

# H.B. Robinson Unit 2 Subsequent License Renewal Safety Pre-Submittal Meeting



February 5, 2025

# Agenda

- Opening Remarks
- Subsequent License Renewal (SLR) Project Team
- Overview of Robinson Nuclear Plant (RNP)
- Key Lessons Learned
- SLR Application
- Topics of Interest
  - Concrete Containment Bonded Tendon Prestress Aging Management Program (Plant-Specific)
  - Determination of  $T_0$  for RNP
- Closing Remarks

# SLR Project Team

Rounette Nader\*: VP, New Nuclear Generation and License Renewal

Mark Pyne: Director, License Renewal and Subsequent License Renewal

Daniel Roberts\*: Manager, Subsequent License Renewal

## Mechanical Class 1

Charles Tomes

Chris Saville\*

Crystal Bowers

Joe Terrell

Mark Rinckel

## Licensing

Paul Guill

## Mechanical Non-Class 1

David Lee

Erik Wagner

Lori Hekking

Mark Hager

Matthew Peters

## Civil

David Morris\*

Heather Galloway

## Vendor Support

Structural Integrity Associates

Westinghouse

MPR

## Electrical

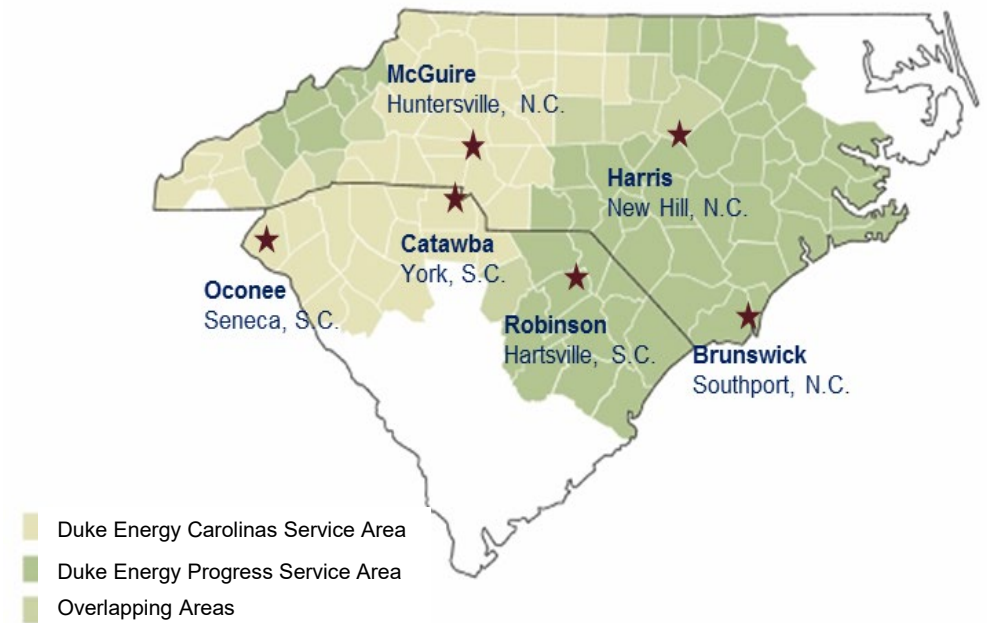
Bert Spear

Steve Graham

\* Speakers

# Overview of Robinson Nuclear Plant

- Located in Hartsville, SC
- 100% owned and operated by Duke Energy
- The Robinson site covers approximately 5,900 acres of land
  - Including and surrounding Lake Robinson (2,250 acres)



