

Research Laboratory Safety Self-Inspection:

Chemical & Physical Safety Checklists

|  |  |
| --- | --- |
| Principal Investigator: | Department: |
| Lab Building: | Inspector Name: |
| Lab Rooms: | Inspection Date: |

**Instructions: Use the checklists below to conduct a chemical and physical safety self-inspection for the hazards in your laboratory. Click the arrow next to each heading to expand the relevant sections for your lab hazards.**

# Chemical and Physical Safety (Documents, Training, PPE)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Is the Lab Specific Lab Safety Manual and Chemical Hygiene Plan (LSM-CHP) completed, updated as necessary, and signed? |  |  |  |  |
| Is a chemical inventory complete, updated and accessible? |  |  |  |  |
| Are Safety Data Sheet (SDS) for all chemicals available, organized and accessible? Is there back-up access in case primary access is not available? Are SDSs for highly hazardous materials in printed form? |  |  |  |  |
| Is EH&S Chemical and Lab Safety training completed and documented for all current lab personnel? |  |  |  |  |
| Is lab-specific training provided by the PI or designated individual, and documented for all lab personnel? |  |  |  |  |
| Is EH&S Hazardous Waste Training completed, current and documented for all lab personnel? |  |  |  |  |
| Are optimum coverage clothing and maximum coverage shoes worn in the laboratory? |  |  |  |  |
| Are equipment for eye and face protection available, accessible, in good condition and suitable for specific hazardous materials handled in the lab? (e.g., safety glasses, safety goggles, face shield, UV shield) |  |  |  |  |
| Are gloves for hand protection available, in good condition, suitable for specific hazardous chemicals and other hazards handled in the lab? (e.g., latex, nitrile, leather, cryogen, autoclave) |  |  |  |  |
| Are lab coats available, in good condition and suitable for the hazardous materials being handled? |  |  |  |  |
| Is splash apron available and in good condition for handling corrosives? |  |  |  |  |
| Is appropriate ear protection available for protection against unusually loud equipment and/or procedures? |  |  |  |  |
| If a respirator/s is/are present in the lab, are lab personnel medically cleared and fit tested to use the respirators? |  |  |  |  |
| Has a lab manager been appointed and been provided training to perform delegated responsibilities such as maintaining safety equipment and documentation for the lab? |  |  |  |  |

# Routine Chemicals

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Are chemicals segregated based on compatibility? |  |  |  |  |
| Are hazardous chemicals stored below shoulder level but not on the floor? |  |  |  |  |
| Are chemicals stored in appropriate cabinets with secured shelving? |  |  |  |  |
| Are flammables stored in appropriate fire-rated cabinets or flammable-safe refrigerator or freezer? |  |  |  |  |
| Are chemicals kept in capped, sealed leak-proof containers and stored upright? |  |  |  |  |
| Are labels on original containers intact and readable? |  |  |  |  |
| Are containers of working solutions and mixtures labeled properly? |  |  |  |  |
| Is the amount of highly hazardous chemicals and chemicals with relatively short shelf-life reasonable for research need? |  |  |  |  |
| Are cabinets used to store hazardous chemicals labeled? |  |  |  |  |
| If chemicals are transported or moved to and from the lab, are lab personnel following guidelines described in the Chemical Transport policy? |  |  |  |  |

# Ventilation and Air Quality

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Does room ventilation appear to eliminate chemical fumes and/or odors in the laboratory? |  |  |  |  |
| Is a chemical fume hood available for use of corrosives, volatile flammable and/or inhalation hazards? |  |  |  |  |

# Fume Hood

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Is a chemical fume hood available for use of corrosives, volatile flammable and/or inhalation hazards? |  |  |  |  |
| Is fume hood certified by EH&S within the last 12 months or after a recent repair? |  |  |  |  |
| Is fume hood airflow within 80-150 lfm? |  |  |  |  |
| Is fume hood free of stored unnecessary items? |  |  |  |  |
| Is fume hood sash clear and in good condition? |  |  |  |  |
| Are fume hood side panels intact? |  |  |  |  |
| Is fume hood airfoil and baffle openings free of obstruction? |  |  |  |  |
| Is fume hood lighting in good working condition? |  |  |  |  |
| Is fume hood alarm, if present, in good working condition? |  |  |  |  |
| Is proper fume hood sash height adjusted based on fume hood use or status? |  |  |  |  |
| Is fume hood work surface clean and free of chemical spill? |  |  |  |  |
| Was the fume hood ASHRAE 110 certified by a third party after installation? |  |  |  |  |
| Are portable chemical fume hoods properly certified, used and maintained? |  |  |  |  |

# Benchtop, non-ducted Fume Hood

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Is fume hood certified and maintained? |  |  |  |  |

