TRAINING UPDATE

Lab Location:	SGMC, WAH & GEC	**Date Distributed:**	4/23/2019
Department:	All staff	**Due Date:**	5/23/2019
		Implementation:	**5/15/2019**

DESCRIPTION OF REVISION

Name of procedure:

Chemical Hygiene Plan SGMC.SA932 v1

Description of change(s):

This is a 'new' SOP that replaces our previous EHS corporate version. It is very similar to the old SOP but has been converted to our local SOP format. A few minor changes were made:

- Removed information that does not pertain to our labs
- Added more details to handling dry ice

Annual training is required for the CHP. Please read through and familiarize yourself with the contents.

This SOP will be implemented on May 15, 2019

Document your compliance with this training update by taking the quiz in the MTS system.

Non-Technical SOP

Title	**Chemical Hygiene Plan**	
Prepared by	Leslie Barrett	Date: 4/10/2019
Owner	Robert SanLuis	Date: 4/10/2019

Laboratory Approval		
Print Name and Title	**Signature**	**Date**
Refer to the electronic signature page for approval and approval dates.		
Local Issue Date:	Local Effective Date:	

Review:		
Print Name	**Signature**	**Date**

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1. PURPOSE

This procedure is intended to protect Laboratory employees from exposures to hazardous laboratory chemicals and to provide guidance on establishing good health and safety practices for laboratory operations. This document outlines compliance requirements for 29 CFR 1910.1450 the OSHA Laboratory Standard and serves as the written Chemical Hygiene Plan (CHP).

2. SCOPE

This document applies to all laboratory employees and facilities that use hazardous chemicals. This procedure is to be used in conjunction with the related standard operating procedures listed in section 6 of this document.

3. RESPONSIBILITY

- Lab Director (or CLIA License Holder) - Ensures the safety and well-being of all personnel involved in activities utilizing radiation, chemical or biological hazards; accomplished in part by providing staff and resources to implement and maintain the provisions of this document.
- Chemical Hygiene Officer (CHO) –
  - Works with Laboratory Managers, Supervisors and other employees to develop and implement appropriate chemical hygiene policies, practices and training.
  - Seeks ways to improve the chemical hygiene program.
  - Serves as the authority and source of information for the OSHA Laboratory Standard and the Quest Diagnostics CHP.
  - Reviews and evaluates the effectiveness of the CHP at least annually and update as needed.

- Lab Managers and Supervisors - Implement control measures to reduce employee exposure to hazardous chemicals. Support the CHO in implementing the provisions of the plan and provide ongoing enforcement the CHP policies.
- Employees - Perform all laboratory related activities in accordance with the procedures located within this Chemical Hygiene Plan.

4. DEFINITIONS

- **Carcinogen –** an agent that can cause cancer. Common carcinogens used in the laboratory are formaldehyde and chloroform. Safety data sheets should contain specific information as to the carcinogenic properties of each chemical. A list of carcinogens is available in the Additional Resources section of this document.
- **Chemical –** any substance or mixture of substances.
- **Classification** - to identify the relevant data regarding the hazards of a chemical; review those data to ascertain the hazards associated with the chemical; and decide whether the chemical will be classified as hazardous according to the definition of hazardous chemical in this document. In addition, classification for health and physical hazards includes the determination of the degree of hazard, where appropriate, by comparing the data with the criteria for health and physical hazards.
- **Hazard category –** the division of criteria within each hazard class, e.g. flammable liquids include four hazard categories. These categories compare hazard severity within a hazard class and should not be taken as a comparison of hazard categories more generally.
- **Hazard class** – the nature of the physical or health hazard, e.g. flammable liquid, carcinogen, acute toxicity.
- **Hazard statement** – a statement assigned to a hazard class and category that describes the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard.
- **Hazardous chemical** - any chemical which is classified as a physical hazard or a health hazard.
- **Health hazard** – a chemical which is classified as posing one of the following hazardous effects:
    - acute toxicity
    - skin corrosion/irritation
    - serious eye damage/irritation
    - respiratory or skin sensitization
    - germ cell mutagenicity
    - carcinogenicity
    - reproductive toxicity
    - specific target organ toxicity (STOT) – single exposure
    - STOT – repeated exposure
    - aspiration
    - simple asphyxiant
- **Label -** an appropriate group of written, printed or graphic information elements concerning a hazardous chemical that is affixed to, printed on, or attached to the immediate container of a hazardous chemical, or to the outside packaging.

- **Label elements** - the specified pictogram, hazard statement, signal word and precautionary statement for each hazard class and category.
- **Mixture** - a combination or a solution composed of two or more substances in which they do not react.
- **NFPA Rating System –** a hazard rating system developed by the National Fire Prevention Association which incorporates a four-part diamond diagram to signify the health, fire, reactivity and other hazards associated with a chemical. (see Addendum E)
- **PEL (Permissible Exposure Limit) –** the time-weighted average threshold limit a person working an 8-hour shift may be exposed to a chemical without suffering ill effects.
- **Physical Hazard** – a chemical that is classified as posing one of the following hazardous effects:
    - an explosive
    - a flammable gas, aerosol, gas, liquid or solid
    - a self-reactive chemical
    - a pyrophoric liquid, solid or gas
    - a self-heating chemical
    - a chemical which emits flammable gases when contacting water
    - an oxidizing liquid or solid
    - an organic peroxide
    - a chemical corrosive to metal
    - a combustible dust
- **Pictogram** - a composition that may include a symbol plus other graphic elements, such as a border, background pattern, or color, that is intended to convey specific information about the hazards of a chemical. Eight pictograms are designated under this standard for application to a hazard category.
- **Product Identifier** – the name or number used for a hazardous chemical on a label or the SDS. It provides a unique means by which the user can identify the chemical.
- **Precautionary statement** - a phrase that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical, or improper storage or handling.
- **Pyrophoric –** a chemical that will ignite spontaneously in air at a temperature of 130^{o} F (54.4^{o} C) or below.
- **Reproductive toxin -** a chemical that affects the reproductive capabilities of males or females, including chromosomal damage (mutagens) and effects on fetuses (teratogens). A list of reproductive toxins can be found in the Additional Resources section of this document.
- **Safety data sheet (SDS)** - written or printed material containing information and instructions on a hazardous chemical present in the workplace. It includes details about the hazards and risks relevant to the substance, requirements for safe handling and actions to be taken in the event of fire, spill, or overexposure.

- **Signal word** - a word used to indicate the relative level of severity of hazard and alert the reader to a potential hazard on the label. The signal words used in this section are "danger" and "warning." "Danger" is used for the more severe hazards, while "warning" is used for the less severe.
- **Simple asphyxiant** - a substance or mixture that displaces oxygen in the ambient atmosphere, and can thus cause oxygen deprivation in those who are exposed, leading to unconsciousness and death.
- **STEL (Short Term Exposure Limit)** – the maximum concentration of a chemical to which a worker may be exposed continuously for up to 15 minutes without danger to health, safety, or work efficiency.

