VERMONT YANKEE
NUCLEAR POWER CORPORATION

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July 29, 1997
BVY 97-85

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 96-012, Supplement 1.

As defined by 10CFR50.73, we are reporting the attached Reportable Occurrence as LER 96-012, Supplement 1.

Sincerely,

VERMONT YANKEE NUCLEAR POWER CORPORATION

Gregory A. Maret
Plant Manager

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

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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 20566-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER ( )	PAGE (3)
VERMONT YANKEE NUCLEAR POWER STATION	05000271	01 OF 04

TITLE (4) Low Pressure Coolant Injection Flow Could Potentially be Diverted due to an Inadequate Design Review prior to Proceduralizing the use of this System

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) 05000
04	16	96	96	-- 012 --	01	07	17	97	N/A	

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: CHECK ONE OR MORE (11)							
POWER LEVEL (10)	100		20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
			20.2203(a)(1)		20.2203(a)(3)(i)	X	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)	X	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)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NO. (Include Area Code)
Gregory A. Maret, 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
NA					NA				
NA					NA				

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)	MO	DAY	YEAR
X	YES (If yes, complete EXPECTED SUBMISSION DATE)		NO		08	15	96

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

On 4/16/96, with the plant at 100% power, Vermont Yankee (VY) determined from a self-assessment that the Residual Heat Removal (RHR) Low Pressure Coolant Injection (LPCI) Subsystem flow could have been partially diverted through the Condensate Water Transfer System (CST); an alternate keep fill system for maintaining the LPCI Subsystem full of water. Normally, the Condensate System is used to maintain the water inventory in the LPCI Subsystem. The supply lines from the Condensate System are equipped with check valves which prevent any diversion of the LPCI flow when the system is initiated. The alternate CST keep-fill system taps into the RHR System through connections designated for flushing. The use of this system as an alternate to the Condensate System was proceduralized, and has only been used during shutdowns. The alternate CST System has no check valves or automatic isolation valves in its supply line and could have allowed LPCI flow to be diverted to the CST System. This is contrary to 10CFR50.73(a)(2)(v) in that with the LPCI Subsystem supplied from the CST System, its ability to fulfill its function to mitigate the consequences of an accident would be degraded. This is also reportable under 10CFR50.73(a)(2)(ii) as operation in a condition outside the design basis.

The root causes of this event are inadequate initial design, lack of a clear, concise Design Basis Document, and an inadequate review of design information prior to proceduralizing the use of this system.

Immediate corrective action was initiated to revise the RHR procedure to prohibit use of the CST System to fill the RHR System. Vermont Yankee has not experienced any events that required the use of the LPCI Subsystems with the alternate fill system in use. Therefore, there was no danger to the health and safety of the public.

DESCRIPTION OF EVENT

On 4/16/96, with the plant at 100% power, Vermont Yankee determined, through the self-assessment process, that some of the Residual Heat Removal (RHR) Low Pressure Coolant Injection (LPCI) Subsystem (EIIS=BO) flow could have been partially diverted when using the Condensate (EIIS=KA) Water Transfer (CST) System as a keep-fill system to maintain the water inventory and static pressure in the LPCI Subsystem. The use of this system as an alternate to the Condensate System was proceduralized, and has only been used during shutdowns. Normally, the Condensate System (EIIS-SD) is used as a keep-fill system, to maintain the water inventory and static pressure of the LPCI Subsystem. The supply lines from the Condensate System to the LPCI Subsystem are equipped with check valves which prevent any backflow and subsequent diversion of LPCI flow when the system is initiated. Conversely if the alternate supply, the CST System, is used to maintain the water inventory and static pressure of the LPCI Subsystem, then the LPCI flow could have been partially diverted to the CST System as this system is not equipped with check valves or valves which automatically isolate to prevent backflow into the system. This is contrary to the system design in that flowpaths that have the potential to divert LPCI flow, automatically reposition in the event of a LPCI injection signal. Therefore, this is a condition outside the design basis and reportable under 10CFR50.73(a)(2)(ii). Further, since the condition could have prevented the RHR Systems from fulfilling its function to mitigate the consequences of an accident it is also reportable under 10CFR50.73(a)(2)(v).

CAUSE OF EVENT

The root causes of this event are attributed to an inadequate initial design of the RHR System which did not fully accommodate off normal operational lineups, the lack of a clear concise Design Basis Document and failure to adequately evaluate procedure revisions in regard to the design basis of the system.

