**General Use Chemical Standard Operating Procedure (SOP)**

Use of Cyanides

*Examples: Hydrogen Cyanide (HCN), Potassium cyanide (KCN), Sodium cyanide (NaCN), Copper (I) cyanide (CuCN), Mercury (II) cyanide (HgCN2), Trimethylsilyl cyanide (C4H9NSi), Tetrabutylammonium cyanide (C17H39N2)*

**Note**: This SOP is intended to provide general guidance on how to safely work with Cyanides and only addresses safety issues specific to Cyanides. Review lab specific SOP and Safety Data Sheets (SDS) for more information. Contact the Principal Investigator/ Laboratory Supervisor or the WSU Chemical Hygiene Officer for questions concerning the applicability of any item listed in this SOP (OEHS: 313-577-1200).

**Most Cyanides are Specific High Risk Chemicals (SHRCs), characterized by category 01 acute inhalation and/or dermal toxicity. Use of SHRCs in WSU research/teaching labs requires a lab specific SOP approved by the WSU Chemical Safety Committee prior to initiation of work with a SHRC.**

# **Hazard Description**

Cyanides are compounds that contain a cyanide group (CN), a chemical functional group consisting of a carbon atom that is triple bonded to a nitrogen atom (C≡N). Cyanides comprise a wide range of compounds of varying degrees of chemical complexity including hydrogen cyanide, cyanide salts, cyanogen (NC-CN), cyanogen halides (CNX, x = halide ion) and nitriles (RCN, R = organic functional group) etc. These compounds exist in the forms of solid (e.g. NaCN, CuCN), liquid [e.g. trimethylsilyl cyanide (C4H9NSi)] and gas (e.g. HCN, C2N2, CNCl) and can easily release or easily metabolized to release the highly toxic cyanide anion (CN-). The most dangerous types of cyanides include hydrogen cyanide (HCN), salts derived from HCN [e.g. potassium cyanide (KCN) and sodium cyanide (NaCN)] and compounds like trimethylsilyl cyanide which readily release HCN or the cyanide ion, upon contact with water or acids.

| **Hazard Pictograms** | **Hazard Statements** |
| --- | --- |
| **Globally Harmonized System pictogram Indicating a chemical is a Flammable Chemical** | Highly Flammable liquid and vapor |
| **Globally Harmonized System pictogram Indicating a chemical is a corrisive** | May be corrosive to metals  Causes serious eye damage  Causes severe skin burns and eye damage |
| **Globally Harmonized System pictogram Indicating a chemical is an Acute Toxic, capable of causing serious adverse health effects (i.e. lethality) after a single or short-term oral, dermal, or inhalation exposure to a substance or mixture.** | Acute toxicity: Oral, Inhalation, Dermal |
| **Globally Harmonized System pictogram Indicating a chemical is an health hazard, such as a carcinogen, mutagen, reproductive toxic, target organ toxic, or aspiration toxic.** | Specific target organ toxicity - single exposure  Specific target organ toxicity - repeated exposure |
| **Globally Harmonized System pictogram Indicating a chemical is an Irritant chemical** | Causes skin irritation  Causes serious eye irritation |
| **Globally Harmonized System pictogram Indicating a chemical has a negative environmental impact** | Short-term (acute) aquatic hazard  Long-term (chronic) aquatic hazard |

\* Hazard pictograms and statements may vary based on the type of cyanide compound used. Refer to [PubChem chemical data base](https://pubchem.ncbi.nlm.nih.gov/) for compound specific hazard description.

