

## **APPENDIX 1**

### **Safety or Personal Protective Equipment**

This policy is for all faculty and staff and can be found on the Human Resources web pages at: <http://www.rochester.edu/working/hr/policies/pdfpolicies/158.pdf> .

## **APPENDIX 2**

### **Reproductive Protection Policy**

This policy is for all faculty and staff and can be found on the Human Resources Web pages at: <http://www.rochester.edu/working/hr/policies/pdfpolicies/167.pdf> .

## **APPENDIX 3**

### **OSHA Laboratory Safety Standard**

The OSHA Laboratory Safety Standard is available at the following web site:

[http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=10106](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10106)

## **APPENDIX 4**

### **Research & Clinical Laboratory Waste Disposal**

Please see the Environmental Health & Safety Web Site:

<http://www.safety.rochester.edu/restricted/labwastetable.pdf>

**APPENDIX 5  
Request for SDS**

DATE: \_\_\_/\_\_\_/\_\_\_

NAME: \_\_\_\_\_ DEPARTMENT: \_\_\_\_\_

ROOM#: \_\_\_\_\_ P.O. BOX: \_\_\_\_\_ PHONE: \_\_\_\_\_

EH&S recommends SDSs for high hazard chemicals be retained in the laboratory. If you do not have a current copy of these safety sheets, they are available through the internet.

For any SDSs you were not able to obtain through the internet, complete the requested information below. Print the complete name of the chemical. Providing the information in columns 2 and 3 can reduce the time required to obtain the SDS.

CHEMICAL NAME	MANUFACTURER & ADDRESS	CAT #

**Return form via Fax to: 274-0001**

QUESTIONS? Call x5-3241

or

**Return form via intradepartmental mail to: EH&S, Box 278878**

## APPENDIX 6

### Peroxidizable Compounds

Organic peroxides are considered low-power explosives that are sensitive to shock, sparks, and other accidental ignition. Several compounds that may be found in labs present a similar hazard because they can undergo auto-oxidization to form organic hydroperoxides and/or peroxides when exposed to oxygen in air. Ultraviolet light may cause a free-radical chain mechanism. Oxygen may be added resulting in the formation of the peroxy radical.

Actions can be taken to reduce the formation of peroxides. Storing the chemical under inert atmosphere (N<sub>2</sub> or argon) or under vacuum can increase the safe storage lifetime. Also, chemical manufacturers add stabilizers or inhibitors to inhibit peroxide formation.

Prudent Practices in the Laboratory, Handling and Management of Chemical Hazards, 2011 edition, provides useful test methods to determine if peroxide formation has occurred.

Routine testing should be done prior to the expiration date on the container. The following three tests methods can be used to check for peroxy and hydroperoxide formation:

- Peroxide test strips: These turn to an indicative color in the presence of peroxides.  
NOTE: When used, the strip must be air dried until the solvent evaporates and exposed to moisture for proper indication and quantitation.
- Add 1 to 3 ml of the liquid to be tested to an equal volume of acetic acid, add a few drops of 5% aqueous potassium iodide solution, and shake. The appearance of a yellow to brown color indicates the presence of peroxides. Alternately, addition of 1 ml of a freshly prepared 10% solution of potassium iodide to 10 ml of the organic liquid in a 25 ml glass cylinder produces a yellow color of peroxide is present.
- Add 0.5 ml of the liquid to be tested to a mixture of 1 ml of 10% aqueous potassium iodide solution and 0.5 ml of dilute hydrochloric acid to which has been added a few drops of starch solution just prior to the test. The appearance of a blue or blue-black color within 1 minute indicated the presence of peroxides.

#### Class A: Chemicals posing peroxide hazard without concentration

Butadiene	Isopropyl ether	Tetrafluoroethylene
Chlorobutadiene (chloroprene)	Potassium amide	Vinylidene chloride
Divinyl acetylene	Potassium metal	
Divinyl ether	Sodium amide (sodamide)	

If a container of a Class A peroxidizable is past its expiration date, or if the presence of peroxides is suspected or proven, DO NOT ATTEMPT TO OPEN THE CONTAINER!

#### Class B: Chemicals posing peroxide hazard upon concentration (distillation or evaporation)

Acetal	Dicyclopentadiene	Methyl acetylene
Cumene	Diethylene glycol dimethyl ether (diglyme)	Methyl cyclopentane
Cyclohexene	Diethyl ether	Methyl isobutyl ketone
Cyclooctene	Dioxane ( <i>p</i> -dioxane)	Tetrahydrofuran
Cyclopentene	Ethylene glycol dimethyl ether (glyme)	Tetrahydronaphthalene
Diacetylene	Furan	Vinyl ethers

A test for peroxide should be performed

Class C: Unsaturated materials that may autopolymerize as a result of peroxide accumulation if inhibitors have been removed or are depleted.

Acrylic acid	Ethyl acrylate	Vinyl acetylene
Acrylonitrile	Methyl methacrylate	Vinyl chloride
Butadiene	Styrene	Vinyl pyridine
Chlorotrifluoroethylene	Vinyl acetate	

NOTE: These lists are illustrative but are not exhaustive

## APPENDIX 7 Incompatible Chemicals

The following are common examples of incompatible combinations:

