



CHEMICAL HYGIENE PLAN

Peralta Community College District

Pursuant to 8 CCR 5191

Date Modified: November, 2014

Administered by _____

Chemical Hygiene Plan Administrator

Managed by _____

Chemical Hygiene Officer

Management Support:

District Risk Manager

Chemical Hygiene Officers

- College Business Officers

Chemical Hygiene Plan Co-Administrators:

- Dean and Department Chair

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Foreword

The protection of the safety and health of its employees, students and environment is a high priority of the Peralta Community College District (hereafter, “the District”). On March 25, 1991, the California Occupational Safety and Health Administration (Cal-OSHA) promulgated a rule for occupational exposure to hazardous chemicals in laboratories. This rule 8, CCR, 5191 is designed to help protect laboratory workers from the hazards of the chemicals used.

Included in the standard is a requirement that all employers covered by the standard develop a Chemical Hygiene Plan (CHP). A CHP is a written program which sets forth work practices, equipment use and maintenance procedures, and personal protective equipment requirements that protect employees from the hazards presented by chemicals used in the lab. According to Cal-OSHA, the CHP must include standard operating procedures, criteria for the implementation of chemical control measures, measures to ensure proper operation of engineering controls and personal protective equipment, provisions for the training of workers, provisions for medical consultation in the case of exposure, designation of responsible people in the lab, and identification of procedures for the use of particularly hazardous substances or procedures. It is the intent of this document to satisfy these requirements.

It is up to each lab supervisor to supplement this plan with more detailed information about the proper use of the particular chemicals used in their lab. These supplements may be in the form of written procedures, literature libraries, video presentations, and/or group or individual training. The lab supervisor and Chemical Hygiene Officer (CHO) are responsible for the interpretation and enforcement of policies described in this CHP. The Chemical Hygiene Plan Administrator (CHPA) shall oversee the implementation and monitoring of this plan. The CHPA shall provide technical assistance with administration of this CHP when needed.

A copy of this plan can be found with each College President and the District Office.

The names and addresses of each College and the District Office are outlined below.

Berkeley City College
2050 Center Street, Berkeley, CA

College of Alameda
555 Ralph Appezato Memorial Parkway, Alameda, CA

Laney College
900 Fallon Street, Oakland, CA

Merritt College
12500 Campus Dr Oakland, CA

Peralta Community College District
333 East 8th Street, Oakland, CA

1.0 Chemical Hygiene Responsibilities and Program Coverage

1.1 Chemical Hygiene Responsibilities

Environmental health and safety responsibilities within the District, including chemical hygiene responsibilities, are described in the District's Illness and Injury Prevention Program (IIPP) and other employee policies. Duties specific to laboratory chemical use are described in this section.

A. Chemical Hygiene Officer

The Cal-OSHA standard requires the appointment of a Chemical Hygiene Officer for each laboratory facility. This officer is qualified either through training or experience to oversee the development and implementation of the CHP. This designated officer may hold another job title provided he or she is technically competent to fulfill the responsibilities of both job titles. The Chemical Hygiene Officer has the ultimate responsibility for chemical hygiene throughout the laboratory, and, with the assistance of campus laboratory safety programs, supports the chemical hygiene efforts of lab workers.

The Chemical Hygiene Officer (CHO) is responsible for:

1. Providing technical guidance and assisting the Chemical Hygiene Plan Administrator in the development and implementation of the Chemical Hygiene Plan.
2. Develop and implement appropriate chemical hygiene policies and practices specific to the operations of the lab(s) they are responsible for. The form included in Appendix A is designed to provide a mechanism to assist with this work.
3. Perform regular, formal chemical hygiene inspections, including inspections of emergency equipment.
4. Weekly housekeeping inspections are suggested. Monthly equipment inspections are required.
5. Develop Standard Operating Procedures specific to their lab's operations.
6. Determine the proper level and type of personal protective equipment for lab operations.
7. Conduct an annual campus-wide inventory of laboratory equipment and document this equipment in Appendix D.
8. Conduct an annual campus-wide inventory of the laboratory chemicals and hazardous materials handled and document these items in Appendix C. Ensure the MSDS binder(s) match the inventory of chemical and hazardous materials in the laboratory.

9. Ensure that appropriate training has been provided to employees.
10. Maintain current knowledge concerning the legal requirements of regulated substances in the laboratory.
11. Review and, if necessary, improve the Chemical Hygiene Plan on an annual basis.

B. Laboratory Workers

The laboratory workers are individually responsible for planning and conducting each laboratory operation in accordance with this Chemical Hygiene Plan and developing good chemical hygiene habits.

C. Chemical Hygiene Plan Administrator

The Chemical Hygiene Plan Administrator is responsible for the overall management and administration of the CHP and shall implement and monitor the effectiveness of this plan as specified. The CHPA is responsible for designating a Chemical Hygiene Officer (CHO) to oversee all chemical hygiene activities controlled by this plan. The CHPA shall make available the services necessary to ensure the chemical health and safety of the District. These services provide general assistance in meeting regulatory compliance and safety concerns. They shall be supplemented by laboratory-specific safety programs in order to comply with all applicable safety, health, and environmental regulations.

D. Chemical Hygiene Committee

The Chemical Hygiene Officer (CHO) and Laboratory Supervisor(s) shall act as the Chemical Hygiene Committee. In this role, the Committee shall provide technical and policy oversight of laboratory activities. The CHO and Laboratory Supervisor(s) and the Chemical Hygiene Plan Administrator (CHPA) shall appoint other members to serve on the Chemical Hygiene Committee as deemed necessary.

E. Faculty and Staff

Faculty & Staff are responsible for:

1. Implementing the pertinent requirements of this document in their respective areas.
2. Providing specialized training, or ensuring that students working under their direction in their laboratory area or with their laboratory equipment are trained specifically on the chemical and physical hazards associated with that work. This training must take place at the on-set of use of new equipment, new lab assignment, or changed lab assignment.
3. Ensuring that Safe Work Practices are developed for all "high hazard" operations. The guidelines for the development of Safe Work Practices are provided in Section 5.0 of this document. A current listing and copies of all Safe Work Practices are maintained by the Chemical Hygiene Officer (CHO).
4. Suggesting solutions to improve the safety of the process, equipment, production materials, and training.
5. Knowing safety and emergency equipment locations and operating procedures.
6. Regularly communicating safety information to students as necessary.
7. Ensuring that students are aware of, and familiar with, emergency procedures and the proper use of emergency equipment.
8. Ensuring that all safety training of students is documented and maintained in Department files.
9. Reinforcing training by monitoring the activities of students for unsafe acts and implementing corrective action as necessary.
10. Issuing facility work orders to the General Services Department to initiate safety corrective actions.
11. Placing defective or unsafe equipment out of service and contacting the General Services to arrange for servicing of equipment that is in need of maintenance and/or repair.
12. Managing hazardous materials operations within their areas by making Material Safety Data Sheets (MSDS) available to workers and ensuring that hazardous materials are handled, stored, transported, and disposed of in the correct manner.
13. Maintaining personal work areas in accordance with housekeeping guidelines.

G. Risk Management

The Director, Safety, Health Benefits & Risk Management is responsible for certain elements of the CHP. These elements include:

1. Overseeing the education and training of faculty and staff before using hazardous materials.
2. Coordinating the required training classes as requested by the CHO.
3. Reviewing and monitoring the safe disposal of hazardous materials according to the appropriate federal and state regulations.
4. Ensuring that medical consultative services are available to those employees requesting or needing such services.
5. Maintaining knowledge of the current legal requirements concerning regulated substances.
6. Responsible for resolution of appropriate chemical hygiene management issues.

H. General Services Department

The General Services Department is responsible for:

1. Reviewing and approving laboratory equipment installations for compliance with pertinent building codes and regulations.
2. Maintaining and servicing facilities-related equipment which services laboratories including local exhaust ventilation systems and emergency/life safety equipment (e.g. building fire alarms and fire extinguishers).
3. Providing guidance to Laboratory management, faculty, staff and the CHO regarding appropriate engineering control installations for chemical and physical hazards.
4. Testing the performance of laboratory exhaust hoods annually.

2.0 Scope and Application of this Plan

This standard applies where “laboratory use” of hazardous chemicals occurs. Laboratory use of hazardous chemicals is defined as the handling or use of such chemicals in which all of the following conditions are met:

- The handling or use of chemicals involves containers which can easily and safely be manipulated by one person;
- Multiple chemical procedures or chemical substances are used; and
- Protective laboratory practices and equipment are available and in common use to minimize the potential for employee exposures to hazardous chemicals.

At a minimum, this definition covers employees (including student employees, technicians and supervisors) who use chemicals in teaching and clinical laboratories in the District. Certain non-traditional laboratory settings may be included under this standard at the option of individual departments within the District. Laboratory students and volunteers, while not legally covered under

this standard, will be given training commensurate with the level of hazard associated with their laboratory work.

Where this section applies, it shall supersede, for laboratories, the requirements of Title 8 of the California Code of Regulations Section 5190 and Article 110, Regulated Carcinogens of the General Industry Safety Orders, except as follows:

1. The requirement to limit employee exposure to the specific exposure limit.
2. When that particular regulation states otherwise, as in the case of Section 5209(c)(6).
3. Prohibition or prevention of eye and skin contact where specified by any health regulation shall be observed.
4. Where the action level (or in the absence of an action level, the exposure limit) is exceeded for a regulated substance with exposure monitoring and medical surveillance requirements.
5. The "report of use" requirements of Article 110, (Section 5200 et. seq.) Regulated Carcinogens regulations.
6. Section 5217 on Formaldehyde shall apply to anatomy, histology and pathology laboratories.

This regulation shall not apply to:

1. Uses of hazardous chemicals which do not meet the definition of laboratory use, and in such cases, the employer shall comply with the relevant regulations in Title 8, California Code of Regulations, even if such use occurs in a laboratory.
2. Laboratory uses of hazardous chemicals which provide no potential for employee exposure. Examples of such conditions might include:
 - a. Procedures using chemically-impregnated test media such as Dip-and-Read tests where a reagent strip is dipped into the specimen to be tested and the results are interpreted by comparing the color reaction to a color chart supplied by the manufacturer of the test strip; and
 - b. Commercially prepared kits such as those used in performing pregnancy tests in which all of the reagents needed to conduct the test are contained in the kit.

2.1. Coordination with Other Standards and Guidelines

Although this standard deals only with the use of hazardous chemicals, employees may also encounter potential physical, biological, radioactive, or otherwise threatening hazards in the laboratory. In the event that there is a conflict between provisions of various standards, the Chemical Hygiene Plan Administrator (CHPA) or the District's Risk Manager should be contacted to assist in resolving the discrepancy.

3.0 Exposure Limits

For laboratory uses of Cal/OSHA regulated substances, the employer shall ensure that laboratory employees' exposures to such substances do not exceed the exposure limits specified in the control of hazardous substances referenced in 8, CCR, 5139 of the General Industry Safety Orders.

3.1 Employee Exposure Determination (Monitoring)

Initial monitoring will occur if the District has reason to believe that an employee's exposure to any substance regulated by a standard which requires monitoring if that exposure levels for that substance exceed the action level (or in the absence of an action level, the exposure limit). The person supervising, directing or evaluating the monitoring shall be competent in industrial hygiene practice.

If the initial monitoring prescribed discloses employee exposure over the action level (or in absence of an action level, the exposure limit) periodic monitoring will be implemented.

Termination of any monitoring will be done in accordance with the relevant regulation.

Within in 15 working days after the receipt of any monitoring results, the District will notify the employee(s) of the results in writing either individually or by posting results in an appropriate location that is accessible to employees.

4.0 Chemical Hygiene Plan Requirements

Where hazardous chemicals as defined by this regulation are used in the workplace, the District shall develop and carry out the provisions of a written Chemical Hygiene Plan which is:

- A. Capable of protecting employees from health hazards associated with hazardous chemicals in that laboratory and
- B. Capable of keeping exposures below the limits specified in subsection 5191(c).

The Chemical Hygiene Plan shall be readily available to employees, employee representatives and, upon request, to the Chief.

