



Office of Health, Safety and Security

## Monthly Analysis of Electrical Safety Occurrences



October 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 increased from 10 in September to 13 in October. This is the second month in 2012 in which no electrical shock was reported. The number of electrical intrusion occurrences remained at one occurrence while the number of lockout/tagout occurrences increased from two to six. In October, workers identified electrical hazards 86 percent of the time, which is an improvement over the 40 percent in September.

### 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 no reported electrical shocks in the month of October, which is a reduction from the six occurrences reported in September. October is the third shock-free month in the last 36 months and the second month this calendar year.

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 shocks per month.

Figure 1 – Three-Year Trend of Electrical Shocks

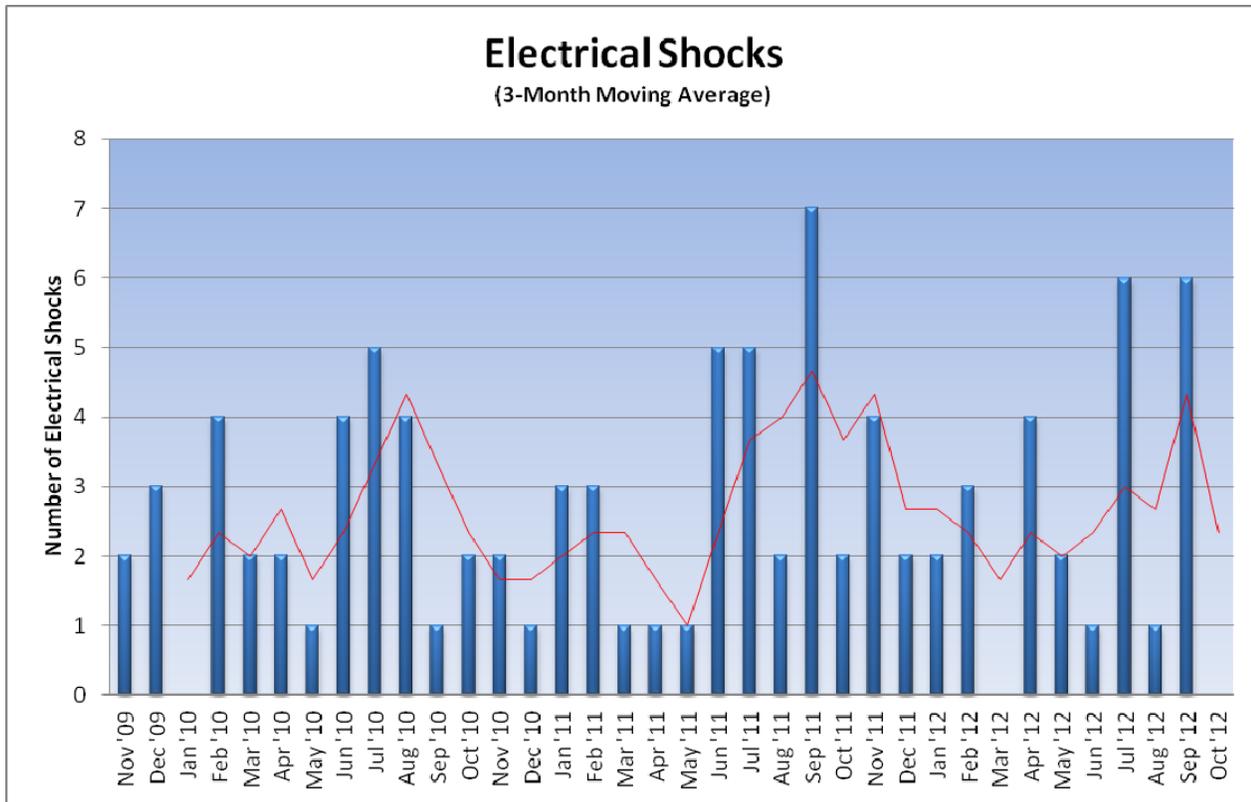


Figure 2 shows electrical shocks by worker type. The number of shocks involving electrical workers has slowly increased, while those involving non-electrical workers decreased after 2011. Since 2008, the majority of shocks (about 73 percent) involve non-electrical workers.

Figure 2 - Electrical Shock by Worker Type

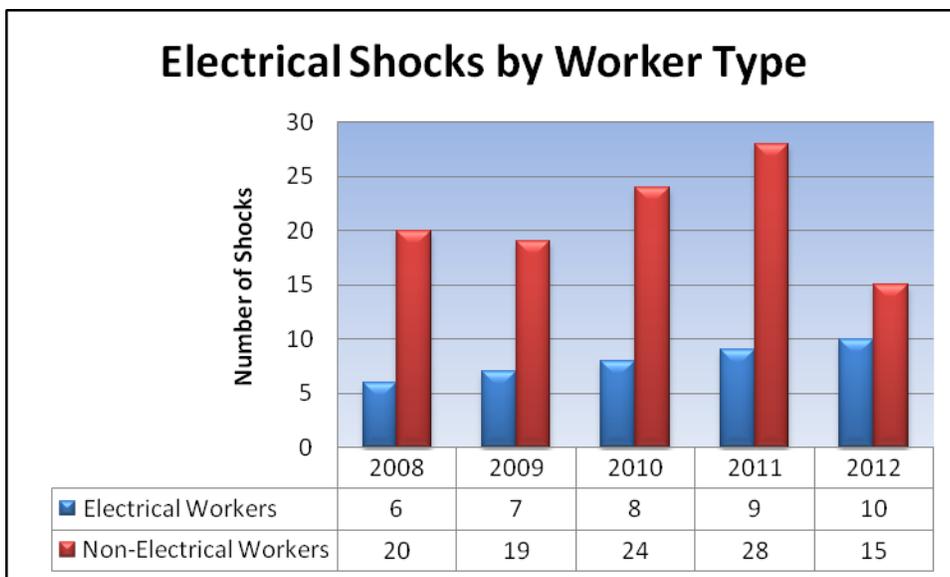
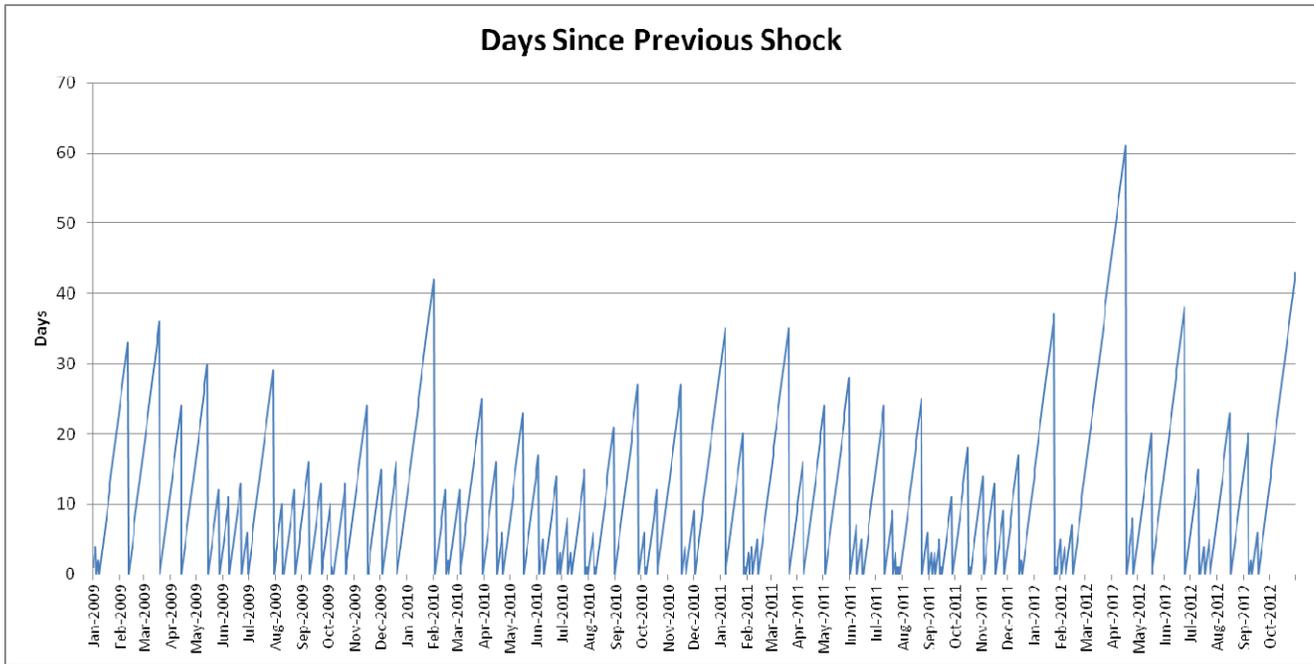


Figure 3 shows the number of days since the previous electrical shock for the DOE complex. The longest interval was 61 days (April 16, 2012) and the present interval is 43 days as of October 31.

Figure 3 - Days since Previous Shock



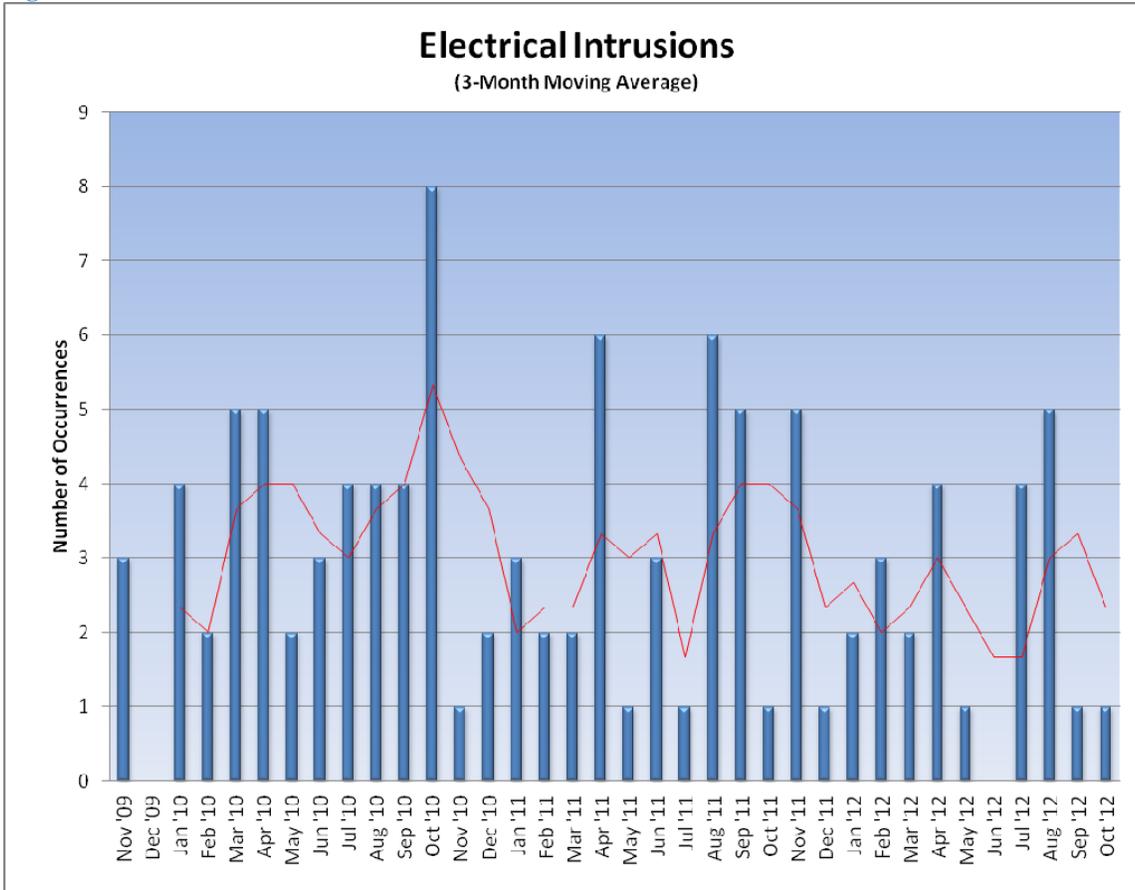
### Electrical Intrusion

The number of electrical intrusion occurrences (i.e., cutting/penetrating, excavating, or vehicle/equipment contact of overhead electrical conductors) remained at one for October. In this occurrence, a maintenance electrician saw an arc and heard a "bang" while tightening a screw in a raceway cover. The screw penetrated the insulation of a 480-volt phase, shorting it to ground. The majority of the available energy was prevented from being shorted to ground because the raceway was rated as a 480-volt confinement system and the circuit was protected by an instantaneous-trip circuit breaker. There was no electrical shock.

The number of electrical penetration occurrences average about 1.7 occurrences per month and have shown an increasing trend since October 2011. During that thirteen month period, there have only been four months in which no electrical penetration/cutting occurrences have been reported.

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 October there were six reported occurrences involving lockout/tagout (LOTO), which is an increase from the two occurrences reported in September. These events are summarized in the following sections.

