

Introduction to Stray Voltage

May 3, 2016

Stray Voltage Testing

May 4-5, 2016

Advanced Stray Voltage

May 5-6, 2016

WE Energies Service Center
1300 Janesville Avenue
Fort Atkinson, Wisconsin 53538

Developed by

University of Wisconsin Biological Systems
Engineering Department

Public Service Commission of Wisconsin

Wisconsin Department of Agriculture, Trade and
Consumer Protection

The series of stray voltage investigators' courses have been redesigned to reduce time in the classroom and improve knowledge retention by combining web-based instructional modules with our classroom sessions. You will review basic materials at home before attending the course. When you enroll for a course you will be sent instructions on accessing the web-based instructional material. You will need to successfully complete these instructional modules before attending the classroom session. Each instructional module will have a short quiz to test your knowledge. After the classroom session, you will take a "final exam" online.

Course Organizers and Instructors:

Brian Costello is a Senior Agricultural Representative for Alliant Energy. As a stray voltage investigator, Brian has conducted more than 350 investigations in his 10 years at Alliant Energy. He has been assisting with the Stray Voltage Investigator Training classes for the past 6 years.

Robert Fick, PhD, PE, is Lead Agricultural Engineer at Alliant Energy and adjunct professor of Biological Systems Engineering at the University of Wisconsin. He has helped develop stray voltage rules and protocols for the State of Michigan and has taught stray voltage classes at Michigan State University and the University of Wisconsin for the last 20 years and helped develop the Wisconsin Farm Wiring Classes.

Paul Ortmann is a Senior Electrical Engineer with Idaho Power Company. He has been involved in the investigation of stray voltage for several years, and has taught classes on stray voltage in Wisconsin, Minnesota, and Idaho. Paul has also been involved in the development of stray voltage rules and investigation protocols.

Douglas J. Reinemann, PhD is professor of Biological Systems Engineering at the University of Wisconsin-Madison. He has Extension, research and teaching appointments in the areas of machine milking and rural energy issues. He has conducted research and educational programs on stray voltage since 1990.

Tom Seidl is a Principle Engineer with WE Energies, a Wisconsin utility. In the course of his duties, he has been conducting stray voltage investigation and analysis for over 25 years. He has been involved in stray voltage investigator training for the last 15 years, and participated in the development of the training class for electricians participating in Wisconsin's Farmstead Rewiring Program. He is a Registered Professional Engineer in the State of Wisconsin.

Introduction to Stray Voltage May 3, 2016

The introductory course is for those new to the topic of stray voltage. It is designed to give dairy producers and agricultural professionals a basic understanding of stray voltage sources and solutions and includes a demonstration of simple spot check measurements for stray voltage.

COURSE TOPICS INCLUDE:

- ◆ Basic Electrical Knowledge
- ◆ Utility and Farm Circuits
- ◆ Review of Animal Research
- ◆ Stray Voltage Rules and Regulations
- ◆ Voltage Spot Checks

COURSE SCHEDULE:

May 3: 8:00 am - 5:00 pm - Lunch and Dinner included

Stray Voltage Testing May 4-5, 2016

The testing course is designed to give the professional stray voltage investigator the tools required to collect the data required for a complete stray voltage investigation. Students will gain an understanding of the farm and utility circuits associated with stray voltage and measurement techniques to determine the sources of voltage and current on a farm. This course includes farm visits and a hands-on exercise during which the student will work with an experienced stray voltage investigator and perform all of the standard measurements of a stray voltage investigation.

COURSE TOPICS INCLUDE:

- ◆ Review of Electrical Calculation Methods
- ◆ Stray Voltage Circuits and Sources
- ◆ Agricultural Electrical Code
- ◆ Customer Relations
- ◆ Stray Voltage Measurement Tools
- ◆ Measurement Techniques and Data Recording
- ◆ Hands-On Stray Voltage Investigation in Small Groups, and Data Analysis

COURSE SCHEDULE:

May 4: 8:00 am - 5:00 pm - Lunch and Dinner included

May 5: 8:00 am - 12:00 pm - Lunch included

Advanced Stray Voltage - May 5-6, 2016

This advanced course is designed to develop analytical skills of the experienced stray voltage investigator. It is designed to give the professional stray voltage investigator detailed technical information for a complete stray voltage investigation, including determination of sources and mitigation methods.

