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10 CFR 52.79

January 13, 2015

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

Subject: Duke Energy Carolinas, LLC  
William States Lee III Nuclear Station - Docket Nos. 52-018 and 52-019  
AP1000 Combined License Application for the William States Lee III Nuclear  
Station Units 1 and 2  
Revised Response to Request for Additional Information Letter No. 116  
(eRAI 7539)  
Ltr#: WLG2015.01-02

- References:
1. Letter from Brian Hughes (NRC) to Robert Kitchen (Duke Energy), Request for Additional Information Letter No. 116, Related to SRP Section 03.12 – ASME Code Class 1, 2, and 3 Piping Systems and Piping Components and Their Associated Supports for the William States Lee III Units 1 and 2 Combined License Application, dated May 14, 2014 (ML14134A573)
  2. Letter from Christopher M. Fallon (Duke Energy) to the Document Control Desk, Response to Request for Additional Information Letter No. 116 (eRAI 7539), Ltr# WLG2014.06-04, dated June 11, 2014 (ML14163A571)

This letter provides Duke Energy's revised response to the Nuclear Regulatory Commission's request for additional information (RAI) included in Reference 1. Duke Energy's initial response was provided in Reference 2. During the December 11, 2014 public meeting with NRC (ML14321A158), Duke Energy agreed to submit an updated response to eRAI 7539 addressing the need to perform as-built analyses of piping systems using site-specific response seismic spectra. The revised response to the NRC information request is provided in Enclosure 1, which also identifies associated changes to be made in a future revision of the Final Safety Analysis Report for the Lee Nuclear Station.

If you have questions or require additional information, please contact Robert H. Kitchen, Nuclear Development Licensing Director, at (704) 382-4046.

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I declare under penalty of perjury that the forgoing is true and correct. Executed January 13, 2015.

Sincerely,

A handwritten signature in black ink that reads "Christopher M Fallon". The signature is written in a cursive style with a prominent initial "C" and a long, sweeping underline.

Christopher M. Fallon  
Vice President  
Nuclear Development

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Enclosure:

- 1) Lee Nuclear Station Units 1 and 2 Revised Response to Request for Additional Information (RAI) Letter No. 116, SRP Section 03.12-2 (eRAI 7539)

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xc (w/o enclosure):

Frederick Brown, Deputy Regional Administrator, Region II

xc (w/ enclosure):

Brian Hughes, Senior Project Manager, DNRL

**Enclosure 1**  
**Lee Nuclear Station Units 1 and 2**  
**Revised Response to Request for Additional Information (RAI)**  
**RAI Letter No. 116**  
**SRP Section 03.12-2 (eRAI 7539)**

**Enclosure 1**  
**Lee Nuclear Station Units 1 and 2**  
**Revised Response to Request for Additional Information (RAI)**  
**RAI Letter No. 116**  
**SRP Section 03.12-2 (eRAI 7539)**

**Lee Nuclear Station Response to Request for Additional Information (RAI)**

**RAI Letter No. 116**

**NRC Technical Review Branch: NRO/MEB**

**Reference NRC RAI Number(s): 03.12-2 (eRAI 7539)**

**NRC RAI:**

The staff notes that the Lee site-specific In-Structure Response Spectra (ISRS) exceed the DCD ISRS at certain locations. Clarify in the application for those areas which are not bounded by the CSDRS/HRHF whether the as-built analysis will be performed using the DCD spectra or the site-specific spectra.

If the DCD spectra are to be used in the as-built analysis, clarify in the application how these analyses will confirm that site-specific in-structure exceedance compared to CSDRS/HRHF will remain non-damaging.

**Duke Energy Response:**

For clarity in response, note that Enclosure 4 to Duke Energy's letter dated January 30, 2014 provided Westinghouse report WLG-GW-GLR-815, Revision 0, "Effect of William S. Lee Site Specific Seismic Requirements on AP1000 SSCs" (Reference 1) which is now cited as FSAR Subsection 3.7 Reference 206. Section 5.3 of WLG-GW-GLR-815 confirms that the site-specific in-structure response spectra (ISRS) exceed the corresponding DCD ISRS at some locations.

Duke Energy plans as-built seismic reconciliation of the Duke Lee ISRS exceedances using the site-specific seismic spectra to qualify the as-built building structures and primary component design of the Duke Lee site. Any building structures and primary equipment FRS exceedances of the AP1000 CSDRS and/or HRHF envelopes are justified based on:

- Comparison of force results for all structures and primary components; or
- Structures and equipment not sensitive to high frequency (HF) motion; or
- Comparison of Duke Lee ni20u seismic floor response spectra (FRS) to AP1000 ni20t seismic reconciliation analysis FRS.

Similarly, site specific spectra will be used to perform as-built reconciliation of any Auxiliary Shield Building (ASB) and Containment Internal Structures (CIS) floor area high frequency FRS exceedances, which do not affect piping. Any ASB and/or CIS HF exceedances will be qualified by comparison of AP1000 Test Response Spectra (TRS), CSDRS/HRHF Required Response Spectra (RRS), and Lee site-specific RRS. Further, for electro-mechanical equipment qualification, WLG-GW-GLR-815 Section 6.4 noted that should there be instances where the site-specific RRS exceed the AP1000 TRS, those specific locations will be revisited, and retesting will be performed if needed. This commitment is reflected in the Lee FSAR.

