

May 11, 2007

MEMORANDUM TO: W. E. Kemper, Chief
Instrumentation and Electrical Engineering Branch
Division of Engineering, Fuel, and Radiological Research
Office of Nuclear Regulatory Research

FROM: Girija S. Shukla, Project Manager **/RA/**
Special Projects Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF THE APRIL 24, 2007, MEETING WITH INDUSTRY
REPRESENTATIVES AND THE DIGITAL INSTRUMENTATION AND
CONTROLS (DIGITAL I&C) HIGHLY INTEGRATED CONTROL ROOM
– COMMUNICATION ISSUES TASK WORKING GROUP (TWG) TO
DISCUSS ISSUES RELATED WITH THE DIGITAL I&C PROJECT

On April 24, 2007, the Nuclear Regulatory Commission (NRC) staff met with the Nuclear Energy Institute (NEI) and other nuclear industry shareholders as a Task Working Group (TWG) on Highly Integrated Control Room (HICR) – Communications to communicate progress on follow-up actions identified during previous meetings and discuss Priority and Actuation Control System (PACS) system overview. The meeting took place at NEI headquarters located in Washington, D.C. Enclosure 1 lists the meeting attendees.

A public meeting notice was issued on April 12, 2007, and was posted on the NRC's external (public) web page (Agencywide Document Access Management System (ADAMS) Accession No. ML071020402, Enclosure 2). The notice included the meeting agenda, which was also available as a handout at the meeting. The discussions included; (1) revisions to the HICR – Communications project plan, (2) Industry proposed revisions to IEEE 7-4.3.2, (3) HICR – Human Factors position on the use of non-safety VDUs to control reactor operations, (4) a detailed discussion continued from the March 29, 2007, TWG meeting on VDU design concepts, and (5) a presentation from AREVA describing a system overview of PACS.

The meeting started with a quick update by Paul Rebstock on the progress and changes that were made by the Digital I&C Steering Committee since the last HICR – Communications TWG meeting on March 29, 2007. The TWG project plan was discussed and the Milestones and Deliverables lists from the Steering Committee Project Plan (Enclosure 3, extracted from April 13, 2007, letter to A. Shahkarami, Appendix 4, page 6 (ML071060070)) and from the HICR – Communications Project Plan (Enclosure 4, extracted from March 29, 2007, meeting summary, attachment 5, page 8 (ML070940244)) were provided. Discussion among the TWG determined that the dates needed to be added back into the table with revised dates to help prioritize and give a clear direction in developing interim guidance. A preliminary set of dates for deliverables was drafted and further discussion was reserved from the next meeting. In addition to establishing deliverable dates, the TWG also discussed the High Priority Issues discussed at the last TWG meeting (Enclosure 5, extracted from March 29, 2007, meeting summary, attachment 3 (ML070940244)) and List of Proposed Generic Level 1 Milestones (Enclosure 6).

The NRC also provide copies of a draft outlining of guidance and acceptance criteria (Enclosure 7) intended to supplement the applicable portions of the Standard Review Plan pertaining to communications independence among digital systems. Industry contacts agreed to review the document and provide comments at the next TWG meeting.

Industry Proposed Revisions to IEEE 7-4.3.2

As a follow up action from the March 29, 2007, public meeting, the industry contacts provided a draft of Section 5.6 of IEEE 7-4.3.2 (Enclosure 8). The TWG members agreed to take the draft into consideration and discuss it at the next meeting if appropriate. NEI will distribute a copy of Dave Herrell's write-up on IEEE 7-4.3.2 for review and discussion at the next meeting. In addition, NEI will distribute a white paper concerning data errors based upon consideration of the on-going update to IEEE 7-4.3.2

Human Factors Position on Use of Non-safety VDUs to Control Reactor Operations and Design Concepts

As a follow up action from the March 29, 2007, public meeting, the TWG discussed the VDU design concepts. It was determined that more information needs to be gathered before the topic can be addressed appropriately. NRC staff agreed to review the presentation from Mitsubishi Heavy Industries (MHI) at the March 29, 2007, meeting and create a list of VDU issues that need further TWG discussion. Industry agreed to work in parallel and begin work on a white paper.

Priority and Actuation Control System (PACS) Overview

Ben Borrusch from AREVA provided the TWG with a presentation on priority actuation and control system (PACS) design concepts. (Enclosure 9). Mr. Borrusch's presentation provided the TWG with an understanding of PACS developed by AREVA for the ERP. The presentation included a system overview, AV42 priority control module, prioritization of actuation signals, and module drive actuation and monitoring. In addition, Mr. Borrusch will determine whether AREVA can provide additional detail and a function diagram for the PACS design concept during the next meeting.

