CSN Procedure	Facilities Management
Category: Environmental Health and Safety	Effective Date: 01/30/2023
Chemical Hygiene Plan	

I. PURPOSE

The purpose of this Chemical Hygiene Plan (CHP) is to establish a written program that sets forth safe work practices that protect employees from the physical and health hazards present by hazardous substances used within the laboratory environment. Safety is a collective responsibility that requires the full cooperation of everyone in the laboratory. However, the ultimate responsibility for safety rests with everyone, especially the person carrying out the procedure.

Accidents often result from an indifferent attitude, failure to use common sense, or failure to follow instruction. Everyone within the laboratory should become familiar with what other people are doing within the lab because all can be victims of one individual's mistake. Do not hesitate to point out to fellow lab personnel that they are engaging in an unsafe practice or operation, if needed.

II. SCOPE

This Chemical Hygiene Plan (CHP) is required by the Occupational Safety and Health Administration's (OSHA) Laboratory Safety Standard (29CFR 1910.1450). The CHP covers all College of Southern Nevada (CSN) employees, including staff and faculty, as well as any other parties that work with chemicals and/or may be exposed to the effects of such chemicals in CSN chemistry, biology, health, or other science laboratories. Department-specific Chemical Hygiene Plans may also be incorporated into individual Lab Safety Plans, as needed, but shall be at least as stringent as this general plan.

III. PROCEDURE

A. Responsibilities

The College President has been granted the authority and responsibility for institutional-level health and safety planning by the NSHE Board of Regents.

1. CSN Environmental Health & Safety

   - Responsible for developing, reviewing, updating, and overseeing the implementation of the CHP.
   - Act as a consultant/resource for departments and programs within the College regarding implementation and enforcement of this plan.
   - Evaluate work practices and use of personal protective equipment (PPE).
   - Provide relevant safety program materials; provide and document related training; recommend environmental monitoring and response actions; and coordinate any compliance activities, as appropriate.

2. Division Deans and Department/Program Directors

   - Responsible for compliance with the CHP requirements within their functional units.
   - Coordinate with CSN Environmental Health & Safety, regarding compliance with the plan.
   - Compliance with the CHP shall not be delegated to unqualified personnel.

3. Supervisors and Managers

   - Responsible for ensuring that all requirements of the CHP that apply to their functional work areas are carried out properly.
   - Ensure that all appropriate personal protective equipment (PPE) is available to employees.
   - Review safe work practices with their employees and, if necessary, post signage in appropriate areas to indicate the hazards and to limit access if necessary.
   - Ensure adherence to the CHP shall not be delegated to non-management personnel without prior

consultation with the Director of Environmental Health & Safety.
- Determine laboratory procedures or activities that require prior approval from the Supervisor, Manager, Director, or designee before work is initiated.

4. Each functional work area shall have a responsible (managerial) person designated to:

   - Ensure that the CHP is followed in their work area.
   - Conduct chemical inventories and update the chemical inventory in their work area as needed (with assistance from Environmental Health & Safety).
   - Maintain SDSs (Safety Data Sheets) for all chemicals in their work areas and ensure their availability to employees and students (with assistance from Environmental Health & Safety).
   - Review and update any site-specific CHP information annually, at a minimum, or more frequently as needed.
   - Ensure that chemical hygiene training is conducted for all employees within the functional work unit.

B. Training

All laboratory personnel must complete general laboratory safety training and lab-specific training before:

1. Beginning work in the laboratory.
2. Prior to new exposure situations; and
3. As work conditions change.

Laboratory Supervisors must provide laboratory-specific training to new employees covering the following topics, where applicable:

- Location of the Chemical Hygiene Plan, Laboratory Safety Manual, and Safety Data Sheets
- Location of emergency equipment and exit routes
- Specialized equipment
- Standard Operating Procedures
- Location of Personal Protective Equipment
- Specialized procedures and protocols
- Specific physical and health hazards, potential exposure, and emergency procedures pertaining to hazardous materials in the laboratory
- Procedures for reporting incidents and injuries

Documentation of new employee laboratory-specific training shall be documented using the New Employee Chemical Hygiene Plan - Orientation and Training Checklist located in Appendix A.

In addition, annual refresher training is also required for all laboratory personnel. CSN EH&S offers online training and instructor-led training to assist laboratories in implementing laboratory-specific training. Topics include:

- Review of laboratory rules and regulations, including the Chemical Hygiene Plan
- Recognition of laboratory hazards
- Use of engineering controls, administrative controls, and personal protective equipment to mitigate hazards
- Exposure limits for hazardous chemicals
- Signs and symptoms associated with exposures to hazardous chemicals
- Use of Personal Protective Equipment
- Chemical exposure monitoring
- Review of reference materials (e.g., SDS) on hazards, handling, storage, and disposal of hazardous chemicals
- Procedures for disposing of hazardous chemical waste
- Fire safety and emergency procedures
- Information regarding access to employee exposure and medical records, as required annually

C. General Guidelines:

The following are general guidelines to minimize safety and health problems associated with laboratory work.

- Follow all safety instructions carefully.
- Become thoroughly acquainted with the location and use of safety facilities such as safety showers, exits, and eyewash fountains.
- Before undertaking any laboratory work
    - Become familiar with the hazards of chemicals involved. Know the safety precautions and emergency procedures that protect you from those hazards.
    - Become familiar with the hazards of the apparatus and the operations involved. Know what to do to protect yourself and others from those hazards.

D. Hazard Communication

CSN is responsible for providing information about the hazardous substances in our workplace, the associated hazards, and the control of these hazards, through a comprehensive hazard communication program that is summarized below. CSN has an established Hazard Communication Program that complies with the OSHA Hazard Communication Standard, 29 CFR 1910.1200. CSN's Hazard Communication Program can be found on the EHS Website at: https://www.csn.edu/environmental-health-safety.

The purpose of CSN's Hazard Communication Program is to ensure that all employees and, upon request, their personal physicians, have the right to receive information regarding the hazardous substances to which they may have been exposed at work. The requirements of the Hazard Communication Program apply to laboratory environments at CSN campuses due to the potential for activities that may occur outside of areas where engineering controls are available. Proper hazard communication involves the active participation of the Division Deans and Department/Program Directors; Laboratory Managers and Supervisors; and EH&S who are each responsible for providing consultation and safety information to employees working with hazardous chemicals.

1. Safety Data Sheets:

   A Safety Data Sheet (SDS) must be available for each hazardous substance in a laboratory's chemical inventory. No hazardous chemical may be purchased or stored at a College of Southern Nevada facility unless accompanied by an appropriate SDS and properly labeled**.** The department requesting the purchase of a chemical or hazardous product using a P-Card or other process is responsible for obtaining an SDS from the supplier or vendor and submitting the proper paperwork to the EH&S Department for product approval. An SDS must be received with the shipment of chemicals. SDSs are available from the CSN online SDS library located at: https://www.csn.edu/environmental-health-safety.

