

**IEEE STANDARDS ASSOCIATION**

**Preprint Proposals for  
the 2022 Edition of the  
National Electrical Safety Code<sup>®</sup>  
(NESC<sup>®</sup>)**



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**Preprint Proposals for  
the 2022 Edition of the  
National Electrical Safety Code®  
(NESC®)**

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## Foreword

This publication has been prepared to provide all interested persons an opportunity to study and comment on the Proposed Revisions to be incorporated into the 2022 Edition of the National Electrical Safety Code® (NESC®).

This Preprint provides the full text of each proposal to revise the 2017 Edition of the NESC together with the recommendation of the subcommittee that has cognizance of the rule addressed by the change proposal (CP). A change bar, located in the left-hand margin, signifies the specific material that each of the various subcommittees has approved for the inclusion in the revised Code.

The deadline for receipt of comments on the proposed revisions contained herein is 1 March 2020. Only comments that are submitted electronically through the website will be accepted. Comments for each separate topic are to be uploaded separately and must use the NESC comment template. The template, instructions, FAQs, and additional information can be found on the NESC website at:

<https://standards.ieee.org/products-services/nesc/form.html>

In those cases where a single CP or a group of related CPs affects rules within the scope of two or more subcommittees, the recommendations of all subcommittees affected are included. Where there are recommendations of two or more subcommittees, a recommendation by NESC Subcommittee 1, which is responsible for coordination, is also included as the final proposed change in this phase of the NESC revision cycle.

Please note that the subcommittee recommendations herein are subject to further review and revision by the cognizant subcommittee following study and evaluation of all comments received in the Fall of 2020. The subcommittee final recommendation will be prepared for a February 2021 letter ballot of the National Electrical Safety Code Committee. It is anticipated that the approved text will be submitted for American National Standards Institute approval in May 2021 with publication of the NESC 2022 Edition on 1 August 2021.

If you have any questions, please contact [NESC-support@ieee.org](mailto:NESC-support@ieee.org) at the IEEE Standards Association.

### PDF Instructions

This PDF has the following navigation options:

- 1) All CP numbers listed under Subcommittee Comments are linked to the actual CP. Use the hand tool to click on the CP number and automatically be taken to the proposed change. This applies to “See CP” and “See action taken on CP” comments.
- 2) Previous View and Next View are toolbar buttons in the current versions of Adobe® Acrobat® software. Using them enables navigation between the Subcommittee Comments and the proposed change. If these buttons do not appear in the toolbar, follow instructions for adding them in the software being used.

## Call for Comment on Specific NESC Change Proposals

The publication of the 2022 NESC Preprint is an important opportunity for all stakeholders to provide comment on the Change Proposals (CPs) received and initial recommendations made by the NESC Subcommittees. As such, the broadest possible input is solicited and all interested and affected parties are encouraged to provide comment. For over 30 CPs, NESC Subcommittees have specifically requested public comment from affected interests.

### Sections 1, 2, and 3

#### CP5049, Rule 010 C

CP5049 seeks to clarify purpose (Rule 010) of the NESC with regard to abnormal events (e.g., weather). Public comments for this change proposal are encouraged.

#### CP5542, Rule 017 A

CP5542 recommends that customary units (inch-foot) units be placed in the primary position in NESC text, and that metric (SI) units be placed in the secondary position, in parentheses. The CP further recommends that separate customary and metric unit tables and figures be created, and that the metric tables and figures be placed in an annex or appendix. NESC Subcommittee 1 recommends the use of normative annexes for the next edition so that if separated, the metric tables will continue to be recognized as part of the Code. Public comments for this change proposal are encouraged.

#### CP5424, Definition: joint use

NESC Subcommittee 1 is requesting public comments on CP5424 for a definition of joint use, as the action taken by NESC Subcommittee 1 differs from the action taken by NESC Subcommittee 4.

#### CP5104, Appendix B

NESC Subcommittee 1 is seeking comments on CP5104. NESC Subcommittee 1 has no majority position, pending outcome of public comments on other change proposals addressing the k-factor. See also CP5570 and CP5571.

### Section 9, Grounding Methods

#### CP5287, Rule 094 B2

NESC Subcommittee 2 recognizes the action taken on CP5287 represents a substantial change with regard to requirements for driven rods. NESC Subcommittee 2 seeks public comments especially in the form of analysis and consequences associated with this proposed rule change.

### Part 1: Electric Supply Stations

#### CP 5006, Rules 140–141

NESC Subcommittee 3 seeks public comment on CP5006, a comprehensive revision of Section 14, Storage Batteries, to recognize new battery technologies, applications, and their hazards.

#### CP 5452, Rule 190

NESC Subcommittee 3 seeks public comment on CP5452, which proposes to replace the existing Section 19 with a new section covering new and emerging electric generation station technologies. The proposal's initial focus is on photovoltaic (PV) generating stations.

### Part 2: Installation and Maintenance of Overhead Electric Supply and Communication Lines

#### CP5096, Rule 215 C2, C3

NESC Subcommittee 4 is seeking public comment on CP5096. NESC Subcommittee 4 voted to reject this CP but the vote outcome was not a strong majority.

The proposal is to require line designers to consider a wide variety of field situations created by a broken or slake anchor guy wire. A majority of the subcommittee members felt the proposed rule could not be practically applied and would result in confusion for many designers. The CP as written is ineffective for the industry to universally apply and poorly understood on joint-use pole applications as seen in the 2012 Edition of the NESC. Effectively grounding and bonding the communication messenger to initiate the supply system protective devices is a better solution for safety. Communication work rules require a communication worker to test for voltage prior to performing work that mitigates the safety concern around “voltage transfer.” NESC Subcommittee 4 encourages individuals to consider the negative vote comments and offer public comments.

