

IEEE NPEC Subcommittee SC-3
Operations, Maintenance, Aging, Testing, & Reliability
Meeting 22 – 1

Wednesday Morning, 19 Jan 2022
Orlando, FL

Members Present:	Suresh Channarasappa	Jim Parello (C) (T)
	Tom Crawford (PC) (T)	Clint Pierce
	Jacob Kulangara	Rebecca Steinman (Chair)
	Ed Mohtashemi (T)	Phil Ward
	Khoi Nguyen	Yvonne Williams (PC)

T – participating by WebEx or telephone

Members Absent:	George Ballassi (PC)	Craig Sellers (C)
	John Beatty	Ted Riccio (H)
	Hamid Heidarisaafa (C)	Khadijah West
	Jim Liming (H)	Kiang Zee
	Joe Napper (C)	

Guests:	Christian Orlando	Marek Tengler
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1.0 Introduction

- **Opening Remarks and Meeting Agenda**

Rebecca called the meeting to order at 8:05 AM EST. The meeting has met the quorum requirements to conduct business with 9 of 14 members present, as shown in Attachment 2. John Beatty and George Ballassi sent their regrets for not being able to attend.

Rebecca welcomed everyone, including those participating by Webex. She then presented the draft agenda. We made minor edits, including correcting the date. Yvonne moved to approve the agenda as corrected; Jacob seconded. The agenda was unanimously approved by voice vote. The approved agenda is included in Attachment 1.

Rebecca reviewed the Patent Slides and the Copyright slides; noting that these are available in iMeet Central. They are also included as Attachments 9 & 10. Tom mentioned that we had a good discussion yesterday, during the WG-3.1 meeting. Hamid had pointed out that we need to be aware of the source of material, particularly when referencing EPRI documents. Tom noted that referencing the documents was not an issue, but we need to be careful of copyright permissions if we include any material from those documents.

Rebecca responded to a question, stating that all SC-3 and WG-3.x members are sent invitations to our meetings. She is using iMeet Central for mailings and asked everyone

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to keep their profile information updated. Rebecca also noted that members must logon to iMeet at least every six months to keep their accounts active; she recommends logging on quarterly. Tom asked everyone to send him any updates for the SC-3 Roster.

2.0 Secretary's Report

- **SC-3 Approval of S21-2 Meeting Minutes**

The SC3 21-2 draft meeting minutes were reviewed, and a few minor changes were identified. Tom moved to approve and Khoi seconded. The minutes were approved unanimously by voice vote.

- **Action Item Status**

Rebecca reviewed and updated the Action Item list.

The updated action item list is provided in Attachment 4.

- **Alligator Fund**

There were no expenses to the Alligator Fund and no meeting fee was collected. Tom is the custodian of the Alligator Fund, whose balance is \$680.72. Status is contained in Attachment 3.

3.0 Chair's Report

- **Leadership Review / Membership**

Rebecca Steinman is the Chair for 2023. Volunteers are needed to fill the Vice Chair and Secretary positions.

Rebecca worked with Christian Orlando to advertise for new members of WG-3.4 in support of IEEE 1205 and for WG-3.3 in support of IEEE 577 & 933 last fall. Tom reiterated that we all need to recruit new members and encourage our younger members to step up into leadership positions.

Khoi indicated that he has submitted a request for two PRA people from NRC be assigned to support SC-3 / WG-3.3.

Clint said that Kiang has retired from Jensen Hughes. He will find out his status for continued support and membership; several members pointed out his excellent contributions in the past.

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- **Leadership Telecons**

We held one Leadership telecon in December to discuss plans and organization for the coming year.

- **NPEC Preparations**

The NPEC meeting is scheduled to start at 9 am and end at 3 pm EST. There is a \$100 meeting fee, payable in cash or by credit card.

Rebecca is scheduled for a presentation on NRC endorsement of IEEE 1819 during the NPEC meeting, and Yvonne will present a Preview of IEEE 338.

4.0 P338 Preview

Yvonne reviewed the Preview presentation for the NPEC meeting on Thursday. She added some clarifications since the WG presentation on Tuesday, and those were discussed. Jacob moved to approve the presentation and Khoi seconded. The motion was passed unanimously by voice vote. The presentation slides are provided in Attachment 11.

5.0 Old Business

- **Presentation on NRC Endorsement of 1819**

Rebecca reviewed the draft letter on NRC Endorsement of IEEE 1819 that she prepared for NPEC to submit to the NRC. Special thanks go to Ted Riccio for his input to the draft.

Next, Rebecca reviewed the draft presentation on this same subject that she plans to make during Thursday's NPEC meeting. A good discussion followed, and several editorial changes were incorporated. Jacob moved to approve the presentation and Yvonne seconded. The motion was passed unanimously by voice vote. The presentation slides are provided in Attachment 12.

Khoi indicated that the NRC public meeting on potential endorsement of IEEE 1819 will be scheduled once the NPEC letter has been received and reviewed. It is probable that the meeting will be available virtually.

- **Standards Status**

Yvonne reviewed the Master SC-3 Standards Schedule. It was noted that although the P933 PAR doesn't expire until 2025, the standard itself was published in 2013 and therefore expires in 2023. A copy of the updated SC-3 standards schedule is provided in Attachment 8. The current NPEC SC-3 standards schedule is provided in Attachment 5.

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6.0 New Business

During the NPEC 21-2 meeting, NPEC used a pair of eMeet Luna conference phones to facilitate the hybrid meeting. These units worked very well in the NPEC meeting room. Tom purchased units for another organization where he is involved, and they also work well there. As a result, Tom submitted information and suggested that SC-3 also purchase these units, since it appears that we are likely to be conducting hybrid meetings for the foreseeable future. After some discussion, Khoi moved and Jacob seconded a motion for Tom to procure a pair of eMeet Luna conference phones and connecting cable for SC-3, using funds from the Alligator Fund. The motion was approved unanimously by voice vote.

7.0 Working Group Reports

- **WG-3.1**

IEEE 336 was published in September 2020. It will expire in 2030.

IEEE 338 PAR expires in 2022. The WG has revised the standard and scheduled a Preview for the NPEC meeting Thursday. Comments received to date have been addressed. We plan to ballot and publish the standard by the end of the year.

IEEE 1819 was published in 2016 and will expire in 2026. We will start working on 1819 after 338 work is complete. (Yvonne will draft a PAR for revision.) The current task is to encourage the NRC to endorse the standard. A letter has been drafted, and a presentation to NPEC is scheduled for the N22-1 meeting.

- **WG-3.2**

The PAR for P692 expires in 2022. All efforts to recruit a chair and members for this WG have failed. The standard will be allowed to expire.

- **WG-3.3**

Balloting for IEEE P577 has been completed, all comments have been resolved, and the standard is awaiting Revcom approval. The P577 PAR expires in 2022.

IEEE 933 expires in 2023. The PAR expires in 2025, but that is moot, since the standard expires sooner. We are actively working on the revision.

IEEE 352 expires in 2026. Khoi developed a draft PAR.

