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May 14, 1999

Re: Indian Point Unit No. 2
Docket No. 50-247

Document Control Desk
US Nuclear Regulatory Commission
Mail Station PI-137
Washington, DC 20555-0001

SUBJECT: Request for Additional Information - Generic Letter 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves," dated 9/18/96 (TAC No. M97057)

References:

1) Response to US Nuclear Regulatory Commission Letter on Consolidated Edison's 60-day Response to Generic Letter 96-05, dated November 18, 1996

2) 180-Day Response to US Nuclear Regulatory Commission Generic Letter 96-05: Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves, dated March 17, 1997

3) Safety Evaluation on Joint Owners' Group Program on Periodic Verification of Motor-Operated Valves Described in Topical Report MPR-1807 (Revision 2), dated 10/30/97

4) Response to Safety Evaluation-Joint Owners' Group Program on Periodic Verification of Motor-Operated Valves (in response to Generic Letter 96-05), dated April 30, 1998

Generic Letter 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Motor-Operated Valves," dated September 18, 1996, requests certain actions be taken by utilities to establish or ensure effectiveness of programs to verify on a periodic basis that safety-related motor-operated valves (MOVs) continue to be capable of performing their safety functions.

Pursuant to 10 CFR 50.54 (f), Consolidated Edison Company of New York, Inc. (Con Edison) provided written responses to GL 96-05 on November 18, 1996 and March 17, 1997. Further, on April 30, 1998, Con Edison informed the staff that the Joint Owners' Group (JOG) program on MOV Periodic Verification described in Topical Report MPR-1807, Revision 2, would be implemented.

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Attachment A to this letter responds to your specific requests for additional information. Attachment B provides a list of commitments associated with the responses in Attachment A. Should you or your staff have any concerns regarding this matter, please contact Mr. John McCann, Manager, Nuclear Safety & Licensing.

Very truly yours,

Subscribed and sworn to
before me this 14th day
of May 1999

Karen L. Lancaster
KAREN L. LANCASTER
Notary Public, State of New York
No. 60-4643659
Qualified In Westchester County
Term Expires 9/30/99

Attachments

cc: Mr. Hubert J. Miller
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ATTACHMENT A

REQUEST FOR ADDITIONAL INFORMATION
GENERIC LETTER 96-05
RESPONSES

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
INDIAN POINT UNIT NO. 2
DOCKET NO. 50-247
MAY 1999

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
ON GENERIC LETTER 96-05

NRC Question 1:

In NRC Motor Operated Valve Inspection Report No. 50-247/98-11, the NRC staff closed its review of the motor-operated valve (MOV) program implemented at Indian Point Station Unit 2 (IP2) in response to Generic Letter (GL) 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance." In the inspection report, the NRC staff discussed certain aspects of the Con Edison's (Con Ed) MOV program over the long term. For example, the inspectors noted that (1) charging system valve 222 needed additional justification to establish a long-term basis for the selected valve factor; (2) Con Ed committed to a formal review of conditions and limitations contained in the NRC's safety evaluation of the Electric Power Research Institute (EPRI) MOV Performance Prediction Model (PPM); (3) Con Ed plans to increase the actuator capability of several valves during the next refueling outage; and (4) Calculations for valve FCV-625 would be revised to include a design requirement to ensure that mechanical wedging is maintained for this Anchor/Darling double-disk gate valve. Con Ed should describe the actions taken to address the specific long-term aspects of the MOV program at IP2 noted in the inspection report.

Item (1) of Question 1: additional justification for charging system valve

Con Edison response:

Valve 222, which has a selected valve factor of 0.804, is a 4", 150# class, Aloyco split wedge gate valve that has a safety-related function to close. A dynamic test was attempted in order to determine a closing valve factor. However, an adequate flow rate was not obtainable to provide the flow effects necessary to consider the test successful. The CVCS host system cannot support generation of higher flow rates across this valve during a refueling shutdown.

