



SUNY Broome Community College

Chemical Hygiene Plan

- The following Chemical Hygiene Plan has been developed in accordance with the OSHA "Occupational Exposure to Hazardous Chemicals in Laboratories Standard", 29 CFR 1910.1450.



Chemical Hygiene Plan

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The principal focus of the SUNY Broome Chemical Hygiene Plan (CHP) is that of a written plan capable of protecting laboratory workers from health dangers associated with hazardous chemicals, and keeping exposures below the Permissible Exposure Levels (PEL), as published and enforced by OSHA as a legal standard. It is designed to be a working document, readily available to all employees. The CHP shall include each of the following elements and shall indicate specific measures that SUNY Broome will take to ensure laboratory employee protection:

1. Standard Operating Procedures for the use of hazardous chemicals.
2. Criteria for determining and implementing control measures to reduce exposure.
3. Measures to assure proper functioning of fume hoods and other engineering controls.
4. Provisions for employee information and training.
5. Circumstances under which a laboratory operation or procedure will require prior approval.
6. Provisions for medical consultation and examination.
7. Designation of responsible personnel, including the Chemical Hygiene Officer and a Chemical Hygiene Committee.
8. Provisions for particularly hazardous substances.

This CHP is generic to all SUNY Broome Laboratories. It is to be used as a starting point of lab safety information. It is the responsibility of the lab supervisor to add *specific* safety information for his/her laboratory operations and experiments which are not covered by this plan.

1. Standard Operating Procedures

1.A. General Rules

Awareness is the most fundamental rule of chemical safety. Everyone working in a laboratory should remain constantly aware of:

- The chemicals hazards, as determined from the Safety Data Sheets (SDSs) and other appropriate references. SDSs may be electronically retrieved from [SUNY Broome's Health & Safety webpage](#).
- Appropriate safeguards for using that chemical, including personal protective equipment.
- Location and proper use of emergency equipment.
- How to properly store the chemical when not in use.
- Proper personal hygiene practices.
- The proper use, maintenance, and limitations of personal protective equipment.
- The proper methods of transporting chemicals within the facility.
- Appropriate procedures for emergencies.

Never put yourself at greater risk by working alone in a laboratory. Working alone is not recommended.

1.B. Personal Hygiene

Personal hygiene is an important factor in chemical hygiene. To affect a person, a toxic chemical must contact that person. The four routes of entry (inhalation, ingestion, injection, and eye and skin contact) limit the chemical's ability to contact us. If we properly protect ourselves, we can eliminate the chemical's ability to do harm. Some good personal hygiene practices include:

- Wash promptly if skin contact is made with any chemical.
- Wear appropriate eye protection at all times.
- Avoid inhalation of chemicals; do not "sniff" test chemicals.
- Do not mouth pipette anything; use suction bulbs.
- Wash well before leaving the laboratory; do not wash with solvents; use soap.
- Change clothing as soon as possible after leaving the laboratory, and launder work clothes often.
- Do not drink, eat, smoke, or apply cosmetics in the laboratory.

1.C. Food and Smoking

There should be no eating, drinking, smoking, or application of cosmetics allowed in areas where chemicals are either stored or used. Because chemical vapors can be absorbed by foodstuff and tobacco, no food or tobacco products should be allowed into chemical use areas.

1.D. Personal Protective Equipment (PPE)

The most fundamental piece of protective equipment is the clothing which a lab worker wears. Clothing should be worn to minimize exposed skin surfaces. Exposed skin surfaces can lead to direct contact through splashing. Therefore, all lab workers should wear long sleeved/long legged clothing and avoid short sleeved shirts, shorts or skirts. Sandals, open-toed shoes and canvas shoes should not be worn in the laboratory.

In addition, the following is a list of PPE which is the responsibility of the laboratory worker to make certain is appropriate protection for the hazards encountered:

- Eye Protection
- Gloves
- Aprons
- Face Shields
- Lab Coats
- Respirators (contact Health & Safety first)

A detailed review of PPE is found in section 2.E.

1.E. Housekeeping

Common housekeeping practices contribute to improving chemical hygiene and safety. A clean, organized work area is much safer than a cluttered or dirty one. Some appropriate housekeeping measures include:

- Keep all aisles, hallways, and stairs clear of all chemicals.

- Keep all work areas, especially lab benches, clear of clutter and obstruction.
- All working surfaces and floors should be cleaned regularly.
- Wastes should be kept in the proper containers and labeled properly.
- Access to emergency equipment, showers, eyewashes and exits, should never be blocked by anything.
- Never store chemicals on the floor, even temporarily.
- Laboratory staff should be considerate and aware of the maintenance/custodial staff. The typical maintenance/custodial staff is not as highly educated on chemicals and their hazards as most laboratory workers.

Therefore, for the safety of maintenance/custodial staff, laboratory workers should make sure that:

- ✓ All broken glassware is safely disposed of. Do not throw broken glass in the trash unless it is enclosed in a solid secondary container.
- ✓ All chemicals are placed in proper storage areas by the end of each workday.
- ✓ All chemical containers are labeled with both the identity of the chemical and its hazards.
- ✓ All spills are promptly cleaned up and the spilled chemical is properly disposed of.

1.F. When Not to Proceed with Experimental Work in a Laboratory

Sometimes, laboratory workers should not proceed with what seems to be a routine task. Under some conditions, the routine task might contain hazards not fully recognized by the worker. Workers should recognize certain indicators to review the procedure, including but not limited to:

- New procedure, process or test - even if it is very similar to older practices.
- It is likely that toxic limit concentrations could be exceeded or that other harm is likely.
- Change or substitution of any of the ingredient chemicals in a procedure.
- Failure of any of the equipment used in the process, especially safeguards such as fume hoods or clamp apparatus.
- Unexpected test results. When a test result is different than predicted, a review of how the new result impacts safety practices must be made.
- If members of the laboratory staff become ill, suspect exposure, or otherwise suspect a failure of laboratory safeguards.