- **WG-3.4**

Rebecca has reconstituted WG 3.4. IEEE 1205 expires in 2024. A draft PAR has been submitted to AdCom. The WG has about 15 members, approximately half are new. Two

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of the new members are from utilities, and some are international. The WG plans to add some additional guidance and is looking for other changes that need to be incorporated into the draft. The next meeting is scheduled for 02/25/2022. Preview is planned for N24-1, and the standard is expected to be published by the end of 2024.

8.0 Action Items

Yvonne reviewed the Action Items from today's meeting:

- 21-1-C Khoi & Yvonne will determine if any assistance is needed in updating WG membership in iMeet Central
- 21-2-A Rebecca to contact Christian Orlando to see about running a call for volunteers ad in other IEEE newsletters, such as PES, Nuclear Science & Plasma Society, etc. This action will be left open for 22-2 meeting.
- 22-1-A Rebecca & Yvonne will develop a Call for Participation for IEEE-1819
- 22-1-B Yvonne will upload IEEE-692 / WG-3.2 files to iMeet
- 22-1-C Tom will purchase eMeet Luna conference phones for SC-3 from the Alligator Fund

The revised AI List is provided in Attachment 4.

9.0 Liaison Reports

Liaison reports were provided as follows:

- NRC – Khoi provided highlights of his report; the full report is in Attachment 7 and on iMeet Central.
- ASME – No new report was available; Attachment 6 is not used.
- SCoRA – No new report was available.

10.0 Next Meeting

TVA is considering sponsoring the N22-2 meeting. More information will be provided when available.

Update from NPEC meeting: N22-2 meeting will be in Gatlinburg TN July 25-28, 2022.

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11.0 Adjournment

Jacob made motion for adjournment and Khoi seconded. The motion was approved by voice vote and the meeting was adjourned at 2:45 PM EST.

Prepared by Rebecca Steinman / Tom Crawford

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iMeet Central SC-3 Workspace:

<https://ieee-sa.imeetcentral.com/npecsc3/>

SC-3 Website information:

<http://sites.ieee.org/npec-sc3/>

NPEC Standards Website information:

<http://sites.ieee.org/pes-npec/npec-standards/>

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ATTACHMENTS

Attachment 1 Agenda	Attachment 2 Rolling Attendance	Attachment 3 Alligator Fund
Attachment 4 Action Items	Attachment 5 NPEC SC-3 Standards Status Spreadsheet	Attachment 6 ASME Liaison Report (None)
Attachment 7 NRC Liaison Report	Attachment 8 SC-3 Standards Schedule	Attachment 9 IEEE Patent Slides
Attachment 10 IEEE Copyright Slides	Attachment 11 N22-1 P338 Preview Slides	Attachment 12 NRC Endorsement of IEEE 1819 Presentation

Agenda – Meeting 22-1 – Orlando, FL w/ WebEx Option

NPEC Subcommittee SC-3, Operations, Maintenance, Aging, Testing, and Reliability

Meeting Date/Time:	Wednesday, 01/19/2022 0900-1215 EST Hotel Meeting Room: Royal	Chairman: Vice Chair: Secretary:	Rebecca Steinman TBD TBD
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Desired Outcomes:	<ol style="list-style-type: none"> 1. Review status/activities of each SC Working Group 2. Review status of membership and officers succession 3. Update SC3 standards master schedule
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WHAT	WHO	WHEN
Welcome, Review Desired Outcomes <ul style="list-style-type: none"> • Meeting logistics • Patent Slides • Introductions 	R. Steinman All	0900 - 0910
Chairman's Introduction <ul style="list-style-type: none"> • Opening remarks • Review/approve agenda 	R. Steinman	0910 - 0920
Secretary's Report <ul style="list-style-type: none"> • Approval of SC3 21-2 Meeting Minutes • Action Item review/status • Alligator fund report 	R. Steinman	0920 - 0930
Chairman's Report <ul style="list-style-type: none"> • SC3 Leadership – Succession planning • Membership Status • NPEC meeting preparations & agenda for tomorrow's meeting and future meetings 	R. Steinman	0930 - 0945
Review P338 Preview	Y. Williams	0945 - 1015
BREAK	All	1015 - 1030
Old Business <ul style="list-style-type: none"> • NRC endorsement of IEEE 1819-2016 (overview, NPEC letter & presentation) • Master schedule for Std review/updates 	R. Steinman	1030 - 1045
New Business/Rumor Mill/Drumbeats <ul style="list-style-type: none"> • Possible purchase – eMeet Luna Speakerphone – to support hybrid meetings 	R. Steinman	1045 - 1055
Working Group Reports <ul style="list-style-type: none"> • WG-3.1 (Testing) – 336 expires in 2030, 338 expires in 2022, 1819 in 2026 • WG-3.2 (Security) – 692 expires in 2023 • WG-3.3 (Reliability) – 577 expires in 2022, 933 in 2023, 352 in 2026 • WG-3.4 (Aging) – 1205 expires in 2024 	Y. Williams N/A K. Nguyen R. Steinman	1055 - 1105 N/A 1105 - 1115 1115 - 1130
Review of Action Items	R. Steinman	1130-1145
Liaison Reports <ul style="list-style-type: none"> • NRC report 	K. Nguyen	1145 - 1200
Wrap-up & Next Meeting Schedule	Y. Williams	1200 - 1215
Meeting Closeout/Adjournment	Y. Williams	1215

NPEC Subcommittee SC-3
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Attendance

Last	First	SC-3 Member	2020-1	2020-2	2021-1	2021-2	2022-1
Ballassi	George	X		T	T	X	
Beatty	John	X	X	T	T	T	
Channarasappa	Suresh	X	X	T	T		X
Crawford	Tom	X	X	T	T	X	T
Heidarisafa	Hamid	C					
Kulangara	Jacob	X	X	T	T	X	X
Liming	Jim	H		N	N	Resigned/Honorary	
Mohtashemi	Ed	X		T			T
Napper	Joe	C					
Nguyen	Khoi	X	X	T	T	T	X
Parello	Jim	C	O	N			N
Pierce	Clint	X	X	T	T		X
Riccio	Ted	H	Honorary				
Sellers	Craig	C			N	N	
Singh	Gurshan	X			T		
Steinman	Rebecca	X		T	T	T	X
Ward	Phil	X	X	T	T		X
West	Khadija	x	X	Appointed	T	T	
Williams	Yvonne	X	X	T	T	T	X
Zee	Kiang	X	X	T	T		

Members are shown in **bold** and colored yellow as of end of most recent meeting.
 Corresponding and Alternate members are shown in green.

TOTAL VOTING ATTENDEES	X		10	1	0	3	7
TOTAL NON-VOTING ATTENDEES	0		1	0	0	0	0
TOTAL VOTING TELECON PARTICIPANTS	T		0	13	13	5	2
TOTAL NON-VOTING TELECON PARTICIPANTS	N		0	2	2	1	1
TOTAL ATTENDEES			11	16	15	9	10
TOTAL SC-3 MEMBERS		14					

Attachment 3

NPEC Subcommittee SC-3

Operations, Maintenance, Aging, Testing, and Reliability

Alligator Fund

The Alligator Fund is made up of voluntary contributions from SC-3 members to defray the cost of meeting rooms, refreshments, etc.

