

IEEE SUBCOMMITTEE ON QUALIFICATION
IEEE/NPEC/SC-2 Meeting 08-01
Minutes of Meeting SC2-08-1
Sheraton Convention center
Myrtle Beach, SC

April 8-9, 2008

Members Attending: [See Table 2](#)

Members Absent: [See Table 2](#)

Table 1 Guests:	Matt Ceglia	IEEE
	Jeff Chivers	Rosemount Nuclear
	Jonathan Cornelius	Raychem GmbH
	Milton Concepcion	Nuclear Regulatory Commission
	Toshihiko Fukuyama	JAPEIC
	Christopher Gleason	GEH
	Lance Guthreau	ASCO
	Charles Hills	General Cable
	Mohammad Hosain	Exelon
	Frank Kloer	Invensys Triconex
	Bob Minadeo	Areva
	Darren Martin	Vibration Research Corp
	Marie Nemier	Curtis-Wright
	Jon Pirrong	CableLan
	Larry Witt	Weed Instrument
	Jackie Wright	Enercon

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1.0 Call to Order

The SC-2 Chairman, Nissen Burstein, opened the meeting on Tuesday April 8, 2008 at 8:00 am and welcomed everyone in attendance. This meeting was scheduled for 1 ½ days and concluding Wednesday April 9, 2008. A role call was taken and it was determined that a quorum was available, with 32 of 50 SC-2 members present. Bridge Bharthey has retired and resigned from SC-2.

2.0 Introduction of Members and Guests

Open introduction

3.0 General Remarks, Review and Approval of Agenda

The meeting agenda (Attachment 1) was reviewed and no changes were requested. A motion was made by Tom Hency to approve the meeting agenda. Tom Koshy seconded the motion and the SC-2 members approved the agenda unanimously.

The Chairman summarized topics (Attachment 2) discussed in AdCom on Sunday April 6, 2008.

New plant design presentations will be given at each meeting to keep membership informed.

NPEC 08-02, will be July 14-16, 2008, Toronto, Ontario, Canada. A valid passport is required for entry into Canada. SCs will meet Monday, 7/14; AdCom meets Tuesday, 7/15; and NPEC meets, Wednesday, 7/16.

Emerging Issues will be tracked on an AdHoc basis, as needed, and at Chairman's discretion.

The Chairman identified that appointments to SC-2 and Working Groups have changed to last only one year. (Previous appointment and reappointment to SC-2 were on a bi-annual basis). Membership will be renewed at the beginning of the fiscal year. If a member wishes to not continue his/her membership then the member is requested to inform the SC-2 Chair, SC-2 Secretary, and associated Working Group. Recommendations are solicited for SC membership for 2009 from individual WGs.

Members are encouraged to bring guests to attend SC-2 and Working Group meetings to promote a better understand of the SC-2 organizations. All SC-2 members are encouraged to become a member of a Working Group. Membership to SC-2 is a reward for accomplishments on working groups. Recommendation to be elevated to NPEC and above is based on a person's accomplishments and participation.

The bylaws require attendance of at least one meeting per year.

No voting proxies are allowed for SC-2 members. Members are allowed to have an alternate at the SC-2 meetings provided the alternate is not an SC-2 committee member. Membership can only have one vote. Therefore, proxies will no longer be allowed for voting or meeting attendance requirements.

Working Groups are allowed to have less than ten members. The ten member minimum requirement previously identified only applies to the sponsoring committee (such as NPEC) in order for them to conduct business, and does not apply to the SCs.

Caprice Warren, Advent, has agreed to become the meetings coordinator.

The Chairman discussed the NPEC Goals for 2007-2008.

The Chairman discussed that Awards are solicited for technical working groups.

4.0 Review and Approval of Meeting Minutes (07-2)

The minutes of the previous SC-2 meeting 07-2 were discussed and no changes were made. Ed Mohtashemi made motion to approve the minutes, which was seconded by Robert Queenan and the minutes were approved unanimously.

5.0 SC-2 Chairman's Report

The Chairman discussed the alligator fund and stated that after Meeting 07-02, the balance was \$140.70.

A contribution of \$50 was requested from each of the members for this meeting. Of the 32 members physically present at the meeting, 32 contributed the requested \$50. In addition, 6 guests contributed \$50. A total of \$1900 was collected. Hotel costs were \$1834.46, which leaves a balance of \$256.24, after an opening balance of \$190.70. The Chairman, SC-2, holds these funds. SC-2 in 2007 was required to complete an IEEE income report for IRS tax purposes. SC-2 does not plan to complete the IEEE income report in the future, because the SC has no reportable income.

