



4 1 S T A N N U A L

Minnesota Power Systems Conference



November 1-3, 2005

Continuing Education and Conference Center

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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. Newly created and redesigned concurrent sessions include substations, utility industry futures, delivery systems, project management, relaying, distribution automation, and distributed resources.

Earn 16 Hours of Continuing Education Credit by attending this program.

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UNIVERSITY OF MINNESOTA

Program Schedule

Tuesday, November 1, 2005

GENERAL SESSION

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

Moderator: Steve Mohs

Co-Moderators: Gerry Steffens, Ed Cannon

7:15	Check-In Continental Breakfast	10:00	Break
8:15	Welcome <i>Steve Mohs</i> , Ulteig Engineers, Inc.	10:30	Third World Power: The Electrification of the Village of Pignon, Haiti <i>Michael Callies</i> , Hartland Engineering
8:30	Issues Facing the States Electric Utilities <i>Donald J. Shippar</i> , President & CEO, Allete	11:15	MISO Market Initiatives (MMI) Update <i>Clair Moeller</i> , Midwest Independent Transmission System Operator, Inc.
9:15	Managing the Aging Workforce for Power Delivery <i>Wanda Reder</i> , S&C Electric Company	12:00	Lunch

CONCURRENT SESSIONS

1:00 – 4:15 p.m.

SUBSTATION

Moderator: Tom Guttormson

Co-Moderators: Mark Harvey, Chuck Healy

1:00	Station Services in Substations <i>Kenneth Benoit</i> , Minnesota Power
1:45	Substation Project through the Eyes of a Civil/Structural Engineer <i>Dragana Hadziosmanovic</i> , Ulteig Engineers, Inc.
2:30	Break
2:45	Thermal Considerations for Transformer Loading <i>David Harris</i> , Waukesha Electric Systems
3:30	The Application, Design, and Life of Power Transformer FOA Coolers <i>W. Michael Martin</i> , Flakt Coiltech, Inc.
4:15	Adjourn

DELIVERY SYSTEMS

Moderator: Al Haman

Co-Moderators: Gerry Steffens, Philip Spaulding

1:00	Gridworks Multi-Year Program <i>Gil Bindewald</i> , U.S. Department of Energy
1:45	Southeast Minnesota, Southwest Wisconsin Transmission Planning Study <i>Scott Nickels</i> , Rochester Public Utilities
2:30	Break
2:45	Application of Static Var Compensators in Entergy's System to Address Voltage Stability Issues—Planning, Design, Construction, Commissioning Considerations <i>Ivars Vancers</i> , Siemens Power T&D, Inc.
3:30	Transmission Provider Reliability Study—What Are Good Measuring Sticks <i>Tom Butz</i> , Power System Engineering
4:15	Adjourn

EXHIBITOR RECEPTION

4:15-6:00 p.m.

Wednesday, November 2, 2005

CONCURRENT SESSIONS

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

PROJECT MANAGEMENT

Moderator: Denny Branca
Co-Moderators: Pat Hayes, Jim Hanson

- 7:30 Continental Breakfast
- 8:30 Engineering and Construction of the Arrowhead-Weston 345 kV Transmission Line Project, Minnesota Portion
Ron Gullicks, Minnesota Power
- 9:15 Mobilizing Restoration Crews—2004 Florida Hurricane
Bill Teeters, Xcel Energy
- 10:00 Break
- 10:30 The Challenges and Virtues of Implementing an Enterprise-Wide Outage Management System
Warren Birgel, Jr. and Denny Branca, Xcel Energy
- 11:15 Plymouth Maple Grove Transmission Upgrade – Project Management
Kevin Lennon, Great River Energy
- 12:00 Lunch

DISTRIBUTED RESOURCES

Moderator: Chuck Healy
Co-Moderators: Tom Guttormson, Craig Turner

- 7:30 Continental Breakfast
- 8:30 Arc Flash Safety Hazard Concerns
Dean Robinson, Sebesta Blomberg & Associates
- 9:15 Protection for Unexpected Delta Sources
Ken Behrendt, Schweitzer, Engineering Laboratories, Inc.
- 10:00 Break
- 10:30 Community Based Renewable Energy
Michael Reese, University of Minnesota-West Central Research & Outreach Center
- 11:15 Interconnection of Wind Turbine Generators to Distribution Feeders
Vince Granquist, Consulting Engineers Group
- 12:00 Lunch

CONCURRENT SESSIONS

1:00 – 4:15 p.m.

