



Northern States Power Company

Prairie Island Nuclear Generating Plant

1717 Wakonade Dr. East
Welch, Minnesota 55089

August 30, 1996

10 CFR Part 50
Section 50.73

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

PRAIRIE ISLAND NUCLEAR GENERATING PLANT

Docket Nos. 50-282 License Nos. DPR-42
50-306 DPR-60

Cable Tray Separation Discrepancies

The Licensee Event Report for this occurrence is attached. In the report, we made new NRC commitments indicated as the italicized statements in the Corrective Action section of the report:

This event was reported via the Emergency Notification System in accordance with 10 CFR Part 50, Section 50.72, on July 31, 1996 and August 9, 1996. Please contact us if you require additional information related to this event.

Jack Leville

for Michael D Wadley
Plant Manager
Prairie Island Nuclear Generating Plant

c: Regional Administrator - Region III, NRC
NRR Project Manager, NRC
Senior Resident Inspector, NRC
Kris Sanda, State of Minnesota

Attachment

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9609050140 960830
PDR ADOCK 05000282
S PDR

IR2241

EXPIRES 04/30/98

LICENSEE EVENT REPORT (LER)

(See reverse for required number of
digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION
COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO
THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING
BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33),
U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE
PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET,
WASHINGTON, DC 20503.

FACILITY NAME (1)

Prairie Island Nuclear Generating Plant Unit

DOCKET NUMBER (2)

05000 282

PAGE (3)

1 OF 7

TITLE (4)

Cable Tray Separation Discrepancies

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER	
07	31	96	96	-- 13 --	00	8	30	96	Prairie Island Unit 2	05000 306	
									FACILITY NAME	DOCKET NUMBER	
										05000	
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)									
N		20.2201(b)			20.2203(a)(2)(v)			50.73(a)(2)(i)			50.73(a)(2)(viii)
POWER LEVEL (10)		20.2203(a)(1)			20.2203(a)(3)(i)			X 50.73(a)(2)(ii)			50.73(a)(2)(x)
100		20.2203(a)(2)(i)			20.2203(a)(3)(ii)			50.73(a)(2)(iii)			73.71
		20.2203(a)(2)(ii)			20.2203(a)(4)			50.73(a)(2)(iv)			OTHER
		20.2203(a)(2)(iii)			50.36(c)(1)			50.73(a)(2)(v)			Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iv)			50.36(c)(2)			50.73(a)(2)(vii)			

LICENSEE CONTACT FOR THIS LER (12)

NAME

Jack Leveille

TELEPHONE NUMBER (Include Area Code)

612-388-1121

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE).	X NO	EXPECTED SUBMISSION	MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On July 31, 1996 both units were at 100% power. During review of potential discrepancies identified by the design basis reconstitution effort at Prairie Island, it was determined that cable tray separation criteria were not followed in all cases. Subsequently, other discrepant cable tray interactions were identified.

All discrepant conditions were evaluated and it was concluded that the "as-found" conditions for all cables (with the addition of administrative controls applied in one instance) allowed a determination of operability, in spite of the discrepancies. All discrepant conditions will be restored to the original design criteria.

A project has been initiated to determine the configuration of all of the cable tray interactions in the plant (except for a new building which was built to new separation criteria).

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

EVENT DESCRIPTION

On July 31, 1996 both units were at 100% power. During review of potential discrepancies identified by the design basis reconstitution effort at Prairie Island, it was determined that cable tray¹ separation criteria were not followed in all cases.

The Updated Final Safety Analysis Report (USAR), Section 8.7.2, provides Prairie Island Nuclear Generating Plant (PINGP) cable routing criteria; which states:

"Class 1E cables for each of the two units in the plant are divided into six (6) basic groups consisting of the four Reactor Protection/NIS (colored) Channels and "A" and "B" redundant trains. Minimum spacing between these groups are maintained as follows:

Redundant A & B Trains	-36"	Horizontally (tray rail to tray rail) and Vertically (tray bottom to tray bottom)
Reactor Protection/NIS Channels	-36"	Horizontally (tray rail to tray rail) and Vertically (tray bottom to tray bottom)
Spacing Between any Reactor Protection/NIS Channel and Redundant A or B Train	-36"	Horizontally (tray rail to tray rail) and 15" Vertically (tray bottom to tray bottom)

... This minimum vertical spacing would also apply between a Class 1E Tray and a Non-Safety Tray.

Where separation is not attainable, protective barriers are provided.