5. PROCEDURE

This document includes standard operating procedures for safe handling, use and storage of hazardous chemicals.

5.1 Hazard Classification

A Hazard classification of chemicals is the responsibility of chemical manufactures and importers. For each chemical, the manufacturer or importer determines the hazard class and category relying on scientific literature and other evidence concerning the potential hazards. Employers are not required to classify chemicals unless they choose not to rely on the classification performed by the chemical manufacturer or importer.

B For chemicals produced for use exclusively in the lab, the employer shall determine if the chemical is hazardous, and if so, provide appropriate training as required.

C If a chemical produced is a byproduct whose composition is not known, the employer shall assume the substance is hazardous and shall implement safeguards outlined in this document for handling, storage and disposal.

D If a chemical is produced for another user outside of the laboratory, the employer shall comply with the labeling and SDS development outlined in the Hazard Communication Standard (OSHA 29 CFR 1910.1200).

5.2 Procurement of Hazardous Chemicals within the Laboratory

A Prior to obtaining a new chemical for lab use, the dept. manager ordering the chemical will coordinate with the CHO and/or EHS, as needed, to perform a risk assessment by researching the label information, SDS and other material necessary to understand the safe handling requirements (e.g. ventilation controls, exposure monitoring needs, personal protective equipment) and disposal considerations. A sample risk assessment worksheet is presented as Addendum C.

B All hazardous chemicals at the laboratory facility must be documented on a central chemical list or inventory. This document shall be readily available to employees (posted on safety cabinet, see Related Documents) and updated whenever a new hazardous chemical is introduced into the lab. The list or inventory will be reviewed at least annually for accuracy by the dept. staff, or the CHO, or designee. A sample chemical inventory sheet is presented as Addendum D.

C Safety Data Sheets (SDS) must be available (hard copy or electronic) for each hazardous chemical brought into the laboratory. SDSs must be readily available upon request from employees, regulatory agencies or emergency response personnel.

5.3 General Chemical Hygiene Practices

A Engineering Controls

Engineering controls are mechanical means of minimizing the employee exposure to hazardous chemicals and may include the following:

a. Eye Wash Facilities. Eye wash units are required in all laboratories where injurious or corrosive chemicals are used or stored. The following ANSI standards for location, design and maintenance of emergency eyewash facilities have been adopted:

1. Shall be located within 10 seconds travel distance of areas where hazardous chemicals are used and must be clearly marked and unobstructed.
2. Eye wash facilities should be operated by a simple valve that activates in one second or less and simultaneously drenches both eyes.
3. Eye wash facilities must provide a minimum of a 15 minute water supply at no less than 0.4 gallons per minute.
4. Eye wash facilities must be inspected and flushed on a weekly basis. A log must be kept documenting the inspections and flushes. Refer to Related Documents for local eyewash inspection log.
5. Refer to Addendum H for eyewash instructions.

b. Safety showers provide an immediate water drench on an affected person. Note: There are no safety showers in Adventist Healthcare (AHC) facilities because of the low volume of hazardous chemicals stored.

c. Ventilation Controls
Ventilation controls are intended to minimize employee exposure to hazardous chemicals by removing air contaminants from the work site. There are two main types of ventilation controls:

1. General (Dilution) Exhaust is a room or building-wide system that brings in air from outside and ventilates within. Laboratory air must be continually replaced, preventing the increase of air concentration of toxic substances during the workday. General exhaust systems are not recommended for the use of most hazardous chemicals.
2. Local Exhaust is a ventilated, enclosed work space (e.g. a fume hood) intended to capture, contain and exhaust harmful fumes, vapors and particulate matter generated by procedures conducted with hazardous chemicals. To determine ventilation requirements, assess the SDS. Some SDS terminology used to indicate a need for special ventilation considerations beyond general exhaust ventilation:
   - *use with adequate ventilation*
   - *avoid vapor inhalation*

- *use in a fume hood*
- *provide local exhaust ventilation*

3. Selection of an Exhaust Hood

   A conventional fume hood is designed as a three sided cabinet with a moveable glass front sash. This is connected to a designated exhaust system to create the air flow needed to draw chemical contaminants (e.g. mists, fumes, toxic gases) from the workspace to the building exterior. The hood may also provide a physical barrier in the event of an adverse reaction or explosion.

   Certain types of hoods are not designed for the use of hazardous chemicals (e.g. biological safety hoods that recirculate exhaust into the room). If a hood's capabilities are not fully understood, check the manufacturer specifications or call the CHO or EHS contact before using hazardous chemicals in the hood.

   Ductless, or portable fume hoods, which employ filtration media, may be an option to conventional local exhaust hoods. Contact the CHO or EHS contact for consultation before acquiring any ductless fume hood.

4. <u>Proper Use of a Fume Hood</u>

   Observe the following guidelines when handling a hazardous chemical requiring a fume hood:

   - Conduct all operations that may generate air contaminants at or above the appropriate PEL or TLV inside a fume hood.
   - Keep all apparatus at least 6 inches back from the face of the hood and keep the slots in the hood baffle free of obstruction by apparatus or containers.
   - Large equipment should be elevated at least two inches off the base of the fume hood, to allow for the passage of air underneath the apparatus.
   - Do not use the hood as a waste disposal mechanism.
   - Minimize storage of chemicals or apparatus in the hood.
   - Keep the hood sash closed at all times except when the hood is in use.
   - Minimize foot traffic and other forms of potential air disturbances past the face of the hood while in use.
   - Do not have sources of ignition inside the hood when flammable liquids or gases are present.
   - Use sash as a safety shield when boiling liquids or conducting an experiment with reactive chemicals.
   - The system of verification that the hood is operating must be checked prior to each use (e.g. a piece of ribbon on the sash). Never work with hazardous chemicals if the required ventilation system is not working.
   - Monitor and document the hood's face velocity monthly if the hood does not have an integrated air flow monitoring system. Use an air

flow meter (velometer) and record the average of three measurements across the hood face in the monthly maintenance log. Acceptable face velocity range is 80-120 CFM (cubic feet per minute) at sash height of 12 inches. Contact the CHO for a hood inspection, or facilities for repair, if the result is out of range.

- Hoods must be inspected and certified annually. Annual certification should include face velocity tests as well as inspection of belts, fans, sash operation, alarm performance, and other mechanical or performance features.
  If the hood does not pass the face velocity test and/or has identified performance failures, it will be documented as "failed" by the inspector on the test log. The unit must be labeled “out of service” and repaired before hazardous chemicals can be used in the hood.

  If the hood does pass, the inspector will affix a label with the date of inspection and will mark the hood to indicate proper sash position for optimum hood performance. In general, the sash height should be set at a level where the operator is shielded to some degree from any explosions or violent reactions which could occur and where optimum airflow dynamics are achieved. If a fume hood has no markings regarding sash height or inspection dates, contact the Manager, your CHO or EHS contact, or hood maintenance vendor to arrange for an inspection.

