

## **NRR-DMPSPEm Resource**

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**From:** Buckberg, Perry  
**Sent:** Tuesday, March 27, 2018 1:32 PM  
**To:** Turkal, Mark A  
**Cc:** Hon, Andrew; Braden, Michael; Grzeck, Lee; Winslow, Christopher Reese  
**Subject:** Brunswick Units 1 & 2 Request for Additional Information - Relief Request for RPV Shell Circumferential Weld Examination (L-2018-LLR-0001)  
**Attachments:** SRXB RAI for Brunswick 1 2 Relief Request EPID L-2018-LLR-0001 3-27-2018.pdf

Mark,

In a letter dated January 23, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML18023A134), Duke Energy Progress (the licensee) submitted the subject alternative for U.S. Nuclear Regulatory Commission (NRC) staff approval.

The NRC staff is reviewing your submittal and has determined that additional information is required to complete the review. The specific information requested is addressed in the attached document. You confirmed today that the request for additional information (RAI) was understood and did not include proprietary or security-related information, and agreed to provide a response within 30 days of this request.

The NRC staff considers that timely responses to RAIs help ensure sufficient time is available for staff review, and contribute toward the NRC's goal of efficient and effective use of staff resources. Please note that if you do not respond to this request by the agreed-upon date or provide an acceptable alternate date, we may deny your application for amendment under the provisions of Title 10 of the Code of Federal Regulations, Section 2.108. If circumstances result in the need to revise the agreed upon response date, please contact Andy Hon or myself.

Thanks,

**Perry Buckberg**

Senior Project Manager  
phone: (301)415-1383  
[perry.buckberg@nrc.gov](mailto:perry.buckberg@nrc.gov)  
U.S. Nuclear Regulatory Commission  
Office of Nuclear Reactor Regulation  
Mail Stop O-8B1a  
Washington, DC, 20555-0001

**Hearing Identifier:** NRR\_DMPS  
**Email Number:** 263

**Mail Envelope Properties** (SN6PR09MB2607881F97E93A3D8A18AE8F9AAC0)

**Subject:** Brunswick Units 1 & 2 Request for Additional Information - Relief Request for RPV Shell Circumferential Weld Examination (L-2018-LLR-0001)  
**Sent Date:** 3/27/2018 1:31:33 PM  
**Received Date:** 3/27/2018 1:31:36 PM  
**From:** Buckberg, Perry

**Created By:** Perry.Buckberg@nrc.gov

**Recipients:**

"Hon, Andrew" <Andrew.Hon@nrc.gov>  
Tracking Status: None  
"Braden, Michael" <Michael.Braden@duke-energy.com>  
Tracking Status: None  
"Grzeck, Lee" <Lee.Grzeck@duke-energy.com>  
Tracking Status: None  
"Winslow, Christopher Reese" <Christopher.Winslow@duke-energy.com>  
Tracking Status: None  
"Turkal, Mark A" <Mark.Turkal@duke-energy.com>  
Tracking Status: None

**Post Office:** SN6PR09MB2607.namprd09.prod.outlook.com

<b>Files</b>	<b>Size</b>	<b>Date &amp; Time</b>
MESSAGE	1507	3/27/2018 1:31:36 PM
SRXB RAI for Brunswick 1 2 Relief Request EPID L-2018-LLR-0001 3-27-2018.pdf		
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**Options**

**Priority:** Standard  
**Return Notification:** No  
**Reply Requested:** No  
**Sensitivity:** Normal  
**Expiration Date:**  
**Recipients Received:**

REQUEST FOR ADDITIONAL INFORMATION BY THE REACTOR SYSTEMS BRANCH

RELIEF REQUEST FOR EXAMINATION OF REACTOR VESSEL SHELL WELDS

FOR BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2

DUKE ENERGY PROGRESS, LLC

DOCKET NUMBERS 50-325 AND 50-324

(EPID L-2018-LLR-0001)

