Office of Health, Safety and Security

Monthly Analysis of Electrical Safety Occurrences

December 2012

Purpose

This analysis resource provides the Department of Energy's (DOE) electrical safety community with a compilation of, and informal observations on, electrical safety occurrences reported through the Occurrence Reporting and Processing System (ORPS). The topics addressed in this analysis resource are responsive to requests for this information by the electrical safety community, who utilizes this information through monthly conference calls to foster information exchange and continual learning regarding electrical safety occurrences and their prevention across the DOE complex.

Key Observations

The number of electrical safety occurrences decreased from six in November to four in December. There were three reported electrical shocks and the number of reported lockout/tagout occurrences remained at one. There were no reported electrical intrusion occurrences in December. This is only the third month since November 2009 in which there were no reported electrical intrusion occurrences.

Electrical Safety Occurrences

The following sections provide a summary of selected occurrences based upon specific areas of concern regarding electrical safety (e.g., bad outcomes or prevention/barrier failures). The complete list and full report of the occurrence reports is provided in Attachment 2.

Electrical Shock

There were three reported electrical shocks in the month of December, which is an increase from two shocks in November. These occurrences are summarized below.

1. An engineer experienced a minor electrical shock in the left hand while troubleshooting a developmental electronic test box that was used on a piece of test equipment and sitting on a metal table. The engineer used a diode with long leads as a pointer to identify to a technician the electrical component the engineer believed to be defective while examining the box with the cover removed. The engineer felt a shock in his left hand which was on the table when the end of the diode he held in his right hand came into contact with a small capacitor located next to the component. The engineer was not injured.

2. An employee was holding a motor control cable in his left hand while reaching around a control cabinet to turn a controller off when his right hand brushed a portion of the cabinet or chassis and he felt a tingling sensation across his upper chest. The work was immediately stopped. Emergency responders arrived and the employee informed them he that he felt a bit woozy after the event. He was taken to the emergency room of a local hospital for evaluation and held overnight for observation. The stepper motor, controller, and electrical cabinet have been removed from service pending inspection and further investigation. Investigators so far have found a possible short inside a connector of the motor cable involving 48 volts. The connector has a metal housing and apparently was being held in the left hand of the employee when the shock was felt.

3. A machinist was operating an Electrical Discharge Machine (EDM) and experienced a minor electrical shock (57 volts) to the right arm when touching a dial indicator as the machine was operating. The machinist was evaluated by an occupational medical provider and returned to work without restriction. The EDM was taken out of service and electricity to the unit was locked and tagged out and a critique was scheduled..

Figure 1 shows a 3-year trend of electrical shocks for the DOE complex. During this period, the average number of electrical shocks has remained below three (2.6) shocks per month.

Figure 1 – Three-Year Trend of Electrical Shocks

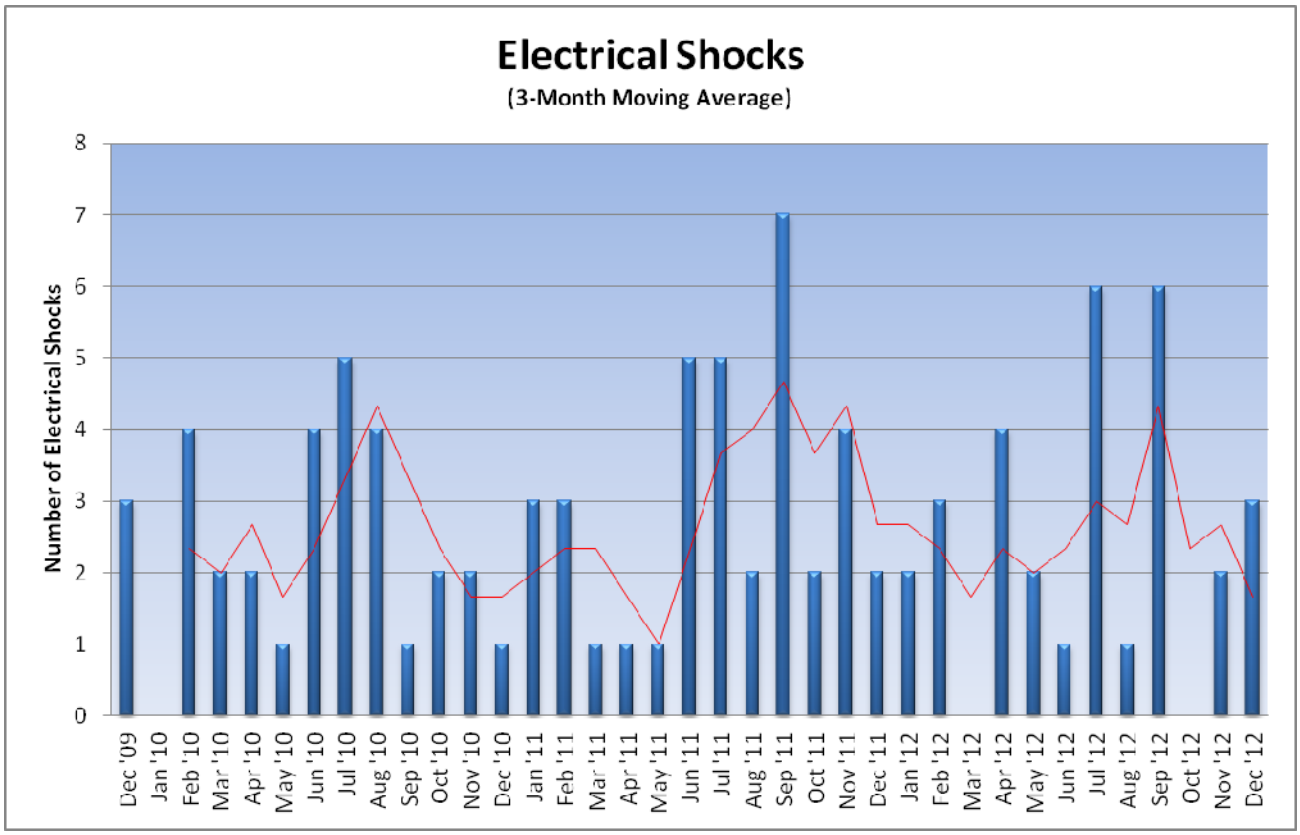


Figure 2 shows electrical shocks by worker type. The number of shocks involving electrical workers has slowly increased, while those involving non-electrical workers decreased after 2011. Since 2008, the majority of shocks (about 73 percent) involve non-electrical workers.

