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SCOPE

This document applies to Baylor Scott & White ("BSWH") Health System Laboratory employees.

DEFINITIONS

Acute Toxin: Chemicals that can cause damage as the result of a single or short-duration exposure.

Carcinogen:

- A chemical regulated by OSHA as a carcinogen, has been classified as "known to be carcinogenic" by the National Toxicology Program (NTP), or listed as a group 1 carcinogen by the International Agency for Research on Cancer Monographs (IARC)
- A chemical that has been classified as "reasonably anticipated to be carcinogenic" by NTP or listed as a group 2A or 2B carcinogen by the IARC if it meets the toxicological criteria listed in the January 31, 1990 Fed Register, pages 3319-3320

GHS: Globally Harmonized System of Classification and Labelling of Chemicals

PPE: Personal Protective Equipment

Reproductive toxin: Chemicals that affect the reproductive capabilities including chromosomal damage (mutations) and effects on fetuses (tetragenesis).

SDS: Safety Data Sheet

TWA: Time Weighted Average

STEL: Short Term Exposure limit

BSWH ESEM: Baylor Scott and White Environmental Safety and Emergency Management

POLICY

Baylor Scott and White Health Laboratories have a documented chemical hygiene plan that complies with OSHA, CAP, and other local, state, and federal regulatory standards.

PROCEDURE

Responsibilities of the Laboratory Medical Director

- The laboratory medical director:
  - ensures implementation of a safe laboratory environment in compliance with good laboratory practice and applicable regulations.
  - ensures compliance with OSHA and local, state, and federal regulations, as well as other applicable safety standards.
  - Annually evaluates the Chemical Hygiene Plan for effectiveness.

Chemical Hygiene Officer Responsibilities:

- Establishes, maintains, and revises the chemical hygiene plan (CHP).
- Creates and revises safety rules and regulations.
- Monitors procurement, use, storage, and disposal of chemicals.
- Conducts regular inspections of the laboratories, preparations rooms, and chemical storage rooms, and submits detailed laboratory inspection reports to administration.
- Maintains inspection, personnel training, and inventory records.
- Assists laboratory supervisors in developing and maintaining adequate facilities.
- Seeks ways to improve the chemical hygiene program.

Laboratory Safety designee has overall responsibility for chemical hygiene in the laboratory, including responsibility to:

- Ensure that laboratory personnel comply with the departmental CHP and do not operate equipment or handle hazardous chemicals without proper training and authorization.
- Always wear personal protective equipment (PPE) that is compatible to the degree of hazard of the chemical.
- Follow all pertinent safety rules when working in the laboratory to set an example.
- Review laboratory procedures for potential safety problems before assigning to other laboratory personnel.
- Ensure that visitors follow the laboratory rules and assumes responsibility for laboratory visitors.
- Ensure that PPE is available and properly used by each laboratory employee and visitor.
- Maintain and implement safe laboratory practices.
- Provide regular, formal chemical hygiene and housekeeping inspections, including routine inspections of emergency equipment;
- Monitor the facilities and the chemical fume hoods to ensure that they are maintained and function properly. Contact the appropriate person, as designated by the department chairperson, to report problems with the facilities or the chemical fume hoods.

Chemical Hazard Determination

- A complete list of all chemicals used in the laboratory is maintained. See BSWH Laboratories Master Chemical Inventory on the share point site for a comprehensive list.
- Before ordering new material not listed, evaluate the consequences of ordering the chemical. For example, the possibility of having to establish a designated area or having to use the material within existing designated areas, or if the material requires special waste disposal procedures.
- The carcinogenic potential, reproductive toxicity and acute toxicity for all chemicals used has been evaluated by reference to appropriate lists and SDS information.
- Each laboratory annually catalogs their chemicals and updates their inventory on the BSWH Laboratories Master Chemical Inventory list.
- Chemicals are not transported via the pneumatic tube system.