For valves that could not be dynamically tested, Con Edison used two statistical analysis approaches (Approach 1 and Approach 2) to determine bounding valve factors. Approach 1 grouped valves based on manufacturer, type, disk design, disk/seat material, and process fluid and analyzed the available test data using a Student's t-distribution that provided a 95% confidence that the actual valve factors were less than the statistically determined bounding valve factor. Approach 2 grouped valves based on manufacturer, type, disk design, size, ANSI pressure class rating, disk/seat material, and process fluid and analyzed the available test data using a normal distribution to assure a 95% confidence level bounding valve factor. When adequate test data was available to use Approach 2, the higher of the bounding valve factors obtained from both approaches was used. This provided further assurance that the determined valve factor is conservative. If the available test data was insufficient to use Approach 2, the Approach 1 valve factor was used and further long term action was required to justify the applied valve factor.

The Approach 2 test data available for valve 222 consisted of in-plant testing on valve LCV-112C, and test data of an identical valve from EPRI and from another utility (Crystal River). Since this resulted in a group that did not meet the minimum sample size requirements, Con Edison used the Approach 1 bounding valve factor of 0.804 for this MOV.

The valve factor selected for 222 is conservative relative to test results available for similar valves at other nuclear facilities. It is the intention of Con Edison to attempt to obtain additional test data for this type of valve so that an acceptable Approach 2 analysis can be performed. In the event additional test data is not available, Con Edison will evaluate what actions, if any, are necessary to justify fully the applied valve factor. This test data will be sought from the industry; however, no valid data may be available. Con Edison plans to complete this survey by August 31, 1999.

Item (2) of Question 1: review of conditions and limitations in the NRC's safety evaluation of the PPM

Con Edison response:

During their review of sample PPM calculations, inspectors noted several cases where Con Edison's program did not adequately address conditions and limitations associated with the PPM calculation and had not formally reviewed the NRC's Safety Evaluation of Topical Report TR-103237, "EPRI Motor Operated Valve Performance Prediction Program." The problems were limited to a small number of calculations and the functionality of the affected valves was not challenged by the oversights. However, the deficiencies would have resulted in the failure to perform additional actions to validate certain design assumptions in the long term.

Con Edison has completed a formal review of the NRC Safety Evaluation and has revised the Indian Point 2 Motor Operated Valve Program document to include a checklist to be performed prior to the approval of PPM calculations that ensures the calculations have been performed in accordance with the conditions and limitations of the EPRI Motor Operated Valve Performance Prediction Program and the NRC Safety Evaluation. In addition, the checklist requires a review of valve-specific test results to verify that the outputs of the PPM calculation are bounded by the test data. The revised program document provides direction for required actions in the event the calculation does not meet the criteria in the checklist. Con Edison is in the process of completing checklists for all existing PPM calculations. The completed checklists are expected to be incorporated into the approved PPM calculations by July 31, 1999.

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ON GENERIC LETTER 96-05

Item (3) of Question 1: increase of actuator capability for several

Con Edison response:

Con Edison is currently reviewing modification options for low margin valves as a result of a Limitorque Technical Update 98-01 impact analysis. Proposed modifications currently being evaluated include increasing the gear ratio of valves 535 and 536 (pressurizer power-operated relief valves), increasing the motor size and gear ratio of valves 887A and 887B (safety injection pump suction isolation valves), and increasing the motor size, decreasing the gear ratio, and bypassing the torque switch to assure flow isolation of valves 822A and 822B (residual heat removal heat exchanger cooling water outlet valves). Additional modifications may be performed consistent with the margin improvement goals of the Indian Point 2 MOV Program. This evaluation will be completed and a definitive program will be established by the next refueling outage, which will commence no later than June 3, 2000.