## Physical hazards

* Some cyanide compounds (e.g. HCN, trimethylsilyl cyanide) are extremely flammable and form explosive mixtures with air. May be ignited by heat, sparks or flames or can detonate when exposed to shock, heat, or friction.
* Most Inorganic cyanides are:
* Generally noncombustible (except HCN), but often react with moisture (slowly), acid (readily) or metals (readily) to evolve highly flammable gasses (HCN, H2). Acids cause the rapid evolution of HCN(g). Even carbon dioxide from the air is sufficiently acidic to liberate HCN(g) from solutions of cyanides.
* Incompatible with strong oxidizing agents and cause violent oxidation reactions with oxidizers such as chlorates, perchlorates, nitrates or nitrites.
* Presents an explosion hazard when heated with or exposed to other oxidizing agents and may polymerize explosively at elevated temperature (50-60°C) or in the presence of traces of alkali metals.
* Some cyanide compounds are highly corrosive to metals (e.g. Sodium cyanide)

## Health Hazards

* Cyanide ion is an inhibitor of the enzyme cytochrome c oxidase and hence disrupts the aerobic cellular respiratory mechanism resulting in tissue anoxia. This affects systems that mainly depend on aerobic respiration (such as the central nervous system, respiratory and cardiovascular systems) and is 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.
* The severity of health effects depends on the compound properties, exposure route and the exposure concentration of the specific cyanide compound used.
* Oral, dermal and inhalation exposure to many cyanides results in acute and chronic health hazards which can be extremely harmful or fatal. Depending on type of cyanide compound, concentration and exposure route death may occur within a few minutes to hours or may cause harmful chronic effects. For e.g.
* blood levels of cyanide ion (CN-) cause toxic effects at ≥ 0.05 mg of CN/dL (1 Dl = 100ml) of blood, and deaths have occurred at blood levels ≥ 0.3 mg/dL .
* acute inhalation exposure to 546 ppm of HCN(g) is fatal after 10 minutes and 110 ppm is life-threatening after a 1-hour exposure.
* Chronic exposure to HCN(g) as low as 6–10 ppm is harmful and may cause breathing difficulties, chest pain, vomiting, blood changes, headaches, and enlargement of the thyroid gland.
* Ingestion of cyanide compounds (even in small amounts) may be fatal, unless the exposed person quickly receives antidote therapy.
* Chronic exposure to thiocyanate ion, (the major metabolite of cyanide, produced in the liver), can affect the endocrine system which reduce the ability of the thyroid gland to produce hormones that are necessary for the normal function of the body.
* Survivors of severe cyanide poisoning may develop heart, brain, and nerve damage over time.

# **Control of Hazards – General**

* Check the availability of alternative less hazardous substances in place of cyanide compounds.
* If using cyanides, conduct a hazard assessment to identify proper use and handling techniques, fire safety, storage, and waste disposal issues specific to the type of cyanide compound being used.
* When purchasing, order the smallest quantity or the lowest concentration available that will meet experimental needs. This will avoid excessive storage and the need to dilute or manipulate the stock solution(s).
* Review the Safety Data Sheet (SDS) and emergency response procedures for specific cyanide compound prior to beginning work.
* Set up a designated area for work with cyanide compounds. Post warnings signs to areas where cyanide compound(s) is being used and stored (e.g. “DANGER: Cyanide in Use – Highly Toxic”). Include name and contact information of the responsible individual.
* Verify your experimental set-up and procedure prior to use. Conduct a dry run.
* Be familiar with the emergency response procedures listed in the lab specific SOP corresponding to the specific cyanide compound used.
* Post the lab specific SOP next to the area where cyanides will be used, for easy access, in case of an emergency
* Ensure a sink, eyewash, and safety shower are immediately available and accessible.
* DO NOT store in metal containers.
* Store cyanides away from heat, moisture and incompatible chemicals such as oxidizers, metals, acids, acidic salts, CO2, SO2, halogens and water.
* If weighing cyanide powder inside a chemical fume hood is not feasible, tare an empty container then add the powder to the container inside the CFH then seal the container before returning to the scale to weigh the powder (Do not use a metal scoop to transfer cyanide powder!).
* Use materials and containers appropriate for cyanide use and remain aware of potential incompatibilities (e.g. metal containers and other metal utensils). Polypropylene works well with most cyanide compounds.
* Keep all containers tightly closed when not in use and during transport.
* Regularly clean work areas handling cyanides to prevent inadvertent reactions with incompatible materials.
* Use secondary containers when handling and transporting cyanides to prevent spills.
* Never work alone when working with cyanides. Work within sight and/or hearing of at least one other person who is familiar with the hazards of cyanides and first aid / emergency response procedures.
* Warn others in the immediate area when working with cyanides.
* Each employee working in a lab that handles cyanides (as a reactant or a product) must receive lab-specific instructions/training on the dangers of cyanides and MUST be aware on:
* Routes of cyanide exposure (e.g., ingestion, inhalation, and skin absorption) and the associated acute and chronic adverse health effects
* Signs of cyanide exposure and poisoning
* Methods to prevent/minimize exposure (e.g., administrative and engineering controls and use of proper PPE), use of laboratory apparatus and chemical fume hoods, personal protective equipment)
* First aid procedures for a suspected cyanide exposure
* Emergency evacuation procedures

