Department Laboratory Safety Plan (DLSP)

A SAFETY MANUAL DESIGNED TO SUPPLEMENT THE COLBY COLLEGE LABORATORY SAFETY PLAN (LSP)
STUDENTS
IN THE CASE OF AN EMERGENCY:

• If you are in immediate danger such as a fire, or large chemical spill, pull the fire alarm, evacuate the area and building, and call Security at Extension 5911, or from a mobile phone at 859-5911, from a safe location. Locate the members of your lab personnel outside at a prearranged meeting space.

• Notify your instructor or supervisor if not in immediate danger. Phone numbers for people responsible for the room are listed on the door labels outside of each lab. DO NOT LEAVE THE AREA UNTIL HELP ARRIVES.

• Never attempt to handle an emergency or a spill by yourself. Always find a partner and notify Security at extension 5911 or 859-5911 from a mobile phone.

• DO NOT attempt to handle any emergency situations that make you feel uncomfortable. Please evacuate the area and call for immediate assistance (use information on door signs).

• **THE COLBY EMERGENCY CAMPUS SIREN:** If you hear the alarm siren atop the Mudd building sound, listen for and follow any verbal instructions given at the end of the tone. If you cannot clearly understand the instructions, go to the Colby College homepage (www.colby.edu) and follow the instructions given there.

• When the Health Center (HC) is open, all students with minor/moderate injuries should go to the HC for evaluations. The HC is open 8-8 Monday-Friday and 12-8 Saturday-Sunday.

• Off hours or for more serious injuries should go to the ER for evaluation either transported by Security or if need be City ambulance.
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1.0 PURPOSE
This Departmental Laboratory Safety Plan (DLSP) has been drafted as a general guidance document listing the specific safety requirements to work in a Chemistry Department laboratory at Colby College. This plan supplements the existing campus-wide Laboratory Safety Plan (LSP). The LSP/DLSP complies with the requirements of OSHA’s Laboratory Safety Standard, 29 CFR 1910.1450.

2.0 SCOPE
The requirements of this DLSP apply to all faculty, staff, students, and student employees that work, whether for academic credit or for employment, in the Chemistry Department laboratory facilities at Colby College.

3.0 REFERENCE DOCUMENTS
3.2. OSHA, Occupational Exposure to Hazardous Chemicals in Laboratories, 29 CFR 1910.1450
3.3. Colby College Laboratory Safety Plan (LSP)

4.0 DEFINITIONS
4.1. Cryogenic liquids: Materials with boiling points of less than -73C (-100F). This includes liquid nitrogen, helium, oxygen, hydrogen and argon. A slush mixture of dry ice with isopropanol is a common cryogen used at Colby College.
4.2. DLSP: Department Laboratory Safety Plan
4.3. Ethidium Bromide (EtBr): A commonly used stain for the visualization of nucleic acids in agarose gels. It is a mutagen. It is widely used by scientists due to its high sensitivity, rapid staining and low cost.
4.4. Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS): Chemical and hazardous material information sheets specifying chemical hazards in compliance with the OSHA Hazardous Communications Standard.
4.5. Personal Protective Equipment (PPE): Protective clothing or gear used by individuals to protect laboratory and studio personal from various physical, chemical and other hazards.
4.6. Physical Plant Department (PPD): Colby College’s facility maintenance department.
4.7. Satellite Accumulation Area (SAA): Accumulation areas for specific hazardous waste streams.
4.8. Hazardous Waste Accumulation Site (HWAS): Accumulation areas for full hazardous waste containers from the campus SAAs, Keyes Room 4.
5.0 RESPONSIBILITIES

Responsibilities for oversight, implementation and maintenance of the Chemistry DLSP are assigned below. Identified personnel may designate tasks assigned to them to a qualified employee, student or consultant, as appropriate.

5.1. Chemical Hygiene Officer (CHO):

The EHS Director will oversee the plan and act as the CHO. Responsibilities of the CHO include the following:

- The CHO will consult with the Chemistry Department faculty and staff to maintain and revise the DLSP annually by reviewing, creating, and revising safety rules and regulations based on risk assessments, incidents and near misses, and new hazardous procedures introduced by new faculty members or changes in faculty research projects,
- conduct biannual inspections of laboratories and photography darkrooms and submit the results to the administration,
- oversee the supervision, implementation and revision of Moodle based Laboratory Safety Training Module, and the laser, radiation and biohazard safety training programs used to train students in the Chemistry Department.

5.2. Chemistry Departmental Chairperson:

The department chairperson will assume overall responsibility for maintaining the Department specific DLSP. Additional responsibilities of the department chairperson include the following:

- Support the CHO in the implementation of the DLSP,
- verify that all PIs in the Department are familiar with the contents of the LSP and department specific DLSP,
- provide budgetary support to ensure compliance including adequate personal protective equipment and third party training if required,
- serve on the Lab Safety Committee,
- appoint a Departmental Safety Coordinator.

5.3. Lab Safety Committee (LSC):

Members of the LSC will meet at least quarterly.

- The Department Chairperson and/or Chemistry Department Safety Coordinator will report any concerns or revisions of the DLSP to the LSC.

5.4. Principal Investigator (PI)/ Laboratory Supervisor:

- The PIs/staff member will support the CHO and department chairs in the implementation of the LSP and department specific DLSPs, and
- contact the CHO to report revisions to laboratory facilities or procedures and will work directly with the Departmental Chairperson and/or the Departmental Safety Coordinator to ensure revision of the DLSP.
• Students shall not be used to communicate EHS issues between faculty and staff.
• Faculty are directly responsible for enforcing safety policies in their laboratories and field sites. This includes confirmation that visitors, students, staff, and faculty have received the required safety training, are following safe laboratory/field procedures as described in the LSP/DLSP, are trained in the proper operation of instrumentation and scientific apparatus used in their work, understand the specific hazards of their substances and procedures used in their laboratory/field work, and are disposing of wastes properly. It is the responsibility of individual faculty to provide sufficient oversight of their laboratory and field sites so that safety policies are consistently enforced.
• In the event of either a chemical spill or an accident that results in human injury, fire, or physical damage, the laboratory/field site supervisor must complete a spill or accident report form within 24 hours and submit it to the chemistry safety office liaison, who will send it to the CHO.
• Supplemental to our departmental safety training, faculty are responsible for implementing and enforcing the Laser, Radiation and Biohazard Safety Training programs, under the direction of the CHO, when students use these procedures in the laboratory.

5.5. **Chemistry Departmental Safety Coordinator:**

The Chemistry Department Safety Coordinator will act as a liaison between the department(s) and the Safety Committee. Responsibilities include:

- Annual revision of the DLSP,
- work with the departmental chairperson to ensure LSP/DLSP compliance,
- serve on the Lab Safety Committee,
- organize and implement the Colby College Moodle Online Safety Training Course and the Chemistry Departmental Safety Training Course for all students working with chemicals in the Chemistry Department, not including students enrolled in general chemistry courses,
- (every semester) organize and update the Keyes Building, Keyes Inventory Room 6 and the Keyes Outside Flammable Storage card access permissions for students that are currently working in the department, completed all safety training and have signed the safety agreement,
- weekly inspections of the Chemistry Department SAAs and movement of any full containers to the HWSA within 72 hours,
- update the chemical inventory, prepare chemical labels and check for peroxide forming chemicals,
- oversee the 190/200 proof ethanol inventory, provide an annual update of the ethanol inventory to the CHO,
- maintain a small inventory of safety equipment to help implement the DLSP: gloves, NFPA labels, peroxide test strips, safety solvent bottles, general use lab goggles, glass and sharps waste receptacles,
• oversee and biannually inspect spill kits and first aid kits in the Chemistry Department for quality and content,
• annual update of the emergency contact information, standard operating procedures (SOP) and hazard information forms (HIF) included as door signage on every working laboratory, prep room, inventory and storage door in the Chemistry Department,
• weekly update of the MSDS/SDS hardcopy library housed on the third floor of the Chemistry Department.

