DELRAN TOWNSHIP SCHOOL DISTRICT

CHEMICAL HYGIENE PLAN

FACILITY NAME: High School and Middle School

ADDRESS: Delran Middle School
905 Chester Avenue
Delran, NJ 08075

Delran High School
50 Hartford Road
Delran, NJ 08075

PREPARED BY: Coastal Environmental Compliance, LLC
P.O. Box 167
Hammonton, NJ 08037
Phone - 609.685.9984 Fax - 609.561.6197
Phone - 609.820.9312

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BACKGROUND

On January 31, 1990, the Occupational Safety and Health Administration (OSHA) passed the "Occupational Exposures to Hazardous Chemicals in Laboratories: Final Rule" (29 CFR Part 1910.1450) which is otherwise known as the "Laboratory Standard." This regulation has since been adopted by New Jersey under the Public Employees Occupational Safety and Health Act (PEOSHA).

Under PEOSHA the final standard was effective June 21, 1993, and a compliant Chemical Hygiene Plan must be implemented by March 21, 1994.

The Laboratory Standard was created in order to address the specific types of exposure potential that exist in a laboratory which are different from those types of exposures that exist in general industry. It requires the development of a Chemical Hygiene Plan (CHP), a written document which outlines the specific health and safety procedures for a given laboratory.

The main purpose of a CHP is to protect the employees in a laboratory from exposure to hazardous chemicals. It accomplishes this using the following methods:

- Education
- Monitoring
- Housekeeping
- Use of Protective Equipment

In an educational laboratory, the law does not explicitly state that students are to be included in the CHP. However, extending the 'umbrella of protection' as provided by the CHP would require minimal adjustment to the base CHP. Therefore, the CHP is constructed to protect the students, as well as the school employees.

1.0 RESPONSIBILITY

The responsibility for laboratory chemical safety at Delran Township School District includes the following:

The Delran Township Board of Education has the principal responsibility for chemical hygiene within the institution and must, with the Superintendent, the Principal, and the Science Supervisor, provide continual support for institutional chemical hygiene.

The Science Teachers is ultimately responsible for chemical hygiene within the Science Department.

The Chemical Hygiene Officer (CHO) (Ms. Erica DeMichele will be designated as the CHO) must:

a. Work with administrators and science staff to develop and implement the chemical hygiene policies and practices;
b. Monitor procedures for procurement, usage and disposal of chemicals used in the laboratories (Chemical, Biological, Physical and Earth Science) utilizing Hazard Communications (HazCom), Right to Know (RTK), and Resource Conservation and Recovery Act (RCRA) activities [summaries of these regulations are included in the Appendix];
c. See that appropriate audits are performed as per Right to Know;
d. Assist the Science Department teachers to develop precautions, standard procedures and adequate facilities;
e. Be a resource for the current legal requirements concerning regulated substances that are used at the facility;
f. Seek ways to continually improve the chemical hygiene program by utilizing resources in and out of school, keeping the information in the CHP current and encouraging revision and enhancement of the training program.

Ms. Erica DeMichele (CHO) is responsible for the implementation and continuance of the Chemical Hygiene Plan. This responsibility includes:

a. Ensuring that all Science Teachers know and follow the rules contained in the Chemical Hygiene Plan;
b. Ensuring that appropriate protective equipment is available and in working order;
c. Providing appropriate training to all Science Teachers according to departmental assignments. (This will occur in conjunction with Worker and Community Right to Know requirements);
d. Conducting regular, formal chemical hygiene and housekeeping inspections, including routine inspections of emergency equipment (at least twice each year, using the checklist provided in the Appendix);
e. Being a resource for the current legal requirements concerning regulated substances used in the laboratories and incorporating any new regulations in the chemical hygiene plan;
f. Determining the appropriate levels of protective apparel and equipment for Science Department personnel and science laboratory students;
g. Ensuring that available facilities are adequate for the use of any new material being ordered.

The Science Teacher has the primary responsibility for:

a. Observing chemical hygiene procedures during laboratory activities specific to that day's laboratory operations. (These procedures will encompass all aspects of the operation including the proper laboratory clean-up at the end of the laboratory activity. Safety recommendations will be obtained from the laboratory manuals, guides and future in-house laboratory safety development.);
b. Planning and conducting each laboratory operation in accordance with the institutional chemical hygiene procedures;
c. Developing good personal chemical hygiene habits and conveying such habits to students in the Science Department Laboratories;

d. Reviewing the appropriate safety procedures prior to the laboratory experiment and conveying this safety information to the students either through lecture or quizzing.

2.0 THE LABORATORY FACILITIES

2.1 The Design Of Laboratories Which Use Hazardous Chemicals Should Include:

a. An appropriate general ventilation system with air intakes and exhausts located to avoid intake of contaminated air. Exhausts will be located so that contaminated air is not drawn into classroom areas.

b. Stockrooms which are appropriately ventilated to minimize a buildup of fumes if an uncontrolled, unexpected chemical release was to occur (Emergency ventilation procedures will be posted in those stockrooms where ventilation may be a problem);

c. Laboratory hoods which are vented to prevent contaminated air being drawn into the general ventilation system.

d. Other standard safety equipment in or near the laboratory area including: emergency eye wash stations (in all Science Department laboratories), fire extinguishers (in all Science Department laboratories), fire blankets (in all Science Department laboratories), emergency drench stations (in chemistry laboratories where required);

e. Laboratory chemical disposal in accordance with RCRA disposal regulations (see Waste Disposal Chapter of this Plan). Biological disposal will follow proper methods and protocols for disposal of specific items.

f. Laboratory classes will not be held in rooms that do not comply with the requirements established in this document. If necessary, laboratory classes will be moved to accommodate the needs of experiments that use hazardous chemicals which require special safety precautions and/or safety equipment that is not available elsewhere. The decision to move classes will be made by the Chemical Hygiene Officer.

2.2 VENTILATION

2.2.l General Ventilation System

1. The general laboratory ventilation system shall provide a source of air for breathing and for input to local ventilation devices.
   a. It will not be relied on for protection from toxic substances released into the laboratory.
   b. The general laboratory ventilation system will ensure that laboratory air is continually exchanged, preventing a dangerous concentration of toxic substances from building up during a working day.
   c. The general laboratory ventilation system will direct air flow into the laboratory area from non-laboratory areas and out to the exterior of the building.

2.2.2 Laboratory Fume Hoods

1. Laboratory fume hoods will be vented, and the exhaust will be located in such a position to not contaminate air being drawn into the general ventilation system.
2. Each laboratory fume hood will be monitored ANNUALLY to test the fume hoods ventilation performance.

2.2.3 Special Ventilation Requirements

1. Biological hoods will be used to accommodate the needs of the Biology Department.
2. Any modifications made to the ventilation systems will be reviewed to ensure the safety of the teachers and the students working in the laboratories.
3. Changes will occur if appropriate testing of the ventilation equipment confirms a problem.
4. The normal performance rates of the room ventilation system will range from 4 to 12 room exchanges during a one-hour period, continuously, during room occupation.
5. General air flow should not be turbulent and should be relatively uniform throughout the laboratory, with no high velocity or static areas; air flow into and within the hood should not be excessively turbulent; hood face velocity should be adequate (80-100 linear feet per minute).

