

47th Annual MINNESOTA POWER SYSTEMS CONFERENCE

November 1-3, 2011

**Earle Brown Heritage Center
6155 Earle Brown Drive
Brooklyn Center, Minnesota**

Sponsored by:
College of Continuing Education, University of Minnesota

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COLLEGE OF CONTINUING EDUCATION

UNIVERSITY OF MINNESOTA

MILP SYMPOSIUM CONFERENCE

Tuesday, November 1, 2011

GENERAL SESSION

8:15 a.m.-12:00 noon

Moderator: Mark Gutzmann

Co-Moderators: Mark Harvey, Gerry Steffens, Larry Brusseau

7:15	Check-in Continental Breakfast	10:30	Federal Regulations and their Impact on Electric Utilities: Financial Impact, Climate Change, Environmental Challenges, Transmission Policy, and Fuel Type Impact <i>John Kinsman, Edison Electric Institute</i>
8:15	Welcome <i>Mark Gutzmann, Xcel Energy</i>	11:15	Improving the Performance and Security of Electric Power Systems for the Benefit of Customers, Investors, and the Environment <i>Edmund Schweitzer, Schweitzer Engineering Laboratories</i>
8:30	Responsible by Nature <i>Benjamin Fowke, Xcel Energy</i>	12:00	Lunch
9:15	Plug-In Charging Feature <i>Dennis Brown, General Motors Company</i>		
10:00	Break		

CONCURRENT SESSIONS

1:00 - 4:15 P.M.

SUBSTATION

Moderator: Chuck Healy
Co-Moderators: Steve Mohs,
Mythili Chaganti

- 1:00 Swept Frequency Response Analysis to Detect Power Transformer Shipping Damage
Michael Bocovich, Xcel Energy
- 1:45 Voltage Control Issues with LTC Transformers on a Smart Grid Generator Bus
Thomas Branch, Beckwith Electric Company, Inc.
- 2:30 Break
- 2:45 Integration of IEC 61850 Gse and Sampled Value Services to Reduce Substation Wiring
David Dolezilek, Schweitzer Engineering Laboratories
- 3:30 Applying the National Electrical Code (NEC) in Substations
Jeff Heinemann and Mark Scheid, Ulteig Engineers
- 4:15 Adjourn

UTILITY INDUSTRY FUTURES

Moderator: Mike Steckelberg
Co-Moderators: Michael Marz,
Dave VanHouse

- 1:00 LIFE: Fusion Energy Soon Enough to Make a Difference
Tom Anklam, National Ignition Facility
- 1:45 Smart Electricity Storage for Heating: A Resource for Renewable Integration and Fast Regulation
Roger Rognli, Cooper Power Systems and Paul Steffes, Steffes Corporation
- 2:30 Break
- 2:45 The Future of the Grid
Douglas Brown, Siemens Energy, Inc.
- 3:30 EIPC's DOE-Sponsored Project on Interconnection-Level Analysis and Planning for the Eastern Interconnection
Dan Fredrickson, MAPPCOR, Inc.
- 4:15 Adjourn

CONCURRENT SESSIONS

1:00 – 4:15 p.m.

PROJECT MANAGEMENT

Moderator: Denny Branca
Co-Moderators: Jim Hanson, Rick Johnson

- 1:00 Alternative Construction Access Method on Heavily Regulated Wetlands
Crystal Koles, American Transmission Company and Drew St. John, New South Equipment Mats
- 1:45 Helicopters, Low-Energy Explosives, and Ice Roads: Constructing the First CAPX2020 345kV Transmission Line Segment
Dave Berklund, Tony Moore, and Jeff Gutzmann, Xcel Energy
- 2:30 Break
- 2:45 Minnesota's Power's Upgrade of Network Transformers
Dan Schultz, Minnesota Power
- 3:30 Shutting Down Light Rail: Xcel Energy's Fifth Street Substation Transformer Replacement Project
Grant Stevenson and Caroline Peterson, Xcel Energy
- 4:15 Adjourn

EXHIBITOR RECEPTION

4:15-6:00 p.m.

