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AUG 06 2018

10 CFR 50.55a

LR-N18-0069

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Salem Generating Station Unit 1
Renewed Facility Operating License No. DPR-70
NRC Docket No. 50-272

Subject: Revision to Request for One-Time Relief for Reactor Vessel Cold Leg Nozzle to Safe-End Weld Examinations Inspection Interval

References:

1. PSEG letter to NRC, "Request for One-Time Relief for Reactor Vessel Cold Leg Nozzle to Safe-End Weld Examinations Inspection Interval," dated January 31, 2017 (ADAMS Accession No. ML17031A278)

2. NRC letter to PSEG, "Salem Nuclear Generating Station, Unit No. 1 – Safety Evaluation of Relief Request S1-I4R-160 Regarding the Fourth 10-Year Interval of the Inservice Inspection Program (CAC No. MF9149)," dated July 17, 2017 (ADAMS Accession No. ML17172A587)

In Reference 1, PSEG Nuclear LLC (PSEG) requested approval of Relief Request S1-I4R-160 for Salem Unit 1. This request was approved by the NRC in Reference 2.

In Relief Request S1-I4R-160, PSEG requested to extend the required reactor vessel cold leg nozzle inspections by approximately six months to the Salem Unit 1 S1R26 Refueling Outage in Spring 2019. This request was proposed to align these inspection activities with the scheduled Reactor Vessel Internals Materials Reliability Program (MRP-227) and American Society of Mechanical Engineers (ASME) Section XI Reactor Vessel inspections with the core barrel removed. This would allow the cold leg nozzle inspections to be performed from the inside surface.

PSEG is deferring the removal of the core barrel until the S1R27 Refueling Outage in Fall 2020 outage. In January 2018, subsequent to the Reference 2 approval of the proposed six month extension, MRP-227 baffle-former bolt inspection expansion

guidance was issued. Deferring the removal of the core barrel provides PSEG the time to prepare for the required MRP-227 barrel-former bolt expansion inspections. The ASME Section XI Reactor Vessel Weld examinations were originally planned to be performed in the S1R27 refueling outage and were pulled up one outage to the S1R26 refueling outage to align with the removal of the core barrel. Therefore deferring the removal of the core barrel to S1R27 does not impact the required completion schedule for the ASME Section XI Reactor Vessel Weld examinations.

In accordance with 10 CFR 50.55a, "Codes and standards," PSEG hereby requests NRC approval of Revision 1 of Relief Request S1-I4R-160 for Salem Unit 1. PSEG proposes to extend the required reactor vessel cold leg nozzle inspection by approximately 24-months to the Salem Unit 1 S1R27 Refueling Outage in Fall 2020. This will align these examination activities with the revised schedule for removal of the core barrel, allowing these examinations to be performed from the inside surface.

PSEG requests approval of the proposed request by April 6, 2019 to align with the start of Unit 1 refueling outage S1R26 when the subject examinations would be required to be performed in accordance with approved Relief Request S1-I4R-160.

Relief Request S1-I4R-160 Revision 1 applies to the Unit 1 Fourth Inservice Inspection Interval which began on May 20, 2011 and is scheduled to end on December 31, 2020. The Code of Record for the Salem Unit 1 Fourth 10-Year Inservice Inspection Interval is the ASME Code, Section XI, 2004 Edition. The proposed relief request revision is provided in Attachment 1.

There are no regulatory commitments contained in this letter.

Should you have any questions concerning this matter, please contact Mr. Brian Thomas at 856-339-2022.

Sincerely,

Paul R. Duke, Jr.
Manager - Licensing
PSEG Nuclear LLC

Attachment 1: 10CFR 50.55a Relief Request S1-I4R-160, Revision 1

cc: Administrator, Region I, NRC
NRC Senior Resident Inspector, Salem
J. Kim, Project Manager, Salem, USNRC
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bcc: Manager - Salem Programs
Director - Regulatory Compliance
Salem ISI Program Owner
Corporate ISI Program Owner
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Attachment 1

10CFR 50.55a Relief Request S1-I4R-160, Revision 1

Salem Nuclear Generating Station, Unit No. 1
Renewed Facility Operating License No. DPR-70
NRC Docket No. 50-272

10 CFR 50.55a Request S1-I4R-160, Revision 1

Hardship in Accordance with 10 CFR 50.55a(z)(2)
Hardship Without a Compensating Increase in Quality and Safety

1. ASME Code Component(s) Affected

Code Class:	1
Examination Category:	Code Case N-770-2
Item Number:	Inspection Item D
Description:	Reactor Pressure Vessel (RPV) Cold Leg Nozzle to Safe-End Alloy 600 Welds: Loop 11 – 27.5-RC-1110-5 Loop 12 – 27.5-RC-1120-5 Loop 13 – 27.5-RC-1130-5 Loop 14 – 27.5-RC-1140-5

2. Applicable Code Edition and Addenda

Code Case N-770-2 as referenced in 10 CFR 50.55a(g)(6)(ii)(F). American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, "Rules for Inservice Inspection and Testing of Components of Light-Water Cooled Plants," 2004 Edition with no Addenda. For Unit 1 the Fourth 10-Year Interval began on May 20, 2011 and is scheduled to end on December 31, 2020.

