Commonwealth Edison Company
1400 Opus Place
Downers Grove, IL 60515

June 2, 1995

ComEd

U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attn: Document Control Desk

Subject: Quad Cities Nuclear Station Unit 2
Additional Information Pertaining to Proposed Core Shroud Repair
NRC Docket No. 50-265

References: (1) J.L. Schrage to USNRC letter dated May 5, 1995.

(2) Teleconference on May 25, 1995, between ComEd (J. Schrage, et al) and the USNRC (R. Pulsifer, et al).

In the Reference (1) letter, Commonwealth Edison (ComEd) transmitted information pertaining to the proposed Core Shroud reapir at Quad Cities Nuclear Station, Unit 2 [Supplement A to Revision 4 of GENE-771-68-1094 (hereafter referred to as Supplement A)]. In the Reference (2) teleconference, the NRC staff requested additional information with respect to Supplement A. This letter transmits ComEd's response to the NRC staff's request. This requested information is provided in the attachment to this letter.

To the best of my knowledge and belief, the analyses and evaluations contained in this document are true and correct. In some respects the document is not based on my personal knowledge, but on information furnished by other Commonwealth Edison employees, contractor employees, and/or consultants. Such information has been reviewed in accordance with company practice, and I believe it to be reliable.

If there are any questions concerning this matter, or need for further clarification, please contact this office.

Sincerely,

John L. Schrage
Nuclear Licensing Administrator

OFFICIAL SEAL
JACQUELINE T EVANS
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES: 12/15/97

Jacqueline T. Evans 6/2/95

Attachment

cc: J. B. Martin, Regional Administrator - RIII
R. M. Pulsifer, Project Manager - NRR
C. G. Miller, Senior Resident Inspector - Quad Cities
Office of Nuclear Facility Safety - IDNS

k:\nla\quad\shroud\preprf.wpf

A018

ATTACHMENT
Request for Additional Information
Quad Cities Core Shroud Modification

Question:

In the ComEd response to NRC RAI Question 3.e.9, dated March 21, 1995, ComEd stated that the worst load combination, DBE + $LOCA_{MSLB}$, creates a momentary separation of 0.426 in. at the H6 weld (page 18).

The May 5, 1995 ComEd letter contains Supplement A to Revision 4 of GENE-771-68-1094 (hereafter referred to as Supplement A). Page 19 shows calculated gaps under various loading combinations. The largest gap shown is 0.450 in. at H7, for DBE + Normal Pressure loading condition. The largest gap for DBE + $LOCA_{MSLB}$ loading condition is listed as 0.408 in. at H6.

There is a discrepancy in these responses. We need to know which is the correct response.

Response:

The response submitted by ComEd in the May 5, 1995 letter [Supplement A to Revision 4 of GENE-771-68-1094 (hereafter referred to as Supplement A)] is correct and should be considered as the upper bound separation for the response to Question 3.e.9 in the response dated March 21, 1995. The reasons for the differences are noted below:

- In the March 21, 1995 ComEd response, the shroud stiffness (cracked) was estimated based on the realistic assumption of a fillet weld between the shroud and the top guide ring, which increases the ring stiffness. The stiffness used was 9370 kips/inch, while the shroud stiffness used in Supplement A (i.e. in the May 5, 1995 response) is without the fillet weld (lower bound estimate), and was 3580 kips/inch. This decrease in stiffness reduces the effective preload and thus causes higher values for the crack openings.

- The shroud weights used in Supplement A, as stated in our May 24, 1995 submittal, were calculated more accurately, and result in slightly higher weights than were used in the crack opening calculations in the March 21, 1995 submittal.

- Supplement A accounted for a reduction in preload due to looseness in the tie rods caused by potential weld cracking after installation. For this analysis the tie rods were assumed to have been installed prior to shroud cracks being formed. The original March 21, 1995 response did not account for this reduction in tie rod preload associated with weld cracking occurring after the tie rod installation.

ComEd is also providing a clarification as to why the maximum estimated gap under a DBE + Normal Pressure loading condition (0.450 inches at H7) is slightly greater than the maximum gap under a DBE + $LOCA_{MSLB}$ loading condition (0.408 inches at H6). The primary difference relates to the relatively high self weight of the Quad Cities Core Shroud relative to the uplift pressures. The high self weight of the Quad Cities Core Shroud offsets the effects of the MSLB pressures resulting in a significant reduction in the amount of the gap opening at the H6 location. The 0.408 inch gap at H6 is the bounding condition for the DBE + $LOCA_{MSLB}$ loading case as it is based on

an assumed crack location below the core plate. Note that the uplift pressure associated with an assumed crack location above the core plate (i.e. H5) would result in a reduced net uplift force.

Another contributing factor to the differences in the calculated gaps is that the two maximum gap values do not occur at the same location and are the result of different seismic analysis conditions. The maximum tie rod load under a DBE + Normal Pressure loading condition is 306 Kips (GENE-771-72-1094 Rev. 1 pages 79 & 82) which is the result obtained from analysis case E (an assumed crack at H4 modeled as a hinge) whereas the maximum tie rod load under a DBE + $LOCA_{MSLB}$ loading condition is 126 Kips (GENE-771-72-1094 Rev. 1 pages 79 & 82) which is the result obtained from analysis case H (an assumed crack at H3 modeled as a roller). Note that the difference between the seismic modeling as a roller joint versus a hinged joint is an analysis technique used to account for the effect of the increased pressure associated with a MSLB. The calculated tie rod load associated with a hinge at H7 (location where the maximum emergency condition gap was computed) is less than the 306 Kip bounding tie rod load used for this evaluation. Thus the 0.450 inch gap is a conservative upper bound for the emergency condition.

Based on the clarifications provided above, it can be concluded that the reason the maximum calculated gap under the emergency condition is larger than the calculated gap in the faulted condition is due to the compounded effects of the conservative methods used to calculate the maximum gap under the emergency condition. For both cases, these gaps will close after a short period of time and thus are not a concern with respect to bypass leakage. The decision to utilize an upper bound tie rod load in this evaluation was done to provide consistency with the previous evaluations performed for the design of the tie rod assembly.