



Office of Health, Safety and Security

## Monthly Analysis of Electrical Safety Occurrences



July 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 July increased from thirteen in June to twenty. There were five reported electrical shocks, two electrical intrusion occurrences, and three reported lockout/tagout occurrences. In July, workers identified electrical hazards 45 percent of the time, which is a decrease in hazards identification from 62 percent in June.

### 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 five reported electrical shocks in the month of July. This is an increase from the single electrical shock reported in June. These occurrences are summarized below.

1. An employee felt a tingling sensation in his hand while performing routine maintenance on a portable public address (PA) unit when he touched the padlock securing the tool box. Work was stopped. Electricians took voltage measurements and detected a difference in potential of approximately 4.1 volts between the padlock and earth ground. Measurements further indicated a difference of potential of approximately 61 volts between the service drop frame and earth ground. An underground lighting circuit was the source of the issue. A short had occurred on the lighting circuit in and when the circuit was isolated, the voltage potential difference went to zero.

2. A post baccalaureate student sustained a mild shock to his left thumb when it brushed exposed terminals of a circular Military Connector on a legacy electrical control panel. The student, who performs diagnostics of DC devices and systems, believed the connector was a signal connection and not AC power. While performing a voltage check of the connector using a voltmeter set on DC, the meter probes arced to ground, melting one of the probe's metal tips. The student was not expecting AC, believing that the panel was no longer energized. Electricians found a tripped 120-volt breaker that powered the connector.
3. A worker, who was tracing telephone jumpers on the main distribution frame, received a minor shock to the left arm when the arm touched a wire block when an analog inbound call was to terminate on the block. The shock caused the worker to pull away and their left hand to hit the left eye causing injury.
4. An employee was returning an aluminum ladder to its hanger in an exterior elevator room their left hand brushed against an adjacent venturi bulb on a ventilation thermostat resulting in a shock. Electricians discovered 120 volts on the exposed coil.
5. An undergraduate student was shocked while using a hand-held multi-meter. The student was collecting data from a scintillation counter used the multi-meter to confirm voltage output from a high voltage cable connection attached to an energized power supply set at 1,000 volts. It is believed the student's fingers touched the probes of the multi-meter during that task and received the shock.

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 (2.7) shocks per month.

**Figure 1 – Three-Year Trend of Electrical Shocks**

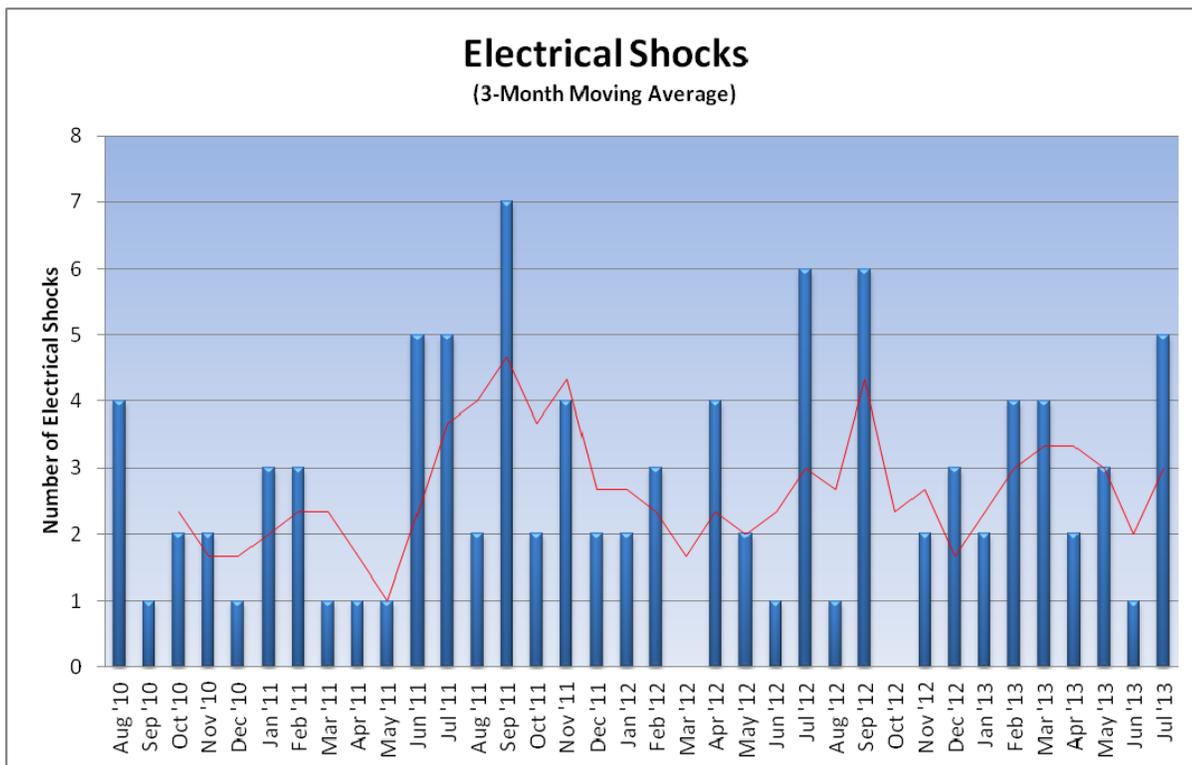


Figure 2 shows electrical shocks by worker type through July 2013. The number of shocks involving electrical workers slowly increased through 2012 and then dropped in 2013, while those involving non-electrical workers decreased after 2011. Since 2008, the majority of shocks (about 74 percent) involve non-electrical workers. So far for 2013, that percentage is 81.

Figure 2 - Electrical Shock by Worker Type

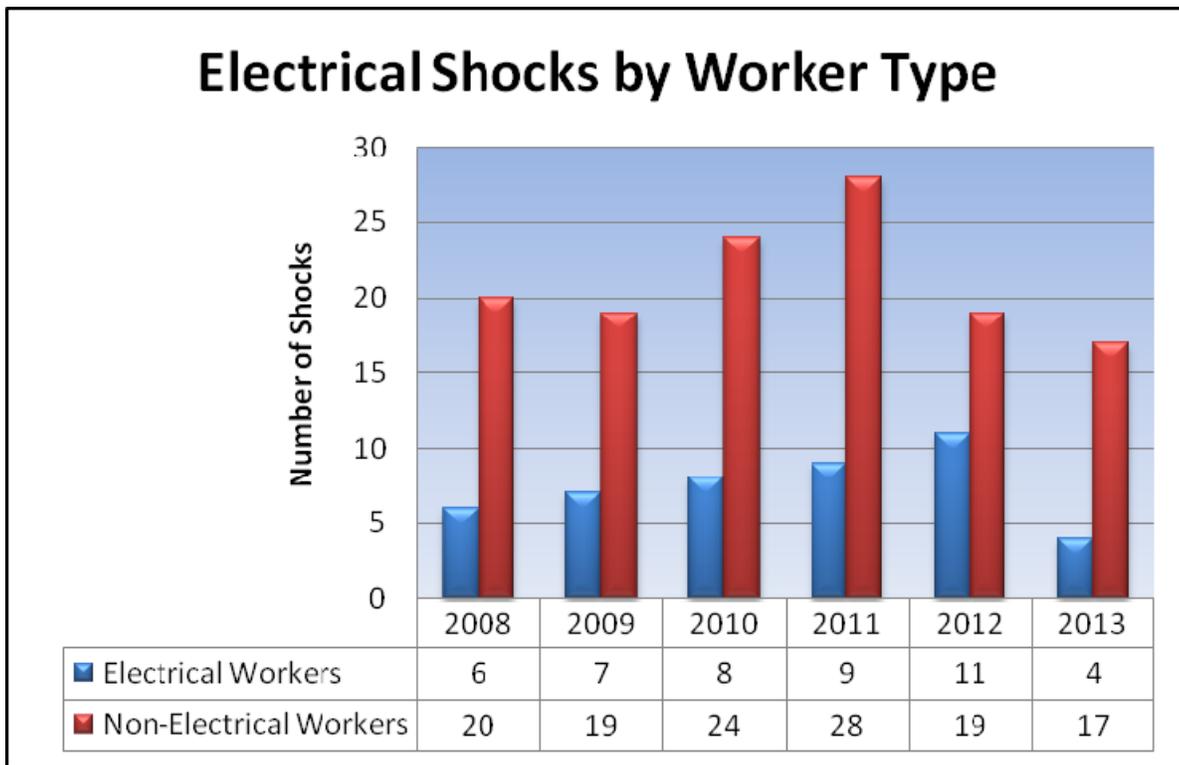
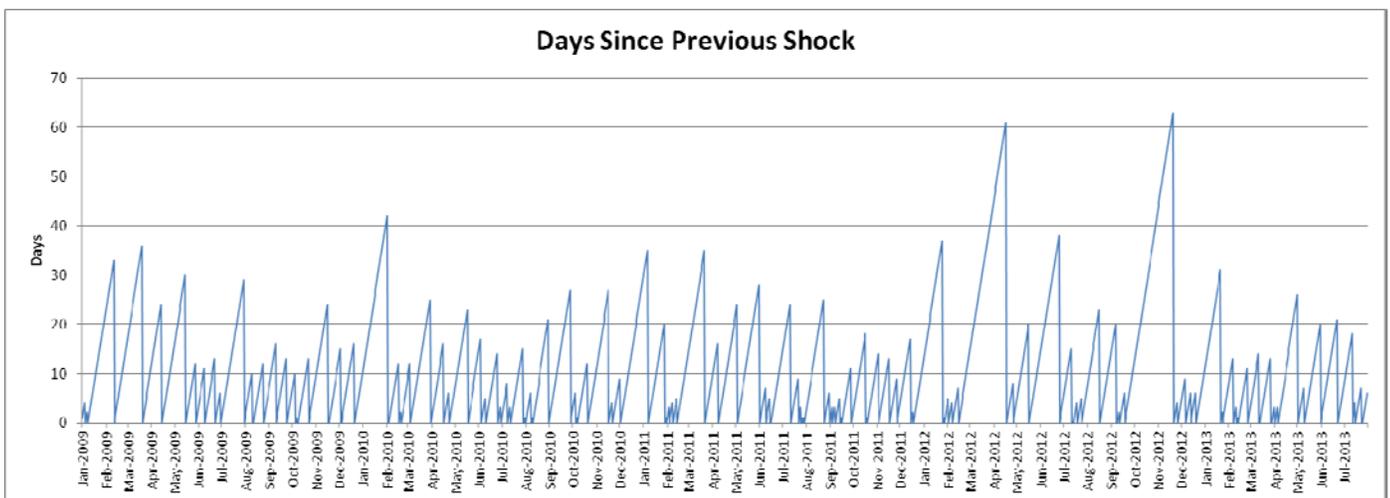


Figure 3 shows the number of days since the previous electrical shock for the DOE complex. The longest interval was 63 days (November 20, 2012) and the present interval is 6 days as of July 31.

Figure 3 - Days since Previous Shock



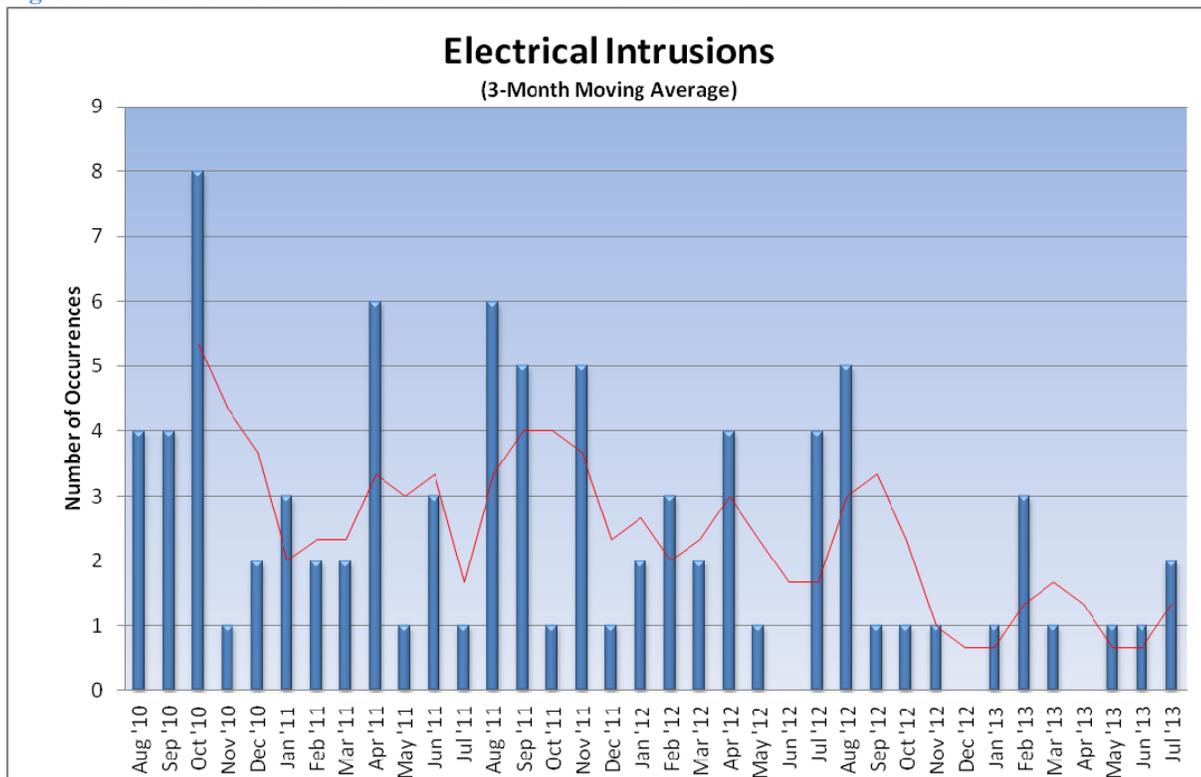
## Electrical Intrusion

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

1. A maintenance mechanic using a reciprocating saw cut into a conduit containing an energized wire carrying 480 volts. The mechanic observed a spark when the saw blade penetrated the conduit and immediately stopped cutting. The mechanic was wearing appropriate personal protective equipment and experienced no adverse effects. The impacted wiring was identified as the power supply to a freight elevator. Work was suspended and electricians de-energized the affected system and affixed lockout/tagout control.
2. The mast of a large forklift traveling down a road caught a power pole support line. The resulting force snapped the support pole and brought the support wire down across the forklift and the road. However, the support line did not strike an energized phase on the power pole. The driver stopped and remained seated in the forklift. Linemen de-energized the power to remove the support lines from the power pole and the forklift. No personnel were injured. The critique and investigation revealed that the static wire (grounded wire) from the power pole to the support pole was draped over the forklift and was about 1 inch from the 13.6 kV energized phase conductor. In addition to the forklift driver on the forklift, at least one bystander walked within the predicted Step Potential zone of the forklift, had the fork lift become energized.

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 July there were three reported occurrences involving lockout/tagout (LOTO), which is a decrease from the six occurrences reported in June. These occurrences are summarized below.

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

1. Maintenance personnel violated the procedural requirements for the control and use of maintenance locks while troubleshooting a facility cask transfer car when they left their personal locking device in place after the shift ended without requesting a cognizant operations manager LOTO. Supervisors will check the status of LOTOs before the end of each shift with increased attention on personal locking devices that should be converted to a cognizant operations manager LOTO.
2. Electricians read 80 volts AC between neutral and ground in a transformer cabinet during a Safe Condition Check, before performing an inspection of high resistance grounding cabinets for transformers. The electricians also discovered 30 volts AC on another cabinet. The work package included a lockout/tagout boundary for 120 VAC and 480 VAC. The electricians contacted their work supervisor of the voltage reading and were instructed to stop work. The electricians removed the lockout/tagout boundary to restore the safety function of the grounding cabinets.
3. An employee removed the main circuit breaker of a cathode power supply that was still locked and tagged with two personnel safety system configuration locks as well as three personal locks (Lock, Tag, and Try locks) from the Radio Frequency group. The intent was to replace the old locked main breaker with a new main breaker. Although the power supply had been isolated from the upstream panel for several months, and there was no hazardous energy present, the removal of the breaker with the locks and tags still attached was unauthorized and violated policy and procedures.

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

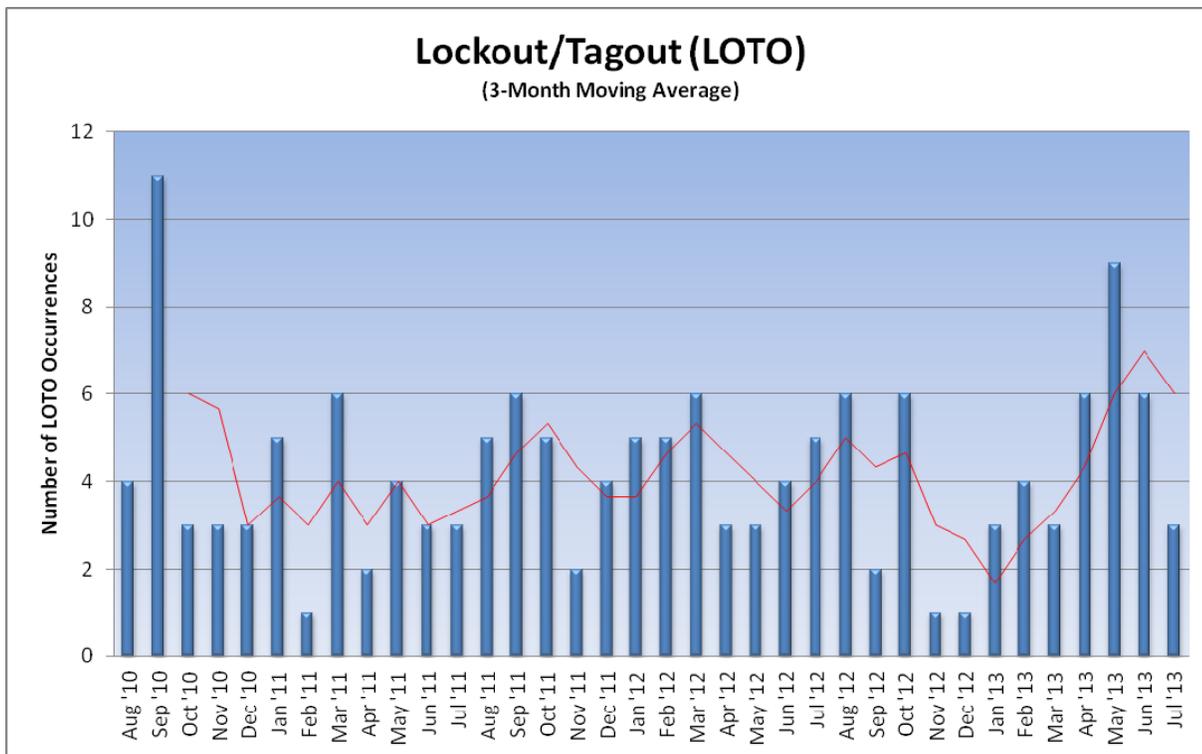
1. A walk-down team discovered an un-terminated, energized, 480-volt power supply cable for a group of well pumps during initial electrical breaker lineup. The cable had been connected to the electrical power supply but a section of cable had not been properly spliced in the field. The new cable had been installed by construction personnel to upgrade well pump power supplies. The electrical cable was immediately de-energized and a field investigation was initiated.
2. A technician inserted a reference thermocouple into the temperature-monitoring well of an infrared temperature source, and saw an electrical arc between the sheath of the thermocouple wire and the case of the temperature source. A shipment of fuses had been received for some infrared guns that needed to be calibrated and the calibration laboratory technician installed the fuses in preparation for calibration. The technician started the furnace and set the black-body calibration source to 250 degrees Celsius. A metal Type K thermocouple needed to be inserted into the furnace to aid in calibration. When inserting

the probe, the technician noted some resistance and as he pushed the probe further into the furnace the insertion produced an arc. The technician pulled the power plug out of the furnace and disconnected it from the wall outlet, and turned off the switch. The technician was not aware that the internal parts of the furnace (internal ceramic insulation) could deteriorate. When resistance was felt while trying to insert the probe, this was a sign that something was wrong. The fact that the probe was inserted after the furnace was started instead of already being in place indicates a performance problem and lack of standard or procedure.