Figure 2 - Electrical Shock by Worker Type

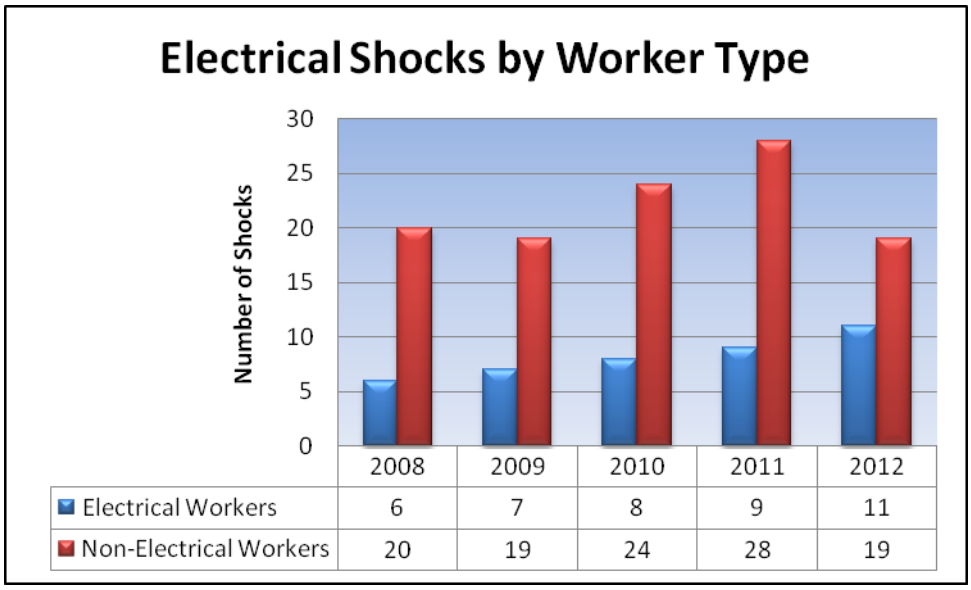
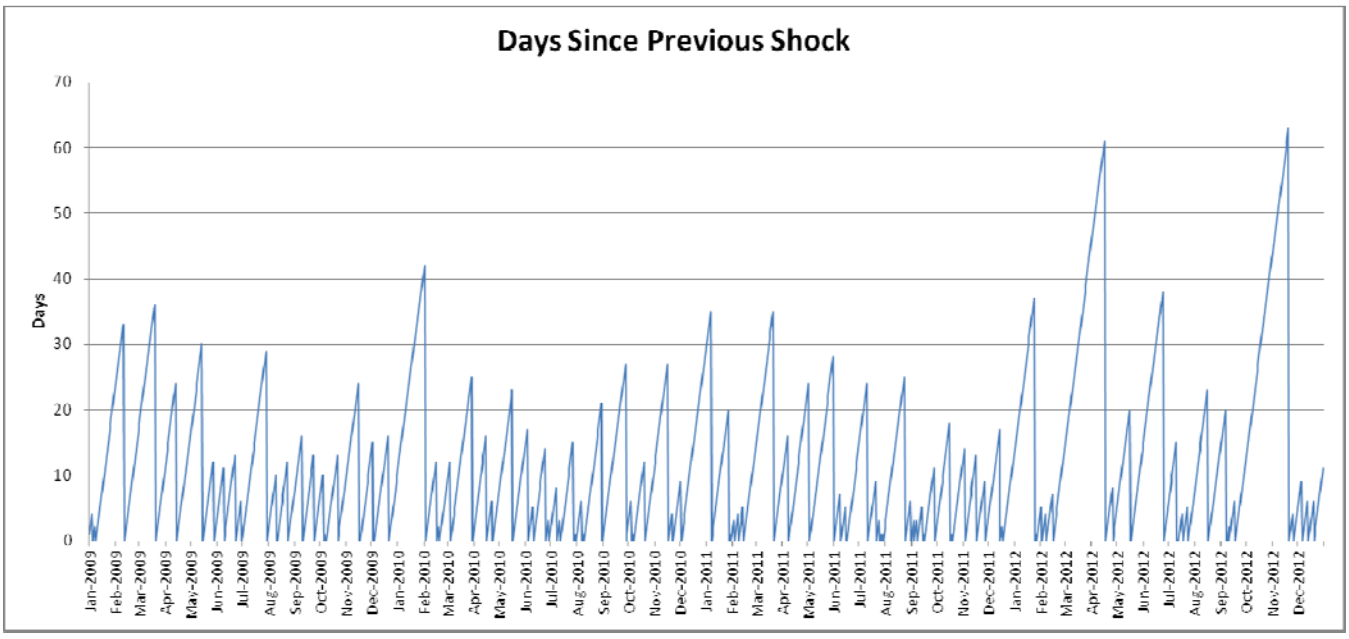


Figure 3 shows the number of days since the previous electrical shock for the DOE complex. The longest interval was 63 days (November 20, 2012) and the interval as of December 31, 2012 is 11 days.

Figure 3 - Days since Previous Shock

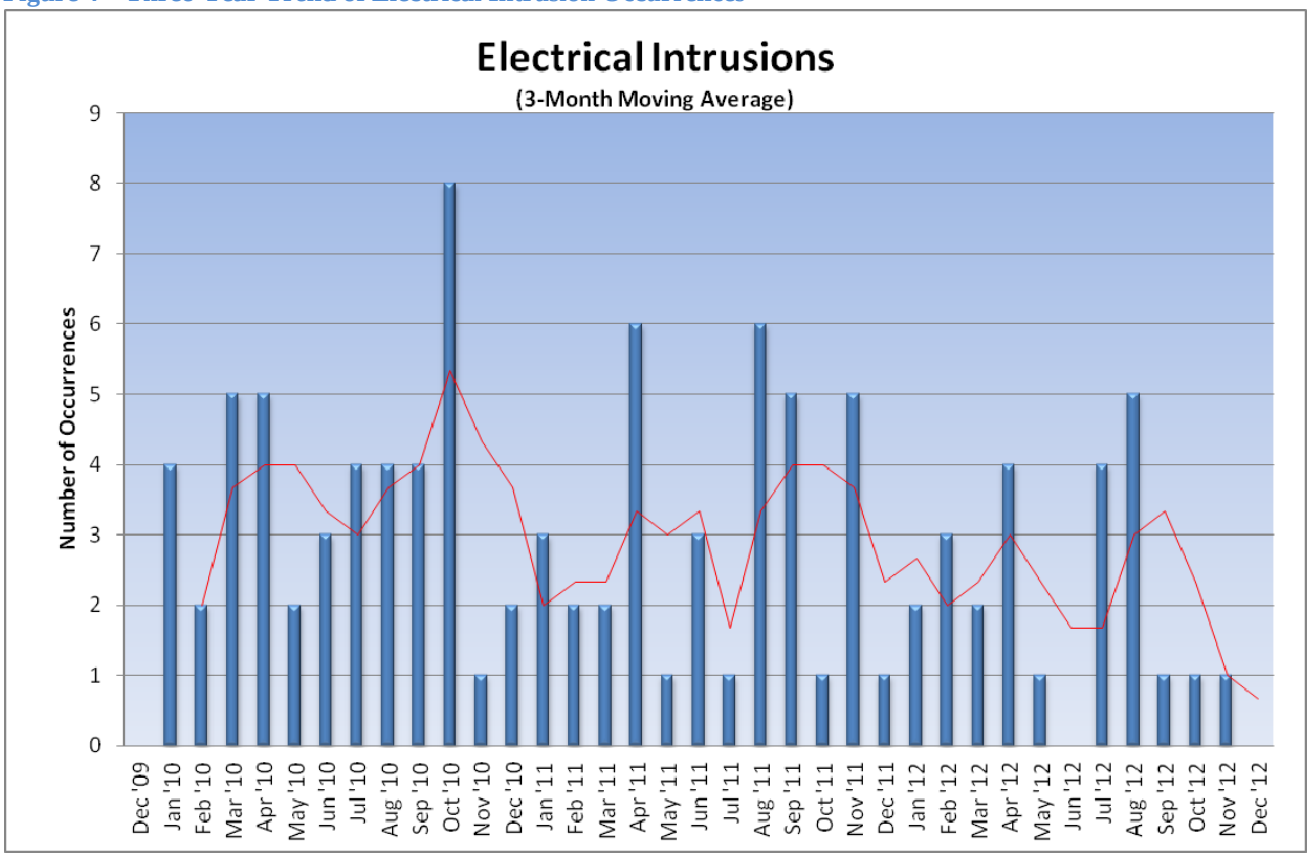


Electrical Intrusion

There were no electrical intrusion occurrences (i.e., cutting/penetrating, excavating, or vehicle/equipment contact of overhead electrical conductors) reported in December. This is only the third month since November 2009 in which there were no reported occurrences.

Figure 4 shows a 3-year trend of electrical intrusion occurrences for the DOE complex. During this period we have seen an average of just under 3 occurrences per month (2.9).

Figure 4 – Three-Year Trend of Electrical Intrusion Occurrences



Hazardous Energy Control

In December there was one reported occurrence involving lockout/tagout (LOTO), which is the same as November.

