



Office of Health, Safety and Security

## Monthly Analysis of Electrical Safety Occurrences



August 2013

### 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 in August decreased from twenty in July to twelve. There were two reported electrical shocks, three electrical intrusion occurrences, and three lockout/tagout occurrences. In August, workers identified electrical hazards 42 percent of the time, which is a slight decrease in hazards identification from 45 percent in July.

### 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 two reported electrical shocks in the month of August. This is a decrease from the five electrical shocks reported in July. These occurrences are summarized below.

1. A sampling nuclear chemical operator experienced an electrical shock (118V) after contacting the discharge piping of a submersible well pump while operating the pump during sampling. The portable generator supplying power to the pump was de-energized and all work in the area was halted. The area was cleared of personnel and the event scene was preserved. The employee was sent to the onsite occupational health services provider for evaluation and released back to work with no restriction. The well pump had twisted and damaged electrical wiring. No out of service tag was applied to the well or the well pump after the discovery of damaged electrical equipment.

2. An employee received an electrical shock while plugging in an AC adapter. The employee needed to connect a PROM loader to another piece of equipment in a test rack, using a built-in AC receptacle in a recessed area of the test rack to provide power to the PROM loader. On the first attempt to plug it in, the employee stated that it did not feel like it was plugged in to the socket properly and that it could have been misaligned. The employee then reached his hand back into the area and grasped the adapter to remove it and wrapped their fingertips around the side of the adapter (the same side as the prongs) in order to gain leverage. The employee surmised that their right index finger came in contact with the one prong that was not inserted into the socket (the other prong was only partially inserted into the socket) when an electrical shock travel up their right arm.

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

Figure 1 – Three-Year Trend of Electrical Shocks

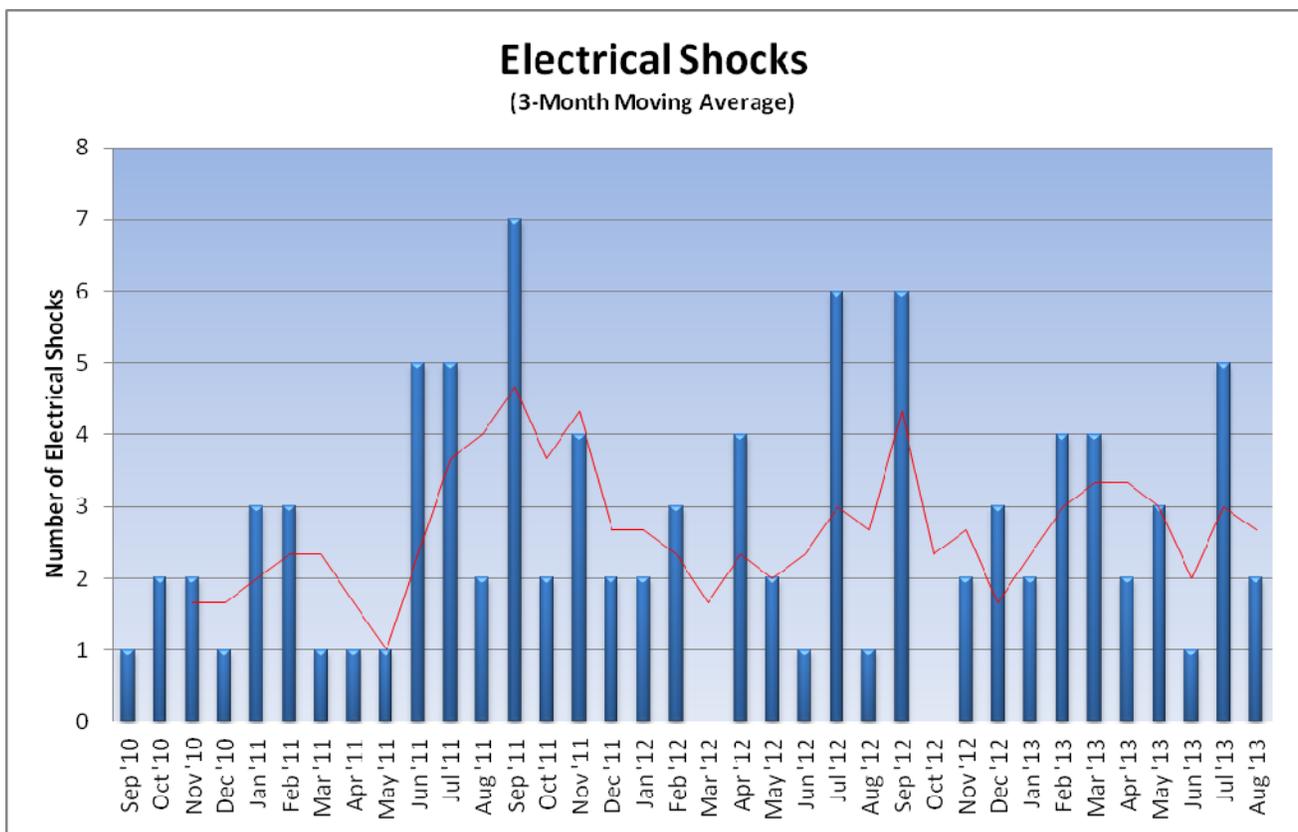


Figure 2 shows electrical shocks by worker type through August 2013. The number of shocks involving electrical workers slowly increased through 2012 and then dropped in 2013. Presently, this is the lowest year since 2008. Shocks involving non-electrical workers decreased after 2011. Since 2008, the majority of shocks (about 74 percent) involve non-electrical workers. So far for in 2013, that percentage is 83.

Figure 2 - Electrical Shock by Worker Type

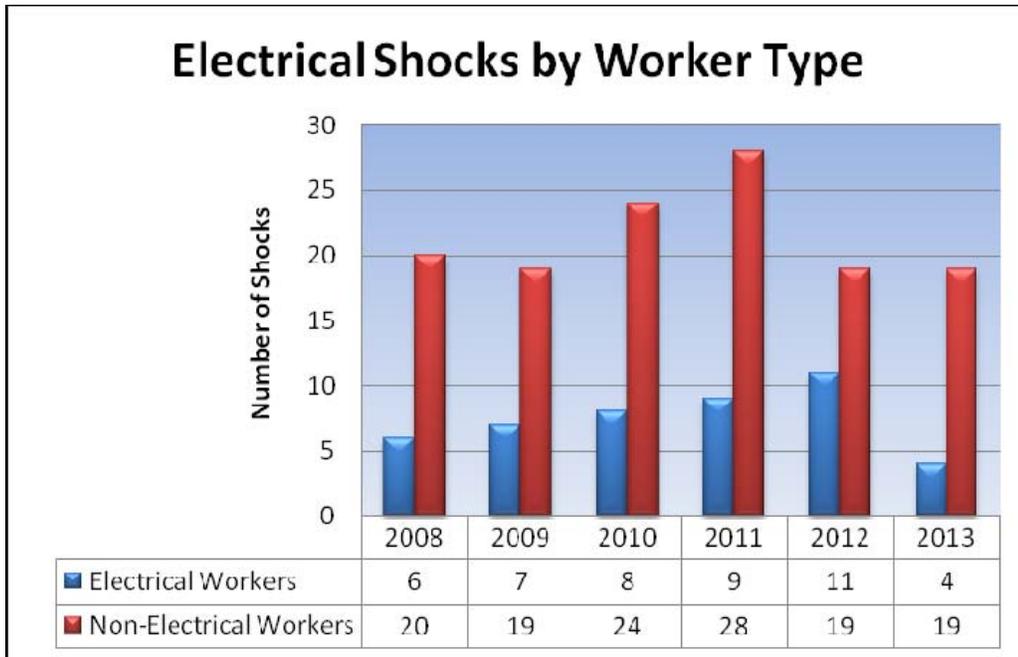
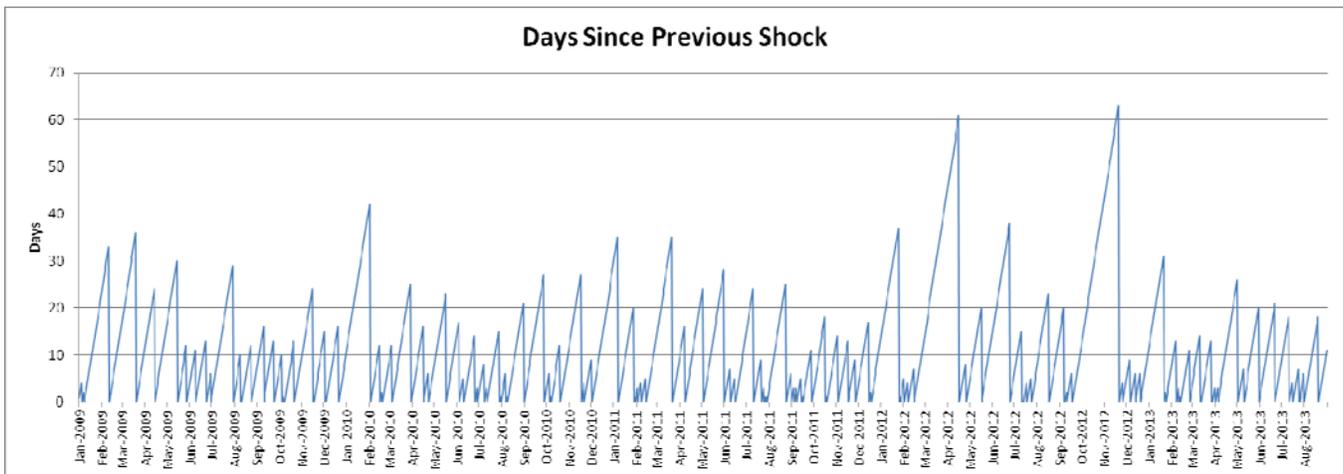


Figure 3 shows the number of days since the previous electrical shock for the DOE complex. The longest interval was 63 days (November 20, 2012) and the present interval is 11 days as of August 31.

Figure 3 - Days since Previous Shock



### Electrical Intrusion

There were three electrical intrusion occurrences (i.e., cutting/penetrating, excavating, or vehicle/equipment contact of overhead electrical hazards) for August, which is an increase from the two occurrences in July. These occurrences are summarized below.

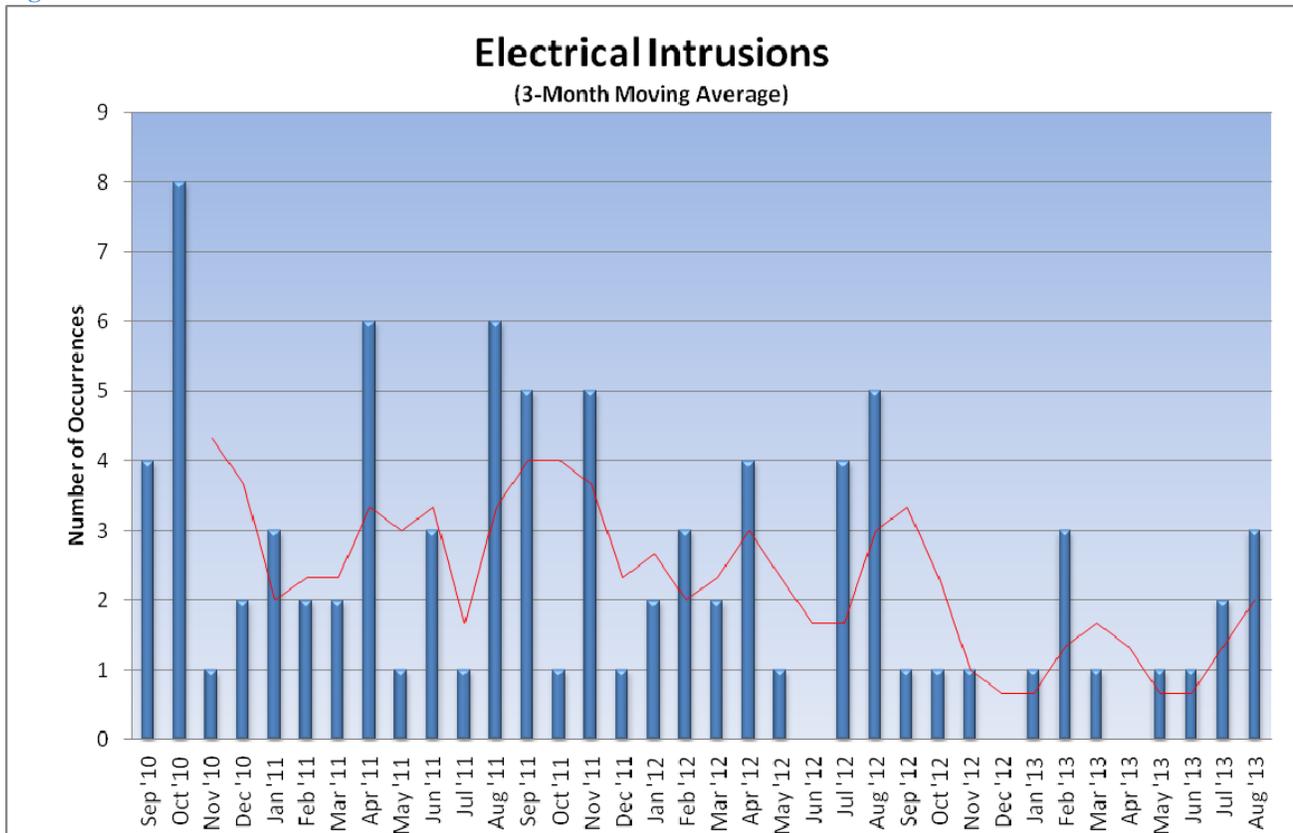
1. A cylinder hauler hit and cut a 2,400-volt overhead power line above a perimeter road as it was being driven to a maintenance facility. The driver was not aware that any contact had

occurred. A spotter and escort traveling in front of the hauler did not see any contact with the line or any abnormalities with the position of the cylinder hauler boom, which is normally 16 feet above the roadway. There were no injuries and no damage to the cylinder hauler. A second power line in the same location was not hit. Upon measurement, that line was determined to be 16 feet 8 inches above the road surface. NEC code specifications call for 2400-volt power lines to be 20 feet above the roadway.

2. The bucket of an excavator snagged a 240-volt line feeding an electric car charging station during subcontracted trenching operations for ground grid installation. The bucket damaged the shallow unmarked plastic conduit containing the energized power cable. The excavator operator stopped work immediately upon discovery, opened the electrical panel to find the conduit pulled enough to dislodge an electrical breaker, and then called the substation superintendent. Electrical crews locked out the breaker supplying power to the conduit. There were no injuries associated with this event.
  
3. A subcontractor worker cut through a conduit with a hacksaw and made contact with a previously unknown energized wire. The subcontractor was rerouting conduit inside drywall in preparation for a bathroom door installation. When the saw blade hit the energized wire, it caused a spark and grounded the circuit to the conduit through the blade. The subcontractor was wearing appropriate personal protective equipment and did not receive a shock. Work was stopped.

