

NATIONAL ELECTRICAL SAFETY CODE, ANSI-C2
SUBCOMMITTEE 5
GRADES (24), LOADS (25), STRENGTHS (26), INSULATION (27)

Approved Meeting Minutes

Review of Comments on Proposals for Revisions to the 2002 Edition of NESC

Thursday and Friday, July 20-21, 2000
Seattle, Washington

Chair: Frank Denbrock

Secretary: Allen Clapp

Members Attending: Ajello, Bingel, Clapp, Denbrock, Freimark, Davidchik, Desantis, J. Hanson, Harrel, Heald, Hensel, Kempner, Kluge, Peters, Pinkham, Rempe, Shultz, Slavin, Stanford, Wong—see attached attendance sheets

Members Absent: Clem, Fuller, D. Hanson, Jones, Madore, McGee

Alternates Attending: Aichinger, Corzine, Schwalm—see attached attendance sheets

Alternates Absent: Lacoursiere

Guests: see attached attendance sheets

1.0 Introduction of Subcommittee Members, Alternates, Guests and Staff Personnel

1.1 General Comments and Information on Meeting Room Facilities, etc.

Frank Denbrock

1.2 Status of e-mail, fax, correct addresses, etc.

2.0 Determination of Voting Eligibility and Priority of Subcommittee 5 Membership Present

2.1 Explanation of voting/balloting procedure (NESC Procedures Manual)

Allen L. Clapp

3.0 Identification and Expression of Concerns Pertaining to Subcommittee 5 Work Activities Relating to Revision of the 1997 Edition of the NESC to Obtain the 2002 Edition

3.1 W.G. 5.1, Leon Kempner, Chair; Continuity of Sections 24, 25 and 26

3.2 W.G. 5.2, Robert Peters, Chair; Total Revision of NESC

3.3 W.G. 5.6, Tom Pinkham, Chair; Section 27, Insulation

3.4 Other's Concerns

4.0 Brief Review and Discussion of New Developments, Standards and Research Affecting S/C5 Work

4.1 New ASCE-7 Extreme Wind Map
Leon Kempner

4.2 New ASCE-7 Ice Data, Ice/Wind Map
Leon Kempner/Jerry Wong/Robert Peters

4.3 Status of ASCE's Loading Guides, ANSI 05, and Other Standards for Application in NESC Editions
Leon Kempner/Nelson Bingel /Robert Peters/Jerry Wong/Donald Heald, Nick DeSantis

4.4. Others
Wong: IEC 826 transmission standard now being balloted. Canadian NESC is progressive. ASCE latticed tower standard committee met last week. ASCE steel pole standard committee and ASCE concrete pole design guide committee being established. ASCE 74 will not finish this year—early next year; it is desired to make ASCE 74 a design standard instead of a guide. ASCE is now trying to set up a distribution design manual. *Kempner*: chairing the ASCE substation structure design guide. IBC is not going to require earthquake design for utility structures.

5.0 Discussion of Strategies to Consider at This Meeting in Addressing 439 Comments Received on Proposals for Revisions to the 2002 NESC

5.1 Discussion Leaders to Develop and Recommend Agenda

Lawrence M. Slavin
Bruce Freimark
Nelson G. Bingel
Daniel M. McGee
Joseph Rempe

Proposed Discussion Agenda

1. Decide on treatment of CP 2372, then take up issues

Motion:

Put CP2372 in the standard as an alternate method and adjust it as necessary for decisions made on other CPs, as appropriate. –Motion Failed

Voting Affirmative:

Ajello, Bingel, Clapp, Denbrock, Freimark, Peters, Rempe,

Voting Negative: Aichinger for McGee, Davidchik, Desantis., J. Hanson, Harrel, Heald, Hensel, Kempner, Kluge, Pinkham, Shultz, Slavin, Standford, Wong

Not voting: Clem, Fuller, D. Hanson, Jones, Madore,

Comments: Clapp—If we don't clean it up and put in the standard, no one can use it. **Kluge:** The two methods often yield significantly different results and, therefore, should not be permitted as alternate methods.

