NORTHEAST STATE

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CHEMICAL HYGIENE PLAN

Safety, Security and Plant Operations Office

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Purpose

The purpose of the Northeast State Community College Chemical Hygiene Plan (CHP) is to protect employees and to reduce the risk of injury from chemical hazards associated with laboratories. This is accomplished by establishing responsibilities, policies, and procedures for handling hazardous chemicals and through the development and implementation of work practices and control measures expressly tailored to the various laboratories present at the college. Additionally, this plan serves as a guide for the various departments as they develop their specific Chemical Hygiene Plans. The plan is written to follow *OSHA's Occupational Exposure to Hazardous Chemicals in Laboratories* standard (29 CFR 1910.1450).

Responsibilities

The President of Northeast State Community College (NeSCC) is ultimately responsible for the safety of all employees. The President oversees the administration of safety policies through the normal chain of authority within the institution.

The Vice President for Academic Affairs is responsible for laboratories, which utilize hazardous chemicals.

The Safety, Security and Plant Operations Office is responsible for developing and implementing the overall safety program for the college. Duties are as follows for the Chemical Hygiene Plan director:

- Develop and maintain this written plan and perform annual reviews.
- Monitor compliance with the program including periodic inspections.
- Assist supervisors, directors, and division leads in the implementation of the program.
- Assist with fulfilling all training requirements.
- Investigate all reported accidents that result in exposure to hazardous chemicals.
- Provide guidance on hazardous waste handling and disposal.

Departments that have Laboratories

- Appoint a Chemical Hygiene Officer (OSHA Coordinator) to facilitate the implementation of the program.
- Ensure that all necessary personal protective equipment (PPE) is available.
- Ensure necessary and required training is provided to potentially exposed employees.
- Monitor and enforce compliance.

Departmental Chemical Hygiene Officers

- Perform surveys/inspections to ensure laboratories follow this program.
- Ensure that new employees are oriented to this standard when initially hired.
- Maintain all departmental records required by the program.
- Review the CHP annually and revise as needed. Review must be documented in writing. The documentation may be as simple as writing a statement on the cover page stating that the annual review has been performed.
- Ensure that appropriate personal protective equipment is worn by all laboratory personnel and visitors.
- Ensure that all Hazardous Waste containers are appropriately labeled.
- Creates and revised safety rules and regulations.

Methods of Compliance Policy

Procurement

- Personnel should order the smallest quantity necessary to complete the work.
- Personnel who initiate purchase requests should review health and safety data on chemicals prior to ordering to determine any special requirements for handling, storage, or disposal. Staff and faculty should substitute non-hazardous chemicals whenever possible.
- Safety Data Sheets (SDS) for chemicals used at Northeast State Community College must be readily available for review in the area where they are used. If a department cannot obtain an SDS, they should contact the Safety, Security and Plant Operations Office immediately. Safety Data Sheets (SDS) are available through the msdsonline.com link found on the laboratory computer desktop or by contacting the Environmental Health, Safety and Sustainability office.

All containers of chemicals received for use should:

- Be clearly labeled as to contents.
- Identify appropriate hazard warning. Chemicals that are converted to the new GHS standard shall be labeled with either:
    - Product Identifier
    - Signal Word
    - Hazard Statement
    - Pictogram
    - OR: Product Identifier and adequate information about the hazards
- List the name and address of the manufacturer/importer/or responsible party.
- Be inspected upon receipt to ensure they are intact and not leaking. Damaged or unlabeled containers should not be accepted.

NOTE: Under no circumstances are marked bottles to be filled with any chemicals other than what is on the label.

Chemical Storage

- Chemical storage inside the laboratory should be limited to those chemicals necessary for work in progress. Central storerooms shall be used when they are available. Chemicals should not be stored on the bench. Open shelves should be designed with a restraining device or lip to prevent containers from creeping or tipping over.
- Oxidizers, reducing agents, and fuels should be stored separately in the event of an accident.
- Chemicals shall be inspected at least semiannually to determine their condition. Corroded or leaking containers should be turned in as hazardous waste.
- SDS label information should be followed for storage requirements.
- Maintain existing labels on incoming containers of chemicals and other materials.
- Cabinets, storage areas, and transfer vessels, including, but not limited to, beakers, flasks, reaction vessels, and process equipment shall be labeled.
- Chemical shipments should be dated upon receipt and stock rotated.
- Chemicals should not be stored in the chemical hood, on the floor, in areas of egress, on the benchtop, or in areas near heat or in direct sunlight.
- Highly hazardous chemicals (per SDS) should be stored in a well-ventilated and secure area designated for that purpose.