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 (2.4).

**Figure 4 – Three-Year Trend of Electrical Intrusion Occurrences**



## **Hazardous Energy Control**

In August there were three reported occurrences involving lockout/tagout (LOTO), which is the same as reported in July. These occurrences are summarized below.

### **Occurrences Involving Lockout/Tagout**

1. An independent verifier discovered a LOTO error during a review of a Tagout Authorization Form for work on a Leachate Electrical System. The verifier noticed that the LOTO had been installed on the wrong circuit breaker. Circuit breaker #15 was locked out instead of circuit breaker #17. Work was halted and the proper LOTO was performed on the correct breaker.
2. A subcontractor performing work in support of a kitchen remodel project did not hang the necessary tags in support of the electrical LOTO process. Although the subcontractor had identified the correct electrical circuits, performed the correct zero energy verifications, and hung locking devices on the circuits; no tags had been hung. The subcontractor also managed all locking devices under the control of a single key and not the required "one lock and one tag" for each authorized person performing electrical work in the area. The work was paused until the correct lock and tagging devices were in place.
3. A vendor technician notified the LOTO Responsible Individual that he had not applied his personal lock to an energy control point, which is a violation of the LOTO requirements. The LOTO was for the repair of an Oxford Instruments Plasma Etcher.

### **Occurrences Involving Discovery of Uncontrolled Hazardous Energy**

1. Electricians saw a spark when they began to pull a rocker switch from an instrument panel while troubleshooting the rocker switch. There were no injuries and the electricians stopped work and made appropriate notifications. An investigation was initiated.
2. Workers discovered an unexpected electrical energy source while removing substation capacitor banks that were locked out with safe condition and safe to work checks performed to verify the absence of hazardous energy. Each of the capacitors in the banks was grounded and the electricians were in the process of de-terminating wires to allow for physical removal and replacement of the cabinets. When the electricians removed the wires on the terminal box they saw a spark and immediately capped the exposed wire. The terminal box did not show up on the facility drawings, although it is found on the vendor information as connected to a transformer that should also be within the isolation boundary.
3. A worker was installing a conduit through the under-floor when the conduit made contact with a legacy energized 120-volt wire which resulted in an arc flash. The worker immediately stopped work. The wire was traced back to a breaker panel and was turned off. The arc flash did not trigger the breaker switch. There was no shock or personnel injury and equipment damage was limited to the conduit. An investigation was initiated.

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

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

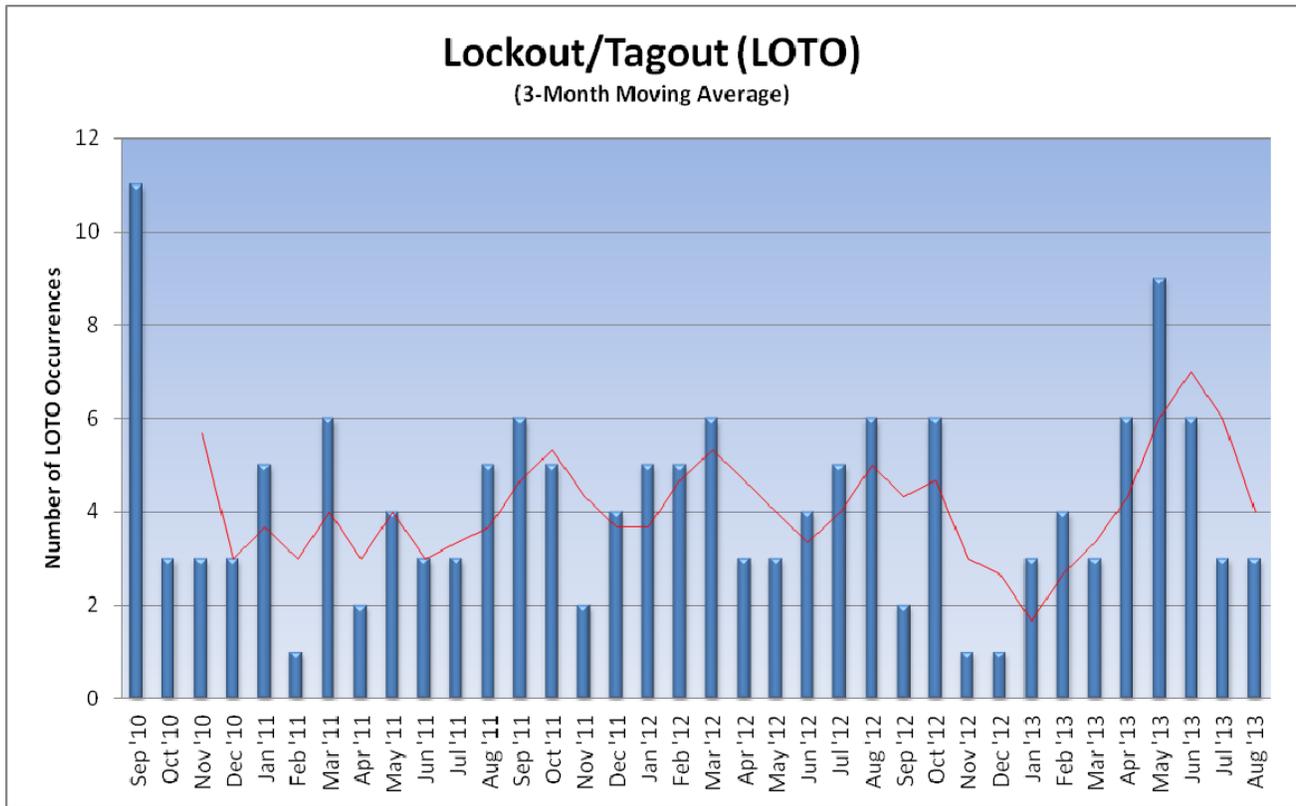
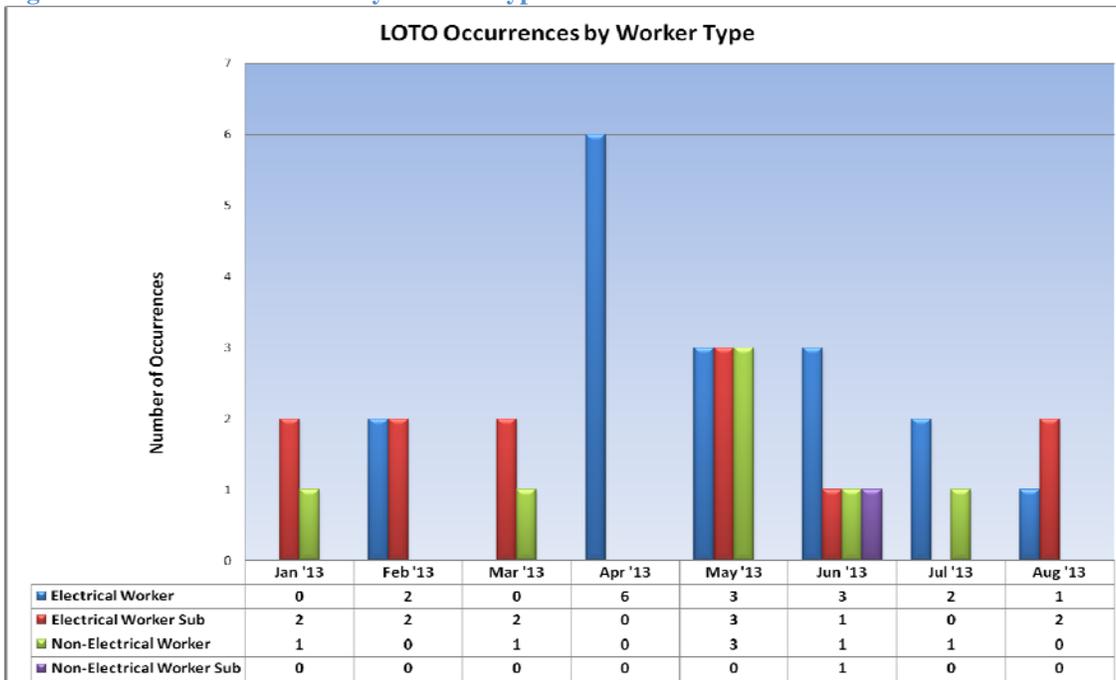


Figure 6 shows LOTO occurrences by worker type. The distribution by percentage is 46% for electrical workers, 32% for electrical worker subcontractors, 19% for non-electrical workers, and 3% for non-electrical worker subcontractors.

Figure 6 – LOTO Occurrences by Worker Type



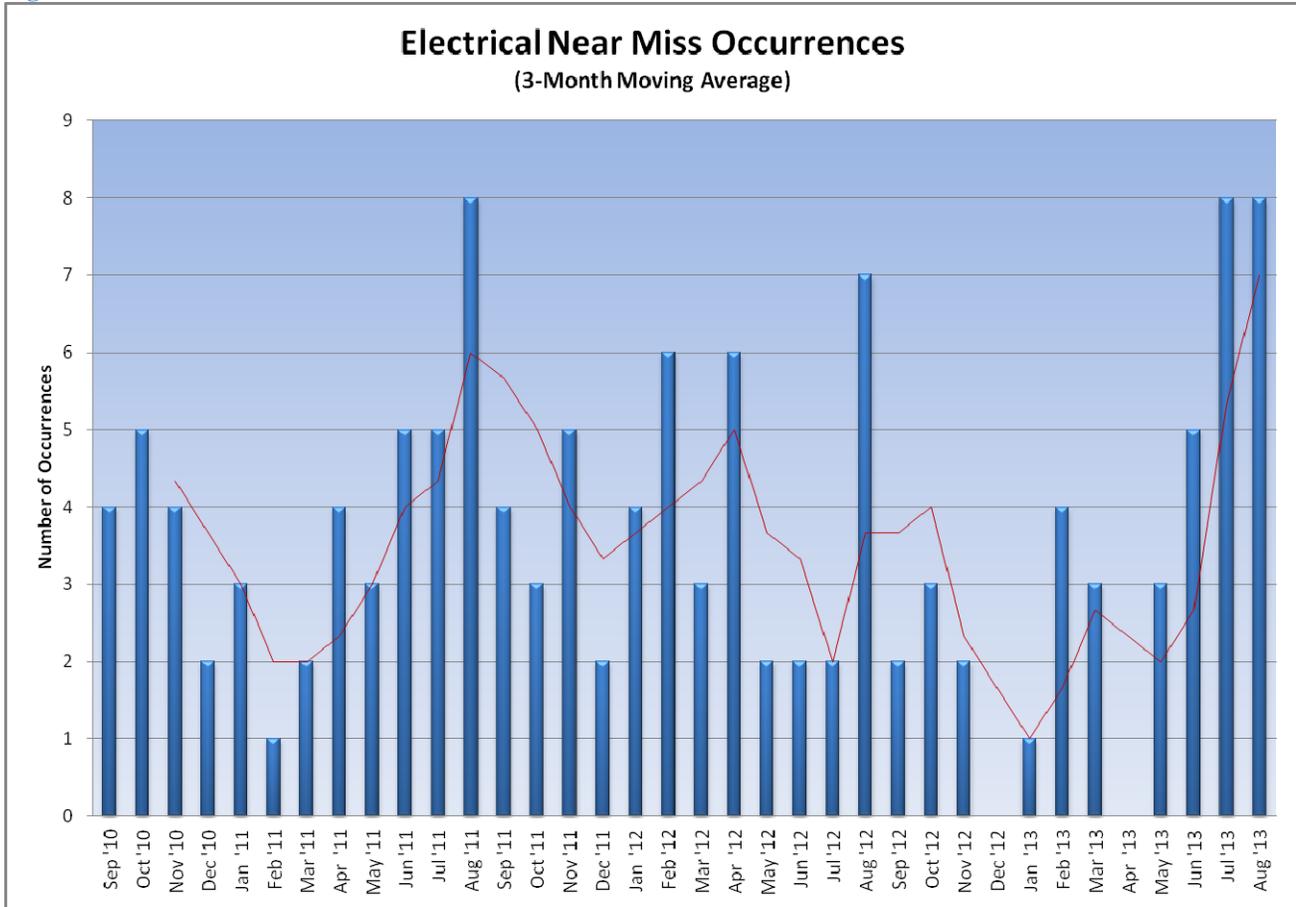
## **Electrical Near Miss**

There were eight electrical near miss occurrences reported in August, which is the same number as reported in July.

1. A subcontractor was installing a new metering control device in a 480-volt switchgear electrical cabinet and unknowingly worked within the arc flash boundary while not wearing arc flash personal protective equipment. The zero energy verification performed previously did not accurately reflect the actual conditions of the system.
2. A cylinder hauler hit and cut a 2,400-volt overhead power line above a perimeter road as it was being driven to a maintenance facility. (See Electrical Intrusion Section – Occurrence #1)
3. A sampling nuclear chemical operator experienced an electrical shock (118V) after contacting the discharge piping of a submersible well pump. (See Electrical Shock Section – Occurrence #1)
4. Electricians saw a spark when they began to pull a rocker switch from an instrument panel. (See Occurrences Involving Discovery of Uncontrolled Hazardous Energy – Occurrence #1)
5. Workers discovered an unexpected electrical energy source while removing substation capacitor banks. (See Occurrences Involving Discovery of Uncontrolled Hazardous Energy – Occurrence #2)
6. A worker was installing a conduit through the under-floor when the conduit made contact with a legacy energized 120-volt wire. (See Occurrences Involving Discovery of Uncontrolled Hazardous Energy – Occurrence #3)
7. The bucket of an excavator snagged a 240-volt line feeding an electric car charging station during subcontracted trenching operations for ground grid installation. (See Electrical Intrusion Section – Occurrence #2)
8. A subcontractor worker cut through a conduit with a hacksaw and made contact with a previously unknown energized wire. (See Electrical Intrusion Section – Occurrence #3)

Figure 7 shows a 3-year trend of near miss occurrences for the DOE complex. The monthly average is 3.6 occurrences.

Figure 7 – Three-Year Trend of Electrical Near Miss Occurrences



## Monthly Occurrences Tables

Table 1 shows a breakdown of the outcomes, performance issues, and worker types associated with the electrical safety occurrences for August 2013.

Table 1 - Breakdown of Electrical Occurrences

Number of Occurrences (August)	Involving:	Last Month (July)
2	Electrical Shocks	5
0	Electrical Burns	0
3	Hazardous Energy Control (LOTO)	3
3	Inadequate Job Planning	5
1	Inadvertent Drilling/Cutting of Electrical Conductors	1
1	Excavation of Electrical Conductors	0
1	Vehicle Intrusion of Electrical Conductors or Equipment	1
8	Electrical Near Misses	8
7	Electrical Workers	7

<b>Number of Occurrences (August)</b>	<b>Involving:</b>	<b>Last Month (July)</b>
5	Non-Electrical Workers	13
5	Subcontractors	3

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 the previous 5 years and CY 2013. The average number of occurrences a year ago (August 2012) was 13.1 per month and the number of shocks was at 19.

