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July 25, 1985

Mr. Hugh L. Thompson, Jr., Director  
Division of Licensing  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Subject: Dresden Station Units 2 and 3  
Quad Cities Station Units 1 and 2  
Safety Evaluation on Containment  
Isolation Dependability by  
Demonstration of Containment  
Purge and Vent Valve Operability  
Docket Nos. 50-237/249 and 254/265

- References (a): NRC letter and Safety Evaluation Report  
from H.L. Thompson Jr. to D.L. Farrar  
dated June 17, 1985
- (b): CECO letter from B. Rybak to H.R. Denton  
dated May 3, 1984.
- (c): NRC letter and Safety Evaluation Report  
from D.M. Crutchfield to D.L. Farrar  
dated November 4, 1983.
- (d): CECO letter from R.F. Janecek to D.G.  
Eisenhut dated December 26, 1980.
- (e): CECO letter from R.F. Janecek to D.G.  
Eisenhut dated August 22, 1980.

Dear Mr. Thompson:

This letter is written to provide a written response to the staff's letter and safety evaluation report dated June 17, 1985, reference (a). From our previous submittals and responses, the staff's SER concluded that CECO did not demonstrate the ability of the containment purge and vent valves to close against the design basis loss of coolant accident. The staff has concluded that two major items are still at issue; these are:

- (1) actual values of the closing torque for the 18-inch butterfly valves
- (2) quantification of the effect an elbow has on the closing torque for a butterfly valve when the valve is within five pipe diameters of the elbow or tee.

In order to resolve the two major items, the staff included a list of three specific open issues that should be addressed, note enclosure 1.

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Therefore, pursuant to 10 CFR 50.54 (f) CECO was requested to address the following items.

1. Our assessment of the operability of our purge and vent valves in light of the concerns outlined in the Safety Evaluation Report and
2. Whether or not we intend to maintain the purge and vent valves sealed closed in accordance with Standard Review Plan Section 6.2.4, II.6.f and to verify them to be closed every 31 days whenever the reactor is not in the cold shutdown or refueling mode until such time as we submit acceptable information that demonstrates that our purge/vent valves will operate in the event of a DBA-LOCA.

CECO's response to these items are provided as follows:

Item 1:

Our assessment of the operability of our purge and vent valves in light of the concerns outlined in the Safety Evaluation Report.

Response:

Open issues 1 and 2 of enclosure 1 stated that the large differences between the dynamic torque predictions between similar 18-inch Pratt 2F11 valves at other plants and the Dresden, Quad Cities valves need to be resolved. Specifically tests performed for the Pratt 18-inch valves for Prairie Island resulted in a dynamic torque prediction of 18,000 in-lbs. In addition tests performed on a 6-inch Allis Chalmer valve, which is similar to the Pratt Valve, scaled up to an 18-inch diameter disk resulted in a dynamic torque prediction of 16,000 in-lbs; where as CECO scaled tests resulted in a dynamic torque prediction of 2,600 in-lbs.

CECO has tried to resolve the differences in the testing. However, firm conclusions could not be drawn from the investigation. Therefore for conservatism, CECO has accepted the dynamic torque results from the Prairie Island analysis.

CECO has recomputed the stresses on critical valve components utilizing the dynamic torque value, 18,000 in-lbs, from the Prairie Island analysis. The stresses were computed utilizing the original analysis methodology as presented in references (d) and (e).

Utilization of the existing analytical methodologies with the new torque values, resulted in an overstressed condition at certain valve disc angles. On this basis, the maximum opening angles were determined such that

by limiting the valve angles below the specified value, all of the valve components met the acceptance criteria. The maximum opening angles were determined for both in-plane and out-of-plane valve orientations to be 50° and 35°, respectively.

In the process of performing this reanalysis, undue conservatisms were found in the original methodologies. We, therefore, believe that the valves can be fully qualified without limiting the valve opening angle by removing the following conservatisms from the analysis methodology.

1. Utilization of service level C allowables instead of service level A allowables as allowed by the ASME Code.
2. Modeling the shaft constraint conditions more accurately
  - a) modeling the bearing as a guide instead of a pinned connection
  - b) accounting for the disk hub and disk stiffness.
- 3) Modeling the applied disc load as a distributed load instead of a point load.

The dynamic torque values from the Pratt analysis will be utilized in the following manner. Since the 18,000 in-lbs represents the worst case valve shaft out-of-plane with elbow configuration, the NRC suggested factors of 1.5 and 3 were used to back calculate a dynamic torque value of 6000 in-lbs. This valve will be used for the uniform flow conditions. The appropriate torque values for valves within 5 pipe diameters of an elbow or tee are then as follows:

- (1) 1.5 x 6000 in-lbs for elbow-shaft in plane configurations
- (2) 3.0 x 6000 in-lbs for elbow-shaft out of plane configurations

The revised analysis will be submitted by October 1, 1985.

The staff's SER stated, note open Issue 3 in Enclosure 1, that an operability demonstration needs to be performed for valves AO-1601-56, 60, 63 and 55.

