



Office of Health, Safety and Security

Monthly Analysis of Electrical Safety Occurrences



June 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 11 in May to 9 in June and one of these occurrences resulted in an electrical shock. Also the number of electrical intrusion occurrences decreased to zero while the number of lockout/tagout occurrences increased from three occurrences in May to four occurrences in June. Workers continued to improve on electrical hazards identification as they found problems with lockout/tagout implementation and conditions involving uncontrolled hazardous energy.

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 June occurrence reports is provided in Attachment 2.

Electrical Shock

There was one electrical shock for the month of June, which is a reduction from the two electrical shocks reported in May. This occurrence involved a custodian who received an electrical shock while cleaning an electrical stove. Preliminary investigation indicates no evidence of bonding jumpers to components, a faulty burner control switch, and unprotected wiring within the assembly on the burner unit.

Figure 1 shows a 3-year trend of electrical shocks for the DOE complex. During this period, the average number of electrical shocks has remained below three per month. The majority of shocks (about 75 percent) involve non-electrical workers.

Figure 1 – Three-Year Trend of Electrical Shocks

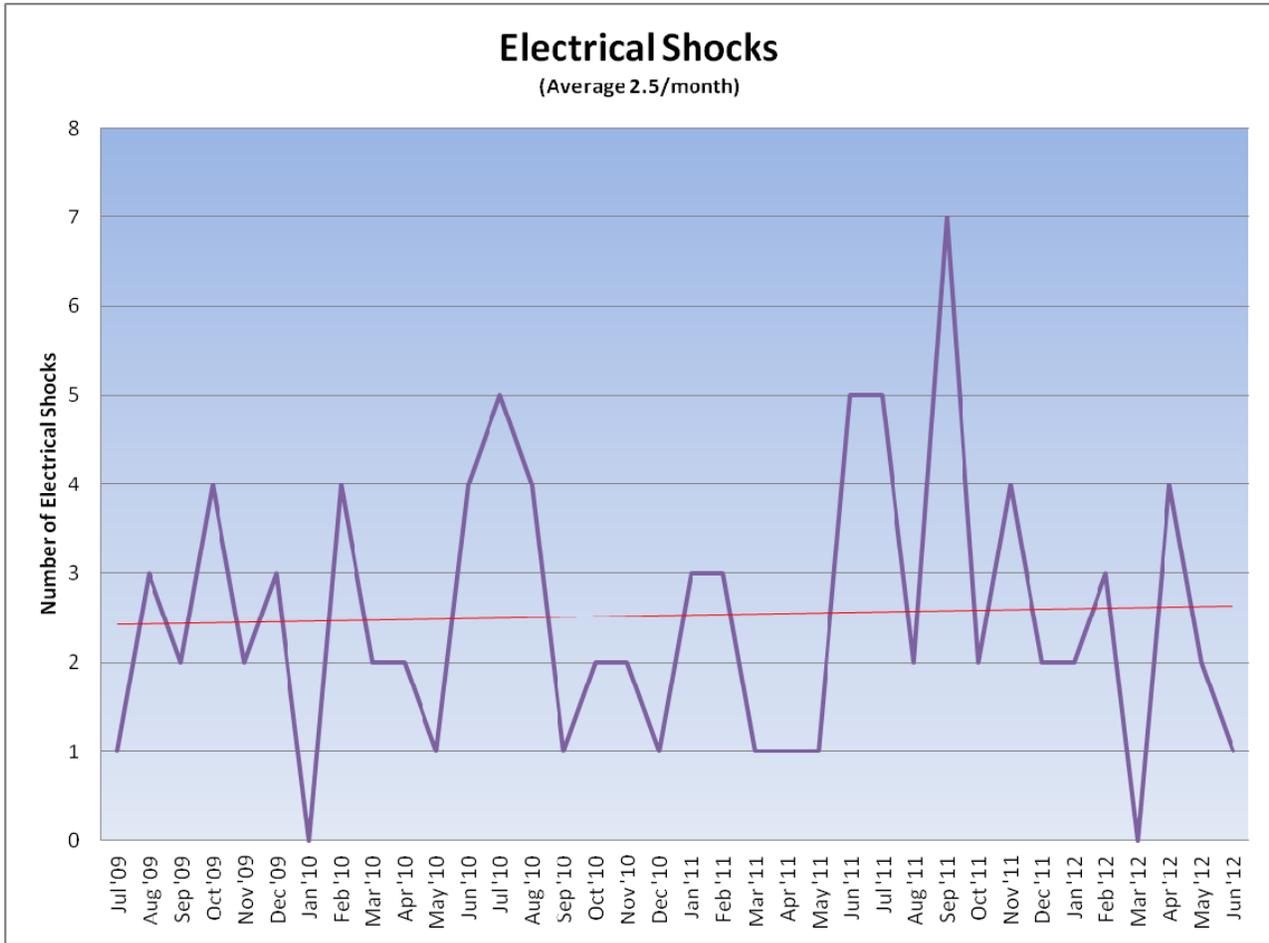
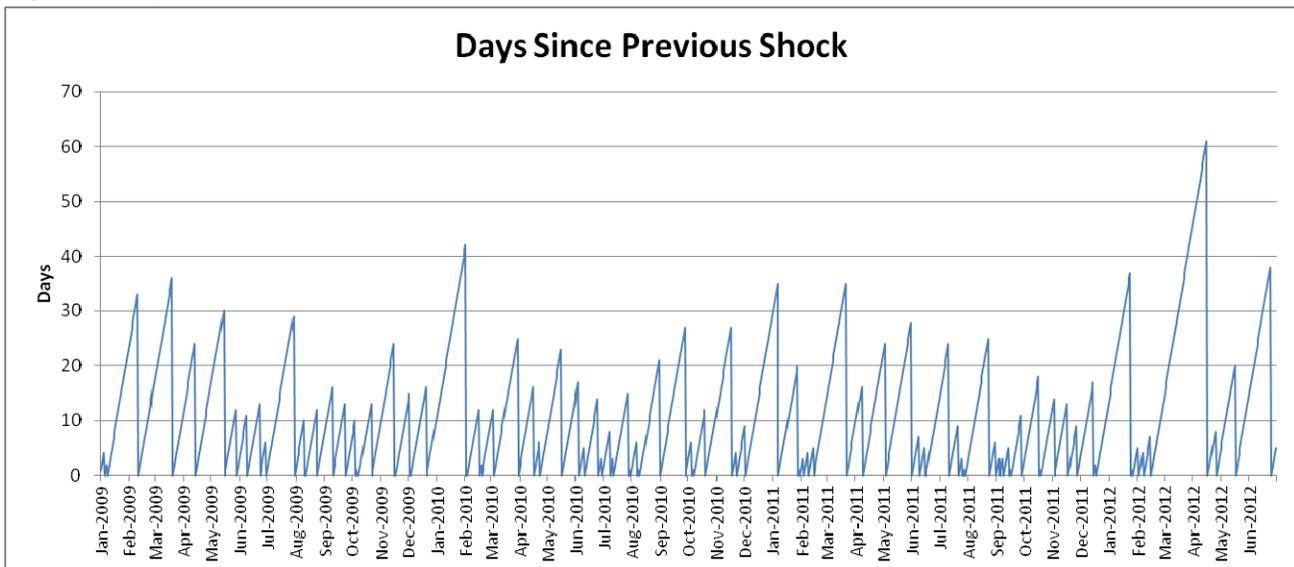


Figure 2 shows the number of days since the previous electrical shock for the DOE complex. The longest interval was 61 days (April 16) and the present interval is 5 days as of June 30.

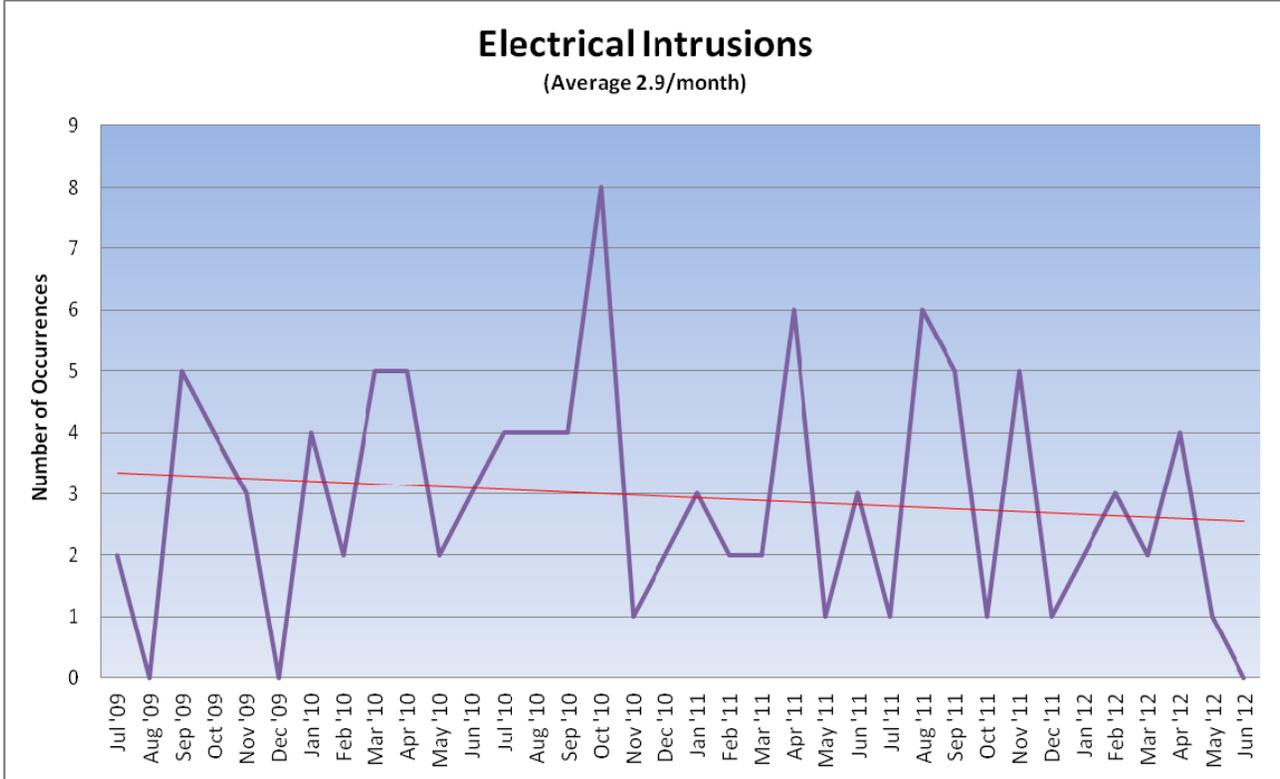
Figure 2 - Days since Previous Shock



Electrical Intrusion

In June, the number of electrical intrusion occurrences (i.e., cutting/penetrating, excavating, or vehicle contact of electrical conductors) decreased to zero from the single occurrence in May. Figure 3 shows a 3-year trend of electrical intrusion occurrences for the DOE complex. During this period we see a slight decrease in the overall trend. June is the first month since December 2009 in which no electrical intrusion occurrences were reported.

Figure 3 – Three-Year Trend of Electrical Intrusion Occurrences



Hazardous Energy Control

In June there were four reported occurrences involving lockout/tagout (LOTO), which is an increase from the three occurrences reported in May. Two of these occurrences resulted from not hanging locks when required and the other two involved issues associated with correct labeling of tags. These types of administrative errors, although appearing minor, can be indicators of complacency or carelessness, which should not be tolerated in a hazardous energy control program. There also were occurrences involving procedure non-compliances and discovery of hazardous energy. These events are summarized in the following sections.