**Table 2 - Summary of Electrical Occurrences**

<b>Period</b>	<b>Electrical Safety Occurrences</b>	<b>Shocks</b>	<b>Burns</b>	<b>Fatalities</b>
August	12	2	0	0
July	20	5	0	0*
June	13	1	0	0
May	17	3	0	0
April	11	2	0	0
March	14	4	0	0
February	13	4	0	0
January	7	2	0	0
2013 total	107 (avg. 13.4/month)	23	0	0
2012 total	138 (avg. 11.5/month)	30	1	0
2011 total	136 (avg. 11.3/month)	36	5	0
2010 total	155 (avg. 12.9/month)	28	2	0
2009 total	128 (avg. 10.7/month)	25	3	0
2008 total	113 (avg. 9.4/month)	26	1	0

(\*) Although there were no fatalities reported in ORPS, a lineman at a Bonneville Power Administration substation was electrocuted on July 30 while working on a transfer box.

Figure 8 shows the distribution of electrical safety occurrences by Secretarial Office.

Figure 8 - Electrical Occurrences by Month and Secretarial Office

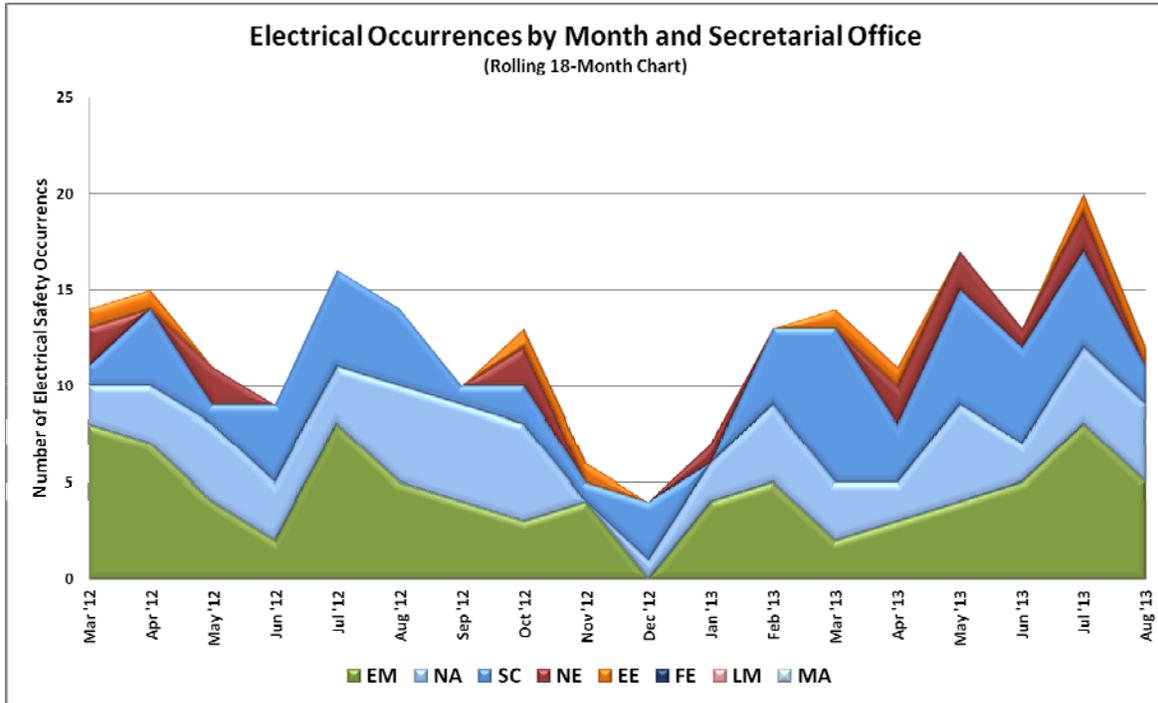
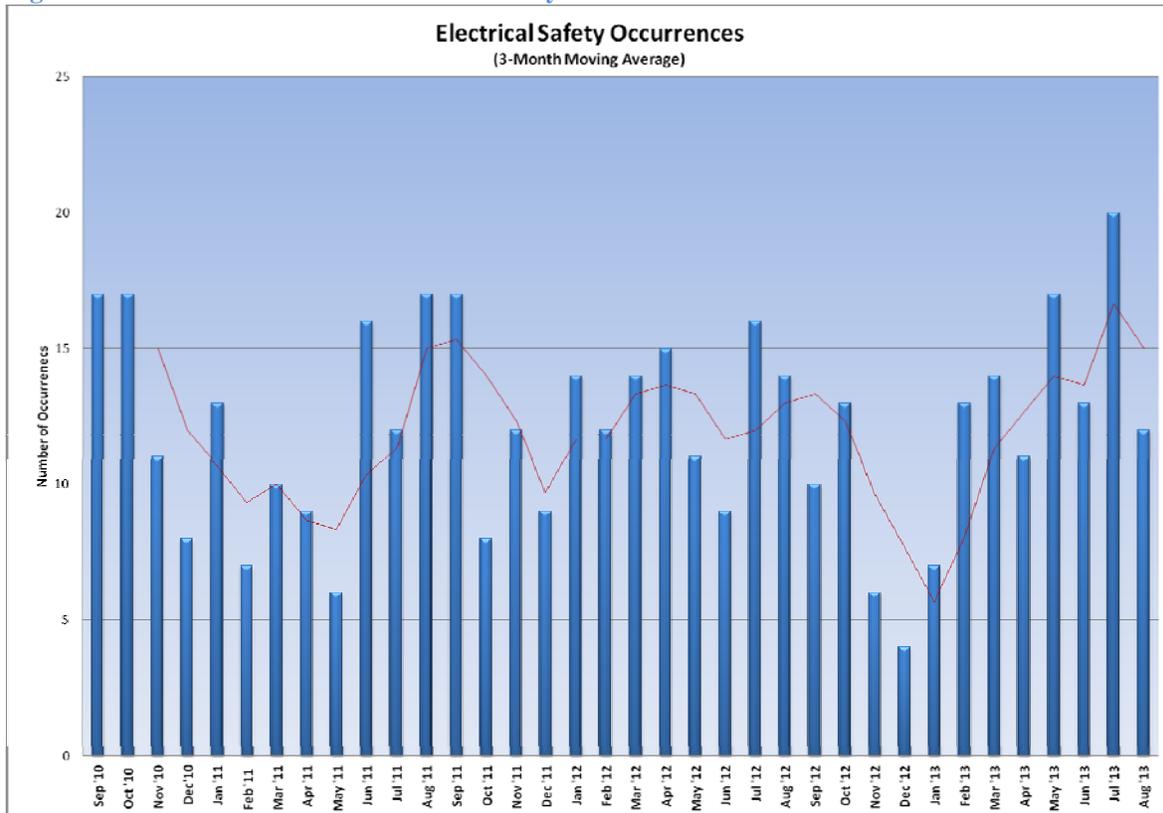


Figure 9 shows 3-year trend of electrical safety occurrences for the DOE complex.

Figure 9 – Three-Year Trend of Electrical Safety Occurrences



# 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 the Electrical Severity Measurement Tool ([http://www.efcog.org/bp/p/doc/bp48-Electrical\\_Severity\\_Measurement\\_Tool%20R3.pdf](http://www.efcog.org/bp/p/doc/bp48-Electrical_Severity_Measurement_Tool%20R3.pdf)). The seventeen occurrences are classified as shown in Table 3. Actual scores are provided in Attachment 1.

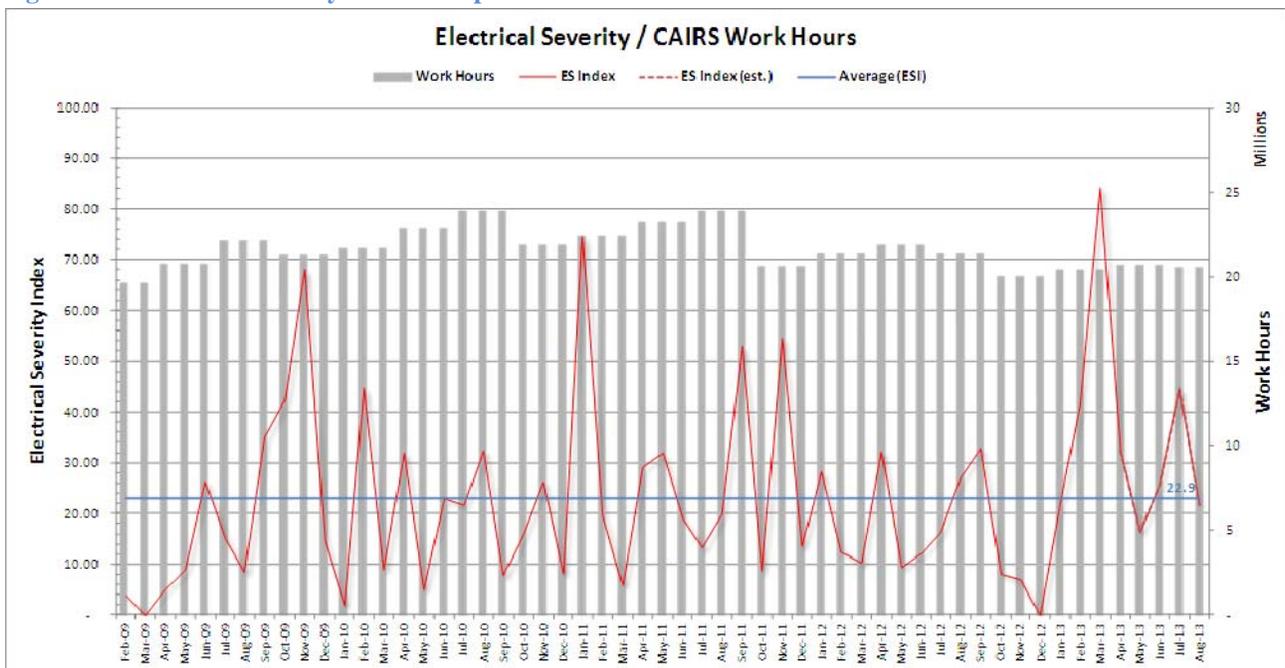
**Table 3 – Classification of Electrical Safety Occurrences by ES Score**

Occurrence Classification	Electrical Severity Score	Number of Occurrences
HIGH	≥ 1750	0
MEDIUM	31-1749	7
LOW	0-30	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 10 shows a calculated ESI for the DOE complex and Table 4 shows the ESI.

**Figure 10 - 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.

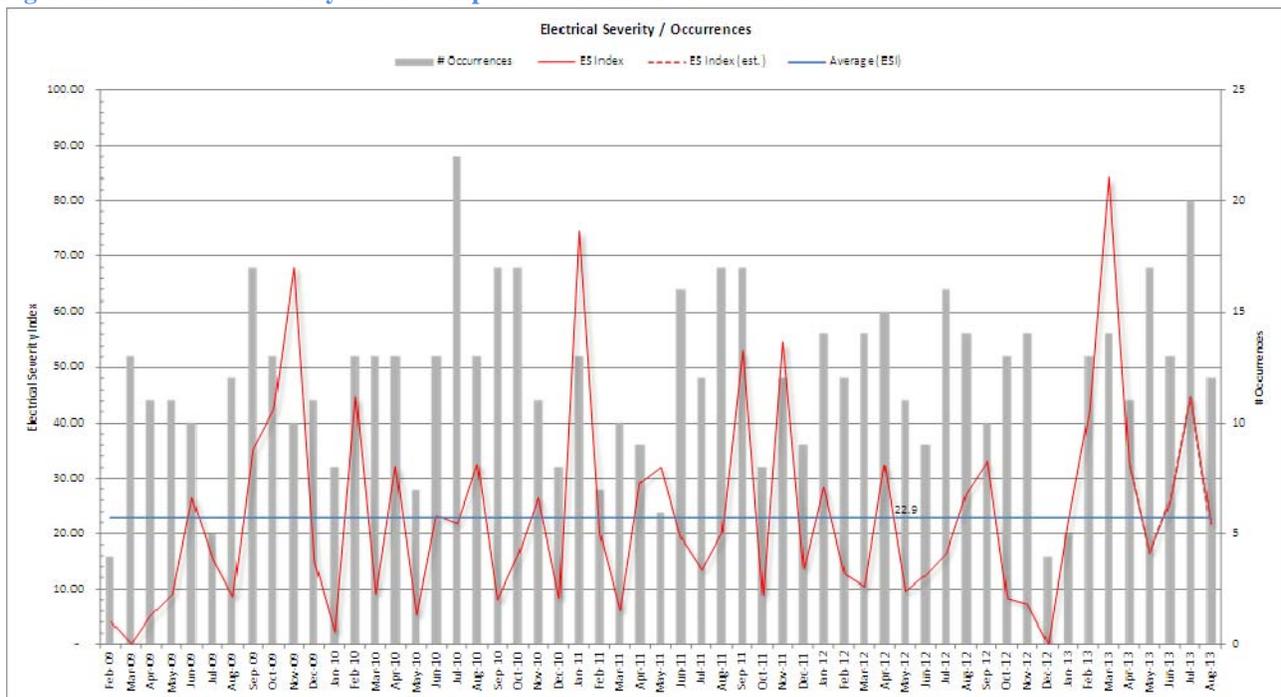
Table 4 - Electrical Severity Index

Category	July	August	Δ
Total Occurrences	20	12	-8
Total Electrical Severity	4,574	2,230	-2,344
Estimated Work Hours	20,518,103* (20,518,103)	20,540,887	+22,784
ES Index	44.59* (44.59)	21.71	-22.88
Average ESI	23.0	22.9	-0.1

\* These are estimated CAIRS work hours for July ES Index based on the estimated hours. The estimated hours and ES Index based on the estimated hours (as reported in July) are shown below in parentheses.  
 Electrical Severity Index =  $(\sum \text{Electrical Severity} / \sum \text{Work Hours}) \times 200,000$

Figure 11 shows the ESI with the number of Occurrences instead of Work Hours.

Figure 11 - Electrical Severity Index Compared to Number of Occurrences



The average ESI (22.9) has remained fairly steady over the last three months following high severity occurrences in March and July. The lowest average ESI was 19.2 in June 2010.

Figure 12 shows the number of days since the previous high severity occurrence. The present interval is 47 days as of August 31. The previous longest interval was 679 days ending March 12, 2013.

