Office of Health, Safety and Security

Monthly Analysis of Electrical Safety Occurrences

September 2011

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 remained at seventeen for September, while the number of reported electrical shocks increased from two in August to seven this month with two resulting in burns. Seventy-one percent of the shocks involved non-electrical workers, which were exposed to faulty equipment. Also in September the number of electrical intrusion occurrences and hazardous energy control occurrences remained at about the same numbers as reported in August. Occurrences involving hazardous energy control issues continue in which workers fail to verify safe (zero-energy) working conditions or fail to implement a lockout in accordance with facility/site hazardous energy control procedures. Four of these occurrences involved electrical workers who certainly should know better because of their knowledge regarding the potential hazards of working on or near energized conductors or circuit parts.

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 September occurrence reports is provided in Attachment 2.

Electrical Shock

There were seven occurrences in September that resulted in an electrical shock. Five of the seven shocks involved non-electrical workers. Four of the seven shocks resulted because of damaged or faulty equipment. The occurrences are summarized below.

1. A radiological inspector was plugging in a battery charger for a Hand E Counter unit when she saw sparks at the electrical outlet and felt a slight electrical shock. The inspector received first aid for a slight burn to her little finger. An electrical short had occurred in the 110-volt power cable for the 3-step battery charger, which resulted in a severed power cable and the minor burn her finger. Further discussion with the inspector revealed a less than adequate pre-use inspection of the cord. The power strip was inspected, tagged “DO NOT OPERATE,” and removed from service.

2. A machinist experienced a shock to his right hand while working on a "wire saw" machine. The machinist was medically evaluated, and released to full duty. The cause of the shock was the breakdown of "Inchworm" linear motor insulation coupled with the drive motor housing not being grounded because of a manufacturing defect. This resulted in 750 VDC applied to the saw assembly with no path to ground.

3. A subcontractor electrician sustained a 110-volt AC shock between his index and middle finger of his right hand when cutting a wire in an out-of-service timing control box. One set of wires that entered the box had been properly locked and tagged out but a second set of wires had not. No verification to assure all wires were de-energized was conducted within the box before cutting the wires. The electrician was medically evaluated. The second set of wires was traced back to their source and properly locked and tagged out.

4. An employee received an electrical shock while installing a power distribution unit in a rack. The unit has two 208-volt whips, each supplying power to eight outlets. After he installed the unit in the rack, he plugged the “A” whip into a 208-volt outlet and, when he grabbed the “B” whip plug, he received a shock. He tested the plug with a multi-meter and discovered that power from the “A” whip was feeding back through the “B” whip. The equipment was determined to be faulty and occurs if the cables are connected out of phase from one another.

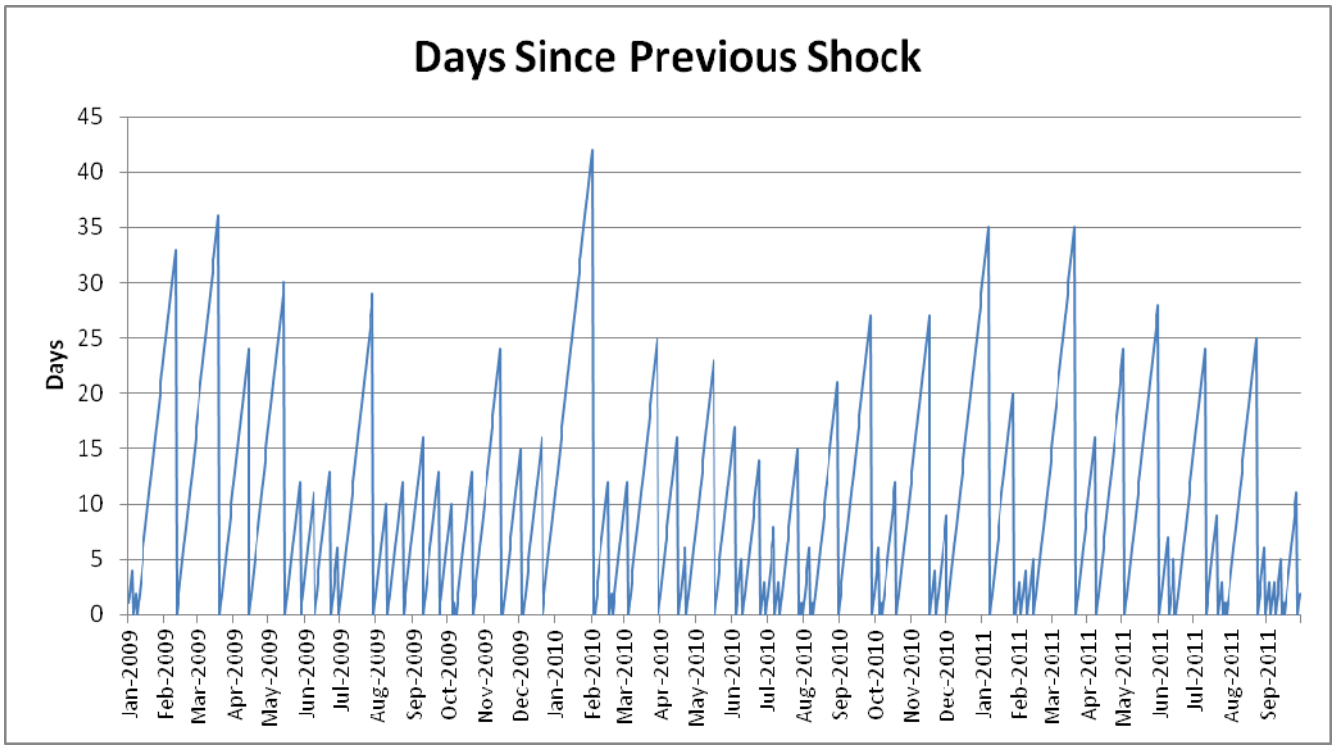
5. While working in a transformer compartment, a worker received a static shock (with a visual spark) to his neck while removing water from a flooded basement, which houses several power supplies (transformers and rectifiers). A Job Hazard Analysis included ensuring that power was locked and tagged out to the high-voltage supply and all potential/stored energy was turned off. It was found that capacitors in a rectifier section were still at approximately 140 VDC. Further investigation revealed that the capacitors were being fed 140VDC from a ground detection system, and that there was no lockout/tagout in place as required.

6. A lab employee experienced a shock and second-degree burn on the palm side of the left hand upon touching a wall-mounted electrical junction box. Inspection of the junction box revealed that an energized 120-VAC power wire within the junction box had previously been pinched between the metal junction box and its metal cover plate. The added pressure of the worker's hand on junction box cover further pinched the wire and penetrated to the conductor, resulting in the shock. The employee was sent to the lab’s Occupational Medicine clinic for first-aid treatment.

7. While a technician was simultaneously inserting a stainless steel gas purge line and lowering the door of an electric box furnace, he experienced a mild electrical shock to his right forearm. The technician was holding the purge line in his left hand while lowering the box furnace door with his right hand when purge line inadvertently touched the furnace heating element. The door to the furnace had been blocked open to allow for the purge line, which was contrary to the design of the furnace and acceptable work practices. The technician was evaluated and returned to work.

Figure 1 shows the number of days since the previous electrical shock for the DOE complex. The present interval is 2 days. The longest interval was 41days in 2010.

Figure 1 - Days since Previous Shock



Electrical Intrusion

In September there was a slight decrease in the number of electrical intrusion occurrences (i.e., cutting/penetrating, excavating, or vehicle contact of electrical conductors) from six in August to five this month. Only one of these occurrences involved electrical work and an electrician. The other occurrences involved workers who were either equipment operators or laborers. In addition, all five of the occurrences involved subcontractors, which could indicate a need for more effective oversight of subcontractor work activities. Because electrical intrusion-type events typically involve non-electrical workers performing non-electrical work, the workers may not have any type of electrical safety training or any expectation that an electrical hazard exists. Four of the five electrical intrusion occurrences are summarized below. The fifth occurrence was previously discussed under the electrical shocks as occurrence number 3.

1. A subcontract worker was excavating soil with a track hoe for utility installation when the bucket struck and severed two phases of an energized 13.2 kV electrical line. The circuit breaker immediately tripped and isolated the fault. The electrical line had been installed to provide temporary power to the construction site, which includes several job site trailers and tower cranes.

2. A subcontractor weld inspector was moving and lowering a scissor lift when the lift caught a temporary 480-volt power cable and stretched the rope suspending the cable. The tension of the rope caused the outer jacket of the cable to pull apart without damaging the conductors.

3. A subcontractor was performing demolition and cut a 110-volt line. The contractor was standing on scaffolding and was using a Sawzall® to remove soffit from around the perimeter of a room. The contractor saw sparks and immediately stopped work. Electrical lines feeding the room had been removed; however, there was a concealed single conduit coming through the perimeter of the room that powered lights in an adjacent bathroom.

4. When a subcontract worker drilled into a sheetrock wall to install a white board, the drill penetrated the backside of an electrical panel mounted on the other side of the wall. The drill bit hit an energized buss bar inside the panel and tripped a circuit breaker. The scope of work under approved subcontractor's Job Hazard Analysis did not include drill work and as a result, no penetration permit was issued for this project.

Hazardous Energy Control

In September there were six reported occurrences involving lockout/tagout (LOTO) issues. This is an increase of one occurrence from August. These occurrences involved not hanging locks as required, not signing onto the LOTO, and locking out the wrong source of energy. In two of the occurrences workers failed to verify a safety to work condition. Performing a safe to work check is a necessary step in the hazardous energy control process to ensure that exposed electrical conductors or circuit parts are de-energized so that work can proceed safely. Three of the occurrences involved subcontractor electricians. These types of LOTO mistakes typically result from a failure to understand the sites LOTO process or from a breakdown in communications between work groups. Four of the LOTO occurrences are summarized below the other two occurrences were previously discussed under the electrical shocks as occurrence number 3 and occurrence number 5.

1. Ironworkers, who were completing the installation of scaffolding to support bridge crane inspection preventive maintenance, failed to install their Authorized Worker Locks to isolate power to the crane buss bars. This was required to protect ironworkers if the long poles of the scaffold inadvertently contacted the buss bars. The local disconnect to the buss bars was in the open position during the work.

2. An electrician was tasked with performing quarterly preventive maintenance on an HVAC heat pump and had applied the required LOTOs and performed a safe condition check. The electrician was then tasked to perform another LOTO at a different location. When he returned to the HVAC unit, he discovered a tripped circuit

breaker. The electrician obtained authorization from his foreman to reset of the breaker. The foreman asked if he was signed on the LOTO permit and the electrician said yes and reset the breaker within the HVAC LOTO boundary; however, the electrician was actually signed on a different permit.

3. Construction work damaged a conduit and junction box causing a circuit breaker to trip. Utilities Operators identified a tripped 20-amp breaker in Panel C and placed a control lock on the breaker. Electricians placed a lockout on the circuit and after completing the repairs, removed the lockout from Panel C and energized the breaker. They then discovered that power to the circuit in the junction box was still off. Upon further investigation, they determined that the circuit in the junction box fed from either Panel X or M, which were found to be de-energized. The main feeder breaker in the outside switchgear feeding Panel X had tripped on ground fault and was not controlled by a lockout.

4. A subcontract construction electrician had relocated a 4-plug electrical box, including its wiring and portions of conduit, without verification of air gap isolation or performing lockout/tagout on the circuit. The box was incorrectly labeled with an abandoned panel number. Although the electrician had used a voltage tester and confirmed the wires were de-energized, the circuit was later traced to an energized panel, with the switch in the 'off' position.

Electrical Near Miss

In September there were four occurrences that were considered to be an electrical near miss. Three of these occurrences were previously discussed under the electrical intrusion occurrences numbers 1, 3, and 4. The other near-miss occurrence is summarized below.

A technician noticed an electrical short while installing a metal flex duct to an oven in. Maintenance personnel determined that the cord cap had been miswired, causing an unexpected 60-volt short. An electrical craftsman, who was to install the supply cord on a new oven, had used a supply cord that matched the cap end and had connected the cord to the manufacturer's junction box at the rear of the oven; however, the connections to the existing male cord cap were not checked for proper configuration. A voltage measurement from the chassis of the oven to the cabinet measured 60 volts. The ground conductor was landed on a phase terminal and one of the phase conductors landed on the ground terminal.

Monthly Occurrences Tables

Table 1 shows a breakdown of the outcomes, performance issues, and worker types associated with electrical safety occurrences for September 2011.

Table 1 - Breakdown of Electrical Occurrences

Number of Occurrences	Involving:	Last Month
7	Electrical Shocks	2
2	Electrical Burns	0

Number of Occurrences	Involving:	Last Month
6	Hazardous Energy Control	5
3	Inadequate Job Planning	1
3	Inadvertent Drilling/Cutting of Electrical Conductors	3
1	Excavation of Electrical Conductors	3
1	Vehicle Intrusion of Electrical Conductors or Equipment	0
4	Electrical Near Misses	8
7	Electrical Workers	5
10	Non-Electrical Workers	12
7	Subcontractors	9

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 initially 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
The search produced 17 occurrence reports and none were culled out.

Table 2 provides a summary of the electrical safety occurrences for CY 2011.

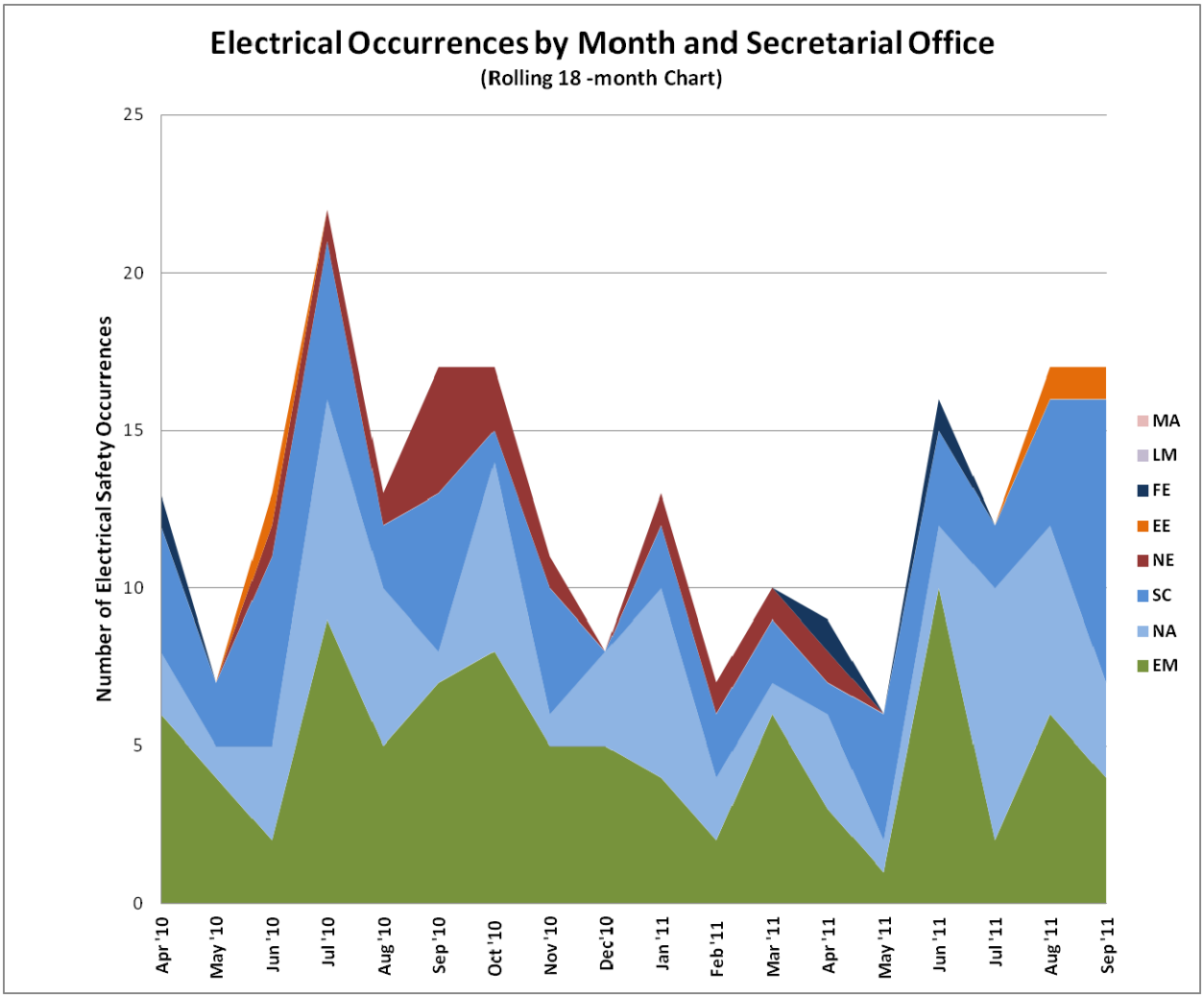
Table 2 - Summary of Electrical Occurrences

Period	Electrical Safety Occurrences	Shocks	Burns	Fatalities
September	17	7	2	0
August	17	2	0	0
July	12	5	0	0
June	16	5	1	0
May	6	1	0	0
April	9	1	0	0
March	10	1	0	0
February	7	3	0	0
January	13	3	1	0
2011 total	107 (avg. 11.9/month)	28	4	0
2010 total	155 (avg. 12.9/month)	28	2	0
2009 total	128 (avg. 10.7/month)	25	3	0
2008 total	113 (avg. 9.4/month)	26	1	0
2007 total	140 (avg. 11.7/month)	25	2	0
2006 total	166 (avg. 13.8/month)	26	3	0
2005 total	165 (avg. 13.8/month)	39	5	0
2004 total	149 (avg. 12.4/month)	25	3	1

The monthly average for 2011 increased from last month's average of 11.3 occurrences.

