SECRETARY

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 25, 2016

COMMISSION VOTING RECORD

DECISION ITEM: SECY-15-0106

TITLE: PROPOSED RULE: INCORPORATION BY REFERENCE OF INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS STANDARD 603-2009, "IEEE STANDARD CRITERIA FOR SAFETY SYSTEMS FOR NUCLEAR POWER GENERATING STATIONS" (RIN 3150-AI98)

The Commission acted on the subject paper as recorded in the Staff Requirements Memorandum (SRM) of February 25, 2016.

This Record contains a summary of voting on this matter together with the individual vote sheets, views and comments of the Commission.

Annette L. Vietti-Cook
Secretary of the Commission

Enclosures:
1. Voting Summary
2. Commissioner Vote Sheets

cc: Chairman Burns
Commissioner Svinicki
Commissioner Ostendorff
Commissioner Baran
OGC
EDO
PDR

VOTING SUMMARY – SECY-15-0106

RECORDED VOTES

	APPROVED	DISAPPROVED	ABSTAIN	NOT PARTICIPATING	COMMENTS	DATE
Chrm. Burns		X			X	02/05/16
Cmr. Svinicki		X			X	12/22/15
Cmr. Ostendorff		X			X	01/14/16
Cmr. Baran	X	X			X	01/12/16

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: Chairman Burns

SUBJECT: SECY-15-0106: PROPOSED RULE: INCORPORATION BY REFERENCE OF INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS STANDARD 603-2009, "IEEE STANDARD CRITERIA FOR SAFETY SYSTEMS FOR NUCLEAR POWER GENERATING STATIONS" (RIN 3150-AI98)

Approved ____ Disapproved __X__ Abstain ____ Not Participating ____

COMMENTS: Below _____ Attached __X__ None _____

Entered in STARS
Yes ✓
No _____

Signature

5 February 2016
Date

Chairman Burns Comments on SECY-15-0106
Proposed Rule: Incorporation by Reference of Institute of Electrical and Electronics Engineers Standard 603-2009, "IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations"

In this paper, the staff recommends publishing for public comment a proposed rule to update requirements for digital instrumentation and controls (I&C) at nuclear power plants. Specifically, the staff proposes to incorporate by reference the 2009 edition of the Institute of Electrical and Electronics Engineers (IEEE) Standard 603, "IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations," in 10 CFR 50.55a, "Codes and standards," subject to one exception and several conditions. I have carefully reviewed the staff's proposal and appreciate the multiple briefings from staff, discussions with my fellow Commissioners, and presentations and discussion during the December 17, 2015, Commission meeting on this topic.

I agree with Commissioner Baran that IEEE Std. 603-2009 reflects technological advances that could enhance our regulatory structure. As observed by Commissioner Ostendorff, however, the availability of the alternative process in 10 CFR 50.55a means that there is not an urgent safety reason to incorporate this standard. There remains significant disagreement among the staff and with our external stakeholders over the appropriate path forward for incorporating this standard into our regulations and the priority that should be placed on this rulemaking effort in light of other significant digital I&C issues to be resolved. For these reasons, I disapprove the issuance of the proposed rule for comment at this time.

I agree with my fellow Commissioners that we would benefit from an integrated strategy to modernize the NRC's digital I&C infrastructure. As observed by Commissioner Baran, the incorporation of IEEE Std. 603-2009 is just one element of the agency's efforts. As such, the staff should present a digital I&C action plan to the Commission for approval in 90 days. In addition, the staff should present at that time any policy issues that are ripe for Commission consideration, enabling the Commission to address these issues before rulemaking proceeds, especially where there is significant disagreement on the optimal approach.

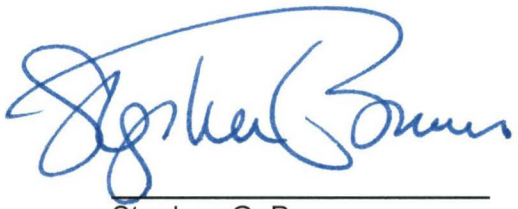
The staff's plan should include the following elements:

1. **Integrated schedule and priority of future activities.** This integrated view should consider the broader context of digital I&C regulatory challenges and include all related activities being pursued by the staff, including incorporation of IEEE Std. 603-2009 into 10 CFR 50.55a, any necessary updates to the policy on common-cause failure in SRM-SECY-93-087, and development of guidance for 10 CFR 50.59 evaluations of digital I&C upgrades.

