

Occurrence Report

After 2003 Redesign

Lawrence Livermore Nat. Lab. (BOP)

(Name of Facility)

Laboratory - Research & Development

(Facility Function)

Lawrence Livermore National Lab.

Lawrence Livermore National Lab.

(Site)

(Contractor)

Name: William Goldstein**Title:** Associate Director, Physical Sciences Directorate**Telephone No.:** (925) 422-2515

(Facility Manager/Designee)

Name: Freeman, Jeffrey W**Title:** OCCURRENCE REPORTING**Telephone No.:** (925) 424-6787

(Originator/Transmitter)

Name:**Date:**

(Authorized Classifier (AC))

1. Occurrence Report Number: NA--LSO-LLNL-LLNL-2008-0001

Building 174 Electrical Shocks

2. Report Type and Date: FINAL

	Date	Time
Notification:	01/09/2008	19:14 (ETZ)
Initial Update:	01/09/2008	20:24 (ETZ)
Latest Update:	02/06/2008	12:50 (ETZ)
Final:	02/06/2008	12:50 (ETZ)

3. Significance Category: 3**4. Division or Project:** S&T**5. Secretarial Office:** NA - National Nuclear Security Administration**6. System, Bldg., or Equipment:** 174

7. UCNI?: No

8. Plant Area: Site 200

9. Date and Time Discovered: 01/08/2008 10:30 (PTZ)

10. Date and Time Categorized: 01/08/2008 11:30 (PTZ)

11. DOE HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

12. Other Notifications:

Date	Time	Person Notified	Organization
01/08/2008	12:08 (PTZ)	Allen Macenski	ESH&Q
01/08/2008	11:58 (PTZ)	Becky Failor	LEDO/BU
01/08/2008	12:10 (PTZ)	Erik Begg	NNSA/LSO
01/08/2008	12:06 (PTZ)	David Prokosch	ES&H TL
01/08/2008	12:03 (PTZ)	Rex Beach	LEDO

13. Subject or Title of Occurrence:

Building 174 Electrical Shocks

14. Reporting Criteria:

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

15. Description of Occurrence:

On January 8, 2008 at approximately 10:00 a.m., a worker received a shock in Building 174 while removing a plug from a hard-wired, permanently installed power strip. The power strip was located underneath a laser optic table and in close proximity to experimental equipment which led the worker to unplug the apparatus without maintaining visual contact with the plug. While working the plug loose, the worker's fingers came into contact with the exposed metal prong.

On December 18, 2007, a similar incident occurred within the same facility when a worker received a shock while attempting to plug a low-voltage power supply into the same type of power strip. Due to the configuration of the power strip (the location underneath the table and the narrowness of the strip), only one of the prongs was inserted correctly. The worker's finger touched the second prong which was outside the power strip.

Due to the similarity of incidents, on January 8, 2008 it was determined that a Occurrence Report should be filed as a Management Concern.

16. Is Subcontractor Involved? No

17. Operating Conditions of Facility at Time of Occurrence:N/A

18. Activity Category:03 - Normal Operations (other than Activities specifically listed in this Category)

19. Immediate Actions Taken and Results:

Work in the building 174 lab was halted after the December 18th incident. Afterwards, management began to review possible alternatives to the current configuration. Notification was made to personnel working in the lab about the possible concern when connecting items to the power strips. A similar response was made after the January 8th incident. On December 18th, the LLNL Fire Department was contacted because the incident occurred after normal business hours. A portable EKG test was performed and indicated no adverse effects. The worker was subsequently referred to LLNL's onsite Health Services. After the January incident, the worker was immediately transported to Health Services and evaluated with an EKG test, which also showed no injury.

20. ISM:

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

21. Cause Code(s):

A1B5C01 - Design/Engineering Problem; Operability of Design / Environment LTA; Ergonomics LTA
A3B1C03 - Human Performance Less Than Adequate (LTA); Skill Based Errors; Incorrect performance due to mental lapse
-->couplet - A1B5C02 - Design/Engineering Problem; Operability of Design / Environment LTA; Physical environment LTA

22. Description of Cause:

A1B5C02 Design/Engineering Problem, Physical environment. The installation of the power strips underneath the laser optic tables created a situation where employees were forced to connect/disconnect plugs in a potentially unsafe manner.

A3B1C03 Human Performance, Incorrect performance due to mental lapse. In both cases, the employee should have used better technique to connect/disconnect the electrical equipment. Each neglected to visually confirm that they were connecting/disconnecting the plug correctly.

