VERMONT YANKEE
NUCLEAR POWER CORPORATION

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January 4,1996
BVY 96-02

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 95-021

Dear Sirs:

As defined by 10 CFR 50.73, we are reporting the attached Reportable Occurrence as LER 95-021.

Very truly yours,

VERMONT YANKEE NUCLEAR POWER CORPORATION

Robert J. Wanczyk

Robert J. Wanczyk
Plant Manager

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

JE22

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 ( )	PAGE (3)
VERMONT YANKEE NUCLEAR POWER STATION	05000271	01 OF 06

TITLE (4) Plant Scram due to Turbine Trip Resulting from High Reactor Water Level Caused by Feedwater Regulating Valve Failure

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
12	08	95	95	-- 021 --	00	01	04	96	N/A	

OPERATING MODE (9)	N
POWER LEVEL (10)	79

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: CHECK ONE OR MORE (11)

	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)		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)	X	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)		

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	SJ	FCV	F135	Y					

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	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 12/8/95 at 1114 an automatic plant shutdown occurred. The plant shutdown was the result of a turbine trip caused by high reactor water level due to a failure of the "A" Feedwater Regulating Valve (FCV-6-12A). Power had been reduced to 79% and FCV-6-12A had been pinned in manual due to problems with the valve oscillation. When FCV-6-12A was placed in manual the tapered pin used to couple the manual operator to the valve stem could not be fully inserted. Due to asbestos contamination concerns in the area the operators were ordered out of the area until cleanup could be completed. Vibration of FCV-6-12A subsequently caused the tapered pin to come out allowing the valve to open. The failure of the FCV-6-12A operator was due to an unthreading of the connection between the upper and middle operator shafts. The torque on the connection is thought to have been disturbed during a prior maintenance activity and vibration during operation resulted in the two shafts becoming disconnected. The valve was repaired and retested satisfactory. The valve overhaul procedure is being revised to incorporate manufacturers recommendations, and improved I&C Technician training on these specific valve operators is being pursued. The availability of limited asbestos worker training for Auxiliary operators to allow them to enter contaminated areas if required to operate equipment is being pursued.

DESCRIPTION OF EVENT

On 12/8/95 at 1114, with the reactor operating at 79% power, an automatic plant shutdown occurred. The plant shutdown was the result of a turbine trip caused by high reactor water level due to a failure of the "A" Feedwater Regulating Valve (FCV-6-12A) (EIIS-FCV).

In November 1995, during full power operations, minor oscillations were noted on the FCV-6-12A (~ 3-5% of valve motion). Observations of reactor level and feedwater flow showed them to be remaining constant. Prior history with the valve where similar oscillations had been noted were addressed by adjustments to the valve operator. This occurrence was believed to also be one requiring adjustment. The limited troubleshooting performed on the valve while in service did not reveal the cause of the oscillations. The performance of the valve was monitored and plans were made to reduce power to 50% to allow removal of the valve from service for more comprehensive troubleshooting. Due to observations of increased valve packing leakage and concerns that the oscillations would result in further deterioration of the valve packing a decision was made to perform the power reduction on 12/8/95. The power reduction commenced at 0900. At 0935 reports of shaking/oscillation of the piping in the feedwater pump room were received from the operators and I&C personnel in the area to monitor valve performance. The shaking was severe enough that the decision was made to take manual control of FCV-6-12A since it was the suspected cause. (Manual control of the valve is accomplished by turning the valve handwheel until a sleeve hole lines up with the hole in the valve stem. A tapered pin is then inserted through the concentric holes in the manually operated sleeve and the valve stem (Figure 1) and the control air bypass valve on the air operator is then opened to shift control to the manual handwheel.) During the process of taking manual control of FCV-6-12A, insertion of the tapered pin was hampered by the motion of the valve and associated piping. Insertion of the tapered pin stopped the movement of FCV-6-12A and the shaking of the feedwater piping. When the tapered pin was inserted it was noted that the pin was not fully inserted but was being held in place by the friction being imposed on it by the sleeve and stem. To insert the pin fully would have required manual movement of the valve. At that time constant communication with the control room had not been established and the operator in the feedwater pump room did not want to change the valve position and possibly reactor level without communication with the control room operator. Additionally, as a result of the shaking of the piping dust from the asbestos insulation had been dislodged into the area. The decision was made to hold power steady at the existing power level of 79% until the asbestos insulation could be cleaned up. All operators were requested to stay clear of the area until the asbestos cleanup was completed. No vibration was felt at the valve when left and it was thought that even though the tapered pin was not fully inserted that its placement was sufficient to hold it in place until the cleanup was completed. The valve handwheel was tied in place to prevent movement and an Auxiliary Operator was stationed just outside the area in communication with the control room should valve operation be required.