The Chemical Hygiene Plan shall include each of the following elements and shall indicate specific measures that the employer will take to ensure laboratory employee protection:

- A. Standard operating procedures relevant to safety and health considerations to be followed when laboratory work involves the use of hazardous chemicals;
- B. Criteria that the employer will use to determine and implement control measures to reduce employee exposure to hazardous chemicals including engineering controls, the use of personal protective equipment and hygiene practices; particular attention shall be

given to the selection of control measures for chemicals that are known to be extremely hazardous;

- C. A requirement that fume hoods comply with Section 5154.1, that all protective equipment shall function properly and that specific measures shall be taken to ensure proper and adequate performance of such equipment;
- D. Provisions for employee information and training as prescribed in subsection 5191(f);
- E. The circumstances under which a particular laboratory operation, procedure or activity shall require prior approval from the employer or the employer's designee before implementation;
- F. Provisions for medical consultation and medical examinations in accordance with subsection 5191(g);
- G. Designation of personnel responsible for implementation of the Chemical Hygiene Plan including the assignment of a Chemical Hygiene officer and, if appropriate, establishment of a Chemical Hygiene Committee; and
- H. Provisions for additional employee protection for work with particularly hazardous substances. These include "select carcinogens," reproductive toxins and substances which have a high degree of acute toxicity. Specific consideration shall be given to the following provisions which shall be included where appropriate;
 - 1. Establishment of a designated area;
 - 2. Use of containment devices such as fume hoods or glove boxes;
 - 3. Procedures for safe removal of contaminated waste; and
 - 4. Decontamination procedures.

5.0 Mt. San Antonio District Chemical Hygiene Plan Components

5.1 Standard Operating Procedures for Laboratory Chemicals

Standard Operating Procedures are the generally accepted and best practices for use of chemicals in particular situations. These SOPs may be overridden under special circumstances when appropriate. The reasons for such modifications, if any, shall be documented by the Laboratory Supervisor. When SOPs are not available for a specific lab situation, the lab supervisor and CHO will develop them, in consultation with the references cited below, and the Chemical Hygiene Plan Administrator.

A. Controlling Chemical Exposure

Each laboratory employee shall minimize personal and coworker exposure to the chemicals in the laboratory. General precautions that shall be followed to achieve this goal during the handling and use of all chemicals are as follows:

- A chemical mixture shall be assumed to be as toxic as its most toxic component. Possibilities for substitution will be investigated.
- Laboratory employees shall be familiar with the symptoms of exposure for the chemicals with which they work and the precautions necessary to prevent exposure.
- Eating, drinking, smoking, and the application of cosmetics are prohibited in areas where laboratory chemicals are present. Hands shall be thoroughly washed after working with chemicals. Storage, preparation, handling and consumption of food or beverages shall not occur in chemical storage areas, nor should refrigerators, glassware or utensils be used for laboratory operations.
- Each employee shall keep the work area clean and uncluttered.
- All chemicals and equipment shall be labeled with appropriate hazard warnings. At the completion of each workday or operation, the work area shall be cleaned.
- Mouth suction for pipetting or starting a siphon is prohibited.
- Skin contact with all chemicals shall be avoided. Employees shall wash exposed skin prior to leaving the laboratory. Additional specific precautions based on the toxicological characteristics of individual chemicals shall be implemented by the lab supervisor, as deemed necessary.

B. Laboratory Equipment

The following rules shall apply to the use of laboratory equipment:

- All laboratory equipment shall be used only for its intended purpose.
- All glassware will be handled and stored to minimize breakage; all broken glassware will be immediately disposed of in the broken glass container. All evacuated glass apparatus shall be shielded to contain chemicals and glass fragments should implosion occur.
- Appropriate waste receptacles shall be provided and identified as such by signs attached to the receptacle.
- All laboratory equipment shall be inspected on a periodic basis and replaced or repaired as necessary.

C. Planning for Emergencies

Before work with laboratory chemicals begins, plans for various emergencies will be developed. The circumstances to be covered include fire, chemical spill, and personnel exposure. In addition, the following work practices will be observed:

- Spill containment will be established around areas in which more than one liter of liquid is used. Workers manipulating chemicals shall maintain communication with other people while handling chemicals;
- Emergency equipment will be checked on a monthly basis for unusual conditions; and
- PPEs will be checked prior to use and preferably at the beginning of the employee's work shift.

D. Laboratory Specific SOPs

Laboratory specific Standard Operating Procedures are available in each campus lab where they are applicable. The SOPs developed for a specific lab should be listed in the Lab CHP form found in Appendix A.

5.2 Criteria for Implementation of Control Measures

This Chemical Hygiene Plan is intended to limit laboratory workers' exposure to Cal-OSHA-regulated substances. Laboratory workers shall not be exposed to substances in excess of the permissible exposure limits (PEL) specified in Cal-OSHA Title 8, §5191 (a) or the Threshold Limits Values set by the American Conference of Governmental Industrial Hygienists. PELs refer to airborne concentrations of substances and are averaged over an eight-hour day. Certain substances also have "action levels." Action levels are air concentrations below the PEL that nevertheless require that certain actions take place, such as medical surveillance and workplace monitoring.

An employee's workplace exposure to any regulated substance shall be monitored if there is reason to believe that the exposure will exceed an action level or a PEL. If exposures to any regulated

substance routinely exceed an action level or permissible exposure level, control measures shall be implemented.

A. Professional Judgment

The lab supervisor may use professional judgment to assess the nature of chemical exposure resulting from a lab procedure and prescribe engineering controls and personal protective equipment to be used during the procedure. This judgment will be documented through use of Standard Operating Procedures and Laboratory Chemical Safety Summaries written for the chemicals in use.

B. Air Sampling

Air sampling for evaluating employee exposure to chemical substances shall be conducted on an as-needed basis (to be determined by the lab supervisor or District Risk Manager). Air sampling will be conducted if there is reason to believe that exposure levels for regulated substances that require sampling routinely exceed the action level or, in the absence of an action level, the PEL.

Air sampling will be conducted according to established industrial hygiene practices. It may be conducted by qualified lab workers, other qualified District Personnel or outside consultants. The results of air sampling studies performed in the laboratory should be sent to the Chemical Hygiene Plan Administrator and District Risk Manager for record maintenance.

5.3 Criteria for Implementation of Specific Control Measures

Engineering controls, personal protective equipment, hygiene practices, and administrative controls each play a role in a comprehensive laboratory safety program. Implementation of specific measures must be carried out on a case-by-case basis, using the following criteria for guidance in making decisions.

A. When to Use Fume Hoods

The laboratory fume hood is the major protective device available to laboratory workers. It is designed to capture chemicals that escape from their containers or apparatus and to exhaust them from the laboratory environment before they are inhaled. Characteristics to be considered in requiring fume hood use are physical state, volatility, toxicity, flammability, eye and skin irritation, odor, and the potential for producing aerosols.

A fume hood should be used if a proposed chemical procedure exhibits any one of these characteristics to a degree that;

- (1) airborne concentrations might approach the action level (or permissible exposure limit),
- (2) flammable vapors might approach one tenth of the lower explosion limit,
- (3) materials of unknown toxicity are used or generated, or

(4) the odor produced is annoying to laboratory occupants or adjacent occupants.

Procedures that can generally be carried out safely outside the fume hood (depending on the capacity of the general ventilation system to remove any airborne contaminants) include those involving;

(1) water-based solutions of salts, dilute acids, bases, or other reagents,

(2) very low volatility liquids or solids,

(3) closed systems that do not allow significant escape to the laboratory environment, and

(4) extremely small quantities of otherwise hazardous chemicals.

B. When to Use Safety Shields or Other Containment Devices

Safety shields, such as the sliding sash of a fume hood, are appropriate when working with highly concentrated acids, bases, oxidizers or reducing agents, all of which have the potential for causing sudden splashing, spattering, or even explosive release of material. Reactions carried out at non-ambient pressures (vacuum/negative pressure or positive/high pressure) also require safety shields, as do reactions that are carried out for the first time or are significantly scaled up from normal conditions.

Other containment devices, such as glove boxes or vented gas cabinets, may be required when it is necessary to provide an inert atmosphere for the chemical procedure taking place, when capture of any chemical emission is desirable, or when the standard laboratory fume hood does not provide adequate assurance that overexposure to a hazardous chemical will not occur. The presence of biological or radioactive materials may also mandate certain special containment devices.

Local exhaust ventilation may be required for equipment that exhausts toxic or irritating materials to the laboratory environment.

Ventilated chemical storage cabinets or rooms should be used when the chemicals in storage may generate toxic, flammable or irritating levels of airborne contamination. Venting of these cabinets shall be performed in accordance with the Authority Having Jurisdiction.

C. When to Use Personal Protective Equipment

- **Laboratory supervisors or CHOs shall designate areas, activities, and tasks** that require specific types of personal protective equipment. Protective equipment shall not be worn in public areas, in order to prevent the spread of chemical or biological contamination from laboratory areas.

- **Eye Protection:** Eye protection is required for all personnel and any visitors whose eyes may be exposed to chemical or physical hazards. Side shields on safety spectacles provide some protection against splashed chemicals or flying particles, but goggles or face shields are necessary when there is a greater than average danger of eye contact. A higher than average risk exists when working with highly reactive chemicals, concentrated corrosives, or with vacuum or pressurized glassware systems. Appropriate eye protection devices will follow the recommended guidance with the Authority Having Jurisdiction. The District and employees will also follow the recommendations in the *Selection, Use and Maintenance of Protectors* as prescribed by ANSI Z-87.1-2003.
- **Protective Clothing:** Lab coats or other similar clothing protectors are strongly encouraged for all laboratory personnel.
- **Lab coats are required when working with select carcinogens, reproductive toxins, substances which have a high degree of acute toxicity, strong acids and bases, and any substance on the Cal-OSHA PEL list carrying a “skin” notation.**
- **Sandals, open-toed shoes, flip flops, and bare feet are not permitted in any laboratory.**
- **Gloves:** Gloves made of appropriate material are required to protect the hands and arms from thermal burns, cuts, or chemical exposure that may result in absorption through the skin or reaction on the surface of the skin. Gloves should be carefully selected using guides from the manufacturers and recommendations prescribed in the MSDSs of the chemicals being handled.
- **Respiratory Protection:** Respiratory protection **shall not** be used as a substitute for adequate engineering controls. Availability of respiratory protection for emergency situations may be required when working with chemicals that are highly toxic and highly volatile or gaseous. If an experimental protocol requires exposure above the action level that cannot be reduced, respiratory protection will be required. Respirators shall be selected and used in accordance with 8 CCR 5144. All use of respiratory protective equipment is covered under the District’s Respiratory Protection Program.
- **Personal Protective Equipment must be stored in an appropriate and sanitary manner** consistent with the manufacturer’s recommendations.

5.4 Management of Engineering Controls

Engineering controls are intended to minimize employee exposure to chemical and physical hazards in the workplace. These controls must be maintained in proper working order for this goal to be achieved.

Modification of engineering controls shall not occur unless testing of the modification indicates that worker protection will continue to be adequate. Improper function of engineering controls must be reported to the lab supervisor immediately. Improperly functioning systems shall be taken out of service until proper repairs have been completed.

When improper functioning systems are taken out of service the use of chemicals or hazardous materials requiring the use of said functioning systems shall not be used. Use of chemicals or hazardous materials will resume once the functioning systems are operating properly.

5.5 Local Exhaust Ventilation

The following procedures shall apply to the use of local exhaust ventilation;

- Capture hoods of local exhaust ventilation systems shall be as close as practicable to the source of the contaminants,
- Local exhaust fans shall be operating when exhaust hoods are being used,
- After using local exhaust, the ventilation fan shall be operated for an additional period of time sufficient to clear residual contaminants from the ductwork,
- The ventilation system shall be inspected annually by the Chemical Hygiene Plan Administrator, and
- Prior to a change in chemicals or procedures, the adequacy of the available ventilation systems shall be determined by the lab supervisor.

5.6 Laboratory Hoods

Work practices shall follow the requirements of California Title 8, §5154.1, Ventilation Requirements for Laboratory-Type Hood Operations. Prior to the introduction of new chemicals, the adequacy of hood systems available shall be determined by the lab supervisor.

Ductless fume hoods shall not be used for volatile toxic materials and should be posted as “Not for use with toxic materials.” Consult with the District’s Risk Manager before using these hoods to control lab vapors.

5.7 Chemical Storage Cabinets

Storage cabinets for flammable and hazardous chemicals will be ventilated as needed and as permitted by the Authority Having Jurisdiction. They will be provided with a spill containment system appropriate to the chemicals stored in them.

5.8 Biosafety Cabinets

The operation and maintenance of biosafety cabinets shall be in accordance with California Title 8, §5154.2, Ventilation Requirements for Biological Safety Cabinets. The exhaust air from biosafety cabinets shall pass through scrubbers, HEPA filters, or other treatment before release into the regular exhaust system.

Biosafety cabinets will be certified annually and each time they are moved. This certification shall be arranged by the Chemical Hygiene Plan Administrator.

5.9 Cold Rooms and Warm Rooms

If temperature controlled rooms do not have fresh air ventilation, volatile chemicals shall not be used in them.