**CP5332, Rule 233 C2, C3, C3c**

See action taken on CP5196. This CP and CP5196 address identified issues within the Code but take differing approaches. The intent is to clarify the approach to increasing the clearance between conductors supported on different structures and where the voltage between the conductors exceeds 22 kV. NESC Subcommittee 4 is requesting specific comments on these two proposals during the public comment period.

**CP5334, Rule 233 Table 233-1**

See action taken on CP5196. This CP and CP5196 address identified issues within the Code but take differing approaches. The intent is to clarify the approach to increasing the clearance between conductors supported on different structures and where the voltage between the conductors exceeds 22 kV. NESC Subcommittee 4 is requesting specific comments on these two proposals during the public comment period.

**CP5335, Rule 233 Table 233-2, Footnotes 1, 2**

See action taken on CP5332. This CP and CP5332 address identified issues within the Code but take differing approaches. The intent is to clarify the approach to increasing the clearance between conductors supported on different structures and where the voltage between the conductors exceeds 22 kV. NESC Subcommittee 4 is requesting specific comments on these two proposals during the public comment period.

**CP5337, Rule 233 Table 233-3**

See action taken on CP5332. This CP and CP5332 address identified issues within the Code but take differing approaches. The intent is to clarify the approach to increasing the clearance between conductors supported on different structures and where the voltage between the conductors exceeds 22 kV. NESC Subcommittee 4 is requesting specific comments on these two proposals during the public comment period.

**CP5591, Rule 234 Table 234-1**

NESC Subcommittee 4 believes CP5591 presents a positive approach to considering conductor wind displacement for clearances to buildings, but that it is not fully developed regarding supporting structures. NESC Subcommittee 4 is seeking public comment on the general approach this CP is proposing.

**CP5592, Rule 234 Table 234-2**

NESC Subcommittee 4 feels CP5592 presents a positive approach to considering conductor wind displacement for clearances to buildings, but that it is not fully developed regarding supporting structures. NESC Subcommittee 4 is seeking public comment on the general approach this CP is proposing.

**CP5595, Rule 224 A**

NESC Interpretation Request (IR) 575, Rule 224A and Rule 238D for the 2012 Edition was considered by the Interpretations Subcommittee but consensus could not be reached. NESC Subcommittee 4 formed a Task Force to prepare a report for inclusion in the Preprint for public comment. See CP5595, CP5603, and CP5604 for proposed changes to Rule 224A and Rule 235A2 as recommended by NESC Task Force 4.5.

**CP5603, Rule 224 A**

NESC Interpretation Request (IR) 575, Rule 224A and Rule 238D for the 2012 Edition was considered by the Interpretations Subcommittee but consensus could not be reached. NESC Subcommittee 4 formed a Task Force to prepare a report for inclusion in the Preprint for public comment. See CP5595, CP5603, and CP5604 for proposed changes to Rule 224A and Rule 235A2 as recommended by NESC Task Force 4.5.

**CP5604, Rule 235 A2**

NESC Interpretation Request (IR) 575, Rule 224A and Rule 238D for the 2012 Edition was considered by the Interpretations Subcommittee but consensus could not be reached. NESC Subcommittee 4 formed a Task Force to prepare a report for inclusion in the Preprint for public comment. See CP5595, CP5603, and CP5604 for proposed changes to Rule 224A and Rule 235A2 as recommended by NESC Task Force 4.5.

**CP5027, Rule 238**

NESC Subcommittee 4 is seeking public comment on the proposed changes. The intent of the subcommittee is to consolidate the antenna rules into a single location to clarify the required antenna rules and to treat antennas as equipment consistently throughout the Code.

**CP5152, Rule 235 Table 235-6, row 2**

The intent of this CP was to simplify the clearance rules for guys and guy anchors. NESC Subcommittee 4 believes that the modified CP is a first good step but specifically seeks comments on the proposed guy clearances.

**CP5570, Rule 230 B4 (Subcommittee 4)**

**CP5571, Rule 251 B3 (Subcommittee 5)**

A Joint Subcommittee 4/5 WG was tasked with developing change proposals relative to the k-factor (additive constant) for several rules in Part 2. Public comment is invited for these CPs. Additionally, several other CPs were submitted relative to this topic: see CPs 5440, 5441, 5442, 5443, 5444, 5445, 5446, and 5447.

The subcommittees are seeking the opinion of the professional electrical utility community as related to the following:

- Does the k-factor require revision?
- The impact of the CPs if implemented.
- Data that would support your opinion.
- Alternatives that could be considered by the Joint Subcommittee.
  - Do any of the related CPs noted above address the issue more effectively?

See also CP5104.

**CP5517, Rule 250 C**

**CP5589, Rule 250 C**

**CP5590, Rule 253**

**CP5267, Rule 253**

NESC Subcommittee 5, through extensive discussion as to how to update Rule 250C, developed two approaches. Both CPs eliminate the Importance Factor ( $I = 1.0$ ) from the equations. The Importance Factor is now included in the wind speed maps.

The subcommittee is seeking to adopt a wind map philosophy that is consistent with Industry Standard ASCE 7-16 and Manual of Practice ASCE 74-19, and addresses the change in these documents for extreme wind maps and their implementation for the safety to utility workers and the public.