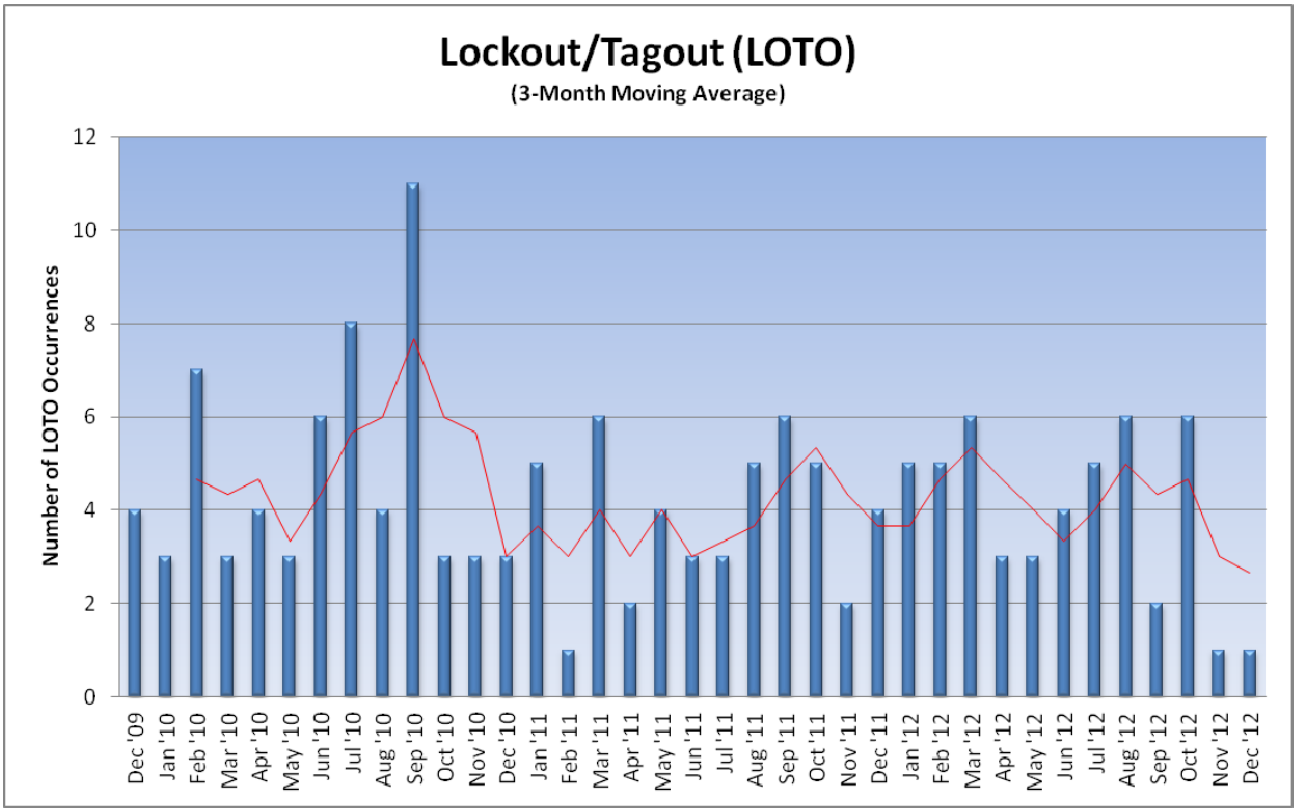
Occurrences Involving Lockout/Tagout

A lock and tag was placed on the wrong circuit breaker intended to isolate a power distribution panel. A subcontractor identified the presence of power in the electrical distribution panel during a safe to work check. During the critique, the controlling organization confirmed that the lock and tag was placed on the wrong circuit breaker and not in accordance with the written instructions. A critique was held.

This occurrence underscores the importance of conducting a safe to work check. The check identified the problem before any work had been performed that could have exposed workers to hazardous energy.

Figure 5 shows a 3-year trend of LOTO occurrences for the DOE complex. The monthly average is 4.2 occurrences.

Figure 5 – Three-Year Trend of Lockout/Tagout Occurrences



Electrical Near Miss

There were no reported near miss occurrences in December.

Monthly Occurrences Tables

Table 1 shows a breakdown of the outcomes, performance issues, and worker types associated with the electrical safety occurrences for December 2012.

Table 1 - Breakdown of Electrical Occurrences

Number of Occurrences (December)	Involving:	Last Month (November)
3	Electrical Shocks	2
0	Electrical Burns	0
1	Hazardous Energy Control (LOTO)	1
0	Inadequate Job Planning	0
0	Inadvertent Drilling/Cutting of Electrical Conductors	0
0	Excavation of Electrical Conductors	0
0	Vehicle Intrusion of Electrical	1

Number of Occurrences (December)	Involving:	Last Month (November)
	Conductors or Equipment	
0	Electrical Near Misses	2
2	Electrical Workers	2
2	Non-Electrical Workers	4
1	Subcontractors	5

NOTE: The numbers in the left-hand column are not intended to total the number of occurrences for the month and are only associated with the items in the center column.

In compiling the monthly totals, the search looked for occurrence discovery dates in this month [excluding Significance Category R (Recurring) reports] and for the following ORPS HQ keywords:

01K – Lockout/Tagout Electrical, 01M – Inadequate Job Planning (Electrical), 08A – Electrical Shock, 08J – Near Miss (Electrical), 12C – Electrical Safety

Table 2 provides a summary of the electrical safety occurrences for CY 2012. The present monthly average decreased from last month's value of 12.2/month. The average number of occurrences a year ago (December 2011) was 11.3/month. The average number of electrical shocks for the last nine years has been 29 and the average number of electrical safety events has been 143.

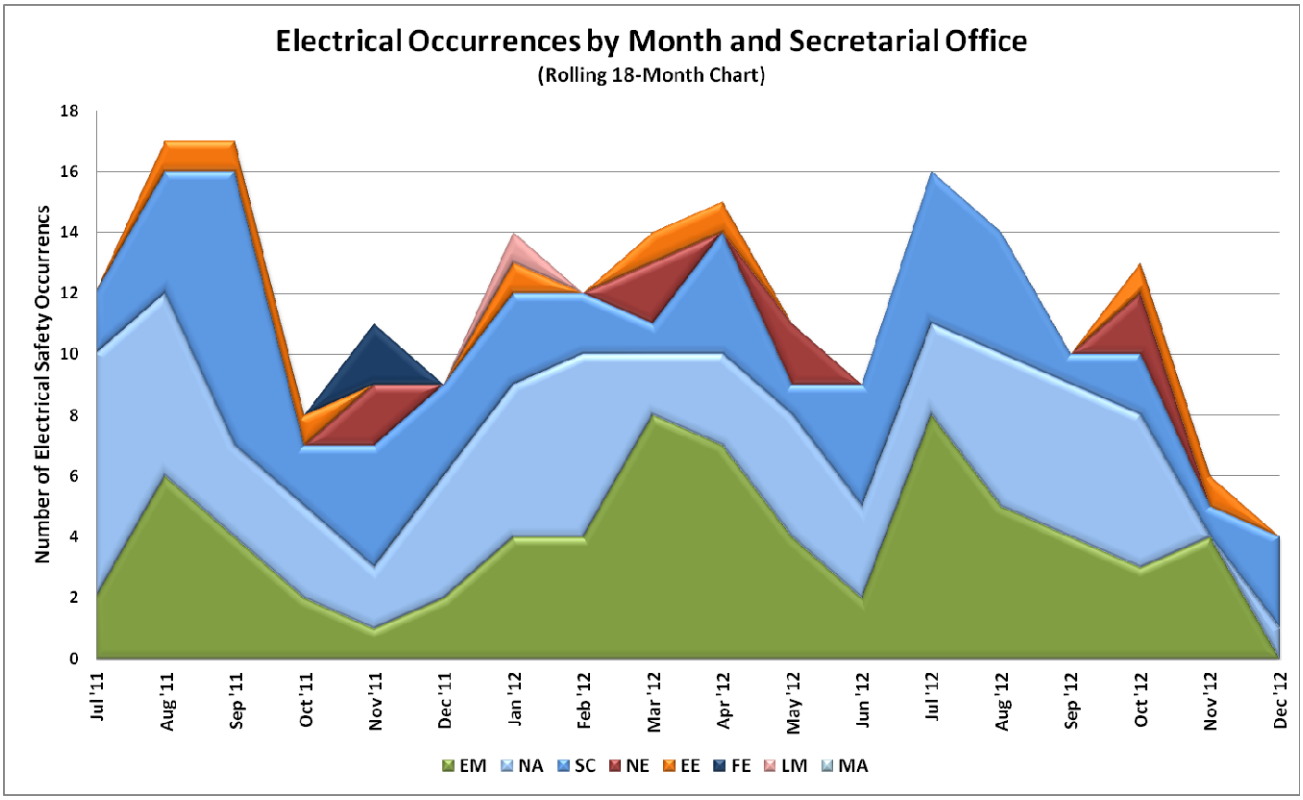
Table 2 - Summary of Electrical Occurrences

Period	Electrical Safety Occurrences	Shocks	Burns	Fatalities
December	4	3	0	0
November	6	2	0	0
October	13	0	0	0
September	10	6	0	0
August	14	1	0	0
July	16	6	0	0
June	9	1	0	0
May	11	2	1	0
April	15	4	0	0
March	14	0	0	0
February	12	3	0	0
January	14	2	0	0
2012 total	138 (avg. 11.5/month)	30	1	0
2011 total	136 (avg. 11.3/month)	36	5	0
2010 total	155 (avg. 12.9/month)	28	2	0
2009 total	128 (avg. 10.7/month)	25	3	0
2008 total	113 (avg. 9.4/month)	26	1	0
2007 total	140 (avg. 11.7/month)	25	2	0
2006 total	166 (avg. 13.8/month)	26	3	0
2005 total	165 (avg. 13.8/month)	39	5	0

Period	Electrical Safety Occurrences	Shocks	Burns	Fatalities
2004 total	149 (avg. 12.4/month)	25	3	1

Figure 6 shows the distribution of electrical safety occurrences by Secretarial Office

Figure 6 - Electrical Occurrences by Month and Secretarial Office



Electrical Severity

The electrical severity of an electrical occurrence is based on an evaluation of electrical factors that include: electrical hazard, environment, shock proximity, arc flash proximity, thermal proximity and any resulting injury(s) to affected personnel. Calculating an electrical severity for an occurrence provides a metric that can be consistently applied to evaluate electrical occurrences across the DOE complex.

