

Appendices

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Appendix 1

Incoming Chemical Data Sheet

Purpose This form is to be used for inventory tracking purposes. The form should be completed as soon as the chemical is received. The form is to be provided to the Section Supervisors, who will then enter the information into the Materials Laboratory's Chemical Inventory Database.

Responsibility Section Supervisors

Form The following information should be recorded:

Item	To Complete
Chemical Name	
Common Name	
CAS Number	
Manufacturer	
Catalog Number	
Hazard Class	
NFPA Code	
Date Received	
Expiration Date	
Storage Location (Lab, Room, Cabinet)	
Container Type	
Container Size	
Number of Containers	
MSDS	Yes/No Date:
Name and Contact information of person completing the form	

Appendix 2

BITMIX Section

Itemized Inventory

ChemicalName

Acetone

Barcode Quantit Room Cabinet Shelf

225890 55 gal Haz Shed Clean side

225889 55 gal Haz Shed Clean side

Ammonium Molybdate Tetrahydrate

211754 100 g B140 Drawer

Antimony Potassium Tartrate

211757 125 g B140 Drawer

Ascorbic Acid

211755 100 g B140 Drawer

Butyl Alcohol

211756 1 L Haz Shed Clean side

Ethyl Alcohol

323544 1 gal Haz Shed Clean side

323543 1 gal Haz Shed Clean side

323545 1 gal Haz Shed Clean side

Ethylene Glycol

211724 4 L Haz Shed Clean side

211725 4 L Haz Shed Clean side

211723 4 L Haz Shed Clean side

Excel

225818 30 gal Haz Shed Clean side

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ChemicalName

Barcode Quantit Room Cabinet Shelf

Glycerin

211728	4 L	Haz Shed	Clean side
211726	4 L	Haz Shed	Clean side
211727	4 L	Haz Shed	Clean side

Heat Transfer Fluid

211761	1 gal	Haz Shed	Clean side
211758	1 gal	Haz Shed	Clean side
211760	1 gal	Haz Shed	Clean side
211762	1 gal	Haz Shed	Clean side
211759	1 gal	Haz Shed	Clean side

Isopropyl Alcohol 70%

211739	1 gal	Haz Shed	Clean side
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Mineral Oil

323027	5 gal	Haz Shed	Clean side
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Toluene

225829	4 L	Haz Shed	Clean side
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Trichloroethylene

324006	4 L	Haz Shed	Clean side
324008	4 L	Haz Shed	Clean side

Xylene

225828	4 L	Haz Shed	Clean side
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Current Chemical Inventory-Chem Lab

<i>Chemical or Trade Name</i>	<i>CAS#</i>	<i>Color Code</i>	<i>H F R</i>	<i>Specific</i>	<i>Quantity</i>	<i>Room</i>	<i>Cabinet</i>	<i>Shelf</i>
1013 Portland Cement	n/a	Gray/Green/Orange	2 0 0	Irritant,Carcinogen	1 pack	B139	4	2
1016 Portland Cement	n/a	Gray/Green/Orange	2 0 0	Irritant,Carcinogen	1 pack	B139	4	2
101f Steel	n/a	Gray/Green/Orange	0 0 0	Inert	1 pack	B139	4	3
12h Steel	n/a	Gray/Green/Orange	0 0 0	Inert	1 pack	B139	4	3
1881a Portland Cement	n/a	Gray/Green/Orange	2 0 0	Irritant,Carcinogen	1 pack	B139	4	2
1882 Calcium Aluminate Cement	n/a	Gray/Green/Orange	2 0 0	Irritant,Carcinogen	1 pack	B139	4	2
1884a Portland Cement	n/a	Gray/Green/Orange	2 0 0	Irritant,Carcinogen	1 pack	B139	4	2
1885a Portland Cement	n/a	Gray/Green/Orange	2 0 0	Irritant,Carcinogen	1 pack	B139	4	2
1886 Portland Cement Composition (Cranberry Cap)	n/a	Gray/Green/Orange	2 0 0	Irritant,Carcinogen	2 pack	B139	4	2
1887a Portland Cement	n/a	Gray/Green/Orange	2 0 0	Irritant,Carcinogen	2 pack	B139	4	2
1888a Portland Cement	n/a	Gray/Green/Orange	2 0 0	Irritant,Carcinogen	1 pack	B139	4	2
19g Steel	n/a	Gray/Green/Orange	0 0 0	Inert	1 pack	B139	4	3
2689 Coal Fly Ash	n/a	Gray/Green/Orange	2 0 0	Irritant,Carcinogen	1 pack	B139	4	2
2690 Coal Fly Ash	n/a	Gray/Green/Orange	2 0 0	Irritant, Carcinogen	1 pack	B139	4	2
2691 Coal Fly Ash	n/a	Gray/Green/Orange	2 0 0	Irritant,Carcinogen	1 pack	B139	4	2
27e Iron Ore	7439-89-6	Gray/Green/Orange	0 0 0	Inert	1 pack	B139	4	3
40h Sodium Oxalate	62-76-0	White	3 0 1	Corrosive	1 pack	B139	4	3
45d Copper	7440-50-8	Gray/Green/Orange	0 0 0	Inert	1 pack	B139	4	3
634a Portland Cement	n/a	Gray/Green/Orange	2 0 0	Irritant,Carcinogen	1 pack	B125	Counter	1
635 Portland Cement (Blue Cap)	n/a	Gray/Green/Orange	2 0 0	Irritant,Carcinogen	1 pack	B139	4	2

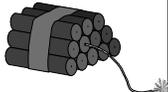
<i>Chemical or Trade Name</i>	<i>CAS#</i>	<i>Color Code</i>	<i>H F R</i>	<i>Specific</i>	<i>Quantity</i>	<i>Room</i>	<i>Cabinet</i>	<i>Shelf</i>
740a Zinc	7440-66-6	Gray/Green/Orange	0 0 0	Inert	1 pack	B139	4	3
84k Potassium Hydrogen Phthalate	877-24-7	Gray/Green/Orange	1 1 0	Irritant	1 pack	B139	4	3
Aluminum Standard	n/a	White	3 0 1	Corrosive	100 mL	B139	5	2
Ammonium Chloride	12125-02-9	Gray/Green/Orange	2 0 2	Irritant	500 g	B139	3	3
Ammonium Hydroxide, Solution	1336-21-6	Striped White	3 0 1	Corrosive	5 L	B139	Base	1
Ammonium Nitrate	6484-52-2	Yellow	2 1 3	Oxidizer	1500 g	B139	Reactives	1
Ammonium Oxalate	6009-70-7	White	3 0 1	Corrosive	250 g	B139	3	7
Antimony Trichloride	10025-91-9	White	3 0 2	Corrosive	1000 g	B139	3	7
Antimony Trioxide	1309-64-4	Blue	3 0 0	Toxic/ Irritant	1000 g	B139	3	5
Boron Standard	n/a	Striped White	2 0 2	Corrosive	100 mL	B139	5	2
Calcium Hyrdoxide	1305-62-0	Gray/Green/Orange	2 0 2	Corrosive	500 g	B139	3	3
Calcium Standard	n/a	White	3 0 1	Corrosive	100 mL	B139	5	2
Chloroform	67-66-3	Blue	3 1 1	Toxic	4 L	B139	Flammables	2
Chloroform	67-66-3	Blue	3 1 1	Toxic	12 L	Haz Shed	1	1
Ethyl Alcohol, Anhydrous, Denatured	64-17-5	Red	2 3 1	Flammable	4 L	B139	Flammables	1
Hydrochloric Acid	7647-01-0	White	3 0 2	Corrosive	7.5 L	B139	Acid 1	1
Hydrochloric Acid	7647-01-0	White	3 0 2	Corrosive	2.5 L	B139	Acid 2	2
Hydrofluoric Acid	7664-39-3	White	4 0 2	Corrosive	1 L	B139	Acid 2	1
Hydrogen Peroxide	7722-84-1	White	3 0 3	Corrosive	500 mL	B139	Acid 1	1
Iron Standard	n/a	White	3 0 1	Corrosive	100 mL	B139	5	2
Lanthanum Standard	n/a	White	3 0 1	Corrosive	100 mL	B139	5	2

<i>Chemical or Trade Name</i>	<i>CAS#</i>	<i>Color Code</i>	<i>H F R</i>	<i>Specific</i>	<i>Quantity</i>	<i>Room</i>	<i>Cabinet</i>	<i>Shelf</i>
Lithium meta-Borate	13453-69-5	Gray/Green/Orange	2 0 1	Irritant	100 g	B139	3	4
Magnesium Standard	n/a	White	3 0 1	Corrosive	100 mL	B139	5	2
Manganese Standard	n/a	White	3 0 1	Corrosive	100 mL	B139	5	2
Mercsorb®	n/a	Gray/Green/Orange	2 2 2	Severe Irritant	1000 g	B139	3	6
Methanol	67-56-1	Red	3 3 1	Flammable	1 L	B139	Flammables	1
Methanol	67-56-1	Red	3 3 1	Flammable	4 L	B139	Flammables	2
Methyl Ethyl Ketone	78-93-3	Red	2 3 1	Flammable	4 L	B136	Flammables	2
Methyl Red	63451-28-5	Gray/Green/Orange	1 1 1	Mild Irritant	25 g	B139	4	3
Nitric Acid	7697-37-2	White	4 0 3	Corrosive	2.5 L	B139	Acid 2	2
Petroleum Ether	8032-32-4	Red	2 4 1	Flammable	0.5 L	B139	Flammables	1
pH Buffer 10.01	n/a	Gray/Green/Orange	1 0 0	Irritant	475 mL	B139	Counter	1
pH Buffer 4.01	n/a	Gray/Green/Orange	1 0 0	Mild Irritant	475 mL	B139	Counter	1
pH Buffer 7.00	n/a	Gray/Green/Orange	0 0 0	Mild Irritant	475 mL	B139	Counter	1
Phosphorous Standard	n/a	White	3 0 1	Corrosive	200 mL	B139	5	2
Potassium Permanganate	7722-64-7	Yellow	3 0 3	Oxidizer	500 g	B139	Reactives	2
Potassium Standard	n/a	White	3 0 1	Corrosive	100 mL	B139	5	3
Quality Control Sample 26	n/a	White	4 0 2	Corrosive	250 mL	B139	5	3
Resisorb®	n/a	Gray/Green/Orange	3 1 2	Toxic	4 kg	B139	3	6
Silica Gel, Indicating	63231-67-4	Gray/Green/Orange	2 1 1	Irritant	1600 g	B139	3	4
Silicon Standard	n/a	Gray/Green/Orange	0 0 0	none	100 mL	B139	5	3
Silver Nitrate	7761-88-8	Yellow	3 0 3	Oxidizer	25 g	B139	Reactives	1

<i>Chemical or Trade Name</i>	<i>CAS#</i>	<i>Color Code</i>	<i>H F R</i>	<i>Specific</i>	<i>Quantity</i>	<i>Room</i>	<i>Cabinet</i>	<i>Shelf</i>
Sodium Carbonate	497-19-8	Gray/Green/Orange	1 1 2	Irritant	500 g	B139	3	4
Sodium Chloride	7647-14-5	Gray/Green/Orange	1 0 0	Slight Irritant	1 kg	B139	3	4
Sodium Hydroxide, Solution	1310-73-2	Striped White	3 0 2	Corrosive	4 L	B139	Base	1
Sodium Standard	n/a	White	3 0 1	Corrosive	100 mL	B139	5	3
Stannous Chloride	10025-69-1	Gray/Green/Orange	2 0 2	Irritant	1500 g	B139	3	4
Sulfur Standard	n/a	Gray/Green/Orange	1 0 1	Toxic	200 mL	B139	5	3
Sulfuric Acid	7664-93-9	White	4 0 2	Corrosive	5 L	B139	Acid 2	2
Titanium Standard	n/a	White	4 0 2	Corrosive	100 mL	B139	5	3
Toluene	108-88-3	Red	2 3 1	Flammable	4 L	B139	Flammables	2
Trichloroethane	71-55-6	Blue	3 1 1	Toxic	4 L	B139	Flammables	2
Trichloroethylene	79-01-6	Blue	2 1 1	Toxic	4 L	B139	Flammables	2
Yttrium Standard	n/a	White	3 0 1	Corrosive	100 mL	B139	5	3
Zinc Standard	n/a	White	3 0 1	Corrosive	100 mL	B139	5	3

Appendix 3

Chemical Segregation & Incompatibilities Guidelines

Class of Chemical	Examples	Recommended Storage Method	Incompatible Materials	Possible Reaction If Mixed
Corrosive Acids 	Mineral Acids – Chromic Acid Hydrogen Chloride Hydrochloric Acid Nitric Acid Perchloric Acid Phosphoric Acid Sulfuric Acid	Separate cabinet or storage area away from potential water sources, i.e. under sink	Flammable Liquids Flammable Solids Bases Oxidizers Poisons	Heat  Gas Generation Violent Reaction 
Corrosive Bases/Caustic 	Ammonium Hydroxide Sodium Hydroxide Sodium Bicarbonate	Separate cabinet or storage area away from potential water sources, i.e. under sink	Flammable Liquids Flammable Solids Acids Oxidizers Poisons	Heat  Gas Generation Violent Reaction 
Explosives 	Ammonium Nitrate Nitro Urea Picric Acid Trinitroaniline Trinitrobenzene Trinitrobenzoic Acid Trinitrotoluene Urea Nitrate	Secure location away from other chemicals	Flammable Liquids Oxidizers Poisons Acids Bases	Explosion Hazard  

Class of Chemical	Examples	Recommended Storage Method	Incompatible Materials	Possible Reaction If Mixed
Flammable Liquids 	Acetone Benzene Diethyl Ether Methanol Ethanol Toluene Glacial Acetic Acid	Grounded flammable storage cabinet of flammable storage refrigerator	Acids Bases Oxidizers Poisons	Fire Hazard  Heat  Violent Reaction 
Flammable Solids 	Phosphorus Magnesium	Separate dry cool area	Acids Bases Oxidizers Poisons	Fire Hazard Heat  Violent Reaction 
Oxidizers 	Sodium Hypochlorite Benzoyl Peroxide Potassium, Permanganate Potassium Chlorate Potassium Dichromate Peroxides, Perchlorates Chlorates, Nitrates	Spill tray that is separate from flammable and combustible materials	Reducing Agents Flammables Combustibles Corrosives	Fire Hazard  Toxic Gas Generation 
Poisons 	Cyanides Cadmium Mercury Osmium Acrylamide DMSO	Vented, cool, dry area in unbreakable chemically resistant secondary containers	Flammable Liquids Acids Bases Oxidizers Corrosives	Generation of Toxic & Flammable Gas  Violent Reaction 
Water Reactive Chemicals 	Sodium Metal Potassium Metal Lithium Metal Lithium Aluminum Hydride	Dry, cool location away from potential spray from fire sprinklers and other water sources, i.e. under sink	Aqueous Solutions Oxidizers	Heat  Violent Reaction 

Class of Chemical	Examples	Recommended Storage Method	Incompatible Materials	Possible Reaction If Mixed
Flammable Compressed Gases 	Methane Acetylene Propane Hydrogen	Cool, dry area away from oxidizing gases while securely attached to wall or bench	Oxidizing & Toxic Compressed Gases Oxidizing Solids	Fire Hazard  Explosion Hazard 
Oxidizing Compressed Gases 	Oxygen Chlorine Bromine	Cool, dry area away from flammable gases while securely attached to wall or bench	Flammable Gases	Fire Hazard  Explosion Hazard 
Poisonous Compressed Gases 	Carbon Monoxide Hydrogen Sulfide	Cool, dry area away from flammable gases or liquids while securely attached to wall or bench	Flammable Gases Oxidizing Gases	Release of Toxic Gas  Violent Reaction 

