



Office of Health, Safety and Security



# Monthly Analysis of Electrical Safety Occurrences

January 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 increased from nine in December to fourteen in January. The number of reported electrical shocks remained at two while the number of electrical intrusion occurrences increased by only one occurrence to two as did lockout/tagout to five occurrences. Hazards identification still needs to improve. Workers identified potential electrical hazards in only 55 percent of the occurrences in December and in January. In January, electrical workers identified hazards 71 percent of the time while non-electrical workers identified hazards 57 percent of the time.

## 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 January occurrence reports is provided in Attachment 2.

### Electrical Shock

There were two occurrences in January that resulted in an electrical shock. One of these occurrences involved a non-electrical worker. The occurrences are summarized below.

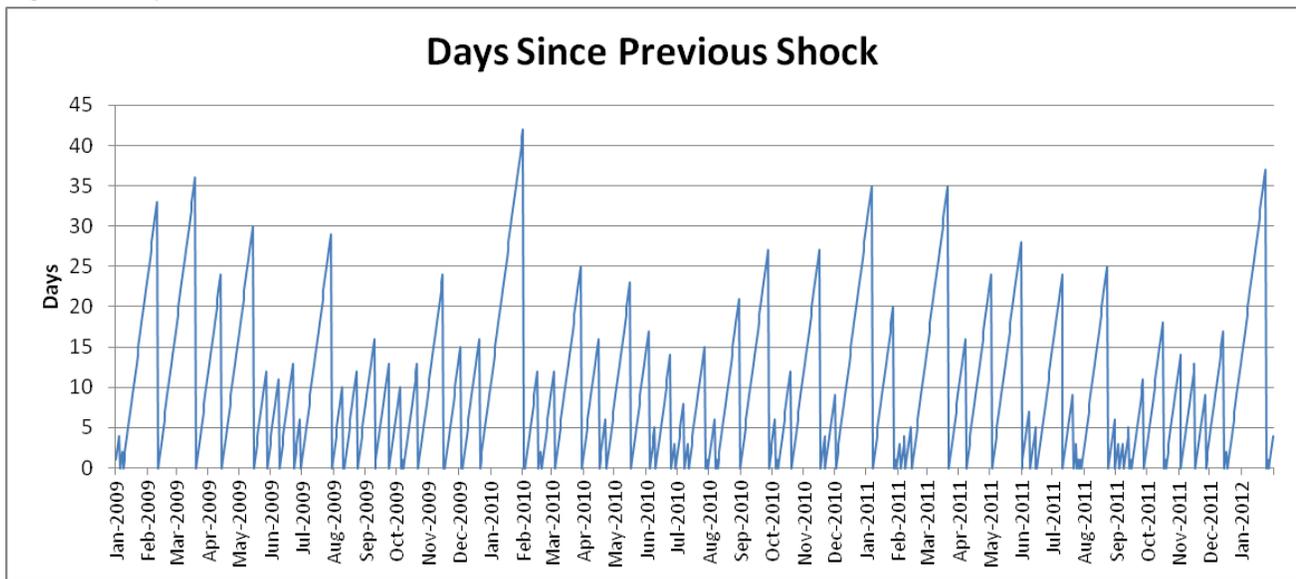
1. An instrument technician was shocked when he moved a wire bundle to gain access to a terminal strip to install testing leads during routine preventive maintenance on stack monitoring equipment. The work package for this activity did not require a lock and tag. The technician was taken to first aid and returned to work without restrictions. Upon further investigation of the wiring in the stack alarm cabinet, testing identified that the

wiring was 120 volts and consisted of seven groups of twisted pairs equipped with bleed wires. Only one of the seven bleed wires was grounded as expected. The technician received the shock from one of the ungrounded pairs.

2. An Engineering Division employee received a low voltage (28 volt DC) electrical shock from a welding machine. The employee had been using a Miller Syncrowave 250DX TIG welder over the past 2 days to weld component pieces together. While pressing the pedal to check the argon flow on the machine, he received a "buzz" through the torch handle. The employee reported the incident to his supervisor who advised him to go to Health Services for evaluation. The welder was locked out and tagged out for further evaluation.

Figure 1 shows the number of days since the previous electrical shock for the DOE complex. As of January 31, the interval was 4 days. The interval had shown good improvement when it reached 37 days on January 24. The longest interval was 42 on days on February 1, 2010.

Figure 1 - Days since Previous Shock



**Electrical Intrusion**

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

1. The boom of a construction subcontractor’s high-reach, rough-terrain telehandler (i.e., telescopic forklift) contacted a 13.2-kV power line suspended 25½ feet above the roadway while relocating concrete forms. Immediately after the forklift made contact, the spotter and other workers in the area alerted the driver to the hazard. The driver backed away from the power line and lowered the boom. There was no electrical arcing and the power line was not damaged. The circuit re-closures did not activate (meaning there was no ground fault detected). There were no injuries and no property damage.

2. A construction contractor drilled into a concrete ceiling and hit an electrical conduit containing an energized 120-volt lighting circuit. The contractor was installing pipe supports and was operating a drill with a masonry bit. The contractor immediately stopped work when a spark was noticed. No injuries resulted. The contractor was wearing a hard hat, a respirator, safety goggles and leather gloves.

### **Hazardous Energy Control**

In January there were five reported occurrences involving lockout/tagout (LOTO) or hazardous energy control issues, which is small increase from the four occurrences reported in December. The majority of these occurrences involved the failure to install LOTO devices when they were required. Two of these occurrences involved subcontractors. In one case the subcontractor did not use the sites hazardous energy control procedures and in the other case, the subcontractor ignored warning signs of the presence of an electrical hazard. These occurrences are summarized below.

1. A facility had been electrically isolated at the transformers under a LOTO to support preventative maintenance work. Later, an instrument technician was released to perform wire verifications in the same facility. The work package scope for the wiring verifications was not adequately evaluated as it was understood to be less than 50 volts; therefore, it was not included under the existing LOTO. The instrument technician ended up performing work on a 120-volt system. Although this work did not have power because of the existing LOTO, it was not specifically reviewed and released as such. The technician was at no time exposed to hazardous energy. The work was immediately stopped and the area was placed in a safe condition.
2. Subcontractor electricians performed an electrical upgrade for a site office trailer using the subcontractor's hazardous energy control procedure but not DOE's contractor hazardous energy control procedure. The subcontractor participated in a walk down to provide a cost estimate for upcoming electrical work; the site representative left the area and left the electricians unescorted to complete the walk down. The electricians concluded the upgrade could be easily accomplished and performed the work. The subcontractor opened the main breaker for the trailer and applied a personal lock on the electrical panel. Hazardous energy was not present during the minor upgrade.
3. Workers used an incorrect job-specific LOTO to perform preventive maintenance on a diesel fire pump. The workers had performed the work steps correctly, recorded the job-specific LOTO number on the work package paperwork, and successfully completed other steps until they reached the step where information conflicted with the LOTO. They suspended work and notified supervisory personnel. There was no exposure to hazardous energy.
4. During a review of a hoist preventative maintenance work package, it was discovered that the single source LOTO form in the package for the work already performed had been correctly signed by the issuing authority, but the second signature by the service supervisor or authorized employee had not been completed. Further checks determined that another similar single source LOTO that was performed for a previous work activity that same day was also lacking the second signature. A follow-on review

determined that the hold points in the work packages for applying the LOTOs had been checked and signed and the LOTOs were executed successfully. No personnel were exposed to any energy sources.

5. A subcontractor performed electrical work on a lathe and mill in a machine shop without a required energized electrical work permit or a LOTO permit. A researcher had opened the circuit breaker to de-energize the equipment for the subcontractor, but the subcontractor did not apply a lock and tag, even though a warning sign on the interlock system panel warned "Danger, Electrocutation Hazard-Disconnect power before servicing machine or panel." Work was immediately stopped.

### **Electrical Near Miss**

In January there were four occurrences that were considered to be an electrical near miss. This is an increase from the two near-miss occurrences reported in December. Two of the near-miss events were discussed in the electrical intrusion section (forklift contact with a 13.2 kV power line and drilling into a 120-volt lighting circuit conduit). The other two near-miss events are summarized below.

1. An electrician observed an electrical spark upon stripping wires that were to be connected to a new 120-volt irrigation controller unit. The spark occurred after he applied his lock and tag to a circuit that had been previously locked and tagged and after he used a proximity sensor to check previously capped wires for presence of voltage. Work was stopped and the area was barricaded. There was no injury or shock.
2. A metal prong and trailing wire that originated from the narrow "hot phase" of an outlet of a re-locatable power tap (RPT) were discovered behind a microwave in a break room. The exposed hazard could cause an electric shock to anyone making contact. The RPT was immediately removed from service.

## **Monthly Occurrences Tables**

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

**Table 1 - Breakdown of Electrical Occurrences**

| <b>Number of Occurrences</b> | <b>Involving:</b>                                     | <b>Last Month</b> |
|------------------------------|---|-------------------|
| 2                            | Electrical Shocks                                     | 2                 |
| 0                            | Electrical Burns                                      | 1                 |
| 5                            | Hazardous Energy Control                              | 4                 |
| 5                            | Inadequate Job Planning                               | 2                 |
| 1                            | Inadvertent Drilling/Cutting of Electrical Conductors | 0                 |
| 0                            | Excavation of Electrical Conductors                   | 1                 |
| 1                            | Vehicle Intrusion of Electrical                       | 0                 |

| Number of Occurrences | Involving:              | Last Month |
|-----------------------|-------------------------|------------|
|                       | Conductors or Equipment |            |
| 4                     | Electrical Near Misses  | 2          |
| 7                     | Electrical Workers      | 5          |
| 7                     | Non-Electrical Workers  | 4          |
| 5                     | Subcontractors          | 4          |

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 sixteen occurrence reports and two of the occurrences were culled out. The first occurrence ([NE-ID--BEA-MFC-2012-0001](#)) was culled out because it involved damaged equipment and the second occurrence ([SC--ASO-ANLE-ANLEFMS-2012-0001](#)) was culled out because it involved an installation error regarding cable clearances.

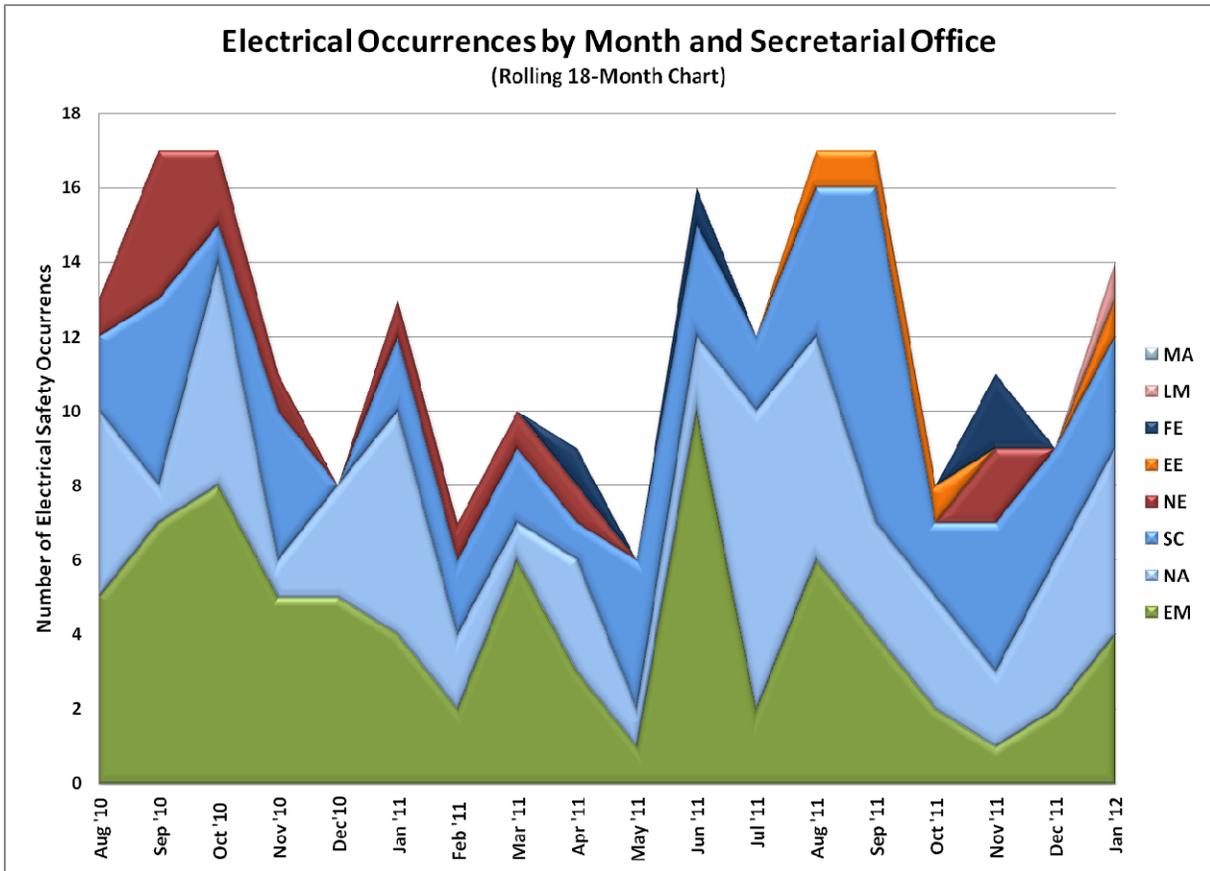
Table 2 provides a summary of the electrical safety occurrences for CY 2012. This is the second January in a row in which there were more than ten occurrences reported. The average number of occurrences for the past five Januarys is 12.6 while the average for the past five Decembers is 9.2. The higher numbers in January could reflect the increase in work activities following a slowdown in work because of the holidays.

