

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report No. 50-282/79-15; 50-306/79-12

Docket No. 50-282; 50-306

License No. DPR-42; DPR-60

Licensee: Northern States Power Company
414 Nicollet Mall
Minneapolis, MN 55401

Facility Name: Prairie Island Nuclear Generating Plant, Units 1 & 2

Inspection At: Red Wing, Minnesota

Inspection Conducted: June 26-28, 1979

Inspector: E. J. Gallagher

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7-13-79

Approved By:

D. W. Hayes
D. W. Hayes, Chief
Engineering Support Section 1

7/13/79

Inspection Summary

Inspection on June 26-28, 1979 (Report Nos. 50-282/79-15; 50-306/79-12)

Areas Inspected: Followup to IE Bulletin No. 79-02, pipe support base plate designs using concrete expansion anchors; review of test program and procedures; observation of testing of anchor bolts and review of quality records. The inspection involved a total of 14 inspector-hours by one NRC inspector.

Results: No items of noncompliance were identified in the areas inspected.

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DETAILS

Persons Contacted

Principal Licensee Personnel

- *P. Tierney, Plant Manager
- *G. LeNertz, Staff Engineer

Teledyne Engineering Service

- G. A. Carpenter, Principal Engineer
- P. D. Harrison, Senior Engineer

NRC Resident

- *C. Feierabend

*Denotes those in attendance at exit meeting.

Functional or Program Areas Inspected

An inspection was performed at the Prairie Island, Units 1 & 2 operating plants, in order to followup on licensee actions regarding IE Bulletin 79-02, pipe support base plate designs using concrete expansion anchors.

1. Status of Licensee's Test Program of Pipe Support Base Plates Units 1&2

As of the inspection, the licensee had fully implemented a test program to verify the status of pipe support base plate designs and installations using concrete expansion anchors. The following system are included as seismic category I:

- a. Steam Generator Blowdown
- b. Main Steam (PART)
- c. Auxiliary Feedwater
- d. Safety Injection
- e. Reactor Coolant
- f. Residual Heat Removal
- g. Containment Spray
- h. Chemical Volume Control
- i. Component Cooling Water
- j. Emergency Cooling Water
- k. Spent fuel pit cooling

Regulatory Guide 1.29, Seismic design classification was used to identify the above.

Items brought to the NRC inspector's attention are as follows:

- a. The original anchors were installed without an inspection or quality control procedure however, the manufacturers equipment and recommended installation practices were used.
- b. Units 1 & 2 have not had any extended outages during the bulletin time frame which would allow for inspections to be performed in normally inaccessible areas. These areas are planned to be inspected during the next refueling period in early 1980. The auxiliary building supports are to be tested during plant operation.
- c. One type of expansion anchor was used: Shell type manufactured by RAWL ("Red Head").
- d. Each system identified as seismic category I is planned to be 100% visually inspected with a sample method for actual tension tests. The sample size was to be developed based on results during testing.
- e. Field inspections on approximately 225 base plates in various systems indicated certain deficiencies. They were recorded to be: (1) bolts without proper embedment into shell anchor, i.e. thread engagement less the one diameter, (2) plates and bolt spacing at variance with design details, (3) bolt size not as indicated on design drawings. Because of these findings, the Licensee initiated a 100% inspection of as-built conditions on base plate supports.
- f. Northern States Power Company is a member of the group of licensee's associated with the Teledyne analytical and experimental work on base plate design and seismic capability. Teledyne is also providing field testing and inspection services.

2. Review of Procedure for Expansion Anchor Test Programs

The inspector reviewed specifications for the anchor bolt test program. The procedure encompassed the requirements for inspection of expansion anchors as stated in the IE Bulletin.

- a. Teledyne Procedure P3607-1 Rev 0, Base plate Verification Procedure.
- b. Teledyne Procedure RP-01 Rev 0, Base plate Repair Procedure

The procedure required a direct tension test method at load equal to one-fifth ultimate as reported by manufacturer information. The loads being used to test the installed anchors were as follows:

<u>Anchor Size (inches)</u>	<u>Load (LB's)</u>
3/8	610
1/2	1,130
5/8	1,810
3/4	2,710
7/8	3,770

3. Observation of Testing Concrete Expansion Anchors (Unit 1 & 2)

The inspector observed testing and inspection activities. The following specific tests were observed:

- a. Snubber support 1-CCH-304: Four 5/8" anchors tension tested to 1,810 lbs.
- b. Snubber support 1-CCH-354-1: One 5/8" anchor tension tested to 1,810 lbs.
- c. Snubber support 1-CCH-354-2: One 1/2" anchor tension tested to 1,130 lbs.
- d. Snubber support 1-CWH-434: Four 5/8" anchors tension tested to 1,810 lbs.
- e. Snubber support 1-CCH-320-1: One 1/2" anchor tension tested to 1,130 lbs.
- f. Snubber support 1-SIH-53; Two 5/8" anchors tension tested to 1,810 lbs.
- g. Snubber support 1-CCH-320-2: One 1/2" anchor tension tested to 1,130 lbs.
- h. Snubber support 1CCH-350-1: One 1/2" anchor tension tested to 1,130 lbs.

All tension tests observed indicated that the anchors were properly set and could withstand one-fifth of the ultimate load capacity.

4. Review of Quality Records for Testing Anchor Bolts

A review was made of base plate support inspection data sheets. The inspections include all necessary information to document inspection findings. A sketch of the base plate support is included with the dimensions to be compared to design details. Discrepancies that are noted are reviewed and analyzed to determine effect on original design.

5. Other Items in IE Bulletin 79-02

- a. The bulletin requires verification that pipe support baseplate flexibility was accounted for in the calculation of anchor bolt loads. The licensee indicated that Teledyne Engineering Services is performing a site specific analysis to determine anchor bolt load accounting for flexibility. The initial review indicated some bolts do not presently have a factor of safety of five for shell type anchors as the bulletin requires.
- b. Teledyne is also performing cyclic tests to demonstrate that the shell type anchors can withstand low and high cycle load associated with a seismic event and normal operation. The results are to be included in the bulletin response.

Exit Interview

The inspector met with site staff representatives at the conclusion of the inspection on June 28, 1979. The inspector summarized the scope and findings of the inspection. The licensee acknowledged the findings.