6. The quality and quantity of ventilation will be evaluated upon installation of all new ventilation equipment and will be regularly monitored at least every 3 months by the Department of Buildings and Grounds and be reevaluated whenever changes in the local ventilation devices are made.

3.0 BASIC RULES & PROCEDURES

Teachers and students will be responsible to know the basic rules and procedures for conducting experiments and otherwise working in the laboratory. Information regarding rules and procedures are provided in multiple locations including this document, posters, hand-outs, the laboratory syllabus and other safety guides that may be available within the Science Department.

3.1 General Rules

a. A void routine exposure to chemicals.

b. Use minimum amounts of chemicals necessary.

c. No eating, drinking, chewing gum, or application of cosmetics anywhere in the laboratory.

d. Wash hands with soap before leaving laboratory.

e. Do not store food near chemicals.

f. Use caution when using any glassware (wear gloves, goggles, etc.).

g. No running, horseplay or practical jokes.

h. Tie back long hair and loose clothing.

i. Always wear proper protective clothing to prevent exposure of skin to chemicals: goggles, gloves, apron, etc.

j. Proper shoes must be worn during all laboratory activities. Open-toe, sandals or perforated shoes shall not be worn.

k. Contact lenses shall be removed prior to all laboratory activities when chemicals are being used. Chemical fumes can become mixed with the saline solution the eyes produce and become trapped under the contact lens. Undetected, this can cause damage to the tissues of the eyes.

l. Keep work area clear and uncluttered.

m. Avoid working in lab alone.

n. Use fume hood for all operations where hazardous vapors are likely to be generated. Confirm proper fume hood performance before use. When fume hood

is in use, windows should be kept in their most efficient operating position (approximately six inches above the sill).

o. Staff and students are expected to know the location of all safety equipment.

p. Staff members shall seek information concerning the potential hazards of the chemical substances to be used in the laboratory. These sources include Material Safety Data Sheets (SDS), Laboratory manuals, as well as other chemical indexes which contain toxicological information given about the chemical substances in question.

q. Unattended operations: Normally the Science and Safety Departments do not encourage experiments to be left unattended. However, there are those times and circumstances when an experiment must be left unattended or must be left overnight due to the length of the laboratory activity. In such situations:

    1. the lights should be left on in the area where the experiment is located (room, hood, etc.);
    2. a visible sign and/or note shall be placed near the operations. Another sign shall be placed on the door of the room, to warn of any potential hazards that m ay be present in the room should a power outage occur; and
    3. provisions should be made to contain toxic substances being used in the operation in the event of utility service failure that might cause unwanted heating or cooling of the operation, ventilation system failure, fume hood failure (fumes inside the room), refrigeration failure (for volatiles that must be kept cool, etc.).

r. Experiments using hazardous chemicals that are not included on the syllabus will need prior approval by the Chemical Hygiene Officer.

s. The staff should be alert to unsafe conditions and see that they are corrected when detected to avoid a potentially hazardous condition from becoming a hazardous incident.

3.2 Rules for Working With Toxic Chemicals

a. Spill procedures and emergency contingencies will be reviewed before beginning work.
b. All transfers and work with toxic chemicals will occur in a hood.
c. Do not under any circumstances use your mouth in place of a suction device for pipetting or to start a siphon.
d. Do not use carcinogens! If used, it will be by instructors only, under carefully controlled conditions.
e. After work with toxic chemicals is complete, remove protective apparel and wash hands thoroughly (Be sure to dispose of disposable clothing and thoroughly clean other protective equipment or clothing. Disposable gloves shall be decontaminated by rinsing them with soap and water and disposing of them in a proper waste receptacle).
f. Use a wet mop, sponge or towel to clean spill of dry powder toxic chemicals (Do not use broom; wear gloves to prevent contact with skin.).
g. Keep accurate inventory records.
h. Clearly label container and hood when work is being conducted.
i. Store in area which is well ventilated and has limited access.
j. Be sure all waste is properly handled and labeled (See Waste Disposal Program and refer to Appendix A).
k. CHEMICAL DISPOSAL: No Materials which contain or may contain any chemical or chemical residue may be thrown into the trash can unless the material has been bagged in a plastic bag, so as to prevent inadvertent chemical reactions.
g. Any time that a 30% Hydrogen Peroxide solution is used for experiments, resistant gloves and lab apron are required to be worn.

3.3 Corrosive Agents

Special cautions should be used when using strong acids or bases. Be sure to reference safety information included with lab instructions to ensure that controls are in place to prevent accidents. Staff and students should be aware of location and use of emergency equipment and supplies.

3.4 Electrically Powered Laboratory Apparatus

a. Use common sense caution when using electrical equipment.
b. Do not use equipment with damaged power cords.
c. Be sure all switches are off before connecting to power source.
d. Turn instrument off before disconnecting power.
e. Do not pull cord to disconnect power.
f. Be sure hands and outlet are dry when unplugging instrument.
g. If equipment has a three-prong plug, do not circumvent the grounding mechanism.
h. Whenever possible, use outlets that have Ground-Fault Interrupt (GFI) protection.

3.5 Vacuum Procedures and Pressure Procedures

a. If a laboratory requires the use of pressure or vacuum, goggles must be worn to protect eyes and face from flying debris.
b. If a glass container is to be placed under pressure or vacuum, ensure that there are no chips or cracks in the glassware.
c. Avoid quick releases of vacuum or pressure. Regulate pressure differential to prevent undue stress to laboratory apparatus.

3.6 Procedures For Common Types Of Experiments

a. First aid kits and eye-wash stations must be inspected before each laboratory or at least once each day when experiments are being conducted.
b. Laboratory procedures and hazards must be reviewed prior to each experiment.
c. Experiments that use caustic or corrosive chemicals must be conducted in a laboratory equipped with an emergency drench shower and a 15-minute continuous flow eye-wash station.

3.7 Procedures For Other Experiments

Procedures for experiments that have unusual concerns shall include and exemplify all of the health and safety guidelines presented in the previous sections. Special care should be taken to avoid chemical exposure and to record any unexpected or otherwise unusual occurrences with detail.

4.0 CHEMICAL SAFETY

4.1 Chemical Procurement

a. All chemicals will be obtained through and with the approval of the CHO using the appropriate protocols as defined by the Science Supervisor .

b. No container will be accepted without an adequate identifying label and SDS.

c. The CHO will ensure the availability of information for proper handling, storage and disposal for all chemicals and ensure that all shipments include SDS's that will be kept on file for CHP and RTK .

d. Order reasonable amounts of chemicals that are anticipated to be used in the ensuing school year, and no more.

e. The CHO will be responsible for ensuring that older inventory supplies are exhausted before newer supplies are opened.

4.2 Chemical Stockrooms/Storerooms

Chemicals will be stored in locked storerooms in appropriately protected cabinets. Chemicals not intended for immediate use will not be stored in the laboratories unless otherwise approved by the CHO. Any chemicals stored in the laboratories will be stored according to the storage protocols and access will be limited.

Chemicals will be stored alphabetically within groups sorted by type. Toxic chemicals will be stored in a well ventilated area with local exhaust ventilation.

Chemicals that are highly toxic or other chemicals whose containers have been opened will be in unbreakable secondary containers. These containers will confine the movement of a spill, and include, but are not limited to: acid storage cabinets, oxidizer storage cabinets, laboratory storage cabinets (floor and wall anchored), and box storage with vermiculite.