Valves AO-1601-56 and 60 are 18-inch 2F11 valves identical to the other 18 inch butterfly valves in the plants. Therefore all the operability analyses performed thus far are directly applicable to valves AO-1601-56 and 60. Operability analyses for the 6-inch butterfly valves have been completed utilizing the original methodology. The results for that analysis have been submitted in our December 26, 1980 submittal from R.F. Janecek (CECo) to D.G. Eisenhut (NRC). Again all analyses will be revised utilizing the criteria outlined above.

CECo will perform operability reviews for the AO-1601-55 valves which are 4-inch valves. The 55 valves located at Quad Cities are 4-inch gate valves. We will perform operability reviews in accordance with the NRC suggested methodology for gate valves in item 3 of the open issues. It should be noted that the 4-inch valves at Dresden are not 4-inch gate valves. They are 4-inch Jamesbury butterfly valves with a spring loaded air operator. The analyses for these valves will be submitted by October 1, 1985.

Operability reviews on all the operators for the subject valves will be performed utilizing the dynamic torque predictions from the Prairie Island analysis.

It is our understanding that seismic qualification of these valves is currently an unresolved safety issue. Therefore, seismic qualification will be addressed as part of unresolved issue A-46.

#### Item 2:

Whether or not we intend to maintain the purge and vent valves sealed closed in accordance with Standard Review Plan Section 6.2.4, II.6.f and to verify them to be closed every 31 days whenever the reactor is not in the cold shutdown or refueling mode until such time as we submit acceptable information that demonstrates that our purge/vent valves will operate in the event of a DBA-LOCA.

#### Response

CECo must emphasize that the units at Dresden and Quad Cities cannot be properly operated with the valves in a locked closed position. Dresden and Quad Cities tech specs require that the purge and vent valves remain fully operable and further require that some valves remain open to maintain the required  $\Delta P$  between the torus and drywell.

We expect the above described reanalyses to demonstrate compliance with acceptance criteria under DBA-LOCA conditions with the valves in the fully open position. If the valves and valve operators cannot be fully qualified by analysis, CECO will immediately initiate interim changes to the appropriate valves to limit the maximum open position to a position which will ensure the closing capability of the valves during a loss of coolant accident as determined by the revised analysis. CECO will then proceed to implement permanent modifications to allow the valves to operate within their full range capability. The interim modifications will be removed when the permanent modifications have been completed.

CECo has reviewed the operability program as stated above, with the NRC via telecon on July 24, 1985 with Mr. R. Wright and Mr. R. Gilbert of the NRC. CECO understands that the operability program as stated above is acceptable to the NRC for LOCA qualification. As stated previously, we will submit the results of the reanalysis and our final disposition of this issue by October 1, 1985.


July 25, 1985

To the best of my knowledge and belief the statements contained herein and in the attachment are true and correct. In some respects these statements are not based upon my personal knowledge but upon information furnished by other Commonwealth Edison employees. Such information has been reviewed in accordance with Company practice and I believe it to be reliable.

One signed original and ten (10) copies of this letter and the attachment are provided for your use.

If you have any questions regarding this matter, please direct them to this office.

Very truly yours,

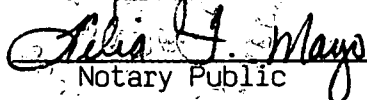


J. R. Wojnarowski  
Nuclear Licensing Administrator

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cc: R. Bevan - NRR  
R. Gilbert - NRR  
NRC Resident Inspector - Dresden  
NRC Resident Inspector - Quad Cities

SUBSCRIBED and SWORN to  
before me this 25<sup>th</sup> day  
of July, 1985

  
Notary Public

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Open Issues

Dresden Station Units 2 and 3

Quad Cities Station Units 1 and 2

Demonstration of Containment Purge and Vent Valve Operability

1. The large differences in dynamic torque predictions between similar 18-inch valves at other plants with the Pratt 18-inch 2F 11 valves at Dresden-Quad Cities need to be resolved (see Section 4.1 and 4.2 of attached TER).
2. Depending on the resolution of (1) above, for the 18-inch valves the stress analysis for critical valve parts and the structural/torque capability of the valve operator may have to be reexamined.
3. Operability demonstration information needs to be furnished for the A0-1601-56, -60, -63, and -55 valves. Since the 4 inch gate valve A0-1601-55 does not experience the hydrodynamic lift loads that the butterfly valves (-56, -60, and -63) are subject to, the review areas typically for this type of valve are as follows:
  - o Seismic qualification data
  - o Static pressure analysis
  - o Closure analysis (demonstrating the operator capability).

The 18-inch butterfly valves (-56 and -60) and the 6-inch butterfly valves (-63) require operability demonstration information for review as follows:

- o Methodology used in dynamic torque predictions and torque analysis results.
- o Stress analysis results (dynamic and static) for critical valve parts including load combinations used, stress allowables and applicable codes/standards.
- o Torque margins and actuator torque absorption capability.
- o Seismic qualification data.