Meeting	Beginning Balance	Meeting Contributions	Expenses	Ending Balance
S13-1	\$906.36	\$0.00	\$0.00	\$906.36
S13-2	\$906.36	\$0.00	\$0.00	\$906.36
S14-1	\$906.36	\$0.00	\$0.00	\$906.36
S14-2	\$906.36	\$0.00	\$0.00	\$906.36
S15-1	\$906.36	\$0.00	\$0.00	\$906.36
S15-2	\$906.36	\$0.00	\$0.00	\$906.36
S16-1	\$906.36	\$0.00	\$0.00	\$906.36
S16-2	\$906.36	\$0.00	\$0.00	\$906.36
S17-1	\$906.36	\$0.00	\$65.19	\$841.17
S17-2	\$841.17	\$0.00	\$51.08	\$790.09
S18-1	\$790.09	\$0.00	\$52.16	\$737.93
S18-2	\$737.93	\$0.00	\$0.00	\$737.93
S19-1	\$737.93	\$0.00	\$0.00	\$737.93
S19-2	\$737.93	\$50.00	\$50.00	\$737.93
S20-1	\$737.93	\$50.00	\$107.21	\$680.72
S20-2	\$680.72	\$0.00	\$0.00	\$680.72
S21-1	\$680.72	\$0.00	\$0.00	\$680.72
S21-2	\$680.72	\$0.00	\$0.00	\$680.72
S22-1	\$680.72	\$0.00	\$0.00	\$680.72

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Action Items List

Item No.	Subcommittee 3.0 Actions	Owner	Due Date	Closure Comments
17-2-B	Submit at least one topic to the SC-3 chair that you as a SC member would like to see presented as a 1-hr SC-3 training/technical session at a future mtg.	All Members	Ongoing	S18-2: Keep this item open and reminder all members to contribute ideas. S19-2: Kiang Zee suggested generating a list of training topics based on the Q&A of the 19-02 NPEC presentation on integrating IEEE 1819 into other NPEC standards. All members encouraged to submit technical presentation topics. Hold item open. S20-2: Action remains open. Rebecca suggests starting a discussion thread on iMeet Central to capture training topic suggestions. S21-1: Action remains open. Only suggested topic received to date transferred to WG 3.1 for action. Members are encouraged to submit ideas for future meeting technical presentation topics. S21-2: No updates. Action remains open. S22-1: No updates. Action remains open.
21-1-C	Schedule WebEx for WG chairs to learn how to update iMeet WG membership lists.	Steinman	22-1 mtg	S21-2: Rebecca targeting a phone call in the late fall 2021. S22-1: Rebecca to confirm all WG chairs have Admin rights. (Complete 1/20/22) WG chairs (Williams and Nguyen) to evaluate need for call and let Rebecca know.
21-2-A	Contact IEEE liaison about running a call for volunteers ad in other IEEE newsletters such as PEC, Nuclear Science & Plasma Society, etc.	Steinman	22-1 mtg	S22-1: Call for Volunteers published for WG 3.4 for 1205 and WG 3.3 for 577/933 in October 2021. COMPLETE.
22-1-A	Develop and publish Call for Participants for IEEE 1819. Effort to be coordinated through Christian Orlando.	Steinman / Williams	22-2 Mtg	
22-1-B	Upload IEEE 692 / WG 3.2 files to iMeet.	Williams	22-2 Mtg	
22-1-C	Purchase eMeet Luna conference phones for SC3 from the Alligator Fund.	Crawford	22-2 Mtg	

SC-3 "Operations, Maintenance, Aging, Testing & Reliability"

Chair: Rebecca Steinman

PROJECT	Standard Expiration	PAR Expiration	TITLE	Working Group	Chair	Vice Chair	Cycle Year	21-02	22-01	22-02	Status/Comments
336	2030	N/A	IEEE Standard Installation, Inspection, and Testing Requirements for Power, Instrumentation, and Control Equipment at Nuclear Facilities	1	Y. Williams		2				
338	2022	Dec-2022	IEEE Standard Criteria for the Periodic Surveillance Testing of Nuclear Power Generating Station Safety Systems	1	Y. Williams		10		Preview		Draft Development
352	2026	N/A	IEEE Guide for General Principles of Reliability Analysis of Nuclear Power Generating Stations and Other Nuclear Facilities	3	K. Nguyen		6				
577	2022	Dec-2022	IEEE Standard Requirements for Reliability Analysis in the Design and Operation of Safety Systems for Nuclear Power Generating Stations	3	K. Nguyen		10				RevCom Agenda for Approval (25 Jan 2022)
692	2023	Dec-2022	IEEE Standard Criteria for Security Systems for Nuclear Power Generating Stations	2	Vacant		9				PAR approved 9/27/2018 Allow the std to expire-WG not active
933	2023	Dec-2025	IEEE Guide for Definition of Reliability Program Plans for Nuclear Generating Stations and Other Nuclear Facilities	3	K. Nguyen		9				Draft Development
1205	2024	N/A	IEEE Guide for Assessing, Monitoring, and Mitigating Aging Effects on Class 1E Equipment used in Nuclear Power Generating Stations	4	R. Steinman	S. Channarasappa	8				New WG formed. PAR is being revised.
1819	2026	N/A	Standard for Risk-Informed Categorization and Treatment of Electrical Equipment in Nuclear Facilities	1	Y. Williams		6				

U.S. Nuclear Regulatory Commission (NRC) Liaison Report
IEEE NPEC, ESSB, ICC, & PSRC – January 2022

1. General

- a. Daniel H. Dorman has been selected by the Nuclear Regulatory Commission as the agency's next Executive Director for Operations.
- b. The Nuclear Regulatory Commission's Advisory Committee on Reactor Safeguards has elected Dr. Joy Rempe as Chair, Dr. Walt Kirchner as Vice Chair and Dr. David Petti as Member-at-Large.
- c. The Nuclear Regulatory Commission announced that it has awarded nearly \$6 million in grants to support research and development activities for nuclear science, engineering, technology, and related disciplines.