Partial Incompatibility Listing

Compound/Class	Avoid Storage Near or Contact With:
Acids	
Acetic Acid -----	Chromic acid, nitric acid, hydroxyl compounds, ethylene, glycogen, perchloric acid, peroxides, permanganate
Hydrofluoric Acid -----	Ammonia (aqueous or anhydrous)
Nitric Acid (conc.) -----	Acetic acid, aniline, chromic acid, acetone, alcohol, or other flammable liquids, hydrocyanic acid, hydrogen sulfide, or other flammable gases, nitratable substances: copper, brass or any heavy metals (or will generate nitrogen dioxide/nitrous fumes) or organic products such as wood and paper
Sulfuric Acid -----	Light metals (lithium, sodium, potassium), chlorates, perchlorates, permanganates
Bases	
Ammonia -----	Mercury, chlorine, bromine, iodine, hydrofluoric acid, calcium hypochlorite
Calcium oxide -----	Water
Alkaline metals -----	Sodium, potassium, magnesium, calcium, aluminum, carbon dioxide, carbon tetrachloride or other chlorinated hydrocarbons, halogens, water
Bromine -----	Ammonia, acetylene, butadiene, methane, propane, butane (or other petroleum gases), hydrogen, sodium carbide, turpentine, benzene, finely divided metals
Carbon, activated -----	Calcium hypochlorite, oxidizing agents
Chlorine -----	Ammonia, acetylene, butadiene, methane, propane, butane, or other petroleum gases, hydrogen, sodium carbide, turpentine, benzene, finely divided metals
Copper -----	Acetylene, hydrogen peroxide, nitric acid
Fluorine -----	Isolate from everything
Iodine -----	Acetylene, ammonia (aqueous or anhydrous), hydrogen
Mercury -----	Acetylene, ammonia, fulminic acid (produced in nitric acid ethanol mixtures)
Oxygen -----	Oils, grease, hydrogen, other flammable gases, liquids, or solids
Phosphorous (white) -----	Air, oxygen, caustic alkalis as reducing agents (or will generate phosphine)
Potassium -----	Carbon tetrachloride, carbon dioxide, water
Silver -----	Acetylene, oxalic acid, tartaric acid, fulminic acid (produced in nitric acid-ethanol mixtures), and ammonium compounds

Compound/Class	Avoid Storage Near or Contact With:
Organics	
Acetone -----	Concentrated nitric acid and sulfuric acid mixtures
Acetylene -----	Fluorine, chlorine, bromine, copper, silver, mercury
Aniline -----	Nitric acid, hydrogen peroxide
Flammable Liquids -----	Ammonium nitrate, chromic acid, hydrogen peroxide, nitric acid, sodium peroxide, halogens
Hydrocarbons-----	Fluoride, chlorine, bromine, chromic acid, sodium peroxide (propane, butane, etc.)
Nitroparaffins -----	Inorganic bases, amines
Oxalic Acid -----	Silver, mercury
Oxidizers	
Chlorates -----	Ammonia salts, acids, metal powders, sulfur, finely divided organics, or combustible materials
Chromic Acid (trioxide) -	Acetic acid, naphthalene, camphor, glycerol, turpentine, alcohol or flammable liquids
Ammonium Nitrate -----	Acids, metal powders, flammable liquids, chlorates, nitrates, sulfur, finely divided organic or combustible materials
Chlorine Dioxide -----	Ammonia, methane, phosphine, hydrogen sulfide
Cumene Hydroperoxide--	Organic or inorganic acids
Hydrogen Peroxide -----	Copper, chromium, iron, most other metals or salts, alcohols, acetone, or other flammable liquids, aniline, nitromethane, or other organic or combustible materials
Hypochlorites -----	Acids (will generate chlorine or hypochlorous acid)
Nitrates -----	Sulfuric acid (will generate nitrogen dioxide)
Perchloric Acid -----	Acetic acid, bismuth and its alloys, alcohol, paper, wood, grease, oils
Peroxides (Organics) -----	Organic or inorganic acids; also avoid friction and store cold
Potassium Chlorate -----	Acids, especially sulfuric acid
Potassium Permanganate	Glycerol, ethylene glycol, benzaldehyde, sulfuric acid
Sodium Peroxide -----	Any oxidizable substance such as methanol, ethanol, glycerol, ethylene glycol, glacial acetic acid, acetic anhydride, benzaldehyde, furfural, methyl acetate, ethyl acetate, carbon disulfide
Alkaline metals -----	Sodium, potassium, magnesium, calcium, aluminum, carbon dioxide, carbon tetrachloride or other chlorinated hydrocarbons, halogens, water
Calcium oxide -----	Water
Cyanides -----	Acids (will generate hydrogen cyanide)
Phosphorous (white)-----	Air, oxygen, caustic alkalis as reducing agents (will generate phosphine)
Potassium -----	Carbon tetrachloride, carbon dioxide, water
Sodium -----	Carbon tetrachloride, carbon dioxide, water
Sodium Peroxide -----	Any oxidizable substance such as methanol, ethanol, glycerol, ethylene glycol, glacial acetic acid, acetic anhydride, benzaldehyde, furfural, methyl acetate, ethyl acetate, carbon disulfide
Sulfides -----	Acids (will generate hydrogen sulfide)

Compound/Class	Avoid Storage Near or Contact With:
Reducing Agents	
Hydrazine -----	Hydrogen peroxide, nitric acid, other oxidants
Nitrites -----	Acids (will generate nitrous fumes)
Sodium Nitrite-----	Ammonium nitrate and other ammonium salts
Toxics/Poisons	
Arsenicals -----	Reducing agents (will generate arsine)
Azides -----	Acids (will generate hydrogen azide)
Cyanides -----	Acids (will generate hydrogen cyanide)
Hydrocyanic Acid -----	Nitric Acid, alkalis
Hydrogen Sulfide -----	Fuming nitric acid, oxidizing gases
Selenides -----	Reducing agents (will generate hydrogen selenide)
Sulfides -----	Acids (will generate hydrogen sulfide)
Tellurides -----	Reducing agents (will generate hydrogen telluride)

Appendix 4

Flammables

General Characteristics

- Flammable liquids are the most commonly found chemicals in a laboratory. Flammables can readily catch fire and burn. It is the vapor of a flammable liquid that burns, not the liquid itself.
- The rate at which a flammable liquid produces flammable vapors depends on its vapor pressure: the higher the vapor pressure, the more readily the liquid will vaporize. A chemical's vapor pressure also increases with increasing temperature. This makes flammable chemicals more hazardous when heated.
- The flash point of a chemical is that minimum temperature at which a liquid gives off vapor in sufficient concentration to form an ignitable mixture with air. Many commonly used flammables have flash points lower than room temperature; for example, diethyl ether (flash point of -45.0°C), acetone (flash point of -17.8°C), and isopropyl alcohol (flash point of 11.7°C). Acetone and MEK are examples of extremely flammable chemicals used at the Mats Lab.
- As flammable chemicals evaporate, the chances for ignition increase significantly. Tightly seal all flammable materials into appropriate containers and store accordingly. The limits of flammability or explosivity define the range in which a flammable vapor or gas can ignite and burn when mixed with air. The low end of this range is called the lower explosive limit or LEL; the high end of this range is called the upper explosive limit or UEL. If the vapor concentration in air is below the LEL or above the UEL, the mixture will not burn, but if the concentration is within these limits there is a very high risk of an explosion. The vapor in air concentration must be within the limits of flammability in order for it to ignite and burn.
- Some flammable chemicals, such as benzene, have a very narrow flammability range, while others, such as acetaldehyde, have a very wide flammability range.
- Most flammable vapors have a vapor density that is greater than that of air. The result is that these vapors will seek the lowest elevations. Flammable vapors can also travel great distances.
- Eliminate all potential and surrounding ignition sources when working with flammables.

Use and Storage

- Store flammable liquids that are not in use in safety cans, storage cabinets designed for flammables, or inside storage rooms.
- Minimize the amount of flammable liquids stored in the lab.
- Use flammables only in an area free of ignition sources. Remember, smoking is not permitted anywhere inside the building.
- When transferring flammables in metal containers, voltage potentials can result in static sparks capable of igniting flammable vapors. Flammable liquid dispensing and receiving containers must be bonded together before pouring. Large containers such as drums must also be grounded when used as a dispensing or receiving vessel. All grounding and bonding connections must be metal to metal. Safety catalogs offer the necessary bonding and grounding wires.
- Never heat flammables by using an open flame. Use steam baths, water baths, oil baths, heating mantles, or hot air baths.
- Never store flammable chemicals in a standard household refrigerator. There are several ignition sources located inside a standard refrigerator that can set off a fire or violent explosion.

- When flammables are to be stored cold, use only a lab safe or explosion-proof refrigerator. Another alternative is to use an ice bath to chill the chemicals. Remember, there is no safety benefit in storing a flammable chemical in a refrigerator if the flash point of that chemical is below the temperature of the refrigerator.

Health Hazards

In general, the vapors of many flammables are irritating to mucous membranes of the respiratory system and eyes, and in high concentrations are narcotic. The following symptoms are typical for the respective routes of entry.

Acute Health Effects

- Inhalation – headache, fatigue, dizziness, drowsiness, narcosis (stupor and unresponsiveness)
- Ingestion – slight gastro-intestinal irritation, dizziness, fatigue
- Skin Contact – dry, cracked, and chapped skin
- Eye Contact – stinging, watering eyes, and inflammation of the eyelids

Chronic Health Effects

The chronic health effects will vary depending on the specific chemical, the duration of the exposure, and the extent of the exposure. However, damage to the lungs, liver, kidneys, heart, and/or central nervous system may occur. Cancer and reproductive effects are also possible. The following groups of flammables exhibit similarities in health effects:

- Hydrocarbons – aliphatic hydrocarbons are narcotic but their systemic toxicity is relatively low. Aromatic hydrocarbons are all potent narcotic agents and overexposure to the vapors can lead to loss of muscular coordination, collapse, and unconsciousness. Benzene is toxic to bone marrow and can cause leukemia.
- Alcohols – vapors only moderately narcotic.
- Ethers – exhibit strong narcotic properties and for the most part are only moderately toxic.
- Esters – vapors may result in irritation to the eyes, nose, and upper respiratory tract.
- Ketones – systemic toxicity is generally not high.

First Aid

The following first aid measures are generally applicable to flammables. For more information on specific chemicals, consult the MSDS for that chemical.

Routes of Entry	First Aid Measure
Inhalation	<ul style="list-style-type: none"> • Remove person from the contaminated area if it is safe to do so • Get medical attention and do not leave person unattended
Ingestion	<ul style="list-style-type: none"> • Remove the person from the source of contamination • Get medical attention. Do not induce vomiting.
Skin contact	<ul style="list-style-type: none"> • Remove person from source of contamination • Remove clothing, jewelry, and shoes from the affected areas • Flush the affected area with water for at least 15 minutes • Get medical attention
Eye contact	<ul style="list-style-type: none"> • Remove person from the source of contamination • Flush the eyes with water for at least 15 minutes • Get medical attention

Personal Protective Equipment

- Always use a fume hood while working with flammable liquids
- Nitrile and neoprene gloves are effective against most flammables
- Wear a non-flammable lab coat to provide a barrier to your skin, and goggles if splashing is likely to occur.

Oxidizers

General Characteristics

- Oxidizers or oxidizing agents present fire and explosion hazards on contact with combustible materials. Depending on the class, an oxidizing material may: increase the burning rate of combustibles with which it comes in contact; cause the spontaneous ignition of combustibles with which it comes in contact; or undergo an explosive reaction when exposed to heat, shock, or friction.
- Oxidizers are generally corrosive.
- *Do not order or use anhydrous perchloric acid.* It is unstable at room temperature and can decompose spontaneously with a severe explosion. Anhydrous perchloric acid will explode in contact with wood or other organic materials.
- Perchloric acid is an oxidizing agent of particular concern. The oxidizing power of perchloric acid increases with an increase in concentration and with an increase in temperature. Cold, 70% perchloric acid is a strong, non-oxidizing corrosive. A 72% perchloric acid solution at elevated temperatures is a strong oxidizing agent. A 85% perchloric acid solution is a strong oxidizer at room temperature.

Use and Storage

- In general, store oxidizers away from flammables, organic compounds and combustible materials.
- Strong oxidizing agents like chromic acid should be stored in glass or some other inert container, preferably unbreakable. Corks and rubber stoppers should not be used.
- Reaction vessels containing appreciable amounts of oxidizing material should never be heated in oil baths, but rather on a heating mantle or sand bath.

Health Hazards

Oxidizers have been chosen as a group primarily due to their potential to add to the severity of a fire or to initiate a fire. But there are some generalizations that can be made regarding the health hazards of an oxidizing material. In general, oxidizers are corrosive and many are highly toxic.

Acute Health Effects

Some oxidizers such as nitric and sulfuric acid vapors, chlorine, and hydrogen peroxide act as irritant gases. All irritant gases can cause inflammation in the surface layer of tissues when in direct contact. They can also cause irritation of the upper airways, conjunctiva, and throat. Some oxidizers, such as fluorine, can cause severe burns of the skin and mucus membranes. Chlorine trifluoride is extremely toxic and can cause severe burns to tissue. Nitrogen trioxide is very damaging to tissue especially the respiratory tract. The symptoms from an exposure to nitrogen trioxide may be delayed for hours, but fatal pulmonary edema may result.

Chronic Health Effects

Nitrobenzene and chromium compounds can cause hematological and neurological changes. Compounds of chromium and manganese can cause liver and kidney disease. Chromium VI compounds have been associated with lung cancer.

First Aid

In general, if a person has inhaled, ingested, or has come into direct contact with these materials the person must be removed from the source of contamination as quickly as possible, if it is safe to do so. Medical help must be summoned. In the case of an exposure directly to the skin or eyes it is imperative that the exposed person be taken to an emergency shower or eyewash immediately. Flush the affected area for a minimum of 15 minutes then get medical attention.

Personal Protective Equipment

- Safety eyewear is always required while working in the labs and when handling oxidizers.
- Always use a chemical fume hood because most oxidizers pose a hazard through the inhalation route
- In many cases, the glove of choice will be neoprene, polyvinyl chloride (PVC), or nitrile
- Be sure to consult a glove compatibility chart to ensure the glove material is appropriate for the particular chemical you are working with. Also, the glove manufacturer can be consulted for additional information.
- Chemical splash goggles must be worn if the potential for splashing exists or if exposure to vapor or gas is likely.

Corrosives

General Characteristics

- Corrosives are most commonly acids and alkalis, but many other materials can also be severely damaging to living tissue
- Corrosives can cause visible destruction or irreversible alterations at the site of contact
- Inhalation of the vapor or mist can cause severe bronchial irritation. Corrosives are particularly damaging to the skin and eyes.
- Certain substances considered non-corrosive in their natural dry state are corrosive when wet, such as when in contact with moist skin or mucus membranes. Examples of these materials are lithium chloride, halogen fluorides, and allyl iodide.
- Sulfuric acid is a very strong dehydrating agent and nitric acid is a strong oxidizing agent
- Dehydrating agents can cause severe burns to the eyes because of their affinity for water.