Chemical	Keep out of contact with:
Acetic Acid	perchloric acid, nitric acid, chromic acid, hydroxyl compounds, peroxides, permanganates, glycols
Acetylene	chlorine, bromine, copper, fluorine, silver, mercury
Alkali Metals (e.g. Sodium)	water, chlorinated hydrocarbons, carbon dioxide, halogens
Ammonia, Anhydrous	mercury, chlorine, calcium hypochlorite, iodine, bromine, hydrofluoric acid
Ammonium Nitrate	acids, metal powders, flammable liquids, chlorates, nitrites, sulfur, finely divided combustible materials
Aniline	nitric acid, hydrogen peroxide
Bromine	same as chlorine
Carbon, Activated	calcium hypochlorite, all oxidizing agents
Chlorates	ammonium salts, acids, metal powders, sulfur, finely divided combustible materials
Chromic Acid	acetic acid, naphthalene, camphor, glycerin, turpentine, alcohol, flammable liquids
Chlorine	ammonia, acetylene, butadiene, butane, methane, propane (or other petroleum gases), hydrogen, sodium carbide, turpentine, benzene, finely divided metals
Copper	acetylene, hydrogen peroxide
Flammable Liquids	ammonium nitrate, inorganic acids, hydrogen peroxide, sodium peroxide, halogens, chromic acid
Hydrocarbons	fluorine, chlorine, bromine, chromic acid, sodium peroxide
Hydrofluoric Acid	anhydrous ammonia, ammonium hydroxide
Hydrogen Peroxide	copper, chromium, iron, most metals or their salts, alcohol, acetone, aniline, nitromethane, flammable liquids, oxidizing gases
Hydrogen Sulfide	fuming nitric acid, oxidizing gases
Iodine	acetylene, ammonia (aqueous or anhydrous), hydrogen
Mercury	acetylene, fulminic acid, ammonia
Nitric Acid	acetic acid, aniline, chromic acid, hydrocyanic acid, hydrogen sulfide, flammable liquids, flammable gases
Oxalic Acid	silver, mercury
Perchloric Acid	acetic anhydride, bismuth and its alloys, organic materials
Potassium	carbon tetrachloride, carbon dioxide, water
Potassium Chlorate	sulfuric and other acids
Potassium Permanganate	glycerin, ethylene glycol, benzaldehyde, sulfuric acid
Silver	acetylene, oxalic acid, tartaric acid, ammonia compounds
Sodium Peroxide	alcohol, glacial acetic acid, acetic anhydride, benzaldehyde, carbon disulfide, glycerin, ethylene, glycol, ethyl acetate, methyl acetate, furfural
Sulfuric Acid	potassium chlorate, potassium perchlorate, potassium permanganate (or compounds with similar light metals, such as sodium, lithium, etc.)

Consult the SDS and chemical labels for the chemicals in your location for additional information on incompatible chemicals.

## APPENDIX 8

### Storage Rules for Chemicals

#### Precautions for Chemical Storage

Follow these general guidelines for the storage of laboratory chemicals:

1. Label all chemical containers.
2. Read chemical labels carefully before storing a chemical. Storage information is usually provided on the product label or the chemical's Safety Data Sheet (SDS).
3. Provide a definite storage place for each chemical and return the chemical to that location after each use.
4. Avoid storing chemicals on bench tops. Limit such storage to those used frequently.
5. Avoid storing chemicals in chemical fume hoods, except for those chemicals in current use.
6. Store volatile or odoriferous chemicals in a ventilated cabinet or in the cabinet under a chemical fume hood.
7. If a chemical does not require a ventilated cabinet, store it inside a closable cabinet or on a shelf that has a lip on it.
8. Do not expose stored chemicals to heat or direct sunlight.
9. Separate chemicals into compatible groups and store alphabetically within compatible groups using the scheme listed in Appendix 8. Note: Some chemicals of the same category may be incompatible.
10. Consider the security needs for the chemicals being stored.
11. Store no more than 10 gallons of Flammable liquids outside an approved flammable storage cabinet. Use National Fire Prevention Association (NFPA) or Underwriters Laboratories (UL) approved storage cabinets for flammable liquids.
12. Flammable chemicals requiring refrigeration must **not** be stored in a standard refrigerator. Rather, use a "flammable storage" or an "explosion proof" refrigerator.
13. Use spill trays under containers of corrosive reagents (includes acids pH <3 and bases pH >10).
14. Do not store hazardous liquids or large objects on shelves above eye level.
15. Secure the lids of the bottles and containers.

#### Suggested Segregation for Chemical Storage

CHEMICAL GROUPING	STORAGE CONSIDERATIONS	EXAMPLES
<b>FLAMMABLE LIQUIDS &amp; SOLIDS</b>	Store in flammable liquid storage cabinet or in cabinets under fume hoods. Separate from oxidizing materials.	Acetone, Ethanol, Xylene
<b>NON-FLAMMABLE SOLVENTS</b>	Store in cabinet. Can be stored with flammable liquids. Separate from oxidizing materials.	Carbon tetrachloride, Ethylene glycol
<b>POISONS</b>	Separate from all other chemicals.	Sodium Cyanide, Methyl mercury
<b>CARCINOGENS:</b>	Separate from all other chemicals	Diazobenzidine
<b>CRYOGENIC GASES</b>	Store cylinder upright and secured to the wall/bench.	Cryogenic nitrogen
<b>ORGANIC ACIDS:</b>	Separate from mineral (inorganic) acids. Store in non-combustible cabinet. Separate from caustics, cyanides, sulfides.	Acetic acid, Formic acid
<b>INORGANIC ACIDS</b>	Separate from organic acids. Store in non-combustible cabinet. Separate from caustics, cyanides, sulfides.	Hydrochloric acid, Sulfuric acid

<b>OXIDIZING ACIDS</b>	Separate from other acids. Separate from flammables.	Nitric acid, Perchloric acid (this acid requires a special hood)
<b>BASES</b>	Store in dry area. Separate from acids.	Ammonium hydroxide, Sodium hydroxide, Amines
<b>WATER REACTIVE CHEMICALS</b>	Store in cool, dry location. Separate from aqueous solutions. Protect from fire quenching water.	Sodium, Lithium, Calcium hydride
<b>OXIDIZERS</b>	Store in non-combustible cabinet. Separate from flammable and combustible materials.	Sodium nitrate, Sodium hypochlorite, Potassium permanganate
<b>COMPRESSED GASES (Non-Oxidizing)</b>	Store upright in well ventilated area. Separate from oxidizing compressed gases.	Nitrogen, Hydrogen, Carbon Dioxide
<b>COMPRESSED GASES (Oxidizing)</b>	Store upright in a well ventilated area. Separate physically from flammable compressed gases.	Oxygen, Chlorine, Nitrous oxide
<b>SOLIDS (Non-volatile, Non-reactive)</b>	Store in cabinets or open shelves.	Agar, Sodium Chloride, Sodium bicarbonate
<b>PEROXIDIZABLE MATERIALS</b>	Store in a cool and dry location. Keep away from sunlight	See Appendix 4
<b>PYROPHORIC MATERIALS</b>	Ignites spontaneously in air. Store separately from flammable materials.	Phosphorus, sodium, tributylaluminum
<b>THERMALLY UNSTABLE MATERIALS</b>	Store in flammable storage or explosion-proof refrigerators.	See Appendix 5
<b>REPRODUCTIVE HAZARDS</b>	Separate from all other chemicals	Aniline, benzene, chloroform
<b>NANOMATERIALS</b>	Separate from all other chemicals	Fullerenes
<b>TOXIC SUBSTANCES</b>	Store in a cool, well ventilated area in an unbreakable secondary container. Keep away from light, heat, oxidizing agents, and moisture. Only a limited quantity should be present in a work location.	Beryllium, CDC Select Agents