Wednesday, November 2, 2011

CONCURRENT SESSIONS

8:30 a.m.-12:00 noon

DISTRIBUTION AUTOMATION/ COMMUNICATIONS

Moderator: Tom Guttormson

**Co-Moderators: Dan Nordell,
Gerry Steffens**

- 7:30 Continental Breakfast
- 8:30 Recent Developments in Smart Grid Wireless Communication Technologies
Dan Nordell, Xcel Energy
- 9:15 Wireless Communication for Distribution Automation in the Smart Grid
Colin Lippincott, FreeWave Technologies
- 10:00 Break
- 10:30 Recognizing Priority of Var Flow in Smartgrid Volt/Var Management Strategies
Thomas Branch, Beckwith Electric
- 11:15 High-Speed Communication-Assisted Tripping and Sectionalizing For Distribution Systems
Steve Turner, Beckwith Electric
- 12:00 Lunch

DELIVERY SYSTEMS I

Moderator: Michael Marz

**Co-Moderators: Dave Peterson,
Dave VanHouse**

- 7:30 Continental Breakfast
- 8:30 NSP Distribution VAr Pilot Project
Andy Dammel and Dan Lysaker, Xcel Energy
- 9:15 SynchroPhasor Technology and Project Review
Jim Kleitsch, American Transmission Company
- 10:00 Break
- 10:30 Stray Voltage in Distribution Systems
Al Haman, STAR Energy Services
- 11:15 Duluth Electric System Upgrade
Reed Rosandich and Joe Peterson, Minnesota Power
- 12:00 Lunch

RELAYING I

Moderator: Mark Gutzmann

Co-Moderators: Greg Woodworth, Mark Harvey

- 7:30 Continental Breakfast
- 8:30 Using COMTRADE to Commission Protection
Steve Turner, Beckwith Electric
- 9:15 Differential Protection for Power Transformers with Standard and Non-Standard Phase Shifts
Terrence Smith, General Electric
- 10:00 Break
- 10:30 Line Protection: Redundancy, Reliability, and Affordability
David Whitehead, Schweitzer Engineering Laboratories, Inc.
- 11:15 Where Did Those Transients Come From and How Are We Going to Handle Them? A Fresh Look at CCVT Transients and Other Analog Input Phenomena
Roger A. Hedding, ABB, Inc.
- 12:00 Lunch

Wednesday, November 2, 2011

CONCURRENT SESSIONS

1:00-4:15 p.m.

POWER GENERATION

Moderator: Jeff Schoenecker

**Co-Moderators: Philip Spaulding,
Mike Steckelberg**

- 1:00 Wind Turbine TV Interference Issues at Locations Remote from Turbines, Verification, and Mitigation Alternatives
Ralph Evans, Evans Associates
- 1:45 System Impact Study Considerations for > 1MW DG Interconnections
Erik Sonju, Power System Engineering, Inc.
- 2:30 Break
- 2:45 Nuclear Energy Update
Terry Pickens, Xcel Energy
- 3:30 Minnesota Power's Boswell Unit 3 Environmental Compliance and Electrical Infrastructure Upgrades
Kent Ogston, Minnesota Power
- 4:15 Adjourn

DELIVERY SYSTEMS II

Moderator: Michael Marz

**Co-Moderators: Al Haman,
Mythili Chaganti**

- 1:00 Underground Power Cable Considerations - Alternatives to Overhead
Earle (Rusty) Bascom, Electrical Consulting Engineers, P.C
- 1:45 HVDC Transmission with Voltage Sourced Converters
Mike Bahrman, ABB Inc.
- 2:30 Break
- 2:45 Evaluation of Coupling Effect between DC and AC Transmission Running on the Same Right-of-Way
Bruno Bisewski, RBJ Engineering
- 3:30 Temporary Overvoltage Issues in Distribution-connected Photovoltaic Systems and Mitigation Strategies
Michael Ropp, Northern Plains Power Technologies
- 4:15 Adjourn