The program draws upon extensive field experience gained by the Public Service Commission of Wisconsin, electric power suppliers, and nationally recognized experts. This is an interactive course that is focused on circuit analysis and small group evaluation of data from actual stray voltage investigators. Students will work in small groups with an experienced investigator to do a case study and use the analysis tools presented in the course.

Over 500 stray voltage investigators have attended this course. A new module has been added to give participants hands-on-experience with the latest electrical test equipment for high frequency measurements.

*** On the first day, we will join students in the Stray Voltage Testing class since many of the topics overlap.**

COURSE SCHEDULE:

May 5: 8:00 am - 5:00 pm - Lunch included and Dinner is on your own

May 6: 8:00 am - 12:00 pm

COURSE TOPICS INCLUDE:

- ♦ **Utility Service Transformations**
- ♦ **Factors Contributing to Stray Voltage from Utility Systems**
- ♦ **Electrical Code Update for Agricultural Buildings**
- ♦ **Factors Contributing to Stray Voltage from the Farm Wiring System**
- ♦ **Advanced Measurement Techniques and Source Determination**
- ♦ **High Frequency Measurement Equipment and Methods**
 - ♦ Capabilities of Various Commercial Stray Voltage Measuring Devices
 - ♦ Use and Misuse of Data Loggers for Stray Voltage Investigations
 - ♦ Interpreting Field Data
- ♦ **Special Stray Voltage Mitigation Techniques**
- ♦ **Review of Research**
 - ♦ Low Level Contact Voltage and Animal Health
 - ♦ High Frequency Events and Animal Responses
- ♦ **Review of International Research Publications**
- ♦ **Case Studies - Small Group Exercise with Experienced Investigator**
- ♦ **Case Study Reports and Discussion**

General Information

REGISTRATION FEES:

**Introduction to Stray Voltage \$150
\$200 if registered after April 25, 2016**

Fee includes registration, materials, breaks, lunch and dinner.

**Stray Voltage Testing \$350
\$400 if registered after April 25, 2016**

Fee includes registration, materials, breaks, lunch on Wednesday and Thursday and dinner on Wednesday

**Advanced Stray Voltage Analysis \$350
\$400 if registered after April 25, 2016**

Fee includes registration, course materials, breaks and lunch on Thursday

Make checks payable to: UW-Madison.

Class sizes will be limited to 40 registrants.

Registration will be filled on a first come/first served basis. Information will be emailed to confirm your registration.

Mail to: CALS Conference Services, 640 Babcock Drive, Madison, Wisconsin 53706 or FAX your registration form to (608) 262-5088.

Online: <http://www.cals.wisc.edu/ccs/CurrentPrograms.html>

Please advise us at the time of registration if you have a disability and desire special accommodations. Requests will be kept confidential.

COURSE LOCATION: WE Energies Service Center, 1300 Janesville Avenue, Fort Atkinson, WI 53538

LODGING OPTIONS: Americas Best Value-Courtyard Inn, 1225 Janesville Avenue, Fort Atkinson, (920) 563-6444.

Holiday Inn Express, 1680 Madison Avenue, Fort Atkinson, (920) 563-3600.

Please make your own hotel reservations by calling the hotel of your choice.

CANCELLATIONS/REFUNDS: If you are unable to attend, please notify CALS Conference Services immediately at (608) 263-1672. To receive a full refund, you must contact CALS Conference Services seven days before the course starts. After that date, a \$75 cancellation fee will be charged. If you fail to cancel, no refund will be granted.

Registration Form

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640 Babcock Drive
Madison, Wisconsin 53706
Fax: (608) 262-5088

ONLINE: <http://www.cals.wisc.edu/ccs/CurrentPrograms.html>

Fill out a **separate** registration form (or copy) for each registrant. *Print clearly or type*

Name _____

Company _____

Address _____

City/State/Zip _____

Daytime Phone _____

Email _____

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\$400 if registered after April 25, 2016**

**Advanced Stray Voltage Analysis \$350
\$400 if registered after April 25, 2016**

Enclose fee. Payment must be made at time of registration.

Make checks payable to UW-Madison.

Please charge to the following account:

Visa MC AMEX DISC

Expiration Date _____

Credit Card # _____

Name on Card _____

Signature _____