

STANDARD OPERATING PROCEDURE

Procedure Title	
Procedure Author	
Date of Creation/Revision	
Name of Responsible Person <small>(The PI, Lab Supervisor, Research Lead or Autonomous Researcher)</small>	
Location to be Performed <small>(building/lab #)</small>	

#1	Process or Experiment Description: <i>Briefly summarize the process or experiment, including an estimate of how long the process takes and how frequently it will be conducted. Include total quantities (volume, mass) of the materials you to expect to use.</i>

#2	Risk Assessment: <i>Identify potential safety hazards.</i>															
#2a Physical Hazards: Mechanical hazards (pinch points; rotation/moving part); Pressure/vacuum; Thermal Hazards (heat/cryo); Electrical Hazards (fire, shocks, overloaded circuits; Slip, Trip & Fall Hazards (working from step ladder/ladder/elevated platform); Sharps/ sharp edges (needles, razors, sharp edges)																
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="5">Hazard Types <small>(Examples of common physical hazards)</small> <i>Check applicable physical hazards</i></td> </tr> <tr> <td><input type="checkbox"/> Mechanical</td> <td><input type="checkbox"/> Pressure/vacuum</td> <td><input type="checkbox"/> Electrical</td> <td><input type="checkbox"/> Thermal</td> <td><input type="checkbox"/> Sharps/sharp edges</td> </tr> <tr> <td><input type="checkbox"/> Slip/Trip/Fall</td> <td><input type="checkbox"/> Elevated work</td> <td><input type="checkbox"/> Elevated work</td> <td><input type="checkbox"/> Other</td> <td><input type="checkbox"/> Other</td> </tr> </table>		Hazard Types <small>(Examples of common physical hazards)</small> <i>Check applicable physical hazards</i>					<input type="checkbox"/> Mechanical	<input type="checkbox"/> Pressure/vacuum	<input type="checkbox"/> Electrical	<input type="checkbox"/> Thermal	<input type="checkbox"/> Sharps/sharp edges	<input type="checkbox"/> Slip/Trip/Fall	<input type="checkbox"/> Elevated work	<input type="checkbox"/> Elevated work	<input type="checkbox"/> Other	<input type="checkbox"/> Other
Hazard Types <small>(Examples of common physical hazards)</small> <i>Check applicable physical hazards</i>																
<input type="checkbox"/> Mechanical	<input type="checkbox"/> Pressure/vacuum	<input type="checkbox"/> Electrical	<input type="checkbox"/> Thermal	<input type="checkbox"/> Sharps/sharp edges												
<input type="checkbox"/> Slip/Trip/Fall	<input type="checkbox"/> Elevated work	<input type="checkbox"/> Elevated work	<input type="checkbox"/> Other	<input type="checkbox"/> Other												

List individual physical hazard associated with the procedure.

#2b Chemical Hazards:

See Appendix B for complete chemical hazard list with: SDS link, CAS#, GHS Signal word & Hazards

Significant Chemical hazards:

List significant chemical hazards - (Pyrophoric; Flammable; Carcinogenicity; Reproductive toxicity)

List individual chemicals used in the procedure below.

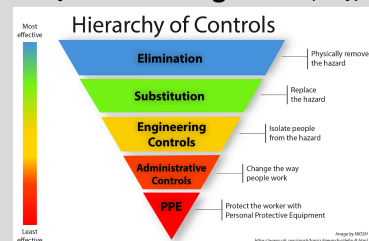
#2c Other Hazards:

Hazard Types <small>(Examples of other hazards)</small>				
<input type="checkbox"/> Radiological	<input type="checkbox"/> Noise	<input type="checkbox"/> Laser	<input type="checkbox"/> Ergonomics	<input type="checkbox"/> Noise
<input type="checkbox"/> Fire	<input type="checkbox"/> Spill	<input type="checkbox"/> Water Leak	<input type="checkbox"/> Other	<input type="checkbox"/> None

List individual other hazards associated with the procedure.

STANDARD OPERATING PROCEDURE

#3 Risk/Hazard Mitigation: *Specify all controls needed to mitigate hazards and safely perform research or experiment.*



#3a Engineering Controls: *(e.g. Ventilation- fume hood, pressure relief device, glove box, blast shielding, equipment interlocks)*

Engineering Controls	<i>Check applicable engineering controls to be used during procedure.</i>			
<input type="checkbox"/> Ventilation	<input type="checkbox"/> Interlocks	<input type="checkbox"/> Guarding	<input type="checkbox"/> Pressure relief	<input type="checkbox"/> Isolation / Shielding
<input type="checkbox"/> Glove Box	<input type="checkbox"/> Gas Cabinet	<input type="checkbox"/> Labeling	<input type="checkbox"/> Other	<input type="checkbox"/> None

List all engineering controls to be used during the procedure and the hazard being mitigated.