## Unstable Chemicals

Some chemicals decompose, resulting in the formation of explosive products. For example, ethers and olefins form peroxides on exposure to air and light. Peroxides can form even if the containers have not been opened. These chemicals should be dated when received and unopened containers should be discarded after one year through the Environmental Compliance/Hazardous Waste Management Unit. See the Peroxidizable Compounds, Appendix 6, for additional information.

## Explosive Chemicals

Some chemicals may rapidly decompose or explode when struck, vibrated, agitated or heated. Some become shock sensitive with age. Refer to the label and the Safety Data Sheet to determine if a chemical has this property. Precautions include:

1. Write the date received/opened on all containers of explosive/shock-sensitive chemicals.
2. Discard opened containers after six months, and closed containers after one year.

3. Work with small quantities and always wear the appropriate PPE.

4. Examples of explosive chemicals include, but are not limited to:

Azides	Fulmates	Nitros, dinitros, trinitros
Acetylide	Hydroperoxides	Nitrosos
Amine oxides	Hypohalites	Ozonides
Chlorates	Metal alkyls	Perchlorates
Diazo cmpds.	N-haloamines	Peroxides
Diazonium cmpds.	Nitrates	Picrates, picryls

5. The following are materials known to be shock-sensitive / explosive:

Acetylides of heavy metals	Aluminum ophorite	Amatol
Ammonal	Ammonium nitrate	Ammonium perchlorate
Ammonium picrate	Benzoyl peroxide	Butly tetryl
Calcium nitrate	Copper acetylide	Cumene hydroperoxide
Cyanuric triazide	Cyclotrimethylenetrinitramine	Cyclotetramethylenetrinitramine
Dinitroethyleneurea	Dinitroglycerine	Dinitrophenol
Dinitrophenolates	Dinitrophenyl hydrazine	Dinitrotoluene
Dipicryl sulfone	Dipicylamine	Erythritol tetranitrates
Fulminate of mercury compounds	Fulminate of silver	Fulminating gold
Fulminating mercury	Fulminating platinum	Gelatinized nitrocellulose
Guanyl nitrosamino guanyltetrazene	Guanyl nitrosamino guanylidene hydrazine	Guanylidine
Heavy metal azides	Hexite	Hexanitrodiphenyl amine
Hexanitrostilbene	Hexogen	Hydrazinium nitrate
Hydrazoic acid	Lead azide	Lead mannite
Lead mononitroresorcinate	Lead picrate	Lead styphnate
Magnesium ophorite	Mannitol hexanitate	Mercury oxalate
Mercury tartrate	Mononitrotoluene	Nitroaminotetrozole
Nitrated carbohydrate	Nitrated glucoside	Nitrated polyhydric alcohol
Nitrogen trichloride	Nitrogen triiodide	Nitroglycerin
Nitroglycide	Nitroglycol	Nitroguanidine
Nitroparaffins	Nitronium perchlorate	Nitrosoguanidine
Nitrourea	Organic amine nitrates	Organic nitramines
Organic peroxides	Picramic acid	Picramide
Picratol	Picric acid	Picryl chloride
Picryl fluoride	Polynitro aliphatic compounds	Potassium nitrate
Potassium nitroaminotetrazole	Raney Nickel Catalyst	Silver acetylide
Silver azide	Silver styphnate	Silver tetrazene
Sodatol	Sodium amatol	Sodium dinitro-ortho-cresolate
Sodium nitrate	Sodium picramate	Syphnic acid
Tetrazene	Tetranitrocarbazole	Tetrytol



Trimonite	Trinitroanisole	Trinitrobenzene
Trinitrobenzoic acid	Trinitrocresol	Trimethylolethane
Trinitronaphthalene	Trinitrophenetol	Trinitrochloroglucinol
Trinitrotoluene	Trinitroresorcinol	Tripyridine
Tritonal	Urea nitrate	

This list is provided as a guide and is not all inclusive. Carefully review Safety Data Sheets before working with chemicals.

## APPENDIX 9

### Chemical Abbreviations

OSHA and EPA regulations require all chemical containers be labeled. To assist lab personnel in the identification of laboratory prepared solutions, the following abbreviations were approved by the University Chemical Hygiene Officer. The hazards are based on the pure materials. The chemicals may pose a lesser hazard when they are diluted with water.

Those who use abbreviations must print this appendix and place it onto the lab's SOP Manual or in a prominent location in the lab. Any additional abbreviations can be added on the last page. NOTE: The researchers must enter all the required information into the columns provided.

The National Fire Protection Association (NFPA) rates the hazard of a chemical on a scale of 0 to 4 (0 is no hazard and 4 is severe hazard). The hazards include:

H = health hazard

F = fire hazard

R = reactivity

Special hazards (example, OX = oxidizing hazard).

