



Office of Health, Safety and Security



Monthly Analysis of Electrical Safety Occurrences

February 2012

Purpose

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

Key Observations

The number of electrical safety occurrences decreased from fourteen in January to twelve in February and the number of reported electrical shocks increased from two to three. Also the number of electrical intrusion occurrences increased from two to three. The number of hazardous energy control occurrences remained at five. Hazards identification still needs to improve; for example, in February workers identified the hazards in only 42 percent of the occurrences. In each of those cases, the hazard was identified by an electrical worker. An electrical safety occurrence, which resulted in a high electrical severity categorization, has not been reported in over nine months.

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 February occurrence reports is provided in Attachment 2.

Electrical Shock

There were three occurrences in February that resulted in an electrical shock. All three of these occurrences involved non-electrical workers. Although the investigation into the source of the electrical energy is ongoing for two of the occurrences, it appears that there might be issues associated with grounding or bonding. The occurrences are summarized below.

1. A subcontractor employee touched a scaffold and felt a slight tingle. The scaffold was erected at a fuel tank in preparation to perform cleaning and painting of the tank. The

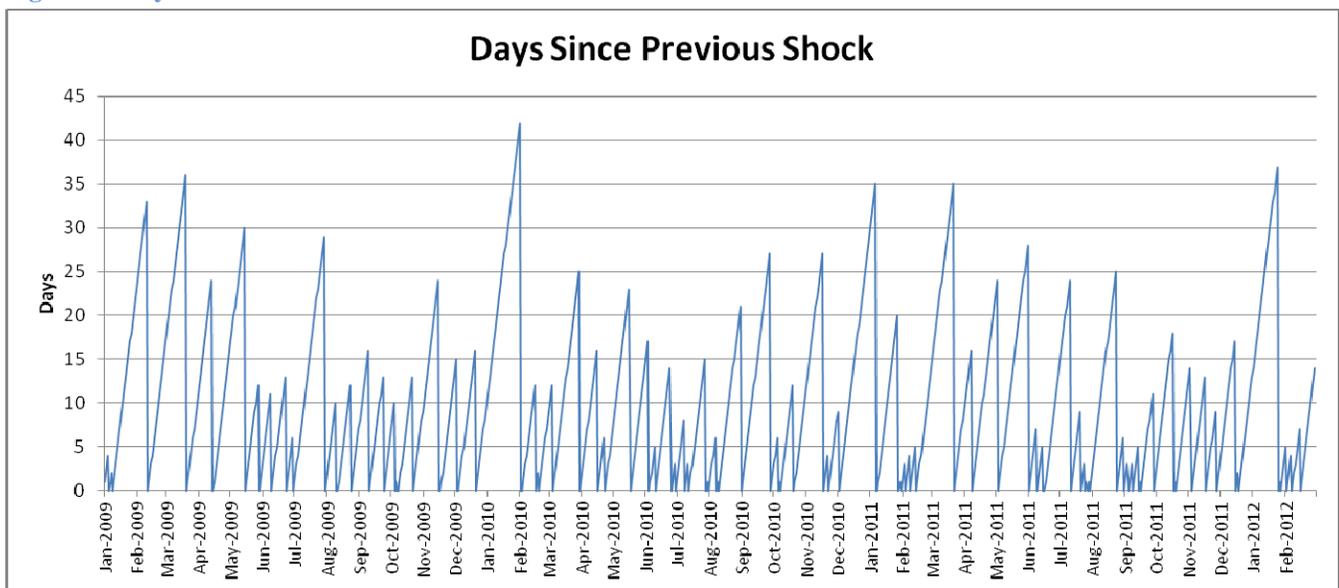
initial investigation revealed a 60 volt reading on the scaffold. The source is unknown at this time. The area was secured with barricades and placed in a safe condition. An investigation into the source of the voltage was initiated. There were no personnel injuries or equipment damage as a result of this event.

2. Two electrical and instrumentation mechanics were installing metal hand rails on the steps to a storage building when one of the mechanics received a very small shock to his hand. The shock occurred when the mechanic grabbed a hand rail that had fallen against an adjacent metal building. A voltage check on the skin of the metal building detected 41 volts. Although the measured voltage was less than the hazardous energy defined level of 50 volts, the potential for being greater than 50 volts existed. Power to the metal building was isolated and the building was barricaded until troubleshooting is complete to determine the source of the voltage. The mechanic was sent to Medical for evaluation and was released from medical and returned to their regular scheduled work duties.

3. A worker received a shock to their little finger while plugging a dual relocatable power tap (RPT) into a wall outlet in their office. When the worker plugged it into the outlet, they saw a spark and felt a tingle in their little finger and up the right forearm. The worker was taken to medical for evaluation and released back to work with no restrictions. Destructive disassembly of the RPT revealed that the two-chassis RPT (two modules) second module did not have its metal chassis bonded to the equipment grounding conductor (EGC). The first module does have its chassis bonded to the EGC. This provided the current return path for the faulted supply wire. The investigation suggests that the RPT was poorly assembled indicating there was less than adequate quality control during manufacturing.

Figure 1 shows the number of days since the previous electrical shock for the DOE complex. The present interval is 14 days. The longest interval was 42 days on February 1, 2010.

Figure 1 - Days since Previous Shock



Electrical Intrusion

In February, the number of electrical intrusion occurrences (i.e., cutting/penetrating, excavating, or vehicle contact of electrical conductors) increased from two in January to three this month. These occurrences are summarized below.

1. While digging a hole for a fence post, subcontractors ruptured a water line that had an energized heat trace. The workers were using a straight bar to break-up the frozen gravel and soil mixture and at a depth of about 1 foot, the straight bar seemed to hit some soft soil. When they raised the bar out of the excavation, water sprayed up about 18 inches from the point of impact. The water line was isolated. During the Fact Finding, a concern was raised that the water line might have heat trace which may have been damaged. A work order was prepared to identify and isolate any heat trace that ran near the ruptured water line. A 120-volt heat trace was found in the area. Although the heat trace was not damaged, its discovery resulted in the categorization of the event as the unexpected discovery of an uncontrolled electrical hazardous energy source. Facility drawings were inadequate to identify underground utilities in the area. Additionally, the subsurface investigation failed to identify the presence of an underground line about 1 foot below the surface.
2. Workers were installing anchors in a plaster covered block wall to hang a whiteboard when they hit an energized electrical circuit within the wall. The workers immediately stopped work and notified their supervisor, who instructed them to stand down the work. When the supervisor arrived at the work location, the workers had resumed drilling, contrary to the supervisor's direction, and installed the whiteboard after moving the location approximately 4 inches along the wall surface. The supervisor called for electricians, who evaluated the damaged circuit and checked the circuit breakers at the power distribution panel to ensure that a fault condition was indicated. Emergency work planning was completed, absence of hazardous energy verification was conducted, the circuit was traced, and the wires were de-terminated in the junction box to render the circuit in a safe/de-energized condition. All other drilling or wall penetrating activities were suspended pending a critique and corrective action implementation.
3. While clearing snow along with a 5-cubic yard front end loader, a 480-volt power cord was severed, tripping its circuit breaker. The cord had been buried approximately 2 inches below the surface and the rough terrain caused the bucket to dip below grade, which allowed it to hit the cord. The severed cord was discovered by the workers as they began additional cleanup with hand tools. The workers did not come into contact with the severed cord. The engineering drawing controlling power configuration at this area required the power cords to run on top of the ground. This power cord posed a tripping hazard and was subsequently buried. The engineering drawing was not updated to reflect this configuration. A lockout/tagout was applied and the damaged cable was removed from service by cutting the connectors off at each end.

Hazardous Energy Control

In February there were five reported occurrences involving lockout/tagout (LOTO) or hazardous energy control issues, which represent no change from January. Two of these occurrences resulted from incorrect equipment labeling, one involved attaching locks that wouldn't have prevented the circuit breaker from being closed, and in another occurrence power was left on to a cabinet that had exposed energized conductors. In one case, a vendor technician performed troubleshooting in a cabinet without following a hazardous energy control process.

1. An electrical safety officer identified an incomplete electrical LOTO that was performed outside the scope of the Integrated Work Document (IWD), which required appropriate shock and arc flash personal protective equipment for zero voltage check verifying the power for a portion of a control panel. The work included the installation of a new controller relay contactor to the portion of the panel that was isolated, but did not identify as a hazard the known exposed 480 volts and unknown exposed 208 volts. While determining the appropriate LOTO point, it was determined that the label on the control panel was incorrect and that the actual circuit that supplied the power. The LOTO of the control panel was performed at the identified power source; however, during the zero energy check of the panel, a 208-volt terminal within the panel was identified. Work was paused and notifications were made. The control panel was placed in a safe configuration and the IWD was revised. The electrical box was re-labeled to reflect the correct information.
2. A facility operations director was notified that locks and tags installed on circuit breakers identified as 480-volt electrical service for pumps were incorrect. The actual circuit breakers for the pumps were in the open position (not energized), but not locked or tagged out. The facility has been under construction since 2009 and the construction drawings had been modified over time and not all of the subcontractors had received the latest changes. The original drawings had the location for the two pump breakers at positions 4 and 5 and the panel was labeled accordingly. However, when the circuit breaker was received, the pump breakers were moved to positions 2 and 3 and other equipment were placed in position 4 and 5. This was done because of the size of the circuit breakers and their usual location in the panel (i.e., larger breakers toward the bottom of the panel instead of the top as indicated in the drawing). Work was paused and notifications were made and control of drawings will be reviewed and a path forward developed to ensure all drawings used are current.
3. A technical safety services representative was performing biosafety cabinet certifications when he observed sparks in the cabinet emanating from the base of an adjustment knob. The representative then disconnected several wire harnesses which fed into the internal control panel which is in violation of the subcontractor's safety documentation. Any electrical work that requires anything beyond disconnecting a cord-and-plug unit requires lockout/tagout controls. This particular biosafety cabinet is hardwired and fed from a circuit breaker, which is not considered a cord-and-plug unit. The representative did not receive a shock and reported the incident. The work was stopped and signage was placed on the cabinet noting that is defective.

4. An electrical safety engineer noticed that a LOTO hasp and locks that subcontractor workers had attached to circuit breakers were not placed in the proper position to prevent the circuit breakers from being moved to the closed position (turned on) following completion of work on two new electrical panels. In addition, the workers did not perform a start test of the breaker while executing the LOTO procedure. Had the start test been performed, the breaker would have closed and the improper LOTO method would have been identified and corrected. No worker was exposed to any hazardous energy source and workers were wearing all proper personal protective equipment for performing the absence-of-voltage verification.

5. Electricians discovered a panel had been removed from a transmission electron microscope control cabinet and the electrical disconnect providing power to the cabinet was in the ON position (232/400V). The cabinet panel had been left off overnight. There was no contact with energized components or personnel injuries. The electrical disconnect was locked and tagged out and the equipment was placed in a safe configuration. A critique was held.

Electrical Near Miss

In February there were six occurrences that were considered to be an electrical near miss. This is an increase from the four near-miss occurrences reported in January. Three of the near-miss occurrences were discussed in Electrical Intrusion section (No. 1-3) and two were discussed in the Hazardous Energy Control section (No.1 and No.5). The sixth near-miss event occurred when employees heard a loud ‘pop’ and observed an arc at a workbench. The arc tripped a GFCI device that protected the workbench. It appears that an employee unintentionally energized a power cord from one of the workbench's built-in electrical receptacles and the power cord, which had exposed leads on the free end, touched the metal workbench, resulting in the arc. The employee, who was holding the power cord, did not experience a shock. The employee notified line management and the workbench was immediately placed out of service to preserve the scene. A critique was held.

Monthly Occurrences Tables

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

Table 1 - Breakdown of Electrical Occurrences

Number of Occurrences	Involving:	Last Month
3	Electrical Shocks	2
0	Electrical Burns	0
5	Hazardous Energy Control	5
0	Inadequate Job Planning	5
1	Inadvertent Drilling/Cutting of Electrical Conductors	1
1	Excavation of Electrical Conductors	0
1	Vehicle Intrusion of Electrical Conductors or Equipment	1

Number of Occurrences	Involving:	Last Month
6	Electrical Near Misses	4
6	Electrical Workers	7
6	Non-Electrical Workers	7
6	Subcontractors	5

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

In compiling the monthly totals, the search 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 fifteen occurrence reports and three of the occurrences were culled out because they all were Significance Category R reports. The occurrences numbers are [NA--LSO-LLNL-LLNL-2012-0012](#), [NA--YSO-BWXT-Y12SITE-2012-0008](#), and [SC--BHSO-BNL-BNL-2012-0005](#).