The wind map currently used for Rule 250C in the NESC 2017 edition is a non-uniform hazard wind map showing wind hazards of 50-year MRI for continental winds, and approximately 90-year MRI for hurricane winds along the east and southeastern states.

CP5517 adopts the 100-year Mean Recurrence Interval (MRI) 3 s gust wind speed map of ASCE 7-16 (Appendix CC, Serviceability Considerations). *This map would be applicable to both Grade B and Grade C, with Load Factors (LF) from Table 253-1 without Note 7.* In general, the 100-year MRI map is not significantly different from the current map with some localized exceptions. Note that Table 253-1 contains a 0.87 load factor that is applied to the Rule 250C wind load for Grade C structures that effectively make the resultant comparable to a 50-year MRI wind. A load factor of 1.0 is applied for Grade B.

CP 5589 addresses the application of wind maps per the grade of construction, as follows:

Grade of construction	ASCE 7-16 Mean Recurrence Interval (MRI) [3 s gust wind speed map recorded at 33 ft (10 m) above ground]
B	100 year MRI in mph (m/s) with a LF = 1.0
C	50 year MRI in mph (m/s) with a LF = 1.0

NESC Subcommittee 5 seeks the opinion of the professional utility engineering community as to the best approach between CPs 5517 and 5590 and CPs 5589 and 5267.

**CP5426, Rule 250 D**

NESC Subcommittee 5 would like feedback from those reviewing the proposed 2022 CPs as to any concerns with adopting the latest version of the 100-year Mean Recurrence Interval (MRI) Uniform Ice Thickness Map with 3 s gust speeds to be found in Manual of Practice ASCE 74-19.

**CP5453, Rule 250 C**

**CP5454, Rule 250 D**

**CP5466, Rule 250 C**

**CP5467, Rule 250 D**

The listed CPs would, in effect, reduce or eliminate exemptions from the additional load cases listed on Rules 250C and 250D for structures supporting lines not exceeding 60 ft above ground grade or water level.

As shown in various load cases, structures supporting relatively small conductors are governed by Rule 250B. The Rule 250B loading district and applied grade of construction will determine which conductor sizes would be governed by Rule 250B loads versus Rules 250C and 250D load cases.

As shown in the Preprint, SC5 modified both CPs 5453 and 5454 in such a fashion as to effectively avoid change to the current approaches to the structures supporting lines that do not exceed 60 ft above grade or water level.

NESC Subcommittee 5 would like feedback from the professional electrical utility community as related to the following:

- Do the original CPs have merit (prior to modification)?
- Would selective exemptions be appropriate? For example: Lines exceeding 22 kV to ground that cross rural/agricultural areas could be constructed to Grade C.

NESC Subcommittee 5 would like feedback from the professional electrical utility community on the concept of requiring all structures, regardless of height, to be subject to Rule 250C and Rule 250D load cases in addition to load cases of Rule 250B.

- The impact of the CPs requiring all structures to be subject to Rules 250C and 250D load cases if implemented.
- Data that would support this opinion.
- Alternatives that could be considered by the Joint Subcommittee.
  - Do any of the related CPs noted above address the issue more effectively? In particular, are CP5353 and CP5354 (discussed following) the most appropriate options?
- Should we simply leave the rules alone?

#### **CP5467, Rule 250 D**

Based on discussion within NESC Subcommittee 5, there was concern as to the validity of applying exposure category B and the concept being more design-based in nature. Utilities would be unable to utilize exposure category B considering exposure categories may change over time. Moreover, industry experience has shown the effects of secondary damage to be largely responsible for failures on shorter structures during extreme wind or combined ice and wind events. Therefore the proposed change is not perceived to improve safety. The proposed change would present inconsistencies with the current gust response factors in the Code.

#### **CP5465, Rule 250 A3**

#### **CP5471, Rule 250 Table 250-2**

NESC Subcommittee 5 would like feedback from those reviewing the proposed 2022 CPs as to the value of including conditions for the use of ASCE 74-10 Exposure Category B for lines and structures that do not exceed 60 ft.

### **Part 3: Underground Lines**

#### **CP5411, Rule 315 A4**

NESC Subcommittee 7 notes that the referenced standards, IEEE Std 487-2007, IEEE Standard for the Electrical Protection of Communications Facilities Serving Electric Supply Locations—General Considerations, and IEEE Std 1590-2003, IEEE Recommended Practice for the Electrical Protection of Communication Facilities Serving Electric Supply Locations Using Optical Fiber Systems, have been revised since 2007 and 2003. The most recent version of IEEE Std 487 is IEEE Std 487-2015 and the most recent version of IEEE Std 1590 is IEEE Std 1590-2009. NESC Subcommittee 7 seeks comments regarding whether it is appropriate to update the Note associated with this rule to identify the most current version of these IEEE standards.

#### **CP5520, Rule 380 E**

This CP has the potential to require utilities to maintain different types of transformers with different insulating liquid types. Additionally, Rule 152A is in regard to substations generally under the control of a single entity and differs from the conditions associated with pad-mounted equipment near buildings. NESC Subcommittee 7 is also concerned that use of the term “minimized” is vague as part of a “shall” rule.

### **Part 4: Work Rules**

#### **CP5528, Rule 441 A3f**

Covering neutrals is required in Rule 41A3a; additional information is needed about covering conductive objects. NESC Subcommittee 8 will work with the submitter to respond to NESC Subcommittee 8’s questions in the public comment period, and also seeks additional public comment.