Occurrences Involving Lockout/Tagout

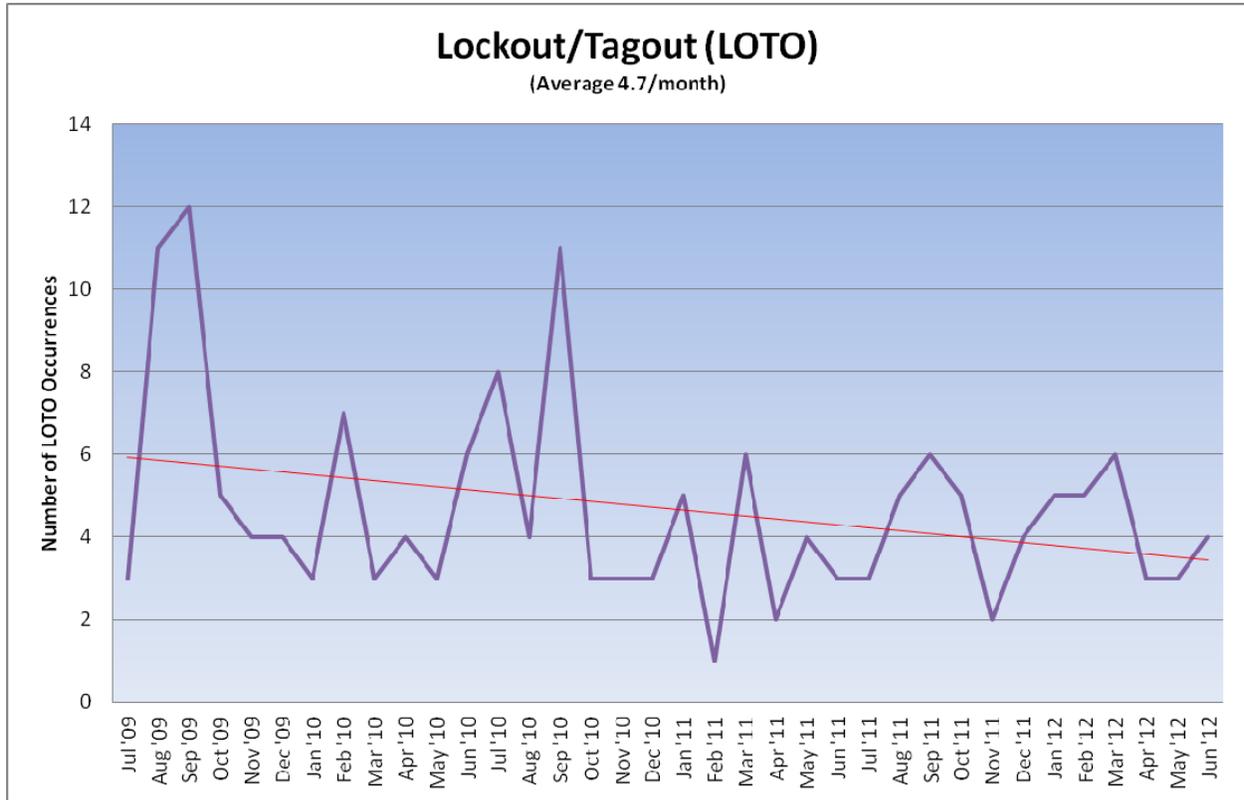
1. A LOTO had not been applied as required to an ion vacuum pump while a worker was removing a small adapter plate on the top of a klystron oil tank. While performing this task, the worker saw sparks from the underside of a connector when it contacted the grounded cover of the oil tank. There was no shock. The worker was part of a Group LOTO and had believed all energy sources had been isolated and de-energized. A preliminary review of

the work control documentation and the LOTO procedure revealed that it was not updated following the installation of the temporary vacuum pump dual channel power controller. The sparks observed by the worker were produced by the temporary vacuum pump dual channel power controller, which was energized at 3.3kVdc at 100mA. The worker was not aware of the energized controller. The work was suspended and an investigation initiated.

2. During a job restart walk down, a review team noticed that the LOTO tag applied to an electrical disconnect was labeled incorrectly. The work order instructions and the single source criteria screening sheet in the work package were also reviewed and found to incorrectly reference the circuit. The mislabeling did not prevent the successful isolation of the circuit and the absence of voltage had been confirmed before the initial work was performed. The employee, who originated the LOTO, confirmed that this was a clerical error. The numbering was corrected, reviewed and approved before the work activity resumed.
3. A switch numbering administrative error was discovered on a LOTO permit and its associated tags. The error, an omitted "S" prefix, was discovered during a required walk down and review. As confirmed by site engineering, the "S" prefix in the switch number stands for "switch." The omission did not prevent energy isolation or expose personnel to any hazards. The "S" is a part of the engineered numbering system and the full switch numbers are required to be noted in the LOTO permit and associated tags. The site is currently in the process of resuming work associated with LOTO after a self-imposed site-wide stand down. Response activities to date have included the reduction of the number of active Issuing Authorities (IA), providing updated IA training, and requiring a Senior Review Board review and approval of each LOTO before performing any associated work. Each LOTO that was in place before the stand down is being reviewed by teams that include personnel independent from the initial application of the LOTO to determine if the LOTO is adequate to allow work to resume.
4. It was discovered that an unauthorized 208-volt, 30-Amp, 4-wire cable with a male plug at one end and exposed wires (pigtail) at the other end, had been left plugged into a de-energized power source the previous evening. The employee failed to apply LOTO to the power source before plugging the 12-inch "pigtail" into the energy source and had left the pigtail plugged into the de-energized source for the evening. The following morning an operator turned on the power source, and the exposed wires arced and shorted, opening the breaker to the power source and the electrical panel that fed it. The cable was removed and destroyed so it could not be used again. The employee's electrical work authorization was revoked.

Figure 4 shows a 3-year trend of LOTO occurrences for the DOE complex. Although there was a small increase from last month, we can see a general decrease in the number of occurrences involving the implementation of lockout/tagout for electrical work during this period.

Figure 4 – Three-Year Trend of Lockout/Tagout Occurrences



Occurrences Involving Hazardous Energy Control Procedure Noncompliance

While performing a safe condition check on a 480-volt electrical panel, an employee used insufficient personal protective equipment for the distance the safe condition check was performed. The field sketch drawing in the work package included incident energy calculations based on a 48-inch distance from the panel. The worker performed the safe condition check at 18 inches, in violation of the work package. The decreased distance resulted in an increase in the incident energy. The worker wore a flash suit jacket and was adequately protected in that area for a distance of 18 inches. However, the flash suit hood he wore did not provide adequate protection at a distance of 18 inches. Construction management issued a work pause.

Occurrences Involving the Discovery of Uncontrolled Hazardous Energy

1. During the performance of a safe-to-work check in accordance with the site Hazardous Energy Control Program, 90 volts DC was identified within the Hazardous Energy Control Boundary. A Controlling Organization Tagout Authorization Form had been authorized to perform maintenance on a battery charger. The lockout had been installed and the safe condition check was completed as described on the form. The work was immediately halted when the voltage was identified. There was no contact with hazardous energy.
2. A Materials Sciences Division Safety Coordinator discovered an opened thermal evaporator instrument, which posed a potential for exposure to energized electrical

systems. The initial fact finding indicated that an employee had opened the instrument's front panel to clean up a spill of ethylene glycol that the system had created. At the time of discovery, the instrument was energized at 220 volts and it appeared to have been left in the energized state for an extended period of time. The Electrical Safety Manager unplugged the tool and the Division Safety Coordinator roped it off, pending further investigation.

3. A subcontract electrical controls technician opened a Variable Frequency Drive (VFD) panel to visually inspect a connection. The technician believed that the panel only contained 24-volt terminations. After opening the panel, the technician was called away for several hours and left the panel open. A Computing Sciences staff member entered the room and saw the opened panel door, without any person attending the panel or any barriers preventing access. He contacted the Division Safety Coordinator, who in turn contacted the Electrical Safety Program Manager. Further investigation revealed that the panel contained two 208-volt terminations that were energized and exposed. The technician did not perform any work in the VFD panel, and only intended to perform a visual inspection of the 24-volt control wire terminations. The technician did not notice the 208-volt terminations. Subcontractors are required to obtain an Energized Electric Work Permit for any energized testing, troubleshooting, or visual inspection on circuits greater than 50 volts. Opening the panel was also a deviation from the required work authorization process, the inspection of the VFD panel was not listed as a task to be performed on the worker's pre-task hazard analysis. Work on the project was stopped to conduct a review and hold a safety meeting.

Electrical Near Miss

In June, there were two occurrences that were considered to be an electrical near miss, which is the same as last month. These two near-miss occurrences were discussed in the Hazardous Energy Control section. The first was discussed under Occurrences Involving Lockout/Tagout in which a worker observed sparks from a temporary vacuum pump dual channel power controller that was energized at 3.3kVdc at 100mA. The second occurrence was discussed under Occurrences Involving the Discovery of Uncontrolled Hazardous Energy, which involved an open instrument panel that had exposed 220-volt energized circuits.

Monthly Occurrences Tables

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

Table 1 - Breakdown of Electrical Occurrences

Number of Occurrences	Involving:	Last Month
1	Electrical Shocks	2
0	Electrical Burns	1
4	Hazardous Energy Control (LOTO)	3
2	Inadequate Job Planning	4
0	Inadvertent Drilling/Cutting of	1

Number of Occurrences	Involving:	Last Month
	Electrical Conductors	
0	Excavation of Electrical Conductors	0
0	Vehicle Intrusion of Electrical Conductors or Equipment	0
2	Electrical Near Misses	2
5	Electrical Workers	6
4	Non-Electrical Workers	5
1	Subcontractors	1

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 nine reports.

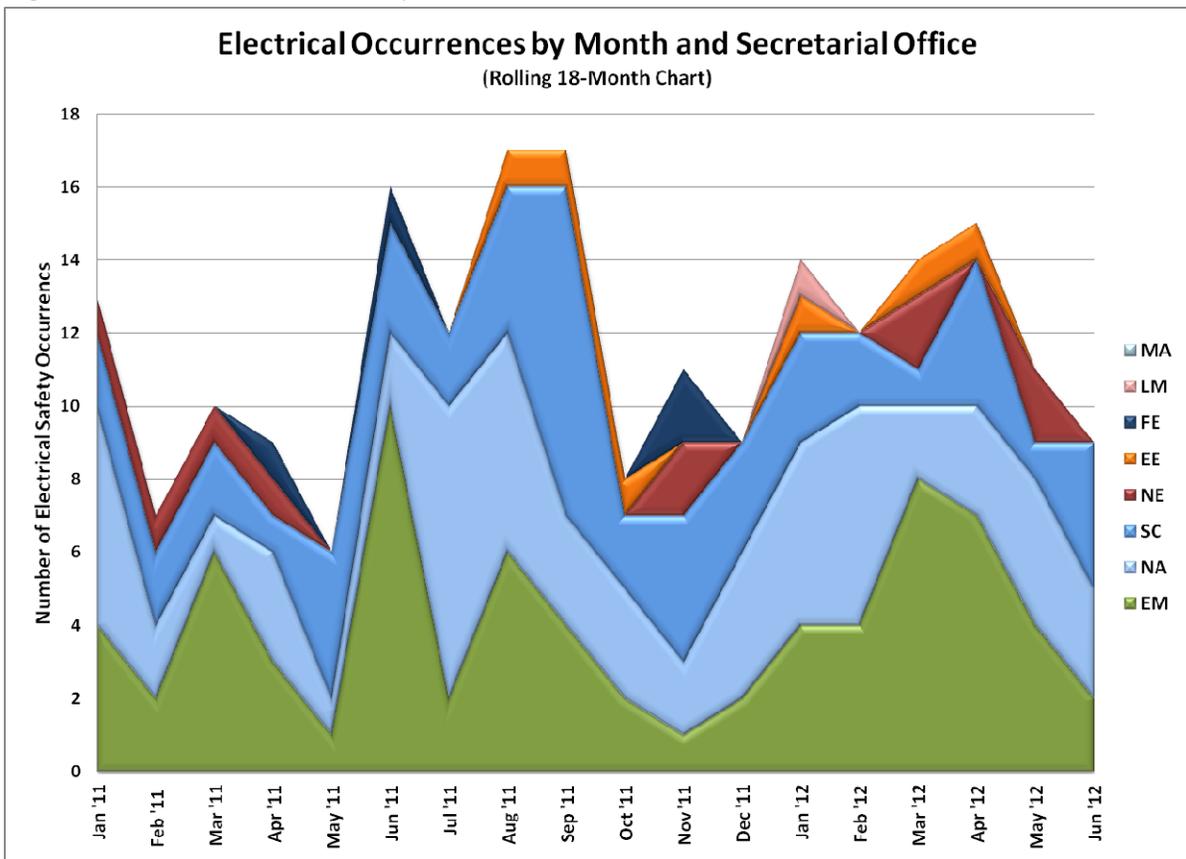
Table 2 provides a summary of the electrical safety occurrences for CY 2012. The present monthly average has decreased but remains higher than the mid-year average of 11.2/month for CY2011. We have fewer shocks than last year at this time (14 in June 2011).

Table 2 - Summary of Electrical Occurrences

Period	Electrical Safety Occurrences	Shocks	Burns	Fatalities
June	9	1	0	0
May	11	2	1	0
April	15	4	0	0
March	14	0	0	0
February	12	3	0	0
January	14	2	0	0
2012 total	75 (avg. 12.5/month)	12	1	0
2011 total	136 (avg. 11.3/month)	36	5	0
2010 total	155 (avg. 12.9/month)	28	2	0
2009 total	128 (avg. 10.7/month)	25	3	0
2008 total	113 (avg. 9.4/month)	26	1	0
2007 total	140 (avg. 11.7/month)	25	2	0
2006 total	166 (avg. 13.8/month)	26	3	0
2005 total	165 (avg. 13.8/month)	39	5	0
2004 total	149 (avg. 12.4/month)	25	3	1

Figure 5 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. Since March, EM has shown a continued decrease in the number of occurrences. Following slight increases during the same period, NA decreased in June, while SC increased from last month.

