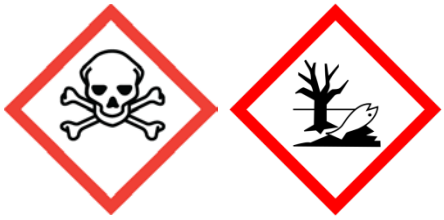

Standard Operating Procedure

POTASSIUM OR SODIUM* CYANIDE

Potential Hazards/Toxicity

Potassium and Sodium Cyanide are highly toxic compounds that may be ingested or absorbed through the skin. In reaction with acid or water they will produce hydrogen cyanide gas, a deadly compound when inhaled.

Health Effects:
It is highly acutely toxic by all routes of exposure. It is important to note that some people can detect a bitter almond odor when exposed to even low levels of hydrogen cyanide gas (HCN). However, lack of odor should not be construed as an absence of HCN.

Acute Effects:

Eye/Skin: Irritation, redness, and possible burns. **Exposure to the salts or their aqueous solutions by eye or skin contact can be fatal.**

Ingestion: May cause tissue anoxia, characterized by weakness, headache, dizziness, confusion, cyanosis (bluish skin due to deficient oxygenation of the blood), weak and irregular heartbeat, collapse, unconsciousness, convulsions, coma and death. May cause nausea and vomiting. **May be fatal if swallowed.**

Inhalation: Poisoning can occur by inhalation of mists of cyanide solutions and by inhalation of HCN produced by the reaction of metal cyanides with acids and with water. **May be fatal if inhaled.** Symptoms of nonlethal exposure to cyanide include weakness, headache, dizziness, rapid breathing, nausea, and vomiting.

Chronic Effects:
Prolonged or repeated skin contact may cause dermatitis. Prolonged or repeated contact may cause skin necrosis and/or ulceration of the skin. Exposure to small amounts of cyanide compounds over long periods of time is reported to cause loss of appetite, headache, weakness, nausea, dizziness, and symptoms of irritation of the upper respiratory tract and eyes.

These compounds must not be handled while working alone.

Users must familiarize themselves with the specific hazards of the compounds they are working with, which can be found on the chemical's Safety Data Sheet (SDS). SDSs are available through the ChemWatch link on Yale's EHS webpage (ehs.yale.edu).

Personal Protective Equipment (PPE)

The University's Personal Protective Equipment Policy can be found here: http://ehs.yale.edu/PPEPolicy

Eye Protection
Safety glasses must be worn. Always work with the fume hood sash between your face and the work area.

Hand Protection
Double gloves, a utility grade nitrile glove over an exam style, must be worn when handling these compounds.

*Note: Sodium cyanide also has the pictogram designating it as corrosive.

Skin and Body Protection
Long pants or clothing that covers the body to the ankles and closed-toe solid top shoes must be worn when handling cyanide salts. Lab coats must be worn. If working with larger amounts where a splash to the body/arms is possible, then additional body protection should be worn, i.e., chemical resistant apron, oversleeves, etc.

Engineering Controls

Fume hoods, or other locally exhausted ventilation, must always be used when handling potassium and sodium cyanide in both solution and powdered form.

Handling/Storage

- Use only inside a fume hood, ensuring work is at least 6" behind the sash inside the hood.
- No containers of acid should be in the fume hood or work area.
- A pH 10 buffer solution and dilute bleach solution must be available to clean up the work surfaces after each use (washed with buffer solution, then rinsed with bleach). Utensils, glassware and other items contaminated with these compounds must be decontaminated after use. This must be completed inside the fume hood before removing any of the items.
- Store in tightly closed containers in a cool, dry location separated from acids.
- **All containers of sodium or potassium cyanide must be stored in locked cabinets.** These cabinets should be accessible only to those researchers familiar with these handling requirements. A current inventory of the compound should be kept with the container.

Emergency Procedures

Fire Extinguishers
An ABC dry powder extinguisher is appropriate if there is a fire involving potassium or sodium cyanide. Do not use a carbon dioxide extinguisher.

Eyewash/Safety Showers
An ANSI approved eyewash station that can provide quick drenching or flushing of the eyes must be immediately available in the laboratory where these cyanides are used. An ANSI approved safety drench shower must also be available within 10 seconds travel time as well. Ensure the locations of the eyewashes and safety showers, and how to activate them, are known prior to an emergency.

First Aid Procedures

If inhaled
Remove to fresh air. Call 911 for immediate medical attention.

In case of skin contact
Go to the nearest emergency shower if contaminated. Yell for assistance and rinse for 15 minutes, removing all articles of clothing to ensure contaminate is completely removed. Call 911 for immediate medical attention.

In case of eye contact
Go to the nearest emergency eyewash. Yell for assistance and rinse for 15 minutes. Call 911 for immediate medical attention.

Spills

Small Spill
If a small spill of <1gram of materials occurs inside a fume hood, lab personnel should be able to safely clean it up by following these spill clean up procedures:

- Alert people in immediate area of spill
- Wear personal protective equipment, including utility grade nitrile gloves
- Solution: Confine spill to small area with absorbent material (pads, vermiculite) and clean surfaces with pH 10 buffer solution, followed by dilute bleach solution
- Solid/crystals: Sweep up with dustpan/broom and clean surfaces with pH 10 buffer solution, followed by dilute bleach solution
- Collect residue, place in container, label container, and dispose of as hazardous waste

Larger Spill or Spill Outside a Fume Hood

- Call EHS for emergency assistance (M-F 8:30-5: 785-3555, all other times 911)
- Evacuate the spill area
- Post someone or mark-off the hazardous area with tape and warning signs to keep other people from entering
- Stay nearby until emergency personnel arrive and provide them with information on the chemicals involved

Waste Disposal

Sodium or potassium solutions/stock materials must be collected as hazardous waste. All items contaminated with acutely toxic (P-Listed) compounds must be collected as hazardous waste. This includes weigh boats, pipette tips, kimwipes, and other similar items that have come into contact with these compounds.

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Lab Specific Protocol/Procedure:

Principal Investigator's Signature/Date