**Exhibit DEC-001**

September 28, 2016

**UNITED STATES OF AMERICA**
**NUCLEAR REGULATORY COMMISSION**

**Before the Commission**

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| In the Matter of | ) | |
| | ) | |
| DUKE ENERGY CAROLINAS, LLC | ) | Docket Nos. 52-018 and 52-019 |
| | ) | |
| (William States Lee III Nuclear Station, Units 1 and 2) | ) | |

**APPLICANT'S PRE-FILED TESTIMONY IN SUPPORT OF THE MANDATORY HEARING FOR THE WILLIAM STATES LEE III NUCLEAR STATION, UNITS 1 AND 2 COMBINED LICENSES**

## I. WITNESS FOR THE UNCONTESTED HEARING

**Q1. Please State your full name.**

**A1.** My name is Robert H. Kitchen. I am the Director - Licensing, Nuclear Development for Duke Energy Carolinas, LLC ("DEC"). I have overall responsibility for the development of the William States Lee III Nuclear Station ("Lee Nuclear Station"), Units 1 and 2 Combined License Application ("Lee COLA") and other State and Federal permits and approvals. My business address is EC12L, P.O. Box 1006, Charlotte, NC 28201-1006.

**Q2. Please describe your educational and professional background.**

**A2.** I earned a Bachelor of Science degree in Engineering from Tulane University in 1973 and a Master's degree in Business Administration from UNC-Wilmington in 1997. I have worked at Carolina Power & Light Co. ("CPL"), Progress Energy Inc. ("PGN") and Duke Energy Corporation for 35 years (I will refer to CPL, PGN and Duke Energy Corporation collectively as "Duke."). I have 43 years of experience in nuclear power plant operations and engineering in the

areas of licensing, engineering projects, plant operations and maintenance. I have experience with the various aspects of licensing nuclear power plants, including the applicable regulatory requirements, policies, and practices. I represented Duke in the NuStart Design Centered Working Group ("DCWG") for the AP1000 reactor. My *curriculum vitae* is provided as Exhibit DEC-002.

**Q3. What is the purpose of your testimony?**

**A3.** The purpose of my testimony is to support the findings that the Commission must make as part of the mandatory hearing on uncontested issues for the Lee Nuclear Station COLA proceeding.

## II. BACKGROUND

**Q4. Please briefly describe DEC's COL Application for Lee Nuclear Station.**

**A4.** DEC filed its COLA for the Lee Nuclear Station on December 12, 2007. The Lee COLA has been updated and revised since the initial filing, most recently on April 11, 2016. The Lee COLA seeks combined licenses ("COL") under 10 C.F.R. Part 52 to construct and operate two Westinghouse Electric Company ("Westinghouse") AP1000 advanced passive pressurized water reactors. These new reactors are formally designated as William States Lee III Nuclear Station Units 1 and 2. The Lee COLA includes a request for associated material licenses under 10 C.F.R. Parts 30, 40, and 70.

The Lee COLA incorporates by reference the Design Certification Rule for the AP1000 Design, Appendix D to 10 C.F.R. Part 52, as amended on December 22, 2011, which certifies Westinghouse's AP1000 Design Control Document ("DCD"), Revision 19.

**Q5. Please describe the ownership of Lee Nuclear Station Units 1 and 2.**

**A5.** DEC will be the sole owner of Lee Nuclear Station Units 1 and 2 and will retain full responsibility for operation of the new units after the requirements of 10 C.F.R. § 52.103(g) are satisfied. DEC is a wholly-owned subsidiary of Duke Energy Corporation, the largest electric power holding company in the United States. DEC is not owned, controlled, or dominated by an alien, foreign corporation, or foreign government.

**Q6. Can you briefly describe how the COLA is organized?**

**A6.** The Lee COLA is composed of eleven parts. Each of these is identified below, along with the current revision of each part:

- Part 1 – General and Financial Information (Revision 11)
- Part 2 – Final Safety Analysis Report ("FSAR") (Revision 11)
- Part 3 – Environmental Report ("ER") (Revision 1) and Supplement 1
- Part 4 – Technical Specifications (Revision 11)
- Part 5 – Emergency Plan (Revision 7)
- Part 6 – Limited Work Authorization (Not Used)
- Part 7 – Departures and Exemptions (Revision 11)
- Part 8 – Safeguards/Security Plans (withheld from public availability) (Revision 3)
- Part 9 – Withheld Information (Revision 12)
- Part 10 – Proposed License Conditions and Inspections, Tests, Analyses, and Acceptance Criteria ("ITAAC") (Revision 11)
- Part 11 – Enclosures (Revision 11).

**Q7. What is the significance of the fact that the Lee COLA is not the first COLA to reference the AP1000 DCD?**

**A7.** In 2006, the NRC Staff ("Staff") described its "design-centered review approach" ("DCRA") in Regulatory Issue Summary 2006-06. The Staff discussed the potential efficiencies to be realized from increased standardization and coordination of approaches, stating that:

> In order for the DCRA to be fully effective, it is essential that applicants referencing a particular design standardize their applications to the maximum extent practicable (standardize design features, analyses, assumptions, and methods) such that the technical review and decisions are made against a standard application, known as the reference COL (R-COL) application. If this is done, those decisions will be applicable to subsequent COL (S-COL) applications that reference the standard. The NRC's DCRA uses the DC review or the review of the R-COL as the basis for acceptance. The DC or R-COL application review will identify those technical areas to be considered standard for a given design. . . . S-COL applicants who use the standard application and actively work with the R-COL applicant to standardize will significantly benefit from the DCRA and the goal of having "one issue, one review, one position" for multiple COL applications.

