

Electrical Safety and Equipment Inspections for Users

APS/Users Monthly Meeting

Bruce Glagola

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**Don't
Shoot
the
Messenger**



Recent Electrical Short Incident

- Involved A Specialty Experimental Apparatus In Use Since 2001
- Apparatus Had Been Modified Several Times
- User Was Not Familiar With Latest Modifications (No Instructions Or Labeled Connections)
- User Erroneously Decided He Had To Cut A Wire In Order To Disassemble Apparatus Prior To Moving It Into A Hutch
- User Planned To Reconnect Wire Ends After Reassembling Apparatus
- Moved Apparatus Into Hutch And Electrically Energized Part Of It – Erroneously Thought Cut Wire Was Fed Off A Different Portion

Recent Electrical Short Incident (cont'd)

- User Did Not Realize Cut Wire Was Now Energized
- Wire Subsequently Touched A Grounded Rack Causing A Short To Ground
- 2 Amp Fuse On Temperature Controller Blew And Circuit Breaker For Wall Outlet Tripped Open
- Users Present Removed Plug From Wall Outlet, Spliced The Wire, Replaced The Fuse, Reset The Circuit Breaker, And Again Energized Apparatus
- A 2nd User Present Recognized Event Was A “Near Miss”

Recent Electrical Short Incident (cont'd)

- The 2nd User Stated He Would Report “Near Miss” To Home Institute
- Neither Sector Personnel Nor APS Personnel Were Notified Of Short Circuit
- This Incident Occurred On February 16, 2006
- Final “Near Miss” Report Not Turned In Until March 23, 2006
- Sector Manager Was Then Contacted By Home Institute Regarding Incident
- This Was A Reportable Occurrence To DOE

Incident Lessons Learned

- Written Instructions And Labeling Connections Are Important
- Demonstrated Need For APS Staff To Better Communicate Current Requirements To Users
 - User Performed Electrical Work Without Being APS Qualified Or Authorized To Do So
 - Never Occurred To Him This Might Be Required
 - User Had Not Been informed This Was Required
- Demonstrated Need To Reinforce With Users That Sector Personnel And APS Staff Need To Be Notified When Such Events Occur

New APS User Safety Update

- Informs Users Of New Electrical Safety Requirements
 - Electrical Safety Awareness Training Now Required Even To Plug In A Piece Of Electrical Equipment (ESH377)
 - Electrical Safety Training Required To Perform Any Electrical Work (Even Cutting And Splicing A Wire) (ESH371)

- All Electrical Equipment Brought On Site Must Be Inspected By APS Unless It Has Been Labeled Or Tested By A Nationally Recognized Testing Laboratory – More On This

- Users Must Dial 911 To Report Injuries, Serious Illnesses, Or Hazardous Chemical Spills

- Users Must Report To A Floor Coordinator Or Sector Safety Coordinator All Events Involving “Near Misses” Or Incidents Where An Injury Could Have Easily Resulted

Electrical Inspection of Users Equipment

■ Why?

- The revised Argonne ES&H manual section 9.3 now stipulates that *“All electrical equipment and components, including research and development (R&D) equipment, must be labeled or listed by a nationally recognized testing laboratory (NRTL), or be examined and approved by a Designated Electrical Equipment Inspector (DEEI) prior to use. R&D equipment often is not NRTL-approved because of its unique nature.”* The inspections are required by NEC, OSHA, and DOE regulations.

■ Regulation References:

- NEC (NFPA 70): 110.2 and 110.3
- OSHA: 29CFR1910.303(a) and 29CFR1910.303(b)(2)
- NFPA 70E: 400.2 and 400.3

Electrical Inspection of Users Equipment

- What's involved?
 - A trained DEEI must inspect electrical equipment brought on to site by users.
 - Simply put, the rules are those of general good practice in instrument construction.

