

U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 50-271/85-41

Docket No. 50-271

License No. DPR-28

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

Facility Name: Vermont Yankee Nuclear Power Station

Inspection At: Vernon, Vermont

Inspection Conducted: December 16-20, 1985

Inspector: E. H. Gray  
E. H. Gray, Lead Reactor Engineer

1/22/86  
date

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

1/22/86  
date

Inspection Summary:

Inspection on December 16-20, 1985 (Report No. 50-271/85-41)

Areas Inspected: Routine, unannounced inspection of preparations for recirculation piping replacement including work instruction packages, weld-in, welder qualification and training, weld procedure review, observation of welding, recirculation system pipe whip restraints, reactor building wall embedded support plates and QA/QC involvement in the pipe replacement work. The inspection included 35 hours on-site and 4 hours in the Region office.

Results: No violations were identified.

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## DETAILS

### 1.0 Persons Contacted

Vermont Yankee Nuclear Power Corporation (VY) and Yankee Atomic Electric Company (YAEC).

J. DeVincentis, Mechanical Engineer  
J. Hoffman, Engineering Supervisor (Recirculation Project)  
J. Gianfrancesco, Construction Supervisor  
R. Martin, Quality Assurance Supervisor  
R. Oliver, Lead Mechanical Engineer  
\*J. Pelletier, Plant Manager  
\*D. Reid, Operations Superintendent  
R. Wanczyk, Technical Services Superintendent  
K. Willens, Welding Engineer  
W. Wittmer, Recirculation Pipe Replacement Project Manager

#### Morrison and Knudsen (M&K)

C. Chen, Project Weld Engineer  
S. Giles, Quality Control Supervisor  
J. Harriston, Quality Assurance Manager  
B. Jacobs, Lead Weld Engineer  
W. Robison, Radiographer

\*Present at exit meeting on December 20, 1985.

### 2.0 Licensee Action on Previous Open Items

(Closed) Unresolved Item (271/85-33-01). Water Soluble Paper for Weld Root Pass Inert Gas Shield Purge Dams.

The Information Notice 85-13 discusses the consequences of using soluble dams to contain inert shielding gas on the inaccessible side of welds during root pass and hot pass welding. The issues of concern were the possible unfavorable effects of purge paper fibers in the system prior to decomposition, the review of the applicability of the Monticello CRD filter clogging problem to the Vermont Yankee CRD filter, the control of use of the purge paper to prevent overheating during welding with the corresponding reduction of solubility and the control over use of the paper to minimize the amount of fibers in the system.

The General Electric letter (GE-VY-85206) dated December 10, 1985 which presents the CRD filter operation, describing how the VY CRD filters differ from those at Monticello such that normal scram performance at VY would not be inhibited by filter clogging, was reviewed by the inspector. The VY Engineering Department for the recirc piping project reviewed this GE letter and concluded in File Memo 006608 dated December 16, 1985 that the VY CRD would not be affected by screen plugging.

The contractor has evaluated the solubility of purge paper as a function of maximum temperature reached during welding corresponding to the distance from the paper to the weld. This distance is controlled by specific direction in the Work Instruction when purge paper is to be used. Although no detrimental effect is expected from the use of purge paper, the contractor has established controls to assure solubility of paper used and has attempted to minimize the amount of dissolved purge paper remaining in the system.

This item is closed.

### 3.0 Recirculation Pipe Replacement

#### 3.1 Overview

This is the second inspection (Ref. 271/85-33) directed primarily toward the recirculation pipe replacement activities. Production welding was complete on the NIB safe end and the weld PLR-WB-12 of the B Loop Crossover. Welding was in progress on the NIA safe end. This inspection included observation and review of portions of the following:

- Welding in progress;
- Work Instruction Packages;
- Radiography including film and procedure FQP 9.4 review;
- Documentation of work completed;
- Documentation of QC inspections;
- Weld wire or filler metal control;
- Examination of the NIA, NIB and PLR-WB-12 welds;
- Status of welder qualification; and
- Pipe whip restraints for the recirculation Piping System.

On the basis of the observations made during this inspection, it was concluded that the program of the licensee and contractor in the pipe replacement project meets procedural and regulatory requirements although some isolated cases of documentation problems were found, as discussed in Part 3.2 of this report.

No violations were identified.

#### 3.2 Documentation

Portions of work packages and records of QC inspections and hold point signoffs for work in progress including NDE and welding were reviewed to determine the level of conformance to project procedural and regulatory requirements.

For those work packages reviewed by the inspector, signoffs were consistent with the status of in-progress work. However, the layout of the work packages was found to include provisions which would permit several interrelated work operations to be performed in parallel.