# **Engineering/Ventilation Controls**

* AVOID INHALATION! all forms (solid, liquid and gas) of cyanides must be opened and handled only in a certified chemical hood.
* Sash height must be set to the lowest set point, to avoid escaping dust and gasses and also to provide a physical barrier for the user.
* Always perform experiments at least 6 inches from sash, into the fume hood

# **Personal Protective Equipment**

In addition to proper street clothing (long pants or equivalent that cover legs and ankles, close-toed non-perforated shoes that completely cover the feet), wear the following Personal Protective Equipment (PPE) when performing lab operations/tasks:

* Eye protection - safety glasses
* Hand protection – Two pairs of standard nitrile exam gloves or one pair of non-disposable nitrile gloves as the outer glove (minimum 10 mil thickness) and disposable standard nitrile exam glove as the inner glove.
* Consult with glove manufacturer to ensure that the gloves are compatible with the specific cyanide compound in use.
* Thoroughly inspect the gloves prior to each use. Do not use damaged gloves.
* ALWAYS double-glove.
* Change gloves (outer and inner) frequently (at least once an hour) during an experimental procedure.
* Immediately change to fresh gloves, once gloves become contaminated. Wipe-off splashes before removing contaminated gloves, to reduce possibility of transferring contamination to skin.
* Dispose of used gloves as hazardous chemical waste.
* Remove gloves using a technique which avoids skin touching the exterior surface.
* Skin and body protection - Chemical protective lab coat- Fully buttoned lab coat made with cotton, polyester or a blend of the two (e.g. [Workrite™ FR/CP™ Lab Coat](https://www.fishersci.com/shop/products/fr-cp-lab-coat-men-s/p-6771070)) with sleeves extending to the wrists.
* If splashes may occur use:
* Goggles and face shield
* Chemical resistant apron and sleeves worn over lab coat [e.g. [Tyvek](file:///C:\Users\sekanayaka\Desktop\WSU%20CSC%20meetings\CSC%20meetings%202021\WSU%20CSC%20September%2023rd%202021\Sodium%20azide%20SOP\19-010F_FactSheet%20Azides_ADA_Final.docx) or other chemical resistant ([Tychem](https://www.thomassci.com/controlled-environment/apparel-garments/disposable-garments/aprons/_/Tychem-QC-Apron-Chemical-Resistant-26-x-52?q=Chemical%20Resistant%20Apron))].
* Respiratory protection: Avoid working outside of a chemical fume hood with cyanide compounds. If work must be conducted outside of a chemical fume hood, contact OEHS (577-1200) to evaluate your operations and to determine required respiratory protection. A respiratory protection program that meets MIOSHA requirements must be followed whenever workplace conditions warrant respirator use. Visit [OEHS Respiratory Protection](https://research.wayne.edu/oehs/health-safety/respirators) webpage for more information.
* REMOVAL OF PPE: After clean-up and decontamination of the work area, remove PPE in the following order:

1. Outer gloves
2. Long sleeve acid resistant apron
3. Lab coat
4. Face shield
5. Chemical goggles
6. Inner gloves

Disposable items should be placed in a solid hazardous chemical waste container. Wash hands and forearms immediately after removing PPE.

