POLICY AND PROCEDURE: WORKING AFTER HOURS IN KGI RESEARCH LABS

Effective Date: October 18, 2013
Approved by: President Schuster

1.0. PURPOSE:

To safeguard KGI laboratory workers, and to help secure KGI property, this policy provides guidelines related to work conducted in KGI laboratories after regular KGI business hours (5:30PM to 8:30AM, on weekends and during all KGI observed holidays) by any student, staff, or faculty whose job duties require work in any KGI laboratory (referred to herein as "laboratory worker"). It is preferable whenever possible to avoid working after hours in a laboratory. If unavoidable, this policy must be utilized.

2.0. POLICY AND PROCEDURE:

Principle Investigator (PI) Responsibilities: The PI is the individual designated by KGI to have primary responsibility for a project involving laboratory work. In general, the PI is a faculty member who directly supervises / advises the student / staff performing the laboratory work. For TMPs that require laboratory work, the PI is the TMP advisor. Beyond providing scientific leadership, the PI's duties include ensuring compliance with all administrative requirements related to the project, including all provisions set forth in this policy. The PI has to exercise proper judgment in allowing only competent, responsible, and properly trained lab workers to work after hours.

Laboratory Worker Responsibilities: Before working in KGI research laboratories after hours, all laboratory workers must obtain PI approval, and KGI must be notified using the process outlined below. The laboratory worker must abide by the provisions set forth in this policy. When working after hours, the laboratory worker must exercise proper judgment to work safely. Laboratory workers can refuse to work in KGI laboratories after hours.

The "Buddy System": After hour work may require a minimal, regular, or rigorous buddy system. *In all cases, the laboratory worker must sign in and out* on either the log sheet posted in Bld 517at the KGI safety officer's station, or posted in Bld 535 in the mail room (Rm. 139). This log sheet will identify the name of the laboratory worker and of the responsible PI, the primary room numbers involved, time in and time out. The lab worker can see from this log sheet if anyone else is present in the building's laboratories. For the ***minimal*** *buddy system*, the lab worker is encouraged to touch base with these other individuals. No other requirements apply.

For all work requiring the *regular and rigorous buddy system*, a laboratory worker has to identify another individual as buddy. This buddy can be the principle investigator or a peer, who is familiar with the hazards involved in the lab work and the appropriate emergency procedures. The lab worker must indicate on the log sheet the time period during which the work requiring a buddy will be performed, and list the name of the buddy.

In the ***regular*** *buddy system*, the assigned buddy has to check in on the laboratory worker at least every 30 minutes, to ensure that no injury or emergency has arisen. Once the work requiring a buddy has been completed, the lab worker must notify the buddy that the work has been completed and that the buddy arrangement is no longer needed.

In situations involving significant hazards, a ***rigorous*** *buddy system* is required. Under these circumstances, the laboratory worker must remain visible to the buddy. Occasional loss of visual contact cannot exceed a few minutes.

Restrictions: High School Students are not permitted to work after hours. Undergraduate Students are permitted to work afterhours under the supervision of a graduate level lab worker or faculty member. Undergraduate students may not work after hours using the minimal buddy system.

Obtaining approval: The laboratory worker and the PI must complete the after hour lab work approval form (Appendix A), and must determine if the work is potentially hazardous. Appendix B provides guidance and examples.

If the work can be considered minimal risk, then the minimal buddy system applies. If the work should be considered hazardous, then the PI and the laboratory worker must prepare a written SAFETY PROTOCOL that meets the minimal requirements specified in Appendix C. If it is highly unlikely that the properly executed work would lead to imminent harm, then the minimal buddy system applies. If the work has the potential to lead to imminent harm, then the PI and laboratory worker indicate on the approval form whether the regular or rigorous buddy system applies. The PI may require the regular or rigorous buddy system for certain less experienced laboratory workers, even if the work is minimal risk or involves no imminent harm.

Submit the completed approval form, and for anything above minimal risk the written safety protocol, to KGI's chemical and biological safety officer, who will review the information provided. The chemical or biological safety officer may ask the PI / laboratory worker for clarifications and modifications and in some cases may solicit input / advice from independent KGI faculty PIs with suitable expertise.

Hazard Risk Assessment and Safety Protocol: For any work above minimal risk, the PI and the lab worker must identify the potential hazards. This analysis should include a consideration of rare events which might result in lab worker harm (e.g. broken vials, broken centrifuge tubes, organic spills, etc.). To help mitigate the harm from these rare events, the PI and the lab worker should develop protocols which reduce the potential hazard through procedural adjustments, or physical containment (hoods, gloves, face shield, secondary centrifuge containment, etc.). The results of this hazard risk assessment must be captured in a written safety protocol that meets the minimal requirements outlined in Appendix C.