RELAYING II

Moderator: Dave Hoops

Co-Moderators: Mark Gutzmann, Greg Woodworth

- 1:00 Powerline Channel Consideration for Protective Relay Applications
Miriam Sanders, Quanta Technologies
- 1:45 Power System Instability - What Relay and Planning Engineers Need to Know
Charles Mozina, Consultant, Beckwith Electric
- 2:30 Break
- 2:45 Designing a New IEC 61850 Substation Infrastructure at Manitoba Hydro
Gerrit Dogger, Cooper Power Systems
- 3:30 Detection of Undamped Sub-Synchronous Oscillations of Wind Generators with Series Compensated Lines
Adi Mulawarman, Xcel Energy and Pratap Mysore, HDR
- 4:15 Adjourn

Thursday, November 3, 2011

CONCURRENT SESSIONS

8:30 a.m.-12:00 noon

TUTORIAL I

Moderator: Bruce Wollenberg
Co-Moderators: Larry Brusseau,
Dave Peterson

- 7:30 Continental Breakfast
- 8:30 Substation Design 101
Sheldon Silberman, Xcel Energy
- 10:00 Break
- 10:30 Substation Design 101
(continued)
- 12:00 Adjourn

TUTORIAL II

Moderator: Chuck Healy
Co-Moderators: Mike Steckelberg,
Mythili Chaganti

- 7:30 Continental Breakfast
- 8:30 Gapless MOV Surge Arresters
Dilip Biswas, Siemens Energy, Inc.
- 10:00 Break
- 10:30 Gapless MOV Surge Arresters
(continued)
- 12:00 Adjourn

Topic Descriptions

GENERAL SESSION

Responsible by Nature

Benjamin Fowke, Xcel Energy

Chairman and CEO Ben Fowke will discuss how Xcel Energy balances its core responsibilities, including providing safe, reliable, reasonably priced energy to customers and strong returns to shareholders in a challenging economic and regulatory environment. All the while, the company maintains its environmental leadership position and works hard to demonstrate value.

Plug-In Charging Feature

Dennis Brown, General Motors Company

As the auto industry becomes more dependent upon Electric Vehicles (Plug-In Hybrid Electric Vehicles, Battery Electric Vehicles, and Extended Range Electric Vehicles), the Plug-In Charging Feature will become an integral part of the driver's daily routine. The Plug-In Charging feature enables off-board electrical power grid (grid-based) power to be used immediately or at a later time by on-vehicle functions.

Federal Regulations and their Impact on Electric Utilities: Financial Impact, Climate Change, Environmental Challenges, Transmission Policy, and Fuel Type Impact

John Kinsman, Edison Electric Institute

The presentation will focus upon environmental, energy, and economic considerations of regulations addressing air, climate, water, and solid waste.

Improving the Performance and Security of Electric Power Systems for the Benefit of Customers, Investors, and the Environment

Edmund Schweitzer, Schweitzer Engineering Laboratories

Dr. Schweitzer will describe where the power system is going in response to intermittent renewable power; an intelligent power network of ever greater size and complexity; and how to maintain stability and security in light of these demands.

SUBSTATION

Swept Frequency Response Analysis to Detect Power Transformer Shipping Damage

Michael Bocovich, Xcel Energy

It is expected that minor transformer winding movement that occurred as a result of shipping can be detected by comparing factory and received frequency response analysis in the "as shipped" condition. Several swept frequency response analysis (SFRA) tests were conducted on a transformer during different stages of damage to a winding to validate this expectation. A brief explanation of SFRA tests will be presented followed by the tests conducted, results, and conclusions.

Voltage Control Issues with LTC Transformers on a Smart Grid Generator Bus

Thomas Branch, Beckwith Electric Company, Inc.

This presentation illustrates coordinating DG bus voltage controls to maximize generator contribution. Discussion will include integration of SMART GRID distribution DG into applications with existing or planned LTC transformers. Presents effects of regulation choices.

Integration of IEC 61850 Gse and Sampled Value Services to Reduce Substation Wiring

David Dolezilek, Schweitzer Engineering Laboratories

Recent interest in making the electric distribution network "smarter" has increased the demand for cost-effective, yet reliable, communication services. At the same time, and almost on a daily basis, new - often wireless - communication technologies are being offered to the utility sector. This presentation will discuss some of these recent communication offerings, ranging from private to public and proprietary to standards-based, in an effort to help the utility engineer most effectively select and use them.