3. Employees preparing for maintenance activity observed a damaged electrical conduit containing exposed 120-volt conductors on top of a laboratory fume hood. The planned scope did not include electrical work associated with the fume hood. The workers stopped work and the circuit breaker was positively locked and tagged out. The breaker for the circuit associated with the damaged conductors was found in the open position.
4. A warehouse employee bumped into a damaged thermostat on a wall and caused an electrical arc on the enclosure. Investigation indicated the device had been previously damaged and not reported. The employee was not shocked or injured. The system was de-energized and locked and tagged out. The damaged thermostat was removed and a blank cover was placed on the enclosure.

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

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



## **Electrical Near Miss**

There were eight electrical near miss occurrences reported in July, which is an increase from the five occurrences in June.

1. While preparing to sample a cylinder, an un-insulated grounding cable fell onto a cylinder cart power cable plug resulting in an electrical arc. The 480-volt power plug was not fully seated in the receptacle which provided a small gap and exposure of the plug prongs. The grounding cable fell against the exposed prongs resulting in an electrical arc. A ground fault alarmed and electrical power to the cylinder cart was immediately turned off and appropriate administrative danger tags were hung. No personnel were shocked.
2. A maintenance mechanic using a reciprocating saw cut into a conduit containing an energized wire carrying 480 volts of current. (See Electrical Intrusion Section – Occurrence #1)
3. A walk-down team discovered an un-terminated, energized, 480-volt power supply cable for a group of well pumps lying in the desert. (See Occurrences Involving Discovery of Uncontrolled Hazardous Energy – Occurrence #1)
4. A post baccalaureate student sustained a mild shock to his left thumb when his thumb brushed exposed terminals of a circular Military Connector on a legacy electrical control panel. (See Electrical Shock Section – Occurrence #2)
5. The mast of a large forklift traveling caught a power pole support line, snapping the support pole, and draping the support wire over the forklift and about 1 inch from the 13.6 kV energized phase conductor. (See Electrical Intrusion Section – Occurrence #2)
6. A technician inserted a reference thermocouple into the temperature-monitoring well of an infrared temperature source, and saw an electrical arc between the sheath of the thermocouple wire and the case of the temperature source. (See Occurrences Involving Discovery of Uncontrolled Hazardous Energy – Occurrence #2)
7. A warehouse employee bumped into a damaged thermostat on a wall and caused an electrical arc on the enclosure. (See Occurrences Involving Discovery of Uncontrolled Hazardous Energy – Occurrence #4)
8. Workers unexpectedly damaged two conduits containing electrical circuits that were partially embedded in the concrete while they were removing a section of sidewalk. Although the conduits were damaged, the electrical wiring was undamaged and the circuits remained intact. The electrical circuits feed outdoor lighting and are controlled by timers that are only energized at night. The work occurred during daylight hours so the electrical lines were not energized.

## Monthly Occurrences Tables

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

**Table 1 - Breakdown of Electrical Occurrences**

Number of Occurrences (July)	Involving:	Last Month (June)
5	Electrical Shocks	1
0	Electrical Burns	0
3	Hazardous Energy Control (LOTO)	6
5	Inadequate Job Planning	1
1	Inadvertent Drilling/Cutting of Electrical Conductors	1
0	Excavation of Electrical Conductors	0
1	Vehicle Intrusion of Electrical Conductors or Equipment	0
8	Electrical Near Misses	5
7	Electrical Workers	9
13	Non-Electrical Workers	4
3	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 (July 2012) was 13 per month and the number of shocks was at 18.

**Table 2 - Summary of Electrical Occurrences**

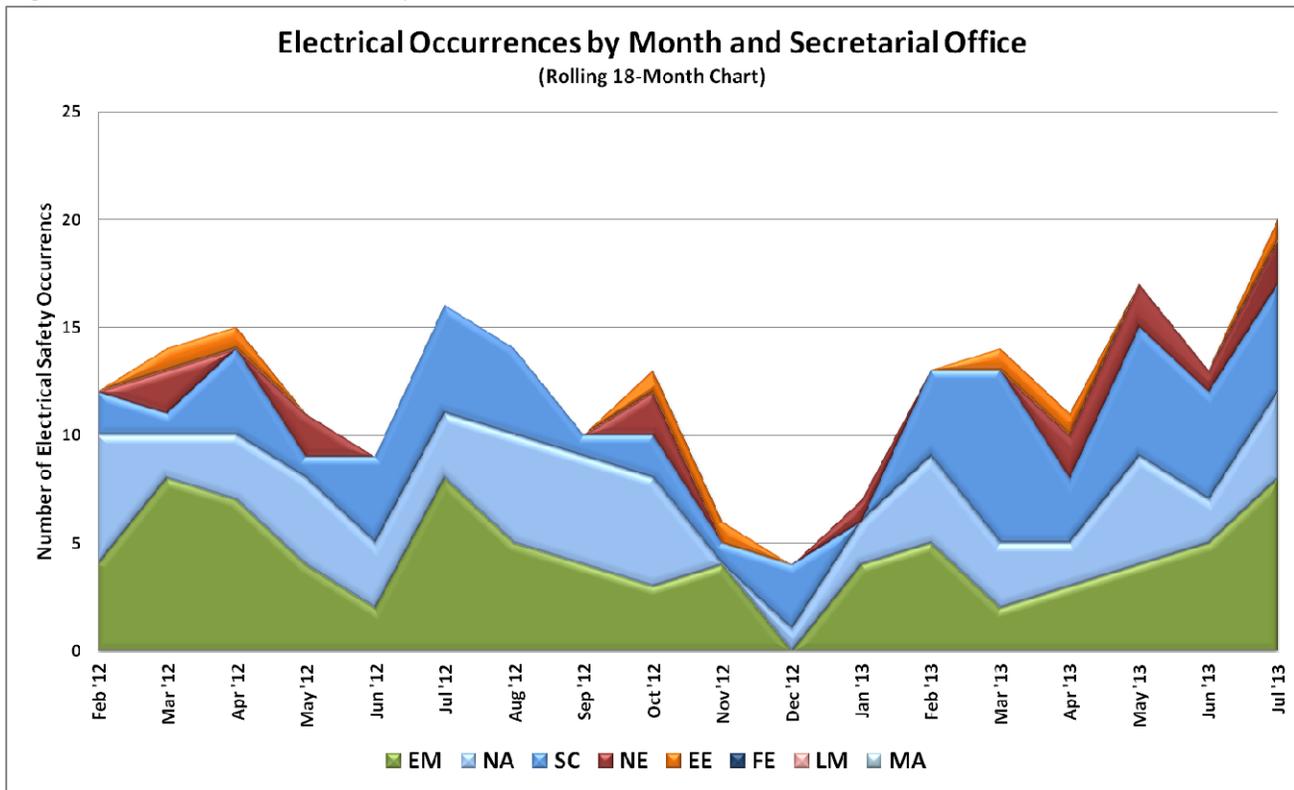
Period	Electrical Safety Occurrences	Shocks	Burns	Fatalities
July	20	5	0	0*
June	13	1	0	0
May	17	3	0	0
April	11	2	0	0
March	14	4	0	0
February	13	4	0	0
January	7	2	0	0
2013 total	95 (avg. 13.6/month)	21	0	0
2012 total	138 (avg. 11.5/month)	30	1	0

Period	Electrical Safety Occurrences	Shocks	Burns	Fatalities
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 6 shows the distribution of electrical safety occurrences by Secretarial Office.

Figure 6 - Electrical Occurrences by Month and Secretarial Office



## Electrical Severity

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

### Electrical Severity Scores

The electrical severity scores (ES) are calculated using 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.

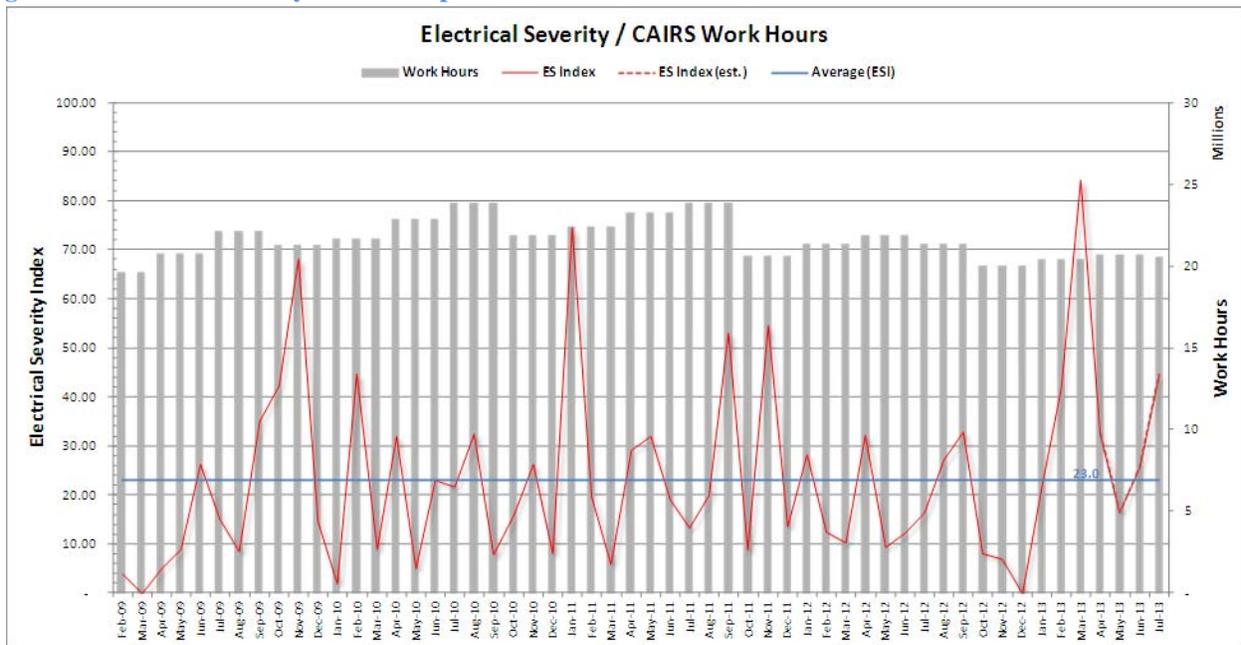
**Table 3 – Classification of Electrical Safety Occurrences by ES Score**

Occurrence Classification	Electrical Severity Score	Number of Occurrences
HIGH	≥ 1750	1
MEDIUM	31-1749	7
LOW	1-30	5
No Score	0	7

**Electrical Severity Index**

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

**Figure 7 - Electrical Severity Index Compared to Work Hours**



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

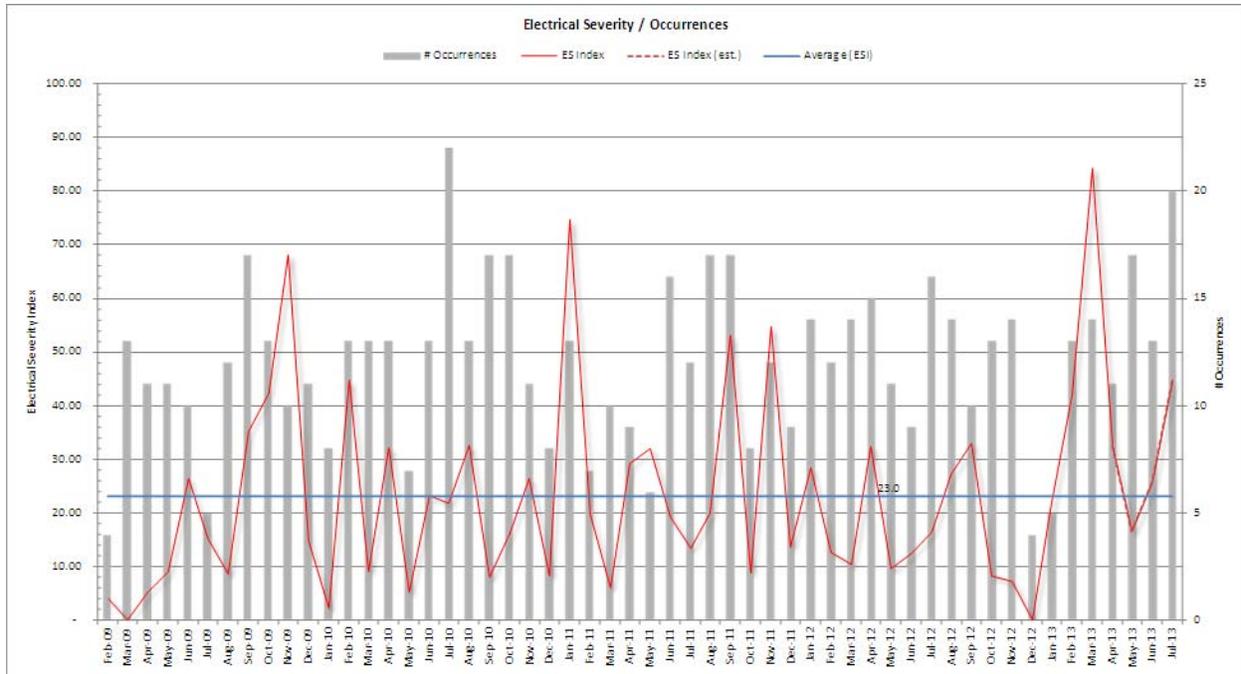
**Table 4 - Electrical Severity Index**

Category	June	July	Δ
Total Occurrences	13	20	+7
Total Electrical Severity	2,640	4,574	+1,934
Estimated Work Hours	20,654,811* (19,911,170)	20,518,103	-136,708
ES Index	25.56* (26.52)	54.59	+19.02
Average ESI	22.7	23.0	+0.3

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

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

**Figure 8 - Electrical Severity Index Compared to Number of Occurrences**



The average ESI (23.0) has remained fairly steady over the last three months then increased because of a high severity occurrence in July. The lowest average ESI was 19.2 in June 2010.

Figure 9 shows the number of days since the previous high severity occurrence. The present interval is 16 days as of July 31. The previous longest interval was 679 days ending March 12, 2013.

**Figure 9 - Days since Previous High Severity Occurrence**

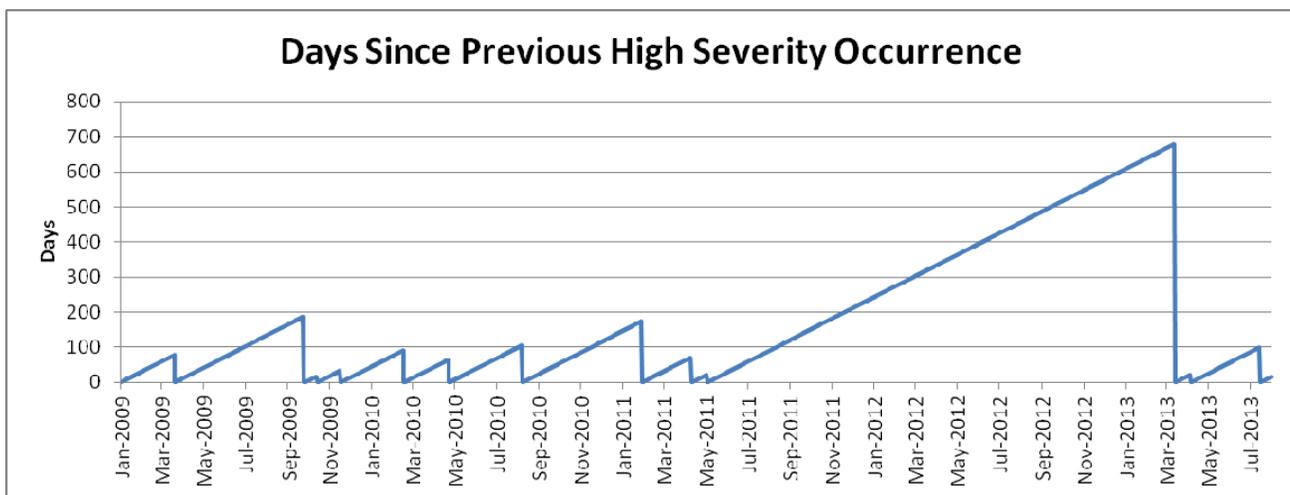
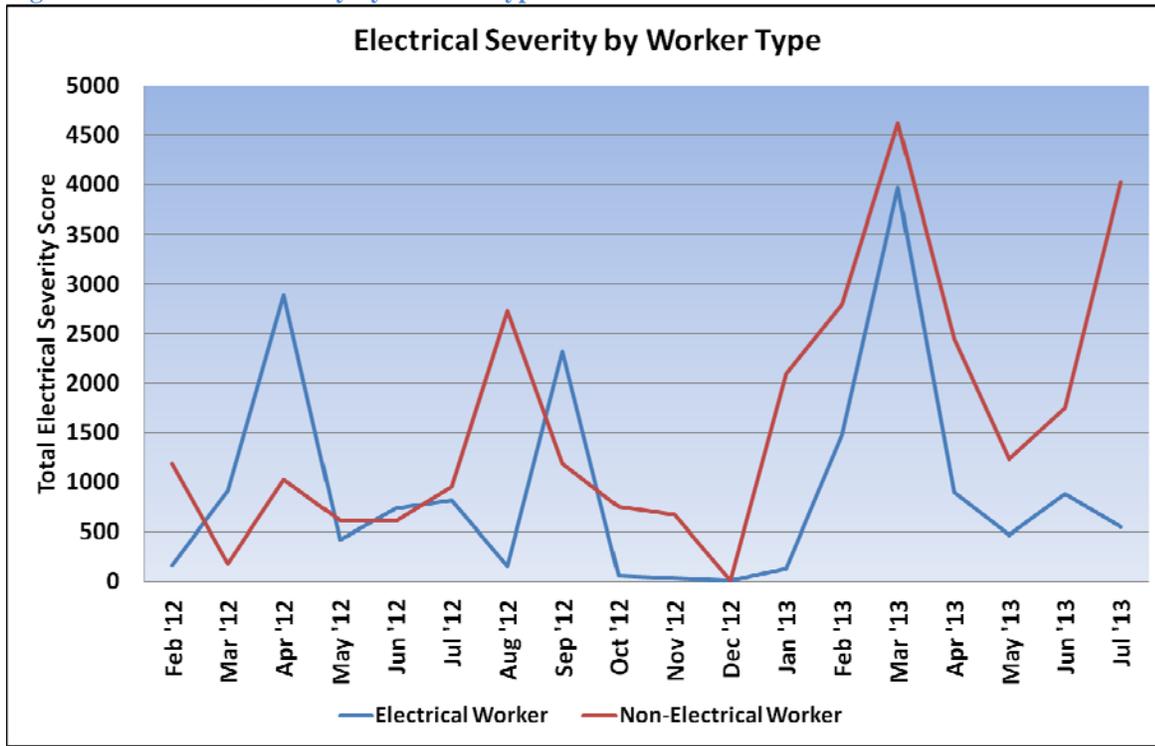


Figure 10 shows the total electrical severity score by worker type for each month.