2. Operating Reactors

- a. Open Phase Condition (OPC) – On June 6, 2019, Nuclear Energy Institute (NEI) submitted Revision 3 to the voluntary industry initiative (VII) (ADAMS Accession No. ML19163A176), and subsequently submitted the accompanying guidance document, 19-02 "Guidance for Assessing Open Phase Condition Implementation Using Risk Insights," (ADAMS Accession No. ML19172A086) on June 20, 2019. Revision 3 of VII includes an option for not enabling the Open Phase Isolation System (OPIS) automatic functions based on assessing the change in risk between operating with automatic functions versus reliance on operator manual action to isolate a power supply affected by an OPC. The staff revised Temporary Instruction (TI) 2515/194 to verify adequacy of licensees' implementation of VII Rev. 3. The staff currently working on issuing the Bulletin 2012-01 closure letters to licensees who had the TI 2515/194 inspection completed. The NRC staff is making progress with closing out NRC Bulletin 2012-01 for the sites it inspected as bulletin closure letters have been issued for approximately 85 percent of the operating plants. The NRC had completed revising the Reactor Oversight Process Inspection Procedures and Inspection Manual Chapter to provide periodic oversight of licensee's implementation of the voluntary industry initiative to address the open phase vulnerabilities. When all inspections are completed, the staff will perform technical evaluations to determine the adequacy of VII as implemented by licensees to address the OPC concerns and communicate the results to the Commission.
- b. Environmental Qualification (EQ) Inspections have been completed.
 - The Power Operated Valve (POV) inspections started at the beginning of 2020 and no major EQ issues have been identified to date except for a potential generic issue involving Limitorque actuators with a soft clutch. There was a public meeting on December 8, 2020 to share with Industry and the Public the findings and lessons learned while implementing IP 71111.21N.02, "Design-Basis Capability of Power-Operated Valves Under 10 CFR 50.55a Requirements," inspections in 2020. The

inspectors will continue to look at EQ as part of the design basis and licensing conditions of components they inspect.

- c. Subsequent License Renewal (North Anna, Point Beach, Oconee, and St. Lucie) reviews currently underway.
- d. Vendor Inspections
 - ESI (TBD)
 - Fairbanks Morse (ML21298A086)
 - NTS (ML21319A392)

3. New Reactors

- a. NuScale Rulemaking is ongoing.
- b. NRC has accepted for review an application from Kairos Power for a permit to construct a test reactor at a site in Oak Ridge, Tennessee.

4. Advanced Reactors

- a. The NRC is evaluating technical reports from multiple advanced reactor designs (i.e., pre-application stage).

5. Rulemaking

- a. The NRC staff is developing 10 CFR Part 53 rulemaking, which will establish a new framework for licensing and regulating advanced nuclear reactors. Public meetings with stakeholders are ongoing.

6. Research

- a. Below is the status of some of the RGs as well as additional updates:
 - Environmental Qualification: RG 1.89
 - To endorse IEC/IEEE Std. 60780-323-2016
 - Received public comments
 - Addressing public comments currently
 - Final Publication expected third quarter 2022
 - Environmental Qualification of Connection Assemblies: RG 1.156
 - To endorse IEEE Std. 572-2019
 - DG-1400 out for public comment in Feb 2022
 - Environmental Qualification of Safety-Related Battery Chargers, Inverters, and UPSs: RG 1.210
 - To endorse IEEE Std. 650-2017
 - Onsite Emergency AC Power Sources: RG 1.9
 - To endorse IEEE Stds. 387-2017 (EDG) and 2420-2019 (CTG)
 - Adds Design and Testing Considerations for AC Power sources other than EDGs and CTGs
 - Received & addressed public comments
 - ACRS meetings held in July 2021
 - Public meeting conducted in Aug 2021
 - Issue ACRS response letter in Oct 2021
 - ACRS SC meeting – Feb 2022
 - Republish revised draft guide for public comment in Spring 2022

Attachment 7

- Assessing, Monitoring, and Mitigating Aging Effects: new RG
 - To endorse IEEE Std. 1205-2014
 - DG-1393 out for public comment in Feb 2022
 - Risk-Informed Categorization of Electrical and Electronic Equipment
 - To endorse IEEE Std. 1819-2016
 - Determining path forward of endorsing in a new RG or an existing RG 1.201 on categorization of SSCs
 - The NRC plans to hold a public meeting in first quarter of calendar year 2022 to further discuss the staff's consideration of the potential endorsement for IEEE Std. 1819-2016.
 - Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications: RG 1.129
 - To endorse IEEE Std. 450-2020
 - Draft in development
 - Criteria for the Protection of Class 1E Power Systems and Equipment: new RG
 - To endorse IEEE Std. 741-2021/2022
 - Draft in development
 - Sizing lead-acid batteries: RG 1.212
 - To endorse IEEE Std. 485-2020
 - Draft in development
 - Installation Design & Installation of Vented Lead-Acid Batteries: RG 1.128
 - To endorse IEEE Std. 484-2019
 - Draft in development 1.156
- c. In 2014, NRR submitted user need requests (UNR 2011-014 and UNR 2016-012) to RES to perform research on aging cables and methods of condition monitoring.
- On September 24, 2012, a research project contract was awarded to NIST to perform the following tasks: confirm the adequacy of the condition-monitoring methods, including: (a) mechanical conditions of tensile test (elongation at break), and compressive modulus (indenter method); (b) dielectric condition indicators (insulation resistance, and frequency domain reflectometry) (c) chemical indicators (oxidation time/temperature, Fourier transform infrared spectroscopy, mass loss Thermogravimetric analysis).
 - The objective of the research project was to confirm the adequacy of commonly used condition monitoring methods to track the aging of cables.
 - On December 10, 2021, a research project contract was awarded to Kinectrics to perform the following tasks: 1) perform a Loss-of-Coolant Accident (LOCA) Test on the cables aged during the NIST Project to simulate 50, 60, and 80 years of operation, 2) Determine if the condition monitoring techniques evaluated during the NIST Project are suitable to perform Condition Based Equipment Qualification.
- d. The NIST project was completed on September 15, 2021. The period of performance for the Kinectrics research project is from 12/10/2021 – 11/15/2021.
- e. The submerged cable tan delta test criteria research has been completed. The Research Information Letter should be published by summer 2022.

7. Part 21 Reports

Attachment 7

a. The following Part 21 Reports were issued in the past 6 months (more information available on the NRC website under the Part 21 Reports webpage):

- i. 2021-26-00 - Final Notification of a Deviation with Inverter Assembly (Model NLI-072034-CSI-K-5-A)
- ii. 2021-24-00 - Engine Systems, Inc. Part 21 Reportable Notification on a Pressure Regulator Valve
- iii. 2021-23-00 – Flowserve Part 21 Notification for Limitorque Supplied DC Motor

8. Generic Communications

- a. Information Notice (IN)-21-03- Operating Experience Related to the Duane Arnold Energy Center Derecho Event on August 10, 2020 Sources

Attachment 8

NPEC Subcommittee SC-3

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SC-3 Standards Schedule

	WG 3.1	WG 3.2	WG 3.3	WG 3.4
2017-1	336		352	
2017-2	336		577	
2018-1	336		577	
2018-2	336		577	
2019-1	336		577	
2019-2	338		577	
2020-1	338	692	577	
2020-2	338	692	577	
2021-1	338		933	
2021-2	338		933	
2022-1	338		933	1205
2022-2	338		933	1205
2023-1	1819		933	1205
2023-2	1819		933	1205
2024-1	1819		352	1205
2024-2	1819		352	1205
2025-1	1819		352	
2025-2	1819		352	
2026-1	336		352	
2026-2	336		352	
2027-1	336			
2027-2	336			
2028-1	336			
2028-2	336		577	
2028-1	338		577	
2028-2	338		577	
2028-1	338		577	
2028-2	338		577	
2029-1	338		577	
2029-2	338		577	

