

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-271/85-04

Docket No. 50-271

License No. DPR-28 Priority - Category C

Licensee: Vermont Yankee Nuclear Power Corporation
RD 5, Box 169
Ferry Road
Brattleboro, Vermont 05301

Facility Name: Vermont Yankee Nuclear Power Station

Inspection At: Framingham, Massachusetts and Vernon, Vermont

Inspection Conducted: April 9-12, 1985

Inspector: A. A. Varela
A. A. Varela, Lead Reactor Engineer

June 11, 1985
date

NRC Contract Personnel: M. E. Nitzel, EG&G, Idaho
S. L. Morton, EG&G, Idaho

Approved by: J. T. Wiggins
J. T. Wiggins, Chief
Materials and Processes Section, EB, DRS

6/11/85
date

Inspection Summary:

Inspection on April 9-12, 1985 (Report No. 50-271/85-04)

Areas Inspected: Special, announced inspection by one region-based inspector and two NRC contractor personnel of licensee actions in response to NRC/IE Bulletins 79-02, Pipe Support Base Plate Designs Using Expansion Anchor Bolts; 79-07, Seismic Stress Analysis of Safety Related Piping; 79-14, Seismic Analyses for As-Built Safety Related Piping Systems; and verification of design analyses and work performed in modifications affected by these bulletins. The inspection involved 54 inspector-hours at the Framingham, Massachusetts office, 45 inspector-hours at the plant, and 12 inspector-hours of in-office review by the inspection team.

Results: No violations were identified.

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DETAILS

1. Persons Contacted

Vermont Yankee Nuclear Power Corporation and Yankee Atomic Electric Company

- *L. X. Bozek, QA Supervisor, Operations
- *P. J. Donnelly, Technical Service Superintendent
- *J. M. DeVincentis, Engineer Support, Plant
- *C. Greeno, Mechanical Engineer
- *R. Hoch, Maintenance Superintendent
- *A. C. Kadak, Project Manager
- *R. J. Ludwick, Operations Support Manager
- *R. Martin, Supervisor, Quality Design, Procurement
- *H. M. Metell, ESD
- *R. Mossey, Construction Supervisor
- *R. P. Oliver, Lead Mechanical Engineer
- *J. Pelletier, Plant Manager
- *D. Pike, Manager, Operations Quality
- *D. A. Reid, Operations Superintendent
- A. Roudenko, Senior Engineer

CYGNA Energy Services (CYGNA)

- *G. Dyckman, Project Manager
- *S. J. Stratis, Regional QA Manager
- J. White, Division Manager
- S. C. Tumminelli, Engineer

2. Inspection Purpose and Scope

The purpose of this inspection was to review with cognizant and responsible licensee representatives at the corporate engineering office and at the plant the completeness of their responses to NRC/IE Bulletins 79-02, Pipe Support Base Plate Designs Using Expansion Anchor Bolts; 79-14, Seismic Analysis for As-Built Safety Related Piping Systems; and 79-07, Seismic Stress Analysis of Safety Related Piping. The scope of the inspection included a review of engineering design and quality assurance documentation relating to inspection, testing and modifications satisfying requirements and licensee commitments with respect to the bulletins. A walkdown inspection of the plant verified repairs relating to IEB 79-02, 79-14, and 79-07.

3. Review Criteria

The latest revisions of the subject bulletins were used to define required actions by the utility. In addition, Temporary Instructions (TI) 2515/28 and 2515/29 were used to further define inspection requirements relative

to IEB 79-02 and 79-14, respectively. Applicable sections of the Code of Federal Regulations (10 CFR 50) were used to provide guidance regarding regulatory requirements.

4. Review of Licensee Responses

The inspection team reviewed bulletin responses available from NRC files prior to the inspection. Any items requiring further discussion were noted as items to be addressed while at the corporate engineering office or plant site.