Figure 12 - Days since Previous High Severity Occurrence

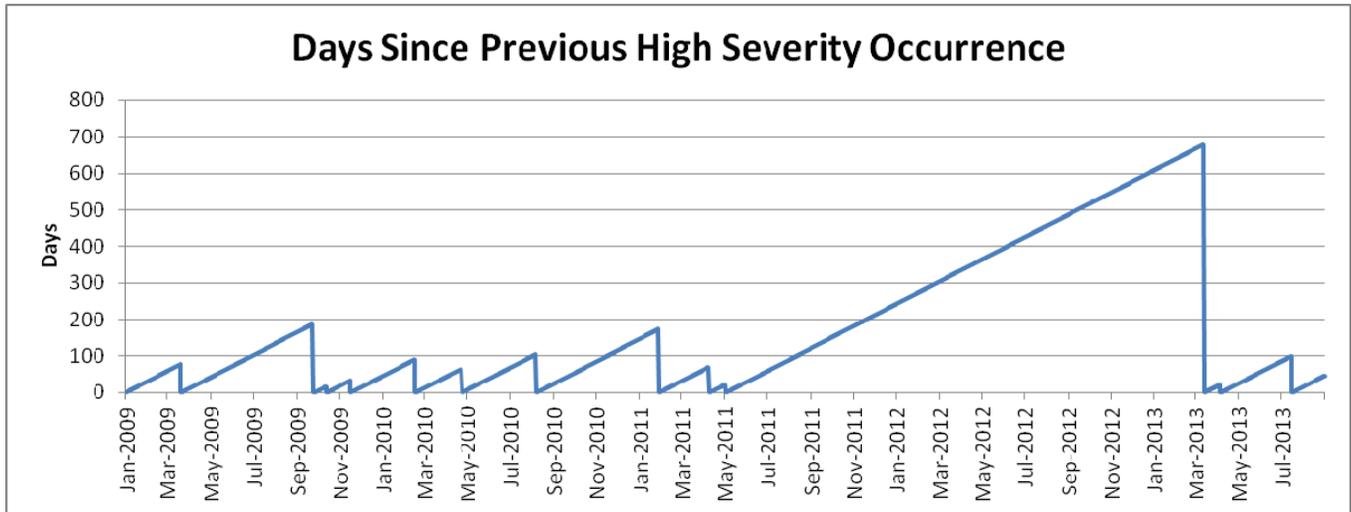
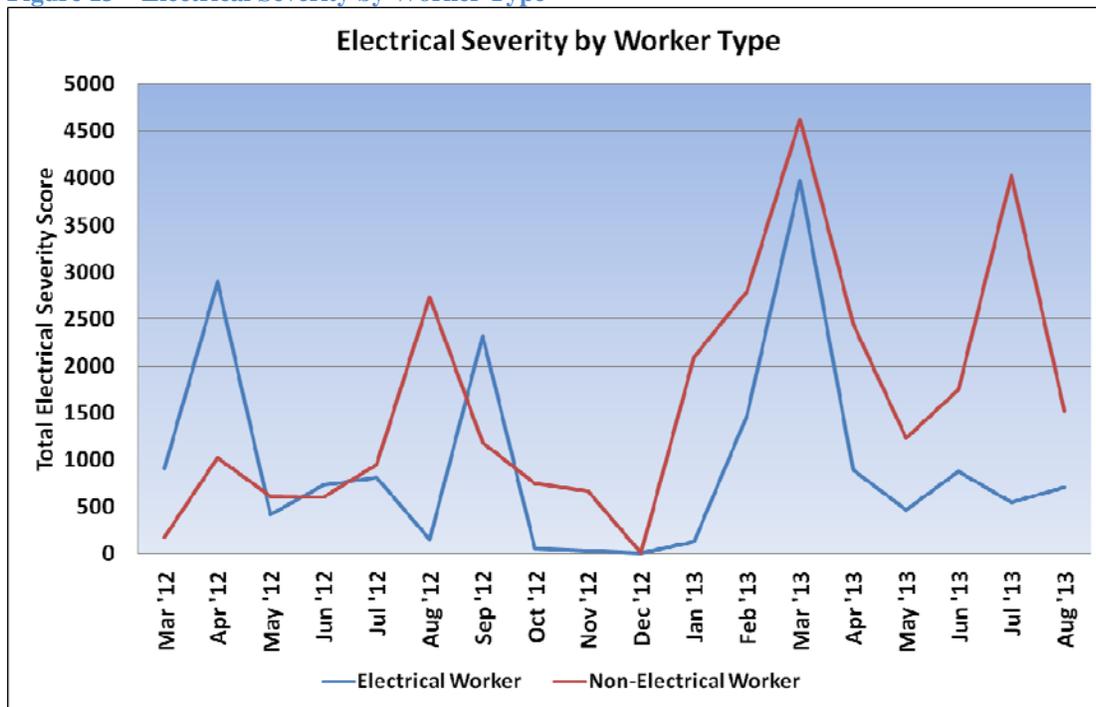


Figure 13 shows the total electrical severity score by worker type for each month.

Figure 13 – Electrical Severity by Worker Type



The present ES score for electrical workers is 710 and 1,520 for non-electrical workers.

**Summary of Occurrences by Severity Band**

For the interval August 2012 through August 2013 (current month and the past 12), Figures 14 and 15 summarize occurrences by severity band and month of discovery date by percentage of total occurrences in month and number of occurrences in month.

Figure 14 - Occurrences by Electrical Severity Band (Percentage)

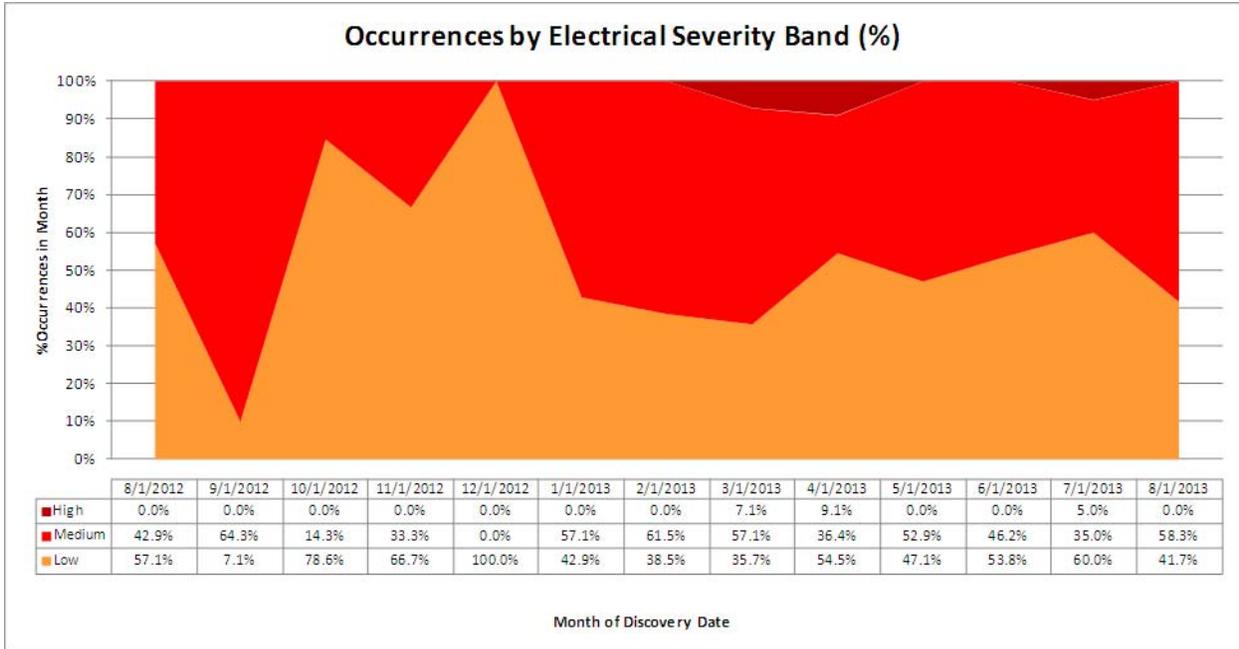
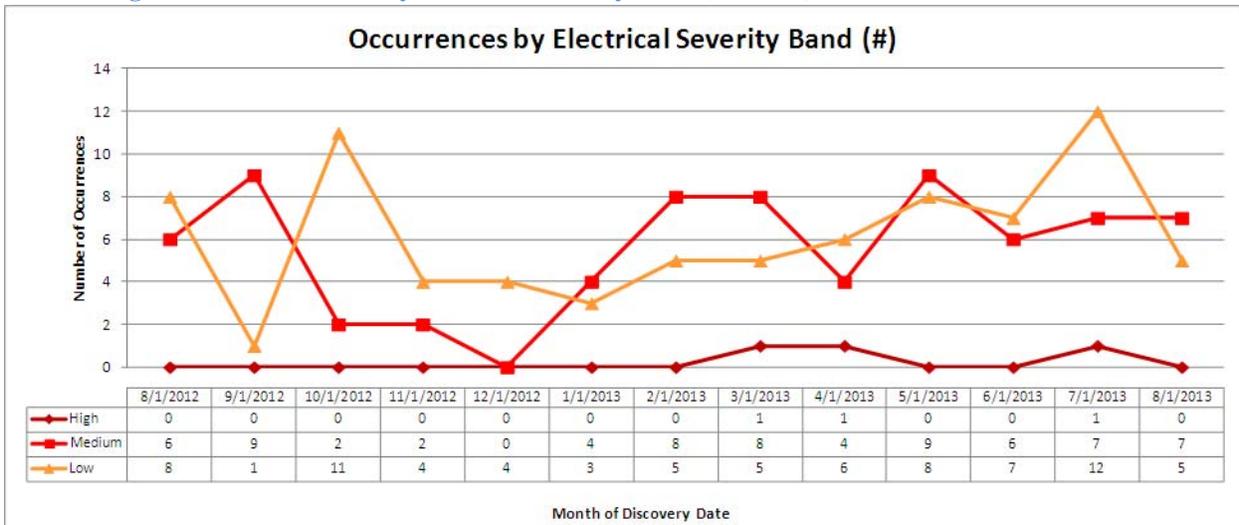


Figure 15 - Occurrences by Electrical Severity Band (Number)

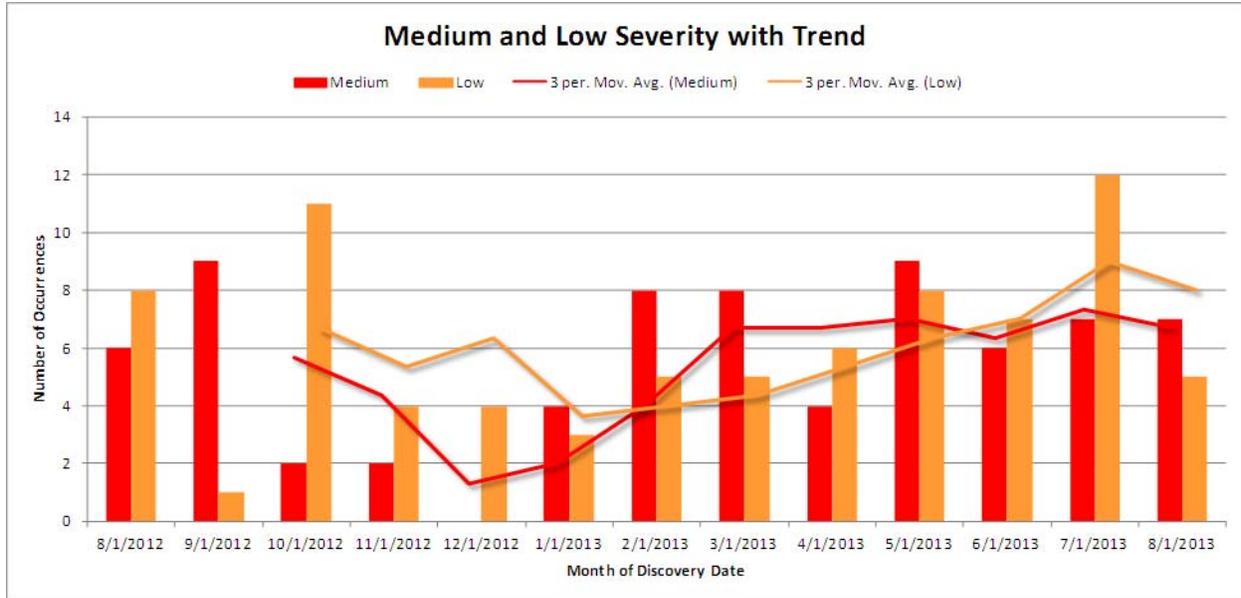


The previous two charts show that a high electrical severity event occurred in March, April and July ending a 679-day period since the last occurrence in May 2011. The number of occurrences with Medium severity scores remained constant while the Low severity scores decreased.

### Medium and Low Severity with Trend

Figure 16 focuses on the Medium and Low severity data series for August 2012 through August 2013. Trend lines are included for each, using a 3-month moving average.

Figure 16 - Trend of Medium and Low Electrical Severity Occurrences



The 3-month moving average shows a slightly decreasing trend for Low and Medium severity occurrences following an increase since the beginning of the year.

## 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

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

## Attachment 1

## Electrical Safety Occurrences – August 2013

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-2013-0017	A subcontractor did not wear arc flash PPE to install a metering device in 480V switchgear.					X				3	2E(2)	550
2	EM--PPPO-BWCS-PGDPDUCON-2013-0008	A cylinder hauler hit and cut a 2,400-volt overhead power line.								X	3	10(2)	700
3	EM-RL--CPRC-GPP-2013-0005	An operator was shocked when touching the discharge piping of a submersible well pump.	X								2	2B(6), 2E(1), 10(3)	330
4	EM-RL--CPRC-TPLANT-2013-0002	Electricians saw a spark when they began to pull the rocker switch from an instrument panel.									3	2E(2)	30
5	EM-RL--WCH-ERDF-2013-0007	An independent verifier discovered that the wrong circuit breaker was locked out.				X					4	2E(3)	0
6	EM-RP--WRPS-ANALLAB-2013-0001	Unexpected electrical energy source discovered while removing capacitor banks.					X				3	2E(2)	20
7	NA--LSO-LLNL-LLNL-2013-0030	A subcontractor did not hang the necessary tags in support of the electrical LOTO process.				X					4	2E(3)	0
8	NA--LSO-LLNL-LLNL-2013-0032	A worker was installing a conduit and it touched a legacy energized 120V wire causing in an arc flash.									3	2E(2)	110
9	NA--NVSO-GONV-NTS-2013-0001	The bucket of an excavator snagged a 240V line to electric car charging station.						X			3	2E(2)	50
10	NA--SS-SNL-5000-2013-0003	An employee received an electrical shock while plugging in an AC adapter.	X								2	2E(1)	330
11	SC--BSO-LBL-EHS-2013-0001	A vendor technician did not apply his personal lock to an energy control point.				X					4	2E(3)	0

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-2013-0014	A subcontractor cut through a conduit with a hacksaw and hit an unknown energized wire.					X		X		3	2E(2)	110
	TOTAL		2	0	0	3	3	1	1	1			

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 0-30

## Electrical Safety Occurrences – August 2013

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			
1	EE-GO--NREL-NREL-2013-0017	A subcontractor did not wear arc flash PPE to install a metering device in 480V switchgear.	X		X			X	X		X			X
2	EM--PPPO-BWCS-PGDPDUCON-2013-0008	A cylinder hauler hit and cut a 2,400-volt overhead power line.		X		XX				X				X
3	EM-RL--CPRC-GPP-2013-0005	An operator was shocked when touching the discharge piping of a submersible well pump.				X					X			X
4	EM-RL--CPRC-TPLANT-2013-0002	Electricians saw a spark when they began to pull the rocker switch from an instrument panel.	XX			X					X			X
5	EM-RL--WCH-ERDF-2013-0007	An independent verifier discovered that the wrong circuit breaker was locked out.	X								X			
6	EM-RP--WRPS-ANALLAB-2013-0001	Unexpected electrical energy source discovered while removing capacitor banks.	X			X					X			X
7	NA--LSO-LLNL-LLNL-2013-0030	A subcontractor did not hang the necessary tags in support of the electrical LOTO process.	X		X	X					X			
8	NA--LSO-LLNL-LLNL-2013-0032	A worker was installing a conduit and it touched a legacy energized 120V wire causing in an arc flash.	X			XX					X			X
9	NA--NVSO-GONV-NTS-2013-0001	The bucket of an excavator snagged a 240V line to electric car charging station.			X	X					X			X
10	NA--SS-SNL-5000-2013-0003	An employee received an electrical shock while plugging in an AC adapter.	X			X					X			
11	SC--BSO-LBL-EHS-2013-0001	A vendor technician did not apply his personal lock to an energy control point.	XX		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-2013-0014	A subcontractor cut through a conduit with a hacksaw and hit an unknown energized wire.			X	X					X			X
	TOTAL		7 X	5	5	7	5	1	1	1	11	0	0	8

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 56293 OR(s) with 59603 occurrences(s) as of 9/20/2013 10:25:26 AM  
 Query selected 12 OR(s) with 12 occurrences(s) as of 9/20/2013 10:27:32 AM

Download this report in Microsoft Word format. 