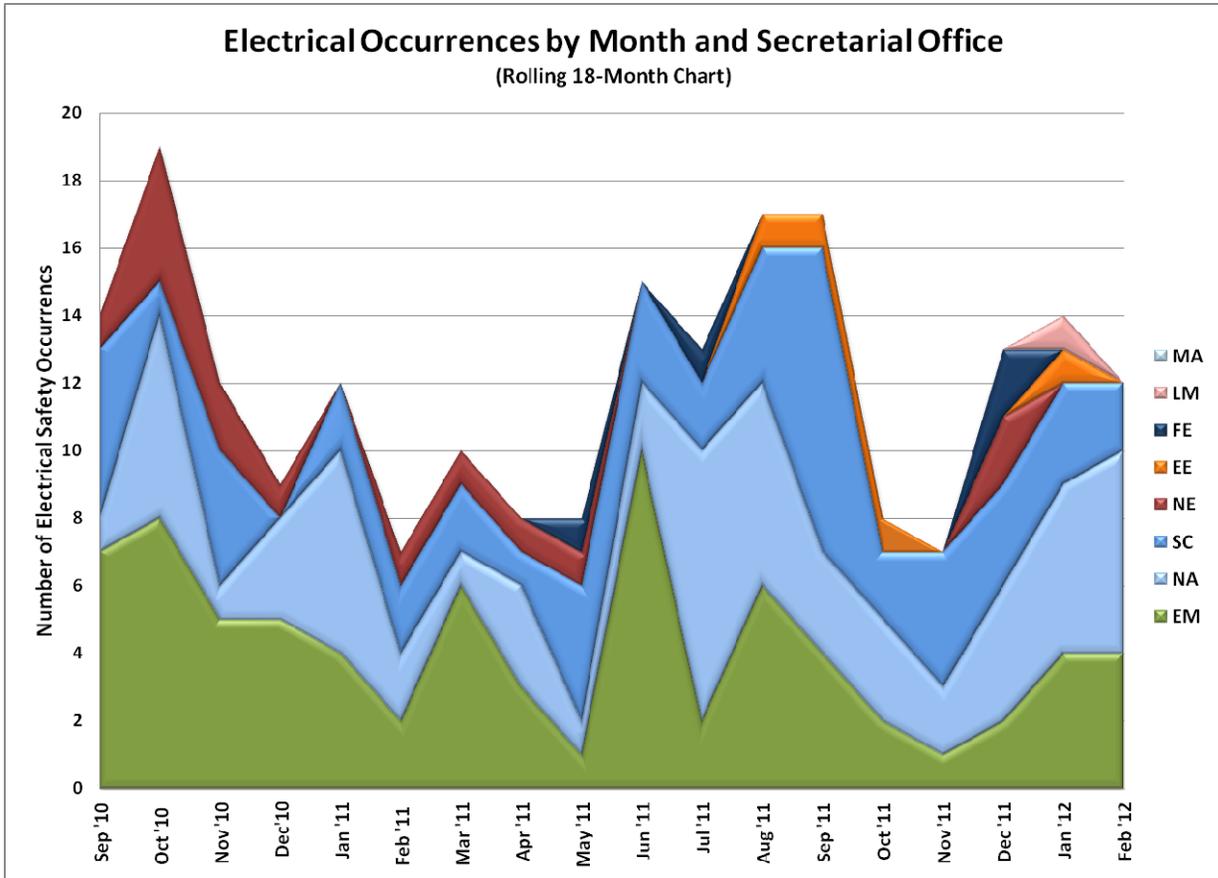
Table 2 provides a summary of the electrical safety occurrences for CY 2012.

Table 2 - Summary of Electrical Occurrences

Period	Electrical Safety Occurrences	Shocks	Burns	Fatalities
February	12	3	0	0
January	14	2	0	0
2012 total	26 (avg. 13.0/month)	5	0	0
2011 total	136 (avg. 11.3/month)	36	5	0
2010 total	155 (avg. 12.9/month)	28	2	0
2009 total	128 (avg. 10.7/month)	25	3	0
2008 total	113 (avg. 9.4/month)	26	1	0
2007 total	140 (avg. 11.7/month)	25	2	0
2006 total	166 (avg. 13.8/month)	26	3	0
2005 total	165 (avg. 13.8/month)	39	5	0
2004 total	149 (avg. 12.4/month)	25	3	1

Figure 2 shows the distribution of electrical safety occurrences by Secretarial Office. The Office of Environmental Management (EM), the Office of Science (SC), and the National Nuclear Security Administration (NA) typically report the most occurrences of all the offices. Over the past several months, EM and NA have increased and SC decreased.

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

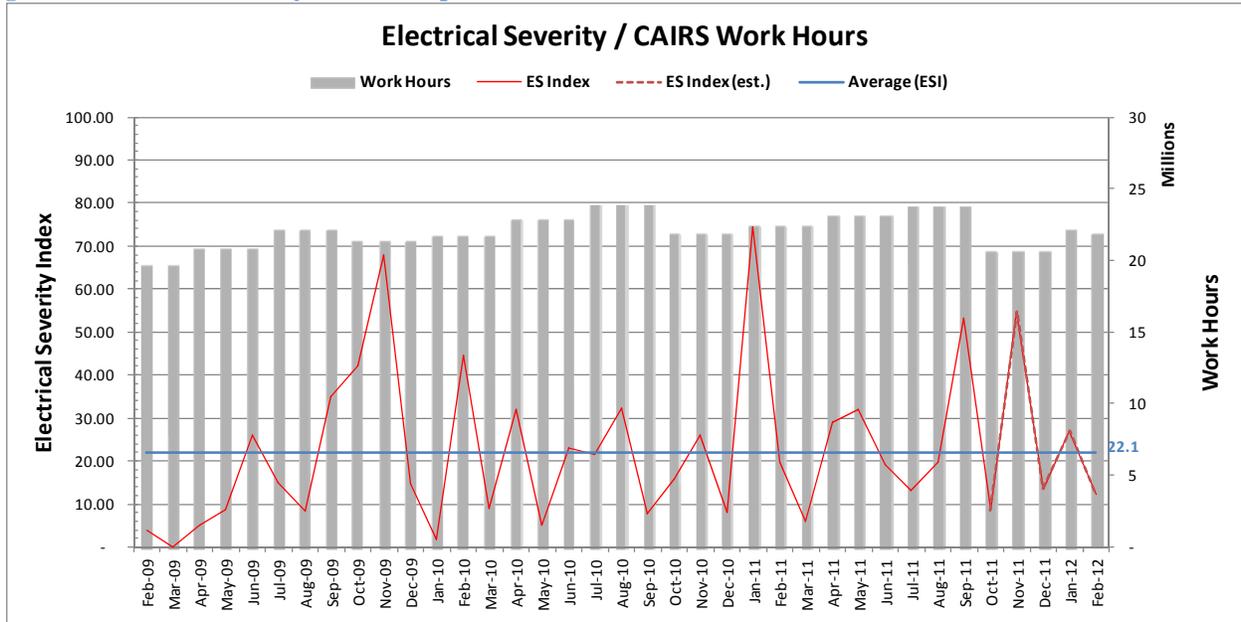
Table 3 – Classification of Electrical Safety Occurrences by ES Score

Occurrence Classification	Electrical Severity Score	Number of Occurrences
HIGH	≥ 1750	0
MEDIUM	31-1749	6
LOW	1-30	4

Electrical Severity Index

The Electrical Severity Index (ESI) is a performance metric that was developed to normalize events against organizational work hours. The ESI is calculated monthly and trended. Figure 3 shows a calculated ESI for the DOE complex and Table 4 shows the ESI and how it has changed from the previous month.

Figure 3 - Electrical Severity Index Compared to Work Hours



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

Table 4 - Electrical Severity Index

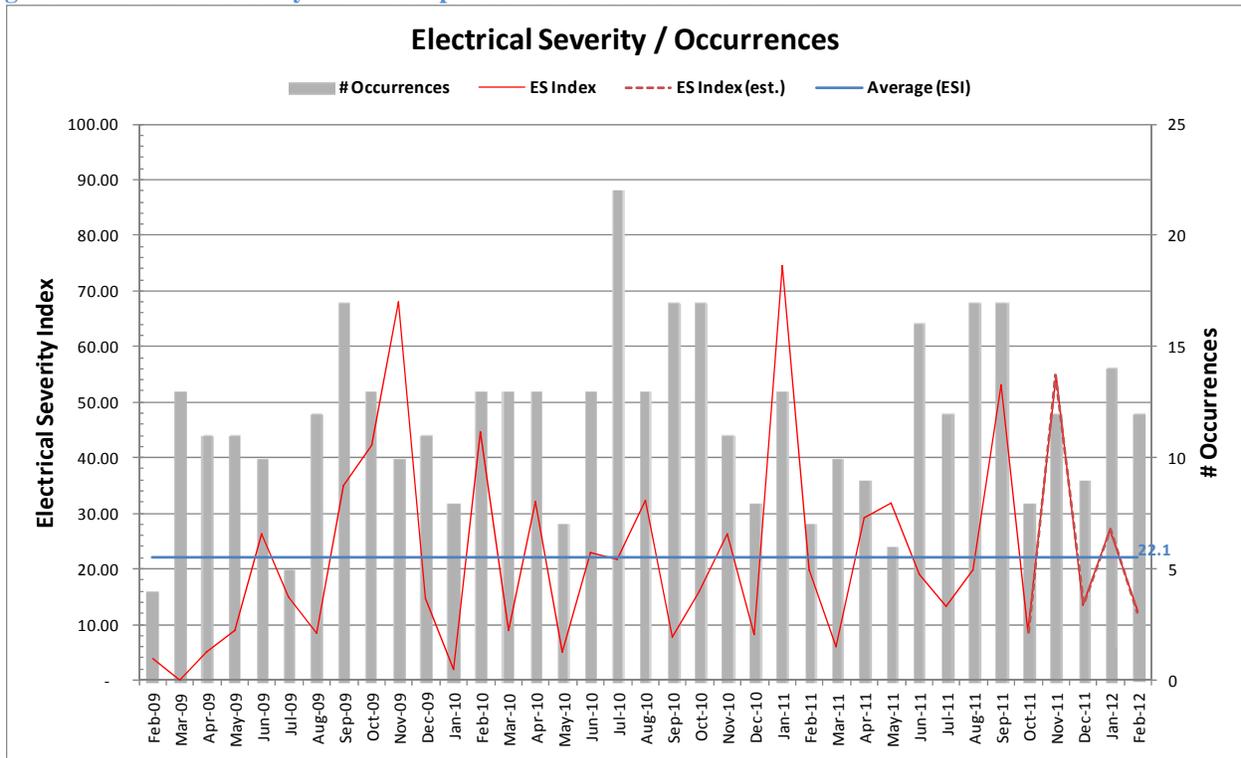
Category	January	February	Δ
Total Occurrences	14	12	-2
Total Electrical Severity	3,008	1,364	-1668
Estimated Work Hours	22,130,689* (22,130,689)	21,867,825	-262,864
ES Index	27.18* (27.18)	25.52	-14.93
Average ESI	22.4	22.1	-0.3

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

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

Figure 4 shows the ESI with the number of Occurrences instead of Work Hours.

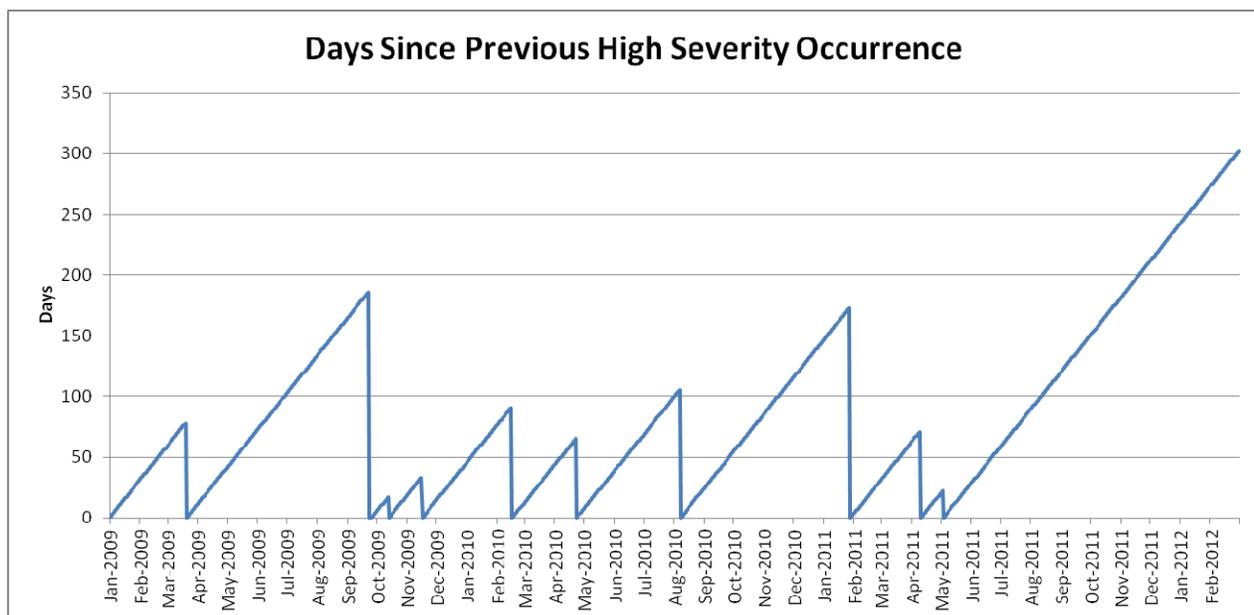
Figure 4 - Electrical Severity Index Compared to Number of Occurrences



The average ESI (22.1) has remained fairly constant over the past several months but showed a decrease this month. The lowest average ESI was 19.2 in June 2010.