Figure 5 - 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 seven occurrences are classified as shown in Table 3. The actual score for each occurrence is provided in Attachment 1.

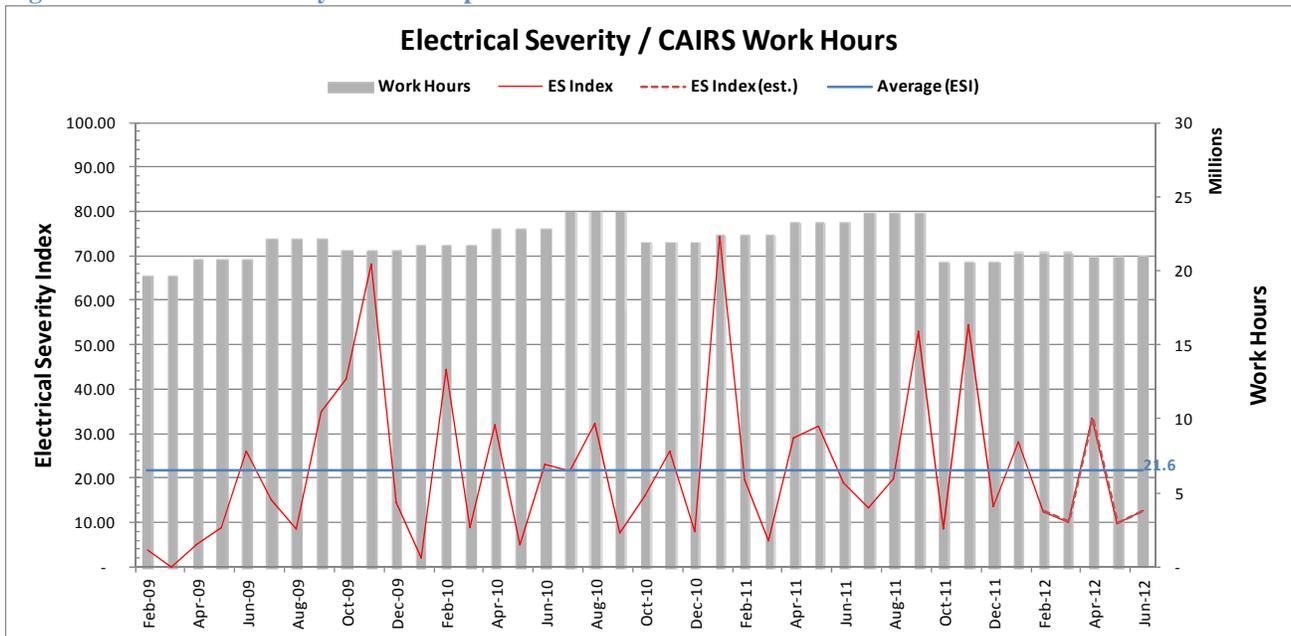
Table 3 – Classification of Electrical Safety Occurrences by ES Score

Occurrence Classification	Electrical Severity Score	Number of Occurrences
HIGH	≥ 1750	0
MEDIUM	31-1749	4
LOW	1-30	3

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 6 shows a calculated ESI for the DOE complex and Table 4 shows the ESI and how it has changed from the previous month.

Figure 6 - 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

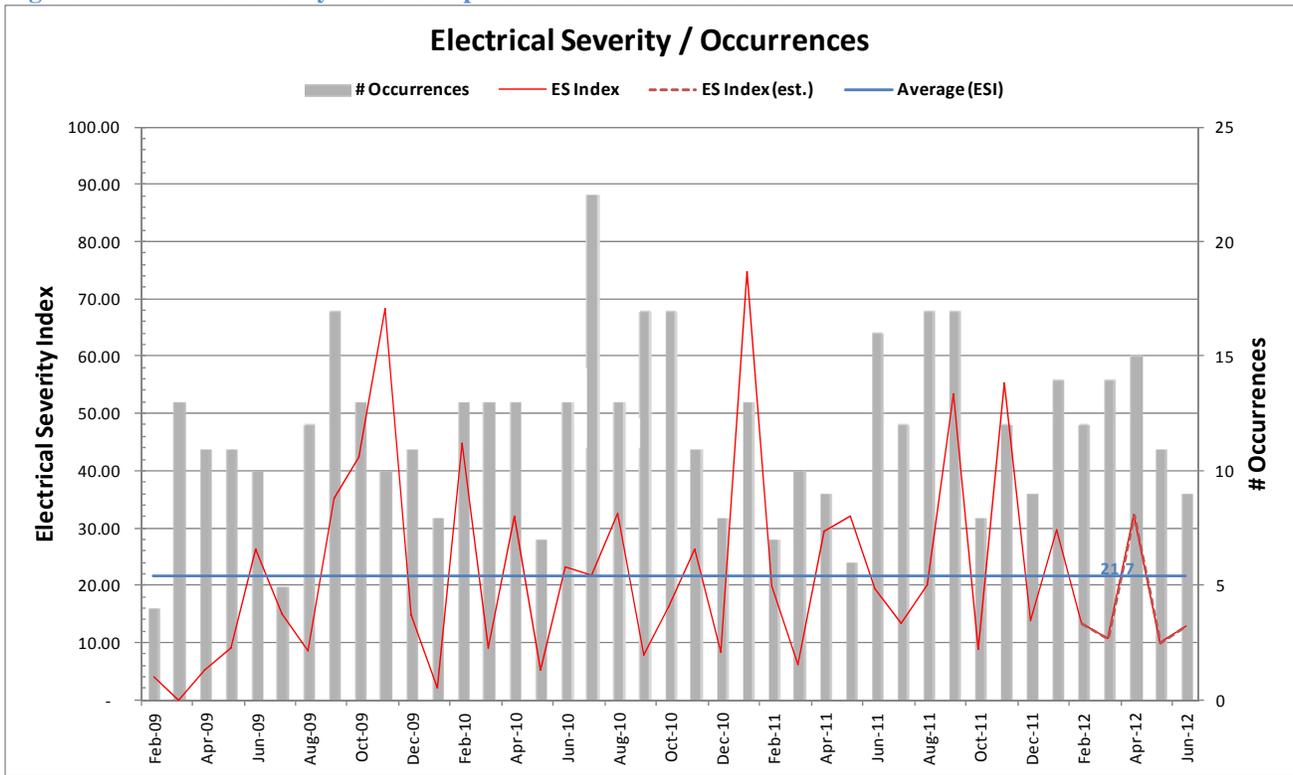
Category	May	June	Δ
Total Occurrences	11	9	-2
Total Electrical Severity	1,030	1,331	+301
Estimated Work Hours	20,963,016* (20,644,272)	21,022,147	+59,131
ES Index	9.83* (9.98)	12.66	+2.84
Average ESI	21.9	21.6	-0.3

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

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

Figure 7 shows the ESI with the number of Occurrences instead of Work Hours.

Figure 7 - Electrical Severity Index Compared to Number of Occurrences



The average ESI (21.6) has decreased for two consecutive months. The lowest average ESI was 19.2 in June 2010. Figure 8 shows the number of days since the previous high severity occurrence. The present interval is 425 days as of June 30. The previous longest interval was 181 days in 2009.

Figure 8 - Days since Previous High Severity Occurrence

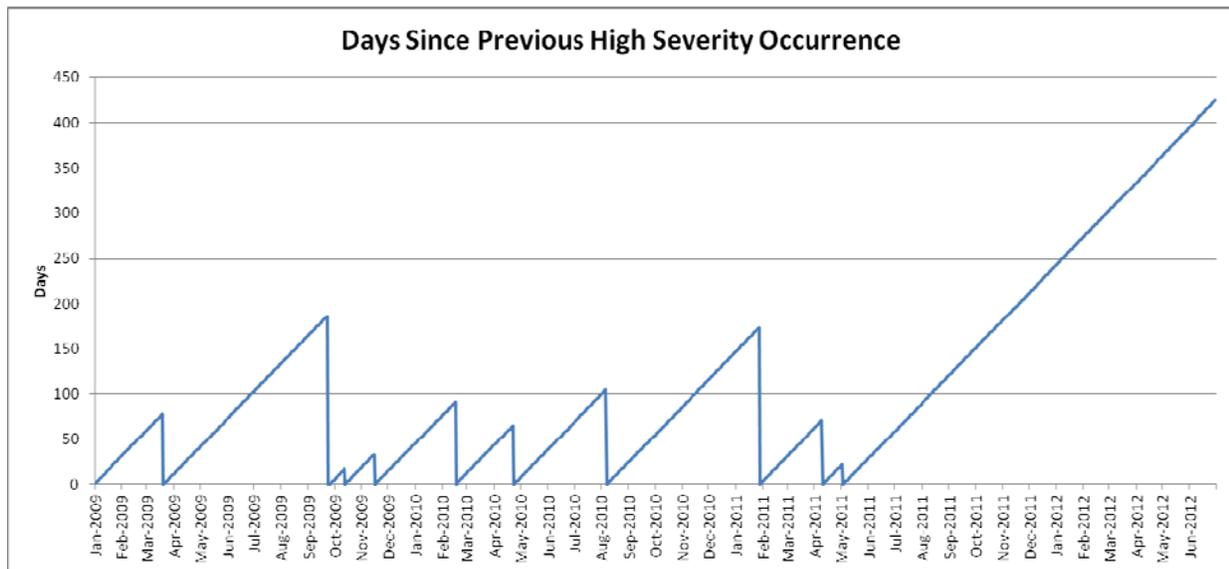
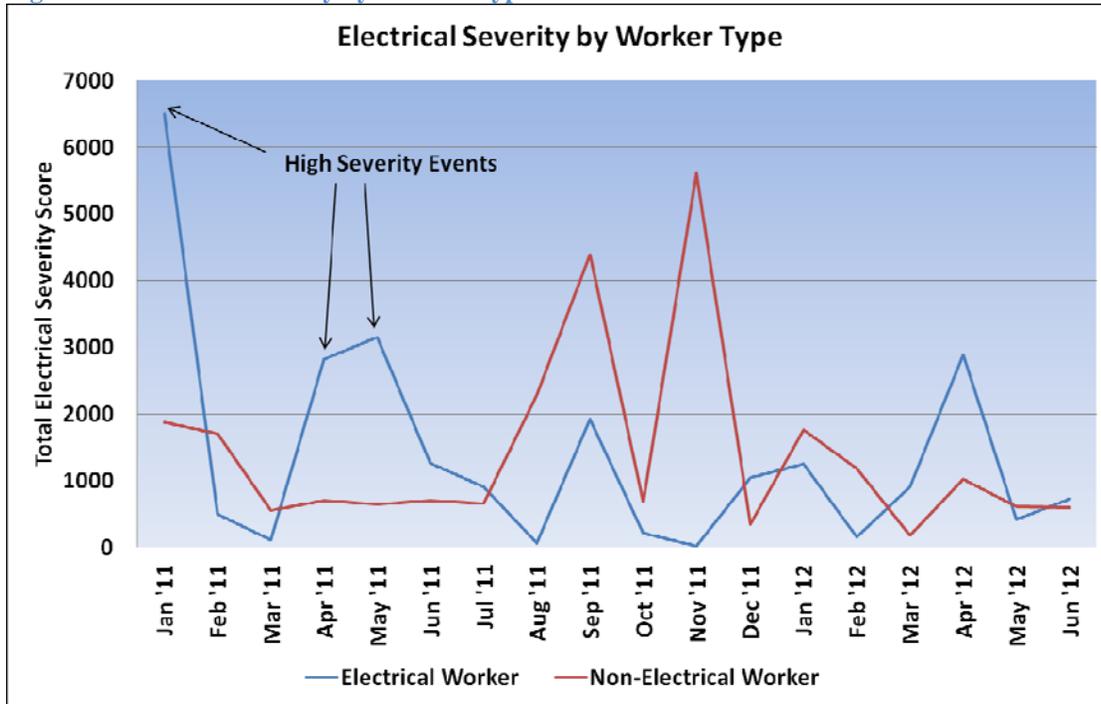


Figure 9 shows the total electrical severity score by worker type for each month.

Figure 9 – Electrical Severity by Worker Type



Electrical Workers typically have the fewest number of occurrences but they had three High-Severity events while Non-Electrical Workers have Low to Medium ES scores. The ES scores for June were close with Non-Electrical Workers at 600 and Electrical Workers at 731.