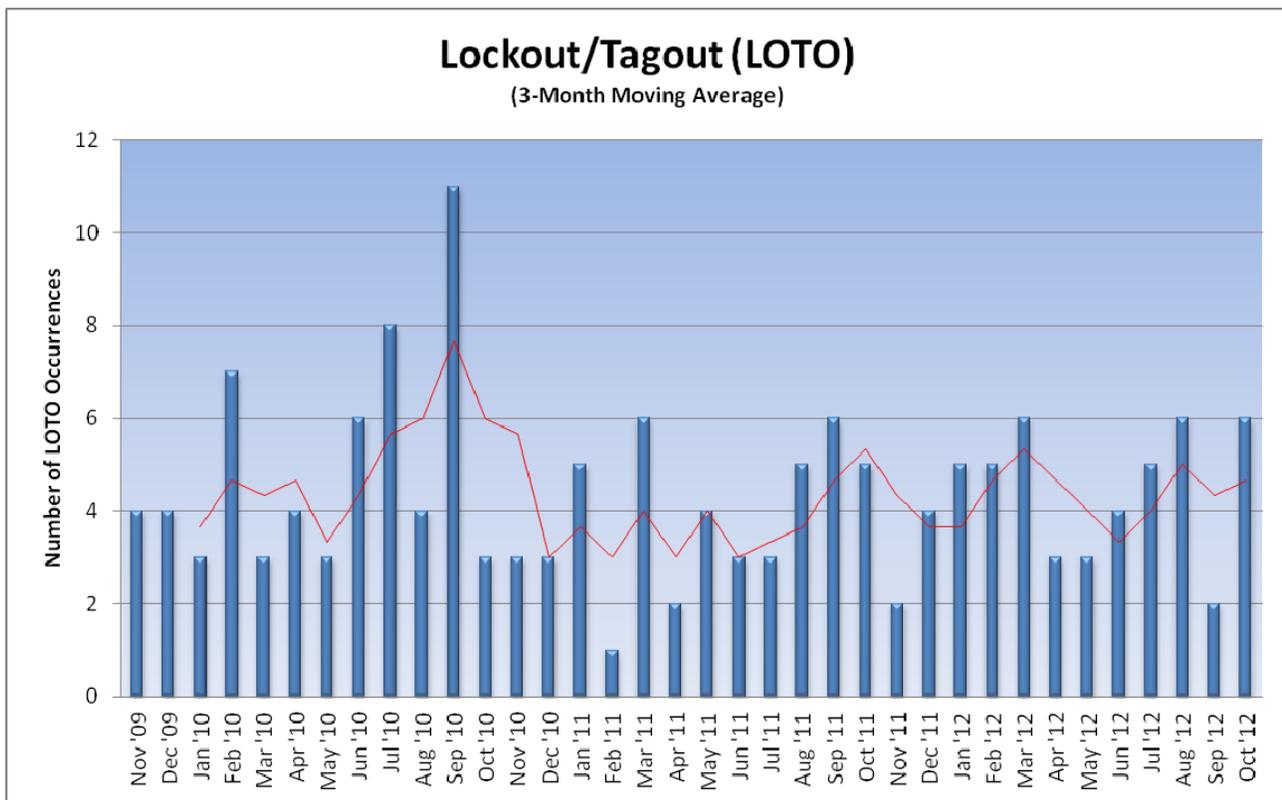
#### Occurrences Involving Lockout/Tagout

1. A subcontractor was exposed to 120 volts when he removed a drive motor cover on a malfunctioning rollup door without installing a LOTO or wearing proper personal protective equipment. The work was suspended and notifications were made.
2. An industrial hygiene technician performed air monitoring work on an air handling unit without being required to over lock the unit with their personal authorized worker lock. It was initially believed the technician could perform confined space air monitoring from outside the air handling unit without applying a lock; however, it was later discovered that the electrical heating coils, if energized, would have been a potential electrical shock hazard to the technician while inserting an air monitoring probe.

3. A subcontractor electrician performed a LOTO on a circuit that was not included on a Low Voltage Outage Permit while installing a new transformer. De-energizing the additional circuit resulted in a loss of power to equipment and caused a number of alarms. The electrician was not working on energized circuits.
4. A subcontractor performed maintenance on a commercial coffee machine without the installation of a LOTO. The subcontractor opened an internal circuit breaker to de-energize the coffee machine but did not lock the circuit breaker. Work was immediately stopped and the coffee-making equipment was put in a safe condition.
5. A subcontractor performed work on an electrical system without following LOTO procedures. There was no contact with hazardous energy.
6. The key for an electrical vault LOTO was left on a table next to the lockbox instead of being placed inside the lockbox, during a building electrical outage. Failure to place the electrical vault key in the lockbox was a failure to follow the hazardous energy control program.

Figure 5 shows a 3-year trend of LOTO occurrences for the DOE complex. The monthly average is 4.4 occurrences.

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



## Occurrences Involving Hazardous Energy Control Procedure Non-Compliances

1. An electrician opened the wrong circuit breaker for a LOTO because of an inaccurate panel schedule, which resulted in a loss of power to an uninterruptable power supply (UPS). Problems were identified in the formality of and attention to detail in the application of Conduct of Operations principles related to: consistent work package instructions; following procedures and permits verbatim; adequacy of pre-job briefs; electrical panel schedules/labeling; and worker questioning attitude. Power was restored to the UPS.
2. Concerns were raised as to whether hazardous energy controls had been implemented or if Non-Destructive Analysis (NDA) personnel were exposed to hazardous energy when they took measurements in casting furnaces. NDA personnel were taking measurements when a maintenance electrician and a production operator told them that the furnaces needed to be energized for post-maintenance purposes. Concerns about hazardous energy control were raised and work was suspended.

## Discovery of Uncontrolled Hazardous Energy

1. A worker identified an energized 120-volt circuit at a panel and adjacent relays while performing a safe condition check for a Controlling Organization lockout of an exhaust fan system. Investigators found that the one-line control drawing used to design the tagout boundary did not show an additional source of power; however, the additional power source was noted on other system drawings. The work package was suspended.
2. Workers discovered 124 VAC while performing the Safe Condition Check during the installation of a LOTO to support replacement of a power supply. The activity was stopped and notifications were completed.
3. An electrical short circuit occurred from a 120-volt light switch when a mechanical subcontractor removed parts on a heating, ventilation and cooling (HVAC) unit. The prime contractor had removed electrical power to the work area with the exception of the lighting circuit. The short occurred when the subcontractor removed energized electrical power to the HVAC unit, which caused a short to the conductors.

## **Electrical Near Miss**

In October, there were three occurrences that were considered to be an electrical near miss, which is an increase from the two occurrences last month. One of these occurrences was discussed in the Electrical Intrusions section and the other two were discussed under Hazardous Energy Controls; occurrence number 3 under the Discovery of Uncontrolled Hazardous Energy section and occurrence number 2 under Occurrences Involving Hazardous Energy Control Procedure Non-Compliances section.

## Monthly Occurrences Tables

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

**Table 1 - Breakdown of Electrical Occurrences**

Number of Occurrences	Involving:	Last Month
0	Electrical Shocks	6
0	Electrical Burns	0
6	Hazardous Energy Control (LOTO)	2
4	Inadequate Job Planning	2
1	Inadvertent Drilling/Cutting of Electrical Conductors	0
0	Excavation of Electrical Conductors	0
0	Vehicle Intrusion of Electrical Conductors or Equipment	1
3	Electrical Near Misses	2
8	Electrical Workers	6
5	Non-Electrical Workers	4
6	Subcontractors	2

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 increased from last month's value of 12.7/month. The average number of occurrences a year ago (October 2011) was 11.5/month.

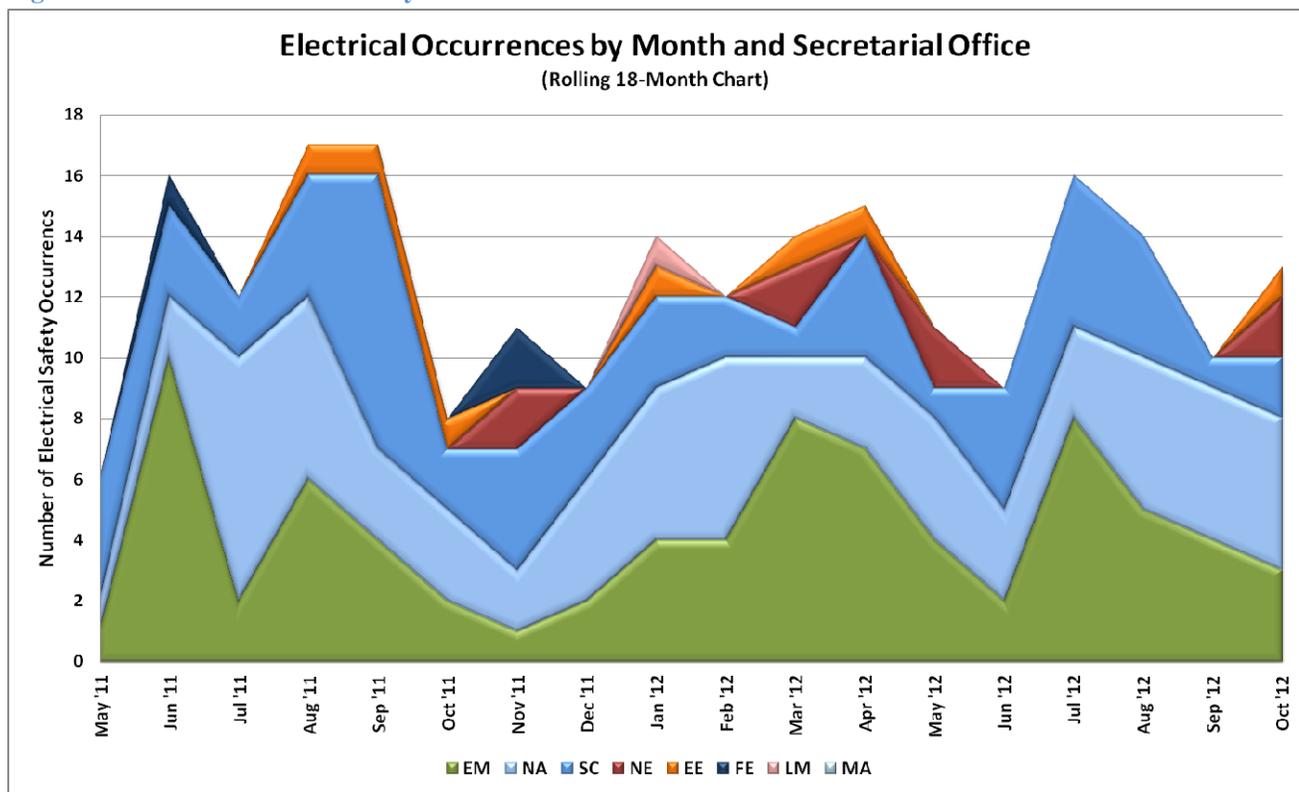
**Table 2 - Summary of Electrical Occurrences**

Period	Electrical Safety Occurrences	Shocks	Burns	Fatalities
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

Period	Electrical Safety Occurrences	Shocks	Burns	Fatalities
January	14	2	0	0
2012 total	128 (avg. 12.8/month)	25	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
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](http://www.efcog.org/wg/esh_es/docs/Electrical_Severity_Measurement_Tool.pdf). The 13 occurrences are classified as shown in Table 3. The actual score for each occurrence is provided in Attachment 1.

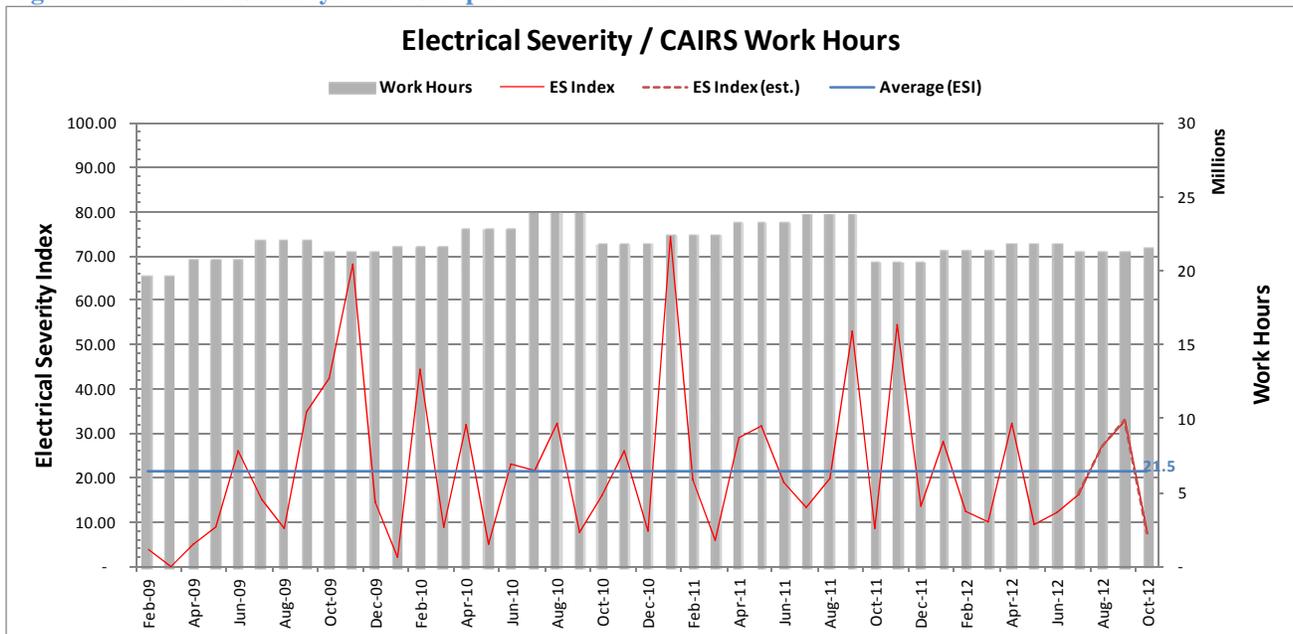
**Table 3 – Classification of Electrical Safety Occurrences by ES Score**

Occurrence Classification	Electrical Severity Score	Number of Occurrences
HIGH	≥ 1750	0
MEDIUM	31-1749	2
LOW	1-30	6
No Score	0	5

## 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	September	October	Δ
Total Occurrences	10	13	+3
Total Electrical Severity	3,500	810	-2690
Estimated Work Hours	21,240,621*	21,539,387	+298,766

