

U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 50-271/84-13

Docket No. 50-271

License No. DPR-28 Priority - Category C

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

Facility Name: Vermont Yankee Nuclear Power Station

Inspection At: Vernon, Vermont

Inspection Conducted: June 25-29 and July 12-13, 1984

Inspectors: *R. A. McBrearty*  
R. A. McBrearty, Reactor Engineer

7/27/84  
date

Approved by: *J. P. Durr*  
J. P. Durr, Chief, Materials &  
Processes Section, EPB, DETP

7/27/84  
date

Inspection Summary: Inspection conducted on June 25-29, and July 12-13, 1984  
(Report No. 50-271/84-13)

Areas Inspected: Routine, unannounced inspection of the licensee's augmented ultrasonic examination of recirculation system piping in response to NRC Generic letter 84-11 including observation of work in progress, and review of personnel qualification/certification records; review of ISI program, review of NDE procedures and review of ISI data. The inspection involved 37 hours onsite by one regional based inspector.

Results: No violations were identified.

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## Details

### 1. Persons Contacted

#### Vermont Yankee Nuclear Power Corporation

- D. Dyer, Auditor - Engineer, QA
- \*D. C. Girrior, Senior QA Engineer
- \*R. D. Pagodin, Engineering Support Supervisor
- \*J. Pelletier, Plant Manager
- \*D. A. Reid, OPS Superintendent
- \*R. J. Wanczyk, Technical Services Superintendent

#### Yankee Atomic Electric Company

- J. Lance, Manager, Mechanical Services Group
- \*L. E. Mullins, ISI Coordinator
- L. Reed, Senior QA Engineer

#### Independent Testing Laboratory (ITL)

- \*J. Harrison, NDE Supervisor

#### Magnaflux Quality Services (MQS)

- \*M. F. Sherwin, NDE Level III

#### USNRC

- \*W. J. Raymond, Senior Resident Inspector

\*Denotes those present at the exit meeting on 6/29/84 and/or 7/13/84.

### 2. Inservice Inspection (ISI) Program

The current outage is the first outage in first inspection period of the second 10-year inspection interval. The first interval was scheduled to end in December, 1982, but it was extended to allow the final inspection to be concurrent with the scheduled outage which ended on June 16, 1983.

The inspector reviewed the following to ascertain that regulatory requirements and the facility Technical Specification requirements are being met:

- Section 4.6.E of the facility technical specification
- Proposed amendment to Technical Specification 4.6 dated 1/30/79
- NRC Technical Evaluation Report dated 9/2/82
- NRC letter dated 5/19/83 to the licensee

- Licensee letter dated 4/19/84 to the NRC

The inspector found that the inservice inspection activities which are planned for the current outage will be governed by the applicable requirements of the 1974 Edition of ASME Section XI through the Summer 1975 Addenda. This is in compliance with the facility Technical Specification. The 1/30/79 licensee submittal is a request to replace the specific code edition referenced in the Technical Specification with a general reference to the code edition and addenda incorporated by reference in 10 CFR 50.55a. This request has not yet been granted by the NRC.

The licensee stated that he intends to submit a revised ISI Program by November, 1984. The revised program will incorporate the requirements of ASME Section XI, 1980 Edition through Winter 1980 Addenda, and will be applied during all remaining inspections of the current inspection period and the second 10 year inspection interval.

No violations were identified.

### 3. Recirculation System Piping Examination

#### a. Licensee Response to Generic Letter 84-11

Based on the results of the inspections conducted pursuant to IE Bulletins 82-03 and the NRC August 26, 1983 Orders, the Commission believes that an ongoing program for similar reinspections at all BWRs is needed. Generic Letter 84-11 was issued on April 19, 1984 to provide licensees with NRC recommended actions to accomplish the aforementioned reinspections.

Vermont Yankee letter dated June 5, 1984, to the NRC compares the licensee's reinspection program to the staff's recommendations listed in Generic Letter 84-11, and provides additional information requested by the NRC.

The inspector reviewed the licensee's reinspection program and found that Generic Letter 84-11 is being met with two exceptions, which were identified by the licensee's letter dated June 5, 1984 as follows:

- The NRC staff recommends the inspection of all weld overlays on welds where circumferential cracks longer than 10% of circumference were measured. Vermont Yankee has seventeen (17) such overlays. Ten of these are identical joints (sweep-0-let to riser). The licensee plans to examine five of these joints. If no indications are detected, the remainder five sweep-0-let to riser joints will not be examined.
- The generic letter defines "effective overlay thickness" as the "thickness of overlay deposited after the first weld layer that clears dye-penetrant testing (PT) inspection." The licensee maintains that the effective thickness of the overlay is the

full overlay thickness as defined by ultrasonic measurements or equivalent measurement technique.

The licensee and the NRC have held discussions regarding the above exceptions, but at the conclusion of this inspection no decision has resulted. This is considered unresolved pending further action (271/84-13-01).

b. Observations of Work In Progress

The inspector observed the ultrasonic examination of the following welds to ascertain that regulatory requirements were met and that procedural requirements were complied with:

- Weld 32-4, 20" diameter RHR System pipe to elbow weld - This weld was examined during the previous outage and no indications were detected at that time.
- Weld 9A, 28" diameter Recirculation System elbow to pipe weld - This weld displayed crack indications when examined during the last outage and was judged to be acceptable for continued use without repair based on the measured through wall dimension of the crack.