Figure 5 shows the number of days since the previous high severity occurrence. The present interval is 302 days as of February 29, 2012. The previous longest interval was 181 days in 2009.

Figure 5 - Days since Previous High Severity Occurrence



Summary of Occurrences by Severity Band

For the interval February 2011 through February 2012 (current month and the past 12), Figures 6 and 7 summarize occurrences by severity band and month of discovery date by percentage of total occurrences in month and number of occurrences in month.

Figure 6 - Occurrences by Electrical Severity Band (Percentage)

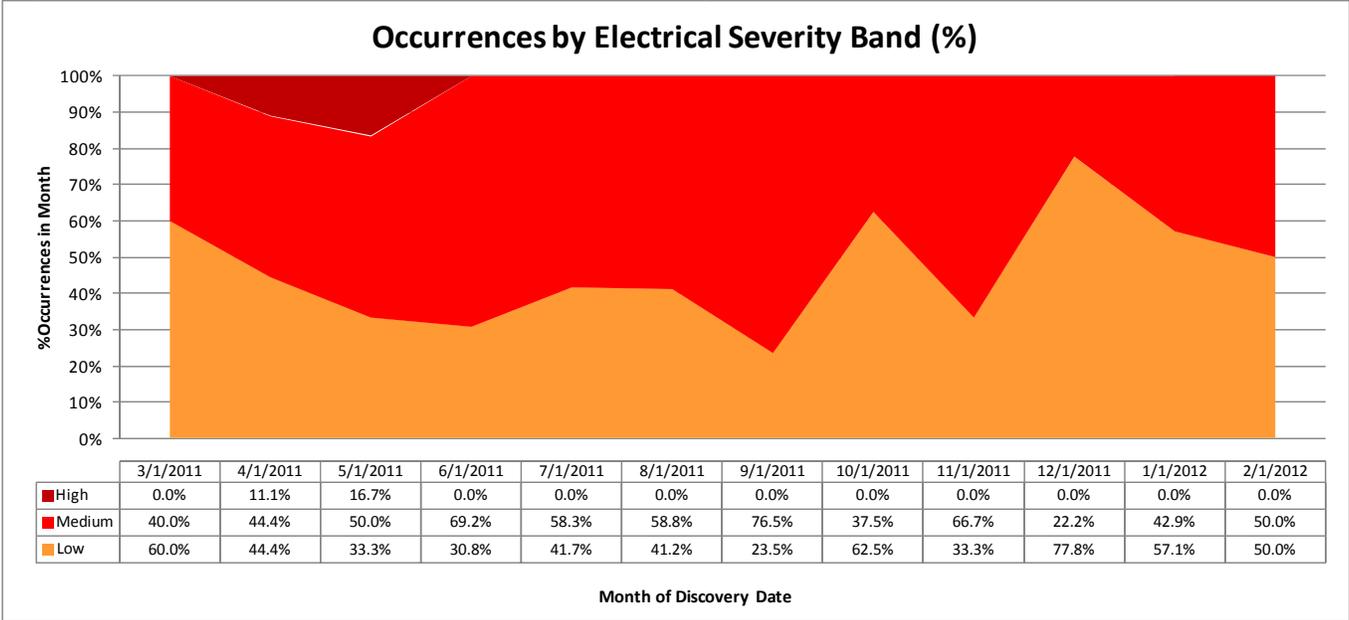
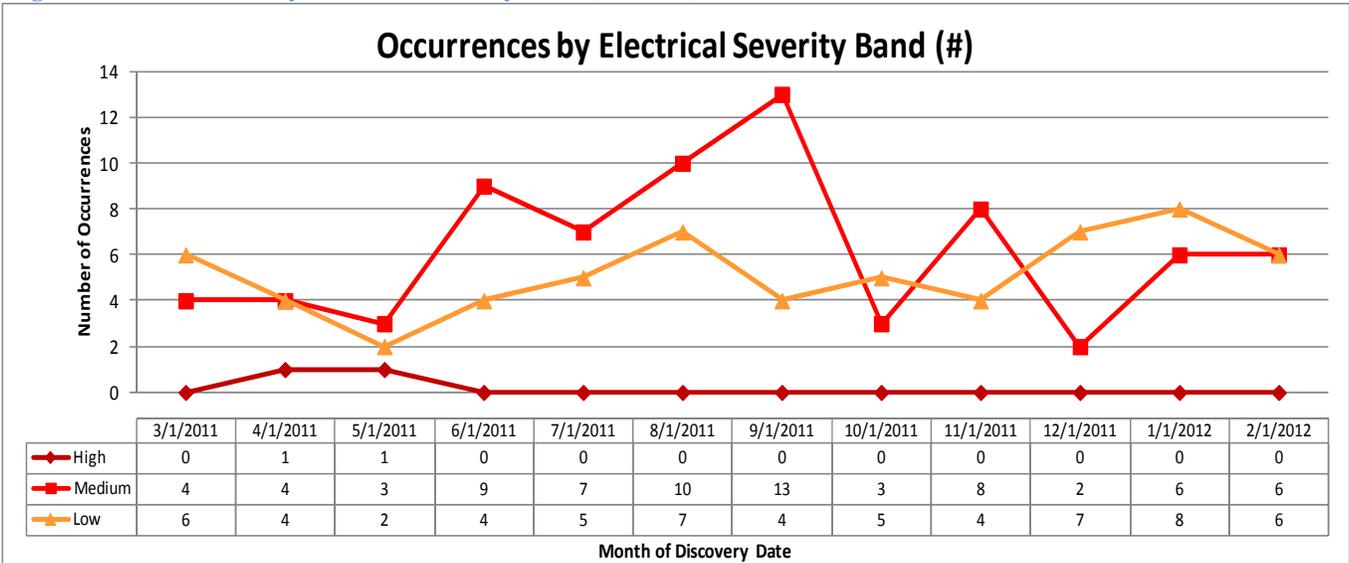


Figure 7 - Occurrences by Electrical Severity Band (Number)

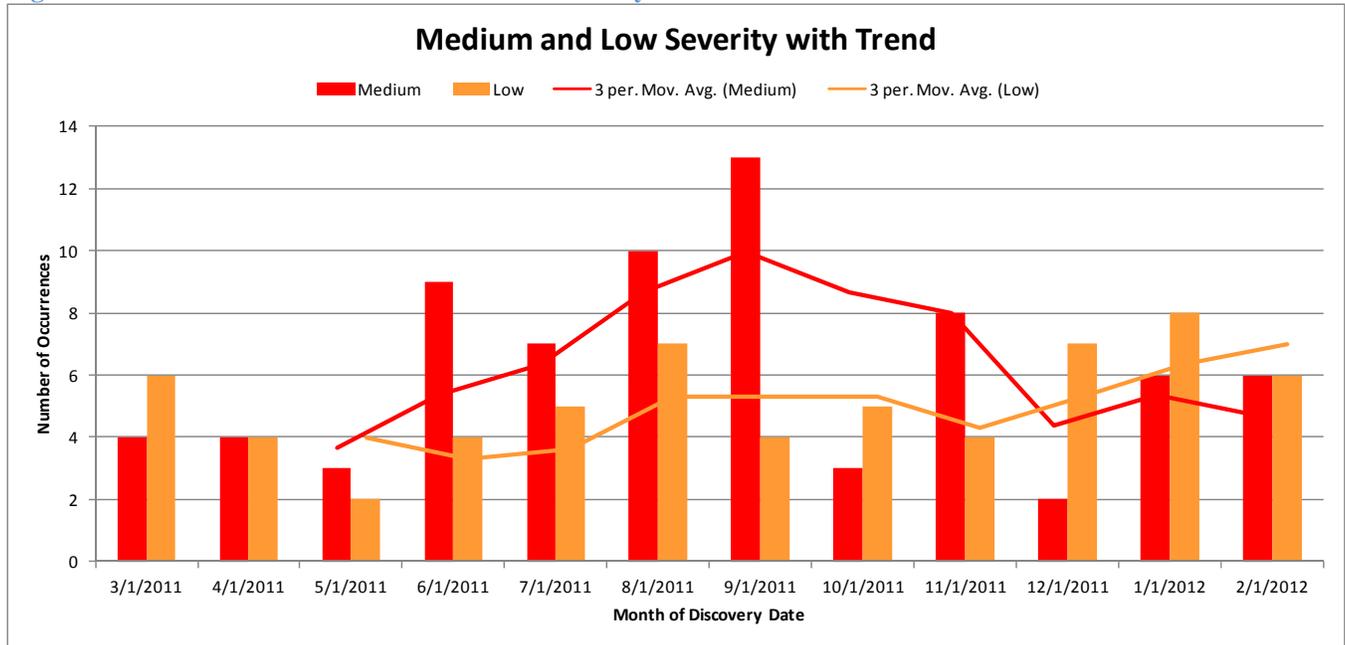


What can be seen from the previous two charts is that the number of occurrences with High electrical severity scores has remained at zero for the past nine months and that the number of occurrences with Medium scores has remained the same and equal to the number of Low severity occurrences.

Medium and Low Severity with Trend

Figure 8 focuses on the Medium and Low severity data series for February 2011 through February 2012. Trend lines are included for each, using a 3-month moving average.

Figure 8 - Trend of Medium and Low Electrical Severity Occurrences



The 3-month moving average shows a decreasing trend in the Medium severity occurrences since September 2011. The figure also shows an increase in 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/>

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Electrical Safety Occurrences – February 2012

No	Report Number	Event Summary	SHOCK	BURN	ARCF ⁽¹⁾	LOTO ⁽²⁾	PLAN ⁽³⁾	EXCAV ⁽⁴⁾	CUT/D ⁽⁵⁾	VEH ⁽⁶⁾	SC ⁽⁷⁾	RC ⁽⁸⁾	ES ⁽⁹⁾
1	EM-ID--ITG-AMWTF-2012-0006	During excavation, an unknown water line was struck that had energized 120V heat tracing.						X			3	2E(2)	140
2	EM-ORO--UCOR-K25GENLAN-2012-0001	Workers installed anchors in a plaster covered CMU block wall and hit an energized electrical circuit within the wall.							X		4	10(2)	20
3	EM-SR--SRNS-SIPS-2012-0001	A subcontractor touched a scaffold and felt a slight tingle from 60 volts on the scaffold.	X								2	2E(1)	480
4	EM-SR--SRR-HTANK-2012-0002	A mechanic received a shock to the hand from a handrail touching a metal building. Voltage on the skin of the building was 41.	X								2	2E(1)	480
5	NA--LASO-LANL-DPWEST-2012-0001	While clearing snow, a front-end loader severed a 480V power cord, tripping its circuit breaker.								X	3	2E(2)	0
6	NA--LASO-LANL-HEMACHPRES-2012-0003	Incomplete LOTO results in work performed near energized 480V and 208V terminals.				X					3	2E(2), 10(3)	50
7	NA--LASO-LANL-TA55-2012-0008	Locks and tags were installed on the wrong 480V circuit breakers because of incorrect panel labels.				X					4	2E(3)	50
8	NA--LSO-LLNL-LLNL-2012-0005	Worker receives shock to little finger while plugging dual re-locatable power tap into outlet.	X								2	2E(1)	60
9	NA--LSO-LLNL-LLNL-2012-0008	A subcontractor removed a cover to access a fan speed dial and then disconnected several wire harnesses without a LOTO.				X					4	2E(3)	20
10	NA--LSO-LLNL-LLNL-2012-0009	A worker unintentionally energized a power cord via a 110V receptacle and the cord's exposed leads touched a metal workbench resulting in the arc.									3	10(3)	20

