

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Commission

In the Matter of)	
)	Docket No. 52-017-COL
Dominion Virginia Power)	
)	March 16, 2017
North Anna Power Station, Unit 3)	

**DOMINION VIRGINIA POWER’S CORRECTED PRE-FILED TESTIMONY
IN SUPPORT OF THE MANDATORY HEARING FOR THE
NORTH ANNA POWER STATION, UNIT 3 COMBINED LICENSE**

I. WITNESS FOR THE UNCONTESTED HEARING

Q1. Please state your full name.

A1. My name is Mark A. Giles. I am the Director, Nuclear Project Technical Support for Dominion Resources Services, Inc. I have overall responsibility for the North Anna Power Station (“NAPS”), Unit 3 Combined License Application (“NA3 COLA”), associated design engineering, and related State and Federal permits and approvals. My business address is 5000 Dominion Boulevard, Glen Allen, Virginia 23060.

Q2. Please describe your educational and professional background.

A2. I earned a Bachelor of Science degree in Mechanical Engineering from Old Dominion University in 1983 and a Master’s degree in Construction Management from Florida International University in 1993. I have thirty-three years of experience in regulatory affairs, nuclear engineering, operations and management positions, including the Director of Nuclear Regulatory Projects and Director of Regulatory Affairs with Entergy, and nine years with the Nuclear Regulatory Commission as a Resident Inspector, Project Manager, and Senior Resident

Inspector. In my current position, I have been responsible for the North Anna Unit 3 project for the last six years. My *curriculum vitae* is provided as Exhibit DVP-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 NA3 COLA proceeding.

II. BACKGROUND

Q4. Please briefly describe the COL Application for NA3.

A4. Virginia Electric and Power Company, dba Dominion Virginia Power (“Dominion”), filed its COLA for NA3 on November 27, 2007. The NA3 COLA has been updated and revised since the initial filing, most recently on June 22, 2016. The NA3 COLA seeks a combined license (“COL”) under 10 C.F.R. Part 52 to construct and operate an Economic Simplified Boiling Water Reactor (“ESBWR”) designed by GE-Hitachi Nuclear Energy Americas, LLC (“GEH”). This new reactor is formally designated as North Anna Unit 3. The NA3 COLA includes a request for associated material licenses under 10 C.F.R. Parts 30, 40, and 70.

The NA3 COLA incorporates by reference the Design Certification Rule for the ESBWR Design, Appendix E to 10 C.F.R. Part 52, which certifies GEH’s ESBWR Design Control Document (“DCD”), Revision 10. The NA3 COLA also references an Early Site Permit (Early Site Permit No. ESP–003, issued on November 27, 2007, and as amended on October 30, 2008, April 13, 2011, and January 30, 2013) for the North Anna Site, and the assessment of environmental issues in the NRC’s final Environmental Impact Statement for an Early Site Permit (“ESP”) at the North Anna ESP Site (NUREG-1811) (Dec. 2006) (“ESP FEIS”).

Q5. Please describe the ownership of NA3.

A5. Dominion will be the sole owner of NA3 and will retain full responsibility for operation of the new unit after the requirements of 10 C.F.R. § 52.103(g) are satisfied. Dominion is a wholly-owned subsidiary of Dominion Resources, Inc., one of the nation’s leading energy companies with approximately \$71 billion in total assets and operating revenue of nearly \$12 billion through the year ending December 31, 2016. Dominion 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 NA3 COLA is composed of ten parts. Each of these is identified below, along with the current revision of each part:

- Part 1 – General and Administrative Information (Revision 4)
- Part 2 – Final Safety Analysis Report (“FSAR”) (Revision 9)
- Part 3 – Environmental Report (“ER”) (Revision 8)
- Part 4 – Technical Specifications (Revision 7)
- Part 5 – Emergency Plan (Revision 5)
- Part 6 – Limited Work Authorization (Not Used)
- Part 7 – Departures and Exemptions (Revision 7)
- Part 8 – Safeguards/Security Plans (withheld from public availability) (Revision 5)
- Part 9 – Other Withheld Information (Not Used)
- Part 10 – Tier 1/ITAAC/Proposed License Conditions (Revision 8).

Q7. What is the significance of the fact that the NA3 COLA is not the first COLA to reference the ESBWR 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 endorsed 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).

The NA3 COLA was developed and reviewed under this design-centered approach. The NA3 COLA was originally designated as the R-COLA when it was submitted in 2007. The COLA submitted by Detroit Edison Company for Fermi Unit 3, which also referenced the ESBWR, became the “R-COLA” in 2010 when Dominion revised its COLA to reference a different technology – the US-APWR. After Dominion revised its application in 2013 to revert to the ESBWR design, Dominion followed the DCRA approach and adopted the R-COLA’s resolution of standard plant licensing issues except to the extent required to satisfy site-specific requirements.