A design basis reconstitution tracking item, Follow-On-Item (FOI) Assessment A0688, addressed several cable tray separation issues identified by PINGP Quality Control (QC) personnel. Possible inconsistencies with USAR, Section 8 requirements were documented in QC Surveillances and Nonconformance Reports.

In response to an action item from FOI A0688, a safety evaluation was prepared to evaluate the cable tray separation discrepancies. The safety evaluation determined that the identified cable trays and their associated equipment were operable and provided a justification for continued operation. The evaluation was based on current separation criteria guidance and a mutually redundant function

¹ (EIS Component Identifier: TY)

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analysis (an evaluation to determine if a single failure could defeat redundant safety functions). Ultimately the cable tray physical separation criteria discrepancies will be resolved by the installation of barriers in accordance with plant design standards.

Subsequent to the July 31, 1996 10CFR50.72 notification, three additional cases of cable tray separation discrepancies were discovered and evaluated. Two of the interactions were acceptable based on application of reduced cable tray separation criteria justified by industry testing and safety evaluation. The third case was determined to involve two trains of pressurizer heater control cables² and could not be justified by either reduced separation criteria or redundant function analysis as outlined in the safety evaluation. The interim resolution of this discrepancy involved administrative controls which eliminated the potential of a single failure compromising redundant functions of pressurizer heater control. Both trains of pressurizer heaters remained operable per requirements of the technical specifications. This cable tray discrepancy has since been resolved by installation of barriers to meet plant design standards.

CAUSE OF THE EVENT

Design/Installation.

Many of the cable trays evaluated in FOI A0688 were installed by Modification 80Y139 to support additional cable requirements for Event Monitoring instrumentation to comply with Regulatory Guide 1.97. A review of the design and installation documentation associated with Modification 80Y139 indicates the following:

- The project design criteria cited the USAR Section 8.7 cable tray separation criteria as applicable.
- A review of the installation work request and associated design drawings indicates the documents did not adequately address cable tray separation requirements between trays installed for Event Monitoring functions and other existing safety and non-safety related cable trays. The focus of the modification appeared to be maintaining separation between redundant Event Monitoring cable trays.

For the subsequent cases:

- One discrepancy apparently resulted from the removal after initial plant operation of a barrier that is shown on the original plant cable tray installation drawings, although there is no current

² (EIS Component Identifier: CBL3)

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physical evidence that the barrier was ever installed.

- A cause determination for the second discrepancy is unresolved. The separation discrepancy is shown on the original cable tray design drawings with specific dimensions noted that match the existing installation. No barriers between the redundant trays are noted on the drawings. A search of original construction engineering records is underway to determine if this apparent discrepancy was resolved as part of original design.
- The third discrepancy apparently resulted from an installation error on Project 89Y976, "Electrical Safeguards Upgrade". A cable tray cover is shown on the design drawings but no cover was in place when identified.

ANALYSIS OF THE EVENT

In response to an action item from FOI A0688, a safety evaluation was prepared to evaluate cable tray separation discrepancies. It was determined that the cable tray discrepancies listed in the Safety Evaluation were operable and have been shown to be acceptable as a justification for continued operation (JCO) of the plant as follows:

1. The application of IEEE 384-1992 criteria to the remaining tray interactions as follows:
 - Classification of the areas of concern per IEEE 384-1992, Section 6.1:
Demonstration that areas classified as pipe failure hazard areas were not subject to conditions resulting from pipe rupture or jet impingement that would prevent safety related circuits and equipment from performing their safety related function. In accordance with Section 6.1 of the standard, this permitted these areas to be assessed as limited hazard areas subject to wetting and environmental effects only. The result of this evaluation of the three plant areas where the specified cable tray interactions occur is to establish that the effects of design basis accidents, which is limited to pipe rupture from a steam line break. Pipe whip and jet impingement do not affect the cable trays. The cables are qualified for wetting and environmental effects (from a steam line break). The only remaining effects of concern are limited to failures or faults within electrical equipment or cable, which is the single failure of concern.
 - For areas classified as limited hazard area, the application of the IEEE 384-1992, section 6.1.4 separation criteria (1" horizontal and 3" vertical separation instrument and control trays).

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- For areas classified as limited hazard areas, the application of reduced separation criteria based on industry test data (1" vertical separation between safety and non-safety related instrument and control trays).
- 2. Other interactions are acceptable based on Unit 2 (EM Cables)/Unit 1 (safety related train B) tray interactions do not involve mutually redundant trays.
- 3. Other interactions involving safeguards and non-safeguards tray interactions are acceptable; these are based on the determinations that interactions do not involve mutually redundant trays nor non-safeguard trays causing common mode involvement between two or more mutually redundant safeguard systems.

