Laboratory Specific Standard Operating Procedures

TITLE: SOP for the safe use of Sodium Azide

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 sodium azide (CAS #26628-22-8**)**. In addition to use of this SOP, persons working with sodium azide chemicals 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

- Sodium azide (NaN_3) is a colorless crystalline solid and is readily soluble in water. It is a common preservative of samples and stock solutions in laboratories and a useful reagent in synthetic work.
- Reacts violently with nitric acid, bromine, carbon disulfide, dimethylsulfate, and several heavy metals including copper and lead.
- On contact with water or acid, sodium azide reacts to form a toxic gas (hydrazoic acid) with a pungent odor. However, the odor may not be strong enough to give sufficient warning.

- Sodium azide reacts with heavy metals and their salts, and potentially with metal spatulas and metal lab equipment, to form metal azides, which are shock-sensitive explosives.
- When heated to its decomposition temperature of ~275°C, sodium azide may undergo violent decomposition.

Health Hazards

- Sodium azide is highly acutely toxic by all routes of exposure (LD50 oral [rat] 27mg/kg).
- Severe irritant of the eyes and is capable of causing pain, severe conjunctivitis and permanent corneal injury. Eye contact may cause systemic effects.
- Strong irritant of the skin and, if contact is prolonged, may cause burns. Bare unprotected skin should not be exposed to this material. Toxic systemic effects may result from skin absorption.
- The solid is an irritant of the gastro-intestinal tract, highly toxic and may be fatal if ingested. Symptoms of ingestion can include breathlessness, rapid heartbeat, nausea, abdominal pain, vomiting, headache, restlessness and diarrhea.
- The dust may be highly irritating to the upper respiratory tract and may be harmful if inhaled, potentially causing sore throat, cough, dizziness, shortness of breath, bronchitis, and delayed lung edema.
- Chronic exposure may result in liver and kidney damage.
- Sodium azide is a mutagen and should be considered carcinogenic.

Section 4: Personal Protective Equipment

- Proper Laboratory Attire - pants or dresses/shorts below the knees, sleeved shirt, close-toe shoes
- Lab Coat - fully buttoned lab coat with sleeves extending to the wrists. Coat should be laundered if it becomes contaminated. A chemical-resistant apron with attached sleeves should be worn over the laboratory coat if working with large amounts of solution or if there is a potential of splashing during the procedure.
- Eye/ Face Protection
  - At a minimum, safety glasses with side shields will be used when handling this chemical. Goggles or face shields must be worn during operations with the exposure to mist or a high liquid splash potential.
  - Ordinary (street) prescription glasses do not provide adequate protection.
- Hand Protection
  - Nitrile disposable gloves. Double-gloving is recommended when working with pure sodium azide or sodium azide solutions greater than 5%.
  - Change gloves frequently and when contaminated, punctured, or torn.
  - Laboratory personnel should thoroughly wash hands with soap and water before and immediately upon removal of gloves.
- Respiratory Protection - If potential for 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 sodium azide use is determined to be necessary, purchase as a dilute solution as possible and in the minimum necessary quantities.

- A chemical fume hood must be used when handling sodium azide dust, to include the weighing of dry powders, or solutions in a manner that may produce an airborne hazard (i.e., mists).
- The working surfaces of any hood for which sodium azide is used should be protected with plastic backed absorbent pads to insure containment of any spills. The side and back walls shall be covered to a minimum height of 12”
- Work at least 6” inside of hood and set sash at lowest possible position.

Section 6: Special Handling and Storage Requirements

- Use of sodium azide should be limited to appropriately trained and authorized lab personnel.
- Prior to conducting any work with sodium azide, the Principal Investigator/Laboratory Supervisor must provide training to laboratory personnel specific to the hazards involved in working with this substance, proper personal protective equipment (PPE), work area decontamination, and waste and emergency procedures.
- Whenever handling pure sodium azide powder or concentrated solutions of 5% or more, it is recommended that a second trained individual be present in the lab or in the vicinity.
- Pure sodium azide and concentrated solutions of 5% or more must be stored in appropriate, sealed glass containers within an unbreakable secondary containment and in a location that is secure to unauthorized access.
- When moving pure sodium azide to a chemical hood, do not remove it from the secondary containment until it is in the hood.
- All sodium azide shall be stored in a cool, well-ventilated area away from heat, air, light and moisture and away from metals, acids, carbon disulfide, bromine, chromyl chloride, sulfuric acid, nitric acid, hydrazine and dimethyl sulfate.
- Do not store on metal shelves or use metal items (spatulas) to handle.
- All areas where sodium azide is stored must be labeled with a caution sign noting the presence of sodium azide and its hazards.

Section 7: Spill and Accident Procedures

- The availability, location, and contents of an appropriate chemical spill clean-up kit must be confirmed prior to handling or beginning any work with sodium azide.
- Immediately notify all lab personnel of spills (with the details of the spill and actions being taken) and regulate access 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).
- Clean-up of spills of dry powders and large volumes (greater than 25 ml) of sodium azide should only be performed by EH&S.
- Properly trained lab personnel may clean-up small spills (less than 25 ml) that are located inside/outside of the chemical fume hood. The following practices shall be used:
  - Never use metal instruments to perform sodium azide spill clean-up.
  - Wipe up spilled solutions with chemical absorbent pads.
  - Cover solids with an inert material, collect, and place in a non-metal container. Do not vacuum spilled solid sodium azide. Solid materials should be lightly swept and transferred to waste storage container in a manner minimizing the amount of aerosol generated.
  - Once the spill (either solid or solution) has been completely collected, wipe the area down at least two times using soap and a pH adjusted (pH 9.0) water solution.

- The waste generated as the result of the use of sodium azide is considered hazardous and must be disposed of accordingly. Under no circumstances should sodium azide containing wastes be disposed of through standard plumbing, as it may react with copper, lead, brass, or solder to form an accumulation of the highly explosive azide compounds.
- 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 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).
- 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 sodium azide, 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 rinse any exposed areas of skin and/or eyes with copious amounts of water for at least 15 minutes.
- All exposed persons should seek immediate medical attention (subsequent to initial decontamination for skin/eye contact).
- All non-disposable equipment and materials and work surfaces that have/ potentially have become contaminated with sodium azide shall be decontaminated with soap water (pH adjusted 9.0) solution prior to storage and re-use. The waste water shall be treated as a hazardous material and managed accordingly.
- Gloves, test tubes, pipette tips, and paper towels, etc. that are contaminated with sodium azide shall be managed as hazardous waste.

Section 9: Waste Disposal Procedures

The waste generated as the result of the use of sodium azide 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.