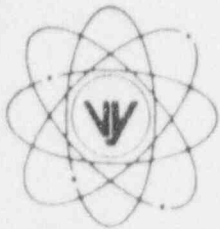


VERMONT YANKEE NUCLEAR POWER CORPORATION



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

October 7, 1996

BVY 96-116

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Reference: (a) License No. DPR-28 (Docket No. 50-271)

Subject: Reportable Occurrence No. LER 96-021

As defined by 10CFR50.73, we are reporting the attached Reportable Occurrence as LER 96-021.

Sincerely,

VERMONT YANKEE NUCLEAR POWER CORPORATION

Robert J. Wanczyk
Plant Manager

cc: USNRC Region 1 Administrator
USNRC Resident Inspector - VYNPS
USNRC Project Manager - VYNPS

9610160121 961007
PDR ADOCK 05000271
S PDR

JE 22
11

NRC Form 366 (4-95)			U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB NO. 3150-0104 EXPIRES 04/30/98					
LICENSEE EVENT REPORT (LER)						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.					
FACILITY NAME (1) VERMONT YANKEE NUCLEAR POWER STATION					DOCKET NUMBER () 05000271		PAGE (3) 01 OF 05				
TITLE (4) Inadequate procedural controls of MOV Limit Switch Settings result in a potential common cause failure mode with the capacity to affect multiple safety significant components.											
EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NO.(S)	
09	07	96	96	-- 021 --	00	10	07	96	N/A	05000	
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: CHECK ONE OR MORE (11)									
N		20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)			
POWER LEVEL (10)		00		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)		X 50.73(a)(2)(vii)			
LICENSEE CONTACT FOR THIS LER (12)											
NAME								TELEPHONE NO. (Include Area Code)			
ROBERT J. WANCZYK, PLANT MANAGER								802-257-7711			
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)											
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	.....	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
A	BO	20	L200	YES	.....	NA					
NA					.....	NA					
SUPPLEMENTAL REPORT EXPECTED (14)								EXPECTED SUBMISSION DATE (15)		MO	DAY
YES (If yes, complete EXPECTED SUBMISSION DATE)				X	NO						

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

On 09/07/96 at 1200, while the plant was shut down for refueling, operators attempted to transfer RHR shutdown cooling operation from the "A" RHR subsystem operating in the shutdown cooling mode, to the "B" RHR subsystem providing shutdown cooling, with the "D" RHR pump in service. When the "D" RHR pump control switch was placed in "start" the "D" RHR pump logic immediately went into a tripped condition. Circuit monitoring equipment indicated that the tripped condition was caused by an incomplete suction path. Operators verified that the suction path was correct. The operators then established the required shutdown cooling alignment using the "B" shutdown cooling suction isolation valve and the associated RHR pump. Investigation revealed that the "D" RHR pump permissive logic had been affected coincident with the implementation of a design change which standardized MOV electrical configurations. It was determined that a lack of documented bases for the MOV limit switch setpoints precipitated a potential common cause failure mode which could have affected pump permissive logic trains in the Reactor Water Cleanup System, Low Pressure Coolant Injection System, the Reactor Core Isolation Cooling System, and the Shutdown Cooling function of RHR. Vermont Yankee immediately verified that the pump and valve logic circuit which was functionally affected was limited to the single Shutdown Cooling Subsystem. It was therefore verified that Vermont Yankee had not operated in a configuration wherein its principal safety systems or barriers were significantly degraded. Therefore it is concluded that this event posed no danger to the health or safety of the public. Procedures, guidelines, and training are being modified to prevent recurrence.

NRC Form 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION LICENSEE EVENT REPORT (LER)		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.		
FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)		PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REV #
VERMONT YANKEE NUCLEAR POWER CORPORATION	05000271	96	-- 021 --	00
				02 Of 05

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

DESCRIPTION OF EVENT

On 09/07/96 at 1200 while shut down for refueling, operators attempted to transfer Residual Heat Removal (RHR, EIS=BO) shutdown cooling operation from the "A" RHR subsystem providing decay heat removal, to the "B" RHR subsystem, with the "D" RHR pump (EIS=P) in service. When the "D" RHR pump control switch (EIS=HS) was taken to "start" the "D" RHR pump logic immediately went into a tripped condition. Monitoring equipment indicated that the tripped condition was caused by an incomplete suction path. Operators verified that the suction path was correct. Following the system lineup investigation, the operators established the required shutdown cooling alignment using the "B" shutdown cooling suction isolation valve and the associated RHR pump. There was no significant increase in reactor coolant system (EIS=AO) temperature during the period when shutdown cooling flow was interrupted.

