

Limerick Generating Station  
Digital Modernization Project  
LAR Pre-submittal Meeting



NRC Pre-submittal Meeting  
September 8, 2022

# Introductions – Constellation Project Team

## ○ Licensing

- Darani Reddick, Licensing Director
- Frank Mascitelli, Licensing Lead
- Laura Lynch, LGS Regulatory Assurance Manager
- Jim Berg, LGS Regulatory Assurance
- Pareez Golub, Digital Licensing SME

## ○ Engineering

- Mark DiRado, Central Design Organization (CDO) Director
- John Connelly, Central Design Organization Manager
- Mark Samselski, CDO - Lead Responsible Engineer
- George Bonanni, CDO - Senior Staff Engineer
- Mike Foote, CDO - Senior Staff Engineer
- Scott Schumacher, Systems Engineering

# Introductions – Constellation Project Team

## ○ Project Management

- Steve Hesse, Project Director
- Dave Molteni, Senior Manager and Station Lead
- Jerry Segner, Principal Project Manager
- Kayla Marriner, Project Manager

## ○ Operations

- Paul Krueger, Senior Operations Specialist

## ○ Nuclear Oversight

- Dave Peiffer, Performance and Assessment Lead

# Introductions – Westinghouse Project Team

## ○ Project Management

- Mark Lloyd, Sr. Director of Project Execution and Delivery
- Dominic Mocello, Project Manager
- Boyan Setchenski, Program Manager

## ○ Engineering

- Ken Lunz, Director of Safety System Engineering
- Suresh Channarasappa, Consulting Engineer for Equipment Qualification
- Warren Odess-Gillett, Lead – Licensing
- Steve Merkiel, Functional & System Design Lead

# Agenda / Opening Remarks

## ○ Open / Public Session

- Introductions
- Project Update/Schedule
- License Amendment Request (LAR) Preview (ISG-06 Enclosure B)
- VOP / VOP Summary
- HFE follow-up from June 2022 meeting
- Elimination of Turbine Enclosure – Main Steam Line Tunnel Temperature – High Isolation Function
- Implementation LAR Overview

## ○ Closed Session

- SyRS / SyDS LAR content
- Equipment Qualification Summary Report (EQSR)
- Deterministic behavior
- PPS and DCS Power Supply

# *Project Update/Schedule*

# Project Schedule

- Submit LAR 09/30/22
- NRC Acceptance Letter Issued 12/02/22
- Conceptual Verification (CV) - Complete 12/09/22
- Preliminary Validation (PV) - Complete 02/17/23
- Submit LAR Supplements
  - CV Report 02/09/23
  - SyDS Rev 2 02/17/23
  - PV RSR 03/30/23
  - Seismic EQ 04/18/23
  - Environmental EQ 05/03/23
  - EMC EQ 06/16/23
- Integrated System Validation - Complete 08/31/23
- Integrated FAT - Complete 12/22/23
- LAR SER Issued 03/06/24
- LGS Unit 1 Outage Install - Start 04/08/24

# *LAR Preview*



# LAR Preview

- Cover letter
- Evaluation of Proposed Change (Attachment 1)
  - System description, current requirements, reason for, and description of the proposed changes
  - Required information per DI&C-ISG-06 Enclosure B, Alternate Review Process
  - Description of Licensing Technical Report (LTR) (previously submitted)
  - RRCS Reclassification (addressed in LTR)
  - Elimination of RRCS Feedwater Runback function (addressed in LTR)
  - Elimination of Turbine Enclosure – High Temp. MSL Isolation function
  - D3 CCF Coping Analysis (previously submitted)
  - Factory Acceptance Test / Site Acceptance Test
  - Surveillance Requirement (SR) Elimination (addressed in LTR)
- Technical Specification (TS) Changes (Attachment 2)
  - TS markups and clean pages
  - TS Bases markups (information only)
  - Description of Changes
  - Format is similar to ITS Conversion

# LAR Preview

- Attachments
  - System Requirements Specification (SyRS), Revision 1
  - Failure Modes and Effects Analysis (FMEA)
  - System Design Specification (SyDS), Revision 1
  - Equipment Qualification Summary Report (EQSR)
  - Human Factors Engineering
  - VOP Summary
  - Draft UFSAR Markups (for information only)
  - Regulatory Commitment