Figure 10 – Electrical Severity by Worker Type

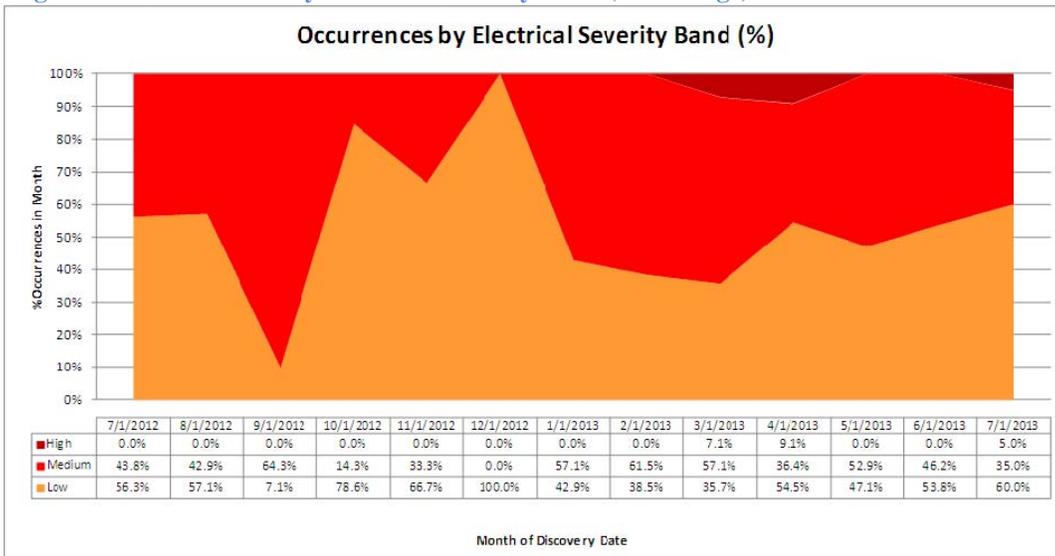


The present ES score for electrical workers is 550 and 4,024 for non-electrical workers.

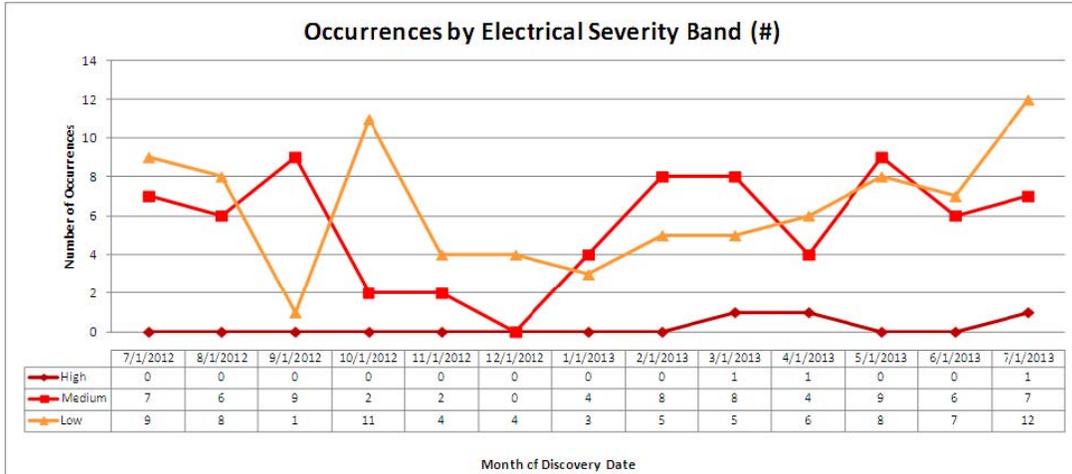
**Summary of Occurrences by Severity Band**

For the interval July 2012 through July 2013 (current month and the past 12), Figures 11 and 12 summarize occurrences by severity band and month of discovery date by percentage of total occurrences in month and number of occurrences in month.

Figure 11 - Occurrences by Electrical Severity Band (Percentage)



**Figure 12 - Occurrences by Electrical Severity Band (Number)**

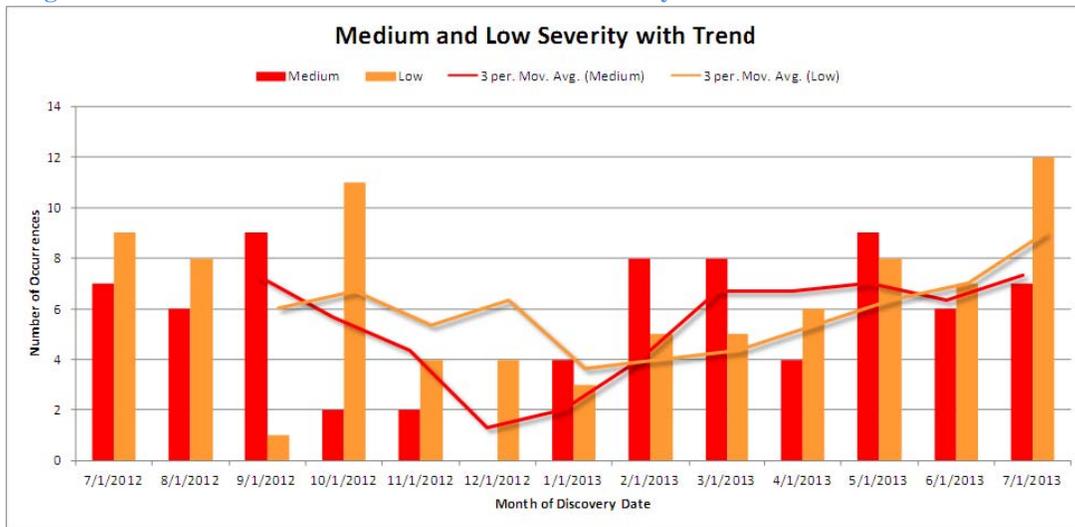


The previous two charts show that a high electrical severity event occurred in March, April and July ending a 679-day period since the last occurrence in May 2011. The number of occurrences with Medium and Low or zero severity scores increased.

**Medium and Low Severity with Trend**

Figure 13 focuses on the Medium and Low severity data series for July 2012 through July 2013. Trend lines are included for each, using a 3-month moving average.

**Figure 13 - Trend of Medium and Low Electrical Severity Occurrences**



The 3-month moving average shows a slightly increasing trend for Low and Medium severity occurrences.

## Additional Resources

### Electrical Safety Blog

<http://hsselectricalsafety.wordpress.com/>

### EFCOG Electrical Safety Subgroup

[http://www.efcog.org/wg/esh\\_es/index.htm](http://www.efcog.org/wg/esh_es/index.htm)

### Electrical Safety Wiki

<http://electricalsafety.doe-hss.wikispaces.net/home>

### Center of Excellence for Electrical Safety

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

## Contact

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## Attachment 1

## Electrical Safety Occurrences – July 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-2013-0013	A subcontract technician reached inside an energized control console without wearing insulated shock protecting gloves.									3	2E(3), 10(2)	220
2	EM--PPPO-BWCS-PORTDUCON-2013-0009	Grounding cable fell onto power plug resulting in electrical arc.									3	10(3)	100
3	EM--PPPO-LKY-PGDPENVRES-2013-0002	A mechanic cut into a conduit containing an energized 480V wire with a reciprocating saw.							X		3	2E(2), 2E(3)	1050
4	EM-CBFO--NWP-WIPP-2013-0010	Maintenance personnel violated LOTO procedures by leaving their personal locking device on after the shift ended.				X					4	2E(3)	0
5	EM-CBFO--NWP-WIPP-2013-0011	Electricians identified an energized 480-volt cable that was not terminated.					X				3	2E(2)	0
6	EM-ORO--UCOR-K25GENLAN-2013-0002	Electrical shock from portable public address system.	X								2	2E(1), 2E(2)	33
7	EM-RL--CPRC-GPP-2013-0004	Un-terminated 480V cable found energized.									3	2E(2)	0
8	EM-RL--CPRC-PFP-2013-0003	Electricians discovered 80VAC during a Safe Condition Check in a grounding cabinet.				X	X				4	2E(3)	0
9	EM-RL--MSC-WSCF-2013-0002	A post job review of a PM indicated that a TAF should have been used instead of the 8 Criteria per the work package.					X				3	2E(2)	0
10	NA--LASO-LANL-BOP-2013-0005	A student sustained a mild shock to his left thumb when it brushed exposed terminals of a connector on an electrical control panel.	X								2	2E(1), 2E(3)	330
11	NA--LASO-LANL-PHYSTECH-2013-0013	A forklift mast hit a guy wire and the guy wire, which was within inches of energized 13.6 kV conductors, fell onto the forklift.								X	3	10(3)	2100

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	NA--SS-SNL-9000-2013-0001	While tracing telephone jumpers on a main distribution frame, a worker's left arm touched a wire block and received a shock.	X								2	2A(5), 2E(1)	330
13	NA--SS-SNL-SNLCORP-2013-0002	An employee received a shock when his hand brushed against a damaged thermostat that was reading 120V.	X								2	2E(1)	330
14	NE-ID--BEA-CFA-2013-0002	While inserting a thermocouple into the temperature-monitoring well an electrical arc occurred.									3	2E(2)	20
15	NE-ID--BEA-FCF-2013-0001	Discovery of unmitigated 120V power source during fire alarm system upgrades.					X				3	2E(2)	20
16	SC--PNSO-PNNL-PNNLBOPER-2013-0010	Workers observed a damaged electrical conduit containing exposed 120V conductors.									3	2E(2)	10
17	SC--TJSO-JSA-TJNAF-2013-0004	A worker removed the main circuit breaker of a power supply that was still locked and tagged.				X					4	2E(3)	0
18	SC--TJSO-JSA-TJNAF-2013-0005	Student received a shock while testing HV cable at 1000V.	X				X				2	2E(1)	11
19	SC-ORO--GOOR-FEDBUILDGS-2013-0001	A warehouse employee bumped a damaged thermostat on a wall causing an electrical arc.									3	2E(2)	20
20	SC-ORO--ORNL-X10BOPLANT-2013-0005	Workers unexpectedly damaged two conduits containing electrical circuits embedded in concrete while removing a sidewalk.									3	2E(2)	0
	TOTAL		5	0	0	3	5	0	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 ≥ 1750, Medium is 31-1749, and Low is 1-30

## Attachment 1

## Electrical Safety Occurrences – July 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/T <sup>(9)</sup>	NEUT <sup>(10)</sup>	NM <sup>(11)</sup>
										H	L			
1	EE-GO--NREL-NREL-2013-0013	A subcontract technician reached inside an energized control console without wearing insulated shock protecting gloves.	X		X			X	X		X			
2	EM--PPPO-BWCS-PORTDUCON-2013-0009	Grounding cable fell onto power plug resulting in electrical arc.		X		X <sup>X</sup>					X			X
3	EM--PPPO-LKY-PGDPENVRES-2013-0002	A mechanic cut into a conduit containing an energized 480V wire with a reciprocating saw.				X					X			X
4	EM-CBFO--NWP-WIPP-2013-0010	Maintenance personnel violated LOTO procedures by leaving their personal locking device on after the shift ended.	X	X							X			
5	EM-CBFO--NWP-WIPP-2013-0011	Electricians identified an energized 480-volt cable that was not terminated.	X		X	X					X			
6	EM-ORO--UCOR-K25GENLAN-2013-0002	Electrical shock from portable public address system.		X		X <sup>X</sup>					X			
7	EM-RL--CPRC-GPP-2013-0004	Un-terminated 480V cable found energized.	X								X			X
8	EM-RL--CPRC-PFP-2013-0003	Electricians discovered 80VAC during a Safe Condition Check in a grounding cabinet.	X			X					X			
9	EM-RL--MSC-WSCF-2013-0002	A post job review of a PM indicated that a TAF should have been used instead of the 8 Criteria per the work package.	X			X					X			
10	NA--LASO-LANL-BOP-2013-0005	A student sustained a mild shock to his left thumb when it brushed exposed terminals of a connector on an electrical control panel.		X		X <sup>X</sup>					X			X
11	NA--LASO-LANL-PHYSTECH-2013-0013	A forklift mast hit a guy wire and the guy wire, which was within inches of energized 13.6 kV conductors, fell onto the forklift.				X				X				X

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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	NA--SS-SNL-9000-2013-0001	While tracing telephone jumpers on a main distribution frame, a worker's left arm touched a wire block and received a shock.	X		X	X					X			
13	NA--SS-SNL-SNLCORP-2013-0002	An employee received a shock when his hand brushed against a damaged thermostat that was reading 120V.				X					X			
14	NE-ID--BEA-CFA-2013-0002	While inserting a thermocouple into the temperature-monitoring well an electrical arc occurred.	X			X					X			X
15	NE-ID--BEA-FCF-2013-0001	Discovery of unmitigated 120V power source during fire alarm system upgrades.	X								X			
16	SC--PNSO-PNNL-PNNLBOPER-2013-0010	Workers observed a damaged electrical conduit containing exposed 120V conductors.	X			X					X			
17	SC--TJSO-JSA-TJNAF-2013-0004	A worker removed the main circuit breaker of a power supply that was still locked and tagged.	X			X					X			
18	SC--TJSO-JSA-TJNAF-2013-0005	Student received a shock while testing HV cable at 1000V.				X X				X				
19	SC-ORO--GOOR-FEDBUILDGS-2013-0001	A warehouse employee bumped a damaged thermostat on a wall causing an electrical arc.	X			X					X			X
20	SC-ORO--ORNL-X10BOPLANT-2013-0005	Workers unexpectedly damaged two conduits containing electrical circuits embedded in concrete while removing a sidewalk.	X	X		X					X			X
	TOTAL		7	13	3	11	9	1	1	2	18	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 56252 OR(s) with 59562 occurrences(s) as of 8/15/2013 10:33:52 AM  
 Query selected 20 OR(s) with 20 occurrences(s) as of 8/15/2013 10:42:01 AM

Download this report in Microsoft Word format. 

**1)Report Number:** [EE-GO--NREL-NREL-2013-0013](#) 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:** Subcontractor troubleshoots boiler with insufficient shock protecting PPE  
**Date/Time Discovered:** 07/01/2013 13:15 (MTZ)  
**Date/Time Categorized:** 07/02/2013 10:15 (MTZ)  
**Report Type:** Notification

**Report Dates:**

Notification	07/05/2013	16:59 (ETZ)
Initial Update		
Latest Update		
Final		

**Significance Category:**

3

**Reporting Criteria:**

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

10(2) - An event, condition, or series of events that does not meet any of the other reporting criteria, but is determined by the Facility Manager or line management to be of safety significance or of concern for that facility or other facilities or activities in the DOE complex.

The significance category assigned to the management concern should be based on an evaluation of the potential risks and impact on safe operations. (1 of 4 criteria - This is a SC 3 occurrence)

**Cause Codes:**

**ISM:**

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

**Subcontractor Involved:**

Yes  
Kasco Boiler Repair

**Occurrence Description:**

On July 1, 2013, a subcontract technician was performing troubleshooting activities on a boiler in NREL's Integrated Biorefinery Research Facilities (IBRF) Process Development Unit (PDU). The technician opened the boiler's control console, read the history on the digital fault detector, and traced the fault to a tripped overload switch. The console was energized at

the time, which was necessary for the technician to diagnose the problem with the boiler. The technician was not wearing insulated shock protecting gloves when he reached into the console, contrary to NFPA 70E electrical safety requirements.

No injuries or property damage resulted from this occurrence. An incident investigation has been initiated.

**Cause Description:**

**Operating Conditions:** The boiler had been experiencing problems starting up and was not operational

**Activity Category:** Maintenance

**Immediate Action(s):** 1. NREL EHS initiated an incident investigation.

**FM Evaluation:** No injuries or property damage resulted from this occurrence.

**DOE Facility Representative Input:**

**DOE Program Manager Input:**

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

**Division or Project:** Site Operations

**Plant Area:** South Table Mountain

**System/Building/Equipment:** Boiler in the Integrated Biorefinery Research Facilities

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

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:** 08H--OSHA Reportable/Industrial Hygiene - Safety Noncompliance  
11G--Other - Subcontractor  
12C--EH Categories - Electrical Safety  
14E--Quality Assurance - Work Process Deficiency  
14G--Quality Assurance - Procurement Deficiency

**HQ Summary:** On July 1, 2013, while performing troubleshooting activities on a boiler, a subcontract technician reached inside the boiler's energized control console without wearing insulated shock protecting gloves, which is a violation of the National Fire Protection Association 70E electrical safety requirements. The technician received no injuries and an incident investigation has been initiated.

