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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington. D.C. 20555 - 0001

Subject: Response to Request for Additional Information Regarding Risk Informed Inservice Inspection Relief Requests for Braidwood Station, Units 1 and 2, and Byron Station, Units 1 and 2

Braidwood Station, Units 1 and 2
Facility Operating License Nos. NPF-72 and NPF-77
NRC Docket Nos. STN 50-456 and STN 50-457

Byron Station, Units 1 and 2
Facility Operating License Nos. NPF-37 and NPF-66
NRC Docket Nos. STN 50-454 and STN 50-455

References:

(1) Letter from K. A. Ainger (Exelon Generation Company, LLC) to U.S. NRC, "Response to Request for Additional Information Regarding Risk Informed Inservice Inspection Relief Requests for Braidwood Station, Units 1 and 2, and Byron Station, Units 1 and 2," dated September 5, 2001

(2) Letter from G. F. Dick, Jr. (U.S. NRC) to O. D. Kingsley (Exelon Generation Company, LLC), "Request for Additional Information Regarding Inservice Inspection Relief Requests for Braidwood Station, Units 1 and 2, and Byron Station, Units 1 and 2," dated May 23, 2001

(3) Letter from T. J. Tulon (Commonwealth Edison Company) to U.S. NRC, "Braidwood Station Interval 2 Inservice Inspection Program: Relief Request I2R-39, Alternative to the ASME Boiler and Pressure Vessel Code, Section XI, Requirements for Class 1 and Class 2 Piping Welds", dated October 16, 2000

(4) Letter from William Levis (Commonwealth Edison Company) to U.S. NRC, "Byron Station Interval 2 Inservice Inspection Program, Relief Request I2R-40, Alternative to the ASME Boiler and Pressure Vessel Code, Section XI, Requirements for Class 1 and Class 2 Piping Welds," dated November 17, 2000

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In References 3 and 4, Commonwealth Edison Company, now Exelon Generation Company, LLC, requested approval of an alternative to the existing 1989 edition of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," requirements for the selection and examination of Class 1 and 2 piping welds. This alternative utilizes the "risk-informed" inservice inspection (RI ISI) program methodology discussed in Electric Power Research Institute (EPRI) Topical Report (TR) 112657, "Revised Risk-Informed Inservice Inspection Evaluation Procedure," Revision B-A, December 1999. In Reference 2, the NRC requested additional information regarding our Reference 3 and 4 submittals. Exelon subsequently provided the requested information in Reference 1.

This letter is being submitted to the NRC to clarify one issue presented in Reference 1. In Reference 1, Attachment C, "Response to Request for Additional Information [RAI], Braidwood Station, Units 1 and 2, RAI Question Br. 12, and Byron Station, Units 1 and 2, RAI Question By. 18," a detailed discussion is presented regarding the risk impact of implementing the RI ISI program. Page C-16 describes the "frequency of flaws" term (i.e., ϕ), which is a mathematical term used in the Markov model. Attachment C states the following:

> "Estimates of the frequency of flaws are determined from the same service data that is used to develop the failure rates and rupture frequencies."

The service data that were used to develop the failure rates and rupture frequencies are based on the Electric Power Research Institute (EPRI) database (i.e., T.J. Mikschl and K.N. Fleming, "Piping System Failure Rates and Rupture Frequencies for Use in Risk Informed Inservice Inspection Applications," EPRI TR-111880, September 1999). The above statement would imply that ϕ was developed solely using the EPRI database; however, ϕ is actually a function of multiple variables not all provided in the EPRI database. Therefore, based on informed engineering judgement, data from SKI – Pipe, "SKI Piping Failure Database," dated May 1, 2000, in combination with the EPRI database were used to determine the value of ϕ. Using engineering judgement to determine ϕ is consistent with the guidance in EPRI Topical Report, TR-110161, "Piping System Reliability and Failure Rate Estimation Models for Use in Risk-Informed In-Service Inspection Applications." TR-110161, Table 3-2, "Strategies for Estimation of Markov Model Parameters," states that, "Data from results of NDE inspections can be used to estimate [ϕ] directly as a multiple of the rate of leaks." Further, TR-110161, Table 6-2, Definition of Markov Model Parameters," states that ϕ is, "Assumed to be 3 λ_F [where λ_F is the occurrence rate of a leak from a flaw state] for all segments and all degradation mechanisms, i.e., for each flaw that develops a leak there will be on the average 3 detectable flaws in the same location that do not develop leaks; based on engineering judgement."

The base value for ϕ used in the RI ISI analysis for Byron and Braidwood Stations is 4.39 λ_F. It is worthy to note that the resultant core damage frequency (CDF) is relatively insensitive to a wide range of values for ϕ. A sensitivity study was performed where ϕ was varied from 1.0 to 20.0. Given this range for ϕ, the resultant reactor coolant system CDF varied from 9.16E-08 to 9.15E-08.

Given the above discussion, the results of the Byron Station and Braidwood Station RI ISI analyses are unaffected and remain valid. The basis upon which the NRC previously approved the use of the RI ISI approach is also unaffected.

Please direct any questions you may have regarding this submittal to Mr. J. A. Bauer at (630) 657-2801.

Respectfully,

K. A. Ainger for

Keith R. Jury
Director – Licensing
Mid-West Regional Operating Group

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Braidwood Station
NRC Senior Resident Inspector – Byron Station