



**CENTERIOR
ENERGY**

PERRY NUCLEAR POWER PLANT

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VICE PRESIDENT - NUCLEAR

January 3, 1992
PY-CEI/NRR-1433 L

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

Perry Nuclear Power Plant
Docket No. 50-440
LER 91-020-01

Dear Sir:

Enclosed is Licensee Event Report 91-020-01 for the Perry Nuclear Power Plant.

Sincerely,

Michael D. Lyster

MDL:RWG:sc

Enclosure: LER 91-020-01

cc: NRC Project Manager
NRC Sr. Resident Inspector
NRC Region III

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PBR ADDIC OS 00440
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Operating Companies
Cleveland Electric Illuminating
Trust, Inc.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20549, AND TO THE PAPERWORK REDUCTION PROJECT, 3150-0104, OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (3)

PAGE (3)

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91	020	01

Perry Nuclear Power Plant, Unit 1

05001944791-020-0102 OF 015

NOT IF THERE IS NO CHANGE IN REQUIREMENTS, USE PREVIOUS EPC Form 386A (1/77)

I. Introduction

On October 7, 1991, discrepancies in the installation of the fire wrap on Appendix R raceways was determined to be a fire barrier impairment which could adversely affect safe shutdown requirements. At the time of the discovery the plant was in Operational Condition 3 at zero percent rated thermal power. The reactor pressure vessel [RPV] was at 360 psig and 425 degrees Fahrenheit. On December 4, 1991, discrepancies in the thickness and length of fire barrier material on supports and heat transfer items were also determined to be a fire barrier impairment which could adversely affect safe shutdown requirements. At the time of this discovery, the plant was in Operational Condition 1 at 100 percent rated thermal power. The reactor pressure vessel [RPV] was at 1020 psig and saturated conditions.

Violations of the Fire Protection Program which would have adversely affected the ability to achieve and maintain safe shutdown in the event of a fire are required to be reported to the NRC in accordance with Technical Specification 6.9.4. The deviation of the installed mechanical fastener spacing from the vendor's tested configuration without technical justification is also considered a defect as defined in 10CFR21. The information contained in this LER satisfies the reporting requirements of that regulation.

II. Event Description

Periodic Test Instruction (PTI-P54-P0075) "Appendix R Fire Wrap Inspection" was started on June 12, 1991, with recently revised inspection criteria. On August 27, during the performance of PTI-P54-P0075, several examples of excessive band spacing were found installed in the plant. As part of the review of IEN 91-47, "Failure of Thermo-Lag Fire Barrier Material to Pass Fire Endurance Test", differences between the design for the 1 hour cable tray and conduit raceway fire wrap installed by BISCO, Inc. and the installation instructions provided by Thermal Sciences Inc. (TSI) were also identified. Discussion with the manufacturer, TSI, indicated that the fire wrap had only been tested and approved with a maximum spacing of twelve inches for the mechanical fasteners. On site records were reviewed and no documentation could be found for any fire tests for the installed configuration and no analysis was available to support extending the distance between the mechanical fasteners. Therefore, the information incorporated in the design documents was not justified.

On October 7, 1991, these discrepancies in the banding requirements of TSI Thermo-Lag Fire Wrap on Appendix R Raceways were determined to be a fire impairment as banding at an interval greater than that tested could result in the fire wrap being unable to perform its rated function. All uninspected raceways and those found to exceed the twelve inch spacing were declared impaired as a fire barrier and hourly fire watches were initiated. On October 15, 1991, BISCO Inc. was contacted; however, they also did not have any records

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TEXT (IF ANY) APPLICABLE TO THIS REPORT, USE ADDITIONAL NRC FORM 388A-1 (17)

of fire tests or analysis on the installed configuration. PTI-P54-P0075 was completed on October 16, 1991, identifying all the affected cable trays. Approximately 950 feet of affected cable trays were located throughout the plant. One example of excessive banding spacing was found with the conduit raceways.

During rework of the mechanical fasteners and other identified deficiencies, those persons installing and inspecting the rework also noted inconsistent protection of the raceway supports, both in thickness and length. Several deficiencies in length were identified during the PTI performed from June through October 1991; however, the insufficient thickness was a new deficiency. On December 4, 1991 it was determined that the insufficient fire barrier material installed on support and heat transfer members for both raceways and conduit was determined to be a potential generic plant-wide problem. All protected Appendix R raceways and conduits were declared impaired, and where no impairment documentation existed for previously impaired raceways, new impairments were generated and the appropriate compensatory actions were initiated.