STD	Standard		Age as of: 01/31/2022	Time left (yrs)	PAR
	Approved	Expires			Expires
336	09/24/2020	09/24/2030	1.4	8.6	-
338	02/06/2012	02/06/2022	10.0	0.0	12/2022
352	12/07/2016	12/07/2026	5.2	4.9	-
577	08/30/2012	08/30/2022	9.4	0.6	12/2022
692	08/23/2013	08/23/2023	8.4	1.6	12/2022
933	12/11/2013	12/11/2023	8.1	1.9	12/2025
1205	03/27/2014	03/27/2024	7.8	2.2	-
1819	09/22/2016	09/22/2026	5.4	4.6	-

Preview N22-1

Pending Revcom Approval

Allow to Expire

Draft Submitted

Balloting
and
Approval

Includes:

- 1 Preview, ballot pool, ballot, receive comments
- 2 Resolve comments, recirc
- 3 Submit to/ revcom approval/publish

INSTRUCTIONS FOR THE WG CHAIR

The IEEE SA strongly recommends that at each WG meeting the chair or a designee:

- **Show slides 1 through 4 of this presentation**
- **Advise the WG attendees that:**
 - IEEE's patent policy is described in Clause 6 of the *IEEE SA Standards Board Bylaws*;
 - Early identification of patent claims which may be essential for the use of standards under development is strongly encouraged;
 - There may be Essential Patent Claims of which IEEE is not aware. Additionally, neither IEEE, the WG, nor the WG Chair can ensure the accuracy or completeness of any assurance or whether any such assurance is, in fact, of a Patent Claim that is essential for the use of the standard under development.
- **Instruct the WG Secretary to record in the minutes of the relevant WG meeting:**
 - That the foregoing information was provided and that slides 1 through 4 (and this slide 0, if applicable) were shown;
 - That the chair or designee provided an opportunity for participants to identify patent claim(s)/patent application claim(s) and/or the holder of patent claim(s)/patent application claim(s) of which the participant is personally aware and that may be essential for the use of that standard
 - Any responses that were given, specifically the patent claim(s)/patent application claim(s) and/or the holder of the patent claim(s)/patent application claim(s) that were identified (if any) and by whom.
- The WG Chair shall ensure that a request is made to any identified holders of potential essential patent claim(s) to complete and submit a Letter of Assurance.
- It is recommended that the WG Chair review the guidance in *IEEE SA Standards Board Operations Manual* 6.3.5 and in FAQs 14 and 15 on inclusion of potential Essential Patent Claims by incorporation or by reference.

Note: **WG** includes Working Groups, Task Groups, and other standards-developing committees with a PAR approved by the IEEE SA Standards Board.

PARTICIPANTS HAVE A DUTY TO INFORM THE IEEE

- Participants shall inform the IEEE (or cause the IEEE to be informed) of the identity of each holder of any potential Essential Patent Claims of which they are personally aware if the claims are owned or controlled by the participant or the entity the participant is from, employed by, or otherwise represents
- Participants should inform the IEEE (or cause the IEEE to be informed) of the identity of any other holders of potential Essential Patent Claims

**Early identification of holders of potential
Essential Patent Claims is encouraged**

WAYS TO INFORM IEEE

- **Cause an LOA to be submitted to the IEEE SA (patcom@ieee.org); or**
- **Provide the chair of this group with the identity of the holder(s) of any and all such claims as soon as possible; or**
- **Speak up now and respond to this Call for Potentially Essential Patents**

If anyone in this meeting is personally aware of the holder of any patent claims that are potentially essential to implementation of the proposed standard(s) under consideration by this group and that are not already the subject of an Accepted Letter of Assurance, please respond at this time by providing relevant information to the WG Chair

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All IEEE SA standards meetings shall be conducted in compliance with all applicable laws, including antitrust and competition laws.

- Don't discuss the interpretation, validity, or essentiality of patents/patent claims.
- Don't discuss specific license rates, terms, or conditions.
 - Relative costs of different technical approaches that include relative costs of patent licensing terms may be discussed in standards development meetings.
 - Technical considerations remain the primary focus.
- Don't discuss or engage in the fixing of product prices, allocation of customers, or division of sales markets.
- Don't discuss the status or substance of ongoing or threatened litigation.
- Don't be silent if inappropriate topics are discussed. Formally object to the discussion immediately.

For more details, see *IEEE SA Standards Board Operations Manual*, clause 5.3.10 and *Antitrust and Competition Policy: What You Need to Know* at <http://standards.ieee.org/develop/policies/antitrust.pdf>

PATENT-RELATED INFORMATION

The patent policy and the procedures used to execute that policy are documented in the:

- ***IEEE SA Standards Board Bylaws***
(<http://standards.ieee.org/develop/policies/bylaws/sect6-7.html#6>)
- ***IEEE SA Standards Board Operations Manual***
(<http://standards.ieee.org/develop/policies/opman/sect6.html#6.3>)

Material about the patent policy is available at
<http://standards.ieee.org/about/sasb/patcom/materials.html>

**If you have questions, contact the IEEE SA
Standards Board Patent Committee
Administrator at patcom@ieee.org**



IEEE SA COPYRIGHT POLICY

NOVEMBER 2019



INSTRUCTIONS FOR CHAIRS OF STANDARDS DEVELOPMENT ACTIVITIES

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- The IEEE SA Copyright Policy is described in the IEEE SA Standards Board Bylaws and IEEE SA Standards Board Operations Manual
 - IEEE SA Copyright Policy, see
 - Clause 7 of the IEEE SA Standards Board Bylaws
<https://standards.ieee.org/about/policies/bylaws/sect6-7.html#7>
 - Clause 6.1 of the IEEE SA Standards Board Operations Manual
<https://standards.ieee.org/about/policies/opman/sect6.html>
- IEEE SA Copyright Permission
 - <https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/permissionltrs.zip>
- IEEE SA Copyright FAQs
 - <http://standards.ieee.org/faqs/copyrights.html/>
- IEEE SA Best Practices for IEEE Standards Development
 - http://standards.ieee.org/develop/policies/best_practices_for_ieee_standards_development_051215.pdf
- Distribution of Draft Standards (see 6.1.3 of the SASB Operations Manual)
 - <https://standards.ieee.org/about/policies/opman/sect6.html>

Ballot Preview

Presentation – P338

Jan. 20, 2022 (NPEC Mtg 22-1)

By Yvonne Williams (WG-3.1 Chair)

“Standard for Criteria for the Periodic
Surveillance Testing of Nuclear Power
Generating Station Safety Systems”

NPEC Preview – P338

Presentation Contents

1. History
2. P338 PAR Summary
3. Working Group Membership
4. P338 Table of Contents
5. Summary of Changes
6. Schedule
7. Conclusion

NPEC Preview – P338

1. History

Recent History of IEEE Std 338

- Originally developed for construction of new plants of the 70s & 80s. Its main purpose was to provide guidance in the development of periodic surveillance testing for nuclear power plants.