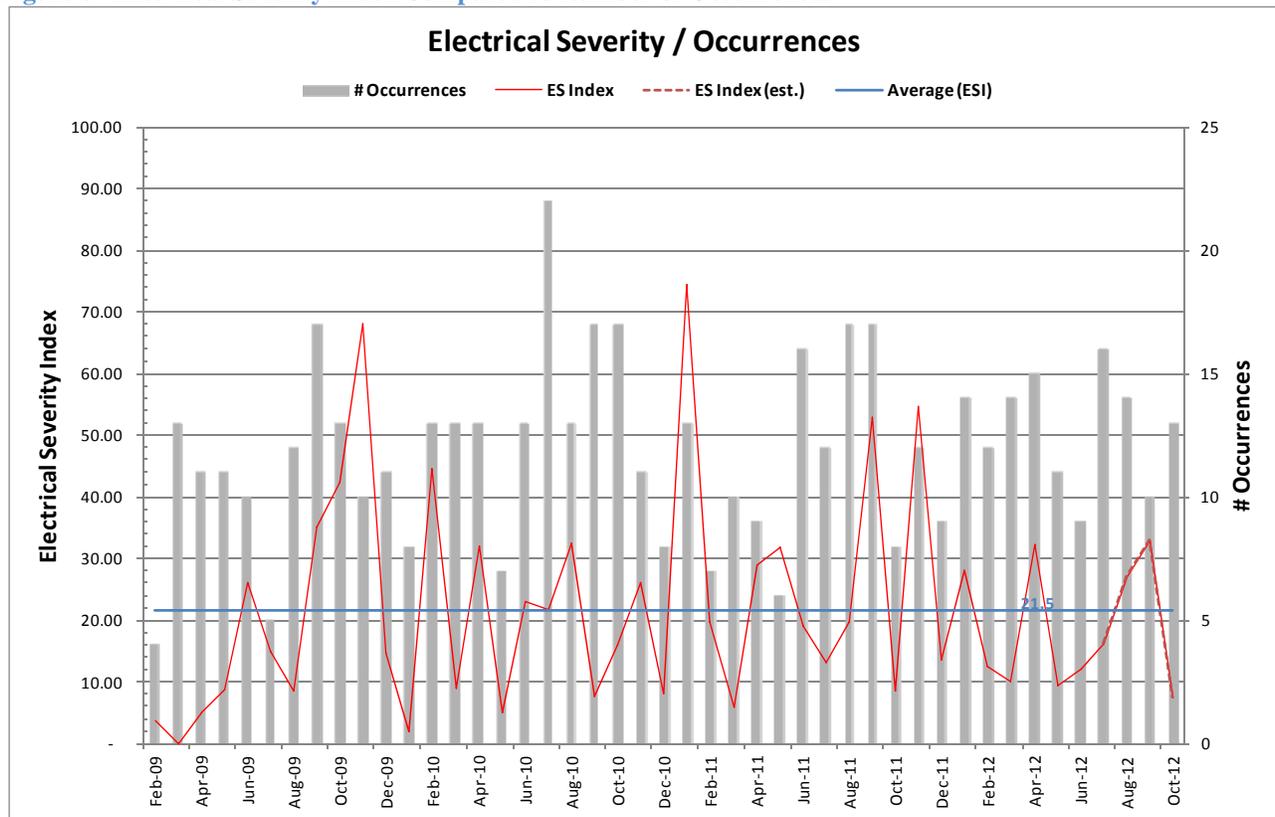
Category	September	October	Δ
	(19,173,333)		
ES Index	32.96* (36.51)	7.52	-25.43
Average ESI	22.0	21.5	-0.5

\* 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 September) are shown below in parentheses.

$$\text{Electrical Severity Index} = (\Sigma \text{Electrical Severity} / \Sigma \text{Work Hours}) 200,000$$

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 (21.5) has decreased slightly from last month. 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 547 days as of October 31. The previous longest interval was 181 days in 2009.

Figure 9 - Days since Previous High Severity Occurrence

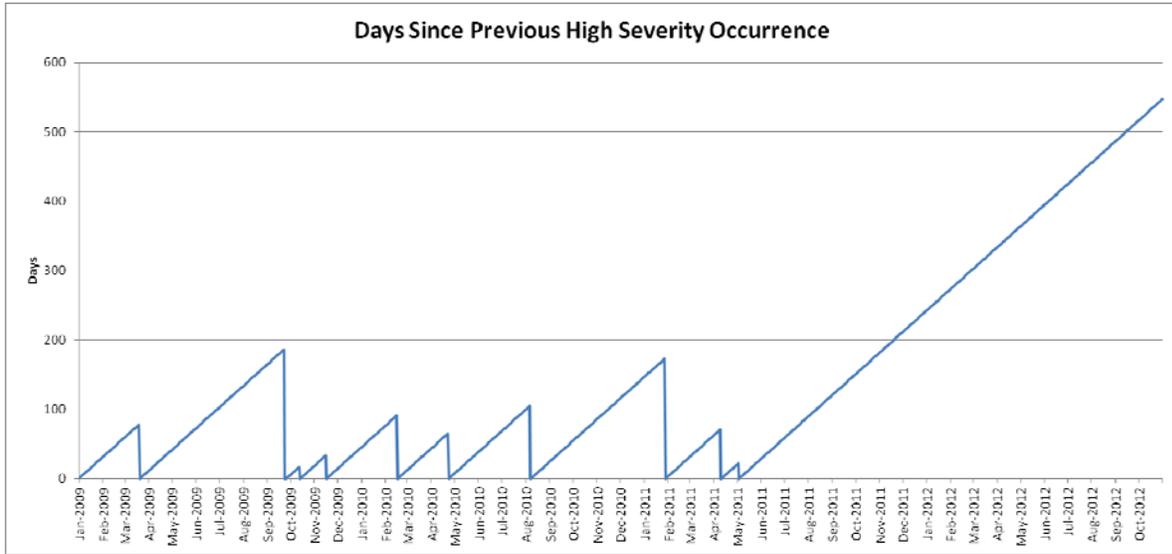
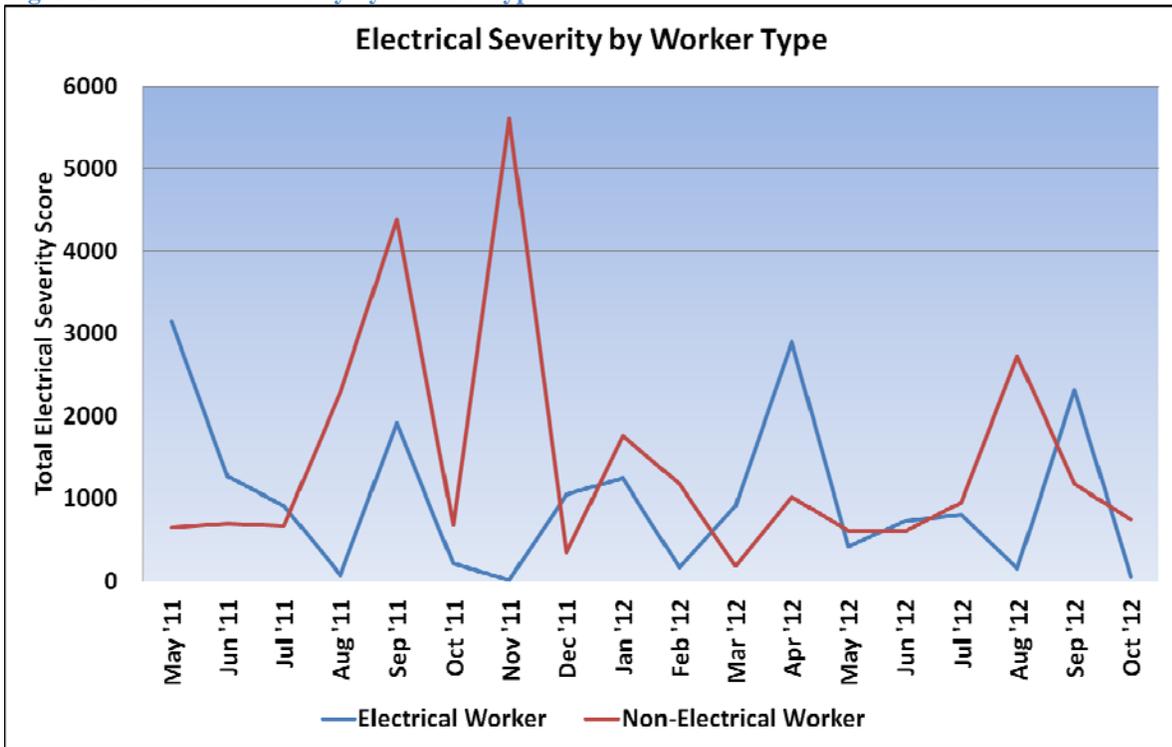


Figure 10 shows the total electrical severity score by worker type for each month.

Figure 10 – Electrical Severity by Worker Type



Electrical workers typically have the fewest number of occurrences. Following a spike in September of 2,320, the ES score for electrical workers dropped to 60, while non-electrical workers ES scores decreased from 1,180 to 750. The average ES scores for the 18 month period are 1,181 for electrical workers and 1,436 for non-electrical workers.

## Summary of Occurrences by Severity Band

For the interval October 2011 through October 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)

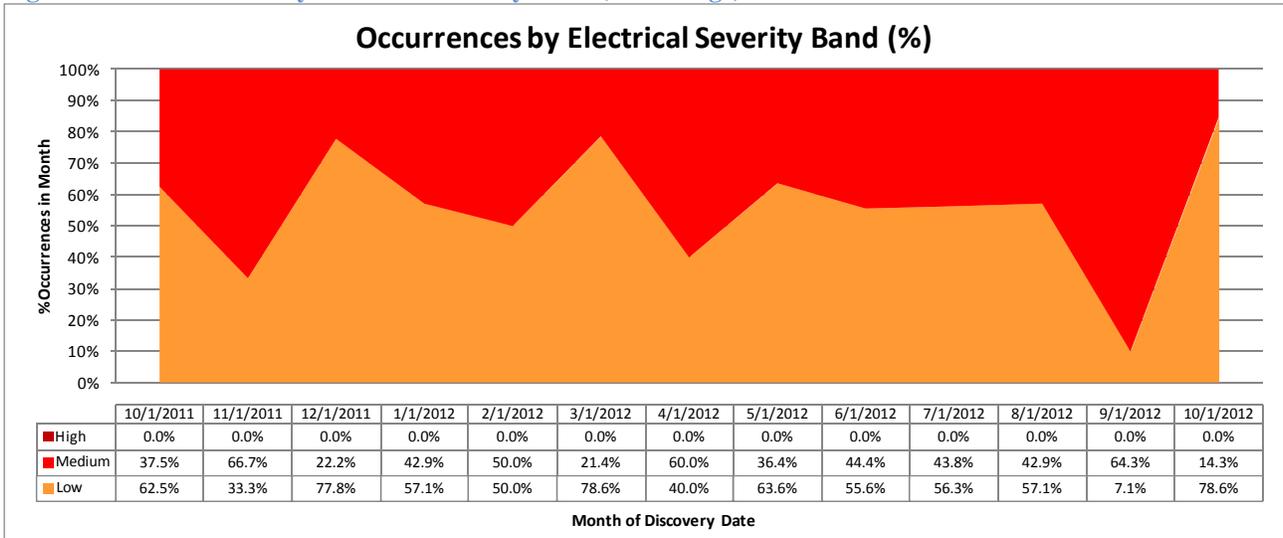
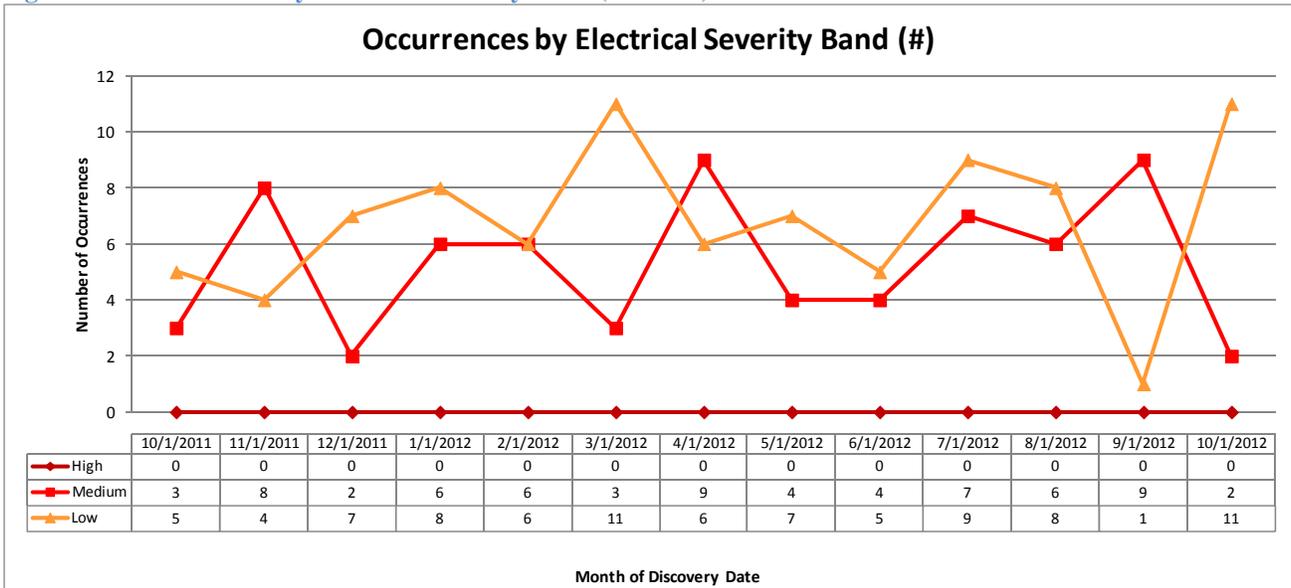


Figure 12 - Occurrences by Electrical Severity Band (Number)