Training and Implementation Requirements: The PI must ensure that all laboratory workers understand and adhere to the provisions of this policy. Additionally, the PI must document that lab workers have been properly trained by the PI or a competent delegate to perform the after-hour work. The PI must ensure that all documents required for after-hour work approval are completed and submitted in a timely manner. For after-hour work above minimal risk, the PI must ensure that a safety protocol meeting the requirements specified herein is in place and has been read and understood by the laboratory worker. The PI must explain the "buddy system" to the lab worker, and emphasize that a buddy capable of assisting the lab worker must be identified as required by this policy. We encourage lab workers to carry a cell phone when working after hours, with the campus emergency phone number (909-607-2000), and the campus security phone number (909-607-8736) programmed in. If no cell phone is available or there is no cell service, the laboratory worker must know where the nearest campus phone is located, which should have these phone extensions posted.

Updating Requirements: If a laboratory worker engages in a new after hour activity that involves new risks, then a new approval form and the appropriate safety protocol must be submitted.

Appendix A: APPROVAL FORM FOR AFTER HOUR LABORATORY WORK

Name of Laboratory Worker:_____PI:_____
For staff / student laboratory workers, the PI is typically the faculty member who directly supervises / advises the laboratory worker. If the PI is the laboratory worker, enter N/A under PI.

Lab Location(s): Building / Room #:_____Date range for work to be conducted: _____
Briefly describe the work to be performed. Identify any potential hazards. Check the required buddy system. Refer to the policy for details on the buddy system requirements. See Appendix B for guidance and examples for potential hazards, and their risk classification. For work involving hazardous materials or equipment, prepare a written "Safety Protocol" according to the guidelines in Appendix C.

Work to be performed	Potential Hazards	Required Buddy System		
		Minimal	Regular	Rigorous

Please read and sign the reverse side of this form.

By signing, the laboratory worker:

- Confirms having read and understood the "Working After-Hours in KGI Research Labs" policy and agrees to abide by its provisions.
- For work which is not minimal risk: Confirms having read and understood the safety protocol for the work to be performed, and agrees to abide by its provisions.
- Indicates his/her willingness to perform this work after hours. (Lab workers have the right to refuse working after hours)
- Acknowledges having received training in the proper experimental and emergency procedures for the work he/she is authorized to do, and confirms to be able to execute those procedures.

KGI Laboratory Worker Signature: _____ Date: _____

By signing, the PI:

- Agrees to ensure compliance with the "Working After-Hours in KGI Research Labs" policy
- For work which is not minimal risk: Confirms that a safety protocol for the work to be performed is in place that meets the guidelines set forth in Appendix C.
- Confirms that the laboratory worker has been properly trained in the experimental and emergency procedures, and that the laboratory worker has demonstrated proficiency in these procedures.

PI Signature: _____ Date: _____

Documentation: The PI / laboratory worker should submit this form and the associated safety protocols to KGI's chemical and biological safety officer. The form may be submitted as original hardcopy or as scanned pdf. The PI / laboratory should keep a copy of this form and the associated safety protocols on record and accessible.

Updating Requirements: If the laboratory worker engages in a new after hour activity that involves new risks, then the PI / laboratory worker have to submit a new after hour lab work approval form to KGI's chemical and biological safety officer, in addition to any new associated safety protocols.

Appendix B: WORK INVOLVING HAZARDOUS MATERIALS OR EQUIPMENT

This document gives guidance and examples for hazardous materials or equipment, and for risk classification of work involving such hazards

Chemical Hazards include, but are not limited to chemicals that are pyrophoric, water reactive, potentially explosive, acutely toxic, peroxide forming, strong corrosives, strong oxidizing agents, strong reducing agents, and regulated carcinogens. The table below provides selected examples and their risk classification, for illustrative purposes only. This is NOT a comprehensive list, and needs to be evaluated in each specific situation.

Minimal Risk – work does not involve hazardous chemicals	Above Minimal Risk – work involves hazardous chemicals		
	Unlikely to cause imminent harm	Can cause imminent harm	Can cause serious imminent harm
Minimal buddy system applies	Minimal buddy system applies	Regular buddy system applies	Rigorous buddy system applies
Work with non-flammable and minimally toxic compounds (e.g., NaCl, $NaHCO_3$, Na_2SO_4, alginate, Poly(ethylene glycol), ascorbic acid, etc.)	Work with < 500 mL ethanol or isopropanol	Work with > 500 mL of ethanol or isopropanol. Work with Acetone, EtOAc, toluene, dichloromethane, chloroform	Using large amounts of moderately flammable solvents, or any work with highly flammable solvents (e.g. diethyl ether)
Making and using aqueous buffers (pH 5-9)	Work with e.g. 1M acids and bases	Work with small amounts of concentrated strong acids and bases (e.g. conc H_2SO_4, 30% NaOH, phenol)	Work with large amounts of concentrated strong acids and bases (e.g. conc H_2SO_4, 30% NaOH, phenol
	Work with small quantities of chemicals that pose minor risk	Work with moderately reactive or moderately toxic materials	Work with highly reactive materials, e.g. $LiAlH_4$, BuLi
	Analytical HPLC or thin-layer chromatography	Preparative column chromatography with large quantities of organic solvents	Work with highly toxic materials e.g. Diisopropyl-fluorophosphate, dimethylsulfate, HF, HCN, TFA, Thallium salts
		Anhydride acylation of amines	Work with materials that can react to cause uncontrolled decompositions: HNO_3, $AlCl_3$, conc H_2O_2, oxalyl chloride