By letter dated January 23, 2018 (Reference 1), in accordance with the Title 10 of *Code of Federal Regulations* (10 CFR) 50.55a(z)(1), Duke Energy Progress, LLC (Duke Energy, or the licensee), submitted a Relief Request for the Nuclear Regulatory Commission's (NRC's) approval of an alternative to perform the In-Service Inspection (ISI) of the Reactor Pressure Vessel (RPV) circumferential shell welds for the Brunswick Steam Electric Plant (BSEP), Units 1 and 2. The current ISI program is required to comply with the applicable American Society of Mechanical Engineers (ASME) Code, Section XI Edition and Addenda required by 10 CFR 50.55a(g)(4)(ii), with applicable 10 CFR 50.55a(b)(2) conditions. This ISI, which is based on the ASME Code 2007 Edition through 2008 Addenda, Section XI, Subarticle IWB-2500, Table IWB-2500-1, Examination Category B-A, Item B1.11, "Circumferential Shell Welds", requires a volumetric examination of 100-percent of the weld. The proposed alternative, 10 CFR 50.55a request number ISI-09, would eliminate the examination of the fifth 10-year RPV circumferential shell weld, scheduled to start on May 11, 2018 and end on May 10, 2028.

The NRC Generic Letter (GL) 98-05, "Boiling Water Reactor Licensees Use of the BWRVIP-05 Report to Request Relief from Augmented Examination Requirements on Reactor Pressure Vessel Circumferential Shell Welds," under the heading "Permitted Action" requires two conditions to be met for a permanent relief from the ISI requirements of 10 CFR 50.55a(g). To complete the evaluation of condition number (2), the Reactor Systems Branch (SRXB) staff requests the licensee to provide the following additional information:

**SRXB-RAI 1**

Regulatory Basis: 10 CFR Part 50, Appendix G, Fracture Toughness Requirements

Insofar as it requires to meet the fracture toughness requirements for the ferritic materials of the RPV with adequate safety margins during normal operations and hydrostatic test with core not critical, the Pressure-Temperature (P-T) limits of the RCS as defined in this Appendix should be met.

RAI

In the Enclosure to Reference 1, the second paragraph under the heading "Review of Low Pressure Injection Sources" states:

For the low pressure make-up systems, the Core Spray and Residual Heat Removal systems, these system's pumps have a shutoff head of approximately 313 psig and 250 psig, respectively. The BSEP pressure-temperature limit curves for hydrostatic testing allow pressures up to 313 psig at a temperature of 70 °F.

The above information is inconsistent with the BSEP Units 1 and 2 TS Section 3.4.9, Pressure-Temperature (P-T) limits, Figures 3.4.9-3, 3.4.9-4, and 3.4.9-5 for hydrostatic and leak tests. The RPV beltline curves in these figures allows a maximum pressure of 283 psig in the RCS temperature range of 70°F to 110°F. In addition, the RPV beltline curve in TS Figure 3.4.9-1 for the RPV heatup/cooldown also requires to operate below 283 psig pressure in the RCS temperature range of 70°F to 110°F.

- (a) Justify the inconsistency between the above Reference 1 statement, which states 313 psig as the allowed pressure limit, and the TS Figures 3.4.9-1, 3.4.9-3, 3.4.9-4, and 3.4.9-5 which shows the maximum pressure limit of 283 psig.
- (b) Justify the inconsistency between the above Reference 1 statement, which states Core Spray (CS) pump shutoff head of 313 psig, and UFSAR Figure 6-49 which shows the CS pump shutoff head as approximately 790 ft (342 psig approximately based on water density of 62.4 lb/ft<sup>3</sup>)
- (c) As per UFSAR Table 6-19, the pressure at which CS injection valve opens is 395 psig. On an inadvertent initiation of the CS system, with its pump shutoff head of approximately 342 psig (considering UFSAR Figure 6-49 is correct), the system would inject water into the RPV at a significantly high flow rate (2 pump minimum rated flow of approximately 8,200 gpm). In this situation, explain how a cold overpressure of the RCS will be prevented during RPV normal heatup/cooldown (TS Figure 3.4.9-1), and during RPV hydrostatic test (TS Figures 3.4.9-3, 3.4.9-4, and 3.4.9-5) so that the RCS pressure remains below the TS limiting pressure of 283 psig.

#### References

1. Letter from Duke Energy to NRC dated January 23, 2018, "Brunswick Steam Electric Plant, Unit Nos. 1 and 2 Renewed Facility Operating License Nos. DPR-71 and DPR-62 Docket Nos. 50-325 and 50-324 Inservice Inspection Program Proposed Alternative ISI-09 In Accordance With 10 CFR 50.55a(z)(1) Regarding Reactor Pressure Vessel Circumferential Shell Weld Examinations," ((ADAMS Accession No. ML18023A134)