At 1114 a high reactor water level alarm was received followed eight seconds later by a high reactor water level turbine trip and a reactor scram on Generator Load Reject. When the high reactor water level alarm was received the Control Room Operator took manual control of the B feedwater Regulating Valve (FCV-6-12B) and closed the valve to attempt to stop the reactor level increase but was unable to stop the level increase before the turbine trip occurred. The high reactor water level was caused by the tapered pin in FCV-6-12A vibrating out and allowing the valve to open.

At 1115 the two running reactor feedwater pumps (A and C) tripped on high reactor water level.

At 1150 reactor water level was restored to a normal level of 163 inches.

At 1151 the C reactor feedwater pump was restarted to maintain reactor water level.

CAUSE OF EVENT

The cause of the failure of FCV-6-12A is thought to have resulted from a prior maintenance activity. FCV-6-12A was worked on twice during the 1995 refueling outage. The first time was to perform an overhaul of the valve operator. The second maintenance activity was to address air leakage in the lower portion of the operator. This activity required the valve operator to be partially disassembled. During the disassembly some reverse torque was applied to the connection between the upper and middle shafts. Since the maintenance activity did not require disassembly of this connection the torque was not rechecked when the operator was reassembled.

The cause of the tapered pin becoming dislodged from FCV-6-12A is that it was not fully inserted such that it would lock into position. The operator inserting the pin noted that it was not fully in position. However since the insertion of the pin had stopped the vibration of the piping, operators were reluctant to take further actions at that time which could disturb the stability of the system. It was thought that the friction between the pin and valve stem would be sufficient to hold the pin in place while the situation was reviewed and a determination made on the next course of action to be taken. A contributing factor was the asbestos contamination in the area which resulted from the piping vibrations. Since the Operators were not trained as asbestos workers they were asked to leave the area until the asbestos cleanup could be completed and were therefore not able to monitor the position of the pin to insure that it remained in position.

ANALYSIS OF EVENT

The high reactor water level trip functioned as designed to trip the main turbine generator at 173 inches and the reactor feed pumps at 175 inches. The maximum water level recorded in the reactor vessel was 195 inches, well below the bottom of the main steam lines which are at 234 inches.

The Reactor Protection System responded as designed to scram the reactor on generator load reject when the turbine control valves closed from the turbine trip.

After the turbine trip and reactor scram, reactor pressure was maintained by the turbine by-pass valves and remained above 810 psig.

No primary containment isolations or other ECCS system actuations occurred as a result of the plant trip.

After the plant was fully shutdown the operator for FCV-6-12A was disassembled to determine the cause of the valve malfunction. Upon disassembly it was found that the threaded connection between the upper and lower shafts (Figure 1 and 2)) had come unscrewed. This effectively disconnected the valve operator from the valve disk such that the operator would only limit open travel of the valve disk. The operator for FCV-6-12A had been overhauled during the 1995 refueling outage. A recent vendor bulletin dealing with assembly of the middle and upper operator shafts had been received in 1994. The vendor bulletin noted instances of the connection between the upper and middle shafts coming loose and recommended use of a thread sealant on the shaft threads and torquing the shaft connection to 100 ft-lbs. The torque requirement was incorporated into the work order for the operator overhaul. The valve manufacturer was contacted about the recommendation to use thread sealant on the threads. The manufacturer stated that the use of a thread sealant was not a requirement and its use was subsequently not incorporated into the valve work. At the completion of the overhaul the post maintenance testing revealed an air leak in the lower portion of the operator. The operator was partially disassembled to address this air leak. During the disassembly the shafts were disconnected between the middle and lower shafts (Figure 1). During the disassembly some torque was applied to the connection between the upper and middle shafts however, as the maintenance activity did not require disassembly of this connection, the torque was not rechecked when the operator was reassembled.

CORRECTIVE ACTIONS

Immediate:

1. Cleanup of the asbestos contamination in the feedwater pump room was completed.

2. The operator for FCV-6-12A was repaired and retested to insure proper operation. Thread sealant was installed on the threaded connection and the connection was torqued to 100 ft-lbs.

3. The operator on FCV-6-12B was inspected to the extent possible without operator disassembly to ensure a similar problem did not exist with it. No problems were noted during the inspection.

4. The feedwater piping and associated hangers were inspected to ensure that no damage had been created by the piping movement. No damage was identified.