RELAYING

Moderator: Nathan Germolus
Co-Moderators: Al Haman, Mark Harvey

- 1:00 Breaker Failure Protection
Roger Hedding, ABB Inc.
- 1:45 EMTP Reference Models for Transmission Line Relay Testing
Kalyan Mustaphi, Excel Engineering
- 2:30 Break
- 2:45 Field Experience with High-Impedance Fault Detection Relays
Mark Adamiak, GE Multilin
- 3:30 A Comparison Between High-Impedance and Low-Impedance Restricted Earth Fault Protection
Ali Kazemi, Schweitzer Engineering Laboratories
- 4:15 Adjourn

DISTRIBUTION AUTOMATION

Moderator: Dan Nordell
Co-Moderators: Gerry Steffens, Ed Cannon

- 1:00 The BPL Landscape Today
Matt A. Oja, BPL Deployment
- 1:45 Automated Interruption Monitoring of Distribution Systems
Rod Jensen, Otter Tail Power Company
- 2:30 Break
- 2:45 Automation Communication Alternatives
Rick A. Schmidt, Power System Engineering, Inc.
- 3:30 Distribution SCADA: A Non-Traditional Utility Approach
Len Jewell, Dakota Electric Association
- 4:15 Adjourn

Thursday, November 3, 2005

CONCURRENT SESSIONS

8:30 a.m. - 11:45 a.m.

UTILITY INDUSTRY FUTURES

Moderator: Mike Steckelberg

Co-Moderators: Dave Peterson, Dave VanHouse

- 7:30 Continental Breakfast
- 8:30 Hybrid Vehicles, Hydrogen and Fuel Cell Vehicles
Karl Fiegenschuh, Ford Motor Company
- 9:15 Landfill Gas to Energy: A Cooperative's Perspective
John McWilliams, Dairyland Power Cooperative
- 10:00 Break
- 10:30 A Comparison of the Relative Benefits of Nuclear and Renewable Energy
Michael Ropp, South Dakota State University
- 11:00 Eastern Interconnection Phasor Project
Terry Bilke, Midwest ISO
- 11:45 Adjourn

TUTORIAL - SUBSTATION COMMUNICATIONS

Moderator: Dan Nordell

Co-Moderators: Tom Guttormson, Ed Cannon

- 7:30 Continental Breakfast
- 8:30 Practical Communications Network Applications for Substation and Distribution Automation: Network Planning and Strategic Considerations
Gary Roskos, Open Systems International, Inc.
- 9:15 Practical Communications Network Applications for Substation and Distribution Automation: IP and IP/Serial Hybrid Networks: An Overview of the Latest Generation of Open Communication and Security Products
Gary Roskos, Open Systems International, Inc.
- 10:00 Break
- 10:30 Use of IEC Standards for Utility Communications
Dan Nordell, Xcel Energy
- 11:00 Bridging the Gap Between Legacy Serial Communication Networks and IP
Arturo Herrera, Microwave Data Systems
- 11:45 Adjourn

Topic Descriptions

GENERAL SESSION

Issues Facing the States Electric Utilities

Donald J. Shippar, President & CEO, Allete

Major upgrades and expansion of the states transmission infrastructure is expected to be required over the next 15 years to support customers growing demand for electricity. The state's utilities have undertaken a joint effort to determine if regulatory changes are appropriate to ensure that these projects will be developed in a timely, efficient manner, consistent with the public interest. This paper will provide an overview of the results of this effort as well as other issues facing the utility industry such as issues impacting future generation resources and how utilities will maintain technical expertise as its graying workforce retires

Managing the Aging Workforce for Power Delivery

Wanda Reder, S&C Electric Company

The power industry has dealt with many recent challenges placing much effort on financial and infrastructure demands. Meanwhile leaders have placed relatively little importance on developing the technically skilled workforce leaving the availability of expertise to address industry challenges in question. The current situation is a result of staff reductions, few recent new hires, and early exit of talent, factors which have led to a decline in the availability of power curricula and the enrollment in them. These factors, along with demographic trends, leave us challenged to ensure there is adequate expertise and incoming talent to replenish a declining technical workforce. This presentation reviews the U.S. power industry workforce and recommended steps to proactively address the situation.