SC-2 members were balloted to meet with NPEC or with the EQ Technical Committee. Twenty-eight voted to meet with the EQ Technical Committee, 8 voted to meet with NPEC, and 1 had no preference of the 51 SC-2 members.

The following standards were reviewed with their working groups and there are no plans to move them to SC-2:

- IEEE Std 535 (Lead Storage Batteries) was revised in 2006
- IEEE 317 (Electric Penetration Assemblies)
- IEEE 628 (Raceway Systems)
- IEEE 816 (Smoke)

The following standards are being considered for joint working groups with SC-2:

- IEEE C37.98 (Seismic Qualification of Relays), see Item 7.6
- IEEE C37.105 (Qualifying Class 1E Protective Relays and Auxiliaries)
- IEEE C37.81/82 (Seismic and Environmental Qualification of SWGR)
- IEEE C37.121 (SWGR Design)

The Chairman identified the SC-2 Liaisons:

- A. ASME, Glen Schinzel
- B. EPRI, Chris Abernathy
- C. IEC, Jim Gleason
- D. ISA, Bob Queenen
- E. NEI, Gordon Cleifton
- F. NRC, Tom Koshy,

5.1 Vice Chairman's Report

New IEEE Styling Manual 2007 has been issued. Working Groups with near term document revisions are requested to perform a review of the manual for updates, which may impact their document.

6.0 SC-2 Secretary's Report

The Secretary reviewed the SC-2 List of Action Items, discussing the following status:

Item No.	Description	Comments	Status
<i>Action Items from Meeting 07-1</i>			
AI-07-1-1	NPEC will be provided an option for SC-2 to meet at least once per year with NPEC.	While NPEC would like SC-2 to meet in conjunction with NPEC, the logistics of adding SC-2's need for 1.5 days and NPEC's already tight schedule no longer make this a priority.	Closed
AI-07-1-2	A letter will be prepared to NPEC to consolidate qualification standards for 535, 317, 628 and C3798 under SC-2	C37.98 will be jointly sponsored by SC-2 and the relay committee, Marie Nemier will be joining SC-2	Closed
<i>Action Items from Meeting 07-2</i>			
AI-07-2-1	A PAR is being pursued for reaffirmation of IEEE 323.	IEEE does not need a PAR and the balloting process has commenced on IEEE MYBALLOT, sign up to ballot by 4/23/08.	Closed
AI-07-2-2	A PAR extension is being considered for P1682 (Fiber Optic Cables, Connectors, Splices).	Jan Pirrong noted that the PAR extension might not be required.	Open
AI-07-2-3	Invite local IEEE chapter of the town in which we are meeting to an evening speech at the next meeting.	No progress to report	Open
AI-07-2-4	Need to determine status of 628 and 535 relative to moving over to SC-2	Will not be moving	Closed
AI-07-2-5	Check situation regarding joint logos and report back to SC and NPEC.	IEEE is working this and will provide direction to SC-2	Open
AI-07-2-6	Verify ballot process w/NPEC, particularly regarding P-627 and P-1682	Nissen Burstein	Open
AI-07-2-7	SC-2 is seeking a volunteer to	Caprice Warren, Advent, will be the	Closed

Item No.	Description	Comments	Status
	provide meeting logistics.	meetings coordinator.	

7.0 Discussions and Updates

7.1 Update on NPEC Activities

The SC-2 Chairman provided an update on NPEC activities. SC-2 members were all encouraged to become involved and with one of the ten active SC-2 WGs. Active membership is necessary to be considered for membership at the NPEC level.

7.2 Development of Joint IEEE/IEC Standards.

IEC has initiated a work project for revision of IEC 60780. Richard Wood has been selected to lead the revision to IEC 60780. They will consider IEEE 323-2003 and work with SC 2.1. Richard Wood is on both IEC and SC-2. Kjell Spang provided the update. IEC 60780 (W.G. A9) has been given approval to make revisions to bring it up to the latest version of IEEE 323 in an attempt to harmonize the two documents. SC 2.1 Chair (Jim Gleason) is now a member of IEC and will work with IEC 60780 (W.G. A9) to develop consistency between both Environmental Qualification standards. Major technical differences between the two standards have been identified to IEC to assist in the harmonization process. The initial draft of the standard is expected to be out within a year. No changes to IEEE Std 323-2003 will occur until IEC 60780 has been revised so that technical harmonization of the documents can be accomplished. See Attachment 3.

Kjell Spang has developed a new work product for condition monitoring, which is a new topic for which neither IEEE nor IEC standards exist. This is the first joint project. SC 2.1 has agreed to participate. Kjell has authority to commence work. Scott Malcolm, Chairman of NPEC attended the meeting.

