Laboratory Specific Standard Operating Procedures

TITLE: SOP for the safe use of Phenol and Phenol Solutions

Date: Review: Date Revised:

Principle Investigator:

Authors (Names):

Department, Building, Room(s):

Contact Phone Number:

This SOP must be kept on file for all laboratory employee training and review.

Section 1: (Check One)
There are three methods that can be used to write SOPs. They are: by process (distillation, synthesis, chromatography, etc.); by individual hazardous chemical (benzene, phenol, arsenic, etc.); and by hazardous chemical class (flammable, corrosive, oxidizer, etc.).

_____ Process ___X__ Chemical _____Hazard Chemical Class

Section 2: Describe Process, Hazardous Chemical or Hazard Class
This SOP presents guidelines and procedures for the safe use of phenol (CAS #108-95-2) and its solutions in a laboratory or clinic environment. In addition to use of this SOP, persons working with phenol and its solutions should be thoroughly familiar with general guidelines for high hazard chemicals identified in the High Hazard Chemical Policy (EHS 200.09) and all other applicable LSUHSC chemical safety policies. All current applicable MSDSs should be available and reviewed prior to use.

Section 3: Potential Hazards
Physical Hazards

- Pure phenol is a colorless to light-pink, crystalline solid with a sweet, acrid odor. (Note: phenol liquefies by mixing with about 8% water.). Many biochemical uses of phenol use a water saturated phenol solution, or a mixture of phenol in chloroform.
- Combustible and corrosive.
- Incompatible and Reactive with acids, aluminum chloride, calcium hypochlorite and strong oxidizers.

Health Hazards

- Phenol is a poison and toxic via ingestion, inhalation and skin absorption.
- Acute phenol intoxication causes shock, collapse, coma, convulsions, cyanosis, and death.
- Chronic phenol poisoning is characterized by vomiting, difficulty swallowing, excessive salivation, diarrhea, anorexia, headache, fainting, vertigo, mental disturbances, and possibly skin eruptions.
- Phenol is very hazardous in case of skin contact and can produce chemical burns, redness, edema, tissue necrosis, and gangrene. It initially can cause numbness or slight tingling, so employees may not be immediately aware of contact. Prolonged exposure may result in deposition of dark pigment in the skin.
- Contact with the eye may result in irritation, conjunctival swelling, whitened cornea, and blindness.
- Inhalation exposure hazard is low due to its low volatility (except when heated and/or agitated, or in the case of a large spill).
- Ingestion can cause severe burns of the mouth and throat, marked abdominal pain, cyanosis, muscular weakness, collapse, coma, and death.
- Not considered to be carcinogenic.
- May cause reproductive and fetal effects.

Section 4: Personal Protective Equipment

- Proper Laboratory Attire - pants or dresses/shorts below the knees, sleeved shirt, close-toe shoes)
- Lab Coat - If high splash potential exists, wear a rubber or neoprene apron.
- Eye/ Face Protection
  - Eye protection should be selected on potential for splash and exposure. At a minimum, safety glasses with side shields when only low splash hazard exists (eg. placing a tissue sample in a container). Goggles should be worn if using or transferring larger quantities.
  - If there is a high risk of a splash hazard, a full face shield should be worn.
  - Ordinary (street) prescription glasses do not provide adequate protection.
- Hand Protection
  - Use disposable Viton, neoprene, natural rubber or PVC gloves during all tasks
  - Laboratory personnel should thoroughly wash hands with soap and water before and immediately upon removal of gloves.
- Respiratory Protection - If significant inhalation exposures are anticipated/suspected, contact EH&S (568-6585) for consultation.

Section 5: Engineering Controls

- Identify and use safer chemical alternatives, if possible.
- If phenol use is determined to be necessary, as possible, purchase and store the minimum necessary quantities.
- Work with large volumes of phenol must be done in a properly operating and certified laboratory fume hood.
- Work at least 6” inside of hood and set sash at lowest possible position
- Safety shower and eye wash stations should be easily accessible where phenol is used.

Section 6: Special Handling and Storage Requirements

- Store in a cool, dry place away from light and oxidizers such as chlorine, bromine, and calcium hypochlorite.
- Only approved explosion-proof refrigerators should be used for cold storage
- Keep away from heat, flames, sparks, sources of ignition (including empty phenol containers that will retain product residue)
- Keep containers tightly closed during storage.
- Transport in closed containers, in the smallest amounts necessary.
- Access and use should be limited to appropriately trained and authorized lab personnel
- Mixing or dispensing should be done within a chemical fume hood. As necessary, small amounts can be handled safely on the bench top, as long as skin contact is avoided and proper decontamination procedures are implemented.
- Wash hands thoroughly after use.

Section 7: Spill and Accident Procedures

- The availability, location, and contents of chemical spill clean-up kits must be confirmed prior to handling or beginning any work with phenol.
- Immediately notify all lab personnel of spills (with the details of the spill and actions being taken) and regulate access, as necessary, to the area.
- Laboratory personnel should be prepared to respond to spills in accordance with the general guidance provided in LSUHSC Chemical Spill Response Procedure (EHS 200.02).
- Spill volumes less than approximately 25 ml/25 g can be cleaned by lab personnel with assistance from EH&S by using absorbent pads (found in chemical spill kits) and placing in an appropriate waste disposal container. Do not vacuum spilled solid phenol. Solid materials should be lightly swept and transferred to waste storage container in a manner minimizing the amount of aerosol generated.
- Spill volumes greater than approximately 25 ml/25 g shall be cleaned-by EH&S (personnel should immediately evacuate the area and contact LSUHSC Police for spills greater than one liter).
- Do not attempt to clean spills if you feel unsure of ability to complete safely.
- Personnel cleaning the spill shall, at minimum, wear the same PPE required for handling/use
- In the event of skin contact, immediately remove contaminated clothing and wash affected areas with soap and copious amounts of water.
- In case of contact with eyes, immediately flush eyes with copious amounts of water for at least 15 minutes and subsequently obtain medical attention.
- All exposed persons should be removed from the area and seek immediate medical attention (subsequent to initial decontamination for skin/eye contact).
- In the event of ingestion, obtain immediate medical attention. Do not induce vomiting unless directed to do so by medical personnel.
- Report all spills, regardless of size, to laboratory PI, who will report to LSUHSC EH&S.

Section 8: Decontamination Procedures

- Where the eyes or body of any person may be exposed to phenol, a safety shower/eye wash must be available for immediate use. Personnel must be aware of location of nearest Safety Shower/ Eye Wash and verify that a current certification of performance tag is present.

- Personnel shall immediately rinse any phenol exposed areas of skin and/or eyes with copious amounts of water for at least 15 minutes.
- All equipment, materials and work surfaces that have/ potentially have become contaminated with phenol shall be thoroughly cleaned with soap water solution prior to storage and/or re-use.

Section 9: Waste Disposal Procedures

Phenol waste is considered hazardous and must be disposed of in accordance with LSUHSC Chemical Waste Management Procedures (EHS 200.04).

Section 10: Laboratory Specific Protocol(s):

Attach laboratory protocol for specific handling and operational practices.