~~As built piping systems will be qualified using the DCD CSDRS/HRHF seismic spectra since all piping systems were performed and qualified for both CSDRS and HRHF. Also, it has been~~

~~shown in WLG-GW-GLR-815 that the Lee site-specific spectra and HRHF spectra are similar, and that detailed piping stress analysis of selected piping systems indicated that the site-specific pipe stresses are enveloped by the CSDRS pipe stresses.~~

When performing an as-built reconciliation of piping analysis packages, Duke Energy and Westinghouse will also use an EPRI Nuclear Construction Issues Group document (Reference 2) to justify existing analysis instead of having to create a new analysis to incorporate slightly different dimensional changes in the models. Parameters like location of supports, centerline lengths to fittings, angular deviations of the pipe centerline, and valve concentrated weights, all have some tolerance that, if met, maintain the applicability of the design basis analysis without a formal reanalysis. Reference 2 has a basic assumption that the seismic analysis used to qualify the piping package used uniform envelope response spectra. The NRC has accepted this approach to as-built reconciliation and Reference 2 is cited in the AP1000 DCD, Revision 19 (DCD Subsection 3.6.3.2).

The analyses described in Reference 1 demonstrate that the Lee site-specific spectra and HRHF spectra are similar. Detailed stress analysis of selected piping systems indicate that the site-specific pipe stresses are enveloped by the CSDRS pipe stresses. Therefore, as described in FSAR Subsection 3.7.2.15, standard design practices for AP1000 piping systems have considered cases enveloping the Lee site-specific requirements. In some cases the as-built reconciliation review using Reference 2 may indicate that a detailed as-built re-analysis of certain piping systems is needed. For those cases, as-built piping systems will be qualified using the DCD CSDRS/HRHF seismic spectra since all piping systems were analyzed and designed for both CSDRS and HRHF. In addition, for these cases when as-built re-analyses are needed, the as-built piping system will also be qualified using the Lee site-specific spectra to confirm that configuration changes during construction have not affected the piping system qualification for site-specific demands. FSAR Subsection 3.9.3 will be updated to reflect Duke Energy's commitment for these confirmatory analyses. DCD Subsection 3.9.8.2 contains the Combined License Information item commitment to reconciliation of as-built piping as described in Subsection 3.9.3, and FSAR Subsection 14.3.3.3 points out that reconciliation of as-built piping systems is covered in as-built ITAAC identified in DCD Tier 1.

#### References

1. Westinghouse Electric Company, LLC, "Effect of William S. Lee Site Specific Seismic Requirements on AP1000 SSCs," WLG-GW-GLR-815, Revision 0, January 17, 2014.
2. Electric Power Research Institute, "Guidelines for Piping System Reconciliation (NCIG-05, Revision 1), Document ID NP-5639, May 5, 1988.

#### Associated Revision to the Lee Nuclear Station Final Safety Analysis Report:

FSAR Subsections 3.9.3 and 3.9.9

#### Attachment:

- 1) Revisions to FSAR Subsections 3.9.3 and 3.9.9



**Attachment 1**  
**Lee Nuclear Station Units 1 and 2**  
**Revised Response to Request for Additional Information 03.12-2 (eRAI 7539)**  
**Revisions to FSAR Chapter 3, Subsection 3.9 Text**

**Subsection 3.9.3**

**Subsection 3.9.9**

1. COLA Part 2, FSAR, Chapter 3, Subsection 3.9.3, is revised as follows:

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**3.9.3 ASME Code Classes 1, 2, and 3 Components, Component Supports, and Core Support Structures**

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Add the following at the end of DCD Subsection 3.9.3:

When performing an as-built reconciliation of piping analysis packages, Duke Energy and Westinghouse will also use Reference 205 to justify existing analysis instead of having to create a new analysis to incorporate slightly different dimensional changes in the models. Parameters like location of supports, centerline lengths to fittings, angular deviations of the pipe centerline, and valve concentrated weights, all have some tolerance that, if met, maintain the applicability of the design basis analysis without a formal reanalysis. Reference 205 has a basic assumption that the seismic analysis used to qualify the piping package used uniform envelope response spectra. The NRC has accepted this approach to as-built reconciliation and Reference 205 is cited in the AP1000 DCD, Revision 19 (DCD Subsection 3.6.3.2).

The analyses described in Reference 206 demonstrate that the Lee site-specific spectra and HRHF spectra are similar. Detailed stress analysis of selected piping systems indicate that the site-specific pipe stresses are enveloped by the CSDRS pipe stresses. Therefore, as described in FSAR Subsection 3.7.2.15, standard design practices for AP1000 piping systems have considered cases enveloping the Lee site-specific requirements. In some cases the as-built reconciliation review using Reference 205 may indicate that a detailed as-built re-analysis of certain piping systems is needed. For those cases, as-built piping systems will be qualified using the DCD CSDRS/HRHF seismic spectra, since all piping systems were analyzed and designed for both CSDRS and HRHF. In addition, for these cases when as-built re-analyses are needed, the as-built piping system will also be qualified using the Lee site-specific spectra to confirm that configuration changes during construction have not affected the piping system qualification for site-specific demands.

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2. COLA Part 2, FSAR, Chapter 3, Subsection 3.9.9, is revised to add the following information:

205. Electric Power Research Institute, "Guidelines for Piping System Reconciliation (NCIG-05, Revision 1), Document ID NP-5639, May 5, 1988.

206. Westinghouse Electric Company, LLC, "Effect of William S. Lee Site Specific Seismic Requirements on AP1000 SSCs," WLG-GW-GLR-815, Revision 0, January 17, 2014.