Applying the National Electrical Code (NEC) in Substations

Jeff Heinemann and Mark Scheid, Ulteig Engineers

A discussion of National Electrical Code (NEC) design considerations for substations, including working clearances, grounding and bonding, conduit fill, and station service sizing in electrical equipment enclosures.

UTILITY INDUSTRY FUTURES

LIFE: Fusion Energy Soon Enough to Make a Difference

Tom Anklam, National Ignition Facility

This presentation will describe recent progress toward demonstrating fusion ignition at the National Ignition Facility, the world's most powerful laser, completed in 2009. It then describes how this technology can be extended to build a fusion energy pilot plant by the mid-2020s.

Smart Electricity Storage for Heating: A Resource for Renewable Integration and Fast Regulation

Roger Rognli, Cooper Power Systems and Paul Steffes, Steffes Corporation

This presentation focuses on the economic and environmental value of using smart Electric Thermal Storage as a cost effective approach for the integration of variable renewable energy into the grid and for doing low carbon regulation.

The Future of the Grid

Douglas Brown, Siemens Energy, Inc.

This presentation addresses the integration of renewables, electric vehicles and smart grid technologies to the electric power grid and looks at applications such as Masdar City, which could be the world's first carbon-neutral city.

EIPC's DOE–Sponsored Project on Interconnection-Level Analysis and Planning for the Eastern Interconnection

Dan Fredrickson, MAPPCOR, Inc.

The Eastern Interconnection Planning Collaborative (EIPC) is a coalition of North American Electric Reliability Corporation (NERC) regional Planning Authorities covering the Eastern Interconnection. The EIPC was founded to provide a broad-based, transparent collaborative process among all interested stakeholders. The DOE–sponsored project objectives include the preparation of analyses of transmission requirements under a broad range of alternative futures and the development of long-term interconnection-wide transmission expansion plans in response to the alternative resource scenarios selected through a stakeholder process.

PROJECT MANAGEMENT

Alternative Construction Access Method on Heavily Regulated Wetlands

Crystal Koles, American Transmission Company and Drew St. John, New South Equipment Mats

Transmission Company (ATC) faced a daunting environmental challenge in upgrading a transmission line in central Wisconsin. ATC partnered with New South Equipment Mats to develop a solution using a new form of engineered construction mats. The engineered mat system saved ATC approximately \$2 million while meeting all environmental requirements.

Helicopters, Low-Energy Explosives and Ice Roads: Constructing the First CAPX2020 345kV Transmission Line Segment

Dave Berklund, Tony Moore, and Jeff Gutzmann, Xcel Energy

CAPX2020 is a joint initiative of 11 regional utilities to upgrade and expand the electric transmission grid to ensure continued reliable and affordable service. This presentation will focus on the engineering and construction efficiencies associated with the design and installation of the first 28 miles of 345 kV double circuit monopoles.

Minnesota's Power's Upgrade of Network Transformers

Dan Schultz, Minnesota Power

In October 2008 Minnesota Power experienced a catastrophic failure of a network transformer. This presentation describes network transformer systems in general and details repairs and upgrades of MP's network systems.

Shutting Down Light Rail: Xcel Energy's Fifth Street Substation Transformer Replacement Project

Grant Stevenson and Caroline Peterson, Xcel Energy

Replacement of a transformer at Xcel Energy's Fifth Street Substation in downtown Minneapolis is a fairly straight forward engineering project but required the shutdown of light rail transit and a high degree of planning with Metro Transit, City of Minneapolis, and other stakeholders. This presentation discusses technical issues and focuses on the logistics of the replacement.

DISTRIBUTION AUTOMATION/ COMMUNICATIONS

Recent Developments in Smart Grid Wireless Communication Technologies

Dan Nordell, Xcel Energy

Recent interest in making the electric distribution network "smarter" has increased the demand for cost-effective, yet reliable, communication services. At the same time, and almost on a daily basis, new - often wireless - communication technologies are being offered to the utility sector. This presentation will discuss some of these recent communication offerings, ranging from private to public and proprietary to standards-based, in an effort to help the utility engineer most effectively select and use them.