For a list of particularly hazardous substances, see https://ehs.mit.edu/chemical-safety-program/dangerous-highly-toxic-chemicals/

For work that requires the regular or rigorous buddy system, the buddy has to be familiar with the potential risks and emergency procedures.

Biological Hazards include, but are not limited to biological materials rated above biosafety level 1, and biological materials listed as a "select agents. The table below provides selected examples and their risk classification, for illustrative purposes only. This is NOT a comprehensive list, and needs to be evaluated in each specific situation.

Minimal Risk – work does not involve biological hazards	Above Minimal Risk – work involves biological hazards		
	Unlikely to cause imminent harm	Can cause imminent harm	Can cause serious imminent harm
Minimal buddy system applies	Minimal buddy system applies	Regular buddy system applies	Rigorous buddy system applies
Standard microbiology / molecular biology operations with agents that are not associated with disease in healthy adult humans – NIH risk group 1 (e.g. *E.coli* K12, *Bacillus subtilis*)	Work with BSL2 organisms that cause no imminent harm to healthy individuals. Low risk agents in NIH risk group 2: agents that are associated with human disease which is rarely serious and for which preventive or therapeutic interventions is available	Work with BSL2 organisms that can cause imminent harm to healthy individuals. Work with any BSL2 organism or strain that is therapy-resistant, such as MRSA and MDR (Multi Drug Resistant) strains. Mid to high risk agents in NIH risk group 2	Work with BSL2 organism that are readily transmissible, survive outside of media and host, and can cause fast progressing disease and / or require immediate medical intervention. Agents that are associated with serious or lethal human disease for which preventive or therapeutic interventions may be available (NIH risk group 3)
	Work with toxins in amounts 100 fold less than the LD50	Work with toxins in amounts 10 fold less than the LD50	Work with toxins in amounts > 0.1x LD50 .

For the NIH risk group classification, see https://osp.od.nih.gov/wp-content/uploads/NIH_Guidelines.pdf – Appendix B

For information on an organism's biosafety level, and required precautions, see http://www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/index-eng.php#b

For work with BSL2 level organisms and toxins that requires the regular or rigorous buddy system, the buddy has to be BSL2 trained, and familiar with the potential risks and emergency procedures.

Equipment Hazards include, but are not limited to regular equipment items found in biology laboratories, machine shop equipment, and procedures involving high voltage, current, pressure, or temperatures to which the user can be exposed. The table below provides selected examples and their risk classification, for illustrative purposes only. This is NOT a comprehensive list, and needs to be evaluated in each specific situation.

Minimal Risk – work does not involve Equipment Hazards	Above Minimal Risk – work involves Equipment Hazards		
	Unlikely to cause imminent harm	Can cause imminent harm	Can cause serious imminent harm
Minimal buddy system applies	Minimal buddy system applies	Regular buddy system applies	Rigorous buddy system applies
Manual Tools	Use of Bunsen burner	Drill Presses	Injection Molder
Laser Cutter	Use of centrifuge	Band Saw	Replacing and moving pressurized gas cylinders
3D Printer	Use of liquid N2 cylinder / container	Sherline Lathe	
	Turning on and off pressurized gas cylinder	Sherline Mill	
	CNC	Heat sealer	
	Dremel	Grinder	
	Spin coater		

For work that requires the regular or rigorous buddy system, the buddy has to be familiar with the potential risks and emergency procedures.

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Appendix C: Guidelines for Safety Procedures

A Safety Procedure is required for laboratory work involving hazardous materials or equipment. This document lists the *minimal requirements* for such and safety procedure. Each lab is free to expand and adapt as needed.

Briefly describe the hazardous work to be performed.

List the hazards involved in this work.

Describe the most significant risks (what can go wrong / give rise to a potentially dangerous situation) associated with these hazards. Discuss the severity and likelihood of occurrence.

Describe strategies implemented to decrease the likelihood and severity of the potentially dangerous situations. (e.g. safe handling guidelines, protective equipment, waste disposal)

Describe required actions in the event that a dangerous situation was to occur. What to do / who to contact

Recommended After Hour Buddy System: □ Minimal □ Regular □ Rigorous