The occurrence of any of these conditions should result in work stoppage and immediate investigation by the laboratory supervisor. The results of the investigation should be reported immediately to the Chemical Hygiene Officer (CHO) who must decide whether to continue the investigation, institute any additional corrective actions beyond those of the laboratory supervisor, or allow work to continue.

1.G. Spills and Accidents

Spills of toxic substances or accidents involving any hazardous chemicals should be resolved immediately. The overall steps to handle a spill or accident are:

- Notify your supervisor or other nearby laboratory workers, and the appropriate emergency responders immediately – dial 9-911 from a campus phone or 911 from a cell phone. Public Safety should also be notified at x5083 from a campus phone or 778-5083 from a cell phone.

- If the spilled chemical is flammable, extinguish all nearby sources of ignition.
- If a person has been splashed with a chemical, wash the victim with plenty of water for at least 15 minutes, remove all contaminated clothing, and get medical attention.
- If a person has been overexposed by inhalation, get the victim to fresh air, and get medical attention.
- After securing proper medical attention for a chemical exposure victim, neutralize or absorb the spilled chemical with the proper spill cleanup material and dispose of it in accordance with the SUNY Broome hazardous waste policy.
- For assistance with chemical spills, call Health & Safety at x5083

During emergencies, it is important to:

- NOT handle emergencies alone, especially without notifying someone that the accident has occurred.
- NOT apply medical aid procedures without some training in that area.
- NOT linger at the accident scene if you are not one of the emergency responders.

1.H. Waste Chemicals

Chemical wastes are regulated by the Environmental Protection Agency (EPA) under the Resource Conservation and Recovery Act (RCRA) as well as the State of New York, Hazardous Waste Regulations, 6 CRR-NY. SUNY Broome has its own Hazardous Waste Policy, based upon both of these regulations.

Each laboratory worker at SUNY Broome should have a copy of the Hazardous Waste Policy, and be familiar with its procedures. It is the responsibility of every laboratory worker, faculty, staff and student to legally and safely dispose of all hazardous chemical wastes. For a copy of the SUNY Broome policy, contact the Chemical Hygiene Officer, Hans Van Houten x5366, or retrieve it from [SUNY's Broome Health & Safety webpage](#).

1.I. Procedure-Specific Safety Procedures

Written laboratory procedures normally have a brief description of specific safety practices for that particular procedure. Lab workers should read and review those practices before commencing a procedure.

1.J. Transport of Chemicals around Campus

As part of research, projects, and educational activities, chemicals may be moved from the stockrooms to labs, from lab to lab, or between buildings under certain conditions:

- Hand transportation of up to 1 gallon of material with an NFPA rating of 0 to 2 in all categories as long as the material is transported in a secondary container.
- Hand transportation of up to five (5) capped 10-ml sample vials of compatible materials with an NFPA rating of 3 or more in any category, as long as the material is transported in a secondary container. Vials may be capped, sealed with secure stoppers of compatible materials, or other appropriate seals to prevent spillage. Sole use of parafilm, foil, or other similar materials is not sufficient for transporting liquids.
- Secondary containment carriers must be sturdy, in good condition, and compatible with the material being transported. Chemicals will not be distributed without a secondary containment carrier.
- The person transporting the chemicals must treat the chemical with due respect for the hazard (e.g., not running, not swinging the carrier, using a cart when appropriate, etc.).

- The person transporting the chemicals should NOT wear chemically resistant/lab gloves. The containment system should be sufficient to protect against spills. Note that the handle of the container should be free of chemicals/residue. Persons may of course use personal gloves to protect against outside weather conditions as appropriate.
- Transportation of chemicals in vehicles and/or over public access roads or sidewalks is prohibited unless the driver is authorized by the CHO. This does not apply to small sample vials transported for analysis (capped vials up to 10 ml).

2. Criteria to Determine and Implement Control Measures to Reduce Exposure to Hazardous Chemicals

Chemical safety is accomplished by awareness of a chemical's hazards, and by keeping the chemical under control through a variety of engineered safeguards. Laboratory workers should be familiar with the proper use of those safeguards. Laboratory supervisors should be able to detect the malfunction of those safeguards. All engineered controls must be properly maintained, inspected on a regular basis, and never overloaded beyond their design limits.

2.A. General Ventilation

General ventilation refers to the quantity and quality of the air supplied to the laboratory. The building ventilation system should ensure that the laboratory air is continuously being replaced so that harmful concentrations of hazardous chemicals do not increase during the working day.

2.B. Fume Hoods

The fume hood is the best local exhaust device used in laboratories. It is, however, but one part of the total ventilation system and should not be considered as separate from the total system. The reason being is its performance will be strongly influenced by other features in the general ventilation system. All work done with chemicals with low exposure limits or high vapor pressures should be done in a fume hood. To ensure your fume hood provides the highest degree of protection, observe the following guidelines:

- Only materials being used in an ongoing experiment should be kept in the fume hood. Cluttering of the hood will create airflow disturbances.
- Large apparatus inside a hood should be placed upon blocks or legs to allow air to flow underneath.
- Operate the hood with the door as low as practical, but not above 15 inches open to ensure worker protection.
- Work as far into the hood as possible. At least six inches is recommended.
- Keep your head outside the hood.
- Avoid cross drafts at the face of the hood. Even pedestrian traffic may be sufficient current to cause air turbulence.
- Keep hood door closed when not attended.