Item (4) of Question 1: revision of valve FCV-625 calculations

Con Edison response:

Valve FCV-625, the thermal barrier heat exchanger isolation valve, is an Anchor Darling double-disk gate valve that uses thrust settings based on a PPM Anchor Darling hand-calculation model. FCV-625 is required to close under two different design basis accident scenarios. The valve is required to close and hard seat (provide a leak tight seal) in response to a containment isolation signal against 121 psid. The valve is also required to close to isolate a RCP Thermal Barrier Heat Exchanger tube rupture against 2212 psid. Under the Thermal Barrier tube rupture scenario, the valve is not required to provide a leak tight seal and flow isolation is the functional requirement. Con Edison performed PPM Anchor Darling hand calculations for both scenarios and determined that the required closing thrust for isolating flow against the Thermal Barrier tube rupture DP was much greater (12,737 lb. vs. 3,937 lb.) than the required thrust for hard seat closing in response to a containment isolation signal and was therefore bounding. The current torque switch setting of 20,318 lbf. ensures adequate mechanical wedging and the current calculations include a design requirement that ensures that mechanical wedging will be maintained for this valve by using the bounding thrust requirement of the Thermal Barrier tube rupture scenario. Therefore, no calculation revisions are necessary.

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ON GENERIC LETTER 96-05

NRC Question 2:

In a letter dated March 17, 1997, the licensee stated that it is participating in the Joint Owners Group (JOG) Program on MOV Periodic Verification in response to GL 96-05. On August 13, 1997, the Westinghouse Owners Group (WOG) submitted Revision 2 of Topical Report MPR-1807, "Joint BWR, Westinghouse and Combustion Engineering Owners Group Program on Motor-Operated Valve (MOV) Periodic Verification." On October 30, 1997, the NRC staff completed a safety evaluation concluding that the JOG program is an acceptable industry-wide response to GL 96-05, with certain conditions and limitations. Con Ed should update its commitment to the JOG program to address Revision 2 of the JOG topical report and the NRC safety evaluation.

Con Edison response to Question 2:

The JOG had agreed that, after the NRC safety evaluation was issued, the participating utilities would notify the NRC of their plans to implement the JOG program described in Revision 2 of the JOG topical report which was the subject of the NRC safety evaluation. In a letter dated April 30, 1998, Con Edison provided the requested notification whereby Con Edison planned to continue participating in the JOG MOV Periodic Verification Program as a member of WOG and to implement the program elements described in Revision 2 of Topical Report MPR-1807.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
ON GENERIC LETTER 96-05

NRC Question 3:

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. In (a) letter dated March 17, 1997, Con Ed stated that static diagnostic testing would be based, in part, on an expert review and the IP2 Probabilistic Safety Assessment (PSA). As IP2 is a pressurized-water reactor (PWR) nuclear plant designed by Westinghouse, is the licensee applying the 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, Con Ed should describe the methodology used for risk ranking MOVs 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 risk significance.

Con Edison response to Question 3:

The methodology used to risk rank MOVs at IP2 is documented in "Evaluation of the Probabilistic Risk Significance of MOVs Installed in Indian Point Unit 2 Nuclear Power Station" dated August 1994 (IP2 evaluation). The IP2 evaluation preceded the release of Westinghouse Owners Group (WOG) "Risk Ranking Approach for Motor-Operated Valves in Response to Generic Letter 96-05" dated March 1997. The individuals involved in the IP2 evaluation pioneered the original methodology (see IP2 evaluation), which led to the BWROG and WOG developments. Con Edison has completed a comparison review of the risk ranking methodology utilized at IP2 to the WOG and NRC safety evaluation and has identified those areas where additional effort is required to be completely consistent with the WOG Engineering Report V-EC-1658-A Revision 2 and the NRC Safety Evaluation. Some of the differences identified include:

1. In the IP2 evaluation, MOVs were grouped into two categories as risk important and non-risk important rather than three (High, Medium, and Low) categories suggested by JOG. The IP2 evaluation results have also been utilized in a conservative way. At IP2, all risk important valves are included in the High category relative to periodic verification. Also, the importance cutoff used in the IP2 evaluation for the High category is 1E-4 versus the 1E-2 and 1E-3 for High and Medium, respectively in the JOG. Relaxation of this more stringent categorization to the more recently approved industry standards will be considered in a future update (e.g., MOVs binned according to JOG).

