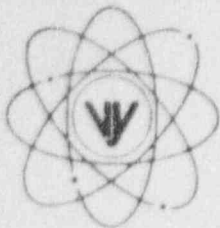


# VERMONT YANKEE NUCLEAR POWER CORPORATION



P.O. Box 157, Governor Hunt Road  
Vernon, Vermont 05354-0157  
(802) 257-7711

November 30, 1995  
BVY 95-130

U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Attn: Document Control Desk

References: Operating License DPR-28  
Docket No. 50-271  
Reportable Occurrence No. LER 95-018 Supp. 1

Dear Sir:

As defined by 10 CFR 50.73, we are reporting the attached Reportable Occurrence as LER 95-018, Supplement 1.

Very truly yours,

Robert J. Wanczyk  
Plant Manager

RJW/dm

cc: Regional Administrator  
USNRC  
Region I  
475 Allendale Road  
King of Prussia, PA 19406

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PDR ADDCK 05000271  
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NRC Form 366 (4-95)				U.S. NUCLEAR REGULATORY COMMISSION  <b>LICENSEE EVENT REPORT (LER)</b>				APPROVED BY OMB NO. 3150-0104 EXPIRES 04/30/98 ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.							
<b>FACILITY NAME (1)</b> VERMONT YANKEE NUCLEAR POWER STATION						<b>DOCKET NUMBER (2)</b> 05000271				<b>PAGE (3)</b> 01 OF 06					
<b>TITLE (4)</b> Inadequate IST Surveillance and Reg Guide 1.97 Submittal Information on the Recirculation Loop Sample Line Isolation Valves due to Misinterpretation of the Existing Design Configuration during Program Development															
<b>EVENT DATE (5)</b>			<b>LER NUMBER (6)</b>				<b>REPORT DATE (7)</b>			<b>OTHER FACILITIES INVOLVED (8)</b>					
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME		DOCKET NO.(S) 05000				
09	29	95	95	-- 018 --	01	11	30	95	N/A		N/A				
<b>OPERATING MODE (9)</b>		N		<b>THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: CHECK ONE OR MORE (11)</b>											
<b>POWER LEVEL (10)</b>		100%		20.2201(b)		20.2203(a)(2)(v)		X		50.73(a)(2)(i)		50.73(a)(2)(viii)			
20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)									
20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71									
20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER									
20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		(Specify in Abstract below or in NRC Form 366A)									
20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)											
<b>LICENSEE CONTACT FOR THIS LER (12)</b>															
<b>NAME</b>  ROBERT J. WANCZYK, PLANT MANAGER									<b>TELEPHONE NO. (Include Area Code)</b>  802-257-7711						
<b>COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)</b>															
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	.....	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS					
N/A					.....										
					.....										
					.....										
<b>SUPPLEMENTAL REPORT EXPECTED (14)</b>									<b>EXPECTED SUBMISSION DATE (15)</b>		MO	DAY	YEAR		
YES (If yes, complete EXPECTED SUBMISSION DATE)				X NO											

**ABSTRACT** (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On 09/29/95, in response to an inquiry from Monticello Nuclear Station, a review of the control power and indication circuits for the two recirculation loop sample line isolation valves (FCV 2-39 and 40) which receive a close signal from the Primary Containment Isolation System determined that: 1) the existing circuit configuration does not meet the specific intent of Regulatory Guide (RG) 1.97 in that position indication for these valves is from non-redundant power sources, and only provides indirect indication of valve position, and 2) the In-Service Testing (IST) requirements for these valves have not been satisfied because previous testing relied on the position indication circuits for providing direct measurement of valve position.

The root cause of the RG 1.97 submittal and IST testing discrepancies was determined to be a misinterpretation of the existing design configuration.

There is reasonable assurance these 3/4" air-operated (spring to close) valves would have isolated, if required, based on their fail-closed design to a loss of air/control power, and previous testing which cycled and leak rate tested the valves.