**Similar OR Report Number:**

**Facility Manager:**

Name	JORDAN, MAUREEN Y
Phone	(303) 275-3248

Title	EHS OFFICE DIRECTOR
-------	---------------------

**Originator:**

Name	OKANE, BARBARA V.
Phone	(303) 384-7609
Title	ENVIRONMENTAL H & S SENIOR ES&H SPEC

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
07/02/2013	10:15 (MTZ)	Mike Gigstead - DOE	DOE-GO
07/02/2013	11:18 (MTZ)	Event Distribution	DOE/NREL

**Authorized Classifier(AC):**

**2)Report Number:** [EM--PPPO-BWCS-PORTDUCON-2013-0009](#) After 2003 Redesign

**Secretarial Office:** Environmental Management

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

**Facility Name:** Portsmouth Duf6 Conversion Plant

**Subject/Title:** Grounding Cable Fell onto Power Plug resulting in Electrical Arc

**Date/Time Discovered:** 07/27/2013 00:10 (ETZ)

**Date/Time Categorized:** 07/29/2013 10:30 (ETZ)

**Report Type:** Notification

**Report Dates:**

Notification	07/30/2013	15:41 (ETZ)
Initial Update		
Latest Update		
Final		

**Significance Category:** 3

**Reporting Criteria:** 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:**

**ISM:**

**Subcontractor Involved:** No

**Occurrence Description:** While preparing to sample a Cylinder at the Cylinder Modification System (CMS) area of the BWCS Piketon DUF6 conversion facility, a grounding

cable fell onto the CMS Cart power cable plug resulting in an electrical arc.

On July 27, 2013 at 0010 hours EDT, while preparing to sample a Cylinder at the CMS area under JCO-004, a grounding cable fell onto the CMS Cart power cable plug. The 480 volt power cable plug was not fully seated in the receptacle which provided a small gap and exposure of the plug prongs. The un-insulated grounding cable fell against the exposed prongs resulting in an electrical arc. No personnel were shocked as a result of this incident.

A ground fault alarm on the Basic Process Control System (BPCS) was received. The appropriate Alarm Response Procedure (ARP) for a ground fault was initiated. Electrical power to the CMS cylinder cart was immediately turned off at the local disconnect. The buss ground detection was reset and verified to remain clear. Administrative Danger tags were hung on both the local disconnect for the receptacle and the cable reel plug attached to the cylinder cart.

No personnel were shocked or in any way injured during this occurrence. As a result of this incident, CMS operations at both the BWCS Piketon and Paducah facilities were suspended pending investigation including an extent of condition (EOC) review.

**Cause Description:**

**Operating Conditions:**

Normal

**Activity Category:**

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

**Immediate Action(s):**

The appropriate Alarm Response Procedure (ARP) for a ground fault was initiated. Electrical power to the CMS cylinder cart was immediately turned off at the local disconnect. The buss ground detection was reset and verified to remain clear. Administrative Danger tags were hung on both the local disconnect for the receptacle and the cable reel plug attached to the cylinder cart.

**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:**

X-1300

**Facility Function:**

Uranium Conversion/Processing and Handling

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:**

01A--Inadequate Conduct of Operations - Inadequate Conduct of Operations (miscellaneous)  
 01Q--Inadequate Conduct of Operations - Personnel error  
 08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical)  
 12K--EH Categories - Near Miss (Could have been a serious injury or fatality)  
 14E--Quality Assurance - Work Process Deficiency

**HQ Summary:**

On July 27, 2013, while preparing to sample a cylinder, an un-insulated grounding cable fell onto a cylinder cart power cable plug resulting in an electrical arc. The 480-volt power plug was not fully seated in the receptacle which provided a small gap and exposure of the plug prongs. The grounding cable fell against the exposed prongs resulting in an electrical arc. A ground fault alarmed and electrical power to the cylinder cart was immediately turned off and appropriate administrative danger tags were hung. No personnel were shocked. Operations were suspended pending an investigation.

**Similar OR Report Number:** 1. N/A

**Facility Manager:**

Name	Ken Collier
Phone	(740) 289-5441
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
07/29/2013	10:30 (ETZ)	Ken Collier	BWCS
07/29/2013	10:30 (ETZ)	Mark Mattheiss	BWCS
07/29/2013	10:30 (ETZ)	Kent Fortenberry	BWCS
07/29/2013	10:45 (ETZ)	Dee Perkins	DOE PPPO
07/29/2013	10:47 (ETZ)	Pete Burban	DOE PPPO
07/29/2013	11:25 (ETZ)	John Saluke	DOE PPPO
07/29/2013	11:28 (ETZ)	Jack Zimmerman	DOE PPPO

**Authorized Classifier(AC):** Beth Keener      Date: 07/29/2013

**3)Report Number:** [EM--PPPO-LKY-PGDPENVRES-2013-0002](#) After 2003 Redesign

Attachment 2

**Secretarial Office:** Environmental Management  
**Lab/Site/Org:** Paducah Gaseous Diffusion Plant  
**Facility Name:** Environmental Restoration  
**Subject/Title:** Conduit Containing Energized Wire Cut During Facility D&D Activities  
**Date/Time Discovered:** 07/08/2013 09:55 (ETZ)  
**Date/Time Categorized:** 07/08/2013 11:01 (ETZ)  
**Report Type:** Notification  
**Report Dates:**

Notification	07/10/2013	15:02 (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.  
  
2E(3) - Any failure to follow a prescribed hazardous energy control process (e.g., lockout/tagout, hazardous energy control program).

**Cause Codes:**

**ISM:**

**Subcontractor Involved:** No

**Occurrence Description:** At approximately 0855 hours on July 8, 2013, a maintenance mechanic (MM) cut into a conduit containing an energized wire carrying 480 volt current. The MM observed a visible spark when the reciprocating saw blade penetrated the conduit and the MM immediately stopped cutting. The employee did not report any sensation of being shocked and sustained no visible injury. Work was immediately suspended and the area was cordoned off. As a precaution, the worker was sent for evaluation by the company occupational medical provider. The evaluation found the worker to have no adverse effects and to be fit for duty.

The work scope being performed at the time of the event was the removal of non-energized asbestos wiring in preparation for facility demolition. The wiring is enclosed in existing facility conduit. Due to the limited clearance at the selected cut location the MM used a reciprocating saw to cut into the conduit as allowed by work control. The worker was wearing PPE that is consistent with asbestos related work. Additionally, the worker was wearing cut resistant gloves for hand protection.

The impacted wiring was identified as the power supply to a freight elevator.

At some point during past operations (estimated 2009 timeframe) the freight elevator was disconnected from generator power and connected to building temporary power. When the building temporary power to the elevator was installed it was connected to existing conduit running several floors up to the freight elevator motor in the building penthouse. Other building temporary power is connected by flexible rubber service cords, marked with voltage ratings, and is easily distinguishable from existing building conduit. The energized system that was cut had the same appearance as the non-energized materials being removed.

Following the incident, electricians de-energized the affected circuit and affixed a Lock Out/Tag Out (LOTO) pending further evaluation. A Formal Suspension of Work was issued for work related to removal of conduit containing asbestos wiring in the facility. A fact-finding meeting was convened. Preliminary causal factors have been determined and corrective actions identified to avert further electrical incident. A review for extent of condition has been initiated to ensure that other similar conditions do not exist.

**Cause Description:**

**Operating Conditions:**

Does not apply

**Activity Category:**

Facility Decontamination/Decommissioning

**Immediate Action(s):**

Electricians de-energized the affected system and affixed LOTO control. The Project Manager initiated a Formal Suspension of Work for asbestos wiring removal activities in the facility. Environmental Safety and Health and Project Management convened a Fact Finding meeting.

**FM Evaluation:**

Results of the Electrical Severity calculation using Electrical Severity Measurement Tool (ESMT):

$$(EHF)*[(1+EF+SPF+AFPF+TPF)*IF]=ES$$

$$EHF \text{ (Electrical Hazard Factor)} = 50$$

$$EF \text{ (Environmental Factor)} = 0$$

$$SPF \text{ (Shock Proximity Factor)} = 10$$

$$AFPF \text{ (Arc Flash Proximity Factor)} = 10$$

$$TPF \text{ (Thermal Proximity Factor)} = 0$$

$$IF \text{ (Injury Factor)} = 1$$

$$(50)*[(1+0+10+10+0)*1] = 1050 \text{ (Medium Severity)}$$

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is**

Yes.

**Required:**

Before Further Operation? No

By Whom: Keith Jefferies

Attachment 2

By When: 08/19/2013

**Division or Project:** Paducah Environmental Remediation Project

**Plant Area:** C-410/420

**System/Building/Equipment:** C-410/420 Asbestos Wiring Removal

**Facility Function:** Environmental Restoration Operations

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:** 01B--Inadequate Conduct of Operations - Loss of Configuration Management/Control  
 01N--Inadequate Conduct of Operations - Inadequate Job Planning (Other)  
 07D--Electrical Systems - Electrical Wiring  
 08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical)  
 12C--EH Categories - Electrical Safety  
 14D--Quality Assurance - Documents and Records Deficiency  
 14E--Quality Assurance - Work Process Deficiency

**HQ Summary:** On July 8, 2013, a maintenance mechanic using a reciprocating saw cut into a conduit containing an energized wire carrying 480 volts of current. The mechanic observed a visible spark when the reciprocating saw blade penetrated the conduit and immediately stopped cutting. The mechanic was wearing appropriate personal protective equipment and experienced no adverse effects. The impacted wiring was identified as the power supply to a freight elevator. Work was suspended and electricians de-energized the affected system and affixed lockout/tagout control. A fact finding meeting was initiated.

**Similar OR Report Number:**

**Facility Manager:**

Name	Craig Jones
Phone	(270) 441-5114
Title	Manager of Projects

**Originator:**

Name	Freels, Jennie P
Phone	(270) 441-5407
Title	QA SUPPORT & PROGRAMS MANAGER

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
07/08/2013	11:10 (ETZ)	Dave Kent	LATA KY
07/08/2013	11:10 (ETZ)	Craig Jones	LATA KY
07/08/2013	11:10 (ETZ)	Keith Jefferies	LATA KY
07/08/2013	15:00 (ETZ)	Jeff Snook	DOE

**Authorized Classifier(AC):** Merlin Ihnen    **Date:** 07/10/2013

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**4)Report Number:** [EM-CBFO--NWP-WIPP-2013-0010](#) **After 2003 Redesign**  
**Secretarial Office:** Environmental Management  
**Lab/Site/Org:** Carlsbad Field Office  
**Facility Name:** Waste Isolation Pilot Plant  
**Subject/Title:** Failure to follow prescribed hazardous energy control process - PLD use  
**Date/Time Discovered:** 07/15/2013 10:00 (MTZ)  
**Date/Time Categorized:** 07/15/2013 10:45 (MTZ)  
**Report Type:** Notification/Final

**Report Dates:**

Notification	07/17/2013	15:47 (ETZ)
Initial Update	07/17/2013	15:47 (ETZ)
Latest Update	07/17/2013	15:47 (ETZ)
Final	07/17/2013	15:47 (ETZ)

**Significance Category:** 4

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

**Cause Codes:**

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

**Subcontractor Involved:** No

**Occurrence Description:** On June 25, 2013, during a Carlsbad Area Office (CBFO) work order review, it appeared that on June 19, 2013, maintenance personnel performing troubleshooting activities on the Facility Cask Transfer Car, may have violated requirements in WIPP Procedure (WP) 10-AD3005, Control and Use of Maintenance Locks. On July 15, 2013, at 1000 hours, additional information gathered from June 25, 2013 was discussed and evaluated by the Facility Manager (FM), Electrical Subject Matter Expert and other staff. Based on that information, it was determined that the maintenance personnel had left their PLDs in place after the shift ended without requesting a COM LOTO and by doing so did not comply with WP 10-AD3005. At 1045 hours, the FM categorized the issue as an ORPS reportable occurrence under reporting criterion 2E(3)SC4 per WP12-ES3918. The Carlsbad Field Office Facility Representative was notified of the categorization at 1150 hours. Note: Hazardous electrical energy had been removed from the equipment and verified through zero energy checks prior to commencing work on both days. No hazardous condition existed, no employees were injured by or exposed to hazardous electrical energy.

**Cause Description:**

**Operating Conditions:** Does not apply.

Attachment 2

**Activity Category:** Maintenance

**Immediate Action(s):** The Facility Manager directed managers, first line supervision and engineers to:

- Review applicable lockout/tagout (LOTO) procedures and document review on a read and sign sheet.
  
- Meet with your staff and identify any recommended changes to clarify the current LOTO procedures. Document and submit the recommendations and submit provide to the FM and the Cognizant Individual responsible for procedure maintenance.
  
- Reinforce with your supervisors that until procedure changes are made, strict adherence to the current procedures must be maintained.
  
- Review all open work packages that have exceeded one shift and where a Personal Locking Device (PLD) was used on the initial shift to assure the required Cognizant Operations Manager (COM) LOTO was applied. Notify the FM of any identified noncompliance.
  
- Supervisors remind crafts at morning meetings and pre-jobs briefings to adhere to LOTO process requirements. Remind them to stop and ask if they are unclear concerning the requirements. These reminders will be conducted each shift beginning on 7/16/13 through 8/2/13.
  
- Supervisors will remind crafts daily that if work involving a PLD cannot be completed in a single shift a COM LOTO must be applied. These reminders will be conducted each shift beginning on 7/16/13 through 8/2/13.
  
- Supervisors will check status of LOTOs in their area of responsibility prior to the end of each shift – with increased attention on PLDs that should be converted to COM LOTOs. These checks will be conducted each shift beginning on 7/16/13 through 8/2/13.

**FM Evaluation:**

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** No

**Division or Project:** NWP/WIPP

**Plant Area:** Underground

**System/Building/Equipment:** WH03/534/Facility Cask Transfer Car

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

**Corrective Action:**

**Lessons(s) Learned:**

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

**HQ Summary:** On July 15, 2013, the facility manager, electrical subject matter expert and other staff determined that maintenance personnel violated the requirements in WIPP Procedure 10-AD3005, Control and Use of Maintenance Locks, on June 19 while troubleshooting the Facility Cask Transfer Car because they left their Personal Locking Device (PLD) in place after the shift ended without requesting a Cognizant Operations Manager (COM) lockout/tagout (LOTO). Supervisors will check the status of LOTOs in their area of responsibility before the end of each shift with increased attention on PLDs that should be converted to COM LOTOs.

**Similar OR Report Number:**

**Facility Manager:**

Name	KENNEDY, SCOTT J.
Phone	(575) 234-8434
Title	FACILITY MANAGER

**Originator:**

Name	KNOX, JEFF W.
Phone	(575) 234-8462
Title	FACILITY MANAGER DESIGNEE

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
07/15/2013	10:00 (MTZ)	Barry Brown	NWP/ESH
07/15/2013	10:00 (MTZ)	Jeff Knox	NWP/FMD
07/15/2013	10:00 (MTZ)	Scott Kennedy	NWP/FM
07/15/2013	10:00 (MTZ)	Hardy Bellows	NWP/SIM
07/15/2013	11:50 (MTZ)	Kenny Padilla	CBFO/FR

**Authorized Classifier(AC):**

**5)Report Number:** [EM-CBFO--NWP-WIPP-2013-0011](#) After 2003 Redesign  
**Secretarial Office:** Environmental Management  
**Lab/Site/Org:** Carlsbad Field Office  
**Facility Name:** Waste Isolation Pilot Plant

Attachment 2

**Subject/Title:** Unexpected discovery of an energized cable

**Date/Time Discovered:** 07/17/2013 14:46 (MTZ)

**Date/Time Categorized:** 07/17/2013 16:20 (MTZ)

**Report Type:** Update

**Report Dates:**

Notification	07/22/2013	18:34 (ETZ)
Initial Update	08/07/2013	12:03 (ETZ)
Latest Update	08/07/2013	12:03 (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:**

**Subcontractor Involved:** Yes

Budwine Electric

**Occurrence Description:** On July 17, 2013, at approximately 1330 hours, electricians performing a work area inspection for a cable relocation project in the WIPP underground identified an energized 480 volt cable. The cable had been previously tagged with an Inactivation Tag and had been thought to be abandoned. The electricians, per their Conduct of Operations training, immediately stopped work and notified Underground Services. Underground Services personnel identified the 480V power source, de-energized the cable and applied appropriate Lockout/Tagout (LOTO). It was later determined that the cable had been left in this configuration as part of work performed to support mining activities in the underground Maintenance Shop. A review of the mining support work instructions and associated LOTO information showed that the LOTO applied as part of the work instructions had been removed and the circuit breaker returned to an energized configuration. The Facility Manager categorized the occurrence and directed an extent of condition to be conducted throughout the entire underground facility to see if any other cables were in the same uncontrolled configuration. As a result of the extent of condition, another cable was discovered in the same configuration at a different location.

Note: No personnel were injured by or exposed to hazardous electrical energy.

**DETAILS**

On the morning of July 17, 2013, five electricians were assigned a work package to relocate cables in the WIPP Underground in the South 90 drift

between East 140 and East 300. To support the work that same morning Underground Services de-energized the circuits feeding the cables and performed a LOTO using a Cognizant Operations Manager (COM) lock. The electricians participated in a pre-job briefing, hung their personal locks on the multi-lock COM lock (at approximately 0745 hours), performed their energy checks and began to relocate two 13.8kV cables. They worked through the morning.

Upon their return from lunch the electricians progressed to a location near a cable in South 90 that had been disconnected, rolled up and hung from the rib (wall). This cable was not part of their work scope. The cable leads had been taped and a Deactivation Tag hung at the end of the cable. One of the electricians suggested that they should check the cable for energy. A scan of the cable using a non-contact voltage detector showed that it was indeed energized.