2. **Senior management engagement.** Active engagement by senior management supports timely and safety-focused resolution of complex regulatory issues. For example, implementation of nuclear power plant license renewal and the lessons learned from the Fukushima accident both benefited from oversight by an NRC steering committee of senior managers. The staff's plan should include the establishment of a senior management steering committee to oversee resolution of digital I&C regulatory challenges.

3. **Incorporation of additional stakeholder feedback.** I agree with Commissioner Ostendorff that the staff should share its draft digital I&C action plan with stakeholders and conduct public meetings between the NRC and industry to reach a common understanding of the digital I&C regulatory challenges. In addition, plans for continuing stakeholder engagement following the preparation of the staff's plan should be considered in the integrated schedule noted above.

4. **Structure for future requirements and guidance.** Any new or revised requirements addressed in the action plan should be performance-based rather than prescriptive. Requirements should also be technology neutral. Guidance should focus on acceptable approaches to complying with requirements and may include specific technology-focused provisions. If only one approach is acceptable to the staff to ensure safety based on current understanding, and this approach is appropriately technology-neutral and performance-based, then it should be included in a requirement rather than in guidance. I agree with Commissioner Svinicki that true requirements should reside in our regulations, not in guidance.



Stephen G. Burns
5 February 2016

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: COMMISSIONER SVINICKI

SUBJECT: SECY-15-0106: PROPOSED RULE: INCORPORATION BY REFERENCE OF INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS STANDARD 603-2009, "IEEE STANDARD CRITERIA FOR SAFETY SYSTEMS FOR NUCLEAR POWER GENERATING STATIONS" (RIN 3150-AI98)

Approved ____ Disapproved XX Abstain ____ Not Participating ____

COMMENTS: Below ____ Attached XX None ____

SIGNATURE

12/22/15

DATE

Entered on "STARS" Yes ✓ No ___

Commissioner Svinicki's Comments on SECY-15-0106
Proposed Rule: Incorporation by Reference of Institute of Electrical and Electronics Engineers Standard 603-2009, "IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations" (RIN 3150-AI98)

I disapprove the staff's recommendation to publish the proposed rule (Enclosure 1 to SECY-15-0106) in the *Federal Register*. Instead the matter should be returned to the staff for continued work within and between the relevant IEEE standards setting committee, the NRC staff, external stakeholders, digital instrumentation and control (DI&C) vendors, licensees, and the regulated community, more broadly than has occurred to date. Multiple public technical workshops and meetings will be needed to resolve these matters, and this will take time. But the matter as presented to the Commission is not actionable in its current form. The staff should return to the Commission with a plan and schedule, no later than 90 days after the issuance of the staff requirements memorandum (SRM) in this matter, proposing its intended path forward on these matters.

The staff has presented the Commission with a decision package wherein the issues are not fully explored, expert views are divergent and attempts to harmonize them were apparently not made by senior management, regulatory options are not presented, and issues made manifest by the one option that is presented – the proposed rule – are not sufficiently addressed. Simply put, this package does not provide an adequate basis for Commission decision making at this time. Additionally, it appears that issues that arose during the development of this package, such as diversity and defense-in-depth criteria to address potential common cause failures, were not resolved but were simply shunted off to "another rulemaking," the final form of which will inevitably have an impact on the proposed requirements in the rule before us, but nobody can tell us how.