Hazardous chemicals will be stored in minimum quantities so as to be expended by the end of the school year. Quantities of hazardous chemical left from the previous year will be used before new containers are opened. If using old chemicals is unacceptable, old chemicals will be marked for immediate disposal. Chemicals will be examined at least once a year by the Chemical Hygiene Officer for replacement, disposal potential, and container integrity.

Chemical substances will be stored so that they are not exposed to heat and direct sunlight.

Stockrooms/storerooms will not be used as preparation and/or repacking areas.

4.2.1 Specific Storage Safety Regulations

1. Dangerous chemicals such as corrosive acids will be stored as close to the floor as possible and preferably at floor level.
2. Any chemicals that are stored at floor level will not be in the walking area.
3. Chemicals that react violently with each other shall not be stored in proximity. Dangerous combinations are: glycerin and nitric acid; cyanides and acids; peroxides; chlorates; nitrates, permanganates (oxidizing agents), and wood, paper, and many organic compounds that can be easily oxidized.
4. White phosphorous must be kept under water in a double container (primary and secondary containment). The outer container shall be made of metal. Direct sunlight and heat must be avoided.
5. Sodium and potassium must be stored in kerosene as soon as the original container has been opened. Direct sunlight and heat can cause glass containers to break. Potassium shall not be kept longer than one academic year after being opened.
6. Hydrofluoric acid in wax bottles shall be stored in a cold location.

7. Ethyl ether (diethyl ether) shall not be kept longer than 3 months when the container is opened and not longer than one year in a sealed container. The shelf life of ethyl ether is less than one year. Ethyl ether will form volatile organic peroxides after prolonged storage past the recommended shelf life. Crystallized organic peroxides are potentially explosive.
8. Where the possibility of reagent containers slipping off a shelf exists, a ledge shall be added.
9. Glass tubing shall be stored horizontally and supported the full length of the tubing.
10. Reagent bottles shall be prominently and accurately labeled.
11. All chemicals shall be dated upon receipt and the Chemical Abstract Service (CAS) Number affixed if appropriate. When the shelf-life date is critical, a removal date will be affixed to a prominent place on the label.
12. Compressed gas cylinders shall be stored and capped in fire resistant, ventilated, dry and cool areas. Medical size cylinders shall be securely strapped to a frame or a cart built for this purpose and always stored with a cap securely in place.

General Considerations for Chemical Storage

Carefully read the label before storing a hazardous chemical. The SDS will also provide any special storage information and incompatibilities.

Do not store unsegregated chemicals in alphabetical order or incompatible chemicals in close proximity to each other. The amount of space that can be placed between different chemical classes depends on the amount of storage area available in the lab. Store dry reagents, liquids reagents and solutions and compressed gases in separate areas. Within each of these chemical forms segregate into hazard classes.

Segregate dry reagents as follows:

- oxidizing solids
- flammable solids
- water reactive solids

- all others solids

Segregate liquid reagents and solutions as follows:

- acid liquids
- caustic liquids
- oxidizing liquids
- perchloric acid solutions
- flammable or combustible liquids
- all other liquids

Segregate compressed gases as follows:

- toxic gases
- flammable gases
- oxidizing and inert gases

Once separated into hazard classes, chemicals may be stored alphabetically.

Use approved storage containers and safety cans for flammable liquids. Use spill trays under containers of strong corrosive reagents. Do not store liquids above eye level.

Dispose of old chemicals promptly.

Storage of flammable liquids outside of a storage cabinet should avoided when possible. Flammable liquids that are not in use should be stored in an appropriate cabinet.

Stability refers to the susceptibility of the chemical to dangerous decomposition. Ethers, and olefins form peroxides on exposure to air and light. Since these chemicals are packaged in an air atmosphere, peroxides can form even though the containers have not been opened.

The label and SDS will indicate if a chemical is unstable.

The following are examples of materials that may form explosive peroxides:

acetal	cyclohexene
decahydronaphthalene	diacetylene
dicyclopentadiene	diethyl ether
diethylene glycol	dimethyl ether
dioxane	divinyl acetylene
ethyl ether	terahydronaphthalene
isopropyl ether	methyl acetylene
tetrahydrofuran	vinylidene chloride
vinyl ether	ethylene glycoldimethylether (glyme)

Shock sensitive refers to the susceptibility of the chemical to rapidly decompose or explode when struck, vibrated or otherwise agitated.

Some chemicals become increasingly shock sensitive with age. Write the date received and date opened on all containers of shock sensitive chemicals. Unless an inhibitor was added by the manufacturer, closed containers of shock sensitive materials should be discarded after 1 year. Open containers of shock sensitive materials should be discarded within 6 months of opening.

The label and SDS will indicate if a chemical is shock sensitive. Wear appropriate personal protective equipment when handling shock sensitive chemicals.

Table 1 lists materials that can be shock sensitive.

acetylides of heavy metals	aluminum ophorite explosive	amatol
ammonium perchlorate	ammonium picrate	ammonium salt lattice
copper acetylide	cyanuric triazide	cyclotrimethylenetrinitramine
dinitroglycerine	dinitrophenol	dinitrophenolates
dipicryl sulfone	dipicylamine	erythritol tetranitrates
fulminate of silver	fulminating gold	fulminating mercury
germane	guanyl nitrosamino	guanyl nitrosamino
hexite	guanyltetrazene	guanylidene hydrazine
hyrazoic acid	hexanitrodiphenyl-amine	hexanitrostilbene
lead salts	lead azide	lead mannite
mercury tartrate	lead styphnate	magnesium ophorite
nitrated polyhydric alcohol	mononitrotoluene	nitroaminotetrozole
nitroglycol	nitrogen trichloride	nitrogen tri-iodide
organic amine nitrates	nitroguanidine	nitroparaffins
picratol	organic nitramines	organic peroxides
potassium nitroaminotetrazole	picric acid	picryl chloride
sodatol		silver azide
syphnic acid		sodium dinitro-ortho-

trinitroanisole trinitronaphthalene tritonal	silver acetylide sodium amatol tetrazene trintrobenzene trinitrophenetol urea nitrate	cresolate tetranitrocarbazole trinitrobenzoic acid trinitrophloro-glucinol
ammonal butyl tetryl cyclotetramethylenetranitramine dinitrophenyl hydrazine explosive mixtures fulminating platinum guanylidene hexogen lead mononitro-resorcinate mannitol hexanitrate nitrated carbohydrate nitroglycerin nitronium perchlorate picramic acid picryl fluoride silver styphnate sodium nitrate-potassium explosive mixtures tetrytol trinitrocresol trinitrotoluene	ammonium nitrate calcium nitrate dinitroethyleneurea dinitrotoluene fulminate of mercury compounds gelatinized nitrocellulose heavy metal azides hydrazinium nitrate lead picrate mercury oxalate nitrated glucoside nitroglycide nitrourea picramide polynitro aliphatic compounds silver tetrazene sodium picramate trimonite trimethylolethane trinitroresorcinol	

* This list is not all inclusive. Review the material safety data sheet for reactivity information concerning the chemicals you use.

Carefully read the label before using or storing compressed gas. The SDS will provide any special hazard information. Always use the minimum size cylinder required to perform the work.

