1. **PURPOSE:** To ensure and promote a safe work environment and protect employees, patients, and visitors from exposure to hazards associated with the use and storage of chemicals in the clinical laboratory areas. To educate laboratory workers about the health hazards associated with hazardous chemicals. To comply with OSHA Code of Federal Regulations, Title 29, Part 1910.10011047, 1450. The following is a link to the OSHA Laboratory Standard: **Occupational exposure to hazardous chemicals in laboratories. - 1910.1450 National Research Council Recommendations Concerning Chemical Hygiene in Laboratories (Non-Mandatory) - 1910.1450 App A References (Non-Mandatory) - 1910.1450 App B**

2. **POLICY:** In order to provide personnel in the Pathology & Laboratory Medicine Service (PLMS) with safe working principles and practices a comprehensive plan is necessary. The specifics of the program will meet the requirements of various accrediting agencies.

3. **SCOPE:** This plan is intended to be comprehensive in scope in order to minimize adverse effects of chemical use on the health of all personnel. The content of this document includes policies and procedures as follows:

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3. RESPONSIBILITIES:

a. The Medical Center or Hospital Director is responsible for:

(1) providing a safe workplace environment for all employees,

(2) implementing an effective safety program which meets the requirements of the various accrediting agencies, and

(3) providing a medical surveillance program through the Employee Health Section for employees exposed to chemicals at or above the action level.

b. The Facility Safety Manager, Industrial Hygienist or GEMS Coordinator is responsible for:

(1) monitoring exposure to hazardous chemicals, such as formaldehyde and xylene, on a regular basis,

(2) providing a comprehensive hood maintenance program,

(3) maintaining a current inventory of hazardous chemicals submitted by PLMS, and

(4) coordinating and monitoring the disposal of hazardous chemicals.

c. **The Chief Pathologist, Pathology & Laboratory Medicine Service and the Laboratory Managers are responsible for:**

(1) providing a safe workplace environment for the employees and volunteers within the service, in accordance with the PLMS Service Line Policy SA-113-003 "Occupational Safety, Health & Fire Protection Service Program Guidelines,"

(2) enforcing the medical center/hospital policy and all relevant procedures regarding employee safety, and volunteers performing tasks within the PLMS,

(3) ensuring that the requirements of various accrediting agencies are fulfilled,

(4) providing the designated laboratory chemical hygiene officer/safety officer at each site in the Service line with necessary support in obtaining resources and personnel to implement the Chemical Hygiene Plan,

(5) ensuring that corrective action is taken for any problems/deficiencies identified, and

(6) monitoring compliance within the laboratory.

d. **The designated Laboratory Chemical Hygiene Officer/Laboratory Safety Officer is responsible for:**

(1) developing policies and procedures for operations that involve hazardous chemicals,

(2) reviewing and evaluating the Chemical Hygiene Plan on an annual basis,

(3) educating and training employees in procedures relating to handling of hazardous chemicals,

(4) monitoring and enforcing compliance with PLMS and hospital/medical center policies,

(5) coordinating the monitoring of permissible exposure limits of various hazardous chemicals for employees within the service,

(6) ensuring that the fume hoods of PLMS are properly tested and maintained in accordance with medical center, hospital and laboratory policies,

(7) documenting compliance with safe work practices via the Quality Improvement Program of PLMS,

(8) maintaining a current and detailed inventory of all chemicals used in the laboratory and providing copies to the medical center/hospital's Industrial Hygienist upon request,

(9) coordinating and monitoring the hazardous waste disposal program for PLMS,

(10) conducting a flammable solvent inventory which is documented on the "Quarterly/Semiannual Walkthru Inspection Checklist", SA-113-026,

(11) reviewing all accident reports in accordance with PLMS Service Line Policy SA-113-002 "Accident Reporting", and

(12) serving as a member of various medical center/hospital committees involving health and safety programs and as the PLMS designated Chemical Hygiene Officer.

e. **The Section Director/Supervisor/Team Leader/Lead Technologist is responsible for:**

(1) ensuring that all laboratory work practices comply with service specific policies, as detailed in this policy,

(2) enforcing safe work practices and the use of engineering controls and personal protective equipment within the assigned section,

(3) displaying the appropriate signage, i.e. NFPA, HMIS, or other rating system signage with designated levels, for all areas in which hazardous chemicals are being stored or handled,

(4) making the Safety Data Sheets (SDS) readily accessible to all employees handling hazardous materials,

(5) assisting the designated Laboratory Chemical Hygiene Officer/ Laboratory Safety Officer in ensuring that all employees receive adequate training,

(6) implementing appropriate corrective action when problems or deficiencies are identified,

(7) advising employees of safe medical treatment or first aid should the need arise,

(8) ensuring that the maximum limits for storage of flammables is not exceeded,

(9) conducting an annual chemical inventory in accordance with this policy,

(10) maintaining the electronic chemical inventory,

(11) ensuring that chemicals without a manufacturer expiration date is evaluated before the assigned expiration date, and to extend the date if needed if the chemical passed the evaluation,

(12) investigating all reported accidents within the assigned section,

(13) completing VA Form 2162, "Report of Accident" and the CA-1 U.S. Department of Labor form for each employee reported accident,

(14) coordinating the entry of employee reported accident data into the ASISTS program, and

(15) providing a list of employees authorized to handle those chemicals requiring monitoring to the Facility Safety Manager in accordance with the Facility Medical Surveillance program. This is limited to PLMS personnel who have completed annual training.

f. **Each employee is responsible for:**

(1) following established policies and procedures designed to protect employees,

(2) recognizing potential safety hazards and reporting them to appropriate supervisors in a timely manner,

(3) reporting all incidents or accidents so that steps may be taken to prevent their recurrence, in accordance with PLMS Service Line Policy SA-113-002 "Accident Reporting,"

(4) reviewing the SDS in the event of exposure for first aid,

(5) ensuring that all containers are labeled in accordance to this policy,

(6) attending mandatory training sessions within the established time frame, and

(7) reviewing PLMS's Chemical Hygiene Plan on an annual basis. This review is documented by successful completion of the Chemical Hygiene Plan quiz.