Additionally, the staff notes that the results of its cost benefit analysis would not justify proceeding with the proposed rulemaking. The staff attempts to justify proceeding based on qualitative factors "because IEEE Std 603-2009 is a voluntary consensus standard developed by participants with broad and varied interests, which has already undergone extensive external review," but a significant problem here is that the staff does not propose to incorporate the standard by reference in the form in which it was developed by "consensus" and had "already undergone extensive external review." Rather, the staff proposes a number of conditions on the standard, which render it a rather poor resemblance of its former self. Moreover, the staff's justification for these requirements appears to constitute an expansion of consideration of qualitative factors in regulatory and backfit analyses, contrary to Commission direction in the SRM to SECY-14-0087.

I also disapprove a proposal not in the paper, but explored as an alternative at the Commission's public meeting on this topic, of having the staff-proposed "conditions" to the incorporation of the standard pulled from the proposed rule and enshrined in agency guidance documents. Guidance documents contain a forward clearly stating that guidance does not constitute regulation. Consistent with this, pseudo-requirements should not lurk in guidance, masquerading themselves as guidance when they are not. Although I hope we do not start contemplating such things, let me be clear on this much. No matter the complexity of an issue, better the Commission make honest requirements of such things and put them in regulation, where requirements belong.

I understand that these are complex issues. I have taken nearly 4 hours of detailed briefing time with the staff on this paper. Their frustration with the process of developing this paper is

evident, and I am sympathetic that there was not better or more prompt management intervention to get the process on a better track. The solution does not lie, however, in approval of this proposed rule or in crude work-arounds, such as differing requirements for new and currently operating nuclear power plants, so that two groups of NRC experts can each "get their way" with some subset of regulated facilities. Neither does the solution lie in the creation of "regulatory certainty" through designing the system architectures ourselves in the regulations.

The relentless march towards increased penetration of digital technology into nuclear power plants is a modern day fact certain – not some conditional "if" statement for the future. I am confident that we are more than capable – just like our regulatory counterparts at the Federal Aviation Administration, the Food and Drug Administration, and elsewhere have – to embrace a paradigm that digital technology brings both enhancements to public health and safety as well as the potential to create vulnerabilities in system performance. To advance our understanding, the staff should build on the dialogue begun in the recent Commission meeting on this topic, explore the issues in greater depth with nuclear vendors who develop the technologies and platforms, and licensees who have or would like to install them, and continue meaningful participation in the standards setting process with the aim of crafting a more informed path forward for the Commission's consideration.

Kristine L. Svinicki 22 December 2015

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: COMMISSIONER OSTENDORFF

SUBJECT: SECY-15-0106: PROPOSED RULE: INCORPORATION BY REFERENCE OF INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS STANDARD 603-2009, "IEEE STANDARD CRITERIA FOR SAFETY SYSTEMS FOR NUCLEAR POWER GENERATING STATIONS" (RIN 3150-AI98)

Approved ____ Disapproved XX Abstain ____ Not Participating ____

COMMENTS: Below ____ Attached XX None ____

Entered in STARS
Yes V
No ____

Signature

1/14/16
Date

Commissioner Ostendorff's Comments on SECY-15-0106:
Proposed Rule: Incorporation by Reference of Institute of Electrical and Electronics Engineers Standard 603-2009, "IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations"

It has been my observation over the past five years as a Commissioner that adoption of digital instrumentation and control (I&C) is one of the most pressing and challenging regulatory concerns facing the Agency and the nuclear industry. Digital I&C is the area where modernization and clarification of our regulatory infrastructure could have the most positive impact on the nuclear enterprise. But work is needed by the NRC and the industry to fulfill this promise. First and foremost, it must be achieved safely, and we must find a way to do it efficiently. This issue will become more pressing as analog components become more obsolete and need to be replaced, and as licensees work to increase plant reliability for long term operation beyond 40 years and perhaps beyond 60. Obsolescence of analog systems presents unique challenges and ultimately could negatively impact plant safety if the issue is not properly managed. Adoption of digital I&C systems has been shown to increase plant reliability and has the potential to result in a significant enhancement to overall plant safety. Unfortunately, our requirements and regulatory guidance have not kept pace with technological advancements. As a result, our regulatory framework for I&C is out-of-date and poses a regulatory impediment to digital I&C adoption efforts. Therefore, to address current and future challenges, we need a comprehensive strategy to make sure our regulatory framework is sound. Our Principle of Good Regulation of "Reliability" states that "regulation should be perceived to be reliable and not unjustifiably in a state of transition." Adherence to this principle has guided my vote on this paper.

