

P1409 CUSTOM POWER TASK FORCE

TF 15.06.05.01

Meeting Minutes

IEEE PES 1997 Summer Meeting, Berlin, Germany

Wednesday, 23 July 1997, 8:00 to 10:00 AM

DIN Sitzungszentrum Conference Center, Room 904

The Custom Power Task Force met during the 1997 Summer Power Meeting in Berlin, Germany. Dan Sabin chaired the meeting.

IEEE had listed the task force in the final printing of the conference's committee meeting schedule in the Tiergarten 3 room of the Hotel Inter-Continental from 8:00 to 10:00 AM. However, the chair decided to move the meeting to an adjacent building to coordinate with a meeting of the Power Quality Interest Group. The PQ Interest Group was scheduled to meet in the DIN Sitzungszentrum Conference Center from 8:00 AM to 12:00 PM. Arshad Mansoor, who was convening the interest group, graciously offered to meet from 10:00 AM to 12:00 PM instead. This accommodation allowed conference attendees to attend the P1409 task force, the interest group, and the SCC22 meeting in the same room.

IEEE posted a sign at the Tiergarten 3 room informing people of the meeting change. Additionally, the call to order was delayed until 8:10 AM to allow latecomers a chance to walk to the adjacent building.

Welcome

IEEE planned the PES Berlin conference as an opportunity for an exchange of technology between the IEEE and European communities. Therefore, the chair took some time at the start of the meeting to present an overview of the task force's scope and objectives. The chair stated that the primary purpose of P1409 is to develop an IEEE guide for the emerging technology of custom power. The document would provide guidelines and performance expectations, offer a resource to utilities in entering the competitive marketplace, and furnish detailed information about custom power devices as options to solving power quality problems. P1409 can also offer a forum for utilities to exchange information. Since the application of custom power devices is a relatively new innovation, P1409 can provide a clearing house of information related to research, installation and testing.

The chair stated that the mission of P1409 is to ensure that the resulting guide is a benefit to utilities. The task force must balance the discussion to include all derivatives of the

technologies being designed and implemented, encourage more constructive participation, and to coordinate with CIGRE's new custom power working group (CIGRE WG 14.31).

Introductions

Attendees introduced themselves, identifying their names and company affiliations. A total of 15 people signed the attendance list, a summary of which is attached. Sabin asked the attendees to update their addresses, phone numbers, etc., on the membership list passed around. The updated membership list is also attached. No members were downgraded from membership status to guest status at this time. Currently, the task force lists 78 members, 8 correspondence members, and 74 guests.

Minutes from New York

The last meeting of the task force was at the 1996 IEEE PES Winter Meeting in New York. Dan Sabin prepared the minutes prepared for this last meeting and he reviewed them at the Berlin meeting. Those present unanimously approved at the minutes.

The IEEE Standards System houses the homepage for the task force. It is located at <http://stdsbbs.ieee.org/groups/1409/>. Currently, the following information is available at the site:

- General information about P1409
- Archive of drafts of the P1409 Guide in Adobe Acrobat PDF format
- Announcements of meetings
- Latest version of the custom power technology development list
- Minutes and agendas from prior meetings in PDF format

Chair's Report

The chair's report focused on the status of the group's PAR. The PAR is the official document that authorizes work on your standards project in the IEEE. PARs are approved by the IEEE Standards Board based on a review and recommendation from NesCom (the New Standards Committee), one of several Board committees. The chair of P1409 submitted a revised PAR to the Voltage Quality Working Group at the winter power meeting in February 1997. The Voltage Quality Working Group then forwarded the form to the Distribution Subcommittee, and which in turn forwarded the form to the Transmission and Distribution Committee.

However, NesCom met twice between the winter and summer meetings and did not discuss P1409. It was not possible to determine what had happened to the form.

After talking with Ben Spherling of the T&D Main Committee, the task force chair decided to resubmit the PAR. Sabin submitted the form to the Voltage Quality Working Group again. The PAR should be on the December 1997 meeting agenda of NesCom.

Presentations

Two presentations were made during the task force meeting. One was by Dan Sabin, entitled, "Update on Custom Power Technology Development and Application." The second was entitled "Economic Evaluation of Power Quality Conditioning Equipment for an Industrial Customer" and was presented by Marek Waclawiak.

Update on Custom Power Technology Development and Application

Dan Sabin, Electrotek Concepts, Inc.

Dan Sabin gave a presentation discussing the latest version of the Custom Power Technology Development List. The latest version is attached to these minutes. It now lists the activities of sixteen different utility systems. He discussed the utility applications of five custom power devices, including the static circuit breaker, static transfer switch, static series device, static shunt device, and static var compensator.

