Northern States Power Company

Monticello Nuclear Generating Plant
2807 West Hwy 75
Monticello, Minnesota 55362-9637

October 31, 1994

Report Required by
10 CFR Part 50, Section 50.73

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

MONTICELLO NUCLEAR GENERATING PLANT
Docket No. 50-263 License No. DPR-22

Revision 1 to LER 94-008,
Structual Beam Connections Associated With the Cable
Spreading Room Floor Found to be Different Than Design

Revision 1 to this Licensee Event Report is attached. This report contains no new NRC commitments.

Please contact Tom Parker at (612) 295-1014 if you require further information.

William J Hill for ROA

Roger O Anderson
Director
Licensing and Management Issues

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

Attachment

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NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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.

# LICENSEE EVENT REPORT (LER)

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

| FACILITY NAME (1) | DOCKET NUMBER (2) | PAGE (3) |
|---|---|---|
| MONTICELLO NUCLEAR GENERATING PLANT | 05000 - 263 | 1 OF 7 |

TITLE (4)
Structual Beam Connections Associated With the Cable Spreading Room Floor Found to be Different Than Design

| EVENT DATE (5) | | | LER NUMBER (6) | | | REPORT NUMBER (7) | | | OTHER FACILITIES INVOLVED (8) | |
|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | MONTH | DAY | YEAR | FACILITY NAME | DOCKET NUMBER |
| 07 | 27 | 94 | 94 | 008 | 01 | 10 | 31 | 94 | | 05000 |
| | | | | | | | | | FACILITY NAME | DOCKET NUMBER 05000 |

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| OPERATING MODE (9) | N | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11) | | | | | |
| | | 20.402(b) | | 20.405(c) | | 50.73(a)(2)(iv) | 73.71(b) |
| POWER LEVEL (10) | 96 | 20.405(a)(1)(i) | | 50.36(c)(1) | | 50.73(a)(2)(v) | 73.71(c) |
| | | 20.405(a)(1)(ii) | | 50.36(c)(2) | | 50.73(a)(2)(vii) | X OTHER |
| | | 20.405(a)(1)(iii) | | 50.73(a)(2)(i) | | 50.73(a)(2)(viii)(A) | (Specify in Abstract below and in Text, NRC Form 366A) |
| | | 20.405(a)(1)(iv) | | 50.73(a)(2)(ii) | | 50.73(a)(2)(viii)(B) | |
| | | 20.405(a)(1)(v) | | 50.73(a)(2)(iii) | | 50.73(a)(2)(x) | |

LICENSEE CONTACT FOR THIS LER (12)

| NAME | TELEPHONE NUMBER (Include Area Code) |
|---|---|
| Tom Parker | 612-295-1041 |

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 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |
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| SUPPLEMENTAL REPORT EXPECTED (14) | | | EXPECTED SUBMISSION DATE (15) | MONTH | DAY | YEAR |
|---|---|---|---|---|---|---|
| YES (If YES, complete EXPECTED SUBMISSION DATE) | X | NO | | | | |


ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

While operating at 96% power on July 27, 1994, an engineer discovered a potential operability concern with the Cable Spreading Room Floor. The engineer was field verifying the Plant Control and Cable Spreading Structure Design Basis Document. The field welds for the framed beam connections did not conform with the design specified by the Architect Engineer. Initially actions were taken to ensure operability while additional structural analysis was conducted. The subsequent analysis determined that the connections are operable as installed. The field welds were made during original plant construction. This review also identified a concern with a modification that installed the Halon system in the Cable Spreading Room. A miscommunication between NSP engineers and the Architect Engineer resulted in the Halon system being installed with inadequate documentation. Improvements to the modification process have significantly reduced the probability of miscommunications similar to one discussed here.

Description:

While operating at 96% power during end-of-cycle coastdown on July 27, 1994, an engineer discovered a potential operability concern with the Cable Spreading Room Floor (EIIS System Code: MA) under Halon actuation (EIIS System Code: KQ) or during a tornado. The engineer was field verifying the Plant Control and Cable Spreading Structure Design Basis Document. The field welds for the framed beam connections did not conform with the design specified by the Architect Engineer. The design specified that:

> "All beam connections shall be detailed as shown Part 4 'Connections' of the AISC Manual of Steel Construction, Table VI and shall be equivalent to Table I or Table II bolted as specified on the drawings, unless otherwise noted."

The 6th edition of the Manual was in effect at the time of construction.

