

Oyster Bay-East Norwich

Chemical Hygiene Plan

The Occupational Safety and Health Administration's (OSHA) Laboratory Standard (29 CFR 1910.1450) requires that all laboratories (including schools) develop a Chemical Hygiene Plan. This plan will define practices and procedures to be followed in the laboratory that will provide for the safety of all personnel.

The school district is responsible for appointing a **Chemical Hygiene Officer to coordinate all aspects of the Chemical Hygiene Plan.** The Chemical Hygiene Officer is also responsible for assuring compliance with New York State Education Department (SED) requirements regarding the storage of hazardous chemicals in science facilities.

Introduction

The school district's Laboratory Chemical Hygiene Plan has been developed through extensive use of the Federal Occupational Safety and Health Administration Standard (29 CFR 1910.1450) which addresses occupational exposure to hazardous chemicals in laboratories. This standard in turn extracted much information from *Prudent Practices for Handling Hazardous Chemicals in Laboratories* which was published by the National Research Council and is a well respected publication within the laboratory science community.

Although the OSHA Laboratory standard deals primarily with chemical hazards, it is obvious that general laboratory safety is also of great concern. As such, chemical hygiene and general laboratory safety should not be thought of as independent issues but as complimentary factors. While this standard, as with all OSHA Standards, seeks to develop procedures specifically for employee safety, such safe practices will also help ensure the safety of the student population.

The school district has developed this written Chemical Hygiene Plan in an attempt to afford protection from health hazards associated with hazardous chemicals in the laboratory and to keep exposures below specified limits. The Chemical Hygiene Plan will include but not be limited to the following:

- ◇ Standard operating procedures relevant to safety and health considerations to be followed when laboratory work involves the use of hazardous chemicals.
- ◇ Criteria that the school district 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 will be given to the selection of control measures for chemicals that are extremely hazardous.

- ◇ Fume hoods and other protective equipment will function properly, and specific measures will be taken to ensure proper performance of such equipment.
- ◇ Provisions will be made for employee information and training.
- ◇ The circumstances under which a particular laboratory operation, procedure or activity will require approval prior to implementation.
- ◇ Provisions for medical consultation and medical examinations as necessary.
- ◇ Designation of personnel responsible for implementation of the Chemical Hygiene Plan including the assignment of a Chemical Hygiene Officer.
- ◇ Provisions for additional employee protection for work with particularly hazardous substances including “select carcinogens”, reproductive toxins and substances which have a high degree of acute toxicity. In general, such substances will not be used in the school science laboratory. Where appropriate, specific consideration will be given to the following provisions:
 1. Establishment of a designated area.
 2. Use of containment devices such as fume hoods or glove boxes.
 3. Procedures for safe removal of hazardous waste.
 4. Decontamination procedures.
- ◇ It should be understood that the **school district’s Hazard Communication Program may in many instances overlap the components of the Chemical Hygiene Plan**. This is especially true in the area of training. These plans have been developed to complement each other in affording employees the highest degree of information, training and safety.

The school district will **review the effectiveness of the Chemical Hygiene Plan** and update it as necessary.

General Principles

◇ MINIMIZE ALL CHEMICAL EXPOSURE

It is prudent to minimize all chemical exposures due to the fact that few laboratory chemicals are without hazards. General precautions for handling all laboratory chemicals have been adopted rather than specific guidelines for particular chemicals. **Skin contact with chemicals will be avoided as a cardinal rule.**

◇ AVOID UNDERESTIMATION OF THE RISK

Even for substances of no known significant hazard exposure will be minimized, and for work with substances which present special hazards, special precautions will be taken. One should **assume that any mixture will be more toxic than its most toxic component** and that all substances of unknown toxicity are toxic.

◇ PROVIDE ADEQUATE VENTILATION

The best way to prevent exposure to airborne substances is to prevent their escape into the working atmosphere by use of hoods and other ventilation devices. The school district will always seek to provide the best ventilation system possible.

◇ INSTITUTE A CHEMICAL HYGIENE PROGRAM

The school district realizes that a mandatory Chemical Hygiene Program is necessary to minimize potential chemical exposure. This will be a regular, continuing effort, not merely a standby or short-term activity. Recommendations will be followed in academic teaching laboratories as well as by full-time laboratory workers.