III. Cause Analysis

The cause of inadequate banding spacing was inadequate design. The TSI vendor manual specifies a maximum spacing of twelve inches between the fasteners. The spacing specified on the design drawing and in the Installation Standard Specification, (ISS 2100) "Detailed Specification for Penetration Seals, Raceway Fire Barriers and Radiant Heat Energy Shield", called for a band 1 to 7 inches from the edge of a board section and one band in the middle of the section. With board lengths up to 6.5 feet long, bands could be up to 38 inches apart. Conditions in the plant of up to 24 inch spacing have been found. Also the design for conduit wrap required a spacing of twelve plus or minus three inches between the fasteners. This information was approved by the Architect Engineer, Gilbert Commonwealth. Due to the inaccurate design information, incorrect installation criteria were incorporated into PTI-P54-P0075 when it was separated from PTI-P54-P0054, "Fire Barrier Visual Inspection" on April 19, 1991.

The cause of insufficient fire barrier material on the raceway and conduit supports/heat transfer items was inadequate installation procedures. Although the TSI vendor manual called for fire barrier material 0.25 inches thick and 18 inches in length from the outer surface of the raceway barrier, examples of as thin as 0.125 inch and as short as 9 inches were discovered. This can be partially attributed to an inadequate installation instruction which specified verifying the 0.25 thickness when the fire barrier material was wet, and which did not account for any shrinkage that may occur when the material dried, as specified in the vendor manual. In many cases, other members intercepting the support within the 18 inch distance from the outer surface of the raceway barrier were not covered with the fire barrier material. This can be attributed to application errors during installation and inadequate installation vendor:

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TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (R530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555 AND TO THE PAPERWORK REDUCTION PROJECT (L150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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supplied quality control program. In these instances, the TSI installation requirements had not been clearly communicated through the installation and inspection documents.

IV. Corrective Action

The immediate corrective action in both incidents was declare the raceways impaired, and to initiate hourly fire watches, with operable fire detection in all affected areas, for the fire impairment situation. Compensatory actions will remain in effect until the raceways and conduits are completely restored to operable conditions. This will include assuring all band spacing in accordance with the TSI vendor manual and that the fire barrier material on support and heat transfer items is in accordance with the ISS 2100. Due to the additional scope of work, the rework of the banding spacing is now scheduled for completion September 15, 1992. The Installation Standard Specification 2100 and the design drawing will be revised by February 7, 1992 and PTI-P54-P0075 has been revised to reflect the installation criteria for banding spacing specified by the TSI vendor manual. The PTI was also reviewed for adequacy of inspection scope; as it is a periodic inspection to discover degradations due to wear and was not intended to be a reverification of installation specification conformance, no further changes were deemed necessary. Other deviations between the BISCO installation and the TSI vendor manual have been evaluated and found to have been tested or analyzed and determined to be acceptable.

V. Safety Analysis

The Fire Protection program as described in the Updated Safety Analysis Report states that in order to protect the ability to achieve safe shutdown, as analyzed in the Safe Shutdown Capabilities Report, adequate fire barriers will be in place. The maximum fire loading in any of the affected areas is 54 minutes. Without a fire test for the installed configuration, it is not possible to determine how long the fire barrier would withstand an exposure fire in the area, or how the heat transfer items would perform with insufficient fire barrier material. The program further requires that if the barriers are degraded, compensatory measures will be taken. This requirement was not met from time of installation until the condition was discovered. As the redundant trains of various ECCS systems rely on the affected fire barriers, this event is considered to have potential safety significance.

The basis for the design of the fire protection program is to provide a defense-in-depth principle by preventing a fire from starting; quickly detecting and extinguishing fires that do start; and protecting safety related systems so that a fire will not prevent safe shutdown of the plant. Fire detection is provided by smoke detectors installed in all areas where the deficiencies were found. Also automatic suppression is provided in those areas where the combustible loading would present a potential exposure to the cables trays.

NRC FORM 2666
(6-83)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED ONE NO 2-90-6104

(EXPIRES 4/30/93)

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20563.

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TEXT OF LER SHOULD BE PREPARED, AND SUBMITTED, IN ACCORDANCE WITH 10 CFR 26.117.

A previously reported LER (88-044) dealt with missing fire wrap. In that event, the missing wrap was extended to the fire seal. Additionally, a corrective action was to include specific inspection criteria for cable tray wrap in the periodic testing. PTI-P54-P0075 was created in response to this action with very detailed inspection criteria for Appendix R Fire Wrap. This inspection not only includes a list of all fire wrap required, but also banding requirements, support steel wrap length, and any specials requirements for each inspection area. As a result of this detailed criteria, and the information provided in IEN 91-47, the discrepancy with the mechanical fastener spacing was discovered.

Energy Industry Identification System Codes are identified in the text as [XX].