Figure 2 shows the distribution of electrical safety occurrences by secretarial office. As can be seen, the Office of Science laboratories and sites were the largest contributor. The Office of Nuclear Energy hasn't reported an occurrence since April 2011.

Figure 2 - Electrical Occurrences by Month and Secretarial Office



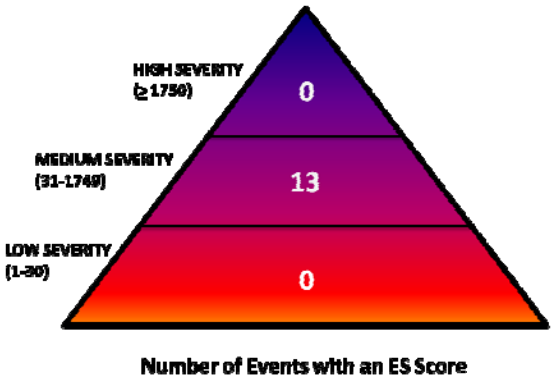
Electrical Severity

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 are calculated using Revision 2 of the Electrical Severity Measurement Tool, which can be found on the EFCOG website at http://www.efcog.org/wg/esh_es/docs/Electrical_Severity_Measurement_Tool.pdf. Four of the electrical occurrences this month did not have an Electrical Severity (ES) score. The other thirteen occurrences are distributed as shown in Figure 3, with the highest ES score being 1650. The actual score for each occurrence is provided in Attachment 1.

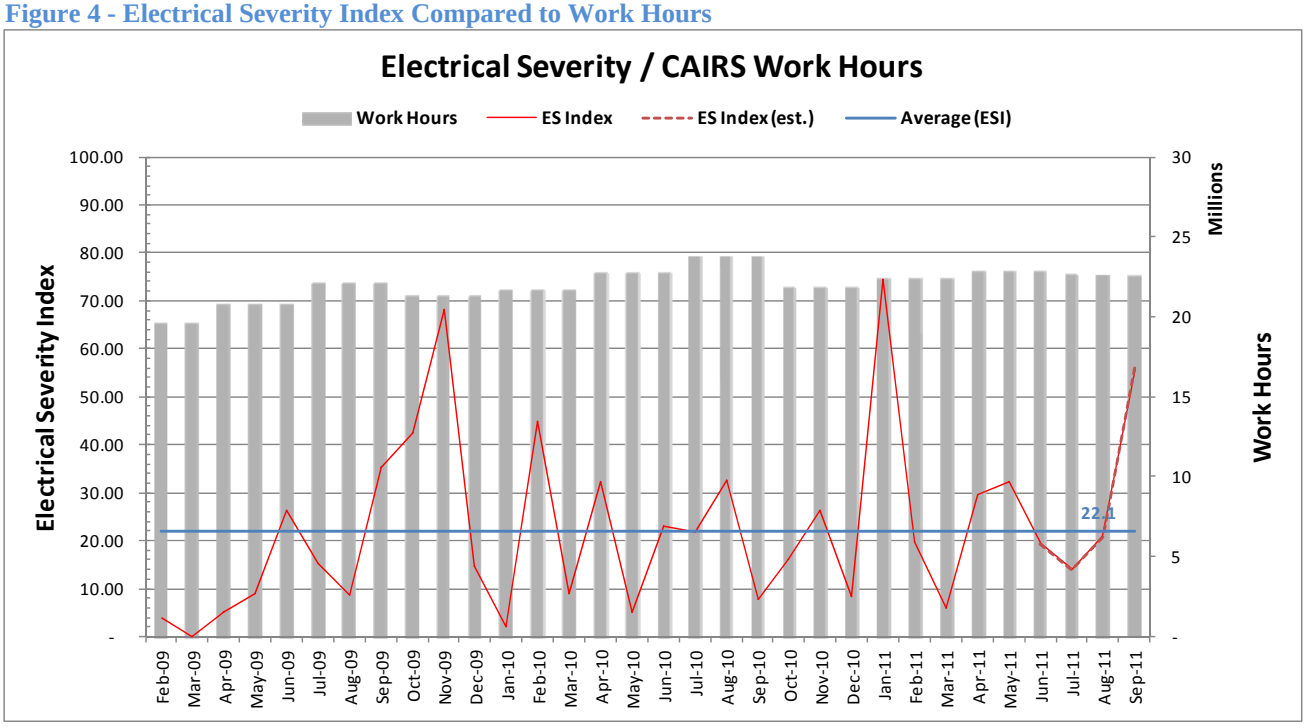
Figure 3 - Electrical Severity Count



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. Each DOE site calculates their own ESI and sets their own annual ESI goals. These ESI goals can vary from 0.22 to 160.0. Presently, the DOE complex goal is for the monthly ESI to be below the average ESI and to reduce the average ESI for the DOE complex to < 20.0. This average ESI goal was established based on the average ESI for 2009 (18.99) and 2010 (19.03). Figure 4 shows a calculated ESI for the DOE complex. The present ESI has increased to its highest level since January 2011 and is the third highest during the 32-month period.

Figure 4 - 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 3 - Electrical Severity Index

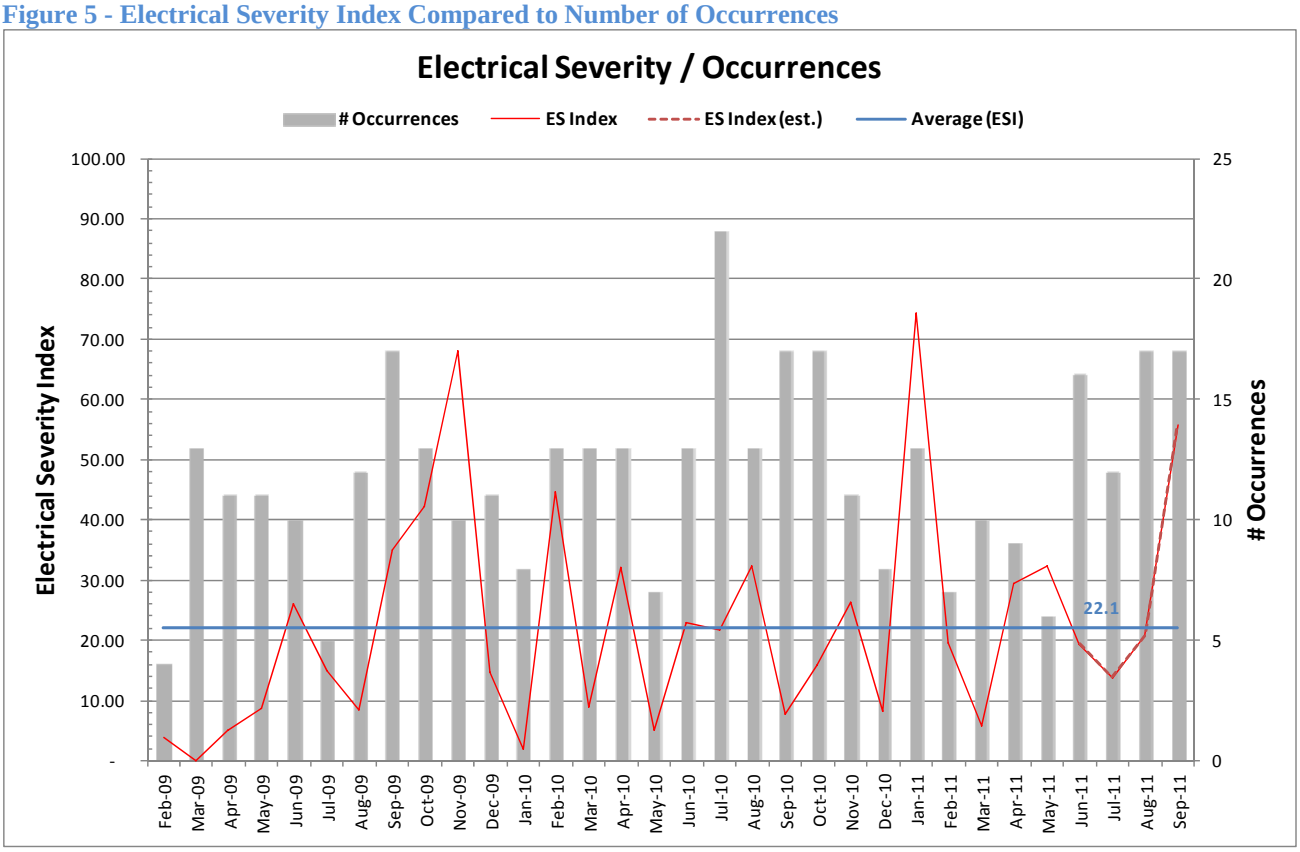
Category	August	September	Δ
Total Occurrences	17	17	0
Total Electrical Severity	2,360	6,310	+3,950
Estimated Work Hours	22,665,063* (22,630,393)	22,567,759	-97,304
ES Index	20.83* (20.86)	55.92	+35.1
Average ESI	21.0	22.1	1.1

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

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

Figure 5 shows the ESI with the number of Occurrences instead of Work Hours.

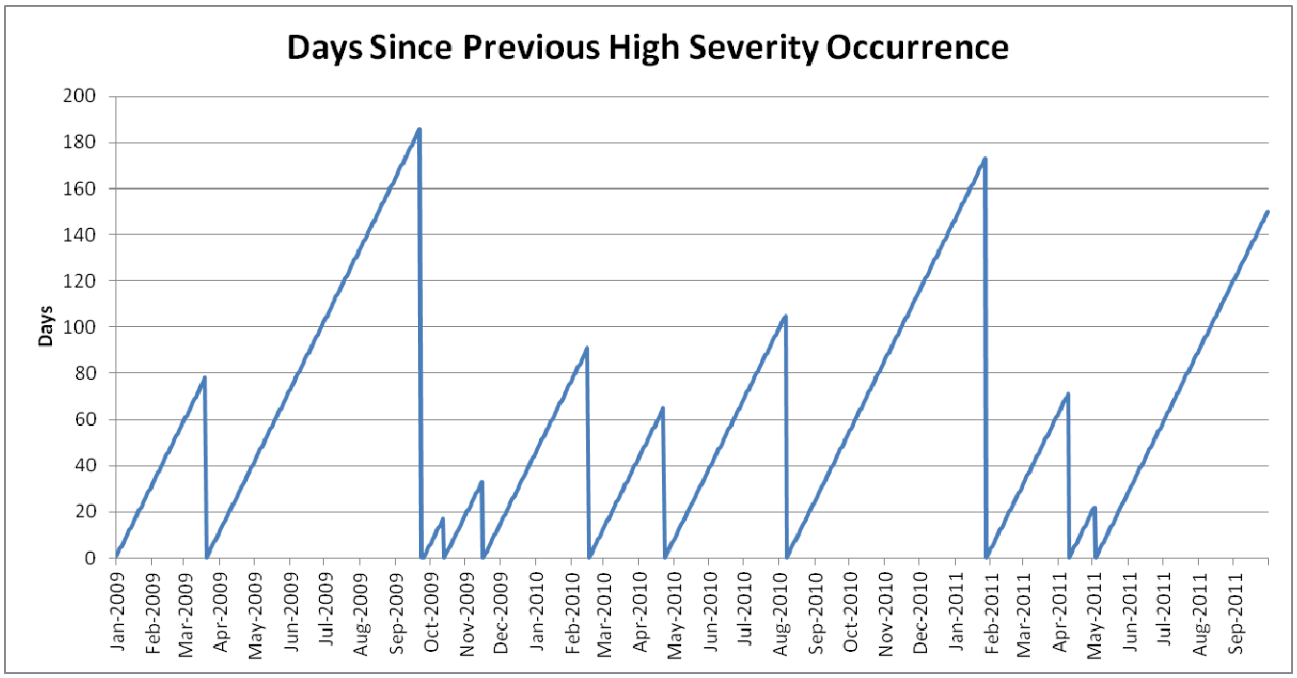
Figure 5 - Electrical Severity Index Compared to Number of Occurrences



The average ESI has increased from 19.2 in June 2010 to 22.1 in September 2011.

The following chart shows the number of days since the previous high severity occurrence. The present interval is 150 days. The longest interval was 181 days in 2009.

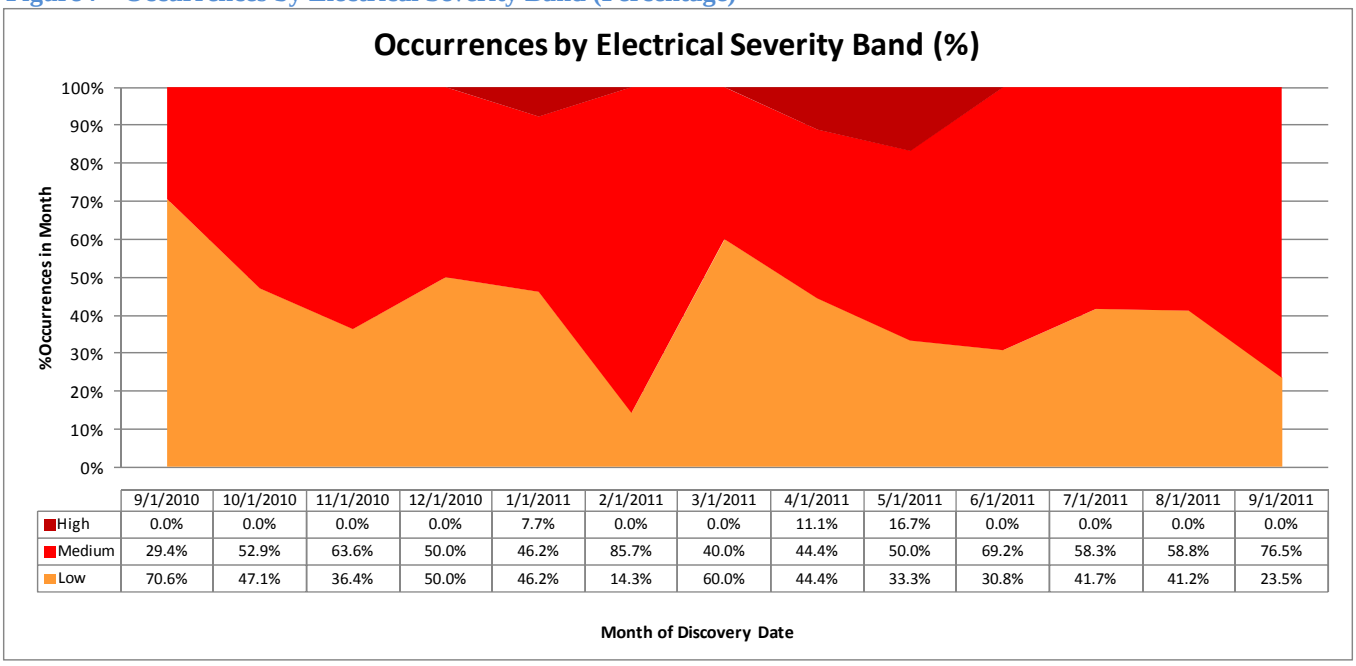
Figure 6 - Days since Previous High Severity Occurrence



Summary of Occurrences by Severity Band

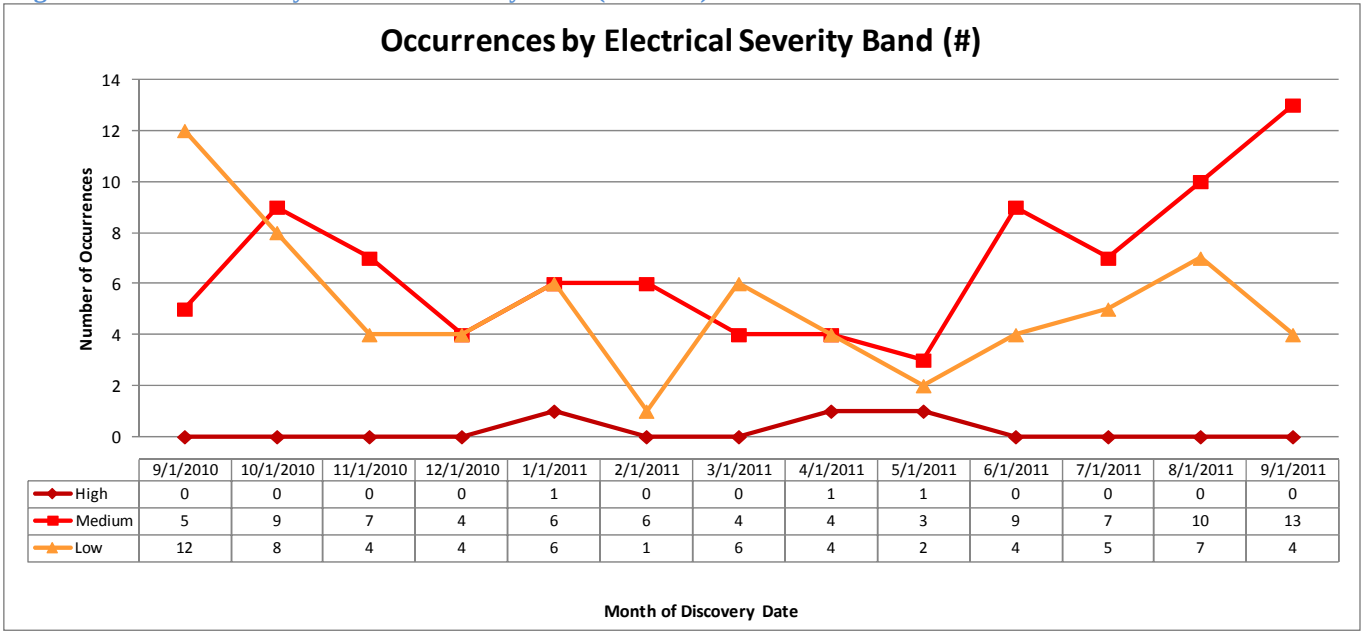
For the interval September 2010 through September 2011 (current month and the past 12), Figures 7 and 8 summarize occurrences by severity band and month of discovery date by percentage of total occurrences in month and number of occurrences in month.