Use and Storage

- Always store acids separately from bases. Also, store acids away from flammables, because many acids are also strong oxidizers
- Do not work with corrosives unless an emergency shower and continuous flow eyewash are available
- Always add acid to water, never add water to acid. This is to prevent splashing from the acid because of the generation of excessive heat as the two substances mix.
- Never store corrosives above eye level. Store on a low shelf or cabinet.
- It is a good practice to store corrosives in a tray or bucket to contain any leakage.
- When possible, purchase corrosives in containers that are coated with a protective plastic film that will minimize the danger to personnel if the container is dropped.
- Store corrosives in a wooden cabinet or one that has a corrosion-resistant lining. Corrosives stored in a metal cabinet will quickly damage it and if the supports that hold up the shelves become corroded, the result could be disastrous.

Health Hazards

All corrosives possess the property of being severely damaging to living tissues (e.g., skin and eyes). They also attack other materials, such as metal. Skin contact with alkali metal hydroxides (for example, sodium hydroxide and potassium hydroxide) is more dangerous than with strong acids. Contact with alkali metal hydroxides normally causes deeper tissue damage because there is less pain than with an acid exposure. The exposed person may not wash it off thoroughly enough or seek prompt medical attention. On contact with skin, acids generally form a protein layer that prevents further penetration and is painful, whereas alkali metal hydroxides do not form this layer.

All hydrogen halides are acids that are serious respiratory irritants and also cause severe burns. Hydrofluoric acid is particularly dangerous. At low concentrations, hydrofluoric acid does not immediately show any signs or symptoms upon contact with skin. It may take several hours for the hydrofluoric acid to penetrate the skin before you would notice a burning sensation. However, by this time permanent damage, such as second and third degree burns with scarring, can result.

Acute Health Effects

- Inhalation - irritation of mucus membranes, difficulty in breathing, fits of coughing, pulmonary edema
- Ingestion - irritation and burning sensation of lips, mouth, and throat; pain in swallowing; swelling of the throat; painful abdominal cramps; vomiting; shock; risk of perforation of the stomach
- Skin Contact - burning, redness and swelling, painful blisters, profound damage to tissues, and with alkalis a slippery, soapy feeling
- Eye Contact - stinging, watering of eyes, swelling of eyelids, intense pain, ulceration of eyes, loss of eyes or eyesight.

Chronic Health Effects

Symptoms associated with a chronic exposure vary greatly depending on the chemical. For example, the chronic effect of hydrochloric acid is damage to the teeth; the chronic effects of hydrofluoric acid are increased bone density, fluorosis, and anemia; the chronic effects of sodium hydroxide are unknown.

First Aid

The following first aid measures are generally applicable to corrosives. For more information on specific chemicals, consult the MSDS for that chemical.

Routes of Entry	First Aid Measure
Inhalation	<ul style="list-style-type: none"> • Remove person from the contaminated area if it is safe to do so. • Get medical attention and do not leave person unattended.
Ingestion	<ul style="list-style-type: none"> • Remove the person from the source of contamination. Get medical attention. • Do not induce vomiting.
Skin contact	<ul style="list-style-type: none"> • Remove person from the source of contamination and take immediately to an emergency shower or source of water. • Remove clothing, shoes, socks and jewelry from affected areas as quickly as possible, cutting them off if necessary. Be careful not to get any chemical on your skin or inhale the vapors. • Flush the affected area with water for a minimum of 15 minutes. Get medical attention.
Eye contact	<ul style="list-style-type: none"> • Remove person from source of contamination and take immediately to an eyewash or source of water. • Rinse the eyes for a minimum of 15 minutes. Have the person rotate his or her eyes up and down and from side to side while flushing with water. • Get medical attention. • Do not let person rub his or her eyes or keep them tightly shut.

Personal Protective Equipment

- Always use corrosives in a chemical fume hood
- Always wear the proper gloves when working with acids
- Neoprene and nitrile gloves are effective against most acids and bases
- PVC is also effective for most acids

- A rubber-coated apron is effective
- Wear goggles. If splashing is likely to occur, wear a face shield over the goggles.

Reactives

General Characteristics

Polymerization Reactions

Polymerization is a chemical reaction in which two or more molecules of a substance combine to form repeating structural units of the original molecule. This can result in an extremely high or uncontrolled release of energy. An example of a chemical which can undergo a polymerization reaction is polyvinylbenzene.

Water Reactive Materials

1. When water reactive materials come in contact with water, one or more of the following can occur: liberation of heat which may cause ignition of the chemical itself if it is flammable, or ignition of flammables that are stored nearby; release of a flammable, toxic, or strong oxidizing gas; release of metal oxide fumes; and formation of corrosive acids.

2. Water reactive chemicals can be particularly hazardous to fire fighting personnel responding to a fire in a lab, because water is the most commonly used fire extinguishing medium.

3. Examples of water reactive materials:

- alkali metals (e.g., lithium)
- silanes
- sodium, potassium
- alkylaluminums
- magnesium
- zinc
- aluminum

Pyrophorics

1. Pyrophoric materials can ignite spontaneously in the presence of air.

2. Examples of pyrophoric materials:

- diethylzinc
- triethylaluminum
- many organometallic compounds

Peroxide-Forming Materials

1. Peroxides are very unstable, and some chemicals that can form them are commonly used in laboratories. This makes peroxide-forming materials some of the most hazardous substances found in a lab. Peroxide-forming materials are chemicals that react with air, moisture, or impurities to form organic peroxides. Peroxide formation by most of these materials is greatly increased by evaporation or distillation. Organic peroxide compounds are extremely sensitive to shock, sparks, heat, friction, impact, and light. Many peroxides formed from materials used in laboratories are more shock sensitive than TNT. Just the friction from unscrewing the cap of a container of an ether that has peroxides in it can provide enough heat to cause a severe explosion.

2. Examples of peroxide forming materials (the first group listed is the most hazardous):

- isopropyl ether divinylacetylene
- sodium amide potassium amide

- dioxane diethyl ether
- tetrahydrofuran vinyl ethers
- butadiene vinylpyridine
- acrylonitrile styrene

Other Shock-Sensitive Materials

1. These materials are explosive and are sensitive to heat and shock.
2. Examples of other shock sensitive materials:
 - chemicals containing nitro groups
 - fulminates
 - hydrogen peroxide (30% +)
 - ammonium perchlorate
 - benzoyl peroxide (when dry)
 - Compounds containing the following functional groups: acetylide, azide, diazo, halamine, nitroso, and ozonide.

Use and Storage

- A good way to reduce the potential risks is to minimize the amount of material used in the experiment. Use only the amount of material necessary to achieve the desired results.
- Always substitute a less hazardous chemical for a highly reactive chemical whenever possible. If it is necessary to use a highly reactive chemical, only order the amount that is necessary for the work.

Water Reactive Materials

Store water-reactive chemicals in an isolated part of the lab. A cabinet away from any water sources, such as sinks, emergency showers, and chillers, is an appropriate location. Clearly label the cabinet "Water-Reactive Chemicals – No Water".

Pyrophorics

Store pyrophorics in an isolated part of the lab and in a clearly marked cabinet. Be sure to routinely check the integrity of the container and have the material disposed if the container is corroded or otherwise damaged.

Peroxide-Forming Materials

- Do not open the chemical container if peroxide formation may have occurred. The act of opening the container could be sufficient to cause a severe explosion. Visually inspect liquid peroxide-forming materials for crystals or unusual viscosity before opening. Pay special attention to the area around the cap. Peroxides usually form upon evaporation, so they will most likely be formed on the threads under the cap.
- Date all peroxide forming materials with the date received, opened, and the expected shelf life. Chemicals such as isopropyl ether, divinyl acetylene, sodium amide, and vinylidene chloride should be discarded after three months. Chemicals such as dioxane, diethyl ether, and tetrahydrofuran should be discarded after one year.
- Store all peroxide forming materials away from heat, sunlight, and sources of ignition. All organic peroxides are highly flammable and sunlight accelerates the formation of peroxides.
- Secure the lids and caps on these containers to discourage the evaporation and concentration of these chemicals.
- Never store peroxide-forming materials in glass containers with screw cap lids or glass stoppers. Friction and grinding must be avoided. Also, never store these chemicals in a clear glass bottle where they would be exposed to light.

- A test can be performed to check for the presence of peroxides in ethers. However, if you suspect that peroxides may be present, it is probably wise to call the hazardous waste disposal vendor for disposal. If you notice crystal formation in the container or around the cap, do not attempt to open or move the container.
- Never distill ether unless it is known to be free of peroxides.

Other Shock Sensitive Materials

- Store these materials separately from other chemicals and in a clearly labeled cabinet.
- Never allow picric acid to dry out; it is extremely explosive. Always store picric acid in a wetted state.

Health Hazards

Reactive chemicals are grouped together as a category primarily because of the safety hazards associated with their use and storage and not because of similar acute or chronic health effects. For health hazard information on specific reactive materials consult the MSDS or the manufacturer. However, there are some hazards common to the use of reactive materials. Injuries can occur due to heat or flames; hearing loss can result; respiratory injuries can occur due to inhalation of fumes, vapors, and reaction products; and a very serious hazard is flying debris which can inflict physical injuries.

First Aid

If someone is seriously injured the most important step to take is to contact emergency responders as quickly as possible. Explain the situation clearly and accurately.

If someone is severely bleeding apply a sterile dressing, clean cloth, or handkerchief to the wound. Place the palm of your hand directly over the wound and apply pressure. Continue to apply pressure until help arrives and keep the person calm. If a person is on fire, have them drop immediately to the floor and roll. If a fire blanket is available put it over them. An emergency shower can also be used to douse flames if one is immediately available. If a person is going into shock, have them lie down on their back if it is safe to do so and raise the feet about one foot above the floor.

Personal Protective Equipment

Wear appropriate personal protective clothing while working with highly reactive materials. This might include: impact resistant chemical splash goggles, a face shield, gloves, a lab coat (to minimize injuries from flying glass or an explosive flash), and a shield. Conduct work within a chemical fume hood as much as possible and pull down the sash as far as is practical. When the experiment does not require you to reach into the fume hood, keep the sash closed. Barriers can offer protection of personnel against explosions and should be used. Many safety catalogs offer commercial shields which are commonly polycarbonate and are weighted at the bottom for stability. It may be necessary to secure the shields firmly to the work surface.

Toxins

General Characteristics

- Any chemical at the right dose could be toxic to humans; however, some chemicals are known to be hazardous at very low concentrations, over a very short exposure time, or after repeated exposures. These chemicals are the toxins, poisons, and carcinogens.
- A toxin may be mutagenic and cause a heritable change in the gene structure, or may also be teratogenic and cause a malformation of an embryo. Pregnant women and persons in their childbearing years should not work with or, at a minimum, use extreme caution while handling these materials.
- The toxicity of a material is a result of its ability to interfere with the metabolism of living tissue. An acute toxin can cause an adverse effect after a single or short duration exposure. A chronic toxin causes an adverse effect after repeated exposures, after a long duration single exposure, or after a long latency period. Carcinogens are examples of chronic toxins that have a long latency period before the effects of the exposure are observed.

Use and Storage

- All exposure to chemicals that are known to be highly toxic must be minimized by substituting a less hazardous chemical, decreasing the exposure time to the chemical, wearing protective clothing, practicing safe laboratory techniques, and using properly functioning laboratory safety equipment, such as fume hoods or biological safety cabinets, as appropriate.
- Do not eat, drink, smoke or apply cosmetics in an area where toxic chemicals are used or stored, or without washing hands after using such chemicals.
- Thoroughly wash your hands and arms before leaving the work area and at the end of the day. Store containers of toxic materials in pans, trays, or other secondary containers to minimize hazards if the containers were to break or the contents spill.
- Use absorbent paper on the work surface to contain spills.
- Restrict access where toxic materials are used and post signs if special toxicity hazards exist.
- Vacuum pumps that are used with materials having high chronic toxicity should be protected by high-efficiency scrubbers or high-efficiency particulate air (HEPA) filters and vented into a chemical fume hood.
- Store toxic chemicals separately in a clearly labeled cabinet. Do not allow personnel to work with toxins until they have been properly trained in their hazards, use, storage and proper handling. If other hazards also apply to toxic chemicals, store as appropriate to those hazards.

Health Hazards

The health hazards of toxic materials vary greatly. For information on specific chemicals, consult the MSDS for that chemical.

First Aid

1. Remove the person from the source of contamination if it is safe to do so.
2. Get medical attention immediately.
3. Try to determine exactly what the person has been exposed to and provide this information to the emergency responders.
4. Provide a copy of the MSDS to the emergency responders if at all possible.

Personal Protective Equipment

- Protect your skin, eyes, and respiratory tract by using the appropriate engineering controls, such as fume hoods and glove boxes, and by using personal protective clothing such as gloves and lab coats.
- Make sure that the fume hood is in proper working condition. When in doubt, contact the Safety and Health Services Office to have the fume hood tested.

Compressed Gas

General Characteristics

- Cylinders of compressed gases can pose a chemical hazard as well as a physical hazard.
- If the valve were to break off a cylinder, the amount of force present could propel the cylinder through a brick wall.

Use and Storage

- Use toxic, flammable, or reactive gases only in a fume hood or other ventilated enclosure.
- Always use the appropriate regulator on a cylinder. If a regulator will not fit a cylinder's valve, replace the cylinder, not the regulator. Do not ever attempt to adapt or modify a regulator to fit a cylinder it was not designed for. Regulators are designed to fit only specific cylinder valves to avoid improper use.
- Inspect regulators, pressure relief devices, valves, cylinder connections, and hose lines frequently for damage.
- Never accept or use a cylinder that cannot be positively identified. Color coding is not a reliable way of identifying a cylinder because the colors can vary from supplier to supplier.
- Do not use oil or grease on any cylinder component of an oxidizing gas because a fire or explosion can result.
- Never transfer gases from one cylinder to another. The gas may be incompatible with the residual gas remaining in the cylinder, or may be incompatible with the material that the cylinder is made of.
- Never completely empty cylinders; rather, leave approximately 25 psi of pressure. This will prevent any residual gas in the cylinder from becoming contaminated.
- Place all cylinders so that the main valve is always accessible.
- Close the main cylinder valve whenever the cylinder is not in use.
- Remove regulators from unused cylinders and always put the safety cap in place to protect the valve.
- **Always secure cylinders, whether empty or full**, to prevent them from falling over and damaging the valve (or falling on your foot). Secure cylinders by chaining or strapping them to a wall, lab bench, or other fixed support.
- Oxygen should be stored in an area that is at least 20 feet away from any flammable or combustible materials or separated from them by a noncombustible barrier at least 5 feet high and having a fire-resistance rating of at least 1/2 hour.
- To transport a cylinder, put on the safety cap and strap the cylinder to a hand truck in an upright position. Never roll a cylinder.
- Always clearly mark empty cylinders and store them separately.
- Be careful while handling compressed gas cylinders, and never drop or strike a cylinder against anything
- Use only wrenches or other tools supplied by the cylinder supplier to open a valve. Open cylinder valves slowly.

Carcinogens or Suspected Carcinogens

General Characteristics

Carcinogens are chemicals that are known or suspected to cause tumors in mammalian species.