**Table 2 - Summary of Electrical Occurrences**

| Period     | Electrical Safety Occurrences | Shocks | Burns | Fatalities |
|------------|-------------------------------|--------|-------|------------|
| January    | 14                            | 2      | 0     | 0          |
| 2012 total | 14 (avg. 14.0/month)          | 2      | 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 two months, EM and NA have increased and SC decreased. The Office of Legacy Management reported their first occurrence since August 2008.

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](http://www.efcog.org/wg/esh_es/docs/Electrical_Severity_Measurement_Tool.pdf). Three of the electrical occurrences did not have an ES score. The other eleven occurrences are classified as shown in Table 3. The actual score for each occurrence is provided in Attachment 1.

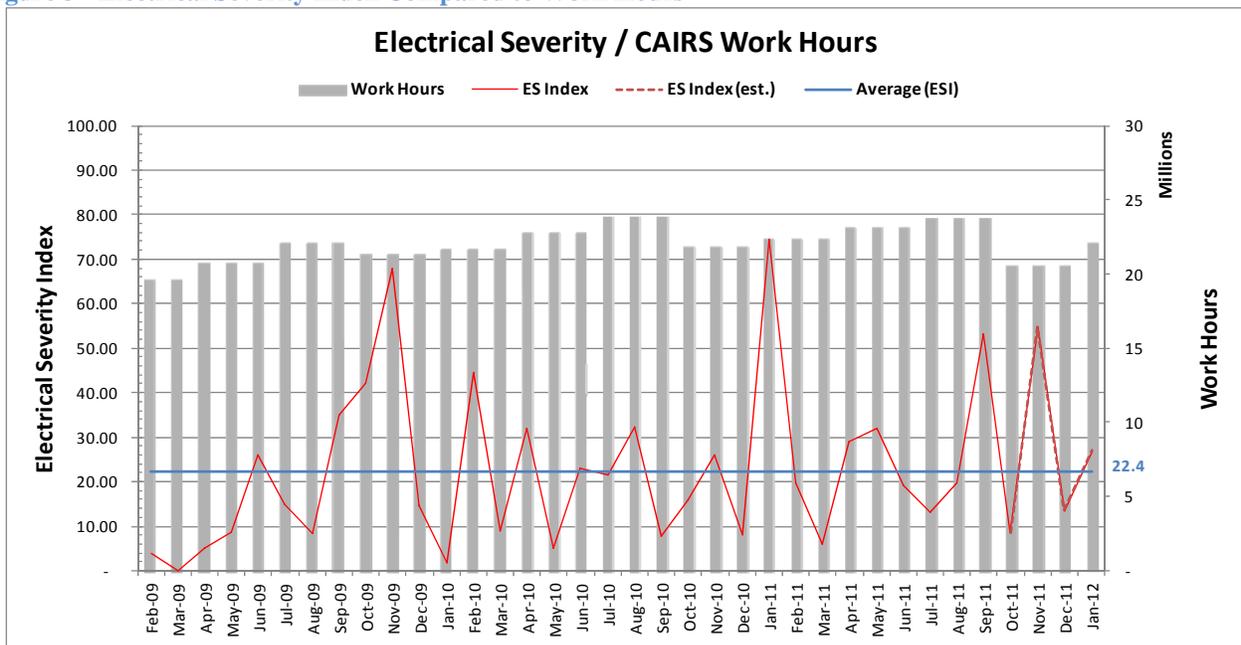
**Table 3 – Classification of Electrical Safety Occurrences by ES Score**

| Occurrence Classification | Electrical Severity Score | Number of Occurrences |
|---------------------------|---------------------------|-----------------------|
| HIGH                      | ≥ 1750                    | 0                     |
| MEDIUM                    | 31-1749                   | 6                     |
| LOW                       | 1-30                      | 5                     |

**Electrical Severity Index**

The Electrical Severity Index (ESI) is a performance metric that was developed to normalize events against organizational work hours. The ESI is calculated monthly and trended. Figure 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**

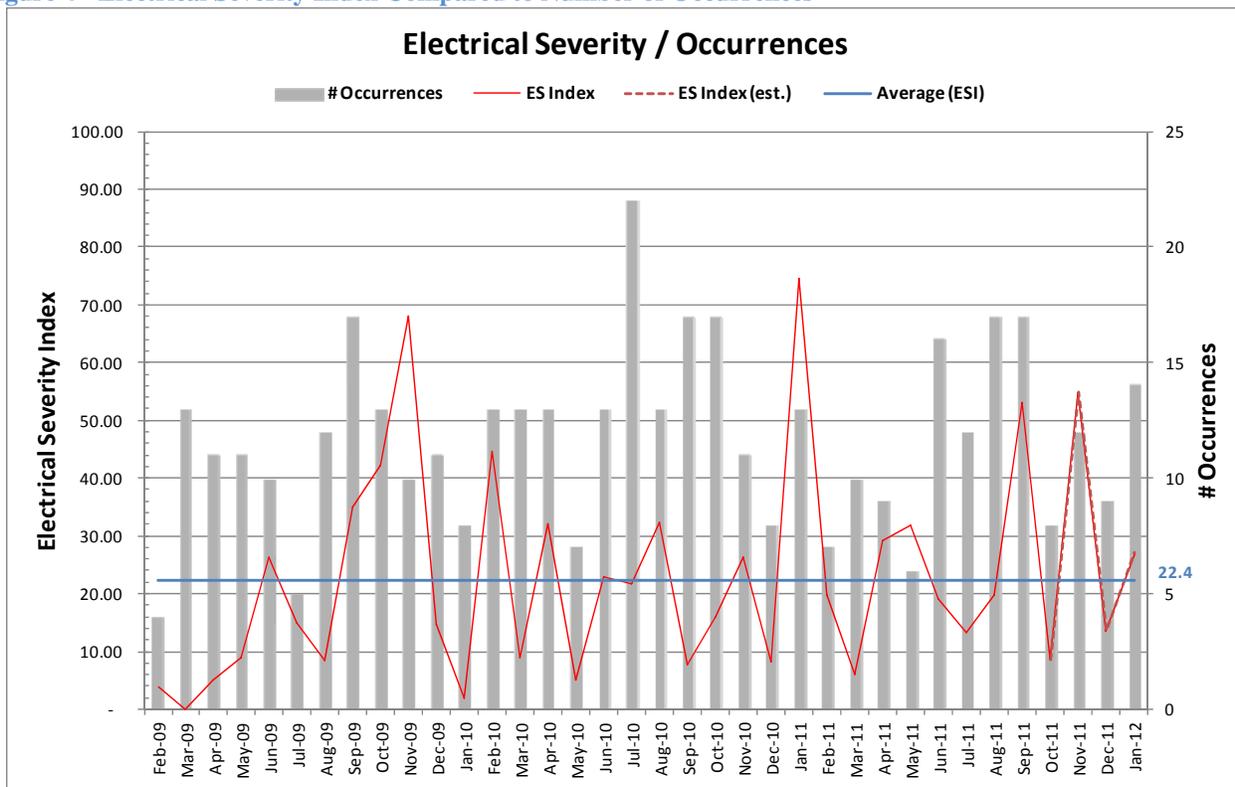
| Category                         | December                    | January    | Δ          |
|----------------------------------|-----------------------------|------------|------------|
| <b>Total Occurrences</b>         | 9                           | 14         | +5         |
| <b>Total Electrical Severity</b> | 1,400                       | 3,008      | +1,608     |
| <b>Estimated Work Hours</b>      | 20,537,075*<br>(22,384,570) | 22,130,689 | +1,593,614 |
| <b>ES Index</b>                  | 13.63*<br>(12.51)           | 27.18      | +13.55     |
| <b>Average ESI</b>               | 22.1                        | 22.4       | +0.3       |

\* These are estimated CAIRS work hours for December and ES Index based on the estimated hours. The estimated hours and ES Index based on the estimated hours (as reported in November) 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.

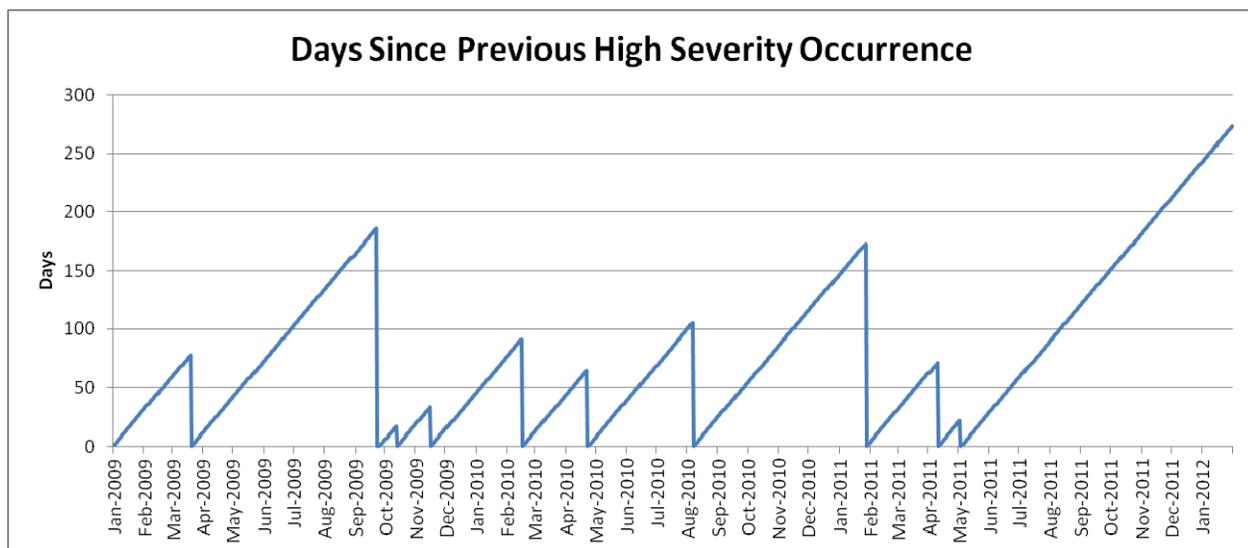
Figure 4 - Electrical Severity Index Compared to Number of Occurrences



The average ESI has remained fairly constant over the past several month and increased slightly from December to 22.4 in January. 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 268 days. The previous longest interval was 181 days on September 22, 2009.

Figure 5 - Days since Previous High Severity Occurrence



## Summary of Occurrences by Severity Band

For the interval January 2011 through January 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)

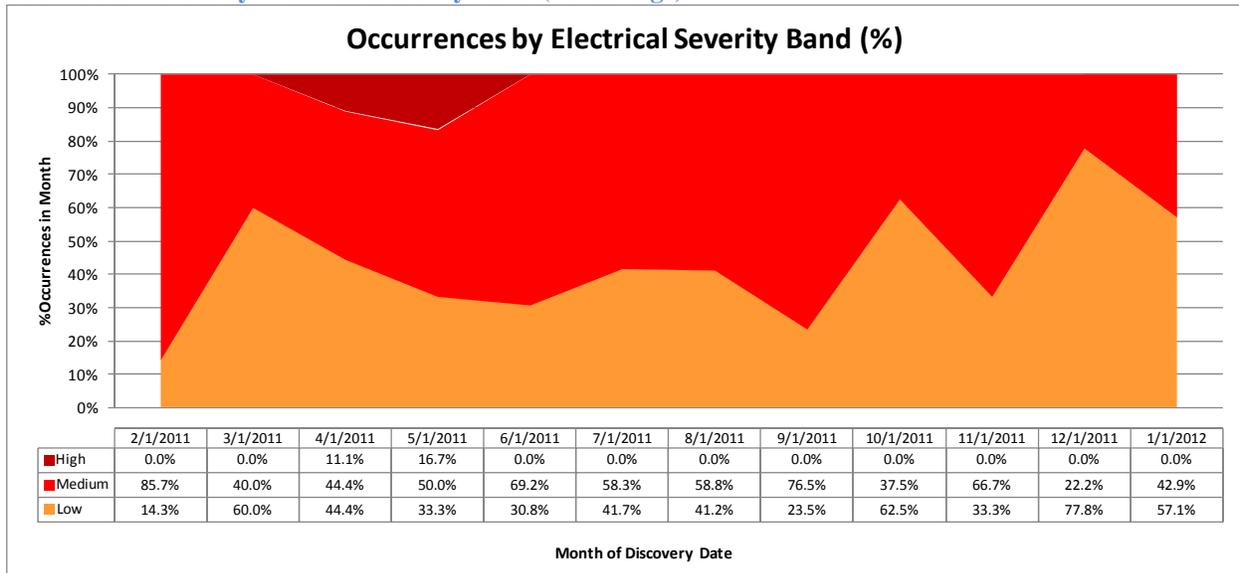
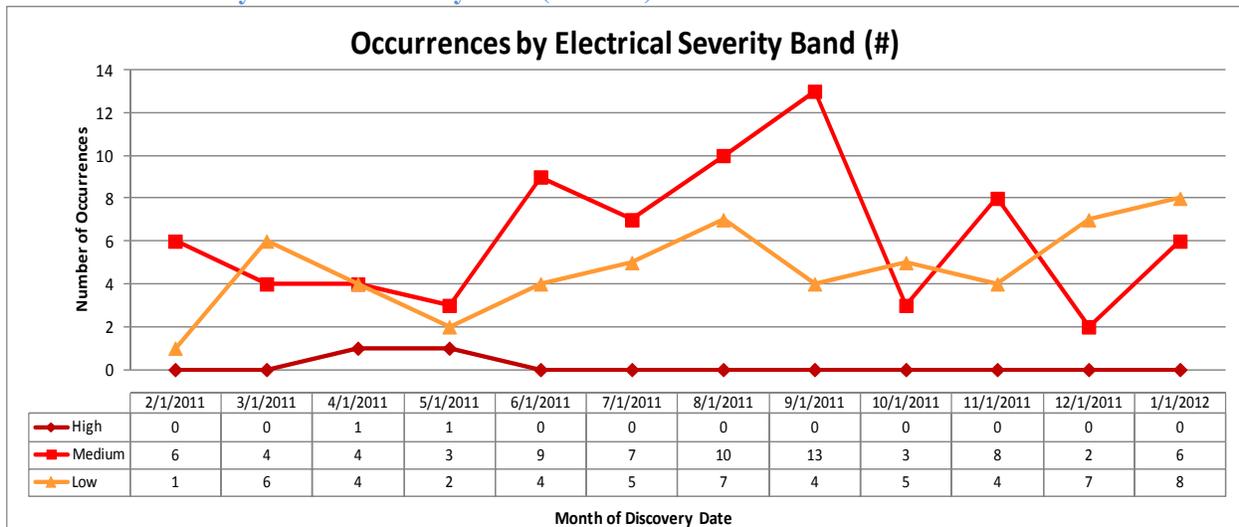


