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RA-22-0160
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10 CFR 50.4
10 CFR Part 54

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

Subject: Duke Energy Carolinas, LLC (Duke Energy)
Oconee Nuclear Station (ONS), Units 1, 2, and 3
Docket Numbers 50-269, 50-270, 50-287
Renewed License Numbers DPR-38, DPR-47, DPR-55
Subsequent License Renewal Application
Responses to ONS SLRA – Second Round RAIs – TRP 76 (Irradiation Structural) – FE 3.5.2.2.2.6

References:

1. Duke Energy Letter (RA-21-0132) dated June 7, 2021, Application for Subsequent Renewed Operating Licenses, (ADAMS Accession Number ML21158A193)
2. NRC Letter dated July 22, 2021, Oconee Nuclear Station, Units 1, 2, and 3 - Determination of Acceptability and Sufficiency for Docketing, Proposed Review Schedule, and Opportunity for a Hearing Regarding Duke Energy Carolinas' Application for Subsequent License Renewal (ADAMS Accession Number ML21194A245)
3. NRC E-mail dated September 22, 2021, Oconee SLRA - Request for Additional Information B2.1.27-1 (ADAMS Accession Number ML21271A586)
4. Duke Energy Letter (RA-21-0281) dated October 22, 2021, Subsequent License Renewal Application, Response to Request for Additional Information B2.1.27-1 (ADAMS Accession Number ML21295A035)
5. NRC E-mail dated November 23, 2021, Oconee SLRA – Request for Additional Information - Set 1 and Second Round Request for Additional Information RAI B2.1.27-1a (ADAMS Accession Number ML21327A277)
6. Duke Energy Letter (RA-21-0332) dated January 7, 2022, Subsequent License Renewal Application Responses to NRC Request for Additional Information Set 1 and Second Round Request for Additional Information B2.1.27-1a (ADAMS Accession Number ML22010A129)
7. NRC E-mail dated January 11, 2022, Oconee SLRA – Request for Additional Information - Set 2 (ADAMS Accession Numbers ML22012A043 and ML22012A042)
8. Duke Energy Letter (RA-22-0036) dated February 14, 2022, Subsequent License Renewal Application Responses to NRC Request for Additional Information Set 2 (ADAMS Accession Number ML22045A021)
9. NRC E-mail dated January 18, 2022, Oconee SLRA – Request for Additional Information Set 3 (ADAMS Accession Numbers ML22019A103 and ML22019A104)

Enclosure 1, Attachments 1P, 3P, 4P, and 5P of this letter contains proprietary information that is being withheld from public disclosure under 10 CFR 2.390. Upon separation of Attachments 1P, 3P, 4P, and 5P from Enclosure 1 Attachments, this letter is decontrolled.

10. Duke Energy Letter (RA-22-0040) dated February 21, 2022, Subsequent License Renewal Application Responses to NRC Request for Additional Information Set 3 (ADAMS Accession Numbers ML22052A002)
11. NRC E-mail dated March 16, 2022, Oconee SLRA – Request for Additional Information Set 4 (ADAMS Accession Numbers ML22080A077 and ML22080A079)
12. NRC E-mail dated March 21, 2022, Oconee SLRA – 2nd Round RAI B4.1-3 (ADAMS Accession Numbers ML22081A005 and ML22081A006)
13. NRC E-mail dated March 29, 2022, Oconee SLRA – 2nd Round RAI 4.6.1-1a (ADAMS Accession Numbers ML22091A091 and ML22091A092)
14. Duke Energy Letter (RA-22-0111) dated March 31, 2022, Subsequent License Renewal Application Follow-up Request for Additional Information Set 2 and 3 Updates (ADAMS Accession Number ML22090A046)
15. Duke Energy Letter (RA-22-0129) dated April 20, 2022, Subsequent License Renewal Application Responses to Oconee SLRA - 2nd Round RAI B4.1-3 (ADAMS Accession Number ML22110A207)
16. NRC E-mail dated April 20, 2022, Oconee SLRA – Request for Additional Information 3.1.2-1 (ADAMS Accession Numbers ML22113A008 and ML22113A009)
17. Duke Energy Letter (RA-22-0124) dated April 22, 2022, Subsequent License Renewal Application Responses to NRC Request for Additional Information Set 4 (ADAMS Accession Numbers ML22112A016)
18. NRC E-mail dated April 27, 2022, Oconee SLRA – 2nd Round RAI FE 3.5.2.2.2.6 – Irradiation Structural (ADAMS Accession Numbers ML22122A131 and ML22122A132)
19. NRC E-mail dated April 28, 2022, Oconee SLRA – 2nd Round RAI B2.1.9-2a (ADAMS Accession Numbers ML22122A018 and ML22122A019)
20. NRC E-mail dated May 3, 2022, Oconee SLRA – Second Round Requests for Additional Information B2.1.7-4a (ADAMS Accession Number ML22124A161)
21. Duke Energy Letter (RA-22-0137) dated May 20, 2022, Response to ONS SLRA Second Round RAI 4.6.1-1a (ADAMS Accession Number ML22140A016)
22. Duke Energy Letter (RA-22-0159) dated May 27, 2022, Response to ONS SLRA – Request for Additional Information 3.1.2-1 (ADAMS Accession Number ML22147A001)
23. NRC E-mail dated June 1, 2022, Oconee SLRA – 2nd Round RAI B2.1.7-4b (ADAMS Accession Number ML22154A214)
24. Duke Energy Letter (RA-22-0158) dated June 8, 2022, Response to ONS SLRA – Request for Additional Information B2.1.9-2a (ADAMS Accession Number ML22159A151)
25. Duke Energy Letter (RA-22-0193) dated July 8, 2022, Response to ONS SLRA Second Round RAI B2.1.7-4b (ADAMS Accession Number ML22189A010)

By letter dated June 7, 2021 (Reference 1), Duke Energy Carolinas, LLC (Duke Energy) submitted an application for the subsequent license renewal of Renewed Facility Operating License Numbers DPR-38, DPR-47, and DPR-55 for the Oconee Nuclear Station (ONS), Units 1, 2, and 3 to the U.S. Nuclear Regulatory Commission (NRC). On July 22, 2021 (Reference 2), the NRC determined that ONS subsequent license renewal application (SLRA) was acceptable and sufficient for docketing. In emails from the NRC to Steve Snider (Duke Energy) dated September 22, 2021, November 23, 2021, January 11, 2022, January 18, 2022, March 16, 2022, March 21, 2022, March 29, 2022, April 20, 2022, April 28, 2022, May 3, 2022, and June 1, 2022 (References 3, 5, 7, 9, 11, 12, 13, 16, 19, 20 and 23), the NRC transmitted specific requests for additional information (RAI) to support completion of the Safety Review. The responses were provided to the NRC on October 22, 2021, January 7, 2022, February 14, 2022, February 21, 2022, March 31, 2022, April 20, 2022, April 22, 2022, May 20, 2022, May 27, 2022, June 8, 2022, and July 8, 2022, (References 4, 6, 8, 10, 14, 15, 17, 21, 22, 24, and 25).

