



DEPARTMENT OF THE ARMY
UNITED STATES MILITARY ACADEMY
West Point, New York 10996

REPLY TO
ATTENTION OF

Department of Chemistry and Life Science

January 5, 2012

MEMORANDUM FOR RECORD

SUBJECT: Department of Chemistry and Life Science Laboratory Safety Program Policy

1. References.

- a. OSHA Standard 29 CFR Part 1910, *Occupational and Health Safety Standards*.
- b. OSHA Standard 29 CFR § 1910.120, *Hazardous Waste Operations and Emergency Response*.
- c. OSHA Standard 29 CFR § 1910.1200, *Hazard Communication*.
- d. OSHA Standard 29 CFR § 1910.1450, *Occupational Exposures to Hazardous Chemicals in Laboratories*.
- e. DOD Instruction 6050.5, *Hazardous Material Information System*.
- f. AR 385-10, *The Army Safety Program*.
- g. USMA Reg 385-10, *Safety Program*.
- h. USACHPPM Technical Guide 190, *Guide to Managing Occupational Exposure to Bloodborne Pathogens*.
- i. *Safety in Academic Chemistry Laboratories, Volume 1, Accident Prevention for College and University Students*, 7th Edition. 2003. American Chemical Society Joint Board – Council Committee on Chemical Safety. 48 pp.
- j. *Prudent Practices in the Laboratory, Handling and Management of Chemical Hazards, updated version*. 2011. National Research Council of the National Academies, 337 pp.

2. Background.

a. Any science program has certain potential dangers. Yet, with careful planning, most dangers can be avoided in any laboratory-oriented science program. It is essential for all members of the Department of Chemistry and Life Science to develop a positive approach to a safe and healthful environment in the department and particularly in the laboratories. Safety and the enforcement of safety standards, regulations and laws in science classrooms and laboratories are the primary responsibility of the faculty, staff, and cadets—each assuming his/her share. Safety and health should be an integral part of the planning, preparation, and implementation of all science programs and courses.

b. More than 1,000 cadets, faculty, and staff use the Department of Chemistry and Life Science laboratories each semester. On any given day, hundreds of cadets, employees, and visitors occupy our teaching and research laboratories. Undergraduate science courses are faced with the problem of introducing inexperienced people (frequently in enormous numbers) to the laboratory culture, including the handling of hazardous materials. Although many students come to their first undergraduate course with good preparation from their high school science courses, others may be "chemophobic," having

a prejudice against chemicals of all kinds. These personnel are exposed to numerous potential hazards including chemical, biological, physical, and radioactive hazards, as well as musculoskeletal stresses. Every year in the West Point laboratory setting where >1,000 cadets (and new employees) experience new activities, the likelihood of incidents, injury, and damage is high. Therefore, it is essential that the cadets (and new employees) are taught what can go wrong, how to prevent such events from occurring, and what to do in case of an emergency. They must learn to evaluate intelligently the wide range of hazards in laboratories and learn the techniques by which potential dangers can be controlled routinely with negligible risk.

c. Laboratory safety is governed by numerous local, state, military and federal regulations. Over the years, the Army and the Occupational Safety and Health Administration (OSHA) have promulgated rules/regulations and published guidance to make laboratories increasingly safe for all personnel. This document is intended for all personnel who occupy, work in, or visit our office or laboratory areas. Every individual within our Department, including cadets, is responsible to ensure that we have safe, healthy places to work and to ensure that applicable health, safety, and environmental regulations are followed.

3. Department of Chemistry and Life Science Laboratory Safety Program hierarchy of controls prioritizes intervention strategies based on the premise that the best way to control a hazard is to systematically remove it from the workplace, rather than relying on faculty and staff to reduce their exposure. The following types of measures to protect laboratory occupants, prioritized from the most effective to least effective, are:

- a. **Engineering Controls.** Engineering controls are those that involve making changes to the work environment to reduce work-related hazards. These types of controls are preferred over all others because they make permanent changes that reduce exposure to hazards and do not rely on worker behavior. By reducing a hazard in the workplace, engineering controls can be the most cost-effective solutions for employees to implement. The use of chemical fume hoods and biological safety cabinets are examples of mandated engineering controls.
- b. **Administrative Controls.** Administrative controls are those that modify worker's work schedules, laboratory procedures, risk assessments, and tasks in ways that minimize their exposure to workplace hazards. **All Department personnel will include a SAFETY statement on their annual Performance Appraisal Support Form to indicate how they are supporting this Safety Policy.** The Chemical Hygiene Plan and Standards Operating Procedures are required administrative controls that reduce risks. Training is provided to all new (incoming) personnel either during New Instructor Training for faculty, during the new employee orientation period for staff or during laboratory orientation for cadets. This training consists of annual Hazard Communication (HAZCOM) training and Chemical Hygiene Plan training for all personnel and additional safety training for all laboratory support staff, as appropriate.

