BONNEVILLE
JOINT SCHOOL DISTRICT 93
"Achieving Each Individual's Highest Potential"

Chemical Hygiene Plan

(Revised March 23, 2007)

Site Specific Responsibility for
Chemical Hygiene and Laboratory Safety

School Name: Bonneville High School

Department: Science

Room(s) covered by this plan: 215

Science Department Chairpersons: Rick Alm

Faculty Member with Primary Responsibility:
Chemistry Instructor, Building CHO officer, Holly Martin

Designated Individuals with Specific/Supervisory Safety Responsibilities:
List person(s) designated by the Chemical Hygiene Plan responsible to manage specific chemical hygiene plan functions.

Designated Individual	Responsibility
Tony Worley, Head Custodian	**Equipment Operations**
Neal Allen, Environmental Program Manager	**Waste Removal** **Waste Procedures**
Holly Martin, Chemistry Instructor	**Chem Inventory** **Chem Handling** **Student Safety Training**
Guy Bliesner, Health & Safety Coord.	**Compliance** **Annual Review**

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Implementation Date: _____

Annual Review Date: _____

Signature: _____

Site Specific Responsibility for
Chemical Hygiene and Laboratory Safety

School Name: Hilcrest High School

Department: Science

Room(s) covered by this plan: 216

Science Department Chairperson: Randy Waite

Faculty Member with Primary Responsibility:
Chemistry Instructor, Building CHO officer, Randy Waite

Designated Individuals with Specific/Supervisory Safety Responsibilities:
List person(s) designated by the Chemical Hygiene Plan responsible to manage specific chemical hygiene plan functions.

Designated Individual	**Responsibility**
Ron Hay , Head Custodian	**Equipment Operations**
Neal Allen, Environmental Program Manager	**Waste Removal** **Waste Procedures**
Randy Waite, Chemistry Instructor	**Chem Inventory** **Chem Handling** **Student Safety Training**
Guy Bliesner, Health & Safety Coord.	**Compliance** **Annual Review**

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Implementation Date: _____

Annual Review Date: _____

Signature: _____

Site Specific Responsibility for
Chemical Hygiene and Laboratory Safety

School Name: Sandcreek Middle School

Department: Science

Room(s) covered by this plan: B-9

Science Department Chairpersons: N/A

Faculty Member with Primary Responsibility:
Chemistry Instructor, Building CHO officer, Jana Wixom

Designated Individuals with Specific/Supervisory Safety Responsibilities:
List person(s) designated by the principal investigator responsible to manage specific chemical hygiene plan functions.

Designated Individual	**Responsibility**
Robin Merritt, Head Custodian	**Equipment Operations**
Neal Allen, Environmental Program Manager	**Waste Removal** **Waste Procedures**
Jana Wixom, Chemistry Instructor	**Chem Inventory** **Chem Handling** **Student Safety Training**
Guy Bliesner, Health & Safety Coord.	**Compliance** **Annual Review**

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Implementation Date: _____

Annual Review Date: _____

Signature: _____

Site Specific Responsibility for
Chemical Hygiene and Laboratory Safety

School Name: Rocky Mountain Middle School

Department: Science

Room(s) covered by this plan: 202, 207

Science Department Chairpersons: N/A

Faculty Member with Primary Responsibility:
Chemistry Instructor, Building CHO officer, Ken Munger

Designated Individuals with Specific/Supervisory Safety Responsibilities:
List person(s) designated by the Chemical Hygiene Plan responsible to manage specific chemical hygiene plan functions.

Designated Individual	**Responsibility**
Joe Landon, Head Custodian	**Equipment Operations**
Neal Allen, Environmental Program Manager	**Waste Removal** **Waste Procedures**
Ken Munger & Annette Smith, Chemistry Instructors	**Chem Inventory** **Chem Handling** **Student Safety Training**
Guy Bliesner, Health & Safety Coord.	**Compliance** **Annual Review**

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Implementation Date: _____

Annual Review Date: _____

Signature:_____

Emergency Telephone Numbers

FIRE 911

MEDICAL EMERGENCY . . …….. 911

POISON CENTER. 1-800-222-1222

IDAHO STATE COMMUNACATIONS OFFICE……..…….1-800-632-8000
(for areas without a 911 system)

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A. Introduction

1. Goal of the Chemical Hygiene Plan

   It is the policy of this school district to provide a place of employment that is free from recognized hazards likely to cause physical harm, and that complies with all federal, state, and local laws and regulations affecting the safety and health of its employees. This Chemical Hygiene Plan addresses this goal for the laboratory workplace by including the requirements of the Occupational Safety and Health Administration (OSHA) Standard on Occupational Exposure of Hazardous Chemicals in Laboratories as adopted by the Idaho Division of Building Safety.

2. Who is covered by the Laboratory Standard

   The laboratory standard covers "laboratory use of hazardous chemicals", where chemical manipulations occur which are not part of a production process.
   "Laboratory scale" means 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. This definition excludes those workplaces whose function is to produce commercial quantities of materials.

   Employees who are to be addressed in the Chemical Hygiene Plan are individuals employed in the laboratory workplace that may be exposed to hazardous chemicals in the course of his or her assignments. This includes employees who actually work in the laboratory (instructors and aides) or employees who because of their work assignments may be required to enter a laboratory where potential exposures may occur, such as maintenance or custodial personnel.

   List of employees covered by this plan:

   Science Department Personnel– Bonneville and Hilcrest High Schools, Rocky Mountain and Sandcreek Middle Schools

   The occasional visitor to the laboratory, such as a guest or sales person, is not included in the definition of employee and therefore does not need to be addressed in the Chemical Hygiene Plan. Students pose a unique consideration. Because students are not employees, they are not formally covered by provisions of the CHP. However, there are recommendations in this document that suggest appropriate student rights and responsibilities related to issues of chemical safety.

3. Summary of the Requirements

   a. The Laboratory Standard requires that covered laboratories prepare, implement, and make available to employees, a Chemical Hygiene Plan which is capable of:

      (1) Protecting employees from health hazards associated with hazardous chemicals in the laboratory.

      (2) Keeping laboratory employees' exposures to IDBS-regulated substances below the permissible exposure limits.

   b. The Chemical Hygiene Plan should include:

      (1) Procedures for determining employee exposure that includes: initial monitoring, periodic monitoring, and employee notification of the monitoring results.

      (2) Employee and student information and training to ensure that they are apprised of the hazards of chemicals present in their work area(s).

      (3) Procedures for employees who work with hazardous chemicals to receive medical attention under specified circumstances.

      (4) A system for hazard identification of incoming containers of chemicals and for chemical substances developed in the lab.

      (5) Requirements for the use of proper respiratory equipment where necessary to maintain exposure below permissible exposure limits.

      (6) Record keeping procedures for employee exposure monitoring measurements and medical records.

B. Chemical Hygiene Personnel

1. Goal

   Successful development and implementation of a Chemical Hygiene Plan must be by the full commitment of the senior administrators, the school district Safety Program Manager and laboratory Chemical Hygiene Officer. Implementation of this plan shall be by the responsibility of the Safety Program Manager and the Chemical Hygiene Officer(s). The Chemical Hygiene Officers’ goal is to ensure that responsibility for chemical hygiene and safety in the laboratories is shared by all who work in those laboratories including students.

2. Key Personnel and Their Responsibilities

a. Superintendent

The superintendent is ultimately responsible for chemical hygiene within the school district. The Superintendent should, with other administrators, provide continuing support for district-wide chemical hygiene programs.

b. Principal

The principal is responsible for chemical hygiene programs in the local school. The principal will appoint a Chemical Hygiene Officer for the local school and will monitor, support, and require school employees' compliance with the CHP.

c. Health and Safety Coordinator

The school district Safety Program Manager will insure compliance with the CHP, and monitor local school's implementation of the school district CHP.

d. School Chemical Hygiene Officer

Their responsibilities include:

(1) Records: Maintain adequate records detailing chemical inventory, student laboratory safety training and laboratory safety inspection.

(2) Training: Ensure that employees and students are provided with the required and appropriate training to carry out their responsibilities.

(3) Monitor local school compliance with the school district CHP.

e. Laboratory Instructor

Each laboratory instructor is responsible for planning and conducting each laboratory operation in accordance with the appropriate laboratory procedures and rules outlined in the Chemical Hygiene Plan. . Appropriate student training and documentation of training shall be the responsibility of the laboratory instructor. It is also the instructor's responsibility to develop good personal chemical hygiene habits.

f. Students

Good personal chemical hygiene habits must also be taught to all students who use the lab while enrolled in science courses. Students shall not be allowed to use school district laboratories until such training has taken place. . Students shall not be allowed to use school district laboratories unless they are directly supervised by a school district laboratory instructor. Students shall not be allowed to use school district laboratories outside of regular science course classes unless they first obtain permission from the school CHO and are directly supervised during their work.

C. Standard Operating Procedures for Laboratories

1. Goal

To protect employees and students working in the laboratory, others who may be exposed, and to protect the environment from injury or contamination due to hazardous chemicals.

2. Employee Exposure Protection

Laboratory operations will be conducted in a manner that prevents employee exposure to OSHA/IDBS-regulated substances in excess of the permissible exposure limits (PELs). (OSHA, 29 CFR Part 1910 Subpart Z.)

a. Respiratory Equipment

Proper respiratory equipment will be provided to employees and students where the use of respirators is necessary to maintain exposure below permissible exposure limits.

b. Personal Protective Equipment

Personal protective equipment and instructions on the proper use of this equipment will be provided to employees and students, as appropriate, to minimize exposure to hazardous chemicals.

3. Laboratory Facilities (Design Criteria)

The work conducted in a lab and its scale must be appropriate to the physical facilities available and to the quality of the ventilation system.

a. Laboratory Design

A laboratory facility should include, where appropriate:

(1) An adequate general ventilation system with air intakes and exhausts located so as to avoid intake of contaminated air.

(2) Well-ventilated stockrooms and storerooms.

(3) Proper chemical storage for specific hazardous materials; e.g., flammables, corrosives, poisons.

(4) Adequate laboratory hoods and sinks.

(5) Emergency equipment including fire extinguishers, spill kits, and alarms.