During the presentation, Neil Woodley informed the group that Texas Utilities has been demonstrating a static transfer switch for about eight months. After the meeting, Vladi Basch confirmed the installation, providing additional information by email which is included in the attached list. There was also some discussion of installations of static transfer switches in place at the 480 V level.

Economic Evaluation of Power Quality Conditioning Equipment for an Industrial Customer

Marek Waclawiak, United Illuminating Company

Marek Waclawiak gave a presentation which discussed the methodology chosen to solve power quality problems at a UI industrial customer, who was experiencing problems with voltage sags. An EPRI-sponsored project was performed in which testing was done to determine the sensitivity levels of different equipment within the customer's facility. This provided a means to evaluate customer-side power quality conditioning solutions.

Long-term monitoring data were available from power quality monitoring were taken at the utility substation and customer service entrance. The monitoring was combined with power quality state estimation to estimate the customer's load response to the voltage sags monitored on the primary distribution. These results were used to evaluate power quality conditioning solutions on the utility-side of the meter.

The methodology presented a useful model for the economics section of the custom power task force guide. Elements from the UI approach, which has been used before in an

EPRI project with SDGE, will become part of the P1409 draft guide over the next few months.

Liaison Relationships

No liaison reports were made at this meeting.

Panel Session

At the Voltage Quality Working Group Meeting in February 1997, Jim Burke asked if the P1409 wanted to participate in a panel discussion at the 1998 IEEE PES Winter Meeting in Tampa, Florida. Dan Sabin agreed to organize the panel discussion. The panel will be organized over the next month.

Next Meeting

The next meeting of the Custom Power Task Force will be at the 1998 IEEE PES Winter Meeting in Tampa, Florida. The task force should meet on Tuesday, February 4, 1998.

Attachments

1. Meeting Agenda, Custom Power Task Force Summer 1997 Meeting
2. Meeting Attendance, Custom Power Task Force Summer 1997 Meeting
3. Most recent membership list for the Custom Power Task Force
4. Most recent copy of the Custom Power Technology Development List

Minutes Submitted by

D. Daniel Sabin
Task Force Chairman

Electrotek Concepts, Inc.
408 North Cedar Bluff Road, Suite 500
Knoxville, TN 37923-3605

423-470-9222, Ext. 134
423-470-9223, FAX

d.sabin@ieee.org

P1409 DISTRIBUTION CUSTOM POWER TASK FORCE

TF 15.06.05.01

Meeting Agenda

IEEE PES 1997 Summer Power Meeting

Berlin, Germany

Wednesday, 23 July 1997

Intercontinental Hotel

8:00 to 10:00 AM

The Custom Power Task Force will meet next during the IEEE Power Engineering Society 1997 Summer Meeting in Berlin, Germany. We will meet on Wednesday, July 23, 1997, from 8:00 AM to 10:00 AM in the Intercontinental Hotel.

At the last meeting of the task force during the 1997 Winter Meeting of the IEEE PES, it was decided that the group would not focus upon normal business during the Berlin meeting because of low projected member attendance. Therefore, the task force meeting would be used as an opportunity for sharing IEEE activities in distribution custom power with European industry.

1. Welcome Dan Sabin
2. Introductions
3. Review minutes from New York and agenda for present meeting Dan Sabin
4. Chairman's Report..... Dan Sabin
5. Presentations

Update on Custom Power Technology Development and Application

..... Dan Sabin

Economic Evaluation of Power Quality Conditioning Equipment for an Industrial Customer

..... Marek Waclawiak

6. Open Discussion
7. Next Meeting: Winter IEEE PES Meeting in Tampa (February 1-5 1998)
8. Adjourn

P1409 CUSTOM POWER TASK FORCE

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Meeting Attendance

**IEEE PES 1997 Summer Meeting, Berlin, Germany
Wednesday, 23 July 1997, 8:00 to 10:00 AM
DIN Sitzungszentrum Conference Center, Room 904**

Name	Representing
Roger Bergeron	Hydro Québec
Math Bollen	Chalmers University of Technology
Daniel Brooks	Electrotek Concepts, Inc.
Randy Collins	Clemson University
Erich W. Gunther	Electrotek Concepts, Inc.
Arshad Mansoor	PEAC
Larry Morgan	Duke Power
Chris Mullins	Power Monitors, Inc.
Jacob Roiz	Canadian Electricity Association
Donald Ruthman	Myron Zucker Inc.
D. Daniel Sabin	Electrotek Concepts, Inc.
Peter Shah	Metrosonics Inc.
Marek Waclawiak	United Illuminating Company
Neil H. Woodley	Westinghouse Electric Corporation
Dario Zaninelli	Politecnico di Milano