2. Labels, Signs, and Other Forms of Warning:

   Labeling requirements for all hazardous substances are summarized as follows:

   - Labels on incoming containers of hazardous chemicals shall not be removed or defaced until the container is completely empty.
   - All containers of hazardous substances must be labeled with the identity of the hazardous substance and all applicable hazard warning statements, with no abbreviations.
   - All containers not actively being used in a transfer or a reaction must also be labeled.
   - Labels must be legible, in English, and clearly displayed; Lewis structures alone are inadequate.
   - The label must contain all applicable hazard warning statements.
   - Non-original secondary containers (e.g., smaller, or temporary containers into which a material is transferred for use) must be labeled with the identity of the substance and appropriate hazard warnings.
   - Symbols and/or other languages may be provided for non-English speaking employees.
   - Prepared mixtures and/or buffers must be labeled with the appropriate hazard warnings based on the knowledge of the chemical and physical properties of that substance.

- Use the symbols in the Globally Harmonized System of Classification and Labeling of Chemicals.

Global Harmonization System (Hazard Communication Standard Pictograms)

Laboratories containing hazardous chemicals must be identified with an entrance sign that provides critical safety information to alert users, visitors, and emergency responders to specific hazards within the room. A PDF version of the entrance sign along with instructions is provided in Appendix B – Laboratory Hazard Entrance Sign and Instructions. Faculty and staff are responsible for keeping their hazard communication signage up to date.

3. List of Hazardous Substances:

   All laboratories are required to keep a chemical inventory for each hazardous substance in their possession, and specific information on any associated health or safety hazards must be made readily available to all laboratory personnel, typically through Safety Data Sheets. Compressed gases need to be included in the chemical inventory.

E. Chemical Storage and Segregation

Each chemical in the laboratory should be stored in a specific location and returned there after each use. Acceptable chemical storage locations may include corrosive cabinets, flammable cabinets, laboratory shelves, or appropriate refrigerators or freezers. Fume hoods should not be used as general storage areas for chemicals, as this may seriously impair the ventilating capacity of the hood. Chemicals should not be routinely stored on bench tops or stored on the floor. Additionally, bulk quantities of chemicals (i.e., larger than one gallon) should be stored in a separate storage area, such as a stockroom, supply room, or storage cabinet designed for the chemical it is meant to store.

Where possible, hazardous liquids, toxic, or corrosive chemicals stored on laboratory shelves should be placed inside a tub or basin to capture any spilled material and should not be stored on shelves above eye-level. Chemicals which are highly toxic, or corrosive should be in unbreakable secondary containers.

Chemicals must be stored at an appropriate temperature and humidity level and should never be stored in direct sunlight or near heat sources, such as laboratory ovens. Incompatible materials

should be stored in separate cabinets, whenever possible. If these chemicals must be stored in one cabinet, due to space limitations, adequate segregation and secondary containment must be ensured to prevent adverse reactions. All stored containers must be appropriately labeled and tightly capped to prevent vapor interactions and to alleviate nuisance odors. Flasks with only septa, cork, rubber, or glass stoppers should be avoided because of the potential for leaking.

Laboratory refrigerators and freezers must be labeled appropriately with “No Food/Drink” and must **never** be used for the storage of food or drinks intended for human consumption. Freezers should be defrosted periodically so that chemicals do not become trapped in ice formations. **Never** store peroxide formers (e.g., ether) in a refrigerator not specifically designed for storage of flammable liquids.

Additional requirements for specific chemicals are outlined below:

1. Flammable and Combustible Liquids:

   Flammables should not be stored alongside combustible materials like paper and packaging nylon bags. Large quantities of flammable or combustible materials should not be stored in the laboratory. Examples of equipment that can be used for storage include flammable storage cabinets, flammable storage refrigerators or freezers that are designed and UL approved for the storage of flammable substances, or approved safety cans or drums that are grounded.

   The maximum total quantity of flammable liquids kept outside a flammable storage cabinet, safety can, or approved refrigerator/freezer is **10 gallons per room** and must not exceed **60 gallons** in each laboratory, unless authorized by CSN EH&S. Always segregate flammable or combustible liquids from oxidizing acids and oxidizers. Flammable materials must never be stored in domestic-type refrigerators/freezers and should not be stored in a refrigerator/freezer if the chemical has a flash point below the temperature of the equipment. Flammable or combustible liquids must not be stored on the floor or in any exit access.

   When a flammable liquid is withdrawn from a metal container or drum, or when a metal container is filled from another source, both the metal container and other equipment must be electrically wired to each other and to a ground to avoid the possible buildup of static charge. Only small quantities should be transferred to glass, plastic, or other non-electrically conductive containers. When a flammable liquid is transferred from a metal container to glass, the metal container should be grounded.

2. Oxidizers:

   Oxidizers, such as oxygen, hydrogen peroxide, inorganic peroxides, nitric acid, household bleach, etc., should be stored in a cool, dry place and kept away from flammable and combustible materials, such as wood, paper, Styrofoam, most plastics, flammable organic chemicals, and away from reducing agents, such as zinc, alkaline metals, and formic acid.

3. Peroxide Forming Chemicals:

   Peroxide forming chemicals, such as cyclohexene, cyclopentene, diethyl ether, vinyl ethers, etc., should be stored in airtight containers in a dark, cool, and dry place and must be segregated from other classes of chemicals that could create a serious hazard to life or property should an accident occur (e.g., acids, bases, oxidizers). The containers should be labeled with the date received and the date opened. This information, along with the chemical identity should face forward to minimize container handling during an inspection. Minimize the quantity of peroxide forming chemicals stored in the laboratory and dispose of peroxide forming chemicals before peroxide formation.

   Carefully review all cautionary material supplied by the manufacturer prior to use. Avoid evaporation or distillation, as distillation defeats the stabilizer added to the solvents. Ensure that containers are tightly sealed to avoid evaporation and that they are free of exterior contamination or crystallization. Never return unused quantities back to the original container and clean all spills immediately.

   If old containers of peroxide forming chemicals are discovered in the laboratory, (greater than two

years past the expiration date or if the date of the container is unknown), do not handle the container. If crystallization is present in or on the exterior of a container, do not handle the container. Secure it and contact CSN EH&S for pick-up and disposal.

4. Pyrophoric and Water Reactive Substances:

   Because pyrophoric substances can spontaneously ignite on contact with air and/or water, they must be handled under an inert atmosphere and in such a way that rigorously excludes air and moisture. Some pyrophoric materials are also toxic, and many are dissolved or immersed in a flammable solvent. Other common hazards include corrosivity, teratogenicity, or peroxide formation.

   Only minimal amounts of reactive chemicals should be used in experiments or stored in laboratories. These chemicals must be stored as recommended in the SDS. Reactive materials containers must be clearly labeled with the correct chemical name, in English, along with a hazard warning.

