

February 13, 2001

Mr. Michael R. Kansler  
Senior Vice President and  
Chief Operating Officer  
Entergy Nuclear Operations, Inc.  
440 Hamilton Avenue  
White Plains, NY 10601

SUBJECT: CLOSEOUT OF GENERIC LETTER 97-01 - INDIAN POINT NUCLEAR  
GENERATING UNIT NO. 3 (TAC NO. M98570)

Dear Mr. Kansler:

This letter provides the U.S. Nuclear Regulatory Commission (NRC) staff's assessment of letters from the Power Authority of the State of New York (PASNY) dated April 29, 1997, July 21, 1997, and September 17, 1997, which provided your 30-day and 120-day responses to Generic Letter (GL) 97-01, "Degradation of CRDM/DEDM Nozzle and Other Vessel Closure Head Penetrations," and PASNY's letter dated February 16, 1999, which provided your response to the staff's request for additional information (RAI) dated November 24, 1998, relative to the issuance of the GL. These responses provided PASNY'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 Indian Point Nuclear Generating Unit No. 3 (IP3). On November 21, 2000, the license for IP3 was transferred to Entergy Nuclear IP3 and Entergy Nuclear Operations, Inc. By letter dated January 26, 2001, Entergy Nuclear Operations, Inc. requested that the NRC continue to review and act upon all requests before the Commission which had been submitted by PASNY.

On April 1, 1997, the staff issued GL 97-01, "Degradation of CRDM/DEDM Nozzle and Other Vessel Closure Head Penetrations," 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 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 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. In PASNY's responses to the GL, you indicated that you were a participant in the WOG's integrated program for evaluating the potential for evaluating the potential for PWSCC and that you were endorsing the probabilistic susceptibility model in the applicable topical report.

The staff performed a review of PASNY's responses dated April 29, 1997, July 21, 1998, and September 17, 1997, and the applicable WCAP for the IP3 facility and determined that some additional information was needed for completion of the review. On November 24, 1998, the staff issued an RAI requesting (1) a description of the crack initiation and growth susceptibility model used for assessment of the VHP nozzles at IP3; (2) the susceptibility ranking of IP3 as compiled from the crack initiation and growth analysis of the VHP nozzles; (3) a description of how the probabilistic failure model used for assessment of the VHPs at IP3 was benchmarked; (4) a description of how the probabilistic failure models for the assessment of VHP nozzles at IP3 will be refined to allow the input of plant-specific inspection data; (5) a description of how the variability in product forms, material specifications, and heat treatments used to fabricate each CRDM penetration nozzle are addressed in the probabilistic crack initiation and growth models; (6) a description of how various Westinghouse activities will be used to update the probabilistic susceptibility assessment of VHP nozzles; and (7) your comments of the susceptibility rankings of the VHP nozzles at IP3 relative to those of Farley Unit 2 and Diablo Canyon Unit 2.

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 based on a calculation of the time it would take for a VHP of a subject plant to have the same predicted probability of containing a 75 percent through-wall flaw relative as the "worst-case flawed" VHP at D.C. Cook Unit 2. The normalized ranking for a plant's nozzles was then grouped by histogram into one of three time-dependent susceptibility groupings: (1) those plants whose 75 percent through-wall probability would occur within 5 years of January 1, 1997, (e.g., plants with high susceptibility VHPs); (2) those plants whose 75 percent through-wall probability would occur within 5-15 years of January 1, 1997 (e.g., plants with moderate susceptibility VHPs); and (3) those plants whose 75 percent through-wall probability would occur at a time beyond 15 years of January 1, 1997 (e.g., plants with low susceptibility VHPs).

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 of Mechanical Engineers 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)

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- 1996 - North Anna Unit 1 (Westinghouse design)
- 1998 - Millstone Unit 2 (CE design)
- 1999 - Ginna (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 have been ranked as having 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 plants that are currently ranked in either the high or moderate susceptibility categories. 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 we have approved the integrated program for implementation, we conclude that the integrated program provides an acceptable basis for evaluating IP3's VHPs. You 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 you are considering applying for license renewal of your facilities, your application will need to address the following items: (1) an assessment of the susceptibility of your VHPs to develop PWSCC during the extended license terms for the facilities; (2) a confirmation that the VHPs at your facilities are included under the scope of your boric acid corrosion inspection program, and (3) a summary of the results of any inspections that have been completed on your VHPs prior to the license renewal application, as appropriate.

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

Sincerely,

**/RA/**

George F. Wunder, Project Manager, Section 1  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-286

cc: See next page

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