I have carefully reviewed SECY-15-0106, and the non-concurring views that were presented. I have also benefited from several internal staff briefings, meetings with my fellow Commissioners, discussions with industry stakeholders, and discussions during a December 18, 2015, public Commission meeting. I conclude that this SECY paper does not provide sufficient context for me to approve the draft proposed rule to codify the Institute of Electrical and Electronics Engineers Standard 603-2009 (IEEE 603) as proposed by the staff. IEEE 603 is only one small piece of the broader picture, and it must be viewed in the context of a comprehensive strategy to address regulatory challenges associated with digital I&C as a whole. Moreover, I note that the SECY paper refers to two future rulemakings that are not described in sufficient detail to understand the relationship of these additional rulemakings to the draft proposed IEEE 603 rule. Therefore, I do not approve publishing the draft proposed rule for comment at this time.

I strongly believe that there is no urgency for putting the rule in place today and that taking the time to look at the big picture and do this right will be well worth any resultant delay. There are several reasons for my decision: (1) going forward with IEEE 603 in isolation does not address the concerns of regulatory uncertainty and could introduce more uncertainty by piecemeal regulation contrary to our Principles of Good Regulation; (2) issues such as common cause failure which were removed from the draft proposed rule during the concurrence process are

arguably more pressing and should not be fully divorced from decisionmaking on IEEE 603; and (3) the impact of the next update to the IEEE 603 standard (expected completion in 2018-2019) should be considered. I will also note that there is no immediate safety concern that must be addressed by this rulemaking in the near term. It took the staff eight years to codify the 1991 version of IEEE 603. So far, it has been seven years since the 2009 version of the standard was issued by IEEE. In the meantime, the staff has reviewed and approved new reactor designs (e.g., AP1000, ESBWR and the ABWR amendment) and reviewed license amendment requests for operating reactor digital upgrades by reviewing them against the current industry standard under 10 CFR 50.55a(z), "Alternatives to Codes and Standards Requirements." Thus, we can and should take the time to address digital I&C regulatory decisions in an integrated and comprehensive manner.

To provide a clear picture of the path forward, the staff should develop an integrated strategy to modernize the NRC's digital I&C regulatory infrastructure and remove any unnecessary impediments to digital I&C adoption. The staff should provide the strategy, with proposed implementation milestones, to the Commission 90 days following the date of the staff requirements memorandum on SECY-15-0106. In my recent discussions with senior NRC staff, it has been brought to my attention that the staff would benefit from Commission direction on key issues that are fundamental to moving forward in this area. As such, I am recommending to my fellow Commission colleagues that the Commission provide the following high-level principles to guide the staff's development of the integrated digital I&C strategy:

1) Requirements should be performance-based rather than prescriptive.

2) Digital I&C safety requirements should be technology neutral (i.e., the same requirements should apply to operating and new reactors), however, guidance should be tailored if necessary.

3) The NRC's policy in SRM-SECY-93-087 for addressing common cause failure should be updated with a risk-informed, performance-based approach that reflects the current state of knowledge and advancement of digital I&C.

4) NRC requirements and guidance should not pose an unnecessary impediment to advancement in nuclear applications of digital technology. Increased reliability has been demonstrated in domestic nuclear applications, international nuclear applications, and non-nuclear applications with high consequences (e.g., medical devices, Department of Defense weapons systems, and aviation). Our regulations and guidance should be fully informed by relevant operating experience.

5) The staff should share its draft digital I&C action plan with stakeholders and conduct joint public meetings between the NRC and Industry digital I&C steering committees to reach a common understanding of the digital I&C regulatory challenges and common vision for the priorities and potential solutions to address them. The interactions between the staff and industry Fukushima steering committees was a successful model of such

interaction. This stakeholder feedback and input is needed to fully inform Commission decision-making on digital I&C regulatory matters.