Motion:

Put CP2372 in the standard as an Appendix for information purposes essentially "as is" and adjust it as necessary for decisions made on other CPs, as appropriate.
–Motion Failed

Voting Affirmative:

Aichinger for McGee, Ajello, Davidchik, Denbrock, J. Hanson, Kluge, Slavin, Stanford,

Voting Negative: Bingel, Clapp, DeSantis,, Freimark, Harrel, Heald, Hensel, Kempner, Peters, Pinkham, Rempe, Shultz, Wong

Not voting: Clem, Fuller, D. Hanson, Jones, Madore,

Comments: Clapp, Kempner, Harrel, Wong: The proposal should be massaged as necessary and not limited essentially as is.

Motion:

Put CP2372 in the standard as an Appendix for information purposes and adjust it as necessary for decisions made on other CPs, as appropriate. The latest ASCE ice/wind and 3-second gust wind maps shall be used in the Appendix.. –Motion Passed

Voting Affirmative:

Aichinger for McGee, Ajello, Clapp, Davidchik, Denbrock, DeSantis,J. Hanson, Harrel, Kempner, Kluge, Rempe, Slavin, Stanford, Wong

Voting Negative: Bingel, Freimark, Heald, Hensel, Peters, Pinkham, Shultz,

Not voting: Clem, Fuller, D. Hanson, Jones, Madore,

Comments: Clapp: I would prefer to see this is the code as an alternate, but will accept putting it in the Appendix as notice for future action. **Freimark:** As an Appendix, CP2372 is not a portion of the NESC and may be ignored. I would not expect to receive CPs to improve or otherwise modify CP2372 for the 2007 NESC. **Kempner:** If the Code is going to change, we need to keep the proposed direction available to Code users for consideration and to generate feedback to SC5. The Appendix would serve this purpose. **Rempe:** It is important that CP 2372 be included in the publication of the 2002 NESC. My concern is that between the publication of 2002 edition and consideration of implementing CP2372 within the 2007 Edition, there will not be enough experience from throughout the industry to see its application in the design of transmission and distribution plant. **Bingel:** I am against putting CP2372 in the Appendix because I am in favor of adopting the CP as an alternate strength and loading option. There

is a lot of public support for the concept and, just because the numbers don't come out the same as current practice doesn't necessarily mean they are wrong.

2. Decide issues and effect on old method and CP 2372

Comment No. **CP No.** **2384, 2233**

Motion:

Change Proposal 2233 shall stand as modified from the errata sheet and that it replace CP 2384.

Footnote 4 to Table 253-1 to read "**This factor may be reduced to 1.75 for structures when the span being supported is not a crossing.**"

Voting Affirmative:

Ajello, Bingel, Clapp, Davidchik, Denbrock, Freimark, J. Hanson, Harrel, Heald, Hensel, Kempner, Kluge, Aichinger for McGee, Peters, Pinkham, Rempe, Shultz, Slavin, Standford, Wong

Voting Negative: DeSantis,

Not voting: Clem, Fuller, D. Hanson, Jones, Madore,

Comments: Heald: I continue to be concerned with the use of a low overload factor for prestressed concrete and steel poles at deadends and Grade C Construction.

Comment No. **CP No.** **2151**

Motion:

Reject that portion of CP 2151 for the 2002 Edition concerning removal of the 60-ft exemption on application of extreme wind loads and set up a working group to develop recommendations for appropriate differences in wind treatment or other limitations for lower profile structures and lines vs. higher structures and lines for the 2007 Edition.