In an email from Angela X. Wu (NRC) to Steve Snider (Duke Energy) dated April 27, 2022 (Reference 18), the NRC transmitted Second Round RAIs – TRP 76 (Irradiation Structural) – FE 3.5.2.2.2.6 also to support completion of the safety review. Enclosure 1 provides responses to the Second Round RAIs – TRP 76 (Irradiation Structural) – FE 3.5.2.2.2.6. Enclosure 1, Attachments 1P, 3P, 4P, and 5P contain proprietary information. Enclosure 2 contains the affidavit for the proprietary information.

Since Enclosure 1 contains proprietary information, it is supported by an affidavit signed by the owner of the information (Enclosure 2). The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in 10 CFR 2.390(b)(4) and consistent with NRC Regulatory Issue Summary 2014-01, Regulatory Requirements for Withholding of Proprietary Information from Public Disclosure. Accordingly, it is respectfully requested that the proprietary information be withheld from public disclosure in accordance with 10 CFR 2.390. A redacted, non-proprietary version is provided in Enclosure 1, Attachments 1, 3, 4, and 5. Correspondence with respect to the copyright or proprietary aspects of the vendor information or affidavit should be addressed to the Framatome representative identified in the respective affidavit.

As directed by the NRC Project Manager, the revised due date for this response is July 25, 2022. This submittal contains no new or revised regulatory commitments.

Should you have any questions regarding this submittal, please contact Paul Guill at (704) 382-4753 or by email at paul.guill@duke-energy.com.

I declare under penalty of perjury that the foregoing is true and correct. Executed on July 25, 2022.

Sincerely,

Steven M. Snider
Site Vice President
Oconee Nuclear Station

Enclosure:

1. Responses to ONS SLRA – Second Round RAIs – TRP 76 (Irradiation Structural) – FE 3.5.2.2.2.6

Attachment	RAI Number
1	3.5.2.2.2.6-1A – Non Proprietary Version
1P	3.5.2.2.2.6-1A – Proprietary Version
2	3.5.2.2.2.6-1B
3	3.5.2.2.2.6-3A - Non Proprietary Version
3P	3.5.2.2.2.6-3A - Proprietary Version
4	3.5.2.2.2.6-7A - Non Proprietary Version
4P	3.5.2.2.2.6-7A - Proprietary Version
5	3.5.2.2.2.6-9 Non Proprietary Version
5P	3.5.2.2.2.6-9 Proprietary Version
6	3.5.2.2.2.6-10

2. Framatome Affidavit

CC: W/O Enclosures:

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ENCLOSURE 1

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3
SUBSEQUENT LICENSE RENEWAL APPLICATION
RESPONSES TO ONS SLRA – SECOND ROUND RAIS – TRP 76
(IRRADIATION STRUCTURAL) – FE 3.5.2.2.2.6

Enclosure 1
Responses to ONS SLRA – Second Round RAIs – TRP 76 (Irradiation Structural) – FE 3.5.2.2.2.6

Regulatory Basis:

Title 10 of the Code of Federal Regulations (CFR) Section 54.21(a)(1) requires license renewal applicants to perform an integrated plant assessment (IPA) in their application to identify and list systems, structures, and components (SSCs) that are within the scope of license renewal and subject to aging management review (AMR). Further, 10 CFR 54.21(a)(3) requires for the SSCs identified to be subject to AMR, the applicant demonstrate that the effects of aging will be adequately managed such that their intended functions are maintained consistent with the current licensing basis (CLB) for the subsequent period of extended operation. To complete its review and enable the staff to make a reasonable assurance finding on functionality of reviewed SSCs for the subsequent period of extended operation consistent with 10 CFR 54.21, the staff requires under 10 CFR 54.29(a) additional information be provided regarding the matters described below.

Attachment	RAI Number
1	3.5.2.2.2.6-1A – Non Proprietary Version
1P	3.5.2.2.2.6-1A – Proprietary Version
2	3.5.2.2.2.6-1B
3	3.5.2.2.2.6-3A - Non Proprietary Version
3P	3.5.2.2.2.6-3A - Proprietary Version
4	3.5.2.2.2.6-7A - Non Proprietary Version
4P	3.5.2.2.2.6-7A - Proprietary Version
5	3.5.2.2.2.6-9 – Non Proprietary Version
5P	3.5.2.2.2.6-9 - Proprietary Version
6	3.5.2.2.2.6-10

ENCLOSURE 1

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3
SUBSEQUENT LICENSE RENEWAL APPLICATION
RESPONSES TO ONS SLRA – SECOND ROUND RAIS – TRP 76
(IRRADIATION STRUCTURAL) – FE 3.5.2.2.2.6

ATTACHMENT 1
RAI 3.5.2.2.2.6-1A
[Non Proprietary Version]

Note: Text that is within brackets is proprietary to Framatome, Inc.

RAI 3.5.2.2.2.6-1A

Background:

The applicant in its response to SLRA RAI 3.5.2.2.2.6-1 stated that the "baseline condition of weld WR-36 has been established in part through the absence of bounding degradation detected on the horizontal surface of the RV [reactor vessel] support assembly for Oconee Units 1, 2, and 3." The response also identified loss of material and cumulative fatigue damage to be the aging effects that ONS manages and will continue to do so through ASME Section XI, Subsection IWF, Boric Acid Corrosion, and Fatigue Monitoring AMPs for the subsequent period of extended operation (SPEO). This RAI focuses on "bounding degradation" associated aging effects for loss of material due to boric acid, that could potentially exist at WR-36 weldments.

