



Commonwealth Edison  
1400 Opus Place  
Downers Grove, Illinois 60515

March 17, 1992

Dr. Thomas E. Murley, Director  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Attn: Document Control Desk

Subject: Additional Information Related to the  
Commonwealth Edison Motor Operated Valve  
Testing Program

Byron Units 1 and 2,  
NRC Docket Numbers 50-454 and 50-455

Braidwood Units 1 and 2,  
NRC Docket Numbers 50-456 and 50-457

Zion Units 1 and 2,  
NRC Docket Numbers 50-295 and 50-304

Dresden Units 2 and 3,  
NRC Docket Numbers 50-237 and 50-249

Quad Cities Units 1 and 2,  
NRC Docket Numbers 50-254 and 50-265

LaSalle Units 1 and 2,  
NRC Docket Numbers 50-373 and 50-374

Reference: Generic Letter 89-10, "Safety Related Motor  
Operated Valve Testing and Surveillance," dated  
June 28, 1989

Dear Dr. Murley:

The purpose of this letter is to provide additional information related to the Commonwealth Edison (CECo) Motor Operated Valve (MOV) Test and Surveillance Program initiated by the Referenced Generic Letter. This additional information was requested by the NRC as a result of a Byron MOV inspection. The details of the inspection are documented in Reports 50-454/91003 and 50-455/91003.

9203230301 920317  
PDR ADOCK 05000237  
P PDR

*A06A*  
*1/1*

March 17, 1992

Although identified at Byron Station, the issues raised have application to other CECo sites. Therefore, the responses contained in the Attachment are being docketed for all CECo operating stations.

If there are any questions or comments, please contact me at (708) 515-7292.

Sincerely,



David J. Chrzanowski  
Nuclear Licensing Administrator  
Generic Issues

cc: A. Bert Davis, Regional Administrator - RIII  
R. Pulsifer, Project Manager - NRR/PDIII-2  
A. Hsia, Project Manager - NRR/PDIII-2  
B. Siegel, Project Manager - NRR/PDIII-2  
L. Olshan, Project Manager - NRR/PDIII-2  
C. Patel, Project Manager - NRR/PDIII-2  
J. Hickman, Project Manager - NRR/PDIII-2  
R. Elliott, Project Engineer - NRR/PDIII-2  
S. Dupont, Senior Resident Inspector - Braidwood  
W. Kropp, Senior Resident Inspector - Byron  
W. Rogers, Senior Resident Inspector - Dresden  
D. Hills, Senior Resident Inspector - LaSalle  
T. Taylor, Senior Resident Inspector - Quad Cities  
J. Smith, Senior Resident Inspector - Zion

## Attachment

### **Supplemental Response to Byron MOV Inspection Report**

**Report Nos. 50-454/91003(DRS), 50-455/91003(DRS)**

#### **Section I.**

**CECo committed to address the adequacy of the GL 89-10 program in light of the recent problems with 8 AFW Discharge Header Isolation Valves and to provide the NRC with the results of a sample review of MOVs outside IE Bulletin (IEB) 85-03 and the resulting consideration of the impact on the GL 89-10 schedule.**

A review of the generic implications of the AFW problems (miscalculation of the pump flows on valves AF013A - H) has been completed. All IEB 85-03 valves and additionally, all GL 89-10-valves at Byron, Braidwood, and Zion Stations were evaluated. The analogous AFW valves at Braidwood and Zion had similar discrepancies as those found at Byron Station. However, the error in the limiting differential pressure calculation was not repeated for any of the remaining IEB 85-03 valves. Therefore, this discrepancy has no impact on the GL 89-10 schedule.

The fact that the error was not systematically repeated is understandable because:

1. In most cases, pump dead-head pressure is assumed. Most valves are not located in systems where there are branching flows. The analysis for calculation of pump flow in these particular systems is simplified because the flow rate is zero when the valve is closed and there is no need to calculate the pipeline flow resistance.
2. The design basis function of the other valves was more clearly established during the design phase of the plant. The original design basis for the AF013 valves did not include a "safety related function".
3. The GL 89-10 effort is more sophisticated than the IEB 85-03 effort. The industry has also had the benefit of additional experience and lessons learned in performing the GL 89-10 work. CECo has used a single task team to perform the design basis calculations for all 6 nuclear stations. The single task team and the increased sophistication of the GL 89-10 effort reduces the likelihood of errors.

