



**Ronald A. Jones**  
Vice President  
New Nuclear Operations

August 21, 2014  
NND-14-0474  
10 CFR 50.90

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

Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3  
Combined License Nos. NPF-93 and NPF-94  
Docket Nos. 52-027 & 52-028

Subject: LAR 13-21 S1 License Amendment Request: Module CA03 Details

- Reference:
1. Southern Nuclear Operating Company, ND-13-1504, Vogtle Electric Generating Plant Units 3 and 4 LAR-13-018 License Amendment Request: Module CA03 Details (Adams Accession Number ML13197A117)
  2. Southern Nuclear Operating Company, ND-13-2341, Vogtle Electric Generating Plant Units 3 and 4 LAR-13-018S License Amendment Response to Request for Additional Information: Module CA03 Details (Adams Accession Number ML13310A887)
  3. Southern Nuclear Operating Company, ND-13-2394, Vogtle Electric Generating Plant Units 3 and 4 LAR-13-018S2 Supplement to License Amendment Request: Module CA03 Details (Adams Accession Number ML13319B203)
  4. South Carolina Electric & Gas Company (SCE&G) Request for License Amendment Request: Module CA03 Details February 27, 2014 (NND-14-0079)

In accordance with the provisions of 10 CFR 50.90, South Carolina Electric & Gas Company (SCE&G) requests an amendment to the Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3 combined licenses (COLs) numbers NPF-93 and NPF-94, respectively.

The LAR has been supplemented from Reference 4, the original submittal in letter NND-14-0079 dated February 27, 2014 for conformance with Reference 2. Hence, Enclosure 3 has been added to provide a detailed description and justification for the use of Type

2209 duplex stainless steel weld filler material for the welding of duplex stainless steel to carbon steel as described in UFSAR Subsection 6.1.1.3.

The supplemental information provided in this letter does not impact the scope of the requested amendment, nor the conclusions of the regulatory evaluation (including the significant hazards consideration determination and the environmental considerations).

This letter contains no regulatory commitments.

In accordance with 10 CFR 50.91, SCE&G is notifying the State of South Carolina of this LAR by transmitting a copy of this letter and enclosures to the designated State Official.

Should you have any questions, please contact Mrs. April Rice by telephone at (803) 941-9858, or by email at arice@scana.com.

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

Executed on this 21<sup>st</sup> day of March, 2014.

Sincerely,



Ronald A. Jones  
Vice President  
New Nuclear Operations

MMD/RAJ/mmd

Enclosure 3: Supplemental Information – Module CA03 Details (LAR 13-21 S1)

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**South Carolina Electric and Gas Company  
Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3**

**NND-14-0474**

**Enclosure 3**

**Supplemental Information  
Module CA03 Details  
(LAR 13-21 S1)**

With this supplement, South Carolina Electric & Gas Company (SCE&G) is providing further details on the use of Type 2209 duplex stainless steel weld filler material for the welding of duplex stainless steel to carbon steel as described in UFSAR Subsection 6.1.1.3.

The welding of duplex stainless steel to carbon steel has the potential for formation of martensite in the weld when high levels of ferritic base material are diluted into the weld. A detailed description and justification for the control of martensite formation during the welding of carbon steel stiffeners to the outside of the IRWST wall is provided below. This additional information is consistent with the response in Reference 2 for the discussion of weld filler.

UFSAR Subsection 6.1.1.3 indicates Type 2209 duplex stainless steel weld filler material will be used to weld the in-containment refueling water storage tank (IRWST). This is referring to the weld metal that can be used for welding the base metals S32101 to S32101. Type 2209 and 309(L) filler metal are the typical filler metals that can be used to weld S32101 to carbon steel.

The International Molybdenum Association (IMOA) provides a reference document, "Practical Guidelines for the Fabrication of Duplex Stainless Steel" [Second Edition 2009, Published by the IMOA, ISBN: 978-1-907470-00-4 ([http://www.imoa.info/download\\_files/stainless-steel/Duplex Stainless Steel 2d Edition.pdf](http://www.imoa.info/download_files/stainless-steel/Duplex%20Stainless%20Steel%202d%20Edition.pdf))] that recommends the use of type 2209 and 309(L) for the welding of carbon steel or low alloy steel to S32101 (see Section 12.1.9 and Table 15 of the IMOA document).

The key is the use of a filler metal with a high content of nickel. Type 2209 has a nickel content range of 7.5 to 10.5 percent based on the filler metal type. Welding consumables usually contain 2 to 4 percent nickel and promote the formation of austenite in the weld. The final microstructures of the weld contain a mixture of austenite and ferrite.

Martensite can be present in dissimilar welds, but can be controlled in the procurement of filler metal, and qualification of the Welding Procedure Specification (WPS) which is followed throughout the entire welder qualification process and production process.

Each heat/lot of filler metal is purchased with the following requirements:

- an all weld metal tensile,
- five Charpy impacts tested at -40°F (-40°C), and
- ferrite content between 35 to 65 Ferrite Number (FN).

The WPS is qualified to the requirements of AWS D1.6-1999 and also must meet these requirements:

- qualified with a minimum 0.5-inch groove weld with the appropriate carbon steel (note that AWS D1.6 does not specify any groupings of non-stainless steel),
- the WPS shall state a maximum heat input to be followed,
- weld metal must meet a minimum 5% ferrite at the root and face,
- the heat affected zone of the S32101 shall be 35% to 65% for the root and face, and
- Charpy impact shall be tested at -40°F (-40°C).