5.6. Chemistry Laboratory Personnel (includes faculty, staff and students):
• Faculty and staff are required to complete safety training designed by the CHO. All faculty and staff are urged to attend the Chemistry Department safety training.
• Students are required to complete the safety training designed by the CHO and the departmental safety training outlined by the Departmental Safety Coordinator (approved by the Chemistry Department). The departmental safety training will reinforce the safety procedures outlined in the DLSP and the location and use of safety equipment. Students are required to complete the training and sign a safety agreement that assures that they understand and agree to follow the LSP and the Chemistry DLSP prior to working with chemicals in a laboratory. (LSP, APPENDIX D).
• Comply with specific behavior outlined in this DLSP including the wearing of the appropriate personal protective equipment at all times, good housekeeping practices, proper laboratory conduct and the immediate communication of any spills, illnesses, and accidents.

5.7. PPD Services Personnel:
• All PPD members who work or may work in any chemistry laboratory or studio will be trained by the CHO on LSP/DLSP awareness and will obtain information about the workplace before any work is started.
• All PPD members are urged to contact the Department Safety Coordinator if they have any questions or concerns.
• All PPD personnel will refuse to enter or render services to any laboratory in an unsafe condition and will report findings to their immediate supervisor.
• All PPD personnel must adhere to the PPE requirements described on the door signage before entering or rendering services to any chemistry department laboratory.

5.8. Radiation Safety Officer (RSO):
• Work with the faculty in the Chemistry Department to implement the Radiation Safety Training Program.
6.0 LAB SAFETY REQUIREMENTS

The following includes basic guidelines for maintaining a safe working environment in all Chemistry Department laboratories at Colby College.

6.1. Chemistry Faculty/Staff Teaching Laboratory Safety Requirements:

6.1.1 If an instructor (the faculty or teaching staff member that is assigned to the laboratory section) must leave the building or is not readily available to the students in a laboratory for an emergency situation, another faculty or teaching staff member must be contacted to cover the laboratory. This policy covers all 100 and 200 level courses and 300 level courses that include non-chemistry (not safety trained by the department) majors. Advanced course laboratories that service only students that are safety trained by the department are not subject to this policy, (300-400 level where all students have been safety trained by the department) as long as the students agree to the “buddy system”. However, the instructor must be available until all of the students have finished working. Working in an office on the same floor is allowable as long as the students can easily find the instructor in the case of an emergency. However, the instructor must periodically check the students in the lab.

- This policy does not apply to independent student research for which departmental safety training and the buddy system is always required.
- Student assistants do not qualify to cover a laboratory section in the absence of the faculty or teaching staff member.
- Instructors often work with students in the Instrument lab (Keyes 203). The instructor needs to inform the student assistant and the students that they will be in K203. The student assistant must cover the laboratory until the return of the instructor.
- This policy is necessary to the end of the laboratory section, even if the laboratory runs longer than the scheduled time (overtime). This includes clean up time, computer and discussion time. This policy is necessary when not doing wet chemistry if chemicals are readily available anywhere in the lab (bottles on bench tops, reaction in hoods, etc.).
- Students are not to be left unattended in a laboratory to take exams if chemicals are readily available in the room.
- **Quick** restroom breaks or office trips to “get something” do not require extra coverage. (Notify the student assistant.)

6.2. Requirements for the Buddy System:

6.2.1 Day or night, students are not permitted to work alone in Colby Chemistry labs while using hazardous materials or performing hazardous procedures. A partner must be within earshot, (a minimum of the same building and same floor), and must be aware of what to do in the case of an emergency.

6.2.2 Authorized students must call Security during rare circumstances, between 9 pm and 6 am, if a partner is unavailable. The dispatcher will note the time of
the call, the building and room number and a phone number where the student is working. The student is required to call Security if they are working longer than 20 minutes and when they are finished and leaving the lab. Security will take appropriate action and attempt to call the student if more than the 20 minutes has elapsed. If the student has left the lab without contacting Security, disciplinary action will be taken and/or after hours work privileges will be revoked. Noncompliant students found working after hours will be asked to leave the building. The departmental chair will be notified.

6.2.3. If a student wishes to study and/or work in a laboratory where no hazardous substance or procedure is involved anywhere in the laboratory (by self or other working students), the student may do so at any hour of the day without a partner, but the student must abide by the general safety rules outlined in the LSP/DLSP.

6.3. **General Requirements:**

6.3.1. Personnel are not permitted to play loud music or wear headphones/earbuds while working while working with hazardous materials or process in the laboratory.

6.3.2. Visitors, including students not working in the laboratory, are permitted as long as they are wearing the correct PPE and escorted by trained authorized personnel. Visitors must be trained and sign the Lab Safety Training Acknowledgement before they will be allowed to work in the laboratory or studio. The Departmental Chair should be notified of non-Colby visitors.

6.3.3. Minors, not enrolled at Colby, are permitted in the laboratory only when involved in educational or classroom activities. Minors must be supervised in person at all times, wear applicable PPE and comply with all lab safety requirements. The departmental chairperson must approve all events involving minors.

6.3.4. Know the location and operation of all the safety equipment and spill kit in your workspace.

6.3.5. Prep rooms are working labs. Students employed to help prepare solutions and instrumentation for Chemistry courses must follow all safety procedures outlined by the LSP and DLSP. The faculty member teaching the course is responsible for the supervision of this student.

6.4. **Requirements for Personal Protective Equipment:**

6.4.1. All Chemistry laboratories and chemical inventory rooms require appropriate protective eye protection to be worn at all times, even when working on a computer or instrument. Four laboratories are exempt because of no working hood: Keyes 406, Keyes 303B and Keyes 111 and the Schupf Computation Lab.

- Specific types of goggles not supplied by the department, but required for extra precautions, can be supplied by the PI or Department Safety Coordinator.
• Laser goggles are addressed in the Laser Safety Training Plan (CHO).

6.4.2. Gloves are provided by the Chemistry Department. No single glove material provides effective protection for all uses. Review the MSDS/SDS to determine of the gloves is compatible with the procedures you are using. Inspect all gloves for rips and tears before use. Do not use expired gloves. A dip test is recommended.

• Vinyl and Nitrile gloves are used for protection against hazardous chemicals. Both types of gloves in S, M L and XL sizes are store on Keyes 4th floor. All Faculty, staff and the department secretary have a key to the cabinet.

• Use insulated gloves (Kevlar) for hot materials or broken glass. Kevlar gloves are routinely stored by all laboratory ovens and in the Organic Chemistry laboratory, K305. Also available from the Departmental Safety Coordinator.

• Use cryogloves for extra cold materials such as liquid nitrogen, dry ice etc. Cryogloves are housed on top of the gas cylinder cage, Keyes first floor landing. Please return after use. Also available from the Departmental Safety Coordinator.

• Butyl gloves are available for routine acetone and acid washing procedures. Available from the Departmental Safety Coordinator.

• Specific types or lengths of gloves not supplied by the department, but required for extra precautions, can be supplied by the PI or DSC.

• Gloves must be removed before exiting the workplace, handling a doorknob or phone, using instrumentation or a computer etc. The gloves are never disposed of in the hallway waste receptacle. Put new gloves on when you return to work. If you must use a glove for protection while moving hazardous materials to a different location, etc., take one glove off and use the bare hand to manipulate the doorknob, etc and carry the material in the gloved hand.

6.4.3. The use of lab coats or aprons is not required in the Chemistry Department. The use of lab coat or apron will, however, provide an additional protective layer against a spill or burn and is highly recommended.

6.5. Requirements for Personal Hygiene:

6.5.1. All chemistry laboratories and storage areas that require PPE, and have refrigerator/freezers in these areas are safety labeled on the entry side of the door to prohibit eating, drinking (including water), chewing gum, applying makeup or lip balm and smoking. Never store food or drinks for human consumption in a lab freezer or refrigerator. Do not place any food or drink cups in the laboratory trash. The Chemistry Department has appropriate hallway waste receptacles on every floor. Food and drink may be placed outside of the lab door if necessary.

6.5.2. Chemistry Department laboratories, prep rooms, inventory and storage rooms are supplied with safety compliant cabinets for the proper storage of flammable, acidic, basic, toxic chemicals. Improper storage of chemicals in working hoods, on bench tops or on the floor is prohibited.
6.6. **Equipment Specific Lab Safety Requirements:**

6.6.1. **Laboratory Chemical Hoods:** Laboratory chemical hoods are one of the most important components used to protect personnel from exposure to hazardous chemicals and other harmful agents.

