



Department of Energy



Energy Facility Contractors Group



2008 ELECTRICAL SAFETY MEETING & WORKSHOP

July 28- August 1

Golden, CO

Hosted by National Renewable Energy Laboratory



Nestled at the base of the Rocky Mountains just south of Boulder, Colorado, is NREL's National Wind Technology Center (NWTTC), the U.S. Department of Energy's (DOE's) premier wind energy research and development facility.

Event Details:

The 2008 Annual *DOE/EFCOG Electrical Safety Meeting and Workshop* will be held at the Denver Marriott West. The event is a forum for identifying best practices and procedures to improve electrical safety practices within the DOE complex. It is designed for safety professionals, electrical engineers, electricians, technicians, electrical inspectors, electrical trainers, and other personnel involved in electrical safety.

Registration Website:

www.lanl.gov/orgs/hsr/electrical_safety/

Meeting & Workshop Contacts

General Meeting Chair: Sal Sferrazza (sal_sferrazza@nrel.gov)

Technical Program Chair: Jackie McAlhaney (jackie.mcalhaney@srs.gov)

Workshop Chair: Lloyd Gordon (lbgordon@lanl.gov)

Registration Chair: David Glickson (david_glickson@nrel.gov)

Schedule of Events

Monday	1:00-4:30	<i>NFPA 70B, Short Seminar on Electrical Equipment Maintenance, James Stallcup</i>
Tuesday	7:30-8:00 8:00-8:15 8:15-8:45 8:45-9:15 9:15-9:45 9:45-10:00 10:00-10:15 10:15-11:30 11:30-1:00	Registration Welcome Kickoff, NREL Site Manager <i>DOE Electrical Safety Update, Frank Russo</i> <i>EFCOG Initiatives Update, Lloyd Gordon</i> Morning Break <i>DNFSB Comments, Ajit Gwal</i> <i>Working on Live Parts, Ken Mastrullo</i> Lunch Break
	1:00-2:30 2:30-2:45 2:45-4:00 4:00-5:00	<i>Arc Flash PPE Advances, Hugh Hoagland</i> Afternoon Break <i>Lightning Safety, James Stallcup</i> <i>R&D Electrical Safety Standards Needs, Lloyd Gordon</i>
Wednesday	7:30-8:00 8:00-9:30 9:30-10:00 10:00-10:15 10:15-11:30 11:30-1:00	Coffee & Juice <i>NFPA 70E 2009 Proposals, Bobby Gray</i> <i>UL Electrical Safety Initiatives</i> Morning Break <i>Electrical Equipment Safety Advances, Skip Hicks</i> Lunch Break
	1:00-1:30 1:30-4:30	Introduction to Workshop Topics, Lloyd Gordon Select one of the following workshops to attend: <ul style="list-style-type: none"> • <i>Arc Flash Calc, Mark McNellis and Jackie McAlhaney</i> • <i>CFR 851 Issues, Bryan Drennan</i> • <i>DOE Elec Safety Handbook, Bobby Gray</i> • <i>DC Systems, Keith Gershon</i> • <i>Severity Measurement Tool, Lloyd Gordon</i>
Thursday	7:30-8:00 8:00-11:30 11:30-1:00 1:00-3:00 3:00-4:30 4:30-5:00	Coffee & Juice <i>Workshop Continues</i> Lunch Break <i>Workshop Continues</i> <i>Workshop Presentations</i> <i>Closing Comments and Future Plans</i>
Friday	7:30-8:00 8:00-10:00 10:00-12:00	Coffee & Juice <i>Advances in DC Arc Flash Testing, Dr. P.K.Sen</i> <i>Guided Tour: National Wind Technology Center (NWTC) Boulder, CO, Sal Sferrazza</i>

Featured Presenters

NFPA 70B, Electrical Equipment Maintenance



James Stallcup, Founder and CEO of Grayboy, Inc., is a noted authority in the electrical field and author of *Stallcup's® Electrical Equipment Maintenance Simplified*. This presentation focuses on the rules and regulations contained in NFPA 70B, *Recommended Practice for Electrical Equipment Maintenance, 2007 Edition*. James will provide recommended practices and guidelines for implementation of safe and effective preventive maintenance of industrial electrical systems.

Electrical Arc Flash Personal Protective Equipment Advances



Hugh Hoagland, electrical arc testing and safety expert, has developed legislation and standards in both the US and Europe and serves on several industry committees. He developed most of the arc-resistant rainwear used in the world today as well as creating the first face shield to protect against electric arcs. Hugh will provide an informative update on fire retardant fabric and personal protective equipment testing.

Working On or Near Live Parts

Ken Mastrullo, Regional Coordinator for Region 1 OSHA and author of Handbook for Electrical Safety in the Workplace, will provide an overview of the rules, regulations, and best practices that should be employed when working on or near live parts. The subject matter to be covered includes the hierarchy rules on determining when it is permitted to work on live parts, determining the analysis schemes utilized to identify the hazards and the magnitude of the exposure to the worker, and determining how to select the proper PPE to perform a specific task. Ken will also provide time for electrical safety questions with regards to OSHA requirements and interpretations.