GALL-SLR AMP XI.S3, "ASME Section XI, Subsection IWF," in its "Acceptance Criteria" program states that "loss of material due to corrosion or wear," is an unacceptable condition for Class 1, 2, 3, and MC component supports. In its "Operating Experience" program element, it states that boric acid corrosion is an aging mechanism that could lead to cracking/SCC of bolts. GALL-SLR AMP XI.M10, "Boric Acid Corrosion," in its "Operating Experience," program element states:

> Boric acid corrosion has been observed in nuclear power plants and references [NRC IN 86-108 (and Supplements 1 through 3), IN 2002-11, IN 2002-13, and IN 2003-02] and has resulted in significant impairment of component-intended functions in areas that are difficult to access/observe (NRC Bulletin 2002-01). Boric acid leakage can become airborne and can cause corrosion in locations other than in the vicinity of the leak [Licensee Event Reports (LER) 250/2010-005, LER 346/2002-008]. Corrosion rates may be inaccurately predicted due to the installation of a different type of material than indicated on the design documents (LER 346/1998-009) or galvanic corrosion caused by wet boric acid crystals bridging between dissimilar metals [Electric Power Research Institute (EPRI) 1000975].

During the regulatory audit, the staff reviewed Action Request (AR) 01809387, which discusses the existence of boron residue on the ONS Unit 2 RV annulus cavity and RV support skirt. It states that although dry boron residue was found on the RV support skirt, the skirt did not exhibit signs of material degradation. Additional AR regulatory audit reviews included AR 02300737, which discusses borated water penetration beneath base plates resulting in potential corrosion under support base plates and anchor bolting, and ARs 01809387 and 01910016, which further address borated water leakage for loss of material and dependency of its rate on temperature and environment (see related audit questions at ADAMS Accession No. ML22024A038).

On March 16, 2022, the NRC staff held a closed public meeting with ONS, in part to clarify loss of material due to boric acid corrosion on the RV support skirt, summarized in a letter dated April 4, 2022, to Duke Energy (ADAMS Accession No. ML22084A614). ONS in its clarifying proprietary presentation (ADAMS Accession No. ML22084A109) stated:

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> **]]**

Issue:

In the revised SLRA Table 3.1.2-1 regarding the “support skirt” AMR line items, the applicant proposes to manage the effects of aging for loss of material with SLRA AMPs B2.1.4 (Boric Acid Corrosion) and B2.1.30 (Section XI, Subsection IWF) during the SPEO. These SLRA AMPs have no discussion on “bounding degradation” for loss of material aging effect. The applicant’s response to SLRA RAI 3.5.2.2.2.6-3 (designated by ONS as 3.5.2.2.2.2-3, ADAMS Accession No. ML22010A130) and discussion of TRP 76 RAI 3.5.2.2.2.2-3 during the March 7, 2022, (partially closed) and March 16, 2022, (closed) public meetings (documented in meeting summaries at ADAMS Accession Nos. ML22075A204 and ML22084A614, respectively) indicate that the RV lower skirt areas and RV anchorage experience temperatures close to the EPRI-referenced temperatures of 212–220°F (included in the EPRI “Boric Acid Corrosion: Revision to BAC Guidebook (ADAMS Accession No. ML120690185)) that result in a concentrated boric acid, maximizing its effects for corrosion/loss of material in areas where borated water leakage exists. Additionally, as noted above in the “Background,” evaporating borated water could contribute to loss of material of the RV support skirt assembly that could include the W36 welds as well.

It is not clear whether the “bounding degradation” for loss of material refers to a specific amount (e.g., mills) or to a general corrosion that could affect the structural integrity or reduce the load bearing capacity of the RV support skirt assembly, and hence those of the W-36 weldments. It is also not clear how much boric acid could accumulate in the lower part of the RV support skirt/ RV anchorage and whether the accumulation would lead to a specific amount of loss of material that could be used as an indicator for the W-36 weldments integrity. Furthermore, it is not clear to what extent if any the evaporated off/airborne boric acid may have affected or potentially could affect difficult to access or uninspectable areas of the RV support skirt assembly, such as the W36 weldments, through the SPEO.

Finally, it is not clear what steps the applicant takes and will continue to do so to the end of the SPEO to ensure that difficult to access or uninspectable areas of the RV support skirt assembly, such as the W36 weldments at the transition forging to support skirt, are not affected by boric acid leakage or airborne boric acid that could cause loss of material. It is also not clear how ONS plans to use the “bounding degradation” for loss of material to establish a baseline for the condition of the W36 weldments before entering the SPEO and thereafter to its end to ensure the integrity of the W36 weldments.

Request:

a) Describe the term “bounding degradation” in the context of loss of material aging effect. Include in the discussion numerical values considered in the “bounding degradation” for loss of material and how these values are used to evaluate the integrity of difficult to access or uninspectable areas, such as the W36 weldments, of the ONS units.

b) Clarify what steps ONS has taken and continues to do so for the subsequent period of extended operation to ensure that difficult to access or uninspectable areas of the RV support skirt assembly are not affected by airborne boric acid so that the structural integrity and bearing capacity of the support structure remains intact.

c) Identify necessary updates of pertinent areas of relevant procedures and of the SLRA reflecting the ONS response to this RAI clarifying the ONS position on “bounding degradation” associated with loss of material aging effect input or justify the ONS position for not updating.

Duke Energy Response to RAI 3.5.2.2.2.6-1A Request a

The qualitative term, bounding degradation, was used in a figurative manner in the response to RAI 3.5.2.2.2.6-1. No numerical values were involved in this qualitative judgment. The aging effect of loss of material for the RV support skirt assembly described in SLRA Table 3.1.2-1 is managed for the PEO and will continue to be managed for the SPEO using the ASME Section XI, Subsection IWF AMP and the Boric Acid Corrosion AMP. As described in the response to RAI 3.5.2.2.2.6-1 (ADAMS Accession Number ML22045A021), the IWF-2500 inspection boundary for visual examination of the RV support skirt assembly includes vertically-oriented regions of the support skirt, which includes the transition forging to RV support skirt weld WR-36, and horizontally-oriented regions of the support skirt, which includes the support flange, the support skirt to support flange weld, and the anchor bolts. Also as described in the response, it is reasonable to expect that degradation (i.e., loss of material) would develop in the horizontally-oriented regions of the RV support flange prior to the development of loss of material in the vertically-oriented regions of the support skirt, since the lower horizontal surfaces are more likely to be potentially exposed to standing water or accumulate boron deposits. The detection of loss of material on the horizontal regions of the RV support assembly, where examination accessibility is much higher than that for the vertical regions, is expected to be a leading indicator of loss of material for the remainder of the RV support skirt assembly. Loss of material detected in regions of higher susceptibility on areas of the RV support skirt assembly would be expected to precede, or bound, loss of material in regions of lower susceptibility.