Total in Attendance: 15

IEEE Custom Power Task Force Membership List

As of August 03, 1997

Name	Company	Mailing Address	Phone	Status*
Bill Aaron	Tampa Electric Company	P.O. Box 111, Tampa, FL 33601	813-228-4223	M
Rajaie Abu-Hashim	Commonwealth Edison	1319 South First Avenue, Maywood, IL	708-410-5523	G
Ron Ammon	LILCO	175 East Old Country Lane, DPE OP BLDG2, Hicksville, NY 11801	516-545-4019	M
Charlie Antonopoulos	ABB Power Systems	410 Peeksville Hollow Road, Putnam Valley, NY 10579	914-526-3564	M
Gene Baker	Florida Power Corp	2600 Lake Lucien Drive, Suite 400 (MAC-MT3B), Maitland, FL 32751-7234	407-475-2420	M
Juan Balda	University of Arkansas	Engineering Center, Fayetteville, AR 72701	501-575-6578	M
John Banting	Cooper Power Systems	1045 Hickory Street, Pewaukee, WI 53126	414-691-8308	G
Philip Barker	Power Technologies, Inc.	1482 Erie Blvd., Schenectady, NY 12305	518-395-5078	M
Vladi Basch	Baltimore Gas and Electric	7225 Windsor Blvd., Baltimore, MD 21244	410-265-4021	M
Roger Bergeron	Hydro Québec	1800 Biv Lionel Boulet, Varennes, Québec J3X1S1 Canada	514-652-8228	M
Richard Bingham	Dranetz Technologies	1000 New Durham Road, Edison, NJ 08818	908-248-4393	G
Math Bollen	Chalmers University of Technolo	Department of Electric Power Systems, Gothenburg, 421 96 Sweden	+46 31772 3832	M
Stan Brock	BMI	3250 Jay Street, Santa Clara, CA 95054	408-970-3700	G
Daniel Brooks	Electrotek Concepts, Inc.	790 N Cedar Bluff Rd, Suite 500, Knoxville, TN 37923	423-470-9222, Ext. 122	G
Joseph Buch	Wisconsin Electric	231 W. Michigan P279, Milwaukee, WI 53201		G
Reuben Burch	Alabama Power	600 North 18th Street, Birmingham, AL 35291-0862		G
James L. Burke	ABB Power T&D Company, Inc.	Electric Systems Technology Institute, 1021 Main Campus Drive, Raleigh, NC 2760	919-856-2360	M
Clayton W. Burns	Niagara Mohawk Power Corp.	Research & Development, D-G, 300 Erie Boulevard West, Syracuse, NY 13202		G
Bill Carter	Detroit Edison	2000 2nd Ave, Detroit, MI 48226	313-235-8356	M
Bill Chai	General Electric	381 Upper Broadway, Ft. Edward, NY 12828	518-746-5718	M
Arunachala Chandraseka	Tennessee Technological Univers	Electrical Engineering Department, P. O Box 5004, Cookeville, TN 38505	615-372-3626	G
Randy Collins	Clemson University	Department of ECE, Clemson, SC 29634-0915	864-656-5920	G
Larry Conrad	Cinergy Corp	1000 E. Main St., Plainsfield, IN 46168	317-838-2022	M
James Crane	Commonwealth Edison	1319 South First Avenue, Maywood, IL 60153	708-410-5584	M
John Csomay	Virginia Power	P.O. Box 26666, Richmond, VA 23261	804-771-3664	G
Leszek S. Czarnecki	Louisiana State University	Electrical & Computer Engineering, Baton Rouge, LA 70803	504-388-5239	G
Fouad Dagher	New England Power Service Compa	25 Research Drive, Westboro, MA 01582	508-389-2680	M
Andy Dettloff	Detroit Edison	2000 Second Avenue, Detroit, MI	313-235-7750	M
Tom Diliberti	Detroit Edison	2000 Second, 312 SB, Detroit, MI 48226	313-237-7517	G
Paul Eichin	P.E. Consulting Group	P.O. Box 1310, Spokane, WA 99210-1310	509-238-2300	M
Robert Ender	Consultant	30 Fairfield Drive, Kennebunk, ME 04043	207-967-0728	G
Mike Ennis	S&C Electric	6601 N. Ridge Road, Chicago, IL 60626	773-338-1000	G
Ricky Evans	Virginia Power	P.O. Box 26666, Richmond, VA 23261-6666	804-771-3520	M
Sager I. Farraj	LADWP	P.O. Box 111, Room 819, Los Angeles, CA 90012	213-367-2711	CM
Karen Forsten	PEAC	10421 Research Drive, Suite 400, Knoxville, TN 37932	423-974-8336	M
Betty M. Fritz	Tampa Electric	P.O. Box 111, Tampa, FL 33601	813-228-4660	G
William Gannon	Commonwealth Edison	1319 S. First Avenue, Maywood, IL 60153	708-450-5431	M
Thomas Gentile	Eastern Utilities	750 West Center Street, PO Box 543, West Bridgewater, MA 02379	508-559-2000 x3838	M
Steven L. Grindinali	O&R Utilities	One Blue Hill Plaza, Pearl River, NY 10965		G
David C. Griffith	D.C. Griffith & Associates	7336 Samuel Lord Drive, Chagrin Falls, OH 44022		G
Joe Groesch	Central Illinois Light Company	300 Liverty Street, Peoria, IL 61602	303-693-4750	M
Edward M. Gulachenski	Quality Power Engineering	8 MacNeill Drive, Southboro, MA 01772	508-460-9736	G

