

July 18, 2013

MEMORANDUM TO: Ian C. Jung, Chief
Instrumentation, Control, and Electronics
Engineering Branch 2
Division of Engineering
Office of New Reactors

FROM: Eugene Eagle, Electronics Engineer **/RA/**
Instrumentation, Control, and Electronics
Engineering Branch 2
Division of Engineering
Office of New Reactors

SUBJECT: SUMMARY OF JUNE 20, 2013 UNITED STATES NUCLEAR
REGULATORY COMMISSION CATEGORY 2 PUBLIC MEETING
ON DRAFT REGULATORY ISSUE SUMMARY (RIS) ON
EMBEDDED DIGITAL DEVICES

On June 20, 2013, the U. S. Nuclear Regulatory Commission (NRC) staff, Office of New Reactors (NRO), Division of Engineering, held a public meeting to:

- 1) Share the background, intent, and scope of the proposed RIS on embedded digital devices with industry and the public.
- 2) Discuss the issues, experiences, challenges, and views on the application of embedded digital devices.

Tom Bergman, Director of Engineering, Office of New Reactors, opened the meeting with a welcome to attendees and provided introductory remarks. Stakeholders in attendance included utility representatives of nuclear power plants under construction (Vogtle and V.C. Summer) and some of the operating plants, representatives from the nuclear power plant vendors (Mitsubishi Heavy Industries (MHI), AREVA, General Electric-Hitachi (GEH) and others), representatives from the Nuclear Energy Institute (NEI), and fuel cycle facility representatives. Gordon Clefton of NEI also provided opening statements and expressed appreciation for the opportunity to have a public meeting for the draft embedded digital device RIS rather than written comments only.

Ian Jung, Branch Chief of the Instrumentation, Control, and Electronics Engineering Branch 2 was the lead presenter for the NRC and led the discussion with the attendees. He introduced draft RIS 2013-XX, "Embedded Digital Devices in Safety-Related Systems, Systems Important to Safety, and Items Relied on for Safety," which is publically available in the Agencywide Documents Access and Management System (ADAMS) under Accession Number ML12248A065. He stated the purpose of the RIS was to heighten awareness that programmable embedded digital devices may exist in many types of plant equipment (e.g., pumps, valves, breakers, relays, diesel generators, uninterruptible power supplies), and that potential safety issues may result, for example, if a programming or specification error would occur that could affect safety equipment in

multiple trains. One purpose of the RIS is to clarify the technical position on existing regulatory requirements applicable when embedded digital devices are used in nuclear facility equipment. While staff and industry representatives noted the importance of considering embedded devices for purposes of providing appropriate cyber security protections for nuclear facilities, cyber security is not included in the current scope of the draft RIS.

The meeting demonstrated that stakeholders are highly engaged on this embedded digital device issue. The attendees presented ideas and asked questions on the RIS, embedded digital device experiences, and application of digital technology in nuclear facilities in general.

An AREVA representative stated that one of their European projects was faced with a huge challenge for this issue late in development related to cyber security protection of equipment containing embedded digital devices, resulting in significant additional work and negative impact on schedules. Another meeting attendee stated that it is difficult to access information inside these devices from the sub-vendors due to their proprietary nature, raising concerns on the licensee/vendor understanding of what is in the devices, as well as compliance with the requirements. Other attendees added that some commercial products may include programmable embedded digital devices that have multiple capabilities through code that is unneeded and unused for accomplishing the designated safety function. This may unnecessarily increase the complexity of the software or software-developed logic, and also the potential risk for a software related error.

There was discussion on the use of 'best estimates' in the analysis for potential software common cause failure (CCF) of non-safety systems. This may occur when embedded digital devices are used in redundant equipment in non-safety systems that could potentially affect safety systems. The NRC staff acknowledged that this area needs further discussion, which is also related to the current open items in certain design certification applications. There was also discussion on whether software CCFs in non-safety systems should be 'analyzed events' in accordance with NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," Chapter 15.

There was discussion regarding the credit (relaxation from other activities in the staff guidance) that can be taken if 100-percent testing is achieved for simple embedded digital devices. There was concern whether practical digital components would be simple enough to achieve 100% testing. The NRC Staff acknowledged that this was another topic for further discussion, but not necessarily material to this RIS.

Fuel facility representatives indicated the RIS needed further clarification on regulations that specifically apply to fuel facilities. The NRC staff responsible for this area accepted this comment as an action item.

