

DRAFT

REQUEST FOR ADDITIONAL INFORMATION

OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST 4RR-01

PPL SUSQUEHANNA, LLC

SUSQUEHANNA STEAM ELECTRIC STATION UNITS 1 AND 2

DOCKET NO. 50-387 AND 50-388

By letter dated October 29, 2014,<sup>1</sup> PPL Susquehanna, LLC (PPL), submitted Relief Request 4RR-01 for review and approval for the Susquehanna Steam Electric Station (SSES) Units 1 and 2. Specifically, PPL requested to continue to use the Risk-Informed Inservice Inspection (RI-ISI) program as an alternative to the American Society of Mechanical Engineers (ASME) Section XI, ISI Program for Class 1 and 2 piping welds. To complete its review, the Nuclear Regulatory Commission (NRC) staff in the Division of Risk Assessment's Probabilistic Risk Assessment (PRA) Licensing Branch (APLA) and the Division of Engineering's Component Performance, Non-Destructive Examination (NDE), and Testing Branch (EPNB) requests a response to the questions below.

APLA RAI-01: In Section 4.0 of the Safety Evaluation Report (SER) for Electric Power Research Institute, Inc. (EPRI) Topical Report TR-112657, "Revised Risk-Informed Inservice Inspection Evaluation Procedure," Revision B-A, the NRC staff concluded that a licensee requesting to implement an risk-informed inservice inspection (RI-ISI) program pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(a)(3) may incorporate into its application, by reference, the program described in EPRI TR-1 12657, Rev. B, together with appropriate plant-specific information, provided that the application includes, among other items, a summary of the risk impact. The licensee stated in Section 5 of the Attachment 1 to 4RR-01, that "[a]s part of the RI-ISI living program update, the delta risk assessment was re-evaluated and was determined to continue to meet the delta risk acceptance criteria of EPRI TR-112657."

Provide results of the risk impact assessment by comparing the proposed ISI program to the initial Section XI requirements.

APLA RAI-02: In the SER for EPRI TR-112657, the NRC staff stated that "[t]he scope, level of detail, and quality of a [probabilistic risk assessment] PRA and the general methodology for using PRA in regulatory applications is discussed in [Regulatory Guide] RG 1.174 [, "An Approach for Using Probabilistic Risk Assessment In Risk Informed Decisions On Plant Specific Changes to the Licensing Basis"<sup>2</sup>]. RG 1.178 [, "An Approach for Plant Specific Risk Informed Decisionmaking

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<sup>1</sup> Agencywide Documents Access and Management System (ADAMS) Accession No. ML14302A443.

<sup>2</sup> ADAMS Accession No. ML023240437.

Inservice Inspection of Piping,<sup>3]</sup> provides guidance that is more specific to ISI.” An acceptable change-in-risk evaluation requires the use of a PRA of appropriate technical quality that models the as-built and as-operated plant, as discussed in RGs 1.178 and 1.200, Revision 2, “An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities.”

Section 5.3 of EPRI TR-112657 describes that the consequence evaluation portion of the EPRI Methodology utilizes PRA inputs. EPRI TR-112657 further identifies key attributes and/or areas of the PRA where quality is considered relatively important to support a consistent RI-ISI application.

In Table 1 of Attachment 2 to 4RR-01, the licensee provided twenty four supporting requirements (SRs) associated with internal flooding not meeting Capability Category II of the American Society of Mechanical Engineers (ASME)/American Nuclear Society (ANS) PRA standard (ASME/ANS RA-Sa-2009) from a full-scope peer review completed in 2012. Most of these SRs do not meet CC I requirements of the standard. In assessing the impact of these SRs, the licensee stated in Section 1.3 of Attachment 2 to 4RR-01, that

“Based on this industry comparison and small contribution of internal flooding to overall [Core Damage Frequency] CDF and [Large Early Release Frequency] LERF, the Susquehanna internal flooding PRA can be applied to support the 4th 10 year inspection interval based on code case N-578-1.”

The contribution of flooding to total CDF is irrelevant to judging the acceptability of consequence and change-in-risk evaluations and, therefore, the acceptability of a RI-ISI program. As the full-scope peer-review of the Susquehanna Steam Electric Station (SSES) PRA has identified many Facts and Observation (F&Os) related to the internal flooding, the internal flooding PRA does not seem to be suitable for directly supporting the RI-ISI.

- a) Provide an explanation of why the results of the internal flooding PRA, if used in consequence and change-in-risk evaluations to support the relief request, are acceptable given that the large number of SRs related to key areas in flooding identified in EPRI TR-112657, Revision B-A do not meet requirements of the ASME/ANS RA-Sa-2009 and RG 1.200, Revision 2.
- b) Describe whether any RI-ISI specific evaluation was performed to overcome the known weaknesses in the flooding evaluation.

APLA RAI-03: The SER states that EPRI TR-112657, Rev. B does not include a detailed discussion of the specific assumptions to be used to guide the assessment of the direct and indirect effects of segment failures. The SER further states that specific assumptions regarding the direct and indirect effects of pipe segment failure should be developed by the individual licensees and should form part of the onsite documentation.