## Section I. (cont.)

A further study was performed to assess the generic risk of errors in the original procurement. This study compared the original differential pressure used on the procurement data sheets with the recently calculated design basis differential pressures. 40% of the Byron valves were sampled and the following general trends were observed, excluding the AFW discharge valves with the previously noted problems:

1. The original procurement differential pressures on approximately 80% of the valves examined were higher than the recently calculated differential pressures. The average procurement pressure was 3 times the design basis pressure. This is likely due to the fact that the procurement specification was developed using simplified, conservative assumptions instead of detailed analyses of process conditions.
2. Approximately 20% of the valves examined had procurement differential pressures which were less than the design basis values. Each of these valves was examined in detail. In every case, the discrepancy was explained by the purposeful conservatism in the recently calculated results. As an example, containment pressure at the time of switchover to cold leg recirculation was estimated to be 45 psig. In fact, the containment pressure in the worst case design basis accident would have decayed to a value of 33 psig or less prior to valve initiation.
3. Approximately 50% of the valves for which procurement pressure was less than the design basis pressure have been identified as having thrust margins less than our desired goal. However, all had positive margins. As a result of CECO's design margin requirements, these valves will undergo either a spring pack change or a gear ratio change. The other 50% of the valves for which procurement pressure was less than the design basis pressure have been found to have sufficient thrust margins. The identification of these valves occurred as part of CECO's GL 89-10 program.

In summary, the AFW valve problem identified at Byron Station was an isolated case and is not repeated elsewhere. Therefore, there is no impact on the current GL 89-10 program schedule.

## Section II.

**The NRC requested CECo to document and justify the definition of "practicable" and to notify the NRC when available.**

This definition is now available and is documented internally in CECo's Corporate Nuclear Engineering Department. The definition is summarized below:

Per CECo commitments to the NRC, all valves in the GL 89-10 Program will be evaluated to determine whether full differential pressure (dp) testing is practicable. CECo will test all valves that meet the practicable criteria at full dp conditions. Valves which do not meet the practicable criteria will be verified utilizing the 2-phase dp testing process defined in CECo's GL 89-10 program document.

CECo has split the practicable criteria for determining what type of testing to perform on GL 89-10 MOVs into 2 parts: 1) Practicability, and 2) Meaningfulness. The following contains the definition of these parts:

**Step 1 => Determine if dp testing is practicable.**

A test is not **practicable** when conditions arise from performing the test that have adverse safety implications, violate plant technical specifications or procedures, and/or could result in damage to plant equipment. Some examples include: isolating an operating pump's suction valve, injecting cold water into an operating vessel, and/or dead heading a pump

**Step 2 => Determine if Zero dp testing is meaningful.**

Zero dp (static) testing is considered **meaningful** in lieu of design basis dp testing if the static load of the MOV dominates the load during the design basis condition. If the dp component of the total MOV thrust is less than 10%, then the static test is **meaningful**.

CECo's position is that the only appropriate form of dp testing is full design basis dp testing. CECo has used engineering judgement and consultation with industry experts in the field to define our full design basis dp testing criteria. CECo's criteria is that linear extrapolation of test results to 100% design basis flow conditions gives acceptable results for all valves tested at >90% of those conditions. This is consistent with the NRC's position detailed in Supplement 1 to the GL 89-10 document. The response to question #25 in Supplement 1 states that extrapolation of test results

## **Section II. (cont.)**

of an MOV in situ at conditions less severe than design basis conditions may be extrapolated, only if justified properly. CECo's position is that the linear extrapolation of MOV test data at conditions <90% of design basis dp conditions is not reliable. At this time, there is work ongoing at CECo to develop enhanced mathematical techniques that may allow extrapolation to 100% design basis conditions of data taken from certain MOVs tested between 80% and 90% of design basis conditions. CECo will only dp test MOVs where extrapolation of the test results to full design basis conditions can be justified. The valves that are not full dp tested will be verified utilizing the 2 stage process as defined in CECo's GL 89-10 program document.

### **Section III.**

**In the Byron MOV IR, the NRC requested CECo to justify the method used to perform periodic verification of the capability of the MOVs within the GL 89-10 program.**

CECo's position on periodic testing of MOVs is consistent with the NRC position stated in GL 89-10, Item F, "Testing of MOVs at design basis conditions need not be repeated unless the MOV is replaced, modified, or overhauled to the extent that the licensee considers that the existing test results are not representative of the MOV in its modified configuration".

CECo has committed in the MOV Program Document to performing static testing with diagnostics and full design basis dp testing with diagnostics on all GL 89-10 program MOVs, where practicable, as defined in Section II. Subsequent periodic testing will be performed under static conditions unless the MOV is replaced, modified, or overhauled to the extent that the original dp test results are not applicable to the MOV in its modified configuration. This is consistent with the NRC requirement.

Documentation and performance trending over the life of the plant will be maintained for each MOV in the GL 89-10 program. CECo will examine the overall MOV database at 2 year intervals to evaluate and determine the need to adjust the testing frequency of individual MOVs from the current interval of 5 years or 3 refueling outages, whichever is longer. CECo will properly justify any change in the required testing frequency for any particular MOV.

## Section IV.

**In the Byron MOV IR, the NRC had an unresolved item (50-454/91003-02, 50-455/91003-02) pending review by NRR of the overall accuracy of the VOTES diagnostic equipment.**

This review has now been completed. Test results performed by the Idaho National Engineering Laboratory (INEL) validates that the accuracies of the VOTES equipment used by CECo of  $\pm 9.2\%$  to  $\pm 9.8\%$  fall well within the actual capabilities of the equipment.