Q8. What effect does incorporating the ESBWR DCD, Revision 10, have on the Staff's review of the NA3 COLA?

A8. Incorporating the ESBWR DCD, Revision 10, by reference narrows considerably the scope of issues that the Commission needs to consider before issuing the COL. Under the NRC rules at 10 C.F.R. § 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 ESBWR DCD, Revision 10, are addressed in Dominion's testimony in this mandatory hearing only to the extent that Dominion submitted departures from certified information.

Q9. Does the NA3 COLA contain any exemptions from NRC regulations?

A9. Yes. The NA3 COLA contains five exemptions from NRC regulations. These exemptions are addressed in Part 7 of the COLA.

The first exemption is 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 and 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 second exemption request is from 10 C.F.R. Part 52 Appendix E, Section III.B, which requires a COL applicant to incorporate and comply with the elements of the certified design including Tier 1 information. Due to space limitations at the NAPS site, Unit 3 will need an intermediate switchyard where the main generator circuit breaker and two motor-operated disconnects (“MODs”) will be located. This departs from the location shown in a Tier 1 figure (Figure 2.13.1-1, Sheet 1). The NRC Staff determined that the exemption is authorized by law, will not present an undue risk to public health and 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 change to standard information is minimal. The NRC Staff also determined that the exemption would not result in a significant decrease in the level of safety otherwise provided by the design, as required by 10 C.F.R. Part 52, Appendix E, § VIII.A.4.

The third exemption request is from 10 C.F.R. Part 52, Appendix E, Section III.B, which requires a COL applicant to incorporate and comply with the elements of the certified design including Tier 1 information. The Safe Shutdown Earthquake (“SSE”) for NA3 is defined to include both the certified seismic design response spectra (“CSDRS”) and the site-specific foundation input response spectra (“FIRS”) for each seismically qualified structure. This departs from the definition in a Tier 1 table (Table 5.1-1, Footnote (4)). The site-specific definition of SSE will be applied in the Inspections, Tests, Analyses, and Acceptance Criteria (“ITAAC”) for ensuring seismic capability of the plant. A new definition for a site-specific SSE ensures that the

as-built plant will be seismically designed, analyzed, and qualified for meeting the site-specific conditions. The NRC Staff determined that the exemption is authorized by law, will not present an undue risk to public health and 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 certified information in the Tier 1 Table 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 this change augments the ESBWR DCD for the North Anna 3 site-specific seismic conditions to ensure the adequacy of the North Anna 3 seismic design. The NRC Staff also found that the exemption would not result in a significant decrease in the level of safety otherwise provided by the design, as required by 10 C.F.R. Part 52, Appendix E, § VIII.A.4.

The fourth exemption request is from 10 C.F.R. Part 52, Appendix E, Section III.B, which requires a COL applicant to incorporate and comply with the elements of the certified design including Tier 1 information. The liquid radwaste effluent discharge pipeline will be extended to transfer liquid radwaste effluent from the liquid waste management system (“LWMS”) in the Radwaste Building to the environment, instead of discharging into the cooling tower blowdown line, which is a departure from Tier 1 information. The NRC Staff determined that the exemption is authorized by law, will not present an undue risk to public health and 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. In particular, North Anna 3 does not plan to discharge any liquid waste except under very unusual circumstances and only when

adequate dilution from Units 1 or 2 is available in accordance with procedures. 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 any decrease in safety due to reduced standardization is minimal. The NRC Staff also found that the exemption would not result in a significant decrease in the level of safety otherwise provided by the design, as required by 10 CFR Part 52, Appendix E, § VIII.A.4.

The fifth exemption request is from 10 C.F.R. Part 52, Appendix E, Section III.B, which requires a COL applicant to incorporate and comply with the elements of the certified design including Tier 1 information. The design of structures housing Regulatory Treatment of Non-Safety Systems (“RTNSS”) equipment is being changed to withstand the most limiting hurricane missiles generated by hurricane winds using a missile spectrum and velocities that take into account both the hurricane-generated missiles described in the DCD and the Unit 3 site-specific hurricane-generated missiles, evaluated in accordance with NRC guidance that postdates the ESBWR DCD approval. The NRC Staff determined that the exemption is authorized by law, will not present an undue risk to public health and 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 it is likely that other ESBWR licensees and applicants would request the same exemption and any decrease in safety due to reduced standardization is minimal. The NRC Staff also found that the exemption would not

result in a significant decrease in the level of safety otherwise provided by the design, as required by 10 C.F.R. Part 52, Appendix E, § VIII.A.4.

Q10. Does the NA3 COLA contain any departures from the ESBWR DCD?