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<sup>3</sup> ADAMS Accession No. ML032510128.

In Table 1 of Attachment 2 to 4RR-01, the description of F&O 6-14 states that a “qualitative discussion of additional impacts (jet impingement, pipe whip, humidity) is required for CC I/II per Reg Guide 1.200 clarification to meet SR IFSN-A6. An evaluation of medium/small bore piping for pipe whip and jet impingement is required to meet SR IFQU-A9.”

- a) Clarify if specific guidelines and assumptions used for determining direct and indirect effects of flooding have been developed for this application.
- b) Clarify if the loss of mitigating ability (discussed in Section 3.2.4 of the SER) where segment failures that only cause failure of mitigating functions but do not cause a plant trip has been considered in consequence evaluations for this application in accordance with EPRI TR-112657.

APLA RAI-04: In Section 4.0 of the SER for EPRI TR-112657, Revision B-A, the NRC staff concluded that a licensee requesting to implement an RI-ISI program pursuant to section 50.55a(a)(3) may incorporate into its application, by reference, the program described in EPRI TR-112657, Rev. B, together with appropriate plant-specific information, provided that the application includes, among other items, a statement that RG principles have been met (or any exceptions) and a summary of any augmented inspections that would be affected.

- a) The fifth principle in RG 1.174 states that the impact of the proposed change should be monitored using performance measurement strategies. Clarify whether the implementation and monitoring program of the third 10-year interval ISI program will continue during the proposed fourth 10-year interval. Discuss any changes in the implementation and monitoring program from the third 10-year interval.
- b) Identify any changes to augmented inspection programs from the approved third 10-year interval RI-ISI program and discuss the reason(s) for any changes.

APLA RAI-05: RG 1.193,<sup>4</sup> “ASME Code Cases Not Approved for Use,” Revision 4, has listed Code Case N-578-1, “Risk-Informed Requirements for Class 1, 2, or 3 Piping, Method B” as an unacceptable Section XI Code Case. Identify any portions of Code Case N-578-1, which has been used in the development of the proposed RI-ISI program, that are not specifically incorporated into, or referenced by, EPRI TR-112657, Revision B-A.

EPNB RAI-01: Attachment 1, Table 1 and Table 2 of 4RR-01 shows the number of welds to be examined in the fourth interval will decrease. However, the NRC staff cannot determine if the locations to be examined have changed. Are the inspection locations in the RI-ISI program that have been developed for the fourth 10-year interval the same locations as those in the third interval RI-ISI program approved in the NRC staff’s July 28, 2005,<sup>5</sup> safety evaluation? If not, please summarize the changes to the program and what caused those changes.

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<sup>4</sup> ADAMS Accession No. ML13350A001.

<sup>5</sup> ADAMS Accession No. ML051990330.

EPNB RAI-02: Provide values for the changes in core damage frequency and changes in large early release frequency for SSES compared to ASME Code, Section XI ISI program values, and to the fourth ISI interval RI-ISI program values.

EPNB RAI-03: Provide a similar table as shown in Attachment A, Tables 7 and 8, of letter dated September 16, 2003,<sup>6</sup> for your proposed fourth interval program.

EPNB RAI-04: In Section 7 of 4RR-01, the licensee stated, in part, that:

Susquehanna considers both the plant and industry operating experience and updates the RI-ISI program during the re-evaluation process following each inspection period...

- a) Has the operating experience from Licensee event report (LER) 50-387/2012-007-01, dated November 20, 2012,<sup>7</sup> been incorporated to the RI-ISI program?

Corrective action number 6 in LER 50-387-2012-007-01 states, in part, that:

The welds are to be Inspected each refueling outage (once per cycle) to confirm no surface indications and shall continue until the piping has been modified (or eliminated) to minimize vibrational response.

- b) Please summarize the actions taken because of this operational experience.
- c) Have the inspections taken place?
- d) If so, what are the results?
- e) Has the piping been modified (or eliminated) to minimize vibrational response?
- f) Has an inspection been performed on the modified piping?
- g) If applicable, Please explain plan for further inspections on the piping.

EPNB RAI-05: Of the welds not selected for future examinations, have previous examinations of any of these welds identified service induced degradation? If so, what was the degradation mechanism and what was done to mitigate the degradation?

EPNB RAI-06: 4RR-01 states the RI-ISI program is a living program monitored periodically for changes, where this monitoring includes numerous facets. Please confirm that vendor issued communications such as General Electric (GE)-Hitachi Safety Communications are included as part of the reviews done for the living aspects of the program.

EPNB RAI-07: The NRC staff notes that in the components affected section on page 1 of 18, the B-F welds Code Item number is B5.140. This code item number is no longer in the ASME Code for the applicable inspection interval. Please explain?

EPNB RAI-08: Please provide Reference 2 - PPL Letter PLA-7178" - Inservice inspection Program Plan for the Fourth Ten Year Interval" dated June , 2014.

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<sup>6</sup> ADAMS Accession No. ML032670839.

<sup>7</sup> ADAMS Accession No. ML123250703.