5.10 Emergency Equipment

Eyewashes must be inspected monthly by the Laboratory Supervisor. This will ensure that the eyewash is working properly, and that the water is clean, should the eyewash be used.

Fire extinguishers shall be checked monthly by the Laboratory Supervisor.

The District's Risk Manager shall ensure that fire extinguishers are serviced as prescribed by mandate by a person certified by the State Fire Marshal.

Fire blankets, if any, shall be checked weekly by the Laboratory Supervisor to ensure that they are available and are properly mounted.

6.0 Employee Information and Training

6.1 Information

Laboratory employees shall have access to information on the hazards of chemicals and procedures for working safely. Supervisors shall ensure that laboratory employees are informed about and have access to the following information sources:

- The contents of the Cal-OSHA lab standard, Occupational Exposure to Hazardous Chemicals in Laboratories, and its appendices (California Title 8, §5191).
- The location of the District's Chemical Hygiene Plan and laboratory specific standard operating procedures.
- The Permissible Exposure Limits (PEL) for Cal-OSHA regulated substances.
- Signs and symptoms associated with exposures to hazardous chemicals used in the lab.
- The location and availability of known reference material(s) on the hazards, safe handling, storage and disposal of hazardous chemicals found in the laboratory including, but not limited to, material safety data sheets received from the chemical supplier.

6.2 Training

The District shall provide employees with training to ensure they are apprised of the hazardous chemicals present in their work area. Training may relate to an entire class of hazardous substances to the extent appropriate.

A. Content

Employee training programs will include, at a minimum, the following subjects;

- Methods and observations of detecting the presence or release of hazardous chemicals (observation, signage and labeling, odor, real-time monitoring, air sampling, etc.),
- Symptoms associated with exposures to hazardous chemicals,
- Physical health hazards of chemicals in the work area,
- Good laboratory practice, including general techniques designed to reduce personal exposure and to control physical hazards, as well as specific protective mechanisms and warning systems used in individual laboratories,
- Emergency response actions appropriate to individual laboratories,
- Applicable details of the departmental Chemical Hygiene Plan, including general and laboratory-specific Standard Operating Procedures, and
- Familiarization with the District's Hazardous Waste Management procedures.

8.0 Medical Consultations and Examinations

8.1 Availability

All employees who work with hazardous chemicals will have an opportunity to receive medical attention, including any follow-up examinations that the examining physician determines to be necessary, under the following circumstances:

- When an employee develops signs or symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory;
- Where exposure monitoring reveals an exposure level above the action level or PEL for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements;
- Medical surveillance shall be established for the affected employee(s) as prescribed by the appropriate standard; or
- In the event of a spill, leak, explosion or other occurrence that results in the probability of a hazardous exposure.

The Chemical Hygiene Plan Administrator and the District Risk Manager shall be contacted whenever the need for medical consultation or examination occurs, or when there is uncertainty as to whether any of the above criteria have been met.

8.2 Arranging for Examinations

All medical examinations and consultations will be performed by or under the direct supervision of a licensed physician and will be provided through the District, without loss of pay and at a reasonable time and place.

In the event of a life-threatening illness or injury, dial 911 and request emergency response personnel.

8.3 Referral Process

The District shall provide the examining physician with the following information;

- The identity of the hazardous chemical(s) to which the employee may have been exposed,
- A description of the conditions under which the exposure occurred including quantitative exposure data, if available, and
- A description of the signs and symptoms of exposure that the employee is experiencing, if any.

The above information will be collected and communicated by the lab supervisor and will be submitted to the Chemical Hygiene Plan Administrator, District Risk Manager, as well as to the examining physician.

8.4 Physician's Report

The examining physician will provide the District's Risk Manager a written report, which shall include;

- Any recommendation for further medical follow-up,
- The results of the medical examination and any associated tests,
- Any medical condition that may be revealed in the course of the examination that may place the employee at increased risk as a result of exposure to a hazardous chemical found in the workplace, and
- A statement that the employee has been informed by the physician of the results of the consultation or medical examination and any medical condition that may require further examination or treatment. The written opinion will not reveal specific findings of diagnoses unrelated to occupational exposure.

9.0 Hazard Identification

With respect to labels and material safety data sheets, the District shall;

- A. Ensure that labels on incoming containers of hazardous chemicals are not removed or defaced,
- B. Maintain in the workplace any material safety data sheets that are received with incoming shipments of hazardous chemicals, and ensure that they are readily accessible to laboratory employees during each work shift when they are in their work area(s).

The following provisions shall apply to chemical substances developed in the laboratory;

1. If the composition of the chemical substance which is produced exclusively for the laboratory's use is known, the employer shall determine if it is a hazardous chemical as defined in subsection 5191(b). If the chemical is determined to be hazardous, the employer shall provide appropriate training as required under subsection 5191(f).
2. If the chemical produced is a byproduct whose composition is not known, the employer shall assume that the substance is hazardous and shall implement subsection 5191(e).
3. If the chemical substance is produced for commercial purposes by another user outside of the laboratory, the employer shall comply with the Hazard Communication Standard (Section 5194) including the requirements for preparation of material safety data sheets and labeling.

10.0 Particularly Hazardous Procedures

The Cal-OSHA Lab Standard requires that special consideration be given to the use of chemicals or procedures with particular hazards. A brief list of examples is in Appendix B. This consideration requires either the development of special operating procedures or prior approval of the laboratory supervisor, as indicated by a written permit describing the conditions for the work to be done.

10.1 Work with Particularly Hazardous Substances

When laboratory procedures include the use of highly hazardous chemicals, special precautions shall be implemented as deemed necessary by the lab supervisor. These precautions will be developed for work with select carcinogens, reproductive toxins and substances that have a high degree of acute toxicity. Development of these precautions will consider including the following provisions in the special procedures:

- Establishment of a designated area for the use of the high hazard chemicals;
- Signage and access control to the work area where the chemical is used;
- Special precautions, such as use of glove boxes or other containment devices;
- Enclosure or isolation of contaminated equipment;
- Practicing good laboratory hygiene;
- Prudent transportation of very toxic chemicals;
- Planning for accidents and spills; and

- Special storage and waste disposal practices.

10.2 Pre-approval of Particularly Hazardous Work

A permit system shall be utilized for all laboratory activities that do not follow standard or special operating procedures and, thus require pre-approval by the CHA. These activities include off-hours work, sole occupancy of lab and unattended operations.

The toxicity of the chemicals used, the hazards of the procedures to be done, and the knowledge and experience of the laboratory workers must be considered in deciding which work will be allowed with pre-approval.

- **Off-Hours Work Procedures:** Laboratory personnel are not permitted to work after hours in the lab, except when permit conditions are met.
- **Working Alone:** Work shall not be performed in the laboratory when the only person in the room is the laboratory person performing the work. Under unusual conditions, activities such as crosschecks, periodic Public Safety Department checks, or other measures may be taken as established by a permit.
- **Unattended Operations:** When laboratory operations are performed which will be unattended by laboratory personnel (continuous operations, overnight reactions, etc.), the following procedures will be employed:

An appropriate permit will be written and posted. A sign will be posted at all entrances to the laboratory. The overhead lights in the laboratory will be left on. Precautions shall be made for the interruption of utility services during the unattended operation (loss of water pressure, electricity, etc.). The person responsible for the operation will return to the laboratory at the conclusion of the operation to assist in the dismantling of the apparatus.

10.0 Chemical Spills, Releases and Accidents

10.1 Emergency Response

Telephone numbers of emergency personnel, supervisors and other workers as deemed appropriate are posted on the lab entrance. These signs shall be checked quarterly by the Laboratory Supervisor for accuracy.

10.2 In Case of Fire

The first reaction to a fire is to evacuate the occupants of the building. Fire extinguishers appropriately classed, shall be available in all labs. They may be used by trained personnel to fight

incipient fires and small fires. Fire extinguisher training is available through the District Risk Manager.

10.3 In Case of Spills

In the event of a chemical spill, release or other accident, lab workers will respond as outlined in the District's Emergency Response plan. The size of the spill and its hazards shall dictate the proper response. If there is any doubt about the lab worker's ability to safely clean up the spill, and conditions do not warrant contacting emergency response services, then the Chemical Hygiene Plan Administrator shall be contacted.

10.4 In Case of Personnel Exposures

All employees shall be instructed as to the location and proper usage of emergency showers and eyewashes.

The college's Emergency Procedures Flipchart and other applicable SOPs should be used.

11.0 Recordkeeping

At a minimum, safety records shall be maintained as required by Cal-OSHA.

It is the intent of this Chemical Hygiene Plan to require the maintenance of records of accidents, unusual chemical exposures, spills, incidents, and other occurrences as required by the Authorities Having Jurisdiction.

11.1 Accident Reports

Accident investigations will be conducted by the lab supervisor with assistance from the Chemical Hygiene Plan Administrator as deemed necessary. All accident reports will be forwarded to the District Risk Manager within eight (8) hours of the incident. A verbal report of injuries related to an accident will be reported to the District Risk Manager within one (1) hour of the incident. Accident reports will be written and retained for five years.

11.2 Exposure Evaluations/Monitoring Results

Copies of exposure records or monitoring results carried out by individual departments will be kept within the department and will also be sent to the District Risk Manager. Raw data will be kept for one year, and summary data will be kept for the term of employment, plus 30 years.

11.3 Medical Consultation and Examinations

Results of medical consultations and examinations will be kept by the District Risk Manager for a length of time specified by the appropriate medical records standard. This time will be at least the term of employment plus 30 years, as required by Cal-OSHA.

11.4 Training

Copies of individual employee training should be recorded and kept for five years in both the individual's department file and at the office of the District Risk Manager.

11.5 Equipment Inventory and Inspection

A complete inventory of laboratory equipment is provided in Appendix D. The Laboratory Supervisor shall ensure that the inventory list is updated as needed and on an annual basis.

Records of inspections of equipment will be maintained for five years. Fume hoods will be maintained to comply with 8 CCR 5154.1. Data on annual laboratory fume hood monitoring will be maintained by the Chemical Hygiene Plan Administrator and General Services. Laboratory fume hood monitoring data are considered maintenance records. As such, the raw data will be kept for one-year and the summary data for five years.

12.0 Annual Chemical Hygiene Plan Review

The laboratory supervisor and Chemical Hygiene Officer will review the laboratory's Chemical Hygiene Plan annually and update as necessary. Results will be provided to the Chemical Hygiene Plan Administrator. Laboratory supervisors are responsible to assign responsibility for taking corrective action on any deficiency noted.

13.0 References and Other Information Sources

13.1 References

A. Literature References

- National Research Council, Prudent Practices for Handling and Disposing Hazardous Chemicals in Laboratories, National Academy Press, Washington, D.C., 1995.
- California Code of Regulations, Title 8, §5191, Occupational Exposure to Hazardous Chemicals in Laboratories.
- California Code of Regulations, Title 8, §5154.1, Ventilation Requirements for Laboratory-Type Hood Operations
- Science Safety Handbook for California Public Schools, 1999 Edition, California Department of Education, Sacramento

B. Internet Resources

- **Material Safety Data Sheets**
<http://hazard.com/msds>
- **Cal-OSHA Regulations**
<http://www.dir.ca.gov/samples/search/query.htm>

Appendix A: Laboratory Specific Chemical Hygiene Procedures

1. Primary containers of chemicals are stored in the stockroom, segregated by class.
2. Annual chemical inventories include inspection of the chemicals for replacement, deterioration and container integrity.
3. The stockroom is locked at all times, and a key is required for entry.
4. Personnel accessing the stockroom will be knowledgeable and at all times follow the set procedure, including material handling techniques and selection of protective apparels.
5. Storage is based on compatibility, and storage requirements. Chemicals are arranged alphabetically within their chemical classification.
6. Storage of food for human consumption is not allowed in all rooms where chemicals are present: chemicals and foods for consumption must not be stored in the same refrigerator. All department refrigerators used to store chemicals will be designated as laboratory refrigerators.
7. Flammable chemicals must be stored in a vented flammable cabinet.
8. Any chemical mixture shall be assumed as toxic as its most toxic component. Substances of unknown toxicity shall be assumed toxic and must be stored accordingly.
9. Larger quantities of flammable liquids, corrosives or toxic chemicals are stored in the outside storage sheds.