The electricians immediately stopped work per their Conduct of Operations training. The crew's electrical Maintenance Engineer observed the action and reported the energized cable to Underground Services. At approximately 1330 hours, Underground Services subsequently reported the discovery to the Facility Shift Manager (FSM). Underground Services personnel arrived at the South 90 location, traced the cable to its source, a Transfer Switch (53P-SW04-178). Underground Services placed the switch in a neutral position (off) and opened the upstream circuit breaker (53P-SBD04/5-CB2) and applied a LOTO to each.

The craft indicated that they were never exposed to hazardous energy since their precautionary area check found the energized cable prior to them working in its proximity.

It was later determined that the cable had been energized since the completion of the work control document in November 2012, it appeared that a step in the work control document had been misinterpreted and the LOTO was removed and the circuit breaker energized. A review of the work control document and associated LOTO information revealed that the LOTO was applied as part of the work instructions and that the work control instructions never requested the removal of the LOTO. The work instructions had directed the subcontractor to tape the leads of the cable and to hang an inactivation tag that identified the associated work order number and Engineering Change Order number to the cable. The tape was applied to protect the conductors while they were being removed from the enclosure and from the exposure of the elements. The tape was not applied for isolation/insulation purposes.

A copy of the work order (WO #1103917) that was developed and worked to support mining the floor in the East 300 Maintenance Shop was examined.

This package included removal and relocation instructions for the cable that was later found to be energized. Also, the associated LOTO Control Sheets used by Underground Services to lock and tag and subsequently remove locks and tags were examined and reflected the as-found condition.

The work associated with the work order (WO #1103917) was performed by a NWP subcontractor. The pertinent steps in the work order associated with LOTO of the energized cable were:

- On 9/18/12 53P-SBD04/5-CB2, 53P-SBD04/4-CB9 both feeding 53P-SW04-178 were opened and locked out. 53P-SW04-178 was placed in a neutral position and also locked out (Step 8.32 of the work instructions).
- That same day the locks were cleared and the circuit breakers were closed on Circuit Breaker (CB) 2 and CB9. The clearance position showed as NORMAL (the primary feed was through CB2). (Steps 8.50.1 and 8.51 of the work instructions).
- On 9/19/12 53P-SBD04/5-CB2, 53P-SBD04/4-CB9 were again opened and locked out (Step 8.55 of the work instructions).
- That same day the locks were cleared and the circuit breakers closed. (Steps 8.58.1 and 8.59 of the work instructions).
- On 9/25/12 53P-SBD04/5-CB2, 53P-SBD04/4-CB9 were again opened and locked out (Step 8.82 of the work instructions).
- These locks were cleared on 11/2/12. CB2 was closed and CB9 was left in the open position. There were no work instructions to remove the locks. The LOTO Control Sheets identify that a contractor requested removal of the locks. Step 8.167.1 of the work order stated, "U/G Services Engineer, ensures all temporary power alignments are operating and functioning according to normal operating parameters." This step was signed off on 11/2/12 by the same Underground Facilities Engineer that cleared the locks.

**Cause Description:**

**Operating Conditions:**

**Activity Category:**

**Immediate Action(s):**

Does not apply.

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

Work stopped upon discovery.

Electricians notified Underground Services and the Facility Shift Manager.

Underground Services removed power from the cable and performed an appropriate Lockout/Tagout.

The Facility Manager directed an inspection to be conducted throughout the entire underground facility to see if any other cables may have been left in the same configuration.

The Facility Manager directed a Safety Pause. A Safety Pause discussion (slide show) was developed and initiated on 7/22/13 and will continue with oncoming work crews through 7/24/13.

A Debrief was conducted on 7/18/13.

The issue was entered into the Issues Management Processing System via a WIPP Form.

**FM Evaluation:**

UPDATE 8/7/13 - This update was submitted to correct information in the Details portion of the Description of Occurrence section. The initial Notification report text incorrectly stated, "The Cognizant Engineer indicated that he had directed a subcontractor to tape the leads on the cable. He also directed the subcontractor to hang the inactivation tag with the work order number with the Engineering Change order number written on it." The work instructions directed the subcontractor to tape the leads and hang the inactivation tag not the Cognizant Engineer. The work instructions also required LOTO to be applied but never requested removal of that LOTO.

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:**

Yes.  
Before Further Operation? No  
By Whom: Site Operations  
By When:

**Division or Project:**

NWP/WIPP

**Plant Area:**

South 90 drift

**System/Building/Equipment:** ED04/Underground/53P-SBD04/5-CB2

**Facility Function:**

Nuclear Waste Operations/Disposal

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:**

01A--Inadequate Conduct of Operations - Inadequate Conduct of Operations (miscellaneous)  
01B--Inadequate Conduct of Operations - Loss of Configuration Management/Control  
01M--Inadequate Conduct of Operations - Inadequate Job Planning (Electrical)  
01R--Inadequate Conduct of Operations - Management issues  
11G--Other - Subcontractor  
12C--EH Categories - Electrical Safety  
14D--Quality Assurance - Documents and Records Deficiency  
14E--Quality Assurance - Work Process Deficiency

**HQ Summary:**

On July 17, 2013, electricians performing a work area inspection for a cable relocation project in the WIPP underground facility identified an energized 480-volt cable. The cable had been previously tagged with an inactivation tag and had been thought to be abandoned. The electricians immediately stopped work and notified Underground Services. Underground Services

personnel identified the 480-volt power source, de-energized the cable, and applied appropriate the lockout/tagout. It was later determined that the cable had been left in this configuration as part of work performed to support mining activities in the underground Maintenance Shop in September 2012 through November 2012. The Facility Manager directed an inspection to be conducted throughout the entire underground facility to see if any other cables were in the same uncontrolled configuration. As a result of the inspection, another cable was discovered in the same configuration at a different location. No personnel were injured by or exposed to hazardous electrical energy.

**Similar OR Report Number:**

**Facility Manager:**

Name	KENNEDY, SCOTT J.
Phone	(575) 234-8434
Title	FACILITY MANAGER

**Originator:**

Name	KNOX, JEFF W.
Phone	(575) 234-8462
Title	FACILITY MANAGER DESIGNEE

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
07/17/2013	14:46 (MTZ)	Mark Long	NWP/FSM
07/17/2013	14:53 (MTZ)	Jeff Knox	NWP/FMD
07/17/2013	15:12 (MTZ)	Scott Kennedy	NWP/FM
07/17/2013	16:10 (MTZ)	Kenny Padilla	CBFO/FR

**Authorized Classifier(AC):**

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<b>6)Report Number:</b>	<a href="#">EM-ORO--UCOR-K25GENLAN-2013-0002</a> After 2003 Redesign						
<b>Secretarial Office:</b>	Environmental Management						
<b>Lab/Site/Org:</b>	East Tennessee Technology Park						
<b>Facility Name:</b>	ETTP S&M & Cylinders						
<b>Subject/Title:</b>	Unexpected Discovery of Energy Source at Portable Public Address System						
<b>Date/Time Discovered:</b>	07/25/2013 10:00 (ETZ)						
<b>Date/Time Categorized:</b>	07/26/2013 13:18 (ETZ)						
<b>Report Type:</b>	Update						
<b>Report Dates:</b>	<table border="1"> <tr> <td>Notification</td> <td>07/26/2013</td> <td>15:04 (ETZ)</td> </tr> <tr> <td>Initial Update</td> <td>07/27/2013</td> <td>13:06 (ETZ)</td> </tr> </table>	Notification	07/26/2013	15:04 (ETZ)	Initial Update	07/27/2013	13:06 (ETZ)
Notification	07/26/2013	15:04 (ETZ)					
Initial Update	07/27/2013	13:06 (ETZ)					

Attachment 2

Latest Update	07/30/2013	17:24 (ETZ)
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.).

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

**Cause Codes:**

**ISM:**

2) Analyze the Hazards

**Subcontractor Involved:**

No

**Occurrence Description:**

At approximately 1000 on 7-25-2013, maintenance personnel were performing routine maintenance on a portable Public address (PA) unit located north of Building K-1650. While accessing a locked tool box, integral to the portable PA unit, an employee felt a tingling sensation in his hand as he touched the padlock securing the tool box.

**Cause Description:**

**Operating Conditions:**

Surveillance and Maintenance

**Activity Category:**

Facility Decontamination/Decommissioning

**Immediate Action(s):**

The employee stopped work, warned his co-worker, and called his supervisor. Upon the supervisor's arrival the PA unit was barricaded to prevent inadvertent access and qualified electrical personnel were called to investigate.

**FM Evaluation:**

Work was stopped and the area was made safe. Voltage measurements taken by the electricians indicated a difference in potential of approximately 4.1 volts between the padlock and earth ground. Measurements further indicated a difference of potential of approximately 61 volts between the service drop frame and earth ground. Emergency action was taken to remove the power feed and insured all potential hazards were removed. Remaining portable PA units on different circuits have also been placed in a safe configuration. Further evaluation continues and this occurrence will be updated as additional information is obtained.

Update 7/30/13:

The investigation determined that an underground lighting circuit was the source of the issue. Further investigation revealed that a short had occurred on the lighting circuit in question. The circuit was isolated and the voltage potential difference went to zero. The ETTP site was evaluated for similar conditions and any areas of concern were made safe pending further

investigation.

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

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

**Division or Project:** Operations/S&M

**Plant Area:** Vicinity of K-1650

**System/Building/Equipment:** Portable Public Address Unit

**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  
 08A--OSHA Reportable/Industrial Hygiene - Electrical Shock  
 12C--EH Categories - Electrical Safety  
 14L--Quality Assurance - No QA Deficiency

**HQ Summary:** On July 25, 2013, while performing routine maintenance on a portable public address (PA) unit, an employee felt a tingling sensation in his hand as he touched the padlock securing the tool box. Work was stopped. Voltage measurements taken by the electricians indicated a difference in potential of approximately 4.1 volts between the padlock and earth ground. Measurements further indicated a difference of potential of approximately 61 volts between the service drop frame and earth ground. The power feed to the PA unit was removed.

**Similar OR Report Number:**

**Facility Manager:**

Name	Gutmanis, A.
Phone	(865) 574-9910
Title	Electrical Manager

**Originator:**

Name	Holowczak, Mark S
Phone	(865) 574-3611
Title	ENFORCEMENT COORDINATOR

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
07/25/2013	10:02 (ETZ)	McNutt, M.	UCOR

07/25/2013	10:02 (ETZ)	Selvey, J.	UCOR
07/25/2013	10:15 (ETZ)	Smith, B.	UCOR
07/25/2013	10:15 (ETZ)	Perkins, L.	DOE
07/25/2013	10:30 (ETZ)	Armstrong, J.	DOE
07/25/2013	10:40 (ETZ)	Kopotic, J.	DOE
07/25/2013	10:40 (ETZ)	Noe, T.	DOE-FR

**Authorized Classifier(AC):** Fillers, F.    **Date:** 07/26/2013

**7)Report Number:** [EM-RL--CPRC-GPP-2013-0004](#) **After 2003 Redesign**  
**Secretarial Office:** Environmental Management  
**Lab/Site/Org:** Hanford Site  
**Facility Name:** Groundwater Protection Project  
**Subject/Title:** Un-terminated 480 Volt Type W Cable Found Energized in 100 KW Area  
**Date/Time Discovered:** 07/25/2013 09:15 (PTZ)  
**Date/Time Categorized:** 07/25/2013 09:45 (PTZ)  
**Report Type:** Notification

**Report Dates:**

Notification	07/29/2013	18:46 (ETZ)
Initial Update		
Latest Update		
Final		

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

**Cause Codes:**  
**ISM:** 2) Analyze the Hazards  
**Subcontractor Involved:** No  
**Occurrence Description:** On 07-25-13 at 0915 hours an energized 480 volt power supply cable for a group of KW well pumps was discovered laying in the Desert un-terminated.

During initial electrical breaker lineup, it was discovered there was no power at a well pump power distribution rack. A field walkdown was initiated to investigate the unexpected condition. The walkdown team discovered the cable had been connected to the electrical power supply at the P&T but a section of cable had not been properly spliced in the field. The new 480 volt cable had been installed by construction forces as part of a facility modification to upgrade well pump power supplies. No personnel came in contact with the electrical energy and no material damage was discovered

Attachment 2

associated with the event.

**Cause Description:**

**Operating Conditions:**

Facility was not operating and was in the process of being started.

**Activity Category:**

Facility/System/Equipment Testing

**Immediate Action(s):**

- The electrical cable was immediately de-energized
- The un-terminated portion of the cable was physically barricaded and danger signs hung
- A controlling organization LOTO is being established
- Required DOE and CHPRC event notifications had been made
- A field investigation of the event was initiated
- A critique is scheduled for 1230 hrs. 7/25/13.

**FM Evaluation:**

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:**

Yes.  
Before Further Operation? No  
By Whom: Lynn Davison  
By When:

**Division or Project:**

Soil and Groundwater Remediation Project

**Plant Area:**

100 KW Area

**System/Building/Equipment:**

KW Pump & Treat Facility

**Facility Function:**

Environmental Restoration Operations

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:**

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

**HQ Summary:**

On July 25, 2013, during initial electrical breaker lineup, a walk-down team discovered an un-terminated, energized, 480-volt power supply cable for a group of well pumps lying in the desert. The cable had been connected to the electrical power supply at the P&T but a section of cable had not been properly spliced in the field. The new cable had been installed by construction personnel to upgrade well pump power supplies. The electrical

cable was immediately de-energized and a field investigation was initiated.

**Similar OR Report Number:**

**Facility Manager:**

Name	BARRETT, WILLIAM F.
Phone	(509) 373-3985
Title	OPERATIONS DIRECTOR

**Originator:**

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

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
07/25/2013	09:20 (PTZ)	Bill Barrett	CHPRC
07/25/2013	09:25 (PTZ)	Bob Popielarczyk	CHPRC
07/25/2013	10:34 (PTZ)	Kerry Schierman	DOE-RL
07/25/2013	11:40 (PTZ)	Mike Boyce	MSA

**Authorized Classifier(AC):**

**8)Report Number:**

[EM-RL--CPRC-PFP-2013-0003](#) After 2003 Redesign

**Secretarial Office:**

Environmental Management

**Lab/Site/Org:**

Hanford Site

**Facility Name:**

Plutonium Finishing Plant

**Subject/Title:**

30V/80V AC Identified in Maintenance Work Boundary During Lockout/Tagout Safe Condition Check

**Date/Time Discovered:**

07/02/2013 09:15 (PTZ)

**Date/Time Categorized:**

07/02/2013 11:38 (PTZ)

**Report Type:**

Notification/Final

**Report Dates:**

Notification	07/08/2013	21:07 (ETZ)
Initial Update	07/08/2013	21:07 (ETZ)
Latest Update	07/08/2013	21:07 (ETZ)
Final	07/08/2013	21:07 (ETZ)
Revision 1	07/09/2013	12:15 (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:**

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**ISM:** 2) Analyze the Hazards  
3) Develop and Implement Hazard Controls

**Subcontractor Involved:** No

**Occurrence Description:** On 7/02/2013, during Safe Condition Check prior to work on high resistance grounding cabinets for Transformers #1 and #3, electricians discovered 80 volts AC present between the line side cabinet neutral control switch and ground on Cabinet #3. Electricians also discovered 30 volts AC at corresponding points on Cabinet #1. Work was being conducted under Work Package 2Z-13-02468, which included a lockout/tagout boundary for 120 VAC and 480 VAC per Tagout Authorization Form (TAF) PUO-13-050. Electricians notified the Field Work Supervisor (FWS) of the voltage reading and were immediately instructed to stop work. The FWS notified the Shift Operations Manager (SOM) of the issue and that the area was in a safe configuration. The SOM acknowledged safe configuration and reported they were responding to a potentially higher priority event and that they would follow-up. Following resolution of the other event, between 1100 to 1130 hours the FWS met with the SOM, Electrical Engineer, LOTO Subject Matter Expert (SME) and RL-DOE Facility Representative to discuss the electrical discovery.

**Cause Description:**

**Operating Conditions:** At 0933 hours CAM alarming in Room 235A-3, ICP established. ICP stood down at 1040 hours.

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

**Immediate Action(s):** \* Work package 2Z-13-02468 suspended pending electrical investigation activities.  
\* Lockout/tagout boundary was removed to restore the safety function of the grounding cabinets.  
\* Initiate critique and electrical investigation.

**FM Evaluation:** 07/09/2013: Corrected editorial and typographical errors.

**DOE Facility Representative Input:**

**DOE Program Manager Input:**

**Further Evaluation is Required:** No

**Division or Project:** CH2MHILL Plateau Remediation Company

**Plant Area:** 200 West

**System/Building/Equipment:** High resistance grounding cabinets north of 234-5Z

**Facility Function:** Plutonium Processing and Handling

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:** 01K--Inadequate Conduct of Operations - Lockout/Tagout Noncompliance (Electrical)

01M--Inadequate Conduct of Operations - Inadequate Job Planning (Electrical)

08H--OSHA Reportable/Industrial Hygiene - Safety Noncompliance

12I--EH Categories - Lockout/Tagout (Electrical or Mechanical)

14E--Quality Assurance - Work Process Deficiency

**HQ Summary:**

On July 2, 2013 during a Safe Condition Check, electricians working on inspection of high resistance grounding cabinets for transformers 1 and 3, read 80 volts AC present between neutral and ground in transformer #3 cabinet. The

electricians notified the Field Work Supervisor (FWS) of the voltage reading and were instructed to stop work. The FWS verified that the area was in a safe configuration and the electricians removed the lockout/tagout boundary to restore the safety function of the grounding cabinets.

**Similar OR Report Number:**

**Facility Manager:**

Name	Swartz, Mike
Phone	(509) 373-0078
Title	Deputy Project Manager

**Originator:**

Name	FITZGERALD, PATRICIA A
Phone	(509) 373-4942
Title	OPERATIONS SPECIALIST

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
07/02/2013	09:33 (PTZ)	P. N. Jenkins	CHPRC
07/02/2013	09:33 (PTZ)	D. C. McCranie	DOE-RL
07/02/2013	09:35 (PTZ)	B. H. Lueck	CHPRC
07/02/2013	11:00 (PTZ)	J. M. Carranco	CHPRC

**Authorized Classifier(AC):**

**9)Report Number:**

[EM-RL--MSC-WSCF-2013-0002](#) After 2003 Redesign

**Secretarial Office:**

Environmental Management

**Lab/Site/Org:**

Hanford Site

**Facility Name:**

Waste Sampling & Characterization

**Subject/Title:**

Work scope required a Tagout Authorization Form (TAF) but an Eight Criteria lockout was called out in the work package.