- The hoods are inspected by PPD twice a year to verify proper function and airflow.
- All hoods in the Chemistry Department support alarms that with ring when an unsafe airflow is detected.
- Notify the PI, LSC and/or PPD immediately if the alarm on your hood is ringing. PPD/HVAC personnel are trained in the importance of the hoods and respond ASAP. Do not continue to work in the hood until PPD says it is safe.
- Never modify a hood in any way to adversely affect its performance.
- Always label the contents of the reactions or products that are in the hood. Use an ethanol marker or attach a label on the hood face. In the case of an emergency, chemical identity is the key to proper response. If reactions must be left unattended or overnight the responsible personnel must ensure that the reaction is stable, properly secured and labeled. Required labeling elements include the specific details regarding the chemicals involved and emergency contact information. This is especially important when a reaction is left to run unattended for any period of time.
- Always use the hood sash at the designated position. There are two different types of hoods in the Chemistry Department: a vertical and horizontal front sash opening. Newer hoods have a vertical sash that can be slowly moved left and right. The working position is when both doors are closed. Older hoods have a horizontal that moves up and down. The working position is at the sash position labeled by the manufacturer on the side of the hood, approximately half way closed. To assure proper face velocity, always move the sash slowly and avoid rapid body movement when in front of the hood.
- Work is performed by extending the arms under the sash while keeping the head outside of the sash. Always attempt to keep the sash between the person and the hazard. Goggles and gloves are mandatory.
- Work at least six inches inside of the hood (behind the face). This assures that the highest concentration of the contaminant is away from the face of the person and the hood. Place equipment as far back as possible but do not block the back baffle.
- Use racks to support any equipment used in the hood. Avoid using large pieces of equipment in the hood that can block airflow.
- Never use a hood for chemical storage. Only a labeled spill kit and NFPA labeled vented safety bottles may be kept long term basis in a hood.
- Certain hoods in the Chemistry Department are designated for special use and have been modified for the specific hazard. Please use these hoods when necessary and try not to use them for general use. Examples of specific hoods
at Colby are Keyes 303C Hazardous Materials Hood (for the use of mutagenic chemicals such as ethidium bromide and acrylamide), Keyes 203 Heat Transfer Hood for the ICP, and Keyes 303 Cell Culture Hood for tissue culture with laminar flow hoods to maintain sterile environments (biohazards).

6.6.2. Schlenk lines are maintained in a glove box in Keyes 202 and under two hoods in Keyes 409. Schlenk lines consist of a dual manifold with several ports used to safely manipulate air sensitive compounds where one manifold is connected to a source of purified inert gas, while the other is connected to a high-vacuum pump. The inert gas line is vented through a bubbler, while solvent vapors and gaseous reaction products are prevented from contaminating the vacuum pump through a liquid nitrogen or dry ice/acetone cold trap. The lines may contain mercury.

6.6.3. A gas cylinder cage is found on the first floor of Keyes near the basement entry stairs. Full cylinders of flammable and nonflammable gases are housed and chained in the cage and empty cylinders chained next to the cage, with the caps on. All cylinders are marked as full or empty using cylinder tags stored on top of the cage.

6.6.4. Equipment requiring supplemental safety training by the PI:

- A laser system (laser), side room of Keyes 205.
- X-Ray Crystallography (radiation hazard) in Keyes 307
- Darkroom, (radiation hazard) Keyes 406A
- Tissue Culture Hood and Workspace (biohazard), Keyes 303
- Radiation Workspaces, Keyes 303A and Keyes 309

6.6.5. Equipment warranting extra instrumental safety procedures by the PI:

- An industrial microwave oven (microwave), Keyes 205.
- THF/Ether distillation apparatus (flammable), Keyes 203.
- (NMR) Nuclear Magnetic Resonance (magnetism, cryogen), Keyes 208
- Hazardous Materials Hood (mutagens), Keyes 303C
- Voltametry (use of mercury), Keyes 203.

7.0 REQUIREMENTS FOR CHEMICAL LABELING, TRANSPORT AND STORAGE

7.1. Chemical Labeling Requirements:

7.1.1. All Chemistry Department laboratories must maintain proper chemical labeling. Primary containers must have an intact label as printed by the manufacturer. If the label has become damaged or missing on usable chemicals review the MSDS/SDS to determine the correct language and relabel the container. (LSP, APPENDIX A and APPENDIX C)

7.1.2. Secondary containers used for long-term storage in laboratories must be marked with the product name as well as an NFPA diamond. This refers to any
solid or liquid chemical that has been transferred or mixed from a primary container. Review the MSDS/SDS to determine the correct language and label the container. (LSP, APPENDIX A and APPENDIX C)

7.1.3. Single use day containers under the control of the laboratory personal using the container do not have to be labeled.

7.1.4. Every Chemistry laboratory and prep room are supplied with several different styles of NFPA labels. Available from Departmental Safety Coordinator.

7.1.5. Every Chemistry teaching lab has additional GHS/NFPA labeling wall charts to aid required labeling.

7.2. **General Chemical Transport and Storage Requirements:**

7.2.1. Gas cylinders are found in use throughout the department. These cylinders must be properly supported with a cylinder sleeve that is attached to a permanent surface, never free standing. They should be labeled as IN USE. An appropriate regulator must be used. Regulators are gas specific. Door signage identifies laboratories containing gas cylinders.

- Use appropriate carts for transporting gas cylinders. The designated cart is housed in Keyes 203. Always use the chain to support the gas cylinder on the cart.

7.2.2. All Chemistry laboratories, prep rooms and inventory rooms are supplied with at least one designated (4L) plastic chemical carrier bucket, labeled for ownership, to be used for all chemical transport. If borrowed, please return the buckets to the proper location.

7.2.3. Use a lab cart to transfer larger items.

7.2.4. All refrigerator/freezers housed in a Chemistry laboratory, prep or storage room that contains hazardous materials must be an explosion proof unit. Chemicals need to be separated for incompatibilities and housed in secondary containment.

- The refrigerator/freezer in the Keyes Outside Flammables room is to be used for extremely flammable and/or explosive materials. This unit is wired to ground for safety against sparks. Secondary containment and dessication are supplied.

7.2.5. The Outside Flammables Room is to be used for all flammable chemicals not in active use. Solid flammables are stored alphabetically in the flammable cabinet on the wall. General use liquid flammables are stored on the top shelf (HPLC solvents) and on the left shelf unit. Specific lab solvents (not for general use) are marked with the PI name and stored on the center and right shelf unit. 20L drums of solvent are stored, but not stacked on the floor. This door is under Security card access.

7.2.6. Absolute (200 proof) and 95% (190 proof) ethanol is kept under special key and mandatory state inventory in the back closet in the Keyes Outside Flammables Room. Available from the Chemistry Departmental Safety Coordinator.

7.2.6. Keyes Room 4 is used for non-flammable chemical storage, and hazardous and radioactive waste storage. This room is under Security card access.
• Chemicals are separated by hazard and stored alphabetically. Liquids are limited to the bottom shelf. Oxidizing acids, non-oxidizing acids, bases, oxidizers and toxic chemicals are stored in labeled safety cabinets. Lewis acids, organic acids are separated and further separated from general use materials.
• Hydrofluoric acid is kept in a separate acid cabinet. (Refer to LSP for safety guidelines.)
• The right closet is the Hazardous Waste Storage Area (HWSA) that contains hazardous and nonhazardous waste from campus SAAs. The Chemistry Department Safety Coordinator moitors the contents of this room are for compliance (weekly schedule) by the Chemistry Department Safety Coordinator. The waste is emptied every 90 days.
• The closet on the left contains the radioactive waste. It is under the supervision of the RSO.

7.2.7. Keyes Room 6 is used to temporarily store chemicals that have been retrieved by safety trained personnel (hand card recommended at all times) from the Eustis mailroom. Packages are safely inspected for odors and/or leakage. Goggles and gloves are required. Unsafe packages are not opened and the Departmental Safety Coordinator is immediately notified. Safe packages are opened, inspected and stored on the shelf unit. All liquids are stored the bottom shelf only. A refrigerator and freezer unit is available. Larger items and drums/cases of solvents are stored on the floor. The PI is notified and is responsible for the prompt and safe storage of the material.

8.0 WASTE MANAGEMENT

8.1. Types of Laboratory Waste:

Lab waste may fall into a number of different categories and management requirements. It is the responsibility of the faculty member who oversees the laboratory to properly characterize and manage the waste generated in their labs.

