



**Commonwealth Edison**  
One First National Plaza, Chicago, Illinois  
Address Reply to: Post Office Box 767  
Chicago, Illinois 60690

April 30, 1984

Mr. James C. Keppler  
Regional Administrator  
U.S. Nuclear Regulatory Commission  
Region III  
799 Roosevelt Road  
Glen Ellyn, IL 60137

Subject: Dresden Station Units 2 and 3  
Drywell/Torus Vacuum Breaker  
Seal Qualification  
NRC Docket Nos. 50-237 and 50-249

Reference (a): J. G. Keppler letter to J. J. O'Connor  
dated November 18, 1983.

Dear Mr. Keppler:

This letter and its attachments is Commonwealth Edison's (CECo's) response to Item 2.4. (iv).(1) of the referenced report. This item identified CECO's commitment to determine and assess the environmental qualification status of the subject vacuum breaker seals and lubricants used with them. An abstract of the program implemented for this purpose and a technical status report on the seals and lubricants relative to Dresden's vacuum breakers is provided here. The attachments are informational copies of the program specifications and the program final analysis report. We believe that this material will provide the information necessary for an NRC review.

Program Abstract

Commonwealth Edison's plan to address this concern was to design and perform an operability and external leakage control functional test program. The tests covered the static and dynamic seals (and corresponding lubricants), either in use then or proposed for future use. A valve mock-up was constructed to facilitate exposure of design samples to the anticipated DBA environmental conditions and perform the functional tests.

The mock-up (sample) exposures were performed by Argonne National Laboratories, under the requirements and direction of Station Nuclear Engineering Department (SNED). The tests themselves were performed exclusively by CECO personnel, with the use of the same procedures and apparatus employed by Dresden to assess the operability and leakage control performance of the actual vacuum breaker seals. These procedures were reviewed and regarded as suitably conservative, given the fact that conservative environmental conditions for sample exposures were also used.

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Fundamental to test program design was development of a specification document (Attachment A). In detail, this effort provided requirements for such items as; 1) environmental exposure criteria, 2) sample selection and mock-up construction, and 3) the specifics of the functional tests and their attendant seal performance acceptance criteria. The express objective of these requirements was to provide the means to qualify the designs involved for the environmental conditions commensurate with a period of four fuel cycles (Approximately six years, which equates to the vacuum breaker refurbishment cycle), plus 28-30 days after a DBA event, which was determined to be adequate for the plant safety functions of the valve external seals. In this regard, the environmental conditions of greatest importance were cumulative gamma radiation to  $3.2 \times 10^7$  Rads ( $\pm 10\%$ ) with peak temperatures of up to  $334^\circ\text{F}$  ( $\pm 5^\circ\text{F}$ ).

The subsequent test results are discussed in depth in the final analysis report (Attachment B). In summary, all of the designs involved met the specified performance acceptance criteria without difficulty. Consequently, it is our position that the designs tested, both now in use or planned for future use, are in fact environmentally qualified to the extent necessary to support the vacuum breaker external seal operability and leakage control safety related functions.

One particular dynamic seal design, a bronze bushing/EPR O-ring prototype, was obviously superior. Although it had distinctively excellent performance, clearly its best advantages were related to its maintainability. In fact, we believe the comparison of test results for this design to those for the other designs shows that the maintainability aspect was much more directly related to Dresden's past vacuum breaker seal problems than the design qualification aspect itself.

### Status

In recognition of the test findings, Dresden has initiated modifications for both Units 2 and 3 to employ the bushing/O-ring dynamic seal and EPR O-ring static seal designs. SNED has performed the necessary design review actions, per the applicable CECO Q.A. Program requirements. The modifications have now been fully implemented on Dresden Unit 3 (with excellent confirmatory in-plant test results), and will be fully implemented on Unit 2 during the next available off critical path outage opportunity. With the decision to employ the bronze bushing design, we will discontinue the use of the 75 psi proof test during future local leak rate testing of the vacuum breaker seals.

The dynamic O-rings will be procured safety-related commercial grade. That is, the material will be purchased from an approved vendor, ordered to certain specifications (I.D. cross section and compound number) and requiring a Certificate of Conformance with each shipment.

J. G. Keppler

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If there are any further questions regarding this matter, please contact this office.

Very truly yours,



B. Rybak  
Nuclear Licensing Administrator

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Attachment

cc: Region III Inspector - Dresden w/o Att.

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