#### **CP5600, Table 410-**

NESC Subcommittee 8 and Working Group 8.16 request public comment on CP5600 regarding a proposed new Table 410-4 that addresses live-front transformers, live-front terminations, and horizontally racked circuit breakers based on recent new arc flash testing.

*NOTE:* All submitted CPs are included in the Preprint. A number of proposals were withdrawn by the submitters during the NESC Subcommittee meetings that took place to review proposals. These withdrawn CPs are no longer open for comment, since there was no action taken by the cognizant subcommittee. They are included in the Preprint Proposals for the 2022 Edition of the NESC as a matter of historical record.

## Procedure for Revising the National Electrical Safety Code

### 1. Preparation of change proposals for amendment

#### 1.1 A proposal may be prepared by any

- a) Substantially interested person
- b) Interested organization
- c) NESC Subcommittee
- d) Member of the NESC Committee or its subcommittees

#### 1.2 Change proposal submittal

Change proposals shall be submitted to: Secretary, National Electrical Safety Code Committee using the change proposal form (template) via the IEEE NESC website, <https://standards.ieee.org/products-services/nesc/form.html>.

#### 1.3 Each separate rule change shall begin on a separate change proposal form. The change proposal shall consist of:

- a) A statement, in NESC rule form, of the exact change, rewording or new material proposed;
- b) The name of the submitter (organization or individual as applicable);
- c) Supporting comments, giving the reasons why the NESC should be so revised.

### 2. Secretariat action

The Secretariat shall:

- a) Determine if the change proposal is in the proper format and contains all information necessary to make it acceptable for processing. If it is incomplete or otherwise fails to meet the requirements for processing, the Secretary shall return it to the submitter for completion or revision;
- b) Determine if the change proposal is to be considered through the Standard or Fast-Track Revision Process;
- c) Acknowledge receipt of proposals for revision. (If the submitter does not receive an acknowledgment within 30 days of submission, the submitter should contact the Secretariat);
- d) Distribute to each member of the appropriate NESC subcommittee all of the proposals received, arranged in a coordinated sequence.

#### 2.1 Standard revision process

The revision process shall follow the revision schedule published in the version of the National Electrical Safety Code under revision, or as amended and as appears on the NESC website.

### 3. Technical Subcommittee recommendation

The NESC subcommittee responsible shall consider each proposal and take one or more of the following steps:

- a) Endorse the proposal as received.

- b) Prepare a proposed revision or addition for the NESC (this may be a coordination of several comments or a committee consensus on a modification of a proposal).
- c) Refer the proposal to a technical working group or task force for detailed consideration.
- d) Request coordination with other NESC Subcommittees
- e) Recommend rejection of the proposal for stated reasons.

For each item, a subcommittee voting statement shall be prepared, accompanied by members' statements concerning their votes (cogent reasons are required for negative and abstention votes).

#### 4. Preprint of proposals

The Secretariat shall organize and publish a Preprint of proposed revisions including:

- a) Each main committee and subcommittee member identified by category and affiliation;
- b) The original proposal as received from the submitter;
- c) The recommendation of the subcommittee with respect to the proposal (including a voting statement and subcommittee members' statements);
- d) Information regarding submittal forms (templates) for comments.

The Preprint shall be distributed to all members of NESC subcommittees and the representatives of the organizations comprising the NESC Main Committee. Printed and/or electronic copies shall be available for sale to all interested parties. Notice of availability of the Preprint shall be submitted to ANSI for publication in ANSI Standards Action. The Preprint shall carry information on how to submit comments on the proposals and the final date for such submissions.

#### 5. Final processing of proposed revisions and comments

Following the public review period, the Secretariat shall organize and distribute for subcommittee consideration all comments received.

##### 5.1 Review of public comments

The Preprint and the public comments received shall be considered by the subcommittees. Change proposals on new or significantly different issues may not be considered. Substantive changes in the ballot draft from the recommendations in the Preprint shall be appropriately noted. The subcommittee may take the following actions:

- a) The subcommittee may recommend adoption or rejection of the proposal by majority vote.
- b) When extended technical consideration or resolution of differing or conflicting points of view is necessary, the subcommittee may refer the problem to a working group of the subcommittee for proposed resolution. If expeditious consideration is not possible, the subject shall be held on the docket.
- c) Each working group shall provide, to its parent subcommittee, recommendations on matters considered as a result of subcommittee referrals under items a) and b) above.
- d) Each subcommittee shall prepare a report showing its proposed revisions and all items to be held on the docket together with a plan for their disposition.
- e) The Secretary shall provide commenters with copies of reports of actions taken on the rules affected by their comments, and shall make all such reports available for examination upon request.

## 6. Final approval

Based upon the subcommittee reports, the Secretariat shall prepare a draft revision of the NESC and distribute copies to:

- a) The NESC Main Committee for approval by a 30-day letter ballot;
- b) The American National Standards Institute for concurrent 45-day public review in ANSI Standards Action.

6.1 Comments received in response to the letter ballot and public review shall be considered by the Executive Subcommittee. Since technical changes on new or significantly different issues are not allowed during this time, any new or significantly different technical change that is suggested shall be sent by the Executive Subcommittee to the appropriate cognizant technical subcommittee for consideration for the next revision cycle. The Executive Subcommittee shall be responsible for the timely processing of unresolved comments. Unless a consensus for revision is established, the requirements of the current edition shall carry over to the proposed edition. Those items on which consensus cannot be reached shall be considered by the appropriate cognizant technical subcommittee during the next revision cycle.