(6) First aid equipment including first aid kits, eyewash fountains and drench showers.

b. Laboratory Ventilation

(1) The general laboratory ventilation system should provide a source of air for breathing and for input to local ventilation devices, ensure that laboratory air is continually circulated and direct air flow into the laboratory from non-laboratory areas and out to the exterior of the building.

(2) General laboratory ventilation should not be relied on for protection from exposure to hazardous chemicals released into the laboratory. A rate of 4-12 room air changes per hour is normally adequate general ventilation if local exhaust systems such as hoods are used as the primary method of control. General air flow should not be turbulent and should be relatively uniform throughout the laboratory. The most recent ASHRAE standard should be consulted for new facilities and for any facility experiencing indoor air quality problems. ASHRAE recommends 15-20 CFM per person in school classrooms and higher rates for hazardous areas. General ventilation rates must be tied to the size of the room, the occupant load, and the exposure potential. How is the facility being used? Are chemical experiments being performed in, or outside of, the hood? Are select carcinogens or acute toxics allowed in the lab? All of these items will greatly affect the general ventilation rate in the laboratory/classroom in a middle or high school.

(3) A laboratory hood with a minimum of 2.5 linear feet of hood space per person should be provided for every two students if they spend most of their time working with chemicals. Airflow into and within the hood should not be excessively turbulent and hood face velocity should be adequate (typically 60-125 lfpm).

(4) Cabinets that store hazardous chemicals should be fitted with auxiliary ventilation systems. Stockrooms should be well ventilated.

(5) The quality and quantity of ventilation should be evaluated when installed, regularly monitored (at least once a month), and reevaluated whenever a change in ventilation devices is made.

4. Employee Exposure Determination and Monitoring

If there is reason to believe that exposure levels for an OSHA/IDBS-regulated substance routinely exceed the action level (or in the absence of an action level, the PEL), the Safety Program Manager or Chemical Hygiene Officer will ensure that employee or student exposure to that substance is measured. (Refer to Section 8.)

5. Medical Consultations and Medical Exams

Employees who work with hazardous chemicals will be provided with an opportunity to receive medical attention when overexposure to a hazardous chemical is suspected. (Refer to Section 8.)

6. Chemical Procurement

The activities and personnel involved in purchasing or otherwise acquiring chemicals for the laboratory must be performed in accordance with the Chemical Hygiene Plan.

a. Plan Purchase Approval

This school district does not currently have a specific approval procedure for chemical purchases. However, it is this school district's policy that all chemical purchases are of minimum amount needed for immediate needs and address a valid curriculum based need. Stock piling of chemicals for future use for any reason is discouraged. A copy of each purchase order will be sent to the Environmental Program Manager.

b. Receiving Shipments

Before a substance is received, information on proper handling, storage and disposal should be available and known to employees involved in shipping, receiving and distribution of laboratory chemicals. Preferably, all substances should be received in a central location within the department and inspected by the department Chemical Hygiene Officer. No container should be accepted without an adequate identifying label and Material Safety Data Sheet.

c. No select carcinogens, reproductive toxins or highly acute toxins are allowed in middle school or high school laboratories in this school district without written approval of the Environmental Program Manager.

7. Hazard Identification

Laboratory chemicals and facilities should be properly labeled to identify any hazards associated with them for employee information and protection.

a. Container Labels

Labels on incoming containers of hazardous chemicals must not be removed or defaced. Unlabeled bottles of chemicals should not be opened; such materials should be disposed of promptly as outlined in the Waste Disposal Procedures below.

When dispensing chemicals from one container to another, make sure that the new container is properly labeled with the chemical name and hazards. All secondary containers should be labeled in this manner unless they are intended for the immediate use of the person who dispensed the chemicals.

b. Material Safety Data Sheets

Material Safety Data Sheets received with incoming shipments of hazardous chemicals must be maintained and made readily available to laboratory employees and students upon request. No chemical shall be in storage in any laboratory without a Material Safety Data Sheet readily available.

c. Laboratory Signs

Laboratory areas that have special or unusual hazards should be posted with warning signs. Signs should be posted to show the location of safety showers, eyewash stations, exits, first aid kits, fire extinguishers, etc. Extinguishers should be labeled to show the type of fire for which they are intended. Waste containers should be labeled to show the type of waste that can be safely deposited. Consumption of food and beverages is not permitted in areas where laboratory operations are being carried out. Areas where food is permitted should be marked and a warning sign (e.g., EATING AREA - NO CHEMICALS) should be posted.

8. Material Handling

The storage, distribution, and methods of handling hazardous chemicals will be conducted in a manner which minimizes the potential for accidents and employee or student exposure.

a. Stockrooms/Storerooms

Hazardous chemicals should be segregated in a well-identified area with local exhaust ventilation. Stockrooms/storerooms should remain locked. Stockrooms/storerooms should be under the control of one person who is responsible for its safety and inventory control. Stored chemicals should be examined at least once each semester and prior to the beginning of classes, for replacement, deterioration, and container integrity.

b. Distribution

When chemicals are hand carried, they should be placed in an outside container or acid-carrying bucket to protect against breakage and spillage. To avoid exposure to persons on passenger elevators, chemicals should be transported on freight-only elevators, if possible.
Compressed gas cylinders should never be rolled or dragged. Cylinders should be transported with a suitable handcart and the cylinder strapped in place.

c. Laboratory Storage

Quantities of chemicals stored in the laboratory should be kept to a minimum. Chemicals should be stored away from heat sources and direct sunlight. All Chemicals in the Bonneville joint school District #93 will be stored according to the Flynn Scientific chemical storage protocol. Incompatible materials should be segregated for storage. Periodic inventories shall be conducted at least twice a year, at the end of each semester, with unnecessary items being sent for disposal following the Waste Disposal Procedures outlined below.

d. Use of a Hood

A hood should be used for operations that might result in release of toxic chemical vapors or dust. In general, the hood should be used when working with any appreciably volatile substance with a Threshold Limit Value (TLV) of less than 50 ppm.

Chemicals stored in the hood should not be allowed to block vents or air flow and should be kept to a minimum. The hood ventilation system should be kept "on" if chemicals are stored in the hood.

Chemical storage in the hood is only allowed on a temporary basis, although some hoods have a built-in storage compartment. These compartments can only be used if they provide ventilation to the outside. This applies to all chemical storage cabinets.

e. Working Alone

No experiments should be conducted by an instructor or student working alone in a laboratory. There are no exceptions to this policy.

f. Dispensing Chemicals

When chemicals are being transferred from one container to another, employees should be sure that the new container is compatible with the chemical and is labeled with the identity of the chemical. The label must have the date and name of the employee filling the container. Also, the use of hazard warning labels are required, e.g., poison, corrosive, flammable, etc.

9. Laboratory Operations/Activities Requiring Approval

Instructors should be informed of those laboratory procedures and operations which require prior approval from the Chemical Hygiene Officer to ensure that these activities are carefully monitored for adherence to the Chemical Hygiene Plan and regulatory requirements.

a. Laboratory Operations Requiring Prior Approval

(1) Non-routine procedures for which the employee or student has not been trained.

(2) Analytical work with an unknown substance.

(3) Disposal of chemical wastes.

(4) Operations or activities for which there are no written procedures.

(5) Purchase of chemicals.

10. Emergency Prevention and Response

Laboratory instructors and other employees should be familiar with emergency procedures in order to prevent and reduce the impact of laboratory accidents.

a. Emergency Procedures

The emergency procedures should address a failure in the ventilation systems and evacuation of the laboratory.

b. First Aid

Schools must have personnel trained in first aid available during working hours to render assistance until medical help can be obtained. All laboratory science personnel in this district are encouraged to possess a valid first aid card.

c. Emergency Equipment

The Safety Program Manager and/or Chemical Hygiene Officer will ensure that adequate emergency equipment is available in the laboratory and inspected periodically to ensure that it is functioning properly. (Refer to the laboratory safety checklist in this manual.)

d. Accident Reports

All accidents and near accidents should be carefully investigated. The results of this investigation and recommendations for the prevention of similar occurrences should be forwarded to the Safety Program Manager and Safety Committee. Accident reports will be kept on file with the Safety Program Manager and made available upon request. Employee accident forms will be forwarded to the ESD Safety Coordinator.

11. Waste Disposal

The Safety Program Manager, Environmental Manager and Chemical Hygiene Officer will ensure that laboratory chemicals are disposed of in compliance with appropriate regulations and in a manner which minimizes damage to human health and the environment.

a. Waste Handling

Chemical wastes should be removed from the laboratory to a central waste storage area, by authorized personnel, at least once a semester or upon request, and from the central storage area at regular intervals. Unlabeled containers of chemicals and solutions should undergo prompt disposal; if partially used, they should not be opened.

b. Waste Disposal/Recycling

Laboratory wastes should be recycled whenever possible. Before disposing of any laboratory waste materials, consult the Environmental Program Manager for the proper disposal method or procedure. Hoods should not be used as a waste disposal method for volatile chemicals.

c. Waste Removal Request

Chemical wastes should be removed from the laboratory to a central waste storage area, by authorized personnel upon request. A waste removal request will be sent to the Environmental Program Manager by the building CHO. This request must state the common name, chemical formula, amount and type of container of the substance to be removed. (see attached form)

12. Information and Training

The Safety Program Manager and Chemical Hygiene Officer will provide laboratory and other appropriate employees (e.g., receiving and shipping personnel, custodial, maintenance, stockroom personnel, emergency teams) with information and training on the hazards of chemicals present in their work area and what to do if an accident occurs.

a. Training Program

Training will consist of at least the following subjects:

(1) Methods that may be used, and observations to detect, the release or presence of a hazardous chemical (such as continuous monitoring devices and the visual appearance or odor of hazardous chemicals when being released).

(2) The physical and health hazards of chemicals in the work area.

(3) The measures that instructors can take to protect themselves and their students from these hazards, including specific procedures that this school district has implemented to protect instructors and students from exposure to hazardous chemicals (e.g., general laboratory safety rules, emergency procedures and protective equipment to be used).

b. Information for Employees

Employees will be provided with the following information:

(1) The OSHA Standard for Occupational Exposure to Hazardous Chemicals in Laboratories

(3) The permissible exposure limits (PEL's) for IDBS-regulated substances or recommended exposure limits for other hazardous chemicals where there is no applicable standard.

(4) The signs and symptoms associated with exposure to hazardous chemicals used in the laboratory.

