



Hot Plate Switch Failure

Lawrence Berkeley National Laboratory Lessons Learned

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Concern Statement: A laboratory hot plate's power switch failed, resulting in a fire in the fume hood. Although the switch position, switch detent, and indicator light demonstrated that the power was off, electrical power continued to flow to the heating elements.

Applicable to: Employees who work with laboratory heating devices, such as hot plates and mantles.

Incident: A researcher switched off a hot plate off by placing the dial at "0." The researcher noted that the switch "clicked" into the off position and the power indicator light extinguished. However, the heating coils remained energized, eventually overheating a beaker of oil on the hot plate and initiating a fire in the fume hood.

Cause: When placed in the off position, the power switch failed to de-energize the hot plate, and the indicator light did not show that power was still provided to the heating elements. The hot plate/stirrer was a Corning model PC 420. Although fires in laboratories involving hot plates are not uncommon, most fires occur when heating operations are unattended or the user forgets to turn off the hot plate. In this incident, the hot plate continued heating after three indicators signaled that it was turned off, an insidious and unusual failure. Very similar events occurred at Lawrence Livermore National Lab and Pacific Northwest National Lab in 2003.



Defective Hot Plate



Damaged Fume Hood

Recommended Actions

The following recommendations are provided to reduce the chances of a similar failure and fire in laboratory operations:

- Periodically test the function of the "off switch" on each hot plate and heating mantle to verify that it works and the heating device quickly cools. Any unit that fails this test should be taken out of service immediately and reported to EH&S for further evaluation.
- Avoid intentional unattended use of hot plates and heating mantles when possible.
- If you must have an unattended heating operation, think out your safety plan. It may require a feedback system that will detect overheating and deenergise the heater before a fire erupts.

Further Information

Assistance or questions regarding this lessons learned may be directed to Gary Piermattei (x6370) or Rick Kelly (x4088).

For other lessons learned, go to: http://www.lbl.gov/ehs/html/lessons_learned.htm

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