Wireless Communication for Distribution Automation in the Smart Grid

Colin Lippincott, FreeWave Technologies

Examine strategies to deploy wireless technologies for distribution automation and achieve optimal system management. Attendees will learn about different solutions available and discover the advantages of using wireless communication systems.

Recognizing Priority of Var Flow in Smartgrid Volt/Var Management Strategies

Thomas Branch, Beckwith Electric

This presentation illustrates the importance of reducing distribution system var flows as the initial goal of Volt/Var Management systems, as well as the benefits of proposed Smart Grid capabilities for this function.

High-Speed Communication-Assisted Tripping and Sectionalizing For Distribution Systems

Steve Turner, Beckwith Electric

This paper demonstrates application of communication-assisted tripping and sectionalizing for distribution systems—including settings, operational details, and examples—plus the impact of these schemes on the utility distribution network reliability.

DELIVERY SYSTEMS I

NSP Distribution VAr Pilot Project

Andy Dammel and Dan Lysaker, Xcel Energy

The Xcel Energy VAr project is intended to demonstrate the efficiency improvement attainable by tightly controlling the power factor of the distribution system at the feeder circuit level.

SynchroPhasor Technology and Project Review

Jim Kleitsch, American Transmission Company

A high level overview including everything you ever wanted to know about the state of synchrophasor implementation but were afraid to ask from this utility engineer's perspective. This presentation includes information on real world uses of the technology along with the experience gained collecting and analyzing the data at ATC for the past two years.

Stray Voltage in Distribution Systems

Al Haman, STAR Energy Services

This presentation will review basic concepts of stray voltage and how investigations are conducted. Several case studies involving dairy farms will be examined to help understand correction and mitigation techniques.

Duluth Electric System Upgrade

Reed Rosandich and Joe Peterson, Minnesota Power

Beginning in 2000, Minnesota Power (MP) began a 15-year plan to upgrade a large part of the Duluth area 13.8 kV distribution system. This major 34.5 kV investment is necessary to alleviate 13.8 kV capacity limitations and provide first-contingency switching options if a major substation is lost catastrophically.

RELAYING I

Using COMTRADE to Commission Protection

Steve Turner, Beckwith Electric

This presentation demonstrates commissioning of protection functions using COMTRADE — an IEEE standard for common format for transient data exchange — including creation of a detailed test plan and COMTRADE records for a specific test.

Differential Protection for Power Transformers with Standard and Non-Standard Phase Shifts

Terrence Smith, General Electric

Application of transformer differential of two- or three-winding conventional power transformers or autotransformers has become a trivial matter, while protection of phase shifting transformers (PST), Scott transformers, LeBlanc transformers, Zig-Zag grounding transformers, or converter transformers is a challenge. This presentation discusses methods to provide differential protection to these types of transformers.

Line Protection: Redundancy, Reliability, and Affordability

David Whitehead, Schweitzer Engineering Laboratories, Inc.

Fault trees compare the dependability and security of line protection systems. The effect of comprehensive commissioning testing, hidden failures, common-mode failures, and two-out-of-three voting schemes are demonstrated.

Where Did Those Transients Come From and How Are We Going to Handle Them? A Fresh Look at CCVT Transients and Other Analog Input Phenomena

Roger A. Hedding, ABB, Inc.

Since the advent of solid state relays CCVT transients have been a hindrance to distance relays and high speed performance. This paper reviews CCVT transients and how they are minimized with CCVT design and microprocessor relays.

POWER GENERATION

Wind Turbine TV Interference Issues at Locations Remote from Turbines, Verification, and Mitigation Alternatives

Ralph Evans, Evans Associates

Today's wind turbines utilize a lightning protection wire running the length of the leading edge of the blade. This wire may pick up TV, radio, public safety, and other radio frequencies and scatter them toward potential receiver locations. This can cause

interference and failure of the received signal in direct proportion to the size and number of the turbines. This paper will present methods of predicting the extent of this interference, and will discuss possible mitigation measures.

System Impact Study Considerations for > 1MW DG Interconnections

Erik Sonju, Power System Engineering, Inc.

The purpose of this presentation is to review technical items that should be considered when performing system impact studies associated with the interconnection of large distributed generation facilities. Actual case studies will be presented.