**1)Report Number:** [EE-GO--NREL-NREL-2013-0017](#) 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:** Unexpected discovery of electrical energy during subcontractor activity  
**Date/Time Discovered:** 08/27/2013 13:40 (MTZ)  
**Date/Time Categorized:** 08/28/2013 16:48 (MTZ)  
**Report Type:** Notification

**Report Dates:**

Notification	08/30/2013	17:23 (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  
 Encore Electric, sub to JE Dunn

**Occurrence Description:** On Monday, August 26, 2013, a subcontractor at NREL's Energy Systems Integration Facility (ESIF) installed a new metering control device in a 480V switch gear electrical cabinet. The following day, it was discovered that this work had unknowingly been performed within the arc flash boundary and that the zero energy verification performed previously did not accurately reflect the actual conditions of the system.

Prior to performing work, the system was locked and tagged out, per the one-line drawing, to address all energy sources feeding into the switch gear. Zero energy was verified on the load-side of the main breaker. Based on the results of the zero energy verification, the workers removed their electrical and arc flash PPE and continued with the installation. Unbeknownst to the workers, the zero energy verification did not reflect

the voltage that was present on the line-side of the breaker because the main breaker had a legacy lockout/tagout in place - applied during previous work in April - which interrupted the circuit.

On Tuesday, August 27, 2013, the newly installed metering control device was activated, which allowed detection of voltage (480V) within the switch gear cabinet. At this point, it was realized that workers had been working within the arc flash boundary while not wearing arc flash PPE. There was no shock exposure; work was performed outside the restricted approach boundary.

No injuries or property damage resulted from this occurrence. Upon discovery, work was stopped and an incident investigation initiated.

**Cause Description:**

**Operating Conditions:**

Normal Operating Conditions

**Activity Category:**

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

**Immediate Action(s):**

1. Work was stopped and the situation reported to NREL.
2. An administrative lockout was applied to the system.
3. An incident investigation was initiated.

**FM Evaluation:**

No injuries or property damage resulted from this occurrence. There was no impact to facility operations.

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:**

Yes.  
Before Further Operation? Yes  
By Whom: NREL EHS  
By When: 09/20/2013

**Division or Project:**

Site Operations

**Plant Area:**

South Table Mountain

**System/Building/Equipment:**

Energy Systems Integration Facility

**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)  
08H--OSHA Reportable/Industrial Hygiene - Safety Noncompliance  
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 August 26, 2013, a subcontractor at the Energy Systems Integration Facility installing a new metering control device in a 480V switch gear electrical cabinet had unknowingly been performed within the arc flash boundary while not wearing arc flash personal protective equipment, and the zero energy verification performed previously did not accurately reflect the actual conditions of the system. Unknown to the workers, the zero energy verification did not reflect the voltage that was present on the line-side of the breaker because the main breaker had a legacy lockout/tagout in place applied during previous work in April, which interrupted the circuit. No injuries or property damage resulted from this occurrence. Upon discovery, work was stopped and an incident investigation initiated.

**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
08/28/2013	16:48 (MTZ)	Event Distribution	DOE/NREL

**Authorized Classifier(AC):**

**2)Report Number:** [EM--PPPO-BWCS-PGDPDUCON-2013-0008](#) After 2003 Redesign

**Secretarial Office:** Environmental Management

**Lab/Site/Org:** Paducah Gaseous Diffusion Plant

**Facility Name:** Paducah Duf6 Conversion Plant

**Subject/Title:** Cylinder Hauler Contacts Over-Roadway 2400V Power Line while Traveling Onsite on Perimeter Road

**Date/Time Discovered:** 08/14/2013 08:45 (ETZ)

**Date/Time Categorized:** 08/21/2013 12:45 (ETZ)

**Report Type:** Notification

**Report Dates:**

Notification	08/23/2013	09:45 (ETZ)
Initial Update		

Latest Update		
Final		

**Significance Category:**

3

**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 3 occurrence)

**Cause Codes:**

**ISM:**

**Subcontractor Involved:**

No

**Occurrence Description:**

On August 14, 2013, at approximately 7:45 am CDT, an NCH-35 cylinder hauler was reported to have come into contact with an over-head power wire (2400V) above a perimeter road outside the cylinder yards as it was being driven to the USEC facilities for routine maintenance. The NCH-35 cylinder hauler was not transporting any cylinders at the time. The wire was reported as broken but the NCH-35 driver was not aware that any contact had occurred. The BWCS spotter and USEC escort traveling in front of the NCH-35 did not observe any contact with the wire or any abnormalities with the position of the cylinder hauler boom. The normal traveling position of the cylinder hauler boom is approximately 16 feet above the roadway. The driver, spotter and escort were notified later that the wire had been broken. The driver of a vehicle traveling behind the hauler (an offsite contractor) on the same road reported that he had observed the wire being contacted by the cylinder hauler and notified his site POC (LATA KY) who notified the USEC PSS. There were no personnel injuries and no damage to the cylinder hauler as a result of this incident.

USEC PSS closed the roadway temporarily while repairs to the line were made. A second line in the same location was not contacted. Upon measurement, the line still suspended over the roadway was determined to be 16 feet 8 inches above the road surface. NEC code specifications call for 2400V power lines to be 20 feet above the roadway.

A fact finding meeting was held on August 14, 2013 with personnel involved. Since October of 2011, this route has been used on 45 occasions to transfer NCH-35 cylinder haulers to and from USEC for maintenance without incident including as recently as August 12, 2013. BWCS suspended NCH-35 cylinder hauler travel on this route pending investigation and implementation of corrective actions.

**Cause Description:**

**Operating Conditions:** Normal

**Activity Category:** Transportation Onsite

**Immediate Action(s):** The USEC PSS restricted access to the road and the line was repaired. BWCS requested Information from the USEC facility regarding the location of the power line and the type, condition and damage to the wire. Upon repair of the wire USEC allowed access to the area by BWCS staff and collection of relevant information was initiated. BWCS suspended NCH-35 cylinder hauler travel on this route pending investigation and implementation of corrective actions.

**FM Evaluation:**

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** Yes.  
Before Further Operation? No  
By Whom: Plant Manager  
By When:

**Division or Project:** B&W Conversion Services, LLC

**Plant Area:** Grid Map Location F2

**System/Building/Equipment:** Cylinder Hauler

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

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:** 01S--Inadequate Conduct of Operations - Incorrect/Inadequate Installation  
07B--Electrical Systems - Electrical Distribution  
08H--OSHA Reportable/Industrial Hygiene - Safety Noncompliance  
08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical)  
10C--Transportation - Industrial Equipment Movement Incident  
12C--EH Categories - Electrical Safety  
14E--Quality Assurance - Work Process Deficiency

**HQ Summary:** On August 14, 2013, an NCH-35 cylinder hauler hit and cut a 2,400-volt overhead power line above a perimeter road outside the cylinder yards as it was being driven to the USEC facilities for routine maintenance. The cylinder hauler was not transporting any cylinders at the time. The driver was not aware that any contact had occurred. A spotter and escort traveling in front of the hauler did not see any contact with the line or any abnormalities with the position of the cylinder hauler boom, which is normally 16 feet above the roadway. An offsite contractor driving behind the hauler saw it hit the power line. There were no injuries and no damage to the cylinder hauler. The roadway was temporarily closed while the power line was repaired.

**Similar OR Report Number:**

**Facility Manager:**

Name	Tom Robinson
Phone	(270) 538-2229
Title	Plant Manager

**Originator:**

Name	WHITLEY, DANIEL S.
Phone	(270) 538-2038
Title	COMPLIANCE OFFICER

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
08/14/2013	12:45 (ETZ)	Tom Robinson	BWCS
08/14/2013	13:45 (ETZ)	Don Dihel	DOE PPO

**Authorized Classifier(AC):** Michael Stanley      Date: 08/21/2013

**3)Report Number:**

[EM-RL--CPRC-GPP-2013-0005](#) After 2003 Redesign

**Secretarial Office:**

Environmental Management

**Lab/Site/Org:**

Hanford Site

**Facility Name:**

Groundwater Protection Project

**Subject/Title:**

Sampler experiences electrical shock during well sampling at well 199-H4-84 in the 100H Area

**Date/Time Discovered:**

08/01/2013 10:00 (PTZ)

**Date/Time Categorized:**

08/01/2013 12:25 (PTZ)

**Report Type:**

Update/Final

**Report Dates:**

Notification	08/01/2013	18:25 (ETZ)
Initial Update	08/06/2013	09:15 (ETZ)
Latest Update	09/19/2013	18:33 (ETZ)
Final		

**Significance Category:**

2

**Reporting Criteria:**

2B(6) - Personnel exposure to chemical, biological or physical hazards (e.g. noise, laser, ultraviolet light, heat, etc.) above limits established in 10 CFR Part 851, but below levels deemed immediately dangerous to life and health (IDLH).

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

10(3) - A near miss to an otherwise ORPS reportable event, where something physically happened that was unexpected or unintended, or where no or only one barrier prevented an event from having a reportable consequence.

The significance category assigned to the near miss must be based on an evaluation of the potential risks and extent of personnel exposure to the hazard. (1 of 3 criteria - This is a SC 3 occurrence)

**Cause Codes:**

A2B3C02 - Equipment/ material problem; Inspection/ testing LTA;

Inspection/ testing LTA

A3B2C05 - Human Performance Less Than Adequate (LTA); Rule Based Error; Situation incorrectly identified or represented results in wrong rule used

-->couplet - A5B4C01 - Communications Less Than Adequate (LTA);

Verbal Communications LTA; Communication between work groups LTA

-->couplet - A5B4C06 - Communications Less Than Adequate (LTA);

Verbal Communications LTA; Suspected problems not communicated to supervision

A4B5C06 - Management Problem; Change Management LTA; Personnel / department interactions not considered

A1B5C02 - Design/Engineering Problem; Operability of Design / Environment LTA; Physical environment LTA

**ISM:**

2) Analyze the Hazards

3) Develop and Implement Hazard Controls

**Subcontractor Involved:**

No

**Occurrence Description:**

On 08-01-13 at 1000 Hrs, while operating a submersible well pump during sampling at well 199-H4-84 in the 100-H Area, a Sampling NCO experienced an electrical shock after contacting the discharge piping of the well pump. The portable generator supplying power to the pump was de-energized and all work in the area was halted. The area was cleared of personnel and the event scene was preserved. The employee was sent to the onsite occupational health services provider for evaluation. The employee was evaluated and released back to work with no restriction. An initial investigation was conducted by S&GRP management and safety personnel. As a result of the initial investigation, a formal Stop Work was issued for all groundwater sampling activities. Notifications were made and a Critique has been scheduled for 08-05-13.

**Cause Description:**

Root Cause 01- Potential Electrical shock hazard not adequately identified or controlled.

Contributing Cause 01- Appropriate means and methods not provided to control or limit sampling operations at well 199-H4-84 prior to completion of repairs.

Contributing Cause 02- Well physical configuration introduced potential

for twisting of wires when sampling equipment was attached.

Contributing Cause 03- No out of service tag was applied to well or well pump after discovery of damaged electrical equipment.

**Operating Conditions:**

Operating Conditions at the well site were normal at the time of the event.

**Activity Category:**

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

**Immediate Action(s):**

- The portable generator supplying power to the pump was de-energized.
- Work in the area was halted and area was cleared of personnel to preserve the event scene.
- Portable electric generator and submersible well pump were secured.
- Work in the immediate area was suspended and personnel were cleared from the area in order to preserve the event scene.
- Employee was sent to the onsite medical provider for evaluation; subsequently released back to work with no restriction.
- Notifications were made to appropriate DOE and CHPRC personnel.
- An Out of Service tag was installed on the well cover.
- The Well Access List was removed from the project website to halt access to S&GRP-controlled wells.
- A formal Stop Work was initiated for all groundwater sampling activities.
- An initial investigation was conducted and a critique was held to further investigate the event.

**FM Evaluation:**

A Stop Work was instituted to allow time to complete initial investigation prior to resuming field work activities.

Final Report due date of September 16, 2013 will be extended to a new target date of September 24, 2013. New target date is necessary to include additional actions and adopting of CHPRC processes and expectations related to Equipment Deficiency Logs.

In addition, several actions need to be included in the Root Cause Evaluation including assessment of other unique S&GRP administrative processes, evaluation of potential technology available to further reduce the electrical hazards present during well sampling, and review of S&GRP Conduct of Operations Matrix to ensure it adequately addresses the sampling and drilling organizations within S&GRP. Other minor changes will also be made to the Corrective Action Plan as necessary to ensure

consistency.

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** No

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

**Plant Area:** 100H Area, Hanford

**System/Building/Equipment:** Groundwater Well 199-H4-84

**Facility Function:** Environmental Restoration Operations

**Corrective Action 01:** **Target Completion Date:**10/15/2013 **Tracking ID:**CR-2013-1957 CA1

Develop procedure to formally document the Well Concern Report (WCR) process to include:

- Improved communication and process flow between Sampling Operations, Sample Management and Reporting and the Well Concern Report process.
- Established process for Well Concern Report issuance and resolution.
- Established process for Out of Service tags in relation to Well Concern Report process.
- Instructions for removal of well from well access list (if deemed necessary by Field Work Supervisor) and subsequently placing well back on WAL.
- Other enhancements to improve usability and hazard identification / communication.