#3b Administrative Controls: *(e.g. signage, using IR thermometer to check for hot surface, training)*

Admin Controls	<i>Check applicable administrative controls to be used during procedure.</i>			
<input type="checkbox"/> Safety Signage	<input type="checkbox"/> Equipment/ instrument training	<input type="checkbox"/> OJT (on the job training)	<input type="checkbox"/> JSA	<input type="checkbox"/> Housekeeping
<input type="checkbox"/> Related SOPs	<input type="checkbox"/> Labeling satellite containers	<input type="checkbox"/> Other	<input type="checkbox"/> None	<input type="checkbox"/>

List all administrative controls to be used during the procedure and the hazard being mitigated.

#3c Personal Protective Equipment and Other Safety Equipment: *(specify type of gloves – nitrile, latex, etc.; lab coats; goggles/face shield/laser eyewear; respiratory protection, etc.):*

PPE	<i>Check applicable PPE to be used during procedure.</i>			
<input type="checkbox"/> Gloves	<input type="checkbox"/> Eye / Face protection	<input type="checkbox"/> Body (lab coat, apron)	<input type="checkbox"/> Foot protection	<input type="checkbox"/> Respiratory Protection
<input type="checkbox"/> Head	<input type="checkbox"/> Fall protection	<input type="checkbox"/> Other	<input type="checkbox"/> None	

List all PPE or other safety equipment to be used during the procedure and the hazard being mitigated.

#4 Step-By-Step Operating Procedure: *Provide a sequential description of work, including details such as chemical concentrations and when special safety equipment is to be utilized. Include temperature, pressure, and other experimental conditions. Schematics, or pictures are suggested for complex set ups.*

STANDARD OPERATING PROCEDURE

Lists sequential step-by-step process of procedure with enough detail that a scientist not familiar with the process could complete it safely from start to finish.

#5 **Designated Area:** *Where highly toxic materials, highly flammable/pyrophoric, highly corrosive, reactive/unstable, or nanomaterials are used, identify the designated work area(s), and the necessary personnel decontamination after completion of work.*

List labs or specific areas of the lab that the steps of the process must be performed in. (e.g. using acid hood, hoods with particulate filter, glove box, etc.

#6 **Special Handling Procedures, Transport & Storage Requirements:** *Describe special handling and storage requirements for hazardous chemicals in your laboratory, especially for highly reactive/ unstable materials, highly flammables, and corrosives. Describe transport and secondary containment requirements, between the laboratory and beam lines or between facilities.*

#7 **Shipping and Receiving Requirements:** *Describe shipping or receiving requirements, especially for highly toxic, highly reactive/ unstable materials, highly flammables, and corrosives.*

#8 **Waste Disposal:** *Identify amounts of waste anticipated and appropriate disposal procedures.*

#9 **Training Requirements:** *List the general and lab-specific trainings required. Please list all training courses.*

STANDARD OPERATING PROCEDURE

Course #	SLAC Required Badge Access
*219	Employee Orientation to ES&H
*291 /291PRA	Ergonomics Training-Office Worker / <i>Practical only is voluntary</i>
Course #	ESD ESH Training for Experimental Spaces (<i>minimum</i>)
*105	Haz Waste Management/ Refresher
*120	Work Planning Control Overview (WPC)
*128	Laboratory Safety Orientation
*PJB101	Pre-Job Briefing Checklist and Tool Training (Core)
Course #	Required Training for Lab/Specific Process
	Additional Training Requirements: (training on specific equipment/instruments; laser, RGD, pressure, etc)
#10	Approval Required: <i>Identify any tasks that require prior approval by the PI/ Laboratory Supervisor (e.g., use of Restricted Chemicals and other higher hazard chemicals, and running of higher hazard operations). List Subject Matter Experts (SMEs) consulted for approval.</i>
Procedures must at a minimum be approved by: <ul style="list-style-type: none"> • Author • PI/SME/Equipment Custodian or Super-user must peer review and approve • Laboratory Manager • ESH Coordinator • Laser or Radiation SMEs must approve for experiments/equipment with laser or radiation generating devices (RGDs) 	
Appendices or Attachments:	Appendix Date of Implementation (Revision Date)
Appendix A	E m e r g e n c y P P r

STANDARD OPERATING PROCEDURE

	o c e d u r e s (m a n d a t o r y)	
Appendix B	C h e m i c a l H a z a r d I n f o r m a t i o n (m a n d a t o r y)	

STANDARD OPERATING PROCEDURE

	y)	
Appendix C	S c h e m a t i c s / D r a w i n g (o p t i o n a l)	
Appendix D	T a b l e s (o p t i o n a l)	