The performance standard for fume hoods at SUNY Broome is the delivery of a minimum face velocity of 75-100 linear feet per minute with a door opening of 15 inches. Performance testing is coordinated by the lab's department e.g. Chemistry, on an annual basis.

2.C. Flammable Storage Cabinets

Cabinets designed for the safe storage of flammable chemicals can only do so if used and maintained properly. Always read the manufacturer's information, and abide by the following:

- Store only compatible materials inside the cabinet.

- Do not store paper or cardboard inside cabinets with the chemicals.
- Do not overload the cabinet.

2.D. Eyewashes and Safety Showers

Eyewashes and safety showers will be provided wherever chemicals are handled for immediate first aid treatment of chemical splashes, and for extinguishing clothing fires.

- Every laboratory worker should learn the locations of, and how to use the safety showers and eye washes in their laboratory so that he or she can find them with their eyes closed, if necessary.
- Keep all passageways to the eyewash and shower clear of any obstacle (even temporary ones).
- Showers and eye wash units should be tested frequently to assure that access is not restricted, the start chain is within reach, and they function properly.

2.E. Personal Protective Equipment (PPE)

A variety of specialized clothing and equipment is commercially available for use in the laboratory. The proper use of these items will minimize or eliminate exposure to the hazards associated with many laboratory operations. Every laboratory worker should be familiar with the location and proper use of the PPE in their laboratory area.

A brief introduction to PPE was made in section 1.D. Some additional information is found in Appendix B, as well as in the following:

2.E.1. General Eye Protection Policy

Eye protection is required of all personnel and any visitors present in any location where chemicals are stored or handled. This protection should meet the requirements of the American National Standards Institute (ANSI) Z87.1. No one should enter any laboratory without appropriate eye protection. Safety spectacles that meet the criteria described below provide minimum eye protection for regular use. Additional protection may be required when carrying out more hazardous operations.

Contact lenses should not be worn in a laboratory. Gases and vapors can be concentrated under such lenses and cause permanent eye damage. Furthermore, in the event of a chemical splash in the eye, it is often nearly impossible to remove the contact lens to irrigate the eye because of involuntary spasm of the eyelid. There are some exceptional situations in which contact lenses must be worn for therapeutic reasons. Persons who must wear contact lenses should inform the laboratory supervisor so that satisfactory safety precautions can be planned.

2.E.2. Safety Glasses

Ordinary prescription glasses do not provide adequate protection from injury to the eyes. Safety glasses must be worn to protect the eyes from the impact of flying objects, and some extent chemical splashes. When safety glasses are worn without side shields, liquid splashes or flying particles can potentially reach the eye. If side shields are attached to the frames, greater protection against liquid or solid agents is afforded.

2.E.3. Goggles

Goggles provide greater protection against chemical splashes than safety glasses with side shields due to the fact that they fit more closely to the face and form a more effective barrier against foreign materials. Goggles are also impact-resistant.

2.E.4. Goggles with Face shield

Face shields provide good protection to the eyes, face and neck against flying particles, sprays of hazardous liquids, splashes of molten metal and hot solutions. They are not recommended for eye protection against the impact of hurtling objects, therefore it is generally necessary to wear safety glasses or goggles underneath the face shield.

2.E.5. Specialized Eye Protection

There are specific goggles and masks for protection against laser hazards, and other intense light sources, as well as glass blowing goggles, and welding masks and goggles. The laboratory supervisor should determine whether the task being performed requires specialized eye protection and require the use of such equipment if it is necessary.

2.E.6. Gloves

Proper protective gloves should be worn whenever the potential for contact with corrosive or toxic materials and materials of unknown toxicity exists. Gloves should be selected on the basis of the material being handled, the particular hazard involved, and their suitability for the operation being conducted. For technical assistance in proper glove selection, please refer to Appendix B, or call the Health & Safety at x5083.

2.E.7. Laboratory Clothing

The clothing worn by a laboratory worker can be imperative to their safety.

- Such workers should not wear loose (neckties), skimpy (shorts), or torn clothing and unrestrained longhair.
- Loose or torn clothing and unrestrained long hair can easily catch fire, dip into chemicals, or become ensnared in moving laboratory equipment; skimpy clothing offers little protection to the skin in the event of a chemical splash.
- Perforated shoes, sandals, or cloth sneakers should not be worn in laboratories or where mechanical work is being done.
- Lab coats are intended to prevent contact via a chemical splash or a spill. The cloth lab coat is, however, primarily a protection for clothing, and may itself present a hazard (combustibility) to the wearer.
- Lab coats should only be worn inside the laboratory to avoid the possibility of contamination outside the lab confines.
- Rubber Aprons provide better protection from corrosive or irritating liquids in the event of a splash or spill.

2.E.8. Respirators

Suitable respiratory equipment shall be provided to all laboratory workers when engineering controls cannot maintain laboratory contaminants below acceptable levels.

- The written respirator program, as mandated by OSHA 29CFR1910.134, will discuss issues such as respirator selection criteria, inspection, and maintenance.
- All laboratory workers using respirators will be trained in their proper use and care. Please notify Health & Safety at x5083 before purchasing or using a respirator.

2.E.9. Hearing Protection

Hearing protection should be worn in "high noise" areas to protect individuals from "noise-induced hearing loss" which is a permanent decrease in the ability to hear resulting from excessive exposure to noise. Different hearing protection devices vary in their ability to reduce noise. Hearing protectors include a variety of earplugs and earmuffs. Additional information on hearing protection can be found in Appendix B.

