



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001**

April 30, 2020

The Honorable Kristine L. Svinicki
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

**SUBJECT: REPORT ON THE SAFETY ASPECTS OF THE SUBSEQUENT
LICENSE RENEWAL APPLICATION REVIEW OF THE SURRY POWER
STATION, UNITS 1 AND 2**

Dear Chairman Svinicki:

During the 672nd meeting of the Advisory Committee on Reactor Safeguards (ACRS), April 8-10, 2020, we completed our review of the subsequent license renewal (SLR) application for the Surry Power Station, Units 1 and 2 (Surry), and the associated final safety evaluation report. Our review considered actions by Virginia Electric and Power Company (Dominion), to extend the license of each unit by 20 years beyond 60 years of operation.

Our Plant License Renewal Subcommittee reviewed past, current, and future actions to address subsequent license renewal at Surry during a meeting on February 5, 2020. During this review, we had the benefit of discussions with representatives of the staff and Dominion. We also had the benefit of the referenced documents. This report fulfills the requirement of 10 CFR 54.25 that the ACRS review and report on all license renewal applications.

CONCLUSION AND RECOMMENDATION

1. The established programs and the commitments made by Dominion to manage age-related degradation provide reasonable assurance that Surry can be operated in accordance with its current licensing basis for the subsequent period of extended operation (SPEO) without undue risk to the health and safety of the public.
2. The Dominion application for subsequent license renewal of the operating license for Surry should be approved.

BACKGROUND

Surry Power Station, Units 1 and 2, are located on a site situated on Gravel Neck, adjacent to the James River in Surry County, Virginia. Each unit includes a three-coolant-loop, pressurized light water reactor nuclear steam supply system, and a turbine generator, all of which were furnished by Westinghouse Electric Corporation. Each unit has a licensed thermal power output

of 2,587 megawatts-thermal (MWt). The Nuclear Regulatory Commission (NRC) issued the initial operating licenses on May 25, 1972, for Unit 1, and January 29, 1973, for Unit 2. The NRC issued the first renewed operating licenses on March 20, 2003.

In this application, Dominion requests renewal of the operating licenses for an additional 20 years beyond the expiration of their current renewed licenses. The licenses would be extended to May 25, 2052, for Unit 1, and to January 29, 2053, for Unit 2.

DISCUSSION

The staff reviewed the Dominion application for SLR in accordance with the Generic Aging Lessons Learned (GALL-SLR) and the Standard Review Plan (SRP-SLR) guidance documents. Conformance with this guidance provides bases for a conclusion that an applicant for license renewal of 20 additional years beyond 60 years will assure adequate protection of the public through the SPEO.

The most significant generic issues challenging operation beyond 60 years are: reactor pressure vessel embrittlement; irradiation-assisted stress corrosion cracking of reactor internals; concrete structures and containment degradation; and electrical cable environmental qualification, condition monitoring, and assessment. Each of these items has been addressed by Dominion and evaluated by the staff through the review process. We agree with the staff's safety evaluation report regarding these issues.

Prior to requesting SLR, Dominion has been making systematic improvements in the Surry facility. Significant primary system modifications included replacement of the flux thimbles, reactor vessel head, and reactor coolant pump main flange bolts. Secondary system modifications were implemented to replace flow-assisted corroded piping, to replace the steam generator feed ring, and to install ultrasonic feedwater flow instrumentation. Major electrical system modifications involved replacement of the isolated phase bus duct, main transformer, station service transformer, and reserved station service transformer. Dominion has also replaced the fire detection system and is installing carbon fiber reinforced polymer lining to improve performance of underground piping. These improvements demonstrate investments by Dominion to maintain the units in good material condition to assure safe operation.

In its final safety evaluation report, the staff documented its review of the Subsequent License Renewal Application (SLRA) and other information submitted by Dominion and obtained through staff audits. The staff also performed two audits on the technical details of the SLRA from February 4-28, 2019, and April 22-25, 2019, wherein the completeness of the identified structures, systems, and components within the scope of the license renewal program was evaluated.

Dominion will implement, at Surry, 47 GALL-Aging Management Programs (AMPs) for SLR, comprised of 40 existing programs and 7 new programs. Of the 7 new programs, 5 are consistent with the GALL-SLR Report and 2 are consistent with allowed exceptions. Of the 40 existing programs, 6 are consistent with the GALL-SLR Report, 24 are consistent with enhancements, one is consistent with allowed exceptions, and 9 are consistent with enhancements and allowed exceptions. There are no plant-specific enhancements evaluated against the SRP-SLR. The staff found the programs with exceptions and enhancements to be acceptable.

Dominion has demonstrated the effectiveness of their programs to maintain material condition, to sustain system and equipment performance, and to identify improvements to assure facility safety and reliability. Dominion is implementing lessons learned from both its own license renewal experience as well as those from industry. Commitments in the SLRA and in Dominion responses to the staff audits and inspections provide assurance that these programs will continue throughout the SPEO. These are managed through the Dominion commitment tracking program.

