

# Common Q Platform Elimination of Technical Specification Surveillance Requirements (WCAP-18461) NRC Meeting November 2019

Steven Merkiel, Warren Odess-Gillett, and Richard Paese  
Westinghouse Electric Company

# OUR VISION & VALUES

**Westinghouse will remain the first choice for safe, clean and efficient energy solutions.**

We enhance our delivery of that vision by living our values:

- ▶ Safety & Quality First
- ▶ Valuing Ethics, Integrity & Diversity
- ▶ Passion for Serving Our Customers Globally
- ▶ Dedication to Each Other Through Servant Leadership
- ▶ Creating Value for Shareholders, Customers & Employees
- ▶ Consistently Delivering Our Commitments

# Agenda

- Overview of WCAP-18461
  - Purpose/Benefits of Tech Spec Surveillance Requirement (SR) Elimination
  - Proposed Applications/Architectures
  - Discuss types of SRs that are within the scope of WCAP-18461
  - Overview of Self-Diagnostics
  - Outline of Methodology
  - Current Efforts
- Walkthrough WCAP-18461
- Schedule of Documents for NRC Review

# WCAP-18461 Overview

# Introduction

- Current Tech Spec Surveillance Requirements (SRs) are mostly based on analog technology
  - Westinghouse Plant Standard Tech Specs, NUREG-1431
  - Combustion Engineering (CE) Plant Standard Tech Specs, NUREG-1432
- Leveraging self-diagnostics of the Common Q Platform can eliminate safety system SRs

# Benefits of Tech Spec Surveillance Reduction

- Increased Safety
  - Minimize the time the system is at less than full redundancy
  - Minimize how often the system is “touched”, which in turn reduces human performance errors.
  - Increasing the amount of time the system is “checked” by crediting self-diagnostics
- Reduced Costs
  - Less hours/effort spent testing the safety system
  - Less development and maintenance of testing procedures
  - Cost savings from reducing manual testing will help offset upgrade costs

# Proposed Applications

- Reactor Protection Systems/Engineered Safety Feature Actuation Systems (PPS)
- Core Protection Calculator Systems (CPCS)
- Diesel Loading Sequencer (DLS) Systems
- Post-Accident Monitoring (PAM) Systems

# Proposed SR Candidates for Elimination

- Channel Checks (performed up to every 12 hours per NUREG-1431 and NUREG-1432)
- Safety System Functional Logic Tests (Westinghouse)
  - Channel Operational Tests (COT)
  - Actuation Logic Tests (ALT)
  - Actuating Device Tests (ADT)\*
- Safety System Functional Logic Tests (CE)
  - Channel Functional Tests (includes Bistable Testing, Matrix Logic Testing, and Trip Logic Testing)
- Response Time Testing of the Safety System (excluding sensors/actuating devices)

\*Not part of NUREG-1431



# Self-diagnostics

- Platform Software Self-diagnostics
  - AC160
  - Component Interface Module (CIM) Diagnostics\*
- Application Software Self-Diagnostics
  - Inter-channel Comparisons
  - Termination Unit Faults
  - Addressable Constant Verification

\*CIM equipment is only used for ESFAS implementations

# Methodology

- Equipment-based approach to SR Elimination is utilized
  - Common Q component identification
  - Determine the failure modes for the identified components
  - Mapped self-diagnostic functions to the identified component failure modes
  - SRs are then reviewed to assure failure modes of applicable components are covered

# Current Efforts

- Vogtle 3&4 License Amendment Request (LAR) 19-001 (ML19084A309)
  - Protection and Safety Monitoring System (PMS) Tech Spec Surveillance Elimination for Vogtle Units 3&4
  - Removal of manual Channel Checks, COTs, ALTs, and ALOTs
  - Removal of Response Time Testing of the PMS Rack Components
  - Currently in review by the NRC which has produced positive discussions (anticipated SER prior to the end of 2019).

# Conclusions

- The majority of I&C Safety System Tech Spec SRs can be eliminated for equipment replaced with Common Q
- All Failure Modes were found to be covered by more than one self-diagnostic
- Cost savings from reduced testing are expected to incentivize upgrading vintage safety I&C systems

# NRC Expedited Review/Schedule

# Applicability of this Review to the NRC Expedited Topical Report Review Process

- 1) The review scope is limited due to the NRC's approval of an SNC/AP1000 LAR for a similar methodology. This Topical Report is a generic version of the LAR and addresses additional Common Q systems.
- 2) This Topical Report does not invalidate the original safety evaluation conclusions for the Common Q platform. It remains as an acceptable digital I&C platform for safety-related systems in nuclear power plants.
- 3) The staffs methods for establishing the safety conclusions for the SNC/AP1000 LAR are unchanged for this review.

# Schedule of Documents

- Submit WCAP-18461-P/NP to the NRC in December 2019

# WCAP-18461-P (DRAFT) Walkthrough