

CLOSE ENCOUNTERS OF THE LAB KIND

THE SANTAYANA REPORT

George Santayana was a Spanish-American philosopher, essayist, poet, and novelist. In 1905, he penned the famous aphorism “those who cannot remember the past are condemned to repeat it.” More than a century later, the saying reverberates with professionals the world over. The following is a summary of a recent incident at Columbia University. The information presented is intended to provide awareness and help readers plan against the occurrence of a similar situation in their laboratory or work area.

Cold Room Classics

Environmental rooms, often referred to simply as “cold rooms”, normally utilize a closed circulation system designed to control and maintain temperature and humidity. These facilities are critical for the storage and use of many research materials, however two recent incidents in Columbia University environmental rooms illustrate the importance of safety awareness when utilizing refrigerated spaces.

Environmental Health and Safety (EH&S) received an indoor air quality (IAQ) complaint from users who experienced eye and throat irritation while working in a cold room at the Medical Center. Using a process of elimination, EH&S worked with the room’s users to attempt to identify any contents of the room that had the potential to cause eye irritation. This process yielded numerous chemical bottles in violation of proper safe storage practices which were segregated and removed, as were items that could serve as substrates for mold growth, such as cardboard boxes. Ultimately, air quality in the room was improved by the removal of the hazardous materials, but supplemental cleaning was also required to fully mitigate the symptoms, suggesting that a previous spill or release of a volatile material may have caused the issue.

The second incident was a spill of phenol that was inappropriately stored in a freezer room shared between three research groups. The bottle of frozen phenol was wrapped only in parafilm, and when the cold room experienced a mechanical problem causing a loss of cooling, the bottle thawed and released its contents. Access to the room was blocked by storage boxes and EH&S staff donned respirators and appropriate personal protective equipment to remove boxes, check for contamination and remediate the spill areas underneath. A thorough cleaning was only possible after full removal of the stored materials in the room.

Lessons Learned

These classic cold room issues of improper storage and overcrowding can result in dangerous conditions inside. Since fresh air only enters for brief moments when the door is opened and closed, odors and vapors that would otherwise not accumulate under normal laboratory ventilation conditions may become hazardous. Additional hazards associated with cold rooms include:

1. Hazardous chemicals: In case of a release due to a spill or vaporization may result in an environment that is toxic, explosive, oxygen deficient, odorous, or irritating. Storage of volatile hazardous chemicals including flammable, toxic, volatile acids and bases is prohibited in cold rooms.

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2. Potential to generate an oxygen deficient environment: Dry ice sublimates to carbon dioxide gas, which can then displace oxygen in a cold room. Certain compressed gases may displace oxygen, and with no external supply of fresh air, an oxygen deficient environment may result. Storage of dry ice and compressed gas cylinders is prohibited in cold rooms for this reason.
3. Mold growth: Cold rooms may provide optimum environmental conditions (temperature and humidity) for mold to grow if there is cellulose substrate material (food) inside. Mold may have negative health effects and could contaminate experimental specimens. To prevent mold amplification, do not store paper, cardboard, Kim wipes, cloth, or other similar materials in cold rooms. Enclose these materials in air-tight plastic containers for moisture control, if necessary, and clean work surfaces regularly.
4. Contamination of food and beverages: Experimental samples, biological media and chemicals present in the cold room may contaminate food and drinks. Never store any food or beverage items in cold rooms.

For more detailed information about keeping your environmental room safe, please visit the EH&S website at <http://ehs.columbia.edu> and search for “environmental room safety”.

For more information on how to properly store chemicals in a laboratory setting please visit Rascal and complete “Chemical Storage and Segregation 101 (TC2100).”

For further information, or to view previous Santayana Reports, please visit our [lessons learned website](#). For any other safety related matter, please contact the [EH&S office](#).