Use and Storage

If the laboratory unit is using, repackaging, releasing, handling, or storing any of the carcinogens listed in WAC 296-62-07302 (see below list of Carcinogens) and the carcinogens (solid or liquid) that are 0.1 percent or greater by weight or volume, the Section Supervisor must:

- Establish a designated area (an area that can be used for work with carcinogens, reproductive toxins, or substances that have a high degree of acute toxicity. The designated area can be a fixed piece of equipment such as a fume hood, or a small room or enclosure)
- Establish a regulated area (an area where entry and exit is restricted and controlled)
- Post sign at entrance to regulated area stating:

<p>CANCER SUSPECT AGENT AUTHORIZED PERSONNEL ONLY</p>

- Protect laboratory vacuum systems with high- efficiency scrubbers or disposable absolute filters (if applicable)
- Perform a hazard assessment (see Chapter 4.6 Personal Protective Equipment). Provide and require employees to wear a clean change of appropriate laboratory clothing (for example, solid front gown, surgical scrub suit, fully buttoned lab coat, etc.);
- Require employees, prior to exiting from a regulated area, to remove and leave protective clothing and equipment at the point of exit and at the last exit of the day. Place used clothing and equipment in impervious containers at the point of exit for purposes of decontamination or disposal. Containers must be labeled with the full chemical name, Chemical Abstracts Service Registry number, and have the warning words “cancer-suspect agent” displayed. Containers with carcinogenic contents with corrosive or irritating properties must be labeled with statements warning of such hazards and, if appropriate, note particularly sensitive or affected portions of the body.
- **DO NOT REMOVE CONTAMINATED CLOTHING FROM THE REGULATED AREA AND LAUNDER AT HOME.**
- Require employees to wash hands, forearms, face and neck upon each exit from the regulated area close to the point of exit, and before engaging in other activities.
- Ensure air pressure in the laboratory area is negative in relation to the pressure in the surrounding area. Exhaust air should not be discharged to regulated areas, non-regulated areas, or the external environment unless decontaminated. There should be no connection between the regulated area and any other area through the ventilation system.
- Maintain current inventories of the listed carcinogens.
- Ensure fume hoods are tested semi-annually by Facilities and Equipment Management Operations.

List of Carcinogens or Suspected Carcinogens

OSHA designates the following chemicals as carcinogens and which must be handled in “designated areas”

1. 2-Acetylaminofluorene
2. 4-Aminodiphenyl
3. Acrylonitrile
4. Arsenic (inorganic)*
5. Asbestos
6. Benzene*
7. Benzidine
8. Cadmium – all forms
9. bis-Chloromethyl ether
10. 3,3-Dichlorobenzidine and its salts
11. 4-Dimethylaminoazobenzene
12. Ethyleneimine
13. Ethylene Oxide
14. Formaldehyde*
15. Methyl chloromethyl ether
16. Methylenedianiline
17. Nitrosodimethylamine
18. alpha-Naphthylamine
19. beta-Naphthylamine
20. 4-Nitrophenyl
21. beta-Propiolactone
22. Vinyl chlorid

*Chemicals currently used at Materials Lab

Additional chemicals known to be human carcinogens (As designated in NTP sixth Annual Report on Carcinogens)

1. Aflatoxins
2. Analgesic Mixtures containing Phenacetin
3. Azathioprine
4. 1,4-Butanediol Dimethylsulfonate (Myerlan)
5. Chlorambucil
6. 1-(2-Chloroethyl)-3-(4-methylcyclohexyl)-1-nitrosourea (MeCCNU)
7. Chromium and Certain Chromium Compounds (Hexavalent Chromium)
8. (examples are: calcium, lead, strontium, and zinc chromates, and chromium dioxide)
9. Conjugated estrogens
10. Cyclophosphamide
11. Diethylstilbestrol (DES)
12. Erionite
13. Melphalan
14. Mustard Gas
15. Thorium Dioxide

Personal Protective Equipment

The required PPE, such as respirators, gloves, and lab coats, will vary depending on the physical characteristics of the chemical's carcinogenicity, and the regulated area (for example, working in open air versus working in a fume/exhaust hood).

Any other use of the carcinogen, such as for one used in a fume hood (which requires written approval), will require wearing clean, full-body protective clothing, shoe covers, and gloves prior to entering the regulated area. Washing procedures required for employees handling confirmed carcinogens are that their hands and arms must be washed upon completion of work and before engaging in other activities.

A sink, soap, and clean towels for washing shall be provided in the area just outside of the regulated area of the lab. Towels shall be laundered with lab coats on a weekly basis through a laundry service.

Training

Only authorized personnel or individuals wearing appropriate safety clothing and equipment and escorted by authorized personnel are allowed into regulated areas. Authorized personnel must receive training and indoctrination prior to being authorized to enter a regulated area. This training must include the following:

- The specific nature of the operation involving carcinogens that could result in exposure. Other operations involving the use of a confirmed carcinogen require written approval and specific procedures for its use and decontamination needs prior to any handling other than storage.
- Purpose for and application of the medical surveillance program including, as appropriate, methods of self-examination. This includes a pre-assignment examination and an exam every 3 years with a questionnaire exam the other 2 years.
- Purpose for and application of decontamination practices and procedures.
- Purpose for and significance of emergency practices and procedures.
- The employee's specific role in emergency procedures.
- Specific information to aid the employee in recognition and evaluation of conditions and situations that may result in the release of confirmed carcinogens.
- The purpose for and application of specific first-aid procedures and practices.
- A review of this section at the employee's first training and indoctrination program and annually thereafter.

Appendix 5

Chemical Handling Sheet - Hydrofluoric Acid Handling

Purpose

Because of its hazards, hydrofluoric acid (HF) deserves special mention within the category of oxidizing materials. The purpose of this handling sheet is to provide a quick reference to the proper handling and disposal of HF. **Caution:** This handout is not intended to replace the material safety data sheet (MSDS).

Physical Properties

The physical properties are listed below:

CAS #	7664-39-3
Formula	HF
Synonyms	Fluorohydric Acid
Molecular Weight	20.01
Appearance	Colorless, Fuming Liquid
Solubility	Miscible in Water
Density	48%, 1.150
Boiling Point	48%, 108 C
RCRA	U134
NIOSH:	Recommended Exposure Limit (REL), 8-hr TWA 3 ppm, 2.5 mg/m ³
Odor Threshold	0.04 ppm

Shipping Description

Hydrofluoric Acid, Corrosive, Poison, 8, UN 1790

Health Hazards

- Fluoride ions readily penetrate skin and tissue, which may destroy subcutaneous tissue.
 - Exposure to the vapors will cause respiratory damage.
 - HF burns take a long time to heal and result in significant scarring.
-

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Chemical Handling Sheet - Hydrofluoric Acid Handling,

Continued

Handling Precautions

- Only persons fully trained in the hazards of HF should use it.
 - HF is corrosive. Take all necessary precautions to prevent corrosion of equipment.
 - Absorbent clothing can hold HF in contact with skin for extended periods of time.
 - All HF work should be done in a properly functioning hood.
 - All equipment that comes in contact with HF should be thoroughly washed with water immediately after use.
 - HF should NEVER be used in glass containers.
 - Contact with metals may cause the release of hydrogen gas, which is a fire or explosion hazard.
-

Personal Protection

Eye Protection: Transparent face shield. Acid-resistant plastic splash goggles (glass will become etched).

Gloves: Neoprene or rubber with long gauntlets.

Ventilation: Use in a hood with at least 100 feet per minute (fpm) face velocity.

Clothing: Rubber apron and rubber sleeve guards. Rubber boots are recommended because of the corrosive nature of HF to leather.

First Aid

HF burns are severe and are often not immediately noticed. First wash affected area with large amounts of water. Water will not penetrate as well as HF. Immediately seek medical treatment.

If hydrogen fluoride vapors have been inhaled, move the person immediately to an uncontaminated atmosphere (if it is safe to do so), keep the person warm, and seek prompt medical attention.

Storage and Disposal

- Store HF separately and keep only the amount necessary in the lab.
 - Store in an HF-resistant container in a cool, dry location.
 - Never store HF in a glass container because it is incompatible with glass.
 - HF is a RCRA-listed waste in addition to being a characteristic corrosive waste.
-

Spill Remediation

Small HF spills should be neutralized with soda ash and washed with large amounts of water. Large spills of HF should also be neutralized with soda ash. An inert absorbent can be used to soak up the spilled material. The collected waste will need to be treated as hazardous waste.

Chemical Handling Sheet - Perchloric Acid

Purpose

Because of its hazards, perchloric acid deserves special mention within the category of oxidizing materials. The purpose of this handling sheet is to provide a quick reference to the proper handling and disposal of perchloric acid.

Caution: This handout is not intended to replace the material safety data sheet (MSDS).

Physical Properties

The physical properties of perchloric acid are listed below:

CAS #	7601-90-3
Formula	HClO ₄
Appearance	Water white liquid fuming, oily liquid
Density	1.664, 70% solution
Boiling Point	203 C°
Odor	None

Shipping Description

Shipping description for perchloric acid is as follows:

Concentration	Description
>72%	Forbidden for transport
50-72%	Perchloric Acid, 5.1, Oxidizer, Corrosive UN1873
<50%	Perchloric Acid, 8, Corrosive, Oxidizer, UN1802

Health Hazards

- Fluoride ions readily penetrate skin and tissue, which may destroy subcutaneous tissue.
 - Exposure to the vapors will cause respiratory damage.
 - Perchloric acid burns take a long time to heal and result in significant scarring.
-

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Chemical Handling Sheet - Perchloric Acid, Continued

Handling Precautions

- A heated solution of perchloric acid is a very strong oxidizing agent. Solutions containing perchloric acid should be cooled wherever possible.
 - Whenever possible, substitute a less hazardous chemical for perchloric acid.
 - Do not allow perchloric acid to come in contact with any strong dehydrating agents, such as sulfuric acid. Accidental formation of anhydrous perchloric acid is possible through evaporation or dehydration of the acid. In this form **THE ACID IS EXPOSIVE!**
 - *Do not* attempt to heat perchloric acid if you do not have access to a properly functioning perchloric acid fume hood. Perchloric acid can only be heated in a hood specially equipped with a washdown system to remove any perchloric acid residue. The hood should be washed down after each use and it is preferred to dedicate the hood to perchloric acid use only.
 - Keep only the minimum amount necessary for your work.
-

Personal Protection

Eye Protection: Chemical-resistant splash goggles that are also impact-resistant

Gloves: Polyvinyl chloride (PVC).

Ventilation: Use in a hood with at least 100 feet per minute (fpm) face velocity. If process involves heating or fuming, a dedicated perchloric acid fume hood should be used.

Clothing: Lab coat. An apron is recommended if the perchloric acid used is in a concentrated form.

Respirator: May be required if large volumes are being used or if the perchloric acid has the potential to be volatilized. Use a National Institute of Occupational Safety and Health- (NIOSH-) approved respirator with an acid mist cartridge.

First Aid

Wash any exposed areas of skin with large volumes of water. If eye contact has occurred, flush eyes in eye wash for 15 minutes. Seek medical treatment.

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Chemical Handling Sheet - Perchloric Acid, Continued

Storage and Disposal

- Perchloric acid should be stored in its original container within compatible secondary containment, preferably glass or porcelain. Glass trays should be wiped periodically.
 - Perchloric acid should be kept separate from other chemicals, but may be stored with other inorganic acids, preferably in a metal cabinet designed for acid/corrosive storage.
 - Small quantities of perchloric acid can be stored in a dedicated perchloric acid hood.
 - No flammable materials or organic solvents should be used in the designated perchloric acid fume hood.
 - Do not store perchloric acid with organic material
 - Do not keep perchloric acid for more than a year, because explosive crystals may form.
-

Contact with Other Chemicals

Avoid contact of perchloric acid with the following chemicals:

- Sulfuric acid
 - Phosphorous pentoxide
 - Alcohol
 - Glycerol
 - Hypophosphites
 - Acetic anhydride
 - Bismuth and its alloys
 - Combustible materials such as paper and wood.
-

Spill Remediation

CLEAN UP SPILLS OF PERCHLORIC ACID ONLY IF YOU HAVE BEEN TRAINED TO DO SO AND THE APPROPRIATE EQUIPMENT IS AVAILABLE!

To clean a spill, neutralize it with soda ash (sodium carbonate) or other appropriate neutralizing agent. Soak up the neutralized spill with an inorganic-based absorbent, if possible. Do not use organic materials, such as kim-wipes or toweling, because they may spontaneously ignite upon contact with perchloric acid. If rags or paper towels are inadvertently used, wet them with water and place them in a tightly sealed plastic bag. **DO NOT** use rags, paper towels, or sawdust and then put them aside to dry, because such materials may spontaneously ignite. A second neutralization and rinsing of the wetted area is recommended.

Perchloric acid waste must not be mixed with other wastes. It should be placed into acid-resistant containers that are clearly labeled and held for disposal.

Appendix 6

Waste Handling Sheet – Acid Waste Solution Containing Metals

Process Generating Waste: Waste acid generated during testing of fence for zinc content.

Pollution Prevention: Do not dispose of acid waste solution with high metal content down any drain. Accumulate all acid wastes in a closed, marked container.

Safe Handling Tips: Wear personal protective equipment that provides protection from corrosives. All concentrated acid wastes must be decanted in a fume hood.

ACCUMULATION IN LAB UNITS

Accumulation Container

Required Container Label



Complete the label with the words “Dangerous waste” and “Corrosive”

Handling Requirements

Responsibility Individual lab personnel generating the waste

Onsite Accumulation Area Acid waste solution should be stored under a fume hood or ventilated cabinet. Storage areas should be constructed of materials that are resistant to the acid waste. The storage cabinet should have vertical separations to provide for incompatible storage.

Continued on next page

Waste Handling Sheet – Acid Waste Solution Containing Metals, Continued

ACCUMULATION AT HAZARDOUS WASTE STORAGE UNIT

Accumulation Container

Required Container Label



4-L Glass Container



Complete the label with the words "Dangerous waste" and "Corrosive"



Handling Requirements

Responsibility	Chemical Hygiene Officer
Onsite Accumulation Area	Acid wastes storage cabinet in the Hazardous Waste Storage Unit
Managing the Container	Keep the container in good condition. Keep the lid closed. Keep the container secure and properly labeled.
Transport Preparation	When nearly full, call vendor for pickup and disposal
Paperwork/Documentation	Complete manifest. After pickup and disposal, confirm receipt of waste disposition (for example, certificate/documentation of disposal).

Waste Handling Sheet - Excel Clean HD Waste

- Process Generating Waste:** Cleaning instruments and containers contaminated with asphalt.
- Pollution Prevention:** Do not mix oil, lubricants, or other chemicals into the parts washing basin. Keep the basin lid closed when not in use. Let the cleaned parts dry before removing them from the drainage shelf. Prevent spills and releases from the system.
- Safe Handling Tips:** Review the product label and the material safety data sheet (MSDS) for Excel Clean HD. Wear the personal protective equipment (PPE) specified by the label and MSDS when using the system and cleaning up any spilled material. PPE listed includes safety goggles and impervious gloves. Prevent fires by eliminating potential nearby sources of heat and ignition.