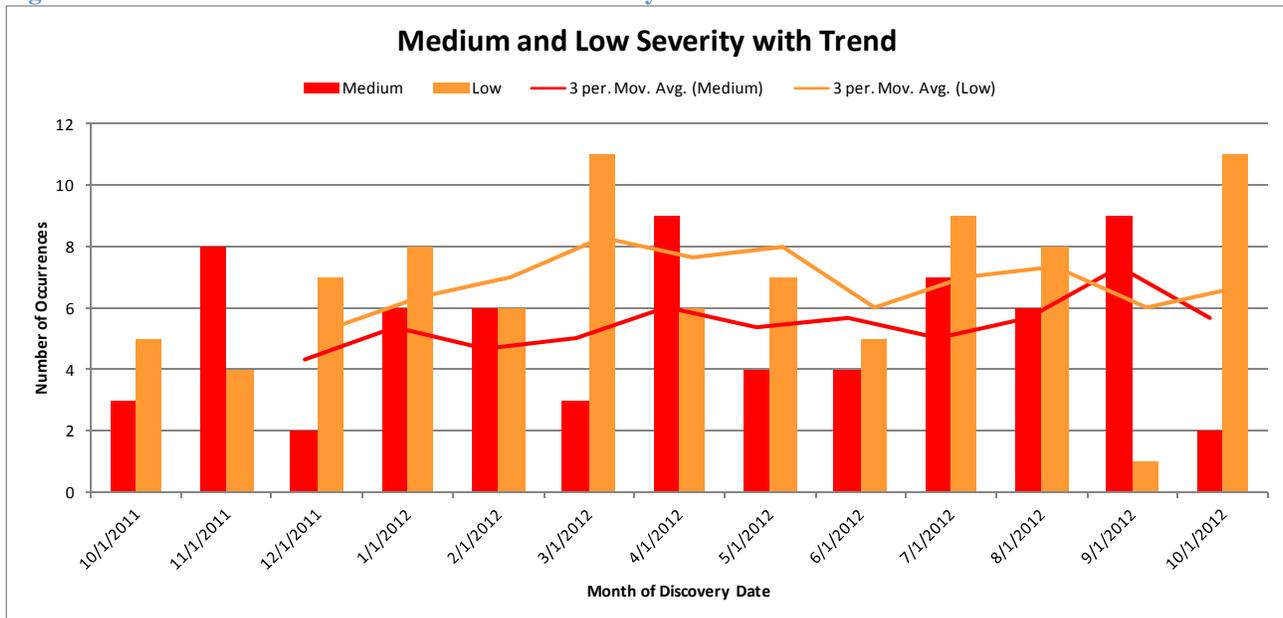


What can be seen from the previous two charts is that the number of occurrences with High electrical severity scores has remained at zero for the past 14 months and that the number of occurrences with Medium scores have decreased as the number of Low and zero severity occurrences increased.

## Medium and Low Severity with Trend

Figure 13 focuses on the Medium and Low severity data series for October 2011 through October 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 and an increasing trend for Low severity occurrences. 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](http://www.efcog.org/wg/esh_es/index.htm)

### Center of Excellence for Electrical Safety

<http://www.lanl.gov/safety/electrical/>

## Contact

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## Attachment 1

## Electrical Safety Occurrences – October 2012

No	Report Number	Event Summary	SHOCK	BURN	ARCF <sup>(1)</sup>	LOTO <sup>(2)</sup>	PLAN <sup>(3)</sup>	EXCAV <sup>(4)</sup>	CUT/D <sup>(5)</sup>	VEH <sup>(6)</sup>	SC <sup>(7)</sup>	RC <sup>(8)</sup>	ES <sup>(9)</sup>
1	EE-GO--NREL-NREL-2012-0015	A subcontractor was exposed to 120V when he removed a motor cover without wearing proper PPE or installing a LOTO.				X					3	2E(2)	20
2	EM-RL--CPRC-CENTPLAT-2012-0001	An energized 120V circuit was found in a panel during a LOTO safe condition check.					X				4	2E(3)	10
3	EM-RL--CPRC-GPP 2012-0004	Work performed inside air handling unit without placing authorized worker lock.				X					4	2E(3)	0
4	EM-RL--CPRC-SNF-2012-0012	Workers discovered 124 VAC while performing the zero energy check.					X				3	2E(2), 2E(3)	10
5	NA--LASO-LANL-CMR-2012-0011	An electrician opened the wrong breaker for a LOTO because of an inaccurate panel schedule.					X				4	10(2)	0
6	NA--LASO-LANL-TA55-2012-0034	An electrician saw an arc and heard a bang when a screw penetrated a 480V conductor on an electrical raceway cover.							X		3	2E(2)	0
7	NA--LSO-GOAK-LSO-2012-0001	A subcontractor performed a LOTO on a circuit that was not included on a low voltage permit.				X					4	2E(3)	0
8	NA--SS-SNL-NMFAC-2012-0007	A short circuit occurred from a 120V light switch while removing parts on a HVAC unit.					X				3	2E(2)	20
9	NA--YSO-BWXT-Y12NUCLEAR-2012-0021	Concerns were raised as to whether hazardous energy controls had been implemented for work in electric furnace.									3	10(3)	600
10	NE-ID--BEA-STC-2012-0002	A subcontractor worked on a commercial coffee machine without a LOTO.				X					4	2E(3)	110
11	NE-ID--GOID-RESL-2012-0001	A subcontractor worked on an electrical system without following LOTO procedures.				X					3	2E(2)	20

Attachment 1

No	Report Number	Event Summary	SHOCK	BURN	ARCF <sup>(1)</sup>	LOTO <sup>(2)</sup>	PLAN <sup>(3)</sup>	EXCAV <sup>(4)</sup>	CUT/D <sup>(5)</sup>	VEH <sup>(6)</sup>	SC <sup>(7)</sup>	RC <sup>(8)</sup>	ES <sup>(9)</sup>
12	SC--BSO-LBL-OPERATIONS-2012-0012	A subcontractor electrician opened a panel that contained exposed, energized 120V contacts without permission.									4	2E(3)	20
13	SC--PNSO-PNNL-PNNLBOPER-2012-0017	The key for an electrical vault LOTO was left on the table next to the lock box instead of being placed inside the lock box.				X					4	2E(3)	0
	TOTAL		0	0	0	6	4	0	1	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  $\geq 1750$ , Medium is 31-1749, and Low is 1-30

Attachment 1

Electrical Safety Occurrences – October 2012

No	Report Number	Event Summary	EW <sup>(1)</sup>	N-EW <sup>(2)</sup>	SUB <sup>(3)</sup>	HFW <sup>(4)</sup>	WFH <sup>(5)</sup>	PPE <sup>(6)</sup>	70E <sup>(7)</sup>	VOLT <sup>(8)</sup>		C/T <sup>(9)</sup>	NEUT <sup>(10)</sup>	NM <sup>(11)</sup>
										H	L			
1	EE-GO--NREL-NREL-2012-0015	A subcontractor was exposed to 120V when he removed a motor cover without wearing proper PPE or installing a LOTO.			X			X			X			
2	EM-RL--CPRC-CENTPLAT-2012-0001	An energized 120V circuit was found in a panel during a LOTO safe condition check.	<del>XX</del>			X					X			
3	EM-RL--CPRC-GPP-2012-0004	Work performed inside air handling unit without placing authorized worker lock.				X					X			
4	EM-RL--CPRC-SNF-2012-0012	Workers discovered 124 VAC while performing the zero energy check.	<del>XX</del>			X					X			
5	NA--LASO-LANL-CMR-2012-0011	An electrician opened the wrong breaker for a LOTO because of an inaccurate panel schedule.	X			X					X			
6	NA--LASO-LANL-TA55-2012-0034	An electrician saw an arc and heard a bang when a screw penetrated a 480V conductor on an electrical raceway cover.	X			<del>XX</del>					X			X
7	NA--LSO-GOAK-LSO-2012-0001	A subcontractor performed a LOTO on a circuit that was not included on a low voltage permit.	X		X						X			
8	NA--SS-SNL-NMFAC-2012-0007	A short circuit occurred from a 120V light switch while removing parts on a HVAC unit.			X	<del>XX</del>					X			X
9	NA--YSO-BWXT-Y12NUCLEAR-2012-0021	Concerns were raised as to whether hazardous energy controls had been implemented for work in electric furnace.	X								X			X
10	NE-ID--BEA-STC-2012-0002	A subcontractor worked on a commercial coffee machine without a LOTO.	X		X	X					X			
11	NE-ID--GOID-RESL-2012-0001	A subcontractor worked on an electrical system without following LOTO procedures.	<del>XX</del>		X	X					X			

Attachment 1

No	Report Number	Event Summary	EW <sup>(1)</sup>	N-EW <sup>(2)</sup>	SUB <sup>(3)</sup>	HFW <sup>(4)</sup>	WFH <sup>(5)</sup>	PPE <sup>(6)</sup>	70E <sup>(7)</sup>	VOLT <sup>(8)</sup>		C/I <sup>(9)</sup>	NEUT <sup>(10)</sup>	NM <sup>(11)</sup>
										H	L			
12	SC--BSO-LBL-OPERATIONS-2012-0012	A subcontractor electrician opened a panel that contained exposed, energized 120V contacts without permission.	X		X						X			
13	SC--PNSO-PNNL-PNNLBOPER-2012-0017	The key for an electrical vault LOTO was left on the table next to the lock box instead of being placed inside the lock box.	X			X					X			
	TOTAL		8	5	6	2X	11	1	0	0	13	0	0	3

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 55916 OR(s) with 59226 occurrences(s) as of 11/28/2012 12:09:57 PM

Query selected 13 OR(s) with 13 occurrences(s) as of 11/28/2012 12:10:15 PM

Download this report in Microsoft Word format. 

**1)Report Number:** [EE-GO--NREL-NREL-2012-0015](#) After 2003 Redesign

**Secretarial Office:** Energy Efficiency and Renewable Energy

**Lab/Site/Org:** National Renewable Energy Laboratory

**Facility Name:** National Renewable Energy Laboratory

**Subject/Title:** Service subcontractor exposed to electrical shock hazard

**Date/Time Discovered:** 10/23/2012 10:30 (MTZ)

**Date/Time Categorized:** 10/23/2012 17:52 (MTZ)

**Report Type:** Notification

**Report Dates:**

Notification	10/25/2012	17:36 (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:** 4) Perform Work Within Controls

**Subcontractor Involved:** Yes

Vortex

**Occurrence Description:** On October 23, 2012, a service subcontractor was called to NREL to repair a malfunctioning rollup door in the Research Support Facility (RSF). An employee from the subcontractor company was dispatched to NREL and checked in with Site Operations. Upon his arrival at NREL, the subcontractor employee evaluated the door and determined that he would need a ladder and tools to perform his work. After escorting the subcontractor to retrieve his ladder and tools, his escort, a Site Operations maintenance technician, was temporarily called away.

When the Site Ops worker returned after 5 to 10 minutes, the subcontractor informed the Site Ops worker that he needed to cut through the drywall in order to access the door's gearbox. The Site Ops worker escorted the subcontractor to meet with the Building Area Engineer (BAE)

to request a penetration permit. When the maintenance technician, BAE, and subcontractor convened a short time later at the door site to review the work and issue the penetration permit, it was discovered that the cover had been removed from the door's driver (motor), which was located above the ceiling tiles on the opposite side of the door from the gearbox. The subcontractor had removed the cover in order to visually inspect the condition of the driver and see if any components had burnt out. At no time did the worker attempt to perform any work on the driver. The service subcontractor had been authorized to work at NREL since July 2010.

The subcontractor did not control the electrical hazard presented by the uncovered driver box either via use of required PPE or by locking and tagging out the system prior to opening the cover (PPE is also required for lockout/tagout in order to confirm zero voltage). As a result, he was exposed to 120 volts of electricity. At the time of the exposure, he was standing on the second rung of a ladder, approximately two feet off the ground. No injuries or property damage resulted from this occurrence.

Upon discovery of the uncovered driver box, the BAE suspended all work on the door and notified NREL's Environment, Health and Safety Office. NREL requested, via its Contracts & Business Services Office, that the subcontractor conduct an incident investigation of this occurrence, to include causal analysis and corrective actions. NREL will review the submitted incident investigation report and will meet with the subcontractor's management prior to work resuming. NREL has also initiated an internal investigation of the occurrence.

**Cause Description:**

**Operating Conditions:**

Normal Operating Conditions

**Activity Category:**

Maintenance

**Immediate Action(s):**

1. The Building Area Engineer (BAE) suspended all work on the door.
2. The BAE notified the Environment, Health and Safety Office of the occurrence.
3. NREL requested, via its Contracts & Business Services Office, that the subcontractor conduct an incident investigation of this occurrence, to include causal analysis and corrective actions.
4. NREL will review the subcontractor's incident investigation report and will review the report with the subcontractor's management prior to resuming work on this activity.
5. An NREL incident investigation has been initiated as well.

**FM Evaluation:**

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is**

Yes.

**Required:** Before Further Operation? No  
 By Whom:  
 By When:  
**Division or Project:** Site Operations  
**Plant Area:** South Table Mountain  
**System/Building/Equipment:** Research Support Facility  
**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  
 14G--Quality Assurance - Procurement Deficiency

**HQ Summary:** On October 23, 2012, a subcontractor was exposed to 120 volts when he removed a drive motor cover on a malfunctioning rollup door at the Research Support Facility without wearing proper personal protective equipment or installing a lockout/tagout. The subcontractor removed the cover when his escort was called away for approximately 5 to 10 minutes. The condition was discovered when the subcontractor, escort and Building Area Engineer went to the rollup door to conduct a review before issuing a penetration permit that was necessary to repair the door. Work was suspended and notifications were made.