B Administrative and Work Practice Controls

The following guidelines have been established to minimize hazards and to maintain basic chemical safety in the laboratory.

a. Health and Hygiene

1. Avoid direct contact with any hazardous chemical. Know the types of protective equipment available and use the proper type for each job.
2. Confine long hair and loose clothing and always wear footwear that fully covers the feet.
3. Mouth pipetting is prohibited
4. Use appropriate safety equipment whenever exposure to gases, vapors or aerosols is suspected and ensure ventilation controls (e.g. fume hoods) are working properly.
5. Wash hands thoroughly with soap and water after handling chemicals, before leaving the laboratory, and before eating or drinking.
6. Manipulation of contact lenses is prohibited when using hazardous chemicals. It is imperative that face and eye protection policies are adhered to when wearing contact lenses.
7. Laboratory employees must become familiar with the symptoms of exposure for the hazardous chemicals that they use and the precautions necessary to prevent exposure.

8. Do not leave potentially hazardous operations or assays unattended. Develop a protocol with the department management if unattended operations are required due to emergency conditions (e.g. power outage or other utility interruption, or evacuation)

b. Food and Drink in the Laboratory

1. There shall be no food, gum chewing, candy, drink, smoking or applying cosmetics in any laboratory which has radioactive materials, biohazardous materials or hazardous chemicals present or likely to be present. There shall be no storage, use or disposal of these items in the laboratory (including refrigerators within laboratory).
2. Rooms which are adjacent, but separated by floor to ceiling walls with closeable door, and do not have any chemical, radioactive or biohazardous agents present, may be used for food consumption, preparation, or applying cosmetics at the discretion of the manager, or supervisor responsible for the areas.

c. Housekeeping

1. Keep work areas clean and uncluttered. Clean work areas upon completion of an operation or at the end of each workday.
2. Clean chemical spills immediately and thoroughly, according to guidelines established in this document. Understand the location of the nearest chemical spill kit and become familiar with its use.
3. Do not block exits, emergency equipment or controls.
4. Do not use hallways and stairways as storage areas.
5. Store and dispose of hazardous waste generated by laboratory operations as directed in the Biohazardous Waste Management (see Related Documents).

d. Chemical Handling, Storage, and Transport

1. Training on proper handling, storage and disposal of hazardous chemicals is required before using them. See section 5.16 of this document for details.
2. Information on hazardous chemicals and access to related Safety Data Sheets will be made available to all laboratory employees. See section 5.16 of this document for details.
3. When procuring chemicals, purchase the minimum amount necessary to maintain operations.
4. Chemical containers with missing or defaced labels or that do not meet packaging regulations should not be accepted.
5. Hazardous chemicals should be stored on shelves with easy reach and below eye level. Strong acids and bases should be stored near floor level and not under sinks where contamination by moisture may occur.
6. Protective bottle carriers or leak resistant, unbreakable secondary containment must be used for transporting and handling glass bottles of hazardous chemicals larger than 500 ml.

7. Chemicals must be segregated by compatibility (e.g. separate acids, bases and flammables) to prevent a chemical reaction in the event of a spill or leak.
8. Chemical storage areas must have appropriate signage.
9. Keep a minimum quantity of chemicals at the lab bench.
10. Cover working surfaces with plastic backed absorbent paper to contain splashes or drips. Remove the liner and discard daily.
11. Any chemical mixture shall be assumed to be as toxic as its most toxic component; unless known to be otherwise.
12. Substances of unknown toxicity shall be assumed to be toxic.
13. When transporting chemicals in the laboratory, precautions should be taken to avoid dropping or spilling chemicals.
14. When transporting chemicals on a cart, use a cart that is suitable for the load and one that has vertical edges to contain leaks or spills.
15. When possible, transport chemicals in freight elevators.

e. Working Alone

All employees who perform duties in isolated locations outside of visual or verbal range from coworkers or security personnel shall be provided with a means to signal an emergency to a supervisor, other employees or security.

C Personal Protective Equipment

Personal Protective Equipment (PPE) must be provided to all employees working with hazardous chemicals A risk assessment conducted by the CHO, EHS contact and department management is required to ensure appropriate PPE is selected for the hazard(s). PPE typically includes the following:

a. Eye Protection

1. Eye protection must be made available to all employees or visitors to laboratories where chemicals are used and stored.
2. Protective eye and face equipment must be used where there is a potential for a splash or spray from a hazardous chemical.
3. The minimum acceptable requirement for working with hazardous chemicals is a pair of chemical splash goggles.

b. Protection of Skin and Body

Skin and body protection involves the use of protective clothing to guard against chemical exposure from a splash or spill.

1. The minimum personal protective equipment requirements when working with chemicals are a fully buttoned lab coat and chemical resistant gloves.
2. Open-toed shoes, sandals, shorts or exposed legs are not allowed when working with hazardous chemicals.

3. Impervious protective equipment may be required based on the volume and/or concentration of hazardous chemicals used. For example, thicker gloves and a rubber apron over a lab coat when handling strong acids or bases. A risk assessment or the SDS should specify appropriate protective equipment.
4. Thermal or insulated gloves and goggles (or face shield) are required for handling dry ice (solid CO2). Other safe practices include:
   - Never allow any unprotected part of the body touch dry ice
   - Do not breathe the cooled vapor
   - Discard unwanted dry ice by allowing it to sublimate in a safe place that is well ventilated. Never dispose of it in a sink, toilet or other drain or place in the trash or garbage

c. Respirators

Respirator use is only allowed where engineering controls are not feasible or not yet installed. Respirator use requires participation in a Respiratory Protection Program which included an initial medical exam, and fit test. Annual fit tests must be conducted.

