



Northern States Power Company

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July 19, 1991

10 CFR Part 50
Section 50.73

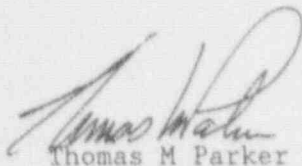
U S Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
Docket Nos. 50-282 License Nos. DPR-42
50-306 DPR-60

One Unit 1 Safety-related Snubber Failed Its Functional Test

The Licensee Event Report for this occurrence is attached.

Please contact us if you require additional information related to this event.



Thomas M Parker
Manager
Nuclear Support Services

c: Regional Administrator - Region III, NRC
NRR Project Manager, NRC
Senior Resident Inspector, NRC
MPCA
Attn: Dr J W Ferman

Attachment

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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATES 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 20503.

FACILITY NAME (1)

Prairie Island Nuclear Generating Plant Unit 1

DOCKET NUMBER (2)

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TITLE (4)

One Unit 1 Safety-related Snubber Failed Its Functional Test

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 NAMES | DOCKET NUMBER(S) |
|-------|-----|------|------|-------------------|-----------------|-------|-----|------|-----------------------|------------------|
| 06 | 19 | 91 | 91 | 008 | 00 | 07 | 19 | 91 | Prairie Island Unit 2 | 05000306 |
| | | | | | | | | | | 0500011 |

OPERATING MODE (9)

N

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11)

| | | | | | |
|------------------|-----|-----------------|----------------|--------------------|-------------------------------------------------------------|
| POWER LEVEL (10) | 000 | 20.402(a) | 20.406(a) | 50.73(a)(2)(H) | 72.71(a) |
| | | 20.406(a)(1)(U) | 50.73(a)(1) | 50.73(a)(2)(V) | 72.71(a) |
| | | 20.406(a)(1)(H) | 50.73(a)(2) | 50.73(a)(2)(VH) | |
| | | 20.406(a)(1)(U) | 50.73(a)(2)(U) | 50.73(a)(2)(VH)(A) | OTHER (Specify in Address below and in Text, NRC Form 365a) |
| | | 20.406(a)(1)(H) | 50.73(a)(2)(H) | 50.73(a)(2)(VH)(B) | |
| | | 20.406(a)(1)(V) | 50.73(a)(2)(U) | 50.73(a)(2)(A) | |

LICENSEE CONTACT FOR THIS LER (12)

NAME

Arne A Hunstad

TELEPHONE NUMBER

6 1 2 3 8 8 - 1 1 2 1

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

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NRC | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NRC |
|-------|-------------|-----------|--------------|-------------------|-------|--------|-----------|--------------|-------------------|
| B | B1 P S N B1 | B10 87 | Yes | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

SUPPLEMENTAL REPORT EXPECTED (14)

EXPECTED SUBMISSION DATE (15)

MONTH DAY YEAR

YES (If yes, complete EXPECTED SUBMISSION DATE)

XX NO

ABSTRACT (Limit to 1400 words, i.e., approximately fifteen single-space typewritten lines) (16)

On June 19, 1991 Unit 1 was shutdown for refueling. The snubber at location 1-SIRH-23B was being functionally tested in accordance with Technical Specification 4.13.C. The snubber had been in service for 5 years on a Safety Injection Accumulator discharge line. The snubber failed its functional test. Fluid condition was also found to be unacceptable; the fluid, usually translucent with a blue or pink tint added, had deteriorated such that it was dark and opaque. The snubber was declared inoperable and corrective actions were taken.

The snubber experiences a small-amplitude constant vibration. It is believed that this vibration, which causes constant movement of the snubber piston, results in localized heating of the snubber fluid. In those snubbers utilizing metal piston rings, it is believed that the localized heating is sufficient to cause degradation of the snubber fluid. Fluid degradation allowed heating and abnormal wear of metal piston rings and cylinder walls. The degraded fluid partially plugged internal control valves, preventing proper piston movement.

An adjacent snubber, which uses elastomer rings, was inspected and found to be in good condition. Snubbers of the vendor's later design use elastomer rings.