As described in the SLRA, the ASME Section XI, Subsection IWF AMP consists of periodic visual inspections to manage loss of material for Class 1, 2, and 3 component supports. VT-3 examinations are required in accordance with IWF-2520, Table IWF-2500-1, Item F1.40. The acceptance standards provided in IWF-3410 do not include a standard that refers to a specific amount (e.g., mils), of material loss, but rather describe the as-found conditions that are unacceptable for continued service. The as-found conditions which are unacceptable for continued service include, but are not limited to, deformation or structural degradation of fasteners or other support items; missing, detached, or loosened support items; scoring, roughness, or general corrosion on close tolerance machined or sliding surfaces; and misalignment of supports.

As described in the response to RAI 3.5.2.2.2.6-1, approximately 66.5% of the IWF-2500 examination boundary for the RV support skirt assembly is accessible for visual examination. As reported in Relief Request RR 15-ON-004 (ADAMS Accession Number ML15201A573), which was reviewed and approved by the NRC staff (ADAMS Accession Number ML16004A262), examinations of the RV support skirt performed to the extent practical provide reasonable assurance of structural integrity of the component. Most of the accessible examination surface is comprised of the lower, horizontal portions of the RV support skirt assembly. In addition, small portions of the support skirt vertically-oriented regions, including portions of weld WR-36, are accessible for direct visual examination. The RV reflective metal insulation (RMI) was specifically designed to include, for each Oconee unit, two 9 inches high x 24 inches wide removable inspection panels to enable the partial examination of vertically-oriented portions of the support skirt, including portions of weld WR-36. Periodic IWF visual examinations of the Units 1, 2, and 3 RV support assembly were last performed in 2012, 2013, and 2014, respectively and are described in ANP-3898NP, Revision 0, Section 9.4.1. A review of the referenced inspection results identified that the total area examined through the removable inspection panels was about 739 square inches for each Oconee unit. There were no unacceptable conditions or indications detected on the accessible vertical or horizontal regions of the RV support skirt assembly during the most recent examinations.

In addition, as described in SLRA Supplement 3 (ADAMS Accession Number ML21349A005), the ASME Section XI, Subsection IWF AMP will be enhanced to perform periodic evaluations of the acceptability of inaccessible areas of supports (e.g., portions of supports covered by insulation) when conditions in accessible areas that could indicate the presence of, or result in, degradation to inaccessible areas of supports. These evaluations will be performed once every ten years during the SPEO.

If ASME Section XI Subsection IWF visual examinations find unacceptable conditions on the accessible surfaces of the RV support assembly, including the accessible portions of weld WR-36 and including the lower, horizontally-oriented surfaces where loss of material is expected to be a leading indicator of loss of material for the remainder of the support skirt including difficult-to-access or un-inspectable areas comprised of vertically-oriented regions, the corrective action program will drive resolution of the issue so that the intended function of the RV support skirt assembly is maintained.

Duke Energy Response to RAI 3.5.2.2.2.6-1A Request b

The potential impacts of evaporated or airborne boric acid on difficult-to-access or un-inspectable areas of the RV support skirt assembly are managed using both the ASME Section XI, Subsection IWF AMP and the Boric Acid Corrosion AMP. The response to RAI 3.5.2.2.2.6- 1A, Request “a” more fully describes the actions to be taken under the ASME Section XI, Subsection IWF AMP. The complementary Boric Acid Corrosion AMP includes provisions to identify leakage through inspection and examination. When leakage is identified, a visual inspection is performed that identifies the leakage pathway and any boron deposits on adjacent structures, components, and supports so that leakage cleanup can begin, and corrective actions can be initiated, as necessary. Any obstructions to visual inspection are removed for inspection, unless a technical justification for not performing the visual inspection is documented. For leakage examinations of borated systems components with external insulation, the surrounding areas of the floor, equipment surfaces, or exposed surfaces of the insulation are examined for evidence of borated water leakage. An initial inspection determines the extent of insulation removal that is required in order to properly perform the examination for evidence of leakage. As with the ASME Section XI, Subsection IWF AMP, the Corrective Action Program will drive resolution for issues identified under the Boric Acid Corrosion AMP such that the intended function of the RV support skirt assembly is maintained.

Duke Energy Response to RAI 3.5.2.2.2.6-1A Request c

Updates to relevant procedures or the SLRA are not required. The aging effect of loss of material for the RV support skirt assembly will be managed for the SPEO using the ASME Section XI, Subsection IWF AMP and the Boric Acid Corrosion AMP. The identification and evaluation of borated water leakage for component supports such as the RV support skirt assembly will be managed for the SPEO using the Boric Acid Corrosion AMP. See the responses to RAI 3.5.2.2.2.6-1A, Requests “a” and “b” for justification of this position.

ENCLOSURE 1

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3
SUBSEQUENT LICENSE RENEWAL APPLICATION
RESPONSES TO ONS SLRA – SECOND ROUND RAIS – TRP 76
(IRRADIATION STRUCTURAL) – FE 3.5.2.2.2.6

ATTACHMENT 2
RAI 3.5.2.2.2.6-1B

RAI 3.5.2.2.2.6-1B

Background:

The applicant's response to ONS SLRA RAI 3.5.2.2.2.6-1 stated that the "baseline condition of weld WR-36 has been established in part through the absence of bounding degradation detected on the horizontal surface of the RV support assembly for Oconee Units 1, 2, and 3." The response also identifies loss of material and cumulative fatigue damage to be the aging effects that ONS manages and will continue to do so through SLRA AMPs B2.1.4, B2.1.30, and B3.1, (ASME Section XI, Subsection IWF, Boric Acid Corrosion, and Fatigue Monitoring AMPs) respectively, during the SPEO. This RAI focuses on "bounding degradation" associated with the aging effect for cumulative fatigue damage of the WR-36 weldments.

SLRA Section 4.3.2.1 as amended by SLRA Supplement 2 dated November 11, 2021 (ADAMS Accession No. ML21315A012), states that "[t]he effects of fatigue on the intended functions of the reactor vessels, including the reactor vessel support skirts, will be adequately managed by the Fatigue Monitoring AMP (B3.1) for the Subsequent Period of Extended Operation (SPEO)."

SLRA AMP B3.1 (Fatigue Monitoring) in its "Program Description," states it "monitors and tracks the number of occurrences and severity of design basis transients assessed in the applicable fatigue or cyclic loading analyses" and that "each analyzed component does not exceed the applicable limit through the SPEO." SLRA Section B3.1 describes the AMP as consistent with enhancements and no exceptions to GALL-SLR AMP X.M1, which states that "[f]atigue of components is managed by monitoring one or more relevant fatigue parameters … established by the applicable fatigue analysis." The GALL-SLR AMP X.M1 also states that the program "verifies the continued acceptability of existing analyses through cycle counting" and periodically updates "the fatigue analyses to demonstrate that they continue to meet the appropriate limits."

