

Status of NRC Staff's Acceptance Review of the Limerick Digital Instrumentation and Controls License Amendment Request

November 10, 2022

Public Meeting

Purpose of Meeting

- Provide Constellation status of NRC staff's ongoing acceptance review of Limerick LAR
- Discuss Identified Information Insufficiencies
- Discuss Potential Information Insufficiencies
 - Describe potential acceptance issues
 - Describe potential “review challenge”
- Communicate options NRC staff are considering

License Amendment Request

- Constellation Submitted LAR on September 26, 2022
 - Supporting documents submitted prior to LAR on August 12, 2022
- Non-Proprietary copies of LAR and supporting documents available in NRC document management system ADAMS at Accession Nos. ML22269A569 and ML22224A149
- Proposed amendment would allow the use of a new single digital instrumentation and controls system to replace analog instrumentation of reactor protection system, analog nuclear steam supply shutoff system, emergency core cooling system, reactor core isolation cooling system, and end-of-cycle recirculation pump trip.

Limerick LAR Acceptance Review Team

5 NRR Divisions, 9 Technical Branches, 15 Reviewers, 3 Project Managers

- **NRR/DEX***
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 - Nan Chien
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 - Steven Alferink
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Overview of NRC Staff's Acceptance Review Process

- After receipt of an amendment request, the NRC determines whether the request contain sufficient technical information both in scope and depth for the NRC staff to complete the detailed technical review
- Current acceptance review status
 - Constellation has provided significant information in many technical areas to support the digital modification
 - Constellation has identified information that needs to be provided and a schedule for providing the information needed to complete the review
 - NRC staff have identified additional areas that need discussion with Constellation to help determine whether sufficient information for review has been provided and a potential review challenge

Identified Information Insufficiencies

- Constellation has provided a schedule for providing the following information that is currently not include in LAR:
 - Human Factors Engineering (HFE) Conceptual Verification Results Summary Report (RSR): February 9, 2023
 - HFE Preliminary Verification RSR: March 30, 2023
 - Seismic Equipment Qualification (EQ) Summary Report, Revision 0: April 18, 2023
 - Environmental EQ Summary Report, Revision 1: May 3, 2023
 - Electromagnetic Compatibility (EMC) EQ Summary Report, Revision 2: June 16, 2023

Planned Changes to the Request

- Constellation plans to replace Attachment 5, System Design Specification (SyDS), Revision 2
 - WNA-DS-04900-GLIM-P, Revision 3, LGS PPS System Design Specification (SyDS): February 17, 2023

Potential Information Insufficiencies

1. Use of CIM for priority module
2. Compliance of independence between redundant portions of a safety system with criteria in IEEE 603 (IEEE 279)
3. Compliance of bypass removal with criteria in IEEE 603 (IEEE 279)

Potential Acceptance Issue (1 of 3)

- **Issue:** Use of CIM priority module
- **Basis/Context:** Section 3.2.5 of the LTR describes the CIM priority module. For the Limerick application, the PPS uses the CIM priority module to perform signal prioritization between the safety system and the DAS. The CIM was developed for AP1000 application. The LAR references WCAP-17179-P for technical description of the CIM. The NRC reviewed the WCAP-17179-P as part of AP1000. However, in the response to generic open items (GOI) 8 in Section 6.2.1.1 of the LTR, the licensee noted the NRC reviewed Rev. 2, and in the LAR, and noted that the TR is currently at Rev. 6. The LTR does not describe the changes made versus what the staff reviewed for AP1000.

Also, the CIM configuration for AP1000 was modified for Vogtle 3 & 4. The LTR references the review and approval of this configuration as part of AP1000 and Vogtle 3 and 4 ITAAC. The LTR does not include enough information to determine if the planned use of the CIM module for Limerick is similar from how it was used in Vogtle 3 and 4.

In Tables 3.2. 5-1, 3.2.5-2, and 3.2.21-1 the licensee describes conformance with DI&C ISG-04. These tables refer to WCAP-17179-P and the review and approval by the NRC of the ITAAC for AP1000 and Vogtle 3 &4 for disposition. However, because of the items identified above, it is not clear how the PPS system component interface modules for Limerick conform with DI&C ISG-04.