   Suitable storage locations may include inert gas-filled desiccators or glove boxes; however, some pyrophoric materials must be stored in a flammable substance approved freezer. If pyrophoric or water reactive reagents are received in a specially designed shipping, storage, or dispensing container (such as the Aldrich Sure/Seal packaging system), ensure that the integrity of that container is maintained. Ensure that sufficient protective solvent, oil, kerosene, or inert gas remains in the container while pyrophoric materials are stored. Never store reactive chemicals with flammable materials.

5. Corrosives:

   Store corrosive chemicals (i.e., acids, bases) below eye level and in secondary containers that are large enough to contain at least 10% of the total volume of liquid stored or the volume of the largest container, whichever is greater. Acids must always be segregated from bases and from active metals (e.g., sodium, potassium, magnesium) and must also be segregated from chemicals which could generate toxic gases upon contact (e.g., sodium cyanide, iron sulfide).

   Specific types of acids require additional segregation. Mineral acids must be kept away from organic acids and oxidizing acids must be segregated from flammable and combustible substances. Perchloric acid should be stored by itself, away from other chemicals. Picric acid is reactive with metals or metal salts and explosive when dry and must contain at least 10% water to inhibit explosion.

6. Compressed Gas Cylinders:

   Compressed gas cylinders that are stored in the laboratory must be chained or strapped to the wall or other stable object, with the safety cap in place when not connected to a regulator. The cylinders must be restrained by two chains or straps; one chain must be placed at one-third from the top of the cylinder, and the other placed at one-third from the bottom of the cylinder. If this is not practical, contact EH&S for guidance. Bolted “clam shells” may be used in instances where gas cylinders must be stored or used away from the wall. Store liquefied fuel-gas cylinders securely in the upright position. ***Cylinders are not to be stored in a horizontal position***. Do not expose cylinders to excessive dampness, corrosive chemicals, or fumes.

   Certain gas cylinders require additional precautions. Flammable gas cylinders must use only flame-resistant gas lines and hoses which carry flammable or toxic gases from cylinders and must have all connections wired. Compressed oxygen gas cylinders must be stored at least 20 feet away from combustible materials and flammable gases.

   Gas cylinder connections must be inspected frequently for deterioration and must never be used without a regulator. **Never** use a leaking, corroded, or damaged cylinder, and never refill compressed gas cylinders. When stopping a leak between the cylinder and regulator, always close the valve before tightening the union nut. The regulator must be replaced with a safety cap when the cylinder is not in use. Move gas cylinders with the safety cap in place using carts designed for this purpose.

7. Liquid Nitrogen:

   Because liquid nitrogen containers are at low pressure and have protective rings mounted around the regulator, they need to be affixed to a permanent fixture such as a wall to prevent them from walking or rolling into the egress path in an earthquake. However, additional protection considerations should be addressed when storing liquid nitrogen in a laboratory. The primary risk to laboratory personnel from liquid nitrogen is skin or eye thermal damage caused by contact with the material. In addition, nitrogen expands 696:1 when changing from a cryogenic liquid to a room temperature gas. The gases usually are not toxic, but if too much oxygen is displaced, asphyxiation is a possibility. Always use appropriate thermally insulated gloves when handling liquid nitrogen. Face shields may be needed in cases where splashing can occur.

   Additional procedures covering the storage and handling of chemicals can be found on the EHS Website at: https://www.csn.edu/environmental-health-safety.

F. Transporting Chemicals

Transport chemicals using the container-within-a-container concept. This will shield them from shock during any sudden change of movement. Large containers of corrosives should be transported from central storage in a chemically resistant or another container designed for this purpose. Any movement/transport of chemicals must be negotiated carefully. Smoking is never allowed around chemicals.

When moving in the laboratory, anticipate sudden backup or changes in direction by others. If you should stumble or fall while carrying glassware or chemicals, try to project them away from yourself and others.

G. Personal Protective Equipment

Safety and emergency equipment, appropriate for the type of work, will be identified and made available where needed in the laboratories. Laboratory personnel must understand the importance of using safety equipment and Personal Protective Equipment (PPE) and the role this equipment plays in the prevention of illness and injury. It is the desire of the College of Southern Nevada to develop a culture of safety in which the use of safety equipment is second nature. Laboratory personnel will be provided with necessary PPE such as laboratory coats, safety glasses, and gloves. Laboratory Supervisors will ensure needed PPE is made available. Laboratory personnel are ultimately responsible for working in a safe manner. This includes using their PPE. Those who are not working in a safe manner will be retrained and monitored. Failure to work safely will result in additional training and may lead to progressive disciplinary action by the responsible supervisor.

Wearing of personal protective equipment in laboratories is summarized as follows:

1. Laboratory Coats:

   Laboratory coats shall be readily available and worn in laboratories. Laboratory coats are essential to protect street clothing from biological agent aerosols or chemical splashes and spills, vapors, or dusts. For work with acids or bases, acid-resistant protective wear must be worn. Laboratory coats should not be worn in non-laboratory areas (e.g., cubicles and other administrative areas) or in common areas (e.g., lunchroom and restrooms). In addition, one should not wear PPE outside of a laboratory area if there is any possibility of carrying a hazardous material from one area to another via one's PPE, this may include movement from one laboratory space to another if the possibility of cross-contamination exists.

2. Safety Glasses:

   Safety glasses [in compliance with American National Standards Institute (ANSI) Z87.1] are required for employees while in all areas of the laboratory where chemicals are stored and handled. Chemical splash goggles shall be worn when there is a danger of splashing from a hazardous chemical or biological material, flying particles, corrosives, cryogenic liquids, liquids hotter than 60 degrees Celsius, or fumes and mists harmful to the eyes. Like safety glasses, goggles are impact resistant. Chemical splash goggles should have indirect ventilation so

hazardous substances cannot drain into the eye area. Full-face shields that protect the face and throat shall always be worn with goggles when maximum protection from flying particles and harmful liquids is needed.

3. Protective Gloves:

   Protective gloves (e.g., chemical resistant gloves, puncture resistant gloves, or insulated gloves) should be worn whenever it is necessary to handle corrosive chemicals or microbial materials, rough or sharp-edged objects (e.g., broken glass), very hot or very cold materials, or whenever protection is needed against accidental exposure to contaminants or hazards. Gloves should be selected based on the material being handled, the hazard involved, and their suitability for the operation being conducted. Disposable gloves should not be reused. Non-disposable used gloves shall be inspected and washed prior to reuse. Damaged or deteriorated gloves will be replaced immediately. Non-disposable gloves shall be washed prior to removal from hands.

4. Respiratory Protection:

   Respiratory protection may be required, under certain circumstances, for use by laboratory personnel. However, engineering controls are the primary means used to control potential airborne hazards. Requirements for respirator use will be determined by CSN EH&S and may include medical qualification of the employee and annual training and fit testing.

