Indian Point 3
Nuclear Power Plant
P.O. Box 215
Buchanan, New York 10511

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NewYorkPower Authority

John H. Garrity
Resident Manager

September 20, 1993
IPN-93-108

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop PI-137
Washington, D.C. 20555

SUBJECT: Indian Point 3 Nuclear Power Plant
Docket No. 50-286
License Event Report # 93-030-00
"Motor Operated Valves in an Overthrust, Outside Design Basis, Condition Due to Personnel Error."

Dear Sir:

The attached Licensee Event Report (LER) 93-030-00 is hereby submitted in accordance with the requirements of 10CFR50.73. This event is of the type defined in the requirements pursuant to 10CFR50.73(a)(2)(ii)(B). Also attached are the commitments made by the Authority in this LER.

Very truly yours,

John H Garrity

John H. Garrity
Resident Manager
Indian Point 3 Nuclear Power Plant

JHG/DJC/vjm

cc: See Next Page

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Mr. Thomas T. Martin
Regional Administrator
Region 1
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King of Prussia, Pennsylvania 19406

INPO Records Center
700 Galleria Parkway
Atlanta, Georgia 30339-5957

U.S. NRC Resident Inspector's Office
Indian Point 3

Attachment
List of Commitments

Number	Commitment	Due Date
IPN-93-108-01	The Authority will modify AC-MOV-784 and AC-MOV-786 prior to startup to correct their overthrust condition.	Prior to plant startup
IPN-93-108-02	The Authority has identified, and will perform analyses for acceptability as is or will modify or reset valves with potential overthrust concerns, which may exist for GL-89-10 Program MOVs at Indian Point 3 that have been diagnostically tested in the absence of valve structural analysis. This effort has begun and will be completed prior to plant startup.	Prior to plant startup
IPN-93-108-03	The Authority will provide a supplement to this LER upon completion of our GL 89-10 Program MOVs structural analyses for Indian Point 3.	Prior to plant startup

NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Indian Point Unit 3	05000286	1 OF 6

TITLE (4) Motor Operated Valves in an Overthrust, Outside Design Basis, Condition Due to Personnel Error.

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 NUMBER
										05000
08	20	93	93	-- 030 --	00	09	20	93	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	N
POWER LEVEL (10)	000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)
	20.405(a)(1)(i)		50.36(c)(1)		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)		(Specify in Abstract below and in Text, NRC Form 366A)
	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)		

Name	TELEPHONE NUMBER (Include Area Code)
Fred Martsen, Senior Nuclear Maintenance Engineer	(914) 681-6789

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

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X	YES (If yes, complete EXPECTED SUBMISSION DATE).	NO		11	15	93

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

On August 20, 1993 at 1750 hours with the plant in cold shutdown, engineering determined that a valve overthrust condition exist for two motor operated valves (MOVs). The overthrust condition is outside design basis and existed since initial plant construction. Engineering discovered from the preliminary valve manufacturer's structural analyses that overthrust conditions potentially exist for a total of thirty MOVs. Engineering is verifying these analyses as part of the Generic Letter 89-10 MOV program. Based on the analyses six MOVs were declared inoperable. The cause of this event was personnel error - the lack of knowledge by the industry, at the time these designs were performed, of various design parameters and operating characteristics (i.e., valve structural limits, post torque switch trip inertia, ineffective design of motor brakes). Engineering will perform analyses for acceptability as is or will modify or reset valves prior to plant startup. This event had no significant effect on the health and safety of the public.

DESCRIPTION OF THE EVENT

On August 20, 1993 at 1750 hours with the plant in cold shutdown and the Residual Heat Removal (RHR) System in operation, the reactor power level at 0%, the reactor coolant temperature at approximately 110 degrees Fahrenheit, the reactor coolant system (RCS) pressure at atmospheric, the pressurizer level below 0%, and the RCS level above reduced inventory, engineering determined that an overthrust condition exists for two motor operated valves. The existing motor operator torque switch settings for Reactor Coolant Pump and Vessel Support Component Coolant Water Return Containment Isolation Valves AC-MOV-784 and AC-MOV-786 (CC) (ISV), (VELAN) (V085) (Limitorque SMB-00) (L200) result in maximum stem thrusts which exceed, by at least a factor of two, the calculated allowable thrust limits for the valve yokes. The shift supervisor declared the valves inoperable and de-energized them. A four hour report to the NRC was made at 1841 hours on August 20, 1993 in accordance with 10CFR50.72(b)(2)(i) for a condition which was thought to potentially be an unanalyzed condition.

On August 25, 1993 engineering identified the overthrust condition potentially exists for a total of thirty motor operated valves, based on preliminary manufacturer valve structural analyses. Engineering is verifying these analyses as part of the Generic Letter 89-10 MOV program. Engineering determined, in addition to AC-MOV-784 and AC-MOV-786, four RHR Heat Exchanger Outlet Isolation Valves (SI-MOV-746, SI-MOV-747, SI-MOV-899A, and SI-MOV-899B) (BP) (ISV) (VELAN) (V085) (Limitorque) (L200) also have a potential large overthrust condition for the valve wedges. Operations declared them inoperable and deenergized them open. Operations considered two trains of RHR to be inoperable, based on the inoperable RHR valves. Engineering evaluated the RHR valves's condition and determined they can perform their intended function for cold shutdown with the RHR system in operation. Operations declared the RHR valves operable.