**Date/Time Discovered:**

07/17/2013 08:45 (PTZ)

**Date/Time Categorized:**

07/23/2013 12:30 (PTZ)

**Report Type:**

Update

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**Report Dates:**

Notification	07/21/2013	18:58 (ETZ)
Initial Update	07/24/2013	16:22 (ETZ)
Latest Update	07/24/2013	16:22 (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:**

**Subcontractor Involved:**

No

**Occurrence Description:**

UPDATE: 7/24/13:

On 7/23/2013 at 1230 hours, after further discussions with the WSCF Facility Representative, it was determined the categorization for occurrence EM-RL--MSC-WSCF-2013-0002 needed to be changed from a Group 2, Subgroup E, (3) SC-4 to Group 2, Subgroup E, (2) SC-3. The justification is based on the fact the work package had been released for work and only time constraints prevented the discovery of a second energy source.

**INITIAL DESCRIPTION:**

A post job review of the previous days Administration/Nuclear Spectroscopy Laboratory (ADM/NSL) heating, ventilation and air conditioning (HVAC) outage identified that part of an Air Handling Unit Preventive Maintenance (PM) was not completed. It was identified that this work scope would have required a Tagout Authorization Form (TAF) instead of the 8 Criteria that had been used in the work package. Personnel did not enter the enclosure with the energized exposed electrical hazard. The issue was reported to the Facility Manager and the Emergency Operations Center (EOC) Shift Office.

**Cause Description:**

**Operating Conditions:**

Normal Operations/ADMIN/NSL preventive maintenance in process

**Activity Category:**

Maintenance

**Immediate Action(s):**

1. Notified DOE Facility Representative
2. Notified Laboratory Director
3. Notified EOC Shift Office
4. Scheduled Fact Finding Meeting

**FM Evaluation:**

To be determined in the Final Report.

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

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

**Division or Project:** MSA/Energy and Environmental Services/EES

**Plant Area:** 600 Area

**System/Building/Equipment:** Air Handling Unit/6266/Heater Enclosure

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

**Corrective Action:**

**Lessons(s) Learned:**

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

**HQ Summary:** On July 17, 2013, during a post job review of the previous days ADM/NSL heating, ventilation, and air conditioning outage, it was identified that part of an air handling unit preventive maintenance was not completed. This work scope would have required a Tagout Authorization Form instead of the 8 Criteria that had been used in the work package. Personnel did not enter the enclosure with the energized exposed electrical hazard. The issue was reported to the facility Manager.

**Similar OR Report Number:**

**Facility Manager:**

Name	Troy F. Dale
Phone	(509) 373-7020
Title	Facility Manager

**Originator:**

Name	TRUMP, GARY D
Phone	(509) 376-3030
Title	HANFORD EOC SHIFT OFFICE

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
07/17/2013	09:00 (PTZ)	Ben Wallace	DOE/RL
07/17/2013	09:02 (PTZ)	Jon Kon	MSA/WSCF

07/17/2013	09:20 (PTZ)	Gary Trump	MSA/EOC
07/23/2013	12:30 (PTZ)	Ben Wallace	DOE/RL
07/24/2013	08:15 (PTZ)	G. D. Trump	MSA/EOC

**Authorized Classifier(AC):**

**10)Report Number:** [NA--LASO-LANL-BOP-2013-0005](#) After 2003 Redesign

**Secretarial Office:** National Nuclear Security Administration

**Lab/Site/Org:** Los Alamos National Laboratory

**Facility Name:** "at large" or Balance of Plant

**Subject/Title:** Worker Sustains Minor Electrical Shock

**Date/Time Discovered:** 07/11/2013 11:00 (MTZ)

**Date/Time Categorized:** 07/11/2013 12:55 (MTZ)

**Report Type:** Update

**Report Dates:**

Notification	07/13/2013	01:44 (ETZ)
Initial Update	07/13/2013	12:27 (ETZ)
Latest Update	07/13/2013	12:27 (ETZ)
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.).

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

**Cause Codes:**

**ISM:**

**Subcontractor Involved:** No

**Occurrence Description:** MANAGEMENT SYNOPSIS

On July 11, 2013, at 0845, at Technical Area (TA) 3, Building 130, a post baccalaureate student (S1) in the Environmental Compliance Programs (ENV-CP) Group leaned against a wall where a legacy electrical control panel was located and his thumb brushed exposed terminals of a circular Military Connector on the panel sustaining a mild shock to his left thumb. S1 stated he did not consider the shock to be of a great concern because the shock could be compared to that of a carpet static shock. An undergraduate student (S2) was with S1 when the incident occurred. S2 currently performs low-voltage work using a voltage meter to perform diagnostics of direct current (DC) devices and systems. S2 believed the connector was a signal connection, and not AC power, and he attempted to perform a voltage check

of the connector using a voltmeter set on DC. While S2 was taking readings the meter probes arced to ground blackening and melting one of the voltmeter's pointed metal tips. S2 was not expecting alternating current (AC) because he and S1 had previously been informed that the panel was no longer an energized one since it was turned over in 2000. There is a locked receptacle on the panel in the off position which is known to de-energize the controls on the panel, but it was not known that the Military Connector remained energized. The students immediately put up a sign on the wall to inform others not to touch the panel. When the Radiation Protection Services (RP-SVS) Supervisor arrived at work the students reported the incident to him.

At 1029, the RP-SVS Supervisor submitted a Facility Service Request (FSR) to assess the panel connector.

At 1100, the RP-SVS Supervisor and the students left to attend a student function.

At 1045, the UI Maintenance Coordinator (MC) reviewed the FSR in his system and notified the UI Operations Manager of the event. The Operations Manager sent the MC and two electricians to go to the site and assess the panel. The electricians discovered a tripped 120 volts AC circuit breaker that supplied power to the connector where the shock occurred. The electricians locked and tagged out the power source at the breaker.

At 1300, the RP-SVS Supervisor and the students returned to Building 130. S1 received an e-mail from an Environmental, Safety and Health (ESH) representative directing him to report to LANL Occupational Medicine (LANL-OM) for an evaluation as a result of the shock he received from the connector.

At 1400, S1 reported to LANL-OM and was evaluated for any serious injuries resulting from the shock. He was released back to work without restrictions.

At 1600, a critique was convened and the Division Electrical Safety Officer (DESO) present evaluated the event using the electrical severity tool. The evaluation resulted in a score of 330 for an electrical severity significance of "Medium" because the event resulted in a worker contacting hazardous electrical energy. The Utilities and Institutional (UI) Facilities Operations Director (FOD) dual categorized the event as Group 2, Subgroup 2E (1) significance category 2 and as Group 2, Subgroup 2E (3) significance category 4.

## BACKGROUND

Building 130 was turned over to the RP-SVS Supervisor approximately ten years ago to conduct aerosol experiments. At the time of the turnover no formal process existed for turning over aging facilities. S1 has been a student employee for ENV-CP for the past four years during the summer seasons, during which time, he was often assigned to work in Building 130 under the mentorship of the RP-SVS Supervisor.

The panel had been used for radiation instrument calibration during the residency of Radiation Protection (RP) more than ten years ago. The panel consists of an audible speaker, an isolated power switch, a red light that signified rad testing was in progress, an east and west pig selector switch, a test switch and a start button. It is unknown when the Military Connector was added to the panel and what its purpose was, but it appears to have been a modification to the panel after its original construction (its position is slightly out of line with the other devices and it is differently shaped and affixed). The Military Connector is known to have not been used since sometime before 1987.

**Cause Description:**

**Operating Conditions:**

Normal

**Activity Category:**

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

**Immediate Action(s):**

- 1) Worker was taken to LANL-OM for evaluation and was released back to work with no restrictions.
- 2) The UI Maintenance Coordinator and electricians assessed the area and locked and tagged out the circuit.
- 3) The UI Electricians will place a cap onto the connector.

**FM Evaluation:**

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:**

Yes.  
Before Further Operation? No  
By Whom: QPA-PA, UI, ENV-CP  
By When: 08/23/2013

**Division or Project:**

Utilities and Institutional Facilities Division

**Plant Area:**

TA-3 BLDG 0130

**System/Building/Equipment:**

TA-3 Building 0130

**Facility Function:**

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

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:** 01A--Inadequate Conduct of Operations - Inadequate Conduct of Operations (miscellaneous)  
 01B--Inadequate Conduct of Operations - Loss of Configuration Management/Control  
 01Q--Inadequate Conduct of Operations - Personnel error  
 08A--OSHA Reportable/Industrial Hygiene - Electrical Shock  
 08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical)  
 12C--EH Categories - Electrical Safety  
 14D--Quality Assurance - Documents and Records Deficiency  
 14E--Quality Assurance - Work Process Deficiency

**HQ Summary:** On July 11, 2013, a post baccalaureate student sustained a mild shock to his left thumb when his thumb brushed exposed terminals of a circular Military Connector on a legacy electrical control panel. An undergraduate student, who performs diagnostics of direct current (DC) devices and systems, believed the connector was a signal connection and not alternating current (AC) power. He attempted to perform a voltage check of the connector using a voltmeter set on DC, when the meter probes arced to ground, melting one of the probe's pointed metal tips. The undergraduate student was not expecting AC because he believed that the panel was no longer energized. Electricians discovered a tripped 120-volt AC circuit breaker that supplied power to the connector where the shock occurred. The electricians locked and tagged out the power source at the breaker.

**Similar OR Report Number:**

**Facility Manager:**

Name	James Rabold
Phone	(505) 667-5658
Title	UI Facilities Operations Director Designee

**Originator:**

Name	GARCIA, CELINA H
Phone	(505) 606-1815
Title	OCCURRENCE INVESTIGATOR

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
07/11/2013	12:59 (MTZ)	David George	NNSA

**Authorized Classifier(AC):** Kimberli Tanner      Date: 07/12/2013

**11)Report Number:** [NA--LASO-LANL-PHYSTECH-2013-0013](#) After 2003 Redesign  
**Secretarial Office:** National Nuclear Security Administration  
**Lab/Site/Org:** Los Alamos National Laboratory  
**Facility Name:** Physical and Technical Supt.

Attachment 2

**Subject/Title:** Near Miss to a Personal Injury: Forklift Contacts Power Pole Support Wire  
**Date/Time Discovered:** 07/15/2013 09:10 (MTZ)  
**Date/Time Categorized:** 07/15/2013 10:15 (MTZ)  
**Report Type:** Notification  
**Report Dates:**

Notification	07/18/2013	17:59 (ETZ)
Initial Update		
Latest Update		
Final		

**Significance Category:**

3

**Reporting Criteria:**

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:**

**ISM:**

**Subcontractor Involved:** No

**Occurrence Description:** MANAGEMENT SYNOPSIS

On July 15, 2013, at 0910, at Technical Area (TA) 16, near Building 969, an Acquisition Services Management Materials Management (ASM-MM) Transportation Specialist (W1) contacted one of three guy wires located above the road intersection on Anchor Ranch road with the mast of the forklift he was driving. The communications guy wire was pulled forward and cut and the middle static guy wire, which was within a few inches from the 13.6 kilovolts (kV) energized conductors, fell onto the forklift. The static guy wire did not strike an energized phase on the power pole. As the guy wire was being pulled forward the strut support pole broke 2 feet below ground level. The forklift was not energized by the 13.6 kV conductors. As a precaution, the forklift operator was instructed by his supervisor to remain in the forklift until the power was de-energized. Emergency Management was notified and responded to the site. The area was secured by LANL Security (SOC) and traffic was re-routed around the location of the incident. The Utilities and Institutional (UI) Facilities Linemen Crew were notified and responded to the site. The UI Linemen Crew Superintendent assessed the scene and isolated power to the area for approximately thirty (30) minutes as they removed the support lines from the power pole and the fork lift and completed repairs. Impacts to the facility were minimal and no personnel injuries were incurred as a result of the event.

Attachment 2

At 0955, power was restored to the area and at 1005 the scene was cleared and returned to the Weapons Facility Operations Director.

On July 16, 2013, at 1100, a critique was convened to review the event. Based on subsequent information provided, the Utilities and Institutional (UI) Facilities Operations Director designee categorized the event as a Group 10(3), significance category 3, Management Concern Near Miss to a personal injury.

On July 17, 2013, at 1910, the Chief Electrical Safety Officer evaluated the event using the electrical severity tool. The evaluation resulted in a score of 1100 for an electrical severity significance of "Medium" because the worker was in the proximity to a shock hazard and was within the restricted approach boundary.

**Cause Description:**

**Operating Conditions:**

Normal

**Activity Category:**

Transportation Onsite

**Immediate Action(s):**

- 1) UI Utility Linemen Superintendent notified and reported to the site where with concurrence of the UI Utility dispatcher isolated the energy source and repairs were completed.
- 2) EM&R was notified and reported to the site.
- 3) WFO FOD initialized parameter control at the incident area until SOC arrived. The area was then secured by SOC and traffic was re-routed around the location of the incident.

**FM Evaluation:**

The Chief Electrical Safety Officer evaluated the event using the electrical severity tool. The evaluation resulted in a score of 1100 for an electrical severity significance of "Medium".

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:**

Yes.  
Before Further Operation? No  
By Whom: QPA-PA, UI, ASM  
By When: 08/30/2013

**Division or Project:**

Utilities and Institutional Facilities Division

**Plant Area:**

TA-16-969

**System/Building/Equipment:**

TA-16-969 Power Pole Support Line

**Facility Function:**

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

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:**

07B--Electrical Systems - Electrical Distribution

07D--Electrical Systems - Electrical Wiring  
 08F--OSHA Reportable/Industrial Hygiene - Industrial Operations Issues  
 08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical)  
 12K--EH Categories - Near Miss (Could have been a serious injury or fatality)  
 14E--Quality Assurance - Work Process Deficiency

**HQ Summary:**

On July 15, 2013, the mast of a forklift hit one of three guy wires located above a road intersection at Technical Area 16, near Building 969. The communications guy wire was pulled forward and cut and the middle static guy wire, which was within a few inches from the 13.6 kV energized conductors, fell onto the forklift. The static guy wire did not strike an energized phase on the power pole. As the guy wire was being pulled forward the strut support pole broke 2 feet below ground level. The forklift was not energized by the 13.6 kV conductors. As a precaution, the forklift operator was instructed by his supervisor to remain in the forklift until the power was de-energized. A linemen crew superintendent assessed the scene and isolated power to the area to remove the support lines from the power pole and the forklift and complete the repairs. There were no injuries and minimal impact to the facility.

**Similar OR Report Number:**

**Facility Manager:**

Name	Robert Ortiz
Phone	(505) 665-2416
Title	UI Facilities Operations Director Designee

**Originator:**

Name	GARCIA, CELINA H
Phone	(505) 606-1815
Title	OCCURRENCE INVESTIGATOR

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
07/15/2013	12:18 (MTZ)	Steve Frye	NNSA
07/15/2013	12:18 (MTZ)	John Swientoniewski	NNSA
07/16/2013	15:00 (MTZ)	Dave George	NNSA

**Authorized Classifier(AC):** Kimberli Tanner      Date: 07/17/2013

**12)Report Number:**

[NA--SS-SNL-9000-2013-0001](#) After 2003 Redesign

**Secretarial Office:**

National Nuclear Security Administration

**Lab/Site/Org:**

Sandia National Laboratories - SS

**Facility Name:**

SNL Division 9000

**Subject/Title:**

Minor Electrical Shock Results in Subsequent Eye Injury

Attachment 2

**Date/Time Discovered:** 07/24/2013 10:00 (MTZ)

**Date/Time Categorized:** 07/29/2013 15:30 (MTZ)

**Report Type:** Notification

**Report Dates:**

Notification	07/30/2013	19:05 (ETZ)
Initial Update		
Latest Update		
Final		

**Significance Category:** 2

**Reporting Criteria:**

2A(5) - Any single occurrence resulting in a serious occupational injury. A serious occupational injury is an occupational injury that:

- a) Requires in-patient hospitalization for more than 48 hours, commencing within 7 days from the date the injury was received;
- b) Results in a fracture of any bone (except bone chips, simple fractures of fingers, toes, or nose, or a minor chipped tooth);
- c) Causes severe hemorrhages or severe damage to nerves, muscles, tendons, or ligaments. (Note: Severe damage is generally considered to have occurred if surgery is required to correct the damage.)
- d) Damages any internal organ;
- e) Causes (1) a concussion or (2) loss of consciousness due to an impact to the head, or
- f) Causes second- or third-degree burns, affecting more than five percent of the body surface.

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:**

- 2) Analyze the Hazards
- 3) Develop and Implement Hazard Controls

**Subcontractor Involved:**

Yes  
Mutual Telecom Services Inc.

**Occurrence Description:**

On 7/24/2013 at approximately 1000, a worker was tracing some telephone jumpers on the Main Distribution Frame (MDF) in Building 829/Rm. 105. During this activity, the worker's left arm came into contact with a wire block at the precise time that an analog inbound call was to terminate on the block, resulting in a minor shock to the worker's left arm. Consequently, the shock caused an involuntary response to pull away, which caused the worker's left hand to strike the left eye, resulting in an injury.

Electrical severity is 330: Electrical hazard factor - 10 (single phase, <250 VAC), Environment factor - 0 (dry), Shock Proximity Factor - 10 (inside prohibited boundary/contact), No arc flash or thermal hazard, no PPE

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mitigations, Injury factor - 3 (shock w/no additional injury).

**Cause Description:** Critique/Fact Finding Performed: 7/25/2013  
**Operating Conditions:** Normal Working Conditions  
**Activity Category:** Facility/System/Equipment Testing  
**Immediate Action(s):** Worker was driven by a coworker to their home and then worker drove to their ophthalmologist for evaluation.  
**FM Evaluation:** EOC #30208

**DOE Facility Representative Input:**

**DOE Program Manager Input:**

**Further Evaluation is Required:** Yes.  
Before Further Operation? No  
By Whom: Causal Analysis Team  
By When: 09/12/2013

**Division or Project:** 9000/TeleComm Infrastructure

**Plant Area:** Tech Area I

**System/Building/Equipment:** Telephone Panel/Bldg 829/Room 105

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

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:** 08A--OSHA Reportable/Industrial Hygiene - Electrical Shock  
08D--OSHA Reportable/Industrial Hygiene - Injury  
11G--Other - Subcontractor  
12C--EH Categories - Electrical Safety  
14L--Quality Assurance - No QA Deficiency

**HQ Summary:** On July 24, 2013, while tracing telephone jumpers on the main distribution frame, a worker's left arm came into contact with a wire block at the precise time that an analog inbound call was to terminate on the block, resulting in a minor shock to the worker's left arm. Consequently, the shock caused the worker to pull away which caused their left hand to strike the left eye causing injury. The worker drove to the ophthalmologist for evaluation. A Fact Finding was performed.

