STANDARD OPERATING PROCEDURE
for
ACIDS CONTAINING PHOSPHOROUS

Location(s): ___________________________________________________

Chemical(s): Hypophosphorous acid, methylphosphonic acid, phosphonic acid, phosphoric acid, phosphorous acid.

Specific Hazards: Harmful, corrosive, causes severe burns to the skin and other tissues.

1. Purchasing: All purchases of this material must have written approval from the Principal Investigator or _______________________ before ordering. The user is responsible to ensure that a current Material Safety Data Sheet (MSDS) is obtained unless a current one is already available within the laboratory. Quantities of this material will be limited to ________________, or the smallest amount necessary to complete the experiment.

2. Storage: Materials will be stored according to compatibility and label recommendations in a designated area: ________________________________________. Storage areas will be regularly inspected by _________________________________ to ensure safety. Periodic inventory reductions will be scheduled.

3. Authorized personnel: Use of this material requires prior written approval from the PI or ______________________, Title: ____________________. Use will be limited to the following personnel (check all that apply):

Principal Investigator ___ Graduate students___
Technical staff ___ Post doctoral employees___ Undergraduates ___
Other (describe) _________________________

4. Training requirements: The user must demonstrate competency and familiarity regarding the safe handling and use of this material prior to purchase. Training should include the following:

___Review of current MSDS ___Special training provided by the department/supervisor
___Review of the OSHA Lab Standard ___Review of the departmental safety manual
___Review of the Chemical Hygiene Plan ___Safety meetings and seminars
___Laboratory safety training (EH&S)
5. **Use location:** Materials shall be used only in the following designated areas in room _____. Check all that apply:

- demarcated area in lab (describe)
- fume hood ___
- glove box ___
- other (describe) ___________________

6. **Personal protective equipment:** All personnel are required to wear the following personal protective equipment whenever handling this material (check all that apply):

- Safety goggles _____
- Chemical safety goggles ____X____
- Face shield _____

Gloves (type/use):

- **Incidental Contact:** double glove with nitrile gloves (4 mil) or use 8 mil or thicker nitrile gloves
- **Extended Contact:** use 8 mil or thicker nitrile gloves

- Lab coat ____X_____ Rubber apron ____X____
- Tyvek clothing ____________
- Respirator (type) ____________ Other (describe) ___________________

7. **Waste disposal:** The authorized person using this material is responsible for the safe collection, preparation and proper disposal of waste unless otherwise stated below. Waste shall be disposed of as soon as possible and in accordance with all laboratory and University procedures.

   Specific instructions: Neutralize waste acid with sodium bicarbonate or sodium bicarbonate solutions until a pH of 5.5 or higher is achieved. Drain dispose with 100 times volume of water.

8. **Decontamination:** Specific instructions: Use a rag or paper towel with 5% sodium bicarbonate solution to decontaminate equipment or surfaces.

9. **Exposures:** Emergency procedures to be followed (from MSDS):

   **Skin contact**
   - Symptoms: Strong irritation, redness, burns.
   - first aid: Flood areas in contact with acid with large amounts of water using a safety shower or eyewash for 15-20 minutes. Get immediate medical attention.

   **Eye contact**
   - symptoms: Strong irritation, redness, burns.
   - first aid: Flood areas in contact with acid with large amounts of water using a safety shower or eyewash for 15-20 minutes. Get immediate medical attention.

   **Inhalation**
symptoms: Severe irritation and burns of the respiratory tract.
first aid: Get immediate medical attention. Remove exposed person to fresh air. Use a bag valve mask or similar device to perform artificial respiration if needed.

Ingestion
Symptoms: Burns of mucus membranes, vomiting, diarrhea
First aid: Get immediate medical attention. Give large amounts of water or milk. Allow vomiting to occur. When vomiting occurs, keep head lower than hips to prevent aspiration. (Note: Never make an unconscious person vomit or drink fluids.) If person is unconscious, turn head to side.

10. Spills: Spill cleanup materials to be used, location of materials, PPE to be used, disposal of cleanup materials, etc. Please be as complete as possible:
Wearing the personal protective equipment described above, sprinkle solid sodium carbonate or bicarbonate over the spill. Scoop up the spill mixture and place it in a sturdy plastic container such as a rubber bucket. In a fume hood slowly fill up the bucket with ice water. Add additional sodium carbonate or sodium bicarbonate with stirring until a pH of 5.5 or higher is obtained. Rinse the neutralized acid down the drain with 100 volumes of water or more.

11. Phone numbers:
Cornell Campus Police 911 (accidents, spills)
Environmental Health and Safety 5-8200
Gannett Health Center 5-5155

12. Other: Special precautions, incompatible/reactive materials, usable shelf life, etc. Please be as specific as possible:
The reaction of the acids of phosphorous with some materials may release phosphine, hydrogen and other hazardous materials. Review the MSDS and other references concerning incompatible reactions.

Prepared by: ________________________________
Date: __________
Reviewed/Revised: _________________