NRC Regulatory Issue Summary 2006-06, "New Reactor Standardization Needed to Support the Design-Centered Licensing Review Approach," at 2 (May 31, 2006). The Commission embraced the process recommended by the Staff in its Final Policy Statement, "Conduct of New Reactor Licensing Proceedings" 73 Fed. Reg. 20,963 (Apr. 17, 2008).

Here, the Lee COLA is a "Subsequent COLA" (or "S-COLA") since it incorporates the standard plant material of the COLA submitted by Southern Nuclear Operating Company for Vogtle Units 3 and 4, the "R-COLA," which also referenced the AP1000 DCD. Following the DCRA approach, DEC has adopted the R-COLA's resolution of standard plant licensing issues except to the extent required to satisfy site-specific requirements or to address certain changes to the certified design identified during detailed design activities supporting lead plant construction. Since DEC has implemented the DCRA approach, "no further staff review of the adequacy of the approach [of such common issues] is necessary" and the Staff's review of the Lee COLA with

respect to such matters is "limited to verification that [DEC] has indeed adopted the previously approved approach and will properly implement it, and, for technical issues that depend on site-specific factors, that the previously-approved approach applies to the applicant's proposed facility." *Id.* at 20,973.

**Q8. What effect does incorporating the AP1000 DCD, Revision 19, have on the Staff's review of the Lee COLA?**

**A8.** Incorporating the AP1000 DCD, Revision 19, by reference narrows considerably the scope of issues that the Commission needs to consider before issuing the COLs. Under the NRC rules at § 52.63(a)(5), except as provided in 10 C.F.R. § 2.335, in making the findings required for issuance of a combined license, the Commission treats as resolved those matters resolved in connection with the issuance of a design certification rule. Accordingly, safety issues within the scope of the AP1000 DCD, Revision 19, are addressed in DEC's testimony in this mandatory hearing only to the extent that DEC submitted departures for certified information.

**Q9. Does the Lee COLA contain any exemptions from NRC regulations?**

**A9.** Yes. The Lee COLA contains seven exemptions from NRC regulations. These exemptions are addressed in Part 7 of the COLA, in Sections B.1 through B.7.

The first exemption is a non-substantive exemption from certain COLA organization and numbering requirements in 10 C.F.R. Part 52, Appendix D, Section IVA.2.a. The NRC Staff determined that the exemption is authorized by law, will not present an undue risk to public health or safety, and is consistent with the common defense and security, and that special circumstances are present as described in 10 C.F.R. § 50.12(a)(2)(ii) because application of the

regulation in the particular circumstances is not necessary to achieve the underlying purpose of the rule.

The second is an exemption from certain Material Control and Accounting ("MC&A") requirements in 10 C.F.R. Part 70 and Part 74 so that the same requirements apply to Part 52 licensees as apply to Part 50 licensees. Similar exemptions have been granted for previously issued COLs. The NRC Staff determined that the exemption is authorized by law, will not present an undue risk to public health or safety, and is consistent with the common defense and security, and that special circumstances are present as described in 10 C.F.R. § 50.12(a)(2)(ii) because the application of the regulation in these particular circumstances is not necessary to achieve the underlying purpose of the rule. The NRC Staff agreed that nuclear reactors licensed under 10 C.F.R. Part 52 should be treated the same as the reactors licensed under 10 C.F.R. Part 50 regarding the MC&A for special nuclear material ("SNM").

The third exemption request is from 10 C.F.R. Part 52 Appendix D, Section III.B which requires a COL applicant to incorporate and comply with the elements of the certified design including Tier 1 information and generic Technical Specifications ("TS"). This exemption request is necessary to add additional components to the condensate return design to enable the Passive Core Cooling System to more effectively perform its design function and revise a TS to address downspout screens. The NRC Staff determined that the exemption is authorized by law, will not present an undue risk to public health or safety, and is consistent with the common defense and security, and that special circumstances are present as described in 10 C.F.R. § 50.12(a)(2)(ii) because application of the Tier 1 information is not necessary to achieve the underlying purpose of the rule. Furthermore, as required by 10 C.F.R. § 52.63(b)(1), the NRC Staff found that the special circumstances outweigh any decrease in safety that may result from the reduction in

standardization caused by the exemption because the exemption modifying the condensate return portion of the passive core cooling system will improve the reliability and effectiveness of the condensate return system, to better allow the system to perform its intended function.

The fourth exemption request is from 10 C.F.R. Part 52 Appendix D, Section III.B, which requires a COL applicant to incorporate and comply with the elements of the certified design including generic TS. A permissive to the source range flux doubling function to prevent bypassing the chemical and volume control system makeup isolation actuation upon a source range flux doubling is added to more effectively perform its design function and provide reactor protection as analyzed, and to comply with IEEE Std. 603–1991. This change includes adding the permissive to the instrument Table in the TS. The NRC Staff determined that the exemption is authorized by law, will not present an undue risk to public health or safety, and is consistent with the common defense and security, and that special circumstances are present as described in 10 C.F.R. § 50.12(a)(2)(ii) because application of the requirements in the generic TS Table is not necessary to achieve the underlying purpose of the rule.