Figure 7 - Occurrences by Electrical Severity Band (Percentage)



	9/1/2010	10/1/2010	11/1/2010	12/1/2010	1/1/2011	2/1/2011	3/1/2011	4/1/2011	5/1/2011	6/1/2011	7/1/2011	8/1/2011	9/1/2011
High	0.0%	0.0%	0.0%	0.0%	7.7%	0.0%	0.0%	11.1%	16.7%	0.0%	0.0%	0.0%	0.0%
Medium	29.4%	52.9%	63.6%	50.0%	46.2%	85.7%	40.0%	44.4%	50.0%	69.2%	58.3%	58.8%	76.5%
Low	70.6%	47.1%	36.4%	50.0%	46.2%	14.3%	60.0%	44.4%	33.3%	30.8%	41.7%	41.2%	23.5%

Figure 8 - Occurrences by Electrical Severity Band (Number)



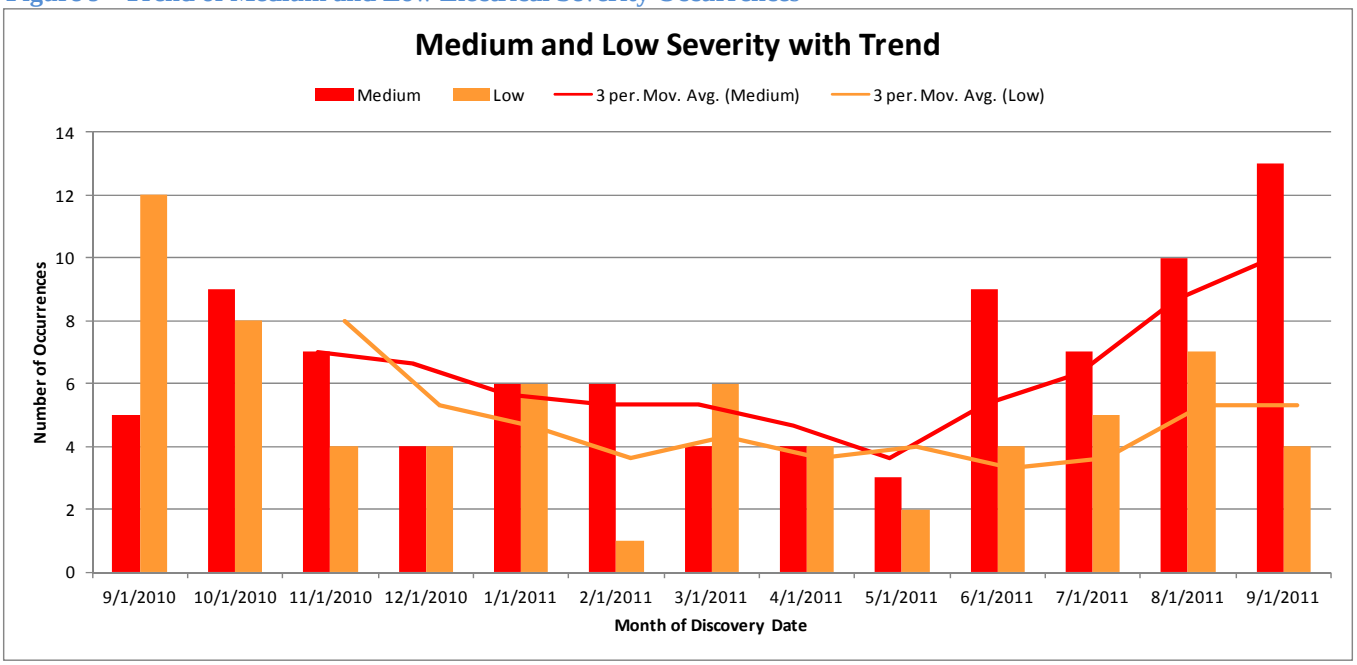
	9/1/2010	10/1/2010	11/1/2010	12/1/2010	1/1/2011	2/1/2011	3/1/2011	4/1/2011	5/1/2011	6/1/2011	7/1/2011	8/1/2011	9/1/2011
High	0	0	0	0	1	0	0	1	1	0	0	0	0
Medium	5	9	7	4	6	6	4	4	3	9	7	10	13
Low	12	8	4	4	6	1	6	4	2	4	5	7	4

What can be seen from the previous two charts is that the number of occurrences with High electrical severity scores has remained at zero for the past four months and that the number of occurrences with Medium scores have steadily increased. It is more desireable to see more Low than Medium severity occurrences as was seen in September 2010 and March 2011.

Medium and Low Severity with Trend

Figure 9 focuses on the Medium and Low severity data series for September 2010 through September 2011. Trend lines are included for each, using a 3-month moving average.

Figure 9 - Trend of Medium and Low Electrical Severity Occurrences



The 3-month moving average shows an increase in the Medium severity occurrences since May 2011 and a leveling off off Low severity occurrences.

Additional Resources

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

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

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

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

Contact

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Attachment 1

Electrical Safety Occurrences – September 2011

No	Report Number	Event Summary	SHOCK	BURN	ARCF[1]	LOTO[2]	PLAN[3]	EXCAV[4]	CUT/D[5]	VEH[6]	SC[7]	RC[8]	ES[9]
1	EE-GO--NREL-NREL-2011-0011	The bucket of a track hoe struck and severed two phases of an energized 13.2kV electrical line.						X			3	2C(2), 4B(7)	1100
2	EM-RL--CPRC-WRAP-2011-0003	No locks installed on disconnect while constructing a scaffold near crane buss work.				X					3	2C(2)	0
3	EM-RP--BNRP-RPPWTP-2011-0023	An electrician worked under a LOTO permit that he did not sign.				X					3	2C(2)	0
4	EM-SR--SRNS-CPWM-2011-0009	Rad inspector receives minor shock and burn while plugging in a 110V battery charger.	X	X							3	10(2)	330
5	EM-SR--SRNS-FGEN-2011-0008	A scissor lift caught a temporary 480V power cable pulling apart the outer jacket of the cable w/out damaging the conductors.								X	2	10(2)	0
6	NA--LSO-LLNL-LLNL-2011-0046	A machinist experienced a shock to his right hand while working on a wire saw machine.	X								3	10(2)	1650
7	NA--PS-BWP-PANTEX-2011-0063	Electricians worked on a de-energized circuit that was not controlled by a LOTO.				X	X				3	2C(2)	0
8	NA--SS-SNL-NMFAC-2011-0008	Incorrectly wired cord cap causes 60V short.									3	2C(2)	550
9	SC--AMSO-AMES-AMES-2011-0003	A laborer cut an energized 110V lighting circuit in a concealed single conduit with a saw.							X		3	2C(2)	110
10	SC--ASO-ANLE-ANLEFMS-2011-0016	A subcontractor electrician received a 110V shock to his fingers when cutting a wire in an out-of-service timing control box.	X			X	X		X		2	2C(1)	330
11	SC--BSO-LBL-CRD-2011-0001	A technician received a shock from faulty 208V equipment because of a back feed.	X								4	10(2)	330

Attachment 1

No	Report Number	Event Summary	SHOCK	BURN	ARCF[1]	LOTO[2]	PLAN[3]	EXCAV[4]	CUT/D[5]	VEH[6]	SC[7]	RC[8]	ES[9]
12	SC--BSO-LBL-OPERATIONS-2011-0018	A subcontractor drilled into a sheetrock wall, penetrated the back of an electrical panel and hit an energized buss bar.							X		3	2C(2)	110
13	SC--BSO-LBL-OPERATIONS-2011-0019	An electrician relocated an electrical box, wiring, and conduit w/out verifying air gap isolation or performing a LOTO.				X					3	2C(2)	110
14	SC--PSO-PPPL-PPPL-2011-0007	While working in a transformer cabinet, a worker received a shock to the neck.	X			X	X				3	2C(2)	210
15	SC--SSO-SU-SLAC-2011-0012	During a switching operation an abandoned 12kV cable was energized and faulted in a vault.			X						3	2C(2)	600
16	SC--TJSO-JSA-TJNAF-2011-0009	A worker received a shock and 2nd-degree burn on the hand upon touching an electrical junction box that contained a pinched 120V wire.	X	X							3	10(2)	550
17	SC-ORO--ORNL-X10CENTRAL-2011-0003	Technician receives shock to forearm when metal purge line touches energized heating element in furnace.	X								2	2C(1)	330
	TOTAL		7	2	1	6	3	1	3	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 – September 2011

No	Report Number	Event Summary	EW[1]	N-EW[2]	SUB[3]	HFW[4]	WFH[5]	PPE[6]	70E[7]	VOLT[8] H	VOLT[8] L	C/I[9]	NEUT[10]	NM[11]
1	EE-GO--NREL-NREL-2011-0011	The bucket of a track hoe struck and severed two phases of an energized 13.2kV electrical line.		X	X	X				X				X
2	EM-RL--CPRC-WRAP-2011-0003	No locks installed on disconnect while constructing a scaffold near crane buss work.		X			X				X			
3	EM-RP--BNRP-RPPWTP-2011-0023	An electrician worked under a LOTO permit that he did not sign.	X				X				X			
4	EM-SR--SRNS-CPWM-2011-0009	Rad inspector receives minor shock and burn while plugging in a 110V battery charger.		X		X					X			
5	EM-SR--SRNS-FGEN-2011-0008	A scissor lift caught a temporary 480V power cable pulling apart the outer jacket of the cable w/out damaging the conductors.		X	X	X					X			
6	NA--LSO-LLNL-LLNL-2011-0046	A machinist experienced a shock to his right hand while working on a wire saw machine.		X		X					X			
7	NA--PS-BWP-PANTEX-2011-0063	Electricians worked on a de-energized circuit that was not controlled by a LOTO.	X		X		X				X			
8	NA--SS-SNL-NMFAC-2011-0008	Incorrectly wired cord cap causes 60V short	X			X					X			X
9	SC--AMSO-AMES-AMES-2011-0003	A laborer cut an energized 110V lighting circuit in a concealed single conduit with a saw.		X	X	X					X			X
10	SC--ASO-ANLE-ANLEFMS-2011-0016	A subcontractor electrician received a 110V shock to his fingers when cutting a wire in an out-of-service timing control box	X		X	X					X			
11	SC--BSO-LBL-CRD-2011-0001	A technician received a shock from faulty 208V equipment because of a back feed.	X			X					X			

Attachment 1

No	Report Number	Event Summary	EW[1]	N-EW[2]	SUB[3]	HFW[4]	WFH[5]	PPE[6]	70E[7]	VOLT[8] H	VOLT[8] L	C/I[9]	NEUT[10]	NM[11]
12	SC--BSO-LBL-OPERATIONS-2011-0018	A subcontractor drilled into a sheetrock wall, penetrated the back of an electrical panel and hit an energized buss bar.		X	X	X					X			X
13	SC--BSO-LBL-OPERATIONS-2011-0019	An electrician relocated an electrical box, wiring, and conduit w/out verifying air gap isolation or performing a LOTO.	X		X		X				X			
14	SC--PSO-PPPL-PPPL-2011-0007	While working in a transformer cabinet, a worker received a shock to the neck.		X		X					X			
15	SC--SSO-SU-SLAC-2011-0012	During a switching operation an abandoned 12kV cable was energized and faulted in a vault.	X			X				X				
16	SC--TJSO-JSA-TJNAF-2011-0009	A worker received a shock and 2nd-degree burn on the hand upon touching an electrical junction box that contained a pinched 120V wire.		X		X					X			
17	SC-ORO--ORNL-X10CENTRAL-2011-0003	Technician receives shock to forearm when metal purge line touches energized heating element in furnace.		X		X					X			
	TOTAL		7	10	7	13	4	0	0	2	15	0	0	4

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 55423 OR(s) with 58733 occurrences(s) as of 10/25/2011 11:59:50 AM
Query selected 17 OR(s) with 17 occurrences(s) as of 10/25/2011 12:00:14 PM

Download this report in Microsoft Word format.

1)Report Number: EE-GO--NREL-NREL-2011-0011 **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 struck buried electrical conduit during excavation activity
Date/Time Discovered: 09/21/2011 11:00 (MTZ)
Date/Time Categorized: 09/21/2011 12:00 (MTZ)
Report Type: Notification
Report Dates:

Notification	09/23/2011	19:19 (ETZ)
Initial Update		
Latest Update		
Final		

Significance Category: 3
Reporting Criteria: 2C(2) - Failure to follow a prescribed hazardous energy control process (e.g., lockout/tagout) or a site condition that results in the unexpected discovery of an uncontrolled hazardous energy source (e.g., live electrical power circuit, steam line, pressurized gas). This criterion does not include discoveries made by zero-energy checks and other precautionary investigations made before work is authorized to begin.

4B(7) - A facility or site stand-down resulting from safety reasons reportable as an occurrence or occurrences.

Note: This is a secondary reporting criterion, and does not require a separate occurrence report.

Cause Codes:
ISM:
Subcontractor Involved: Yes
Haselden Construction and Total Site Utilities
Occurrence Description: On September 21, 2011, a construction subcontract worker was excavating soil with a track hoe as part of a utility installation when the bucket struck and severed two phases of an energized 13.2 kV electrical line. The circuit breaker immediately tripped and isolated the fault. The electrical line had been installed to provide temporary power to the

	construction site which includes several job site trailers and tower cranes. No injuries or property damage resulted from the event however electrical service to the construction site has been interrupted. NREL project management suspended all excavation work associated the construction project pending further analysis of the event. NREL and the subcontract organization have initiated an incident investigation.
Cause Description:	
Operating Conditions:	Normal construction operations, no unusual conditions identified
Activity Category:	Construction
Immediate Action(s):	1. All excavation activities for this construction project have been suspended. 2. The electrical line has been locked and tagged out until repairs are made. 3. An "all hands" safety meeting has been performed with all construction personnel associated with this project. 4. An incident investigation is being conducted.
FM Evaluation:	No worker injuries or significant property damage occurred as a result of the incident.
DOE Facility Representative Input:	
DOE Program Manager Input:	
Further Evaluation is Required:	Yes. Before Further Operation? Yes By Whom: NREL Project Management By When: 09/23/2011
Division or Project:	Infrastructure Campus Development Office
Plant Area:	South Table Mountain
System/Building/Equipment:	Ingress/Egress Construction
Facility Function:	Solar Activities
Corrective Action:	
Lessons(s) Learned:	
HQ Keywords:	07B--Electrical Systems - Electrical Distribution 07C--Electrical Systems - Power Outage 08F--OSHA Reportable/Industrial Hygiene - Industrial Operations Issues 08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical) 11G--Other - Subcontractor 12G--EH Categories - Industrial Operations 14E--Quality Assurance - Work Process Deficiency 14G--Quality Assurance - Procurement Deficiency
HQ Summary:	On September 21, 2011, a construction subcontract worker was

excavating soil with a track hoe as part of a utility installation when the bucket struck and severed two phases of an energized 13.2 kV electrical line. The circuit breaker immediately tripped and isolated the fault. The electrical line had been installed to provide temporary power to the construction site, which includes several job site trailers and tower cranes. The electrical line has been locked and tagged out until repairs are made. No injuries or property damage resulted from the event; however, electrical service to the construction site has been interrupted. National Renewable Energy Laboratory project management suspended all excavation work associated the construction project pending further analysis of the event. An incident investigation is being conducted.

