U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Embedded Digital Device Regulatory Issue Summary Update

Embedded Digital Device Workshop
October 08, 2014

Eugene Eagle (Instrumentation & Controls)
– NRR/DE/EICB
Booma Venkataraman (Fuel Cycle Facilities)
– NMSS/FCSS/PORSB
Duane Hardesty (Non-Power Reactors)
– NRR/DPR/PRLB

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Embedded Digital Device Regulatory Issue Summary (RIS) Status

- Draft revised Embedded Digital Device (EDD) RIS issued for public comment (2nd round) June 2014
- Nine sets of public comments received
  - Organizations – NEI, EPRI
  - Utilities – FPL, STARS Alliance
  - Universities – MIT, Penn State, U. of Florida
  - Consultants – Nuclear Automation Eng., NewClearDay Inc.
- NRC staff from Task Working Group (TWG) currently addressing all public comments

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Embedded Digital Device RIS
TWG Addressing Public Comments

- TWG members are:
  - Representing FIVE different NRC offices
  - Mainly from I&C disciplines
  - Continuity through same members with some new members
  - Have significant nuclear plant or nuclear industry experience
- TWG members represent offices associated with:
  - New reactors (NRO)
  - Operating nuclear power reactors (NRR)
  - Non-power reactors (NRR)
  - Fuel cycle facilities (NMSS)
  - Cyber and nuclear facility security (NSIR)
  - NRC research (RES)

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Embedded Digital Device RIS Introduction of the RIS

- Applies to safety-related systems and excludes common defense and security, including cyber security applications
- Raises awareness among licensees that EDDs may exist in plant or facility equipment used in safety-related applications
- Encourages identification, review, documentation, and control necessary to demonstrate quality and reliability
- Highlights possible vulnerability of equipment and systems to potential hazards like common cause failures (CCF) caused by software defects in EDDs
- Addresses the NRC technical positions and regulations for power reactors, non-power reactors, and fuel cycle facilities
- Does not provide any guidance or set any new expectations

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Embedded Digital Device RIS Public Comment Highlights (Nuclear Reactors)

- The RIS Definition of an EDD that defines what electronic components are considered EDDs
- Perception of over-emphasis on diversity as only prevention or mitigation against a potential CCF
- Perception of increase in cyber security effort and cost
- Lack of needed guidance provided by RIS
- Similar equipment with EDDs in extensive successful use in industry world-wide
- How much testing is sufficient
- Perception of application of power regulations to non-power reactors

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Embedded Digital Device RIS Public Comment Highlights (Fuel Cycle Facilities)

Notable Public Comments:

- Recommendation to expand the scope of the RIS by adding cyber-security related components
- Perception that NRC has set new expectations (e.g.,10 CFR 70.72 change process as applied to EDDs)

NRC Key Messages:

- Licensees/applicants should adequately address any impact EDDs have on quality and reliability of safety-related systems
- This RIS is raising awareness on the issue and is not setting any new expectations