◇ OBSERVE PERMISSIBLE EXPOSURE LIMITS

Permissible Exposure Limits (PELs) established by the Occupational Safety and Health Administration (OSHA) and Threshold Limit Values (TLVs) established by the American Conference of Government Industrial Hygienists (ACGIH) should not be exceeded. **This information may be obtained by referring to the area Material Safety Data Sheet Manual or the OSHA Hazard Communication Standard.**

Responsibilities

Although it is clear that responsibility for chemical hygiene rests at all levels throughout the school system, a line of authority has been established to ensure that the provisions of the Chemical Hygiene Plan are met. For the purposes of the plan the following designations have been established:

◇ **CHIEF EXECUTIVE OFFICER - SUPERINTENDENT OF SCHOOLS**

The Superintendent of Schools has ultimate responsibility for chemical hygiene within the school district and will in conjunction with other school officials provide continuing support for chemical hygiene at all levels of the school system.

◇ **OPERATIONS SUPERVISOR – ASSISTANT SUPERINTENDENT FOR FINANCE AND OPERATIONS**

Ensure that students and staff know and follow chemical hygiene rules; that protective equipment is available and in working order; and that appropriate training has been provided.

◇ **ADMINISTRATOR - SCHOOL PRINCIPAL**

The School Principal will act as the chief administrator in individual school buildings and will assume responsibility for chemical hygiene within that building.

◇ **CHEMICAL HYGIENE OFFICER - SCIENCE SUPERVISOR**

The **Science Supervisor will act as the Chemical Hygiene Officer** and will be the overall coordinator of the Chemical Hygiene Plan. The Chemical Hygiene Officer, who is critical to a successful plan, will be responsible for the following:

1. Working with administrators and other school staff to develop and implement appropriate chemical hygiene policies and practices.
2. Monitoring procurement, use, and disposal of chemicals used in the laboratory.
3. Conducting periodic audits of the laboratory for safety compliance.
4. Assist Science Teachers in developing safety precautions and adequate laboratory facilities.
5. Maintain awareness of the legal requirements concerning regulated substances.
6. Continually seek ways to improve the chemical hygiene program.

◇ **LABORATORY TEACHING ASSISTANT**

The Laboratory Teaching Assistant will have overall charge for chemical hygiene in individual laboratories and be responsible as follows:

1. Know the current legal requirements concerning regulated substances.
2. Determine the required levels of protective apparel and equipment.
3. Ensure that facilities and training for use of any material ordered are adequate.

◇ **BUILDINGS AND GROUNDS**

1. Provide regular inspections of emergency equipment.
2. Schedule and organize waste-disposal.

The Laboratory Facility

The laboratory facility will include the following:

An appropriate general ventilation system with air intakes and exhausts located so as to avoid intake of contaminated air.

Adequate, well ventilated stockrooms/storerooms.

Laboratory hoods and sinks.

Other safety equipment including eyewash fountains and drench showers.

Arrangements for waste disposal.

◇ MAINTENANCE

Chemical hygiene-related equipment (hoods, incinerator, etc.) will undergo continuing appraisal and be modified if inadequate.

◇ USAGE

The work conducted in the laboratory and its scale will be appropriate to the physical facilities available and especially to the quality of ventilation.

◇ VENTILATION

The general laboratory ventilation system will provide a source of air for breathing and for input to local ventilation devices but it should not be relied on for protection from toxic substances released into the laboratory. The system will ensure that laboratory air is continually replaced, preventing an increase of air concentrations of toxic substances during the working day and a direct air flow into the laboratory from non-laboratory areas and out to the exterior of the building.

Chemical Safety General Rules

◇ ACCIDENTS AND SPILLS

Eye Contact - Promptly flush eyes with water for a prolonged period (15 minutes) and seek medical attention.

Ingestion - Encourage the victim to drink large amounts of water.

Skin Contact - Promptly flush the affected area with water and remove any contaminated clothing. If symptoms persist, seek medical attention.

Clean-Up - Promptly clean up spills using appropriate protective apparel and equipment and proper disposal.

Following these practices will ensure proper operation of ventilation systems and protection of employees and students.

◇ AVOIDANCE OF ROUTINE EXPOSURE

Develop and encourage safe habits; avoid unnecessary exposure to chemicals by any route.