Erich W. Gunther	Electrotek Concepts, Inc.	408 North Cedar Bluff Road, Suite 500, Knoxville, TN 37923	615-470-9222, Ext. 14	M
Dennis Hansen	PacifiCorp	1407 W.N. Temple, OUC 2000, Salt Lake City, UT 84140	801-220-4816	M
Erik Hanson	General Electric	381 Broadway, Ft. Edward, NY 12828	518-746-5250	M
Gil Hensley	Pacific Gas & Electric Co	123 Mission Street, PO Box 770000 ML H28H, San Francisco, CA 94177	415-973-4892	M
Michael D. Higgins	American Electric Power Service	1 Riverside Plaza, Columbus, OH 43215-2373	614-223-2480	G
Jay Hill	GE Power Engineering	1 River Road, 2-520, Schenectady, NY 12345	518-385-0602	G
Leeman Hong	Consolidated Edison Co.	4 Irving Place, New York, NY 11021		G
Jim Howell	Alabama Power	600 North 18th Street, Birmingham, AL 35291-0657	205-250-3369	G
Reza Irvani	University of Toronto	10 Kings College Road, Toronto, Ontario M5S364 Canada	416-978-7755	G
Scott Jackson	Houston Lighting & Power	P.O. Box 1700, Houston, TX 77251	713-945-6135	G
Sasan Jalali	Siemens	100 Technology Drive, Alpharetta, GA 30202	770-740-3330	M
Jon Jipping	Detroit Edison	2000 Second Avenue, 422 Service Building, Detroit, MI 48226	313-235-7806	M
Brian K. Johnson	Department of Electrical Engine	University of Idaho, Moscow, ID 83844-1023	208-855-6902	M
Nunnally Johnson	PacifiCorp	920 S.W. Sixth Avenue, Rm 800 PSB, Portland, OR 97204	503-464-6348	G
Gerald Keane	Westinghouse	4400 Alafaya Trail, Orlando, FL 32876	407-281-5545	CM
Mark Kempker	Indianapolis Power and Light Co	1230 W. Morris Street, Indianapolis, IN 46221	317-261-8615	M
John Kennedy	Georgia Power Company	333 Piedmont Avenue, Bin 10016, Atlanta, GA 30308	404-526-2670	M
Thomas S. Key	TCRD/PEAC	10521 Research Drive, Suite 400, Knoxville, TN 37932	423-974-8336	M
Margaret Kirk	Kirk Engineering	1327 Lower Marine Dr, Bremerton, WA 98312	360-479-0114	G
Ljubomir Kojovic	Cooper Power Systems	P.O. Box 100, Franksville, WI 53126	414-835-1511	G
W. O. Kramer	CEGELEC	490 Lapp Road, Malvern, PA 19355	615-651-7625	G
David Kreiss	Kreiss Johnson Technologies	1155 Camino Del Mar, Suite 514, Del Mar, CA 92014	619-259-0711	M
Paul M. Krisciunas	Commonwealth Edison	1319 South First Avenue, Maywood, IL 60153-2496	708-410-5301	CM
Frank Lambert	NEETRAC	395 Piedmont Ave, Atlanta, GA 30308	404-526-2416	M
Jeff Lamoree	Electrotek Concepts, Inc.	408 North Cedar Bluff Road, Suite 500, Knoxville, TN 37923	423-470-9222, Ext. 131	G
Tom Lemak	Westinghouse	1310 Beulah Road, Pittsburgh, PA 15235	412-256-2356	CM
Jim Lemke	Cinergy	P.O. Box 3039, Kokomo, IN 46902	765-454-6196	M
Ed Lennox	S&C Electric Company	6601 North Ridge Blvd., Chicago, IL 60626	312-338-1000 x 2317	G
Blane Leuschner	Square D Company	295 Tech Park Drive, Suite 100, La Vergne, TN 37086	615-459-8528	M
Yiqiao Liang	Cegelec Automation	301 Alpha Drive, RIDC Industrial Park, Pittsburgh, PA 15238	412-967-07684	G
Jim Loorya	Panamax	150 Mitchell Blvd., San Rafael, CA 94903	415-499-3900, Ext. 392	M
Stoneham A. M.	Virginia Power	701 E. Cary St., Richmond, VA 23219	804-771-3644	M
Ramon Mancao	Baltimore Gas and Electric	Calvert Cliffs Nuclear Power Plant, Lusby, MD 20657		G
Arshad Mansoor	PEAC	10521 Research Drive, Suite 400, Knoxville, TN 37932	615-974-8378	M
Michael B. Marz	Cooper Power Systems	P. Box 100, Franksville, WI 53126	414-835-1587	M
Tom McCarthy	Los Angeles Water & Power	P.O. Box 111, Rm 819, Los Angeles, CA 90051	213-367-2730	M
Steve McCluer	Square D/EPE Technologies	1660 Scenic Drive Ave., Costa Mesa, CA 92626	714-513-7348	CM
Mark F. McGranaghan	Electrotek Concepts, Inc.	408 North Cedar Bluff Road, Suite 500, Knoxville, TN 37923	423-470-9222, Ext. 123	M
Mark McVey	Virginia Power	P.O. Box 26666, Richmond, VA 23261-6666	804-771-3006	M
Harshad Mehta	Silicon Power Corporation	175 Great Valley Parkway, Malvern, PA 19355	610-407-4700	M
Walt P. Mendenhall	Baltimore Gas & Electric	1068 North Front Street, Room 301, Baltimore, MD 21202	410-291-3215	G
Stephen Middlekauff	Duke Power Company	Power Delivery Dept. EC09Q, P. O Box 1006, Charlotte, NC 28201-1006	704-382-5420	M
Dubach Mike	GE Company	3900 East Mexico Avenue, Suite 400, Denver, CO 80210	303-753-2242	G
William A. Moncrief	Jacobs Serrine Engineers, Inc.	135 Technology Parkway, #200, Norcross, GA 30092	770-447-9136	M
Larry Morgan	Duke Power	P.O. Box 1006, EC09Q, Charlotte, NC 28201	704-382-4252	M
Allen Morinec	Cleveland Electric Illuminating	P.O. Box 5000, M.S. 4141-1, Cleveland, OH 44101	216-447-2505	G
David Mueller	Electrotek Concepts, Inc.	408 North Cedar Bluff Road, Suite 500, Knoxville, TN 37923	423-470-9222, Ext. 132	G
Ram Mukherji	Consultant	472 Rancho Los Nogales Drive, Covina, CA 91724-3347	818-339-6852	M