A10. Yes. As described in Part 7 of the COLA, Dominion seeks approval of six departures from the ESBWR certified design. The first departure (NAPS DEP 3.7-1) is related to the site-specific horizontal and vertical foundation response spectra and accelerations, which exceed the CSDRS at certain frequencies. This departure revises the definition of SSE (Tier 1 information addressed by the third exemption discussed above) to include site-specific FIRS and redefines the Operating Basis Earthquake (Tier 2* information). In addition to these changes, numerous changes are made to Tier 2 information in the FSAR, presenting the results of the structural evaluations that have been performed addressing the ability of the plant to meet the site-specific seismic demands.

The second departure (NAPS DEP 8.1-1) is a departure from Tier 1 and Tier 2 information that moves the mapped location of the main generator circuit breaker and its MODs from the “Turbine Island/Transformer Yard” to an intermediate switchyard. A request for an exemption from this DCD Tier 1 information is included in Exemption 2.

The third departure (NAPS DEP 8.1-2) is a departure from Tier 2 information related to standards for lightning protection, which differ in some respects from the standards under which the existing NAPS switchyard was designed.

The fourth departure (NAPS DEP 11.4-1) is a departure from Tier 2 information reconfiguring the ESBWR Radwaste Building to accommodate a greater quantity of Class B and C waste,

while maintaining space for at least three months of packaged Class A waste. This departure is identical to one granted for the R-COLA.

The fifth departure (NAPS DEP 12.3-1) is a departure from Tier 1 and Tier 2 information providing for discharge of liquid effluent from the LWMS through the effluent discharge pipeline, and not into the cooling tower blowdown line. A request for an exemption from this DCD Tier 1 information is included in Exemption 4.

The sixth departure (NAPS DEP 19A-1) is a departure from Tier 1 and Tier 2* information that increases the hurricane missile spectrum and the velocities that structures housing RTNSS equipment must withstand under NRC guidance issued subsequent to certification of the ESBWR design. A request for an exemption from this DCD Tier 1 information is included in Exemption 5. Additional details regarding these departures are provided in Part 7 of the COLA.

Q11. Please describe the ESP for the North Anna Site.

A11. The ESP for the North Anna Site established the suitability of North Anna Site for two additional units bounded by a plant parameter envelope (“PPE”). The PPE was selected to bound the design characteristics of a number of reactor designs, including the ESBWR. The North Anna Unit 3 COL application incorporates the information from the ESP Site Safety Analysis Report (“SSAR”) and ESP Environmental Report that addressed siting and environmental issues in the ESP proceeding, and provides the required information comparing the ESBWR design with the site characteristics and design parameters specified in the ESP. The ESP application also addressed a number of major features in the Emergency Plan.

Q12. What effect does referencing the ESP have on the Staff's review of the North Anna Unit 3 COLA?

A12. This ESP resolved all site suitability issues (such as the topics addressed in Chapter 2 of the SSAR) with the exception of compliance with certain Combined License Action Items set forth in Appendix C of the ESP, variances sought in the Application, and detailed information on emergency planning. A variance is a plant-specific departure from one or more of the site characteristics, design parameters, or terms and conditions of an early site permit. The ESP also resolves the environmental issues relating to the construction and operation of nuclear units at the ESP Site addressed in the NRC's ESP FEIS, with the exception of issues that were deferred or identified as open items in the FEIS, and any environmental issue involving the construction or operation of the facility for which significant new information has been identified.

Q13. Does the COLA address the Combined License Action Items in the ESP?

A13. Yes, each of the Combined License Action Items, which are listed in Appendix C of the ESP, have been addressed in the COLA, as indicated by Table 1.10-202 of the FSAR.

Q14. Does the COLA address the conditions in the ESP?

A14. Yes, each of the applicable conditions in Section 3.E of the ESP are addressed in the COLA, as indicated by Table 1.10-202 of the FSAR. Each of the environmental terms and conditions in the ESP applicable to Unit 3 are addressed in Table 1.3-1 of the ER.

Q15. Does the COLA evaluate conformance with the site characteristics and plant parameters specified in the ESP?

A15. Yes, Parts 2 and 3 of FSAR Table 2.0-201 evaluate whether each of the site characteristics and plant parameters specified in the Appendices A and B of the ESP and in the SSAR are met. There are 18 variances that have been addressed in Part 7 of the COLA. Tables

3.0-1 and 3.0-2 of the ER evaluate the ESP Site Characteristics and Plant Parameters that were identified in FEIS Table 1-1 and ESP Appendix D as pertaining to the environmental review.

Q16. Please describe those variances.