Surry experienced a pipe break in a section of underground fire protection loop piping in July 2019. As required by their current operating license, Dominion is proceeding to resolve this issue within their corrective action program. Immediate and continuing compensatory measures have been in place to maintain capabilities of the fire protection system until a final action plan is developed and implemented. A cause evaluation determined that graphitic corrosion (selective leaching) was the cause of the piping failure. We were briefed by Dominion on their plans and progress to identify and replace susceptible piping using a prioritized approach. They will ultimately replace all susceptible piping with improved materials that are less susceptible to this phenomenon. The project has been authorized by Dominion, and piping replacement is in progress. In addition to addressing this issue, Dominion confirmed that they will inform their aging management programs as new information related to these materials degradation mechanisms and examination methods is identified. We find that these actions demonstrate appropriate adherence to and implementation of the aging management program. We support Dominion's involvement with ongoing industry programs on this topic. The staff will continue to review the progress of this specific corrective action within existing inspection and reactor oversight programs.

The staff conducted license renewal audits, and the audits verified the appropriateness of the Dominion scoping and screening methodology for AMPs, the appropriateness of the aging management review, and the acceptability of the plant-specific time limited aging analyses. The staff audit reports confirm the completeness of the Surry aging management program. The Post-Approval Site Inspection for License Renewal verified that the current license renewal requirements are implemented appropriately. The audits and inspections were comprehensive, and the corresponding reports were thorough. The License Renewal Program inspections demonstrated that the AMPs associated with the initial license renewal are being implemented appropriately and have resulted in no findings.

Based on these audits, inspections, and the staff reviews, the staff concluded that Dominion has demonstrated that the effects of aging at Surry will continue to be adequately managed. Safety functions will be maintained consistent with Surry's licensing basis for the SPEO, as required by 10 CFR 54.21(a)(3). The staff's review of the SLRA identified no open or confirmatory items. We agree with the staff's conclusion that there are no issues that preclude renewal of the operating license for Surry, as described in 10 CFR 54.29(a)(1) and (a)(2).

SUMMARY

The established programs and the commitments made by Dominion to manage age-related degradation provide reasonable assurance that Surry can be operated in accordance with its licensing basis for the SPEO without undue risk to the health and safety of the public. The Dominion application for a SLR of the operating license for Surry should be approved.

Members Riccardella and Sunseri did not participate in portions of the meeting related to metal and environmental fatigue and irradiation embrittlement of the reactor pressure vessel and sacrificial shield wall in Chapter 4, "Time-limited Aging Analyses," of the application.

We are not requesting a formal response from the staff to this letter report.

Sincerely,

Matthew W. Sunseri
Chairman

REFERENCES

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3. Virginia Electric and Power Company, "Surry Power Station Updated Final Safety Analysis Report, Revision 50, Chapters 0-13," September 27, 2018 (ML19058A584).
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6. U.S. Nuclear Regulatory Commission, "Report for the In-Office Regulatory Audit Surry Power Station, Unit Nos. 1 and 2 Subsequent License Renewal Application (EPID NOS. L-2018-RNW-0023 And L-2018-RNW-0024)," May 30, 2019 (ML19128A079).
7. U.S. Nuclear Regulatory Commission, "Report for the On-Site Regulatory Audit Regarding the Surry Power Station, Unit Nos. 1 and 2 Subsequent License Renewal Application (EPID NOS. L-2018-RNW-0023 And L-2018-RNW-0024)," June 20, 2019 (ML19169A329).
8. U.S. Nuclear Regulatory Commission, "Surry Power Station – Nuclear Regulatory Commission Integrated Inspection Report 05000280/2019003 and 05000281/2019003," November 7, 2019 (ML19311C688).
9. U.S. Nuclear Regulatory Commission, NRC NUREG-1800, Revision 2, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants (SRP-LR)," December 2010 (ML103490036).
10. U.S. Nuclear Regulatory Commission, NRC NUREG-1801, Revision 2, "Generic Aging Lessons Learned (GALL) Report," December 2010 (ML103490041).

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13. U.S. Nuclear Regulatory Commission, NRC Regulatory Guide 1.188, Revision 1, "Standard Format and Content for Application to Renew Nuclear Power Plant Operating Licenses," September 2005 (ML051920430).
14. U.S. Nuclear Regulatory Commission, NRC NUREG-2192, "Standard Review Plan for Review of Subsequent License Renewal Applications for Nuclear Power Plants," July 2017 (ML17188A158).
15. U.S. Nuclear Regulatory Commission, NRC NUREG-2221, "Technical Bases for Changes in the Subsequent License Renewal Guidance Documents NUREG-2191 and NUREG-2192," December 2017 (ML17362A126).
16. U.S. Nuclear Regulatory Commission, NRC NUREG-2222, "Disposition of Public Comments on the Draft Subsequent License Renewal Guidance Documents NUREG-2191 and NUREG-2192," December 2017 (ML17362A143).
17. U.S. Nuclear Regulatory Commission, NRC Regulatory Guide 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials," May 1988 (ML003740284).

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