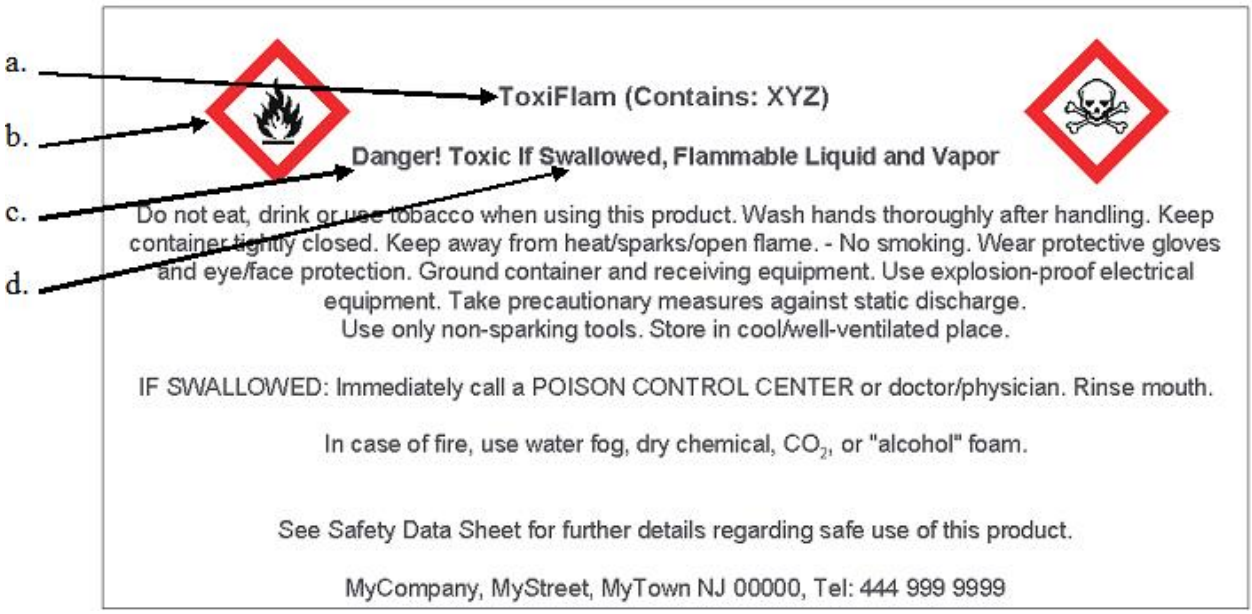
5.4 Labeling

A Labeling on Primary Containers

a. All purchased containers of hazardous chemicals must be labeled from the manufacturer or importer with the required label components outlined in the Global Harmonized System (GHS) and the OSHA Hazard Communication Standard. These components are not subject to variation and should appear on every label as indicated in the GHS for each hazard class/category. These components include:

1. Product Identifier – the unique name or number used for a hazardous chemical on a label or on the SDS.
2. Hazard Symbols or Pictograms – that convey the physical, health and environmental class and category.
3. Signal Words – “Danger” or “Warning” are used to emphasize hazards and denote the relative severity of the hazards
4. Hazard Statements – standard phrases assigned to the hazard class and category that describe the nature of the hazard.

b. The employee shall not remove or deface the label.
c. Here is a sample of what a primary container (manufacturer supplied) GHS label would look like:



B Labeling on Secondary (Workplace) Containers

a. Secondary workplace containers commonly used in the lab may incorporate the GHS label or label elements; or may remain an alternate labeling system (e.g. the NFPA rating system) which provides the user with specific information regarding the physical and health hazards of the hazardous chemical. (See Addendum E)
b. Workplace labels or other forms of warning must be legible, in English, and prominently displayed on the container, or readily available in the work area throughout the work shift. Employers with employees who speak other languages may add the information in their language to the material presented, as long as the information in presented in English as well.
c. If needed, the label information can be placed in the work area (e.g. on the instrument or device used to hold the container) if the label does not fit on the actual container.
d. Workplace container labels should also contain the preparation date, expiration date, technician's initials or other pertinent information for the material in question.

5.5 Safety Data Sheets

A. Chemical manufacturers and importers are responsible for development and distribution of Safety Data Sheets (SDS), formerly Material Safety Data Sheets (MSDS), for each hazardous chemical they produce. The document may be provided with the shipping container or it may be sent as a separate document prior to or at the time of the shipment.
B. Employers must have a safety data sheet in the work place for each hazardous chemical used and will ensure they are readily available during each work shift to employees in their work area. Electronic access and other alternatives to

maintaining paper copies of the SDS are permitted as long as no barrier to immediate employee access in the workplace is created by such options.

C. SDS must also be made readily available, upon request, to designated representatives, or regulatory inspectors.

5.6 Chemical Exposure Monitoring

A. Permissible Exposure Limits

a. OSHA mandates that employee exposure to a regulated substance may not exceed the defined Permissible Exposure Limit (PEL). The PEL represent the Time Weighted Average (TWA) in parts per million (ppm) or milligrams of substance per cubic meter of air (mg/m^3). The TWA represents the ratio between exposure and work shift.

b. An Action Level may also be established for hazardous chemicals used in the laboratory. An action level is a chemical concentration, as an eight-hour time weighted average that initiates certain required procedures. These procedures could include reevaluation of the chemical operation, confirmation of proper engineering controls or other steps to reduce airborne chemical concentrations. Some chemical contaminants have established regulatory action levels.

c. Some OSHA exposure limits for commonly used laboratory chemicals are presented below. Exposure limits for other chemicals are located on their respective SDS.

	Action Level	**PEL**	**STEL**
Formaldehyde	0.5 ppm	0.75 ppm	2.0 ppm
Methanol	n/a	200 ppm	250 ppm
Methylene chloride	12.5 ppm	25 ppm	125 ppm
Xylene	n/a	100 ppm	150 ppm*

*ACGIH Threshold Limit Value (no OSHA value available)

B. Employee Exposure Determination

a. Monitoring for airborne concentrations to chemicals may be appropriate for the following circumstances:

1. When there is a change in an analytical method or a new hazardous chemical is introduced into the lab and there is reason to believe that exposure levels could exceed established action levels.
2. Where there is an increase in the volume of a regulated chemical used in an existing operation.
3. When regulations require chemical exposure air monitoring.
4. When employees complain of excessive odors or vapors, or develop some type of adverse effect as a result of contact with a chemical used in the work place.

b. If the initial monitoring indicates employee exposures over the action level (or in the absence of an action level, the PEL), procedures will be enacted to comply with the provisions of the relevant standard and likely include:
   1. A review of the chemical operation
   2. A review of the proper function of the engineering controls (e.g. hoods)
   3. A review of the employee's technique in handling the hazardous material
   4. An increased frequency of exposure monitoring (e.g. bi annually instead of annually) until the results are below the action level (or PEL if no action level)
   5. The development of an investigation document and corrective action plan to be shared with the employees in the area
   6. A medical survey or evaluation for the employee exposed above the action level or PEL.
c. Periodic monitoring can be terminated for a particular regulated chemical if the requirements in the relevant standard are met.
d. Employers must notify the employee of the monitoring results within 15 working days after receipt of monitoring results. The results must be either individually distributed in writing or posted in a location accessible to all affected employees.

5.7 Special Considerations

A. The OSHA Laboratory Standard requires that additional employee protection be provided for the laboratory use of select carcinogens, reproductive toxicants and chemicals with a high degree of acute toxicity. Prior approval from the CHO, EHS representative or location leadership is required prior to implementing a new order these materials. While these materials are limited in Quest Diagnostics laboratories, when present the following tactics are employed limit the potential for employee exposure:

   a. These hazardous materials are used in designated areas of the lab, and use is restricted to protective areas like hoods or glove boxes. Warning signs on these designated areas should alert employees to potentially hazardous materials and allow those unfamiliar with the laboratory surroundings to identify hazardous chemical use and/or storage areas.
   b. Employees are provided with training on the hazardous materials that they will encounter in their job, the precautions needed for safe use, methods to decontaminate material and remove contaminated waste.
   c. Employees will have access to SDS for all hazardous materials.
   d. Employees will participate in exposure monitoring where appropriate to ensure exposures are below established limits/
   e. Employees will follow the chemical hygiene practices outlined in this document.