ACCUMULATION IN LAB UNITS

Accumulation Container



Required Container Label



Complete the label with the words "Dangerous waste" and "Toxic"

Handling Requirements

- Responsibility** Individual lab personnel generating the waste
- Onsite Accumulation Area** This waste is accumulated in the individual lab unit at designated waste accumulation area.
- Managing the Container** Keep the washing basin container closed, dry, secure and in good condition. Make sure the container is correctly labeled. When the parts washing basin containing Excel Clean HD is spent and ready to be replaced, the entire basin is taken to the Hazardous Waste Storage Unit.

Continued on next page

Waste Handling Sheet – Acid Waste Solution Containing Metals, Continued

ACCUMULATION AT HAZARDOUS WASTE STORAGE UNIT

Accumulation Container

Required Container Label

 <p>55-gallon drum or 35-gallon Poly Drum</p>	 <p>Complete the label with the words "Dangerous waste" and "Toxic"</p>
--	---

Handling Requirements

Handling Responsibility	Chemical Hygiene Officer
Onsite Accumulation Area	Hazardous Waste Storage Unit
Managing the Container	Keep the container in good condition. Keep the lid closed. Keep the container secure and ensure it is properly labeled.
Transport Preparation	When nearly full, contact Waste Disposal Contractor.
Paperwork/Documentation	Complete and sign Uniform Hazardous Waste manifest. After pickup and disposal, confirm receipt of waste disposition (for example, certificate/documentation of disposal).

Waste Handling Sheet – Outdated Chemicals

Process Generating Waste: Unused chemicals that are outdated or are no longer used.

Pollution Prevention: Do not purchase more than necessary. Avoid transferring to separate container for use if at all possible, because this may increase the volume that would need to be purchased and disposed of. Always dispose according to appropriate methods. Prevent spills and releases from the system.

Safe Handling Tips: Wear personal protective equipment that provides protection from the chemicals. Consult material safety data sheet (MSDS) as necessary.

ACCUMULATION IN LAB UNITS

Accumulation Container

Required Container Label

<p style="text-align: center;">Leave in original container.</p>	<div style="text-align: center;">  </div> <p style="text-align: center;">Complete the label with the words “Dangerous waste” and appropriate hazard label according to class.</p>
---	--

Handling Requirements

Responsibility Individual lab personnel generating the waste.

Onsite Accumulation Area An outdated chemical should be removed from the chemical storage cabinet as soon as it becomes outdated or unusable.

Continued on next page

Waste Handling Sheet – Acid Waste Solution Containing Metals, Continued

ACCUMULATION AT HAZARDOUS WASTE STORAGE AREA

Accumulation Container

Required Container Label

<p>LAB PACK (Vary by Vendor)</p>	 <p>Complete the label with the words "Dangerous waste" and appropriate hazard label according to class</p>
----------------------------------	---

Handling Requirements

Handling Responsibility	Chemical Hygiene Officer
Onsite Accumulation Area	Hazardous Waste Storage Unit
Managing the Container	Keep the container in good condition. Keep the lid closed. Store only with compatible material.
Paperwork/Documentation	After pickup and disposal, confirm receipt of waste disposition (for example, certificate/documentation of disposal).

Waste Handling Sheet – Partially Filled Chemical Product Containers

- Process Generating Waste:** Aerosol paint cans, enamel, oil or latex-based paint in cans, or older materials still in their original containers used during facility and equipment management operations or by lab units.
- Pollution Prevention:** **Whenever possible, use all products until the containers are empty.** Disposal of non-hazardous but usable products is wasteful and uneconomical. Partially filled containers that are discarded and still hold usable degreasers, solvents, or other chemicals may be considered Dangerous Wastes.
- Safe Handling Tips:** Use gloves when handling partially filled containers. Ensure container lids are securely closed. Never store partially filled containers near extreme heat sources or in the sun. Containers that are empty should be handled in accordance with the Waste Handling Sheet “Empty Metal, Plastic, or Glass Containers.”

ACCUMULATION IN LAB UNITS OR MAINTENANCE SHOP

Accumulation Container

Required Container Label

 <p><i>Black plastic bags</i></p>	 <p>Specific product MSDSs are required to select the container and complete the container label. If the contents are hazardous wastes, they must be placed in steel drums and the yellow label must be used.</p>
---	--

Handling Requirements

- Responsibility** Individual lab personnel generating the waste or Facilities and Equipment Management Operations personnel generating the waste.
- Satellite Accumulation Area** In the designated area in each lab unit or Maintenance Shop.

Continued on next page

Waste Handling Sheet – Partially Filled Chemical Product Containers, Continued

ACCUMULATION AT HAZARDOUS WASTE STORAGE AREA

Accumulation Container

Required Container Label

 <p>55-gallon drums</p>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>NON-HAZARDOUS Waste</p> <p>OPTIONAL INFORMATION SHIPPER _____ ADDRESS _____ CITY, STATE, ZIP _____ CONTENTS _____</p> <p>NON-HAZARDOUS WASTE</p> </div> <p>or</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>HAZARDOUS WASTE</p> <p><small>SEEK LINES FROM THE WASTE DISPOSAL</small></p> <p><small>IF HAZARDOUS, CONTACT THE WASTE DISPOSAL OR A QUALIFIED PERSONNEL FOR THE</small></p> <p><small>IDENTIFICATION INFORMATION:</small></p> <p>NAME _____ ADDRESS _____ CITY _____ STATE _____ ZIP _____ PHONE (____) _____ FACILITY NO. _____ COUNTY NO. _____</p> <p><small>DO NOT REUSE THIS LABEL FOR OTHER PURPOSES</small></p> <p>HANDLE WITH CARE!</p> </div> </div> <p><i>Specific product MSDSs are required to select the container and complete the container label. If the contents are hazardous wastes, they must be placed in steel drums and the yellow label must be used.</i></p>
--	--

Handling Requirements

Handling Responsibility	Chemical Hygiene Officer if it is hazardous waste.
Onsite Accumulation Area	Hazardous Waste Storage Unit if it is hazardous waste. If it is a non-hazardous waste, dispose as solid waste.
Managing the Container	Keep the container in good condition. Keep the lid closed. Store only with compatible material.
Transport Preparation	When nearly full, call vendor for pickup and disposal.
Paperwork/Documentation	After pickup and disposal, confirm receipt of waste disposition (for example, certificate/documentation of disposal).

Waste Handling Sheet – Solvent Waste

Process Generating Waste: Solvent waste generated during sample testing.

Safe Handling Tips: Review the product label and the material safety data sheet (MSDS) for the solvent. Wear the personal protective equipment specified by the label and MSDS. Transfer of solvent waste should take place in a fume hood. Prevent fires by eliminating potential nearby sources of heat and ignition.

ACCUMULATION IN LAB UNITS

Accumulation Container



2 or 4-L Container

Required Container Label



Complete the label with the words "Dangerous waste" and "Flammable"



Handling Requirements

Responsibility Individual lab personnel generating the waste.

Onsite Accumulation Area This waste is accumulated in the designated waste accumulation area, which is well-ventilated, or in a flammable liquid storage cabinet. Should be stored away from acids.

Continued on next page

Waste Handling Sheet – Solvent Waste, Continued

ACCUMULATION AT HAZARDOUS WASTE STORAGE UNIT

Accumulation Container

Required Container Label

 <p>4-L Container</p>	 <p>Complete the label with the words “Dangerous waste” and “Flammable”</p> 
---	---

Handling Requirements

Handling Responsibility	Chemical Hygiene Officer
Onsite Accumulation Area	Flammable storage cabinet in the Hazardous Waste Storage Unit
Managing the Container	Keep the container in good condition. Keep the lid closed. Keep the container secure and ensure it is properly labeled.
Transport Preparation	When nearly full, call vendor for pickup and disposal.
Paperwork/Documentation	Complete manifest. After pickup and disposal, confirm receipt of waste disposition (for example, certificate/documentation of disposal).

Appendix 7

EMERGENCY ACTION PLAN

General Emergency Procedures

The Chemical Hygiene Officer is responsible for obtaining and maintaining the appropriate emergency response telephone numbers and posting the telephone numbers in the laboratory.

The essence of a plan to handle emergencies is summarized in the acronym "NEAR": Notify, Evacuate, Assemble, and Report.

Notification:

The person involved in or witnessing the accident or emergency must notify the section supervisor, the Chemical Hygiene Officer, or the Emergency Coordinator indicated on the personnel directory for the following emergencies:

- All spills
- Injuries

The fire department/EMS shall be notified for the following emergencies:

- Spills that cannot be handled by lab spill kits or cannot be cleaned up without a significant employee skin or inhalation exposure to dangerous amounts of hazardous chemicals.
- All fires
- All explosions
- Serious injuries/Medical Emergencies

The local fire department or a qualified hazardous chemical spill cleanup contractor will handle all major spills, fires, or explosions. No Materials Lab employee will attempt cleanup of a major chemical spill. A "major chemical spill" is defined as a spill that cannot be handled by lab spill kits or cannot be cleaned up without significant employee skin or inhalation exposure to dangerous amounts of hazardous chemicals (see also Section 4.3). All laboratory employees will be evacuated from the spill, fire, or explosion area during cleanup or other emergency activities and will not re-enter until given clearance by the fire department or cleanup contractor.

Evacuate

The decision to evacuate will be made by the person who is notified, the section supervisor, Chemical Hygiene Officer, or Emergency Coordinator. If evacuation is necessary, or if the fire alarm sounds, the Evacuation Plan (following this section) will be followed beginning with notification of the Emergency Coordinator or an alternate. Do not re-enter the evacuated area until instructed to do so by the Emergency Coordinator.

The lab is equipped with an audible fire alarm system that can be activated manually or by smoke sensors in various locations in the lab. The manual pull-box alarm locations are located throughout the lab.

Assemble

Employees are to assemble at the areas designated in the evacuation plan following an evacuation. Section supervisors, the Chemical Hygiene Officer, and the emergency coordinator are responsible to determine if all employees have assembled at the assembly area. If an

employee has not evacuated, that information will be given to the fire or police department when they respond to the incident. Under no circumstances are employees to re-enter the laboratory after an evacuation until approval is given by the fire department or Emergency Coordinator if the fire department is not summoned.

Reporting

All incidents must be reported through the Incident Report Form (following this section).

The Chemical Spill Form (following this section) may also be used to report spills.

Medical Emergencies

In an emergency requiring immediate critical first aid, follow these steps:

1. Notify one of the qualified emergency first aid responders.
2. Call for an ambulance or paramedics (911).
3. Act in a way that will prevent further injury. Do not move the victim(s) unless there is a risk of further injury in his or her current location. Do not endanger yourself or others while trying to assist the victim(s).
4. Any employee who renders first aid and is exposed to blood will be offered hepatitis vaccinations as required by the OSHA Bloodborne Pathogens regulations - 29 CFR 1910.1030.

In case of a minor accident or injury requiring medical attention, the employee will be taken to the local medical provider. In case of serious injury, the employee will be transported to the emergency room by ambulance. Maps showing routes to the local medical provider and emergency telephone numbers can be found in the break rooms and in this Appendix.

First Aid Kits

First aid kits are located throughout the lab.

Chemical Spill Report

Report filed by:

Date:

Section I: Spill

A) Date of Spill:

Time: (AM/PM) circle one

B) Name of chemical (s) Amount Units (pounds, grams, etc.)

Attach a copy of the MSDS sheets for all chemicals listed.

C) Location of Spill

D) Describe exactly where the spill occurred; be as specific and as exact as possible. If the spill happened within the laboratory, locate the spill with a large black X on the map attached to this form.

E) List everyone in the immediate area when the spill occurred.

NAME MATS LAB EMPLOYEE (Y/N)

F) Describe how the spill happened.

G) Was the area evacuated? () Yes () No

H) Symptoms (if any) person(s) experiencing?

Name _____ Symptom(s)

I) Was first aid given? () Yes() No

J) Describe any first aid given or any immediate action taken. (e.g. safety shower, eye wash, etc.)

K) Was a physician consulted? () Yes() No

L) Was it a medical emergency? () Yes() No

Section II: Clean Up

- A.) How was this spill cleaned up? Who was involved in the spill clean-up? If the spill clean-up kit was used, give its name, manufacturer, catalog number, and the location it was taken from.
- B.) Disposal
Describe how the waste (the spilled chemical and the clean-up residue) was disposed of.

Section III Misc.

- A.) Unsafe condition or act causing spill:
- B.) Action taken to prevent similar spills:
- C.) Additional Comments, Recommendations, or Actions:

Signature	Date
-----------	------

Chemical Hygiene Officer Signature	Date
------------------------------------	------

Laboratory Manager Signature	Date
------------------------------	------

- Route copies to
- a.) Safety and Health Services Office
 - b.) Chemical Hygiene Officer
 - c.) Lab Administrative Officer

Incident Reporting Form

Incident #

*****REPORT MUST BE COMPLETED WITHIN 24 HOURS FOLLOWING INCIDENT*****

Employee Name:

Last, First, MI

Job Title:

Date of Incident:

Month, Day, Year

Time of Incident:

AM PM

Name of Supervisor:

Last, First, MI

Lab Section:

Incident Location:

Weather Conditions:

STATEMENTS

Employee's Account of Incident:

Specific Material and Location:

The above statement is true and accurate.

Employee's Signature:

Date:

Witness Statement:

The above statement is true and accurate.

Witness's Signature:

Date:

Witness Statement:

The above statement is true and accurate.

Witness's Signature:

Date:

Supervisor's Signature:

Date:

Manager's Signature:

Date:

EVACUATION PLAN

In the event of an emergency requiring evacuation, the following procedures must be followed:

1. At the sound of a fire alarm, or if instructed, all personnel must evacuate. Maps outlining evacuation routes are located throughout the lab and are attached to this appendix. Follow lighted exit paths to building exits. All employees are to assemble at the staging area, which is indicated in the evacuation plan.
2. Do not panic - remain calm.
3. Listen for instructions. The Emergency Coordinator will repeat instructions throughout the course of the evacuation.
4. All employees must assemble at the evacuation staging area. If instructed to do so by your Emergency Coordinator(s), you may need to move upwind or to an alternate area. Only the Emergency Coordinator has authority to move a group to an alternate staging area.
5. Supervisors are responsible for accounting for all employees in their groups or any visitor who has entered the facility. The receptionists in the lab and in the main building are in charge of the visitor log-in books. These log-in books will be brought to the check-in station during evacuation procedures so that all visitors can be accounted for.
6. All employees must remain at the evacuation staging area until instructed to return by the Emergency Coordinator.
7. During evacuation procedures, never leave the staging area unless instructed to do so by the Emergency Coordinator.

Appendix 8

Hazard Assessment for Personal Protective Equipment

Use with WAC 296-800-160 Personal Protective Equipment (PPE)

This tool can help you do a hazard assessment to see if your employees need to use personal protective equipment (PPE) by identifying activities that may create hazards for your employees. The activities are grouped according to what part of the body might need PPE. You can make copies, modify and customize the form to fit the specific needs of your particular work place, or develop your own form that is appropriate to your work environment.

This tool can also serve as written certification that you have done a hazard assessment as required by WAC 296-800-16010. Document your hazard assessment for PPE. Make sure that the blank fields at the beginning of the checklist (indicated by *) are filled out (see below, Instruction #4).

