



Mike Terbrueggen, CEO, O-T-S



Mike Terbrueggen is the CEO and Principal Engineer at Operations-Training-Solutions, which he founded in 1994. He designs, develops, and delivers advanced training seminars, develops training programs

and materials, and provides consulting services for power operations and engineering personnel.

Mike received his undergraduate degree in Electronics Engineering from the University of Michigan (Go Blue!) and his graduate degree in Power Engineering from the University of Colorado.

Mike was born in Detroit, Michigan. After high school, he entered the U.S. Army and was stationed at Fort Carson, Colorado. He was in the 4th infantry with the 4th Combat Engineers. Mike has two daughters, one son, and four grandchildren. He lives in Longmont, Colorado, where he enjoys golf, music, and home improvement projects in his spare time.

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Operations-Training-Solutions and Otter Tail Power Company are recognized by the North American Electric Reliability Corporation as a continuing education provider that adheres to NERC Continuing Education Program Criteria.

2024

Dynamics of Power System Disturbances

HOSTED BY



Primary Business Address
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May 6-9, 2024

Arrowwood Resort
Alexandria MN

2024 Dynamics of Power System Disturbances

Presented by Mike Terbruggen, CEO, O-T-S

Course Description: Using FERC, NERC, regional entity and involved company disturbance reports, Mike will step through and describe the "Sequence of Events" during actual power system disturbances. Please see daily agenda below for more detailed information.

O-T-S is recognized by the North American Electric Reliability Corporation (NERC) as a continuing education provider and this class has been approved through NERC's ILA process. Students who complete this course, with a passing score on the class assessment, will be awarded 32 Continuing Education Hours (CEHs) in the NERC SOCCED.

Course Schedule

Monday May 6, 2024

0800 - 1700

- Focus on industry tools past and present. Importance of recovering ACE following a generation loss. Single points of failure in Protection Systems and the roll of an RC during a major disturbance. Discuss results from incorrect generation dispatch orders, examine the event.
- Step through & describe the sequence of events during the 11/9/1965 disturbance event in the northeastern portion of the Eastern Interconnection.
- Step through & describe the sequence of events during the 2/14/2008 disturbance event @ the Huntington generator in the Western Interconnection.
- Step through & describe the sequence of events during the 11/09/2016 California ISO event in the Western Interconnection.

Tuesday May 7, 2024

0800 - 1700

- Discuss the mechanics behind the formation of islands during disturbances and illustrate oscillatory instability by using actual plots of transmission line flows. Discuss situational awareness, Transmission loadability rules, and the relationship between Voltage Control and Angle Stability.
- Step through & describe the sequence of events during the 8/14/2003 disturbance event in the Eastern Interconnection.
- Step through & describe the sequence of events during the 7/02/1996 & 8/10/1996 disturbance events in the Western Interconnection.
- Step through & describe the sequence of events during the 3/13/1989 disturbance event in the Quebec Interconnection.

Wednesday May 8, 2024

0800 - 1700

- Discuss the importance of recovering rapidly from an IROL exceedance, the impacts of unexpected operation or relays during events. Discuss the consequences of incorrect assumptions of CB positions and the dangers associated with voltage phase angle grown during extended faults.
- Step through & describe the sequence of events during the 6/25/1998 disturbance event in the MAPP (now MRO) area of the Eastern Interconnection.
- Step through & describe the sequence of events during the 6/14/2004 disturbance event in the Arizona area of the Western Interconnection.
- Step through & describe the sequence of events during the 2/26/2008 disturbance event in the Florida area of the Eastern Interconnection.

Thursday May 9, 2024

0800 - 1700

- Discuss the importance of testing and understanding the operation of RAS. Description of ERCOT, SPP & MISO power systems and their operations and the importance of coordination between Reliability Coordinators.
- Step through & describe the sequence of events during the 9/8/2011 disturbance event in the southwest corner of the Western Interconnection.
- Step through & describe the sequence of events during 10 disturbance events that involved Photo-Voltaic (PV) inverter based resources (IBRs).
- Step through & describe the sequence of events within the ERCOT, SPP & MISO Systems during the February 2021 Extreme Cold Weather Event.

Registration

NAME

COMPANY

BILLING ADDRESS

PHONE

EMAIL

NERC CERT#

Fee: \$1,200.00 per attendee
(Includes hotel breakfast, breaks, and lunches)

Method of payment: Bill me Check

Hotel accommodations:
Arrowwood Resort and Conference Center

866-386-5263
2100 Arrowwood Lane NW
Alexandria, MN 56308

A block of 15 rooms has been held from Sunday-Thursday for the week. Rooms are blocked under **Otter Tail Power Company Training**.

Room rate:
\$99.00 for Otter Tail Power Company block.
Government rate available upon request.

To register, email this form or contact:

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