Do not smell or taste chemicals.

Vent apparatus which may discharge toxic chemicals into local exhaust devices.

Inspect gloves and test glove boxes before use.

◇ CHOICE OF CHEMICALS

Use only those chemicals for which the quality of the available ventilation system is appropriate.

◇ EATING, SMOKING ETC.

Avoid eating, drinking, smoking, gum chewing or application of cosmetics in areas where laboratory chemicals are present. Wash hands before conducting these activities.

Avoid storage, handling or consumption of food or beverages in storage areas, refrigerators and in glassware or utensils which are also used for laboratory operations.

◇ EQUIPMENT AND GLASSWARE

Handle and store laboratory glassware with care to avoid damage; do not use damaged glassware.

Use extra care with Dewar flasks and other evacuated glass apparatus; shield or wrap them to contain chemicals and fragments should implosion occur.

Use equipment only for its designated purpose.

◇ **EXITING**

Wash areas of exposed skin well before leaving the laboratory.

◇ **HORSEPLAY**

Avoid practical jokes or other behavior which might confuse, startle or distract another worker.

◇ **MOUTH SUCTION**

Do not use mouth suction for pipetting or starting a siphon.

◇ **PERSONAL APPAREL**

Confine long hair and loose clothing; wear shoes at all times in the laboratory but do not wear sandals, perforated shoes or sneakers.

◇ **PERSONAL HOUSEKEEPING**

Keep the work area clean and uncluttered with chemicals and equipment being properly labeled and stored. Clean the work area on completion of an operation or at the end of each day.

◇ **PERSONAL PROTECTION**

Assure that appropriate eye protection is worn by all persons including visitors, where chemicals are stored or handled.

Wear appropriate gloves when the potential for contact with toxic materials exists. Inspect the gloves before each use, wash them before removal and replace them periodically.

◇ **PLANNING**

Seek information and advice about hazards; plan appropriate protective procedures and plan positioning of equipment before beginning any new experiments.

◇ **USE OF HOODS**

As a rule of thumb use a hood or other local ventilation device when working with any appreciably volatile substance.

Confirm adequate hood performance before use; keep hood closed at all times except when adjustments within the hood are being made; keep materials stored in hoods to a minimum and do not allow them to block vents or airflow.

Leave the hood on when it is not in active use if toxic substances are stored in it or if uncertain whether adequate general laboratory ventilation will be maintained when it is off.

◇ **VIGILANCE**

Be alert to unsafe conditions and see that they are corrected when detected.

◇ **WASTE DISPOSAL**

Assure that the plan for each laboratory operation includes plans and training for waste disposal.

Deposit chemical waste in appropriately labeled receptacles and follow all other waste disposal procedures of the Chemical Hygiene Plan.

Do not discharge to the sewer concentrated acids or bases, highly toxic, malodorous, or lachrymatory (tear producing) substances or any substance which may interfere with the biological activity of waste water treatment plants, create fire or explosion hazards, cause structural damage or obstruct flow.

◇ **WORKING ALONE**

Avoid working alone in a building; do not work alone in a laboratory if the procedures being conducted are hazardous.

Allergens and Embryotoxins

◇ ALLERGENS

Some examples of allergens include diazomethane; isocyanates; and bichromates. Wear suitable gloves to prevent hand contact with allergens or substances of unknown allergenic activity.

◇ EMBRYOTOXINS

Some examples of embryotoxins include organomercurials; lead compounds; and formamide. If you are a woman of childbearing age, handle these substances only in a hood whose satisfactory performance has been confirmed, using appropriate protective apparel (especially gloves) to prevent skin contact.

Review each use of these materials with the supervisor and review continuing uses annually or whenever a procedural change is made.

Store these substances, properly labeled, in an adequately ventilated area in an unbreakable secondary container.

Notify supervisors of all incidents of exposure or spills; consult a qualified physician when appropriate.

Chemicals of Chronic and Acute Toxicity

◇ PURPOSE

To minimize exposure to these toxic substances by any route using all reasonable approaches. Some examples of these substances include hydrofluoric acid and hydrogen cyanide. Generally, these substances would not be used in a school setting.

◇ APPLICABILITY

These precautions are appropriate for substances with moderate, chronic or high acute toxicity used in significant quantities.

