

ABSTRACT

This final safety evaluation report¹ (FSER) documents the U.S. Nuclear Regulatory Commission (NRC or the Commission) staff's technical review of the combined license (COL) application (COLA) submitted by Dominion Virginia Power (Dominion)² (Dominion, or the applicant), for North Anna 3.

In a letter dated November 26, 2007, the Dominion submitted its application to the NRC for a COL to construct and operate a General Electric-Hitachi Economic Simplified Boiling-Water Reactor (ESBWR) pursuant to the requirements of Section 103 and 185(b) of the *Atomic Energy Act of 1954 as Amended (AEA)*, Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, "Licenses, Certifications and Approval for Nuclear Power Plants," and the associated material licenses under 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material"; 10 CFR Part 40, "Domestic Licensing of Source Material"; and 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material." This reactor will be identified as North Anna 3 and will be located on the existing North Anna Power Station site (North Anna site) in Louisa County, Virginia, approximately 40 miles north northwest of Richmond, Virginia.

As indicated in the applicant's November 26, 2007 submittal, the application incorporated by reference Revision 4 of the ESBWR Design Control Document (DCD) and Revision 9 of the North Anna 3 Early Site Permit (ESP) for the North Anna 3 site. The NRC issued the North Anna ESP (ESP-003) on November 27, 2007 based on Revision 9 of the ESP application (ADAMS Accession No. ML073180421).

By letter dated June 28, 2010, Dominion revised its application to incorporate by reference the Mitsubishi Heavy Industries', Ltd. United States – Advanced Pressurized Water Reactor (US-APWR). By letter dated April 25, 2013, Dominion notified the staff that it planned to revert back to ESBWR reactor technology for its North Anna 3 COLA. Dominion then submitted a revised application that incorporated by reference the ESBWR DCD, Revision 9 by letter dated December 18, 2013.

By letter dated June 24, 2014, Dominion submitted a revised application that incorporated by reference the ESBWR DCD, Revision 10. In a letter dated January 23, 2015, Dominion followed the design center approach and reviewed the Detroit Edison Company Fermi 3 COLA updates (ADAMS Accession Nos. ML14295A354 and ML14308A337) that reflected the changes to the Fermi 3 COLA incorporating by reference the codified version of the ESBWR design certification rule (DCR) which is contained in 10 CFR Part 52, Appendix E, "Design Certification Rule for the U.S. Economic Simplified Boiling Water Reactor." The ESBWR DCR was published on October 15, 2014 (79 FR 61944) and is effective as of November 14, 2014. The ESBWR DCR references Revision 10 of the ESBWR DCD.

This FSER presents the results of the staff's review of information submitted in conjunction with the North Anna 3 COLA, except those matters resolved as part of the referenced design certification rule. In Appendix A to this FSER, the staff has identified certain license conditions and inspections, tests, analyses and acceptance criteria (ITAAC) that the staff recommends the Commission impose, should the COL be issued to the applicant. In addition to the ITAAC in Appendix A, the ITAAC found in the

¹ This FSER documents the NRC staff's position on all safety issues associated with the combined license application. The Advisory Committee on Reactor Safeguards (ACRS) independently reviewed those aspects of the application that concern safety, as well as the advanced safety evaluation report without open items (an earlier version of this document), and provided the results of its review to the Commission in a report dated November 15, 2016. This report is included as Appendix F to this SER.

ESBWR DCD Revision 10 Tier 1 material will also be incorporated into the COL should the COL be issued to the applicant.

On the basis of the staff's review² of the application, as documented in this FSER, the staff recommends that the Commission find the following with respect to the safety aspects of the COL application: 1) the applicable standards and requirements of the Atomic Energy Act and Commission regulations have been met, 2) required notifications to other agencies or bodies have been duly made, 3) 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, 4) the applicant is technically and financially qualified to engage in the activities authorized, and 5) issuance of the license will not be inimical to the common defense and security or to the health and safety of the public.

² An environmental review was also performed of the COL application and its evaluation and conclusions are documented in NUREG-2105, "Final Supplemental Environmental Impact Statement for Combined License (COL) for North Anna 3."