The inspection team reviewed additional material provided by the licensee during the inspection. The material relating to IEB 79-02 consisted of additional procedures governing inspection, testing, maintenance and modification of piping supports, base plates and concrete anchor bolts. Sample calculations of concrete anchor bolt loads were reviewed and samples requiring modification were chosen for detailed field inspection and QA/QC documentation followup. The additional material relating to IEB 79-14 consisted of special procedures governing the field walkdown of piping systems and current piping system isometric drawings. Samples of engineering evaluations of nonconformances found during the IEB 79-14 effort were also reviewed. No additional information specifically dealing with IEB 79-04 or 79-07 was examined at the corporate offices. In addition, results of the licensee's seismic reevaluation program (SRP) were also reviewed since this program will be encompassing the conclusion of the IEB 79-02 and 79-14 bulletins. The pertinent documents described above for IEB 79-02 and 79-14 are listed in the following tables.

TABLE 1
ENGINEERING DOCUMENTATION REVIEWED

<u>Document</u>	<u>Description</u>
BM 9002/WI-4	Cygn Energy Services (Cygn) work instruction regarding collection of field data for IEB 79-14
BM 9002/WI-5	Cygn work instruction regarding non-conformance report (NCR) processing for IEB 79-14
--	Cygn piping evaluation criteria for IEB 79-14
--	Cygn design criteria for modification of pipe supports under IEB 79-02
BM84018/WI-2	Cygn work instruction for pipe stress analysis

<u>Document</u>	<u>Description</u>
BM84018/WI-3	Cygna work instruction for pipe support analysis
BM84018/DC-1	Cygna design criteria for piping stress analysis
BM84018/DC-2	Cygna design criteria for pipe support analysis
CS-8	IEB 79-14 field walkdown package for the core spray system, part 8
FDW-5	IEB 79-14 field walkdown package for the feedwater system, part 5
FDW-5A	IEB 79-14 field walkdown package for the feedwater system, part 5A
79-14-412	NCR regarding a discrepancy on the core spray system, part 8
79-14-413	NCR regarding a discrepancy on the core spray system, part 8
79-14-126	NCR regarding a discrepancy on the feedwater system, part 5
79-14-127	NCR regarding a nonconformance on the feedwater system, part 5A
BM9002/WI-1	Cygna work instruction regarding field walkdowns of piping and supports
O.P. 5200.16	Yankee Atomic Electric Company (YAEC) concrete expansion anchor test procedure
O.P. 5200.18	Mercury Company concrete expansion anchor removal and replacement procedure
SP-49974-700	Revised Mercury Company concrete expansion anchor removal and replacement procedure
FVY 85-32	YAEC to NCR letter describing the status and results of the small bore pipe support testing program

<u>Document</u>	<u>Description</u>
79-14-336	NCR regarding a discrepancy on the high pressure coolant injection (HPCI) system, part 7
79-14-239	NCR regarding a discrepancy on support RSW-H260 located on the service water system, part 9
79-14-245	NCR regarding a discrepancy on the service water system, part 9
79-14-337	NCR regarding a discrepancy on support HPCI-H47 located on the HPCI system, part 7
BM-9002-79-14-HPCI	Piping field verification package for HPCI piping
BM-9002-79-14-RCIC	Piping field verification package for RCIC piping

TABLE 2

IEB 79-02 SUPPORTS REVIEWED

<u>System</u>	<u>Support Number</u>	<u>Field Inspected</u>	<u>Calculations Reviewed</u>
SW	RSW-HD178A	No	Yes
SW	RSW-HD178B	No	Yes
SW	RSW-H179	Yes	Yes
SW	RSW-H178	Yes	No
SW	RSW-H262	Yes	No
SW	RSW-H260	Yes	No
RCIC	RCIC-HD95C	No	Yes
RCIC	RCIC-HD95D	No	Yes
RCIC	RCIC-H84	Yes	No
RCIC	CST-H67	Yes	No
HPCI	HPCI-H152	Yes	Yes
HPCI	HPCI-H47A	Yes	Yes
HPCI	HPCI-H47B	Yes	Yes
HPCI	HPCI-H50	Yes	Yes
HPCI	HPCI-H46	No	Yes
RHR	RHR-H173B	Yes	Yes
RHR	RHR-H174C	Yes	Yes

NOTE: SW = Service Water
 RCIC = Reactor Core Isolation Cooling
 HPCI = High Pressure Coolant Injection
 RHR = Residual Heat Removal

"Field Inspected" indicates that the support was verified to agree with current drawings during the plant walkdown.

"Calculations Reviewed" indicates that structural adequacy calculations, walkdown data sheets and other related documentation were examined.

