

April 11, 2018

Serial: BSEP 18-0044

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

Subject: Brunswick Steam Electric Plant, Unit No. 1
Renewed Facility Operating License No. DPR-71
Docket No. 50-325
Application of Dissimilar Metal Weld Full Structural Overlay - Reactor Pressure
Vessel Nozzles N4A and N4D

Reference:

Letter from William R. Gideon (Duke Energy) to the U.S. Nuclear Regulatory
Commission Document Control Desk, *Proposed In-service Inspection Alternative for
Application of Dissimilar Metal Weld Full Structural Overlay – Nozzles N4A and N4D*,
dated March 19, 2018, ADAMS Accession Number ML18078A804

Ladies and Gentlemen:

By letter dated March 19, 2018 (i.e., Reference), Duke Energy Progress, LLC (Duke Energy),
proposed a 10 CFR 50.55a(z)(1) alternative to apply dissimilar metal weld full structural weld
overlays (FSWOLs) to the reactor pressure vessel (RPV) nozzles N4A and N4D for the
Brunswick Steam Electric Plant (BSEP), Unit No. 1.

Within 14 days of completion of the final ultrasonic testing (UT) examination of the FSWOLs,
Duke Energy committed to provide: (1) a listing of indications detected in the overlaid welds and
(2) disposition of all indications and, if possible, the type and nature of the indications. Duke
Energy completed ultrasonic testing examination of the FSWOLs on the N4A and N4D nozzles
on March 31, 2018. The Enclosure to this letter provides a summary of the UT examinations
and dispositions.

Please refer any questions regarding this submittal to Mr. Lee Grzeck, Manager – Regulatory
Affairs, at (910) 832-2487.

Sincerely,



Bryan B. Wooten
Director - Organizational Effectiveness
Brunswick Steam Electric Plant

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Enclosure:

Brunswick Steam Electric Plant, Unit No. 1 - Summary of the Ultrasonic Testing (UT) Examinations and Dispositions for the Reactor Feedwater Nozzles N4A and N4D Full Structural Weld Overlays

cc:

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Brunswick Steam Electric Plant, Unit No. 1 - Summary of the Ultrasonic Testing (UT) Examinations and Dispositions for the Reactor Feedwater Nozzles N4A and N4D Full Structural Weld Overlays

Background

By letter dated March 19, 2018, Duke Energy Progress, LLC (Duke Energy), proposed a 10 CFR 50.55a(z)(1) alternative to apply dissimilar metal weld full structural weld overlays (FSWOLs) to the reactor pressure vessel (RPV) nozzles N4A and N4D for the Brunswick Steam Electric Plant (BSEP), Unit No. 1. As committed to in the March 19, 2018 request, the following provides: (1) a listing of indications detected in the overlaid welds and (2) disposition of all indications and, if possible, the type and nature of the indications. Duke Energy has completed ultrasonic testing examination of the FSWOLs on the N4A and N4D nozzles.

Feedwater Nozzle N4A Weld Overlay (Weld Identification: 1B21N4A-2-SW1-2 WOL)

Indication 1

Type: Lack of Bond (Laminar)
Location: Circumferential orientation from 1.75" to 2.75" to datum point
Axial orientation 2.9" to datum point
Dimensions: Length = 1.00" (Circumferential)
Width = 0.25" (Axial)
Comments: The indication is located outside the preservice examination volume and does not interfere with the examination coverage for the circumferential nozzle weld repaired by the weld overlay installation.

Indication 2

Type: Lack of Bond (Laminar)
Location: Circumferential orientation from 2.0" to 4.25" to datum point
Axial orientation 4.0" to datum point
Dimensions: Length = 2.25" (Circumferential)
Width = 0.25" (Axial)
Comments: The indication is located within the preservice examination volume and interferes with complete examination coverage for the circumferential nozzle weld repaired by the weld overlay installation.

Disposition

The two laminar indications identified in Feedwater Nozzle N4A Weld Overlay (i.e., Weld Identification: 1B21N4A-2-SW1-2 WOL) are considered acceptable based on the following:

- The axial separation between the two indications is approximately 1.1". This exceeds the separation requirement "S" of 0.125" per IWA-3330. Therefore, the two indications do not have to be considered as a single continuous indication.
- The total Laminar Flaw area is 0.81 in². This meets the acceptance criteria of IWB-3514.6 and table IWB-3514-3 of 7.5 in².

- The longest linear flaw dimension measured is 2.25". This meets the acceptance criteria of ASME Code Case N740-2 Section 3 Item (a)(3)(a) of the greater of 3" or 10% of the pipe circumference (i.e., 4.3").
- Considering an overlay area of 349.5 in², the total reduction in coverage is less than 1%. This meets the acceptance criteria of ASME Code Case N740-2 Section 3 Item (a)(3)(b) of less than 10%.
- Considering a preservice examination area of 100.66 in², the total reduction in coverage due to the laminar indications is 0.044% (i.e., 0.004% circumferential limitation +0.04% axial limitation), which is acceptable based on an allowable loss in coverage of less than 10%.

Feedwater Nozzle N4D Weld Overlay (Weld Identification: 1B21N4D-5-SW1-2 WOL)

Indication 1

Type: Lack of Bond (Laminar)
Location: Circumferential orientation from 13" to 13.75" to datum point
Axial orientation 5.3" to datum point
Dimensions: Length = 0.75" (Circumferential)
Width = 0.25" (Axial)
Comments: The indication is located outside the preservice examination volume and does not interfere with the examination coverage for the circumferential nozzle weld repaired by the weld overlay installation.

Indication 2

Type: Lack of Bond (Laminar)
Location: Circumferential orientation from 30.75" to 31.25" to datum point
Axial orientation 5.3" to datum point
Dimensions: Length = 0.50" (Circumferential)
Width = 0.25" (Axial)
Comments: The indication is located outside the preservice examination volume and does not interfere with the examination coverage for the circumferential nozzle weld repaired by the weld overlay installation.

Disposition

The two laminar indications identified in Feedwater Nozzle N4D Weld Overlay (Weld Identification: 1B21N4D-5-SW1-2 WOL) are considered acceptable based on the following:

- The circumferential separation between the two indications is approximately 17". This exceeds the separation requirement "S" of 0.375" per IWA-3330. Therefore, the two indications do not have to be considered as a single continuous indication.
- The total Laminar Flaw area is 0.31 in². This meets the acceptance criteria of IWB-3514.6 and table IWB-3514-3 of 7.5 in².
- The longest linear flaw dimension measured is 0.75". This meets the acceptance criteria of ASME Code Case N740-2 Section 3 Item (a)(3)(a) of the greater of 3" or 10% of the pipe circumference (i.e., 4.3").

- Considering an overlay area of 349.5 in², the total reduction in coverage is less than 1%. This meets the acceptance criteria of ASME Code Case N740-2 Section 3 Item (a)(3)(b) of less than 10%.
- There is no impact of the identified indications on the preservice inspection volume for weld 1B21N4D-5-SW1-2.