5. **DEFINITIONS:**

a. Action Level - is the materials concentration in air (exposure level) at which OSHA regulations to protect employees take effect, e.g., workplace air analysis.

b. Acute toxicity- describes the adverse effects resulting from a single exposure to a substance.

c. Carcinogen - a chemical substance or a mixture of chemical substances which induce cancer or increase its incidence.
OSHA classifies carcinogenicity by the following:
1. Being evaluated by the International Agency for Research on Cancer and listed as a known carcinogen
2. Listed in the latest edition of the National Toxicology Program as a carcinogen or potential carcinogen
3. OSHA regulates the chemical as a carcinogen.

d. Chemical – refers to any elements, chemical compounds, or mixture of elements and/or compounds.

e. Class I flammable- any liquid that has a closed-cup flash point below 37.8°C and a Reid vapor pressure not exceeding 2068.6 mm Hg at 37.8°C as determined by ASTM D 323.

f. Class II combustible- any liquid that has a flash point at or above 37.8°C and below 60°C.

g. Class IIIA combustible- any liquid that has a flash point at or above 60°C but below 93°C

h. Combustible Liquid – refers to any liquid having a flash point at or above 100° F (37.8° C), the total volume of which makes up 99% or more of the total volume of the mixture.

i. Corrosive - a chemical that causes visible destruction of or irreversible

alterations in living tissue by chemical action at the site of contact; a liquid that causes a severe corrosion rate in steel. (Example: Acids).

j. Exposure or exposed – means that an employee is subjected in the course of employment to a chemical that is a physical or health hazard, and includes potential (i.e. accident or possible) exposure. "Subjected" in terms of health hazards includes any route of entry, i.e. inhalation, ingestion, skin contact or absorption.

k. Flammable - a solid, liquid, vapor or gas that ignites easily and burns rapidly. (Examples: Xylene, Methanol, Alcohols).

l. Hazardous Chemical - a substance or mixture of substances having properties capable of producing adverse effects on the health or safety of a human.

m. The Hazardous Materials Identification System, HMIS®- The system utilizes colored bars, numbers and symbols to convey the hazards of chemicals used in the workplace.

Health Hazard (Blue) - The Health section conveys the health hazards of the material. The blue Health bar has two spaces, one for an asterisk and one for a numeric hazard rating. If present, the asterisk signifies a chronic health hazard, meaning that long-term exposure to the material could cause a health problem such as emphysema or kidney damage.

Degree of hazard
0 = No significant risk to health.
1 = Irritation or minor reversible injury possible.
2 = Temporary or minor injury may occur.
3 = Major injury likely unless prompt action is taken and medical treatment is given.
4 = Life-threatening, major or permanent damage may result from single or repeated overexposures.

Flammability (Red) indicates susceptibility to burning- The flammability criteria are defined according to OSHA standards:

0 = will not burn
1 = will ignite if preheated
2 = will ignite if moderately heated
3 = will ignite at most ambient conditions
4 = burns readily at ambient conditions

Physical Hazard (Orange) indicates energy released if burned, decomposed or mixed- Reactivity hazard are assessed using the OSHA criterion of physical hazard. Seven hazard classes are recognized: Water Reactives, Organic Peroxides, Explosives, Compressed gases, Pyrophoric materials, Oxidizers and Unstable Reactives. The level of hazard is indicated using numeric values (0 = low hazard to 4 = high hazard)**.**

0 = Materials that are normally stable, even under fire conditions, and will not react with water

1 = Materials that are normally stable but can become unstable (self-react) at high temperatures and pressures. Materials may react non-violently with water or undergo hazardous polymerization in the absence of inhibitors.

2 = Materials that are unstable and may undergo violent chemical changes at normal temperature and pressure with low risk for explosion. Materials may react violently with water or form peroxides upon exposure to air.

3 = Materials that may form explosive mixtures with water and are capable of detonation or explosive reaction in the presence of a strong initiating source. Materials may polymerize, decompose, self-react, or undergo other chemical change at normal temperature and pressure with moderate risk of explosion.

4 = Materials that are readily capable of explosive water reaction, detonation or explosive decomposition, polymerization, or self-reaction at normal temperature and pressure.

Personal Protective Equipment (White)- indicate what personal protective equipment (PPE) should be used when working with the material. HMIS® uses a letter coding system for this section.

n. National Fire Protection Association (NFPA) Hazard Rating - a diamond shaped visual system that provides a general idea of the inherent hazards and their severity of materials relating to fire prevention, exposure and control. The preferred reading order is, health, flammability, reactivity, special.

Left Quadrant - Health Hazard (Blue)

Degree of hazard; level of short term protection.

0 = ordinary combustible hazard

1 = slightly hazardous

2 = hazardous

3 = extreme danger

4 = deadly

Top Quadrant - Flammability (Red) indicates susceptibility to burning.

0 = will not burn
1 = will ignite if preheated
2 = will ignite if moderately heated
3 = will ignite at most ambient conditions
4 = burns readily at ambient conditions

Right Quadrant - Reactivity, Instability (Yellow) indicates energy released if burned, decomposed or mixed.