Electrical Severity Scores

The electrical severity scores (ES) are calculated using Revision 2 of the Electrical Severity Measurement Tool, which can be found on the EFCOG website at http://www.efcog.org/wg/esh_es/docs/Electrical_Severity_Measurement_Tool.pdf. The six occurrences are classified as shown in Table 3. Actual scores are provided in Attachment 1.

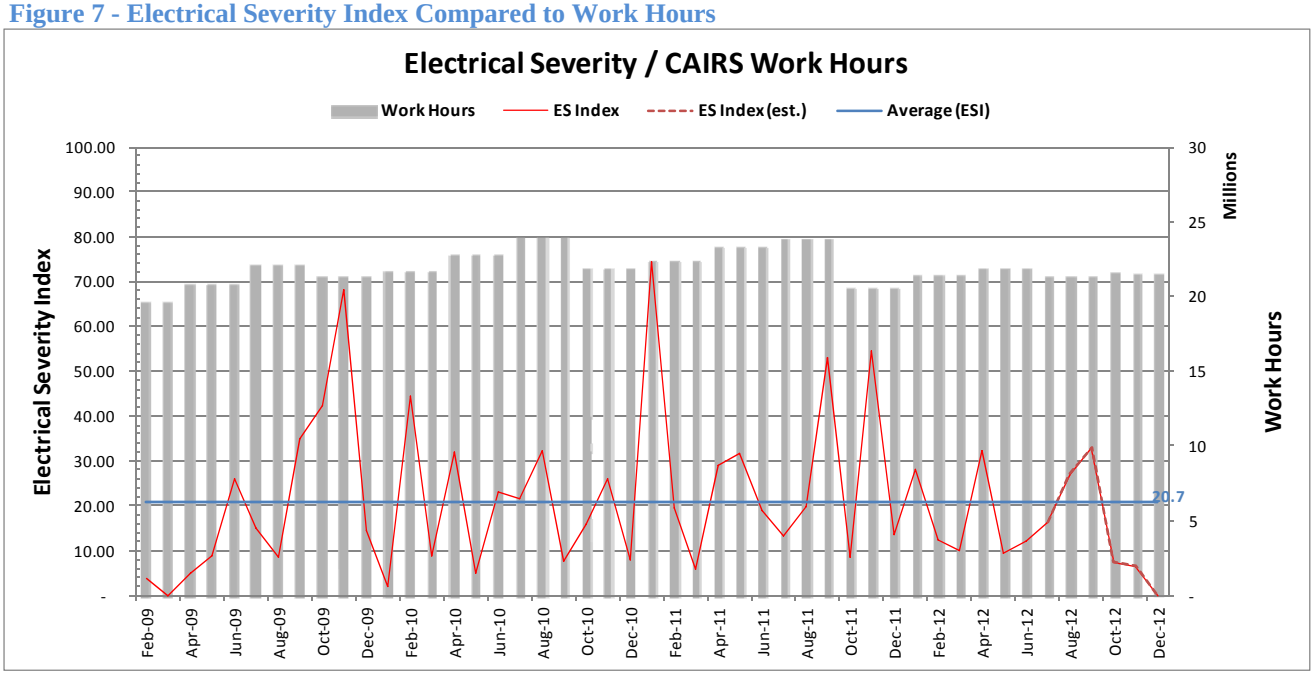
Table 3 – Classification of Electrical Safety Occurrences by ES Score

Occurrence Classification	Electrical Severity Score	Number of Occurrences
HIGH	≥ 1750	0
MEDIUM	31-1749	1
LOW	1-30	2
No Score	0	1

Electrical Severity Index

The Electrical Severity Index (ESI) is a performance metric that was developed to normalize events against organizational work hours. The ESI is calculated monthly and trended. Figure 7 shows a calculated ESI for the DOE complex and Table 4 shows the ESI and how it has changed from the previous month.

Figure 7 - Electrical Severity Index Compared to Work Hours



Note: An estimated ESI is calculated until accurate CAIRS man-hours are available. The chart is updated monthly.

Table 4 - Electrical Severity Index

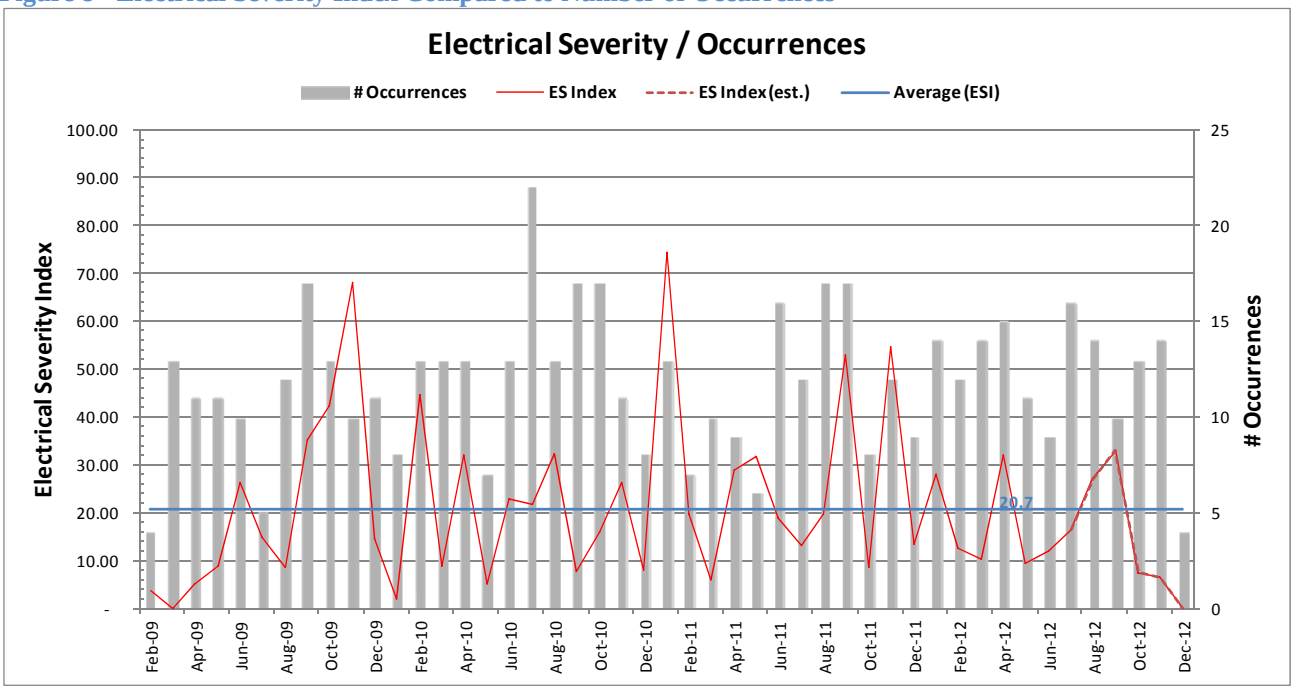
Category	November	December	Δ
Total Occurrences	6	4	-2
Total Electrical Severity	700	345	-355
Estimated Work Hours	21,489,592* (21,489,592)	21,431,499	-58,093
ES Index	6.51* (6.51)	3.22	-3.29
Average ESI	21.2	20.7	-0.5

* These are estimated CAIRS work hours for September and ES Index based on the estimated hours. The estimated hours and ES Index based on the estimated hours (as reported in October) are shown below in parentheses.

Electrical Severity Index = (Σ Electrical Severity / Σ Work Hours) 200,000

Figure 8 shows the ESI with the number of Occurrences instead of Work Hours.

Figure 8 - Electrical Severity Index Compared to Number of Occurrences



The average ESI (20.7) has decreased slightly for the last three months. The lowest average ESI was 19.2 in June 2010.

Figure 9 shows the number of days since the previous high severity occurrence. The present interval is 608 days as of December 31, 2012. The previous longest interval was 181 days in 2009.

