

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-271/89-05

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: April 4-7, 1989

Inspectors:

A. Finkel

A. Finkel, Senior Reactor Engineer

5/3/89

date

W. Oliveira

W. Oliveira, Reactor Engineer

5/3/89

date

Approved by:

N. Blumberg

N. Blumberg, Chief, Operational Programs
Section, OB, DRS

5/3/89

date

Inspection Summary: Inspection on April 4-7, 1989 (Inspection Report No.
50-271/89-05)

Areas Inspected: Routine unannounced inspection consisting of the review and implementation of the ATWS Rule 10 CFR 50.62; open items identified in previously issued NRC inspection reports; surveillance and calibration program; and quality assurance/quality control interface with surveillance testing.

Results: Licensee is complying with the ATWS Rule 10 CFR 50.62. The quality organization appears adequately staffed to support the present operation of this site. Surveillance testing and the calibration program are following the licensee established program plan. During this inspection unresolved items 85-26-01, 87-08-01 and 87-18-02 were closed. No violations or deviations were identified.

Details

1.0 Persons Contacted

Vermont Yankee Nuclear Power Corporation

P. Donnelly, Maintenance Superintendent
*R. Grippardi, Quality Assurance Supervisor
*R. Pagondin, Technical Services Superintendent
*J. Pelletier, Plant Manager
D. Reid, Operations Support Manager
S. Skibniowsky, Chemistry Supervisor
R. Spinney, Training Manager
W. Wiltmer, Construction Superintendent

United States Nuclear Regulatory Commission

G. Grant, Senior Resident Inspector

The inspectors also held discussions with other licensee personnel during the course of this inspection.

*Denotes those present at the exit meeting on April 7, 1989.

2.0 Follow-up of Previous Inspection Findings (92706)

(Closed) Unresolved Item 85-26-01 - Establish qualification and certification requirements of receiving inspector (QAT) in accordance with ANSI N45.2.6-78. The job description for the quality assurance technician (QAT) was revised November 3, 1985 and approved on January 16, 1986. The revised QAT job description reflects the intent of ANSI N45.2.6-1978, paragraph 3.5.2, Level II in the area of schooling and experience. The inspector reviewed the present QAT personnel records and verified that their qualifications comply with the licensee's revised job description requirements. This item is closed.

(Closed) Unresolved Item (87-08-01) - QDR Manual Requirements were not followed during maintenance of the RHR motors. The licensee's equipment manual recommended that the motor oil be changed at six month intervals. The maintenance program for the RHR motors required the oil to be replaced during each refueling cycle. During the third quarter of 1987, General Electric (GE) completed an evaluation of the electric motor maintenance program at Vermont Yankee. GE's recommendation to the licensee on the subject of motor oil lubrication stated that oil lubricated motors should be sampled every six months and the oil changed every outage.

The Vermont Yankee maintenance procedures require that oil be changed at refueling outages based on plant history records and motor test results. The Maintenance Department does not plan to perform oil sampling as recommended by GE unless their test data indicates a motor problem. Based on their historical records and test data results for their RHR motors, the inspector concurred that their present oil replacement program is acceptable. This item is closed.

(Closed) Unresolved Item (87-18-02) - Maintenance Department failed to classify activities into major-minor inspection criteria as defined in procedure AP-6025. The licensee specifies the inspection criteria in their individual department procedures and uses the peer inspection process to perform first level inspection of the task. Procedure AP-6025 was revised on April 25, 1988 to delete the requirement for using the major-minor method of classifying inspection criteria. The surveillance and audit inspections were performed by the quality organization as defined in their quality control program for this site.

To ensure that the AP-6025 revision removing the requirement for major-minor classification did not present a safety concern, the inspector reviewed the QA Surveillance Reports 88-130 on the Instrumentation and Control Department and 88-113 on the Maintenance Department, which evaluated the effectiveness of the revised AP-6025. These surveillance reports and the inspector's evaluation of sampled surveillances performed during 1988-1989 indicated that the departments were complying with the criteria defined in AP-6025 without an apparent lessening of work quality or safety. This item is closed.