Cylinders of compressed gases must be handled as high energy sources. When storing or moving a cylinder, have the cap securely in place to protect the stem. Use suitable racks, straps, chains or stands to support cylinders.

Do not expose cylinders to temperature extremes.

Always use the correct regulator. Do not use a regulator adapter. Oil or grease on the high-pressure side of an oxygen cylinder can cause an explosion. Do not lubricate an oxygen regulator.

Cylinders of toxic, flammable, or reactive gases should be stored and used in a fume hood or with local ventilation.

Never bleed a cylinder completely empty. Leave a slight pressure to keep contaminants out.

Always wear safety glasses when handling compressed gases.

The decisions you make concerning the use of chemicals in the laboratory should be based on an objective analysis of the hazards, rather than merely the perception of the risks involved. Once this has been accomplished, a reasonable means of controlling the hazards through experimental protocol, work practices , ventilation, use of protective clothing, etc., can be determined.

In order to assess the hazards of a particular chemical, both the physical and health hazards of the chemical must be considered.

Before using any chemical, the safety data sheets (sds) or other appropriate resource should be reviewed to determine what conditions of use might pose a hazard. Accidents with hazardous chemicals can happen quickly and may be quite severe. The key to prevention of these accidents is awareness. Once the hazards are known, the risk of an accident may be reduced significantly by using safe work practices.

Basic Toxicology

The health effects of hazardous chemicals are often less clear than the physical hazards. Data on the health effects of chemical exposure, especially from chronic exposure, are often incomplete. When discussing the health effects of chemicals, two terms are often used interchangeably - *toxicity* and *hazard*. However, the actual meanings of these words are quite different. *Toxicity* is an inherent property of a material, similar to its physical constants. It is the ability of a chemical substance to cause an undesirable effect in a biological system. *Hazard* is the likelihood that a

material will exert its toxic effects *under the conditions of use*. Thus, with proper handling, highly toxic chemicals can be used safely. Conversely, less toxic chemicals can be extremely hazardous if handled improperly.

RISK = TOXICITY X EXPOSURE

The actual health risk of a chemical is a function of the toxicity and the actual exposure. No matter how toxic the material may be, there is little risk involved unless it enters the body. An assessment of the toxicity of the chemicals and the possible routes of entry will help determine what protective measures should be taken.

4.3 Chemical Distribution

The CHO will manage the distribution of chemicals to individual storage closets and storage areas. The CHO will be responsible for safe distribution of the chemicals to their appropriate storage areas in a timely manner.

If the distribution of chemicals requires transporting the chemicals using an automobile or other vehicle, containers will be packed so as to reduce the risk of breakage during transportation (Please refer to SDS's for storage, transportation and incompatibility requirements).

4.4 Laboratory Storage

Flammable chemicals are to be stored in a flammable cabinet. If the cabinet is metallic, it will be electrically grounded.

Corrosive chemicals are to be stored in a corrosion resistant cabinet. Nitric acid will be kept separate from other corrosives using at least secondary containment measures.

Other chemicals will be stored according to groups in a well-ventilated area.

All storage areas will have access to at least one ABC rated fire extinguisher.

Storage cabinets will not be moved without prior approval and assistance from the CHO. Signs will be posted near each movable cabinet to ensure that the dangers of moving the cabinets are clearly illustrated.

4.5 Chemical Hazards

General

Hazardous chemical means a chemical for which there is statistically significant evidence (based on at least one study conducted according to established scientific principles), that acute or chronic health effects may occur in exposed employees, or if it is listed in any of the following:

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

In most cases, the label will indicate if the chemical is hazardous. Look for key words like caution, hazardous, toxic, dangerous, corrosive, irritant, or carcinogen. Old containers of hazardous chemicals (pre-1985) may not contain hazard warnings.

If you are not sure a chemical you are using is hazardous, review the Material Safety Data Sheet (SDS) or contact your supervisor.

IRRITANTS*:*
Irritants are materials that cause inflammation of the body surface with which they come in contact. The inflammation results from concentrations far below those needed to cause corrosion. Common irritants include substances such as:

- ammonia
- alkaline dusts and mists
- hydrogen chloride
- hydrogen fluoride*
- halogens
- ozone
- phosgene*
- nitrogen dioxide
- phosphorus chloride
- arsenic trichloride
- these materials also have other hazardous properties.

Irritants can also cause changes in the mechanics of respiration and lung function. These include:

- sulfur dioxide
- acetic acid
- formaldehyde*
- formic acid
- sulfuric acid
- acrolein
- halogens

  * these materials also have other hazardous properties.

Long term exposure to irritants can result in increased mucous secretions and chronic bronchitis.

A *primary irritant* exerts no systemic toxic action, either because the products formed on the tissue of the respiratory tract are non-toxic or because the irritant action is more severe than any systemic toxic action. Example: hydrogen chloride.

A *secondary irritant's* effect on mucous membranes is overshadowed by a systemic effect resulting from absorption. These include:

- hydrogen sulfide
- aromatic hydrocarbons

Exposure to a secondary irritant can result in pulmonary edema, hemorrhage and tissue necrosis.

Simple Asphyxiants deprive the tissue of oxygen. Simple asphyxiants are inert gases that displace oxygen. These include:

- nitrogen
- nitrous oxide
- carbon dioxide
- helium

Chemical asphyxiants render the body incapable of maintaining an adequate oxygen supply. They are active at very low concentrations (few ppm). These include:

- carbon monoxide
- cyanides

Primary anesthetics have a depressant effect upon the central nervous system, particularly the brain. These include:

- halogenated hydrocarbons
- alcohols

Hepatotoxic agents cause damage to the liver. These include:

- carbon tetrachloride
- tetrachloroethane
- nitrosamines

Nephrotoxic agents damage the kidneys. These include:

- halogenated hydrocarbons
- uranium compounds

Neurotoxic agents damage the nervous system. The nervous system is especially sensitive to organometallic compounds and certain sulfide compounds. These include:

- trialkyl tin compounds
- tetraethyl lead
- methyl mercury
- carbon disulfide
- organic phosphorus insecticides
- manganese
- thallium

Some toxic agents act on the blood or *hematopoietic* system. The blood cells can be directly affected, or the bone marrow can be damaged. These include:

- nitrites
- aniline
- toluidine
- nitrobenzene
- benzene

There are toxic agents that produce damage of the pulmonary tissue (lungs) but not by immediate irritant action. *Fibrotic* changes can be caused by free silica and asbestos. Other dusts can cause a restrictive disease called pneumoconiosis.

The term *carcinogen* describes any agent that can initiate or speed the development of malignant or potentially malignant tumors, malignant neoplastic proliferation of cells, or cells that possess such material. A listing of carcinogenic materials can be found in appendix C. Carcinogens commonly used in large quantities at the University include formaldehyde, benzene, ethylene amine, ethylene oxide, and chloroform.

Select carcinogen is any substance that meets one of the following criteria:

- It is regulated by OSHA as a carcinogen
- It is listed under the category, "known to be carcinogens" in the National Toxicology Program (NTP), "Annual Report of Carcinogens" (latest edition)
- It is listed under Group 1, "carcinogenic to humans" by the International Agency for Research on Cancer Monographs (IARC)
- It is listed under 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 according to any of the following criteria:
    a. After inhalation exposure of 6-7 hours per day, 5 days per week, for a significant portion of a lifetime, to doses of less than 10 mg/m3
    b. After repeated skin application of 300 mg/kg of body weight per week
    c. After oral doses of less than 50 mg/kg of body weight per day

Reproductive hazards are chemicals that affect the reproductive capabilities including chromosomal damage (mutagens) and effects on the fetus (teratogens).