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⁾
11	SC--BSO-LBL-OPERATIONS-2012-0003	A subcontractor did not place their hasp and locks on circuit breakers to properly prevent the breakers from being closed.				X					4	2E(3)	0
12	SC--PNSO-PNNL-PNNLBOPER-2012-0002	Electricians found a panel removed from a control cabinet and the cabinet disconnect was still ON (232/400V).				X					3	2E(2)	20
	TOTAL		3	0	0	5	0	1	1	1			

Key

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

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

Electrical Safety Occurrences – February 2012

No	Report Number	Event Summary	EW ⁽¹⁾	N-EW ⁽²⁾	SUB ⁽³⁾	HFW ⁽⁴⁾	WFH ⁽⁵⁾	PPE ⁽⁶⁾	70E ⁽⁷⁾	VOLT ⁽⁸⁾		C/T ⁽⁹⁾	NEUT ⁽¹⁰⁾	NM ⁽¹¹⁾
										H	L			
1	EM-ID--ITG-AMWTF-2012-0006	During excavation, an unknown water line was struck that had energized 120V heat tracing.		X	X	X					X			X
2	EM-ORO--UCOR-K25GENLAN-2012-0001	Workers installed anchors in a plaster covered CMU block wall and hit an energized electrical circuit within the wall.		X		X					X			X
3	EM-SR--SRNS-SIPS-2012-0001	A subcontractor touched a scaffold and felt a slight tingle from 60 volts on the scaffold.		X	X	X					X			
4	EM-SR--SRR-HTANK-2012-0002	A mechanic received a shock to the hand from a handrail touching a metal building. Voltage on the skin of the building was 41.		X		X					X			
5	NA--LASO-LANL-DPWEST-2012-0001	While clearing snow, a front-end loader severed a 480V power cord, tripping its circuit breaker.		X	X	X					X			X
6	NA--LASO-LANL-HEMACHPRES-2012-0003	Incomplete LOTO results in work performed near energized 480V and 208V terminals.	X				X				X			X
7	NA--LASO-LANL-TA55-2012-0008	Locks and tags were installed on the wrong 480V circuit breakers because of incorrect panel labels.	X				X				X			
8	NA--LSO-LLNL-LLNL-2012-0005	Worker receives shock to little finger while plugging dual relocatable power tap into outlet.		X	X	X					X			
9	NA--LSO-LLNL-LLNL-2012-0008	A subcontractor removed a cover to access a fan speed dial and then disconnected several wire harnesses without a LOTO.	X		X		X				X			
10	NA--LSO-LLNL-LLNL-2012-0009	A worker unintentionally energized a power cord via a 110V receptacle and the cord's exposed leads touched a metal workbench resulting in the arc.	X			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⁾		C/I ⁽⁹⁾	NEUT ⁽¹⁰⁾	NM ⁽¹¹⁾
										H	L			
11	SC--BSO-LBL-OPERATIONS-2012-0003	A subcontractor did not place their hasp and locks on circuit breakers to properly prevent the breakers from being closed.	X		X		X				X			
12	SC--PNSO-PNNL-PNNLBOPER-2012-0002	Electricians found a panel removed from a control cabinet and the cabinet disconnect was still ON (232/400V).	X				X				X			X
	TOTAL		6	6	6	7	5	0	0	0	12	0	0	6

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

Production GUI - New ORPS

ORPS contains 55589 OR(s) with 58899 occurrences(s) as of 3/12/2012 7:25:58 AM
Query selected 12 OR(s) with 12 occurrences(s) as of 3/12/2012 10:24:12 AM

Download this report in Microsoft Word format. 

1)Report Number: [EM-ID--ITG-AMWTF-2012-0006](#) **After 2003 Redesign**
Secretarial Office: Environmental Management
Lab/Site/Org: Idaho National Laboratory
Facility Name: ADVANCED MIXED WASTE TREATMENT FAC
Subject/Title: Ruptured Water Line During Construction Excavation Activity
Date/Time Discovered: 02/08/2012 16:00 (MTZ)
Date/Time Categorized: 02/08/2012 16:55 (MTZ)
Report Type: Notification

Report Dates:

Notification	02/13/2012	18:39 (ETZ)
Initial Update		
Latest Update		
Final		

Significance Category: 3

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

Cause Codes:

ISM:

Subcontractor Involved: Yes
Sunroc

Occurrence Description: At about 1015 on February 01, 2012 while digging a hole for a fence post, a water line was ruptured.
A project to install a new AMWTP facility access trailer was being worked. The work requires pouring a concrete foundation and modifying the facility fence line to connect it to the new access trailer. AMWTP, does not have the equipment to perform a subsurface investigation, and contracted CH2M-WG Idaho, LLC (CWI), one of three Idaho National Laboratory (INL) contractors to perform the subsurface investigation. CWI performed the subsurface investigation on November 01, 2011 and submitted the report to AMWTP. Paint was used to mark the areas where the subsurface investigation showed underground utility lines. The project started in late January using subcontractor personnel. The form for the

concrete pour had been completed. On February 01, 2012 at 0710 a pre-job brief was conducted. As part of the job, hand excavating a hole to set a fence post was being performed. The area being excavated was three to four feet from any area marked as containing underground utility lines. The subcontractor personnel were using a straight bar to break-up the frozen gravel and soil mixture. At about 1016, with the excavation at a depth of about 1 foot, the straight bar seemed to hit some soft soil. When the contractor employee raised the straight bar out of the excavation, water sprayed up about eighteen inches from the point of impact. Excavation was immediately stopped and notifications were made to the host site. During the Fact Finding, a concern was raised that the water line might have accompanying heat trace which may have been damaged. Since it could not be easily determined if heat trace was present, a work order was prepared to identify and isolate any heat trace that ran near the ruptured water line. Once all heat trace in the immediate area of the water line was isolated, the insulation was removed from the ruptured pipe to determine if heat trace was there and ascertain its condition. 120 volt heat trace was found in the area. Although the heat trace was not damaged, its discovery resulted in the categorization of the event as the unexpected discovery of an uncontrolled electrical hazardous energy source.

Cause Description:

Operating Conditions:

Normal Operations

Activity Category:

Construction

Immediate Action(s):

1. All work was stopped.
2. Subcontractor personnel exited the immediate area around the leak.
3. Notifications to AMWTP Management were made.
4. The water line was isolated.

FM Evaluation:

Facility drawings were inadequate to identify underground utilities in the area and to identify possible electrical energy in the area. Additionally, the subsurface investigation failed to identify the presence of an underground line about one and a half feet below the surface.

DOE Facility Representative

Input:

DOE Program Manager

Input:

Further Evaluation is Required:

No

Division or Project:

AMWTP

Plant Area:

Grounds

System/Building/Equipment: New Facility Access Trailer

Facility Function:

Nuclear Waste Operations/Disposal

Corrective Action:

Lessons(s) Learned:

HQ Keywords: 01B--Inadequate Conduct of Operations - Loss of Configuration Management/Control
 02F--Environmental - Potable Water Release
 05D--Mechanical/Structural - Mechanical Equipment Failure/Damage
 08F--OSHA Reportable/Industrial Hygiene - Industrial Operations Issues
 08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical)
 11G--Other - Subcontractor
 12G--EH Categories - Industrial Operations
 14D--Quality Assurance - Documents and Records Deficiency
 14E--Quality Assurance - Work Process Deficiency
 14G--Quality Assurance - Procurement Deficiency

HQ Summary: On February 1, 2012, while digging a hole for a fence post, a water line was ruptured. Subcontractor personnel were using a straight bar to break-up the frozen gravel and soil mixture and at a depth of about 1 foot, the straight bar seemed to hit some soft soil. When the bar was raised out of the excavation, water sprayed up about 18 inches from the point of impact. The water line was isolated. During the Fact Finding, a concern was raised that the water line might have heat trace which may have been damaged. A work order was prepared to identify and isolate any heat trace that ran near the ruptured water line. A 120-volt heat trace was found in the area. Although the heat trace was not damaged, its discovery resulted in the categorization of the event as the unexpected discovery of an uncontrolled electrical hazardous energy source. Facility drawings were inadequate to identify underground utilities in the area. Additionally, the subsurface investigation failed to identify the presence of an underground line about 1 foot below the surface.

Similar OR Report Number:

Facility Manager:

Name	HAYMAN, PHILIP L.
Phone	(208) 557-6501
Title	SPECIAL PROJECTS MANAGER

Originator:

Name	SISSON, CLINTON E
Phone	(208) 521-3523
Title	AMWTP CHARACTERIZATION FAC. NUCLEAR

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
02/08/2012	17:11 (MTZ)	Steve Ahrendts	DOE-ID

Authorized Classifier(AC): Misty Hiltzman Date: 02/13/2012

2)Report Number: [EM-ORO--UCOR-K25GENLAN-2012-0001](#) After 2003 Redesign

Secretarial Office: Environmental Management
Lab/Site/Org: East Tennessee Technology Park
Facility Name: ETPP S&M & Cylinders
Subject/Title: Resumption of Work Placed on Supervisory Hold without Approval - Building K-1007 Rm. 1121
Date/Time Discovered: 02/06/2012 15:17 (ETZ)
Date/Time Categorized: 02/07/2012 11:30 (ETZ)
Report Type: Notification/Final
Report Dates:

Notification	02/08/2012	13:40 (ETZ)
Initial Update	02/08/2012	13:40 (ETZ)
Latest Update	02/08/2012	13:40 (ETZ)
Final	02/08/2012	13:40 (ETZ)
Revision 1	02/20/2012	09:52 (ETZ)

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

Cause Codes:
ISM: 2) Analyze the Hazards
Subcontractor Involved: No
Occurrence Description: At approximately 1529 on 02/06/12, workers involved in installation of anchors in a plaster covered CMU block wall came in contact with an energized electrical circuit within the wall. The workers were installing a white board along the west wall of Room 1121 Bldg. K-1007. Workers immediately "stopped work" and notified their supervisor and were instructed to stand down the work. Upon the supervisor's arrival at the work location, the workers had already resumed drilling activities, contrary to the supervisor's direction, and completed the white board installation after relocating the installation location approximately 4 inches along the wall surface.

Cause Description:
Operating Conditions: : Building K-1007 is an Administrative Office Area.
Activity Category: Maintenance
Immediate Action(s): After the Supervisor arrived at the work location, the work was "Stopped", electricians were called, the damaged circuit was evaluated, and circuit breakers were checked at the power distribution panel to ensure that a fault

condition was indicated. Emergency work planning was completed, absence of hazardous energy verification was conducted, circuit was traced, and wires were de-terminated in the closet junction box to render the circuit in a safe/de-energized condition. All other drilling or wall penetrating activities by ETTP Maintenance group were suspended pending a critique and corrective action implementation.

FM Evaluation:

DOE Facility Representative

Input:

DOE Program Manager

Input:

Further Evaluation is Required: No

Division or Project: Facility Operations/S&M

Plant Area: SW Area of ET

System/Building/Equipment: K-1007 Rm. 1121

Facility Function: Balance-of-Plant - Offices

Corrective Action:

Lessons(s) Learned:

HQ Keywords: 01T--Inadequate Conduct of Operations - Willful Violation
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 February 6, 2012, workers involved in installation of anchors in a plaster covered CMU block wall came in contact with an energized electrical circuit within the wall. The workers were installing a white board along the west wall of Room 1121 of Building K-117. Workers immediately "stopped work" and notified their supervisor and were instructed to stand down the work. When the supervisor arrived at the work location, the workers had already resumed drilling activities, contrary to the supervisor's direction, and completed the white board installation after relocating the installation location approximately 4 inches along the wall surface. The supervisor issued a "stopped work" and electricians were called. The damaged circuit was evaluated and circuit breakers were checked at the power distribution panel to ensure that a fault condition was indicated. Emergency work planning was completed, absence of hazardous energy verification was conducted, circuit was traced, and wires were de-terminated in the closet junction box to render the circuit in a safe/de-energized condition. All other drilling or wall penetrating activities were suspended pending a critique and corrective action implementation.