Flammable and Combustible Liquids

- The quantity of flammable and combustible liquids stored in a laboratory shall not exceed 60 gallons.
- Flammable and combustible liquids shall be stored in glass, metal, or plastic containers that meet the requirements of NFPA 30.
- Flammable and combustible liquids shall be stored in approved cabinets designed following NFPA 30. Cabinets should not be located adjacent to an exit or in a stairwell.
- Refrigerators and freezers used to store flammable liquids shall be explosion-proof or “laboratory safe” following NFPA 45. Do not store food or beverages in the refrigerators.

Water Reactive Chemicals

Water-reactive chemicals shall be segregated from other chemical storage. These chemicals should be stored in approved cabinets designed following NFPA 30. If approved cabinets are not available, containers should be over-packed in a metal can during storage.

Water-reactive chemicals shall not be stored with flammable or combustible liquids. Cabinets used for storage of water-reactive chemicals shall be posted “CAUTION – WATER REACTIVE CHEMICAL. DO NOT USE WATER TO EXTINGUISH FIRE”.

Shock Sensitive Chemicals

Unless the manufacturer has added an inhibitor, unopened containers of shock sensitive chemicals should be turned in after 12 months of storage. Once opened, shock sensitive chemicals should be turned in as hazardous waste after 6 months of storage.

Shock sensitive chemicals shall be prominently noted on the inventory.

Compressed Gases

General Requirements:

- Gas cylinders shall be properly labeled.
- Gas cylinders shall be properly secured.
- When gas cylinders are in storage, hand valves shall be tightly closed, and the valve protector cap shall be in place.
- Compressed gas from cylinders shall be reduced using a regulator specifically designed for that purpose.

Reduction valves, gauges, and fittings used for oxygen shall not be used for other gases. Likewise, valves, gauges, and fittings used for other gases shall not be used for oxygen.

Storage Requirements:

- Gas cylinders stored outdoors shall be protected from the elements. Gas cylinders shall not be stored near sources of ignition, heat, or open flames.
- Full and empty gas cylinders shall be stored in separate locations. Empty gas cylinders shall be appropriately marked.
- Gas cylinders shall not be stored in the laboratory. The number of cylinders should be limited to the number necessary to complete work in progress.

Transporting Chemicals

Toxic, flammable, or corrosive chemicals should be placed in a carrying bucket or other unbreakable container when moved between rooms or through the laboratory corridors.

Wheeled carts should be used to move larger quantities of chemicals, which cannot be hand-carried. Freight elevators, where available, should be used to move chemicals between floors. Passenger elevators shall not be used when personnel are on board.

Compressed gas cylinders shall be moved using a suitable hand truck. The gas cylinder shall be strapped in place with the valve protector cap installed. Only one cylinder shall be moved at a time.

Engineering Controls

Engineering controls including fume hoods, glove boxes, local exhaust ventilation, and substitution of less toxic chemicals should be used to minimize exposure to all hazardous chemicals in the laboratory.

Laboratory operations, which involve chemicals with a PEL or TLV of 100 ppm or less (gas or vapor) or 1.1 mg/m3 or less (aerosol) shall be planned and conducted using appropriate engineering controls. High-risk operations shall be conducted inside primary containment including chemical hoods and glove boxes. Low-risk operations where the potential for generation of gas, vapor, or aerosol contamination is remote, may be conducted on the open bench.

Chemical Hoods

Hoods shall have an average face velocity of 80 to 120 feet per minute (fpm) with the sash in the marked open position. Hoods will have a red arrow indicating the proper open operating position. Individual velocity readings should be within 20 fpm with the exhaust on and the hood raised 18 inches.

Hood performance shall be evaluated at least annually and after any repair or modification to the ventilation system.

Hoods that are used for toxic compounds or reproductive toxins shall be evaluated monthly to ensure they are operating at the proper face velocity.

Local Exhaust Ventilation

Design/performance criteria for local exhaust ventilation should be with following the Industrial Ventilation Manual (latest edition).

System Performance shall be evaluated annually and after any repair or modification.

Air Balance

Laboratories should be maintained under negative pressure for corridors and administrative areas. In areas where local exhaust systems such as hoods are used as the primary means of control, general ventilation should provide 4 to 12 air changes per hour. Laboratories not under negative pressure should be evaluated and a plan of corrective action developed.