**Similar OR Report Number:**

**Facility Manager:**

Name	JORDAN, MAUREEN Y
Phone	(303) 275-3248
Title	EHS OFFICE DIRECTOR

**Originator:**

Name	LITTRELL, BOBBIJO R.
Phone	(303) 275-3230
Title	COMPLIANCE ASSURANCE SPECIALIST

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
10/23/2012	17:52 (MTZ)	Event Notification	DOE/NREL

**Authorized Classifier(AC):**

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**2)Report Number:** [EM-RL--CPRC-CENTPLAT-2012-0001](#) After 2003 Redesign

**Secretarial Office:** Environmental Management  
**Lab/Site/Org:** Hanford Site  
**Facility Name:** Central Plateau Remediation Project  
**Subject/Title:** Energized Circuit Found During Safe Condition Check  
**Date/Time Discovered:** 10/24/2012 10:14 (PTZ)  
**Date/Time Categorized:** 10/24/2012 11:20 (PTZ)  
**Report Type:** Notification/Final

**Report Dates:**

Notification	10/29/2012	17:07 (ETZ)
Initial Update	10/29/2012	17:07 (ETZ)
Latest Update	10/29/2012	17:07 (ETZ)
Final	10/29/2012	17:07 (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:**

3) Develop and Implement Hazard Controls

**Subcontractor Involved:**

No

**Occurrence Description:**

While performing a safe condition check for a Controlling Organization lockout of the B Plant Exhaust Fan System, an energized 120 volt circuit was identified at the TB-1 panel and adjacent relays. Investigation found that the one-line controlled drawing used to design the tagout boundary did not show an additional source of power. The additional power source was noted on other system drawings.

**Cause Description:****Operating Conditions:**

Maintenance

**Activity Category:**

Maintenance

**Immediate Action(s):**

Work was stopped. The tag was cleared and the Exhaust Fan System restored to service. The work package was suspended. A critique was conducted.

**FM Evaluation:****DOE Facility Representative****Input:****DOE Program Manager****Input:****Further Evaluation is Required:**

No

**Division or Project:**

Decommissioning Waste Fuels &amp; Remediation Services

**Plant Area:**

200E

**System/Building/Equipment:** B Plant

**Facility Function:** Nuclear Waste Operations/Disposal

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:** 01B--Inadequate Conduct of Operations - Loss of Configuration Management/Control  
 01M--Inadequate Conduct of Operations - Inadequate Job Planning (Electrical)  
 12C--EH Categories - Electrical Safety  
 14D--Quality Assurance - Documents and Records Deficiency  
 14E--Quality Assurance - Work Process Deficiency

**HQ Summary:** On October 24, 2012, an energized 120 volt circuit was identified at the TB-1 panel and adjacent relays while performing a safe condition check for a Controlling Organization lockout of the B Plant Exhaust Fan System. Investigation found that the one-line control drawing used to design the tagout boundary did not show an additional source of power. The additional power source was noted on other system drawings. Work was stopped, the tag was cleared and the Exhaust Fan System was restored to service. The work package was suspended. A critique was conducted.

**Similar OR Report Number:**

**Facility Manager:**

Name	Corriell, Darin R
Phone	(509) 376-1743
Title	Facility Manager

**Originator:**

Name	POOLE, M ELIZABETH
Phone	(509) 373-0522
Title	

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
10/24/2012	10:14 (PTZ)	D. Corriell	CPS&M
10/24/2012	10:14 (PTZ)	M. Edington	CPS&M
10/24/2012	11:55 (PTZ)	R.V. Johnson	DOE RL
10/24/2012	12:25 (PTZ)	G. Trump	MSA ONC

**Authorized Classifier(AC):**

**3)Report Number:** [EM-RL--CPRC-GPP-2012-0004](#) After 2003 Redesign

**Secretarial Office:** Environmental Management

**Lab/Site/Org:** Hanford Site

**Facility Name:** Groundwater Protection Project

**Subject/Title:** Work Performed Without Authorized Worker Lock Being Placed

**Date/Time Discovered:** 10/04/2012 19:00 (PTZ)

**Date/Time Categorized:** 10/05/2012 07:00 (PTZ)

**Report Type:** Notification/Final

**Report Dates:**

Notification	10/10/2012	16:19 (ETZ)
Initial Update	10/10/2012	16:19 (ETZ)
Latest Update	10/10/2012	16:19 (ETZ)
Final	10/10/2012	16:19 (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:**

- 2) Analyze the Hazards
- 3) Develop and Implement Hazard Controls
- 4) Perform Work Within Controls
- 5) Provide Feedback and Continuous Improvement

**Subcontractor Involved:** No

**Occurrence Description:** On 10/4/2012, a new preventive maintenance work package (G2-12-60421, "200W P&T 6 Month Chemical Room Air Handling Unit Inspection") for the 200 West Pump and Treat (P&T) chemical room air handling unit was executed. Prior to work beginning, the air handling unit was electrically isolated using an 8 criteria lock out/tag out (LOTO). Following completion of maintenance work package, a post job engineering review was completed. During the review, it was discovered that an Industrial Hygiene Technician (IHT) had performed air monitoring work for the air handling unit without being required to over lock the unit with their personal authorized worker lock (AWL).

Initially it was believed the IHT could perform confined space air monitoring from outside of the air handling unit (the confined space boundary) without applying an AWL since there was no potential exposure to any known hazard. In response to questions raised by the work team, an agreement was reached to conduct a follow-up engineering evaluation of other possible hazardous energy sources. During the course of the review, it was discovered that the electrical heating coils, if energized, would have been a potential electrical shock hazard to the IHT via the extended reach air monitoring probe.

Since the air handling unit had been electrically isolated by the 8 criteria lockout, at no time during the preventive maintenance and air monitoring activities were any personnel exposed to a hazardous energy source.

**Cause Description:**

**Operating Conditions:** Normal - Conducting Planned Maintenance of Air Handling Unit

**Activity Category:** Maintenance

**Immediate Action(s):**

- 1) Initiated standard event notification process.
- 2) Suspended further maintenance of air handling units pending evaluation of similar air handling units and modification of maintenance work package(s).
- 3) Scheduled critique of event.

**FM Evaluation:**

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** No

**Division or Project:** CHPRC Soil & Groundwater Remediation Project

**Plant Area:** 200 West

**System/Building/Equipment:** 200 West Pump & Treat / Building 289-T

**Facility Function:** Environmental Restoration Operations

**Corrective Action:**

**Lessons(s) Learned:** Lessons Learned to be developed as part of the causal analysis.

**HQ Keywords:**

- 01K--Inadequate Conduct of Operations - Lockout/Tagout Noncompliance (Electrical)
- 01N--Inadequate Conduct of Operations - Inadequate Job Planning (Other)
- 01O--Inadequate Conduct of Operations - Inadequate Maintenance
- 08H--OSHA Reportable/Industrial Hygiene - Safety Noncompliance
- 12B--EH Categories - Conduct of Operations
- 14E--Quality Assurance - Work Process Deficiency

**HQ Summary:** On October 4, 2012, an Industrial Hygiene Technician (IHT) performed air monitoring work on an air handling unit without being required to over lock the unit with their personal authorized worker lock (AWL). A new preventive maintenance work package for inspecting the air handling unit had been executed and the unit had been electrically isolated using a lock out/tag out. It was initially believed the IHT could perform confined space air monitoring from outside the air handling unit without applying an AWL since there was no potential exposure to any known hazard. Personnel discovered that the electrical heating coils, if energized, would have been a potential electrical shock hazard to the IHT via the extended reach air monitoring probe during a follow-up engineering evaluation of other possible hazardous energy sources. A critique was scheduled.

**Similar OR Report Number:**

**Facility Manager:**

Name	BARRETT, WILLIAM F.
------	---------------------

Phone	(509) 373-3985
Title	OPERATIONS DIRECTOR

**Originator:**

Name	DAVISON, LYNN R.
Phone	(509) 373-4442
Title	OPERATIONS SPECIALIST

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
10/05/2012	07:00 (PTZ)	Mark Cherry (Acting V.P.)	CHPRC
10/05/2012	08:00 (PTZ)	Brian Biro	DOE-RL
10/05/2012	08:05 (PTZ)	Krista Weeks	HAMTC
10/05/2012	08:08 (PTZ)	Ryan Legg	CHPRC
10/05/2012	08:14 (PTZ)	Dale Higham	CHPRC
10/05/2012	09:40 (PTZ)	Gary Trump	ONC

**Authorized Classifier(AC):**

**4)Report Number:** [EM-RL--CPRC-SNF-2012-0012](#) After 2003 Redesign  
**Secretarial Office:** Environmental Management  
**Lab/Site/Org:** Hanford Site  
**Facility Name:** Spent Nuclear Fuels Project  
**Subject/Title:** Voltage Discovered During Safe Condition Check at Cold Vacuum Drying Facility  
**Date/Time Discovered:** 10/16/2012 15:00 (PTZ)  
**Date/Time Categorized:** 10/16/2012 15:32 (PTZ)  
**Report Type:** Update  
**Report Dates:**

Notification	10/18/2012	16:53 (ETZ)
Initial Update	10/19/2012	18:10 (ETZ)
Latest Update	10/19/2012	18:10 (ETZ)
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.

2E(3) - Any failure to follow a prescribed hazardous energy control

process (e.g., lockout/tagout, hazardous energy control program).

**Cause Codes:**

**ISM:** 3) Develop and Implement Hazard Controls

**Subcontractor Involved:** No

**Occurrence Description:** On 10/16/12, at the Cold Vacuum Drying Facility, during installation of Lockout Tagout (LOTO) V-12-017 to support replacement of a power supply in CP-411, per Work Package 1K-11-10295, voltage (124VAC) was discovered to be present during the Safe Condition Check. The activity was stopped, notifications were completed, and the event was screened and categorized. A critique was scheduled for the following day to fully evaluate the event.

Update 10/19/12: Based on continuing investigation and review, this event is being upgraded to a Group 2, Subgroup E, Hazardous Energy Control Electrical Category 2, SC-3; 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. No additional immediate actions were taken or required. Discovery associated with the upgrade in significance category was 10/19/12, 1045 Hours, and categorization was completed on 10/19/12, at 1234 Hours.

**Cause Description:**

**Operating Conditions:** Normal operations. Work was underway to install a LOTO in support of power supply replacement.

**Activity Category:** Normal Operations (other than Activities specifically listed in this Category)

**Immediate Action(s):** Work was stopped, notifications were made, the event was screened and categorized, and a critique was scheduled for the following day.

**FM Evaluation:** The facility is in a safe condition, with no hazard to the workers, environment, or facility.

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is** Yes.

**Required:** Before Further Operation? No  
By Whom: Facility Engineering  
By When:

**Division or Project:** CHPRC/D&D/100K Area

**Plant Area:** 100K Area

**System/Building/Equipment:** Power Supply in CP-411/CVD Facility

**Facility Function:** Nuclear Waste Operations/Disposal

**Corrective Action:****Lessons(s) Learned:****HQ Keywords:**

01M--Inadequate Conduct of Operations - Inadequate Job Planning  
(Electrical)  
08H--OSHA Reportable/Industrial Hygiene - Safety Noncompliance  
12C--EH Categories - Electrical Safety  
14E--Quality Assurance - Work Process Deficiency

**HQ Summary:**

On October 16, 2012, during the installation of a lockout/tagout to support replacement of a power supply in CP-411 at the Cold Vacuum Drying Facility, workers discovered 124 VAC while performing the Safe Condition Check. The activity was stopped, notifications were completed, and the event was screened and categorized. A critique was scheduled to fully evaluate the event.

**Similar OR Report Number:****Facility Manager:**

Name	R. K. Nissen
Phone	(509) 373-4547
Title	Manager, K West Facility

**Originator:**

Name	FEIL, RHONDA K
Phone	(509) 373-4551
Title	ADMINISTRATIVE SPECIALIST

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
10/16/2012	15:10 (PTZ)	R. K. Nissen	CPRC/D&D
10/16/2012	15:32 (PTZ)	D. H. Splett	RL/OOD
10/19/2012	11:50 (PTZ)	D. H. Splett	RL/OOD
10/19/2012	12:15 (PTZ)	R. K. Nissen	CPRC/D&D

**Authorized Classifier(AC):****5)Report Number:**

[NA--LASO-LANL-CMR-2012-0011](#) After 2003 Redesign

**Secretarial Office:**

National Nuclear Security Administration

**Lab/Site/Org:**

Los Alamos National Laboratory

**Facility Name:**

Chemistry & Metallurgy Research

**Subject/Title:**

Management Concern: Formality of and Attention to Detail of Conduct of Operations Principles in Work Processes

**Date/Time Discovered:**

10/02/2012 10:45 (MTZ)

**Date/Time Categorized:**

10/02/2012 15:45 (MTZ)

**Report Type:**

Notification/Final

**Report Dates:**

Notification	10/05/2012	11:55 (ETZ)
Initial Update	10/05/2012	11:55 (ETZ)
Latest Update	10/05/2012	11:55 (ETZ)
Final	10/05/2012	11:55 (ETZ)

**Significance Category:**

4

**Reporting Criteria:**

10(2) - An event, condition, or series of events that does not meet any of the other reporting criteria, but is determined by the Facility Manager or line management to be of safety significance or of concern for that facility or other facilities or activities in the DOE complex.  
 The significance category assigned to the management concern should be based on an evaluation of the potential risks and impact on safe operations.  
 (1 of 4 criteria - This is a SC 4 occurrence)

**Cause Codes:**

**ISM:**

5) Provide Feedback and Continuous Improvement

**Subcontractor Involved:**

No

**Occurrence Description:**

**MANAGEMENT SYNOPSIS**

On Tuesday, October 2, 2012, at 1045 hours, at the Los Alamos National Laboratory (LANL) Chemistry and Metallurgy Research (CMR) Facility, a Facility Operator (FO) reported to the Operations Center (OC) that he had completed an Independent Verification of a lock out tag out (LO/TO) for an elevator repair activity in Wing 9. The OC Shift Operations Supervisor (SOS) responded that they had received a corresponding indication that the Wing Uninterruptable Power Supply (UPS) had lost power. The elevator repair isolations should not have affected any other systems in the Wing. The OC SOS directed that the work activity be paused, the LO/TO be removed and power restored. The event was initially categorized as non-reportable.

