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New York Power Authority

Robert J. Barrett
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December 15, 1999
IPN-99-127

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

SUBJECT: Indian Point 3 Nuclear Power Plant
Docket No. 50-286
Reply to Request for Additional Information
Re: Generic Letter 96-05, MOV Periodic Verification Program

REFERENCES:

1. NRC Letter dated November 22, 1999; G. Wunder to J. Knubel, "Request for Additional Information Re: Generic Letter 96-05."
2. NYPA Letter IPN-99-041, dated April 22, 1999; R. J. Barrett to NRC, "Reply to Request for Additional Information Regarding Generic Letter 96-05; MOV Periodic Verification Program."
3. NRC Letter dated March 5, 1999; G. Wunder to J. Knubel, "Request for Additional Information Regarding Response to Generic Letter 96-05."
4. NYPA Letter IPN-97-154, dated November 10, 1997; R. J. Barrett to NRC, "Response to NRC Generic Letter 96-05; Description of Motor-Operated Valve Periodic Verification Program."
5. NYPA Letter IPN-96-118, dated November 15, 1996; W. J. Cahill, Jr. to NRC, regarding initial response to Generic Letter 96-05.
6. U.S. Nuclear Regulatory Commission Generic Letter 96-05; "Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves," dated September 18, 1996.

Dear Sir:

This letter provides our response to the Request for Additional Information (RAI), Reference 1, regarding the New York Power Authority (NYPA) implementation of a Periodic Verification Program (PVP) for Motor-Operated Valves (MOVs). The questions were discussed by NYPA and NRC staff via a conference call in September 1999. Previous correspondence regarding NYPA's PVP for MOVs is listed above (References 2 through 6). In accordance with Reference 2, the Authority did conduct MOV static testing as part of the PVP during the recently completed refueling outage, RO-10.

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The Authority's responses to the questions in this RAI are provided in Attachment 1.

There are no new commitments made by the Authority in this submittal. If you have any questions, please contact Mr. Ken Peters, Indian Point Unit 3 (IP3) Licensing Manager at (914) 736-8029.

Very truly yours,

Robert J. Barrett
Site Executive Officer
Indian Point 3 Nuclear Power Plant

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ATTACHMENT I to IPN-99-127

REPLY TO REQUEST FOR ADDITIONAL INFORMATION REGARDING GENERIC LETTER 96-05; MOV PERIODIC VERIFICATION PROGRAM

QUESTION # 1:

The NRC staff notes that the Westinghouse Owners Group (WOG) provided an example list of risk-significant motor-operated valves (MOVs) for consideration by each licensee in applying the WOG methodology. Explain any differences between the WOG list of risk-significant MOVs and the Indian Point Unit 3 list of risk-significant MOVs.

ANSWER # 1:

The WOG risk ranking approach for MOVs in response to GL 96-05 is the "Risk Ranking Approach for Motor-Operated Valves In Response to Generic Letter 96-05," V-EC-1658-A, Revision 2, prepared by the Westinghouse Electric Company in July 1998. On page 26 of that report, a list is provided of generic MOVs that are found to be ranked either medium or high for safety significance at other Westinghouse plants. Following the conference call with NRC staff in September 1999, NYPA was requested to provide an explanation as to why certain MOVs at Indian Point Unit 3 (IP3) were assigned a low risk ranking compared to other Westinghouse plants, for which the equivalent MOV was assigned either a medium or high ranking. The explanation is in the attached table. For each generic MOV function ranked medium or high at other plants, this table shows the equivalent IP3 valve along with the MOVs risk ranking category. The comment column provides a brief explanation of the ranking for each MOV. In general, the differences in risk ranking are due to either variance in plant design or plant configuration control.

Differences in plant design account for the different risk rankings for the following valves:

CH-LCV-112B/C and AC-MOV-730 & 731.