4.1 Inspection Findings

IEB 79-02 had several requirements. Among these were:

- a. Verify that pipe support base plate flexibility was accounted for in the calculation of anchor bolt loads.
- b. Verify that the appropriate factors of safety as stated in the bulletin were met.

The licensee's original efforts on Bulletin 79-02 applied only to seismic supports on Seismic Category I systems; thus, the bulletin requirements stated above were not applied to the nonseismic pipe supports which used concrete expansion anchors on Seismic Category I systems. This issue was addressed to the licensee because of the possibility that any support failure during a seismic event could have a cascading effect of overloading and failing adjacent supports. A demonstration of adequate safety factors would add assurance that the possibility of failures had been minimized.

The inspectors noted that the seismic reanalysis program (SRP) which had been initiated by the licensee addressed all piping supports on Seismic Category I systems. A limited sample of calculations performed as part of the SRP were reviewed and found to be acceptable. However, further information was requested to demonstrate that appropriate factors of safety exist for all supports using concrete expansion anchor bolts on Seismic Category I piping systems. This is Unresolved Item (50-271/85-04-01).

The licensee's representatives acknowledged the unresolved item described above and agreed to submit additional information in a timely manner.

5. Verification Walkdown Inspection

A physical inspection of portions of plant systems selected by the inspection team was conducted. The purpose of this walkdown was to verify samples of piping systems and supports for compliance to as-built conditions as described in the licensee's documentation and to verify repairs or modifications to piping, pipe supports and/or baseplates required by the subject bulletins. The following piping systems were examined:

TABLE 3
PIPING SYSTEMS FIELD VERIFIED

<u>System</u>	<u>Line</u>	<u>Drawing</u>	<u>Location</u>
S.W.	12"-SW-158	PI-1178-S	Reactor Building
RCIC	6"-CST-3	PI-1101-S	Reactor Building
HPCI	4"-HPCI-6	PI-1065-S	Reactor Building
RHR	4-RHR-24B	PI-1138-S	Reactor Building

Findings: No violations were identified.

6. REVIEW OF LICENSEE QUALITY ASSURANCE RECORDS

A review was performed of the licensee's administrative controls and quality assurance activities relating to the subject bulletins. These major categories of quality assurance actions performed by YAEC were evaluated for conformance to their QA program.

- Vendor evaluation reports of CYGNA for engineering services related to subject bulletins and the VY Seismic Reanalysis Program (SRP) initiated in July, 1980
- Surveillance inspection reports of CYGNA field engineering activities at the VY plant
- Triennial reevaluation of CYGNA

CYGNA's surveillance inspection reports (SIR) of VY plant activities relating to NRC/IEBs 79-02 and 79-14 were reviewed and evaluated. Approximately thirty reports, covering inprocess inspection, testing and as-built verification between August, 1979 and April, 1980 were covered. The Surveillance Report Status by CYGNA dated August, 1981 presented closeout of all unsatisfactory findings identified in the SIRs. Additionally, VY plant maintenance audits and surveillance reports of contractor QC actions and documentary reports on maintenance work under 79-02 and 79-14 were reviewed and evaluated for conformance to VY's operational QA department manual. Final support documentation on pipe hanger modification work performed by the Mercury Company between July, 1979 and May, 1980 was observed to be indexed, well organized and readily retrievable. Job order completion forms by the engineering support supervisor and the QA coordinator provided turnover documentation and completion check-off for each purchase order, its corresponding MPR and resolution of NCRs.

No violations were identified.

7. Conclusion

Based on the review performed during this inspection, the inspectors considered the licensee's actions regarding IEB 79-07 and 79-14 to have been acceptable. These IEBs are closed. Additionally, pending completion of the analyses and tests to be performed on anchor bolts for deadweight supports, the inspectors considered IEB 79-02 closed.

8. Definition of Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable, violations or deviations relative to the bulletin requirements. Unresolved items identified during this inspection are discussed in Paragraph 4.

9. Exit Interview

The inspectors met with licensee and A-E personnel (denoted in Paragraph 1). The NRC inspector summarized the inspection findings. The licensee acknowledged the inspector's comments and committed to provide additional documentation relating to the IEB 79-02, as identified in Paragraph 4. At no time during the inspection was written material provided to the licensee by the inspectors except a request for technical information.