A16. As described in Part 7 of the COLA, Dominion seeks approval of 18 variances from the ESP or SSAR. The first variance (NAPS ESP VAR 2.0-1) recalculates the maximum long-term dispersion estimate values for routine releases, necessitated by changes in the locations of and distances to receptors. The second variance (NAPS ESP VAR 2.0-2) increases the maximum hydraulic conductivity value based on test results from an additional observation well installed for further subsurface investigation related to Unit 3. The third variance (NAPS ESP VAR 2.0-3) increases the hydraulic gradient value based on additional groundwater data. The fourth variance (NAPS ESP VAR 2.0-4) reevaluates the ground motion response spectra (“GMRS”) and SSE for the site to consider the impact of more recent seismicity, including the 2011 M 5.8 earthquake at Mineral, Virginia. The GMRS and SSE in the COLA were derived using the performance-based methodology endorsed in Regulatory Guide 1.208, and the new seismic source characterization model for the Central and Eastern United States (“CEUS SSC”) and EPRI ground motion model, with the CEUS SSC earthquake catalog updated to account for the Mineral Virginia earthquake. The fourth variance also changed the elevation at which the SSE and GMRS are defined, to be representative of the site below the foundations in the power block area and consistent with NRC guidance. The fifth variance (NAPS ESP VAR 2.0-5) updates distribution coefficients (K_d) to be consistent with measure values. The sixth variance (NAPS ESP VAR 2.0-6) adopts DCD values for source terms and the resulting doses to be consistent with those in the certified version of the ESBWR DCD. The seventh variance (NAPS ESP VAR 2.0-7) includes a pair of changes. The first change corrects an error in the coordinates of the

proposed facility boundaries, while the second change clarifies that abandoned mat foundations will not be removed unless a Seismic Category I or II structure is located above them. The eighth variance (NAPS ESP VAR 2.3-1) revises site characteristic values for tornados to be consistent with revised NRC guidance. The ninth variance (NAPS ESP VAR 2.4-1) revises the void ratio, porosity and seepage velocity of saprolite to be consistent with additional data collected from subsurface investigations for Unit 3.

The tenth variance (NAPS ESP VAR 2.4-2) corrects certain information on the water supply wells at the North Anna site. The eleventh variance (NAPS ESP VAR 2.4-3) corrects the reference point elevation for an observation well, based on a survey conducted subsequent to issuance of the ESP. The twelfth variance (NAPS ESP VAR 2.4-4) increases the lake level used in various hydrological evaluations to be consistent with the decision to increase lake level by three inches when Unit 3 begins operation to reduce downstream impacts. The thirteenth variance (NAPS ESP VAR 2.4-5) updates the probable maximum flood (“PMF”) level to account for the increase in lake level and a peaked unit hydrograph. The fourteenth variance (NAPS ESP VAR 2.5-1) changes the slopes and safety of slopes analysis based on Unit 3 site-specific information. The fifteenth variance (NAPS ESP VAR 12.2-1) updates the information on gaseous effluent doses, based on the changes in maximum long-term dispersion estimates previously discussed and changes in maximum annual gaseous release values. The sixteenth variance (NAPS ESP VAR 12.2-3) revises the maximum annual liquid release values to specifically address only the ESBWR design, rather than the composite set of nuclides from multiple reactor designs considered in the ESP. The seventeenth variance (NAPS ESP VAR 12.2-4) updates dose information from the existing Units 1 and 2. The eighteenth variance (NAPS ESP VAR 12.2-5) revises the maximum annual gaseous effluent release values to

specifically address only the ESBWR design, rather than the composite set of possible radionuclide releases from multiple reactor designs evaluated in the ESP.

Q17. Does the COLA address any substantial new information related to emergency planning?

A17. Yes. The ESP evaluated major features of the emergency plan and determined that there was no significant impediment to their development. Part 5 of the COLA provides a complete emergency plan.

Q18. What environmental information has been provided in the COLA?

A18. In accordance with 10 C.F.R. § 51.50(c)(1), the ER incorporated by reference the assessment of environmental issues that were resolved in the ESP proceeding and provided, where necessary, the following supplemental information:

- Information demonstrating that the design of the facility falls within the ESP site characteristics and design parameters, as discussed above;
- Information resolving any significant environmental issue identified by the NRC that was not resolved in the ESP proceeding;
- Any new and significant information for issues related to the impacts of construction and operation of the facility that were resolved in the early site permit proceeding;
- A description of the process used to identify new and significant information regarding the NRC's conclusions in the ESP environmental impact statement; and
- Demonstration that relevant environmental terms and conditions for the ESP will be satisfied by the date of issuance of the combined license, or for requirements applicable to activities that may continue beyond COL issuance, would be appropriately included as terms and conditions of the combined license.

Section 1.3.2 of the ER identifies the environmental issues that were not resolved in the ESP proceeding and the ER sections that address each such issue. Section 1.3.3 of the ER identifies

the issues affected by new and significant information and the ER sections that address each such issue.

Q19. Please describe your process to identify new and significant environmental information.

A19. As described in Section 1.3.3.2 of the COLA ER, Dominion’s process for identifying new and significant environmental information was a multi-step proceduralized process beginning with a systematic review of the FEIS and ESP ER sections to identify the “key inputs” relevant to resolved issues. These key inputs were then screened and evaluated by a team consisting of subject matter experts, licensing specialists, engineering and environmental personnel, and other knowledgeable individuals to identify new information and evaluate its significance.