# LAR Preview: DI&C ISG-06, Revision 2, Enclosure B

|      |  |   |
|------|--|---|
| 1.1  | Summary of Application Software Planning and Processes (see D.4)                       | Addressed in WCAP-18598-P, "Licensing Technical Report for the Limerick Generating Station Units 1 & 2 Digital Modernization Project," Revision 0 (LTR), Section 5, "PPS - I&C System Development Processes (D.4)." Document previously submitted on August 12, 2022 (ADAMS Accession No. ML22224A146)  |
| 1.2  | Summary of Vendor Oversight Plan (see C.2.2)   | LAR, Attachment 11  |
| 1.3  | Approved Topical Report Safety Evaluation (see D.5)                                    | Addressed in LAR, Attachment 1, "Evaluation of Proposed Change," Section 3.1, "DI&C-ISG-06 Alternate Review Process (ARP) LAR Contents" and LTR, Section 6, "PPS - Applying a Referenced Topical Report Safety Evaluation (D.5)" <ul style="list-style-type: none"> <li>• WCAP-16097-P, "Common Qualified Platform Topical Report," Revision 5 (ADAMS Accession No. ML21140A104)</li> <li>• WCAP-16096-P, "Software Program Manual for Common Q™ Systems," Revision 5.1, (ADAMS Accession No. ML21146A203)</li> </ul> |
| 1.4  | System Description (see D.1)   | Addressed in LAR, Attachment 1, Section 2.1, "System Description and Operation," and LTR, Section 2, "Plant System Description (D.1)"   |
| 1.5  | System Architecture (see D.2)  | <ul style="list-style-type: none"> <li>• Addressed in LTR, Section 3, "System Architecture (D.2)</li> <li>• System Requirements Specification (SyRS), Revision 1</li> <li>• System Design Specification (SyDS), Revision 1</li> <li>• System Design Specification (SyDS), Revision 2 (submitted later)</li> </ul>   |
| 1.6  | Summary of Hardware Equipment Qualification (see D.3)                                  | LAR, Attachment 8   |
| 1.7  | Unified Compliance/Conformance Matrix for IEEE Std 603-1991 and 7-4.3.2-2003 (see D.6) | Addressed in LTR, Section 7, "PPS - Compliance/Conformance Matrix for IEEE Standards 603-1991 and 7-4.3.2-2003"   |
| 1.8  | Changes to Technical Specifications (see D.7)  | LAR, Attachment 2   |
| 1.9  | Setpoint Methodology and Calculations (see D.7)  | Not applicable; There are no changes to setpoints, setpoint calculations, or setpoint methodology.  |
| 1.10 | Secure Development and Operational Environment (see D.8)                               | Addressed in LTR, Section 8, "PPS - Secure Development and Operational Environment (D.8)"   |

# Post LAR Supplements / Submittals

- Post LAR submittal Supplements will include the following:
  - Equipment Qualification
    - Equipment Qualification Summary Report (EQSR), as needed
    - Seismic EQ
    - Environmental EQ
    - EMC EQ
  - HFE NUREG-0711 Result Summary Reports (RSRs) (Procedure / Training Impacts, V&V)
  - System Design Specification (SyDS), Revision 2
- Separate Risk-Informed Completion Time (RICT) LAR
- Separate Installation Support LAR

# *Vendor Oversight Plan / VOP Summary*

# Vendor Oversight Plan

- The VOP has been established as a controlled CEG procedure; it is a procedure-based “umbrella” document that implements the CEG vendor oversight activities
- The hierarchy of CEG procedures that will ensure the effectiveness of CEG vendor oversight activities is described in both the VOP and VOP Summary
  - Quality management, procurement, design control, project management, risk management, and corrective action
- Performance measures and acceptance criteria for each phase of the software life cycle are included in the VOP and described in the VOP Summary
- Corrective action and documentation processes for CEG’s vendor oversight activities are included in the VOP and summarized in the VOP Summary
- Both the VOP and VOP Summary include a description of the administrative process for revising the oversight plan

# Vendor Oversight Plan Summary

- Background
- VOP Table of Contents
- Vendor Oversight Plan Scope
- Procedural Basis for the VOP
  - Quality Management
  - Procurement
  - Design Control
  - Project Management
  - Risk Management
  - Corrective Action
  - VOP Change Process
- Project Organization and Roles
- Performance Measures and Acceptance Criteria
- Plant Specific Action Items
- Corrective Actions