2.F. Vapor Detection

Do not use odor as a means of determining that inhalation limits are or are not being exceeded. Whenever there is reason to suspect that a toxic chemical inhalation limit might be exceeded, whether or not a suspicious odor is noticed, immediately stop work and notify your supervisor.

2.G. Criteria for Control Measures

This section examines the criteria and guidelines which will be used to determine the use of engineered and administrative controls and personal protective equipment.

2.G.1. Exposure Guidelines for Toxic Chemicals

The Safety Data Sheets (SDSs) for many of the chemicals used in the laboratory will state recommended limits or OSHA-mandated limits, or both, as guidelines for exposure. Typical limits are threshold limit values (TLV), permissible exposure limits (PEL) and action levels. When such limits are stated, they will be used to assist the laboratory supervisor and/or chemical hygiene officer in determining the safety precautions, control measures and safety apparel that apply when working with toxic chemicals. Please see Appendix A for NYS PESH PELs.

2.G.2. Flammability Guidelines

The flash point of a substance is the lowest temperature at which a liquid gives off vapor in sufficient concentration to form an ignitable mixture with air near the surface of the liquid. At SUNY Broome, the flash point of a chemical will be used as the reference standard for flammability.

- OSHA and NFPA have guidelines on when a chemical is considered flammable. Those guidelines are herein adopted for use in the laboratory.
- "Flammable" is generally used to refer to chemicals with a flash point below 100 degrees F.
- "Combustible" is generally used to refer to chemicals with a flash point between 100 and 200 degrees F.
- Any chemical with a flash point below 200 degrees F will be considered a fire hazard.

2.G.3. Reactivity Guidelines

Guidelines on which chemicals are reactive can be found in regulations from the Environmental Protection Agency (40CFR). The NFPA has also developed guidelines on what constitutes a reactive chemical. These sources will be used as a guideline to determine which substances are considered reactive.

At SUNY Broome, a reactive chemical is one which is:

- Described as such on the chemical's SDS.
- Ranked by the NFPA as a 3 or 4 for reactivity.
- Determined by the US DOT as either an oxidizer, an organic peroxide, or an explosive (Classes A, B, or C).
- Fits the US EPA definition of reactive in 40CFR261.
- Fits the OSHA definitions of unstable.
- Is found to be reactive with ordinary substances.

Once a chemical has been determined to be reactive, all proper safety precautions will be used including extra segregation in storage and prohibition of mixing with other chemicals without personal protection and precautions.

2.G.4. Corrosive Material Guidelines

A corrosive chemical is defined by OSHA, DOT and EPA. SUNY Broome will consider a chemical corrosive if it fits the definition of corrosive in the following list of regulations.

- OSHA 29 CFR
- DOT 49 CFR
- EPA 40 CFR
- Corrosive materials are also designated as such on container labels and SDSs.
- Handle corrosive chemicals with all proper safety precautions, including wearing both safety goggles and face shield, gloves known to be resistant to permeation or penetration, and a laboratory apron or laboratory coat.

2.G.5. Miscellaneous Criteria for Control Measures

In addition to the previously listed guidelines in this section, SUNY Broome will use the available information on a chemical's Safety Data Sheet (SDS) or on the container label. Appropriate control measures found on the label or product SDS may contain the following information: health hazards, fire hazards, PPE required, storage and handling data, and disposal information. This information will be used to determine the appropriate control measures which are necessary to protect the health of all laboratory workers at SUNY Broome.

3. Fume Hoods and Other Engineering Controls

The purpose of this section is to assure that the hoods on campus perform adequately. Measures includes a review of the installation plans of new fume hoods, regular inspections, preventative maintenance, education, and training.

3.A. Hood Requirements

- SUNY Broome requires all fume hoods to maintain an average linear face velocity of 75-100 LFM at a sash height of at least 15 inches.
- All fume hoods should be ducted and should have the fan located on the roof.
- A make-up air system should be provided for all new hoods.
- All new stacks should extend at least 6 feet above the roof line for optimum flow efficiency.
- No hood should be used for a function for which it was not designed.

3.B. Hood Inspections

The department who utilizes the hoods will coordinate and perform annual inspections of their fume hoods, with assistance from Maintenance and Health & Safety. Inspections include:

- Air flow survey. This involves measurement of the face velocity with an air velocity meter.
- Check to verify if hoods are being used properly.
- Note any conditions which may cause obstruction in air flow or cross drafts.

All information is documented on a test report sheet. Information on this sheet includes the actual measurements and the hood's average face velocity, the date of inspection, the name of the individual performing the test, and a comment section for miscellaneous information such as messy conditions, excessive chemical storage or other unsafe practices

which may be noted at the time of the inspection. A certification sticker is dated and signed along with the LFM reading and placed on the left side of the fume hood cabinet.

- If a hood does not meet the minimum face velocity of 75-100 LFM, the person testing the hood will make adjustments to the cabinet, if possible. This involves adjusting the baffle or damper, moving large objects which may be obstructing air flow, or any other adjustments which may improve the hood's performance.
- If cabinet adjustments are not adequate, the inspector will initiate a Maintenance Work Order to correct the deficiency or repair the fume hood as needed.
- During this process, the supervisor of the laboratory as well as the department head will be informed of this activity. The hood is not to be used during this time.
- If the hood performance is still below standard after repairs have been made, Maintenance or a third party contractor will be requested to make further adjustments.
- A hood which fails to meet the 75-100 LFM will be labeled as not being suitable to work with hazardous materials.

3.C. New Hoods

- The design plans of all new fume hoods at SUNY Broome will be reviewed prior to approval by Health & Safety. In addition, Health & Safety may evaluate the selection and design of all fume hoods before they are installed.
- All newly installed fume hoods are reported to Health & Safety and must be certified before they may be used.