5.8 Chemically Hazardous Waste

A. Dispose of chemical waste according to Adventist Healthcare hospital protocols.

5.9 Radioactive Material Hazards

A. Other than sealed sources, use of radioactive materials at Quest Diagnostics is limited to locations with active materials licenses. Contact the local Radiation Safety Officer and consult the Radiation Protection Program SOP for additional information. (See Related Documents)

5.10 Biological Material Hazards

A. Refer to the Bloodborne Pathogens Exposure Control Plan for procedures related to handling biologically hazardous materials. (See Related Documents)

5.11 Emergency Situations

A. Emergency contact information for lab management, EHS and workers deem appropriate for handling emergencies (e.g. First Response Team) should be posted in each department.

a. Fire - The following steps are basic protocol for handling a fire or fire-related emergency situation in the laboratory. Remember R-A-C-E

1. **R**escue employees if it is safe to do so
2. **A**larm – pull the fire alarm
3. **C**all 9-1-1 from a safe location and notify the site emergency leader
4. **E**vacuate safely from the building

B. Chemical Spill Prevention and Clean Up

a. The best way to clean up a spill is to prevent the spill in the first place by using the following tactics:

1. Always use the smallest quantity of chemical feasible and keep the minimal quantity of chemical on benches, under hoods, and in storage in the laboratory
2. Use protective bottle carriers and carts suitable for the load with high, leak proof edges to contain any spills.
3. Properly store and segregate chemical to prevent unanticipated reactions.

b. Spill Kits - Each laboratory is responsible for stocking sufficient spill kit material that:

1. Is appropriate for the type of chemicals used (e.g. acids, bases, solvents, formalin).
2. Is sufficient in quantity to handle the largest container of chemical likely to be spilled. For example, if 4-liter bottles are available for use, then the spill kit must have the capacity to handle 4 liters of material.
3. Is readily accessible at all times and conveniently located for immediate use.
4. All employees in the area have been trained to use properly.
5. Must be used in accordance with the manufacture instructions.
6. Must be used within the expiration date or, if no expiration date is assigned, must be marked with the date put into service and periodically (e.g. quarterly) checked for usability (e.g. if granular, is it still pourable).

c. For spills of highly toxic or flammable material, or you are unsure of how to proceed, or the volume is beyond the capability of the spill team, execute the following steps:
   1. Call 9-1-1
   2. Evacuate personnel from the spill area and alert nearby areas or departments to the spill.
   3. Isolate the spill area and close doors to the room where the spill occurred.
   4. If the spill is a flammable material, remove ignition sources and shut down equipment, if feasible.
   5. Activate local exhaust ventilation to the outside of the building only if present. Open windows or establish local exhaust ventilation (e.g. fans) to the outside of the building, if safe to do so.
   6. Evacuate the building if chemicals or contaminants could enter the air circulation system of a building.

d. For small quantity spills suitable for the capacity of the spill kit material on hand. Follow the basic steps below. Consult the Safety Data Sheet (SDS) of the material spilled and the specific spill kit instructions for additional details.
   1. Put on the proper personal protective equipment (PPE). This may include chemically resistant gloves, eye and face protection, laboratory coat, and shoe covers if needed.
   2. Control area of spill with the use of dikes (rolled up absorbent sheets). Alert employees in the area of the spill and obtain their assistance if needed.
   3. Get the correct spill kit for the material spilled.
   4. Spread absorbent material on the spilled chemical.
   5. Label a plastic bag with the name of the spilled chemical and any hazard associated with the chemical (e.g. flammable, corrosive, carcinogenic)
   6. Scoop up the absorbed chemical material with mechanical device (e.g. dustpan, cardboard) and place in the plastic bag.
   7. Wash the area of the spill with water and absorb the water (e.g. with paper towels). Place the absorbent material in the plastic bag.
   8. Place the plastic bag in the chemical waste storage are for disposal by the chemical waste vendor.

C. Chemical Exposure to Body

a. If an employee spills hazardous or corrosive chemicals on their body.
   1. Remove person from spill area only if the attempt to rescue the victim does not present a danger to the rescuer.
   2. Remove contaminated clothing while under an emergency shower.
   3. Flood affected area with tepid water for at least 15 minutes or longer if pain persists.
   4. Wash skin with mild soap and water – do not use neutralizing chemicals, creams, lotions or salves.
   5. Contact emergency response personnel and assure they know the chemical(s) involved if additional assistance is needed.

6. Send employee to occupational medical provider if needed.

D. Chemical Exposure to Eyes

a. If an employee splashes a hazardous or corrosive chemical in their eye(s):

1. Remove victim from spill area only if the attempt to rescue the victim does not present a danger to the rescuer.
2. Lead the victim immediately to an emergency eye wash facility.
3. Have employee hold eyelids open (assist employee if necessary).
4. Flush eyes for at least 15 minutes or longer if pain persists.
5. Contact emergency response personnel and assure they know the chemical(s) involved, if additional assistance is needed.
6. Send employee to occupational medical provider if needed.

5.12 Incident and Injury Reporting

A. All incidents (e.g. chemical spills or exposures) and injuries must be reported to your supervisor, manager or EHS representative in a timely manner and not later than the shift that the incident occurred. Refer to the Incident and Injury Investigation SOP for specific reporting guidance or see the EHS intranet webpage. (http://questnet1.qdx.com/Business_Groups/HR/ehs/ehs.htm)

5.13 Medical Consultations and Examinations

A. Facilities must provide all employees who work with hazardous chemicals an opportunity to receive medical consultation or attention, including any follow-up examinations, under the following circumstances:

a. An employee develops signs or symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory.
b. Exposure monitoring results reveal an exposure level above the action level (or in the absence of an action level, the Permissible Exposure Limit) for an OSHA regulated substance for which there is exposure monitoring and medical surveillance requirements. Medical surveillance shall be provided to the affected employee as prescribed by the particular standard.
c. An event takes place in the work area, such as a spill, leak, explosion or other occurrence resulting in the likelihood of a hazardous exposure.

B. All medical consultations and examinations must be performed by or under the direct supervision of a licensed physician and must be provided without cost to the employee, without loss of pay and at a reasonable time and place.

5.14 Decontamination of Equipment

A. When a request for equipment repair or transfer to another location is initiated, the following steps must be undertaken to ensure the safety of the employees responsible for repair or transfer if the equipment has been contaminated by hazardous chemicals:

a. Remove chemical contaminants with an appropriate solvent or cleaning solution.
b. After contaminants have been eliminated complete an "Equipment Release Form". A sample form can be found in Addendum A. The form shall be put in a visible place on the equipment to be repaired or transferred. The equipment must have the Equipment Release Form affixed for initiation of repair or transfer.