Differences in plant configuration control account for the different risk rankings for the following valves:

SI-MOV-1810, AC-MOV-1870, AC-MOV-743, SI-MOV-842 & 843, SI-MOV-856C/E/H/J, SI-MOV-746 & 747, SI-MOV-899A/B and CH-MOV-205 & 226.

It should also be noted that differences in plant design also account for the fact that some of the generic functions listed in the table are not applicable to IP3. For example, IP3 does not utilize MOVs for service water or component cooling water non-essential isolation.

The MOV risk rankings in this table are based primarily upon results from the originally docketed IP3 Individual Plant Examination (IPE), which was docketed June 30, 1994 (IPN-94-079, "IPE for Internal Events") and approved by NRC on December 12, 1995.

Question 1 Table

Generic List of MOVs Ranked Medium or High For Other Westinghouse Plants

Generic Function	Equivalent IP3 Valve ID	Position		*IP3 Risk Ranking*	Comment
		Normal	Accident		
RWST to HHSI (CCP) pump suction	SI-MOV-1810	Open	Open/ Closed	*Low*	Open during injection phase of LOCAs. Isolates HHSI pump suction from RWST during high-head sump recirculation phase. However, check valve SI-847 must also fail open to allow backflow to RWST.
	CH-LCV-112B	Closed	Open	*Low*	LCV-112B opens on lo-lo VCT level. Unlike generic Westinghouse plants, charging pumps at IP3 are not part of the ECCS system. Emergency boration provided by CH-MOV-333.
RWST to LHSI (RHR) pump suction	SI-MOV-882	Open	Open/ Closed	*Medium [2]*	Modeled as "failure to remain open" in IPE during injection phase. Isolates RHR suction from RWST during sump recirculation. However, use of external (RHR) recirculation is conditional on the failure of internal recirculation. A "medium" ranking has been assessed using deterministic methods -- the MOV is important for external recirculation, which provides redundancy to internal recirculation.
RWST to containment spray pump suction	N/A	N/A	N/A	*N/A*	The containment spray pumps at IP3 do not have a motor-operated suction valve.
Containment sump to LHSI (RHR) pump suction	SI-MOV-885A	Closed	Open/ Closed	*Medium*	Provides suction to RHR pumps during external recirculation; however, preferred cooling is from the recirculation pumps (internal recirculation). Also provides containment isolation function. A "medium" ranking has been assessed using deterministic methods -- the MOV has multiple active failure modes and provides redundancy to the recirculation pumps (internal recirculation).
	SI-MOV-885B	Closed	Open/ Closed	*Medium*	Provides suction to RHR pumps during external recirculation; however, preferred cooling is from the recirculation pumps (internal recirculation). Also provides containment isolation function. A "medium" ranking has been assessed using deterministic methods -- the MOV has multiple active failure modes and provides redundancy to the recirculation pumps (internal recirculation).
Containment sump to cont spray pump suction	N/A	N/A	N/A	*N/A*	The containment spray pumps at IP3 do not take suction from the containment sump.
RHR pump to CC pump and/or SI pump suction	SI-MOV-888A	Closed	Open	*High*	Provides suction to SIPs during high-head recirculation.
	SI-MOV-888B	Closed	Open	*High*	Provides suction to SIPs during high-head recirculation.
RHR pump miniflow recirculation	AC-MOV-1870	Open	Open/ Closed	*Low*	Modeled as "failure to remain open" in IPE. May be required to close to prevent direct release of containment sump water to RWST during internal recirculation. However, redundancy provided by check valve SI-881 and MOVs SI-882 and AC-743. Each RHR pump is provided with an additional miniflow line which only contains manual valves.
	AC-MOV-743	Open	Open/ Closed	*Low*	Modeled as "failure to remain open" in IPE. May be required to close to prevent direct release of containment sump water to RWST during internal recirculation. However, redundancy provided by check valve SI-881 and MOVs SI-882 and AC-1870. Each RHR pump is provided with an additional miniflow line which only contains manual valves.