**Similar OR Report Number:**

**Facility Manager:**

Name	Frank Antonich
Phone	(505) 845-3481
Title	Environment, Safety, and Security Professional

**Originator:**

Name	ROGERS, JESSICA
Phone	(505) 845-4727

Title	OCCURRENCE REPORTING ADMINISTRATOR
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**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
07/24/2013	13:42 (MTZ)	EOC	4236
07/24/2013	16:00 (MTZ)	Kelly Rogers	9330
07/24/2013	16:00 (MTZ)	Pat Manke	9335
07/24/2013	16:00 (MTZ)	Natalie Lopez	9335
07/24/2013	16:00 (MTZ)	John Zepper	9300
07/29/2013	13:19 (MTZ)	Mike Vahle	9000
07/29/2013	15:50 (MTZ)	Veronica Martinez	DOE/SFO

**Authorized Classifier(AC):** Steve Feador      Date: 07/30/2013

**13)Report Number:** [NA--SS-SNL-SNLCORP-2013-0002](#) **After 2003 Redesign**  
**Secretarial Office:** National Nuclear Security Administration  
**Lab/Site/Org:** Sandia National Laboratories - Corporate  
**Facility Name:** SNL Corporate  
**Subject/Title:** Employee Receives Minor Electrical Shock from Faulty Equipment  
**Date/Time Discovered:** 07/16/2013 08:20 (MTZ)  
**Date/Time Categorized:** 07/22/2013 08:20 (MTZ)  
**Report Type:** Update  
**Report Dates:**

Notification	07/23/2013	18:35 (ETZ)
Initial Update	07/23/2013	19:02 (ETZ)
Latest Update	08/14/2013	18:23 (ETZ)
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:** 2) Analyze the Hazards  
**Subcontractor Involved:** No  
**Occurrence Description:** At approximately 1600 on 7/3/2013, an employee was returning an aluminum ladder to its hanger in an exterior elevator room at Bldg.770. The employee lifted the ladder up into the air and onto its hanger and during this process the left hand brushed against an adjacent venturi bulb on a

ventilation thermostat. The employee felt a sting, but did not contact their manager (who was out of town) and was unable to reach the organization's Facility Manager. The employee decided not to go to medical as they were not sure they sustained a shock. The employee submitted a Facilities Service Request to have the thermostat inspected by an electrician and went home without incident.

On 7/16/13, the organization's Facilities Manager sent an email to the employee inquiring about the status of the thermostat inspection. The employee replied that it had not been resolved. It was suggested in the email that the Employee contact their ES&H Coordinator. On 7/17/13, the ES&H Coordinator was contacted by the employee. The coordinator requested that Facilities expedite the service request due to the nature of the incident. At 1430 on 7/17/2013, the coordinator, the employee, and their manager went to the elevator room and were given incident details by the employee.

On 7/18/2013, a Facilities Electrician and Building Mechanic inspected the ventilation thermostat. The employee contacted the ES&H Coordinator at 1330 to relay that the electricians had inspected and removed the unit. A call and page was sent to the electrician by the coordinator to find out the readings, but apparently the electrician had left for the day. A call was made to Electrical Safety SME to relay the status of the event and that they were unable to find details on the Electrician's findings. The Electrical Safety SME was able to contact the electrician's supervisor and emailed the coordinator COB on 7/18/2013, that the electrician reported discovering 120 volts on the exposed coil. The coordinator did not receive the email until returning to work on Monday, 7/22/2013.

The electrical severity of the event is 330 as follows: Electrical Hazard Factor :10 (<208, low energy) Environment Factor: 0(dry); Shock Proximity Factor: 10 (contact with live parts); Arc Flash Proximity/Thermal Proximity Factor: 0 (no arc flash or thermal hazard); No PPE Mitigations; Injury Factor: 3 (shock).

<b>Cause Description:</b>	Critique/Fact Finding Performed: 7/16/2013
<b>Operating Conditions:</b>	Normal
<b>Activity Category:</b>	Normal Operations (other than Activities specifically listed in this Category)
<b>Immediate Action(s):</b>	Facilities Service Request #SR 470794 was submitted by Employee. Elevator Room is locked and access controlled via Key Control.
<b>FM Evaluation:</b>	EOC #30170
<b>DOE Facility Representative Input:</b>	
<b>DOE Program Manager Input:</b>	
<b>Further Evaluation is Required:</b>	Yes. Before Further Operation? Yes

Attachment 2

By Whom: Causal Analysis Team  
 By When: 09/05/2013

**Division or Project:** Executive Support Division  
**Plant Area:** Tech Area I  
**System/Building/Equipment:** Building 770 Elevator Room  
**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  
 08A--OSHA Reportable/Industrial Hygiene - Electrical Shock  
 12C--EH Categories - Electrical Safety  
 14L--Quality Assurance - No QA Deficiency

**HQ Summary:** On July 22, 2013, it was discovered that on July 3, an employee was returning an aluminum ladder to its hanger in an exterior elevator room at Building 770, when the employee lifted the ladder up into the air and onto its hanger, their left hand brushed against an adjacent venturi bulb on a ventilation thermostat. The employee felt a sting, but did not contact their manager (who was out of town) and was unable to reach the organization's Facility Manager. The employee decided not to go to medical as they were not sure they sustained a shock. The employee submitted a Facilities Service Request to have the thermostat inspected by an electrician. On July 18, the electrician reported discovering 120 volts on the exposed coil.

**Similar OR Report Number:**

**Facility Manager:**

Name	Ann Kirk-Schweitzer
Phone	(505) 845-0456
Title	Environment, Safety, Security 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
07/22/2013	08:20 (MTZ)	EOC	4236
07/22/2013	08:25 (MTZ)	Todd Harrison	00098
07/22/2013	08:56 (MTZ)	Jerry McDowell	00002
07/22/2013	08:56 (MTZ)	John Larson	00098
07/22/2013	08:56 (MTZ)	Bess Campbell-Domm	4020

07/22/2013	09:10 (MTZ)	Michael Brown	DOE/SFO
07/22/2013	09:30 (MTZ)	Veronica Martinez	DOE/SFO

**Authorized Classifier(AC):** Ron Baker    **Date:** 07/23/2013

**14)Report Number:** [NE-ID--BEA-CFA-2013-0002](#) **After 2003 Redesign**  
**Secretarial Office:** Nuclear Energy, Science and Technology  
**Lab/Site/Org:** Idaho National Laboratory  
**Facility Name:** Central Facilities Area  
**Subject/Title:** Black-Body Calibration Source Equipment Malfunction at CFA Calibration Lab  
**Date/Time Discovered:** 07/23/2013 09:00 (MTZ)  
**Date/Time Categorized:** 07/25/2013 10:00 (MTZ)  
**Report Type:** Notification  
**Report Dates:**

Notification	07/30/2013	15:03 (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:** A2B6C01 - Equipment/ material problem; Defective, Failed or Contaminated; Defective or failed part  
A5B2C05 - Communications Less Than Adequate (LTA); Written Communication Content LTA; Ambiguous instructions / requirements  
A5B3C01 - Communications Less Than Adequate (LTA); Written Communications Not Used; Lack of written communication  
A3B2C02 - Human Performance Less Than Adequate (LTA); Rule Based Error; Signs to stop were ignored and step performed incorrectly  
-->couplet - A6B3C04 - Training deficiency; Training Material LTA; Performance standards LTA

**ISM:** 2) Analyze the Hazards

**Subcontractor Involved:** No

**Occurrence Description:** During insertion of a reference thermocouple into the temperature-monitoring well of an infrared temperature source, an electrical arc occurred between the sheath of the thermocouple wire and the case of the temperature source on 7/23/2013 at 0900 hrs. No injuries resulted from this incident.

A pass-down (team) meeting was held at 0700 hrs. A shipment of fuses had

been received for the infrared guns that needed to be calibrated and the calibration lab technician installed the fuses in preparation for calibration. The lab technician started the furnace and set the black-body calibration source to 250 degrees Celsius. A metal Type K Thermocouple needed to be inserted into the furnace to aid in calibration. When inserting the probe, the technician noted some resistance and as he pushed the probe further into the furnace the insertion produced an arc. The lab technician jumped in reaction to the arc. He pulled the power plug out of the furnace and disconnected from the wall outlet, turned off the switch immediately after the arc was produced. The employee did not receive a shock.

Once the furnace was in a safe configuration, the lab technician notified his manager. The lab technician and his manager went back to the scene of the incident and discussed the incident with the engineer. The calibration lab manager notified the Site Wide Facilities Services (SFS)) Manager to inform him of the incident and also told him the lab technician did not believe he was injured. The Calibration Lab Manager escorted the lab technician to the CFA medical dispensary for medical evaluation as a precaution.

The SFS Manager and the Technical Services Manager went to the calibration lab to walk down the area where the incident occurred and to talk to the laboratory personnel. While there the manager requested an out of service (formal) be placed on the plug that had been removed from the furnace so the furnace could not be operated.

The lab technician and his manager returned to the calibration lab and the technician completed his personnel statement about the incident.

Both metal and ceramic thermocouple probes can be used in the black-body calibration furnace, however, the same metal Type K thermocouple has been utilized to calibrate the infrared guns the previous times the guns were calibrated. During previous operations of the furnace the probe was already inserted into the furnace. The last time the furnace was used, the controller stayed on longer than usual and blew the fuse so the probe was removed. There is no protocol for inserting the probe into the furnace and nothing dictates inserting the probe before or after starting the furnace. The furnace was last used in March of 2013 and was only used 12 times in the last three years. It is only used to calibrate the infrared guns.

The lab technician is in the process of completing the provisions to perform calibrations utilizing the black-body calibration furnace but he has completed OJT training to set up, start, and operate the furnace itself. There was some uncertainty whether the lab technician should be setting up, starting or operating the calibration furnace without a qualified person there to monitor (OJT trainer). The lab technician stated during the critique that prior to setting up and starting the furnace an inspection of the probe cord was performed to ensure it was in good working order. There is no required

inspection or maintenance of the furnace.

The calibration lab manager contacted the manufacturer regarding the incident and the representative suggested a ceramic probe be used due to potential for the ceramic insulation within the furnace deteriorating after prolonged use. The furnace owner's manual does not reference the ceramic port that was added at a later date by the manufacturer nor does it suggest types of probes to be used. Based on the safety evaluation performed the afternoon of the incident, the safety specialist noted that the paperwork (instructions/manual) is very simple - not very detailed. Manuals are less than adequate which makes them a large part of the problem. Employees would not be expected to know all the details on a piece of equipment without more detailed manuals. Employees would not have expected using the calibration furnace to result in an arc and there would be no expectation of having a current flow. A tripping hazard would be more of a concern.

There is a high voltage sticker located above the insertion port. The calibration lab personnel and the safety specialist were under the assumption the high voltage sticker was referring the furnace (e.g if the back of the furnace is removed) as a whole and not the insertion point itself.

The calibration lab manager issued a request to all personnel working and operating equipment within the calibration lab to check other pieces of equipment such as the calibration furnace to ensure there are no others that could produce the same result. The lab manager also held a safety meeting the day after the incident to discuss expectation when something just does not look right.

When asked, the lab technician believes it was equipment malfunction that caused the incident. He also stated the he thought several things went well such as the response to power down and secure the equipment, the availability and guidance of his manager, and the concern about his well being.

The following issues were identified:

- Equipment was not UL or CE Listed even though all parts are believed to be functioning.
- Type K Metal thermocouple was used instead of ceramic.
- The issue may have stemmed from a breakdown of insulation within the calibration furnace - would potentially expose metal thermocouple with metal of furnace.

Gap exists between documentation/instructions and understanding by employees.

- Fuses in the calibration furnace were blowing ~ four weeks prior to event.
- The metal probes are used because the calibration lab employees can calibrate them. If ceramic is used it must be sent to NIST for calibration.

## Attachment 2

- There is no procedure for setup, start up and operation of the calibration furnace and nothing to give guidance on potential maintenance/inspections of internal parts such as ceramic insulation.
- Requirements of performing work during qualification period. Can personnel operate a piece of equipment if part of an overall qualification?
- Probe was inserted after the calibration furnace was started when it is normally already inserted before the furnace is started.
- Manual/instructions for calibration furnace does not contain enough details or information (i.e. suggested probe material).
- Confusion about high voltage sticker located near insertion port on back of furnace.

Compensatory measures that have been taken were:

- Instrument put in a safe configuration and tagged out.
- Extent of conditions initiated within calibration lab.
- Immediate management concern for individual and situation (i.e. sent technician to dispensary and discussed incident with calibration lab employees).
- Evaluated other instruments where probes are inserted in high energy equipment.
- Calibration Lab technician was evaluated by CFA Medical Dispensary personnel twice to ensure no issues.
- Safety/Post Event evaluation performed by independent person from calibration lab.
- POD held on 7/24 was focused on hazards identification and expectations if it just doesn't look right.
- Performed a controlled test to verify voltage at time of incident.
- All instruments will be evaluated (dual verification) prior to use from day of critique until extent of conditions has been completed.

### **Cause Description:**

The lack of details in the owner's manual and lack of a setup, startup and operation of the calibration furnace created a lack of knowledge and understanding of the system and associated requirements. Nor were workers aware the internal parts of the furnace (internal ceramic insulation) could deteriorate.

The resistance felt when trying to insert the probe was a sign that something was wrong. The fact that the probe was inserted after the furnace was started instead of already being in place indicates a performance problem and lack of standard or procedure

### **Operating Conditions:**

Normal

### **Activity Category:**

Facility/System/Equipment Testing

### **Immediate Action(s):**

The temperature source was taken out of service.

The employee was taken to medical for evaluation and released with no restrictions.

F&SS Management was notified.

DOE was notified.  
Critique is scheduled for 07/25/2013.

**FM Evaluation:**

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** No

**Division or Project:** Laboratory Wide Facilities Services

**Plant Area:** CFA-698

**System/Building/Equipment:** CFA-698 Calibration Laboratory

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

**Corrective Action 01:** **Target Completion Date:**08/08/2013 **Tracking ID:**IO-028401

Complete an Extent of Conditions within the CFA Calibration Lab. Include review of manufacturer instructions and technical specifications.

**Corrective Action 02:** **Target Completion Date:**08/31/2013 **Tracking ID:**IO-028401

Evaluate lab-wide conditions to identify the possibility of other similar equipment.

**Corrective Action 03:** **Target Completion Date:**09/30/2013 **Tracking ID:**IO-028401

Evaluate qualification and training of all Calibration Lab personnel including OJT instructor training.

**Corrective Action 04:** **Target Completion Date:**08/08/2013 **Tracking ID:**IO-028401

Issue Lessons Learned.

**Corrective Action 05:** **Target Completion Date:**07/25/2013 **Tracking ID:**IO-028401

Take calibration furnace involved in this incident out of service.

**Corrective Action 06:** **Target Completion Date:**10/30/2013 **Tracking ID:**IO-028401

Determine INL Standard of Acceptance for UL listed versus CE listed and extent of conditions for equipment currently in use/service.

**Lessons(s) Learned:** Equipment manuals may not contain detailed information about add-on parts/components installed by a manufacturer.

**HQ Keywords:** 01A--Inadequate Conduct of Operations - Inadequate Conduct of Operations (miscellaneous)  
01F--Inadequate Conduct of Operations - Training Deficiency  
01G--Inadequate Conduct of Operations - Inadequate Procedure  
01Q--Inadequate Conduct of Operations - Personnel error  
05D--Mechanical/Structural - Mechanical Equipment Failure/Damage

08H--OSHA Reportable/Industrial Hygiene - Safety Noncompliance  
 08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical)  
 12B--EH Categories - Conduct of Operations  
 14B--Quality Assurance - Training and Qualification Deficiency  
 14D--Quality Assurance - Documents and Records Deficiency  
 14E--Quality Assurance - Work Process Deficiency

**HQ Summary:**

On July 23, 2013, during insertion of a reference thermocouple into the temperature-monitoring well of an infrared temperature source, an electrical arc occurred between the sheath of the thermocouple wire and the case of the temperature source. A shipment of fuses had been received for the infrared guns that needed to be calibrated and the calibration laboratory technician installed the fuses in preparation for calibration. The technician started the furnace and set the black-body calibration source to 250 degrees Celsius. A metal Type K thermocouple needed to be inserted into the furnace to aid in calibration. When inserting the probe, the technician noted some resistance and as he pushed the probe further into the furnace the insertion produced an arc. The technician pulled the power plug out of the furnace and disconnected it from the wall outlet, and turned off the switch. The employee was not shocked and made appropriate notifications.

**Similar OR Report Number:** 1. None related to this incident.

**Facility Manager:**

Name	WINN, STEVEN L
Phone	(208) 526-1075
Title	F&SS Laboratory-Wide Services Manager

**Originator:**

Name	KIBBEE, JOY D.
Phone	(208) 533-7382
Title	PERFORMANCE ASSURANCE COORDINATOR

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
07/23/2013	10:45 (MTZ)	Eric K Anderson	F&SS Man
07/23/2013	10:45 (MTZ)	Steven Winn	F&SS Man
07/23/2013	12:15 (MTZ)	Jason Sams	DOE FR

**Authorized Classifier(AC):** Jeffrey Garner      Date: 07/30/2013

**15)Report Number:**

[NE-ID--BEA-FCF-2013-0001](#) After 2003 Redesign

**Secretarial Office:**

Nuclear Energy, Science and Technology

**Lab/Site/Org:**

Idaho National Laboratory

**Facility Name:**

Fuel Conditioning Facility

**Subject/Title:**

Discovery of Un-mitigated 120V Power Source During Fire Alarm System

Upgrades  
**Date/Time Discovered:** 07/17/2013 16:00 (MTZ)  
**Date/Time Categorized:** 07/17/2013 17:05 (MTZ)  
**Report Type:** Notification

**Report Dates:**

Notification	07/18/2013	17:07 (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
- 4) Perform Work Within Controls

**Subcontractor Involved:**

No

**Occurrence Description:**

During the upgrade of the Fuel Conditioning Facility (FCF) fire protection system, operations discovered a blown 1 amp 120V fuse in a programmable logic controller (PLC) that provides an interlock function from the fire protection system. Investigation of the cause for the blown fuse showed a module had been replaced during the fire protection system upgrade that had a 120V line to it. The approved work package did not identify any 120V power and did not specify LO/TO for the 120V line going to the module.