Appendix B: Chemical/Hazardous Material Inventory

Inventory - Chemical

Revised 1/17/2013

<u>CHEMICAL</u>	<u>Room/ Location</u>	<u>CAS Number</u>	<u>EHS</u>	<u>Shelf</u>	<u>Vendor</u>	<u>Catalog#</u>	<u>Expiration Date</u>
Aluminum Nitrate, Crystalline, Certified ACS	521A, S1	7784-27-2	No	1	Fisher	A586-250	
Aluminum Nitrate (9H ₂ O) ACS reagent ≥98%	521A, S1	7784-27-2	No	3	Sigma	237973	
Aluminum Oxide Type A-5	521A, S1	1344-28-1	No	4	Sigma	A2039	
Ammonium Acetate, ACS	521A, S1	631-61-8	No	4	Fisher	A-637	
Ammonium Carbonate, ACS	521A, S1	505-87-5	No	4	Sigma	20786-1	
Ammonium Cerium(IV) Nitrate, ACS ≥98.5%	521A, S1	16774-21-3	No	2	Sigma	215473	
Ammonium Chloride, reagent plus ≥99.5%	521A, S1	12125-02-9	No	1	Sigma	A4514	
Ammonium Citrate Dibasic, 98% GC	521A, S1	3012-65-5	No	4	Sigma	C1883	
Ammonium Molybdate (4H ₂ O) ACS	521A, S1	12054-85-2	No	1	Sigma	A7302	
Ammonium Molybdate (4H ₂ O) ACS, Fisher chemical	521A, S1	12054-85-2	No	1	Fisher	S93122	
Ammonium Molybdate (4H ₂ O) ACS, Alfa Aesar	521A, S1	12054-85-2	No	1	Fisher	AA1183122	
Ammonium Nitrate, granular ACS	521A, S1	6484-52-2	No	1	Fisher	A676-500	use first
Ammonium Nitrate, granular ACS	521A, S1	6484-52-2	No	1	Fisher	S93123	
Ammonium Oxalate	521A, S1	6009-70-7	No	4	Sigma	A8545	

(H2O), ACS							
Ammonium Persulfate	521A, S1	7727-54-0	No	3	Baker	0762-11	
Ammonium Persulfate, molecular biology ≥98%	521A, S1	7727-54-0	No	4	Sigma	A9164	
Ammonium Phosphate Dibasic, ACS pH 7.7-8.1, ≥98%	521A, S1	7783-23-0	No	3	Sigma	A1167	
Ammonium Phosphate Dibasic	521A, S1	7783-23-0	No	4	Malinkrodt	0784-01	
Ammonium Sulfate, sigma ultra ≥99%	521A, S1	7783-20-2	No	1	Sigma	A2939	
Ammonium Sulfate	521A, S1	7783-20-2	No	1	EM	AX1385-1	
Ammonium Thiocyanate, ACS ≥98.5%	521A, S1	1762-95-4	No	1	Sigma	22198-8	
Barium Carbonate, ACS	521A, S1	513-77-9	No	3	Sigma	B1021	
Barium Chloride (2H2O), crystal ACS	521A, S1	10326-27-9	No	1	Fisher	B34-500	
Barium Nitrate, ACS ≥99%	521A, S1	10022-31-8	No	1	Sigma	217581	
Barium Hydroxide (8H2O) ≥98%	521A, S1	12230-71-6	No	2	Sigma	B2507	
Barium Hydroxide (8H2O) ACS, ≥98%	521A, S1	12230-71-6	No	4	Sigma	B3153	
Borax, 99%	521A, S1	1303-96-4	No	2	Sigma	B9876	
Calcium Acetate (H2O), sigma ultra 99%	521A, S1	62-54-4	No	2	Sigma	C4705	
Calcium Acetate (H2O), reagent plus ≥ 99%	521A, S1	62-54-4	No	2	Sigma	C1000	
Calcium Chloride (2H2O), reagent plus ≥ 99%	521A, S1	10035-04-8	No	1	Sigma	C3881	
Calcium Hypochlorite, technical grade	521A, S1	7778-54-3	No	1	Sigma	211389	
Calcium Nitrate (4H2O) ≥ 99%	521A, S1	13477-34-4	No	1	Sigma	C1396	
Calcium Sulfate (1/2 H2O)	521A, S1	7778-18-9	No	3	Baker	1463-01	
Calcium Carbonate, ACS ≥ 99%	521A, S1	471-34-1	No	1	Acros	423515000	
Cesium Chloride, molecular biology ≥ 98%	521A, S1	7647-17-8	No	3	Sigma	C-4036	
Chromium (III) Chloride (6H2O), 96%	521A, S1	10060-12-5	No	1	Sigma	C1896	

Chromium (III) Nitrate (9H ₂ O)	521A, S1	7789 02-8	No	1	Sigma	239529	
Chromium (III) Nitrate (9H ₂ O), crystal reagent ≥ 99%	521A, S1	7789 02-8	No	3	Spectrum	C1250	
Chromium (VI) Oxide, ≥ 99%	521A, S1	1333-82-0	No	3	Sigma	20782-9	
Cobalt (II) Chloride (6H ₂ O), ACS reagent	521A, S1	7791-13-1	No	1	Acros	42357-1000	
Cobalt (II) Chloride (6H ₂ O), ACS	521A, S1	7791-13-1	No	1	Ricca	RDCC0660-500B1	*
Cobalt (II) Nitrate (6H ₂ O), ACS ≥ 98%	521A, S1	10026-22-9	No	2	Sigma	239267	
Cobalt (II) Nitrate (6H ₂ O), ACS	521A, S1	10026-22-9	No	3	Spectrum	C1315	
Copper Acetate	521A, S1	6046-93-1	No	1	Sigma	C5893	
Copper (II) Acetate (H ₂ O)	521A, S1	6046-93-1	No	2			
Copper (II) Carbonate (basic), reagent grade	521A, S1	12069-69-1	No	1	Sigma	20789-6	
Copper (I) Chloride,	521A, S1	7758-89-6	No	1	Sigma		
Copper (II) Chloride (H ₂ O), ≥ 99%	521A, S1	10125-13-0	No	2	Sigma	C6641	
Copper (II) Chloride (2H ₂ O), reagent grade, crystal	521A, S1	10125-13-0	No	1	Fisher	S93220	
Copper (II) Chloride (2H ₂ O), reagent grade, crystal	521A, S1	10125-13-0	No	1	Sigma	221783	
Copper Nitrate	521A, S1	19004-19-4	No	1	Sigma	C2646	
Copper Nitrate (4H ₂ O)	521A, S1	19004-19-4	No				
Copper (II) Sulfate (5H ₂ O), reagent plus 99%	521A, S1	7758-99-4	No	1	Sigma	C7631	
Iron (II) Chloride (4H ₂ O), ≥ 99%	521A, S1	13478-10-9	No	2	Sigma	F2130	
Iron (II) Chloride (6H ₂ O)	521A, S1	13478-10-9	No				
Iron (III) Chloride (6H ₂ O), ACS grade, lumps	521A, S1	10025-77-1	No	1	Fisher	I88-500	
Iron (III) Chloride (6H ₂ O), reagent grade ≥ 98%, lumps	521A, S1	10025-77-1	No	1	Sigma	F2877	
Iron (III) Nitrate	521A, S1	7782-61-8	No	1	Sigma	F3002	

(9H ₂ O), ≥ 98%							
Iron (II) Sulfate (7H ₂ O), reagent plus ≥ 99%	521A, S1	7782-63-0	No	1	Sigma	F7002	
Iron (II) Sulfate (7H ₂ O), reagent plus ≥ 99%	521A, S1	7782-63-0	No	1	Sigma	31007-7	
Ferric Ammonium Sulfate (10H ₂ O), ACS	521A, S1	7783-83-7	No	1	Fisher	I75-500	
Carbonyl Iron, ≥ 97%	521A, S1	7439-89-6	No	3	Sigma	C3518	
Lead (II) Acetate (3H ₂ O)	521A, S1	6080-56-4	No	2	Sigma	L3396	*2-24-09
Lead (I) Chloride	521A, S1	7758-95-4	No	2	anachemia	AC-5390	
Lead (II) Nitrate	521A, S1	10099-74-8	No				
Magnesium Chloride (6H ₂ O), reagent plus, ≥ 99%	521A, S2	7791-18-6	No	1	Sigma	M0250	
Magnesium Chloride (6H ₂ O), ACS 99-102%	521A, S2	7791-18-6	No	4	Sigma	M9272	
Magnesium Iodate, 99%	521A, S2	7790-32-1	No	4	Sigma	M0137	
Magnesium Nitrate (6H ₂ O), ACS reagent 99%	521A, S2	13446-18-9	No	1	Sigma	237175	
Magnesium Sulfate (anhydrous)	521A, S2	7487-88-9	No	1	Malinkrodt	6070	
Magnesium Sulfate	521A, S2	7487-88-9	No	4			
Magnesium Sulfate (7H ₂ O), ACS 98-102%, ph 5-8.2	521A, S2	10034-99-8	No	1	Sigma	M9397	
Magnesium Hydroxide, ≥ 95%, powder	521A, S2	1309-42-8	No	4	Sigma	M8511	
Manganese Chloride (4H ₂ O), ACS, crystals	521A, S2	13446-34-9	No	1	Fisher	M87-500	
Manganese Oxide, powder	521A, S2	1313-13-9	No	1	Sigma	M3138	
Manganese Sulfate	521A, S2	7785-87-7	No	2			
Manganese Sulfate (H ₂ O)	521A, S2	10034-96-5	No	3	Malinkrodt	6192	
Mercury Chloride, reagent plus, ≥99.5%	521A, S2	7487-94-7	Yes	4	Sigma	M1136	

Mercury (I) Nitrate (2H ₂ O), ≥97%	521A, S2	7782-86-7	No	4	Sigma	230413	
Mercury Oxide, ACS reagent	521A, S2	21908-53-2	Yes	4	Spectrum	M1180	
Mercury Sulfate	521A, S2	7783-35-9	No	4	Baker	264004	
Nickel Chloride (6H ₂ O), reagent plus	521A, S2	7791-20-0	No	1	Sigma	N5756	
Nickel Chloride (6H ₂ O)	521A, S2	7791-20-0	No	3	Sigma	N5756	
Nickel (II) Nitrate (6H ₂ O), crystalline	521A, S2	13478-00-7	No	1	Sigma	244074	
Nickel (II) Sulfate (6H ₂ O), ≥ 98%	521A, S2	10101-97-0	No	1	Sigma	379417	
Nickel (II) Sulfate (7H ₂ O), 99.999% trace metals basis	521A, S2	10101-98-1	No	4	Sigma	20389-0	
Potassium Acetate, ACS, ≥ 99%	521A, S2	127-08-2	No	3	Sigma	P3542	
Potassium Bicarbonate	521A, S2	298-14-6	No	3	Baker	2940	
Potassium Bromide, reagent plus, ≥ 99%	521A, S2	7758 02-3	No	2	Sigma	P9881	
Potassium Carbonate, ACS, anhydrous, granular powder	521A, S2	584-08-7	No	3	Fisher	P208	
Potassium Chlorate, reagent grade, 98%	521A, S2	3811 04-9	No	1	Sigma	224863	
Potassium Chloride	521A, S2	7447-40-7	No	3	Malinkrodt		
Potassium Chloride, reagent plus, ≥ 99%	521A, S2	7447-40-7	No	2	Sigma	P4504	
Potassium Chromate, science grade	521A, S2	7789-00-6	No	1	Wards	37W2746	
Potassium Cyanide, ACS reagent, ≥ 96%	521A, S2	151-50-8	Yes	2	Sigma	207810	
Potassium Dichromate	521A, S2	7778-50-9	No	2	Malinkrodt	6772	
Potassium Ferric Cyanide	521A, S2		No	1	Malinkrodt	6912	

Potassium Ferrocyanide (II) (3H ₂ O), ACS, 99%	521A, S2	14459-95-1	No	1	Sigma	22768-4	
Potassium Hydrogen Phthalate, ACS acidimetric standard	521A, S2	877-24-7	No	1	Sigma	179922	
Potassium Hydrogen Sulfate, laboratory grade	521A, S2	7646-93-7	No	2	Sigma	P5035	
Potassium Hydroxide, ≥ 85% KOH, pellets	521A, S2	1310-58-3	No	2	Sigma	P1767	
Potassium Hydroxide, ≥ 85% KOH, pellets	521A, S2	1310-58-3	No	3	Sigma	P1767	
Potassium Iodate, ACS reagent, powder	521A, S2	7758 05-6	No	2	Acros	41824-1000	
Potassium Iodate, reagent grade 98%	521A, S2	7758 05-6	No	1	Sigma	207977	
Potassium Iodide	521A, S2	7681-11-0	No	1	Acros	41826	
Potassium Nitrate, ACS reagent, ≥ 99%	521A, S2	7757-79-1	No	2	Sigma	P6162	
Potassium Oxalate, ACS reagent, 99%	521A, S2	6487-48-5	No	1	Sigma	22342-5	
Potassium Permanganate, ACS ≥ 99.0%	521A, S2	7722-64-7	No	1	Sigma	P9810	
Potassium Permanganate	521A, S2	7722-64-7	No	2	Baker	3228-01	
Potassium Persulfate, ACS ≥ 99.0%	521A, S2	7722-64-7	No	2	Sigma	216224	
Potassium Persulfate, ACS ≥ 99.0%	521A, S2	7722-64-7	No	1	Acros	42418-500	
Potassium Periodate	521A, S2	7790-21-8	No	2	Malinkrodt	UN1479	
Potassium Phosphate (monobasic), ACS, ≥99.0%	521A, S2	7778-77-0	No	1	Sigma	P0662	
Potassium Phosphate (monobasic), ACS, ≥99.0%	521A, S2	7778-77-0	No	2	Sigma	P0662	
Potassium Phosphate (dibasic)	521A, S2	7758 11-4	No	2	Baker	3252	
Potassium Phosphate (dibasic), ACS, ≥ 98.0%	521A, S2	7758 11-4	No	3	Sigma	P3786	
Potassium Sodium Tartrate, ACS 99%	521A, S2	6381-59-5	No	2	Sigma	217255	
Potassium Sulfate, ACS reagent, ≥ 99.0%, granular	521A, S2	7778-80-5	No	1	Sigma	P4042	