Question 1 Table
Generic List of MOVs Ranked Medium or High For Other Westinghouse Plants

Generic Function	Equivalent IP3 Valve ID	Position		*IP3 Risk Ranking*	Comment
		Normal	Accident		
SI pump miniflow recirculation	SI-MOV-842	Open	Open/ Closed	*Low*	Modeled as "failure to remain open" in IPE during injection phase. Provides containment isolation during high-head recirculation.
	SI-MOV-843	Open	Open/ Closed	*Low*	Modeled as "failure to remain open" in IPE during injection phase. Provides containment isolation during high-head recirculation.
HHSI flow to RCS cold legs	SI-MOV-856C	Open	Open/ Closed	*Low [1]*	Modeled as "failure to remain open" in IPE during injection phase and cold leg recirculation cooling. Closed during hot-leg recirculation; also provides isolation capability during interfacing systems LOCAs.
	SI-MOV-856E	Open	Open/ Closed	*Low [1]*	Modeled as "failure to remain open" in IPE during injection phase and cold leg recirculation cooling. Closed during hot-leg recirculation; also provides isolation capability during interfacing systems LOCAs.
	SI-MOV-856H	Open	Open/ Closed	*Low [1]*	Modeled as "failure to remain open" in IPE during injection phase and cold leg recirculation cooling. Closed during hot-leg recirculation; also provides isolation capability during interfacing systems LOCAs.
	SI-MOV-856J	Open	Open/ Closed	*Low [1]*	Modeled as "failure to remain open" in IPE during injection phase and cold leg recirculation cooling. Closed during hot-leg recirculation; also provides isolation capability during interfacing systems LOCAs.
LHSI flow to RCS cold legs	SI-HCV-638	Throttled	As Req'd	*Medium*	Throttled as required during shutdown cooling and post-LOCA sump recirculation.
	SI-HCV-640	Throttled	As Req'd	*Medium*	Throttled as required during shutdown cooling and post-LOCA sump recirculation.
	SI-MOV-746	Open	Open/ Closed	*Low*	Modeled as "failure to remain open" in IPE during injection phase and low-head recirculation. Closed during high-head sump recirculation.
	SI-MOV-747	Open	Open/ Closed	*Low*	Modeled as "failure to remain open" in IPE during injection phase and low-head recirculation. Closed during high-head sump recirculation.
	SI-MOV-899A	Open	Open/ Closed	*Low*	Modeled as "failure to remain open" in IPE during injection phase and low-head recirculation. Closed during high-head sump recirculation.
	SI-MOV-899B	Open	Open/ Closed	*Low*	Modeled as "failure to remain open" in IPE during injection phase and low-head recirculation. Closed during high-head sump recirculation.
RCS hot legs to RHR pumps	AC-MOV-730	Closed	Open/ Closed	*Low*	Required to open for normal shutdown cooling. However, AFW is capable of maintaining the plant in hot shutdown for approximately 12 days (with backup city water). Only modeled for SGTR initiators. Valve required to remain closed to prevent interfacing systems LOCA.
	AC-MOV-731	Closed	Open/ Closed	*Low*	Required to open for normal shutdown cooling. However, AFW is capable of maintaining the plant in hot shutdown for approximately 12 days (with backup city water). Only modeled for SGTR initiators. Valve required to remain closed to prevent interfacing systems LOCA.

Question 1 Table
Generic List of MOVs Ranked Medium or High For Other Westinghouse Plants