Engineering converted AC-MOV-784 and AC-MOV-786 from manual to motor operated in 1975, prior to initial startup. The conversion included an adapter plate screwed onto the top of the valve yoke with tack welds on the yoke hub to preclude rotation of the actuator relative to the yoke. During the 1990 refueling outage, the tack welds were found to be cracked on AC-MOV-784 and were repaired prior to startup. Because GL 89-10 design basis reviews and diagnostic testing were not completed at that time, the potential relationship between cracked tack welds and the subject overload condition was not identified. Potential indications of tack weld cracking for valve AC-MOV-786 have been identified during the current 1993 outage. The valve configuration for AC-MOV-784 and 786 will be modified prior to startup to preclude the need for these tack welds. Plant documents indicated that Crane manufactured valves were originally specified for this application instead of the existing Velan manufactured valves, but this document discrepancy did not contribute to the inadequate design for the conversion.

The Authority performed diagnostic testing at Indian Point 3 under static baseline conditions for the GL 89-10 Program during the 1990 and 1992 refueling outages. The diagnostic tests for these six valves (AC-MOV-784, AC-MOV-786, SI-MOV-746, SI-MOV-747, SI-MOV-899A, and SI-MOV-899B) showed high overthrust, with maximum measured thrusts up to almost three times the measured thrust at torque switch trip. Engineering assumed them to be acceptable since the maximum thrusts were well under the actuator's thrust ratings, but this would also require verification of the valve structural analysis.

CAUSE OF THE EVENT

The cause of this event was personnel error - the lack of knowledge by the industry that resulted in inadequate design engineering, at the time these designs were performed, of various design parameters and operating characteristics (i.e., valve structural limits, post torque switch trip inertia, ineffective design of motor brakes).

A contributing cause to this event was a personnel error - inattention to detail by engineering to adequately address seismic loading for the conversion of the valves AC-MOV-784 and 786 from manual to motor operated in 1975, prior to plant startup.

Another contributing cause to this event was a personnel error - misjudgment by engineering in assuming the original design would result in the valve being less limiting than the published actuator ratings. In the absence of the valve structural analyses, the Limitorque operator thrust ratings were considered in setting the maximum thrust limits for testing. Those limits were considered to be interim limits, subject to confirmation by the valve structural analyses.

Today, the Authority's GL 89-10 Program has augmented our knowledge of the industry's lessons learned to adequately design and maintain safety related MOVs.

CORRECTIVE ACTIONS

The Authority will modify AC-MOV-784 and AC-MOV-786 prior to startup to correct their overthrust condition.

The Authority has identified, and will perform analyses for acceptability as is or will modify or reset valves with potential overthrust concerns, which may exist at Indian Point 3 for GL-89-10 Program MOVs that have been diagnostically tested in the absence of valve structural analysis. This effort has begun and will be completed prior to plant startup.

The Authority will provide a supplement to this LER upon completion of our GL 89-10 Program MOVs structural analyses for Indian Point 3.

ANALYSIS OF THE EVENT

This event is reportable under 10 CFR 50.73 (a)(2)(ii)(B), in that motor operated valves were in an overthrust condition which is outside design basis.

Engineering determined through analyses that valves AC-MOV-784, AC-MOV-786, SI-MOV-746, SI-MOV-747, SI-MOV-899A, and SI-MOV-899B could experience stresses in excess of the design basis structural acceptance criteria. This condition existed to some extent, dependent on past motor operated valve setup, since initial plant startup.

This event was also considered for reportability under 10CFR50.73(a)(2)(vii), for a single condition causing two independent trains in a single system to become inoperable resulting in the loss of capability for RHR. The inoperable RHR valves caused the RHR trains to be considered inoperable, but they were able to perform their intended function, and subsequently, declared operable; therefore no loss of RHR capability existed.

Similar, inadequate engineering MOV events were reported in LERs 91-001, 91-006 and 92-008.

SAFETY SIGNIFICANCE

This event had no significant effect on the health and safety of the public. The Authority determined that the MOVs (AC-MOV-784, AC-MOV-786, SI-MOV-746, SI-MOV-747, SI-MOV-899A, SI-MOV-899B) would have been able to perform their safety function based on engineering analyses. Of the thirty MOVs with a potential overthrust condition, these six valves have significantly more overthrust.

Engineering determined that AC-MOV-784 and 786 can perform their design basis accident mitigating function even if during operation the maximum stem thrust and seismic loading would be postulated to occur simultaneously. The maximum stem thrust occurs at the end of closure and the valve would have already performed its safety function to close. Any binding effects due to seismic loading would have minimal impact on the valve's ability to close. Although the loading condition, at the end of the close cycle, could result in significant yielding deformation of the yoke preventing the valves from re-opening, there are no re-opening design basis accident mitigation requirements for AC-MOV-784 and 786. The design basis accident mitigating function is to close in response to high-high containment pressure resulting from the design basis loss of coolant accident (LOCA) or main steam line break (MSLB).

There is no safety significance as a result of not having component cooling water to the reactor coolant pumps and reactor vessel support coolers, from the postulated loss of the capability to reopen these component cooling water return valves (AC-MOV-784 and AC-MOV-786), because the plant is analyzed to achieve safe shutdown without this cooling.

The Authority determined that valves SI-MOV-746, SI-MOV-747, SI-MOV-899A, SI-MOV-899B will remain operable during the worst case loading combination which includes dead weight, pressure, design basis earthquake, and thrust loads.