Q20. Please describe Dominion’s request in the COLA for Part 30, 40, and 70 licenses.

A20. The NA3 COLA includes a request for licenses to receive, possess and use by-product, source, and special nuclear material in connection with the operation of Unit 3. These licenses (under 10 C.F.R. Parts 30, 40, and 70, respectively) will allow Dominion to possess and use nuclear fuel, radiological waste materials, and various radiological sources used for operational purposes.

Q21. Was there a review of the NA3 COLA by the Advisory Committee on Reactor Safeguards (“ACRS”)?

A21. Yes. The ACRS provided an independent review and report to the Commission regarding the NA3 COLA. On November 15, 2016, the ACRS issued a letter on its review of the NA3 COLA, concluding that:

1. There is reasonable assurance that NA3 can be built and operated without undue risk to the health and safety of the public. The COLA for North Anna Unit 3 should be approved.
2. Site-specific departures and exemptions from the ESBWR design control document (DCD), including those in the areas of seismic design and analysis, electrical power distribution system, liquid effluent discharge, and design for hurricane wind generated missiles, are acceptable and should be approved.
3. There is reasonable assurance that the ESBWR design and the North Anna unit 3 site satisfy the requirements resulting from the Fukushima Near-Term Task Force recommendations.

Advisory Committee on Reactor Safeguards, Report on the Safety Aspects of Dominion Virginia Power Combined License Application for North Anna Unit 3 (Nov. 15, 2016) at 1-2.

Q22. Did the NRC Staff document its safety and environmental reviews?

A22. Yes. The NRC Staff documented its safety review in the Final Safety Evaluation Report Related to the Combined License for North Anna Power Station, Unit 3, issued January 12, 2017 (“FSER”), 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.” FSER (abstract). In February 2010, the Staff issued the final Supplemental Environmental Impact Statement (“SEIS”) for the COL for North Anna Power Station Unit 3, concluding that “[t]he [NRC] staff’s recommendation to the Commission related to the environmental aspects of the proposed action is that the COL be issued.” NUREG-1917, “Supplemental Environmental Impact Statement for Combined Licenses (COL) for North Anna Power Station Unit 3” at 10-20 (Feb. 2010).

Q23. What safety findings must the Commission make under Part 52 in order to issue the COL to Dominion?

A23. Under 10 C.F.R. § 52.97(a), the Commission may issue the COL 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 Act, 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.

Q24. What are the environmental findings required by Part 51?

A24. 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 COL should be issued, denied, or appropriately conditioned to protect environmental values; and

- Determine whether the NEPA review conducted by the Staff has been adequate.

Q25. Does the NA3 COLA, and the NRC Staff's review of the COLA, meet the standards identified above?

A25. 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)

Q26. Have the applicable standards and requirements of the Act and the Commission's regulations been met?

A26. Yes. The NA3 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 NA3 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 review). The NRC Staff reviewed the COLA and evaluated it against the applicable regulations in 10 C.F.R. Parts 20, 26, 30, 31, 32, 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, Dominion concludes that, for the purpose of issuing NA3 COL, 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)

Q27. Have the required notifications to other agencies or bodies been duly made?

A27. Yes. As required by Section 182(c) of the AEA and 10 C.F.R. § 50.43(a), the NRC notified the State Corporation Commission of Virginia, North Carolina Utilities Commission, and the Federal Energy Regulatory Commission of the NA3 COL application. In addition to publishing notices in the *Federal Register*,¹ the NRC also published notices of the application in *The Richmond Times-Dispatch*, *The Daily Progress*, *The Free-Lance Star*, and *The Central Virginian*. Required notifications to other agencies or bodies have been made.

10 C.F.R. § 52.97(a)(1)(iii)

Q28. Is there reasonable assurance that the facility will be constructed and will operate in conformity with the licenses, the provisions of the Act, and the Commission's regulations?

A28. Yes. The NA3 COLA, which incorporates the ESBWR DCD, provides critical aspects of construction and operation of NA3. This information includes the ESBWR DCD, which is incorporated by reference, the general and financial information section of the application, technical specifications, the emergency plan, the quality assurance ("QA") plan, and the physical

