A. Purpose

The guidelines were developed to provide procedures for the purchase, storage and safe use and response to occupational exposure to Cyanide in Columbia University laboratories.

B. Applicability/Scope

These guidelines apply to all Columbia University laboratory personnel, who store, handle or use cyanide or cyanide compounds.

C. Responsibilities

1. Principal Investigators (PI):
   a. Develop and maintain a detailed SOP in accordance with policy guidelines.
   b. Ensure that all lab personnel handling or working with cyanide compounds have taken the appropriate safety training: Laboratory Safety Training (TC0950) and Cyanide Safety Training (TC0085).
   c. Provide task specific training to lab staff.
   d. Ensuring cyanide compounds are stored safely and securely.
   e. Ensuring cyanide waste is collected in accordance with this policy.

2. User (s):
   1. Attending safety training.
   2. Following task specific SOPs.
   3. Reviewing this policy.
   4. Storing cyanide compounds in accordance with this policy.
   5. Collecting cyanide waste in accordance with this policy.

3. Environmental Health and Safety (EH&S):
   a. Help users in developing and practicing safe work procedures.
   b. Providing appropriate safety training, as needed.
   c. Picking up the waste and disposing of it in accordance with all applicable regulations.
   d. Certifying chemical fume hoods annually.

D. Definitions

Background:

Cyanide is listed as extremely hazardous substances, under 40 CFR parts 302 and highly toxic materials, under OSHA 29 CFR 1910.1200 Appendix A. Personnel using cyanide must be trained in the health hazards, personal protective measures and emergency first aid treatment procedures. Specific treatment for exposures may include the use of a Cyanide Antidote Kit.
Health Effects:

Cyanide can cause adverse health effects when inhaled or absorbed through the skin. Hydrogen cyanide is a colorless gas with a faint, bitter, almond-like odor, while sodium cyanide and potassium cyanide are both white solids. Cyanide compounds are used in many industrial applications but their use in academic research laboratories is usually on a small scale.

Cyanide is a fast-acting poison, which when exposed to can cause severe breathing difficulty, convulsions and/or death. Low level exposure may result in shortness of breath, convulsions, and loss of consciousness. Exposure to cyanide at high levels for a short period may result in irritation of the eyes, nose and throat; headache, shortness of breath, harm to the central nervous system, the respiratory system, the cardiovascular system, and may quickly lead to death. Long-term exposure to low levels of cyanide may cause deafness, vision problems, nosebleed and loss of muscle coordination. It may also affect the thyroid gland. Cyanide is stored and used in several laboratories at Columbia University. While engineering controls and Personal Protective Equipment must be utilized when working with cyanide, the possibility for accidental exposure exists. Personnel using these materials are required to exercise extreme caution and follow these guidelines when working with any cyanide, particularly; hydrogen cyanide, potassium cyanide and sodium cyanide. Other cyanide salts may require similar precautions.

E. Procedures

1. **Purchasing:**
   a. Purchase the smallest amount of cyanide feasible for a specific task.
   b. Create a task specific SOP (Standard Operating Procedures) for the use of cyanide.
   c. Notify the Office of Environmental Health & Safety (EH&S) that the lab is intending to use cyanide or a cyanide containing compounds.
   d. Purchase and maintain a cyanide antidote kit.
   e. Maintain the Safety Data Sheet (SDS) in the laboratory where cyanide is used.

2. **Storage:**
   a. Label all cyanide chemicals clearly. Preferably mark containers with a colored tape and the words “Cyanide Hazard”.
   b. Store in tightly closed containers (ideally polypropylene), in a secured (preferable under lock and key) and well-ventilated area away from water, moisture and steam.
   c. Cyanide must be stored separately from strong acids such as hydrochloric, sulfuric and nitric acid and acid salts as their interaction releases highly flammable and toxic hydrogen cyanide gas.
   d. Cyanide compounds are not compatible with oxidizing agents (such as perchlorates, peroxides, permanganates, chlorates, nitrates, chlorine, bromine, and fluorine); amines;
calcium hydroxide; caustic ammonia; sodium carbonate; iron and magnesium. These must be segregated and stored away from cyanide.

3. **Handling & Use:**

   a. Ensure all lab staff members who will be working with and storing cyanide have taken the appropriate safety training: Laboratory Safety Training (TC0950) and Cyanide Safety Training (TC0085).
   
   b. Review these guidelines before the work with cyanide begins.
   
   c. All work with cyanide must be performed within a certified chemical fume hood.
   
   d. Personnel should not work alone while using cyanide; limit work to normal business hours.
   
   e. Personal Protective Equipment (PPE), such as safety goggles; nitrile gloves and lab coats must be worn. When handling or actively working with cyanide consider double gloving.
   
   f. Ensure the emergency safety shower and eye wash stations are in a working condition.
   
   g. All containers must be kept closed and sealed until materials are needed for use.
   
   h. In an attempt to keep an accurate account of quantities used, EH&S strongly encourages labs to use a mechanism to account the use of cyanide, such as using “Cyanide Use Log”.
   
   i. Non-disposable utensils, glassware, and other surfaces contaminated with cyanide compounds must be decontaminated at the end of the laboratory work session. This should be completed inside a certified fume hood before removing any of the items. All contaminated surfaces should be washed using a pH 10 buffer solution and rinsed with a freshly made 10% bleach solution. The contaminated solutions and disposable items must be collected as cyanide containing hazardous waste.
   
   j. The SDS along with the Standard Operating Procedures (SOP) should be available in the laboratory where this material is being stored and used.