◇ LOCATION

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

Always use a hood (previously evaluated to confirm adequate performance with a face velocity of at least 60 linear feet per minute) or other containment device for procedures which may result in the generation of aerosols or vapors containing the substance; trap released vapors to prevent discharge with the exhaust hood.

◇ **PERSONAL PROTECTION**

Always avoid skin contact by use of gloves and long sleeves; always wash hands and arms immediately after working with these materials.

◇ **RECORDS**

Maintain records of the amounts of these materials on hand; amounts used; and the names of workers involved.

◇ **PREVENTION OF SPILLS AND ACCIDENTS**

Be prepared for accidents and spills. Assure that at least two people are present at all times if a compound in use is highly toxic or of unknown toxicity.

Store breakable containers of these substances in chemically-resistant trays; work and mount apparatus above such trays or cover work and storage surfaces with removable, absorbent, plastic-backed paper.

If a major spill occurs outside the hood, evacuate the area; inform a school administrator, and assure that clean-up personnel wear suitable protective apparel and equipment.

◇ **WASTE**

Thoroughly decontaminate or incinerate contaminated clothing or shoes; if possible, chemically decontaminate by chemical conversion.

Store contaminated waste in closed, suitably labeled, impervious containers (for liquids, in glass or plastic bottles half filled with vermiculite).

Chemicals of High Chronic Toxicity

◇ ACCESS

Conduct all transfers and work with these substances in a controlled area, a restricted access hood, glove box or portion of a lab, designated for use of highly toxic substances for which all people with access are aware of the substances being used and necessary precautions.

◇ APPROVALS

Prepare a plan for use and disposal of these materials and obtain the approval of the laboratory supervisor.

◇ NON-CONTAMINATION/DECONTAMINATION

Protect vacuum pumps against contamination by scrubbers or HEPA filters and vent them into the hood; decontaminate vacuum pumps or other contaminated equipment, including glassware, in the hood before removing them from the controlled area.

Decontaminate the controlled area before normal work is resumed.

◇ EXITING

On leaving a controlled area, remove any protective apparel (placing it in an appropriately labeled container) and wash hands, forearms, face and neck.

◇ HOUSEKEEPING

Use a wet mop or vacuum cleaner equipped with a HEPA filter instead of dry sweeping if the toxic substance was a dry powder.

◇ MEDICAL SURVEILLANCE

If using toxicologically significant quantities of such a substance on a regular basis, consult a physician concerning desirability of regular medical surveillance.

◇ RECORDS

Keep accurate records of the amounts of these substances stored and used, the dates of use, and names of users.

◇ SIGNS AND LABELS

Assure that the controlled area is conspicuously marked with warning and restricted access signs and that all containers of these substances are appropriately labeled with identity and warning labels.

◇ SPILLS

Assure that contingency plans, equipment, and materials to minimize exposure of people and property in case of accident are available.

◇ **STORAGE**

Store containers of these chemicals only in a ventilated, limited access area in appropriately labeled, unbreakable, chemically resistant, secondary containers.

◇ **WASTE**

Use chemical decontamination whenever possible; ensure that containers of contaminated waste (including washings from contaminated flasks) are transferred from the controlled area in a secondary container under the supervision of authorized personnel.

Chemical Hygiene Plan Components

◇ PROCUREMENT

Before a substance is received, information on proper handling, storage, and disposal should be known to those who will be involved. **No container should be accepted without an adequate identifying label.** Preferably, all substances should be received in a central location. **The least toxic substance available shall always be utilized as first choice and nontoxic chemical substitutions will be made whenever possible.**

◇ STOCKROOMS/STOREROOMS

Toxic substances should be segregated in a well identified area with local exhaust ventilation. Chemicals which are highly toxic or other chemicals whose containers have been opened, should be in unbreakable secondary containers. Stored chemicals should be examined periodically for replacement, deterioration, and container integrity.

Stockrooms/Storerooms should not be used as preparation, or repackaging areas, should be open during normal working hours, and be controlled by one person.

◇ DISTRIBUTION

When chemicals are hand carried, the container should be placed in an outside container or bucket. "Freight only" elevators should be used if possible.