Note: The Well Concern Report process will maintain alignment with CHPRC policies, procedures and expectations for tracking equipment deficiencies. In addition, the process will satisfy the requirements for an Equipment Deficiency List (EDL) per PRC-PRO-OP-40122 Control of Equipment and System Status Section 3.5.

**Corrective Action 02:** **Target Completion Date:**08/28/2013 **Tracking ID:**CR-2013-1957 CA2

Revise GRP-FS-04-G-004 Operational Monitoring Groundwater Sampling to include the following warnings/cautions/prerequisites, steps and modified forms/appendices:

- Add instructions/cautions to keep riser pipe stationary during sampling operations. This will include not allowing the pipe to rotate, twist or turn while attaching sampling equipment.
- Add instructions/prerequisites to visually inspect all equipment prior to use (including electrical plugs and connectors, etc.) during pre-use inspections and prior to field sampling.
- Establish a robust process to differentiate between major issues (i.e. safety-related) and minor issues (labeling, potential improvements, etc.)

- during well sampling pre-trip and pre-use inspections.
- Establish Roles and Responsibilities for discovery of abnormalities, applying Out of Service tags and completing a Well Concern Report. Process interaction will be established between Sampling Operations work control and Well Concern Report process.
- Modify Well Concern Report form to include reporting of abnormalities observed during inspections to the FWS, Out of Service Tag number, and notification for well removal from Well Access List.
- Modify Appendix M Well Concern Report Instructions to include decision by FWS for necessity of Out of Service tag and removal of well from Well Access List.

Note: The Well Concern Report process will maintain alignment with CHPRC policies, procedures and expectations for tracking equipment deficiencies. In addition, the process will satisfy the requirements for an Equipment Deficiency List (EDL) per PRC-PRO-OP-40122 Control of Equipment and System Status Section 3.5.

**Corrective Action 03:**

**Target Completion Date:**10/30/2013 **Tracking ID:**CR-2013-1957 CA3

Perform engineering evaluation of the existing flush-mount well design and methods used to sample those wells to significantly reduce or eliminate potential of any possible damage to the well electrical or bonding components caused by rotation of the sample discharge piping. The proposed change(s) will be presented to the sampling NCOs for their concurrence.

After evaluation, design, develop and implement a method to significantly reduce or eliminate potential for damaged electrical components or bonding caused by rotation of the sampling discharge piping.

Additional action(s) will be added to this CR as necessary to track change implementation.

**Corrective Action 04:**

**Target Completion Date:**11/15/2013 **Tracking ID:**CR-2013-1957 CA4

Modify Well Maintenance procedure(s) to specify required installation of pumps in flush mount wells to reflect new configuration standards for engineering method implemented in PA-03. (CA3).

**Corrective Action 05:**

**Target Completion Date:**11/30/2013 **Tracking ID:**CR-2013-1957 CA5

Perform inspection of all flush mount wells with permanently installed electric submersible pumps. Inspection will include:

- Conditions of electrical components above and below the well landing plate.
- Verification that bonding has remained intact and in good operating condition.
- Inspection of electrical wiring for degradation, damage, etc. potentially caused by twisting, turning, and other conditions which could negatively affect the operability.

Formally document the results of the flush mount well inspection.

**Corrective Action 06:**

<b>Target Completion Date:</b> 12/15/2013	<b>Tracking ID:</b> CR-2013-1957 CA6
---	--------------------------------------

Based on results of the flush mount well inspections performed for RA-02 (CA5), establish a preventive maintenance (PM) program for wells with permanently installed pumps which have the potential to create an electrical shock hazard. The initial PM frequency will be determined by Remediation Support Management team based on the equipment degradation rate.

Note: This action is only required to be implemented if the inspection results from RA-02 (CA5) identify electrical component degradation or damage.

**Corrective Action 07:**

<b>Target Completion Date:</b> 08/28/2013	<b>Tracking ID:</b> CR-2013-1957 CA7
---	--------------------------------------

Complete training/briefing with appropriate Sampling NCOs and FWSs. Intent of briefing is to include discussion on the following topics:

- Update status of Stop Work.
- Solicitation of feedback from sampling NCOs to help resolve issues that caused the shock event.
- Demonstration using a mockup of the well discharge pipe and electrical connection to exhibit how the twisting motion on the discharge piping created excess stress on electrical connections.
- Revisions made to groundwater sampling and Well Access List procedures to add additional detail regarding the use of Out of Service tags.
- Development of new procedure to integrate the flow of Well Concern Reports, Out of Service tags, removal of wells from the Well Access List, and administrative barriers to ensure an out of service well is not sampled (CA1).
- Demonstration using a mockup of the proposed flush-mount well remedy to eliminate over rotation of the discharge piping. Solicit feedback to develop appropriate actions.

**Corrective Action 08:**

<b>Target Completion Date:</b> 12/31/2013	<b>Tracking ID:</b> CR-2013-1957 CA8
---	--------------------------------------

Update initial Sampling NCO training curriculum to include the electrical shock event and the associated lessons learned.

**Corrective Action 09:**

<b>Target Completion Date:</b> 10/15/2013	<b>Tracking ID:</b> CR-2013-1957 CA9
---	--------------------------------------

Modify GRP-FS-04-G-004 Appendix K Groundwater Well Pre-Trip Inspection to include additional instructions for visual inspection of sampling equipment including electrical connections, configuration issues, etc.

**Corrective Action 10:**

<b>Target Completion Date:</b> 12/31/2013	<b>Tracking ID:</b> CR-2013-1957 CA10
---	---------------------------------------

Perform engineering evaluation of available technology for utilization by the NCOs to indicate, reduce, or eliminate electrical shock hazard potential for sampling operations.

Implement recommended changes/modifications as necessary.

Additional actions will be added to this CR to track these changes/modifications to closure.

**Corrective Action 11:**

<b>Target Completion</b> <b>Date:</b> 12/31/2013	<b>Tracking ID:</b> CR-2013-1957 CA11
---	--

Review GRP-TI-0001 Groundwater Remediation Project Conduct of Operations Matrix to ensure the matrix adequately encompasses the groundwater sampling and drilling organizations. The review will evaluate whether or not the appropriate Conduct of Operations elements have been applied to these areas of the project.

This will be performed as a Work Site Assessment, scheduled in the IEP database, and resources from CHPRC Operations Program will be involved in the assessment/verification process.

**Corrective Action 12:**

<b>Target Completion</b> <b>Date:</b> 11/30/2013	<b>Tracking ID:</b> CR-2013-1957 CA12
---	--

Complete an Integrated Evaluation Plan (IEP) assessment in 1st Quarter FY2014 focusing on the interrelated processes for handling operational or safety deficiencies/concerns at groundwater wells. This will include Well Concern Reports, Out of Service tagging, Well Access List, groundwater sample packages (GSPs) and sampling schedules.

This assessment will include independent involvement (outside of S&GRP) for assistance with ensuring processes are in alignment with CHPRC policies, procedures and expectations.

**Corrective Action 13:**

<b>Target Completion</b> <b>Date:</b> 02/15/2014	<b>Tracking ID:</b> CR-2013-1957 CA13
---	--

Complete evaluation of S&GRP administrative processes to ensure alignment with CHPRC policies, procedures or expectations and identify for elimination any stove-piped administrative processes within the S&GRP.

This evaluation will be completed as a Work Site Assessment and will be included in the Integrated Evaluation Plan (IEP) database.

Separate Condition Reports will be initiated for any issues identified.

**Corrective Action 14:**

<b>Target Completion</b> <b>Date:</b> 10/15/2013	<b>Tracking ID:</b> CR-2013-1957 CA14
---	--

Develop and submit a Lessons Learned for the event.

**Corrective Action 15:**

<b>Target Completion</b> <b>Date:</b> 03/31/2014	<b>Tracking ID:</b> CR-2013-1957 CA15
---	--

Effectiveness Review Requirement

Perform an Effectiveness Review per the Effectiveness Review Criteria within this report to ensure actions taken have adequately addressed the identified causes.

**Lessons(s) Learned:**

Damage to groundwater well electrical components can occur due to rotation of the equipment above the well landing plate, which may or may not be readily visible to workers. Extra precaution should be taken to limit the rotation of the equipment, as most electrical components are difficult to identify without complete removal of installed submersible well pumps.

Identification of potential hazards and application of appropriate hazard controls is necessary to prevent other work groups or teams from performing similar tasks and exposing them to similar hazards. Personnel should understand their roles and responsibilities for controlling or limiting access to the area or equipment in question.

**HQ Keywords:**

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

**HQ Summary:**

On August 1, 2013, a sampling nuclear chemical operator experienced an electrical shock after contacting the discharge piping of a submersible well pump while operating the pump during sampling at Well 199-H4-84 in the 100-H Area. The portable generator supplying power to the pump was de-energized and all work in the area was halted. The area was cleared of personnel and the event scene was preserved. The employee was sent to the onsite occupational health services provider for evaluation. The employee was evaluated and released back to work with no restriction. An initial investigation was conducted and a formal Stop Work was issued for all groundwater sampling activities.

**Similar OR Report Number:** 1. EM-RL--CPRC-GPP-2011-0001

**Facility Manager:**

Name	Mark Cherry
Phone	(509) 380-2424
Title	S&GRP Remediation Support Director

**Originator:**

Name	NELSON, ROBERT J.
Phone	(509) 373-6657
Title	OPERATIONS SPECIALIST

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
------	------	-----------------	--------------

08/01/2013	12:25 (PTZ)	B. Popielarczyk	CHPRC
08/01/2013	12:25 (PTZ)	M. Cherry	CHPRC
08/01/2013	12:52 (PTZ)	B. Biro	DOE-RL
08/01/2013	14:02 (PTZ)	T. Cornell	EOC

**Authorized Classifier(AC):**

---

**4)Report Number:** [EM-RL--CPRC-TPLANT-2013-0002](#) After 2003 Redesign  
**Secretarial Office:** Environmental Management  
**Lab/Site/Org:** Hanford Site  
**Facility Name:** T-Plant Facility  
**Subject/Title:** Electrical Spark seen during Maintenance Activity  
**Date/Time Discovered:** 08/14/2013 13:45 (PTZ)  
**Date/Time Categorized:** 08/14/2013 15:15 (PTZ)  
**Report Type:** Notification  
**Report Dates:**

Notification	08/19/2013	10:20 (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:** No  
**Occurrence Description:** On August 14, 2013, electricians were performing troubleshooting of a rocker switch on the 2706T Instrument Panel. The work was conducted using an Eight-Criteria Checklist. The Electricians locked out Circuit 14 of Panel E-LP-2706-T4B-1 and installed their authorized worker locks. A safe to work check was performed on the rocker switch terminals with no power found. When the Electricians began to pull the rocker switch from the 2706T Instrument Panel, they saw a spark. No injuries occurred.

**Cause Description:**  
**Operating Conditions:** Maintenance  
**Activity Category:** Maintenance  
**Immediate Action(s):** The Electricians stopped work, notified FWS, and the panel was secured.

The work has been suspended; the Facility is investigating possible causes. A critique was conducted.

**FM Evaluation:**

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** Yes.  
 Before Further Operation? No  
 By Whom: T Plant Operations  
 By When: 09/28/2013

**Division or Project:** Decommissioning Waste Fuels & Remediation Services

**Plant Area:** 200 West

**System/Building/Equipment:** 2706T

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

**Corrective Action:**

**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 August 14, 2013, while performing troubleshooting of a rocker switch, electricians saw a spark when they began to pull the rocker switch from the 2706T Instrument Panel. The electricians locked out Circuit 14 of Panel E-LP-2706-T4B, installed their authorized worker locks, and performed a safe to work check on the rocker switch terminals with no power found. There were no injuries. The electricians stopped work, made appropriate notifications and an investigation was initiated.

**Similar OR Report Number:**

**Facility Manager:**

Name	Sauceda, Daniel G
Phone	(509) 373-3194
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
------	------	-----------------	--------------

08/14/2013	13:50 (PTZ)	DG Saucedo	T Plant
08/14/2013	15:15 (PTZ)	AK Wright	DOE RL
08/14/2013	15:53 (PTZ)	T Woodford	MSA EOC

**Authorized Classifier(AC):**

---

**5)Report Number:** [EM-RL--WCH-ERDF-2013-0007](#) After 2003 Redesign  
**Secretarial Office:** Environmental Management  
**Lab/Site/Org:** Hanford Site  
**Facility Name:** Env.Restoration Disposal Facility  
**Subject/Title:** Lockout/Tagout Process Violation Involving ERDF Leachate Electrical System

**Date/Time Discovered:** 08/06/2013 10:15 (PTZ)

**Date/Time Categorized:** 08/07/2013 08:16 (PTZ)

**Report Type:** Notification/Final

**Report Dates:**

Notification	08/12/2013	16:39 (ETZ)
Initial Update	08/12/2013	16:39 (ETZ)
Latest Update	08/12/2013	16:39 (ETZ)
Final	08/12/2013	16:39 (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  
WSDO

**Occurrence Description:** On August 6 2013, at approximately 1000 hrs, the Washington Closure Hanford (WCH) Environmental Restoration Disposal Facility (ERDF) Subcontractor Technical Representative (STR) was preparing an electrical circuit panel at the ERDF leachate system for an eventual component replacement in the monitoring system by establishing a Controlling Organization Lockout/Tagout (LO/TO) on the circuit breaker. The work was being performed in accordance with a Tagout Authorization Form (TAF) that had been reviewed and approved to progress with the electrical work. The WCH ERDF STR was accompanied by a subcontractor sub-tier electrician. The TAF identified circuit breaker #17 to be LO/TO, which the sub-tier electrician opened and received a control panel response that the circuit had been de-energized. The electrician then placed a restraining device on circuit breaker #15 (which was normally open) instead of circuit breaker #17. The WCH ERDF STR then installed the LO/TO devices on circuit breaker #15 and did not realized the circuit breaker restraining

device was on the wrong circuit breaker. Following the LO/TO installation, the WCH ERDF STR summoned the LO/TO independent verifier to review and check the circuit breaker's established LO/TO. The WCH ERDF independent verifier reviewed the TAF, the circuit panel and breaker, and the LO/TO that had been installed and noticed the LO/TO was installed on circuit breaker #15 instead of circuit breaker #17.

The WCH ERDF independent verifier notified the WCH ERDF STR and the electrician of the error. The LO/TO process was halted. There were no personnel working on the leachate system monitoring circuits during the LO/TO process and no personnel were exposed to any hazardous energy when the LO/TO was being established. Although the WCH ERDF independent verifier caught the LO/TO error, as designed in the established LO/TO process, the installation of the LO/TO on the wrong circuit breaker constituted a failure to properly execute a hazardous energy control process.