Adequate conditioned make-up air shall be provided to ensure the safe operation of the ventilation system.

Administrative and Work Practice Controls

Handling Chemicals

- Working quantities of hazardous chemicals outside of storage during an operation shall be as small as practical. Containers shall be closed when not in use.
- Care should be taken to minimize aerosol formation during complex manipulations. Electrostatic powders and other solid materials shall be handled in solution whenever feasible.
- Mouth pipetting shall be prohibited.

Laboratory Glassware

- Handle and store laboratory glassware with care to avoid damage. Damaged glassware should not be used.
- Glassware used for pressure or vacuum service shall be designed specifically for that purpose.

Chemical Hoods

- Work with the hood sash closed as much as possible during the operation.
- Keep all apparatus and containers at least 6 inches behind the face to minimize spillage from the hood.
- Keep the slot in front of the lower hood baffle free from obstructions. Elevate all Necessary apparatus and equipment.
- Minimize the storage of chemicals or hazardous waste inside the hood. Use approved cabinet or satellite storage locations.
- Minimize foot traffic past the open face of the hood.
- If the hood sash is supposed to be partially closed for operation, the hood should be labeled, and the appropriate closure point clearly marked.

Protective Clothing and Equipment

Eye Protection:

- Eye protection shall meet the requirements of ANSI Standard Z87.1 (latest edition).
- Eye protection suitable for the operation being conducted shall be worn in all laboratories where hazardous chemicals are handled or stored.
- Chemical goggles shall be worn during operations where a splash hazard exists or where corrosives are used.
- Face shields shall be worn when additional eye/face protection is necessary against splash or projectiles.

- Face shields shall be used in combination with approved eye protection.
- Lab instructors should review to determine if contact lenses should not be worn in the laboratory.
- Visitors shall comply with the above requirements.

Gloves:

- Gloves shall be worn to minimize potential skin contact with hazardous chemicals. Selection of gloves should be based on the potential and severity of liquid contamination as well as their suitability for the operation performed. Safety Data Sheets should be consulted to determine the type of glove material to be used.

- The following glove discipline shall be followed:
    - Gloves shall be visually inspected for cuts, tears, and degradation before each use. A leak test shall be performed to identify pinholes. Damaged or leaking gloves shall be discarded.
    - Gloves shall be decontaminated and removed as soon as practical if contaminated during an operation. Once contaminated, gloves shall be discarded.
    - Personnel should become proficient at doffing gloves to prevent cross-contamination. Employees shall wash their hands with soap and water after gloves have been removed.

Footwear:

- Laboratory personnel are to wear closed-toe shoes. The use of sandals or sneakers is prohibited.

Eyewash/Safety Showers:

- The design and installation of new equipment shall comply with ANSI Standard Z358.1 (latest edition).
- Equipment shall be inspected by the user periodically to determine if it is functional. Safety showers and eyewash stations shall be inspected weekly.
- Signs should be used to post the location of each eyewash and safety shower in the laboratory.
- Equipment shall always be accessible. Personnel shall not store equipment, apparatus, or containers in front of eyewash or safety showers.

Air Monitoring

When there is a reasonable probability that employee exposure exceeds the action level for a chemical, the Safety, Security and Plant Operations Office should be contacted to arrange for any necessary air monitoring.

Information and Training

Personnel shall be provided with information and training to ensure they are informed of chemical hazards in the laboratory. The following health and safety information shall be provided:

- Contents of the OSHA Laboratory Standard and its appendices.
- Location and availability of the Chemical Hygiene Plan.
- Signs and symptoms associated with exposure to hazardous chemicals used in the laboratory.
- Location and availability of reference material including SDSs.
- Personnel handling hazardous chemicals shall be trained and able to answer verbally the following questions:
    - What is the objective of the Occupational Exposure to Hazardous Chemicals in the Laboratory Standard?
    - What hazardous chemicals do they work with, and what are their long and short-term effects?
    - How can they detect the presence, concentration, and/or release of the hazardous chemicals they work with?
    - What measures are or can be taken to protect themselves from overexposure in the event of an emergency?
    - What are the medical provisions of the standard?
    - Where is the information, such as the Chemical Hygiene Plan, located, and has it been explained?

Personal Hygiene

Personnel shall wash their hands after handling hazardous chemicals.

Personnel shall shower after abnormal circumstances, which result in chemical contamination to the neck, arms, legs, or body.

Mouth pipetting is prohibited.