3.D. Facilities Requirements

- Facilities is responsible for the annual inspection of the fan systems. This includes:

3.D.1.

All hoods must be shut down before going onto the roof to perform the preventative maintenance. Prior approval is MANDATORY before the systems are turned off to prevent unsafe conditions to occur in a laboratory. It is the responsibility of the Facilities/Maintenance personnel to advise the laboratory workers or building managers whenever a shutdown is required. Upon completion of the work, the Facilities/Maintenance personnel will alert laboratory workers or building manager and advise that the system is once again operational.

3.D.2.

Once the fan system is off, the Maintenance personnel are to check belts, grease the motor and make any repairs as needed.

3.E. Miscellaneous Fume Hood Information

- Health & Safety maintains certification records of all hoods on campus.
- Health & Safety will provide special training sessions by request and will respond to any questions regarding proper hood usage on the SUNY Broome campus.

4. Laboratory Worker Information and Training

SUNY Broome will provide all laboratory workers with information and training concerning the hazardous chemicals in SUNY Broome's laboratories. This information and training shall be provided when a laboratory worker is initially assigned to a laboratory where hazardous chemicals are present and also prior to assignments involving new hazardous chemicals and/or new laboratory work procedures. All lab workers should be re-trained annually.

4.A. Laboratory Worker Information

All laboratory workers at SUNY Broome shall be informed of the following:

- The content and requirements of the OSHA laboratory standard.
- The content, location, and availability of the SUNY Broome chemical hygiene plan (CHP).
- The PEL's, action levels and other recommended exposure limits for hazardous chemicals used in SUNY Broome's laboratories.
- The signs and symptoms associated with exposure to the hazardous chemicals used in the laboratory.
- The location and availability of SDSs and other reference materials on the hazards, safe handling, storage and disposal of hazardous chemicals found in the laboratory.

The OSHA Laboratory Standard and SUNY Broome's Chemical Hygiene Plan are located in the following areas:

Public Safety Building – Contact Hans Van Houten – EH&S Coordinator – x5366

Human Resources Department located in the Wales Building – x5319

It is available during normal working hours, 8:30 AM to 5:00 PM. Access at all other times is available through the Campus Public Safety - x5083

4.B. Laboratory Worker Training

All laboratory workers at SUNY Broome shall receive training in the following areas:

- The methods and observations that may be used to detect the presence or release of a hazardous chemical.
- The hazards associated with the chemicals used in SUNY Broome laboratories.
- The measures laboratory workers can use to protect themselves from these hazards, including specific procedures such as appropriate work practices, personal protective equipment to be used and emergency procedures.
- The details of SUNY Broome's Chemical Hygiene Plan.

5. Laboratory Operations or Procedures That Require Prior Approval

All laboratory workers must obtain prior approval to proceed with a laboratory task from their immediate supervisor or his or her designee whenever:

- A new laboratory procedure or test is about to be carried out.
- It is likely that toxic limit concentrations could be exceeded or that other harm is likely.
- There is a change in a procedure or test, which may include:
 - A 10% or greater increase or decrease in the amount of one or more chemicals used.
 - A substitution or deletion of any of the chemicals used in the procedure.
 - Any change in other conditions under which the procedure is to be conducted.
- There is a failure of any of the equipment used in the process, especially of safeguards such as fume hoods or clamped apparatus.
- There are unexpected results.
- Members of the laboratory staff become ill, suspect that they or others have been exposed, or otherwise suspect a failure of any safeguards.
- Whenever a student, faculty or staff member introduces a new hazardous material into the laboratory, prior approval must be granted by the Environmental and Occupational Safety Manager before the material is permitted on campus. This includes all materials with biological, chemical and radiological hazards.

The occurrence of any of these conditions should result in work stoppage and immediate investigation by the laboratory supervisor. The results of the investigation should be reported immediately to the Chemical Hygiene Officer and/or department chair, who then must decide whether to continue the investigation, institute any additional corrective actions beyond those of the laboratory supervisor, or allow work to continue.

6. Exposure Assessments, Medical Consultations, and Examinations

6.A.

There may be times when laboratory workers or supervisors suspect that someone has been exposed to a hazardous chemical to a degree and in a manner that might have caused harm to the victim. If the circumstances suggest a reasonable suspicion of exposure, the victim is entitled to a medical consultation, and if determined in the consultation, also to a medical examination at no cost, with no loss of work day time attributed to the victim.

6.A.1. Criteria for Reasonable Suspicion of Exposure

It is the policy of SUNY Broome to promptly investigate all work-related incidents in which there is even a remote possibility of laboratory worker overexposure to a toxic substance.

Events or circumstances that might reasonably constitute overexposure include:

- A hazardous chemical leak, spill, or other uncontrolled release.
- A laboratory worker has direct skin or eye contact with a hazardous chemical.
- A laboratory worker manifests symptoms such as headache, rash, nausea, coughing, tearing, irritation or redness of the eyes, irritation of nose or throat, dizziness, loss of motor dexterity, etc. and:
 - Some or all of the symptoms disappear when the person is taken away from the exposure area and breathes fresh air, and the symptoms reappear soon after the employee returns to work with the same hazardous chemicals.
 - Two or more persons in the same laboratory have the same complaints.

6.B. Exposure Assessment

In cases of emergency, exposure assessments are conducted after the victim has been treated.

Note: It is not the purpose of an exposure assessment to determine that a failure on the part of the victim, or others, to follow proper procedures was the cause of an exposure. The purpose of an exposure assessment is to determine that there was or was not an exposure that might have caused harm to one or more laboratory workers, and if so, to identify the hazardous chemical or chemicals involved. Another purpose of an exposure assessment will include a risk assessment in order to ensure that a failure will not occur again, and thereby prevent future exposures.