Similar OR Report Number:

Facility Manager:

Name	Bailey, John
Phone	(865) 241-8875
Title	Facility Manager

Originator:

Name	HOLOWCZAK, MARK S
Phone	(865) 574-3611
Title	ENFORCEMENT COORDINATOR

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
02/06/2012	15:29 (ETZ)	John Bailey	UCOR FM
02/06/2012	16:10 (ETZ)	Tim Noe	DOE ORO
02/06/2012	16:15 (ETZ)	Larry Perkins	DOE ORO

Authorized Classifier(AC): Frederick Fillers Date: 02/07/2012

3)Report Number:

[EM-SR--SRNS-SIPS-2012-0001](#) After 2003 Redesign

Secretarial Office:

Environmental Management

Lab/Site/Org:

Savannah River Site

Facility Name:

Site Infrastructure and Project Systems

Subject/Title:

Subcontractor Experienced Tingle after Contact with Scaffold at 715-2A Alternate Fuel Tank

Date/Time Discovered:

02/07/2012 15:30 (ETZ)

Date/Time Categorized:

02/09/2012 12:50 (ETZ)

Report Type:

Notification

Report Dates:

Notification	02/09/2012	16:03 (ETZ)
Initial Update		
Latest Update		
Final		

Significance Category:

2

Reporting Criteria:

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

Cause Codes:

ISM:

Subcontractor Involved:

Yes
Augusta Industrial

Occurrence Description: At approximately 1330 hours on 02/07/2012, a subcontractor employee touched a scaffold and felt a slight tingle. The scaffold was erected at the 715-2A E-85 alternate fuel tank, in preparation to perform cleaning and painting of the tank. There were no personnel injuries or equipment damage as a result of this event.

The initial investigation revealed a 60 volt reading on the scaffold. The source is unknown at this time. Further investigation is ongoing.

The event was initially categorized as a 10(2), Management Concern on 02/07/2012. It was revised to 2E(1), Sig Cat 2 on 02/09/2012; based on results from the initial investigation by Site Services Management, Infrastructure Engineering, and the SERB (Site Electrical Review Board) members.

The electrical severity score for the shock event involving the subcontractor contacting the scaffold at the Ethanol Fuel Tank is 480. 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 480 (Medium Significance). This event scores as follows: Electrical Hazard: 10 (60 volts measured at point of contact to person); Environmental Factor: 5 (damp); Shock Proximity Factor: 10 (contact - within prohibited approach boundary); Arc Flash: 0; Thermal Factor: 0; and Injury Factor:3 (shock- no fibrillation). Electrical Severity= $10*(1+5+10+0+0)*3=480$.

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

Cause Description:

Operating Conditions: Sunny, Clear, Dry, 57 degrees F Worker was preparing equipment to pressure wash inside of fuel tank.

Activity Category: Maintenance

Immediate Action(s):

1. Subcontractor took an immediate time out.
2. The Subcontractor Technical Representative and the Manager, Transportation Operations was notified.
3. Area was secured with barricades and placed in a safe condition.
3. An investigation into the source of the tingle was initiated.
4. Site Electrical Review Board member was contacted and assisted with the initial investigation.

FM Evaluation: The Facility Manager has reviewed and concurs with this report.

The voltage source is unknown at this time. Further investigation is

ongoing.

Initial report approved by P.P. Lodomirak, Manager, Site Infrastructure Transportation; and by T.A. Bolton, Director, Site Infrastructure on 02/09/2012.

DOE Facility Representative

Input:

DOE Program Manager

Input:

Further Evaluation is Required: Yes.
 Before Further Operation? Yes
 By Whom: K.H. Heath
 By When: 02/14/2012

Division or Project: Site Services

Plant Area: A-Area

System/Building/Equipment: 715-2A, E-85 Alternate Fuel Station Tank

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

Corrective Action:

Lessons(s) Learned:

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

HQ Summary: On February 7, 2012, a subcontractor employee touched a scaffold and felt a slight tingle. The scaffold was erected at the 715-2A E-85 alternate fuel tank, in preparation to perform cleaning and painting of the tank. The initial investigation revealed a 60 volt reading on the scaffold. The source is unknown at this time. The calculated severity for this event is 480, medium severity. Management was notified. The area was secured with barricades and placed in a safe condition. Further investigation is ongoing. There were no personnel injuries or equipment damage as a result of this event.

Similar OR Report Number:

Facility Manager:

Name	LADOMIRAK, PETER P.
Phone	(803) 557-5354
Title	Manager, Site Infrastructure Transportation

Originator:

Name	HAAS, GARY M
Phone	(803) 557-4353
Title	LEAD OPERATIONS SPECIALIST

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
02/09/2012	12:50 (ETZ)	T.A. Bolton	Site Srv
02/09/2012	12:50 (ETZ)	R.E. Gentry	Site Srv
02/09/2012	12:50 (ETZ)	K.W. Atkinson	Site Srv
02/09/2012	12:55 (ETZ)	S.J. Fryar	DOE-SR
02/09/2012	13:01 (ETZ)	K.H. Heath	Site Srv
02/09/2012	13:03 (ETZ)	T.M. Bolen	Safety
02/09/2012	13:11 (ETZ)	A.M. Suggs	SRSOC
02/09/2012	13:12 (ETZ)	P.P. Lodomirak	Site Srv

Authorized Classifier(AC): Haas, G.M. Date: 02/09/2012

4)Report Number: [EM-SR--SRR-HTANK-2012-0002](#) After 2003 Redesign
Secretarial Office: Environmental Management
Lab/Site/Org: Savannah River Site
Facility Name: H Tank Farm
Subject/Title: Unexpected Contact with Electrical Energy Source at 241-24H Annex
Date/Time Discovered: 02/15/2012 15:35 (ETZ)
Date/Time Categorized: 02/15/2012 15:35 (ETZ)
Report Type: Notification
Report Dates:

Notification	02/16/2012	14:56 (ETZ)
Initial Update		
Latest Update		
Final		

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

Cause Codes:

ISM:

Subcontractor Involved: No

Occurrence Description: On 2/15/12 two Electrical and Instrumentation (E&I) mechanics were installing metal hand rails on the steps to a storage building next to 241-24H Annex. One of the hand rails fell against 241-24H Annex. When the mechanic grabbed the hand rail he received a very small shock to his hand.

Voltage was then checked on the skin of the metal building. E&I detected 41 Volts on the building skin. After consultation with the SERB, Facility Management determined that the electrical shock experienced at 241-24H Annex will be categorized as 2E(1), Significant Category 2. Although the measured voltage (41 Volts) was less than the hazardous energy defined level of 50 Volts, the potential for being greater than 50 Volts exists. A fact finding will be held after troubleshooting is complete to determine the cause of the voltage.

Electrical Severity = Proximity Factor*(1+Electrical Hazard+Environmental Factor+Arc Flash+Thermal Factor)*Injury Factor.
Electrical Hazard: 10(41 volts measured at point of contact to person, source 120/240 volts ac); Environmental Factor: 5(damp); Proximity Factor: 10(contact-within prohibited approach boundary); Arc Flash: 0; Thermal Factor: 0; Injury Factor: 3(shock-no fibrillation).

Electrical Severity = $10*(1+5+10+0+0)*3= 480$

Cause Description:

Operating Conditions:

Normal Operations

Activity Category:

Maintenance

Immediate Action(s):

A time out was called. Power to the 241-24H Annex building was isolated and the Annex building was barricaded. E&I mechanic was sent to Medical to ensure no medical issues resulted from the shock. Troubleshooting activities were initiated.

FM Evaluation:

The employee was released from medical and returned to their regular scheduled work duties.

DOE Facility Representative

Input:

DOE Program Manager

Input:

Further Evaluation is Required:

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

Division or Project:

Tank Farms

Plant Area:

H Tank Farm

System/Building/Equipment: 241-24H Annex

Facility Function:

Nuclear Waste Operations/Disposal

Corrective Action:

Lessons(s) Learned:

HQ Keywords:

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

HQ Summary:

On February 15, 2012, two Electrical and Instrumentation (E&I) mechanics were installing metal hand rails on the steps to a storage building next to 241-24H Annex when one of the mechanics received a very small shock to his hand. The shock occurred when the mechanic grabbed a hand rail that had fallen against 241-24H Annex. E&I checked for voltage on the skin of the metal building and detected 41 volts. Although the measured voltage (41 Volts) was less than the hazardous energy defined level of 50 Volts, the potential for being greater than 50 volts exists. A fact finding will be held after troubleshooting is complete to determine the source of the voltage.

Similar OR Report Number:

Facility Manager:

Name	Green, Brenda L
Phone	(803) 208-8592
Title	Facility Manager Tank Farm/ETP

Originator:

Name	GREEN, MICHAEL J.
Phone	(803) 208-3171
Title	SRR SIRIM COORDINATOR

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
02/15/2012	15:35 (ETZ)	Wyatt Clark	LWO Mgr
02/15/2012	15:35 (ETZ)	Brenda Green	Fac Mgr
02/15/2012	15:35 (ETZ)	Glen Johnson	Op Mgr
02/15/2012	15:35 (ETZ)	R. Edwards	Eng Mgr
02/15/2012	15:35 (ETZ)	Steve Goff	DOE FR
02/15/2012	15:37 (ETZ)	Mark Sautman	DNFSB
02/15/2012	15:40 (ETZ)	Mark Guilfoyle	SERB
02/15/2012	15:42 (ETZ)	A. Ross	SRSOC
02/15/2012	15:42 (ETZ)	Michael Green	SIRIM

Authorized Classifier(AC):

5)Report Number:

[NA--LASO-LANL-DPWEST-2012-0001](#) After 2003 Redesign

Secretarial Office:

National Nuclear Security Administration

Lab/Site/Org:

Los Alamos National Laboratory

Facility Name:

DP Site West, TA-21

Subject/Title:

Unexpected Discovery of Hazardous Energy During Snow Removal

Date/Time Discovered:

02/03/2012 14:30 (MTZ)

Date/Time Categorized: 02/03/2012 15:50 (MTZ)

Report Type: Final

Report Dates:

Notification	02/07/2012	15:49 (ETZ)
Initial Update	02/22/2012	10:52 (ETZ)
Latest Update	02/22/2012	10:52 (ETZ)
Final	02/22/2012	10:52 (ETZ)

Significance Category: 3

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

Cause Codes: A4B3C08 - Management Problem; Work Organization & Planning LTA; Job scoping did not identify special circumstances and/or conditions

ISM: 2) Analyze the Hazards
4) Perform Work Within Controls

Subcontractor Involved: Yes
Portage Inc.

Occurrence Description: MANAGEMENT SYNOPSIS: On Friday, February 3, 2012 while clearing snow along the north east side of Enclosure 12 at Technical Area 21 (TA-21) with a 5 cubic yard front end loader a 480v power cord was severed. The cord was buried approximately 2" below the surface and the rough terrain caused the bucket to dip below grade which allowed for contact with the cord. The severed cord was discovered by the workers as they began to additional cleanup with hand tools. The workers did not come into contact with the severed cord.

The engineering drawing controlling power configuration at Material Disposal Area B (MDAB) required the power cords to run on top of the ground. This power cord posed a tripping hazard and was subsequently buried approximately 2 inches below grade. The engineering drawing was not updated to reflect this configuration. Although this configuration was known by many facility personnel, including engineering, it was not approved by engineering. This configuration was in place during the start up review that authorized operation of Enclosure 12.

A hazard assessment had not been completed as required by LANL procedure, P-300, nor was the activity approved by operations and the work had not been released to the field for execution. The work was being conducted in conjunction with set up of a Integrated Environmental Services (IES) trailer for the upcoming IES cylinder campaign. This work was authorized on the TA-21 Plan Of the Day (POD) to begin February 6, 2012. The unauthorized work was conducted on February 3, 2012.

There was no load on the line and the breaker tripped as designed. There were no injuries to the workers involved.

The LANL Electrical Safety Officer and LANL Engineer were notified and were on site at 1551. LANL Lock Out/Tag Out was applied at 1530 and the site was in safe configuration at 1530.

Following notification, the LANL TA-21, Designated Electrical Safety Officer (DESO) evaluated the event using the LANL Electrical Severity (ES) tool. Since the cord was cut with a front end loader, the national consensus is not to score this type of event. The justification is because there was no exposure to the workers involved. The final ES score will be zero.

The Facility Operations Director (FOD) designee categorized the event as ORPS Group 2 sub-group 2E (2) SC 3 on February 3, 2012 at 1550.

Due to the late discovery of the event on February 3, 2012, a critique was scheduled for Monday, February 6th at 1000. The FOD confirmed categorization of the event at the critique on February 6, 2012.

Cause Description:

CAUSAL ANALYSIS AND OBSERVATIONS

The Causal Analysis tool used to determine the apparent causes in this event was TapRoot (trademark) software. The DOE Causal Analysis Tree was used to identify the causal factors associated with deficient and/or absent events and conditions.

ISM SUMMARY:

Workers that were involved in this activity were on site the day of the event to support another TA-21 campaign; therefore, the work was conducted outside the written scope of work for the day. Because the work performed was outside the written scope of work, the ISM deficiency identified is, Perform Work Within Controls (Step 4). Workers did not complete a hazard assessment as required by LANL Procedure P-300, nor was the activity approved by operations and the work had not been released to the field for execution.