A *mutagen* affects the chromosome chains of exposed cells. The effect is hereditary and becomes part of the genetic pool passed on to future generation.

A *teratogen* (embryotoxic or fetotoxic agent) is an agent that interferes with normal embryonic development without damage to the mother or lethal effect on the fetus. Effects are not hereditary.

A *sensitizer* causes a majority of the exposed population to develop an allergic reaction in normal tissue after repeated exposure to the chemical. The reaction may be as mild as a rash (contact dermatitis) or as serious as anaphylactic shock.

Acutely toxic chemicals are substances falling into the following categories:

- A chemical that has a median lethal dose (LD50) of 50 milligrams or less per kilogram of body weight, when administered to albino rats weighing 200g to 300g each.

- A chemical that has a median lethal dose (LD50) of 2000 milligrams or less per kilogram of body weight, when administered by continuous contact for 24 hours, (or less if death occurs within 24 hours), to the bare skin of albino rabbits weighing 200g to 300g each.

- A chemical that has a median lethal concentration (LC50) in air of 200 parts per million by volume, or less, of gas, or vapor, or 2 milligrams per liter or less, of mist, fume, or dust, when administered by continuous inhalation for one hour, (or less if death occurs within one hour), to albino rats weighing 200g to 300g each.

Extremely toxic chemicals are substances that cause irreversible neurological damage or death with extremely small doses. Substances in this class include many organic mercury compounds such as dimethyl mercury and MPTP (1-methyl-4phenyl-1, 2, 3, 6-tetrahydropyridine) which can cause irreversible Parkinsonian syndrome. Lab work with these materials requires review by EHRS and typically includes chemical resistant gloves and protective clothing.

5.0 ENVIRONMENTAL MONITORING

The risk of exposure in an educational laboratory is minimal yet it still exists. Any risk requires the use of an environmental monitoring program, but the minimal risk allows the use of a program which is not as comprehensive as that used in an industrial laboratory. Therefore, monitoring of airborne concentrations of chemical substances by instrumentation will only be performed upon the recommendation of the Chemical Hygiene Officer.

The syllabus will be reviewed annually to evaluate which experiments use hazardous chemicals. Special notes will be included with the experiment procedures for those experiments to ensure that all who will be participating in those experiments are aware of the dangers and how to protect themselves.

An "Incident Report Log" will be created in order to track accidents during the experiments that are conducted in each laboratory. The following information will need to be entered in the log.

Name of Experiment	**Date**	**Time**	**Class Number**

List of Chemicals Used	**Hazardous? How?**

Comments, Accidents, Unusual Occurrences:

The log will be kept accessible with the SDS's and it will be the instructor's responsibility to enter information anytime there is a problem in a lab experiment, even if the problem appeared to be small.

At the end of each school year, the log will be reviewed by the CHO for any repetitive potential exposures.

If at any time during any experiment, a person or persons experience nausea, dizziness or other symptoms that may indicate an exposure, clear the area to ensure that no further exposure occurs.

Please refer to the Medical Program section for more information on exposure symptoms.

5.1 Chemical Spill Response Information

Low Risk: Spills or release involving small volumes of low-hazard chemicals should be cleaned up by laboratory personnel using appropriate personal protective equipment (PPE) and pertinent information about the chemical (ex. Safety Data Sheet)

High Risk: Spills or releases involving highly hazardous chemicals should not be cleaned up by lab personnel. In case of such an event, call 911 immediately.

Low-Risk Spill or Release Response Procedure:

1. Put on appropriate PPE.
2. Isolate spill with absorbents. Protect any floor drains or exterior storm drains.
3. Liberally cover spill with appropriate neutralizing agent.
4. Prepare a hard walled container lined with 2 mil polyethylene bag.
5. Utilize tongs, dustpan, and broom while picking up broken glass.
6. Place neutralized material and saturated absorbents in a trash bag or other container that will contain fluid.
7. Place a label on the bag identifying its contents.
8. Dispose of the waste in a proper manner, by contacting a hazardous waste disposal company.

High-Risk Spill or Release Response Procedure:

1. Evacuate the laboratory.
2. Alert all personnel in adjoining rooms to evacuate.
3. Call 911.
4. Go directly to the Main Office and inform the principal and other appropriate staff of the situation, such as the chemical hygiene officer and facilities personnel.
5. Obtain the safety data sheet and other requested information for the first responders.

6.0 HOUSEKEEPING, MAINTENANCE & INSPECTIONS

6.1 General

a. Laboratories will be kept clean and orderly at all times.

b. Floors will be kept clean and will be cleaned immediately after a spill.

c. Storage areas will be kept clean at all times. Free access to all chemical storage areas will be appropriately maintained.

d. Avoid storage of containers on the floors. Appropriate shelf space will be used, if available.

e. When not in use, all chemicals and equipment will be returned to its proper storage area.

f. When experiments are being conducted, special care will be taken to ensure that easy access is made to the safety equipment and the exit doors.

6.2 Cleaning

a. Floors will be cleaned regularly.

b. Counter tops and fume hoods will be cleaned immediately after each use.

6.3 Inspections

The purpose of the inspection is not to reprimand but to ensure proper chemical hygiene in the laboratory.

Formal housekeeping inspections will be conducted at least twice a year. Inspections will be performed by the CHO or an appointed officer in cooperation with the teachers responsible for each laboratory or storeroom (See section 6.0).

6.4 Maintenance

Fume hoods and other protective equipment will be inspected for proper operation at least once each year. Records of all inspections and maintenance performed on the fume hoods and the general ventilation system will be maintained in the Science Office and the Office of the Department of Buildings and Grounds.

All safety equipment will be maintained according to manufacturer's recommendations.

All safety equipment will be tested to ensure proper operation at least once every two months. This will include:

- inspecting eye-wash stations and showers,
- checking water level on portable eyewashes (eye-washes that are more likely to be emptied will be inspected daily.),
- inspecting pressure gauges on fire extinguishers,
- inspecting fire blankets

6.5 Passageways

All passageways are to remain clean and clear of debris and/or furniture at all times to provide easy mobility.

Passageways include the following:

- doors connecting laboratories, classrooms, and storage areas
- aisles between rows of desks or lab benches.
- storage areas with connecting or exit doors at either end.
- means of egress (visible and clear), if blocked "Not an exit" sign.

If a passageway must be blocked, it will be clearly marked as "Blocked -Not an Exit."

7.0 MEDICAL PROGRAM

7.1 Compliance

The Laboratory Standard requires that “employers provide employees with an opportunity to receive appropriate medical examinations whenever the employee exhibits signs or symptoms associated with exposure to a hazardous chemical.”

The standard also requires that the employer provide medical consultation in the case of a spill, leak or other potential employee exposure. The purpose of the consultation is to determine whether an examination is necessary. "All medical examinations and consultations shall be performed by or under the direct supervision of a licensed physician and shall be provided at a reasonable time and place without cost to the employee.”