This International Standard specifies standard methods for condition monitoring of electrical equipment of safety system for nuclear power plants. It includes monitoring methods using mechanical, dielectric and chemical condition indicators. The methods specified in this standard are applicable to electrical equipment containing polymeric and organic materials. It is proposed that this standard will address the most commonly used condition monitoring methods (mechanical, dielectric and chemical indicators) and performance measurements to insure accuracy and repeatability of results. The document will contain a general section to be applicable to all methods and a separate part for each condition monitoring indicator. The three condition monitoring indicators being considered at this time are:

- 1) Indenter modulus
- 2) Elongation at break, and
- 3) Oxidation Induction Temperature (OIT).

An aggressive schedule has been developed, which includes a meeting, tentatively scheduled for Sweden in September 2008, of the joint IEC-IEEE technical experts to review drafts of the elements for Indenter modulus, Elongation at break, and Oxidation Induction Temperature and completion in April 2009.

SC 2.1 Chair (Jim Gleason) is one of technical expert from the US, which will work on the development of the joint IEEE/IEC condition monitoring standard. Jim will be the formal IEEE NPEC interface for this program. See Attachment 4.

IEEE Position on Joint Logo was presented by Matt Ceglia, Program Manager, Technical Program Development, IEEE Standards Activities. The dual logo program was designed to address cases where IEEE documents can be adopted by IEC. IEEE could also accept IEC documents with changes through the PAR process. Discussions are presently taking place between both organizations to negotiate and establish policies for how to establish joint working groups for development of co-sponsored documents. There are no formal agreements between IEEE and IEC in place at this time to perform this function.

7.3 Evaluation and Screening Process for High Frequency Sensitive Equipment

Jim Parelo discussed the efforts for Evaluation and Screening Process for High Frequency (HF) Sensitive Equipment. The issue arises because Central and Eastern United States (CEUS) plants on rock sites may exceed the Certified Seismic Design Response Spectra (CSDRS) for frequencies greater than 10 Hz for new plant designs. Since HF motions have been shown to be non-damaging to virtually all types of NPP structures, systems, and components (SSCs) with the exception of potentially HF-sensitive components. The NEI Seismic Technical Issues Committee, which includes SC-2 / SC 2.2 members (Nissen Burstein, Jim Gleason, Jim Parelo, and John Richards), assisted in drafting a white paper. The white paper created a HF screening process in which potentially HF sensitive equipment is evaluated for HF sensitivity. Westinghouse has performed an extensive HF evaluation process for AP-1000. See Attachment 5.

7.4 EQ QA AdHoc

This activity was concluded in SC-2. Their task was to determine if there is a need to update standards to address quality assurance (QA) programs performed outside the United States that are not in compliance with 10 CFR Part 50, Appendix B. The ADHOC QA Committee report recommended that no actions should be taken within SC-2 and the effort transferred to the NPEC level. The recommendation was reported at the NPEC 08-1 meeting. NPEC Chair (Scott Malcolm) accepted their findings and requested N. Burstein to form an NPEC ADHOC working group to investigate the QA requirements. The NPEC ADHOC working group was requested to complete the QA investigation and make recommendations to NPEC.

The new committee consists of Nissen Burstein, Jim Gleason, Glen Schinzel, Tom Koshy, Tom Ruggiero, Exelon and ASME, John Adkins, QA Sup Southern Company, and K. Beard, NQA-USA.

Nissen Burstein reported that discussions were held among the team and ASME and NQA-1 representatives. The discussion centered on the topic that some outside of US contractor work for EQ may have been performed in accordance with QA programs that may not have met all of the requirements of 10 CFR 50 Appendix B.

John Adkins, outgoing chairman of NQA-1 explained some of the background behind SECY-03-0117. It was created by an effort by EPRI to show that ISO 9000 is equivalent to 10 CFR 50 Appendix B. The NQA-1 Committee concluded that ISO 9000 is not equivalent, the SECY -03-0117 effectively states this and ISO 9000 could not be used for compliance with 10 CFR 50 Appendix B. The bottom line was 10 CFR 50 Appendix B has to be met for plants licensed in the USA.

A method for IEEE NPEC involvement may be to seek a non-voting IEEE representative as liaison to NQA-1. Note, NPEC has authorized N Burstein to request membership on NQA-1 as the IEEE representative.

Milton Conception, NRC (Member of SC-2.1 and NQA-1) has agreed to make a presentation on NQA-1 at the next SC 2 meeting.

7.5 Discussion of DG-1142/RG 1.209/IEEE 323-2003

Jim Gleason stated that RG 1.209 has been issued. IEEE comments had been considered and changes were made based on IEEE's input. New plants are committing to RG 1.209 in their DCDs.