Standard Operating Procedures for Handling Chemicals

- Do not pipette by mouth liquids of any kind.
- Do not smell or taste chemicals.
- Vent any apparatus that discharges toxic chemicals such as vacuum pumps into local exhaust devices.
- Inspect gloves before use.
- No toxic chemical will be stored in walk-in refrigerators and walk-in incubators.
- Use toxic chemicals only in designated areas.
- Eating, drinking, smoking, or any activity that encourages employees to touch their face or mouth with their hands, is not permitted in the laboratory. Wash hands before performing these activities outside the laboratory.
- No food or beverages will be stored in laboratory refrigerators, or in laboratory equipment such as glassware.
- Proper PPE must be used when handling chemicals

Handling Chemicals in Designated Areas

In areas where the concentration of airborne formaldehyde exceeds either the TWA or the STEL the following should be posted:

DANGER
FORMALDEHYDE
MAY CAUSE CANCER
CAUSES SKIN, EYE, AND RESPIRATORY IRRITATION
AUTHORIZED PERSONNEL ONLY

- Individuals working within these areas must wear the appropriate PPE defined in the laboratory's procedures.
- Regard such areas and anything within them as chemically contaminated and discourage all individuals from handling materials or equipment within them unless they are wearing protective gear.

Use of Chemical Fume Hoods (where applicable)

- Annually or whenever a malfunction occurs, chemical fume hoods are inspected. Documentation is maintained of each inspection.
- Contact Healthcare Technology Management or Engineering in case of malfunction.
- Never use a malfunctioning chemical fume hood.
- Remove unnecessary clutter from the chemical fume hood.
- Do not use hoods for storage of chemicals.
- With the chemical fume hood exhaust motor on, the sash height giving a minimum flow of 100 ft/min is marked on each hood.
- Each chemical fume hood is fitted with an anemometer. Note the anemometer reading daily when in use, on Hood Air face Monitoring form.
- Never work in a chemical fume hood with the sash above the mark.
- Wear appropriate gloves when handling hazardous chemicals in a chemical fume hood. Inspect gloves before use. If gloves are visibly contaminated with chemicals, wash before removal. Replace gloves periodically.

Ventilation

- The ventilation of each laboratory room is evaluated annually by measuring the room air changes. Airflow changes must be at least 6 air changes per hour
- The Laboratory Administrative Director or designee reviews the annual report. In the event that airflow changes are inadequate, submit a work order to Engineering.

PPE for Safe Chemical Handling

- Wear closed-toed shoes at all times in the laboratory.
- Wear appropriate gloves when handling hazardous chemicals.
- Wear appropriate protective gear when using or handling chemicals. Each laboratory, defines "appropriate protective gear" in their laboratory procedures.
- When working in areas where corrosive, caustic or volatile chemicals are in use, contact lenses should not be worn unless air-tight goggles are used.

Formaldehyde and Xylene Monitoring

- Monitoring of all departments will be performed as necessary by the BSWH ESEM Department to insure that all areas have exposure levels below the action limit and STEL. A representative sample of areas and job descriptions will be monitored by the BSWH ESEM Department or Facility Safety Director
- Determine the exposure of each employee identified.
- Correct any issues detected if the results exceed:
    - Formaldehyde - 0.5 ppm (8hr time-weighted exposure, the “action Level”) or 2.0 ppm (STEL)
    - Xylene - 100 ppm (8hr time-weighted exposure) or 150 ppm (STEL)
- Repeat monitoring any time there is a change in production, equipment, process, personnel or control measures, which may result in new or additional exposure to formaldehyde for any employee involved in the activity.
- Monitoring may be discontinued if results for two consecutive sampling periods taken at least seven days apart show that employee exposure is below the action level and the STEL, and
    - No change has occurred in production, equipment, process personnel or control measures that may result in new or additional exposure to formaldehyde, and
    - There have been no reports of conditions that may be associated with formaldehyde exposure.
- If any personnel report signs or symptoms of respiratory or dermal conditions associated with formaldehyde exposure, promptly monitor the affected person’s exposure.

The BSWH ESEM Department maintains all exposure measurements. Employee records are maintained for 30 years per BSWH ESEM policy.