The fifth exemption request is from 10 C.F.R. Part 52 Appendix D, Section III.B, which requires a COL applicant to incorporate and comply with the elements of the certified design including Tier 1 information. Acceptance criteria for hydrogen venting inside containment are revised for consistency with the current detailed design of the plant. The NRC Staff determined that the exemption is authorized by law, will not present an undue risk to public health or safety, and is consistent with the common defense and security, and that special circumstances are present as described in 10 C.F.R. § 50.12(a)(2)(ii) because application of the Tier 1 information is not necessary to achieve the underlying purpose of the rule. Furthermore, as required by 10 C.F.R. § 52.63(b)(1), the NRC Staff found that the special circumstances outweigh any decrease in

safety that may result from the reduction in standardization caused by the exemption because modifying the ITAAC acceptance criteria for combustible gas control will allow for application of acceptance criteria that are appropriate to evaluate a plant built according to the current detailed design, does not reduce the design margins of the Containment Hydrogen Control System, and will result in no reduction in the level of safety.

The sixth exemption request is from 10 C.F.R. Part 52 Appendix D, Section III.B, which requires a COL applicant to incorporate and comply with the elements of the certified design including Tier 1 information and generic TS. Site-specific revisions to the AP1000 design and associated dose consequence analyses presented in DCD Revision 19 are required to ensure that operator dose following a DBA is maintained below the limit in the General Design Criteria ("GDC") for the duration of the event. These include revising Tier 1 information to add information on ITAAC related to the radiation shielding below the Main Control Room ("MCR") Emergency Habitability System ("VES") filter and reflect a change to the name of the actuation signal for isolating the MCR penetrations and initiating the VES, and changing generic TS to lower the allowable value for secondary coolant iodine activity concentration. The NRC Staff determined that the exemption is authorized by law, will not present an undue risk to public health or safety, and is consistent with the common defense and security, and that special circumstances are present as described in 10 C.F.R. § 50.12(a)(2)(ii) because application of the Tier 1 information is not necessary to achieve the underlying purpose of the rule. Furthermore, as required by 10 C.F.R. § 52.63(b)(1), the NRC Staff found that the special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption because adding shielding to the VES filter will improve the reliability and effectiveness of the MCR and

associated heating, ventilation, and air conditioning ("HVAC") systems, to better allow the MCR and the VES to perform their intended functions with respect to radiological habitability.

The seventh exemption request is from 10 C.F.R. Part 52 Appendix D, Section III.B, which requires a COL applicant to incorporate and comply with the elements of the certified design including Tier 1 information and generic TS. Changes are made to ensure the VES design functions to: 1) maintain heat loads within the main control room envelope ("MCRE") within design basis assumptions to limit the heat-up of the room, 2) ensure a 72-hour supply of breathable quality air for the occupants of the MCRE, 3) maintain the MCRE pressure boundary at a positive pressure with respect to the surrounding areas with a discharge of air through the main control room vestibule, and 4) provide a passive recirculation flow of MCRE air to maintain MCR dose rates below an acceptable level during VES operation. The NRC Staff determined that the exemption is authorized by law, will not present an undue risk to public health or safety, and is consistent with the common defense and security, and that special circumstances are present as described in 10 C.F.R. § 50.12(a)(2)(ii) because application of the Tier 1 information is not necessary to achieve the underlying purpose of the rule. Furthermore, as required by 10 C.F.R. § 52.63(b)(1), the NRC Staff found that the special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption because the exemption modifying the VES will result in no reduction in the level of safety.

**Q10. Does the Lee COLA contain any departures from the AP1000 DCD?**

**A10.** Yes. As described in Section A of Part 7 of the COLA, DEC seeks approval of thirteen departures from the AP1000 certified design. The first is a standard departure sought by plants

referencing the AP1000 design. This standard departure (STD DEP 1.1-1) is a non-substantive administrative departure for organization and numbering of the FSAR sections, and is a standard departure for plants referencing the AP1000 design.

The second departure (WLS DEP 1.8-1) corrects a citation in an interface description in the DCD. The third departure (WLS DEP 2.0-1) is related to the site-specific horizontal and vertical foundation response spectra and accelerations, which exceed the AP1000 Certified Seismic Design Response Spectra at frequencies above 14 and 16 hertz respectively. This departure adds a discussion of the application of the Lee Nuclear Station site-specific response spectra. The fourth departure (WLS DEP 3.2-1) is related to the previously-described exemption request for the changes to the condensate return portion of the Passive Core Cooling System. This departure makes modifications to Tier 2 designs for the Polar Crane Girder, Internal Stiffener, and Passive Core Cooling System gutters as described in Section A Part 7 of the Lee COLA. The fifth departure (WLS DEP 3.8-1) is related to the Lee Nuclear Station site-specific lateral earth pressure on below-grade walls. This is a Tier 2 departure that adds a discussion of the application of the Lee Nuclear Station site-specific lateral pressure. The sixth departure (WLS DEP 3.11-1) is a correction to the "Envir. Zone" numbers for Spent Fuel Pool Level instruments to be consistent with the actual designed locations identified on Westinghouse design documents. The seventh departure (WLS DEP 6.2-1) is a correction to the ITAAC acceptance criteria for the in-containment compartment vents to reflect the as-designed plant configuration. The eighth departure (WLS DEP 6.3-1) is made to more accurately describe the long-term cooling capability of the Passive Residual Heat Removal Heat Exchanger ("PRHR HX") in a closed-loop mode of operation. The ninth Lee-specific departure (WLS DEP 6.4-1) corrects the AP1000 design and associated dose consequence analyses presented in DCD Revision 19 to ensure that operator