7.6 IEEE C37.98 move to NPEC/SC-2

Marie Nemier, IEEE Power System Relay Committee (PSRC) Working Group Chairwoman presented "IEEE C37.98, Standard for Seismic Testing of Relays." A PAR has been approved with Joint Sponsors of PSRC and NPEC SC-2 to update the standard to address digital, solid state multi-function relays and EMI/RFI requirements. Suresh Channarasappa was identified as the SC-2 Co-Chair for this standard. The joint committee is soliciting members from SC 2, PSRC and industry. See Attachment 7.

7.7 P-627 Preview/Review/Comments

Dave Horvath, Chairman SC 2.10 previewed P-627. The PAR was approved May 7, 2007; Revision was submitted at NPEC AdCom08-1 (Jan. 2008) and approval expected by IEEE NesCom June 2008. The scope of the proposed standard is to provide the basic principles for qualification of equipment used in nuclear facilities. The proposed standard is intended to be an upper tier document to both IEEE Std 323 and ASME Std QME-1. SC-2 members are requested to provide additional comments within two weeks. SC-2 voted to recommend the preview to NPEC. See Attachments 8 and 9.

7.8 Westinghouse AP1000 EQ Program

Jim Parello noted that AP1000 has submitted a DCD change and has provided NRC with information on the Seismic High Frequency issue. W has started to discuss qualification capabilities with vendors and test laboratories. COL's have been submitted to NRC for TVA's Bellefonte site near Scottsboro in Jackson County, Alabama; Progress Energy's Harris sites near New Hill in Wake County, North Carolina; SCE&G sites near Fairfield County, South Carolina; Southern Nuclear Operating Company's Vogtle Site near Augusta in Burke County, Georgia; and Duke Energy's Lee site near Charlotte in Cherokee County, South Carolina.

7.9 GEH ABWR and ESBWR EQ Programs

Ed Mohtashemi and Jim Gleason presented the GEH ABWR and ESBWR EQ Program updates. ESBWR is working on DCD Revision 5, which is due out shortly. ESBWR has also started to discuss qualification capabilities with vendors. Ed Mohtashemi noted that GEH has opened a new ABWR project office in San Jose, California. ESBWR COL's have been submitted to NRC for Dominion's North Anna sites near Richmond in Louisa County, Virginia; and Entergy Operations, Inc. (EOI) Grand Gulf site, near Port Gibson in Claiborne County, Mississippi. ABWR COL's have been submitted to NRC for STPNOC's South Texas Project sites near Bay City in Matagorda County, Texas.

7.10 Areva US EPR EQ Program

Nissen Burstein presented an update on the Areva US EPR EQ Program. UniStar Nuclear and

Constellation COL has been submitted to NRC for AREVA U.S. Evolutionary Power Reactor (EPR) for the Calvert Cliffs Nuclear Power Plant Unit 3.

8.0 NRC Liaison Report

Tom Koshy presented the NRC report. See Attachment 11. Some highlights are:

- Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients, GL 2008-01.
- Designation and Protection Of Safeguards Information, IN 2008-1
- Findings Identified During Component Design Bases Inspections, IN 2008-2
- Control of Simulation Software Categorized as Sensitive Unclassified Nonsafeguards Information, IN 2007-39
- Inadequate Implementation of 10 CFR Part 21 Requirements by Vendors Who Supply Basic Components To Nuclear Power Plant Licensees, IN 2007-40

Status of Updating Software Related Regulatory Guides is included in the status report.

Interim Staff Guidance Status is included in the status report.

The New Reactor Licensing Activities Schedule is enclosed.

The List of Expected New Nuclear Plant Applications is enclosed.

Regulatory Guide schedule is enclosed RG 1.100 is expected shortly, but RG 1.89 has been delayed at least 6 more months.

9.0 Working Group Reports

9.1 IEEE Standard 323 (SC-2.1 - WG on Environmental Qualification)

Jim Gleason stated that a PAR is not required for reaffirmation of IEEE Std 323. Therefore the reaffirmation process has commenced. The Interim Staff Guidance documents were discussed at the last meeting. ISGs for highly integrated control room, D3 (diversity and defense in depth), and cyber security have EQ implications.

9.2 IEEE Standard 334 (SC-2.2 - WG on Motors)

Co-chairman James Dean reported that IEEE Std 334 has been issued and they were planning the next changes.

9.3 IEEE Standard 382 (SC 2.3 - WG on Valve Operators)

Ed Mohtashemi is the new chairman and IEEE Std 382 has been issued. They are looking for new members.

