General Use SOP for Highly Reactive/Unstable Materials

#1	Process or Experiment Description

This standard operating procedure (SOP) is intended to provide general guidance on how to safely work with highly reactive/unstable materials. This SOP is generic in nature and only addresses safety issues pertaining to reactivity/stability hazards of chemicals. In some instances, several general use SOPs may be applicable for a specific chemical (i.e., for perchloric acid, both general use SOPs for highly reactive/ unstable materials and corrosives would apply). If you have questions concerning the applicability of any item listed in this procedure contact the Principal Investigator/Laboratory Supervisor of your laboratory or Environmental Health and Safety (x3-0448).

#2	Hazardous Chemicals/Class of Hazardous Chemicals

Highly reactive and unstable materials are those that have the potential to vigorously polymerize, decompose, condense, or become self-reactive under conditions of shock, pressure, temperature, light, or contact with another material. Examples of such substances are explosives, peroxides, water-reactives, self-reactives, and pyrophorics.

#3	Control of Hazards- General

• Minimize the quantity of reactive chemicals used or synthesized to the smallest amount needed.
• Handle reactive chemicals with caution. Appropriate chemical-specific precautions must be taken for mixing even small quantities with other chemicals.
• Chemical reactions conducted at temperatures or pressures above or below ambient conditions must be performed in a manner that minimizes risk of explosion or vigorous reaction.
• Provide a mechanism for adequate temperature control and heat dissipation.
• Utilize shields and barricades, and personal protective equipment (such as face shields with throat protectors and heavy gloves) whenever there is a possibility of explosion or vigorous chemical reaction.
• Glass equipment operated under vacuum or pressure must be shielded, wrapped with tape, or otherwise protected from shattering.

#3a	Engineering/Ventilation Controls

As many reactive materials liberate combustible and/or toxic gas when exposed to water vapor or air, they should be used in a lab hood to prevent hazardous buildup of gases.If the process does not permit the handing of such materials in a fume hood, contact Environmental Health and Safety at x3-0448 to review the adequacy of alternative ventilation measures.

#3b	Personal Protective Equipment

In addition to proper street clothing *(long pants (or equivalent) that covers legs and ankles, and close-toed non-perforated shoes that completely cover the feet)*, wear the following Personal Protective Equipment (PPE) when performing lab operations/tasks involving highly reactive and unstable materials:
• Safety goggles and face shield
• Flame-resistant lab coat (such as Nomex)
Additional PPE for pyrophoric and/or water-reactive substances:
• Appropriate chemical-resistant gloves (additional fire resistant gloves may be necessary depending on the task)
• Non-synthetic street clothing
Additional PPE for explosive substances:
• Heavyweight gloves (such as anti-static PVC gauntlets)
• Blast shield

#4	Special Handling Procedures and Storage Requirements

Ensure careful handling of handling materials that may be sensitive to shock, heat, friction, or light.Ensure secondary containment and segregation of incompatible chemicals per guidance within the SU Chemical Hygiene Plan. Also, follow any substance-specific storage guidance provided in MSDS documentation.Label all chemicals with date received and date opened and if an appropriate expiration date does not exist, assign one as provided within SU Safety Fact Sheet on Peroxide Forming Chemicals.Any chemicals with crystallization, visible discoloration, or liquid stratification potentially have undergone peroxidation and must not be used or otherwise disturbed. Refer to the SU Safety Fact Sheet on Peroxide Forming Chemicals.

#5	Spill and Accident Procedures

Prompt response to chemical spills is critical to protect worker health & safety and to mitigate adverse affects to the environment. For further guidance, refer to "Response to Chemical Spills and Exposures".Laboratory personnel who work with hazardous chemicals are to be provided the opportunity to receive medical attention/consultation when:
• A spill, leak, explosion or other occurrence results in a hazardous exposure (potential overexposure).
• Symptoms or signs of exposure to a hazardous chemical develop.

#6	Waste Disposal

Many reactive/ unstable materials intended for disposal may likely be considered hazardous wastes. For general guidance regarding waste disposal, refer to: http://web.stanford.edu/dept/EHS/prod/enviro/waste/index.html

#7	Minimum Training Requirements

• General Safety & Emergency Preparedness (EHS-4200)
• Chemical Safety for Laboratories (EHS-1900)
• Laboratory-specific training

#8	Approval Required

Consult with PI regarding need for prior approval. Laboratory personnel shall seek and the PI must provide prior approval of any chemical usage involving the following list of restricted chemicals.

#9	Decontamination Procedures

Personnel: If immediate medical attention is required, call x9-911 (or x286 in the School of Medicine). Remove any contaminated clothing, and IMMEDIATELY flush contaminated skin with water for at least 15 minutes following any skin contact. For eye exposures, IMMEDIATELY flush eyes with water for at least 15 minutes.
Consult MSDS for guidance on appropriate first aid. Where medical attention is required, ensure to bring along MSDS(s) of chemical(s) to aid medical staff in proper diagnosis and treatment.
Area: Decontamination procedures vary depending on the material being handled. The toxicity of some materials can be neutralized with other reagents. All surfaces should be wiped with the appropriate cleaning agent following dispensing or handling. Waste materials generated should be treated as a hazardous waste.

#10	Designated Area

For highly reactive/unstable materials that are also considered particularly hazardous substances, a designated area shall be established per other applicable SOPs.