Similar OR Report Number:

Facility Manager:

Name	JORDAN, MAUREEN Y
Phone	(303) 275-3248
Title	EHS Office Director

Originator:

Name	BAYLOSIS, ED A.
Phone	(303) 275-3240
Title	ISM PROGRAM MANAGER

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
09/21/2011	13:47 (MTZ)	Event Distribution	DOE/NREL

Authorized Classifier(AC):

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2)Report Number: EM-RL--CPRC-WRAP-2011-0003 **After 2003 Redesign**

Secretarial Office: Environmental Management

Lab/Site/Org: Hanford Site

Facility Name: WASTE RECEIVING & PROCESSING FACILIT

Subject/Title: Authorized Worker Locks Not Installed During Scaffold Construction

Date/Time Discovered: 09/15/2011 11:00 (PTZ)

Date/Time Categorized: 09/19/2011 12:45 (PTZ)

Report Type: Notification

Report Dates:

Notification	09/21/2011	20:32 (ETZ)
Initial Update		
Latest Update		
Final		

Significance Category: 3

Reporting Criteria: 2C(2) - Failure to follow a prescribed hazardous energy control process (e.g., lockout/tagout) or a site condition that results in the unexpected discovery of an uncontrolled hazardous energy source (e.g., live electrical power circuit, steam line, pressurized gas). 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 Wednesday September 14 and Thursday, September 15, ironworkers supported the WRAP facility to complete installation of scaffolding for a bridge crane inspection preventive maintenance (PM). The work package for this PM required use of an Eight Criteria Checklist and Authorized Worker Locks (AWLs) to shut down the power to the crane buss bars. This was required to protect workers if the long poles of the scaffold inadvertently contacted the buss bars. On Wednesday, September 14, the breaker was opened, AWLs were installed, and the majority of the scaffold was erected. At the end of the day, the toe boards and plywood had not been installed and the scaffold had not received final inspection. The AWLs were removed and the disconnect was left in the open position.

On Thursday, September 15, the ironworkers returned to the facility and contacted maintenance Field Work Supervisor (FWS) 1. FWS 1 was not in charge of the bridge crane work package. FWS 1 indicated they would contact the correct FWS (FWS 2). The riggers went through the radiological access control system and proceeded to the Transuranic Package Transporter (TRUPACT) Bay, where FWS 2 job met them. FWS 2 did not provide a pre-job or confirm that one had been provided. The ironworkers installed the toeboards and plywood flooring on the scaffold without installing their AWLs. This was contrary to the requirements of the work package. The error was not recognized until after construction of the scaffold had been completed.

Cause Description:

Operating Conditions: Maintenance

Activity Category: Maintenance

Immediate Action(s): WRAP personnel verified that the local disconnect to the buss bars had remained in the open position during the work on Thursday. The work package has been suspended. A critique was conducted.

Following the critique, WRAP management determined that a Controlling Organization Lockout would be installed on the local disconnect until the bridge crane PM is completed.

FM Evaluation:	
DOE Facility Representative Input:	
DOE Program Manager Input:	
Further Evaluation is Required:	Yes. Before Further Operation? No By Whom: WRAP By When: 10/27/2011
Division or Project:	Waste and Fuels Management Project
Plant Area:	200W
System/Building/Equipment:	2336W
Facility Function:	Nuclear Waste Operations/Disposal
Corrective Action:	
Lessons(s) Learned:	
HQ Keywords:	01A--Inadequate Conduct of Operations - Inadequate Conduct of Operations (miscellaneous) 01K--Inadequate Conduct of Operations - Lockout/Tagout Noncompliance (Electrical) 01N--Inadequate Conduct of Operations - Inadequate Job Planning (Other) 01P--Inadequate Conduct of Operations - Inadequate Oral Communication 01R--Inadequate Conduct of Operations - Management issues 08H--OSHA Reportable/Industrial Hygiene - Safety Noncompliance 12I--EH Categories - Lockout/Tagout (Electrical or Mechanical) 14E--Quality Assurance - Work Process Deficiency
HQ Summary:	On September 15, 2011, ironworkers, who were completing the installation of scaffolding to support a WRAP facility bridge crane inspection preventive maintenance (PM), installed the toe boards and plywood flooring on the scaffold without installing their Authorized Worker Locks (AWLs) in accordance with the requirements of the work package. The error was not recognized until after construction of the scaffold had been completed. The work package for this PM required the use of an Eight Criteria Checklist and AWLs to shut down the power to the crane buss bars. This was required to protect workers if the long poles of the scaffold inadvertently contacted the buss bars. WRAP personnel verified that the local disconnect to the buss bars was in the open position during the work. The work package has been suspended and a critique was conducted. Following the critique, WRAP management determined that a Controlling Organization Lockout would be installed on the local disconnect until the bridge crane PM is completed.

Similar OR Report Number:

Facility Manager:

Name	Mortensen, A. Stuart
Phone	(509) 373-1486
Title	Facility Manager

Originator:

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

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
09/15/2011	15:00 (PTZ)	TJ Fulton	WRAP
09/15/2011	16:00 (PTZ)	JE Trevino	DOE RL
09/19/2011	12:00 (PTZ)	ET McCarthy	TRU Prog
09/19/2011	13:50 (PTZ)	JE Trevino	DOE RL
09/19/2011	14:24 (PTZ)	Occurrence Notify Cnt	MSA ONC

Authorized Classifier(AC):

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3)Report Number: EM-RP--BNRP-RPPWTP-2011-0023 **After 2003 Redesign**

Secretarial Office: Environmental Management

Lab/Site/Org: Hanford Site

Facility Name: RPP Waste Treatment Plant

Subject/Title: An electrician performed work under a/an LOTO permit that he did not sign.

Date/Time Discovered: 09/29/2011 16:15 (PTZ)

Date/Time Categorized: 09/29/2011 17:45 (PTZ)

Report Type: Notification

Report Dates:

Notification	09/30/2011	17:15 (ETZ)
Initial Update		
Latest Update		
Final		

Significance Category: 3

Reporting Criteria: 2C(2) - Failure to follow a prescribed hazardous energy control process (e.g., lockout/tagout) or a site condition that results in the unexpected discovery of an uncontrolled hazardous energy source (e.g., live electrical power circuit, steam line, pressurized gas). 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 9/29/2011 an Area Operations Maintenance electrician (AOME)self-reported an administrative violation of the Lock-Out/Tag-Out (LO/TO) process. The AOME was tasked with performing a quarterly heat pump preventive maintenance procedure on Building T-52 HVAC roof unit. The AOME applied the required LO/TOs and performed the required safe condition check on the unit. The maintenance work was performed under a Management Suspension of Work (MSOW) which required a pause after the LO/TOs were in place to review the work instructions. The AOME was than tasked to perform another LO/TO application at a different location. Later in the day, the AOME return to the HVAC unit maintenance and discovered a tripped breaker. The AOME obtained authorization for a one time re-set of the breaker from his General Foreman (GF). The GF asked if the AOME was signed on the LO/TO permit and the AOME said yes. The AOME proceeded to operate the circuit breaker within the HVAC LO/TO boundary and re-set it. It was discovered the AOME was actually signed on to a different LO/TO permit. This incident was recognized after the LO/TO was removed and the job complete. The AOME was never exposed to an uncontrolled hazardous energy source as the power was isolated and locked out in accordance with the work package documentation. The AOME completed and verified the safe condition check and signed off the step in the work package.
Cause Description:	
Operating Conditions:	N/A
Activity Category:	Construction
Immediate Action(s):	The electrician self-reported the violation to Supervision. Area Operations and Construction Management initiated an investigation into the violation.
FM Evaluation:	
DOE Facility Representative Input:	
DOE Program Manager Input:	
Further Evaluation is Required:	No
Division or Project:	Waste Treatment Facility

Plant Area: 600

System/Building/Equipment: T-52 warehouse

Facility Function: Nuclear Waste Operations/Disposal

Corrective Action:

Lessons(s) Learned:

HQ Keywords: 01K--Inadequate Conduct of Operations - Lockout/Tagout Noncompliance (Electrical)
12I--EH Categories - Lockout/Tagout (Electrical or Mechanical)
14D--Quality Assurance - Documents and Records Deficiency
14E--Quality Assurance - Work Process Deficiency

HQ Summary: On September 29, 2011, an Area Operations Maintenance electrician self-reported an administrative violation of the Lock-Out/Tag-Out (LO/TO) process to supervision. The electrician was tasked with performing quarterly preventive maintenance on the Building T-52 HVAC roof heat pump unit. The electrician applied the required LO/TOs and performed the required safe condition check on the unit. The maintenance work was performed under a Management Suspension of Work, which required a pause to review the work instructions after the LO/TOs were in place. The electrician was then tasked to perform another LO/TO application at a different location. The electrician later returned to the HVAC unit and discovered a tripped circuit breaker. The electrician obtained authorization for a one-time reset of the breaker from his general foreman. The foreman asked if the electrician was signed on the LO/TO permit and the electrician said yes and proceeded to reset the breaker within the HVAC LO/TO boundary, but the electrician was actually signed on to a different LO/TO permit. This incident was recognized after the LO/TO was removed and the job was complete. The electrician was never exposed to an uncontrolled hazardous energy source as the power was isolated and locked out in accordance with the work package documentation.

Similar OR Report Number:

Facility Manager:

Name	Ty Troutman
Phone	(509) 373-8387
Title	Manager of Construction

Originator:

Name	MEAGHER, THOMAS S.
Phone	(509) 373-8467
Title	SAFETY ASSURANCE

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization

09/29/2011	17:45 (PTZ)	Tucker Campbell	BNI
09/29/2011	17:45 (PTZ)	Thom Nash	BNI
09/29/2011	17:45 (PTZ)	Ty Troutman	BNI
09/29/2011	17:54 (PTZ)	Paul Hirschman	DOE
09/29/2011	18:37 (PTZ)	Gary Trump	ONC

Authorized Classifier(AC): N/A Date: 09/29/2011

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4)Report Number: EM-SR--SRNS-CPWM-2011-0009 **After 2003 Redesign**
Secretarial Office: Environmental Management
Lab/Site/Org: Savannah River Site
Facility Name: Closure Projects and Works Management
Subject/Title: E-Area Battery Charger Incident (ARRA)
Date/Time Discovered: 09/16/2011 07:30 (ETZ)
Date/Time Categorized: 09/20/2011 09:34 (ETZ)
Report Type: Final
Report Dates:

Notification	09/20/2011	15:28 (ETZ)
Initial Update	10/11/2011	15:44 (ETZ)
Latest Update	10/11/2011	15:44 (ETZ)
Final	10/11/2011	15:44 (ETZ)

Significance Category: 3
Reporting Criteria: 10(2) - An event, condition, or series of events that does not meet any of the other reporting criteria, but is determined by the Facility Manager or line management to be of safety significance or of concern to other facilities or activities in the DOE complex. One of the four significance categories should be assigned to the occurrence, based on an evaluation of the potential risks and the corrective actions taken. (1 of 4 criteria - This is a SC 3 occurrence)

Cause Codes: A2B6C01 - Equipment/ material problem; Defective, Failed or Contaminated; Defective or failed part
A3B3C06 - Human Performance Less Than Adequate (LTA); Knowledge Based Error; Individual underestimated the problem by using past events as basis
-->couplet - NA
ISM: 2) Analyze the Hazards
Subcontractor Involved: No
Occurrence Description: An electrical short in the power (110V) cable for a three step battery charger resulted in a severed power cable and a minor burn to the left little (pinky) finger recorded as a first aid case. A Radiological Protection Inspector was plugging in a battery charger for a Hand E

	Counter unit when she noticed sparks at the electrical outlet and felt a slight electrical shock. The inspector immediately stepped back from the outlet letting go of the cord and notified her First Line manager (FLM). The FLM notified the Shift Operations Manager (SOM) and secured the area. Since power was still on at the power strip a human barricade was used to warn others until the circuit breaker was de-energized. The inspector was transported by her FLM to medical where first aid was administered for a slight burn to her little finger. The inspector was allowed to return to work without restriction to her assigned duties although no contamination area work was allowed. A follow up visit to medical on 9/19/11 resulted in a full release. Further discussion with the inspector revealed a less than adequate pre-use cord inspection. While locating the power panel to de-energize the power strip, several pieces of portable equipment had to be moved to access the panel and a two drawer Fire King cabinet was located below the panel. E&I inspection of the power strip resulted in an uncertain state so the strip was DO NOT OPERATE tagged to remove it from service. Note: The SRS Electrical Safety subject matter expert has calculated the electrical severity of this event using guidance develped by the EFCOG/DOE Electrical Safety Subgroup. The calculated severity for this event is 330. This event scores as follows: Electrical Hazard: 10 (120 volt circuit); Environmental Factor: 0 (dry); Shock Proximity Factor: 10 (shock felt); Arc Flash: 0; Thermal Factor: 0; and Injury Factor: 3 (Shock but no fibrillation). Electrical Severity= 10*(1+0+10+0+0)*3= 330 Note: Discovery to Categorization exceeded the two hour time frame due to discussions being held to determine most applicable criterion.
Cause Description:	The primary cause was an electrical short in the power (110V) cable for a three step battery charger resulting in a severed power cable. A contributing cause was a less than adequate inspection of cord prior to use.
Operating Conditions:	Normal operations.
Activity Category:	Normal Operations (other than Activities specifically listed in this Category)
Immediate Action(s):	Radcon FLM was contacted. The area was secured. Employee was taken to Site medical. De-energized the breaker in the power panel. Notified E&I personnel to inspect power strip. After the power strip was inspected it was unplugged and tagged DO NOT OPERATE. Issued bulletin to SRNS and SRR Radcon personnel on this incident.

FM Evaluation:	The corrective actions have been determined to be adequate to prevent recurrence.
DOE Facility Representative Input:	
DOE Program Manager Input:	
Further Evaluation is Required:	No
Division or Project:	Solid Waste Management
Plant Area:	E-Area
System/Building/Equipment:	704-47E
Facility Function:	Nuclear Waste Operations/Disposal
Corrective Action 01:	**Target Completion Date:**10/20/2011 / **Tracking ID:**2011-CTS-11060, CA #3 Issue Site wide bulletin on the incident reinforcing inspection of cords before use per 18Q.
Corrective Action 02:	**Target Completion Date:**10/11/2011 / **Tracking ID:**2011-CTS-11060, CA #4 Replace the power strip and research additional power strips to ensure uniform configuration.
Corrective Action 03:	**Target Completion Date:**09/20/2011 / **Tracking ID:**2011-CTS-11060, CA #6 Include cord inspection discussion in SWMF morning toolbox meeting.
Lessons(s) Learned:	See Corrective Action #1.
HQ Keywords:	01A--Inadequate Conduct of Operations - Inadequate Conduct of Operations (miscellaneous) 01Q--Inadequate Conduct of Operations - Personnel error 07D--Electrical Systems - Electrical Wiring 08A--OSHA Reportable/Industrial Hygiene - Electrical Shock 08D--OSHA Reportable/Industrial Hygiene - Injury 12C--EH Categories - Electrical Safety 13H--Management Concerns - American Recovery and Reinvestment Act (ARRA) 14E--Quality Assurance - Work Process Deficiency 14H--Quality Assurance - Inspection and Acceptance Testing Deficiency
HQ Summary:	On September 16, 2011, an electrical short in the power (110-volt) cable for a 3-step battery charger resulted in a severed power cable and a minor burn to the left little finger recorded as a first aid case. A Radiological Protection Inspector was plugging in a battery charger for a Hand E Counter unit when she noticed sparks at the electrical outlet and felt a slight electrical shock. The inspector immediately stepped back

from the outlet and let go of the cord. She then notified her first line manager, who notified the shift operations manager and secured the area. Because the power was still on at the power strip, a human barricade was used to warn others until the circuit breaker was opened. The inspector was transported to medical where first aid was administered for a slight burn to her little finger. The inspector was allowed to return to work without restriction, except no contamination area work was permitted. A follow up visit to medical on September 19 resulted in a full release. Further discussion with the inspector revealed a less than adequate pre-use cord inspection. The power strip was inspected, tagged "DO NOT OPERATE," and removed from service.

