

# Maine Yankee

RELIABLE ELECTRICITY SINCE 1972

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September 26, 1996

MN-96-138

JRH-96-210

## UNITED STATES NUCLEAR REGULATORY COMMISSION

Attention: Document Control Desk

Washington, DC 20555

References: (a) License No. DPR-36 (Docket No. 50-309)  
(b) MYAPCo Letter to USNRC (MN-95-113, dated September 27, 1995)  
(c) USNRC Letter to MYAPCo dated April 1, 1996, Request for Additional Information Regarding Appendix R Exemption for Flux Monitoring Circuits (TAC. No. M93941)

Subject: Appendix R Exemption for Flux Monitoring Circuits

Gentlemen:

Maine Yankee requested an exemption from the radiant heat shield requirements of Section III.G of Appendix R to 10 CFR Part 50 in reference (b). Reference (c) requested additional information on this subject.

Maine Yankee has decided to withdraw the request for exemption. Attached please find a description of how we plan on meeting the radiant heat shield requirements of Section III.G of Appendix R to 10 CFR Part 50.

Please contact us should you have any questions regarding this matter.

Very truly yours,



James R. Hebert, Manager  
Licensing & Engineering Support Department

JRH/mwf

Enclosure

c: Mr. Hubert Miller  
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## **EXECUTIVE SUMMARY**

The installed configuration of Thermo-Lag 330-1 material on the 2" diameter conduit containing neutron monitoring (NI) cable inside containment at MY directly meets the critical parameters required to qualify the configuration as achieving at least a 1/2 hour fire rating. A stainless steel material will be used to encapsulate the radiant energy shield (RES) in order to comply with the noncombustibility requirements for a RES. The adequacy of protection provided for the conduit supports and/or intervening steel will be confirmed during installation of the stainless steel encapsulation material, with upgrades provided if required. Reasonable assurance is provided that the RES installed at MY meets regulatory requirements for a RES upon installation of the stainless steel encapsulation and confirmation of the adequacy of the protection provided to the conduit supports and intervening steel. The existing Thermolag material protecting the NI conduit will be upgraded, as necessary, to meet the requirements of an RES during the next refueling outage.

## **BACKGROUND INFORMATION**

Section III.G.2.e of Appendix R to 10CFR50 (Reference 5) allows the use of a noncombustible RES as one of the separation methods for protection of redundant safe shutdown capability inside containment.

Section III.G.2.e does not specify a fire rating requirement for the RES. Reference 4 responds to a question in Section 3.7.1 about the fire ratings for RESs. The response refers to the guidelines of BTP CMEB 9.5-1, Section C.7.a(1)b, which indicates that an RES should have a fire rating of 1/2 hour. It goes further to state that any (noncombustible) material with a 1/2 hour fire rating should be capable of performing the required function.

Based on the above, NRC requires that RESs be constructed of noncombustible materials. In addition, although not identified as such in Appendix R, NRC has interpreted that RESs are required to achieve a 1/2 hour fire rating. Non-fire-rated RESs may be acceptable to NRC provided that they have been demonstrated to provide an equivalent level of protection against the hazard of a localized fire inside containment.

A radiant energy shield is used to protect a NI cable running in a 2" diameter conduit in Loop 1 at Maine Yankee. The RES is constructed of TSI's Thermo-Lag 330-1 material in a configuration that the vendor documented as having a 1-hour fire rating at the time of installation. The use of the TSI material as a RES was, at that time, considered conservative. The qualified fire rating of TSI assemblies has been under scrutiny since the early 1990's. It has been shown by tests that the original configurations, thought to provide a 1-hour fire rating, like the configuration used at MY, do not meet the acceptance criteria for a 1-hour fire barrier. In addition, it has also been shown that Thermo-Lag 330-1 does not meet the definition of a noncombustible material.

The following documents the fire rated capabilities of the Thermo-Lag assembly in its installed configuration on the NI conduit at MY. Issues of combustibility of the material will be addressed by encapsulating the Thermo-Lag material with a stainless steel material.

## **DISCUSSION**

Reference 1 was developed by NEI to provide utilities with a process to determine the fire rated capabilities of Thermo-Lag 330-1 assemblies used to protect one train of required safe shutdown capability. The scope, definitions, methodology, and evaluation criteria are addressed in Sections 1 through 6 of Reference 1. The appendices contain most of the detailed information necessary to implement the application guide.

Appendix A "Tested Barrier Segments" is used to correlate the size, shape, and orientation of the installed item against NEI, TUEC, and TVA fire tests that were conducted to meet standard fire test acceptance criteria. Appendix B "Tested Assemblies" provides some specific information on the construction of the Thermo-Lag barrier and summarizes the fire test results for the same fire tests identified in Appendix A. Appendix C "Tested Parameters" lists the critical configuration parameters that must be evaluated in order to determine the available fire rating of an as-installed configuration, and provides a cross-reference to the as-tested critical parameters in the NEI, TUEC, and TVA fire tests. Appendix D provides the technical bases for evaluating specific as-installed parameters that do not directly match those in the fire tests (such as installed steel vs. tested aluminum raceways) through the use of bounding criteria.

Based on the information provided in Appendices A and B of the Application Guide, the as-installed configuration of Thermo-Lag on the 2" diameter conduit at MY most closely matches the 2" diameter conduit tested in NEI Test 2-1. Appendix B identifies that the 2" diameter conduit tested in NEI Test 2-1 exceeded the conduit surface and conduit internal temperatures at 39 minutes and 45 minutes, respectively. Appendix B also identifies the physical condition of the surface of the Thermo-Lag barrier was satisfactory following the test, meaning no unacceptable openings developed in the barrier during the test. Therefore, if the installed configuration at MY closely matches the configuration tested in NEI Test 2-1, a minimum 1/2 hour fire rating can be assigned to the RES at MY.

Based on the comparison of critical configuration parameters provided in the application guide, reasonable assurance is provided that the as-installed configuration of Thermo-Lag 330-1 material on the 2" diameter conduit will perform at least as well as the 2" diameter conduit configuration tested in NEI Test 2-1, provided that the adequacy of protection for supports and intervening steel are confirmed. Therefore, reasonable assurance is provided that the RES at MY could achieve at least a 1/2 hour fire rating.

## REFERENCES

1. NEI Application Guide for Evaluation of Thermo-Lag 330 Fire Barrier Systems, Rev. 2
2. Fire Endurance Test of a Thermo-Lag 330-1 Fire Protective Envelope Test 2-1 (6in., 4in., 2in., and 3/4in. Aluminum Conduit Assemblies), dated 4/7/94
3. Fire Endurance Test Acceptance Criteria for Fire Barrier Systems Used to Separate Redundant Safe Shutdown Trains within the Same Fire Area (Supplement 1 to Generic Letter 86-10, "Implementation of Fire Protection Requirements"), dated 3/25/94
4. Implementation of Fire Protection Requirements (Generic Letter 86-10), dated 4/24/86
5. 10CFR50 Appendix R - Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979, dated 11/19/80
6. Maine Yankee Job Order No. 83-09A-2-1, Implementing Instructions for Installation of Fire Barrier Materials in Instruction No. 83-09A-2
7. Maine Yankee Purchase Order No. 36746, inclusive of addendums, Purchase and Installation of Fire Barrier For Electrical Conduits and Junction Box Assemblies, Specification No. MY-EDCR 83-09A-S1