Indian Point 3
Nuclear Power Plant
P.O. Box 215
Buchanan, New York 10511
914 736.8001

New York Power Authority

Robert J. Barrett
Site Executive Officer

April 22, 1999
IPN-99-041

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 Regarding
Generic Letter 96-05; MOV Periodic Verification Program

REFERENCES:

1. NRC letter dated March 5, 1999; G. Wunder to J. Knubel, "Request for Additional Information Regarding Response to Generic Letter 96-05."

2. 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."

Dear Sir:

This letter provides a response to the Request for Additional Information (Reference 1) regarding the Authority's implementation of a periodic verification program (PVP) for motor-operated valves (MOV). A summary description of the PVP was provided by the Authority (Reference 2) in response to Generic Letter 96-05. The Authority still plans to conduct MOV static testing as part of the PVP during the upcoming refueling outage, RO10, as stated in the PVP summary description. The refueling outage is scheduled to begin September 10, 1999. Also, the Authority is continuing to participate in the Joint Owners Group regarding this subject. The Authority's responses to specific questions in the Request for Additional Information are provided in Attachment I.

There are no new commitments made by the Authority in this submittal. If you have any questions, please contact Mr. Ken Peters.

Very truly yours,

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

cc: next page

A013

cc: Regional Administrator
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Resident Inspector's Office
Indian Point 3 Nuclear Power Plant
U.S. Nuclear Regulatory Commission
P.O. Box 337
Buchanan, NY 10511

Mr. G. Wunder, Project Manager
Project Directorate I
Division of Reactor Projects - I/II
U.S. Nuclear Regulatory Commission
Mail Stop 8 C4
Washington, DC 20555

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

QUESTION 1:

In NRC Inspection Report No. 50-286/98-80, the NRC staff closed its review of the motor-operated valve (MOV) program implemented at Indian Point Nuclear Generating Unit No. 3 (IP3) in response to Generic Letter (GL) 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance," based on the results of the inspection and your plan to resolve several outstanding MOV issues as described in a letter dated January 22, 1998. In the inspection report, the NRC staff discussed certain aspects of your MOV program to be addressed over the long term. For example, the inspectors noted that you agreed to:

1. review valve factor data for Groups B5 and B6 to account for data scatter; and
2. establish the disc orientation of its Anchor/Darling double-disc gate valve population.

In addition to the NRC inspection report items, you committed in your January 22, 1998 letter to take specific actions, including:

1. incorporation of Electric Power Research Institute (EPRI) MOV Performance Prediction Methodology (PPM) results into applicable thrust/torque calculations;
2. modification of three MOVs to provide increased output capability necessary to implement PPM predictions;
3. revision of an MOV performance trending procedure to include trending of performance parameters; and
4. validation of the assumptions used in the sizing calculations for Teledyne motor-actuators.

Please describe the actions taken to address the specific long-term aspects of the MOV program at IP3 noted in the NRC inspection report and its letter dated January 22, 1998.

ANSWER 1:

Regarding the two items identified in the referenced NRC inspection report:

1. The six valves in Groups B5 and B6, that do not have measured valve factors, will be evaluated using the EPRI Performance Prediction Methodology for Anchor-Darling double disc gate valves. The thrust capability calculations for these valves will be revised to incorporate the thrust requirement determined from the EPRI methodology. The results will be compared to the existing settings for the MOVs and adjustments, if needed, will be made during the next refueling outage, RO10. The refueling outage is currently scheduled to begin September 10, 1999.

2. The Authority revised the Anchor-Darling overhaul procedure in 1997 to determine and record disc orientation. This procedure will be used when future work on the valve internals is needed. There is no specific need or schedule for valve disassembly at this time. The

Authority understood that this status was found acceptable during the closeout inspection for Generic Letter 89-10 and is reflected by the statement quoted from the inspection report.

Technically, this issue involves the ability of the Anchor-Darling double disk gate valves to achieve hard-seat contact while closing under differential pressure and maintain leakage within specified limits, even if the differential pressure across the valve is reduced. With one exception, the Authority has tested all of the motor-operated Anchor-Darling double disk gate valves that have a containment isolation function. The exception is SI-MOV-882 (RWST to RHR suction isolation) which has zero differential pressure for closing. Also, the thrust capability sizing calculation for this valve includes a factor for 100% margin.