(5) The location and availability of reference material on the hazards, safe handling, storage and disposal of hazardous chemicals found in the laboratory including Material Safety Data Sheets.

c. When to Provide Training and Information

Information and training will be provided at the time of the employee's initial assignment to the work area where hazardous chemicals are present and prior to assignments involving new exposure situations. Refresher information and training will be provided at least annually.

Students will receive and Instructors will document general laboratory safety training at the beginning of each semester and whenever practice demonstrates a need. Specific safety procedures will be taught or reviewed whenever the need dictates.

13. Inspections and Reviewing Chemical Hygiene Plan

General safety inspections of the laboratory and annual review of the Chemical Hygiene Plan will contribute to overall laboratory and employee safety. The Safety Program Manager will ensure that these procedures are followed in each department and by each Chemical Hygiene Officer. Documentation of compliance will be available in school.

a. Inspecting Laboratory Safety Equipment

Laboratory safety equipment will be inspected at least once a semester to ensure fitness for use and modified if inadequate, including:

(1) Fume hoods & other protective equipment (environmental controls)

(2) Personal protective equipment (e.g., gloves, respirators).

(3) Emergency equipment (e.g., fire extinguishers, spill kits).

(4) First aid equipment (e.g., showers, eyewash stations). (See science lab safety checklist for complete list.)

b. Review of the Chemical Hygiene Plan

The Chemical Hygiene Plan for the laboratory will be reviewed by the Safety Program Manager, Chemical Hygiene Officer, Hazardous Waste Coordinator, and others designated by the Safety Program Manager, at least annually for:

(1) Compliance with current regulations and for adequacy in protecting employees from the health and physical hazards associated with chemicals in use in the laboratory. The results of this review should be recorded, including notes on needed changes, when those changes were made, etc.
(2) The plan will be updated as necessary (e.g., when there are changes in laboratory operations, laboratory personnel, regulations, etc.) and in a timely manner.

D. General Laboratory Safety Rules

1. Goal

To protect the health and safety of laboratory instructors and students who work with hazardous chemicals through training and careful attention to safe operation practices.

2. Specific General Rules

The following pages contain the General Laboratory Safety Rules for all school district laboratories. Other specific laboratory safety rules for individual laboratories can be added to these rules by the Chemical Hygiene Officer of that laboratory.

a. Know the safety rules and procedures that apply to the work at hand. Before beginning any new operation, determine the potential hazards and appropriate safety precautions to take.

b. Know the location of, and how to use, emergency equipment in the area, as well as how to obtain additional help in an emergency. Be familiar with emergency procedures.

c. Know the types of protective equipment that are available and use the proper equipment for each job.

d. Watch out for unsafe conditions and report them so that corrections can be made as soon as possible. One person's accident can be a danger to everyone in the lab area.

e. Consuming food or beverages in laboratories or areas where chemicals are being used or stored is not permitted.

f. Practical jokes or other behavior that might distract, startle or confuse another worker can be dangerous and must be avoided.

g. Make sure that you use equipment for its designed purpose only.

h. If you leave an operation unattended for any period of time, leave the laboratory lights on, post a sign, and take the necessary precautions for the event of a failure of a utility service (such as electricity or cooling water). Any time chemicals are out of locked cabinets or storerooms, an unattended lab must be locked.

i. Notify the laboratory Chemical Hygiene Officer immediately if you have been exposed to a hazardous chemical.

3. Chemical Handling

a. Do not smell or taste chemicals.

b. Always add acid to water. Never add water to acid.

c. Know the hazards posed by the different classes of chemicals, including oxidizers, flammables, corrosives, compressed gasses, acutely hazardous and chronically hazardous chemicals.

d. Read and understand the Material Safety Data Sheet (MSDS) before using any new chemical.

e. Be aware of the proper waste disposal methods for the chemicals you are handling. Improper disposal may lead to injury to human health, the environment and/or facility equipment.

f. Be sure that equipment is carefully secured before its use. Combine reagents in the proper order, and avoid adding solids to hot liquids.

g. Never work alone in the laboratory. Make arrangements to have someone monitor your activities.

h. When transporting, storing, using, or disposing of any substance, be sure that the substance cannot accidentally come into contact with an incompatible substance. This contact could result in explosions or the production of highly toxic or flammable substances. Refer to incompatibility charts.

i. When chemicals are being transferred from one container to another, be sure that the new container is compatible with the chemical and is labeled with the identity of the chemical. Labels shall be dated and have the name of the person making the transfer.

4. Health and Hygiene

a. Wear appropriate eye protection at all times in areas where chemicals are used or stored. Do not use contact lenses in the laboratory. The plastic lens can absorb chemical vapors which can then cause serious eye damage.

b. Use protective apparel, including face shields, gloves, and other special clothing, as needed. Inspect gloves before each use, wash them before removal, and replace them periodically. Avoid contact between gloves and exposed skin, clothing, and eyes or mucous membranes during use.

c. Long hair and loose clothing should be confined to avoid accidents; lab smocks or aprons are highly recommended. No shorts or short skirts should be worn in the labs or storage areas. Sandals, cloth sneakers, opened toes, and perforated shoes shall not be worn. Feet should be covered in the event of a spill.

d. Mouth suction to pipet chemicals or to start a siphon shall NOT be permitted for any laboratory procedure; a pipetter, pipet bulb, or aspirator shall be used to provide vacuum.

e. Avoid exposure to gases, vapors, and aerosols. Use appropriate safety equipment when this type of exposure is likely.

f. Wash well with soap and water before leaving the laboratory. Chemicals on hands can be transferred to food and ingested.

5. Food Handling

a. No food or beverages shall be stored, handled or consumed in the laboratory or other areas where chemicals are used or stored.

b. Do not bring chemicals or chemical equipment into areas that are designated for food consumption or smoking.

c. Glassware or utensils that have been used for laboratory operations shall never be used to prepare or consume food. Laboratory refrigerators, ice chests, microwave ovens, cold rooms, etc., must not be used for food storage or preparation. Laboratory refrigerators shall have spark-proof motors to avoid setting off explosions of leaking vapors.

6. Housekeeping

a. Work areas shall be kept clean and free from obstructions. Cleanup should follow the completion of each operation and at the end of each day.

b. Wastes shall be deposited in the appropriate receptacles. Equipment and chemicals should be stored properly. Clutter should be minimized.

c. Laboratory accidents and spills shall be attended to immediately. Follow the appropriate emergency procedures.

d. Chemical and waste containers shall be kept labeled at all times. The laboratory supervisor should be informed immediately of the presence of any unlabeled containers. Do not open unlabeled containers.

e. Access to exits, emergency equipment controls, etc., shall not be blocked.

f. Notify the laboratory supervisor immediately if equipment malfunctions. Discontinue use of the equipment if a safety hazard exists.

g. Chemical storage under the hoods should be kept to a minimum. Leave the hood ventilation system turned on if chemicals are stored in or under the hood. Only temporary hood storage is allowed.

7. Glassware

a. Accidents involving glassware are the leading cause of laboratory injuries. Careful storage and handling procedures should be used to avoid glassware breakage.

b. Adequate hand protection should be used when inserting glass tubing into rubber stoppers or corks or when placing rubber tubing on glass hose connections. Tubing should be fire polished or rounded and lubricated, and hands should be held close together to limit movement of glass should a fracture occur.

c. Vacuum-jacketed glass apparatus should be handled with extreme care to prevent implosions. Only glassware designed for vacuum work should be used for that purpose.

d. Hand protection should be worn when picking up broken glass. Small pieces should be swept up with a brush and dustpan.

8. Flammability Hazards

a. Do not use an open flame to heat a flammable liquid or to carry out a distillation under pressure. Use an open flame only when it is necessary and extinguish it as soon as it is no longer needed.

b. Before lighting a flame, remove all flammable substances from the immediate area and notify others in the area. Check all containers of flammable substances in the area to ensure that they are tightly closed.

c. Store flammable materials in a flammable cabinet or other appropriate location.

d. Make sure that all flammable cabinets and containers are properly grounded to prevent accidental ignition of flammable vapors and liquids from static electricity or other sources of ignition.

9. Hazardous Waste Handling

    a. Hazardous wastes should be properly labeled and stored in a separate hazardous waste area.

    b. See your laboratory Chemical Hygiene Officer for the proper hazardous waste disposal procedures.

    Note: Any questions or concerns about laboratory safety rules should be addressed to your laboratory Chemical Hygiene Officer and/or the school district's Safety Program Manager

E. Specific Exposure Control Measures

1. Goal

    To address the criteria that would invoke the use of specific exposure control measures, above and beyond the Standard Operating Procedures and General Laboratory Safety Rules, which will reduce instructor or student exposure to hazardous chemicals.

2. Criteria

    Criteria for determining when and what types of specific exposure control measures should be implemented may be based on: (1) the degree of toxicity of a substance to be used; (2) the exposure potential of the procedures to be performed; or, (3) the capacity of the engineering controls, administrative practices or personal protective equipment to control personal exposures effectively.

3. Degree of Toxicity of Substances

    No select carcinogens, reproductive toxins or highly acute toxins are allowed in middle or high school laboratories in this school district without written authorization from the Safety Program Manager.

    Select carcinogens which are substances meeting one of the following criteria:

    a. IDBS or OSHA regulates it as a carcinogen.

    b. It is listed under the category "known to be carcinogens" in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) (latest edition).

    c. It is listed under Group 1 ("carcinogenic to humans") by the International Agency for Research on Cancer Monographs (IARC) (latest edition).

d. 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:

(1) 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/m.

(2) After repeated skin application of less than 300 mg/kg of body weight per week.

(3) After oral dosages of less than 50 mg/kg of body weight per day.

Reproductive Toxins, which are chemicals affecting the reproductive capabilities including chromosomal damage (mutations) and effects on fetuses (teratogenesis). In addition, certain reproductive toxins may cause infertility in females or males.
High Acute Toxicity Substances which may be fatal or cause damage to target organs as a result of a single exposure. Examples include hydrogen cyanide, hydrogen sulfide, and nitrogen dioxide.