dose following a DBA is maintained below the GDC limit for the duration of the event. The tenth departure (WLS DEP 6.4-2) makes changes to ensure that the VES can perform its design functions and ensure that Main Control Room habitability and environmental qualification requirements are met in the most limiting event scenario. The eleventh departure (WLS DEP 7.3-1) makes changes to ensure compliance with IEEE 603 by incorporating an operating bypass permissive to prevent blocking the Source Range nuclear instrumentation flux doubling function, or actuating the function when the conditions are not met. The twelfth departure (WLS DEP 8.3-1) is a departure clarifying Class 1E current limiting features. The thirteenth departure (WLS DEP 18.8-1) is related to the Emergency Response Facility locations. This departure relocates the Technical Support Center ("TSC") and the Operations Support Center ("OSC") from the locations described in the DCD. Additional details regarding these departures are provided in Section A of Part 7 of the COLA.

**Q11. Please describe DEC's request in the COLA for a Part 30, 40, and 70 license.**

**A11.** The Lee COLA includes a request for a license to receive, store, or use byproduct, source, or special nuclear material (under 10 C.F.R. Parts 30, 40, and 70 respectively). These licenses will allow DEC to possess and use nuclear fuel, radiological waste materials, and various radiological sources used for operational purposes.

**Q12. Was there a review of the Lee COLA by the Advisory Committee on Reactor Safeguards ("ACRS")?**

**A12.** Yes. The ACRS provided an independent review and report to the Commission regarding the Lee COLA. On December 14, 2015, the ACRS issued a letter on its review of the Lee COLA, concluding that:

1. There is reasonable assurance that Lee, Units 1 and 2, can be built and operated without undue risk to the health and safety of the public.

2. Site seismic inputs requiring a departure from the AP1000 certified design have been adequately addressed by the applicant and the staff, and this departure should be approved.

3. The departure providing for a consolidated Technical Support Center for the two units should be approved.

4. The location exception for a consolidated Emergency Operations Facility should be approved.

5. The Duke Energy COLA for Lee should be approved following approval of generic changes which are pending submittal and which affect standard content material for the AP1000.

Report on the Safety Aspects of the Duke Energy Carolinas, LLC, Combined License Application for William States Lee III Nuclear Station, Units 1 and 2, at 1-2 (December 14, 2015). The five generic issues relating to emergent design issues were subsequently addressed under the design-centered review approach in connection with the Levy COLA. On April 18, 2016, the ACRS issued a letter report on the "Exemptions to the AP1000 Certified Design Included in the Levy Nuclear Plant Units 1 and 2 Combined License Application" concluding that the five exemptions addressing the emergent design issues "are needed to enable the certified design to perform intended functions and should be approved."

**Q13. Did the NRC Staff document its safety and environmental reviews?**

**A13.** Yes. The NRC Staff documented its safety review in the Final Safety Evaluation Report for the William States Lee III Nuclear Station Units 1 and 2 Combined License Application, dated August 1, 2016, concluding that there is "reasonable assurance that the facility will be constructed and will operate in conformity with the license, the provisions of the Atomic Energy Act, and the Commission's regulations." In December 2013, the Staff issued the Final Environmental Impact Statement ("FEIS") for the Lee Nuclear Station, concluding that "[t]he

NRC staff's recommendation to the Commission related to the environmental aspects of the proposed action is that the COLs should be issued." NUREG-2111, "Final Environmental Impact Statement for Combined Licenses (COLs) for William States Lee III Nuclear Station Units 1 and 2" at 10-33 (Dec. 2013).

**Q14. What safety findings must the Commission make under Part 52 in order to issue COLs to DEC?**

**A14.** Under 10 C.F.R. § 52.97(a), the Commission may issue COLs if it finds that:

- The applicable standards and requirements of the Atomic Energy Act ("AEA") and the Commission's regulations have been met;
- Any required notifications to other agencies or bodies have been duly made;
- There is reasonable assurance that the facility will be constructed and will operate in conformity with the licenses, the provisions of the AEA, and the Commission's regulations;
- The applicant is technically and financially qualified to engage in the activities authorized;
- Issuance of the licenses will not be inimical to the common defense and security or to the health and safety of the public; and
- The findings required by 10 C.F.R. Part 51, Subpart A, have been made.

**Q15. What are the environmental findings required by Part 51?**

**A15.** Under 10 C.F.R. § 51.107, the Commission must do the following:

- Determine whether the requirements of Sections 102(2) (A), (C), and (E) of the National Environmental Policy Act ("NEPA") and the regulations in 10 C.F.R. Part 51, Subpart A, have been met;

- Independently consider the final balance among conflicting factors contained in the record of the proceeding with a view to determining the appropriate action to be taken;
- Determine, after weighing the environmental, economic, technical, and other benefits against environmental and other costs, and considering reasonable alternatives, whether the COLs should be issued, denied, or appropriately conditioned to protect environmental values; and
- Determine whether the NEPA review conducted by the Staff has been adequate.