Third World Power: The Electrification of the Village of Pignon, Haiti

Michael Callies, Hartland Engineering

Haiti is one of the poorest nations in the world. Electricity is a rare commodity that has the ability to improve health care, education, business opportunities, and the overall economy in Haiti's cities and towns. What started as a dream and a donated generator from Donald Trump has led to the start of a new era in the town of Pignon.

MISO Market Initiatives (MMI) Update

Clair Moeller, Midwest Independent Transmission System Operator, Inc.

A large part of the Eastern Interconnection of electric utilities is functioning under a wholesale electric marketplace administered by the Midwest Independent System Operator. This presentation will provide an overview of that marketplace, a brief summary of how it functions, and its mechanics along with current status.

SUBSTATION

Station Services in Substations

Kenneth Benoit, Minnesota Power

This presentation will define types of station services used in substations, explore various configurations and provide typical designs. Topics will include design parameters, selecting transformers, panel boards, and transfer switches.

Substation Project through the Eyes of a Civil/Structural Engineer

Dragana Hadziosmanovic, Ulteig Engineers, Inc.

A substation project is a complex process. It consists of multiple tasks and requires coordination of various disciplines. The civil/structural part is generally 10 to 15 percent of the total project, which is why it is sometimes easy to overlook the importance of it. Frost heaved foundations and failed buses are some examples of why we should not forget about that part of the project. It is also important to know what information civil engineers need to know to complete his/her task.

Thermal Considerations for Transformer Loading

David Harris, Waukesha Electric Systems

Load factors are increasing and management is asking for higher utilization of the installed capacity. What are key factors that determine the thermal capability of a power transformer? What can be done to maintain and/or improve the thermal capability? Thermal loading affects the aging of the transformer insulation; what are other contributing factors contributing to insulation aging and what can we do to mitigate the aging process?

The Application, Design, and Life of Power Transformer FOA Coolers

W. Michael Martin, Flakt Coiltech, Inc.

FOA coolers are generally applied to all mobile transformers, almost all GSU's, and they have a variable life span depending on the environment in which they are installed. Once they begin to show signs of end-of-life, plans should be made to replace them before they degrade the winding material and the life of the power transformer. Due to the cost of the oil handling equipment, replacing all of the FOA coolers at the same time is a prudent decision.

DELIVERY SYSTEMS

Gridworks Multi-Year Program

Gil Bindewald, U.S. Department of Energy

Gridworks is a multi-year plan developed by the Department of Energy's Office of Electric Transmission and Distribution. This office is dedicated to the modernization of America's electric grid. The Gridworks program has two key aspects: (1) The introduction of "next generation" hardware for cables and conductors, substations and protective systems, and power electronics; (2) The integration of information systems and digital technologies into the electric system.

The Gridworks program is only part of the effort needed. Utilities, equipment manufacturers, state government agencies, national laboratories, and universities can join the DOE in building public-private partnerships to tackle the challenges and implement effective solutions. The aim is to leverage taxpayer investments in research and development with private capital to spur innovation and accelerate market acceptance.

Southeast Minnesota, Southwest Wisconsin Transmission Planning Study

Scott Nickels, Rochester Public Utilities

The Southeast Minnesota, Southwest Wisconsin Transmission Study presentation will provide transmission solutions to the long-term load serving issues in Southeast Minnesota and Southwest Wisconsin. The current bulk transmission system load serving limitations to Rochester, Minnesota, and La Crosse, Wisconsin, will be discussed. The presentation will provide the transmission alternatives studied to mitigate these deficiencies as well as document the system impact of each alternative as related to load serving, system reliability, congestion mitigation, and area interchange capabilities.