6.2 All ballots with unresolved negative comments shall be recirculated for 10 days to the Main Committee. The verbatim text of each comment, the name of the negative voter, and a rebuttal shall be included in the recirculation ballot package. During a recirculation ballot, committee members shall have an opportunity to respond, reaffirm or change their previously cast votes.

6.3 In connection with an objection articulated during a public comment period, or submitted with a vote, each such objector shall be informed in writing that an appeals process exists within these procedures.

## Committee Membership

### Main Committee

**Nelson G. Bingel, III, *Chair***     **Danna J. Liebhaber, *Vice Chair***

Organization represented	Voting position	Name	Employed by
Chair	Principal	Nelson G. Bingel III	Nelson Research, LLC
Past Chair	Principal	Michael J. Hyland	American Public Power Association
AAR	Principal	Robert Verhelle	HTNB Corporation
AEIC	Principal	Swapan Dey	Eversource Energy
APPA	Principal	Alex Hofmann	American Public Power Association
APPA	Alternate	Nathan Mitchell	American Public Power Association
APTA	Principal	Narayana Sundarum	American Public Transit Association
APTA	Alternate	Nathan Leventon	American Public Transit Association
ATIS	Principal	Lawrence M. Slavin	Outside Plant Consulting Services, Inc.
ATIS	Alternate	Trevor Bowmer	Bunya Consulting
BPA	Principal	Danna J. Liebhaber	Bonneville Power Administration
EEI	Principal	Eric K. Engdahl	American Electric Power
EEI	Alternate	Lauren E. Gaunt	Eversource Energy
IBEW	Principal	George Arhos	International Brotherhood of Electrical Workers
IBEW	Alternate	David Mullen	International Brotherhood of Electrical Workers
IEEE/PES	Principal	Otto Lynch	Power Line Systems, Inc.
IEEE/IAS	Alternate	Charles Ward	TechServ Consulting & Training, Inc.
IEC	Principal	David Hittinger	Independent Electrical Contractors of Greater Cincinnati
IEC	Alternate	Jason Todd	Independent Electrical Contractors
IMSA	Principal	Jeffrey Knight	International Municipal Signal Association
NARUC	Principal	Mark Rettmann	Oregon Public Utility Commission
NECA	Principal	Stephen Poholski	Newkirk Electric, Retired
NECA	Alternate	Michael J. Johnston	National Electrical Contractors Association
NEMA	Principal	Paul Orr	National Electrical Manufacturers Association
NRECA	Principal	Robert Harris	National Rural Electric Cooperative Association
NSC	Vacant		
NSPE	Principal	Robert S. Fuller	Texas-New Mexico Power Co.
SCTE	Principal	Timothy Cooke	Amphenol Broadband Solutions
SEIA	Principal	Lee Kraemer	First Solar
SEIA	Alternate	Greg Ball	Tesla
TVA	Principal	Clayton L. Clem	Tennessee Valley Authority
TVA	Alternate	Stephen Cantrell	Tennessee Valley Authority
WAPA	Principal	Ross Clark	U.S. Department of Energy, Western Area Power Administration
USDA/RUS	Principal	Gerald Moore	USDA/Rural Utilities Service

**Subcommittee 1**  
**Purpose, Scope, Application, Definitions, and References**  
**(Sections 1, 2, and 3)**

**Samuel Stonerock, Chair**

**Mickey B. Gunter, Secretary**

Name	Voting position	Employed by	Organization represented
Keith Reese	Principal	Georgia Power Company	Interpretations SC
Nelson G. Bingel III	Principal	Nelson Research	NESC Main
Danna J. Liebhaber	Alternate	Bonneville Power Administration	NESC Main
Samuel Stonerock	Principal	Southern California Edison	SC1
Mickey B. Gunter	Alternate	Georgia Power, Consultant	SC1
Robert Molde	Principal	Xcel Energy	SC2
Ronald J. Wellman	Alternate	American Electric Power	SC2
James E. Houston	Principal	Southern Company Services	SC3
Gregory Wolven	Alternate	WIN Energy REMC	SC3
Eric K. Engdahl	Principal	American Electric Power, Consultant	SC4
Mickey B. Gunter	Alternate	Georgia Power, Consultant	SC4
Joseph Rempe	Principal	Tacoma Power	SC5
Bruce Freimark	Alternate	American Electric Power	SC5
Lauren E. Gaunt	Principal	Eversource Energy	SC7
William Ashley Eanes	Alternate	Duke Energy	SC7
Samuel Stonerock	Principal	Southern California Edison	SC8
Brent McKinney	Alternate	City Utilities of Springfield	SC8

**Subcommittee 2**  
**Grounding Methods**  
**(Section 9)**

**Robert Molde, Chair**

**Ronald J. Wellman, Secretary**

Name	Voting position	Employed by	Organization represented
James McGowan	Principal	Quanta Services, Inc.	CEC
Donald Zipse	Principal	Electrical Forensics, LLC	CEC
Trevor Bowmer	Principal	Bunya Consulting	CPR
Ernest Gallo	Alternate	Ericsson	CPR
Timothy Cooke	Principal	Amphenol Broadband Solutions	CPR
George Arhos	Principal	IBEW	ECL
David Mullen	Alternate	IBEW	ECL
Robert Molde	Principal	Xcel Energy	EPR
Ronald J. Wellman	Principal	American Electric Power	EPR
Lauren E. Gaunt	Principal	Eversource Energy	EPR
Michael Renman	Alternate	Xcel Energy	EPR
Steven Burlison	Alternate	Duke Energy	EPR