6.C.1.

Unless circumstances suggest other or additional steps, these actions constitute an exposure assessment:

- Interview the complainant and also the victim if not the same person.
- List the essential information about the circumstances of the complaint, including:
 - The chemical under suspicion.
 - Other chemicals used by the victim.
 - All chemicals being used by others in the immediate area.

- Other chemicals stored in that area.
- Symptoms exhibited or claimed by the victim.
- How these symptoms compare to symptoms stated in the SDS for each of the identified chemicals.
- Were control measures, such as personal protective equipment and fume hoods, used properly?
- Were any air sampling or other monitoring devices in place? If so, were the measurements obtained from these devices consistent with other information?
- Monitor or sample the air in the area for suspect chemicals.
- Determine whether the victim's symptom compare to the symptoms described in the SDS or other reference material.
- Determine whether the present control measures and safety procedures are adequate.
- Within 15 working days of receipt of the results of any monitoring, laboratory workers will be notified of those results.

6.D. Medical Examination and Consultation

The purpose of a medical consultation is to determine whether a medical examination is warranted. When, from the results of an exposure assessment, it is suspected or known that a laboratory worker was overexposed to a hazardous chemical or chemicals, the laboratory worker should obtain medical consultation from or under the direct supervision of a licensed physician.

When warranted, laboratory workers should receive a medical examination from or under the direct supervision of a licensed physician who is experienced in treating the victims of chemical overexposure. The medical professional should also be knowledgeable about which tests or procedures are appropriate to determine if there has been an overexposure.

These provisions apply to medical consultations and examinations:

6.D.1.

SUNY Broome will provide all laboratory workers who work with hazardous chemicals an opportunity to receive medical consultation and examination when:

- The laboratory worker develops signs or symptoms associated with a hazardous chemical to which the worker may have been exposed.
- Monitoring, routine or otherwise, suggests that there could have been an exposure above the action level, for a chemical for which a substance-specific standard has been established.
- There is a spill, leak or other uncontrolled release of a hazardous chemical.

6.D.2.

The physician is to be provided with:

- The identity of the hazardous chemical or chemicals to which the laboratory worker might have been exposed.
- The exposure conditions, if any.

6.D.3.

The physician will furnish the employer in written form:

- Recommendations for follow-up, if determined to be pertinent.
- A record of the results of the consultation and, if applicable, of the examination and any tests that were conducted.
- Conclusions concerning any other medical condition noted that could put the laboratory worker at increased risk.
- A statement that the laboratory worker has been informed both of the results of the consultation and examination, and of any medical condition that may require further examination or treatment.

6.D.4.

These written statements and records should not reveal specific findings that are not related to an occupational exposure.

6.E. Documentation

All memos, notes and reports related to a complaint of actual or possible exposure to hazardous chemicals are to be maintained as part of the record, for the duration of the worker's employment, plus 30 years thereafter.

6.F. Notification

SUNY Broome laboratory workers shall be notified of the result of any medical consultation or examination with regard to any medical condition that exists or might exist as a result of overexposure to a hazardous chemical.

7. Designation of Responsible SUNY Broome Personnel, Including the Chemical Hygiene Officer & Chemical Hygiene Committee

7.A. Responsibilities of the individual laboratory worker:

- Each person working with or around chemicals is responsible for remaining aware of the hazards of those materials and handling those materials in a safe manner.
- Each person is responsible for knowing how to store, use, and dispose of hazardous chemicals based on the hazards of the materials they are working with.

7.B. Responsibilities of the Laboratory Supervisor (faculty, staff, etc.):

- Each laboratory supervisor has the responsibility of giving all the necessary safety instructions to his or her workers prior to the beginning of any laboratory work involving hazardous chemicals.
- Each laboratory supervisor has the responsibility of seeing that laboratory workers carry out their individual safety responsibilities.
- Each laboratory supervisor will be familiar with the SUNY Broome Chemical Hygiene Plan.

7.C. Responsibilities of the SUNY Broome Chemical Hygiene Officer:

- The Chemical Hygiene Officer will work with administrators and other employees to develop and implement appropriate chemical hygiene policies and practices, and hazard communication policies and practices, and monitor procurement, use, and disposal of chemicals.
- Provides technical guidance in the development and implementation of the Chemical Hygiene Plan (CHP).
- The CHO is responsible to set forth work practices, procedures, personal protective equipment, and other equipment that will protect the health and safety of laboratory workers.

The designated Chemical Hygiene Officer at SUNY Broome is the Environmental, Health & Safety Coordinator, Hans Van Houten. This position reports to the Director of Health & Safety, Mr. Joseph O'Connor.

7.D. Responsibilities of the SUNY Broome Chemical Hygiene Committee:

- Review and implement modifications to the Chemical Hygiene Plan.
- Review new processes, experiments and research projects that are referred to the committee.
- Investigate and review all chemical exposure incidents.
- Review training records.

The Chemical Hygiene Committee shall consist of personnel from a cross section of all departments covered by this plan. The committee shall meet on a semi-annual basis, or as needed. The committee may be called to meet for an emergency situation. Select members may also be asked to assist in lab safety inspections.

Actions that directly affect a department will be reviewed with the Dean of the department prior to implementation. However, actions that are required to abate situations that are immediate threats to the health, safety, or the environment, will be implemented immediately upon discovery of the situation.