9.4 IEEE Standard 383 (SC 2.4 - WG on Cables)

John White was not present, but Nissen Burstein noted that IEEE Std 383 reaffirmation has commenced.

9.5 IEEE Standard 344 (SC 2.5 - WG on Seismic Qualification)

Jim Parello, the WG Chairman, informed SC-2 that, while there was no new activity on this standard, they expect NRC to issue a revision to RG 1.100 soon. The Seismic High Frequency Issue continues to be worked by NEI and the vendors. See item 7.4. See Attachment 12.

9.6 IEEE Standard P627 (SC 2.10 - WG on Design Qual)

The Chairman of the WG, Dave Horvath, previewed P627 and expects a ballot by end of 2008.

9.7 IEEE Standard 572 (SC 2.11 - WG on Connectors)

There was no report. IEEE 572 was published in 2006.

9.8 IEEE Standard 650 (SC 2.13 - WG on Battery Chargers)

Dennis Dellinger, the WG Chairman, reported that the revised standard was published in 2006.

9.9 IEEE Standard 649 (SC 2.14 - WG on Motor Control Centers)

Tom Brewington spoke for Chairman of the WG, Robert Francis, and said that the standard was published in 2006.

9.10 IEEE Standard P-1682 (SC 2.15 - WG on Fiber Optic Cable)

The Chairman of the WG, Jan Pirrong, said that progress is being made and a full draft is expected for SC-2 08-2.

9.11 ASME Liaison Report

Glen Schnitzel could not be present, so Nissen Burstein discussed the ASME Liaison Report.

10.0 Action Item Status

Action items from previous SC-2 meetings were reviewed at this meeting. Table 3 provides a listing and the status of action items from past meetings, along with new action items identified at this meeting.

Table 3 - List of Action Items

Item No.	Description	Responsible	Status
<i>Action Items from Meeting 07-1</i>			
AI-07-1-1	NPEC will be provided an option for SC-2 to meet at least once per year with NPEC.	Nissen Burstein	Closed
AI-07-1-2	A letter will be prepared to NPEC to consolidate	Nissen Burstein	Closed

Item No.	Description	Responsible	Status
	qualification standards for 535, 317, 628 and C3798 under SC-2		
<i>Action Items from Meeting 07-2</i>			
AI-07-2-1	A PAR is being pursued for reaffirmation of IEEE 323.	Jim Gleason	Closed
AI-07-2-2	A PAR extension is being considered for P1682 (Fiber Optic Cables, Connectors, Splices).	Jan Pirrong	Open
AI-07-2-3	Invite local IEEE chapter of the town in which we are meeting to an evening speech at the next meeting.	Nissen Burstein	Open
AI-07-2-4	Need to determine status of 628 and 535 relative to moving over to SC-2	Nissen Burstein	Closed
AI—07-2-5	Check situation regarding joint logos and report back to SC and NPEC.	Nissen Burstein	Open
AI-07-2-6	Verify ballot process w/NPEC, particularly regarding P-627 and P-1682	Nissen Burstein	Open
AI-07-2-7	SC-2 is seeking a volunteer to provide meeting logistics. Advent Engineering (Caprice Warren) has volunteered to perform activities associated with SC-2 meeting logistics.	Nissen Burstein	Closed
<i>Action Items from Meeting 08-1</i>			
AI-08-01	Review P627 by 4-23-08 and send comments to Dave Horvath	All	Open
AI-08-02	Preview P1682 at SC-2 08-02	Jan Pirrong	Open
AI-08-03	Prepare revision to SC-2 O&P manual	SC-2 Vice-Chairman	Open

11. New Items and Presentations

11.1 Non-Destructive and Non-Intrusive Cable Condition Monitoring Using FT-NIR Spectroscopy

Hormoz Azizian, NIR Technologies Inc, and S. Benson, RCM Technology made this presentation. The objectives of the paper discussed were to determine feasibility of using FT-NIR for condition monitoring and to determine sensitivity of FT-NIR to changes due to radiation and thermal aging. It was noted that FT-NIR could not be used on cables with black insulation, because of no reflectance. See Attachment 6.

11.2 “Differences in Test Control Systems and Data Reduction Practices used in the Performance of Seismic Test Programs, Part II.”

Darrin Martin, Vibration Research, presented “Differences in Test Control Systems and Data Reduction Practices used in the Performance of Seismic Test Programs, Part II.” Darrin covered testing and analysis methods of Coherence, Cross-Correlation, Stationarity, Peak Stress Cycle Counting, and Measurement of

the Zero Period Acceleration. See Attachment 10.