CHEMICAL / SOLUTION NAME	ABBREVIATION	HAZARD WARNING	NFPA RATING	GHS HAZARD
5-Bromo-4-Chloro-3-Indolyl Beta-D-Galactopyranoside	X-gal	Irritation to eyes/skin/respiratory tract/digestive tract	H1 F1 R0	
Acetic Acid	CH <sub>3</sub> COOH	Corrosive. Irritation to eyes/skin/respiratory tract	H3 F2 R0	
Amino Ethyl Carbazole	AEC	Carcinogen. Irritation to eyes/skin/respiratory tract	H2 F1 R0	
Ammonium Acetate	NH <sub>4</sub> OAC	Irritation to eyes/skin/respiratory tract	H1 F1 R1	
Ammonium Bicarbonate	NH <sub>4</sub> HCO <sub>3</sub>	Irritation to eyes/skin	H1 F0 R0	
Ammonium Chloride	NH <sub>4</sub> Cl	Irritation to eyes/skin	H2 F0 R0	
Ammonium Hydroxide	NH <sub>4</sub> OH	Corrosive to eyes/skin	H3 F1 R0	
Ampicillin	Amp	May cause allergic skin reaction	----	
Beta-Mercaptoethanol, 2-Mercaptoethanol	BME	Flammable. Severe irritation to eyes/skin/respiratory tract	H3 F2 R1	
Bleach (10% diluted solution)	10% bleach	Irritation to eyes/skin	H1 F0 R1	
Bovine Serum Albumin	BSA	-----	H0 F0 R0	No hazard
Bromophenol Blue	BPB	-----	H0 F0 R0	No hazard
Calcium Chloride	CaCl <sub>2</sub>	Irritation to eyes/skin/respiratory tract	H2 F0 R2	
Carbenicillin	Carb	Irritation to eyes/skin/respiratory tract. Sensitization.	H2 F0 R2	
Cesium Chloride	CsCl	Irritation to eyes/skin/respiratory tract	H2 F0 R0	
Chloroform	CHCl <sub>3</sub>	Carcinogen. Irritation to eyes/skin/respiratory tract	H2 F0 R0	
Diaminobenzidine	DAB	Carcinogen. Irritation to eyes/skin/respiratory tract	H2 F0 R0	
Dimethylformamide	DMF	Irritation to eyes/skin/respiratory tract	H2 F2 R0	

Dimethyl Sulfoxide	DMSO	Irritation to eyes/skin	H2 F1 R0	
Dulbecco's Phosphate Buffer Saline	DPBS	No information available	H0 F0 R0	No hazard
EBC Lysis Buffer	EBC	Irritation to eyes		
Ethanol	EtOH	Flammable. Irritation to eyes/skin/respiratory tract	H2 F3 R0	 
Ethidium Bromide	EtBr	Irritation to eyes/skin/respiratory tract	H2 F1 R0	
Ethylenediaminetetraacetic Acid	EDTA	Mild Irritation to eyes/skin/respiratory tract	H2 F1 R0	
Fetal Bovine Serum	FBS	Irritation to eyes/skin/respiratory tract.	H0 F0 R0	
Glucose-Tris-EDTA	GTE	Irritation to eyes/skin/respiratory tract.	H2 F0 R0	
Guanidinium thiocyanate-Tris-Sarcosyl Buffer	GTC Buffer	Irritant to eyes/skin/respiratory tract.	H2 F0 R0	
Hydrochloric Acid	HCl	Corrosive. Burns to eyes/skin/respiratory tract	H3 F0 R1	
Hydrofluoric Acid	HF	Corrosive. Burns to eyes/skin/respiratory tract	H4 F0 R0	
Hydrogen Peroxide	H <sub>2</sub> O <sub>2</sub>	Oxidizer. Burns to eyes/skin	H3 F0 R1 OX	
Hygromycin	Hygro	Antibiotic	H3 F0 R0	 
Isopropyl beta-D-thiogalactopyranoside	IPTG	Contains material believed to be carcinogenic, eye & respiratory irritant	H2 F0 R0	 
Kanamycin	Kan	Antibiotic	H1 F0 R0	 
Luria-Bertani Medium	LB		H0 F0 R0	No hazard
M9 Salts	M9Salts		H0 F0 R0	No hazard
M9 Terrific Broth	M9TB		H0 F0 R0	No hazard
M9Luria Broth	M9LB		H0 F0 R0	No hazard
Magnesium Acetate	MgOAC	Mild Irritation to eyes/skin/respiratory tract	H1 F1 R0	
Magnesium Chloride	MgCl <sub>2</sub>	Irritation to eyes/skin	H2 F0 R0	
Magnesium Sulfate	MgSO <sub>4</sub>	Irritation to respiratory tract	H1 F0 R0	
Methanol	MeOH	Flammable. Poison. Irritation to eyes, skin, & respiratory tract	H2 F3 R0	  
N,N-Dimethyl Formamide	DMF	Flammable. Strong Irritation to eyes/skin/respiratory tract	H2 F2 R0	 
N-2-Hydroxyethylpiperazine-N'-2-ethanesulfonic acid	HEPES		H0 F0 R0	No hazard
Neomycin	Neo	May cause allergic skin reaction	----	
Paraformaldehyde Fixative	PFA	Severe Irritation to eyes/skin/respiratory tract, carcinogen	H3 F3 R1	 
Phenylmethylsulfonyl Fluoride	PMSF	Severe Irritation to eyes/skin/respiratory tract	H3 F1 R2	
Phosphate Buffered Saline	PBS	May cause irritation	H1 F0 R0	