Application of Static Var Compensators in Entergy's System to Address Voltage Stability Issues—Planning, Design, Construction, Commissioning Considerations

Ivars Vancers, Siemens Power T&D, Inc.

Entergy, located in New Orleans, Louisiana, is in the process of installing SVCs at two of its major load centers. Extensive voltage stability assessment was performed to understand the problem and determine the size and location of the SVC. This presentation will present planning, design, construction, and testing aspects of the SVC installation in the Entergy System. Construction of the facilities, involving a variety of site challenges, will be presented and solutions discussed. Experience in testing and commissioning of the SVC connected to a 230 kV generation bus will be reviewed and initial operation of the system within the planning parameters will be presented.

Transmission Provider Reliability Study—What are Good Measuring Sticks

Tom Butz, Power System Engineering

With the release of the IEEE P1366™ 2003, utilities are provided a number of measures to evaluate reliability. Even with this guide, there are now more questions than answers. What measures are the most meaningful? What is a consistent set of terms and definitions? What is an "apples to apples" comparison in reliability? What business decisions can be made to improve system reliability? G&T cooperatives are in a unique position in that they serve customers at a wholesale level at transmission and sub-transmission delivery points, and not the ultimate customer. A group of seven G&Ts have been working together to benchmark reliability performance and have come up with a set of indices and definitions that provide a reasonably consistent metric for reliability.

PROJECT MANAGEMENT

Engineering and Construction of the Arrowhead-Weston 345 kV Transmission Line Project, Minnesota Portion

Ron Gullicks, Minnesota Power

This presentation will provide an overview of regulatory approvals, engineering, and construction of the Minnesota portion of this improvement to the regional electrical transmission grid.

Mobilizing Restoration Crews –2004 Florida Hurricane

Bill Teeters, Xcel Energy

Xcel Energy's role in the 2004 hurricane restoration efforts will be reviewed in several stages from initial contacts of the host utilities, mobilization of 150 crew members, logistics for traveling crews, DOT requirements while traveling, safety, work rules, reassignments to different utilities and restoration sites while in the field, releases from host utilities, and the travel home.

The Challenges and Virtues of Implementing an Enterprise-Wide Outage Management System

Warren Birgel, Jr. and Denny Branca, Xcel Energy

Xcel Energy recently implemented an enterprise-wide outage management system, which covers a 3.5 million customer base and is used by over 500 users on a normal business day. This presentation will review the business drivers and vision for the project. In addition, it will provide insight on the experiences learned from this successful project, including the strategies and tactics that paid off and the ones that did not pay off.

Plymouth Maple Grove Transmission Upgrade – Project Management

Kevin Lennon, Great River Energy

The Plymouth Maple Grove Transmission Upgrade was the first transmission project to successfully gain a Certificate of Need and Route Permit under the new state permitting process. The main focus of the presentation will be on project management and related issues with permitting and construction of 14 miles of 115 kV transmission line in the densely populated metro area.

DISTRIBUTED RESOURCES

Arc Flash Safety Hazard Concerns

Dean Robinson, Sebesta Blomberg & Associates

This presentation is designed to increase the awareness of arc flash safety issues for engineers who design, specify, sell, procure, install, operate and maintain breakers between 120 VAC to 765 kV. Standard groups involved with this issue will be reviewed along with a description of the types of injuries that typically result from electric arc flashes.

Protection for Unexpected Delta Sources

Ken Behrendt, Schweitzer, Engineering Laboratories, Inc.

Utilities commonly use delta-wye transformers to serve three-phase customer loads from their transmission networks and distribution feeders. With the proliferation of distributed generation installed at the customer load site, these delta-wye transformers become sources of fault current that can be difficult to detect and isolate. This presentation reviews the nature of fault current contributions and voltage characteristics from ungrounded delta sources, discusses various techniques used to detect fault contributions from delta sources, and also discusses the possible impact of distributed generator control systems and interconnection protection to unexpected delta source fault contributions. Armed with this information, utility engineers and their customers can determine what protection and control schemes they need to insure faults are cleared properly to avoid the hazards of uncleared faults.