5.15 Compliance with the Laboratory Standard

A. It is the employee's right to receive information about the known physical and health hazards of the hazardous chemicals in his/her work area and to receive adequate training to work safely with these substances.
B. Employees have the right to work in a safe environment and must be able to inform the CHO, the EHS contact, or the Laboratory supervisor about potential risks in the laboratory.
C. The Chemical Hygiene Plan (CHP) must be readily available to employees and employee representatives through the Managing Director, Lab Services Director or departmental manager or supervisor.
D. The local CHP needs should map out the location of hazardous chemical storage areas, fire extinguishers, eyewash and shower units, spill kits and other critical emergency equipment for all employees, visitors/contractors and emergency responders.
E. The local Chemical Hygiene Officer and/or EHS contact will review the CHP and local practices to evaluate its effectiveness at least annually and update as needed. A sample annual review sheet can be found as Addendum B.

5.16 Employee Information, Training and Recordkeeping

A. Employees must have access to information and training to ensure that they are apprised of the hazards of chemicals present in the work area. Such information must be provided at the time of an employee's initial assignment and prior to assignment involving new exposure potential. Employees should receive periodic (e.g. annual) refresher information and training to ensure that they are aware of the risks of exposure to hazardous chemicals.

a. Information provided to employees must include:

1. The contents of the OSHA Lab Standard (see References for links).
2. The location and availability of the Quest Diagnostics CHP.
3. The permissible exposure limits for OSHA regulated substances (or published exposure limits for hazardous chemicals where there is no applicable OSHA standard) they will encounter in their work area.
4. Signs and symptoms associated with exposures to hazardous chemicals used in the laboratory (available on Safety Data Sheets, i.e. SDS).
5. The location and availability of reference materials on the hazards, safe handling, storage and disposal of hazardous chemicals found in the laboratory, including, but not limited to, Safety Data Sheets received from the supplier.
6. The proper use of spill kit material to clean up a hazardous chemical spill.

b. Method of Training

1. General awareness training provided to employees will include:

i. Methods and observations that may be used to detect the presence or release of a hazardous chemical (such as monitoring conducted by monitoring devices, visual appearance or odor of hazardous chemicals when being released).
ii. Potential physical and health hazards associated with chemicals in the work area.
iii. The measures employees can take to protect themselves from these hazards, including appropriate work practices, emergency procedures, and personal protective equipment to be used.
iv. Review of the specific information provided by the SDS.
v. The applicable details of the CHP.

2. Departmental specific training provided by Supervisors to employees will include:

i. Review of departmental specific standard operating procedures.
ii. Location of spill kits, eyewashes, showers, fire extinguishers, chemical bottle carriers, etc.
iii. A copy of the department specific hazardous chemical list or inventory outlining the hazards associated with each chemical (on labels or SDS).

5.17 Recordkeeping

The following records must be maintained:

A. Documentation of initial and subsequent chemical hygiene training. Retain for 5 years.
B. New Chemical Risk Assessments are retained indefinitely.
C. Chemical Exposure Monitoring Records. Exposure records for airborne contaminants are retained indefinitely and made available to the applicable employee upon request.
D. Medical Surveillance Records. Medical surveillance records are considered confidential information and are kept separate from other personnel records. These records are to be retained indefinitely.
E. Chemical Inventories are updated as needed and reviewed at least yearly for completeness. These records are retained indefinitely.
F. Safety Data Sheets (SDSs). These records are to be updated on an as needed basis and reviewed at least once a year for completeness. These records are retained indefinitely.
G. Instrument maintenance records (e.g. fume hood certifications) – see Quest retention schedule as it varies by state (typically from 2 years to “active +5 years”).

6. RELATED DOCUMENTS

- Bloodborne Pathogens Exposure Control Plan

- Biohazardous Waste Management SOP
- Radiation Safety Program, 101-20-009b, SGMC Patient Care Standards Manual
- Incident Reporting and Post Exposure Prophylaxis SOP
- Eyewash Inspection Log (AG.F65)
- Hazardous Material Inventory Log (AG.F340)

All Quest procedures are available on the Quest Diagnostics EHS webpage: http://questnet1.qdx.com/Business_Groups/hr/ehs/ehs.htm

7. REFERENCES

OSHA, 29 CFR 1910.1200 Hazard Communication Standard
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10099
OSHA, 29 CFR 1910.1450 Occupational Exposure to Hazardous Chemicals in Laboratories Standard
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10106
OSHA, 29 CFR 1910.1048, Formaldehyde Standard
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10075
OSHA, 29 CFR 1910.1052, Methylene Chloride Standard
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10094
Clinical Laboratory Safety; Approved Guidelines – Third Edition; CLIS GP17-A3; June 2012
http://questnet1.qdx.com/Business_Groups/HR/ehs/documents/clsi_clinical_lab_safety_gp17_a3_june_2012.pdf

8. REVISION HISTORY

Version	Date	Reason for Revision	Revised By	Approved By
		Supersedes SGAHQDEHS706v3.5		

9. ADDITIONAL RESOURCES

Below are links to resources for lists and additional information for potentially hazardous agents and chemicals.

- OSHA Carcinogens – http://www.osha.gov/SLTC/carcinogens/index.html
- OSHA Reproductive Toxins – http://www.osha.gov/SLTC/reproductivehazards/index.html
- International Agency for Research on Cancer (IARC) carcinogen lists - http://monographs.iarc.fr/ENG/Classification/index.php
- National Toxicology Program Report on Carcinogens (RoC) - http://ntp.niehs.nih.gov/?objectid=035E57E7-BDD9-2D9B-AFB9D1CADC8D09C1

10. ADDENDA

Addendum A – Equipment Release Form
Addendum B – Chemical Hygiene Plan Effectiveness Review (Sample Template)
Addendum C – New Chemical Risk Assessment (Sample Template)
Addendum D – Chemical Inventory Sheet (Sample Template)
Addendum E – Using the NFPA Hazard Rating for Workplace Containers
Addendum F – Designation of Local Chemical Hygiene Officer
Addendum G – Emergency/Medical Procedures
Addendum H – Eyewash Protocols

ADDENDUM A

EQUIPMENT RELEASE FORM

Date: _____ Location of Origin_____

Employee Responsible _____

Destination/Service Department _____

Service To Be Performed _____
_____

Type of Equipment
_____
_____
_____

Contaminated (Yes/No) _____

Contaminants Identified/Suspected _____
_____
_____

Method of Decontamination _____
_____
_____
_____

Name of Person Decontaminating (Print) _____

I certify that the above listed equipment is free of contamination or hazardous agents, and that it is safe to release to unrestricted areas and/or perform the work described above on this equipment.