Issue:

SLRA AMP B3.1 has no discussion on "bounding degradation" for cumulative fatigue damage aging effect on the RV support skirt WR36 welds of the RV transition forging (i.e., dutchman). It is not clear what fatigue parameter(s) is (are) monitored for the relevant fatigue analysis (e.g., transient cycle limits/cyclic loading) for cumulative usage factor or reviewed for fatigue evaluation needed for ASME Section III fatigue waiver evaluation specific to the RV steel support skirt WR36 welds and used to define the "bounding degradation" for cumulative fatigue damage aging effect. It is also not clear whether such a fatigue analysis (or fatigue evaluation) considered the effects of the boric acid corrosion, if any, for the definition of "bounding degradation" aging effect for the WR-36 support skit welds.

Request:

a) Describe the term "bounding degradation" as it relates to the cumulative fatigue damage aging effect. Include in the "bounding degradation" discussion for cumulative fatigue damage numerical values used in the relevant fatigue analysis (e.g., loading limit cycles) or considered in fatigue waiver evaluation.

b) Clarify whether loss of material aging effect (e.g., due to boric acid corrosion), if it occurs, has been considered in the fatigue life evaluation of the support skirt and in particular at the WR-36 weldments.

c) Identify necessary updates of pertinent areas of relevant procedures and of the SLRA reflecting the ONS response to this RAI clarifying the ONS position on "bounding degradation" for cumulative fatigue damage aging effect or justify the ONS position for not updating.

Duke Energy Response to RAI 3.5.2.2.2.6-1B Request a

See the response to RAI 3.5.2.2.2.6-1A, Request "a," where it is described that degradation due to loss of material detected in regions of highest susceptibility on areas of the RV support skirt assembly would be expected to precede, or bound, loss of material in regions of lower susceptibility. In this context, the term bounding degradation does not apply to the aging effect of cumulative fatigue damage.

Duke Energy Response to RAI 3.5.2.2.2.6-1B Request b

The fatigue life evaluation of the Oconee RV original components, including the RV support skirt assembly, was determined in accordance with the requirements in Subsection A, Article 4, Paragraphs N-415 and N-416, of the 1965 Edition of ASME B&PV Code, Section III, with Addenda through Summer of 1967 (Reference: BAW-2251A, ADAMS Accession Number ML20212G901). Design cyclic loadings and thermal conditions for B&W-designed RCS Class 1 components are defined by the component design specifications. These design cyclic loadings were used to calculate the ability of the components to withstand cyclic operation without fatigue failure, and the ability to withstand cyclic operation without fatigue failure is expressed in terms of calculations required by Section III, i.e., fatigue usage factors (CUFs). CUF values for the support skirt were calculated as part of the RV fatigue analysis. As reported in SLRA Section 4.3.2.1, the CUF calculations also considered changes associated with the RV, such as reactor vessel closure head (RVCH) replacements, and pursuit of a measurement uncertainty recapture (MUR) power uprate. In order to continue meeting fatigue design limits consistent with the current licensing basis (CLB), the effects of fatigue on the intended functions of the reactor vessel, including the reactor vessel support skirt assembly, will be adequately managed by the Fatigue Monitoring AMP for the Subsequent Period of Extended Operation (SPEO) in accordance with 10 CFR 54.21(c)(i)(iii), as reported in SLRA Section 4.3.2.1, as supplemented (ADAMS Accession Number ML21315A012).

The fatigue life evaluation of the RV, including the RV support skirt assembly, considered design cyclic loadings, but did not consider the potential for loss of material (e.g., due to boric acid corrosion). As reported in SLRA Table 3.1.2-1, the aging effect of loss of material for the RV support skirt assembly is managed for the PEO and will continue to be managed for the SPEO using the ASME Section XI, Subsection IWF AMP and the Boric Acid Corrosion AMP. If visual examinations find unacceptable conditions such as loss of material on the accessible surfaces of the RV support assembly, including the accessible portions of weld WR-36 and including those horizontally-oriented surfaces where loss of material is expected to be a leading indicator of loss of material for the remainder of the support skirt assembly, including difficult-to-access or un-inspectable areas comprised of vertically-oriented regions, the corrective action program, consistent with the ASME Section XI Subsection IWF AMP and the Boric Acid Corrosion AMP, will drive resolution of the issue. To date, no unacceptable conditions or indications have been found that would require loss of material to be considered in the fatigue evaluation of the RV support skirt assembly.

Implementation of the ASME Section XI Subsection IWF AMP, the Boric Acid Corrosion AMP, and the Oconee Fatigue Monitoring Program AMP, which utilize the corrective action program to address conditions adverse to quality, will provide reasonable assurance that identified aging effects will be adequately managed so that the intended functions of RV support skirt assembly will be maintained consistent with the CLB during the SPEO.

Duke Energy Response to RAI 3.5.2.2.2.6-1B Request c

Updates to relevant procedures or the SLRA are not required since the term bounding degradation does not apply to the aging effect of cumulative fatigue damage.

ENCLOSURE 1

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3
SUBSEQUENT LICENSE RENEWAL APPLICATION
RESPONSES TO ONS SLRA – SECOND ROUND RAIS – TRP 76
(IRRADIATION STRUCTURAL) – FE 3.5.2.2.2.6

ATTACHMENT 3
RAI 3.5.2.2.2.6-3A
[Non Proprietary Version]

Note: Text that is within brackets is proprietary to Framatome, Inc.

RAI 3.5.2.2.2.6-3A

Background:

ONS in its response to RAI 3.5.2.2.2.6-3 (designated by ONS as 3.5.2.2.2.2-3, ADAMS Accession No. ML22010A130) described the methodology used to estimate the temperature at the RV concrete pedestal. It stated that its methodology is based on a two-dimensional (2D) model used in an analysis to calculate temperature contours at two representative **[[** **]]**. The methodology **[[** **]]**. Through this approach ONS concluded that "[a]ll primary shield wall concrete temperatures are less than 200° F in SLRA section 3.5.2.2.2.2.