Community Based Renewable Energy

Michael Reese, University of Minnesota-West Central Research & Outreach Center

Mr. Reese will discuss the development of the University of Minnesota Renewable Energy Research and Demonstration Center at Morris. Four core renewable energy systems are being developed as part of the Renewable Energy Center. The systems include a hybrid wind energy system with a wind to hydrogen demonstration; a biomass gasification system; a community anaerobic digester system; and a Renewable Energy Research and Education Office Addition featuring sustainable building design, energy efficiency technologies, and renewable energy systems. All four systems are designed to be community-scale, functional production systems but also research and demonstration platforms for the University of Minnesota.

Interconnection of Wind Turbine Generators to Distribution Feeders

Vince Granquist, Consulting Engineers Group

A number of issues must be addressed in interconnecting wind generation to distribution feeders. Utilities are being called on to provide interconnection information on small machines less than 39 kW up to large machines in the MW range. This presentation will cover inverter connected small turbines and technical challenges associated with the larger units.

RELAYING

Breaker Failure Protection

Roger Hedding, ABB Inc.

Breaker failure protection has evolved in its implementation from remote backup, to local backup using discrete relays, to being an integral part of the main protection in microprocessor relay schemes. This paper reviews breaker failure protection and the schemes that are being implemented in the industry based on some of the work currently being done in working group K2 of the Power Systems Relaying Committee. Some of the pitfalls in applying breaker failure protection are discussed as well as issues associated with timer settings, initiation elements, and breaker failure relay/ reclosing relay coordination.

EMTP Reference Models for Transmission Line Relay Testing

Kalyan Mustaphi, Excel Engineering

Transmission line relays are exposed to many variables in the power systems (line length, sources strength, parallel lines, series and shunt compensation, fault type, faults on the point of voltage waveform, etc.), which creates transient and dynamic undesired fault currents and voltages. In order to ensure a protective relay will perform as expected, it must be tested under realistic power system conditions. The test values should contain transient, dynamic, and steady state components which is possible with the waveforms generated from EMTP (Electro Magnetic Transient Program) simulation. A Power System Model has been developed which can help to test and evaluate any transmission line relay.

Field Experience with High-Impedance Fault Detection Relays

Mark Adamiak, GE Multilin

High-impedance, arcing faults (HiZ faults) are a perennial problem for distribution systems. General Electric commercialized the algorithms in a relay for detecting a large percentage of these faults, while maintaining security against false operations. We will discuss the performance and the field experiences of widespread applications of this technology.

A Comparison Between High-Impedance and Low-Impedance Restricted Earth Fault Protection

Ali Kazemi, Schweitzer Engineering Laboratories

This presentation examines the theory of operation for Restricted Earth Fault (REF) protection for power transformers. Issues such as relay sensitivity requirements, transformer fault current distribution, impact of fault location on relay performance (winding coverage), current transformer (CT) requirements, and the impact of CT transient response on REF protection elements will be discussed.

DISTRIBUTION AUTOMATION

The BPL Landscape Today

Matt A. Oja, BPL Deployment

Broadband over power line (BPL) continues to gain steam as a viable broadband access technology. New manufacturers have entered the marketplace, offering faster speeds and more features than ever before. Several independent research firms are forecasting strong growth for the BPL industry over the next five years, and state and federal regulator support is becoming more vocal. The presenter will review and discuss major developments in regulatory decisions, the surge in utility requests for proposals, and past deployments updates. He will also address the increasing interest in distribution automation over BPL and how existing suppliers are enhancing their platforms to enable simple connections via Internet protocol.

Automated Interruption Monitoring of Distribution Systems

Rod Jensen, Otter Tail Power Company

Utilities around the country are under increased pressure to improve their processes for capturing customer interruption data, used to calculate industry standard reliability performance indices. Otter Tail Power Company recently installed an automated Web-based interruption monitoring system to be used to gather interruption data and calculate indices used to report reliability performance to the required utility commissions. This presentation provides an overview of the solution selection process, system installation and scale up, and overall project budget performance.

Automation Communication Alternatives

Rick A. Schmidt, Power System Engineering, Inc.