Potential Acceptance Issue (1 of 3) cont.

- **Issue:** Use of CIM priority module
- **Information Needed:**
 - Description of the differences between Rev. 2 and Rev. 6 of WCAP-17179-P.
 - Information describing the configuration of the CIM module for Limerick and similarities with the application developed for Vogtle 3 and 4.
 - Description on how the CIM module configuration for Limerick demonstrate conformance with DI&C-ISG-04.

Potential Acceptance Issue (2 of 3)

- **Issue:** Compliance of independence between redundant portions of a safety system with criteria in IEEE 603 (IEEE 279)
- **Basis/Context:** Independence between redundant portions of a safety system: Justification not provided for partial compliance with Clause 5.6.1. Noncompliance part of clause is not described in the referenced Section 3.5.14.1, and a case seems to be made for full compliance.
- **Information Needed:** The licensee will need to identify the portions of IEEE 603 Clause 5.6.1 which have been identified as non-compliant and will need to provide a justification for why this non-compliance is acceptable with the installation of the new system.

Potential Acceptance Issue (3 of 3)

- **Issue:** Compliance of bypass removal with criteria in IEEE 603 (IEEE 279)
- **Basis/Context:** “Exception” for IEEE Std 603, Clauses 6.6 and 7.4 is identified in LTR Table 7-1. The NRC staff also notes that the proposed design does not appear to be compliant with the equivalent Clause 4.12, “Operating Bypasses” in IEEE Std 279. The referenced LTR Section 3.3.2.8 describes the “exception” but does not provide justification other than referring to UFSAR Section 15.0.6. The UFSAR also does not justify the “exception” from Bypass Removal criteria.
- **Information Needed:** The licensee should provide a justification for why the non-compliance with the criteria of IEEE Std 603 Clauses 6.6, and 7.4 or IEEE Std 279, Clause 4.12 is acceptable with the installation of the PPS system. If this non-compliance issue is to be characterized as an “exception” from the regulatory requirements of IEEE 279 (Limericks License Basis).

Potential “Review Challenge”(1 of 1)

- **Issue:** Partial and non-compliance identified by Constellation
(a different aspect of potential acceptance issues 2 of 3 and 3 of 3)
- **Basis/Context:** In the WEC LTR , which was submitted prior to the LAR, Constellation provides a compliance/conformance matrix for IEEE Standards 603-1991 and 7-4.3.2-2003. In the matrix Constellation identifies 3 clauses from IEEE Standard 603-1991 that the PPS is either partially compliant or non-compliant.
- As justification for the partial and non-compliance, Constellation references UFSAR and emergency operating procedures, which are documents licensee can change without prior NRC approval. The partial and non-compliance identified by the Constellation would require prior NRC approval. NRC staff plans to confirm that the (1) appropriate prior NRC approval was obtained for the identified partial compliance and non-compliance and (2) whether this aspect of the current licensing basis for the existing system(s) carries over to the new PPS.

NRC Staff's Acceptance Review – Next Step

- The NRC staff will consider the clarifications provided by Constellation
- The NRC staff will decide whether there is a need to give Constellation an opportunity to supplement the LAR prior to making an acceptance decision



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Acronyms and Initialisms

ADAMS – Agencywide Documents Access and Management System

BTP – Branch Technical Position

CIM – Component Interface Module

DAS – Diverse Actuation System

DEX – Division of Engineering and External Hazards

DRA – Division of Risk Assessment

DSS – Division of Safety Systems

DORL – Division of Operating Reactor Licensing

DRO – Division of Reactor Oversight

EMC – Electromagnetic Compatibility

ESFAS – Engineered Safety Features Actuation System

EQ – Equipment Qualification

HFE – Human Factors Engineering

IEEE – Institute of Electrical and Electronics Engineers

ITAAC - Inspections, Tests, Analyses, And Acceptance Criteria

LAR – License Amendment Request

LTR – Licensing Technical Report

NRR – Office of Nuclear Reactor Regulation

PPS – Plant Protection System

RPS – Reactor Protection System

RSR – Results Summary Report

TR – Technical Report

TR – Topical Report

WEC – Westinghouse Electric Company