4. Exposure Potential

The routes of exposure to chemicals may occur by inhalation, ingestion, contact with skin or eyes, or injection.

a. Inhalation of chemical vapors, mists, gases or dusts can produce poisoning through the mucous membrane of the nose, mouth, throat, and lungs and can seriously damage these tissues. The degree of injury resulting from exposure to toxic vapors, mists, gases or dusts depends on the toxicity of the material and its solubility in tissue fluids, its concentration and the duration of exposure.

b. Ingestion of many chemicals can be extremely dangerous. The relative acute toxicity of a chemical can be evaluated by determining its LD 50, which is defined as the quantity of chemical that will cause the death of 50% of the test animals when ingested in a single dose. In addition, many chemicals will directly damage the tissue of the mouth, throat, nose, lungs, and gastrointestinal tract.

c. Contact with skin and eyes can lead to significant chemical injury. A common result of skin contact is local irritation, but many chemicals can be absorbed through the skin and cause systemic poisoning. Most chemicals are damaging to the eyes, which are very sensitive organs. Alkaline materials, phenols, and strong acids can cause permanent loss of vision.

d. Injection of chemicals is not a very common route of exposure but may occur through mechanical injection from glass or other materials contaminated with chemicals, or when chemicals are handled in syringes.

Other factors to consider in evaluating the degree of exposure potential from the use of a particular chemical or activity involving the chemical include the:

e. Chemical's volatility, flammability, and reactivity.

f. Potential for unplanned chemical reactions.

g. High heat of reaction.

h. Amount of time that a worker will be exposed.

i. Sensitivity of the lab worker (e.g., asthma, allergies, pregnancy).

j. Potential for generating aerosols.

k. Potential for an uncontrollable release.

5. Capacity of Engineering Controls, Administrative Practices, and Personal Protective Equipment

Evaluating the need for specific exposure control measures when an employee is handling certain chemicals or using certain procedures should include a review of existing engineering controls, administrative practices and personal protective equipment (PPE).

The capacity of general ventilation and local exhaust systems should be evaluated against the required level of employee exposure protection. For example, work with any toxin should be conducted under a hood with a face velocity of at least 60 lfpm (or other containment device) if the procedure could result in the generation of aerosols or vapors. Administrative practices, such as record keeping, training and medical surveillance, may need to be revised for particular laboratory activities to ensure employees are adequately protected from overexposure to hazardous chemicals. It may be appropriate to maintain inventory and usage records for certain chemicals and provide routine medical surveillance for instructors who will be handling these substances in any significant quantities.

The compatibility of available PPE and substances and/or procedures to be used is another area to consider in deciding whether to implement certain exposure control measures. Laboratory employees should be trained on the proper use and type of PPE to use and should seek guidance from their laboratory Chemical Hygiene Officer if they are uncertain about its adequacy for a specific operation.

6. Employee Exposure Control Measures

   The IDBS Laboratory Standard requires that each laboratory evaluate the need for specific exposure control measures when employees are working with select carcinogens, reproductive toxins, or substances with a high degree of acute toxicity. These measures include the establishment of designated areas, use of containment devices, decontamination procedures and safe removal of contaminated waste. No select carcinogens, reproductive toxins or highly acute toxins are allowed in middle or high school laboratories in this school district without written authorization from the Environmental Program Manager.

7. Designated Areas

   IDBS recommends that the use of select carcinogens, reproductive toxins, or substances of high acute toxicity be restricted to "designated areas," especially when other less toxic chemicals are being used in the same area. A designated area may be an entire laboratory, an area within a lab, or a device such as a lab hood. The goal is to limit exposures and alert all employees in the vicinity to the potential hazard. No select carcinogens, reproductive toxins or highly acute toxins are allowed in middle or high school laboratories in this school district without written authorization from the Safety Program Manager.

8. Containment Device

   Circumstances involving select carcinogens, reproductive toxins, or substances of high acute toxicity that may warrant the use of containment devices (such as a fume hood) include:

   a. The use of volatile substances.

   b. Manipulations that may generate an aerosol.

   c. Any handling or reaction that may result in an uncontrollable release.

   d. Critical hoods should have a monitoring device to allow convenient confirmation of adequate hood performance prior to use. No select carcinogens, reproductive toxins or highly acute toxins are allowed in middle or high school laboratories in this school district without written authorization from the Safety Program Manager.

9. Decontamination Procedures

   It may be appropriate to establish decontamination procedures to adequately address the decontamination required for certain designated areas in the laboratory. Vacuum pumps and other contaminated equipment including glassware should be decontaminated in the hood before removing them from the designated area. The controlled area should be decontaminated periodically and always before normal work is resumed there.

10. Safe Removal of Contaminated Waste

Safe disposal of contaminated wastes should be part of the planning process for any laboratory experiment or procedure. If practical, very hazardous substances should be converted to less hazardous substances in the laboratory rather than being directly placed in containers for disposal. Personnel removing contaminated waste should be aware of the hazards and should know what to do in the event of a spill during transport. To ensure the safe removal of wastes from the laboratory, the Hazardous Waste Coordinator--through the Chemical Hygiene Officer, Environmental Manager and the Safety Program Manager--should be contacted for the proper disposal methods.

Solid chemical wastes should be placed in suitable containers. It is important to ensure that all waste containers are properly labeled to identify the associated contents and hazards. Laboratory employees involved in disposing of the wastes should be aware of the hazards of the waste, the importance of segregating incompatible materials and the applicable regulatory requirements.

11. Procedures for Handling Reproductive Toxins

Examples: Lead Compounds, Organomercurials, Formaldehyde Ethidium Bromide

a. Women of childbearing age should only handle these substances in a hood and when satisfactory performance of the hood has been confirmed.

b. Avoid skin contact by using gloves and wearing long sleeves and other protective apparel as appropriate.

c. Always wash hands and arms immediately after working with these materials.

d. Keep records of the amounts of these materials on hand, amounts used, and the names of the workers involved.

e. Employees should be familiar with the emergency procedures for accidents or spills involving these substances. The Chemical Hygiene Officer should be notified of all incidents of exposures or spills.

f. Unbreakable containers of these substances should be stored in a well-ventilated area and should be labeled properly.

g. No select carcinogens, reproductive toxins or highly acute toxins are allowed in middle or high school laboratories in this school district without written authorization from the Safety Program Manager.

12. Procedures for Handling Chemicals with High Acute Toxicity

Examples: Hydrofluoric Acid, Hydrogen Cyanide

a. Use and store these substances in areas of restricted access with special warning signs.

b. Always use a hood or other containment device for procedures that may result in the generation of aerosols or vapors containing the substance. The released vapors should be trapped to prevent their discharge with the hood exhaust.

c. Avoid skin contact by using gloves and wearing long sleeves and other protective apparel as appropriate.

d. Always wash hands and arms immediately after working with these materials.

e. Keep records of the amounts of these materials on hand, amounts used, and the names of the workers involved.

f. Employees should be familiar with the emergency procedures for accidents or spills involving these substances. If a major spill occurs outside of the hood, emergency responders should wear appropriate personal protective equipment and all other workers should evacuate the area.

g. Be sure that at least two people are present at all times when a highly toxic compound, or compound of unknown toxicity, is being used.

h. Breakable containers of these substances should be stored in resistant trays, and work and storage surfaces should be covered with removable, absorbent plastic-backed paper.

i. Contaminated clothing should be chemically decontaminated, if possible, or destroyed. Contaminated waste should be stored in suitably labeled impervious containers. Liquids can be stored in glass or plastic bottles containing vermiculite.

j. No select carcinogens, reproductive toxins or highly acute toxins are allowed in middle or high school laboratories in this school district without written authorization from the Safety Program Manager.

13. Procedures for Handling Select Carcinogens

Examples: Benzene, Nickel, and Vinyl Chloride

a. All work with these substances should be conducted in a "designated area" such as a restricted access hood, glove box, or portion of a lab designated for use of chronically toxic substances. People with access to this area should be aware of the substances used and the necessary precautions to take. The designated area should be clearly marked with warning and restricted access signs.

b. The use and disposal of these substances should be approved by the Chemical Hygiene Officer prior to this activity.

c. Always use a hood or other containment device for procedures that may result in the generation of aerosols or vapors containing the substance. The released vapors should be trapped to prevent their discharge with the hood exhaust.

d. Vacuum pumps should be protected against contamination by scrubbers or other devices and vented into the hood. Vacuum pumps and other contaminated equipment should be decontaminated in the hood prior to removing them from the designated area. The designated area should also be decontaminated before resuming work there.

e. Avoid skin contact by using gloves and wearing long sleeves and other protective apparel as appropriate.

f. Remove any protective clothing before leaving a designated area and place it in an appropriate, labeled container.

g. Always wash hands, arms, face and neck immediately after working with these materials.

h. Keep records of the amounts of these materials on hand, amounts and dates used, and the names of the employees involved.

i. Employees should be familiar with the emergency procedures for accidents or spills involving these substances. If a major spill occurs outside of the hood, emergency responders should wear appropriate personal protective equipment and all other workers should evacuate the area.

j. Be sure that at least two people are present at all times when a highly toxic compound, or compound of unknown toxicity, is being used.

k. These substances should be stored in unbreakable containers in a ventilated area with limited access. Work and storage surfaces should be covered with removable, absorbent plastic-backed paper. All containers should be labeled with the identity and hazards of the substance.

l. Contaminated clothing should be chemically decontaminated, if possible, or destroyed. Contaminated waste should be stored in suitably labeled impervious containers. Liquids can be stored in glass or plastic bottles containing vermiculite. Containers of contaminated wastes should be transferred from the designated area in a secondary container.

m. Determine the appropriateness of medical surveillance for employees if they are working with toxicologically significant quantities of these substances on a regular basis.

n. Positive pressure glove boxes should be checked for leaks before each use. Negative pressure glove boxes should have a ventilation rate of at least 2 volumes per hour and a pressure of at least 0.5 inches of water. Exit gases should be trapped or filtered and then released through the hood.

o. No select carcinogens, reproductive toxins or highly acute toxins are allowed in middle or high school laboratories in this school district without written authorization from the Environmental Program Manager.