2. Personnel experienced in PRA, GL 89-10 issues, and operations & maintenance participated in the development of and/or reviewed the evaluations. The methodology included consideration of Level 2, shutdown, and external events. Subsequent to the evaluations, risk significance and these qualitative considerations were considered relative to Maintenance Rule implementation. Although the maintenance rule expert panel did not necessarily focus at the component level of detail, the methodology and risk ranking of MOVs was conservative (e.g., importance >1E-4 treated as High category). An expert panel review will be conducted relative to MOV risk ranking by April 1, 2000.

Based on the above, IP2 programs are judged to meet the intent of JOG. As stated above, it is the intention of Con Edison to perform those activities necessary to satisfy the requirements of the WOG methodology for risk ranking MOVs in response to Generic Letter 96-05.

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ON GENERIC LETTER 96-05

NRC Question 4:

The JOG program focuses on the potential age-related increase in 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. Con Ed should describe the plan at IP2 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.

Con Edison response to Question 4:

Con Edison ensures adequate motor actuator capability by performing preventive maintenance (PM) on MOVs and by implementing the periodic verification program. Motor actuator PMs typically include stem lubrication, grease inspection, electrical check and meggar, operator and motor external inspection, and limit and torque switch inspection. The frequency of MOV static tests in the periodic verification program is based on the JOG guidance.

Con Edison has prepared calculation PGI-00396-00 to perform and document an evaluation of the margin between the available thrust (or torque) and the required thrust (or torque) for each MOV in the Indian Point 2 Generic Letter 89-10 Program using the guidance provided in Limitorque Technical Update 98-01 and its Supplement. Based on the results of this calculation, the current design margins and MOV setpoints are acceptable for all IP2 GL 89-10 program valves. In some cases, the torque at control switch trip (CST) at the current torque switch setting exceeds the pullout torque capability of the actuator under degraded voltage. However, calculation PGI-00398-00 was performed using the Commonwealth Edison Methodology to provide a sufficient increase in motor capability to assure operation under design basis conditions. Specific recommended modifications and setpoint changes as a result of these analyses will be implemented at the next refueling outage.

Con Edison identified ten valves that required a specific configuration review by Limitorque or had terminal voltages lower than 70% of the nameplate rated voltage. For seven of these valves the Commonwealth Edison Methodology provided adequate justification of motor capability. Con Edison has requested and is waiting for a specific configuration review by Limitorque on the remaining three valves. However, preliminary analyses performed indicate that an operability issue is not expected once the configuration review is completed. Con Edison will notify the NRC when the configuration review is completed.

ATTACHMENT B

REQUEST FOR ADDITIONAL INFORMATION
GENERIC LETTER 96-05
LIST OF COMMITMENTS

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
INDIAN POINT UNIT NO. 2
DOCKET NO. 50-247
MAY 1999

ATTACHMENT B

LIST OF COMMITTMENTS

Commitment	Due Date
Obtain industry test data to develop (if sufficient data is available) Approach 2 MOV statistical analysis	Completion of industry survey of test data planned by August 31, 1999
Prepare checklist for all existing PPM calculations	Completion of checklist expected by July 31, 1999
Evaluate modification options for low margin valves and establish a definitive program consistent with margin improvement goals	This evaluation, program and any resulting modifications will be completed during the 2000 refueling outage
Conduct expert panel review relative to MOV risk ranking	This will be completed by April 1, 2000
Inform NRC when Limitorque configuration review is complete	30 days following receipt of review from Limitorque