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Technical Part 5: RadICS Digital I&C Platform Topical Report

Commercial Grade Dedication Plan

(Closed Session)

July 14, 2015, Rockville, Maryland



Agenda

- Commercial Grade Dedication Strategy
- EPRI TR-106439 for Commercial Dedication Framework
- EPRI TR-107330 for Method 1 Special Tests and Inspections of Critical Characteristics
- Approach to Method 2 Commercial-Grade Survey of Critical Characteristics
- Use of RadICS Development Documents
- Operating Experience

Commercial Grade Dedication Strategy

- Commercial Grade Dedication (CGD) Plan for RadICS Platform will be based on established guidance:
 - EPRI Handbook 1011710 for the independent Critical Design Review of the technology
 - EPRI TR-106439 for the CGD of the platform developed to the Radiy Quality Management System and IEC Requirements
 - EPRI TR-107330 for the equipment qualification tests
- IEEE Std 7-4.3.2-2003 recognizes the acceptability of EPRI TR-106439 for commercial grade dedication
- Maintenance of RadICS commercial dedication (required by IEEE 7-4.3.2 Section 5.4.2.3) will be accomplished by RadICS QA Program to be certified to meet 10 CFR Part 50 Appendix B requirements

EPRI TR-106439 for CGD Framework

- EPRI TR-106439 will be used to structure the CGD effort
 - Compliance with EPRI TR-106439 process will be demonstrated using a checklist, which provided a mapping that shows where the elements of the dedication process are addressed in licensing documentation
- RadICS CGD plan will use a combination of three acceptance methods described in EPRI TR-106439 to verify the adequacy of the platform:
 - Method 1: Special Tests and Inspections of the equipment
 - Method 2: Commercial Grade Survey of hardware and electronic design development processes
 - Method 4: Acceptable Performance Record of the RadICS platform

EPRI TR-107330 for Method 1 Special Tests and Inspections of Critical Characteristics

- Qualification testing of the RadICS Platform Test Specimen will be used to address Method 1

- Testing will demonstrate that the RadICS platform functioned correctly during and/or after exposure to the series of stress tests outlined in EPRI TR-107330

Approach to Method 2 Commercial-Grade Survey of Critical Characteristics (1/3)

Method 2 critical characteristics will be based on three US benchmarks

- RadICS Electronic Design Development process (based on IEC Standards) will be evaluated for [developed from applicable NRC review guidance for safety system software development defined in NRC Branch Technical Position 7-14, IEEE Standard 7-4.3.2-2003, and other endorsed IEEE standards]
- RadICS Platform Design Characteristics will be evaluated for [developed from NUREG/CR-6082, DI&C-ISG-04, and IEEE Std 603-1991]
- RadICS Platform Design Characteristics will be evaluated for [developed from EPRI TR-107330]