NOTE: Although most plants associate it with NRC required testing, it is also very useful for other testing, at other nuclear facilities, and is intended for international use as well.

- 2006 revision incorporated risk-informed guidance for determination or modification of test intervals.

NPEC Preview – P338

1. History

Recent History of IEEE Std 338

- ↪ 2012 revision added:
 - ↪ Requirement for testing redundant portions of same safety group
 - ↪ Clarification of response time test requirements
 - ↪ Various information for digital systems
 - ↪ Acceptability of on-line monitoring and its use for risk-informed test intervals
 - ↪ Integrated decisionmaking to Annex D for risk-informed test intervals
- ↪ New PAR approved Sept 27, 2018 (expires end of 2022)

NPEC Preview – P338

2. PAR Summary

Scope of Proposed Standard:

The standard provides criteria for the performance of periodic **surveillance** testing of nuclear power generating station safety systems. The scope of periodic testing consists of functional tests and checks, calibration verification, and time response measurements, as required, to verify that the safety system performs its defined safety function. Post-maintenance and post-modification testing are not covered by this document. This standard amplifies the periodic **surveillance** testing requirements of other ~~nuclear safety-related~~ IEEE **nuclear** standards.

NPEC Preview – P338

2. PAR Summary (Continued)

Purpose of Proposed Standard:

This standard is intended to aid the user not only in designing a periodic test capability but also in defining and optimizing the primary elements of an effective periodic test program (including planning, performance/acceptance criteria, procedures, test intervals, and documentation).

NPEC Preview – P338

2. PAR Summary (Continued)

Key information:

- ↪ Minimal changes to Scope
- ↪ No changes to Purpose
- ↪ Revised to current style manual and template

NPEC Preview – P338

2. PAR Summary (Continued)

Need for the Revision Project:

- ↪ a. Normal 10-year cycle
- ↪ b. Include current technology
- ↪ c. Investigate changes to coordinate with revised and new IEEE nuclear standards

NPEC Preview – P338

3. Working Group Membership

Now 12 members - User (1), Producer (2), General Interest (3), Government/Military (3), Consultants (3)

User (Utility) Philip Ward

Producer (NSSS) John Beatty, Suresh Chanarasappa

General Interest Tom Crawford, Ed Mohtashemi, Yvonne Williams
(retired)

Govt/Military George Ballassi, Khoi Nguyen, Khadijah West

Consultant Jacob Kulangara, Clint Pierce, Kiang Zee

Notable contributors during development included Jim Liming (consultant) and Ted Riccio (utility and then retired), as well as several corresponding members.

NPEC Preview – P338

4. P338 Table of Contents

Major clauses remain the same: (with changes in accordance with style manual / template)

- ❖ Overview (General, Scope, Purpose – added Word Usage)
- ❖ Normative references
- ❖ Definitions
- ❖ System design requirements for testing
- ❖ Testing program requirements
- ❖ Annex A – Bibliography
- ❖ Annex B – General overview of risk-informed surveillance testing
- ❖ Annex C – Evaluation process for surveillance test changes
- ❖ Annex D – Programmatic approach to risk-informed surveillance test interval management

NPEC Preview – P338

5. Summary of Changes

This revision incorporates the following changes to reflect current practices and user needs:

- Added guidance for use of IEEE 1819 by facilities adopting a risk-informed program for equipment categorization and treatment.
- Added ANSI/ASME NQA-1 as normative reference and in clauses referencing ANS 3.2, for operating plants.
- Added considerations for manual indication of bypassed/inoperable status and for multi-unit indication of bypassed/inoperable status.
- Added more specific wording for digital device criteria, in general referencing IEEE 7-4.3.2. Coordinated terminology for consistency.

NPEC Preview – P338

5. Summary of Changes (continued)

- ↪ Enhanced clause 5.4.3 discussion for digital equipment systems to clarify crediting of system diagnostics (rather than periodic surveillance testing).
- ↪ Updated per revised template, revised wording consistent with new clause 1.4 (Word usage).
- ↪ Provided editorial enhancements. Verified current titles of references.
- ↪ Updated bibliography, including deleting dates on standards where appropriate.
- ↪ Complete review for clarifications and guidance of current IEEE style manual / template, etc.

Note: reinserted an item from 2012 version that was inadvertently omitted from the version submitted to NPEC

NPEC Preview – P338

5. Summary of Changes (continued)

IEEE 338-2012 Clause 5.4 Test methods

5.4.1 General



b) The indication of a successful test shall be:

1) A positive, predetermined, and direct indication of a change of state, such as a solid-state or electromechanical device operation, with a corresponding signal transmission/conversion (for example, sounding an alarm, turning a light on or off, change of state of a contact or optical isolator, meter, or computer indication, starting of a motor, or movement of a valve or other actuator).

2) Absence of any observed abnormal results in the redundant channels, if applicable.



b) The test input to the channel shall be introduced as close to the sensor as is practicable. This may be accomplished in various ways, such as:

1) By perturbing the monitored variable. This refers to variations introduced in the variable, such as changing the pressures, temperatures, or power levels.

2) By introducing and appropriately varying a substitute input to the sensor of the same nature as the monitored variable. This refers to such actions as opening the equalizing valve on flow measuring differential pressure cells, isolating and bleeding the inputs to pressure measuring devices, or injecting hot or cold liquids into liquids whose temperature is being monitored.

NPEC Preview – P338

6. Schedule

- ↪ Jan / 2022: Complete - review Draft D5 at SC-3 meeting and confirm permission to preview at NPEC
- ↪ Jan / 2022: WG resolve comments received
- ↪ Jan / 2022: Preview at NPEC; request permission to ballot
- ↪ Jan / 2022: Mandatory edit
- ↪ Feb / 2022: Form ballot pool
- ↪ Mar / 2022: Submit for ballot
- ↪ Jul / 2022: Resolve ballot comments
- ↪ Aug / 2022: Recirc ballot, if needed
- ↪ Sep / 2022: Submit to RevCom
- ↪ Late 2022: Publish!

NPEC Preview – P338

7. Conclusion

- ☑ WG-3.1 has developed a draft revision to IEEE 338-2012, which meets the requirements of the approved PAR.
- ☑ IEEE 338 draft has been approved by Subcommittee 3.
- ☑ WG-3.1, with approval of Subcommittee 3, requests permission to ballot IEEE P338.