7.2 Exposure Recognition

It is important that signs and symptoms of exposure to hazardous chemicals are easily recognized. The following are some typical symptoms that may be observed when an individual is exposed to a hazardous chemical:

- nausea, vomiting
- dizziness, light-headedness, confusion irritability
- eye irritation
- skin rash, itchiness
- numbness in the extremities
- jaundice (yellowing of skin)

These are only the most common signs and symptoms. Any unusual behavior or symptoms could be an indication of an exposure. If an exposure is suspected, move the affected individual to a clean air source (outside is preferable). Record any exposures or suspected exposures in the Incident Logbook.

1: Federal Register, Vol. 55, No.21, 29 CFR part 1910, "Occupational Exposures to Hazardous Chemicals in Laboratories; Final Rule", p. 3325 2 Ibid., p. 3325

7.3 First Aid [3]

ANY FIRST AID REQUIRED WILL BE RENDERED BY THE SCHOOL NURSE.

*First aid information presented in this document does not supersede the authority of an Emergency Medical Technician, nurse or licensed physician.

First Aid Booklets and Pamphlets are available from the American Red Cross. Where applicable, Red Cross posters should be placed in conspicuous locations.

If exposure to a chemical occurs, call the Poison Control Center immediately. They are available 24 hours a day, every day of the year. On staff nurses will direct you in administering the proper procedures for a chemical exposure.

NJ Poison Control Center: 1-800-764- 7661

Inhalation of Chemical Vapor

Immediately move victim out of room and into an area with clean fresh air, preferably outside.

Alert medical authorities for observation.

The respiratory tract is the most common route of entry for gases, vapors, particles, and aerosols (smoke, mists and fumes). These materials may be transported into the lungs and exert localized effects or be absorbed into the bloodstream. Factors that influence the absorption of these materials may include the vapor pressure of the material, solubility, particle size, its concentration in the inhaled air, and the chemical properties of the material. The vapor pressure is an indicator of how quickly a substance evaporates into the air and how high the concentration in air can become – higher concentrations in air cause greater exposure in the lungs and greater absorption in the bloodstream.

Most chemicals have an odor that is perceptible at a certain concentration, referred to as the odor threshold; however, there is no relationship between odor and toxicity. There is considerable individual variability in the perception of odor. Olfactory fatigue may occur when exposed to high concentrations or after prolonged exposure to some substances. This may cause the odor to seem to diminish or disappear, while the danger of overexposure remains.

Symptoms of over-exposure may include headaches, increased mucus production, and eye, nose and throat irritation. Narcotic effects, including confusion, dizziness, drowsiness, or collapse, may result from exposure to some substances, particularly many solvents. In the event of exposure, close containers or otherwise increase ventilation, and move to fresh air. If symptoms persist, seek medical attention.

Volatile hazardous materials should be used in a well-ventilated area, preferably a fume hood, to reduce the potential of exposure.

Skin Exposure to Chemical

Remove contaminated clothing. Flush exposed area of skin with copious amounts of water. Skin should be flushed for at least 15 minutes. Alert medical authorities to observation.

NOTE: If skin contact with a chemical covers a large area of the body and soaks the clothing, remember that modesty must not preempt safety. (All effected clothing must b removed to effectively rinse skin under the garments).

The simplest way for chemicals to enter the body is through direct contact with the skin or eyes. Skin contact with a chemical may result in a local reaction, such as a burn or rash, or absorption into the bloodstream. Absorption into the bloodstream may then allow the chemical to cause toxic effects on other parts of the body. The SDS usually includes information regarding whether or not skin absorption is a significant route of exposure

The absorption of a chemical through intact skin is influenced by the health of the skin and the properties of the chemical. Skin that is dry or cracked or has lacerations offers less resistance. Fat-soluble substances, such as many organic solvents, can easily penetrate skin and, in some instances, can alter the skin's ability to resist absorption of other substances.

Wear gloves and other protective clothing to minimize skin exposure. See Personal Protective Equipment (section 8.0) for more information. Symptoms of skin exposure include dry, whitened skin, redness and swelling, rashes or blisters, and itching. In the event of chemical contact on skin, rinse the affected area with water for at least 15 minutes, remove clothing while rinsing, if necessary. Seek medical attention if symptoms persist.

Avoid use of solvents for washing skin. They remove the natural protective oils from the skin and can cause irritation and inflammation. In some cases, washing with a solvent may facilitate absorption of a toxic chemical.

Chemical contact with eyes can be particularly dangerous, resulting in painful injury or loss of sight. Wearing safety goggles or a face shield can reduce the risk of eye contact. Eyes that have been in contact with chemicals should be rinsed immediately with water continuously for at least 15 minutes. Contact lenses should be removed while rinsing—do not delay rinsing to remove the lenses. Medical attention is necessary if symptoms persist.

Eye Exposure to Chemical

Immediately move victim to eye-wash station and flush eyes for a minimum of 15 minutes. Alert medical authorities for observation.

Ingestion of Chemical

Alert the Poison Control Center. Read instructions on the SDS or container label (if available). Be cautious, labels are frequently incorrect as to properly responding to ingestion of a chemical. Do not induce vomiting unless instructed by the Poison Control Center.

The gastrointestinal tract is another possible route of entry for toxic substances. Although direct ingestion of a laboratory chemical is unlikely, exposure may occur as a result of ingesting contaminated food or beverages, touching the mouth with contaminated fingers, or swallowing inhaled particles which have been cleared from the respiratory system. The possibility of exposure by this route may be reduced by not eating, drinking, smoking, or storing food in the laboratory, and by washing hands thoroughly after working with chemicals, even when gloves were worn.

Injection of Chemical (via cuts)

Immediately flush injection point with copious amounts of water. Contact the Poison Control Center. If bleeding is serious, refer to First Aid Posters for instructions on how to stop bleeding.

In all cases of chemical exposure, the school medical authority must be notified. If the Poison Control Center is contacted, they will arrange for transportation to a hospital.

The final possible route of exposure to chemicals is by accidental injection. Injection effectively bypasses the protection provided by intact skin and provides direct access to the bloodstream, thus, to internal organ systems. Injection may occur through mishaps with syringe needles, or through accidents with pipettes, broken glassware or other sharp objects that have been contaminated with toxic substances.

If accidental injection has occurred, wash the area with soap and water and seek medical attention, if necessary. Cautious use of any sharp object is always important. Wearing gloves may also reduce the possibility of injection.

7.4 Specific Evaluation Procedures

All accidents which result in the potential exposure of a student or staff member to a hazardous chemical will be reported using the current facility reporting procedures.

1. The district shall provide the physician with:
   - information as to the identity of the hazardous chemical(s) used by an exposed employee.
   - a description of the conditions which existed during the time of an exposure incident
   - a description of the signs and symptoms of the exposure that the employee is experiencing.
2. The physician shall provide the district with:
   - recommendations concerning further medical follow-ups for the exposed employee to the district in writing
   - written results of the medical examination of the exposed employee
   - a written report to the district on any medical condition which may be revealed in the course of the examination which may place the exposed employee at increased risk
   - a written statement specifying that the exposed employee has been informed by the physician of the results of the consultation or medical examination.

The district shall establish and maintain for each employee that works in laboratory environments, an accurate record of any measurements taken to monitor employee exposures and any medical consultation and examinations including tests or written opinions that are required.

