

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.

PNPP Response to Section VI

Perry Nuclear Power Plant's current schedule of the major milestones for resolution of the Thermo-Lag fire barrier concerns, based on the current NUMARC test schedule, is as follows:

February 1994 to May 1994: Obtain NUMARC Phase 2 test results and industry application guidelines

May 1994 to December 1994: Evaluate the NUMARC information against plant installations. Develop design documents to justify existing installations and/or upgrade the installations. This may involve additional testing.

Within 180 days after completing the evaluation of the NUMARC results PNPP will supply a schedule detailing any required corrective actions and their corresponding completion dates.

NRC Request for Information Section VII

VII. Sources and Correctness of Information

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

PNPP Response to Section VII

The information contained in this response was reviewed by appropriate discipline personnel and was verified to be correct and accurate to the best of their knowledge. Sources of information are identified in the text above where applicable and include but are not limited to; design drawings, vendor installation instructions, contractor installation drawings, instructions, material documentation and installation documentation packages and quality control inspection documentation.

FIRE BARRIER INFORMATION

BUILDING ELEVATION									
FIRE ZONE/ AREA	RACEWAY OR ITEM	TYPE	DIAMETER OR SIZE	FIRE RATING	APPROX. LENGTH FT.	APPROX. TSI AREA SQ. FT.	APP R III G	EXEMPT.	APPROX IEEE AMT [LENGTH]
EMERGENCY SERVICE WATER PUMP HOUSE									
ESW-1a	1305	TRAY	12" X 3"	1-HR	50	42		X	8 FT
CONTROL COMPLEX 574'									
CC-1a	1P45R13A	COND.	0.75"	1-HR	15			X	
CC-1a	1P45R39A	COND.	0.75"	1-HR	15			X	
CC-1a	1R33R2200A	COND.	1.00"	1-HR	45			X	
CC-1a	106	TRAY	18" X 3"	1-HR	53	203		X	20 FT
CC-1a	609	TRAY	18" X 3"	1-HR	53	203		X	20 FT
CC-1a	1655	TRAY	12" X 3"	1-HR	53	150		X	20 FT
CC-1a	ECC 2059	PENTR	15' X 7'	3-HR		105	X		
CC-1b	1P42F12B	COND.	1.25"	1-HR	14			X	
CC-1b	1P42F18B	COND.	1.25"	1-HR	51			X	10 FT
CC-1b	1P42F4B	COND.	1.25"	1-HR	28			X	20 FT
CC-1b	1R33R2159B	COND.	1.00"	1-HR	16			X	5 FT
CC-1b	255	TRAY	18" X 3"	1-HR	50	192		X	10 FT
CC-1b	1308	TRAY	18" X 3"	1-HR	50	192		X	10 FT
CC-1b	1803	TRAY	12" X 3"	1-HR	50	142		X	7 FT
CC-1c	1P42F11A	COND.	1.25"	1-HR	20			X	
CC-1c	1P42F12B	COND.	1.25"	1-HR	24			X	
CC-1c	1P42F15A	COND.	1.25"	1-HR	80			X	5 FT
CC-1c	1P42F18B	COND.	1.25"	1-HR	8			X	
CC-1c	1R33F224A	COND.	1.50"	1-HR	24			X	15 FT