*HFE Follow-up  
from June 2022  
Presubmittal Meeting*



# Addressing HFE Regulatory Requirements and Guidance

- **Key HFE Requirements**
  - UFSAR Section 13.1.2 / NUREG-0737 Supplement 1, Item I.D.1
  - DCRDR Program Plan and Summary Report
- **Key HFE Guidance**
  - DI&C-ISG-06
  - DI&C-ISG-06 references NUREG-0711, NUREG-1764, IEEE 603-1991
- **Key Limerick Documents Demonstrating Compliance**
  - *INL/LTD-22-68693, HFE Program Plan*
    - LAR Attachment 10, Table 1 maps the relevant HFE Program Plan sections to the requirements in NUREG-0737 Supplement 1 Item I.D.1 (DCRDR) requirements
    - The HFE Program Plan describes how all 12 NUREG-0711 HFE activities are implemented for the project
    - The HFE program plan addresses how NUREG-1764 is used
    - Licensing Basis will be updated to include NUREG-0711 and NUREG-1764 as part of this modification

# V&V Results Timing

| Date                           | Activity   | Results Available for Draft SER |
|--------------------------------|--|---------------------------------|
| 12/9/2022<br>2/9/2023 Report   | Execute Conceptual Verification ( <b>CV</b> ) and generate report                  | Yes                             |
| 2/17/2023<br>3/30/2023 Report  | Execute Preliminary Validation ( <b>PV</b> ) and issue report                      | Yes                             |
| 8/31/2023<br>12/22/2023 Report | Execute <b>ISV</b> and generate report   | No                              |
| 12/22/2023<br>2/23/2024 Report | Execute <b>FAT</b> , resolve any relevant issues from ISV and generate FAT report. | No                              |

# V&V Information to Support LAR in Lieu of Final ISV

| Activity | Description   | Product   | Equipment Used for Activity   |
|----------|---|---|---|
| CV       | <ul style="list-style-type: none"> <li>• Verifies the conceptual design against style guide via scenario walkthroughs</li> <li>• Uses prototype static displays and navigation strategy created as part of Task Analysis (TA)</li> <li>• Uses draft procedures aligned with prototype displays</li> <li>• Important Human Actions are assessed</li> </ul> | CV results included in Report                                       | Combination of laptop loaded with static displays, and/or glass top simulator |
| PV       | <ul style="list-style-type: none"> <li>• Uses dynamic displays</li> <li>• Validates procedures and HSI design</li> <li>• Conducted via a dynamic HSI workshop</li> <li>• Follows the “Preliminary Validation” per NUREG-0800, Chapter 18, Attachment A. will address any changes to credited manual actions.</li> </ul>                                   | PV results included in RSR with the Task Support Verification (TSV) | Any combination of laptop, ANSI 3.5 simulator, and/or glass top simulator     |

# Glass Top Simulator & ANSI 3.5 Simulator

- Glass Top Simulator (used for PV)
  - Stand-alone unit that represents the control room on digital touch screens.
  - Includes three or four screens on a roll-around unit.
  - Can represent the control room on a digital screen for any given configuration but will not include the physical HSIs.
  - Screen size is constrained and, therefore, may not reflect actual HSI sizes.
  - Only displays parts of the control room at any given time.
- ANSI 3.5 Simulator (used for ISV)
  - Uses physical HSIs.
  - Physical modifications are put in place by disabling HSIs (switches, screens, etc.) and mounting temporary interfaces.
  - May not fully represent the final control room configuration
  - Positioning of the HSIs may not exactly correspond to their final location.
  - Provides the ability to see the entire control room at the same time.

*Elimination of Turbine  
Enclosure – Main Steam Line  
Tunnel Temperature – High  
Isolation Function*

# Elimination of *Turbine Enclosure – MSL Tunnel Temperature - High* Isolation Function

- The ambient temperature of the monitored Turbine Enclosure (TE) Main Steam Line (MSL) tunnel area can approach the automatic isolation setpoint for reasons other than actual main steam leaks in the area, such as hot weather, reduced efficiency of the TE chillers, or instrument drift.
- If both TE MSL Tunnel Temperature - High trip systems were to initiate an isolation signal, a full Group 1 isolation and reactor trip would result. Group 1 isolation closes the MSIVs, resulting in a loss of heat sink, as well as rendering the main feedwater system unavailable for scram recovery. The loss of Feed Water becomes a scram with complications.
- The proposed change deletes CTS 3.3.2 Function 1.g, “Turbine Enclosure (TE) - Main Steam Line (MSL) Tunnel Temperature - High,” from CTS Tables:
  - 3.3.2-1, “Isolation Actuation Instrumentation”
  - 3.3.2-2, “Isolation Actuation Instrumentation Setpoints”
  - 3.3.2-3, “Isolation Actuation Instrumentation Response Times”
  - 4.3.2.1-1, “Isolation Actuation Instrumentation Surveillance Requirements.”