Potassium Thiocyanate, reagent plus, ≥ 99.0%	521A, S2	333-20-0	No	1	Sigma	P3011	
Potassium Thiocyanate, ACS, crystals	521A, S2	333-20-0	No	1	Acros	42423-500	
Silver Nitrate, reagent plus, ≥ 99%	521A, S3	7761-88-8	No	1	Sigma	S6506	
Silver Nitrate, ACS grade	521A, S3	7761-88-8	No	1	Carolina	88-7793	
Sodium Acetate (3H ₂ O), reagent grade, crystal	521A, S3	127-09-3	No	1	Fisher	S93352	
Sodium Acetate (3H ₂ O)	521A, S3	127-09-3	No	1	Carolina	88-8050	
Sodium Acetate, ACS reagent, ≥ 99.0%	521A, S3	127-09-3	No	2	Sigma	241245	
Sodium Acetate, ACS, ≥ 99%, anhydrous	521A, S3	127-09-3	No	2	Sigma	S8750	
Sodium Benzoate	521A, S3	532-32-1	No	1			
Sodium Bicarbonate, ACS reagent, ≥ 99.7%	521A, S3	144-55-8	No	2	Sigma	S6014	
Sodium Bicarbonate, reagent plus, ≥ 99.5%	521A, S3	144-55-8	No	2	Sigma	S8875	
Sodium Bisulfite	521A, S3	7631-90-5	No	1	Baker	405	
Sodium Bromate, ≥ 99.0%	521A, S3	7789-38-0	No	1	Sigma	224871	
Sodium Bromide, ≥ 99.5%	521A, S3	7647-15-6	No	1	Sigma	S9756	
Sodium Bromide	521A, S3	7647-15-6	No	4	Baker	2218	
Sodium Carbonate (H ₂ O)	521A, S3	497-19-8	No	3			
Sodium Carbonate (anhydrous), ACS, ≥ 99.5%, dry basis	521A, S3	497-19-8	No	1	Sigma	S6139	
Sodium Carbonate (anhydrous), ACS, powder	521A, S3	497-19-8	No	3	Fisher	S-263	
Sodium Carbonate (anhydrous)	521A, S3	497-19-8	No	4	Baker	2223	
Sodium Chloride	521A, S3	7647-14-5	No	1			
Sodium Chloride, reagent grade, crystals	521A, S3	7647-14-5	No	2	Carolina	88-8882	
Sodium Citrate Tribasic (2H ₂ O), ACS reagent, ≥ 99.0%	521A, S3	6132 04-3	No	1	Sigma	S4641	
Sodium Citrate Tribasic (2H ₂ O), ACS reagent, ≥ 99.0%	521A, S3	6132 04-3	No	2	Sigma	S4641	

Sodium Dichromate (2H ₂ O), ACS, crystalline	521A, S3	7789-12-0	No	3	Fisher	S235	
Sodium Fluoride, reagent grade, powder	521A, S3	7681-49-4	No	2	Scholar	9607204	
Sodium Hydrogen Sulfate	521A, S3	10034-88-5	No	3	Malinkrodt	7432-02	*not there
Sodium Hydroxide, ACS, ≥ 97%, pellets	521A, S3	1310-73-2	No	1	Acros	42433-500	
Sodium Iodide, crystal	521A, S3	7681-82-5	No	1	Fisher	S324-100	
Sodium Molybdate	521A, S3	10102-40-6	No	4	MCB reagents	SX0650-3	
Sodium Nitrate, ≥ 99.0%	521A, S3	7631-99-4	No	1	Sigma	S5506	
Sodium Nitrate, ACS, ≥ 99.0%	521A, S3	7631-99-4	No	2	Sigma	221341	
Sodium Nitrite, granular, USP	521A, S3	7632-00-0	No	3	Spectrum	S0185	
Sodium Oxalate, ACS, ≥ 99.55	521A, S3	62-76-0	No	1	Sigma	S9265	
Sodium Phosphate (monobasic), ACS, ≥ 98.0%	521A, S3	10049-21-5	No	1	Sigma	S9638	
Sodium Phosphate (monobasic), reagent plus, ≥ 99.0%	521A, S3	10049-21-5	No	2	Sigma	S0751	
Sodium Phosphate (monobasic), colorless to white crystals	521A, S3	10049-21-5	No	3	Fisher	BP330	
Sodium Phosphate (dibasic), reagent plus, ≥ 99.0%	521A, S3	7558-79-4	No	1	Sigma	S0876	
Sodium Phosphate (dibasic)	521A, S3	7558-79-4	No	1	Malinkrodt	7917	
Sodium Phosphate (tribasic)(12H ₂ O), ≥ 98.0%	521A, S3	10101-89-0	No	1	Sigma	S1001	
Sodium Phosphate (H ₂ O)	521A, S3		No	3			
Sodium Pyrophosphate (10H ₂ O), ACS	521A, S3	13472-36-1	No	3	Fisher	S390	
Sodium Sulfate, reagent plus, ≥ 99.0%	521A, S3	7757-82-6	No	1	Sigma	S9627	

Sodium Sulfate	521A, S3	7757-82-6	No	2	Baker	3375-01	
Sodium Sulfide (9H ₂ O)	521A, S3	1313-84-4	No	3	Sigma	S4766	
Sodium Sulfite, ≥ 98.0%	521A, S3	7757-83-7	No	1	Sigma	S0505	
Sodium Tartrate	521A, S3	6106-24-7	No	2	Sigma	S8640	
Sodium Thiosulfate	521A, S3	10102-17-7	No	1	Sigma		
Sodium Thiosulfate (5H ₂ O), ≥ 99.5%	521A, S3	10102-17-7	No	1	Sigma	S8503	
Sodium Thiosulfate (5H ₂ O), ACS, 99.5%	521A, S3	10102-17-7	No	1	Sigma	217247	
Sodium Thiosulfate (5H ₂ O), ACS, 99.5%	521A, S3	10102-17-7	No	3	Sigma	217247	
Strontium Nitrate, ACS reagent, ≥ 99.0%	521A, S3	10042-76-9	No	1	Sigma	243426	
Sulfur	521A, S3	7704-34-9	No	1		5594-500	
Zinc Chloride	521A, S3	7646-85-7	No	1	Sigma	208586	
Zinc Nitrate (6H ₂ O)	521A, S3	10196-18-6	No	1	Sigma	Z2375	
Zinc Nitrate (6H ₂ O)	521A, S3	10196-18-6	No	2	Sigma	Z2375	
Zinc Sulfate	521A, S3	7733-02-0	No	2	Baker	2452	*2-26-09
Acetamide	521A, S4	60-35-5	No	1	Sigma	A1053	
Acetophenetidin, powder	521A, S4	62-44-2	No	3	Sigma	A2500	
acetylsalicylic acid, 99.0%	521A, S4	50-78-2	No	2	Acros	158185000	
acetylsalicylic acid, ≥ 99.0%, crystalline	521A, S4	50-78-2	No	2	Sigma	A5376	
Benzamide	521A, S4	55-21-0	No	1	Sigma	B2009	
Benzamide	521A, S4	55-21-0	No	3	Sigma	B2009	
Benzoic Acid	521A, S4	65-85-0	No	1	Sigma	B3250	
Benzophenone, reagent plus, 99%	521A, S4	119-61-9	No	3	Aldrich	B930-0	
Biphenyl, reagent plus, 99.5%	521A, S4	92-52-4	No	3	Sigma	B3465-6	
Chloroacetic acid	521A, S4	79-11-8	No	2	Fisher	A176-500	
Cholesterol, 95%	521A, S4	57-88-5	No	1	Sigma	C75209	
Citric Acid, anhydrous	521A, S4	77-92-9	No	1	Fisher	S93178	
1,4 dichlorobenze, crystal, ≥ 98.0%	521A, S4	106-46-7	No	1	Spectrum	D1020	

1,4 dichlorobenze, 97%	521A, S4	106-46-7	No	1	Acros	113190010	
2,4-dinitrophenylhydrazine, reagent grade, 97%	521A, S4	119-26-6	No	1	Sigma	D19930-3	
Dimethylglyoxime	521A, S4	95-45-4	No	1	Ricca	RDCD550-100B1	
Diphenylamine	521A, S4	122-39-4	No	1	Sigma	D3409	
EDTA, Disodium Salt, (2H ₂ O)	521A, S4	6381-92-6	No	1	Baker	8993-01	
EDTA, Disodium Salt, (2H ₂ O), reagent, ≥ 99.0%	521A, S4	6381-92-6	No	1	Spectrum	E1045	
EDTA, Tetrasodium Salt, (2H ₂ O), reagent	521A, S4	62-02-8	No	1	Fisher	02793-500	
Maleic Acid, ≥ 99.0%	521A, S4	110-16-7	No	2	Spectrum	M1075	
Malonic Acid, reagent, ≥ 99.0%	521A, S4	141-82-2	No	2	Spectrum	MA150	
Naphthalene, 99%	521A, S4	91-20-3	No	2	Sigma	N2380	
Alpha-naphthol, reagent plus, ≥ 99.0%	521A, S4	90-15-3	No	2	Sigma	N-1000	
Alpha-naphthol, sigma ultra, ≥ 99.0%	521A, S4	90-15-3	No	3	Sigma	N2780	
Oxalic acid	521A, S4	144-62-7	No	2	Acros	423152500	
1-phenyl-2-thiourea	521A, S4	103-85-5	No	3	Sigma	222909	
Polyvinyl Alcohol, 98% hydrolized, avg. mol. Weight 13-23k	521A, S4	9002-89-5	No	3	Sigma	34840-6	
Polyvinyl Alcohol	521A, S4	9002-89-5	No	3	Sigma	363111	
Potassium Tellurate (H ₂ O), ≥ 90%	521A, S4	123333-66-4	No	3	Sigma	P0677	
Phthalic Anhydride, reagent plus, 99%	521A, S4	85-44-9	No	2	Sigma	125733	
Salicylic Acid	521A, S4	69-72-7	No	2	Sigma	S0875	
Sodium Acrylate, 97%	521A, S4	7446-81-3	No	3	Aldrich	408220	
Stearic Acid	521A, S4	57-11-4	No	2			
Sulfanilic Acid, ≥ 99.0%	521A, S4	121-57-3	No	2	Sigma	S5263	
Sulfamic Acid	521A, S4	5329-14-6	No	1	Sigma	S6771	