Issue:

The staff noted that Figures 3.5.2.2.2.2-3-1 and 3.5.2.2.2.2-3-2 presented in the response to RAI 3.5.2.2.2.6-3 (designated by ONS as 3.5.2.2.2.2-3) and Figures 9-5 and 9-6 in ANP-3898P (ADAMS Accession No. 21158A201) **[[** **]]** During the March 7, 2022, (partially closed) and March 16, 2022, (closed) public meetings (documented in meeting summaries at ADAMS Accession Nos. ML22075A204 and ML22084A614, respectively), ONS stated that its methodology was based on **[[** **]]**. The **[[** **]]**.
The staff notes that **[[** **]]** provides a unique temperature estimate for the bolt or pin azimuth at the RV support skirt plate interfacing the concrete pedestal. What it is not clear in the SLRA and in the response to RAI 3.5.2.2.2.6-3 is the conservatism in the methodology used that led ONS conclude that "[a]ll primary shield wall concrete temperatures are less than 200° F."

Request:

a) Clarify the conservatism used in the **[[** **]]**.

b) Identify necessary updates of pertinent areas of the SLRA reflecting this RAI input or justify the ONS position for not updating.

Duke Energy Response to RAI 3.5.2.2.2.6-3A Request a

Each **[[** **]]**$_{d,e}$ heat transfer analysis uses the same conservatism and thermal boundary conditions to determine a peak concrete temperature from the shear pin model, and equivalently from the anchor bolt model. The conservatism for both analyses is summarized as follows:

- The gamma heating rates are directly taken from the conservative model of the neutron fluence and gamma dose estimates at 80 years (72 EFPY) for Oconee SLR.
- The axial gamma heating profile at the inside surface of the primary shield wall is applied without attenuation in the **[[ ]]**$_{d,e}$ concrete heat transfer models.
- A minimum cavity ventilation airflow is assumed in the reactor vessel cavity since a maximum temperature is desired.
- Bulk air temperatures are **[[ ]]**$_{d,e}$ near the anchor bolts and shear pins and **[[ ]]**$_{d,e}$ near RV outlet nozzles.

  For the evaluation of the concrete temperature, the highest expected air temperatures are the most appropriate condition. The bulk air temperatures used in the analysis correspond to the highest (summer) measured values of the ambient temperatures in the reactor cavity over several years of recorded data.

  The value of **[[ ]]**$_{d,e}$ corresponds to average measurements from two thermocouple elements that are located at the bottom of the reactor cavity, each at a location near the anchor bolts and shear pins.

  The value of **[[ ]]**$_{d,e}$ corresponds to average measurements from two thermocouple elements that are located at two cold leg loop piping penetrations (RV outlet nozzles) where the penetrations exit through the primary shield wall.

[[

]]$_{d,e}$.

In addition, no azimuthal heat transfer was considered in each of the **[[ ]]**$_{d,e}$ thermal analyses, **[[**

]]$_{d,e}$. It is estimated that the peak temperature underneath the sole plate for the shear pin model (upper bound) would be below 200°F if azimuthal heat transfer were considered.

Duke Energy Response to RAI 3.5.2.2.2.6-3A Request b

No revision to the SLRA is required. The original SLRA submittal, as supplemented by this RAI response (Request “a” above) provides clarification of the conservatisms in the analysis used to estimate the temperature at the RV concrete pedestal.

ENCLOSURE 1

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3
SUBSEQUENT LICENSE RENEWAL APPLICATION
RESPONSES TO ONS SLRA – SECOND ROUND RAIS – TRP 76
(IRRADIATION STRUCTURAL) – FE 3.5.2.2.2.6

ATTACHMENT 4
RAI 3.5.2.2.2.6-7A
[Non Proprietary Version]

Note: Text that is within brackets is proprietary to Framatome, Inc.

RAI 3.5.2.2.2.6-7A

Background

In its nonproprietary response to RAI 3.5.2.2.2.6-7 (ADAMS Accession No. ML22045A021), the applicant determined that the nelson studs may be susceptible to irradiation embrittlement, which was based, in part, on the determination of the lowest service temperature (LST) value for the nelson studs. In proprietary report ANP-3898P, Revision 0 (Enclosure 5, Attachment 1 to the SLRA), the applicant explained that temperature contours of the reactor vessel (RV) support skirt assemblies of the ONS units were developed using models **[[ ]]**. The applicant also explained these temperature contours during a closed, proprietary meeting on March 16, 2022 (ADAMS Accession No. ML22084A614 for meeting summary). The applicant stated that it used the temperature contour at the **[[ ]]**. However, the applicant's statement did not indicate that the nelson studs were included in the ANP-3898P evaluation, therefore the temperature contour used for the nelson studs is not clear.

Issue

Because the ANP-3898P evaluation did not include the nelson studs, the staff is not clear whether the LST value determined in the response to RAI 3.5.2.2.2.6-7 for the nelson studs was based on the temperature contour **[[ ]]**.

Request

a) Clarify whether the LST value determined in the response to RAI 3.5.2.2.2.6-7 for the nelson studs was based on the temperature contour at the **[[ ]]**.

b) Identify necessary updates of pertinent areas of the SLRA to reflect this clarification or justify the ONS position for not updating.

Duke Energy Response to RAI 3.5.2.2.2.6-7A Request a

The response to RAI 3.5.2.2.2.6-7, along with **[[ ]]**$_{d,e}$, report a lowest service temperature (LST) value of **[[ ]]**$_{d,e}$ based on the temperature contour plots as shown in Figure 3.5.2.2.2.6-7A-1. The LST value for the nelson studs provided in the response to RAI 3.5.2.2.2.6-7 was based on the anchor bolt location. The temperature contours that are obtained from the heat transfer through the anchor bolts and through the vertical bearing plate, where the nelson studs are attached, provide a conservative lower estimate of the actual reactor vessel skirt temperature. .

[[ ]]d,e

Figure 3.5.2.2.2.6-7A-1
RV Embedment Temperatures at Anchor Bolt Location
[[ ]]d,e

Duke Energy Response to RAI 3.5.2.2.2.6-7A Request b

No revision to the SLRA is required. The original SLRA submittal, as supplemented by this RAI response (Request “a” above) provides clarification regarding the temperature contour used for the determination of the LST value for the nelson studs.

ENCLOSURE 1

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3
SUBSEQUENT LICENSE RENEWAL APPLICATION
RESPONSES TO ONS SLRA – SECOND ROUND RAIS – TRP 76
(IRRADIATION STRUCTURAL) – FE 3.5.2.2.2.6

ATTACHMENT 5
RAI 3.5.2.2.2.6-9
[Non Proprietary Version]

Note: Text that is within brackets is proprietary to Framatome, Inc.