# Compressed Gases

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Is gas cylinder located away from high traffic areas, doorways, electrical sources, heat sources? |  |  |  |  |
| Are gas cylinders segregated by chemical compatibility? |  |  |  |  |
| Is gas cylinder secured? |  |  |  |  |
| Is gas cylinder labeled? |  |  |  |  |
| Are cylinders that are not in use (not connected to a system/process) have their regulators removed and the cylinder capped? |  |  |  |  |
| Are gas lines/tubings visible from source to point of use and not hidden behind walls, ceiling tiles and other obstruction? |  |  |  |  |
| Are gas lines in good condition? |  |  |  |  |
| Are gas lines clearly labeled from point of source to end of use when there are multiple gas lines or when the gas source is not in direct line of sight from the point of use for a single gas line? |  |  |  |  |
| Are gas valves and connections leak tested and leak free? |  |  |  |  |
| Is gas cylinder transported with cylinder cart? |  |  |  |  |
| Are old gas cylinders disposed of properly or returned to the vendor? |  |  |  |  |
| Are gas cabinets labeled? |  |  |  |  |
| Are blow guns/gas nozzles used for cleaning and other approved purposes regulated at 30 psi or below? |  |  |  |  |

# High hazard gases-Toxic

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Is the amount of gas reasonable for the procedure so that the IFC's MAQ for highly toxic gases is not exceeded in the control area where the lab is located? |  |  |  |  |
| Is toxic gas concentration reasonable for lab procedure? |  |  |  |  |
| Is cylinder of toxic gas secured, stored and dispensed in ventilated gas cabinet or chemical fume hood? |  |  |  |  |
| Is gas specific detector installed at point of release and point of use, and calibrated bi-annually or as recommended by the manufacturer? |  |  |  |  |
| Is gas detection system for toxic gas attached to an alarm system that is monitored 24 hours a day? |  |  |  |  |
| Is written SOP for use of toxic gas available, contains all required information, approved by PI and signed by authorized users? |  |  |  |  |
| Are authorized users of toxic gases trained on safe handling of compressed gases, cylinder change-out and specific SOPs? Are their trainings documented? |  |  |  |  |
| Is written SOP for cylinder change-out available and followed? |  |  |  |  |
| Is replacement date written on the portable gas detector? |  |  |  |  |

# High hazard gases-Oxidizer

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Is written SOP available for oxidizing gas? |  |  |  |  |

# High hazard gases- Highly toxic gas

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Is the amount of gas reasonable for the procedure so that the IFC's MAQ for highly toxic gases is not exceeded in the control area where the lab is located? |  |  |  |  |
| Is highly toxic gas concentration reasonable for lab procedure? |  |  |  |  |
| Is cylinder of highly toxic gas secured, stored and dispensed in ventilated, sprinklered gas cabinet or chemical fume hood? |  |  |  |  |
| Is gas specific detector installed at point of release and point of use, and calibrated bi-annually or as recommended by the manufacturer? |  |  |  |  |
| Is gas detection system for highly toxic gas attached to fire alarm system that is monitored 24 hours a day? |  |  |  |  |
| Is written SOP for use of highly toxic gas available, approved by PI and signed by authorized users? |  |  |  |  |
| Are authorized users of highly toxic gases trained on safe handling of compressed gases, cylinder change-out and specific SOPs? Are their trainings documented? |  |  |  |  |
| Is written SOP for cylinder change-out available and followed? |  |  |  |  |

# High hazard gases-Corrosive

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Is written SOP for use of corrosive gas established? |  |  |  |  |
| Is corrosive gas stored/used inside a ventilated enclosure such as a fume hood or gas cabinet? |  |  |  |  |
| Is a gas sensor and alarm system installed and maintained (calibrated, sensor replaced) to detect accidental release of corrosive gas? |  |  |  |  |
| Are gas lines for corrosive gas free of signs of corrosion? |  |  |  |  |

# High hazard gases-Flammable

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Is a written SOP for use of flammable gas established? |  |  |  |  |
| Are non-sparking tools available for cylinder change-out? |  |  |  |  |
| Is gas cylinder in appropriate location? |  |  |  |  |
| Are tubing used appropriate for the type of gas and rated for the pressure by which the gas is being dispensed from the cylinder? |  |  |  |  |
| (Horizon) Are gas sensors available to detect leaks of specific flammable gases? Are the sensors connected to the building detections system? |  |  |  |  |