Voting Affirmative:

Ajello, Bingel, Clapp, Davidchik, Denbrock, DeSantis, Freimark, J. Hanson, Harrel, Heald, Hensel, Kempner, Kluge, Aichinger for McGee, Peters, Pinkham, Rempe, Shultz, Slavin, Standford, Wong

Voting Negative: None

Not voting: Clem, Fuller, D. Hanson, Jones, Madore,

Comments: Clapp: Recent experience with line failures of Grade C pole lines with 40-ft poles and more than 5 inches of total diameter of conductors and cables that pass the Rule 250B requirements but fail the 250C requirements indicate a need to restrict or eliminate the 60-ft exemption. **Heald:** Whatever the exclusion (40-, 50- or 60-ft), it should be limited to Grade C Construction. FI prefer to have

different extreme wind requirements for Grade B and Grade C construction, thereby reinforcing the concept of different transverse strength requirements for different Grades of Construction.

Comment No. **CP No.** **2309**

Motion:

Reject CP 2309 for the 2002 Edition as modified by SC5 and shown on page 251 of the Preprint because, with the retention of the 60-ft exclusion for extreme winds for the 2002 Edition, this proposal is not yet in the shape to be an alternate to the light, medium and heavy loading districts. Some loads (as presently included in the proposal) would be inappropriate, compared to the loads in the present system, particularly in the light loading district.

Voting Affirmative:

Ajello, Clapp, Davidchik, Denbrock, DeSantis, Freimark, J. Hanson, Harrel, Heald, Hensel, Kempner, Kluge, Aichinger for McGee, Peters, Pinkham, Rempe, Shultz, Slavin, Standford, Wong

Voting Negative: None

Not voting: Bingel, Clem, Fuller, D. Hanson, Jones, Madore,

Comments: Freimark: CP 2309 should be rejected as an alternate to the loads in existing Rule 250B (light, medium and heavy loading districts) since, in areas with no ice loading, the design loads would be significantly less than in the present light loading district and the extreme wind loads of Rule 250C need not be applied to facilities less than 60-ft above ground (i.e., most distribution lines).

Kluge: There were numerous NESC 2002 Comments challenging the validity of the ASCE ice/wind map in numerous regions of the USA. I believe ASCE needs to address and resolve the challenges. I have talked with Kathy Jones (author of original report from Cold Regions Research and Engineering Laboratory) and am not satisfied that these concerns have or are being addressed. There were numerous comments (e.g. Comment 3643) that this change would result in significant load changes, some higher, others lower, than current NESC District loads. There were concerns that these changes are appropriate and have been properly adjusted. **Slavin:** The calculated loads based upon CP 2309 (as modified by SC5) would also be very low compared to the present required loads for the current heavy loading area, particularly for Grade B Construction.

Comment No. **CP No.**

Motion:

Reject the original CP 2309.

The new wind and ice map is not yet included within the body of an accepted standard published under a consensus standard process. Publication in the Commentary of a standard is not sufficient for use herein. The Subcommittee was unable to complete its review of the effects of requiring the consideration of this

map and will set up a working group to determine appropriateness of adoption for the 2007 Edition.

Voting Affirmative:

Ajello, Davidchik, Denbrock, DeSantis, J. Hanson, Harrel, Heald, Hensel, Kempner, Kluge, Aichinger for McGee, Pinkham, Rempe, Shultz, Slavin, Standford, Wong

Voting Negative: Clapp, Freimark, Peters,

Not voting: Bingel, Clem, Fuller, D. Hanson, Jones, Madore,

Comments: Freimark: I would accept the latest version of the ice/wind map.

Peters, Clapp: I am against the rejection of this map because it provides the latest statistical information concerning ice accumulation. This map indicates that there are large differences in current loading which indicates several parts of the country are not properly designing for ice loading using Rule 250B. This change proposal would provide a more complete design for icing.

Comment No. **CP No.** **2363**

Motion:

Task Force 5.1.5 on wind loading shall be charged with reviewing the comments on CP 2363 and bringing recommendations to Piscataway for resolution, with the following direction.

Voting Affirmative:

Ajello, Clapp, Davidchik, Denbrock, DeSantis, Freimark, J. Hanson, Harrel, Heald, Hensel, Kempner, Kluge, Aichinger for McGee, Peters, Pinkham, Rempe, Shultz, Slavin, Standford, Wong

Voting Negative:

Not voting: Bingel, Clem, Fuller, D. Hanson, Jones, Madore,

Comments:

Comment No. **3103** **CP No.** **2363**

Motion:

Reject Comment 3103. The basis of the calculations are 200-ft spans with 50-ft, which does not apply (with the 60-ft exemption) and certain applications in coastal areas may be underloaded.