3.0 Anticipated Transient Without Scram (ATWS) Rule, 10 CFR 50.62 (2500/20)

3.1 Scope:

The scope of the inspection was to determine that the Vermont Yankee's (VY) present system design complies with the requirements of 10 CFR 50.62, paragraphs C (3), (4), (5), (d), and that their test programs are designed to ensure that the Alternate Rod Injection (ARI), Standby Liquid Control System (SLCS), and the recirculation pumps will function as designed under conditions indicative of an ATWS. The documentation that was reviewed by the inspectors and used in the validation of the design and test data reviews are listed in Attachment A of this report.

3.2 Alternate Rod Injection (ARI) System and Recirculation Pumps

3.2.1 Description of Modification:

To comply with the independence criteria of 10 CFR 50.62, paragraph C, the ARI system is designed so that upon a high pressure or low water level signal the system relays, which are in a de-energized state, will energize and trip the reactor. The Reactor Protection System (RPS) upon a high pressure or low water level signal will de-energize causing a reactor trip.

The VY ARI has a 10 second time delay added to provide for longer core flow during level decrease transients, to assure adequate core cooling, before the recirculation pumps are shut down. The high reactor vessel pressure trip signals opens the GE AKF-2-25 motor generator (MG) field breakers which supply the voltage for the recirculation pumps thus causing the pumps to stop and coast down. Both the RPS and the ARI systems remove the air supply from their scram valves, causing these solenoids valves to open thus providing a reactor scram signal. The RPS and the ARI systems are redundant from the sensors to the activating devices, however, the level transmitters and the logic cards are the same manufacture (Rosemount 1152T0280's), but completely redundant.

3.2.2 Finding:

To ensure that the ARI installed system complied with the system design criteria and that the test program demonstrated the operation of the system, the inspector verified the installed equipment of one train of the ARI system from the sensor to the tripping relay devices. The inspector also reviewed the system surveillance test data from 1988 through the first quarter of 1989; verified that the ARI train was installed per the design drawings; and verified that the test data determined that the ARI system was functional. This item is closed.

3.3 Standby Liquid Control System (SLCS)

3.3.1 Description of Modification:

The ATWS rule, 10 CFR 50.62C, (4), requires all BWR's to modify their SLCS to be equivalent in control capacity to an 86 gpm injection rate of 13% sodium pentaborate solution. The 86 gpm

and 13% values stated in the ATWS rule were based on a reactor vessel size of 251-inch diameter. Vermont Yankee's reactor vessel size is a 205-inch diameter vessel and based on this their safety analysis establish different rates. VY is also using a higher inventory of Boron-10. The use of Boron-10 isotope provides the neutron absorption (negative reactivity) required to shutdown the reactor if the RPS and ARI systems do not. Yankee Atomic Electric Company calculation (VY C-572) determined the minimum Boron-10 atom percent to be 43, based on a 41 gpm injection rate, to meet the ATWS 10 CFR 50.62C, (4) rule for SLC equivalency.

3.3.2 Findings:

The inspector reviewed the pump test and chemistry reports for 1988 through the first quarter of 1989 to ensure that the system design and the chemistry concentration of the SLCS complied with the requirements of calculation VY C-572. The pump tests and the corrected chemistry data results were within the VY C-572 calculation requirements for this system design.

During this inspection, the refueling SLCS surveillance test per Procedure No. OP4114 was performed. The data had not yet been approved through the licensee's data review system during this inspection period; however, test data reviewed by the inspector appeared to be within the requirements of the test procedure.

The test data supported the VY C-572 calculations for the pump injection rate and the chemical concentration of the SLCS tank. In addition, the refueling surveillance test, OP 4114, also met the VY C-572 flow criteria. The above data reviewed by the inspector complied with the VY Technical Specification (TS) section 3.4 Limiting Condition for Operation and 4.4 Surveillance Requirements. This item is closed.