<b>Name</b>	<b>Voting position</b>	<b>Employed by</b>	<b>Organization represented</b>
Keith Reese	Principal	Georgia Power	EPR
John Bruce	Alternate	Dominion Energy Company	EPR
Bob Dew	Principal	Hi-Line Engineering	EPU
Thomas Gwinn	Alternate	National Rural Electric Cooperative Association	EPU
Robert Harris	Alternate	National Rural Electric Cooperative Association	EPU
Lee Herron	Principal	Burndy LLC	GEN/M
David Hansen	Principal	Public Service Commission of Wisconsin	GOV
Jim Lepinski	Alternate	Public Service Commission of Wisconsin	GOV
Trung Hiu	Principal	USDA/Rural Utilities Service	GOV
Donald Junta	Alternate	USDA/Rural Utilities Service	GOV

**Subcommittee 3  
Electric Supply Stations  
(Sections 10–19)**

**James E. Houston, Chair**

**Gregory A. Wolven, Secretary**

<b>Name</b>	<b>Voting position</b>	<b>Employed by</b>	<b>Organization represented</b>
Andy Kunze	Principal	Enbridge	CEC
John Aultman	Alternate	Saginaw Power & Automation	CEC
Drew Szabo	Principal	Westwood PS	CEC
George Arhos	Principal	IBEW	ECL
David Mullen	Alternate	IBEW	ECL
W. Bruce Dietzman	Principal	Oncor Electric Delivery Company	EPR
David Guzman	Alternate	El Paso Electric Company	EPR
James E. Houston	Principal	Southern Company Services	EPR
William Munn	Alternate	Southern Company Services	EPR
Mark A. Konz	Principal	Gulf Power Company	EPR
K. Shawn Robinson	Principal	American Electric Power	EPR
Kenneth Posey	Alternate	American Electric Power	EPR
Christopher A. Carson	Alternate	Alabama Power Company	EPR
Timothy Jyrkas	Alternate	Xcel Energy	EPR
Lee Kraemer	Principal	First Solar	EPR
Gregory A. Wolven	Principal	WIN Energy REMC	EPU
Thomas Gwinn	Alternate	National Rural Electric Coop. Assn.	EPU
Greg Ball	Alternate	Tesla	GEN/M
William Pollak	Principal	NJ Transit	GEN/OU
Mehrdad Eskandary	Principal	USDA/Rural Utilities Service	GOV
Dustin Metz	Principal	North Carolina Utility Commission	GOV

**Subcommittee 4  
Overhead Lines—Clearances  
(Sections 20, 21, 22, and 23)**

**Eric K. Engdahl, *Chair***

**Mickey B. Gunter, *Secretary***

<b>Name</b>	<b>Voting position</b>	<b>Employed by</b>	<b>Organization represented</b>
Marc Candels	Principal	Candels Consulting	CEC
Jesse Kohler	Principal	Power Line Systems, Inc.	CEC
Troy Little	Principal	Brooks, Jackson & Little, Inc.	CEC
David J. Marne	Principal	Marne & Associates, Inc.	CEC
Douglas Proctor	Principal	Proctor Engineering Services	CEC
Jason Hoskins	Alternate	Ulteig	CEC
Trevor Bowmer	Principal	Bunya Consulting	CPR
Lawrence M. Slavin	Principal	Outside Plant Consulting Services. Inc.	CPR
Ernest Gallo	Alternate	Ericsson	CPR
Richard Meeker	Principal	Crown Castle	CPR
Eric O'Brien	Alternate	Crown Castle	CPR
George Arhos	Principal	IBEW	ECL
David Mullen	Alternate	IBEW	ECL
Eric K. Engdahl	Principal	American Electric Power	EPR
Mickey B. Gunter	Principal	Georgia Power, Consultant	EPR
Alan Kuipers	Principal	Consumer Energy	EPR
Keith Reese	Principal	Georgia Power	EPR
Barrett Thomas	Principal	American Electric Power	EPR
Jeffrey Steiner	Principal	National Grid	EPR
David Young	Alternate	Florida Power & Light	EPR
Blake Tucker	Alternate	American Electric Power	EPR
David D'Hooge	Alternate	Commonwealth Edison Company	EPR
Joseph J. White	Principal	Baltimore Gas & Electric	EPR
Donnie Trivitt	Alternate	OG&E Electric Services	EPR
David Barnard	Alternate	Baltimore Gas & Electric	EPR
Branch Davis	Alternate	Entergy Corporation	EPR
Michael Dyer	Principal	Salt River Project	EPU
Terry Rosenthal	Principal	Laclede Electric Cooperative	EPU
Robert Harris	Alternate	National Rural Electric Coop. Assn.	EPU
Ernest H. Neubauer	Alternate	Southern Rivers Energy, retired	EPU
Jason Jenks	Principal	Intermountain Rural Electric Assn.	EPU
Danna Liebhaber	Principal	Bonneville Power Administration	EPU
Michael Stolz	Alternate	Bonneville Power Administration	EPU
Joanna Pardini	Principal	Amtrak	GEN/OU
Robert Verrelle	Alternate	Amtrak	GEN/OU
Robert Kluge	Principal		GEN

<b>Name</b>	<b>Voting position</b>	<b>Employed by</b>	<b>Organization represented</b>
Akanksha Craft	Principal	Public Service Commission of Wisconsin	GOV
Darren Gill	Principal	Pennsylvania Public Utility Commission	GOV
Donald Junta	Principal	USDA/Rural Utilities Service	GOV
Jim Lepinski	Alternate	Public Service Commission of Wisconsin	GOV
Norris Nicholson	Alternate	USDA/Rural Utilities Service	GOV
Mark Rettmann	Principal	Oregon Public Utilities Commission	GOV

