

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR REACTOR REGULATION  
WASHINGTON, D.C. 20555

December 6, 1991

**NRC INFORMATION NOTICE 91-79: DEFICIENCIES IN THE PROCEDURES FOR INSTALLING  
THERMO-LAG FIRE BARRIER MATERIALS**

Addressees

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to problems that could result from improperly installed THERMO-LAG 330-1 fire barriers that are used to satisfy NRC fire protection requirements for safe shutdown components. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice are not new NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances

NRC Information Notice (IN) 91-47, "Failure of THERMO-LAG Fire Barrier Material to Pass Fire Endurance Test," reported a number of installation deficiencies identified at the River Bend Station (RBS) and discussed a ASTM E-119 fire endurance test conducted for Gulf States Utilities (GSU) in October 1989 at Southwest Research Institute (SwRI) that ended with a failure of a 3-hour THERMO-LAG 330-1 cable tray protective envelope system. On August 23, 1991, the vendor, Thermal Science, Incorporated, (TSI), issued a letter to a number of licensees that discussed specific installation issues raised in IN 91-47 and concluded that the SwRI fire endurance test was not a valid test because of deficiencies in the installation of the test article.

Other licensees have also identified instances of THERMO-LAG fire barrier configurations that were not installed in accordance with the vendor's installation procedures manual. For example, Cleveland Electric Illuminating Company (CEI) reported in Licensee Event Report 91-020 that the mechanical fasteners (banding straps) on the fire barrier enclosures at Perry Nuclear Power Plant had not been installed in accordance with the vendor's installation procedures manual. CEI identified the installation discrepancies while conducting routine fire wrap inspections using revised inspection criteria. The licensee

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identified that no fire endurance tests or engineering analysis had been performed to support the installed configuration. The licensees that have experienced installation problems have attributed most of the reported installation problems to contractor installer errors, incomplete or incorrect design documents, and inadequate quality control oversight. The NRC has also identified a number of installation variations as it has continued to review the vendor's installation procedures and the installation specifications, procedures, and practices for specific plants. Some of the installation variations observed by the NRC do not appear to be in accordance with the vendor's installation procedures manual and may comprise configurations that have not been qualified by fire endurance testing or engineering analyses. In several cases, such as at the River Bend Station (RBS) and Washington Nuclear Power Unit 2 (WNP2), the installation methods used during initial construction of the plant that deviated from the vendor's installation procedures manual were found unacceptable when subsequent qualification fire endurance testing resulted in fire barrier failures.

On October 17, 1991, the NRC met with TSI to discuss issues regarding installation and qualification testing. The vendor stated that it had not included several essential application steps and precautions in its installation procedures manual because the information was presented during the TSI certification training for installers. The vendor stressed the importance of using skilled and certified craftsmen, and qualified quality control inspectors to achieve an adequate fire barrier enclosure. In addition, several licensees have related to the NRC receiving supplementary written and verbal installation guidance from TSI representatives that is not included in the TSI installation procedures manual.

The NRC has discussed installation details with licensees, and visited a number of sites. The staff has observed variations among the installation procedures and practices regarding the following fabrication details:

- Methods for sealing and filling joints between panel sections.
- The orientation and application methods for stress skin.
- The requirements for raceway support protection.
- Allowable gap widths between panel sections.
- The configuration and orientation of structural ribs.
- Methods for installing vaults and firewalls.
- Banding material and application methods.
- Scoring and grooving of panels for fabricating and bending the panels around bends in raceways.
- Thickness acceptance criteria.

For example, an important task during the installation of THERMO-LAG fire barriers is the filling of the joints between adjoining prefabricated panel sections with trowel-grade material to the full depth of the panels. Some facilities use a method in which the ends of individual panel sections are butt joined to one another and the seam between the panel sections is filled and covered with THERMO-LAG trowel grade material (commonly referred to as "dry-fitting"). Some licensees fill the joints by "pre-buttering" the edges of the individual panel sections with trowel grade material before they join the

panels to ensure that the gap between the panels is completely filled. The vendor did not list this method as an option for installing cable tray enclosures in its current installation procedures manual. However, on October 17, 1991, the vendor stated to the NRC that this method was acceptable for installing THERMO-LAG panels to cable trays. In its August 23, 1991, letter to licensees, the vendor stated that stress skin must be placed over panel joints to ensure a continuous outer layer of stress skin for 3-hour barriers and a recent vendor procedure, TSI Technical Note 20684-AL, of October 1989, provides updated installation procedures for aluminum cable trays and requires that each butt joint be covered by an additional layer of stress skin and trowel grade material. The current vendor's generic installation procedures manual does not provide any guidance for installing a continuous layer of stress skin.

The NRC has not been able to verify that all of the specific installation variations observed have been qualified by independent qualification testing or engineering analyses. The NRC is continuing to review other technical issues regarding THERMO-LAG 330-1 fire barriers, including issues concerning the adequacy of qualification testing. Generic Letter 86-10, "Implementation of Fire Protection Requirements," provides additional NRC guidance on fire barrier qualification test acceptance criteria and evaluation of deviations from tested configurations to substantiate field installations.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

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Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED  
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
88-92, Supp. 1	Potential for Spent Fuel Pool Draindown	11/29/91	All holders of OLs or CPs for nuclear power reactors.
91-78	Status Indication of Control Power for Circuit Breakers Used in Safety-Related Appli- cations	11/28/91	All holders of OLs or CPs for nuclear power reactor
90-57, Supp. 1	Substandard, Refur- bished Potter & Brum- field Relays Repre- sented as New	11/27/91	All holders of OLs or CPs for nuclear power reactors.
91-77	Shift Staffing at Nuclear Power Plants	11/26/91	All holders of OLs or CPs for nuclear power reactors.
91-76	10 CFR Parts 21 and 50.55(e) Final Rules	11/26/91	All holders of OLs or CPs and vendors for nuclear power reactors.
91-75	Static Head Corrections Mistakenly not Included in Pressure Transmitter Calibration Procedures	11/25/91	All holders of OLs or CPs for nuclear power reactors.
91-74	Changes in Pressurizer Safety Valve Setpoints Before Installation	11/25/91	All holders of OLs or CPs for nuclear power reactors
91-73	Loss of Shutdown Cooling During Disassembly of High Pressure Safety Injection System Check Valve	11/21/91	All holders of OLs or CPs for nuclear power reactors.
91-72	Issuance of a Revision to the EPA Manual of Protec- tive Action Guides and Protective Actions for Nuclear Incidents	11/19/91	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License  
CP = Construction Permit

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OFC : C/OCB: DORA: NRR: D/DOEA: NRR:  
NAME : CBerlinger : CERossi  
DATE : 12/02/91 : 12/4/91

*In accordance with 11/26/91 memo,  
Miraglia & Rossi, concurrences by  
OGC, OI, OIG, and Tech  
Editor were previously obtained  
by F. Miraglia et al  
Carl Berlinger  
12/2/91*

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