

Dominion Energy Perspective on Long-Term Operation Related Research

Issues:

- Many U.S. states are driving toward renewable and clean energy targets in the coming decades. The Governor of the Commonwealth of Virginia recently signed an executive order seeking actions to achieve 100% of Virginia's electricity from carbon-free sources by 2050. Similarly, Dominion Energy has set goals for net-zero emissions by that same year.
- Continued operation of the existing nuclear fleet is essential in meeting these targets. Research which supports existing and advanced nuclear technologies is needed to bring those clean power technologies to market.
- Our company, along with others, has applied for Subsequent License Renewal (SLR) to extend the operating licenses to 80 years for Surry Power Station and North Anna Power Station in Virginia. It is necessary to ensure aging of key plant components is properly managed and supported by past, current and future research in areas such as reactor internals, concrete and cables for exposure to high temperature, neutron irradiation, stress, or corrosive media.
- To support 80 years of operation, plant modernization efforts are necessary to ensure safe, reliable and cost-effective operation in a very competitive energy market environment.

Dominion Energy Key Messages:

- Dominion Energy and the other lead plant utilities for SLR benefitted greatly from the research collaboration between EPRI, DOE and related labs, and the NRC. The SLR applications were based in large part on this research. The research provided direct input in the technical bases for the aging management programs (AMPs) that made up a significant portion of the application. This research will benefit all future SLR applicants.
- Operating experience from implementation of the aging management programs for the first round of license extensions (40 to 60 years) continues to inform the living nature of these AMPs and will provide opportunities for enhancing or improving the AMPs needed for SLR. Research associated with advancements in monitoring and non-destructive examination (NDE) techniques has the opportunity to further automate and streamline the monitoring of aging in our stations.
- A significant aspect of ensuring safe, reliable and efficient operation to 80 years (and possibly beyond) is the collaboration among utilities, research organizations, vendors and industry users' groups on plant modernization. These efforts are focused on demonstrating the **feasibility** of improvements, **methods** to support decision making, and **deployment** of improvement products. A Plant Modernization Committee facilitated by EPRI and led by industry has identified the top priority technologies to pursue; examples include wireless connectivity, digital I&C upgrades, condition-based maintenance, remote monitoring & diagnostics, mobile work execution, automated chemistry & radiological monitoring, advanced NDE, physical security & emergency preparedness. Several of these modernization efforts involve research into new ways to automate, innovate and take advantage of cutting-edge data management.

Dominion Energy Status and Next Steps:

- The SLR applications for Surry Power Station, submitted in October 2018, and North Anna Power Station in August 2020, used as a basis the research noted above and the

Generic Aging Lessons Learned report for SLR. Both applications are currently under review at NRC. We plan to submit a similar application for VCSummer Power Station in the coming years and will be evaluating submittal for Millstone Power Station in the future.

- Dominion Energy is an active participant in the Plant Modernization Committee. Products we expect this effort to yield will have direct applicability to our SLR improvement projects, notably digital I&C upgrades on safety and non-safety systems, wireless technologies to automate equipment monitoring and diagnostics, and mobile work execution.
- The carbon-free goals noted above also demand continuing research in the technical and licensing aspects of advanced nuclear technologies including such things as small modular reactors and non-light water reactors. Sustaining the existing fleet through SLR and plant modernization efforts provides the bridge needed to complete these research activities and make these advanced technologies viable and market competitive, with greater regulatory certainty. Recent DOE grants under the Advanced Reactor Demonstration Program (ARDP) will further this effort.

Contact Information:

Mark D Sartain
Dominion Energy
Vice President, Nuclear Engineering & Fleet Support
Office: (804) 273-3586
Email: mark.sartain@dominionenergy.com