12.0 Next Meeting

The SC-2 Meeting 08-2, November 2008, Tucson Marriott University Park Hotel, Tucson, AZ, in conjunction with the EQ Technical Committee.

IEEE/NPEC/SC-2 Meeting 09 -1, April 2009, Prospective Locations: San Diego CA, Nashville, TN, London, England, Orlando, FL

13.0 Adjournment

At approximately 12 PM on April 9, 2008 a motion was made to adjourn and meeting SC2-08-01 was adjourned.

Minutes Prepared by:
James Gleason
Secretary, IEEE/SC-2

Attachments: All attachments can be found at the IEEE.org Working Group web site [NPEC Subcommittee and Working Group Areas](#).

14.0 Attachment List

Attachment 1	SC-2- Agenda 08-01
Attachment 2	SC-2- AdCom Agenda 08-01
Attachment 3	R. Woods IEC 60780
Attachment 4	K. Spang CM Work Product
Attachment 5	J. Parelo HF Seismic Screening
Attachment 6	H. Azizian FT-NIR
Attachment 7	M. Nemier IEEE C3798
Attachment 8	D. Horvath P627 Preview
Attachment 9	D. Horvath P627 draft
Attachment 10	D. Martin IEEE 344 Testing
Attachment 11	T. Koshy NRC Liaison Report
Attachment 12	J. Parelo IEEE 344 TM Project Status Report

15.0 Table 2. SC-2 Member Attendee List 2008-01

	Name/Company	Address	4/8	4/9
1	Abernathy, Chris Duke Energy Co. Tel: 704-875-4486 Email: cdabernathy@duke-energy.com		X	X
2	Akhtar, Saleem KCI Consultants Tel : 630-515-2650 x 20 Fax : 630-515-2654 Email: s.akhtar@comcast.net saleemakhtar@kciconsultants.com	1401 Branding Lane Suite 255 Downers Grove, IL 60515	X	X
3	Benson, D. Steven RCM Technologies, Engr Services Tel : 905-821-1616 x 245 Fax : 905-821-1613 Email: steve.benson@rcmt.com	6620 Kitimat Road, Unit 4 Mississauga, Ontario L5N 2B8 Canada	X	X
4	Brewington, T. (Tom) Wyle Laboratories Tel. (256) 837-4411, ext. 512 Fax (256) 837-3363 Email: tom.brewington@wylelabs.com		X	X
5	Burstein, N. M. (Nissen) – Chairman SC-2 AREVA NP, Inc. Tel. (434) 832-2501 Fax (434) 832-2683 Email: nmb@ieee.org	3315 Old Forest Rd. M/C OF54 Lynchburg, VA 24506-0935	X	X
6	Casadevall, S. (Steve) ASCO Valve Inc. Tel. (973) 966-2512 Fax (973) 966-2624 Email: scasadevall@asco.com	50 Hanour Road Florham Park, NJ 07932	X	X
7	Channarasappa, S. (Suresh) Westinghouse Electric Co. Tel. (724)-733-6587 Email: channas@westinghouse.com	1760 Golden Mile Hwy. Monroeville, PA 15746	X	X
8	Chapman, G. V. (Garry) Trentec, Inc. Tel. (513) 528-7900	4600 East Tech Drive Cincinnati, OH 45245		

	Name/Company	Address	4/8	4/9
	Fax (513) 528-9292 Email: gchapman@trentec.com			
9	Chung, Choon-Hoon KOPEC Tel. 82-31-289-3843 Fax 82-31-289-4272 Email: chchung@kopec.co.kr	Electrical Department, 360-9 Mabuk-ri Guseong-eup Yonginsi, Gyeonggi-do, 449- 713, Republic of Kor		
1 0	Dean, J. M. (James) SC 2.2 - 334 (co w/Newell) Applied Energy Services, Inc. Tel. (203) 888-1536 Fax (203) 888-1538 Email: jamesdean@aesnuclear.com	66 Chestnut Tree Hill Rd Oxford, CT 06478	X	X
1 1	Delcea, L. N. (Liviu Nicolae) CNE Prod Tel. +40-241-80-1658 Fax +40-723-111-627 Email: ldelcea@cne.ro	Medgidiei St. No. 1 C.P. 42, Cernavoda 08625 Constanta, Romania		
1 2	Dellinger, D. E. (Dennis) SC 2.13 - 650 Solidstate Controls, Inc. Tel. (614) 846-7500 Fax (614) 885-3990 Email: dennis.dellinger@Ametek.com	875 Dearborn Drive Columbus, OH 43085	X	X
1 3	Di Benedetto, P. (Philip) Tel. (978) 686-3561 (h) (617) 589-2671 (w) Cell (978) 660-7662 Email: pdibenedetto@comcast.net	123 French Farm Road North Andover, MA 01845		
1 4	Dougherty, M. (Mike) Emerson Process Tel: 208-865-1112 Fax: 208-865-1115 Email: mike.dougherty@emersonprocess.com	502 Fourth of July Creek Rd North Fork, ID 83466	X	X
1 5	Drumm, F. (Frank) Tyco Electronics Tel. +49-89-6089-567 Fax +49-89-6089-445 Email: fdrumm@tycoelectronics.com	Raychem GmbH Finsinger Feld 1 85 Ottobrunn, Germany	X	X

