



Laboratory-Specific Standard Operating Procedures

TITLE: SOP for the safe use of N-Nitrosodiethylamine (DEN)

Date: 6/22/18

Review Date:

Revised:

Principal 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 N-Nitrosodiethylamine. In addition to use of this SOP, persons working with N-Nitrosodiethylamine should be thoroughly familiar with general guidelines for high hazard chemicals identified in EHS 200.09, [High Hazard Chemical Policy](#) and all other applicable LSUHSC chemical safety policies. Observe all lab-specific safety procedures as well as guidance provided by the chemical supplier. The current chemical-specific Safety Data Sheet (SDS) must be available and reviewed prior to use.

N-Nitrosodiethylamine (CAS ID #: 55-18-5) is a synthetic light-sensitive, volatile, clear yellow oil that is soluble in water, lipids, and other organic solvents. It is used in experimental research to induce liver tumorigenesis. Synonyms include Diethylnitrosamine (DEN), N-ethyl-N-nitrosoethanamine, and NDEA.

Section 3: Potential Hazards

- Physical Hazards
 - Combustible (produces toxic fumes and nitrogen oxides).
 - Reacts with strong oxidizing agents.
 - Incompatible with reducing agents.

- Health Hazards
 - Toxic if swallowed.
 - Suspected of causing genetic defects.
 - May cause cancer.
 - Harmful to aquatic life (acute hazard).
 - Harmful to aquatic life with long lasting effects (long-term hazard).

Section 4: Personal Protective Equipment

Identify the required PPE. If a respirator is required, contact EH&S before using. Protective clothing and equipment is not a substitute for adequate engineering controls. PPE must be selected on the basis of the hazards present, the type of materials used, and the manner in which they will be handled. Always consult with the PI and lab-specific SOP to determine task appropriate PPE before carrying out any procedures. In addition to the general guidance below, minimum PPE must be worn when working with N-Nitrosodiethylamine.

- Lab coat.
- Double-gloving is recommended.
- Butyl rubber or SilverShield gloves when working with concentrated N-Nitrosodiethylamine.
- NIOSH-approved N-95 respirator must be worn for certain procedures.
- Chemical laboratory – Back-closure gown.
- Animal laboratory – Protective suits (preferably disposable, one-piece, and close fitting at ankles and wrists), hair covering, and overshoes.

For more information about general PPE requirements, refer to EHS-400.03, [Personal Protective Equipment](#).

Section 5: Engineering Controls

Describe engineering controls that will be used to prevent or reduce employee exposure to hazardous chemicals.

- Any handling of N-Nitrosodiethylamine, including weighing, solution preparation, and drawing doses must be done in a fume hood.
- Animal laboratory – All administrations, cage manipulations, and handling of animals that have been administered N-Nitrosodiethylamine must be performed in a certified Biological Safety Cabinet (BSC) for three (3) days after the final administration.
- Animals must be housed in the Chemical Containment Room.

Section 6: Special Handling and Storage Requirements

List storage requirements for hazardous chemicals involved with the SOP, including specific area, and policies regarding access to chemicals. Special procedures such as dating peroxide formers are appropriate here. Is a special “designated area” required?

- Handling Precautions
 - Do not get in eyes, on skin, or on clothing.
 - Avoid inhalation of vapor or mist.
 - Avoid formation of dust.

- In animal laboratory – Agent may be excreted by the animals within the first 24 hours post injection. Treat animals as hazardous.
 - Cages must be properly labeled indicating date and time of administration.
 - Cages are only to be opened under a BSC or Animal Change Hood (ACH).
- Know the location of the nearest emergency safety shower and eyewash station.
- Always wash hands immediately after work is complete or when gloves are removed.
- Storage Precautions
 - Store tightly closed containers within a secondary unbreakable outer container.
 - Store in a well-ventilated space or fume hood.
 - Keep away from direct light (light sensitive, rapidly decomposes).
 - Store separately from incompatible chemicals.

Section 7: Spill and Accident Procedures

Indicate how spills or accidental release will be handled. List the location of appropriate emergency equipment. Any special requirements for protection of personnel from exposure should be identified here.

- For Accidents:
 - In the event of a fire, suitable fire extinguishing media includes use of water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
 - Skin contact – Thoroughly rinse affected areas in emergency shower with water for 15 minutes. Remove all contaminated clothing.
 - Eye contact – Remove contact lenses if applicable and flush eyes with copious amounts of saline or water for at least 15 minutes.
 - Inhalation – Leave the area and move to fresh air.
 - In the event of personal contamination, call campus police (568-8999) and immediately seek medical attention.
 - Seek physician advice regarding possible long term health effects and potential recommendation for medical monitoring.
- For Spills:
 - Use absorbent paper to pick up all liquid spill material.
 - Use caution: May react with cellulose-based absorbents and expanded polymeric absorbents. Consult SDS for specific handling precautions.
 - Avoid dust and aerosol formation.
 - Wash any contaminated surface with appropriate solution.
 - Dispose of contaminated materials (gloves, wipes, etc.) as hazardous waste
 - General procedures for chemical spills are addressed in EHS-200.02, [Chemical Spill Response Policy and Procedures](#).

Incident and accident reporting must be done electronically via the on-line fillable forms located on the [EHS website](#). For more information about appropriate form selection, refer to EHS-400.06, [Incident and Accident Reporting and Investigation Policy](#).

Section 8: Decontamination Procedures

Specify decontamination procedures to be used for equipment, glassware, and clothing: including equipment such as hoods, lab benches, and controlled (special “designated area”) areas within the lab.

- Decontaminate fume hood and BSC surfaces, equipment, utensils, and glassware contaminated with N-Nitrosodiethylamine.
- Depending on the work procedure, all cleaning activities must be conducted within the fume hood, BSC, or ACH.
- Equipment and work surfaces must be routinely cleaned with appropriate disinfectant.
- Dispose of contaminated materials (gloves, wipes, etc.) as hazardous waste.

Section 9: Waste disposal Procedures

N-Nitrosodiethylamine must be disposed of as hazardous waste and in accordance with EHS-200.04, [Chemical Waste Management Procedures](#).

- Do not let this chemical enter the environment.
- Double-bag dry waste using sealable transparent bags.
- Store waste in properly labeled closed containers, in secondary containment, and in a designated storage location.
- Label chemical wastes “HAZARDOUS WASTE” with the chemical constituents, and the date the waste was generated.
- To request a pickup of chemical waste, authorized individuals must use the Facility Services [online service request work order system](#).