Similar OR Report Number: 1. None

Facility Manager:

Name	Verne Mooneyhan
Phone	(803) 208-1158
Title	Solid Waste Operations Manager

Originator:

Name	Still, Debbie L
Phone	(803) 208-2886
Title	SOLID WASTE MANAGEMENT ADMIN. & ORGA

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
09/20/2011	09:34 (ETZ)	J. Gilmour	SW Dir
09/20/2011	09:34 (ETZ)	V. Mooneyhan	Ops Mgr
09/20/2011	09:34 (ETZ)	T. Cochran	DOE FR
09/20/2011	09:34 (ETZ)	D. Beeler	SW FM
09/20/2011	09:34 (ETZ)	L. Mullikin	SW SOM
09/20/2011	10:03 (ETZ)	D. Burnfield	DNFSB

Authorized Classifier(AC): Steve Mentrup Date: 09/20/2011

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5)Report Number: EM-SR--SRNS-FGEN-2011-0008 **After 2003 Redesign**
Secretarial Office: Environmental Management
Lab/Site/Org: Savannah River Site
Facility Name: F-General
Subject/Title: Scissor Lift Contacts Temporary Power Cable - No Injuries
Date/Time Discovered: 09/13/2011 13:45 (ETZ)
Date/Time Categorized: 09/14/2011 08:00 (ETZ)
Report Type: Notification

Report Dates:

Notification	09/16/2011	13:58 (ETZ)
Initial Update		
Latest Update		
Final		

Significance Category: 3

Reporting Criteria: 10(2) - An event, condition, or series of events that does not meet any of the other reporting criteria, but is determined by the Facility Manager or line management to be of safety significance or of concern to other facilities or activities in the DOE complex. One of the four significance categories should be assigned to the occurrence, based on an evaluation of the potential risks and the corrective actions taken. (1 of 4 criteria - This is a SC 3 occurrence)

Cause Codes:

ISM:

Subcontractor Involved: Yes
Baker

Occurrence Description: A subcontractor weld inspector operating a scissor lift in the Waste Solidification Building (WSB) was in the process of moving/lowering the lift when the lift caught a temporary 480v power cable, which stretched the rope that was suspending it. Tension of the rope caused the outer jacket of the cord to pull apart without damaging the conductors.

The electrical severity score for the severed 480 volt electrical welding cord event in WSB is 0. Severity calculation and basis is provided below.

The SRS Electrical Safety subject matter expert has calculated the electrical severity of this event using guidance developed by the EFCOG/DOE Electrical Safety Subgroup. The calculated severity for this event is 0. This event scores as follows: Electrical Hazard: 0 (No exposure to 480 volt circuit since insulation not damaged); Environmental Factor: 0 (dry); Shock Proximity Factor: 0 (insulated cables); Arc Flash: 0; Thermal Factor: 0; and Injury Factor:1 (none). Electrical Severity=0*(1+0+0+0+0+0)*1=0.

Electrical Severity (ES) = (Electrical Hazard Factor) * (1 + Environment Factor + Shock Proximity Factor + Arc Flash Proximity Factor + Thermal Proximity Factor) * (Injury Factor)

Discovery-to-Categorization - The time between discovery of the occurrence on 09/13/2011, at 1345 hours (hrs), and categorization of the event on 09/14/11, at 0800 hrs, exceeded two hours. This was due to

	management discussions being held to determine the most applicable criterion.
Cause Description:	
Operating Conditions:	Normal
Activity Category:	Construction
Immediate Action(s):	All work in the WSB was stopped by the subcontractor (Baker) including all subtier subcontractors. A stand-down was conducted by Baker and SRNS Management for all WSB subcontractor personnel starting at 1530 on the day of the event. All work involving scissors lifts was placed on hold for the following day pending development of corrective actions, including additional training by the Subcontractor.
FM Evaluation:	
DOE Facility Representative Input:	
DOE Program Manager Input:	
Further Evaluation is Required:	No
Division or Project:	Waste Solidification Building
Plant Area:	WSB Project
System/Building/Equipment:	Waste Solidification Building
Facility Function:	Balance of Plant - Infrastructure (Other Functions not specifically listed in this Category)
Corrective Action:	
Lessons(s) Learned:	
HQ Keywords:	01F--Inadequate Conduct of Operations - Training Deficiency 07D--Electrical Systems - Electrical Wiring 08F--OSHA Reportable/Industrial Hygiene - Industrial Operations Issues 11G--Other - Subcontractor 12C--EH Categories - Electrical Safety 14B--Quality Assurance - Training and Qualification Deficiency 14E--Quality Assurance - Work Process Deficiency 14G--Quality Assurance - Procurement Deficiency
HQ Summary:	On September 13, 2011, a subcontractor weld inspector was moving/lowering a scissor lift in the Waste Solidification Building (WSB) when the lift caught a temporary 480-volt power cable and stretched the rope suspending the cable. The tension of the rope caused the outer jacket of the cable to pull apart without damaging the conductors. The subcontractor stopped all work in the WSB, including all sub-tier subcontractors. A stand-down was conducted by the subcontractor and SRNS Management for all WSB subcontractor personnel, starting on the day of the event. All work involving scissors lifts was placed on hold for the following day pending development of

corrective actions, including additional training by the subcontractor. The Electrical Severity was calculated to be zero.

Similar OR Report Number:

Facility Manager:

Name	W.T. Davis
Phone	(803) 952-3147
Title	Waste Solidification Building Project Manager

Originator:

Name	HUTTO, JR, CONRAD R
Phone	(803) 952-9748
Title	WSRC LESSONS LEARNED COORDINATOR

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
09/14/2011	08:00 (ETZ)	T.D. Williamson	PMCS
09/14/2011	08:00 (ETZ)	M. Vislay	PMCS VP
09/14/2011	08:00 (ETZ)	T.A. Cantey	NNSA
09/14/2011	08:00 (ETZ)	W.T. Davis	WSB PM
09/14/2011	08:00 (ETZ)	G.A. Girard	NNP

Authorized Classifier(AC):

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6)Report Number: NA--LSO-LLNL-LLNL-2011-0046 **After 2003 Redesign**

Secretarial Office: National Nuclear Security Administration

Lab/Site/Org: Lawrence Livermore National Lab.

Facility Name: Lawrence Livermore Nat. Lab. (BOP)

Subject/Title: Minor Shock During Precision Machining Work

Date/Time Discovered: 09/08/2011 10:00 (PTZ)

Date/Time Categorized: 09/08/2011 15:00 (PTZ)

Report Type: Update/Final

Report Dates:

Notification	09/13/2011	18:21 (ETZ)
Initial Update	09/13/2011	19:00 (ETZ)
Latest Update	10/21/2011	18:19 (ETZ)
Final		
Revision 2	10/24/2011	17:14 (ETZ)

Significance Category: 2

Reporting Criteria: 2C(1) - Failure to follow a prescribed hazardous energy control process (e.g., lockout/tagout) or disturbance of a previously unknown or

	mislocated hazardous energy source (e.g., live electrical power circuit, steam line, pressurized gas) resulting in a person contacting (burn, shock, etc.) hazardous energy.
Cause Codes:	A2B6C01 - Equipment/ material problem; Defective, Failed or Contaminated; Defective or failed part
ISM:	2) Analyze the Hazards
Subcontractor Involved:	No
Occurrence Description:	On September 8, 2011, at approximately 1000, a Building 432 machinist reported experiencing a shock to his right hand while working on a "wire saw" machine. The individual reported the shock to his supervisor, who immediately called 911 and directed another worker to secure the scene. The machinist was taken to Health Services, evaluated, and released to full duty. At 1300 a critique was held. The specific energy source for the shock was unclear, as well as whether or not it might have been the result of a static discharge. Upon completion of the critique, troubleshooting of the saw assembly was initiated by qualified personnel to determine a specific energy source for the shock. By 1200 on September 9, 2011 enough data had been gathered to nominally rule out electrostatic discharge as the cause of the shock. However, the in-situ troubleshooting was unable to determine a specific energy source for the shock, making a severity calculation impossible. Further troubling shooting and evaluation will require disassembly of some of the components. Based on results to date it was determined that a Group 10(2) SC3 management concern OR be filed. A management review will be performed. Update 10/19/2011: Troubleshooting the equipment involved with this occurrence revealed voltages and currents involved in the shock that yield a severity calculation score of 1650 resulting a categorization of Medium Severity. For this reason, it was determined that this OR will be categorized as a Group 2(1) SC2 exposure to hazardous energy OR. This occurrence report is being tracked in LLNL's Issues Tracking System, reference Assessment No. 33303.
Cause Description:	Barrier Analysis and Why-Because methodologies were performed, coupled with an HPI analysis, to determine the apparent cause of this occurrence. A2B6C01Equipment/Material Problem - Defective or failed part. The proximate cause of this shock was the breakdown of "Inchworm" linear motor insulation, leading to insulation failure, coupled with the drive

motor housing not being grounded due to a manufacturing defect. The failure and defect resulted in inchworm motor drive voltage existing throughout the wire saw assembly. While removing a screw from the saw assembly with an Allen wrench, the side of the machinist's hand holding the wrench touched a separately grounded lighting unit. This completed a path to ground through his right hand, resulting in the shock.

The small, tabletop wire saw assembly is located on a small, single purpose workbench and consists of two main components. The saw housing contains an abrasive wire loop, driven rotationally by a commercial Nationally Recognized Testing Laboratory (NRTL) listed 24V motor purchased for this purpose. The saw housing mounts to a commercial precision "inchworm" linear motor that translates the saw horizontally. A 120V AC Burleigh manual controller provides DC power and position and hold signals to piezoelectric devices that cause the inchworm linear motor to move. The controller/linear motor are not NRTL listed, but approved for use via LLNL's Authority Having Jurisdiction (AHJ) program as "Legacy Accepted Equipment". The controller was manufactured in 1983, purchased by LLNL in 1985 and met all criteria for "Legacy AHJ Equipment". The controller is marked indicating this approval for use. Additional components on the workbench included a standalone task lighting unit and a small vacuum pump.

Design and construction of the saw assembly was by LLNL personnel, following appropriate controls and requirements. Specifically, the saw housing used a listed 24VDC motor to drive the wire loop. The saw assembly mounts to a commercial, linear motor designed for horizontal translation. At the time of design and construction, an assumption was made that the controller provided 24VDC power to the inchworm motor. This assumption was reinforced by the motor being powered via a nine-pin serial connector. Investigation subsequent to this occurrence revealed that the actual supplied voltage was approximately 750VDC. An understanding of specific controller output voltage, while significant for analysis of this event, would not have affected the requirements for the design of the unit, as the motor was designed for the purpose for which it was used.

At the time of the shock, the machinist was in the process of replacing the abrasive wire loop. The machinist stated he had performed the operation several times with no issues. The loop is replaced every few days to a week when the saw is in operation. To replace the abrasive loop, the machinist removes the top platen of the saw housing. To do this, the machinist turns off the saw motor and the controller for the inchworm motor. LOTO is not required as the saw motor, also under the

platen, runs off 24 VDC and there are no mechanical hazards (the saw moves slowly, and without much force).

With the inchworm controller "off," and the linear motor still connected, voltage remains applied to the motor. The combination of failed motor insulation and an ungrounded motor housing due to a manufacturing defect resulted in 750 VDC applied to the saw assembly with no path to ground. To remove the top platen of the saw housing, the machinist must remove seven Allen screws. He removed three with no incident. When removing the fourth screw, his hand contacted the task lighting unit on the bench. This provided a path to ground from the assembly, through the Allen wrench, the machinists hand and the case of the task light to ground, causing the shock.

The causal analysis noted that the manufacturing defect contributing to this incident would have been discovered had an AHJ field evaluation been performed on the controller. However, during AHJ program implementation the controller met all criteria for "Legacy Equipment AHJ Accepted" as defined in the "Program Electrical AHJ Field Guide for Electrical Equipment, Installations, and Work" and as such a field evaluation was not required. While the fact the equipment was legacy accepted did not play a direct role in this incident, a review of the legacy accepted AHJ criteria should be performed.

Operating Conditions:	Normal
Activity Category:	Maintenance
Immediate Action(s):	The supervisor called 911. The scene of the shock was secured and cordoned off.
FM Evaluation:	Faulty equipment has been taken out of service. Fault was isolated to a single piece of equipment. That piece of equipment will be dispositioned or repaired. No further impact on operations.
DOE Facility Representative Input:	
DOE Program Manager Input:	
Further Evaluation is Required:	No
Division or Project:	Engineering
Plant Area:	Site 200
System/Building/Equipment:	Building 432
Facility Function:	Laboratory - Research & Development

Corrective Action 01:

Target Completion Date:09/08/2011	**Actual Completion Date:**09/08/2011

Place wire saw out of service until electrical issues are resolved/corrected.

Corrective Action 02:

Target Completion Date:09/30/2011	**Actual Completion Date:**09/27/2011

Engineering Safety Alert - Develop and distribute an Engineering Safety Alert regarding the manufacturing defect discovered with the Burleigh Controller.

Corrective Action 03:

Target Completion Date:01/31/2011	**Actual Completion Date:**

Review AHJ Legacy Accepted criteria - Using a risk-based approach, review the assumptions of the legacy AHJ accepted criteria for equipment to determine whether changes are warranted in how legacy AHJ equipment is treated.

Corrective Action 04:

Target Completion Date:11/30/2011	**Actual Completion Date:**

Extent of condition - Perform extent of condition for similar controllers within TRED precision machine shops

Lessons(s) Learned:

1.) Burleigh Inchworm Controllers, especially those of 1980's vintage, should be identified and evaluated and removed from service until they can be checked for manufacturing defects.

2.) Devices operating with components that use piezoelectric effect will have power supplies of at least a few hundred volts. While this would not affect the design, construction or operation of the wire saw, the lack of knowledge did delay analysis and could have had other negative effects.

HQ Keywords:

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

HQ Summary:

On September 8, 2011, a Building 432 machinist reported experiencing a shock to his right hand while working on a "wire saw" machine. The individual reported the shock to his supervisor, who immediately called 911 and directed another worker to secure the scene. The machinist was taken to Health Services, evaluated, and released to full duty. A critique was held, and
troubleshooting of the saw assembly was initiated by qualified personnel to determine a specific energy source for the shock. On September 9, enough data had been gathered to nominally rule out electrostatic discharge as the cause of the shock. However, the in-situ troubleshooting was unable to determine a specific energy source for the shock, making a severity calculation impossible. Further troubling shooting and evaluation will require disassembly of some of the components.

Similar OR Report Number:

1. NA--LSO-LLNL-LLNL-2011-0020
2. NA--LSO-LLNL-LLNL-2010-0047

3. NA--LSO-LLNL-LLNL-2010-0028

Facility Manager:

Name	Monya Lane
Phone	(925) 423-8738
Title	Associate Director, Engineering

Originator:

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

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
09/09/2011	16:50 (PTZ)	Glenn Fox	LEDO
09/09/2011	16:52 (PTZ)	Tracey Simpson	ES&H TL
09/09/2011	16:58 (PTZ)	Rob Kong	NNSA LSO

Authorized Classifier(AC): Robert Dillman Date: 10/20/2011

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7)Report Number: NA--PS-BWP-PANTEX-2011-0063 **After 2003 Redesign**
Secretarial Office: National Nuclear Security Administration
Lab/Site/Org: Pantex Plant
Facility Name: Pantex Plant
Subject/Title: Work Performed on De-energized Circuit Not Controlled by Lockout
Date/Time Discovered: 09/12/2011 15:00 (CTZ)
Date/Time Categorized: 09/12/2011 16:15 (CTZ)
Report Type: Notification
Report Dates:

Notification	09/14/2011	14:54 (ETZ)
Initial Update		
Latest Update		
Final		

Significance Category: 3
Reporting Criteria: 2C(2) - Failure to follow a prescribed hazardous energy control process (e.g., lockout/tagout) or a site condition that results in the unexpected discovery of an uncontrolled hazardous energy source (e.g., live electrical power circuit, steam line, pressurized gas). This criterion does not include discoveries made by zero-energy checks and other precautionary investigations made before work is authorized to begin.

