UF Environmental Health and Safety
UNIVERSITY of FLORIDA

LESSON LEARNED

Chemical Safety

WHAT HAPPENED?

CHEMICAL BURNS FROM CONTACT WITH PHENOL

A graduate student was working with phenol for the first time in a cluttered fume hood. During the clean-up process, the student removed their lab coat, causing residues of phenol crystals to come in contact with their arm. About an hour later, the student noticed blisters along their arm and near their elbow. The student then contacted their Principal Investigator (PI). Unfortunately, the PI did not know the proper procedure for seeking medical attention. Furthermore, the student had not received proper training, and there was no Standard Operating Procedure (SOP) available for handling phenol.

POTENTIAL HAZARDS

OVERVIEW

When pure, phenol is a white crystalline solid that is volatile and mildly acidic with the molecular formula C_6H_5OH. The commercial product is a liquid. Phenol requires careful handling as it can cause chemical burns. It is a precursor to many materials and is primarily used to synthesize plastics and related materials. Phenol and its chemical derivatives are essential for production of polycarbonates, epoxies, explosives, nylon, detergents, and numerous pharmaceutical drugs.

WHAT WENT RIGHT?

The incident was reported in a timely manner to the PI and then EHS.

WHAT CORRECTIVE ACTIONS WERE TAKEN?

- The PI was required to create a formal and comprehensive laboratory SOP for working with phenol and to review the information with lab personnel.
- All members of the lab, including the PI, were required to complete the chemical hygiene plan training.
- New lab coats, as well as gloves compatible with phenol, were required to be ordered.
- A formal process of communication was required to remind all lab staff to wear applicable PPE during phenol usage.
- A bottle of pharmaceutical-grade polyethylene glycol (PEG) 300/400 was required to be included in the first aid kit.

HOW CAN INCIDENTS LIKE THIS BE PREVENTED?

- **Fume Hood:** Keep the hood clean. Remove unneeded experimental glassware and clutter.
- **SOP:** Develop and train staff in the SOPs for all hazardous chemicals used in the lab. SOPs should include information on safe handling, spill response, and emergency contact numbers. All hazardous chemicals should have a lab specific SOP.
- **Training:** Lab personnel training is a key to preventing injuries and for emergency procedures. Before working with phenol make sure you understand the process. Always pay close attention to all aspects of an experiment in progress.
- **Selecting and Enforcing PPE Use:** Labs must select and enforce the correct PPE. Lab coat, safety glasses, and compatibles gloves. (Working with stock with concentrated solution, utility grade neoprene or butyl gloves. For incidental contact with dilute solutions of <10% phenol, the minimal requirement is double exam-style nitrile or thicker (8mil) nitrile gloves)
- **First aid solution:** When working with phenol make sure to have available polyethylene glycol (PEG) 300 or 400.
- **Readily Accessible Emergency Information**: Ensure that emergency procedures and contact information are clearly posted and easily accessible in all laboratory areas. Ensure all lab personnel are trained and updated on emergency procedures.
- **Working Alone Policy:** Create and review your 'work alone procedures' with your staff, especially when hazardous chemicals are involved.
- **When in doubt ask questions**: to your PI or EH&S Lab Safety. For additional information visit: www.ehs.ufl.edu