- Where can I get more information?
 - http://www.aps.anl.gov/Safety_and_Training/Electrical_Safety/index.html

- Do other National Labs have non-NRTL Inspection Programs?
 - Los Alamos, Brookhaven and SLAC have similar programs
 - Other Labs are in the process of setting up their programs

What needs to be inspected?

■ Does NOT Need Inspection:

- Electrical equipment and devices such as computer, lamps, tools, etc. that bear a listing mark or label from an OSHA recognized Nationally Recognized Testing Laboratory (NRTL) do not need to be inspected.
- Such laboratories include:
 - *UL (Underwriters Laboratory)*
 - *CSA (Canadian Standards Association)*
 - *FM (FM Global Technologies).*
 - *A full list of OSHA recognized labs appears at:*
 - <http://www.osha.gov/dts/otpca/nrtl/index.html#nrtls>
- Equipment that is rated <50 volts and has power consumption of under 1 kilowatt
- Equipment rated 50 volts or greater with current less than 5 milliamps and stored energy <10 joules

What needs to be inspected?

- DOES need inspection:
 - All other electrical/electronic equipment
 - Includes:
 - *Unlisted office equipment*
 - *Equipment that is “home built”*
 - If the device has no identified markings from any of the labs appearing on the OSHA list even if listed by another testing laboratory not on the list
 - If a piece of NRTL equipment is modified, the listing is voided
 - If a piece of previously inspected non-NRTL that has been modified

Organizations Currently Recognized By OSHA as NRTLs:

- **Applied Research Laboratories, Inc. (ARL)**
- **Canadian Standards Association (CSA)** (also known as CSA International)
- **Communication Certification Laboratory, Inc. (CCL)**
- **Curtis-Straus LLC (CSL)**
- **Electrical Reliability Services, Inc. (ERS)**
(also known as eti Conformity Services and formerly Electro-Test, Inc. (ETI))
- **Entela, Inc. (ENT)**
- **FM Global Technologies LLC (FM)**
(also known as FM Approvals and formerly Factory Mutual Research Corporation)
- **Intertek Testing Services NA, Inc. (ITSNA)** (formerly ETL)
- **MET Laboratories, Inc. (MET)**
- **NSF International (NSF)**
- **National Technical Systems, Inc. (NTS)**
- **SGS U.S. Testing Company, Inc. (SGSUS)** (formerly UST-CA)
- **Southwest Research Institute (SWRI)**
- **TUV America, Inc. (TUVAM)**
- **TUV Product Services GmbH (TUVPSG)**
- **TUV Rheinland of North America, Inc. (TUV)**
- **Underwriters Laboratories Inc. (UL)**
- **Wyle Laboratories, Inc. (WL)**

What information is available?

- The APS Safety and Training web page contains information about the inspections at:
 - http://www.aps.anl.gov/Safety_and_Training/Electrical_Safety/index.html

- This information includes:
 - Non-NRTL Equipment Inspections Frequently Asked Questions
 - Equipment Inspection Criteria
 - Non-NRTL Inspection Form
 - NRTL Inspection Form
 - Facility Electrical Equipment Approval Form
 - Electrical Systems Approval Form
 - Inventory Form for non-NRTL Facility Equipment
 - APS Designated Electric Equipment Inspectors
 - Who can become a DEEI?

How?

- Program run by Bruce Glagola
- Triggered by ESAF
 - Two locations on “Equipment” page
 - DEEIs will be notified of an ESAF with equipment to be inspected
- Current Inspectors:
 - Boris Deriy (ASD)
 - Chuck Doose (ASD)
 - Mark Gibson (AES)
 - Tom Hlavacik (XSD)
 - Lynn Ribaud (XSD)
- We will be training more inspectors (FCs and Beamline)
- Contact Bruce Glagola or a DEEI to arrange for an inspection

When

- Currently performing spot inspections
- Full program will go into effect at the end of the present run, 2006-01
 - 25th April 2006
- In order to be in place for the start of run 2006-02.
- More Information
 - http://www.aps.anl.gov/Safety_and_Training/Electrical_Safety/index.html