- c. **Work Practices.** Work practices are procedures for safe and proper work that are used to reduce duration, frequency or intensity of exposure to a hazard. Completed formal **Composite Risk Management Worksheet**, DA Form 7566, April 2005, (e.g. *risk management*) shared with everyone who works in the laboratory are required and essential to minimize risks and increase safety for everyone. These completed worksheets **MUST** be kept in the laboratory and readily available. Faculty and staff are asked for their suggestions, since they have firsthand experience with the tasks actually performed. These controls need to be understood and followed by all faculty, staff, and cadets. Examples of critical work practices are no mouth pipetting, chemical substitutions where feasible, and proper storage and disposal of chemicals.
 - d. **Personal Protective Equipment (PPE).** PPE is protective gear needed to keep workers safe while performing their jobs. Examples of PPE include respirators, safety glasses, safety goggles, face shields, lab coats, lab aprons and disposable gloves. These controls are very important in laboratory settings and must be conscientiously and properly worn.
4. The Department of Chemistry and Life Science Laboratory Safety Program consists of five major elements: 1) hazard identification; 2) Chemical Hygiene Plan; 3) Information and training; 4) exposure monitoring; and 5) medical consultation and examinations.
- a. **Hazard Identification.** Each laboratory must identify which hazardous chemicals will be encountered by its' occupants. All chemical containers must be clearly labeled in accordance with the Hazard Communication standard. Material Safety Data Sheets (MSDSs) for chemicals received by the laboratory must be supplied by the manufacturer or distributor and must be maintained and readily accessible to all laboratory occupants. Each laboratory must have an MSDS in the workplace for each hazardous chemical in use.
 - b. **Chemical Hygiene Plan (CHP).** The purpose of the CHP is to provide guidelines for prudent practices and procedures for the use of chemicals in laboratories. The CHP set forth procedures, equipment, PPE and work practices capable of protecting laboratory occupants with the health hazards presented by chemicals used in laboratories. The CHP includes the following specific information: 1) standard operating procedures; 2) criteria for exposure control monitoring; 3) adequacy and proper functioning of fume hoods and other protective equipment; 4) information and training; 5) requirement for prior approval of laboratory procedures; 6) medical consultations and examinations; and 7) designation of a Chemical Hygiene Officer.
 - c. **Information and Training.** All laboratory workers (faculty, staff, cadets, and contractors) **MUST** be provided with lab-specific information and training relevant to the hazards of the chemicals present in their laboratory, and documented in writing. The training must be provided at the time of initial assignment to a laboratory and prior to assignments involving new exposure situations. **At a minimum this laboratory-specific training must include:**
 - (1) The location and availability of the Chemical Hygiene Plan;

- (2) A comprehensive review of the Composite Risk Management Worksheet, DA Form 7566, April 2005;
 - (3) Physical, chemical, biological, and radiological health hazards in the laboratory work area;
 - (4) The measures that workers can take to protect themselves from these hazards, including protective equipment, appropriate work practices, and emergency procedures;
 - (5) Permissible exposure limits (PELs) for OSHA-regulated substances;
 - (6) Signs and symptoms associated with exposure to hazardous chemicals in the laboratory;
 - (7) The locations and availability of reference materials on hazards, safe handling, storage, and disposal of hazardous chemicals in the laboratory, including, but not limited to, MSDSs; and
 - (8) Retraining, if necessary.
- d. **Exposure Monitoring.** The USMA Industrial Hygiene Office conducts periodic exposure monitoring through air sampling, if there is reason to believe that workers may be exposed to chemicals above the action level (PEL). All chemicals fume hoods are tested annually and certified that they are working properly to protect laboratory workers.
 - e. **Medical Consultation and Examinations.** All exposed workers will have the opportunity to receive medical attention by a licensed physician, including any required follow-up exams. These examinations will be provided without cost to the worker, without loss of pay, and at a reasonable time and place.