Chris Mullins	Power Monitors, Inc.	220 University Blvd., Harrisburg, PA 22801	540-434-7075	M
John Mungenast	Intertec Communications. Inc.	2472 Eastman Ave., Bldgs. 33-34, Ventura, CA 93003-5774	805-658-0933	G
Bob Nelson	Westinghouse	4400 Alafaya Trail, MC605, Orlando, FL 32826	407-281-5381	M
Helyne S. Noyes	LADWP	111 N Hope Street, Room 819, Los Angeles, CA	213-367-2757	G
Chikaodinaka O. Nwankp	Drexel University	ECE Department, Philadelphia, PA 19104	215-895-2218	G
Gregory L Olson	Public Service Electric & Gas C	80 Park Plaza, MCT12-B, Newark, NJ 07102-4194	201-430-5896	CM
Thomas Ortmeyer	Clarkson University	ECE Department, Potsdam, NY 13699-5720	315-268-6536	M
Jim Osborne	Osborne Transformer Corp	21481 Carlo Drive, Clinton Township, MI	810-468-9410	G
Tamara A. Otterstetter	Detroit Edison	2000 Second Avenue, 234SB, Detroit Edison, MI 48266	313-235-6807	M
Dan Pearson	Pacific Gas & Electric	Mail Code H12A, P.O. Box 770000, San Francisco, CA 94177	415-973-2891	M
Scott Peele	Carolina Power & Light Company	412 South Wilmington Street, Raleigh, NC 27601	919-546-6422	M
Brian Peticolas	Power Paragon	901 E. Ball Road, Anaheim, CA 92805	714-956-9200	G
Dave Pileggi	New England Power Service Compa	25 Research Drive, Westborough, MA 01582	508-389-2951	M
Brian Prokuda	Keweenaw Power Systems	P.O. Box 574, Howell, MI 48844	517-548-5318	M
Ravisekhar Raju	University of Washington	Department of Electrical Engineering, Box 352500, Seattle, WA 98195	206-543-2482	G
Greg Rauch	Basic Measuring Instruments	3250 Jay St., Santa Clara, CA 95054	408-970-3700	M
Larry Ray	Square D	295 Tech Park Drive, Suite 100, La Vergne, TN 37086	615-287-3320	G
Paulo F. Ribeiro	Babcock & Wilcox - Accelerator	Naval Nuclear Fuel Division, Mt. Athos Road, Lynchburg, VA 24505-0785	804-522-5991	G
Dave Richardson	Electric Power Research Institut	3412 Hillview, Palo Alto, CA 94303-1395	415-855-2331	M
Gary L. Rieger	Westinghouse Electric STC	1310 Beulah Road, Pittsburgh, PA 15235		G
Sebastian Rios-Marcuel	Universidad Catolica de Chile	Depto. Ing. Electrica	56-2-552-2375, Ext. 42	M
Greg Robinson	KEMA-ECC	4400 Fair Lakes Court, Suite 101, Fairfax, VA 22033	703-631-6912	G
Jacob Roiz	Canadian Electricity Association	1 Westmount Square #1600, Montréal, Québec H37ZP9 Canada	514-934-6480	M
Randy Rowan	G&W Electric Company	3500 W. 127th St., Blue Island, IL 60406	708-388-5010	G
Donald Ruthman	Myron Zucker Inc.	150 Longview Terrace, Williamstown, MA 02167	413-458-2752	G
D. Daniel Sabin	Electrotek Concepts, Inc.	408 North Cedar Bluff Road, Suite 500, Knoxville, TN 37923-3605	423-470-9222, Ext. 134	M
Bob Saint	United Power, Inc.	P.O. Box 929, Brighton, CO 80601	303-637--1206	G
Jim Sanborn	PG&E	2303 Camino Ramon, Suite 200, San Ramon, CA 94583	510-866-5635	M
Phil Sarikas	Intel	5000 W. Chandler Blvd, CH10-20, Chandler, AZ 85226-3699	602-554-1570	CM
Miklos Sarkozi	Westinghouse STC	1310 Beulah Road, Pittsburgh, PA 15235	412-245-2303	M
Lael Saulsman	Puget Sound Power and Light	P.O. Box 97034, OBC-14N, Bellevue, WA 98009-9734	206-454-6363 x 81-2838	M
Joe Schatz	Southern Company Services	P.O. Box 2625, Bin 14N-8195, Birmingham, AL 35202-2625	205-868-5047	M
Ned Schiff	American Superconductor Corp	Two Technology Drive, Westborough, MA 01581	508-836-4200	G
Ross Schifo	Commonwealth Edison	1319 S. First Avenue, Maywood, IL 60153	708-450-5350	G
William Schwabe	UHP International	Box 190, East Amherst, NY 14051		G
John Schwartzenberg	Silicon Power Corporation	175 Great Valley Parkway, Malvern, PA 19355	610-407-4700	G
Peter Shah	Metrosonics Inc.	P.O. Box 23075, Rochester, NY 14692	716-334-7300	G
Tom Short	Power Technologies, Inc.	, Schenedacty, NY		G
H. Jin Sim	CHEDF - Cornell University	428 Phillips Hall, Ithaca, NY 14850	607-254-8811	M
Tejindar Singh	PQES, Inc.	3170 Crow Canyon Place, # 150, San Ramon, CA 94583	510-275-3570	G
J. Charles Smith	Electrotek Concepts, Inc.	2111 Wilson Blvd., Arlington, VA 22201		G
Richard B. Smith	PEAC	10521 Research Drive, Suite 400, Knoxville, TN 37932	615-974-8288	G
Andrew Sohn	Westinghouse Electric Corporati	4400 Alafaya Trail, Orlando, FL 32826	407-281-5162	G
Krishnaswamy Srinvasna	IREQ Institute Hydro Quebec	1800, montee Ste-Julie, Varennes, Québec J3X 1S1 Canada	514-652-8498	G
Tony St. John	San Diego Gas & Electric	8306 Century Park Court, San Diego, CA 92123-1593	619-654-1149	M
Paul Stecuik	Power Technologies, Inc.	1482 Erie Blvd., Schenectady, NY 12305	518-395-5122	G
John E. Sullivan	Sullivan Consulting Group	P.O. Box 335, Half Moon Bay, CA 94019	415-726-0604	G
Ashok Sundaram	EPRI	3412 Hillview Avenue, Palo Alto, CA 94303	415-855-2304	M

