

University of Hawaii Lab Explosion

Background

In March 2016, a postdoctoral researcher working at the University of Hawaii's Hawaii Natural Energy Institute (HNEI) was preparing a mixture of hydrogen, oxygen, and carbon dioxide when an electrostatic discharge ignited the gas mixture. The resulting explosion completely amputated the researcher's arm and caused over \$800,000 in damages to the research lab. As a result of an investigation by the Hawaii Occupational Safety and Health Division (HIOSH), the University of Hawaii was fined \$69,300 for multiple violations of Hawaii Administrative Rules (HAR). The researcher injured in the March 2016 has since filed a negligence lawsuit against the University of Hawaii and Principal Investigators responsible.

Timeline

October 21, 2015 – Post-doc invited by UofH biofuels lab to join research team involving high-pressure hydrogen/oxygen

March 16, 2016 – Same post-doc is injured in a lab explosion when a secondary gas tank explodes

March 30, 2016 – Fire department investigation suggests explosion was triggered by electric spark from a gauge that was not designed for the scope of operation (not Intrinsically Safe). Also identifies several “near-miss” events.



Timeline

April 4, 2016 – UofH announces that University of California Center for Laboratory Safety will conduct an independent investigation of incident

July 1, 2016 – UC Center for Laboratory Safety releases incident report. Identifies multiple “near-miss” scenarios that were unreported/un-investigated. Identifies electrostatic shock as cause of explosion (researcher, tank, gas supply all ungrounded).



Timeline

September 23, 2016 – HIOSH cites UofH with 15 infractions and levies a fine of \$115,500.

- Citations include: Failure to eliminate or reduce hazards; failure to train employees, failure to inspect workplaces; failure to train supervisors; failure to maintain Chemical Hygiene Plan (CHP)

October 12, 2016 – HIOSH fines reduced by 40% with final fine levied at \$69,300.

January 9, 2017 – Injured person files negligence lawsuit against the UofH and lab supervisors.



Analysis

Near-Misses

- Injured person and at least one other lab researcher had experienced small explosions prior to incident in question. (HFD report)
- Injured person informed Principal Investigator (PI) of explosion and concerns and was told “Don’t worry about it.” (HFD report)
- Gloves to prevent static discharge were recommended, but recommendation was not followed (UC report)

Contributing Factors (UC Report)

- Weak laboratory safety inspections
- No enforcement or review of Lab CHP
- Lack of policies addressing regular training beyond that of initial hire
- Poor Standard Operating Procedures (SOP)
- Lack of understanding in regards to and an underestimation of Personal Protective Equipment protections provided
- Lack of safety accountability and oversight due to ineffective organization

Key Points

The University of Hawaii failed to learn lessons learned from similar, high-profile incidents in other academic research laboratories.

Accidents are almost always preceded by multiple near-misses.

Accidents almost always have indicators of unsafe actions and high risk behavior that is clear to outside observers. However, high risk behavior is usually invisible to active participants due to a bias phenomenon called normalization of deviance. “Perceived familiarity can shift...cautiousness to complacency.”

Individuals that are new to an organization or entities outside of an organization are the most effective in identifying problems and high risk behavior. However, new individuals are the most likely to be ignored when raising safety concerns.

Questions?