3. Applicable Code Requirement

10 CFR 50.55a(g)(6)(ii)(F) requires licensees of existing, operating pressurized-water reactors as of August 17, 2017, to implement the requirements of ASME Code Case N–770–2, subject to the conditions specified in paragraphs (g)(6)(ii)(F)(2) through (13). Table 1 of Code Case N-770-2 requires volumetric examination of all Item D welds (uncracked butt welds mitigated with stress improvement) no sooner than the third refueling outage and no later than 10 years following stress improvement application. Salem Unit 1 performed the mechanical stress improvement process (MSIP) on the four RPV Cold Leg Nozzle to Safe-End Alloy 600 welds subject to this relief request. The pre-MSIP and post-MSIP weld volumetric examinations were completed with no recordable flaws. Therefore these welds are classified as Item D welds in accordance with ASME Code Case N-770-2.

The MSIP application was performed in the Fall 2008 refueling outage. This would have required the examinations to be completed in the Salem Unit 1 S1R25 refueling outage in the Fall of 2017 since the S1R26 refueling outage in the Spring of 2019 would be 6 months beyond the 10-year Inspection Interval. PSEG requested and was granted relief on July 17, 2017 to extend the inspections by 6 months until the Spring 2019 refueling outage.

4. Reason for Request

PSEG is requesting a one-time 24-month extension to the 10-year inspection interval required by Table 1 of Code Case N-770-2, for Item D uncracked butt welds mitigated with stress improvement. This interval extension is being requested in accordance with 10 CFR 50.55a(z)(2) as a hardship without a compensating increase in quality and safety.

The 24-month extension would allow the four RPV Cold Leg Nozzle to Safe-End weld volumetric examinations to be performed in Unit 1 refueling outage (S1R27) in the Fall of 2020. This would align the RPV Cold Leg nozzle to Safe-End weld volumetric examinations with the Reactor Vessel Internals Materials Reliability Program (MRP-227) and ASME Section XI RPV examinations with the core barrel removed. This would allow the volumetric examination of the RPV Cold Leg Nozzle to Safe-End welds from the inside surface (ID) when the core barrel is currently scheduled to be removed. Performance of the RPV Cold Leg Nozzle to Safe-End welds in the S1R26 refueling outage in the Spring of 2019 would require the examinations to be performed from the outside surface (OD) of the pipe since the core barrel removal has been moved to the S1R27 refueling outage.

Previous examinations of the RPV Cold Leg Nozzle to Safe-End Alloy 600 welds have been performed from the outside surface of the pipe (OD) at Salem Unit 1. Access to the OD of these welds is inside a "sandbox" which was installed during original plant construction after all welding was completed. Although these examinations can be performed from the OD of the cold leg nozzles for Salem Unit 1, this inspection activity would result in the unnecessary personnel radiation exposure for the personnel performing these examinations without a compensating increase in quality or safety as discussed below.

Based upon a review of dose records for similar RPV Cold Leg Nozzle to Safe-End weld volumetric examinations performed from the OD for most recent inservice inspections at Salem Unit 2, the dose exposure to personnel performing the NDE of four RPV Cold Leg Nozzle to Safe-End weld volumetric examinations was approximately 3.5 REM. This is a conservative estimate of the personnel exposure since it does not include any additional dose received by supporting organizations (i.e., maintenance, radiation protection). Performing the inspections from the ID during the Fall 2020

refueling outage reduces the overall exposure of the weld examinations since this inspection technique is performed remotely and does not require personnel to access the exterior "sandbox" area of the RPV.

During the Fall 2008 refueling outage for Salem Unit 1, PSEG performed MSIP of both the RPV hot leg and cold leg nozzle to Safe-End alloy 600 welds. Pre-MSIP volumetric examinations of the four RPV Cold Leg Nozzle to Safe-End welds and post-MSIP volumetric examinations were performed. The volumetric ultrasonic examination met ASME Section XI, Appendix VIII requirements, including examination volume of essentially 100%. The pre-MSIP and post-MSIP examinations identified no flaws in the four RPV Cold Leg Nozzle to Safe-End welds. The post MSIP weld examinations were the pre-service baseline examinations for these Code Case N-770-2 Inspection Item D welds (MRP-139 requirements at that time).