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F. Inspection And Plan Review

1. Goal

To develop a well organized laboratory inspection program which allows the Chemical Hygiene Officer to identify and correct the cause of chemical exposures before they occur and:

a. Generate and help maintain a high level of prevention consciousness.

b. Assist in the education of employees, supervisors and students in the merits and methods of detecting and eliminating accident causes.

c. Demonstrate the school district's sincere interest in the health, safety and welfare of all employees and students.

d. Foster a better understanding of the responsibilities that each must assume in the prevention of accidents.

e. Help determine where additional training or instruction may be required.

f. To develop a Chemical Hygiene Plan review process which evaluates the effectiveness of the overall plan and identifies the need for updates to ensure that employees and students are adequately protected against harmful exposure to hazardous chemicals.

2. Inspection Procedures

   General laboratory inspection procedures address the following items:
   (see LABORATORY/SCIENCE ROOM SAFETY CHECKLIST)

   a. General ventilation systems, local ventilation equipment (such as fume hoods) and other protective equipment.

   b. Personal protective equipment including gloves, face guards and respirators.

   c. Emergency equipment such as spill kits, eyewash stations and fire extinguishers.

   d. First aid equipment including fire blankets and first aid kits.

   e. Informal inspections of housekeeping and personal chemical hygiene should be conducted periodically.

3. General Laboratory Ventilation

   Each laboratory should be evaluated for the quality and quantity of general ventilation present. This evaluation should be repeated periodically and any time a change is made in the general ventilation system or in the local ventilation systems within the laboratory. Air flow patterns can be observed using commercially available smoke sources. If the general ventilation is satisfactory, the movement of air from the doorways (and other input ports) through the laboratory to the hoods (or other exhaust ports) should be relatively uniform. There should be no areas where the air remains static or where airflow velocities are high. Whenever serious ventilation problems are suspected, air flow rates can be measured using special instruments as a way of identifying differences between input and exhaust air.

   Laboratory work involving use of hazardous chemicals should be conducted in a manner that prevents contact with the skin and unsafe employee exposure through vapors or dust that enter the general laboratory environment. These activities are normally conducted in a hood. Laboratory workers should regard the general laboratory atmosphere as a source of air to breathe and as a source of input air for the local ventilation systems (e.g., hoods).

4. Laboratory Hoods

   OSHA/ IDBS require that fume hoods and other protective equipment must be functioning properly to ensure employee protection from chemical exposure. A comprehensive inspection of this equipment should be conducted at least at the beginning of every semester and should consider the following:

   a. Hoods should not be regarded as a means of disposing of chemicals, but rather as a backup safety device in case dusts or vapors escape from the apparatus being used.

b. Hoods should be tested before use to ensure adequate face velocities (typically 60 to 125 lfpm) and the absence of turbulent flow, perhaps with the use of a continuous monitoring device.

c. The hood should be kept closed except during manipulations of apparatus in the hoods.

d. The placement of equipment and other items in the hood, an open window in the lab, or a person walking by the hood can all affect a hood's performance.

e. Chemicals stored in hoods should be kept to a minimum, and they should not block air vents or disrupt air flow. If hazardous chemicals must be stored in a hood temporarily, the hood ventilation system should be kept in operation.

Hood performance should be tested against the design specifications for uniform air flow across the hood face as well as for total exhaust air volume. The uniformity of airflow to the hood can be determined by taking a series of air velocity measurements at the face of the hood (face velocities) in a grid pattern. If the values for specific points across the hood face vary by more than +/-25 lfpm, from the average value, corrections should be made to achieve uniform airflow. This may involve adjusting interior hood baffles or altering the path of input air flowing into the room.

The total volume of air being exhausted is the product of the average face velocity and the area of the hood opening. In general, face velocities in the range of 60 to 125 lfpm will provide laminar flow of air over the floor and sides of the hood. Higher face velocities (over 125 fpm) result in air turbulence at the hood face and within the hood. This could lead to vapors spilling out into the general laboratory atmosphere.

The optimum face velocity of a hood, known as the capture velocity, will vary depending upon its configuration. Capture velocity increases when the hood sash is lowered, thus reducing the hood face area. The capture velocity when the hood is in use should be greater than the currents of air at the hood face.

The presence of air turbulence at the face of the hood and within the hood should also be determined by observing the smoke pattern. If there is excessive turbulence or if the hood fails to capture smoke, changes may be required in the face velocity, location of air input ports, location of the hood or the volume of input air.

Another method of evaluating hood performance is to monitor worker exposure while the hood is being used for its intended purpose. The criterion for this type of evaluation would be the desired performance of the hood (i.e., does it contain vapors and gases at an unacceptable worker exposure level?).

A hood test should be conducted any time there is a change in any aspect of the lab's ventilation system (i.e., change in total volume of input air, addition of other hoods, etc.). An example Laboratory Hood Inspection form is provided in this section as a guide for documenting hood performance tests and hood area inspections.

Other local ventilation systems, including canopy hoods and snorkels located over various instruments, should also be inspected at least every six months to ensure that they are functioning properly. Ideally, all ventilation systems should have a monitoring device that allows the user to easily determine whether the total system and its necessary components are functioning to provide a safe work place.

5. Emergency, First Aid and Personal Protective Equipment

   Safety equipment should be inspected at least every month to ensure that it will function when needed and that there are adequate supplies. Deficiencies should be noted and promptly corrected.

   An example Laboratory Safety Inspection form is provided in this manual for use in documenting this type of inspection.

6. Review of the Chemical Hygiene Plan

   The effectiveness of the Chemical Hygiene Plan must be reviewed and evaluated at least annually prior to the beginning of the school year and updated if necessary. Factors to consider in the review include:

   a. Changes in laboratory procedures, operations or equipment that may affect the potential for personal exposure to hazardous chemicals.

   b. The addition or deletion of the use of specific hazardous chemicals which warrant a review of laboratory safety procedures.

   c. Changes in laboratory personnel and/or their responsibilities.

   d. The review and evaluation of inspection records, accident investigations, professional research on chemical hygiene techniques, etc.

   Chemical Hygiene Officers can use the Chemical Hygiene Plan (CHP) Review Checklist in this section to insure and document that the CHP conforms to the IDBS/IDBS requirements. Any necessary changes to the CHP should be recorded and noted on the form when completed.

G. Employee Information And Training

1. Goal

   To provide information and training about the hazards of chemicals present in the laboratory work area in a manner and at a frequency which will educate employees on how to protect themselves and others from potential harm in the laboratory.

2. Information Requirements

   Laboratory employees must be provided with specific information on the chemicals used in their work areas. IDBS's information requirements are summarized in this section under the heading "Information Program."

3. Employee Training Requirements

   Employees must be trained on the potential chemical hazards in their work areas and on appropriate sections of the Chemical Hygiene Plan.

4. Who Should Be Trained

   This training should be provided to all employees who actually work in the laboratory as well as to other employees whose assignments may require that they enter a laboratory where exposures might occur, such as maintenance and custodial personnel. Employees who are responsible for receiving and handling shipments of new chemicals or chemical wastes should also be informed of the potential hazards and appropriate protective measures for chemicals they may receive. Students should also receive training appropriate to their level of chemical handling and potential exposure.

5. Record Keeping

   Training of laboratory personnel should be documented and kept in the employee's file.

6. Information and Training Frequency

   The OSHA/IDBS Laboratory Standard requires that employees receive information and training at the time of their initial assignment to a work area where hazardous chemicals are present and prior to assignments involving new exposure situations. Refresher training and information must be provided at least annually.

7. Information Program

   Laboratory employees will be informed of at least the following information:

a. The location and availability of the Chemical Hygiene Plan.

b. The permissible exposure limits (PEL's) for OSHA/IDBS-regulated substances and/or recommended exposure limits for other hazardous chemicals.

c. Signs and symptoms of exposure to hazardous chemicals used in the laboratory.

d. The location and availability of known reference materials on the hazards, safe handling, storage and disposal of hazardous chemicals found in the lab including, but not limited to, Material Safety Data Sheets received from the chemical supplier.

8. Employee Training Program - IDBS

Laboratory employees will be trained on the applicable details of the Chemical Hygiene Plan (CHP) including a review of the:

General Rules for Laboratory Safety.

a. Appropriate sections of the Standard Operating Procedures such as:

(1) Laboratory Operations/Activities Requiring Approval; Material Handling (including dispensing and labeling of chemicals); Waste Disposal Methods.

(2) Chemical Hygiene Personnel

(a) Emergency procedures outlined in the school district's Emergency Response Plan, including spills, fires, explosions, evacuation and decontamination.

(b) Specific exposure control measures to be used in handling particularly hazardous chemicals.

IDBS requires that the training also address:

b. Methods and observations that can be used to detect the presence or release of a hazardous chemical (including any monitoring being conducted and the visual appearance or odor of a chemical when released).

c. The physical and health hazards of chemicals in the work area.

d. Measures employees can take to protect themselves from these hazards, including the location and proper use of protective apparel and equipment and the location of emergency equipment and exits.

The Department of Health and the Office of Superintendent of Public Instruction also require that comparable laboratory safety training and personal protective equipment be provided to students appropriate to their potential exposure to hazardous chemicals. This will vary based on their grade level, courses of study, the lab facility and the individual policies of the school district, school, instructor, local health district, workers' compensation insurance and property and casualty insurance carriers.

H. Exposure Monitoring And Medical Attention

1. Goal

   To provide laboratory instructors, other laboratory employees and students with an appropriate level of exposure monitoring and medical attention to protect them from adverse health effects resulting from potential exposure to hazardous chemicals.

2. Exposure Monitoring

   The Laboratory Standards for exposure monitoring are summarized on the following pages. The Safety Program Manager or Chemical Hygiene Officer will maintain any records of exposure monitoring, including the test method and results. Employee exposure monitoring records should be kept in the employee's file.

   If there is reason to believe that exposure levels for an OSHA/IDBS-regulated substance routinely exceed the action level (or in the absence of an action level, the PEL), employee exposure to that substance will be measured.

   a. Initial Exposure Determination

      Factors that might raise the possibility of overexposure and therefore warrant an initial measurement of employee exposure include:

      (1) The manner in which the chemical procedures or operations involving the particular substance are conducted (e.g., use of an open vessel instead of a closed system).

      (2) The existence of historical monitoring data that shows elevated exposures to the particular substance for similar operations.

      (3) The use of a procedure which involves significant quantities or is performed over an extended period of time.

      (4) Signs or symptoms of exposure (e.g., skin or eye irritation, shortness of breath, nausea, headache, etc.) which are experienced by the employee.