**Cause Description:**

The work package was not adequate to address all of the electrical hazards and system interconnections associated with the fire alarm system upgrade.

**Operating Conditions:**

Argon Cell Standby Mode

**Activity Category:**

Maintenance

**Immediate Action(s):**

Work was stopped and notifications were made. No personnel came in contact with the hazardous energy. An extent of conditions evaluation is being performed in FCF and other facilities affected by the fire system upgrade to determine if similar conditions exist prior to commencing work. A critique is scheduled for 1000 on 07/22/2013.

**FM Evaluation:**

There was no personnel contact to hazardous electrical energy >50V but the potential was there. The facility will now remain with a degraded fire alarm system and compensatory measures in place.

**DOE Facility Representative Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** Yes.  
 Before Further Operation? Yes  
 By Whom: Critique on 07/22/2013  
 By When: 07/23/2013

**Division or Project:** Mission Support/Spent Fuel Treatment

**Plant Area:** MFC Bldg. 765

**System/Building/Equipment:** Fire Protection/Fire Alarm System

**Facility Function:** Reprocessing

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:** 01M--Inadequate Conduct of Operations - Inadequate Job Planning (Electrical)  
 03A--Fire Protection and Explosives Safety - Fire Protection Equip Degradation  
 12B--EH Categories - Conduct of Operations  
 14E--Quality Assurance - Work Process Deficiency

**HQ Summary:** On July 17, 2013, during the upgrade of the Fuel Conditioning Facility fire protection system, operations discovered a blown 1 amp 120-volt fuse in a programmable logic controller that provides an interlock function from the fire protection system. Investigation of the cause for the blown fuse showed a module had been replaced during the fire protection system upgrade that had a 120-volt line to it. The approved work package did not identify any 120-volt power and did not specify a lockout/tagout for the 120-volt line going to the module. The work package was not adequate to address all of the electrical hazards and system interconnections associated with the fire alarm system upgrade.

**Similar OR Report Number:**

**Facility Manager:**

Name	BELCHER, ROBERT B.
Phone	(208) 533-7715
Title	Operations Manager

**Originator:**

Name	BELCHER, ROBERT B.
Phone	(208) 533-7715
Title	SR. STAFF SPECIALIST

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
07/17/2013	16:00 (MTZ)	Richard Denning	DOE-ID

**Authorized Classifier(AC):** Jeffrey Garner      Date: 07/17/2013

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**16)Report Number:** [SC--PNSO-PNNL-PNNLBOPER-2013-0010](#) After 2003 Redesign

**Secretarial Office:** Science

**Lab/Site/Org:** Pacific Northwest National Laboratory

**Facility Name:** Energy Research Programs (PNNL)

**Subject/Title:** Discovery of Uncontrolled Hazardous Electrical Energy Source above Fume Hood

**Date/Time Discovered:** 07/24/2013 16:00 (PTZ)

**Date/Time Categorized:** 07/24/2013 17:50 (PTZ)

**Report Type:** Notification

**Report Dates:**

Notification	07/26/2013	08:24 (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:** 5) Provide Feedback and Continuous Improvement

**Subcontractor Involved:** No

**Occurrence Description:** On July 24, 2013 at approximately 1600 hrs., PNNL staff preparing for a maintenance activity observed a damaged electrical conduit containing exposed 120 Volt conductors on top of a laboratory fume hood in the Environmental Molecular Sciences Laboratory (EMSL) lab 1413. Workers stopped work and notified supervision. The breaker for the circuit associated with the damaged conductors was found in the open or "off" position. The planned scope did not include electrical work associated with the fume hood. Workers did not contact hazardous energy.

**Cause Description:**

**Operating Conditions:** Indoors, dry.

**Activity Category:** Maintenance

**Immediate Action(s):** The area was controlled and the circuit breaker was positively locked and tagged out. The event was classified as reportable due to the unexpected discovery of an uncontrolled hazardous electrical energy source. Appropriate notifications were made. A critique was held on Thursday, July 25, 2013.

**FM Evaluation:**

**DOE Facility Representative Input:**

**DOE Program Manager**

**Input:**

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

**Division or Project:** Operational Systems Directorate

**Plant Area:** RCHN Area

**System/Building/Equipment:** EMSL / Lab 1413

**Facility Function:** Laboratory - Research & Development

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:** 07D--Electrical Systems - Electrical Wiring  
 12C--EH Categories - Electrical Safety  
 14L--Quality Assurance - No QA Deficiency

**HQ Summary:** On July 24, 2013, employees preparing for maintenance activity observed a damaged electrical conduit containing exposed 120-Volt conductors on top of a laboratory fume hood. The planned scope did not include electrical work associated with the fume hood. Workers stopped work and the circuit breaker was positively locked and tagged out. The breaker for the circuit associated with the damaged conductors was found in the open or "off" position.

**Similar OR Report Number:**

**Facility Manager:**

Name	McMullin, K. E.
Phone	(509) 371-6020
Title	Building Manager, Richland Facilities Core Team 2

**Originator:**

Name	Pollari, Roger Allen
Phone	(509) 371-7700
Title	EVENT REPORTING PROGRAM MANAGER

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
07/24/2013	18:23 (PTZ)	Carlson, J. L.	PNSO

**Authorized Classifier(AC):** Pollari, R. A. Date: 07/26/2013

**17)Report Number:** [SC--TJSO-JSA-TJNAF-2013-0004](#) After 2003 Redesign

**Secretarial Office:** Science

**Lab/Site/Org:** Thomas Jefferson National Accelerator Site

Attachment 2

**Facility Name:** Thomas Jefferson Nat'l Accelerator  
**Subject/Title:** ENG-13-0710 Failure to Follow Lock, Tag, and Try and Configuration Management Procedures While Removing a De-energized Circuit Breaker  
**Date/Time Discovered:** 07/10/2013 16:50 (ETZ)  
**Date/Time Categorized:** 07/11/2013 10:30 (ETZ)  
**Report Type:** Notification/Final

**Report Dates:**

Notification	07/15/2013	17:01 (ETZ)
Initial Update	07/15/2013	17:01 (ETZ)
Latest Update	07/15/2013	17:01 (ETZ)
Final	07/15/2013	17:01 (ETZ)

**Significance Category:** 4  
**Reporting Criteria:** 2E(3) - Any failure to follow a prescribed hazardous energy control process (e.g., lockout/tagout, hazardous energy control program).

**Cause Codes:**  
**ISM:** 4) Perform Work Within Controls  
**Subcontractor Involved:** No  
**Occurrence Description:** While working in zone 0L104, an employee removed the main circuit breaker of the Cathode Power Supply (CPS) which was still locked and tagged with 2 Personnel Safety System (PSS) Configuration locks as well as three personal locks (Lock, Tag, and Try (LTT) locks) from Radio Frequency (RF) group. The intent was to replace the old main breaker - the one with the locks - with a new main breaker.

Although the CPS had been isolated from the upstream panel for several months, and there was no hazardous energy present, the removal of the breaker with the locks and tags still attached was unauthorized and violated Jefferson Lab's policy and procedures.

In addition to the LTT violation, configuration control of the PSS was also compromised.

**Cause Description:**  
**Operating Conditions:** Long Shutdown Working Conditions ( Maintenance)  
**Activity Category:** Maintenance  
**Immediate Action(s):**  
1. The PSS group moved the PSS lock upstream to maintain control of the system.  
2. After initial notification, line management began coordinating a in-house lessons learned surrounding this event which will be presented to all persons with Lock, Tag and Try (LTT) training.

**FM Evaluation:**

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** No

**Division or Project:** Engineering/ Long Shutdown Maintenance

**Plant Area:** Building 53

**System/Building/Equipment:** Rebuild of 0L04 CPS High Voltage Cabinet/ Personnel Safety S

**Facility Function:** Laboratory - Research & Development

**Corrective Action:**

**Lessons(s) Learned:** Even when there is no hazardous energy present, it is imperative to completely follow the Lab's LTT policies and procedures, no exceptions.

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

**HQ Summary:** On July 10, 2013, an employee removed the main circuit breaker of a Cathode Power Supply that was still locked and tagged with two Personnel Safety System (PSS) Configuration locks as well as three personal locks (Lock, Tag, and Try locks) from the Radio Frequency group. The intent was to replace the old locked main breaker with a new main breaker. Although the power supply had been isolated from the upstream panel for several months, and there was no hazardous energy present, the removal of the breaker with the locks and tags still attached was unauthorized and violated Jefferson Lab's policy and procedures.

- Similar OR Report Number:**
1. SC-ORO--SURA-TJNAF-2002-0005
  2. EM-CBFO--WTS-WIPP-2010-0001
  3. SC--PNSO-PNNL-PNNLBOPER-2008-0001

**Facility Manager:**

Name	JOHNSON, CHRISTINA J.
Phone	(757) 269-7611
Title	REPORTING OFFICER

**Originator:**

Name	JOHNSON, CHRISTINA J.
Phone	(757) 269-7611
Title	REPORTING OFFICER

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Attachment 2

**Other Notifications:**

Date	Time	Person Notified	Organization
07/11/2013	10:30 (ETZ)	Steve Neilson	TJSO

**Authorized Classifier(AC):** Christina Johnson      Date: 07/11/2013

**18)Report Number:**

[SC--TJSO-JSA-TJNAF-2013-0005](#) After 2003 Redesign

**Secretarial Office:**

Science

**Lab/Site/Org:**

Thomas Jefferson National Accelerator Site

**Facility Name:**

Thomas Jefferson Nat'l Accelerator

**Subject/Title:**

PHY-13-0724 Student Received a Shock While Testing HV Cable- No injury

**Date/Time Discovered:**

07/24/2013 17:50 (ETZ)

**Date/Time Categorized:**

07/25/2013 15:31 (ETZ)

**Report Type:**

Notification

**Report Dates:**

Notification	07/30/2013	12:09 (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
- 4) Perform Work Within Controls

**Subcontractor Involved:**

No

**Occurrence Description:**

On July 24, 2013 at approximately 4:30 PM, an undergraduate student was working alone in a Physics laboratory collecting data from a scintillation counter. The student was tasked with recording background counts against different input voltages. Voltage was controlled by settings on a cabinet mounted power supply, with a starting voltage of 800 Volts and upper voltage of 1200 volts, with data taken in 50 volt increments. During the data collection, the student questioned the readings for one of the assemblies being measured and used a hand held multi-meter to confirm voltage output from the high voltage cable connection. At that time the cable was attached to the energized power supply which was set at 1000 volts. It is believed the student's fingers contacted the multi-meter's probes during that task, and the student was shocked.

## Attachment 2

The student immediately went to Occupational Medicine where he was evaluated by Occupational Medicine. After the student was evaluated he was released to full duty, no restrictions.

**Cause Description:**

**Operating Conditions:**

Normal Operating Conditions

**Activity Category:**

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

**Immediate Action(s):**

1. The User/Undergraduate student was immediately seen by Occupational Medicine.
2. The Fact Finding meeting was held in the field, so that the team could have a better understanding of the student's assigned task.
3. The tests have been temporarily suspended until a task specific work plan has been completed and approved by the Physics Division Safety Officer.

**FM Evaluation:**

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:**

Yes.  
Before Further Operation? No  
By Whom: Physics Division  
By When:

**Division or Project:**

Physics/ Hall C

**Plant Area:**

Building 90- Lab 126

**System/Building/Equipment:** Building 90- Lab 126 / Scintillation Counter

**Facility Function:**

Laboratory - Research & Development

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:**

01M--Inadequate Conduct of Operations - Inadequate Job Planning (Electrical)  
08A--OSHA Reportable/Industrial Hygiene - Electrical Shock  
11I--Other - Visiting Scientist/Researcher or Student Employee  
12C--EH Categories - Electrical Safety  
14E--Quality Assurance - Work Process Deficiency

**HQ Summary:**

On July 24, 2013, while using a hand-held multi-meter, an undergraduate student was shocked. The student was collecting data from a scintillation counter and tasked with recording background counts against different input voltages. During the data collection, the student questioned the readings for one of the assemblies being measured and used the multi-meter to confirm voltage output from the high voltage cable connection attached to the energized power supply set at 1,000 volts. It is believed the student's fingers contacted the multi-meter's probes during that task, and the student was shocked. The student went to Occupational Medicine where he was evaluated and released. A Fact Finding was initiated.

**Similar OR Report Number:**

**Facility Manager:**

Name	JOHNSON, CHRISTINA J.
Phone	(757) 269-7611
Title	REPORTING OFFICER

**Originator:**

Name	JOHNSON, CHRISTINA J.
Phone	(757) 269-7611
Title	REPORTING OFFICER

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
07/24/2013	18:00 (ETZ)	Steve Neilson	TJSO

**Authorized Classifier(AC):** Christina Johnson      Date: 07/25/2013

**19)Report Number:** [SC-ORO--GOOR-FEDBUILDGS-2013-0001](#) After 2003 Redesign

**Secretarial Office:** Science

**Lab/Site/Org:** Oak Ridge Operations

**Facility Name:** Oak Ridge DOE Federal Building

**Subject/Title:** Damaged Electrical Device Near Miss

**Date/Time Discovered:** 07/15/2013 16:30 (ETZ)

**Date/Time Categorized:** 07/15/2013 17:30 (ETZ)

**Report Type:** Notification

**Report Dates:**

Notification	07/17/2013	16:30 (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:** Warehouse employee bumped into damaged thermostat on the wall while working causing an electrical arc on the enclosure. Investigation indicated device had been previously damaged and not reported. The employee was

not shocked or injured.

**Cause Description:**

**Operating Conditions:** Does not apply

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

**Immediate Action(s):** System was de-energized and locked and tagged out. The damaged device removed and a blank cover was placed on the enclosure.

**FM Evaluation:**

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

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

**Division or Project:** ORNL Warehouse Storage

**Plant Area:** Bay 4

**System/Building/Equipment:** 1916-T2 Warehouse Electrical

**Facility Function:** Balance-of-Plant - Storage (except SNM)

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:** 01A--Inadequate Conduct of Operations - Inadequate Conduct of Operations (miscellaneous)  
 01P--Inadequate Conduct of Operations - Inadequate Oral Communication  
 07D--Electrical Systems - Electrical Wiring  
 08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical)  
 12C--EH Categories - Electrical Safety  
 14E--Quality Assurance - Work Process Deficiency

**HQ Summary:** On July 15, 2013, a warehouse employee bumped into a damaged thermostat on the wall while working and caused an electrical arc on the enclosure. Investigation indicated the device had been previously damaged and not reported. The employee was not shocked or injured. The system was de-energized and locked and tagged out. The damaged thermostat was removed and a blank cover was placed on the enclosure.

**Similar OR Report Number:**

**Facility Manager:**

Name	FALLON, CATHERINE A
Phone	(865) 576-0586
Title	FACILITY MANAGER DESIGNEE

**Originator:**

Name	FALLON, CATHERINE A
Phone	(865) 576-0586

Title	FACILITY MANAGER DESIGNEE
-------	---------------------------

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
07/15/2013	17:00 (ETZ)	Chuck Spoons, FR	FIRMD

**Authorized Classifier(AC):**

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**20)Report Number:** [SC-ORO--ORNL-X10BOPLANT-2013-0005](#) After 2003 Redesign

**Secretarial Office:** Science

**Lab/Site/Org:** Oak Ridge National Laboratory

**Facility Name:** X-10 General Op. & Landlord Activity

**Subject/Title:** Electrical Conduit Damaged during Removal of Sidewalk

**Date/Time Discovered:** 07/16/2013 10:12 (ETZ)

**Date/Time Categorized:** 07/16/2013 11:50 (ETZ)

**Report Type:** Notification

**Report Dates:**

Notification	07/18/2013	16:23 (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:** No

**Occurrence Description:** On July 16, 2013, maintenance activities were in process to replace a section of sidewalk. The work was being performed in accordance with an authorized work order.

During removal of a section of sidewalk, workers unexpectedly damaged two conduits containing electrical circuits that were partially embedded in the concrete. Although the conduits were damaged, the electrical wiring was undamaged and the circuits remained intact. The electrical circuits feed outdoor lighting and are controlled by timers that are only energized at night. The construction activities occurred during daylight hours so the electrical lines were not energized.

Line management notified the Laboratory Shift Superintendent was notified and the event was categorized as SC(3), 2E(2), "Hazardous Electrical Energy Control" event.

There were no injuries to personnel, or environment, health and safety impacts as a result of this event.

**Cause Description:**

**Operating Conditions:** Normal

**Activity Category:** Maintenance

**Immediate Action(s):**

- All work was immediately stopped
- The electrical circuits were placed in a safe condition
- An investigation was initiated
- Critique was held on July 17, 2013

**FM Evaluation:** ORNL management is evaluating the circumstances of the event, corrective actions and lesson learned will be developed as needed.

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** Yes.  
Before Further Operation? No  
By Whom: Jonathan Mark Forstrom  
By When: 08/30/2013

**Division or Project:** Logistical Services Division

**Plant Area:** Building 5700

**System/Building/Equipment:** Building 5700 Sidewalk

**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  
08F--OSHA Reportable/Industrial Hygiene - Industrial Operations Issues  
08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical)  
12G--EH Categories - Industrial Operations  
14E--Quality Assurance - Work Process Deficiency

**HQ Summary:** On July 16, 2013, workers unexpectedly damaged two conduits containing electrical circuits that were partially embedded in the concrete while they were removing a section of sidewalk. Although the conduits were damaged, the electrical wiring was undamaged and the circuits remained intact. The electrical circuits feed outdoor lighting and are controlled by timers that are only energized at night. The work occurred during daylight hours so the

electrical lines were not energized. All work was immediately stopped and the electrical circuits were placed in a safe condition. An investigation was initiated.

**Similar OR Report Number:**

**Facility Manager:**

Name	Jonathan Mark Forstrom
Phone	(865) 576-5640
Title	Logistical Services Division Director

**Originator:**

Name	PEHRSON, PAUL B.
Phone	(865) 576-7929
Title	OCCURRENCE REPORTING MANAGER

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
07/16/2013	10:12 (ETZ)	Lab Shift Superintendent	ORNL LSS
07/16/2013	12:16 (ETZ)	Johnny Moore	DOE ORNL
07/16/2013	12:16 (ETZ)	Martha Kass	DOE ORNL

**Authorized Classifier(AC):**

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