8.1.1. Laboratory waste will fall under one or more of the following categories.
• Solid waste
• Hazardous waste
• Radioactive waste
• Biomedical waste

8.2. Hazardous Waste:

8.2.1. Per Federal and States laws, the properties of hazardous waste are defined as any substance that exhibits one or more of the following hazardous characteristics: IGNITABILITY (flash point less than 140F), CORROSIVE (pH less than 2 or greater than 12.5), REACTIVITY reactive to water, shock, heat, and/or pressure, or gives off toxic gases, or unstable and reacts rapidly or explosively, and TOXICITY (that which will leach more than a specified amount of heavy metals, pesticides, and carcinogens/mutagens). If you find a waste at your site that has no product information, please contact the CHO. Do not
assume that the waste is nonhazardous. The MSDS/SDS, bottle label and manufacturer's information are also resources in determining if the laboratory waste is a waste is hazardous.

- The Chemistry Department uses a flashpoint of less than 120°F.

8.2.2. The Chemistry Department discourages the use of and limits the accumulation of a class of chemicals which, when a certain shelf-life is exceeded, form explosive peroxide crystals. These chemicals not only place individuals and facilities at risk, the disposal of them, upon crystallization, require excessive monetary and other resources.

- Whenever any chemical is ordered, the Secretary provides the order information to the Laboratory Safety Coordinator. This information is routinely used for Chemistry Depart Inventory labeling. The Laboratory Coordinator will check each order for peroxide producing chemicals and will supply a secondary label that will identify the chemical as a peroxide forming compound and its expiration requirements (shelf-life) (APPENDIX A) based on when the container is opened. It is the PI's responsibility to supply the open date and the expiration on the label and apply the label to the bottle.

- Following, it is the responsibility of the PI to adhere to the shelf-life designated on the bottle label. Peroxide-forming chemicals should be routinely checked for peroxide formation using peroxide test strips. Expired bottles that test negative for peroxides are stored in the Hazardous Waste facility until the 90 day pickup. Any container that does test positive for peroxides, prior to or beyond the expiration date, or is deemed unsafe to be added to the next general hazardous waste shipment will require alternate treatment such as a punch and burn, and the faculty member who ordered the chemical is responsible for the notifying the CHO. Avoid touching or moving a suspect bottle.

- Factors that affect the rate of peroxide formation: exposure to air, light and heat, and contamination from metals.

- Store all peroxide forming chemicals away from sunlight. Use explosion proof refrigeration if flammable.

- Peroxide crystals may form on the container plug or threads of the lid. When twisted, detonation can occur. Never open a liquid organic peroxide or peroxide forming chemical if crystals or a precipitate are present

- Purchase peroxide forming chemicals with peroxide inhibitor (ex. BHT) whenever possible. Order quantities that can be used within expiration and disposal time limits.

- Do not distill, evaporate or concentrate any peroxide forming chemical until tested for the presence of peroxide.
• Label will include:

**WARNING: MAY FORM EXPLOSIVE PEROXIDES**

Store in a tightly closed original container. Avoid exposure to light, air, and heat.

If crystals, discoloration, or layering are visible, contact the Safety office immediately!

Check for peroxides before distilling or concentrating.

**THIS CHEMICAL HAS A LIMITED SHELF LIFE**

Container received on: __________ Container opened on: __________

Chemical Ordered by: ____________________________________________

(Name Of Faculty Member)

Test or dispose of _____ months after receipt

- Quantofix Peroxide 100 test strips are available upon request from the CHO and the Departmental Safety Coordinator to determine the level of peroxide formation in stored chemicals.

8.2.3. The Chemistry Departments limits the use of mercury thermometers, manometers, barometers, etc. to research laboratories and instrumental use. Mercury is a toxic heavy metal that must be treated as a hazardous waste.

- Non-mercury thermometers are highly recommended for all teaching laboratories. Such have red, blue or green nontoxic liquid and can be disposed of in a glass waste container. Do not put non-mercury thermometers in the general trash.

- Broken mercury thermometers do not go into the general trash, glass waste or sharps waste. Wearing proper PPE, use the Mercury spill kit to contain the solid mercury and to decontaminate the area. Specific directions are included in the Mercury spill kit. Place broken mercury glassware and any liquid or solid mercury waste in the designated container located in a Satellite Accumulation Area (SAA). Use a Kevlar glove or towel to break the thermometer, etc if it is too long for the container. Alternately, include the thermometer, etc with all of the contaminated items used to clean up the spill (including gloves) required to be stored in a ziplock bag labeled for contents and date of spill. Continue to follow spill response guidelines (Section 10.4).

- Voltammetry is an instrumental technique that requires the use of mercury, Keyes 203.

8.2.4. Hazardous waste must be accumulated/stored in a Satellite Accumulation Area (SAA) prior to disposal to the Hazardous Waste Storage Room in Keyes Room 4 (HWSA) by hazardous waste trained personnel.

8.2.5. The SAAs on campus listed in the LSP, APPENDIX B. A waste generator can use any of the campus SAAs as long as the SAA is approved and compatible with the waste.
The SAAs are clearly labeled and are monitored weekly for proper use. Each SAA has reminder sheets for waste identification, proper use, and separation based on incompatibilities.

- All Chemistry SAAs contain a properly labeled separate jug for each hazardous waste stream that is separated from incompatible waste by secondary containment whenever spaced permits. All SAAs include pH to test acidic and basic waste, a sharpie for marking the jugs and a funnel to avoid spillage, and a small mercury cleanup kit. SAAs in Keyes 303 and Keyes 309 also include ethidium bromide spill kits.

8.2.6. Guidelines for safe use of a SAA in the Chemistry Department follow:

- Identify if the waste is a hazardous or nonhazardous waste. Hazardous waste must be added to the SAA when work has been completed. It cannot be stored in any other container, even if labeled, closed, under a hood or accumulated while using an instrument. Use the MSDS/SDS. Nonhazardous waste can be put down a laboratory sink drain with copious amounts of water. Sink pipes are curved and can allow chemicals to accumulate in the plumbing. Chemical fumes, odors and unwanted reactions with unknown chemicals in the plumbing can be avoided by using lots of water upon disposal.

- Choose the properly labeled waste container that suits your hazardous waste. The Chemistry Department supplies properly labeled and separate containers for FLAMMABLES, OXIDIZERS, ACIDS, BASES, REACTIVES, HEAVY METALS, MERCURY and for any chemical(s) that are incompatible with most other compounds. Ethidium bromide and phenol /chloroform waste are routinely kept in separate containers.

- Solid waste is separated as nonhazardous/hazardous contents in separate containers with appropriate labeling. Nonhazardous solid waste is typically silica gel from spent columns with little chemical contamination and/or nonhazardous solid chemical waste. Hazardous solid waste is typically any hazardous solid chemical waste that has been used or produced in the laboratory. Often the contaminated weighing or filter paper is included.

- Check the label on the container to be sure that your waste is compatible with what is already in the container. If there is a compatibility issue, use a different SAA. Use the MSDS/SDS.

- You can move this container under a nearby hood to transfer the waste if it is difficult to use the SAA due to space constraints. After transferring the waste, always put the waste container immediately back into the SAA area.

- Check to see that the container is not leaking, bulging, etc.

- Remove the lid and use a funnel to add your waste. Spilling solvents will make the label illegible and potentially result in mixing of incompatibly waste. When complete, replace the lid and make sure that it is secure.

- Use a sharpie marker to label the contents added. Please use the chemical name, not a structure or formula. The MSDS/SDS and the important
information concerning incompatibilities and disposal are easier to locate by chemical name.

- A separate mercury waste container can be found in all SAAs. Place the mercury metal under the water in the container to contain mercury vapors. Liquid mercury spills are also added to the water. The containers are pre-labeled for mercury waste. Broken thermometers small enough to fit, may be placed directly in the container. A sealed, labeled plastic bag can also be used, if the thermometer cannot fit in the special SAA container.

- Ethidium bromide (EtBr) and acrylamide liquid and solid hazardous waste should be collected in a separate container in all SAAs near any workspace that uses these mutagens. An EtBr spill kit must be included in the workspace to ensure proper cleanup. Trace amounts of EtBr (less than 0.1%) in electrophoresis gels do not pose a serious hazard so they can be discarded in the trash if properly bagged and secured. If the gels contain more than 0.1% EtBr they should be placed in an appropriate container for hazardous waste disposal. Aqueous Solutions can be decontaminated or deactivated using charcoal filtration. The contaminated charcoal is considered EtBr solid waste.

