



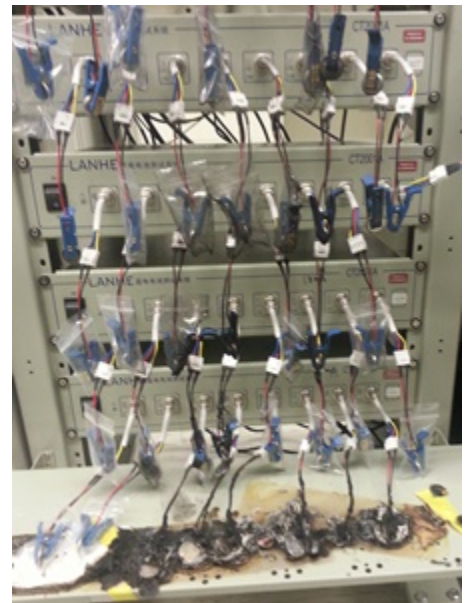
Coin cell battery fails, continues to receive low voltage, causes fire in PSL

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Staff member smelled odd odor, investigated, but found no fire

Summary

A staff member working in the basement of the Physical Sciences Laboratory smelled an odor and proactively walked through several laboratories looking for the source. He finally came to a lab where he identified the source. He and another staff member searched and discovered burnt paper towels and coin cell batteries sitting on a metal sample tray of a battery bank test station. Finding no smoke or fire at the time, the staff member responded correctly by contacting the cognizant space manager (CSM) and the event was reported to the PNNL Security Operations Center (375-2400). **Lessons Learned:** When using battery test stands for testing coin cell batteries, remember to verify that software safety limits are set and avoid lining sample trays with paper towels or combustible materials.



Details

Data from the test station's software showed that the problematic battery failed about 90 hours prior to the fire. Data showed that the voltage and current safety limits were not set and, therefore, after the battery failed, it continued to receive low voltage and current, increasing the battery temperature, causing the battery's seal to open, exposing the sodium electrode to air and igniting the sodium and the paper towels that had been placed on the tray as extra assurance against conductivity on the metal tray.

The data also revealed that two-thirds of the cell batteries checked did not have the software limits set to limit both the voltage and current. After further review, it was discovered that the LANHE battery-test-stand software does not come from the manufacturer with automatic, preset safety limits like the other battery test stands in use in the laboratory.

Although paper towels have not been used for lining metal sample trays in the past, they may have been used as extra assurance against possible conductivity on the metal tray.

Lessons Learned

Monitoring battery performance more closely might have provided a warning for the failed battery and the ignition of the paper towels. It was important to recognize that the LANHE battery-test-stand software did not automatically set the safety

limits (to turn off the voltage) like the other battery test stands used at PNNL. There was no need to add paper towels to reduce conductivity on the metal tray, as the trays are already painted with non-conductive paint.

Research staff members

- **Verify that software safety limits are set**, either by the manufacturer or manually before testing.
- **Avoid using paper towels or any other combustible material as insulation** for batteries being tested on metal trays. The metal trays that come with these test stands are already sufficiently insulated.
- **Contact your CSM or call 375-2400** if you smell smoke or encounter any other abnormal condition.
- **Know the correct response to a fire.** If there is a small fire you can put out by pulling a plug, isolating the fuel source or smothering the flames, do so. Then call 375-2400 and watch the area until help arrives. If you need a fire extinguisher or the fire is too large to put out, pull the fire alarm first. Then use the extinguisher or exit the building and call 375-2400. Stay in the staging area and explain the situation to the building emergency director.