First Aid

For severe injury or illness dial 911 or 423-677-7926 (campus police), report the nature and extent of the emergency, and await medical support. Render the appropriate first aid.

The following general first aid procedures should be followed in the event of chemical contamination or acute exposure:

- Eye contact: Immediately flush eyes with water for at least 15 minutes. Hold eyelids apart to ensure adequate irrigation. Seek prompt medical attention.

- Skin contact: Immediately flush the affected area with water and remove contaminated clothing. Wash the area with hand soap or mild detergent to remove any residual contamination. Seek prompt medical attention.
- Non-corrosives: If the victim is conscience and not having convulsions, dilute by drinking a glass of water or milk, discontinue dilution if it makes the victim nauseous. Seek prompt medical attention.
- Caustics: Indications of ingestion of strong acids, alkalis, or petroleum products include burns around the victim's lips or mouth or a characteristic order. Tissue damage in the mouth and throat is immediate (within 30 seconds) and progressive. When liquid caustics, especially strong alkalis, have been swallowed, the value of diluting is questionable. Stimulating the victim to vomit will cause more damage. Seek prompt medical attention.
- Inhalation: Move employees away from the exposure to fresh air. Begin rescue breathing if breathing has stopped. Use CPR if the heart has stopped.

Medical Surveillance

Medical examinations and consultation shall be performed by or under the direct supervision of a licensed physician at a reasonable time and place. Each case will be reviewed and handled by the Human Resources Department and Worker's Compensation to ensure employees receive the examination and appropriate compensation.

Employees shall be provided an opportunity to receive medical attention, including any follow-up examinations, that the examining physician determines to be necessary under the following circumstances:

- When an employee develops signs or symptoms associated with occupational exposure to a hazardous chemical.
- When air sampling reveals exposure levels routinely above the action level or, in its absence, the PEL for an OSHA-regulated substance. Medical surveillance shall comply with the requirements of that standard.

Medical consultation shall be provided whenever an abnormal event such as a spill, leak, or explosion takes place in the laboratory. Its purpose shall be to determine whether a subsequent medical examination is necessary.

For required medical examinations and consultations, the examining physician shall provide a written opinion, which includes the following:

- Any recommendations for further medical follow-up.
- Results of the medical examination and diagnostic tests.
- Any medical condition that may be revealed during the examination that places the employee at increased risk because of exposure to a hazardous chemical found in the workplace.

- A statement that the employee has been informed by the physician of the results of the consultation or medical examination and any medical condition that may require further examination.

Waste Management

- Laboratory wastes shall be handled and disposed of following Northeast State Hazardous Waste Management Manual
- Chemicals shall be handled and stored in such a way that their identity is retained from initial receipt or production to use or ultimate destruction whenever feasible. Then chemicals are combined and become part of a laboratory waste mixture; a record of all chemicals in the mixture shall be maintained.
- Personnel shall minimize the generation of hazardous waste whenever feasible. Common methods of waste minimization include substitution of less hazardous chemicals, process changes, recycling, or reuse. Plans should be outlined in the Hazardous Waste Reduction Plan.
- Non-hazardous chemical waste shall be disposed of according to existing guidance. If guidance is not available, request assistance from the Safety, Security and Plant Operations Office.
- Chemical Waste should be accumulated near the point of generation by the laboratory workers.
- Each waste type should be stored in a compatible container pending transfer or disposal and should be clearly labeled and kept sealed when not in use. Labels should include the accumulation start date and hazard warnings as appropriate.
- Waste chemicals should be stored so that they do not interfere with normal laboratory operations.
- A record (log) shall be kept whenever a chemical is added as a hazardous waste.

Chemical Spills

- Personnel shall not attempt to clean up large spills. Evacuate the laboratory and contact the offices of Safety, Security and Plant Operations Office and the NeSCC Police Department immediately.
- Laboratories shall maintain supplies and equipment to handle small spills. These include adsorbents, neutralizers, mops, buckets, dustpans, paper towels, sponges, and waste containers.
- Spill trays shall be used for all complex operations where there is a reasonable probability a spill could occur.
- All waste resulting from a spill shall be handled in accordance with the Northeast State Hazardous Waste Management Manual.

Liquid Spills:

- Spills should be confined using trays, adsorbents, or paper towels whenever feasible.