Regarding the four items identified in the Authority's commitment letter (Reference A) for Generic Letter 89-10 closure:

1. The thrust / torque calculations for three of the five affected valves have been updated using the EPRI Performance Prediction Methodology. The calculations were updated to support the modifications planned for these valves during the next refueling outage as described in the response to the next question. The revision of the calculations for the two remaining valves (AC-MOV-745A and 745B; RHR Heat Exchanger Inlet Isolation) is currently scheduled for completion prior to the start of RO10.

2. As stated in Reference A, the Authority plans to modify the three valves during RO10. The modification design for these valves was based on the updated thrust / torque requirements obtained using the EPRI Performance Prediction Methodology.

   The modification of the PORV block valves (RC-MOV-535 and 536) will include the installation of a new gear set in the existing actuators. The resulting increase in overall gear ratio will increase the torque and thrust capabilities of these MOVs. The modification of the RCP thermal barrier return isolation valve (AC-FCV-625) will replace the existing double lead valve stem with a single lead valve stem to increase the valve stroke time from five seconds to ten seconds. This change provides for an increase in closing thrust per unit torque from the existing valve actuator. This change will also reduce the effect of a fluid momentum factor that contributes to the magnitude of the design basis differential pressure in the valve closing direction. Although not identified as a commitment for GL 89-10 closeout, the Authority also plans to apply this modification to AC-MOV-789, which is in series with AC-FCV-625.

3. This action is complete. The Authority revised procedure TSP-051, "Generic Letter 89-10 Motor Operated Valve Trending Procedure" in August 1998 to include performance parameters for trending. Typical trending parameters include, but are not limited to, stem/stem-nut friction coefficient, valve factor, torque switch settings, and motor current information.

4. Teledyne motor-actuators are used on the Main Boiler Feedwater Pump Discharge Isolation Valves, BFD-2-31 and BFD-2-32. As stated in Reference A, the Authority plans to perform testing during RO10 to validate the assumptions used in the sizing calculations. The planned testing consists of using a dynamometer to obtain motor torque versus motor power curves. MOVATS testing, with the actuator installed on the valve will then be performed to

measure motor power and valve stem torque. The test results will be evaluated to determine motor and gear efficiency for comparison to the values used in the sizing calculations. The Authority plans to complete the evaluation of the test results within 3 months after startup from the refueling outage.

During the closeout inspection for GL 89-10, the Authority agreed to provide a letter to the NRC when the actions described in our January 22, 1998 letter are complete. The above responses provide a status update and the Authority still intends to provide a letter upon completion of these activities.

QUESTION 2:

In a letter dated November 10, 1997, you stated your commitment to implement the Joint Owners Group (JOG) Program on MOV Periodic Verification in response to GL 96-05. The JOG program specifies that the methodology and discrimination criteria for ranking MOVs according to their safety significance are the responsibility of each participating licensee. As IP3 is a pressurized-water reactor (PWR) nuclear plant designed by Westinghouse, are you applying the Westinghouse Owners' Group (WOG) methodology for ranking MOVs based on their safety significance as described in WOG Engineering Report V-EC-1658-A (Revision 2, dated August 13, 1998), "Risk Ranking Approach for Motor-Operated Valves in Response to Generic Letter 96-05," and the NRC safety evaluation dated April 14, 1998? If not, please describe the methodology used for risk ranking MOVs at IP3 in more detail, including a description of:

(1) the process used to develop sample lists of high-risk MOVs from other Westinghouse plants; and
(2) how expert panels were used to evaluate MOV risk significance.

ANSWER 2:

The MOV risk ranking for GL 96-05 is not based upon the WOG Engineering Report, V-EC-1658-A. Rather, the risk ranking for GL 96-05 is an extension of the risk ranking previously established for the GL 89-10 Program. The ranking method uses the Risk Achievement Worth importance measure as described in a NUMARC guideline document (Reference B).

The RAW importance measure was selected primarily because this measure assumes that a particular MOV (or common cause group of MOVs) will not function under design-basis conditions. The resulting change to core damage frequency can be determined based on the assumed failure of a particular MOV or group of MOVs. This approach, as summarized below, produced equivalent or conservative risk ranking results compared to the WOG approach.

In assigning a risk ranking category to an MOV, consideration was also given to the possibility of common-cause failure modes. Individual MOVs received the same ranking as their respective common-cause group of valves that are categorized based on valve type and application. This follows recommendations in Section 6.2 of Reference B which states that "if the assessment of common cause events resulted in a group of MOVs having a significant impact on CDF, then those MOVs should be added to the high priority category as well."