Figure 9 - Days since Previous High Severity Occurrence

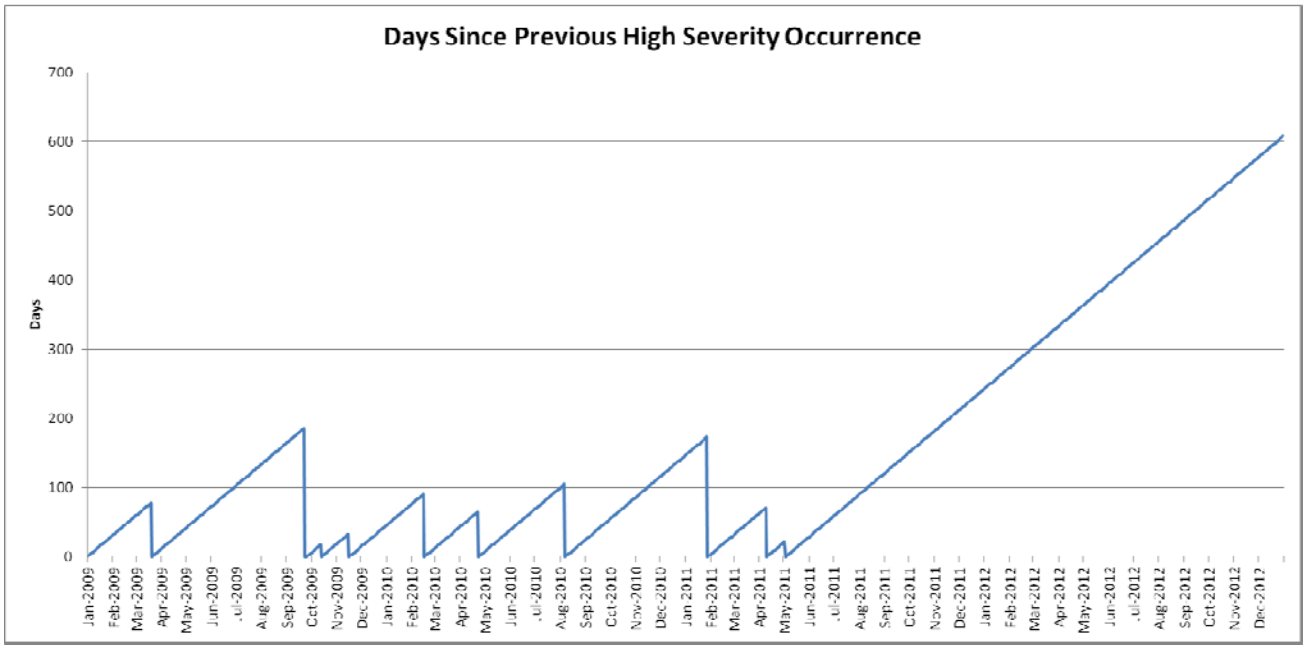
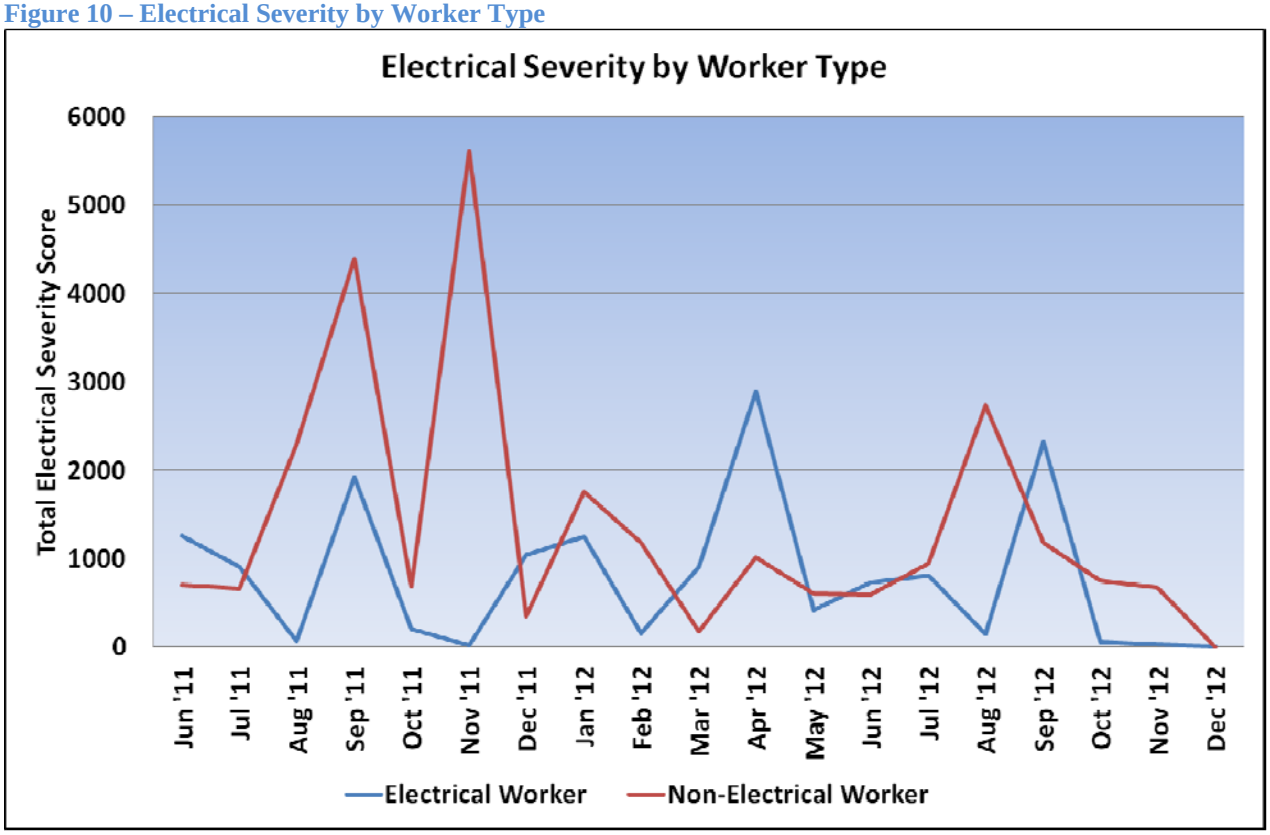


Figure 10 shows the total electrical severity score by worker type for each month.

Figure 10 – Electrical Severity by Worker Type

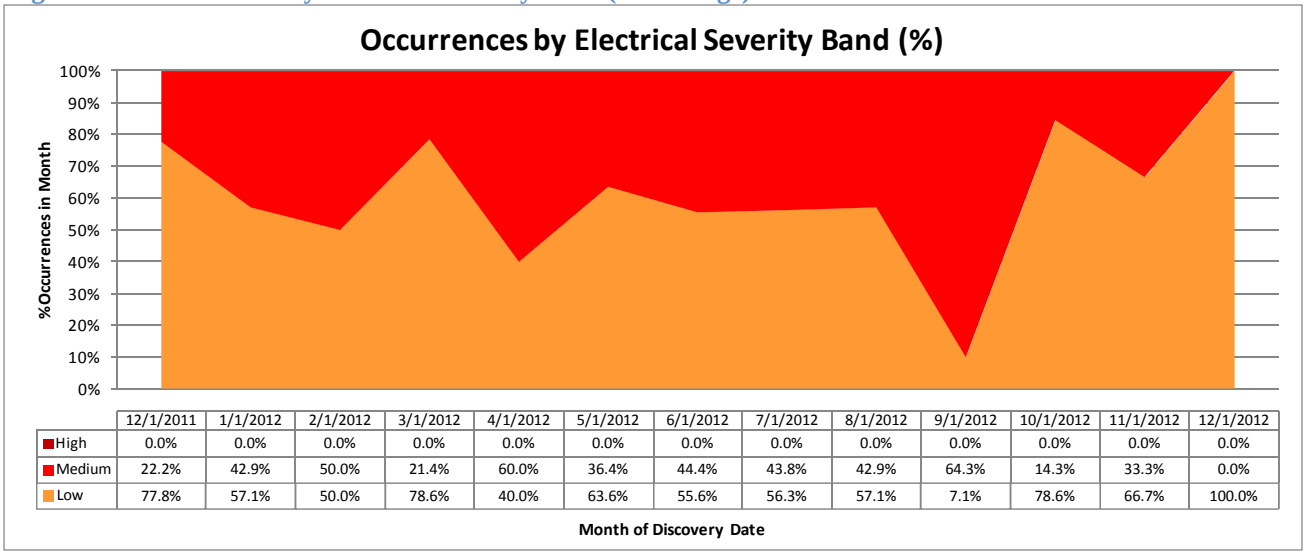


Electrical workers typically have the fewest number of occurrences. Following a spike of 2,320 in September 2012, the ES score for electrical workers has dropped to 12, while non-electrical workers ES scores decreased from 1,180 to 6. The average ES scores for the 18 month period are 1,095 for electrical workers and 1,354 for non-electrical workers.