Voting Affirmative:

Ajello, Clapp, Davidchik, Denbrock, DeSantis, Freimark, J. Hanson, Harrel, Heald, Hensel, Kempner, Kluge, Aichinger for McGee, Peters, Pinkham, Rempe, Shultz, Slavin, Standford, Wong

Voting Negative: None

Not voting: Bingel, Clem, Fuller, D. Hanson, Jones, Madore,

Comments: Kluge, Heald: I agree with the motion to reject at this time. This is a substantially different proposal (method) than what was published in the Preprint. This proposal needs public review to be accepted. I encourage the author to submit a 2007 Change Proposal.

Comment No. 3104 CP No. 2363

Motion:

Reject. Option 1 is a new change proposal. Option 2 is no longer applicable, since the 60-ft exemption is being retained.

Voting Affirmative:

Ajello, Clapp, Davidchik, Denbrock, DeSantis, J. Hanson, Harrel, Heald, Hensel, Kempner, Aichinger for McGee, Peters, Pinkham, Rempe, Shultz, Slavin, Standford, Wong

Voting Negative: Freimark, Kluge,

Not voting: Bingel, Clem, Fuller, D. Hanson, Jones, Madore,

Comments: Freimark: I do not think adding Exposure B is a major change proposal.

Comment No. 3105 CP No. 2363

Motion:

Reject. Complication added by this change proposal is not justified. CP 2363 is consistent with revisions being considered to ASCE Manual 74

Voting Affirmative:

Ajello, Clapp, Davidchik, Denbrock, DeSantis, Freimark, J. Hanson, Harrel, Heald, Hensel, Kempner, Kluge, Aichinger for McGee, Peters, Pinkham, Rempe, Shultz, Slavin, Standford, Wong

Voting Negative: None

Not voting: Bingel, Clem, Fuller, D. Hanson, Jones, Madore,

Comments: Kluge

Comment No. 3150 CP No. 2363

Motion:

Reject: No supporting information given by the Commentor.

Voting Affirmative:

Ajello, Clapp, Davidchik, Denbrock, DeSantis, Freimark, J. Hanson, Harrel, Heald, Hensel, Kempner, Kluge, Aichinger for McGee, Peters, Pinkham, Rempe, Shultz, Slavin, Standford, Wong

Voting Negative: none

Not voting: Bingel, Clem, Fuller, D. Hanson, Jones, Madore,

Comments:

Comment No. **3151, 3152, 3232, 3295, 3505, 3566, 3641, 3713, 3750**
CP No. **2363**

Motion:

Reject: No longer applicable since the 60-ft exclusion will stay for this edition. See action taken on CP2151.

Voting Affirmative:

Ajello, Clapp, Davidchik, Denbrock, DeSantis, Freimark, J. Hanson, Harrel, Heald, Hensel, Kempner, Kluge, Aichinger for McGee, Peters, Pinkham, Rempe, Shultz, Slavin, Standford, Wong

Voting Negative: none

Not voting: Bingel, Clem, Fuller, D. Hanson, Jones, Madore,

Comments:

Comment No. **3164** **CP No.** **2363**

Motion:

Accept in Principle. Combine the height adjustment, gust response factors and importance factors into two tables of combined factors. Use 2 decimal places.

Voting Affirmative:

Freimark, J. Hanson, Heald, Hensel, Kluge, Rempe, Slavin,

Voting Negative: Ajello, Clapp, Davidchik, Denbrock, DeSantis, Harrel, Kempner, Aichinger for McGee, Peters, Shultz, Wong

Not voting: Bingel, Clem, Fuller, D. Hanson, Jones, Madore, Pinkham, Standford,

Comments:

Comment No. 3164 CP No. 2363

Motion:

Paragraph C1: remove the word “loading” from “ice”. Make editorial changes to definition of I. Remove ”in Rule 250C”, as shown in the paragraph below the defined terms. Remove the word “NOTE:” from the bottom sentence of Preprint page 244 to make that sentence part of the code; use the term k_z .