Lee Taylor	Duke Power	P.O. Box 1007, WC24A, Charlotte, NC 28201	704-382-4253	G
Rao Thallman	Salt River Project	P.O. Box 52025, ISB 562, Phoenix, AZ 85072-2025	602-236-5481	M
Tom Tobin	S&C Electric Company	6601 N. Ridge Blvd., Chicago, IL 60626	312-338-1000	G
Betty Tobin	Seattle City & Light	700 5th Avenue, Suite 3644, Seattle, WA 98104-5031	206-684-3076	G
Short Tom	Power Technologies, Inc	1482 Erie Boulevard, Schenectady, NY 12305	518-395-5101	G
Hahn Tram	ABB Automated Distribution	1021 Main Campus Drive, Raleigh, NC 27606	919-856-3845	G
Linh Tu	Pacific Gas & Electric	2303 Camino Ramon, Suite 200, San Ramon, CA 94583	510-866-5288	M
Timothy D. Unruh	Consumers Power Company	212 W. Michigan Avenue, H-903, Jackson, MI 49201	517-788-7034	M
David Vannoy	Delmarva Power and Light	P.O. Box 6066, Newark, DE 19714	302-452-6385	G
Marek Waclawiak	United Illuminating Company	157 Church Street MS 1-9D, New Haven, CT 06510-2103	203-499-2877	M
Van Wagner	Detroit Edison	2000 Second Avenue, Detroit, MI 48226	313-235-8494	CM
Reigh Walling	General Electric	One River Road, Building 2, Room 501, Schenectady, NY 12345	518-385-5370	G
Dan Ward	Virginia Power	P.O. Box 26666, OJRP-11, Richmond, VA 23261	804-775-5328	M
Cheri Warren	Power Technologies, Inc.	1482 Erie Blvd., Schenectady, NY 12305	518-395-5102	M
Michael Weinold	Siemens AG	EVNP3, P.O. Box 3220, Erlangen, 91052 Germany	+49-9131-7-32542	M
Greg Welch	Commonwealth Edison	1319 South First Avenue, Maywood, IL	708-410-7906	G
Steve Whisenant	Duke Power Company	P.O. Box 1006, Charlotte, NC 28201	204-382-6608	G
Charlie Williams	Florida Power Corp	2600 Lauce Lucien Drive, Suite 400 (MACMT3B), Maitland, FL 32751-7234	407-475-2426	M
Neil H. Woodley	Westinghouse Electric Corporati	1310 Beulah Road, Pittsburgh, PA 15235-5098	412-256-2323	M
Peter Yan	Commonwealth Edison	1319 South First Avenue, Maywood, IL 60153	708-410-5347	G
Don Yuen	Puget Sound Power & Light	P.O. Box 97034, OBC-145, Bellvue, WA 98009-9734	206-462-3656	G
Dario Zaninelli	Politecnico di Milano	p.ZZZ Leonardo da Vinci, Milano, 32-20133 Italy	+39-2-23993721	M

