DESERT RESEARCH INSTITUTE
Guidelines for Laboratory-Scale Use of ETHIDIUM BROMIDE

INTRODUCTION

Ethidium Bromide (EtBr) is commonly used as a non-radioactive marker for identifying and visualizing nucleic acid bands. It is a dark red, crystalline solid, which fluoresces readily when exposed to UV light. Because of its hazardous properties, the use of EtBr required special handling and disposal. The amount purchased should be limited to only the quantity needed to complete the project to avoid disposing the excess as hazardous waste. The user is responsible for ensuring a current Material Safety Data Sheet (MSDS) is obtained unless a one is already available within the laboratory.

The use of EtBr should be conducted in designated areas within the laboratory to avoid the potential for widespread contamination. Use areas should be posted with appropriate warnings. Additional lab specific details on how and where ethidium bromide is used in the lab and lab specific safety measures to follow shall be outlined either as an addendum to this document or in other lab specific safety documents that are used for employee lab specific safety education.

POTENTIAL HAZARDS

Ethidium bromide is a potent mutagen and moderately toxic after an acute exposure. It may be fatal if inhaled and is harmful if swallowed or absorbed through the skin. EtBr causes irritation to skin, eyes and the respiratory tract.

Acute Exposure: Inhalation and/or ingestion can be fatal. Can cause nausea, vomiting and diarrhea if swallowed. May cause methemoglobinemia which is characterized by dizziness, drowsiness, headache, shortness of breath, cyanosis, rapid heart rate, chocolate-brown colored blood, unconsciousness and possible death. Causes irritation to the respiratory tract. Causes eye irritation.

Chronic Exposure: Although there is no evidence for the carcinogenicity or teratogenicity of this substance in humans, ethidium bromide is strongly mutagenic and therefore should be regarded as a possible carcinogen and reproductive toxin.

There is no exposure limit established for ethidium bromide, however, **if airborne exposure is suspected**, **stop work** and contact EH&S for assistance in conducting a work hazard assessment and hazard mitigation and monitoring protocol.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Wear Nitrile gloves (double glove recommended for prolonged contact) and additional protection including a lab coat, close-toed shoes, and apron as needed in areas of unusual exposure. ANSI Z87 safety glasses shall be used and chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible.

ENGINEERING CONTROLS

Use process enclosures, local exhaust ventilation, or other engineering controls such as a chemical hood to reduce dust concentrations. . Weighing EtBr powder should be done in a powders weighing hood. Use only in an area equipped with an emergency shower and eyewash.

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SPECIAL HANDLING PROCEDURES AND STORAGE REQUIREMENTS

Handling: Operations capable of generating dust or aerosols shall be conducted in a chemical hood to prevent exposure by inhalation. Wear appropriate PPE. Avoid cross-contamination of street clothes. Thoroughly wash when leaving restricted areas.

Storage: Keep container tightly closed and store in a cool, dry area away from sources of heat or ignition. Keep away from strong oxidizers.

SPILL AND ACCIDENT PROCEDURES

Skin contact: Immediately flush skin with copious amounts of soap and water for at least 15 minutes while removing contaminated clothing. Wash clothing before reuse. Get medical attention immediately.

Eye contact: Immediately flush eyes with copious amounts of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention immediately.

Inhalation: Poison material. Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Ingestion: Do no induce vomiting unless directed by medical personnel (Poison Control: 1-800-222-1222). Never give anything by mouth to an unconscious person. Get medical attention immediately.

Incidental spill: Do not attempt cleanup if you feel unsure of your ability to do so, or if you perceive the risk to be greater than normal laboratory operations. Avoid creation of airborne dust. For liquids, absorb freestanding liquid with dry paper towels. If the spill is a powder, carefully wipe it up with wet paper towels. Place material in a suitable container labeled with the words “hazardous waste”.

Large spill: Alert others in immediate area, evacuate the laboratory and close the doors. Call EH&S emergency number (775) 742-6330.

DECONTAMINATION

Decontamination Solution: 4.2 g of sodium nitrite, 20ml of 50% hypophosphorous acid solution (CAS# 6303-21-5) in 300ml of water.

Decontamination Procedure: Wash area with a paper towel soaked in decontamination solution. Then rinse the area 5 times with paper towels soaked with tap water, using a fresh towel each time. Soak all the towels in decontamination solution for 1 hour. Remove towels and gently wring out excess solution, and dispose of as dry waste in a separate bag along with contaminated gloves. Use UV light to ensure all ethidium bromide has been removed.

After decontamination, thoroughly wash the area with soap and water, then rinse. Treat all clean up materials as non-RCRA wastes. Specific instructions may be developed for the lab and should be included here_____

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WASTE DISPOSAL PROCEDURES

Ethidium bromide waste should be placed in a properly labeled, suitable container with securely sealed lid. Solid wastes (gloves/paper towels) should be in a separate container from liquid wastes (solution). Submit a Request for Waste Disposal Form to EH&S to arrange for pick up and disposal.

MSDS LOCATION (list lab specific location here) _____

TRAINING

Lab specific standard operating procedures must be developed and all laboratorians who work with or are potentially exposed to ethidium bromide in the lab must receive documented training and education about the hazards and how to minimize them.