Utilities today need more than ever to monitor, control, and gather data from their electrical systems for effective planning and operation. Communications technology is a key element to enable these applications. This presentation will provide an overview of how to approach a communications project and communications technology alternatives utilities may choose for their solution.

Distribution SCADA: A Non-Traditional Utility Approach

Len Jewell, Dakota Electric Association

(DEA) took stock of the lessons learned from their previous approach to SCADA and decided that this time things needed to be different. Specifically, DEA wanted the new SCADA system to fit into DEA's information system rather than changing the information system to fit SCADA. This meant that DEA was now looking for SCADA software that was: (1) off-the-shelf, "shrink-wrapped" the same for all users (no more customer specific modifications that proved too costly to maintain and upgrade); (2) capable of running on the Windows operating system (so it could be supported by existing in-house expertise); (3) used by thousands of customers (so that development costs for new features could be more affordable); (4) capable of being upgraded without hours and hours of custom engineering time (so that it will be painless to upgrade the product and thus keep it "ever-green" to avoid the headaches of another forklift upgrade); and (5) cost effective upfront and over the lifetime of the product. Initially, DEA looked for these qualities in the offerings of traditional electric utility SCADA vendors and was unable to find one that really fit all the needs. Then DEA discovered iPower which had the promise of satisfying all of DEA's SCADA system needs but had not been proven at a distribution co-operative as large as DEA – until now.

UTILITY INDUSTRY FUTURES

Hybrid Vehicles, Hydrogen and Fuel Cell Vehicles

Karl Fiegenschuh, Ford Motor Company

Concerns about high fuel prices, oil supply, and security have increased public demand for improved fuel efficiency and political requirements to reduce the dependence of the transportation system on imported oil. Hybrid electric vehicles and fuel cell vehicles can help address both issues. This presentation will provide a brief overview of these vehicle technologies, as well as the possible pathways and challenges facing the transportation industry in the future.

Landfill Gas to Energy: A Cooperative's Perspective

John McWilliams, Dairyland Power Cooperative

Landfill gas to energy projects offer electric utilities an opportunity to generate baseload energy that is cost effective and is considered as renewable energy. Dairyland Power Cooperative's Seven Mile Creek project came online in early 2004. Dairyland is currently planning to bring three additional landfill gas to energy projects online within the next 12 to 18 months. Each of the projects has faced regulatory, legislative, and technical issues that have threatened the viability of the projects.

A Comparison of the Relative Benefits of Nuclear and Renewable Energy

Michael Ropp, South Dakota State University

Nuclear energy and renewable energy share one thing in common – they both can produce electricity with little or no emission of greenhouse gases. There are several comparisons in the literature on nuclear vs. fossil fuels, and of renewable energy vs. fossil fuels, but there are very few thorough comparisons of nuclear energy and renewable energy technologies. People on the renewables side dismiss nuclear because of what they deem its "obvious shortcomings," and people on the nuclear side dismiss renewables, saying basically that they can't meet the need. In this presentation, this issue will be examined in more depth, and the optimal roles for both nuclear and renewable energy in our electricity mix will be explored.

Eastern Interconnection Phasor Project

Terry Bilke, Midwest ISO

This presentation will provide operations and engineering staff with an applications overview of phasor theory and technology. This will include background on current initiatives (particularly the EIPP sponsored by the Department of Energy) and the uses of this technology in grid operations and planning. Attendees will learn how to get more information on and become involved in this effort (to include how to gain access to the data and tools).

TUTORIAL - SUBSTATION COMMUNICATIONS

The tutorial on substation communications techniques presents a continuing series of topics which will help the substation engineer take advantage of the latest advances in communication technology. This year's tutorial consists of four presentations detailing the use of the Internet protocol in the utility environment. Presentation details are as follows:

Practical Communications Network Applications for Substation and Distribution Automation

Gary Roskos, Open Systems International, Inc.

This two-part presentation will discuss practical and flexible options for implementing modern communications networks for utility automation and information management.

Part 1: Network Planning and Strategic Considerations

Part 2: IP and IP/Serial Hybrid Networks and Overview of the Latest Generation of Open Communication and Security Products

Use of IEC Standards for Utility Communications

Dan Nordell, Xcel Energy

This presentation will discuss the use of recently adopted international standards for substation and control center communications and the emerging products which support them.