Update on NRC Endorsement of IEEE 1819-2016

R.L. STEINMAN

SC3 CHAIR

IEEE Deterministic Framework

IEEE 352 (Principles of Reliability Analysis) created to support IEEE 279 (Std Criteria for Protection Systems)

- IEEE 352 published the same year as WASH-1400
- Despite existence of WASH-1400 many regulations are deterministic (without considering numerical estimates of risk)
- IEEE 603 (Std Criteria for Safety Systems) replaces IEEE 279

IEEE 352 supplemented by IEEE 577 (Reliability Analysis in the Design and Operation of Safety Systems) and IEEE 933 (Definition of Reliability Program Plans)

- IEEE had been leading the application of risk and reliability

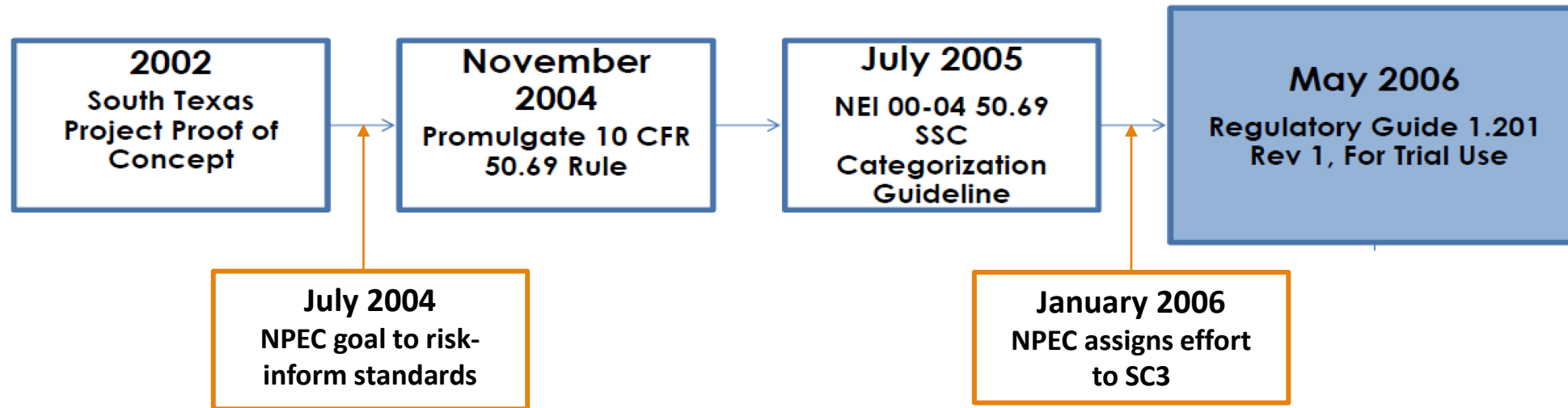
IEEE 603 (Safety Systems), IEEE 308 (Auxiliary Power) and IEEE 497 (Accident Monitoring) define what equipment requires “special treatment” [quality, seismic, EQ] and other IEEE standards provides the details about applying the various special treatments

PRA / Risk-Informed Methods Background

1990s and early 2000s saw the start of a significant effort in the development of PRA and risk-informed decision-making at the NRC

PRA Implementation Plan (1994 to 1999)

Risk-Informed Regulation Implementation Plan (RIRIP) (2000 to 2007)



Risk-Informed and Performance-Based Plan (RPP) (2007 to Present)

Options for Risk-Informing IEEE Standards

1. Replace existing standards that stipulate deterministic criteria and requirements for IEEE Class 1E equipment with one risk-informed standard that stipulates equipment criteria based on safety significance determination;
2. Add sections or addenda to existing standards that stipulate deterministic criteria and requirements for IEEE Class 1E equipment that do not supersede deterministic requirements, but offer an alternative acceptable risk-informed approach; and
3. Develop one new standard that does not specifically supersede existing deterministic criteria and requirements for IEEE Class 1E equipment but offers an alternative acceptable risk-informed approach that can be used in conjunction with existing deterministic standards.

NPEC went with Option 3 and developed IEEE 1819-2016 – a standard that provides methods to categorize electrical and electronic components using a risk-informed process and provides the recommended treatment of categorized components commensurate with their safety significance.