0 = stable and not reactive with water
1 = unstable if heated
2 = violent chemical change
3 = shock and heat may detonate
4 = may detonate

Bottom Quadrant - Special Hazard (White)

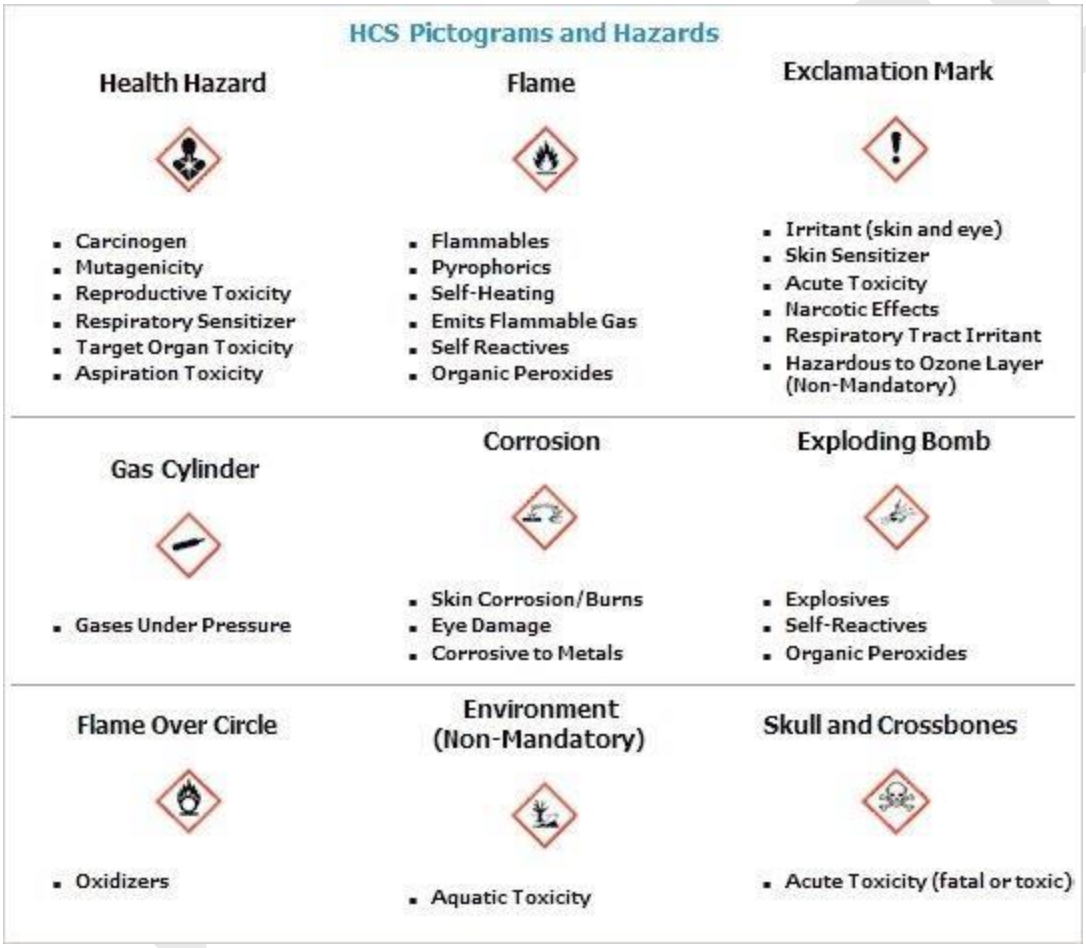
0XY = oxidizing agent
~~W~~ = reacts with water. NO WATER
Acid
Alkali
Corrosive
Radioactive

o. Oxidizer – refers to a chemical other than a blasting agent or explosive that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.

p. Parts per Million (ppm) - the parts of vapor or gas per million parts of contaminated air, by volume at 25û C.

q. Permissible Exposure Limit (PEL) - is the time weighted average concentration to which an employee can be exposed and must not be exceeded during any 8-hour work shift of a 40-hour work week. Most of these limits were originally set by the American Conference of Governmental Industrial Hygienists (ACGIH) and are enforced by OSHA. The PEL assists industrial hygienists in implementing exposure control programs.

r. Pictogram – Hazard Pictograms–There are nine pictograms used to convey the health, physical and environmental hazards. HCS requires eight of these pictograms, the exception being the environmental pictogram as environmental hazards are not within OSHA's jurisdiction. These pictograms will have a black symbol on a white background with a red diamond frame (see illustrations below):



s. 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.

t Product identifier – the name or number used for a hazardous chemical on a label or in the SDS. It provides a unique means by which the user can identify the chemical. The product identifier used shall permit cross-references to be made among the

list of hazardous chemicals required in the written hazard communication program, the label and the SDS.

u. Reactive - a chemical substance or mixture that vigorously polymerizes, decomposes, condenses, or becomes self-reactive due to shock, pressure or temperature. (Examples: Picric acid). (NOTE: Require special handling procedures).

v. Reagent- a substance that, because of the reactions it causes, is used in analysis and synthesis.

w. Reproductive toxicity- adverse effects of chemicals on sexual function and fertility in adult males and females, as well as developmental toxicity in the offspring.

x. Safety data sheet (SDS) –is a document that provides information on the properties of hazardous chemicals and how they affect health and safety in the workplace.

y. Short Term Exposure Limit (STEL) – a 15 minute time weighted average exposure that should not be exceeded at any time during a workday. The STEL is usually measured over a 15 minute period unless noted otherwise due to a specific chemical or procedure. (NOTE: Regulated by OSHA).

z. 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. Examples are “danger” and “warning”. “Danger is used for the more severe hazards, while “warning” is used for the less severe.

(a) Threshold Limit Value (TLV) - threshold limit values are 8 hour time weighted average concentrations established by the ACGIH.

(b) Time Weighted Average (TWA) - is the concentration for a normal 8-hour workday or 40-hour workweek to which nearly all workers may be repeatedly exposed, day after day, without adverse effect unless otherwise noted.

(c) Toxic – describes a material’s ability to injure biological tissue. Having 1) an LD_{50} if 50 to 500 mg/kg when administered orally to albino rats weighing 200 to 300 g each; 2) an LD_{50} of 200 to 1000 mg/kg when administered by continuous contact for 24 hours to the bare skin of albino rabbits weighing 2 to 3 kg each; or 3) an LC_{50} of 200 to 2000 ppm (gas or vapor) or 2 to 20 mg/1 (mist, fume, or dust) when administered by continuous inhalation for 1 hour to albino rats weighing 200 to 300 g each. Acute Toxicity is the adverse (acute) effects resulting from a single dose of or exposure to a material. Ordinarily used to denote effects observed in experimental animals.