On Wednesday, October 3, 2012, a critique was held where it was determined that the event did not constitute a LO/TO violation, nor were workers exposed to electrical hazardous energy as work had not begun at the time of discovery of the mis-placed LO/TO. However, the CMR Facility Operations Director (FOD) designee determined that there was a management concern regarding the formality of and attention to detail with the application of Conduct of Operations principles. At 1010 hours the FOD designee re-categorized the event from non-reportable to 10(2) significance category 4.

The formality of and attention to detail in the application of Conduct of Operations principles were related to: consistent work package instructions; following procedures and permits verbatim; adequacy of pre-job briefs; electrical panel schedules/labeling; and worker questioning attitude. Corrective actions addressing these concerns will be managed in

the LANL Performance Feedback and Issues Management System (PFITS); reference PFITS issue number 2012-3682.

There was no impact to the health and safety of personnel, the environment, or the program as a result of this event.

#### EVENT SEQUENCE

On Monday, October 1, 2012, at approximately 0800 hours, a LANL Maintenance and Site Services (MSS) crew reported to the CMR OC to begin maintenance work on the elevator in Wing 9, where it had been reported that the elevator doors were not closing. The OC SOS issued locks based on the provided Attachment B and two completed red tags, indicating a LO/TO of the CDD (the local disconnect location). However, the locks did not leave the OC, as work performed that day did not require de-energized work.

On Tuesday, October 2, 2012, at approximately 0800 hours, a different MSS crew reported to the CMR OC to continue the maintenance work. Again, the OC SOS issued locks based on the provided Attachment B and two completed red tags, indicating a LO/TO of the MCC (an upstream disconnect location); specifically, circuit 4.

A MSS elevator electrician placed a lock and tag on the elevator CDD, which was identified in the MSS Task Steps document included in the work package. A CMR FO performed the required independent verification of the LO/TO and noticed that the tag and Attachment B identified the MCC as the disconnect point. The MSS electrician located the MCC panel, but was unable to identify the exact location of circuit 4 as the circuits were not marked and there was not a panel schedule available for reference. At some point in the past, the word “elevator” had been written below a circuit, and the MSS electrician interpreted this as identifying circuit 4 and applied the lock and tag to that circuit.

At 1045 hours, the CMR FO reported to the OC that he had completed an Independent Verification of a LO/TO for elevator repair activities. The OC SOS responded that they had received a corresponding indication that the Wing UPS had lost power. The elevator repair isolations should not have affected any other systems in the Wing. The OC SOS directed that the work activity be paused, the LO/TO be removed and power restored.

At approximately 1050 hours, power was restored to the UPS and all work on the elevator maintenance was paused.

#### EXTENT OF CONDITION

The FOD designee assessed the need for an Extent of Condition (EOC), in accordance with DOE Order 232.2, Occurrence Reporting and Processing

of Operations Information, and determined one was warranted for this event. The EOC results are not available at this time. EOC results will be documented in the local LANL Performance Feedback Improvement Tracking System (PFITS) Record Number PFITS-2012-3682.

**Cause Description:**

**Operating Conditions:**

Normal

**Activity Category:**

Maintenance

**Immediate Action(s):**

1. The lock and tag was removed and power restored to the UPS.
2. Work was paused.
3. The work package will be reviewed to correct discrepancies.
4. The correct LO/TO isolation point will be identified on a new Attachment B.
5. A panel schedule will be placed in the MCC box in W9.

**FM Evaluation:**

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:**

No

**Division or Project:**

CMR Operations

**Plant Area:**

TA-3 bldg. 29

**System/Building/Equipment:** Wing 9 Elevator

**Facility Function:**

Laboratory - Research & Development

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:**

- 01A--Inadequate Conduct of Operations - Inadequate Conduct of Operations (miscellaneous)
- 01B--Inadequate Conduct of Operations - Loss of Configuration Management/Control
- 01E--Inadequate Conduct of Operations - Operations Procedure Noncompliance
- 01K--Inadequate Conduct of Operations - Lockout/Tagout Noncompliance (Electrical)
- 01M--Inadequate Conduct of Operations - Inadequate Job Planning (Electrical)
- 01P--Inadequate Conduct of Operations - Inadequate Oral Communication
- 01R--Inadequate Conduct of Operations - Management issues
- 07C--Electrical Systems - Power Outage
- 08H--OSHA Reportable/Industrial Hygiene - Safety Noncompliance
- 12B--EH Categories - Conduct of Operations
- 14D--Quality Assurance - Documents and Records Deficiency
- 14E--Quality Assurance - Work Process Deficiency

**HQ Summary:**

On October 3, 2012, the Chemistry and Metallurgy Research Facility Operations Director designee determined that there was a management concern regarding the formality of and attention to detail with the application of Conduct of Operations principles following a critique of an occurrence resulting in an uninterruptable power supply (UPS) loss of power after the wrong circuit was de-energized for an elevator repair in Building 29. The formality of and attention to detail in the application of Conduct of Operations principles were related to: consistent work package instructions; following procedures and permits verbatim; adequacy of pre-job briefs; electrical panel schedules/labeling; and worker questioning attitude. Power was restored to the UPS and all work on the elevator maintenance was paused. The work package will be reviewed to correct discrepancies and the correct isolation point will be identified

**Similar OR Report Number:**

**Facility Manager:**

Name	Steve Antimary
Phone	(505) 664-0473
Title	Facility Operations Director Designee

**Originator:**

Name	TANNER, KIMBERLI K
Phone	(505) 665-8197
Title	OCCURRENCE INVESTIGATOR

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
10/02/2012	16:10 (MTZ)	Randi Allen	NNSA

**Authorized Classifier(AC):** Kimberli Tanner      Date: 10/05/2012

**6)Report Number:**

[NA--LASO-LANL-TA55-2012-0034](#) After 2003 Redesign

**Secretarial Office:**

National Nuclear Security Administration

**Lab/Site/Org:**

Los Alamos National Laboratory

**Facility Name:**

Plutonium Proc & Handling Facility

**Subject/Title:**

Unexpected Discovery of Electrical Energy: Electrical Arc Caused by Tightening a Screw in a Raceway Cover

**Date/Time Discovered:**

10/22/2012 10:10 (MTZ)

**Date/Time Categorized:**

10/22/2012 11:11 (MTZ)

**Report Type:**

Final

**Report Dates:**

Notification	10/24/2012	09:34 (ETZ)
Initial Update	11/16/2012	10:28 (ETZ)
Latest Update	11/16/2012	10:28 (ETZ)

Final	11/16/2012	10:28 (ETZ)
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<b>Significance Category:</b>	3
<b>Reporting Criteria:</b>	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.
<b>Cause Codes:</b>	A7B1C01 - Other problem; External Phenomena; Weather or ambient conditions LTA
<b>ISM:</b>	6) N/A (Not applicable to ISM Core Functions as determined by management review.)
<b>Subcontractor Involved:</b>	No
<b>Occurrence Description:</b>	<p>MANAGEMENT SYNOPSIS: On Monday, October 22, 2012, at 1010, at Technical Area 55, Building 400 (TA-55-400), a Maintenance and Site Services, Central Shop Operations (MSS-CS ) electrician (E1) observed an arc and heard a "bang" while tightening a screw in an electrical raceway cover. The electrician did not experience any indication of electric shock. The screw penetrated the insulation of one phase of a 480 volt system. The phase shorted to ground. The raceway was rated as a 480 volt confinement system and the circuit was protected by an instantaneous circuit breaker which prevented the majority of the energy available from being shorted to ground. Analysis indicated there was no hazard to the electrician because of 1)the confinement system and 2) the instantaneous breaker function. The TA-55 radiological liquid waste (TA-55-RLW) Operations Manager categorized the event as Group 2E(2) significance level 3.</p> <p>BACKGROUND: The air ventilation system in TA-55-400 was being balanced in order to meet the requirements of negative air pressure in the laboratories. Part of the process was the identification and elimination of leak paths. The electrical raceways were identified as air leak paths because of a combination of loose cover screws and gaps between the covers and raceway. In order to correct the problem the screws holding the covers on were to be tightened and the gaps in the raceways were to be taped. The IWD developed for construction was still in use for the electrical system and covered tightening cover screws and taping air gaps. Personal Protective Equipment (PPE) for the job included a hard had, safety glasses, dielectric gloves, and steel toed shoes.</p> <p>E1 stated that it is not common to work on raceway covers once construction is completed. However, there was no reason to suspect that the cover screws might cause an electrical hazard.</p> <p>Work started on Monday, October 22, 2012. E1 and his partner were working together tightening screws in the raceway cover. E1 stated there were no indications that the conduits in the raceway were out of position, i.e., no missing screws and/or bulging covers. At approximately 1010 E1</p>

tightened a cover screw approximately one half turn, observed an arc, and heard a "bang."

**Cause Description:**

Apparent causal analysis and the DOE Causal Analysis Tree as described in the DOE Occurrence Reporting Causal Analysis Guide (DOE G 231.1-2) were used to identify the causes for this event. Apparent causes are identified as the most probable causes of an event or condition that management has the control to fix and for which effective recommendations for corrective actions can be generated.

The electrical event was not caused by poor work practices, component failure, failure to follow IWD, nor poor supervision. The use of the 6' X 6" X 36" sheet metal pull box, with its cover plate screw that contacted the conductor, with an EMT raceway was the correct application. Job hazards were reviewed and the electricians removed all the TA55-400 raceway covers using 8 cal/cm<sup>2</sup> suits, dielectric gloves, head covers, and face blast shields. E1 stated the conductors were all within standards. No deficiencies were identified. The only recommendation developed was that, as a good practice, raceway cables be tie-wrapped together in the raceway after pulling and before the cover plate is installed.

The DOE cause code which best describes this condition is Other Problem (A7), No Cause Code is Applicable (B4), No cause is known for this event (C01), A7B1C01.

Although no corrective action opportunities were identified a lessons learned will be developed and issued LANL-wide describing the event and the recommendation to tie-wrap raceway cables after pulling and before the cover plate is installed.

Corrective action No. 1 was to develop and issue a lessons learned.

No ISM deficiencies were identified.

Extent of Condition: Job hazards were reviewed and the electricians removed all the TA55-400 raceway covers using 8 cal/cm<sup>2</sup> suits, dielectric gloves, head covers, and face blast shields. E1 stated the conductors were all within standards. No deficiencies were identified.

**Operating Conditions:**

Tightening raceway cover screw

**Activity Category:**

Normal Operations (other than Activities specifically listed in this Category)

**Immediate Action(s):**

The electrician and his partner immediately stopped work and notified their foreman and the TA-55-400 operations center. The area was isolated with caution tape and system subject matter experts analyzed the situation and identified the tripped circuit. The system served by the system had uninterruptable power supply and diesel generator backup. There was no loss of electrical service to the

system.  
 Zero voltage was confirmed on all three phases and the line was repaired. Initial review of the incident indicated the conductor was located on the side of the raceway and the raceway cover screw penetrated the insulation after approximately one half turn of the screw. No installation deficiencies or material flaws were identified.  
 A critique was held at 1530 on the day of the event.  
 The work control process was reviewed and approved before work resumed.

**FM Evaluation:** Although this event did not impact the workers or the facility, it did re-emphasize the need to plan for the unexpected. The workers recognized potential hazards and were protected from them.

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** No

**Division or Project:** TA55-RLW

**Plant Area:** TA-55

**System/Building/Equipment:** TA-55-400 electrical raceway

**Facility Function:** Plutonium Processing and Handling

**Corrective Action 01:**

<b>Target Completion</b> <b>Date:</b> 11/16/2012	<b>Actual Completion</b> <b>Date:</b> 11/16/2012
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REVISION OR EXTENSION OF THIS ACTION REQUIRES FACILITY OPERATIONS DIRECTOR APPROVAL.

Title: Issue Lessons Learned

Action: Develop and issue lessons learned

Deliverable: Copy of lessons learned 2012-36

Responsible Organization: TA55-DO

Target or Completed Due Date: 11/08/2012

See PFITS 2012-4007, action #2 for action closure and objective evidence.

This action addresses cause code A7B1C01 which is identified in the causal analysis.

NOTE: This action has been closed in ORPS based on the documented completion of the Performance Feedback Improvement Tracking System (PFITS) entry.

**Lessons(s) Learned:****HQ Keywords:**

07D--Electrical Systems - Electrical Wiring  
 08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical)  
 12C--EH Categories - Electrical Safety  
 14L--Quality Assurance - No QA Deficiency

**HQ Summary:**

On October 22, 2012, a Maintenance and Site Services, Central Shop Operations (MSS-CS) electrician observed an arc and heard a "bang" while tightening a screw in an electrical raceway cover at Technical Area 55, Building 400. The electrician did not experience an electric shock. The screw penetrated the insulation of one phase of a 480-volt system, which shorted to ground. The majority of the available energy was prevented from being shorted to ground because the raceway was rated a 480-volt confinement system and the circuit was protected by an instantaneous circuit breaker. Work was stopped and appropriate notifications were made.

**Similar OR Report Number:** 1. None.

**Facility Manager:**

Name	Clifford Kirkland
Phone	(505) 606-0576
Title	TA-55-RLW Operations Manager

**Originator:**

Name	HUNSINGER, MARK W
Phone	(505) 665-1496
Title	OCCURRENCE INVESTIGATOR

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
10/22/2012	11:21 (MTZ)	Ron Fontana	LASO/FR

**Authorized Classifier(AC):** Mark Hunsinger      Date: 11/16/2012

**7)Report Number:**

[NA--LSO-GOAK-LSO-2012-0001](#) After 2003 Redesign

**Secretarial Office:**

National Nuclear Security Administration

**Lab/Site/Org:**

Lawrence Livermore National Lab.