EVENT DESCRIPTION:

The set up for this IES trailer was authorized on the TA-21 POD to begin February 6, 2012 (the planning was not complete so this work would not have been released to the field for execution on the 6th) not February 3, 2012 (when this work was conducted). However the POD for Portage had identified set up for this IES trailer on Thursday February 2, 2012. This was intended to continue planning the set up work. No field set up

activities were conducted on the 2nd and there is no Portage POD on the 3rd Friday, as the facility contains minimum staffing to support only waste shipments out of the facility. The crew that performed the unauthorized work was in the facility on stand-by, for spill response during the waste shipping operation.

The area where the event took place was along the North side of enclosure 12 at the East end. The PIC had determined the need to clear snow from the area (ranging from 1' to 3') to support an upcoming activity (IES cylinder campaign). During this operation a spotter was ten to fifteen feet ahead of the front end loader in observation of this work and he did not see the cord being cut. There was approximately 1 feet of snow over the area where the cable was cut. The uneven terrain/slope caused the front end loader bucket to dip below grade which allowed it to cut the cord. The operator did not know the cord had been cut at. The operator was later using hand tools in the cord area and then saw that the cord had been completely cut. As soon as the Operator discovered the cut cable, he notified the PIC who notified the Operations Center. An ESO and electrician were called to the scene and verified the breaker had tripped. They then had a LO/TO applied and removed the damaged cable from service by cutting the connectors off each end.

The upcoming IES cylinder campaign requires setting in place a support trailer on the North side of enclosure 12 at the East end. This area is covered in 1' to 3' of snow. Because the power drop for the trailer was much farther West than expected, the PIC decided to clear a much greater distance (approximately 75') to the West of snow. This took the snow removal operation into the area of the energized power cable.

APPARENT CAUSE:

The investigation analysis determined that there was one apparent cause that led to this event.

The Cause Code that best addresses the apparent cause for this event is A4B3C08 – Job scoping did not identify special circumstances and /or conditions.

Operating Conditions:	Normal
Activity Category:	Normal Operations (other than Activities specifically listed in this Category)
Immediate Action(s):	Facility placed in safe configuration.
FM Evaluation:	No injury to workers involved in the event.
DOE Facility Representative	

Input:

DOE Program Manager

Input:

Further Evaluation is Required: No

Division or Project: TA-21 Clean-up

Plant Area: TA-21

System/Building/Equipment: Enclosure 12

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

Corrective Action 01:

Target Completion Date: 02/10/2012	Actual Completion Date: 02/06/2012
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REVISION OR EXTENSION OF THIS ACTION REQUIRES FACILITY OPERATIONS DIRECTOR APPROVAL.

See PFITS 2012-725 for action closure and objective evidence.

TITLE: Verbally counsel the Site Supervisor

ACTION: Verbally counsel the Site Supervisor who authorized work not on the Plan of the Week. The Site Supervisor was verbally counseled by the Facility Operations Director and Operations Manager.

RESPONSIBLE ORG: TA-21 Operations

DELIVERABLE: Email from Operations Manager stating the action had been completed

TARGET DUE DATE: 02/12/2012

This action addresses cause code A4B3C08 which is identified in the causal analysis.

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

Corrective Action 02:

Target Completion Date: 02/10/2012	Actual Completion Date: 02/07/2012
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REVISION OR EXTENSION OF THIS ACTION REQUIRES FACILITY OPERATIONS DIRECTOR APPROVAL.

See PFITS 2012-725 for action closure and objective evidence.

TITLE: Revise the subcontractor Plan of the Day (POD)

ACTION: Revise the subcontractor Plan of the Day (POD) to insure it fully integrates with the Operations Plan of the Week and does not contain work that has not been released by Operations.

RESPONSIBLE ORG: TA-21 Operations

DELIVERABLE: Revised POD that captures all subcontractor work and email from IRM/action owner.

TARGET DUE DATE: 02/10/2012

This action addresses cause code A4B3C08 which is identified in the causal analysis.

Corrective Action 03:

Target Completion Date:02/10/2012	Actual Completion Date:02/07/2012
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REVISION OR EXTENSION OF THIS ACTION REQUIRES FACILITY OPERATIONS DIRECTOR APPROVAL.

See PFITS 2012-725 for action closure and objective evidence.

TITLE: Brief the entire MDA B field team on the results of the critique.

ACTION: Brief the entire MDA B field team on the results of the critique by the Operations Manager. Review the requirements for release of work with the team and the prohibition on performing unauthorized work was re-emphasized. Each member of the team to be provided with a copy of the new POD.

RESPONSIBLE ORG: TA-21 Operations

DELIVERABLE: Attached roster from the briefing that summarized the critique and the prohibition on performing unauthorized work. All personnel were given the new POD OE: Email from IRM , POD from action 4 and roster

TARGET DUE DATE: 02/10/2012

This action addresses cause code A4B3C08 which is identified in the causal analysis.

Lessons(s) Learned:

: The Work Control Safety Management program should not be relied upon as the only means to protect the workforce. Physical barriers and warning signs and labels should be utilized to protect temporary portable systems and clearly identify hazards.

HQ Keywords:

- 01A--Inadequate Conduct of Operations - Inadequate Conduct of Operations (miscellaneous)
- 01B--Inadequate Conduct of Operations - Loss of Configuration Management/Control
- 01E--Inadequate Conduct of Operations - Operations Procedure Noncompliance
- 01N--Inadequate Conduct of Operations - Inadequate Job Planning (Other)
- 01R--Inadequate Conduct of Operations - Management issues
- 07D--Electrical Systems - Electrical Wiring
- 08F--OSHA Reportable/Industrial Hygiene - Industrial Operations Issues
- 08H--OSHA Reportable/Industrial Hygiene - Safety Noncompliance
- 08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical)
- 11G--Other - Subcontractor
- 12C--EH Categories - Electrical Safety
- 14D--Quality Assurance - Documents and Records Deficiency
- 14E--Quality Assurance - Work Process Deficiency
- 14G--Quality Assurance - Procurement Deficiency

HQ Summary:

On February 3, 2012, while clearing snow along the north east side of Enclosure 12 at Technical Area 21 with a 5-cubic yard front end loader, a 480-volt power cord was severed, tripping its circuit breaker. The cord was buried approximately 2 inches below the surface and the rough terrain caused the bucket to dip below grade which allowed for contact with the cord. The severed cord was discovered by the workers as they began additional cleanup with hand tools. The workers did not come into contact with the severed cord. The engineering drawing controlling power configuration at Material Disposal Area B required the power cords to run on top of the ground. This power cord posed a tripping hazard and was subsequently buried. The engineering drawing was not updated to reflect this configuration. A Lock Out/Tag Out was applied. Appropriate notifications were made and a critique was scheduled.

Similar OR Report Number: 1. NA--LASO-LANL-DPWEST-2011-0001

Facility Manager:

Name	Steven Henry
Phone	(505) 606-2394
Title	Facility Operations Director

Originator:

Name	Buksa, Martha D.
Phone	(505) 606-0277
Title	OCCURRENCE INVESTIGATOR

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
02/03/2012	15:01 (MTZ)	Dave Nickless	DOE/LASO

Authorized Classifier(AC): Martha D. Buksa Date: 02/22/2012

6)Report Number: [NA--LASO-LANL-HEMACHPRES-2012-0003](#) **After 2003 Redesign**
Secretarial Office: National Nuclear Security Administration
Lab/Site/Org: Los Alamos National Laboratory
Facility Name: HE Machining/Pressing Facils
Subject/Title: Near Miss: Incomplete LOTO Results In Work Performed Near Energized 480V and 208V Terminals
Date/Time Discovered: 02/21/2012 11:30 (MTZ)
Date/Time Categorized: 02/21/2012 12:00 (MTZ)
Report Type: Notification
Report Dates:

Notification	02/24/2012	18:49 (ETZ)
Initial Update		
Latest Update		
Final		

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

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

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

Cause Codes:

ISM:

Subcontractor Involved: No

Occurrence Description: Management Synopsis: At 1130 on February 21, 2012, the Weapons Facility Operations (WFO) Electrical Safety Officer (ESO) notified the WFO Facility Operations Director (FOD) that he had identified an incomplete electrical Lock Out Tag Out (LOTO) that was performed outside the scope of the IWD for a maintenance work activity in Technical Area 16 Building 260 (TA-16-260). The incomplete LOTO was discovered during the technical investigation into the cause of an attic fire

in TA-16-260 that occurred on February 17, 2012 (reference NA--LASO-LANL-HEMACHPRES-2012-0002).

The work was performed using a signed and authorized Integrated Work Document (IWD). The IWD required appropriate shock and arc flash Personal Protective Equipment (PPE) for zero voltage check verifying the power for a portion of the control panel serving HVA4 but did not identify two other sources of power to that panel, a 480 V supply and 208V supply. The work activity included the installation of a new controller relay contactor to the portion of the panel that was isolated, but did not identify as a hazard the known exposed 480V and unknown exposed 208V. After evaluation the ESO determined the worst-case electrical severity score was 50, which is defined as moderate hazard, based on potential exposure to energized 480V.

A prompt critique was held and at 1135 the WFO FOD dual-categorized the event as 2E(2)3 and 10(3c)3.

Background: On February 17, 2012, Maintenance Site Services (MSS) crafts were performing troubleshooting and repair activities on TA-16-260 HVAC unit 4 in an effort to restore heat to the facility.

That morning, the crafts installed a new Minimax controller in the control panel for HVAC unit 4 using an authorized IWD. The IWD required a LOTO of the local panel disconnect, but not the 480V feed to the panel. They performed a zero-energy check on the portion of the control panel they worked on, wearing the appropriate shock and arc flash PPE identified in the IWD and continued to wear the PPE during the installation of the new Minimax controller.

At approximately 1100 on February 21, 2012, the WFO ESO, working with the WFO MSS resident electricians, was evaluating the electrical panel as part of the technical investigation into the cause of an attic fire associated with HVAC the previous week. To gather information it was requested that a picture of the inside of the control panel be taken and a visual inspection of the panel be made. During the course of determining the appropriate LOTO point it was determined that the label on the control panel was incorrectly labeled "Fed from Panel 1A Room 103" and that the actual circuit that supplied power to the HVA-4 was SWBA2 Circuits 19, 22, and 23. LOTO of the HVA-4 control panel was performed at the identified power source. This LOTO point was chosen because it would de-energize the entire control panel, including the line side of the control panel local disconnect. During the zero energy check of the panel, a 208V terminal within the panel was identified. At that point, the work was paused and notifications were made.

Cause Description:

Operating Conditions: Normal
Activity Category: Maintenance
Immediate Action(s):
1. The control panel was placed in a safe configuration, the IWD for the investigation was revised, and a trace on the source of the 208V circuit will be performed.
2. A critique was held immediately upon notification.
3. The electrical box will be re-labeled to reflect the correct information.

FM Evaluation:

DOE Facility Representative

Input:

DOE Program Manager

Input:

Further Evaluation is Required: Yes.
Before Further Operation? No
By Whom: CAO-PF and WFO FOD
By When: 04/06/2012

Division or Project: Weapons

Plant Area: TA-16

System/Building/Equipment: TA-16-260 electrical panel

Facility Function: Explosive

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)
01M--Inadequate Conduct of Operations - Inadequate Job Planning (Electrical)
08H--OSHA Reportable/Industrial Hygiene - Safety Noncompliance
08J--OSHA Reportable/Industrial Hygiene - Near Miss (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 February 21, 2012, the Weapons Facility Operations Electrical Safety Officer identified an incomplete electrical Lock Out/Tag Out (LOTO) that was performed outside the scope of the Integrated Work Document (IWD) for maintenance work in Technical Area 16, Building 260 (TA-16-260). The IWD required appropriate shock and arc flash Personal Protective Equipment for zero voltage check verifying the power for a portion of the control panel serving HVA4. The work included the installation of a new controller relay contactor to the portion of the panel that was isolated, but did not identify as a hazard the known exposed 480 volts and unknown exposed 208 volts. While determining the appropriate LOTO point, it was

determined that the label on the control panel was incorrect (Fed from Panel 1A Room 103) and that the actual circuit that supplied power to the HVA-4 was SWBA2 Circuits 19, 22, and 23. LOTO of the HVA4 control panel was performed at the identified power source. During the zero energy check of the panel, a 208-volt terminal within the panel was identified. Work was paused and notifications were made. The control panel was placed in a safe configuration and the IWD was revised. The electrical box was re-labeled to reflect the correct information.