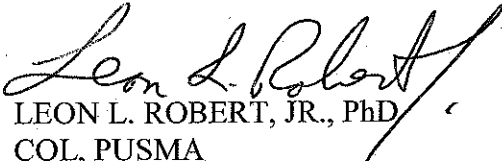
5. Roles and responsibilities in implementing the Department Laboratory Safety Plan.

- a. The **Head of the Department of Chemistry and Life Science** (COL Robert) bears ultimate overall responsibility for safety and chemical hygiene within the department.
- b. The **Chemical Hygiene Officer** (Dr. Balz): 1) develops and implements appropriate chemical and biological hygiene policies and procedures; 2) monitors procurement, use, and disposal of chemicals used in the labs; 3) ensures that the appropriate audits are maintained; 4) helps Program Directors, Course Directors, and Lab Supervisors develop precautions and adequate facilities; 5) knows the current legal requirements concerning regulated substances; and 6) seeks ways to improve the chemical hygiene program.
- c. The **Safety Committee** will: 1) know and understand the requirements of the OSHA Laboratory Standard regulation (29CFR 1910.1450), applicable DoD and DA regulations, and the Department of Chemistry and Life Science Chemical Hygiene Plan; 2) conduct a quarterly safety meeting and a walk-through of all laboratories; 3) seek ways to continually improve the Department Safety Program and the Chemical Hygiene Plan; 4) investigate all chemical accidents and near misses to determine the cause and take appropriate corrective action to prevent similar accidents; and 5)

monitor the safety performance of the faculty, staff and cadets to ensure that the required safety equipment, practices and techniques are understood and are being employed and ensure that action is taken to correct work practices that may lead to chemical exposures or releases.

- d. **Laboratory Supervisors (including all Program Directors, Course Supervisors, Course Directors, Instructors, and Researchers)** have the overall responsibility for chemical and biological hygiene in the laboratory. They must: 1) ensure that laboratory workers know and follow the chemical hygiene rules; 2) ensure that protective equipment is available and in working order; 3) ensure that appropriate training have been provided and documented; 4) provide regular, formal chemical hygiene and housekeeping inspections, including routine inspections of emergency equipment; 5) know the current legal requirements concerning regulated substances; 6) determine the required levels of PPE and equipment and ensure that PPE is worn at all times in the laboratory; and 7) ensure that facilities and training for use of any material being ordered are adequate.
- e. **Laboratory Workers (including cadets):** 1) plan and conduct each operation in accordance with the facility's chemical hygiene procedures; 2) develop good personal biological and chemical hygiene habits; and 3) report all accidents and potential biological and chemical exposures immediately to their instructor/supervisor.

6. POC for this policy is the undersigned at (845) 938-3900 or leon.robert@usma.edu.


LEON L. ROBERT, JR., PhD
COL, PUSMA
Professor and Head



DEPARTMENT OF THE ARMY
UNITED STATES MILITARY ACADEMY
West Point, New York 10996

REPLY TO
ATTENTION OF

Department of Chemistry and Life Science

February 26, 2012

MEMORANDUM FOR RECORD

SUBJECT: Department of Chemistry and Life Science Policy for Working in Laboratories during Duty Hours and Non-Duty Hours

1. REFERENCES:

a. Safety in Academic Chemistry Laboratories, Volume 1: Accident Prevention for College and University Students, 7th Edition, 2003. *Publication of the American Chemical Society Joint Board-Council Committee on Chemical Safety*. Available at: http://portal.acs.org/portal/PublicWebSite/about/governance/committees/chemicalsafety/publications/WPCP_012294

b. Safety in Academic Chemistry Laboratories, Volume 2: Accident Prevention for Faculty and Administrators, 7th Edition, 2003. *Publication of the American Chemical Society Joint Board-Council Committee on Chemical Safety*. Available at: http://portal.acs.org/portal/PublicWebSite/about/governance/committees/chemicalsafety/publications/WPCP_012293

c. Doing Things Safely is Not Just the Right Way to Work – It's the Only Way! Safety for Introductory Chemistry Students, *American Chemical Society Brochure*, 2010. Available at: http://portal.acs.org/portal/PublicWebSite/about/governance/committees/chemicalsafety/publications/CNBP_025238

d. *Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards*. National Research Council of the National Academies, 2011.

e. Alaimo, R. J. 2001. *Handbook of Chemical Health and Safety*. New York: Oxford University Press.

f. HHS Publication No. (CDC) 21-1112. 2009. *Biosafety in Microbiological and Biomedical Laboratories, 5th Edition*. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 45 pps.