4.0 Complex Surveillance (61701) and Testing/Calibration (61725)

4.1 Scope:

The inspector observed selected tests to determine if the tests were: (1) performed in accordance with approved Instrument and Control (I&C) and Maintenance surveillance/test procedures; (2) properly administratively controlled, and (3) were performed by trained and qualified personnel.

4.2 Findings:

4.2.1 Surveillance/Test Program:

The surveillance/test program was well documented and administratively controlled by the Engineering Support Department (ESD), the Maintenance Department, and the I&C Department. The key procedures for administering the surveillance program are Administrative Procedures (AP) 0200 (Maintenance), AP 0310 (I&C) and AP 4000 (ESD). Departmental procedures (DPs) provided the details for implementing the surveillance program. These procedures and other documents referenced in the inspection report are listed in Attachment A.

4.2.2 Surveillance Program Activities:

The performance of two I&C surveillance tests and one Maintenance test listed below were observed to assess the surveillance and test/calibration effort for: administrative controls; test procedure technical content; planning and timely performance of the tests; QA coverage; corrective actions; reporting and analyzing the results (data); and post test restoration.

- Vibration tests by the Maintenance Department of the core spray pump in accordance with OP 4123.
- Reactor core isolation cooling (RCIC) system A/B isolation logic test in accordance with OP 4368.
- Automatic initiation test of the Primary Containment Isolation System (PCIS) valves in accordance with OP 4334.

The above tests were satisfactorily performed. However, while observing performance of OP 4334 the inspector noted that step 57 required the actuation of PCIS valves A-20, A-22A and A-22B in the Control Room. The arrangement of Control Room Panel 9-3 was, however, changed by EDCR No. 86-411 and these valves were redesignated NI-20, NI-22A and NI-22B, respectively. AP 6004 and YNSD WE-100 requires procedures and drawings affected by an EDCR to be corrected. A Plant Operations Review Committee (PORC) approved EDCR 86-411 without verifying that the "no procedural changes required," statement of the data package was correct. Documents AP 0155 and control room drawing 191175, which designate valve numbers, were not changed per the approved EDCR 86-411. The licensee acknowledged the error and initiated actions to correct the error and determine the root cause of why the EDCR process did not identify these documents. The inspector had no further questions.

4.2.3 QA/QC Interfaces with Surveillance Testing:

Five annual QA audit reports and six QA surveillance reports listed in attachment A sections 2.3 and 2.4 were reviewed by the inspector. The reports were comprehensive and the corrective action responses were complete and timely.

A Quality Service Department (QSD) inspector was observed performing surveillance inspection of the PCIS valves automatic initiation test of OP 4334. The QSD inspector documented the NRC inspectors concern regarding the PCIS valves discussed in paragraph 4.2.2 and placed in the licensee's corrective action system.

4.3 Conclusion:

The surveillance/test and calibration effort is documented and implemented satisfactorily by qualified personnel. The licensee has initiated action to determine the root cause regarding the proper implementation of the EDCR process discussed in paragraphs 4.2.2 and 4.2.3.

5.0 Exit Interview

Licensee management was informed of the scope and purpose of the inspection at the entrance interview on April 4, 1989. At the conclusion of the site inspection on April 7, 1989, an exit interview was conducted with the licensee's senior site representatives (denoted in section 1). The findings were identified and the status of previous inspection findings were discussed.

At no time during this inspection was written material provided to the licensee by the inspector. Based on the NRC Region I review of this report and discussions held with licensee representatives during this inspection, it was determined that this report does not contain information subject to 10 CFR 2.790 restrictions.