4. **Disposal:**

   a. Contact EH&S to establish appropriate waste stream prior to use
   
   b. Waste materials should be kept in a closed and properly labeled container within a certified fume hood or Satellite Accumulation Area (SAA) within the laboratory.
   
   c. Cyanide waste should be collected independently of other waste types. Never add any acidic compounds to a cyanide waste container.
   
   d. All gloves, matting, and any other potentially contaminated material must also be collected and labeled as hazardous waste.
   
   e. Please note that cyanide is an Environmental Protection Agency (EPA) P-Listed (acutely toxic) material and the bottle it was received in, even when empty, must also be managed and collected as hazardous waste.
   
   f. For hazardous waste disposal services please complete the waste pick-up request form at [http://vesta.cumc.columbia.edu/ehs/wastepickup/](http://vesta.cumc.columbia.edu/ehs/wastepickup/).

F. **Emergency Contacts**
1. **Exposure Response:**

In the event of an emergency where an employee is exposed, have the SDS, SOP and Antidote kit on hand. Take all three with the exposed individual to the Emergency Room for proper treatment.

<table>
<thead>
<tr>
<th>Campus</th>
<th>Emergency Room Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>CUMC</td>
<td>New York-Presbyterian Hospital: 630 West 168th Street, New York, NY10032</td>
</tr>
<tr>
<td>LDEO</td>
<td>Nyack Hospital: 160 North Midland Avenue Nyack, NY 10960</td>
</tr>
<tr>
<td>Morningside</td>
<td>St. Luke's Hospital: 1111 Amsterdam Avenue at 114th St, New York, NY 10025</td>
</tr>
<tr>
<td>Nevis</td>
<td>St. John's Riverside Hospital Dobbs Ferry Pavilion 128 Ashford Avenue Dobbs Ferry, NY 10522</td>
</tr>
</tbody>
</table>

At MS campus: - Public Safety (x99) & then call 911 for medical help. Inform the emergency responders that there is a Cyanide Antidote Kit onsite. Make SDS, SOP and Antidote Kit available to responders.

At CUMC campus: - Public safety (305-8100) and then call NYPH EMS at 212-305-9999. Inform the emergency responders that there is a Cyanide Antidote Kit onsite. Make SDS, SOP and Antidote Kit available to responders.

At LDEO campus: Call safety (x555) & then 911.

At Nevis campus: Call 911 & then EH&S (212-305-6780 or 212-854-8749). Inform the emergency responders that there is a Cyanide Antidote Kit onsite. Make SDS, SOP and Antidote Kit available to responders.

NYSPI: Call Security 212-543-5555 & 911. Inform the emergency responders that there is a Cyanide Antidote Kit onsite. Make SDS, SOP and Antidote Kit available to responders.

**Exposure to cyanide is a serious medical emergency and onset of symptoms after cyanide exposure is very rapid. If an exposure results in cyanide contact with the eye, or irritation of the eye, nose, and throat, symptoms may include:**

- Shortness of breath or other respiratory symptoms or chest pain.
- Change in mental status, headache, confusion, weakness and/or loss of consciousness.
2. **To Rescue**

   a) **Symptomatic person** - *the rescuers should avoid direct contact with the affected (exposed) employee* keeping the employee calm until trained responders arrive.
   
   b) *Person without any symptoms* - the *affected (exposed) employee* should be removed to a fresh air; all co-workers in the lab should evacuate the area; and all lab doors should be closed. CU Public safety and EH&S should be called immediately.
   
   c) In case of skin contamination, remove contaminated clothing & wash the affected area with copious amounts of water for 15 minutes and seek medical help as soon as possible.
   
   d) Make SDS & SOP available to rescuers and the medical personnel upon their arrival.

G. **Cross References like URL, Forms, web addresses, etc.**

   N/A

H. **Medical Surveillance**

   N/A

I. **Recordkeeping:**

   It is recommended that records of use and inventory be maintained either by using the form provided in appendix --- or similar form.

J. **Appendices**

   1. Appendix A – Cyanide Antidote Kit

K. **Forms**

   In case of an exposure, please complete the Departmental Accident Report Form ([http://www.ehs.columbia.edu/incidentform.pdf](http://www.ehs.columbia.edu/incidentform.pdf))

L. **References**

   1. Institute of Occupational Safety and Health (NIOSH)

   2. US Environmental Protection Agency (EPA)
      [http://www.epa.gov/osw/hazard/wastetypes/listed.htm](http://www.epa.gov/osw/hazard/wastetypes/listed.htm)

   3. Occupational Safety & Health Administration (OSHA)
APPENDIX A

CYANIDE ANTIDOTE KIT

CYANIDE ANTIDOTE KIT COMPONENTS
Below are the components included in a Cyanide Antidote Kits.

- 2 Ampoules’ Sodium Nitrite Injection
- 2 Vials Sodium Thiosulfate Injection
- 12 Ampoules’ Amyl Nitrite Inhalants
- 1 Sterile 10mL Disposable Syringe
- 1 Sterile 60mL Disposable Syringe
- 1 Sterile Disposable 20g Needle
- 1 Stomach Tube
- 1 Non-Sterile 60mL Syringe
- 1 Tourniquet & Instructions for Treatment

CYANIDE ANTIDOTE KIT SUPPLIERS
The Cyanide Antidote Kit is available by prescription only and is maintained by medical facilities. The kit is available from:

1. Taylor Pharmaceutical
   1711 Paramount Court • Waukesha, WI 53186 • Phone: 800-558-6270
   Fax: 800-558-1551 • E-mail: service@buyEMP.com • Website: www.buyEMP.com
2. Keystone Pharmaceuticals, Inc.
   26072 Merit Circle, Suite 101, Laguna Hills, CA 92653
   Tel (949) 348 – 7770
3. ABO Pharmaceutical
   Mission Viejo, CA 92692
   (877) 226 - 2266