However, while operable, a reportability assessment prepared for and reviewed by the Prairie Island Plant Operations Committee determined that the event was reportable under 10CFR50.72(b)(1)(ii)(B) and 10CFR50.73(a)(2)(ii)(B): "In a condition that is outside the design basis of the plant."

Subsequent to the July 31, 1996 10CFR50.72 reporting, three additional cases of cable tray separation discrepancies were discovered and evaluated. These interactions are listed and evaluated in a safety evaluation addendum. Two of the interactions were acceptable based on application of reduced cable tray separation criteria justified by industry testing and safety evaluation. The third case was determined to involve two trains of pressurizer heater controls that could not be justified by either reduced separation criteria or redundant function analysis. The interim resolution of this discrepancy involved administrative controls on the Train B safety related source by locking out the breaker and transfer switch and maintaining the cable in a de-energized condition. This eliminated the potential of a failure (cable fault) compromising redundant trains of pressurizer heater control. Both trains of pressurizer heaters remained operable per requirements of the technical specifications. This cable tray discrepancy was resolved on an expedited basis by installation of barriers per plant design requirements. It was determined that this cable tray separation discrepancy was also a reportable event under 10CFR50.72(b)(1)(ii)(B) and 10CFR50.73(a)(2)(ii)(B): "In a condition that is outside the design basis of the plant."

Per the above discussion, all the discrepancies which have been identified have been evaluated and the affected equipment determined to be operable, therefore, health and safety of the public was not affected.

CORRECTIVE ACTION

1. *Plant cable tray separation design and installation, including both original plant design and subsequent modifications, will be reviewed and all separation discrepancies identified will be evaluated and resolved. This work will be executed as follows:*

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- A. Plant cable tray installation drawings will be color coded by separation groups (trains and channels) and reviewed to identify possible cable tray separation discrepancies. A discrepancy occurs when two or more trays in a given area are closer together than allowed by the cable tray separation criteria and tray barriers are not installed in accordance with the plant design drawings. Cable tray separation criteria are defined in the USAR and plant design documents. This evaluation will be performed in plant areas that include safety related cable trays with the exception of the newly constructed (1992) D5/D6 Building (which is designed to current standards and includes separation groups separated by building areas).
- B. All potential cable tray separation discrepancies will be physically inspected and the separation will be documented. In addition, all cable tray barriers shown on the drawings will be inspected. Each cable tray separation discrepancy confirmed by the physical inspection will be identified, evaluated, and resolved. The evaluation, in addition to tray separation issues noted above, will include a review to confirm Appendix R safe shutdown is not affected by the cable tray interaction. The evaluation will include a determination of operability, and if required, appropriate entry into Technical Specification LCO conditions, and possible compensatory actions. The inspection will also evaluate the accuracy of installation drawings for tray separation distances versus the as-built installation.
2. A safety evaluation will be written to evaluate all cases of cable tray separation discrepancies that are identified as valid by this project.
3. The Site Engineering Manual will be revised to more clearly define the requirements for installation and maintenance of barriers when required for cable tray separation.
4. Implementation Schedule:
- All cable tray separation discrepancies identified to date will be resolved by restoring cable tray separation to USAR and plant design requirements. The deadlines for this restoration is as follows:
- Unit 2: By the end of the next refueling outage which is scheduled to commence in January, 1997.
 - Unit 1: By April 1, 1997.

For the cable tray separation design and installation review discussed in Item 1 above, Corrective Action 1.A has already been started. We will provide future status reports to the Resident Inspector on Actions 1 through 3.

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5. An independent review of existing reportability determinations on open Follow-on Item (FOI) assessments (from the Design Basis Documentation and Validation program) will be conducted. Initially a sample of 10% (10 FOIs) of the open FOIs (93) will be reviewed. This review will be completed by October 31, 1996. If warranted by the findings, the sample will be increased so that there is reasonable assurance that all FOIs currently open have been evaluated accurately for operability and reportability.
6. Consider training plant electrical system and design engineers and quality control inspectors on the following:
- Licensing and design requirements for cable tray separation.
 - Installation requirements for trays and required barriers to comply with the design requirements and drawings.
 - Requirement to maintain cable tray separation and barrier installations during subsequent plant modification and work activities.

FAILED COMPONENT IDENTIFICATION

None

PREVIOUS SIMILAR EVENTS

We previously reported cable separation discrepancies for control board equipment in Unit 1 LER 93-14.