5. Work Clothing:

   Suitable clothing shall always be worn in the laboratory to cover unprotected skin. Shorts, skirts, and dresses are not allowed. Clothing may absorb liquid spills that would otherwise meet your skin. Synthetic fabrics may increase the severity of injury in case of fire. Cotton is less prone to static electricity buildup than nylon or other synthetics. Sandals, perforated shoes, and bare feet are prohibited to be worn in laboratories. Safety-toed shoes are recommended when handling and/or moving compressed gas cylinders.

H. Environmental Monitoring

CSN EH&S will conduct air monitoring to determine employee exposures if there is a reason to believe that exposure levels for a chemical may exceed the OSHA Permissible Exposure Limit (PEL). Due to the low volume and infrequent use of highly toxic substances in the laboratories, exposure monitoring of airborne concentrations is not normally necessary.

However, exposure to hazardous chemicals may be minimized using a combination of engineering controls, administrative controls, and personal protective equipment, listed in order of priority. Assessing exposure to hazardous chemicals may be accomplished through several methods performed, including employee interviews, visual observation of chemical use, evaluation of engineering controls, use of direct reading instrumentation, or the collection of analytical samples from the employee's breathing zone. Personal exposure assessment will be performed under either of the following situations:

- Based on chemical inventories, review of Standard Operating Procedures (SOPs), types of engineering controls present, laboratory inspection results, and/or hazard assessments, CSN EH&S will determine whether an exposure assessment is warranted; or
- User of a hazardous chemical has concern or reason to believe exposure is not minimized or eliminated through the use of engineering controls or administrative practices and the potential for exposure exists. The user should then inform his or her Laboratory Supervisor, who will in turn contact CSN EH&S for assistance. CSN EH&S will then determine the best course of action in assessing employee exposure, including visual assessment, air monitoring, medical evaluation, examination, or medical surveillance.

All work with volatile and/or highly toxic substances in the laboratory will be performed in fume hoods. Fume hoods are tested and certified on an annual basis. Proper airflow must be 80-125 feet per minute. If a fume hood does not meet this standard, it will not be used for handling highly toxic substances until it is repaired. The hood should be labeled "Out-of-Service" and a work order submitted for repairs. Annual test and certification of fume hoods will be conducted by CSN Facilities Management and documentation of the test will be posted on/near the fume hoods.

Fume hoods shall not be used for storage of any chemical substances or laboratory equipment. Any chemicals or equipment found in the fume hoods must not impede the airflow or exceed that quantity which can reasonably be determined “in use.” Fume hood sashes will be kept in a closed position when the hood is off. In addition, the hoods at the laboratory are never turned off.

Local exhaust ventilation, such as exhaust snorkels may be used to capture and remove dust, noxious fumes, electricity, sparks, soldering, and corrosive fumes at the point they are produced on benches and other work surfaces. They should not be used with volatile and/or highly toxic substances.

I. Medical Program

An opportunity to receive medical attention is available to all employees who work with hazardous chemicals in the laboratory. First-aid kits are available in each of the laboratories. Automated External Defibrillators (AEDs) are available in each building on each campus. The opportunity for medical attention will be made available to employees as part of the Workers’ Compensation Program when an employee develops signs or symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory.

Medical surveillance programs will be established where exposure monitoring reveals an exposure level above the action level for an Occupational Safety and Health Administration (OSHA)-regulated substance for which there are exposure monitoring and medical surveillance requirements, and/or whenever an event takes place in the laboratory such as a spill, leak, explosion, or other emergency resulting in the likelihood of a hazardous exposure. The employee will be provided an opportunity for medical consultation to determine the need for a medical examination.

J. Housekeeping and Maintenance

CSN custodial staff cleans floors routinely. Eyewash/safety shower stations in laboratories are inspected by Facilities Maintenance Department personnel and flushed once per month and documented on a tag at each station. Saline solution bottles are changed in eyewash containers as directed by the manufacturer, and/or directly after each use. All eyewash/safety showers must be always accessible and remain free of debris.

Fire extinguishers are present in each laboratory and may be demarcated by a sign above the fire extinguisher’s location. Supervisors shall ensure employees are familiar with the location of each fire extinguisher in their work areas. Extinguishers located in buildings are inspected monthly by the Facilities Maintenance Department. A contractor performs annual testing and servicing of building fire suppression, fire extinguishing, and portable fire extinguishers. Fire blankets are also placed at various locations within each laboratory.

All inoperable electrical equipment (fume hoods, centrifuges, refrigerators, fume hoods, scales, stirrers, etc.) shall be tagged and placed out-of-service if found to be inoperable. All inoperable electrical equipment must be repaired or replaced before being returned to full service and use. Stairways/hallways shall not be used for storage under any circumstances.

K. Laboratory Safety Inspections

CSN EH&S has a comprehensive Laboratory Safety Inspection Procedure to assist laboratories and other facilities that use, handle, or store hazardous chemicals to maintain a safe work environment. This procedure helps to ensure compliance with regulations and to fulfill CSN’s commitment to protecting the health and safety of the campus community.

As part of the Laboratory Safety Manual, the laboratory safety inspection procedure outlines how CSN EH&S and laboratory staff conducts periodic inspections of laboratories and other facilities with hazardous chemicals to ensure the laboratory is operating in a safe manner and to ensure compliance with all Federal, State, and college safety requirements. The primary goal of laboratory inspections is to identify both existing and potential accident-causing hazards, actions, faulty operations, and procedures that can be corrected before an accident occurs. CSN’s Laboratory Safety Inspection Procedure and Laboratory Safety Manual can be found on the EHS Website at: https://www.csn.edu/environmental-health-safety.

L. Chemical Purchases

New chemical purchases must be approved by the CSN Environmental Health and Safety Director. A New Chemical Approval Form must be sent to the CSN EHS Director along with the SDS for each chemical for review/approval prior to completing the purchase requisition. The form will be returned promptly to the sender indicating 'approval' or 'disapproval' along with a short explanation, if the request is disapproved. New chemicals are not to be used until Approval is obtained. Copies of approved requests should be kept on file by the initiator. CSN's New Chemical Approval Form along with additional chemical purchasing guidelines can be found in CSN's Hazard Communication Plan found on the EHS Website at: https://www.csn.edu/environmental-health-safety.

M. Hazardous Waste Management

Hazardous wastes generated in the State of Nevada are regulated by the Nevada Division of Environmental Protection. Federal Environmental Protection Agency (EPA) regulations also govern certain aspects of hazardous waste management since most of our waste is treated and disposed of out of state. These hazardous waste regulations are part of the Resource Conservation and Recovery Act (RCRA). Local enforcement authority for CSN Campuses is administered by the Restricted Waste Management Program, a division of the Southern Nevada Health District.

CSN's Hazardous Waste Management Program manages the disposal of all hazardous waste generated on each campus. Each laboratory employee must comply with the CSN Hazardous Waste Management Procedure requirements and all applicable regulations. Hazardous waste pick-up service is provided by CSN Environmental Health and Safety (EH&S) on a weekly basis. Laboratory personnel are responsible for identifying hazardous waste, segregating, labeling, and storing it properly in each laboratory. Each Staff Research Associate (SRA) or other laboratory representative is responsible for coordinating the disposal of all hazardous materials from his/her laboratories on a weekly basis. Specific hazardous waste management procedures can be found on the EHS Website at: https://www.csn.edu/environmental-health-safety.