# **Special Handling Procedures and Storage Requirements**

* Safe handling requirements:
* Avoid contact with skin, eyes and other mucous membranes.
* Avoid dust formation or breathing vapors, mist, or gas.
* Handle only in areas with adequate ventilation (Chemical fume hood) or respiratory protection, away from incompatible materials and conditions (refer to compound specific SDS for more information).
* Always transport cyanide compounds from the storage area to the chemical fume hood in a labeled, sealed non-breakable secondary container. Always remove cyanide compound from its secondary container within a chemical fume hood in order to safely vent any accumulated vapor.
* Perform all experimental procedures with cyanides over plastic-backed absorbent pads in a chemical fume hood. Dispose of pads immediately after use or upon contamination in to durable 6 mil plastic a bag (double bagging required), seal the bag and dispose in to a solid hazardous waste container dedicated to cyanide waste.
* Most liquid and gaseous cyanides are highly flammable, prevent any build-up of electrostatic charge
* Conditions for safe storage
* Refer to SDS for compound specific storage requirements.
* Primary container MUST be labeled and closed tightly. Immediately close the container after each use. Do not wait until the end of experiment to close the primary container.
* Store cyanide compounds in tightly sealed locked cabinets. These cabinets should be accessible only to those researchers familiar with handling cyanide compounds.
* If potential for disturbance or breakage exists, place the primary container (tightly sealed and labeled), in a labeled, sealed non-breakable secondary container, before storing within the locked cabinet
* Do not store in unlabeled containers (primary and secondary).
* Store in a cool, dry, and well-ventilated place away from incompatible materials (e.g. oxidizers, acids and metals) and conditions (sunlight, heat and moisture) to prevent adverse reactions including formation of hydrogen cyanide gas.
* Use and storage areas should be shielded from overhead water sources, such as fire sprinkler systems or plumbing.
* Partially used, open containers of cyanide should be returned immediately to the storage area. They should not be left standing in the work area.
* A current inventory of the compound should be kept with the cyanide container.
* Assign a person (e.g. PI, laboratory supervisor or laboratory safety officer) to monitor the cyanide compound inventory for amounts in storage or in use. If any amount goes missing, contact principal investigator(s) immediately.

# **Decontamination Procedures**

* Decontaminate surfaces and clean-up spills promptly.
* In addition to the decontamination information listed below it is always recommended to refer to the SDS to determine a compound specific decontamination method.
* **Note: Do not use plain water to decontaminate as it can react with cyanides to release HCN gas.**

1. Personal Protective Equipment:

* Upon leaving work area where cyanide is used, remove PPE according to procedures listed above, then wash hands, forearms, face, and neck.
* Dispose all cyanide contaminated disposable PPE as solid hazardous chemical waste to durable 6 mil polyethylene bags (double bagging required). DO NOT rinse cyanide contaminated disposable items prior to discarding as hazardous waste.
* Thoroughly wipe the cyanide contaminated reusable PPE with absorbent material. For surface contaminated with solid material, do not dry sweep/wipe, use wipes [dampened with pH 10 buffer solution or a solution of detergent and water (pH > 8 and < 10.5)] and then rinse with 10% bleach solution. Collect all rinsate to the same plastic bag, close the bag tight and placed in a labeled hazardous waste container to be picked up and disposed via OEHS waste management group.

1. Chemical fume hood interiors, bench tops, equipment, and other laboratory surfaces where NaN3 is used:

* Clean and decontaminate after each use.
* Visible cyanide liquid or solid powder contamination should be initially wiped off. To wipe off visible cyanide powder spills without dust generation, use paper towels that have been dampened with pH 10 buffer solution or a solution of detergent and water (pH > 8 and < 10.5). Safely dispose cyanide contaminated wipes as solid hazardous chemical waste into durable 6 mil polyethylene bags (double bagging required). After removal of visible liquid droplets/powder, remove any residual cyanide by thoroughly rinsing with 10% bleach solution. Collect all rinsate to the same plastic bag, close the bag tight and place in a labeled hazardous waste container (e.g. 5-gallon solid white pail provided by OEHS) to be picked up by OEHS waste management group.
* Decontaminate all the non-disposable items within the fume hood prior to removal from the fume hood.