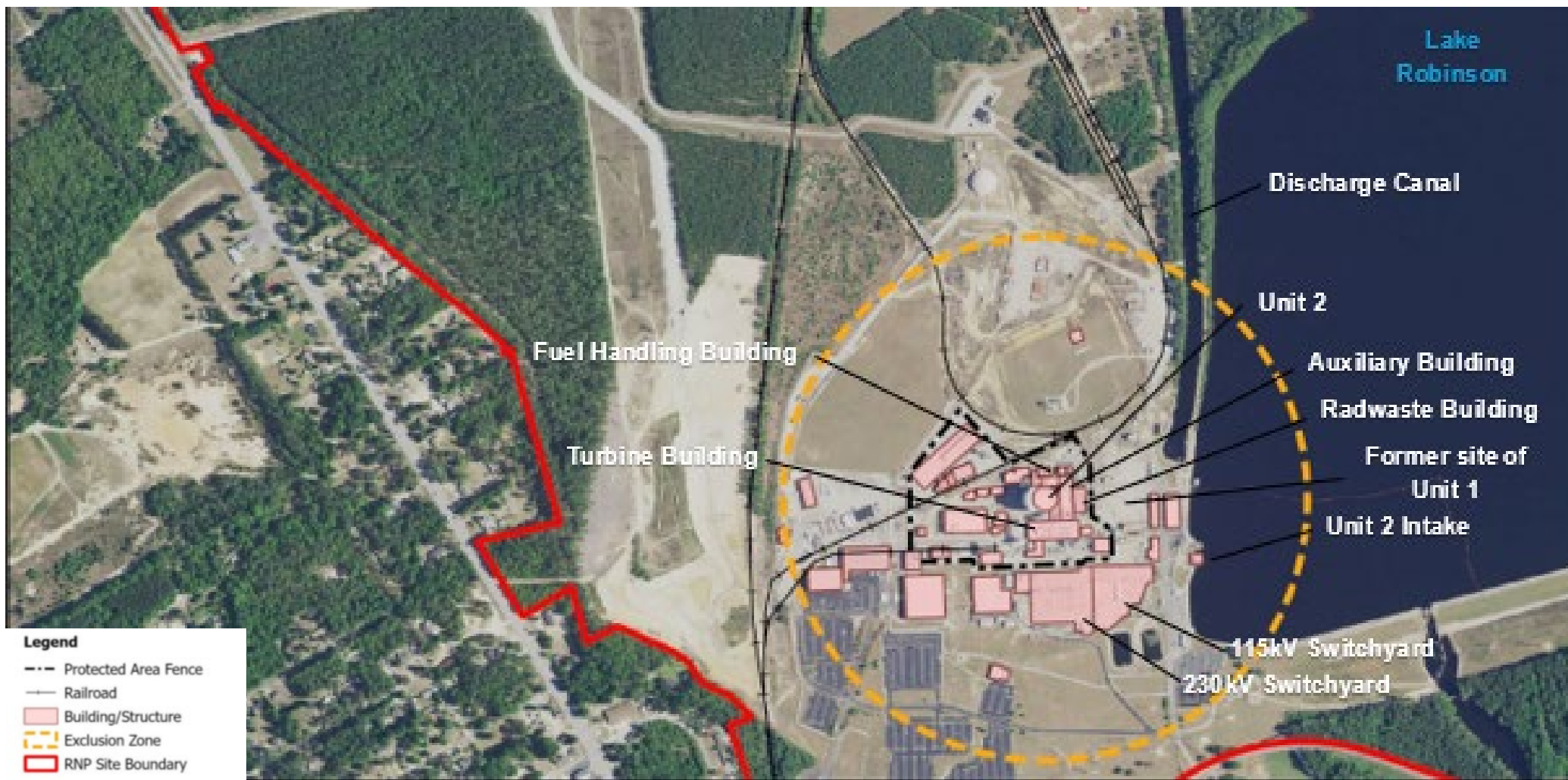
	OL	40 Yrs	60 Yrs	80 Yrs
Robinson Unit 2	1970	2010	2030	2050

- Initial License Renewal (2004) based on NUREG-1801, GALL Report, Revision 0
- IP 71003 Phase IV completed December 2018 (ML19038A210)

# Overview of Robinson Nuclear Plant

- Single Unit Westinghouse Three-loop Nuclear Steam Supply System (NSSS)
  - Pressurized Water Reactor (PWR)
  - Reactor Output: 2,339 MW<sub>t</sub>
  - Power Output: 787 MW<sub>e</sub>
- Core Power History:
  - 1970: 2,200 MW<sub>t</sub> Initial
  - 1979: 2,300 MW<sub>t</sub> Power Uprate
  - 2002: 2,339 MW<sub>t</sub> Power Uprate
- Ultimate Heat Sink: Lake Robinson
  - Inlet: Southern end of lake
  - Discharge: Northern end of lake
- 24-month Refueling Cycle

# Overview of Robinson Nuclear Plant



# SLR Key Lessons Learned

- Involvement in the NEI License Renewal Taskforce (LRTF)
- Engagement in ongoing NRC efficiency efforts
  - Participating and following to ensure quality and consistent applications
  - Worked with NEI to provide feedback on the new NRC graded approach pilot program
- Extensive aging management experience
  - All 11 units have renewed Operating Licenses
  - 10 of 11 units are operating in the Period of Extended Operation
- Lessons learned:
  - Experienced team on second SLR project; many also with initial LR experience
  - Participated in peer reviews of other industry SLR applications
  - Reviewed industry RAIs
    - Increase quality of SLR application
    - Reduce number of RAIs

# SLR Application

- Target Submittal Date: April 2025
- CERTREC ePortal:
  - Folder for each IPAR, TLAA, and AMP
  - Ability to be updated as necessary throughout audit
- Operating Experience (OE)
  - Searched action requests (AR) from 7/1/2014 – 8/14/2024
  - Utilized over 300 keywords for initial OE search
  - Reviewed approximately 14,600 ARs
  - Identified no new aging effects