	Name/Company	Address	4/8	4/9
1 6	Emerson, Walter Shaw Stone & Webster Tel. (617) 589-2686 Fax (617) 589-5501 Email: walter.emerson@shawgrp.com	100 Technology Center Dr Stoughton, MA 02072	X	X
1 7	Fargo, W. D. (Wells) Southern California Edison Co. Tel. (949) 368-2525 Fax (949) 368-9552 Email: fargowd@songs.sce.com	3214 Legendario San Clemente, CA 92673-3811	X	
1 8	Faya, A. J. (Artur) Canadian Nuclear Safety Commission Tel. (613) 996-0023 Fax (613) 943-1292 Email: artur.faya@cnsccsn.gc.ca	280 Slater Road Ottawa, Ontario K1C 5S9 Canada		
1 9	Francis, R. L. (Robert) SC 2.14 - 649 Wyle Laboratories Tel. (256) 837-4411 ext. 315 Fax (256) 837-3363 Email: robert.francis@wylelabs.com	7800 Highway 20 West Huntsville, AL 35807		
2 0	Gleason, J. (Jim) SC 2.1-323/Sec'y SC-2 General Electric Hitachi Nuclear energy Tel. (910) 602-4786 Fax NA Email: james.gleason@ge.com	3901 Castle Hayne Rd, Wilmington, NC 28401	X	X
2 1	Gove, P. (Patrick) Black & Veatch Tel. (913) 458-7834 Fax. (913) 458-2491 Email: Govepa@bv.com	11401 Lamar Overland Park, KS 66213	X	X
2 2	Hadovski, W. L. (William) SC 2.11 - 572 Westinghouse Electric Co. Tel. (860) 731-6258 Fax (860) 731-6256 Email: william.l.hadovski@us.westinghouse.com	2000 Day Hill Road Windsor, CT 06095		
2 3	Hencey III, T. (Tom) Scientech, Inc. Tel. (727) 669-3047 Fax (727) 669-3100	1393 Indian Trail N. Palm Harbor, FL 34683	X	X

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2 4	Hopp, Dirk C. Areva NP NLE-G Tel. 49-9131-189-5034 Fax 49-9131-189-136052 Email: dirk.hopp@areva.com	Freyeslebenstrasse 1 91058 Erlangen, Germany		
2 5	Horvath, D. (Dave) SC 2.10 – P627 Advent Engineering Tel. (734) 930-7500 Fax (734) 327-7501 Email: dah@adventengineering.com	P.O. Box 555 24 Frank Lloyd Wright Blvd., Lobby C Ann Arbor, MI 48106	X	X
2 6	Jagtiani-Krause, Serena Trentec, Inc. Tel. (513) 528-7900 Fax (513) 528-9292 Email: skrause@trentec.com	4600 East Tech Drive Cincinnati, OH 45245		
2 7	Korsah, K. (Kofi) Oak Ridge National Laboratory Tel. 865-576-6064 Fax 865-574-1249 Email: korsahk@ornl.gov	Bethel Valley Road P.O. Box 2008 Bldg. 3500, MS 6010 Oak Ridge, TN 37831-6010	X	X
2 8	Koshy, Thomas U.S. Nuclear Regulatory Commission Tel. 301-415-5828 Fax: 301-415-5074 Email: txk@nrc.gov	USNRC Office of Research MS T-10M05 Washington, DC 20555	X	X
2 9	Lory, B. M. (Bruce)			
3 0	Mikow, D (Daniel) AREVA NP, Inc. Tel. (724) 779-9800 ext. 1314 Fax (724) 779-9844 Email: daniel.mikow@areva.com	200 West Kensinger Drive Suite 600 Cranberry Township, PA 16066	X	X
3 1	Mohiuddin, A. (Asif) Sargent & Lundy Tel. (312) 269-2752 Fax (312) 269-7041 Email: asif.mohiuddin@sargentlundy.com	55E. Monroe 23C41 Chicago, IL 60603	X	X