**Facility Name:**

Livermore Site Office

**Subject/Title:**

Subcontractor's Failure to Follow Low Voltage Outage (LVO) Permit Requirements and Procedures

**Date/Time Discovered:**

10/17/2012 14:00 (PTZ)

**Date/Time Categorized:**

10/18/2012 10:30 (PTZ)

**Report Type:**

Notification/Final

**Report Dates:**

Notification	10/24/2012	12:30 (ETZ)
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Initial Update	10/24/2012	12:30 (ETZ)
Latest Update	10/24/2012	12:30 (ETZ)
Final	10/24/2012	12:30 (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:** 1) Define the Scope of Work  
4) Perform Work Within Controls

**Subcontractor Involved:** Yes  
Cable Links Construction Group

**Occurrence Description:** On Wednesday, 10/17/12, at approximately 2:00 pm, a Cable Links Construction Group (subcontractor of NNSA) electrician was installing a new transformer (T0057) in U325 and failed to follow the LLNL Low Voltage Outage (LVO) Permit requirements and procedures.

The electrician had an LVO Permit to perform LOTO on circuit # 4 Panel 1875A1-9, but he noticed he needed to replace the conductor inside of panel 1875A1-9. The electrician proceeded to perform LOTO on circuit # 9 on Panel 1875A1 located upstream without following the LVO Permit process. De-energizing circuit #9 resulted in loss of power to equipment in U325.

The LLNL mechanic received a number of alarm calls for equipment in U325 and he rushed to the facility and inspected the equipment for status and potential damage. No equipment was identified to be damaged at this time. The electrician had de-energized the panel and was not working on live circuits. No injuries resulted from this event.

The additional LOTO was not approved under the scheduled LVO permit. The equipment lost power and raised concerns with the property owner. Cable Links did not follow the procedures that are set in the Site Specific Safety Plan. This was determined to be a violation of LVO permit and procedures.

**Cause Description:**

**Operating Conditions:** Normal

**Activity Category:** Construction

**Immediate Action(s):** This is an NNSA managed contract through the Albuquerque Complex. The work is being performed at LLNL. The NNSA Contracting Officer Representative (COR) was notified of this concern, at which time both NNSA and LLNL representatives spoke with the Cable Links electrician and Project Manager of the concern.

The Facilities & Infrastructure Directorate (F&I) line managers were immediately notified of the event.

On Thursday October 18, 2012, at approximately 7:00 am LLNL had a safety meeting to go over what occurred and what needs to be done. LSO/LLNL requested Cable Links to make sure that all employees are familiarized with the site specific safety plan and that they understand if there is an unsafe condition that the responsible individual needs to be contacted right away to prevent potential harm to workers. LSO/LLNL followed up with an email indicating that work should be halted and that formal notification would be forthcoming.

On Monday October 22, 2012, the Contracting Officer (CO) at the Albuquerque Complex issued the Suspension of Work for a period of seven days. As a result of the safety violation, Cable Links is requested to provide a Mitigation Plan by October 24, 2012 that addresses what steps will take to ensure that no future safety violations will occur for the remainder of the project.

**FM Evaluation:**

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** No

**Division or Project:** NNSA/LSO

**Plant Area:** Site 200

**System/Building/Equipment:** U325

**Facility Function:** Balance of Plant - Infrastructure (Other Functions not specifically listed in this Category)

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:** 01E--Inadequate Conduct of Operations - Operations Procedure Noncompliance  
01K--Inadequate Conduct of Operations - Lockout/Tagout Noncompliance (Electrical)  
07C--Electrical Systems - Power Outage  
08H--OSHA Reportable/Industrial Hygiene - Safety Noncompliance  
11G--Other - Subcontractor  
12I--EH Categories - Lockout/Tagout (Electrical or Mechanical)  
14E--Quality Assurance - Work Process Deficiency  
14G--Quality Assurance - Procurement Deficiency

**HQ Summary:** On October 17, 2012, an NNSA subcontractor performed a lockout/tagout

(LOTO) on a circuit that was not included on the LLNL Low Voltage Outage (LVO) Permit while installing a new transformer (T0057) in U325. De-energizing the additional circuit resulted in a loss of power to equipment in U325 and caused a number of alarms. No equipment was damaged. The electrician had de-energized the panel and was not working on energized circuits. No injuries resulted from this event.

**Similar OR Report Number:**

**Facility Manager:**

Name	Stephan Loo
Phone	(925) 423-1369
Title	Doe NNSA Federal Project Director

**Originator:**

Name	HARTNETT, ADRIENNE M
Phone	(925) 424-6963
Title	PROGRAM ANALYST

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
10/18/2012	12:30 (PTZ)	Mike Brown	LSO
10/18/2012	12:30 (PTZ)	Phil Hill	LSO

**Authorized Classifier(AC):** Lois Marik    Date: 10/23/2012

**8)Report Number:**

[NA--SS-SNL-NMFAC-2012-0007](#) After 2003 Redesign

**Secretarial Office:**

National Nuclear Security Administration

**Lab/Site/Org:**

Sandia National Laboratories - SS

**Facility Name:**

SNL NM Site-wide F & M

**Subject/Title:**

Mechanical subcontractor creates a short circuit during renovation at Building 804

**Date/Time Discovered:**

10/18/2012 09:30 (MTZ)

**Date/Time Categorized:**

10/18/2012 14:00 (MTZ)

**Report Type:**

Notification

**Report Dates:**

Notification	10/22/2012	15:50 (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
  - 3) Develop and Implement Hazard Controls
  - 4) Perform Work Within Controls

**Subcontractor Involved:** Yes  
National Heating and Ventilating

**Occurrence Description:** At approximately 0900, a subcontract mechanical worker was removing parts on a HVAC unit and an electrical short circuit occurred from a 120 volt light switch at Building 804. The Prime contractor had removed electrical power to the work area with the exception of the lighting circuit. The short was caused by the mechanical subcontractor removing the energized electrical power to the HVAC unit which caused a short to the conductors. The subcontract mechanical worker was wearing a hard hat, safety glasses, safety shoes and work gloves while dismantling the heating, ventilating, and air-conditioning (HVAC) system. The tool that the mechanical subcontractor was utilizing had a rubber handle.

The worker was taken to medical for a precaution and released to full duty. There was no evidence of a shock during the event.

FMOC has categorized the event as an occurrence. It is a Group 2, Subgroup E-Hazardous energy Control (2), any unexpected discovery of an uncontrolled electrical hazardous energy source (e.g., live electrical power circuit, etc.). Significance category 3.

The severity score for the event is a 20 as follows: The electrical hazard factor--10; Environmental factor--0; Shock proximity factor--1; Arc Flash proximity factor--0; Thermal proximity factor--N/A; Injury factor--1.

**Cause Description:** Critique/Fact Finding Performed: 10/18/2012

**Operating Conditions:** Normal

**Activity Category:** Construction

**Immediate Action(s):** Worker was taken to Medical as a precaution.  
Area was barricaded.  
General notifications were conducted.  
Investigation was initiated.

**FM Evaluation:** EOC #27195

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is** Yes.

**Required:** Before Further Operation? No

By Whom: Causal Analysis Team

By When:

**Division or Project:** 4000/4820/Building 804 renovation

**Plant Area:** Tech Area I

**System/Building/Equipment:** Building 804, Mechanical room, 120 volt lighting switch

**Facility Function:** Balance of Plant - Infrastructure (Other Functions not specifically listed in this Category)

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:** 01M--Inadequate Conduct of Operations - Inadequate Job Planning (Electrical)  
 07D--Electrical Systems - Electrical Wiring  
 08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical)  
 11G--Other - Subcontractor  
 12C--EH Categories - Electrical Safety  
 14E--Quality Assurance - Work Process Deficiency  
 14G--Quality Assurance - Procurement Deficiency

**HQ Summary:** On October 18, 2012, an electrical short circuit occurred from a 120-volt light switch at Building 804 when a mechanical subcontractor removed parts on a heating, ventilation and cooling (HVAC) unit. The prime contractor removed electrical power to the work area with the exception of the lighting circuit. The short occurred when the subcontractor removed energized electrical power to the HVAC unit, which caused a short to the conductors. The worker was taken to medical and released to full duty. There was no evidence of a shock during the event. The electrical severity score for the event is 20.

**Similar OR Report Number:**

**Facility Manager:**

Name	Greg Kirsch
Phone	(505) 845-9497
Title	FESH Lead

**Originator:**

Name	GOETSCH, ROBERT S.
Phone	(505) 284-4647
Title	SENIOR TECHNICAL WRITER

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
10/18/2012	10:00 (MTZ)	Anthony Chavez	4843
10/18/2012	10:00 (MTZ)	Stan Harrison	4870

10/18/2012	10:00 (MTZ)	Lynne Schluter	4820
10/18/2012	10:00 (MTZ)	Art Ratzel	4800
10/18/2012	10:00 (MTZ)	EOC	4236
10/18/2012	10:00 (MTZ)	Debbie Garcia-Sanchez	SSO

**Authorized Classifier(AC):** John Norwalk      **Date:** 10/22/2012

**9)Report Number:** [NA--YSO-BWXT-Y12NUCLEAR-2012-0021](#) **After 2003 Redesign**

**Secretarial Office:** National Nuclear Security Administration

**Lab/Site/Org:** Y12 National Security Complex

**Facility Name:** Y12 Nuclear Operations

**Subject/Title:** NDA Measurements on 9212 E-Wing furnaces

**Date/Time Discovered:** 10/04/2012 10:30 (ETZ)

**Date/Time Categorized:** 10/04/2012 18:41 (ETZ)

**Report Type:** Update

**Report Dates:**

Notification	10/09/2012	20:06 (ETZ)
Initial Update	10/18/2012	16:16 (ETZ)
Latest Update	11/15/2012	15:24 (ETZ)
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.

10(2) - An event, condition, or series of events that does not meet any of the other reporting criteria, but is determined by the Facility Manager or line management to be of safety significance or of concern for that facility or other facilities or activities in the DOE complex.  
 The significance category assigned to the management concern should be based on an evaluation of the potential risks and impact on safe operations.  
 (1 of 4 criteria - This is a SC 3 occurrence)

**Cause Codes:**

- ISM:**
- 2) Analyze the Hazards
  - 3) Develop and Implement Hazard Controls
  - 4) Perform Work Within Controls

**Subcontractor Involved:** No

**Occurrence Description:** Prescribed processes for control of hazardous energy were not in place while Non-Destructive Assay (NDA) staff conducted holdup measurements of a casting furnace. Measurement is performed by inserting

a probe into the furnace which comes into close proximity to a bus-bar and an induction coil. The furnace coil and bus-bar were not energized during these NDA activities; however, LOTO was not applied to the furnace prior to work start. While NDA work was in process, a Maintenance Electrician and a Production Operator came to perform scheduled post-maintenance activities on the furnace and communicated to NDA personnel that the furnace coils needed to be energized for post-maintenance purposes. The Operator and Electrician planned to raise the furnace to the up position prior to energizing the coils using controls located on a mezzanine above the furnace. NDA work requires that the furnace be in the lowered position and powered off, so NDA personnel backed away from furnace area until the Operator returned furnace to the lowered position. Furnace induction coils were never energized by the Electrician during this evolution. Once the furnace was returned to the lowered position and confirmed to be powered off (meeting condition for how NDA performed measurement in the past), NDA personnel proceeded to complete holdup measurements. NDA personnel had performed this task in a similar manner for approximately eight years.

Management concerns were noted relative to work planning and control, hazard recognition, and staff knowledge of LOTO requirements. NDA personnel did not properly notify the Shift Manager of their intent to start work and did not formally suspend work when an unexpected situation was encountered. A procedure and Automated Job Hazard Analysis (AJHA) were in place for this job; neither identified the need for LOTO controls nor specified that the furnace must be verified to be powered off prior to NDA measurements. NDA staff were not currently trained on LOTO and did not recognize the need for special hazardous energy controls

**Cause Description:**

**Operating Conditions:**

Normal - NDA Testing

**Activity Category:**

Inspection/Monitoring

**Immediate Action(s):**

1. Work was suspended in affected area.
2. Proper notifications were made to NDA chain of command and 9212 Production Facilities Department.
3. Initial meeting was held with involved parties to discuss situation and arrange further actions (Work Team Investigation)

**FM Evaluation:**

Update 10-17-2012: As a result of further investigation and analysis, including a Critique Summary Discussion, management determined it was appropriate to change the reporting criteria from 10-3 to 10-2 and 2E-2.

Update 11-15-2012: Please extend the due date to 12-06-2012 to allow for additional corrective action coordination between working groups.

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** Yes.  
 Before Further Operation? No  
 By Whom: Steve C. Lambson  
 By When:

**Division or Project:** Production Support

**Plant Area:** Protected

**System/Building/Equipment:** 9212/9215

**Facility Function:** Uranium Conversion/Processing and Handling

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:** 08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical)  
 12B--EH Categories - Conduct of Operations  
 14E--Quality Assurance - Work Process Deficiency

**HQ Summary:** On October 4, 2012, concerns were raised as to whether hazardous energy controls had been implemented or if Non-Destructive Analysis (NDA) personnel were exposed to hazardous energy when they took measurements of the east side casting furnaces in E-Wing. Measurements are required for routine Nuclear Material Controls & Accountability inventory. NDA personnel were taking measurements when a maintenance electrician and a production operator told them that the furnaces needed to be energized for post-maintenance purposes. Concerns about hazardous energy control were raised and work was suspended in affected area.

