VERMONT YANKEE NUCLEAR POWER CORPORATION

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April 4, 1992

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

REFERENCE: Operating License DPR-28
Docket No. 50-271
Reportable Occurrence No. LER 92-05.

Dear Sirs:

As defined by 10 CFR 50.73, we are reporting the attached Reportable Occurrence as LER 92-05.

Very truly yours,

VERMONT YANKEE NUCLEAR POWER CORPORATION

Donald A. Reid
Plant Manager

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

IE22

NRC Form 366 (6-89) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED OMB NO. 3150-0104
EXPIRES 4/30/92
ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3160-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20603.

FACILITY NAME (1)	DOCKET NO. (2)	PAGE (3)
VERMONT YANKEE NUCLEAR POWER STATION	05000271	01 OF 04

TITLE(4) Reactor Scram during shutdown caused by the contacts on the Reactor Mode Switch not closing as they should have

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQ #	REV#	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NO. (S)
03	06	92	92	- 005	- 00	04	04	92		05000

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO REQ'MTS OF 10 CFR §: CHECK ONE OR MORE (11)			
POWER LEVEL (10)	000	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	XX 50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER:
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NO.
DONALD A. REID, PLANT MANAGER	AREA CODE 802 257-7711

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYST	COMPONENT	MFR	REPORTABLE TO NPRDS		CAUSE	SYST	COMPONENT	MFR	REPORTABLE TO NPRDS	
B	JE	33	0082	YES		N/A					
N/A				N/A		N/A					

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MO	DAY	YR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approx. fifteen single-space typewritten lines) (16)

On 3/6/92 at 1946 with reactor power less than 1%, during a routine plant shutdown to initiate a refueling outage,a Group I Primary Containment Isolation (PCIS) (EIIS=JE) and a Plant Scram occurred. At the time, the Reactor Mode Switch (RMS) was selected to the Startup position, however, a Group I PCIS isolation occurred based on Reactor Pressure less than 800 psig and a resultant Scram occurred on the Main Steam Line Isolation Valve (MSIV) less than full open signal. Both of these signals should have been bypassed with the RMS in Startup.

The cause of this event was the failure of the contacts on the RMS to fully close following the movement of the RMS from Run to Startup.

The immediate corrective actions were to implement procedures for the Reactor Scram, take the RMS to Refuel, reset the Scram, and reset the PCIS Group I isolation to establish the Main Condenser as a heat sink. Following review of the event the I&C department verified the proper switch contact make-up when the RMS changed position to support any further shutdown activities.

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

DESCRIPTION OF EVENT

On 3/6/92 at 1946 with reactor power less than 1%, during a scheduled plant shutdown to initiate the 1992 refueling outage, a plant scram occurred. As part of the normal shutdown sequence the Reactor Mode Switch (RMS), type SB-1 manufactured by General Electric, was changed from the Run position to the Startup position. With the RMS in the Startup position, a number of isolations and/or Reactor protective functions are bypassed.However, a Group I Primary Containment Isolation System (PCIS) (EIIS=JE) isolation occurred from Reactor Pressure less than 800 psig. This isolation should have been bypassed with the RMS in the Startup position. The Reactor Scram occurred as a result of the Main Steam Line Isolation Valve (MSIV) less than full op signal being present. This signal should also have been bypassed with the RMS in the Startup position. When the RMS was moved from the Run position to the Start-up position some of the contacts on the RMS remained in the interim position that occurs between the Run and Start-up position. Some or all of the contacts that provide the bypass functions when the RMS is out of the Run position, had not closed and the low pressure isolation and reactor scram therefore occurred when the low pressure switches actuated and the MSIV's closed.

Both of these signals (PCIS GP I and the RX SCRAM) would be expected with the RMS in the Run position if reacto pressure was less than 800 pounds. The Reactor Scram and PCIS Group I isolation were reset and all systems returned to normal at 1957.

CAUSE OF THE EVENT

This event was caused by the RMS contacts not fully engaging in their proper location. The design of this equipment,(the Reactor Mode Sw 1)(RMS), makes it difficult for the operator to determine when the switch is fully in the red position. The reactor scram was a result of contacts not closing that should have clo hen the Reactor Mode Switch was repositioned from Run to Startup.

The design of the RMS is such that contacts eak or open immediately when the RMS is moved from its initial position. However, the switch contacts do not make-up or close until the switch has been repositioned exactly in the proper position. Any slight failure to move the switch fully to the desired location may prevent the "closed contacts" from closing. It was the failure of the contacts to close (due to the slight misalignment of the switch) that resulted in the PCIS function and Scram function not being bypassed.

ANALYSIS OF EVENT

All systems responded to the Scram in accordance with their design. An evaluation of the RMS functions was performed and determined that in all but one case,the failure of a contact(s) to close does not preclude a protective action from occurring but could be the cause of an unnecessary challenge of an Emergency Safety Function (ESF).

The evaluation initially reviewed the Mode Switch change from Run to Startup, and for every contact verified the function of the contact and performed an assessment of the potential consequences of a failure of the contact to change state when the Mode Switch was repositioned.