Bridging the Gap Between Legacy Serial Communication Networks and IP

Arturo Herrera, Microwave Data Systems

Electric utilities which are establishing new or expanding existing communications networks face several challenges. The networks must support current applications and services and integrate with existing infrastructure while accommodating future growth and technology and must do so cost effectively and reliably. They must combine industrial and corporate network infrastructures, provide a high level of cyber security, and provide services to both IP and proprietary serial protocols. This presentation will present ideas for migrating from legacy networks to the emerging world of Internet protocol devices.

LOCATION AND ACCOMMODATIONS

The conference will be held at the Continuing Education and Conference Center, 1890 Buford Avenue, on the St. Paul campus of the University of Minnesota. Parking is available adjacent to the Center in lot S104 for \$5.00 per day and in the Fairground lot S108 for \$3.25 per day. Please see map for details.

Convenient lodging for out-of-town participants is available at the Four Points Sheraton Hotel Minneapolis, 1330 Industrial Boulevard, Minneapolis, 612-331-1900 or 1-800-325-3535. The rate is \$84, plus tax, for a single or double room. Participants are responsible for making their own lodging reservations. To receive the special conference rate, please identify yourself as a participant of the Minnesota Power Systems Conference. Reservations must be made by October 9. After this date reservations will be accepted on a space and rate available basis.

REGISTRATION AND FEES

The fee for the conference is \$225 if received by October 17; if received after October 17 the fee is \$250. The conference fee includes all sessions, two luncheons, refreshment breaks, the exhibitor reception, and the conference proceedings. You are encouraged to register early to take advantage of the lower fee. If you cancel your registration by October 25, 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.

EXHIBITOR RECEPTION

The exhibitor reception will be held on Tuesday, November 1, from 4:15-6:00 p.m. at the Continuing Education and Conference 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.

CONTINUING EDUCATION UNITS (CEUs)

Participants who attend the entire conference will receive 1.6 CEUs. Participants who attend only Tuesday and Wednesday will receive 1.3 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.

FOR FURTHER INFORMATION

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CALL FOR PAPERS FOR 2006 CONFERENCE