(d) Toxic Substance – any chemical or material that produces any reversible or irreversible effects on the body via any route. These effects include irritation, mutation, reproductive effects, tumorigenesis, organ or functional system effects, or death.

6. **PROCEDURES:**

a. **Equipment**

(1) Engineering Controls

(a) The Medical Center/Hospital Ventilation and Air Conditioning (HVAC) system is the foremost measure used to reduce employee exposure to hazardous chemicals.

(b) Functional fume hoods are located within each laboratory section in which hazardous chemicals are being utilized.

(2) Personal Protective Equipment (PPE)

(a) PPE must be readily accessible and in accordance with Hospital/Medical Center policies.

(b) Depending on the nature of the chemical, the PPE required will vary in accordance with the information contained in the SDS.

(c) The personal protective equipment that must be provided in laboratories, and used where appropriate, includes safety goggles, full face shield, gloves, aprons, disposable laboratory coats or body covering protection.

(d) Where the use of respirators is necessary to maintain exposure below permissible exposure limits, the Medical Center/Hospital, at no cost to the employee, will provide the proper respiratory equipment as well as training in its use.

NOTE: The respirators shall be selected and used in accordance with the requirement of 29 CFR 1910.134 and/or guidelines as established by the facility's Industrial Hygienist.

b. **General Rules**

(1) Unnecessary risks shall not be taken; questions concerning job safety should be referred to the appropriate supervisor/director/leader,

(2) Accidents or injuries must be reported promptly according to PLMS Service Line policy SA-113-002 "Accident Reporting."

(3) **Pipetting by mouth is strictly prohibited.** Mechanical devices are available for all personnel.

(4) Personal Protective Equipment (PPE), such as a coat, gown, gloves, apron, and eye protection shall be worn as recommended on Safety Data Sheets (SDS) when handling hazardous chemicals.

(5) Safety goggles must be worn when working with chemicals.

(6) Sniffing of reagents can cause injury to an employee's mucous membranes and is prohibited.

(7) Great care shall be used when performing dilutions.

(a) Always add acids or alkali to water.

(b) Allow acid/alkali to run down the side of the container slowly and mix by gentle rotation.

(8) Heavy plastic bottle carriers shall be used to transport acids and alkalis.

(9) A grounding wire must be in place on the 55 gallon drums (solvent waste can) before transferring flammables from one container to another in order to avoid a static spark that may result from pouring the solvent.

(10) Tissue processors and similar automatic equipment that release ignitable vapors into the ambient workspace shall be located and operated at least 5 feet away from the storage of combustible materials.

(11) Safety equipment, such as safety showers, eyewashes and appropriate fire extinguishers are located in each section of the laboratory and are tested periodically. The procedure for “Emergency First Aid”, SA-113-025 shall be posted in the area of each eyewash and safety shower station.

(12) Eating, drinking, and smoking are absolutely prohibited throughout the technical and analytical areas of the laboratory.

(13) Food and beverages are not permitted in analytical/laboratory area refrigerators.

(14) Shoes should cover the entire foot. Staff should not wear sandals, perforated shoes, or canvas shoes. Canvas shoes will absorb chemicals or infectious fluids, therefore they are not recommended. If worn, the canvas shoes should be covered with disposable, fluid-resistant shoe covers.

(15) Avoid practical jokes or other behavior that might startle, confuse or distract laboratory personnel. Horseplay at any time is not allowed.

(16) Hair must be secured back and off the shoulders in such a manner as to prevent it from coming into contact with contaminated materials or surfaces and moving instrumentation.

(17) Spill kits will be made available where needed.

a. If there is no manufacturer's expiration date the kit will be dated with the date placed into service.

b. The spill kit will be assessed for its usability either quarterly or semi-annually. PLMS Service Line Policy "PLMS Safety Program", SA-113-026, Quarterly/Semi-Annual Walkthru Inspection Checklist will be used to document the usability.

((1)) The kit will be checked for a manufacturer's expiration date. If none, the kit will be checked for a date placed into service.
((2)) The kit will be checked for manufacturer's instructions.
((3)) The kit will be checked to see if the contents are accounted for and the kit will be replaced if contents are missing.
((4)) Kits that contain granules will be checked for clumping and if detected the kit will be replaced.

(18) All employees must be aware of the following when working with any chemicals:

a. The chemical hazards as determined from the SDS, labels, and other appropriate references. SDS files are available to every employee.

b. Use of secondary containment to avoid spills: especially glass bottles on the floor.

c. Appropriate safeguards when using a chemical, including personal protective equipment.

d. The location of the nearest safety shower, eyewash station, fire extinguisher, and fire alarm and knowledge of emergency phone numbers.

e. The location and the proper use of the nearest emergency spill control station.

f. How and where to properly store the chemical when not in use.

g. Review of the SDS before using chemicals with which one is unfamiliar.

h. The proper methods for transporting chemicals within the facility.

i. The importance of purchasing minimum amounts of hazardous chemicals.

j. Appropriate procedures for emergencies, including evacuation routes, spill clean up procedures, and proper waste disposal.

c. **Use of Fume Hoods**

(1) Operating fume hoods shall be used for the handling of hazardous materials:

(a) with a Threshold Limit Value (TLV) <50 parts per million (PPM),

(b) defined as a carcinogen/suspected carcinogen or

(c) if the SDS indicates use.

(2) A fume hood should not be used to dispose of chemicals by evaporation unless the vapors are trapped and recovered for proper waste disposal.

(3) The hood fan should remain on whenever a chemical is opened and in use inside the hood.

(4) Personnel shall notify their immediate Supervisor/Director/Team Leader/Lead Technologist, or the Laboratory Safety Officer, in the event of a hood failure.