Instructions:

- Do a walk-through survey of each work area and job/task. Read through the list of work activities in the first column, putting a check next to the activities performed in that work area or job.
- Read through the list of hazards in the second column, putting a check next to the hazards to which employees may be exposed while performing the work activities or while present in the work area. (for example, abrasive blasting: chopping wood; work-related exposure: flying particles).
- Decide how you are going to control the hazards. Try considering engineering, work place, and/or administrative controls to eliminate or reduce the hazards before resorting to using PPE. If the hazard cannot be eliminated without using PPE, indicate which type(s) of PPE will be required to protect your employee from the hazard.
- Make sure that you complete the following fields on the form (indicated by *) to certify that a hazard assessment was done:
 - Name of your work place
 - Address of the work place where you are doing the hazard assessment
 - Name of person certifying that a workplace hazard assessment was done
 - Date the hazard assessment was done

PPE HAZARD ASSESSMENT CERTIFICATION FORM

*NAME OF WORK PLACE: _____

*ASSESSMENT CONDUCTED BY: _____

*WORK PLACE ADDRESS: _____

*DATE OF ASSESSMENT: _____

WORK AREA(S): _____

JOB/TASK(S): _____

***REQUIRED FOR CERTIFYING THE HAZARD ASSESSMENT. USE A SEPARATE SHEET FOR EACH JOB/TASK OR WORK AREA**

EYES		
<p>WORK ACTIVITIES, SUCH AS:</p> <input type="checkbox"/> ABRASIVE BLASTING <input type="checkbox"/> CHOPPING <input type="checkbox"/> CUTTING <input type="checkbox"/> DRILLING <input type="checkbox"/> WELDING <input type="checkbox"/> PUNCH PRESS OPERATIONS <input type="checkbox"/> OTHER: _____	<p><input type="checkbox"/> SANDING <input type="checkbox"/> SAWING <input type="checkbox"/> GRINDING <input type="checkbox"/> HAMMERING</p>	<p>WORK-RELATED EXPOSURE TO:</p> <input type="checkbox"/> AIRBORNE DUST <input type="checkbox"/> FLYING PARTICLES <input type="checkbox"/> BLOOD SPLASHES <input type="checkbox"/> HAZARDOUS LIQUID CHEMICALS <input type="checkbox"/> INTENSE LIGHT <input type="checkbox"/> OTHER: _____
<p>CAN HAZARD BE ELIMINATED WITHOUT THE USE OF PPE? YES <input type="checkbox"/> NO <input type="checkbox"/></p> <p>IF NO, USE:</p> <input type="checkbox"/> SAFETY GLASSES <input type="checkbox"/> SAFETY GOGGLES GOGGLES <input type="checkbox"/> SHADING/FILTER (# _____) <input type="checkbox"/> WELDING SHIELD <input type="checkbox"/> OTHER: _____		
<p><input type="checkbox"/> SIDE SHIELDS <input type="checkbox"/> DUST-TIGHT</p>		
FACE		
<p>WORK ACTIVITIES, SUCH AS:</p> <input type="checkbox"/> CLEANING WORK <input type="checkbox"/> WELDING <input type="checkbox"/> SIPHONING <input type="checkbox"/> PAINTING MOLTEN <input type="checkbox"/> OTHER: _____	<p><input type="checkbox"/> FOUNDRY <input type="checkbox"/> MIXING <input type="checkbox"/> POURING METAL</p>	<p>WORK-RELATED EXPOSURE TO:</p> <input type="checkbox"/> HAZARDOUS LIQUID CHEMICALS <input type="checkbox"/> EXTREME HEAT/COLD <input type="checkbox"/> POTENTIAL IRRITANTS: _____ <input type="checkbox"/> OTHER: _____
<p>CAN HAZARD BE ELIMINATED WITHOUT THE USE OF PPE? YES <input type="checkbox"/> NO <input type="checkbox"/></p> <p>IF NO, USE:</p> <input type="checkbox"/> FACE SHIELD <input type="checkbox"/> SHADING/FILTER (# _____) <input type="checkbox"/> WELDING SHIELD <input type="checkbox"/> OTHER: _____		
HEAD		
<p>WORK ACTIVITIES, SUCH AS:</p> <input type="checkbox"/> BUILDING MAINTENANCE <input type="checkbox"/> CONFINED SPACE OPERATIONS <input type="checkbox"/> CONSTRUCTION <input type="checkbox"/> ELECTRICAL WIRING <input type="checkbox"/> WALKING/WORKING UNDER CATWALKS <input type="checkbox"/> WALKING/WORKING UNDER CONVEYOR BELTS <input type="checkbox"/> WALKING/WORKING UNDER CRANE LOADS <input type="checkbox"/> UTILITY WORK <input type="checkbox"/> OTHER: _____	<p>WORK-RELATED EXPOSURE TO:</p> <input type="checkbox"/> BEAMS <input type="checkbox"/> PIPES <input type="checkbox"/> EXPOSED ELECTRICAL WIRING OR COMPONENTS <input type="checkbox"/> FALLING OBJECTS <input type="checkbox"/> MACHINE PARTS <input type="checkbox"/> OTHER: _____	<p>CAN HAZARD BE ELIMINATED WITHOUT THE USE OF PPE? YES <input type="checkbox"/> NO <input type="checkbox"/></p> <p>IF NO, USE:</p> <input type="checkbox"/> PROTECTIVE HELMET <input type="checkbox"/> TYPE A (LOW VOLTAGE) <input type="checkbox"/> TYPE B (HIGH VOLTAGE) <input type="checkbox"/> TYPE C <input type="checkbox"/> BUMP CAP (NOT ANSI-APPROVED) <input type="checkbox"/> HAIR NET OR SOFT CAP <input type="checkbox"/> OTHER: _____
HANDS/ARMS		
<p>WORK ACTIVITIES, SUCH AS:</p> <input type="checkbox"/> USING COMPUTERS <input type="checkbox"/> MATERIAL HANDLING <input type="checkbox"/> GRINDING <input type="checkbox"/> WELDING	<p><input type="checkbox"/> USING KNIVES <input type="checkbox"/> SANDING <input type="checkbox"/> SAWING <input type="checkbox"/> HAMMERING</p>	<p>WORK-RELATED EXPOSURE TO:</p> <input type="checkbox"/> BLOOD <input type="checkbox"/> HAZARDOUS CHEMICALS CHEMICAL: _____ CHEMICAL: _____
<p>CAN HAZARD BE ELIMINATED WITHOUT THE USE OF PPE? YES <input type="checkbox"/> NO <input type="checkbox"/></p> <p>IF NO, USE:</p> <input type="checkbox"/> GLOVES <input type="checkbox"/> CHEMICAL RESISTANCE		

<input type="checkbox"/> WORKING WITH GLASS <input type="checkbox"/> OTHER: _____	CHEMICAL: _____ CHEMICAL: _____ CHEMICAL: _____ <input type="checkbox"/> TOOLS OR MATERIALS THAT COULD SCRAPE, BRUISE, OR CUT <input type="checkbox"/> EXTREME HEAT/COLD <input type="checkbox"/> OTHER: _____	<input type="checkbox"/> LIQUID/LEAK RESISTANCE <input type="checkbox"/> TEMPERATURE RESISTANCE <input type="checkbox"/> ABRASION/CUT RESISTANCE <input type="checkbox"/> SLIP RESISTANCE <input type="checkbox"/> PROTECTIVE SLEEVES <input type="checkbox"/> OTHER: _____
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FEET/LEGS

<u>WORK ACTIVITIES, SUCH AS:</u> <input type="checkbox"/> BUILDING MAINTENANCE <input type="checkbox"/> CONSTRUCTION <input type="checkbox"/> DEMOLITION <input type="checkbox"/> PLUMBING <input type="checkbox"/> TRENCHING <input type="checkbox"/> USE OF HIGHLY FLAMMABLE MATERIALS <input type="checkbox"/> WELDING <input type="checkbox"/> OTHER: _____	<u>WORK-RELATED EXPOSURE TO:</u> <input type="checkbox"/> EXPLOSIVE ATMOSPHERES <input type="checkbox"/> EXPLOSIVES <input type="checkbox"/> EXPOSED ELECTRICAL WIRING OR COMPONENTS <input type="checkbox"/> HEAVY EQUIPMENT <input type="checkbox"/> SLIPPERY SURFACES <input type="checkbox"/> TOOLS <input type="checkbox"/> OTHER: _____	<u>CAN HAZARD BE ELIMINATED WITHOUT THE USE OF PPE?</u> YES <input type="checkbox"/> NO <input type="checkbox"/> <u>IF NO, USE:</u> <input type="checkbox"/> safety shoes or boots <input type="checkbox"/> TOE PROTECTION <input type="checkbox"/> <input type="checkbox"/> METATARSAL PROTECTION <input type="checkbox"/> <input type="checkbox"/> ELECTRICAL PROTECTION <input type="checkbox"/> <input type="checkbox"/> HEAT/COLD PROTECTION <input type="checkbox"/> <input type="checkbox"/> PUNCTURE RESISTANCE <input type="checkbox"/> <input type="checkbox"/> CHEMICAL RESISTANCE <input type="checkbox"/> ANTI-SLIP SOLES <input type="checkbox"/> LEGGINGS OR CHAPS <input type="checkbox"/> FOOT-LEG GUARDS <input type="checkbox"/> OTHER: _____
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BODY/SKIN

<u>WORK ACTIVITIES SUCH AS:</u> <input type="checkbox"/> BATTERY CHARGING <input type="checkbox"/> DIP TANK OPERATIONS <input type="checkbox"/> FIBERGLASS INSTALLATION <input type="checkbox"/> IRRITATING CHEMICALS <input type="checkbox"/> SAWING <input type="checkbox"/> OTHER: _____	<u>WORK-RELATED EXPOSURE TO:</u> <input type="checkbox"/> CHEMICAL SPLASHES <input type="checkbox"/> EXTREME HEAT/COLD <input type="checkbox"/> SHARP OR ROUGH EDGES <input type="checkbox"/> OTHER: _____	<u>CAN HAZARD BE ELIMINATED WITHOUT THE USE OF PPE?</u> YES <input type="checkbox"/> NO <input type="checkbox"/> <u>IF NO, USE:</u> <input type="checkbox"/> VEST, JACKET <input type="checkbox"/> COVERALLS, BODY SUIT <input type="checkbox"/> RAINGEAR <input type="checkbox"/> APRON <input type="checkbox"/> WELDING LEATHERS <input type="checkbox"/> ABRASION/CUT RESISTANCE <input type="checkbox"/> OTHER: _____
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LUNGS/RESPIRATORY ¹

<u>WORK ACTIVITIES SUCH AS:</u> <input type="checkbox"/> CLEANING <input type="checkbox"/> POURING <input type="checkbox"/> <input type="checkbox"/> MIXING <input type="checkbox"/> SAWING <input type="checkbox"/> PAINTING <input type="checkbox"/> FIBERGLASS INSTALLATION <input type="checkbox"/> COMPRESSED AIR OR GAS OPERATIONS <input type="checkbox"/> OTHER: _____	<u>WORK-RELATED EXPOSURE TO:</u> <input type="checkbox"/> IRRITATING DUST OR PARTICULATE <input type="checkbox"/> IRRITATING OR TOXIC GAS/VAPOR <input type="checkbox"/> OTHER: _____	<u>CAN HAZARD BE ELIMINATED WITHOUT THE USE OF PPE?</u> YES <input type="checkbox"/> NO <input type="checkbox"/> *(SEE FOOTNOTE 1)
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EARS/HEARING ¹

<u>WORK ACTIVITIES SUCH AS:</u> <input type="checkbox"/> GENERATOR <input type="checkbox"/>	<u>WORK-RELATED EXPOSURE TO:</u> <input type="checkbox"/> LOUD NOISES	<u>CAN HAZARD BE ELIMINATED WITHOUT THE USE OF PPE?</u> YES <input type="checkbox"/> NO <input type="checkbox"/>
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<p>GRINDING</p> <p><input type="checkbox"/> VENTILATION FANS <input type="checkbox"/></p> <p>MACHINING</p> <p><input type="checkbox"/> MOTORS <input type="checkbox"/></p> <p>ROUTERS</p> <p><input type="checkbox"/> SANDING <input type="checkbox"/></p> <p>SAWING</p> <p><input type="checkbox"/> PNEUMATIC EQUIPMENT</p> <p><input type="checkbox"/> PUNCH OR BRAKE PRESSES</p> <p><input type="checkbox"/> USE OF CONVEYORS</p> <p><input type="checkbox"/> OTHER: _____</p>	<p><input type="checkbox"/> LOUD WORK ENVIRONMENT</p> <p><input type="checkbox"/> NOISY MACHINES/TOOLS</p> <p><input type="checkbox"/> PUNCH OR BRAKE PRESSES</p> <p><input type="checkbox"/> OTHER: _____</p>	<p>*(SEE FOOTNOTE 1)</p>
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⁽¹⁾ NOTE: Other hazards requiring PPE (such as respiratory, noise, fall, etc.) are not included in this volume of the PPE Guide but will be covered in future volumes (see WAC 296-62 for respiratory and hearing protection and WAC 296-155 for fall protection for further assessment). However, you should consider all hazards when you conduct your hazard assessment. See a list of other Washington Industrial Safety and Health Administration rules (in "How to use this guide," p. 4) for information regarding PPE for specific work places.

Appendix 9

Sample MSDS

MSDS for ACETONE Page 1

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: ACETONE

FORMULA: (CH₃)₂CO

FORMULA WT: 58.08

CAS NO.: 67-64-1

NIOSH/RTECS NO.: AL3150000

COMMON SYNONYMS: DIMETHYL KETONE; METHYL KETONE; 2-PROPANONE

PRODUCT CODES: 9010,9006,9002,9254,9009,9001,9004,5356,A134,9007,9005,9005,9008

EFFECTIVE: 08/27/86

REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM:

HEALTH - 1 SLIGHT

FLAMMABILITY - 3 SEVERE (FLAMMABLE)

REACTIVITY - 2 MODERATE

CONTACT - 1 SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

PRECAUTIONARY LABEL STATEMENTS

DANGER

CAUSES IRRITATION

EXTREMELY FLAMMABLE

HARMFUL IF SWALLOWED OR INHALED

KEEP AWAY FROM HEAT, SPARKS, FLAME. AVOID CONTACT WITH EYES, SKIN, CLOTHING.

AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE ALCOHOL FOAM, DRY CHEMICAL, CARBON DIOXIDE - WATER MAY BE INEFFECTIVE.

FLUSH SPILL AREA WITH WATER SPRAY.

SAF-T-DATA(TM) STORAGE COLOR CODE: RED (FLAMMABLE)

2 - HAZARDOUS COMPONENTS

COMPONENT % CAS NO.

ACETONE 90-100 67-64-1

3 - PHYSICAL DATA

BOILING POINT: 56 C (133 F) VAPOR PRESSURE(MM HG): 181

MELTING POINT: -95 C (-139 F) VAPOR DENSITY(AIR=1): 2.0

SPECIFIC GRAVITY: 0.79 EVAPORATION RATE: ~10

(H₂O=1) (BUTYL ACETATE=1)

SOLUBILITY(H₂O): COMPLETE (IN ALL PROPORTIONS) % VOLATILES BY VOLUME:
100

APPEARANCE & ODOR: CLEAR, COLORLESS LIQUID WITH A FRAGRANT SWEET
ODOR.

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP: -18 C (0 F) NFPA 704M RATING: 1-3-0

FLAMMABLE LIMITS: UPPER - 13.0 % LOWER - 2.6 %

FIRE EXTINGUISHING MEDIA

USE ALCOHOL FOAM, DRY CHEMICAL OR CARBON DIOXIDE.