Phosphate Buffered Saline-Tween	PBST, PBS-Tween	Irritation to eyes/skin/respiratory tract	H1 F0 R0	
Piperazine-N, N'-bis[2-ethanesulfonic acid]	PIPES	Irritation to eyes/skin/respiratory tract	H1 F1 R0	
Polyacrylamide Gel Electrophoresis Running Buffer	PAGE Running Buffer	Irritation to eyes/skin/respiratory tract	H1 F0 R0	
Polyacrylamide Gel Electrophoresis Transfer Buffer	Page Transfer Buffer	Irritation to eyes/skin/respiratory tract	H1 F0 R0	
Polyethylene Glycol	PEG	Irritation to eyes and skin	H1 F1 R0	
Polyvinyl Alcohol	PVA, PVOH	Irritation to skin	H0 F2 R0	
Potassium Acetate	KOAc	Mild Irritation to eyes/skin/respiratory tract	H2 F1 R0	
Potassium Chloride	KCl	Mild Irritation to eyes/skin/respiratory tract	H0 F0 R0	
Potassium Hydroxide	KOH	Corrosive. Burns to eyes/skin/respiratory tract	H3 F0 R1	
Potassium Iodide	KI	Irritation to eyes/skin/respiratory tract	H1 F0 R0 OX	
Potassium Phosphate, Dibasic	K <sub>2</sub> HPO <sub>4</sub>	Mild Irritation to eyes/skin/respiratory tract	H1 F0 R0	
Potassium Phosphate, Monobasic	KH <sub>2</sub> PO <sub>4</sub>	Mild Irritation to eyes/skin/respiratory tract	H1 F0 R0	
SOB Medium	SOB	No known hazard	H0 F0 R0	No hazard
SOC Medium	SOC	No known hazard	H0 F0 R0	No hazard
Sodium Acetate	NaOAc	Mild irritation to eyes/skin/respiratory tract	H0 F1 R0	
Sodium Azide	NaN <sub>3</sub>	Poison. Irritation to eyes	H3 F1 R0	
Sodium Bicarbonate	NaHCO <sub>3</sub>	Irritation to eyes/skin/respiratory tract	H1 F0 R1	
Sodium Carbonate	Na <sub>2</sub> CO <sub>3</sub>	Corrosive. Burns to eyes/skin/respiratory tract	H3 F0 R1	
Sodium Chloride	NaCl, Saline	Irritation to respiratory tract	H1 F0 R0	
Sodium Citrate	NaCitrate	Irritation to eyes/skin/respiratory tract	H1 F1 R0	
Sodium Dodecyl Sulfate	SDS	Irritation to eyes/skin/respiratory tract	H2 F1 R0	
Sodium Fluoride	NaF	Toxic (reproductive effects, mutagenic). Irritation to eyes/skin/respiratory tract	H3 F0 R0	
Sodium Hydroxide	NaOH	Corrosive. Burns to eyes/skin/respiratory tract	H3 F0 R1	
Sodium Lauryl Sulfate	SLS	Irritation to eyes/skin/respiratory tract	H1 F1 R0	
Sodium Phosphate, Monobasic	NaH <sub>2</sub> PO <sub>4</sub>	Irritation to eyes/skin/respiratory tract	H2 F0 R0	
Sodium Phosphate, Dibasic	Na <sub>2</sub> HPO <sub>4</sub> , DSP	Mild Irritation to eyes/skin/respiratory tract	H1 F0 R0	
Saline Sodium Citrate	SSC	Irritation to eyes/skin/respiratory tract	H2 F1 R0	
Sulfuric Acid	H <sub>2</sub> SO <sub>4</sub>	Corrosive. Burns to eyes/skin/respiratory tract	H3 F0 R2	



## APPENDIX 10

### Important Phone Numbers and Safety Information

Instructions: Print out this page and post it in a location within the laboratory. The information is a useful guide for all laboratory personnel.

#### Important Phone Numbers

UNIT	NUMBER
Public Safety	x13 (Emergency) x5-3333 (non-emergency)
Medical Assistance (UHS Medical Center 1-5000)	x5-1164 or x5-4955
EH&S	x5-3241
Poison Center	1-800-222-1222
Laboratory Safety Unit	x5-2402
Environmental Compliance/Hazardous Waste	x5-2056
Occupational Safety Unit	x5-3241
Radiation Safety Unit	x5-3781

#### Safety Information

The first three rows must be filled in by departmental personnel.

UNIT	LOCATION OF INFORMATION
Lab Manager / Laboratory Safety Officer:	
Safety Data Sheets (SDS) available at room #:	
Chemical Inventory at/in room:	
Emergency Chemical Exposure Information	Poison Center 1-800-222-1222
Safety Policies (electronic):	<a href="http://www.safety.rochester.edu/policies.html">http://www.safety.rochester.edu/policies.html</a>

#### EPA Hazardous Waste Requirements

1. A “hazardous waste” is any chemical or chemical mixture that is an EPA listed waste or has characteristics of ignitability, corrosivity, toxicity, or reactivity.
2. Label all hazardous waste containers “HAZARDOUS WASTE” and other words that identifies the contents of the container.
3. Place all hazardous waste in a labeled “Hazardous Waste Satellite Accumulation Area”, located in the same room as the point of generation.
4. Keep hazardous waste containers closed except when adding wastes.
5. Do not drain dispose hazardous waste.
6. Place hazardous waste containers in secondary containment trays.
7. Place a waste tag on the chemical waste container just prior to disposal of the container through the Environmental Compliance/Hazardous Waste Unit.
8. Call Hazardous Waste (x5-2056) when a pickup is required.

**Questions about hazardous waste? Contact Environmental Compliance/Hazardous Waste at x5-2056.**

## APPENDIX 11

### Low Risk Spills (Minor Spills)

Many hazardous substances necessitate special clean-up procedures to minimize hazards to clean-up personnel. Spills can be classified as either a minor clean-up procedure or a major spill. Some chemicals may present potential adverse health effects unless the proper actions are taken. Major spill clean-up should not be attempted by laboratory personnel. If personnel are present at the time of a major spill and a spill kit is readily available, the contents of the kit can be emptied onto the spill to help stabilize the spill until the Spill Team arrives. Contact Public Safety (x13) to activate the University's Spill Response Team.

**Minor spill, also called “Low Risk Spills”,** do not expose laboratory employees to over-exposures because they present a lower hazard to personnel. These “Low Risk Spills” can be cleaned up immediately by the laboratory staff wearing the appropriate PPE.

#### HOW TO CLEAN UP A SMALL “LOW RISK” LIQUID SPILL

##### Introduction:

This procedure is for the cleanup of “low risk” liquid chemical spills of less than 1 gallon (4 liters). **Waste collected from “low risk” spills must be packaged and disposed of through the Environmental Compliance/Hazardous Waste Unit (only exception is water).**

**CAUTION: This procedure is NOT to be used to clean up any liquid that is not listed as a “low risk” chemical. Trained laboratory staff must follow the information listed below and observe any special notes listed for the chemical.**

##### Location of Spill Supplies:

The Lab Manager / Laboratory Safety Officer of each lab complex shall have a supply of spill cleanup supplies to absorb or neutralize spilled materials.

##### Spill supplies:

Absorbent materials or neutralizers:

Speedy-Dri (general absorber, including flammable liquids))

Absorbent pads or pillows (general absorber)

Boric acid (for base spills, pH > 9)

Sodium bicarbonate (for many acids, pH < 5)

Plastic scoop or scraper

Plastic bucket or drum or large trash bag for waste (handle as hazardous waste)

Hazardous waste tag

##### PPE:

All personnel cleaning spills are to wear chemical protective gloves (double glove), safety glasses or face shield, and clothing covers (lab coat or Tyvec suit). Personnel can always utilize additional PPE.