Mr. Hayes of Westinghouse was invited to make a similar presentation concerning the Westinghouse Priority Logic Module. Mr. Hayes indicated that, from a licensing standpoint and within the scope of this TWG, the Westinghouse Priority Logic Module is sufficiently similar in concept to the AREVA PACS that no presentation by Westinghouse is necessary.

Other Topics

During the meeting, it was requested that the TWG address multi-drop communication protocols. It is unclear to the TWG if these protocols can ensure that data are not corrupted in the process of multiple hand-offs. It was decided that discussion of this topic should be delayed until the meeting after next.

Also, the industry contacts agreed that the presentations to date concerning data communications have addressed all present concerns and believe the NRC now has sufficient information regarding their plans and concerns to develop proposed guidance.

Action Item Summary & Future Meeting Agenda Items for HICR – Communications TWG

Seven item actions were identified during this meeting, as follows:

<u>Item #</u>	<u>Description of Action Item</u>	<u>Responsibility</u>
1	Provide a copy of Dave Herrell's write-up on IEEE 7-4.3.2.	NEI
2	Reword section 5.6.4.3 of IEEE 7-4.3.2 and send revision to all members of TWG for review.	NEI
3	Review and provide comments on section 5.6.4.3 of IEEE 7-4.3.2 for the next meeting.	NRC/NEI
4	Review presentation on VDUs from March 29, 2007, meeting and create a list of issues that need further discussion/clarification.	NRC
5	Draft white paper on guidance staff could use to review non-safety-related VDUs, including explanation of selection on non-safety VDUs vs. safety VDUs and credible failures.	NEI
6	Review and provide comments on NRC's draft outline of guidance and acceptance criteria for next meeting.	NEI
7	Determine whether AREVA can provide more detail on the PACS design concept for the next meeting.	AREVA
8	Schedule next TWG meeting.	NRC

The next HICR – Communications TWG meeting will be May 22, 2007, and the tentative subject matter for this meeting:

- follow-up on the actions items listed directly above
- continue discussions on the details and functional diagram of AREVA's PACS design concept
- begin discussions on
 - NRC's draft outline of guidance and acceptance criteria
 - industries white papers concerning IEEE 7-4.3.2, data failure and non-safety VDUs
- prepare for NRC Commission briefing on Digital I&C in June/July.

Enclosures:

1. List of Attendees
2. Meeting Notice (ADAMS ML071020402)
3. Steering Committee Project Plan (extracted from March 29, 2007, meeting summary, attachment 5, page 8 (ADAMS ML070940244))
4. HICR – Communications Project Plan (extracted from March 29, 2007, meeting summary, attachment 5, page 8 (ADAMS ML070940244))
5. High Priority Issues for Digital I&C HICRc (extracted from March 29, 2007, meeting summary, attachment 3 (ADAMS ML070940244))
6. List of Proposed Generic Level 1 Milestones (ADAMS ML071310239)
7. Draft Outline of Guidance and Acceptance Criteria (ADAMS ML071310029)
8. April 6th version of IEEE 7-4.3.2 revision (ADAMS ML071300474)
9. AREVA presentation slides (ADAMS ML071300470)

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Package ADAMS ACCESSION NO. ML071300462

OFFICE	NRO/DE/ICE2	NRR/DPR/PSPB/PM	RES/DFERR/ERA/IE	RES/IEEEB/BC
NAME	KCorp	GShukla	PRebstock	WKemper
DATE	5 / 11 / 2007	5 / 11 / 2007	5 / 11 / 2007	5 / 11 / 2007

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ATTENDEES
MEETING WITH INDUSTRY REPRESENTATIVES AND THE DIGITAL I&C
HIGHLY INTEGRATED CONTROL ROOM – COMMUNICATION ISSUES
TASK WORKING GROUP
TUESDAY, APRIL 24, 2007

INDUSTRY:

B. Borrusch	AREVA
P. Lobner	DS&S
W. Bowers	Exelon
J. Murray	Invensys
G. Johnson	LLNL
M. Takashima	MHI
K. Scarola	MNES-NAE
D. Herrell	MPR Associates
K. Keithline	NEI
J. Ross	NEI
R. Kisner	ORNL
M. Bobrer	ORNL
R. Jarrett	TVA
T. Hayes	Westinghouse

NRC:

J. Smith	NRC/NRO
K. Corp	NRC/NRO
R. Beacom	NRC/NRO
H. Li	NRC/NRO
E. Eagle	NRC/NRO
P. Rebstock	NRC/RES
W. Kemper	NRC/RES
M. Waterman	NRC/RES
D. Coe	NRC (participated via telephone)