N. Accidents, Emergencies, and Chemical Spills

Laboratory emergencies may result from a variety of factors, including serious injuries, fires and explosions, spills and exposures, and natural disasters. All laboratory employees should be familiar with and aware of the location of their laboratory's emergency response plans and safety manuals. **Before beginning any laboratory task**, know what to do in the event of an emergency. Identify the location of safety equipment, including first aid kits, eye washes, safety showers, fire extinguishers, fire alarm pull stations, and spill kits. Plan ahead and know the location of the closest fire alarms, exits, and telephones in your laboratory.

For all incidents requiring emergency response, call University Police Services (UPD) at 7-911 from a campus phone, or (702) 895-3669 from off-campus or cell phones.

Medical Emergencies: In the event of a medical emergency, tell the UPD dispatcher that you have a medical emergency and provide them with the following information:

- Your name and telephone number.
- Nature of the illness or injury.
- Location of the emergency on campus (building, floor, and room number).
- Number of people involved: Is victim(s) conscious, breathing, bleeding?
- Remain on the line until the dispatcher has asked you all the questions and follow their instructions.

Guidelines for Assistance:

- DO NOT move a victim unless necessary.
- DO NOT jeopardize your safety or the safety of the patient. Wait for professional help if you are not trained to assist.
- If you are trained in first-aid or CPR, assist the patient up to the level you are trained in.
- Report all accidents or injuries to Environmental Health & Safety Department at 702-651-7445.

It is the best practice to have someone, if available, meet the ambulance personnel and take them to the person that is ill or injured.

Injury and Illness Reporting: Laboratory Supervisors are responsible for ensuring that their employees receive appropriate medical attention in the event of an occupational injury or illness. All accidents and near misses must be reported to the employee's **supervisor. The employee's Supervisor is responsible for notifying EH&S** at (702) 651-7445 and UNLV Risk Management and Safety at (702) 895-5404 or (702) 895-4226. EH&S will conduct an accident investigation and develop recommendations and corrective actions to prevent future accidents. At a minimum, each laboratory must have the following preparations in place:

- Fully stocked first aid kit.
- Posting of emergency telephone numbers.
- Training of staff to accompany injured personnel to medical treatment site and to provide medical personnel with copies of SDS(s) for the chemical(s) involved in the incident.

Chemical Spills and Releases: If it is a small spill, it is your responsibility to clean it up - but if you **DO NOT** know the identity of the spilled substance, have not been trained in the proper handling of chemical procedures, or are uncomfortable cleaning up the spill; immediately evacuate the area and notify EH&S at (702) 651-7445 or University Police Services at (702) 895-3669, if after business hours. Any danger to life or safety should be immediately reported to UPD.

- Reporting of a Chemical Spill or Release is required for:
  - Chemical Spill/Release over one gallon of liquid or one pound of solid.
  - All mercury spills (regardless of size).
  - All uncontrolled compressed gas releases.
  - All unintentional release of a chemical to bare ground, sewer, or surface water.
  - Unintentional release of oil to bare ground or water.
- Notify Environmental Health & Safety at 702-651-7445, fill out an Incident Report Form, and forward it to: ehs@csn.edu.
- When the spill occurs **after business hours** (5 pm-8 am and weekends) – **call University Police Services** at 702-895-3669 or x7911.

Additional emergency procedures, forms, and reporting information can be found on CSN's Incident Reporting Website at: https://www.csn.edu/csn-incident-reporting and CSN's Emergency Preparedness Website at: https://www.csn.edu/emergencypreparedness.

O. Recordkeeping

All accident and injury reports shall be kept indefinitely by UNLV Risk Management and Safety.

Copies of any medical consultation, examinations, tests, or written opinions due to employee exposure will be maintained by EH&S for the term of employment plus thirty years in accordance with 29 CFR 1910.1020. Any medical records maintained on employees may be viewed or copied by the affected employee or his/her representative, designated in writing, within normal business hours.

An inventory of all chemicals used in the laboratories is maintained and updated whenever a new chemical is added, or chemical use is discontinued. The supervisors in the laboratories are responsible for updating the chemical inventory list.

IV. DEFINITIONS

ACGIH - The American Conference of Governmental Industrial Hygienists is a voluntary membership organization of professional industrial hygiene personnel in governmental or educational institutions.

Combustible Liquid - Any liquid having a flashpoint at or above 100°F (37.8°C) but below 200°F (93.3°C), except any mixture having components with flashpoints of 200°F or higher, the total volume of which makes up 99% or more of the total volume of the mixture.

Compressed Gas - A gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi at 70°F (21.1°C), or; a gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130°F (54.4°C) regardless of the pressure at 70°F (21.1°C), or; a liquid having a vapor pressure exceeding 40 psi at 100°F (37.8°C) as determined by ASTM D-32372.

Corrosive - A substance that, according to the DOT, causes visible destruction or permanent changes in human skin tissue at the site of contact or is highly corrosive to steel.

Emergency -Any potential occurrence, such as but not limited to, equipment failure, rupture of containers, or failure of control equipment which could result in an uncontrolled release of a hazardous chemical into the workplace.

Flammable gas - a gas that, at ambient temperature and pressure, forms a flammable mixture with air at a concentration of 13% by volume or less; or a gas that, at ambient temperature and pressure, forms a range of flammable mixtures with air wider than 12% by volume, regardless of the lower limit.

Flammable liquid - any liquid having a flashpoint below 100°F (37.8°C), except any mixture having components with flashpoints of 100°F (37.8°C) or higher, the total of which makes up 99% or more of the total volume of the mixture.

Flashpoint - The minimum temperature at which a liquid gives off a vapor in sufficient concentration to ignite in the presence of an ignition source.

Fume Hood - A device located in a laboratory, enclosed on five sides with a movable sash or fixed partial enclosure on the remaining side; constructed and maintained to draw air from the laboratory and to prevent or minimize the escape of air contaminants into the laboratory; and allows chemical manipulations to be conducted in the enclosure without insertion of any portion of the employee's body other than hands and arms.

Hazardous Chemical - A chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. A chemical is also considered hazardous if it is listed in any of the following:

1. OSHA, 29 CFR 1910, Subpart Z, Toxic and Hazardous Substances.
2. “Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment,” ACGIH (latest edition).
3. “The Registry of Toxic Effects of Chemical Substances,” NIOSH (latest edition).

Hazardous Material - Any material which is a potential/actual physical or health hazard to humans.

Hazard Warning - Any words, pictures, symbols, or a combination thereof appearing on a label or other appropriate form of warning which conveys the hazards of the chemical(s) in the container(s).