¹ *Notice of Receipt and Availability of Application for a Combined License, Dominion Virginia Power — North Anna Unit 3*, 72 Fed. Reg. 70,619 (Dec. 12, 2007); *Acceptance for Docketing of an Application for Combined License for North Anna Unit 3*, 73 Fed. Reg. 6,528 (Feb. 4, 2008); *Notice of Hearing and Opportunity To Petition for Leave To Intervene on a Combined License for North Anna Unit 3*, 73 Fed. Reg. 12,760 (Mar. 10, 2008); *Notice of Intent To Prepare an Environmental Impact Statement and Conduct Scoping Process*, 73 Fed. Reg. 13,589 (Mar. 13, 2008); *Correction and Supplement to Notice of Intent To Prepare an Environmental Impact Statement and Conduct Scoping Process*, 73 Fed. Reg. 41,132 (July 17, 2008); *Notice of Availability of the Draft Supplemental Environmental Impact Statement for North Anna Power Station Unit 3 Combined License Application*, 73 Fed. Reg. 79,196 (Dec. 24, 2008); *Notice of Availability of the Final Supplemental Environmental Impact Statement for North Anna Power Station Unit 3 Combined License Application*, 75 Fed. Reg. 14,207 (Mar. 24, 2010); *Combined license application, receipt*, 81 Fed. Reg. 24,900 (Apr. 27, 2016), 81 Fed. Reg. 26,837 (May 4, 2016), 81 Fed. Reg. 29,308 (May 11, 2016), and 81 Fed. Reg. 31,263 (May 18, 2016).

security plan. These materials demonstrate that there is reasonable assurance that NA3 can be built and operated in compliance with the COL, the AEA, and the NRC's regulations.

Q29. What actions did the NRC Staff take to satisfy itself that the plant could be constructed and operated safely?

A29. In addition to reviewing the COLA material provided by Dominion, 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 Dominion's records and documentation, and performed confirmatory calculations, in order to confirm information or conclusions made by Dominion.

Q30. How does the NRC Staff ensure that the bases for its reasonable assurance finding will be maintained in the future?

A30. The NRC Staff developed draft license conditions and ITAAC for NA3. The draft COL identifies 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 FSER or the Tier 1 information in the ESBWR DCD referenced by the NA3 COLA.

Q31. Did the NRC Staff reach a "reasonable assurance" conclusion with respect to the NA3 COLA?

A31. Yes. The NRC Staff concluded based on its safety and environmental reviews, documented in the FSER and SEIS, respectively, that there is reasonable assurance that the facility will be constructed and will operate in conformance with the licenses, the provisions of the Atomic Energy Act and the Commission's regulations.

Q32. Do you agree with the NRC Staff’s conclusions?

A32. Yes.

10 C.F.R. § 52.97(a)(1)(iv)

Q33. Is Dominion technically qualified to engage in the activities authorized by the COL?

A33. Yes. Dominion has the longstanding engineering and management experience (including operations, engineering, and other functions) to be technically-qualified to engage in construction and operation of NA3. Dominion has nearly 50 years of experience in the design, construction, and operation of nuclear generating stations. Dominion and its affiliate currently operate six nuclear units at three sites located in Virginia and Connecticut. As the NRC found, Dominion has a demonstrated ability to choose and manage the oversight of nuclear steam supply system vendors, architect engineers, and constructors of nuclear-related work.

Q34. Did the NRC Staff conclude that Dominion was technically qualified to engage in the activities authorized by the COL?

A34. Yes. As documented in the NRC Staff’s SER, the NRC Staff evaluated Dominion’s experience, organizational structure, and QA program. The NRC Staff found that Dominion “is technically qualified to engage in design, construction activities and operation of a nuclear power plant.” FSER Section 13.1.4 (“Technical Evaluation”) at 13-7.

Q35. Is Dominion financially qualified to engage in the activities authorized by the COL?

A35. Yes. Dominion provided information in the COLA to demonstrate its financial qualifications, including information regarding the cost of construction and operation of NA3, and decommissioning funding assurance. Dominion is one of the nation’s ten largest investor-owned electric utilities. It serves approximately 2.6 million electric customers in Virginia and North Carolina, has supply-side portfolio of 21,665 megawatts (“MW”) of generation capacity,

and its operating revenues in 2016 were approximately \$7.6 billion. Dominion is a subsidiary of Dominion Resources, Inc., which is one of the nation's largest producers and transporters of energy, with \$71 billion in total assets, and operating revenues in 2016 of nearly \$12 billion.

Dominion is an electric utility as defined in the NRC rules recovering its costs through cost-of-service-based rates. This rate recovery includes the ability to recover costs associated with projected construction work in progress, and associated allowance for funds used during construction, planning, development and construction costs, life-cycle costs, and costs of infrastructure associated therewith. The decommissioning funding amount will be covered by Dominion through an external sinking fund. Dominion will collect decommissioning funding contributions through regulated, cost-of-service-based rates.

Q36. Did the NRC Staff conclude that Dominion was financially qualified to engage in the activities authorized by the COL?

A36. Yes. The NRC Staff reviewed the information provided by Dominion and provided its evaluation in Chapter 1 of the FSER. The NRC Staff evaluated the information pertaining to the total cost of NA3, consisting of engineering, procurement, construction costs, owner's costs, and contingencies, and information pertaining to sources of construction funding. The NRC Staff found that Dominion has demonstrated it possesses or has reasonable assurance of obtaining the funds necessary to cover estimated construction costs and related fuel cycle costs.