ANALYSIS OF EVENT

The LPCI portion of the RHR System is designed to operate automatically to restore and maintain the coolant inventory in the reactor vessel, in combination with other core standby cooling systems, so that the core is adequately cooled to limit fuel cladding damage following a design basis loss-of-coolant accident.

The CST System was not used for maintaining water inventory in the LPCI Subsystem while the plant was at power but is used as an alternate source during shutdown conditions when the Condensate System is not available. During these periods, if a LPCI injection was initiated, some LPCI flow could be diverted to the CST System through the fill lines which have no check valves. This diverted flow would not be sufficient to prevent the core from being adequately cooled as redundant systems are available to provide the required amount of core cooling.

Vermont Yankee Technical Specifications (TS) 3.5.H.4 allow both LPCI Subsystems or both Core Spray Systems or one Diesel Generator to be inoperable during refueling conditions provided that a source of water greater than 300,000 gallons is available. This is permissible during shutdown/refueling conditions as the heat load is low and other systems are available to cool the core. Therefore, adequate core cooling was available and there was no danger to the health and safety of the public.

During the root cause analysis investigation it was determined that similar conditions existed as stated in the following paragraphs.

A similar condition occurred when the plant was refueling and using the shutdown cooling mode of RHR. When in this mode of operation, the normal Reactor Water Clean Up (RWCU) suction ultimately ties into the "A" Recirculation Loop. The flow passes through two RWCU safety class MOVs, the NNS portion of the system, two RWCU safety class discharge check valves, and finally into the "B" Feedwater (FW) line, upstream of FW check valves. A small (approximately less than 500 GPM) break in the

NNS portion of the piping would be isolated on the discharge of the RWCU system by two safety class discharge check valves. However, the two RWCU safety class suction MOVs do not automatically isolate, thus providing a path to a break in the 4"suction piping. The capability to isolate the RWCU System in this mode is provided by remote manual operation of the RHR System Shutdown Cooling motor operated valves and the RWCU suction motor operated valves.

Additionally, the original General Electric design specification (SPEC. NO. 22A1440, Rev. 1) states that "the Shutdown Cooling subsystem shall be drained and flushed during normal shutdown when the reactor reaches the pressure where automatic LPCI protection in no longer required (approximately 100 psig)." This is true when irradiated fuel is in the vessel and the reactor is in cold shutdown, provided no work is permitted which has the potential for draining the vessel (T.S. 3.5.H.3). However, this flushing is performed when the reactor pressure is below 100 psig, but prior to placing the reactor in cold shutdown. Therefore, LPCI would still need to be operable. Also, LPCI may still be required to be operable during refueling to comply with T.S. 3.5.H.4. This configuration creates a safety class to NNS interface which cannot be automatically isolated when LPCI is required to be operable.

CORRECTIVE ACTIONS

IMMEDIATE CORRECTIVE ACTION

A revision to the RHR procedure to remove the section that allowed the use of the CST System for maintaining water inventory and pressure in the LPCI Subsystem was made.

SHORT TERM CORRECTIVE ACTION

1. The Operations Department issued a Night Order which states that the Condensate Transfer System cannot be used to maintain the RHR System pressure until an evaluation is completed.

2. A Temporary Modification was prepared and is available for installation to use the Condensate Transfer System for RHR keep-fill by routing Condensate Transfer flow through the normal keep-fill lines which have safety class check valves to prevent backflow.

LONG TERM CORRECTIVE ACTIONS

1) This event will be reviewed by the Design Engineering Group who will propose a long term solution. This will be completed by 4/1/98.

2) A Design Basis Document Program has been initiated to review and enhance the design basis for risk significant systems including the RHR System. This will be completed by 12/31/97.

3) Criteria have been developed to govern operator action regarding boundary valves at safety class to NNS interfaces. An AP 0028 Commitment has been assigned to Design Engineering to determine the mechanism for controlling those criteria. This will be completed by 9/19/97.

4) A configuration evaluation will be performed specifically for the RHR line used to perform hot flushes and system flushes, in order to control the use of this line for flushing purposes. This will be completed by 10/1/97.

5) Design Engineering will evaluate safety class to NNS interfaces and determine if any specific valves have to be added to the IST Program. This will be completed by 8/31/97.

6) All operating procedures will be reviewed, by Systems Engineering, for similar conditions for the risk significant systems. This will be completed by 4/1/98.

ADDITIONAL INFORMATION

A similar event had been reported to the Commission as LER 94-005 whereby the Service Water System was cross-connected with the Fire Suppression System.