March 7, 2018

Hello Everyone,

I would like to share with you a recent safety incident that occurred on Saturday, February 24, 2018, and affected two labs in the FRNY new wing: FRNY 2153 and FRNY 1181.

Water supply plastic tube detached from condenser caused flooding of two labs:
Description: This incident happened during a crystallization experiment that requires the use of a jacketed tube condenser using water as cooling agent, attached to the crystallizer. The experiment was started on Friday, February 23, and was performed in the fume hood, using for the condenser water coming from the cold water line of the fume hood, with the flow set to half. One of the more senior researchers in the lab advised to fully open the water valve due to the requirements set for the use of water lines in the Fisher fume hoods (the main water line generates too much pressure for the standard internal valves of the Fisher fume hood; and as a result, the valves must be fully open in order to avoid overpressure). Both students left the lab late Saturday afternoon, since the experiments were scheduled to continue through the night.

At approximately 3pm on Saturday (2/24), a researcher came to the lab to setup an unrelated experiment. At this time, no water was leaking. At 7pm, when the researcher reentered the lab, he noticed an abundance of water leaking through the door of lab 2153. Upon further investigation, he noticed that the inlet cold water line to the condenser in the fume hood was disconnected and spraying onto the lab floor. He closed the water valve and called the group safety officer, who assessed the situation and based on the picture sent, advised to clean up the water using mops and paper towels. Because the water was cleaned up in a seemingly timely manner, no further action was taken at that time, but the flooding was reported via email on Sunday afternoon.

On Monday morning, February 26, it was discovered that the flooding affected the lab below, FRNY 1181, but most external surfaces were already dry. Damages to lab 1181 were identified and assessed. Flooding, largely concentrated to the center of the lab, caused severe damage to ceiling tiles, and affected cabinets, drawers, and several small pieces of equipment found on benchtop counters. Many items on the upper shelves in that area showed signs of water damage and were either dried or still partly wet. A single biohazard pipette tip jar had been in the path of the water and was full of standing water. Several drawers below the bench on both sides were full of standing water, and their contents saturated. There was also a small pool of water on the ground on the right side of the lab. Many samples and assay kits were also damaged from the immense amount of water.

Immediate Action Taken:

Lab 2153 was cleaned using mops and sponges on Saturday, February 24. However, the cleanup of FRNY 1181 required much more work because of the extensive damage and potential contamination with biohazard. The researchers using FRNY 1181 worked tirelessly to clean and decontaminate the lab. All materials at bench level or below on the right side bench were considered biohazard contaminated. The water in the drawers on this side was extracted and autoclaved before disposal. All solid materials on this side that were considered trash were disposed of in the biohazard waste. All external surfaces were decontaminated with bleach, including flooring. All electrical equipment in the area was examined for damage, and several pieces of equipment were placed in a desiccators to dry before testing them for proper function. All affected items were inventoried.

Actions taken to prevent future occurrences:

Adjustable ring clamps were installed onto the condenser tubing in order to prevent slippage while operating at high flow rates. Additionally, the fume hood in question will be modified with a second valve, such that the cold water line can be used at lower flow rates. With a two valve configuration, the cold water line can be operated at a much lower backpressure.

Some lessons learned and general recommendations:

1. **Always assume the worst in case of a flood:** Although not all floods are necessarily safety incidents, they should be considered safety incidents until it is verified that they don't cause health/safety risks. In this case, the flood on the upper floor lab was not considered a major incident as no chemicals, or electrical equipment was affected or came into contact with water. The researchers did not consider the water will affect anything else besides their lab, or maybe nearby offices. They did not consider the possibility of the lab below being affected by the flooding.
2. **Know what you need to do in similar cases**: For any incidents on campus that could cause health, safety, or property risks, the first step to follow is to **call Purdue Police or 911**. Even if the incident is not an emergency, or seems minor, the police should be contacted. They can dispatch the fire department and/or REM employees 24/7 to come and evaluate the situation immediately. The fire department and REM employees can immediately help in containing the incident and cleaning up however necessary. The REM employees will help identify any hazard (chemical, electrical, biohazard, radiological), restrict access to the area if necessary, and will know what to do to clean it up. In the case of water damage they can immediately put out fans and other equipment to help dry out the area. Contacting the police this way ensures that REM is aware of the situation immediately, and all the appropriate people are notified as soon as possible (both in REM/safety and in the other affected labs) to help take care of the incident properly. The fire department who are dispatched can access surrounding rooms and rooms above/below the incident immediately to check for further damage.
3. **Communication at all levels needs to be improved**: There were several instances related to this incident when communication was either lacking, or was not fast enough or wide enough. Verbal communication is not sufficient – although more time consuming, written communication is preferred.
4. **Use of plastic tubing to supply water to cooling equipment**: To prevent plastic tubing form becoming detached from equipment due to high pressure from water supply, always secure the tubing to the equipment with adjustable ring clamps. Also, it is recommended that reinforced tubing is used in these situations, to prevent bursting of tubing due to pressure in the tube.
5. **Water supply in the fume hood**: these should be checked with the building deputy and a plumber to verify how they should be used. If it is deemed that they need to be fully open to function properly, this information has to be communicated to the group(s). The group can then take precautionary measures, or have the fume hood modified professionally to have a second valve, such that the cold water line can be used at lower flow rates.
6. **Incident report:** Ensure everyone in your group, including undergraduate researchers, know and follow the incident report protocol. Report any safety incidents or near misses to the group safety officer and to the safety committee chair, and discuss them in your group meetings. Sharing this type of information is key in increasing safety awareness. For large chemical spills or incidents that could cause health, safety, or property risks, the first step to follow is to **call Purdue Police or 911.**

Some other near misses and incidents were reported, such as: broken glass, laceration to fingers, use of defective apparatus, overheated oven, small chemical spills in fume hood. Always check equipment for mechanical integrity before using it. Always wear the recommended PPE when working in the lab. Make sure the PPE used provides adequate protection from hazards and the necessary dexterity to avoid safety incidents.

Please continue to report any safety incidents and near misses that occur in your work area; sharing them with everyone in our School will raise the safety awareness and prevent similar situations from happening.

Sincerely,
Gabriela
On behalf of the ChE Safety Committee