# High Hazard liquids and solids

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Are written standard operating procedures (SOPs) established for all high hazard chemicals and processes? Are SOPs reviewed annually and updated as necessary? |  |  |  |  |
| Have lab personnel authorized to work with high hazard chemical and procedures received SOP-specific training and this training documented by signing the written SOPs? |  |  |  |  |
| Are SDSs attached to the SOP or are they printed out and organized in a binder? |  |  |  |  |
| Are amounts of highly hazardous chemicals stored reasonable based on the needs of approved experiments or procedures? |  |  |  |  |
| Are equipment hazards, and procedure hazards, if any, addressed in the SOP? Are photographs, diagrams or illustrations used to add clarity to the SOP? |  |  |  |  |

# High-hazard liquids and solids- Flammable liquid (5 gal or more container)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Is solvent pump or safety pouring device available and used for dispensing from large flammable liquid containers? |  |  |  |  |
| Is 55-gal drum containing flammable liquid properly grounded and bonded? |  |  |  |  |
| Is volume of flammable below the maximum allowable quantity within the control area? |  |  |  |  |

# High-hazard liquids and solids- Pyrophoric liquid

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Is written SOP for use of pyrophoric liquid available, signed and implemented? |  |  |  |  |
| Are authorized users of pyrophoric liquid trained on safe handling of pyrophoric liquid and their training documented? |  |  |  |  |
| Is flame-resistant clothing and flame-resistant lab coat available and used when handling pyrophoric liquid? |  |  |  |  |

# High-hazard liquids and solids- Peroxide formers

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Do containers of peroxide formers indicate date of receipt and date opened? |  |  |  |  |
| Are peroxide formers discarded according to their expected shelf-life and ability to form peroxides? |  |  |  |  |
| Is inhibited counterpart of the peroxide former purchased if available and usable? |  |  |  |  |
| If peroxide testing is performed, are testing results clearly documented in a logbook or on the container? |  |  |  |  |

# High-hazard liquids and solids- Emits flammable gas (Water reactive)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Is a class D fire extinguisher available in the lab? |  |  |  |  |

# High Hazard liquids and solids- Health hazard- HF

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Is calcium gluconate gel and calcium gluconate eyewash (if applicable) available and not expired? |  |  |  |  |
| Is neoprene gloves, tyvek suit, acid resistant apron, acid resistant shoe cover, face shield available? |  |  |  |  |
| Is HF signage posted in HF work area? |  |  |  |  |
| Is written HF SOP available, and signed by PI and authorized users? |  |  |  |  |
| Is HF-specific procedure and safety training of authorized users performed and documented? |  |  |  |  |
| Is HF spill kit available? |  |  |  |  |
| Is amount and/or concentration of HF on hand reasonable for research needs? |  |  |  |  |
| Is HF, when stored with other compatible acids, stored in secondary containment, clearly labeled and separated from other containers in the cabinet as far as possible? |  |  |  |  |
| Is HF stored in the same room where it is used? |  |  |  |  |

# High Hazard liquids and solids- Health hazard - Mercury

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Is mercury spill kit available? |  |  |  |  |
| Is alcohol-based thermometer used if mercury thermometer is not necessary? |  |  |  |  |
| Is a written SOP for safe use of mercury developed, signed and reviewed annually? |  |  |  |  |

# High Hazard liquids and solids- Skin corrosion/burns- $\leqq $ 2% HF

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Is calcium gluconate gel and calcium gluconate eyewash (if applicable) available and not expired? |  |  |  |  |
| Is HF signage posted in HF work area? |  |  |  |  |
| Is written HF SOP available, and signed by PI and authorized users? |  |  |  |  |
| Is HF-specific procedure and safety training of authorized users performed and documented? |  |  |  |  |
| Does the container of HF-containing product or prepared solution clearly labeled that it contains HF? |  |  |  |  |

# High-hazard liquids and solids- Cryogen

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Is cryogen tank/dewar stored in a well-ventilated area? |  |  |  |  |
| Is oxygen monitor available where cryogen tanks are stored in a room with unreliable ventilation? |  |  |  |  |
| Are required PPE (cryogen gloves, face shield) available and used when handling cryogens? |  |  |  |  |
| Are necessary precautions observed so that the potential for oxygen displacement is minimized when transferring liquid nitrogen inside a confined space or a small room? |  |  |  |  |
| Is large dewar positioned so that pressure release port is turned away from the direction of egress? |  |  |  |  |

# Nanomaterials

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Is written SOP developed for use of nanomaterial? |  |  |  |  |
| Is nanomaterial handled inside the fume hood? |  |  |  |  |
| Are proper PPEs used when handling nanomaterials? |  |  |  |  |
| Are personnel authorized to work with nanomaterials trained specifically for safe use of this hazard and is the training documented in the CHP? |  |  |  |  |