6) The strategy should include the staff's recommendation for how to proceed on IEEE 603 after re-consideration within the broader context of digital I&C regulatory challenges and after consideration of stakeholder input.

I look forward to receiving the staff's integrated digital I&C strategy.

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: Commissioner Baran

SUBJECT: SECY-15-0106: PROPOSED RULE: INCORPORATION BY REFERENCE OF INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS STANDARD 603-2009, "IEEE STANDARD CRITERIA FOR SAFETY SYSTEMS FOR NUCLEAR POWER GENERATING STATIONS" (RIN 3150-AI98)

Approved __X__ Disapproved __X__ Abstain ____ Not Participating ____

COMMENTS: Below ____ Attached __X__ None ____

Entered in STARS
Yes ✓
No ____

Jeff Baran
Signature

1/12/16
Date

Commissioner Baran's Comments on SECY-15-0106, "Proposed Rule: Incorporation By Reference of Institute of Electrical and Electronics Engineers Standard 603-2009, 'IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations'"

In this paper, the NRC staff recommends publishing for public comment a proposed rule to update requirements for digital instrumentation and control protection and safety systems in nuclear power plants. Specifically, the staff proposes to incorporate by reference the 2009 Institute of Electrical and Electronics Engineers (IEEE) voluntary consensus standard into NRC regulations, subject to one exception and several conditions developed by the NRC staff.

I approve publishing a proposed rule to incorporate by reference the 2009 voluntary consensus standard. NRC's current regulation references the 1991 IEEE consensus standard, which is now 25 years old. Digital technologies and design concepts obviously have advanced considerably over that time. The 2009 update reflects major technological developments and addresses a number of issues that are not addressed by the 1991 standard and therefore not addressed by NRC's current regulations. According to the NRC staff, the substantive changes in the 2009 standard represent "considerable safety improvements" over the 1991 standard. I see no downside to updating our regulations to include the newer, more comprehensive 2009 consensus standard. In fact, I am not aware of any stakeholders who oppose adopting the core updated standard. Industry stakeholders at the December 2015 Commission meeting on this topic explicitly supported adoption of the core 2009 standard. For the reasons discussed in the draft statement of considerations, I support the staff-recommended exception to this update, which would retain the previous standard's maintenance bypass requirements. I approve the staff's recommendation to certify that this rule, if promulgated, will not have a significant economic impact on a substantial number of small entities.

Although there is broad staff and stakeholder agreement on the benefits of adopting the core 2009 consensus standard, there are significant disagreements within the NRC staff and among external stakeholders about whether the staff-developed conditions should be included in the proposed rule, included in the accompanying agency guidance, or not included in either document. Some believe that the additional requirements would "accelerate the pace at which licensees upgrade nuclear plant instrumentation and control systems" by providing regulatory certainty, while others contend that the requirements would have the opposite effect.

In my view, the Commission and NRC staff would benefit from further stakeholder input on the potential conditions. Instead of including the conditions in the proposed rule, the staff should modify the proposed rule's draft *Federal Register* notice to seek specific public comment on the merits of each condition offered by the staff and whether each condition should be included in the final rule, included in regulatory guidance, or not included in either the rule or accompanying guidance. The notice also should be revised to include additional detailed questions for public comment related to defense-in-depth and diversity criteria to address common-cause failures.

This rulemaking is just one element of the agency's effort to address digital instrumentation and control issues. In order to allow the Commission to consider the public comments on this proposed rule in the context of NRC's entire digital instrumentation and control effort, the staff should provide an overall nuclear reactor digital instrumentation and control action plan to the Commission as a notation vote paper within six months of the issuance of the staff requirements memorandum. The plan should discuss the key digital instrumentation and control issues, staff proposals to address them, and the timeframes associated with those proposed initiatives. The Commission can then consider the overall

approach to these issues before deciding whether and in what form to finalize the rule to incorporate by reference the 2009 IEEE consensus standard. The staff should submit the action plan voting paper to the Commission regardless of whether this proposed rule moves forward at this time.

I want to express my appreciation to the NRC staff, including those who non-concurred on this paper, and the external stakeholders who shared their valuable perspectives on this complex issue.