(WATER MAY BE INEFFECTIVE.)

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND

SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN
POSITIVE

PRESSURE MODE.

MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE
WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS

VAPORS MAY FLOW ALONG SURFACES TO DISTANT IGNITION SOURCES AND
FLASH BACK.

CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH
STRONG OXIDIZERS MAY CAUSE FIRE.

5 - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 1780 MG/M³ (750 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 2375 MG/M³ (1000 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 2400 MG/M³ (1000 PPM)

TOXICITY: LD₅₀ (ORAL-RAT) (MG/KG) - 9750

LD₅₀ (ORAL-MOUSE) (MG/KG) - 3000

LD₅₀ (IPR-MOUSE) (MG/KG) - 1297

LD₅₀ (SKN-RABBIT) (G/KG) - 20

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE

VAPORS MAY BE IRRITATING TO SKIN, EYES, NOSE AND THROAT.

INHALATION OF VAPORS MAY CAUSE NAUSEA, VOMITING, HEADACHE, OR LOSS
OF CONSCIOUSNESS.

LIQUID MAY CAUSE PERMANENT EYE DAMAGE.

CONTACT WITH SKIN HAS A DEFATTING EFFECT, CAUSING DRYING AND
IRRITATION.

INGESTION MAY CAUSE NAUSEA, VOMITING, HEADACHES, DIZZINESS,
GASTROINTESTINAL IRRITATION.

CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE KIDNEY AND/OR LIVER
DAMAGE.

TARGET ORGANS: RESPIRATORY SYSTEM, SKIN

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: NONE
IDENTIFIED

ROUTES OF ENTRY: INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT
EMERGENCY AND FIRST AID PROCEDURES

CALL A PHYSICIAN.

IF SWALLOWED, IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING.

IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL
RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR
AT LEAST 15 MINUTES. FLUSH SKIN WITH WATER.

6 - REACTIVITY DATA

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, SOURCES OF IGNITION

INCOMPATIBLES: HALOGEN ACIDS AND HALOGEN COMPOUNDS, STRONG BASES,
STRONG OXIDIZING AGENTS, CAUSTICS, AMINES AND AMMONIA,
CHLORINE AND CHLORINE COMPOUNDS, STRONG ACIDS, ESP. SULFURIC, NITRIC,
HYDROCHLORIC

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SUITABLE PROTECTIVE CLOTHING. SHUT OFF IGNITION SOURCES; NO
FLARES, SMOKING, OR FLAMES IN AREA. STOP LEAK IF YOU CAN DO SO
WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. TAKE UP WITH SAND
OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO
CONTAINER FOR LATER DISPOSAL. FLUSH AREA WITH WATER.

J. T. BAKER SOLUSORB(R) SOLVENT ADSORBENT IS RECOMMENDED FOR SPILLS
OF THIS PRODUCT.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL
ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: U002 (TOXIC WASTE)

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 5000 PPM, A GAS MASK WITH ORGANIC VAPOR CANNISTER IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS WITH FULL FACE SHIELD IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GLASSES WITH SIDESHIELDS, BUTYL RUBBER GLOVES ARE RECOMMENDED.

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: RED (FLAMMABLE)

SPECIAL PRECAUTIONS

BOND AND GROUND CONTAINERS WHEN TRANSFERRING LIQUID. KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA.

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: ACETONE

HAZARD CLASS: FLAMMABLE LIQUID

UN/NA : UN1090

LABELS: FLAMMABLE LIQUID

REPORTABLE QUANTITY : 5000 LBS.

INTERNATIONAL (I.M.O.) PROPER SHIPPING NAME: ACETONE

HAZARD CLASS : 3.1

UN/NA : UN1090

LABELS : FLAMMABLE LIQUID

Appendix 10



To Be Completed By Employee or Employee's Supervisor	[1] Employee Name (Last, First, MI)		[2] Phone Number	[3] Region	
	[4] Org Code	[5] Job Title		[6] Work Hours	
	[7] Work Days		[8] Date and Time of Incident	[9] Date of Report	[10] Date and Time Reported to Supervisor
	[11] Supervisor's Name			[12] Phone Number	
	[13] Type of Workplace Incident (Check all that apply)				
	<input type="checkbox"/> State-Owned Property/Equipment <input type="checkbox"/> Involving State Vehicle <input type="checkbox"/> Involving POV on Official Business <input type="checkbox"/> Involving Marine Vessel <input type="checkbox"/> Non-State-Owned Property/Equipment		<input type="checkbox"/> Near Miss - Close Call (Complete Questions 1 thru 18) <input type="checkbox"/> Injury, Minor (Not involving Licensed Healthcare Professional, complete 1 thru 26) <input type="checkbox"/> Injury (Involving Licensed Healthcare Professional) <input type="checkbox"/> Illness <input type="checkbox"/> Fatality		
	[14] Describe in Detail the Incident and Work Activity (Attach additional documentation, if necessary)				
	[15] List any Witnesses and Phone Numbers				
	[16] Specific Location of Incident (e.g., SR / Milepost / Address, Vessel, etc.)				
	[17] Did Incident Occur Within a Workzone? <input type="checkbox"/> Yes <input type="checkbox"/> No		[18] Work Operation Code		
	[19] Type of Injury		[20] Specific Part of Body Injured		
	[21] Source of Injury		[22] Cause of Injury		
	[23] Medical Treatment (Check all that apply)			L&I Claim # _____	
<input type="checkbox"/> On-site First Aid Only <input type="checkbox"/> Treated at Clinic		<input type="checkbox"/> Treated at Emergency Room <input type="checkbox"/> Treated via Outpatient Care			
<input type="checkbox"/> Hospitalized <input type="checkbox"/> Other		<input type="checkbox"/> None			
[24] Report Completed By (Printed Name and Signature)		[25] Date	[26] Phone Number		

If this incident involved any vehicles or equipment complete questions 69 through 157 (pages 4 and 5) of this form.

To Be Completed By Employee's Supervisor	[27] Investigator's Name (Last, First, MI)		[28] Title	[29] Phone Number
	[30] Date Investigation Began	[31] Date Investigation Completed		[32] Supervisor's Org Code
	[33] Has the Employee Returned to Work? <input type="checkbox"/> No - Anticipated Return Date _____ <input type="checkbox"/> Yes - Date Returned to Work _____ <input type="checkbox"/> Full Duty <input type="checkbox"/> Restricted Duty - Anticipated Return to Full Duty _____			
	[34] Investigation Summary (Describe in detail - Who, What, Where, When?) (Attach additional documentation, if necessary)			
	[35] Prior to Starting Work Was a Safety Briefing Conducted? (Check all that apply) <input type="checkbox"/> Pre Activity Safety Plan (PASP) <input type="checkbox"/> Tailgate Talk <input type="checkbox"/> Safety Briefing			
	[36] List the Personal Protective Equipment (PPE) in Use at the Time of the Incident. If NO PPE was in Use, Explain Why. (Attach additional documentation, if necessary)			
	[37] Preventative Action Plan (PAP) - Include planned date of completion, and what operational and/or administrative changes to be made to prevent similar incidents. Outline the steps to be taken to correct a deficiency in standard operating procedures, training, or equipment for accident prevention purposes. See Chapter 6 of the Safety Manual. (Attach additional documentation, if necessary)			
	[38] Is There any Equipment or Vehicle Damage? <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, Ensure that Questions 69 through 157 (pages 4 and 5) of this form are Completed.			
[39] Investigated By (Printed Name and Signature)			[40] Date	

Incident Reviewer	[41] Date Report Reviewed	[42] Reviewer's Name (Last, First)	[43] Reviewer's Org Code
	[44] Title		[45] Phone Number
	[46] Reviewer Comments (e.g., preventative actions taken, compliance with safety standards, cause, etc.) (Attach additional documentation, if necessary)		
	[47] Reviewer Signature		[48] Date

Region Safety Manager	[49] Employee Risk Classification Code (Check One) <input type="checkbox"/> 4902-00 Clerical/Administrative Office Personnel <input type="checkbox"/> 5307-00 Employees - N.O.C. <input type="checkbox"/> 5300-00 Administrative Field Personnel		
	[50] OSHA Recordable <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Sure	[51] If "Yes", Recordability Criteria (Check All that Apply) <input type="checkbox"/> Death - § 1904.7(b)(2) <input type="checkbox"/> Days away from work - § 1904.7(b)(3) <input type="checkbox"/> Restricted work or transfer to another job - § 1904.7(b)(4) <input type="checkbox"/> Medical treatment beyond first aid - § 1904.7(b)(5) <input type="checkbox"/> Loss of consciousness - § 1904.7(b)(6) <input type="checkbox"/> A significant injury or illness - § 1904.7(b)(7) <input type="checkbox"/> Chiropractic <input type="checkbox"/> Other	
	[52] Are all applicable sections of this report complete? <input type="checkbox"/> Yes <input type="checkbox"/> No CS Case Number _____		
[53] Safety Manager (Printed Name and Signature)		[54] Safety Manager Phone	[55] Date

Equipment Technician	[56] Type of Vehicle and/or equipment involved (Check all that apply) <input type="checkbox"/> State Owned <input type="checkbox"/> POV on State Business <input type="checkbox"/> Other (Describe) _____				
	[57] Vehicle/Equipment Make	[58] Body Type	[59] Model	[60] Year	[61] License Number
	[62] Equipment Number (If State Owned)	[63] Estimated Cost of Repairs	[64] Charge Codes		
	[65] Repairs Chargeable To <input type="checkbox"/> Maintenance <input type="checkbox"/> Engineering <input type="checkbox"/> Other _____				
	[66] Equipment Technician Notes - Include estimated repair costs, replacement equipment costs, and any mechanical factors that may be pertinent to the incident. (Attach additional documentation, if necessary)				
	[67] Equipment Technician (Printed Name and Signature)				[68] Date

If this incident involved any vehicles or equipment complete questions 69 through 157 (pages 4 and 5) of this form.

To Be Completed By Employee or Employee's Supervisor	Conditions	[69] Type of Road Surface	[70] Road Condition	[71] Weather Condition				
		[72] Warning Equipment in Use When the Incident Occurred (Check all that apply) <input type="checkbox"/> Rotating Flashers <input type="checkbox"/> Arrow Board <input type="checkbox"/> TMA <input type="checkbox"/> Other (Describe)						
		[73] Was Vehicle and/or Equipment Damage Caused by other Non-WSDOT Party? <input type="checkbox"/> Yes <input type="checkbox"/> No						
	Vehicle / Equipment No. 1	[74] Type of Vehicle and/or equipment involved (Check all that apply) <input type="checkbox"/> State Owned <input type="checkbox"/> POV on State Business <input type="checkbox"/> Other (Describe)						
		[75] Vehicle/Equipment Make	[76] Body Type	[77] Model	[78] Year	[79] License Number		
		[80] Equipment Number (If State Owned)		[81] Estimated Cost of Repairs				
		[82] Operator's License No.	[83] Was vehicle being used on Official State Business? <input type="checkbox"/> Yes <input type="checkbox"/> No	[84] Have you had a previous accident while driving on state business? <input type="checkbox"/> Yes <input type="checkbox"/> No				
		[85] If Privately Owned, Name and Address of Owner						
		[86] Owner Car No. 2		[87] Phone	[106] Owner Car No. 3		[107] Phone	
		[88] Address	[89] City	[90] Zip Code	[108] Address	[109] City	[110] Zip Code	
	[91] Driver		[92] Phone	[111] Driver		[112] Phone		
	[93] Address	[94] City	[95] Zip Code	[113] Address	[114] City	[115] Zip Code		
	[96] Driver's License No.		[97] Vehicle License No.		[116] Driver's License No.		[117] Vehicle License No.	
	[98] Vehicle Make	[99] Year	[100] Body Type	[118] Vehicle Make	[119] Year	[120] Body Type		
	[101] Name of Passengers			[121] Name of Passengers				
[102] Repair Cost	[103] Describe Damage		[122] Repair Cost	[123] Describe Damage				
[104] Insurance Company		[105] Policy No.	[124] Insurance Company		[125] Policy No.			
[126] What was Damaged?								
Other Property	[127] Name and Address of Owner					[128] City	[129] Zip Code	[130] Phone

To Be Completed By Employee or Employee's Supervisor	Injured Parties	[131] Name and Address	[132] Extent of Injury	[133] Age	[134] Veh 1	[135] Veh 2	[136] Veh 3	[137] Peds
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Witnesses	[138] Witness Name		[139] Address	[140] City	[141] Zip Code	[142] Phone		
Other	[143] Did Police Investigate? <input type="checkbox"/> Yes <input type="checkbox"/> No		[144] If Yes, Division (Sheriff, WSP, City)		[145] Was Citation Issued? <input type="checkbox"/> Yes <input type="checkbox"/> No		[146] If Yes, Issued To <input type="checkbox"/> You <input type="checkbox"/> Veh2 <input type="checkbox"/> Veh3	
	[147] Have you filed a Motor Vehicle Collision Report (MVCR) as Required by Law? <input type="checkbox"/> Yes <input type="checkbox"/> No		[148] Type of Incident <input type="checkbox"/> Front to Rear <input type="checkbox"/> Head-On <input type="checkbox"/> Sideswipe <input type="checkbox"/> Bike - Car <input type="checkbox"/> Hit Object <input type="checkbox"/> Broadside <input type="checkbox"/> Rollover <input type="checkbox"/> Parked Car <input type="checkbox"/> Pedestrian <input type="checkbox"/> Other _____					
Incident Information		[149] No. 1, Your Vehicle	[150] No. 2, Other Party (Name)	[151] No. 3, Other Party (Name)				
	a. At what distance was danger first noticed?							
	b. What warning signals were given?							
	c. Obstruction to vision (weather and other)?							
	d. Lights On? Wipers On? Windows Fogged?							
Equipment Incident Diagram and Damage	[152] <input type="checkbox"/> Straight Road <input type="checkbox"/> Hillcrest <input type="checkbox"/> One Lane <input type="checkbox"/> Curve - R or L <input type="checkbox"/> Uphill <input type="checkbox"/> One and One-Half Lane <input type="checkbox"/> Level <input type="checkbox"/> Downhill <input type="checkbox"/> Two Lane or Four Lane				[153] Mark Damaged Areas			
	Show on diagram position of each car, vehicle or injured person, indicating by arrow direction of each. 							
	IMPORTANT If street or view was obstructed in any way, indicate where and how; also indicate any street car or tracks and traffic signals or signs.				Indicate points of compass N. E. S. W.			
	[154] Employee Signature	[155] Date	[156] Supervisor Signature	[157] Date				

Appendix 11

Bulk Hazardous Material and Waste Storage Areas Inspection Log – Weekly

Instructions: Make copies of this form as they are needed. Inspect bulk hazardous material and waste storage areas once a week for leaks, signs of corrosion, dents, bulging, swelling, and proper labeling. If a container is found to be leaking, immediately transfer the waste to a new container. Containers must be closed at all times except when adding or removing wastes. Waste containers must not be stored next to other containers holding incompatible chemicals (that is, acids and bases, flammables and oxidizers, cyanides and acids, etc.) unless they are separated by a cabinet wall or have secondary containment (plastic pail). Document every inspection on this form and save every inspection log for at least 3 years. Make sure that any deficiencies you find are corrected immediately and are documented in writing.