Thioacetamide, reagent grade, 98%	521A, S4	62-55-5	No	1	Sigma	172502	
Vanillin, reagent plus, 99%	521A, S4	121-33-5	No	3	Sigma	V1104	
2-mercaptoethanol, for molecular biology, ≥ 98% GC	521A, fumehood	60-24-2	No		Sigma	M3148	
formamide, for molecular biology, ≥ 99.5% GC	521A, fumehood	75-12-7	No		Sigma	F7508	
acetic anhydride, reagent grade, ≥ 98.0%	521A, fumehood	108-24-7	No		Sigma	A6404	
n-methylaniline, 98%	521A, fumehood	100-61-8	No		Aldrich	M29304	
ethylene diamine, reagent plus, 99%	521A, fumehood	107-15-3	No		Sigma	E26266	
2-nitrofluorine, 98%	521A, fumehood	607-57-8	No		Sigma	N16754	
Calcium, granular, 6 mesh, 99%	521A, fumehood	7440-70-2	No		Sigma	215147	
Lithium metal	521A, fumehood	7439-93-2	No		Fisher	75462	
phenylmethanesulfonyl fluoride, ≥ 98.5% GC	521A, fumehood	329-98-6	No		Sigma	P7626	
Nitric Acid, reagent ACS	521, Acid	7697-37-2	Yes	4	Acros	424000025	*3-4-09
Hydrochloric Acid, reagent grade, 37%	521, Acid	7647-01-0	No	3	Sigma	435570	
Hydrochloric Acid, ACS +	521, Acid	7647-01-0	No	3	Fisher	A144	
Phosphoric Acid	521, Acid	7664-38-2	No	3	Carolina	88-1470	
Acetic Acid, ACS reagent, ≥ 99.7%	521, Acid	64-19-7	No	3	Sigma	320099	
Acetic Acid, ACS reagent, ≥ 99.7%	521, Acid	64-19-7	No	3	Acros	42322-0025	
Propionic Acid	521, Acid	79-09-4	No	2	Fisher	A258	
Propionic Acid, reagent grade, 99%	521, Acid	79-09-4	No	2	Sigma	P1386	
Hexanoic Acid, 99%	521, Acid	142-62-1	No	2	Sigma	H12137	
Methyl Salicyclate	521, Acid	119-36-8	No	2	Sigma	240826	
Methyl Salicyclate, NF, 98%	521, 1B	119-36-8	No	2	Spectrum	ME170	
Acetic Anhydride, certified ACS	521, Acid	108-24-7	No	2	Fisher	A10-100	
n-Butyric Acid	521, Acid	107-92-6	No	2	Sigma	B2503	

Sulfuric Acid, ACS, 95.0-98.0%	521, Acid	7664-93-9	Yes		Sigma	258105	
Sulfuric Acid	521, Acid	7664-93-9	Yes	1	Sigma	320500	*not there
Ammonium Hydroxide, reagent grade, 29%	521, Acid	7664-41-7	Yes	4	Fisher	S93119	
Ammonium Hydroxide, ACS reagent	521, Acid	1336-21-6	Yes	4	Spectrum	A1195	
Sodium Hydroxide, 50% in H2O	521, Acid	1310-73-2	No	3	Sigma	415413	
Sand, Ottawa, white fine	521A	14808-60-7	No	Top	Wards	20W7423	
Zinc, 20 mesh	521A	7440-66-6	No	Top	Sigma	Z1251	
Zinc, science grade, mossy	521A	7440-66-6	No	Top	Wards	37W6325	
Copper, lab grade, shot	521A	7440-50-8	No	Top	Wards	37W2207	
Chromium, lab grade, pieces	521A	7440-47-3	No	Top	Wards	37W2177	
Magnesium, ribbon	521A	7439-95-4	No	Top	Wards	37W2850	
Magnesium, ribbon, Acs	521, S12	7439-95-4	No		Sigma	266302	
Sulfur, reagent grade, powder, -100 mesh	521A	7704-34-9	No	Top	Sigma	215198	
Iron filings	521A	7439-89-6	No	Top	Wards	37W2312	
phenolphthalein, ACS reagent	521A	77-09-8	No	Top	Sigma	105945	
eriochrome black T	521A	1787-61-7	No	Top	Fisher	SE32-500	
methanol, HPLC and ACS grade	521, 30A	67-65-1	No		Fisher	A452-4	
benzaldehyde	521, 30A	100-52-7	No		Sigma	B6259	
methanol	521, 30A	67-65-1	No		Pharmco	33900000	
formaldehyde, 37% by weight, with preservative, ACS	521, 30A	50-00-0	No		Fisher	F-79	
acetone	521, 30A	67-64-1	No		Pharmco	32900000	
N,N-Dimethylformamide, for molecular biology, ≥ 99.0%	521, 30A	68-12-2	No		Sigma	D4551	
trans-Cinnamaldehyde, 99%	521, 30A	14371-10-9	No		Sigma	C80687	

p-Anisaldehyde, ≥ 98.0% (GC)	521, 30A	123-11-5	No		Sigma	A0519	
propionaldehyde	521, 30A	123-38-6	No		Sigma	P51451	
p-tolualdehyde, 97%	521, 30A	104-87-0	No		Sigma	T3560-2	
cyclohexanone, ACS reagent, ≥ 99.0%	521, 30A	108-94-1	No		Sigma	39824-1	
acetonitrile, HPLC and ACS grade	521, 30B	75-05-8	No		Fisher	A998-4	
Cyclohexane, 99.5%	521, 1A	110-82-7	No		Acros	176810025	
Hexane, ≥ 99.0%	521, 1A	110-54-3	No		Acros	111110025	
2-Butanone, ACS reagent, ≥ 99.0%	521, 1A	78-93-3	No		Sigma	36047-3	
1-Hexene, 97%	521, 1A	592-41-6	No		Sigma	230545	
Hexane, spectrophotometric grade, ≥ 95%	521, 1A	110-54-3	No		Sigma	248878	
Cyclohexene, reagent plus, 99%	521, 1A	110-83-8	No		Sigma	125431	
N,N-Dimethylformamide, for molecular biology, ≥ 99.0%	521, 1A	68-12-2	No		Sigma	D4551	
Xylene	521, 1A	1330-20-7	No		Malinkrodt	8668	
Toluene, ACS, ≥ 99.5%	521, 1A	108-88-3	No		Sigma	179418	
Toluene, ACS, ≥ 99.5%	521, 1A	108-88-3	No		Spectrum	T1098	
Benedict's Solution	522, refrigerator	14459-951, 333-20-0, 497-19-8, 6132-04-3, 7732-18-5, 7758-99-8	No		Ricca	930-32	
Cupric Acetate	522, refrigerator	6046-93-1, 64-19-7, 7732-18-5	No		Ricca	2488-16	
Isoamyl Alcohol	521, Flammable	123-51-3	No	top shelf	Sigma	I3643	
Octanol, reagent plus, 99%	521, Flammable	111-87-5	No	top shelf	Sigma	112615	

Ethyl Acetate	521, Flammable	141-78-6	No	top shelf	Wards	39W12	
Ethyl Acetate, ACS	521, Flammable	141-78-6	No	top shelf	Fisher	E145	
Ethyl Acetate	521, Flammable	141-78-6	No	top shelf	Malinkrodt	4992	
1-butanol, ACS	521, Flammable	71-36-3	No	top shelf	Fisher	A399	
1-butanol	521, Flammable	71-36-3	No	top shelf	Malinkrodt	3000	
Amyl Alcohol	521, Flammable	71-41-0	No	top shelf			
2-Propanol	521, Flammable	67-63-0	No	top shelf	Baker	9084	
Benzyl Alcohol	521, Flammable	100-51-6	No	top shelf	Sigma	B16208	
tert-Butyl Alcohol	521, Flammable	75-65-0	No	top shelf	Malinkrodt	2998	
Amyl Acetate	521, Flammable	628-63-7	No	top shelf	Baker	9094-1	
Parafin Oil	521, Flammable	8012-95-1	No	top shelf	Carolina	87-9110	3/9/200
Glycerol	521, Flammable	56-81-5	No	middle	Sigma	134872	
Glycerol, synthetic, USP	521, Flammable	56-81-5	No	middle	Spectrum	G1015	
Triethylamine	521, Flammable	121-44-8	No	middle	Sigma	132063	
1-dodecanol, reagent grade, 98%	521, Flammable	112-53-8	No	middle	Sigma	126799	
cyclohexanol, reagent plus, 99%	521, Flammable	108-93-0	No	middle	Sigma	105899	
polyethylene glycol, avg. mol weight 400	521, Flammable	25322-68- 3	No	middle	Sigma	P3265	
Propylene glycol, USP, FCC	521, Flammable	57-55-6	No	middle	Fisher	P355-1	
Aniline, reagent plus, 99%	521, Flammable	62-53-3	No	middle	Sigma	132934	
Glyoxal	521, Flammable	107-22-2	No	middle	Sigma	G3140	
1-pentanol	521, Flammable	71-41-0	No	middle	Sigma	P8274	
Ethylene glycol, ≥ 99%	521, Flammable	107-21-1	No	bottom	Acros	146750025	

Petroleum Ether	521, Flammable	68476-50-6, 109-66-0, 107-83-5, 96-14-0, 75-83-2, 79-29-8, 78-78-4, 287-92-3, 71-43-2	No	bottom	Sigma	443441	
1-propanol, ACS reagent, ≥ 99.5%	521, Flammable	71-23-8	No	bottom	Spectrum	P1430	
sec-Butanol, certified	521, Flammable	78-92-2	No	bottom	Fisher	1664	
2-Propanol, reagent ACS	521, Flammable	67-63-0	No	bottom	Spectrum	I1040	
ethyl alcohol, anhydrous, 200 proof, reagent, ACS	521, Flammable	64-17-5	No	bottom	Acros	61509-0040	
Penicillin G (1600 units/mg)	522A, P3	69-57-8	No	top	Sigma	PenK	3/12/200
Sarcosine, sigma ultra	522A, P4	107-97-1	No	top	Sigma	S7672	
Ficoll, PM 400	522, B2	26873-85-8	No	top	Sigma	F4375	
DEAE cellulose, preswollen, microgranular	522, B2	9013-34-7	No	top	Sigma	D3764	
Riboflavin, USP	522A, P3	83-88-5	No	top	Spectrum	RI108	
Gum Arabic, reagent grade	522A, P3	9000 01-5	Yes	top	Sigma	G9752	
Acrylamide	522A, P4	79-06-1	No	top	Pharmaco	17-1307-01	
Sodium Pyruvate, reagent plus, ≥ 99.0%	522A, P4	113-24-6	No	top	Sigma	P2256	
L-lysine, USP grade, cell culture tested, 98.5-101%	522A, P3	657-27-2	No	top	Sigma	L8662	
Ferric Tartrate		2944-68-5	No	top	Malinkrodt	2338	*
L-histidine	522A, P3	71-00-1	No	top			
L-histidine	522A, P3	71-00-1	No		Baker	N327-05	
L-leucine	522A, P3	61-90-5	No	top	Sigma	L1512	
L-methionine	522A, P3	63-68-3	No	middle	Sigma	M2893	
L-threonine	522A, P3	72-19-5	No	middle	Sigma	T-1645	3613
L-threonine, cell culture tested, USP, 99.0-101.0%	522A, P3	72-19-5	No	top	Sigma	T8841	
Uridine, powder, cell culture tested	522A, P3	58-96-8	No	middle	Sigma	U3003	
Papain		9001-73-4	No	bottom	Usbiochemical	19930	
Urea	522A, P3	57-13-6	No	bottom	Matheson	CB816	

Trypsin	Barbara fridge	9002 07-7	No	bottom	Difco	0152-15	
Riboflavin, ≥ 99.0%, cell culture tested, insect	522A, P3	83-88-5	No	bottom	Sigma	R9504	
Inositol, FCC	522A, P4	87-89-8	No	bottom	Spectrum	I1004	
Aminobenzoic Acid, USP	521A, S4	150-13-0	No	top	Spectrum	AM150	
DL-maleic acid, ≥ 98% (GC)	521A, S4	110-16-7	No	bottom	Sigma	M0875	
Adenine, powder, cell culture tested	522A, P3	73-24-5	No	bottom	Sigma	A3159	
Fumaric Acid	521A, S4	110-17-8	No	bottom	Sigma	F2750	
n-Lauryl Sarcosine, for molecular biology, ≥ 94%	522A, P4	137-16-6	No	top	Sigma	L9150	
L-tryptophan	522A, P3	73-22-3	No	bottom	Malinkrodt	2741	
H2O2, 30%, ACS	522, refrigerator	7722-84-1	No	microbio	Fisher	H325	
catechol	521A, A4	120-80-9	No		Sigma		*
congo red	522, F5	573-58-0	No		Sigma		
albumin standard	522, B2		No		Pierce		
Agar	522A, P2	9002-18-0	No	1	Difco	0145-17-3	3/17/200
Bactoagar	522A, P2		No	1 and 3	Difco	0140-01	
Baird Parker	522A, P2	7447-41-8	No	3	Difco	276830	
Dnase test agar	522A, P2	7647-14-5	No	1	Hardy	C5670	
EMB	522A, P2		No	2	Hardy	C7331	
EMB	522A, P2		No	3	Difco	0076-17-0	
Heart infusion Agar	522A, P2	7558-79-4, 9002-18-0	No	4	Difco	004417-9	
Levine EMB Agar	522A, P2		No	2	Difco	0005-17-6	
Lysine Iron Agar	522A, P2		No	3	EM science	11640	*
MacConkey Agar	522A, P2		No	2	Difco	0075-17-1	
Macconkey Agar	522A, P2		No	4	BBL	4311387	
Macconkey w/o CV Agar	522A, P2		No	3	Difco	0470-17-2	
Manitol Salt Agar	522A, P2	7647-14-5	No	1	Hardy	C6231	
mEndo Agar	522A, P2	569-61-9	No	3	Difco	273610	
MIO (Motility ornithine decarboxylase, indol)	522A, P2		No	1	Accumedia	7389	
MIO (Motility ornithine decarboxylase, indol)	522A, P2		No	4	Difco	0735-02-0	
Mueller Hinton Agar	522A, P2		No	1	Hardy	C6421	
Noble Agar	522A, P2		No	2	Difco	0142-01	
OF basal medium	522A, P2	7647-14-5	No	1	Hardy	c6501	