Upon discovering the technical error in the LO/TO process, ERDF personnel halted the LO/TO process and a determination was made to re-initiate the LO/TO process for the leachate system repair work by drafting a new TAF. Personnel involved in the event did not realize the error was reportable into the Occurrence Reporting and Processing System (ORPS) and believed that because the error was caught during the verification process it was not a reportable event. After discussions with Department of Energy (DOE) Richland Operations Office (RL) personnel, and other WCH personnel on August 7, 2013, it was determined the event was reportable to ORPS, and notifications were initiated, and a fact finding was scheduled.

**Cause Description:**

**Operating Conditions:**

N/A

**Activity Category:**

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

**Immediate Action(s):**

Once it was determined the LO/TO had not been properly applied, work was halted, and the proper LO/TO was performed on the correct breaker. Notifications were made to ERDF management. A fact finding was scheduled on August 7, 2013, and an investigation was initiated.

**FM Evaluation:**

WCH ERDF personnel documented the issue involving the technical violation of the LO/TO process on an Issue Form, which was submitted into the WCH Corrective Action Management System (CAMS). The results of the investigation and any subsequent actions will be documented on the Issue Form and tracked within CAMS. An Apparent Cause Analysis will also be performed and results will be captured on the Issue Form associated with the event.

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** No

**Division or Project:** Waste Operations

**Plant Area:** 600 Area

**System/Building/Equipment:** Leachate System Breaker Panel

**Facility Function:** Environmental Restoration Operations

**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 August 6, 2013, an Environmental Restoration Disposal Facility (ERDF) independent verifier discovered a lockout/tagout (LO/TO) error during a review of a Tagout Authorization Form for work on the Leachate Electrical System. The verifier noticed that a LO/TO had been installed on the wrong circuit breaker. Circuit breaker #15 was locked out instead of circuit breaker #17. Work was halted and the proper LO/TO was performed on the correct breaker. Notifications were made to ERDF management and a fact finding was scheduled.

**Similar OR Report Number:**

**Facility Manager:**

Name	Jeff Armatrout
Phone	(509) 373-3228
Title	Waste Operations Director

**Originator:**

Name	FOSTER, STEVEN JAMES
Phone	(509) 372-9722
Title	PRICE ANDERSON ACT COORDINATOR

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
08/07/2013	08:52 (PTZ)	J. Allen	DOE/RL
08/07/2013	09:12 (PTZ)	M. Boyce	EOC

**Authorized Classifier(AC):**

---

**6)Report Number:** [EM-RP--WRPS-ANALLAB-2013-0001](#) After 2003 Redesign  
**Secretarial Office:** Environmental Management  
**Lab/Site/Org:** Hanford Site  
**Facility Name:** 222-S/Analytical Laboratory  
**Subject/Title:** Unexpected Electrical Energy Source Discovered While Performing Work  
**Date/Time Discovered:** 08/20/2013 10:15 (PTZ)  
**Date/Time Categorized:** 08/20/2013 11:44 (PTZ)  
**Report Type:** Notification

**Report Dates:**

Notification	08/22/2013	13:07 (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

**Subcontractor Involved:** No  
**Occurrence Description:** During performance of a work package to remove substation capacitor banks at the 222-S Laboratory, an unexpected electrical energy source was discovered. Lock and tag installation and zero-energy (safe condition and safe-to-work) checks were previously performed and the energy source was not detected. There was no contact with live electrical energy.

**Cause Description:**  
**Operating Conditions:** Does not apply.  
**Activity Category:** Maintenance  
**Immediate Action(s):** Work was halted, the facility was placed in a safe configuration, and an event investigation was initiated.

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

**Required:** Before Further Operation? No  
 By Whom: Greenough, Keith J Jr  
 By When:  
**Division or Project:** Washington River Protection Solutions LLC (WRPS)  
**Plant Area:** 200 West  
**System/Building/Equipment:** Electrical/222-S/Substation Capacitor Banks  
**Facility Function:** Laboratory - Analytical  
**Corrective Action:**  
**Lessons(s) Learned:**  
**HQ Keywords:** 01M--Inadequate Conduct of Operations - Inadequate Job Planning (Electrical)  
 08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical)  
 12C--EH Categories - Electrical Safety  
 14E--Quality Assurance - Work Process Deficiency

**HQ Summary:** On August 20, 2013, workers discovered an unexpected electrical energy source while removing substation capacitor banks at the 222-S Laboratory. A lock and tag had been installed and zero-energy (safe condition and safe-to-work) checks were performed but the energy source was not detected at that time. Work was halted and the facility was placed in a safe configuration. There was no contact with electrical energy. An event investigation was initiated.

**Similar OR Report Number:**

**Facility Manager:**

Name	Greenough, Keith J Jr
Phone	(509) 373-9541
Title	Manager, Facility

**Originator:**

Name	WATERS, SHAUN F
Phone	(509) 373-3457
Title	OPERATIONS SPECIALIST

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
08/20/2013	11:44 (PTZ)	Wilkinson, R. E.	WRPS
08/20/2013	12:35 (PTZ)	Ross, W. E.	WRPS
08/20/2013	12:35 (PTZ)	Domnoske-Rauch, L. A.	DOE-ORP
08/20/2013	12:42 (PTZ)	Woodford, T. L.	MSA-EOC

**Authorized Classifier(AC):**

---

**7)Report Number:** [NA--LSO-LLNL-LLNL-2013-0030](#) After 2003 Redesign

**Secretarial Office:** National Nuclear Security Administration  
**Lab/Site/Org:** Lawrence Livermore National Lab.  
**Facility Name:** Lawrence Livermore Nat. Lab. (BOP)  
**Subject/Title:** Failure to Follow Prescribed Hazardous Energy Control Process During Subcontractor Remodel Project at Building 323  
**Date/Time Discovered:** 08/08/2013 17:00 (PTZ)  
**Date/Time Categorized:** 08/09/2013 11:00 (PTZ)  
**Report Type:** Notification/Final

**Report Dates:**

Notification	08/13/2013	14:15 (ETZ)
Initial Update	08/13/2013	14:15 (ETZ)
Latest Update	08/13/2013	14:15 (ETZ)
Final	08/13/2013	14:15 (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:** Yes  
Cerruto Construction

**Occurrence Description:** On Thursday August 8, 2013 a subcontractor performing work in support of a kitchen remodel project in Building 323 was found not to have the necessary tags hung in support of the electrical Lock Out/Tag Out (LOTO) process. The subcontractor had performed the lock out process on several electrical circuits supporting a kitchen area in Building 323 with the purpose to remove cabinetry in support of initial remodeling project efforts.

During a project area review by the supporting Environment Safety & Health Team industrial safety (IS) professional, it was noted that even though the subcontractor had identified the correct electrical circuits to de-energize, had performed the correct zero energy verifications, and hung locking devices on the necessary electrical circuits; no tags had been hung in support of the LOTO process.

Additionally, the subcontractor was found to have all locking devices managed under the control of one single key and not the required "one lock and one tag" for each authorized personnel performing electrical work in the area.

No injuries or exposure to an electrical hazard resulted from this event.

This occurrence report is being tracked in LLNL's Issues Tracking System, reference Assessment No. 36669.

**Cause Description:**

**Operating Conditions:** Normal

**Activity Category:** Construction

**Immediate Action(s):**

1. The work was paused until the correct lock and tagging devices were in place.
2. It was not until the next morning that F&I line management was able to go to the work location and verify the information with the subcontractor.
3. Once the correct LOTO devices were in place the configuration was confirmed with both F&I line management and supporting ES&H Industrial Safety personnel, the remodeling project was allowed to restart.

**FM Evaluation:**

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** No

**Division or Project:** O&B

**Plant Area:** Site 200

**System/Building/Equipment:** Building 323 Kitchen Area Remodeling Project

**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 August 8, 2013, a subcontractor performing work in support of a kitchen remodel project in Building 323 did not hang the necessary tags in support of the electrical Lock Out/Tag Out (LOTO) process. Although the subcontractor had identified the correct electrical circuits, performed the correct zero energy verifications, and hung locking devices on the circuits; no tags had been hung. Additionally, the subcontractor managed all locking devices under the control of a single key and not the required "one lock and one tag" for each authorized person performing electrical work in the area. The work was paused until the correct lock and tagging devices were in place.

**Similar OR Report Number:** 1. NA--LSO-LLNL-LLNL-2013-0009

**Facility Manager:**

Name	Harold T. Conner, Jr.
Phone	(925) 422-5786
Title	Associate Director, F&I Directorate

**Originator:**

Name	LUDWIG, MARK E.
Phone	(925) 422-6964
Title	OCCURRENCE REPORTING OFFICER

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
08/09/2013	11:25 (PTZ)	Mark Sueksdorf	LEDO
08/09/2013	11:27 (PTZ)	Dave Aron	NNSA LFO
08/09/2013	11:50 (PTZ)	Tracey Simpson	ES&H TL

**Authorized Classifier(AC):** Kevin Akey      Date: 08/12/2013

**8)Report Number:**

[NA--LSO-LLNL-LLNL-2013-0032](#) After 2003 Redesign

**Secretarial Office:**

National Nuclear Security Administration

**Lab/Site/Org:**

Lawrence Livermore National Lab.

**Facility Name:**

Lawrence Livermore Nat. Lab. (BOP)

**Subject/Title:**

Unexpected discovery of an uncontrolled electrical hazardous energy source in Building 115

**Date/Time Discovered:**

08/15/2013 11:30 (PTZ)

**Date/Time Categorized:**

08/15/2013 13:15 (PTZ)

**Report Type:**

Notification

**Report Dates:**

Notification	08/19/2013	14:01 (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

4) Perform Work Within Controls

**Subcontractor Involved:**

No

**Occurrence Description:**

At approximately 11:30 a.m. on August 15, 2013, during installation of conduit through the under-floor in B115 (room 1410), the conduit made contact with a legacy live 120 volt wire resulted in an arc flash.

Once the worker saw the arc flash, he immediately stopped work and contacted Computation Facility Management. Upon arriving at the incident scene, the Computation Facility Management representative secured the scene and contacted a Computation electrician to safely secure the exposed wire. The electrician secured the wire and traced the wire to the breaker panel and turned the breaker off. The arc flash did not trigger the breaker switch. The LLNL Electrical Safety Officer was contacted for assistance in evaluating the incident. There was no shock or personnel injury and the only equipment damage was limited to the conduit.

The area has been secured and an investigation initiated.

This occurrence report is being tracked in LLNL's Issues Tracking System, reference Assessment No. 36759.

**Cause Description:**

**Operating Conditions:**

Normal Operations

**Activity Category:**

Construction

**Immediate Action(s):**

The scene was secured. An electrician turned off the breaker and secured the exposed wire.

**FM Evaluation:**

Submit the final occurrence report to the ORO by 09/24/2013. Enter the final occurrence report into ORPS by 09/27/2013.

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is**

Yes.

**Required:**

Before Further Operation? No

By Whom: Scott Colonese

By When:

**Division or Project:**

Director's Office

**Plant Area:**

Site 200

**System/Building/Equipment:** Building 115 alarm circuit conduit

**Facility Function:**

Laboratory - Research & Development

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:**

07E--Electrical Systems - Electrical Equipment Failure

08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical)

12C--EH Categories - Electrical Safety  
 14L--Quality Assurance - No QA Deficiency

**HQ Summary:**

On August 15, 2013, while a worker was installing a conduit through the under-floor in B115 (room 1410), the conduit made contact with a legacy energized 120-volt wire which resulted in an arc flash. The worker immediately stopped work and contacted a Computation Facility Management representative who arrived at the incident scene and secured the wire, traced the wire to the breaker panel, and turned the breaker off. The arc flash did not trigger the breaker switch. There was no shock or personnel injury and equipment damage was limited to the conduit. An investigation was initiated.

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

**Facility Manager:**

Name	John Lewis
Phone	(925) 422-0359
Title	Security Director

**Originator:**

Name	LUDWIG, MARK E.
Phone	(925) 422-6964
Title	OCCURRENCE REPORTING OFFICER

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
08/15/2013	13:59 (PTZ)	Tracey Simpson	ES& TL
08/15/2013	14:01 (PTZ)	Gordon Krauter	LEDO
08/15/2013	14:08 (PTZ)	Roy Kearns	NNSA LFO

**Authorized Classifier(AC):** Karen Dodson      Date: 08/16/2013

**9)Report Number:** [NA--NVSO-GONV-NTS-2013-0001](#) After 2003 Redesign  
**Secretarial Office:** National Nuclear Security Administration  
**Lab/Site/Org:** Nevada Test Site  
**Facility Name:** Nevada Test Site  
**Subject/Title:** Excavator Damaged Live Electrical Charging Cable During Excavation  
**Date/Time Discovered:** 08/07/2013 09:00 (PTZ)  
**Date/Time Categorized:** 08/07/2013 09:00 (PTZ)  
**Report Type:** Notification  
**Report Dates:**

Notification	08/08/2013	19:31 (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  
 Valley Electric

**Occurrence Description:** Approximately 0900 PDT on 8/7/13, during NNSA/Nevada Field Office (NFO) subcontracted trenching operations for ground grid installation at the Mercury Switching Center a excavator bucket damaged a shallow unmarked plastic conduit containing power cable leading to an electric vehicle charging station in front of Building 23-1010. The excavator bucket had snagged a 240V line feeding an electric car charging station. The excavator operator stopped work immediately upon discovery, opened the electrical panel to find the conduit pulled enough to dislodge an electrical breaker, and then called the Substation Superintendent for Valley Electric Association (VEA). The Superintendent then made all the necessary notifications to his management, National Security Technologies, LLC (NSTec) and NFO. NSTec personnel responded to the scene with safety and electrical crews to locked out the breaker supplying power to the conduit. There were no personnel injuries associated with this event. NFO sent a local Facility Representative (FR) to review the work site and document the incident. After interviews with electrical contractor personnel, and discussions with VEA engineering supervision, the Deputy Assistant Manager for Site Operations allowed work to resume approximately 1300 PDT with the stipulation that trenching operations in the area would be conducted using hand tools.

**Cause Description:**

**Operating Conditions:** Does Not Apply

**Activity Category:** Construction

**Immediate Action(s):** Stop work and condition placed into safe mode.

Notifications made to NNSA/Nevada Field Office line management.

**FM Evaluation:**

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is** Yes.

**Required:** Before Further Operation? No  
 By Whom: NFO  
 By When: 09/19/2013

**Division or Project:** Valley Electric Authority Project

**Plant Area:** NNSS-Area 23

**System/Building/Equipment:** Switching Station

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

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:** 07D--Electrical Systems - Electrical Wiring  
 07E--Electrical Systems - Electrical Equipment Failure  
 08F--OSHA Reportable/Industrial Hygiene - Industrial Operations Issues  
 08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical)  
 11G--Other - Subcontractor  
 12G--EH Categories - Industrial Operations  
 14E--Quality Assurance - Work Process Deficiency  
 14G--Quality Assurance - Procurement Deficiency

**HQ Summary:** On August 7, 2013, the bucket of an excavator snagged a 240-volt line feeding an electric car charging station during subcontracted trenching operations for ground grid installation at the Mercury Switching Center. The bucket damaged the shallow unmarked plastic conduit containing the energized power cable. The excavator operator stopped work immediately upon discovery, opened the electrical panel to find the conduit pulled enough to dislodge an electrical breaker, and then called the Substation Superintendent for Valley Electric Association. The Superintendent then made all the necessary notifications to his management, National Security Technologies. Electrical crews locked out the breaker supplying power to the conduit. There were no injuries associated with this event.