Summary of Occurrences by Severity Band

For the interval June 2011 through June 2012 (current month and the past 12), Figures 10 and 11 summarize occurrences by severity band and month of discovery date by percentage of total occurrences in month and number of occurrences in month.

Figure 10 - Occurrences by Electrical Severity Band (Percentage)

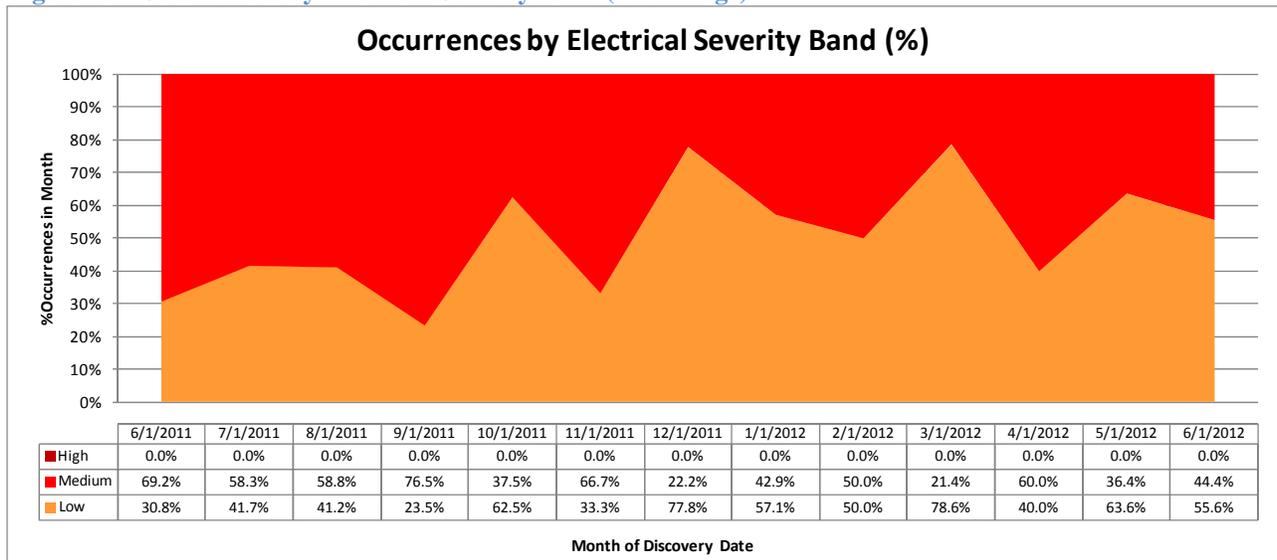
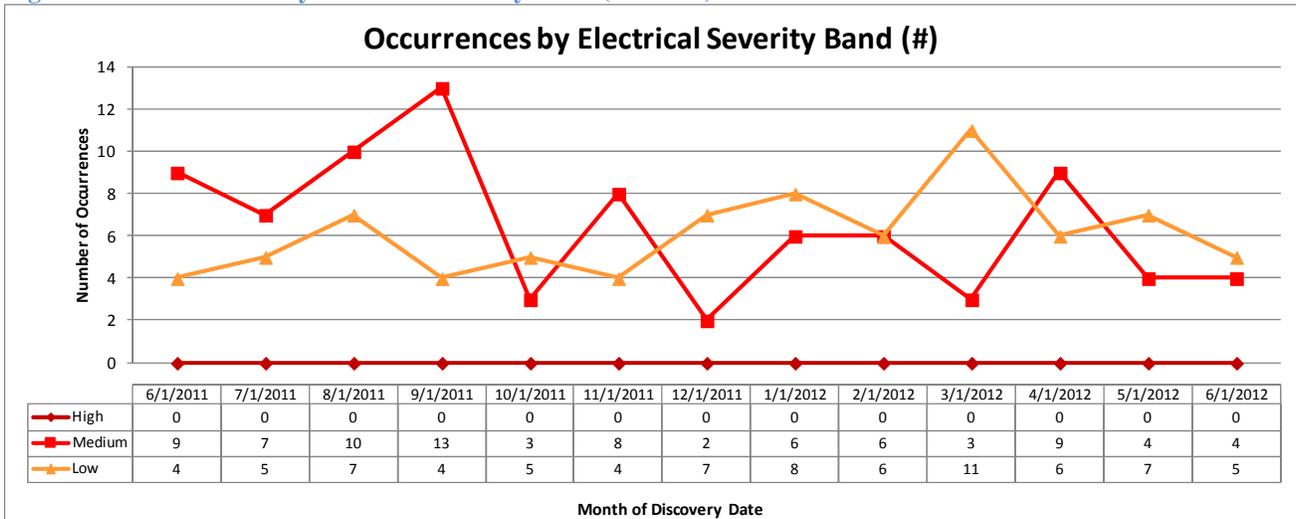


Figure 11 - Occurrences by Electrical Severity Band (Number)

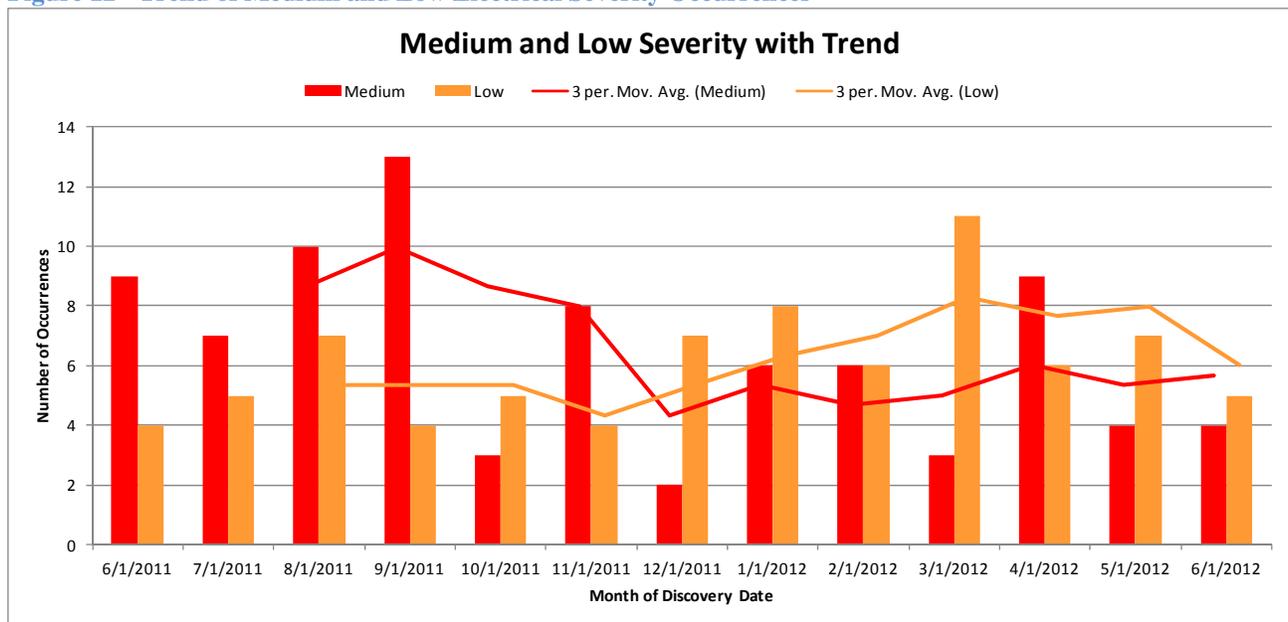


What can be seen from the previous two charts is that the number of occurrences with High electrical severity scores has remained at zero for the past 12 months and that the number of occurrences with Medium scores has decreased below the number of Low severity occurrences.

Medium and Low Severity with Trend

Figure 12 focuses on the Medium and Low severity data series for June 2011 through June 2012. Trend lines are included for each, using a 3-month moving average.

Figure 12 - Trend of Medium and Low Electrical Severity Occurrences



The 3-month moving average shows a decreasing trend for Low severity occurrences while Medium severity occurrences have remained relatively the same. A higher percentage of Low severity occurrences is preferred.

Additional Resources

Electrical Safety Blog

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

Electrical Safety Wiki

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

EFCOG Electrical Safety Subgroup

http://www.efcog.org/wg/esh_es/index.htm

Center of Excellence for Electrical Safety

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

Contact

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Attachment 1

Electrical Safety Occurrences – June 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-RL--CPRC-PFP-2012-0007	During a safe-to-work check, 90 VDC was identified within the hazardous energy control boundary.					X				3	2E(2)	11
2	EM-RP--BNRP-RPPWTP-2012-0013	While performing a safe condition check on a 480V panel, an employee used insufficient PPE for the distance during the check.									4	2E(3)	700
3	NA--LSO-LLNL-LLNL-2012-0027	A LOTO was not used and sparks were seen from a power controller that was energized at 3.3kVDC.				X					4	2E(3)	110
4	NA--YSO-BWXT-Y12SITE-2012-0028	A job restart review team noted that a LOTO tag was incorrectly labeled for the equipment.				X					4	2E(3)	0
5	NA--YSO-BWXT-Y12SITE-2012-0030	A numbering error was found on LOTO permit and tags.				X					4	2E(3)	0
6	SC--BHSO-BNL-BNL-2012-0019	A custodian received a shock while cleaning an electrical stove.	X								2	2E(1)	330
7	SC--BSO-LBL-MSD-2012-0001	Front panels were left off an instrument exposing 220V.									3	2E(2)	20
8	SC--BSO-LBL-OPERATIONS-2012-0007	A subcontractor opened an electrical panel to perform a visually inspection and was exposed to energized 208 VAC.					X				3	2E(2)	20
9	SC--TJSO-JSA-TJNAF-2012-0008	A 208V cable with exposed wires was left plugged into a power source with no LOTO.				X					4	2E(3)	140
	TOTAL		1	0	0	4	2	0	0	0			

Key

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

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

Attachment 1

Electrical Safety Occurrences – June 2012

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			
1	EM-RL--CPRC-PFP-2012-0007	During a safe-to-work check, 90 VDC was identified within the hazardous energy control boundary.	X				X				X			
2	EM-RP--BNRP-RPPWTP-2012-0013	While performing a safe condition check on a 480V panel, an employee used insufficient PPE for the distance during the check.	X				X	X	X		X			
3	NA--LSO-LLNL-LLNL-2012-0027	A LOTO was not used and sparks were seen from a power controller that was energized at 3.3kVDC.		X		X				X				X
4	NA--YSO-BWXT-Y12SITE-2012-0028	A job restart review team noted that a LOTO tag was incorrectly labeled for the equipment.	X				X				X			
5	NA--YSO-BWXT-Y12SITE-2012-0030	A numbering error was found on LOTO permit and tags.	X				X				X			
6	SC--BHSO-BNL-BNL-2012-0019	A custodian received a shock while cleaning an electrical stove.		X		X					X			
7	SC--BSO-LBL-MSD-2012-0001	Front panels were left off an instrument exposing 220V.		X			X				X			X
8	SC--BSO-LBL-OPERATIONS-2012-0007	A subcontractor opened an electrical panel to perform a visually inspection and was exposed to energized 208 VAC.	X		X		X				X			
9	SC--TJSO-JSA-TJNAF-2012-0008	A 208V cable with exposed wires was left plugged into a power source with no LOTO.		X		X					X			
	TOTAL		5	4	1	3	6	1	1	1	8	0	0	2

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 55774 OR(s) with 59084 occurrences(s) as of 7/24/2012 1:04:56 PM
Query selected 9 OR(s) with 9 occurrences(s) as of 7/24/2012 1:08:19 PM

1)Report Number: [EM-RL--CPRC-PFP-2012-0007](#) After 2003 Redesign

Secretarial Office: Environmental Management

Lab/Site/Org: Hanford Site

Facility Name: Plutonium Finishing Plant

Subject/Title: 90V DC Identified During Safe-to-Work Check on Battery Charger BC-1 in Room 266 of Building 234-5Z

Date/Time Discovered: 06/05/2012 14:00 (PTZ)

Date/Time Categorized: 06/05/2012 15:45 (PTZ)

Report Type: Final

Report Dates:

Notification	06/07/2012	16:13 (ETZ)
Initial Update	07/19/2012	14:24 (ETZ)
Latest Update	07/19/2012	14:24 (ETZ)
Final	07/19/2012	14:24 (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: A3B1C01 - Human Performance Less Than Adequate (LTA); Skill Based Errors; Check of work was LTA
-->couplet - A6B2C01 - Training deficiency; Training Methods Less Than Adequate (LTA); Practice or "hands-on" experience LTA
A3B1C03 - Human Performance Less Than Adequate (LTA); Skill Based Errors; Incorrect performance due to mental lapse
-->couplet - NA

ISM: 3) Develop and Implement Hazard Controls
4) Perform Work Within Controls

Subcontractor Involved: No

Occurrence Description: On 6/5/2012, during performance of a safe-to-work check in accordance with the Hanford Hazardous Energy Control (HEC) Program (DOE-0336, "Lockout/Tagout"), 90V DC was identified within the work boundary. A Controlling Organization (CO) Tagout Authorization Form (TAF) had been authorized, lockout installed and Safe Condition Check (SCC) completed as described on the TAF. The TAF was for maintenance activities on battery

charger BC-1.