The NRC Staff also examined Dominion's financial statements, decommissioning funding assurance, ownership, and means of complying with nuclear insurance and indemnity requirements. Based on its review, the NRC Staff concluded that there is reasonable assurance that Dominion is financially qualified to engage in the proposed activities regarding NA3 and that Dominion 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, Dominion is not required to provide financial qualifications information related to operating cost recovery.

10 C.F.R. § 52.97(a)(1)(v)

Q37. Will issuance of the licenses be inimical to the common defense and security or to the health and safety of the public?

A37. No. Dominion 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 ESBWR design.

Q38. What did the NRC Staff conclude based on that review?

A38. 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.

Q39. Did the Staff consider the sufficiency of operational programs?

A39. Yes. 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 NA3 FSAR at Table 13.4-201, Operational Programs Required by NRC Regulations. The NRC Staff's review determined that the operational programs identified by Dominion 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 license contains conditions to ensure that operational programs will be properly implemented. This also supports the NRC Staff's conclusion that issuance of the COL will not be inimical to the common defense and security or to public health and safety.

Q40. Did the NRC Staff review Dominion's emergency plan?

A40. Yes. The NRC Staff concluded that Dominion's emergency planning information is acceptable and supports the NRC Staff's conclusion that issuance of the COL will not be inimical to public health and safety.

Q41. Did the NRC Staff make an overall inimicality finding?

A41. Yes. Based on its review of the COLA, the NRC Staff concluded that issuance of the NA3 COL 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)

Q42. Has the NRC Staff's review been adequate to support the findings set forth in 10 C.F.R. § 51.107(a)?

A42. 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 the COL for construction and operation of NA3.

10 C.F.R. § 51.107(a)(1)

Q43. Have the requirements of Sections 102(2) (A), (C), and (E) of NEPA and the regulations in this subpart been met?

A43. Yes, these requirements of NEPA have been met by the Staff's preparation of the ESP FEIS, which evaluated the environmental impacts of constructing and operating nuclear plants bounded by a PPE at the North Anna Site, and the SEIS, which was prepared in accordance with 10 C.F.R. §§ 51.75(c)(1) and 51.92(c)-(e) to address any previously unresolved or deferred issues and new and significant information relating to Unit 3. The FEIS and SEIS were 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.

Q44. How did the NRC Staff meet Section 102(2)(A) of NEPA?

A44. The NRC Staff prepared the ESP FEIS and SEIS based on its independent assessment of the information provided by Dominion 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 ESP FEIS and SEIS reflect the "hard look" required by NEPA and have support in logic and fact.

Q45. How did the Staff meet Section 102(2)(C) of NEPA?

A45. As required by Section 102(2)(C) of NEPA, the ESP FEIS and SEIS, collectively, address (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. In addition, as required by Section 102(2)(C) of NEPA, in preparing both the ESP FEIS and SEIS, the NRC consulted with and received comments from other State and Federal agencies with jurisdiction by law or special expertise, such as the U.S. Army Corps of Engineers ("USACE"), the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the U.S. Environmental Protection Agency, Virginia Department of Environmental Quality, Virginia Department of Historic Resources, and the Virginia Department of Game and Inland Fisheries. This correspondence is described in Appendix F of the ESP FEIS and SEIS.

Q46. How did the Staff meet Section 102(2)(E) of NEPA?

A46. The Staff considered appropriate alternatives in the ESP FEIS and SEIS, including the no-action alternative, energy alternatives, alternative sites, and system design alternatives. The ESP FEIS and SEIS demonstrate 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)

Q47. 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?

A47. Yes. Section 10.6 of the SEIS contains the NRC Staff's summary of the cost-benefit balancing for the NA3 COLA. The NRC Staff concluded that on balance, the benefits of Unit 3 would significantly outweigh the economic, environmental, and social costs of the project. As reflected in the SEIS, the most apparent benefit from constructing and operating NA3 is that it would generate power and provide thousands of residential, commercial, and industrial consumers with electricity. The primary societal benefits associated with nuclear power generation relative to most other alternative power generating approaches are price stability and longevity, energy security, and fuel diversity. Other benefits include tax revenue, regional productivity, and community development. The benefits of building and operating NA3 are presented in SEIS Table 10-3. Internal costs to Dominion, as well as external costs to the surrounding region and environment, would be incurred during the construction and operation of NA3. Internal costs include the costs to physically construct the power plant (capital costs), as well as operating and maintenance costs, fuel costs, waste disposal costs, and decommissioning costs. External costs include all costs imposed on the environment and region surrounding the plant and may include such things as a loss of regional productivity, environmental degradation, or loss of wildlife habitat. Internal and external costs of building and operating NA3 are presented in SEIS Table 10-4.

10 C.F.R. § 51.107(a)(3)

Q48. After weighing the environmental, economic, technical, and other benefits against environmental and other costs, and considering reasonable alternatives, should the COL be issued?