The above welds were examined in accordance with ITL procedure II, Revision 3-A by ITL personnel assisted by Magnaflux Quality Services personnel. The examinations were done with the P-scan system developed by the Danish Welding Institute. As used at Vermont Yankee, this is a semi automatic system in which the search probe is manually moved over the examination surface. The probe movement is restricted and controlled by a track to which the probe mechanism is attached. Data acquisition is entirely computerized and is done automatically. Magnaflux personnel who performed the probe pushing function were specially trained in the use of the equipment. A portion of the training, which was administered by qualified ITL personnel, was observed by the inspector.

The ultrasonic examination results of eleven (11) welds in the recirculation system and associated RHR piping were found by the licensee to be indicative of intergranular stress corrosion cracking in those welds.

The initial examinations were performed using the "P-scan" technique, a semi-automatic scanning system. The P-scan results were verified with manual scanning techniques, and, in two instances, with the use of the ALN 4060 examination system. The P-scan technique was found to be capable of detecting axially oriented reflectors in addition to those of circumferential orientation. Weld number 32-4, a 20-inch diameter RHR system weld was found by the P-scan method to contain an axially oriented crack. This was confirmed with the use of a qualified manual examination technique.

Further evaluation of the results was in progress during this inspection. The licensee was in the process of determining the through wall dimension of the known cracks.

The inspector observed the licensee's crack sizing effort regarding recirculation system weld number 65A to ascertain that the sizing was done by qualified personnel using approved sizing techniques.

The inspector found that the work was done by a licensee representative who had successfully passed the EPRI NDE Center crack sizing course including a practical examination. The in plant sizing was done using the latest accepted techniques and equipment.

No violations were identified.

c. Review of Data

P-scan data are reviewed by Level II and Level III personnel representing the licensee, ITL and Magnaflux Quality Services. The inspector observed the preliminary review of data representing the following welds:

- \* • Weld No. 1A, 28" diameter pipe to elbow weld
- \* • Weld No. 2, 28" diameter pipe to elbow weld
- \*\*\* • Weld No. 26A, 28" diameter elbow to pipe weld
- \*\*\* • Weld No. 27, 28" diameter elbow to pipe weld
- \* • Weld No. 30B, 22" diameter end cap to ring header weld
- \* • Weld No. 16B, 22" diameter ring header to cross connect weld
- \*\* • Weld No. 17, 28" diameter pipe to Tee weld
- \*\*\* • Weld No. 15, 28" diameter pipe to Tee weld
- \*     Displayed evidence of cracking when previously examined and was judged to be acceptable for continued use without repair
- \*\*     Previously examined - no indications detected.
- \*\*\*    Not previously examined.

The data were reviewed with respect to the presence of questionable indications in each weld. Specific weld locations were decided upon where additional information was needed and supplemental examination of those locations in each weld was planned. At the time of this inspection the additional examinations were not completed.

#### 4. Feedwater Nozzle Examination

The licensee has provided a full size nozzle mock-up containing artificial defects (notches) to be used for the training and qualification of examination personnel and for the qualification of the ultrasonic examination procedure. The inspector examined the mock-up and found that it represents the nozzle configuration at the site. The artificial defects are located at the inside surface at selected locations in the bore and blend radius areas. The qualification process included personnel training, a practical test consisting of the examination of a selected portion of the mock-up and the successful identification of the artificial defects in the volume of interest.

The following were reviewed by the inspector:

- Documentation regarding personnel and procedure qualification for performing feedwater nozzle examinations.
- Nuclear Energy Services, Inc. (NES) procedure 80A7616, Revision 2, "Ultrasonic Examination Procedure for Reactor Feedwater Nozzle Inner Radius"
- Ultrasonic examination data related to the examination of the four (4) feedwater nozzles.

In addition to the above, the qualification/certification records of the examination personnel were examined.

The review was done to ascertain that the examinations were done in accordance with the governing procedure, that the examination results were properly documented, and that the examination personnel were qualified and certified in accordance with applicable regulatory and ASME Code requirements.

No violations were identified.

#### 5. Quality Assurance Audits

The inspector reviewed documentation related to licensee QA Inspection No. VY-84-25 conducted on 6/11-25/84 to ascertain that ISI activities are audited by licensee QA personnel and that regulatory requirements are met.

QA Inspection was found to cover various activities including the following:

- Witness of the ultrasonic examination of feedwater nozzles N4B and N4C.
- Witness of the ultrasonic P-scan examination of recirculation system welds number 17 and 2.
- Personnel qualification records of ITL, MQA and NES NDE personnel.

- Material and equipment certification records including those regarding ultrasonic calibration blocks.
- Review of NDE data sheets.

The inspector's review indicated that the various activities were properly performed and that the records were complete and retrievable.

No violations were identified.

6. Unresolved Items

Unresolved items are items about which more information is required to ascertain whether they are acceptable, violations or deviations. An unresolved item is discussed in paragraph 3.a.

7. Exit Interview

The inspector met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on June 29 and July 13, 1984. The inspector summarized the purpose and scope of the inspection and the findings. At no time during this inspection was written material provided by the inspector to the licensee.