Nuclear Energy Update

Terry Pickens, Xcel Energy

This presentation will look at the Fukushima Daiichi nuclear plant accident. It will discuss how the nuclear industry, including Xcel Energy, is responding and potential future impacts.

Minnesota Power's Boswell Unit 3 Environmental Compliance and Electrical Infrastructure Upgrades

Kent Ogston, Minnesota Power

In order to meet government mandates for emissions, Boswell Energy Center Unit 3 was retrofitted with emission controls from 2006-2009. As part of this project, the entire auxiliary medium voltage electrical infrastructure was replaced due to capacity and interrupting capability issues. The overall goals of the project were to meet emission requirements while creating an operationally safer electrical infrastructure and maintaining unit net power production. The combined Unit 3 projects consisted of the environmental retrofit, including turbine efficiency upgrades, dry ash handling, and duty cycle preservation projects which included the electrical infrastructure upgrades. The execution of these projects was a multiple discipline engineering effort, and the overall investment in Boswell Unit 3 as a result of these projects was approximately \$300 million.

DELIVERY SYSTEMS II

Underground Power Cable Considerations - Alternatives to Overhead

Earle C. (Rusty) Bascom, III, Electrical Consulting Engineers, P.C.

Underground transmission cables are increasingly being used where rights-of-way costs, permitting, and environmental constraints prevent construction of overhead. This presentation discusses considerations for using underground transmission cable systems.

HVDC Transmission with Voltage Sourced Converters

Mike Bahrman, ABB Inc.

The use of voltage-sourced converters has broadened the application range for high voltage direct current transmission. New applications include efficient high-power underground or hybrid transmission for wind generation.

Evaluation of Coupling Effect Between DC and AC Transmission Running on the Same Right-of-Way

Bruno Bisewski, RBJ Engineering

This paper describes a study carried out to investigate the level of induced ac voltage and ac current in the 500 kV dc line due to coupling from 275 kV and 500 kV ac lines that run in parallel to the dc line. A set of systematic parametric analyses were simulated so that guidelines for planning and siting of parallel ac/dc lines could be developed. Mitigative measures that could be applied to limit the impact of fundamental frequency coupling on the dc equipment were also explored.

Temporary Overvoltage Issues in Distribution-connected Photovoltaic Systems and Mitigation Strategies

Michael Ropp, Northern Plains Power Technologies

As increasing numbers of photovoltaic plants and other distributed generators (DGs) are connected to distribution feeders, more utilities are raising worries about various forms of temporary overvoltage (TOV). This presentation will discuss the physical mechanisms that give rise to TOV, focusing on those associated with DGs, with support from simulation results to help quantify the levels of TOV that can realistically be expected. Then, potential mitigation strategies will be explored.

RELAYING II

Powerline Channel Consideration for Protective Relay Applications

Miriam Sanders, Quanta Technologies

This presentation is a tutorial on applying a channel to the transmission line for use with protective relaying applications. A review of the components that make up the channel will be included.

Power System Instability - What Relay and Planning Engineers Need to Know

Charles Mozina, Consultant, Beckwith Electric

This presentation provides necessary knowledge of power system stability to protect against blackouts and other events that could cause expensive equipment damage and downtime. Recent generator instability cases are provided as examples.

Designing a New IEC 61850 Substation Infrastructure at Manitoba Hydro

Gerrit Dogger, Cooper Power Systems

This presentation will provide an overview of a solution to replace the current Substation Automation System (SAS) which is a discrete RTU and PLC-based control and metering architecture with an integrated IEC 61850-based architecture.

Detection of Undamped Sub-Synchronous Oscillations of Wind Generators with Series Compensated Lines

Adi Mulawarman, Xcel Energy and Pratap Mysore, HDR

A routine switching event at a substation resulted in sustained oscillations between wind generators and Xcel Energy system connected through a series compensated line. This presentation describes the event that led to the development and commissioning of the new relay.

TUTORIAL I

Substation Design 101

Sheldon Silberman, Xcel Energy

This tutorial will introduce a few of the concepts and steps in substation design. We will explore some of the common types and purposes of substations, discuss the overall design and construction process, and learn to design in flexibility and reliability as you develop the scope and details of your project.