(5) Hoods must be inspected at regular intervals as outlined in the PLMS Service Line policy, SA-113-008 "Hood Performance and Maintenance."

(6) Hoods are not to be used as primary storage areas for chemicals. Materials placed in hoods shall be kept to a minimum and shall not block airflow patterns.

d. **Standard Operating Procedures for Select Hazards**

(1) Compressed Gases

(a) Cylinders must be secured/chained at all times so they cannot fall.

(b) Valve safety covers shall be left on until pressure regulators are attached.

(c) Cylinders must be clearly labeled indicating the contents and the hazards.

(d) When transporting cylinders, a hand truck or dolly with a securing device (i.e. strap, chain) must be used.

(e) The transportation of large cylinders should not be performed single-handedly. As an added safety precaution two employees may work together in the transport process.

(f) No more than two cylinders of flammable gases shall be manifolded together.

(g) Standby cylinders of a flammable gas (full or empty) are NOT to be stored in the laboratory.

(h) Gas valves and cylinders shall be regularly checked for leaks. Cylinders and connections should be tested for leaks using a soap solution by whomever is attaching the regulator.

(i) Valves on all flammable gas cylinders shall be shut off when the unit is unattended.

(j) The use of oil, grease or lubricants on valves is prohibited.

(k) Do not attempt to repair damaged cylinders or force frozen cylinder valves.

(l) When more than one cylinder of a highly flammable gas is to be used in one room, specific approval by the Medical Center/Hospital Industrial Hygienist shall be obtained.

(2) **Caustic and Corrosive Materials**

(a) Specific information describing chemicals is given in the Safety Data Sheet provided by the manufacturer and on the container labels.

(b) Corrosive chemicals shall be handled with all proper safety precautions including personal protective equipment, as detailed in the specific procedure for the analysis being performed.

(c) If large quantities of acids or alkalies are being used, a shield or barrier shall be used to control spills.

(3) **Toxic Chemicals**

(a) Safety Data Sheets state the recommended limits or OSHA mandated guidelines for exposure to toxic chemicals.

(b) When a Threshold Limit Value (TLV) or Permissible Exposure Limit (PEL) for a chemical (i.e. glutaraldehyde) is less than 50 ppm, the employee using the chemical shall handle the chemical in a fume hood which has been certified and approved for use.

(c) Whenever handling toxic substances with vapor pressures likely to exceed air concentration limits (i.e. formaldehyde, xylene), such work shall be conducted in a bench top fume hood and/or fume hood.

(4) **Reactive Chemicals**

(a) Reactivity information can be found on a chemical SDS or container label.

(b) Reactive chemicals shall be handled with appropriate safety precautions, including segregation in storage and use of appropriate personal protective equipment.

(5) **Formaldehyde**

(a) Any formaldehyde solution, composed of more than 0.1% formaldehyde is considered by OSHA to be a potential carcinogen.

(b) The control of formaldehyde, in accordance with OSHA exposure limits, shall be accomplished by mechanical/engineering controls.

(c) Appropriate personal protective equipment; laboratory coat, goggles, gloves shall be worn at all times when handling formaldehyde with concentration >0.1%.

(d) All employees whose work assignments include potential exposure to formaldehyde must receive initial training upon hire, and annual training thereafter.

(6) **Perchloric Acid**

(a) The use of safety goggles or other protective eyewear is required when performing tests utilizing perchloric acid.

(b) Original bottle should be stored inside a glass container, having a greater capacity than the original container.

(c) Perchloric acid must be separated and stored away from combustible materials, organic chemicals, strong dehydrating agents or oxidizing reagents.

(d) Only 2 bottles of perchloric acid shall be stored in any section of the laboratory.

(e) Heating of perchloric acid above ambient temperatures shall only be done in an approved, certified fume hood.

(7) **Picric Acid**

(a) The use of safety goggles or other protective face/eyewear is required when performing tests utilizing picric acid.

(b) Picric acid, wet with at least 10% water is considered stable under normal temperatures and pressures.

(c) Conditions to avoid exposing picric acid to, include heat and contact with metals.

(d) The use and preparation of bouins solution (which contains picric acid) shall only be done under the supervision of the Histology supervisor.

(8) **Dry Ice**

(a) Never transport dry ice in a plastic bag or airtight container; always use a rigid container that allows for escape of CO2 gas.

(b) Dry ice should never be placed in an unventilated room or vehicle.

(c) Do not inhale dry ice.

(d) Dry ice should never be handled with bare skin. Insulated gloves (i.e. neoprene) or tongs should be used.

(e) To safely dispose of dry ice, remove to a well-ventilated area for sublimation.

(f) Dry ice should never be placed on the workbench or poured into a sink because of damage to the workbench, sink or drain pipes may occur.

e. **Chemical Procurement, Distribution and Storage**

(1) **Procurement**

(a) When ordering chemicals, supervisors or other individuals authorized to order supplies must request that the manufacturer provide a SDS for the product when delivered.

(b) Before a chemical is received, information on proper handling, storage, and disposal should be known to those involved.

(c) No container shall be accepted without adequate identifying label. All substances shall be received by authorized employees to accept orders.

(d) Toxic substances shall be segregated in a well identified area with exhaust ventilation, (i.e. flammables with flammables, oxidizer with oxidizers).

(e) Every effort should be made to find less hazardous substitutes for more hazardous chemicals, provided a suitable substitute is available.

(2) **Distribution**

(a) All hazardous materials shall be transported within the facility in safety containers to prevent breakage or in the original shipping cartons.

(b) All chemicals and solvents entering a facility are for use only in the facility where they are originally received.

(c) Once received in PLMS, hand carried chemicals shall be transported in an outside container and concentrated acids shall be transported using heavy duty plastic carriers.

(d) A grounding wire must be in place when transferring flammables from one metal container to another in order to avoid a static spark that may result from pouring the solvent.

(3) **Storage**

(a) Amounts permitted in the laboratory work area should be as small as possible and practical.