**Subcommittee 5**  
**Overhead Lines—Strength and Loading**  
*(Sections 24, 25, and 27)*

**Joseph Rempe, Chair**

**Bruce Freimark, Secretary**

<b>Name</b>	<b>Voting position</b>	<b>Employed by</b>	<b>Organization represented</b>
Otto Lynch	Principal	Power Line Systems Inc.	CEC
Brandon Grillon	Alternate	Power Line Systems. Inc.	CEC
Wesley J. Oliphant	Principal	Exo Inc.	CEC
Mark Messenger	Principal	Osmose Utilities Service	CEC
Brenda Sears	Principal	TRC Solutions	CEC
Kurt Traub	Principal	Ampirical	CEC
Derrick Slayman	Alternate	Ampirical	CEC
Trevor Bowmer	Principal	Bunya Consulting	CPR
Lawrence M. Slavin	Principal	Outside Plant Consulting Services. Inc.	CPR
Timothy Cooke	Principal	Amphenol Broadband Solutions	CPR
G. Paul Anundson	Principal	National Grid	EPR
Ronald Cotant	Principal	American Electric Power	EPR
Bruce Freimark	Principal	American Electric Power	EPR
C. Jerry Wong	Principal	Florida Power & Light	EPR
Edward Harrel	Principal	Oncor Electric Delivery Company	EPR
Jeffrey Erdle	Principal	Duke Energy	EPR
John-Chung Ng	Principal	American Electric Power	EPR
Prasad Yenumula	Alternate	Duke Power Company	EPR
Jessica Farrell	Alternate	National Grid	EPR
Matthew Shellenberger	Alternate	American Electric Power	EPR
Aaron Darby	Alternate	American Electric Power	EPR
Rusty Soderberg	Principal	Consumers Energy	EPR
James Dubay	Alternate	Consumers Energy	EPR
Robert Fuller	Principal	Texas-New Mexico Power Company	EPR
Michael Garrels	Principal	Xcel Energy	EPR

<b>Name</b>	<b>Voting position</b>	<b>Employed by</b>	<b>Organization represented</b>
Frank Agnew	Principal	Alabama Power Company	EPR
Wade Shultz	Principal	Alabama Power Company	EPR
John Trentham	Alternate	Alabama Power Company	EPR
David West	Alternate	Duke Power Company	EPR
Melanie Bragdon	Alternate	Florida Power & Light	EPR
Warren Brooks	Principal	City Utilities of Springfield	EPU
Joseph Rempe	Principal	Tacoma Power	EPU
Thomas Haire	Principal	Rutherford EMC	EPU
Robert Harris	Principal	National Rural Electric Cooperative Association	EPU
Kevin Mara	Alternate	GDS Associates	EPU
Grand Glaus	Alternate	Columbia River Electric Association	EPU
Will Pittman	Principal	Carteret-Craven Electric Cooperative	EPU
Clayton L. Clem	Principal	Tennessee Valley Authority	EPU
Stephen Cantrell	Alternate	Tennessee Valley Authority	EPU
Leon Kempner	Principal	Bonneville Power Administration	EPU
Mark Nelson	Alternate	Bonneville Power Administration	EPU
Mark Jurgemeyer	Principal	Intermountain Rural Electric Association	EPU
Cody Neyens	Principal	Western Area Power Administration	EPU
John Busel	Principal	American Composites Manufacturers Association	GEN/M
Scott Holmes	Alternate	Highland Composites	GEN/M
Dustin Troutman	Alternate	Creative Pultrusions, Inc.	GEN/M
Helen Chen	Principal	American Iron and Steel Institute	GEN/M
William Reisdorff	Alternate	Valmont Utility	GEN/M
Jim Fixsen	Principal	Bell Lumber and Pole	GEN/M
Bob Reisdorff	Alternate	Laminated Wood Systems Inc.	GEN/M
Martin Rollins	Principal	H.M. Rollins Company, Inc.	GEN/M
Andrew Schwalm	Principal	Victor Insulators, Inc.	GEN/M
Robert Kluge	Alternate		GEN
Arthur Graham	Principal	Florida Public Service Commission	GOV
Ryan Laruwe	Principal	Michigan Public Service Commission	GOV
Chendi Zhang	Principal	USDA/Rural Utilities Service	GOV
Norris Nicholson	Alternate	USDA/Rural Utilities Service	GOV