Attachment A

1.0 Anticipated Transient Without Scram (ATWS)

1.1 Alternate Rod Injection (ARI) Documentation

- RPS Instrumentation and Control Drawings 850-851 and 855-856
- ARI Instrumentation and Control Drawings 860-867
- RPS Level Drawing - Rosemont 1152T0230
- ARI Level Drawing - Rosemont 1152T0280
- RPS Logic Trip Drawings 803-828
- ARI Logic Trip Drawings 862
- RPS/ARI Scram Valve Drawing G191170
- Operations Procedure (OP) 4337 - Reactor Water Level ECCS Initiation, Isol, Funct/Calibration, Revision 21, March 31, 1989
- Operations Procedure (OP) 4342 - Rx Pressure RPT/ARI/Eccs Funct/Calibration, Revision 8, January 25, 1989
- Operations Procedure (OP) 4369 - RPT/ARI Operational Test, Revision 3, January 5, 1989

1.2 Standby Liquid Control System (SLCS)

- Calculation VYC-572 - Yankee Atomic Electric Company SLCS Design Calculation
- Operations Procedure (OP) 4611 - Sampling and Treatment of the Standby Liquid Control System
- Operations Procedure (OP) 4611.01 - Standby Liquid Control System Treatment Request
- Operations Procedure (OP) 4611.02 - Analysis of Enriched Boric Acid, Enriched Sodium Pentaborate Decahydrate, Borax and Sodium Pentaborate Solution for % B-10 Composition
- Operations Procedure (OP) 0630 - Water Chemistry

- Operations Procedure (OP) 2114 - Operation of the Standby Liquid Control System
- Operations Procedure (OP) 4114 - Standby Liquid Control System Surveillance
- Department Procedure (DP) 0641 - Procedure for Logging Results of Chemical Analysis
- Drawing 191171 - Standby Liquid Control Flow Diagram
- SLCS Surveillance Test Reports 1981 - First Quarter 1989

1.3 Reactor Recirculating Pumps

- B-19130 (SH702) - Control Wiring Diagram - Reactor Recirculating Motor Generator Set MGI-1A Field Breaker
- B-191301 (SH803) - Reactor Protection System - Reactor Scram Sensors - Channel A1

2.0 Complex Surveillance and Testing/Calibration

2.1 Administrative Procedures

- Administrative Procedure (AP) 0155 - Current System Valve and Breaker Lineup and Identification, Revision 11, March 2, 1988
- AP 0200 - Maintenance Program, Revision 11, July 1, 1987
- AP 0310, Surveillance Preventative and Corrective Maintenance Program, Revision 3, August 12, 1988
- AP 4000 - Surveillance Testing Control, Revision 10, July 20, 1988
- AP 6004 - Engineering Design Change Requests, Revision 12, November 3, 1988
- Yankee Nuclear Services Division Engineering Instruction WE-100, Engineering Design Change Request, Revision 17, February 15, 1989
- Quality Assurance Department Procedure OQA-X-1, Quality Assurance Surveillances, Revision 12, December 29, 1987

- Instrument and Control (I&C) Department Procedure (DP) 0301, Calibration and Control of Measuring and Test Equipment (M/TE), Revision 11, September 23, 1987

2.2 Test Procedures

- Operations Procedure (OP) 4123 - Core Spray System Surveillance, Revision 18, February 27, 1989
- OP 4334 - Automatic Initiation Test of PCIS Valves, Revision 11, March 23, 1989
- OP 4368 - Reactor Core Isolation Cooling (RCIC) System A/B Isolation Logic Test, Revision 18, February 17, 1989

2.3 Annual QA Audit Reports

- VY-86-11 - Measuring and Test Equipment, September 19, 1986
- VY-87-11 - Measuring and Test Equipment, June 11, 1987
- VY-87-15 - Technical Specifications, July 29, 1987
- VY-88-15 - Technical Specifications, March 11, 1988
- VY-88-11 - Measuring and Test Equipment, September 16, 1988

2.4 QA Surveillances (SURVs)

- SURV 88-03 - Core Spray System Surveillance, January 8, 1987
- SURV 88-36 - Surveillance of Scram Discharge Instrument, Volume High Water Functional Test, March 4, 1988
- SURV 89-21 - Shutdown to Low Power Standby, February 11, 1989
- SURV 89-22 - Reactor Core Isolation System Injection to Reactor Vessel, February 13, 1989
- SURV 89-24 - Battery Performance Test/Preventive Maintenance, February 22, 1989
- SURV 89-45 - Assembly of Reactor and Drywell System for Operation, March 23, 1989