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 (F-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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|-----------------------|-------------------|----------------|-------------------|-----------------|----------|----|
| FACILITY NAME (1) | DOCKET NUMBER (2) | LER NUMBER (3) | | | PAGE (3) | |
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | | |
| Prairie Island Unit 1 | 0500028291 | 91 | 008 | 00 | 02 | 04 |

TEXT (If more space is required, use additional NRC Form 365A's) (17)

EVENT DESCRIPTION

On June 19, 1991 Unit 1 was shutdown for refueling. The snubber (EIIIS Component Identifier: SNB) at location 1-SIRH-23B was being functionally tested in accordance with Technical Specification 4.13.C. The snubber had been in service for 5 years on a Safety Injection Accumulator discharge line (EIIIS System Code: BQ). The snubber failed its functional test when it could not be operated through its full stroke of 5 inches in either tension or compression (actual available movement was only 3-1/2 inches). Also, the snubber did not lock up properly. Fluid condition was also found to be unacceptable; the fluid, usually translucent with a blue or pink tint added, had deteriorated such that it was dark and opaque. The snubber was declared inoperable and corrective actions were begun. The failed snubber was disassembled and inspected. A replacement snubber was installed in location 1-SIRH-23B.

Note that this event was not an event that presented itself to the plant operators; therefore, there is no discussion of the event from the perspective of the operator.

CAUSE OF THE EVENT

The snubber experiences a small-amplitude constant vibration. It is believed that this vibration, which causes constant movement of the snubber piston, results in localized heating of the snubber fluid. In those snubbers utilizing metal piston rings such as the failed snubber, it is believed that the localized heating is sufficient to cause degradation of the snubber fluid. Fluid degradation allowed heating and abnormal wear of metal piston rings and cylinder walls. The degraded fluid partially plugged internal control valves, preventing proper piston movement.

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 (F-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

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TEXT (If more space is required, use additional NRC Form 365A-1 (17))

An adjacent snubber, which uses elastomer piston rings, was inspected and found to be in good condition. Snubbers of this vendor's later design use elastomer rings.

It is believed that proper visual inspection of fluid would detect degradation before snubber failure. The visual inspections done to date have not specifically judged fluid quality.

ANALYSIS OF THE EVENT

A snubber must allow thermal (slow) movement of the piping while acting quickly to restrain piping subjected to seismic activity. Analysis of the snubber failure showed that the 3-1/2 inch movement observed was sufficient to prevent the snubber from restraining its piping during thermal expansion. However, the snubber probably would not have acted properly to restrain piping movements during a seismic event. No seismic events were experienced during the period the snubber was failed; therefore, this event had no effect on integrity of the piping system. Since the snubber was inoperable, Technical Specification 3.12.A was violated, and the event is reportable pursuant to 10CFR50.73(a)(2)(i)(B).

Technical Specification 4.13.C requires that, for each failed snubber, an additional ten percent of similar snubbers be tested. Since there are 8 snubbers of this type in Unit 1 one additional snubber was tested and found satisfactory.

The engineering evaluation performed in accordance with Technical Specification 4.13.E showed that components affected by the inoperable snubber remain capable of meeting their design service.

CORRECTIVE ACTIONS

Corrective actions included:

A thermal growth analysis of the piping associated with the failed snubber was performed by the architect-engineer. This evaluation concluded the reduced stroke was adequate for thermal growth.

The engineering evaluation required by Technical Specification 4.13.E was done.

The failed snubber was disassembled and inspected.

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FACILITY NAME (1)

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Prairie Island Unit 1

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TEXT (IF MORE SPACE IS REQUIRED, USE NRC Form 365A-1 (17))

The snubber fluid was analyzed. It was found to be the correct fluid, but the fluid had deteriorated and contained metal wear particles.

The snubber adjacent to the failed snubber was removed, functionally tested, disassembled and inspected. This snubber, in service 4 years, has elastomer rings and is believed to see the same operating conditions as the failed snubber. No abnormalities were observed.

All safety-related snubbers were visually inspected for fluid quality; no other snubbers with deteriorated fluid were found.

A replacement snubber (with elastomer piston rings) was installed in location 1-SIRH-23B.

The snubber visual inspection frequency will be modified in accordance with Technical Specification 4.13.A.

Steps will be added to visual inspection surveillance procedures to specifically inspect fluid quality.

Snubbers rebuilt in the future will be fitted with elastomer seals in place of the metal piston rings.

FAILED COMPONENT IDENTIFICATION

Basic Engineers 2X5 snubber, Model 410

PREVIOUS SIMILAR EVENTS

There have been no previous similar events reported at Prairie Island.