**Q16. Does the Lee COLA, and the NRC Staff's review of the COLA, meet the standards identified above?**

**A16.** Yes. The basis for the Commission to make each of the relevant safety and environmental findings required under 10 C.F.R. §§ 52.97 and 51.107 is described below.

## III. DISCUSSION

**10 C.F.R. § 52.97(a)(1)(i)**

**Q17. Have the applicable standards and requirements of the AEA and the Commission's regulations been met?**

**A17.** Yes. The Lee COLA was based on NRC regulations and applicable portions of relevant Standard Review Plans ("SRP"), Interim Staff Guidance ("ISG"), Regulatory Guides ("Reg. Guides"), bulletins, generic letters, and other NUREGs. The primary SRPs for the Lee Nuclear Station COLA review were NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (LWR [Light Water Reactor] Edition)" (safety review) and NUREG-1555, "Standard Review Plans for Environmental Reviews for Nuclear Power Plants: Environmental Standard Review Plan" (environmental reviews). The NRC Staff

reviewed the COLA and evaluated it against the applicable regulations in 10 C.F.R. Parts 20, 26, 30, 40, 50, 51, 52, 55, 70, 73, 74, 100, and 140. The NRC Staff considered applicable portions of the SRP, ISGs, Reg. Guides, bulletins, generic letters, and other NUREGs. Based on the COLA and the NRC Staff's review, documented in the FSER and the FEIS, DEC concludes that, for the purpose of issuing Lee Nuclear Station COLs, the applicable standards and requirements of the AEA, and the Commission's regulations have been met.

**10 C.F.R. § 52.97(a)(1)(ii)**

**Q18. Have the required notifications to other agencies or bodies been duly made?**

**A18.** Yes. As required by Section 182(c) of the AEA and 10 C.F.R. § 50.43(a), the NRC notified the Public Service Commission of South Carolina, North Carolina Public Utilities Commission, and the Federal Energy Regulatory Commission of the Lee COL application. In addition to publishing a notice of receipt of the Lee COLA in the *Federal Register*,[1] the NRC also published notices pertaining to the application in the Gaffney Ledger, Spartanburg Herald-Journal, The State, Charlotte Observer, and Gaston Gazette. Required notifications to other agencies or bodies have been made.

[1] 73 Fed. Reg. 6,218 (Feb. 1, 2008); *See also* Duke Energy; Acceptance for Docketing of an Application for a Combined License for William States Lee III Units 1 and 2, 73 Fed. Reg. 11,156 (Feb. 29, 2008); Duke Energy Carolinas, LLC (Duke); William States Lee III Combined License Application; Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping Process, 73 Fed. Reg. 15,009 (Mar. 20, 2008); Duke Energy, Notice of Hearing and Opportunity To Petition for Leave To Intervene. 73 Fed. Reg. 22,978 (Apr. 28, 2008); Combined Licenses at William States Lee III Nuclear Station Site, Units 1 and 2; Duke Energy Carolinas, LLC. 76 Fed. Reg. 79,228 (Dec. 21, 2011).

**10 C.F.R. § 52.97(a)(1)(iii)**

**Q19. Is there reasonable assurance that the facility will be constructed and will operate in conformity with the licenses, the provisions of the AEA, and the Commission's regulations?**

**A19.** Yes. The Lee COLA, which incorporates the AP1000 DCD, provides critical aspects of construction and operation of Lee Nuclear Station Units 1 and 2. This information includes the FSAR, which incorporates the AP1000 DCD by reference, the general and financial information section of the application, technical specifications, the emergency plan, the quality assurance ("QA") plan, and the physical security plan. These materials demonstrate that there is reasonable assurance that Lee Nuclear Station Units 1 and 2 can be built and operated in compliance with the COLs, the AEA, and the NRC's regulations.

**Q20. What actions did the NRC Staff take to satisfy itself that the plant could be constructed and operated safely?**

**A20.** In addition to reviewing the COLA material provided by DEC, the NRC Staff issued Requests for Additional Information ("RAIs"). The RAIs sought additional information or clarifications in order to develop sufficient information for the NRC Staff to make a reasonable assurance finding. The NRC Staff also conducted audits and inspections of DEC's records and documentation, and performed confirmatory calculations, in order to confirm information or conclusions made by DEC.

**Q21. How does the NRC Staff ensure that the bases for its reasonable assurance finding will be maintained in the future?**

**A21.** The NRC Staff developed draft license conditions and ITAAC for Lee Nuclear Station Units 1 & 2. The draft COLs identify proposed license conditions, including conditions related

to the Fukushima Near-Term Task Force Recommendations, and ITAAC. The basis for each license condition or ITAAC appears in the technical evaluations in the Lee COLA.

**Q22. Did the NRC Staff reach a "reasonable assurance" conclusion with respect to the Lee COLA?**

**A22.** Yes. The NRC Staff concluded based on its safety and environmental reviews, documented in the "Final Safety Evaluation Report for Combined Licenses for William States Lee III Nuclear Station, Units 1 and 2" (Aug. 2016) ("FSER") and FEIS, respectively, that there is reasonable assurance that the facility will be constructed and will operate in conformance with the licenses, the provisions of the AEA and the Commission's regulations.