8.0 PROTECTIVE APPAREL AND EQUIPMENT

8.1 Compatibility

a. Protective apparel and equipment should be constructed of material which is chemical resistant. **Polyvinylchloride (PVC)** is a commonly used plastic which is resistant to many different types of chemicals.

b. When using strong acids and bases, it is very important to know the compatibility of the **gloves** being worn with the material being used. Check manufacturer's information.

c. Clear plastic **goggles (not safety glasses)** are suitable for secondary educational laboratory experiments. The most important function of goggles is to protect the eye from flying debris and splashes. In the case of a splash, the goggles must be able to be removed quickly.

8.2 Safety Shower

At least one drenching safety shower will be located in each facility where caustic or corrosive chemicals are used in the laboratories. Any experiments that use caustic or corrosive chemicals must be conducted in laboratories which have easy access to a drenching shower.

8.3 Eyewash

Each Chemistry and Biology laboratory classroom will be equipped with an eye-wash station. Every laboratory classroom which uses corrosive or caustic materials must be equipped with an eye-wash station that is capable of supplying a 15-minute continuous flow of water.

8.4 Fire Extinguisher

Each laboratory will be equipped with two fire extinguishers and fire blanket. The fire extinguishers should be inspected annually. All science department staff are expected to have the basic knowledge for proper operation of a fire extinguisher. It is the Chemical Hygiene Officer's responsibility to ensure that all teachers know how to extinguish a flame with a fire extinguisher.

8.5 Other

Anyone, whether staff or student, who conducts a laboratory experiment using hazardous chemicals, must wear a full protective apron and goggles at all times during the experiment (gloves will be worn when deemed necessary by the CHO and the instructor).

9.0 RECORDS

All records pertaining to the laboratories and the Chemical Hygiene Plan will be kept in a central location which provides easy access. Whenever possible, records will be inserted into the main copy of the CHP.

9.1 Accident

All accidents, regardless of how minor, will be recorded and filed with the Incident Report Log for annual review by the CHO. Accidents include not only those involving chemicals but any incident where there is an injury or damage to the facility. The following information will be recorded:

- date and time of incident
- names and titles of those involved description of incident
- names of chemicals involved types of equipment involved
- how incident will be prevented in future

Accident records will be reviewed at the end of each year to identify recurrent problems and any areas that are not being protected by the CHP.

9.2 Inventory

An inventory will be kept of all the hazardous chemicals that are stored at the facility. Inventories of chemicals will be kept in accordance with all Right-To-Know regulations.

Material Safety Data Sheets (SDS's) for all chemicals stored in the laboratory facilities will be kept on file and easily accessible.

9.3 Medical

The results of all consultations and examinations as a result of a suspected or confirmed exposure will be kept on file at all times. Actual records will be kept with the school nurse.

References to those records will be kept on file with the CHO. Records of examinations will be kept so as to protect the privacy of the individual who may have been exposed.

An annual consultation between the CHO and the facility's nurse will be scheduled in order to fully evaluate medical records so that the privacy of the student or staff member will be maintained.

9.4 Information & Training

Records of all information and training classes and memos will be kept on file for three years. Records will include content of class as well as attendance sheets.

10.0 SIGNS AND LABELS

Various types of information that are pertinent to the CHP will be posted in different areas of the Science Department. Posters will be changed and updated in order to attract attention and to promote reading and understanding the posters. Some posters may require some explanation and may be included in any safety lectures that are conducted throughout the school year.

To Be Posted in Staff Offices and Meeting Areas:
Emergency Phone Numbers and Emergency Procedures

To Be Posted in All Laboratories:
General Rules, Clean-up Guides, Emergency Information, Chemical Handling Information

To Be Posted in Chemistry Laboratories: **Handling Caustics and Corrosives**

To Be Posted in Biology Laboratories: **Avoiding Formaldehyde Vapors**

Labeling:
All containers will be labeled according to New Jersey's Right to Know regulations. Process containers such as beakers and reaction flasks that will be emptied before the end of the laboratory need not be labeled.

However, containers that will not be emptied within 48 hours must be labeled properly. Labels can be copied from the originating container label.

11.0 SPILLS AND ACCIDENTS

11.1 Emergency Response Procedures -Large Spills

a. The student or other witness will notify the appropriate and most convenient proper authority (classroom teacher, security guard, or principal) of the spill. The witness must provide the following information, if possible:

NAME of the spilled material

LOCATION of spill

AMOUNT spilled (approximately)

b. Upon evaluation by the instructor, CHO or Science Supervisor, the room will be evacuated, if necessary. If evacuation is necessary, the principal must be notified as soon as possible and given the information on the spill.

c. Any adjacent classrooms that may potentially be exposed to vapors, gases or fumes from the incident must also be evacuated.

d. The teacher or CHO may take defensive steps to help prevent the spread of the contamination into drains or other environmentally sensitive areas. These steps may include the placement of absorbent materials around the perimeter of the drain or blocking drains. Employees WILL NOT come into contact with spilled material or place themselves at risk. If evacuation was not necessary , the defensive steps taken by the appropriate personnel will be sufficient in responding to the spill.

e. If evacuation was necessary, the principal or other emergency personnel will notify the fire department, a Hazardous Materials Emergency Response Team (HAZMAT) and the Plant Facilities Supervisor as soon as word is received of the spill. The HAZMAT Incident Commander is the most senior person responsible for directing activities throughout the clean-up efforts.4

f. Trained emergency responders will dispatch to the scene, bringing appropriate personal protective equipment, communication devices, air monitoring equipment and first aid equipment.

g. The Incident Commander shall establish external communication channels between the school and outside parties using the school dispatcher or any other appropriate means of external communication.

h. The Incident Commander will contact any outside agencies necessary to assist in the response including any of the fire, police, emergency medical, health or emergency management departments, to provide essential services.

i. The Incident Commander will contact the DEP spill hotline if he/she believes at any time during the response that the spill or release represents a potential or actual hazard to the environment or community.

j. The Incident commander shall determine when it is safe to re-occupy the classroom or building. In making this determination, the Incident Commander will consider air monitoring results and will check all potentially affected classroom equipment for evidence of pressure build-up, leaks, or other potential hazards.

k. After the completion of the emergency response, the Incident Commander will convene all responders, the classroom instructor and the appropriate school administrators to critique the handling of the response, to determine the root cause of the incident, and to **identify future preventive** measures.

The fire department will arrive on site with its own Incident Commander whose responsibility is to take immediate corrective action to stop the leak or discharge or contact the New Jersey State Police Emergency Response Unit if the scope of the job becomes too large. The contracted HAZMAT group will be given charge of the site when the fire department is satisfied that sufficient steps have been taken. The School District will assume all liability for proper clean-up of the spilled material.

11.2 Alarm System

Locations of nearest alarm pull stations will be posted inside door of each laboratory classroom.

11.3 Spill Control

Each laboratory will have access to spill control equipment relevant to the chemicals being used in that particular laboratory. Equipment can be stored in such a fashion where multiple labs could share the same equipment (i.e.-prep rooms, storage closets, etc.)

Some examples of spill control equipment are listed below:

- Universal spill pillows capable of absorbing various types of liquids.
- Acid/Base neutralization materials.
- Commercially available universal spill kits.
- 5-gallon chemically resistant container for waste storage prior to disposal.