# **Waste Disposal**

* Do not dispose of any cyanide waste by dumping down a drain.
* Do not discard in regular trash containers.
* Always dispose the cyanide waste to compatible waste containers within the chemical fume hood.
* For solid waste:
* Place solid based cyanide waste materials into durable 6 mil plastic bags (double bagging required).
* Seal the bag within the fume hood.
* Dispose the sealed waste bag to a labeled hazardous solid waste container (5-gallon solid white pale) kept outside the fume hood. Place the waste container in a designated waste accumulation area within the laboratory to be picked up by OEHS waste management team.
* For liquid waste:
* Discard the liquid waste into a compatible, labeled liquid waste container placed within the hood. Due to spacing and handling restraints within the fume hood, use a small (≤ 1 gallon) waste container to collect liquid waste. To retain any accidental spills always place the waste container within a secondary container.
  + Seal the container tightly within the fume hood and then place the waste container in a secondary container kept outside the fume hood in a designated waste accumulation area in the laboratory to be picked up by OEHS waste management team.
* **Note**: Many cyanide-containing chemicals are Environmental Protection Agency (EPA) P-Listed (acutely toxic) \* chemicals, which have stringent requirements for waste disposal. Such p-listed waste types include:
* Unused and waste P-listed cyanide solids and solutions
* Empty primary bottles in which P-listed cyanide compound was received in.
* Other utensils contaminated with P-listed cyanides such as syringes, pipette tips, and other containers if the cyanide-containing chemical was the sole active ingredient in the container.
* Used and potentially contaminated absorbent pads, PPE, etc.

\* Refer to [EPA website](https://www.epa.gov/hw/defining-hazardous-waste-listed-characteristic-and-mixed-radiological-wastes#PandU) to identify P-listed cyanide compounds.

* All types of cyanide waste are considered hazardous chemical waste and MUST be disposed of by OEHS. [Submit requests to OEHS](https://research.wayne.edu/oehs/forms/chem-waste) for waste containers, labels, and waste collection.
* Extra caution must be taken to make certain that cyanide waste does not come in contact with incompatible agents such as acid which will cause the release of HCN gas.
* Refer to the [OEHS Hazardous Waste Management web page](http://research.wayne.edu/oehs/hazardous/index.php) and [WSU Chemical Hygiene Plan](http://research.wayne.edu/oehs/pdf/chemical-hygiene-plan.pdf) for more information on waste disposal.

# **Spill procedures**

**DO NOT use PLAIN WATER to clean up a cyanide spill. In contact with water, cyanides can form hydrogen cyanide, HCN, a highly toxic and flammable gas.**

1. **Spills**

DO NOT attempt to cleanup cyanide spills, independent of the amount, if:

* released hydrogen cyanide (HCN) gas or produced a smell of bitter almonds – this indicates release of HCN gas.
* spilled on chemically contaminated surfaces
* initiated a chemical reaction
* generated dust and contaminated the surrounding air
* happened outside of the fume hood
* have impacted the environment (via the storm drain, soil, or air outside the building)
* OR hazards are unknown

*NOTE: Never rely on the characteristic almond odor. Between 20-60% of people cannot detect the odor of hydrogen cyanide gas.*

1. Evacuate the spill area
2. Call WSU Police (313) 577-2222. Available 24 hours a day, 7 days a week.
3. Post someone or mark-off the hazardous area with tape and warning signs to keep other people from entering.
4. Remain in the vicinity until emergency personnel arrive and provide them with information on the chemicals involved.

For additional information regarding spill response procedures, refer to the [OEHS chemical spill response guidelines](http://research.wayne.edu/oehs/chemical/spills), [WSU Chemical Hygiene Plan](http://research.wayne.edu/oehs/pdf/chemical-hygiene-plan.pdf) and [American Chemical Society (ACS) guide for chemical spill response](https://www.acs.org/content/acs/en/about/governance/committees/chemicalsafety/publications/guide-for-chemical-spill-response.html).