_____
Signature of Responsible Person *Date*

ADDENDUM B

Chemical Hygiene Plan Effectiveness Review (Sample Template)

CHO Name (print):_____ Date of Review_____

1.) Incident and Injury log reviewed for chemical related incidents
Incidents noted: ____ Yes (complete table below) ____ No

Type of event	Cause	Corrective Action

2.) Chemical List or Inventory Reviewed
New chemicals being used: ____Yes (complete table below) ____ No

Chemical	MSDS Available	Monitoring Required

3.) Safety Audits Reviewed for Chemical Safety Issues

Deficiencies have: ____ Decreased ____ Increased ____ Stable

4.) Employee compliance and knowledge of Chemical Safety reviewed

Employee training complete: ____ Yes ____ No
Random employee interview shows knowledge: ____ Yes ____ No

5.) Data for personal and/or air monitoring reviewed

Results within limits (and below action levels): ____ Yes ____ No

6.) Chemical Hygiene Plan SOP reviewed
Changes needed: ____ Yes (complete table below) ____ No

Current documentation	Change needed	Target Date

The Chemical Hygiene Plan has been reviewed for year _____

_____ _____
Chemical Hygiene Officer Date

_____ _____
Medical Director Date

ADDENDUM C NEW CHEMICAL RISK ASSESSMENT (Sample Template)

Quest Diagnostics

Department New Chemical Risk Assessment

Department:
Contact:
Date Completed

Key: V = Volatile/Solvent/Flammable
L = Acids/Bases/Corrosives
S = Dry Chemical (X = Yes)
H = Hazardous Air Pollutant (X = Yes)

Key: C = Carcinogen
R = Reproductive Toxin
A = Acute Toxin
H=Highly toxic
M=Moderately toxic
S=Slightly toxic

(Check all applicable boxes)

Chemical or Reagent Name	Vendor	Catalog/Item#	Unit of Measure	Quanity Needed	SDS On File	V	L	S	H	C	R	A

Procedure or Method Material Used In: _____

SDS reviewed: Yes_____ No_____

Hazard Rating	Health	Fire Hazard	Reactivity	Other
NFPA				
HMIS				

Route of Exposure: Inhalation: ____ Skin/Eye: ____ Ingestion: _____

Required Controls
Engineering Controls Fume hood: ____ Glove box: ____ Other: ____

Personal Protective Equipment Lab coat: ____ Gloves: ____ Face Protection: ____ Respirator: ____ Other: ____

Exposure Monitoring Required Yes _____ No _____

Incompatable Materials: _____

Waste Disposal
Hazardous waste Yes____ If yes, EPA Waste Class: _____ DOT Shipping Name: _____

Non-regulated waste Yes____ Disposal by: Sanitary sewer _____ Waste Vendor _____ Other _____

Spill Material Available: Type to use: Acid ____ Base ____ Solvent ____ Other ____
Location of spill kit: _____

Fire Extinguishing Material Water: ____ Dry Chemical (ABC): ____ CO2: ____ Foam: ____

Name _____ **Signature** _____ **Title:** _____ **Date:** _____

Name _____ **Signature** _____ **Title:** _____ **Date:** _____

ADDENDUM D

CHEMICAL INVENTORY SHEET (Sample Template)

Quest Diagnostics

Department Chemical Inventory & Evaluation

Department: Toxicology
Contact:

Date Completed 2/25/2011

Key: V = Volatile/Solvent/Flammable
L = Acids/Bases/Corrosives
S = Dry Chemical (X = Yes)
H = Hazardous Air Pollutant (X = Yes)

Key: C = Carcinogen
R = Reproductive Toxin
A = Acute Toxin
H=Highly toxic
M=Moderately toxic
S=Slightly toxic

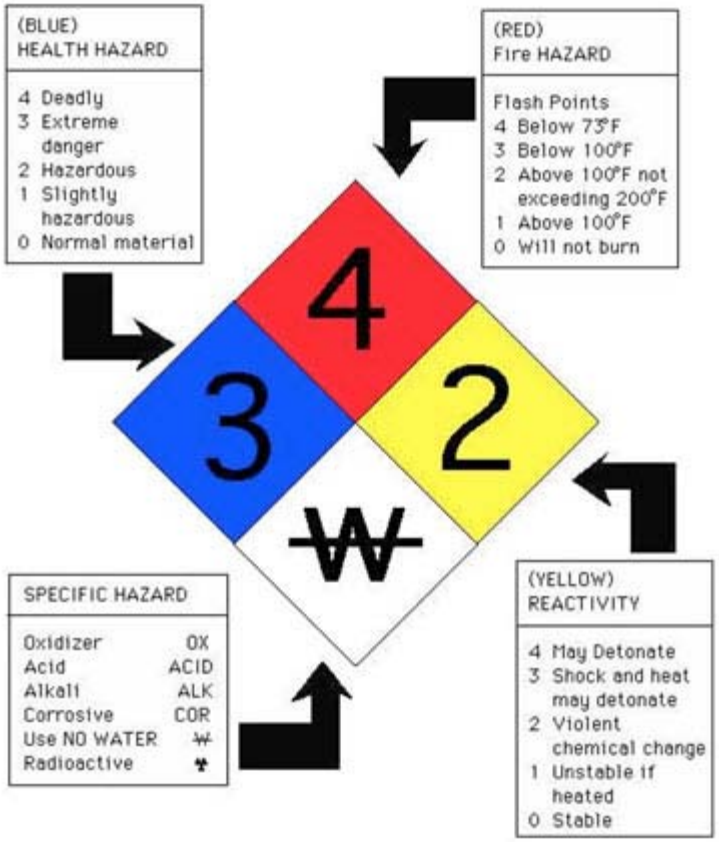
(Check all applicable boxes)

Chemical or Reagent Name	Vendor	Catalog/Item#	Unit of Measure	SDS On File	V	L	S	H	C	R	A
Ammonium dihydrate	Alfa Aesar	7722-76-1	500gm	X			X				
Barbituric Acid	Sigma-Aldrich	185698	25gm	X			X				
Chloramine T	Fisher	01779-250	250gm	X			X				
Chloroacetic Acid	Baker	0216-01	500gm	X			X				
Iodine Crystals	Sigma	I-3380	1kg	X			X				S
Magnesium Chloride	Sigma	M-8266	100gm	X			X				
Metanil Yellow	Aldrich	202029	100 gm	X			X				
Molecular Sieve	EM	MX1583L-1	500gm	X			X				
1,3 Propanediol 98%	Aldrich	P-50404	100gm	X	S		X				
1-Chlorobutane	Em Science	CX-0914-6	1liter	X	F,V						
Acetic Anhydride	Sigma	A-6404	1liter	X	F,S						H
Acetone	Mallinckrodt	2435-06	1liter	X	F,S						S
Acetonitrile	Mallinckrodt	2856-10	4liter	X	F,V					X	M
Ammonium Hydroxide	Fisher	A-669S212	2.5liter	X		B					H
Ammonium Phos. Mono	Sigma	A1645	100 gm	X			X				
Calcium Carbonate	Baker	1294-01	500gm	X			X				
Chloramine T	Fisher	1779	250gm	X			X				
Creatinine	Sigma-Aldrich	C-4255	100 gm	X			X				
Diethylamine	Aldrich	471216	1 liter	X	F,S					X	H
Diphenylamine	Mallinckrodt	4938	125gm	X			X				H
Ethyl Acetate	Mallinckrodt	H-3442	4liter	X	F,S						
Ethyl Alcohol / Denatured	Fisher	A407-4	4liter	X	F,V						S
Ethyl Alcohol Absolute	Acros	DSP KY-417	2liter	X	F,V						S
Ethylene Glycol	Fisher	E178-500	500 ml	X	S						H