Similar OR Report Number:

Facility Manager:

Name	Raeanna Sharp-Geiger
Phone	(505) 667-4246
Title	WFO Facility Operations Director

Originator:

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

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
02/21/2012	12:00 (MTZ)	Steven Frye	NNSA
02/21/2012	12:00 (MTZ)	Ed Christie	NNSA

Authorized Classifier(AC): Kimberli Tanner Date: 02/24/2012

7)Report Number:

[NA--LASO-LANL-TA55-2012-0008](#) After 2003 Redesign

Secretarial Office:

National Nuclear Security Administration

Lab/Site/Org:

Los Alamos National Laboratory

Facility Name:

Plutonium Proc & Handling Fac

Subject/Title:

Incorrect Electrical Breakers Locked and Tagged Out During Building Construction

Date/Time Discovered:

02/06/2012 17:27 (MTZ)

Date/Time Categorized:

02/06/2012 17:27 (MTZ)

Report Type:

Notification/Final

Report Dates:

Notification	02/08/2012	18:51 (ETZ)
Initial Update	02/08/2012	18:51 (ETZ)
Latest Update	02/08/2012	18:51 (ETZ)
Final	02/08/2012	18:51 (ETZ)

Significance Category:

4

Reporting Criteria:

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

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

Cause Codes:

ISM: 6) N/A (Not applicable to ISM Core Functions as determined by management review.)

Subcontractor Involved: No

Occurrence Description: MANAGEMENT SYNOPSIS: On Monday, February 6, 2012, at 1727, the Technical Area 55 (TA-55) Facility Operations Director (FOD) was notified that locks and tags installed on circuit breakers identified as 480 volt electrical service for pumps in the Radiological Laboratory Utility Office Building (RLUOB) were incorrect. The actual circuit breakers for the pumps were open (not energized) but not locked or tagged out. The TA-55 FOD categorized the event as 2E(3), significance category 4.

BACKGROUND: RLUOB has been under construction since 2009. During construction the construction drawings were modified using Field Change Requests (FCRs). As the drawings were modified over time not all of the subcontractors received the latest changes. The original drawings had the location for the two pump breakers at positions PPE 4 and 5 and the panel was labeled accordingly. However, when the circuit breaker was received, the pump breakers were moved to positions PPE 2 and 3 and the zone 1 ventilation fans were placed in position 4 and 5. Electrical experts stated this was done because of the size of the circuit breakers and their usual location in the panel; i.e. larger breakers toward the bottom of the panel instead of the top as indicated in the drawing.

In November 2011 a Lockout/Tagout was requested for the pump circuit breakers. A walk-down of the circuit was performed twice; however, the discrepancy was not identified and circuits 4 and 5 were opened, lock and tags were applied, and a zero voltage test was performed. A pump rotation test was scheduled for Monday, February 6, 2012. Prior to the test the locks and tags were verified and the circuit was walked-down. During the walk-down it was identified that circuits 4 and 5 were not connected to the pumps. Work was paused at 1430 and notifications were initiated. The TA-55 FOD was notified of the event at 1727 and categorized the event as ORPS reportable.

Cause Description:

Operating Conditions: Walk-down of electrical circuit prior to pump test.

Activity Category: Construction

Immediate Action(s): Work was paused on February 6, 2012 and the panel was re-labeled with the correct circuit breaker locations. A critique of the event was held on Tuesday, February 7, 2012. During the critique immediate action was developed.

1) A standing order for construction and operations directing change-of-state (switching power off and on to determine if the equipment is

activated) will be added to Lockout/Tagout in RLUOB. This requirement will remain in effect until the project delivers complete as-built drawings.

- 2) A pause on work under electrical lockout will remain in effect until A walk-down of all RLUOB lockout/tagouts (approximately 115 locks) has been performed and correct configuration verified.
- 3) Control of drawings will be reviewed and a path forward developed to ensure all drawings used are current.

FM Evaluation:

DOE Facility Representative

Input:

DOE Program Manager

Input:

Further Evaluation is Required: No

Division or Project: RLUOB

Plant Area: TA-55

System/Building/Equipment: TA-55 RLUOB

Facility Function: Plutonium Processing and Handling

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)
08H--OSHA Reportable/Industrial Hygiene - Safety Noncompliance
12I--EH Categories - Lockout/Tagout (Electrical or Mechanical)
14D--Quality Assurance - Documents and Records Deficiency
14E--Quality Assurance - Work Process Deficiency

HQ Summary:

On February 6, 2012, the Technical Area 55 (TA-55) Facility Operations Director was notified that locks and tags installed on circuit breakers identified as 480-volt electrical service for pumps in the Radiological Laboratory Utility Office Building (RLUOB) were incorrect. The actual circuit breakers for the pumps were open (not energized) but not locked or tagged out. RLUOB has been under construction since 2009 and the construction drawings had been modified over time and not all of the subcontractors had received the latest changes. The original drawings had the location for the two pump breakers at positions PPE 4 and 5 and the panel was labeled accordingly. However, when the circuit breaker was received, the pump breakers were moved to positions PPE 2 and 3 and the Zone 1 ventilation fans were placed in position 4 and 5. Electrical experts stated this was done because of the size of the circuit breakers and their usual location in the panel; i.e. larger breakers toward the bottom of the panel instead of the top as indicated in the drawing. Work was paused and notifications were made and control of drawings will be reviewed and a

path forward developed to ensure all drawings used are current.

Similar OR Report Number:

Facility Manager:

Name	Stu McKernan
Phone	(505) 667-3030
Title	Deputy Facility Operations Director

Originator:

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

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
02/06/2012	17:27 (MTZ)	Dan Carter	NNSA/FR

Authorized Classifier(AC): Mark Hunsinger Date: 02/07/2012

8)Report Number:

[NA--LSO-LLNL-LLNL-2012-0005](#) 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:

Worker receives shock to little finger while plugging dual RPT (relocatable power tap) into wall outlet in Building 482 office

Date/Time Discovered:

02/02/2012 14:00 (PTZ)

Date/Time Categorized:

02/02/2012 15:00 (PTZ)

Report Type:

Update/Final

Report Dates:

Notification	02/06/2012	14:08 (ETZ)
Initial Update	03/09/2012	19:23 (ETZ)
Latest Update	03/09/2012	19:23 (ETZ)
Final		

Significance Category:

2

Reporting Criteria:

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

Cause Codes:

A2B6C01 - Equipment/ material problem; Defective, Failed or Contaminated; Defective or failed part

ISM:

6) N/A (Not applicable to ISM Core Functions as determined by management review.)

Subcontractor Involved:

Yes

General Atomics

Occurrence Description:

On Thursday, February 2, 2012 at approximately 3pm it was determined that a worker received a shock to her little finger while plugging a RPT (relocatable power tap) with two modules into a wall outlet in her office in B482. When the worker plugged the RPT into the outlet she saw a spark and felt a tingle in her little finger and up the right forearm. Worker was taken to medical provider for evaluation. Electricians evaluated panel 1011A4, circuit A5 and determined the breaker tripped and there was no visible damage to the RPT. The RPT was plugged into the same receptacle by the electricians (wearing voltage and arc flash rated PPE). This resulted in the breaker tripping and visible damage to the case of the RPT. The severity score is 60, medium category, a single hand dry shock. This is based on the worker's certainty of not touching the electrical conductors and the dropping of the large numerical score for a large transformer in the electrical supply system, since the worker's connection was through the low energy plasma of the arcing plug-receptacle.

This occurrence report is being tracked in LLNL's Issues Tracking System, reference Assessment No. 33975.

Cause Description:

Why/Because causal analysis method was used.

The worker was evaluated by a health care professional and released back to work with no restrictions. Interviews with the worker revealed that she was certain that she did not come in contact metal pieces of the plug or RPT chassis indicating that there was an issue with the unit.

Based on the initial test, it was believed there was an issue with the RPT and not with the building wiring system. Destructive disassembly revealed that the two chassis RPT (two module) second module did not have its metal chassis bonded to the equipment grounding conductor (EGC). The first module does have its chassis bonded to the EGC. This provided the current return path for the faulted supply wire. The first module also had the supply wire pinched between the metal chassis and the dielectric support base. A second unit was destructively disassembled and the same configuration was found suggesting a quality problem during manufacturing. There was no reason to suspect that there was anything wrong with the RPTs until the incident occurred.

In addition, it was determined that the unit had an NRTL label and the status of the RPT was verified on the UL website. Consumer product safety commission (CPSC) was viewed for any recalls of this product, none were found. The manufacturer's website, Fellowes, was verified for recalls and none were found. Fellowes was contacted for confirmation because this product is no longer in their website inventory and the product safety manager returned inquiry and said they have no technical data to

share because the RPT is manufactured by a subcontractor. This incident was also reported to the DOE EFCOG electrical safety sub group teleconference based on the initial OR.

Concurrently, the Institution issued a safety flash, NIF&PS sent a recall email and FPOCs performed a sweep of the NIF&PS buildings. Fifteen units were collected and disposed.

Operating Conditions: Normal
Activity Category: Normal Operations (other than Activities specifically listed in this Category)
Immediate Action(s): The worker was taken to medical for evaluation. The area was secured and investigation initiated. The RPT was removed from office.
FM Evaluation: The RPT was poorly assembled indicating there was less than adequate quality control during manufacturing.

DOE Facility Representative

Input:
DOE Program Manager
Input:

Further Evaluation is Required: No
Division or Project: N & PS
Plant Area: Site 200
System/Building/Equipment: Building 482 office wall outlet
Facility Function: Laboratory - Research & Development

Corrective Action 01:

Target Completion Date: 02/03/2012	Actual Completion Date: 02/03/2012
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LLNL will inform workers of potential issue with RPT by issuing a Safety Flash.

Corrective Action 02:

Target Completion Date: 02/07/2012	Actual Completion Date: 02/07/2012
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NIF&PS will issue NIFGram and perform a sweep of the buildings to collect and dispose of faulty RPTs.

Lessons(s) Learned: Safety News Flash - Electrical Shock - Multi-outlet strip to be removed from service

HQ Keywords: 07D--Electrical Systems - Electrical Wiring
 08A--OSHA Reportable/Industrial Hygiene - Electrical Shock
 11G--Other - Subcontractor
 12C--EH Categories - Electrical Safety
 14L--Quality Assurance - No QA Deficiency

HQ Summary: On February 2, 2012, a worker received a shock to their little finger while plugging a dual relocatable power tap (RPT) into a wall outlet in their

office. When the worker plugged the dual RPT into the outlet, they saw a spark and felt a tingle in their little finger and up the right forearm. The worker was taken to medical for evaluation. Electricians evaluated panel 1011A4, circuit A5, and determined the breaker tripped and the plug was damaged. The area was secured and an investigation was initiated.

Similar OR Report Number: 1. NA--LSO-LLNL-LLNL-2012-0004

Facility Manager:

Name	Valerie Roberts
Phone	(925) 424-3662
Title	N&PS Deputy Principal Associate Director

Originator:

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

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
02/02/2012	16:10 (PTZ)	Roger Rocha	LEDO
02/02/2012	16:15 (PTZ)	Tracey Simpson	ESH TL
02/02/2012	16:17 (PTZ)	Dave Aron	NNSA LSO

Authorized Classifier(AC): Lydia Hunt Date: 03/06/2012

9)Report Number:

[NA--LSO-LLNL-LLNL-2012-0008](#) 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:

Building 361 Subcontractor Hazardous Electrical Energy Control Violation

Date/Time Discovered:

02/23/2012 14:08 (PTZ)

Date/Time Categorized:

02/23/2012 16:00 (PTZ)

Report Type:

Final

Report Dates:

Notification	02/27/2012	17:27 (ETZ)
Initial Update	02/27/2012	17:27 (ETZ)
Latest Update	03/02/2012	19:14 (ETZ)
Final	03/02/2012	19:14 (ETZ)

Significance Category:

4

Reporting Criteria:

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

Cause Codes:

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

Subcontractor Involved: Yes
Technical Safety Services

Occurrence Description: On February 21st, a Technical Safety Services (TSS) representative was performing biosafety cabinet (BSC) certifications in B361. After realizing that the airflow for the BSC in R1845 was substandard, the representative removed the outer BSC cover to access the fan speed dial which originates from an internal panel. Upon adjusting the dial, sparks were seen emanating from the base of the knob. The representative then disconnected several wire harnesses which fed into the internal control panel which is in violation of the subcontractor's safety documentation, which is an attachment and referenced in LLNL's procured services work control documentation. Any electrical work that requires anything beyond disconnecting a cord-and-plug unit requires lockout/tagout controls. This particular BSC is hardwired and fed from a circuit breaker (not considered a cord-and-plug unit).

The TSS employee reported to the LLNL escort that he was okay (no shock was reported).

This occurrence report is being tracked in LLNL's Issues Tracking System, reference Assessment No.34060.

Cause Description:

Operating Conditions: Testing/Certification

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

Immediate Action(s): The immediate actions taken were: 1) Stop the work, 2) Notification of the users of the BSC that they should not use it, 3) Signage placed on the BSC noting that is defective and not to be used. The circuits are administratively locked and tagged.