(b) Storage on bench tops is not appropriate. Exposure to heat or direct sunlight shall be avoided.

(c) Toxic substances shall be segregated in well-identified areas with

local exhaust ventilation. Chemicals shall be stored by reactive class (i.e. flammable with flammables). Incompatible chemicals must be segregated from each other in storage.

(d) Stored chemicals should be examined periodically (at least annually) for replacement, deterioration, and container integrity.

(e) Whenever possible, flammable and combustible liquids should be stored in approved containers.

(f) The amount of chemicals permitted in the laboratory work area should be as small as possible.

(g) In each laboratory area, up to 1 gallon of Class I, II, and IIIA liquids may be stored outside of fire-resistant cabinets for each 100 ft2 of space defined by fire-resistant walls/doors. Up to 2 gallons of Class I, II, and IIIA liquids may be stored in safety cans and safety cabinets for each 100 ft2. These amounts may be doubled if there is an automatic fire suppression system (e.g., sprinklers).

(h) The bulk amount of flammable solvents are stored in an approved flammable storage cabinet or a designated area/building.

(i) Flammable cabinets located throughout PLMS must be properly used and maintained.

(j) Flammables shall be stored away from caustics, oxidizing acids, and oxidizers.

(k) Large bottles of acid or solvents shall be stored in low shelves of appropriate cabinets.

(l) Acids shall be separated from caustics.

(m) Water-reactive chemicals shall be kept in a cool and dry place.

(n) Due to the markedly high flammability and reactivity rating of picric acid, a flammable safety cabinet has been designated to house picric acid and bouins solution ONLY. This safety cabinet is located in a cool, dry area of the Histology section.

(o) Section Supervisors/Directors/Leaders or members of laboratory safety sub-committees, shall compile chemical inventories of their areas on an bi-annual basis. Chemicals on the inventory will be evaluated for their carcinogenic potential, reproductive toxicity and acute toxicity. (SDS is an example of a resource to be used to obtain the information needed for the evaluation. The inventory grid is one mechanism to document the evaluation.) At the time of the bi-annual inventory chemicals will be evaluated for evidence of deterioration. In addition, chemicals that have been assigned an expiration

date that are approaching the assigned expiration date should be evaluated to see if the expiration date can be extended. The Lab Safety Officer shall maintain the master list of chemicals stored and used within the service. The chemical inventory shall also be forwarded to the Hospital/Medical Center Safety Section.

f. **Environmental Monitoring**

(1) Monitoring of PLMS personnel exposed to formaldehyde and xylene is performed on an annual basis by or per site specific conditions/requirements, or when there is reason to believe that permissible exposure levels are being routinely exceeded. The monitoring is performed by the Industrial Hygienist/Designee of the Medical Center/Hospital.

(2) The OSHA Standards are:

(a) Formaldehyde

((1)) 8 hour TWA (Time weighted average) - permissible exposure level equals .75/ppm (parts per million).

((2)) 15 minutes STEL (Short term exposure level) equals 2.0/ppm (parts per million).

(b) Xylene

((1)) 8 hour TWA (Time Weighted Average) permissible exposure limit equals 100 ppm (parts per million).

((2)) 15 minutes STEL (Short Term Exposure Level) equals 150 ppm (parts per million).

(3) Regular instrumental monitoring of airborne concentrations is not usually practical in laboratories except when redesigning hoods or when a highly toxic substance is used regularly. Care shall be taken in PLMS to ensure that:

(a) The ventilation/air conditioning system (including hoods) is working and is being used properly.

(b) Laboratory personnel are using proper protective equipment and following good hygiene and safe work practices.

(4) Should monitoring reveal concentrations at or above permissible exposure limits corrective actions must be initiated.

(5) Employees must be notified of all monitoring results. The results shall be posted in an area where all personnel may view them.

(6) PLMS fume hoods shall be certified annually or semi-annually, according to the policies/procedures outlined in PLMS Service Line policy SA-113-008,"Hood Performance and Maintenance."

g. **Housekeeping Maintenance and Inspections**

(1) Housekeeping

(a) Each laboratory in the PLMS Service Line shall determine the product to be used for routine decontamination. Refer to VISN Safety procedure SA-113-018, “Procedure for Decontamination.”

(b) Computer keyboards in PLMS shall be cleaned following the procedure outlined in the VISN Safety procedure SA-113-018, “Procedure for Decontamination.”

(c) All PLMS personnel are responsible for daily cleaning of all bench tops and other work areas such as fume hoods and bio-safety cabinets. Minimum requirements are as follows:

((1)) Work surfaces shall be cleaned at least once per 24 hours. In the Microbiology laboratory cleaning will take place at the end of the tour.

((2)) All fume hood equipment must be cleaned and/or decontaminated PRIOR to repair by Engineering Section of Facilities Management Service if their access involves the area where biohazardous or chemical materials are handled. Refer to PLMS Safety procedure SA-113-018, “Procedure for Decontamination”, for further details.

(d) Floors should be kept free of litter by laboratory personnel and cleaned regularly by Environmental Management Service.

(e) All chemicals should be placed in their proper storage area at the end of each workday.

(2) Maintenance and Inspections

(a) Eyewash stations shall be flushed weekly. Documentation is either maintained by the facility or each section of the laboratory. Should the weekly testing identify a problem with an eyewash station the immediate supervisor shall be notified. The supervisor shall report to the Laboratory Safety Officer and ensure that a work order with Engineering Service is placed to correct the problem.

(b) Personal protective equipment cabinets shall be designated, maintained, and well stocked.

(c) Fire extinguishers shall be inspected monthly in accordance with specific Fire and Safety Code requirements.

(d) Hallways should not be used as storage areas and access to exits and emergency equipment should never be blocked.