Highly Toxic -A substance falling within any of the following categories:

1. A substance that has a median lethal dose (LD50) of 50 milligrams or less per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each;
2. A substance that has a median lethal dose (LD50) of 200 milligrams or less per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between two and three kilograms each; or
3. A substance that has a median lethal concentration (LC50) in air of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter or less of mist, fume, or dust, when administered by continuous inhalation for one hour (or less if death occurs within one hour) to albino rats weighing between 200 and 300 grams each.

Incompatible - The term applies to two substances to indicate that one material cannot be mixed with the other without the possibility of a dangerous reaction

Local Exhaust Ventilation - A ventilation system that captures and removes the contaminants at the point they are being produced before they escape into the laboratory air.

NFPA - The National Fire Protection Association; a voluntary membership organization whose aims are to promote and improve fire protection and prevention.

Oxidizer- Is a substance that gives up oxygen easily to stimulate the combustion of organic material.

Permissible Exposure Limit (PEL) - An exposure, inhalation, or dermal permissible exposure limit specified in 8CCR5155. PELs may be either a time-weighted average (TWA) exposure limit (8hour), a 15-minute short-term limit (STEL), or a ceiling (C).

Personal Protective Equipment (PPE) - Any devices or clothing worn by the worker to protect against hazards in the environment. Examples are lab coats, respirators, gloves, and chemical splash goggles.

Pyrophoric - A chemical that will spontaneously ignite in the air at a temperature of 130°F (54.4°C) or below.

Respirator - A device which is designed to protect the wearer from inhaling harmful contaminants.

Safety Data Sheet (SDS) - Written or printed material concerning a hazardous chemical which is prepared in accordance with paragraph (g) of 29 CFR 1910.1200. (Formerly material safety data sheet, MSDS).

Toxicity - A relative property of a material to exert a poisonous effect on humans or animals and a description of the effect and the conditions or concentration under which the effect takes place.

Vapor - The gaseous form of substances which are normally in the liquid or solid state (at normal room temperature and pressure). Vapors evaporate into the air from liquids such as solvents. Solvents with lower boiling points will evaporate faster.

V. APPENDICIES:

Appendix A – New Employee Chemical Hygiene Plan - Orientation and Training Checklist

Appendix B – Laboratory Hazard Entrance Sign and Instructions

Appendix C – Document Revision History

Appendix A

New Employee Chemical Hygiene Plan Orientation and Training Checklist

Employee Name: _____ **Employee #:** _____

Job Title: _____ **Supervisor:** _____

Employment Date: _____

Laboratory-specific training covered by Supervisor (check all that apply):

- ☐ Location of the Chemical Hygiene Plan
- ☐ Location of Laboratory Safety Manual
- ☐ Location of Safety Data Sheets
- ☐ Location of emergency equipment, fire extinguishers, and exit routes
- ☐ Specialized equipment procedures
- ☐ Standard Operating Procedures
- ☐ Location of Personal Protective Equipment
- ☐ Specialized procedures and protocols
- ☐ Specific physical and health hazards, potential exposure, and emergency procedures pertaining to hazardous materials in the laboratory
- ☐ Procedures for reporting injuries and injuries

Supervisor's Signature: _____ Date: _____

Comments:

Employee's Signature: _____ Date: _____

Comments:

Appendix B

Laboratory Hazard Entrance Sign and Instructions

LABORATORY SAFETY AND EMERGENCY INFORMATION

CAMPUS: * _____ BUILDING: _____ ROOM: _____

ROOM CONTACT INFORMATION: PHONE: EMAIL:

1. _____ _____ _____

2. _____ _____ _____

3. _____ _____ _____

PERSONAL PROTECTIVE EQUIPMENT

1. * _____
2. * _____
3. * _____
4. * _____
5. * _____

HAZARDS AND WARNINGS

* _____ * _____

* _____ * _____

SPECIAL / OTHER HAZARDS

EMERGENCY: **DIAL 7-911**

UNIVERSITY POLICE DEPARTMENT: **702-895-3669**

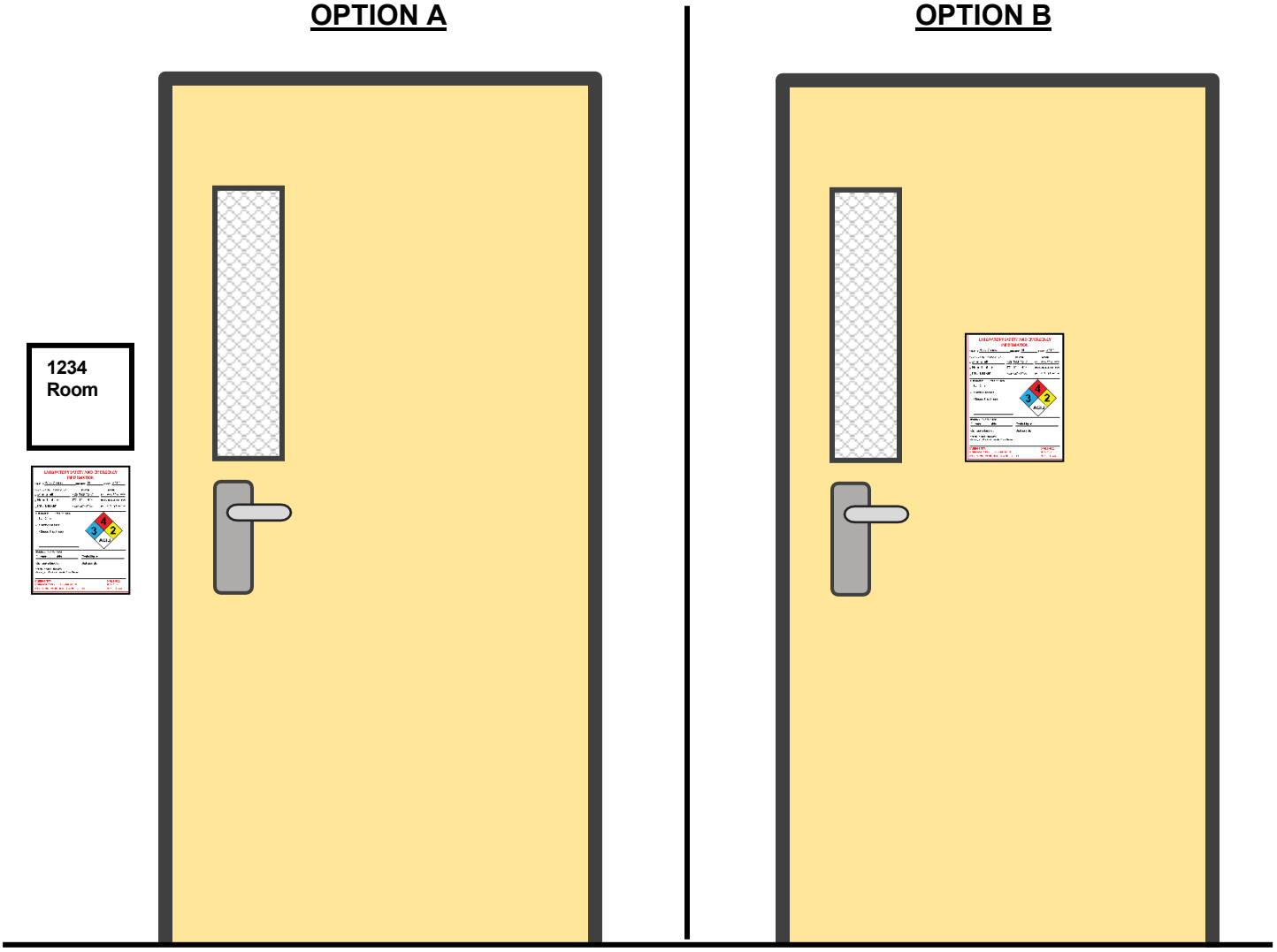
ENVIRONMENTAL HEALTH AND SAFETY: **702-651-7445**