TUTORIAL II

Gapless MOV Surge Arresters

Dilip Biswas, Siemens Energy, Inc.

Surge Arresters of gapless MOV technology are designed to provide stable and reliable protection to electrical equipments and apparatus from over-voltage surges. However, selection of appropriate surge arresters play a key role in getting the best protection, reliability, and safety.

2011 MIPSYCON Planning Committee

Denny Branca

Cooper Power Systems
Plymouth, Minnesota

Larry Brusseau

MAPPCOR
Roseville, Minnesota

Mythili Chaganti

IEEE PES Twin Cities
Chapter Chair
Minneapolis, Minnesota

Kristi Fischer

University of Minnesota
St. Paul, Minnesota

Catherine Flannery

University of Minnesota
St. Paul, Minnesota

Tom Guttormson

Connexus Energy
Ramsey, Minnesota

* Mark Gutzmann

Xcel Energy
Minneapolis, Minnesota

Al Haman

STAR Energy Services
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Chuck Healy

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Company
Waukesha, Wisconsin

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Jeff Schoenecker

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Philip Spaulding

Xcel Energy
Maple Grove, Minnesota

Mike Steckelberg

Great River Energy
Maple Grove, Minnesota

Gerry Steffens

Rochester Public Utilities
Rochester, Minnesota

Dave VanHouse

Minnesota Power
Duluth, Minnesota

Bruce Wollenberg

University of Minnesota
Minneapolis, Minnesota

Greg Woodworth

Minneapolis, Minnesota

*Planning Committee Chair

General Information

ABOUT THE CONFERENCE

This conference provides electric utility engineers and consultants the opportunity to stay abreast of today's power system technology. The conference emphasizes the unique challenges faced by electric utilities in the Midwest. The conference also serves as a forum for power engineers to meet with their colleagues from other utilities to discuss mutual concerns. Concurrent sessions include substations, utility industry futures, distribution automation/communications, power generation, delivery systems, project management, relaying, and two tutorials.

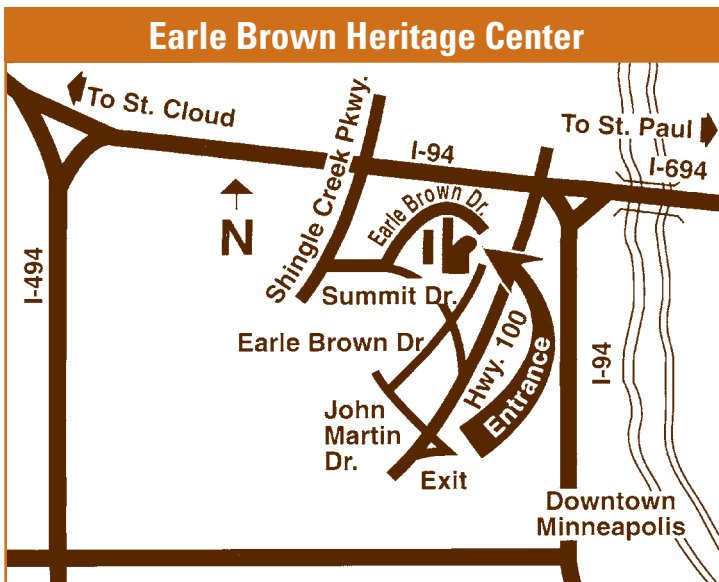
LOCATION AND ACCOMMODATIONS

The conference will be held at the Earle Brown Heritage Center, 6155 Earle Brown Drive, Brooklyn Center, MN 55430. For directions, please visit their Web site – www.earlebrown.com. The Earle Brown Heritage Center is located near the intersection of I-94/694 and Shingle Creek Parkway (just north of Brookdale Shopping Center). There is ample free parking surrounding the facility. Please see map for details.