The equipment necessary for each laboratory will be determined by the CHO.

11.4 Reporting

All spills must be reported to the CHO and properly recorded in the Incident Report Log.

12.0 INFORMATION AND TRAINING PROGRAM

12.1 General Content

The purpose of the Information and Training Program is to ensure that all school staff are thoroughly versed in the overall content of the CHP and the procedures that are defined within it.

The Information and Training Program also ensures that the staff gather as a group in order to address any shortcomings or inadequacies of the CHP.

Many of the requirements within the Laboratory Standard overlap the requirements of the New Jersey Right-To-Know (NJRTK) requirements. The CHP Information and Training will be able to be combined with the NJRTK training.

The initial introductory training will establish and explain the contents of the CHP and responsibilities of the various employees. It will also explain the importance of documentation and of using procedures that incorporate proper health and safety aspects as described within the CHP .

12.2 Emergencies and Personal Protection Training

The Emergency Response Procedures as outlined in Chapter 11.0 will be reviewed and explained.

The importance of using personal protective equipment during educational laboratories and while preparing for classes will be explained and emphasized. (for example - Educators will necessarily be exposed to chemicals of greater concentrations in preparing solutions for use in experiments.)

12.3 Chemical Hazards

The specific hazards of the most commonly used chemicals will be reviewed. (chemical specific training)

Any chemicals that staff may have questions about how to handle or dispose will also be reviewed.

12.4 Training Is Continual

Meetings and training courses are not intended to be the only source of training. The CHP is expected to be modified whenever it becomes necessary. Every time the CHP is modified, some informal training must follow to ensure that all appropriate staff are knowledgeable of the changes.

12.5 Literature/Consultation

Appropriate literature will be distributed during the training programs. Each affected staff member will be supplied a personal copy of the CHP.

13.0 WASTE DISPOSAL PROGRAM

13.1 General Information

Currently, the science department at the Schools do not generate enough hazardous waste in any given month in order to be classified as a Fully Regulated Generator. However, in the case that enough waste is generated to exceed the 220-pound monthly limit for chronic waste or 2.2 pound limit for acute waste, then the Standard Operating Procedures presented in the following section shall be followed.

13.2 Standard Operating Procedures

Identification

Please refer to Appendix A to determine whether waste is listed and whether the hazard is considered to be acute or chronic. If the waste is not listed, then it can be disposed of as ordinary solid waste or poured down the drain.[6]

Determination

The following questions must be answered:

1. How much hazardous waste has been or will be generated during this calendar month?
2. How much hazardous waste is currently being stored at this facility?
3. Do these totals add up to greater than 2.2 pounds of acutely hazardous waste or greater than 220 pounds of chronically hazardous waste?

If the answer to number 3 is 'NO' then the facility is considered to be a Small Quantity Generator and the waste does not need to be manifested (It must, however, be properly segregated and disposed of at the Burlington County Landfill in Columbus as hazardous waste.).

5 High school laboratory waste product contents should be known. If they are unknown, the characteristics must be compared against the regulations in the Appendix.

6 Anything poured down the drain must be diluted to prevent any possible disturbance in drain lines

If the answer to question 3 is 'YES' then the material must be manifested, packed and transported by a licensed hazardous waste hauler to a licensed Transportation, Storage and Disposal (TSD) facility. The appropriate supervisor will assist in determining who will be contracted to dispose of manifested waste.

13.3 Chemical Waste Disposal:

a. Chemical waste shall be deposited in appropriately labeled receptacles.

b. Do not discharge concentrated acids or bases, highly toxic, malodorous, and lachrymatory substances or any substance that might interfere with the biological activity of wastewater treatment plants, create fire or explosion hazards, cause structural damage, or obstruct flow.

c. Since each chemical presents its own special problem for disposal, Safety Data Sheets should be consulted for the best methods of disposal. Disposal by recycling or chemical decontamination is the preferred method.

d. Before beginning any laboratory activity, the teacher should be familiar with the best techniques for disposal of the chemicals and materials involved.

e. Only those organic compounds that are reasonably soluble in water are suitable for drain disposal. A compound is considered water soluble if it dissolves to the extent of at least 3% judged by whether 0.2 milliliters or 0.1 grams dissolves in 3 milliliters of water in a test tube (Prudent Practices for Disposal of Chemicals from Laboratories). In such situations materials can be put down the drain when flushed or mixed with at least 100 volumes of excess water. Substances that boil below 50 degrees Celsius should never be flushed down the drain.

f. Inorganic compounds that contain low toxic hazard cations and anions can be disposed of down the drain provided they are neutralized to a pH between 6 and 10.

g. Inorganic compounds that are insoluble should be disposed of in the solid chemical waste container. Soluble compounds that contain toxic cations should be precipitated and disposed of in the manner suggested by the Chemical Hygiene Officer.

h. The following is a partial list of examples of how chemical substances should be disposed of in house:

Acetone	Dilute with at least ten times its original volume of water and pour down the drain.
Acetic Acid	Neutralize with a base and pour down the drain.
Ammonium Chloride	Pour down the drain.
Calcium Chloride	Pour down the drain.
Calcium Hydroxide	Pour down the drain.
Calcium Oxide	Mix with water to make a thin slurry, adjust pH to approximately 7 and pour down the drain.
Copper Compounds	Evaporate to dryness and reserve residue for disposal by an EPA approved waste disposal contractor.
Denatured Alcohol	Dilute with at least ten times its original volume of water and pour down the drain.
Ethyl Alcohol	Dilute with at least ten times its original volume of water and pour down the drain.
Hydrochloric Acid	Neutralize with a base and pour down the drain.
Hydrogen Peroxide	Decompose by boiling for approximately ten minutes (2%-3%) then pour down the drain.
Iodine	Treat with lM Sodium Thiosulfate solution to convert iodine and pour the mixture down the drain.
Lead Compounds	Reserve for disposal by an EPA approved waste disposal contractor.
Limewater	Pour down the drain.
Mercury	Collect and store in labeled, sealed containers. Recycle in house or utilize an EPA approved hazardous waste transport contractor to send out to a recycling firm.
Methyl Alcohol	Dilute with water to at least ten times its volume and pour down the drain.

Nitric Acid	Neutralize with a base and pour down the drain.
Phenolphthalein	Dilute with water to at least ten times its volume and pour down the drain.
Paradichlorobenzene	Place in a clearly marked wide-mouth bottle partially filled with finely divided vermiculite and fitted with a good screw cap for storage for disposal by an EPA approved waste disposal contractor.
Sodium Hydroxide	Neutralize with an acid and pour down the drain.
Sulfuric Acid	While stirring slowly, add the acid to at least ten times its volume of water. Neutralize with a base and pour down the drain.
Strontium Chloride	Reserve for disposal by an EPA approved disposal contractor. **Zinc Chloride** Adjust pH to approximately 7 and pour down the drain. **Zinc Nitrate** Pour down the drain.

13.4 Biological Waste Disposal:

a. Following dissection procedures, preserved specimens will be disposed of in accordance with the procedures recommended in the technical information provided by the vendor of the specimens (i.e. material data safety sheets and direct contact with the vendor) and in an appropriately labeled receptacle.

b. All disposable instruments used to perform the dissection will be disposed of following the same procedures used for preserved specimens.

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