RAI 3.5.2.2.2.6-9

Background

In Section 9.4.3 of nonproprietary report ANP-3898NP, Revision 0 (Enclosure 4, Attachment 1 to the SLRA, ADAMS Accession No. ML21158A200), the applicant determined a minimum LST value of 139.05°F for the RV support skirt and steel components of the embedment assemblies. During a closed, proprietary meeting on March 16, 2022 (ADAMS Accession No. ML22084A614 for meeting summary), the applicant explained two conservatisms in the determination of the minimum LST value of 139.05°F.

Issue

To make its safety findings, the staff needs the explanation of the conservatisms applied to determine the minimum LST value of 139.05°F for the RV support skirt and steel components of the embedment assemblies submitted into the NRC docket.

Request

a) Discuss and submit the explanation(s) of conservatism(s) used in the determination of the minimum LST value of 139.05°F for the RV support skirt and steel components of the embedment assemblies submitted into the NRC docket.

b) Identify necessary updates of pertinent areas of the SLRA to reflect this explanation or justify the ONS position for not updating

Duke Energy's Response to RAI 3.5.2.2.2.6-9 Request a

The minimum lowest service temperature (LST) value of 139.05°F for the RV support skirt and steel components of the embedment assemblies is calculated using the following conservatisms and justifications:

- The LST is defined by calculating the temperature distribution in the RV support skirt at 100% (full) steady state conditions. B&W plants with constant T_{ave} have the lowest cold leg temperature at 100% (full) power.
- Gamma heating is neglected, which supports the determination of a minimum LST value.
- Maximum cavity ventilation airflow is assumed. This is conservative for the LST calculation because it maximizes the heat transfer coefficients applied in the cavity regions.
- A bulk air temperature of **[[ ]]$_{d,e}$** is selected, which is the minimum measured temperature at the inlets to the RV cavity over the three most recent winter periods.
- Solid-to-solid contact resistance is ignored, so heat can more easily diffuse into the supporting concrete surfaces.
- Heat transfer through the anchor bolts, rather than through the shear pins, results in a conservatively low estimate of the actual RV skirt temperature, since the anchor bolts have a larger conduction path from the support skirt to the concrete.

Duke Energy's Response to RAI 3.5.2.2.2.6-9 Request b

No revision to the SLRA is required. The original SLRA submittal, as supplemented by this RAI response (Request "a" above) provides an explanation of the conservatisms used in the determination of the minimum value of LST for the RV support skirt and steel components of the embedment assemblies.

ENCLOSURE 1

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3
SUBSEQUENT LICENSE RENEWAL APPLICATION
RESPONSES TO ONS SLRA – SECOND ROUND RAIS – TRP 76
(IRRADIATION STRUCTURAL) – FE 3.5.2.2.2.6

ATTACHMENT 6
RAI 3.5.2.2.2.6-10

RAI 3.5.2.2.2.6-10

Background

In Section 9.4.4.3 of ANP-3898NP, Revision 0, the applicant discussed the initial nil-ductility temperature (NDT) values of the RV support skirt assembly components. In RCIs 3.5.2.2.2.6-H and 3.5.2.2.2.6-I, included in the letter dated December 2, 2021 (ADAMS Accession No. ML21336A001), the applicant confirmed that there were no plant-specific measured values of initial NDT (or Charpy V-Notch absorbed energy values from which initial NDT values can be derived) of the RV support skirt assembly components, and that the initial NDT values and corresponding margins came from NUREG-1509, "Radiation Effects on Reactor Pressure Vessel Supports," May 1996 and BAW-10046A, "Methods of Compliance With Fracture Toughness and Operational Requirements of 10 CFR 50, Appendix G," Revision 2 (ADAMS Accession No. ML20207G642).

Issue

Reporting of initial NDT values (or Charpy V-Notch absorbed energy values from which initial NDT values can be derived) for steel components are typically required by the design code of record, such as Section III of the ASME Code. It is not clear why plant-specific measured values of initial NDT values (or Charpy V-Notch absorbed energy values from which initial NDT values can be derived) were not available for the ONS RV support skirt assembly components. The NRC staff noted that plant-specific measured values of initial NDT values were also not available for the sole plate, vertical bearing plate, and nelson studs of the embedment assembly that the applicant evaluated in its response to RAI 3.5.2.2.2.6-7.

Request

a) Explain why plant-specific records of measured values of initial NDT (or Charpy V-Notch absorbed energy values from which initial NDT values can be derived) are/were not available for use in the ONS RV support skirt assembly and embedment assembly components (which includes the sole plate, vertical bearing plate, and nelson studs) for the transition temperature evaluation.

b) Identify necessary updates of pertinent areas of the SLRA to reflect this clarification or justify the ONS position for not updating.

Duke Energy Response to RAI 3.5.2.2.2.6-10 Request a

The RV support assembly items that were supplied by B&W include the RV support skirt, RV support flange, and associated welds as described in ANP-3898P/NP, Section 9.3. Consistent with the response to RAI 3.5.2.2.2.6-1 (ADAMS Accession Number ML22045A021), these items were fabricated in accordance with the ASME Code Section III (1965 Edition through Summer 1967 Addenda).

In accordance with the ASME Code Section III (1965 Edition through Summer 1967 Addenda), N-330, the RV support assembly items supplied by B&W were permitted to be tested for ductile to brittle transition by either the drop weight test (ASTM E-208) or the Charpy V-notch impact test (ASTM A 370 Type A). Based on review of the ONS RV ASME Code Section III Design Specification, impact properties (Charpy V-notch, or CVN) of the above RV support items supplied by B&W were performed to demonstrate compliance with N-330. As permitted by N-331.2, Charpy V-Notch Tests, an acceptance test shall consist of a set of three CVN specimens tested at temperatures 60°F below the lower of the vessel hydrotest temperature or the lowest service metal temperature.

The hydrostatic test temperature for the Oconee RVs was confirmed to be 100°F per the RV quality assurance data packages (QADPs), and the CVN test temperature requirement was established at

40°F in the ASME Code Section III RV Design Specification, thus complying with temperature requirement in the ASME Code Section III, N-331.2. In addition, N-331.2 specifies that the specimens shall break at energies no less than those indicated in Table N- 421 by steel grade. For SA-515, Grades 60 and 70, required CVN for three specimens is 15 ft-lb and 20 ft-lb, respectively.