Motion not completed: Wong and Kluge will rewrite for Piscataway meeting.

Voting Affirmative: NOTE VOTED

Ajello, Clapp, Davidchik, Denbrock, DeSantis, Freimark, J. Hanson, Harrel, Heald, Hensel, Kempner, Kluge, Aichinger for McGee, Peters, Rempe, Shultz, Slavin, Wong

Voting Negative:

Not voting: Bingel, Clem, Fuller, D. Hanson, Jones, Madore, Pinkham, Stanford,

Comments:

Comment No. 3181 CP No. 2363

Motion:

Reject the first part, because it is a new change proposal. Reject the 2nd and 3rd parts because of the retention of the 60-ft exclusion. Reject the 4th part because it is beyond the scope of the CP and ASCE 74 is not applicable.

Voting Affirmative:

Ajello, Clapp, Davidchik, Denbrock, DeSantis, Freimark, J. Hanson, Harrel, Heald, Hensel, Kempner, Aichinger for McGee, Peters, Rempe, Shultz, Slavin, Wong

Voting Negative: Kluge,

Not voting: Bingel, Clem, Fuller, D. Hanson, Jones, Madore, Pinkham, Stanford,

Comments: The first part that addresses the effects of elevation above sea level on wind pressure is relative to this change proposal and should be addressed. If it makes the rule excessively complicated, then we should say so and not say the comment is “out of scope”.

Comment No. 3201 CP No. 2363

Motion:

Comments on 250C: Reject Part 1 because the 60-ft exemption is retained in this edition. Reject Part 2a because other exposures will not be included in this

edition. Refer Part 2b and Part 3 to the working group 5.1.5 for editorial treatment.

Comments on 250C1: Table action on Part 1 for WG 5.1.5 to review. No action required on Part 2. Table action on Part 3 for editorial action by WG 5.1.5.

Comments on 250C2: Manual 74 is being revised and will be compatible with changes in the NESC.

Comment on Figure 250-2: No action required.

Voting Affirmative:

Ajello, Clapp, Davidchik, Denbrock, DeSantis, Freimark, J. Hanson, Harrel, Heald, Hensel, Kempner, Kluge, Peters, Rempe, Shultz, Slavin, Wong

Voting Negative:

Not voting: Aichinger for McGee, Bingel, Clem, Fuller, D. Hanson, Jones, Madore, Pinkham, Standford,

Comments:

Comment No. 3383 CP No. 2363

Motion:

Accept: the new map will be incorporated.

Voting Affirmative:

Ajello, Clapp, Davidchik, Denbrock, DeSantis, Freimark, J. Hanson, Harrel, Heald, Hensel, Kempner, Kluge, Peters, Rempe, Shultz, Slavin, Wong

Voting Negative:

Not voting: Aichinger for McGee, Bingel, Clem, Fuller, D. Hanson, Jones, Madore, Pinkham, Standford,

Comments:

Comment No. 3453 CP No. 2363 and 2309

Motion: Include the all the extreme wind map from ASCE 7-98—Figure 6.1, 6.1a,b,c.

Voting Affirmative:

Ajello, Clapp, Davidchik, Denbrock, DeSantis, Freimark, J. Hanson, Harrel, Heald, Hensel, Kempner, Kluge, Peters, Rempe, Shultz, Slavin, Wong

Voting Negative:

Not voting: Aichinger for McGee, Bingel, Clem, Fuller, D. Hanson, Jones, Madore, Pinkham, Standford,

Comments:

Comment No. 3542 CP No. 2363

Motion:

Reject: We need the Importance Factor to coordinate NESC requirements with ASCE-7 to show appropriate factors for use with utility structures.