Cause Codes:

ISM:	4) Perform Work Within Controls
Subcontractor Involved:	Yes Mid West Fabricator
Occurrence Description:	On Saturday, 09/10/11, construction activities in the accessible attic space above Bldg. 12-6 on Saturday, 09/10/11, resulted in damage to an existing conduit and junction box. The electrical circuit within the conduit shorted to ground, tripping a protective circuit breaker upstream of the short. Utilities Operators responded to the incident and identified a tripped 20 amp circuit breaker in Panel C located in the hallway of Bldg. 12-6. Utilities Operators placed a control lock on the breaker to prevent further operation. Electricians were recalled to the Plant to verify absence of energy at the site of the event. On Monday, 09/12/11, Electricians were dispatched via work order to place a lockout on the circuit and proceed with repairs. Upon completion of the work, the lockout was removed from Panel C and the tripped circuit breaker was reset and energized. It was then that Electricians discovered power to the circuit in the junction box was still off. Upon further investigation, they determined the circuit in the damaged junction box fed from either Panel X or M, which were found to be de-energized. The main feeder breaker in the outside switchgear feeding Panel X had tripped on ground fault. Work was stopped and the event was reported to management. There were no injuries to personnel or damage to equipment or the environment as a result of this event.
Cause Description:	
Operating Conditions:	Normal
Activity Category:	Maintenance
Immediate Action(s):	Maintenance Section Manager stopped work. On 09/12/11 the event was categorized as 2C(2)SC3, Failure to follow a prescribed hazardous energy control process or a site condition that results in the unexpected discovery of an uncontrolled hazardous energy source. On 09/13/11 a critique was conducted and the category remained the same.
FM Evaluation:	
DOE Facility Representative Input:	
DOE Program Manager Input:	
Further Evaluation is	No

Required:

Division or Project: Maintenance

Plant Area: Zone 12 North

System/Building/Equipment: 12-6

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)
01M--Inadequate Conduct of Operations - Inadequate Job Planning (Electrical)
07D--Electrical Systems - Electrical Wiring
11G--Other - Subcontractor
12I--EH Categories - Lockout/Tagout (Electrical or Mechanical)
14E--Quality Assurance - Work Process Deficiency
14G--Quality Assurance - Procurement Deficiency

HQ Summary: On September 10, 2011, construction activities in the accessible attic space above Building 12-6 resulted in damage to an existing conduit and junction box. The electrical circuit within the conduit shorted to ground, tripping a protective circuit breaker upstream of the short. Utilities Operators responded to the incident and identified a tripped 20-amp circuit breaker in Panel C. Utilities Operators placed a control lock on the circuit breaker to prevent further operation. Electricians were recalled to the Plant to verify absence of energy at the site of the event. On September 12, electricians placed a lockout on the circuit and proceed with repairs. Upon completion of the work, the lockout was removed from Panel C and the tripped circuit breaker was reset and energized. It was then that the electricians discovered power to the circuit in the junction box was still off. Upon further investigation, they determined that the circuit in the damaged junction box fed from either Panel X or M, which were found to be de-energized. The main feeder breaker in the outside switchgear feeding Panel X had tripped on ground fault and was not controlled by a lockout. Work was stopped and the event was reported to management. There were no injuries to personnel or damage to equipment or the environment as a result of this event. A critique was conducted.

Similar OR Report Number:

Facility Manager:

Name	Brent Henderson
Phone	(806) 477-3213
Title	Plant Maintenance Department Manager

Originator:

Name	HALL, BEVERLY J

Phone	(806) 477-3222
Title	

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
09/12/2011	16:25 (CTZ)	Raul Castaneda-Hernandez	PXSO
09/12/2011	16:25 (CTZ)	Dianne Ely	B&W

Authorized Classifier(AC): Stan Stambaugh Date: 09/14/2011

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8)Report Number: NA--SS-SNL-NMFAC-2011-0008 **After 2003 Redesign**
Secretarial Office: National Nuclear Security Administration
Lab/Site/Org: Sandia National Laboratories - SS
Facility Name: SNL NM Site-wide F & M
Subject/Title: Improperly Wired Cord Cap to Blue M Oven in Building 894 Causes Unexpected Discovery of 60-Volt Short
Date/Time Discovered: 09/14/2011 16:30 (MTZ)
Date/Time Categorized: 09/15/2011 08:00 (MTZ)
Report Type: Notification
Report Dates:

Notification	09/19/2011	16:31 (ETZ)
Initial Update		
Latest Update		
Final		

Significance Category: 3
Reporting Criteria: 2C(2) - Failure to follow a prescribed hazardous energy control process (e.g., lockout/tagout) or a site condition that results in the unexpected discovery of an uncontrolled hazardous energy source (e.g., live electrical power circuit, steam line, pressurized gas). 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: 3) Develop and Implement Hazard Controls
4) Perform Work Within Controls
Subcontractor Involved: No
Occurrence Description: On September 14, 2011, a lab personnel in Building 894, Room 132A, noted an electrical short while installing a metal flex duct to an oven. After maintenance personnel conducted trouble shooting, it was determined the cord cap was previously wired in a non-standard

configuration, causing the unexpected discovery of a 60 volt short.

After receiving a work order to install a supply cord, the electrical craftsmen located an existing supply cord that matched the cap end from a facilities storage area and connected the cord to the new furnace. The cord was connected at the manufacturer's supplied junction box at the rear of the furnace and three wiring connections were made on the 12th of September, two days before the event. However; the wiring connections made to the existing male cord cap were not checked for proper configuration. Once the equipment was plugged in, no additional electrical checks were made. As a technician was attempting to connect a flexible vent line to the machine, part of the vent came in contact with an adjacent metal cabinet and the short was observed. The technician did not receive a shock, only the short was observed. A voltage measurement was made by a craftsman who was in the area from the chassis of the furnace to the cabinet, and a 60-volt reading was observed. At this point the equipment was unplugged and the receptacle and supply cord were inspected. The supply cord was found to be miswired at the male cord cap, with the ground conductor landed on a phase terminal and one of the phase conductors landed on the ground terminal. The miswired cord cap caused the chassis of the furnace to become energized. The wiring at the cord cap was subsequently corrected.

During the site visit the following observations and testing were performed:

The receptacle that was recently installed to serve the new furnace is an L6-30 twist lock receptacle that is fed from Panel-DB, circuits 16 and 17. The receptacle is a 30amp rated, 250volt, 3-wire device consisting of 2 "hot" conductors and a ground. The following measurements were made on the receptacle to determine proper configuration.

Phase-A to Ground 121.3 volts
Phase-B to Ground 121.4 volts
Phase-A to Phase-B 209.7 volts

The equipment ground was also checked to a known grounded location and a reading of .1 ohms was seen. These readings indicate the receptacle is properly configured and solidly grounded.

An additional ohm reading was taken from the ground prong of the receptacle to the chassis of the unplugged furnace and an infinite reading was seen indicating that the furnace is "floating" or ungrounded when not plugged in. The metal cabinet adjacent to the furnace was also checked for continuity to ground and found to have various ohm readings with the lowest being read from the door hinge and a higher

	value found at the door handle. The cabinet is inadvertently grounded through various connections to the building. All connections at the cord cap and at the furnace were re-inspected and confirmed to now be correct. Immediate Actions: The equipment was taken out of service The electrical supply cord was checked and repaired Notifications were conducted An investigation was initiated
Cause Description:	Critique/Fact Finding Performed: 09/15/2011
Operating Conditions:	Normal
Activity Category:	Maintenance
Immediate Action(s):	The equipment was taken out of service The electrical supply cord was checked and repaired Notifications were conducted An investigation was initiated
FM Evaluation:	
DOE Facility Representative Input:	
DOE Program Manager Input:	
Further Evaluation is Required:	Yes. Before Further Operation? No By Whom: Causal Analysis By When: 10/28/2011
Division or Project:	4840/Installing supply cord to Blue M oven
Plant Area:	Tech Area I
System/Building/Equipment:	Blue M oven electrical supply cord/bldg. 894, rm. 132A
Facility Function:	Balance-of-Plant - Machine shops
Corrective Action:	
Lessons(s) Learned:	
HQ Keywords:	01S--Inadequate Conduct of Operations - Incorrect/Inadequate Installation 07D--Electrical Systems - Electrical Wiring 08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical) 12B--EH Categories - Conduct of Operations 14E--Quality Assurance - Work Process Deficiency
HQ Summary:	On September 14, 2011, a technician noticed an electrical short while installing a metal flex duct to an oven in Building 894, Room 132A.

Maintenance personnel conducted troubleshooting and determined that the cord cap had been wired in a non-standard configuration, causing an unexpected 60-volt short. Two days before the event, an electrical craftsman, who was to install a supply cord on a new furnace, had located in a facilities storage area an existing supply cord that matched the cap end and had connected the cord. The cord was connected at the manufacturer's junction box at the rear of the furnace and three wiring connections were made; however, the connections to the existing male cord cap were not checked for proper configuration. Once the equipment was plugged in, no additional electrical checks were made. When the technician was attempting to connect the vent duct to the machine, part of the vent touched an adjacent metal cabinet and the short was observed. The technician was not shocked. A craftsman took a voltage measurement from the chassis of the furnace to the cabinet, and a 60-volt reading was observed. At this point the equipment was unplugged and the receptacle and supply cord were inspected. The supply cord was found to be miswired at the male cord cap, with the ground conductor landed on a phase terminal and one of the phase conductors landed on the ground terminal. The wiring at the cord cap was subsequently corrected.

Similar OR Report Number:

Facility Manager:

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

Originator:

Name	ROGERS, JESSICA
Phone	(505) 284-9732
Title	ASA

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
09/14/2011	16:30 (MTZ)	EOC	4136
09/15/2011	10:00 (MTZ)	Art Ratzel	4800
09/15/2011	10:00 (MTZ)	Mike Quinlan	4870
09/15/2011	10:00 (MTZ)	Debbie Garcia-Sanchez, FR	DOE/SSO
09/15/2011	10:00 (MTZ)	Pam McKeever	4820
09/15/2011	10:00 (MTZ)	Lynnwood Dukes	4840

Authorized Classifier(AC): John Norwalk Date: 09/19/2011

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9)Report Number: SC--AMSO-AMES-AMES-2011-0003 **After 2003 Redesign**

Secretarial Office: Science
Lab/Site/Org: Ames Laboratory
Facility Name: Ames Laboratory (BOP)
Subject/Title: Energized 110 VAC Cut
Date/Time Discovered: 09/12/2011 14:00 (CTZ)
Date/Time Categorized: 09/19/2011 13:30 (CTZ)
Report Type: Notification
Report Dates:

Notification	09/21/2011	10:10 (ETZ)
Initial Update		
Latest Update		
Final		

Significance Category: 3
Reporting Criteria: 2C(2) - Failure to follow a prescribed hazardous energy control process (e.g., lockout/tagout) or a site condition that results in the unexpected discovery of an uncontrolled hazardous energy source (e.g., live electrical power circuit, steam line, pressurized gas). This criterion does not include discoveries made by zero-energy checks and other precautionary investigations made before work is authorized to begin.

Cause Codes: A3B1C01 - Human Performance Less Than Adequate (LTA); Skill Based Errors; Check of work was LTA
-->couplet - NA

ISM:
Subcontractor Involved: Yes
Boone Construction
Occurrence Description: Contractor was performing demolition for renovation of Spedding Auditorium. Electrical lines feeding the auditorium had been removed by Ames Lab Facilities. There was a concealed single conduit coming through the perimeter of the auditorium that was used to power a bathroom lights adjacent to the auditorium. Contractor was standing on standard scaffolding using a Sawzall to remove soffit (plaster, metal screen, and metal framing) around the perimeter of the room. Contractor observed sparks and stopped work immediately. Employee did not receive a shock.
Cause Description: Contractor did not get a tall ladder to look above the location where the sawzall was to be used.
Operating Conditions: Does Not Apply
Activity Category: Construction
Immediate Action(s): Stopped cutting and contacted project manager.
FM Evaluation:

DOE Facility Representative Input:

DOE Program Manager Input:

Further Evaluation is Required: No

Division or Project: Iowa State University

Plant Area: 301 Spedding

System/Building/Equipment: Concealed Electrical Conduit Servicing 110 V Lighting

Facility Function: Laboratory - Research & Development

Corrective Action 01:

Target Completion Date:09/12/2011	**Actual Completion Date:**09/12/2011

Stop work.

Corrective Action 02:

Target Completion Date:09/12/2011	**Actual Completion Date:**09/12/2011

Meet with contractor to reiterate importance of verifying absence of hazards before assuming safe work activity.

Corrective Action 03:

Target Completion Date:09/30/2011	**Actual Completion Date:**09/21/2011

Update Pre-Job Briefing Checklist (10200.001) to remind contractors to verify absence of utilities.

Corrective Action 04:

Target Completion Date:09/30/2011	**Actual Completion Date:**09/21/2011

Update Contractor Orientation Training (AL-220) to emphasize verifying absence of utilities before performing work.

Lessons(s) Learned:

HQ Keywords:
01F--Inadequate Conduct of Operations - Training Deficiency
01N--Inadequate Conduct of Operations - Inadequate Job Planning (Other)
07D--Electrical Systems - Electrical Wiring
08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical)
11G--Other - Subcontractor
12C--EH Categories - Electrical Safety
14B--Quality Assurance - Training and Qualification Deficiency
14D--Quality Assurance - Documents and Records Deficiency
14E--Quality Assurance - Work Process Deficiency
14G--Quality Assurance - Procurement Deficiency
14H--Quality Assurance - Inspection and Acceptance Testing Deficiency

HQ Summary: On September 12, 2011, a contractor was performing demolition for renovation of the Spedding Auditorium and cut a 110-volt line. The

contractor was standing on scaffolding and was using a Sawzall® to remove soffit (plaster, metal screen, and metal framing) from around the perimeter of the room. The contractor observed sparks, immediately stopped work, and contacted the project manager. Electrical lines feeding the auditorium had been removed by Ames Lab Facilities; however, there was a concealed single conduit coming through the perimeter of the auditorium that was used to power bathroom lights adjacent to the auditorium. The contractor did not get a tall ladder to look above the location where the saw was to be used. There was no electrical shock.

Similar OR Report Number:

Facility Manager:

Name	WESSELS, TOM E
Phone	(515) 294-2153
Title	ESH&A Manager

Originator:

Name	NELSON, SHAWN A
Phone	(515) 294-9769
Title	INDUSTRIAL SAFETY SPECIALIST

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
09/12/2011	14:00 (CTZ)	Cindy Baebler	AMSO

Authorized Classifier(AC):

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10)Report Number: SC--ASO-ANLE-ANLEFMS-2011-0016 **After 2003 Redesign**

Secretarial Office: Science

Lab/Site/Org: Argonne National Laboratory East

Facility Name: Facility Management Services

Subject/Title: Contractor Electrician Sustains Shock across Fingers While Cutting Energized 110v AC Wire

Date/Time Discovered: 09/28/2011 08:59 (CTZ)

Date/Time Categorized: 09/28/2011 10:35 (CTZ)

Report Type: Notification

Report Dates:

Notification	09/30/2011	16:05 (ETZ)
Initial Update		
Latest Update		
Final		

Significance Category: 2

Reporting Criteria: 2C(1) - Failure to follow a prescribed hazardous energy control process

	(e.g., lockout/tagout) or disturbance of a previously unknown or mislocated hazardous energy source (e.g., live electrical power circuit, steam line, pressurized gas) resulting in a person contacting (burn, shock, etc.) hazardous energy.
Cause Codes:	
ISM:	
Subcontractor Involved:	Yes Universal Power & Control
Occurrence Description:	On September 28, 2011, at approximately 9 AM, a sub-tier contractor electrician sustained a 110v AC shock between his index and middle finger of his right hand when cutting a wire in an out-of-service timing control box located in the fan loft of Building 223. The task was associated with the Hood Replacement Project. Preliminary information from the fact-finding determined that one set of wires entering the box had been properly locked and tagged out but a second set had not. No verification to assure all wires were deenergized was conducted within the box prior to cutting the wires.
Cause Description:	
Operating Conditions:	Indoor location, dry concrete floor, sufficient light.
Activity Category:	Construction
Immediate Action(s):	A 9-1-1 was initiated. The sub-contractor electrician was evaluated by Argonne medics and signed a refusal of further treatment. The second set of wires was traced back to their source and properly locked and tagged out. A fact-finding meeting was conducted during the afternoon of the incident. The electrical work was paused for development of a specific procedure for the next phase with review and concurrence by a site electrical engineer and the division safety personnel. An Electrical Severity Index Tool Calculation was performed based upon the conditions at the time of the incident. The score was 330 (moderate severity range is 31-1749). The sub-contractor electrician was disciplined per contract terms and suspended from work at Argonne. Continuing investigation is underway.
FM Evaluation:	
DOE Facility Representative Input:	
DOE Program Manager Input:	
Further Evaluation is Required:	Yes. Before Further Operation? No By Whom: FMS Division By When:

Division or Project: Facilities Management & Services--Hood Replacement

Plant Area: 200 Area

System/Building/Equipment: Hood Exhaust/223/Electrical

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)
01M--Inadequate Conduct of Operations - Inadequate Job Planning (Electrical)
08A--OSHA Reportable/Industrial Hygiene - Electrical Shock
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 September 28, 2011, a sub-tier contractor electrician sustained a 110-volt AC shock between his index and middle finger of his right hand when cutting a wire in an out-of-service timing control box located in the fan loft of Building 223. The task was associated with the Hood Replacement Project. Preliminary information from the fact-finding meeting determined that one set of wires entering the box had been properly locked and tagged out but a second set of wires had not. No verification to assure all wires were de-energized was conducted within the box before cutting the wires. The electrician was evaluated by Argonne medics and he signed a refusal of further treatment. The second set of wires was traced back to their source and properly locked and tagged out. The electrical work was paused for development of a specific procedure for the next phase with review and concurrence by a site electrical engineer and the division safety personnel. Continuing investigation is underway.

Similar OR Report Number:

Facility Manager:

Name	STINE, G. Y.
Phone	(630) 252-8930
Title	Director, Facilities Management & Services Div.