- Neutralize inorganic acids with an appropriate chemical or use an absorbent mixture (i.e., soda ash or diatomaceous earth). Other liquids should be absorbed with a non-reactive material such as sand or vermiculite and placed in suitable containers.
- Flammable liquids: Turn off or remove all ignition or heat sources. Continuously ventilate the area. Absorb the liquid with a non-reactive material and space in a suitable container.

Solid Spills:

- Low-toxicity materials should be swept into a dustpan and placed in a suitable container. Wet methods or HEPA-filtered vacuum shall be used to clean up toxic chemicals.

Emergencies

Laboratories should develop an emergency plan which includes the following elements:

- Emergency procedures and evacuation maps are posted in each classroom in the event of an emergency.
- Evacuation procedures include primary and alternate evacuation routes.
- Instructions for shutting down equipment or apparatus in the event of an emergency.
- Procedures to ensure personnel do not re-enter the laboratory before the emergency is over.

Fires

Laboratory personnel shall not attempt to extinguish large fires. The following steps should be taken:

- Confine the fire by closing the hood sash or laboratory doors and fire doors as appropriate.
- Immediately evacuate the fire area and call campus police at 423-677-7927 and 911.
- Implement the Laboratory Emergency Plan.
- Designated Laboratory personnel trained in the use of portable fire extinguishers may extinguish incipient stage fires. At least two people shall be available with the fire is extinguished. The following steps should be taken:
    - Alert other personnel and have them call 423-677-7927 and 911. If you have not already done so.
    - Extinguish the fire by directing the discharge at the base of the flames.
    - If the fire cannot be controlled, evacuate the area, and implement the Laboratory Emergency Plan.

Ventilation Failure

Operations shall be terminated in a safe manner in the event of a low flow condition or complete ventilation failure. Personnel shall:

- Close the hand valve on all compressed gas cylinders.
- Turn off laboratory air, vacuum, and propane gas systems to equipment and apparatus.
- Close containers of volatile chemicals.
- Close the chemical hood sash.
- Evacuate the laboratory room.

Personnel shall not re-enter the laboratory until ventilation has been restored for at least 30 minutes.

In cases where the operation could not be terminated and there is a reasonable probability that the laboratory atmosphere is unsafe, air monitoring may be necessary before re-entry. Supervisors, Directors, and Division Chairs shall be contacted for guidance.

Housekeeping

Laboratories shall be kept clean and free from obstructions. Personnel shall clean work areas at the end of each day's operations.

Hazardous waste should be stored in the satellite accumulation area in closed containers. Non-hazardous solid and liquid waste should be stored in appropriate receptacles or containers.

Equipment, apparatus, and chemical inventories should be properly stored. Excess equipment and chemicals should be turned in to minimize clutter in the laboratory.

Stairways and halls shall not be used as storage areas. Access to exits and emergency equipment shall not be blocked.

Special Procedures for Handling Acutely Toxic Compounds, Carcinogens and Reproductive Toxins

General:

- In addition to the hygiene practices covered in the previous paragraphs, the following special procedures are to be used for laboratory operations involving acutely toxic compounds, carcinogens, and reproductive toxins.

Storage and Distribution:

- Acutely toxic compounds, carcinogens, and reproductive toxins should be segregated from other chemicals and stored in a well-ventilated area. When available, ventilated cabinets shall be used for storage.
- Cabinets shall be posted "DANGER – CHEMICAL CARCINOGEN", "CAUTION – CANCER SUSPECT AGENT", or "CAUTION – TOXIC AGENTS", as appropriate.

- Storage of unopened containers presents no special hazards. Once opened, volatile chemicals shall be sealed with parafilm tape, or over-packed in an unbreakable container.
- Acutely toxic compressed gases shall be stored in a chemical hood or gas cabinet. Storage shall be kept to the minimum required to complete the work in progress.
- Acutely toxic compounds, carcinogens, or reproductive toxins shall be placed in an unbreakable secondary container before transport through the laboratory. The secondary container should contain absorbent material to cushion the primary container and absorb the contents in the event of a spill. Secondary containers shall be appropriately labeled.

Engineering Controls for Particularly Hazardous Substances

Laboratory operations that involve acutely toxic compounds, carcinogens, or reproductive toxins, shall be planned, and conducted using appropriate engineering controls. High-risk operations shall be conducted inside chemical hoods or glove boxes. Low-risk operations where the potential for generation of gas, vapor, or aerosol contamination is remote may be conducted on the open bench.

House vacuum shall be provided with in-line filters or traps to prevent contamination. Vacuum pumps shall be vented into a chemical hood or local ventilation system.

