 <p>Cornell University Physical Sciences Complex</p>	<p>Safe Use of Cyanides in Research</p> <p><i>Chemistry & Chemical Biology</i></p>	<p>SOP</p>
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1. Background

Inorganic cyanides used in research represent a class of particularly hazardous substances exhibiting neurotoxic effects on exposure. The use of these materials is restricted and subject to department oversight. Researchers proposing to use inorganic cyanide salts or hydrogen cyanide must receive preapproval from the Chemistry Department Safety Committee, complete required training prior to working with these materials and maintain these materials in a manner that restricts access to authorized individuals.

2. Purpose and Requirements

This document provides guidance to investigators using cyanides in research and establishes procedures for the approval, purchase, storage and security of these materials.

3. Scope

These guidelines apply to investigators in the Department of Chemistry & Chemical Biology who are conducting research in the Physical Sciences Complex and who use, handle or store inorganic cyanide salts or hydrogen cyanide.

4. Responsibilities

4.1 Chemistry & Chemical Biology

The department of Chemistry & Chemical evaluates the use of cyanides in the department and establishes guidelines for the responsible use in research. These guidelines outline procedures for procurement, use, record keeping, and storage of cyanides in research. The department will monitor and maintain a record of researchers and authorized users conducting research involving these materials.

4.2 Chemistry Department Safety Committee

The Chemistry Department Safety Committee provides oversight of the use of restricted cyanides in research to include approval, supervision and evaluation of submitted protocols.

4.3 Research Faculty

Research faculty are responsible for maintaining complete and accurate accounting of substances, from the time they are ordered until they are used up or disposed of. Inventories and records for materials should be kept at the premises where the approved activity is conducted, and be readily available for inspection.

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Research faculty should evaluate current and future use of cyanides for their individual research groups

If use of cyanides is expected to continue, faculty must:

- prepare a use protocol which includes the following information:
 - specific material (s)
 - approximate amount needed
 - purpose or nature of use
 - expected frequency
 - list of authorized users
 - location of designated storage area
 - procedures for routine handling and storage
 - procedures for disposal waste disposal
 - contingency plan for spills and emergency exposures
- update/ amend protocols to include new researchers
- ensure authorized users listed on protocols have completed the requisite training
- ensure cyanide compounds are maintained in the chemical inventory and stored safely and securely
- designate a Material Manager
- report any known loss, theft or diversion of material to the department safety manager

If further research use is not expected, faculty must

- ensure appropriate disposal of material and restrict sharing or transfer of material to other research groups

4.4 Material Manager

A Material Manager is required if the Principal Investigator (PI) is unable to oversee day-to-day activities associated with the use of cyanides in the lab.

These activities include:

- Purchasing
- Record keeping-maintaining inventory and use logs
- Security of materials
- reporting any knowledge or suspicion of loss or diversion to the supervisor
- Inform supervisor and/or PSC safety manager of compliance issues of concern

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4.5 Authorized Users

Authorized users must

- ensure that they are listed as authorized users on an existing protocol prior to working with restricted cyanide compounds
- complete required training including initial safety training and Cyanide Safety training prior to commencing work
- review applicable Safety Data Sheets (SDS, Standard Operating Procedures (SOPs) and emergency response procedure prior to working with these materials
- wear required Personal Protective Equipment (PPE)
- conduct only that work which is within the scope of the protocol approved by the department safety committee
- not work with restricted materials in the absence of someone else who may be available to provide assistance in case of an emergency.
- limit such work to standard business hours, if possible.
- follow applicable lab, department and university procedures

4.6 Physical Sciences Complex Safety Manager

The Physical Sciences Complex Safety Manager will

- Monitor the use of restricted cyanides in the department by conducting routine inspection of use records and secure storage areas
- report any losses to department safety committee

4.7 Environmental Health & Safety

- Establish procedures for disposal of toxic and highly toxic materials.
- Establish emergency response procedures for toxic and highly toxic chemicals.
- Provide emergency response personnel to assist in spill and exposure management

5. Procedure for Use of Restricted Cyanides with Protocol Approval

A schematic of this process is included in Appendix I.

1. Place materials in secure storage location in the lab.
2. Conduct initial inventory of materials.
3. Maintain inventory and use log.
4. Identify and train authorized users and Material Manager. Document training.
5. Include list of authorized users in inventory/use binder.
6. Authorized users may request material from Material Manager.
7. Users complete material use log.

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8. User conducts experiment.
9. User returns material to Material Manager who documents return in use log.

5.1.1 Purchasing

Investigators should purchase the smallest amount of material necessary to complete the proposed. A maximum of 500 g is permitted per CAS# for a given research group.

5.1.2 Storage

Store cyanides in a separate, stationary area that is secured by a lock and key mechanism. Store individual containers sealable secondary containers (polypropylene). Remove cyanide from its secondary container in a chemical fume hood to allow any accumulated gas to be vented safely.

5.1.3 Handling & Use

Conduct operations involving approved materials in a properly functioning, certified chemical fume hood. Ensure that the sash is set to the proper working height. Wear gloves during handling and wash hands immediately after working with cyanide compounds.