# Elimination of *Turbine Enclosure – MSL Tunnel Temperature - High Isolation Function* (cont.)

- The proposed change adds new TS 3.7.9, “Turbine Enclosure Main Steam Line Tunnel Temperature.” Proposed TS 3.7.9 will ensure that an MSL steam leak in the TE MSL tunnel will be promptly detected, and appropriate actions taken.
- The new LCO 3.7.9 is applicable in OPCON 1, 2, and 3 and requires the TS MSL Tunnel maximum temperature to be  $\leq 175^{\circ}\text{F}$  (i.e., current isolation trip setpoint).
- New SR 3.7.9.1 requires verification that the TE MSL tunnel temperature is  $\leq 175^{\circ}\text{F}$  on a frequency controlled by the Surveillance Frequency Control Program (SFCP). The initial frequency will be 24 hours.
- Proposed Actions require immediate verification that no MSL leak exists if TE MSL Tunnel temperature exceeds  $175^{\circ}\text{F}$ , and periodic verification every 12 hours thereafter. If it cannot be verified that there is no MSL leakage, or if the periodic verification is not performed, a plant shutdown is required.

# Elimination of *Turbine Enclosure – MSL Tunnel Temperature - High* Isolation Function (cont.)

- The TE – MSL Tunnel Temperature - High function is not assumed to actuate in any accident analysis. The function is a surrogate for MSL leakage, which is an assumption in some accident analyses. However, creating the potential for a complicated reactor scram based on a surrogate indication, which may not be indicative of actual MSL leakage, is unnecessary.
- Replacing this automatic MSIV isolation requirement with a monitoring requirement and a manual shutdown if MSL leakage is detected will eliminate the risk of an unnecessary plant transient while still providing the appropriate remedial actions to ensure the plant is operating safely and within the assumed plant conditions.
- The proposed change is similar to May 20, 2022 Hatch license amendment precedent that eliminated the Hatch instrumentation function, “Turbine Building Area Temperature – High.” This Hatch function serves the same purpose as the LGS "Turbine Enclosure Main Steam Line Tunnel Temperature," function.



# *Implementation LAR Overview*

# INSTALLATION Support LAR

- Add a note to the Operational Condition (MODE) 5 Applicability of TS 3/4.3.1, "Reactor Protection System Instrumentation," Tables 3.3.1.1-1 and 4.3.1.1-1, Function 11, "Reactor Mode Switch Shutdown Position," and Function 12 "Manual Scram," consistent with NUREG-1433, "Standard Technical Specifications General Electric BWR/4 Plants," Revision 5.0;
- Add a note to TS 3/4.8.1.2, "A.C. Sources – Shutdown," Surveillance Requirement (SR) 4.8.1.2 specifying the applicable Emergency Diesel Generator (EDG) SRs in MODE 5, consistent with Technical Specification Task Force (TSTF) Traveler -582 (TSTF-582), "RPV WIC Enhancements," and TSTF-583-T, "TSTF-582 Diesel Generator Variation;"
- Revise the MODE 5 applicability of TS 3/4.3.3, "Emergency Core Cooling System Actuation Instrumentation," Tables 3.3.3-1 and 4.3.3-1, Function 5, "Loss of Power," consistent with TSTF-583-T;
- Delete the TS 3/4.5.2, "Reactor Pressure Vessel (RPV) Water Inventory Control (WIC)," Action a, requirement to suspend core alterations, consistent with TSTF-542, "Reactor Pressure Vessel Water Inventory Control," and
- Add a one-time Completion Time (CT) extension for TS 3/4.3.4, "ATWS Recirculation Pump Trip Actuation Instrumentation," Actions d. and e.

# INSTALLATION Support LAR

- Add a one-time Completion Time (CT) extension for TS 3/4.3.4, "ATWS Recirculation Pump Trip Actuation Instrumentation," Actions d. and e.
  - LCO 3.3.4.1 Action d: With one trip system inoperable, restore the inoperable trip system to OPERABLE status within 72 hours or in accordance with the Risk Informed Completion Time Program, or be in at least STARTUP within the next 6 hours.
  - LCO 3.3.4.1 Action e: With both trip systems inoperable, restore at least one trip system to OPERABLE status within 1 hour or be in at least STARTUP within the next 6 hours.
- Requesting CT extension to 30 days to support simultaneous demolition of both Trip systems planned to start 30 days prior to Refuel Outage.
- Demolition of one trip system at a time was reviewed and judged not practical.
- Note in the PPS submittal (9/30/22) the RRCS system will be reclassified as a non-safety related system, removed from TS, and implemented on the non-safety relation Ovation Platform.
- The justification will be based on a hybrid technical justification using both deterministic and risk insights.
- A PRA analysis was completed that meets RG 1.177 thresholds for one time CT extensions.