COND. = CONDUIT CHNL. = CHANNEL TYPE TRAY

FIRE BARRIER INFORMATION

BUILDING ELEVATION									
FIRE ZONE/ AREA	RACEWAY OR ITEM	TYPE	DIAMETER OR SIZE	FIRE RATING	APPROX. LENGTH FT.	APPRGX. TSI AREA SQ. FT.	APP R III G	EXEMPT.	APPROX IEEE AMT [LENGTH]
CONTROL COMPLEX 599'									
CC-2a	255	TRAY	18" X 3"	1-HR	16	61		X	
CC-2a	268	TRAY	18" X 3"	1-HR	18	69		X	18 FT
CC-2a	269	TRAY	18" X 3"	1-HR	20	77		X	10 FT
CC-2a	270	TRAY	18" X 3"	1-HR	20	77		X	35 FT
CC-2a	290	TRAY	18" X 3"	1-HR	24	92		X	40 FT
CC-2a	291	TRAY	18" X 3"	1-HR	4	15		X	4 FT
CC-2a	1308	TRAY	18" X 3"	1-HR	20	77		X	
CC-2a	1803	TRAY	12" X 3"	1-HR	20	57		X	7 FT
CC-2b	1R22H4A	CHNL.	4" X 2"	1-HR	20	26		X	10 FT
CC-2b	1R33F1010A	COND.	2.00"	1-HR	55			X	20 FT
CC-2b	1R33F119A	COND.	2.00"	1-HR	14			X	
CC-2b	1R33H1A	CHNL.	4" X 2"	1-HR	22	29		X	
CC-2b	125	TRAY	30" X 3"	1-HR	25	146		X	20 FT
CC-2b	126	TRAY	30" X 3"	1-HR	4	23		X	4 FT
CONTROL COMPLEX 620'									
1CC-3c	1R33C5483B	COND.	4.00"	3-HR	20		X		10 FT
1CC-3e	109	TRAY	12" X 3"	1-HR	10	28	X		
1CC-3e	612	TRAY	24" X 3"	1-HR	10	48	X		
1CC-3e	1657	TRAY	12" X 3"	1-HR	10	28	X		
1CC-4f	1324	TRAY	18" X 5"	1-HR	32	117	X		20 FT
1CC-4f	1817	TRAY	12" X 5"	1-HR	32	101	X		

COND. = CONDUIT CHNL. = CHANNEL TYPE TRAY

FIRE BARRIER INFORMATION

BUILDING ELEVATION									
FIRE ZONE/ AREA	RACEWAY OR ITEM	TYPE	DIAMETER OR SIZE	FIRE RATING	APPROX. LENGTH FT.	APPROX. TSI AREA SQ. FT.	APP R III G	EXEMPT.	APPROX IEEE AMT [LENGTH]
CONTROL COMPLEX 638'									
1CC-4a	1M25C15X	COND.	0.75"	1-HR	65		X		4 FT
1CC-4e	1M25C19X	COND.	0.75"	1-HR	30		X		
1CC-4e	1R33C5459X	COND.	1.25"	1-HR	30		X		
1CC-4e	1R33C5461X	COND.	1.25"	1-HR	41		X		8 FT
1CC-4e	296 [3M]	TRAY	9" X 3"	1-HR	.		X		
1CC-4f	1R33C5461X	COND.	1.25"	1-HR	52		X		
1CC-4a	1R33C5423B	COND.	2.00"	N/A	-	-			6 FT
1CC-4a	1R33C5002A	COND.	3.00"	N/A	-	-			8 FT
1CC-4a	1R33C5421B	COND.	2.50"	N/A	-	-			4 FT
1CC-4a	1C95R172B	COND.	0.75"	N/A	-	-			5 FT
1CC-4b	1R33D169B	COND.	2.50"	N/A	-	-			4 FT
1CC-4b	1R33D169B	COND.	2.50"	N/A	-	-			5 FT
1CC-4b	1R33C5420B	COND.	1 25"	N/A	-	-			5 FT
1CC-4b	1R33R1415B	COND.	1.00"	N/A	-	-			5 FT
1CC-4c	1C95A242C	COND.	0 75"	N/A	-	-			8 FT
1CC-4c	1C95A240C	COND.	0,75"	N/A	-	-			5 FT