NRC = Nuclear Regulatory Commission
NRR = Office of Nuclear Reactor Regulation
NRO = Office of New Reactors
NMSS = Nuclear Material Safety and Safeguards
RES = Office of Nuclear Regulatory Research
NEI = Nuclear Energy Institute
TVA = Tennessee Valley Authority
ORNL = Oak Ridge National Labs
MHI = Mitsubishi Heavy Industries
LLNL = Lawrence Livermore National Laboratory

APRIL 13, 2007

7. MILESTONES, ASSIGNMENTS AND DELIVERABLES:

NEAR-TERM					
Milestones, Assignments and Deliverables	deliverable	Due Date	Est./Actual	Lead	Support
1. Communication Independence					
1a) Receive industry proposals for HICR communication design concepts	✓		F	NEI	N/A
1b) Identify regulatory & design requirements with basis for each type of interaction			F	NRC	NEI
1c) Issue draft interim guidance if appropriate	✓		F	NRC	N/A
1d) Receive public comments			F	NEI	N/A
1e) CRGR interaction (as needed)			F	NEI	N/A
1f) ACRS interaction (as needed)			F	NRC	NEI
1g) Issue final interim guidance if appropriate	✓		F	NRC	N/A
LONG-TERM					
1h) Work with IEEE on modifications to 7-4.3.2 – anticipate issue by:	✓		F	NEI	NRC
1i) Issue revised RG 1.152	✓		F	NRC	N/A
1j) Issue revised SRP	✓		F	NRC	N/A

7.3 Milestones, Assignments, and Deliverables

Milestones and Deliverables	deliverable	Due Date (2007 or as-noted)	$\frac{\text{F}_{\text{est}}}{\text{Actual}}$	Lead	Support
Near-Term					
Initial TWG meeting		<i>Feb 23</i>	A	NRC	NEI
Statement of fundamental restrictions & requirements - draft	✓	<i>March 8</i>	A	NRC	NEI
Statement of fundamental restrictions & requirements - final	✓	<i>March 8</i>	A	NRC	NEI
Submit final draft of HICRc Project Plan for integration into DI&C plan	✓	<i>March 16</i>	A	NRC	NEI
DI&C-SC endorsement of HICRc Project Plan			F	NA	n/a
Identify communication design concepts		<i>March 22</i>	F	NEI	NRC
Final prioritization of communication design concepts	✓	<i>March 29</i>	F	NEI	NRC
NRC RES Project results available (not final report)		<i>June 1</i>	F	NRC	n/a
Develop regulatory & design requirements with basis for each type of interaction	✓	<i>June 1</i>	F	NRC	NEI
Develop guidance outline & acceptance criteria	✓	<i>June 15</i>	F	NRC	NEI
Document basis for rule change recommendations	✓	<i>June 15</i>	F	NRC	NEI
Industry review & comment on guidance outline & acceptance criteria	✓	<i>June 22</i>		NEI	n/a
Develop initial draft of guidance recommendations	✓	<i>June 29</i>	F	NRC	NEI
Final draft of guidance recommendations submitted for use in developing draft Regulatory Information Summary	✓	<i>July 31</i>	F	NRC	n/a
Develop draft Regulatory Information Summary(s)	✓	<i>Sept 7</i>	F	NRC	n/a
DI&C-SC endorses draft Regulatory Information Summary(s)	✓	<i>Sept 14</i>	F	NRC	NEI
Issue the approved Regulatory Information Summary(s)	✓	<i>Sept 28</i> (tentative projection)	F	NRC	n/a
Long-Term					
work with IEEE on modifications to 7-4.3.2 – anticipate issue by:				NEI	n/a
revise RG 1.152				NRC	n/a
revise SRP				NRC	n/a

High priority issues for Digital I&C HICRc

(***all have same priority assuming draft RIS is available September 2007***)

1. Communication between safety divisions.
 - Functional Independence
 - Message Integrity
2. Control of both safety and non-safety components from a non-safety workstation (VDU)
 - via Non-safety function computer and priority module, or
 - directly from a non-safety HMI to a safety function computer
 - component or group control
3. Human-Machine Interface (HMI) to multiple divisions of safety digital systems (Safety and Non-safety HMI)
4. Operating a reactor using information displayed on a non-safety VDU for all plant conditions
5. Requirements for priority modules
6. Safety HMI control of non-safety components
7. Design requirements (e.g., Quality and Qualification) for Non-Safety devices involved in inter-channel communication
 - Non-safety VDU
 - Shared sensors
8. Communication involving diverse non-safety systems
9. Safety Communication Protocols
 - Profibus between safety divisions
 - Ethernet between digital safety systems and safety HMI

ATTACHMENT 3

ENCLOSURE 5