Hazardous Material/Hazardous Waste Storage Area (Circle One)

Date	Inspector's Printed Name and Signature	Storage area free of spills and leaks	Containers and storage area properly labeled	Containers within secondary containment	Fire extinguishers serviced and tagged	Hazardous waste labels complete and visible	Eye wash, safety showers, ER equipment	Containers sealed with tight-fitting lids/bungs	Incompatibles properly Separated	Waste not stored over allowable time	Comment/Corrective Action
		Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	
_____	_____										_____ _____ _____
_____	_____										_____ _____ _____
_____	_____										_____ _____ _____
_____	_____										_____ _____ _____
_____	_____										_____ _____ _____
_____	_____										_____ _____ _____
_____	_____										_____ _____ _____

*NA – Not applicable

Satellite Hazardous Material and Waste Storage Area Inspection Log -- Weekly

Instructions: Make copies of this form as they are needed. Inspect waste containers holding hazardous chemical wastes once a week for leaks, signs of corrosion, dents, bulging, swelling, and proper labeling. If a container is found to be leaking, immediately transfer the waste to a new container. Containers must be closed at all times except when adding or removing wastes. Waste containers must not be stored next to other containers holding incompatible chemicals (that is, acids and bases, flammables and oxidizers, cyanides and acids, etc.) unless they are separated by a cabinet wall or have secondary containment (plastic pail). Document every inspection on this form and save every inspection log for at least 3 years. For the Satellite Hazardous Waste Storage areas, up to 55 gallons of one waste stream can be stored at a given location. Make sure that any deficiencies you find are corrected immediately and are documented in writing.

Lab Unit: _____

Date	Inspector's Printed Name and Signature	Storage Area Free of Spills and Leaks	Containers Properly Labeled	Containers Closed	Containers Properly Secured	Hazardous Waste Labels Complete and	Waste not stored over allowable time	Comment/Corrective Action
		Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	
_____	_____							_____ _____ _____
_____	_____							_____ _____ _____
_____	_____							_____ _____ _____
_____	_____							_____ _____ _____
_____	_____							_____ _____ _____
_____	_____							_____ _____ _____

*NA – Not applicable

Laboratory Safety Equipment Checklist - Quarterly

Laboratory Unit _____ Date _____

Inspector Name _____ Room Number/Area _____

Emergency Equipment:

	Number	Open		Comments				
Fire Doors		Yes	No					
	Number	Accessible		Adequate Flow (If testable)		Comments		
Safety Shower		Yes	No	Yes	No			
Eye Wash Units		Yes	No	Yes	No			
	Number	Accessible		Adequately Stocked		Comments		
First Aid Kits		Yes	No	Yes	No			
Spill Kits		Yes	No	Yes	No			
	Number	Accessible		Pin In Place		Gauge Full (If present)		Comments/ Damage
Fire Extinguishers		Yes	No	Yes	No	Yes	No	

Fume hoods:

Functioning Properly? Yes No Not Applicable (If no, has it been reported? Yes No)

Has the fume hood been inspected in the past year? Yes No Not Applicable

Is fume hood being improperly used for storage and disposal? Yes No Not Applicable

Miscellaneous:

Personal Protective Equipment available? Yes No Currently In use? Yes No

Are gas cylinders in use? Yes No Secured? Yes No

Chemical inventory updated in the past year and a copy sent to department? Yes No Not Applicable

Date of last chemical inventory update: _____

Are training records up-to-date? Yes No Date of last update: _____

Chemicals properly stored (segregated according to chemical class)? Yes No Not Applicable

Is chemical waste being labeled and disposed of properly? Yes No Not Applicable

Are all containers and bottles properly labeled? Yes No Not Applicable

Evidence of food or drink in the laboratory? Yes No

Are all belts/pulleys properly guarded? Yes No Not Applicable

Weekly laboratory inspection forms completed? Yes No Not Applicable

Comments: _____

Laboratory Safety Inspection Checklist - Annual

Laboratory Unit _____ Date _____

Inspector Name _____ Room Number/Area _____

I. Laboratory Work Practices

	Yes/No	Comments
✓ Food and beverages are not stored in the laboratory areas, refrigerators, or in glassware that is also used for laboratory operations.	Yes/No	
✓ Pipetting is performed by mechanical means.	Yes/No	
✓ Laboratory surfaces are cleaned, disinfected, or decontaminated after work is performed.	Yes/No	
✓ Required PPE is being worn.	Yes/No	
✓ Hoods are not being used for storage.	Yes/No	

II. Housekeeping

	Yes/No	Comments
✓ Laboratory and storage areas uncluttered and orderly (including bench top).	Yes/No	
✓ Aisles and exits are free from obstruction.	Yes/No	
✓ Work surfaces are protected from contamination.	Yes/No	
✓ Electrical cords are in good condition and are UL-listed.	Yes/No	
✓ Tools and equipment are in good repair and electrically grounded.	Yes/No	
✓ Tops of cabinets and shelves are free from stored items.	Yes/No	
✓ Heavy objects are confined to lower shelves.	Yes/No	
✓ Glassware is free from cracks, chips, sharp edges and other defects.	Yes/No	
✓ Broken glass containers are available and in use.	Yes/No	

Continued on next page

Laboratory Safety Inspection Checklist - Annual, Continued

III. Personal Protective Equipment

	Yes/No	Comments
✓ Protective gloves are available and matched to hazards involved.	Yes/No	
✓ Eye protection is available and in use in all laboratories.	Yes/No	
✓ Lab coats, Tyvek garments, etc. are available and in use.	Yes/No	
✓ Dirty rags are stored in a covered container until removed for laundering.	Yes/No	
✓ Appropriate protective clothing is available and in use when working with radioactive materials.	Yes/No	
✓ Respirators are provided when necessary, and selected on the basis of hazard present.	Yes/No	
✓ Respirators are used correctly, cleaned after every use, and stored in a convenient, clean, and sanitary area.	Yes/No	

IV. Hazard Communication

	Yes/No	Comments
✓ Primary and secondary chemical containers are labeled with identity, appropriate hazard warnings, and expiration dates.	Yes/No	
✓ Signs on storage areas (for example, refrigerators) and laboratory areas are consistent with hazards within.	Yes/No	
✓ MSDS binders are available for chemicals used, and stored in area.	Yes/No	
✓ Employees know how to access MSDS for their work area.	Yes/No	
✓ Satellite MSDS collections are complete and readily available at all times to lab personnel or made available via the internet.	Yes/No	

Continued on next page

Laboratory Safety Inspection Checklist - Annual, Continued

V. Chemical Storage

	Yes/No	Comments
✓ Incompatible materials are segregated.	Yes/No	
✓ Corrosives and flammables are stored below eye level.	Yes/No	
✓ Hazardous materials used/stored in the laboratory are limited to small quantities.	Yes/No	
✓ Unnecessary, unused, or outdated materials are removed from laboratories and chemical storage areas.	Yes/No	
✓ Safety carriers are available and in use while transporting chemicals.	Yes/No	
✓ All lab carts have side rails.	Yes/No	
✓ All containers are properly labeled with: Name, Date, Contents	Yes/No	

VI. Flammable Liquids Storage & Handling

	Yes/No	Comments
✓ Flammable liquids are stored and used away from ignition sources.	Yes/No	
✓ Bulk quantities of flammable liquids are stored in approved storage cabinets.	Yes/No	
✓ Flammable liquid storage cabinets are properly labeled.	Yes/No	
✓ Flammable liquid storage cabinets close properly.	Yes/No	
✓ Flammables stored on open shelves in glass or plastic containers are within permissible quantities	Yes/No	
✓ Safety cans used to handle small quantities of flammable liquids are properly labeled.	Yes/No	
✓ Solvent waste cans are labeled properly with: Name, Date, Contents,	Yes/No	
✓ Nothing is stored on top of flammable cabinets.	Yes/No	

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Laboratory Safety Inspection Checklist - Annual, Continued

VII. Compressed Gas Cylinders

	Yes/No	Comments
✓ Gas cylinders are properly chained/secured.	Yes/No	
✓ Cylinder caps are in place when cylinders are not in use or being moved.	Yes/No	
✓ Gas cylinders are transported on a cart with chains.	Yes/No	
✓ Gas cylinders are stored away from excessive heat.	Yes/No	
✓ Fuel gas cylinders are at least 20 feet away from oxygen cylinders.	Yes/No	
✓ Gas cylinders are properly marked as to their contents.	Yes/No	
✓ Full and empty cylinders are stored separately.	Yes/No	
✓ Empty gas cylinders are labeled "EMPTY."	Yes/No	
✓ Gas lines, piping, manifolds, etc. are labeled with the identity of their contents.	Yes/No	
✓ Hoses, tubing, and regulators are in good working condition.	Yes/No	

VIII. Waste Handling: Hazardous and Non-Hazardous

	Yes/No	Comments
✓ No liquid waste is disposed of in the sinks or the sewer.	Yes/No	
✓ Hazardous wastes are not accumulated for longer than 6 months in the laboratory.	Yes/No	
✓ Waste streams are separated as necessary (for example, solid vs. liquid, hazardous vs. non-hazardous, halogenated vs. non-halogenated, etc.	Yes/No	
✓ Waste containers are appropriately labeled before placing in waste storage area.	Yes/No	
✓ Containers of hazardous waste are labeled properly with the date and name of person discarding waste.	Yes/No	
✓ Waste material is not allowed to accumulate on the floors, in corners, or under shelves/tables in laboratories.	Yes/No	

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Laboratory Safety Inspection Checklist - Annual, Continued

IX. Means of Egress and Emergency Exits

	Yes/No	Comments
✓ Exits are clearly marked.	Yes/No	
✓ Exits are free from obstruction.	Yes/No	
✓ All fire doors are self-closing.	Yes/No	
✓ All fire doors are kept closed.	Yes/No	
✓ Fire alarms are provided.	Yes/No	
✓ Emergency numbers are posted on or near telephones.	Yes/No	
✓ Emergency evacuation routes are posted in common hallways.	Yes/No	
✓ Emergency exit lights are working and clear of obstruction.	Yes/No	

X. Safety Equipment

	Yes/No	Comments
✓ Safety showers and eye wash stations are located within 75 feet of all laboratories.	Yes/No	
✓ Safety showers and eye wash stations are clearly labeled, and these areas are clear from obstruction.	Yes/No	
✓ All showers and eye wash stations are clean, covers are replaced, and they in good working condition.	Yes/No	
✓ Fire extinguishers are available.	Yes/No	
✓ Fire extinguishers are the appropriate type for the hazard in the work area.	Yes/No	
✓ Fire extinguishers are checked monthly. Date of last check: _____	Yes/No	
✓ Fire detection devices, smoke alarms, sprinkler systems, and lighted exit signs are in good working condition.	Yes/No	
✓ First-aid supplies are readily available and clearly visible.	Yes/No	
✓ Employees know where safety equipment is located and how to operate it.	Yes/No	

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Laboratory Safety Inspection Checklist - Annual, Continued

XI. Other Labeling & Posting

	Yes/No	Comments
✓ Warning signs and labels are present whenever required (for example, carcinogen, mutagen) where chemicals are stored.	Yes/No	

XII. Miscellaneous & Notes

Chemical Disposition Sheet

Purpose This form is to be used for inventory tracking purposes. The form should be completed whenever a substantial amount of a chemical is used, a container is emptied, or the chemical is disposed of. The form is to be provided to the Chemical Hygiene Officer, who will then enter the information into the Materials Laboratory's Chemical Inventory Database.

Responsibility The person who disposes of the chemical should complete the form.

Form The following information should be recorded:

Item	To Complete
Chemical Name	
Common Name	
CAS Number	
Manufacturer	
Catalog Number	
Hazard Class	
MSDS	
Date Received	
Expiration Date	
Location	
Amount	
Current Amount	
Recommended Reorder Amount	
Alternate Names	



Laboratory Employee Training and Awareness Checklist

Employee Name:

Supervisor Name:

Employee Job Title:

Initiation Date:

General Topic	Training Requirement	Required for All Employee (Yes/No)	Require Refresher (Yes/No)	Training Methodology	Trained By	Training Date	Signature
Environmental Health and Safety Manual Content	Know the location, general content, and how to use the manual	Yes		New employee orientation			
Facility Information	Know who the primary and secondary facility contacts and emergency coordinators are	Yes		New employee orientation			
Chemical and Waste Management Procedures							
	Chemical procurement policies and procedures			On-the-Job Training			
	Chemical receipt and distribution procedures			On-the-Job Training			
	Chemical storage requirements and guidelines			On-the-Job Training			
	Chemical storage and retrieval procedures			On-the-Job Training			
Basic Lab Safety							
	General Laboratory Safety Principles and Practices			New employee orientation			
	General chemical hazards and control			On-the-Job Training			
	Use of Personal Protective Equipment			On-the-Job Training			
	Know locations of						
	• Chemical Hygiene Plan (included in the Environmental Health and Safety Manual)			New employee orientation			
	• Fire extinguishers and pull stations			New employee orientation			
	• Eyewash/douse showers			New employee orientation			
	• First aid kits			New employee orientation			
	• Hazardous materials spill kits			New employee orientation			
	Know proper operations of the following:						
	• Fume hood			On-the-Job Training			
	• Fire extinguishers			Classroom Training			
	• Eyewash/douse showers			Classroom Training			
	Safety requirements of compressed gases			On-the-Job Training			
	How to perform CPR/First Aid			Classroom Training			
	Hazardous chemical labeling			On-the-Job Training			

Laboratory Employee Training and Awareness Checklist

Employee Name:

Supervisor Name:

Employee Job Title:

Initiation Date:

General Topic	Training Requirement	Required for All Employee (Yes/No)	Require Refresher (Yes/No)	Training Methodology	Trained By	Training Date	Signature
Hazardous Waste Disposal							
	Regulations pertaining to the identification, accumulation, and reporting of hazardous wastes			Classroom Training			
	Laboratory waste disposal practices, including locations and supplies			On-the-Job Training			
Medical Program	Policy related to medical surveillance, consultation and examination			New employee orientation			
Hazard Communication							
	Know location and content of MSDS			New employee orientation			
	Labeling requirements			New employee orientation			
	External communication procedures	Yes		New employee orientation			
	Corrective action and recommendation policies and procedures	Yes		New employee orientation			
Inspection and Monitoring							
	Weekly Inspection Procedures for the Hazardous Material and Waste Storage Units			On-the-Job Training			
	Weekly Inspection Procedures for the Satellite Hazardous Material and Waste Storage Units			On-the-Job Training			
	Monthly Laboratory Safety Equipment Inspection Procedures			On-the-Job Training			
	Annual Laboratory Safety Inspection Procedures			On-the-Job Training			
Lab-specific procedures							
	Treatment of polymer resin waste			On-the-Job Training			
	Neutralize acidic solutions in acid sink			On-the-Job Training			
	Instrument and Container Cleaning			On-the-Job Training			
Hazardous Chemicals	Proper procedures for storage and handling of the following chemicals:						
	• Carcinogens such as benzene and formaldehyde			On-the-Job Training			
	• Hydrofluoric Acid			On-the-Job Training			
	• Perchloric Acid			On-the-Job Training			

Laboratory Employee Training and Awareness Checklist

Employee Name:

Supervisor Name:

Employee Job Title:

Initiation Date:

General Topic	Training Requirement	Required for All Employee (Yes/No)	Require Refresher (Yes/No)	Training Methodology	Trained By	Training Date	Signature
Hazardous Material Shipment	Proper procedures for shipment of hazardous material.			Classroom Training			
Other							