◇ LABORATORY STORAGE

Amounts permitted should be as small as practical. Storage on bench tops and in hoods is inadvisable. Exposure to heat or direct sunlight should be avoided. Periodic inventories should be conducted, with unneeded items being discarded or returned to the storeroom/stockroom.

◇ MAINTENANCE

Eye wash fountains should be inspected at intervals of not less than three months.

Safety showers should be tested routinely.

Other safety equipment should be inspected regularly (**every three to six months**).

Procedures to prevent restarting of out-of-service equipment should be established.

◇ PASSAGEWAYS

Stairways and hallways should not be used as storage areas.

Access to exits, emergency equipment, and utility controls should never be blocked.

◇ **FIRST AID**

Personnel trained in first aid should be available during working hours.

◇ **PROTECTIVE APPAREL AND EQUIPMENT**

Protective apparel compatible with the required degree of protection for the substances being handled such as gloves, goggles, aprons, etc.

An easily accessible drench-type safety shower.

A double eyewash station.

A fire extinguisher.

Fire alarm and telephone (with emergency telephone #'s) for emergency use.

◇ **RECORDS**

Accident records should be written and retained. Use of a standard accident form is recommended.

◇ **SIGNS AND LABELS**

Emergency telephone numbers of emergency personnel/facilities, supervisors and laboratory workers.

Identity label, showing contents of containers (including waste receptacles) and associated hazards.

Location signs for safety showers, eyewash stations, other safety and first-aid equipment, exits and areas where food and beverage consumption and storage are permitted.

◇ **SPILLS AND ACCIDENTS**

A written **Emergency Plan** should be established and communicated to all personnel. It should include procedures for ventilation failure, evacuation, medical care, reporting and drills.

There should be an alarm system to alert people in all parts of the facility including isolation areas such as cold rooms.

A spill control policy should be developed and should include consideration of prevention, containment, clean up and reporting.

All accidents or near accidents should be carefully analyzed with the results distributed to all who might benefit.

◇ INFORMATION AND TRAINING PROGRAM

Purpose

- ◇ To assure that all individuals at risk are adequately informed about the work in the laboratory, its risks, and what to do if an accident occurs.

Emergency and Personal Protection Training

- ◇ Every laboratory worker should know the location and proper use of available protective apparel and equipment.
- ◇ Some of the full-time personnel of the laboratory should be trained in the proper use of emergency equipment and procedures.
- ◇ Such training as well as first-aid instruction should be available to and encouraged for everyone who might need it.
- ◇ Receiving and stockroom/storeroom personnel should know about hazards, handling equipment, protective apparel and relevant regulations.

Material Safety Data Sheets (MSDS)

- ◇ **All laboratory employees should be aware of the location of material safety data sheets and how to appropriately read them.**

Location of Plans

- ◇ **All laboratory employees should be aware of the location of the Chemical Hygiene Plan and the Hazard Communication Written Program.**

◇ WASTE DISPOSAL PROGRAM

Purpose

- ◇ To assure that minimal harm to people, other organisms, and the environment will result from the disposal of waste laboratory chemicals.

Content

- ◇ A detailed list of labelled chemicals to be disposed is provided to Buildings and Grounds.
- ◇ Professional chemical waste transportation and pick-up is coordinated through the Buildings and Grounds office.
- ◇ Before a worker's employment in the laboratory ends, chemicals for which that person was responsible should be discarded or stored.

◇ **FREQUENCY OF DISPOSAL**

- ◇ Indiscriminate disposal by pouring waste chemicals down the drain or adding to mixed refuse for landfill burial is unacceptable.
- ◇ Hoods should not be used as a means of disposal for volatile chemicals.
- ◇ Disposal by recycling or chemical decontamination are preferable.



CHEMICAL SPILLS AND ACCIDENTS

EMERGENCY PLAN

In the case of a chemical spill:

- Evacuate the area, room or school as appropriate.
- Contain the spill with available equipment.
- Secure the area.
- Attend to injured personnel and call the medical emergency number, if required.
- Alert building administration and site personnel:

School Principal

Science and Technology Supervisor, Janna Ostroff x 6544,
jostroff@obenschools.org

School Head Custodian

- Do NOT attempt to clean the spill unless trained to do so. If trained, deal with the spill in accordance with instructions described in MSDS.
- Call a spill cleanup company or the Fire Department to perform large chemical spill cleanups.