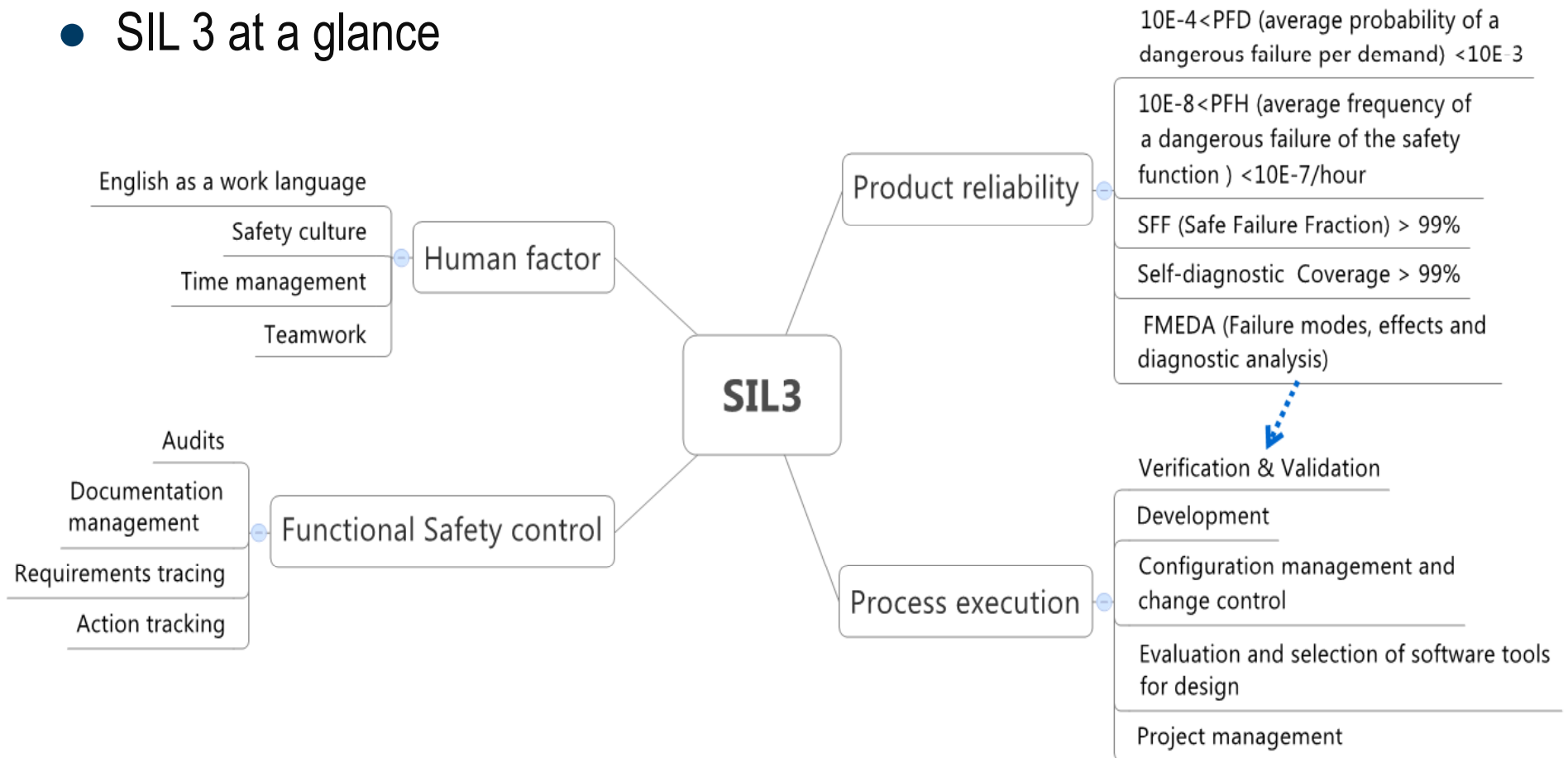
Approach to Method 2 Commercial-Grade Survey of Critical Characteristics (2/3)

- Radiy will also use the recent IEC SIL 3 Certification work performed by **exida** to support the Method 2 assessment
- Relevance to RadICS CGD assessment:

IEC 61508 defines the requirements for suppliers to follow during product development to ensure that their products have a high level of resistance to random hardware and “systematic” design failures. Compliance is evaluated by qualified third party certification agencies which assess and certify that a product has been designed and developed in accordance with the standard. **exida** follows a rigorous process that verifies the Safety Integrity Level (SIL) of a product’s hardware and software design, as well as its manufacturing and quality control procedures.

Approach to Method 2 Commercial-Grade Survey of Critical Characteristics (3/3)

- SIL 3 at a glance



Use of RadICS Development Documents

- Method 2 reviews will assess existing verification and validation records for critical safety features of the RadICS platform
- EPRI TR-106439 envisions the approach of using the historical development records as a basis for acceptance in a commercial grade dedication review
 - High quality records that are readily retrievable and maintained within an effective configuration management system are essential for use in the RadICS CGD effort

Operating Experience

- Method 4 will be based on the Radiy 3 operating experience to demonstrate satisfactory performance with the platform technology
- Operating experience will not be used to compensate for shortcomings in legacy electronic design nor will it be used as a basis for establishing module failure rates

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Thank you for your attention!

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