(e) Inspections shall be held quarterly or semiannually. The "Quarterly/Semiannual Walkthru Inspection Checklist", SA-113-026 all be used for documentation purposes.

h. **Medical Program- Employee Health Section**

(1) Routine Surveillance – The Medical Center/Hospital shall provide all employees who work with hazardous chemicals an opportunity to receive medical consultation and examination when:

(a) Employees develop signs or symptoms associated with a hazardous chemical to which the employee may have been exposed within the Service;

(b) Monitoring, routine or otherwise, suggests that there could have been an exposure above the PEL or Action Limit;

(c) There is a spill, leak, or other uncontrolled release of a hazardous chemical which may have resulted in an increased or unacceptable occupational exposure to the chemical.

(2) Accidents and Illnesses

(a) Refer to "Emergency First Aid", SA-113-025 when accidental contact occurs with a chemical.

(b) All personnel should report to their Supervisors/Directors Team Leaders/Lead Technologists at once in any of the above situations.

(c) Policies and procedures for reporting personal injury accidents is detailed in PLMS Service Line Policy SA-113-002, "Accident Reporting."

(3) Medical Surveillance

(a) Employees identified as potentially exposed to formaldehyde at or above the action level shall be entered into a medical monitoring program.

(b) Medical examinations and consultations shall be performed by or under the direct supervision of Employee Health or licensed physician without cost to the employee, without loss of pay and at a reasonable time and place.

(c) Employees who are exposed to other hazardous materials (i.e. carcinogens) as part of their work duty shall be entered into the facility Medical Surveillance Program, which is coordinated by Employee Health.

i. **Personal Protective Equipment**

(1) Personal protective equipment (PPE) shall include but is not limited to: gloves, laboratory coats, gowns, aprons, protective eyewear, masks, goggles and face shields. Consult the SDS and SA-113-039, Minimum Required Personal Protective Equipment and Engineering Controls for Laboratory Tasks.

(2) Safety goggles shall be used when handling hazardous chemicals or chemical waste.

(3) Personal protective equipment shall be compatible with the required degree of protection for the chemical being handled. Each section of PLMS shall designate PPE appropriate for the tasks performed outlined in SA-113-039, Minimum Required Personal Protective Equipment and Engineering Controls for Laboratory Tasks.

j. **Records**

(1) The VA provides a health service program for employees that includes emergency treatment, and preventive health measures.

(2) Medical records are retained by Employee Health in accordance with federal regulations.

(3) Personnel folders and records are maintained by Human Resource Management Service in accordance with federal government regulations.

(4) Accidents shall be reported:

(a) immediately

(b) to employee's Supervisor/Director/Leader

(c) to Employee Health

(5) All accidents/injuries shall be entered into the ASISTS Program within 48 hours of occurrence. Copies of the accident report forms should also be submitted to the

Laboratory Safety Officer.

(6) All reported incidents should be investigated in accordance with this plan. Events or circumstances which might constitute a chemical overexposure include:

(a) a hazardous chemical leaked or was spilled or was other wise rapidly released in an uncontrolled manner.

(b) a laboratory employee had direct skin or eye contact with a hazardous chemical.

(c) a laboratory employee manifests symptoms, such as headaches, rash, nausea, coughing, irritation or redness of eyes, irritation of nose or throat, dizziness, or loss of motor dexterity.

(d) two or more persons in the laboratory work area have similar complaints.

k. **Signs and Labels**

(1) PLMS provides for a uniform policy which indicates the presence of certain hazards that may not be apparent to the casual observer.

(2) The entrance to work areas where chemical carcinogens are being used or stored shall be identified in accordance with the HazMat signage. The restrictions and signs should be permanent.

(3) Labels

(a) In the case where chemicals are not labeled by the manufacturer with an expiration date, the chemical is labeled upon receipt with a five year expiration date. The expiration date will consist of the month and year written on the container. The chemical will be evaluated prior to expiration to check if the expiration date can be extended. Evaluation will consist of evidence of deterioration (color/consistency changes, clumping or other evidence of excess moisture in container, etc.). If the contents successfully pass its testing it can be extended another five years. In addition, if QC testing on the final reagent prepared from the chemical fails to perform as expected, the chemical must be discarded appropriately and replaced.

(b) When reagents are not labeled by the manufacturer with an expiration date, the reagent's procedure will be examined and the reagent will be given an appropriate expiration date according to the stability, frequency of use, storage conditions and risk of deterioration. Successful reagent performance within a certain time period can

be based on historical quality control. An expiration date of one year or less will be assigned.

(c) A new expiration data must be recorded if opening the container changes the expiration date, storage requirement, etc.

(d) Primary chemical containers shall be affixed with a legible manufacturer label.

((1)) The following is included on the label:

((a)) Product identifier

((b)) Signal word

((c)) Hazard statement(s)

((d)) Pictogram(s)

((e)) Precautionary statement(s)

((f)) What to do if accidental contact occurs; first aid

((g)) Name, address and telephone number of the chemical manufacturer, importer or other responsible party.

(e) Secondary containers containing

((1)) Non-hazardous chemical shall be affixed with labels listing the identity of its contents.

((2)) Hazardous chemicals intended for storage and use for a period greater than one day shall be affixed with labels listing

((a)) the identity of the hazardous chemical

((b)) the date filled

((c)) precautionary/hazard warning label; a hazard rating system, i.e. GHS, NFPA, HMIS, etc.

((d)) what to do if accidental contact occurs

((3)) Batches of vials or test tubes containing chemicals of the same hazard may have the hazard labels affixed to a common carrier or box.

((4)) Signs, placards, process sheets, batch tickets, operating procedures, or other such written materials in lieu of affixing labels to individual stationary process containers, as long as the alternative method identifies the containers to which it is applicable and conveys the information otherwise required to be on a label.

(((a))) The written materials shall be readily accessible to the employees in their work area throughout each work shift.

((5)) 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. If the portable container will be used by more than one employee or used over the course of more than one shift, the container must be labeled.

((6))The chemical identity given on a chemical label must be in plain

English, and must list the chemicals common name given on the SDS or manufacturer's label, or an accepted acronym.