**Q23. Do you agree with the NRC Staff's conclusions?**

**A23.** Yes.

**10 C.F.R. § 52.97(a)(1)(iv)**

**Q24. Is DEC technically qualified to engage in the activities authorized by the COLs?**

**A24.** Yes. DEC has the longstanding engineering and management experience (including operations, engineering, and other functions) to be technically-qualified to engage in construction and operation of Lee Nuclear Station Units 1 and 2. The Lee Nuclear Station project is part of Duke Energy's Nuclear Development organization. Duke Energy is the largest electric power company in the United States and operates eleven nuclear units at six nuclear stations (and until recently, a twelfth at the Crystal River Energy Complex). Duke Energy has over 40 years of experience in the design, construction, and operation of nuclear generating stations.

**Q25. Did the NRC Staff conclude that DEC was technically qualified to engage in the activities authorized by the COLs?**

**A25.** Yes. As documented in the NRC Staff's SER, the NRC Staff evaluated DEC's experience, organizational structure, and QA program. The NRC Staff found that "Based on DEC's experience with building and operating nuclear power plants and the staff's evaluation of DEC's QA program, the Staff finds that DEC is technically qualified to hold a 10 CFR Part 52 license in accordance with 10 CFR 52.97(a)(1)(iv)."

**Q26. Is DEC financially qualified to engage in the activities authorized by the COLs?**

**A26.** Yes. DEC provided information in the COLA to demonstrate its financial qualifications, including information regarding the cost of construction of Lee Nuclear Station Units 1 and 2, and decommissioning funding assurance. DEC is an electric utility as defined in the NRC rules recovering its costs through cost-of-service based rates. In 2007, both North Carolina and South Carolina enacted legislation that included cost recovery mechanisms supportive of nuclear plant investment. In South Carolina, the South Carolina Public Service Commission authorized financing costs to be reflected in rates with annual updates to the recovery mechanism to reflect increases in financing costs as the nuclear project advances through construction. These annual updates do not require a general rate case proceeding. In North Carolina, construction phase financing costs must be introduced into rates through a general rate proceeding. Decommissioning funding assurance will be provided by an external sinking fund, into which initial and continuing contributions will be deposited.

**Q27. Did the NRC Staff conclude that DEC was financially qualified to engage in the activities authorized by the COLs?**

**A27.** Yes. The NRC Staff reviewed the information provided by DEC. The NRC Staff evaluated the information pertaining to the total cost of Lee Nuclear Station Units 1 and 2, consisting of construction costs, including owner's costs, initial core fuel supply costs, financing costs, inflation, and information pertaining to funding sources. The NRC Staff also considered regulations and guidance related to financial protection requirements and indemnity agreements, sources of funds for construction, financial qualifications, and decommissioning funding assurance. The NRC Staff's evaluation is in FSER Chapter 1. Based on its review, the NRC Staff found that DEC and Duke Energy Corporation have sufficient financing capacity to fund the Lee project. The NRC Staff concluded that there is reasonable assurance that Duke is financially qualified to engage in the proposed activities regarding William States Lee III, Units 1 and 2 and that Duke satisfies the NRC requirements relating to financial qualification, decommissioning funding assurance, restrictions on foreign ownership or control, and nuclear insurance and indemnity. As an electric utility recovering its costs of generating electricity through regulated rates, DEC is not required to provide financial qualifications information related to operating cost recovery.

**10 C.F.R. § 52.97(a)(1)(v)**

**Q28. Will issuance of the licenses be inimical to the common defense and security or to the health and safety of the public?**

**A28.** No. DEC provided information, analysis, and conclusions regarding site-specific conditions, including geography and demography of the site; nearby industrial, transportation, and military facilities; site meteorology; site hydrology; and site geology, seismology, and geotechnical engineering to ensure that issuance of the licenses will not be inimical to public

health and safety. In addition to a review of that information, the NRC Staff also evaluated the design of structures, systems, and components to ensure safe operation, performance, and shutdown when subjected to extreme weather, floods, seismic events, missiles (including aircraft impacts), chemical and radiological releases, and loss of offsite power to the extent not already resolved by the incorporation of the AP1000 design.

**Q29. What did the NRC Staff conclude based on that review?**

**A29.** The review confirmed that radiological releases and human doses during both normal and design basis accident scenarios will remain within regulatory limits, which supports the NRC Staff's conclusion that issuance of the licenses will not be inimical to public health and safety. The review also determined that the physical security to be implemented at the site is adequate to protect the facility, which supports the NRC Staff's conclusion that issuance of the licenses will not be inimical to the common defense and security.

**Q30. What about operational programs?**

**A30.** The NRC Staff evaluation included the operational programs identified in the Staff Requirements Memorandum for SECY-05-0197, dated February 22, 2006, as well as additional operational programs, including a cybersecurity program, a program for SNM MC&A, and a SNM physical security program. These programs are listed in the Lee Nuclear Station FSAR at Table 13.4-201, Operational Programs Required by NRC Regulations. The NRC Staff's review determined that the operational programs identified by DEC are sufficiently described to assure compliance with regulations. Where the NRC Staff needed to confirm operational program implementation to reach a reasonable assurance finding, but the details of program implementation were not governed by specific regulatory requirements, the draft licenses contain

conditions to ensure that operational programs will be properly implemented. This also supports the NRC Staff's conclusion that issuance of the COLs will not be inimical to the common defense and security or to public health and safety.

**Q31. Did the NRC Staff review DEC's emergency plan?**

**A31.** Yes. The NRC Staff concluded that DEC's emergency preparedness and response plan is acceptable and supports the NRC Staff's conclusion that issuance of the COLs will not be inimical to public health and safety.