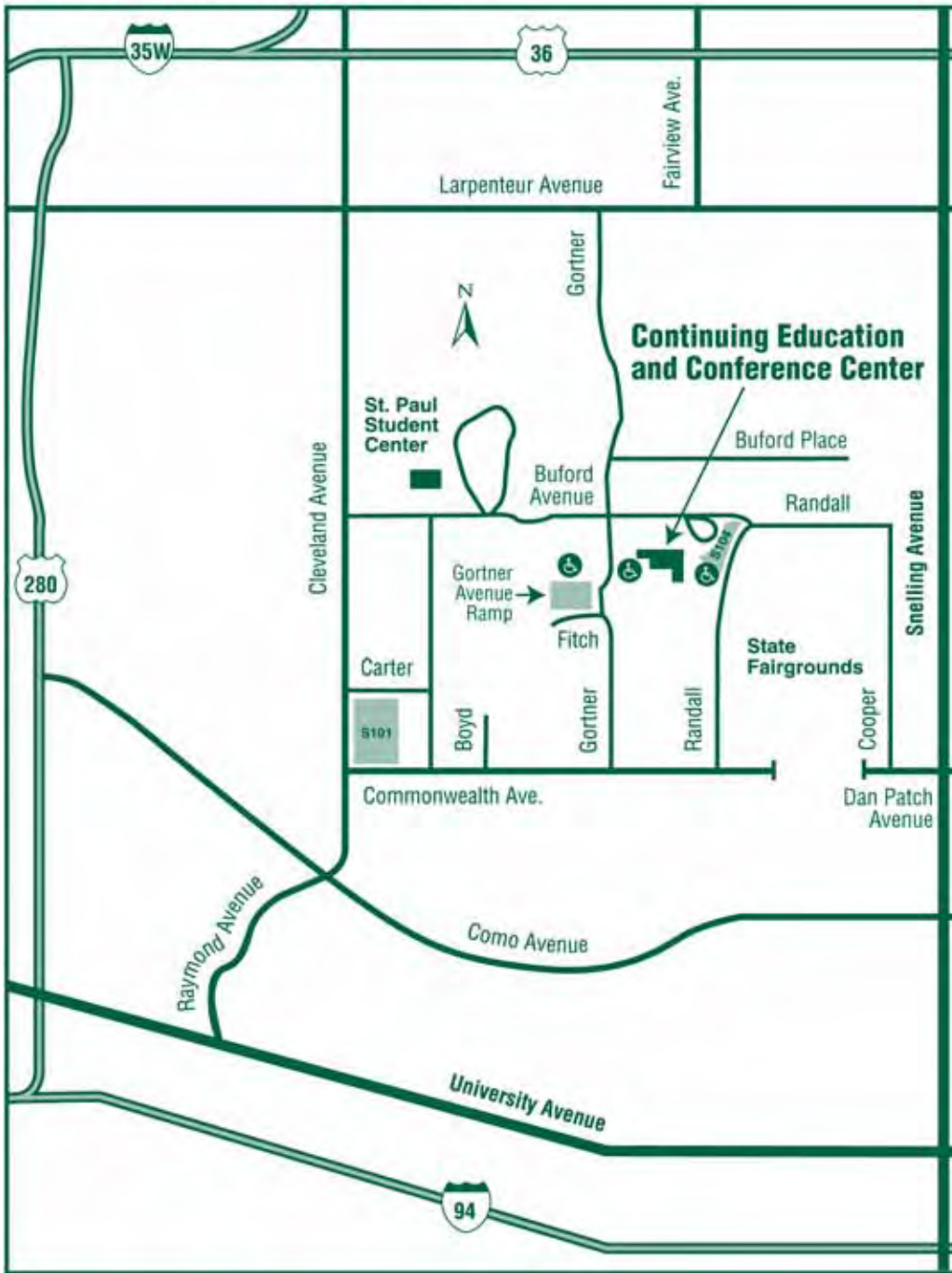
Deadline for title and abstract submission for MIPSYCON 2006 is *January 10, 2006*. Notification of acceptance will be mailed by *June 2006*. The deadline for final paper submission for accepted speakers is *August 31, 2006*.

If you would like to be considered for the 2006 program, please submit an abstract of approximately 300 words to: Kay Syme, College of Continuing Education, University of Minnesota, 352 Classroom Office Building, 1994 Buford Avenue, St. Paul, Minnesota 55108, E-mail: conferences4@cce.umn.edu.

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- = Parking facilities
- ♿ = Handicapped access and parking

Directions

From I-694: Take 35W south to the Cleveland Avenue exit (Note: exit to the left). Follow Cleveland Avenue to Larpenteur Avenue. Go east (left) on Larpenteur to Gortner, turn south (right) on Gortner and go to Buford Avenue. Turn east (left) on Buford Avenue.

From I-35W: Take the Highway 36 exit and turn south on Cleveland Avenue to Larpenteur Avenue. Go east (left) on Larpenteur to Gortner, turn south (right) on Gortner and go to Buford Avenue. Turn east (left) on Buford Avenue.

From downtown St. Paul: Go west on I-94 to Snelling Avenue. Go north on Snelling Avenue to Larpenteur Avenue. Go west (left) on Larpenteur to Gortner, turn south (left) on Gortner and go to Buford Avenue. Turn east (left) on Buford Avenue.

From downtown Minneapolis: Go east on I-94 to MN-280, exit number 236. (Note: exit to the left). Merge onto MN-280 north. Exit at Larpenteur Avenue. Take Larpenteur east (right) to Gortner (3rd traffic light). Turn south (right) on Gortner and go to Buford Avenue. Turn east (left) on Buford Avenue to the parking area.



2005 MIPSYCON PLANNING COMMITTEE

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**Planning Committee Chair*

41st Annual Minnesota Power Systems Conference

November 1-3, 2005

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

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Enclosed is \$225 in full payment of the conference registration fee (received by October 17).

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