## 10 STEP “LOW RISK” LIQUID SPILL PROCEDURE:

NOTE: If the quantity of the spilled materials exceeds the listed volume of the chemical, do not go further. Evacuate the area, close the door, and contact Public Safety at x13 for the University Spill Team.

1	Evacuate all personnel from spill area.
2	Gather all necessary PPE and cleanup supplies.
3	Determine planned actions to minimize time in spill area.
4	Put on protective gloves, safety glasses or face shield, lab coat or Tyvec suit.
5	Secure liquid spill source if still leaking.
6	Contain spill by covering with neutralizer, absorbent, pad or pillow. Use generous quantity so no visible liquid is visible. Use plastic scoop to assist in covering spill.
7	Place contaminated sorbent materials into waste container (large plastic bag, plastic bucket, etc.). Take off outer gloves and place in waste container. Seal waste container.
8	Surface clean area of spill with detergent/water to remove residual chemicals.
9	Label waste container and place into Hazardous Waste Satellite Accumulation Area.
10	Remove PPE and wash hands thoroughly with soap and water.

## HOW TO CLEAN UP A SMALL “LOW RISK” SOLID SPILL

### Introduction:

This procedure is for the cleanup of “low risk” solid chemical spills of less than 8 pounds (4 kilograms). **Waste collected from “low risk” spills must be packaged and disposed of through the Hazardous Waste Management Unit.**

**CAUTION: This procedure is NOT to be used to clean up any solid that is not listed as a “low risk” chemical. Trained laboratory staff must follow the information listed below and observe any special notes listed for the chemical. If chemical “dusts” may be generated, personnel may need to wear an N95 respirator (must be enrolled in the University’s Respirator Program).**

### Location of Spill Supplies:

The Lab Manager /Laboratory Safety Officer of each lab complex shall have a supply of spill cleanup supplies to absorb or neutralize spilled materials.

### Spill supplies:

Plastic scoop or scraper  
Plastic bucket or drum or large trash bag for waste  
Hazardous waste tag

### PPE:

All personnel cleaning spills are to wear chemical protective gloves (double glove), safety glasses or face shield, and clothing covers (lab coat or Tyvec suit). Personnel may always elect to wear additional PPE.



## 10 STEP “LOW RISK” SOLID SPILL PROCEDURE:

1	Evacuate all personnel from spill area.
2	Gather all necessary PPE and cleanup supplies.
3	Determine planned actions to minimize time in spill area.
4	Put on nitrile gloves, safety glasses or face shield, lab coat or Tyvec suit.
5	Scoop or <b>gently</b> brush up solid material <b>while minimizing dust generation</b> . Solids that do not react with water can be sprayed with a water mist. Place collected material into waste container. <b>NEVER</b> use vigorous dry sweeping actions to remove spilled materials.
6	Wipe down contaminated material with a damp mop, paper towels or lab wipes.
7	Using paper towels, surface clean area of spill with detergent/water to remove residual chemicals.
8	Place paper towels/wipes and gloves into waste container.
9	Label waste container and place into Hazardous Waste Satellite Accumulation Area.
10	Remove PPE and wash hands thoroughly with soap and water.

## LIST of “LOW RISK” CHEMICAL

### For Small Spill Clean Ups

NOTE: The information found in the listings below is believed to be correct. Always obtain and read the SDS for the chemical to verify the hazard rating of the chemical and obtain additional supplemental information to clean up small-scale chemical spills.

“Low Risk” COMPOUND	CAS NO.	Health	Fire	Reactivity	Special Notes
Acetone	67641	1	3	0	Vaporizes quickly. Add absorbent immediately. Remove any open flames. Limit small spill responses to <1 liter.
Agar	9002180	0	1	0	
Albumin (human)	70024907	1	0	0	Handle as biohazard
Alconox	1025000	0	0	0	
Aldicarb	116063	1	0	1	
Alumina (aluminum oxide)	1344281	1	0	0	
Amino acetic acid	56406	1	1	0	
Aluminum sulfate	7784318	1	0	0	
Ammonium acetate	631618	2	1	0	
Ammonium benzoate	1863634	1	0	0	
Ammonium bitartrate	2214422	1	0	0	
Ammonium bromide	12124979	1	0	0	
Ammonium chloride	12125029	1	0	0	
Ammonium citrate	3012655	1	0	0	
Ammonium persulfate	7727540	1	3	0	
Ammonium sulfate	7783202	1	0	0	
Ammonium thiosulfate	7783188	0	0	2	
Amyl alcohol, n-	71410	1	3	0	

<b>“Low Risk” COMPOUND</b>	<b>CAS NO.</b>	<b>Health</b>	<b>Fire</b>	<b>Reactivity</b>	<b>Special Notes</b>
Amyl benzene, n-	538681	1	2	1	
Amyl butyrate, n-	540181	0	2	0	
Amyl ether	693652	1	2	0	
Amyl lactate	6382065	1	2	0	
Amyl laurate	5350038	0	1	0	
Amyl naphthalene	1320270	0	1	0	
Amyl phenyl phenyl ether	70289360	0	2	0	
Amyl salicylate	2050080	0	1	0	
Amyl stearate	6382134	0	1	0	
Amylcyclohexane	4292926	1	0	0	
Anisole	100663	1	2	0	
Antifreeze	107211	1	1	0	
Ascorbic acid	50817	1	1	0	
Bactopeptone	51142188	1	1	0	
Barium carbonate	513779	1	0	0	
Barium chloride	10326279	1	0	0	
Barium nitrate	10022318	2	0	0	
Barium sulfate	7727437	1	0	0	
Bentonite	1302789	0	0	0	
Benzoic acid	65850	2	1	0	
Benzyl alcohol	100516	2	1	0	
Benzyl benzoate	120514	1	1	0	
Benzyl ether	103504	0	1	0	
Benzyl salicylate	118581	0	1	0	
Bis(2-ethylhexyl) maleate	142165	1	1	0	
Bis(2-ethylhexyl)succinate	2915573	0	1	0	
Bleach	7778543	2	0	0	
Boric acid	10043353	1	0	0	
Buffer solutions (for pH, all)	Multiple	1	0	0	
Butanediol, 1,2-	584032	1	2	0	
Butanediol, 1,3-	107880	1	1	0	
Butanediol, 1,4-	110634	1	1	0	
Butanediol, 2,3-	513859	1	1	0	
Butene-1,4-diol, 2-	110656	1	1	0	
Butyl alcohol	71363	1	3	0	
Butly oleate, n-	142778	0	1	1	
Butylstearate	123955	0	1	0	
Butylbenzylphthalate	85687	1	1	0	
Butylene glycol, 1,3-	107880	1	1	0	
Butyrolactone	96480	1	2	0	
Calcium carbonate	471341	2	0	0	
Calcium chloride	10043524	1	0	0	
Calcium oxide	1305788	1	0	0	
Calcium sulfate	7778189	0	0	0	
Carnauba wax	8015869	1	1	0	
Castor oil	8001794	1	1	0	
Cellulose acetate	9004357	1	0	0	
Cesium chloride	7647178	1	1	0	
Citric acid	77929	2	1	0	
Cobalt naphthenate	61789513	1	2	0	

