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U.S. Nuclear Regulatory Commission
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Washington, DC 20555

Subject: Duke Power Company LLC d/b/a
Duke Energy Carolinas, LLC
Oconee Nuclear Station, Unit 1,
Docket No. 50-269
Replacement of Steam Generators
Request for Relief No. 04-ON-007, Rev 1

By letter dated May 17, 2004 Duke Energy Corporation (now Duke Power Company LLC d/b/a Duke Energy Carolinas) (Duke) submitted Request for Relief No. 04-ON-007 associated with the replacement of Steam Generators on Oconee Unit 1.

Subsequently, the Lead NRC reviewer forwarded a request for additional information. During preparation of a response to that request, it became apparent to Duke personnel that the initial request needed substantial revision. In subsequent telephone conversations Duke Regulatory Compliance personnel notified the NRR Project Manager for Oconee that Duke intended to withdraw the original request and resubmit a revision.

Therefore, please withdraw the original request. Attached is Revision 1 to Request for Relief No. 04-ON-007 which is intended to replace the prior request in its entirety. Duke requests that the NRC grant relief as authorized under 10 CFR 50.55a(g)(6)(i).

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If there are any questions or further information is needed you may contact R. P. Todd at (864) 885-3418.

Very truly yours,

R. Michael Glover/for

Bruce H. Hamilton, Vice President
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Attachment

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ISI Relief Request File
NRIA File/ELL EC050
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Duke Power Company LLC
Oconee Nuclear Station (ONS)
Unit 1
Replacement of Steam Generators

Request for Relief 04-ON-007
Revision 1

Pursuant to 10 CFR 50.55a(3)(i) Duke Power Company LLC (Duke) proposes an alternative to the requirements of ASME Section III, that provide an acceptable level of quality and safety as those described in Paragraph NB 4232, 1983 Edition with no addendum. The Oconee replacement Steam Generators were designed to the 1989 ASME Code. The Reactor Coolant System piping was requalified to the 1983 Code during the Steam Generator Replacement project. Therefore, this request for relief references the requirements of the 1983 Code with respect to the affected piping welds.

1. Components for Which Relief is Requested

The following Reactor Coolant System welds that were completed during the replacement of Steam Generators A & B on Unit 1:

1-RC-289-7V Cold Leg 1AI	1-RC-289-6V Hot Leg 1A Riser
1-RC-289-8V Cold Leg 1A2	1-RC-289-5V Hot Leg 1A RSG Nozzle
1-RC-289-3V Cold Leg 1B2	1-RC-289-2V Hot Leg 1 B Riser
1-RC-289-4V Cold Leg 1B1	1-RC-289-1V Hot Leg 1B RSG Nozzle

2. Code Requirement

ASME Section III, Subparagraph 4232.1, “Fairing of Offsets”, 1983 Edition.

3. Code Requirement for Which Relief is Requested

Relief is requested from the requirements of ASME Code, Section III, 1983 Edition, no Addendum, Subparagraph NB-4232.1 for at least a 3:1 straight line taper over the width of the finished weld. These as-built weld geometries do not meet the 3:1 taper requirements of NB-4232.1.

4. Basis for Relief

During the replacement of Steam Generators A and B on Unit 1 of the Oconee Nuclear Station, it was discovered that the as-built ferritic weld configurations at several locations (listed in Item 1 above) on the Reactor Coolant System piping did not meet the taper requirements on the inside diameter (ID) of the welds as stipulated in NB-4232.1. The actual geometry over the width of the finished ferritic weld resembles a counter bore, rather than the 3 to 1 taper required by NB-4232.1.

In the process of performing the weld, ferritic filler metal was applied to the counter bore area on the ID, while avoiding the welding of ferritic filler metal over the austenitic stainless steel cladding. Cladding was then applied as weld metal overlay on the ID base metal and ferritic weld metal and faired in opposing directions across the weld leaving a smooth surface with a small amount of concavity.

ASME Code Section III, Subsubarticle NB-3650 analysis was performed for the as-built weld geometries to demonstrate Code analysis acceptability for those welds that did not meet the geometry requirements of NB-4232.1.