DC Arc Flash Testing Update

Dr. P. K. Sen, Professor of the Power Systems Engineering Research Center at the Colorado School of Mines and Project Manager for The IEEE/NFPA Arc Flash Collaborative Research and Testing Project, will present a status and provide some preliminary results on DC voltage arc flash testing. As project manager, Dr. Sen oversees all day-to-day activities of this multi-year initiative to gain greater understanding of electrical arc flash and arc blast hazards and how to protect workers against them. Over 2,000 test protocols will be used to measure thermal, pressure, sound, shrapnel, toxicity and radioactive phenomena generated in arc flashes, as well as how enclosures affect the energy released.

Advances in Arc Flash Mitigation

C. A. (Skip) Hicks, Square D Field Services Division, will discuss methods for reducing and mitigating arc flash hazards. Protecting employees from the hazards of Arc Flash has become increasingly important throughout industry today. With recent increased awareness of the dangers of Arc Flash, there are many companies that offer Arc Flash Personal Protective Equipment (PPE). Ensuring employees select proper PPE and then use it can be a daunting task. Often ignored are the methods of mitigating or even eliminating the AF Hazard through the proper design of equipment. This short seminar will discuss techniques that are available today not only for new systems being built but retrofit into existing systems.

NEC Article 708, Critical Operations Power Systems (COPS)

John Kovacik, Underwriters Laboratories, Inc., member of the Technical Correlating Committee for the 2008 NEC and Code Making Panel 10 (CMP), will discuss the new National Electrical Code Article 708 on Critical Operations Power Systems. Critical operations power systems are generally installed in vital infrastructure facilities, that if destroyed or incapacitated, would disrupt national security, the economy, public health or safety or where deemed necessary by the authority. John will discuss the risk assessment and testing and maintenance requirements to comply with this article.

EFCOG Initiatives Update

Lloyd Gordon, 2008 chair of the EFCOG Electrical Safety Task Group, will present the 2008 EFCOG electrical safety initiatives, including: Center of Excellence for Electrical Safety, DOE Electrical Safety Handbook, position papers on electrical safe work practices and code issues, support of electrical CFR 851 issues, and more.

R&D Electrical Safety Standards Needs

Lloyd Gordon, co-chair of the ISA Standards committee on High Power R&D Systems, will present needs and proposals for standards in R&D electrical safety system designs and safe work practices, including personnel safety devices, such as grounding sticks; automatic energy removal systems for capacitor banks; PPE for high voltage and capacitor bank work; shock boundaries for DC; arc flash calculations for DC and capacitors; and more.

NFPA 70E-2009 Major Changes

Bobby Gray, a principle member of the National Fire Protection Association 70E Committee and instructor for the NFPA Code seminars, will provide a summary of the major changes in the NFPA 70E 2009 edition. Attendees will learn about the advances in electrical safety as accepted by the NFPA 70E committee and will get an opportunity to ask questions about certain changes.

Workshop Topics: July 30 and 31

Electrical Safety Special Interest Area Workshops

All workshops begin Wednesday afternoon, continue through Thursday and conclude Thursday afternoon with final presentations. Final workshop presentations are for all workshop attendees and will include a facilitator summary of actions and next steps in these special interest areas. All attendees should select and participate in one of these interactive workshops

Workshop #1 - Arc Flash Calculations and PPE Selection

In this workshop we will review the methods of 60 Hz arc flash calculations, including those by hand, and with available software packages. Important topics to be discussed may include: labeling facility and programmatic equipment for arc flash hazards; comparing calculations to the task tables; choosing the right PPE for various

parts of the body; PPE in mixed hazard environments (e.g., respirators and arc flash); task based selection of PPE; arc blast issues; etc. The goal is to produce guidance for consistent methods for complex wide use, especially in areas not well covered by 70E and IEEE 1584.

Workshop #2 - CFR 851 Electrical Issues

In this workshop we will review common electrical 851 findings, including clearance violations, unused openings, unlisted equipment approval, etc.; review NTS electrical reports; discuss what are the “de minimus” thresholds; how to deal with legacy violations; and, how to flow down CFR 851 requirements to subcontractors. The goal is to produce guidance for the complex on what issues are of the highest priority; special problems and interpretations, etc.

Workshop #3 - DOE Electrical Safety Handbook

This workshop will begin with a review of the status and plan for the DOE Electrical Safety Handbook. An important topic will be the future of the handbook, including purpose, structure, organization, and a process for future revisions. The goal is to assist in the production of the current revision and to develop a process for future revisions.

Workshop #4 - DC System Electrical Hazards

This workshop will focus on the electrical hazards of DC systems, including R&D DC power supplies and battery banks. The working group will identify issues, such as DC shock boundaries, DC arc flash calculations, Uninterruptible Power Supply systems, etc. The goal is to produce guidance material for complex wide use and disseminate through the Center of Excellence website and the DOE Electrical Safety Handbook. Also, proposals for NFPA 70E submission will be discussed.

Workshop #5 - Electrical Severity Measurement Tool

This workshop will review results from the past two years of use of the Electrical Severity Measurement Tool. Topics include: experience in using the tool; any recommended changes; assisting HSS in getting the ORPs criteria revised; looking at complex wide trends using the tool; develop and improve user tools, such as training; and analyze root cause trends across the complex over the past 5 years using the tool. The goal is to assist in the revision of the ORPs criteria for electrical events, improve user tools and training, and report on complex wide trends.