Members: 78

Correspondence Members: 8

Registered Guests: 74*

* A member will be downgraded to a registered guest if he/she misses three consecutive task force meetings and fails to contact the task force secretary to convert to correspondence member status.

Status Key: M = Member, CM = Correspondence Member, G = Guest

Custom Power Technology Development

A continuing goal of the Custom Power Task Force will be to centralize information concerning the development of custom power technology and the installation of devices which utilize this technology. This list presents the most current information available regarding custom power technology as of August 3, 1997.

Note that this is an “application-oriented” listing of projects. With these new technologies, companies are very reluctant to apply them until there is some field experience. Sharing of information about applications helps to generate acceptance for the technologies in the marketplace, identifies benefits and potential problems with the technologies in specific applications, and helps identify areas for future technology improvements. All of these are important overall benefits that can be achieved without the sharing of proprietary information about particular products and technologies.

A similar approach has been used for years in the HVDC Subcommittee and its associated working groups (more recently expanded to include FACTS technologies). The HVDC groups published a number of papers and bibliographies that documented HVDC installations around the world, helped develop guidelines for equipment specifications, and significantly enhanced the visibility of these new technologies in the marketplace. These are the kind of objectives that we would like to accomplish with the activities of the Custom Power Task Force.

Custom Power Technology Development - August 3, 1997

American Electric Power

Is in the process of installing an outdoor 15kV, 600A, static transfer switch at an industrial park in Columbus, Ohio. The switch is expected to be placed in service in the 2nd half of 1997 (*Last Update: July 1997*).

Baltimore Gas and Electric

Has demonstrated an indoor 15kV, 600A static transfer switch at an office building in downtown Baltimore. The switch was placed in service in September 1995, and has operated successfully since that time.

BGE has placed an outdoor 15kV, 600A, static transfer switch in service at a customer's chemical manufacturing plant in the Baltimore metropolitan area. The switch was placed in service in September 1996, and has successfully prevented service interruptions on several occasions since that time.