Laboratory Hazard Entrance Sign Instructions

The following fields must be completed to provide as much information on the hazardous chemicals stored in the laboratory:

- Section 1 – list the campus, building, and room number.
- Section 2 – list the emergency contacts for the room.
- Section 3 – list the Personal Protective Equipment required to enter the room.
- Section 4 – identify the NFPA 704 number ratings for the chemical(s) located in the laboratory. NFPA 704 number ratings can be obtained for common chemicals in Appendix C or from the material's SDS. For laboratories containing multiple chemicals, the ratings can be composited by providing the highest number rating from each chemical in each of the four-color areas. Example: Alcohol (2-3-0) + Acetylene (0-4-3) + Hydrochloric Acid (3-0-1-ACID) = The whole room would post 3-4-3-ACID.
- Section 5 – Identify any major chemical, biological, radiological hazards and warnings located within the room.
- Section 6 – Identify any special or other hazards that may be present that are not identified in Section 5.

Faculty and staff are responsible for keeping their hazard communication signage up to date. The entrance signs must be printed using a color printer and posted outside the main entrance to the laboratory in one of the following locations:



Example Laboratory Hazard Entrance Sign

LABORATORY SAFETY AND EMERGENCY INFORMATION

CAMPUS: West Charleston **BUILDING:** G **ROOM:** G104

ROOM CONTACT INFORMATION:	PHONE:	EMAIL:
1. John Smith	702-123-4567	john.smith@csn.edu
2. Robert Labcoat	702-111-4444	robert.labcoat@csn.edu
3. Paul Beaker	702-321-8765	paul.beaker@csn.edu

PERSONAL PROTECTIVE EQUIPMENT

1. Lab Coat
2. Safety Glasses
3. Closed Toe Shoes
4. *
5. *

HAZARDS AND WARNINGS

Flammable Liquids — Toxic Liquids

Corrosive Liquids — Biohazards

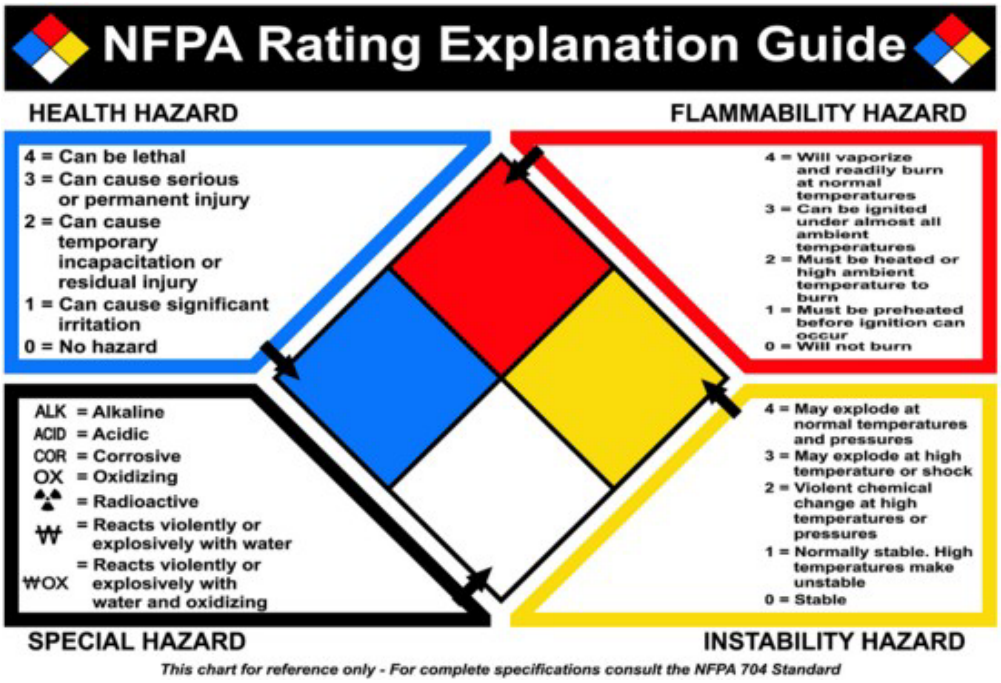
SPECIAL / OTHER HAZARDS

Carcinogens, Electrical Hazards, Open Flames

EMERGENCY: DIAL 7-911
UNIVERSITY POLICE DEPARTMENT: 702-895-3669
ENVIRONMENTAL HEALTH AND SAFETY: 702-651-7445

NFPA 704 Ratings for Common Chemicals

Based on the hazards, the NFPA 704 placard contains the familiar four color, 1-4 number rating symbol that quickly identifies the hazard information broken down into four hazard classes, with 1 indicating a low level of hazard and 4 indicating a high hazard level. The four chemical hazard types correspond to the four-color areas: red indicates a flammability hazard, yellow indicates a reactive hazard, blue indicates a health hazard, and the white area is reserved for special hazards that are identified by hazard symbols or labels to indicate hazards such as radioactivity, biohazard, water reactive chemicals, etc. Each of these hazards has a different set of safety precautions associated with them. The figure below is an example of a visible hazard identification sign along with an explanation of the NFPA Rating System.



The table below is a list of common laboratory chemicals and their associated NFPA Ratings.