Figure 7 - Occurrences by Electrical Severity Band (Number)

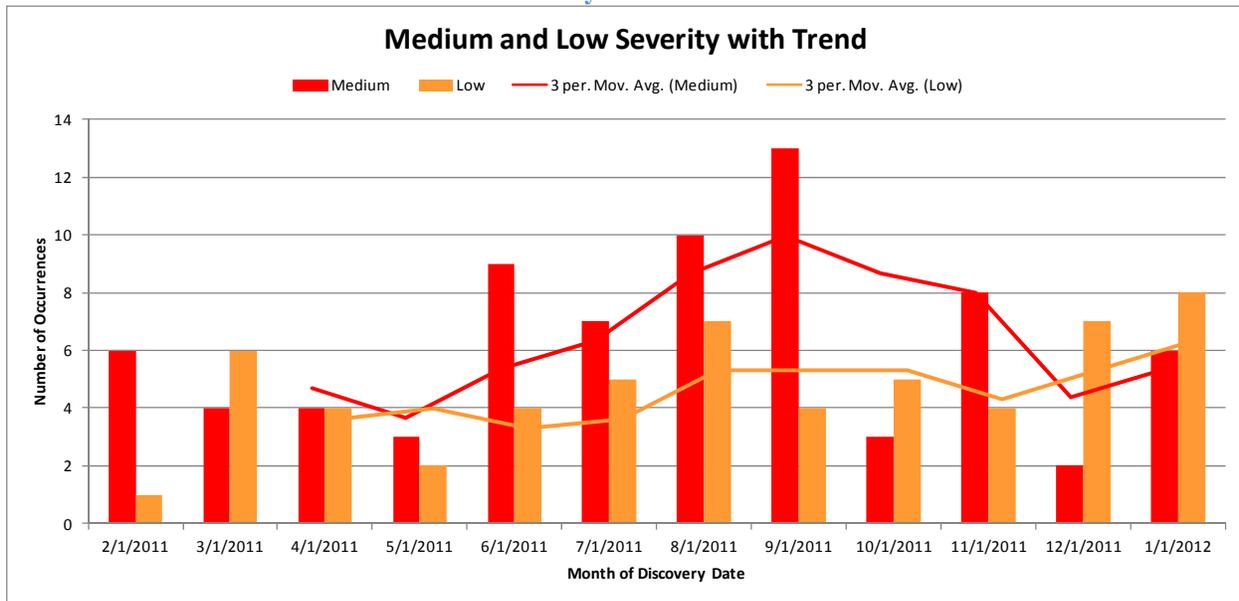


What can be seen from the previous two charts is that the number of occurrences with High electrical severity scores has remained at zero for the past eight months. The number of occurrences with Medium scores increased from December, as well as the number of Low severity occurrences.

## **Medium and Low Severity with Trend**

Figure 8 focuses on the Medium and Low severity data series for January 2011 through January 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 an increasing trend in the Medium severity occurrences since December and an increasing trend of Low severity occurrences since November.

## **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/wq/esh\\_es/index.htm](http://www.efcog.org/wq/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 – January 2012

| No | Report Number                  | Event Summary  | SHOCK | BURN | ARCF <sup>(1)</sup> | LOTO <sup>(2)</sup> | PLAN <sup>(3)</sup> | EXCAV <sup>(4)</sup> | CUT/D <sup>(5)</sup> | VEH <sup>(6)</sup> | SC <sup>(7)</sup> | RC <sup>(8)</sup> | ES <sup>(9)</sup> |
|----|--------------------------------|--|-------|------|---------------------|---------------------|---------------------|----------------------|----------------------|--------------------|-------------------|-------------------|-------------------|
| 1  | EE-GO--NREL-NREL-2012-0001     | A subcontractor hit a 13.2 kV power line while using a high-reach forklift.  |       |      |                     |                     |                     |                      |                      | X                  | 3                 | 10(3)             | 1600              |
| 2  | EM-RL--CPRC-WRAP-2012-0001     | An instrument tech received a 120-V shock while moving a wire bundle to gain access to a terminal strip to install testing leads.    | X     |      |                     |                     |                     |                      |                      |                    | 2                 | 2E(1)             | 330               |
| 3  | EM-RP--BNRP-RPPWTP-2012-0002   | Electricians installed a frequency control box to a temporary panel without guarded terminals.                                       |       |      |                     |                     | X                   |                      |                      |                    | 4                 | 2E(3)             | 700               |
| 4  | EM-RP--BNRP-RPPWTP-2012-0003   | A vendor began a demonstration of a field diagnostic testing of circuit boards in violation of the hazardous energy control process. |       |      |                     |                     | X                   |                      |                      |                    | 4                 | 2E(3)             | 11                |
| 5  | EM-RP--WRPS-TANKFARM-2012-0001 | An instrument tech performed work on 120V system without following a hazardous energy control process.                               |       |      |                     | X                   | X                   |                      |                      |                    | 4                 | 2E(3)             | 0                 |
| 6  | LM--STOL-MONT-2012-0001        | Unauthorized electrical work performed by subcontractor.   |       |      |                     | X                   |                     |                      |                      |                    | 4                 | 2E(3)             | 0                 |
| 7  | NA--LSO-LLNL-LLNL-2012-0002    | Electrician discovered 120V electrical source during irrigation controller installation.   |       |      |                     |                     | X                   |                      |                      |                    | 3                 | 2E(2)             | 110               |
| 8  | NA--LSO-LLNL-LLNL-2012-0004    | A metal prong and trailing wire from a hot phase of an outlet of a re-locatable power tap was discovered behind a microwave.         |       |      |                     |                     |                     |                      |                      |                    | 3                 | 2E(2)             | 20                |
| 9  | NA--SS-SNL-CASITE-2012-0001    | Contractor drills into energized 120V lighting circuit conduit.  |       |      |                     |                     |                     |                      | X                    |                    | 3                 | 2E(2)             | 100               |
| 10 | NA--YSO-BWXT-Y12SITE-2012-0003 | Workers used an incorrect job-specific LOTO to perform maintenance on a fire pump.   |       |      |                     | X                   |                     |                      |                      |                    | 4                 | 2E(3)             | 10                |
| 11 | NA--YSO-BWXT-Y12SITE-2012-0005 | Preventive maintenance performed under a single source LOTO with incomplete signatures.  |       |      |                     | X                   |                     |                      |                      |                    | 4                 | 2E(3)             | 5                 |

Attachment 1

| No | Report Number                  | Event Summary  | SHOCK | BURN | ARCF <sup>(1)</sup> | LOTO <sup>(2)</sup> | PLAN <sup>(3)</sup> | EXCAV <sup>(4)</sup> | CUT/D <sup>(5)</sup> | VEH <sup>(6)</sup> | SC <sup>(7)</sup> | RC <sup>(8)</sup> | ES <sup>(9)</sup> |
|----|--------------------------------|--|-------|------|---------------------|---------------------|---------------------|----------------------|----------------------|--------------------|-------------------|-------------------|-------------------|
| 12 | SC--BSO-LBL-ENG-2012-0001      | An employee received a low voltage 28VDC shock from the TIG welder.  | X     |      |                     |                     |                     |                      |                      |                    | 3                 | 10(2)             | 12                |
| 13 | SC--BSO-LBL-ESD-2012-0001      | A subcontractor performed electrical work on a lathe and mill without a required energized electrical work permit or LOTO.   |       |      |                     | X                   |                     |                      |                      |                    | 4                 | 2E(3)             | 110               |
| 14 | SC-ORO--ORNL-X10HFIR-2012-0002 | An energized 120V circuit on a terminal block arced when a solution got on the circuit, which should have been de-energized. |       |      |                     |                     | X                   |                      |                      |                    | 3                 | 2E(2)             | 0                 |
|    | TOTAL                          |  | 2     | 0    | 0                   | 5                   | 5                   | 0                    | 1                    | 1                  |                   |                   |                   |

Key

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

ES Scores: High is  $\geq 1750$ , Medium is 31-1749, and Low is 1-30

Attachment 1

Electrical Safety Occurrences – January 2012

| No | Report Number                  | Event Summary  | EW <sup>(1)</sup> | N-EW <sup>(2)</sup> | SUB <sup>(3)</sup> | HFW <sup>(4)</sup> | WFH <sup>(5)</sup> | PPE <sup>(6)</sup> | 70E <sup>(7)</sup> | VOLT <sup>(8)</sup> |   | C/T <sup>(9)</sup> | NEUT <sup>(10)</sup> | NM <sup>(11)</sup> |
|----|--------------------------------|--|-------------------|---------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|---|--------------------|----------------------|--------------------|
|    |                                |  |                   |                     |                    |                    |                    |                    |                    | H                   | L |                    |                      |                    |
| 1  | EE-GO--NREL-NREL-2012-0001     | A subcontractor hit a 13.2 kV power line while using a high-reach forklift.  |                   | X                   | X                  | X                  |                    |                    |                    |                     | X |                    |                      | X                  |
| 2  | EM-RL--CPRC-WRAP-2012-0001     | An instrument tech received a 120 V shock while moving a wire bundle to gain access to a terminal strip to install testing leads.    | X                 |                     |                    | X                  |                    |                    |                    |                     |   | X                  |                      |                    |
| 3  | EM-RP--BNRP-RPPWTP-2012-0002   | Electricians installed a frequency control box to a temporary panel without guarded terminals.                                       | X                 |                     |                    |                    | X                  |                    | X                  |                     | X |                    |                      |                    |
| 4  | EM-RP--BNRP-RPPWTP-2012-0003   | A vendor began a demonstration of a field diagnostic testing of circuit boards in violation of the hazardous energy control process. |                   | X                   | X                  |                    | X                  |                    |                    |                     | X |                    |                      |                    |
| 5  | EM-RP--WRPS-TANKFARM-2012-0001 | An instrument tech performed work on 120V system without following a hazardous energy control process.                               | X                 |                     |                    |                    | X                  |                    |                    |                     | X |                    |                      |                    |
| 6  | LM---STOL-MONT-2012-0001       | Unauthorized electrical work performed by subcontractor.   | X                 |                     | X                  |                    | X                  |                    |                    |                     | X |                    |                      |                    |
| 7  | NA--LSO-LLNL-LLNL-2012-0002    | Electrician discovered 120V electrical source during irrigation controller installation.   | X                 |                     |                    | X                  |                    |                    |                    |                     | X |                    |                      | X                  |
| 8  | NA--LSO-LLNL-LLNL-2012-0004    | A metal prong and trailing wire from a hot phase of an outlet of a re-locatable power tap was discovered behind a microwave.         |                   | X                   |                    |                    | X                  |                    |                    |                     | X |                    |                      | X                  |
| 9  | NA--SS-SNL-CASITE-2012-0001    | Contractor drills into energized 120V lighting circuit conduit.  |                   | X                   | X                  | X                  |                    |                    |                    |                     | X |                    |                      | X                  |
| 10 | NA--YSO-BWXT-Y12SITE-2012-0003 | Workers used an incorrect job-specific LOTO to perform maintenance on a fire pump.   |                   | X                   |                    |                    | X                  |                    |                    |                     | X |                    |                      |                    |
| 11 | NA--YSO-BWXT-Y12SITE-2012-0005 | Preventive maintenance performed under a single source LOTO with incomplete signatures.  |                   | X                   |                    |                    | X                  |                    |                    |                     | X |                    |                      |                    |

Attachment 1

| No | Report Number                  | Event Summary  | EW <sup>(1)</sup> | N-EW <sup>(2)</sup> | SUB <sup>(3)</sup> | HFW <sup>(4)</sup> | WFH <sup>(5)</sup> | PPE <sup>(6)</sup> | 70E <sup>(7)</sup> | VOLT <sup>(8)</sup> |    | C/I <sup>(9)</sup> | NEUT <sup>(10)</sup> | NM <sup>(11)</sup> |
|----|--------------------------------|--|-------------------|---------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|----|--------------------|----------------------|--------------------|
|    |                                |  |                   |                     |                    |                    |                    |                    |                    | H                   | L  |                    |                      |                    |
| 12 | SC--BSO-LBL-ENG-2012-0001      | An employee received a low voltage 28VDC shock from the TIG welder.  |                   | X                   |                    | X                  |                    |                    |                    |                     | X  |                    |                      |                    |
| 13 | SC--BSO-LBL-ESD-2012-0001      | A subcontractor performed electrical work on a lathe and mill without a required energized electrical work permit or LOTO.   | X                 |                     | X                  |                    | X                  |                    |                    |                     | X  |                    |                      |                    |
| 14 | SC-ORO--ORNL-X10HFIR-2012-0002 | An energized 120V circuit on a terminal block arced when a solution got on the circuit, which should have been de-energized. | X                 |                     |                    |                    | X                  |                    |                    |                     | X  |                    |                      |                    |
|    | TOTAL                          |  | 7                 | 7                   | 5                  | 5                  | 9                  | 0                  | 1                  | 1                   | 13 | 0                  | 0                    | 4                  |

Key

(1) EW = electrical worker, (2) N-EW = non-electrical worker, (3) SUB = subcontractor, (4) HFW = hazard found the worker, (5) WFH = worker found the hazard, (6) PPE = inadequate or no PPE used, (7) 70E = NFPA 70E issues, (8) VOLT = H (>600) L(≤600), (9) C/I = Capacitance/Inductance, (10) NEUT = neutral circuit, (11) NM = near miss

# ORPS Operating Experience Report

## Production GUI - New ORPS

ORPS contains 55563 OR(s) with 58873 occurrences(s) as of 2/22/2012 8:23:55 AM  
 Query selected 14 OR(s) with 14 occurrences(s) as of 2/22/2012 8:45:33 AM

Download this report in Microsoft Word format. 