<b>“Low Risk” COMPOUND</b>	<b>CAS NO.</b>	<b>Health</b>	<b>Fire</b>	<b>Reactivity</b>	<b>Special Notes</b>
Cod liver oil	8001692	0	1	0	
Copper carbonate	1184641	1	0	1	
Corn oil	8001307	0	1	0	
Cresyl acetate, p-	140396	1	2	0	
Cupric acetate	6046931	0	0	0	
Cupric chloride	13933170	0	0	0	
Cupric nitrate	19004194	0	0	0	
Cupric sulfate	7758997	2	0	0	
Cyclopentanol	96413	1	2	0	
Decane	124185	1	2	0	
Decane, 1-	872059	0	2	0	
Developer, Photo (working solutions)	Mixture	1	0	0	Concentrates are not low risk
Dextran	9004540	0	1	0	
Dextrose	50997	0	1	0	
Diatomaceous earth	68855549	0	0	0	
Diethyl maleate	141059	1	1	0	
Diethyl malonate	105533	1	2	0	
Diethyl succinate	123251	1	2	0	
Diethylene glycol dimethyl ether	111966	1	2	1	
Diethylene glycol monobutyl ether acetate	124174	1	1	0	
Diethylene glycol monomethyl ether	111773	1	2	0	
Diisodecyl phthalate	26761400	0	1	0	
Diisooctyl phthalate	27554263	1	1	0	
Diisopropylbenzene, 1,3-	99627	0	2	0	
Dimethyl sebacate	106796	1	1	0	
Dimethyl sulfoxide	67685	2	1	0	Rapidly absorbed through skin, use caution if mixed with other chemicals.
Dimethyl terephthalate	120616	1	1	0	
Diphenyl phthalate	84628	1	1	0	
Diphenylethane	103297	0	1	0	
Diphenylmethane	101815	1	1	0	
Dipropylene glycol	110985	1	1	0	
Dodecane	112403	1	2	0	
Dodecyl benzene	25265785	1	1	0	
Drierite	7778189	1	0	0	
Ethoxy benzene	103731	0	2	0	
Ethyl acetamide	625503	0	1	0	
Ethyl alcohol	75175	0	3	0	Vaporizes quickly. Add absorbent immediately. Remove any open flames. Limit small spill responses to <1 liter.
Ethyl benzoate	93890	1	1	0	
Ethyl benzoyl acetate	94020	0	2	0	
Ethyl butyrylacetate	123660	1	2	0	
Ethyl malonate	105533	1	2	0	
Ethyl oxalate	95921	1	2	1	
Ethyl phenylacetate	101973	0	1	1	

<b>“Low Risk” COMPOUND</b>	<b>CAS NO.</b>	<b>Health</b>	<b>Fire</b>	<b>Reactivity</b>	<b>Special Notes</b>
Ethylacetamide, N-	65503	0	1	0	
Ethylene glycol	107211	1	1	0	
Ethylene glycol diacetate	111557	1	2	0	
Ethylene glycol monoacetate	542596	0	1	0	
Ethylhexanoic acid, 2-	149575	1	1	0	
Ethyl-naphthalene, 2-	1317379	1	0	1	
Fixer (working solution)	Multiple	1	0	0	Concentrates are not low risk
Formalin (10% formaldehyde)	500000	2	2	0	Only if under 250 ml volume
Gelatin	9000708	0	0	0	
Glucose	50997	1	0	0	
Glucericine	56815	1	1	0	
Glycerol	56815	1	1	0	
Glycerol triacetate	102761	0	1	0	
HEPES	7365459	1	1	1	
Heptanol	543497	0	2	0	
Hexadecane	544763	1	1	0	
Hexanedione, 2,5-	110134	1	2	0	
Hexyl methacrylate	142096	0	2	0	
Hydroxybenzaldehyde, 4-	123080	0	2	0	
Iron oxide	1309382	0	0	0	
Isoamyl alcohol	123513	1	2	0	
Isopropyl alcohol	67630	1	3	0	Vaporizes quickly. Add absorbent immediately. Remove any open flames. Limit small spill responses to <1 liter.
Lactic acid	50215	2	0	0	
Lactic acid, methyl ester	547648	1	2	0	
Lanolin	8006540	1	1	0	
Linseed oil	8001261	1	1	0	
Lithium carbonate	554132	1	0	0	
Lithium sulfate	10377487	2	0	0	
Magnesium	7439954	0	1	1	
Magnesium carbonate	23389335	1	0	0	
Magnesium chloride	7791186	1	0	0	
Magnesium nitrate	102213157	1	0	0	
Magnesium oxide	1309484	1	0	0	
Magnesium sulfate	7487889	1	0	0	
Manganous sulfate	10034965	1	0	0	
Mercury	7439976	2	0	0	Thermometers only! Follow mercury thermometer clean up procedure
Methanol	67561	1	3	0	Vaporizes quickly. Add absorbent immediately. Remove any open flames. Limit small spill responses to <1 liter.
Methyl benzoate	93583	1	2	0	
Methyl lactate	27871494	1	2	0	
Methyl styrene, 4-	622979	0	2	1	
Methylene blue	7220793	1	1	0	