Investigation revealed the following:

On 4/12/2012, Electricians were assigned to install HECs to isolate BC-1 for repair work. The work was to replace a stuck ammeter and some bulbs. TAF PUO-12-012 directed that two isolations would be needed; however, following the pre-job briefings, the electricians discovered that the SCC could not be performed as the field condition did not match the drawings used to develop the TAF. The SCC was not performed and the Shift Operations Manager and Controlling Organization Administrator (COA) were notified. The discrepancy was discussed by the COA and the Electricians. The COA verified that the work was safe; locks and tags were removed.

The COA closed TAF PUO-12-012 and initiated development of a new TAF (PUO-12-018). Engineering initiated revision of the drawings to match field conditions discovered on 4/12/12. The condition was evaluated against Occurrence Reporting criteria and determined to not be reportable since the isolation points were correct, hazardous energy would not have been present, and the issue was identified prior to conducting the SCC.

Between 4/13/2012 and 4/17/2012, TAF PUO-12-018 was developed and sent to the PFP Electrical Design Authority (TAF Technical Reviewer). The TAF Technical Reviewer stated that they “reviewed the TAF for accuracy and verified that the points matched those in the essential document which is used for documentation (H-2-26538 Sh 13, ATTACHMENT C). When [the TAF Technical Reviewer] saw that the information was accurate and that its sources listed on the H-2-26538 Sh 13 were accounted for, [they] signed the document as tech reviewer.”

NOTE: Drawing H-2-140554 Sh 1 shows a control signal feeding into BC-1 from Room 321 Annunciator “K”. This drawing was not reviewed during TAF development.

On 4/18/2012, utilizing the new TAF, pre-job briefing was conducted and locks and tags were hung. A SCC and safe-to-work check was performed; no issues noted. The work originally scoped for 4/12 was performed. Locks and tags were removed and the battery charger returned to service.

On 4/19/2012, also utilizing the new TAF, pre-job briefing was conducted and locks and tags were hung. A SCC and safe-to-work check was performed; no issues noted. Additional minor electrical work was performed. The locks and tags were removed and the battery charger returned to service.

On 6/5/2012, the Field work Supervisor (FWS) led a pre-job briefing. Discussion included, but was not limited to the TAF, voltage checks and specifics of SCC: "remember this is the one where the line/load designations were inconsistent with the field conditions noted on the previous TAF". The SOM conducted the Controlling Organization briefing. The work was controlled by work package 2Z-11-4942, PFP MINOR ELECTRICAL WORK partial release #107 (and the relevant portions of DOE-0336).

The Work Team proceeded to Room 266 and the Electricians donned their Personal Protective Equipment (PPE). Electrician 1 (E1) hung the tags per the TAF, Electrician 2 (E2) performed independent verification. E2 performed the SCC per the TAF. The appropriate boxes were signed on the TAF. E2 removed screws securing BC-1 drawer and slid the drawer out to begin a safe-to-work check. E2 initially began checking using a proximity tester (recognizing that this is not a part of the safe-to-work check, but is a good practice).

E2 proceeded to check multiple points/contacts using an approved contact multimeter (T-5-1000); no issues noted until E2 discovered 90V DC between the annunciator terminals and the drawer equipment ground. Specifically E2 stated that when they checked Black/Red on the annunciator terminals, the reading was "zero", but when they checked Black to the drawer ground lug or Red to the drawer ground lug, they found 90V DC. E2 verified what they found with E1 as witness and conducted similar checks using a different ground. The Electricians notified the FWS; FWS also verified DC voltage found.

FWS notified the PFP Instrumentation/Electrical Maintenance and Deactivation Manager (I/EM&D Manager). I/EM&D Manager proceeded to Room 266 and verified the DC voltage. I/EM&D Manager went to the SOM and notified them of the condition. SOM authorized "buttoning-up" the drawer and removal of locks and tags; completed and BC-1 was returned to service. The PFP Operations Manager, PFP Work Management Director and PFP Deputy Project Manager were notified. The SOM and PFP Management discussed reportability and the event was initially categorized as a 2E(3) SC-4 Reportable Occurrence.

Following a critique, the event was conservatively re-categorized under the 2E(2) SC-3 criterion due to the possibility that 90V DC may have existed within the work boundary during two prior evolutions, but the DC voltage was not detected during those evolutions. At the time of the critique, it was unclear if this was because the voltage was not present or if the safe-to-work check was not conducted in an identical manner during these prior evolutions. The Electrician believed they performed the checks in the same manner, but could not be certain.

Subsequent Electrical Field Investigation re-created the electrical configuration and determined that DC voltage was present in that configuration; therefore, on the previous evolutions the DC power source must have been present without being identified/isolated.

Cause Description:

1.0 PROBLEM STATEMENT

On 6/5/2012, in Room 266 of Building 234-5Z, while performing a Safe-to-Work Check for maintenance on battery charger BC-1, an Electrician identified 90V DC inside the Hazardous Energy Control Boundary. There was no contact with exposed energized electrical conductors; however, on at least two previous evolutions where work was performed inside the HEC Boundary, the DC power source must have been present without being identified/isolated.

2.0 PROBLEM ANALYSIS

The Analysis Team Lead reviewed the associated documents and conducted interviews. The Lead Evaluator was also the Critique Leader during investigation. A Why Tree Analysis (see ATTACHMENT D of the Apparent Cause Evaluation Report) was utilized to examine two main questions:

- 1) Why was DC voltage not discovered on prior evolutions?
- 2) Why did use of the TAF not completely isolate all hazardous energy within the work boundary?

2.1 APPARENT CAUSES

AC-01: TAF Preparer and Tech Reviewer did not demonstrate adequate depth of review to identify all relevant drawings needed to identify/isolate DC sources of power. (A3B1C01, A6B2C01, ISMS CF-3 and CF-4)

Use of the TAF isolated all power listed on the essential drawing, but did not completely isolate all hazardous energy within the work boundary. When the TAF was developed, Subject Matter Experts (SMEs) who were consulted, the TAF preparer, Tech Reviewer and Workers were not aware that a 125V DC circuit existed in the drawer.

NOTE: Interviewees and ACE Team members could not recollect (and no evidence could be found) of prior intrusive maintenance on BC-1 or BC-2. This indicates a Human Performance Error Precursor related to "Unfamiliarity w/ task / First time".

The methods used for TAF preparation did not reveal the presence of the 125V DC circuit because 1) SME input, walkdowns, and Controlling Organization knowledge did not reveal the wiring configuration and 2) the essential drawing used for TAF preparation did not show the circuit.

1) Although many personnel in the facility were aware that control/annunciators signals exist as potential sources of "dual power", it was not recognized as a potential in this instance. This is further indication of the influence of the Unfamiliarity Error Precursor.

2) The essential drawing used for TAF preparation did not show the circuit because only the one-line Essential Drawing was used which does not show the circuit. Other drawings which do show the circuit were not used because the TAF preparer and Tech Reviewer were not aware of more detailed drawings, nor did the one-line reference the other drawings.

The ACE Team concluded that although a drawing existed, which contained more detailed information, the TAF preparer and Tech Reviewer could only have known about its presence through prior experience or deeper review. The Unfamiliarity Error Precursor exacerbated the issue of the TAF preparer and Tech Reviewer not identifying all relevant drawings.

The Tech Reviewer is fairly new to PFP and did not fully understand that they were responsible for verifying that the TAF preparer had chosen the appropriate drawings as well as the proper isolation points on drawings identified. The Tech Reviewer's participation in the investigation and evaluation, as well as one-on-one discussions with the PFP Engineering and Work Planning Director and the PFP Operations Manager, corrected this misperception.

Based upon the fact that the TAF preparers and Tech Reviewers have been trained to perform the task, the cause is not related to a failure to train the individuals on how to perform the functions of TAF preparation and review. Additionally, examination of the training concluded that the training itself is adequate to address the knowledge needed. The low incidence of issues with TAF preparation at PFP reinforces this determination. However, management indicated that techniques for utilization of PFP specific drawings for TAF preparation and review could be improved. Interview with PFP Engineering Management indicated that, in the past, this level of understanding of PFP drawings and systems was developed through field experience, not formal training.

Preventive Actions 1 and 2 address this issue.

AC-02: The method used by an electrician to conduct Safe-to-Work Checks

did not reveal the presence of DC voltage. (A3B1C03, ISMS CF-4)

The Electrician believed they performed the Safe-to-Work checks in the same manner on prior evolutions, but could not be certain. Electrical field investigation following the critique re-created the electrical configuration and determined that DC voltage were present in that configuration; therefore, on the previous evolutions, the DC power source must have been present without being identified/isolated. The methods used for the Safe-to-Work check on the prior evolutions did not reveal latent DC voltage because the Electrician did not look for DC voltage or recognize that DC could be present. The Electricians obtain their information (working mindset) from the TAF and briefings.

Electrical Field Investigation re-created the electrical configuration and determined that DC voltage was present in that configuration; therefore, on at least two previous evolutions, the DC power source must have been present without being identified/isolated.

Electricians participated in the investigation and were interviewed during cause evaluation. The evaluation team concluded that PFP Electricians understand proper techniques and are proficient in Safe-to-Work Checks and that this is an isolated incident. No corrective actions were developed to address this cause; however, Action 5 will assess/verify this assertion.

NOTE: The complete Apparent Cause Evaluation Report can be obtained from the Originator/Transmitter.

Operating Conditions:

Normal Operations

Activity Category:

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

Immediate Action(s):

- 1) Management notified.
- 2) Work area returned to safe/operable configuration per direction of the SOM (BC-1 drawer closed and Controlling Organization Locks removed.
- 3) Work Package 2Z-11-4942 partial release #107 was suspended.
- 4) PFP COAs conducted an initial Extent of Condition review and did not identify any current TAFs with similar conditions.
- 5) Event initially categorized as a 2E(3) SC-4 Reportable Occurrence; following investigation, the event was re-categorized under the 2E(2) SC-3 criterion.

FM Evaluation:

Initial Evaluation:

The event was initially categorized under the 2E(3) SC-4 criterion.

Following investigation, it was re-categorized under the 2E(2) SC-3 criterion.

Final Evaluation:

1.0 EXTENT OF CONDITION

This condition was evaluated at the PFP activity level. As such preventive actions are to address PFP personnel/training. Action 6 was developed to track communication of the lessons to be learned to other facilities.

2.0 HISTORICAL REVIEW

A detailed review of the ORPS was conducted. Initial review with no time limit specified identified 777 reports complex wide which included the 2E – Hazardous Electrical Energy Control criteria. This review was narrowed by selecting only occurrences within the Richland Operations Office (RL) and found that the number reduced to 78 reports. The review was further narrowed to PFP, again with no time limit specified. The review identified 10 final reports. These 10 reports were examined for similarities:

- EM-RL--PHMC-PFP-2004-0018, 110-v spark occurred when an electric cord was cut during D&D work to remove equipment from Glovebox HA-9A
- EM-RL--PHMC-PFP-2005-0011, An electrician received a 120-volt shock through leather gloves from a neutral wire tested de-energized before being cut (source unknown)
- EM-RL--PHMC-PFP-2006-0024, Performance of High Mast Lighting Drilling prior to hanging Lock & Tag as required by procedure
- EM-RL--CPRC-PFP-2008-0001, Less Than Adequate Safe Work Boundary Identified During the Performance of Work
- EM-RL--CPRC-PFP-2009-0005, An electrical arc occurred in a wiring gutter during a planned electrical dismantling activity
- EM-RL--CPRC-PFP-2010-0012, Fence Wire Made Contact with Flex Conduit causing Damage to Conduit and Tripping 480 volt Breaker (ARRA)
- EM-RL--CPRC-PFP-2010-0014, Individual Shocked between Right Thigh and Left Hand while Working in 291-Z
- EM-RL--CPRC-PFP-2010-0019, Unidentified Electrical Hazard located in Room 228A of Building 234-5Z (ARRA)
- EM-RL--CPRC-PFP-2010-0020, Controlling Organization LOTO Removed without Authorization Following Chiller Substation Isolation (ARRA)
- EM-RL--CPRC-PFP-2010-0022, Fuse Replacement Activity did not Follow Proper Hazardous Energy Controls (ARRA)

Although these occurrences share some common factors or consequences, none of these reports were determined to show similar cause, nor were they viewed as potential precursors to EM-RL--CPRC-PFP-2012-0007, 90V DC Identified During Safe-to-Work Check on Battery Charger BC-1.