None of these conditions should be allowed to exist in middle or high school laboratories in this school district.

b. Exposure Monitoring

If the initial exposure determination described above discloses employee exposure over the action level for a particular substance (or in the absence of an action level, the PEL), the school district will immediately comply with the exposure monitoring requirements of the IDBS standard for that substance.

Monitoring airborne concentrations of individual hazardous chemicals should be conducted in the following circumstances:

(1) In testing or redesigning the hoods and other local ventilation devices in the laboratory.

(2) When a specific substance that is toxic or highly toxic is regularly and continuously used (e.g., three times a week).

(3) When requested by a laboratory employee because of a documented health concern or suspicion that a PEL may be exceeded.

c. Record Keeping

Exposure testing procedures and results should be sent to the Safety Program Manager who coordinates and maintains these records.

The employee will be notified of any monitoring results within 15 working days after receipt of the results either individually or by posting the results in an appropriate location that is accessible to employees such as the safety bulletin board.

An accurate record of any measurements taken to monitor employee exposures must be kept, transferred and made available for each employee in accordance with IDBS's Access to Employee Exposure and Medical Records requirements.

3. Medical Attention

The Safety Program Manager must maintain an accurate record for each laboratory employee undergoing medical consultations or medical examinations as required by the IDBS Laboratory Standard. (Medical examinations are to be provided at no cost to the employee.) Information that should be kept in an employee's file includes, where appropriate, the:

a. Exposure monitoring test methods and results.

b. Material Safety Data Sheet of the hazardous chemical(s) involved.

c. Accident Report.

d. Information submitted to, and received from, the physician.

4. Medical Consultations and Medical Exams

Employees who work with hazardous chemicals will be provided with an opportunity to receive medical attention when overexposure to a hazardous chemical is suspected.

a. Medical attention will be provided to an employee under the following circumstances:

(1) Whenever an employee develops signs or symptoms of exposure to a hazardous chemical to which they may have been exposed in the laboratory, the employee will be provided with the opportunity to receive an appropriate medical examination.

(2) When exposure monitoring reveals an exposure level routinely above the action level (or PEL) for a IDBS-regulated substance, medical surveillance will be conducted as required by the particular IDBS standard.

(3) Whenever an event takes place in the laboratory such as a spill, leak or explosion that results in the likelihood of a hazardous exposure, the affected employee will be provided with the opportunity for medical consultation to determine the need for a medical exam.

b. Type of Medical Attention

All medical examinations and consultations will be performed under the direct supervision of a licensed physician and will be provided without cost to the employee, without loss of pay and at a reasonable time and place. All questions regarding medical consultations and examinations should be directed to the Safety Program Manager.

c. Information for the Physician

The following information will be provided to a physician conducting medical consultations and exams:

(1) The identity of hazardous chemicals to which the employee may have been exposed.

(2) A description of the conditions under which the exposure occurred, including quantitative exposure data if available.

(3) A description of the signs and symptoms of exposure that the employee is experiencing, if any.

d. Physician's Report

A written opinion from the examining physician for any consultations or exams performed under this Operating Procedure must include:

(1) Any recommendations for further medical follow-up.

(2) The results of the medical examination and any associated tests.

(3) Any medical condition revealed during the course of the exam which might compromise employee safety during, or as a result of, exposure to hazardous chemicals found in the workplace.

(4) A statement that the employee has been informed by the physician of the results of the consultation or medical exam and any medical condition that may require further examination or treatment.

The written opinion should not reveal specific diagnoses unrelated to occupational exposure, except as noted above.

e. Record Keeping

An accurate record of any medical consultations or medical examinations must be kept by the Safety Program Manager. Records for each employee must be transferred and made available as specified under IDBS's Access to Employee Exposure and Medical Records requirements.

Provisions equal to the above shall be extended to affected students when an overexposure situation occurs. Application of the specific provisions related to student medical records, method of payment for physician services, etc., will vary according to student safety requirements and school district policies.

LABORATORY/SCIENCE ROOM SAFETY CHECKLIST

(Courtesy Idaho Division of Building Safety)

General Safety Requirements:

YES	NO	N/A	
☐	☐	☐	Are all containers of chemicals, materials, etc. properly labeled? (IDAPA 17.10.01.004.01.) (IGSHS 301.05.a)
☐	☐	☐	Is there a chemical hygiene plan in place? (IDAPA 17.10.01.004.01) (IGSHS 111.04.)
☐	☐	☐	Are Material Safety Data Sheets (MSDS) on hand for all chemicals And materials? (IDAPA 17.10.01.004.01.) (IGSHS 301.06.a)
☐	☐	☐	Are unlabeled chemicals removed from the school? (IDAPA 17.10.01.004.01) (IGSHS 111.05.a)
☐	☐	☐	Are expired chemicals removed from the school? (IDAPA 17.10.01.004.01) (IGSHS 111.05.a)
☐	☐	☐	Are contaminated chemicals removed from the school? (IDAPA 17.10.01.004.01) (IGSHS 111.05.a)
☐	☐	☐	Is eating prohibited in laboratories/science rooms? (IDAPA 17.10.01.004.01) (IGSHS 111.03.b)
☐	☐	☐	Are laboratory/science room refrigerators prohibited for the storage of food items? (IDAPA 17.10.01.004.01) (IGSHS 111.03.c)
☐	☐	☐	Does the laboratories/science room have a spill control kit? (absorbent & neutralizer)? (IDAPA 17.10.01.004.02) (IGSHS 111.07.b)
☐	☐	☐	Is the chemical storeroom floor excluded from being used for storage? (IDAPA 17.10.01.004.01) (IGSHS 111.06.a)
☐	☐	☐	Are chemical storage cabinets/room kept locked and controlled by the instructor? (IDAPA 17.10.01.004.01) (IGSHS 111.06.c)

YES	NO	N/A	
☐	☐	☐	Are poisons marked with the skull and crossbones and the word poison? (IDAPA 17.10.01.004.03) (lGSHS 111.05.b)
☐	☐	☐	Are heavy and large bottles stored near the floor? (IDAPA 17.10.01.004.01) (lGSHS 111.06.d)
☐	☐	☐	Are heavy and large bottles protected from breakage? (IDAPA 17.10.01.004.01) (IGSHS 111.06.d)
☐	☐	☐	Are chemicals prohibited from being stored above eye level? (IDAPA 17.10.01.004.01) (lGSHS 111.06.e)
☐	☐	☐	Are chemicals that react with each other prohibited from being stored in close proximity to each other? (IDAP A 17.10.01.004.01) (IGSHS 111.06.f)
☐	☐	☐	Is adequate shelving provided to prevent chemicals from becoming overcrowded and inaccessible? (IDAP A 17.1 0.0 1.004.05) (IGSHS 111.06.g)
☐	☐	☐	Does chemical shelving have protective safety lips? (IDAPA 17.10.01.004.05) (IGSHS 111.06.k)
☐	☐	☐	Is a periodically updated inventory of all chemicals maintained and available? (IDAPA 17.10.01.004.014) (IGSHS 111.06.h)
☐	☐	☐	Is the laboratory storage room properly ventilated? (IDAP A 17.10.01.004.05) (lGSHS 111.06.j)
☐	☐	☐	Is the chemical laboratory equipped with a fume hood? (IDAPA 17.10.01.004.02) (IGSHS 111.07.c)
☐	☐	☐	Is the fume hood exhaust kept under negative pressure until exhaust ducting passes to the outside of the building? (IDAPA 17.10.01.004.05) (IGSHS 111.03.h)
☐	☐	☐	Is the chemical laboratory/science room equipped with emergency eyewash capable of 15-minutes continuous water flow? (IDAPA 17.10.01.004.02) (IGSflS 111.07.d)

YES	NO	N/A	
☐	☐	☐	Is the chemical laboratory/science room equipped with an emergency overhead shower? (IDAPA 17.10.01.004.02) (IGSHS 111.07.e)
☐	☐	☐	Are portable LP gas containers prohibited from being used in classrooms? (IDAPA 17.10.01.004.04) (UFC 82.103b)
☐	☐	☐	Is personal protective equipment provided for hazards? (IDAPA 17.10.01.004.01.) (IGSHS 050.03.a)
☐	☐	☐	Is eye protection worn when there is danger of eye injury? (IDAPA 17.10.01.004.01.) (IGSHS 050.04.a)
☐	☐	☐	Is face protection worn when there is danger of face injury? (IDAPA 17.10.01.004.01.) (IGSHS 050.04.a)
☐	☐	☐	Is the eye protection adequate for the hazard? (IDAPA 17.10.01.004.01.) (IGSHS 050.04.b)
☐	☐	☐	Is the face protection adequate for the hazard? (IDAPA 17.10.01.004.01.) (IGSHS 050.04.b)
☐	☐	☐	Is the eye protection reasonably comfortable? (IDAPA 17.10.01.004.01.) (IGSHS 050.04.f)
☐	☐	☐	Is the face protection reasonably comfortable? (IDAPA 17.10.01.004.01.) (IGSHS 050.04.f)
☐	☐	☐	Does the eye protection fit snugly? (IDAPA 17.10.01.004.01.) (IGSHS 050.04.f)
☐	☐	☐	Does the face protection fit snugly? (IDAPA 17.10.01.004.01.) (IGSHS 050.04.f)
☐	☐	☐	Is the eye protection durable? (IDAPA 17.10.01.004.01.) (IGSHS 050.04.f)
☐	☐	☐	Is the face protection durable? (IDAPA 17.10.01.004.01.) (IGSHS 050.04.f)

YES	NO	N/A	
☐	☐	☐	Is the eye protection clean and in good repair? (IDAPA 17.10.01.004.01.) (IGSHS 050.04.f)

Fire Safety:

YES	NO	N/A	
☐	☐	☐	Is flammable and combustible waste material and residues controlled so that they do not contribute to a fire emergency? (IDAPA 17.10.01.004.01) (IGSHS 060.03.b)
☐	☐	☐	Is 10 gallons or more of flammable/combustible liquids stored in an approved cabinet? (IDAPA 17.10.01.004.01.) (IGSHS 220.14.c)
☐	☐	☐	Is the flammable/combustible liquid storage cabinet limited to 60 gallons of class I or II liquids? (IDAPA 17.10.01.004.01.) (IGSHS 220.12.f)
☐	☐	☐	Is the flammable/combustible liquid storage cabinet labeled "FLAMMABLE KEEP FIRE AWAY"? (IDAPA 17.10.01.004.03.) (IGSHS 220.12.h)
☐	☐	☐	Is the flammable/combustible liquid storage cabinet of double wall metal construction? (IDAPA 17.10.01.004.01.) (IGSHS 220.12.i)
☐	☐	☐	Does the flammable/combustible liquid storage cabinet have a 2-inch high doorsill? (IDAPA 17.10.01.004.01.) (IGSHS 220.12.i)
☐	☐	☐	Do the flammable/combustible liquid storage cabinet doors close securely? (IDAPA 17.10.01.004.01.) (IGSHS 220. 12.i)
☐	☐	☐	Does the flammable/combustible liquid storage cabinet have tight joints and seams? (IDAPA 17.10.01.004.01.) (IGSHS 220.12.i)

Inspection Date:___/___/___ Inspector Signature_____

Chemical Disposal Request

Bonneville Joint School district #93

Date:_____

CHO Name:_____ School Name:_____

Chemical for Disposal

(Separate sheet for each chemical)

Common Name:_____ Chemical formula:_____

Amount:_____ Type of container_____

Reason for disposal_____

For Office Use

Date removed from school:_____

Date of disposal:_____

Method of disposal:

_____

_____

_____

_____

Appendix A

Acutely Toxic Gases

This list is not intended to be all inclusive. No chemical on this list should be in inventory without a valid, documented curriculum-based need
Review MSDS before working with chemicals on this list

Name	CAS#	Name	CAS#
arsenic pentafluoride	784-36-3	oxygen difluoride	7783-41-7
Arsine	7784-42-1	phosgene	75-45-5
boron trifluoride	7637-07-2	phosphine	1498-40-4
Chlorine	7782-50-5	phosphorus pentafluoride	7641-19-0
Diazomethane	334-88-3	selenium hexafluoride	7783-79-1
Diborane	19287-45-7	silicon tetrafluoride	7783-61-1
Fluorine	7681-49-4	stibine	10025-91-9
methyl mercaptan	74-93-1	sulfur tetrafluoride	7783-60-0

Appendix B

Acutely Toxic Chemicals

This list is not intended to be all inclusive. No chemical on this list should be in inventory without a valid, documented curriculum-based need.
Review MSDS before working with chemicals on this list

Acrolein	Acrylyl chloride	2-Aminopyridine
Benzyl chloride	Bromine	Chlorine dioxide
Chlorine trifluoride	Chlorpicrin	Cyanogen chloride
Cyanuric fluoride	Decaborane	Dichloro acetylene
Dimethyl disulfide	Dimethylsulfate	Dimethylsulfide
Ethylene chlorohydrin	Ethylene fluorohydrin	Hexamethylene diisocyanate
Hexamethyl phosphoramide	Iodine	Iron pentacarbonyl
Isopropyl formate	Methacryloyl chloride	Methacryloxyethyl isocyanate
Methyl acrylonitrile	Methyl chloroformate	Methylene biphenyl isocyanate
Methyl fluoroacetate	Methyl fluorosulfate	Methyl hydrazine
Methyl Mercury (and other organicforms)	Methyltrichlorosilane	Methyl vinyl ketone
Nickel carbonyl	Nitrogen tetroxide	Nitrogen trioxide
Organo Tin compounds	Osmium tetroxide	Oxygen difluoride
Ozone	Pentaborane	Perchloromethyl mercaptan
Phosphorus oxychloride	Phosphous trichloride	Sarin

Select Agents

Sulfur monochloride	Sulfur pentafluoride	Sulfuryl chloride
Tellurium hexafluoride	Tetramethyl succinonitrile	Tetranitromethane
Thionyl chloride	Toluene-2,4-diisocyanate	Trichloro (chlormethyl) silane

Appendix C

Known and Suspected Carcinogens

This list is not intended to be all inclusive. No chemical on this list should be in inventory without a valid, documented curriculum-based need.
Review MSDS before working with chemicals on this list

Chemical Name	CAS
A-alpha-C (2-Amino-9H-pyrido{2,3-b]indole)	26148685
Acetaldehyde	76070
Acetamide	60355
Acetochlor	34256821
2-Acetylaminofluorene	53963
Acifluorfen	62476599
Acrylamide	79061
Acrylonitrile	107131
Actinomycin D	50760
Adriamycin (Doxorubicin hydrochloride)	23214928
AF-2; [2-(2-furyl)-3-(5-nitro-2-furyl)]acrylamide	3588537
Aflatoxins	----
Alachlor	15972608
Aldrin	309002
Allyl chloride	107051
2-Aminoanthraquinone	117793
p-Aminoazobenzene	60093
ortho-Aminoazotoluene	97563
4-Aminobiphenyl (4-aminodiphenyl)	92671
3-Amino-9-ethylcarbazole hydrochloride	6109973
1-Amino-2-methylanthraquinone	82280
2-Amino-5-(5-nitro-2-furyl)-1,3,4-thiadiazole	712685
Amitrole	61825
Aniline	62533
ortho-Anisidine	90040

ortho-Anisidine hydrochloride	134292
Antimony oxide (Antimony trioxide)	130964
Aramite	140578
Arsenic (inorganic arsenic compounds)	---
Asbestos	1332214
Auramine	492808
Azaserine	115026
Azathioprine	446866
Azacitidine	320672
Azobenzene	103333
Benz[a]anthracene	56553
Benzene	71432
Benzidine [and its salts]	92875
Benzo [b] fluoranthene	205992
Benzo [j] fluoranthene	205823
Benzo [k] fluoranthene	207089
Benzofuran	271896
Benzo [a] pyrene	50328
Benzotrichloride	98077
Benzyl chloride	100447
Benzyl violet 4B	1694093
Beryllium and beryllium compounds	---
Betel quid with tobacco	---
Bis(2-chloroethyl)ether	111444
N,N,-Bis(2-chloroethyl)-2-naphthylamine (Chlornapazine)	494031
Bischloroethyl nitrosourea (BCNU) (Carmustine)	154938
Bis (chloromethyl) ether	542881
Bitumens, extracts of steam-refined and air-refined	---
Bracken fern	---
Bromodichloromethane	75274
Bromoform	75252
1,3-Butadiene	106990
1,4-Butanediol dimethanesulfonate (Busulfan)	55981

Butylated hydroxyanisole	25013165
vbeta-Butyrolactone	3068880
Cadmium and cadmium compounds	---
Captafol	2425061
Captan	133062
Carbon tetrachloride	56235
Carbon-black extracts	---
Ceramic fibers	---
Chlorambucil	305033
Chloramphenicol	56757
Chlordane	57749
Chlordecone (Kepone)	143500
Chlordimeform	115286
Chlorendic acid	115286
Chlorinated paraffins	108171262
Chlorodibromethane	124481
Chloroethane (Ethyl chloride)	75003
1-(2-Chloroethyl)-3-cyclohexyl-1-nitrosourea	13010474
1-(2-Chloroethyl)-3-(4-methylcyclohexyl)-1-nitrosourea (Methyl-CCNU)	13909096
Chloroform	67663
Chloromethyl methyl ether	107302
3-Chloro-2-methylpropene	563473
4-Chloro-ortho-phenylenediamine	95830
p-Chloro-o-toluidine	95692
Chlorothalonil	1897456
Chlorozotocin	54749905
Chromium (hexavalent)	---
Chrysene	18019
C. I. Acid Red 114	6459945
C. I. Basic Red 9 monohydrochloride	569619
Ciclosporin (Cyclosporin A; Cyclosporine)	59865133;79217600
Cinnamyl anthranilate	87296

Cisplatin	15663271
Citrus Red No. 2	6358538
Cobalt metal powder	7440484
Cobalt [II] oxide	1307966
Conjugated estrogens	---
Creosotes	---
para-Cresidine	120718
Cupferron	135206
Cycasin	14901087
Cyclophosphamide (anhydrous)	50180
Cyclophosphamide (hydrated)	6055192
D&C Orange No. 17	46831
D&C Red No. 8	2092560
D&C Red No. 9	5160021
D&C Red No. 19	81889
Dacarbazine	4342034
Daminozide	1596845
Dantron (Chrysazin; 1,8-Dihydroxyanthraquinone)	117102
Daunomycin	20830813
DDD (Dichlorodiphenyldichloroethane)	72548
DDE (Dichlorodiphenyldichloroethylene)	72559
DDT (Dichlorodiphenyltrichloroethane)	50293
DDVP (Dichlorvos)	62737
N,N'-Diacetylbenzidine	613354
2,4-Diaminoanisole	615054
2,4-Diaminoanisole sulfate	39156417
4,4'-Diaminodiphenyl ether (4,4'-Oxydianiline)	101804
2,4-Diaminotoluene	95807
Diaminotoluene (mixed)	---
Dibenz[a,h]acridine	226368
Dibenz[a,j]acridine	224420
Dibenz[a,h]anthracene	53703
7H-Dibenzo[c,g]carbazole	194592

Dibenzo[a,e]pyrene	192654
Dibenzo[a,h]pyrene	189640
Dibenzo[a,i]pyrene	189559
Dibenzo[a,l]pyrene	191300
1,2-Dibromo-3-chloropropane (DBCP)	96128
p-Dichlorobenzene	106467
3,3'-Dichlorobenzidine	91941
1,4-Dichloro-2-butene	764410
3,3'-Dichloro-4,4'-diaminodiphenyl ether	28434868
1,1-Dichloroethane	75343
Dichloromethane (Methylene chloride)	75092
1,2-Dichloropropane	78875
1,3-Dichloropropene	542756
Dieldrin	60571
Dienestrol	84173
Diepoxybutane	1464535
Diesel engine exhaust	---
Di(2-ethylhexyl)phthalate	117817
1,2-Diethylhydrazine	1615801
Diethyl sulfate	64675
Diethylstilbestrol	56531
Diglycidyl resorcinol ether (DGRE)	101906
Dihydrosafrole	94586
3,3'-Dimethoxybenzidine (ortho-Dianisidine)	119904
3,3'-Dimethoxybenzidine dihydrochloride (ortho-Dianisidine dihydrochloride)	20325400
Dimethylcarbamoyl chloride	79447
1,1-Dimethylhydrazine (UDMH)	57147
1,2-Dimethylhydrazine	540738
Dimethylvinylchloride	513371
1,6-Dinitropyrene	42397648
1,8-Dinitropyrene	42397659
2,4-Dinitrotoluene	121142