Summary of Occurrences by Severity Band

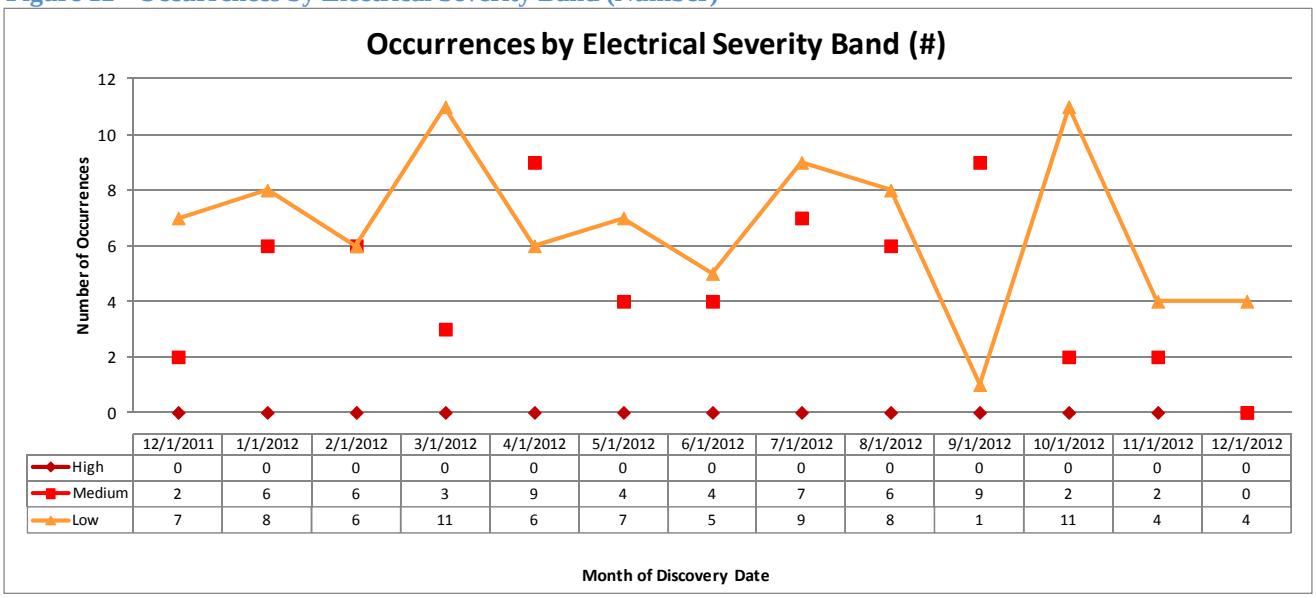
For the interval December 2011 through December 2012 (current month and the past 12), Figures 11 and 12 summarize occurrences by severity band and month of discovery date by percentage of total occurrences in month and number of occurrences in month.

Figure 11 - Occurrences by Electrical Severity Band (Percentage)



	12/1/2011	1/1/2012	2/1/2012	3/1/2012	4/1/2012	5/1/2012	6/1/2012	7/1/2012	8/1/2012	9/1/2012	10/1/2012	11/1/2012	12/1/2012
High	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Medium	22.2%	42.9%	50.0%	21.4%	60.0%	36.4%	44.4%	43.8%	42.9%	64.3%	14.3%	33.3%	0.0%
Low	77.8%	57.1%	50.0%	78.6%	40.0%	63.6%	55.6%	56.3%	57.1%	7.1%	78.6%	66.7%	100.0%

Figure 12 - Occurrences by Electrical Severity Band (Number)



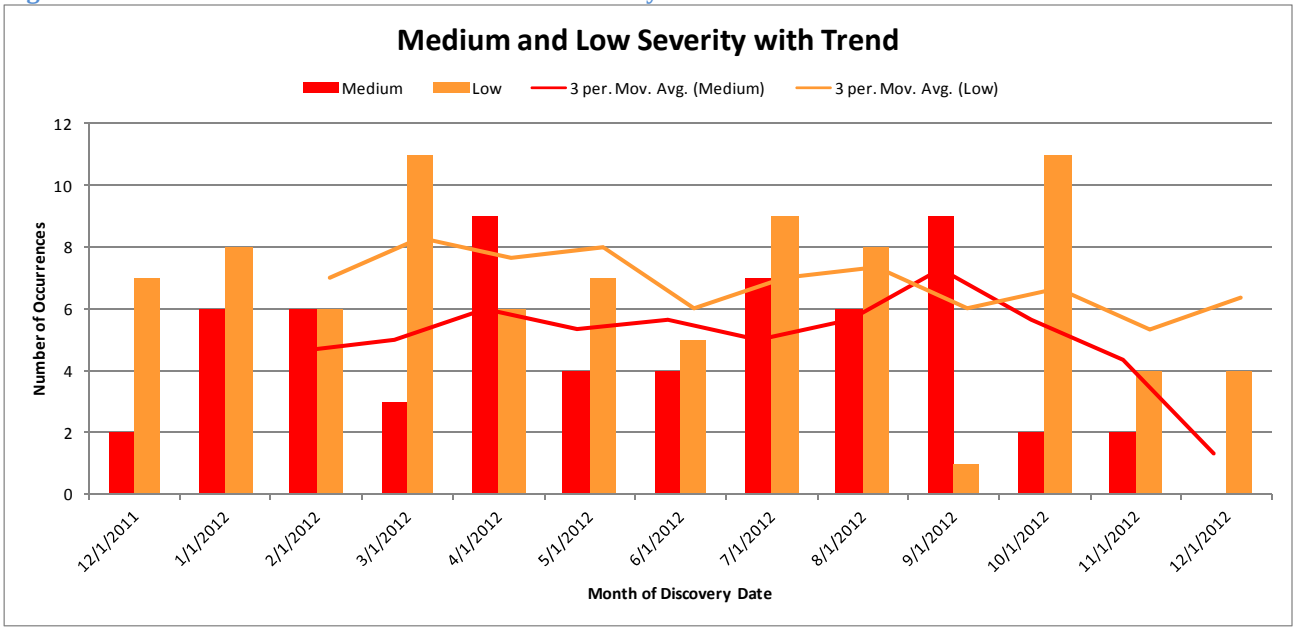
	12/1/2011	1/1/2012	2/1/2012	3/1/2012	4/1/2012	5/1/2012	6/1/2012	7/1/2012	8/1/2012	9/1/2012	10/1/2012	11/1/2012	12/1/2012
High	0	0	0	0	0	0	0	0	0	0	0	0	0
Medium	2	6	6	3	9	4	4	7	6	9	2	2	0
Low	7	8	6	11	6	7	5	9	8	1	11	4	4

What can be seen from the previous two charts is that the number of occurrences with High electrical severity scores has remained at zero with the last event occurring back in May 2011. The number of occurrences with Medium severities decreased while the number of Low and zero severity occurrences remained the same.

Medium and Low Severity with Trend

Figure 13 focuses on the Medium and Low severity data series for December 2011 through December 2012. Trend lines are included for each, using a 3-month moving average.

Figure 13 - Trend of Medium and Low Electrical Severity Occurrences



The 3-month moving average shows a decreasing trend for Medium severity occurrences as Low severity occurrences remained the same. A higher percentage of Low severity occurrences is preferred.

Additional Resources

Electrical Safety Blog
http://hsselectricalsafety.wordpress.com/

Electrical Safety Wiki
http://electricalsafety.doe-hss.wikispaces.net/home

EFCOG Electrical Safety Subgroup
http://www.efcog.org/wg/esh_es/index.htm

Center of Excellence for Electrical Safety
http://www.lanl.gov/safety/electrical/

Contact

Glenn S. Searfoss
Office of Analysis, HS-24
Phone: 301-903-8085
Email: glenn.searfoss@hq.doe.gov

Attachment 1

Electrical Safety Occurrences – December 2012

No	Report Number	Event Summary	SHOCK	BURN	ARCF[1]	LOTO[2]	PLAN[3]	EXCAV[4]	CUT/D[5]	VEH[6]	SC[7]	RC[8]	ES[9]
1	NA--KCSO-AS-KCP-2012-0007	An engineer was shocked on the hand when accidentally touching a charged capacitor in a 300VDC test box.	X								3	2E(2)	12
2	SC--ASO-ANLE-ANLEAPS-2012-0003	Worker receives minor 80VDC shock while using a stepper motor controller.	X								2	2E(1)	330
3	SC--PNSO-PNNL-PNNLBOPER-2012-0021	A LOTO was placed on the wrong circuit breaker intended to isolate a power distribution panel.				X					4	2E(3)	0
4	SC--PNSO-PNNL-PNNLBOPER-2012-0022	A machinist received a 57VDC shock to the right arm when touching a dial indicator on an electrical discharge machine.	X								2	2E(1)	3
	TOTAL		3	0	0	1	0	0	0	0			

Key

(1) ARCF = significant arc flash, (2) LOTO = lockout/tagout, (3) PLAN = job planning, (4) EXCAV = excavation/penetration, (5) CUT/D = cutting or drilling, (6) VEH = vehicle or equipment intrusion, (7) SC = ORPS significance category, (8) RC = ORPS reporting criteria, (9) ES = electrical severity