Chemical Exposures

- In the event of a possible work related exposure to hazardous chemicals, the Employee/Staff Health Clinic or Emergency Department treats affected employees.
- Employee incidents are entered into Midas. Additional paperwork if needed is found on the homepage. The Laboratory Director or designee reviews all employee incident reports.
- In the event of accidental contamination of any part of the body, the following procedures are required:
    - Eye contact: Using the nearest eyewash station, flush the eyes for a prolonged period of time (15 minutes), and seek immediate medical attention.
    - Ingestion: After checking the SDS, the employee should be encouraged to drink large amounts of water, if appropriate. Seek immediate medical attention.
    - Skin contact: Flush the affected area promptly, while removing contaminated clothing. If the area involved is extensive, use an emergency shower. After washing, seek immediate medical attention.
    - Inhalation: Seek immediate medical attention.
- Seek medical attention in the following circumstances:
    - When an employee develops signs and symptoms associated with a hazardous chemical exposure.

- When environmental monitoring reveals an exposure level routinely above the action level.
- When 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.

Safety Inspections

- The Environment of Care Committee inspects each laboratory annually. Findings are submitted to the Laboratory Director electronically.
- The laboratory will correct deficiencies identified during the inspection.
- Documentation of the corrective action is maintained.
- When new equipment is purchased or when there is a process change with chemical usage, the Laboratory Director will notify the Facility Safety Representative to perform a safety inspection.

SDS

- An SDS is maintained for all chemicals, reagents, and kits via an online repository.
- An SDS is obtained for any new chemicals, reagents or kits and added to the online repository.
- The SDS is maintained in a manner that is available to all employees at all times.
- For chemicals no longer in use, the SDS documents are maintained for a period of 30 years.

Primary Labeling Standards

In addition to the chemical name or identifier and manufacturer's name and contact information, labels must contain the following elements for each hazard class associated with that chemical:

- Pictogram – a symbol to give a visual clue of the hazard class.
- Signal Word – either "Danger" or "Warning"
- Specific Hazard Statement(s)
- Specific Precautionary Statement(s)

Chemicals or reagents created in the laboratory are also required to be labeled, but these "secondary" or "workplace" labels may use other system of warning (such as HMIS or NFPA labels) to convey hazard information.

Ensure that existing labels from any chemical container is never removed or defaced, even at the time of disposal.

GHS Pictograms

The pictograms on chemical containers must be a red diamond with a black GHS symbol inside. If the chemical has more than one hazard, multiple pictograms will be used.

Signal Words

- "Danger" is used for more severe hazards.
- "Warning" is used for less severe hazards.

Only one signal word that corresponds to the most severe hazard class should be used on the label. Signal words are standardized and not subject to variation.

Hazard Statements

Standard phrases that describe the nature of the physical, health, or environmental hazard. Hazard statements are standardized and not subject to variation.

Examples include "Fatal in contact with skin" or "Heating may cause a fire or explosion".

For products with more than one hazard class, a GHS hazard statement for each hazard class must be included on the product label and SDS.

On some SDS you may see the hazard statement preceded by a code that starts with the letter H and is followed by three digits (such as H225). If multiple hazard statements are applicable, a "+" sign is used between codes.

Precautionary Statements

A set of standardized phrases that give advice on the correct handing of the chemical product.

Precautionary statements address prevention, response, storage, and/or disposal precautions. Examples include "Wash thoroughly after handling", "If eye irritation persists, get medical attention" or "Store in a well-ventilated place".

Similar to hazard statements, each precautionary statement has a designated code which may be included on labels. Each precautionary code begins with the letter P followed by three digits.

Secondary Labeling Standards

When portions of chemicals are removed from the original bottles, or if new solutions are created in the laboratory, these containers must be labeled with **secondary labels**, or "workplace" labels. This includes wash bottles.

Secondary labels do not have to be GHS labels, but must include the full name and concentration of the chemical, an indication of the physical and health hazards, and recommended protective equipment or protocols.

- Label all secondary containers, even wash bottles.
- Labels should include the following information:
  - Product identifier
  - Signal word
  - Hazard statement(s)
  - Pictogram(s)
  - Precautionary statement(s)
  - Or product identifier and words, pictures, symbols, or combination thereof, which provide at least general information regarding the hazards of the chemicals, and which, in conjunction with the other information immediately available to employees under the hazard communication program, will provide employees with the specific information regarding the physical and health hazards of the hazardous chemical.
    - Date prepared
    - Expiration date

Where a chemical or a group of similar chemicals is stored in small individual quantities, such as a stain, these materials may be grouped in a larger container that is appropriately labeled.