8. Procedures for Carcinogens, Reproductive Toxins, Substances That Have a High Degree of Acute Toxicity, and Chemicals of Unknown Toxicity

The following procedures in this section will apply when performing laboratory work with greater than 10 mg. of any carcinogen, reproductive toxin, substance that has a high degree of acute toxicity, or a chemical whose toxic properties are unknown.

8.A.

The following definitions apply:

8.A.1.

Select carcinogen: Any substance defined as such in OSHA 29CFR1910.1450 and any other substance described as such in the applicable SDS.

8.A.2.

Reproductive toxin: Any substance described as such in the applicable SDS.

8.A.3.

Substance with a high degree of acute toxicity: Any substance for which the LD50 data described in the applicable SDS causes the substance to be classified as a "highly toxic chemical" as defined in ANSI Z129.1.

8.A.4.

Chemicals whose toxic properties are unknown: A chemical for which there is no known statistically significant study conducted in accordance with established scientific principles that establishes its toxicity.

8.A.5.

For the purpose of this CHP, chemicals in these four categories, 8.A.1. to 8.A.4., will be called "particularly hazardous chemicals".

8.A.6.

Designated Area: A hood, glove box, portion of the laboratory, or an entire laboratory room designated as the only area where work with quantities of particularly hazardous chemicals in excess of the specified limit shall be conducted.

8.B.

Designated areas shall be posted and their boundaries clearly marked. Only those persons trained to work with particularly hazard chemicals will work with those chemicals in a designated area. All such persons will:

- Use the smallest amount of the chemical that is consistent with the requirements of the work that is to be done.
- Store particularly hazardous chemicals only in the designated area.
- Decontaminate a designated area when work has been completed.
- Prepare wastes from work with particularly hazardous chemicals for waste disposal in accordance with any specific disposal procedures consistent with Federal and State regulations, and the SUNY Broome Hazardous Waste Policy.

8.C.

Laboratory workers using particularly hazardous chemicals shall take extra precautions in maintaining good personal hygiene. In addition to the hygiene practices in Section 1.B., workers should not wear any personal items, such as jewelry which might be difficult or impossible to decontaminate.

- When possible, disposable clothing should be used.
- Gloves and long sleeves should be used at all times to prevent skin contact with particularly hazardous chemicals.

As stated in the beginning, this Chemical Hygiene Plan is generic for all SUNY Broome laboratories. It is to be used as a starting point of lab safety information. It is the responsibility of the laboratory supervisor, under direction from the department chair, to add *specific* safety information for his/her laboratory operations and experiments which are not covered by this plan.

APPENDIX A

Double click PDF below to open

PESH

Permissible Exposure Limits

§ 800.5 Permissible exposure limits.

An employee's exposure to any substance listed in Table Z-1-A, Z-2, or Z-3 of this section shall be limited in accordance with the requirements of the following paragraphs of this section.

- (a) *Table Z-1-A.* (1) Substances in transitional limits columns with limits preceded by "C"--ceiling values. An employee's exposure to any substance in Table Z-1-A under the transitional limits column, the exposure limit of which is preceded by a "C", shall at no time exceed the exposure limit given for that material in Table Z-1-A under the transitional limits columns.
- (2) Other substances in transitional limits columns--8-hour time weighted average. An employee's exposure to any substance in table Z-1-A under the transitional limits columns, the exposure limit of which is not preceded by a "C", shall not exceed the 8-hour time weighted average given for that substance in table Z-1-A under the transitional limits columns in any 8-hour work shift of a 40-hour work week.
- (3) Final rule limits columns. An employee's exposure to any substance listed in table Z-1-A shall not exceed the time weighted average (TWA), short term exposure limit (STEL), and ceiling limit specified for that substance in table Z-1-A under the final limits columns.
- (4) Skin designation. To prevent or reduce skin absorption, an employee's skin exposure to substances listed in table Z-1-A with an "X" in one or both of the skin designation columns following the substance name shall be prevented or reduced to the extent necessary in the circumstances through the use of gloves, coveralls, goggles, or other appropriate personal protective equipment, engineering controls or work practices.
- (5) Definitions. The following definitions are applicable to the final rule limits columns of table Z-1-A:
- (i) *Time weighted average (TWA)* is the employee's average airborne exposure in any 8-hour work shift of a 40-hour work week which shall not be exceeded.
- (ii) *Short term exposure limit (STEL)* is the employee's 15 minute time weighted average exposure which shall not be exceeded at any time during a work day unless another time limit is specified in a parenthetical notation below the limit. If another time period is specified, the time weighted average exposure over that time period shall not be exceeded at any time during the working day.
- (iii) *Ceiling* is the employee's exposure which shall not be exceeded during any part of the work day. If instantaneous monitoring is not feasible, then the ceiling shall be assessed as a 15-minute time weighted average exposure which shall not be exceeded at any time over a working day.
- (6) Additional definition. The terms *substance, air contaminant, and material* are equivalent in meaning for 29 CFR 1910.1000. (29 CFR 1910 was previously filed with the Secretary of State on February 2, 1988, under File Number 240. It is available for inspection at the NYS Department of State and the NYS Department of Labor, and can be obtained From the U.S. Government Printing Office in Federal Register, Volume 52, No. 176, pp. 34460-34578, September 11, 1987).
- (b) *Table Z-2.* Table Z-2 is applicable for the transitional period and to the extent set forth in subdivision (f) of this section.
- (1) Eight-hour time weighted averages. An employee's exposure to any material listed in table Z-2, in any 8-hour work shift of a 40-hour work week, shall not exceed the 8-hour time weighted average limit given for that material in table Z-2.
- (2) Acceptable ceiling concentrations. An employee's exposure to a material listed in table Z-2 shall not exceed at any time during an 8-hour shift the acceptable ceiling concentration limit given for the material in the table, except for a time period, and up to a concentration not exceeding the maximum duration and concentration allowed in the column under "acceptable maximum peak above the acceptable ceiling concentration for an 8-hour shift".