Phenol Red Agar	522A, P2	7647-14-5	No	2	Difco	0098-17-4	
phenylalanine agar	522A, P2	7647-14-5	No	2	Difco	0745-15-3	
Potato dextrose Agar	522A, P2		No	1	Hardy	C6621	
R2A	522A, P2		No	4	Difco	1826-17-1	
Rainbow 0157	522A, P2		No	2	Biolog	80101	
Sabouraud Dextrose	522A, P2		No	1	Hardy	c6811	
Sabouraud Dextrose	522A, P2		No	2	Difco	0109-71-1	
SIM (sulfate indol motility)	522A, P2		No	1	Hardy	C6941	
Simmons citrate	522A, P2	7647-14-5	No	1	Accumedia	7156B	
Simmons citrate	522A, P2	7647-14-5	No	2	Difco	0091-17-1	
Skim milk agar	522A, P2		No	1	Hardy	C7931	
Snyder Test	522A, P2		No	1	Hardy	C8110	
SS agar	522A, P2	7772-98-7, 1185-57-5	No	4	Difco	0074-17-2	
TCBS	522A, P2		No	2	Difco	265020	
Tetrathionate	522A, P2	7772-98-7	No	3	Difco	1417	
thioglycolate	522A, P2	7647-51-1, 367-51-1	No	2	Accumedia	7160	????
Tinsdale Agar Base	522A, P2	7647-14-5	No	1	Hardy	C7711	
Tributylin agar base (without tributyrin)	522A, P2		No	3	Sigma	T3688	
Triple sugar iron agar	522A, P2		No	1	Hardy	C7111	
Triple sugar iron agar	522A, P2		No	4	Difco	226540	
Tryptic Soy Broth	522A, P2		No	1	Hardy	C7121	
Moeller Decarboxylase Base	522A, P2		No	1	Hardy	C6371	
MR-VP	522A, P2	7758 11-4	No	1 and 2	Accumedia	7237B	
Nitrate Broth	522A, P2	7757-79-1	No	2	Difco	0268-17-3	
Nutrient broth	522A, P2		No	2	Difco	0003-01-6	
Phenol Red Broth Base	522A, P2		No	2	Difco	0092-17-0	
Terrific broth	522A, P2		No	4	BBL	22711-022	
Tryptic nitrate	522A, P2		No		Difco	0367-01-6	
Tryptic Soy Agar	522A, P2		No	1	Sigma	T8907	
Urea Broth	522A, P2	57-13-6, 7558-79-4	No	1	Difco	227210	
Bactopeptone	522A, P2	51142-18-8	No	3	Difco	0118-17-0	3/18/200
Beef Extract	522A, P2		No	1	Hardy	C5101	
Brewer's Yeast	522A, P2		No	2	USBiochem	23546	
Casamino acids	522A, P2	65072-00-6	No	1,2,3	Difco	0230-17-3	
Casein	522A, P2	9000-71-9	No	2	Sigma	C-0376	
Malt extract	522A, P2		No	4	Difco	0186-17-7	
Nutrient gelatin	522A, P2		No	2	Hardy	C6481	
Pancreatic Casein digest	522A, P2		No	1	Hardy	C6531	
Pancreatic Digest of	522A, P2		No	1	Hardy	C6541	

Gelatin							
Peptone Thione E	522A, P2		No	4	BBL	212302	
Proteose peptone #3	522A, P2		No	3	Difco	0122-4-4	
Skim milk powder	522A, P2		No	1	Hardy	C6931	
TC yeast- late	522A, P2		No	3	Difco	5577-15-5	?????
Tryptone	522A, P2		No	2	Accumedia	7351B	
Yeast extract	522A, P2		No	2	Difco	0127-17-9	
Yeast nitrogen base	522A, P2		No	2	Difco	0919-15	
Yeast carbon base	522A, P2		No	2	Difco	0391-15-0	
L-arabinose	522A, P3	5328-37-0	No	1	Acros	104980256	
cellulose	522A, P3	9004-34-6	No	3	Sigma	C6663	
dextrose	522A, P3	50-99-7	No	1	Difco	0155-174	
dextrose	522A, P3	50-99-7	No	4	Difco	0155-15-6	
dextrose, anhydrous, granular	522A, P3	50-99-7	No	4	Baker	1916	
D-fructose	522A, P3	57-48-7	No	1	Sigma	F0127	
Fructose	522A, P3	57-48-7	No	1			
D-galactose	522A, P3	59-23-4	No	1	Sigma	G0625	
D-glucose	522A, P3	50-99-7	No	2	Sigma	G8270	
alpha-lactose	522A, P3	63-42-3	No	4			
lactose	522A, P3	63-42-3	No	1	Difco	0156-17-3	
lactose	522A, P3	63-42-3	No	1	Malinkrodt	5652	
lactose	522A, P3	63-42-3	No	4	Sigma	L3625	
D-Maltose monohydrate, grade I, ≥ 98% from potato	522A, P3	6363-53-7	No	1	Sigma	M5885	
Maltose monohydrate	522A, P3	6363-53-7	No	1	Baker	P533-05	
Mannitol	522A, P3	69-65-8	No	1	Fisher	M120-500	
Mannitol	522A, P3	69-65-8	No	1	Sigma	M4125	
D-rafucose pentahydrate	522A, P3	17629-30-0	No	1	Acros	195670250	
sorbitol	522A, P3		No				
starch (potato)	522A, P3	9005-25-8	No	3 and 4	Difco	128F-0453	
starch (soluable)	522A, P3	9005-25-8	No	1	Fisher	S516	
starch (soluable)	522A, P3	9005-25-8	No	4	Difco	0178-17-7	
sucrose	522A, P3	57-50-1	No	1	Hardy	c7021	
D-xylose	522A, P3	58-86-6	No	2			
L-arginine	522A, P3	1119-34-2	No	2	Baker	B577-05	
L-cystine	522A, P3	56-89-3	No	2	National Bio	7134	
L-glutamic acid	522A, P3	6106 04-3	No	3	Sigma	G1626	
L-glutamine	522A, P3	56-85-9	No	3	Irvine Scientific	967000	
guanidine	522A, P3	50-01-1	No	3	BRL	5502UA	
guanidine	522A, P3	50-01-1	No	3	Gibco	5502-016	
L-lysine	522A, P3	657-27-2	No	2	Sigma	L5626	
L-ornithine	522A, P3	3184-13-2	No	2	Sigma	O2375	
pyruvic acid	522A, P3	127-17-3	No	2	Sigma	117F-05185	
RNA	522A, P3		No	4	USBiochem	21175	

thiamine	522A, P3	67-03-8	No	1			
L-threonine	522A, P3	72-19-5	No	2	Sigma	T1645	
L-threonine	522A, P3	72-19-5	No	2	Sigma	T1270	
L-tryptophan	522A, P3	73-22-3	No	2			
Bacto-peptone	522A, P3	51142-18-8	No	4	Difco	0118-02-7	
Bacto-tryptone	522A, P3		No	4			
Dithiothreitol	522A, P3	27565-41-9	No	1	Alexis	280-001-g010	*
Gelatin	522A, P3	9000-70-8	No	2			
polyvinyl pyrrolidone, avg. mol. Weight 40k	522A, P3	9003-39-8	No	3	Sigma	PVP-40	
Hydroxypropylmethyl cellulose, 2% in H2O	522A, P3	9004-65-3	No	3	Sigma	H7509	
Yeast	522A, P3		No	3	Sigma	YBD	
Litmus	522A, P3	1393-92-6	No	1	Sigma	L7382	
Tributyrin (C4:0), ≥ 99%	522A, P3	60-01-5	No	1	Sigma	T8626	
NaCl	522A, P3	7647-14-5	No	2	Malinkrodt	7581	
L-phenylalanine	522A, P3	63-91-2	No	2	Baker	T390-05	
Noble Agar	522A, P3	9002-18-0	No		Difco	0142-01	
D-ribose	522A, P3	50-69-1	No				
Glycerol, ACS reagent, ≥ 99.5%	522A, P4	56-81-5	No	1	Sigma	G7893	
Sodium Benzoate, reagent plus, 99%	522A, P4	532-32-1	No	2	Sigma	109169	
Tris Borate EDTA, 5X	522A, P4	77-86-1, 10043-35-3, 60-00-04	No	3	Scholar	9438006	
Centrimide, ≥ 98%, powder	522A, P4	57-09-0	No	2	Sigma	H5882	
EDTA, 4 Na salt	522A, P4	62-02-8	No	2	Sigma	ED45	
EDTA, 4 Na salt	522A, P4	62-02-8	No	2	Bio-RAD	161-0729	
Magnesium Acetate (4H2O)	522A, P4	142-72-3	No	2	Fisher	BP215	
Glycine, crystalline	522A, P4	56-40-6	No	2	Fisher	G46	
Sodium Dodecyl Sulfate (SDS)	522A, P4	8012-56-4	No	2	Bio-RAD	161-0301	
Dowex 50x8-50	522A, P4	11119-67-8	No	3	Spectrum	DWX57	
Giemsa Stain	522A, P4	67-56-1, 56-81-5, 506-59-2, 660-68-4, 51811-82-6, 68988-92-1	No	2	Gibco	10092	
Triton 100x	522A, P4	9083-53-8	No	1	Spectrum	TR135	
Tween80KR	522A, P4	9050-57-1	No	3	Sigma	P6474	

Tween20	522A, P4	9005-64-5	No	3	Sigma	P1379	
Tween20	522A, P4	9005-64-5	No	1	Bio-RAD	170-6531	
Boric Acid	522A, P4	11113-50-1	No	1	Baker	0091-01	
EDTA, 4 Na salt	522A, P4	62-02-8	No	2	Baker	L693-07	
Tricaine (ethyl-3-aminobenzoate), 98%	522A, P4	886-86-2	No	2	Sigma	E10521	
Trizma base, biotechnology grade, ≥ 99.9%	522A, P4	77-86-1	No	2	Sigma	T6066	
Agarose (ultrapure)	522A, P4	9012-36-6	No	2	Invitrogen	15510-027	
Immersion oil type A	522A, P1		No	2	Hardy	Z85	
bile spot reagent	522A, P1	302-95-4	No		Hardy	Z61	
Vogues Proskauer-A	522A, P1	90-15-3, 64-17-5	No		Hardy	Z91	
Methylene Blue	522A, P1	7220-79-3, 67-56-1, 64-17-5	No		Hardy	Z88	
Nitrate B	522A, P1		No		Hardy	Z72	
Indole Kovacs	522A, P1	71-41-0, 7647-01-0, 100-10-7	No		Hardy	Z67	
FeCl3	522A, P1	10025-77-1	No		Hardy	Z63	
Lactophenol Cotton Blue	522A, P1	50-21-5, 108-95-2	No		Hardy	Z68	
Napthyethylenediamine	522A, P1	1465-25-4	No		Hardy	Z125	????
Gram Iodine	522A, P1	7553-56-2, 7681-11-0	No		Hardy	I008	
Oxidrop	522A, P1		No		Hardy	Z119	????
Oxistrip	522A, P1		No		Hardy	Z93	
Methylene Blue	522A, P1	7220-79-3, 67-56-1, 64-17-5	No		Difco	3319-75	
Nitrate C (zinc)	522A, P1	7440-66-6	No		Hardy	z73	
basic fuchsin	522A, P1	569-61-9	No		Hardy	BF-008	
vogues proskauer-B	522A, P1	1310-58-3	No		Hardy	Z92	
Nitrate A (sulfanilic acid)	522A, P1	64-19-7	No		Hardy	Z71	
Ampicillin, sodium salt	521B, refrigerator	69-52-3	No		Sigma	A9518	*
Ninhydrin Reagent, in alcohol	521B, refrigerator	485-47-2	No		Hardy	Z70	
Flagella Stain	521B, refrigerator	64-17-5, 1401-55-4, 108-95-	No		Hardy	Z87	

