Planning Safe Research – Self Assessment
at
The University of Michigan –Dearborn

This summary is meant to provide a mechanism of self-assessment for Deans, Directors, Department Heads, and Primary Investigators (PI) in order to determine whether they are meeting the institutional expectations for workplace and laboratory safety in their research operations.

EXPECTATIONS:

- **Planning for the safety** of experiments is far better than dealing with an employee or student injury, equipment damage, and work stoppage which results from a lab accident.
- Primary investigators are expected to **be fully aware of the risks** posed by their research materials/methods and **effectively communicate this awareness** to their staff and students. The expected method for instilling this awareness is through **written standard operating procedures (SOP's)**, used to instruct the students and identify necessary precautions to avoid injury and equipment damage. **Written records** of this instruction must be kept within the Chemical Hygiene Plan (CHP) and/or lab.
- Equally important to communication is direct involvement of the PI is **observing the behavior** of their students, and **enforcing safety procedures**. This can be difficult for research directors in the absence of a lab manager. The lack of a lab manager leaves the research director responsible for the safety of the day-to-day activities and resulting accidents.
- Research **equipment safety features** such as exhausted enclosures, sensor/alarm systems, power-interlocked guards and shields, system pressure gauges, and measures must be installed to reduce exposure risks and monitor system performance.

RESOURCES: The University provides safety resources to the research community through the Department of Environmental, Health and Safety & Emergency Management (EHSEM). Technical assistance regarding research material risks, method refinement, equipment specifications and training, hazard containment, protective equipment, and hazardous waste disposal is available through (EHSEM). The EHSEM web page (www.umd.umich.edu/ehsem) is a readily available resource for initial query into these areas. Templates for safety plans, SOP's, best practices, and recommended methods are all easily accessible from these on-line systems. If you do not find something please contact EHSEM (x3-4914). EHSEM representatives are a phone call away, and can provide personalized service for specific research safety challenges.

SELF-ASSESSMENT

Plan for safety – Some of the first considerations for an experiment design or method change should be the hazardous chemicals to be used, dangerous equipment to be purchased, and the potential injury they may cause. One rule-of-thumb is to assume that accidents will happen (chemical spills, fire) and plan accordingly.

- Have you considered minimization of quantities of the most hazardous chemicals in your inventory?
- Have you enclosed hazardous processes in fume hoods or other containment devices to minimize release of potentially hazardous vapors into the ambient laboratory air, especially during spill events?
- Have you identified the most appropriate protective equipment to be worn by your staff and students while using hazardous experimental materials and equipment?
- Have you considered placing guards, screens, or barriers between the hazard and the researcher or student?

Be fully aware of the risks – You and your research staff or students should have a good working knowledge about the hazards of the chemicals you plan to use and the potential dangers of the equipment you have purchased.

- Have you read and understood the product safety warnings on research equipment and hazardous chemical labels?
- Have you ensured that your graduate students and post-docs have also achieved a high level of awareness on these risks as they apply to the research methods they plan to use?
- Have you thoroughly reviewed material safety data sheets for the chemicals you expect your staff to use, and have you briefed them on specific hazards?
- How will you check your staff to assure they retain the knowledge you feel is important to remember? Think about the response and performance you expect from your staff or students if a hazardous chemical spill or exposure occurs.

Communicate awareness – You should expect your staff and students to be knowledgeable about the hazards of their work and what action to take in the event something goes wrong.

- Have you made absolutely sure that the students and staff who are working with hazardous materials and equipment have been fully trained on the risks they are exposed to and what to do when things go wrong (assume they will)? Has training been documented?
- Have you provided them with (or had them draft themselves) written emergency procedures, and ensured that they are trained to handle chemical release emergencies and personal injuries?

Write Standard Operating Procedures – You should expect that your experimental protocol to be followed closely and without incident.

- When your students wrote their protocol materials and methods, did they include precautions and warnings that address protective equipment, chemical storage, fume hood use, and chemical waste disposal?
- Did they write these precautionary instructions in to the protocol at points where the risks present themselves?

Instruct the students – You should expect your staff and students to quickly become familiar with and follow the SOP's you have approved.

- Have you used the SOP to instruct the students in your lab about your expectations for performance and safety? Written SOP's and documented training lends an element of consistency to instruction, so you don't over-train one person and under-train another. Continuity is also a factor, so the instructions are not distorted or weakened over time and by staff turn-overs.

Observe their behavior – You should expect that your instructions are being followed in practice, on a daily basis.

- As laboratory director, do you feel you are responsible for personally verifying that the methods and precautions you have approved are being followed? Your regular presence in the research lab, observing the experimental methods, shows that you care and are serious about safety.

Enforce safety procedures – You should have methods in place to correct those who do not follow your instructions.

- In the event you find employees not following standard safety precautions, or flagrantly ignoring good lab practices, do you take firm action to clarify your expectations to the employee and others in the lab?

Designate a responsible person – You should have a management structure in place to maintain continuity and the quality of your operations when you are away from the laboratory.

- Have you assigned laboratory management responsibility and authority to one or more of your post-docs or graduate students? Long-term management of a research project is best accomplished with the aid of laboratory supervisors with seniority and a measure of authority. Such lab managers can efficiently instruct new staff, maintain the quality of practices, and offer ideas for improvement.

Assure equipment safety features – You should ensure that your hazardous research equipment has features that prevent injury to the user, even if they intentionally try to defeat the guards and shields.

- Have you ensured that your equipment is modern and in good working order? Many modern scientific instruments contain features that reduce or eliminate the potential for accidental exposure and injury to the user. These features are present to reduce product liability, based on past injury experience. For thousands of older instruments that contain few or no safety features, the laboratory director is responsible for identifying critical hazard points and guarding them with shields or power interlocks.

Planned Obsolescence – You should ensure that your scientific equipment (sophisticated facility features) function safely over the long hauls. Nothing man-made lasts forever, and most equipment requires expensive maintenance to operate past 5 years. ***At 10 years, most equipment is obsolete and parts are difficult to find.***

- Do you have a plan or scheme for assessing the quality and safety of your scientific equipment that is used in the productive research of your graduate students and post-docs?
- Do you have a plan or scheme for maintenance costs and eventually replacement costs for critical equipment and specialty facility infrastructure? This should be undertaken as a laboratory management function. Too often, the day comes for replacement and no funding is available.

Legal Responsibility
From the University Record

- The Standard Practice Guide (601.9) states: "It is the University's policy to defend and idemnify employees who become parties to legal proceedings by virtue of their good faith efforts to perform their responsibilities of employment."

- When both the institution and the individual have been named in a lawsuit, the first step is to determine if the individual was acting in "good faith" when the alleged discriminatory situation occurred.

- There may be situations where the University, after investigating, determines that the supervisor/manager did not act in good faith and at that point, the University may decline to defend the employee alleged to have discriminated. At that point, the employee is on his/her own to retain legal counsel and to pay any judgment, Hage said.

SPG - Integrity of Scholarship (See pg.2 item 6)