It is not required to label portable containers into which hazardous chemicals are transferred from labeled containers and which are intended only for the immediate use of the employee who performs the transfer.

Chemical Storage, General

- Maintain chemical inventories to the minimum amount necessary for efficient laboratory operation.
- Hazardous chemicals shall not be stored above eye level
- Store on open shelves in the laboratory no more than one pint or 500 grams of any extremely hazardous chemical.
- Do not store incompatible chemicals such that leakage or accidents would result in their mixing. Where space permits, they should be stored in separate cupboards. They may be stored on separate shelves; however, these shelves should be such that one chemical cannot leak down onto a non-compatible chemical.
- Do not store powerful oxidants in the same cupboard as organic solvents. SDS list incompatible chemicals.

Storage of Flammable Liquids

- Maintain supplies of flammable or combustible liquids to the minimum amount necessary for efficient laboratory operation.
- Use safety cans for storing flammable liquids if appropriate.
- Where, for reasons of purity, it is not acceptable to store flammable liquids in safety cans, use the original container.
- Use bottle carriers to transport glass bottles of flammable liquids.

- Adequately ventilate rooms where flammable solvents are stored.
- Wherever flammable liquids are stored, an appropriate fire extinguisher must be available in the immediate vicinity.
- In areas where there is no Automated Fire Extinguishing System (AFES), CAP allows the following storage limits of Class I, II and IIIA liquids for each 100 ft^2 of space defined by fire-resistant walls/doors and the presence of an automatic fire suppression system.
    - Two gallons stored outside of fire-resistant cabinets or safety cans.
    - Four gallons stored in fire-resistant cabinets or safety cans.

Storage of Acids and Bases

- Maintain supplies of acids and bases to the minimum amount necessary for efficient laboratory operation.
- Store supplies of acids and bases in cabinets near floor level.
- The cabinet must be cool, dry and well ventilated.
- Do not store acids and bases under sinks to prevent contamination by moisture.
- Store supplies of acids and bases adequately separated to prevent a chemical reaction in the event of an accident/spill/leak.
- Store all corrosive liquid chemicals in drip trays that are chemically resistant. Tray capacity must be 110% of the largest container.
- Use bottle carriers to transport all glass containers larger than 500 mL that contain hazardous chemicals.

Training

The goal of training is to inform employees of the risks of hazardous chemicals in the workplace, the controls available for their protection and how to use them. Training must be conducted initially when an employee is hired or when the potential hazards of the job change.

Training will include but is not limited to:

- The contents of the Chemical Hygiene Plan
- The chemical and physical hazards of chemicals in the laboratory
- Location, proper use, and limitations of PPE
- Spill control policy and location of cleanup equipment and materials
- Availability and location of information sources, such as books and SDSs
- Explanation of how to read a SDS
- Emergency evacuation plans

ATTACHMENTS

None.

RELATED DOCUMENTS

BSWH Hospital Laboratories Master Chemical Inventory (BSWH.LAB.SAF.0613.F1)
BSWH Regional Clinic Laboratories Master Chemical Inventory (BSWH.LAB.SAF.0613.F2)
BSWH Laboratories List of Acute Toxins (BSWH.LAB.SAF.0613.F3)
BSWH Laboratories List of Carcinogens (BSWH.LAB.SAF.0613.F4)
BSWH Laboratories List of Reproductive Toxins (BSWH.LAB.SAF.0613.F5)
BSWH Laboratories List of Class 1 Flammables (BSWH.LAB.SAF.0613.F6)
BSWH Laboratories List of Oxidizers (BSWH.LAB.SAF.0613.F7)

REFERENCES

Occupational Safety and Health Administration. Toxic and hazardous substances hazard communication: standard. 2012: [29CFR1910.1200]
Occupational Safety and Health Administration. Occupational exposures to hazardous chemicals in laboratories: standard. 2012: [29CFR1910.1450]

REVISION HISTORY

Version #	Effective Date	Description of Change	Revised By	Removed Date