ES Scores: High is ≥ 1750, Medium is 31-1749, and Low is 1-30

Electrical Safety Occurrences – December 2012

No	Report Number	Event Summary	EW[1]	N-EW[2]	SUB[3]	HFW[4]	WFH[5]	PPE[6]	70E[7]	VOLT[8] H	VOLT[8] L	C/I[9]	NEUT[10]	NM[11]
1	NA--KCSO-AS-KCP-2012-0007	An engineer was shocked on the hand when accidentally touching a charged capacitor in a 300VDC test box.	X			X					X			
2	SC--ASO-ANLE-ANLEAPS-2012-0003	Worker receives minor shock while using a 45VAC stepper motor controller.		X		X					X			
3	SC--PNSO-PNNL-PNNLBOPER-2012-0021	A LOTO was placed on the wrong circuit breaker intended to isolate a power distribution panel.	X		X						X			
4	SC--PNSO-PNNL-PNNLBOPER-2012-0022	A machinist received a 57V shock to the right arm when touching a dial indicator on an electrical discharge machine.		X		XX					X			
	TOTAL		2	2	1	3	1	0	0	0	4	0	0	0

Key

(1) EW = electrical worker, (2) N-EW = non-electrical worker, (3) SUB = subcontractor, (4) HFW = hazard found the worker, (5) WFH = worker found the hazard, (6) PPE = inadequate or no PPE used, (7) 70E = NFPA 70E issues, (8) VOLT = H (>600) L(≤600), (9) C/I = Capacitance/Inductance, (10) NEUT = neutral circuit, (11) NM = near miss

ORPS Operating Experience Report

ORPS contains 55952 OR(s) with 59262 occurrences(s) as of 1/4/2013 7:46:46 AM
Query selected 4 OR(s) with 4 occurrences(s) as of 1/4/2013 8:39:14 AM

Download this report in Microsoft Word format.

1)Report Number: NA--KCSO-AS-KCP-2012-0007 **After 2003 Redesign**
Secretarial Office: National Nuclear Security Administration
Lab/Site/Org: Kansas City Plant
Facility Name: Kansas City Plant
Subject/Title: Engineer Receives Minor Electrical Shock During Troubleshooting
Date/Time Discovered: 12/06/2012 16:40 (CTZ)
Date/Time Categorized: 12/07/2012 07:30 (CTZ)
Report Type: Notification
Report Dates:

Notification	12/11/2012	16:50 (ETZ)
Initial Update		
Latest Update		
Final		

Significance Category: 3
Reporting Criteria: 2E(2) - Any unexpected discovery of an uncontrolled electrical hazardous energy source (e.g., live electrical power circuit, etc.). This criterion does not include discoveries made by zero-energy checks and other precautionary investigations made before work is authorized to begin.

Cause Codes:
ISM: 2) Analyze the Hazards
Subcontractor Involved: No
Occurrence Description: On December 6, 2012 at approximately 1640 hours a Honeywell Federal Manufacturing & Technologies Kansas City (FM&T/KC) engineer experienced a minor electrical shock in the left hand during trouble shooting. The Honeywell FM&T/KC engineer was trouble shooting a developmental electronic test box that had been used on a piece of test equipment. The electronic box had been removed from the tester and had been sitting disconnected for approximately 30 minutes before work had begun on the box. While examining the box with the cover removed, the engineer used a diode with long leads as a pointer to identify to a technician the electrical component that the engineer believed to be defective. While pointing to the component with the diode in the right hand, the end of the diode came into contact with a small capacitor located next to the component. When the diode

	contacted the capacitor, the engineer felt a shock in the left hand that was positioned on the metal back of the work table containing the box.
Cause Description:	
Operating Conditions:	Does not apply.
Activity Category:	Normal Operations (other than Activities specifically listed in this Category)
Immediate Action(s):	Honeywell FM&T/KC Physical Security, Fire Protection Operations, HS&E Manager and HS&E Safety Engineers immediately responded to the area. The condition of the employee was assessed. The engineer's vitals were then taken by a Fire Protection Operations employee. A review of the employee found no entry or exit injuries. The employee returned to work with no restrictions. The FM&T/KC Electrical Safety Committee is convening to evaluate this incident. This report has been reviewed and determined to be unclassified by: Derivative Classifier: Clyde E. Hicks Title: HS&E Administrator II Date: December 10, 2012
FM Evaluation:	The true voltage of the shock the engineer received is unknown. The circuit's potential is 300 volts Direct Current, however, the box sat for approximately 30 minutes, allowing for some bleed down of the capacitor. Interviews with the engineers identified that the capacitor should have bled down when the equipment was de-energized. The KCP Electrical Safety Committee is convening to evaluate the incident using the DOE Electrical Severity Measurement tool.
DOE Facility Representative Input:	
DOE Program Manager Input:	
Further Evaluation is Required:	Yes. Before Further Operation? Yes By Whom: Electrical Committee By When: 12/14/2012
Division or Project:	Honeywell Federal Mfg. & Technologies Kansas City
Plant Area:	Main Bldg, mezzanine
System/Building/Equipment:	Product Testing Equipment, diode
Facility Function:	Balance of Plant - Infrastructure (Other Functions not specifically listed in this Category)
Corrective Action:	

Lessons(s) Learned:

HQ Keywords: 01A--Inadequate Conduct of Operations - Inadequate Conduct of Operations (miscellaneous)
01Q--Inadequate Conduct of Operations - Personnel error
08A--OSHA Reportable/Industrial Hygiene - Electrical Shock
12C--EH Categories - Electrical Safety
14E--Quality Assurance - Work Process Deficiency

HQ Summary: On December 6, 2012, an engineer experienced a minor electrical shock in the left hand during trouble shooting of a developmental electronic test box that was used on a piece of test equipment and sitting on a metal table. The engineer used a diode with long leads as a pointer to identify to a technician the electrical component the engineer believed to be defective while examining the box with the cover removed. The engineer felt a shock in his left hand which was on the table when the end of the diode he held in his right hand came into contact with a small capacitor located next to the component. The engineer was not injured.

Similar OR Report Number:

Facility Manager:

Name	Kevin Allgeyer
Phone	(816) 997-5107
Title	Sr. Health, Safety & Environment Manager

Originator:

Name	HICKS, CLYDE E
Phone	(816) 997-2262
Title	EMERGENCY MGT SPECIALIST

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
12/06/2012	17:30 (CTZ)	Mike Roberts	KCFO

Authorized Classifier(AC): Clyde E. Hicks Date: 12/10/2012

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2)Report Number: SC--ASO-ANLE-ANLEAPS-2012-0003 **After 2003 Redesign**

Secretarial Office: Science

Lab/Site/Org: Argonne National Laboratory East

Facility Name: Advanced Photon Source

Subject/Title: Worker Receives Minor Electric Shock While Using A 45 VAC Stepper Motor Controller

Date/Time Discovered: 12/20/2012 14:55 (CTZ)

Date/Time Categorized: 12/20/2012 15:45 (CTZ)

Report Type: Notification

Report Dates:

Notification	12/21/2012	17:57 (ETZ)
Initial Update		
Latest Update		
Final		

Significance Category: 2

Reporting Criteria: 2E(1) - Any unexpected or unintended personal contact (burn, injury, etc.) with an electrical hazardous energy source (e.g., live electrical power circuit, etc.).

Cause Codes:

ISM:

Subcontractor Involved: No

Occurrence Description: Three APS employees were working with a stepper motor and associated controller. The transformer and control chassis for the step motor are contained in a small electrical cabinet located in Building 401 Mechanical Equipment Laboratory L 0117. The stepper motor and control circuit is fed with 48 VAC from a transformer which in turn is fed from a 110 VAC, 20 amp circuit. The stepper motor was connected to the controller with a standard motor control cable.

At approximately 14:50 CST yesterday 12/20/12, employee A was holding the motor control cable in his left hand while reaching around the control cabinet to turn the controller off when his right hand brushed a portion of the cabinet or chassis and he felt a tingling sensation across his upper chest. Work was immediately stopped and a 911 call was made by one of the other employees. When the emergency responders arrived, employee A informed them he that he felt a bit woozy after the event. Based on this information the emergency responders decided to take him to the emergency room of a local hospital for evaluation where he subsequently was held overnight for observation. He was released at 1400 CST on December 21, 2012.

The stepper motor, controller, and electrical cabinet have been removed from service pending inspection and further investigation. An investigation team has been formed. The investigation so far has found a possible short of the
48V inside a connector of the motor cable. The connector has a metal housing and apparently was being held in the left hand of employee A when the shock was felt.

An update to this report presenting additional information and the results of an electrical severity calculation will be provided in early January 2013 after Argonne staff have returned from a scheudled holiday break.