**Q32. Did the NRC Staff make an overall inimicality finding?**

**A32.** Yes. Based on its review of the COLA, the NRC Staff concluded that issuance of the Lee Nuclear Station COLs will not be inimical to the common defense and security or to public health and safety.

**10 C.F.R. § 52.97(a)(1)(vi)**

**Q33. Has the NRC Staff's review been adequate to support the findings set forth in 10 C.F.R. § 51.107(a)?**

**A33.** Yes, as discussed in the sections below, the NRC Staff's environmental review has been adequate to support the findings set forth in 10 C.F.R. § 51.107(a) for the purpose of issuing COLs for construction and operation of Lee Nuclear Station Units 1 and 2.

**10 C.F.R. § 51.107(a)(1)**

**Q34. Have the requirements of Sections 102(2) (A), (C), and (E) of NEPA and the regulations in this subpart been met?**

**A34.** Yes, these requirements of NEPA have been met by the Staff's preparation of the FEIS, which evaluated the environmental impacts of constructing and operating Lee Nuclear Station

Units 1 and 2. The FEIS was prepared by the NRC in accordance with the Commission's rules in 10 C.F.R. Part 51, which are derived from the Council on Environmental Quality guidance, and using the comprehensive guidance in the environmental SRP.

**Q35. How did the NRC Staff prepare the Lee Nuclear Station Units 1 and 2 FEIS?**

**A35.** The NRC Staff prepared the Lee Nuclear Station Units 1 and 2 FEIS based on its independent assessment of the information provided by DEC and information developed independently by the NRC Staff, including thorough consultation with other State and Federal agencies. As required by Section 102(2)(A) of NEPA, the Staff used a systematic, interdisciplinary approach to integrate information from many fields, including the natural and social sciences as well as the environmental design arts. The NRC Staff's findings in the FEIS reflect the "hard look" required by NEPA and have support in logic and fact.

**Q36. What was the scope of the FEIS?**

**A36.** As required by Section 102(2)(C) of NEPA, the Lee Nuclear Station Units 1 and 2 FEIS addresses (1) the environmental impact of the proposed action, (2) unavoidable adverse environmental effects, (3) alternatives to the proposed action, (4) the relationship between short-term users of the environment and the maintenance and enhancement of long-term productivity, and (5) irreversible and irretrievable commitments of resources that would be involved in the proposed action should it be implemented.

**Q37. You mentioned consultation with other agencies. Can you briefly describe those efforts?**

**A37.** The U.S. Army Corps of Engineers ("USACE") participated as a cooperating agency in preparing the Lee FEIS and collaborated with the NRC Staff review team under a Memorandum

of Understanding regarding the review of nuclear plant license applications signed by the NRC and USACE in 2008. The NRC also consulted with and received comments from other State and Federal agencies with jurisdiction by law or special expertise, such as the U.S. Fish and Wildlife Service and the U.S. Environmental Protection Agency. This correspondence is described in Appendix F of the FEIS.

**Q38. What types of alternatives did the NRC Staff consider in the FEIS?**

**A38.** The alternatives considered in the FEIS included the no-action alternative, energy alternatives, alternative sites, and system design alternatives. The FEIS demonstrates that the NRC Staff adequately considered alternatives to the proposed action, consistent with the requirements in Section 102(2)(E) of NEPA.

**10 C.F.R. § 51.107(a)(2)**

**Q39. Has the NRC Staff independently considered the final balance among conflicting factors contained in the record of the proceeding with a view to determining the appropriate action to be taken?**

**A39.** Yes. FEIS Section 10.6 contains the NRC Staff's summary of the cost-benefit balancing for the Lee COLA. The NRC Staff concluded that construction and operation of the proposed Lee Nuclear Station Units 1 and 2, with the mitigation measures identified by the NRC Staff, would have accrued benefits that most likely would outweigh the economic, environmental, and social costs associated with constructing and operating new units at the Lee Nuclear Station. The primary benefit from building and operating the Lee Nuclear Station units is that they would generate baseload power and provide thousands of residential, commercial, and industrial consumers with electricity. The social and economic benefits of maintaining an adequate supply of electricity may be large, given that reliable electricity supplies are key to economic stability

and growth. Other benefits include tax revenue, regional productivity, and community development. The benefits of building and operating Lee Nuclear Station are presented in FEIS Table 10-3. Internal costs to DEC, as well as external costs to the surrounding region and environment, would be incurred during the preconstruction, construction, and operation of the Lee Nuclear Station. Internal costs include the costs to build the power plant (capital costs), as well as operating and maintenance costs, and the costs of fuel, waste disposal, and decommissioning. External costs include all costs imposed on the environment and region surrounding the plant and may include the loss of regional productivity, environmental impacts, and loss of habitat. Internal and external costs of building and operating the Lee Nuclear Station are presented in FEIS Table 10-4.

**10 C.F.R. § 51.107(a)(3)**

**Q40. After weighing the environmental, economic, technical, and other benefits against environmental and other costs, and considering reasonable alternatives, should the COLs be issued?**

**A40.** Yes. In the Lee Nuclear Station FEIS, the NRC Staff considered the cost-benefit balancing and reasonable alternatives. Based on that assessment, the NRC Staff recommends that the COLs be issued. The overall conclusion was based on (1) the Lee Nuclear Station ER and the supplement thereto; (2) consultation with Federal, State, Tribal and local agencies; (3) the NRC Staff review team's own independent evaluation; (4) the NRC Staff's consideration of public scoping comments on the environmental review; and (5) the assessments summarized in the FEIS, including mitigation measures. The NRC Staff also found that none of the alternative sites assessed in the FEIS is obviously superior to the Lee Nuclear Station site. I concur with the NRC Staff's conclusions.