- Any chemical, buffer or reagent mixture than has several known incompatibilities can have its own waste container (if room in the SAA allows). Contact the Departmental Safety Coordinator to add a SAA container.

8.3. Biomedical and Radioactive Waste:

8.3.1 The disposal of radioactive and biohazard wastes is described in the Colby College Radioactivity and Biohazard plans and will not be addressed in the DLSP. Contact the CHO or PI for information about radioactive and biohazard waste.

8.4. Sharps:

8.4.1 Needles and scalpels must never put in the general trash. All sharps must be disposed of in a designated sharps container found in every Chemistry Department laboratory and prep room. If the sharps container has a biohazard label included by the manufacturer, remove or cross off the biohazard information. Syringes that do not contain any hazardous materials may be put in the general trash. When full, the sharps container must be closed securely and placed in the waste room, Keyes 4, for disposal. This does not include syringes and sharps contaminated with biohazards or radioactive materials, which must be managed specifically as biohazard or radioactive waste. Available from the Chemistry Departmental Safety Coordinator.

8.5. Empty Bottles and Containers:

8.5.1 Empty bottles and containers need to be cleaned out, removed from inventory and disposed of properly.

- Air out empty flammable solvent bottles or odiferous containers under a hood before using the trash.
- To avoid unwanted smells, fumes or fires in trash cans, rinse all chemical containers well before disposal. Empty the liquid waste in an SAA if hazardous.
- It is recommended that the labels are removed or crossed out using permanent marker before disposal.
- Place the washed and empty containers in the labeled “empty bottle bins” that are located in every Chemistry Department laboratory and prep room. The Chemistry Department Safety Coordinator will routinely check the bins for container removal. If the container has a label, it will be removed from the departmental chemical inventory. If it does not have a label, the container with be placed in the appropriate waste receptacle.
- If a general bottle is damaged or broken, use the glass waste receptacle. Do not place in the general trash. When the glass trash container is full, please close, secure the lid with tape, and label as trash. Properly labeled secured glass boxes may be put into the dumpsters.
- Unbroken general glass containers can be placed in the general trash receptacle.
- Recycling an empty container is highly recommended.

9.0 HAZARD COMMUNICATION

9.1 Door Signs:

9.1.1. Every Chemistry Department laboratory, prep room, inventory and storage door will display a current list of the contact personnel for that workspace and GHS pictograms showing the hazards located in that room. This information is essential in the case of an emergency. (LSP, APPENDIX 3). Signage will also include a “no food or drink allowed” sticker.

9.1.2. The Chemistry Department will also include Hazard Identification forms (HIF) and Standard Operating Procedures (SOP) that will further aid in the identification of hazardous materials and/or procedures specific to that workspace. These forms are included in the package so that emergency personnel unfamiliar to the workspace can readily identify what hazards are present and where the hazards are located in the workspace before they enter the room. The HIF will identify the specific hazard and the location of each. The SOP will identify a specific hazard and/or procedure and how to best respond to that particular hazard. (APPENDIX B, C)

9.1.3. Inside each Chemistry Department laboratory, prep, inventory and storage room is a yellow sign that displays the emergency phone extension and several tips to ensure a safe working environment. Any faculty, staff or student that fail to follow this set of minimal rules will be asked to leave that workspace until willing to comply.

9.1.4. All door signage, HIFs and SOPs are reviewed and updated annually to ensure that he information is correct and current.

9.2 MSDS/SDS:

9.2.1. The MSDS/SDS hardcopy library is housed in the red binder in the Keyes third floor hallway.
9.2.2. Chemistry faculty, staff and students are also encouraged to use readily available online MSDS/SDS sheets, especially when the hardcopy cannot be located in the Keyes collection.

10.0 LABORATORY EMERGENCIES

The Chemistry Department uses door signage to display emergency information specific to every laboratory, prep, inventory and storage room. Included either on the door or inside the workplace is a green and white sticker that will display the location of the nearest spill kit and first aid kit.

10.1. General Guidelines:

- Everyone working with chemicals in the Chemistry Department should know what to do in the case of an injury, spill, fire, accident and any other emergency specific to that workplace. No one should start to work until they know the location and how to operate the emergency equipment, the location of available exits, their role in emergency response and how to report the emergency to summon help and document the event. All faculty, staff and students must be trained to know what to do in the case of an emergency. This is reviewed on page 2 of the DLSP and in all safety training modules.
- If you cannot assess the conditions well enough to be sure of your own safety, do not enter the area. Call emergency personnel and describe the situation as best you can.
- In the event of an accident or injury, do not leave the area until reporting the accident to a faculty member or Security.
- A written spill (LSP, APPENDIX E) and accident report (LSP, APPENDIX F) must be submitted to the CHO following the verbal report within 24 hours. The CHO will alert the Departmental Safety Coordinator of the event.
- When the Health Center (HC) is open, all minor/moderate student injuries should go to the HC for evaluations. The HC is open 8-8 Monday-Friday and 12-8 Saturday-Sunday.
- Injured victims must always be accompanied by other students or by Security when traveling to the Health Center or local hospital.

10.2. Chemical Injury Response:

10.2.1. General treatment of contaminated personnel:

- If an individual is injured, has ingested or is contaminated with a hazardous substance, the responder must tend to that individual before implementing spill control. If possible, obtain information about the materials being used and provide copies of the MSDS/SDS to the Health Center or other medical provider.
- For small areas of skin, immediately flush with flowing water for no less than 15 minutes.
- Large scale chemical contamination may require the use of an emergency shower (LSP, APPENDIX G). The Chemistry Department includes a yellow “Emergency Shower Duffle Bag” that includes goggles, towels and a blue
tyvek suit for privacy reasons. Bystanders must immediately contact Security at 859-5911 to summon emergency assistance.

10.2.2. **Chemical burns to the eyes:** Chemical eye burns result from eye contact with strong bases and acids. In the event of a chemical eye burn, the injured person must flush their eyes for 15 minutes in the emergency eyewash. Bystanders must immediately contact Security at 859-5911 to summon emergency assistance. (LSP, APPENDIX G).

10.2.3. **Treatment of Ethidium Bromide contamination:**
- In the case of eye contact, flush eye(s) with water for at least 15 minutes lifting upper and lower eyelids occasionally. If skin is exposed, remove contaminated clothing and wash skin immediately with soap and water.
- If EtBr vapors are inhaled, remove to fresh air. If swallowed, get medical attention immediately.

10.3. **Physical Injury Response:**

10.3.1. In the case of a minor injury, a first aid kit may be used to stabilize the wound if necessary seek medical attention. All personnel who work in a laboratory in which hazardous materials are used must be familiar with the location and use of the first aid kit.

10.3.2. In the event of a minor cut, seek immediate medical attention at the Health Center or local hospital. For large laceration immediately contact Security at 5911 (859-5911 from a mobile phone) and remain with the victim.

10.3.3. Immediately call emergency personnel if the injured person appears to be unconscious. Stay with the victim until help arrives.

10.3.4. If the victim is having convulsions, immediately call emergency personnel. If it is safe to enter the area, remove anything from the area that may cause harm to the victim. Stay with the victim until help arrives.

10.3.5. If the victim has a cryogenic burn, immediately call emergency personnel. Do not apply heat. Loosen clothing to promote circulation and flush the area with tepid water to reduce freezing. Stay with the victim until help arrives.

10.4. **Spill Response Guidelines:**

10.4.1. All personnel who work in a laboratory in which hazardous materials are used must be familiar with the location and use of the spill kit.
- Use sodium bicarbonate for acid spills, citric acid for base spills, absorbant/vermiculite material for solvent spills, and dykes/pillows to contain larger spills.
- Use a mercury spill kit for mercury spills.
- Use an EtBr spill kit for ethidium bromide spills.
- File a spill report.

10.4.2. Students are trained by the department to assist directly with minor spill response ONLY if they are familiar with the chemicals involved and comfortable with the quantity spilled.