5.1.4 Disposal

Many inorganic cyanides are listed as acutely toxic (P-listed) and must be disposed of in accordance with EHS Hazardous Waste Handling procedures outlined in the Cornell University Hazardous Waste Manual.

See examples below:

CAS#	Chemical Name	P-Code
	Cyanides, N.O.S	P030
151-50-8	Potassium cyanide	P098
74-90-8	Hydrogen cyanide	P063
143-33-9	Sodium cyanide	P106
506-64-9	Silver cyanide	P104
544-92-3	Copper cyanide	P029
557-21-1	Zinc cyanide	P121

Items contaminated by highly toxic compounds should not be placed in solid waste bins. These materials should be placed in a leak-proof container or plastic bag, labeled with the hazardous waste tag and submitted for pickup by EHS.

5.1.5 Spills & Emergencies

Spills and other emergencies should be handled in accordance with EHS-Exposures to and Spills

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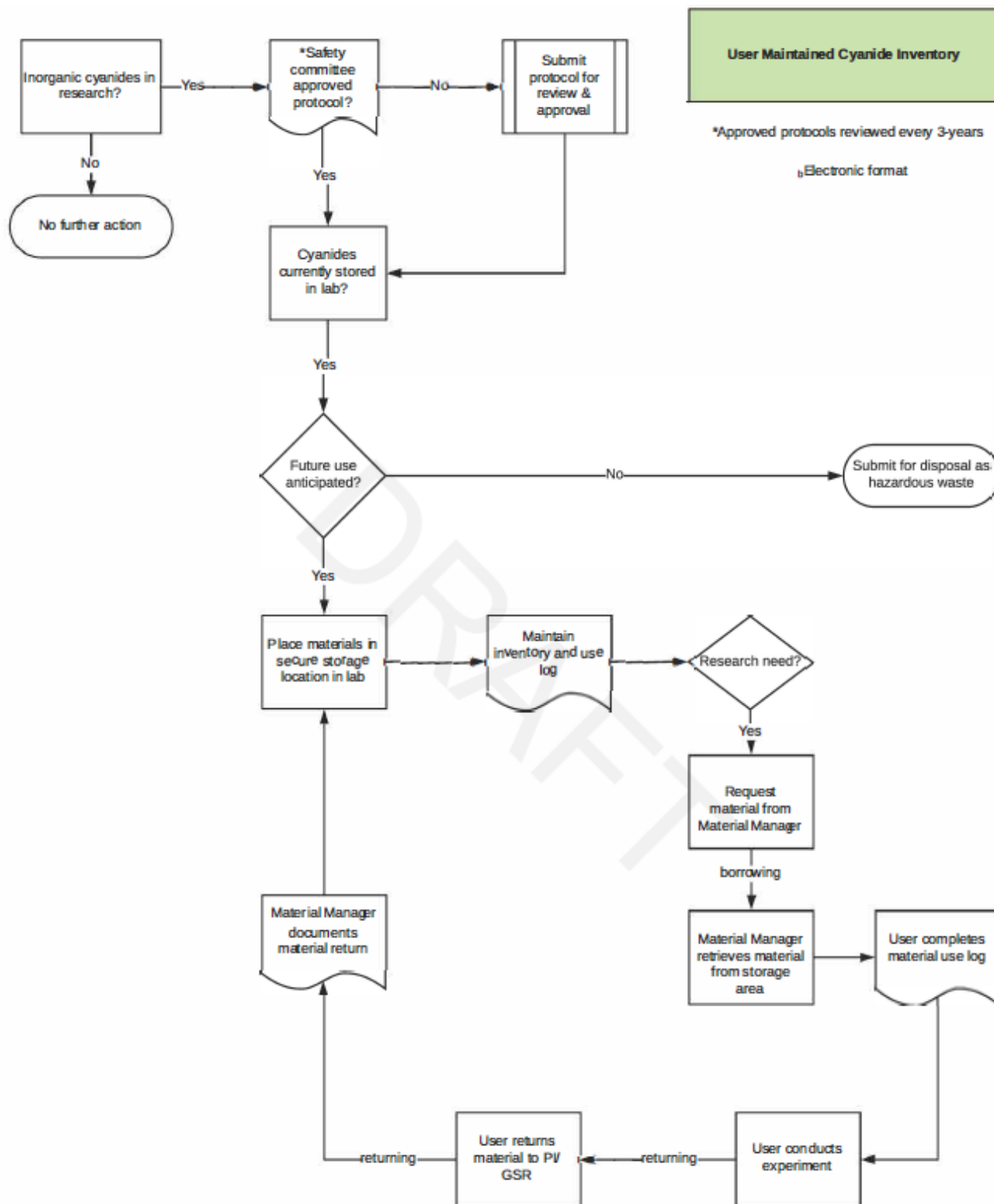
of Acutely Toxic Chemicals.

6. Related Documents/Procedures

- Cyanide Safety Training
- Cornell EHS-Emergency Procedures for Toxic Chemicals.
- Cornell University Hazardous Waste Manual

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