FM Evaluation:

DOE Facility Representative

Input:

DOE Program Manager

Input:

Further Evaluation is Required: No

Division or Project: PLS

Plant Area: Site 200

System/Building/Equipment: Building 361 Biosafety Cabinet

Facility Function: Laboratory - Research & Development

Corrective Action:

Lessons(s) Learned:

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

HQ Summary: On February 21, 2012, a Technical Safety Services (TSS) representative was performing biosafety cabinet (BSC) certifications in Building 361 when he observed sparks in the BSC. After realizing that the airflow for the BSC in R1845 was substandard, the representative removed the outer BSC cover to access the fan speed dial which originates from an internal panel. Upon adjusting the dial, sparks were seen emanating from the base of the knob. The representative then disconnected several wire harnesses which fed into the internal control panel which is in violation of the subcontractor's safety documentation, which is an attachment and referenced in LLNL's procured services work control documentation which states that any electrical work that requires anything beyond disconnecting a cord-and-plug unit requires lockout/tagout controls. This particular BSC is hardwired and fed from a circuit breaker (not considered a cord-and-plug unit). The TSS employee did not receive a shock and reported the incident. Work was stopped and signage was placed on the BSC noting that is defective.

Similar OR Report Number: 1. NA--LSO-LLNL-LLNL-2008-0012

Facility Manager:

Name	Dave Boercker
Phone	(925) 422-4187
Title	Deputy Associate Director - Operations, Physical a

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
02/23/2012	16:46 (PTZ)	Mark Sueksdorf	LEDO
02/23/2012	16:48 (PTZ)	Paul Borenstein	ESH TL

02/23/2012	16:55 (PTZ)	Rob Kong	NNSA LSO
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Authorized Classifier(AC): Warren Rued **Date:** 02/27/2012

10)Report Number: [NA--LSO-LLNL-LLNL-2012-0009](#) **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: Inadvertent action in building 321D results in arc causing GFCI device to trip - No Shock
Date/Time Discovered: 02/23/2012 14:30 (PTZ)
Date/Time Categorized: 02/24/2012 13:15 (PTZ)
Report Type: Update

Report Dates:

Notification	02/27/2012	18:13 (ETZ)
Initial Update	02/27/2012	18:16 (ETZ)
Latest Update	02/27/2012	18:16 (ETZ)
Final		

Significance Category: 3
Reporting Criteria: 10(3) - A near miss to an otherwise ORPS reportable event, where something physically happened that was unexpected or unintended, or where no or only one barrier prevented an event from having a reportable consequence.
 The significance category assigned to the near miss must be based on an evaluation of the potential risks and extent of personnel exposure to the hazard. (1 of 3 criteria - This is a SC 3 occurrence)

Cause Codes:

ISM:

Subcontractor Involved: No

Occurrence Description: On February 23, 2012, at approximately 1430, in Building 321D employees heard a loud 'pop" and observed an arc at a work bench. The arc caused the GFCI device protecting the workbench to trip. It appears that an employee unintentionally energized a power cord via one of the workbench's built-in electrical receptacles. The power cord had exposed leads that contacted the metal of the workbench, resulting in the arc. The employee did not experience a shock and no injuries occurred. Other than some scoring from the arc, no damage occurred . The employee notified line management and the work bench was immediately placed out of service to preserve the scene. A critique was held at 0900 on February 24.

The 110V power cable involved was provided by a customer with a plug on one end and two exposed and tinned wires on the other. At the time of

the incident, the customer had asked the employee to review the positive and neutral wiring of the plug with him. With the cord wound in her left hand and the plug and two exposed wire ends facing the same direction, the employee placed the plug near the front of a workbench built-in 110VAC outlet to demonstrate. The employee and customer were discussing the plug configuration when the employee heard a loud pop and saw a flash. The employee believes that she must have moved her arm such that the plug entered the receptacle slots and made contact with the receptacle conductors. This is the only scenario that explains the creation of a path for current. Based on the fact that an unintended event occurred it was determined that a Group 10(3) SC3 management concern OR be filed.

A management review will be performed.

This occurrence report is being tracked in LLNL's Issues Tracking System, reference Assessment No.34061

Cause Description:

Operating Conditions:

Normal

Activity Category:

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

Immediate Action(s):

The employee notified their supervisor. The affected work bench was placed out of service and the scene isolated and placed under the control of the Division Leader.

FM Evaluation:

Submit final report is to ORO by 4/3/2012.

Enter final occurrence report into ORPS by 4/6/2012.

DOE Facility Representative

Input:

DOE Program Manager

Input:

Further Evaluation is Required:

Yes.
Before Further Operation? No
By Whom: Robert Dillman
By When: 04/06/2012

Division or Project:

Engineering

Plant Area:

Site 200

System/Building/Equipment:

Building 321D

Facility Function:

Laboratory - Research & Development

Corrective Action:

Lessons(s) Learned:

HQ Keywords:

01A--Inadequate Conduct of Operations - Inadequate Conduct of Operations (miscellaneous)

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

HQ Summary:

On February 23, 2012, in Building 321D, employees heard a loud ‘pop’ and observed an arc at a work bench. The arc caused the GFCI device protecting the workbench to trip. It appears that an employee unintentionally energized a power cord via one of the workbench's built-in electrical receptacles. The power cord had exposed leads that contacted the metal of the workbench, resulting in the arc. The employee did not experience a shock and no injuries occurred. The employee notified line management and the work bench was immediately placed out of service to preserve the scene. A critique was held.

Similar OR Report Number:

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
02/24/2012	15:07 (PTZ)	Mark Sueksdorf	LEDO
02/24/2012	15:10 (PTZ)	Tracey Simpson	ESH TL
02/24/2012	15:12 (PTZ)	Rob Kong	NNSA LSO

Authorized Classifier(AC): Robert Dillman Date: 02/27/2012

11)Report Number: [SC--BSO-LBL-OPERATIONS-2012-0003](#) After 2003 Redesign

Secretarial Office: Science

Lab/Site/Org: Lawrence Berkeley National Laboratory

Facility Name: Operations Division

Subject/Title: LOTO Procedural Deviation in B84 - No Exposure, No Injuries

Date/Time Discovered: 02/16/2012 14:00 (PTZ)

Date/Time Categorized: 02/16/2012 16:51 (PTZ)

Report Type: Notification/Final

Report Dates:

Notification	02/21/2012	13:52 (ETZ)
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Initial Update	02/21/2012	13:52 (ETZ)
Latest Update	02/21/2012	13:52 (ETZ)
Final	02/21/2012	13:52 (ETZ)

Significance Category: 4

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

Cause Codes:

ISM: 4) Perform Work Within Controls

Subcontractor Involved: Yes
Webcor/WBE

Occurrence Description: At approximately 1400 hours on 02/16/2012, LBNL personnel discovered a LOTO procedural deviation in B84.

In the morning of 02/16/2012, a second-tier electrical subcontractor WBE work crew had been performing the initial energization of two new electrical panels in Building 74. This took place with some panel covers being removed so that voltage testing and phase rotation checks could be performed. The isolation circuit breakers for these panels were located in Building 84. After the energized testing was performed satisfactorily, the panels were locked out in order to put the panel covers back on. After performing the LOTO, the electrical subcontractor WBE work crew verified absence of voltage in the panels and placed the panel covers on. The workers then took a lunch break.

After lunch, WBE and LBNL personnel returned to Building 84 to clear the LOTO on the isolation circuit breakers placed there earlier and to re-energize the new panels in B74. The Lab EH&S (Environment, Health, & Safety) electrical safety engineer noticed that the LOTO hasp and locks WBE workers had attached to the B84 circuit breakers earlier were not placed in the proper position to prevent the breakers from being closed (turned on). The type of breaker is a 208 VAC low voltage power circuit breaker with a racking mechanism. A shutter covers the racking mechanism and can be locked in the down or up position. When the breaker is racked in (connected), the shutter must be locked in the up position. Instead, the workers locked the breaker with the shutter in the down position. In addition, the workers did not attempt a start test of the breaker while executing the LOTO procedure in B84. Had the start test been performed, the breaker would have closed and the improper LOTO method would have been identified and corrected.

During the execution of the LOTO, no worker was exposed to any hazardous energy source. Workers were wearing all proper PPEs for performing the absence-of-voltage verification. All of the down-stream

electrical breakers were locked to 'open' (shut off) but had not yet been tested for zero energy.

Cause Description:

Operating Conditions: Indoors, lighted, dry

Activity Category: Construction

Immediate Action(s): The LOTO work had been completed at the time of discovery; the electric panels were re-energized.

FM Evaluation: -WBE is an electrical subcontractor to the project's primary general contractor Webcor.

DOE Facility Representative

Input:

DOE Program Manager

Input:

Further Evaluation is Required: No

Division or Project: Facilities Division

Plant Area: B84

System/Building/Equipment: Building 84 main electrical circuit breakers

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

Corrective Action:

Lessons(s) Learned:

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

HQ Summary: On February 16, 2012, an Environment, Health, & Safety electrical safety engineer noticed that a lockout/tagout (LOTO) hasp and locks that subcontractor workers had attached to the B84 circuit breakers were not placed in the proper position to prevent the circuit breakers from being closed (turned on) following completion of work on two new electrical panels in Building 74. In addition, the workers did not attempt a start test of the breaker while executing the LOTO procedure in B84. Had the start test been performed the breaker would have closed and the improper LOTO method would have been identified and corrected. No worker was exposed to any hazardous energy source and workers were wearing all proper personal protective equipment for performing the absence-of-voltage verification.

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
02/16/2012	17:16 (PTZ)	Kevin Hartnett	BSO
02/16/2012	17:16 (PTZ)	Mary Gross	BSO

Authorized Classifier(AC):

12)Report Number: [SC--PNSO-PNNL-PNNLBOPER-2012-0002](#) After 2003 Redesign

Secretarial Office: Science

Lab/Site/Org: Pacific Northwest National Laboratory

Facility Name: Energy Research Programs (PNNL)

Subject/Title: Discovery of Uncontrolled Hazardous Energy Source

Date/Time Discovered: 02/07/2012 08:30 (PTZ)

Date/Time Categorized: 02/07/2012 08:50 (PTZ)

Report Type: Notification

Report Dates:

Notification	02/09/2012	15:11 (ETZ)
Initial Update		
Latest Update		
Final		

Significance Category: 3

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

Cause Codes:

ISM: 4) Perform Work Within Controls

Subcontractor Involved: Yes
FEI Company

Occurrence Description: On Tuesday, February 07, 2012, PNNL electricians discovered a panel had been removed from the Transmission Electron Microscope control cabinet.

The electrical disconnect providing power to the cabinet was in the ON position (232/400V). The cabinet panel had been removed on February 6, 2012, at approximately 1630 hours and left off overnight.

There was no contact with energized components or personnel injuries.

Cause Description:

Operating Conditions: N/A

Activity Category: Research

Immediate Action(s): The electrical disconnect was locked and tagged out and the equipment was placed in a safe configuration. A critique was held Tuesday, February 7, 2012.

FM Evaluation: Results of the Electrical Severity calculations for this event:

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

EHF (Electrical Hazard Factor) = 10

EF (Environmental Factor) = 0

SPF (Shock Proximity Factor) = 1

AFPF (Arc Flash Proximity Factor) = 0

TPF (Thermal Proximity Factor) = 0

IF (Injury Factor) = 1

$$(10)*[(1+0+1+0+0)*1] = 20 \text{ Low Severity}$$

DOE Facility Representative

Input:

DOE Program Manager

Input:

Further Evaluation is Yes.

Required: Before Further Operation? No

By Whom:

By When:

Division or Project: W.R. Wiley, Environmental Molecular Sciences Lab

Plant Area: PNNL Site

System/Building/Equipment: EMSL / Room 1118

Facility Function: Laboratory - Research & Development

Corrective Action:

Lessons(s) Learned:

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

HQ Summary: On February 07, 2012, PNNL electricians discovered a panel had been

removed from a transmission electron microscope control cabinet and the electrical disconnect providing power to the cabinet was in the ON position (232/400V). The cabinet panel had been removed on February 6, and left off overnight. The calculated severity for this event is 20, low severity. There was no contact with energized components or personnel injuries. The electrical disconnect was locked and tagged out and the equipment was placed in a safe configuration. A critique was held.

Similar OR Report Number: 1. SC--PNSO-PNNL-PNNLBOPER-2010-0019

Facility Manager:

Name	Lea, A. S.
Phone	(509) 371-6233
Title	Manager, Microscopy

Originator:

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

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
02/07/2012	09:25 (PTZ)	R. Yasek	PNSO

Authorized Classifier(AC): Pollari, R. A. Date: 02/09/2012

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