Originator:

Name	BENKERT, JOHN J
Phone	(630) 252-4335
Title	

HQ OC Notification:

Date	Time	Person Notified	Organization

NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
09/28/2011	10:10 (CTZ)	G. Y. Stine	ANLEFMS
09/28/2011	10:35 (CTZ)	R. Colglazier	ANLEPMA
09/28/2011	10:40 (CTZ)	C. Clarke	ANLEOPS
09/28/2011	10:45 (CTZ)	C. Schumann	DOE-ASO

Authorized Classifier(AC):

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11)Report Number: SC--BSO-LBL-CRD-2011-0001 **After 2003 Redesign**

Secretarial Office: Science

Lab/Site/Org: Lawrence Berkeley Laboratory

Facility Name: Computational Research Division

Subject/Title: Employee Received Electrical Shock from Faulty Equipment

Date/Time Discovered: 09/14/2011 17:30 (PTZ)

Date/Time Categorized: 09/15/2011 09:18 (PTZ)

Report Type: Notification/Final

Report Dates:

Notification	09/19/2011	17:19 (ETZ)
Initial Update	09/19/2011	17:19 (ETZ)
Latest Update	09/19/2011	17:19 (ETZ)
Final	09/19/2011	17:19 (ETZ)

Significance Category: 4

Reporting Criteria: 10(2) - An event, condition, or series of events that does not meet any of the other reporting criteria, but is determined by the Facility Manager or line management to be of safety significance or of concern to other facilities or activities in the DOE complex. One of the four significance categories should be assigned to the occurrence, based on an evaluation of the potential risks and the corrective actions taken. (1 of 4 criteria - This is a SC 4 occurrence)

Cause Codes:

ISM: 5) Provide Feedback and Continuous Improvement

Subcontractor Involved: No

Occurrence Description: On 09/09/2011, a Computer Sciences (CS) Directorate employee received an electrical shock in Building 50B while installing a piece of equipment.

The employee was installing a Server Technology Sentry Fail-Safe XL PTXL-HF16-2-06 Power Tower, a power distribution unit (PDU) in a rack in Building 50B room 2275 on 09/09/2011. The unit has two L6-30

208V whips, each supplies power to eight C14-208V outlets. The unit is designed for redundancy. After the employee installed the unit in the rack, he plugged the A whip into a 208V outlet. When he grabbed the B whip plug, he received a shock and immediately dropped the B whip plug. He tested the plug with a multi-meter and discovered that the power from the A whip was feeding back through the B whip. He immediately unplugged the unit and removed it from the rack. He immediately reported the incident to his management to begin investigation of the equipment. The incident was not reported to the CS safety coordinator until 09/14/2011.

The employee later described the shock as 'a tingling' sensation. He stated that he did not realize that a very minor shock constituted an injury and should be reported to the Lab's Health Services. Upon learning of the incident on 09/14/2011, the CS safety coordinator informed EH&S the same day. An EH&S electrical safety engineer conducted a preliminary investigation that day and determined that the equipment was faulty. He contacted the manufacturer and found out that the problem was a known issue and that it occurs if the cables are connected out of phase from one another.

The employee reported to Health Services on 09/15/2011 and returned to work without restriction.

Cause Description:

Operating Conditions: Indoors, lighted, dry

Activity Category: Research

Immediate Action(s): The employee dropped the plug and disconnected the other plug from the outlet.

FM Evaluation: - The employee was not performing LOTO work and was not in violation of any prescribed procedure. Based on the fact that the equipment is faulty, LBNL decided to report the incident as Management Concern to share the information about a defective equipment and to remind employees to promptly report injuries, no matter how minor.

- EH&S electrical safety engineer will contact the manufacturer and the NRTL (Nationally Recognized Testing Laboratory) Listing agency to determine whether a recall or other action is needed.

- CS Associate Laboratory Director sent out a CS level-1 email on 09/16/2011 reminding everyone of the requirement to report all injuries, no matter how minor, including electrical shock.

DOE Facility Representative Input:

DOE Program Manager

Input:

Further Evaluation is Required:	No
Division or Project:	Computing Sciences Directorate
Plant Area:	B50B-2275
System/Building/Equipment:	Building 50B Room 2275
Facility Function:	Laboratory - Research & Development
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 07B--Electrical Systems - Electrical Distribution 08A--OSHA Reportable/Industrial Hygiene - Electrical Shock 11H--Other - Procurement Deficiency/Defective Items 12C--EH Categories - Electrical Safety 14E--Quality Assurance - Work Process Deficiency 14G--Quality Assurance - Procurement Deficiency
HQ Summary:	On September 9, 2011, a Computer Sciences (CS) Directorate employee received an electrical shock in Building 50B while installing a Server Technology Sentry Fail-Safe XL PTXL-HF16-2-06 Power Tower (a power distribution unit in a rack) in Building 50B, Room 2275. The unit has two L6-30 208-volt whips, each supplying power to eight C14-208-volt outlets. After the employee installed the unit in the rack, he plugged the A whip into a 208-volt outlet and, when he grabbed the B whip plug, he received a shock and immediately dropped the B whip plug. He tested the plug with a multi-meter and discovered that the power from the A whip was feeding back through the B whip. He immediately unplugged the unit and removed it from the rack. He reported the incident to his management to begin investigation of the equipment, but the incident was not reported to the CS safety coordinator until September 14. The employee later described the shock as 'a tingling' sensation and said that he didn¡¯t realize that a very minor shock constituted an injury and should be reported to the Lab's Health Services. An electrical safety engineer performed a preliminary investigation and determined that the equipment was faulty. He contacted the manufacturer and found out that the problem was a known issue and that it occurs if the cables are connected out of phase from one another. The manufacturer and testing laboratory will be contacted to determine whether a recall or other action is needed.
Similar OR Report Number:	
Facility Manager:	Name: Katherine Yelick

Phone	(510) 495-2431
Title	Associate Laboratory Director

Originator:

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

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
09/15/2011	09:22 (PTZ)	Kevin Hartnett	BSO
09/15/2011	09:22 (PTZ)	Mary Gross	BSO

Authorized Classifier(AC):

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12)Report Number: SC--BSO-LBL-OPERATIONS-2011-0018 **After 2003 Redesign**
Secretarial Office: Science
Lab/Site/Org: Lawrence Berkeley Laboratory
Facility Name: Operations Division
Subject/Title: Circuit Breaker Tripped During Wall Drilling - No Injuries
Date/Time Discovered: 09/12/2011 08:45 (PTZ)
Date/Time Categorized: 09/12/2011 11:44 (PTZ)
Report Type: Notification
Report Dates:

Notification	09/14/2011	20:01 (ETZ)
Initial Update		
Latest Update		
Final		

Significance Category: 3
Reporting Criteria: 2C(2) - Failure to follow a prescribed hazardous energy control process (e.g., lockout/tagout) or a site condition that results in the unexpected discovery of an uncontrolled hazardous energy source (e.g., live electrical power circuit, steam line, pressurized gas). This criterion does not include discoveries made by zero-energy checks and other precautionary investigations made before work is authorized to begin.

Cause Codes:
ISM: 2) Analyze the Hazards
3) Develop and Implement Hazard Controls
4) Perform Work Within Controls
Subcontractor Involved: Yes

	Business Interios by Staples / Seabrite
Occurrence Description:	At approximately 0845 hours on 09/12/2011, a subcontractor Seabrite worker drilled into a sheetrock wall in B90-2063 to install a white board in the conference room. The drill penetrated the backside of an electrical panel mounted on the other side of the wall, contacted a live bus bar of electrical panel PNL-019090 (92A2A), causing the circuit breaker to trip, which in turn resulted in power failure to a portion of Building 90. Some of the receptacle outlets on the second floor of B90 were affected. After the power failure, the Facilities electrician issued a stop work order, and reset the tripped circuit breaker. The scope of work under approved SJHA (Subcontractor Job Hazard Analysis) did not include drill work, as a result, no penetration permit was issued for this project. There were no injuries.
Cause Description:	
Operating Conditions:	Indoors, lighted, dry
Activity Category:	Construction
Immediate Action(s):	The LBNL electrician stopped work
FM Evaluation:	- Facilities suspended all scheduled work by Seabrite, pending completion of a stand-down meeting. - Seabrite is a subcontractor of Business Interios by Staples
DOE Facility Representative Input:	
DOE Program Manager Input:	
Further Evaluation is Required:	Yes. Before Further Operation? No By Whom: Facilities By When:
Division or Project:	Facilities Division
Plant Area:	B90-2063
System/Building/Equipment:	Building 90 Room 2063
Facility Function:	Balance of Plant - Infrastructure (Other Functions not specifically listed in this Category)
Corrective Action:	
Lessons(s) Learned:	
HQ Keywords:	01N--Inadequate Conduct of Operations - Inadequate Job Planning (Other) 07C--Electrical Systems - Power Outage 08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical) 11G--Other - Subcontractor 12C--EH Categories - Electrical Safety 14E--Quality Assurance - Work Process Deficiency

14G--Quality Assurance - Procurement Deficiency

HQ Summary: On September 12, 2011, a subcontractor worker drilled into a sheetrock wall in B90-2063 to install a white board in the conference room. The drill penetrated the backside of an electrical panel mounted on the other side of the wall, contacted an energized buss bar of electrical panel PNL-019090 (92A2A), causing the circuit breaker to trip, which in turn resulted in power failure to a portion of Building 90. After the power failure, the Facilities electrician issued a stop work order, and reset the tripped circuit breaker. The scope of work under approved Subcontractor Job Hazard Analysis did not include drill work and as a result, no penetration permit was issued for this project. All scheduled work by the subcontractor was suspended pending completion of a stand-down meeting. There were no injuries.

Similar OR Report Number:

Facility Manager:

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

Originator:

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

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
09/12/2011	11:58 (PTZ)	Kevin Hartnett	BSO
09/12/2011	11:58 (PTZ)	Mary Gross	BSO

Authorized Classifier(AC):

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13)Report Number: SC--BSO-LBL-OPERATIONS-2011-0019 **After 2003 Redesign**

Secretarial Office: Science

Lab/Site/Org: Lawrence Berkeley Laboratory

Facility Name: Operations Division

Subject/Title: LOTO Violation During B71 Laboratory Construction Project - No Injuries

Date/Time Discovered: 09/13/2011 07:45 (PTZ)

Date/Time Categorized: 09/13/2011 14:11 (PTZ)

Report Type: Notification

Report Dates:

Notification	09/15/2011	19:48 (ETZ)
Initial Update		

Latest Update		
Final		

Significance Category: 3

Reporting Criteria: 2C(2) - Failure to follow a prescribed hazardous energy control process (e.g., lockout/tagout) or a site condition that results in the unexpected discovery of an uncontrolled hazardous energy source (e.g., live electrical power circuit, steam line, pressurized gas). This criterion does not include discoveries made by zero-energy checks and other precautionary investigations made before work is authorized to begin.

Cause Codes:

ISM: 4) Perform Work Within Controls

Subcontractor Involved: Yes
Gwinn Construction

Occurrence Description: Summary: A subcontractor electrician relocated an electrical box without applying LOTO. There were no injuries.

At approximately 0745 hours on 09/13/2011, a Facilities Construction Manager discovered that a Gwinn Construction electrician had relocated a 4-plug electrical box, including its wiring and portions of conduit, without verification of air gap isolation or performing LOTO (Lockout/Tagout) on the circuit. He stopped work immediately. The subcontractor was working on the Building 71 Room 117 laboratory construction project (FP#1105). The box was incorrectly labeled with an abandoned panel number. Although the electrician had used a voltage tester and confirmed the wires were de-energized, the circuit was later traced to a live panel, with the switch in the 'off' position. There were no injuries.

Facilities conducted a meeting with all Construction Managers (CM's) and Project Managers (PM's), including Engineering personnel, to review LOTO safety expectations. All CM's and PM's visited each work site and held stand-down meetings with the respective construction crew and conducted safety meetings to pass on the LOTO safety message.

Cause Description:

Operating Conditions: Indoors, lighted, dry

Activity Category: Construction

Immediate Action(s): The Construction Manager stopped work immediately.

FM Evaluation: - Stop-Work remains in effect for electrical work on the project.

- LBNL Facilities requested that the Gwinn electrician be removed and restricted from the LBNL site.

	- Facillities held a separate safety meeting on 09/15/2011 with the entire Gwinn Construction crew prior to re-authorizing electrical work on this project.
DOE Facility Representative Input:	
DOE Program Manager Input:	
Further Evaluation is Required:	Yes. Before Further Operation? Yes By Whom: Facilities By When: 09/16/2011
Division or Project:	Facilities Division
Plant Area:	B71-117
System/Building/Equipment:	Building 71 Room 117
Facility Function:	Balance of Plant - Infrastructure (Other Functions not specifically listed in this Category)
Corrective Action:	
Lessons(s) Learned:	
HQ Keywords:	01B--Inadequate Conduct of Operations - Loss of Configuration Management/Control 01K--Inadequate Conduct of Operations - Lockout/Tagout Noncompliance (Electrical) 11G--Other - Subcontractor 12I--EH Categories - Lockout/Tagout (Electrical or Mechanical) 14D--Quality Assurance - Documents and Records Deficiency 14E--Quality Assurance - Work Process Deficiency 14G--Quality Assurance - Procurement Deficiency
HQ Summary:	On September 13, 2011, a Facilities Construction Manager discovered that a subcontract construction electrician had relocated a 4-plug electrical box, including its wiring and portions of conduit, without verification of air gap isolation or performing lockout/tagout on the circuit. He stopped the work immediately. The subcontractor was working on the Building 71 Room 117 laboratory construction project. The box was incorrectly labeled with an abandoned panel number. Although the electrician had used a voltage tester and confirmed the wires were de-energized, the circuit was later traced to an energized panel, with the switch in the 'off' position. There were no injuries. A Stop-Work remains in effect for electrical work on the project.
Similar OR Report Number:	

Facility Manager:

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

Originator:

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

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
09/13/2011	14:30 (PTZ)	Mary Gross	BSO
09/13/2011	14:30 (PTZ)	Kevin Hartnett	BSO

Authorized Classifier(AC):

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14)Report Number: SC--PSO-PPPL-PPPL-2011-0007 **After 2003 Redesign**

Secretarial Office: Science

Lab/Site/Org: Princeton Plasma Physics Laboratory

Facility Name: Princeton Plasma Physics Lab. (BOP)

Subject/Title: Failure to follow a prescribed hazardous energy control process prior to water removal from a transformer cabinet.

Date/Time Discovered: 09/04/2011 14:04 (ETZ)

Date/Time Categorized: 09/10/2011 11:30 (ETZ)

Report Type: Update/Final

Report Dates:

Notification	09/13/2011	16:01 (ETZ)
Initial Update	09/14/2011	12:30 (ETZ)
Latest Update	10/05/2011	16:17 (ETZ)
Final		

Significance Category: 2

Reporting Criteria: 2C(1) - Failure to follow a prescribed hazardous energy control process (e.g., lockout/tagout) or disturbance of a previously unknown or mislocated hazardous energy source (e.g., live electrical power circuit, steam line, pressurized gas) resulting in a person contacting (burn, shock, etc.) hazardous energy.

Cause Codes: A4B3C11 - Management Problem; Work Organization & Planning LTA; Inadequate work package preparation
A3B3C05 - Human Performance Less Than Adequate (LTA); Knowledge Based Error; Incorrect assumption that a correlation exists

between two or more facts
-->couplet - A1B4C04 - Design/Engineering Problem; Design Verification / Installation Verification LTA; Acceptance of design/installation LTA

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

Subcontractor Involved: No

Occurrence Description: Proper lockout/tagout processes were not followed when accessing a transformer cabinet to remove water from Robicon Power Supplies in the ESAT Basement.

As a result of heavy rains from Hurricane Irene and the failure of a sump pumping system the ESAT Building basement was slightly flooded (~ 4.5 inches of water on floor). The basement of the ESAT Building houses several Robicon Power Supplies. These power supplies consist of transformers and rectifiers which take 4160 VAC and output up to 300 VDC. On the morning of Wednesday August 31, 2011 a member of the Power Systems Branch contacted Facilities personnel to help remove the remaining water in the ESAT basement to prevent any damage to the Robicon Power Supplies. A Job Hazard Analysis was prepared by personnel in the Facilities group and then reviewed and updated by Power Systems personnel prior to commencement of work. This hazard analysis included ensuring that power was de-energized (lockout/tagout) to the high voltage supply and all potential/stored energy to be "turned off" for the equipment being worked on. The workers were briefed on the hazards by both Power Systems Branch personnel and Facilities personnel. On Thursday September 1, 2011 Facilities personnel returned to the ESAT basement to complete their work. While working in the T-3 transformer compartment a member of the Facilities group received what was reported as a static shock (with a visual spark) while removing residual water. The Facilities group individual was leaning over a transformer when he received a shock to the neck. Facilities personnel stopped work and asked the Power Systems Branch personnel to confirm that power was removed from the panel. Power Systems personnel confirmed power was removed and Facilities personnel completed their work. The incident was reported approximately four (4) days after the occurrence.