Couplet: A1B5C01 Ergonomics less than adequate. Because the configuration of the power strips was less than optimal, the employees failed to connect/disconnect the electrical equipment properly. A better layout of the power strips would have prevented or at least minimized the potential for an electrical shock.

23. Evaluation (by Facility Manager/Designee):

Soon after the incident, the LLNL Electrical Safety Advisory Board (ESAB) met to discuss the potential hazards with the power strips and their frequent installation underneath tables. It was recommended that these strips be relocated where feasible. If not feasible, it was suggested that signs be affixed to the tables alerting employees of the potential hazard. An immediate memo was sent to all workers within the directorate warning them of the potential hazards with the configuration. This was supplemented by the issuance of a LLNL Lessons Learned which reiterated the recommendations of the ESAB. Finally, the LLNL Deputy Director issued a memo instructing all LLNL work groups to review their facilities and identify where similar conditions exist. The recommendation to replace where practical or install signs was reinforced.

A review of past Lessons Learned revealed that this same condition was identified in 2003 which prompted the preparation of a LLNL Lessons Learned which only suggested that programs consider replacing the narrow strips and urged employees not to plug or unplug devices into power strips unless they could maintain visual contact with the plug and power strip.

LLNL management has identified this occurrence as a potential problem throughout LLNL. The Deputy Director's memo has extended corrective actions to all LLNL Directorates with the expectation that they review their work areas and take remedial action as necessary to prevent a recurrence.

24. Is Further Evaluation Required?: No

25. Corrective Actions

(* = Date added/revised since final report was approved.)

1.	Identify causes of the event/condition - A causal analysis will be conducted to determine why the shocks occurred.		
	Target Completion Date: 02/21/2008	Completion Date: 01/10/2008	
2.	Perform extent of condition review - An extent of condition review will be conducted to determine how prevalent the problem is. All laboratory space will be examined and the number and location of the tables with poorly configured power strips will be identified.		
	Target Completion Date: 03/01/2008	Completion Date: 02/05/2008	
3.	Correct problematic conditions - Develop a plan to address conditions where poorly configured power strips may pose a hazard. For those instances where it is not feasible to correct or constraints prevent an immediate fix, signs will be placed in a prominent location warning employees of the hazard.		
	Target Completion Date: 04/01/2008	Completion Date:	

26. Lessons Learned:

The placement of these narrow power strips on the underside of laser optic tables, with the outlets facing the floor, played a large role in both shocks. There may be a tendency by employees to connect/disconnect electrical items by "feel" rather than with sight. The placement of some of the strips (i.e., against walls, adjacent to experimental equipment, etc.) may also present a problem for employees by making correct connection/disconnection difficult. Furthermore, the narrowness of the strips can contribute to an unsafe condition by allowing the two-pronged style plugs to be incorrectly inserted. LLNL Programs should review their laser optic tables to determine if potentially hazardous conditions exist. Such conditions should be remedied (i.e., relocate or remove some power strips) as circumstance dictate and resources allow. For those power strips that are not deemed feasible to relocate, signs should be posted warning employees of the potential danger.

27. Similar Occurrence Report Numbers:

N/A

28. User-defined Field #1:

No Injury

29. User-defined Field #2:

No property damage

30. HQ Keyword(s):

01A--Inadequate Conduct of Operations - Inadequate Conduct of Operations (miscellaneous)
01Q--Inadequate Conduct of Operations - Personnel error
08A--OSHA Reportable/Industrial Hygiene - Electrical Shock
11F--Other - Inadequate Design
12C--EH Categories - Electrical Safety
14C--Quality Assurance - Quality Improvement Deficiency
14E--Quality Assurance - Work Process Deficiency
14F--Quality Assurance - Design Deficiency

31. HQ Summary:

On January 8, 2008, a worker received a shock in Building 174 while removing a plug from a hard-wired, permanently installed power strip. The power strip was located underneath a laser optic table and in close proximity to experimental equipment which led the worker to unplug the apparatus without maintaining visual contact with the plug. While working the plug loose, the worker's fingers came into contact with the exposed metal prong. The worker was immediately transported to Health Services and evaluated with an EKG test, which also showed no injury. [This report also documents a very similar event which occurred on December 18, 2007, where a worker at the same facility received a shock while attempting to plug a low-voltage power supply into the same type of power strip, also without injury.]

32. DOE Facility Representative Input:

33. DOE Program Manager Input:

34. Approvals:

Approved by: William Goldstein, Facility Manager/Designee

Date: 02/06/2008

Telephone No.: (925) 422-2515

