University of Wisconsin-Madison
College of Agricultural & Life Sciences

CALS Conference Services
620 Babcock Drive
Madison, Wisconsin 53706

Introduction to Stray Voltage

May 12, 2009

Arlington Agricultural
Research Station
Arlington, Wisconsin

Stray Voltage Testing

May 13-14, 2009

Arlington Agricultural
Research Station
Arlington, Wisconsin

Advanced Stray Voltage Analysis

October 28-29, 2009

The InnTowner Hotel (Best Western)
Madison, Wisconsin

Developed by

University of Wisconsin
Biological Systems Engineering Dept.

Public Service Commission of Wisconsin

Wisconsin Department of Agriculture,
Trade and Consumer Protection

Printed on recycled paper

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" on-line.

Course Organizers and Instructors

Mark Cook is state certified as a Master Electrician and Commercial Electrical Inspector. He is a manager at the Public Service Commission of Wisconsin and is a member of the Rural Energy Management Council's Board of Directors. Mark was a member of Wisconsin's Stray Voltage Task Force in 1986 and 1987 and has been in the electrical industry for over twenty-nine years.
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. For more information about Dr. Reinemann's research visit his web page www.uwex.edu/uwmril.
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.

Introduction to Stray Voltage
Arlington Agricultural Research Station
May 12, 2009

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 12: 8:00 am - 5:00 pm - Continental Breakfast and Lunch Included (Breakfast at 7:00 am)

Location

Arlington Agricultural Research Station
N695 Hopkins Rd., Arlington, WI 53911
Phone: 608-846-3761; Fax: 608-846-3920

Lodging

A block of rooms has been reserved at the Days Inn in DeForest, WI (608) 846-7473. The block will be held until April 12, 2009. To receive the conference room rate ($54/single or double), mention that you will be attending the Stray Voltage Training Course.

Other Instructors

Jim Biesterveld, Dunn Energy Cooperative
Pete Enstrom, WE Energies
Robert Fick, PhD, PE, Alliant Energy
Chuck Forster, PE, Phasor Labs
Dave Hansen, WDATCP
Roger O'Neil, Xcel Energy
Mike Paffel, Xcel Energy
John Roberts, DVM, WDATCP

Stray Voltage Testing
Arlington Agricultural Research Station
May 13-14, 2009

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 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 13: 8:00 am - 5:00 pm - Continental Breakfast, Lunch and Supper Included (Breakfast at 7:00 am, Supper at 6:00 pm)
May 14: 8:00 am - 5:00 pm - Breakfast and Lunch Included (Breakfast at 7:00 am)

Lodging

A block of rooms has been reserved at the Days Inn in DeForest, WI (608) 846-7473. The block will be held until May 12, 2009; after that date the rooms will be sold on a first request basis. To receive the conference room rate ($54/single or double), mention that you will be attending the Stray Voltage Training Course.

Advanced Stray Voltage Analysis
The Best Western InnTowner Hotel
October 28-29, 2009

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.

Location

Best Western InnTowner Hotel
2424 University Avenue
Madison, WI 53705
(608) 233-8778
A block of rooms has been reserved at the InnTowner Hotel ($92.00). The block will be held until September 28, 2009; after that date the rooms will be sold on a first request basis. To receive the conference room rate, mention Group Code VOLTAGE when making your reservation.

Instructors

See course organizers and instructors

Coordinators

Roger Kasper, Wisconsin Department of Agriculture, Trade & Consumer Protection

Lorna Vinger, Public Service Commission of WI

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**

Course Schedule

October 28
8:00 am - 5:00 pm - Breakfast, Lunch and Supper Included (Breakfast at 7:00 am, Supper at 6:00 pm)

October 29
8:00 am - 5:00 pm - Breakfast and Lunch Included (Breakfast at 7:00 am)

General Information

Registration Fees

Introduction to Stray Voltage $175
$150 if registered before April 21, 2009
Fee includes registration, conference materials, breaks and lunch.

Stray Voltage Testing $350
$300 if registered before April 22, 2009
Fee includes registration, conference materials, all breaks, breakfast, lunch and supper on Wednesday, and breakfast and lunch on Thursday.

Advanced Stray Voltage Analysis $500
$450 if registered before September 24, 2009
Fee includes registration, conference materials, all breaks, lunch and supper on Thursday, and breakfast and lunch on Friday.

Make checks payable to: **UW-Madison**.
Class size will be limited to 30 registrants.
Registration will be filled on a first come/first served basis.
Information will be sent to confirm your registration and provide detailed information on location, class schedule and accommodations.

Mail to: CALS Conference Services, 620 Babcock Drive, Madison, Wisconsin 53706 or FAX your registration form to (608) 262-5088.

Online: www.peopleware.net/2723

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

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.

Continuing Education Units

This course meets criteria for the nationally accepted Continuing Education Unit. To obtain a copy of your CEU transcript, call (608) 262-6215.

Registration Form

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May 13-14, 2009

Advanced Stray Voltage Analysis
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MAIL/FAX TO: CALS Conference Services
620 Babcock Drive
Madison, Wisconsin 53706
Fax: (608) 262-5088

ONLINE: www.peopleware.net/2723

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

Name _____

Company _____

Address _____
Home or Business

City/State/Zip _____

Daytime Phone _____

Email _____

☐ **Introduction to Stray Voltage $175**
$150 if registered before April 21, 2009

☐ **Stray Voltage Testing $350**
$300 if registered before April 22, 2009

☐ **Advanced Stray Voltage Analysis $500**
$450 if registered before September 24, 2009

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

Make checks payable to **UW-Madison.**

Please charge to the following account:

Visa _____ Mastercard _____ Expiration Date _____

Credit Card # _____

Name on Card _____

Signature _____

☐ **I cannot attend but please add my name to the Stray Voltage mailing list.**