Immediate actions included: tagging the control switches for these valves in the closed position, informing the NRC, and verifying (daily) that the outboard isolation valve (FCV 2-40) is closed in accordance with Technical Specification requirements until the issues with these valves are resolved. Long term corrective actions include a design change that facilitates IST surveillance testing and meets the specific intent of RG 1.97 requirements.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

#### DESCRIPTION OF EVENT

On 09/29/95, at 1030 hours, with the reactor at 100% of rated power, a review of the control power and indication circuits for the two recirculation loop sample line isolation valves (FCV 2-39 and 40)(EIS = KN) that receive a close signal from the Primary Containment Isolation System (PCIS)(EIS = JM) identified the following issues:

- The indicating lights for both valves are supplied from the same power source. This appears to be contrary to the Post Accident Monitoring redundancy requirements of NRC Regulatory Guide (RG) 1.97 and the Vermont Yankee RG 1.97 submittal.
- The indicating light signals originate from control circuit contacts rather than from isolation valve position switches. The resulting indication shows whether the solenoid associated with the isolation valve is energized; as opposed to "directly" indicating whether the isolation valve is open or closed. This appears to be contrary to the direct measurement requirements of RG 1.97 and the Vermont Yankee RG 1.97 submittal.
- Present In-Service Testing (IST) performed to satisfy Technical Specification surveillance testing requirements relies on the indicating light configuration previously described. Since position switches are not utilized, past testing has not directly confirmed valve stroke times, and the remote position indication tests for the subject valves. Therefore, the subject Technical Specification surveillance test requirements have not been satisfied.

Based on these issues, the control switches for FCV 2-39 and 40 were "tagged" in the closed position, the Resident NRC Inspectors were briefed, the Vermont Yankee Licensing Engineer informed the Office of Nuclear Reactor Regulation (NRR), and measures were instituted to verify, on a daily basis, that the outboard isolation valve (FCV 2-40) is closed in accordance with Technical Specification requirements until the associated IST and RG 1.97 issues are resolved. Additionally, these immediate corrective actions, and the status of additional actions/reviews in-progress were topics of discussion at subsequent plant management daily meetings.

The current RG 1.97 and IST issues associated with FCV 2-39 and 40 were identified by Vermont Yankee Engineering while researching a 09/25/95 inquiry from Monticello Nuclear Station as to whether our facility has redundant power supplies to the position indicators for the recirculation loop sample line isolation valves.

#### CAUSE OF EVENT

The root cause of the RG 1.97 submittal and IST testing discrepancies was determined to be a misinterpretation of the existing design configuration. Specifically, it was not recognized or documented that FCV-2-39 and 40 did not meet RG 1.97 requirements for power source redundancy, nor was it confirmed that the method of providing valve position information was consistent with the RG 1.97 definition of direct measurement. In addition, subsequent RG 1.97 submittals did not identify these discrepancies. If the direct measurement of valve position indication met the intent of RG 1.97, the IST testing requirements would have been met utilizing the existing IST surveillance procedures.

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## ANALYSIS OF EVENT

The subject recirculation loop sample line isolation valves are air-operated, 3/4" globe valves which: 1) are normally closed, 2) receive a close signal from PCIS Group I Logic, and 3) fail-closed on a loss of air or control power. The purpose of the recirculation loop sample line, in which FCV 2-39 and 40 are located, is to provide an alternate means of obtaining reactor coolant chemistry samples (during normal power operation) in the unlikely event the "normal" sample path through the Reactor Water Cleanup (RWCU) System (EIS = CE) is unavailable.

As described in the Technical Specification Bases for primary containment isolation valves, "Double isolation valves are provided on lines that penetrate the primary containment and communicate directly with the reactor vessel (eg. FCV 2-39 and 40), and on lines that penetrate the primary containment and communicate with the primary containment free space. Closure of one of the valves in each line would be sufficient to maintain the integrity of the pressure suppression system. Automatic initiation is required to minimize the potential leakage paths from the containment in the event of a loss-of-coolant accident."

## In-Service Testing (IST) Issue

Section 4.6.E.2 of the Vermont Yankee Technical Specifications requires that IST of safety-related pumps and valves be performed in accordance with the requirements of the ASME Boiler and Pressure Code and applicable addenda as required by 10 CFR 50.55a. Vermont Yankee is committed to the 1990 Edition of the ASME Boiler and Pressure Vessel Code. The 1990 Edition of the Code incorporates by reference ASME OMa-1988 Part 10 (OM-10) for IST of valves.

Section 1.1 of OM-10 requires that all active or passive valves which are required to perform a specific function in shutting down a reactor to the cold shutdown condition, in maintaining the plant in the cold shutdown condition or in mitigating the consequences of an accident be tested in accordance with the requirements of the code. FCV-2-39 and FCV-2-40 are primary containment isolation valve which have a specific function to isolate in order to limit containment leakage below the Technical Specification allowable limits. FCV-2-39 and FCV-2-40 are identified in revision 17 of the Vermont Yankee Inservice Test Program Plan with stroke timing, fail-safe testing, leakage testing and position indication testing requirements.