**Q41. How does the NRC Staff's conclusion relate to the findings that the USACE must make for activities within its jurisdiction?**

**A41.** The NRC's conclusion is independent of the USACE's determination of a Least Environmentally Damaging Practicable Alternative ("LEDPA") under Section 404(b) of the Clean Water Act and the USACE's public interest review. The USACE's independent regulatory permit decision documentation will address other information and evaluations that are outside the NRC's scope of analysis (and therefore not addressed in the Lee Nuclear Station FEIS), but are required by the USACE to support its permit decision. The USACE issued the 404 Permit for Lee in September 2015, and its Record of Decision determined that the Lee site was the LEDPA.

**10 C.F.R. § 51.107(a)(3)**

**Q42. Has the NRC Staff's review been adequate?**

**A42.** Yes. The NRC Staff conducted an independent environmental evaluation of the application that consumed more than five years of focused effort. The NRC obtained additional information as needed by DEC response to RAIs and site visits where appropriate. The NRC Staff developed independent, reliable information and conducted a systematic, interdisciplinary review of the potential impacts of the proposed action on the environment and reasonable alternatives to the proposed action. The NRC Staff considered the purpose of and need for the proposed action, the environment that could be affected by the action, and the consequences of the proposed action, including mitigation that could reduce impacts. The FEIS considered the potential impact of conservation measures in determining the demand for power and consequential need for additional generating capacity. The FEIS compared the alternatives to the proposed action. The NRC Staff considered the adverse environmental effects that could not be

avoided should the proposed action be implemented, the relationship between short-term uses of the human environment and the maintenance and enhancement of long-term productivity, and the irreversible or irretrievable commitments of resources that would be involved in the proposed project.

**Q43. Was the public permitted to participate in the environmental review process?**

**A43.** Yes. At the start of the environmental review, the NRC Staff issued a notice of intent to prepare an FEIS and invited the public to provide any information relevant to the environmental review (the NEPA scoping process). An additional scoping meeting was held at the start of the NRC review of the Environmental Report Supplement. The NRC Staff also provided opportunities for governmental and general public participation during the public meeting on the draft Environmental Impact Statement ("DEIS") and sought, received, and responded to comments on the DEIS from the public. Those responses are documented in the FEIS.

**Q44. What are your overall conclusions regarding the NRC Staff's Environmental Review?**

**A44.** I agree with the NRC Staff that, for the purpose of issuing the Lee COLs, the NRC Staff conducted a thorough and complete environmental review that was sufficient to meet the requirements of NEPA and adequate to inform the Commission's action on the COLs requested.

## IV. CONCLUSION

**Q45. What are your overall safety conclusions regarding issuance of the COLs?**

**A45.** With respect to safety issues, the application and the record of the licensing review contain sufficient information, and the review of the application by the NRC Staff has been adequate, to support the findings to be made by the Commission, with respect to the standards set

forth in the Hearing Notice and the applicable standards in NRC regulations. Based on the record, DEC is technically and financially qualified to construct and operate Lee Nuclear Station. Issuance of licenses for the construction and operation of Lee Nuclear Station Units 1 and 2 will not be inimical to the common defense and security or to the health and safety of the public.

**Q46. What are your overall environmental conclusions regarding the issuance of the COLs?**

**A46.** Based upon the entire record of this proceeding, the environmental review conducted by the NRC Staff pursuant to 10 C.F.R. Part 51 has been adequate; the requirements of Sections 102(2)(A), (C), and (E) of NEPA have been satisfied; an independent weighing and balancing of the environmental, technical, and other costs and benefits of the Lee Nuclear Station supports the issuance of the licenses; and the requested licenses should be issued.

Certification

I, Robert H. Kitchen, certify that the testimony above was prepared by me or under my direction, and I adopt this testimony as my sworn testimony in this proceeding. I hereby certify under penalty of perjury that the testimony above is true and correct to the best of my knowledge, information, and belief.

Executed in Accord with 10 C.F.R. § 2.304(d)

Robert H. Kitchen
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704-382-4046

Dated at Charlotte, NC
this 28th day of September, 2016

**UNITED STATES OF AMERICA**
**NUCLEAR REGULATORY COMMISSION**

Before the Commission

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| In the Matter of | ) | |
| | ) | |
| DUKE ENERGY CAROLINAS, LLC | ) | Docket Nos. 52-018 and 52-019 |
| | ) | |
| (William States Lee III Nuclear Station, Units 1 and 2) | ) | |
| | ) | |

## CERTIFICATE OF SERVICE

I hereby certify that the foregoing Applicant's Pre-Filed Testimony in Support of the Mandatory Hearing for the William States Lee III Nuclear Station, Units 1 and 2, Combined Licenses, accompanying Certification, and Curriculum Vitae of Robert H. Kitchen, have been refiled as exhibits and served through the E-Filing system on the participants in the above-captioned proceeding, this 28th day of September, 2016.

/Signed electronically by David R. Lewis/

David R. Lewis
Counsel for Duke Energy