3.0 ACTIONS NOT DIRECTLY LINKED TO CAUSE

Actions 3, 4 5 and 6 were developed as a result of the evaluation, but do not specifically address cause as they are not preventive in nature.

DOE Facility Representative

Input:

DOE Program Manager

Input:

Further Evaluation is Required: No

Division or Project: PFP Closure Project

Plant Area: 200 West

System/Building/Equipment: 234-5Z, Room 266 Battery Charger BC-1

Facility Function: Plutonium Processing and Handling

Corrective Action 01:

Target Completion Date: 08/29/2012	Tracking ID: CR-2012-1643
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Action Statement:

Develop and perform PFP-specific training for PFP TAF Preparers and Technical Reviewers to enhance existing training on utilizing relevant drawings during TAF preparation and technical review. Specifically the training materials should cover the importance of not relying on one-line drawings and validation of one-lines with drawings which include more detail.

Closure Requirements:

Provide a closure statement describing the action taken with a copy of the training materials and course completion roster showing 100% completion by the target audience.

Actionee:

Lee Ebbeson

Corrective Action 02:

Target Completion Date: 08/29/2012	Tracking ID: CR-2012-1643
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Action Statement:

Revise the PFP Controlling Organization List to include instruction that the PFP Operations Manager shall interview each new TAF Preparer and

Technical Reviewer to ensure expectations for utilizing relevant drawings and field walkdowns during TAF preparation and technical review are met.

Closure Requirements:

Provide a closure statement describing the action taken with a copy of the revised PFP Controlling Organization List as evidence.

Actionee:

Lee Ebbeson

Corrective Action 03:

Target Completion Date: 07/25/2012	Tracking ID: CR-2012-1643
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Action Statement:

Install a permanent label in the BC-1 control drawer which indicates the presence of the 125V DC circuit (dual power present).

Closure Requirements:

Provide a closure statement describing the action taken with photographic evidence that the label is present.

Actionee:

Bernie Lueck

Corrective Action 04:

Target Completion Date: 08/29/2012	Tracking ID: CR-2012-1643
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Action Statement:

Revise Essential Drawing H-2-26538 Sh 13 to reference Drawing H-2-140554 Sh 1.

Closure Requirements:

Provide a closure statement describing the action taken with a copy of the revised drawing as evidence.

Actionee:

Rick Jensen

Corrective Action 05:

Target Completion Date: 08/29/2012	Tracking ID: CR-2012-1643
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Action Statement:

Conduct a Work Site Assessment (WSA) on PFP Qualified Worker (QW) Safe-to-Work Checks. Determine if 100% of PFP QWs demonstrate understanding of proper techniques and are proficient in Safe-to-Work Checks. This should include a Line of Inquiry on tools chosen and determine if particular tools should be prescribed.

Closure Requirements:

Provide a closure statement describing the action taken with a copy of the WSA as objective evidence.

Actionee:
Rick Garcia

Corrective Action 06:

Target Completion Date:08/29/2012 **Tracking ID:**CR-2012-1643

Action Statement:

Develop and issue a PFP Lessons Learned (LL) in accordance with PRC-PRO-MS-067, Lessons Learned and guidance provided at: <http://prc.rl.gov/rapidweb/PFP-Closure/index.cfm?PageNum=7>. Issue LL as Required Reading for PFP Electricians, Electrical Engineers, and Controlling Organization.

Closure Requirements:

Provide a closure statement describing the action taken with a copy of the LL, evidence that it was transmitted to CHPRC Issues Management and a RR Report documenting completion by the target audience.

Actionee:
Shawn Gibson

Lessons(s) Learned:

The overarching lesson to be learned from this event is that TAF preparers, Tech Reviewers and workers must ensure that the field conditions match drawings and the Hazardous Energy Control Boundaries are appropriately controlled. Also, during preparation of TAFs, it is imperative that all sources of information are used to identify control boundary (field walkdown, other drawing verification, etc.), not just essential or one-line drawings.

HQ Keywords:

01B--Inadequate Conduct of Operations - Loss of Configuration Management/Control
01F--Inadequate Conduct of Operations - Training Deficiency
01M--Inadequate Conduct of Operations - Inadequate Job Planning (Electrical)
08H--OSHA Reportable/Industrial Hygiene - Safety Noncompliance
12C--EH Categories - Electrical Safety
14B--Quality Assurance - Training and Qualification Deficiency
14D--Quality Assurance - Documents and Records Deficiency
14E--Quality Assurance - Work Process Deficiency

HQ Summary:

On June 5, 2012, during performance of a safe-to-work check in accordance with the Hanford Hazardous Energy Control Program (DOE-0336, Lockout/Tagout), 90 volts DC was identified within the Hazardous Energy Control Boundary. A Controlling Organization Tagout Authorization Form (TAF) had been authorized to perform maintenance on a battery charger. The lockout had been installed and the safe condition check completed as described on the TAF. The work was immediately halted when the 90 volts DC was identified. There was no contact with hazardous energy.

Similar OR Report Number: 1. None

Facility Manager:

Name Jerry Long

Phone	(509) 373-0047
Title	Vice President and Project Manager

Originator:

Name	GIBSON, SHAWN A.
Phone	(509) 373-2523
Title	OPERATIONS SPECIALIST

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
06/05/2012	15:20 (PTZ)	L E Ebbeson	CHPRC
06/05/2012	15:20 (PTZ)	M A Wright	CHPRC
06/05/2012	15:20 (PTZ)	K M Schierman	DOE-RL
06/05/2012	15:20 (PTZ)	R L Garcia	CHPRC
06/07/2012	09:30 (PTZ)	J W Long	CHPRC
06/07/2012	09:30 (PTZ)	L E Ebbeson	CHPRC
06/07/2012	09:39 (PTZ)	K M Schierman	DOE-RL

Authorized Classifier(AC):

2)Report Number:

[EM-RP--BNRP-RPPWTP-2012-0013](#) After 2003 Redesign

Secretarial Office:

Environmental Management

Lab/Site/Org:

Hanford Site

Facility Name:

RPP Waste Treatment Plant

Subject/Title:

Hazardous Energy Work Process Violation

Date/Time Discovered:

06/11/2012 11:30 (PTZ)

Date/Time Categorized:

06/11/2012 11:30 (PTZ)

Report Type:

Notification/Final

Report Dates:

Notification	06/13/2012	19:15 (ETZ)
Initial Update	06/13/2012	19:15 (ETZ)
Latest Update	06/13/2012	19:15 (ETZ)
Final	06/13/2012	19:15 (ETZ)

Significance Category:

4

Reporting Criteria:

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

Cause Codes:

A3B1C01 - Human Performance Less Than Adequate (LTA); Skill Based Errors; Check of work was LTA

-->couplet - A5B1C01 - Communications Less Than Adequate (LTA);

ISM: Written Communication Method of Presentation LTA; Format deficiencies
4) Perform Work Within Controls

Subcontractor Involved: No

Occurrence Description: On May 30, 2012, a worker performed a safe condition check on a 480-volt electrical panel (H3, located at T43/T47). The PPE the worker used was insufficient protection for the distance the safe condition check was performed.

The field sketch (FSK) drawing (24590-WTP-FSK-CON-E-09-000444001) in the work package included incident energy calculations based on a 48-inch distance from the panel. The worker performed the safe condition check at 18 inches, in violation of the work package. (Note: Safe condition checks for voltages less than 1,000 volts are typically conducted at 18 inches.)

The decreased distance resulted in an increase in the incident energy. The worker wore a Flash Suit Jacket (arc rated 31 cal/cm²) and was adequately protected in that area for a distance of 18 inches. However, the Flash Suit Hood (arc rated 15 cal/cm²) he wore did not provide adequate protection at a distance of 18 inches.

Cause Description: The condition was not identified until June 11th.
A3B1C01 - Check of work less than adequate.
Rationale:
The employee did not check the work package. Instead, he assumed the work was to be done at 18 inches when the work package instructed it be performed at 48 inches.

A5B1C01 - Format deficiencies.
Rationale:
The layout of the written communication made it difficult to follow. The Safe Condition Check document indicates what level of PPE to wear but the distance to accomplish the Safe Condition Check is found on a different document. It would be easier for the worker if both the PPE and the distance were on the same document.

Operating Conditions: Construction

Activity Category: Construction

Immediate Action(s): Construction management issued a work pause for new installations of electrical temporary power and electrical LO/TO work, excluding work packages affected by the WTP Site Master Clearance.

FM Evaluation: N/A

DOE Facility Representative Input:

DOE Program Manager

Input:

Further Evaluation is Required: No

Division or Project: Waste Treatment Facility

Plant Area: 600

System/Building/Equipment: T-65 building

Facility Function: Nuclear Waste Operations/Disposal

Corrective Action:

Lessons(s) Learned: N/A

HQ Keywords: 01E--Inadequate Conduct of Operations - Operations Procedure Noncompliance
 01G--Inadequate Conduct of Operations - Inadequate Procedure
 08H--OSHA Reportable/Industrial Hygiene - Safety Noncompliance
 12C--EH Categories - Electrical Safety
 14D--Quality Assurance - Documents and Records Deficiency
 14E--Quality Assurance - Work Process Deficiency

HQ Summary: On May 30, 2012, while performing a safe condition check on a 480-volt electrical panel, an employee used insufficient personal protective equipment for the distance the safe condition check was performed. The field sketch drawing in the work package included incident energy calculations based on a 48-inch distance from the panel. The worker performed the safe condition check at 18 inches, in violation of the work package. The decreased distance resulted in an increase in the incident energy. The worker wore a Flash Suit Jacket and was adequately protected in that area for a distance of 18 inches. However, the Flash Suit Hood he wore did not provide adequate protection at a distance of 18 inches. Construction management issued a work pause. On June 11, the condition was identified.

Similar OR Report Number: 1. EM-RP--BNRP-RPPWTP-2012-0010

Facility Manager:

Name	Steve Overton
Phone	(509) 373-8268
Title	Manager of Construction

Originator:

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

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
06/11/2012	11:30 (PTZ)	John Schmoll	BNI

06/11/2012	11:30 (PTZ)	Steve Overton	BNI
06/11/2012	11:40 (PTZ)	Paul Hirschman	DOE
06/11/2012	13:12 (PTZ)	Tom Cornell	ONC

Authorized Classifier(AC):

3)Report Number: [NA--LSO-LLNL-LLNL-2012-0027](#) 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 194 vacuum ion pump controller unexpected electrical source
Date/Time Discovered: 06/22/2012 11:00 (PTZ)
Date/Time Categorized: 06/29/2012 14:00 (PTZ)
Report Type: Update
Report Dates:

Notification	06/25/2012	11:04 (ETZ)
Initial Update	07/03/2012	16:43 (ETZ)
Latest Update	07/03/2012	16:43 (ETZ)
Final		

Significance Category: 3

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

Cause Codes:

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

Subcontractor Involved: No

Occurrence Description: On Friday, June 22, 2012 NIF&PS Management determined that LOTO had not been applied as required to a ion vacuum pump in B194. A worker was tasked to remove a small adapter plate on the top of the Klystron oil tank in order to verify the existence of a gasket and its material. While performing this task, the worker observed sparks from the underside of this connector when it contacted the grounded cover of the oil tank; the worker did not receive a shock. The worker was part of a group LOTO and believed all energy sources were isolated and de-energized.

A preliminary review of the work control documentation and related LOTO procedure revealed that it was not updated following the installation of the temporary vacuum pump dual channel power controller. The sparks observed by the worker were produced by the temporary vacuum pump

dual-channel power controller that was energized at 3.3kVdc at 100mA. The worker was not aware of the energized controller. The work was suspended and an investigation initiated.

UPDATE 6/29/12: Based on the investigation of the incident, the review team has determined that the incident is more appropriately captured using Group 2 Personnel Safety and Health, E. Hazardous Electrical Energy Control, Item (2), Significance Category 3 - Any unexpected discovery of an uncontrolled electrical hazardous energy source. The discovery date/time has also been updated to 6/20/12 at 11am. The delay in categorization is due to the the complexity of the equipment and time required to conduct a critique of the event and determine reportability.

This occurrence report is being tracked in LLNL's Issues Tracking System, Reference Assessment No. 34511.

Cause Description:

Operating Conditions:

Normal

Activity Category:

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

Immediate Action(s):

Work was suspended and an investigation initiated.