Voting Affirmative:

Ajello, Clapp, Davidchik, Denbrock, Freimark, J. Hanson, Harrel, Heald, Hensel, Kempner, Kluge, Peters, Rempe, Shultz, Slavin, Wong

Voting Negative: DeSantis,

Not voting: Aichinger for McGee, Bingel, Clem, Fuller, D. Hanson, Jones, Madore, Pinkham, Standford,

Comments:

Comment No. CP No.

Motion: Form and/or charge the following Working Groups/Task Forces:

Task Force 5.1.5 on Wind Loading—Chair Kempner, with Wong, Harrel, DeSantis, Kluge, Freimark—revise all of the changes needed for CP 2363 per this meeting.

Task Force 5.1.9 Freimark, Slavin, Shultz and Kluge—will review the major decisions made yesterday and earlier today on 2151, 2309, 2384, and 2233 and suggest appropriate responses on each of the related comments.

Working Group 5.8 to evaluate and resolve appropriate changes to the 60-ft exemption for the 2007 Edition—Chair Heald, with Kempner, Hensel, Slavin, Freimark, Bullinger, Rempe, Shultz—

Working Group 5.2 will review all comments on 2372 and bring appropriate changes to Piscataway.

Voting Affirmative:

Ajello, Clapp, Davidchik, Denbrock, DeSantis, Freimark, J. Hanson, Harrel, Heald, Hensel, Kempner, Kluge, Peters, Rempe, Shultz, Slavin, Wong

Voting Negative:

Not voting: Aichinger for McGee, Bingel, Clem, Fuller, D. Hanson, Jones, Madore, Pinkham, Standford,

Comments:

Comment No. CP No.

Motion: Set up a panel session at the 2001 PES Summer Meeting in Vancouver, BC or other appropriate venues for WG 5.7 to explain the changes in NESC Strengths and Loadings rules—Slavin to work out.

Voting Affirmative:

Ajello, Clapp, Davidchik, Denbrock, DeSantis, Freimark, J. Hanson, Harrel, Heald, Hensel, Kempner, Kluge, Peters, Rempe, Shultz, Slavin, Wong

Voting Negative:

Not voting: Aichinger for McGee, Bingel, Clem, Fuller, D. Hanson, Jones, Madore, Pinkham, Standford,

Comments:

Comment No.

CP No.

Motion:

Voting Affirmative:

Ajello, Clapp, Davidchik, Denbrock, DeSantis, Freimark, J. Hanson, Harrel, Heald, Hensel, Kempner, Kluge, Peters, Rempe, Shultz, Slavin, Wong

Voting Negative:

Not voting: Aichinger for McGee, Bingel, Clem, Fuller, D. Hanson, Jones, Madore, Pinkham, Standford,

Comments:

Comment No.

CP No.

Motion:

Voting Affirmative:

Ajello, Clapp, Davidchik, Denbrock, DeSantis, Freimark, J. Hanson, Harrel, Heald, Hensel, Kempner, Kluge, Peters, Rempe, Shultz, Slavin, Wong

Voting Negative:

Not voting: Aichinger for McGee, Bingel, Clem, Fuller, D. Hanson, Jones, Madore, Pinkham, Standford,

Comments:

Comment No.

CP No.

Motion:

Voting Affirmative:

Ajello, Clapp, Davidchik, Denbrock, DeSantis, Freimark, J. Hanson, Harrel, Heald, Hensel, Kempner, Kluge, Peters, Rempe, Shultz, Slavin, Wong

Voting Negative:

Not voting: Aichinger for McGee, Bingel, Clem, Fuller, D. Hanson, Jones, Madore, Pinkham, Standford,

Comments:

3. Set up working groups to develop answers to individual Comments relating to issues.

5.2 Approval of Recommended Agenda

5.3 Proceeding with Comments Review within Time Constraints at Seattle

6.0 Review Present and Future Subcommittee 5 Activities and Need to Establish New Working Groups, Task Forces, etc.

6.1 Active Working Group and Task Force

- W.G. 5.1; **L. Kempner (Chair)** – *Continuity of Sections 24, 25 and 26*
 - T.F. 5.1.1 (**Disbanded**)
 - T.F. 5.1.2 (**Disbanded; Work Combined with T.F. 5.1.5 Scope of Activities**)
 - T.F. 5.1.3 (**Clapp**) – *Inconsistencies of Sections 24, 25, 26 and 27*
 - T.F. 5.1.4 (**Kempner**) – *Old/Alternate vs. Recommended Method*
 - T.F. 5.1.5 (**Kempner**) – *Wind Loading*
 - T.F. 5.1.6 (**Clem**) – *Ice Loading*
 - T.F. 5.1.7 (**Bingel**) – *Fiber Reinforced Composite Structures*
 - T.F. 5.1.8 (**Bingel**) – *Grade B vs. Grade C Reliability*
- W.G. 5.2; **R. Peters (Chair)** – *Total New NESC*
- W.G. 5.6; **T. Pinkham (Chair)** – *Line Insulation*
 - T.F. 5.6.1 (**Pinkham**) – *Coordinate Changes/Improvements*
 - T.F. 5.6.2 (**Pinkham, Rojas, DeSantis**) – *Test Methods/Extreme Loading*

6.2 Additional Working Group and Task Force Requirements

- Scope of Activities
- Schedule of Completion

7.0 Scheduling of Future Subcommittee 5, Working Group and Task Force Meetings

7.1 Piscataway, NJ, October 2, 3, 4 and 5, 2000

7.2 Other Meetings

8.0 General Comments on ANSI C2-NESC Organization, Scope of Work Activities, Needed Improvements, etc.

9.0 Adjournment

Principal Members of NESC Subcommittee 5

<i>e</i> <i>Nam</i>	Employed By:	Organization Represented:	Telephone: Email:	<i>Check Date Present</i>			
				July 20, 2000 AM	PM	July 21, 2000 AM	PM
Ajello, Julian	California Public Utilities	NARUC	(415) 703-1327 jea@cpuc.ca.gov	X	X	X	X
Bingel, Nelson G.	OSMOSE, Inc.	AWPA	(716) 882-5905x249 nbingel@osmose.com	X	X		
Clapp, Allen L.	Clapp Research Associates, P. C.	Self	(919) 782-7745 allen@clappresearch.com	X	X	X	X
Clem, Clayton L.	TVA Transmission Power Supply	TVA	(423) 751-3217 clclem@tva.gov				
Davidchik, Darrell	Verizon	EIA	(972) 718-7287 Darrell.davidchik@telops.gte.com	X	X	X	X
Denbrock, Frank A.	D & A Consulting Engineers	IEEE/PES/T&D	(517) 788-3800/3801 denbrock@ic.net	X	X	X	X
DeSantis, Nicholas J.	Florida Power Corporation	EI	(407) 475-2276 Nicholas.j.desantis@fpc.com	X	X	X	X
Freimark, Bruce	American Electric Power	EI	(614) 883-7244 bfreimark@aep.com	X	X	X	X
Fuller, William F.		NSPE	(817) 332-4852 bfuller@flash.net				
Hanson, Douglas	Western Area Power Supply	WAPA	(303) 275-2811 ahansond@wapa.gov				
Hanson, Jerome G.	Hanson & Associates	Self	(303) 985-7979 JGHanson@aol.com	X	X	X	X
Harrel, Edward	TXU Electric	EI	(817) 215-6068 eharrell@tuelectric.com	X	X	X	X
Heald, Donald G.	RUS-US Dept of Agriculture Electric Staff Division	RUS	(202) 720-9102 dheald@rus.usda.com	X	X	X	X
Hensel, Richard W.	Consumers Energy	IEEE	(517) 788-1095 rwhensel@cmsenergy.com	X	X	X	X
Jones, W. D.	Stanley Consultants, Inc.	IEEE/IAS	(303) 799-6806 joneswalt@stanleygroup.com				
Kempner, Leon	Bonneville Power Administration	BPA	(503) 230-5563 lkempnerjr@bpa.gov	X	X	X	X