The public was given opportunities to provide comments or ask questions on these topics. Gordon Clifton indicated that NEI would collect and consolidate comments on the RIS from their members and transmit these to the NRC staff. The NRC expects to issue the RIS prior to the end of 2013.

A list of attendees is attached. Slides for this public meeting are publically available in ADAMS under Accession Number ML13169A344. The public meeting notice including enclosures with the "Agenda" and "Obtaining a Copy of Draft Embedded Digital Device RIS from the Public WebSite" is publically available in ADAMS under Accession Number ML13149A361.

Members of the public were either in attendance and Public Meeting Feedback forms were distributed and submitted according to standard practices. Please direct any inquires to Eugene Eagle at (301) 415-3706 or via e-mail to Eugene.Eagle@nrc.gov.

Enclosure
Attendee List

CONTACT: Eugene Eagle, NRO/DE
(301) 415-3706

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Enclosure
Attendee List

CONTACT: Eugene Eagle, NRO/DE/ICE2
(301) 415-3706

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DPasquale, NRO	JCintron, NMSS	

ADAMS Accession Numbers: MLXXXXXXXX; *via email NRO-002

OFFICE	NRO/DE/ICE2	NRO/DE/ICE2:BC
NAME	EEagle*	IJung
DATE	7/ 18 /2013	7/ 18 /2013

OFFICIAL RECORD COPY

List of Attendees

NRC Category 2 Public Meeting on Draft Regulatory Issue Summary (RIS) on
Embedded Digital Devices
Held on June 20, 2013

Name	Organization
Robert Atkinson	Dominion
Jack Zhao	NRC – NRO/DE/ICE1
Eugene Eagle Jr	NRC – NRO/DE/ICE2
Tim Mossman	NRC – NSIR/CSD
Jim Gaslevic	NRC – NRO/DCIP
Ian Cozens	NRC – NRO/DCIP
Ken Scarola	MNES/NAE
Bob Hirmanpour	Southern Nuclear
Wes Vaughn	Southern Nuclear
Janet Schluefer	NEI
Brock Wilbanks	Southern Nuclear
Paul Rebstock	NRC – RES/DE/ICEEB
Mike Franovich	NRC – NMSS/FCSS
Booma Venkataraman	NRC – NMSS/FCSS
David L. Rahn	NRC – NRR/DE/EICB
Gordon Clefton	NEI
Royce Beacom	NRC – NRO/DE/ICE1
Tom Alexion	NRC – NRR/PGCB
Patrick Troy	Lockheed Martin
Joesph Murray	MTS for Lockheed Martin
Michael Waterman	NRC – RES/DE/ICEEB
Herbert (Skip) Bulter	Gen Nuclear
Sara Ruby	Gen Nuclear
Jorge A. Cintron	NRC – NMSS/FCSS
Russell Sydnor	NRC – RES/DE/ICEEB
Jonathan Nay	AREVA
Bill Roggenbrodt	NRC – NRO/DE/ICE1
Eric Lee	NRC – NSIR/CSD
Dinesh Taneja	NRC – NRO/DE/ICE2
Ian C. Jung	NRC – NRO/DE/ICE2

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Embedded Digital Devices
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Name	Organization
Jim Shank	PSEG Nuclear
Mike Miller	Sargent & Lundy/Duke Energy
Paul Naab	Wolf Creek
Terry Tyndali	GE
Max Robertson	GE
Darrell Cooksey	Hurst Technologies Corp
Joseph Ashcraft	NRC – NRO/DE/ICE2
Sheila Jean	Engineering Oversight
Richard Harper	I&C Design Engineering
Doug Freimarck	EN-Columbia Nenerating Station
Jim Bringley	SCE&G
Tyrone Heyward	Scana
Ronald Jarrett	TVA Corp Engineering
Robert Reible	Luminant Generation Company
William Catullo	Westinghouse Engineering Services
Frank Beaty	GNF
Peter Miner	USEC Inc.
Gary Hamby	Honeywell
Vere Joesph	Zachry Nuclear Engineering, Inc.
Leon Rafner	Certrec Corp
Edward Stickle	GE
Ajay Tiwari	SCANA
David Culver	Southern Nuclear
Daniel Cronin	UFTR
Zee Sultan	Southern Nuclear
William Roger	Lockheed Martin
George Hough	Pacific Gas & Electric Company