<b>“Low Risk” COMPOUND</b>	<b>CAS NO.</b>	<b>Health</b>	<b>Fire</b>	<b>Reactivity</b>	<b>Special Notes</b>
Mineral oil	8012951	0	1	0	
Octadecane	593453	1	1	0	
Octanol, 2-	123966	1	2	0	
Oleic acid	112801	1	1	0	
Olive oil	8001250	0	1	0	
Pentanediol, 1,4-		1	1	0	
Pentanediol, 1,5-	111295	1	1	0	
Pentanol, 1-	71410	3	3	0	Vaporizes quickly. Add absorbent immediately. Remove any open flames. Limit small spill responses to <1 liter.
Pentanol, 3-	584021	1	2	0	
Peptones	73049737	1	1	0	
Petroleum sulfonate	4719044	0	1	0	
Phenol, red	43748	1	1	0	
Phenyl acetate	122792	1	2	0	
Phenyl propyl alcohol, 1-	93549	0	1	0	
Phenylacetic acid	103822	1	1	0	
Phenyldiethanolamine, N-	120070	1	1	0	
Phosphate Buffer Solution (PBS)	Multiple	0	0	0	
Photo developer (working solution)	Multiple	1	0	0	Concentrates are not low risk
Photographic fixer (working solution)	Multiple	1	0	0	Concentrates are not low risk
Phthalic acid	88993	1	1	0	
Polyethylene glycol	25322683	1	1	0	
Polyvinyl alcohol	9002895	0	2	0	
Potassium acetate	127082	0	1	0	
Potassium bitartrate	868144	1	0	0	
Potassium bromated	7758012	0	0	0	
Potassium chloride	7447407	1	0	0	
Potassium ferricyanide	13746662	1	0	0	
Potassium iodide	7681110	2	0	0	
Potassium nitrate	7757791	0	0	0	
Potassium permanganate	7722647	1	0	0	
Potassium phosphate (mono, di, and tri basic)	Multiple	1	0	0	
Potassium sodium tartrate	6381595	0	1	0	
Potassium sulfate	7778805	0	1	0	
Potassium tartrate	921539	0	0	0	
Propanediol, 1,2-	57556	0	1	0	
Propanediol, 1,3-	504632	1	2	0	
Propanol (all isomers)	Multiple	1	3	0	Vaporizes quickly. Add absorbent immediately. Remove any open flames. Limit small spill responses to <1 liter.
Propylene carbonate	108327	1	1	1	
Propylene glycol	57556	0	1	0	
Pump oil	Multiple	1	1	0	
Sand	Multiple	0	0	0	No quantity limit

<b>“Low Risk” COMPOUND</b>	<b>CAS NO.</b>	<b>Health</b>	<b>Fire</b>	<b>Reactivity</b>	<b>Special Notes</b>
Silica gel	1343982	1	0	0	
Salicylaldehyde	90028	0	2	0	
Salicylic acid	69727	1	1	0	
Sodium bicarbonate	144558	0	0	0	
Sodium carbonate	497198	1	0	0	
Sodium chloride	7647145	0	0	0	
Sodium citrate	6132043	1	1	0	
Sodium nitrate	7631994	0	0	0	
Sodium phosphate, di basic and mono basic	Multiple	1	0	0	
Sodium sulfate	7757826	0	0	0	
Sodium thiosulfate	10102172	1	0	0	
Starch (all)	Multiple	0	0	0	
Stearic acid	57114	1	1	0	
Sucrose	57501	0	1	0	
Tannic acid	1401554	1	1	0	
Tartaric acid	133379	0	1	0	
Tetradecane	629594	1	1	0	
Tetradecanol, 1-	112721	0	1	0	
Tetradecene, 1-	1120361	0	1	0	
Tetraethylene glycol	112607	1	1	0	
Tetrahydronaththalene, 1,2,3,4-	119642	1	2	0	
Tetralin	119642	1	2	0	
Tetramethoxypropane,	102523	0	2	0	
Tetramethylbenzene, 1,2,3,4-	488233	0	2	0	
Tetramethylbenzene, 1,2,3,5-	527537	1	2	0	
Tetramethylbenzene, 1,2,4,5-	95932	0	2	0	
Toner (for copiers)	Multiple	0	1	0	
Triacetin	102761	0	1	0	
Tributyl citrate	77930	1	1	0	
Tridecanone	593088	1	1	0	
Triethanolamine	102716	1	1	1	
Triethyl citrate	77930	1	1	0	
Triethyl phosphate	78400	1	1	1	
Triethylene glycol	112276	1	1	0	
Triethylene glycol dimethyl ether	112492	1	1	0	
Trimethyl-1,3-pentanediol, 2,2,4-	144194	1	1	0	
Trimethylene glycol	504632	1	2	0	
Triphenyl phosphate	78400	1	1	1	
Triethylene glycol	112276	1	1	0	
Triethylene glycol dimethyl ether	112492	1	1	0	
Trimethyl-1,3-pentanediol, 2,2,4-	144194	1	1	0	
Trimethylene glycol	504632	1	2	0	
Triphenyl phosphate	101020	0	1	0	
Triphenylmethane	519733	0	1	0	
Tripropylene glycol	24800440	0	1	0	
TRIS	1185531	0	0	0	

<b>“Low Risk” COMPOUND</b>	<b>CAS NO.</b>	<b>Health</b>	<b>Fire</b>	<b>Reactivity</b>	<b>Special Notes</b>
Triton ® X-100	9002931	1	0	0	
Tryptone	73049737	1	1	0	
Undecane	1120214	1	2	0	
Vacuum pump oil	Multiple	1	1	0	
Water	7732185	0	0	0	
Wax, paraffin	8002742	0	1	0	
Zinc	7440666	2	0	1	
Zinc acetate	5970456	2	0	0	
Zinc oxide	1314132	1	0	0	
Zinc nitrate	7779886	1	0	0	
Zinc stearate	557051	0	1	0	