**1)Report Number:** [EE-GO--NREL-NREL-2012-0001](#) **After 2003 Redesign**  
**Secretarial Office:** Energy Efficiency and Renewable Energy  
**Lab/Site/Org:** National Renewable Energy Laboratory  
**Facility Name:** National Renewable Energy Laboratory  
**Subject/Title:** Near miss - mast of forklift contacts 13.2 kV power line with no electrical fault  
**Date/Time Discovered:** 01/05/2012 14:45 (MTZ)  
**Date/Time Categorized:** 01/05/2012 16:30 (MTZ)  
**Report Type:** Final

**Report Dates:**

|                |            |             |
|----------------|------------|-------------|
| Notification   | 01/09/2012 | 19:58 (ETZ) |
| Initial Update | 02/17/2012 | 09:07 (ETZ) |
| Latest Update  | 02/17/2012 | 09:07 (ETZ) |
| Final          | 02/17/2012 | 09:07 (ETZ) |

**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:** A3B1C01 - Human Performance Less Than Adequate (LTA); Skill Based Errors; Check of work was LTA  
 -->couplet - NA  
 A4B1C01 - Management Problem; Management Methods Less Than Adequate (LTA); Management policy guidance / expectations not well-defined, understood or enforced  
 A4B3C08 - Management Problem; Work Organization & Planning LTA; Job scoping did not identify special circumstances and/or conditions  
 A4B1C04 - Management Problem; Management Methods Less Than Adequate (LTA); Management follow-up or monitoring of activities did not identify problems  
 A4B5C04 - Management Problem; Change Management LTA; Risks / consequences associated with change not adequately reviewed / assessed  
 A3B1C02 - Human Performance Less Than Adequate (LTA); Skill Based Errors; Step was omitted due to distraction  
 -->couplet - NA

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

4) Perform Work Within Controls

**Subcontractor Involved:**

Yes  
Haselden Construction

**Occurrence Description:**

At 2:44 PM on Thursday January 5, 2012 a construction subcontractor (of the concrete division) was using a high reach rough terrain telehandler (i.e. forklift) to relocate concrete forms on the ingress/egress project. The forklift mast contacted a 13.2 kV power line suspended 25.5 feet above the roadway. After contacting the line co-workers stopped the driver and alerted him to the hazard. The driver backed away from the power line and lowered the boom. The contact did not cause electrical arcing, the power line was not damaged, the fault protection on the power line did not activate (meaning there was no ground fault detected), and there were no injuries and no property damage.

Update: Feb. 9, 2012. The following information was revealed during the incident investigation:

Sequence of Events and Condition Details:

1. January 5, 2012: 6:45 A.M., the ingress/egress construction project subcontractor held the daily Plan of the Day (POD) meeting. All lower tiered subcontractors who had submitted PODs for the day were in attendance, including the concrete division foreman.
2. The concrete division POD document identified the work activity for the day as "strip arroyo and wash". This activity involved stripping the new culvert head wall forms using a Genie Rough Terrain telehandler forklift and power washing the concrete wall in the arroyo. This work area was located on the east side of the ingress/egress project.
3. Approximately 11 A.M., the concrete division foreman overheard a discussion between the project superintendent and the NREL Construction Manager about the need to continue the installation of the concrete form system for the Moss Street retaining wall. The foreman interjected that he would get to work on the Moss Street retaining wall installation as soon as he was able to reassign his crew.
4. Approximately 2 P.M., the concrete wall crew began their work activity on the Moss Street retaining wall. The Moss Street retaining wall work area was located on the far west side of the project site.
5. 2:15 P.M. the forklift operator and spotter located the form system in the project lay down area.
6. The workers rigged the form under the forklift with two 20-foot nylon slings and began to transport the 1800 lb, 8 foot by 23 foot form - exiting the main construction area and traveling west on Denver West Parkway with the spotter managing the tag line.
7. After traveling approximately 1/4 mile, the forklift operator began turning south onto Moss Street. At that point, the backrest of the telehandler contacted the lower phase of the 13.2 kV power line.
  - a. The power lines were 25.5 feet above the ground and were clearly marked with red flagging (flagging installed by Excel Energy) and there was warning signage at street level below the power line.
  - b. The operator indicated in his report that the sun was in his eyes and he was not familiar with the area as he returned to this project two weeks ago after about a 4 month lapse. The spotter said that his attention was on traffic and he did not notice the overhead power line.

- c. The traffic guard at the Moss Street/Denver West Pkwy intersection indicated in his witness statement that he was occupied directing traffic into and out of the project. The traffic guard tried to get the forklift operator's attention, but was not close enough to the forklift to be heard.
- 8. After contacting the power line, the forklift operator backed up onto Denver West Parkway, traveled east to the surface parking lot entrance, and then traveled down the road and placed the form on the ground.

**Supporting Information:**

**Plan of the Day/Job Hazard Analysis Process:**

According to subcontractor's site specific safety orientation, all scheduled work needs to be on the POD along with the JHA, and these PODs/JHAs must be approved by the subcontractor's superintendent before work is authorized to start. The PODs and JHAs must be submitted to the superintendent by 2 P.M. the day before the activity is set to start. These PODs and JHAs are reviewed at the supervisor's plan of the day meeting held at 6:45 A.M. each morning.

All subcontractor employees associated with this event/activity were given the project safety orientation prior to being badged, as verified by the subcontractor's attendance record file copy. The POD and change management expectations were discussed as part of this orientation. The stated expectation was that subcontractors must notify the superintendent of changes that relate to work scope, materials and/or processes that may introduce new or different hazards to the project. Additionally, the revised POD must be revised and accepted by the project superintendent. The POD then must be reviewed with the work crew and re-signed as verification that everyone is aware of the change of work and procedures in order to safely perform the work activity.

**Background information on crew experience and training:**

Both of the concrete crew members had worked on the Moss Street wall area the previous day. The forklift operator was deemed as a qualified equipment operator. There was no formal training or qualification process for spotters.

The activity being performed at the time of the incident was not identified on the crew's Plan of the Day (POD). The subcontractor identified this as a direct violation of the project procedures. Without this activity being on the POD, there was no opportunity for the foreman to formally review the details of this activity with the project management or safety team.

**Cause Description:**

- 1. Human Performance (on the part of the operator) was less than adequate:
  - a. A3B1C02 Step was omitted due to distraction. The spotter indicated in his witness statement that his attention was on the form and the traffic and he did not see the overhead power line. The traffic guard indicated that his attention was focused on traffic. Neither the driver nor the spotter observed the warning signs nor the flagging on the power line. The overhead power lines were clearly identified with red flagging and there were overhead power line warning signs at ground level.
  - b. A3B1C01 Check of work less than adequate: operator did not properly plan out and continuously monitor for hazards along their hazard path.

2. A4B1C01 Management policy guidance/expectations not well defined, understood or enforced. The POD/JHA work control process did not adequately define the expectations for POD content - specifically how much detail is required explaining the scope of work, the associated hazards and controls of the task. The process did not adequately define expectations for effective flow-down to workers. Enforcement of the POD process was less than adequate, the superintendent accepted a POD that was less than adequate (see cause 4.a.iii).

3. Work organization and planning less than adequate:  
A4B3C08 Job scoping did not identify special circumstances and/or conditions. POD did not include the movement of the concrete forms to Moss Street; neither did the POD adequately define the day's work - there is no mention of form movement with a forklift. A revised POD was not submitted for the Moss Street form work.

4. Management methods less than adequate:  
a. A4B1C04 Management follow-up monitoring of activities did not identify problems.  
i. Foreman did not discuss the travel path for moving around to the work site.  
ii. Foreman did not review change in activities with the project superintendent and obtain the superintendent's approval to change work. The established POD process was not followed. The foreman did not revise the POD and did not obtain concurrence on a revised POD from the superintendent.  
iii. The Superintendent accepted a less than adequate POD from the concrete division - the POD did not indicate what equipment was to be used, but only said "strip arroyo and wash".

Root Cause  
Change Management Less Than Adequate  
A4B5C04 Risks/consequences associated with change not adequately reviewed/assessed. The process to be followed and the hazards associated with the movement of the wall forms were not analyzed.

**Operating Conditions:**

Normal construction operations, no unusual conditions identified

**Activity Category:**

Construction

**Immediate Action(s):**

1. Operator backed away from the power line and used a different route to deliver the concrete forms.
2. NREL EHS was notified.
3. The construction subcontractor immediately disallowed the movement of concrete forms with high reach rough terrain telehandlers
4. The construction subcontractor began an incident investigation.

**FM Evaluation:**

There was no impact to the workers, facility, or the environment as a result of this near miss. Haselden Construction will submit a corrective plan prior to resuming forklift operations involving concrete form relocations.

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is**

No

**Required:**

**Division or Project:** Infrastructure Campus Development Office  
**Plant Area:** South Table Mountain  
**System/Building/Equipment:** Ingress/Egress Construction Project  
**Facility Function:** Balance of Plant - Infrastructure (Other Functions not specifically listed in this Category)

**Corrective Action 01:** **Target Completion Date:**01/18/2012 **Actual Completion Date:**01/18/2012

Review the incident and site specific construction equipment policy requirement with project workers including lower tier subcontractors, to include:

- Site overhead power line locations and identified warning signs/markings.
- Associated hazards and work controls/prohibitions regarding activities and/or construction equipment movement in the vicinity of overhead power lines.
- Restrictions and prohibitions regarding construction equipment travel on the Denver West Parkway and/or under overhead power lines.

**Corrective Action 02:** **Target Completion Date:**01/18/2012 **Actual Completion Date:**01/18/2012

Implement a site specific policy restricting and/or prohibiting construction equipment traveling on the Denver West Parkway and/or under site overhead power lines.

**Corrective Action 03:** **Target Completion Date:**01/28/2012 **Actual Completion Date:**01/24/2012

Revise the POD form instructions to better define expectations for the amount of information to include in the POD document, e.g. the scope of work, hazards and controls also identify the required task elements (location, equipment, travel route). The revised form is to include information on what constitutes a change in conditions warranting a new POD submission.

**Corrective Action 04:** **Target Completion Date:**01/28/2012 **Actual Completion Date:**01/24/2012

Train staff and lower tiered subcontractors on the revised POD process/form requirements, change management conditions and provide documentation of training.

**Corrective Action 05:** **Target Completion Date:**01/28/2012 **Actual Completion Date:**01/24/2012

Subcontractor to implement a daily quality review on each POD/JHA submitted for the day's work activities.

**Corrective Action 06:** **Target Completion Date:**01/28/2012 **Actual Completion Date:**01/23/2012

Subcontractor to implement a documented field verification process to ensure the POD/JAW process flow down is effectively communicated to workers and is demonstrated during observed work activities. Each week, each member of the contractor project management team will be responsible for providing a field quality check of the POD - verifying what is documented is what is occurring.

**Corrective Action 07:** **Target Completion Date:**03/15/2012 **Actual Completion Date:**

Share the information from this incident investigation with Site Operations/Shipping and Receiving. Determine if additional preventive measures (e.g. signage) are necessary to prevent the possibility of future power line contact. The new Moss Street entrance has three locations where vehicles will be traveling under overhead power lines - a new condition for STM roadways.

**Lessons(s) Learned:** The lack of task specificity in the POD produces an over-reliance on "skill of the craft," which may result in error likely situations due to insufficient planning, control and craft instruction.

**HQ Keywords:** 01N--Inadequate Conduct of Operations - Inadequate Job Planning (Other)  
 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  
 12K--EH Categories - Near Miss (Could have been a serious injury or fatality)  
 14E--Quality Assurance - Work Process Deficiency  
 14G--Quality Assurance - Procurement Deficiency

**HQ Summary:** On January 5, 2012, a construction subcontractor contacted a 13.2 kV power line suspended 25.5 feet above the roadway while using a high reach rough terrain telehandler (i.e. forklift) to relocate concrete forms. Immediately after the contact, the spotter and other workers in the area alerted the driver to the hazard. The driver backed away from the power line and lowered the boom. The contact did not cause electrical arcing, the power line was not damaged, and the reclosures on the power line did not activate (meaning there was no ground fault detected). There were no injuries and no property damage.

