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**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

WASHINGTON, D.C. 20555-0001

December 8, 1999

Mr. Oliver D. Kingsley, President  
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Commonwealth Edison Company  
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**SUBJECT:    GENERIC LETTER 97-01, "DEGRADATION OF CRDM/CEDM NOZZLE AND OTHER VESSEL CLOSURE HEAD PENETRATIONS" - BYRON STATION, UNITS 1 AND 2, AND BRAIDWOOD STATION, UNITS 1 AND 2 (TAC NOS. M98549, M98550, M98547 AND M98548)**

Dear Mr. Kingsley:

By letters dated April 29 and July 30, 1997, Commonwealth Edison Company (ComEd) provided its 30-day and 120-day responses to Generic Letter (GL) 97-01, "Degradation of CRDM/CEDM Nozzle and Other Vessel Closure Head Penetrations." Additional information was provided in ComEd's letter of December 29, 1997. ComEd's letters of December 1, 1998, and January 15, 1999, provided its response to the staff's request for additional information (RAI) dated September 2, 1998. The responses provided ComEd's proposed program and efforts to address the potential for primary water stress corrosion cracking (PWSCC) to occur in the control rod drive mechanism (CRDM) nozzles at Byron Station, Units 1 and 2, and Braidwood Station, Units 1 and 2 (Byron and Braidwood).

On April 1, 1997, the staff issued GL 97-01 to the industry, requesting that addressees provide a description of the plans to inspect the vessel head penetrations (VHPs) at their respective pressurized water reactor (PWR) designed plants. In the discussion section of the GL, the staff indicated that it did not object to individual PWR licensees basing their inspection activities on an integrated, industry-wide inspection program.

The Westinghouse Owners' Group (WOG), in coordination with the efforts of the Nuclear Energy Institute (NEI) and the other PWR Owners' Groups (the Babcock and Wilcox Owners' Group (B&WOG) and Combustion Engineering Owners' Group (CEOG)), determined that it was appropriate for its members to develop a cooperative integrated inspection program in response to GL 97-01. Therefore, on July 25, 1997, the WOG submitted two Topical Reports, WCAP-14901, Revision 0, and WCAP-14902, Revision 0, on behalf of the member utilities in the WOG. In these reports, the WOG provided descriptions of the two models, the EPRI/Dominion Engineering CIRSE Model (crack initiation and growth susceptibility model) and the Westinghouse Model, that were being used to rank the VHPs at the participating plants in the owners' group. The ComEd responses indicated that ComEd was a participant in the WOG's integrated program for evaluating the potential for PWSCC to occur in the VHPs of Westinghouse designed PWRs, and that the EPRI/Dominion Engineering CIRSE Model and WCAP-14902 were applicable to the assessment of VHPs at Byron and Braidwood.

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The staff performed a review of ComEd's responses to the GL and the applicable WCAP for Byron and Braidwood, and determined that some additional information was needed for completion of the review. Therefore, on September 2, 1998, the staff issued an RAI to ComEd requesting: (1) a description of the probabilistic susceptibility ranking for a plant's VHPs to undergo PWSCC relative to the rankings for the rest of the industry; (2) a description of how the respective susceptibility models were benchmarked; (3) a description of how the variability in the product forms, material specifications, and heat treatments used to fabricate a plant's VHPs were addressed in the susceptibility models; and (4) a description of how the models would be refined in the future to include plant-specific inspection results. As was the case for the earlier responses to the GL, the staff encouraged a coordinated, generic response to the requests in the RAI. Similar RAIs were issued to the other PWR licensees.

On December 11, 1998, NEI submitted a generic, integrated response to the RAIs on GL 97-01 on behalf of the PWR industry and the utility members in the owners' groups. In the generic submittal, NEI informed the staff that it normalized the susceptibility rankings for the industry. The generic response to the RAIs also provided sufficient information to answer the information requests in the RAIs, and emphasized that the integrated program is an ongoing program that will be implemented in conjunction with EPRI, the PWR Owners' Groups, the participating utilities, and the Material Reliability Projects' Subcommittee on Alloy 600. By letter dated March 21, 1999, the staff informed NEI that the integrated program was an acceptable approach for addressing the potential for PWSCC to occur in the VHPs of PWR-designed nuclear plants, and that licensees responding to the GL could refer to the integrated program as a basis for assessing the postulated occurrence of PWSCC in PWR-design VHPs.

To date, all utilities have implemented VT-2 type visual examinations of their VHPs in compliance with the American Society for Mechanical Engineers (ASME) requirements specified in Table IWB-2500 for Category B-P components. Most utilities, if not all, have also performed visual examinations as part of plant-specific boric acid wastage surveillance programs. In addition, the following plants have completed voluntary, comprehensive augmented volumetric inspections (eddy current examinations or ultrasonic testing examinations) of their CRDM nozzles:

- 1994 - Point Beach, Unit 1 (Westinghouse design)
- 1994 - Oconee, Unit 2 (B&W design)
- 1994 - D.C. Cook, Unit 2 (Westinghouse design)
- 1996 - North Anna, Unit 1 (Westinghouse design)
- 1998 - Millstone, Unit 2 (a CE design)
- 1999 - Ginna (a Westinghouse design)

In addition, the following plants have completed voluntary, limited augmented volumetric inspections of their VHPs as well:

- 1995 - Palisades - eight instrument nozzles (CE design)
- 1996 - Oconee, Unit 2 - reinspection of two CRDM nozzles (B&W design)
- 1997 - Calvert Cliffs, Unit 2 - vessel head vent pipe (CE design)

The majority of these plants were considered to have the more susceptible VHPs in the industry. Of these inspections, only the inspections at D.C. Cook, Unit 2, have resulted in the identification of any domestic PWSCC type flaw indications. The current program includes additional commitments to perform further volumetric inspections of the CRDM nozzles at Oconee, Unit 2 (a reinspection of 2-12 nozzles in 1999), Crystal River 3 (in 2001, a B&W design), Diablo Canyon, Unit 2 (in 1999, a Westinghouse design), Farley, Unit 2 (in 2001, a Westinghouse design), and San Onofre, Unit 3 (in 2002-2008, a CE design). These plants are currently ranked in either the high or moderate susceptibility categories.

By letters dated December 1, 1998, and January 15, 1999, ComEd provided its response to the staff's RAI. In the January 15, 1999, submittal ComEd endorsed the NEI submittal of December 11, 1998, and indicated that ComEd was a participant in the NEI/WOG integrated program. Since the additional voluntary volumetric inspections performed to date have confirmed that PWSCC is not an immediate safety concern with respect to the structural integrity of VHPs in domestic PWRs, and since the NRC staff has approved the integrated program for implementation, we conclude that the integrated program provides an acceptable basis for evaluating the VHPs. ComEd may refer to the integrated program when submitting related VHP-related licensing action submittals for the remainder of the current 40-year licensing period. However, if ComEd is considering applying for license renewal of Byron or Braidwood, any application will need to address the following items: (1) an assessment of the susceptibility of the VHPs to develop PWSCC during the extended license terms for the facilities; (2) a confirmation that the VHPs at the facility is included under the scope of the boric acid corrosion inspection program, and (3) a summary of the results of any inspections that have been completed on the VHPs prior to the license renewal application, as appropriate.

This completes the staff's efforts relative to your responses to GL 97-01. Thank you for your consideration and efforts in addressing this issue.

Sincerely,

Original Signed By

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