After the incident was reported a review of the system was performed and it was found that capacitors in the rectifier section were still at some voltage (approximately 140 VDC). It is likely that this voltage was responsible for the shock to the individual. An electrical severity index calculation (index developed by the EFCOG Committee) indicated a value of 21 which is considered "Low Electrical Severity". "Low (score of 1 -30) events are usually those items that truly did not pose a risk to the worker such as carpet shock and mishaps that were expected to

	happen in the work control document for which the worker was appropriately prepared for. Therefore, an event with a calculated ES value of 1-30 is not an electrical event". Further investigation revealed that the capcitors were being fed 140VDC from a ground detection system. A follow-up electrical severity calculation completed on 14 September 2011 indicates an Electrical Severity of 210 which falls in the Medium hazard range of 31 - 1749 on the EFCOG Committee scale. Further investigation revealed that although there were several breakers open including one which was racked-out and a disconnect switch open in the supply to the Robicon power supplies, there was no Lockout/Tagout in place as required by the Job Hazard Analysis. Additionally, there were no zero voltage checks performed prior to personnel accessing the transformer compartment. If the proper prescribed hazardous energy control process had been used, it is likely that 140 VDC would have been found on the secondary of the transformer that likely provided the shock.
Cause Description:	The individual supervising this activity assumed that satisfying the kirk key system safed the power supplies for the work being performed. While the kirk key system did remove high voltage power supplied, the lack of zero voltage checks prevented finding of an obscure "low hazard" voltage source. This was complicated by the fact that an access procedure was not available to be used for access to the supplies.
Operating Conditions:	Equipment was de-energized at the time of the occurrence
Activity Category:	Maintenance
Immediate Action(s):	Proper lockout/tagout and zero voltage checks to be performed. Isolation/removal of power supplying rectifier from ground detection system shall be included in this lockout/tagout. Additionally, an access procedure addressing the specific steps required to perform proper hazardous control including lockout/tagout will need to be developed for these power supplies.
FM Evaluation:	This occurrence does not affect the plant, system, program, etc.
DOE Facility Representative Input:	
DOE Program Manager Input:	
Further Evaluation is Required:	No
Division or Project:	Engineering and Infrastructure
Plant Area:	C-Site ESAT Basement

System/Building/Equipment: ESAT Building Basement/Robicon Power Supply Transformer T-3

Facility Function: Laboratory - Research & Development

Corrective Action 01:

Target Completion Date:10/15/2011	**Actual Completion Date:**10/05/2011

Development of an Access Procedure to be completed prior to working on equipment. Additionally, the importance of zero voltage checks will be included in the procedure.

Lessons(s) Learned: More than anything this occurrence shows the importance of zero-voltage checks. While the hazardous energy control process was lacking with respect to the access procedure, the performance of zero voltage checks would likely have found the existing voltage.

HQ Keywords:
01K--Inadequate Conduct of Operations - Lockout/Tagout Noncompliance (Electrical)
01M--Inadequate Conduct of Operations - Inadequate Job Planning (Electrical)
05D--Mechanical/Structural - Mechanical Equipment Failure/Damage
08A--OSHA Reportable/Industrial Hygiene - Electrical Shock
11D--Other - Natural Phenomena
12I--EH Categories - Lockout/Tagout (Electrical or Mechanical)
14E--Quality Assurance - Work Process Deficiency

HQ Summary: On September 1, 2011, while working in a T-3 transformer compartment, a member of the Facilities group received a static shock (with a visual spark) while removing residual water from the ESAT basement after it was flooded by Hurricane Irene, and failure of a sump pumping system. The basement houses several Robicon Power Supplies consisting of transformers and rectifiers. A Job Hazard Analysis (JHA) had been prepared. This hazard analysis included ensuring that power was de-energized (lockout/tagout) to the high voltage supply and all potential/stored energy to be "turned off" for the equipment being worked on. The workers were briefed on the hazards by both Power Systems Branch personnel and Facilities personnel. The Facilities group individual was leaning over a transformer when he received a shock to the neck. Facilities personnel stopped work and Power Systems personnel confirmed power was removed and Facilities personnel completed their work. After the incident was reported a review of the system was performed and it was found that capacitors in the rectifier section were still at some voltage (approximately 140 VDC; low severity). It is likely that this voltage was responsible for the shock to the individual. Further investigation revealed that the capacitors were being fed 140VDC from a ground detection system, and that there was no lockout/tagout in place as required by the JHA to the Robicon power supplies.

Similar OR Report Number: 1. None

Facility Manager:

Name	WHITE, FRANCIS J.
Phone	(609) 243-2899
Title	HEAD, SITE PROTECTION DIVISION

Originator:

Name	YAGER, LYNNE H
Phone	(609) 243-2367
Title	QUALITY ASSURANCE TECHNICAL SPECIALI

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
09/10/2011	12:00 (ETZ)	Leif Dietrich	DOE PSO

Authorized Classifier(AC):

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15)Report Number: SC--SSO-SU-SLAC-2011-0012 **After 2003 Redesign**
Secretarial Office: Science
Lab/Site/Org: Stanford Linear Accelerator Center
Facility Name: Stanford Linear Accelerator Center
Subject/Title: 12 kV Fault in Unoccupied Underground Vault
Date/Time Discovered: 09/20/2011 10:45 (PTZ)
Date/Time Categorized: 09/20/2011 18:00 (PTZ)
Report Type: Notification
Report Dates:

Notification	09/22/2011	17:10 (ETZ)
Initial Update		
Latest Update		
Final		

Significance Category: 3
Reporting Criteria: 2C(2) - Failure to follow a prescribed hazardous energy control process (e.g., lockout/tagout) or a site condition that results in the unexpected discovery of an uncontrolled hazardous energy source (e.g., live electrical power circuit, steam line, pressurized gas). 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: SLAC high voltage electricians were performing switching of 12 kV buses when a 12 kV phase-to-phase fault occurred in a nearby

	underground vault. The electricians were transferring loads from 12 kV Bus 3 to 12 kV Bus 6 in preparation for a Bus 3 outage. When attempting to transfer a substation from Bus 3 to Bus 6, a 12 kV cable that had been disconnected (over 10 years ago) and taped off in the vault was inadvertently energized. The disconnected cable faulted at the taped-off end resulting in an electrical arc in the vault. The arc and resulting explosion displaced the manhole cover approximately two feet horizontally. The upstream breaker promptly tripped on overcurrent and isolated the fault. Several nearby workers were startled by the sound of the explosion. There were no injuries. The momentary power outage caused the linear accelerator and several other systems to go off line. Other witnesses: Two employees in the general vicinity of the manhole cover were startled by the noise, and two other employees in the area also noticed the event.
Cause Description:	
Operating Conditions:	Does not apply.
Activity Category:	Normal Operations (other than Activities specifically listed in this Category)
Immediate Action(s):	The faulted circuit was isolated and locked out with an administrative lock and tag. All 12 kV switching operations were placed on hold. Recovery operations were implemented for the affected systems.
FM Evaluation:	
DOE Facility Representative Input:	
DOE Program Manager Input:	
Further Evaluation is Required:	Yes. Before Further Operation? No By Whom: SLAC Investigation Team By When:
Division or Project:	Accelerator Directorate (AD)
Plant Area:	Building 002
System/Building/Equipment:	Building 002 (Klystron Gallery), Sector 2
Facility Function:	Accelerators
Corrective Action:	
Lessons(s) Learned:	
HQ Keywords:	01E--Inadequate Conduct of Operations - Operations Procedure Noncompliance 07B--Electrical Systems - Electrical Distribution 07C--Electrical Systems - Power Outage 07D--Electrical Systems - Electrical Wiring

08K--OSHA Reportable/Industrial Hygiene - Near Miss (Other)
12C--EH Categories - Electrical Safety
14E--Quality Assurance - Work Process Deficiency

HQ Summary: On September 20, 2011, SLAC high voltage electricians were performing switching of 12-kV buses when a 12-kV phase-to-phase fault occurred in a nearby underground vault. The electricians were transferring loads from 12-kV Bus 3 to 12-kV Bus 6 in preparation for a Bus 3 outage. While attempting to transfer a substation from Bus 3 to Bus 6, a 12-kV cable that had been disconnected (over 10 years ago) and taped off in the vault was inadvertently energized. The disconnected cable faulted at the taped-off end resulting in an electrical arc in the vault. The arc and resulting explosion displaced the manhole cover approximately 2 feet horizontally. The upstream breaker promptly tripped on overcurrent and isolated the fault. Several nearby workers were startled by the sound of the explosion. There were no injuries. The momentary power outage caused the linear accelerator and several other systems to go off line. The faulted circuit was isolated and locked out with an administrative lock and tag. All 12-kV switching operations were placed on hold. Recovery operations were implemented for the affected systems.

Similar OR Report Number:

Facility Manager:

Name	KERWIN, RALPH R
Phone	(650) 926-2095
Title	FIRE MARSHAL

Originator:

Name	JOHNSON, HOPE E
Phone	(650) 926-4322
Title	FACILITY MANAGER ADMIN.

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
09/20/2011	17:00 (PTZ)	Ralph Kerwin	SLAC
09/20/2011	18:00 (PTZ)	Marie Heard	SSO DOE

Authorized Classifier(AC):

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16)Report Number: SC--TJSO-JSA-TJNAF-2011-0009 **After 2003 Redesign**
Secretarial Office: Science
Lab/Site/Org: Thomas Jefferson National Accelerator Site
Facility Name: Thomas Jefferson Nat'l Accelerator
Subject/Title: Minor Shock and Burn from Contact With an Electrical Junction Box

Date/Time Discovered: 09/08/2011 10:35 (ETZ)
Date/Time Categorized: 09/09/2011 15:30 (ETZ)
Report Type: Notification
Report Dates:

Notification	09/13/2011	10:20 (ETZ)
Initial Update		
Latest Update		
Final		

Significance Category: 3
Reporting Criteria: 10(2) - An event, condition, or series of events that does not meet any of the other reporting criteria, but is determined by the Facility Manager or line management to be of safety significance or of concern to other facilities or activities in the DOE complex. One of the four significance categories should be assigned to the occurrence, based on an evaluation of the potential risks and the corrective actions taken. (1 of 4 criteria - This is a SC 3 occurrence)

Cause Codes:
ISM:
Subcontractor Involved: No
Occurrence Description: Jefferson Lab employee experienced a shock and 2nd-degree burn on the palm side of left hand upon touching a wall-mounted electrical junction box. Subsequent inspection of the junction box revealed that an energized 120 VAC power wire within the junction box had previously been pinched between the metal junction box and its metal cover plate. The added pressure of the worker's hand on the cover of the junction box is suspected to have further pinched the wire and penetrated to the conductor. This created an electrical discharge through the junction box and contacted the worker's hand.
Cause Description: Pending
Operating Conditions: Mechanical installation in progress
Activity Category: Construction
Immediate Action(s): Employee was sent to JLab Occupational Medicine clinic. (First-aid-only treatment required.)
Contacted Facilities Management which dispatched electricians to the location.
Electrical power sources supplying the conductors in the box were secured.
FM Evaluation: Pending
DOE Facility Representative Input:
DOE Program Manager

Input:

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

Division or Project: Accelerator Division Cryomodule Production

Plant Area: Test Lab Rm 115

System/Building/Equipment: Electrical Distribution System

Facility Function: Accelerators

Corrective Action:

Lessons(s) Learned: Pending

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 September 8, 2011, a Jefferson Lab employee experienced a shock and second-degree burn on the palm side of the left hand upon touching a wall-mounted electrical junction box. Subsequent inspection of the junction box revealed that an energized 120-VAC power wire within the junction box had previously been pinched between the metal junction box and its metal cover plate. The added pressure of the worker's hand on the cover of the junction box is suspected to have further pinched the wire and penetrated to the conductor. This created an electrical discharge through the junction box and contacted the worker's hand. The employee was sent to the lab's Occupational Medicine clinic for first-aid treatment. Facilities Management was contacted and electricians were dispatched to secured electrical power sources supplying the conductors.

Similar OR Report Number: 1. None

Facility Manager:

Name	KELLY, JOHN JACKSON
Phone	(757) 269-7531
Title	EMERGENCY MANAGER

Originator:

Name	KELLY, JOHN JACKSON
Phone	(757) 269-7531
Title	EMERGENCY MANAGER

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
09/08/2011	14:30 (ETZ)	S. Neilson	TJSO

Authorized Classifier(AC): John Kelly Date: 09/09/2011

17)Report Number: SC-ORO--ORNL-X10CENTRAL-2011-0003 **After 2003 Redesign**
Secretarial Office: Science
Lab/Site/Org: Oak Ridge National Laboratory
Facility Name: ORNL Central Complex
Subject/Title: Technician Receives Mild Electrical Shock While Purging Furnace
Date/Time Discovered: 09/28/2011 09:00 (ETZ)
Date/Time Categorized: 09/29/2011 15:29 (ETZ)
Report Type: Update
Report Dates:

Notification	09/30/2011	16:26 (ETZ)
Initial Update	10/20/2011	12:29 (ETZ)
Latest Update	10/20/2011	12:35 (ETZ)
Final		

Significance Category: 2
Reporting Criteria: 2C(1) - Failure to follow a prescribed hazardous energy control process (e.g., lockout/tagout) or disturbance of a previously unknown or mislocated hazardous energy source (e.g., live electrical power circuit, steam line, pressurized gas) resulting in a person contacting (burn, shock, etc.) hazardous energy.

Cause Codes:
ISM:
Subcontractor Involved: No
Occurrence Description: On September 28, 2011, a technician was simultaneously inserting a stainless steel gas purge line and lowering the door of an electric box furnace when he experienced a mild electrical shock to his right forearm. The technician was holding the stainless steel purge line in his left hand while lowering the box furnace door with his right hand. The stainless steel purge line inadvertently came into contact with the furnace heating element.

The door to the furnace had been blocked open slightly to allow for the purge line, which was contrary to the design of the furnace and acceptable work practices.

On September 29, 2011, line management and the Laboratory Shift Superintendent (LSS) were notified of the event and it was categorized as a 2C(1) Hazardous Energy Control, SC 2.

There were no injuries, environmental, health or safety consequences or impacts as a result of this occurrence.

	UPDATE October 20, 2011: Extension to ORPS Reporting date required to match the NTS Corrective Action Reporting date. The previous ORPS Final Report date of November 11, 2011, is now changed to December 9, 2011. This action was approved by the Facility Representative.
Cause Description:	
Operating Conditions:	Normal
Activity Category:	Research
Immediate Action(s):	The furnace was removed from service. The incident was not reported at the time, but in subsequent discussions with line management on September 29, 2011, the technician was advised to report to ORNL Health Services. The employee was evaluated and returned to work without any restrictions. On September 29, 2011, line management and the LSS were notified of the event and it was categorized as a 2C(1) Hazardous Energy Control, SC 2. A critique was conducted on September 29, 2011.
FM Evaluation:	ORNL line management will evaluate the circumstances surround the event and implement actions as appropriate.
DOE Facility Representative Input:	
DOE Program Manager Input:	
Further Evaluation is Required:	Yes. Before Further Operation? No By Whom: Gene Ice By When: 12/09/2011
Division or Project:	Materials Science and Technology Division
Plant Area:	Building 4508
System/Building/Equipment:	Building 4508
Facility Function:	Laboratory - Research & Development
Corrective Action:	
Lessons(s) Learned:	
HQ Keywords:	01A--Inadequate Conduct of Operations - Inadequate Conduct of Operations (miscellaneous) 01E--Inadequate Conduct of Operations - Operations Procedure Noncompliance 01P--Inadequate Conduct of Operations - Inadequate Oral Communication 08A--OSHA Reportable/Industrial Hygiene - Electrical Shock

12C--EH Categories - Electrical Safety
14E--Quality Assurance - Work Process Deficiency

HQ Summary: On September 28, 2011, a technician was simultaneously inserting a stainless steel gas purge line and lowering the door of an electric box furnace when he experienced a mild electrical shock to his right forearm. The technician was holding the purge line in his left hand while lowering the box furnace door with his right hand when purge line inadvertently touched the furnace heating element. The door to the furnace had been blocked open slightly to allow for the purge line, which was contrary to the design of the furnace and acceptable work practices. The incident was not reported at the time, but in subsequent discussions with line management on September 29, the technician was advised to report to ORNL Health Services. The technician was evaluated and returned to work without any restrictions. There were no injuries, environmental, health or safety consequences or impacts as a result of this occurrence. A critique was conducted.

Similar OR Report Number:

Facility Manager:

Name	Gene E. Ice
Phone	(865) 574-4065
Title	Materials Science and Technology 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
09/29/2011	14:10 (ETZ)	Lab Shift Superintendent	ORNL LSS
09/29/2011	16:06 (ETZ)	Michele Branton	DOE ORNL
09/29/2011	16:06 (ETZ)	Johnny Moore	DOE ORNL

Authorized Classifier(AC):