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

REGION III

Report No. 50-263/79-16

Docket No. 50-263 License No. DPR-22

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

Facility Name: Monticello Nuclear Generating Plant

Inspection At: Nuclear Technology, Inc., San Jose, CA

Inspection Conducted: October 15-17, 1979

Inspector: I. T. Yin 11/5/79

Approved By: D. H. Danielson, Chief 11/5/79
Engineering Support Section 2

Inspection Summary

Inspection on October 15-17, 1979 (Report No. 50-263/79-16)
Areas Inspected: Licensee actions relative to IE Bulletin No. 79-14, including general discussion on NRC requirements, procedure review, and review of stress calculations and records. The inspection involved 15 inspector-hours at the consultants office by one NRC inspector.
Results: No items of noncompliance or deviations were identified.

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DETAILS

Persons Contacted

Northern States Power Company (NSP)

*R. Goranson, Project Engineer

Nuclear Technology, Inc. (Nutech)

*T. O. Brown, Director of Operations
*R. Petrokas, Deputy Director of Engineering
*A. Higginbotham, Engineering Manager
*T. N. Vogel, Project Engineer
J. Arterburn, Project Engineer
*D. McWilliams, Project Engineer
*G. Wederstein, Engineer

*Denotes those attending the exit interview.

Functional or Program Areas Inspected

This special inspection was conducted at the Nutech office to evaluate the licensee's implementation of IEB 79-14, including verification and evaluations performed by their engineering consultant. The unresolved areas identified during the inspection will be reviewed during subsequent inspections. (263/79-16-01)

1. Nutech Evaluation Basis

The original A-E and NSSS Supplier were Bechtel Power Corporation (Bechtel) and General Electric Company (GE). The licensee contracted Nutech to implement the IEB 79-14 requirements. The following materials that were transmitted to Nutech from Bechtel and GE, including hanger drawings from Bergen-Patterson Corporation (B-P), were reviewed by the inspector.

a. Bechtel Isometric Drawings

(1) Some of the isometric drawings transmitted to Nutech are vendor drawings. There was no apparent document to show the Bechtel program for verifying the vendor drawings with the stress calculation drawings. The specific questionable drawings reviewed by the inspector are contained in Nutech review package, Book 15 for the RHR Loop A.

(2) In review of Bechtel stress calculation MR-1 for the RHR System line TW-30-16-GE, where penetration X-13B was

identified as a rigid anchor, the inspector noted that since the penetration is shown with expansion type bellows on the flue head assembly, the pipe line might not be fixed at that point. Furthermore, during a site inspection of the RHR Service Water System (Nutech Book 1 of 2 Outside Containment) a hanger was observed at a wall penetration where an anchor was required. The inspector stated that further review in these areas should be made by Nutech since the removal of pipe anchors will not only affect the seismic analysis, but will also alter the original Bechtel piping thermal and weight calculations.

(3) In review of some of the Bechtel calculations, such as 507, 508, 509 and 510 contained in Nutech review package Book 1 of 5 and Book 4 of 5 for the HPCI TW3-12-ED and TW1-14-HE lines and others, it was noted by the inspector that seismic vibration modes and corresponding system frequencies were documented on the stress isometrics. However, the Nutech engineers were told that the analyses were performed based on static coefficient methods. The reason for the additional information recorded on the isometrics was that at that time Bechtel was developing a dynamic analysis computer program (ME-601), and the lines had been chosen for evaluation. The design control and the documentation of developing the static coefficient based on floor response spectrum were not apparent.

(4) In review of the Bechtel seismic analyses isometrics, it was not clear whether or not the 15 foot long 14" FE 10-18A flow element for RHR loop A (Nutech Book 15) and the rupture disc assembly which consists of four flanges, bolts and nuts, and other added weights for the HPCI RS2-16-HE line had been taken into consideration.

b. <u>GE Documents</u>

(1) The inspector reviewed a GE letter, G-EK-9-91, to Nutech, dated July 30, 1979, subject, "Monticello Nuclear Generating Plant IE Bulletin No. 79-14", which transmitted drawings, seismic analyses and other engineering documents. The letter stated that GE is not responsible for the completeness and accuracy of the content. The inspector stated that, if GE had not reviewed the material they sent, the basis and criteria for the future Nutech evaluation was considered questionable.

(2) In review of the Monticello FSAR, two areas required further clarification.

- The H. J. Saxton recirculation loop piping seismic analysis report dated October 6, 1968, did not include the bypass line. The configuration of the bypass line appeared to be unique in that it differed from the typical type for this vintage (BWR 4, Mark I); it was similar to a more recent GE generic design (BWR 5, Mark II).

- The H. J. Saxton recirculation loop piping analysis report dated October 6, 1968, did not correspond to the FSAR Table 12-2-1C, "Highest Stresses," relative to node numbers and stress values. Nutech stated that they had not yet evaluated the subject matter and that the moments due to seismic loadings were extracted from the Saxton report and were combined with moments resulting from other primary type loadings. In addition, stress intensification had been factored into the combined primary stresses.

c. B-P Hanger Design

(1) For those hanger drawings reviewed, such as No. SR-69 SR-50, SR-68A, SR-68B, SR-83, SS-36A, and SS-36B, where axial forces existed, there were no shear lugs installed to prevent slippage of pipe clamps on the pipe. No apparent studies had been made on: (1) coefficient of friction under specific conditions, (2) bolt torque requirements for various pipe sizes, (3) preventative measures to ensure required tightness would not be reduced during system operations, and (4) requirements to verify operability after material relaxation and thermal cyclic conditions.