FM Evaluation:

Submit the final occurrence report to the ORO by 08/10/2012.

Enter the final occurrence report into ORPS by 08/13/2012.

DOE Facility Representative

Input:

DOE Program Manager

Input:

Further Evaluation is

Yes.

Required:

Before Further Operation? Yes

By Whom: Lydia Hunt

By When: 08/10/2012

Division or Project:

NIF&PS

Plant Area:

Site 200

System/Building/Equipment:

Building 194

Facility Function:

Laboratory - Research & Development

Corrective Action:

Lessons(s) Learned:

HQ Keywords:

01G--Inadequate Conduct of Operations - Inadequate Procedure

01K--Inadequate Conduct of Operations - Lockout/Tagout Noncompliance (Electrical)

01L--Inadequate Conduct of Operations - Lockout/Tagout Noncompliance (Other)

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 June 22, 2012, NIF&PS Management determined that (Lockout/Tagout) LOTO had not been applied as required to an ion vacuum pump in Building 194. A worker was tasked to remove a small adapter plate on the top of the Klystron oil tank in order to verify the existence of a gasket and its material. While performing this task, the worker observed sparks from the underside of this connector when it contacted the grounded cover of the oil tank; the worker did not receive a shock. The worker was part of a group LOTO and believed all energy sources were isolated and de-energized. A preliminary review of the work control documentation and related LOTO procedure revealed that it was not updated following the installation of the temporary vacuum pump dual channel power controller. The sparks observed by the worker were produced by the temporary vacuum pump dual channel power controller that was energized at 3.3kVdc at 100mA. The worker was not aware of the energized controller. The work was suspended and an investigation initiated.

Similar OR Report Number: 1. NA--LSO-LLNL-LLNL-2012-0011
 2. NA--LSO-LLNL-LLNL-2012-0002
 3. NA--LSO-LLNL-LLNL-2011-0037

Facility Manager:

Name	Valerie Roberts
Phone	(925) 424-3662
Title	NIF&PS Deputy Associate Principal 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
06/22/2012	15:55 (PTZ)	Joel Bowers	LEDO
06/22/2012	15:57 (PTZ)	Tracey Simpson	ESH TL
06/22/2012	15:58 (PTZ)	Roy Kearns	NNSA LSO

Authorized Classifier(AC): Lydia Hunt Date: 06/29/2012

4)Report Number: [NA--YSO-BWXT-Y12SITE-2012-0028](#) **After 2003 Redesign**
Secretarial Office: National Nuclear Security Administration
Lab/Site/Org: Y12 National Security Complex
Facility Name: Y-12 Site
Subject/Title: LO/TO Labeling Issue on ACU-45

Date/Time Discovered: 06/11/2012 13:30 (ETZ)

Date/Time Categorized: 06/11/2012 15:05 (ETZ)

Report Type: Notification/Final

Report Dates:

Notification	06/13/2012	17:06 (ETZ)
Initial Update	06/13/2012	17:06 (ETZ)
Latest Update	06/13/2012	17:06 (ETZ)
Final	06/13/2012	17:06 (ETZ)

Significance Category: 4

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

Cause Codes:

ISM: 4) Perform Work Within Controls

Subcontractor Involved: No

Occurrence Description: The power circuit for air-conditioning unit ACU-45 had been locked and tagged out for a maintenance activity to replace the unit on April 25, 2012, prior to a site-wide Lockout/Tagout (LO/TO) stand-down. During the walkdown to restart the job on June 11, 2012, the review team noted that the LO/TO tag applied to disconnect 2EB-3E-2 was labeled incorrectly as 3EB-3E-2. The work order instructions and the single source criteria screening sheet in the work package were also reviewed and found to incorrectly reference the circuit as 3EB-3E-2. The mis-labeling did not prevent the successful isolation of the circuit and the absence of voltage had been confirmed before the initial work was performed prior to the LO/TO stand-down. Discussions with the Issuing Authority (person who originates the LO/TO) confirmed this to be a clerical error. The numbering is required to be corrected and reviewed/approved before the work activity will be allowed to resume.

NOTE: The Y-12 Site is currently in the process of resuming work associated with LO/TO after a May 8, 2012, self-imposed site-wide stand-down. Response activities to date have included the reduction of the number of active Issuing Authorities (IA), providing updated IA training, and requiring a Senior Review Board review and approval of each LO/TO prior to performing any associated work. Each existing LO/TO that was in place prior to the stand-down is also being reviewed by teams that includes personnel independent from the initial application of the LO/TO to determine if the LO/TO is adequate to allow work to resume. It was during one of these review activities that this clerical error was identified.

Cause Description:

Operating Conditions: Normal

Activity Category: Normal Operations (other than Activities specifically listed in this Category)
Immediate Action(s): The maintenance operation was already in suspension and was not allowed to resume.

FM Evaluation:

DOE Facility Representative Input:

DOE Program Manager Input:

Further Evaluation is Required: No

Division or Project: FI&S

Plant Area: Prop. Protected Area

System/Building/Equipment: 9201-3

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

Corrective Action:

Lessons(s) Learned:

HQ Keywords: 01B--Inadequate Conduct of Operations - Loss of Configuration Management/Control
 01K--Inadequate Conduct of Operations - Lockout/Tagout Noncompliance (Electrical)
 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 June 11, 2010, during a job restart walkdown, a review team noted that the Lockout/Tagout (LO/TO) tag applied to disconnect 2EB-3E-2 was labeled incorrectly as 3EB-3E-2. The power circuit for air-conditioning unit ACU-45 had been locked and tagged out to replace the unit on April 25, prior to a site-wide LO/TO stand-down. The work order instructions and the single source criteria screening sheet in the work package were also reviewed and found to incorrectly reference the circuit as 3EB-3E-2. The mis-labeling did not prevent the successful isolation of the circuit and the absence of voltage had been confirmed before the initial work was performed prior to the LO/TO stand-down. The employee, who originated the LO/TO, confirmed that this was a clerical error. The numbering will be corrected and reviewed/approved before the work activity resumes.

Similar OR Report Number:

Facility Manager:

Name	R. A. Jago
Phone	(865) 576-2428
Title	East Maintenance Center Manager

Originator:

Name	CHARLES, TONY M
Phone	(865) 574-1566
Title	OCCURRENCE REPORTING PROGRAM MANAGER

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
06/11/2012	15:10 (ETZ)	S. K. Little	FI&S VP
06/11/2012	15:10 (ETZ)	R. S. Underwood	Director
06/11/2012	15:15 (ETZ)	O. R. Brewer	PSS
06/11/2012	15:17 (ETZ)	A. S. Dull	NNSA
06/11/2012	15:25 (ETZ)	Duty-FR	NNSA

Authorized Classifier(AC): J. A. Nations Date: 06/13/2012

5)Report Number: [NA--YSO-BWXT-Y12SITE-2012-0030](#) **After 2003 Redesign**

Secretarial Office: National Nuclear Security Administration

Lab/Site/Org: Y12 National Security Complex

Facility Name: Y-12 Site

Subject/Title: Administrative Numbering Error on LO/TO Permit and Tags

Date/Time Discovered: 06/26/2012 09:15 (ETZ)

Date/Time Categorized: 06/26/2012 09:35 (ETZ)

Report Type: Notification/Final

Report Dates:

Notification	06/28/2012	10:33 (ETZ)
Initial Update	06/28/2012	10:33 (ETZ)
Latest Update	06/28/2012	10:33 (ETZ)
Final	06/28/2012	10:33 (ETZ)
Revision 1	06/28/2012	10:45 (ETZ)

Significance Category: 4

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

Cause Codes:

ISM: 4) Perform Work Within Controls

Subcontractor Involved: No

Occurrence Description: A switch numbering administrative error was discovered on an existing Lockout/Tagout (LO/TO) permit and its associated tags. The error, omitting an "S" prefix, was made prior to the May 8, 2012, site-wide LO/TO stand-down and was discovered during a required walk down and review that is a

part of the current LO/TO resumption activities. As confirmed by site Engineering, the “S” prefix in the switch number stands for “switch.” The omission did not prevent energy isolation or expose personnel to any hazards. Because the “S” is a part of the engineered numbering system and the full switch numbers are required to be noted in the LO/TO Permit and associated tags, the omission is a failure to follow the prescribed energy isolation process.

NOTE: The Y-12 Site is currently in the process of resuming work associated with LO/TO after a May 8, 2012, self-imposed site-wide stand-down. Response activities to date have included the reduction of the number of active Issuing Authorities (IA), providing updated IA training, and requiring a Senior Review Board review and approval of each LO/TO prior to performing any associated work. Each existing LO/TO that was in place prior to the stand-down is being reviewed by teams that include personnel independent from the initial application of the LO/TO to determine if the LO/TO is adequate to allow work to resume. It was during one of these review activities that this administrative error was identified.

Cause Description:

Operating Conditions:

The site is reviewing all LO/TOs implemented prior to May 8, 2012, for adequacy.

Activity Category:

Maintenance

Immediate Action(s):

- FI&S Management was notified of the discovery
- The LO/TO was already in suspension.
- The Senior Review Board approved resumption of the activity under the LO/TO pending correction of the switch numbering errors.

FM Evaluation:

DOE Facility Representative

Input:

DOE Program Manager

Input:

Further Evaluation is

No

Required:

Division or Project:

FI&S

Plant Area:

Protected Area

System/Building/Equipment: 9204-2

Facility Function:

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

Corrective Action:

Lessons(s) Learned:

HQ Keywords:

- 01B--Inadequate Conduct of Operations - Loss of Configuration Management/Control
- 01K--Inadequate Conduct of Operations - Lockout/Tagout Noncompliance

(Electrical)
 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 June 26, 2012, a switch numbering administrative error was discovered on an existing Lockout Tagout (LOTO) permit and its associated tags. The error, omitting an "S" prefix, was made prior to the May 8, site-wide LOTO stand-down and was discovered during a required walk down and review, which is a part of the current LOTO resumption activities. As confirmed by site engineering, the "S" prefix in the switch number stands for "switch." The omission did not prevent energy isolation or expose personnel to any hazards. The "S" is a part of the engineered numbering system and the full switch numbers are required to be noted in the LOTO permit and associated tags. The Y-12 Site is currently in the process of resuming work associated with LOTO after a self-imposed Sitewide stand down. Response activities to date have included the reduction of the number of active Issuing Authorities (IA), providing updated IA training, and requiring a Senior Review Board review and approval of each LOTO prior to performing any associated work. Each existing LOTO that was in place prior to the stand down is being reviewed by teams that include personnel independent from the initial application of the LOTO to determine if the LOTO is adequate to allow work to resume.

Similar OR Report Number: 1. NA--YSO-BWXT-Y12SITE-2012-0021

Facility Manager:

Name	J. D. Moore
Phone	(865) 574-0546
Title	Director of Maintenance Support

Originator:

Name	CHARLES, TONY M
Phone	(865) 574-1566
Title	OCCURRENCE REPORTING PROGRAM MANAGER

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
06/26/2012	09:45 (ETZ)	S. K. Little	FI&S VP
06/26/2012	09:45 (ETZ)	W. R. Klemm	Dep. Mgr
06/26/2012	10:15 (ETZ)	W. M. Crisp	PSS
06/26/2012	10:30 (ETZ)	A. S. Dull	NNSA
06/26/2012	10:30 (ETZ)	Duty-FR	NNSA

Authorized Classifier(AC): J. A. Nations Date: 06/27/2012

6)Report Number: [SC--BHSO-BNL-BNL-2012-0019](#) After 2003 Redesign

Secretarial Office: Science

Lab/Site/Org: Brookhaven National Laboratory

Facility Name: Brookhaven National Laboratory (BOP)

Subject/Title: Custodian Sustains Electric Shock

Date/Time Discovered: 06/25/2012 11:30 (ETZ)

Date/Time Categorized: 06/25/2012 12:49 (ETZ)

Report Type: Notification

Report Dates:

Notification	06/26/2012	13:12 (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 June 25, 2012, at Brookhaven National Laboratory (BNL), a custodian received an electrical shock while cleaning an electrical stove. The supervisor transported the custodian to the on-site medical clinic for evaluation. There was no visible injury. The custodian returned to work without restriction.

Cause Description:

Operating Conditions: Normal Operations

Activity Category: Maintenance

Immediate Action(s): The stove was locked out and tagged out. The supervisor transported the custodian to the on-site medical clinic for evaluation to include an EKG. The EKG was normal.

FM Evaluation:

DOE Facility Representative

Input:

DOE Program Manager

Input:

Further Evaluation is Yes.