<i>Name</i>	Employed By:	Organization Represented:	Telephone: Email:	<i>Check Date Present</i>			
				July 20, 2000 AM	PM	July 21, 2000 AM	PM
Kluge, Robert O.	Alliant Energy	EEl	(608) 252-3056 bobkluge@alliant-energy.com	X	X	X	X
Madore, Michael	Chicopee Municipal Lighting	APPA	(413) 598-8311x40 mmadore@celd.com				
McGee, Daniel	Consultant (AISI)	AISI	(732) 671-6043 dmcgee@steel.org				
Peters, Robert C.	RCP Engineering	IEEE	(610) 775-2003 Rcpenginrg@cs.com	X	X	X	X
Pinkham, T. A.		IEE/PES/T&D	(603) 472-5446 tapinkham@ieee.org	X	X	X	X
Rempe, Joseph	Tacoma Power	APPA	(253) 502-8290 jrempe@ci.tacoma.wa.us	X	X	X	X
<i>Shultz, Wade</i>	Alabama Power Co.	SEEX	(205) 257-4173 ewshultz@southernco.com	X	X	X	X
Slavin, Lawrence M.	Telcordia Technologies	ATIS	(973) 829-4330 lslavin@telcordia.com	X	X	X	X
Standford, Richard J.	Niagara Mohawk Power Corp.	EEl	(315) 428-6777 standford@niagaramohawk.com	X	X		
Wong, Jerry	Florida Power & Light	EEl	(561) 694-4877 Jerry_Wong@FPL.com	X	X	X	X

<i>Alternate Members of NESC Subcommittee 5</i>							
<i>Name</i>	Employed By:	Organization Represented:	Telephone: Email:	<i>Check Date Present</i>			
				July 20, 2000 AM	PM	July 21, 2000 AM	PM
<i>Aichinger, Richard</i>	Valmont Industries, Inc.	AISI	(402) 359-2201 X3669 RFA@valmont.com	X	X	X	X
<i>Corzine, Ron</i>	Savannah Electric & Power Co.	SEEX	(912) 754-2770 rj.corzin@southernco.com	X	X	X	X
<i>Lacoursiere, Brian</i>	International Utility Structures	AISI	(403) 269-2350 blacoursiere@iusi.ca				
<i>Schwalm, Andrew</i>	Victor Insulators, Inc.	IEEE	(716) 924-2127 aschwalm@victorinsulators.com	X	X	X	X

Guests: Please give complete address, telephone, and e-mail

Guests Name:	Mailing Address:	Telephone: Email:	<i>Check Date Present</i>			
			<i>July 20, 2000</i> AM	PM	<i>July 21, 2000</i> AM	PM
<i>P. D. Quinn</i>	Santee Cooper, 1 Riverwood Drive Moncks Corner, SC 29461	(843) 761-4002 pdquinn@santeecooper.com	X			
<i>Frank Ferracane</i>	Illinois Power Co., 500 S. 27 th St. Decatur, IL 62521	(217) 362-6322 frank_ferracane@illinoispower.com	X			
<i>Rex Bullinger</i>	NCTA, 1724 Massachusetts Ave, NW Washington, DC 20036	(202) 775-3636 rbullinger@ncta.com	X	X	X	
<i>Shand Waddoups</i>	Pacificorp, 1407 W. North Temple—STE 330 Salt Lake City, UT 84140	(801) 220 6634 shand.waddoups@pacificorp.com	X			
<i>Tom Diamantis</i>	Niagara Mohawk, C-1, 300 Erie Blvd W. Syracuse, NY 13202	(315) 428-5688 diamantist@nimo.com	X			
<i>Gene Lindholm</i>	AES/CILCO, 300 Liberty St. Peoria, IL 61602	(309) 693-4751 glindholm@cilco.com		X		
<i>Chuck Amrhyn</i>	OPEC, PO Box 476 Mendham NJ 07945	(973) 543-2369 ocam-opec@msn.com	X	X	X	X