Analytical instrumentation that generates vapor or aerosol contamination shall be vented into a hood or operated using local exhaust ventilation to capture air contaminants.

Administrative and Work Practice Controls

Two Person Rule: High-risk operations may require that there be two people always present in the area. Prior approval from your manager should be sought before beginning high-risk operations.

Designated Area:

- Laboratory operations shall be conducted in a “designated area” where access to unauthorized personnel is restricted. The area may be the entire room, an area within the room, or the primary containment. Doors leading to the designated area shall always remain closed.
- Each designated area shall be posted, “DANGER – CHEMICAL CARCINOGEN”, “CAUTION – CANCER SUSPECT AGENT”, “CAUTION – TOXIC AGENTS”, or “AUTHORIZED PERSONNEL ONLY”, as appropriate.
- Working Surfaces: Working surfaces shall be non-porous and covered with absorbent, plastic-backed paper. Spill trays should be used when complex manipulations are conducted.

Decontamination:

Contaminated equipment, apparatus, and glassware shall be decontaminated before removal from the designated area. Working surfaces shall be decontaminated before beginning new operations. Acetone,

methanol, or water is recommended for solvent washing when chemical decontamination is not feasible.

Inspection Program

Inspections will include an appropriate combination of routine inspections, self-audits, Safety, Security and Plant Operations Office audits, and possible external audits.

Elements:

- Inspectors will bring a checklist to ensure that all issues are covered.
- Dialogue with workers should occur during the inspection as they can provide valuable information and allow inspectors an opportunity to show workers how to fix problems.
- An inspection report with all findings will be prepared and issued to appropriate management personnel. Corrective action requests will be included in the final report if needed.

APPENDIX 1

Explanation of Terms

Chemical Hygiene Officer. The designated employee who is qualified by training or experience to provide technical guidance in the development and implementation of the Chemical Hygiene Plan.

Chemical Hygiene Plan. A written program that sets forth policies and procedures capable of protecting employees from the health hazards associated with their workplace.

Combustible liquid. Any liquid having a flashpoint at or above 100 degrees Fahrenheit (F).

Compressed gas. A gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi at 70 degrees F, or a gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130 degrees F regardless of the pressure at 70 degrees F, or a liquid having a vapor pressure exceeding 40 psi at 100 degrees F as determined by ASTM D-323-72.

Employee. An individual employed in a laboratory may be exposed to hazardous chemicals in the course of their employment.

Explosive. A chemical that causes a sudden, almost instantaneous release of pressure, gas and heat when subjected to sudden shock, pressure, or high temperature.

Flammable liquid. A liquid having a flash point below 100-degree F, except any mixture having components with flash points of 100 F or higher, the total of which make up 99 percent or more of the total volume of the mixture.

Flammable solid. A solid other than a blasting agent or explosive that is liable to cause fire through friction, absorption of moisture, spontaneous chemical change, or retained heat from manufacturing

or processing, or which can be ignited readily and when ignited burns vigorously and persistently as to create a serious hazard. A chemical that ignites and burns with a self-sustained flame at a rate greater than one-tenth of an inch per second along its major axis when tested by the method described in 16 CFR 1500.44.

Hazardous chemical. A chemical for which there is statistically significant evidence based on at least one study conducted following established scientific principles that acute or chronic health effects may occur in an exposed employee. This includes chemicals that are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents that act on the hematopoietic (blood-forming) systems, and agents that can damage the lungs, skin, eyes, or mucous membranes.

High Risk Operations. Experimental procedures involving the manipulation, handling, or reaction of hazardous chemicals where the potential for release of gas, vapor, or aerosol contamination is high. This category includes but is not limited to (i) rapid exothermic reactions, (ii) transfer of electrostatic powders, (iii) heating, mixing, or transfer of volatile chemicals, (iv) pressurized operations where there is potential for uncontrolled release, and (v) work involving aerosol generation.

Laboratory. A facility or individual room where the "laboratory use" of hazardous chemicals occurs.

Laboratory hood. A type of engineering control enclosed on five sides with a movable sash or fixed partial enclosure on the remaining side designed to draw air from the laboratory into the enclosure to prevent or minimize the escape of contaminants into the laboratory space.

Laboratory scale. Work with substances in which the equipment used for reactions, transfers, and other handling are designed to be easily and safely manipulated by one person.

Oxidizer. A chemical other than a blasting agent or explosive as defined in Title 29 CFR, part 1910.109 (a), that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.