A48. Yes. In the NA3 SEIS, the NRC Staff considered the cost-benefit balancing and reasonable alternatives. Based on that assessment, the NRC Staff recommends that the COL be issued. The overall conclusion was based on (1) the NA3 COLA including the ER; (2) the NRC Staff's review conducted for the ESP application and documented in the FEIS; (3) consultation with Federal, State, Tribal and local agencies; (4) the NRC Staff's own independent review of potential new and significant information available since preparation and publication of the ESP EIS; (5) the Staff's consideration of comments related to the environmental review that were received during the review process; and (6) the assessments summarized in the SEIS, including the potential mitigation measures identified in the Dominion ER and in the SEIS. I concur with the NRC Staff's conclusions.

Q49. How does the NRC Staff's conclusion relate to the findings that the USACE must make for activities within its jurisdiction?

A49. The NRC's conclusion is independent of the USACE's review findings under Section 404(b) of the Clean Water Act ("CWA"). The USACE issued the 404 permit for NA3 on September 29, 2011, and determined that the North Anna Unit 3 project was the least environmentally damaging practicable alternative.

Because of concerns raised by individuals about potential impacts to populations of the Sensitive Joint-Vetch (*Aeschynomene virginica*) along the Mattaponi River resulting from barges transporting large components to the roll-off facility near Walkerton, Virginia, the U.S. Army Corps of Engineers in November 2016 suspended the CWA Section 404 permit that authorized

impacts related to the Mattaponi River roll-off facility pending the resolution of additional consultations between NRC and the U.S. Fish and Wildlife Service (“USFWS”) under Section 7 of the Endangered Species Act. As part of the Section 7 consultation, NRC submitted to USFWS on December 9, 2016 a Supplemental Biological Assessment (“BA”) that included an evaluation of potential impacts to Sensitive Joint-Vetch populations along the barge transport route and concluded that the project is not likely to adversely affect the Sensitive Joint-Vetch. In addition, in a letter dated February 20, 2017, Dominion committed to additional measures for avoiding impacts to the Sensitive Joint-Vetch populations. On February 22, 2017, the USFWS concurred with the Supplemental Biological Assessment and Dominion’s proposed actions, completing the consultation.

10 C.F.R. § 51.107(a)(3)

Q50. Has the NRC Staff’s review been adequate?

A50. Yes. The NRC Staff conducted an independent environmental evaluation of the application that encompassed a number of years of focused effort. Before development of the draft SEIS, the NRC Staff issued a notice of intent and invited the public to provide any new and potentially significant information relevant to the environmental review since issuance of the ESP FEIS. The NRC obtained additional information as needed by Dominion responses 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. In the ESP FEIS and SEIS, 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 SEIS evaluated the benefits and need for NA3. The SEIS also supplemented the ESP FEIS's evaluation of alternatives. This included evaluating the no action alternative and alternative energy sources, and evaluating new information on system design alternatives, including alternative intake structure designs, alternative discharge structure designs, and alternative water supplies. The SEIS 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.

Q51. Was the public permitted to participate in the environmental review process?

A51. Yes. At the start of the environmental review, the NRC Staff issued a notice of intent to prepare a SEIS and invited the public to provide any information relevant to the environmental review (the NEPA scoping process). The NRC Staff also provided opportunities for governmental and general public participation during the public meeting on the draft SEIS and sought, received, and responded to comments on the draft SEIS from the public. Those responses are documented in the SEIS.

Q52. What are your overall conclusions regarding the NRC Staff's environmental review?

A52. I agree with the NRC Staff that, for the purpose of issuing the NA3 COL, 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 COL requested.

IV. CONCLUSION

Q53. What are your overall safety conclusions regarding issuance of the COL?

A53. 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, Dominion is technically and financially qualified to construct and operate NA3. Issuance of a combined license for the construction and operation of NA3 will not be inimical to the common defense and security or to the health and safety of the public.

Q54. What are your overall environmental conclusions regarding the issuance of the COL?

A54. 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 NA3 supports the issuance of the license; and the requested license should be issued.

Certification

I, Mark A. Giles, 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)

Mark A. Giles

Director, Nuclear Project Technical Support

Dominion Resources Services, Inc.

5000 Dominion Boulevard

Glen Allen, VA 23060

mark.a.giles@dom.com

804-273-2244

Dated at Glen Allen, VA
this 16th day of March, 2017

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

Before the Commission

In the Matter of)	
)	Docket No. 52-017-COL
Dominion Virginia Power)	
)	
North Anna Power Station, Unit 3)	

CERTIFICATE OF SERVICE

I hereby certify that the foregoing Dominion Virginia Power’s Corrected Pre-Filed Testimony in Support of the Mandatory Hearing for the North Anna, Unit 3, Combined License, and accompanying Certification, have been filed as an exhibit and served through the E-Filing system on the participants in the above-captioned proceeding, this 16th day of March, 2017.

/Signed electronically by David R. Lewis/

David R. Lewis