SIGNATURE(s)

Approved by: _____
Author

Approval date: _____

STANDARD OPERATING PROCEDURE

Approved by: _____
PI/SME/Custodian

Approval date: _____

Approved by: _____
Lab Manager

Approval date: _____

Approved by: _____
ESH Coordinator

Approval date: _____

STANDARD OPERATING PROCEDURE

Appendix A - Emergency Procedures

Emergency Procedures: *Indicate how spills, personnel exposure/injury, and other accidents should be handled and by whom. List emergency contact numbers.*

Lab occupants will notify lab Lab Manager, ESH Coordinator, Principle Invest(s) or researcher leader: in the event of accidents (e.g. injuries, fires, spills/releases, leaks) occur during work in the laboratory.

Life-threatening emergencies (e.g. fire/smoke, explosion, large-scale spill or release, compressed gas leak, valve failure)

1. Call 911.
2. Alert people in the vicinity and activate the local alarm systems.
3. Evacuate the area and go to emergency assembly point (EAP). Indicate EAP here.
4. Remain nearby to advise emergency responders.
5. Once personal safety is established, call ext. 5555 to activate internal response.
6. Provide local notifications.

If personnel exposed or injured

1. Remove the injured/exposed individual from the area, unless it is unsafe to do so because of the medical condition of the victim or the potential hazard to rescuers.
2. Administer first aid as appropriate.
3. Flush contamination from eyes/skin using the nearest emergency eyewash/shower for a minimum of 15 minutes. Remove any contaminated clothing.
4. Bring to the hospital copies of safety data sheets (SDSs) for all chemicals to which the victim was exposed.
5. Call the SLAC Occupational Health Center at ext. 2281 for more information and to schedule an appointment.

Safety Shower/Eye Shower

Use safety shower/eyewash for any serious chemical self-contamination.
self-contamination.

1. 15-minute rinse for both safety shower and eye wash
2. Clothes should be removed in the event of clothing contamination
3. Towel and clean disposable coverall available near Eyewash/Safety Shower station

Non-life-threatening emergencies

1. Call ext. 5555 to activate internal response.
2. Provide local notifications.

STANDARD OPERATING PROCEDURE

Appendix A - Emergency Procedures (continued)

For small spills / local cleanup

In the event of a minor spill or release that can be cleaned up by local personnel (personnel are authorized via work planning and control to handle spilled material, appropriate PPE is available, compatible spill response material is readily available in sufficient quantity, and cleanup is safe):

1. Notify personnel in the area and restrict access. Eliminate all sources of ignition.
2. Review the SDS for the spilled material or use your knowledge of the hazards of the material to determine the appropriate level of protection.
3. Wearing appropriate personal protective equipment, clean up spill. Collect spill cleanup materials in a tightly closed container. Manage spill
4. cleanup debris as hazardous waste.
5. Submit waste pickup request (<https://www-group.slac.stanford.edu/esh/forms/hazpickup.pdf>) to Waste Management.

Building maintenance emergencies (for example, power outages, plumbing leaks)

Submit a Facilities service request (https://slacprod.servicenowservices.com/self_service?id=facilities) or call appropriate building manager.

Location of Nearest Emergency Safety Equipment:	
Item:	Location: <i>Building/RM and location description</i>
Eyewash/Safety Shower	
First Aid Kit	
Chemical Spill Kit	
Fire Extinguisher	
Telephone	
Fire Alarm Manual Pull Station	

Emergency Contacts: <i>(name, phone #, email)</i>			
Title	Name	Phone #	Email
Lab Manager (LM)			
ESH Coordinator			
Supervising Principle Investigator (PI)			
Research Leader			
Building Manager			

Additional Emergency Procedures:

STANDARD OPERATING PROCEDURE

Appendix B- Chemical Hazards

Chemical Hazards: Use chemical name, CAS#. GHS Signal word and Hazard statements. Link SDS.

List chemicals below-

Chemical Name /CAS#	GHS Signal Word	GHS Hazard Statements
<i>Sample:</i> Acetone /67-64-1	Danger	<ul style="list-style-type: none">● Highly flammable liquid and vapor● Causes serious eye irritation● May cause drowsiness or dizziness
		<ul style="list-style-type: none">●●●
		<ul style="list-style-type: none">●●●
		<ul style="list-style-type: none">●●●
		<ul style="list-style-type: none">●●●
		<ul style="list-style-type: none">●●●

STANDARD OPERATING PROCEDURE

Appendix C – Schematics/Drawing *(optional)*

STANDARD OPERATING PROCEDURE

Appendix D – Tables *(optional)*