10.4.3. **Minor Spill Response Procedure:**
- Always wear the appropriate PPE when responding to a spill.
• Never respond to a spill alone.
• Review the MSDS/SDS if unfamiliar with the chemical before responding.
• All spills must be documented on Spill Reporting Form (LSP APPENDIX E) and submitted to the CHO as soon as possible.

10.4.4. In the event of a large spill that poses an immediate threat to personal safety and cannot be safety controlled using a spill kit, immediately evacuate the area and any effected nearby areas and call Security. Stay nearby until help arrives so that you can report the situation to the emergency personnel.

10.4.5. Chemistry Spill Kits are found on every floor, in and outside of Keyes Room 4 and in the Keyes Outside Flammables Room. All kits are located by using the green and white Spill Kit sticker.
• Chemistry spill kits include: two sets of goggles, gloves, a box of ziplock bags, a sharpie, a dust pan and brush; a small mercury spill kit and a mercury spill kit for small and large spills; sodium bicarbonate, citric acid; and absorbent/vermiculite material contained in ziplock bags and dykes/pillows.
• The Chemistry Department also houses large wheeled drum of sodium bicarbonate for large acid spills in the Keyes basement hallway outside of Room 4.

10.4.6. The Chemistry Department does not maintain a Respirator Program.

10.5. Fires Response Guidelines:
10.5.1. Only trained responders are permitted to fight fires at Colby College. In the event of a fire alarm, if possible, stabilize any experiments and exit the building as quickly as possible. Congregate with the other building occupants at a safe distance from the building. Do not leave the area until told to do so by the responders.
10.5.2. The designated area for the Chemistry Department to meet in the case if a fire is on the Bixler Building lawn adjacent to the Chemistry Building.
10.5.3. Fire Response Procedures:
• The extinguishers are only to be used by trained personnel in the case of a small containable fire. Notify the CHO as soon as possible after an extinguisher is used. The CHO will notify the fire department and will see that the used extinguisher is replaced.
• Know your exit routes.
• Know the location of the nearest fire extinguisher, fire alarm-pull station, fire blanket, telephone, emergency contact list, safety showers.

11.0 RECORDS
11.1. Copies of the Chemistry DLSP are located in the Safety office, Security office, the secretary's office, every laboratory, prep, inventory and storage room and on the Chemistry Department computer image and web page.
11.2. Copies of the LSP are located in the Safety office, Security office, and the secretary's office for the programs and departments covered under this plan.
12.0 TRAINING

12.1. All laboratory personnel (including faculty, staff, research/honors students and classroom students) are required to be safety trained before starting any work in the Chemistry Department. All personnel will review, understand and follow all applicable safety rules and regulations that apply to the workplace and sign a safety agreement (LSP, Appendix D) that assures that they understand and agree to follow the Chemistry DLSP.

12.2. Student training sessions will include the requirements and use of the LSP/DLSP, MSDS/SDS, PPE, general safety rules, the location and use of emergency equipment including safety eye washes, showers, spill and first aid kits, chemical management, and emergency procedures for accidents and spills.

12.2.1. The Chemistry Department requires successful completion of the Colby College Moodle Safety Training Session and the Departmental Safety Training Course.

12.2.2. The Chemistry Department Safety Coordinator will show documentation of this training by maintaining copies of the signed safety agreements.

12.2.3. Additional training may be required for special procedures specific to a laboratory. The PI responsible for that lab will be required to deliver and enforce that training.

12.3. It is the responsibility of the department Chair and the supervising faculty member to train faculty and staff employees when employment begins. The training will consist of the contents of the LSP/DLSP, the employee’s right to know about workplace hazards, the departmental labeling system and policies, the location and use of MSDS/SDS, the determination of hazards, protective measures, location and operation of safety equipment, emergency procedures and reporting.

12.4. Students enrolled in 100 and 200 level chemistry laboratory classes will be safety educated by the faculty/staff laboratory instructor before any laboratory work begins. This information will be summarized in the class syllabus. At minimum, students will know where the LSP/DLSP are kept, what to do in the case of an emergency and the general safety rules of that workplace. Subsequent safety issues that arise from specific laboratory procedures must be addressed at the start of the laboratory session.

13.0 ENFORCEMENT

13.1. Failure to follow the policies and procedures outlined in the LSP/DLSP could result in disciplinary action up to and including expulsion from school for students and loss of employment for faculty and staff, not to mention serious injury and/or property damage.

13.2. To ensure that the guidelines in this document are being followed, the Colby EHS Director (CHO) and the Department Chair will conduct a biannual compliance inspection of each laboratory in the Chemistry Department. At least one of these inspections may include a representative(s) from a non-Colby third party.
APPENDIX A: PEROXIDE FORMING CHEMICALS

Applicable Chemicals: There are three classes of peroxidizable chemicals monitored by the Chemistry Department:

- **Class A** – These are chemicals that form explosive levels of peroxides without concentration upon exposure to air. These chemicals may be stored up to 12 months upon receipt, and must be periodically tested for peroxides upon opening, in a flammable materials storage area. They will be shipped as hazardous waste at the next hazardous waste shipment date after expiration.

- **Class B** – These are chemicals that form explosive levels of peroxides on concentration of impurities (distillation/evaporation). These chemicals may be stored up to 18 months upon receipt and must be periodically tested for peroxides upon opening in a flammable materials storage area. They will be shipped as hazardous waste at the next hazardous waste shipment date after expiration.

- **Class C** – These are chemicals that may autopolymerize as a result of peroxide accumulation and become explosive. These chemicals may be stored up to 18 months upon receipt, and must be periodically tested for peroxides upon opening, in a flammable materials storage area. They will be shipped as hazardous waste at the next hazardous waste shipment date after expiration.

Compounds of the following types are known to form peroxides (contains a peroxo (O-O) unit, a chemical formula of $\text{O}_2^2$):

A. Aldehydes.

B. Ethers, especially cyclic ethers, and those derived from primary and secondary alcohols.

C. Compounds containing benzylic hydrogen atoms, especially if the hydrogen atoms are on tertiary carbon atoms, e.g. cumene.

D. Compounds containing the allylic structure, including most alkenes.

E. Ketones, especially cyclic ketones.

F. Vinyl and vinylidene compounds.

**Class A Chemical List:**

- Butadiene (liquid)
- Chloroprene (liquid)
- Cumene

- Cyclohexene
- Diethyl ether

- Divinylacetylene
- Diethylene glycol dimethyl ether (diglyme)

- Dicyclopentadiene
- Isopropyl ether
- Methylacetylene

- 1-Octene
- 1-Pentene
- Tetrafluoroethylene

- Tetrahydroanaphthalene
- Vinylidene chloride
**Class B Chemical List:**

<table>
<thead>
<tr>
<th>Class B</th>
<th>Chemical List</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetal</td>
<td>Acetaldehyde</td>
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<tr>
<td>2-Butanol</td>
<td>2-Cyclohexen-1-ol</td>
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<tr>
<td>Diacetylene</td>
<td>Dioxanes</td>
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<tr>
<td>Furan</td>
<td>4-Heptanol</td>
</tr>
<tr>
<td>3-Methyl-1-butanol</td>
<td>Methylcyclopentane</td>
</tr>
<tr>
<td>Methyl isobutyl ketone</td>
<td>4-Methyl-2-pentanol</td>
</tr>
<tr>
<td>2-Pentanol</td>
<td>4-Penten-1-ol</td>
</tr>
<tr>
<td>2-Phenylethanol</td>
<td>2-Propanol</td>
</tr>
<tr>
<td>Vinyl ethers</td>
<td>Vinyl acetates</td>
</tr>
<tr>
<td>Other secondary alcohols</td>
<td>Vinyl pyridine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class C</th>
<th>Chemical List</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrylic Acid</td>
<td>Acrylonitrile</td>
</tr>
<tr>
<td>Chloroprene</td>
<td>Chlorotrifluoroethylene</td>
</tr>
<tr>
<td>Styrene</td>
<td>Tetrafluoroethylene</td>
</tr>
<tr>
<td>Butadiene</td>
<td>Methyl methacrylate</td>
</tr>
<tr>
<td></td>
<td>Vinyl acetylene (gas)</td>
</tr>
</tbody>
</table>
APPENDIX B: Hazard Information Form (HIF)

