February 3, 2003

LICENSEE: Exelon Generation Company, LLC (Exelon)

FACILITY: Peach Bottom Atomic Power Station, Units 2 and 3

SUBJECT: SUMMARY OF TELECOMMUNICATION WITH EXELON TO DISCUSS INFORMATION IN SECTION 4.3.2, "REACTOR VESSEL INTERNALS FATIGUE AND EMBRITTLEMENT" OF THE PEACH BOTTOM LICENSE RENEWAL APPLICATION

On September 13, 2002, the NRC staff (hereafter referred to as "the staff") issued a safety evaluation report (SER) with open and confirmatory items related to the license renewal of Peach Bottom Atomic Power Station, Units 2 and 3 (PBAPS) (ADAMS Accession No. ML022590468). The SER contained an open item (OI) in Section 4.5.2 related to aging affects of the core shroud and top guide. On November 14, 2002, the staff held a conference call with representatives of Exelon (hereafter referred to as "the applicant") to discuss OI 4.5.2-1. The information discussed, the applicant's responses, and the follow-up actions are provided below. Participants of the November 14, 2002, conference call are included in Enclosure 1.

The subject discussed was reactor vessel internals embrittlement analyses. Specifically, the staff stated that Section 4.3.2.2 of the PBAPS License Renewal Application (LRA) indicates that the high fluence locations in the top guide are exempt from inspection. BWRVIP-26, BWR Top Guide Inspection and Flaw Evaluation Guidelines, states that the threshold fluence beyond which the components will be significantly affected is 5×10^{20} n/cm^2. At neutron fluences above this threshold, components would be susceptible to irradiation-assisted stress corrosion cracking (IASCC). Appendix C to BWRVIP-26 states that the generic fluence on the top guide for 60 years is 6×10^{21} n/cm^2, which exceeds the 5×10^{20} n/cm^2 damage threshold.

The applicant further stated that the location on the top guide that will see this high fluence, is the grid beam. This is Location 1, as identified in BWRVIP-26, Table 3-2, "Matrix of Inspection Options." In their evaluation of the top guide assembly, including the grid beam, General Electric (GE) assumed a lower allowable stress value, acknowledging the high fluence value at this location. The conclusion from this analysis was that no inspection was necessary because there was no safety consequence of single failure at this location.

The applicant stated that the staff's safety evaluation found the BWRVIP-26 report to be acceptable for licensees participating in the BWRVIP to reference in an LRA to the extent specified and under the limitation delineated in the license renewal SER. In order for licensees participating in the BWRVIP to reference the report, they must commit to the accepted aging management programs defined therein, and complete the action items described in the license renewal SER. By referencing the BWRVIP-26 report, as supplemented and modified, and meeting these limitations, an applicant will provide sufficient information for the staff to find

that the applicant will adequately manage the effects of aging, so that the intended actions of the reactor vessel internal components covered by the scope of the report will be maintained consistent with the current licensing basis during the period of extended operation. The applicant asserted that the material presented by BWRVIP-26 applies to PBAPS, that PBAPS is committed to follow the accepted aging management programs defined therein, and that PBAPS will complete the action items described in the license renewal SER. Furthermore, the applicant reminded the staff that, in accordance with the BWRVIP, as new operating experience becomes available, reports are revised to reflect new information to include revised aging management programs. Participants, including PBAPS, have 45 days to comply with any revised BWRVIP requirements or request exception from the staff. The applicant believes that, until BWRVIP-26 is revised, no additional actions are warranted at PBAPS.

The staff stated that BWRVIP-26, Section 6.3, Core Configuration Distortion, indicates that multiple ruptures of adjacent beam segments could lead to displacements of fuel assemblies at the top guide elevation on the order of 5 inches, and could inhibit the insertion of control rods during seismic events.

The staff is concerned that multiple failures of top guide beams are possible when the threshold fluence for IASCC is exceeded. According to Topical Report, "BWRVIP-26A: BWR Vessel and Internals Project, BWR Top Guide Inspection and Flaw Evaluation Guidelines," February 2002, multiple cracks have been observed in top guide beams at Oyster Creek. In addition, baffle former bolts on PWRs that exceeded the threshold fluence have experienced multiple failures. The staff agrees with the BWRVIP-26 conclusion for top guide beams; no inspection is required when a single failure is postulated. However, when the neutron fluence for the top guide beam exceeds the IASCC damage threshold, the staff believes that multiple failures from IASCC are possible and that an inspection program is necessary to ensure that multiple failures do not result in the loss of the ability of control rods to be inserted. In order to ensure that this issue was addressed during the license renewal term, the staff identified this as a time-limited aging analysis (TLAA) in its SER, which is documented in a December 7, 2000, letter to C. Terry. Section 3.5 of the staff's SER indicates that accumulated neutron fluence is a TLAA issue and must be identified and evaluated by individual applicants considering license renewal.

The staff requested that the applicant consider the impact of multiple IASCC on the ability to insert control rods during design basis events. If multiple IASCCs could impact the ability to insert control rods during design basis events, the applicant would need to provide a program to manage the aging effects during the license renewal period. The letter is for the purpose of formally requesting this information. Enclosure 2 contains additional questions the staff transmitted to the applicant via electronic mail to supplement the staff's request. In a letter from M.P. Gallagher to the NRC dated January 14, 2003, the applicant provided additional information to respond to the staff's request. The staff subsequently held a conference call with the applicant on January 16, 2003, to request additional clarification regarding the highest fluence location in the core. In a letter from M.P. Gallagher to the the NRC dated January 29, 2003, the applicant provided, in writing, the requested information.

A draft of this telecommunication summary was provided to the applicant to allow them the opportunity to comment on the contents prior to it's issuance. The applicant requested the information contained in the fourth paragraph to this summary be added as further clarification on this issue.

/***RA* by DLSolorio for**/

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Office of Nuclear Reactor Regulation

Docket Nos.: 50-277 and 50-278

Enclosures: As stated

cc w/enclosures: See next page

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Proposed Top Guide Inspection Program for BWR models 2 through 5

In BWR models 2 through 5, the top guide is formed by a series of Type 304 stainless steel beams joined at right angles by means of vertical slots with beams welded to a peripheral ring.

Parameter Monitored: Program monitors the effect of cracking on top guide by detection and sizing of cracks using enhanced visual examination.

Prior to entering the license renewal period, the applicant is to determine whether or when 10 percent of the top guide beam slots and peripheral weld locations will exceed the IASCC threshold. When 10 percent of the top guide beam slot and peripheral weld locations exceed the threshold for IASCC, the licensee is to perform an enhanced visual examination (detect ½ mil wire) at these locations. If more than 10 percent of the top guide beam slot and peripheral weld locations exceed the threshold for IASCC, the applicant is to inspect 10 percent of the locations that are most susceptible to IASCC. Reinspections are at ten-year intervals, following the initial inspection, and shall consist of 10 percent of the top guide beam slot and peripheral weld locations. The locations for reinspection shall be locations that exceed the IASCC threshold.

All cracks are to be evaluated to IWB-3600 of ASME Code Section XI. However, when cracks are found in adjacent beams, both beams are to be repaired. Sample expansion should also be performed in accordance with ASME Code Section XI.

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