APPENDIX B

RESOURCES PAGE

TOPIC	DESCRIPTION	LINK
Chemical Compatibility Chart	EPA's Method of Determining the Compatibility of Hazardous Wastes	https://www.epa.gov/hwpermitting/method-determining-compatibility-hazardous-wastes
Chemical Label Pictograms	OSHA GHS Label Pictograms System	https://www.osha.gov/Publications/HazCom_QuickCard_Pictogram.html
Chemical Label Comparison	Comparison of GHS and NFPA Labels	https://www.osha.gov/Publications/OSHA3678.pdf
EHS Department	Contact the BCC EH&S @ 778-5366	http://www2.sunybroome.edu/safety/
Emergencies	BCC emergency information for staff and students	http://www2.sunybroome.edu/safety/wp-content/uploads/sites/32/2017/06/Emergency-Response-Guidelines.pdf
Emergency Notification	RAVE Alert – how to be notified of emergencies on campus	http://www2.sunybroome.edu/safety/rave-alert/
Fire Extinguishers – how to operate	Watch how to use an extinguisher properly	http://www.youtube.com/watch?v=BLjoWjCrDqg
Fire Safety Information	BCC information related to fire prevention, what to do in an	http://www2.sunybroome.edu/safety/emergency-response-plan/fire/

	emergency, building evacuation plans, etc.	
Glove Chemical Resistance Guide	From Ansell	https://www.ansellpro.com/download/Ansell_8thEditionChemicalResistanceGuide.pdf
Glove Selection Guide	From Oxford University	https://www.hvcc.edu/ehs/health/glovesguide.pdf
Glove Types	Description of types of gloves and their uses	https://www.hvcc.edu/ehs/health/glove-descriptions.pdf
Hazardous Waste	BCC guidelines on what and how to dispose of Haz Waste	http://www2.sunybroome.edu/safety/environmental-safety/
Regulations – OSHA and PESH	Lab Safety Standard	https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1450
Regulations – Environmental	NYS Dept. Of Environmental Conservation solid and hazardous waste regulations	http://www.dec.ny.gov/regs/2491.html
Safety Data Sheet Information	OSHA Safety Data Sheet Brief	https://www.osha.gov/Publications/OSHA3514.html
Safety Data Sheet Access	Accessing BCC SDSs	https://msdsmanagement.msdsonline.com/c02bbf79-70a4-409a-a5d0-fb9f9a11c0bb/ebinder/?nas=True

APPENDIX C

To print brochure, first double click PDF below to open – select print both sides, flip on short edge

◊ In the event of a MAJOR SPILL or a SERIOUS ACCIDENT ◊

FIRST—Call 9 1 1

SECOND—Call the appropriate college personnel:
Public Safety/Chemical Hygiene Officer

THIS ACTIVATES THE COLLEGE'S EMERGENCY ACTIVATION PLAN!

Chemical Hygiene Officer
Security
Nurse

Dial 607-778-5366
Dial 607-778-5083
Dial 607-778-5181

AFTER-HOURS EMERGENCIES:

Call 9 1 1

◊ POISON CONTROL NUMBERS ◊

Upstate NY Poison Center (800) 222-1222

◊ CHEMICAL SPILL NUMBERS ◊

NYS Spill Hotline (800) 457-7362
Federal Spill Center (800) 424-8802
EPA National (800) 424-8802

Any questions should be addressed to your instructor.
If you are pregnant you should inform your instructor.

AN INSTRUCTOR MUST ALWAYS BE PRESENT
BEFORE YOU ENTER THE LAB

WORKING ALONE IS NEVER ALLOWED



Laboratory Safety

at
SUNY Broome

Your Instructor Will:

- Inform you of YOUR responsibilities for working in the labs.
- Show you where and how to dispose of the chemicals and other materials that you will be working with.
- Show you the location of and how to use all safety equipment that you will use.
- Show you where the SDS files are located.
- Be informed of any accident or incident that occurs in the laboratory.

Appendix D *Double click PDF below to open, then print. All lab students must read and sign safety brochure*

(CHM – 123 – 0001 – 01/18 – 11/19 – 1)
code- course- SOP #- Orig Date- Rev Date- Rev#

**SUNY Broome - Science Laboratory
Standard Operating Procedure / Method**

Title:

Proper Procedure for Administering the Laboratory Safety Brochures and Health Questionnaires in Accordance with HIPAA Regulations

Scope:

All Science Faculty

Restrictions:

None

Equipment and Supplies:

Safety Brochures for each student; The Health Questionnaires for each student; A student signature sheet for each section of each class taught.

PPE's and Safety Precautions:

None

Method:

The **Health Questionnaire** and the **Safety Brochure** must be distributed to each student. The instructor must read and instruct the students on each of the issues addressed in the brochure. A PowerPoint presentation on Lab Safety at SUNY Broome is available at: [Health & Safety](#)
At the beginning of the semester the Instructor will:

- show the location of the safety shower, eyewash, fire blanket, phone, emergency gas shut off
- show the emergency exit routes posted on the wall and explain where to go in the event of evacuation
- explain how to reach 911 (since they might need to call if the instructor is busy or the one injured)
- show where the SDS collection is and explain their function
- discuss each of the laboratory rules from the Chemical Hygiene Plan
- explain the need and reasons for disposing of materials by the correct method and in the correct receptacles (esp. broken glass)
- explain any other pertinent safety rules specific to your class or laboratory
- show the locations of the biohazard waste and the sharps containers (when applicable)

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