Investigation revealed that the pump permissive logic had been affected during the implementation of a design change, implemented on 5/7/96, which standardized the Motor Operated Valve (MOV, EIS=ISV) wiring configuration. The limit switch setpoints were not changed as part of the design change implementation, but were disconnected and subsequently restored during the design implementation. The document controlling the restoration of the limit switches did not specify the necessary sequencing between the two limit switches during an opening sequence.

The affected valve was tested following the design change installation and worked satisfactorily. During the investigation of the failure of the RHR systems to transfer to Shutdown Cooling operation with the "D" subsystem, it was discovered that the valve position following an electrical opening sequence left the valve approximately 1/2 handwheel turn from the required position to provide the pump permissive output.

It was concluded that a potential existed for a common cause failure mode which could affect pump permissive logic trains in the Reactor Water Cleanup (RWCU EIS=CE), Low Pressure Coolant Injection System, the Reactor Core Isolation Cooling System (EIS=BN), and the Shutdown Cooling function of RHR.

The common cause failure potential existed because two functions, and their respective limit switches, were provided setpoints without clearly identifying the interface between the two limit switch functions. The first of the two functions was the valve open indication which deenergizes the MOV motor following a successful opening sequence. The second function was the input to the affected pump start permissive circuit which permits the pump to start when the associated suction valve is fully open. The pump permissive and valve control limit switches were assigned to actuate at 95% full open. The limit switch setpoints have a +/- 2% tolerance. The limit switches, having the same setpoint with an allowed tolerance of +/- 2%, introduced the possibility that the valve motion in the opening direction could stop, due to the valve control logic seeing the valve as "full open," prior to meeting the pump start permissive requirements. This potential has historically been addressed during the limit switch field setting process. Technicians had been trained that the interlock limit switches were to be set to ensure they actuate prior to valve control limit switches actuate. Plant procedures which control the in-plant setting of MOV limit switches did not reinforce the need to properly sequence the interlock and valve control limit switches.

When the potential common cause failure mode was manifested as the loss of the "D" RHR pump VY immediately identified the problem with the MOV limit switch setpoint control process and then identified a list of 9 valves which were potentially affected. The VY MOV group initiated work orders and examined each valve. The investigation revealed that the only control logic which was improperly sequenced was the "D" shutdown cooling isolation wherein the problem was originally revealed. In most other cases the pump permissive was met prior to valve motor deenergization during the opening sequence, indicating that the interlocks were properly set. In one case (the RWCU System) the two limit switches actuated simultaneously. Its limit switches were adjusted to ensure that the pump permissive would be met prior to the valve travel limit switch deenergizing the valve motor.

NRC Form 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION LICENSEE EVENT REPORT (LER)		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.		
FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)		PAGE (3)
VERMONT YANKEE NUCLEAR POWER CORPORATION	05000271	YEAR	SEQUENTIAL NUMBER	REV #
		96	-- 021 --	00
				03 OF 05

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

CAUSE OF EVENT

The Root Cause of this event was a lack of formal MOV limit switch setpoint basis documentation.

Contributing causes of this event were:

1. Inadequate written procedures, in that they were not designed for the least experienced qualified users. The procedure lacked the specific instructions which would have benefitted users of limited experience
2. Inadequate training, in that the training did not specifically address the potential consequences of inappropriate actions (such as the coordination of limit switch settings using the standardized wiring scheme).

ANALYSIS OF EVENT

The lack of specific instructions prescribing and documenting the relationship of the limit switch setpoints which establish suction valve operation and associated pump start permissive logic created a condition which challenged Reactor Water Cleanup, all RHR shutdown cooling subsystems, Reactor Core Isolation Cooling (RCIC), and one half of a LPCI subsystem. Each case, however, was verified by direct inspection to be properly set. Further, each of the cited safety injection systems undergoes quarterly surveillance testing which would have revealed the problem.

The analysis which follows describes the safety significance of the condition in which the plant actually operated. Specifically, the investigation revealed that only the "D" portion of the Shutdown Cooling mode of the RHR system was adversely affected. The design change had been installed in the "D" Shutdown Cooling suction isolation valve since 5/21/96. The "D" RHR subsystem was therefore in a degraded condition (relative to shutdown cooling capability) for approximately 3 1/2 months.