((7)) Existing labels on incoming containers of hazardous chemicals shall not be removed or defaced, unless the container is immediately marked with the required information.

(f) Reagent kits and solutions must be labeled in regard to:
- Content
- Concentration or titer (if applicable)
- Date prepared or reconstituted by the laboratory
- Expiration date

Note: The above elements may be recorded in a log (paper or electronic), rather than on the containers themselves, providing that all containers are identified so as to be traceable to the appropriate data in the log.

(4) Signs: Signs should be posted as needed. The Haz-Mat warning system shall be posted in all PLMS section entryways. This identifies individual laboratory chemical, biohazard and other special hazards.

(5) SDS: Safety Data Sheets must be provided by the manufacturer/distributor of chemicals. Employees in each lab section must be provided this information; therefore SDS's shall be accessible during each work shift.

(6) Emergency phone numbers are posted in each section of the laboratory.

(7) Hazardous solvent waste shall be stored in flammable safety containers.

(8) Chemical waste containers must have the words "Hazardous Waste". Who applies the date when the container is full is dependent on medical center policy.

(9) Signs must be posted for safety showers, eyewash stations, other safety and first aid equipment and emergency exits.

l. Spills and Accidents

(1) Only the specific amount of chemicals needed for a certain procedure should be on a bench. All large containers should be stored in safety cabinets.

(2) Information on the clean-up of chemical spills can be found in the SDS.

(2) Should a small spill occur, go to nearest spill response kit and follow

stated procedures.

(3) Should a large spill occur, immediately notify Supervisor/ Director/Leader and follow site specific procedures.

(4) All spills and accidents must be reported to the appropriate Supervisor/Director/Leader and the Laboratory Safety Officer immediately and Hospital Safety within 48 hours.

(5) Proper reporting of accidents is essential to PLMS See PLMS Service Line Policy SA-113-002, "Accident Reporting" for details.

(7) Immediate information on the proper handling of a chemical emergency is available through CHEMTREC 1-800-424-9300. Be ready to specify the exact nature of the emergency.

m. **Training**

Training regarding Chemical Hygiene and Safety is provided at the time of an employee's initial assignment, prior to assignments involving new exposure situations and annually thereafter, to assure that all employees at risk are adequately informed about the work in the laboratory, its risks, and what to do if an accident occurs.

(1) Each new employee will be oriented at hospital/medical center VA New Employee Orientation with regard to hazard communication standards, fire, and disaster plans.

(2) Each new employee will be oriented to the Clinical Laboratory Safety Program by the Laboratory Safety Officer and/or their immediate supervisor.

(3) Each employee will complete annual training which includes but is not limited to: fire, electric, chemical and SDS, general safety, spill response, and emergency preparedness which may be presented at the facility and/or service level.

n. **Waste Disposal Guidelines**

Waste generated by PLMS is documented in the VISN 12 GEMS sharepoint website. PLMS supplies the list of waste generated by various procedures and instruments throughout the areas of the lab. Data submitted includes which sites generates the waste, and the name of instrument or procedure, The GEMS coordinator evaluates the waste by using the vendor data and/or SDS and advises PLMS on the proper waste disposal.

The following is the link to the waste characterization document

https://vaww.visn12.portal.va.gov/Employee%20Resources/safety/gems/gemscw/Shared%20Documents/Forms/AllItems.aspx

The complete Waste Disposal Guidelines can be found in PLMS Service Line Policy SA-113-011, "Disposal and Reduction of General, Infectious and Hazardous Chemical Waste."

7. REFERENCES:

a. Hood Performance and Maintenance, PLMS Service Line Policy SA-113-008.

b. Quarterly/Semiannual Walkthru Inspection Checklist, SA-113-026.

c. Accident Reporting Policy, PLMS Service Line Policy SA-113-002.

d. Disposal and Reduction of General, Infectious, and Hazardous Chemical Waste, PLMS Service Line Policy SA-113-011.

e. Formaldehyde Program, VA Hines Hospital, Policy 001-57 (R-3), November 9, 2000.

f. Medical Surveillance Program, VA Hines Hospital, Policy 001-63 (R-2), October 20, 2000.

g. New Employee Orientation/Training, PLMS Service Line Policy UN-113-004.

h. Managing Safety in the Clinical Laboratory: J.P. Dux and R.F. Stalzer, Van Nostrand Reinhold Company, New York, 1988.

i. Environmental Health and Safety in the Hospital Laboratory, P.A. Flury and K. Deluca, Charles C. Thomas Publisher, 1978.

j. Laboratory Safety: Principles and Practices, B.M. Miller, American Society for Microbiology, Washington, D.C., 1986.

k. Current CAP Inspection General Checklist, College of American Pathologists, Safety Section.

l. VA Employee Handbook, Office of Personnel and Labor Relations, Washington, D.C., 2007.

m. Developing a Laboratory Chemical Hygiene Plan, Shirley A Ramaley, MLO, December, 1990.

n. Guidelines for Writing Facility Chemical Hygiene Plan, Frank J. Denny Jr., OSHA (OOS1), Washington, D.C., June 1992.

o. Code of Federal Regulations, 1991, 29 CFR, Part 1910, 1030.

p. Right-To-Know Pocket Guide for Laboratory Employees, J.O. Accrocco and M. Cinquanti, Genium Publishing Corporation, 1992.

q. Code of Federal Regulations, CFR, 1910.1200, Hazard Communication.

r. CLSI document, GP17-A3, Clinical Laboratory Safety; Approved Guideline-Third Edition, vol. 32, No. 9.

s. Complete Guide to Laboratory Safety, second edition, Terry Jo Giles, MT(ASCP), MA Ed., published by HCPro, Inc.2007.

t. www.ilpi.com/msds/ref/hmis.html

u. SA-113-039, Minimum Required Personal Protective Equipment and Engineering Controls for Laboratory Tasks.