BUILDING: Department of Chemistry
ROOM: ______
DATE: ______

CHEMICAL STORAGE:
HAZARD: LOCATION:
___ ACIDS-CORROSIVES:
   (Hazard code – white)
___ BASES-CORROSIVES:
   (Hazard code – white)
___ (SUSPECT) CARCINOGENS
   TERATOGENS/MUTAGENS
   POISONS:
      (Hazard code – blue)
___ FLAMMABLE SOLIDS/LIQUIDS:
      (Hazard code – red)
___ OXIDIZERS:
      (Hazard code – yellow)
___ HIGHLY REACTIVE/INCOMPATIBLE/
   ACUTELY HAZARDOUS:
      (Hazard code – orange)

SPECIAL HAZARDS:
___ LASERS ___ MICROWAVES
___ RADIOACTIVITY ___ X-RAY
___ STRONG MAGNETIC FIELD ___ OTHER:
___ HIGH VOLTAGE ELECTRICITY
COMPRESSED GAS CYLINDERS:

___ He  ___ N₂  ___ O₂  ___ Ar  ___ CO₂  ___ H₂  ___ liquid N₂  ___ other:

SAFETY:

___ CHEMICAL SPILL KIT LOCATION:

___ MERCURY SPILL KIT LOCATION:

___ FIRE EXTINGUISHER(S) LOCATION:

___ NEAREST SATELLITE WASTE ACCUMULATION AREA:

___ OTHERS:
APPENDIX C: LABORATORY SPECIFIC STANDARD OPERATING PROCEDURE

Dept. of Chemistry

Date: __________
Principal Investigator: ____________________________________________
Telephone Number: ______________________________
Room and Building: ______________________________

A. (Please check all that apply):
   This is a hazardous ___ process/procedure (see step B).
   ___ chemical (see step C). **Chemical name:**

B. Describe the hazardous process/procedure:

C. Describe the hazardous chemical. (Please check all that apply):
   This hazardous chemical is:
   ___ a suspect or known carcinogen
   ___ is a suspect or known reproductive toxin (mutagen, teratogen)
   ___ highly toxic to humans
   ___ toxic to the environment
   ___ an irritant
   ___ corrosive
   ___ a sensitizer
   ___ a neurotoxin
   ___ a combustible liquid
   ___ a compressed gas
   ___ explosive
   ___ flammable
   ___ an organic peroxide
   ___ an oxidizer
   ___ pyrophoric
   ___ highly unstable (reactive)
   ___ water reactive
   ___ other (please explain):
D. Personal Protective Equipment (check all that apply):

___ Non-disposable gloves must be worn (please select type):
    ___ neoprene ___ PVC ___ nitrile ___ butyl rubber ___ viton TM
___ Impermeable disposable gloves must be worn (please select type):
    ___ latex/rubber ___ nitrile ___ vinyl
___ Temperature protection (Kevlar/Nomex/Zetex): ___ hot temps ___ cold temps
___ Lab coat or apron must be worn.
___ Safety glasses/goggles must be worn (___ UV protection ___ Laser protection)
___ Particle mask must be worn
___ Respirator must be worn. Please specify type. (Note: Must be respirator certified)
___ Hearing protection must be used. Specify type:
___ Other (please explain):

E. Engineering Controls (please check all that apply):

___ Fume hood must be used at all times
___ Laminar flow hood must be used at all times
___ “Hot-Hood” must be used at all times (carcinogens/mutagens)
___ Cold room should be used at all times
___ Inert atmosphere (glove box) must be used at all times
___ Protective barrier must be used (ex. laser light, etc.). Please describe:
___ Other (please explain):

F. Special Handling and Storage Requirements (please check all that apply):

___ Requires refrigeration
___ Requires freezing
___ Requires –80C freezing
___ Must be stored under inert atmosphere. Store under ________.
___ Known incompatibilities:

___ Inventory (NFPA) category:
___ Other (please explain):
G. Spill and Accident Procedures:

___ In the case of contact with eyes, immediately flush with copious amounts of water for at least 15 minutes (use safety eye wash).

___ In the case of contact with skin, immediately wash with soap and copious amounts of water.

___ In the case of a spill, departmental spill carts and procedures are sufficient.

___ In the case of a spill, evacuate the room immediately and call x5911 for cleanup.

Close the door, post a warning on the door and prevent any unauthorized entry into the area.

___ Other:

H. Decontamination Procedures:


I. Waste Disposal Procedures (refer to the MSDS Sheet):

___ Can be disposed of safely down the sink with copious amounts of water.

___ Must be disposed of in the SAA as a:

   ___ flammable ___ oxidizer ___ toxic/heavy metal ___ reactive

   ___ acid (pH less than 2) ___ base (pH greater than 12)

___ Incompatibilities (please list):
APPENDIX D: Door Signage
Keyes 6

Chemical Receiving Room

AUTHORIZED PERSONNEL ONLY

Brenda Fekete: Ext. 5768, Mobile no. 207-215-6644

Amy Poulin: Ext. 5750

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

Safety Glasses

Gloves

Laboratory Chemical Hazards:

Flammable Liquids
Oxidizing Liquids
Acute Toxicity
Skin Corrosion
Skin Irritation
OSHA, STOT, Aspiration Hazard
Keyes 4

Chemical Storage Room

AUTHORIZED PERSONNEL ONLY

Brenda Fekete: Ext. 5768, Mobile no. 207-215-6644
Wade Behnke: Ext. 5504, Mobile no. 207-861-1572

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

Safety Glasses  Gloves

Laboratory Chemical Hazards:

Flammable Liquids  Oxidizing Liquids  Acute Toxicity  Skin Corrosion  Skin Irritation  CMR®, STOF®, Aspiration Hazard
Keyes OS

Outside Flammables Room

AUTHORIZED PERSONNEL ONLY

Brenda Fekete: Ext. 5768, Mobile no. 207-215-6644

Wade Behnke: Ext. 5504, Mobile no. 207-861-1572

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

- Safety Glasses
- Gloves

Laboratory Chemical Hazards:

- Flammable Liquids
- Oxidizing Liquids
- Acute Toxicity
- Skin Corrosion
- Skin Irritation
- OMR®, STOT®, Aspiration Hazard
Keyes 107
Chemistry Prep Lab

AUTHORIZED PERSONNEL ONLY

Brenda Fekete: Ext. 5768, Mobile no. 207-215-6644
Lisa Miller: Ext. 5752, Home no: 872-2930

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

Safety Glasses  Gloves

Laboratory Chemical Hazards:

Flammable Liquids  Oxidizing Liquids  Acute Toxicity  Skin Corrosion  Skin Irritation  CMR®, STOP®, Aspiration Hazard
Keyes 111
Computational Chemistry Lab
AUTHORIZED PERSONNEL ONLY

Prof. Nick Boekelheide: Ext. 5761, Mobile no. 971-285-2851
Randall Downer: Ext. 4223

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911
Keyes 202
Inorganic Research Lab
AUTHORIZED PERSONNEL ONLY

Prof. Rebecca Conry: Ext. 5764, Mobile no. 207-313-6667
Brenda Fekete: Ext. 5768, Mobile no. 207-215-6644

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

Laboratory Chemical Hazards:
Keyes 203

Instrumentation Lab

AUTHORIZED PERSONNEL ONLY

Prof. Tom Shattuck: Ext. 5759, Home no. 207-872-2956
Prof. Whitney King: Ext. 5755, Mobile no. 207-649-9674
Chuck Jones: Ext. 5875, Mobile no. 207-649-4338

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

Safety Glasses  Gloves

Laboratory Chemical Hazards:
Keyes 204

Physical Organic Research Lab

AUTHORIZED PERSONNEL ONLY

Prof. Dasan Thamattoor: Ext. 5765, Mobile no. 207-649-1177

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

Safety Glasses  Gloves

Laboratory Chemical Hazards:

Compressed Gases  Flammable Liquids  Oxidizing Liquids  Acute Toxicity  Skin Corrosion  Skin Irritation  OMRI, SOTP, Aspiration Hazard
Keyes 205

Physical Chemistry Lab
Quantitative Analysis Lab

AUTHORIZED PERSONNEL ONLY

Prof. Tom Shattuck: Ext. 5759, Home no. 207-872-2956
Prof. Whitney King: Ext. 5755, Mobile no. 207-649-9674
Chuck Jones: Ext. 5875, Mobile no. 207-649-4338