**B. Small Spills (Solid and Liquid spills only)**

Small spills of cyanides that occur inside a fume hood can be safely cleaned up by local personnel wearing appropriate PPE and using readily available equipment (e.g. absorbent materials):

* 1. Alert personnel in the immediate area of spill and restrict access.
  2. Eliminate all sources of ignition.
  3. Increase ventilation in area of spill (turn on fume hood and open sash, open windows). Vent vapors to outside of building only.
  4. Review the SDS of the spilled material, or use your knowledge, to assess the hazards and to determine the appropriate level of protection and the required spill cleanup material.
     1. **DO NOT** clean up spills requiring respiratory protection. Contact OEHS for help (313-577-1200).
  5. Choose appropriate personal protective equipment (e.g. goggles, face shield, chemical resistant gloves, lab coat or apron).
  6. Protect floor drains, sinks or other potential avenues of environmental release as much as possible. Make a dike around the outside edges of the spill using absorbent materials.
  7. For solid spills: Minimize dust generation. Do not dry sweep. Cover solid spill with appropriate absorbent materials (refer to the SDS for compound specific absorbent material) dampened with a pH 10 buffer solution and then wipe up.
  8. For liquid spills: Wipe the liquid with appropriate absorbent material (refer to the SDS for compound specific absorbent material), working from the spill's outer edges toward the center.
  9. Collect all spilled material using a compatible scoop or other suitable item (nonmetallic).
  10. Double bag ALL spill cleanup materials. Use durable 6 mil plastic (polyethylene) bags for this purpose. Do not use a biohazard bag. Temporally keep the bag inside the fume hood until cleanup process is complete.
  11. After spilled material is removed, decontaminate surface first with a pH 10 buffer solution followed by freshly prepared 10% bleach solution.
  12. Place all contaminated materials (from step k) and other contaminated items such as gloves, to the same double bag from step j.
  13. Seal the bag within the hood and place the bag in to a hazardous waste container dedicated for collection of cyanide waste.
  14. Label waste container with completed hazardous waste tag (available from OEHS).
  15. Submit online [waste pickup request](https://research.wayne.edu/oehs/hazardous/chemical-waste.php) to OEHS.

# **Emergency Procedures**

Exposure to any amount of cyanide compounds should be treated as a serious medical concern, requiring immediate decontamination and medical treatment. See the Emergency Response section of this SOP for first aid response, which MUST be followed by an evaluation in a medical emergency room

**\*\*If medical attention required, call WSU police (313-577-2222) immediately\*\***

* **Fire Extinguishers** – Refer to section 5 of the SDS for chemical specific firefighting measures. ABC dry powder based fire extinguishers are appropriate for most fires. In case of fire directly involving the cyanide, do not attempt to fight the fire unless self-contained breathing apparatuses (SCBAs) are available and you have been trained in the use of a SCBA. Water, CO2 and soda-acid extinguishers will all result in the discharge of hydrogen cyanide gas which may under some circumstances be explosive. Be sure the responsible fire department officer knows the type of cyanides present.
* **Eyewash/Safety Showers** – Depending on the chemical hazard type, an eyewash station and safety shower may be required, easily accessed, and available within 10 seconds travel time for emergency use. Instruct personnel on the locations of eyewashes and safety showers, and how to activate them, prior to an emergency. Refer to [MIOSHA Fact Sheet: Eyewashes and Safety Showers](https://www.michigan.gov/documents/lara/lara_miosha_cet0199_628109_7.doc) to determine if an eyewash/safety shower is required for your specific chemical.

Please note: Additional hazards present in the laboratory may require that an eyewash or safety shower be present. This emergency equipment is required for treating exposures to workplace hazards such as chemical splashes, biological agents, welding sparks, metal shavings, or fine particulates like dust, dirt and sand.

1. **Health Threatening Emergencies**
   1. **Fire, explosion, health threatening hazardous material spill or release, compressed gas leak, or valve failure.**
      1. Call WSU Police (313) 577-2222.
      2. Alert people in the vicinity and activate the local alarm systems.
      3. Evacuate the area and go to your Emergency Assembly Point.
      4. Remain nearby to advise emergency responders.
      5. Once personal safety is established, call OEHS at (313) 577-1200.