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3 2	Mohtashemi, E. (Edward) GE Nuclear Energy Tel. (408) 925-1844 Fax (408) 925-6261 Email: edward.mohtashemi@gene.ge.com	175 Curter Avenue M/C 788 San Jose, CA 95125	X	X
3 3	Mohr, Charles (Chuck) Enercon Tel. (678) 354-8354 Fax: Email: cmohr@enercon.com	1345 Ridgeland Pkwy Suite 130 Alpharetta, GA 30004	X	X
3 4	Newell, W. (Bill) SC 2.2 – 334 (co w/Dean) Electric Motor & Contracting Tel. (757) 487-2121 Fax (757) 487-5983 Email: wnewell@att.net	3703 Cook Blvd. Chesapeake, VA 23323		
3 5	Parello, J. (James) SC 2.5 – 344/Vice-Chair SC-2 Westinghouse Electric Co., LLC Tel. (724) 722-5545 Fax (724) 722-5497 Email: parellj@westinghouse.com	1000 Westinghouse Drive New Stanton, PA 15672-9606	X	X
3 6	Pavsek, J. (Janez) Siemens Slovenija, I&S Tel. 044-39-746-221 Fax 044-1-474-6106 Email: janez.pavsek@siemens.com	Bratislavaska 5 S1-1000 Ljubijana, Slovenia		
3 7	Pirrong, Jan S. SC 2.15 – P 1682 CableLAN Tel. (617)-803-0489 Fax (508)- 384-7811 Email: jpirrong@cablean.com	8 Sherwood Drive PO Box 196 Norfolk, MA	X	X
3 8	Pomerening, D. J. (Daniel) Southwest Research Institute Tel. (210) 522-2318 Fax (210) 522-4506 Email: dpomerening@swri.org	6220 Culebra Road San Antonio, TX 78238-5166		
3 9	Queenan, Robert Scientech Tel. (208) 524-9311 Fax (208) 524-9238		X	X

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4 0	Roy, F. (Fred) Curtis-Wright Tel. (256) 722-8500x123 Fax (256)722-8533 Email: froy@curtisswright.com	125 West Part Loop Huntsville, AL	X	X
4 1	Sandberg, S. (Steve) Rockbestos-Surprenant W&C Tel. (860) 653-8360 Fax (860) 653-8412 Email: steve.sandberg@r-scc.com	20 Bradley Park Road East Granby, CT 06026	X	X
4 2	Schinzel, G. E. (Glen) South Texas Project Tel. (361) 972-7854 Fax (361)972-7073 Email: geschinzel@stpegs.com	P.O. Box289 Wadsworth TX 77483		
4 3	Spång, K. (Kjell) KS Miltek Tel. +46-31-298573 Fax +46-31-694594 Email: kjell.spang@swipnet.se	Strandskarsvagen 9 SE-42658 Vastra Frolunda, Sweden	X	X
4 4	Tengler, M. (Marek) Tel.+42-0377-386961 Fax +42-0377-386961 Email: tengler@stevenson.cz	Labhova 8/34 Pilsen 31806	X	X
4 5	Van Uffelen, M. (Marco) Tel. +32 14-33-2638 Fax +32-14-31-1993 Email: mvuffele@sckcen.be	Boertang 200 Dept. Instrumentation Building BR3 B-2400, Mol, Belgium		
4 6	Weber, C. E. (Carl) Pacific Gas & Electric Co. Tel. (805) 545-4084 Fax (805) 545-6928 Email: cew2@pge.com	Diablo Canyon Power Plant P.O. Box 56 Avila Beach, CA 93424		
4 7	Wheless, J. (John) Southern Nuclear Operating Company Tel. (205) 992-6898 Fax (205) 992-0391 Email: jmwheles@southernco.com	40 Inverness Center Pkwy. Bin BO57 Birmingham, AL 35242	X	X

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4 8	White, J. (John) SC 2.4 - 383 TXU, CPSES Tel. 254-897-6674 Fax 254-897-0530 Email: j.l.white@ieee.org	PO box 1002 Glen Rose, TX 76043		
4 9	Wood, R. T. (Richard) Oak Ridge National Laboratory Tel. (865) 574-5578 Fax (865) 576-8380 Email: woodrt@ornl.gov	Bethel Valley Road P.O. Box 2008 Bldg. 3500, MS 6010 Oak Ridge, TN 37831-6010		
5 0	Yamamoto, T. (Toshio) JAPEIC Tel. +81-47-380-8554 Fax +81-47-380-8556 Email: yamamoto-toshio@jnes.go.jp	Business Court Shin-Urayasu Bldg. 9-2 Mihama 1-Chome Urayasu-shi, Chiba 279-0011 Japan	X	X

X = Attended