NUREG/CR-7187, "Managing PWSCC in Butt Weld by Mitigation and Inspection," discusses the management of Primary Water Stress Corrosion Cracking (PWSCC) by MSIP in Section 4. Section 4.4 of NUREG/CR-7187 assessed the effectiveness of MSIP for mitigating PWSCC and states at the end, "…it is reasonable to conclude that MSIP provides effective mitigation against the initiation of PWSCC and against the growth of any existing PWSCC that has been detected and allowed to remain in service." Section 4.5 of NUREG/CR-7187 performed an assessment of the Code Case N-770-1 inspection requirements and acknowledged that inspection of MSIP welds serves a defense-in-depth monitoring function rather than a degradation management function.

Since the Salem Unit 1 RPV Cold Leg Nozzle to Safe-End welds have been mitigated by the application of MSIP and were ultrasonically examined without the detection of any flaws, the subsequent ultrasonic examination of these welds is considered as defense-in-depth monitoring and not for the management of PWSCC degradation. Extending the inspection interval 24-months will continue to provide an adequate level of quality and safety. The inspection of the four RPV Cold Leg Nozzle to Safe-End welds will be performed during the Fall 2020 refueling outage.

PSEG believes that imposition of the 10-year inspection interval would create a hardship in that personnel would unnecessarily receive additional radiation exposure, in the order of 3.5 REM, if the examinations were performed during the Spring 2019 refueling outage, without an increase in quality or safety as discussed above.

5. Proposed Alternative and Basis for Use

10CFR50.55a(z)states:

"Alternatives to codes and standards requirements. Alternatives to the requirements of paragraphs (b) through (h) of this section or portions thereof may be used when authorized by the Director, Office of Nuclear Reactor Regulation, or Director, Office of New Reactors, as appropriate. A proposed alternative must be submitted and authorized prior to implementation. The applicant or licensee must demonstrate that:

(1) *Acceptable level of quality and safety*. The proposed alternative would provide an acceptable level of quality and safety; or

(2) *Hardship without a compensating increase in quality and safety*. Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety."

PSEG is requesting a one-time 24-month extension to the 10-year volumetric examination interval required by Table 1 of Code Case N-770-2 for Item D (uncracked butt welds mitigated with stress improvement). This interval extension is being requested in accordance with 10CFR50.55a(z)(2) as a hardship without a compensating increase in quality and safety.

PSEG believes that imposition of the 10-year inspection interval would create a hardship in that personnel would unnecessarily receive additional radiation exposure, in the order of 3.5 REM, if the volumetric examinations were performed during the Spring 2019 refueling outage from the OD, without an increase in quality or safety as discussed in section 4 of this relief request. The inspection of the four RPV Cold Leg Nozzle to Safe-End welds will be performed during the Fall 2020 refueling outage.

6. Duration of Proposed Alternative

The duration of the request for proposed alternative for Salem Unit 1 is through the Fall 2020 refueling outage, S1R27.

7. Precedents

Relief requests have been previously approved by the NRC for extension of Code Case N-770-1 & 2 inspection intervals up to 36-months beyond the required interval as listed below; however, the precedents listed below are for Item B unmitigated butt welds as opposed to Item D uncracked butt welds mitigated with stress improvement.

a. NRC letter to Luminant Generation Company LLC, "Comanche Peak Nuclear Power Plant, Unit 1 - Relief Request 1B3-3, Alternative to the ASME Code, Section XI, Examination Requirements for Reactor Pressure Vessel Cold-Leg Weld Inspection Frequency (CAC No. MF6125)," dated March 14, 2016 (ADAMS Accession No. ML16074A001)

b. NRC Letter to Entergy Nuclear Operations, "Indian Point Nuclear Generating Unit No. 3 – Safety Evaluation for Relief Request IP3-ISI-RR-07 for Reactor Vessel Cold Leg Nozzle to Safe-End Weld Examinations (TAC No. MF3346)," dated August 4, 2014 (ADAMS Accession No. ML14199A444)

c. NRC Letter to Duke Energy Carolinas LLC, "Oconee Nuclear Station, Units 1 and 2 – Safety Evaluation for Relief Request No. 17-ON-001 (EPID L-2017-LLR-0099)," dated April 13, 2018 (ADAMS Accession No. ML18100A005)

8. References

1) Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," Revision 18 dated March 2017

2) Code Case N-770-2, "Alternative Examination Requirements and Acceptance Standards for Class 1 PWR Piping and Vessel Nozzle Butt Welds Fabricated with UNS N06082 or UNS W86182 Weld Filler Material With or Without Application of Listed Mitigation Activities Section XI, Division 1."

3) NUREG/CR-7187, "Managing PWSCC in Butt Welds by Mitigation and Inspection," November 2014