HAZARDOUS CHEMICAL	NFPA HAZARD RATING			
	Health	Flammability	Instability	Special
Acetamide	2	1	1	
Acetaldehyde	2	4	2	
Acetic Acid	3	2	0	
Acetic acid (glacial)	2	2	0	
Acetone	2	3	0	
Acetophenone	2	2	0	
Acetonitrile	3	3	0	
Acetyl chloride	3	3	2	W
Acetylene	1	4	3	
Acrylonitrile	4	3	2	
Aluminum Nitrate	2	2	0	OXY
Ammonium Chloride	2	2	0	OXY
Ammonium Hydroxide	3	0	0	

Ammonium Perchlorate	1	0	4	OXY
Ammonium Persulfate	1	0	1	OXY
Aniline	2	2	0	OXY
Argon, gas	0	0	0	SA
Arsenic Trioxide	2	0	0	
Arsine	4	4	2	
Barium Chlorate	2	0	1	OXY
Barium Sulfate	0	0	0	
Benzene	2	3	0	
Benzoic Acid	2	1	0	
Benzonitrile	2	2	0	
Benzoyl Chloride	3	2	2	W
Bromine	3	0	0	OXY
Bromobenzene	2	2	0	
Bromothymol Blue	1	0	0	
Butanol, 2-	1	3	0	
Butyl Acrylate, inhibited	2	2	2	
Butyl Ether	2	3	1	
Calcium Carbide	2	3	1	W
Calcium Chlorate	1	0	1	OXY
Calcium Hydroxide	3	0	0	
Calcium Hypochlorite	1	0	2	OXY
Calcium Oxide	1	0	1	
Carbon Dioxide, gas	2	0	0	SA
Carbon Tetrachloride	3	0	0	
Chlorine	3	0	0	
Chloroacetonitrile	3	2	0	
Chlorobenzene	2	3	0	
Chloroform	2	0	0	
Chlorophenol, 4-	4	1	0	
Chromic Acid, solid	3	0	1	OXY
Cresol (o-, m-, p-)	3	2	0	
Cyclohexane	1	3	0	
Cyclohexanol	1	2	0	
Cyclohexanone	1	2	0	
Cyclohexene	2	3	0	
Dibenzothiophene	2	1	0	
Dichlorobenzene	2	2	0	
Dichloroethylene	2	3	2	

Diisopropyl Ether	2	3	1	~~W~~
Dimethyl Ether	2	4	1	
Dimethylamine	3	4	0	
Dimethylhydrazine	3	3	1	
Dinitroaniline, 2, 4-	3	1	3	
Dinitrobenzene, 1, 2-	3	1	4	
Dinitrochlorobenzene	3	1	4	
Diphenylamine	2	1	0	
Ethanol	2	3	0	
Ethidium Bromide	2	0	0	
Ethyl Alcohol	2	3	0	
Ethyl Ether	2	4	1	
Ethyl Methyl Ether	2	4	1	
Ethylene	1	4	2	
Ethylene Dichloride	2	3	0	
Ferric Chloride	3	0	0	
Ferrous Sulfate	2	0	0	
Fluorine	3	0	4	
Formaldehyde, aqueous	3	2	0	
Formic Acid	3	2	0	
Helium, gas	1	0	0	
Heptane, n-	1	3	0	
Hexane, n-	1	3	0	
Hexanol, n-	1	2	0	
Hydrochloric Acid	3	0	1	
Hydrogen Peroxide (35-52%)	2	0	1	OXY
Hydrogen Peroxide (>52%)	2	0	3	OXY
Hydrogen, gas	0	4	0	
Hydroxylamine	2	0	3	
Hydrazine Hydrate	4	1	3	
Iodine	2	0	0	
Iodine-Potassium Iodide	0	0	0	
Indole	3	1	0	
Isobutyl acetate	1	3	0	
Isoamyl Alcohol	2	2	0	
Isoprene	2	4	2	
Isopropanol	1	3	0	
Isopropyl Alcohol	1	3	0	
Isopropyl amine	3	4	0	

Magnesium Chloride	1	0	0	
Magnesium Nitrate Hexahydrate	1	0	1	OXY
Manganese Chloride	1	0	0	
Manganese (II) Nitrate	3	1	2	OXY
Malonic Acid	2	1	0	
Methyl Chloride	2	4	0	
Methyl cyclopenate	2	3	0	
Methyl Ethyl Ketone	2	3	1	
Methylene Blue	1	0	0	
Methyl Isocyanate	4	3	2	
Methyl Orange	2	0	0	
Methyl alcohol	1	3	0	
Methyl ethyl ketone	1	3	0	
Methyl-2-butanol, 2-	1	3	0	
Methyl-2-propanol, 2-	1	3	0	
Methylene Chloride	2	1	0	
Napthalene	2	2	0	
Nitric Acid, >40%	3	0	0	
Nitroaniline, p-	3	1	2	
Nitrobenzene, liquid	3	2	1	
Nitrochlorobenzene	3	1	0	
Nitrogen, gas	0	0	0	SA
Nitrogen, refrigerated liquid	3	0	0	
Nitrotoluene, o-, m-, p-	3	1	1	
Oxalic Acid, dihydrate	2	1	0	
Oxygen, gas	0	0	0	OXY
Oxygen, liquid	3	0	0	OXY
Pentane	1	4	0	
Pentanol, 1-	1	3	0	
Pentanol, 2-	3	2	0	
Pentanol, 2-	1	2	0	
Pentanone, 3-	2	3	0	
Petroleum ether	1	4	0	
Phenol	3	2	0	
Phenylethanolamine	2	1	0	
Polychlorinated Biphenyls	2	1	0	
Potassium Chloride	1	0	0	
Potassium Hydroxide	3	0	1	
Potassium Permanganate	2	0	3	OXY

Potassium Sulfate	1	0	0	
Potassium Sulfide	3	1	0	
Potassium, metal	3	3	2	W
Propanol, 2	1	3	0	
Propylene	1	4	1	
Pyridine	2	3	0	
Salicylic Acid	0	1	0	
Sodium Acetate	1	1	0	
Sodium Bicarbonate	2	0	1	
Sodium Bromide	1	1	1	
Sodium Chlorate	1	0	1	OXY
Sodium Chlorite	1	1	1	OXY
Sodium Cyanide	3	0	0	
Sodium Hydroxide	3	0	1	
Sodium Nitrate	2	1	3	OXY
Sodium Nitrite	3	0	2	OXY
Sodium Perchlorate	2	0	1	OXY
Sodium Peroxide	3	0	1	OXY
Sodium Phosphate, di, mono	0	0	1	
Sodium, metal	3	3	2	W
Sodium Sulfate	1	0	0	
Sodium Sulfite	1	0	1	
Sodium Thiosulfate	1	0	1	
Sulfanilamide	2	1	1	
Sulfur Dioxide	3	0	0	
Sulfur, dry	1	1	0	
Sulfuric Acid	3	0	2	W
Tert Butyl Alcohol	2	3	0	
Tetrachloroethylene	2	0	0	
Thioacetamide	3	1	0	
Toluidine Blue	0	1	0	
Toluene	2	3	0	
Trichloroethylene	2	2	0	
Trimethylamine	3	4	0	
Urea	0	1	0	
Vinyl Acetate	2	3	2	
Vinyl Chloride	2	4	2	
Xylenes, o-, m-, p-	2	3	0	
Zinc Nitrate Hexahydrate	2	1	2	OXY

Appendix C
Document Revision History

Authors(s)/ Editor(s):

- Steven Ross, *Assistant Director, Environmental Health & Safety*

Revision Date	Change Details	Reference Section(s)
12/01/2022	Review/Update	all