Generic Function	Equivalent IP3 Valve ID	Position		*IP3 Risk Ranking*	Comment
		Normal	Accident		
Charging line isolation	CH-MOV-205	Open	Open/ Closed	*Low*	Modeled as "failure to remain open" for emergency boration during ATWS and for normal CVCS makeup during very small LOCAs. Also provides containment isolation. However, isolation capability also provided by air-operated valves and check valves.
	CH-MOV-226	Open	Open/ Closed	*Low*	Modeled as "failure to remain open" for emergency boration during ATWS and for normal CVCS makeup during very small LOCAs. Also provides containment isolation. However, isolation capability also provided by air-operated valves and check valves.
VCT Outlet Isolation	CH-LCV-112C	Open	Open/ Closed	*Low*	Must remain open to provide continued suction to charging pumps for normal CVCS makeup. LCV-112C closes on lo-lo VCT level; interlocked with LCV-112B. Unlike generic Westinghouse plants, the charging pumps at IP3 are not part of the ECCS system.
Turbine-driven Aux Feed Pump Steam Admission	N/A	N/A	N/A	*N/A*	At IP3 this function is not provided by MOVs.
Service Water to Aux Feed Water Source	N/A	N/A	N/A	*N/A*	At IP3 this function is not provided by MOVs.
Service Water Nonessential Isolation	N/A	N/A	N/A	*N/A*	At IP3 this function is not provided by MOVs.
Comp Cooling Water nonessential Isolation	N/A	N/A	N/A	*N/A*	At IP3 this function is not provided by MOVs.
Component cooling water to RHR heat exchangers	AC-MOV-822A	Closed	Open	*High*	Required for core cooling during sump recirculation and shutdown cooling modes.
	AC-MOV-822B	Closed	Open	*High*	Required for core cooling during sump recirculation and shutdown cooling modes.
Containment spray pump discharge to spray headers	SI-MOV-866A	Closed	Open	*Medium*	Used for containment spray injection -- containment temperature/pressure control and fission product scrubbing. Containment heat removal also provided by fan cooler
	SI-MOV-866B	Closed	Open	*Medium*	Used for containment spray injection -- containment temperature/pressure control and fission product scrubbing. Containment heat removal also provided by fan cooler
Pressurizer block valves	RC-MOV-535	Closed [3]	Open/ Closed	*High*	Opened during high RCS pressure conditions; closed to isolate stuck-open PORV.
	RC-MOV-536	Closed [3]	Open/ Closed	*High*	Opened during high RCS pressure conditions; closed to isolate stuck-open PORV.

Notes

[1] The contribution of hot-leg recirculation failure following a large-break LOCA is negligible to the core damage frequency.

[2] Despite the presence of a check valve to prevent backflow to the RWST, the concern is also continued depletion of the RWST, which could cause failure of the RHR pumps during sump recirculation. (The combination of containment pressure and sump elevation head may not be high enough to close check valve SI-881, resulting in continued depletion of the RWST and eventual cavitation of the RHR pumps).

[3] In past cycles, the plant has operated with the PORV block valves closed due to leaking PORVs.

QUESTION # 2:

WOG Engineering Report V-EC-1658 recommends that Risk Achievement Worth (RAW) and Fussel-Vesely importance measures be used for risk ranking medium and low risk MOVs. Your submittal dated April 22, 1999 states that Fussel-Vesely was not used to risk rank MOVs. Explain why Fussel-Vesely was not used together with RAW.

ANSWER # 2:

The response to this question was discussed during a September 1999 conference call with NRC staff. To summarize the response, IP3 has taken a more conservative approach to the GL 89-10 methodology. Based upon a comparison between the GL 89-10 risk ranking and the WOG GL 96-05 criterion (and accounting for common cause MOV failures), the results show that the GL 89-10 risk ranking approach bounds the WOG GL 96-05 approach. In fact, using the WOG approach, two MOVs (SI-HCV-638 & 640) that were ranked "medium" in the GL 89-10 program would be ranked "low" using the WOG approach. Four MOVs (SI-MOV-1802A, 1802B, 888A and 888B) that were ranked "high" in the GL 89-10 program would be ranked "medium" using the WOG approach.

The RAW criteria for high priority was reduced from "> 10" to "≥ 1.5"; for medium priority it went from "2 < RAW < 10" to "1.1 ≤ RAW ≤ 1.5"; for low priority it was changed from "< 2" to "< 1.1". The Fussel-Vesely importance measures did not affect the results. The Fussel-Vesely approach was reviewed for actual valves and the approach used by IP3 was determined to be more conservative.