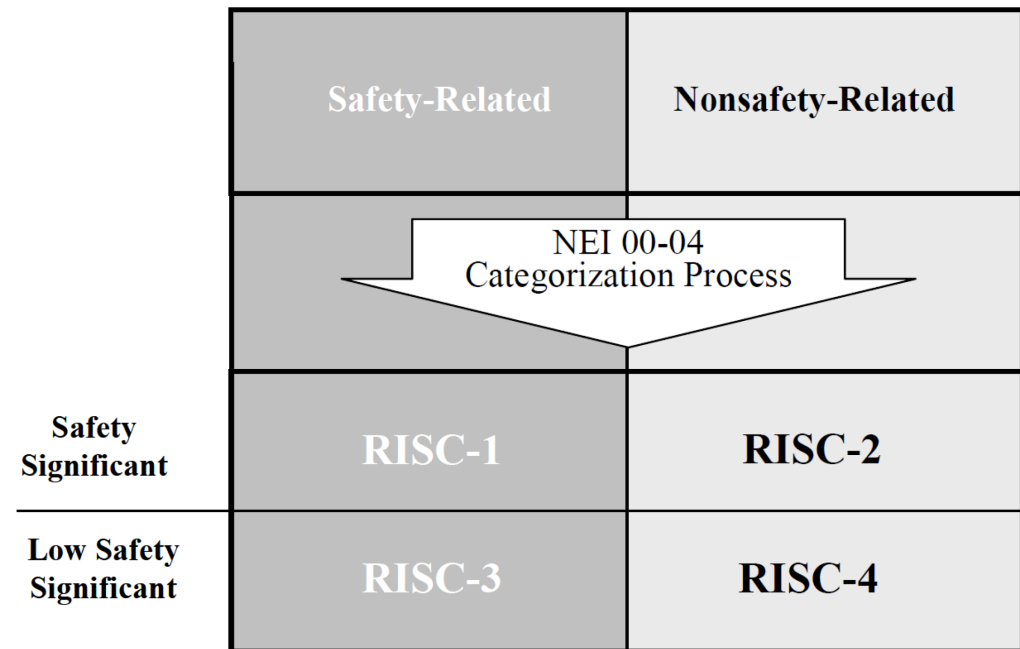
Risk-Informed Safety Classifications

IEEE 1819-2016 FIGURE 1

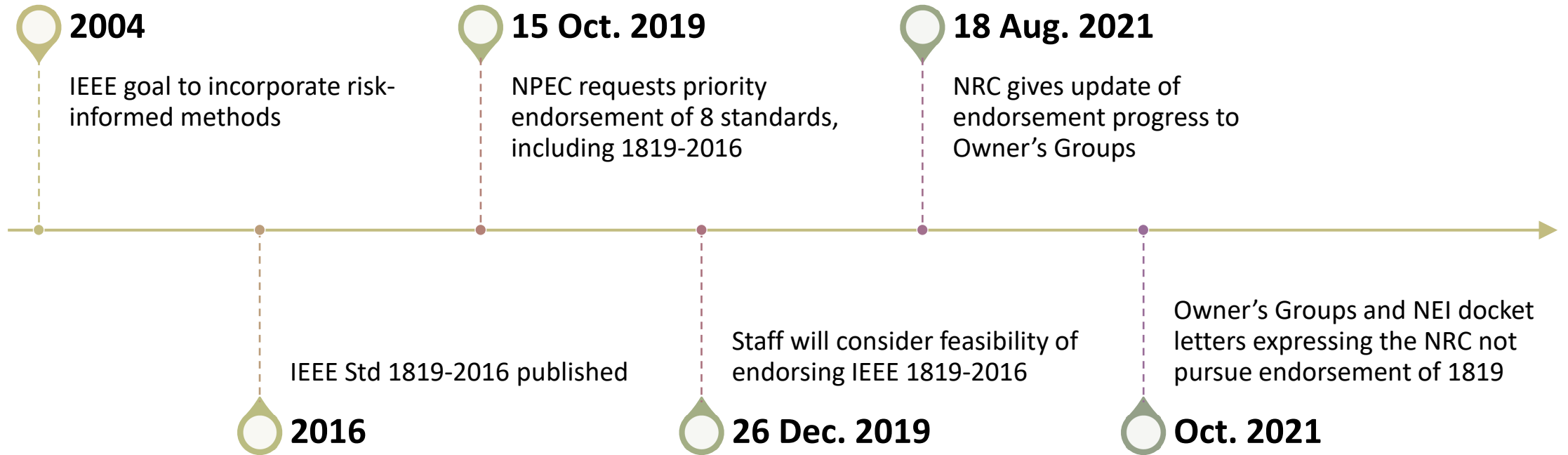
	Class 1E	Non-Class 1E
Safety significant	RISC-1 Class 1E Safety Significant (Current IEEE standards apply)	RISC-2 Non-Class 1E Safety Significant (Can have increased requirements)
Low safety significant	RISC-3 Class 1E Low Safety Significant (Alternate Treatment can be applied)	RISC-4 Non-Class 1E Low Safety Significant (No special requirements)

NEI 00-04 REV 0 FIGURE 1

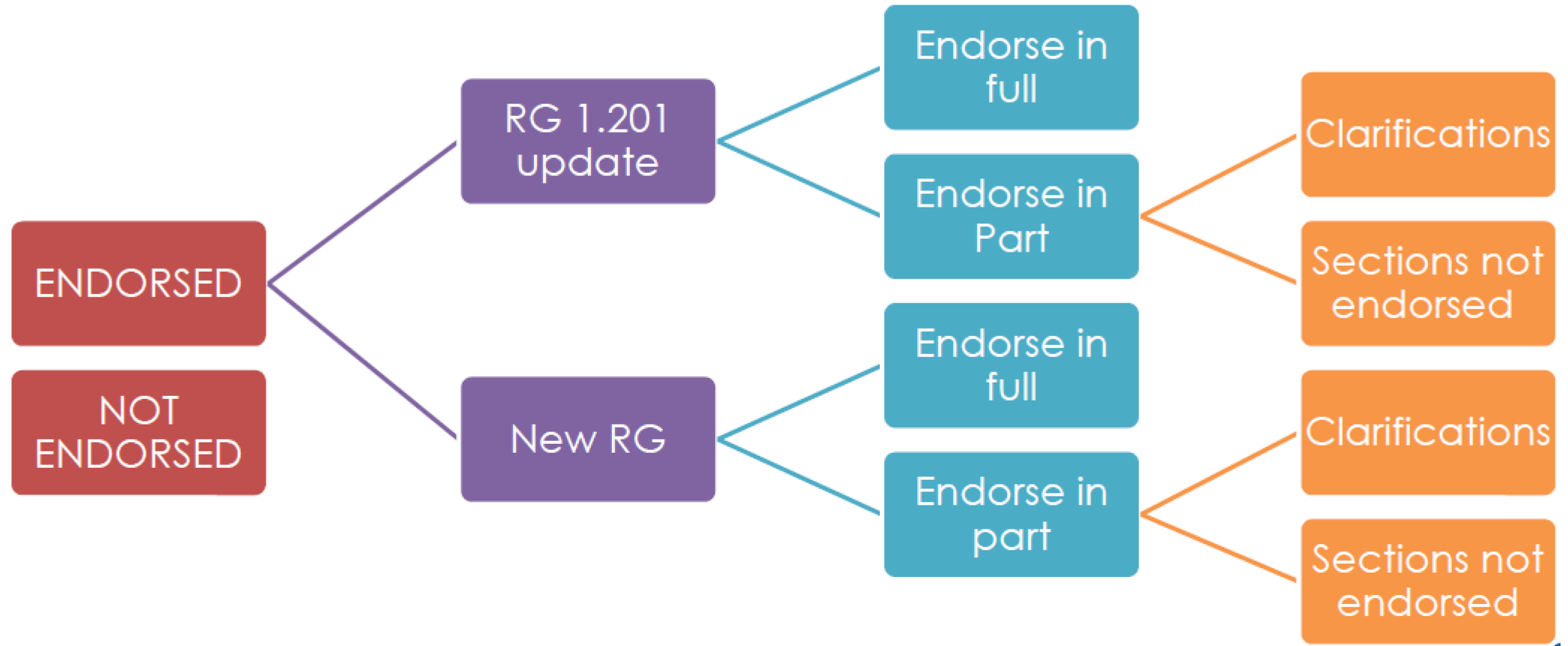
(SIMILAR TO RG 1.201)



Road to NRC endorsement



Potential Endorsement Paths



NEI / Owner's Group No-Go Reasoning

“None of NEI’s members have any intent to use this standard in their implementation of 10 CFR 50.69, “Risk-Informed Categorization and Treatment of Structures, Systems, and Components for Nuclear Power Reactors,” so there appears to be no value in the NRC’s endorsement of this standard.”

Endorsement could lead to “unnecessarily confusing and complicated scenario where licensees would perceive an expectation that mechanical and electrical components be treated differently under 50.69”

License amendments to date referenced NEI 00-04 successfully, so such a standard is not needed

- 24 sites approved as of August 2021
- 5 currently under review (some with new first of a kind approaches)
- Others expected to be submitted in 2022

SC3 Position – Endorsement still desired

IEEE standards complement NRC or industry developed guidance

Mechanical and electrical equipment are already treated differently

Current guidance has gaps regarding categorization and “special treatment” requirements

- 1819 provides categorization considerations for specific components such as breakers, cables, and relays not covered in other current endorsed guidance
- 1819 provides specific guidance on special treatment and alternative treatments for electrical and electronic components not covered in current guidance
- 1819 provides quantitative methods (Annex B) that do not exist in other guidance

Endorsement does not invalidate current guidance; it simply provides an additional information on methods that are acceptable to the NRC

Next steps

SC3 requests NPEC send a follow-on letter to the NRC to reiterate IEEE desire to continue pursuit of endorsement

NRC will hold a public meeting to give various stakeholders an opportunity to voice positions

- NPEC should participate (letter in early 2022 helps ensure we get invited)
- NPEC members can attend as members of the public and voice positions of support