COND. = CONDUIT CHNL. = CHANNEL TYPE TRAY

FIRE BARRIER INFORMATION

BUILDING ELEVATION									
FIRE ZONE/ AREA	RACEWAY OR ITEM	TYPE	DIAMETER OR SIZE	FIRE RATING	APPROX. LENGTH FT.	APPROX. TSI AREA SQ. FT.	APP R III G	EXEMPT.	APPROX IEEE AMT [LENGTH]
CONTROL COMPLEX 679'									
1CC-6	1M25C140A	COND.	0.75"	1-HR	32		X		
1CC-6	1M25C37A	COND.	0.75"	1-HR	18		X		
1CC-6	1R33C2463A	COND.	1.50"	1-HR	14		X		
1CC-6	1R33C3276A	COND.	1.50"	1-HR	18		X		
1CC-6	1R33C5460X	COND.	1.25"	1-HR	46		X		
1CC-6	2" LTG CND	COND.	2.00"	1-HR	117			X	
1CC-6	135	TRAY	18" X 3"	1-HR	20	77	X		12 FT
1CC-6	625	TRAY	18" X 3"	1-HR	20	77	X		12 FT
1CC-6	1696	TRAY	12" X 3"	1-HR	20	57	X		12 FT
2CC-6	1M25C144B	COND.	0.75"	1-HR	35		X		
2CC-6	1M25C56B	COND.	0.75"	1-HR	10		X		
2CC-6	1R33C2461B	COND.	1.50"	1-HR	13		X		
2CC-6	1R33C3282B	COND.	1.50"	1-HR	5		X		
2CC-6	2" LTG CND	COND.	2.00"	1-HR	14			X	
INTERMEDIATE BUILDING 620'									
IB-3	1R33R1072D	COND.	2.00"	1-HR	1		X		
IB-3	1R33R2073D	COND.	2.00"	1-HR	140		X		65 FT
IB-3	1R33R2069B	COND.	2.00"	1-HR	70		X		
IB-3	281	TRAY	30" X 3"	1-HR	80	467	X		30 FT
IB-3	1359	TRAY	30" X 3"	1-HR	80	467	X		30 FT
IB-3	1836	TRAY	24" X 3"	1-HR	80	387	X		30 FT

COND. = CONDUIT CHNL. = CHANNEL TYPE TRAY

FIRE BARRIER INFORMATION

BUILDING ELEVATION									
FIRE ZONE/ AREA	RACEWAY OR ITEM	TYPE	DIAMETER OR SIZE	FIRE RATING	APPROX. LENGTH FT.	APPROX. TSI AREA SQ. FT.	APP R III G	EXEMPT.	APPROX IEEE AMT [LENGTH]
AUXILIARY BUILDING 599'									
1AB-1b	1P57F2B	COND.	1.00"	1-HR	68			X	
1AB-1b	1R33F1051B	COND.	2.00"	1-HR	37			X	30 FT
1AB-1g	RAD SHIELD	PANEL	94" X36"	NONE		24		X	
1AB-2	1E12H3B	CHNL.	4" X 2"	1-HR	8	11	X		5 FT
1AB-2	1R33C5427B	COND.	1.25"	1-HR	138			X	100 FT
1AB-2	1R33F103B	COND.	2.50"	1-HR	2		X		
1AB-2	1R33F1051B	COND.	2.00"	1-HR	36			X	
1AB-2	1R33F251B	COND.	2.50"	1-HR	6		X		
DIESEL GENERATOR BUILDING 620'									
DG-1d	107	TRAY	6" X 3"	1-HR	8	15	X		8 FT
DG-1d	108	TRAY	6" X 3"	1-HR	8	15	X		8 FT
DG-1d	145	TRAY	12" X 3"	1-HR	4	11	X		
DG-1d	146	TRAY	12" X 3"	1-HR	4	11	X		
DG-1d	611	TRAY	12" X 3"	1-HR	8	23	X		8 FT
DG-1d	659	TRAY	24" X 3"	1-HR	8	39	X		
DG-1d	1691	TRAY	12" X 3"	1-HR	18	51	X		
DG-1d	285	TRAY	12" X 3"	N/A	-	-			7 FT

COND. = CONDUIT CHNL. = CHANNEL TYPE TRAY