5. Proposed Alternative

Duke proposes to use ASME Code Analyses, performed in accordance with NB-3650, to demonstrate that the as-built weld geometries meet all stress and fatigue requirements of the ASME Section III Code, 1983 Edition, no Addenda.

6. Justification for the Granting of Relief

As discussed in Section 4 above, a 3 to 1 taper across the entire ferritic base and weld metal on the ID was not attained in discrete areas around the circumference of each of the weld joints identified above.

Deviations from standard code configurations for welds and other piping components are allowed as long as the stress analysis performed in accordance with NB-3650 reflects the actual configurations (as-built) and still meets Code allowable stresses and fatigue limits. The stress analyses performed for each of these locations demonstrated compliance with NB-3650 as discussed below.

A. The code required minimum wall thicknesses of the ferritic (base metal and weld) material, calculated in accordance with Subsubarticle NB-3640, were met. The additional strength provided by the austenitic stainless steel cladding overlay was conservatively ignored in accordance with the requirements of Paragraph NB-3122.

B. The code required calculation of primary stress intensities, in accordance with Paragraphs NB-3652, NB-3654, Nb-3655 and NB-3656, was performed and the requirements were met using the minimum as-built cross sectional properties of the ferritic weld joint. The additional strength provided by the austenitic stainless steel cladding overlay was conservatively ignored in accordance with the requirements of Subparagraph NB-3122.1.

C. The code required calculation of primary plus secondary stress intensity range, in accordance with Subparagraph NB-3653.1 and, in some cases, Subparagraph NB-3653.6, was performed and the requirements were met using the minimum as-built cross sectional properties of the ferritic weld joint. The additional strength provided by the austenitic stainless steel cladding overlay was conservatively ignored in accordance with the requirements of Subparagraph NB-3122.3. In cases where the cladding thickness was in excess of 10% of the combined thickness, additional stresses were accounted, as required by Subparagraph NB-3122.3.

D. The code required calculation of peak stress intensity range, in accordance with Subparagraph NB-3653.2, was performed and the fatigue cumulative usage factor was determined in accordance with Subparagraphs NB-3653.3, NB-3653.4 and NB-3653.5 and the requirements were met using the minimum as-built cross sectional properties of the ferritic weld joint. The additional strength provided by the austenitic stainless steel cladding overlay was conservatively ignored in accordance with the requirements of Subparagraph NB-3122.3. In cases where the cladding thickness was in excess of 10% of the combined thickness, additional stresses were accounted, as required by Subparagraph NB-3122.3.

In cases that did not meet the specific geometric requirements of Subsubarticle NB-3680, that is, the actual weld geometries were not covered by the stress indices of NB-3650, theoretical analysis, supplemented by finite element analysis results, were performed to demonstrate the conservatism of the stress indices used in the NB-3650 stress and fatigue analysis. Per ASME Code Section III, paragraph NB-3681(d): For piping products not covered by NB-3680, stress indices and flexibility factors shall be established by experimental analysis (Appendix II) or theoretical analysis.

As stated previously, the ferritic base and weld metal did not meet, in all locations, the 3 to 1 taper requirements of Subparagraph NB-4232.1. The fairing of transitions in the cladding across a weld joint is not discussed explicitly in Section III, Subsection NB. In each case, the cladding was faired across all transitions at a 3 to 1 taper. In locations where the cladding thickness exceeded 10% of the combined thickness, additional stresses were considered in the calculation of secondary and peak stress intensity ranges. Generally, to avoid the application of excessive cladding thicknesses, opposing 3 to 1 tapers may exist, which would create a slight concavity at the center of the finished weld joint. This is the actual weld geometry that did not meet Code geometry requirements. The opposing tapers in the base weld and cladding do not create a stress concentration above what was considered in the current NB stress and fatigue analyses.

Therefore, based on the presented information, the Code NB-4232.1 geometry requirements for the 3:1 taper were not met, but are acceptable, based on the NB-3650 stress and fatigue analysis results.