It was not clear to the inspector how the sequencing of the work activities covered by these packages was being controlled such that specific steps and hold points would not be inadvertently missed by construction personnel. The inspector noted that prevention of this problem was the responsibility of construction supervision with surveillance by both licensee and contractor QA and QC. The sequencing of work and hold points will be evaluated during subsequent inspections. (50-271/85-41-01)

Presented below are documentation problems identified during this inspection that had corrections completed or in progress by the end of this inspection:

- Radiographic reader sheet for weld WB-12 showed an acceptable inside surface concavity but did not show visual verification by the radiographer of the condition where verification was done.
- The data package for WB-12 was incomplete in that QC inspection reports for all QC inspections including NDE were not in the data package. Review of the controlling procedure SQP-5.2 resulted in a revision to paragraph 4.7.3 to specify that QC inspection reports are to be included in the applicable master work package.
- The weld data card for weld NIB was incomplete in that the reference to Open Item Report (OIR) No. 029 was not signed out as closed by QC. The QC supervisor provided corrective action for this by scheduling review of signoff procedures with QC inspectors.
- The welder log for weld NIA lacked the log date and the welder log for CRC Buildup on the A pump did not show the weld number. The welder log is not a procedurally required document but provides a record of weld machine settings used for each weld pass. QC separately monitors weld variables for comparison to the welding procedure and technique sheet values.

The inspector noted that the above documentation problems indicated the need for added attention to detail in the record process and the need for contractor personnel retraining in procedural documentation requirements. The licensee acknowledged the inspector's concerns.

No violations were identified.

#### 4.0 Recirculation System Pipe Whip Restraints

As discussed in NRC Inspection Report No. 50-271/85-40, during removal of the 28 inch B loop discharge line in late November, pipe whip restraint R10 broke loose from its mounting plate due to insufficient welding during

original plant construction. The recirculation pipe system pipe whip restraint original design was based on having adequate whip restraints for an assumed pipe break at any location. The need for whip restraints was reevaluated on the basis of restraint needs for pipe whip resulting from breaks at the high stress points in the piping. This reanalysis resulted in a determination that certain original pipe whip restraints are not necessary. These unneeded whip restraints are not intended to be replaced after installation of the recirc pipe system. The R10 restraint is one of those not required on the basis of the current pipe whip restraint design basis.

The inspector examined welds of a sample of the remaining pipe whip restraints in the area typical of that insufficiently welded on restraint R10 for comparison to the original construction drawings. This examination did not identify any other restraints with sufficient lack of weld to cause structural failure but did identify nonconformances to the reference construction drawing. These nonconformances included missing structural bars and missing or incomplete welds. The licensee subsequently completed examination of all recirculation pipe whip restraints identifying 14 to be acceptable, 9 to be unacceptable and 9 to be questionable in meeting the original construction requirements. Those found unacceptable or questionable are to be evaluated and dispositioned by the Engineering Department of the recirculation pipe replacement team.

The inspector concluded that the licensee is in the process of inspecting, evaluating and dispositioning the specific and generic aspects of the pipe whip restraint weld deviations from construction drawings. The findings and disposition of identified issues in this area will be examined in subsequent NRC inspections.

No violations were identified.

#### 5.0 Embedded Steel For HPCI Room and Torus Area Pipe Supports and Pipe Hangers

During modifications to a pipe support for the HPCI line in the Torus Room, the embedded plate to which the support was attached was found to be pulled from the wall. The specific support was a pipe anchor, MS-HD-22E, located between the HPCI pump output and the tie in the recirculation system. The original construction drawings indicate a total of 144 embed plates of this type to be installed in the Torus area and HPCI room. The embed plate failure was a direct result of the shear load lugs and anchor bars being removed prior to the concrete pour for the wall. The failure of the embed plate was associated with significant spalling of the concrete around the edge of the embed plate. This topic is also discussed in Inspection Report No. 50-271/85-40.

The inspector examined the embed plate as removed from the wall and the embed plate location on the wall, including the spalled concrete. The other embed plates were viewed on a sampling basis to determine the typical uses, presence (actually absence) of significant concrete



spalling and physical condition of the embed plates. The licensee QC inspection results and engineering analysis of these inspections and plans for testing of embed plates were reviewed. The testing includes a pull test on a sample of plates at 10K pound load, where the maximum load is 8.8K and the load at plate deformation is 12-15K. Additionally, the licensee evaluated the use of ultrasonic examination techniques to verify the acceptability of the installed embedded plates. These techniques were not found to be feasible. Further, the licensee was investigating the use of infrared scanning to examine the back side of the plates.

The safety significance of the failed support was evaluated by YAEC engineering by pipe stress analysis of the HPCI pipe line with and without the pipe anchor considered in place. This analysis established the anchor as contributor to pipe stresses such that loss of function of the anchor resulted in a reduction in the overall pipe stress.

In summary, the inspector observed the failed embed plate, examined a sample of embed plates in position, reviewed the results of licensee evaluation and the program for testing embed plates. The results of the testing program will be examined in subsequent NRC inspections.

No violations were identified.

#### 6.0 QA/QC Involvement in Areas Inspected

The inspector found licensee and contractor Quality Assurance and Quality Control inspection personnel to be involved in project activities. This included prework document review, inspection of work in progress, auditing and documentation.

No violations were identified.

#### 7.0 Exit Interview

An exit interview was held on December 20, 1985, with members of the licensee's staff as denoted in Paragraph 1 and the NRC Senior Resident Inspector. The inspector discussed the scope and findings of the inspection. At no time during this inspection was written material provided to the licensee by the inspector.