2. BACKGROUND. This policy applies to all laboratories and all personnel conducting laboratory work within the Department of Chemistry and Life Science. This policy does not apply to computer laboratories where there are no chemicals present in the room. This policy is based on "best practices" as detailed by the US Army, the American Chemical Society, National Academies of Science and the Centers for Disease Prevention and Control. Beyond regulations and guidelines, we must all hold ourselves responsible for the well-being of all building and laboratory occupants. Development of a "culture of safety" – with accountability up and down

the administrative and scientific chain of command – will result in laboratories that are safe and healthy environments in which to teach, learn, and work.

3. Laboratory Work Hours Defined. Working in laboratories from 0730 to 1700 hours during regular weekdays (duty days) is defined as working during “duty hours”. Working in laboratories at all other times is defined as working “after hours” or during “non-duty hours.”

4. Policy for Cadets Working in Laboratories during Duty Hours. Cadets are never allowed to work alone in laboratories (Reference a., page 5). When working in laboratories during “duty hours,” a cadet must be accompanied by a staff or faculty member (Reference b., page 3). For certain low risk laboratory procedures (based on an approved Risk Assessment) a cadet may work with another “qualified” person. This qualified person may be another cadet who has been fully trained (see Paragraph 6 below) with this training documented in writing and a copy on-hand in the laboratory where the work is being conducted, and who must be aware that s/he is serving in a “qualified person” capacity.

5. Policy for Cadets Working in Laboratories during Non-Duty Hours.

a. Cadets are never allowed to occupy or work in laboratories alone during non-duty hours (after hours, weekends, and holidays). Cadets may work in the presence of a staff or faculty member.

b. If faced with a situation where a faculty member feels it is necessary for 2 or more cadets to work in a laboratory outside of normal duty hours, the faculty member should:

Reconsider the need. Are the increased risks to cadet health and safety really outweighed by the return? Reconsider the timing and setup of the work. Is there any way to accomplish the required tasks during normal duty hours? If the timing of the task cannot be changed and you still feel it must be accomplished outside of normal duty hours, is there any other trained person that will be present to oversee cadet work? If the proposed situation is unsafe, do not proceed with the work.


c. With express written special permission of the Department Head, a cadet and another trained “qualified” cadet may use some laboratory facilities to perform low risk laboratory procedures or work with computers (or other non-chemical or non-biological work). The faculty member in charge must review the proposed experimental procedure(s) and any associated hazards and determine that the cadets possess adequate training in proper experimental and emergency procedures. The faculty member will submit these documents and a specific Risk Assessment for non-duty hour work for consideration to the Department Head. If Department Head approval is granted, a copy of the signed permission form must be present in the laboratory where the work is being done.

6. Required Laboratory Training for Cadets. Faculty is required to provide a safe environment for research by careful oversight of cadets’ work (Ref d., page 4, Para. 1.D.3) Cadets may use laboratory facilities only after the responsible faculty member in charge has reviewed with the cadet(s) the following advanced safety training elements: Chemical Hygiene

Plan; experimental procedures; associated hazards; emergency procedures; and the faculty member has determined that the cadet(s) possesses adequate training in proper experimental and emergency procedures to work safely. This training must be documented in writing and a copy kept on-hand in the laboratory where the work is being accomplished. Cadets are responsible for performing all their work in accordance with those procedures.

7. Faculty/Staff in the Laboratories. There are no restrictions on the use of laboratories by faculty, research associates, technicians, and technical staff. They are expected to avoid working alone when the risk assessment indicates work should be done with another person (i.e., lifting heavy objects, working with explosive compounds, working with high pressure and some compressed gases, etc.) and to use good judgment about performing hazardous procedures when working alone. This in no way implies that other safety requirements are waived; on the contrary, the use of good judgment implies expert knowledge or safe procedures and practices.

8. POC for this policy is the undersigned at (845) 938-3900 or leon.robert@usma.edu.


LEON L. ROBERT, JR., PhD
COL, PUSMA
Professor and Head