It was readily apparent that the scram on March 6th was caused by contacts not closing that should have been closed. Throughout the evaluation, there was no evidence that a contact that opens during the Mode Switch repositioning did or would fail to open. This is due to the fact that the switch contacts are cam operated and start to open immediately when the switch

ANALYSIS OF EVENT CONTINUATION

position is changed. For the contact to fail to open, either the cam would have to be broken, or a contact(s) would have to be welded shut. Either of these potential failure modes would be obvious and detectable. Since no failures of this type have been found, this type of failure was discounted. Even if the contact doesn't reach it's fully open position, the circuit is opened long before the mode switch reaches the next mode position. It was also confirmed that for every indication that a contact was not made up, it involved a contact that would be expected to be closed upon reaching the intended mode switch position.

In summary, all possible movements of the mode switch were evaluated and in only one case did we discover a potential failure mode where if a contact did not close, a protective feature could be bypassed. This occurs when the mode switch is repositioned from Shutdown to Refuel. There is one contact that must close to reset the Mode Switch In Shutdown Scram logic. If this contact does not close, moving the Mode Switch back to Shutdown following this failure would not provide a scram as required. However, this condition is indicated in the Control Room. When the Mode Switch is initially placed in Shutdown, a scram signal is generated. After a ten second delay, this scram signal is bypassed so that the scram can be reset.The automatic bypassing of this scram signal generates an annunciator (5-L-8). When moving the Mode Switch back to Refuel, a contact closure should result in the resetting of this bypass and the annunciator would clear. If the contact on the Mode Switch does not fully close, the annunciator will not clear.

In all other cases, failure of a contact to close does not preclude a protective action from occurring, but could be the cause of an unnecessary challenge to an ESF, such as a reactor scram or PCIS isolation, or it could preclude a desired (but not necessary) action, eg, you may not be able to withdraw control rods).

While it is certainly not desirable to operate in a mode where a scram or isolation could result, there is essentially no concern that we have or would operate in a condition outside the design basis of the plant simply due to the fact that all protective features (plus a few extra) would exist for any movement of the Mode Switch, with the possible exception of the case identified above. Controls can be established to ensure that even this one potential exception can be addressed by verification that the alarm clears when the Mode Switch is moved from Shutdown to Refuel.

Based on the evaluation performed, there are only two Mode Switch changes which could have negative ramifications, beyond the one described above, and those are moving the mode switch from Run to Startup, or from Startup to Run. For the case of moving from Run to Startup, there is a potential that the 800 psig Isolation and the MSIV Closure Scram signals may not get bypassed as intended. There is no reason to stop the mode switch in Startup, therefore for any shutdown, the Mode Switch can be moved directly to Refuel from Run. If it was necessary to be in Startup for example to keep the reactor critical at low power where being in Refuel would prevent rod withdrawal, the Mode Switch could then be moved from Refuel to Startup without concern.

In the case where the mode switch must be moved from Startup to Run, there is the potential that the 15% APRM Scram and the 40% Steam Flow Isolation may not get bypassed as intended.Moving the mode switch in this direction is not a problem in that the operators are not timid about moving the mode switch to Run. There is no possibility of overshooting the Run position, thus the switch is firmly moved into position, and all required contacts are expected to fully close once the mode switch is in full Run position. This assumption is fully supported by VY and industry experience in that Mode Switch "failures" have not occurred with the mode switch in Run.

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

ANALYSIS OF EVENT CONTINUATION

There is also one other switch manipulation that could generate a scram when moving from Shutdown to Refuel. In the above, a concern was described where the Mode Switch in Shutdown scram logic may not reset. If this contact closes, even momentarily, the scram logic will be reset. There is another contact that must close and stay closed or a scram signal will be generated. This scenario is the same as reported in LER 86-08. This scram can be precluded by moving the Mode Switch fully into the Refuel position, or even to Startup. As all rods are inserted before this scenario, we believe that this potential should be known by operators.

It is possible that other mode switch changes may prevent a desired activity, but there is no safety significance to that issue, and can be rectified by ensuring the mode switch is in the intended position (usually by wiggling the switch handle).

Based on this evaluation, it is expected that all previous events where an inadvertent isolation or scram occurred, were a result of a contact not fully closing when the Mode Switch was repositioned. Based on this assumption a review of past failures at VY and industry reported failures related to the Mode Switch and have confirmed this is the case.

CORRECTIVE ACTIONS

IMMEDIATE CORRECTIVE ACTIONS

1. The Operator placed the RMS to Refuel and jiggled the switch to ensure it was in the proper location.

INTERMEDIATE CORRECTIVE ACTION

1. Required the I&C department to verify contact position of the RMS following any change in position until Task Force/Plant management concludes it is no longer needed.

2. Established a Task Force to review and evaluate the failure of the RMS and provide recommended actions to the PORC/Plant Manager.

LONG TERM CORRECTIVE ACTION

1. As recommended by the Task Force, revise appropriate procedures to require that during normal plant shutdowns, the RMS be moved from RUN through STARTUP to REFUEL rather than stopping in Startup.

2. Operators have been instructed to verify the appropriate annunciation clears when going from Shutdown to Refuel.

3. The Task Force's evaluation of the RMS event has been forwarded to the Training Department for additional Operator training so they fully understand the potential impact of RMS repositioning.

ADDITIONAL INFORMATION

There have been no similar events reported to the Commission by Vermont Yankee in the past five years. However, Vermont Yankee LER 86-08 dated July 7,1986 identified a similar occurrence at Vermont Yankee. In addition, numerous similar types of events have been reported in the industry.