The safety design bases and safety design objectives of the RHR system as described in the FSAR follow:

The safety objectives of the RHRS are:

1. To restore and maintain the coolant inventory in the reactor vessel so that the core is adequately cooled after a loss-of-coolant accident. This safety objective was unaffected by the condition as the LPCI mode of RHR for both the A and B subsystems were unaffected.
2. To provide cooling for the suppression pool so that condensation of the steam resulting from the blowdown due to the design basis loss-of-coolant accident is ensured. This objective was always met as the A subsystem was unaffected by the error.
3. To extend the redundancy of the Core Standby Cooling Systems by provision of containment cooling. Neither the torus cooling/spray nor the drywell spray modes of either the A or B RHR subsystems was affected by the error.

Safety Design Bases of RHR

1. The RHRS shall act automatically, in combination with other core standby cooling systems, to restore and maintain the coolant inventory in the reactor vessel such that the core is adequately cooled to limit fuel cladding damage following a design basis loss-of-coolant accident. Neither the A nor B RHR subsystems were affected in their ability to function in the LPCI mode.

NRC Form 366 (4-95)	U.S. NUCLEAR REGULATORY COMMISSION LICENSEE EVENT REPORT (LER)	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.								
FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)								
VERMONT YANKEE NUCLEAR POWER CORPORATION	05000271	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">YEAR</td> <td style="width: 25%;">SEQUENTIAL NUMBER</td> <td style="width: 25%;">REV #</td> <td style="width: 25%;"></td> </tr> <tr> <td style="text-align: center;">96</td> <td style="text-align: center;">-- 021 --</td> <td style="text-align: center;">00</td> <td></td> </tr> </table>	YEAR	SEQUENTIAL NUMBER	REV #		96	-- 021 --	00	
YEAR	SEQUENTIAL NUMBER	REV #								
96	-- 021 --	00								
		PAGE (3)								
		04 OF 05								

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

2. The RHRS, in conjunction with other core standby cooling systems, shall have sufficient diversity and redundancy to provide adequate core cooling. Neither the A nor B RHR subsystems were affected in their ability to function in the LPCI mode.
3. The source of water for restoration of reactor vessel coolant inventory shall be located within the primary containment in such a manner that a closed cooling water path is established. This design basis was not affected by the limit switch setting error.
4. To provide a high degree of assurance that the RHRS operates satisfactorily during a loss-of-coolant accident, each active component shall be capable of being tested during operation of the nuclear system. This design basis was not affected by the limit switch setting error.

As the RHR system was at all times capable of meeting its design basis functions, the plant was not operated outside of its design basis due to the RHR system control logic error.

No other plant systems were physically affected by this event. Therefore the results of this event did not place the plant in an operating condition which presented a challenge to nuclear safety nor did the plant operate in a condition which presented an increased risk to public health or safety.

CORRECTIVE ACTIONS

1. Immediate
 - a. An event report was generated and reviewed by plant management (action complete).
 - b. The potentially affected valves were examined. Only the "D" Shutdown cooling suction isolation valve and the associated RHR pump were affected (action complete).
 - c. A memo was issued by the VY MOV Coordinator to all applicable plant and contracted supervisors describing this event reinforcing the need to ensure that limit switches are set with the permissive interlocks properly coordinated with the valve travel limits (action complete).
2. Long Term
 - a. Revise the MOV Electrical Standard Guideline to provide specific guidance (including setpoint bases) for the setting of limit switches in coordination with valve control (expected completion date: 11/01/96).
 - b. Revise the applicable plant maintenance procedure to implement new guidance provided in the MOV Electrical Standard Guideline (expected completion date: 12/31/96).
 - c. Revise the applicable MOV training module(s) to include the lessons learned from this event (expected completion date: 03/31/97).
 - d. Implement new limit switch settings for applicable valve control and related interlocks, based upon the application of Long Term corrective action "a" (expected completion date: 12/31/97).

NRC Form 366 U.S. NUCLEAR REGULATORY COMMISSION (4-95)		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.				
LICENSEE EVENT REPORT (LER)						
FACILITY NAME (1)		DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
VERMONT YANKFE NUCLEAR POWER CORPORATION		05000271	YEAR	SEQUENTIAL NUMBER	REV #	
		96	--	021	--	00
						05 OF 05

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

ADDITIONAL INFORMATION

Similar events in the past five years have been reported as LER's: 93-16, Generic failure mechanism in RHR Service Water due to inadequate design review, 96-10 supp. 1, Inadequate design and single failure analysis results in a loss of RHR pump minimum flow protection.