BGE has also demonstrated a mobile 15kV, 600A, static transfer switch at a customer's chemical manufacturing plant in the Baltimore metropolitan area. The switch was placed in service in May 1997 and will provide short term power quality protection until a permanent switch is installed in September, 1997. (*Last Update: July 1997*)

British Columbia Hydro and Power Authority

Demonstration of a prototype shunt-connected distribution static compensator to reduce voltage flicker and compensate for harmonic currents at a remote lumber mill on a rural 25 kV feeder. *(Last Update: July 1 1997)*

Cinergy

Cinergy has installed a 15 kV, 600 A solid state fast transfer switch. The switch is self-contained on a pad with an outdoor enclosure, removing the need for special rooms or trailers. After a successful series of transfers involving both single- and three-phase source interruptions, the switch was put into service at a corporate office building. *(Last Update: March 1997)*

Clemson University

Presentation of a transactions-grade paper on input and output objectives for series compensation devices. *(Last Update: July 1997)*

ComEd

Testing a transfer switch

Detroit Edison

Detroit Edison installed a static transfer switch at the Ford Motor Company Sheldon Road Plant. Sheldon Road is a components plant that provides parts to all of Ford's North American assembly plants on a just in time basis. The switch was placed in service on November 10, 1996. This plant is fed from a 40 kV subtransmission system and has a load of 9 MVA. The switch is installed on the 13.8 kV side of the transformers.

Since going in service, the switch has avoided four momentary outages and two significant voltage sags. These disturbances would have had substantial impact on this plant which has large injection molding processes, as well as welding processes for heat exchangers and radiators. *(Last Update: July 1997)*

Duke Power Company

A series compensation device was placed on-line carrying critical customer plant load in late August 1996 on the Duke Power Company system in Anderson, South Carolina. The device is now in service at Orian Rug Company where the unit is protecting the automated yarn manufacturing and weaving plant from voltage sags and disturbances coming from the Duke Power distribution system that serves the plant. The unit is rated at 2 MVA, can store 660 kJ, and operates at 12.47 kV. Normal load current is approximately 120 A. *(Last Update: January 1997)*

Florida Power Corporation

A series compensation device is installed at the FPC 230/12.5 kV, 100 MVA Econ substation in Orlando where it protects one of the six 12.5 kV feeders. The project is designed to demonstrate of the ability of the series device to provide improved feeder power quality in a high isokeraunic environment. Power quality measurements of the Econ feeder data will be compared with the unprotected feeders. *(Last Update: January 1997)*

Hydro-Québec

Hydro-Québec is currently doing simulation on the application of Custom Power Devices on its network. Also, a feasibility study on solid state tap-changer is being done. In 1997, they will study custom power parks. Hydro-Québec is not planning to install custom power devices until 1998. *(Last Update: September 1996)*

Oglethorpe Power

Oglethorpe Power Corporation and Oconee Electric Membership Corporation, a member system of Oglethorpe Power, are host utilities to an installation of an advanced static var compensator installed on a 12.47 kV feeder serving a building products plant in Dudley, Georgia. The plant uses many large induction motors that cause flicker when starting and operating. In addition to flicker, a low power factor is present when the motors are idling, which is often the case. *(Last Update: April 1997)*

Pacific Gas and Electric Company

PG&E installed two static transfer switches in September 1996. Both are rated at 25 kV at 300 A, and are in commercial operation. PG&E is progressing with development of a fast voltage regulator rated at the same voltage and current. This will protect the customer from sags even on radial taps. A prototype static voltage regulator should be ready to start testing in September 1997 with ratings of 300A at 15 kV. *(Last Update: July 1997)*

Powercor Australia, Ltd.

A 50 Hz series compensation device is being commissioned at the Bonlac Foods plant at Stanhope, Victoria, in Australia where it will protect the sensitive dairy food process plant load from disturbances originating on the Powercor Australia overhead rural distribution system. The Bonlac plant produces powdered milk and other related dairy products from milk supplied by nearly 800 dairy farms in the area. The unit is rated at 2 MVA, can store 660 kJ, and operates at 22 kV. *(Last Update: January 1997)*

Public Service Electric and Gas

PSE&G has been involved in a number of custom power projects, including:

- 150 kVA advanced power line conditioner
- solid state breaker (13.8 kV)
- series compensation device
- pole-mounted advanced static var compensator

PSE&G also has each of the devices, except the last, in place and operational. *(Last Update: August 1996)*

Scottish Power

A 4 MVA 50 Hz series compensation device is being installed at the Caledonian Paper Mill at Irvine, Scotland, to protect the paper machine from voltage sags

originating on the 132 kV system feeding the mill. Installation involved segregating the critical load 11 kV bus protected by the series device from the rest of the plant load. (*Last Update: July 1997*)

Texas Utilities

TU has demonstrated an outdoor 15kV, 600A, static transfer switch at an electric operations building in Fort Worth, Texas. The switch was placed in service in October 1996 and has operated successfully since that time. (*Last Update: July 1997*)