**Subcommittee 7  
Underground Lines  
(Sections 30–39)**

**Lauren E. Gaunt, *Chair***

**William Ashley Eanes, *Secretary***

<b>Name</b>	<b>Voting position</b>	<b>Employed by</b>	<b>Organization represented</b>
David J. Marne	Principal	Marne & Associates, Inc.	CEC
Trevor Bowmer	Principal	Bunya Consulting	CPR
Lawrence M. Slavin	Principal	Outside Plant Consulting Services, Inc.	CPR
Timothy Cooke	Principal	Amphenol Broadband Services	CPR
George Arhos	Principal	IBEW	ECL
David Mullen	Alternate	IBEW	ECL
Lauren E. Gaunt	Principal	Eversource Energy	EPR
Jonathan Gonynor	Principal	National Grid	EPR
Mickey B. Gunter	Principal	Georgia Power, Consultant	EPR
William Ashley Eanes	Principal	Duke Energy	EPR
William McCorcle	Alternate	American Electric Power	EPR
Michael Renman	Alternate	Xcel Energy	EPR
Lee Welch	Principal	Southern Company	EPR
Keith Reese	Alternate	Georgia Power Company	EPR
Michael Dyer	Principal	Salt River Project	EPU
Kevin Ogles	Principal	Middle Tennessee Electric Membership Corporation	EPU
Thomas Gwinn	Alternate	National Rural Electric Cooperative Association	EPU
Narayana Sundaram	Principal	American Public Transit Association	GEN/OU
Nathan Leventon	Alternate	American Public Transit Association	GEN/OU
Akanksha Craft	Principal	Public Service Commission of Wisconsin	GOV
Jim Lepinski	Alternate	Public Service Commission of Wisconsin	GOV
Trung Hiu	Principal	USDA/Rural Utilities Service	GOV
Donald Junta	Alternate	USDA/Rural Utilities Service	GOV

**Subcommittee 8**  
**Work Rules**  
*(Sections 40–44)*

<b>Samuel Stonerock, Chair</b>		<b>Brent McKinney, Secretary</b>	
<b>Name</b>	<b>Voting position</b>	<b>Employed by</b>	<b>Organization represented</b>
F. M. Brooks	Alternate	Brooks, Jackson & Little, Inc.	CEC
David Hittinger	Principal	Independent Electrical Contractors	CEC
Charles W. Gross	Principal	Consultant	CEC
Troy Little	Principal	Brooks, Jackson & Little, Inc.	CEC
Ronald May	Alternate	Brooks, Jackson & Little, Inc.	CEC
James McGowan	Principal	Quanta Services, Inc.	CEC
Stephen Poholski	Principal	Newkirk Electric, retired	CEC
Thomas Verdecchio	Principal	ESCI	CEC
David Wallis	Principal	DMW Safety Consulting	CEC
Trevor Bowmer	Principal	Bunya Consulting	CPR
Ernest Gallo	Alternate	Ericsson	CPR
George Arhos	Principal	IBEW	ECL
David Mullen	Alternate	IBEW	ECL
Bill McGough	Principal	Alabama Power Company	EPR
Bernie D. (Donnie) Bell	Alternate	Gulf Power Company	EPR
Stephen Barnard	Principal	Dominion Virginia Power	EPR
Malcolm Smoak	Principal	Southwestern Electric Power Company	EPR
Samuel Stonerock	Principal	Southern California Edison	EPR
Michael Granata	Principal	Appalachian Power Company	EPR
William Beutler	Alternate	First Energy Corporation	EPR
Mark Green	Alternate	PECO Energy Company	EPR
Dennis Hoffman	Alternate	American Electric Power	EPR
Thuy Nguyen	Alternate	American Electric Power	EPR
David Robinson	Alternate	American Electric Power	EPR
Corey Zeigler	Principal	Duke Energy	EPR
Todd Revell	Alternate	Dominion Energy	EPR
Steven Theis	Principal	Public Service Electric & Gas Co.	EPR
Brent McKinney	Principal	City Utilities of Springfield	EPU
Jonathan Beasley	Principal	MEAG Power/Electric Cities of Georgia	EPU
Kevin Dody	Alternate	City Utilities of Springfield	EPU
JD Cox	Principal	Northcentral Electric Power Association	EPU
Thomas Gwinn	Alternate	National Rural Electric Coop. Assn.	EPU
Robert Harris	Alternate	National Rural Electric Coop. Assn.	EPU
Brian Erga	Principal	ESCI Inc.	EPU
Edward Hunt	Principal	Western Area Power Administration	EPU

<b>Name</b>	<b>Voting position</b>	<b>Employed by</b>	<b>Organization represented</b>
Gary Zevenberger	Alternate	Western Area Power Administration	EPU
Jim Lepinski	Alternate	Public Service Commission of Wisconsin	GOV
Mohammed Monawer	Principal	Public Service Commission of Wisconsin	GOV
Norris Nicholson	Principal	USDA/Rural Utilities Service	GOV

### **Organizations represented**

AAR—Association of American Railroads	NARUC—National Association of Regulatory Utility Commissioners
AEIC—Association of Edison Illuminating Companies	NECA—National Electrical Contractors Association
APPA—American Public Power Association	NEMA—National Electrical Manufacturers Association
APTA—American Public Transit Association	NRECA—National Rural Electric Cooperative Association
ATIS—Alliance for Telephone Industry Solutions	NSC—National Safety Council
AWPA—American Wood Preservers Association	NSPE—National Society of Professional Engineers
BPA—Bonneville Power Admin., US Dept. of Energy	RUS—Rural Utilities Services, US Dept. of Agriculture
EEl—Edison Electric Institute	SCTE—Society of Telecommunication Engineers
IBEW—International Brotherhood of Electrical Workers	TVA—Tennessee Valley Authority
IEC—Independent Electrical Contractors	WAPA—Western Area Power Administration, US Dept. of Energy
IEEE—Institute of Electrical and Electronics Engineers, Inc.	
IMSA—International Municipal Signal Association	

### **Classifications for NESC Technical Subcommittees**

CEC—Consulting, Engineering, and Construction	GENERAL:
CPR—Communications Private Sector	GEN/I—General/Insurance
CPU—Communications Public Sector	GEN/IEO—General/Independent Electric Operators
ECL—Electric and Communication Labor	GEN/M—General/Manufacturers
EM—Emeritus	GEN/OU—General/Other Utilities
EPR—Electric Private Sector	GOV—Government
EPU—Electric Public Sector	O—Observers

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