Long term:

1. The plant procedure for overhaul of the operators on FCV-6-12A/B (OP 5353) is being revised to incorporate the use of thread sealant on the threaded connection of the upper and middle operator shafts and that the shaft connection be torqued to a minimum of 100 ft-lbs. Expected completion date is March 1996.

2. The OJT training program for I&C technicians is being expanded to address feedwater regulating valve operator overhaul training. The training program will be completed before the 1996 refueling outage. I&C Technicians utilized to rebuild these valves during the outage will have completed this traiing. Additionally this event and the lessons learned will be reviewed with all Maintenance and I&C personnel during continuing training in 1996.

3. Limited asbestos worker training for Auxiliary Operators, to allow them to enter asbestos control areas if required, will be investigated. Determination of the feasibility of providing this training will be completed by April 1996.

4. An ongoing program of removal of asbestos insulation has been in process for a number of years. As insulation is removed for maintenance activities it is replaced with non-asbestos insulation. This activity will continue.

ADDITIONAL INFORMATION

The root cause analysis for this event are still in progress. Should the root cause analysis reveal different causes for this event an LER supplement will be submitted.

A review of the last five years LER's did not reveal any instances of a similar occurrence.

Figure 1

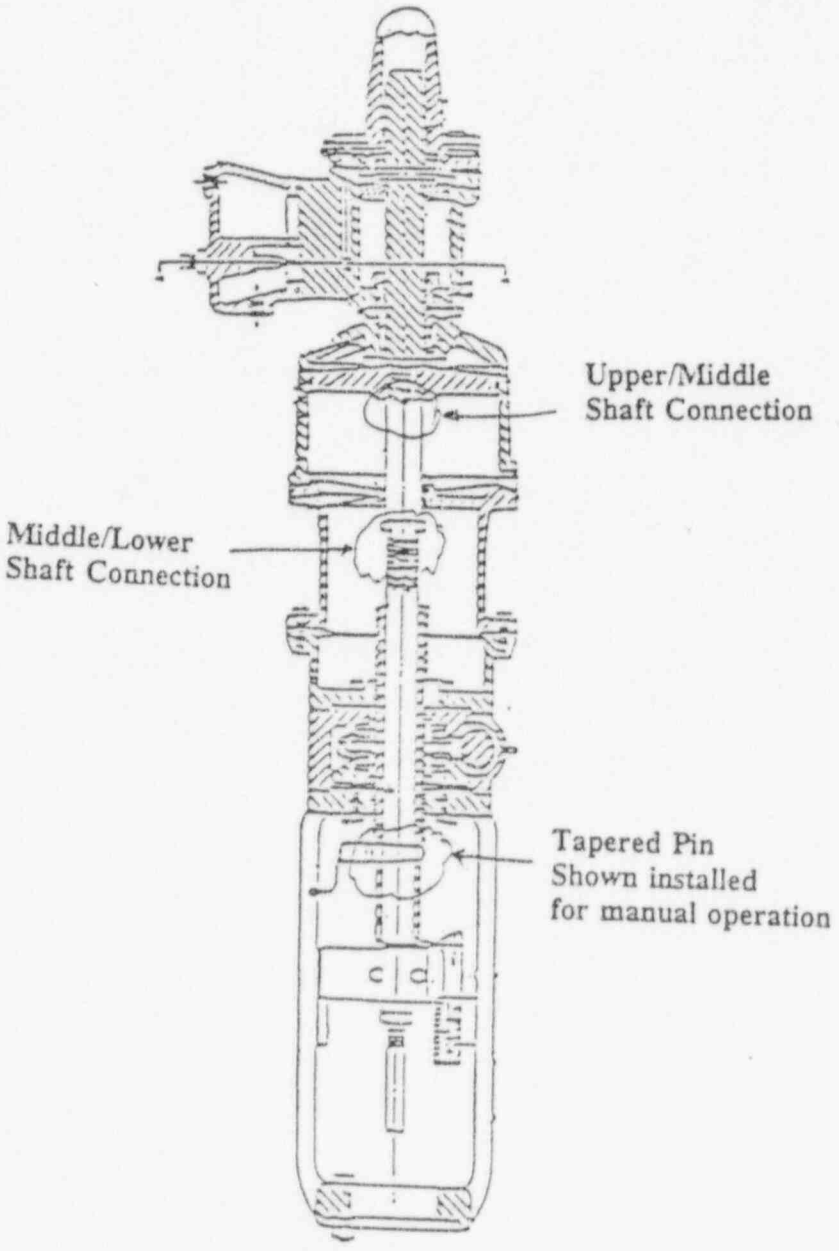
Upper/Middle
Shaft Connection
Middle/Lower
Shaft Connection
Tapered Pin
Shown installed
for manual operation

Figure 2