Section 4.1 of OM-10 requires that valves with remote position indicators be observed locally at least once every 2 years. Where local observation is not possible, other indications are required to be used to verify valve operation.

Section 4.2.1.3 of OM-10 requires that the necessary valve obturator movement be determined by exercising the valve while observing an appropriate indicator, such as indicating lights which signal the required change of obturator position. The remote position indicating lights in the Main Control Room (MCR) are typically used to meet this requirement.

Section 4.2.1.4 of OM-10 requires that the stroke time of all power-operated valves be measured to at least the nearest second. The stroke time of power-operated valves is typically measured manually by plant operators utilizing calibrated stopwatches. The stroke time measurement is typically defined as the time interval from initiation of the actuating signal to the end of the actuating cycle. Stroke timing is performed to verify valve operability and to detect valve degradation.

Section 4.2.1.6 of OM-10 requires that valves with fail-safe actuators be tested by observing the operation of the actuator upon loss of valve actuating power. This is typically performed during valve stroke time closure tests when the power to the operator solenoid valve is removed. The net effect of removing solenoid valve power will cause the valve to move to its appropriate fail-safe position.

FCV-2-39 and FCV-2-40 are air operated valves which are normally closed. Each valve has an external solenoid valve which energizes to supply air to the valve operator to open the valve and de-energizes to vent air from the valve operator to close the



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valve. This event identified that the remote position indication in the Main Control Room (MCR) the subject valves only indicates whether the solenoid valves are energized or de-energized. Since the indicating light signals for the subject valves originate from the power circuit of the valve's solenoid valve, the valve indication in the MCR may not accurately reflect the actual valve position. Therefore, for the subject valves, the main control room lights are not an appropriate indicator to meet the OM-10 code requirements of sections 4.1, 4.2.1.3, 4.2.1.4 and 4.2.1.6 and the Technical Specification Surveillance Requirement 4.6.E.2.

Additionally, the subject valves are identified in Technical Specification Table 4.7.2.a as containment isolation valves which have a maximum operating time of 5 seconds. Technical Specification Surveillance Requirement 4.7.D.1.b specifies that the isolation capability of the valves identified in table 4.7.2 be tested in accordance with specification 4.6.E. Since the IST of the subject valves was determined to be inadequate, the surveillance performed to meet the requirements of Technical Specification 4.7.D.1.b also were not adequately met.

Since the surveillance requirements of specifications 4.6.E.2 and 4.7.D.1.b were not adequately met, this event is reportable pursuant to the requirements of 10 CFR 50.73(a)(2)(i).

#### Reg. Guide 1.97 Issues

RG 1.97, issued in 1980, describes "a method acceptable to the NRC staff for complying with the Commission's regulations to provide instrumentation to monitor plant variables and systems during and following an accident in a light-water-cooled nuclear power plant." With regards to primary containment isolation valve position, the intent of RG 1.97 is for valve position indication to be provided from "sensors that directly measure the desired variables." In this case, the desired variable is the closed/not-closed position of the valve. With regards to valve position indication power supplies, RG 1.97 states, "No single failure within either the accident-monitoring instrumentation, its auxiliary supporting features, or its power sources...should prevent the operators from being presented the information necessary for them to determine the safety status of the plant..." Currently, position indication for FCV 2-39 and 40 is from non-redundant power sources and only provides indirect indication of valve position.

#### Safety Impact

Although the issues associated with FCV 2-39 and 40 position indication are significant in that: 1) the existing circuit configuration does not meet the specific intent of RG 1.97, and 2) Technical Specification IST surveillances for the valves were found to be inadequate, it is concluded the issues involve minimal safety significance. There is reasonable assurance that these 3/4" air-operated (spring to close) valves would have isolated, if required, based on their fail-closed design to a loss of air/control power, and previous Appendix J testing which cycled and leak rate tested the valves. Present position indication may not fully meet RG 1.97 requirements, however, these circuits do provide direct indication (in the control room) of the status of control power to the respective isolation valve trip solenoid. History has shown FCV 2-39 and 40 to be very good performers based on past Type 'C' leak rate testing which documented "as-found" leakage rates well below acceptance criteria limits. In addition, the valve located downstream of FCV 2-40 is also normally maintained in the closed position, except in the unlikely event it is necessary to obtain a coolant sample via this pathway. Although no credit is taken for this valve and its associated piping (which is rated for pressures well in excess of reactor system pressure), this equipment provides an additional barrier that further ensures isolation of the recirculation loop sample line.