Required: Before Further Operation? No

By Whom:

By When:

Division or Project: Staff Services Division
Plant Area: Apartment 41
System/Building/Equipment: Apartment 41
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
 12C--EH Categories - Electrical Safety
 14L--Quality Assurance - No QA Deficiency

HQ Summary: On June 25, 2012, at Brookhaven National Laboratory, a custodian received an electrical shock while cleaning an electrical stove. There was no visible injury. The supervisor transported the custodian to the on-site medical clinic for evaluation to include an EKG, which was normal. The custodian returned to work without restriction. The stove was locked out and tagged out.

Similar OR Report Number:

Facility Manager:

Name	SWENSON, JEFFREY
Phone	(631) 344-2525
Title	STAFF SERVICES DIVISION MANAGER

Originator:

Name	SIERRA, EDWARD A
Phone	(631) 344-4080
Title	ORPS COORDINATOR

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
06/25/2012	11:45 (ETZ)	S. McCafferty	BNL
06/26/2012	10:03 (ETZ)	A. Janczewski	DOE/BHSO

Authorized Classifier(AC):

7)Report Number: [SC--BSO-LBL-MSD-2012-0001](#) After 2003 Redesign
Secretarial Office: Science
Lab/Site/Org: Lawrence Berkeley National Laboratory
Facility Name: Material Sciences Division
Subject/Title: Unprotected 220 v Electric Instrument at JCAP - No Injuries
Date/Time Discovered: 06/22/2012 13:00 (PTZ)
Date/Time Categorized: 06/22/2012 14:57 (PTZ)

Report Type: Notification

Report Dates:

Notification	06/26/2012	15:15 (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: 3) Develop and Implement Hazard Controls

Subcontractor Involved: No

Occurrence Description: On 06/22/2012 at approximately 1300 hours, the Materials Sciences Division Safety Coordinator (DSC) discovered an opened thermal evaporator instrument in Building 976 Room 0132 at the Lab's JCAP (Joint Center for Artificial Photosynthesis) Berkeley 7th Street facility. Initial fact finding indicated that an employee had opened the instrument's front panel to clean up an Ethylene Glycol spill that the system created. The spill would have been a slipping hazard if not cleaned up. At the time of discovery, the instrument was energized at 220 v and it appeared to have been left in the energized state for an extended period of time. The open panel posed potential for exposure to energized electrical systems.

The LBNL Electrical Safety Manager unplugged the tool and the DSC roped it off, pending further investigation.

Cause Description:

Operating Conditions: Indoors, lighted, dry

Activity Category: Research

Immediate Action(s): - The LBNL Electrical Safety Manager unplugged the thermal evaporator instrument and put it out of service.

- JCAP personnel put up a warning sign. The location was roped off with caution tapes.

FM Evaluation: - The LBNL Electrical Safety Manager attempted to replace the front panel, but the panel appeared to be broken and would not remain in place. The instrument is currently under 'out of service' status.

- The staff that originally opened the instrument is currently away.

- The panel that was removed did not have high-voltage warning labels or signs on it.

DOE Facility Representative

Input:

DOE Program Manager

Input:

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

Division or Project: Materials Sciences Division

Plant Area: B976-0132

System/Building/Equipment: Thermal Evaporator Instrument in Building976Room132 at JCAP

Facility Function: Laboratory - Research & Development

Corrective Action:

Lessons(s) Learned:

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

HQ Summary: On June 22, 2012, the Materials Sciences Division Safety Coordinator (DSC) discovered an opened thermal evaporator instrument, which posed a potential for exposure to energized electrical systems in Building 976 Room132 at the Lawrence Berkeley National Laboratory (LBNL) Joint Center for Artificial Photosynthesis 7th Street facility. The initial fact finding indicated that an employee had opened the instrument's front panel to clean up an Ethylene Glycol spill that the system created. At the time of discovery, the instrument was energized at 220 volts and it appeared to have been left in the energized state for an extended period of time. The LBNL Electrical Safety Manager unplugged the tool and the DSC roped it off, pending further investigation. The LBNL Electrical Safety Manager attempted to replace the front panel, but the panel appeared to be broken and would not remain in place. The instrument is currently under out of service status.

Similar OR Report Number:

Facility Manager:

Name	Miquel Salmeron
------	-----------------

Phone	(510) 486-6230
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
06/22/2012	15:02 (PTZ)	Mary Gross	BSO
06/22/2012	15:02 (PTZ)	Kevin Hartnett	BSO

Authorized Classifier(AC):

8)Report Number: [SC--BSO-LBL-OPERATIONS-2012-0007](#) After 2003 Redesign

Secretarial Office: Science

Lab/Site/Org: Lawrence Berkeley National Laboratory

Facility Name: Operations Division

Subject/Title: Electric Panel Left Open at B50B - No Injuries

Date/Time Discovered: 06/11/2012 16:10 (PTZ)

Date/Time Categorized: 06/12/2012 13:13 (PTZ)

Report Type: Notification

Report Dates:

Notification	06/14/2012	21:11 (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
Gwinn Construction / SunBelt Controls

Occurrence Description: At 1610 hours on 06/11/2012, a subcontractor electrical controls technician opened a VFD (Variable Frequency Drive) panel in the limited-access Room 2265 in Building 50B to visually inspect a connection. The SunBelt

Controls' technician, working on the B50B/50A Chilled Water Cross Connect project, had thought the panel only contained 24 V terminations. After opening the panel, the technician was called away for several hours and left the panel open.

While the technician was gone, a Computing Sciences staff entered the room and noticed the opened panel door, without any person attending the panel or any barriers preventing access. He contacted the Division Safety Coordinator, who in turn contacted the LBNL Electrical Safety Program Manager. Further investigation revealed that the panel contained two 208 V terminations that were energized and exposed.

The technician did not perform any work in the VFD panel, and only intended to perform a visual inspection of the 24 V control wire terminations. The technician did not notice the 208 V terminations.

LBNL requires subcontractors to obtain EEWP (Energized Electric Work Permit) for any energized testing, troubleshooting, or visual inspection on circuits greater than 50 V. LOTO was not required other than the fact that the panel was left opened and unattended, and was therefore uncontrolled. Opening the panel was also a deviation from the required work authorization process. The inspection of the VFD panel was not listed as a task to be performed on the worker's Pre-Task Hazard Analysis (PTHA).

Cause Description:

Operating Conditions:

Indoors, lighted, dry

Activity Category:

Construction

Immediate Action(s):

- Upon noticing the opened panel door, the LBNL employee immediately notified his Division Safety Coordinator.

- Facilities stopped work on the project to conduct review and safety meeting.

FM Evaluation:

- Gwinn Construction is the prime subcontractor for the Building 50A/50B Chilled Water Cross Connect project. SunBelt Controls is a second-tier subcontractor for Gwinn Construction.

- Facilities stopped work on the project upon discovery of the opened panel door. A restart meeting was held morning of 06/12/2012 with the Gwinn Construction and SunBelt Controls personnel to review all the requirements of work planning, LOTO and energized work and change management. The meeting also re-emphasized the requirements of listing all planned tasks on the PTHA and revising it to include new tasks and changes.

DOE Facility Representative

Input:

DOE Program Manager

Input:

Further Evaluation is Required: Yes.
Before Further Operation? No
By Whom: Facilities
By When:
Division or Project: Facilities Division
Plant Area: B50B-2265
System/Building/Equipment: B50B Room 2265 Electrical Panel
Facility Function: Balance of Plant - Infrastructure (Other Functions not specifically listed in this Category)

Corrective Action:

Lessons(s) Learned:

HQ Keywords: 01E--Inadequate Conduct of Operations - Operations Procedure Noncompliance
01M--Inadequate Conduct of Operations - Inadequate Job Planning (Electrical)
08H--OSHA Reportable/Industrial Hygiene - Safety Noncompliance
11G--Other - Subcontractor
12C--EH Categories - Electrical Safety
14E--Quality Assurance - Work Process Deficiency
14G--Quality Assurance - Procurement Deficiency

HQ Summary: On June 11, 2012, a SunBelt electrical controls technician opened a Variable Frequency Drive (VFD) panel in the limited access Room 2265 in Building 50B to visually inspect a connection. The subcontractor working on the B50B/50A Chilled Water Cross Connect project had thought the panel only contained 24 Volt (V) terminations. After opening the panel, the technician was called away for several hours and left the panel open. While the technician was gone, a Computing Sciences staff entered the room and noticed the opened panel door, without any person attending the panel or any barriers preventing access, he contacted the Division Safety Coordinator, who in turn contacted the Electrical Safety Program Manager. Further investigation revealed that the panel contained two 208 V terminations that were energized and exposed. The technician did not perform any work in the VFD panel, and only intended to perform a visual inspection of the 24 V control wire terminations. The technician did not notice the 208 V terminations. Subcontractors are required to obtain an Energized Electric Work Permit for any energized testing, troubleshooting, or visual inspection on circuits greater than 50 volts. Opening the panel was also a deviation from the required work authorization process, the inspection of the VFD panel was not listed as a task to be performed on the worker's pre-task hazard analysis. Work on the project was stopped to conduct a review and hold a safety meeting.

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
06/12/2012	14:12 (PTZ)	Kevin Hartnett	BSO
06/12/2012	14:12 (PTZ)	Mary Gross	BSO

Authorized Classifier(AC):

9)Report Number:

[SC--TJSO-JSA-TJNAF-2012-0008](#) After 2003 Redesign

Secretarial Office:

Science

Lab/Site/Org:

Thomas Jefferson National Accelerator Site

Facility Name:

Thomas Jefferson Nat'l Accelerator

Subject/Title:

ENG-12-0620 Electrical Incident in Building 36 - Failure to use Lock Tag and Try

Date/Time Discovered:

06/20/2012 10:00 (ETZ)

Date/Time Categorized:

06/21/2012 16:48 (ETZ)

Report Type:

Notification/Final

Report Dates:

Notification	06/25/2012	17:01 (ETZ)
Initial Update	06/25/2012	17:01 (ETZ)
Latest Update	06/25/2012	17:01 (ETZ)
Final	06/25/2012	17:01 (ETZ)

Significance Category:

4

Reporting Criteria:

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

Cause Codes:

ISM:

1) Define the Scope of Work

Subcontractor Involved:

No

Occurrence Description:

On June 20, 2012 in Building 36 an unauthorized 208 volt, 30 Amp 4 wire cable with a male plug at one end and exposed wires (pigtail) at the other end, had been left plugged into a de-energized power source on the evening of June 19, 2012. The employee failed to apply Lock Tag & Try to the power source prior to plugging the 12 inch "pigtail" into the energy source

and left the pigtail plugged into the de-energized source for the evening.

At approximately 10:00 am the following morning, an operator turned on the power source, and the exposed wires arced and shorted, opening the breaker to the power source and the electrical panel that fed it.

Cause Description:

Operating Conditions:

Normal indoor working conditions

Activity Category:

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

Immediate Action(s):

1. Associate Coordinator removed the cable and the Engineering Support Manager cut the cable to make certain it could not be used again.
2. The employee's supervisor was notified. After meeting with the Associate Coordinator, Engineering Support Manager and the employee, the employee's supervisor revoked the employee's electrical work authorization until further notice.

FM Evaluation:

DOE Facility Representative

Input:

DOE Program Manager

Input:

Further Evaluation is Required:

No

Division or Project:

Engineering/ DC Power Group

Plant Area:

Building 36

System/Building/Equipment:

Building 36/ Energy Source/ male pigtail

Facility Function:

Laboratory - Research & Development

Corrective Action:

Lessons(s) Learned:

HQ Keywords:

- 01K--Inadequate Conduct of Operations - Lockout/Tagout Noncompliance (Electrical)
- 12I--EH Categories - Lockout/Tagout (Electrical or Mechanical)
- 14E--Quality Assurance - Work Process Deficiency

HQ Summary:

On June 20, 2012, it was discovered in Building 36 that an unauthorized 208-volt, 30-Amp, 4-wire cable with a male plug at one end and exposed wires (pigtail) at the other end, had been left plugged into a de-energized power source the previous evening. The employee failed to apply Lock Tag & Try to the power source prior to plugging the 12-inch "pigtail" into the energy source and left the pigtail plugged into the de-energized source for the evening. The following morning an operator turned on the power source, and the exposed wires arced and shorted, opening the breaker to the power source and the electrical panel that fed it. The Associate Coordinator

removed the cable and the Engineering Support Manager cut the cable to make certain it could not be used again. Notifications were made and the employee's supervisor revoked the employee's electrical work authorization until further notice.

Similar OR Report Number:

Facility Manager:

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

Originator:

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

HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

Other Notifications:

Date	Time	Person Notified	Organization
06/20/2012	15:00 (ETZ)	Patricia Hunt	TJSO

Authorized Classifier(AC): Christina Johnson Date: 06/21/2012

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