**Similar OR Report Number:**

**Facility Manager:**

Name	Steve C Lambson
Phone	(865) 576-4397
Title	Manager, Process and Product Engineering

**Originator:**

Name	BURDITT, CAROL A
Phone	(865) 576-3128
Title	

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
10/04/2012	18:41 (ETZ)	Cory Hudson	NDA Mgr
10/04/2012	18:41 (ETZ)	Steve C Lambson	P&P Engr
10/04/2012	18:41 (ETZ)	Ken D Keith, Jr	VP Engr

10/04/2012	18:41 (ETZ)	Johnafred M Thomas	Ops Mgr
10/04/2012	18:41 (ETZ)	Harold Wheat, Jr	NMCA
10/04/2012	18:41 (ETZ)	Mike Glasman, Duty Fac Rep	NNSA
10/04/2012	18:41 (ETZ)	PSS	B&W Y-12

**Authorized Classifier(AC):** W. K. McElmurray      **Date:** 11/15/2012

**10)Report Number:** [NE-ID--BEA-STC-2012-0002](#) **After 2003 Redesign**  
**Secretarial Office:** Nuclear Energy, Science and Technology  
**Lab/Site/Org:** Idaho National Laboratory  
**Facility Name:** Science and Technology Campus  
**Subject/Title:** Subcontract Vendor Performing Equipment Maintenance Without Lockout Tagout  
**Date/Time Discovered:** 10/22/2012 15:00 (MTZ)  
**Date/Time Categorized:** 10/22/2012 17:00 (MTZ)  
**Report Type:** Notification/Final

**Report Dates:**

Notification	10/25/2012	13:49 (ETZ)
Initial Update	10/25/2012	13:49 (ETZ)
Latest Update	10/25/2012	13:49 (ETZ)
Final	10/25/2012	13:49 (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  
**Subcontractor Involved:** Yes  
 Bean Brewers

**Occurrence Description:** On October 22, 2012 at approximately 1500 hours, on the Idaho National Laboratory (INL) in the Research and Education Campus(REC) facility management personnel at the Willow Creek Building discovered a subcontract vendor performing equipment maintenance without the installation of a lock and tag. The vendor, who was performing routine maintenance on a commercial electric coffee-maker, had opened an internal circuit breaker to de-energize the coffee machine, but had not locked the breaker, and the equipment remained plugged in to an overhead 110-volt receptacle during the maintenance activity.

No personnel injuries were sustained as a result of this incident. No workers were exposed to hazardous energy as the equipment was de-energized while work was being performed.

Background information

The subcontractor at the WCB lobby contacted their coffee machine repair person to repair the coffee machine because the machine had failed. The repair person came to the WCB and began performing maintenance on the coffee maker as instructed by the subcontractor without knowledge of the INL. The subcontractor by-passed the requirements of the contract with the INL to include facility personnel or a technical point of contact which lead to issues related to no lock out tag out, work control documents, and authorization through plan of the day. The subcontractor was not familiar with the contents of the contract which lead to these issues.

**Cause Description:**

**Operating Conditions:**

Normal Operations

**Activity Category:**

Maintenance

**Immediate Action(s):**

Upon discovery, BEA personnel immediately stopped the work.

The coffee-making equipment was put in a safe condition.

BEA F&SS management, Procurement, and DOE-ID Field Rep were notified.

A critique was conducted 10/23/2012 at 1300 hours.

**FM Evaluation:**

Actions regarding this issue will be tracked in ICAMS IO 22911

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:**

No

**Division or Project:**

REC Facility Services

**Plant Area:**

WCB

**System/Building/Equipment:**

WCB IF-616

**Facility Function:**

Balance of Plant - Infrastructure (Other Functions not specifically listed in this Category)

**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

14G--Quality Assurance - Procurement Deficiency

**HQ Summary:**

On October 22, 2012, Research and Education Campus facility management personnel at the Willow Creek Building discovered a subcontractor performing maintenance on a commercial coffee machine without the installation of a lockout/tagout. The subcontractor opened an internal circuit breaker to de-energize the coffee machine but did not lock the breaker. Work was immediately stopped and the coffee-making equipment was put in a safe condition.

**Similar OR Report Number:**

**Facility Manager:**

Name	LINDBERG, STEVEN
Phone	(208) 526-4007
Title	RESEARCH AND EDUCATION CAMPUS (REC)

**Originator:**

Name	LINDBERG, STEVEN
Phone	(208) 526-4007
Title	RESEARCH AND EDUCATION CAMPUS (REC)

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
10/22/2012	17:00 (MTZ)	John Martin	DOE-ID

**Authorized Classifier(AC):** Jeffrey Garner      Date: 10/25/2012

**11)Report Number:**

[NE-ID--GOID-RESL-2012-0001](#) After 2003 Redesign

**Secretarial Office:**

Nuclear Energy, Science and Technology

**Lab/Site/Org:**

Idaho National Laboratory

**Facility Name:**

Radiological & Environmental Sciences Lab.

**Subject/Title:**

LO/TO Violation X-ray Machine Installation at CFA-638

**Date/Time Discovered:**

10/29/2012 12:00 (MTZ)

**Date/Time Categorized:**

10/29/2012 13:00 (MTZ)

**Report Type:**

Notification

**Report Dates:**

Notification	10/31/2012	14:43 (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:**

**Subcontractor Involved:** Yes  
Hopewell Design

**Occurrence Description:** DOE Subcontracted vendor was performing work on an electrical system without proper LO/TO processes being followed. There was no contact with hazardous energy or exposure.

**Cause Description:**

**Operating Conditions:** Normal

**Activity Category:** Maintenance

**Immediate Action(s):** Work was stopped, F&SS Management and DOE were notified, and a critique was 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:** DOELAP Dosimetry

**Plant Area:** CFA-638

**System/Building/Equipment:** X-ray machine installation CFA 638

**Facility Function:** Laboratory - Analytical

**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  
14G--Quality Assurance - Procurement Deficiency

**HQ Summary:** On October 29, 2012, a subcontractor performed work on an electrical system without following lockout/tagout procedures. There was no contact with hazardous energy. Work was stopped. A critique was scheduled.

**Similar OR Report Number:**

**Facility Manager:**

Name	WARNER, DONALD C.
Phone	(208) 526-8191
Title	QUALITY ASSURANCE OFFICER

**Originator:**

Name	WARNER, DONALD C.
Phone	(208) 526-8191
Title	QUALITY ASSURANCE OFFICER

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
10/29/2012	12:20 (MTZ)	John Martin	DOE-ID
10/29/2012	12:20 (MTZ)	Scott McBride	BEA

**Authorized Classifier(AC):** Jeff Gardner      Date: 10/29/2012

**12)Report Number:** [SC--BSO-LBL-OPERATIONS-2012-0012](#) After 2003 Redesign

**Secretarial Office:** Science

**Lab/Site/Org:** Lawrence Berkeley National Laboratory

**Facility Name:** Operations Division

**Subject/Title:** Live Energy Work Procedure Violation During B76 Boiler Replacement Project - No Injuries

**Date/Time Discovered:** 10/26/2012 10:15 (PTZ)

**Date/Time Categorized:** 10/26/2012 14:45 (PTZ)

**Report Type:** Notification/Final

**Report Dates:**

Notification	10/30/2012	18:53 (ETZ)
Initial Update	10/30/2012	18:53 (ETZ)
Latest Update	10/30/2012	18:53 (ETZ)
Final	10/30/2012	18:53 (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

**Subcontractor Involved:** Yes

Direct Digital Controls/JR Griffin

**Occurrence Description:**

At approximately 1015 hours on 10/26/2012, while making observations at the Bldg 76 Boiler Replacement project, an EHSS Construction Safety employee noticed that an open FPU (Field Processing Unit) panel in room

103. An electrician from Direct Digital Controls, Inc., a subcontractor to JR Griffin, had opened FPU-004-76 panel to install a conduit into the bottom of the panel box as part of the Project work. Although the voltage within the panel is predominantly 50 volts or less, the box does contain one pair of exposed 120 volt contacts. Although the conduit was to contain wiring for the Wet Pressure Differential Sensor, the electrician was not responsible for making connections to the panel. The electrician, who has "considerable electrical experience," and is a former LBNL employee, was not authorized to open the panel because Direct Digital Controls has not provided LBNL with documentation demonstrating the electrician's experience as required by LBNL internal policy.

There were no injuries and the electrician was wearing Personal Protective Equipment (PPE) appropriate to the hazard. The electrician completed the daily Pre-task Hazard Analysis and attended the pre-job safety orientation.

**Cause Description:**

**Operating Conditions:**

Indoors, lighted, dry

**Activity Category:**

Construction

**Immediate Action(s):**

- Electrical work on the project was stopped and will not resume until the cause of the incident is determined.

**FM Evaluation:**

- Although reporting the incident under ORPS criterion 2E(3), Facilities Division management is electing to conduct a more in-depth investigation into the cause of the incident.

- Direct Digital Controls will re-train all four of its assigned electricians on the following work practices prior to restarting work:

\* LBNL policy and guidelines for establishing an Electrically Safe work Condition

\* LBNL policy and guidelines and methods for obtaining an Energized Electrical Work Permit (EEWP)

\* LBNL policy, guidelines and methods for obtaining a Lock out Tag out (LOTO) Permit.

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:**

No

**Division or Project:**

Facilities Division

**Plant Area:**

B76

**System/Building/Equipment:** Building 76 Room 103 FPU Panel

**Facility Function:**

Balance of Plant - Infrastructure (Other Functions not specifically listed in this Category)

**Corrective Action:**

**Lessons(s) Learned:** Ensure all unresolved issues are clearly communicated to the replacement project manager when control of the project was handed from one responsible party to the other due to personnel changes or temporary absence.

**HQ Keywords:** 01E--Inadequate Conduct of Operations - Operations Procedure Noncompliance  
 11G--Other - Subcontractor  
 12C--EH Categories - Electrical Safety  
 14E--Quality Assurance - Work Process Deficiency  
 14G--Quality Assurance - Procurement Deficiency

**HQ Summary:** On October 26, 2012, an Environment, Health, Safety and Security Construction employee noticed an open FPU (Field Processing Unit) panel in Room 103, in violation of procedures, while making observations at the Building 76 Boiler Replacement project. A subcontractor electrician opened FPU-004-76 panel to install a conduit into the bottom of the panel box as part of project work. The voltage in the panel was less than 50 volts except for one pair of exposed 120 volt contacts. The electrician was not authorized to open the panel because LBNL was not provided documentation demonstrating the electrician's experience. There were no injuries and the electrician was wearing Personal Protective Equipment appropriate to the hazard. Electrical work on the project was stopped and will not resume until the cause of the incident is determined.

**Similar OR Report Number:**

**Facility Manager:**

Name	Jennifer Ridgeway
Phone	(510) 486-6339
Title	Division Director

**Originator:**

Name	MOU, FLORENCE P.
Phone	(510) 486-7872
Title	SENIOR ADMINISTRATOR

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
10/26/2012	14:51 (PTZ)	Mary Gross	BSO
10/26/2012	14:51 (PTZ)	Kevin Hartnett	BSO

**Authorized Classifier(AC):**

**13)Report Number:** [SC--PNSO-PNNL-PNNLBOPER-2012-0017](#) After 2003 Redesign

**Secretarial Office:** Science

**Lab/Site/Org:** Pacific Northwest National Laboratory  
**Facility Name:** Energy Research Programs (PNNL)  
**Subject/Title:** Failure to Follow Hazardous Energy Control Process  
**Date/Time Discovered:** 10/29/2012 13:45 (PTZ)  
**Date/Time Categorized:** 10/29/2012 14:50 (PTZ)  
**Report Type:** Notification/Final  
**Report Dates:**

Notification	10/31/2012	15:07 (ETZ)
Initial Update	10/31/2012	15:07 (ETZ)
Latest Update	10/31/2012	15:07 (ETZ)
Final	10/31/2012	15:07 (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

**Subcontractor Involved:** No

**Occurrence Description:** On Monday, October 29, 2012, a building electrical outage was conducted at the Battelle Inhalation Laboratory (BIL). The outage involved lockout/tagout (LOTO) of the City of Richland (COR) electrical vault and the BIL diesel generator. The keys for the COR electrical vault LOTO and diesel generator were to be controlled by placing the keys in a lock box. Upon completion of the work evolution at 1345 hours, a PNNL Electrician removed his Authorized Worker LOTO from the lock box and observed the COR electrical vault key had not been placed inside the lock box but had been left on the table next to the lock box. Failure to place the COR electrical vault key in the lock box represents a failure to follow PNNL's hazardous energy control program.

**Cause Description:**

**Operating Conditions:** N/A

**Activity Category:** Maintenance

**Immediate Action(s):** Appropriate notifications were made. A critique is scheduled for Thursday, November 1, 2012.

**FM Evaluation:**

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** No

**Division or Project:** Operational Systems Directorate  
**Plant Area:** RCHN Area  
**System/Building/Equipment:** BIL  
**Facility Function:** Balance of Plant - Infrastructure (Other Functions not specifically listed in this Category)

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:** 01K--Inadequate Conduct of Operations - Lockout/Tagout Noncompliance (Electrical)  
 08H--OSHA Reportable/Industrial Hygiene - Safety Noncompliance  
 12I--EH Categories - Lockout/Tagout (Electrical or Mechanical)  
 14E--Quality Assurance - Work Process Deficiency

**HQ Summary:** On October 29, 2012, the key for the City of Richland (COR) electrical vault lockout/tagout (LOTO) was left on the table next to the lock box instead of being placed inside the lock box, during a building electrical outage that involved LOTO of the COR electrical vault and the Battelle Inhalation Laboratory diesel generator. Failure to place the COR electrical vault key in the lock box represents a failure to follow Pacific Northwest National Laboratory’s hazardous energy control program. Appropriate notifications were made and a critique was scheduled.

**Similar OR Report Number:**

**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
10/29/2012	14:51 (PTZ)	Carlson, J. L.	PNSO

**Authorized Classifier(AC):** Pollari, R. A. Date: 10/31/2012

Attachment 2