# SLR Application

- Adherence to NUREG-2191 Rev. 0, including:
  - SLR-ISG-2021-01-PWRVI
  - SLR-ISG-2021-02- MECHANICAL
  - SLR-ISG-2021-03-STRUCTURES
  - SLR-ISG-2021-04-ELECTRICAL
- Peer Review
  - An industry peer review of the Robinson SLR application is being performed
- AMRs
  - Over 6,900 AMR lines
  - Highly consistent with GALL-SLR: >99.87% with notes A through E

# SLR Application

Robinson SLR AMPs					
	Consistent with GALL	Consistent with Enhancement(s)	With Exception Only	With Exception and Enhancement	Plant Specific
<b>Existing</b>					
39	9	28	0	1	1
<b>New</b>					
9	6	0	3	0	
<b>Total</b>					
48					

- Existing Plant-Specific AMP: Concrete Containment Bonded Tendon Prestress

# SLR AMPs

New AMPs		
One Time Inspection (M32)	Selective Leaching (M33)	ASME Code Class 1 Small-Bore Piping (M35)
Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (M38)	Internal Coatings/Linings for In-Scope Piping (M42)	Electrical Insulation for Inaccessible Medium-Voltage Power Cables (E3A)
Electrical Insulation for Inaccessible Instrument and Control Cables (E3B)	Electrical Insulation for Inaccessible Low-Voltage Power Cables (E3C)	Electrical Cable Connections (E6)

AMPs with Exceptions	
Internal Coatings/Linings for In-Scope Piping (M42)	ASME Section XI, Subsection IWE (XI.S1)
Electrical Insulation for Inaccessible Medium-Voltage Power Cables (E3A)	Electrical Insulation for Inaccessible Low-Voltage Power Cables (E3C)

# Topics of Interest

- Concrete Containment Bonded Tendon Prestress AMP (Plant-Specific)
- Determination of  $T_0$  for Robinson for use in SLRA Section 4.2.3

# Concrete Containment Bonded Tendon Prestress AMP (Plant-Specific)

- Existing plant-specific AMP that manages loss of prestress to maintain component intended function
  - AMP was reviewed and accepted during initial license renewal
  - Based on the principals described in Regulatory Guide 1.90, *Inservice Inspection of Prestressed Concrete Containment Structures with Grouted Tendons*, Alternative B
  - Only operating plant in USA with grouted tendon configuration
- Robinson tendons are placed inside a heavy wall six-inch galvanized steel pipe sheath that after initial tensioning was filled with grout to provide corrosion resistance
- AMP visually inspects and measures vertical displacement of containment building exterior concrete during the 10 CFR 50 Appendix J (XI.S4) Integrated Leak Rate Test

## Determination of $T_0$ for Robinson for use in SLRA Section 4.2.3

- The 2019 Edition of ASME Section III, Division 1, NB-2331(a)(5) provides an alternative to use a fracture toughness-based reference temperature of  $RT_{T_0}$  in place of  $RT_{NDT}$  for the calculation of  $RT_{PTS}$
- On March 28, 2024, WCAP-18909-NP, Revision 1 and WCAP-18933-NP, Revision 0, were submitted to the NRC as topical reports (ML24088A214)
  - A public meeting was held on May 22, 2024 (ML24165A236) to discuss the path forward for reviewing the reports
  - It was concluded that the reports would be reviewed as white papers, and the original submittal was supplemented by letter dated June 28, 2024 (ML24180A011)
- The staff provided feedback on January 2, 2025 (ML24353A347)
- Duke Energy plans to follow the guidance in NB-2331(a)(5), as described by the staff, for calculation of  $RT_{PTS}$

# Closing Remarks

- The Robinson SLR application will be consistent with GALL-SLR and industry guidance to the greatest extent possible
- Duke Energy has been engaged with the development of SLR industry guidance and SLR-ISGs
- Duke Energy has supported industry SLR application reviews and incorporated recent RAI responses
- Duke Energy will submit a high quality SLR application to support an 18-month staff review
- Robinson SLRA submittal remains on schedule to submit April 2025

# Acronyms

- AMP – Aging Management Program
- AMR – Aging Management Review
- CFR – Code of Federal Regulations
- GALL – Generic Aging Lesson Learned
- IPAR – Integrated Plant Assessment Report
- ISG – Interim Staff Guidance
- NEI – Nuclear Energy Institute
- NRC – Nuclear Regulatory Commission
- NSSS – Nuclear Steam Supply System
- NUREG – Nuclear Regulatory Guide
- OE – Operating Experience
- OL – Operating License
- PWR – Pressurized Water Reactor
- RAI – Request for Additional Information
- RNP – Robinson Nuclear Plant
- SLR - Subsequent License Renewal
- SLRA – Subsequent License Renewal Application
- TLAA – Time Limited Aging Analysis