Since the identified IST and RG 1.97 issues involve conditions contrary to licensing commitments, it was recognized that NRC involvement was required. Based on this, the Resident NRC inspectors were briefed, and the Vermont Yankee Licensing Engineer informed NRR of the issues and corresponding immediate corrective actions. As the implementation of event corrective actions progress, the Vermont Yankee Licensing Engineer will be kept informed and will provide NRR with

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status updates, as appropriate.

Engineering has developed Basis for Maintaining Operation (BMO) documents to address the identified IST and RG 1.97 issues associated with FCV 2-39 and 40 which were approved on 11/26/95. These valves will continue to be maintained in the closed position pending the review and approval of the BMOs and supporting procedural revisions. As a compensatory measure, the BMOs require alternate means of direct verification of valve closure to be implemented for all evolutions that may open the valves. This requirement will remain in place until the subject issues are resolved via design change. {Note: A BMO is a Vermont Yankee evaluation which provides the basis for maintaining continued operation with a known deficiency in the analysis, design, or qualification of safety-related, environmentally qualified, or technical specification systems, structures, or components.}

#### CORRECTIVE ACTIONS

##### Immediate:

1. FCV 2-39 and 40 were "tagged" in the closed position, and in accordance with Technical Specification requirements, FCV 2-40 is being verified closed, on a daily basis, until the RG 1.97 and IST issues associated with these valves are addressed.
2. FCV 2-39 and 40 were verified to have been cycled and leak rate tested satisfactory in accordance with Appendix J requirements during the Spring 1995 and previous refueling outages.
3. The Vermont Yankee Licensing Engineer contacted NRR, described the event, and indicated the immediate corrective actions the facility has taken in response to the issues associated with FCV 2-39 and 40. As the implementation of corrective actions progress, the Vermont Yankee Licensing Engineer will be kept informed and will provide NRR with status updates, as appropriate.

##### Short Term:

1. Vermont Yankee design basis documents were reviewed to verify the existing FCV 2-39 and 40 position indication circuits are in accordance with the original design basis of the Primary Containment Isolation System. (Status: Complete)
2. A Nuclear Network entry was submitted to alert other facilities to the recently identified IST and RG 1.97 issues associated with our recirculation loop sample line isolation valves. (Status: Complete)
3. A BMO evaluation was performed to justify the cycling of FCV 2-39 and 40 to allow for completion of the respective IST surveillances by using alternate means of direct measurement of valve position. (Status: Complete)
4. A BMO evaluation was performed to address the discrepancies in the Vermont Yankee RG 1.97 submittal associated with FCV 2-39 and 40 position indication. (Status: Complete)

[Note: The approval of Short Term Corrective Actions 3 and 4, revision of the affected procedures, and satisfactory IST surveillance testing of FCV 2-39 and 40 will be confirmed prior to declaring these valves "operable."]

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Long Term:

1. A review of all RG 1.97 valves will be performed to determine if similar conditions exist relative to discrepancies between the present configurations and RG 1.97 commitments. (Expected Completion Date: December 1995)
2. A review of the position indication circuits for all power operated valves in the IST program will be performed to determine if similar conditions exist relative to discrepancies in IST testing methodology. (Expected Completion Date: November 1995)
3. A comprehensive review of the most recent Vermont Yankee RG 1.97 submittal will be performed to determine if there are any additional conditions which do not agree with information provided in the submittal. (Expected Completion Date: March 1996)
4. A design change that facilitates IST surveillance testing, and meets the specific intent of RG 1.97 requirements (i.e. direct measurement of valve position, redundant control power) for FCV 2-39 and 40 will be implemented prior to startup from the 1998 Refueling Outage. (Expected Completion Date: April 1998)

ADDITIONAL INFORMATION

Similar events related to discrepancies in the implementation of RG 1.97 and IST requirements were reported to the Commission under the following Licensee Event Reports:

- |           |   |
|-----------|---|
| LER 90-08 | "Failure to Meet Separation Criteria for Power Cables to Regulatory Guide 1.97 Instrumentation Loops."      |
| LER 95-17 | "Technical Specification 4.6.E Not Met Due to Components Not Included in the Intervice Test Program Scope." |