# High Hazard Equipment and Processes

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Is a written safety SOP available, approved and signed by the Principal Investigator and reviewed annually and updated as needed? |  |  |  |  |
| Are lab personnel authorized to use hazardous equipment or perform hazardous process provided hazard-specific training? Is training documented by signing written SOP or in the lab-specific training section of the CHP and Lab Safety Manual? |  |  |  |  |
| Is manufacturer-issued safety manual available for reference? |  |  |  |  |
| Are built-in safety mechanisms in place, accessible, and functional? |  |  |  |  |
| Is periodic maintenance check performed and documented? |  |  |  |  |
| Is a written lock-out tag-out procedure available and implemented when equipment is being serviced? |  |  |  |  |
| Are moving parts of equipment and pinch points guarded so long as the operation of the equipment is not obstructed by guarding? |  |  |  |  |
| Are equipment or specific parts of equipment properly labeled to communicate hazards present? |  |  |  |  |
| Are laboratory equipment located away from egress and where access by unauthorized personnel are avoided? |  |  |  |  |
| Are equipment with radiation source (x-ray, laser, etc.) evaluated by and registered with EH&S Radiation Safety? |  |  |  |  |

# High Hazard Equipment and Processes- Sharps (needles, scalpels, blades)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Are blades, scalpels, needles and other sharps stored properly (sharp edges guarded) when not in use? |  |  |  |  |

# High Hazard Equipment and Processes- Uninterrupted Power Supply (UPS)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Are UPS units under service contract for battery testing, maintenance and replacement after the warranty period expires? |  |  |  |  |
| Is there a 36" clearance around the UPS and are combustible materials kept away from it? |  |  |  |  |

# High Hazard Equipment and Processes- Vacuums

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Is there a solvent trap present before house vacuum line or vacuum pump? |  |  |  |  |

# High Hazard Equipment and Processes- Process/experiment with electrical hazards including high voltage manipulations

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Are electrically insulated personal protective equipment available and used? |  |  |  |  |
| Are lab personnel trained on electrical safety and is training documented? |  |  |  |  |
| Is written Standard Operating Procedure available for specific task/procedure or experiment that uses high voltage? |  |  |  |  |

# Hazardous Chemical Waste

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Are used chemicals that are hazardous (toxic, corrosive, flammable, reactive) collected as hazardous waste? |  |  |  |  |
| Is waste storage minimized in the lab? |  |  |  |  |
| Is official USC Hazardous Waste tag used to label containers? Are full chemical names written out and is the writing legible and readable? |  |  |  |  |
| Is chemical waste container capped and sealed unless waste is actively being added to the container? |  |  |  |  |
| Is container used for collection compatible with the waste? |  |  |  |  |
| Are only compatible chemicals combined in a waste container? |  |  |  |  |
| Is waste container filled to the level where there is head space to allow liquid expansion? |  |  |  |  |
| Is designated collection area in the vicinity of where waste is generated? |  |  |  |  |
| Are waste containers on secondary containment if stored on the floor? |  |  |  |  |
| Is chemical waste removed from the lab accumulation area within 6 months of generating the waste or as soon as 10-gallon limit is reached; whichever comes first? |  |  |  |  |
| Are old, contaminated, deteriorating and/or unused, unidentified or unlabeled chemicals discarded as hazardous waste and purged from the chemical inventory? |  |  |  |  |
| Are hazard classes of chemical waste indicated on the container label? |  |  |  |  |

# Wastes other than chemical, biological or radioactive

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Is broken glass collected in sturdy cardboard box, lined with thick plastic bag or in plastic bucket and not overfilled and/or more than 10 lbs? |  |  |  |  |
| If broken glass is collected in a plastic bucket with a lid, is the plastic bucket discarded when full rather than the contents transferred to a cardboard box and then reusing the bucket? |  |  |  |  |
| Are empty chemical containers disposed of? |  |  |  |  |
| Are syringes and needles and other sharps such as blades and scalpels, etc. used for chemical/mechanical work disposed of appropriately? |  |  |  |  |
| Are other non-RCRA waste such as metal shavings or dust from any cutting/machining operations collected and disposed of properly? |  |  |  |  |
| Are used oil, used lamps, bulbs and batteries or other universal waste collected in compatible containers, labeled and disposed of according to USC Policy? |  |  |  |  |

# DEA Controlled Materials

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Are controlled materials stored in secured place? |  |  |  |  |
| Are required permits available and current? |  |  |  |  |
| Is annual inventory and usage log kept current? |  |  |  |  |
| Are expiration dates closely monitored and expired materials disposed of properly? |  |  |  |  |

# Field Research

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Do you have a copy of the Field Research Safety guidance; has this been discussed with the project team? |  |  |  |  |

# Others- Emergency Lighting

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Questions | Yes | No | N/A | Comments or Deficiencies\* Indicate room where deficiency is identified |
| Are emergency lighting available? |  |  |  |  |