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

Laboratory Chemical Hazards:
Keyes 206

Physical Organic Research Lab

AUTHORIZED PERSONNEL ONLY

Prof. Dasan Thamattoor: Ext. 5765, Mobile no. 207-649-117

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

Safety Glasses

Gloves

Laboratory Chemical Hazards:
Keyes 207A

Clean Room

AUTHORIZED PERSONNEL ONLY

Prof. Tom Shattuck: Ext. 5759, Home no. 207-872-2956
Prof. Whitney King: Ext. 5755, Mobile no. 207-649-9674

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

Safety Glasses  Gloves

Laboratory Chemical Hazards:

- Compressed Gases
- Flammable Liquids
- Oxidizing Liquids
- Acute Toxicity
- Skin Corrosion
- Skin Irritation
- CMR; STOPl; Aspiration Hazard
Keyes 208

Nuclear Magnetic Resonance (NMR) Lab

AUTHORIZED PERSONNEL ONLY

Prof. Tom Shattuck: Ext. 5759, Home no. 207-872-2956
Chuck Jones: Ext. 5875, Mobile no. 207-649-4338

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

Safety Glasses
Gloves

Laboratory Chemical Hazards:
Keyes 210
Organic Chemistry Research Lab
AUTHORIZED PERSONNEL ONLY

Prof. Jeff Katz: Ext. 5754, Mobile no. 207-465-6307

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

Safety Glasses
Gloves

Laboratory Chemical Hazards:
Keyes 214

Physical Chemistry Research Lab

AUTHORIZED PERSONNEL ONLY

Prof. Tom Shattuck: Ext. 5759, Home no. 207-872-2956

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

Safety Glasses  Gloves

Laboratory Chemical Hazards:
Keyes 303C

Biochemistry Research Lab

Hazardous Material Hood

AUTHORIZED PERSONNEL ONLY

Prof. Julie Millard: Ext. 5757, Home no. 207-437-2896

Brenda Fekete: Ext. 5768, Mobile no. 207-215-6644

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

- Safety Glasses
- Gloves

Laboratory Chemical Hazards:

- Flammable Liquids
- Oxidizing Liquids
- Acute Toxicity
- Skin Corrosion
- Skin Irritation
- CMR®, STOP®, Aspiration Hazard
Keyes 303B

Biochemistry Student Office

AUTHORIZED PERSONNEL ONLY

Prof. Julie Millard: Ext. 5757, Home no. 207-437-2896

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911
Keyes 303A

Biochemistry Radioisotope Lab

AUTHORIZED PERSONNEL ONLY

Prof. Julie Millard: Ext. 5757, Home no. 207-437-2896

Brenda Fekete: Ext. 5768, Mobile no. 207-215-6644

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

Safety Glasses
Gloves

Laboratory Chemical Hazards:

- Flammable Liquids
- Oxidizing Liquids
- Acute Toxicity
- Skin Corrosion
- Skin Irritation
- CMR®, STO®, Aspiration Hazard
Keyes 303
Biochemistry Lab

AUTHORIZED PERSONNEL ONLY

Prof. Julie Millard: Ext. 5757, Home no. 207-437-2896
Prof. Kevin Rice: Ext. 5763, Mobile no. 207-485-2381
Brenda Fekete: Ext. 5768, Mobile no. 207-215-6644

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

Safety Glasses  Gloves

Laboratory Chemical Hazards:

Compressed Gases  Flammable Liquids  Oxidizing Liquids  Acute Toxicity  Skin Corrosion  Skin Irritation  OSHA STOP! Aspiration Hazard
Keyes 305C

Cold Room

AUTHORIZED PERSONNEL ONLY

Chuck Jones: Ext. 5875, Mobile no. 207-649-4338
Prof. Kevin Rice: Ext. 5763, Mobile no. 207-485-2381
Prof. Julie Millard: Ext. 5757, Home no. 207-437-2896

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

Safety Glasses  Gloves

Laboratory Chemical Hazards:
Keyes 305A

Organic Chemistry Prep Room

AUTHORIZED PERSONNEL ONLY

Prof. Jeff Katz: Ext. 5754, Home no. 207-861-8258
Prof. Dasan Thamattoor: Ext. 5765, Mobile no. 207-649-1177
Edmund Klinkerch: Ext. 5762, Mobile no. 207-553-0816

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

- Safety Glasses
- Gloves

Laboratory Chemical Hazards:
Keyes 305

Organic Chemistry Lab

AUTHORIZED PERSONNEL ONLY

Prof. Jeff Katz: Ext. 5754, Home no. 207-861-8258
Prof. Dasan Thamattoor: Ext. 5765, Mobile no. 207-649-1177
Edmund Klinkerch: Ext. 5762, Mobile no. 207-553-0816

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

Laboratory Chemical Hazards:
Keyes 307

X-Ray Crystallography Room

AUTHORIZED PERSONNEL ONLY

Prof. Rebecca Conry: Ext. 5764, Mobile no. 207-313-6667
Chuck Jones: Ext. 5875, Mobile no. 207-649-4338

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

Safety Glasses  Gloves

Laboratory Chemical Hazards:

Flammable Liquids  Oxidizing Liquids  Acute Toxicity  Skin Corrosion  Skin Irritation  Aspiration Hazard
Keyes 309
Biochemistry Research Lab
AUTHORIZED PERSONNEL ONLY

Prof. Kevin Rice: Ext. 5763, Mobile no. 207-485-2381

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

- Safety Glasses
- Gloves

Laboratory Chemical Hazards:
- Compressed Gases
- Flammable Liquids
- Oxidizing Liquids
- Acute Toxicity
- Skin Corrosion
- Skin Irritation
- CMR®, STOPO, Aspiration Hazard
Keyes 406A

Dark Room

AUTHORIZED PERSONNEL ONLY

Prof. Julie Millard: Ext. 5757, Home no. 207-437-2896

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

Safety Glasses  Gloves

Laboratory Chemical Hazards:

Skin Irritation
Keyes 405A
General Chemistry Prep Room
AUTHORIZED PERSONNEL ONLY

Lisa Miller: Ext. 5752, Home no. 207-872-2930
Brenda Fekete: Ext. 5768, Mobile no. 207-215-6644

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

Safety Glasses  Gloves

Laboratory Chemical Hazards:

Flammable Liquids  Oxidizing Liquids  Acute Toxicity  Skin Corrosion  Skin Irritation  CMR®, STG®, Aspiration Hazard
Keyes 405

General Chemistry Lab

AUTHORIZED PERSONNEL ONLY

Prof. Nick Boekelheide: Ext. 5761, Mobile no. 971-285-2851

Lisa Miller: Ext. 5752, Home no. 207-872-2930

Brenda Fekete: Ext. 5768, Mobile no. 207-215-6644

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

- Safety Glasses
- Gloves

Laboratory Chemical Hazards:

- Flammable Liquids
- Oxidizing Liquids
- Acute Toxicity
- Skin Corrosion
- Skin Irritation
- CMR, STOT, Aspiration Hazard
Keyes 409
Inorganic Chemistry Lab

AUTHORIZED PERSONNEL ONLY

Prof. Rebecca Conry: Ext. 5764, Mobile no. 207-313-6667
Brenda Fekete: Ext. 5768, Mobile no. 207-215-6644

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

Safety Glasses  Gloves

Laboratory Chemical Hazards:

- Flammable Liquids
- Oxidizing Liquids
- Acute Toxicity
- Skin Corrosion
- Skin Irritation
- CMR®, STOT®, Aspiration Hazard
Keyes 406

Physical Organic Computational Lab

AUTHORIZED PERSONNEL ONLY

Prof. Dasan Thamattoor: Ext. 5765, Mobile no. 207-649-1177

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911
Keyes 409A
Inorganic Chemistry Prep Room
AUTHORIZED PERSONNEL ONLY

Brenda Fekete: Ext. 5768, Mobile no. 207-215-6644
Prof. Rebecca Conry: Ext. 5764, Mobile no. 207-313-6667

IN AN EMERGENCY CALL COLBY SECURITY AT 859-5911

PPE must be worn when using chemicals or hazardous procedures:

Safely Glasses
Glovers

Laboratory Chemical Hazard

Compressed Gases  Flammable Liquids  Oxidizing Liquids  Acute Toxicity  Skin Corrosion  Skin Irritation  CMR, STO, Aspiration Hazard