This type of connection is shown in Figure 1. The original design specified a full weld between the clip and the beam, e.g., a vertical weld and a top and bottom weld. The engineer identified several beams in the Cable Spreading Room floor that did not have the top and bottom horizontal weld (only the vertical weld). Discussions with an individual on the original construction team indicated that documentation approving this variance may exist. A review of the original plant Field Change Requests and Design Change Requests did not locate any documentation of this variance.

In researching the past structural analyses of the Cable Spreading Room floor, it was discovered that the Architect Engineer for the Halon modification had identified a concern with the potential pressure loading that would be applied by the a Halon actuation. The main concern with the floor loading was the potential overstressing of the composite beam sections in flexure (bending in the middle of the beam). The pre-operational test of the Halon system was conducted with the door (EIIS Component Code: DR) to the Cable Spreading Room unlatched to minimize the room pressure during the actuation in accordance with the Architect Engineer's concern. Following

the review of the pre-operational test by the Architect Engineer, the door was re-latched. Documentation has not been located to determine how the Halon pressure issue was resolved.

Cause:

During original construction (1968), the construction workers that welded the clips to the beams and girders did not install the clips in accordance with the specified design.

The modification that added the Halon System to the Cable Spreading Room didn't adequately resolve the additional floor loading of the Halon pressure. Following the pre-operational test, NSP engineers and the Architect Engineer miscommunicated in that NSP engineers believed that the door could be re-latched. With the door latched, a maximum gas pressure of approximately 1.2 psi could be exerted on the Cable Spreading Room floor. No structural analysis has been located to justify the additional pressure loading.

Analysis:

This event is being reported as a voluntary LER.

Initial calculations justified operability by unlatching the Cable Spreading Room door, which would remove the potential additional force that could be applied by a Halon actuation. Following further evaluation and analysis, the Cable Spreading Room floor was found to be operable as built, even with the additional Halon pressure loading. As such, there were no significant adverse consequences associated with the non-conforming welds and the miscommunication associated with the Cable Spreading Room Floor.

Corrective Actions:

The following immediate actions were promptly taken:

1. The Cable Spreading Room door was unlatched to ensure operability until further analysis could be performed. A security officer was posted at the door 24 hours a day. Unlatching the door prevented a Halon actuation from exerting pressure on the floor, thereby ensuring operability of the structure. The Halon system would still perform its function with the door unlatched, as demonstrated by the Halon pre-operational test (where the door was unlatched).

2. A procedure change was written to require the Cable Spreading Room and the Main Control Room door to be opened in the event that a tornado was present in the vicinity of the site. This action was taken as a precautionary measure.

   It has since been determined that Monticello's licensing basis does not require the tornado differential pressure to be applied to the Cable Spreading Room floor. The original design only applied the tornado differential pressure to external building surfaces.

The following subsequent actions were taken:

1. Additional structural analysis was conducted on the Cable Spreading Room floor. This analysis assumed that the floor concrete slab would carry a portion of the composite beam reaction forces to the supporting structures. Only a portion of the concrete slab (depending upon the slab thickness) was assumed to carry reaction forces (non-dead load forces). This assumption is being used for operability determinations.

   These analyses identified the Cable Spreading Room as being operable as built with a Halon actuation with the Cable Spreading Room door latched, thus this condition was not reportable under 10 CFR 50.72 or 50.73.

2. At the same time the additional analysis was being conducted, high strength bolts (A325) were purchased to be placed in the erection bolt holes (See

Figure). These bolts were added to five of the higher stressed connections to increase their load carrying capacity by developing friction type connections. It was later determined that the connections did not require the high strength bolts to be operable.

3. Other areas of the plant were reviewed to see if similar non-conforming field welds existed on field welded beam connections. Most of the field connections in the plant were found to be similar to the Cable Spreading Room floor, i.e., not in conformance with the specified design. Most of the welded connections (approximately 80%) are shop welds with which we have found no discrepancies.

   Approximately 50% of the plant areas containing non-conforming field welded connections have been reviewed and all areas have been found to be operable. We will continue to review the rest of the areas.

4. The modifications process has been substantially changed and upgraded since the Halon modification was installed, i.e., 1) system engineers no longer perform modifications; a separate group of engineers, who specialize in modifications, perform modifications 2) a team approach is used to perform modifications, 3) a third level technical review of modifications is performed by senior plant engineering personnel, 4) a specific procedure governs communications between NSP and contractors (e.g. Architect Engineers), etc. These changes reduce the likelihood of future miscommunications occurring.

The following future actions will be taken:

1. A long term resolution to the issue of non-conforming field-welded beam connections will be developed and implemented.