**Similar OR Report Number:** 1. EE-GO--NREL-NREL-2011-0011

**Facility Manager:**

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

**Originator:**

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

**HQ OC Notification:**

| Date | Time | Person Notified | Organization |
|------|------|-----------------|--------------|
| NA   | NA   | NA              | NA           |

**Other Notifications:**

| Date       | Time        | Person Notified    | Organization |
|------------|-------------|--------------------|--------------|
| 01/05/2012 | 15:35 (MTZ) | Event Distribution | DOE/NREL     |

**Authorized Classifier(AC):**

**2)Report Number:** [EM-RL--CPRC-WRAP-2012-0001](#) After 2003 Redesign

**Secretarial Office:** Environmental Management

**Lab/Site/Org:** Hanford Site

**Facility Name:** WASTE RECEIVING & PROCESSING FACILIT

**Subject/Title:** Mild Electrical Shock while Conducting Maintenance

**Date/Time Discovered:** 01/27/2012 09:45 (PTZ)

**Date/Time Categorized:** 01/27/2012 11:10 (PTZ)

**Report Type:** Update

**Report Dates:**

|              |            |             |
|--------------|------------|-------------|
| Notification | 01/30/2012 | 19:11 (ETZ) |
|--------------|------------|-------------|

|                |            |             |
|----------------|------------|-------------|
| Initial Update | 02/02/2012 | 10:10 (ETZ) |
| Latest Update  | 02/02/2012 | 10:10 (ETZ) |
| Final          |            |             |

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

**Cause Codes:**

**ISM:**

**Subcontractor Involved:** No

**Occurrence Description:** At approximately 0945 hours, an Instrument Technician was performing routine preventive maintenance on the WRAP stack monitoring equipment. To gain access to a terminal strip to install testing leads, the worker had to move a wire bundle to one side. Upon touching the wire bundle, the worker experienced a mild shock. The apparent source of the shock was the shielding around one of the shielded wires. There was no lock and tag required in the work package for this activity.

Update 1/31/2012

WRAP personnel used a troubleshooting and repair package to do further investigation on the wiring in the Stack Alarm cabinet. Testing identified the wiring to be 120V. The wiring consists of seven groups of twisted pairs equipped with bleed wires. Only one of the seven bleed wires was grounded as expected. The Instrument Technician received the shock from one of the ungrounded pairs.

**Cause Description:**

**Operating Conditions:** Maintenance

**Activity Category:** Maintenance

**Immediate Action(s):** The activity was stopped. Employee taken to first aid and returned to work without restriction. A critique was conducted.

**FM Evaluation:** Update 1/31/2012

Initial investigation indicated that the wire bundle contained only low voltage wires. This update was submitted to provide information found during follow-up investigation of the wiring.

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** Yes.  
 Before Further Operation? No  
 By Whom: WRAP  
 By When: 03/18/2012

**Division or Project:** Waste and Fuels Management Project

**Plant Area:** 200W

**System/Building/Equipment:** 2336W Waste Receiving and Processing (WRAP) Facility

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

**Corrective Action:**

**Lessons(s) Learned:**

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

**HQ Summary:** On January 27, 2012, an Instrument Technician was shocked when he moved a wire bundle to gain access to a terminal strip to install testing leads during routine preventive maintenance on the WRAP stack monitoring equipment. The apparent source of the shock was the shielding around one of the shielded wires, even though the bundle contained low voltage wiring. The work package for this activity did not require a lock and tag. The technician was taken to first aid and returned to work without restrictions.

**Similar OR Report Number:**

**Facility Manager:**

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

**Originator:**

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

**HQ OC Notification:**

| Date | Time | Person Notified | Organization |
|------|------|-----------------|--------------|
| NA   | NA   | NA              | NA           |

**Other Notifications:**

| Date       | Time        | Person Notified | Organization |
|------------|-------------|-----------------|--------------|
| 01/27/2012 | 11:00 (PTZ) | Ty Blackford    | WFMP VP      |
| 01/27/2012 | 11:00 (PTZ) | Stu Mortensen   | WRAP         |
| 01/27/2012 | 11:44 (PTZ) | Joe Waring      | DOE RL       |
| 01/27/2012 | 12:28 (PTZ) | Sam Baker       | MSA ONC      |

**Authorized Classifier(AC):**

**3)Report Number:** [EM-RP--BNRP-RPPWTP-2012-0002](#) After 2003 Redesign

**Secretarial Office:** Environmental Management

**Lab/Site/Org:** Hanford Site

**Facility Name:** RPP Waste Treatment Plant

**Subject/Title:** Electricians installed a Frequency Control Box to a temporary panel without guarded terminals.

**Date/Time Discovered:** 01/11/2012 14:00 (PTZ)

**Date/Time Categorized:** 01/11/2012 15:55 (PTZ)

**Report Type:** Notification/Final

**Report Dates:**

|              |            |             |
|--------------|------------|-------------|
| Notification | 01/12/2012 | 17:00 (ETZ) |
|--------------|------------|-------------|

|                |            |             |
|----------------|------------|-------------|
| Initial Update | 01/12/2012 | 17:00 (ETZ) |
| Latest Update  | 01/12/2012 | 17:00 (ETZ) |
| Final          | 01/12/2012 | 17:00 (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:** 2) Analyze the Hazards

**Subcontractor Involved:** No

**Occurrence Description:** On 1/11/2012, in the Laboratory facility, a crew of electricians installed a Frequency Control Box (FCB) for vacuum testing. The FCB was approved by Field Engineering with the understanding that it met all applicable electrical codes. After the installation, programming and testing, a question was raised about recessed terminals that were potentially accessible. Field Engineering reviewed NFPA 70E and determined that the terminals were required to be guarded. Since they were not, this violated the Hazardous Energy Control process.

**Cause Description:**

**Operating Conditions:** Construction

**Activity Category:** Construction

**Immediate Action(s):** The work was paused for further clarification of procedural compliance and hazard recognition.  
The Field Engineering staff identified an "accessory" terminal cover on the manufacturer's website and sent it through the procurement system.  
The work will be paused until the part is made available to complete the task.

**FM Evaluation:**

**DOE Facility Representative Input:**

**DOE Program Manager Input:**

**Further Evaluation is Required:** No

**Division or Project:** Waste Treatment Plant

**Plant Area:** 600

**System/Building/Equipment:** LAB

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

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:** 01M--Inadequate Conduct of Operations - Inadequate Job Planning (Electrical)  
12C--EH Categories - Electrical Safety  
14E--Quality Assurance - Work Process Deficiency

**HQ Summary:** On January 11, 2012, a crew of electricians installed a Frequency Control Box (FCB) for vacuum testing. The FCB was approved by Field Engineering with the understanding that it met all applicable electrical codes. After the installation,

programming and testing, a question was raised about recessed terminals that were potentially accessible. Field Engineering reviewed NFPA 70E and determined that the terminals were required to be guarded. Since they were not, this violated the Hazardous Energy Control process. The work was paused for further clarification of procedural compliance and hazard recognition.

**Similar OR Report Number:**

**Facility Manager:**

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

**Originator:**

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

**HQ OC Notification:**

| Date | Time | Person Notified | Organization |
|------|------|-----------------|--------------|
| NA   | NA   | NA              | NA           |

**Other Notifications:**

| Date       | Time        | Person Notified | Organization |
|------------|-------------|-----------------|--------------|
| 01/11/2012 | 15:55 (PTZ) | Ty Troutman     | BNI          |
| 01/11/2012 | 15:55 (PTZ) | Tucker Campbell | BNI          |
| 01/11/2012 | 16:00 (PTZ) | Ken Wade        | DOE          |
| 01/11/2012 | 18:10 (PTZ) | Ken Davis       | ONC          |

**Authorized Classifier(AC):**

**4)Report Number:**

[EM-RP--BNRP-RPPWTP-2012-0003](#) After 2003 Redesign

**Secretarial Office:**

Environmental Management

**Lab/Site/Org:**

Hanford Site

**Facility Name:**

RPP Waste Treatment Plant

**Subject/Title:**

Vendor was not provided guidance on procedural compliance

**Date/Time Discovered:**

01/11/2012 14:45 (PTZ)

**Date/Time Categorized:**

01/11/2012 15:55 (PTZ)

**Report Type:**

Notification/Final

**Report Dates:**

|                |            |             |
|----------------|------------|-------------|
| Notification   | 01/12/2012 | 18:07 (ETZ) |
| Initial Update | 01/12/2012 | 18:07 (ETZ) |
| Latest Update  | 01/12/2012 | 18:07 (ETZ) |
| Final          | 01/12/2012 | 18:07 (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

Attachment 2

**Subcontractor Involved:** Yes  
Arc Machines Incorporated. (ANC)

**Occurrence Description:** On 1-11-2012, at the WTP construction site, a vendor began a training session for diagnostics and testing of an orbital welding unit. The vendor provided classroom instruction and began a demonstration of a field diagnostic testing of the circuit boards. A WTP employee discovered there was not a work package to perform this task and asked that the vendor pause the work activity for further clarification. Supervision was notified and they determined that the activity was in violation of the Hazardous Energy Control Process.

**Cause Description:**

**Operating Conditions:** Construction

**Activity Category:** Construction

**Immediate Action(s):** The work was paused for further clarification of procedural compliance and hazard recognition.  
A hazard analysis and work control package is being developed to allow the vendor to complete the training.

**FM Evaluation:**

**DOE Facility Representative Input:**

**DOE Program Manager Input:**

**Further Evaluation is Required:** No

**Division or Project:** Waste Treatment Project

**Plant Area:** 600

**System/Building/Equipment:** Combo Shop

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

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:** 01A--Inadequate Conduct of Operations - Inadequate Conduct of Operations (miscellaneous)  
01M--Inadequate Conduct of Operations - Inadequate Job Planning (Electrical)  
01R--Inadequate Conduct of Operations - Management issues  
11G--Other - Subcontractor  
12C--EH Categories - Electrical Safety  
14E--Quality Assurance - Work Process Deficiency

**HQ Summary:** On January 11, 2012, a vendor began a training session for diagnostics and testing of an orbital welding unit without a work package. The vendor provided classroom instruction and began a demonstration of a field diagnostic testing of the circuit boards. A WTP employee discovered there was not a work package to perform this task and asked that the vendor pause the work activity for further clarification. Supervision was notified and they determined that the activity was in violation of the Hazardous Energy Control Process. A hazard analysis and work control package is being developed to allow the vendor to complete the training.

**Similar OR Report Number:**

**Facility Manager:**

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

**Originator:**

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

**HQ OC Notification:**

| Date | Time | Person Notified | Organization |
|------|------|-----------------|--------------|
| NA   | NA   | NA              | NA           |

**Other Notifications:**

| Date       | Time        | Person Notified | Organization |
|------------|-------------|-----------------|--------------|
| 01/11/2012 | 15:55 (PTZ) | Ty Troutman     | BNI          |
| 01/11/2012 | 15:55 (PTZ) | Tucker Campbell | BNI          |
| 01/11/2012 | 16:00 (PTZ) | Ken Wade        | DOE          |
| 01/11/2012 | 18:10 (PTZ) | Ken Davis       | ONC          |

**Authorized Classifier(AC):**

**5)Report Number:**

[EM-RP--WRPS-TANKFARM-2012-0001](#) After 2003 Redesign

**Secretarial Office:**

Environmental Management

**Lab/Site/Org:**

Hanford Site

**Facility Name:**

Tank Farms

**Subject/Title:**

Failure To Follow Prescribed Hazardous Energy Control Process

**Date/Time Discovered:**

01/10/2012 16:10 (PTZ)

**Date/Time Categorized:**

01/10/2012 16:47 (PTZ)

**Report Type:**

Notification/Final

**Report Dates:**

|                |            |             |
|----------------|------------|-------------|
| Notification   | 01/12/2012 | 12:16 (ETZ) |
| Initial Update | 01/12/2012 | 12:16 (ETZ) |
| Latest Update  | 01/12/2012 | 12:16 (ETZ) |
| Final          | 01/12/2012 | 12:16 (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:**

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

**Subcontractor Involved:**

No

**Occurrence Description:**

On January 9, 2012, the 6241-A facility had been electrically isolated to support backlog preventative maintenance work scope. The 6241-A facility was electrically isolated at the transformers under lockout/tagout authorization form (TAF) TSU-12-001. On January 10, 2012, an Instrument Technician was released to perform wire

verifications in the 6241-A facility. The work package scope for the wiring verifications was not adequately evaluated as it was understood to be less than 50 volts; therefore, not included on TAF TSU-12-001. The Instrument Technician ended up performing work on 120 volt system. Although this activity did not have power because of TAF TSU-12-001, it was not specifically reviewed and released as such. The Instrument Technician was at no time exposed to hazardous energy.

**Cause Description:**

**Operating Conditions:** Does not apply.

**Activity Category:** Maintenance

**Immediate Action(s):** The work was stopped immediately.  
The area was placed in a safe configuration.  
The work package was suspended.  
All the required notifications were completed.  
An event investigation was scheduled for January 11, 2012.

**FM Evaluation:**

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** No

**Division or Project:** Washington River Protection Solutions LLC (WRPS)

**Plant Area:** 200 West

**System/Building/Equipment:** Electrical/6241-A/Instrumentation

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

**Corrective Action:**

**Lessons(s) Learned:**

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

**HQ Summary:** On January 9, 2012, the 6241-A facility had been electrically isolated to support backlog preventative maintenance work scope. The 6241-A facility was electrically isolated at the transformers under lockout/tagout authorization form (TAF) TSU-12-001. On January 10, 2012, an Instrument Technician was released to perform wire verifications in the 6241-A facility. The work package scope for the wiring verifications was not adequately evaluated as it was understood to be less than 50 volts; therefore, not included on TAF TSU-12-001. The Instrument Technician ended up performing work on 120 volt system. Although this activity did not have power because of TAF TSU-12-001, it was not specifically reviewed and released as such. The Instrument Technician was at no time exposed to hazardous energy. The work was immediately stopped and the area was placed in a safe condition.