1,4-Dioxane	123911
Diphenylhydantoin (Phenytoin)	57410
Diphenylhydantoin (Phenytoin), sodium salt	630933
Direct Black 38 (technical grade)	1937377
Direct Blue 6 (technical grade)	2602462
Direct Brown 95 (technical grade)	16071866
Disperse Blue 1	2475458
Epichlorohydrin	106898
Erionite	12510428
Estradiol 17ß	50282
Estrone	53167
Ethinylestradiol	57636
Ethyl acrylate	140885
Ethyl methanesulfonate	62500
Ethyl-4-4'-dichlorobenzilate	510156
Ethylene dibromide	106934
Ethylene dichloride (1,2-Dichloroethane)	107062
Ethylene oxide	75218
Ethylene thiourea	96457
Ethyleneimine	151564
Folpet	133073
Formaldehyde	50000
2-(2-Formylhydrazino)-4-(5-nitro-2-furyl)thiazole	3570750
Furazolidone	67458
Furmecyclox	60568050
Glu-P-1 (2-Amino-6-methyldipyrido[1,2-a:3',2'-d]imidazole)	67730114
Glycidaldehyde	765344
Glycidol	556525
Griseofulvin	126078
Gyromitrin (Acetaldehyde methylformylhydrazone)	16568028
HC Blue 1	2784943
Heptachlor	76448

Heptachlor epoxide	1024573
Hexachlorobenzene	118741
Hexachlorocyclohexane (technical grade)	---
Hexachlorodibenzodioxin	34465468
Hexachloroethane	67721
Hexamethylphosphoramide	680319
Hydrazine	302012
Hydrazine sulfate	10034932
Hydrazobenzene (1,2-Diphenylhydrazine)	122667
Indeno [1,2,3-cd]pyrene	193395
IQ (2-Amino-3-methylimidazp[4,5-f]quinoline)	76180966
Iron dextran complex	9004664
Isosafrole	120581
Lactofen	77501634
Lasiocarpine	303344
Lead acetate	301042
Lead phosphate	7446277
Lead subacetate	1335326
Lindane	---
Mancozeb	8018017
Maneb	12427382
Me-A-alpha-C (2-Amino-3-methyl-9H-pyrido[2,3-b]indole)	68005837
Medroxyprogesterone acetate	71589
Melphalan	148823
Merphalan	531760
Mestranol	72333
8-Methoxypsoralen with ultraviolet A therapy	298817
5-Methoxypsoralen with ultraviolet A therapy	484208
2-Methylaziridine (Propyleneimine)	75558
Methylazoxymethanol	590965
Methylazoxymethanol acetate	592621
3-Methylcholanthrene	56495
5-Methylchrysene	3697243

4,4'-Methylene bis(2-chloroaniline)	101144
4,4'-Methylene bis(N,N-dimethyl)benzenamine	101611
4,4'-Methylene bis(2-methylaniline)	838880
4,4'-Methylenedianiline	01779
4,4'-Methylenedianiline dihydrochloride	13552448
Methylhydrazine and its salts	13552448
Methyl iodide	74884
Methyl methanesulfonate	66273
2-Methyl-1-nitroanthraquinone	129157
N-Methyl-N'-nitro-N-nitrosoguanidine	70257
N-Methylolacrylamide	924425
Methylthiouracil	56042
Metiram	9005422
Metronidazole	443481
Michler's ketone	90948
Mirex	2385855
Mitomycin C	50077
Monocrotaline	315220
5-(Morpholinomethyl)-3-[(5-nitro-furfurylidene)-amino]-2 – oxalolidinone	139913
Mustard Gas	505602
Nafenopin	3771195
1-Naphthylamine	124327
2-Naphthylamine	91598
Nickel and certain nickel compounds	---
Nickel carbonyl	13463393
Nickel subsulfide	12035722
Niridazole	61474
Nitrilotriacetric acid	139139
Nitrilotriacetric acid, trisodium salt monohydrate	18662538
5-Nitroacenaphthene	602879
5-Nitro-o-anisidine	99592
4-Nitrobiphenyl	93933

6-Nitrochrysene	7496028
Nitrofen (technical grade)	1836755
2-Nitrofluorene	607578
Nitrofurazone	59870
1-[5-Nitrofurfurylidene)-amino]-2-imidazolidinone	555840
N-[4-(5-Nitro-2-furyl)-2-thiazolyl]acetamide	531828
Nitrogen mustard (Mechlorethamine)	51752
Nitrogen mustard hydrochloride (Mechlorethamine hydrochloride)	55867
Nitrogen mustard N-oxide	126852
Nitrogen mustard N-oxide hydrochloride	302705
2-Nitropropane	79469
1-Nitropyrene	5522430
4-Nitropyrene	57835924
N-Nitrosodi-n-butylamine	924163
N-Nitrosodiethanolamine	1116547
N-Nitrosodiethylamine	55185
N-Nitrosodimethylamine	62759
p-Nitrosodiphenylamine	156105
N-Nitrosodiphenylamine	86306
N-Nitrosodi-n-propylamine	621647
N-Nitroso-N-ethylurea	759739
3-(N-Nitrosomethylamino)propionitrile	60153493
4-(N-Nitrosomethylamino)-1-(3-pyridyl)1-butanone	64091914
N-Nitrosomethylethylamine	10595956
N-Nitroso-N-methylurea	684935
N-Nitroso-N-methylurethane	615532
N-Nitrosomethylvinylamine	4549400
N-Nitrosomorpholine	59892
N-Nitrosonornicotine	16543558
N-Nitrosopiperidine	100754
N-Nitrosopyrrolidine	930552
N-Nitrososarcosine	13256229

Norethisterone (Norethindrone)	68224
Ochratoxin A	303479
Oxadiazon	19666309
Oxymetholone	434071
Panfuran S	---
Pentachlorophenol	87865
Phenacetin	62442
Phenazopyridine	94780
Phenazopyridine hydrochloride	136403
Phenesterin	3546109
Phenobarbital	50066
Phenoxybenzamine	59961
Phenoxybenzamine hydrochloride	63923
Phenyl glycidyl ether	22601
Phenylhydrazine and its salts	---
o-Phenylphenate, sodium	132274
Polybrominated biphenyls	---
Polychlorinated biphenyls	---
Polygeenan	53973981
Ponceau MX	3761533
Ponceau 3R	3564098
Potassium bromate	7758012
Procarbazine	671169
Procarbazine hydrochloride	366701
Progesterone	57830
1,3-Propane sultone	1120714
beta-Propiolactone	57578
Propylene oxide	75569
Propylthiouracil	51525
Reserpine	50555
Saccharin	81072
Saccharin, sodium	128449
Safrole	94597

Selenium sulfide	7446346
Silica, crystalline	---
Streptozotocin	18883664
Styrene oxide	96093
Sulfallate	95067
Talc´ containing asbestiform fibers	---
Testosterone and its esters	58220
2,3,7,8-Tetrachlorodibenzo-para-dioxin (TCDD)	1746016
1,1,2,2-Tetrachloroethane	79345
Tetrachloroethylene (Perchloroethylene)	127184
p-a, a, a-Tetrachlorotoluene	5216251
Tetranitromethane	509148
Thioacetamide	62555
4,4´ - Thiodianiline	139651
Thiourea	62566
Thorium dioxide	1314201
Toluene diisocyanate	26471625
ortho-Toluidine	95534
ortho-Toluidine hydrochloride	636215
para-Toluidine	106490
Toxaphene (Polychorinated camphenes)	8001352
Trasulfan	299752
Trichlormethine (Trimustine hydrochloride)	817094
2,4,6-Trichlorophenol	88062
Triphenyltin hydroxide	76879
Trichloroethylene	79016
Tris (aziridinyl)-para-benzoquinone (Triaziquone)	68768
Tris (1-aziridinyl) phosphine sulfide (Thiotepa)	52244
Tris (2-chloroethyl) phosphate	115968
Tris (2,3-dibromopropyl) phosphate	126727
Trp-P-1 (Tryptophan-P-1)	62450060
Trp-P-2 (Tryptophan-P-2)	62450071
Trypan blue (commercial grade)	72571

Uracil mustard	66751
Urethane (Ethyl carbamate)	51796
Vinyl bromide	593602
Vinyl chloride	75014
4-Vinyl-1-cyclohexene diepoxide (Vinyl cyclohexene dioxide)	106876
Vinyl trichloride (1,1,2-Trichloroethane)	79005
2,6-Xylidine (2,6-Dimethylaniline)	87627
Zineb	12122677

Appendix D

Known Reproductive Toxins

This list is not intended to be all inclusive. No chemical on this list should be in inventory without a valid, documented curriculum-based need.
Review MSDS before working with chemicals on this list

Name	CAS#	Name	CAS#
Acetaldehyde	75-07-0	Hydrazine(s)	302-01-2
Arsenic	7440-38-2	Hexafluoroacetone	684-16-2
Aniline	62-53-3	Halothane	151-67-7
Aflatoxins		Karathane	131-72-6
Benzene	71-43-2	Lead (inorganic compounds)	7439-92-1
Benzo(a)pyrene	50-32-8	2-Methoxyethanol	109-86-4
Carbon disulfide	75-15-0	2-Methoxyethyl acetate	110-49-6
Chloroform	67-66-3	Methyl chloride	74-87-3
Chloroprene	126-99-8	N-Methyl-2-pyrrolidone	872-50-4
Dimethyl formamide	68-12-2	Propylene glycol monomethyl ether	107-98-2
Di-sec-octyl-phthalate	117-81-7	Propylene glycol monomethyl ether acetate	108-65-6
Dinitrooctyl phenol	63149-81-5	Propylene oxide	75-56-9
Dithane	111-54-6	Trichloroethylene	79-01-6
2-Ethoxy ethanol	110-80-5	RH-7592	
2-Ethoxyethyl acetate	111-15-9v	Systhane/RH-3866	88671-89-0
Ethylene thiourea	96-45-7	TOK (herbicide)	1836-75-5
2-Ethyhexanol	104-76-7	Toluene	108-88-3
Glycol ethers		Vinyl chloride	75-01-4