PREPARING YOUR LAB FOR AN EMERGENCY

By Jim Gilson, Senior Safety Engineer, UC Berkeley

Research labs are unique places that often have hazardous materials, equipment and/or processes that should be "made safe" prior to researchers exiting the lab in an emergency. Research lab emergency shut-down planning ensures the ongoing continuity of the research, the safety of lab building occupants and the safety of emergency responders who must enter the building and possibly the lab. Depending upon the complexity of the lab, its processes, hazards and equipment, "making safe" the research could be as simple as shutting off equipment with a control switch, or closing a fume-hood sash, before leaving the lab which takes little-to-no-time. But hazardous chemicals or biologicals may need to be isolated or safely stored-away prior to evacuation. For complex equipment and associated lab processes, multiple utilities may need to be shut-off using automated emergency control-systems and pre-programmed shut-down sequencing to ensure safe-shut-down while lab users exit the building.

During emergency, time is critical and seconds can mean the difference between life and death. By planning for emergency and the need to evacuate your lab with the utmost of speed, you can minimize the potential for loss of critical research-data and equipment while ensuring researchers' and emergency responders' health and well-being. As a planning-target time-frame, it should not take a single researcher working in a lab more than 30-seconds to "make safe" all lab equipment, processes and hazardous chemicals / biologicals prior to evacuating the lab. Contact your EH&S department for collaborative safety engineering support should you determine your lab cannot be "made safe" and evacuated in under 30-seconds.

Here's a checklist that will help you prepare for an emergency in your lab.

Emergency Preparedness Checklist for Labs

☐ I**nventory physical, biological and chemical hazards** and determine how each should be dealt with during an emergency. Prioritize "making-safe" hazardous chemicals storage, hazardous biologicals containment and hazardous processes safe shut-down. Also, prioritize maintaining egress pathways and adequate lighting along the pathway to safety.

☐ **Assess hazardous chemicals and what must be done to "make them safe" prior to evacuating the lab.** Only use hazardous chemicals in the smallest-quantity needed for research-use during routine lab operations, and keep hazardous chemical reserves in safe-storage such as flammable or gas cabinets.

☐ **Assess lab equipment, biologicals containment and lab processes** for research-critical operations or high-hazard conditions that require biologicals-isolation or safe shut-down before the lab must be evacuated.

☐ **Develop Equipment / Process SOPs** for shutting down equipment or "making safe" hazardous chemicals, biologicals or processes prior to evacuation.

☐ **Train all lab users on the Lab Emergency SOPs** and document this training in lab manuals.

☐ **Train all lab users on the BEP (Building Emergency Plan)** to ensure they know how to safely exit the building and muster outdoors in safety for head-count.

☐ **Label utility shut-off locations clearly** for the lab's critical equipment which include compressed gas shut-off valves, process / cooling water valves, electrical knife switches or circuit breakers, steam valves, hydraulic system control valves, pressure bleed valves left opened, etc.

☐ **Don't rely on manual shut-down of critical systems** for complex research processes or equipment that could take more than 20 seconds, or more than 2-3 individual sequenced steps, to manually shut-down and make safe. Instead, install Programmable Logic Controllers and automated valves and switches to monitor safety-systems and control automatic shut-down sequencing in the event of emergency. Actuate automated shut-down sequences by hitting an emergency stop button located near the exit-door to the lab.

☐ **Participate in emergency practice drills** as though there is a real emergency to determine if your lab's emergency protocols and shut-down procedures are viable and ensure lab safety during an emergency. Conduct a debriefing after the practice drill, and modify Lab SOPs and automated shut-down systems as needed to improve response and safety.

☐ **Ensure data security** and that all research data and research equipment designs are "backed-up" off-site in multiple copies of data-files stored in multiple locations should local research data-storage equipment be damaged / destroyed during an emergency. Automate this back-up process to ensure ongoing research-data security and safety, but keep critical research data-collection and control-equipment isolated from the internet if possible to limit potential damage from virus or malware.

In the event of an emergency, rapidly assess the situation. If immediate evacuation is necessary, do so by simply shutting the fume-hood door, throwing a main power-switch, etc. and exiting the lab. If enough time to implement the lab's 30-second or less emergency shut-down procedures is determined, do so and then evacuate to safety. If at any time should conditions change, or there is any question as to whether it's safe to continue emergency shut-down in the lab, evacuate to safety without hesitation. Remember to make your way to your lab building's muster point for a head-count, and be available and ready to brief the Police, Fire and EMT responders at the muster point about the activities and processes in your lab.