**Similar OR Report Number:**

**Facility Manager:**

|       |                                     |
|-------|-------------------------------------|
| Name  | Ellis, Martin W                     |
| Phone | (509) 373-4696                      |
| Title | Manager, Base Ops Technical Support |

**Originator:**

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

**HQ OC Notification:**

| Date | Time | Person Notified | Organization |
|------|------|-----------------|--------------|
| NA   | NA   | NA              | NA           |

**Other Notifications:**

| Date       | Time        | Person Notified  | Organization |
|------------|-------------|------------------|--------------|
| 01/10/2012 | 16:50 (PTZ) | Moser, D. R.     | WRPS         |
| 01/10/2012 | 16:50 (PTZ) | Wilkinson, R. E. | WRPS         |
| 01/10/2012 | 16:50 (PTZ) | Metzger, S. L.   | WRPS         |
| 01/10/2012 | 16:50 (PTZ) | Ciola, R. J.     | DOE-ORP      |
| 01/10/2012 | 16:55 (PTZ) | Smithwick, R. L. | MSA-ONC      |

**Authorized Classifier(AC):**

---

**6)Report Number:** [LM---STOL-MONT-2012-0001](#) After 2003 Redesign  
**Secretarial Office:** Legacy Management  
**Lab/Site/Org:** Legacy Management Site  
**Facility Name:** Monticello  
**Subject/Title:** Unauthorized electrical work performed by subcontractor  
**Date/Time Discovered:** 01/26/2012 09:00 (MTZ)  
**Date/Time Categorized:** 01/27/2012 09:00 (MTZ)  
**Report Type:** Notification/Final  
**Report Dates:**

|                |            |             |
|----------------|------------|-------------|
| Notification   | 01/30/2012 | 17:57 (ETZ) |
| Initial Update | 01/30/2012 | 17:57 (ETZ) |
| Latest Update  | 01/30/2012 | 17:57 (ETZ) |
| Final          | 01/30/2012 | 17:57 (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  
Lyle Northern Electric

**Occurrence Description:** On January 4, 2012, subcontracted electricians arrived at the site to perform a walk down to provide a cost estimate in preparation of upcoming electrical work planned for the site office trailer. During the walk down, the site representative left the site to have the tires on a GSA vehicle replaced, leaving the subcontractors unescorted to complete the walk down. The electricians, after concluding that the electrical upgrade could be easily accomplished, proceeded to perform the electrical work. This was not recognized until 1/26/12.

Discussions with the subcontractor indicated that they implemented their company procedure for controlling hazardous energy by opening (isolating) the main breaker for the trailer and applying a personal lock on the electrical panel. Hazardous energy was not present during the minor upgrade, but the DOE contractor's hazardous energy control procedure was not followed and the work was not authorized and in accordance with the contractor's requirements.

**Cause Description:**

**Operating Conditions:** Routine operations

**Activity Category:** Maintenance

**Immediate Action(s):** Management notifications were made and a review of the conditions leading to the performance of unauthorized work was initiated.

**FM Evaluation:**

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** No

**Division or Project:** Monticello Site

**Plant Area:** Site office trailer

**System/Building/Equipment:** Site office trailer

**Facility Function:** Environmental Restoration Operations

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:** 01E--Inadequate Conduct of Operations - Operations Procedure Noncompliance  
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 January 4, 2012, subcontractor electricians performed an electrical upgrade for a site office trailer using the subcontractor's hazardous energy control procedure but not DOE's contractor hazardous energy control procedure. The subcontractor participated in a walk down to provide a cost estimate for upcoming electrical work; the site representative left the area and left the electricians unescorted to complete

the walk down. The electricians concluded the upgrade could be easily accomplished and performed the work. The subcontractor opened the main breaker for the trailer and applied a personal lock on the electrical panel. Hazardous energy was not present during the minor upgrade.

**Similar OR Report Number:**

**Facility Manager:**

|       |                     |
|-------|---------------------|
| Name  | HURSHMAN, MICHAEL R |
| Phone | (970) 248-6468      |
| Title | Safety Consultant   |

**Originator:**

|       |                     |
|-------|---------------------|
| Name  | HURSHMAN, MICHAEL R |
| Phone | (970) 248-6468      |
| Title | NONE                |

**HQ OC Notification:**

| Date | Time | Person Notified | Organization |
|------|------|-----------------|--------------|
| NA   | NA   | NA              | NA           |

**Other Notifications:**

| Date       | Time        | Person Notified | Organization |
|------------|-------------|-----------------|--------------|
| 01/26/2012 | 09:00 (MTZ) | Troy Thomson    | Stoller      |
| 01/26/2012 | 09:00 (MTZ) | Carl Jacobson   | Stoller      |
| 01/26/2012 | 09:30 (MTZ) | Ken Karp        | Stoller      |
| 01/26/2012 | 09:35 (MTZ) | Joe Legare      | Stoller      |
| 01/26/2012 | 16:00 (MTZ) | Clay Carpenter  | Stoller      |
| 01/27/2012 | 10:30 (MTZ) | Joe Desormeau   | DOE-LM       |
| 01/27/2012 | 12:30 (MTZ) | Jalena Dayvault | DOE-LM       |

**Authorized Classifier(AC):**

**7)Report Number:**

[NA--LSO-LLNL-LLNL-2012-0002](#) 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:**

Discovery of 120 Volt Electrical Source During Irrigation Controller Installation at Building 451

**Date/Time Discovered:**

01/11/2012 15:00 (PTZ)

**Date/Time Categorized:**

01/12/2012 09:15 (PTZ)

**Report Type:**

Notification

**Report Dates:**

|                |            |             |
|----------------|------------|-------------|
| Notification   | 01/13/2012 | 18:00 (ETZ) |
| Initial Update |            |             |
| Latest Update  |            |             |
| Final          |            |             |

**Significance Category:**

3

**Reporting Criteria:**

2E(2) - Any unexpected discovery of an uncontrolled electrical hazardous energy

source (e.g., live electrical power circuit, etc.). This criterion does not include discoveries made by zero-energy checks and other precautionary investigations made before work is authorized to begin.

**Cause Codes:**

**ISM:**

**Subcontractor Involved:** No

**Occurrence Description:** On January 11, 2012 at approximately 3pm, a Maintenance & Utility Service Department (MUSD) Electrician was installing a new irrigation controller unit on the outside of Building 451. While connecting the circuit for the new irrigation controller it was discovered that the circuit was energized with 120 volts.

On October 27, 2011 (prior to work on January 11, 2012) the circuit was Locked and Tagged Out and by a MUSD Electrician as part of the removal of the old irrigation controller unit. At the time of the October 27, 2011 LOTO; the MUSD Electrician followed all required electrical de-energization controls, with the appropriate rated PPE, and received zero energy meter readings on the circuit. The Electrician proceeded with the removal of the old controller unit and safe ended the wires being disconnected (e.g. installed wire nuts and capped conduit). At this point, this portion of the approved and release work was completed. The MUSD Electrician's Lock and Tag remained on the circuit.

On January 11, 2012, a different MUSD Electrician tasked to install the new irrigation controller proceeded to hang his Lock and Tag onto the original LOTO'ed circuit (i.e. second lock and tag). Then, the Electrician utilized a proximity sensor to check the previously capped wires for the presence of voltage. No voltage was detected on the circuit at this time. Upon making the connections (e.g. stripping the wires) for the new irrigation controller unit, the Electrician observed an electrical spark indicating an energized circuit.

The work was immediately paused and the MUSD Electrician immediately contacted his line supervision to report the situation. No injury or shock resulted from this event. Upon evaluation by LLNL line managers and confirmation with the LLNL Electrical Subject Matter Expert, who evaluated the event to have an electrical severity rating of 110, it was determined that the event shall be reported.

This occurrence report is being tracked in LLNL's Issues Tracking System, reference Assessment No. 33843.

**Cause Description:**

**Operating Conditions:** Normal

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

**Immediate Action(s):**

1. Upon discovery of the energized circuit, the MUSD Electrician immediately stopped work, barricaded off the area, and contacted his line supervision to report the event.
2. The Operations and Business Principal Directorate and Facilities & Infrastructure Directorate line management was notified of the event.
3. The LLNL Electrical Subject Matter Expert was requested to report to the scene and analyze the event to establish and electrical severity rating.
4. A safety pause was performed within the Maintenance & Utility Service

Department to discuss the Building 451 electrical event and discuss best practices while performing Lock Out & Tag Out.

**FM Evaluation:** Submit final occurrence report to ORS by 2/21/2012.

Enter the final report into ORPS by 2/24/2012.

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

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

**Division or Project:** O&B

**Plant Area:** Site 200

**System/Building/Equipment:** 451

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

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:** 01M--Inadequate Conduct of Operations - Inadequate Job Planning (Electrical)  
 08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical)  
 12C--EH Categories - Electrical Safety  
 14E--Quality Assurance - Work Process Deficiency

**HQ Summary:** On January 11, 2012, an electrician observed an electrical spark upon stripping wires that were to be connected to a new 120 volt irrigation controller unit. The spark occurred after he applied his Lock and Tag to a circuit that been previously locked and tagged and after he used a proximity sensor to check previously capped wires for presence of voltage. Work was stopped and the area was barricaded. There was no injury or shock.

**Similar OR Report Number:** 1. NA--LSO-LLNL-LLNL-2011-0037  
 2. NA--LSO-LLNL-LLNL-2010-0028

**Facility Manager:**

|       |  |
|-------|--|
| Name  | Harold T. Conner, Jr.                              |
| Phone | (925) 422-5786                                     |
| Title | Associate Director, Facilities & Infrastructure Di |

**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 |
|------------|-------------|-----------------|--------------|
| 01/12/2012 | 11:20 (PTZ) | Valerie Roberts | LEDO         |

|            |             |                 |          |
|------------|-------------|-----------------|----------|
| 01/12/2012 | 11:23 (PTZ) | Paul Borenstein | ES&H TL  |
| 01/12/2012 | 11:24 (PTZ) | Lois Marik      | NNSA LSO |

**Authorized Classifier(AC):** Kevin Akey    **Date:** 01/13/2012

**8)Report Number:** [NA--LSO-LLNL-LLNL-2012-0004](#) **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 151 Uncontrolled Hazardous Electrical Energy Source Discovery With Re-locatable Power Tap  
**Date/Time Discovered:** 01/24/2012 16:00 (PTZ)  
**Date/Time Categorized:** 01/26/2012 11:30 (PTZ)  
**Report Type:** Update  
**Report Dates:**

|                |            |             |
|----------------|------------|-------------|
| Notification   | 01/30/2012 | 18:16 (ETZ) |
| Initial Update | 01/30/2012 | 18:41 (ETZ) |
| Latest Update  | 01/30/2012 | 18:41 (ETZ) |
| Final          |            |             |

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

**Cause Codes:**

**ISM:**

**Subcontractor Involved:** No

**Occurrence Description:** On January 24, 2012, a re-locatable power tap (RPT) located in a break room within Building 151 was discovered with the remnants of a broken plug still inserted into one of the outlets. It was determined that the metal prong and trailing wire originated from the narrow "hot phase" of the outlet and could have resulted in an electrical shock to anyone coming into contact with it.

There was no employee injuries associated with the discovery and the RPT was immediately removed from service. It is unknown how long the hazard existed; the RPT was located behind a microwave and hidden from view. Program management will interview employees in an attempt to determine the status of the item that was formerly connected to the RPT (which would be unusable now given the damage to the plug).

This occurrence report is being tracked in LLNL's Issues Tracking System, reference Assessment No. 33932.

**Cause Description:**

**Operating Conditions:** Normal

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

**Immediate Action(s):** The RPT was immediately removed from service.  
**FM Evaluation:** Submit the final occurrence report to the ORO by 03/06/2012.  
 Enter the final occurrence report into ORPS by 03/09/2012.

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

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

**Division or Project:** PLS

**Plant Area:** Site 200

**System/Building/Equipment:** Building 151

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

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:** 07D--Electrical Systems - Electrical Wiring  
 08H--OSHA Reportable/Industrial Hygiene - Safety Noncompliance  
 08J--OSHA Reportable/Industrial Hygiene - Near Miss (Electrical)  
 12C--EH Categories - Electrical Safety  
 14E--Quality Assurance - Work Process Deficiency

**HQ Summary:** On January 24, 2012, a metal prong and trailing wire that originated from the narrow "hot phase" of an outlet of a re-locatable power tap (RPT) were discovered behind a microwave in a break room in Building 151. This could cause an electric shock to anyone making contact. The RPT was immediately removed from service.