(2) For those hanger drawings reviewed, such as SS-35, SR-68A and SR-68B, where normal dead weight of the pipe is carried by the hanger rod through the pinned connection at the pipe clamp and additional seismic loads are put on the clamp at approximately right angles to the weight load, the stress allowable for the multiple loadings at one particular set of pipe clamps was not apparent.

Based on the above questionable vendor design practices, the drawings reviewed that did not include design seismic loads, and that the restraint loading direction had not been correlated to the N-direction of the key plan, the licensee was requested to provide B-P's original hanger calculation criteria and computation documentation for the inspector's review during a subsequent inspection.

2. Nutech Evaluations

During his review of Nutech activities the inspector observed the following:

a. In review of valve weights modeled in the seismic analyses, the following significant increases were identified:

Valve No.	Valve Weight in Seismic Analysis (lbs.)	Actual Valve Weight w/o Water (lbs.)
12" MO-2071	2,000	2,953
12" MO-2067	2,820	5,000
12" AO-23-18	260	2,050
12" MO-2068	2,822	5,000
16" N-237	592	975
16" MO-2014	3,600	4,325
16" MO-2012	5,750	10,285
14" MO-2002	840	2,000

Nutech engineers stated that they had evaluated the effect of large increases in valve weights. Pipe stresses were all within the code allowables. The documentation of such evaluation was not available for review.

b. In discussion with Nutech engineers and in review of some of the re-analyses, it was noted that the water weight in the valves (where system contains water) was not considered. This was an oversite on the part of Nutech.

c. In review of Nutech evaluation package, Book 15, RHR Loop A, it was noted that the vendor drawings provided by Bechtel in their calculation MR-1 for line TW-30-16-GE, did not clearly identify all anchor points in the pipe system. The basis and depth of Nutech evaluation appeared to be questionable.

d. In conjunction with the large valve weight increases in the analyses, the effects of hanger, restraint, snubber and anchor design, particularly in the areas of material overstress and excessive deflections, had not been studied by Nutech.

e. In review of Nutech evaluation package, Book 3 of 5 for HPCI TW4-4-ED, HE lines, the 2" CV 2065 angle valve weight was not considered, and a portion of the line on the 4" system was not inspected. The inspector stated that although the bulletin addressed only lines of 2 1/2" and above, the smaller size lines and the lines that are classified non-safety related should all be inspected and evaluated as long as they could

affect the validity of the seismic calculations for 2 1/2" and larger safety related systems.

f. The inspector reviewed in general the content of the Nutech Pistar Computer program used for the seismic reanalysis. The Pistar program was contained in Nutech Topical Report, TR-76-002; Revision 1 was issued on September 18, 1978, and Revision 2 was issued on September 17, 1979. The original version of the program was verified and documented in a "Program Verification Report", Revision 0, dated January 1977. However, Revision 1 and 2 of the program had not been documented in accordance with Nutech Engineering Procedure QEP-009, "Computer Program Verification", Revision 2, dated October 20, 1978.

g. The inspector reviewed Nutech Project Instructions 1, 2 and 3 for implementing IEB 79-14 requirements, and had no adverse comments. The results of the review also resolved the two questionable areas identified in RIII Inspection Report 50-263/79-13 Paragraph 2, "IEB 79-14 Procedure Review".

h. The inspector reviewed some of the qualifications for personnel conducting the evaluation work and had no adverse comments.

3. <u>List of Some of the Documents Reviewed at Nutech</u>

- Project Instruction 1, "IE 79-14 Inspection Requirements," Revision 0, dated August 1, 1979.
- Project Instruction 2, "Submittal of IE 79-14 completed Survey Booklets," Revision 0, dated August 1, 1979.
- Project Instruction 3, IE 79-14 Project Procedures," Revision 0, dated August 1, 1979.
- Monticello FSAR, Paragraph 2.1.10, "Class I Piping Seismic Analysis".
- Monticello FSAR, Table 12-2-1C, "Highest Stresses in Recirculation Loop Piping System".
- H. J. Saxton Report, "Seismic Analysis for the Recirculation Loop Piping", dated October 6, 1968.
- Nutech Topical Report, TR-76-002, "Pistar Computer Program," Revision 2, dated September 17, 1979.
- Nutech Engineering Procedure, QEP-009, "Computer Program Verification," Revision 2, dated October 20, 1978.

- Nutech Evaluation, HPCI Book 1 of 5 for TW3-12-ED System.
- Nutech Evaluation, HPCI Book 2 of 5 for TW3-12-ED System.
- Nutech Evaluation, HPCI Book 3 of 5 for TW4-4-ED and HE Systems.
- Nutech Evaluation, HPCI Book 4 of 5 for TW1-14-HE System.
- Nutech Evaluation, HPCI Book 5 of 5 for RS2-16-HE and other systems.
- Nutech Evaluation, RHR Book 8 for Loop "A" system.
- Nutech Evaluation, RHR Book 15 for Loop "A" system.
- Nutech Evaluation, RHR Service Water Book 1 of 2 for systems outside the containment.

Exit Interview

The inspector met with the licensee and the Nutech representatives, denoted under Persons Contacted, at the conclusion of the inspection. The inspector summarized the purpose and findings of the inspection. The licensee acknowledged the findings reported herein.