Consideration was also given to MOVs with multiple failure modes, such as a valve failing to open during the injection phase and failing to close during the sump recirculation phase.

In addition to probabilistic importance measures, deterministic methods were also employed in the GL 89-10 MOV ranking. The considerations as to how a particular MOV was ranked from a deterministic perspective are as follows:

1. Is the MOV part of a system or train that is redundant to another system or train that does not contain any MOVs? If the answer is "yes", a lower ranking may be justified.

2. Is the MOV normally in position to perform its required function? If the answer is "yes" (i.e., the MOV is not required to change state during its required function), the MOV was given a low ranking.

3. Is the MOV important for scenarios that are not explicitly modeled in the IPE; for example, shutdown modes of operation? If the answer is "yes", the MOV should be placed into a higher category, unless the answer to #1 or #2 above is "yes".

The primary difference between the approach described in the WOG Report and the approach described above for IP 3 is the quantitative criteria used to categorize the risk importance of a particular MOV. The following table provides a comparison of the criteria for the two approaches.

RISK CATEGORY	IP3 CRITERIA	WOG REPORT CRITERIA
High	RAW $\geq$ 1.5	F-V > 0.01 or RAW > 10
Medium	1.1 $\leq$ RAW < 1.5	0.001 < F-V < 0.01 and RAW < 10 or F-V < 0.01 and 2 < RAW < 10
Low	RAW < 1.1	F-V < 0.001 and RAW < 2

Using these criteria, each MOV in the IP 3 GL 89-10 Program received an equal or lower risk ranking based on the WOG Report criteria when compared to that based on the IP3 criteria. Therefore, it is conservative to use the IP3 criteria for risk ranking instead of the WOG Report criteria.

Regarding the specific question on high-risk MOVs from other Westinghouse plants, the Authority compared the results for IP 3 to the results used at Surry. The difference in ranking between similar valves at the two plants was the result of differences in plant design. For example, the Surry equivalent of IP3 valve CH-LCV-112C (Volume Control Tank outlet valve) received a higher ranking because, unlike IP3, Surry does not have separate charging and high-head safety injection pumps. The charging pumps at IP3 are not part of the ECCS. The Surry equivalent of IP3 valve SI-MOV-1810 (RWST suction isolation for SI pumps) received a higher ranking because the equivalent valves at Surry are normally closed, while SI-MOV-1810 is normally open. Although SI-MOV-1810 is required to close during high-head sump recirculation, a check valve is present which will prevent flow diversion back to the RWST in the event of SI-MOV-1810 failure.

Regarding the specific question on the use of an expert panel, the Authority is following the guidelines of the WOG engineering report V-EC-1658-A for expert panel review of risk ranking. At IP3, the panel consists of the Maintenance Rule Committee. The committee has not yet conducted a review of the risk ranking currently established for the MOV included in the periodic verification program. A meeting of the panel is planned by July 30, 1999.

QUESTION 3:

The JOG program focuses on the potential age-related increase in the thrust or torque required to operate valves under their design-basis conditions. In the NRC safety evaluation dated October 30, 1997 on the JOG program, the NRC staff specified that licensees are responsible for addressing the thrust or torque delivered by the MOV motor actuator and its potential degradation. Please describe the plan at IP3 for ensuring adequate AC and DC MOV motor actuator output capability, including consideration of recent guidance in Limitorque Technical Update 98-01 and its Supplement 1.

ANSWER 3:

The Authority will use a combination of periodic static testing, data trending, and preventive maintenance to assure adequate actuator output capability for AC MOVs at IP 3. These activities are accomplished in accordance with established site procedures and programs. There are no DC MOVs within the Generic Letter 89-10 / 96-05 program scope at IP 3. The provisions of Limitorque Technical Update 98-01 and Supplement 1 are being reviewed for incorporation into the applicable MOV sizing calculations. Preliminary conclusions indicate that existing thrust calculations are adequate to address the information provided in the Limitorque technical update. The Authority expects to complete the evaluation of the Limitorque technical information prior to the start of RO10. In addition, the Authority is continuing to participate in the JOG program and will update the IP 3 periodic verification program if new recommendations regarding actuator capability are developed.

REFERENCES:

A. NYPA letter IPN-98-008, dated January 22, 1998; R. J. Barrett to NRC, "Committed Actions to Support Generic Letter 89-10 Program Closure."

B. NUMARC 93-05, "Guidelines for Optimizing Safety Benefits in Assuring the Performance of Motor-Operated Valves," dated December 1993.