- Similar OR Report Number:**
1. DP-OAK--LLNL-LLNL-2000-0066
  2. NA--LASO-LANL-ESHSUPT-2004-0003
  3. NA--LASO-LANL-FIRNGHELAB-2006-0001
  4. NA--LASO-LANL-FIRNGHELAB-2006-0003
  5. SC--BSO-LBL-ALS-2009-0001
  6. SC-OAK--LBL-MSD-1993-0001

**Facility Manager:**

|       |  |
|-------|--|
| Name  | Dave Boercker                                  |
| Phone | (925) 422-4287                                 |
| Title | Deputy Associate Director-Ops, PLS directorate |

**Originator:**

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

**HQ OC Notification:**

| Date | Time | Person Notified | Organization |
|------|------|-----------------|--------------|
| NA   | NA   | NA              | NA           |

**Other Notifications:**

| Date       | Time        | Person Notified | Organization |
|------------|-------------|-----------------|--------------|
| 01/26/2012 | 13:18 (PTZ) | Rob Allen       | LEDO         |
| 01/26/2012 | 13:24 (PTZ) | Tracey Simpson  | ESH TL       |
| 01/26/2012 | 13:28 (PTZ) | Richard Scott   | NNSA LSO     |

**Authorized Classifier(AC):** Warren Rued      Date: 01/30/2012

**9)Report Number:** [NA--SS-SNL-CASITE-2012-0001](#) After 2003 Redesign  
**Secretarial Office:** National Nuclear Security Administration  
**Lab/Site/Org:** Sandia National Laboratories - Livermore  
**Facility Name:** SNL California Site  
**Subject/Title:** Contractor Drills into Energized Lighting Circuit Conduit While Installing Pipe Supports

**Date/Time Discovered:** 01/23/2012 08:15 (PTZ)

**Date/Time Categorized:** 01/23/2012 14:58 (PTZ)

**Report Type:** Update

**Report Dates:**

|                |            |             |
|----------------|------------|-------------|
| Notification   | 01/25/2012 | 17:07 (ETZ) |
| Initial Update | 02/03/2012 | 10:54 (ETZ) |
| Latest Update  | 02/07/2012 | 17:40 (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:** 4) Perform Work Within Controls

**Subcontractor Involved:** Yes  
Mesa Energy Systems (EMCOR)

**Occurrence Description:** On the morning of January 23, 2012, a construction contractor working on the B912 Computer Facility Mechanical Refurbishment project drilled into a concrete ceiling and made contact with an electrical conduit containing a live 120 volt lighting circuit. No injuries resulted. The contractor immediately stopped work when a spark was noticed. The contractor was operating a drill with a masonry bit to install pipe supports. The contractor was wearing hard hat, respirator, safety goggles and leather gloves.

On the morning of January 23, 2012, a construction contractor working on the B912 Computer Facility Mechanical Refurbishment project drilled into a concrete ceiling and made contact with an electrical conduit containing a live 120 volt lighting circuit. No injuries resulted. The contractor immediately stopped work when a spark was noticed. The contractor was operating a drill with a masonry bit to install pipe supports. The contractor was wearing hard hat, respirator, safety goggles and leather gloves.

UPDATE 2/2/2012

Documentation and review of the facts to date yielded the following additional information:

- The worker was operating under a Job Hazard Analysis (JHA) and it was in effect for the activity.
- A work control plan was in place and some of the elements of the plan included Sandia/CA issued permits, a contractor Injury & Illness Prevention Plan (Worker Health & Safety Plan), Pre-Task Planning Guide (PTG) and job site supervision & oversight.
- Drawings of the existing area were provided which identified embedded electrical systems. A survey confirmed embedded electrical systems. The worker was given prior instructions not to drill near the embedded electrical systems. The worker drilled in the vicinity and contacted the energy source.

**Cause Description:**

Critique/Fact Finding Performed: 01/23/2012

**Operating Conditions:**

Construction

**Activity Category:**

Construction

**Immediate Action(s):**

Stop work initiated. Non-Compliance report issued to contractor.

**FM Evaluation:**

EOC# 24136

This event scored a 550 on the EFCOG Electrical Severity Measurement Tool, as follows: Electrical Hazard Factor: 50 (50-230 VAC downstream of a 225 KVA transformer); Environment Factor: 0 (dry); Shock Proximity Factor: 10 (inside the prohibited approach boundary); Arc Flash Proximity Factor: 0 (single phase, 120 VAC); Thermal Proximity Factor: NA; No PPE mitigation; Injury Factor: 1 (no injury).

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:**

Yes.  
Before Further Operation? No  
By Whom: Causal Analysis Team  
By When: 03/08/2012

**Division or Project:**

8000/B912 Mechanical Refurbishment Project

**Plant Area:**

Other

**System/Building/Equipment:**

120VAC Lighting Circuit/B912/South Basement Equipment Room

**Facility Function:**

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

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:**

01N--Inadequate Conduct of Operations - Inadequate Job Planning (Other)  
07D--Electrical Systems - Electrical Wiring  
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 January 23, 2012, a construction contractor working on the Building 912 Computer Facility Mechanical Refurbishment project, drilled into a concrete ceiling

and made contact with an electrical conduit containing an energized 120-volt lighting circuit. The contractor was operating a drill with a masonry bit to install pipe supports. The contractor immediately stopped work when a spark was noticed. No injuries resulted. The contractor was wearing a hard hat, a respirator, safety goggles and leather gloves. A Stop Work was initiated and a Non-Compliance report was issued to the contractor.

**Similar OR Report Number:** 1. NA--SS-SNL-CASITE-2011-0004  
2. NA--SS-SNL-CASITE-2010-0008

**Facility Manager:**

|       |                     |
|-------|---------------------|
| Name  | John Garcia         |
| Phone | (925) 294-3822      |
| Title | 8510 Senior Manager |

**Originator:**

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

**HQ OC Notification:**

| Date | Time | Person Notified | Organization |
|------|------|-----------------|--------------|
| NA   | NA   | NA              | NA           |

**Other Notifications:**

| Date       | Time        | Person Notified | Organization |
|------------|-------------|-----------------|--------------|
| 01/23/2012 | 08:52 (PTZ) | EOC             | 4236         |
| 01/23/2012 | 13:54 (PTZ) | John Garcia     | 8510         |
| 01/23/2012 | 14:58 (PTZ) | FR              | DOE/SSO      |
| 01/23/2012 | 15:12 (PTZ) | Denise Koker    | 8500         |

**Authorized Classifier(AC):** John Garcia      Date: 01/24/2012

**10)Report Number:** [NA--YSO-BWXT-Y12SITE-2012-0003](#) After 2003 Redesign

**Secretarial Office:** National Nuclear Security Administration

**Lab/Site/Org:** Y12 National Security Complex

**Facility Name:** Y-12 Site

**Subject/Title:** Incorrect Job-Specific LO/TO Used on Diesel Fire Pump PM

**Date/Time Discovered:** 01/12/2012 11:30 (ETZ)

**Date/Time Categorized:** 01/12/2012 13:00 (ETZ)

**Report Type:** Notification/Final

**Report Dates:**

|                |            |             |
|----------------|------------|-------------|
| Notification   | 01/17/2012 | 17:17 (ETZ) |
| Initial Update | 01/17/2012 | 17:17 (ETZ) |
| Latest Update  | 01/17/2012 | 17:17 (ETZ) |
| Final          | 01/17/2012 | 17:17 (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:** During a 01/12/2012 Preventive Maintenance (PM) activity for a diesel fire pump, a step in the work sequence could not be followed as written. Upon further review, it was discovered the job-specific Lockout/Tagout (LO/TO) being used was not the one included in the work package but was another one for similar equipment. Work was immediately suspended and supervision was notified of the problem. There was no exposure to hazardous energy during the work activity.

A critique was held on 01/12/2012 to review this event. The review determined that while they had been trained, two of these workers had not performed this PM activity recently. The workers had obtained the incorrect job-specific LO/TO permit they used from a lockbox (a device used for applying multiple locks during a LO/TO activity) maintained on the service truck and believed it to be the correct one for the activity. Further discussion clarified that the job-specific LO/TO obtained from the truck applies to almost all of the engine-driven generators at the Y-12 Site but does not apply to this particular engine-driven fire pump. The workers had performed the work steps correctly, recorded the job-specific LO/TO number on the work package paperwork, and successfully completed other steps until they reached the step where information conflicted with the LO/TO. They correctly suspended work and notified the proper management and supervisory personnel.

**Cause Description:**

**Operating Conditions:** The adjacent facility was in a Limiting Condition of Operation.

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

**Immediate Action(s):**

- Work was suspended and supervision and management personnel were notified of the event.
- The Site Electrical AHJ and Industrial Safety were consulted and determined no hazardous energy was present during the work activity.
- 

The following compensatory measures have been put in place:

1. A directive from the FI&S Vice-President was issued on 01/17/2012 requiring a management review by one of four listed authorities for any LO/TO activity associated with the facility supported by the diesel fire pump prior to beginning the work activity. The reviews will continue until cancelled by the FI&S Vice-President (or designee).

2. A directive from the FI&S Vice-President was issued on 01/17/2012 requiring a management review of all Generator Maintenance Crew work activities by one of ten listed authorities. The reviews will be documented in the work packages and will continue until cancelled by the FI&S Vice-President (or designee).

3. A directive from the Director of FI&S Maintenance Execution was issued on 01/17/2012 requiring all craft personnel to remove all copies of Job Specific LO/TO permits from trucks, tool boxes, etc., and return them to their supervisor for disposition.

**FM Evaluation:**

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** No

**Division or Project:** FI&S

**Plant Area:** Protected Area

**System/Building/Equipment:** 9404-26B

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

**Corrective Action:**

**Lessons(s) Learned:**

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

**HQ Summary:** On January 12, 2012, workers used an incorrect job-specific lockout/tagout (LO/TO) to perform preventive maintenance on a diesel fire pump. The workers had performed the work steps correctly, recorded the job-specific LO/TO number on the work package paperwork, and successfully completed other steps until they reached the step where information conflicted with the LO/TO. They correctly suspended work and notified the proper management and supervisory personnel. There was no exposure to hazardous energy during the work activity.

**Similar OR Report Number:**

**Facility Manager:**

|       |                             |
|-------|-----------------------------|
| Name  | D. G. Muldrew               |
| Phone | (865) 576-2688              |
| Title | Systems Maintenance 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 |
|------------|-------------|-----------------|--------------|
| 01/12/2012 | 13:00 (ETZ) | R. S. Underwood | FI&S Dir     |
| 01/12/2012 | 13:15 (ETZ) | W. M. Crisp     | PSS          |
| 01/12/2012 | 13:17 (ETZ) | S. K. Little    | FI&S VP      |
| 01/12/2012 | 13:17 (ETZ) | Duty FR         | NNSA         |

**Authorized Classifier(AC):** C. J. Schemerhorn Date: 01/17/2012

**11)Report Number:** [NA--YSO-BWXT-Y12SITE-2012-0005](#) After 2003 Redesign

**Secretarial Office:** National Nuclear Security Administration

**Lab/Site/Org:** Y12 National Security Complex

**Facility Name:** Y-12 Site

**Subject/Title:** Incomplete Signatures on Single Source LO/TO

**Date/Time Discovered:** 01/25/2012 11:30 (ETZ)

**Date/Time Categorized:** 01/25/2012 13:05 (ETZ)

**Report Type:** Notification/Final

|                      |                |            |             |
|----------------------|----------------|------------|-------------|
| <b>Report Dates:</b> | Notification   | 01/26/2012 | 17:05 (ETZ) |
|                      | Initial Update | 01/26/2012 | 17:05 (ETZ) |
|                      | Latest Update  | 01/26/2012 | 17:05 (ETZ) |
|                      | Final          | 01/26/2012 | 17:05 (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:** On January 25, 2012, during a review of a hoist Preventative Maintenance (PM) work package from another event, it was discovered that the single source Lockout/Tagout (LO/TO) form in the package for the work already performed had been correctly signed by the Issuing Authority (IA), but the second signature by the Service Supervisor (SS) or Authorized Employee (AE) had not been completed. Further checks determined another similar Single Source LO/TO performed for a previous work activity that same day was also lacking the second signature. This is a failure to follow the proscribed hazardous energy control process.

A follow-on review determined the hold points in the work packages for applying the LO/TOs had been checked and signed, and the LO/TOs were executed successfully. No personnel were placed at risk or exposed to any energy sources during the activities.

This problem will be investigated further but does not currently appear to be widespread.

**Cause Description:**

**Operating Conditions:** The crane was out of service for the PM activity.

**Activity Category:** Maintenance

**Immediate Action(s):** As a result of the previous event, all crane and hoist PM activities were suspended pending further review. This activity also suspended the application of LO/TOs for the same work crew.

**FM Evaluation:**

**DOE Facility Representative Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** No  
**Division or Project:** FI&S  
**Plant Area:** Property Protected  
**System/Building/Equipment:** 9201-1  
**Facility Function:** Balance of Plant - Infrastructure (Other Functions not specifically listed in this Category)

**Corrective Action:**

**Lessons(s) Learned:**

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

**HQ Summary:** On January 25, 2012, during a review of a hoist Preventative Maintenance work package from another event, it was discovered that the single source Lockout/Tagout (LO/TO) form in the package for the work already performed had been correctly signed by the Issuing Authority, but the second signature by the Service Supervisor or Authorized Employee had not been completed. Further checks determined another similar Single Source LO/TO that was performed for a previous work activity that same day was also lacking the second signature. A follow-on review determined the hold points in the work packages for applying the LO/TOs had been checked and signed, and the LO/TOs were executed successfully. No personnel were placed at risk or exposed to any energy sources during the activities.

**Similar OR Report Number:**

**Facility Manager:**

|       |                                   |
|-------|-----------------------------------|
| Name  | F. Wade Ray                       |
| Phone | (865) 576-8287                    |
| Title | Director of Maintenance Execution |

**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 |
|------------|-------------|-----------------|--------------|
| 01/25/2012 | 13:14 (ETZ) | P. F. Chapman   | Safety       |
| 01/25/2012 | 13:15 (ETZ) | R. N. Hughes    | PSS          |
| 01/25/2012 | 13:15 (ETZ) | R. S. Underwood | FI&S Dir     |
| 01/25/2012 | 13:25 (ETZ) | S. K. Little    | FI&S VP      |

|            |             |         |      |
|------------|-------------|---------|------|
| 01/25/2012 | 13:25 (ETZ) | Duty-FR | NNSA |
|------------|-------------|---------|------|

**Authorized Classifier(AC):** J. A. Nations      **Date:** 01/26/2012

**12)Report Number:** [SC--BSO-LBL-ENG-2012-0001](#) **After 2003 Redesign**  
**Secretarial Office:** Science  
**Lab/Site/Org:** Lawrence Berkeley National Laboratory  
**Facility Name:** Engineering Division  
**Subject/Title:** Employee Exposed to Non-Hazardous Electric Energy - No Injuries  
**Date/Time Discovered:** 01/25/2012 15:50 (PTZ)  
**Date/Time Categorized:** 01/25/2012 17:47 (PTZ)  
**Report Type:** Notification  
**Report Dates:**

|                |            |             |
|----------------|------------|-------------|
| Notification   | 01/27/2012 | 18:51 (ETZ) |
| Initial Update |            |             |
| Latest Update  |            |             |
| Final          |            |             |

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

**Cause Codes:**  
**ISM:** 5) Provide Feedback and Continuous Improvement  
**Subcontractor Involved:** No  
**Occurrence Description:** On 01/25/2012 at approximately 1550 hours, an LBNL Engineering Division (END) employee received a low voltage (28 volts DC) electrical shock from the TIG welder located in Building 2 Room 126.