Convenient lodging for out-of-town participants is available at the Embassy Suites Minneapolis – Brooklyn Center Hotel, 6300 Earle Brown Drive, Brooklyn Center, MN 55430. The rate is \$109, plus tax, for a 1 King Suite or 2 Queen Suite. Participants are responsible for making their own lodging reservations. To make a reservation, call 763-560-2700 or 1-800-362-2779. To receive the special conference rate, please identify yourself as a participant of the Minnesota Power Systems Conference. Reservations must be made by October 23, 2011. After this date reservations will be accepted on a space and rate available basis. The hotel is next to the Earle Brown Heritage Center and parking is free.

REGISTRATION AND FEES

The fee for the conference is \$275 if received by October 17; if received after October 17, the fee is \$325. The conference fee includes all sessions, two luncheons, refreshments breaks, and the exhibitor reception. You are encouraged to register early to take advantage of the lower fee. If you cancel your registration by October 24 a refund, minus \$30, will be issued. If you cancel after this date you will not be eligible for a refund. A full refund will be issued if the conference is cancelled by the University of Minnesota.



CONFERENCE PAPERS AND POWER POINT PRESENTATIONS

Conference presentation papers, from speakers who have submitted papers, can be found on the conference Web site, www.cce.umn.edu/mnpowersystems

Presentation PowerPoints, from speakers who are willing to have their PowerPoints posted, will be available for a limited time after the conference on the conference Web site. www.cce.umn.edu/mnpowersystems

EXHIBITOR RECEPTION

The exhibitor reception will be held on Tuesday, November 1, from 4:15-6:00 p.m. at the Earle Brown Heritage Center (the same location as the conference sessions). Exhibitors will display brochures and small equipment. All conference attendees are invited to attend this reception to view the exhibits, meet the exhibitors, and enjoy some hors d'oeuvres and beverages.

CONTINUING EDUCATION UNITS (CEUs)

Participants who attend the entire conference will receive 1.5 CEUs. Participants who attend only Tuesday and Wednesday will receive 1.2 CEUs. One CEU is defined as 10 contact hours of participation in an organized continuing education experience under responsible sponsorship, capable direction, and qualified instruction. A CEU certificate will be sent to each participant after the conference. A permanent record of CEUs earned will be maintained by the University of Minnesota Office of Admissions and Records Transcript Unit.

PROGRAM INFORMATION

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University of Minnesota
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FOR REGISTRATION INFORMATION

612-625-2900
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CALL FOR PAPERS FOR 2012 CONFERENCE

Deadline for abstract submission for MIPSYCON 2012 is January 27, 2012. Notification of acceptance will be sent by June 2012. If you would like to be considered for the 2012 program, please submit an abstract of approximately 300 words online at www.cce.umn.edu/mnpowersystems.

EXHIBITOR INFORMATION AND REGISTRATION

If you are interested in having a display at the exhibitor reception on November 1, 2011, and you would like more information and registration materials go to www.cce.umn.edu/mnpowersystems left-hand link, Exhibitor Information.

Disability accommodations will be provided upon request. This publication is available in alternative formats upon request. Call 612-624-3492.

The University of Minnesota shall provide equal access to and opportunity in its programs, facilities, and employment without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression.

Registration

47th Annual Minnesota Power Systems Conference

ENGR 0364
185552 kf

November 1-3, 2011

Please print or type

Name (Last) (First) (M.I.)

Business Address (Street/P.O. Box) City State Zip

E-mail Fax

Company/Institution Title/Position

Daytime Telephone Home Telephone

I do not want to be listed on the participant list.

Conference Fee

- Enclosed is \$275 in full payment of the conference registration fee (received by October 17).
- Enclosed is \$325 in full payment of the conference registration fee (received after October 17).

Method of Payment

- Enclosed is a check or money order payable to the University of Minnesota.
- The fee will be paid by my employer. Enclosed is a purchase order.
- Payment should be charged to my credit card (check one).
- Visa MasterCard Discover/Novus American Express

Credit Card Number Expiration Date

Name as printed on card (please print)

Signature of cardholder

How to Register

Register Online:

www.cce.umn.edu/mnpowersystems
The most secure form of registration

Mail to (with credit card information):

Information Center 185552
University of Minnesota
20 Coffey Hall
1420 Eckles Avenue
St. Paul, MN 55108-6069

Fax to (with credit card information):

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This fax will be received in a secure location.

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