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

**Facility Manager:**

Name	Kevin Thornton
Phone	(702) 295-1541
Title	Project Manager

**Originator:**

Name	GILE, ANDREA L
Phone	(702) 295-7438
Title	PROJECT OPERATIONS SPEC.

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
------	------	-----------------	--------------

08/07/2013	09:15 (PTZ)	Jeff Haeberlin	NNSA/NFO
------------	-------------	----------------	----------

**Authorized Classifier(AC):**


---

**10)Report Number:** [NA--SS-SNL-5000-2013-0003](#) After 2003 Redesign  
**Secretarial Office:** National Nuclear Security Administration  
**Lab/Site/Org:** Sandia National Laboratories - SS  
**Facility Name:** SNL Division 5000  
**Subject/Title:** Individual Receives Electrical Shock While Plugging in Adapter/Power Supply  
**Date/Time Discovered:** 08/20/2013 09:45 (MTZ)  
**Date/Time Categorized:** 08/20/2013 10:49 (MTZ)  
**Report Type:** Notification

**Report Dates:**

Notification	08/21/2013	18:59 (ETZ)
Initial Update		
Latest Update		
Final		

**Significance Category:**

2

**Reporting Criteria:**

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

**Cause Codes:****ISM:**

- 1) Define the Scope of Work
- 2) Analyze the Hazards
- 3) Develop and Implement Hazard Controls

**Subcontractor Involved:**

No

**Occurrence Description:**

On August 20, 2013, at approximately 0930 MST, an individual received an electrical shock while plugging in an AC adapter. The individual needed to connect a PROM loader to another piece of equipment in the test rack, using a built-in AC receptacle in a recessed area of the test rack to provide power to the PROM loader. On the first attempt to plug it in, the individual stated that it didn't feel like it was plugged in to the socket properly and that it could have been misaligned. The individual then reached his hand back into the area and grasped the adapter to remove it. The individual stated that they wrapped their fingertips around the side of the adapter (the same side as the prongs) in order to gain leverage. The individual surmises that their right index finger came in contact with the one prong that was not inserted into the socket (the other prong was only partially inserted into the socket). When the individual's finger touched the exposed prong, they felt an electrical shock travel up their right arm. Note: The opening to the recessed space where the AC receptacle is located is

approximately 2 3/4 inches by 5 1/2 inches and is located near the bottom of the tester chassis. The individual was trying to guide the adapter into the outlet by 'feel' when the incident occurred.

The individual was wearing an ElectroStatic Discharge (ESD) jacket and a wrist strap snapped into the jacket and plugged into the chassis of the tester. The tester was also grounded.

A preliminary investigation concluded there was no stray voltage in the unit and all electrical measurements on the voltmeter read zero. The Electrical Safety Subject Matter Experts calculated the electrical severity score for this incident at 330.

The adapter was a 120VAC, 60Hz, 0.12A with an output of 5VDC 300mA, Model number DV-530R, was UL Listed and made in China.

**Cause Description:** Critique/Fact Finding Performed: 8/20/2013  
**Operating Conditions:** Normal  
**Activity Category:** Normal Operations (other than Activities specifically listed in this Category)  
**Immediate Action(s):** Unit was taken out of service until an investigation could be performed.  
**FM Evaluation:** EOC# 30540  
**DOE Facility Representative Input:**  
**DOE Program Manager Input:**  
**Further Evaluation is Required:** Yes.  
Before Further Operation? No  
By Whom: Causal Analysis Team  
By When: 10/03/2013  
**Division or Project:** 5000/GBD Space Segment  
**Plant Area:** Other  
**System/Building/Equipment:** Tester Chassis  
**Facility Function:** Laboratory - Research & Development  
**Corrective Action:**  
**Lessons(s) Learned:**  
**HQ Keywords:** 01A--Inadequate Conduct of Operations - Inadequate Conduct of Operations (miscellaneous)  
01Q--Inadequate Conduct of Operations - Personnel error  
08A--OSHA Reportable/Industrial Hygiene - Electrical Shock  
12C--EH Categories - Electrical Safety  
14E--Quality Assurance - Work Process Deficiency  
**HQ Summary:** On August 20, 2013, an employee received an electrical shock while plugging in an AC adapter. The individual needed to connect a PROM

loader to another piece of equipment in the test rack, using a built-in AC receptacle in a recessed area of the test rack to provide power to the PROM loader. On the first attempt to plug it in, the individual stated that it did not feel like it was plugged in to the socket properly and that it could have been misaligned. The individual then reached his hand back into the area and grasped the adapter to remove it and wrapped their fingertips around the side of the adapter (the same side as the prongs) in order to gain leverage. The employee surmised that their right index finger came in contact with the one prong that was not inserted into the socket (the other prong was only partially inserted into the socket) when an electrical shock travel up their right arm.

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

Name	Taffey Maddox
Phone	(505) 844-9020
Title	Engineering and Operations; ES&H Professional

**Originator:**

Name	ROGERS, JESSICA
Phone	(505) 845-4727
Title	OCCURRENCE REPORTING ADMINISTRATOR

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
08/20/2013	09:45 (MTZ)	Harold Stewart	5763
08/20/2013	10:15 (MTZ)	James M. Chavez	5700
08/20/2013	10:38 (MTZ)	EOC	4236
08/20/2013	10:45 (MTZ)	Robert Habbit	5760
08/20/2013	10:45 (MTZ)	Earl Conway	5762
08/20/2013	11:27 (MTZ)	Veronica Martinez	DOE/SFO
08/20/2013	11:52 (MTZ)	Donald Joe	5202

**Authorized Classifier(AC):** Earl Conway      Date: 08/21/2013

**11)Report Number:** [SC--BSO-LBL-EHS-2013-0001](#) After 2003 Redesign

**Secretarial Office:** Science

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

**Facility Name:** Environment/Health/Safety/Security

**Subject/Title:** LOTO Violation at Building 67 Cleanroom - No Exposure, No Injury

**Date/Time Discovered:** 08/13/2013 13:00 (PTZ)

**Date/Time Categorized:** 08/14/2013 14:00 (PTZ)

**Report Type:** Notification/Final

**Report Dates:**

Notification	08/16/2013	17:49 (ETZ)
Initial Update	08/16/2013	17:49 (ETZ)
Latest Update	08/16/2013	17:49 (ETZ)
Final	08/16/2013	17:49 (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:** A4B4C01 - Management Problem; Supervisory Methods LTA; Tasks and individual accountability not made clear to worker  
 A4B1C03 - Management Problem; Management Methods Less Than Adequate (LTA); Management direction created insufficient awareness of the impact of actions on safety / reliability

**ISM:** 4) Perform Work Within Controls

**Subcontractor Involved:** Yes  
 Oxford Instruments

**Occurrence Description:** On 08/14/2013, a vendor technician notified an LBNL LOTO Responsible Individual (RI) that he had not applied his personal lock to an energy control point, a violation of the Lab's LOTO requirements.

The LBNL EHS LOTO Responsible Individual (RI) was supporting Molecular Foundry for an Oxford Instruments Plasma Etcher repair work in Building 67 cleanroom (2219B). The RI, the cleanroom scientist, and two Facilities electricians were present to initiate LOTO Permit LP-746 at 1300 hours on 08/13/2013. The Facilities electricians zero-energy checked the circuit and placed an administrative lock on the Etcher disconnect switch, the cleanroom scientist applied his personal lock onto the switch as well. The Oxford Instruments technician was delayed by traffic and arrived at approximately 1430 hours. The repair work was completed on 08/14/2013.

On 08/14/2013 at approximately 1315 hours, while the RI was briefing the work team regarding releasing the Etcher from LOTO and verifying that all personnel had their LOTO keys prior to gowning and entry into the cleanroom, the vendor technician notified the RI that he had not applied his personal lock. He had seen the locks on the disconnect switch when he arrived on 08/13, and had verified that the scientist had the key to that lock; he thought that was sufficient.

The EHS RI determined that the technician had started work without applying his personal lock and that is a violation of the LBNL 'one worker, one lock' policy.

**Cause Description:**

**Operating Conditions:**

Indoors, lighted, dry

**Activity Category:**

Facility/System/Equipment Testing

**Immediate Action(s):**

Upon recognizing the violation, the LBNL RI stopped work and conducted a briefing before resuming the LOTO release process.

**FM Evaluation:**

- This was a return visit for the Oxford technician. Similar repairs and a LOTO permit had been successfully performed the previous week on 8/6/2013. No pre-job briefing was conducted on 08/13/2013.

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:**

No

**Division or Project:**

Environment/Health/Safety (EHS)

**Plant Area:**

B67

**System/Building/Equipment:**

B67 Molecular Foundry Cleanroom 2219B

**Facility Function:**

Laboratory - Research & Development

**Corrective Action:**

**Lessons(s) Learned:**

Responsible Individuals must consistently present a briefing that reinforces the controls in effect to address hazards the workers will encounter.

**HQ Keywords:**

01A--Inadequate Conduct of Operations - Inadequate Conduct of Operations (miscellaneous)  
01K--Inadequate Conduct of Operations - Lockout/Tagout Noncompliance (Electrical)  
01R--Inadequate Conduct of Operations - Management issues  
08H--OSHA Reportable/Industrial Hygiene - Safety Noncompliance  
12I--EH Categories - Lockout/Tagout (Electrical or Mechanical)  
14E--Quality Assurance - Work Process Deficiency  
14G--Quality Assurance - Procurement Deficiency

**HQ Summary:**

On August 14, 2013, a vendor technician notified an LBNL lockout/tagout (LOTO) Responsible Individual (RI) that he had not applied his personal lock to an energy control point, a violation of the Lab's LOTO requirements. The LBNL EHS LOTO RI was supporting Molecular Foundry for an Oxford Instruments Plasma Etcher repair work in Building 67 cleanroom. The RI, the cleanroom scientist, and two Facilities electricians were present to initiate LOTO. The Facilities electricians zero-energy checked the circuit and placed an administrative lock on the Etcher disconnect switch, the cleanroom scientist applied his personal lock onto the switch as well. The repair work was completed on August 14. The EHS RI determined that the technician had started work without applying

his personal lock and that is a violation of the LBNL 'one worker, one lock' policy.

**Similar OR Report Number:**

**Facility Manager:**

Name	James G. Floyd
Phone	(510) 486-4499
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
08/14/2013	14:30 (PTZ)	Kevin Hartnett	BSO

**Authorized Classifier(AC):**

**12)Report Number:** [SC--BSO-LBL-OPERATIONS-2013-0014](#) After 2003 Redesign  
**Secretarial Office:** Science  
**Lab/Site/Org:** Lawrence Berkeley National Laboratory  
**Facility Name:** Operations Division  
**Subject/Title:** Hacksaw Contacted a Previously Unknown Live Wire at B48 - No Injuries  
**Date/Time Discovered:** 08/15/2013 10:30 (PTZ)  
**Date/Time Categorized:** 08/15/2013 16:55 (PTZ)  
**Report Type:** Update

**Report Dates:**

Notification	08/19/2013	16:21 (ETZ)
Initial Update	09/09/2013	13:57 (ETZ)
Latest Update	09/09/2013	13:57 (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.

**Cause Codes:**

**ISM:**

2) Analyze the Hazards

**Subcontractor Involved:**

Yes  
Eagle Electric/Gowan Construction

**Occurrence Description:** At about 1030 hours on 08/15/2013, a subcontractor worker cut through a conduit and the hacksaw made contact with an energized wire. There were no exposures no injuries.

A Eagle Electric worker, a subcontractor to Gowan Construction, was rerouting conduits inside drywalls in preparation for a door installation for the Building 48 second floor bathroom remodel project. The worker was using a hacksaw to cut the conduit which contained electrical conductors that were LOTO'd under Permit#LP-756. The saw came in contact with a previously unknown energized wire inside the conduit, causing a spark. The worker was wearing appropriate PPE and did not receive a shock. The circuit was grounded out to the conduit through the hacksaw blade.

**Cause Description:**

**Operating Conditions:** Indoors, lighted, dry

**Activity Category:** Construction

**Immediate Action(s):** - Stopped work.

**FM Evaluation:** - The conduit contained electrical conductors that were locked out and tagged out under LOTO Permit LP-756.

- During the Pre-LOTO planning, an LBNL electrician had provided a list of conductors within the conduit. It appears one conductor was not identified at the Pre-LOTO investigation and not included in the list.

- Another LBNL electrician who performed the LOTO on 8/15/2013 discovered that an additional circuit breaker that feeds the refrigerators and microwave for the Fire Fighters was pulled into the same conduit and was not identified during the Pre-LOTO plan.

**09/09/2013 UPDATE:**

Due to an unexpected absence of the root cause analysis team lead causal analyst, LBNL is requesting for a 45-day extension to submit the ORPS final report on 11/14/2013.

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** Yes.  
Before Further Operation? No  
By Whom: Facilities  
By When:

**Division or Project:** Facilities Division

**Plant Area:** B48

**System/Building/Equipment:** Building 48

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

**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)  
 07D--Electrical Systems - Electrical Wiring  
 08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical)  
 11G--Other - Subcontractor  
 12C--EH Categories - Electrical Safety  
 14D--Quality Assurance - Documents and Records Deficiency  
 14E--Quality Assurance - Work Process Deficiency  
 14G--Quality Assurance - Procurement Deficiency

**HQ Summary:** On August 15, 2013, while using a hacksaw, a subcontractor worker cut through a conduit and made contact with a previously unknown energized wire. The subcontractor was rerouting conduit inside drywall in preparation for a bathroom door installation. When the saw came in contact with the energized wire it caused a spark and grounded the circuit to the conduit through the hacksaw blade. The subcontractor was wearing appropriate personal protective equipment and did not receive a shock. Work was stopped.

**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
08/15/2013	17:19 (PTZ)	Mary Gross	BSO
08/15/2013	17:19 (PTZ)	Kevin Hartnett	BSO

**Authorized Classifier(AC):**

---



---

Attachment 2

| [ORPS HOME](#) | [Data Entry](#) | [FM Functions](#) | [Search & Reports](#) | [Authorities](#) | [Help](#) | [Security/Privacy Notice](#) |

*Please send comments or questions to [orpssupport@hq.doe.gov](mailto:orpssupport@hq.doe.gov) or call the Helpline at (800) 473-4375. Hours: 7:30 a.m. - 5:00 p.m., Mon - Fri (ETZ).*

*Please include [detailed information](#) when reporting problems.*