Note: For compressed gas leaks, shut off gas supply only if this can be done safely, without risk to personnel.

* 1. **Injuries and Exposures:** 
     1. Remove the injured/exposed individual from the area, unless it is unsafe to do so because of the medical condition of the victim or the potential hazard to rescuers.
     2. Call WSU Police (313) 577-2222.
     3. Administer first aid as appropriate.
        1. Eye contact: Promptly flush eyes with copious amounts of tepid water for a prolonged period (at least 15 minutes).  If you wear contacts, remove them and put them with the contaminated clothing. Do not put the contacts back in your eyes (even if they are not disposable contacts). If you wear eyeglasses, wash them with soap and water. You can put your eyeglasses back on after you wash them. Seek medical attention.
        2. Ingestion: do not induce vomiting or give fluids to drink. Seek medical attention IMMEDIATELY. See first aid section of chemical Safety Data Sheet.
        3. Skin contact: Remove any contaminated clothing and place the clothing in a labeled durable 6-mil polyethylene bag (double bag). Thoroughly wash and rinse (using cold or warm water) the contaminated skin immediately **using a soap and water solution.** Be careful not to break the victim’s skin during the decontamination process, and cover all open wounds. Use safety shower, if needed. Seek medical attention.
        4. Inhalation: Get to a source of fresh air. Seek medical attention.
     4. Call OEHS (313) 577-1200, to report the exposure and complete [Report of Injury](https://risk.wayne.edu/files/rofi.pdf) form.
     5. Bring to the hospital copies of the Safety Data Sheets for all chemicals to which the victim was exposed.

1. **Non-Health Threatening Emergencies**
   1. **Injuries and Exposures**

For injuries and exposures that are not considered serious or a medical emergency, visit:

Henry Ford Occupational Health – Harbortown

3300 East Jefferson, Suite 100

Detroit MI 48207

(313) 656-1618

Monday – Friday 8:00 AM to 6:30 PM

If Henry Ford Occupational Health Center is closed or for serious injuries, visit:

Henry Ford Hospital – Emergency Room

2799 W. Grand Blvd.

Detroit MI 48202

(313) 916-8742

OR

Detroit Receiving Hospital - Emergency Room

4201 St. Antoine St, Detroit, MI 48201

Phone: (313) 745-3000

# **Minimum Training Requirements**

1. **General Training:**

* Online through the [Collaborative Institutional Training Initiative (CITI)](https://about.citiprogram.org/en/homepage/).
  + Laboratory Safety Training (general lab & chemical safety issues) and Hazard Communication
* [Fire Safety](https://risk.wayne.edu/fire-safety).

1. **Laboratory Specific Safety Training:**

* [Laboratory-Specific Safety Training](https://research.wayne.edu/oehs/docs/lab-safety-training-checklist.doc) checklist
* Review of SDS for chemicals involved in process/experiment including specific cyanide compound(s) in use.
* Review of this generic SOP on use of cyanide compounds.
* Review Lab specific SOP developed for the specific cyanide compound(s)
* Review WSU Hazardous Waste Management guidelines.

1. **References**
2. Agency for Toxic Substances and Disease Registry (ATSDR). Toxicological Profile for Cyanide (Update). Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. 2006.
3. Cyanide Handling and Storage. (2014, September). Retrieved from MIOSHA - Consultation Education and Training Division: https://www.michigan.gov/documents/cis\_wsh\_cet5015\_90101\_7.doc
4. Information on Cyanide Compounds. (n.d.). Retrieved from Standford University - Environmental Health & Safety: https://ehs.stanford.edu/reference/information-cyanide-compounds
5. Johnson-Davis, K. L. (2020). Cyanide toxicity - a case study. In H. Ketha, & U. Garg (Eds.), Toxicology Cases for the Clinical and Forensic Laboratory (pp. 473-479). Academic Press.