2. Structural analysis of other non-conforming field-welded beam connections in structures containing Class I equipment will be completed.

3. This LER will be updated following the completion of the above two actions.

Additional Information:

Failed Component Identification:
None

Previous Similar Event:
None

## Supplemental Information Associated with Revision 01

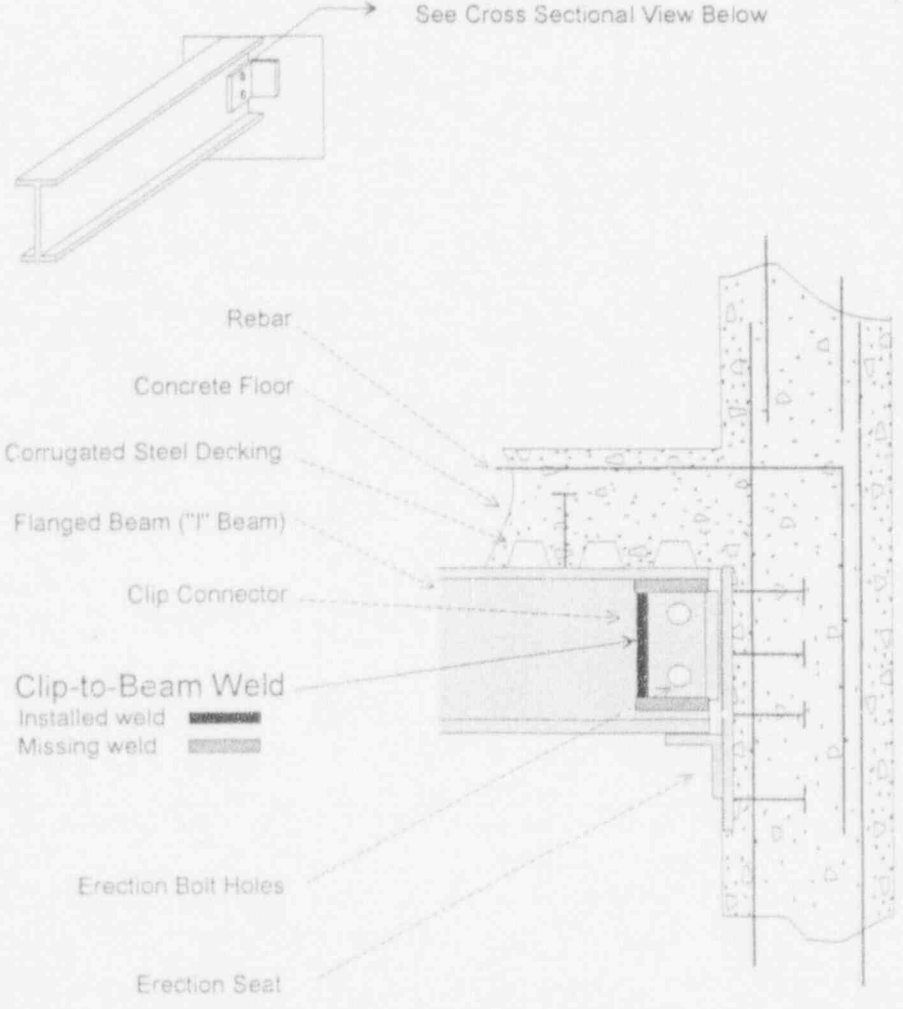
The modifications discussed in Revision 0 were found to be adequate for the long term solution to this concern. All structures containing Class I equipment containing non-conforming field welded beam connections have been reviewed with structural analysis completed where necessary. No additional modifications were found to be necessary. The following methodology was used:

Our long term solution does not assume that concrete slabs carry any shear (reaction) forces. Our calculations to support operability did assume a portion of the concrete slab would carry some shear (reaction) force. The AISC Code does not take credit for the load carrying capacity of the concrete floor slab, so our long term solution takes no credit for the concrete slab floor.

The capacity of the beam web was determined using the Block Shear Failure Technique (See AISC Code, 9th Edition, Section J4).

The allowable weld strength used was 21 KSI, rather than the 15.8 KSI originally used. The original construction Code allowed 15.8 KSI to be used. Later editions of the AISC Code allow 21 KSI. Justification to use the later code version was provided in a 10 CFR Part 50, Section 50.59 evaluation. The 21 KSI for weld strength allowable will be reflected in the next revision to the Updated Safety Analysis Report.

# TYPICAL CABLE SPREADING ROOM FLOOR FIELD WELDED BEAM CONNECTIONS




Not to Scale