		2					
H2O2, reagent grade, 30%	521B, refrigerator	7722-84-1	No		Fisher	S93262	*
Sodium thioglycollate	521B (-20°C)	367-51-1	No		Sigma	T0632	
anti-human whole antiserum (rabbit)	521B (-20°C)		No		Sigma	H8765	
anti-goat serum antibody (rabbit)	521B (-20°C)		No		Sigma	G5018	
anti-chicken serum antibody (rabbit)	521B (-20°C)		No		Sigma	C1036	
Monoclonal Anti-Human Kappa Light Chain (Bound & Free) Ab (mouse)	521B (-20°C)		No		Sigma	K4377	
Anti-Chicken IgY (IgG) (whole molecule) antibody produced in rabbit	521B (-20°C)		No		Sigma	C1161	
Anti-Goat IgG (whole molecule) antibody produced in rabbit	521B (-20°C)		No		Sigma	G5518	
anti-horse serum antibody (rabbit)	521B (-20°C)		No		Sigma	H8890	
anti-sheep serum antibody (rabbit)	521B (-20°C)		No		Sigma	S4265	
anti-mouse serum antibody (rabbit)	521B (-20°C)		No		Sigma	M5774	
Anti-Bovine IgG (whole molecule)-Alkaline Phosphatase Ab (rabbit)	521B (-20°C)		No		Sigma	A0705	
anti-bovine serum antibody (rabbit)	521B (-20°C)		No		Sigma	B8270	
anti-rabbit serum antibody (goat)	521B (-20°C)		No		Sigma	R5131	
sheep serum	521B (-20°C)		No		Sigma	S2263	
chicken serum	521B (-20°C)		No		Sigma	C5405	
bovine adult serum	521B (-20°C)		No		Sigma	B9433	
goat serum	521B (-20°C)		No		Sigma	G6767	
horse serum	521B (-20°C)		No		Sigma	H1270	
rabbit serum	521B (-20°C)		No		Sigma	R4505	
rat serum	521B (-20°C)		No		Sigma	R9759	
mouse serum	521B (-20°C)		No		Sigma	M5905	

PerfectHyb Hybridization Buffer	522, B2	proprietary	No		Sigma	H7033	
B-Per	522, B2		No		Pierce	78248	
Nitrocellulose paper	522, B2	9004-70-0	No		Pierce	88014	
Lowry Reagent	522, B2	497-19-8	No		Pierce	23240	
Fly Nap	522, B2	121-44-8, 64-17-5	No		Carolina	173025	
Slide-a-lyzer Concentrating Solution	522, B2				Pierce	66529	
Gel Code blue	522, B2	67-56-1, 67-68-5	No		Pierce	24590	
Micro BCA Reagent A (MA)	522, B2	proprietary	No		Pierce	23231	
BCA Protein Assay Reagent A	522, B2	proprietary	No		Pierce	23228	
BCA Protein Assay Reagent A	522, B2	proprietary	No		Pierce	23223	
Lane Marker Non-Reducing Sample Buffer	522, B2		No		Pierce	39001	
Micro BCA Reagent B (MB)	522, B2	7758-99-8	No		Pierce	1859078	
Formalin solution, neutral buffered, 10%	522, B2	50-00-0, 67-56-1, 7558-79-4, 10049-21-5	No		Sigma	HT50-1-1	
brilliant green	522, E10	633-03-4	No		BBL		
carbofuchsin	522, E10	569-61-9	No		Difco	3313-75	
phenol red	522, E10	34487-61-1	No		sigma	P0290	
alpha naphthol benzein-p	522, E10		No		malinkrodt	E121	
alizarin red	522, E10	130-22-3	No		baker	A475-03	
aniline blue	522, E10	66687-07-8	No		matheson	B215	
brilliant blue R	522, E10	6104-59-2	No		sigma	B0149	
bromcresol green	522, E10	76-60-8	No		Sigma	114359	
bromcresol purple	522, E10		No		National		
bromophenol blue	522, E10	115-39-9	No		bio-RAD	161-0404	
carmine red	522, E10	1390-65-4	No		Acros	1902000050	
crystal violet	522, E10	548-62-9	No		baker	F906-03	
2,6 dichloroindophenol	522, E10	620-45-1	No		sigma	D1878	
Eosin Y	522, E10	17372-87-1	No		matheson	NB286	

evans blue	522, E10	314-13-6	No		matheson	B702	
fast blue BB	522, E10	120-00-3	No		sigma	201529	
fast green FCF	522, E10	2353-45-9	No		EM	FX0081-1	
hematoxylin	522, E10	517-28-2	No		matheson	B311	
8-hydroxyquinolone	522, E10	148-24-3	No		sigma	H6878	
indigocarmine	522, E10	860-22-0	No		malinkrodt	2489	
Janus Green B	522, E10	2869-83-2	No		Allied	512	
Kovacs complex	522, E10	15406-98-1	No		sigma	D4882	
Light green SF	522, E10	5141-20-8	No		Baker	P3993	
malachite green	522, E10	2437-29-8	No		sigma	m9636	
methyl greeen	522, E10	7114 03-6	No		matheson	B347	
methyl orange	522, E10	547-58-0	No		sigma	M3132	
methyl red	522, E10	493-52-7	No		sigma	M7267	
methyl violet	522, E10	8004-87-3	No		sigma	M4511	
methylene blue	522, E10	122965-43-9	No		sigma	MB1	
neutral red	522, E10	553-24-2	No		matheson	B360	
orange G	522, E10	1936-15-8	No		matheson	B375	
orcein	522, E10	1400-62-0	No		sigma	O7388	
orceinol	522, E10	6153-39-5	No		sigma	O1875	
phenol red	522, E10	34487-61-1	No		spectrum	PH135	
phenolphthalein	522, E10	77-09-8	No		sigma	R9750	
ponceau G	522, E10	3761-53-3	No		matheson	B387	
resorcinol	522, E10	108-46-3	No		sigma	R1000	
safranin o	522, E10	477-73-6	No				
sudan black	522, E10	4197-25-5	No			B413	
sudan III	522, E10	85-86-9	No		matheson	B416	
thymol blue	522, E10	76-61-9	No		sigma	114545	
toluidine blue	522, E10	92-31-9	No		sigma	T3260	
xylene cyanol	522, E10	2650-17-1	No		bio-RAD	161-0423	
Carbon dioxide	521B	124-38-9	No		praxair	CD M-50	
sulfur hexafluoride	521A	2551-62-4	No		alliance gas		
hydrogen	521A	1333-74-0	No		alliance gas		

Appendix C: Definitions

Action level. A concentration designated in Title 8, California Code of Regulations for a specific substance, calculated as an eight (8)-hour time weighted average, which initiates certain required activities such as exposure monitoring and medical surveillance.

Chemical Hygiene Officer. An employee who is designated by the employer, and who is qualified by training or experience, to provide technical guidance in the development and implementation of the provisions of the Chemical Hygiene Plan. This definition is not intended to place limitations on the position description or job classification that the designated individual shall hold within the employer's organizational structure.

Chemical Hygiene Plan. A written program developed and implemented by the employer which sets forth procedures, equipment, personal protective equipment and work practices that;

1. Are capable of protecting employees from the health hazards presented by hazardous chemicals used in that particular work place and
2. Meets the requirements of subsection 5191(e).

Chief. The Chief of the Division of Occupational Safety and Health.

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 (93.3° C), or higher, the total volume of which make up 99 percent or more of the total volume of the mixture.

Compressed gas.

1. A gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi at 70° F (21.1° C); or
2. 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
3. A liquid having a vapor pressure exceeding 40 psi at 100° F (37.8° C) as determined by ASTM D-323-72.

Designated area. An area which may be used for work with "select carcinogens," reproductive toxins or substances which have a high degree of acute toxicity. A designated area may be the entire laboratory, an area of a laboratory or a device such as a laboratory hood.

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

Employee. An individual employed in a laboratory workplace who may be exposed to hazardous chemicals in the course of his or her assignments.

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

Flammable. A chemical that falls into one of the following categories:

1. "Aerosol, flammable" means an aerosol that, when tested by the method described in 16 CFR 1500.45, yields a flame projection exceeding 18 inches at full valve opening, or a flashback (a flame extending back to the valve) at any degree of valve opening;
2. "Gas, flammable" means:
 - a. A gas that, at ambient temperature and pressure, forms a flammable mixture with air at a concentration of 13 percent by volume or less; or
 - b. A gas that, at ambient temperature and pressure, forms a range of flammable mixtures with air greater than 12 percent by volume, regardless of the lower explosive limit.
 - c. "Liquid, flammable" means 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 make up 99 percent or more of the total volume of the mixture.
 - d. "Solid, flammable" means a solid, other than a blasting agent or explosive as defined in 29 CFR 1910.109(a), that is liable to cause fire through friction, absorption of moisture, spontaneous chemical change, or retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious hazard. A chemical shall be considered to be a flammable solid if, when tested by the method described in 16 CFR 1500.44, it ignites and burns with a self-sustained flame at a rate greater than one-tenth of an inch per second along its major axis.

Flashpoint. The minimum temperature at which a liquid gives off a vapor in sufficient concentration to ignite when tested as follows:

1. Tagliabue Closed Tester (See American National Standard Method of Test for Flash Point by Tag Closed Tester, Z11.24 - 1979 (ASTM D 56-79) - for liquids with a viscosity of less than 45 Saybolt Universal Seconds (SUS) at 100° F (37.8° C), or that do not contain suspended solids, and do not have a tendency to form a surface film under test; or
2. Pensky-Martens Closed Tester (see American National Standard Method of Test for Flash Point by Pensky-Martens closed tester), Z11.7 - 1979 (ASTM D 93-79) for liquids with a viscosity equal to or greater than 45 SUS at 100° F (37.8°C), or that contain suspended solids, or that have a tendency to form a surface film under test; or
3. Setaflash Closed Tester (see American National Standard Method of Test for Flash Point by Setaflash Closed Tester (ASTM D 3278-78)). Organic peroxides, which undergo autoaccelerating thermal decomposition, are excluded from any of the flashpoint determination methods specified above.

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. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic systems, and agents which damage the lungs, skin, eyes, or mucous membranes.

Laboratory. A facility where the "laboratory use of hazardous chemicals" occurs. It is a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis.

Laboratory scale. Work with substances in which the containers used for reactions, transfers, and other handling of substances are designed to be easily and safely manipulated by one person. "Laboratory scale" excludes those workplaces whose function is to produce commercial quantities of materials.

Laboratory-type 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.

Walk-in hoods with adjustable sashes meet the above definition provided that the sashes are adjusted during use so that the airflow and the exhaust of air contaminants are not compromised and employees do not work inside the enclosure during the release of airborne hazardous chemicals.

Laboratory use of hazardous chemicals. Handling or use of such chemicals in which all of the following conditions are met:

1. Chemical manipulations are carried out on a "laboratory scale";
2. Multiple chemical procedures or chemicals are used;
3. The procedures involved are not part of a production process, nor in any way simulate a production process; and
4. "Protective laboratory practices and equipment" are available and in common use industry-wide to minimize the potential for employee exposure to hazardous chemicals.

Medical consultation. A consultation which takes place between an employee and a licensed physician for the purpose of determining what medical examinations or procedures, if any, are appropriate in cases where a significant exposure to a hazardous chemical may have taken place.

Organic peroxide. An organic compound that contains the bivalent -o-o- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms has been replaced by an organic radical.

Oxidizer. A chemical other than a blasting agent or explosive as defined in Section 5237(a), that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.

Physical hazard. A chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.

Protective laboratory practices and equipment. Those laboratory procedures, practices and equipment accepted by laboratory health and safety experts as effective, or that the employer can show to be effective, in minimizing the potential for employee exposure to hazardous chemicals.

Reproductive toxins. Chemicals which affect the reproductive capabilities including chromosomal damage (mutations) and effects on fetuses (teratogenesis).

Select carcinogen. Any substance which meets one of the following criteria:

1. It is regulated by Cal/OSHA as a carcinogen; or
2. It is listed under the category, "known to be carcinogens," in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) (1985 edition); or
3. It is listed under Group 1 ("carcinogenic to humans") by the International Agency for Research on Cancer Monographs (IARC) (Volumes 1-48 and Supplements 1-8); or
4. It is listed in either Group 2A or 2B by IARC or under the category, "reasonably anticipated to be carcinogens" by NTP, and causes statistically significant tumor incidence in experimental animals in accordance with any of the following criteria:
 - a. After inhalation exposure of 6-7 hours per day, 5 days per week, for a significant portion of a lifetime to dosages of less than 10 mg/m³;
 - b. After repeated skin application of less than 300 mg/kg of body weight per week; or
 - c. After oral dosages of less than 50 mg/kg of body weight per day.

Unstable (reactive). A chemical which is the pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shocks, pressure or temperature.

Water-reactive. A chemical that reacts with water to release a gas that is either flammable or presents a health hazard.