UNIVERSITY OF NEVADA, RENO LAB RISK ASSESSMENT TOOL

Date: _____ Lab Supervisor: _____ Lab Location: _____

List All Individuals Involved:

Type of Work: ☐ Developmental ☐ Routine

STEP 1: HAZARD ANALYSIS

Sequence of Steps and Actions	Hazards Associated with Step or Action	Required Controls or Procedures

List of Chemicals Used

Chemical	Volume or Weight

List Procedure Conditions, Particularly Temperature and Pressure:

Hazard Summary (check all that apply): All checked items must be addressed in SOP or work plan.

☐ Toxic Chemicals ☐ Flammability ☐ Pyrophoric ☐ Corrosive ☐ Shock Sensitive ☐ High Pressure ☐ High Vacuum

☐ High Temperature ☐ Low Temperature ☐ Electrical ☐ Other _____

Procedure Controls Summary (check all that apply): All checked items must be addressed in SOP or work plan.

Engineered Controls

☐ Fume Hood ☐ Biosafety Cabinet ☐ Special Ventilation ☐ Shielding ☐ UV Protection

☐ Pressure Relief/Vessel Testing & Inspection ☐ Equipment Guarding

Personal Protective Equipment (PPE)

☐ Hand Protection ☐ Standard Lab Coat ☐ Flame Resistant Lab Coat ☐ Eye Protection ☐ Respiratory Protection ☐ Special PPE

Other Controls

☐ Fire Extinguisher ☐ Spill Cleanup Kit ☐ Special Controls _____

STEP 2: RISK ASSESSMENT[1]

Complete the risk assessment as part of the procedure review. For each category, select the item which most accurately describes the lab situation. After scoring, interpret the score using the guidelines in the "Recommended Actions" section. The lab supervisor can increase or decrease the assessment based on the situation. Use of this template and the scoring criteria are intended for use as guidelines to assist researchers in evaluating laboratory operations, they are not meant to replace the judgement of the lab supervisor in ensuring safe laboratory operations.

Chem Volume(s):	Micro (< 0.5 L)

Hazard Recognition: (only the highest score is used):

Flammable:	None
Corrosive:	None
Toxic:	None
Cryogenic:	None
Nanomaterials:	None
Process Conditions:	Ambient
Explosive Hazard:	No
Radiation Hazard:	None
Other Hazard (please specify):	None
Other Hazard (please specify):	None
Inhalation Tax:	None
Reactive:	None
Procedure:	Detailed and Written

Personnel Preparedness and training:	Fully Trained and Qualified
Ventilation:	Hood Used
Shielding Needed:	Used
Equip Maintenance and Testing:	Regularly Performed
Total Score:	3

Recommended Actions Based on Score

Low risk (scores lower than 15): Procedures can be performed with routine precautions.

Moderate risk (scores between 15 and 25): Procedures can be performed with attention given to specific hazards. Supervision is recommended.

High risk (scores between 26 and 30): Procedure may be performed if ncessary. High level attention must be given to all hazards. High level, continuous supervison is mandatory.

Extreme Risk (scores higher than 30): Procedure must be revised to reduce risk.

1: The hazard analysis and risk assessment templates were adapted (with permission) from the LAB RAT developed by Advanced Chemical Safety.

STEP 3: WHAT-IF ANALYSIS

Ask What-If questions to identify potential failure scenarios associated with each procedural step listed in Section 1 that could lead to personnel exposure or injury, fire, over-pressurization/explosion, release of chemicals, or other incidents. Below are a few examples of What-If questions that should be considered but other identified deviations must also be evaluated.

Human Factors/Errors: drop/spill chemical, wrong chemical used, chemical too concentrated or dilute, valve not opened/closed or out of sequence.
Utilities: loss of power (and automatic re-start); loss of laboratory ventilation; loss of water, air, gas.
Experimental Equipment: over-pressurization/loss of pressure relief, incorrect temperature/loss of temperature control, glassware breakage during reaction, failure of equipment cooling, air/water intrusion or leak.

For each What-If answer, make a judgment about its probability and consequences. If the conclusion of the probability and consequence is considered unacceptable, a mitigation control or the need for further action is recorded. If the conclusion is considered to be acceptable, then indicate "no action required."

What If?	Answer	Probability[2]	Consequences[2]	Recommendations

[2] See Appendix I for guidance on estimating probability, consequence, and resulting risk, and response expectations.

Appendix I
Guidance on Estimating Probability, Consequences, and Risk[1]

Laboratory hazard risk is calculated by multiplying the Probability of Occurrence Value (OV) by the Severity of Consequences Value (CV). Probability of occurrence values are listed in Table 1 and severity of consequences values are listed in Table 2. Table 3 lists the hazard risk ratings resulting from the various combinations of probability and severity. Lastly, Table 4 provides general response expectations for each risk level.

Table 1. Probability of Occurrence Values (OV)

Occurrence Value (OV)

Rating	Value	Percent	Description
Not Present	0	0%	Item/operations is not present
Rare	1	1-10%	Rare
Possible	2	10-50%	Possible
Likely	3	50-90%	Likely
Almost Certain to Certain	4	90-100%	Almost Certain to Certain

Table 2. Severity of Occurrence Values

Severity of Consequences

Consequence Rating	Value	Impact to Personnel Safety	Impact to Resources	Impact to Work Performance	Property Damage	Impact to Reputation
No Risk	1	No injuries	No Impact	No Delays	Minor	No Impact
Minor	5	Minor Injuries	Moderate Impact	Modest Delays	Moderate	Potential Damage
Moderate	10	Moderate to Life Impacting Injuries	Additional Resources Required	Significant Delays	Substantial	Damaged
High	20	Life Threatening Injuries From a Single Exposure	Institutional Resources Required	Major Operational Disruptions	Severe	Loss of Confidence

Table 3. Hazard Risk Rating

Severity of Consequences (CV)

Probability of Occurrence (OV)				
OV	CV=1 No Risk	CV=5 Minor	CV=10 Moderate	CV=20 High
OV=4	RR=4 Low	RR=20 High	RR=40 High	RR=80 Critical
OV=3	RR=3 Low	RR=15 Medium	RR=30 High	RR=60 Critical
OV=2	RR=2 Low	RR=10 Medium	RR=20 High	RR=40 High
OV=1	RR=1 Low	RR=5 Low	RR=10 Medium	RR=20 High
OV=0	RR=0 Not Applicable*	RR=0 Not Applicable*	RR=0 Not Applicable*	RR=0 Not Applicable*

*Not Applicable, RR = 0: the material or process is not present in the laboratory

Table 4. Risk Level and Response Expectations

Risk Level and Response Expectations

Risk Level	Expectation of Response
Low	Acceptable risk level - monitor and manage.
Medium	Tolerable risk level - implement corrective action and consider additional controls.
High	Tolerable risk level with strict controls and oversight – implement mitigating and corrective actions with routine monitoring and oversight.
Critical	Intolerable risk level – implement mitigating and corrective actions, engage higher levels of management.

[1]Identifying and Evaluating Hazards in Research Laboratories: A Report of the Hazards Identification and Evaluation Task Force of the American Chemical Society Committee on Chemical Safety, American Chemical Society: Washington, DC, 2013.