The current NRC approved ASME Code Section III (2017 Edition) fracture toughness requirements for material are contained in Subarticle NB-2300 and are significantly different than the fracture toughness requirements from the ASME Code Section III (1965 Edition through Summer 1967 Addenda). For example, for pressure retaining materials, a reference RT_{NDT} is established by drop weight tests (T_{NDT}). At a temperature not greater than T_{NDT} + 60°F, each specimen of the CVN test must exhibit at least 35 mils lateral expansion and not less than 50 ft-lb absorbed energy. If these requirements cannot be met, then additional CVN testing is required to determine the temperature T_{cv} at which they are met. In this case $RT_{NDT} = T_{cv}$ - 60°F.

Therefore, due to the significant revisions to the ASME Code Section III between 1965 with Summer 1967 Addenda and 2017 with regard to fracture toughness testing requirements, it is not possible with the data collected during original fabrication of the RV support assembly items provided by B&W to derive the initial RT_{NDT} from the CVN data reported in the RV QADPs. Therefore, initial NDT values for the base metal RV support assembly items supplied by B&W, as reported in ANP-3898P/NP, Table 9-4, were obtained from NUREG-1509, Table 4-1. As reported in NUREG-1509, Page 41, the source of the information in NUREG-1509, Table 4-1 is NUREG/CR-3009, "Fracture Toughness of PWR Component Supports," Sandia National Laboratory, February 1983. In accordance with guidance from NUREG-1509, Page 40, the NDT mean plus 1.3σ, where σ is the standard deviation, was used. The addition of the "1.3σ" term provides conservatism to the initial NDT values for the RV support assembly base metal items.

This is also true for the initial NDT of RV support assembly weld metals reported in ANP-3898P/NP, Table 9-5, wherein no measured initial NDT values were available from the RV QADPs nor could they be derived from CVN data. As such, BAW-10046A, Revision 2 (ADAMS Accession Number ML20207G642) provides generic initial NDT values for manual metal arc welds reported in ANP-3898P/NP, Table 9-5. Measured initial NDT data is not available for semi-automatic gas shielded metal arc welds from the RV QADPs or from any other source. Therefore, the estimated initial NDT value reported for semi-automatic gas shielded metal in ANP-3898P/NP, Table 9-5, is based on the value (NDT+1.3σ) of the adjoining base metal. The addition of the "1.3σ" term provides conservatism to the initial NDT values for the RV support assembly weld metals.

The RV support embedment items supplied by the architect engineer include the sole plate, vertical bearing plate, nelson studs, shear pins, anchor bolts, jamb nuts, and hex nuts. There were no ASME Code Section III fracture toughness requirements for these architect engineer supplied items that could be located, and as such initial NDT or CVN values were not available for these items. Therefore, NUREG-1509, Table 4-1, (NDT+1.3σ) was used to establish initial NDT for these items. The addition of the "1.3σ" term provides conservatism to the initial NDT values for the sole plate, vertical bearing plate, nelson studs, shear pins, anchor bolts, jamb nuts, and hex nuts.

Duke Energy Response to RAI 3.5.2.2.2.6-10 Request b

No revisions to ANP-3898P/NP or the SLRA are required. The original SLRA submittal, which included ANP-3898P/NP, as supplemented by the response to RAI 3.5.2.2.2.6-1 and this RAI response (Part "a" above) provides the derivation and bases for the initial NDT values reported in ANP-3898P, Section 9.4.4.3, which have not changed based on the RAI responses.

ENCLOSURE 2

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3
SUBSEQUENT LICENSE RENEWAL APPLICATION
RESPONSES TO ONS SLRA – SECOND ROUND RAIS – TRP 76
(IRRADIATION STRUCTURAL) – FE 3.5.2.2.2.6

Framatome Affidavit

AFFIDAVIT

1. My name is Gayle Elliott. I am Deputy Director, Licensing and Regulatory Affairs, for Framatome Inc. (Framatome) and as such I am authorized to execute this Affidavit.

2. I am familiar with the criteria applied by Framatome to determine whether certain Framatome information is proprietary. I am familiar with the policies established by Framatome to ensure the proper application of these criteria.

3. I am familiar with the Framatome information contained in Enclosure 1, Attachments 1P, 3P, 4P, and 5P to Letter Number RA-22-0160 to U.S. Nuclear Regulatory Commission from Mr. Steven M. Snider, Site Vice President, Oconee Nuclear Station, with Subject, "Subsequent License Renewal Application Responses to ONS SLRA – Second Round RAIs – TRP 76 (Irradiation Structural) – FE 3.5.2.2.2.6," and referred to herein as "Document." Information contained in this Document has been classified by Framatome as proprietary in accordance with the policies established by Framatome for the control and protection of proprietary and confidential information.

4. This Document contains information of a proprietary and confidential nature and is of the type customarily held in confidence by Framatome and not made available to the public. Based on my experience, I am aware that other companies regard information of the kind contained in this Document as proprietary and confidential.

5. This Document has been made available to the U.S. Nuclear Regulatory Commission in confidence with the request that the information contained in this Document be withheld from public disclosure. The request for withholding of proprietary information is made in accordance with 10 CFR 2.390. The information for which withholding from disclosure is

requested qualifies under 10 CFR 2.390(a)(4) “Trade secrets and commercial or financial information.”

6. The following criteria are customarily applied by Framatome to determine whether information should be classified as proprietary:

(a) The information reveals details of Framatome’s research and development plans and programs or their results.

(b) Use of the information by a competitor would permit the competitor to significantly reduce its expenditures, in time or resources, to design, produce, or market a similar product or service.

(c) The information includes test data or analytical techniques concerning a process, methodology, or component, the application of which results in a competitive advantage for Framatome.

(d) The information reveals certain distinguishing aspects of a process, methodology, or component, the exclusive use of which provides a competitive advantage for Framatome in product optimization or marketability.

(e) The information is vital to a competitive advantage held by Framatome, would be helpful to competitors to Framatome, and would likely cause substantial harm to the competitive position of Framatome.

The information in this Document is considered proprietary for the reasons set forth in paragraphs 6(d) and 6(e) above.

7. In accordance with Framatome’s policies governing the protection and control of information, proprietary information contained in this Document has been made available, on a limited basis, to others outside Framatome only as required and under suitable agreement providing for nondisclosure and limited use of the information.

8. Framatome policy requires that proprietary information be kept in a secured file or area and distributed on a need-to-know basis.

9. The foregoing statements are true and correct to the best of my knowledge, information, and belief.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on: July 15, 2022.

ELLIOTT Gayle
Digitally signed by ELLIOTT Gayle
Date: 2022.07.15 16:16:34 -04'00'

Gayle Elliott