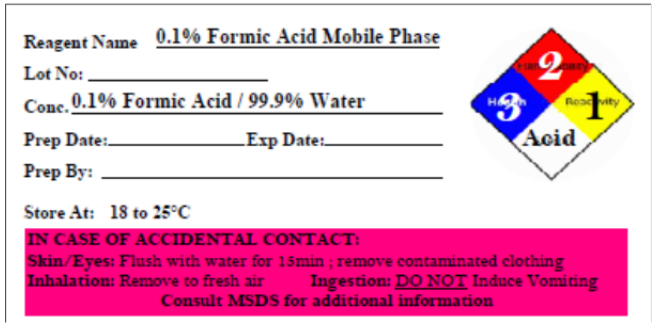
ADDENDUM E

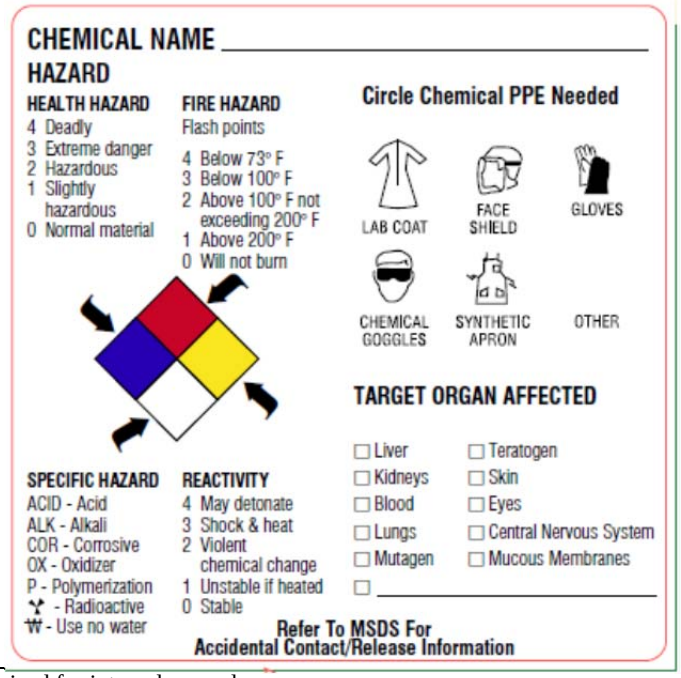
USING THE NFPA HAZARD RATING FOR WORKPLACE CONTAINERS

Numbers from 0-4 designate the risk level for each of the hazard category:



Sample workplace container labels:





ADDENDUM F

DESIGNATION OF LOCAL CHEMICAL HYGIENE OFFICER

The Local Chemical Hygiene Officer (CHO) for Washington Adventist Hospital, Shady Grove Medical Center and Germantown Emergency Center Laboratories is the site Laboratory Director.

ADDENDUM G

EMERGENCY/MEDICAL PROCEDURES

1.0 The Washington Adventist Hospital Laboratory will also follow the fire emergency procedures as outlined in the Washington Adventist Hospital Safety Manual.

2.0 The Shady Grove Medical Center Laboratory and the Germantown Emergency Center will also follow the fire emergency procedures as outlined in the Shady Grove Medical Center Safety Manual.

3.0 Item 5.11 (B)(c) of this document (spills of highly toxic or flammable material or large volume spills) will not be followed. Personnel will contact the site specific Adventist Hospital Safety/Security Department rather than contact emergency services (i.e. 911).

ADDENDUM H

EYEWASH PROTOCOLS

I. Emergency Eyewash Stations (plumbed)

A. Specifications

a. Eyewash head

- Positioned 33"- 45" from floor.
- Positioned 6" from wall or nearest obstruction and pose no hazard to the user (e.g. not mounted under an overhead cabinet causing a potential injury risk in accessing the unit).
- Dust caps/covers must protect nozzles from airborne contaminants and should be removed automatically when the eyewash is activated.
- Flow rate = at least 0.4 gallons per minute (GPM) at a velocity low enough to be non-injurious to the user and a flow pressure of 30 (+/-0.5) pounds per square inch (PSI) for 15 minutes.
- Flushing fluid must be provided to both eyes simultaneously.

b. Valve

- Activates in 1 second or less.
- Stay-open valve (no use of hands once activated).
- Valve remains on until the user shuts it off.

B. Installation

a. Eyewash shall be located in an area that requires no more than 10 seconds travel time (or approx. 55 feet) from areas where hazardous chemicals (irritants, corrosives, or toxins acting by contact or absorption) are located. This is maximum distance and should be evaluated by a risk assessment (higher risk = closer access).

b. Eyewash shall be located on the same level as the hazard (e.g. no step, stairs, ramps, etc. in the path).
Note: A door is considered an obstruction. However, if the hazard is non-corrosive, one door can be present as long as it opens in the same direction of travel as the person requiring the use of the flushing equipment.

c. Eyewashes shall provide a consistent supply of tepid water (60^o – 100^o F).

d. Water supply to plumbed eyewashes shall be protected from unauthorized shut off.

e. Eyewash location shall be in a well-lit area and identified with a highly visible safety sign.

f. The area around the eyewash shall be free from obstacles, material or debris that would inhibit the immediate use of the equipment.

C. Maintenance – Plumbed eyewashes

a. Plumbed eyewash units will be activated weekly for a period long enough to verify operation and ensure that flushing fluid is clear of visible contamination or sediment.

b. The temperature of the water must be comfortable to the touch (i.e. lukewarm, tepid, range of 60^{o}-100^{o} F).
c. Document performance on the Eyewash Inspection form and retain records for life of the unit plus two years, according to Quest Diagnostics records retention schedule.

D. Use
a. Call out for co-worker assistance in reaching the eyewash unit safely.
b. Activate the eyewash unit to remove the covers. Do NOT remove covers with hands. Immediately flush eyes with water.
c. Hold eyelids open with fingers and rotate the eyeballs in all direction to remove the contamination around the eyes. Continue flushing for at least 15 minutes.
d. Obtain the SDS for the chemical contaminant and bring it to the doctor, if further treatment or evaluation is needed.
e. Report the injury or exposure to your manager/supervisor or EHS contact.