2.2.15 Instrumentation & Control Compliance With IEEE 603

Design Description

Instrumentation and Controls designed in compliance to IEEE 603 are identified in Table 2.2.15-1. Table 2.2.15-1 identifies each IEEE Std. 603 criterion that is applied to the design of the systems listed. The design description related to IEEE-603 criteria is provided below.

Instrumentation and Control systems are designed to the following IEEE Std. 603 criteria as listed in Table 2.2.15-1:

(1) Single Failure: Criterion 5.1 - Ensure that safety functions required for design basis events are performed in the presence of:

   a. Any single detectable failure within safety systems concurrent with all identifiable but non-detectable failures;

   b. All failures caused by the single failure; and

   c. All failures and spurious system actions that cause or are caused by the design basis event requiring the safety functions.

(2) Completion of Protective Actions: Criteria 5.2 & 7.3 - The systems are designed to accomplish the safety functions under the full range of applicable conditions enumerated in the design basis and the logic is designed such that, once initiated automatically or manually, the intended sequence of protective actions of the executive features continue until completion.

(3) System Integrity: Criterion 5.5 - The systems are designed to demonstrate that the safety system performance is adequate to ensure completion of protective actions over a range of transient and steady-state conditions enumerated in the design basis.

(4) Capability for Test & Calibration: Criteria: 5.7 & 6.5 – Systems are designed to meet the capability for testing and calibration of safety system equipment, while retaining the capability of the safety system to accomplish their safety functions.

(5) Information Displays: Criterion 5.8 - MCR displays are provided. These displays are defined in the HFE report

Inspections, Tests, Analysis and Acceptance Criteria

Table 2.2.15-2 provides the inspections, tests, and/or analyses, together with associated acceptance criteria for applicable IEEE Std. 603 criteria listed under Table 2.2.15-1.

Table 2.2.15-1
IEEE 603 Criterion vs. System Applicability Matrix

IEEE 603 Criterion	**ICS**	**GDCS**	**NBS**	**SLC**	**NMS**	**RSS**	**RPS**	**PRMS**	**CMS**	**SPTM**	**LD&IS**	**SSLC/ESF**	**RC&IS**	**CRD**	**FWCS**	**SB&PC**	**DPS**	
Tier 1 Subsection	2.4.1	2.4.2	2.1.2	2.2.4	2.2.5	2.2.6	2.2.7	2.3.1	2.15.7	2.15.7	2.2.12	2.2.13	2.2.1	2.2.2	2.2.3	2.2.9	2.2.14	
5.1	X	X	X	X	X	X	X	X	X	X	X	X					X	
5.2& 7.3						X	X				X	X						
5.4	X	X	X	X	X	X	X	X	X	X	X	X						Se un
5.5							X					X						
5.6																		
5.7& 6.5				X	X		X		X		X	X						

Table 2.2.15-2
ITAAC For IEEE 603 Compliance Confirmation

Design Commitment	Inspections, Tests, Analyses	Acceptance
SINGLE FAILURE: Criterion 5.1: 1. The systems identified in Table 2.2.15-1 for Criterion 5.1 ensure that safety functions required for design basis events are performed in the presence of: a. Any single detectable failure within safety systems concurrent with all identifiable but non-detectable failures; b. All failures caused by the single failure; and c. All failures and spurious system actions that cause or are caused by the design basis event requiring the safety functions.	1. Block level Failure Modes and Effects Analyses (FMEAs) of the systems identified in Table 2.2.15-1 will verify compliance with Criterion 5.1.	1. Analysis report(s) co systems identified in Ta Criterion 5.1 ensures th required for design basi performed in the presen a. Any single detectabl safety systems concurr identifiable but non-det b. All failures caused b and c. All failures and spuri that cause or are caused event requiring the safe

Table 2.2.15-2
ITAAC For IEEE 603 Compliance Confirmation

Design Commitment	Inspections, Tests, Analyses	Acceptance
COMPLETION OF PROTECTIVE ACTIONS: Criteria: 5.2 & 7.3: 2. The systems are designed to accomplish the safety functions under the full range of applicable conditions enumerated in the design basis and the logic is designed such that, once initiated automatically or manually, the intended sequence of protective actions of the executive features continue until completion.	2.a. Inspection of the logic design verifies that the logic is designed such that, once initiated automatically or manually, the intended sequence of protective actions of the executive features continue until completion.	2.a. Inspection report(the logic is designe initiated automatically intended sequence of p the executive featur completion.
	2.b. Tests will be conducted by initiating simulated signals to verify that systems ensure the accomplishment of safety functions under the full range of applicable conditions enumerated in the design basis.	2.b. Test report(s) conc ensure the accomplishn functions under the full conditions enumerated
SYSTEM INTEGRITY: CRITERION 5.5: 3. The systems are designed to demonstrate that the safety system performance is adequate to ensure completion of protective actions over a range of transient and steady-state conditions enumerated in the design basis.	3. Tests are performed to verify that the systems are designed to demonstrate that the safety system performance is adequate to ensure completion of protective actions over a range of transient and steady-state conditions enumerated in the design basis.	3. Test report(s) conclu systems are designed to the safety system perfo to ensure completion o over a range of transien conditions enumerated

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Table 2.2.15-2
ITAAC For IEEE 603 Compliance Confirmation

Design Commitment	Inspections, Tests, Analyses	Acceptance
CAPABILITY FOR TEST & CALIBRATION: Criteria: 5.7 & 6.5: 4. The systems identified in Table 2.2.15-1 for Criteria 5.7 & 6.5 have the capabilities for testing and calibration of safety system equipment, while retaining the capabilities of the systems to accomplish their safety functions.	4. Inspection of technical description of surveillance and self-test features, single-failure analyses, FMEAs, and plant Technical Specifications verify that the systems identified in Table 2.2.15-1 for Criteria 5.7 & 6.5 have the capabilities for testing and calibration of safety system equipment, while retaining the capabilities of the systems to accomplish their safety functions.	4. Inspection/analysis r that the systems identif 1 for Criteria 5.7 & 6.5 meet the capabilities fo calibration of system e retaining the capability accomplish their safety
INFORMATION DISPLAYS: Criterion: 5.8: 5. MCR displays are provided for each of the systems identified in Table 2.2.15-1 as defined in an HFE report. {the HFE report needs to be defined in Tier 1 – perhaps in HFE section}	5. Inspections verify that MCR displays are provided for each of the systems identified in Table 2.2.15-1as defined in an HFE report.	5. Inspection report(s) c each of the systems ide Table 2.2.15-1, the MC defined in an HFE repo