The federal government and federal granting agencies, such as NIH, have requested that we do a safety stand down to inventory legacy agents and materials in our possession. Legacy material is material left in labs by faculty, staff, postdoctoral fellows and graduate students who have left the institution. The request is primarily due to the finding of smallpox samples in a freezer in an unsecured FDA laboratory operated on the NIH Bethesda Campus and the well-publicized accidental shipments by CDC of live agents, such as anthrax and Ebola, to labs not equipped to manage them.

Washington University in St. Louis has its own examples for why up-to-date inventories are important:

On December 16, 2014, a medical school laboratory researcher found vials in the back of a freezer that contained lysates from a highly regulated infectious agent. The lab personnel were not aware this material was in the freezer. While not infectious in the lysate form, the lysates can be manipulated to generate the infectious agent.

In late February 2015, in response to the government's request that we do freezer inventories, another researcher found several vials of various viral lysates that were also highly regulated materials.

In both cases, the discoveries required reporting to Centers for Disease Control and Prevention (CDC) and documented witness-destruction of the material.

Separately in the past year, three chemical containers on three separate occasions were found in the back of storage cabinets in laboratories at the University. The chemicals had aged and decomposed to become highly shock sensitive materials. In one case, a bomb squad vendor had to be brought in to use robotics and blast containment equipment to manage the container. While EH&S and several regulatory agencies require laboratories to keep inventories of their chemicals, and to track compounds that can become shock sensitive or unstable on aging or long-term exposure to air, it is evident that not all laboratories have included all legacy material in their inventories and inventories are not being kept up to date.

The types of chemicals found provide safety reminders about proper management of those chemical hazard classes:

In the first case, an older container of 1,4-Dioxane was found to have significant peroxide crystal growth around the cap of the container and throughout the solution in the bottle. A bomb squad contractor had to be called in to use robotic devices to remove the container to a blast-shielded container and to drill with a non-sparking tool through the lid of the container, in order to add a chemical that would stabilize the peroxide compounds. Departments are billed directly for the cost of this type of special response and disposal, and in this particular case was $3,500, not including departmental, security and EH&S labor costs, which were also significant.

In the second situation, an older container of Picric Acid was found to have dried out, with crystals formed around the lid of the container. Dried Picric Acid is heat and shock sensitive, and is a powerful explosive. Special precautions had to be taken to wet the crystals with a suitable solvent in order to safely open the container to add water to allow safe dispose of the chemical.

In the third instance, a container of Picrylsulfonic acid (2,4,6-Trinitrobenzenesulfonic acid) was found. The primary hazard of working with Picrylsulfonic acid is the risk of explosion. Picrylsulfonic acid is an extremely sensitive compound especially when mixed with other compounds (particularly reducing agents, such as hydrides, sulfides, and nitrides), exposed to heat, or exposed to rapid temperature or

pressure changes. Special precautions had to be taken by EH&S to manage the material as an "unwanted chemical".

All of these chemical container incidents offer several safety reminders for our research faculty, staff and graduate students:

1. If you find chemical containers that you suspect may be a potential shock sensitive, explosive or over-pressurization hazard, do not touch or move the containers.
    - Remove sources of heat, light, flame, sparks, static electricity, and mechanical shock
    - Warn occupants to stay away
    - Lower protective sashes if the container is in chemical fume hoods or use blast shields if available to protect people from the container
    - Contact EH&S immediately for assistance at 362-6816, or ehs@wustl.edu.
2. Use your chemical inventories to track chemicals that can become unstable, particularly peroxide forming compounds, picric acid, and shock-sensitive compounds. Send these materials through the EH&S unwanted chemical program long before they become unstable.
3. Make sure your all your inventories (chemical, infectious and radioactive) are updated on a regular basis, monthly to quarterly, to ensure they are reasonably accurate.
4. Assign responsibility to personnel to manage these tasks and document this as part of their performance expectations. Please make sure there are backup personnel for this responsibility when people take sabbaticals or leave the institution.
5. Please also follow policy and protocol safety guidance for management of pyrophoric compounds in your laboratories.
6. Please make sure people responsible for updating inventory databases remove chemical containers/quantities that are no longer in your lab, shop or clinic. We have encountered situations where laboratory inventories are showing 250 gallons of concentrated hydrochloric acid or 150 gallons of flammable solvents in a lab, when reality was there was only 2 liters of hydrochloric and only a few gallons of flammable solvents. Unrealistic high quantities of materials in inventory databases will invite regulatory scrutiny, and possibly fines and penalties, from the Fire Marshal, the Environmental Protection Agency (EPA), Missouri Department of Natural Resources (MDNR), the Department of Homeland Security (DHS), the Federal Bureau of Investigation (FBI) and EH&S.

Please contact EH&S at 314-362-6816, or ehs@wustl.edu, if you have any questions. Thank you.