The employee had been using a Miller Syncrowave 250DX TIG welder over the past two days welding component pieces together. While pressing the pedal to check the argon flow on the machine, he received a "buzz" through the torch handle. The employee reported the incident to his supervisor who advised him to go to the Lab's Health Services (HS) for evaluation. The on-site clinic was closed for the day. The employee advised the supervisor he was ok and was going home since his work day had ended.

The welder was locked out and tagged out for further evaluation.

**Cause Description:**  
**Operating Conditions:** Indoors, dry, lighted  
**Activity Category:** Normal Operations (other than Activities specifically listed in this Category)  
**Immediate Action(s):** - The employee reported the incident to the supervisor.

- The employee went to the Lab's Health Services.
- The TIG welder was locked out and tagged out.

**FM Evaluation:**

- The rated output of the equipment is 28 volts DC Miller Syncrowave 250DX TIG welder.
- The incident was initially categorized as a 2E (hazardous electrical energy control) event. Upon further investigation, the LBNL electrical safety engineer determined that the Electric Severity (ES) score is 12. Based on the low ES score coupled with the voltage, 28 volts DC, LBNL determined this was a non-hazardous electrical energy source.

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:**

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

**Division or Project:**

Engineering Division

**Plant Area:**

B2-126

**System/Building/Equipment:**

Building 2 Room 126- TIG welder

**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 January 25, 2012, an LBNL Engineering Division employee received a low voltage (28 volts DC) electrical shock from the TIG welder located in Building 2 Room 126. The employee had been using a Miller Syncrowave 250DX TIG welder over the past two days welding component pieces together, while pressing the pedal to check the argon flow on the machine he received a "buzz" through the torch handle. The employee reported the incident to his supervisor who advised him to go to the Lab's Health Services for evaluation. The on-site clinic was closed for the day, the employee advised the supervisor he was ok and was going home since his work day had ended. The welder was locked out and tagged out for further evaluation.

**Similar OR Report Number:**

**Facility Manager:**

|       |                   |
|-------|-------------------|
| Name  | Kem Robinson      |
| Phone | (510) 486-6327    |
| 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 |
|------------|-------------|-----------------|--------------|
| 01/25/2012 | 17:58 (PTZ) | Mary Gross      | BSO          |
| 01/25/2012 | 17:58 (PTZ) | Kevin Hartnett  | BSO          |
| 01/25/2012 | 17:58 (PTZ) | Duty Officer    | BSO          |

**Authorized Classifier(AC):**

**13)Report Number:** [SC--BSO-LBL-ESD-2012-0001](#) After 2003 Redesign

**Secretarial Office:** Science

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

**Facility Name:** Earth Sciences Division

**Subject/Title:** LOTO Procedure Violation in B64 - No Injuries

**Date/Time Discovered:** 01/31/2012 11:30 (PTZ)

**Date/Time Categorized:** 01/31/2012 12:55 (PTZ)

**Report Type:** Notification/Final

**Report Dates:**

|                |            |             |
|----------------|------------|-------------|
| Notification   | 02/02/2012 | 20:21 (ETZ) |
| Initial Update | 02/02/2012 | 20:21 (ETZ) |
| Latest Update  | 02/02/2012 | 20:21 (ETZ) |
| Final          | 02/02/2012 | 20:21 (ETZ) |
| Revision 1     | 02/02/2012 | 20:33 (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  
Machine Tool Services

**Occurrence Description:** At approximately 1130 hours on 01/31/2012, EH&S employees became aware of a possible LOTO procedure violation.

An Earth Sciences Division (ESD) researcher drafted a Subcontractor Job Hazard Analysis (SJHA) on 01/30/2012 for a Machine Tool Services worker to come on site for equipment commissioning work. The equipment consists of a lathe and a mill and is located inside a interlock system in Building 64 Machine Shop (Room 161 and 163). The Lab's Facilities personnel had already installed and connected the equipment to the electric source earlier. The vendor worker was to conduct tests and determine that the equipment is fully functional. On the SJHA draft, the researcher's answer to the question regarding electrical work stated that "contractor will check voltage on machines themselves".

On 01/31/2012, while checking the SJHA draft, the Lab's SJHA Program Manager noticed that the work involved voltage testing. He contacted EH&S electrical safety engineer to confirm LBNL procedures and requirements for this task. He then contacted the researcher by phone to obtain more information regarding the work to be performed. While on the phone, he found out that the vendor worker was already onsite performing the work. The SJHA Program Manager immediately ordered stop work and went to the work site with the electrical safety engineer. When they arrived at the scene, they discovered that the researcher had opened the circuit breaker to de-energize the equipment for the vendor, but the vendor had not applied a lock and tag. On the interlock system panel, a warning sign noted "Danger, Electrocutation Hazard-Disconnect power before servicing machine or panel...". Another sign below the panel "Main Power" switch noted "To lock-out machine turn off main power and properly install suitable lock-out device". The vendor worker had indicated that he did not think he needed to perform lock out/tag out (LOTO) on this task. The panel warning signs indicated otherwise. The LOTO Permit process would have identified if the lock should have been applied at the equipment "Main Power" switch or at the building panel circuit breaker.

In addition to the above scope of work, the vendor needed to perform equipment testing which includes voltage testing on the energized 208 volts equipment. LBNL procedures require an 'Energized Electrical Work Permit' to conduct voltage testing that has potential electrical hazards of 50 or more volts. The vendor did not obtain a work permits (LOTO and EEWP) for that day's work on the mill, nor did he obtain a permit to work on the lathe the day before.

The work was stopped until a qualified electrical worker from Lab's Facilities Division was available to assist with the rest of the equipment commission process.

**Cause Description:**

**Operating Conditions:**

Indoors, lighted, dry

**Activity Category:**

Facility/System/Equipment Testing

**Immediate Action(s):**

- Upon learning over the phone that the vendor worker has already started work without permit, EH&S SJHA Program Manager immediately ordered stop-work.

- EH&S electric safety engineer and the SJHA Program Manager both visited the site following the stop-work order to conduct further investigation.

**FM Evaluation:**

- The Electric Severity (ES) score for this equipment / task is 110, medium risk.

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:**

No

**Division or Project:**

Earth Sciences Division (ESD)

**Plant Area:**

B64-0161

**System/Building/Equipment:** Building 64 Room 161 Lathe & Mill

**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 January 31, 2012, EH&S employees became aware that a subcontractor was performing electrical work on a lathe and mill in Building 64 Machine Shop without a required energized electrical work permit (EEWP) or lockout/tagout (LOTO) permit. A researcher had opened the circuit breaker to de-energize the equipment for the subcontractor, but the subcontractor had not applied a lock and tag, even though a warning sign on the interlock system panel warned "Danger, Electrocution Hazard-Disconnect power before servicing machine or panel." Work was immediately stopped.

**Similar OR Report Number:**

**Facility Manager:**

|       |                   |
|-------|-------------------|
| Name  | Donald J. DePaolo |
| Phone | (510) 486-7560    |
| 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 |
|------------|-------------|------------------|--------------|
| 01/31/2012 | 13:00 (PTZ) | BSO Duty Officer | BSO          |
| 01/31/2012 | 13:00 (PTZ) | Kevin Hartnett   | BSO          |
| 01/31/2012 | 13:00 (PTZ) | Mary Gross       | BSO          |

**Authorized Classifier(AC):**

**14)Report Number:** [SC-ORO--ORNL-X10HFIR-2012-0002](#) After 2003 Redesign  
**Secretarial Office:** Science  
**Lab/Site/Org:** Oak Ridge National Laboratory  
**Facility Name:** High Flux Isotope Reactor  
**Subject/Title:** Discovery of an uncontrolled electrical hazardous energy source in terminal box 27 (TB27)  
**Date/Time Discovered:** 01/13/2012 19:44 (ETZ)  
**Date/Time Categorized:** 01/13/2012 22:21 (ETZ)  
**Report Type:** Update

Attachment 2

**Report Dates:**

|                |            |             |
|----------------|------------|-------------|
| Notification   | 01/18/2012 | 15:23 (ETZ) |
| Initial Update | 02/21/2012 | 11:09 (ETZ) |
| Latest Update  | 02/21/2012 | 11:10 (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:**

3) Develop and Implement Hazard Controls

**Subcontractor Involved:**

No

**Occurrence Description:**

On Friday, January 13, 2012, at 1906 hours, while the reactor was shut down, a fire alarm actuated due to smoke detection in room G-14 on the ground floor of building 7900. The ORNL fire department responded and determined that electrical arcing on a single circuit in TB27 was the source of the smoke in the room. The fire department obtained the assistance of an electrician to disconnect the circuit and stop the electrical arcing.

Earlier in the week, TB27 had been opened to allow for the replacement of conductors to a primary heat exchanger cell. Due to calcium deposits, wire pulling was difficult. A standard de-calcification mixture of water and vinegar was introduced into the conduit to dissolve deposits and free the wire. (These are the original wires and have never been replaced.) Initial investigation revealed that the solution dripped from the conduit onto one of the terminal blocks inside TB27 that was not associated with the conductor replacement.

Prior to initiation of the work, a lockout/tagout permit was prepared and executed to de-energize the conductors that were being removed and to de-energize all other circuits in TB27. Initial investigation revealed that a 120 volt circuit located on that terminal block had not been de-energized by the lockout/tagout, causing the electrical arcing. This energized circuit constituted a discovery of an uncontrolled electrical hazardous energy source.

The ORNL Laboratory Shift Superintendent was notified at 2221 hours, and the event was categorized as a 2 E(2) - Any unexpected discovery of an uncontrolled electrical hazardous energy source (e.g., live electrical power circuit, etc.).

There were no environmental, health or safety impacts as a result of this event.

**UPDATE:**

Occurrence submittal date was changed from 02/27/2012 to match the NTS Reporting Date of 03/30/2012 . This adjustment was approved by the DOE Facility Representatives.

**Cause Description:**

**Operating Conditions:**

Reactor was in mid-cycle outage

Attachment 2

**Activity Category:** Shutdown

**Immediate Action(s):** Access to room G-14 was limited until the circuit was de-energized and all circuits in TB27 were verified de-energized.

A critique was conducted on January 14, 2012.

A Shift Order was issued restricting all HFIR work under existing lockout/tagouts until an additional independent review was completed.

**FM Evaluation:** Investigation of the discovery of the uncontrolled electrical hazardous energy source in terminal box 27 is in progress.

**DOE Facility Representative**

**Input:**

**DOE Program Manager**

**Input:**

**Further Evaluation is Required:** Yes.  
 Before Further Operation? No  
 By Whom: Ron Crone  
 By When: 03/30/2012

**Division or Project:** Research Reactors Division

**Plant Area:** Building 7900

**System/Building/Equipment:** (7900) HIGH FLUX ISOTOPE REACTOR

**Facility Function:** Category "A" Reactors

**Corrective Action:**

**Lessons(s) Learned:**

**HQ Keywords:** 01I--Inadequate Conduct of Operations - Safety System Actuation/Evacuation  
 01M--Inadequate Conduct of Operations - Inadequate Job Planning (Electrical)  
 03C--Fire Protection and Explosives Safety - Facility Fire  
 07D--Electrical Systems - Electrical Wiring  
 12C--EH Categories - Electrical Safety  
 14E--Quality Assurance - Work Process Deficiency

**HQ Summary:** On January 13, 2012, while the reactor was shut down, a fire alarm actuated in room G-14 on the ground floor of Building 7900 due to smoke produced by electrical arcing on an energized 120-volt terminal block. The fire department responded and de-energized the circuit, which stopped the arcing. An initial investigation determined that the arcing was caused by the dripping of a water/vinegar solution, used to loosen electrical conductors stuck in a conduit earlier in the week, onto an energized terminal block that should have been de-energized under a lockout/tagout permit.

**Similar OR Report Number:**

**Facility Manager:**

|       |                                     |
|-------|-------------------------------------|
| Name  | Crone, Ron                          |
| Phone | (865) 576-5563                      |
| Title | Research Reactors Division Director |

**Originator:**

|       |                  |
|-------|------------------|
| Name  | PEHRSON, PAUL B. |
| Phone | (865) 576-7929   |

|       |                              |
|-------|------------------------------|
| Title | OCCURRENCE REPORTING MANAGER |
|-------|------------------------------|

**HQ OC Notification:**

| Date | Time | Person Notified | Organization |
|------|------|-----------------|--------------|
| NA   | NA   | NA              | NA           |

**Other Notifications:**

| Date       | Time        | Person Notified          | Organization |
|------------|-------------|--------------------------|--------------|
| 01/13/2012 | 21:20 (ETZ) | Doug Reed                | DOE ORNL     |
| 01/13/2012 | 22:21 (ETZ) | Lab Shift Superintendent | ORNL LSS     |
| 01/13/2012 | 23:28 (ETZ) | Michele Branton          | DOE ORNL     |
| 01/13/2012 | 23:28 (ETZ) | Johnny Moore             | DOE ORNL     |

**Authorized Classifier(AC):**

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