Cause Description:	
Operating Conditions:	Facility shutdown for scheduled maintenance period
Activity Category:	Normal Operations (other than Activities specifically listed in this Category)
Immediate Action(s):	Stepper motor, its controller, and the associated electrical cabinet were disconnected and removed from service. A fact finding meeting was held at 1330 on December 21, 2012. An investigation team has been formed and will begin deliberation the first week in January 2013 after Argonne staff return from a holiday break.
FM Evaluation:	
DOE Facility Representative Input:	
DOE Program Manager Input:	
Further Evaluation is Required:	Yes. Before Further Operation? No By Whom: Investigation team By When:
Division or Project:	X-ray Science Division
Plant Area:	401/L0117
System/Building/Equipment:	48 VAC Stepper Motor and Controller
Facility Function:	Accelerators
Corrective Action:	
Lessons(s) Learned:	
HQ Keywords:	07D--Electrical Systems - Electrical Wiring 08A--OSHA Reportable/Industrial Hygiene - Electrical Shock 12C--EH Categories - Electrical Safety 14L--Quality Assurance - No QA Deficiency
HQ Summary:	On December 20, 2012, an employee was holding a motor control cable in his left hand while reaching around a control cabinet to turn a controller off when his right hand brushed a portion of the cabinet or chassis and he felt a tingling sensation across his upper chest. The work was immediately stopped and another employee called 911. When the emergency responders arrived, the employee informed them he that he felt a bit woozy after the event. Based on this information the emergency responders decided to take him to the emergency room of a local hospital for evaluation where he subsequently was held overnight for observation. The stepper motor, controller, and electrical cabinet have been removed from service pending inspection and further investigation. Investigators so far have found a possible short inside a connector of the motor cable involving 48 volts. The connector has a metal housing and apparently was being held in the left hand of the employee when the shock was felt.

Similar OR Report Number:

Facility Manager:

Name	BARKALOW, THOMAS W
Phone	(630) 252-9243
Title	PSC ESH/QA COORDINATOR

Originator:

Name	BARKALOW, THOMAS W
Phone	(630) 252-9243
Title	SUF ESH/QA COORDINATOR

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
12/20/2012	15:20 (CTZ)	Paul Kearns	Argonne
12/20/2012	15:20 (CTZ)	John Quintana	Argonne
12/20/2012	15:20 (CTZ)	John Houck	DOE-ASO

Authorized Classifier(AC):

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3)Report Number: SC--PNSO-PNNL-PNNLBOPER-2012-0021 **After 2003 Redesign**

Secretarial Office: Science

Lab/Site/Org: Pacific Northwest National Laboratory

Facility Name: Energy Research Programs (PNNL)

Subject/Title: Lock and Tag Placed on Wrong Circuit Breaker

Date/Time Discovered: 12/08/2012 07:35 (PTZ)

Date/Time Categorized: 12/08/2012 10:00 (PTZ)

Report Type: Notification/Final

Report Dates:

Notification	12/11/2012	17:03 (ETZ)
Initial Update	12/11/2012	17:03 (ETZ)
Latest Update	12/11/2012	17:03 (ETZ)
Final	12/11/2012	17:03 (ETZ)
Revision 1	12/12/2012	12:11 (ETZ)

Significance Category: 4

Reporting Criteria: 2E(3) - Any failure to follow a prescribed hazardous energy control process (e.g., lockout/tagout, hazardous energy control program).

Cause Codes:

ISM: 4) Perform Work Within Controls
5) Provide Feedback and Continuous Improvement

Subcontractor Involved: Yes

	American Electric, Inc.
Occurrence Description:	n Saturday, December 8, 2012, in support of a planned outage to isolate a power distribution panel at Building 3410, a safe to work check, performed by the subcontractor, identified power was present in an electrical distribution panel that should have been isolated. During the critique, it was confirmed that the controlling organization Lock and Tag was placed on the wrong circuit breaker and not in accordance with the written instructions.
Cause Description:	
Operating Conditions:	N/A
Activity Category:	Maintenance
Immediate Action(s):	The work was stopped and placed in a safe configuration and management notified. A critique was held on 12/10/2012.
FM Evaluation:	
DOE Facility Representative Input:	
DOE Program Manager Input:	
Further Evaluation is Required:	No
Division or Project:	Operational Systems Directorate
Plant Area:	PNNL Site
System/Building/Equipment:	3410 Building
Facility Function:	Laboratory - Research & Development
Corrective Action:	
Lessons(s) Learned:	
HQ Keywords:	01K--Inadequate Conduct of Operations - Lockout/Tagout Noncompliance (Electrical) 08H--OSHA Reportable/Industrial Hygiene - Safety Noncompliance 11G--Other - Subcontractor 12I--EH Categories - Lockout/Tagout (Electrical or Mechanical) 14E--Quality Assurance - Work Process Deficiency
HQ Summary:	On December 8, 2012, a Lock and Tag was placed on the wrong circuit breaker intended to isolate a power distribution panel at Building 3410. A subcontractor identified the presence of power in the electrical distribution panel during a safe to work check. During the critique, the controlling organization confirmed the Lock and Tag was placed on the wrong circuit breaker and not in accordance with the written instructions.
Similar OR Report Number:	
Facility Manager:	Name: Nichols, C. J.

Phone	(509) 371-6407
Title	Building Manager, Physical Sciences Facilities

Originator:

Name	POLLARI, ROGER A
Phone	(509) 371-7700
Title	

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
12/08/2012	10:10 (PTZ)	Yasek, R.	PNSO

Authorized Classifier(AC): Pollari, R. A. Date: 12/12/2012

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4)Report Number: SC--PNSO-PNNL-PNNLBOPER-2012-0022 **After 2003 Redesign**
Secretarial Office: Science
Lab/Site/Org: Pacific Northwest National Laboratory
Facility Name: Energy Research Programs (PNNL)
Subject/Title: Minor Electrical Shock in Building 3420/1604 Machine Shop
Date/Time Discovered: 12/13/2012 15:15 (PTZ)
Date/Time Categorized: 12/14/2012 14:20 (PTZ)
Report Type: Notification
Report Dates:

Notification	12/17/2012	16:22 (ETZ)
Initial Update		
Latest Update		
Final		

Significance Category: 2
Reporting Criteria: 2E(1) - Any unexpected or unintended personal contact (burn, injury, etc.) with an electrical hazardous energy source (e.g., live electrical power circuit, etc.).

Cause Codes:
ISM: 5) Provide Feedback and Continuous Improvement
Subcontractor Involved: No
Occurrence Description: At 1515 hrs. on 12/13/2012, a Machinist operating an Electrical Discharge Machine (EDM) experienced a minor electrical shock (~57 volts) to the right arm when touching a dial indicator as the machine was operating. The Machinist reported it to his Work Team Lead on 12/13/12 and the incident was reported to the PNNL Single Point of Contact on 12/14/12.

Cause Description:	
Operating Conditions:	N/A
Activity Category:	Normal Operations (other than Activities specifically listed in this Category)
Immediate Action(s):	The machinist was evaluated by the PNNL Occupational Medical Provider and returned to work without restriction. The EDM was taken out of service and electricity to the unit was locked and tagged out. Similar EDM units at other PNNL machine shops were also removed from service pending further evaluation. The EDM manufacturer subsequently confirmed this is a normal operating voltage in the area where the machinist touched the dial indicator. A critique will be scheduled.
FM Evaluation:	
DOE Facility Representative Input:	
DOE Program Manager Input:	
Further Evaluation is Required:	Yes. Before Further Operation? No By Whom: By When:
Division or Project:	Operational Systems Directorate
Plant Area:	PNNL Site
System/Building/Equipment:	3420 Building
Facility Function:	Laboratory - Research & Development
Corrective Action:	
Lessons(s) Learned:	
HQ Keywords:	08A--OSHA Reportable/Industrial Hygiene - Electrical Shock 08C--OSHA Reportable/Industrial Hygiene - Industrial Hygiene Exposure 12C--EH Categories - Electrical Safety 14L--Quality Assurance - No QA Deficiency
HQ Summary:	On December 13, 2012, a Machinist operating an Electrical Discharge Machine (EDM) experienced a minor electrical shock (57 volts) to the right arm when touching a dial indicator as the machine was operating. The Machinist reported it to his Work Team Lead and notifications were made. The machinist was evaluated by the Pacific Northwest National Laboratory (PNNL) Occupational Medical Provider and returned to work without restriction. The EDM was taken out of service and electricity to the unit was locked and tagged out. Similar EDM units at other PNNL machine shops were also removed from service pending further evaluation. A critique was scheduled.
Similar OR Report Number:	1. SC--PNSO-PNNL-PNNLBOPER-2009-0015

2. SC--PNSO-PNNL-PNNLBOPER-2011-0001

Facility Manager:

Name	Berger, J. E.
Phone	(509) 371-7959
Title	Manager, Maintenance & Fabrication Services

Originator:

Name	POLLARI, ROGER A
Phone	(509) 371-7700
Title	

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
12/14/2012	14:25 (PTZ)	Carlson, J. L.	PNSO

Authorized Classifier(AC): Pollari, R. A. Date: 12/17/2012